

# CENTRE FOR JOINT WARFARE STUDIES



## CENJOWS

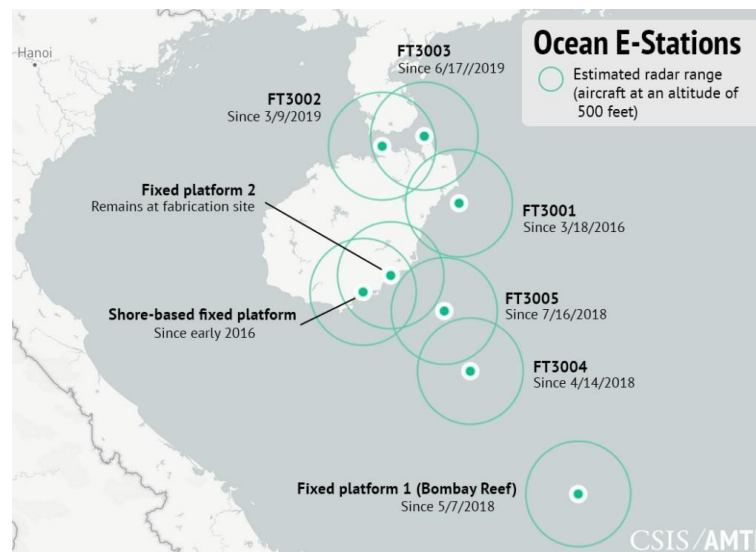
### **CHINA'S UNMANNED OCEAN NETWORK IN SOUTH CHINA SEA**

1. China has deployed a network of unmanned sensors and communications systems between Hainan and Paracel Islands in the northern part of South China Sea. These capabilities are part of a 'Blue Ocean Information Network' to aid in the exploration and control of the maritime environment using information technology. The network constructed between early 2016 and 2019 is referred to as a technology demonstration system. The most visible elements of this network are two types of "Ocean E- Stations" dubbed "floating integrated information platforms" (FIIP) and "Island/reef-based integrated information systems" (IRBIS).
2. The 112-foot floating platforms consist of an upper and lower deck. When deployed, half of the anchored platform is submerged for stability. Power is provided by solar panels arrayed on top of the upper deck. A gas- powered generator provides back-up power when necessary. Wind and wave energy are also offered as clean power options, according to the system description.
3. Both the floating and fixed platforms are intended to host a number of different sensors and act as a communications conduit for the information that they collect. Much of the floating platform's communications functionality and some of its sensing capabilities are likely housed within the radome on its upper deck. Communications capabilities include Ku-band and L-band satellite antennae, radio antenna, and cellular communication antenna. Sensing systems include an Automatic Dependent Surveillance Broadcast (ADS-B) antenna and an Automatic Identification System (AIS) antenna as well as a small air and surface-search radar. The radar has advertised detection range of 30 nautical miles against smaller aircraft or UAVs with a radar cross-section of at least 20 square feet. Larger ships and aircraft may be detected till the radar's line-of-sight.

4. The fixed platforms appear to possess some capabilities that are different from their floating counterparts. One notable addition is the presence of tropo-scatter antennae. Tropo-scatter systems enable over-the-horizon communications by scattering microwave signals off water molecules and dust in the atmosphere; and can often exceed 200 nautical miles range. The antennas at Bombay Reef appear to be pointed toward Chinese facilities at Woody Island, 46 nautical miles away. Tropo-scatter communication links are exceptionally difficult to detect, jam or intercept, as compared to satellite communication or other types of radio communication.

5. Though there is no specific mention of underwater monitoring systems like sonar or hydrophones which could be supported by the floating platforms, but the note to patent application avers that ‘other kinds of observation devices and auxiliary devices suitable for water observation can be further installed.’

6. As of Jun 2020, China has deployed five floating platforms around Hainan, and one fixed platform at Bombay Reef. An additional fixed platform remains at the fabrication site of China Electronics Technology Corporation (CETC) on the east coast of Hainan. The headquarters of CETC nearby also contains one fixed platform, likely a prototype used for research and development.



7. CETC has also demonstrated that the anchored, floating platforms can be relocated in as little as a week. In Mar 2019, it redeployed FT3002 from south of Hainan to western end of the Qiongzhou Strait - which separates the island from the Chinese mainland. Three months later, CETC moved FT3003 to other end of the strait, 30 nautical miles east of FT3002. Together, the platforms can now monitor all maritime traffic entering Qiongzhou Strait.

8. **Comments.** The platforms deployed thus far appear to be intended as a ‘proof-of-concept’. Future plans for the Blue Ocean Information Network though, involve expanding the sensor and communications network to the rest of South China Sea, East China Sea, and other ocean areas far from Chinese coast.

