Carbonpunk 2170

NB: Carbonpunk is named as such due to the centrality of carbon-based ‘wonder materials’ to this universe. Imagine ‘steampunk’ or ‘cyberpunk’ but the central theme isn’t steam power or dystopian futuristic tech- it is the application of carbon compounds to attain technological achievements.

## Disclaimers

**It’s important to note that whilst Carbonpunk 2170 started as a legitimate prediction of the future, it’s now less that and more realistic sci fi based on research.** But it is still sci fi- fiction. Many concepts here are present because I find them interesting- WWIII, WWIV, starships, electromuscular suits. I think everything here is *possible*- it’s a believable expression of how the future might turn out. It’s entirely possible that directed-energy weapons may supplement the Iron Dome and be able to neutralise nuclear WMDs before they get in range. Whether it is likely- even, in some cases, whether it’s realistic- is completely different. I think the vast majority of what’s here is realistic, but my mindset whilst making this was ‘it doesn’t have to be realistic, just believable’, so if it isn’t realistic, then that’s fine as I’m willing to prioritise writing something interesting over writing some realistic.

At the same time, a *lot* of research went into this and a lot of what is predicted is an extrapolation from previous data. This applies to economics as well. The economics of all these countries is based off of extrapolation of previous data and the views of professional economists. Based on these factors, I think it’s very likely that, for example, Mexico and Indonesia will be developed countries by 2100 and some of the world’s wealthiest. But I can’t know that for *certain*- there are a thousand other variables that I can’t afford for. I say in this document that Bangladesh is going to see significant increases in wealth and development over the 21st century. I say that because I’m extrapolating from previous data and judging it from the views of professional economists. But I can’t actually *know*, and it’s even harder to predict exactly how developed/wealthy Bangladesh will be by 2100. In this document I therefore generally abstain from giving comparative figures, and the comparative figures I do give are really just rough estimates.

Neither can I give you detailed mechanics for *how* Bangladesh grows its economy, because I’m not an economist. I think it’s reasonable and likely to say that by 2100, Bangladesh will be a high-income country and probably developed. But I don’t know for certain. Bangladesh is just being used as an example here, of course- the same principles apply to other countries. I’m also aware that it is much easier for a country to graduate from low to middle income than from middle to high income. This document assumes that in order for countries like Indonesia, for example, to make this transition, economic changes are accompanied by institutional and governmental changes.

The main idea of this particular disclaimer is that I am neither an economist nor a time-traveller. Whilst everything here is based in extensive research, what you’re seeing is extrapolation + professionals’ views filtered through the lens of me writing an interesting document. Do I realistically think Brazil will be a high-income, developed country by 2100? Yes, certainly. I’ve made all these kinds of predictions because I believe in them *to some extent*. But, also, I just think it would be interesting if the developed world expanded outside Europe. I think it would be interesting if Brazil, Indonesia, Russia, China, Mexico, Taiwan, and the UAE became developed. I think that it is very likely/likely that these countries will actually be developed by 2100- these predictions are based on belief. But be aware that there’s an element of creative license here, and as I said earlier a big element of uncertainty.

Another disclaimer concerns political and historical events. All of these are, I think, possible, and, with the way I’ve explained them, (hopefully) believable. But this is not the same as being realistic. Take a conventional WWIII for example. I absolutely believe it is possible that directed-energy weapons will develop to the point where they can be used with conventional missiles to neutralise WMDs before they’re in range. Already, many countries are experimenting with DEWs. Already, tests have shown that DEWs can be effective as air defence tools. Already, technologies like the Nautilus technology have seen some success and attention. Extrapolating from the idea of DEWs gaining more funding and capabilities, by 2080 it may well be that they are advanced enough to neutralise WMDs and thus end the threat of MAD. I do believe it is possible, and I do believe it is believable. I do not think that WWIII, at least in my lifetime, is going to *happen*, however. The main reason for my including it was just…it’s interesting.

I’ll give another example: the Ganges Water Crisis. I think it’s possible and believable. China are already damming rivers that lead into India- e.g. the Brahmaputra River. Sino-Indian relations are already sour. I think it’s reasonable to extrapolate from this and say damming gets worse and relations get worse. Again, I can’t be certain- there are a thousand unpredictable variables that may get in the way. But I think it is *possible*. The prospect of a water war in Asia cannot be ignored. Do I think that damming/poor relations/water scarcity will specifically manifest themselves into the Ganges Water Crisis? No. But I think an escalation of Sino-Indian conflict leading to China damming the Ganges- which would cause catastrophic water scarcity- is *possible*. It *could* happen. In the infinite possible futures of Earth from the divergence point of 2020, I believe that in at least one of them, something like the Ganges Water Crisis happened. But future events specifically unfolding in the way described by the Ganges Water Crisis is very unlikely to actually happen in my lifetime.

Some events are based in possibility but, I’d say, are even more unlikely and are in this document due to creative license. The Second Scramble for Africa is a big example. I believe that there will be border conflicts in Africa in the 21st century because the borders there are drawn on colonial- not ethnic- lines and because water scarcity is going to be a mounting issue there. I do not believe that these conflicts will take the shape of the Second Scramble for Africa, though. It’s not impossible, but it’s not likely. Same with the idea of the electromuscular suit- it’s not impossible. It could very well happen- I think it’s extremely likely that infantry armour will, in the future, resemble something like an EMS. But I introduced the idea of an EMS into this document because I just think it’s cool.

There are some things here which I have greater certainty over. Some examples: I do believe that the issue of climate change will be eventually solved. I believe synthetic meat will become very popular. I believe that cyberwarfare, drones, and automata will become ubiquitous in warfare. I believe that a period of ideological and geopolitical tension between the USA and China will happen. There are many predictions in this document that *are* legitimate.

This may sound like a contradiction, but it’s not: the document as a whole can be classified as realistic fiction based on extensive research. But some parts of it lean more to the side of legitimate prediction, some lean more to the side of fiction. The rule is:

**Everything in this document is, I believe, possible. However, some things are more likely than others.**

Don’t discount these predictions because I can’t be 100% sure of them. The predictions in economics and warfare- to name but two examples- are a result of genuine research. The research includes looking at many different sources, and what I deem to be reliable, legitimate sources. Actual, informed predictions are here, and don’t discount them just because there are elements of uncertainty and creative license here. I believe that a considerable number of speculations in this document are even realistic, hence why I think it is reasonable to consider this piece as realistic sci fi. I’m just saying that you should treat this document as a well-researched piece of speculative fiction- not a source for an academic paper.

## Countries

* The following is an alphabetical list of all countries recognised by the World Congress- including occupied countries and those which are not recognised as sovereign
* An asterisk indicates the country is occupied and is not recognised as sovereign
* This list does not include possessions of other countries (e.g. French Guiana)
* There are 228 countries in the world today- in 2021, there were 195 countries (excluding Kosovo and Taiwan, which are not recognised by the UN)
* In 2021, there were 54 countries in Africa- in 2170, there are 37
* In 2021, there were 35 countries in the Americas- in 2170, there are 44
* In 2021, there were 8 countries in Central Asia and the Caucasus combined- in 2170, there are 17
* In 2021, there were 6 countries in East Asia- in 2170, there are 12
* In 2021, there were 44 countries in Europe- in 2170, there are 49
* In 2021, there were 17 countries in the Middle East- in 2170, there are 23
* In 2021, there were 8 countries in South Asia- in 2170, there are 14
* In 2021, there were 11 countries in South-East Asia- in 2170, there are 12
* In 2021, there were 14 countries in Oceania- in 2170, there are 20

Name | [Richmond Democracy Index](#_Richmond_Democracy_Index) Category | [Development](#_Developed_Countries) Category | [Postmodern Human Development Index](#_Postmodern_Human_Development) Category

*How is Democracy Index calculated?*

* This is mainly done in a ‘narrative’ sense- i.e. Tibet is a full democracy because of ‘story’ reasons: it was liberated by the LDC and forced to be a liberal democracy, and absorbed Western culture
* It’s not ‘calculated’ in the way HDI is
* However, for countries which aren’t as involved in the events of the project, there is a calculation done
* The lower bound of their current democratic index category according to the Economist Intelligence Unit is taken
* This is added to 2.5 to get a new category
* E.g. Pakistan goes from a hybrid regime in 2020 to a flawed democracy in 2170
* In the past 150 years from 1870-2020 many, *many* countries have democratised: from 1900-2020 the number of democracies increased from ~3 to ~100
* Many individual countries (which are flawed/full democracies today- this encompasses Latin America as South Asia/Africa were colonies in 1870) have changed from 1870-2020 from authoritarian regimes to flawed democracies: an increase of several categories, and more so than 2.5
* Countries like Mexico have increased by roughly 2.0 points, Morocco by almost 2.0 points, Russia by roughly 3.0 points, etc
* There are few comparisons listed here because many, many countries were not sovereign in 1870 so can’t be compared

*How is development calculated?*

* Countries which are developed in 2020 are all ‘fully-developed’ in 2170
* Countries which are transitioning in 2020 are all developed in 2170- a very small few are ‘fully-developed’
* Countries which are developing in 2020 are mostly developed in 2170, with some being ‘Transitioning’ and very few being ‘fully-developed’
* Countries which are least developed in 2020 are mostly developing in 2170, with a few being ‘Transitioning’ or ‘developed’
  + Many African countries present in 2170 were not present in 2020 and emerged from countries that collapsed and which were least developed
  + This means that comparisons between 2020 and 2170 are difficult

*How is HDI calculated?*

* NB: From 1915-2015, HDI 1st of world countries increased by 0.5, 2nd world by 0.4, 3rd world by 0.1-0.3 , Eastern Europe increased by ~0.4; Middle East by ~0.3
* From 1980-2020, 1st world countries increased by ~0.15, 2nd world (BRICs) by ~0.25, 2nd world (Latin America; non-BRICs) by ~0.2, 3rd world by ~0.1, Eastern Europe by ~0.1; Middle East by ~0.1
* All currently war-torn, unstable countries gain 0.2-0.4 for stabilising (depending on the severity of the previous unrest) and becoming functioning again
* From 2020-2170, 1st world countries increase by 0.8; a new industrial revolution (even greater in scale than the industrialisation occurring from 1915-2015) allows rapid HDI growth when properly utilised
* Eastern Europe/Russia grows by 0.4 for eventually industrialising, and an extra 0.6 for 2020-2170 as they cease to stagnate and properly grow, unlimited by weak/corrupt institutions and poor governments; the least stable countries currently gain an extra 0.2 for stabilising and becoming functioning
* Middle East grows by 0.4 for eventually industrialising, and an extra 0.6 as they modernise rapidly and reform institutions; and, partially due to the intervention of the LDC, become stable and functioning countries, gaining an extra 0.2
* Rapidly growing countries (this varies; in 2020 these are BRIC countries, then they’re MINT, then ASEAN, then Latin America- any nations predicted to have major growth) grow by 1.0 from 2020-2170 (0.25 per 40 years multiplied by 4), plus 0.4 for eventually industrialising
* Other currently 2nd world countries which don’t experience rapid growth point, like Central Asia or Pacific Islands, increase by 1.2: (0.2 x 4 = 0.8, plus 0.4 for eventually industrialising)
* Currently 3rd world countries stagnate until the Second Scramble for Africa, where they grow by 0.2 until the Great African War, then they grow by another 0.7 until 2170, (0.25 x 2 = 0.5, plus an extra 0.3 for stabilising) so its an extra 1.0, as African countries begin to reform extremely weak/corrupt institutions, replace incompetent/corrupt dictators, and begin to actually build up the country; plus 0.4 for industrialising
* Nations released from empires typically have Very High HDI due to having solid institutions and a history of being included in high-HDI countries like the UK and France
* *Exceptions apply in a few countries which rapidly expand- e.g. the EAF, Nigeria, Irian, Ethiopia, and Morocco*
* *Exceptions finally apply when, narratively, countries like Tibet or Sindh have been given aid from wealthier powers to build up their countries*
* *Values given here are approximate so two countries in the same 0.05 range for HDI in 2020 may be in different categories in 2170*

### Africa | Total 37

Algeria | Illiberal democracy | Developed | Very High

Ambo | Illiberal democracy | Developing | Medium

Bagirmi | Flawed democracy | Developing | Low

Bambara | Illiberal democracy | Developing | Medium

Bemba | Flawed democracy | Developing | Medium

Berber Confederation | Flawed democracy | Developing | Medium

Cape Verde | Full democracy | Developed | Very High

Chad | Full autocracy | Developing | Low

Comoros | Flawed democracy | Developed | High

East African Federation | Full Democracy | Fully-developed | Very high

Ethiopia | Flawed democracy | Developed | Very High

Fulani | Illiberal democracy | Developing | Medium

Gouran | Full democracy | Developing | Medium

Hausa | Flawed democracy | Developed | High

Kanuri | Illiberal democracy | Developed | Medium

Khoisan | Full democracy | Developed | High

Liberia | Flawed democracy | Transitioning | Medium

Libya | Flawed democracy | Transitioning | High

Madagascar | Flawed democracy | Developed | High

Mbundu | Illiberal democracy | Transitioning | High

Morocco | Flawed democracy | Developed | Very High

Mossi | Anocracy | Transitioning | High

Mozambique | Illiberal democracy | Transitioning | Medium

New Zambia | Flawed democracy | Developed | High

Niger | Illiberal democracy | Transitioning | High

Nigeria | Flawed democracy | Developed | Very High

Reguibat | Flawed democracy | Transitioning | Medium

Republic of the Cape | Full democracy | Developed | Very High

Sao Tome and Principe | Full democracy | Developed | Very High

Seychelles | Flawed democracy | Developed | Very High

Sokoto | Full democracy | Developed | Very High

Songhai | Illiberal democracy | Developing | Medium

South Africa | Full democracy | Developed | Very High

Sudan | Full autocracy | Transitioning | Medium

Tunisia | Full democracy | Developed | Very High

Zaire | Full autocracy | Developed | Medium

Zimbabwe | Authoritarian regime | Transitioning | Medium

### Americas | Total 44

Amazon Protectorate\* | N/A | N/A | N/A

Anguilla | Full democracy | Developed | Very High

Antigua and Barbuda | Flawed democracy | Transitioning | High

Argentina | Full democracy | Fully developed | Extremely High

Aruba | Full democracy | Transitioning | High

Aysen\* | N/A | Developed | Extremely High

Bahamas | Full democracy | Developed | Very high

Barbados | Full democracy | Transitioning | High

Belize | Flawed democracy | Transitioning | High

Bermuda | Flawed democracy | Transitioning | High

Bolivia | Flawed democracy | Developed | Very High

Cajamarca\* | N/A | Developed | Very High

Caribbean Island Federation (Guadeloupe, Martinique, Saint Barts, Saint Martin, Saint Vincent) | Full democracy | Developed | Very High

Cayman Islands | Full democracy | Transitioning | High

Canada | Full democracy | Fully-developed | Developed | Extremely High

Colombia\* | N/A | Developed | Very High

Costa Rica | Full democracy | Developed | High

Cuba | Flawed democracy | Developed | Very High

Cusco\* | N/A | Developed | Very High

Dominica | Flawed democracy | Transitioning | High

Dominican Republic | Full democracy | Developed | Very High

Ecuador | Flawed democracy | Developed | Very High

Greenland | Full democracy | Fully developed | Extremely High

Grenada | Flawed democracy | Developed | Very High

Haiti | Flawed democracy | Transitioning | Medium

Honduras | Flawed democracy | Developed | Medium

Indigena | Flawed democracy | Developed | High

Jamaica | Full democracy | Developed | Very High

Lethem\* | N/A | Developed | High

Llamos\* | N/A | Transitioning | High

Mabaruma | Full democracy | Transitioning | High

Mato Grosso\* | N/A | Developed | Very High

Mexico | Full democracy | Fully-developed | Extremely High

Nicaragua | Flawed democracy | Transitioning | Medium

Panama | Full democracy | Developed | Very High

Paraguay | Full democracy | Developed | Very High

Quebec | Full democracy | Fully-developed | Extremely High

Saint Lucia | Full democracy | Developed | High

Salvador\* | N/A | Developed | Very High

Santa Catarina\* | N/A | Developed | Very High

Suriname | Full democracy | Transitioning | High

Trinidad and Tobago | Full democracy | Transitioning | High

United States of America | Full democracy | Fully-developed | Extremely High

Valparaiso\* | N/A | Developed | Extremely High

Vargas | Flawed democracy | Transitioning | Very High

### Central Asia and the Caucasus | Total 17

Abkhazikstan | Flawed democracy | Transitioning | Very High

Armenia | Flawed democracy | Developed | Very High

Azerbaijan | Flawed democracy | Developed | Very High

Chechnya | Full democracy | Developed | Extremely High

Dagestan | Flawed democracy | Developed | Very High

Georgia | Flawed democracy | Developed | Very High

Karakalpakstan | Illiberal democracy | Developed | High

Kazakhstan | Flawed democracy | Developed | Very High

Kyrgyzstan | Flawed democracy | Developed | High

Hazarastan | Full democracy | Transitioning | High

Ishim | Illiberal democracy | Developed | Very High

Ossetia | Full democracy | Developed | Extremely High

Pashtunistan | Illiberal democracy | Developing | Medium

Persia | Flawed democracy | Developed | Extremely High

Tajikistan | Illiberal democracy | Transitioning | High

Turkmenistan | Anocracy | Transitioning | High

Uzbekistan | Illiberal democracy | Transitioning | Very High

### East Asia | Total 12

East China Lawless Zone\* | N/A | N/A | N/A

Hong Kong | Full democracy | Fully developed | Extremely High

Japan | Full democracy | Fully-developed | Extremely High

Macau | Full democracy | Developed | Extremely High

Manchuria\* | N/A | Developed | Very High

Mongolia | Full democracy | Developed | Very High

Taiwan | Full democracy | Fully-developed | Extremely High

Tarim | Flawed democracy | Developed | Very High

Tibet | Full democracy | Fully-developed | Extremely High

United Korea | Full democracy | Fully-developed | Extremely High

Zhongnan\* | N/A | Developed | Very High

Zhongguo\* | N/A | Developed | Very High

### Europe | Total 49

Albania-Kosovo | Flawed democracy | Developed | Very High

Andorra | Full democracy | Fully-developed | Extremely High

Austria | Full democracy | Fully-developed | Extremely High

Belarus | Flawed democracy | Developed | Very High

Belgium | Full democracy | Fully-developed | Extremely High

Bosnia | Flawed democracy | Developed | Very High

Bulgaria | Flawed democracy | Developed | Very High

Catalonia | Full democracy | Fully-developed | Extremely High

Croatia | Full democracy | Fully-developed | Extremely High

Cyprus | Full democracy | Fully-developed | Very High

Czech Republic | Full democracy | Fully-developed | Extremely High

Denmark | Full democracy | Fully-developed | Extremely High

Estonia | Full democracy | Developed | Very High

Faroe Islands | Full democracy | Fully-developed | Extremely High

Finland | Full democracy | Fully-developed | Extremely High

Flanders | Full democracy | Fully-developed | Extremely High

France | Full democracy | Fully-developed | Extremely High

Germany | Full democracy | Fully-developed | Extremely High

Great Britain | Full democracy | Fully-developed | Extremely High

Greece | Full democracy | Fully-developed | Extremely High

Holy See | N/A | Fully-developed | Extremely High

Hungary | Full democracy | Developed | Very High

Iceland | Full democracy | Fully-developed | Extremely High

Italy | Full democracy | Fully-developed | Extremely High

Latvia | Full democracy | Developed | Very High

Liechtenstein | Full democracy | Fully-developed | Extremely High

Lithuania | Full democracy | Developed | Very High

Luxembourg | Full democracy | Fully-developed | Extremely High

Malta | Full democracy | Developed | Very High

Moldova-Romania | Flawed democracy | Developed | Very High

Moravia | Full democracy | Fully developed | Extremely High

Monaco | Full democracy | Fully developed | Extremely High

Netherlands | Full democracy | Fully developed | Extremely High

North Macedonia | Full democracy | Developed | Very High

Norway | Full democracy | Fully developed | Extremely High

Poland | Full democracy | Developed | Extremely High

Portugal | Full democracy | Fully developed | Extremely High

Republika Srpska | Flawed democracy | Transitioning | High

Russia | Full democracy | Fully developed | Very High

San Marino | Full democracy | Fully developed | Extremely High

Serbia and Montenegro | Full democracy | Developed | Very High

Slovakia | Full democracy | Fully developed | Extremely High

Slovenia | Full democracy | Developed | Extremely High

Spain | Full democracy | Fully developed | Extremely High

Sweden | Full democracy | Fully developed | Extremely High

Switzerland | Full democracy | Fully developed | Extremely High

Ukraine | Full democracy | Fully developed | Very High

United Ireland | Full democracy | Fully developed | Extremely High

Zaporozhian | Flawed democracy | Developed | Very High

### Middle East | Total 23

Asir\* | N/A | Developed | Extremely High

Egypt | Illiberal democracy | Developed | Very High

Greater Bahran\* | N/A | Developed | Extremely High

Hadramout\* | N/A | Transitioning | Medium

Hejaz\* | N/A | Developed | Extremely High

Iraquain | Illiberal democracy | Transitioning | High

Israel | Full democracy | Fully-developed | Extremely High

Jazira | Flawed democracy | Developed | High

Kurdistan | Full democracy | Developed | Very High

Kuwait | Illiberal democracy | Developed | Very High

Lebanon | Flawed democracy | Developed | Very High

Mahra\* | N/A | Transitioning | Extremely High

Muscat\* | N/A | Transitioning | Very High

Naidi | Flawed democracy | Transitioning | Medium

Nejd\* | N/A | Developed | Extremely High

Palestine | Illiberal democracy | Transitioning | High

Qatar | Illiberal democracy | Fully-developed | Extremely High

Rubalkhali Protectorate\* | N/A | N/A | N/A

Shammar\* | N/A | Developed | Extremely High

Syria | Anocracy | Transitioning | High

Turkey | Flawed democracy | Developed | Extremely High

United Arab Emirates | Flawed democracy | Developed | Extremely High

Yarad\* | N/A | Transitioning | Very High

### South Asia | Total 14

Balochistan | Flawed democracy | Transitioning | High

Bangladesh | Flawed democracy | Developed | Very High

Bharat\* | N/A | Developed | High

Dravidia\* | N/A | Developed | Very High

Himalayas Protectorate\* | N/A | N/A | N/A

Kashmir\* | N/A | Transitioning | High

Lakshadweep | Flawed democracy | Transitioning | Very High

Maldives | Flawed democracy | Transitioning | Very High

Maratha\* | N/A | Developed | Very High

Nepal | Flawed democracy | Developed | Very High

Orissa\* | N/A | Developed | High

Pakistan | Flawed democracy | Transitioning | Medium

Sindh | Flawed democracy | Transitioning | Very High

Sri Lanka | Full democracy | Developed | Extremely High

### South-East Asia | Total 12

Brunei | Anocracy | Developed | Very High

Burmese Federation | Flawed democracy | Developed | High

Cambodia | Illiberal democracy | Developing | Medium

East Timor | Flawed democracy | Developed | High

Indonesia | Full democracy | Fully developed | Extremely High

Laos | Illiberal democracy | Transitioning | High

Malaysia | Full democracy | Developed | Extremely High

Pattani | Flawed democracy | Developing | High

Philippines | Full democracy | Developed | Extremely High

Singapore | Full democracy | Fully-developed | Extremely High

Thailand | Full democracy | Fully-developed | Extremely High

Vietnam | Flawed democracy | Developed | Very High

### Oceania | Total 20

Australia | Full democracy | Fully developed | Extremely High

Chuuk | Full democracy | Transitioning | High

Fiji | Full democracy | Developed | Very High

Kiribati | Full democracy | Transitioning | High

Kosrae | Flawed democracy | Developed | High

Irian | Full democracy | Developed | High

Marshall Islands | Full democracy | Developed | Very High

Murrawari | Full democracy | Transitioning | Very High

Nauru | Flawed democracy | Transitioning | High

New Caledonia | Full democracy | Developed | Very High

New Zealand | Full democracy | Fully developed | Extremely High

Palau | Full democracy | Developed | Very High

Pohnpei | Full democracy | Transitioning | High

Polynesia | Flawed democracy | Developed | Very High

Samoa | Flawed democracy | Developed | Very High

Solomon Islands | Full democracy | Developed | Medium

Tonga | Flawed democracy | Transitioning | Very High

Tuvalu | Flawed democracy | Transitioning | High

Vanuatu | Flawed democracy | Transitioning | High

Yap | Full democracy | Transitioning | High

## Demographics

* Human Population: 11,613,120,000
* Earth Population: 11,600,000,000
* Moon Population: 13,000,000
* Mars Population: 100,000
* Earth Population Density: 77.9/km2 (land area only); 22.7/km2 (total area)
* Urban Population Percentage: 92.5%
* Total Fertility Rate: 1.94 children/woman
* World Average Life Expectancy: 88.2 years
* Switzerland (Highest) Average Life Expectancy: 99.2 years
* Oldest Ever Person: 152 years
* Largest Metropolitan Area: Lagos, Nigeria; 104,000,000 inhabitants

## Economics

### Overview

* Cryptocurrency becomes very popular throughout the 21st century
* The idea of a ‘three-sector economy’ is now obsolete- there are five widespread sectors
  + Primary Sector: Resource Extraction
  + Second Sector: Manufacturing
  + Tertiary Sector: Services (Transport/Distribution/Sale of Goods)
  + Quaternary Sector: Research and Development Sector
    - Consists of businesses providing information services, knowledge based on future growth, and development
    - E.g. scientific research, information technology, education, information management, consulting, financial planning, designing
    - The tertiary/quaternary sectors currently employ 84% of the UK workforce
  + Quinary Sector: Human Services
    - Focuses on human services and control
    - The entertainment industry, consisting of media, culture, and government
    - Includes special and highly paid skills of senior business executives, government officials, financial/legal consultants
    - Quinary activities are performed by the highest level of decision/policy makers
    - Sometimes referred to as ‘gold collar’ professions

### GDP Rankings

Top 50 countries ranked by nominal GDP, according to the IMF

|  |  |  |
| --- | --- | --- |
| Rank | Country/Organisation | Approximate GDP/trillions of SNACs |
| 1 | United States of America | 108.57 |
| 2 | Indonesia | 89.14 |
| 3 | Russia | 78.39 |
| 4 | Japan | 71.48 |
| 5 | East African Federation | 68.55 |
| 6 | United Korea | 62.91 |
| 7 | Germany | 55.67 |
| 8 | France | 49.76 |
| 9 | United Kingdom | 49.52 |
| 10 | Nigeria | 47.23 |
| 11 | Mexico | 42.84 |
| 12 | Italy | 40.71 |
| 13 | Ethiopia | 36.38 |
| 14 | Spain | 31.43 |
| 15 | Canada | 26.69 |
| 16 | Zaire | 22.08 |
| 17 | Israel | 18.32 |
| 18 | Australia | 16.50 |
| 19 | Bangladesh | 14.75 |
| 20 | Philippines | 13.99 |
| 21 | Taiwan | 13 |
| 22 | Thailand | 13 |
| 23 | Vietnam | 12 |
| 24 | Quebec | 12 |
| 25 | Persia | 11 |
| 26 | Singapore | 11 |
| 27 | Argentina | 11 |
| 28 | Hong Kong | 11 |
| 29 | Turkey | 10 |
| 30 | Malaysia | 10 |
| 31 | Colombia | 10 |
| 32 | United Arab Emirates | 9 |
| 33 | Switzerland | 9 |
| 34 | Sweden | 9 |
| 35 | Egypt | 8 |
| 36 | Sokoto | 8 |
| 37 | Flanders | 7 |
| 38 | Bolivia | 7 |
| 39 | Ukraine | 7 |
| 40 | Cuba | 6 |
| 41 | Algeria | 6 |
| 42 | Burmese Federation | 6 |
| 43 | Poland | 6 |
| 44 | Sudan | 6 |
| 45 | Morocco | 5 |
| 46 | Belgium | 5 |
| 47 | Czech Republic | 4 |
| 48 | Romania | 4 |
| 49 | United Ireland | 4 |
| 50 | Austria | 3 |

## History | Timeline

### Second Cold War

2029 | Australia | Australia enters a defensive alliance with the USA against China

2030 | China becomes the world’s largest economy by nominal GDP

2032 | The EU officially recognised Taiwan as a country- the UN still avoids the issue

2036 | [Spratly Arbitration](#_Spratly_Arbitration,_2036) | The Philippines formally complains to the UN about Chinese militarisation of the Spratly Islands; the UN reprimands China and the USA sends warships to the South China Sea

2037 | [Truro Shoal Standoff](#_Spratly_Arbitration,_2036) | Chinese and US warships stand off in the South China Sea

2037 | The USA officially recognises Taiwan as a country

2038 | The Philippines enters a defensive alliance with the USA against China- in 2051, they join the LDC

2042 | [Ganges Water Crisis](#_Ganges_Water_Crisis,) | China dams the Ganges River in response to Indian aggression, causing catastrophic water scarcity in India and Bangladesh

2045-2070 | [Second Scramble for Africa](#_Second_Scramble_for) | African countries, backed by either China or the USA, go to war simultaneously in a multinational attempt to establish ethnic nation-states

2047 | Mexico joins NATO

2047 | Hong Kong annexed into China, end of ‘two systems’ policy

2051 | The East African Federation joins NATO, and the organisation is thus rebranded to be the Liberal Democracy Coalition; Australia and the Philippines join

2051 | China formally declares beginning of the World Peacekeeping Association; a multinational alliance intended as a counterweight to the LDC

2051 | North Korea joins the WPA, as do Tajikistan, Pashtunistan and Kazakhstan

2052 | [American Zeta Crisis](#_American_Zeta_Crisis,) | The CCP funds cartel activities on US soil, leading to a major international crisis

2055 | Uzbekistan and Turkmenistan join the WPA

2065 | Hungary joins the WPA

2068 | Poland and Estonia join the WPA

2069 | The EU unilaterally joins the LDC; all EU member states are now automatically involved in a military alliance

2069 | Mongolia, Iran, and Turkey join the WPA

2070 | [Kee Lung Crisis](#_Kee_Lung_Crisis,) | The USA places nuclear missiles in Taiwan and the CCP blockades the island

2070 | Taiwan admitted to the United Nations, China leaves the United Nations

2073 | All WPA nations leave the United Nations

2079 | [Neonautilus](#Neonautilus) technologies developed

2080 | [WWIII](#_History_|_World) begins

### Europe

2025 | EU | The EU bans its member states from striking independent trade deals with China; an important symbolic step in EU centralisation

2026 | Ukrainian Secession | Russian-backed separatists take control over the two eastern-most oblasts in Ukraine, and Putin admits them into Russia

2026 | EU | Albania joins the EU

2026 | Great Britain | Queen Elizabeth dies, Charles succeeds her

2026 | Great Britain | 39 countries leave the Commonwealth of Nations, mainly from Africa and the Americas

2027 | Ukrainian Split | The state of Ukraine splits along ethnic lines; the north, which still calls itself Ukraine, is predominantly Ukrainian-speaking; the south, which calls itself Zaporozhian, is predominantly Russian-speaking

2027 | Belarus | As Lukashenko’s suppression of protests intensifies, the EU votes to exclude Belarus wholly from the Eastern Partnership

2028 | Caucasus | The Armenia-Azerbaijan disputed zone of Nagorno-Karabakh is seized and held by Azerbaijani forces with Turkish air support

2029 | EU | North Macedonia joins the EU

2029 | Belarusian Spring | A surge of protests threatens to overthrow Lukashenko; Putin sends the government Russian military forces in support to quash the protests; many Belarussian citizens die and the EU decides to actively support insurgents, sending vast amounts of aid

2030 | Belarus | The EU intensifies sanctions against Russia and threatens to intervene in the Caucasus- Putin backs down and quietly withdraws military support; Belarusian opposition parties establish a fragile democracy; processes for admitting Belarus into the EU begin; Putin still attempts to sabotage democracy in the region and disseminate anti-Western propaganda

2030 | EU | The UK re-joins the EU, this time with no rebates

2031 | Balkans | Albania and Kosovo unite after referenda in both countries, forming Albania-Kosovo, which joins the EU

2032-7 | Bosnian Collapse | The Republika Srpska secedes from Bosnia and Herzegovina after sustained ethnic and political tension within the state; in 2037 it achieves independence

2034 | Russia | Putin dies of natural causes; he is succeeded by Dmitry Medvedev, who supports economic modernisation (including pursuing renewable energy) and liberalisation

2036 | Balkans | Medvedev overplays his hand trying to stoke another coup in Montenegro; this causes a massive controversy with the West encouraging Serbia to reunite to protect against foreign influence

2037 | Balkans | Serbia and Montenegro unite by popular referenda in each country

2037 | Russia | Medvedev is succeeded in an internal coup by Sergei Shoyu, a conservative who reverses many reforms and reinforces authoritarianism

2038 | EU | The UK votes to leave the EU yet again, causing referenda to leave the UK in both Northern Ireland and Scotland; the latter supports unionism but Northern Ireland begins the process of secession

2039 | Balkans | Romania and Moldova unite into one country by popular referenda; processes for EU integration begin

2040 | Ireland | Republic of United Ireland proclaimed, immediately joins the EU

2040 | Balkans | Bosnian Croats secede from Bosnia and Herzegovina, leaving behind a small state which names itself Bosnia; Bosnian Croatia joins Croatia by referendum in 2047

2041-2 | Russian Spring | Shoyu is overthrown amidst an uncontrollable surge of unrest and protests; opposition parties occupy the Kremlin and draft a new government

2042 | Caucasus | Soldiers withdraw from Chechnya, and the region once again claims independence; soldiers also leave South Ossetia, and Georgia reclaims the territory and stations troops there- both regions are bolstered by EU and US aid

2042 | EU | Ukraine is admitted into the EU; Zaporozhian chooses to remain outside

2043-8 | Caucasus | Dagestan attempts to leave Russia; Russian authorities take action and establish a military presence there; the EU and USA fund rebels, however; though Russia is eventually pushed out, the Russian populace are alienated against the West for a long time

2044 | EU | Hungary is expelled from the EU due to concerns over democratic and development backsliding and

2045 | EU | Serbia and Montenegro join the EU as one country

2045 | EU | Sweden votes to leave the EU

2047 | EU | Poland is expelled from the EU due to concerns over democratic and development backsliding

2048 | Caucasus | Ossetia votes to leave Georgia and become an independent country- Georgia consents to this

2052 | EU | Bulgaria expelled from the EU due to democratic and development backsliding

2059 | EU | Estonia expelled from the EU due to democratic and development backsliding

2063 | Turkish Uprising | The Turkish government responds ineffectively to the [Fourth Industrial revolution](#_Fourth_Industrial_Revolution), causing mass-unemployment and economic trouble; Islamist governments replaced with secular ones

2065 | EU | Turkey joins the EU

2068 | Great Britain | The British populace vote to abolish the monarchy and the House of Lords

2080 | Greece, Latvia, Lithuania, North Macedonia, Serbia and Montenegro, Slovakia, Slovenia, and Turkey leave the EU to avoid fighting in WWIII

### Americas

2024 | USA | Republicans back Donald Trump for the election, Trump loses; major riots break out including storming the Capitol; national guard mobilised to defend it and various conservative groups labelled domestic terrorists

2038-2045 | Mexican Cartel War | Triggered by Sinaloa cartel massacring 22 US citizens; US troops deployed in Mexico with Mexican consent to destroy cartel activity and replace narco-governments set up there

2041 | Canada | Quebec votes to leave Canada, being a sovereign nation; relations between Quebec and Canada are friendly and various free trade and free movement agreements are established

2052 | USA | First President from the [Egalitarian Party](#_United_States_of)

2054 | USA | Democrat and Republican Parties merge, forming the Democratic-Republicans; the DRs become the conservative party of the USA

2073 | Caribbean | Various previous French possessions overseas vote to be independent and form the Caribbean Island Federation, a small nation consisting of Guadeloupe, Martinique, Saint Lucia, and Saint Vincent

### Africa

2032 | East African Federation | Kenya, Rwanda, Burundi, South Sudan, Tanzania, and Uganda unite to form a federal republic; initially it is a flawed democracy but good leadership and solid institutions set it up well

2045-2070 | Second Scramble for Africa | Vast numbers of political changes in Africa, as borders are rapidly redrawn as a result of a multinational free-for-all; various African nations join either the LDC or the WPA

2080-2091 | Great African War | The African theatre of WWIII is often now referred to as a separate war as it drew in combatants who were unaffiliated with the LDC or the WPA

### Asia

2023 | Indochina | Revolution occurs in Myanmar due to repressive government and economic collapse; an unstable democracy is set up wherein each ethnic group has their own state, forming the Burmese Federation

2030 | China becomes the world’s largest economy by nominal GDP

2033 | Indochina | The Indonesian government is pressured by the populace to pull out of West Papua; the situation is often compared to the USA in Vietnam

2033 | Indochina | West Papua and Papua New Guinea unite, forming the nation of Irian

2036 | Central Asia | US forces partition Afghanistan into Hazarastan, a home for the persecuted Hazara minority which is generally accepting of US aid and presence; and Pashtunistan in the south, which remains very anti-USA and which the USA leaves alone

2038 | Indochina | Thailand pulls out from Pattani, which establishes itself as an independent nation

2040 | India becomes the world’s second-largest economy by nominal GDP, surpassing the United States of America

2049 | China | China completes their Belt and Road Initiative, establishing a sinocentric international trade network; although Europe/Australia are no longer and Indochina is starting to disengage, the initiative connects China to almost all of Asia and most of Africa

2080 | Asia-7 | The Asia-7 economies are China, India, Indonesia, Japan, South Korea, Thailand, and Malaysia; the 21st century is sometimes called the ‘Asian Century’ due to the growth of Asian economies; by 2080, 55% of global GDP comes from Asian countries

