

DATE: September 17, 2002

SUBJECT: HEDS Comm Splinter

LOCATION: University Baptist Church, Great Room, Houston, Texas

TIME: 1300 – 1600

ATTENDANCE:

Name	Affiliation/Org.	Email Address	Phone/Fax Number
Aquino, Joe	JSC/NASA/TA	joseph.m.aquino2@jsc.nasa.gov	(T) 281-483-4033
Bradford, Bob	MSFC/NASA	Bob.Bradford@msfc.nasa.gov	(T) 256-544-2843 (F) 256-544-1430
Calhoun, Melvin	GSFC/HTSI	Melvin.Calhoun@csconline.com	(T) 301-805-3630
Calvelage, Steve	MSFC/CSOC/LMSO	Steve.calvelage@csconline.com	(T) 256-961-9313
Culley, Angela	GSFC/AS&T/450	Angela.culley@csconline.com	(T) 301-805-3097
Douglas, Scott	GSFC/NASA/291	Scott.Douglas@gsfc.nasa.gov	(T) 301-286-9550
Duany, Albert	GSFC/HTSI/290.2	aduany@pop500.gsfc.nasa.gov	(T) 301-286-2721
Durham, Jeff	JSC/USA/OZ	Jeff.h.durham1@jsc.nasa.gov	(T) 281-244-8142
Fanders, Michael	JSC/NACAIT	Michael.t.fanders1@jsc.nasa.gov	(T) 281-483-6069
Frazier, Rob	JSC/USA/DV	Robert.b.frazier1@jsc.nasa.gov	(T) 281-483-4444 (F) 281-483-5880
Gatewood, Clifton	21 SOPSUSAF	Clifton.gatewood@onizuka.af.mil	(T) 408-752-4714 (F) 408-752-4704
Hendrickson, Eric	MSFC/NTI	Eric.Hendrickson@msfc.nasa.gov	(T) 256-544-8735
Hill, Ellen	KSC/USA	Ellen.m.hill@usago.nasa.gov	(T) 321-861-2381
Hillis, Larry	JSC/USA/OZ5	Larry.hillis1@jsc.nasa.gov	(T) 281-244-8428
Hodgson, Tony	Worldcom	Tony.hodgson@wcom.com	(T) 832-816-1125

Kraesig, Rick	JSC/CSOC	Richard.kraesig@csconline.com	(T) 281-853-2304
Lawless, Edward	GSFC/CSC/290	Edward.lawless@csconline.com	(T) 301-805-3145
Manning, Bill	MSFC/CSOC	Bill.manning@csconline.com	(T) 256-961-9491 (F) 256-961-9401
Marion, Tim	MSFC/CSC/PRISMS	Tim.marion@msfc.nasa.gov	(T) 256-961-9380
Mascari, Michele	GSFC/CSOC/NISN	Michele.mascari@csconline.com	(T) 301-805-3214 (F) 301-805-3025
McCutchen, Mark	MSFC/CSC/CSOC	Mark.mccutchen@csconline.com	(T) 256-961-9381
McLamb, Monique	KSC/NASA/TA-B2-B	Monique.mclamb-1@ksc.nasa.gov	(T) 321-867-8540
Norman, Seaton	GSFC/NASA/291	Seaton.Norman@gssc.nasa.gov	(T) 301-286-8676
Parise, Ron	GSFC/CSC/588	Ron.parise@gssc.nasa.gov	(T) 201-286-3896
Penn, Ronald	KSC/PH-K1	Ronald.Penn-1@ksc.nasa.gov	(T) 321-861-7333 (F) 321-861-0197
Reese, Norman	GSFC/Raytheon/291	nreese@sled.gsfc.nasa.gov	(T) 301-286-6486
Schaaf, Ken	WSSH/WSTF/HTSI	kschaaf@wstf.nasa.gov	(T) 505-524-5615
Schneck, Bruce	GSFC/HTSi/450	Bruce.Schneck@csconline.com	(T) 301-805-3018
Segura, Sylvia	KSC/USA	Sylvia.segura@ksc.nasa.gov	(T) 321-867-2158
Smith, Furman	WSSH/WSTF/HTSI	Fsmith@wstf.nasa.gov	(T) 505-524-5394
Smith, John	GSFC/LM/451	John.smith@csconline.com	(T) 301-805-3111 (F) 301-805-3443
Sutton, Robert	MSFC/LMSO	Robert.Sutton@csconline.com	(T) 256-961-9469
Switalski, Len	GSFC/SGT/450	Leonard.switalski@csconline.com	(T) 301-805-3046
Testoff, Steven	GSFC/CSOC/Docs	Steve.Testoff@csconline.com	(T) 301-805-3066
Thomas, Michael	JSC/CSC/NISN	Michael.Thomas@csconline.com	(T) 281-483-7544
Wegener, Richard	JSC/LM/CSOC	Richard.Wegener@csconline.com	(T) 281-853-3429
Wells, Andrew	GSFC/Raytheon/291	awells@sled.gsfc.nasa.gov	(T) 301-286-5658

