



Human Spaceflight (HSF) Network Support Group (NSG) Meeting

September 13, 2012



Sierra Nevada Corp. Space Systems passed one of the most complex tests it has faced for its Dream Chaser. Known as a captive-carry test, the effort required the Dream Chaser to be lifted by helicopter and put through a battery of tests measuring its aerodynamic flight performance.



Using a robotic arm, astronauts on board the International Space Station captured the unmanned SpaceX Dragon capsule



Boeing's CST-100 space capsule, seen here after completing its first parachute test, on April 3, 2012

Johnson Space Center (JSC), TX

**Human Spaceflight (HSF)
Network Support Group (NSG)
Meeting**

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A handwritten signature in black ink that reads "James A. Bangerter". The signature is written in a cursive style and is positioned above a thin horizontal line.

James A. Bangerter
Human Space Flight Network Director
Goddard Space Flight Center

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Network Support Group Attendance

The attendees listed below attended all or part of the September 10 – September 13, 2012 NSG (splinter sessions and/or main forum).

Last Name	First Name	Email Address	Affiliation	Telephone Number
Aviles	Jorge	Jorge.a.aviles@nasa.gov	GSFC/HTSI/FDF	301-286-4447
Aquino	Joe	Joseph.M.Aquino@nasa.gov	JSC/NASA/SCIO	281-483-4033
Bangerter	James	James.A.Bangerter@nasa.gov	GSFC/NASA/ HSF ND	301-286-7306
Banks	Turonald	turonald.banks.contractor@ exelisinc.com	GSFC/HSF	301-823-2563
Barcon	Eric	Eric.M.Barcon@nasa.gov	KSC/NASA	321-867-3522
Batson	Bryan	kenneth.b.batson@nasa.gov	JSC/LM	281-336-5017
Baum	Earl	earl.j.baum@nasa.gov	JSC/NOIT	281-483-2321
Baxter	Cliff	Clifford.d.baxter@nasa.gov	WSC	671-355-3415
Belton	Shawn	Shawn.B.Belton@nasa.gov	GSFC/CSO	301-286-3536
Berner	Jeff	jeff.berner@jpl.nasa.gov	JPL/DSN	818-354-3934
Bethke	Pete	pbethke@mail.wsc.nasa.gov	WSC/SN/TDRS	575-527-7057
Blizzard	Melissa	Melissa.Blizzard@exelisinc.com	GSFC/HSF	301-823-2622
Boggs	Tom	Harry.t.Boggs@nasa.gov	GSFC/CSO	301-2865590
Boldosser	Patrick	patrick.e.boldosser@nasa.gov	GSFC/NASA	301-286-9370
Booker	Harrison	Harrison.Booker@exelisinc.com	GSFC/HSF	301-823-2627
Booth	Mike	Michael.S.Booth@nasa.gov	GSFC/ASRC/HSF	301-286-6192
Brautigam	Ronnie	Ronnie.Brautigam.ctr@patrick.af.mil	ER/CSR	321-853-8150
Calhoun	Melvin	Melvin.Calhoun@exelisinc.com	GSFC/HSF	301-823-2644
Calvelage	Steven	Steven.G.Calvelage@nasa.gov	MSFC/POIC/HOSC	256-961-9313
Cauthen	Phillip	Philip.Cauthen@nasa.gov	MSFC/NASA	256-544-4204
Clark	Elizabeth	Elizabeth.Clark@exelisinc.com	GSFC/HSF	301-823-2625
Colaluca	Vic	victor.colaluca@nasa.gov	KSC/IMCS	321-867-2286
Culley	Angela	Angela.M.Culley@nasa.gov	GSFC/CSO	301-902-6033

Network Support Group Attendance

Last Name	First Name	Email Address	Affiliation	Telephone Number
Custodio	Arian	custodio_arian@bah.com	SCaN	703-589-7517
Dahm	Mike	Michael.P.Dahm@boeing.com	Boeing	321-383-6146
Daniel	Earl	earl.daniel.contractor@exelisinc.com	GSFC/HSF/Docs	443-883-6194
Davis	Darrell	Darrell.D.Davis@usa-spaceops.com	KSC/USA	321-302-6485
Delgado	Mario	Mario.Delgado-1@nasa.gov	JSC/ESTL	281-483-0070
Deutsch	Leslie	leslie.j.deutsch@jpl.nasa.gov	NASA/DSN	818-354-3845
Douglas	Scott	Scott.C.Douglas@nasa.gov	GSFC/NASA/CSO	301-286-9550
Erickson	Jim	James.K.Erickson@jpl.nasa.gov	JPL/DSN	818-393-1529
Fanders	Mike	michael.t.fanders@nasa.gov	JSC/NACAIT	281-483-6069
Foster	William	william.m.foster-1@nasa.gov	JSC/GC Office	281-483-0640
Frazier	Robert	Robert.B.Frazier@nasa.gov	JSC/NACAIT	281-443-4444
Frith	Aaron	edward.a.frith@nasa.gov	JSC/GC Office	281-244-8074
Gardea	Ray	rgardea@wsc.nasa.gov	WSC	515-527-7377
Gawel	Michael	Michael.Gawel@patrick.af.mil	ER	321-853-8118
Gaylor	Kent	Kent.L.Gaylor@nasa.gov	JSC/NASA/EV	281-244-6418
German	Darla	Darla.German@exelisinc.com	GSFC/SCNS	301-823-2500
Glasscock	David	David.O.Glasscock@nasa.gov	WSC	575-527-7035
Gramling	Cheryl	cheryl.j.gramling@nasa.gov	GSFC/NASA	301-286-8002
Greatorex	Scott	Scott.A.Greatorex@nasa.gov	GSFC/NASA/NIMO	301-286-6354
Griffin	Bill	Bill.M.Griffin@lmco.com	JSC/USA/FDOC Op	281-336-5105
Halvorson	Pete	peter.c.halvorson@nasa.gov	JSC/USA/MOD	281-244-7606
Harris	Mark	Mark.A.Harris@nasa.gov	WFF/VHF Ops	757-824-2192
Harris	Roy	Roy.Harris@nasa.gov	JSC/FDOC	281-244-1753
Hasan	Syed	syed.o.hasan@nasa.gov	GSFC/HTSI/FDF	301-286-0995
Hervey	Jewel	jewel.r.hervey@nasa.gov	JSC/NASA/SCIO	281-483-0359
Hester	Daryl	daryl.t9.hester@lmco.com	JSC/FDOC/Eng	281-853-2128

