IOAG-13
22 – 24 September, 2009
Rome, Italy

Attendance:
Chair: Jean-Marc Soula
ASI: Luca Salotti, Claudio Canu, Roberto Ibba, Massimo Calabrese
BNSC: Peter Allan (telecon)
CCSDS: Adrian Hooke/NASA, Nestor Peccia/ESA, Mario Merri/ESA
CNES: Jean-Marc Soula
DLR: Martin Pilgram
ESA: Klaus-Juergen Schulz, Manfred Warhaut, Michael Schmidt
ISRO: Radhika Ramachandran
JAXA: Kaneaki Narita
KARI: Durk-Jong Park, Sangil Ahn
NASA: Badri Younes, James Costrell, Wallace Tai, Les Deutsch, Roger Clason, John Rush (telecon)
RFSA: V. Grishin, Dmitry Gorobets, Yury Komlev, Alexander Kruglov, Viacheslav Naumov, Nikolay Novilov, Alexander Razorenov, Vladimir Shuchev, Sergey Smirnov, Alexander Uliyanov
Secretariat: Barbara Adde/NASA

Agenda:

The final agenda is available on the IOAG.org website.

Tuesday, 22 September, 2009

Welcome/Opening Remarks
The President of the Italian Space Agency (ASI) Mr. Enrico Saggese opened the 3-day meeting by welcoming the international delegations to Rome for these important discussions on finding common standards to interchange and exchange data with other agencies, and the means to do so. Mr. Saggese suggested that the subject of cooperation on disaster recovery be discussed in this forum. He also noted that ASI has a large antenna in Sardenia that could be used for some deep space communication requirements and is open to cooperation with other agencies.

Following Mr. Saggese's remarks, Mr. Claudio Canu/ASI provided a presentation regarding meeting logistics.

Introduction/Agenda Review
IOAG Chairman Jean-Marc Soula thanked the host and noted with appreciation ASI's flexibility in moving the meeting to the Rome location, and welcomed KARI as a new IOAG observer agency.

Mr. Soula reviewed the objectives of this meeting, noting that they were originated from the InterOperability Plenary-2 (IOP-2), held in December 2008, including: internal re-organization of

the IOAG for more efficiency; developing a new relationship with user communities; extension of membership; promulgation of common Service Catalogs in planned stages; , and evolution towards an internetworked space communications architecture. These objectives have been put into the 2009 Work Plan.

The Chairman noted that a quorum was present so that decisions could be taken at this meeting. He asked that a drafting committee be appointed to draft the text of proposed resolutions and actions. The drafting committee consisted of: Chairman, Secretariat, Wallace Tai/NASA (with Adrian Hooke/CCSDS as backup), and Michael Schmidt/ESA.

The Chairman reviewed the draft agenda, and noted that decisions regarding the SISG activities were one of the key outcomes expected from IOAG-13 by IOP-2. He also pointed to the need to improve the various IOAG reference models on cross-support, infusion plans, and mission models, and he would propose a new format for that during the meeting.

The only item of new business was a presentation by Mr. Mario Merri/ESA on behalf of CCSDS, but the chairman noted that the meeting was open to any other proposals. The heads of delegation approved the agenda, with no additions.

Chairman Report
The Chairman reviewed the status of the 2009 Work Plan, which was approved at IOAG-12a. He noted that the delegations needed to decide today if the IOAG should update this type of work plan annually or multiyear. The objective of the current Work Plan is to convert into concrete actions the guidance from the IOP-2. The five core tasks for 2009 include:

- Revision of IOAG Terms of Reference and Procedures Work Plan

- Improvement of presentation and visibility of IOAG mission model, communication assets, and recommended standards

- Cross support Service Catalog #1.

- Initial definition of a Service Catalog #2 to include internetworking services. (This was given to the SISG for development a presentation/proposal may be expected at IOAG-14)

- Draft definition of a solar system internetwork operations concept and candidate architecture.

Mr. Soula noted that all of the related actions are tracked on the IOAG.org website.

