

DATE: April 16, 2012

SUBJECT: CCDev Minutes

LOCATION: JSC, Regents Park III

ATTENDANCE:

Last Name	First Name	Email Address	Affiliation	Telephone Number
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
Bankert	Jeff	jeff.bankert@nasa.gov	GSFC/CSO	301-395-4613
Banks	Turonald	turonald.banks.contractor@exelisinc.com	GSFC/HSF	301-823-2563
Baum	Earl	earl.j.baum@nasa.gov	JSC/NOIT	281-483-2321
Bethke	Pete	pbethke@mail.wsc.nasa.gov	WSC/SN/TDRS	575-527-7057
Blizzard	Melissa	Melissa.Blizzard@exelisinc.com	GSFC/HSF	301-823-2622
Booker	Harrison	Harrison.Booker@exelisinc.com	GSFC/HSF	301-823-2627
Calhoun	Melvin	Melvin.Calhoun@exelisinc.com	GSFC/HSF	301-823-2644
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
Daniel	Earl	earl.daniel.contractor@exelisinc.com	GSFC/HSF/Docs	443-883-6194
Douglas	Scott	Scott.C.Douglas@nasa.gov	GSFC/NASA/CSO	301-286-9550
Fahey	Donald	Donald.L.Fahey@nasa.gov	KSC/Comm Control	321-867-2500
Fanders	Mike	michael.t.fanders@nasa.gov	JSC/NACAIT	281-483-6069
Fesler	Jeff	jfesler@hq.nasa.gov	HQ/Space Ops Ctr Mgr	202-358-1603
Foster	William	william.m.foster-1@nasa.gov	JSC/GC Office	281-483-0640
Frasier	Robert	Robert.B.Frazier@nasa.gov	JSC/NACAIT	281-443-4444
Gaylor	Kent	kent.l.gaylor@nasa.gov	JSC	281-244-6418

<b>Last Name</b>	<b>First Name</b>	<b>Email Address</b>	<b>Affiliation</b>	<b>Telephone Number</b>
Glasscock	David	David.O.Glasscock@nasa.gov	WSC	575-527-7035
Gowda	Shashi	Shashi.gowda-1@nasa.gov	JSC/MOD	713-540-7130
Hervey	Jewel	jewel.r.hervey@nasa.gov	JSC/NASA/SCaN	281-483-0359
Hester	Daryl	daryl.t9.hester@lmco.com	JSC/FDOC	281-853-2128
Hoge	Susan	Susan.L.Hoge@nasa.gov	GSFC/NASA	301-286-3661
Kobin	Heather	Heather.Kobin@nasa.gov	GSFC/NASA/MSM	240-459-0141
Kraesig	Richard	Richard.Kraesig@exelisinc.com	GSFC/HSF	301-823-2569
Marriott	Robert	Robert.R.Marriott@nasa.gov	JSC/NOIT	281-483-6879
Marsh	Mike	Michael.K.Marsh@nasa.gov	JSC/NOIT	281-483-4761
May	Jennifer	jennifer.may.contractor@exelisinc.com	GSFC/HSF	301-823-2629
Nesbitt	Avis	avis.nesbitt-1@nasa.gov	GSFC/CSO	301-286-9587
Nichols	Mike	michael.r.nichols@nasa.gov	WSC	-----
Pearson	Don	don.j.pearson@nasa.gov	JSC/NASA	281-483-8052
Pifer	Fred	fred.pifer.contractor@exelisinc.com	GSFC/HSF	301-823-2646
Powers	Pepper	pepper.p.powers@nasa.gov	GSFC/SCNS	301-286-7540
Ramirez	Crystal	Crystal.E.Ramirez@nasa.gov	GSFC/FDF	301-286-2197
Richards	Erik	Erik.Richards@nasa.gov	WSC	575-527-7120
Russell	Thomas	Thomas.Russell@exelisinc.com	GSFC/HSF	301-823-2626
Schlichter	Dale	Dale.Schlichter@exelisinc.com	GSFC/NEN	301-823-2606
Severance	Mark	mark.t.severance@nasa.gov	JSC/NASA/ESTL	281-483-0384
Sham	Cathy	catherine.c.sham@nasa.gov	JSC/NASA	281-483-012
Testoff	Steven	Steven.B.Testoff@nasa.gov	GSFC/ASRC/HSF	301-286-6538
Thomas	Michael	Michael.L.Thomas@nasa.gov	JSC/CSO	281-483-7544
Thornton	Roderick	roderick.m.thornton@nasa.gov	KSC/Comm	321-867-2241
Wiggins	Andre	Andre.L.wiggins@nasa.gov	GSFC/CSO	301-902-6005

## INTRODUCTION

Mr. Don Pearson convened the April 16, 2012, Network Support Group (NSG) Commercial Crew Program (CCP) Splinter meeting to provide an overview of the CCP (refer to the presentation, *Commercial Crew Program Overview [Tailored Somewhat for C&T]*).