Network Support Group Attendance

Last Name	First Name	Email Address	Affiliation	Telephone Number
Holman	Kitty	kitty.c.holman@nasa.gov	JSC/PRD	281-483-0572
Holmes	Tom	Thomas.F.Holmes@nasa.gov	JSC/GC Office	281-483-6876
Hoge	Susan	Susan.L.Hoge@nasa.gov	GSFC/NASA/FDF	301-286-3661
Hudgins	Bob	bhudgins@wsc.nasa.gov	WSC/Operations	575-527-7078
Ihnat	Bill	William.H.Ihnat@nasa.gov	GSFC/CSO	301-902-6018
James	Russell	russell.w.james@nasa.gov	DFRC/NASA/ WATR Rep	661-267-3070
Johnson	Bradford	Bradley.A.Johnson@nasa.gov	GSFC/SCNS	301-823-2582
Jones	Brian	Brian.Jones-1@nasa.gov	JSC/GC Office	281-483-0555
Jones	Ken	ken.jones-2@nasa.gov	JSC/Comm Integrat	281-483-7671
Jones	Richard	Richard.S.Jones@nasa.gov	JSC/NASA	281-483-8050
Jones	Robert	robert.l.jones-1@nasa.gov	DFRC/Arcata	661-816-1356
Jordan	Steve	Steven.M.Jordan@lmco.com	JSC/USA/Orion Flt	281-333-6259
Kaufman	Tim	timmestay.kaufman@jpl.nasa.gov	JPL	818-354-3326
Kenny	Ted	Ted.Kenny-1@nasa.gov	JSC/NASA/MOD	281-244-0078
Kluksdahl	Norman	Norman.C.Kluksdahl@nasa.gov	JSC/NASA	281-483-7053
Kobin	Heather	Heather.Kobin@nasa.gov	GSFC/NASA/MSM	301-286-1059
Kraesig	Richard	Richard.Kraesig@exelisinc.com	GSFC/HSF	301-823-2569
Kruska	Jason	Jason.Kruska-1@nasa.gov	JSC/NASA/MOD	281-483-4088
Levin	Ryan	ryan.m.levin@nasa.gov	GSFC/SCNS/OSC	301-823-2641
Lintereur	Philip	philip.a.lintereur@boeing.com	Boeing	321-867-5148
Lipford	Jay	James.P.Lipford@nasa.gov	JSC/Comm Control	281-483-4455
Louw	Aldora	aldora.louw@lmco.com	JSC/LM	281-336-5085
Marriott	Robert	Robert.R.Marriott@nasa.gov	JSC/NOIT	281-483-6879
Marsh	Mike	Michael.K.Marsh@nasa.gov	JSC/NOIT	281-483-4761
Martinez	Juan	Juan.u9.Martinez@lmco.com	JSC/HWE/FDOC	281-853-2138
May	Jennifer	jennifer.may.contractor@	GSFC/HSF	301-823-2629

Network Support Group Attendance

Last Name	First Name	Email Address	Affiliation	Telephone Number
		exelisinc.com		
McGill	David	David.McGill-1@nasa.gov	JSC/LM/MOD	281-483-5847
Morse	Gary	Gary.A.Morse@nasa.gov	NASA HQ/SCaN	202-358-0504
Naffah	Elias	Elias.T.Naffah@nasa.gov	SCaN	216-401-2164
Nesbitt	Avis	avis.nesbitt-1@nasa.gov	GSFC/CSO	301-286-9587
Newman	Clark	Clark.P.Newman@nasa.gov	GSFC/FDF	301-286-2738
O'Hagan	Brian	Brian.ohagan-1@nasa.gov	JSC/NASA/MOD	281-483-4786
Pifer	Fred	fred.pifer.contractor@exelisinc.com	GSFC/HSF	301-823-2646
Pinapati	Amy	amy.pinapati@nasa.gov	JSC/LM	281-483-5397
Pitre	Dave	Dave.Pitre@sncorp.com	SNCorp	720-287-6360
Ramirez	Crystal	Crystal.E.Ramirez@nasa.gov	GSFC/FDF	301-286-2197
Richards	Erik	Erik.Richards@nasa.gov	WSC	575-527-7120
Rigsby	Frances	frances.a.rigsby@nasa.gov	MSFC/CSO	256-544-2908
Roffmann	Paul	paul.r.roffmann@lmco.com	JSC/MCC21	281-336-5446
Rogers	Karen	karen.m.rogers@nasa.gov	JSC/MCC/GC Office	281-483-6889
Romansky	Rich	Richard.R.Romansky@nasa.gov	WSC	-----
Rufenacht	Herman	hermann.rufenacht@mdacorporation.com	MDA/Canada	1 (514) 457-2150 x 3593
Russell	Thomas	Thomas.Russell@exelisinc.com	GSFC/HSF	301-823-2626
Schlichter	Dale	Dale.Schlichter@exelisinc.com	GSFC/NEN	301-823-2606
Schlueter	Gary	gary.schlueter@nasa.gov	GSFC/CSO	301-286-0787
Schonbrunner	Bruno	Alan.T.Schonbrunner@nasa.gov	WFF	757-824-1224
Segura	Sylvia	Sylvia.A.Segura@nasa.gov	KSC	321-867-2158
Severance	Mark	mark.t.severance@nasa.gov	JSC/NASA/ESTL	281-483-0384
Shefsky	Dave	david.shefsky@itt.com	GSFC/SCNS	301-464-6184
Simpson	Kimberly	Kimberly.A.Simpson@jpl.nasa.gov	JPL/EFT-1 FTMO	818-354-0555
Smith	Brian	Brian.T.Smith@nasa.gov	JSC/NASA/DA8	281-244-5212

Network Support Group Attendance

Last Name	First Name	Email Address	Affiliation	Telephone Number
Solomon	Doug	douglas.m.solomon@nasa.gov	GSFC/CSO	301-286-6864
Sparks	Ray	Ray.N.Sparks@nasa.gov	MSFC	256-544-7664
Spinolo	Chris	michael.c.spinolo@nasa.gov	GSFC/NASA./CSO	301-286-7552
Statman	Joe	jstatman@jpl.nasa.gov	JPL/DSN	818-625-5096
Steffes	John	John.R.Steffes@nasa.gov	KSC/IMCS/Voice	321-867-7747
Stoumbaugh	Lee	Lee.Stoumbough@lmco.com	JSC/FDOC	281-853-2129
Tai	Wallace	Wallace.S.Tai@jpl.nasa.gov	JPL/NASA	818-574-0137
Thacker	Corey	corey.m.thacker@boeing.com	Boeing	281-226-8998
Testoff	Steven	Steven.B.Testoff@nasa.gov	GSFC/ASRC/HSF	301-286-6538
Thomas	Justin	Justin.L.Thomas@nasa.gov	DFRC/Arcata	661-276-5023
Thomas	Michael	Michael.L.Thomas@nasa.gov	JSC/CSO	281-483-7544
Thompson	Craig	craig.thompson-1@nasa.gov	JSC/NOIT	281-483-0241
Trahan	Jacqulyne	jacqulyne.m.trahan@nasa.gov	JSC/GC Office	281-483-0749
Tran	Hung	Hung.D.Tran@nasa.gov	JSC/NASA	281-483-8045
Varkey	Jubee	Jubee.J.Varkey@nasa.gov	JSC/NASA/MOD	281-483-8692
Venable	Mitch	mitchell.k.venable@nasa.gov	JSC/GC Office	281-483-6075
Ward	Dawn	dawn.e.ward@nasa.gov	JSC/NASA	281-483-6145
Watts	Karen	karen.a.watts@nasa.gov	JSC/ISS	281-990-7962
Whitney	Joe	joseph.l.whitney@nasa.gov	JSC/GC Office	281-483-6878
Wiggins	Andre	Andre.L.Wiggins@nasa.gov	GSFC/CSO	301-902-6005
Wilson	Charles	Charles.R.Wilson@nasa.gov	JSC/GC Office	281-483-6877
Zapp	Lee	Lee.G9.Zapp@lmco.com	JSC/MCC/FDOC	281-853-2186
Zernic	Michael	Michael.J.Zernic@nasa.gov	SCaN	216-551-8265
Yettaw	Mike	Michael.E.Yettaw@nasa.gov	DFRC/NASA	661.276.3253
Zimmerman	Patrick	Patrick.Zimmerman@nasa.gov	JSC/USA	281-483-2849

Network Support Group Minutes

INTRODUCTION

Mr. Jim Bangerter convened the September 13, 2012, Human Spaceflight (HSF) Network Support Group (NSG) meeting to discuss requirements, planning, and issues in support of the International Space Station (ISS), Visiting Vehicles (VV), and commercial space. Mr. Bangerter welcomed the attendees and thanked them for their attendance at the NSG.

