Yaogan Satellites and Chinese ASBM Capability

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In the last quarter of 2013, China launched the Yaogan-17, 18 and 19 satellite launch missions in consecutive months, putting into orbit high resolution earth observation satellites using the Long March series of rockets. According to the Chinese state news agency, the "remote-sensing" satellites will "conduct scientific experiments, carry out land surveys, monitor crop yields, and aid in preventing and reducing natural disasters". But analysts have long believed that the "Yaogan" name is a cover for Chinese surveillance satellites equipped with optical and radar payloads and would considerably boost the Chinese anti-access and area-denial capabilities by augmenting the Anti-Ship Ballistic Missile system (ASBM). In fact, the Yaogan designation is shared by three types of satellites, based on the payloads. These include space-based Synthetic Aperture Radar (SAR) observations, electro-optical observations and naval oceanic surveillance for optical surveillance to track warships by acquiring their optical signatures and radio transmissions.

The triplets launched in three missions, Yaogan-9 in 2010, Yaogon-16 series, in 2012, and the Yaogon-17 series in 2013, are believed to be Electronic Intelligence (ELINT) satellites placed in Low Earth Orbit (LEO). These satellites fly in a triangular formation forming a Naval Ocean Surveillance System (NOSS) due to the inclination of the orbit enabling them to scan a large area. Naval vessels constantly emit electronic signals during their operation and these can be detected by the LEO satellites and can triangulate the position of the vessel. All these work in tandem to locate a target with high precision. The ELINT satellites can cover large area of the ocean while passing and give a rough target position. The SAR and optical imaging satellites then pass over and give precise

target information of the rough estimates. To achieve this, various satellites are launched and positioned in such a way as to detect and narrow down on the area of interest on the sea surface. In all, it is believed the Yaogan series consists of 6 SAR satellites (Yaogan 1, 3, 6, 10, 13 and 18), 9 ELINT satellites in three triplets (Yaogan 9, 16 and 17) and 10 electro-optic satellites (2, 4, 5, 7, 8, 11, 12, 14, 15, 19) beginning with the first Yaogon launch in 2006 to the latest in November 2013. Some Chinese writers suggest that in case of a war, the People's Liberation Army (PLA) can form a network of the SAR, ELINT and electro-optic satellites in orbit and enable sweeping a given area around Chinese waters once in less than 40 minutes enabling rapid target identification with precision.

Together, this network of satellites imparts sophisticated ocean reconnaissance capabilities to track vessels like aircraft carriers and enhances Chinese anti-access and area denial capabilities in the South China Sea or the Taiwan Strait. In the event of a conflict over Taiwan, the primary Chinese objective will be to dissuade the US from interdiction in support of Taiwan and keep the US carrier battle groups out of their effective area of operation. The Taiwan crisis of 1995-96 is believed to have convinced the Chinese of the need to possess area denial capabilities for future conflicts. Identifying a moving carrier amid the vast, open seas and among the clutter of other vessels requires very high precision and real time tracking. The Yaogan network can form the backbone for the Chinese anti-ship ballistic missile, the DF-21D, dubbed the "carrier killer". The missile is land-based and road mobile, meaning it is hard to detect. According to the US Department of Defence estimates, the missile is believed to have a range "in excess of 1,500 km" and can travel at several times the speed of sound which means it can effectively stall US carriers from coming to the aid of Taiwan or Southeast Asian nations in the South China Sea. This also imparts the crucial C4ISR (Command, Control, Communication, Computer, Intelligence, Surveillance and Reconnaissance) capabilities in space for directing the missile. In addition, targeting from the shore reduces the risk to Chinese naval assets from the threat posed by the Harpoon missiles that Taiwan has acquired from the US, including the recently acquired submarine launched variant. Apart from ocean surveillance, these capabilities can be used on land targets as well, to target command and control centres, advanced landing grounds and other defences in areas bordering Tibet, in case of a flare up with India.

There are no known real time test flights of the DF-21D missile and the only test China is believed to have conducted was on an immobile carrier mock-up in the Gobi desert. Still, the frequency of the satellites shows the priority accorded to attain this capability by the Chinese government and the urgency to

operationalise it. It is only a matter of time before the capability is operationally deployed, if it hasn't already been. The uncertainty notwithstanding, given the range and speed of the missile, the ability of Aegis destroyers to intercept it is doubtful if a volley is launched and the risk is disproportional, given the very high stakes involved i.e. aircraft carriers and the entire battle group.

The Yaogan launches clear the air on the credibility of the Chinese ASBM capability which has long been suspect and the nations concerned would do well to devise appropriate counter-measures rather than be in a denial mode about the technological prowess of the Chinese to field such a system. The DF-21D can act as an effective deterrent in any future standoff with the Chinese.

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