



## Press Release: Orbit Logic's Onboard Planning Software Enables Enhanced SSA Using Satellite Clusters

**GREENBELT, MD (February 20, 2023)** – Orbit Logic has been awarded a Phase I Small Business Technology Transfer (STTR) contract sponsored by the Air Force Research Laboratory (AFRL) to develop a solution called Heimdall Onboard. The effort is a research partnership with the University of Texas at Austin (UT), with whom we previously developed a [ground-based version of Heimdall](#)<sup>1</sup> – a planning framework to optimize the use of ground- and space-based sensors to maximize resident space object situational awareness by using an information gain metric as a component of the tasking plan's score.

Heimdall Onboard will enable a team of satellites in a cooperating cluster to perform fully automated Resident Space Object (RSO) custody maintenance of an operator-specified set of high interest objects. The logic required to a) determine an agile schedule to acquire images using onboard sensors, b) detect objects in the images, c) determine orbits for those detections, d) associate the orbits with objects in the locally-maintained onboard catalog, and e) adapt the sensor tasking plans dynamically based on uncertainties, sensor capabilities, and the relative viewing perspectives of the cluster members over time – will all be performed on the flight computers of the cluster elements using decentralized approaches to collaborative autonomy and data fusion.

This effort will integrate UT's mature processing and fusion algorithms with the mature, flight-qualified version of Orbit Logic's Autonomous Planning System (APS) that was developed for AFRL's SaFIRE program, enhancing its decentralized collection planning to ensure that the observations being made by each satellite most effectively contribute to building an SSA picture of all RSOs of interest.

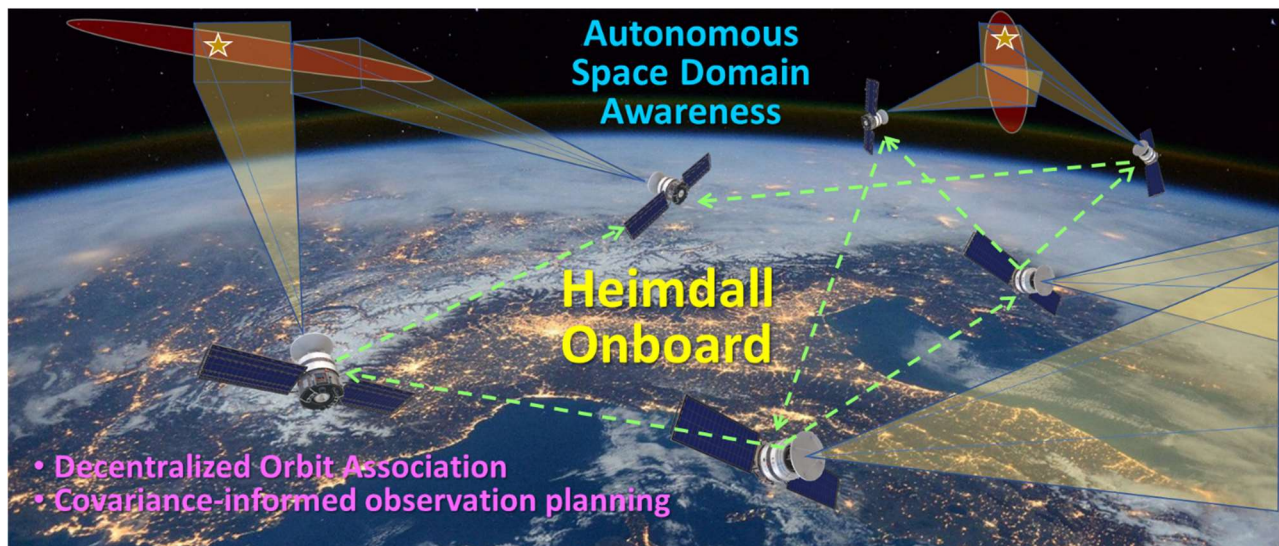


Figure 1: Heimdall Onboard will offload operators using clusters of satellites to autonomously maintain SSA of specified collections of space objects.

APS is a powerful technology that can be leveraged for autonomous planning in *any*

<sup>1</sup> Orbit Logic's Heimdall Solution for Enhanced SSA Sensor Tasking  
<https://orbitlogic.com/Heimdall.html>

domain. The breadth of its applications proves its flexibility; in addition to its use in this activity for autonomous orbital SSA, Orbit Logic has utilized APS for the autonomous operation of heterogeneous constellations of [Low Earth Orbit \(LEO\) satellites](#)<sup>2</sup> with DARPA and AFRL, heterogeneous teams of [unmanned underwater/surface/aerial vehicles \(UUVs/USVs/UAVs\) with the Navy](#)<sup>3</sup>, heterogeneous swarms of [rovers, satellites, and atmospheric vehicles for robotic Mars exploration](#)<sup>4</sup>, [heterogeneous robotic swarms with astronauts-in-the-loop for Lunar exploration](#)<sup>5</sup>, and [mission-adaptive formation flying control of satellite clusters](#)<sup>6</sup>, with NASA.

### **About Orbit Logic, a Boecore Company**

Orbit Logic ([www.orbitlogic.com](http://www.orbitlogic.com)) specializes in mission planning and scheduling solutions for aerospace and geospatial intelligence. Orbit Logic's operationally proven COTS products create better plans faster with fewer resources for all mission phases. Orbit Logic services are available to configure, customize, and integrate Orbit Logic's mobile, web-based, desktop, and flight software applications to provide turn-key operational solutions that leverage the latest available technologies to meet customer goals and exceed their expectations.

Approved for public release; Distribution is unlimited. Public Affairs approval #AFRL-2023-0545

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<sup>2</sup> Orbit Logic's Autonomous Planning System for the DARPA Blackjack Pitboss Program  
<http://orbitlogic.com/uploads/5/7/8/8/57881343/20200206%20Blackjack%20Press%20Release%20Final.pdf>

<sup>3</sup> Orbit Logic's Navy Phase II SBIR, Robust Cooperative Autonomy with Minimal Information Exchange (MinAu)  
<http://orbitlogic.com/uploads/5/7/8/8/57881343/20190709%20MinAu%20Navy%20Phase%20II%20Press%20Release%20Final.pdf>

<sup>4</sup> Orbit Logic's NASA STTR, Mars/Interplanetary Swarm Design and Evaluation Framework (MISDEF)  
<http://orbitlogic.com/uploads/5/7/8/8/57881343/20200416%20MISDEF%20Phase%20I%20Press%20Release.pdf>

<sup>5</sup> Orbit Logic's Intelligent Navigation, Planning, and Awareness for Swarm Systems (IN-PASS) solution  
<http://www.orbitlogic.com/uploads/docs/20210208%20IN-PASS%20Phase%20I%20Press%20Release.pdf>

<sup>6</sup> Orbit Logic's On-board Swarm Control for Autonomy and Responsiveness (OSCAR) solution  
<http://www.orbitlogic.com/uploads/docs/20210713%20OSCAR%20Phase%20I%20Press%20Release.pdf>