Mr. Bangerter extended a welcome to the Jet Propulsion Laboratory (JPL) representatives at the NSG. He stated that the network will once again be working with JPL on the Exploration Missions (EM)-1 and -2. He thanked Mr. Jim Erickson for attending and stated that he looks forward to working with Mr. Erickson and JPL on the new challenges ahead.

Mr. Tracy Minish presented Mr. Bangerter with a plaque from mission operations and signed picture in honor of his years of dedicated service to Human Space Flight. Mr. Minish stated that Mr. Bangerter has been a great leader and that will be missed on Mr. Bangerter's retirement. He stated that sometimes JSC gets tunnel vision and Mr. Bangerter has broadened their vision. Mr. Minish commented that Mr. Bangerter has been a tough and competent Network Director. Mr. Bangerter's expertise and knowledge will be missed. Mr. Minish stated that he treasures Mr. Bangerter's friendship and thanked him for making his job that much easier.

September 2012 NSG splinter session and main forum presentations and minutes can be accessed at the following URL: <http://scp.gsfc.nasa.gov/hsfnsng/nsg/0510/nsg.htm>

HSF ROLLING ACTION ITEM LIST (RAIL) REVIEW

Mr. Steven Testoff provided a review of the HSF Rolling Action Item List (RAIL) (refer to the presentation, *Human Spaceflight [HSF] Action Item Status*). Mr. Testoff reported that there were 9 meetings with open Action Items (AI) for a total of 12 open items, 6 over due items, and 5 meetings with overdue items. Mr. Testoff reviewed the open action items:

- A. Action Item 0910-NSG-ECC-02. Mr. Bangerter discussed this topic with Mr. Mike Bielucki at the White Sands Complex (WSC). Mr. Bielucki owes Mr. Bangerter a position statement. The results of the study have been presented. It has been agreed that the eccentricity will not be increased at this time. A status is required for this item. This item remains OPEN.
- B. Action Item 112811-CC Dev-01. This item will be addressed when the Space Act Agreement (SAA) is signed. This item remains OPEN.
- C. Action Item 112811-CC Dev-02. Solid Rocket Boosters (SRB) will be used and plume study is underway. This item remains OPEN.
- D. Action Item 0412-NSG VHF Status-03. The list needs to be updated. The list will be updated to include the life of the spares and when the spares reach Non Maintainable Equipment (NME). Mr. Bangerter will then take the list to the ISS Program (ISSP) for funds to replace NME through a phased plan. Mr. Scott Greatorex asked that a jalopy chart be prepared for the Very High Frequency (VHF) equipment. Ms. Melissa Blizzard accepted that task. This item remains OPEN.

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- E. Action Item 0412-NSG ATV3-02. Launch minus 30 days was established as the need date. This item is CLOSED.
- F. Action Item 052412-HTV3-MORR-01. The re-entry interface is known. This item is CLOSED.
- G. Action Item 052412-HTV3-MORR-03. Waiting on a Johnson Space Center (JSC) response. This item remains OPEN.
- H. Action Item 053012-VHF1-ORR-01. There is no real data available for a document and there would be a cost associated with the documents production. This item is CLOSED.
- I. Action Item 053012-VHF1-ORR-03. Data was captured for the 6/25/12 Engineering pass and archived at WSC. This item remains OPEN.
- J. Action Item Cygnus CPTR-06. A test report is being worked. The document will be updated to reflect onboard communications changes. This item is CLOSED.
- K. Action Item SpaceX C-2 PMR-01. This was opened because the periods were not being received in time. The periods are known. This item is CLOSED.
- L. Action Item SpaceX CRS1 MORR-01. Two additional tests were conducted to fill in data for implementation losses. This was to fulfill a Commercial Orbital Transportation Services (COTS) milestone. This item is CLOSED.

HSF ORGANIZATION

Mr. Gary Morse provided an HSF organization overview (refer to the presentation, *SCaN Network Management for Human Spaceflight*). Mr. Morse welcomed the JPL representatives. JPL was used to support the Space Shuttle until the 1990's time frame. Mr. Morse welcomed the Glenn Research Center (GRC) representatives.

- A. Space Communications and Navigation (SCaN) operating networks are the Space Network (SN), the Near Earth Network (NEN), and the Deep Space Network (DSN). Each element also has connectivity to other resources such as the Universal Space Network (USN). There will be crossover network support depending on the type of mission. SCaN architecture will need to support future missions to moon, Mars, and near-earth asteroids.
- B. Mr. Morse reviewed the Human Exploration and Operations Mission Directorate organization chart. The Program to Program (P2P) Working Group (WG) includes two elements (Exploration Systems Development [ESD] and HSF). The fourth major program in this organization is SCaN. SCaN will be making decisions on design.
- C. Mr. Morse reviewed the Network Services organization. He reviewed the HSF Systems Engineering organization. Strategic groups take the long term look while the tactical take the near-term look. The centers work together to develop a systems architecture.
- D. Mr. Morse reviewed the network integration/requirements customer interface. Requests from the Space Launch System (SLS) and Multi Purpose Crew Vehicle (MPCV) are fed through the JSC Space Communications Integration Office (SCIO). The diagram illustrates the organization and the work flow for the future.
- E. Mr. Morse reviewed the inter-center interfaces; NENS/SN and DSN planning diagrams. The key to planning is the SCIO; requirements flow from the SCIO to the Goddard Space Flight Center (GSFC) Network Director (ND) and JPL HSF Mission Interface Manager.

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The Eastern Range (ER) is the lead range. JPL will not be greatly involved in all HSF activities (ISS and commercial activities), but will be made aware (check pointing) where applicable. As part of check pointing, JPL will receive all Interim Support Instructions (ISI). An R&R point of Contact (POC) will be added at JPL so that JPL can participate in the Automated Support Requirements System (ASRS) process. The National Aeronautics and Space Administration (NASA) will continue its current arrangements with the Europeans.

