



# **INTERAGENCY OPERATIONS ADVISORY GROUP**

## **IOAG-14 Minutes**

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**Prepared by: Barbara Adde, Secretariat**

**Date: 1 March 2011**



**IOAG-14**  
**2-4 November, 2010**  
**London, England**

**Attendance:**

Chair: Jean-Marc Soula  
Secretariat: Barbara Adde

**Members:**

ASI: Luca Salotti  
CNES: Jean-Marc Soula  
DLR: Martin Pilgram  
ESA: Michael Schmidt, Manfred Warhaut, Gian-Paolo Calzolari, Wolfgang Hell, Marina Gourtovaia (*Russian interpreter*)  
ISRO: Radhika Ramachandran (*Day 2 only*)  
JAXA: Hiroshi Inoue, Tsutomu Shigeta, Ryo Suzuki  
NASA: Phil Liebrecht, Roger Clason, Les Deutsch, Dave Linick, Ken Perko, Madeline Butler, Wallace Tai, James Costrell, Mike Kearney  
*Teleconference:* John Rush, James Miller, Michael Moreau  
RFSA: Anna Metrevelle, Andrey Volkov

**Observers:**

KARI: Sangil Ahn  
UKSA: Peter Allan

**Liaison:**

CCSDS: Adrian Hooke/NASA, Nestor Peccia/ESA  
SFCG: Enrico Vassallo/ESA

**Agenda:**

The final agenda is available on the IOAG website ([www.ioag.org](http://www.ioag.org)).

**Tuesday, 2 November, 2010 – IOAG session**

1. Welcome/Opening Remarks

The Chairman opened the meeting and introduced the host, Dr. Peter Allan of the United Kingdom Space Agency (UKSA). Dr. Allan welcomed all the delegates and provided meeting logistics.

2. Introduction of Delegates

An introduction of delegates was conducted.



### 3. Meeting Introduction

The Chairman presented the draft agenda, and the plan towards preparing presentations for the joint session with the CCSDS the next day, based on the outcome of today's meeting. Both were approved.

A drafting committee for the preparation of actions and resolutions was appointed, to include: Secretariat, Les Deutsch/NASA, and possibly also someone from ESA or JAXA.

### 4. Chairman's Report

The Chairman noted that the 2010 Work Plan was approved via e-vote in July 2010. The goal is to have the 2011 Work Plan approved at the beginning of the year.

Mr. Soula noted that there were three core tasks in 2010: 1) the models, assets, and standard infusion for Service Catalogue #1 (SC#1); 2) the initial definition of a multipoint Cross Support Service Catalogue; and 3) a draft definition of a solar system internetwork (SSI) operations concept. He also noted that a way forward is needed by the end of the current meeting for a development by CCSDS of a SSI Architecture.

The Chairman also noted other issues that would be discussed as part of the agenda: interfaces with other organizations; the requirement of an annual report; status of document naming convention; and the status of the Space Internet Strategy Group (SISG). It was agreed that the Chairman will draft a short 2010 annual report to provide to the Interoperability Plenary (IOP) and 2011 Work Plan (**Action Item 14-01**) for review and approval by the member agencies (**Action Item 14-02**). It was also agreed that the SISG would be placed on inactive status (but not dissolved), since it might be needed again in the future.

### 5. Secretariat Report

5.1 The Secretariat reported on the summary of the e-votes for 2010, noting the difficulty in achieving a quorum. It was agreed that fewer e-votes may be required in the future if more meetings and/or teleconferences are held.

5.2 Most meeting actions are closed, with the noted exception of the updating of IOAG mission models.

5.3 The Secretariat presented the proposed document naming convention. It was agreed that members will review and approve by e-vote.

5.4 Continuing the discussion on the IOAG reference tables and mission models, Ms. Adde was tasked to ensure that the latest aggregated mission model is placed on the IOAG public website (**Action Item 14-03**). She noted that several member agencies have still not provided updated information for the aggregated mission models. In order to encourage full cooperation, the Secretariat will prepare letters for the Chairman to send to the heads of delegation of those outstanding agencies to inquire about their intentions regarding membership in the IOAG and the provision of the missing information (**Action Item 14-04**).



Discussion also focused on a request received during Space Ops 2010 in April regarding the possibility of including commercial assets in the IOAG mission models. It was agreed that the Secretariat will create a separate Communications Assets table for commercial assets in an IOAG-like format (**Action Item 14-05**) and that the Chairman will contact the commercial providers to provide input to this table (**Action Item 14-06**).

## 6. Agency Report

Each agency was provided the opportunity to report on any major highlights since the last full meeting.