The IOAG's first annual report is targeted for release in January 2010. It is expected to be no more than three pages for placement on the public IOAG website and will include a progress status of all tasks. The Chairman also noted that all decisions and resolutions at IOAG-13 should be taken into account in the 2010 work plan, in preparation for IOP-3. Actions need to clearly identify who is responsible and the heads of delegation need to delegate the work for more efficiency. The Chairman requested feedback from the delegations regarding the Work Plan and its focus and requirements.

The Secretariat reported that the IOAG-12a minutes had been approved by email, and requested approval of the IOAG minutes from those members who had not yet commented. The IOAG-12 minutes were approved without modification. The Secretariat reviewed the outstanding actions from the IOAG-12 and IOAG-12a meetings. The resulting status of the action items is available on the web site.

Agency Reports
Each member and observer agency provided agency reports, reviewing any organizational changes, any changes to space communication assets/plans, interoperability status/issues, and future mission plans. Presentations are available on the IOAG.org website. It was noted that all future annual meetings should include a 15-minute presentation from each agency on these specific topics.

One action was given to Peter Allan/BNSC as an outcome of his presentation (IOAG-13-001), on the utilization of the Ka-band by Iridium.

 Wednesday, 23 September

Review of Day 1Actions and Resolutions
The Chairman opened the session with a review of the actions and resolutions from the first day. The IOAG-12 minutes were approved; no recommendations, resolutions, communiqués, or liaison statements were recommended. Only one action had been assigned. Items for discussion on Thursday were added: format and guidelines for 2010 Work Plan, opportunity of joint meetings with other organizations, and suggestions regarding the IOAG mission model. Two agenda items were proposed for future IOAG meetings: communication practices and issues in the IOAG agencies, and agency plans and issues (i.e., regulations, standards, needed coordination) on optical links. It was agreed to seek SFCG's guidance on governance of optical links. Mr. Narita offered to provide input on JAXA's status and its regulatory agency.

Liaison Reports

SFCG: Written report

Two written contributions were provided by the SFCG, which were reviewed by the Chairman, in the absence of the SFCG liaison at the IOAG-13 meeting. The first document presented was the Lunar Mission Model and S-Band and X-Band Bandwidth Requirements. It was agreed that there are changes that need to be made based on agency updates regarding their missions and that there is no problem in the short term, but there are changes in requirements. Mr. Schulz recommended that a liaison statement will be sent to the SFCG stating that Ka uplink and downlink to and from the Moon will be needed; there are plans to have Lunar orbiters or communication relays that will require Moon to orbiter links, as well as Lunar surface communication.

The second presentation was the Mars Mission Model. It was noted that the Russian Phobos-Grunt mission needs to be updated in this model, and that a liaison statement should reflect this information to be added. An action was assigned to FSA to provide this information to the Secretariat to be included in the SFCG Liaison Statement (IOAG-13-002). The information requested for the Moon should also be requested for Mars. A query regarding optical link

governance should also be added to this Liaison Statement. The Secretariat will draft the Liaison Statement to SFCG. It was noted that the next SFCG annual meeting will take place in June in Australia, hosted by NASA.

CCSDS

Mr. Hooke provided an overview of the status of the CCSDS. He asked that the IOAG members make the CCSDS aware of any new missions so that they can include it in their planning. Their next meeting will take place in October 2009 at ESTEC in the Netherlands. Mr. Schulz noted that CCSDS has a broader portfolio than the IOAG and questioned which specific topics CCSDS should receive IOAG input. Mr. Hooke deferred this to Mr. Peccia's presentation.

With respect to IOAG-12 Resolution 12.4 .1 on channel coding, Mr. Younes noted that NASA has firm project requirements that necessitate the LDPC moving forward toward CCSDS Blue Book status as soon as possible. .

In regard to IOAG-12 Resolution 12.9.1, where CCSDS subsequently requested that the IOAG should clarify its needs and priorities, Mr. Soula noted that the reply from the IOAG to CCSDS was consistent with the proposal from the CCSDS, and that any residual issues need to be resolved within the CCSDS. It was agreed to expect feedback from the next CCSDS Management Council (CMC) on this topic.