- F. Mr. Morse reviewed the inter-center interface; NENS/SN and DSN operations diagrams. Responsibilities switch from the JSC SCIO to the Flight Control Team (FCT), Ground Controllers (GC), and ND. JPL check point will continue.
- G. Mr. Morse discussed the Lunar Orbit (LO) Design Reference Mission (DRM). Support will have to transition from the SN to the DSN. It needs to be determined what the optimal time is for that Handover (H/O). The same mission support scenario will exist for the Near Earth Asteroid (NEA) initial capability DRM.
- H. Mr. Morse outlined the SCaN documentation process. JSC SCIO feeds requirements into the Program Requirements Documents (PRD). The DSN uses DSN Service Agreements which they will continue to use. GSFC generates Radio Frequency (RF) Interface Control Documents (ICD) and JPL generates Operations Interface Control Documents (OICD). Both GSFC and DSN generate compatibility documentation. GSFC generates the Network Operations Support Plan (NOSP) and JPL generates the Network Operations Plan (NOP). It may be necessary to generate a joint NOSP. Mr. Eric Barcon asked if the role of the Kennedy Space Center (KSC) Ground Systems Development and Operation (GSDO) Program Office has been discussed. Mr. Morse replied that the GSDO has no assets that SCaN owns. There is no GSDO role within the context of the SCaN documentation set. Mr. Aquino asked if it were a part of the P2P WG. Mr. Morse stated that only the KSC Communications Distribution and Switching Center (CD&SC) is a member. He noted that there is a lab that is not part of SCaN and the projects need to let SCaN know how they want to use external elements.
- I. Mr. Morse discussed the readiness review process. GSFC conducts the Mission Operations Readiness Review (MORR) and JPL conducts the Mission Events Readiness Review (MERR) prior to launch. The JPL MERR is event driven. The review flow leads to the JSC Mission Operations Directorate (MOD) Flight Readiness Review (FRR) (both GSFC and JPL will participate) and the KSC Launch Readiness Review (LRR) at which only GSFC is a participant at this time. Both will participate in the Program FRR. He noted that the ISSP has a STAGE review. Additional reviews may be added depending on the mission.
- J. Mr. Morse reviewed HSF open items and leads.
 - 1. Completion of trade studies to determine correct allocation of SLS ascent telemetry requirements to United States Air Force (USAF), NEN, SN, and others is being worked through Mr. John Hudiburg. Mr. Morse commented that a hybrid approach to ascent is probably the safest approach.
 - 2. Launch Head funding (includes Kennedy Tracking Station [KTS], Ponce de Leon [PDL], and Bermuda [BDA]) – Messrs. Morse and Hudiburg as coordinating efforts.

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Mr. Morse stated that this is coming closer to happening. A decision is expected soon. Funds are needed soon or it will not be possible to meet the readiness date of 2016. Decisions by the Flight Techniques Panel will have an impact. Decisions will be fed to SCA to make design decisions. Mr. Morse noted that SLS will be touring the proposed KTS site, TEL-IV, Building X-Y, PDL, and Jonathan Dickinson Missile Tracking Annex (JDMTA).

3. Systems Engineering funding for various trade studies – Messrs. Hudiburg and Erickson. Trade studies remain to be completed.
4. DSN compatibility with SN Data Group (DG)-1 and funding – Mr. Erickson.
5. DSN Low Density Parity Check (LDPC) code funding – Mr. Erickson. This capability is needed for EM-1 and -2.
6. NEN/DSN entry support/radiometric (Southern Hemisphere tracking) funding – Messrs. Hudiburg and Erickson. Will a southern hemisphere tracking station be needed and the answer is probably yes. Will a station be built or will other assets be used?
7. Network handover strategy – Mr. Morse. When and how do we do the H/O? How will the H/O be documented?

K. Other Items

1. Spectrum Use. The National Telecommunications and Information Administration (NTIA) is putting pressure on the Air Force and NASA to get out of the S-band spectrum.
2. NASA Telecommunications Policy. This is a mandatory NASA Policy Directive (NPD). Mr. Barcon asked how the NPD applies to CCDev. Mr. Morse stated that CCDev is not bound by the NPD. NASA Directorates are bound by the NPD. When dealing with ISS, there is an umbrella SAA which requires coordination. Commercial projects are on their own; NASA advises them.

HSF DOCUMENTATION STATUS

Mr. Earl Daniel provided an HSF documentation status (refer to the presentation, *GSFC Human Space Flight Documentation Status/Plan*). The presentation provides a snapshot of current documentation status and schedules. The schedule is very dynamic.

- A. No documents have been published since the last NSG.
- B. There is one document in general review (*Network Operations Directive for Human Space Flight Network Support*, 450-NOD/HS) and will go into the Configuration Control Board (CCB) review process after the NSG. Mr. Morse stated that this document identifies assets and JPL should be added. It may be necessary to make it a joint document. Mr. Daniel responded that Mr. Bob Marriott is the architect of the document and information is being added. Mr. Joe Aquino stated that Revision 4 does contain JPL as a network element. Mr. Marriott stated that the document describes operational interfaces and not requirements. He stated that he has no issue adding JPL as a signatory. Mr. Bangerter stated that changes should be made to the document, but this is the early stages of the new interface and the document can be revised to add details. Mr. Leslie Deutsch stated that if there is a statement of action by JPL, then JPL needs to sign the

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document. Mr. Bangerter stated that JPL is mentioned, but not taking any action and the next version of the document can be signed by JPL. Mr. Jim Erickson stated that JPL will review the document and decide if they need to sign this version. Mr. Morse stated that he would like his signature as well as that of Mr. Scott Greatorex and Mr. Greatorex's equivalent at JPL.

- C. Mr. Daniel reported that the *Abbreviations and Acronyms*, 450-LIST-Abbrev/Acrnym, Revision 1; *SpaceX Dragon Annex*, 450-TNOSP-ISS, Dragon Annex, Revision 2; *Automated Transfer Vehicle Annex*, 450-TNOSP-ISS, ATV Annex, Revision 1; *Very High Frequency Voice Communications Support Annex to the ISS TNSOP*, 450-TNOSP-ISS, VHF Annex, Revision 1; and the *ISS TNOSP, H-II Transfer Vehicle Annex*, 450-TNOSP-ISS, ATV Annex, Revision 1 are in General Review. There are four TDRSS Network Operations Support Plan (TNOSP) stand alone annexes. These documents are patterned after the 450 NOSP template. Five new procedures will be incorporated into the annexes.
- D. Mr. Daniel reported that the *ISS TNOSP, Cygnus Annex*, 450-TNOSP-ISS, Cygnus Annex, Original and *Configuration Management Freeze Policy for the Integrated Networks and Supporting Elements*, 450-CMFP-HSF/ELV, Revisions 1 are in Local (Team) review. The CMFP is being completely rewritten. JPL is not included in this rewrite. Mr. Deutsch stated that JPL will need to be included at some point.
- E. Mr. Daniel reviewed a series of documents that are on hold or have not been started.
- F. Mr. Daniel reviewed a series of documents scheduled to be updated during the next Fiscal Year. He stated that this list can be used a planning tool by the elements for scheduling resources to review the network documentation.

NSG SPLINTER SESSION SUMMARIES

Each splinter Chairperson or designee was asked to provide a brief summary of the splinter session activities.

- A. Mission Control Center (MCC)-21. Mr. Bangerter provided a splinter meeting summary (no presentation was provided). The meeting was conducted to provide an update and overview of MCC-21 activity. No action items were assigned.
- B. Obsolescence Driven Avionics Redesign (ODAR) Status. Mr. Bangerter provided a splinter meeting summary (no presentation was provided). The meeting was conducted to review test procedures for the new equipment. No action items were assigned.
- C. CCDev. Mr. Bangerter provided a splinter meeting summary (no presentation was provided). The meeting was conducted to provide an update and overview of the CCDev program, activity, and schedules. No action items were assigned.
- D. Denied Scheduling Order (SHO). Mr. Rick Kraesig provided a splinter meeting summary (refer to the presentation, *Denied SHO Elevation Procedure NSG Splinter Meeting Summary*). The purpose of the meeting was to review and redline the procedure used by the Houston GC to escalate the request for a TDRSS event when the time is not available per the TDRS Unused Time (TUT) and the WSC Scheduler is unable to negotiate the time from another user. Two action items were assigned.