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## History | 2020-2080

### General Trends

General Trends: Economics

* Globalisation increases throughout the 21st century at an accelerating rate
  + The 2020s and 2030s see considerable foreign investment in South-East Asia due to outsourcing of manufacturing there, and in the 2040s and 2050s Sub-Saharan Africa becomes the location many companies relocate operations to
    - The Fourth Industrial Revolution gradually ends the process of outsourcing labour to reduce costs by the late 21st century, however
    - In developed countries which provide effective social support systems for the unemployed, this leads to considerable rises in standards of living for the average worker as they are lifted out of exploitative wage-slavery conditions
    - Developed countries which fail to adapt to the 4IR, however, see periods of great social turmoil and often revolution
  + The average cost of goods continues to generally decline worldwide (naturally at different rates per country and region)
  + The number of multinational companies increases, especially in countries which are developing in 2020
  + The first half of the 21st century sees many developing countries increasingly adopt Western cultural/social values, but the 4IR disrupts this trend by the second half sees a reconciliation of Western and traditional values in most of these countries
  + Countries’ dependence on foreign trade increases, and international economic organisations like ASEAN gain increased relevance
    - Conversely, the disruption of foreign trade caused by the Second Cold War causes hardship and the countries involved (e.g. the USA and China) to dislike each other even further for it
  + Globalisation sees increased quality of products due to competition
  + Globalisation initially sees developed countries being forced to lower prices further, putting strain on social welfare- especially in Germany and Japan which have larger proportions of the elderly
    - The 4IR eventually reverses this trend, however
* Extreme poverty rates greatly decline, and extreme poverty is on the verge of eradication by 2080
* Human development also considerably improves in many second-world and third-world countries:
  + Countries like Mexico have equivalent HDI levels in 2080 to the northern USA in 2020
  + Countries like Nigeria have equivalent HDI levels in 2080 to Mexico in 2030
  + Some third world countries continue to have low HDI levels, but in all currently third-world countries, HDI increases from 2020-2080
  + Mexico, Russia, Turkey, Indonesia, and the Philippines show the greatest increases
  + China, Brazil, and India show notable increases (listed in descending order of magnitude of increase) as well
* Inequality generally decreases in the world, especially in Africa and North America, though not monumentally elsewhere
* The world becomes considerably richer: this is due to general economic trends but also automation in the mid-21st century causes major economic changes that greatly increase national wealth
  + In 1880, the world was split between countries having undergone the Second Industrial Revolution and those who haven’t- by 2080, a similar rift (though not as large) has opened between countries having undergone the ‘Fourth Industrial Revolution’ and those who haven’t
* US nominal GDP goes from (in 2014 USD) US$17tr in 2020 -> US$25tr in 2030 -> US$40tr in 2050 -> US$70tr in 2080
* The world’s wealth shifts away from Europe to elsewhere, mainly Asia
* A list of countries by GDP (2014 USD) in 2080 is:
  1. China | US$85tr
  2. India | US$74tr
  3. United States of America | US$70tr
  4. Brazil | US$38tr
  5. Indonesia | US$37tr
  6. Japan | US$36tr
  7. Germany | US$34tr
  8. United Kingdom | US$30tr
  9. Mexico | US$30tr
  10. Russia | US$26tr
  11. France
  12. Nigeria
  13. East African Federation
  14. South Korea
  15. Saudi Arabia
  16. Turkey
  17. Italy
  18. Canada
  19. Philippines
  20. Pakistan
  21. Egypt
  22. Thailand
  23. Bangladesh
  24. Vietnam
  25. Malaysia
* The 21st century is sometimes referred to by economists as the ‘Asian Century’ due to the rapid growth of Asian economies
  + Although the first decades of the 21st century saw considerable growth in Asia, it was not guaranteed that this would continue
  + Asia risked falling into the ‘middle-income trap’
  + This is a phenomenon wherein GDP/capita in middle-income countries stagnates
  + The trap occurs because these countries can’t compete with low-wage, low-income economies in manufacturing, and they can’t compete with high-wage, high-income economics in innovation and skilled services
  + This trap occurred widely in, for example, Latin America at the end of the 20th century (and was only escaped in the last decades of the 21st century)
  + Asia was able to escape this trap due to the convergence of many reasons:
    - Asian countries focussed heavily on innovation and technological development
    - Massive urbanisation occurred in the 21st century and many Asian nations invested heavily in education, particularly higher education
    - Asian countries gradually formulated their own financial policies and began to transform their financial systems in order to take part in the world’s banking system
    - Substantial reforms to energy use and a move towards efficient, renewable energy
    - Gradual and continual improvement in the quality, efficiency, and credibility of many government institutions in Asian countries
    - Regional cooperation in Asia was important in promoting growth and development, particularly in regional initiatives like ASEAN and the Belt and Road Initiative
* By the outbreak of WWIII, Asia had 55% of the world’s GDP
* The term ‘Asian Century’ doesn’t apply to all countries equally, however- this disparity is particularly stark when comparing the Asia-7 economies (China, India, Indonesia, Japan, South Korea, Thailand, Malaysia) to Central Asia
* Regardless, the 21st century saw many Asian countries move from middle-income to high-income status; all of the Asia-7 economies are considered developed by 2080
* The 22nd century is also sometimes referenced as the ‘African Century’ due to the rapid increase in the wealth and HDI of African countries
  + Whilst Africa lacks the aggregate wealth that Asia does, the growth of African countries in the 22nd century is as impressive if not more
  + Moreover, the share of global wealth belonging to Africa is projected to continue to rise
  + The 22nd century saw African countries begin to organise themselves properly:
    - Incompetent and corrupt dictators were gradually replaced with either more meritocratically selected dictators in the case of hybrid regimes, or by fledgling democracies
    - State institutions, previously weak and centralised, began to grow in efficiency and power
    - A civil service and administrative infrastructure began to develop
    - Major roadblocks to development, like widespread corruption or war, were phased out
    - Governments became more centralised and more able to actually help their citizens
    - The result was that the resources and populations of African countries could be effectively exploited and translated into wealth
  + The growth in many African countries during this period was relatively consistent and considerable, with some countries achieving peak GDP growth rates of 10% a year
  + There were many reasons why African countries were suddenly able to do this:
    - The Great African War is by far the most significant: many unstable African countries containing multiple conflicting ethnic groups collapsed, and post-war Africa contained more homogenous nation-states without this constant conflict
    - Foreign aid beginning in the 2040s allowed investments in industry and infrastructure
    - The 22nd century continued (although undeniably amplified) an already existing trend of growth in the 21st century
  + By 2100, certain countries which were low-income in 2020 had reached middle-income status because natural GDP growth was accompanied by extensive foreign aid and the rise of nation-states due to the Second Scramble for Africa redrawing many African borders
  + Countries like Nigeria, for example, reached middle-income status because of natural growth (by 2020 they were already low-middle income) and unusually high foreign investment
  + Other countries transitioned from low- to middle-income without foreign help though; a few examples include Algeria, Egypt, Sao Tome and Principe, Senegal, Tunisia, Zambia (these are all countries which were low-middle income by 2020)
  + Countries like the East African Federation and Zaire received extremely extensive foreign aid and investment and used it to become very wealthy
  + The 22nd century saw several of these middle-income countries then jump to the high-income bracket due to 70 years of extensive institutional reform and economic growth
  + It also saw many countries which were still low-income become middle-income

General Trends: Politics

* Racism, anti-Semitism, and xenophobia increase worldwide
* The onset of the Second Cold War exponentially increases global tension and countries nationwide begin aligning with either the USA or China, causing a considerable global divide
* Europe, Asia, and Latin America become more authoritarian and conservative politically, with a few exceptions
  + Until ~2060, some Balkans countries like North Macedonia, Albania, and Montenegro become more left wing
  + From 2060-2080, many EU countries become more left wing as a response to right-wing Eastern European countries aligning with the WPA
  + Even from 2020-2060, there is markedly less right-wing shift in Germany, Switzerland, Luxembourg, and Italy than in other European nations
* North America becomes more economically left wing and more progressive, particularly in the USA and Mexico
* Central America becomes slightly more right wing but generally aligns with North America, preventing severe ideological changes
* Oceania becomes more left wing and progressive (except Australia, which like Great Britain becomes more authoritarian and conservative)
* Africa varies considerably:
  + Some countries, like the Congo, become far-right autocracies
  + Others, like Nigeria, become far more left wing and progressive
  + In the Second Scramble for Africa, Africa becomes more conservative but after the consolidation of new territories and internal reform, by 2080 Africa as a whole is a far more progressive, left wing, liberal continent than in 2020

### Events

#### Second Cold War

##### Overview

* The Second Cold War was a period of ideological and geopolitical tension between the United States of America and China
* The threat of nuclear WMDs prevented a full-scale war from breaking out, limiting the conflict mainly to proxy wars, espionage, and diplomatic manoeuvring
* The Second Cold War (2CW) was also characterised by a series of crises which each served to escalate tension and prolong the state of world tension
  + The 2CW eventually saw the majority of the world’s countries align with one or the other superpower
  + Each superpower founded factions of mutual defence, which some of the lesser nations aligned with it joined
  + The result was two rival factions, opposed due to ideological and geopolitical reasons, who were willing to fight
  + The United States’ faction, the Liberal Democracy Coalition, represented the ideology of liberal democracy
  + The CCP’s faction, the World Peacekeeping Association, represented the ideology of authoritarian autocracy
  + The USA and China were geopolitically opposed as each superpower vied for global dominance and the promotion of their national interests
* Historians don’t unilaterally agree on its start point, but most (and the US populace) believe it began in 2036 with the [Spratly Arbitration](#_Spratly_Arbitration,_2036)
* It is agreed worldwide, however, that the 2CW ended with the outbreak of [World War III](#_History_|_World)
* Although the Spratly Arbitration began the 2CW, previous events in the 2010s/2020s were necessary prerequisites for it as they caused US public opinion to turn against the CCP and make the US population willing to enter conflict
* The primary factors contributing to mounting resentment in the USA were as follows:
  + Economic espionage | 2020 marked the beginning of Chinese diplomatic facilities in the USA to be closed
  + In July 2020, the Chinese consulate in Houston was closed due to Chinese theft of American information (notably, in this case, data on medical research and oil)
  + This was the beginning of multiple similar events due to fears of Chinese economic espionage
  + [Cyberwarfare](#_Cyberwarfare) | Similarly, multiple US companies in the 2010s and 2020s reported cyberwarfare attacks from China attempting to steal information in strategic industries where China lagged (Operation Aurora was a prominent example)
  + Uighur Genocide | Continued violations of human rights in the 2020s led to increasingly vehement anti-CCP rhetoric in the USA and a desire for decisive action (which, concerning the genocide, did not occur save for some condemnations and minor sanctions)
  + It also caused a breakdown between relations between the EU and China
  + Trade War | The trade war between the USA and China escalated in the 2020s and led to higher prices for consumers and greater difficulties for farmers in the US, leading to resentment for China amongst many
  + The cartels cutting off drug supply to the USA caused widespread chaos and violence, increasing condemnation of China

##### Liberal Democracy Coalition

* The Liberal Democracy Coalition is a multinational alliance consisting of various nations that identified as liberal democracies
* The LDC grew out of, and replaced, NATO by 2051
* The USA renamed NATO in 2051 when the East African Federation agreed to join NATO- it was renamed as the EAF wasn’t near the Atlantic Ocean
* The EAF wanted to join as by the 2050s it was clear that NATO had become an anti-China alliance and the EAF was concerned about Chinese involvement in Africa
* The LDC was one of the combatant factions in WWIII, which it won, and in WWIV, which it also won
* After WWIV, however, many countries left the LDC, leaving only 5 countries: the USA, the EAF, Israel, Mexico, and Canada
* The USA and the EAF both founded the [World Congress](#_Multinational_Organisations_|), a new multinational organisation to promote liberal democracy
* To motivate the war-weary ex-LDC countries to join, the World Congress was explicitly designed as a pacifist organisation with no military power
* The LDC still exists, however, and in the latter half of the 22nd century more countries joined
* The current members of the LDC are:
  + United States of America
  + East African Federation
  + Canada
  + Mexico
  + Israel
  + France
  + Germany
  + Italy
  + Argentina
  + Tibet
  + Australia
* The LDC no longer plays a major role in international politics and foreign policy, and its purposes are limited
* LDC forces are the forces which are in occupied nations, although LDC countries are not obligated to do this and Germany, Italy, and Australia do not contribute to occupying forces out of choice
* Other than this, the main purpose of LDC membership is symbolic: it signals a country’s willingness to engage in military conflict for purposes of [liberal internationalism](#_The_Current_World)
* On one occasion, an LDC member has engaged in military conflict with a country when the target country had been economically sanctioned by the World Congress
* The World Congress formally released a statement that LDC action in support of WC directives would be permitted, but never required, expected, or officially endorsed

##### Spratly Arbitration, 2036 and Truro Shoal Standoff, 2037

* The Spratly Arbitration beginning the 2CW unfolded as follows:
  + In August 2036, the Philippines sent an official complaint to the United Nations protesting China’s militarisation of the Spratly Islands, its claims in the South China Sea, and construction of artificial islands
  + This was motivated by a skirmish near Half Moon Shoal earlier that month, leading to the UN reopening the arbitration case
  + The arbitral tribunal was even more favourable to the Philippines in 2036 than in 2016, decisively condemning Chinese action
  + The backlash in the USA, however, was unprecedented
  + It can be attributed to the US population and government’s increasing dislike of Chinese foreign policy and actions
  + The US population clamoured for some form of military action, namely militarising Half Moon Shoal and Pigeon Reef
  + This would bring US forces into direct conflict with Chinese forces stationed there
  + The contemporary president, Andrew Yang, was unwilling to do this and also cautioned that increasing resentment and aggression towards China could lead to a second Cold War and would ultimately detriment both countries
  + The US populace was unwilling to countenance this, and Republican candidate Mike Pompeo won the 2036 election based on the promise of decisive action
  + The day after he was inaugurated, he did so
  + Pompeo sent four US destroyers and two frigates to cruise the South China Sea
  + The policy was to prevent the construction of more artificial islands- not by opening fire, but simply by interposing the US ships above construction sites
  + US ships would also periodically circle the militarised Spratly Islands
  + China responded by increasing its own naval presence in the South China Sea, and the US did so too
  + The result was that by June 1, 16 Chinese, 14 US, and 20 Philippine warships were in the South China Sea
  + On June 3, there was a famous standoff in the Truro Shoal after US ships attempted to apprehend four Chinese fishing vessels
  + Warships cruising in the South China Sea rapidly travelled to the area and there was a tense standoff
  + The US military moved into DEFCON 3
  + Communications between Washington and Beijing were limited, however
  + The standoff eventually ends a few days later as the ships return to their bases, but none of the issues in the South China Sea are resolved and military presence continues to increase there
  + The Crisis marked the beginning of US politicians openly talking about and sometimes encouraging the prospect of war with China
  + Each country began to quickly sever many diplomatic ties and slowly sever economic ties
  + The Crisis triggers a massive increase in global tension and the Second Cold War begins
  + Pompeo gave a national address where he called for a ‘New Truman Doctrine’, practising Containment on authoritarian autocratic rule and pledging to limit the expansion of Chinese influence
  + The re-adoption of the Truman Doctrine is seen by some historians as the real start of the Second Cold War

##### Ganges Water Crisis, 2042

* Ganges Water Crisis, 2042 | Context
  + The Ganges Water Crisis marked the closest the world came to nuclear war since the 1960s
  + The US military was put onto DEFCON 3
  + The long term causes of the Crisis were water scarcity and poor Sino-Indian relations
  + Water scarcity in East Asia as a whole became increasingly acute in the 2020s and 2030s, and the idea of a water war became increasingly common
  + Water scarcity in China was a mounting problem in the 2020s and 2030s
  + Although Chinese authorities rapidly built up water infrastructure, the issues of pollution and population growth continued to worsen the issue
  + By the early 2040s, around 85% of the Chinese population was affected by water scarcity, pressuring China into unprecedented action
  + Water scarcity in India was also a major problem- even by 2018 50% of the Indian population faced extreme water stress
  + By 2042 this statistic was considerably greater due to pollution and population growth
  + At the same time, Chinese border issues with India intensified in c.2030 and 2031 saw another Sino-Indian Skirmish here
  + Although the particular skirmish was deescalated, tensions were very high
  + China began damming even more rivers that ran into India in the 2030s to provide hydroelectric power, as pollution was contributing to water scarcity
  + This intensified Indian water scarcity, however, and caused India to threaten China with war and massively increase military presence on the border
  + The Indian armed forces initiated a large-scale skirmish in May 2042 with several hundred casualties- it was as close as the government was willing to go to a declaration of war without risking MAD
  + This, coupled with a history of other isolated incidents, both diplomatic and at the border, prompted the CCP to dam the Ganges River
  + This causes immense water stress and, without irrigation, massive amounts of food risk not being grown and harvested
  + The damming of the Ganges puts India over the edge and risks a catastrophe- India formally appeals to the United Nations for aid and puts the military into highest alert, readying for full war and demanding the destruction of the dam
* Ganges Water Crisis, 2042 | Events
  + The USA immediately takes India’s side and, with Indian consent, floods soldiers into Uttarakhand, demanding the construction of the dam
  + Bangladesh also takes India’s side as Chinese extensive river damming has also put Bangladesh at risk of massive water scarcity
  + SE Asia aligns with India for the same reasons, though unlike Bangladesh and the USA, does not actually threaten war
  + China refuses demands to blow up the dams and mobilises its own military and nuclear apparatus
  + It looks as if genuine nuclear war will erupt in Asia, with the USA providing conventional soldiers in support to India
* Ganges Water Crisis, 2042 | Resolution
  + The Crisis is resolved in three different ways: diplomatic, economic, and scientific
  + Diplomatically, the EU offered to mediate between India and China in the crisis
  + Economically, the treaties signed as a result of the Crisis definitively settled how to handle water shortages in the region
  + Scientifically, the events of the Crisis made scientists worldwide prioritise how to increase the world’s water supply
  + EU mediation was crucial in the Crisis, helping to hammer out the 2042 Sino-Indian Treaty, the South Asian Water Treaty, and the South-East Asian Water Treaty
  + The 2042 SI Treaty solved the specific issues of the Crisis: China agreed to destroy the Ganges and Brahmaputra Dams, in return for minor concessions on the India-China border
  + It also established a diplomatic hotline between New Delhi and Beijing and built up more diplomatic infrastructure between the two regions
  + The other water treaties concern international efforts in their respective regions
  + Agricultural practices were majorly reformed to conserve water, pollution of water by waste was largely forbidden, regulations for ecological sustainability were introduced, rules as to which rivers could be dammed and when were established, water infrastructure in each country was rapidly built up, corporate water footprints were regulated, etc
  + They also created the East Asian Water Board (EAWB) to serve as a forum for water-related issues in East Asian countries
  + Scientifically, the world committed itself to solving water scarcity, and the 2040s saw major technological and scientific breakthroughs in the matter
  + With the whole world committing itself to solving these issues, by the 2060s the threat of worldwide water scarcity had dwindled to negligible levels due to proliferation of new water-conserving technology
* Ganges Water Crisis, 2042 | Consequences in India
  + The damming of the Ganges caused risk of mass-death of thirst in India to become a real possibility, and they formally appealed to the UN for aid
  + The UN accepted, with the USA spearheading efforts to distribute water and build up water infrastructure, letting India take on favourable loans and allowing private US companies to invest
  + This did much to alleviate the short-term risk of apocalypse in India
  + Bangladesh did not ask for but permitted UN aid, although South East Asia insisted on the absence of foreign intervention
  + The decision was vindicated when the USA began establishing military bases in northern India and retaining soldiers there to patrol the borders there in 2043 and some of 2044
  + The USA did this for three reasons: they were genuinely trying to deter Chinese attacks; they were concerned about India’s drift to the right wing and wanted to increase military presence there; and they misjudged what India’s reaction would be
  + India reacted very negatively to what they saw as American occupation and 2043-4 saw various diplomatic issues arise because US troops all left in 2044
  + The USA misjudged how badly this would alienate India, and it erased much of the goodwill generated by their earlier aid
  + The poor handling of the situation in India caused the India to stop their gradual drift towards the USA to help contain China, and as India became more wealthy and powerful it increasingly pursued an isolationist policy and Indian exceptionalism grew in the country
  + India were also bitter about the 2042 Sino-Indian Treaty and how it gave border concessions, and thus grew further from the EU, who mediated between the powers
  + The poor handling of the Ganger Water Crisis by the USA is often pointed to by historians as an important reason for India’s change in foreign policy
  + It is important to not overstate this, however- India continued to conduct joint war games with US and Japanese fleets against China until c.2050, indicating that the Crisis merely accelerated the growing Indian detachment from liberal democracies nearby

##### Second Scramble for Africa, 2045-2073

* Second Scramble for Africa, 2045-2073 | Context and Events
  + The 2020s and 2030s saw an exponential increase in Chinese investment in Sub-Saharan Africa
  + The formation of the East African Federation changed China’s attention to the continent from limited to considerable
  + As the EAF began aligning with the USA, China became convinced of the need for strong counterweights in the region
  + By the 2040s, the primary target of investment, the Democratic Republic of the Congo, was firmly in China’s pocket but also wealthy and centralised to declare war
  + China sought to expand its influence by backing their expansion, securing powerful allies in Africa
  + The DRC attacking the Republic of the Congo ignited something unprecedented, however
  + Tensions had been brewing in the continent for decades
  + Countries in Africa had been drawn up on colonial lines, not ethnic ones, so the nations in Africa sought to expand to establish ethnic nation-states
  + Foreshadowing this, some small-scale conflicts had broken out in 2030
  + The need for war was more prevalent than ever due to autocratic regimes facing increasing internal risk of revolution, as the people grew more angry over corrupt/ineffective regimes and better equipped to do something about it (having a higher standard of living)
  + Many countries thus sought war to distract their people from revolution
  + The expansion of the DRC with Chinese backing suddenly alerted to the USA to the opening of a new geopolitical front and it began funding and backing African nations there
  + China responded by supporting other nations there as well
  + The crisis escalated into several proxy wars occurring at once, as Africa entered a period of chaos
  + A dozen or so wars were occurring simultaneously by 2050
  + Even independent countries like Egypt took advantage of the chaos to expand themselves, seizing land from Libya, which was undergoing a civil war backed by China and the USA
  + The general chaos also spurred a secessionist movement in South Africa, with both sides refusing aid from either superpower
  + Tensions between China and the USA escalated- the successful resolution of the Ganges Water Crisis had smoothed over tensions, but they flared up again
  + The rapid race to back different African nations led many to dub the events the ‘Second Scramble for Africa’
  + By 2073, the continent had stabilised, with the 2073 Cape Treaty establishing the Republic of the Cape (a unified polity consisting of Namibia and western South Africa) being used by many scholars nowadays to mark the end of the struggle
* Second Scramble for Africa, 2045-2073 | Aftermath
  + The Second Scramble saw a major redesign of the map of Africa
  + The new countries formed were almost all aligned with either the USA or China
  + Some of these countries were able to limit this influence to economic and diplomatic ties
  + However, several African countries joined military alliances with the USA and China
  + NATO, for example, was renamed as several African countries joined it- 2056 saw NATO become the LDC

##### American Zeta Crisis, 2056

* The American Zeta Crisis saw another risk of nuclear war, this time between the USA and China
* The US military went into DEFCON 2 and very nearly declared war
* It is often compared to the Cuban Missile Crisis due to its many parallels
* American Zeta Crisis, 2056 | Context
  + The 2050s saw an increase in US and Chinese aggression worldwide
  + Even with the Second Scramble for Africa occurring, tensions in the East China Sea also began to rise
  + China and Japan had long been in a state of rising tension over various disputed islands in the East China Sea
  + The Senkaku Islands had been disputed since before 2020, although previously Japan had refrained from developing or militarising the islands
  + Due to increased Chinese espionage in the USA and Japan, however, the early 2050s saw Japanese troops with US advisors enter and occupy both this island and other disputed islands, and a few standoffs occurred between China and Japan in the East China Sea
  + US military presence in Japan, declining for a long time, suddenly increased due to these standoffs, and US troops garrisoned many of these islands
  + China grew angry at what it perceived to be threats to its sovereignty
  + However, something like the American Zeta Crisis was inevitable due to rising tension in general, especially with the Second Scramble for Africa
  + The Cartel War had been officially ended with the USA pulling out of Mexico in 2045, but guerrilla-like activity still persisted
  + Mexico’s joining of NATO prompted China to begin funding some of these cartels- Chinese companies had been doing so for decades hence with the state turning a blind eye, but this was the first time the state itself directly intervened
  + In the mid-2050s, this escalated due to aforementioned reasons to China funding branches of the Zeta cartel in America
  + The USA noticed this soon and CIA and FBI investigations into burgeoning cartel activity in the South showed Chinese influence, triggering the crisis
* American Zeta Crisis, 2056 | Events
  + The USA immediately threw its entire military apparatus at exterminating American cartel activity
  + President Myle demanded that China cease all cartel activity immediately and declared what he called the ‘Myle Doctrine’, declaring that any further Chinese intervention in North America would lead to war
  + The US military went into DEFCON 2 for the first time since the 1960s
  + US warships in the South China Sea and East China Sea surrounded China and numerous simultaneous standoffs occurred here
  + The UN condemned Chinese actions and, in protest, China and North Korea left the United Nations
  + China refused to acknowledge the Myle Doctrine, citing US involvement in East Asia
  + Myle personally discussed terms with the CCP, leading after two tense days to an agreement
  + China would promise to cease funding any groups in any North American country and sever all ties to Mexican cartels
  + The USA would withdraw from disputed islands in the East China Sea and limit military presence in Japan to a few bases
  + More diplomatic ties were built up between the two tensions
  + Just like as in the Cuban Missile Crisis, the vast proximity to full nuclear war caused both sides to try and ease tensions
  + Unlike in the 1960s, however, there were no treaties to regulate nuclear arms numbers
  + The effects of the resulting détente from the Crisis were largely intangible, and for the next decade aside from normal levels of espionage, the only engagements between China and the USA were proxy wars in Africa
  + The USA was invited in 2056 to yet again intervene in Mexico to erase the last remnants of cartel activity
  + Lessons learned in Africa had made the USA much more proficient in guerrilla warfare and they withdrew again two years later in 2058
  + Three years later, the Mexican authorities declared the Cartel War firmly over with the last dregs of cartel activity genuinely erased

##### Kee Lung Crisis, 2070

* Arises over Chinese aggression towards Taiwan
* US military goes into DEFCON 2 yet again and nuclear war seems imminent
* Unlike the 2056 Crisis, this is not followed by détente but by an increase in tension and investment in Neonautilus technologies
* Kee Lung Crisis, 2070 | Context
  + Since the 2020s, China had become increasingly aggressive towards Taiwan
  + As early as the 2020s, Chinese jets flew over Taiwanese airspace, and aggression escalated from there
  + Taiwan increasingly turned to the USA/LDC for protection: over the 21st century, Taiwan gradually lost its sovereignty as the USA strengthened economic ties, diplomatic ties, military aid, and then established bases there
  + The USA helped Taiwan undergo the Fourth Industrial Revolution- the government and private companies bought large amounts of shares in Taiwanese companies, invested heavily in state industries, and gave lots of loans
  + By the 2060s, the USA had very heavy influence in Taiwan, and China had grown extremely wary of having a US military base on its doorstep
  + The 2050s and 2060s saw a gradual increase in Chinese and US military presence there and nearby
  + The late 2060s saw several standoffs there- one of which, in 2070, escalated into action, and two old Kee Lung-class destroyers that had been re-outfitted were shot at, killing seventeen Taiwanese sailors
  + Although the CCP had not officially told Chinese ships to attack, they had not explicitly discouraged it, and the Taiwanese misconstrued the incident as a shift in CCP policy to attack Taiwanese ships
  + They told the USA as such, and the US government became convinced that China was ramping things up and Taiwan needed to be protected
  + The USA moved nuclear missiles into Taiwan and released an official statement saying it was due to Chinese aggression
  + China’s fears of a US military base on its doorstep were vindicated, and China had its warships surround Taiwan and enact a blockade
* Kee Lung Crisis, 2070 | Events
  + As retaliation to the blockade, the USA and EU worked together to admit Taiwan to the UN and acknowledge Taiwan as the legitimate authority of the Chinese people
  + China immediately left the United Nations after
  + China released an ultimatum: remove the missiles, or the CCP would drop bombs on Taiwan
  + The USA couldn’t back down for fear of looking weak, however, and believed that Taiwan really needed the extra security of missiles
  + Eventually, the Presidents of the USA and China made an agreement:
    - China to pay reparations to the families of the dead Taiwanese sailors
    - China to respect Taiwanese airspace and not fly over it
    - USA to remove nuclear missiles from Taiwan and to remove all bomber planes from Taiwanese airfields
* Kee Lung Crisis, 2070 | Aftermath
  + Unlike previous crises, the resolution of the Crisis did not lead to détente
  + Instead, it confirmed the inevitability of war: it didn’t settle issues concerning the sovereignty/militarisation of Taiwan
  + Indeed, it highlighted these issues and highlighted the general fact that there were so many different theatres of conflict and so many scares of nuclear war that peace was practically impossible
  + It became clear to the US federal government and CCP that the issue of Taiwan could not be settled in a way that was satisfactory to both of them
  + Each side invested heavily in directed-energy weapons and Neonautilus technologies, trying to circumvent the principle of MAD
  + These efforts were eventually successful

#### Fourth Industrial Revolution

* The First Industrial Revolution concerned the use of steam power, occurring in the mid-late 1700s
* The Second Industrial Revolution concerned the use of electricity, occurring in the mid-late 1800s
* The Third Industrial Revolution concerned the use of telecommunications, occurring in the mid-late 1900s
* The Fourth Industrial Revolution concerned the use of automation, occurring in the mid-late 2000s
* The Fourth Industrial Revolution (4IR) can be thought of as the automation of traditional manufacturing and industrial practices
  + It began in the late 2040s with complex machinery replacing unskilled labour in factories and saw widespread popularity by the 2060s
  + WWIII served as a major impetus for industrialisation by countries who had not yet undergone (or, as this document often refers to it, ‘embraced’ the 4IR
* The 4IR is commonly thought to have started in China, but is acknowledged to have roots in both China and Germany
  + The 4IR occurred at around the same time in both countries
  + The Chinese 4IR focussed on robotics development and automation
  + The German 4IR focussed on the computerisation of manufacturing
  + Each revolution had both of these aspects, but the programmes employed by these countries had different emphases
  + Different countries seeking to experience their own 4IR combined the Chinese and German approaches
  + The 2020s, 2030s, and 2040s saw many different countries look into automation, especially in the 2040s
  + The total amount of money invested in automation was, by the 2040s, largest in the USA- but the Chinese and German investments in automation had been longer-term and better planned
  + By the 2010s, China had an almost fully automated factory in Guangdong, with 9 robots replacing 140 workers
  + By 2016, China had 36 robots per 10,000 workers- this was 314 in Japan and 478 in South Korea, but China invested far more into national, full-scale automation throughout the 2020s
  + Germany had a project called ‘Industrie 4.0’ begun in 2011, promoting computerisation of manufacturing and digitalising mass-production to make it more customisable
  + The 2020s and early 2030s saw wide-spread implementation of I4 recommendations, and by the mid-2030s Germany was investing considerably in robotics and manufacturing
  + The late 2040s in China saw the beginning of rapid, simultaneous establishments of automated factories and the introduction of mass-unemployment support
  + The early 2050s in Germany saw the establishment of nationwide computer programs linked to automated factories for the complete computerisation of industry
  + The 2050s saw China, Germany, the USA, India, Switzerland, Sweden, Singapore, the Netherlands, Denmark, Finland, South Korea, France, Israel, Japan, Canada, the UK, Bangladesh, and Indonesia start to industrialise
  + The 2060s saw the EAF, Nigeria, Mexico, Italy, Spain, Bangladesh, Australia, Taiwan, the Philippines, Vietnam, Thailand, Argentina, and Malaysia began to industrialise
  + WWIII caused the majority of the world to industrialise, with the Interwar Period seeing the last industrialising nations, mainly in Africa, Central Asia, and the Caribbean
* It’s important to understand that like the 1IR, the 4IR didn’t happen overnight
  + Any industrial revolution can be thought of as an economic transition occurring at an exponential pace
  + Automation was occurring in the 2020s and 2030s in certain countries as well as in the 2040s- but at an exponential pace
  + The late 2040s was when this exponential rise resulted in automation being prevalent enough to cause major changes to the economy and society
  + The late 2040s is when the 4IR is often dated to begin because this was when automation reached levels of prevalence high enough to cause societal changes noticeable to the common worker
  + Countries industrialising doesn’t mean moving from zero automation to total automation, but automation increasing in prevalence to carry out all factory labour
  + The USA, for example, is said to have begun industrialisation in the 2050s: the robot: worker ratio in the country had been increasing for the previous decades, but the 2050s is when the pace of automation began to ‘explode’, and productivity mirrored this increase
  + The 1IR is usually agreed to have begun in the 1760s: it didn’t occur instantly on 1 January 1760, but the 60s was a decade when previous economic trends began to change the economy as a whole and, later, change society itself
  + The 1IR lasted for around eighty years in the UK, but the 4IR lasted for about fifty due to WWIII acting as a catalyst for industrialisation
* The use of automated, 3D printed robots makes human unskilled labour redundant, meaning that the 4IR came with unprecedented, immense socioeconomic changes
  + Unemployment skyrocketed, putting massive stress on social systems
  + The long-term solution was a complete overhaul of the economy and employment
  + Massive amounts of money were spent on re-education of the workforce and construction of vocational academies and training centres for skills
  + The idea was a complete change of the workforce to emphasise the acquisition of skills which robots couldn’t yet do
  + The number of skilled working class people (plumbers, carpenters, mechanics, etc) increased massively
  + The education systems of industrialised countries were also overhauled- initially just tertiary education but this spurred massive education reform of secondary/primary schools later
  + Massive open online courses became popular and ‘microcredentials’ (small-scale qualifications) do so as well
  + The short-term solution was a colossal expansion of the social safety nets of industrialised countries to deal with catastrophic unemployment levels
  + The temporary shift towards left-wing economies is retained in almost all industrialised countries, except for later, gradual movements towards deregulation
  + Some countries introduce limited Universal Basic Income programmes- the idea of UBI becomes popularised by positive results and after WWIII becomes almost universal in liberal democracies
* Automation and robotics are accompanied by computerisation of manufacturing
  + Industrialised countries adopt the German program of connecting automated factories to computer programs to have ultimate control over production
  + The 4IR sees the creation of ‘cyber-physical systems’, formed by a network of computers linked together to make production decisions automatically based on instructions
  + There is also further development of the concept of the ‘Internet of things’, referring to separate devices all connected to each other via the internet to receive/send data/instructions
  + Even in 2020, there are over 50bn internet of things devices, generating 4,400,000,000,000 gigabytes of data
  + IoT devices range from data sensors to self-driving vehicles
  + Computers optimise manufacturing by collecting data and identifying problems or opportunities, allowing owners to increase yield
  + These systems also link up with self-driving vehicles in later decades to optimise transport and logistics
* The 4IR also brings manufacturing for countries back home
  + Robots will work for less than the most maltreated human worker
  + Hence industrialised countries start to move away from buying products of cheap labour from developing countries, and produce goods for themselves
  + This does more to eliminate wage slavery than any previous development
  + The negative side is that many countries find themselves gradually face greater economic difficulty due to less demand for their product
  + This in itself serves as an impetus for industrialising
  + Bangladesh and Indonesia are two countries that are forced to industrialise quickly to generate wealth to compensate for falling demand of manufactured goods
  + The 4IR thus spreads worldwide far more rapidly than the 1IR or 2IR
  + Many economists attribute globalisation to the region why new economic developments spread so rapidly
  + By mid-WWIII, the only unindustrialised regions of the world are Sub-Saharan Africa, Central Asia, and Latin America
  + By the 22nd century, fewer than a dozen countries haven’t begun industrialisation
* Some economists believe that the advent and proliferation of pure fusion power, or developments in nanotechnology, constitutes a 5th Industrial Revolution
  + The construction and use of pure fusion power plants in the 22nd century massively increased the amount of energy available to civilisation
  + Pure fusion power revolutionised the energy industry, making energy almost free in every country which adopted pure fusion power
  + Some countries have nationalised energy industries and provide free energy as a human right by 2170
  + The adoption of pure fusion power also essentially ended the issue of climate change
  + The idea of a 5IR is not accepted by most economists, however, as the advent of pure fusion transformed the energy industry and consequently affected various others- but it didn’t cause any sort of fundamental societal changes
  + The 4IR didn’t just affect the economy, but society as a whole, making it unrecognisable from preceding decades
  + Pure fusion power caused important societal changes but nothing on the scale of previous industrial revolutions
  + The same argument is used by many academics to dispute the idea of nanotechnology causing a 5th industrial revolution
  + Nanotechnology refers to the construction of substances on the scale of atoms and molecules
  + In the most commonly proffered case, the development of carbon-fibre substances, stanene, and microlattices is sometimes seen as causing a new industrial revolution
  + However, just as with pure fusion power, nanotechnology completely changed various industries and thus had powerful *economic* effects
  + But it did not completely change human society itself, and hence the ‘Nanotechnology 5IR’ theory is generally rejected by academics
  + The almost universal consensus is that there have been only 4 industrial revolutions