Whisenant, Michael	MSFC/Getronics	Michael.whisenant@csconline.com	(T) 256-961-9368
Woodall, Bill	KSC/LM	William.Woodall-1@ksc.nasa.gov	(T) 321-867-7012
Wright, Kimberly	MSFC/NASA/AD33	Kim.wright@msfc.nasa.gov	(T) 256-544-0936 (F) 256-544-2554

INTRODUCTION

Ms. Michele Mascari convened the September 17, 2002, Human Exploration and Development System (HEDS) Comm Network Support Group (NSG) Splinter to discuss communications project statuses and activities.

MISSION SUPPORT BACKBONE UPGRADE

- A. Mr. Steve Calvelage gave a presentation on the Mission Support Backbone Upgrade (refer to the attachment, *Mission Support Backbone Upgrade a.k.a BOP [Big Optical Pipes]*). There were several drivers for implementing the upgrade: leases on the existing equipment were coming due; the current carrier arrangement created problems, and it would remove inefficiencies in the network architecture. The network model was based on the existing utilization and Fiscal Year (FY) 03 POP requirements.
- B. Improved diversity is one of the goals of the new architecture. However, there are four sites with physical constraints (Jet Propulsion Laboratory [JPL], LaRC, Headquarters [HQ], and Johnson Space Center [JSC]). These sites have collapsed rings.
- C. The new architecture will provide improved control over provisioning. There will be end-to-end (ETE) ownership of the link. The Carrier will no longer be relied on to configure the ATM services of changes. It will be possible to utilize the Cisco BPX failover/reroute capabilities. Carrier specifications are: Qwest, 2-hour Mean Time to Repair (MTTR) and 30-day termination liability after 1 year; MCI-Worldcom, 4-hour MTTR and 30-day termination liability on installation.
- D. Mr. Calvelage outlined the outstanding activities. A peering move from Chicago to the Marshall Space Flight Center (MSFC) is planned. Mr. Joe Aquino asked if this was the International Space Station (ISS) video and Mr. Calvelage responded that it was. A new circuit will be installed, connected to MSFC. There still will be peering through Chicago to the Canadian Space Agency (CSA). There still will be east/west Internet peering; this is the only interface being changed. The disconnect dates are being evaluated because it falls in the Thanksgiving Holiday time frame. If necessary, the disconnect can be rescheduled. Mr. Aquino stated that he was concerned that the scheduling was very close to a Space Shuttle launch. Mr. Michael Whisenant stated that there were contingency plans in place.
- E. Mr. Calvelage reviewed impacts since the change. Three trouble tickets were generated. There were latency changes created by the upgrade. This issue is being investigated over the entire network. Some latencies improved while others did not. All latencies are within the National Aeronautics and Space Administration (NASA) Integrated Services Network (NISN) Services Document (NSD) specifications.

