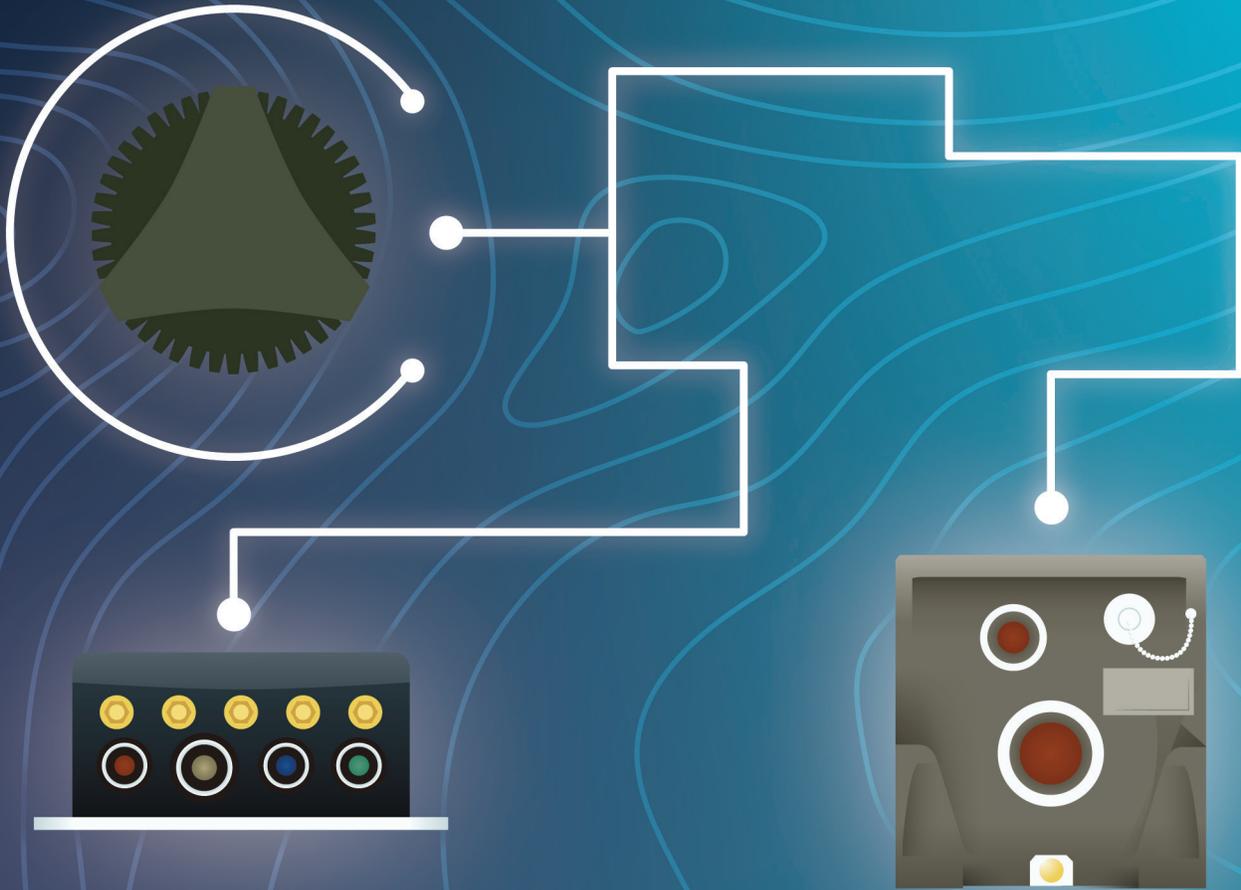# INTERFERENCE THREAT POSITION AWARENESS
THROUGH THE INTEGRATION OF A CRPA WITH INERTIAL SYSTEMS

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SAFRAN
FEDERAL SYSTEMS

Interference Threat Position Awareness

Real-time interference detection for Situational Awareness (SA)

The interference threat information provided from a Controlled Reception Pattern Antenna (CRPA) combined with reliable PNT sources, such as the Safran VersaPNT and Geonyx systems, can deliver situational awareness information, such as the approximate position of interference threat sources. A CRPA was integrated with a Geonyx system and tested operationally.. The CRPA, combined with the accurate heading of the Geonyx, proved to provide robust threat direction finding abilities.