Mr. Peccia followed with a presentation which addressed the potential expansion of the scope of the IOAG to include Mission Operations functions. It was agreed to defer discussion until the next day, after Mr. Merri's presentation on the SM&C activities in CCSDS.

Cross-Support Service Catalogue #1

Mr. Shulz provided a presentation on Cross-Support Service Catalogue #1, which was produced by a working group that was spun-off from the SISG. Noting that the catalog referred to several "To Be Written" (TBW) standards, all agencies agreed to take an action to review and comment very quickly (1 week for review and 1 for update) on the contents of Catalog #1 (IOAG-13-003). Mr. Schulz agreed to take care of the updates of the Catalog and produce the version for endorsement (IOAG-13-004). The Secretariat took an action to create an e-vote within two weeks so that it would be available for the CCSDS meeting (IOAG-13-005).

An action was assigned to all agencies to prioritize the list of the TBW services and associated standards identified in Service Catalogue #1 (IOAG-13-007). This will be based on a template to be established and supplied by the secretariat and chair, for the agencies to provide their answers (IOAG-13-006). The Secretariat will arrange an e-vote on this prioritized list which will be included in a second liaison statement to the CCSDS (IOAG-13-008 and 009).

Integrated Network Service Catalogue #1: NASA Planning

Mr. Tai presented NASA's planning on an Integrated Network Service Catalogue #1, which will be consistent and compliant with IOAG Service Catalogue #1 in terms of service types (naming), functionality, and relevant standards for the various service types. It will be available on NASA's public website. An action was assigned to the Secretariat and Chair to provide a template for presentation by the agencies of their implementation status of Service Catalog #1 (IOAG-13-010); these presentations will be on the agenda for IOAG-14, as part of the agency reports.

SLE Service Management

Mr. Tai delivered an SLE Service Management briefing, with proposed follow-on actions by the IOAG:

- IOAG member agencies to provide programmatic support for the development of the CCSDS standard concerning service management for the radiometric services including Delta-DOR.

- IOAG to recommend development of Service Management specifications for link monitoring and control.

- IOAG to advocate and orchestrate the implementation and deployment of the SLE Service Management capabilities, in compliance with Blue-1 standard, by member agencies.

- IOAG member agencies to continue the SLE Service Management prototype effort for validating standard increments post-Blue-1.

The Chairman requested the agencies to present at the next IOAG meeting their implementation status, open source, availability, and strategy on this issue.

SISG Presentation

SISG Status Briefing

Mr. Shulz provided the SISG Status Briefing, which he compiled in collaboration with Mr. Rush. He noted that the important byproducts of their work are Service Catalogue #1 and a compromise on Resolution 12.9.1 He acknowledged that Ancillary Services will be discussed the next day. . Both Operations Concept and draft Architecture documents have structural compromises, he noted, and reflect an evolution, rather than transition, to an internetworked architecture. He reviewed the status of the nine issues that the SISG has been working and noted that senior NASA and ESA management had concurred that they have agreed in principle on the envisioned SSI for 2020 and on the scope of a work plan that will be conducted in coming months in order to accomplish the delivery of an SSI Operations Concept to CCSDS by 15 May 2010.

Mr. Schmidt delivered the briefing on the SISG Operations Concept, which was developed by working group of the SISG. The overall document structure has been established and development of the initial draft is in progress.

The IOAG was asked by Mr. Schmidt to confirm the purpose and goals of the Operations Concept, to acknowledge the approach, and to approve proceeding with the outstanding work. The delegations acknowledged this approach, except for ISRO, which abstained. The drafting committee was asked to draft a resolution to that effect and to include a request to CCSDS via a liaison statement, asking them to plan to accept the Operations Concept in May 2010 and then to subsequently produce the SSI Architecture definition document.

NASA requested that all formal documents to be sent to the CMC must go through the Secretariat, who will obtain delegation concurrence before distributing to the CMC.

