

# Mounted Assured Positioning, Navigation, and Timing System (MAPS)



*MAPS anti-jam antenna system on a Stryker vehicle*

In February 2024, the Army conducted Mounted Assured Positioning, Navigation, and Timing System (MAPS) Generation (GEN) II IOT&E. The MAPS GEN II IOT&E was conducted in accordance with a DOT&E-approved test plan and was adequate to inform a full-rate production (FRP) decision. In September 2024, DOT&E published a classified IOT&E report assessing MAPS GEN II's operational effectiveness, suitability, and cyber survivability. The Program Executive Officer, Intelligence, Electronic Warfare and Sensors (PEO IEW&S) is expected to make the MAPS GEN II FRP decision in 2QFY25.

## SYSTEM DESCRIPTION

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MAPS is a vehicle-mounted Positioning, Navigation, and Timing (PNT) system that integrates a Military-Code (M-Code) GPS receiver with multiple alternative PNT sources and an anti-jam antenna system to provide vehicle crews and client systems with access to trusted PNT information in conditions where GPS signals may be degraded or denied. MAPS does not have an integrated screen and relies on other client systems to display PNT information to vehicle crews. MAPS supports the Army's transition to M-Code GPS and will replace the legacy Defense Advanced GPS Receiver (DAGR) in a subset of the Army's technical and combat vehicles.

## MISSION

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A unit equipped with MAPS employs trusted PNT information to conduct operations in GPS degraded or denied environments, such as dense vegetation, built-up urban and mountainous terrain, and in the presence of electromagnetic interference or enemy electronic warfare.

PNT information derived from MAPS directly enables positioning of forces; navigation across the operational environment; communication networks; situational awareness applications; and protection, surveillance, targeting, and engagement systems that contribute to combined arms maneuver.

## PROGRAM

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In 2019, the Army Futures Command issued a directed requirement for the PNT Program Manager to conduct a technical assessment of the MAPS GEN II capability to inform requirements and follow-on programs of record. The Commanding General, Army Futures Command, approved the MAPS Capability Development Document in September 2020, documenting the requirement to replace existing GPS receivers and antennas in a subset of Army ground vehicle variants. Following an open competition, the Army selected Collins Aerospace to provide the MAPS GEN II solution. The Army conducted a limited user test in September 2021, which informed the PEO IEW&S decision to enter program of record status at Milestone C as an Acquisition Category II, Major Capability Acquisition program in June 2022. DOT&E approved the MAPS Milestone C TEMP in April 2022.

The MAPS program completed IOT&E in February 2024 in accordance with a DOT&E-approved test plan. DOT&E published a classified report in September 2024. The IOT&E report will support an FRP decision in 2QFY25, and fielding to Stryker Brigade Combat Teams beginning in 4QFY25. A TEMP update supporting post FRP T&E activities is in development and an FOT&E focusing on Armored Brigade Combat Team vehicles is planned for 1QFY26 to support a separate Armored Brigade Combat Team fielding decision.

## » MAJOR CONTRACTOR

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- Collins Aerospace, a subsidiary of Raytheon Technologies – Cedar Rapids, Iowa

## TEST ADEQUACY

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In February 2024, the Army, led by the Army Test and Evaluation Command, conducted MAPS GEN II IOT&E and a cyber survivability adversarial assessment at Yakima Training Center in Yakima, Washington, in accordance with a DOT&E-approved test plan and TEMP. The IOT&E and adversarial assessment were observed by DOT&E and were adequate to determine the operational effectiveness, suitability, and survivability of MAPS GEN II's. DOT&E published a classified IOT&E report in September 2024, which will support the Army's FRP decision planned for 2QFY25. The Army addressed recommendations from the FY22 DOT&E Annual Report to verify deficiency corrections prior to conducting the IOT&E.

## PERFORMANCE

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### » EFFECTIVENESS

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MAPS GEN II is operationally effective and performs significantly better than the legacy DAGR in GPS-contested environments. MAPS GEN II continues to provide reliable PNT information in conditions where the DAGR could not, and improves soldiers' situational awareness, supports

navigation, and allows the unit to maintain operational tempo while moving between mission objectives. Additional details are contained in the September 2024 classified IOT&E report.

## » **SUITABILITY**

MAPS GEN II is operationally suitable and only experienced one essential function failure during IOT&E, meeting its reliability requirement. However, MAPS GEN II does not have an integrated screen and is reliant on the Joint Battle Command – Platform (JBC-P) or other connected client systems to display PNT information to the vehicle crew. The JBC-P experienced three essential function failures during the IOT&E, which reduced the overall PNT system of systems reliability. Operational availability was 99 percent due to the rapid repairability of the failures. Training was sufficient for soldiers to operate the MAPS. However, they expressed a need for additional troubleshooting instruction on the interface between MAPS GEN II and connected client systems. Additional details are contained in the classified DOT&E IOT&E report, published in September 2024.

## » **SURVIVABILITY**

MAPS GEN II is cyber survivable to outsider and nearsider threats. The MAPS Program Office mitigated vulnerabilities found during previous testing, minimizing an adversary's attack opportunities. Additional details are contained in the classified DOT&E IOT&E report, published in September 2024.

# RECOMMENDATIONS

The Army should:

1. Continue testing of the MAPS GEN II ability to resist and respond to evolving GPS threats.
2. Consider adding a screen to MAPS GEN II to serve as an alternate display when JBC-P or other connected client systems are not functioning.
3. Provide additional troubleshooting instruction on the interface between MAPS GEN II and connected client systems.
4. Address the recommendations contained in the DOT&E classified report from September 2024.