**ASI** stated that their office now reports directly to the Director General. Mr. Salotti also noted that their new deep space antenna in Sardinia is physically completed but not yet operational; inauguration is foreseen before the end of 2011; this antenna is a joint venture between ASI and the Italian radioastronomy community and will be mainly used for radioastronomy; it will be fully compatible with IOAG SC#1 provisions; also a new 13 m S-band antenna will be installed in the Malindi site in 2011 and operational in 2012;

**CNES** has two new antennas – a 13-meter x-band antenna in Kiruna and another, north of Canada; both are under onsite acceptance test. Mr. Soula hopes they will be operational by the second quarter next year.

**DLR** noted its new Ka-band antenna.

**ESA** stated that their office will be combining with Human Spaceflight to become a new directorate in April 2011. Technically, he said, they are fully on schedule for a joint ESA-NASA mission, ExoMars. Discussion followed regarding Ka-band and it was agreed that the delegations would prepare a report in advance to IOAG-15 regarding their experience with Ka-band performance and operations considerations (**Action Item 14-10**) and the Secretariat will make these reports available on the IOAG private/public website (**Action Item 14-11**).

**JAXA** noted that of JAXA's three antenna (34-meter, 20-meter, and 10-meter), the 10-meter antenna is aging so they are planning to replace it primarily for downrange communication. JAXA is also collaborating with NASA to test utilization of the Disruption Tolerant Network (DTN) node on ISS. JAXA will procure the necessary equipment in the plan, and are coordinating an agreement with NASA.

**NASA** reported that there will be a larger role for commercial entities in NASA's program, as well as an increase in Earth Science and technology. NASA's Space Communications and Navigation (SCaN) program is focusing on DTN, optical communication, and Software Defined Radio (SDR) technologies. Dr. Warhant pointed out that DLR, ESA, JAXA, Roscosmos and NASA are all involved with DTN, and requested that the DTN demonstration on the International Space Station be added as an agenda item for IOAG-15 meeting (**Action Item 14-12**). Operationally, SCaN is preparing to launch TDRS K- and -L in 2012 and 2013, respectively, having retired TDRS-1 earlier this year. SCaN is also modernizing the Space Network ground system, which will be operational in 2015. It will support CCSDS service management and all standard TTC interfaces, including SLE. NASA plans to replace its 70-meter antennas, starting with the three new 34-meter antennas at the Canberra Deep Space Communications complex, to be completed in 2025. All of these antennas will be Ka-band capable, supporting deep space and



near Earth communication, if warranted. Organizationally, Mr. Liebrecht noted Mr. Costrell's recent retirement from NASA.

**RFSA** noted that its main areas of cooperation are lunar and Mars exploration missions with NASA and ESA. Their main project is Phobos-Grunt. In the Moscow and Baikonour regions, they are developing a complex, which is planned to integrate 12-meter antennas. Cooperation among networks within the framework of IOAG, and assurance of compatibility in terms of SFCG recommendations and CCSDS standards was noted. In response to a query, it was stated that Roscosmos has a principal agreement to use Ukrainian antenna to receive radiometric data. Mr. Ashurkov was not able to attend this meeting, but remains the main point of contact for RFSA to the IOAG.

**KARI** stated that it has added one S-band 11-meter antenna to its tracking system. Also, KOMSAT-5 will be launched in the June 2011 time frame. Dr. Warhaut added that ESA is about to conclude an agreement with KARI regarding telemetry support to European launchers.

**UKSA** announced that it was formed as of April 1, 2010, although the official Act of Parliament has not happened yet. The budget will be in place next year, although it is not known precisely what it will be. The UK is also creating an International Space Innovation Center, which will be a public/private partnership, and which will serve as a focal point for space activities and the delivery arm of the space agency. It will involve all of the public and private organizations involved in space. Its Control Center will be outside of Oxford and will have the capability to use ground stations anywhere.

#### 7. Liaison Report: Space Frequency Coordination Group (SFCG)

Mr. Vassallo noted that SFCG's joint activities with the IOAG are limited to lunar and Martian mission models. He noted that at SFCG-30 it appeared that no Mars missions for ISRO or JAXA were reflected in the IOAG-13 mission model, contrary to the SFCG-29 model, and urged members to submit their updated inputs. Mr. Vassallo accepted an action to cross-check the contents of the IOAG mission model and provide additional information from the SFCG records (**Action Item 14-08**).

He noted four agenda items for WRC-12 that are critical to space communications, including:

- Agenda Item 1.3: optical links. The position of space agencies and the IOAG is there should be no WRC regulation for optical links.
- Agenda Item 1.11: 22 GHz uplink request. This is very contentious item for the US (band overlap with TDRS) and around the world.
- Agenda Item 1.12: 10 GHz sharing with aeronautical systems.
- Agenda Item 1.25: 7-8 GHz band request by mobile satellite services seeking additional spectrum frequency. Mr. Vassallo requested support at the next World Radiocommunications Conference in January-February 2012 (WRC-12). Delegates discussed various actions the agencies can take to support this concern.