Technology Used

CRPA ANTENNA

A CRPA is a type of antenna system featuring multiple antenna elements designed to enhance the resilience and performance of Global Positioning System (GPS) receivers by mitigating interference signals.

GEONYX

The Geonyx is a land true-inertial navigation, target geolocation & artillery pointing system.

VERSAPNT

The VersaPNT is a robust Position, Navigation, and Timing (PNT) solution and can be configured to use external PNT sensors and devices which include but are not limited to a CRPA.

CRPA INTERFACE

The interference direction-finding system utilized a Novatel GAJT-710 (7-element CRPA) for detecting interference and providing information on detected signals. The GAJT-710 provides interference detection on both GPS L1 and L2 bands and can detect up to 6 simultaneous threats per band. The system parsed the data feed from the CRPA to get information of detected interference and calculate relative directions to suspected threat emitters.

GEONYX INTERFACE

The interference direction-finding system utilized a Geonyx system for providing position and heading data for absolute positioning. The VersaPNT has also been used to provide position and heading data, similar to the Geonyx.

With knowledge of the absolute position and heading of the system, the absolute direction to detected interference can be calculated. The CRPA provides interference relative to antenna heading. Assuming the pointing angle between the CRPA and the Geonyx is known, the relative angles of interference can be converted to absolute angles.
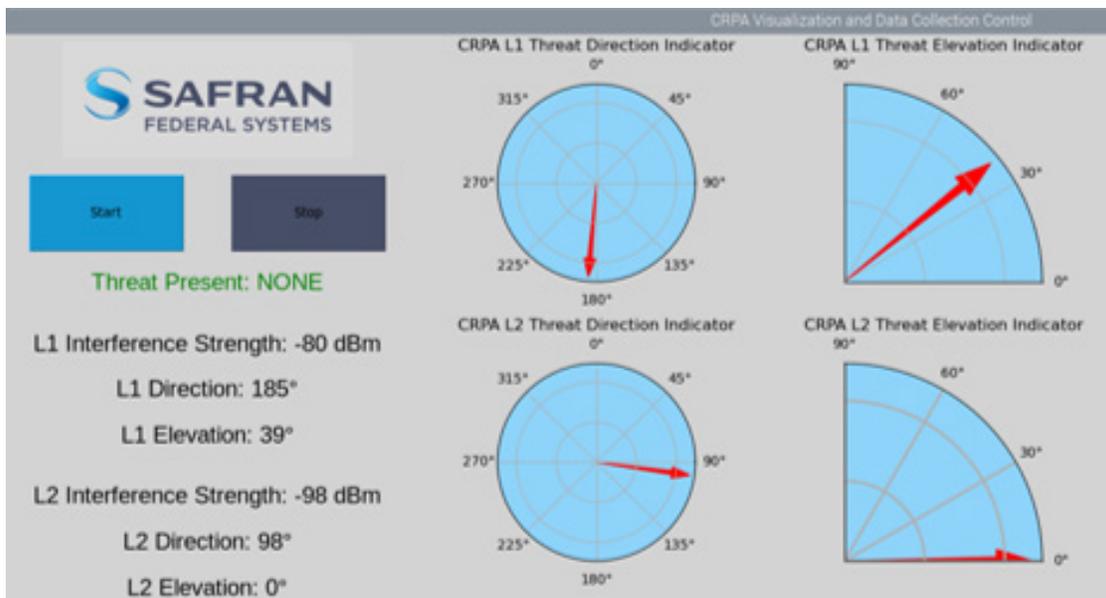
GUI CREATION AND USE

The prototype UI shows the threat information detected from the CRPA in real time:
- Signal strength, azimuth angle, and elevation angles are shown for detected threats on L1 and L2 bands.
- Lines of bearing are calculated using the absolute position and heading from the Geonyx and can be shown on a map.

FUTURE WORK

The prototype ran on separate hardware, so the next step of integration will be to integrate directly on existing navigation/timing systems. Systems will directly intake the CRPA feed and use internal position and heading for calculating absolute bearing to threats. Threat lines of bearing will be shown on system WebUI and updated in real time.

Algorithms will be developed and refined for calculating the absolute position of threats based upon lines of bearing. With enough system movement, the changes in lines of bearing over time can be used to detect the position of threat emitters.

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