

CENTRE FOR JOINT WARFARE STUDIES



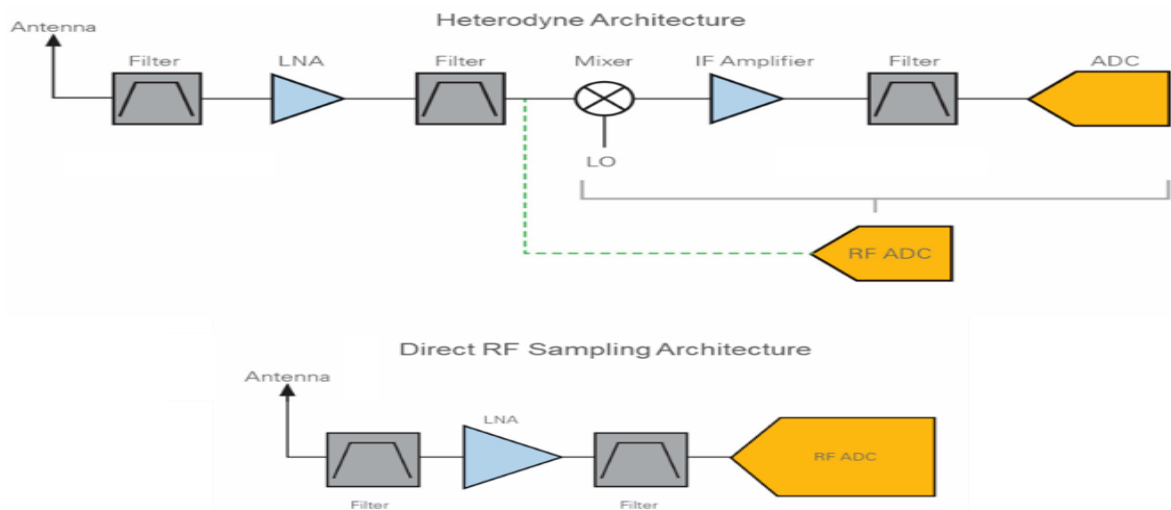
CENJOWS

ICT AND CYBER TECHNOLOGIES – DEVELOPMENTS IN CHINA

Telecom, IT, Social Media & Cyber

High-Speed Data Converters for Transmit and Receive. The latest analog-to-digital converters (ADCs) and digital-to-analog converters (DACs) being released by major semiconductor companies are ultrafast! The wider bandwidth not only allows for better spatial resolution but also makes it possible to implement some pretty interesting techniques for use in radar. For example, a radar can hop around to different frequencies to avoid detection or use the same sensor to act as both a communications system and a radar simultaneously. These converters are so fast that it's actually possible to perform "direct RF sampling," which simply means sampling so fast that you can acquire RF signals directly without up- or down-converting. For example, the newest FlexRIO transceiver has 12-bit resolution up to 6.4 GS/s. At these rates, it's possible to directly sample RF input signals up to C-band by moving much of the signal processing to the digital domain.

Comments. This is significant for AESA radars, because when one is dealing with thousands of antennas, you can reduce the size and cost significantly by eliminating mixers and local oscillators. This will help in significantly reducing the decision cycle of the well known **OODA Loop** developed by Colonel John Boyd, and has tremendous strategic/ military applications.



(Source: https://forums.ni.com/t5/Ni-Blog/4-Underlying-Technologies-That-Are-Changing-the-Game-for/bap/3838006?cid=Twitter-127904-Global-Paid_Broadbased)

China's Strategic Edge in Global Communications. Besides the existing telecommunication assets, such as the *Pakistan East Africa Cable Express* (PEACE), China is working on building some important telecommunication assets in South and Central America, Africa, Myanmar, the Indian Ocean Region (IOR) and in mainland China. These include fibre optic and satellite ground stations. The world-wide Satellite and Spacecraft Telemetry, Tracking, and Command (TTC) stations are operated by the Chinese Academy of Sciences and the PLA's General Armament Department. Apart from the TTC at Beijing, the others on mainland are located close to China's international border: Kashgar (Kyrgyzstan and Tajikistan), Yunnan (Myanmar), Qingdao (South Korea and Japan), Jiamusi (Russia) and Sanya (Vietnam and Philippines). All the overseas TTC stations are in Belt and Road Initiative (BRI) countries: Karachi (Pakistan), Malindi (Kenya), Swakopmund (Namibia), and Neuquén (Argentina). The one in Karachi is close to Gwadar port and the one in Malindi to Mombasa and Lamu ports. Swakopmund is close to Walvis Bay port in Namibia and Porto de Caio is in Angola, both of which are upcoming BRI ports. Neuquén is situated close to numerous infrastructure assets constructed by China in South America: the Fibre Optic Austral (FOA) in Chile and the China-funded multi-billion dollar turnkey railway and infrastructure projects in Argentina.