A resolution was taken for all IOAG agencies to indicate to the SFCG that they endorse its position on the critical 7-8 GHz issue (**Resolution 14-02**).

#### 8. Optical Links



The Chairman provided a consolidated report based on input provided by IOAG member agencies. He noted the global interest from all agencies in optical communication, with some having assets in operation today, and also noted that the CCSDS has created a Special Interest Group (SIG) group to exchange technical information on candidate modulation and coding schemes for optical links. He questioned whether or not the IOAG should be studying the operational use of optical communications. NASA proposed forming an IOAG sponsored Optical Communications Strategy Group similar to the SISG to try to harmonize optical systems internationally. After discussion, an action item was assigned to nominate points of contact for an Optical Links Study Group (**Action Item 14-14**) and another was assigned to correspondingly draft its Terms of Reference (**Action Item 14-13**).

#### 9. Positioning, Navigation and Timing Services

Mr. Miller provided a presentation on the implications of Positioning, Navigation and Timing (PNT) services for the IOAG, and proposed that the IOAG develop a liaison relationship with the International Committee on Global Navigation Satellite Systems (ICG), which is the IOAG counterpart for such issues. It was agreed that the IOAG would pursue this relationship and the Secretariat accepted an action to prepare a letter to the ICG Secretariat (**Action Item 14-19**).

#### 10. Interface with ISECG, ILN and international user groups

The Chairman noted that the International Space Exploration Coordination Group's (ISECG) Global Exploration Roadmap indicates near term opportunities for cooperation, including possibly optical links. Last year, the ISECG formed a Strategic Communications Working Group and an Architecture Working Group (AWG). The Chair was asked to serve as the liaison with the ISECG and accepted an action to contact the AWG to inform them of the IOAG's activities (**Action Item 14-08**). No other mission-focused international user groups have been identified at this time.

#### 11. Liaison Statement from CCSDS

The Chairman provided a consolidated report based on input provided by IOAG member agencies. He noted that the CCSDS sent a liaison statement in June 2010 in response to an earlier statement from the IOAG on issues related to Service Catalogue #1 (SC#1) and Service Catalogue #2 (SC#2). It was agreed that a message to CCSDS needed to be formulated before the end of the joint meeting, based on the proposals in the presentation and the outcomes of the IOAG discussions on this first day.

#### 12. Mission Operations Services

The Chairman discussed the difficulties in consolidating the members' input on this subject. He noted that CCSDS has formed a Special Interest Group to resolve potential overlaps between the CCSDS Spacecraft Monitor and Control Working Group and other CCSDS activities. NASA proposed that, in response to Action Item 13-018, the IOAG should form a Mission Operations Systems Strategy Group (MOSSG), modeled after the SISG. Mr. Kearney would serve as the NASA co-chair and recommended that another agency provide a second co-chair. ESA stated that due to limited resources, a Service Catalogue #3 (SC#3) covering mission operations services is not a short term priority.



After lengthy discussion, the topic was tabled for later discussion.

### 13. Service Catalogue #1 (including Service Management Implementation)

The Chairman provided a consolidated report regarding SC#1, noting that it had been created in response to Interoperability Plenary-2 (IOP-2) Resolution #4, and approved by e-poll in March 2010. This catalogue presents a set of recommended core and extended cross support standards; compatibility with core standards is a goal for all IOAG member agencies. Some of the services rely on standards still to be written by CCSDS. The delegates reached agreement on the following messages to deliver to the CCSDS at tomorrow's joint meeting:

- IOAG has reviewed the infusion status of the services and related standards in SC#1. The infusion of the core services is quite good among the IOAG members.
- IOAG resolves to endorse Trajectory Data Service for exchanging Orbit Data Messages (ODM) as a new core service under SC#1.
- IOAG has noted and appreciates the progress made by CCSDS in taking into account its requests for development of its priority standards in the Cross Support SC#1.
- IOAG also requests some clarifications from CCSDS on the re-factoring of the Cross Support (CS) Service Management standard since some agencies are about to start operational developments and need some guarantee of stability of the standard.
- IOAG requests that work should be initiated as soon as possible to develop a standard on CSTS File Transfer Service (CFXS) to support generic file exchange between Agency ground systems.

### 14. Cross Support Catalogue #2

Mr. Calzolari reported on SC#2 and noted that the following standards need to be finalized:

- DTN standards including network management and routing
- CSTS forward frame service
- Last-hop/First-hop delivery agent
- CSTS forward file service and CSTS return file service
- Time transfer and clock correlation and time synchronization

It was agreed that more discussion is needed on prioritization of the needed standards and that further guidance needs to be submitted to CCSDS before the CCSDS Spring 2011 meeting. At the request of the CCSDS liaison, the Secretariat was tasked to provide advance access to the draft SC#2 so that CCSDS can conduct an informal review (**Action Item 14-20**). It was agreed that Mr. Calzolari will provide a final draft to the Secretariat for distribution (**Action Item 14-21**), who will then arrange an e-vote to approve SC#2 (**Action Item 14-22**). It was agreed that the schema core/extended services would be applied also to SC#2, and that the IOAG would report on preliminary ranking of priorities at an upcoming meeting.