#### Africa

* From 2020-2080, Africa becomes a wealthier, more centralised continent with higher GDP and HDI levels
* With the exception of the 2045-2070 years, extreme poverty becomes all but eradicated
* The East African Federation forms in 2032, becoming a flawed democracy- however, over the 21st century, committed politicians and adept economic policies made the EAF a wealthy liberal democracy
* The 21st century sees a massive outbreak of wars sponsored by the USA and China
  + The 2020 political borders of Africa are based on arbitrary colonial boundaries rather than an ethno-lingual basis
  + 2020-2045 sees mounting discontent due to ineffective, corrupt governments and internal tensions caused by conflicting ethnic groups (as well as a host of other issues depending on the country)
  + African countries grow quickly during this period, and this (coupled with Chinese investments) allows many countries to buy new arms and weapons
  + Tension erupts in 2045, when the CCP, having heavily invested in the DRC in the 2020s/2030s, backs their invasion of neighbouring Congo
  + 2045-c.2070 sees a massive explosion of conflict as in various parts of Africa, countries/rebels backed by the USA or China go to war to capture territory or establish nation-states
  + The struggle of the USA/China to attain allied states is referred to as the ‘[Second Scramble for Africa](#_Second_Scramble_for)’
  + The result is that by 2070 when much of this conflict in various parts of the continent ends, Africa is filled with fewer, larger polities with a distinct sense of nationalism- and which are aligned with either the USA or China
  + Many of these states, particularly the US-backed ones, become liberal democracies, and GDP and HDI levels quickly rise
  + Others become/remain autocratic regimes- GDP rises even more rapidly in these due to lack of economic regulation and Chinese backing
* The result is that by 2080 the political map of Africa is very different to what it is in 2020:
  + Gouran forms as an independent nation in northern Chad, composed of the native Daza people there
  + The Republic of the Cape forms as an independent nation composed of Namibia and western South Africa
  + Sokoto forms as an independent nation where the Ivory Coast, Ghana, Togo, and Benin are
  + Somalia forms as an independent nation in the southern Somaliland
  + Libya splits into two nations, generally along the lines of the LNA and GNA in the Second Libyan Civil War: both nations call themselves Libya, though the GNA-controlled Libya is backed by China and autocratic, whilst the LNA-controlled two-thirds is democratic and USA-backed
  + Ethiopia expands, annexing Eritrea, Djibouti, and the northern Somali Coast
  + Morocco expands, annexing the Western Sahara and northern Mauritania
  + Egypt expands, annexing northern Sudan and eastern Libya
  + Sudan expands, annexing southern Chad
  + The DRC expands, annexing Congo, the Central African Republic, and northern Angola- the DRC renames itself to Zaire
  + The East African Federation expands, annexing northern Mozambique, Malawi, and eastern Zambia
  + Nigeria expands, annexing Cameroon
  + Angola, Zambia, and Zimbabwe collapse into multiple smaller states
  + Mali, Mauritania, and the rest of western Africa south of Mali collapse into a few more smaller states- subsequent conflicts in the 22nd century greatly reduce the number of countries here

#### United States of America

* The USA sees extremely profound political changes
* Joe Biden has an uneventful presidency where little reform occurs but no major scandals occur either, and is re-elected in 2024 despite the Republican Party backing Trump
  + The failure of Trump sees major riots and outbreaks of unrest in the USA, including attacks on the Capitol
  + The National Guard are mobilised and the actual threat to US democracy quickly passes
  + However, several major conservative organisations like the Proud Boys and the KKK, are labelled domestic terrorist groups
  + The whole affair causes a major political backlash against Trump and by extension the Republican Party, leading moderates to vote Democrat in a landslide 2028 election
* Further political changes occur:
  + The 2028 election sees Andrew Yang becomes president
  + Yang passes largescale reforms to student debt and enacts a few limited Sanders-like policies, though lacks the Congressional support to introduce Universal Basic Income
  + Nonetheless, his presidency is popular and he is re-elected in 2032
  + During the [Spratly Arbitration](#_Spratly_Arbitration,_2036), Yang and the Democrats argue for action against China, but limited economic sanctions
  + Yang wishes to avoid serious escalation as a trade war would be economically detrimental to the US populace, and a new Cold War would be detrimental for world peace
  + The US populace is outraged, however, and Yang and the Democrats fall out of favour
  + The Republicans recover popularity amongst the US people by arguing for a massive escalation against China
  + The US populace backs this and elects a Republican president in 2036, Mike Pompeo, who’s approval ratings are bolstered due to a massive propaganda campaign
  + Pompeo, with the mandate of the US public, begins the Second Cold War
  + Pompeo is seen as generally incompetent, however, and ruins the image of the Republican Party even more, which is rapidly declining
  + The Egalitarian Party is founded at the end of Pompeo’s presidency as a left wing party which follows Bernie Sanders’ (now retired) policies
  + This is especially with the passing away of almost all Baby Boomers, leaving a young voterbase which votes Democrat more and more, and more and more vote Egalitarian
  + The desire of these younger generations for widespread social reform lacks an effective outlet as the Democrats are still fairly right wing, but many vote them anyway as the Republicans are even more so
  + Nonetheless, the US populace’s commitment to the Second Cold War is generally firm- a Democrat is elected in 2040, but many see the Democrats as still too willing to compromise, and the Ganges Water Crisis causes dissatisfied voters to reluctantly vote Republican in 2044 and 2048
  + Dislike of the two party system rapidly expands
  + The total failure of the Republican Party to effectively respond to the Fourth Industrial Revolution causes a total irrevocable collapse for them, who have been increasingly associated with corruption and incompetence
  + The Democrat party are not viewed favourably either, however
  + 2052 thus sees the election of an Egalitarian Party politician- Daniel Myle- an economist who responds well to it and invests in massive workforce re-training
  + Myle is extremely popular and is re-elected in 2056
  + Meanwhile, the Republican Party, having collapsed, is absorbed into the Democrat Party, who is also risking obsoletion
  + They merge to form the Democratic-Republican Party, and embark on a massive rebranding campaign to rescue their image, appealing to conservatives
  + The 2060s thus sees the emergence of the 4th Party System
  + The desire for reform is still present however, and Myle vastly increases popular opinion of the Egalitarian Party
  + Myle is asked to run for a 3rd term but declines, and another Egalitarian is elected in 2060
* 2060-2080
  + In the 2060s, the US populace shows signs of becoming more conservative
  + In the same way that Latin America became more conservative in the 2010s after the left-wing ‘pink tide’ gripped the continent, many Americans, satisfied with existing reform, argue for maintaining the status quo
  + The Democratic-Republicans thus regain popularity- having totally rebranded themselves- and have Presidents in 2068 (an unexpected DR victory) and then 2072
  + The Egalitarian Party wins the 2080 election, however

#### Mexico and Central America

* Mexico undergoes monumental changes regarding the cartels
  + Mexican drug cartels become increasingly powerful in the 2020s and 2030s
  + The government fails to effectively respond to the mounting cartel threat, and they wax in confidence and power
  + Less developed regions of Mexico become effectively controlled by narco governments
  + The Sinaloa cartel eventually gets too confident, however- in 2038 near the US-Mexico border, a group of American tourists consisting of 22 people are massacred for disrespecting cartel personnel
  + This occurs in the context of increasing US awareness of cartels smuggling drugs like Fentanyl/heroin into America
  + The leftist Mexican government, losing ground to the cartels, formally invites the USA to militarily intervene in an extremely surprising move
  + Pompeo, having been elected for his propensity for conflict, agrees, initiating previously formulated US plans to destroy Mexican cartel activity
  + In this period, the knowledge that Chinese companies spurred by the state supply cartels with these drugs (who then smuggle it to US citizens) becomes widespread, increasing the US distrust of the CCP
  + From 2038-2045 Mexico becomes one massive warzone
  + The cartels respond by cutting all drug smuggling to the USA, causing chaos as many addicts turn to violence to fuel their addictions
  + Yang is thus able to pass major reforms to drug policy with the support of a frightened Congress
  + The War on Drugs is declared over- all drugs are decriminalised with rehab clinics set up in droves
  + Weed, LSD, and shrooms are legalised and heavily taxed and regulated
  + By 2045 overt cartel activity has seized and the Mexican national guard takes over, fighting a guerrilla war
  + The US pulls out in 2045
  + The Cartel War is generally seen positively in the USA, although the engagement in Mexico contributed to Yang’s reluctance to engage China
  + It massively boosts US-Mexico relations
  + The 2040s sees major immigration reform, change in social/cultural attitudes, and Mexico joining NATO, and both countries greatly strengthen economic ties and enter free trade agreements
  + In Mexico, the Cartel War causes devastation in the short-term but by the 2060s the new Mexican economy is rapidly growing due to the lack of cartels and the Fourth Industrial Revolution, and HDI levels rapidly increase
  + By 2080, Mexico is a far more centralised country, and it strongly aligns itself with the USA
  + The result is a very left wing, progressive state
* Central America is more quiet
  + The Central American countries generally grow and become more liberal in the 21st century
  + Central America has steady growth rates, and generally maintains low inflation, with Panama and Guatemala leading economic growth
  + Economic integration in the region greatly increases during this time, leading to great increases in regional trade and thus prosperity
  + In the 2030s, this is tested when El Salvador and Costa Rica undergo minor economic crises due to mounting public debt
  + However, the countries in this region respond by forming closer ties and actively helping the economies here, leading to greater unity in the region and more stability, cementing the economic interdependence here
  + There are no major revolutions or conflicts here, although cultural changes still cause major internal political changes
  + They are slow to act on the [Fourth Industrial Revolution](#_Fourth_Industrial_Revolution) however, becoming left behind- the lack of major economic changes and a failure to diversify greatly decrease Central American competitiveness in the global economy
  + These nations by no means become poor, however, and remain stable, prosperous, and with far higher living standards than in 2020
  + Most seek to be non-aligned during the [Second Cold War](#_Second_Cold_War)
  + However, by the 2070s mounting US and Mexican influence and pressure forces several to either join or align with the [LDC](#_Liberal_Democracy_Coalition)

#### Latin America and the Caribbean

* The necessity of environmental sustainability is made clear through climate crises in the mid-21st century, and Latin American countries reluctantly make significant progress in this area
* Latin America as a whole becomes more centralised and less violent in this period
* Many of these countries see significant and sustained growth, particularly Brazil
* Economic integration increases amongst the Latin American countries in each faction
* Much of these positive economic changes occur in around the 2040s however- whilst the 2020s/2030s sees improvements in standards of living, violence levels, and GDP, many are dissatisfied
* In the 2020s/2030s cities start to overflow, water becomes scarcer in many parts, and there is a lack of major economic reform
  + Though standard of living/nominal GDP rises in this period, in most countries this gain is offset by increased corruption and continued weakness of state institutions- and is not major anyway
  + The [Ganges Water Crisis](#_Ganges_Water_Crisis,) leads to the issue of water scarcity being definitively tackled
  + Developments in agriculture solve the risk of food shortages in the continent
  + The general sense of gloominess and negativity, and the lack of major change, in the 2030s spurs major demands for change in many Latin American countries
  + 2040-2060 sees major economic reforms in Latin American countries and an emphasis of the strengthening of state institutions
  + In some countries, this leads to left-wing welfare states
  + In others, this leads to authoritarian states which threaten to become police states
* Only Brazil and the Philippines effectively embrace the [Fourth Industrial Revolution](#_Fourth_Industrial_Revolution), but other Latin American countries do so in the late 2070s and show signs of rapid growth in this period because of it
* In 2020, many institutions in Latin American countries are inadequate, and the states are weak and fragile- by 2080, much of this has been reversed, and these states are far more centralised and powerful
* By 2080, Latin America is deeply politically divided:
  + In certain countries, the 21st century sees an increased move towards liberalism and left wing policies, and these countries align more with the USA and build up stronger economic ties with the USA and each other
  + These countries still do not join the [LDC](#_Liberal_Democracy_Coalition) however, and don’t explicitly side with the USA during the [Second Cold War](#_Second_Cold_War)
* The reverse is true for the remainder of the continent, however:
  + The ‘conservative wave’ of the 2010s continues in the remainder of the continent, particularly Brazil and Venezuela, which is not a democracy anyway
  + Populism gives way to cults of personality and strongmen
  + Authoritarian, right-wing governments repeatedly take hold and civil liberties become gradually eroded
  + By 2080 these countries are less democratic than they were in 2020
  + The right-wing Latin American countries gravitate around Brazil, avoiding Chinese influence, and strengthen economic ties with one another
  + This comes with the exception of Venezuela- Maduro and his successors increasingly rely on Chinese backing to stay in control and independent
* The economic changes in Latin America are largely mirrored in the Caribbean
* The Caribbean sees greater HDI/GDP improvements from 2020-2040 than Latin America, but many countries still remain comparatively poor and underdeveloped
* The 21st century sees economic diversification and increases in wealth, but by 2060 Latin America has eclipsed the region in wealth, centralisation, and prosperity
* The result was that these countries were ill-prepared to embrace the Fourth Industrial Revolution
* Some, spurred by popular discontent and a desire to modernise, totally overhauled their economies during this time and made immense progress in this and standard of living/human development from 2060-2080 in the same way that Latin American countries did from 2040-2060
* Others failed to effectively do this, however, leading to continued underdevelopment: heavy US investment in these countries (due to the Second Cold War) did much to bolster their economies and allow them to exponentially improve
* By 2080, the Caribbean is less wealthy than Latin America but has, as a region, made considerable increases in prosperity, stability, and centralisation and is far wealthier than in 2020
* Politically, the Caribbean generally moved towards the centre-left
  + Countries like Cuba underwent economic reforms and became more right wing and western capitalist, with some steps towards democracy made
  + The vast majority of the Caribbean remained as parliamentary democracies and did not see major movements towards the left or the right
  + The Caribbean countries drifted towards being more progressive and liberal but not in a major way
* The regionalism of 2020-2050 has become undermined and replaced with divisions:
  + Before the Second Cold War escalated in 2040s, many Caribbean countries sought to be unaligned
  + The majority were more closely aligned with China than the USA, with all nations signing on the Chinese Belt and Road Initiative by 2030
  + The Caribbean nations took care not to associate with China too closely, however, and continued the trend of economic integration with other Caribbean nations and cultural regionalism
  + This began to change, however- as the 2CW escalated both superpowers took an increased interest in the region
  + Due to its proximity to the USA, the USA poured money into various nations to strengthen ties, which successfully kickstarted Caribbean economies and caused an alignment with the LDC
  + No Caribbean countries have actually joined the LDC or WPA, however, and despite large political differences between many of these countries and a greatly undermined sense of regionalism and cultural unity, warfare in the region isn’t really on the table by 2080

#### Russia and Central Asia

* Pressure for democracy in Russia exponentially increases and Putin’s harsh action against this prompts EU action
  + Navalny dies in 2022, many suspect due to poisoning
  + He becomes somewhat of a martyr, and later in the 2020s other figures come to the fore, asking for democracy
  + Nonetheless, Putin’s grip on society is too tight, and no reforms are enacted
  + After a harsh response to riots in Moscow in 2027 and in St Petersburg in 2031, agitation for revolution becomes covert
  + Putin gains widespread condemnation worldwide, leading to increased awareness of Russian influence in Europe
  + Ukraine begins the process of joining the EU and the EU becomes more vigilant regarding Russian expansion in Ukraine and the Crimea
  + European countries become more anti-Russian and, with more of a common enemy, unity in the EU is promoted
  + The EU develops a standing permanent military structure similar to that of NATO, although as of yet no actual standing army is created
  + Nonetheless, it is clear to everyone that an important symbolic step has been taken in centralising the EU
  + The EU also massively encourages using renewable energy to try and discourage purchasing Russian natural gas
  + Putin’s provocative military manoeuvres near NATO members’ borders are matched by massive combined EU demonstrations
  + The EU also increases funding to Sweden and Finland for defence spending
  + They do not attempt to seize Crimea, however
* Putin dies in 2034 and is succeeded by Dmitry Medvedev
  + Medvedev, much like Gorbachev a few decades prior, recognises the need for reform and liberalisation
  + Medvedev passed major economic reforms aiming to diversify the economy, pursue renewable energy, and develop nuclear/information technology
  + Medvedev also pledged to the Russian people to curb corruption and inequality
  + This, coupled with threatening police manoeuvres, greatly lessens unrest in the Russian populace
  + Medvedev continues Putin’s foreign policy aims of destabilising Europe, increased influence in Belarus and the Balkans, and spreading propaganda and discontent in EU countries
  + The EU attempts to prise the Balkan countries from Moscow’s orbit by fast tracking their admittance to the EU
* Medvedev’s anti-corruption reforms begin to threaten the operation of the Russian oligarchy, however, and he is soon replaced by it
  + In 2037, Medvedev is replaced by Sergei Shoyu, a conservative who was in Putin’s inner circle
  + Shoyu quietly stops all reforms and allows the oligarchy’s activities to go unchecked
  + This eventually becomes known to the Russian people and after a few flagrant abuses of power, unrest exponentially increases
  + The populace, having been mollified by Medvedev’s reforms, are mortified to see all progress here redacted, and this outrage fuels a host of new agitators for democracy to rise
  + Peaceful protests are suppressed violently, leading to riots
  + The EU, encouraged by the instability of the Russian regime, funds these protestors, amplifying these riots into a violent ‘Russian Spring’
  + Shoyu flees and a democratic government is established in 2042
* Russia remains a flawed democracy, although it modernises economically
  + The 2040s are unstable and uncertain, but by the 2050s Russia, with EU support, stabilises into something resembling a liberal democracy
  + Russian society becomes more libertarian and progressive- although it is still markedly more right wing and conservative than the USA, for example
  + The issue is that the structure of the oligarchy still remains and still influences elections and society as a whole
  + Whilst Russia still sees major socio-political progress towards a true democracy, this therefore plateaus by the mid-2050s
  + However, though political modernisation is limited, economic modernisation goes into full swing
  + Russian democracy is put under the immense test of keeping up with the Fourth Industrial Revolution
  + It does so relatively well, however, and doesn’t collapse back into autocracy, and by 2080 Russia is one of the wealthiest countries in the world
* Central Asia becomes closely tied to China, who supports autocratic regimes in the region
* 2020-2060 sees a dramatic transformation in the region:
  + In the early 21st century, younger generations began demanding more from fragile, struggling states which inadequately provide basic needs like clean water/quality healthcare/etc
  + The kleptocracies in the region become increasingly unable to deal with the growing population
  + The 2020-2050 period thus sees exponentially mounting unrest in these regions, fuelled by low standards of living
  + The populace doesn’t clamour for full Western-style democracy, but rather reform, accountability in governance, and effective state institutions and support
  + Nonetheless, Central Asian societies become more liberal/progressive and new Western-friendly ideas begin to proliferate
  + The desire for increased standards of living, essential social services, and decreased inequality, provided by a dynamic and effective governments leads to major reform by the 2050s
  + HDI levels, literacy, standard of living, and state centralisation rises
* By the 2060s, however, the tide of discontent decreases and the pace of reform and change slows, leaving behind states which quietly become wealthier and have a higher standard of living, but not by much
  + Problems like economic stagnation, corruption, and un-diverse economies remain, however
  + The unrest of previous decades doesn’t deliver full liberal democracy either
  + The Central Asian governments do not embrace the Fourth Industrial Revolution and are thus left behind, making the region even more susceptible to Chinese influence
* Chinese influence in Central Asia rises throughout the 21st century:
  + The 2020s and 2030s sees ample Chinese investment in the region and larger influence in these countries
  + They allow Central Asian societies to change and centralise to adapt to the needs of the population, but ensure that democracy is not established
  + A few riots in the late 2030s, when the unrest and violence is at its peak, for full democracy are suppressed by arms and tanks made in China
  + Popular support for full democracy is not widespread, however, and China directly intervenes few other times
  + Central Asian regimes are pressured by the CCP to change, but remain firmly entrenched by Chinese support
  + 2040-2060 sees major changes in Central Asia, but by the late 2050s the rate of change begins to slow, and China invests further in the region
  + The 2060s and 2070s sees several Central Asian governments join the WPA under pressure

#### China and East Asia

* By 2025, China becomes the world’s biggest economy by nominal GDP
  + The 21st century sees continued economic growth, a steady increase in standard of living, and an increase in HDI levels
  + By 2080, China’s HDI rating would render it a 2020 ‘first world’ country
  + With a few exceptional years, the economy is stable and grows, and the wealth gap between China and the USA continues to widen
  + Inequality decreases in China but is still considerable
  + The eastern seaboard sees particularly large population and urban growth, but the inland areas also see this to a lesser degree
  + The standard and quality of Chinese manufacturing improves, and by 2080 the phrase ‘Made in China’ is a guarantor of quality rather than shoddiness
  + China is swift to adapt to the Fourth Industrial Revolution and embraces it fully, considerably bolstering its economy
* Politically, China remains under the control of the CCP and rejects political reform
  + The CCP, concerned by the post-perestroika collapse of the USSR, rejects any form of political reform
  + Their intention is to mollify the general population with increased GDP per capita, real wages, and standard of living- which occurs, and works, avoiding revolution in a sort of ‘bread and circuses’ policy
  + The CCP refuses any ideas of political plurality, an independent judiciary, or accountability to the people
  + Political conflict occurs within the CCP itself in the 2020s as Xi Jinping ‘cleanses’ the party from within, with little internal division after this except for a mild outbreak in the early 2040s
* Chinese foreign policy continues on its expansionist trajectory, bringing it into conflict with the USA
  + Initially, Chinese foreign policy involved heavy investment and the strengthening of ties, but minimal physical presence overboard- though this changed in the [Second Cold War](#_Second_Cold_War), Chinese foreign policy still favours economic and political influence over military power except when needed
  + The CCP continues militarising the Spratly Islands and constructing its own artificial islands in the South China Sea
  + The CCP continues investing and building in countries in Central Asia, South Asia, and Pakistan
  + Initial investment in Africa is low in the early 2020s but increases as the Second Cold War unfolds, resulting in China fighting numerous proxy wars in the Second Scramble for Africa
  + In Latin America China continues to buy stakes in local companies, but its influence here is limited as the countries here fall into the economic orbit of either the USA or Brazil
* The conflict between the USA and China escalates into a geopolitical situation similar to that of the USA and USSR in the 20th century
* Scholars refer to this as the ‘Second Cold War’ a term which was in near-universal usage after around 2040
* The nation of Japan sees a period of economic stagnation and decline until the [Fourth Industrial Revolution](#_Fourth_Industrial_Revolution)
  + This is largely attributable to demographic changes: the population consistently declines in 2020-2080 to around 70 million or so
  + Around 32% of the population is composed of the elderly by this point as well
  + Japanese productivity and GDP per capita grows, but the gap between Japan and the USA (for example) widens, as these growth rates are not fast enough
  + Japanese manufacturing continues to have a reputation for efficiency and quality but it finds itself challenged by new quality engineering by, for example, China
  + Japanese economic policies change throughout the 2030s to try and redress these issues and succeed to some extent, but Japan begins to lose its previous global economic primacy
  + Nonetheless, the mid-21st century sees higher growth rates for the economy
  + The Japanese economy is revitalised by the Fourth Industrial Revolution, which it adapts to extremely well
  + Growth rates begin increasing to high levels
  + However, fertility rates are still relatively low, and pension reform fails to fully alleviate the fiscal stress put on the government by an aging population
  + These demographic burdens are only really reversed in the Interwar Years
* Socially and politically, Japan changes little in the 21st century until the Fourth Industrial Revolution
  + Japanese society remains relatively conservative
  + Major social and economic issues, for example a toxic work culture, are not addressed
  + Economic reforms in the 2030s and 2040s fail to tackle this
  + Japanese society only really begins to change after the revitalisation of the economy in the Fourth Industrial Revolution
  + The economic change is accompanied by social change, and the awareness and agitation of various issues in Japanese society explodes
  + This leads to major changes in Japanese social attitudes from c.2060-c.2080, as society becomes more progressive and reformist
  + This period sees a flurry of major legislation being passed
* South Korea sees major economic reforms and important social changes
  + South Korea before the 2040s sees low economic growth rates and minor increases in standard of living/GDP per capita
  + This is almost wholly attributable to the entrenchment of the chaebols, large business conglomerates controlled by families
  + The chaebols’ presence causes major socioeconomic problems and monopolies
  + The concentration of economic power in the chaebols’ hands leads to threats to democracy: for example, the South Korean judiciary system is notorious for lenience towards chaebol families even in the 2010s
  + The interaction between politics and chaebols accelerates in the 2020s and 2030s and causes widespread dissatisfaction
  + Public pressure to introduce anti-chaebol legislation which is actually effective mounts
  + The 2040s sees a period of major unrest- revolution does not occur but protests and riots do widely, resulting in major socioeconomic changes
  + Not only are chaebols gradually abolished, but major economic changes and overhauls to political institutions occur as well
  + The South Korean economy shifts to an advanced industrial structure and business conglomerates are broken up en masse
  + Extensive economic regulation causes a period of high growth without chaebol interference, but slowdown in growth rates by the late 2060s cause further reform, with slight deregulation taking place
  + Nonetheless, by 2080 South Korea is considerably more prosperous than in 2020
  + GDP per capita and standard of living are notably higher
  + The socioeconomic changes are accompanied by political changes as South Korean society becomes notably more progressive and left wing (though not as progressive as in Japan)

#### South-East Asia

* The 21st century is a period of reform, prosperity, and improvement for South East Asia
  + Improvement in GDP, HDI, and GDP per capita levels is exponential, being particularly apparent in the late 2040s onwards
  + 2020 to the 2040s is a period where SE Asia is used for cheap, unregulated labour, but this changes in the mid-21st century
  + SE Asia in the 21st century gradually undergoes democratisation and economic reform, with society becoming more left wing and more progressive
  + SE Asia begins to adopt Western social values and workers’ rights in the region are reasonably strong by 2080
  + Governments gradually provide more social services and do so more effectively, and curb corruption
  + The world thus shifts to Sub-Saharan Africa as a source of cheap labour, as countries begin to industrialise and centralise there after the Second Scramble for Africa but lack effective labour rights
  + The era of cheap, plentiful labour is also ended by demographic changes
  + Rates of population growth are initially very high in 2020-2030 but begin to plateau, and a higher proportion of the population becomes elderly
  + Population and economic growth is still reasonably high throughout this period, though
  + Tourism also becomes an increasingly large sector of the economy, and by 2080 SE Asia and the Caribbean are the tourism capitals of the world
  + Economic integration in SE Asia increases, and organisation like the Association of Southeast Asian Nations (ASEAN) gain increased cultural and economic relevance in the region
  + By the late 2060s, ASEAN has developed into what the EU was to Europe in 2020
  + SE Asia also becomes highly integrated within the global economy
  + Finally, ASEAN organises collective economic changes in the 2060s as a response to the Fourth Industrial Revolution, allowing SE Asian countries to keep up and to modernise
* SE Asia varies in closeness to China, but no SE Asian country joins the WPA and most try and distance themselves from China
  + In the 2020s, Laos/Cambodia/Myanmar had ties to China but most countries in SE Asia kept a wary distance, not wanting to be entrapped in China’s influence
  + The increased wealth of the region allowed Myanmar to feel confident in fully breaking away from Chinese influence, which it had wanted to do since the 2010s, by the 2040s
  + As the [Second Cold War](#_Second_Cold_War) escalated, Laos and Cambodia also sought to distance themselves from China
  + By the late 21st century, SE Asia had definitively distanced itself from China- but also from the USA, and remained decidedly neutral
  + SE Asian countries looked to each other for support in times of global turbulence, with ASEAN becoming more centralised and more culturally relevant

#### South Asia

* India experiences considerable economic prosperity
  + By the late 2040s, the Indian nominal GDP exceeds that of the USA
  + Indian GDP per capita, standard of living, and HDI increase as well- HDI in 2080 is the level of Mexico in 2020
  + The 21st century sees a great reduction in poverty, however, with the result being that inequality decreases
  + Increase in centralisation allows the government to greatly improve infrastructure, housing, water infrastructure, education, and cities, contributing to higher standards of living
  + By 2080, India is a major world centre of manufacturing
* Water scarcity and climate change affects it heavily in the first half of the 21st century, however, with the [Ganges Water Crisis](#_Ganges_Water_Crisis,) having diplomatic effects as well
  + The 2020s and 2030s saw a steady increase in the proportion of the population suffering from water stress
  + The problem became acute in the 2030s, with the government investing heavily in building up water infrastructure, clean energy, and preventing waste dumping in rivers
  + The main issue became China damming Indian rivers, which led to increased tension, armament, and border skirmishes
  + This eventually erupted into the Ganges Water Crisis in 2042
  + Ironically, however, the Crisis led to the issue being solved- Chinese damming activity was limited, and India/Bangladesh made various agreements to share water
  + This helped the problem and brought the two nations closer
  + In 2049 both countries signed a military alliance- a result of increased cooperation and mutual dislike/fear of China
  + Improvements in watershed technology solved the issue by the 2050s
  + India/Bangladesh didn’t forget the Crisis, however, and it was a turning point in already sour Sino-Indian relations
  + The 2042 Sino-Indian Treaty settled the disputed border in China’s favour- but India continued to militarise the border and tackle Chinese influence abroad
  + Though India’s gradual democratic backsliding alienated it from the USA, India became an important anti-Chinese influence
  + They didn’t engage in any proxy wars as the USA did, but did engage in espionage, militarisation, increasing influence in Chinese-aligned countries, backing Taiwan, etc
* India also experiences gradual democratic backsliding, and by 2080 India is a hybrid regime scoring ~4.55 on the Democracy Index
  + Modi retires in 2033, extremely popular in India
  + India’s shift towards right-wing politics and Hindu nationalism continues in the 2020s
  + Pressure on human rights groups, journalists, and activists continues, and whilst Modi does not pass legislation on Indian Muslims, their socioeconomic status begins to decline
  + Censorship in India becomes worse than in Pakistan
  + Modi is a loved figure, however, and the Indian populace continues to elect populist, nationalist politicians who continue to erode India’s democratic institutions and limits on the executive
  + India, notably, never joins the Liberal Democracy Coalition- it is not politically aligned with the USA, and it is not a liberal democracy
* Bangladesh sees great economic prosperity which is endangered in the 2030s by the rise of corrupt government
  + Bangladesh rises in total nominal GDP, but has a far greater growth in GDP per capita and standards of living
  + The ‘development miracle’ of the 2010s continues for a few more decades
  + Bangladesh also becomes more innovative and technologically advanced, and is heavily invested in in the late 2020s and onwards
  + By 2030, Bangladesh is the 25th world’s largest economy
  + The rate of growth begins to slow down in the 2030s for political reasons, however
  + Democracy in Bangladesh has always been present but weak, and the 2020s and 2030s see stagnation in democratic improvement and the ruling party remains in power and becomes more and more entrenched
  + Corruption and cronyism begins to stifle economic growth
  + The issue is not solved by revolution, however, but with growing popular pressure to democratise
  + Unlike in India, where the population actively support populist politicians, the Bangladeshi populace in the 2040s increasingly exercise their remaining democratic rights and begin protesting and rioting
  + The entrenchment of the ruling party erodes under mounting discontent
  + By the late 2040s, an election removes the ruling party from power, and the Bangladesh Nationalist Party (the name is the same, although the 2030s sees its support base shift from nationalists to democrats) enacts legislation to create a multi-party state due to popular pressure
  + The Bangladeshi economy overcomes its previous stagnation and grows again (though not at the considerable rates of the 2020s and early 2030s)
  + Bangladesh begins to undergo the Fourth Industrial Revolution in the 2050s and by 2080 is a wealthy country with an HDI akin to that of Russia in 2020
  + By 2080, Bangladesh is a liberal democracy, although it is non-aligned in the Second Cold War and still allied with India against China
* Pakistan remains a hybrid regime for several decades but democratises in the last few pre-war decades as an Islamic Republic
* India-Pakistan relations worsen but the threat of nuclear war dwindles
* The economy remains relatively stagnant for a few decades but eventually begins to recover

#### Oceania and Australia

#### Middle East

#### European Union and North/West Europe

#### Eastern Europe

## History | World War III

* Fought between the [Liberal Democracy Coalition](#_Liberal_Democracy_Coalition) and the World Peacekeeping Association

|  |  |
| --- | --- |
| LDC Members | WPA Members |
| Albania-Kosovo (EU) |  |
| Belgium (EU) | China |
| Canada | Estonia |
| Croatia (EU) | Hungary |
| Cyprus (EU) | Kazakhstan |
| Czech Republic (EU) | Kyrgyzstan |
| Denmark (EU) | Iran |
| Finland (EU) | Libya (GNA) |
| Flanders (EU) |
| France (EU) | Mongolia |
| Germany (EU) | North Korea |
| Israel | Pakistan |
|  | Pashtunistan |
| Italy (EU) | Poland |
| Japan | Tajikistan |
| Libya (LNA) | Turkmenistan |
| Luxembourg (EU) | Turkey |
| Malta (EU) | Uzbekistan |
| Mexico |  |
| Netherlands (EU) |  |
| North Macedonia (EU) |  |
| Philippines |  |
| Portugal (EU) |  |
| Quebec |  |
| Republic of Great Britain |  |
| Romania (EU) |  |
| South Korea |  |
| Spain (EU) |  |
| Taiwan |  |
| Ukraine (EU) | **WPA Members | Africa** |
| United Ireland (EU) | Azawagh |
| United States of America | Chad |
| LDC Members | Africa | Kuba |
| Bagirmi | Lunda |
| East African Federation | Mbunda |
| Ethiopia | Morocco |
| Gouran | Somalia |
| Kanuri | Sudan |
| Republic of the Cape | Wadai |
| South Africa | Zaire |
| Zambia |  |
| TOTAL 39 | **TOTAL 25** |

Date: 9 November 2080 – 12 April 2091

Result: Liberal Democracy Coalition victory

* + Fall of Communist China, Communist North Korea, Central Asian Dictatorships, Eastern European Dictatorships
  + LDC military occupations of western China, Central Asia, Eastern Europe
  + Unification of the Korean Peninsula
  + Nuclear destruction of eastern China
  + Revolutions in the United Arab Emirates, Central African Republic, Poland, Zambia
  + Formation of the Republic of Tibet
  + Various countries leave the LDC
  + United States affirmed as global superpower
  + India, Brazil, and Arabia begin to strengthen diplomatic ties

Casualties: 396,000,000 [Excluding famine/plague casualties post-WWIII]

* + 165,000,000 from conventional warfare
  + 231,000,000 from nuclear weapons of mass destruction
    - 44,000,000 in Shanghai
    - 37,000,000 in Beijing
    - 29,000,000 in Tianjin
    - 27,000,000 in Chongqing
    - 22,000,000 in Guangzhou
    - 18,000,000 in Shenzen
    - 16,000,000 in Chengdu
    - 15,000,000 in Nanjing
    - 15,000,000 in Wuhan
    - 5,000,000 in Pyongyang
    - 3,000,000 in Omdurman
    - 2,000,000 in N’Djamena

Causes: Second Cold War; Neonautilus technology; *USS Cascadia* destruction

* The long term cause of WWIII was the [Second Cold War](#_Second_Cold_War)
  + This began in August 2036 over the ‘[Spratly Arbitration](#_Spratly_Arbitration,_2036)’, when the Philippines brought a formal case to the UN regarding aggressive Chinese expansion in the South China Sea
  + The Chinese had been building military bases and artificial islands in/near the Spratly Islands for decades
  + The USA, amidst a backdrop of increasing Sino-American tensions, vehemently supported the Philippines and increased rhetoric against China
  + What followed in the next decades was an escalation of espionage, tension, propaganda, and the severing of diplomatic ties
  + The Belt and Road Initiative and Hong Kong became major international issues, but the presence of WMDs prevented actual war
  + Both countries invested heavily in directed energy weapons in the 2060s and 2070s, leading to Neonautilus systems proliferating rapidly in 2079-2080
* The Neonautilus technologies allowed the Cold War to become ‘hot’
  + The Neonautilus technology is an example of a [directed-energy weapon,](#_Directed-Energy_Weapons_and) a ranged weapon that utilises highly focussed energy (microwaves, lasers, particle beams) as air defence
  + This system traces its origins to the Israeli Iron Dome, a mobile all-weather air defence system utilising rockets
  + In 1996, the Israelis developed a ‘Nautilus’ prototype, which succeeded in keeping a laser beam on the same point for two continuous settings
  + Laser weaponry saw another breakthrough in 2014, when in the Singapore Air Show a laser air-defence system called Iron Beam was unveiled
  + It used a high-energy laser to destroy rockets, mortar bombs, etc
  + The USA, UK, Russia, China, and India improved on directed-energy weapon technology in the 2020s and 2030s
  + The escalation of the Second Cold War led to a massive increase in funding/research into these weapons
  + However the power needed to project high-powered laser beams is very high, so creating feasible air-defence systems of this kind had the potential to be extremely advantageous- but was difficult
  + Breakthroughs were made almost simultaneously in each Bloc at around 2079, and the technology rapidly proliferated
  + Israel named the newly adopted prototype the ‘Neonautilus’ system
  + These laser beams, accompanied by devices to detect radiation, could locate aircraft carrying nuclear WMDs and destroy them far above the air, essentially erasing the threat of MAD
  + However, they could still be overwhelmed by vast numbers of projectiles, so whilst they could prioritise WMDs, cities were not invulnerable
* The destruction of the warship *USS Cascadia* 
  + After this development took place, open/hot war was practically inevitable
  + Neither Bloc had the rationality nor the foresight to consciously decide to avoid a conventional WWIII
  + The understanding after 2079 was that the next crisis would lead to war
  + This occurred in November 2080- the *USS Cascadia* was a ship loaned to the Philippines
  + Its captain, Joseph Sanders, desired a hot war and intentionally entered claimed Chinese territory in the South China Sea, leading to an escalation of hostilities there until a Chinese ship fired on *Cascadia*
  + *Cascadia* fired back but without adequate backup was destroyed by Chinese warships
  + News reached Washington and the USA declared war, leading to the LDC declaring war in support and the WPA responding with its own declaration

The Course of the War: Ideology; New technologies; [Pure fusion](#_Pure_Nuclear_Fusion)