Thursday, 24 September 2009

The Chairman opened the final day of the IOAG-13 meeting with a review of actions and resolutions from the previous day. These include Liaison Statements to the SFCG and the CCSDS. Several action items were also assigned.

Requirements for Ancillary Services Development for CCSDS
Mr. Soula provided a briefing on the status of IOAG Res 12.9.1 negotiations with the CCSDS, with particular attention to the CCSDS communiqué on 5 April, 2009 which requested more information about Ancillary Data services. Several draft positions were proposed, discussed and finalized to be included in the liaison statement to CCSDS:

- IOAG decided to ask CCSDS to develop a standard for an online protocol to transfer monitoring data from ground communication assets to their users; to be available for 2012. This is to exchange a very limited set of ground station parameters in cross support operations.

- IOAG decided that an online service to control the ground space link is not needed for transfers in cross-support operations. The service proposed by the CSSM standard is estimated sufficient.

- IOAG recognized the need, with missions to other Solar System bodies, for standards to: a) command the acquisition; and, b) acquire and transfer remote orbiter-derived Doppler observables and orbiter trajectory and clock information to support landed vehicle position determination. However, IOAG resolves to bring to the attention of CCSDS that this is of medium priority.

- IOAG recognized the need, with missions to other Solar System bodies, for standards to: a) command the acquisition; and, b) acquire and transfer remote orbiter-derived open-loop recording and digitization of Entry, Descent and Landing (EDL) signals. However, IOAG resolves to bring to the attention of CCSDS that this is of low priority as related to a one-time event in the mission.

- IOAG recognized the need, with missions to other Solar System bodies, for standards to: a) command the acquisition; and, b) acquire and transfer remote orbiter-derived orbiter clock calibration and proximity time correlation data to support landed vehicle time correlation. However, IOAG resolves to bring to the attention of CCSDS that this is of moderate importance and needs further assessment.

- IOAG r decided to ask CCSDS to develop a set of standards for correlating space vehicle clocks and distributing time synchronization information. Different mission scenarios are to be identified (Earth and planets) and priority should be put on the development of standards for Earth orbiters as further assessment is needed for other orbiters.

It was also agreed that the SISG should address the metadata needed to support file transfer across the ground-to-ground interface.

Update on Mission Models and Tracking Assets
The Chairman proposed a new format for the IOAG mission models, tracking assets, and standards infusions which would be available on the public website.

An action was assigned to FSA to provide input in the existing format to this table (IOAG-13-011). An action was assigned to the Chair and Secretariat to provide page 2 template for SFCG requirements and other additional information that the agencies will be required to input later (IOAG-13-014).
The Secretariat was assigned an action to send email to member agencies to get accurate input, and integrate it into the models.

Proposal for a new format of IOAG Tracking Assets and Mission Model
The Chairman presented a proposal for a new format for the mission model and tracking assets, which was accepted. The Chair and Secretariat were assigned an action to follow up with the proposals (IOAG-13-012). The agencies agreed to send updates to these models four to six weeks before each annual meeting, and the Secretariat will provide the compiled version on the website two weeks before each annual meeting (IOAG-13-013, 015 & 016).

CCSDS: Mission Operations Services Concept
The new business on the agenda for IOAG-13 was presented by Mr. Merri, representing the CCSDS Spacecraft Monitoring and Control Working Group, who recommended that the IOAG should include Mission Operations services as part of its work plan and strategy. It was agreed that the agencies would conduct internal discussions on the subject and report at the next IOAG meeting (IOAG-13-018); the Secretariat will place this subject on the IOAG-14 meeting agenda.
To support this study it was resolved to ask CCSDS to provide an updated copy of its Mission Operations Services Concept Green Book to the IOAG, after current issues have been resolved within CCSDS. The IOAG also resolved to ask CCSDS to study the production of some kind of "service architecture for space" which could serve to guide the development of future standards and space mission support infrastructure.

Summary and Approval of IOAG-13 Resolutions and Action Items
The Chair reviewed the resolutions, action items, and liaison statements as finalized by the Drafting Committee; the final versions are attachments to these minutes.
Also items to be put on the agenda of the next IOAG meeting were discussed (IOAG-13-017).

