# Software Management Plan (SMP)

**Project title**

# ICAROUS: Integrated Configurable Algorithms for Reliable Operations of Unmanned Systems.

**Project summary**

ICAROUS is a software middleware that enables the robust integration of mission specific software modules and highly assured core software modules for building safety-centric autonomous unmanned aircraft applications. The set of core software modules include formally verified algorithms that (1) detect, monitor, and control conformance to safety criteria; (2) avoid stationary obstacles and maintain a safe distance from other users of the airspace; and (3) compute resolution and recovery maneuvers, autonomously executed by the autopilot, when safety criteria are violated or about to be violated.

# Software Classification and Safety Criticality

# All the systems containing software on the project are Class E and non-safety-critical.

# Schedule

# Start date: 1/1/2014. Alpha Version: 1/6/2016. Beta Version: 10/1/2016. Phase 1 Version: 12/1/2016.

# Resources

# Four civil servants from the Safety-Critical Avionics Systems Branch supporting NASA’s Safe Autonomous Systems Operations (SASO) Project: César Muñoz: 0.4 FTE; Maria Consiglio: 0.4 FTE; George Hagen: 0.2 FTE; Anthony Narkawicz: 0.5 FTE.

# Compliance Matrix

# Attached.

# Testing

Core software modules will have a formal specification in the Program Verification System (PVS). A suite of test cases will be used to validate the software implementation against the functional requirements written in PVS.

**Data Management**

The developed code will be maintained in a software repository in the Safety-Critical Avionics Systems Branch’s SVN server. This server supports version control. César Muñoz will maintain this repository. Official releases of ICAROUS will be distributed, upon approval, in NASA’s GitHub repository of open source.

Formal specifications, test cases, requirement changes, and documentation will be kept track of by César Muñoz and they will be stored in the software repository.