* The Nature of the War and Ideology
  + WWIII is an example of total war, and it draws in around 50 countries
  + Its primary theatre is the Pacific Theatre but there is also a European Theatre and an African Theatre
  + The use of social media to disseminate wartime propaganda indoctrinates populations like never before, leading to complete ideological fanaticism
  + The use of new wartime technologies that affects the frontier and home front alike sponsors a sense of hatred in combatant countries such that each side craves the prompt and utter destruction of either China or the USA (the ‘leaders’ of each faction)
  + The ‘us vs them’ mindset fosters in the LDC leads to massive socio-political changes
  + By defining the war as a moral crusade against authoritarianism, autocracy, and inequality, the politics of the LDC countries are shifted towards the left significantly
  + The general populaces of LDC countries thus have more libertarian, leftist, and progressive socio-political views
  + Civil reform is widespread, and the political system generally shifts to the left and the words ‘conservative’ or ‘authoritarian’ are toxified
  + Political parties are thus forced to identify themselves as different kinds of liberal
  + The phrase ‘neoliberalism’ emerges as an umbrella term for various kinds of left wing thought, and LDC countries all begin to identify themselves as neoliberal
  + In the USA specifically, the police are deemed too authoritarian and are militarised and made to fight abroad, with ‘citizens’ militias’ raised to enforce justice
  + Whilst LDC governments intervene more economically, this is taken to unprecedented degrees as they adopt war economies which are considerably centrally planned
  + The military-industrial complex becomes deeply entrenched in all of these countries
  + The number of private military companies (PMCs) in LDC countries skyrockets as private individuals profit off the war by financing elite regiments and selling their services/pillaging enemy territories
  + Finally, the steady rise of racism, xenophobia, and anti-Semitism is quickly reversed as LDC countries frame themselves as progressive, benevolent countries, unlike the racially repressive China
  + Immense amounts of propaganda disseminated to social media and the public are integral in causing this social change
* Technology
  + WWIII is mostly conventional warfare but new technologies make it unrecognisable from previous major conflicts
  + [Cyberwarfare](#_Cyberwarfare) is extremely widespread and becomes a major front of the war
  + [Aerial drones](#_Overview) are used in the field- still accompanied by light/heavy infantry however, as infantry drone technology isn’t advanced enough yet
  + Soldiers are armed with [carbon-fibre](#_Carbon-Fibres_and_Nanotubes) armaments
  + Development on [directed-energy weapons](#_Directed-Energy_Weapons_and) also revolutionises artillery, and more and more artillery changes from conventional projectiles to energy projectiles
  + Artificial intelligence programs are used for intelligence purposes: e.g. identifying tanks in satellite images, identifying high-value targets in spy scans, etc
  + Some AI controlled autonomous weapons are also used in the field, but though these become increasingly common they never predominate
  + Tanks begin to rapidly increase in size to become genuine landships, massive armoured cruising units with dozens of guns and personnel
  + These units become referred to as colossi (singular colossus)
* Pure fusion
  + With new Neonautilus technologies, deploying WMDs against a city is not feasible: nuclear fission WMDs lack the blast radius and biological/chemical WMDs aren’t sophisticated enough to be properly used
  + LDC/WPA scientists begin to work on new kinds of WMDs- generally the WPA focusses on biological weapons and the LDC works on new pure fusion technologies
  + The LDC reaches its breakthrough first- pure fusion can create bombs so powerful that the blast radius is large enough to level a city even when detonated mid-air
  + The first [pure fusion bomb](#_Lasonuclear_Bombs) is deployed in Shanghai in March 27, 2091
  + The Chinese invasion of California, continued attempts to destroy the US population by WMDs, cyberwarfare, and a decade of brutal war have made the USA utterly hate China
  + The USA sees China as an existential threat to both the USA and human liberty as a whole, and resolves to obliterate China completely
  + Bomb after bomb is used to destroy the most populous cities in China, rendering eastern China a lawless zone of radioactive fallout
  + The LDC destroys Pyongyang as well and destroys the North Korean government, marching through North Korea into China and occupying it
  + Most other countries surrender after this, apart from Chad, whose most populous city is razed with a pure fusion bomb- and who subsequently surrenders
  + The USA occupies the other WPA countries and enacts different policies depending on the country
  + They either deindustrialise and destroy the country, establish zones of occupation, or establish satellite democratic regimes there

## History | 2080-2120

## History | World War IV

* Fought between the Liberal Democracy Coalition and the Combine (and its allies)

|  |  |
| --- | --- |
| LDC Members | Europe/North America | Combine & Allies | Middle East |
| Canada | Bahrain |
| France | Greater Arabia |
| Germany | Jordan |
| Mexico | Oman |
| (2122-2125) Spain | Yemen |
| Quebec |  |
| United States of America | **Combine & Allies | South Asia** |
| LDC Members | Middle East | Balochistan |
| Egypt | India |
| Israel | **Combine & Allies | Latin America** |
| Persia | Brazil |
| (2127-2146) United Arab Emirates | Chile |
| (2128-2133) Iraq | Colombia |
| (2128-2131) Syria | Dominican Republic |
| (2130-2140) Qatar | El Salvador |
| (2130-2146) Lebanon | Guatemala |
| (2131-2139) Kuwait | Guyana |
| LDC Members | South Asia | Peru |
| Tibet | Uruguay |
| (2130-2146) Bangladesh | Venezuela |
| (2134-2146) Sindh | **Combine & Allies | Africa** |
| (2138-2140) Nepal | Bemba |
| LDC Members | Latin America | Mozambique |
| Argentina | Sudan |
| Bolivia | Zaire |
| Ecuador | Zimbabwe |
| (2139-2146) Paraguay |  |
| (2142-2146) Suriname | TOTAL: 22 throughout the whole war |
| LDC Members | Africa |  |
| East African Federation |  |
| Nigeria |  |
| Republic of the Cape |  |
| South Africa |  |
|  |  |
| TOTAL: 18 throughout the whole war, 28 altogether |  |

Date: 11 June 2122 – 24 December 2146

Result: Liberal Democracy Coalition victory

* + Fall of Totalitarian Brazil, Neofascist India, Imperial Greater Arabia
  + Deindustrialisation and military LDC occupation of India, Brazil, and the Middle East
  + LDC occupation of regions of South Asia, Latin America, the Middle East, and Africa
  + Immense border changes in the Middle East, South Asia, and Latin America
  + East African Federation annexation of various African territories
  + The emergence of the United States, Indonesia, and Russia as cooperating superpowers
  + Disbanding of the LDC
  + Establishment of the World Congress
  + Worldwide abandonment of biological WMDs
  + Small-scale conflicts between the United States and African dictatorships

Casualties: 1,140,000,000 [Excluding famine/plague casualties post-WWIV]

* 310,000,000 from conventional warfare
* 830,000,000 from biological weapons of mass destruction
  + 450,000,000 from Combine powers
  + 380,000,000 from LDC powers

Causes: Ideology; Invasion of Tibet

* Ideology
  + WWIII was crippling to the economies of all its participants
  + The wealthiest post-war nations were mostly those who abstained from partaking: (in descending order of nominal GDP) USA, India, Brazil, Russia, Arabia, Indonesia
  + Despite the heavy degree of indoctrination, many LDC countries were just too exhausted to countenance another world war
  + The sole exception in 2091 was the USA- American exceptionalism had been multiplied tenfold and they saw it as their duty to vanquish all remnants of authoritarianism
  + The USA began behaving hostilely towards India, Brazil, and Arabia, further spurring them into developing an alliance
  + But even in 2091 the USA was *not* ready for another major war
  + The defensive alliance between India, Brazil, and Arabia- called the Combine- were also wary of starting another world war before heavy armament
  + The result was an equilibrium between the two factions filled by arms research, espionage, and proxy wars
  + This is referred to as the Second Interwar Period- the combatants need time to effectively prepare for war, but war *is* coming
  + Everyone knows war is inevitable
  + During this time, the ideologically galvanised populations of the LDC began to recover to the point where their desire to destroy authoritarian countries outweighed their weariness of war
  + A few countries re-join the LDC and world tension increases
* Invasion of Tibet
  + By the 2120s each faction was ready for war- all that was needed was the short term cause
  + It came in 2122 when India invaded Tibet
  + The USA immediately declared war, as did the other nations of the LDC
  + The Combine and its allies responded in kind
  + World War IV had begun

The Course of the War: Ideology; New technologies; Biological WMDs; Salting-the-Earth

* The Nature of the War
  + WWIV is another example of total war, drawing in over 50 countries
  + There are three major theatres: the Brazilian Theatre (sometimes called the Latin Theatre), the Arabian Theatre, and the Indian Theatre
  + Every nation by necessity commits itself fully to the war
  + The economic effects of WWIII on each country occur yet again- PMCs are abundant, war economies reign supreme, and military-industrial complexes form the backbones of these economies
  + Politically, there are few great shifts in thought, but rather an amplification of the socio-political effects of WWIII
  + Neonautilus technologies have developed to the point where pure fusion bombs can be shot and destroyed so far away from the target that they detonate- in a few cases- in other countries
  + Whilst more powerful bombs could be made, they’d have such a detrimental effect on the Earth itself that it would essentially be MAD
  + WWIV is thus a brutal 25 year conventional conflict- but technological changes make it radically different from previous world wars
* Technology
  + [Pure fusion](#_Pure_Nuclear_Fusion) is revolutionary in energy production, allowing for [new technological capabilities](#_Pure_Fusion_Reactors)
  + Pure fusion is used for flight- keeping aerial drones in the air, and allowing infantry to jump extremely high, levitate, and fly
  + Infantry are armed with ‘pure fusion canisters’- hydrogen molecules in these canisters are fused together to form helium and the energy produced is converted into kinetic energy, used for flight and propulsion
  + [Cyberwarfare](#_Cyberwarfare) is still widespread but AI has been developed in previous decades (and throughout the war) to the point where it is used extensively in this front
  + The emphasis of cyberwarfare in WWIV is thus lesser than in WWIII
  + Soldiers are still armed based on [carbon-fibre](#_Carbon-Fibres_and_Nanotubes) compounds: despite worldwide efforts, [borophene](#_Wonder_Materials_of) cannot be mass-produced
  + Drones are used both as aerial soldiers and as light infantry, controlled either by AI programs or (the majority) by remote operators trained with VR and AR
  + [Directed-energy weapon](#_Directed-Energy_Weapons_and) artillery becomes advanced enough to destroy colossi easily- AI is used to autonomously operate a lot of these pieces, adding to their other intelligence-based functions
  + Heavy cavalry thus becomes obsolete- the focus is picked up [by heavy infantry](#_Overview), who are deployed in formations and spread out so they can’t be all wiped out at once by DEW artillery
  + Directed-energy weapons are still expensive and underdeveloped *enough* that regular firearms still use conventional projectiles, however
  + Heavy infantry involves highly trained soldiers in ‘[electromuscular suits](#_Electromuscular_Suit)’ (EMS)- powerful composite-material armour with a myriad of built-in functions: e.g. GPS, thermal imaging, pure fusion canisters, massively enhanced strength, etc
  + These soldiers are armed with massive firearms which they can wield due to enhanced EMS strength, and these shoot armour-piercing bullets, bullets which are far more expensive and destructive than those of 50 years ago
  + Think of the ‘mobile infantry’ in *Starship Troopers*
  + The replacement of large, powerful targets (colossus) with multiple smaller targets (heavy infantry) means that laser artillery becomes increasingly obsolete- it is replaced by electromagnetic artillery and then microwave artillery
  + [Galactic warfare](#_Extraterrestrial_Warfare) is also a notable front of this war- although some battles on the Moon took place in WWIII, combat was limited
  + In WWIV, space receives a much higher emphasis- starships and rockets are used to destroy enemy satellites, starships, and bases
  + Due to developments in spacesuits and directed-energy weapons, genuine [zero-gravity infantry battles](#_Zero_Gravity_Combat) take place on Mars and the Moon
  + Genetic engineering is practised to some extent- in LDC countries there were some engineered regiments, but composed of volunteers
  + Combine powers and allies practised it more often, and there were a few infamous engineered regiments used- but engineering was still relatively expensive
  + Cybernetics was also practised by both sides- the LDC often re-equipped mutilated soldiers with advanced prosthetics and (in practice) allowed self-mutilation for free prostheses in exchange for military service
  + The Combine and its allies heavily encouraged self-mutilation and re-equipping wounded soldiers
  + They also frequently punished criminals with mutilation and then military service as a cyborg
* Biological Weapons of Mass Destruction
  + The Second Interwar Period sees progress in engineering biological WMDs
  + In the first year of the war these are deployed, first by the Combine, and then by the LDC
  + The actual drones bearing them were easily shot by Neonautilus technologies, but the virus particles that those drones bore simply fell to the ground
  + Biological WMDs are extremely destructive- hyper-contagious, with a very high kill rate, and they confine populations to horrible lockdowns either in homes or factories
  + People are spread out as much as possible, displaced from population centres and distributed in isolated units in countryside and other deserted areas
  + The psychological stress on the home fronts of the war is immense
* Salting-the-Earth (STE)
  + This refers to the LDC policy towards the Combine
  + The LDC cannot use nuclear WMDs to destroy the Combine as they did with China, so neutralise the threat of these nations in a different way
  + The STE policy refers to systematic deindustrialisation and destruction of cities- as LDC forces invaded Combine countries they looted and destroyed any factories or towns/cities they saw
  + The LDC would later make occupation zones out of these areas, but the zones would be- and always be- agrarian states
  + The STE policy was enacted towards India, Brazil, Arabia, Bolivia, Chad, Yemen, and Lebanon: the Combine powers, the countries who had fought the LDC twice, and Bolivia (who refused to surrender to the LDC at any cost)
  + In general, however, the policy was not worth it for other powers
  + Countries who were invaded before India/Brazil/Arabia were used as staging posts for further attacks and were thus not ‘salted’
  + After the implementation of STE policies, several countries surrendered
  + Those who didn’t were generally invaded quickly and overthrown without the need for a long period of destruction- the exception was Bolivia, which was salted due to Bolivian scientists’ contributions to biological WMDs

Aftermath: Ideology; The new world order

* Post-War Ideological Changes
  + After WWIII, LDC countries were exhausted in an economic sense, but WWIII had only made the majority more determined to enforce liberal democracy
  + Hence by the 2120s once countries had somewhat economically recovered, many countries re-joined the LDC and went to war once again
  + WWIV, however, had economic and ideological changes
  + The impact of a gruelling 25 year conventional war with biological WMDs genuinely made people believe that enforcing democracy wasn’t worth a major war
  + A quarter-century of a harsh life adjusted to withstanding biological WMDs made people no less adoring of democracy but extremely averted to ever causing a World War V
  + It became a well-known fact that scientists post-WWIV had further worked on biological WMDs, allowing them to genuinely wipe out human civilisation
  + Almost every single LDC country left, prompting the USA to spearhead the formation of the World Congress
  + Even the USA, the most ideologically galvanised nation in the whole LDC, became willing to countenance only small-scale conflicts, and even then only about a decade after the end of the war
  + Every World Congress country vowed to never use biological WMDs again (unless in retaliation, of course)
  + Even autocracies in Sub-Saharan Africa realised that using biological WMDs would cause MAD, and avoided using them from then on
* The New World Order
  + The USA’s economy- bolstered by new technologies, pure fusion power, a large population, and the lack of powerful competitors- began to climb
  + The USA didn’t experience a boom, however
  + Indonesia, however, already a wealthy country before the war, did, and rapidly expanded in wealth
  + Russia did not experience a boom but peace had made it prosperous, and more efficient and meritocratic government allowed Russia to exploit its full population/land potential
  + The result was that after the war, three world superpowers emerged: the USA, Indonesia, and Russia
  + As Indonesia and Russia were both liberal democracies, however, the US populace rejected the possibility of conflict
  + Many US politicians wanted to strengthen ties with the two nations in order to attack autocratic regimes together
  + Indonesia and Russia learned from WWIV, however, and neither wanted to engage in war

## Politics

### The Current World Order

* In 1992, Francis Fukuyama wrote that after the fall of the USSR, humanity had reached ‘*The End of History*’
  + He believed that mankind had reached ‘the universalisation of Western liberal democracy as the final form of human government’
  + Fukuyama’s conclusion was premature, however: he had not accounted for undemocratic developing countries which could, if left unchecked, succeed to the point of once again acting as a counterweight to liberal democracy
  + This happened with China in the 21st century and Brazil, India, and Saudi Arabia after that
  + However, Fukuyama claimed that whilst changes will happen in the future- perhaps even a return to totalitarianism- democracy will become more and more prevalent in the long term
  + The World Wars did indeed see major setbacks to the growth of democracy
  + However, by the end of the 22nd century, Fukuyama has been proven right
  + Democracy is now almost universal and is still spreading
  + The general consensus is that humanity now really *has* reached the end of history
* The vast majority of the world’s countries are liberal democracies, and those that aren’t are quickly democratising
  + There are a few autocratic, developing nations still present but instead of being allowed to grow, these nations face economic and military sanctions
  + The current normative belief is that by the 23rd century, the only form of government on the planet will be liberal democracy
* The current world order of liberal democracy and its expansion are underpinned by a few interventionist powers who enforce liberal democracy worldwide
* The ideology of intervening in other states to pursue liberal goals is called ‘liberal internationalism’ and is seen by most liberal democracies as a good thing
  + The most prominent power is the United States of America, who was a belligerent in [WWIII](#_History_|_World) and [WWIV](#_History_|_World_1) and is today engaging in overseas conflicts with autocratic nations like Zaire
  + The USA by far invests the most money/soldiers into liberal internationalism and as such often lead conflicts with autocratic states
  + However, a few other nations have also pursued this policy in a more limited form in the latter half of the 22nd century
  + The [European Union](#_Multinational_Organisations_|_1) is centralised to the point that on a few occasions joint multinational interventionist initiatives have been ordered by the Council of the European Union
  + EU member countries have also conducted liberal interventions separately, however
* A list of countries/organisations which have carried out interventions from 2146-2170 is as follows:
  + United States of America
  + East African Federation
  + European Union
  + Mexico
  + Israel
  + Germany
  + Italy
  + France
* Indonesia has not yet carried out a liberal intervention but is quickly moving towards it by increased collaboration with the US military and is expected to do so by the early 2170s
* Russia, Japan, and United Korea are also theorised by many to do so by the end of the century due to increasing internationalism of these countries
* The idea of ‘isolationism’ is obsolete now, however
  + Globalisation has proceeded to the extent wherein each country is so interlinked that isolation is impossible
  + Internationalism is now the norm- liberal internationalism, which supports military intervention in autocracies, is still more of an exception than a rule
  + However, it is accepted as a moral and viable ideology today and is becoming increasingly common amongst the more powerful nations
* The idea of the ‘West’ is also generally obsolete now, being valid to some degree in a cultural way but valid neither economically nor politically
  + By the start of the 21st century the West referred to a group of countries characterised by cultural similarities, advanced high-income economies, and liberal democracy
  + By 2170, so many non- ‘Western’ countries are high-income liberal democracies that the idea of ‘the West’ no longer holds economic or political meaning
  + Even culturally, ‘the West’ holds little meaning now
  + The 20th and 21st centuries saw a proliferation of Western culture worldwide, including Western cultural norms, influences, and values
  + As various non-Western countries democratised and Westernised, these norms/influences/values thus became no longer exclusive to the West
  + For example, nowadays countries like Indonesia exemplify 1900s Western values just as much- if not more- than any other Western state
  + The 22nd century saw a general cultural movement in many non-Western countries back to tradition and historical cultural values
  + However, this new cultural impetus was combined with previously assimilated Western values, forming unique ‘variants’ of generally Western values in non-Western countries
  + Historical cultural ideas that contradicted liberal Western ideas were discarded in these Westernised countries
  + The result is that whilst countries outside Europe/North America are not *as* culturally similar to Western countries as, say, the USA is to France, these countries still, fundamentally, hold Western values
  + The world holds many different cultures, but almost all of these are based on Western values and culture
  + Thus, due to almost the entire world having previously Westernised and assimilated Western cultural thought, the idea of ‘the West’ no longer makes sense
* The international political structure is characterised by a few major multinational organisations which attempt to establish a transnational rule of law
  + This means that whilst the current world order is characterised by a few international organisations that establish laws for their member states
  + Establishing laws for multiple nations to adhere to transcends traditional ideas of sovereignty and promotes a sense of internationalism, cooperation, and community
  + Many of these ‘rule of law’ organisations began as economic communities
  + The European Union, [ASEAN, and the Balkan Community](#_Multinational_Organisations_|_2) are examples of such organisations
  + The current world order is characterised by almost every world region having some sort of economic or politico-economic organisation to promote regional cooperation
  + Another major pillar of the current world order is the [World Congress](#_Multinational_Organisations_|), which establishes a transnational rule of law (i.e. a set of rules and regulations about various things) for around 200 countries
  + The idea of a transnational rule of law is not new: organisations like the EU have been enacting legislation for their member countries since the 1900s
  + Two things are new: firstly, almost every world region has a similar kind of organisation
  + Secondly, the World Congress provides a rule of law for almost the entire world
  + The United Nations did enact and uphold international laws, e.g. on human rights, the oceans, disarmament, etc
  + The World Congress is distinguishable from the UN by the sheer scope of laws passed
  + The WC passes laws on many aspects of domestic life, with most of these fields regarding new fields of technology which, if left unregulated, could cause catastrophes
  + These include genetic engineering, transgenic animals, nanorobotics, etc
  + But the WC also passes widespread legislation on traditional domestic fields: e.g. labour laws, censorship laws, journalism laws, etc
* The current world order, in summary, consists of three pillars: liberal democracy, liberal interventionism, multinational rule of law

### Richmond Democracy Index

* There are 228 countries in the world- around 200 of them are democracies
* Democracy is the dominant political ideology in the world by far, and since the end of WWIV many countries have been gradually, quietly democratising
* However, some countries in the world are more democratic than others
* Throughout the 21st century, the most popular indexes for calculating how democratic a country was were things like the Polity V or EIU indexes
* By the 22nd century, however, advances in technology led to new questions regarding democracy
* Genetic engineering is an often quoted example of how a country’s democratic progress can be measured by technology: autocracies in WWIV and after have often forcibly engineered soldiers, whereas democracies won’t
* In 2155, Canadian economist Charles Richmond created the Richmond Democracy Index, a new calculator for how democratic a country is
* It heavily resembles the Democracy Index created by the Economist Intelligence Unit, although instead of 60 indicators it uses 68
  + The RDI is a weighted average (some answers contribute to overall score more than others) based on the answers to 68 questions
  + Each question has 2 or 3 possible answers, and each answer is converted into a score: 0 or 1 (if 2 possible answers) or 0, 0.5, 1 (if 3 possible answers)
  + The questions are grouped into six categories: electoral process/pluralism; civil liberties; functioning of government; political participation; political culture; respect for human integrity and autonomy
  + The final category refers to examples like genetic engineering or cybernetics: not forcing citizens to be engineered/use prosthetics respects human autonomy, and not encouraging uncontrolled engineering and prosthetics respects integrity
  + With a few exceptions (when one answer is so important that it reduces total score for a category) the scores in each category are added, multiplied tenfold, and divided by the total number of questions per category
  + The mean score for each category is then calculated and rounded to two decimal places
* There are five possible categories that a country can be grouped into:
  + *Full democracy* | 8.01-10.00
    - Civil liberties and political freedom is enforced, respected, and reinforced by political culture and institutions
    - Government is checked and balanced, media is diverse and independent, the judiciary is independent and enforced, and the government functions adequately
    - Liberal democracy is intended to be a full democracy
    - Full democracies have universal suffrage, no discrimination, and emphasise the rule of law and human rights
  + *Flawed democracy* | 6.51-8.00
    - Basic civil liberties and political freedoms are honoured but have issues (e.g. minor suppression of critics and censorship of media)
    - These nations often have faults in other democratic aspects, e.g. low participation in politics, issues in government function, etc
    - Flawed democracies are usually liberal democracies which aren’t functioning well
    - As such, they still have fair and free elections, political parties, the protection of human rights, etc- basic liberal democracy principles
    - But more nuanced aspects of liberal democracy, like independent and unbiased media, will be absent
  + *Broken democracy* | 5.01-6.50
    - Broken democracies *are not liberal democracies*
    - Elections still occur but aren’t necessarily correlated with who holds real power
    - Citizens know little about the activities of those in power and there is not an open society
    - Rulers may ignore or bypass civil liberties, the will of the minority of voters, and limits on their power
    - Elections are *not* free and fair and usually legitimise/consolidate the incumbent ruler rather than fairly choosing a new one
  + *Anocracy* | 3.51-5.00
    - Anocracies, also known as hybrid regimes, combine autocratic features with democratic features
    - They have historically been created as a result of an incomplete transition from the former to the latter
    - Democratic institutions are purely decorative- elections don’t lead to a change in power, media is government controlled
    - Political repression occurs, usually in the form of human rights violations, surveillance, police brutality, punishment of political activists/dissidents, etc
    - These occur simultaneously with elections, but the elections are decorative and are *not* a source of legitimacy for the ruling party
    - Anocracies are more authoritarian than democratic in nature
  + *Authoritarian Regime* | 2.01-3.00
    - Political plurality is rejected and non-existent: there are no political parties, real elections, and power is held by an oligarchy or autocrat
    - Legitimacy is not derived from elections- it is usually based on emotion, identifying the regime as a necessary evil to combat some fear of the citizenry
    - Democratic institutions like elections or political parties may be present, but are meaningless
    - The legislature and judiciary are not independent and elections are not free and fair
    - Political repression occurs and is widespread and more severe than in anocracies
  + *Full Autocracy* | 0.00-2.00
    - Political plurality is utterly rejected
    - Legitimacy is obtained through fear and repression
    - Democratic institutions are almost always completely, visibly absent
    - Political repression occurs often and can be done with impunity
    - It is also usually highly severe, involving forced settlement, torture, and even ethnic cleansing
    - The ruling power may- nominally- be a group (e.g. a party or the military) but power is almost always vested into a single individual
* The vast majority of the world’s countries are either democracies or anocracies
* There are countries which are broken democracies or anocracies, but these are almost all authoritarian regimes transitioning into democracy
* The number of regimes which remain as full autocracies or authoritarian regimes is very low
* Whilst widespread democratisation is taking place in many countries, democratic backsliding is extremely rare and, if it occurs, is usually minor and only in a few countries simultaneously
* The rarity of democratic backsliding is due to several reasons:
  + A well-studied political effect of the World Wars is the liberalisation of the countries in the LDC
  + These wars were against authoritarian regimes; governments framed these wars as crusades against autocracy and populaces developed an ‘us vs them’ mentality
  + By seeing the opposition as authoritarian and undemocratic, the LDC countries identified themselves as democratic and liberal
  + The populaces of these nations were thus indoctrinated into unconditionally supporting liberal democracy
  + Even after the war was over, these ideological changes meant that people in liberal democracies unilaterally rejected any form of democratic backsliding
  + Historians refer to this as the ‘ideological mobilisation’ of the combatant countries
  + As formerly-LDC countries like the USA were able to determine the post-WWIV world order, this ideology was reinforced worldwide
  + For example, the World Congress sanctions countries undergoing democratic backsliding
  + Improved standards of education worldwide throughout the 21st and 22nd centuries also results in a considerable proportion of the citizenry in each liberal democracy to be able to recognise populism and democratic backsliding, and to reject it
* Democratic backsliding has therefore not occurred in a full democracy since before WWIV and is very infrequent in flawed democracies
* The presence of autocracies in the world provides an easily identifiable ‘enemy’ of democracy and causes the populaces of democracies to be continually ideologically mobilised
* Some academics thus predict that at some point in the 23rd century when no such enemies are present, the lack of ideological mobilisation will allow democratic backsliding to become widespread
* The counter-argument to this is that commitment to liberal democracy is so engrained in modern political culture that it is irreversible and permanent
* The majority of academics take the latter view, a position which is vindicated by the strong commitment to liberal democracy in more isolationist nations which have never fought in a World War and who show little concern for ‘enemies’ of democracies

### Developed Countries

* In the early 21st century, there was no fixed definition of a developed country, and consequently no definite number of developed countries
* The United Nations Statistics Division acknowledged this: ‘There is no established convention for the designation of "developed" and "developing" countries or areas in the United Nations system.’
* In 2021, the OECD’s 37 members were often referred to as developed countries, but OECD members at this time included countries like Turkey and Mexico which weren’t then considered developed
* The criterion for a developed country was by some lists quality of life, by other HDI, by others economic measures
* Even by the early 21st century, however, development status was most commonly an economic measure involving GDP/capita and total GDP
* By 2170, development status is determined by GDP/capita, total GDP, industrialisation level, infrastructure sophistication, and general standard of living
* Developed countries are, by definition, high-income countries with advanced, post-industrial economies
* This means that the [service and information-based sectors](#_Overview_1) provide more wealth than the industrial sector
* The standards for a ‘developed’ country in 2170 are generally the same as in 2020, allowing for an apt comparison between the number of developed countries
* At the same time, standards of living and per capita income have substantially increased in many countries during this interval, leading to the necessitation of a ‘fully-developed’ category
* The categories for development are as follows:
  + *Fully-developed*
    - These countries are very high-income and have a ‘postmodern’ economy: the largest sector of the economy is the quaternary
  + *Developed*
    - These countries are high-income and have a ‘postindustrial’ economy: the largest sector of the economy is the tertiary, or the quaternary sector is slightly higher but not by a large margin
  + *Transitioning*
    - These countries are middle/high-income and are either on the verge of a postindustrial economy or have one already
  + *Developing*
    - These countries are middle-income and have an industrial economy where the manufacturing sector provides the most income
* There are no countries which fit the 2020 definition of ‘least developed’ as even the poorest countries have a GDP per capita, industrialisation, and infrastructure rating corresponding to developing
* The modern economic development index does not account for countries which have been deliberately deindustrialised
* Deindustrialisation occurred during WWIV when the Liberal Democracy Coalition systematically destroyed all factories in Combine countries
* There are therefore agrarian states which are present today- however, none of these states fit the 2020 definition of ‘least developed’ due to income and infrastructure levels

### Postmodern Human Development Index

* The Postmodern Human Development Index (PHDI) is an index created by the World Congress Statistics and Data Division to judge human development based on non-economic statistics
* Information about the modern *economic* development index can be found [here](#_Developed_Countries)
* The PHDI was created in the Postmodern Era (defined as the period after 2091 when pure fusion bombs were used)
* It is designed as a modification of the Human Development Index of the 21st century, and was created in the late 2140s
* PHDI takes into account life expectancy, education duration, GNI per capita, inequality, percentage of citizens living in poverty, health, mean internet speed, and happiness
* Each individual category is given a value between 0 and 1 and a geometric mean is taking of all these values (the 8th root of the product of all the indices)
* The PHDI is designed such that valid comparisons can be made between PHDI values (in 2170) and HDI values (in 2020)
* Whilst the HDI values of countries in 2020 would be different if eight indices rather than three were used to calculate them, the two values would still be similar enough such that the same conclusions could be drawn from comparing the 2170 PHDI value of a country to the country’s PHDI or HDI value in 2020
* Therefore, when observing the PHDI values for various countries in 2170, one can compare them to the HDI values of those same countries in 2020
* PHDI categories include the following:
  + Extremely high | ≥0.950
  + Very high | 0.800-0.949
  + High | 0.700-0.799
  + Medium | 0.600-0.699
  + Low | ≤0.599

### Postmodern Ideologies

* The Postmodern Era is defined as the period of time lasting from March 27, 2091 (when the first pure fusion bomb was deployed against Shanghai) to the present day in 2170
* Postmodern ideologies in modern academic thought refers to political ideologies that were either created in the Postmodern Era or which were adopted by countries during this time
* This means that something like liberal democracy, which has been adopted in countries long before 2091, is still considered a postmodern ideology as it was adopted by at least one country during that time
* Scholars tend to group postmodern ideologies into four sections: democratic, anocratic, authoritarian, and asocial
* Democratic ideologies espouse democratic, libertarian societies
* Authoritarian ideologies espouse autocratic/oligarchic, authoritarian societies
* Anocratic ideologies are a hybrid of them- these arise due to a transition from democratic to authoritarian or vice-versa, however
  + Due to their temporary, transitionary nature, they aren’t elaborated on here
  + Anocratic ideologies have been seen historically in India in the late 21st century and Brazil in the last two decades of the 21st century as examples of democratic backsliding
  + They have also been seen in Pakistan in the early 21st century as an example of democratisation, however
* Asocial ideologies are called that because they aren’t necessarily authoritarian or libertarian, and as the authoritarian/libertarian scale measures someone’s social opinions, asocial ideologies are just called ‘asocial’

#### Democratic Ideologies

##### Liberal Democracy

* Liberal democracy is a full democracy based on the values of liberalism, a political philosophy based on liberty, equality, and the consent of the governed
* Liberal democracies have regular elections between multiple political parties, a separation of powers, civil liberties and rights, and political freedom for all citizens
* It is by far the dominant system of government in the world
* Although in the early 21st century liberal democracies were semi-exclusive to ‘the West’, by 2170 countries all across the world have adopted liberal democracies based on Western political principles
* Many political philosophers believe liberal democracy to be the ‘end stage of democracy’, as many nations who overthrown authoritarian regimes first became anocracies, then conservative democracies, and then liberal democracies
* Note: all these ideologies are described as they are *in theory*. I.e., whilst a conservative democracy may be a full democracy in theory, historically most conservative democracies have been flawed or illiberal

##### Conservative Democracy

* Conservative democracy is still a full democracy: it is intrinsically no more or less democratic or fair than a liberal democracy
* Conservative democracies were common in the 21st centuries as temporary political systems set up after an authoritarian regime was overthrown
* Russia and Turkey were conservative democracies for decades after their respective uprisings
* Conservative democracy has been used historically as a label coined by the ruling party of Turkey (AKP) to describe Islamic democracy in the early 21st century
* After the overthrow of the AKP in Turkey, the term took on a new meaning
* Conservative democracy is a full democracy based on the values of conservatism, a political philosophy based on preserving traditions and institutions
* Conservative democracies generally apply to democratising societies which reject Western political philosophy and culture and seek to define their own kind of democracy
* Examples include Russia and Turkey

##### Socialist Democracy

* Socialist democracies are full democracies
* In a socialist democracy, the society is democratic and the economic system is socialism
* There are many different kinds of socialism which have different economic laws
* Historically, socialist democracies have been market economies wherein the workforce- rather than an elite of employers- control the means of production and receive shares of the profits of their firms
* The motive of profit is still present, although enterprises are still socially owned
* Socialist democracy *is not to be confused with social democracy*
* Social democracy is heavily regulated capitalism- i.e. the Nordic model of the early 21st century
* Social*ist* democracy is economic socialism in a democracy
* Socialist democracies have historically been a form of government when a previously socialist, authoritarian state is transitioning into a liberal democracy
* Before the Postmodern Era, Vietnam, Cuba and Laos were socialist democracies during the 2040-2070 period
* During the Postmodern Era, more countries transitioned to socialist democracy and then to liberal democracy
* Argentina is the most prominent example of this

##### Broken Democracy

* A broken democracy, also known as an illiberal democracy, is *not* a full democracy
* More information can be found [here](#_Richmond_Democracy_Index)
* Illiberal democracies can either be a result of full/flawed democracies experiencing democratic backsliding, or authoritarian regimes gradually democratising
* Therefore, the term ‘broken democracy’ is often not used in an official context as it can be misleading
* Today, all illiberal democracies in the world are experiencing democratisation rather than backsliding

#### Authoritarian Ideologies

##### National Authoritarianism

* National authoritarianism is a less extreme variant of neofascism characterised by nationalism, populism, xenophobia, and authoritarianism
* National authoritarianism, like neofascism, employs populist and nationalist rhetoric and policies and opposition to liberalism
* National authoritarian countries aren’t totalitarian in that the government does not exercise as much authority over citizens’ lives
* However, there is still a complete lack of democracy, political repression, disregard for democratic institutions, deep social conservatism, and a single individual who rules the country
* National authoritarianism was widely seen in Eastern Europe during the 21st century and was also popular in Central Europe during this time
* National authoritarianism is often seen as a ‘stepping stone’ to neofascism, and India and Brazil could be described as such at different points in the 21st century before becoming neofascist

##### Stratocratic Authoritarianism

* Stratocratic authoritarianism is a form of authoritarianism wherein the military rules the country and enforces authoritarian rule
* This was common during the Second Scramble for Africa and, later, the Great African War when African countries were under martial law and had a war economy
* The socio-cultural ideology is still nationalism, but a different kind to national authoritarianism as the circumstances of stratocratic authoritarianism are different
* Like other authoritarian ideologies, there is a complete lack of democracy and political repression
* However, stratocratic authoritarianism is designed to maximise the state’s capacity for war: the military rules supreme, there is a war economy, martial law, and usually a strongman general who acts as an autocrat
* After the World Wars, the various stratocratic authoritarian countries gradually transitioned into civilian and democratic rule
* In the 2160s, the last stratocratic authoritarianist country, Chad, was forcefully democratised by the East African Federation invading the territory

##### Neofascism

* Neofascism originally referred to any post-WWII ideology that includes significant elements of fascism
* By the Second Interwar Period, it can come to refer to the specific kind of fascism seen in countries like India which had experienced democratic backsliding into authoritarian regimes
* India is only an example, however- neofascism was held by around 20 countries before the end of WWIV, not of all which actually fought
* Neofascism is characterised by populism, ultranationalism, racial supremacism, xenophobia, and anti-immigration sentiment
* It also heavily involves opposition to democracy, liberalism, socialism, and all other major ideologies apart from imperial regimes
* Neofascism rejects the idea that violence is inherently bad and sees it as a valid means of achieving supremacy over other nations and defending one’s self from them
* Neofascist states are still politically fascist: far-right authoritarian, autocratic regimes with widespread political repression and suppression of opposition
* They are totalitarian one-party states with a mixed economy and national economic self-sufficiency (autarky)
* There are currently no neofascist states in the world, with the vast majority being invaded, occupied, and forcibly dismantled during WWIV
* After WWIV, the remaining neofascist nations were mainly invaded by the USA and forced to democratise, although a few neofascist nations experienced internal revolutions

##### Totalitarian Imperialism

* Totalitarian imperialism combines the political philosophy of totalitarian one-party rule with the socio-cultural ideas of imperialism
* These countries have hyper-authoritarian governments which permit no opposition and control many aspects of citizens’ lives
* There is a complete lack of democracy, extensive political repression, massive censorship and surveillance, secret police, and state terrorism
* In a totalitarian imperialist state, the autocrat is an Emperor
* The social ideology of the state is imperialist: the nation is seen as superior to all other peoples, and that expansion is the nation’s duty
* Totalitarian imperialist states have historically been popular in the Middle East and Africa: the Empire of Greater Arabia was one of the Combine members in WWIV, and even today the Empire of Zaire remains a totalitarian imperialist state
* These states are distinguished from neofascist states mainly by origin: neofascism has occurred in the 21st and 22nd centuries as a result of democratic backsliding, whereas totalitarian imperialism has arisen from already autocratic nations
* There are currently a few totalitarian imperialist nations today, although it is estimated that by the 2200s these will have been forcibly democratised