Next IOAG Meetings
The delegates agreed that the Chairman would accept BNSC's offer to hold the IOAG-14 meeting in the U.K. in association with the Fall 2010 CCSDS meeting (currently planned in November 2010), pending agreement from the CCSDS. It was also agreed that joint meetings with CCSDS could be pursued periodically for efficiency, but not for all meetings. Intermediate teleconferences and/or "mini-IOAG" meetings should also be called by the Chairman, as deemed necessary, the first opportunity to be considered being the Space Ops conference in Huntsville, in April 2010.
It was conjectured that the IOP-3 is unlikely to be held earlier than the first quarter of 2011, with some possibility of stretching into 2012 (with the location to be defined).

The Chairman thanked ASI for the excellent arrangements they provided and then adjourned the meeting.

Attachments

IOAG-13 Resolutions

R-13-1: IOAG resolves to approve both:

- the goals and approach presented by the Space Internetworking Strategy Group (SISG) for the development of the Operations Concept document; and,

- the proposed modifications of the SISG work plan which anticipates publication of the Operations Concept, the Service Catalog #2, and the requirements documents in draft 0 version in May 2010.

IOAG further resolves to transmit a liaison statement to the Consultative Committee for Space Data Systems (CCSDS) asking that it assume responsibility for producing the Solar System Internetwork (SSI) Architecture Definition Document (in response to the SSI Operations Concept to be delivered in May 2010) in time for the third Inter-Operability Plenary (IOP-3) anticipated not earlier than first quarter of 2011.

R13.2: The IOAG resolves to thank Mrs. Loredana Bruca for her involvement and dedicated support to the IOAG community and wish her the best in her future endeavors.

R13.3: The IOAG resolves to thank the Italian Space Agency (ASI) for its hospitality, and for the excellent arrangements and accommodations that were provided in support of the IOAG-13 meetings.

IOAG-13 Actions

13-001: Peter Allan to follow up within BNSC regarding Iridium request to use the Ka frequency band needed by several Agencies for the Uplink or ISL of their missions (22.55 ~ 23.15 GHz) – Due: 30 October, 2009.

13-002: FSA to include Phobos-Grunt information in the Mars mission model presented in the SFCG report to IOAG-13. Due date: 30 September, 2009.

13-003: All agencies to review the Service Catalogue #1 (issue 1, rev 0) and provide suggested modifications to ESA/KJ Schulz with copies to Chair and Secretariat. <u>Deadline</u> due date: 30September, 2009.

13-004: ESA/KJ Schulz to assemble a "ready for endorsement" version of Service Catalogue #1 and to provide to the Secretariat. Due date: 07 October, 2009

13-005: Secretariat to prepare an e-Vote to endorse Service Catalogue #1, showing a one week delay for completing the e-Vote. Due date: 09 October, 2009.

13-006: Chair and Secretariat to propose a template for agencies to indicate their priorities on standards in the list of the "to be written" standards of the Service Catalogue #1. Due date: 30 September, 2009.

13-007: All agencies to return their priorities on the "to be written" standards of the Service Catalogue #1, making use of the proposed template, to Chair and Secretariat. Due date: 12 October, 2009.

13-008: Secretariat to finalize a follow up liaison statement to CCSDS, reporting on the "to be written" standards of the Service Catalogue #1, and submit for approval to the IOAG Heads of Delegations by e-Vote, showing a one week delay for completing the e-Vote. Due date: 12 October, 2009.

13-009: Secretariat to send the approved liaison statement to the CCSDS secretariat. Due date: 19, October, 2009.

13-010: Chair and Secretariat to propose a template for agencies to report in a unified format their status and plans concerning the list of the services and their related standards in the IOAG Service Catalogue #1. This template is to be used in the Agency reports of the next IOAG meeting. Due date: 30 October, 2009.

