Tension between the Chinese telecoms industry and American and European government agencies has been in the news recently. In this month's technology topic we take a longer term broader view of China's ambitions and ability to be a major and potentially dominant player in global connectivity.

Tim Marshall in his book 'Prisoners of Geography' portrays China as a land power without a need for sea ports. A large land mass, multiple borders and short sea routes to trading partners meant it did not need to be a naval power. It was a country that benefited and continues to benefit from robust natural geographic defences including a 3000 mile border with Mongolia protected by the Gobi desert.

China has however always been interested in investing in transport infrastructure both internally and overseas. A notable 20th century example was the investment in the rail link between Tanzania and Zimbabwe which established trading and economic relationships that remain close today.

This particular story begins earlier in 468 BC with the start of work on the longest man-made canal in the world. Extended in the Sui dynasty (581 to 618AD) and the Yuan dynasty (1271 to 1368 AD) the canal reached a final length of 1794 kilometres (1115 miles) linking Beijing in the north to Hangzhou in the South.

In parallel, China developed the Silk Road Trade Routes (last featured in our August 2018 Technology Topic from Silk Worms to Smart Phones https://www.rttonline.com/tt/TT2018_008.pdf) The Silk Road trade routes connected the ancient world between 130 BC and 1453 AD.

The route was disrupted when the Ottoman Empire boycotted trade with the West prompting 'The Age of Discovery (1453-1660 AD) with maritime routes replacing overland routes.

Distance has always been a double edged sword, on the one hand a bulwark against invasion on the other a barrier to trade. Distance can also be deadly.

Mao Zedong's 6000 mile Long March in 1934/1935 crossed 18 mountain ranges and 24 rivers in a (successful) attempt to avoid Chiang Kai-Shek's encirclement campaign. Over 70,000 people died on the March including Mao's two children and his younger brother but it provided the basis for Mao to take over the Chinese Communist Party and defeat the nationalists to gain control of mainland China.

In 1935 a young Chinese engineer, Tsien Hsue-shen, left China to study at the Massachusetts Institute of Technology (MIT) and then at the suggestion of Theodore von Karman studied at the California Technology Institute (Caltech) under the tutelage of the eminent US rocket scientist Robert Goddard.

Over the next twenty years Tsien Hsue-shen became one of the leading rocket scientists in the US but was deported to China in 1955 as a suspected member of the Communist Party.

That proved to be a truly daft decision as Tsien went on to mastermind one of the most impressive rocket development programmes in world history creating a family of Long March Missiles more than capable of destroying the US sub-continent, partly with help from the Russians.

Fifty years on, this investment in long range weaponry has translated into an ambitious space programme and satellite launch industry which includes major space projects such as Beidou, the Chinese GPS and two way messaging MEO constellation and the spectacular mission earlier this year to the other side of the moon which should rightly be applauded as a technical tour de force with positive long term deep space observation and exploration opportunities. It also demonstrated an advanced ability to set up multi hop communication via satellite to the lunar surface module, an achievement under reported in the Western technical and telecoms press.

In May 2017, President Xi Jinping welcomed Vladimir Putin, Pakistani Prime Minister Nawaz Sharif and Myanmar's Aung San Suu Kyi to Beijing to mark the start of China's 'Belt and Road 'initiative.

This Trillion dollar project includes plans for pipelines and a port in Pakistan, bridges in Bangladesh and railways to Russia. The $62 billion dollar China/Pakistan economic corridor (CPEC) includes motorways, power plants, wind farms, factories and railways and is promoted as being capable of creating one million jobs in Pakistan. Other projects include a $1 billion port project in Sri Lanka, a high speed rail link in Indonesia, an industrial park in Cambodia and an alternative to the Panama Canal in Nicaragua.

Together these plans are potentially larger than the US post war Marshall reconstruction plan and to date the largest development plan in history involving 65% of the world's population, one third of its GDP and a quarter of the world's goods and services.

Space Communication as the New Silk Road

All of which leads us to a discussion on China's likely positioning in the telecommunications space race. The rush to place new communication constellations into space is an evolution of a long international effort to overcome the disadvantage of distance.

This process arguably started in 1840 with the Penny Post but progress was slow and even 180 years later telecommunications providers still manage to charge us for long distance telephone calls, roaming charges in cellular networks being a contemporary example.

But in space, delivery cost is constant irrespective of distance. In a spherical world the flat bill is, or should be, the norm.

This brings us to our final point. China has ambitions to build the world's largest Blue Water Navy, with a build rate now significantly faster than the US navy.

This maritime investment requires a parallel investment in low latency broadband communication at sea only deliverable from a combination of low earth, medium earth and geostationary satellites.

Thus it seems that a new generation of high performance Near Earth Networks are about to be realised as a by-product of Chinese maritime defence sending and could be seen as the Chinese response to the formation of the US space force.

The militarisation of space is of course nothing new and can be traced back at least as far as the German V2 rockets used at the end of the Second World War. We might regret this but it is not going to change any time soon and at least we get to have a new generation of space based communication as an add on benefit.

From a social economic perspective, these networks could revolutionize rural economics and help us manage the forests and fields needed to feed the 70% of us who will be living in cities by 2050.

Not all attempts at improving the agrarian economy are successful. Julius Nyerere's well intentioned Ujammaa initiative in Tanzania in 1961, partly encouraged by China, was at least initially a failure.

The Great Leap Forward initiated by Chairman Mao in 1958 starved 40 million people to death and killed several million sparrows.

Let us hope that The Great Leap Up into space has a happier ending.

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