IT Security Plan for Polar/TIDE and PSI

Summary of Critical Functions

Monitoring the health of the instrument: Timely receipt of the Polar NRT data stream is critical during instrument commanding exercises involving the high voltage power supplies. Saved NRT files or quicklook data files are important for monitoring quickly changing conditions at the spacecraft due to extreme geophysical conditions or when monitoring TIDE's frequent changes to various operational limits. LZ data files are important for the routine monitoring of instrument health.

Generating routine command sequences: Software exists for generating the project required, instrument specific, commanding sequences (RQL files) and for analyzing orbital parameters for the optimal timing of commands. RQL command files are typically generated by the TIDE instrument administrator (Peggy Sloan) and verified by the TIDE instrument scientist (Paul Craven). Significant oversight to the commanding process is provided by the TIDE MSFC lead co-investigator (Michael Chandler).

Generating unique and/or prompt command sequences: When instrument commanding lies outside the routine path described above, commanding sequences are typically generated by the TIDE instrument scientist (Paul Craven) with backup given by the TIDE instrument administrator (Peggy Sloan) and the TIDE MSFC lead co-investigator (Michael Chandler).

Transfer of commanding sequences to missions operations personnel: RQL files, once generated, can be transferred to the Polar operations team by a variety of means. Routine transfer is by email to _____enter email address____. Commanding has also been accomplished by fax and telephone.

Summary of Other, Non-Critical But Important Functions:

Supply of LZ, associated analysis data files, reduced data and graphic files to science teams: TIDE/PSI data analysis and distribution software resides on several Unix machines. The primary site is at MSFC/NSSTC (http://satyr.msfc.nasa.gov) and includes a Sun Ultra 30 as the primary data reduction machine and web server, a 500-count CDRom jukebox supported by a Sun Sparc10, and various minor Sun workstations and/or desktop machines supporting commanding or development work. A mirror site is maintained at GSFC (http://tide.gsfc.nasa.gov) and includes a Sun Ultra 60 as a mirror web server and a RAID system for data service.

Archival of TIDE/PSI data: Data archiving is performed by the data processing analysis noted above.

TIDE/PSI Backup and Recovery Policies:

The TIDE/PSI team has general policies in place that apply to all the servers and software under its responsibility.

All servers and workstations are maintained according to the recommendations and directions of the MSFC and GSFC IT security policies.

All information content on the MSFC and GSFC servers and workstations supporting TIDE/PSI are routinely backed up on a weekly schedule. The most current tape backups are stored by the system administrator in an office area separate from the computer systems. Older backup sets rotate to an office area in a separate building. Full backups of all but the archived, static data are performed monthly with incremental backups performed weekly. Full backups of the GSFC archived data are performed semi-yearly. The MSFC archived data reside on CDRoms for which the team has multiple copies to serve as backups. In addition, a CDRom, updated yearly, with ASCII files of all TIDE/PSI data analysis, data service and instrument commanding software resides with the Polar project scientist at GSFC.

At least bi-monthly, a portion of the

Passwords for key machines and accounts are held by at least two people. Root passwords for MSFC-based servers and workstations are known to both the MSFC TIDE/PSI system administrator, Jeannette Johnson, and by _____ and _____. Passwords to key software and analysis accounts at both MSFC and GSFC are held by Peggy Sloan and Dick West.

For critical instrument monitoring and commanding functions: Software to receive the TIDE/PSI NRT data stream and to create commanding sequences resides and is active on two separate servers at MSFC's NSSTC and can be used on either machine at will. The software also resides on the TIDE/PSI server at GSFC but is used only to verify its functionality in case of future need.

For data service functions: Almost complete data service redundancy is provided, on an immediate basis, by the GSFC/MSFC data server mirroring. Because all data and data servicing software resides on both machines, backup and recovery for these functions should be easily accomplished. Several data download/production processes would need minor software modifications if production processing needed to be switched from MSFC to GSFC at a cost of approximately 1 man-week of our experienced senior programmer's time or 6 man-weeks of an unfamiliar programmer's

TIDE/PSI Backup and Recovery Plan:

7. Credible threat

Mirroring of software functions between machines at MSFC and between MSFC and GSFC provide for immediate recovery for all mission critical functions and almost immediate recover for the less critical data processing functions. The instrument commanding sequences may be remotely generated and submitted to the GSFC FOT. The GSFC FOT have often provided multiple methods, or routes, for command submission. It is also possible, though not optimal, to command the instrument from within the GSFC mission operation center if experienced personnel can be transported there.

System and software backup procedures should be adequate such that TIDE/PSI ground system machines could be restored or duplicated within 2 to 3 weeks time given the experienced personnel, hardware, and space resources to do so.

6. Data loss/corruption

same as above

5. Loss of one or more critical systems

same as above

4. Extended power outage/cyber attack

same as above

3. Localized destruction or contamination

same as above

2. Widespread destruction

same as above

1. Complete devastation

a. Including substantial loss of life

The instrument scientist has unique and primary knowledge of instrument behavior and safe commanding procedures that the instrument administrator and other co-investigators do not. However, in the case of loss of experienced personnel at MSFC, instrument commanding can be competently assumed by the TIDE/PSI co-investigator at SWRI or by the instrument principal investigator at GSFC. Data serving and programming responsibility would be assumed by GSFC. An unplanned interruption of instrument commanding may require safing the instrument for as much as one month's time. Such a move would also require additional funding at those institutions equal to that supporting the MSFC personnel replaced (approx. 2 man-year). The nearly complete software mirroring between MSFC and GSFC mean that data service would be impacted only to the degree that functions would need initiation as noted above.

b. Little or no loss of life

same as above

Contact Information:

Peggy Sloan/MSFC/(256)961-7681

Michael Chandler/MSFC/(256) 961-7645

Paul Craven/MSFC/(256)961-7639