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- E. ISS-Soyuz VHF Status. Mr. Rick Kraesig provided a splinter meeting summary (refer to the presentation, *International Space Station [ISS]/Soyuz Very High Frequency [VHF] Status NSG Splinter Meeting Summary*). The purpose of the meeting was to provide the current status of the NASA VHF network. Mr. Kraesig stated that there have been no significant changes to the VHF systems since the previous mission. No action items were assigned.
- F. Soyuz-32/33 Mission Planning. Mr. Rick Kraesig provided a splinter meeting summary (refer to the presentation, *Soyuz-32/33 Mission Planning NSG Splinter Meeting Summary*). The purpose of the meeting was to review Integrated Network (IN) status for Soyuz crew missions to and from the ISS. There are no significant changes to mission planning. As part of this summary Mr. Kraesig presented a VHF-1 passes table as requested by Mr. Greatorex. No action items were assigned.
- G. H-II Transfer Vehicle (HTV)-3 Status and HTV-4 Mission Planning. Mr. Rick Kraesig provided a splinter meeting summary (refer to the presentation, *H-II Transfer Vehicle-3 [HTV] Mission Status HTV-4 Mission Planning NSG Splinter Meeting Summary*). The purpose of the meeting was to provide a status of the mission, discuss the release/reentry activities, and discuss the lessons learned from the mission. One action item was assigned.
- H. Automated Transfer Vehicle (ATV)-3 Status and ATV-4 Mission Planning. Mr. Rick Kraesig provided a splinter meeting summary (refer to the presentation, *Automated Transfer Vehicle-3 [ATV-3] Mission Status and ATV-4 Mission Planning NSG Splinter Meeting Summary*). The purpose of the ATV-3 meeting was to discuss IN support during the ATV-3 mission and ATV-3 undocking/re-entry plan. Mr. Kraesig stated that the current undocking schedule date is September 25 with re-entry on September 27. No action items were assigned during the ATV-3 portion of the splinter meeting. The purpose of the ATV-4 portion of the meeting was to discuss IN support during the ATV-4 mission. Four action items were assigned during the ATV-4 portion of the meeting. As part of the splinter meeting summary discussion, Mr. Joe Whitney accepted an action item to work with the VV program to coordinate conducting non-coherent passes after launch and prior to docking to look at Local Oscillator Frequency (LOF) state (action item 0912-NSG Main Forum-01).
- I. Flight Dynamics Facility (FDF) VV Requirements. Ms. Crystal Ramirez provided a splinter meeting summary (no presentation was provided). Ms. Ramirez stated that the FDF has requested that the PRD be updated. FDF has provided input to update the delivery dates of products and the length of the FDF network freeze period. As part of the submission, the FDF provided justifications for the changes. The freeze period will be adjusted again when the vehicles are crewed.
- J. HSF Comm WG. Mr. Michael Thomas provided a splinter meeting summary (refer to the presentation, *Human Space Flight COMM Working Group HSF Summary*). The outages and notices were the same as reported during the splinter meeting. There were no changes to the Mission Operations Voice Enhancement (MOVE) status. Mr. Thomas provided updates for the NASA Integrated Services Network (NISN) Service Requests (NSR). NSR 37135 - the vendor sent the wrong cards and that is why the lights did not

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come on. This is being worked. NSRs 37178 and 37329 are now in service. NSR 37341 – is being worked with JSC FDOC to provide all the necessary information needed to complete the task. NSR 37199 – The EIP will not be revised; JSC is responsible for providing an SR to remove and return the router and switches that were used to support the ISS Downlink Enhancement Architecture (IDEA) network. NSR 37495 has been cancelled. NSR 37564 is on hold.

- K. DSN Status. Mr. Jim Erickson provided a splinter meeting summary (no presentation was provided). The purpose of the meeting was to provide an overview of the DSN including key locations and capabilities. The DSN has one 70-meter at each complex. Mr. Erickson discussed the coverage that the DSN can provide for EM-1 and -2. He noted that Exploration Flight Test (EFT)-1 may need additional assets such as Hartebeesthoek. A Southern Hemisphere station may be required for support.
- L. EFT-1 Overview. Mr. Mike Marsh provided a splinter meeting summary (refer to the presentation, *EFT-1 & EFT-1 Network Status NSG Splinter Meeting Summary*).
1. The purpose of the meeting was to present the current status of EFT-1 testing and mission. Discussion highlights included: MCC21 Impacts on the EFT-1 schedule; telemetry dropouts during BBQ roll antenna switches and subsequent reacquisition; duration of the Zone of Exclusion (ZOE) variable depending on latitude location of TDRS satellites; dual (overlapping) SHO requirement; and documentation of C-band tracking data, Launch Trajectory Acquisition System (LTAS) data, and state vectors to/from GSFC/FDF.
 2. Mr. Marsh stated that MCC-21 will have significant impact on the EFT-1 schedule. Mr. Marriott stated that an architectural plan was laid out based on 2013. The MCC-21 transition blackout period covers the currently scheduled EFT-1 mission. The plan does not account for significant change in the MCC or IN. Trade-offs will be necessary. Mr. Morse stated that he is concerned with the implementation of User Service Subsystem-Component Replacement (USS-CR); LDPC has to be implemented for EFT. Mr. Bangerter stated that USS-CR is the permanent plan for implementing LDPC in two Space-to-Ground Link Terminals (SGLT) at White Sands Ground Terminal (WSGT) only; there is an interim plan for EFT-1 that uses roll-around racks. It is hoped that USS-CR will be complete prior to EFT-1.
 3. There are also lesser impacts such as the move from the White FCR and computer platform changes.
 4. During the next voice loop test, KSC/CD&SC will be making adjustments in their MOVE switch trying to help isolate and correct voice loop dropouts experienced during the testing to date.
 5. It was learned that the position of the TDRSs can impact the ZOE times.
 6. No formal action items were assigned. Remaining open questions/issues are considered standard work; will be worked and tracked in the appropriate forums.
- M. Orion and EM-1 and -2 Overview. Mr. Bob Marriot provided a splinter meeting summary (refer to the presentation, *Exploration Mission #1 & #2 [EM1 & EM2] Splinter Group Summary*). JPL and its Mission Interface Manager (MIM) will be added as a network element. The NEN will support ascent. The SN will support LEO and return.

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The DSN will provide support around the moon. Mr. Marriott provided an overview of the DRMs, SLS, Orion spacecraft and major communications links.

- N. WSC Work Schedule. Mr. Bob Hudgins provided a splinter meeting summary (no presentation was provided). The purpose of the meeting was to review the WSC 6-month work/resources schedule.

KSC AND JSC MOVE STATUS

- A. Ms. Segura provided a KSC MOVE status (refer to the presentation, *KSC OIS-M System Overview*). Ms. Segura reviewed the Frequentis USA (FUSA) architecture and KSC switch architecture. MOVE is called Operational Intercommunication System (OIS)-M at KSC. There are 900 conferences common to the industrial area and LC 39 switches. There are four types of keysets. The Type B keyset is specific to KSC. A Type C windows 7 keyset is being developed now. The Type B has the same footprint as the legacy keyset. KSC has received the hardware. MAVEN is the next project to be supported by the Multi-Operation Support Building (MOSB)/Payload Hazardous Servicing Facility (PHSF). Ms. Segura stated that there is a concern on the part of the KSC MOVE project that two MOVE engineers are being lost; personnel who have supported the MOVE project since the beginning. KSC has one of the largest MOVE switches and the engineer's experience is invaluable should issues arise. Mr. Scott Douglas stated that he understands the concern and will communicate the concern back to his Communications Service Office (CSO) management.
- B. Mr. Ken Jones provided a JSC MOVE status (refer to the presentation, *Mission Operations Voice Enhancement [MOVE] Project Digital Voice Inter-Communications Equipment [DVICE]*). Mr. Jones reviewed the Digital Voice Intercommunication Subsystem (DVIS) to DVICE Transition Steps and Implementation Phases. He reviewed the forward plans for the installation of Release 2.0.2. Mr. Jones provided details on Phase 7 - External Interface Cutover (Includes Internal Elements at JSC. JSC internal cutovers are in progress and scheduled to be complete October 14. The International Partners (IP) were very helpful at the last Ground Segment Control Board (GSCB). Japan Aerospace Exploration Agency (JAXA) has decided to stay on analog due to some keying issues.