9. The Blue Ocean Information Network demonstration system in the South China

Sea is the most visible and ambitious project of its kind, using information technology. In a Jun 2019 special edition of the Chinese journal, *Electronic Science & Technology*, CETC officials presented three goals for a future Blue Ocean Information Network:-

- (a) 2025 – Complete construction of Blue Ocean Information Network in ‘key maritime areas of [Chinese] jurisdiction’ and begin ‘Belt and Road’ marine network construction. This would ‘meet the urgent needs of military and civilian authorities for the acquisition of information in China’s jurisdictional maritime areas.’
- (b) 2035 – Build out the ‘Belt and Road’ marine network to fully support the construction of China’s Maritime Silk Road.
- (c) 2050 – Expand construction to the ‘oceanic polar information network’ and lead development of the ‘global ocean information industry.’

10. An article describing ‘Architecture of Marine Environmental Parallel Monitoring System based on the Blue Ocean Information Network,’ was published jointly by researchers from Chinese Academy of Science, CETC Ocean Information Corporation and the PLA Navy Research Institute in March 2020 edition of Chinese Academy of Science’s ‘Journal of Automation.’ It avers that these floating and fixed integrated information platforms could eventually be part of a broader ‘Blue Ocean Information Network,’ which may include other components like ocean buoys, fixed and relocatable underwater sensors like sonar and hydrophones, UAVs, UUVs, and USVs. Other associated systems of this futuristic information network could include wave gliders, underwater vertical sonar arrays, underwater acoustic communications systems, and fixed underwater arrays. Chinese weather and earth observation satellites are also envisaged to be plugged into the system, along with communications satellites such as Chinasat-11. The article also identifies a Blue Ocean Information Network ‘data processing center,’ likely located in Lingshui county of Hainan.

11. The floating and fixed platforms and other components of China’s Blue Ocean Information Network will raise several concerns in the South China Sea and beyond. While CETC has largely cast the network as an environmental monitoring and communications system, the platforms and other systems clearly have military utility. Detailed, persistent hydrographic data, will allow naval forces to better understand how active and passive sonar systems will operate in underwater environment. Beyond that, these platforms would be used to ‘defend islands and reefs in the South China Sea.’ All the discussion about ‘Blue Ocean Information Network’ in Chinese media is anyhow centred around civil-military cooperation and safeguarding China’s national strategic maritime interests.

12. The ability to rapidly relocate platforms and sensors during a crisis may also afford Chinese authorities information advantages in a crisis. An obvious military application would be to use the platforms and deployable underwater systems to close gaps in radar, sonar, or communications coverage in a military confrontation. The potential deployment of E-Stations and other components of ‘Blue Ocean Information Network’ farther afield would also raise security, political, and legal questions, especially in disputed areas. Scarborough Shoal could especially be an apt test case.

*Source: <https://amti.csis.org/exploring-chinas-unmanned-ocean-network/>*

### **China Forms First Satellite Network for Civil Maritime Affairs with HY-1D Launch.**

13. China successfully sent a newly developed HY-1D maritime environment monitoring satellite into orbit onboard a Long March-2C rocket from the Taiyuan Satellite Launch Center in North China's Shanxi Province, on 11 Jun 2020. The designed service life for the satellite is five years. It carries five payloads onboard, including an oceanic water temperature scanner, a coastal zone imager and an automatic vessel identification system. The imager can obtain coastal water environment, coastal zone and ecological environment of rivers and lakes with a spatial resolution of 50 meters, every three days. The HY-1D satellite is designed to work with the HY-1C, which was launched on 07 Sep 2018. This launch enables formation of the country's first satellite network for civil maritime affairs. The two satellites will obtain global water temperature data twice a day with spatial resolution of 1.1 km, which will significantly enhance the country's ability of conducting effective observations of ocean color, coastal resources and ecological environment.

14. **Comments.** The HY-1 satellite family has four members so far, with the first HY-1A satellite launched on 15 May 2002, which was the country's first maritime environment monitoring satellite. The developer, DFH Satellite Coy under the China Aerospace Science and Technology Corporation (CASC) claimed this network will be mainly used to obtain dynamic ocean environment data, such as sea surface temperatures, and monitor environmental changes in China's coastal waters and coastal zones in key global regions as well as marine vessel information. It will also provide services including oceanic environment monitoring and forecasts, maritime disaster early warning, maritime rights protection and law enforcement, and scientific research.

*Source: <https://www.globaltimes.cn/content/1191241.shtml>*