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The PLA's New Base for Space Situational Awareness—Opportunities and Challenges for the U.S.

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The People's Liberation Army (PLA) Strategic Support Force (SSF) has established a new base tailored for the military's space situational awareness (SSA) needs.[i] While the SSF's Base 26 called the Xi'an Satellite Tracking and Control Center and the Beijing Aerospace Flight Control Center will continue to perform satellite telemetry, tracking, and control (TT&C) functions for the People's Republic of China's (PRC's) national satellites, Base 37 will be in charge of foreign space object identification, tracking, and analysis, to include improving the accuracy of the PRC's domestic space object catalog.[1,2,3] Base 37 is probably most similar to a mix of the U.S. Space Force's Delta 4 and 6, and it also has a role in determining if PLA satellites supporting warfighters are experiencing natural or human-made interference from space. The new base will improve the PLA's ability to provide early warning to joint forces of incoming ballistic missiles, as well as space objects' location, maneuvers, and operating environment.

Base 37 is composed of select units from under the Central Military Commission's former general departments, PLA services, and new civilian recruits, indicating that the base will merge and seek to better integrate existing ground and probably space-based SSA capabilities, as well as build new systems. Starting as early as 2018, reputable PRC netizens discussed Base 37 as absorbing some of Base 26's experimental technology departments, and recent evidence indicates that some of those departments may design ground antennas.[4,5] Improvements to ballistic missile early warning will initially be achieved by merging select other PLA services' radar units and improving data integration.[6,7] The PLA may also be ready to integrate data from a more mature space-based missile early warning system.[8] Recruitment adds for technical experts and other information indicate that Base 37 probably has tracking stations and other institutions in at least Shan'anxi, Shandong, Xinjiang, Yunnan, Hangzhou, Qinghai, and Hubei provinces, as well as Chongqing Municipality and Beijing.[9]

[i] Defining SSA, the PLA's Science of Military Strategy in 2020 said, "Space situational awareness capabilities require long-term tracking, monitoring, cataloging and forecasting of targets in the entire space, especially small space targets, providing environmental information for spacecraft launching, measurement and control, and providing intelligence support for command and control." (See: https://www.airuniversity.af.edu/CASI/Display/Article/2913216/in-their-own-words-2020-science-of-military-strategy/)

A review of Base 37's technical reports and patents indicates that its first priorities have been to increase the accuracy of the PRC space object catalog, establish an internal collision early warning system, and improve identification and tracking of key perceived threats. Perceived threats discussed in some of their papers and patents include highly-maneuverable Starlink satellites, very low orbit space objects, and geosynchronous Earth orbit debris. Building a ground and space-based missile early warning system and decreasing the likelihood of PLA military communication satellite on-orbit spectrum interference seem to be longer term projects.[10,11]

The creation of Base 37 brings opportunities and challenges for the U.S.. Regarding the opportunities, it is now much clearer to whom the U.S. should send conjunction warnings, perhaps with a request for a specific confirmation regarding high-risk situations.[12] According to the Beijing Institute of Tracking and Telecommunications Technology (BITTT), the U.S. has been sending conjunction warnings to them since 2009, and they probably receive at least a couple hundred a week, making it unfeasible to respond in every case.[13,14] The U.S. Institute for Defense Analysis's 2018 review of official PRC documents on SSA concluded that the PRC views, "SSA [as] an opportunity to foster international collaborations, and grow…their leadership in the domain." The report goes on to say that, "BITTT noted that cooperation in outer space safety is a common interest [that] China shares with the U.S."[15] While BITTT is a PLA organization, widely supports TT&C and SSA, there is now an opportunity for an additional, and possibly more direct point of contact.

Regarding the challenges, better PLA ground and space-based SSA, not only for missile early warning, but also on-orbit activities could lead to more PRC distrust of U.S. on-orbit operations. A U.S. initiated conversation about on-orbit rules for responsible behavior could mitigate this challenge. PRC researchers have already begun publishing their analysis of the U.S. Geosynchronous Space Situational Awareness Program's (GSSAP's) on-orbit behavior, more analysis of which will likely be published as the PRC's confidence in its catalog increases.[16]

Looking ahead, the international collaboration enabled by a possible publication of the PRC catalog could bring opportunities and challenges to the U.S.. The existence and improvement of a domestic PLA space object catalog might indicate that the PRC intends to share it with the world, as the PLA seems to have thought Russia would do after a 2016 United Nations meeting.[17] Alternatively, the PRC may also plan to allow access to its database through a United Nations partnership.[18] This could be an opportunity to deepen discussion on conjunction warning methods, but on the other hand, it might provide fuel to dispute the U.S. catalog. As documented in recent report, the Chinese and Russians have collaborated on space debris tracking since at least 2018, so a PRC publicly available catalog could also deepen their cooperation.[19]

Initial analysis of Base 37 does not yet reveal that they have a role in operating on-orbit SSA systems, but can confirm their role in integrating and analyzing the data. For example, the base does not appear to operate the satellites reported to be fleeing, imaging, and approaching U.S. satellites, nor operate the robotic arm-equipped movable satellites like SJ-21 and SJ-

17.[20,21,22,23] Base 37's responsibility for improving the PRC space object catalog through correlating detected objects' locations with those in other public catalogs might involve use of on-orbit SSA systems, but PLA researchers continue to indicate that they don't yet have systems other than small, experimental, space-based SSA satellites.[24,25] This is likely to change.

Lastly, in the body of Base 37's technical reports, there is no indication of an intention to improve beyond-graveyard orbit SSA, probably because they are focused on supporting PLA joint force operations on Earth. Signs that they are absorbing other PLA organizations' TT&C functions for beyond-graveyard orbit operations would be noteworthy.[26]

ENDNOTES

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