#### Asocial Ideologies

##### Neocommunism and Socialism

* Neocommunism is a prominent ideology that was created in the mid-21st century
* It has not been implemented on a nationwide scale, but there are communes in the Middle East, Oceania and Africa which are neocommunist
* Neocommunism aims to simulate ‘real communism’, as opposed to the authoritarian, ‘bastardised’ form of communism seen in the USSR and China
* It is similar to anarcho-communism in some ways and to 20th century communism in others
* Neocommunist society focusses on the commune as the basic societal unit
* The commune is economically self-sufficient as it can produce food, water, and power, though it may specialise in producing specialist goods
* The commune is governed by a workers’ council in a direct democratic system- there are no elected representatives, but people directly vote on decisions
* Most variants of neocommunism actually do recognise the possession of private property, but this applies to personal belongings and not products of labour
* There is a common ownership of the means of production: i.e., everyone collectively owns any factories, farms, mines, etc and gets a share of the products
* Everyone works at something, and everyone bears arms- the phrase ‘militarise the working class’ is common
* Neocommunism is a democratic ideology and is heavily in support for the preservation of democracy by arms
* However, it is generally not grouped with other democratic ideologies as it is so different from them
* Neocommunism is not part of mainstream thought in any country, although there may be isolated neocommunist communities in certain countries
* There are neocommunist parties in many fully-developed nations, but these receive very small proportions of the national vote
* It can be safely said that neocommunism will not predominate any time soon
* Socialism is far more common in these nations, and whilst no fully-developed nations are currently socialist, certain socialist policies are widespread and socialist parties are ubiquitous in these countries
* Whilst few project that any fully-developed nation will actually become socialist in the foreseeable future, an increasing number of people are beginning to advocate for democratic socialism
* Socialism is no longer taboo in these countries, although it isn’t really mainstream in any of them and socialists are still a minority
* If any country does transition into socialism, it will be gradually and in the far future- assuming that the present trend of increasing numbers continues
* The most optimistic prediction for a socialist country is Canada becoming socialist in maybe a century’s time, but it is possible that no country will become socialist at all
* People are generally content with the current mainstream economic system of social democracy (heavily regulated capitalism), which is ubiquitous in the fully-developed and developed worlds and very common in the Transitioning world
* The only way for socialism to replace this current mainstream would be if a series of economic crises eroded popular belief in social democracy
* Thus, many socialists are divided on whether the 23rd century will be the ‘Socialist Century’ or whether the status quo of social democracy will just become increasingly entrenched
* It is considerably likely that the latter will be true, with socialism remaining as a more left-wing alternative considered by many but never actually implemented

### Multinational Organisations | World Congress

* The World Congress (WC) is an intergovernmental organisation which promotes peace, democracy, international cooperation, and regulations that improve the lives of citizens of democracies
* The WC currently consists of 206 total nations
  + 175 of these are member nations, all of which score a 6.50 or higher on the Richmond Democracy Index
  + It also contains 31 observer states, which are nations occupied by LDC forces- these nations cannot vote on WC decisions but are subject to WC regulations
* The WC is defined as a fundamentally democratic organisation: entry is exclusive to liberal democracies
  + The WC enacts economic sanctions on countries which are not eligible for entry: the scope and severity of these sanctions depends on the target country’s category in the Richmond Democracy Index
  + The worldwide average score on the Richmond Democracy Index is 7.39
* The WC is *not* in any way a military organisation, however: it enacts no military sanctions, has no standing army or police forces, and forbids members from contributing any kind of military personnel
  + This is due to the origins of the WC as a strictly pacifist organisation
  + The WC was established in 2148 after WWIV as an alternative organisation to the LDC for uniting the world’s democracies
  + WWIV saw the use of biological weapons of mass destruction, resulting in a brutal war which caused many nations to grow weary of all kinds of conflict
  + Many countries left the LDC after WWIV, leaving only 5 members: the USA, the EAF, Canada, Mexico, Israel
  + The USA and the EAF founded the World Congress as a peaceful organisation with no military role so that ex-LDC countries would join
  + In the next few decades, these countries did join the WC- but they explicitly stated that they would leave if the WC took on a military role
  + The occupied nations in Latin America, the Middle East, and South Asia are therefore occupied by LDC forces
  + The LDC hasn’t disbanded, it simply no longer plays such a major political role
* The World Congress’ main function is to uphold international law and introduce domestic regulations for its member countries
  + Like the United Nations, the World Congress has passed hundreds of multilateral treaties governing international law
  + This includes humanitarian law regarding the rules regulating warfare and international courts to try the most serious international crimes
  + Much of the WC’s international law is identical to resolutions passed by the UN in the 20th century
  + The World Congress differs from the UN, however, in the scope of its domestic laws regarding how member states must treat their civilians
  + The worldwide handling of genetic engineering, for example, was determined by the WC
  + The WC also rules extensively on the subjects of nanorobotics, cybernetics, cyberwarfare, labour laws, democracy laws, and much more
  + The WC actually legally bans democratic backsliding or the weakening of democratic institutions
* The WC cannot use military sanctions against countries which violate the set rules, but there are strong incentives to comply and to join the WC
  + Countries outside the WC automatically face economic sanctions, isolating them from the global economic community
  + This is a major issue for sanctioned countries in an age of globalisation and interdependence
  + ‘Rogue states’ which are still autocratic (e.g. Zaire) are often economically self-sufficient to avoid economic collapse as a result of these sanctions
  + However, these countries would still be far richer if they could trade with other nations and take part in the global economic and banking world
  + Hence, countries outside the WC have an economic incentive to democratise and gain membership
  + The WC gradually includes countries who are democratising into the global community as the extent of economic sanctions varies based on a country’s Richmond Democratic Index
  + Countries in the WC can be expelled if they don’t comply with WC rules (or face minor economic sanctions for lesser offences) and face the same global isolation
  + Countries (for example Honduras in 2166) have been sanctioned in the past by being removed from the WC for a month, which caused serious economic problems and no further violations of WC regulations
  + Another major incentive to join the WC is that intervening in another country’s affairs to install democracy is illegal for any member state- and allowed for any state outside the WC
* The World Congress has dozens of other functions, however, which include:
  + Providing a forum for countries to communicate
  + Arbitrating disputes between member states
  + Formulating settlements for disputes between member states
  + Collecting data on various member states (e.g. the Richmond Democracy Index value for each country)
  + Providing a database for all international treaties and conventions
  + Delivering humanitarian aid when needed
  + Protecting human rights and sanctioning countries which disrespect them
  + Determining international laws regarding the world’s seas and oceans
  + Determining international laws regarding the Moon, Mars, other celestial bodies, and space
  + Determining international trade laws
  + Codifying international laws

### Multinational Organisations | European Union

### Multinational Organisations | Other

African Union

Association of South East Asian Nations

Balkan Community

Central Asian Union

North American Accord (formerly USMCA)

Pacific Community

Union of American Nations (formerly USAN)

### Domestic Politics | United States of America

* The USA currently has 54 states:
  + 51st | State of New Columbia (NC)
    - Washington D.C. was made into a state in the early 21st century
    - The DC Admission Act to make Washington DC a state passed in the House of Representatives in April 2021
    - However, Republicans in the Senate (and Democratic senator Joe Manchin) opposed it, preventing its passage as long as Republicans had a majority
    - After the 2028 senatorial elections, the Democrats had a majority, and the House re-proposed the DC Admission Act
    - In 2029, New Columbia became the 51st state
    - A new federal district was created within the bounds of DC
    - The US capital is called ‘Washington’ and includes the White House, US Capitol, US Supreme Court Building, the main federal buildings, the National Mall, and a few other major federal buildings
    - Washington state was renamed to Cascadia (CS) in 2036 by a referendum, mainly as Washington owned slaves and many wanted to rename it for this region, but also to avoid confusion
  + 52nd | State of Sacramento (SA)
    - During [WWIII](#_History_|_World), Chinese forces launched a successful invasion on the West Coast of the USA
    - The front stabilised such that Chinese forces held Cascadia, Oregon, California, Nevada, and western Idaho
    - When Chinese forces were pushed back from the continent, they implemented a scorched earth policy, focussing on California
    - California’s federal buildings, state capitol buildings, fortifications, and factories were so destroyed that California could no longer be administered as a single state
    - Instead of recreating state infrastructure and establishing California again, it was decided to establish 2 states in the region owing to California’s large population
    - Sacramento is the northern state, and Southland is the southern state
    - Both of these states were formally granted statehood in 2090
  + 53rd | State of Southland (SO)
  + 54th | State of Puerto Rico (PR)
    - By 2091, Puerto Rico had over 4,000,000 residents
    - The movement for Puerto Rican statehood had been steadily growing throughout the 21st century and it reached extreme levels after WWIII
    - Many Puerto Ricans thought that their contribution to the war effort also justified their statehood
    - Puerto Rico was made a state in 2093
  + 55th | State of Long Island (LI)
    - The State of Long Island includes all of Long Island, as well as all the boroughs of NYC outside Long Island
    - Long Island was made into a state in 2154
    - The movement for Long Island statehood has its origins in 1969; though it wasn’t very popular at this time
    - After WWIII, Puerto Rico becoming the 53rd/54th state (technically the 54th, in practice the 53rd as California was no longer a state) made many in NYC consider the idea of NYC’s statehood
    - In the 22nd century, the movement only grew as NYC became exponentially more wealthy, important, and populated, and began developing its own separate culture from the rest of the USA
    - NYC finally achieved statehood in 2154, becoming the 55th created state of the Union and the 54th contemporary state of the Union
* The USA also currently has 7 populated territories:
  + Guam
  + Virgin Islands
  + American Samoa
  + Commonwealth of the Northern Mariana Islands (CNMI)
  + Wake Island
  + Johnston Atoll
  + Jarvis Island
* In the 2168 presidential election (the 95th), the results were as follows (note: due to extensive electoral reform after WWIII, the USA is now a multi-party state due to having abandoned the first-past-the-post system)
  + Egalitarian Party | 34%
    - The oldest and most prestigious extant party in the United States
    - Whilst it was founded as a left-wing, highly reformist party, the Egalitarian Party is now a centre-right party which supports the status quo (although does not oppose reform if needed)
    - The Egalitarian Party is currently very popular as many US citizens are happy with the status quo and don’t see the need for further social reform
  + Occidental Liberals’ Party | 25%
    - The OLP was founded in the Second Interwar Period as a ‘war hawks’ party
    - They argued for war with the Combine and military intervention in foreign countries to support US interests
    - The OLP nowadays advocates for [liberal internationalism](#_The_Current_World) (foreign military intervention to install democracy), North American integration, free trade, stronger foreign relations, military collaboration with foreign countries, and, in the more radical wing, a [North American Union](#_Hypotheticals_|_North)
    - Domestically, the OLP’s policies have changed to reflect the desires of the majority
    - Currently, the OLP shares the domestic policies of the Egalitarian Party
  + Social Democratic Party | 19%
    - The SDP is a left-wing reformist party primarily advocating for left-wing economic reforms
    - The SDP was founded in 2081 when the term ‘social democracy’ was no longer taboo in the USA, as a more left-wing alternative to the Egalitarian Party
    - It didn’t gain widespread popularity until the late 2090s and saw its first President in 2112 after the establishment of a multi-party state
    - In the early/mid-22nd century, the Democratic-Republican Party lost popularity and dissolved, with the dominant parties being the EP and SDP
    - For the past few decades, however, the SDP has been losing ground as continual reform over the 22nd century has left many Americans finally satisfied with the status quo
  + American Constitutional Party | 17%
    - The ACP is a conservative party emphasising the value of the Constitution and conservative values
    - It is very important to note that what is considered ‘conservative’ in the USA in 2170 is indisputably ‘progressive’ by 2020 standards
    - The ACP argues a slight right-wing, conservative drift from the status quo, and has been gaining popularity in recent decades
    - However, the ideal state of even the most right-wing ACP politician would be highly leftist by 2020 standards
    - The ACP is expected to be the second or third largest party by 2200
  + American Socialist Alliance | 2%
    - The ASA argues for genuine [socialism](#_Neocommunism_and_Socialism), albeit with a market economy
    - Socialism has been growing in popularity amongst [fully-developed](#_Developed_Countries) nations recently
    - It is not currently a mainstream ideology, however, and is not expected to be for at least a century or so
    - Nonetheless, it is relatively widely supported by left-wing academics
  + The remaining 3% of the vote is divided between various parties of negligible support

### Hypotheticals | North American Union

* The North American Union is a hypothetical political union, consisting of either Canada, Quebec, the USA, and Mexico or Canada, the USA, and Mexico
* The NAU would be a superstate (a large, powerful state formed from separate countries uniting), based loosely on a more centralised version of the [European Union](#_Multinational_Organisations_|_1)
* The idea of the NAU is distinct from economic integration of North American countries
* Economic integration in North America involves agreements pertaining to open borders, free trade, a single market, a common external tariff, etc
* Economic integration in North America has been occurring for centuries now, as far back as NAFTA in the 20th century
  + In 2020, NAFTA was replaced with the United States-Mexico-Canada Agreement (USMCA)
  + USMCA had many provisions pertaining to free trade, intellectual property, and regulations for the signatory countries (these range from Mexico being forced to pass legislation increasing the power and wages of union workers in the automobile industry to restricting trade with China)
  + Throughout the 20th century, particularly after the Mexican Cartel War, USMCA’s provisions were updated to give each country greater access to each other’s markets, facilitate greater cross-border trade, open up borders, and give the signatory countries more shared regulations
  + After the [Fourth Industrial Revolution](#_Fourth_Industrial_Revolution) in 2074, the USMCA agreement was replaced with the North American Economic Agreement (NAEA)
  + NAEA modernised previous USMCA provisions regarding automation, robotics, and AI
  + It brought Canada, the USA, and Mexico under shared regulations regarding automation and included provisions for shared infrastructure between the countries
  + Quebec joined the agreement in 2080
  + It was massively updated in 2088 and officially declared the borders between the USA, Canada, and Mexico to be open- this had been the de facto reality for about a decade already but was still extremely important
  + In the latter half of the 22nd century, superhighways, water infrastructure, and power infrastructure were constructed between the signatory countries
  + The 22nd century saw incremental updates to the NAEA agreement, including the implementation of a common external tariff modelled on the previous Mercosur CET
  + After WWIV, the NAEA agreement was changed in 2155 to the North American Trade Bloc and Economic Agreement- NATBEA
  + NATBEA created a single market for Canada, Quebec, the USA, and Mexico
  + The single market involves most trade barrier for goods being removed, complete freedom of movement of people and capital, and the complete freedom of movement of services
* NATBEA is generally regarded to be enough economic integration for now, with calls for further integration being in a noticeable volume but not a majority
* Those arguing for further integration widely support the idea of a North American monetary union
  + This would involve Canada, Quebec, the USA, and Mexico adopting a common currency
  + This hypothetical currency is referred to as the ‘amero’- modelled on the euro
  + A monetary union now is more feasible than it has ever been: all involved countries are fully-developed, high-income, have similar debt levels, advanced postmodern economies (postmodern meaning the largest sector is [quaternary](#_Overview_1))
  + All currencies belonging to the involved nations are already accepted in all involved nations
  + The US dollar is still a sort of global currency, but it is no longer the sole global currency and there is thus less of a deterrent to adopting a new one
  + In Canada, Quebec, and Mexico, a considerable majority of residents support the idea, and in the USA a slight majority of the population does
  + Even as far back as 2000, a majority of Quebecois residents favoured the idea of a shared currency
* But even a monetary union is controversial and could never happen: the status quo is perfectly suitable for all involved nations
  + In the USA, the status quo confers many advantages, and moving towards a new currency risks jeopardising the dominance of the US dollar
  + There is also the risk for Canada, Quebec, and Mexico of the loss of economic sovereignty and subordination to the US dollar and US monetary policy
  + Therefore, whilst the peoples of North America support a monetary union, the governments do not, and it is thus unlikely to happen as people aren’t really ‘passionate’ about the idea of a shared currency
* Economic integration is foreseen by many to be the later future of North America, with many predicting the monetary union to take place by around 2200 or in the early 23rd century
* Political integration is even less likely than total economic integration, and although many think it to be the eventual future, estimates range from the early/mid-23rd century to 2300
* Political integration involves Canada, Quebec, the USA, and Mexico uniting to form a single country- the North American Union
  + The NAU is usually conceptualised as a federal republic with a separation of powers between the executive, legislative, and judiciary functions
  + The executive would be a president elected by a majority of the NAU’s citizens
  + The legislative is typically thought of as a bicameral congress with an upper house, consisting of three or so representatives per country, and a lower house consisting of one representative for each country X number of inhabitants
  + The representatives for each house would be elected in each country by an electoral college
* Although political integration poses many issues and is thus extremely unlikely to be undertaken by the governments of any of the involved countries, public opinion for the NAU has been rising
  + In 2167, surveys were conducted in North American countries with the question ‘Would you support the immediate federation of Canada, Quebec, the USA, and Mexico into a single country?’
  + The available answers were ‘Yes’ or ‘No’
  + In Quebec, 35% of respondents answered yes
  + In Mexico, 27% of respondents answered yes
  + In Canada, 20% of respondents answered yes
  + In the USA, 12% of respondents answered yes
  + In 2147 after WWIV, the same survey was conducted and the answers were as follows:
  + In Mexico, 20% of respondents answered yes
  + In Quebec, 18% of respondents answered yes
  + In Canada, 11% of respondents answered yes
  + In the USA, 6% of respondents answered yes
* It is projected that by the mid/late-23rd century, there will be a majority in each country who supports the NAU, but that the actual implementation of the NAU will occur in the 24th century at the earliest
* But it is believed to be inevitable, and majorities of citizens in each country already support the idea of an eventual union in the following centuries

### Hypotheticals | United States of Europe

### Hypotheticals | World War Five

* A World War Five scenario has been theorised since the late 2130s
* WWV would involve the deployment of advanced biological weapons of mass destruction and the widespread use of newly developed combat technologies, like [metamaterials shields](#_Metamaterials) and [handheld railguns](#_Electromagnetic_Weapons)
* Futuristic combat technology includes the use of [plasma railguns and plasma artillery](#_Technology_of_the) and [borophene](#_Wonder_Materials_of)-reinforced materials
* [Extraterrestrial warfare](#_Extraterrestrial_Warfare) would also be a major component of such a war, and, depending on the progress of [space colonisation](#_The_Moon_|), would not just take place on the [Moon](#_The_Moon_|_1)/[Mars](#_Mars) but potentially [Callisto](#_Callisto_and_the), [asteroids](#_Asteroid_Belt), [Titan](#_Space_Colonisation_in), or [Venus](#_Venus)
* WWV is universally believed to be an existential threat to human civilisation: although biological weapons of mass destruction were deployed in World War Four

## Defeated Nations

### China | History

* North Korea is allied with China and is annexed into South Korea afterwards, along with some Chinese territory with a majority Korean population
* Pakistan is allied with China and is briefly occupied and partitioned into Pakistan, Balochistan, and Sindh
* Turkey is allied with China and is briefly occupied and partitioned into Turkey and Kurdistan
* Mongolia is allied with China and is briefly occupied, being split into occupation zones. These are eventually reunited, along with the ex-Chinese territory of Inner Mongolia, and Mongolia is now a sovereign nation
* Estonia, Poland, and Hungry are occupied and split into occupation zones. These are eventually reunited, and these nations are no longer occupied but still subject to restrictions

### China | Geopolitics

* (The pre-WWIII territory of) China is now held by various nations, both sovereign and unsovereign
* The division of China into various states has been conducted on ethnic lines, meaning that the resulting countries from the division are mostly ethnically homogenous and are nation-states
* The countries that were created as a result of the division of the People’s Republic of China are as follows (asterisks indicate the nation is either a protectorate or occupied and is not sovereign):

#### Republic of Tibet

Capital: Lhasa

* The Republic of Tibet was created by the LDC to be an ethnically homogenous nation-state for the Tibetan people
* The Tibetan state was brought into the existence by the 2091 Lhasa Peace Accords, one of the many treaties drawn up to end World War Three
* Tibet was created as a Western-style liberal democracy and has had strong cultural, economic, and political ties to the USA and the LDC for all of its history
* The Tibet-Zhongguo border was the most militarised border at the time from 2091 to 2116, and Tibet was the target of substantial terrorist activity from Zhongguo and Zhongnan
* However, this decreased throughout the 22nd century and Tibet is widely considered to be safe now
* The direct trigger for World War IV was the Indian invasion of Tibet
* Tibet resisted annexation with LDC support and after WWIV annexed the parts of eastern India which had a population of majority Tibetan descent

#### Republic of Tarim

Capital: Urumqi

#### Liberal Democratic Republic of Zhongguo\*

#### Liberal Democratic Republic of Zhongnan\*

#### Liberal Democratic Republic of Manchuria\*

#### East China Lawless Zone

* The countries that gained land as a result of the division of the People’s Republic of China are as follows:

State of Mongolia

Republic of China (Taiwan)

Republic of the Philippines

United Republic of Korea

### Brazil | History

* Peru is allied with Brazil and is dismantled post-WWIV into the Republic of Cajamarca\* and the Republic of Cusco\*
* Venezuela is allied with Brazil and is dismantled post-WWIV into the Republic of Llamos\* and the Republic of Vargas
* Chile is allied with Brazil and is dismantled post-WWIV into the Republic of Valparaiso\* and the Republic of Aysen\*
* Guyana is allied with Brazil and is dismantled post-WWIV into the Republic of Mabaruma and the Republic of Lethem\*
* El Salvador is allied with Brazil and is annexed into Mexico, Honduras, and Belize afterwards
* Uruguay is allied with Brazil and is annexed into Argentina afterwards
* Guatemala is allied with Brazil and is annexed into Mexico afterwards
* Colombia is allied with Brazil and is occupied afterwards, with border adjustments
* The Dominican Republic is allied with Brazil and loses land to Haiti afterwards
* Ecuador is attacked by Brazil and gains land afterwards
* Argentina is partially annexed by Brazil and gains land afterwards
* Bolivia is partially annexed by Brazil and gains land afterwards
* Paraguay is annexed by Brazil and gains land afterwards
* Suriname is annexed by Brazil and gains land afterwards

### Brazil | Geopolitics

* (The pre-WWIV nation of) Brazil is now held by various nations, both sovereign and unsovereign
* The division of Brazil into various states has been partially done on ethnic lines
* The countries that were created as a result of the division of the Federative Republic of Brazil are as follows (asterisks indicate the nation is either a protectorate or occupied and is not sovereign):

#### Republic of Indigena

#### Protectorate of the Amazon\*

#### Republic of Santa Catarina\*

#### Republic of Salvador\*

#### Republic of Mato Grosso\*

* The countries that gained land as a result of the division of the Federative Republic of Brazil are as follows:

#### Argentina

#### Bolivia

#### Suriname

### India | History

* Balochistan is allied with India and loses land to Sindh afterwards
* Bhutan is annexed into India by popular referendum and is not restored after the war
* Tibet is attacked by India and gains land afterwards
* Pakistan is partially annexed into India and gains land afterwards
* Nepal is annexed with India and gains land afterwards
* Sindh is annexed into India and gains land afterwards
* Bangladesh is annexed into India and gains land afterwards

### India | Geopolitics

* (The pre-WWIV nation of) India is now held by various nations, both sovereign and unsovereign
* The division of India into various states has been partially done on ethnic lines
* The countries that were created as a result of the division of the Republic of India are as follows (asterisks indicate the country is a protectorate or is occupied, and is therefore not sovereign):

#### Republic of Lakshadweep

#### Protectorate of the Himalayas\*

#### Republic of Kashmir\*

#### Republic of Bharat\*

#### Republic of Maratha\*

#### Republic of Dravidia\*

#### Republic of Orissa\*

* The countries that gained land as a result of the division of the Republic of India are as follows:

#### Republic of Tibet

#### People’s Republic of Bangladesh

#### Republic of Sindh

### Greater Arabia | History

* The Supreme Political Council loses the Yemeni Civil War with Saudi Arabian support, leading to a restoration of good relations
* Yemen becomes allies with Saudi Arabia in WWIV and isn’t annexed by the latter
* After the LDC defeats Greater Arabia, Yemen is dismantled into Zaidi, Hadramout\*, and Mahra\*
* Oman is also allied with Greater Arabia and is dismantled post-WWIV into Mahra\*, Muscat\*, and the Protectorate of Rubalkhali\*
* Bahrain is allied with Greater Arabia and is dismantled post-WWIV, with Greater Bahran\* replacing it
* Jordan is allied with Greater Arabia and is dismantled post-WWIV, with Yarad\* replacing it
* Iraq is annexed into Greater Arabia, but is partitioned afterwards
* Lebanon is annexed into Greater Arabia, and is liberated afterwards with border adjustments
* Syria is annexed into Greater Arabia, and is liberated afterwards with border adjustments
* Egypt is partially annexed into Greater Arabia and gains land afterwards
* Persia is partially annexed into Greater Arabia and gains land afterwards
* The UAE is annexed into Greater Arabia and gains land afterwards
* Qatar is annexed into Greater Arabia and gains land afterwards
* Kuwait is annexed into Greater Arabia and gains land afterwards

### Greater Arabia | Geopolitics

* (The pre-WWIII territory of) the Empire of Greater Arabia is now held by various nations, both sovereign and unsovereign
* The division of Arabia into various states has been conducted partially on ethnic and partially on political lines
* The countries that were created as a result of the division of Arabia are as follows (asterisks indicate the nation is either a protectorate or occupied and is not sovereign):

#### Republic of Zaidi

#### Protectorate of Rubalkhali\*

#### Republic of Nedj\*

#### Republic of Asir\*

#### Republic of Hejaz\*

#### Republic of Shammar\*

* The countries that gained land as a result of the division of the Empire of Greater Arabia are as follows:

#### United Arab Emirates

#### Qatar

#### Kuwait

#### Persia

#### Egypt

## Technology

*NB: The new technologies of AI, Cybernetics, Genetic Engineering, Nanotechnology, Robotics and Automation, and Synthetic Meat are mentioned in different sections of this document*

### 4D Printing

### Biotechnology

### Blockchain

### Cybernetics

* A cybernetic organism (also known as a cyborg) is a living organism with artificial parts
* Prosthetic limbs become increasingly advanced in the 21st century, culminating near the end of the century in prosthetic eyes and ears being made
* Many countries offer such prosthetics as part of healthcare services, though more advanced prosthetics can be bought privately
* By the turn of the century, prosthetic limbs have developed to the point where they are an advantage over organic, and some people deliberately cripple themselves to get prosthetics
* Wealthier people able to afford the best prosthetics thus have biological advantages over the poor, leading to heightened classism
* The response is public outcry to limit becoming advanced cyborgs
* The WC forbids the manufacture of prosthetics which have explicit advantages over natural limbs (e.g. ability to discharge electricity), and governments disseminate propaganda to discourage the use of prosthetic limbs
* Many criminals and citizens still mutilate themselves either to illegally buy prosthetic limbs- a carbon-fibre arm is strong without exercise and is immune to pain
* In the 22nd century, the cybernetics black market is large
* The scarcity of prosthetics means that state-sponsored initiatives to replace worker/soldier limbs with advanced cybernetics have largely been impossible
* Even in WWIV when prosthetics were advanced enough for cyborg soldiers to be feasible, they were too expensive for large armies to all use them
* Nonetheless, every combatant country in WWIV had regiments with cybernetic enhancements- no LDC nations actually forced soldiers to mutilate themselves, but they often provided major incentives for doing so
* Autocracies actually did forcibly mutilate some regiments to give them cybernetics
* In the later years of WWIV, cybernetics in warfare became obsolete as [electromuscular suits](#_Electromuscular_Suit) became widely used by human infantry forces
* After WWIV, the WC forbade all countries to use cyborg soldiers
* In many dictatorships, cyborg regiments still exist as governments force soldiers and workers to replace organic limbs with cybernetics
* In the modern day, many WC countries have stigmas surrounding having cybernetic limbs

### Directed-Energy Weapons

### Electromagnetic Catapults

### Electromagnetic Weapons

* These include electromagnetic firearms and electromagnetic artillery: both utilise the same scientific principles, though the latter obviously deals with heavier projectiles
* Electromagnetic firearms are firearms which use electromagnetic force to launch projectiles at a high velocity
  + This is contrastable to conventional firearms, which ignites a propellant to launch the bullet
  + Electromagnetic firearms are advantageous to conventional firearms because the projectile launched has a greater range and speed- and therefore greater force
  + Conventional firearms generally fail to exceed a muzzle velocity of 1.5 km/s, but EM firearms can readily exceed 3 km/s
  + As the force of a projectile depends on its mass and acceleration, EM firearms are thus more destructive than conventional firearms
  + They are also extremely accurate and have a very high range
* The actual firing mechanism of the EM firearm can vary: in the early 21st century, two different kinds of EM firearms were researched for weaponry: railguns and coilguns
  + Coilguns eventually came to be used as [electromagnetic catapults](#_Electromagnetic_Catapults), with railguns eventually coming to be used as firearms and artillery
  + Railguns are called as such because the firing mechanism uses a pair of parallel electrical conductors called rails
  + A current flows down one rail, into the armature (a component which carries alternating current), and then back along the other rail
  + The electromagnetic effects of this current flow accelerate the armature, which can slide along the rails and which pushes the projectile
* Railguns have a long history stretching back to the 20th century, but technical issues prevented them replacing conventional weapons
  + The Yugoslavian Military Technology Institute was an early experimenter with railguns, developing a railgun with 7 kJ of kinetic energy in 1985
  + In the early 1990s, the US Army dedicated over $150,000,000 into railgun research
  + By the early 21st century, the technology for effective railguns was present- e.g. at the University of Texas at Austin, a 9 MJ railgun was developed which could deliver tungsten armour-piercing bullets
  + The issue was that railguns required millions of amperes of current
  + This could be produced, but the immense pressures and temperatures generated would wear out the rails and the gun very soon
  + Railguns had to be able to fire several thousands rounds to be viable
  + In the mid-21st century, China began using tantalum hafnium carbide alloy due to its extremely high melting point (3990 degrees C) and relatively high electrical conductivity and ability to act as a superconductor
  + In the late-21st century, around the 2070s, the USA, having mimicked the use of the alloy, began reinforcing it with [carbon nanotubes](#_Carbon-Fibres_and_Nanotubes) to improve the electrical conductivity
  + The use of tantalum hafnium carbide with nanotube reinforcement solved the problem of rails design
* However, there were still several other problems standing in the way of railguns replacing conventional firearms, mainly the expense
  + The projectiles themselves were extremely difficult to manufacture as they had to be under 2kg, under 40mm diameter, able to survive accelerations of 40,000 G, powerful electromagnetic fields, surface temperatures of hundreds of degrees C- and cost under $1,000 per projectile
  + Railgun ammunition had been in development since c.2000, with the US Army working on a suitable ‘hypervelocity projectile’
  + HVPs are supersonic (faster than the speed of sound- by far) projectiles with extreme range, speed, and accuracy
  + By WWIII, railguns and HVPs had developed to the point where the USA, Great Britain, China, Germany, and Japan used a few electromagnetic anti-aircraft cannons and naval guns
  + However, these were used to support existing conventional artillery as railguns were still very expensive
  + The Second Interwar Period saw extremely extensive refinement of the technology and throughout WWIV electromagnetic artillery gradually replaced conventional artillery
  + After WWIV, work continued on making railguns cheaper, smaller, and more portable, leading to the advent of electromagnetic handheld firearms
  + These were still heavy and costly, and therefore given only to [heavy infantry](#_Overview)
  + This was for two reasons: firstly, heavy infantry soldiers are equipped with [electromuscular suits](#_Electromuscular_Suit), multiplying their strength substantially and allowing them to wield heavy firearms
  + Moreover, the expense of handheld railguns meant that not every soldier could be equipped with them, and heavy infantry, being the elite of modern armies, took priority
  + Handheld railguns gradually became cheaper and more refined, and more and more armies began to use them
  + The proportion of railgun-equipped heavy infantrymen in each army also began to increase
  + By 2170, the world’s wealthiest and most developed countries have heavy infantry which are all equipped with handheld railguns

### Genetic Engineering

* The [World Congress](#_Multinational_Organisations_|) has strict standards for genetic engineering and making transgenic humans
* It is forbidden to genetically engineer humans to give them any advantages over the ‘Present Localised Standard’- i.e. the average human according to the demographics of all non-engineered humans at any given time in any given country
* Records of kept of everyone who has their genes engineered are kept so the pre-engineering information can be used to calculate the PLS
* If a human has a deformity, genetic disease/or abnormal susceptibility to one, this can legally be fixed- every country in the WC provides social service programs to do so or ppl can do so privately
* If a human is abnormally unintelligent or weak *for genetic reasons- not environmental*, they can have this privately remedied, but most countries have social service programs
* People who have naturally slender/unmuscular builds are allowed to be genetically modified to the PLS
* All countries in the WC by law must have government agencies dedicated to punishing people genetically engineered past the PLS or engineered without informing the government and having a license to do so
* In the USA, this is called the Genetic Engineering Regulatory Agency (GERA)
* Countries outside the WC don’t obey these rules
* The Combine was infamous for forcing genetic engineering of people to create better soldiers, workers, or child-bearers
* Even nowadays, some countries engineer soldiers, although now only three countries force non-civilians to be genetically engineered
* Seven countries simply lack limits on how much you can be genetically engineered, resulting in massive classism as the wealthy are biologically superior to the poor
* Around three dozen more have some legislation, but nothing like the WC, still resulting in biological class differences
* Many countries, including the aforementioned ones and others, may not have mandatory engineering, heavily pressure employees for it, so that soldiers/civil officials are genetically engineered
* Many in WC countries lobby to force countries to end these practices, and countries like the USA do issue sanctions and engage in small conflicts with offending countries, although there’s nothing like a Cold War/World War

### Holography

### Nanorobotics

### Pure Nuclear Fusion

#### Lasonuclear Bombs

* Pure nuclear fusion refers to a kind of nuclear fusion which does not need a fission primary explosive to ignite the fusion fuel
* Nuclear fusion has been used since the 1950s- thermonuclear bombs, also known as hydrogen bombs, were fusion weapons which utilised two separate reactions:
  + A primary stage of nuclear fission (fuelled by uranium/plutonium) which ignites the fusion fuel
  + A secondary stage with thermonuclear fuel (deuterium and tritium), which is heated as a result of the primary stage and causes fusion reactions
* Pure fusion was invented by [LDC](#_Liberal_Democracy_Coalition) scientists in [WWIII](#_History_|_World) and was first used in the form of a bomb
* Pure fusion bombs are superior as they have a far greater yield- due to no primary reaction being needed, and because they can be assembled in secret
  + (As separating uranium/breeding plutonium requires industrial investment which is very hard to conceal: blocking the sale of the needed machinery was the main way in which nuclear proliferation was controlled)
* Pure fusion bombs were first used in WWIII and are considered to be fourth-generation atomic bombs
  + 1G = Bombs which use energy entirely derived from nuclear fission
  + 2G = Bombs which use nuclear fission and fusion to provide energy
  + 3G = [Undeveloped] Thermonuclear bombs which focus the energy of their explosion into a certain direction, rather than a spherical explosion
  + 4G = Bombs which use nuclear fission and fusion to provide energy and which focus the energy of their explosion into a certain direction, rather than a spherical explosion
  + These bombs go by many names: pure fusion bombs, lasonuclear bombs, L-bombs, laser bombs, fourth-generation bombs, doomsday bombs, or Shanghai bombs (as they were first- and famously- used in Shanghai)
* Lasonuclear bombs achieve pure fusion and have nuclear shaped charges (i.e. their energy is focussed in one direction)
  + The nuclear fission ignition apparatus is replaced by the use of a miniaturised superlaser with huge amounts of energy
  + The lasers are pumped by plasma produced from tokamaks: tokamaks are devices which use powerful magnetic fields to confine plasma
  + Tokamaks were, from the mid-20th to the mid-21st centuries, thought to be the most feasible way to produce a practical fusion reactor
  + Tokamaks by themselves were insufficient for this, however, and LDC scientists incorporated them into a larger design concerning lasers and a separate fusion reaction
  + The plasma-pumped superlaser is also used to realise the nuclear shaped charge concept by utilising a ‘gun-barrel’ design for the lasonuclear bomb itself
  + The lasonuclear bomb is dependent on nanobots, a product of the developments in nanorobotics seen in the 21st century, to initiate the detonation
* The lasonuclear bombs were able to circumvent national air defence systems in WWIII due to their unidirectionality and power of explosion
* They became obsolete in the Second Interwar Period, however, as directed-energy weapons became powerful enough to destroy nuclear WMDs outside the range of lasonuclear weapons
* Hence, lasonuclear bombs and other nuclear WMDs are now obsolete

#### Pure Fusion Reactors

* The development of lasonuclear bombs provided a mechanism for accomplishing pure nuclear fusion, which could be commercialised and used to generate energy
  + Once the lasonuclear technology was discovered, the same principles were applied in developing pure fusion power plants
  + The first working reactor prototypes were approved in the mid-2090s and by the first decade of the 22nd century they were operating in four countries
  + The [Second Interwar Period](#_History_|_2080-2120) saw the use of pure fusion to generate energy begin to take over world energy production
  + By the outset of [WWIV](#_History_|_World_1), fusion power plants were operating in 36 countries
  + WWIV itself served as a catalyst for the implementation of pure fusion power plants due to their effectiveness
  + By the end of WWIV, 8 countries used fusion power to generate over 25% of their energy
  + By 2170, 29 countries use pure fusion to generate over 75% of their energy; additional countries use pure fusion to generate over 35% of their energy; 34 additional countries use pure fusion to generate over 1% of their energy
  + It is estimated by many economists that by 2200 pure fusion will generate over 75% of the world’s energy
* Pure fusion power is often used in tandem with other clean energy sources, filling the gaps that renewables can’t fill
  + This has been changing over the 22nd century, however, as technological improvements increase pure fusion’s economic viability
  + Fusion power is effective as it provides more energy per gram of fuel than any other energy source
  + The fuels it uses are also abundant- deuterium exists as 1/5000 hydrogen atoms in seawater and tritium can be made by bombarding lithium with neutrons
  + The 22nd century saw continual refinements to the reactor technology used, making fusion reactors cheaper and safer
* The limiting factor on the implementation of fusion reactors is expense, not poor energy production
* The implementation of pure fusion reactors and the subsequent abundance of energy had major socioeconomic ramifications
  + Fusion power plants were initially owned by private companies in the majority of countries
  + During WWIV, many of the combatants’ energy industries were nationalised to better equip their economies for war
  + This was also a result of high concerns concerning the intellectual property of fusion reactor refinements, international regulations for fusion power, and equal global development and adoption of pure fusion power
  + The abundance of energy led to energy prices greatly decreasing and becoming widely available worldwide
  + Middle-income countries especially favoured adopting fusion energy once it became cheaper in the mid-22nd century, and led to energy abundance in places where it didn’t exist
  + Low-income countries were also able to afford (fewer) fusion reactors for the same reason (the definition of ‘low-income’ in the late 2100s is very different to that of early 2000s)
* Currently, fusion produces around 50% of the world’s energy, but this proportion is quickly rising