WALLOPS GROUND STATION (WGS) STATUS

Mr. Mark Harris presented a WGS status (refer to the presentation, *Wallops 11M/VHF Status*). Mr. Harris reviewed the hardware and software changes made since the April 2012 NSG. Completed work includes the installation of new S-band and X-band receiving equipment, installation of new High Power Amplifier (HPA), and the resurfacing of Building N-162 roof. WGS completed the Dewitt Monitor & Control version 6.5.1 software upgrade to further migrate control of the new equipment and peripherals for NEN upgrade. There was no change in operations personnel; however, one antenna mechanic replacement was made due to retirement. Mr. Harris reviewed the station configuration for Orbital Sciences Corporation (OSC)/Cygnus. He reported that Standard Autonomous File Server (SAFS) accounts have been created and successfully tested by OSC. There are not changes to or issues with the VHF systems. WGS

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conducts Station Readiness Tests (SRT) twice a month. VHF spares are being prepared for transfer. The spares will be tracked in Maximo. Facilities are Green. The staffing level is sufficient to meet all HSF requirements.

WALLOPS RANGE STATUS

Mr. Mark Harris provided a Wallops Range status (refer to the presentation, *Wallops Range Status*). There have been no hardware or software changes since the April 2012 NSG. Mr. Harris reviewed the launch configuration. Mr. Morse asked if the 7-meter antennas have command capability and Mr. Harris replied that he will have to find out. BDA site testing has begun. There was no damage from the recent hurricane. Mr. Douglas asked how BDA was getting communications. Mr. Bangerter stated that the current requirement is received and recorded. Mr. Morse stated that when BDA is used later as part of the launch head, CSO will need to provide communications. Mr. Marriott stated that SLS would like return data in near-real time or real time. It is not a requirement and SLS can fly without it. A full-time dedicated service is not needed and the program does not want to levy a hard requirement that has a high cost; however, if there is an option, it should be explored. Mr. Douglas suggested that the program should open a cost NSR so that CSO can explore the options. There are no open Discrepancy Reports (DR). There is no open work.

CSO MISSION OPERATIONS STATUS

Mr. Scott Douglas provided a CSO mission operations status (refer to the presentation, *Communications Service Office [CSO] Mission Operations Status*).

- A. Mission Outage Notification System (MONS) Training Initiative. Many Customers have complained that Mission Outage Notifications are not useful because they receive too many that have nothing to do with their Sites or Projects. The MONS has always had filter capability similar to the Activity and Outage Posting and Notification System (AOPNS). Operations is standardizing the wording of the MONS messages and has provided training to all Mission Communications Managers (MCM) on using the MONS filters so the MCMs can train customers. CSO is ready to conduct that training and your organization should contract a MCM or Mission Service Manager (MSM). Ms. Melissa Blizzard asked if the training is online. Mr. Douglas replied that CSO will conduct train the trainers sessions and the Network Integration Center (NIC) should work with Mr. Randy Honeycutt. Mr. Andre Wiggins stated that Mr. Honeycutt will set up the training schedule. Mr. Andre Wiggins accepted an action item to work with Mr. Joe Aquino to indentify and work with 3 or 4 JSC personnel to train as trainers for the MONS filter procedures (action item 0912-NSG Main Forum-02).
- B. RAD-2100 Channel Bank Power Supply Replacement Project. RAD is replacing power supplies that have been identified as having defective capacitors within a range of serial numbers made in 2005. To date seven batches of replacement power supplies have been shipped from the vendor for our deployment throughout the network. Every RAD in the Network now has at least one good power supply.

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- C. RAD Ipmux-16 Software Upgrade to V6.05. There are stability issues on the RAD Ipmux used to transmit T-1s across the network. Software on the network has been upgraded.
- D. Digital Matrix Switch (DMS) Replacement Completion. The previous switch was declared as reaching end-of-life by the vendor. Two new DMS UCS 2910 switches were transitioned to an operational status on June 19, 2012. The new switches, one in GSFC, Building 14 room S181 and one in GSFC, Building 32 room N005, provide the same functionality as the prior switch and also provide redundancy, which was not previously available. All transition activities and operational testing have been satisfactorily completed.
- E. MOVE Version 2.0.3. This version of software has been deployed to the network. It was loaded on the GSFC switch 2 and successfully tested. This release fixes some problems from release 2.0.2.
- F. MOVE Keyset Retrofit Status. The WSC, WFF, and JPL locations advise that mission support requirements have contributed to the significant delay in completing their Type-D keyset retrofit. It is costly for FUSA to maintain the required resources to support an overextended retrofit activity. GSFC Code-300 (safety and mission assurance) and Code-400 (flight projects) have been advised. CSO is asking the sites to make every effort to get back on schedule. JPL and Canberra (CAN) are a concern. CAN has been frozen due to critical events. Mr. Erickson stated that he has not heard of this concern and will follow up.
- G. MOVE Project Close Out Concern Status. Mr. Dan Duffy has been named the CSO Service Element Manager for Mission Voice, providing continuity on the civil service side. CSO management understands the need for continuity in engineering support and has communicated this concern to the contractors.
- H. KACE on the Mission Network. KACE is a NASA Agency mandated end-user computer software patch management and configuration reporting tool. There are security vulnerabilities and potential risks to hosts. KACE is not being deployed on the Mission Network at this time. Renewal of the Patchlink licenses for Mission Networks has been completed for one year to provide the vendor (and Agency) time to address the vulnerabilities and risks. A waiver request is going to be submitted for the Mission Network's Approving Official to accept the continual use of PatchLink.
- I. Mission Secure Gateway Request System (MSGRS) Status. MSGRS is a new secure gateway request tool. This tool simplifies the process; you will not have to know all the network details to make a request.
- J. IONet Security Services. Windows Server Update Service (WSUS) allows customers to download Windows software updates from a local server. Customers can download and install antivirus clients for Windows, MAC and Red hat.
- K. Nortel Router Replacement Project (NRRP) Status. The NRRP approach to transition contingency planning is based on a parallel infrastructure implementation providing constant fallback capability to mitigate contingencies during Transition. The fallback capability is inherent in each step at the subnet level. The parallel network will be

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decommissioned after Operational Readiness Review (ORR). Mr. Marriott stated that a good work window for JSC nodes is November 17 – 30.

- L. Small Conversion Device (SCD) High Availability (HA) Software. High Density SCDs have been delivered to JSC and are being tested as Multiplexer/Demultiplexer (MDM) replacements. There is a software release to be ready in February. Mr. Douglas stated that he will have a telecon with Mr. Jay Lipford and others following the week of the NSG.
- M. SCD Release 7.1. This release will provide Consultative Committee for Space Data Systems (CCSDS) capability helping legacy 4800-Bit Block customers convert to CCSDS. The system is currently in the System Test Phase.