Huawei Marine is laying the southernmost submarine optic-fibre cable in the world in Chile, the FOA. Collaborating with Chilean telecom service provider, Comunicación y Telefonía Rural S.A. (CTR), the cable will land on the cities of Puerto Montt, Tortel, Punta Arenas and Puerto Williams. Beijing is providing end-to-end submarine cable solutions and architecture for networking submarine and terrestrial cables. Southern Chile, being a strategic location, FOA can enable Beijing to now survey the jagged terrain of the Chilean coast. The land-based FOA passes through two of the largest extrapolar (outside the Poles) ice fields in the world – the North Patagonian and the South Patagonian. The governments of Chile and Huawei Marine have also signed a pre-feasibility agreement to connect China and Chile with an approximately 20,000 km-long trans-Pacific fibre-optic cable. The exact route of the cable has not been finalised, but it is very likely to connect Shanghai and Valparaiso, passing through some of the island nations of Oceania and the Chilean Easter Islands.



China-Myanmar International Terrestrial Cable System is a land-based optic-fibre cable connects all the major cities of Myanmar – Mandalay, Naypyitaw (capital), Yangon, terminating at the beach resort of Ngwesauung. The cable extends northwards to the Chinese province of Yunnan, passing through the Chinese land port of Ruili. Beijing is interested in financing and expanding the Thilawa port in Yangon. Nepal China Optic-Fibre Link cable passes from the Tibetan town of Gyirong, through the land port of Rasuwagadhi, ending in Kathmandu. The Tibetan Autonomous Region (TAR) has an immense network of optic-fibre telecommunications, working as a strategic gradient to the sparsely connected Nepal, Bhutan and Indian border regions. Besides these terrestrial and long-range submarine OFC projects, Beijing has acquired vast specialization in island telecom connectivity, particularly that of small island nations.

Avassa Submarine Cable Project: China has connected the French Overseas Department of Mayotte with the three major islands of the Union of the Comoros – Grande Comore, Moheli and Anjouan. Interestingly Mayotte became a French Overseas Department as an outcome of a referendum, held in 2009, despite opposition from neighbouring Comoros, which long expressed its reservations about French rule in Mayotte. The French telecom company, Orange S.A., is also constructing the Lower Indian Ocean Network (LION-3) optic-fibre cable between Mayotte and Grande Comore.

Strategic Evolution Underwater Link: China has finished constructing an optic-fibre construction project in the Central American nation of Belize. It has built for Belize Telemedia Limited, a local telecom company, a 24-km-long submarine optic-fibre cable, connecting the mainland of Belize with its Ambergris Caye Island, passing through the ecologically sensitive Belize Barrier Reef.

MARS Submarine Cable: Huawei Marine is collaborating with the Hong-Kong based ICT company, Pacific Century CyberWorks (PCCW) Limited, to construct a 700-km-long submarine optic-fibre cable between the islands of Mauritius and Rodrigues in the Indian Ocean. The cable will be constructed on the Mascarene Plateau, the second largest submarine plateau in the Indian Ocean with shallow depths of about 150-1,000 m.

Comments. It shows the direction China's investment is taking, its diplomatic overtures and the larger geopolitical implications of its growing telecom empire. **TTC stations** established by China in countries that have relatively lower military technology capabilities and are unable to control or monitor their own daily ops, could possibly be used for covert military communications. **The FOA** is a strategic link as the port cities of Punta Arenas and Puerto Williams are the logistics gateway to the Antarctic Peninsula, located as they are on the Strait of Magellan and approx 1,500 km from China's Great Wall Research Station in Antarctica. China can put to tactical use its familiarity with the extreme south of the Americas to patrol the interface of the Atlantic and Pacific Oceans both in the Strait of Magellan and Drake's Passage. If realised, the 20,000 km-long trans-Pacific fibre-optic cable will be the first direct physical telecommunication connection between Asia, predominantly China and South America.