13-011: FSA to provide input in existing format to Tracking Assets Table, Cross Support Model, and IOAG Reference Mission Model. Due date: 31 October, 2009

13-012: Chair and Secretariat to complete the changes to the IOAG tables according to proposals approved at IOAG-13. Due date: 31 October, 2009

13-013: All agencies to provide updates to IOAG Cross Support and Reference Mission Models and Communication Assets Table for their own agency's missions to the Secretariat whenever there are significant changes to their plans and also within 6 weeks of each annual IOAG meeting. Due date: Ongoing.

13-014: Chair and Secretariat to provide template for second page of IOAG Reference Mission Model to fulfill SFCG requirements. Due date: 30 November, 2009

13-015: Secretariat to provide updated IOAG Cross Support Mission Model, Communication Asset Table, and Service Infusion Table on the public IOAG website and archive all previous versions to the secure website. Due date: Ongoing.

13-016: Secretariat to provide updated IOAG Reference Mission Model on secure website and enable access to SFCG. Due date: 31 December, 2009

13-017: Secretariat to put the following topics on the agenda for next IOAG and/or mini-IOAG meeting for discussion and possible resolution:
- Communications practices and issues in the IOAG agencies;
- Agency plans and issues on optical links; and,
- Service Management implementation status and plans.

Due date: Before the next meeting.

13-018: IOAG agencies to study CCSDS Mission Operation Services and comment on whether the scope of the IOAG should be expanded to embrace mission operations functions, with a view towards production of a possible "Service Catalog-3" that includes mission operations services. Due date: Next IOAG meeting.

13-019: Secretariat to draft a letter for chairman signature thanking Mrs. L. Bruca for her years of service to the IOAG. Due date : 14 October, 2009.

To: CCSDS Secretariat
From: IOAG Secretariat
Subject: IOAG-13 Liaison Statement

The Interagency Operations Advisory Group (IOAG) held its 13th annual meeting on 22-24 September, 2009. During this meeting, the delegates of the IOAG received presentations from the Consultative Committee for Space Data Systems (CCSDS) that were provided by its liaisons.

In response to these presentations, the IOAG makes the following observations and requests to the CCSDS:

1. IOAG thanks the CCSDS Spacecraft Monitor and Control Working Group (SM&C) for its presentation of current efforts to develop a top level space mission operations service architecture. The IOAG invites the CCSDS to submit its "Mission Operations Services Concept" Green Book to the IOAG for study by the IOAG agencies, with a view to determining if the scope of the IOAG should be expanded in the future to embrace a potential "IOAG Service Catalog 3" that would cover Mission Operations applications. The IOAG also asks the CCSDS to study whether the current CCSDS work could be expanded to embrace the production of a "Service Oriented Architecture (SOA) for Space Missions."

2. IOAG requests that an update to the channel coding blue book should be processed whenever an LDPC code is ready for publication, in association with its mission profile(s).

3. IOAG asks the CCSDS to assume responsibility for producing a Solar System Internetwork (SSI) Architecture Definition Document in response to the SSI Operations Concept to be delivered by IOAG to CCSDS in May 2010), in time for an IOP-3 that is anticipated not earlier than 2012.

4. As a complement to the IOAG response letter to the CMC dated June 23, 2009, for clarification of the standards to be produced in answer to resolution R 12.9.1, and on the particular subject of the "ancillary services," the IOAG recommends that some new

standards be produced by CCSDS according to the time frames indicated in the attached table.

5. The IOAG considers there is a need for a joint meeting with the CMC and proposes that this is organized on the occasion of the Fall 2010 meetings of CCSDS, in London, United Kingdom, during the first week of November.