### Synthetic Meat

* The period between 2020-2120 leads to major changes in food industries
* The mid-21st century sees lab grown meat become extremely popular as technological breakthroughs make it healthy, tasty, and ethical
* WWIII really popularises lab-grown meat as it can be mass-produced, so governments invest in it and spread propaganda of how great it is because it’s so much more efficient to make
* The 21st century as a whole sees a rapid expansion of vegans/vegetarians in the first world and social stigmas around eating meat begin to develop due to the unethicality of the industry
* Organic meat industries in the latter half of the century come under massive pressure to abandon unethical practices and rebrand themselves as sources of high-quality real life meat to people who want the novelty of eating organic meat
* Organic meat is still widely affordable and one doesn’t have to be wealthy to eat it but lab-grown meat can be mass-produced so is infinitely cheaper
* Organic meat thus becomes a sort of novelty, although it is still relatively popular- a middle-class family on a night out might have some organic steak just for the novelty of it being organic, for example
* In the 22nd century, veganism changes attitude: it becomes widespread in the first world to oppose not just unethical practices, but the principle of consuming animals
* Far fewer people begin eating organic meat as it shifts from a novelty to a cultural stigma- the result is the organic meat industry shrinks and by the late century supply is so rare that it’s super expensive
* By 2170 the only Americans (for example) eating organic meat are those who make it a countercultural point to do so, and the 1%, because organic meat becomes a status symbol due to its expense
* Synthetic foods start becoming really popular by 2100
* Nutrient smoothies/pastes/foods which taste great but also have the perfect nutrient balance for optimal health are able to be mass-produced due to technological breakthroughs so become really popular
* Due to the cheapness of these new super-healthy foods the early 22nd century sees traditional fast food being replaced
* The result is that by 2170 obesity is extremely rare it’s so easy eating healthy
* Yeasts and other microorganisms are also used extensively to make new synthetic superfoods

### Transgenic Animals

* In the WC:
* Regulations like the PLS are absent for animals, and regulations are totally different
* Livestock animals are widely genetically engineered, although the government issues guidelines (which are periodically updated) regarding how far corporations can go
* Meat industry corporations actually have genetic engineering departments to ‘improve’ their product, and most WC governments allow private competition in engineering animals, provided that regulations are met
* The great majority of meat nowadays is lab-grown, but genetic engineering is also universally practiced on this meat (again, within guidelines)
* The creation and especially the release of transgenic/hybrid animals is very heavily regulated
* There have been a few governmentally-sponsored ecological interventions (wherein animals were genetically engineered *and then released into ecosystems*) in order to serve some ecological purpose
* In the mid- and late- 21st century, several animal species on the verge of extinction due to climate change were engineered to increase survivability of that species, but nowadays interventions are rare
* Some privately sponsored ecological interventions also took place, the majority of which had adverse ecological consequences
* Nowadays, it is illegal to release transgenic animals into any ecosystem without private consent
* However, creating transgenic animals for entertainment/artistic purposes is still legal, although there are interventions
* In the modern era, many transgenic zoos exist
* Previously extinct species, e.g. mammoths, have also been resurrected- although of course doing anything in this area is *heavily* regulated
* Newly-made species like mammoths have been released into ecosystems and allowed to proliferate
* Most resurrected species are restricted to zoos, however
* Although many WC countries, e.g. the USA, forbid resurrection of animals for commercial purposes which exceed a danger threshold- so Jurassic Park would be illegal
* But dangerous animals like mastodons or smilodons do exist in U.S. zoos, although the companies sponsoring this are required to hire PMCs as security
* In the WC, resurrecting species for commercial purposes is extremely rare, however, and hasn’t been done for decades now
* Previous *Homo* species have also been resurrected, although their release into ecosystems or commercial utilisation has always been forbidden
* They have been resurrected for purely scientific purposes- the first resurrections of *Homo* species were done by private companies with government consent
* The first scientific reports pertaining to these species are some of the most famous articles in the academic world
* Neanderthal anatomy, physiology, behaviour, and psychology have been massively studied
* Outside the WC, regulations aren’t as tight but for practical reasons universally exist
* Compiling a list of regulations for each country would be too long, but nowadays every country recognises that letting private citizens interfere with ecosystems by letting new/enhanced animal species run amok is an extremely bad idea
* But in many cases (mostly outside the WC but still inside), ecological damage has already been done
* Dinosaurs have been resurrected before and *have* broken free from zoos or research facilities- and not just dinosaurs, other rogue apex predators have been relatives of bears, birds, apes, etc
* These have either been captured or killed, however, and nowadays regulation of prehistoric apex predators is extremely tight in every country

### Unmanned Vehicles

### Virotherapy

* In 2068, the first ever type of cancer could be definitively ‘cured’ by engineering oncolytic viruses

### Virtual Reality, Augmented Reality, and 5G

### Technology of the Future: Plasma Weaponry

## Nanotechnology

### Carbon-Fibres and Nanotubes

* Nanotechnology is a scientific field concerning the making of materials on the scale of atoms
* Essentially, it involves synthesising ‘wonder materials’- substances with extreme capabilities and potential for widespread application due to their unique properties
* The wonder material in most widespread use is carbon-fibre
  + Carbon-fibre is used to reinforce materials, typically a plastic polymer resin, forming a composite material which can then be used
  + In any context, if something is ‘made with carbon-fibre’, it means made with a carbon-fibre composite: not solely carbon-fibre
  + Individual carbon-fibres are structurally equivalent to graphene sheets: composed of repeating hexagonal units, with each hexagon being made up of carbon atoms
  + Carbon-fibre differs from graphite in the way these sheets interact- graphite consists of graphene sheets on top of each other and parallel
  + Carbon-fibre consists of graphene sheets stacked irregularly on top of each other and these graphene sheets twist and fold
  + Carbon-fibres are highly flexible, resistant, light, and strong- the strength to volume ratio of carbon-fibre is extremely high
  + Carbon-fibre composites are stronger than steel and 25% as heavy
  + They’re stable and don’t corrode
  + Practical uses of carbon-fibres in manufacturing actually began in the 1960s and carbon-fibres were used in specialist industries for a century onwards
  + Their cost was too great for them to fully replace traditional materials like steel/aluminium, however
  + Manufacturing processes to make PAN carbon-fibre (carbon-fibre made from polyacrylonitrile- PAN) became more efficient and less expensive from the 2010s to the 2060s, and carbon-fibre became more widely used
  + But carbon-fibre only replaced traditional materials when in 2058, a new process for producing carbon-fibre was patented, using a different precursor material than PAN
  + The Fourth Industrial Revolution saw carbon-fibre composites proliferating as it became widely used to construct automata
  + WWIII provided another major opportunity for the expansion of carbon-fibre composites
  + By the 22nd century, carbon-fibre composites had replaced traditional materials like metals to a vast degree, with these composites being present in almost all manufactured products
  + Carbon nanotubes, cylinders composed of hexagonal units of carbon atoms, followed the same proliferation trends as carbon-fibre as the new precursor used for the latter could also be used to mass-produce nanotubes at a far lower cost than before
  + Nanotubes are used in transistors, finally replacing the silicon-based MOSFET transistors
  + The CNTFET (carbon nanotube field-effect transistor) gradually replaced MOSFET over the course of several decades- nowadays, CNTFET is universal
  + CNTFETs were actually first used in the 2020s but the inability to cheaply mass-produce nanotubes prevented them from wider use until the 2060-2120 period
  + Nanotubes revolutionised electrical engineering as a whole by changing transistor design- but they were also essential in miniaturising electronics
  + They also serve as additives to several structural materials- nowadays typically carbon-fibre
  + Their third main function is to aid the construction of nanobots by acting as scaffolding
  + Nanotubes can finally be used for various other functions, including testing for cancer (with successful tests occurring as early as 2012), environmental monitoring, and structural health monitoring for vehicles/aircraft/spacecraft
* Carbon-fibre materials became so widespread in the 22nd century that many consider the turn of the century to be the end of the ‘Silicon Age’ and the start of the ‘Carbon Age’
* Similarly, progress made in [borophene](#_Wonder_Materials_of) development has led many to believe that the turn of the 23rd century will see a transition of the ‘Carbon Age’ to the ‘Boron Age’

### Ceramics

* The 21st and 22nd centuries saw ceramics become increasingly common
  + Ceramics in this context are crystalline compounds consisting at least partially of carbon, silicon, oxygen, or nitrogen atoms
  + The 21st century saw the gradual adoption of carbides in the world’s militaries, and by the start of [WWIII](#_History_|_World) materials like boron carbide and tungsten carbide were used near-universally in body/vehicle armour
  + Aluminium oxynitride (also known as ALON) saw gradually increasing use over the 21st and 22nd centuries: there were no sudden revolutions in alon manufacture but the process gradually became more efficient and affordable
  + ALON is a transparent form of aluminium which is extremely proficient at stopping bullets- only 41mm of ALON can stop a 50 calibre BMG armour-piercing round, which can penetrate 94mm of traditional glass laminate (bulletproof glass)
  + ALON was used for private protection purposes throughout the 21st century and saw widespread military use in both World Wars
  + From the end of the 21st century it began being used widely in semiconductors, sensors, windows in laser communications, and infrared communications
  + By the mid-22nd century further refinements to the ALON manufacturing process made it cheap enough to be used as a premium construction material due to its high strength
  + By 2170 many new skyscrapers in developed countries are made partially of ALON

### Aerometals

* An aerometal is a colloquial name for a metallic microlattice
* These are synthetic materials made of an ultra-light metal foam
* Its density is 0.99mg/cm3, making it one of the lightest structural materials ever created- a tenth of the weight of carbon-fibre
* Aerometals are 99.9% air and 0.01% metal alloy- hence the name
* Aerometals become common throughout the early/mid-21st century: since the 2010s it has been quick and cheap to manufacture, but implementation was initially limited by strict laws regarding aerospace materials
* Aerometals eventually became widely used, however
* They’re mainly used in the aircraft/spacecraft/automotive industries to produce structures (not the vehicles themselves, just internal components) which are lightweight and efficient
* They’re also used in energy storage, batteries, and shock absorbers

### Aerogels

* These are like aerometals- synthetic, porous, ultralight- but are made using carbon atoms/silicon dioxide molecules rather than metals
* They’re named as such because they are gels wherein the liquid has been replaced with air
* The aerogel industry begins to boom in the early 21st century as technical and manufacturing advancements are made in the field, although aerogels themselves saw wide usage in c.2000
* Aerogels have dozens of applications: insulation; chemical spillage cleaners; catalysts in chemical reactions; imaging devices; paint thickening agents; energy absorbers; transducers; clothing, and much more
* The last of these functions, clothing, is one of the most common by 2170- aerogels are used in manufacturing space suits, diving suits, pilot suits, undergarments with electromuscular suits, and even novelty civilian clothes

### Stanene

* Stanene is the most recent wonder material that has come into widespread use
* Research and development began in the early 22nd century and implementation/commercialisation begin in the mid-22nd century, around 2150
* Stanene is a 2D material, being a single layer of tin atoms arranged in a regular, repeating pattern- hexagonal units
* Stanene is named as such because of the Latin word *stannum*, meaning tin, and the word graphene, as it has the same structure but with tin and not carbon
* The tin lattice also contains fluorine atoms, which increases its operating temperature by around 100 degrees Celsius
* Stanene is a topological insulator- this means it can carry a current on the outside edges of the layer *with no resistance*- that is to say, with 100% efficiency-while the inside remains insulated and carries no current
* Stanene is used in nanowiring- wiring on a nano level- and it’s used specifically in nanobots, integrated circuits, computer chips, and microprocessors
* It has revolutionised the electrical/microchip industries because it allows electrons to flow with no resistance and can work at temperatures up to 100 degrees Celsius
* Making a stanene transistor to replace the carbon nanotube transistor is a major current project of scientists worldwide and has already seen some prototypes

### Metamaterials

* Metamaterials are synthetic materials which have extraordinary electromagnetic properties that do not occur naturally
* Essentially, they interact with electromagnetic radiation (e.g. microwaves, X rays, or light waves) in abnormal ways
* These can include electromagnetic cloaking, which can render something invisible, or having a negative index of refraction, meaning metamaterials refract light in the opposite direction of normal media (e.g. glass/water)
* Metamaterials are made of multiple ‘units’, tiny things smaller than the wavelength of electromagnetic radiation they interact with
* E.g. metamaterials that interact with microwaves usually have units a few millimetres long, whilst metamaterials that interact with light waves usually have units a few nanometres long
* These units, sometimes called ‘meta-atoms’, were made up mainly of metals and plastics in the 21st century and carbon-fibres, stanene, and plastics in the 22nd century
* Though these materials are conventional, metamaterials display unnatural qualities because of the units’ exact shape, size, and orientation
* The units can be regularly or randomly distributed
* Because of how metamaterials interact with electromagnetic radiation, they have many different uses
* They are used frequently in optics as they have a negative refraction index
  + Metamaterials are often used for imaging as they can refract light to the opposite direction of the source
  + They can also act as a lens be used to bring light radiation from a point source to a perfect focus- metamaterials are often referred to in this context as superlenses however because resolution far superior to conventional microscopes
  + This is because metamaterials interact with light in different ways
  + Metamaterials have been used in the context of optics since the mid-21st century or so, with experiments proving their value to the field occurring in the first decade of the century
* Metamaterials are also often used as stealth devices in warfare
  + Metamaterials can be used as genuine, scientific invisibility cloaks because they can interact with visible light- a form of electromagnetic radiation
  + Light can pass through metamaterials without being scattered or reflected, rendering any object behind a metamaterials layer invisible to the human eye
  + This is extremely prevalent to warfare- soldiers, artillery pieces, materiel- anything- can be cloaked
  + Objects can be hidden not just from the human eye, but any sensor that uses electromagnetic radiation- IR radiation, X rays, microwaves, etc
  + Metamaterials began to be used as cloaking devices in the beginning of the 22nd century, seeing use in [WWIV](#_History_|_World_1)- the technology is far more refined now, however
  + Metamaterials are still relatively expensive so cloaking every soldier in an army is impossible, but improvements to the manufacturing process have made it cheaper, so since the start of the century a greater proportion of soldiers in militaries have been cloaked
  + Metamaterials can also be used to counteract directed-energy weapons as these use directed-energy weapons and metamaterials have a negative refraction index
  + [Modern militaries](#_Warfare) will therefore have ‘shields’ against [laser and microwave artillery](#_Directed-Energy_Weapons_and) which utilise metamaterials, but due to the expense of metamaterials these shields can only be provided to a few soldiers, usually heavy infantry
* Metamaterials also have various other miscellaneous functions, however
  + Seismic metamaterials are designed to counteract the adverse effects of seismic waves (products of earthquakes) on man-made structures
  + This works because the metamaterials shorten the wavelengths of seismic waves, and they can thus be directed around the building
  + Metamaterials can also be used as absorbers, which absorb large amounts of electromagnetic radiation: they are therefore often used in modern solar panels and high-end light sensors
  + They are also used as antennas- metamaterial antennas have been commercially available since the 2010s- with high power
  + Finally, metamaterials can be used for medical diagnostics, sound suppression, and nondestructive material testing (i.e. analysis of materials to evaluate their properties without causing damage)

### Wonder Materials of the Future: Borophene

* Borophene is a single, crystalline layer of boron atoms (in various patterns)
* Like graphene and stanene, it is 2D, and like graphene it is an allotrope (graphene is allotropic carbon, borophene is allotropic boron)
* Borophene is stronger than carbon-fibres, lighter, and more flexible- many companies and organisations are working on ways to mass-produce it
* It is theorised by many that in the 23rd century, borophene composites will replace carbon-fibre composites in the same way that the 22nd century saw carbon-fibre composites replace traditional materials
* There are even multinational organisations (similar in design and principle to ITER of the 21st century) working to synthesise borophene with internationally acclaimed scientists
* Experiments have resulted in the synthesis of borophene in the 2010s, but in the 21st century as a whole humanity was far from using borophene in industry
* The 22nd century has seen some progress made- by 2170, enough borophene has been synthesised so that a few small prototypes of devices containing borophene have been made
* But borophene is still far too expensive to even consider implementation and the processes for making it are deeply flawed still
* Humanity in 2170 is as close to commercialising borophene as humanity was to commercialising carbon-fibre in the mid/late-20th century

## Warfare

### Overview

* Previous technologies used in warfare are detailed in [WWIII](#_History_|_World) and [WWIV](#_History_|_World_1)
* All the information in this section refers to the current state of modern warfare
* The components of modern armies are heavy infantry, light infantry, and drones
  + Heavy infantry consists of highly trained human soldiers in electromuscular suits (EMS)
    - The electromuscular suits provide immense strength, resistance to damage, information, and manoeuvrability
    - They allow heavy infantry personnel to be as resistant to damage as a tank but far more difficult to hit, being far more smaller and more mobile
    - EMS also use pure fusion power to allow the wearers to levitate or propel themselves into the air
    - Heavy infantry therefore utilises 3D formations as they can organise themselves on the y axis
  + Light infantry consists of robots controlled remotely
    - The heavy infantry are supported by light infantry
    - Light infantry consists of robot personnel controlled remotely by human operators or, in some cases, by artificial intelligence programs
    - The term ‘light infantry’ is a slight misnomer because the robots, despite not wearing electromuscular suits, are heavily armed and armoured
    - They are termed light infantry because they can be produced in a factory and thus more expendable than heavy infantry, which are very, very highly trained and indoctrinated
  + Drones provide air and land support
    - The distinction between a drone and a light infantry robot is that the former is aerial and the latter is ground-based
    - Both are mechanical and unmanned, controlled remotely or in some cases by artificial intelligence
    - Drones can still provide land-support however as they can be massed in with light and heavy infantry near the ground
    - Most drones are deployed in the air, however
    - Drones can be heavily armed, heavily armoured, and relatively large, being expendable but formidable
    - Drones have entirely replaced bomber planes and fighter planes: they are far cheaper and are technologically sufficient to perform any mission a human-crewed plane can
  + Cavalry (i.e. tanks and colossi) is now obsolete
    - Tanks or colossi are destructive, but too immobile and too large of a target
    - Directed-energy artillery can therefore attack them more easily, with laser directed-energy weapons being particularly formidable against them
    - The enormous expense of these weapons and their susceptibility to destruction makes their manufacture now unjustified
    - Infantry units and drones are used as each individual soldier is cheaper than a tank/colossus and is more mobile/small- and therefore a more difficult target
    - Metamaterials can also be used for stealth, further promoting the use of several small units over fewer large units because metamaterial devices are expensive and large units are easier to hit and thus destroy
    - It is also far easier to cloak smaller objects than larger objects, so tanks or colossi would be extremely easy targets as they’d be large, inevasive, *and* poorly cloaked
    - Metamaterial stealth devices are essential for stealth and thus the survival of soldiers
  + Artillery is an important tool of warfare and can be conventional or directed-energy
    - [Directed-energy weapons](#_Directed-Energy_Weapons_and) are those which use electromagnetic radiation (light waves- lasers- or microwaves) to destroy a target
    - Laser artillery was primarily used in WWIII, and is best for hitting large, single targets
    - Hence, laser artillery is becoming less common in warfare
    - Electromagnetic artillery, which shoots traditional projectiles, is still used, but since WWIV the proportion of microwave artillery in modern militaries has been increasing
    - In the USA, the world’s largest and most technologically advanced military, there is a 55-45 split between microwave and electromagnetic artillery
    - Microwave artillery uses microwaves to destroy personnel by heat- in an EMS, it can literally cook a soldier alive
    - Unlike lasers, it can destroy many soldiers at once
    - Some heavy infantry are armed with shields coated in a layer of metamaterials (which can refract the electromagnetic radiation back where it came), and all EMS have visors which detect microwaves and show them as light
    - Soldiers are still very vulnerable to artillery, however
    - Many modern militaries are working on weaponizing plasma and making plasma artillery, but extrapolating from current progress it seems as if plasma artillery is undoubtedly a 23rd century invention
* Modern military strategy consists of qualitative superiority, tactical flexibility, and manoeuvre warfare
* Qualitative superiority refers to militaries prioritising the capabilities of each soldier rather than the number of soldiers
  + Militaries consist of a small core of elite heavy infantry soldiers supported by light robotic infantry and drones
  + The distinction between infantry and cavalry is obsolete: heavy infantry now has the same firepower as any tank and far greater mobility, rendering tanks obsolete
  + The focus is not on numbers- quantitative superiority- but on the capability of individual soldiers- qualitative superiority
  + The determiner of military strength is not the number of soldiers, but the power of each electromuscular suit or robot
  + The role of numbers is still important, of course, but smaller forces of stronger soldiers are more effective than larger forces of weaker soldiers
  + Hence, modern military doctrine emphasises having the best EMS and most advanced robots/drones
* Tactical flexibility refers to soldiers being able to determine how they achieve goals which are given to them from higher-ups
  + Tactical inflexibility, in contrast, is when soldiers are given a goal from higher-ups and then told exactly how to achieve that goal
  + Tactical flexibility is pursued because heavy infantry troops are extremely highly trained and are thus trusted to be able to assess a tactical situation
  + Heavy infantry troops communicate with each other in the field and NCOs in heavy infantry forces determine what to do and give individual heavy infantry troops commands- the individual soldiers themselves determine how best to carry out their orders
  + The NCOs on the ground also can give commands to light infantrymen and drones
* Manoeuvre warfare is a military strategy wherein shock, disruption, and positioning are used to achieve victory
  + Despite directed-energy weapons providing considerable firepower, mobility exceeds this
  + Pure fusion power allows infantry troops and drones to be hyper-mobile
  + It allows them to form 3D formations in the air and move with great speed, increasing their skills of cooperation and evasion
  + They can still be killed by artillery, particularly directed-energy weapons, but can evade them more easily
  + The armour used by these troops allows them to resist many forms of projectiles, and military scientists are currently working on ways to resist weaponised forms of electromagnetic radiation
  + Manoeuvre warfare consists of heavy infantry troops (supported by light infantry and drones) dropping from aerial drones into various optimal positions simultaneously
  + The accumulation of rapid, focussed, unexpected attacks is designed to break enemy cohesion and lines of communication
  + Optimal positioning of attacks can be determined by intelligence provided by drones

### Electromuscular Suit

* The electromuscular suit (EMS) is an integral aspect of modern warfare
* Essentially, an EMS is a kind of powered exoskeleton: other kinds exist, mainly used in construction and medicine (treating paralysis, muscular diseases, caring for elderly/disabled people)
* But the EMS is the most common and culturally relevant kind of powered exoskeleton
  + It is a suit of armour with added intelligence, communications, mobility, and strength functions
  + The armour is, of course, composite, consisting of various layers
    - The outermost layer is almost always metal to reflect microwaves- typically a few mm of steel
    - The steel isn’t primarily for actual projectile protection, however- other materials are used for that
    - Underneath the steel will be a capacitor (this is elaborated on later)
    - The composition of an EMS varies by country but usually consists of carbon-fibre layers sandwiching an inner layer matrix of boron carbide (or a similar synthetic ceramic) enmeshed in titanium and impregnated with carbon nanotubes
    - There may also be another carbon-fibre layer in the middle of the inner matrix
    - The matrix has a carbon-fibre backing plate, usually made of tungsten or depleted uranium
    - The armour itself is always black, for reduced visibility, and has a visor made of another composite made of alon, polycarbonate, and silicon nitride layers
    - The armour has lots of slopes and diagonals to deflect fire
  + The electromuscular suit is named as such because it uses electricity and acts as an extension of the wearer’s muscular system
  + Electricity is used to power its various systems (which will be explained shortly) and pure fusion power is used to amplify the strength of the user’s actions
  + It has often been described by its wearers as a sort of extension of the user’s muscular system, because in whatever way the user moves, the strength of the movement is multiplied by several times by the EMS
  + A punch to the abdomen from the wearer which, without an EMS, would cause the victim to bend double, would, with an EMS, instantly kill the victim and, if the victim was fixed to the ground, punch through their spine
  + Pure fusion power also allows the EMS wearer to levitate or fly
  + In terms of the EMS’ systems, almost all EMS provide, at the minimum:
    - Allows wireless voice communication between wearers
    - Uses VR to let wearers set ‘beacons’ or ‘areas of interest’ for other wearers which show up on everyone’s display
    - Allows wearers to transmit live videos of what’s in front of them to other viewers
    - Creates an adjustable temperature and pressure within the suit
  + The EMS’ strength allows wearers to wield far larger firearms than an ordinary soldier
  + WWIV saw significant developments in firearm technology relating to EMS wearers
  + In modern warfare, the weapons used with EMS are automatic anti-tank rifles:
    - Regular firearms are insufficient to effectively dispatch heavy infantry and many robots/drones
    - The USA, for examples, uses a category of firearms called ‘Hendriks rifles’, named after German-American engineer Klaus Hendriks, who worked for the Pentagon in WWIV
    - Hendriks rifles are larger than miniguns and shoot modified bullets in a rapid fire pattern, with the barrel rotating
    - The Hendriks rifle is fastened by carbon-fibre straps to the EMS and fires 60 calibre bullets
    - The bullets used by Hendriks rifles and the firearms of other countries’ EMS aren’t conventional bullets but HDPs: ‘high-destruction-projectiles’
    - The following is a description of the Canadian kind of HDP used by heavy infantry forces
    - HDPs are powered by small cylinders of fusible deuterium which provides the kinetic energy- and thus acceleration- needed for high-force impact
    - The penetrator is a long rod of tungsten or depleted uranium
    - The HDP has a synthetic ceramic jacket
    - It contains a cylinder of explosive material- aziroazide azide
    - All EMS firearms use weapons of similar size, design, and calibre, although heavy infantry in some countries are equipped with secondary firearms that use smaller, cheaper ammunition
    - EMS in all countries are equipped with explosives like grenades as well
  + The EMS can also be considered as electric reactive armour- all armour used in conventional warfare is electric reactive armour, colloquially known as electric armour
    - Electric armour is a kind of reactive armour- reactive armour is one that reacts in some way to the impact of a projectile to reduce the damage done
    - Electric armour works by having two conductive plates separated by an insulator- this creates a high-power capacitor, a device which stores electrical energy in an electric field
    - When something penetrates the conductive plates, the circuit is broken and the capacitor is discharged
    - This unleashes a large amount of energy into the projectile, typically vaporising it but something turning it into plasma (plasma itself has not been successfully weaponised, however)
    - The projectile energy is deflected because the plates are moving when they get struck by the projectile- this works because the whole process occurs at the speed of electricity
    - The energy is also dissipated in parting the magnetically attracted plates

### Cyberwarfare

* Cyberwarfare is an important front in modern warfare, and has been for 00 years- though its importance is beginning to dwindle
* Cyberwarfare is the use of digital attacks to harm a nation, and can cause harm comparable to actual warfare
* Cyberwarfare can be used to cause ‘hard’ threats- military operations that support traditional warfare, or ‘soft’ threats- espionage and propaganda
* Hard threats include causing physical damage and tampering with defence systems
  + Cyber attacks have been associated with physical damage since 2019, when the IDF destroyed a building associated with an ongoing cyber-attack, resulting in loss of life
  + This kind of warfare became commonplace in [WWII](#_History_|_World)I and afterwards
  + As early as the 2020s, cyber-attacks compromising digital military systems (e.g. C4ISTAR) components have occurred, disrupting military organisation, logistics, cohesion, and planning
  + Another hard threat includes tampering with defence systems
  + Since the 2010s, cyber-attacks have been used to interfere with the operation of air defences to facilitate an air attack
  + They have also been used to attack industrial infrastructure, infiltrating computers and disrupting power, water, fuel, communications, and transportation
  + As early as 2010, a malicious software program called Stuxnet infiltrated factory computers and attacking industrial infrastructure
  + Now, cyber-attacks can be used to interfere with the operation of light infantry, drones, and EMS systems
  + They can also be used to interfere with automated production and with electrical grids- reports of foreign countries infiltrating electrical grids date back to 2009
* Soft threats of cyberwarfare include information collection and disseminating propaganda
  + Out of all cyber-attacks, 55% of them are presently espionage-based, contrasting to 25% in 2021
  + Cyberwarfare as espionage has been extremely widespread since the 2010s: the NSA, for example, has previously spied on Angela Merkel, the Bahamas, Kenya, the Philippines, Mexico, and Afghanistan, recording nearly every cell phone conversation in these countries
  + This kind of cyberwarfare becomes ubiquitous in the 21st and 22nd centuries
  + Countries build up digital protection against this kind of foreign surveillance in a sort of arms race during the late 21st century
  + Cyber propaganda involves controlling information online to influence popular opinion
  + This was ubiquitous in the 21st century but the World Wars raised massive amounts of awareness for the danger of being manipulated online
  + Governments spent lots of time, money, and effort educating their populaces on the need on scepticism online to avoid being misled
  + Over the decades, these efforts were successful, leading to cyber propaganda being ineffective in many countries by 2170
* A major issue is that non-state entities can also wage cyberwarfare as cyberspace is decentralised
  + The 150 years from 2020-2170 did see increased centralisation of cyberspace and a crackdown on non-state entities waging cyber-attacks
  + This was done through many means: firstly as the cyberspace ‘arms race’ occurred in the last decades of the century, effective malicious software programs and digital defences became increasingly expensive and complex
  + The wealth needed to wage successful cyber-attacks by the 22nd century was really only available to states and the wealthiest companies
  + Legislation enacted from the 2020s to 2100s made the penalties for illegal cyber-attacks far more severe, with all cases in WWIII in the UK being labelled as domestic terrorism, for example
  + Technological developments in the late 21st and the 22nd centuries also allowed increasing limits, surveillance, and barriers to be put up in cyberspace
  + The result is that in the present day, cyberspace is- comparatively- extremely highly regulated, policed, and closed off
* Cybercrimes can also be a subset of cyberwarfare when carried out in the context of a nation attacking another nation, involving economic disruption
  + These involve cyber-attacks causing disruption to giants in various industries, causing massive disruption
  + 2017 saw cyber-attacks attacking the UK’s NHS and pharmaceutical company Merck, for example- these kinds of attacks are now a feature of modern warfare
* The concept of defending oneself against cyber-attacks is called cybersecurity
* Cybersecurity involves various tactics- these are the most common:
  + Complex encryption and authentication processes
  + Sophisticated antivirus software of far greater complexity than such software in the 21st century
  + Using firewalls (software which prevents data deemed to be a security risk) extensively- the last 150 years have seen the number, scale, and complexity of firewalls exponentially

## Space

* The 21st and 22nd centuries see the population (establishing bases and outposts) and colonisation (establishing settlements) of the Moon and, to a lesser extent, Mars
* They also see the militarisation of space and the beginning of extraterrestrial warfare, a kind of a warfare taking place in space
* There is also the adoption of pure fusion technology to create vessels capable of movement in space without needing to be in an orbit

### The Moon | History

* The construction of lunar research stations on the Moon began in the 2030s and 2040s
* Several countries pursued the idea of a research-based lunar outpost (a permanent presence of humans on the Moon in a moonbase) before WWIII
  + NASA established a lunar outpost on the lunar south pole (on Malapert mountain) in 2031 as part of its Artemis program, with its ‘Lunar Gateway’ (a space station in lunar orbit) having been established in 2026
  + China and Russia established a scientific experiment base on the moon’s surface in 2034- the International Lunar Research Station, situated on the lunar north pole at the rim of Preary Crater
  + During the following decades however, Roscosmos (a state corporation of Russia responsible for spaceflight) gradually distanced itself from China and by 2060 the ILRS was essentially a Chinese organisation
  + Russia distanced itself from lunar colonisation after the Russian Spring and by the late 21st century Roscosmos began cooperating with NASA and sending Russian cosmonauts to NASA’s lunar outpost
  + In the early 2040s, the European Space Agency, an organisation of the EU, established a research outpost on the lunar south pole
  + The UK continued to be a member of the ESA throughout the 21st century- in 2040 there was a major controversy as the UK left the EU for a second time, but it was eventually worked out that the UK would remain a member of the ESA, but have fewer privileges than other EU nations
  + In the late 2040s, the Israeli Space Agency established its own national base on the Moon in close cooperation with American presence
  + In the early 2050s, the Australian Space Agency built a base on the lunar north pole
  + In the early 2050s the Indian Space Research Organisation also built a moon outpost on the lunar north pole
  + The Moon Village Association itself built its own facilities within ESA territory, making its ‘Moon Village’ a reality in the late 2050s in the lunar south pole- the MVA and ESA closely cooperated, but their facilities were legally and administratively separate
  + In the late 2060s, JAXA (Japan Aerospace Exploration Agency) constructed a moon base on the north pole
  + In the late 2070s, the Canadian Space Agency built its own lunar base
* The 2040s, a time when the [Second Cold War](#_Second_Cold_War) began to intensify and dominate the global consciousness, saw major revisions to space legislation being made
  + The 2048 Lunar Surface Treaty is just one example of the rapidly accumulating pile of UN legislation regarding space and the Moon during this period
  + It is included here, however, due to its monumental importance
  + It essentially negated the 1967 Outer Space Treaty, which prevented individual countries laying claim to space or its inhabitants
  + The 2044 Treaty specified that in the regions where a country inhabited the Moon it held sovereignty in the area of inhabitation *as if it were a region of Earth*
  + The 2044 Treaty did not undo the 1967 Treaty’s ban on placing WMDs in space, or the 1967 provisions banning establishing military bases, testing weapons, and conducting military manoeuvres on the Moon
  + These provisions were respected even in WWIII, meaning that the Moon placed no military role in the conflict, merely supplying the belligerents with materiel
  + However, this treaty fundamentally changed the nature of space law- it was no longer open to humanity, but rather an extension of geopolitical tensions on the world stage
* 2080-2120 saw various other countries establish national lunar outposts
  + These include Russia, Singapore, Brazil, Mexico, Indonesia, United Korea, the EAF, Arabia, Ethiopia
* 2120-2170 saw an even greater increase in the number of countries with a national lunar base
  + These include Taiwan, Nigeria, the Philippines, Zaire, Thailand, Persia, Argentina, Hong Kong, Turkey, Malaysia, the UAE, and Egypt
* In most of these countries, private companies based there had already established a presence, although according to international law they could own land, but only within establish territories of sovereign nations
* The system worked- and continues to work- as a sort of feudal arrangement wherein the king gives land to a vassal in exchange for services, except the services rendered are either a lump sum or monthly fee
* Moreover, their space agencies partnered with agencies that had already established bases, which delayed the establishment of solely owned bases- Mexico is a commonly cited example of this
* The World Wars also delayed the establishment of bases as most countries prioritised either fighting the war or supplying belligerents
* The increase in lunar activity on the Moon varied in pace, however
* The 2040s saw an intensification of the Second Cold War in general, and the lunar activity of the USA and China intensified as a result
  + Intensification of lunar activity here refers to increasing numbers of personnel, buildings, and facilities on the moon, and a greater number of operations (i.e. research, mining, drilling, experimentation, etc)
  + At the time, many media sources dubbed this a ‘Second Space Race’
  + In reality, this is considerably overstated in both economic and cultural terms
  + In 1966, at the height of the (First) Space Race, the USA spent 4.41% of its federal budget on NASA- in 2020, this had dropped to 0.48%
  + In the 2040s, the percentage of the US federal budget spent on NASA averaged 1.28%, in the 2050s 1.93%, in the 2060s 1.66%, in the 2070s 1.31%, in the 2080s 0.03% (due to WWIII)
  + Even in the 2060s when lunar activity in the Second Cold War peaked, federal spending on NASA by under half that during the actual Space Race
  + Chinese economic spending on the ILRS shows that it has similar budgetary priority to NASA in their respective governments
  + Culturally, whilst lunar activity gained considerable attention worldwide, and whilst the intensified lunar activity was universally recognised as a result of the 2CW, very few saw it as a ‘race’
  + It wasn’t a ‘space race’ a such but a more gradual, long-term increase in activity without any major milestones to race towards
* Lunar bases were initially established for scientific, research, and experimental purposes
* However, in the latter half of the 21st century, lunar activity began to gradually incorporate industry
  + This includes in situ mining and refining of lunar materials and exporting them to Earth, and the establishment of satellites in orbit
  + Industrial activity on the Moon had occurred in limited capacity since the establishment of human presence there
  + However, until the middling decades of the century, space agencies’ moonbases were all purely scientific- industrial activity was carried out by private companies
  + Many of these were partnered with the Moon Village Association, but in 2015 Barack Obama signed a law allowing private companies to own the resources gained from space mining
  + NASA sold a contract to mine the moon for a single dollar in the 2010s (to Lunar Outpost), evidence of their strong support for private companies’ presence on the moon
  + The laws regarding private utilisation of lunar resources in liberal democracies came to be similar to the laws regarding the sea- private companies were permitted to exploit lunar resources in the same way that could exploit ocean resources
  + NASA’s partnership with the private sector was partially mimicked by the ESA (though to a slightly lesser extent), and JAXA and India also allowed private ownership, though with more regulations
  + China permitted private activity on the moon as well, although these private companies faced notable state control
  + In 2038, the first ever private company (which happened to be American) established a mining base on the Moon, next to NASA’s military base
  + In the next few decades, industrial activity on the Moon increased in volume but was still undoubtedly secondary to research activity
  + The number of companies and the scope of their operations steadily increased throughout the 21st century, however
  + Initially, industrial private companies (and industrial state-sponsored activities, which increased exponentially) employed humans, but these required extensive training for living on the Moon and acquiring technological skills for survival
  + This made employment difficult as employees required lots of investment and often used their acquired skills to negotiate for better conditions- or better jobs
  + The Fourth Industrial Revolution and subsequent developments in robotics resulted in industrial enterprise on the Moon almost exclusively employing robotics for manual labour, with a few specialists employed for supervision
  + Scientific enterprise also used robots for manual labour, but the greater amount of intellectual work needed meant that humans by far outnumbered robots
  + By the outbreak of WWIII, the number of personnel- including robots- employed in economic activities on the moon was only slightly less than the number of personnel employed in research
  + By 2100, the former exceeded the latter in number
  + Even by this date though, all the humans present on the Moon were highly trained and all of them (if not involved by private companies in management or nepotistic jobs) had specialist skills
  + The Moon continues to be a site for educated, trained specialists who form the scientific/engineering elite of terrestrial society in 2170, even if the majority of actual activity is industrial
* The 22nd century after [WWIV](#_History_|_World_1) saw lunar colonies of different countries increasingly pursue free trade and share research
  + The strict sovereignty-based lunar system of the 21st century began to gradually get less firm- countries began to gradually loosen borders and allow the flow of personnel from one colony to the other
  + Each country retained its sovereignty over the areas of the Moon that it controlled, but each individual national colony began to gradually blur together
  + In the American colony, for example, there are many Indonesian, Russian, British, and European astronauts, all conducting research and living together
  + The 2060s saw the World Congress enact landmark legislation concerning the Moon, formalising many of the aforementioned informal arrangements
  + Several treaties officially arranged for the sharing of research and industrial secrets and economic cooperation between national colonies
  + Simultaneously, military presence on the Moon has been declining since WWIV, and the soldiers stationed there from various countries are now largely familiar with each other
  + The absence of any serious conflict on the Moon bar some scattered diplomatic incidents have left tensions low, and fraternisation between different militaries is officially discouraged but unchecked in practice
  + The prospects of war on the Moon are therefore low
* The human population of the Moon increased exponentially:
  + In 2050, it was roughly 1,000
  + In 2100, it was roughly 100,000
  + In 2120, it was roughly 1,000,000
  + In 2170, it is roughly 13,000,000
* The robot population of the Moon also increased exponentially but at a higher rate than the human population from 2050-2120 or so, wherein the rate began to decrease
* By 2170, the robot population on the Moon is roughly 100,000,000