TRANSPONDER 5 REQUIREMENTS

Mr. Robert Sutton discussed Transponder 5 requirements (refer to the attachment, *Transponder 5 Requirements*). The GE2 Transponder 5 termination liability expires in July 04. In anticipation of this, a terrestrial solution is being investigated. The current requirements need to be documented and verified. Some requirements are no longer valid. The requirements need to be reviewed and a determination made as to how to transition off the transponder. The current requirements include: Space Shuttle 50 Mbps Stat Mux, Space Shuttle downlink video/audio, Ice

TV, and MER TV. It will be necessary to verify future Goddard Space Flight Center (GSFC) Space Shuttle downlink requirements. Mr. Sutton stated that a review of these requirements by the Space Shuttle community is being requested. Once the review is complete, the appropriate requirements documents will have to be revised. Terrestrial solutions will be investigated and then the proposed solution will be tested and accepted. Mr. Joe Aquino stated that JSC will take the lead to define the Transponder 5 requirements.

PATHFINDER STATUS

Mr. Robert Sutton provided a Pathfinder Project Status (refer to the attachment, *Pathfinder Project Status*). CSOC was tasked to terminate and test a NISN-provided OC-3 between the White Sands Complex (WSC) and JSC, determine what SLAs can be supported via this connectivity, and identify candidates for migration to this bandwidth. Cisco 15454 SONET multiplexers have been installed at the Whites Sands Ground Terminal (WSGT) and JSC. System acceptance testing should be complete by September 30. An NSR is in place to flow the Premium IP (PIP) and Standard IP (SIP) services down the new WSC to JSC circuit. Once in place, it should be possible to turn some services down. Mr. Joe Aquino asked if there were availability/reliability statistics available for the service. Mr. Scott Douglas stated that there were not, but that the service was only carrying engineering data at this point. DS-3 extension procurements are being identified. The stat mux replacement engineering units purchase order has been generated.

GUAM STUDY STATUS

Mr. Robert Sutton provided a Guam Study Status (refer to the attachment, *Guam Study Status*). CSOC was tasked to perform a study and make recommendations to improve the availability of GRGT to WSC communications. Currently there are three T-1s, two for the Multiplexer/Demultiplexer (MDM) and one for the Timeplex multiplexers. There has been a history of minor outages on these circuits. Due to circumstances related to Typhoon Chata'an, there was an outage of approximately 12 hours in July 02. Three options have been identified to improve communications reliability: DomSat service between the Island and the mainland; installation of three redundant, ETE diverse T-1s; and implementation of redundant, diverse circuits on-Island only. Proposals, with cost estimated, have been received for the first two options. Once the third cost estimate is received, the study package will be compiled and formally presented.

ISS VIDEO

- A. Mr. Bill Manning discussed ISS Video (refer to the attachment, *ISS Video Network Support Group [NSG] Status*). There is a requirement for two video channels (4 Mbps each) from JSC to MSFC and one video channel (4 Mbps) JSC to CSA/Remote Payload Investigator (RPI). Three sites have been implemented (University of Alabama [UAB], University of Wisconsin Madison [WSCAR], and Rensselaer Polytechnic Institute [RPI]). New implementations are scheduled. Glenn Research Center (GRC) is scheduled for October 2002. For GRC, it was necessary to purchase new decoder hardware. The Colorado School of Mines is not scheduled. The plan is to set up MPEG 2/4 testing. Test conductors need to be identified and the tests scheduled. A Point-of-Contact (POC) at JSC is needed as well.

- B. The RPI sites have been provided a 30-day license for the client software. It will be the RPI site responsibility to purchase the permanent license. A termination date for the 30-day license will be provided. The client software is approximately 99 dollars. The original proposal was to purchase a block of licenses and provide a license to the RPI site. This option was declined by the program. Mr. Michael Whisenant stated that there is an advantage to the RPI sites buying their own license in that CSOC is not the Cisco client expert. Mr. Manning stated that the licensing options will have to be re-evaluated.
- C. Mr. Manning stated that it is his understanding that the Network PRD (NPRD) is being updated with the RPI requirements. Discussions are ongoing as to how to rewrite the requirement. It needs to be understood that the current implementation is the 'interim solution' and the permanent solution has not been implemented.

