End-to-End Mission Simulation #1 (1 day) Outline

Test Date : Two days during 12/04 – 12/07 Mission Sim period ***(24 hour per day)***

Test Objectives:

- Prepare generic commands for sequencing S/C day-in-the-life leading up to encounter
- Test all required operations procedures, command blocks, and scripts in an integrated manner that mimics real-life operations
- Test all required ground system hardware and software
- Identify/document all problems related to the above
- Get some real experience/training operating CONTOUR
- Science data interface – maybe
- CONTOUR OpNav file Transfer – dependent on setup of IONET and establishment of firewall data path

What is not tested (to be tested when software/systems ready):

- DSN command/TLM interface
- External navigation packet processing at JPL
- OpNav FITS file creation/processing – S/W not ready till Feb 02
- S/C engr. data plotting
- DSN scheduling and SOE generation

Test Prerequisites

All required software, S/C command blocks, S/C systems, ground systems shall be individually tested and validated prior to test date.

Systems Required:	Who	Status
1. Spacecraft minus CRISP	Colby	√ Planned for 12/4-7
2. G&C Testbed	Dellinger	√ In place
3. MOC with new layout, Luke, Vader,R2D2 Lando, IONET, DMZ, APLNET	Griffith	Expected week of 11/19
4. Spacecraft autonomy suit	Harvey	Planned for 11/30
5. Spacecraft mode switch macros	Whittenburg	Reviewed and ready for S/C test
6. I&T staff	Colby	Agreed to work with us

Software/Files/Procedures Required:	Who	Status
1. IONET to DMZ working (Phase 1)	Griffith	Expected week of 11/19
2. Command load generation	Tillman	√
3. Macro dump compare (PROC C) S/W	Tillman	In development
4. S/C SPK File	Navigation	Nav agreed to provide
5. Comet SPK File	Navigation	Nav agreed to provide
6. SPK processing S/W	Tillman	In development
7. G&C CAS's	Pinkine	Done
8. Orbit Maneuver Target File	Dunham	MD agreed to provide
9. Blackhole/Wormhole network setup	Griffith	To be set up after IONET
10. G&C maneuver CAS input file processing	Whittenburg	S/W not yet begun
11. NGIMS/CIDA Instrument CAS's	Bowman	In progress
12. CFI/CRISP	Harch	In progress

13. Science request file for Sim 1	Harch	Expected week prior to Sim
14. Spin Up/Down CAS (may be needed for 3-axis transition)	Holdridge	Not needed
15. 3Axis DeltaV CAS	Holdridge	Done – needs to be tested on SC
16. Integrated command load for Sim 1	Whittenburg	1 Week prior to Sim
17. BUP command sequence for Sim 1	Holdridge/Whittenburg	Not started as yet
18. FC Epoch Viewer Layout	Mulich	Preliminary version completed
19. TLM Pages – G&C, DeltaV , FC, Instruments	Nick/Mark/Alice/TJ	Working set complete
20. Assessment data retrieval, SSR reports	Tillman	Assessment data avail. ? Missing Data capability later
21. Critical Opnav processing (not in Sim 1)	Tillman	Expected Feb 2002
22. Memory examiner	Expected 9/30	
23. JPL OpNav processing and Orbit Determination	Williams	Using existing S/W accord. to NAV
24. Automation scripts for Seqgen-Statesim chain	Tillman	not sure what schedule is here
25. OpNav/Tracking request	Navigation	agreed to provide
26. CA Time File	Navigation	agreed to provide
27. Dump file transfer scripts	Tillman	Delivery date ?
28. Command history report	Tillman/Dewitt?	Karl to see if Statesim can do this
29. Maneuver parameter input file	Holdridge/Dellenger	Provided G&C with formats, G&C agreed to provide sample files for Karl

Ops Procedures Required:	Who	Status
1. Load compare procedure	Mulich	Needs S/W
2. Pass operations (pre, during, post) scripts and procedures	Mulich	
3. Ephemeris generation and check	Pinkine	Needs S/W
4. Command load generation and check	Bowman	Needs automation scripts and S/W (item 24 above)
5. Ephemeris generation and check	Pinkine	Needs S/W

Pre-test Setup (Complete 2 days prior to S/C simulation)

Ground : Setup G&C testbed

Ground : NAV delivers preliminary S/C and COMET SPKs

Ground : MD deliver preliminary burn attitude to G&C

Ground : G&C deliver preliminary burn attitude and time to Mops

Ground : Instruments deliver instrument requests

Ground : MOPs prepares command sequence

Ground : G&C deliver DeltaV maneuever file to Mops (Type DT)

Test Day Preparations

Ground : Power up S/C and G&C Testbed: send S/C mini command load to start S/C operations

Ground : Bring up Command Workstations (Luke and Vader) and JPL NAV (voice)

Ground : Pass 1 HGA Operations - assume abbreviated DSN track (~2 hours) at high bit rates

a. Run nominal pass operations procedures and scripts
b. Load dump/verify S/C command load
c. Load dump/verify S/C ephemeris

Simulation Operations

Spacecraft: Bit rate to 9 bps

Spacecraft: Begin 3-axis operations – in rotisserie mode – low speed SSR recording

Spacecraft: Conduct OpNavs of Comet – high speed recording

Spacecraft: Earth point and playback OpNav and housekeeping SSR data

Ground : Pass 2 HGA Operations

a. Run nominal pass operations scripts
b. Verify SSR playback of Critical OpNav and engr. Data
c. Dump and examine selected contents of C&DH memory (engr. Data, parameters..)

Spacecraft: Bit rate to 9 bps

Ground : Post Pass 2

Ground : Process Critical Opnav (if/when available)

Ground : Transmit Critical OpNav (or dummy file) to Nav via Blackhole

Ground : Nav performs OD and transmits new SPK files to MOC

Ground : Verify S/C engr. Data in TLM archive

Ground: Process new SPK, validate it, and prepare upload

Ground: Process new CA time, validate it, and prepare upload

Ground: MD and G&C prepare updated maneuver files and deliver to MOC

Ground: Process maneuver file and prepare burn update (BUP upload

Spacecraft: Conduct 2nd OpNav sequence

Spacecraft: Earth point HGA and playback OpNav and housekeeping data from SSR

Ground : Pass 3 HGA Operations – last track prior to encounter

a. Run nominal pass operations scripts
b. Load S/C ephemeris, Time of Closet Approach, and Comet Ephemeris
c. Load Burn Update (BUP)

Spacecraft: Bit rate to 9 bps

Ground : Post Pass 3

Ground : Process Critical Opnav

Ground : Transmit OpNav to Nav via Blackhole

Ground : Nav transmits new SPK files to MOC

Spacecraft: 3-Axis spin up and transition to Spin Mode operations

Spacecraft: Conduct Spinning Delta-V maneuver

Spacecraft: Transition to 3-Axis control and de-spin

Spacecraft: Ram point and enter Encounter Mode for ~5 hours

Spacecraft: Conduct instrument operations

d. CFI
~~e. CRISP~~
f. NGIMS
g. CIDA

Spacecraft: Earth point and playback encounter data

Ground : Pass 4 HGA Operations – last track prior to encounter

a. Run nominal pass operations scripts

b. Configure for PB ops
c. Monitor SSR pointers
d. What data pour in

Spacecraft: Bit rate to 9 bps

Ground : Post Pass 4

Ground : Verify data server has Science and Engr. data expected.