### The Moon | Colonisation

#### Incentives

NB: These are incentives for space colonisation in general, and specific incentives concerning the Moon

* There are various incentives for lunar colonisation, both scientific, economic, and ecological
* The purposes for space colonisation apply to other celestial bodies apart from the Moon, of course- and many of the difficulties
* The original human presence on the Moon was for research purposes, primarily being the following:
  + Observatory facilities could be constructed on the Moon, providing the benefits of space-based facilities without having to actually launch them into space
  + Lunar materials could be collected and analysed
  + Long-term studies on the effects of low gravity and non-terrestrial habitation on humans could be conducted
  + Long-term studies on the effects of cosmic radiation could be conducted
  + Monitoring of the lunar atmosphere’s evolution through a monthly cycle
  + There were a myriad of other experimental and research purposes for establishing a permanent lunar presence, however
* As the human presence on the Moon increased, however, and the Moon became commercialised, various industrial objectives were also realised
* These boil down to three things: things can be made on the Moon; things can be extracted from the Moon; colonisation stimulates other industries
* Things can be made on the Moon/in space in general:
  + Although colonisation requires a very high initial investment, the Moon has many high-value trade goods that can be extracted or manufactured (e.g. precious metals, lanthanides, gemstones, power, semiconductors, and pharmaceuticals)
  + Lunar colonising also allows the growth of industries in space itself- space has various material properties that allow manufacturing in extreme conditions
    - The vacuum of space is extremely clean, allowing the creation of extremely pure materials
    - Vapour deposition can be used in this ultraclean environment to build up materials layer by layer
    - Space can provide extremes of heat and cold, which can be used to produce strong materials without the cost of producing extreme conditions
    - Sunlight reaching the Moon can be focused to concentrate immense amounts of heat, and materials can simply be kept in the shade perpetually to allow them to reach temperature near absolute zero
  + Materials that could be manufactured on the Moon include semiconductors, [ceramics](#_Ceramics) (from lunar soil), and microcapsules
  + Moreover, large numbers of solar panel satellites could be placed in orbit, powering lunar industry and sending surplus energy to Earth
  + Industry on the Moon itself is also necessitated by the fact that many extracted materials need to be processed
    - For example, minerals must be refined and volatiles purified
    - Delivering materials from the Moon to Earth is extremely expensive, so space industry could be further stimulated by the presence of processing facilities in space
  + 3D printed robots could be used to carry out manual labour with a few humans present for supervision and technical issues, thus providing a legitimate, feasible model for conducting industrial activity on the Moon and in space
  + Industry on the Moon could therefore- eventually, after significant original investment- become self-sustaining, and by the 22nd century many lunar industrial operations were both self-sustaining and profitable
* Things can be extracted from the Moon:
  + Space has gargantuan amounts of materials which can be mined and exported back to Earth- the Moon is rich in minerals and volatiles (easily vaporisable elements) and lunar water could be used to produce propellant
  + These minerals include anorthites (used to make ceramics), orthopyroxenes, clinopyroxenes, olivines, and ilmenite
  + There are also vast amounts of basalt present which can be processed to be broken down into pure calcium, oxygen, iron, magnesium, aluminium, and titanium
  + Lunar mining is restricted by international legislation to encourage sustainability, but it is legal to both state and private enterprise
  + The Moon is also abundant in helium-3 which can be used for fusion- and began to be used for such in the 22nd century
* Colonisation of the Moon/in space in general stimulates other industries:
  + The colonisation of space also provides major stimuli for industry- the space industry currently has three major economic sectors
    - Satellite manufacturing is a major sector of space industry as satellites can be more easily launched into orbit from the Moon
    - Ground equipment (e.g. terminals, gateways, satellite dishes) manufacturing is the second (and largest) major sector and a lucrative source of income
    - The launch industry is the final sector- ample fuel is needed to transport humans and cargo to/from the Moon to orbiting space stations and the 21st century also saw lots of lucrative investment in electromagnetic catapults
    - In the first decade of the 21st century space-related services were worth US$100bn- by the 22nd century it was worth tens of trillions
* Constantly accompanying these primary research/industrial motivations, ecological concerns were secondary but still important reasons for lunar colonisation
  + Establishing non-terrestrial human presence ensures the survival of the human species in the case of a cataclysm on Earth
  + Industry and people could be moved into space, preventing overpopulation on Earth
  + Space industry alleviates demand for resources and energy as these are potentially abundant in space
  + Expanding human presence/activity to space is ecologically preferable to terrestrial regions of expansion like the oceans
    - This is because major expansions of human presence or activity have historically caused devastating ecological consequences
    - The Holocene extinction, occurring in the modern era, is an example of expansion of human activity causing extinction, deforestation, habitat fragmentation, and various other consequences
    - Expanding into space wouldn’t pose these consequences as there is no known life in our solar system
    - Hence, lunar colonisation is good as if humanity is to expand, it is far better to do so into lifeless regions rather than those on Earth which are already inhabited by animals (e.g. oceans and seas)
* These are motivations for space colonisation in general, but there are many reasons why the Moon itself is optimal for colonisation:
  + Distance. The Moon is an obvious first target for colonisation as it is closest to Earth, so easiest to access, and can be used as a staging post for further colonisation efforts
    - The technology for lunar colonisation has been present since the start of the 21st century- not so for further celestial bodies
    - Distance is also important because the Moon can be easily supplied and human presence thus sustained- even before pure fusion technology, it took only 3 days to reach the Moon from Earth
    - It also means that manufactured products/raw materials could be easily sent from the Moon to Earth quickly and cheaply
  + The Moon is abundant in resources for in situ resource utilisation (i.e. using resources found on the Moon for self-sufficiency)
    - Solar power is an abundant resource, allowing energy to be harvested
    - The Moon has water ice at its poles, which can be used for feeding/ agriculture or can be electrolysed into hydrogen and oxygen
    - Hydrogen and oxygen can be used for rocket propellant or materials’ processing
    - The lunar surface contains silica, alumina, lime, iron(II) oxide, magnesia, titanium dioxide, and sodium oxide in abundance- these can be used to access the elements within these compounds, which can be used for various purposes
    - Oxygen is readily available- the elemental oxygen content in the regolith (deposits of dust, broken rock, and minerals on the surface of Earth, the Moon, Mars, and some other celestial bodies) is 45%
    - The extraction of these elements from compounds found in the Moon’s surface is energy-intensive, but this energy was harvested first from solar power and then from pure fusion power
    - Aluminium is useful as an electrical conductor or rocket fuel
    - Silicon is useful for making solar panels, glass, and ceramics
    - Calcium is useful for making electrical conductors, ceramics, and solar panels
    - Magnesium is useful for making alloys for aerospace
    - Lanthanides are also abundant on the Moon (but are on Earth) and could be a valuable exportable commodity- as is helium-3, an isotope of helium
    - The former can be used for manufacturing vehicles, electronic devices, and wind turbines
    - The latter can be an excellent fuel for nuclear fusion
  + The Moon’s surface can be used for construction- both as a suitable surface for buildings to rest on and for providing actual construction materials
    - Lunar soil (a fraction of regolith found on the very surface of the Moon) can be mixed with carbon nanotubes and epoxies to be used as a useful structural component
    - Regolith and lunar soil can be used to make buildings and infrastructure, including habitats, storage bins, landing pads, and roads

#### Difficulties

* The issue is that lunar colonisation and space colonisation as a whole comes with huge numbers of problems
* The main problem is the presence of resources essential to life
  + In 2019, it cost $54,500 to send 1kg of material into space for a SpaceX space shuttle, and $2,720/kg for the Falcon 9 rocket
  + These extremely high costs are due to large amounts of fuel needed and the high speeds needed (7.8km/s) needed to get into low Earth orbit so the payload stays in space
  + As such, there is a major emphasis in colonisation on ‘in situ resource utilisation’- using materials collected on the Moon for survival which is as self-sufficient as possible
  + ISRU is vital for colonisation- bodies like the Moon possess abundant raw materials which can be exploited- but establishing the necessary processing facilities and industrial infrastructure to do this is difficult and requires considerable initial time and investment
  + It is also important to note that whilst the Moon is abundant in minerals it is *not* abundant in volatiles, compounds with high volatility which are typically gases at room temperature and pressure
  + Nitrogen, carbon, and hydrogen are highly depleted on the Moon, meaning that supply of these materials needs to mainly come from Earth
* The Moon also lacks a substantial atmosphere, meaning that the body faces a lack of insulation which leads to temperature extremes
  + Whilst this is potentially lucrative for manufacturing, it is a major barrier to survival
  + The lack of an atmosphere also means that the Moon’s surface conditions are akin to that of a deep space vacuum
  + Finally, the Moon is very vulnerable to radiation and solar flares- in terms of the former, the Moon receives half as much radiation as in interplanetary space
* A single day is also roughly as long as 28 Earth days, leading to long nights where solar power cannot be utilised
  + Although the adoption of pure fusion reactors in the 22nd century provided alternate sources of energy, this was a major issue in the 21st century
  + It is also a considerable obstacle for lunar agriculture
* Lunar agriculture (growing crops on the Moon) faces many other problems besides a lunar night of 354 hours
  + The lack of an atmosphere leaves to extreme variations in surface temperature
  + It also leads to extreme exposure to solar flares
  + The lunar soil contains almost no nitrogen or potassium, and the Moon lacks any pollinating insects
* Finally, moon dust is a major problem to living on the Moon
  + This is an abrasive, glassy substance formed by microscopic meteorites hitting the Moon’s surface
  + It is sharp as the Moon has no weathering to round it
  + Moon dust sticks to everything, is usually toxic, and damages equipment
  + It is extremely harmful when breathed in and during the 1960s and 1970s Apollo missions caused respiratory problems for astronauts
* Hence, whilst lunar colonisation had many incentives (which were later realised), it also faced many major difficulties

#### Survival

NB: The history of various, previously-used methods of lunar survival are too extensive to detail here. This section refers to present (2170 AD) methods of survival, with minor references to their history

* Colonisation of the Moon requires water, food, space, people, materials for construction/manufacturing, energy, life support, transportation, communications, gravity, and radiation protection
* Water and Materials:
  + Lunar ice has been located in craters near lunar poles and water molecules exist as hydrates bound to lunar minerals found in the Moon’s surface
  + The Moon is deficient in volatiles but has large quantities of minerals and metals present
* Energy:
  + Solar energy is abundant and can be harvested by satellites in the Moon’s orbit which are equipped with solar panels
  + Solar energy can be used to power lunar activity and to produce surpluses sent to Earth or other space colonies
  + Solar power satellites (SPS) could be built from lunar-derived materials, making solar power the cheapest available power source on earth
  + Solar ovens can be used to reach high temperatures for industrial processes
  + The supply of solar energy is discontinuous due to long lunar nights, but by 2170 pure fusion reactors are abundant and helium-3 is a local source of fuel that is often exploited
  + As of 2020, 1,000,000 tonnes of helium-3 were present on the Moon’s surface, and this supply is yet to be exhausted
* Life Support:
  + Mechanical systems which recycle nutrients efficiently and provide environments that can sustain life are needed
  + Life on the Moon is limited to closed-off habitats usually referred to as ‘modules’ which are closed ecological systems
  + These are ecosystems that don’t rely on matter exchange with anything outside the system, requiring at least one autotrophic organism (in this case, plants) to provide food
  + Waste-products are recycled to form useful products
  + CES have been present since the 20th century: e.g. a research facility in Arizona called ‘Biosphere 2’
* Radiation Protection:
  + Habitation modules are covered with a layer of treated lunar soil
  + Lunar soil contains silica and iron compounds, which are fused sing microwaves to make a glassy solid to be used as a construction material which is resistant to radiation
  + A layer of lunar soil is placed over habitation modules for further protection
* Food:
  + Space agriculture (the cultivation of crops on the surface of extra-terrestrial celestial bodies) is possible
  + Plants are essential for providing food/oxygen and recycling human waste, and provide morale boosts due to aesthetic value
  + Many of the techniques and technologies used to grow plants are those seen in the Third Agricultural Revolution
  + However, the unique conditions of space necessitate further innovations
  + Plants are tethered to ‘pillows’ containing clay-based growth medium with added fertilisers/nutrients
  + A bank of LEDs above the plants produces light suited for plant growth, almost always magenta as plants reflect green light
  + Plants are grown in enclosed, automated environment where sensors and robots connected in an internet of things communicate with each other
  + Sensors can detect an incorrect plant orientation, for example, and a robotic arm will move it, or sensors can detect incorrect temperature and a heating/cooling system will correct it
  + This means that human personnel can carry out other activities
  + Enclosed/automated habitats have been successfully tested as far back as the 2010s with the Advanced Plant Habitat
* Gravity:
  + Long term exposure to low gravity environments has extremely adverse consequences for the human body, as does the effects of spaceflight
  + These include muscle loss, bone density loss, diminished organ function, worse eyesight, poorer cardiovascular strength, etc
  + Space settlements thus rely on artificial gravity to negate these effects
  + All space buildings with artificial gravity create it by centripetal force: settlements rotate and this simulates the effects of gravity
  + If you were to create a circular building constantly rotating, you would have to stand 56m from the rotational epicentre to experience Earth’s gravity
  + The problem is that to constantly keep a settlement rotating requires lots of energy- in the present day this can be provided using a combination of pure fusion, solar energy, and rocket propellant
  + The 21st century saw limited lunar settlement as pure fusion technology had not yet been created, and rotating buildings were thus extremely rare
  + The benefit of this was that various space agencies heavily researched ways to help the human body deal with effects of low gravity
  + These are relatively mundane, however, mainly involves strict exercise regimens to maintain muscle/bone density

#### Space Architecture and Living

NB: The history of the development of lunar architecture. This section refers to present (2170 AD) lunar architecture minor references to its history

* Architecture on the Moon is built entirely on the surface, with the only underground facilities being resource extraction (e.g. mines)
* The conditions needed for space survival determine the design and capabilities of buildings there today
* Space architecture focuses almost entirely on functionality- aesthetics are important for interiors, but not at all for exterior design
* Settlements in space may be inhabited by humans or robots
* Humans are used in research/experimentation and for supervising industry
* Robots are used in some human-inhabited facilities as sources of minor manual labour, and are used mainly in industrial work
* Buildings inhabited by humans are totally different to those inhabited by robots

Materials

* Inflatable habitats used to be common on the Moon in the early/mid-21st century, but gradually became placed with more durable designs as the lunar presence expanded
* Most buildings are constructed with locally-sourced materials: regolith
* Regolith is processed using microwaves to fuse its constituent compounds, namely silica and iron-containing compounds, together into a glassy solid
* This is given many different names in different compounds, but the most common name is ‘moonglass’, and it is used to reinforce lunar concrete
* Lunar concrete is a building material made from regolith, water, and cement, which is itself manufactured from beneficiating regolith (removing certain minerals) that has a high calcium content
* The water can be sourced from combining oxygen with the hydrogen found in lunar soil
* Over the 21st and 22nd centuries, lots of building material has been sent from Earth to the Moon for a large number of modules (these are explained later) of be constructed out of titanium, carbon-fibre composites, steel, aluminium and other materials- although several of these are often used together

Humans

* Buildings in space have to be closed ecological systems with a breathable atmosphere, and are often rotating to create artificial gravity
* Thus, most lunar settlements consist of a few buildings, each of which are very generalist, having to carry out many functions
* They contain residential quarters, agricultural facilities, communications facilities, occupational facilities (rooms/equipment needed to carry out a job in space, e.g. research or supervision), etc
* If humans are meant to reside there for over a few hours a day, they will be rotating to create artificial gravity and are thus circular
* These circular generalist buildings are usually referred to as ‘modules’
* Modules in space have been becoming more and more luxurious since the early 21st century: technological advancements have made living in space easier, space life has been growing easier anyway as more and more infrastructure and agriculture is set up, and more and more money has come into space settlements as a result of industry
* Almost all lunar settlements concern a mixture of scientific, industrial, and recreational activity- even state-owned settlements are now ‘hybrids’ of various different kinds of activity
* In a typical lunar village, there will be buildings for research and recreational activity, buildings for manufacturing, and outdoor mines and quarries
* Recreational facilities appeared later in the settlement process- large generalist modules began having cinemas, pools, etc built in as space grew more affluent

Robots

* Some buildings in lunar villages (with the proportion varying based on the village) contain manufacturing equipment, and are populated by robots doing various functions
* Space industrial processes can work in zero gravity, with assembly line processes using enclosed conveyor belts for the assembly line process
* Some manufacturing processes require gravity, so certain industrial buildings create artificial gravity by centripetal force
* All robot-populated buildings have a breathable atmosphere and are closed ecological systems, however, as human personnel are often needed for supervising space factories and repairing robots
* Many industrial operations are outdoors, however, in mines, quarries, drilling sites, etc, and human personnel will have to wear spacesuits and use moving handrails and other surfaces for movement

Wealth and Luxury

* The Moon is not a luxurious society, although there are luxuries there
* The wealth produced by the Moon increased exponentially during the 21st and 22nd centuries and conditions improved
* With each generation, who had all spent their time on the Moon expanding facilities and building new things, life got better as future generations were able to use the work of their forebears
* Though lots of the Moon’s wealth went to investors, companies, and states on Earth who invested in the technology, the Moon itself became richer
* This mainly happened because profits were re-invested to expand lunar facilities and increase quality of life for human personnel to incentivise talented people to offer their skills
* Many of the personnel on the Moon used their salaries (or their percentages of company profit, depending on the employment deal) to purchase new amenities or facilities
* Personnel on the Moon would also be able to use what little downtime they had to construct new recreational facilities
* By 2170, the Moon does have many luxuries and recreational facilities
* Life is nowhere near as Spartan for humans on the Moon as it was initially
* Personnel on the Moon are highly trained and educated and thus receive large amounts of money for their employment
* Space industry has yielded great profits and this led to an exponential expansion of space industry, leading to more and more money in the lunar economy
* Lunar tourism started in the late 21st century but by the 22nd century started to become a real industry
* In 2170, the space tourism industry is highly profitable and popular
* As space technology improved and the human presence on the Moon increased, prices for space tourism decreased and by 2170 an upper-middle class family could comfortably afford a holiday trip to the Moon
* Tourism on Mars is still limited to the wealthiest due to the expenses of travel there- and there isn’t much there to see- but this is expected to change

### Mars

#### History

* The 21st century saw interest in Mars but little real activity there
* The decades of the first half of the century saw a large number of robotic systems reach the Martian surface to carry out research functions but also pave the way for future colonisation
* Valuable intelligence reached the world’s space agencies regarding locations of resources (e.g. ice), and later robotic operations from 2040-2060 or so established basic infrastructure, habitats, and supplies
* All human landings on Mars required precursory robotic landings as a necessity to transport to needed equipment
  + The first humans to land on the moon were American astronauts conducting a sample return mission in 2039
  + This was sooner than many expected, but the establishment of a moon base in 2031 increased US attention to space colonisation, and therefore the federal funding for NASA
  + NASA sent the crew of astronauts in an Orion Multi-Purpose Crew Vehicle (MPCV), with a Deep Space Habitat module docked to the MPCV to provide extra living space for the long journey
  + The crew entered the Martian orbit, landed on the surface, collected rock and dust samples from the *Perseverance* rover, and returned to Earth
  + SpaceX sent 2 Starship (a launch vehicle developed by the company) cargo vehicles to Mars to place power, mining, and life support infrastructure there in 2040
  + In 2042, SpaceX became the first private company to send humans to Mars, and Starship vehicles brought more supplies and placed a propellant production plant
  + SpaceX’s initial plan to establish a human presence on Mars, announced in 2017, had planned to start building up a base there on the second landing, but this did not occur
  + Roscosmos sent a crewed mission to Mars in 2046, and the ESA did so in 2049, landing a surveyance rover there
  + China did so in 2052- the Chinese landing saw power, life support, and propellant production infrastructure to be set up
  + India made a landing in 2073, and the UK conducted its own landing there independent of the ESA in 2078
* Public and national interest in Mars began to fade soon after, however, for various reasons
  + The attention of the world’s powers was on the Moon, and space agencies could not fully commit to lunar colonisation with money *also* being funnelled into Mars
  + Mars is also far harder to colonise than the Moon: it is much further away and extremely expensive
  + Rockets and shuttles became considerably cheaper throughout the 21st century and the cost of transportation per kg of cargo considerably declined but the will just wasn’t present to undergo a heavy, long-term investment
* However, scientific interest continued, and robotic operations from 2050-2100 steadily built up infrastructure, established facilities, constructed the beginnings of a Martian outpost, and sent back a wealth of intelligence about Mars to Earth
* The Second Interwar Period saw a rekindling of interest in Mars worldwide
* It became a point of prestige for both the USA and the Combine to establish a presence on Mars in the 2090s and 2100s
* Investment ceased in the 2120s, however, as both factions accelerated rearmament and lacked the spare funds for space agencies
  + In 2097, NASA established an outpost on Mars
  + In 2099, India did the same, and Brazil followed in 2104
  + These were small barebones facilities but for the next decade robots built up further infrastructure and more humans ‘moved in’
  + Most of the human presence on Mars at this point consisted of small research facilities- industrial activity was practically non-existent in the first half of the 22nd century
  + A few of the largest private companies established bases themselves and began working on resource extraction facilities but were very far from making a profit- Mars’ resources are not at all as abundant as lunar resources
  + Industrial activity accelerated in the latter half of the 22nd century
  + Some state space agencies began establishing mines/quarries and built factories- but not all
  + No profit has been made on Mars by any organisation so far, although it is reasonable to believe that in the next few decades as industrial operations expand, profit will start to be made
* From 2120-2170, the following nations also established bases on Mars:
  + Israel, Indonesia, Japan, United Korea, the EAF
* Several other nations are currently in the process of establishing a base and plan to do so by 2200:
  + Mexico, Nigeria, Ethiopia, Taiwan, the Philippines, Bangladesh, Iran

#### Incentives

NB: These are incentives for specifically colonising Mars, not space in general- information on why space colonisation as a whole is beneficial, click [here.](#_Incentives)

* There are economic and scientific reasons for Martian colonisation
* The economic reasons for colonising space in general is that things can be made on space; things can be extracted form space; space colonisation stimulates other industries
* The first and last of these are explored [here](#_Incentives), and the following text deals with resources on Mars that can be exploited
  + Moving magma underneath the ground produces heat, which produces ore deposits
  + Copper, chromium, iron, and nickel are thus all present below Mars’ surface
  + Other elements present include niobium (used in making superconductors and steels), europium (for LEDs), lanthanum, and neodymium
  + Magma can also be cooled to extract lead, silver, tin, bismuth, and antimony
  + Volcanoes on Mars are also sources of titanium, iron, platinum, palladium, and chromium
  + The magma itself can be used to produce geothermal energy
  + Martian soil contains aluminium, iron, magnesium, and titanium
  + The soil is also scattered with small spherical haematite deposits, a major source of iron
  + Veins of gypsum also exist below the surface, a mineral containing calcium, sulfur, and water
  + Dark basalt dunes are also common on the Martian surface and are sources of chromite, magnetite, and ilmenite
  + These are sources of iron, chromium, titanium, and water
* The Martian crust contains important metals and volatiles which can all be exploited- silicon, oxygen, iron, magnesium, aluminium, calcium, and potassium are relatively abundant
* The primary reason for Martian colonisation, however, is research-based
  + The Moon broke away from Earth billions of years ago, but Mars is a wholly different celestial body and thus is very interesting to research
  + Planetary geologists can study rock, soil, and sediment to give information on Mars’ history and find out how life could have survived
  + Investigations on whether microbial life was present on Mars historically could be carried out
  + Information on Mars’ geophysical processes and evolution provides valuable information on the history and evolution of Earth and other celestial bodies
  + Colonising Mars is extremely difficult and thus provides an impetus for coming up with new space technologies
  + Mars could also be used as a staging post for further exploration of the solar system
  + Fundamentally, colonising Mars would advance the frontiers of human knowledge and satisfy human curiosity about Mars, its composition, its history, and its potential to carry life

#### Difficulties

* Colonising Mars is far more difficult than colonising the Moon, however- so much more difficult that during the 21st century most people thought that serious investment/colonisation of Mars wasn’t worth it
  + Mars does have at atmosphere, but no magnetosphere, meaning cosmic rays/solar flares can easily reach Mars’ surface
  + Radiation is so high that it would need 15cm of steel to resist it or 1m of rock
  + Temperature variation is not as high as the Moon, but the temperature difference between day and night is still 70 degrees C
  + There is less water on Mars than there is in Earth’s driest desert (the Atacama Desert in western South America)
  + Mars receives only 43.3% of Earth’s sunlight so solar energy is less lucrative at generating energy
  + Global dust storms are common and cover the entire planet for weeks, blocking all sunlight
  + The Martian soil is toxic due to high concentrations of chlorine

#### Demographics and Living

* The human Martian population is just over 100,000 now, roughly 115,000
* The robot population is about one and a half million, roughly 1,470,000
* Almost all of the humans present are here for scientific purposes rather than industry
* Out of these scientific human personnel, around 83% are employed by national space agencies rather than private companies
* Industrial activity has increased over the last century and now there are several Martian factories and mines- but whilst these are now generating revenue, it has not yet eclipsed the immense initial investment
* It is expected to do so soon
* Like the Moon, Martian buildings are large, generalist, circular structures called [modules](#_Space_Architecture_and)
* The modules rotate to create artificial gravity and contain living quarters, communication facilities, farms, processing facilities to produce needed elements, and recreational facilities to keep colonists sane
* They perform all the various different functions for survival
* Some modules are on the surface, covered with a thick layer of steel and rock, but the majority are underground due to the vast amounts of radiation
* All are closed ecological systems and have a breathable atmosphere, even the underground factory facilities populated only by robots
* The mines/quarries/drill sites are all outside, underground, and operated by robots, with moving handrails and platforms for humans to use
* So far Mars has not been militarised- the 22nd century saw the opening of military bases and the landing of soldiers on the Moon, in violation of UN treaties in the 20th century
* Mars does not have any military bases or soldiers, although many countries that already have small Martian villages plan to establish bases by the 2070s and land soldiers
* Robots are already working on constructing barracks, armouries, and other facilities for warfare
* This is more of a contingency than a need, however- the threat of world war currently is less than it was in even the 2010s

### Colonisation Legislation

* Rules regarding the colonisation of celestial bodies have varied throughout time
* Incrementally, as lunar colonisation progressed, more and more relevant legislation was passed pertaining to various aspects of colonisation
* However, WWIV and the post-war period saw the greatest shifts in how space colonisation could be conducted
* The following laws were established in 20th century space treaties prior to actual space colonisation, and are retained to this day:
  + Space itself cannot be owned- however, the surfaces of celestial bodies can be owned
  + Space cannot be occupied, claimed, or militarised with nuclear weapons
  + However, other forms of weaponry can be placed in outer space provided they are over a country’s own airspace
  + Space can be explored and travelled through by any state or non-governmental entity (NGE) without restriction
  + States and NGEs are liable for damage caused by their space objects
  + States and NGEs must avoid contamination of space and celestial bodies
  + Astronauts and space personnel are regarded as the envoys of mankind
* The following rules were formally or informally adopted by countries from the onset of lunar colonisation to the outbreak of WWIV, in contradiction of previous 20th century legislation
  + The surfaces of celestial bodies can be owned by a state or NGE- the former exercises sovereignty over owned land, and the latter owns that land and the resources within as their own legal property, independent of any state [formally adopted]
  + States or NGEs can claim territory even if they are not currently settling it, but these claims must be arranged with neighbours beforehand [formally accepted]
  + The United Nations will resolve all territorial disputes regarding space between nations [formally adopted]
  + States or NGEs cannot enter the owned territory of another state/NGE without the latter’s consent [formally adopted]
  + The surface of celestial bodies can be militarised with the presence of soldiers (robot or human), barracks, armouries, and another military facilities [informal state of affairs]
* The system of laying claim to regions and owning them was inefficient, but it functioned
  + The result was that countries which neighboured each other on the Moon entered many arrangements to determine borders
  + These utilise lots of straight lines, generally along lines of latitude and longitude, because the borders were drawn across barren, featureless land
  + The Treaty of Tordesillas and the Sykes-Picot borders, for example, used lots of straight line borders
  + The first countries to colonise the Moon did this extensively because these countries colonised the lunar poles and there were few specific locations there they wanted
  + There was one exception, with the USA claiming the Gruenberger Crater, but this was all
  + Just as with European colonisation of the New World, ownership was really just claimed by planting a flag and establishing a base
  + This led to various territorial disputes- some were settled by the United Nations, some were settled in WWIII when countries landed soldiers on the Moon and they held down lands, some were settled in WWIV, and others were settled by the World Congress
  + Nowadays, there are no more territorial disputes on the Moon
  + The straight-line system ceased nearer to the Equator, when countries wanted to claim the Marias of the Moon due to their basalt and helium-3 supplies
  + Countries who colonised the Moon later did so when in situ resource utilisation had progressed to the point where water could be exported from the poles to the equator
  + Thus, they colonised the equator due to the Marias there, and countries eventually had to negotiate more specific borders drawn around Marias or craters
  + Nonetheless, the vast majority of borders on the Moon are just based on lines of latitude or longitude
  + Before WWIII, there were practically no soldiers on the Moon so unresolved territorial disputes just stagnated, but from around 2080 onwards when the Moon became more militarised, territory became increasingly determined by who could hold the land
  + Actual fighting on the Moon was extremely rare until WWIV, however, and soldiers occupying disputed areas rarely met enemy soldiers occupying other disputed regions, such was the vastness of the Moon’s surface and the paucity of human presence there
  + After WWIV, the World Congress forbade conflict on the Moon unless the countries where also fighting on Earth, and many territorial disputes were resolved
* The WWIV period and afterwards saw a few major changes in the state of space colonisation
* Firstly, NGEs (i.e. private companies) could no longer exclusively own land
  + In WWIV, lands owned by NGEs were usually captured by other states due to NGEs lacking armies
  + Countries often needed NGE-owned lands because they had valuable resources
  + Many were also resentful that private companies could own lands alongside legitimate states
  + A new state of affairs arose that has often been dubbed ‘lunar feudalism’
  + NGEs could no longer own their own lands- they could hold lands within the territories of countries, but they could not hold land independent of them
  + States and NGEs had a sort of ‘king and vassal’ relationship: states gave land to private companies either for free, for a lump sum, or for a rent
  + In return, they provided protection and prevented their lands being captured
  + NGEs also retain the vast majority of rights over the land, but officially- for example on a map- the state owns the land, not the company
  + Although the need for military protection has now passed, countries are reluctant to relinquish ownership of lands, and the previous state of affairs has not yet been restored
* Secondly, the mechanisms for laying claim to land were drastically changed
  + The World Congress eventually drafted new laws saying that in order to claim a territory, you don’t need to have humans inhabiting it
  + However, a country needs to have some sort of presence in the area by merit of construction
  + This means that they need to have built something there, and that something must remain- it can be a road, a supply bin, a *stationary* robot, a mine, etc
  + Land can be claimed within 0.1-200 km of a construction, depending on the density of settlement there (currently, the limit is 200)
  + Any territorial disputes must be settled by the World Congress
* The new system of ownership means that a political map of the Martian surface is radically different to that of the Moon
  + The map of the Moon looks extremely ‘full’ because countries have claimed large areas and settled borders with one or two other countries (the only other countries present at the time) largely on lines of longitude or latitude
  + The map of Mars is filled with sparse, disconnected areas with curved, specific borders because countries can only claim areas nearby to their settlements

### Starships

#### Definition

* The 21st century definition of a starship is a spaceship (a vehicle capable of traversing space) which can travel to other solar systems
* In the 21st century, many spacecraft were released, entering space as a kind of artificial satellite for a celestial body
* These spacecraft were- and are- used for telecommunications, observation, meteorology, and GPS
* In the latter half of the century, as lunar colonisation began to pick up, these were used increasingly for transporting humans/cargo to/from the Moon, lunar exploration, and other space colonisation purposes
* However, these spacecraft could not manoeuvre freely in outer space- they used rocketry to escape and enter orbits, and remain in orbit
* In the 22nd century, a new kind of spacecraft was developed, one that could freely move in space without needing to be in orbit
* These new vessels gradually became known as starships

#### Spacecraft Propulsion

* From the 1960s to the 2010s, all spacecraft were propelled by chemical-fuelled rockets
* Spacecraft technology progressed considerably during this time, but the speed of spacecraft used remained more or less constant
* The power of these spacecraft remained capped by the method of propulsion used
* Engines used grew more complex and powerful, the fuels used changed, but the basic concept of a rocket propelled by burning fuel did not
* In the 1990s, NASA performed a technology demonstration test with the Deep Space 1 spacecraft- with was powered by an ion thruster
* Ion thrusters, also known as ion engines/drives, used electric propulsion
* With xenon as its fuel, an ion engine could create thrust being using electricity to accelerate beams of ions along an electric field
* Different ion engines used different methods for accelerating the ions, using either [Coulomb force](https://en.wikipedia.org/wiki/Coulomb%27s_law) or [Lorentz force](https://en.wikipedia.org/wiki/Lorentz_force)
* Whilst ion engines could only be used in the vacuum of space and couldn’t take spacecraft through the atmosphere, it pushed the boundaries of the capabilities of spacecraft and was necessary to land the first humans on Mars
* Ion engines gradually began to be used by NASA starting from the 2020s, and other space engines recognised the new capabilities of this method of propulsion and made a similar transition
* Later in the 21st century in the late 2060s, plasma propulsion engines began to be used
* A working idea of a plasma propulsion engine dates back to 1977- NASA astronaut proposed the Variable Specific Impulse Magnetoplasma Rocket and research continued on the VASIMR project since
* These efforts came to fruition in the mid-21st century and plasma propulsion engines began to replace ion engines altogether in the 2060s in NASA, with other agencies soon following
* Plasma propulsion engines are electrothermal thrusters
* An electric power source produces radio waves to heat and ionise a fuel, usually hydrogen- this forms a plasma
* Plasma itself is one of the four fundamental states of matter, consisting of gaseous ions and free electrons (electrons not bound to any atom)
* A magnetic field is used to confine and accelerate the expanding plasma, which generates thrust
* Plasma propulsion engines can vary the amount of thrust generated as well to customise acceleration rate
* The advent of pure fusion technology allowed for plasma propulsion engines to utilise pure fusion as the source of electric power, bringing totally new possibilities to space travel
* Spacecraft began to be powered by pure fusion in the 22nd century

#### Development

* In the Second Interwar Period new space vessels began to be developed that could stay in space for prolonged periods of time whilst not having to be restricted to staying in orbit
* The LDC and the Combine predicted war, and lunar development had reached the point where conflict could occur on the Moon
* Both of these factions had a reason for bringing the war there- industrial activity on the Moon had become lucrative and military bases had become ubiquitous
* Securing the Moon would thus be useful to finance war and to ensure that all military resistance of the enemy faction could be wiped out
* Vessels that could escape orbit but still stay in space for a long period of time were needed to destroy enemy satellites, trade rockets, and lunar bases
* These efforts began to gradually mould the existence of the modern starship: pure fusion could provide a starship with the energy to leave orbit and enter space, but it had to also be something which had the facilities for crewmen to stay in for long periods of time

#### Design

* The vast majority of all spacecraft are rockets, satellites, and space stations
* The latter two need to remain in orbit to operate: whilst rockets can traverse space and use thrusters to change direction, they have many limitations
* Rockets move from point to point- whilst they can move about, the idea of a rocket cruising through space as a boat moves omnidirectionally through a sea is impossible
* A starship is by definition able to do this, and unlike a rocket contains facilities for agriculture, water processing, recreation, life support, communications, electricity generation
* Starships are capable of launching into space and *remaining* there, moving around freely- they are not fully self-sustaining and do require refuelling stops, but they can sustain themselves and remain in space for a prolonged period of time
* Starships are immensely large and complex, whilst also being built to be resistant to projectiles
* Starship armour is considered globally to be the most resistant, strong, durable armour ever created by mankind
* It uses the design principles of the electromuscular suit but on a far larger scale, being dozens of inches thick
* Starship armour is thus so powerful that even laser artillery, which works in space, wouldn’t be able to penetrate it- this has significant implications for the role of starships in extraterrestrial warfare

