

16 June 2006

Navigation Working Group Activity Plan to support ISO TC20 SC14 WG3 collaborative operations in Earth orbit.

Statement of Purpose

ISO/TC20/SC14 WG3 has embarked on a new project to develop a Common Data Format for collaborative operations in Earth orbit. The Consultative Committee for Space Data Systems (CCSDS) has requested the Navigation WG to define the requirements to support this new work item. This memorandum defines a detailed activity plan with milestones and schedule to achieve the proposed new standard.

SC14/WG3 and the Orbital Debris Coordination Working Group (ODCWG) have a number of standards they are working on that are related to orbital debris coordination and control. One factor involved in the control of orbital debris is assessing space objects conjunction probability. The determination of the probability of a collision rests fundamentally on the ability to quantify the uncertainty in the spacecraft orbits. SC14 has commenced work on a "Process for Orbital Information Exchange" to support their orbital debris control effort.

The Navigation WG will support the overall SC14 collision avoidance assessment effort by enhancements to the TC20/SC13 ODM, to avoid creating a competing/conflicting standard for the process of orbital information exchange.

Listed below are proposed extensions to the CCSDS ODM to be developed by the Navigation Working Group. This list is a baseline, subject to modifications as work progresses. Objective is to emphasize essential elements, for the purpose of producing a user friendly final Recommendation.

- Covariance matrix information (dimension, coordinate system, solve-fors, etc.)
- Accelerations in X, Y, Z directions at epoch
- Gravitational model (with degree and order)
- Atmospheric model
- Third body perturbations considered
- Solid and ocean tide model identification
- Planetary albedo (including grid size)
- Maneuvers (via extensions to existing OPM parameters)
- Attitude (via CCSDS Attitude Data Message (ADM))
- Earth Orientation Parameters (EOP)
- Solar Weather data
- Shadow model
- Integrator information (scheme, step mode, error control)
- Precession and Nutation update intervals

I. Milestones

Milestone	Completion Date
Submit approval request to CMC to enhance the ODM BB	June 2006
Start draft enhancements to ODM	July - Oct 2006
Assess status at Nav WG meeting	Fall 2006
Continue enhancements to ODM	Jan 2007
Assess status at Nav WG meeting	Spring 2007
Assess status at Nav WG meeting	Fall 2007
Release enhanced ODM version for CCSDS review	Spring 2008
Conduct prototype exercises	Summer 2008
Establish and publish enhanced ODM BB	Fall 2008

III. Deliverables

- Activity Plan
- Draft enhanced ODM BB
- Enhanced ODM BB for review
- Prototype report
- Final enhanced ODM BB