IONET DIVERSITY

- A. Mr. Steve Calvelage provided a presentation on IONET diversity (refer to the attachment, *NISN Internet Protocol [IP] Operational Network [IONET] Diversity*). The IONET is a NISN private IP group of networks. The IONET is divided into the open and closed segments. Primary NASA sites are interconnected by a triangle architecture. The closed IONET comprises 3 independent triangles. The open IONET comprises 1 independent triangle (GSFC-JSC-MSFC). Each leg of the triangle is implemented with as much diversity as possible. NISN has a Gold Premium Level of Service contract with Nortel. The agreement provides a dedicated maintenance engineer, 24x7 support, onsite support 24x7, and replacement hardware.
- B. Mr. Calvelage reviewed a series of action items pertaining to the IONET segments, dating back to 1998. At one time, an action item in 2000 resulted in the writing of an NSR to implement full diversity on the Open IONET triangle, but the NSR was cancelled. NSRs in 2002, resulted in studies to document the triangle and provide cost estimates for implementing diversity. Mr. Scott Douglas stated that he is working with Mr. Bill Caudle to acquire funding for one of the ROMs (Closed IONET, GSFC-KSC-MSFC triangle). Mr. Joe Aquino stated that the diversity NSR was cancelled because NISN was working on an overall network plan. Mr. Douglas stated that the NSR was actually cancelled as part of the NASA cost savings initiatives.
- C. Mr. Calvelage reviewed the results of an audit of the IONET Open segment. The audit showed that there were a limited number of circuits that were single points of failure. The audit concluded that the cost of implementing a solution to overcome the risk is very high. Mr. Aquino stated that there single points of failure in the network at this time and that these failure points need to be addressed. A discussion ensued as to whether some failures in the network were due to single points of failure or unusual instances where there were major outages to multiple circuit paths. Mr. Mark McCutchen stated that studies have been performed and there have been instances where two legs of the triangle were lost. The instances have not been regular. The program needs to establish the priority of the services that might be effected and inform NISN if further action needs to be taken. Elevating the level of service would require additional funding. Mr. Aquino stated that he has a mission critical requirement for restoral and that NISN is not fixing the problem. Mr. McCutchen stated that there are other instances in the agency where items have been identified as issues to be fixed, but not acted on due to funding. Mr.

Aquino stated that he would lay out a business case and go forward with NISN to SCDS to request additional funding and that this issue should be raised at the NSG for the Network Director (ND) to consider.

VOICE COMPRESSION

Ms. Michele Mascari provided a voice compression update (refer to the attachment, *Voice Compression and Network Optimization*). The timeslot and bandwidth allocations for the mission T-1s were reviewed. Voice loops were compressed to 24 kbps except for TV Conference, Air-to-Ground (A/G), and three media loops. The performance for all compressed voice loops was acceptable. Optimization goals included maintaining reroute capability with the AT&T network, providing at least two mission circuits for NASA sites with mission requirements, and reducing T-1 utilization to 80 percent. It was found that over 38 T-1s had greater than 80 percent utilization. Due to voice compression, that number has been reduced. It may be possible for some sites to fit additional services within the existing bandwidth. Some pairs of sites will require new circuits to provide additional mission services. The recommendation is being made to turn down one T-1.

ISS HIGH RATE PAYLOAD DATA LINK

Mr. Steve Calvelage gave a presentation on the ISS 50-Mbps link (refer to the attachment, *Mission Service Planning ISS High Rate Payload Data Link Re-engineering*). The current configuration uses a commercial transponder that is expensive. A NISN Service Request (NSR) was assigned to investigate if NASA should consider adding Asynchronous Transfer Mode (ATM) as a standard service. A specification to the carriers has been released. The response is due September 27, 2002. Three options are being considered: purchase a managed service from a carrier; NISN supplies a customer service, and implement a standalone design. In option 1, the carrier provides ETE management. In option 2, an ATM presence would be established at WSC. The carrier would provide private line circuits terminating on NISN ATM hardware. Option 2 would utilize the ENMC at MSFC as the Network Operations Center (NOC). Option 3 would be built on a private line architecture. Other options to trim costs are being considered as well.

(Original Approved By)

Michele Mascari, Chairperson