Press Release: Orbit Logic Awarded Phase I NASA Contract

GREENBELT, MD (December 3, 2019) – Orbit Logic has been awarded a Phase I Small Business Innovation Research (SBIR) contract sponsored by the National Aeronautics and Space Administration (NASA) to develop the Fault Learning Agent for Prediction, Protection and Early Response (FLAPPER) System – a satellite solution to utilize Machine Learning (ML) to autonomously detect, isolate and correct on-board faults. FLAPPER’s goal is to significantly reduce (and in time, eliminate) the human resources expended in the traditional process of detection and correction of spacecraft faults. Additionally, this would improve responses for missions with limited communications. Reducing the time spent by operators to analyze the root cause, and even providing the capability for the satellite to quickly return to operational state are both seen as obvious benefits of the technology.

The FLAPPER solution will expand our onboard Autonomous Planning System (APS) architecture to include ML capable of detecting, isolating, and mitigating anomalies in real- or near-real-time with minimal ground intervention. A set of defined fault detection and correction constraints will be developed, along with the capability for operators to classify new types of faults. These constraints, along with spacecraft data input, will be used to train a Specialized Autonomous Planning Agent (SAPA) called the FLAPPER Detect SAPA - to detect and classify faults based on novel telemetry limits and value trends. The corrective component of the FLAPPER system (FLAPPER Correct SAPA) will then plan correlated corrective actions to mitigate each fault type.

In Phase I of this SBIR, Orbit Logic will utilize open source ML as the ‘core’. We will evaluate several options to determine the solution that a) most flexibly integrates with real-time, onboard telemetry data formats, b) can most effectively evolve its behavioral data models for satellite-oriented subsystem functions, and c) demonstrate efficient use of processing and memory resource to be practical for utilization onboard the satellite. In Phase II, the FLAPPER solution will be executed on AFRL’s Satellite Fusion, Inference, & Reasoning Engine (SaFIRE) processing appliance and integrated with the Resilient Bus Experimental Laboratory (REBEL) testbed. Verification in this environment will elevate the solution’s maturity through operation on flight-like hardware and against representative mission scenarios.

About Orbit Logic

Orbit Logic (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.