Attachment

ATTACHMENT TO THE IOAG-13 LIAISON STATEMENT TO THE CMC:

REQUIREMENTS FOR FUTURE STANDARDS

	DESCRIPTION OF SERVICES TO BE CONSIDERED BY THE CMC FOR THE DEVELOPMENT OF FUTURE STANDARDS IN THE DOMAIN OF CROSS SUPPORT	CORRESPONDING RESOLUTION OF IOAG 13, WITH INDICATION OF THE REQUIRED TARGET DATE FOR COMPLETION, WHEREVER APPLICABLE
1	A ground-based space link monitoring cross-support transfer service standard	IOAG resolves to ask the CCSDS to develop a standard for a protocol to transfer space link monitoring data from ground communication assets to their users. The purpose is to exchange a limited set of ground station parameters in cross support operations. The IOAG further resolves that this standard should be available by the end of CY2011.
2	A ground space link control cross-support transfer service standard	IOAG resolves that an online service to control the ground space link is not needed for transfers in cross-support operations and that the service provided by the CSSM standard is estimated to be sufficient.
3	A data relay standard for: a) requesting the acquisition of; and, b) transferring remote orbiter-derived Doppler observables and orbiter trajectory and clock information to support landed vehicle position determination	IOAG resolves that it recognizes the need to acquire and transfer remote orbiter-derived Doppler observables and orbiter trajectory and clock information to support landed vehicle position determination. The IOAG further resolves that this is of medium priority and that availability of a standard is requested by the end of CY2012.
4	A data relay standard for: a) requesting the acquisition of; and, b) transferring remote orbiter-derived open-loop recording and digitization of Entry, Descent and Landing (EDL) signals	IOAG resolves that it recognizes the need to acquire and transfer remote orbiter-derived open-loop recording and digitization of Entry, Descent and Landing (EDL) signals. The IOAG further resolves C that this is of medium priority and that the availability of a standard is requested by the end of CY2012.

5	A data relay standard for: a) requesting the acquisition of; and, b) transferring remote orbiter-derived orbiter clock calibration and proximity time correlation data to support landed vehicle time correlation	IOAG resolves that it recognizes the need to request and transfer remote orbiter-derived orbiter clock calibration and proximity time correlation data to support landed vehicle time correlation. The IOAG further resolves that this topic is of moderate importance and needs further engineering assessment. Availability of a standard before the end of CY2014 is not needed.
6	An end-to-end standard for correlating space vehicle clocks and distributing time synchronization information	IOAG recognizes the need to develop a set of standards for correlating space vehicle clocks and distributing time synchronization information. The IOAG resolves that this topic needs further engineering assessment and that various mission scenarios should be identified, possibly with different priority levels for standards development. Availability of a standard before the end of CY 2014 is not needed.
7	A space-based data relay cross-support transfer service standard for monitoring the performance of remote space-space links	IOAG resolves to ask the CCSDS to develop a standard for acquiring and transferring space-to-space link monitoring data in order to exchange a limited set of parameters in cross support operations between, typically, rover and orbiter control centers The IOAG further resolves that this is of medium priority and that the availability of a standard is requested by the end of CY2012.
8	A data relay pass planning service for exchanging, e.g.; orbiter geometrical data slant range; off-pointing angle from antenna boresight; relative velocity of orbiter; orbiter elevation seen from the surface element; AOS & LOS times; etc.	The IOAG resolves to request the CCSDS to define an interface standard for transferring contact planning information concerning TT&C services to be provided by a relay orbiter to remote landed or descending space vehicles, including the interface protocol and parameters required for the contact planning and contact plan generation. Availability of a standard before the end of CY2014 is not needed.

IOAG-13

LIAISON STATEMENT TO SPACE FREQUENCY COORDINATION GROUP

The Interagency Operations Advisory Group (IOAG) held its 12th annual meeting on 22-24 September, 2009. During this meeting, the delegates of IOAG received two presentations from the SFCG that were provided by their liaisons.

In response to these presentations, the IOAG makes the following requests to the SFCG:

- Both the Moon and the Mars mission models should include Ka-band uplink and downlink.
- Both the Moon and the Mars mission models should include translunar and cruise phase, orbiters, inter-satellite links for communication relays, as well as surface communication.

Moreover, in the same meeting, the IOAG concurred there is no urgent need for regulation of the optical links by the ITU or other regulatory body but seeks concurrence, analysis and guidance on this issue by the SFCG.

The IOAG requests that this information be responded to at the next SFCG meeting in June 2010. The next meeting of the IOAG is tentatively scheduled for November 2010.