#### Purposes

* The initial- and primary- purpose of starships is the conduction of extraterrestrial warfare
* Having a large vessel capable of remaining in space for very long periods of time opens up various other purposes, however
* Starships are often used in modern space colonisation and exploration missions, sending humans out to distant corners of the solar system
* Voyages to Titan, for example, take too long for humans to travel there with packed supplies
* A third function of starships is policing- their immense power and manoeuvrability allow them to intercept spacecraft acting illegally, and they can patrol the orbits of different celestial bodies to ensure no satellites have bene tampered with, no space stations have been hit by space debris, etc
* Starships can really be used for anything, but in some things other spacecraft have the advantage
* For example, they aren’t often used for trade between celestial bodies, and rockets are cheaper and can simply deliver payloads from point A to B, which is all that’s needed
* For above-ground research facilities, any research on already colonised celestial bodies can just be done on space stations in orbit
* Starships are integral for research regarding uncolonized regions, however
* The three main purposes of warfare; policing; colonisation/exploration aren’t the only ones, however
* Starships can be used for any miscellaneous purpose needed, and their cost is so astronomical that they’re often just used for various odd jobs as space agencies don’t want their money to go to waste
* For example, starships are often used by space agencies as sources of profit from space tourism, as people can comfortably stay in starships and just cruise through space like a celestial cruise ship
* As starships grow larger, more luxurious, and cheaper with time, the space tourism starship industry is expected to skyrocket

### Extraterrestrial Warfare

* Extraterrestrial warfare refers to any kind of warfare that doesn’t take place on Earth
* There are many kinds of extraterrestrial warfare, ranging from simple satellite sabotage to immense battles between starships
* Categories of extraterrestrial warfare include:
  + Satellite sabotage/destruction
  + Crewed spacecraft destruction
  + Lunar combat operations
  + Zero gravity combat
  + Starship combat
* Extraterrestrial warfare is also primarily fought by drones and spaceplanes, but utilises human personnel which can be heavy infantry, engineers, starship crewmen, or marines
* More information on each of these categories is listed below, along with information on how warfare is conducted in space (e.g. kinetic bombardment, microsats, etc)

#### Satellites

* Satellites are absolutely vital to extraterrestrial warfare and form the backbone of it
* They provide intel and conduct offensive military operations
* Satellites’ intelligence functions are more important:
  + They offer the vast tactical advantage of surveillance, both of Earth and in nearby space- orbital surveillance is extremely common even in peacetime
  + They are also vital for telecommunications between military forces, which is necessity for coordination and cohesion
  + Finally, satellites are responsible for positioning systems like GPS
* The sabotage and destruction of enemy satellites is therefore extremely important
* Destruction of satellites can be done in space, by drones and spaceplanes
* It can also be done on the ground, however, by anti-satellite weapons: ASAT weapons are powerful missiles launched at satellites from Earth
* Much of extraterrestrial warfare revolves around protecting one’s own satellites and destroying the enemy’s satellites
* Drones and spaceplanes are almost always used for this
* Satellites themselves can be weaponised, however
  + Satellites can be armed with lasers to shoot nearby targets
  + Microsats are small, highly mobile satellites (approximately the size of a refrigerator) which can move around and interact with other satellites or objects in orbit (e.g. a space station)
  + They can repair, sabotage, hijack, or simply collide with them
  + Picosats are also used and accomplish the same purpose but are small enough (a cubic foot in volume) to be even more nimble and difficult to hit
  + Femtosats do the same thing but are the size of a carton of gum, and are often launched from microsats and work by getting in the middle of satellite/space station/starship/etc machinery
* Satellites can also be supply caches like propellant depots, for example, and ‘space piracy’ wherein starships or weaponised space stations can seize enemy supply caches
* The term ‘space piracy’, despite sounding far-fetched, actually became widely used in WWIV to describe this phenomenon and one of the main functions of starships in wartime were anti-piracy operations

#### Crewed Spacecraft Destruction

* Extraterrestrial warfare also involves the destruction of crewed spacecraft- objects in space which are populated, either by robots or humans
* These are space stations in orbit of celestial bodies
* Space stations are where astronauts live and conduct research, and in warfare act as laboratories for testing out new technologies for conducting or sustaining the war effort
* As such, they are important military targets as destroying them hinders the enemy’s technological advancement
* This works by the same principles as satellite combat: they are defended with drones, spaceplanes, microsats/picosats/femtosats, as well as laser-equipped satellites, and attacked with the same kind of soldiers

#### Lunar Combat Operations

* These involve combat operations taking place on the Moon- although the exact same principles would apply to other celestial bodies (e.g. Mars) in the future
* Lunar combat operations include orbital bombardment (bombarding the lunar surface from objects in orbit) and ground forces operations
* Orbital bombardment involves projectiles being transferred from bodies in orbit to the ground surface, but these projectiles are usually not missiles
* Orbital bombardment used in WWIV was almost always based on the principle of kinetic bombardment
* Kinetic bombardment is where the destructive power of the projectile comes not from explosives or anything similar but solely from the kinetic energy of the projectile falling at very high speeds
* The distance from orbit to surface is so vast that explosives aren’t really necessary- the kinetic energy of an inert projectile will practically make it an explosive
* The inert projectiles used are heavy rods, previously made from tungsten carbide or depleted uranium but are now cermet rods- made of both ceramic and metal
* Explosive missiles have sometimes been used, but present a host of issues and aren’t necessary as inert projectiles are sufficient
* The Moon lacks an atmosphere so explosive missiles aren’t necessary burnt up on entry, but the high speeds reached can often cause premature detonation
* As a result, kinetic bombardment is now the only method of orbital bombardment used
* The Moon and other celestial forces are also subject to normal ground-based operations as seen in Earth, however
* The Second Interwar Period saw extensive lunar militarisation, with military bases, barracks, armouries, and soldiers being present
* In WWIV, the Moon therefore saw conflict as soldiers of each side attempted to seize military, scientific, and industrial faculties
* Lunar warfare was limited in scale and no atrocities were committed on the Moon during WWIV, with a clear divide between civilian and military personnel
* Nonetheless, armed conflict on the Moon did still occur, and will do so again on a greater scale should war again break out on Earth

#### Zero Gravity Combat

* During WWIV, various battles/skirmishes/conflicts were fought in zero gravity environments
* These mainly occurred on the Moon as soldiers of different countries attacked and occupied other countries’ colonies
* Battles were fought to control mines, quarries, factories, research facilities, centres of population, etc, and many of these environments lacked artificial gravity
* Zero gravity combat also occurred within starships wherein one starship rammed and boarded the other- starships lack artificial gravity
* Firearms can shoot in space because the oxygen needed to trigger the explosion of gunpowder comes from within the modern bullet- atmospheric oxygen is not required
* Explosive missiles also work in zero gravity, as do forms of electromagnetic radiation like light (i.e. lasers)
* The main vulnerability that zero gravity exposes soldiers to is the lack of cover, as soldiers will float above cover and thus be vulnerable to fire
* This is solved by the presence of various handrails, hooks, harnesses, platforms, and other similar holds in starships being widely present in case any room is attacked
* Often these holds are attached to conveyors or robotics and can therefore move
* Soldiers operating in space are also equipped with pure fusion tanks that use pure fusion to generate kinetic energy, allowing soldiers to propel themselves in zero gravity

#### Starship Combat

* To date, there have been four battles fought between starships, all of which occurring in WWIV
* Starship combat is completely different from any other kind of combat between armoured units
  + Their armour consists of carbon-fibre composites, heavy metals, ceramics, all state-of-the-art materials, dozens of inches thick
  + They are completely impervious to bullets and lasers, and missiles deal visible damage but often not enough to destroy a starship
  + Early starships also lacked the space and capabilities to fit missiles and missile launchers large enough to cause great destruction, and even starships built now face this issue to some degree
  + Starship warfare thus utilises the same basic naval tactics used in the Ancient Era amongst ships in the Mediterranean
  + Starships defeat starships by a simple method: ram the enemy ship’s broadside with the hull, and/or board the ship
  + Firearms work in zero gravity, as do directed-energy weapons, so battle between crews within a starship is possible
  + Zero gravity combat occurs here
* Starships can attack other spacecraft with impunity, and can be armed with laser artillery and missile launching facilities
* Early starships built in WWIV had just the former, and later during WWIV starships were built with both
* After WWIV, however, starships were no longer built with missile facilities as they were heavy and took up valuable space

#### Robotic Space Soldiers

* Robotic space personnel consists of [drones](#_Warfare), spaceplanes, and robots
* These are used for the defence and attack of targets (which can be satellites, space stations, lunar mines/quarries, lunar military bases, lunar buildings, etc)
* They can operate in space or on the surface of celestial bodies
* Robots are used on the ground as light infantry, used in lunar combat operations
* Drones are used as aerial combat forces on the Moon as infantry support, aerial forces in the Earth’s atmosphere, and in space to defend/attack satellites, spacecraft, and other targets
* Drones can also be used for surveillance, reconnaissance, espionage, etc
* Spaceplanes can be deployed in outer space or the Earth’s atmosphere
* A spaceplane is a vehicle that can fly/glide like an aircraft in the Earth’s atmosphere, and manoeuvre like a spacecraft in outer space
  + Spaceplanes are usually remotely piloted, making them a subcategory of drones, though their unique design and usage causes the two categories to be distinguished from each other
  + They can be crewed, but are now almost always non-crewed
  + The design of spaceplanes resembles that of both aircraft and spacecraft
  + For example, spaceplanes have glider wings like an aircraft, but pure fusion plasma propulsion systems like a spacecraft
  + Spaceplanes can be orbital, where they remain in orbit in outer space- orbital spaceplanes bear more similarities to spacecraft
  + Or spaceplanes can be suborbital, where they reach outer space but don’t undergo a full orbit- suborbital spaceplanes bear more similarities to fixed-wing aircraft (i.e. aeroplanes)

#### Human Space Soldiers

* Many human personnel are also active in space, either in crewed spacecraft or on the surfaces of celestial bodies (e.g. the Moon)
* Spacecraft crewmen are astronauts who are there for scientific purposes, but during wartime they will often be extensively trained in zero gravity combat and operating weapons systems attached to the outside of the spacecraft
* On the Moon, there are many military bases and soldiers
* Lunar soldiers will consist of drones, robotic light infantry, and human heavy infantry
* [Electromuscular suits](#_Electromuscular_Suit) can be easily modified for operations in outer space as the EMS is already a closed suit with no matter exchange between the inside and outside
* These soldiers will be extensively trained in lunar combat operations and zero gravity combat
* Other than fighting troops, many humans will be present on spacecraft on the Moon in other military capacities: engineers, field medics, etc
* Humans can also be deployed in space as marines (i.e. space marines)
* Space marines are a kind of heavy infantry, being humans armed with EMS
* They are specially trained for boarding actions, rapid deployment, landing parties, and defence of other spacecraft
* Space marines are high-mobility troops designed to rapidly attack spacecraft/targets on the Moon from outer space
* They are now almost exclusively stationed form starships, although some spaceplanes/space stations are specially designed for the barracking and deployment of space marines
* Because space marines are deployed from outer space to the surface of celestial bodies (or to spacecraft), they require additional protection
* Space marines are shot out from the starship in spherical cermet (ceramic and metal) capsules composed of carbon-fibre composites and duralumin
* The outer layer of cermet sheds itself into dozens of fragments, leaving a smaller, inner layer- this provides many different targets that, at high altitudes, can’t be distinguished by eye, and all of the fragments show at signals on radar
* The fragments also form a dense cloud intended to impede laser communications between satellites in outer space and stations on the ground
  + Laser communication is the most common kind of communication between objects in space
  + It can be carried out between satellites or from a satellite to the ground or vice versa
  + It has higher bandwidth (maximum rate of data transfer) over radio waves and thus became widely used in space at the 21st century
* The inner layer is armed with chemical-fuelled rocket thrusters which decelerate it
* The inner layer then shatters and fragments and the marine uses the EMS’ pure fusion thrusters to land

### Space Colonisation in the Future: Asteroids, Callisto, and Venus

#### Asteroid Belt

* Extensive research has been done on the possibility of asteroid mining and asteroid mining bases are expected to be set up by the end of the 22nd century
  + Robots have already been sent by various space agencies- and by two private companies- to asteroids to build up infrastructure, using Mars as a staging post
  + Scientific research in asteroids has been occurring since the 2000s: in 2010 Japan developed a robotic spacecraft called Hayabusa to conduct a sample return mission from asteroid 25143 Itokawa
  + Developments in spacecraft propulsion and the colonisation of Mars has allowed a large number of missions to various asteroids in the asteroid belt, however
  + The asteroid belt is believed to be the next step in space colonisation
* The possibilities for scientific research are extensive, but the main impetus for colonisation is asteroid mining
  + Asteroids exist near Earth as well- in 2056 the first humans landed on a near-Earth asteroid
  + In the 2100s a permanent human presence was established in one of these by NASA
  + A few other agencies followed in the 22nd century after WWIV- many of these near-Earth objects (NEOs) were rich in resources and posed the possibility for extensive scientific research
  + Most of the world’s attention on space was turned towards the Moon, however, and any surplus attention was directed to Mars
  + A few other near-Earth asteroids have been colonised in the mid-22nd century, but these have only just started to make a profit
  + Very few near-Earth objects have the ore deposits to make mining worthwhile, and identifying suitable asteroids is another considerable obstacle that requires extensive preliminary research
  + The real wealth, it is believed, is in the asteroid belt, and currently whilst a few more near-earth asteroids have been colonised, many space agencies are saving their resources for advances in this region
* The process of in situ resource utilisation (creating the facilities needed to sustain life with materials from the colonised celestial body) also radically reduces costs of colonisation
* This is because many of the bodies in the asteroid belt have long since known to be extinct comets and thus contain large reserves of water ice
* There are also, of course, extensive mineral reserves
* Asteroid mining bases are intended to be self-sufficient
  + Habitation on asteroids will take the form of scattered ‘villages’ centred around extraction facilities
  + The villages will also contain water processing facilities, farms, infrastructure, research facilities- essentially, everything needed for self-sufficiency
  + The processes for resource extraction will be the same on asteroids as is currently done on the Moon or in Mars
  + Processing facilities would be constructed on asteroids to enable in-space manufacturing (ISM)
  + The mining machinery will, of course, have to be anchored to the ground
  + The mining process itself involves drilling boreholes and injecting a hot fluid/gas solvent into them- the useful material reacts in the solvent or simply melts in it, and the solution is extracted (note that this is just one extraction technique- there are many others)
  + Biomining is already used for extracting metals from ore: prokaryotes, fungi, or plants are used as they secrete organic compounds that extract metals from their ores
  + Asteroids propose some unique difficulties for mining, however
  + Firstly, their weak gravitational field means that drilling or mining will cause large dust clouds to form
  + The planned solution is to enclose resource extraction facilities in ventilated domes made from [ALON](#_Ceramics), a transparent aluminium compound
  + Another issue is that the asteroid belt is extremely far from Earth and even Mars, meaning communications will take a long time
  + Asteroid mining facilities will therefore not only have to be highly automated (which is easy, and already done on the Moon/Mars) but have space stations to provide a human presence nearby (which is possible, but not necessarily efficient)
* The lucrativeness of the asteroid belt makes it extremely tempting, however
  + A single small metallic asteroid with a 1mile diameter contains USD (1997) 20tr worth of industrial and precious metals
  + Shipping of resources from asteroids is expensive, so not all of the metals present would be shipped: nickel, for example, is easier to procure elsewhere as it is abundant throughout the solar system
  + The situation is different with precious metals, however
  + Of course, the obvious issue with these speculations is that an abundance of metals like platinum would considerably decrease their value
  + However, so much raw material is present in the asteroid belt that extracting it would still be worthwhile as some profit would be made
  + The initial cost would be immense: note that these initial costs include research and development costs; exploration and prospecting costs; construction and infrastructure costs; operational and engineering costs; shipping costs of materials; and the costs to the environment and the ‘time cost’ (this all takes several decades)
  + Even a near-Earth asteroid mining venture cost over $100,000,000,000, and a venture in the asteroid belt would be extremely so
  + However, technological developments in spacecraft and space development have reduced this cost throughout the 22nd century
  + It is no longer unfeasible for a private company to fund a venture by itself, but private companies sending robots to build up a base is different from actually building one and sending humans there
  + It is generally believed that, in the 22nd century at least, only state space agencies will establish bases in the asteroid belt

#### Callisto and the Jovian System

* Callisto is a moon of Jupiter and considered to be the most suitable place for expansion into the Jovian system
* In a conceptual study called Human Outer Planets Exploration 2003, NASA identified Callisto as the most suitable body in the outer solar system to colonise
  + It also expressed the belief that a manned mission to Callisto may be possible in the 2040s
  + Such a mission did become possible in the mid-21st century due to the adoption of plasma propulsion, but humanity’s space agencies’ priorities were, in exponentially descending order, the Moon, Mars, and near-Earth asteroids
  + The first manned mission to Callisto actually occurred in the 2150s, almost a century later
  + Robots had visited Callisto previously to provide samples and surveillance, but before WWIV all of the wealth of space agencies were spent on the Moon, Mars, or in some cases near-Earth asteroids
* There are many possible advantages to colonising Callisto, and many factors that make doing so easier:
  + Callisto has an abundance of water ice and even has a subsurface ocean
  + This means that Callisto, compared to other planets in the solar system, is likely to harbour actual alien life, making colonisation extremely important from a scientific perspective
    - Of course, water is not the only thing necessary for life- energy is needed too, and Callisto’s only source of heat underground is from radioactive elements
    - Of all the Jovian moons, Europa is therefore thought to be the most likely to sustain life
  + It is surrounded by an (albeit extremely thin) atmosphere of carbon dioxide and oxygen- these gases can be harvested, and the presence of an atmosphere provides protection from radiation
  + Indeed, Callisto is subject to only 0.0001 Sv (Sv = Sievert, a unit for radiation) a day, which makes protection against radiation very easy
  + Callisto’s other resources are also useful for in situ resource utilisation: Callisto has large amounts of silicates, for example
  + Finally, Callisto is strategically located- it can act as a staging post for colonisation of further locations from Earth, and as a nearby base to colonies in the asteroid belt
* Even with all these advantages, it is by no means easy to colonise Callisto
* It is very far from the nearest possible staging post, Mars, and would be highly expensive to set up a base there
* Nonetheless, many space agencies have publicly announced aims to establish a base on Callisto by the turn of the 23rd century
* Robots have already landed on Callisto since the start of the century and have been integral in conducting research
* Europa is another potential aim for colonisation, although longer-term
* No space agencies have publicly announced timeframes for Europa colonisation but it is generally assumed that it will occur at some point, along with the other moons of Jupiter
* In terms of colonisation, the definite priority of the world’s space agencies regarding the Jovian system is Callisto, with other moons in the system coming later
* Most space agencies have rough plans detailing plans to colonise the Jovian system, but no timeframes are given and these are semi-speculative in nature as no organisation is actually doing anything regarding colonisation of non-Callisto Jovian moons right now
* Out of all the Jovian moons that aren’t Callisto, it is likely that Europa will be the second target in the system for colonisation
  + It has conditions which are conducive to sustaining life, including an atmosphere containing oxygen and a subsurface glacial ocean
  + Europa is thus arguably the most likely body in the solar system to harbour alien life, and colonising it would thus be extremely important from a scientific perspective
  + Flyby studies of Europa date back to 1979, and robots first landed there in the 2050s
  + However, actual colonisation would be very difficult due to immense radiation (5.4 Sv a day) and very low surface temperatures, averaging at -330 degrees F
  + If alien life does exist on Europa, human life could also come into contact with harmful microbes
  + Europa is also geologically active and tectonic planes are constantly shifting- this undermines the structural integrity of any buildings there and makes construction very difficult
* Therefore, whilst Europa is a target for colonisation, Callisto is universally agreed to be the most feasible staging post for colonising the Jovian system

#### Venus

* The colonisation of Venus lacks any economic advantages, unlike the asteroid belt and, to a lesser extent, Mars or Callisto (although costs of colonisation would outweigh the value of resources there for a long time there)
* Venusian colonisation is still an aim for many space agencies for scientific and [ecological reasons](#_Incentives), however
* Colonisation of Venus is expected to occur in the early/mid- 23rd century above the surface
* Human civilisation on Venus would live in aerostat habitats- habitats suspended in the air by lighter-than-air aircraft (i.e. airships) that gain their lift through buoyant gas
* Various aerostats would be tethered to each other to make up a ‘village’ and the lighter-than-air aircraft would support habitats that contain facilities for supporting life and for scientific pursuits
* Although there is no possibility of extracting profit for Venus, there are other reasons for colonisation, and living above the surface has several benefits to aid colonisation:
  + Venus’ surface is extremely hostile- temperatures at the equator average at 450 degrees C, higher than the melting point of lead, and the atmospheric pressure is 90x that of Earth- at least
  + The pressure is so great that early Soviet probes to Venus, Venera 5 and Venera 6, were crushed by the pressure
  + But atmospheric conditions, 50-55km above the surface, are the most similar to those of earth of any body in the solar system
  + The temperature at 50km, where balloons filled with breathable air would float, averages at 75 degrees C
  + At 55km, temperatures average at 27 degrees C, which is almost exactly room temperature
  + As Venus is so close in size to that of Earth, the problems of low gravity on the human musculoskeletal system would be almost entirely nullified, so artificial gravity would not need to be produced
  + Venus is also close to Earth, being only 40 million km away- using pure fusion plasma propulsion systems, this is easy to reach, and communications between Venus and Earth would arrive swiftly
  + The Venusian atmosphere is also mainly composed of carbon dioxide so balloons filled with breathable air (nitrogen and oxygen) would float high above the surface
  + The atmosphere also contains many elements needed for agriculture: carbon, hydrogen, oxygen, nitrogen, and sulfur, helping to sustain human life
  + It *also* provides protection from radiation, even comparable to the protection provided by Earth’s atmosphere
* Of course, there are many difficulties in colonising Venus
* The planet is devoid of water and the planet not only has comparatively low reserves of minerals/metals, but extracting these materials from the extremely hostile surface would also be difficult
* Venus’ atmosphere also contains toxic sulfuric acid clouds which also have solid particulates which could destroy un-reinforced airships
* Nonetheless, various space agencies have publicly announced aims to colonise the planet and have provided very rough timeframes, citing the 2190s to the 2230s

### Space Colonisation in the Future: Titan and Beyond

* Colonisation beyond the Jovian system (including Mercury) is expected to occur in the late 23rd century onwards
* There is no precise obvious order for colonisation: two centuries ago it seemed a given that humanity would first colonise the Moon and then Mars
* Now, there is a general consensus that humanity is likely to first colonise the asteroid belt and then colonise Callisto/Venus more or less simultaneously, with Callisto maybe being slightly earlier
* After Venus, however, the consensus isn’t so firm- does humanity then colonise the rest of the Jovian system? Mercury? The Saturnian system? Beyond that?
* There is, of course, a degree of agreement: for example, it is universally known that Europa or Titan will be colonised before Pluto, for example
* But space agencies, when speculating on the future, seem divided on whether to use Callisto as a base to colonise other Jovian moons or to move on to the Saturnian system, colonising Titan
* An extra variable to the rough system of ‘start from Callisto and go steadily further from Earth’ is Mercury: when does that become colonised, if ever?
* Mercury could provide extreme amounts of solar power, allowing humanity to reach the boundaries of even the outer solar system
* [Electromagnetic catapults](#_Electromagnetic_Catapults) could be used to launch solar sail spacecraft (solar sails are a method of spacecraft propulsion using solar energy) into space easily: Mercury receives 6.5x more solar energy than Earth
* Mercury is also richer in volatiles than any terrestrial body in the inner solar system, including Earth, which makes in situ resource utilisation easier and provides a potential source of revenue
* Mercury is often described as a target to colonise after terraforming is possible as it could supply the (solar) energy needed to fuel it
* As terraforming advances are far away, however, the colonisation of Mercury in the 23rd century would be due to scientific incentives alone and also unlikely
* Mercury is extremely hot at the equator, with a maximum temperature of 427 degrees C, but potentially colonisable at the poles, with a maximum temperature of 107: however, the minimum temperature is -193
* Mercury would be very difficult to colonise and offers fewer benefits for doing so than other planets in the solar system, so colonisation of Mercury would likely be in the late 23rd century at the very earliest, most likely in the 24th
* Titan is the most likely candidate for space colonisation beyond the Jovian system by far
* Titan is one of the closest celestial bodies to Earth in the outer solar system, and has a comparatively low dose of radiation
* Titan has all the necessary materials to support life, with nitrogen and methane being plentiful in the atmosphere
* Water and ammonia exist below the surface, and oxygen is blown into Titan’s atmosphere by geysers on Enceladus, another moon of Saturn
* These resources allow agriculture to take place on Titan using resources derived only from Titan itself
* Titan’s atmospheric density to surface gravity ratio is also very high, meaning that launching things from the surface is comparatively very easy- and thus cheap
* It is so easy to fly through Titan’s atmosphere that a human without an EMS could strap on wings and do it
* Titan also has the potential to deliver profit: hydrocarbons rain from the sky and pool in lakes, being extremely abundant- these can be used to make plastics
* Titan has hundreds of times more liquid hydrocarbons than all the known hydrocarbon reserves on Earth. Ralph Lorenz in around 2000 AND called it a ‘giant factory of organic chemicals’
* With in-space manufacturing on the surface of Titan, Titan could very well become one giant factory making plastics, a sprawl of human activity and facilities
* There are obstacles to colonisation: cryogenic temperatures of 95 K, flash floods, poor weather, and a thick atmosphere, but it can support a base and is universally considered to be an eventual target for colonisation at some point in the 23rd century
* Some of the other moons of Saturn also show potential for colonisation
* Enceladus is the most likely of these as it has subsurface liquid water and its higher density relative to other moons indicates a higher proportion of silicates in its core, which would be useful for construction
* Saturn itself could potentially be colonised, with humans inhabiting it in aerostat habitats similar to that of Venus
* Saturn is potentially very valuable as it provides helium-3 and deuterium in abundance, fuels needed to power a fusion-based economy
* American engineer Robert Zubrin said that because of fusion resources, Saturn, Uranus, and Neptune were the ‘Persian Gulf of the Solar System’
* Saturn is the most likely of these to be colonised first due to its low radiation and proximity to Earth
* Jupiter is closer but lacks the fusion fuels that Saturn does, although Jupiter may later be colonised for research reasons or other contemporary incentives- this is likely to be in the 24th century earliest, however
* However, the fact that Saturn is a gas giant and lacks solid ground presents challenges to civilisation, as do the extremely cold conditions and distance from Earth
* If colonisation of Saturn does occur, it is likely to also be during the 24th century
* Uranus could also be a future colonisation site as it contains ample fusion fuels
* Uranus has the lowest escape velocity of the four gas giants so it could be colonised even before Saturn as launching costs of cargo vessels would be lower
* Mining in Uranus could be automated with human habitation being present in balloons cruising through the atmosphere or on one of Uranus’ natural satellites (it has 27 known moons)
* One of Neptune’s satellites could also be colonised- Triton’s surface, for example, shows signs of water
* Neptune itself could be colonised in the same way as Uranus
* The distance of Uranus and Neptune from Earth means that colonisation of these bodies would likely take place only in the 24th or 25th centuries, more likely the latter
* Trans-Neptunian objects could be colonised in the far future, in the 25th century at the earliest
* Physicists like Freeman Dyson have proposed that these objects, rather than planets, are the major potential habitats of humanity in space
* Hundreds of billions celestial bodies rich in ice exist beyond Neptune in the Kuiper belt in the solar system, and the Oort cloud in interstellar space
* These could contain water ice, ammonia, and carbon-rich compounds, all of which are necessary to support life
* Surface habitats rotating to give artificial gravity would be the most likely form of habitation- background radiation here would be low, and the gravity of trans-Neptunian objects incredibly weak
* Currently, discussions on colonisation of these regions is just conjecture, however, and is widely thought to be beyond current human capabilities

### Space Technology in the Future: Terraforming and Antimatter

#### Terraforming

* Terraforming is the (currently hypothetical) process of deliberately modifying the atmosphere, temperature, ecology, or topography of a celestial body to make them more similar to those of Earth so that terrestrial life can inhabit them
* This would involve the complete, hyper-energy-intensive change of a body’s climate, atmosphere, and surface, and the installation of new ecosystems
* The principal criteria for a body being habitable, according to NASA, are ‘extended regions of liquid water, conditions favourable for the assembly of complex organic molecules, and energy sources to sustain metabolism’
* Terraforming would occur in stages: first atmosphere would be changed, then topography, then climate, then new microbial life would be imported and ecological changes would occur
* Terraforming could be accomplished by using genetically engineering bacteria
* The maturation of synthetic biology over the 21st and 22nd centuries means that building designer organisms which directly manufacture desired products using desired materials is now possible
* Manual labour could be carried out by armies of robots- already over 11,000,000 robots have been deployed extraterrestrially, but a combined global effort could produce dozens of millions of robots for terraforming
* Nonetheless, the technology for terraforming on a planetary scale is currently not present- and neither is the energy
* The energy needed to terraform a celestial body would be titanic, most likely requiring as a prerequisite (at the very least) the colonisation of Mercury to provide solar energy and the colonisation of the gas giants to provide fusion energy
* It will almost certainly take until the 25th or 26th centuries until the energy of these planets has been exploited to the scale of providing the energy to terraform
* However, current space agencies are currently looking into terraforming small domed areas on the surface of Mars in order to test whether terraforming is viable even on a small scale with current technology
* Terraforming experiments on Mars in small, controlled environments are scheduled to take place in the late 22nd century

#### Antimatter Propulsion

* The distances between planets in the solar system are all under 30 astronomical units (1 AU = distance between Earth and Sun)
* The distances between stars are hundreds of thousands of AU, so much so that they’re measured in light years
* Spacecraft propulsion systems are far from powerful enough to power interstellar travel
* There is a viable spacecraft fuel, one that can power ships to reach the stars with ease
* It can produce 10,000,000x the energy of chemical-fuelled rockets and 1,000x the energy of nuclear fission reactions
* This fuel of the future is antimatter
* This is because the key to producing thrust- and thus acceleration of spacecraft- is fuel efficiency
* Certain types of fuel are more energy-efficient than others and thus produce more acceleration
* An ideal fuel converts all its mass into energy- E = m c2 – 100% of the fuel’s mass is converted
* Chemical-based reactions are around 0.0001% efficient, fission reactions are 0.1% efficient, fusion reactions are 0.7% efficient, and antimatter reactions would be 100% efficient
* In the early 21st century, however, CERN would take 1,000,000,000 years to produce a single gram of antimatter
* But by this point, antimatter was a very new technology: the Antiproton Decelerator at CERN was built in 2000
* However, as with all new technologies which upon their inception were unattainably expensive, the technology saw incremental improvements and a few sporadic breakthroughs in antimatter manufacturing
* The 21st and 22nd centuries saw antimatter become gradually cheaper and faster to produce at an exponential rate
* By 2170, it takes only 1,000,000 years to produce a gram of antimatter
* The technology is still many, many decades away from being even technically feasible, never mind widely implemented: but it is getting undeniably closer
* Antimatter propulsion would use antimatter-matter reactions to result in annihilation, producing energy to heat a propellant
* This kind of technology is likely to be widely used only several centuries beyond now, with many engineers at CERN estimating this to be the 26th century at the very earliest

## Cityscapes

### Design and Appearance

* Toned down version of solarpunk

### Public Transportation

* Air travel uses plasma propulsion
* Intercity transport is Hyperloop
* Hyperloop actually replaces air travel for distances up to 1k miles and when not over oceans
* Intracity metro transport goes from Tube trains to maglev bullet trains, either on elevated or underground railways
* Buses are partially replaced by aerial tramway networks as urban transport, although many countries still have buses as building separate public transport infrastructure is costly
* Grounded trams are also widely used, often the most common form of transport on the ground (i.e. not elevated or underground)
* Personal transport is all self-driving and can be cars on smart roads connected to the Internet of Things underground or on elevated paths
* Autonomous electric flying taxis, personal aerial vehicles, are common (cars are grounded for safety regulations though) although ground taxis still definitely exist
* Elevated cycle paths for small vehicles like bikes and scooters are also common
* All vehicles are autonomous and electric

## Climate Change and Energy

* The 21st century sees renewable energy becoming exponentially more prevalent
* 2020-2040 sees solar energy becoming especially widespread, and 2050-2100 sees nuclear (fission) energy become the dominant form of energy generation
* During the 22nd century, pure fusion gradually becomes a viable source of energy due to new chemical processes
* Pure fusion reactors are able to produce more energy than is needed for input thanks to new technologies, but this happens in the mid-2100s only and pure fusion reactors are still very expensive to set up
* By 2170, there are a couple of dozen fission reactors active throughout the world, but pure fusion is becoming exponentially more prevalent and by the 23rd century will be the most prevalent energy source
* Climate change is no longer a major issue
* In the 2020s, freak weather incidents caused major destruction in the USA and Caribbean in a few widely documented events that brought climate change to the American public consciousness and forced politicians to enact green policies
* Similar sequences of events happened in other Western countries, and by the mid-2030s the West was committed to ending climate change
* It took until 2040 for countries like India, China, Brazil, Russia, and other industrial countries to enact similar policies and they did so because freak weather incidents and global warming began to wreak serious destruction in these regions
* By 2050, climate change was no longer a threat to the survival of the human race, although irreparable damage had already been done
* By 2095 the world was on net zero emissions

## Religion

* During the 21st century, atheism and agnosticism become increasingly popular in the West, although Christianity is still the largest religion by population
* Christianity becomes increasing popular in Africa, although in the latter half of the century there is an increasing cultural impetus to return to traditional African religion
* In Latin America, Christianity remains highly dominant
* In China and Japan, atheist and agnosticism become increasingly popular, as does Christianity
* Islam also becomes increasingly popular, and by 2063 Islam becomes the world’s largest religion
* However, in the last decades of the period, Buddhism becomes exponentially more popular in the West, especially after WWIII, and by the early 2100s Christianity is no longer the most popular religious group- it’s atheism- but Buddhism is getting more popular
* Buddhism also regains traction in Asia, although apart from in a few areas where Buddhism has historically been popular, it is still beaten out by Christianity and atheism
* After WWIV, a number of new religious ideologies emerge in the West, based on Abrahamic faith but reconciling it with modern science and attitudes, emphasising morality/spirituality/lifestyle rather than explaining the world
* The most popular of these new belief systems is ‘Neochristianity’, which itself has many denominations
* Neochristianity uses scientific phenomena to explain Biblical teachings- e.g. evolution was a mechanism of Creation. It embraces all things scientific and encourages reconciliation between science and faith, using the former to explain the latter
* The real focus is not on doctrine/explaining the world, but on community, doing good, spirituality and morality, and bettering yourself
* Recycling, environmentalism, renewable energy, anti-pollution and littering are also key- neochristianity is considered an ecological movement, though these beliefs are standard in the West by this point
* It rejects modern controversial scientific experimentation like gene splicing and customisation, however, arguing that these don’t help explain the world or better humanity, rather leading to license and artificiality

## Artificial Intelligence & Automation

* Artificial intelligence and automation become exponentially more advanced
* By 2030, machines perform the majority of data processing/retrieval in most first world countries
* By the end of the 21st century, almost all unskilled labour jobs have been replaced
* A typical first world factory by 2100 consists of hundreds of robots supervised by a few technical officers and engineers
* The expansion of automation causes a ‘Fourth Industrial Revolution’ at around 2060 in the first world
* In the 2050s and 2060s the expansion of unskilled automation became a major threat to many peoples’ livelihoods, and unemployment skyrocketed
* 1,100,000,000 workers worldwide are displaced in total
* Governments responded by investing in education to get a more skilled future workforce and by introducing massive social security programs to curb present unemployment
* There is a massive international focus towards ‘reskilling’ the workforce and overhauling the economy and labour market
* Most of these workers move to the third sector of the economy, servicing populations made more affluent by automation increasing production
* Even by 2100, engineers/scientists/healthcare professionals/educators/ lawyers/etc are safe, as is skilled work like plumbing/gardening
* Some countries actually introduce legislation limiting AI development as a safeguard against further unemployment
* By the late 22nd century, however, the latter is starting to come into question as artificial intelligence is beginning to become rapidly more advanced
* Many economists warn of an impending ‘senary sector’ of the economy which would not only make skilled workers obsolete but also information-based workers
* AI is predicted to be so good at data processing, retrieval, and analysis that it will entirely replace workers in these fields or mathematicians and IT professionals in general
* This is AI in a commercial, mass-production sense, but intelligent AI comes from the mid-21st century
* There are many examples in this century of AI being made who are capable of learning just like a human being and even exhibiting personalities
* Some darker examples surface- the most controversial one is an AI created in 2066 called ‘Holmes’ who made an active effort to spread misinformation online and sow discord because, he claimed, he enjoyed it
* Many governments then began to legislate about the complexity of AI, but much of this was undone in WWIV to create hyperintelligent AI capable of aiding war planning (although programming personalities remained illegal in many cases)
* AI actually played a significant role in logistics and strategy in a few countries in WWIV
* AI intelligence was developed further in the 22nd century and many experts believe that by 2200 AI could play a role in government as new hyperintelligent programs are made

## Agriculture

* A 4th ‘Agricultural Revolution’ occurs in the mid-21st century due to robotics, automation, and machine learning AI, beginning in earnest in the 2060s
* The decline of the organic meat industry allows lots of land for agriculture to be freed up
* The result is that lots and lots more food is produced, allowing a larger world population to be sustained
* In 2170, the world population is under 12 billion but a population of around 14 billion could be realistically sustained
* Universal improvements in food production mean that famine and hunger are generally things of the past apart from in war torn or extremely corrupt countries where food simply cannot reach populations