## MEETING

- A. The CCP is leading NASA's efforts to develop the next U.S. capability for crew transportation and rescue services to and from the International Space Station (ISS). Mr. Person presented the CCP logo.
- B. Mr. Person reviewed the CCP approach. The 2010 NASA Authorization Act established the commercial crew as the primary method for ISS crew transportation. The program will facilitate the development of U.S. commercial crew space transportation capabilities that will provide safe, reliable, and cost effective access to and from Low Earth Orbit (LEO) and the ISS.
- C. Mr. Pearson reviewed the program timeline. The Critical Design Review (CDR) is scheduled to occur in the next few years. Demo flights are scheduled for mid decade.
- D. CCDev phase 1 provides risk mitigation activity. Phase 2 matures the design elements. There are four companies (Boeing, SpaceX, Sierra Nevada, and Blue Origin) funded through Space Act Agreements (SAA). There are a couple of unfunded providers as well (e.g., ATK and ULA). Three of the four will make it to the internal Preliminary Design Review (PDR) and one of the four will make it to internal System Requirements Review (SRR) state. The focus to date has been on the capsule or booster. NASA wants an integrated capability. The next step is to put all the elements together (e.g., capsule, booster, launch facilities, etc.). In the 2014 timeframe another mechanism will be used vice the SAA.
- E. SpaceX Dragon will make its second launch on April 30. The vehicle is not crewed. The design for the human version will seat seven astronauts. The details are being worked and SpaceX is not at the PDR level yet. Boeing is working on a capsule that also seats seven. Mr. Pearson noted that the requirement is four. Blue Origin is working on its architecture. Sierra Nevada is working on the Dream Chaser, a mini Space Shuttle design that will also seat seven. This vehicle will back into the ISS. All vehicles will stay docked to ISS for up to 210 days. All are looking at various boosters to determine how these boosters need to be modified for Human Spaceflight (HSF). The focus is on the Atlas-5; although the Dragon will use the SpaceX Falcon 9.
- F. The SAA's provide funds to the provider to do technical development. The provider also does development on their own. There are no requirements. Many of the SAA participants are also focused on the launch abort system, which was not a concern for the cargo vehicles.
- G. Mr. Pearson presented a CCP Commercial Providers and Suppliers map. The map illustrated the NASA centers, commercial providers, suppliers and their locations around the country.
- H. Mr. Pearson presented a view of the program structure. He stated that it is a lean organization with approximately 50 - 60 civil servants. The program is managed out of the Kennedy Space Center (KSC). The Deputy Program Manager is at the Johnson Space Center (JSC). The program falls under the Exploration Systems Mission Directorate. The program interfaces with the ISS Program (ISSP), Launch Services

Program (LSP), and Federal Aviation Administration (FAA). There are four different Systems offices. The Partner Integration office oversees the partners such as SpaceX. Some Partner Integration personnel reside at the locations and act as key Points-of-Contact (POC). They have insight into partners organization and work to identify risks to cost, schedule, and program. The Systems Offices work issues and own the requirements. Mr. Pearson reviewed the organization roles and responsibilities as well. Personnel reside at KSC (the bulk), JSC, and the Marshall Space Flight Center (MSFC). Communications fits into several of the areas such as the spacecraft mission planning.

- I. Mr. Pearson provided an overview of the requirements and process implementation approach:
  1. Document 1110. Defines the reference missions. The mission to the ISS is one reference mission.
  2. Document 1130. Requirements at a high level.
  3. Document 1140. Standards and design evaluation criteria.
  4. Document 1120. Management and risk process.
  5. Document 50808. Interface requirements document (crewed or uncrewed). Includes approach corridors.
  6. Document 1150. Operations standard. What are your plans? Do you have Flight Rules? Do you have training?
- J. Mr. Pearson discussed communications and tracking. NASA is hands off and will look at the requirements at a high level; did the commercial provider verify and validate the requirements. NASA will facilitate, but not encourage the design. The commercial providers may subcontract with NASA for unique services. If they want Tracking and Data Relay Satellite System (TDRSS) support, they will have to go to the network. It is believed, that in general, they will want TDRSS support. The commercial providers will have the Commercial Crew vehicle, and NASA will have the Mission Control Center (MCC). NASA has the goal of being FAA licensed. Federal regulations would be in place to protect public safety, but there are no rules to protect the people inside the vehicles. The frequencies to be used are under review.
- K. Mr. Joe Aquino commented that the policy to seek network support is to go through GSFC. These missions will be treated as reimbursable missions. JSC also has MOD “incorporated” looking for business. JSC will also provide communications requirements to GSFC. The desire is to have the requirements flow work as it does today recognizing that there will be some differences. Commercial projects will have to pay for TDRSS services. It is very likely that there will be a hybrid process.
- L. Mr. Aquino asked how deep should we be looking into the requirements? Mr. Pearson stated that the iCAP is in July. The goal is to make multiple awards. Penetrate the design of those trying to reach CDR. If you see communications risks, go to the CCP. For example, an abort capability is needed. If the crew is dumped into the water, who is the rescuer. This is being worked, but we think the government is the best provider for this service.
- M. Mr. Pearson discussed 1130 requirements. Each requirement has a (systems) Office of Primary Responsibility (OPR). The OPR is responsible for the requirement, rationale, and verification. Each requirement has a Stakeholder. The stakeholders are significantly affected by changes to the requirement. Mr. Pearson reviewed several examples of high-level requirements.

1. Requirement 3.1.1.2. Provides for simultaneous operation of two spacecraft. Communications will be needed for both spacecraft.
  2. Requirement 3.5.1.7. Provides for two-way communications between the crew and crew vehicle control center until the crew has been recovered.
  3. Requirement 3.8.1.1. Provides for single failure tolerant two-way communications between the crew vehicle control center and crew from prelaunch through landing and during aborts.
  4. Requirement 3.8.1.2. Provides for 90 percent coverage for ascent and 65 percent for entry.
- N. NASA will try to verify that their architecture meets requirements and certify that they are safe to fly.

### **ACTION ITEM REVIEW**

No action items was assigned at the April 16, 2012, NSG CC Program Overview splinter meeting.

(Original Approved By)  
Mr. James A. Bangerter  
GSFC/NASA/HSF ND