The terrestrial optic-fibre cable passing via Yangon will be of significant use as a building block for expanding the Thilawa port in Yangon. Thilawa is a port of critical importance from the Indian perspective as it is less than 1,000 km away from the north-eastern tip of the Andaman Islands. In TAR, equipped with an immense network of optic-fibre telecommunications, China is now able to exercise military as well as economic dominance across its under-developed borders. Using the Avassa Submarine Cable Project, China seems to be inserting itself, via Avassa, as a stakeholder in bilateral matters between Mayotte and Comoros. The MARS Submarine Cable is of greater relevance. The Rodrigues Island is approximately 1,700 km from the U.S. military base of Diego Garcia and the optic-fibre project could be used for acoustic sensing of ship and submarine movements and seismic sensing.

(Credits- <https://www.gatewayhouse.in/china-global-telecom-tentacles/&ChaitanyaGiri>, Fellow, Space and Ocean Studies, Gateway House)

U.S Ban on Huawei & Rare Earth. The U.S. Commerce Department had last week added Huawei Technologies and 70 affiliates to its "Entity List". The move effectively bans Huawei from buying parts and components from U.S. companies without U.S. government approval. Subsequently Alphabet Inc's Google also decided to suspend business with Huawei. Intel, Qualcomm, and Broadcom, three of the world's leading chip designers and suppliers and the memory chip makers Micron Technology and Western Digital are reported to have suspended shipments to Huawei. For new Huawei devices, Google will stop providing Huawei with access, technical support, and collaboration involving its proprietary apps and services going forward. Huawei said it will continue to provide security updates and after-sales services to all existing Huawei and Honor smartphone and tablet products, covering those that have been sold and that are still in stock globally. Huawei stated that they will continue to build a safe and sustainable software ecosystem, in order to provide the best experience for all users globally. Huawei could look at using Android Open Source Project (AOSP) with a third-party marketplace, but that marketplace won't have millions of apps, and it won't be as secure as Google, besides compatibility of apps with devices will also be a challenge.

China threatened it would cut off rare earth minerals as a countermeasure in the escalated trade battle. The People's Daily in a commentary titled "United States, don't underestimate China's ability to strike back," said, "We advise the U.S. side not to underestimate the Chinese side's ability to safeguard its development rights and interests. Don't say we didn't warn you!"

Comments. Due to the Google business suspension, Huawei will not just lose access to the Android operating system, but will also lose access to GMS or Google Media Services which is a collection of Google applications like Maps, Gmail and access to Play Store. GMS is not a part of the AOSP. Logically the US order extends to the popular apps like WhatsApp, Office365, Facebook, Netflix, etc., as well. While Huawei is expected to continue selling handsets from the existing stock in India, it is likely that it will be forced to suspend the rollout of new devices from both of its handset brands - Huawei and Honor, in India in the short term and wait for the Chinese government to intervene to resolve the trade issue with the US government. Thus if Huawei has to remain in the smartphone business, it has to build the entire stack on its own, which is not challenging for a company like Huawei, but consumer acceptability beyond China markets would be a concern. This would mean creating two parallel Smartphone ecosystems which might not be interoperable.

Rare earth minerals are commonly used in high-tech devices, automobiles, clean energy and defense and are crucial to the production of iPhones, electric vehicles and advanced precision weapons. About 35% of global reserves are in China and it produced 70% of total rare earths in 2018. U.S. consumption of rare earth compounds and metals relies heavily on imports, which rose to \$160 million in 2018, 80% of which were from China. Interestingly the phrase "Don't say we didn't warn you" has been used by the People's Daily in 1962 before China's border war with India and ahead of the 1979 China-Vietnam War.

(**Source**:-<https://telecom.economictimes.indiatimes.com/news/u-s-s-pompeo-says-huawei-an-instrument-of-chinese-government-fbn/69561167>,
<https://telecom.economictimes.indiatimes.com/news/huawei-honor-sales-set-for-a-massive-impact-in-india-analysts/69409781>
<https://www.cnbc.com/2019/05/30/heres-why-chinas-trade-war-threat-to-restrict-rare-earth-minerals-is-so-serious.html> and <https://www.cnbc.com/2019/05/29/dont-say-we-didnt-warn-you---a-phrase-from-china-signals-the-trade-war-could-get-even-worse.html>)