DRYDEN FLIGHT RESEARCH CENTER (DFRC) STATUS

Mr. Russell James presented the DFRC status (refer to the presentation, *Dryden Flight Research Center Western Aeronautical Test Range [WATR]*).

- A. Mr. James provided views of the VHF-1 and VHF-2 systems. All Yagi systems can be remotely controlled. The contingency display backgrounds have changed.
- B. DFRC has found a plug-in replacement for the Rockwell Collins CRC 171 and 211 transceivers. The transceivers will be replaced in phases. Two have been ordered and there are 30 – 40 to replace.
- C. The DICES II voice communications equipment can no longer be supported. DFRC will be adding additional Voice over IP (VoIP) end stations to work with the existing node. The new end stations will be identical to the existing 24 key DICES III end stations.
- D. The COMM3 6-meter directional antenna was taken down for maintenance. The motors are good. Its return to service is To Be Determined (TBD) dependent on additional funds. COMM1 and 2 are available for support.
- E. Mr. James provided an overview of the DFRC telemetry upgrades. One 7-meter antenna is being upgraded for new C-band capabilities to test the new capabilities.
- F. Mr. James provided an overview of the Mobile telemetry systems.
 - 1. DFRC upgraded one 30-foot Mobile Operations Facility (MOF) to increase system availability by making it easier to transport and faster to set up. This system (MOF1) has similar support characteristics as the fixed TM systems at DFRC. It has an S-band uplink.
 - 2. DFRC upgraded MOF2 to support unique customer support requirements. DFRC acquired MOF3, waiting for a customer to request capabilities (same pedestal as MOF2, not trailer mounted). It has an L-band uplink and C-band downlink.
 - 3. DFRC upgraded MOF5 (53-foot trailer used for CEV PA-1 activities at the White Sands Missile Range [WSMR]) to support Dream Chaser as Mobile MCC for Sierra Nevada Corporation. In conjunction with MOF1, these systems will be used to support tow testing of the Dream Chaser Engineering Test Article (ETA) at DFRC in November 2012.
 - 4. Mr. Robert Jones stated that MOF4 was used for the Sophia proof-of-concept. MOF4 can be deployed for long periods of time. Mr. James stated that MOF4 can be broken

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down into suit case size containers. It currently has a 4-foot dish. An 8-foot dish is available.

5. Mr. Morse asked if there is currently a long-term commitment for these resources in Fiscal Year (FY)15. Mr. James responded that Dream Chaser support ends in the January – Spring time frame. MOF4 will be released from service at that time.
- G. Mr. James provided an overview of DFRC space operations support.

SN STATUS

Mr. David Glasscock presented an SN status (refer to the presentations, *SN Status*).

- A. Mr. Glasscock provided a fleet overview. TD6 is at 62.4 degrees (stored). It will be used to support SNE East testing. It can be used to replace F3 if necessary. TD11 is currently scheduled to launch December 13, 2012.
- B. Mr. Glasscock reviewed the TDRSS constellation configuration. This provides a view of the Space-to-Ground Link (SGL) dual supports.
- C. Mr. Glasscock provided a fleet status. The SN has received NASA concurrence to relax the TDRS eccentricity requirements. The SN is awaiting suspension release from JSC. The TDRS-3 (TDS) SGL dedicated downlink Traveling Wave Tube Amplifier (TWTA) is failing. K-band Single Access (KSA)-1 Return services will no longer be available after 9 April 2012. Service will be reactivated to support USS-CR testing through TWTA failure. SA1 Antenna will be dedicated to USS-CR testing November 1012 – February 2013.
- D. Mr. Glasscock reviewed the WSC hardware activity. All Shuttle Unique Equipment (SUE) has been removed from GRGT. All SUE at WSGT and Second TDRSS Ground Terminal (STGT) will be removed prior to December 31, 2012. Manual masking of alerts will be required until a software delivery in approximately May 2013. USS-CR work is scheduled to begin in December and be completed by next year. All WSC facilities were upgraded to GPS timing standard in August 2012. The ATTCS work is scheduled to begin in December and be completed by July. The Guam Data Interface System-replacement (GDIS-R) IPE patch did not fix the problem. The TSI will be kept in place. The Multiple Access (MA) IRS is scheduled to be installed in SGLT-1 in September. SGLT-2 will remain in the legacy configuration for the duration of TDRS-K launch and on-orbit acceptance. New controller software has been installed on the HRDS at WSGT and Guam Remote Ground Terminal (GRGT); installation at STGT is scheduled for late 2012.
- E. Mr. Glasscock reviewed the WSC software activity. Several software deliveries were made. The Demand Access System (DAS) software was delivered in May 2012; retracted, and DASFB001 delivered August 2012.
- F. Mr. Glasscock reviewed TDRS-K support. SN TDRS-K TDRS Operations Control Center (TOCC) facility is currently in use for mission dry-runs and is ready for mission rehearsals. The TOCC supported the site acceptance test of the Boeing BuMCC facility. The Space Communications Network Services (SCNS) contract completed propagating TDRS-K training to the WSC; WSC flight operations team ready to support mission rehearsals.

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- G. Mr. Glasscock provided a VHF status. Remaining work includes installing remote switching and remote keying, updating Local Operating Procedures (LOP), installing the cameras, minor reconfiguring and cleaning-up of the VHF-2 equipment racks, providing masking and RF antenna pattern surveys, and reconfiguring the 500-watt HPAs to 350 watts.

NETWORK AND COMMUNICATIONS ANALYSIS AND INTEGRATION TEAM (NACAIT)

Mr. Mike Fanders gave a NACAIT status (refer to the presentation, *NACAIT Status*). There are no issues with the Canadian Space Agency (CSA) support. There are no new issues with JAXA support. The European Space Agency (ESA) is providing full Columbus Lab operations. ATV-3 is on orbit. ATV-4 will launch NET March 2013. The Agenzia Spaziale Italiana (ASI) is providing ongoing operations to the Permanent Multipurpose Module (PMM). The gateway is prime for Swift. Gateway is prime for NuSTAR. The Russian Space Agency (RSA) voice switch replacement is complete. Digital voice transition is complete. The SpaceX Dragon Network PRD (NPRD) has been retired. Voice loops have been increased from 20 to 24 circuits. The MPCV Mission Support Requirements Document (MSRD) Rev A has been signed off. All funded requirements are in the PRD. The Lockheed Martin (LM) MSRD is used by LM to work with GDSO. Two requirements documents are in use. It is possible there will be two MSRDs created for SLS to meet its System Design Review (SDR). The Interface Requirements Document (IRD) and ICD will be combined.

SN ACCESS SYSTEM (SNAS) SOFTWARE RELEASE STATUS

Ms. Darla German provided a SNAS update (refer to the presentation, *SNAS Release 5 Status*). SNAS Release 5 consists of both a new server and a new client and several bug and DR fixes. A complete list of the fixes is contained in the Release Letter. SNAS Release 5 Performance Test is scheduled for September 17. SNAS Release 5 is installed on the EIF system at WSC where the Acceptance Testing is held. The ORR is scheduled for November. Mr. Marriott asked if there are any constraints driving the November test. Ms. German stated that testing is scheduled for 4 weeks. There are no DRs in this release that have to be completed by a certain date. Mr. Brain Batson stated that the release package is ready. He asked when the release will be installed on WSC systems. Ms. German stated that the installation depends on the WSC schedule. Users will be informed. Four weeks of testing will be conducted, even if the date slips. Cutover will occur when the ORR is complete. Mr. Marriott stated that mid to late November is a good time period. He asked if JSC can work with the GSFC test bed. Mr. Batson replied that he had some difficulty logging on. Mr. Marriott stated that the access issue needs to be worked. He stated that there is concern regarding the TDRS client. Ms. German stated that if there are IP changes, the system needs to be updated.

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EXPEDITION 33/34 OVERVIEW

Mr. Brian Jones provided an Expedition 33-34 briefing (refer to the presentation, *Expedition 33/34*). Expedition 33 begins with the Soyuz TMA-04M undocking on September 16, 2012. Three new crew members (Ford, Novitsky, and Tarelkin) will arrive shortly thereafter on Soyuz TMA-06M. Expedition 33/34 is through March 2013. ODAR installation and testing continues. Mr. Jones reviewed the VV manifest from October 12 through February 13.

NSG ACTION ITEM WRAP UP

Two action items were assigned at the September 13, 2012, Main Forum of the NSG.

AI No.	Assignee	Action	Status
0912-NSG Main Forum-01	Joe Whitney/ JSC/GC	Work with the VV program to coordinate conducting non-coherent passes after launch and prior to docking to look at LOF.	Open
0912-NSG Main Forum-02	Andre Wiggins/ GSFC/CSO	Work with Mr. Joe Aquino to indentify and work with 3 or 4 JSC personnel to train as trainers for the MONS filter procedures.	Open

CLOSING REMARKS

Mr. Bangerter thanked the attendees for their participation at the September 2012 NSG. Mr. Bangerter thanked Mr. Earl Baum for his support in coordinating logistics for the meeting.

Network Support Group Acronyms and Abbreviations

AI	Action Item
ASI	Agenzia Spaziale Italiana
ASRS	Automated Support Requirements System
ATV	Automated Transfer Vehicle
BDA	Bermuda
CAN	Canberra
CCB	Configuration Control Board
CCSDS	Consultative Committee for Space Data Systems
CD&SC	Communications Distribution and Switching Center
CMFP	Configuration Management Freeze Policy
COTS	Commercial Orbital Transportation System
CSA	Canadian Space Agency
CSO	Communications Service Office
DAS	Demand Access System
DFRC	Dryden Flight Research Center
DG	Data Group
DICES	Digital Integrated Communications Electronic System
DMS	Digital Matrix Switch
DR	Discrepancy Report
DRM	Design Reference Mission
DSN	Deep Space Network
DVICE	Digital Voice Inter-communications Equipment
DVIS	Digital Voice Intercommunication Voice Subsystem
EFT	Exploration Flight Test
EM	Exploration Mission
ER	Eastern Range
ESA	European Space Agency
ESD	Exploration Systems Development
ETA	Engineering Test Article
FCT	Flight Control Team
FDF	Flight Dynamics Facility
FRR	Flight Readiness Review
FY	Fiscal Year
FUSA	Frequentis USA

Network Support Group Acronyms and Abbreviations

GC	Ground Controller
GDIS-R	Guam Data Interface System-Replacement
GRC	Glenn Research Center
GRGT	Guam Remote Ground Terminal
GSCB	Ground Segment Control Board
GSDO	Ground System Development Office
GSFC	Goddard Space Flight Center
HA	High Availability
H/O	Handover
HPA	High Power Amplifier
HSF	Human Spaceflight
HTV	H-II Transfer Vehicle
ICD	Interface Control Document
IDEA	ISS downlink Enhancement Architecture
IN	Integrated Network
IP	International Partners
IRD	Interface Requirements Document
ISI	Interim Support Instruction
ISS	International Space Station
ISSP	ISS Program
JAXA	Japan Aerospace Exploration Agency
JDMTA	Jonathan Dickinson Missile Tracking Annex
JPL	Jet Propulsion Laboratory
JSC	Johnson Space Center
KSA	K-band Single Access
KSC	Kennedy Space Center
KTS	Kennedy Tracking Station
LDPC	Low Density Parity Check
LM	Lockheed Martin
LO	Lunar Orbit
LOF	Local Oscillator Frequency
LOP	Local Operating Procedure
LRR	Launch Readiness Review
LTAS	Launch Trajectory Acquisition System
MCC	Mission Control Center
MCM	Mission Communications Manager
MERR	Mission Events Readiness Review

Network Support Group Acronyms and Abbreviations

MIM	Mission Interface Manager
MOD	Mission Operations Directorate
MOF	Mobile Operations Facility
MONS	Mission Outage Notifications
MORR	Mission Operations Readiness Review
MOSB	Multi-Operation Support Building
MOVE	Mission Operations Voice Enhancement
MPCV	Multi Purpose Crew Vehicle
MSGRS	Mission Secure Gateway Request System
MSM	Mission Service Manager
MSRD	Mission Support Requirements Document
NACAIT	Network and Communications Analysis and Integration Team
NASA	National Aeronautics and Space Administration
ND	Network Director
NEA	Near Earth Asteroid
NEN	Near Earth Network
NIC	Network Integration Center
NISN	NASA Integrated Services Network
NME	Non Maintainable Equipment
NOP	Network Operations Plan
NOSP	Network Operations Support Plan
NPD	NASA Policy Directive
NPRD	Network PRD
NRRP	Nortel Router Replacement Project
NSG	Network Support Group
NSR	NISN Service Request
NTIA	National Telecommunications and Information Administration
ODAR	Obsolescence-Driven Avionics Redesign
OICD	Operations Interface Control Document
OIS	Operational Intercommunication System
ORR	Operational Readiness Review
OSC	Orbital Sciences Corporation
PDL	Ponce de Leon
PHSF	Payload Hazardous Servicing Facility
PMM	Permanent Multipurpose Module
POC	Point-of-contact
P2P	Program to Program
PRD	Program Requirements Document

Network Support Group Acronyms and Abbreviations

RAIL	Rolling Action Item List
RF	Radio Frequency
RSA	Russian Space Agency
SAA	Space Act Agreement
SAFS	Standard Autonomous File Server
SCaN	Space Communications and Navigation
SCD	Small Conversion Device
SCIO	Space Communications Integration Office
SCNS	Space Communications Network Services
SDR	System Design Review
SGL	Space-to-Ground Link
SGLT	Space-to-Ground Link Terminal
SHO	Scheduling Order
SLS	Space Launch System
SN	Space Network
SNAS	SN Access System
SRB	Solid Rocket Boosters
SRT	Station Readiness Test
STGT	Second TDRSS Ground Terminal
SUE	Shuttle Unique Equipment
TBD	To Be Determined
TDRS	Tracking and Data Relay Satellite
TDRSS	Tracking and Data Relay Satellite System
TNOSP	TDRSS NOSP
TOCC	TDRS Operations Control Center
TUT	TDRS Unused Time
TWTA	Traveling Wave Tube Amplifier
USAF	United States Air Force
USN	Universal Space Network
USS CR	User Service Subsystem Component Replacement
VHF	Very High Frequency
VoIP	Voice over IP
VV	Visiting Vehicle
WATR	Western Aeronautical Test Range
WG	Working Group
WGS	Wallops Ground Station
WSC	White Sands Complex

Network Support Group Acronyms and Abbreviations

WSGT
WSMR
WSUS

White Sands Ground Terminal
White Sands Missile Range
Windows Server Update Services

ZOE

Zone of Exclusion