### 15. Solar System Internetworking Operations Concept (SSI Operations Concept)

Mr. Schmidt presented the SSI Ops Concept and noted that the IOP-2 had originally asked the IOAG to establish the Space Internetworking Strategy Group (SISG) in order to define an SSI



Operations Concept and an SSI Architecture. Phase-I of the SISG's work focused on defining the requirements and rationale for space internetworking. Subsequently, it was agreed that the SISG should create the Operations Concept for delivery to the CCSDS, who would then create the SSI Architecture. The SISG has now completed Phase-2 of its work and has produced the SSI Operations Concept, supported by the Phase-1 requirements and a detailed set of supporting analysis and trade studies. The complete SISG documentation package was approved by the IOAG for delivery to the CCSDS and an action was assigned to the Secretariat to place this package on the IOAG's public website after final clearance by NASA (**Action Item 14-18**). It was also agreed that the CCSDS should be asked to arrange its 2011 Work Plan with a view towards completing the SSI Architecture sometime in 2012 in order to be ready for the IOP-3 in 2012 or 2013.

#### 16. Improvement of Relationship with CCSDS

The Chairman led a discussion regarding the relationship between IOAG and CCSDS, noting that IOAG is a customer of CCSDS with a smaller domain of interest (cross support) compared to the CCSDS wide scope (interoperability / space standards) and with a shorter term horizon (mission requirements) than the CCSDS (enabling technologies). It is clear that the IOAG has a broad operational focus while CCSDS has a more detailed technical focus. There are also membership differences between the two organizations, which can be seen as a limitation to a more efficient relationship. Discussion also focused on the ways in which the IOAG can advocate for the allocation of resources to the CCSDS working groups by the member Agencies. It was generally agreed that IOAG has a very good relationship with CCSDS and it was proposed that IOAG have regular joint meeting with CCSDS, with at least one more before IOP-3. Dr. Warhaut proposed that IOAG should meet "virtually" (teleconference, web-conference, etc.) every three months, with one plenary meeting, and one joint meeting with CCSDS each year for cost efficiencies and the benefit of interaction. He also requested an explanation on how CCSDS sets its priorities and the resources allocated between the work on standards required by projects and programs (including IOAG ones) and the "push" standards driven by new technology. It was agreed that IOAG will offer to provide advice on new CCSDS work, as considered opportune by the CCSDS Management Council (CMC).

#### 17. Membership

The Chairman led the discussion on membership, and stated that an alignment of membership between IOAG and CCSDS may be considered a long term goal, when interoperability and cross support are exercised by all agencies. Membership in IOAG should be understood by all members to include the duties and activities in between the annual face-to-face meetings, and emphasized the importance of active participation in both organizations.

#### 18. Assignment of tasks for IOAG reports at the joint IOAG-CCSDS meeting

Assignments were made for preparation of presentations at the joint meeting.

**Wednesday, 3 November, 2010 – Joint Session of CCSDS and IOAG**



### 1. Welcome, Opening Remarks, Logistics

The joint meeting was opened by the CCSDS Chairman Mr. Kearney, with logistics information provided by Mr. Allan. The IOAG Chairman noted the recent exchange of letters between IOAG and CCSDS; this meeting is an opportunity to align our positions. He stated that the IOAG has developed the documents as directed by the IOP-2 and have submitted them to CCSDS.

### 2. Introduction of delegates and participants

The delegates and participants introduced themselves.

### 3. Meeting Introduction

Mr. Tongson, Ms. Adde, and Dr. Deutsch were named as the drafting committee for minutes, actions and resolutions. The agenda and objectives were reviewed and approved by the delegations.

### 4. CCSDS Engineering Steering Group Reports

The CCSDS Area Directors gave a comprehensive report on all technical work to the joint session of the CCSDS Management Council and the IOAG; the report is available on the CCSDS and IOAG websites.

### 5. IOAG Reports

The IOAG Chairman reported on IOAG activities to the CCSDS. He stated that the central role of the IOAG is to serve as an interface with user community, and that requirements could come from other organizations, as well, e.g., ISECG and ILN. He noted that IOAG has created a new reference table to monitor the infusion status of new standards, and that some “to be worked” (TBW) standards remain to be prioritized. Service Catalogue #2 has not yet been approved or published and discussions continue regarding internetworking. The SSI Concept of Operations has been sent to CCSDS, with a request from the IOAG that the CCSDS should now create the SSI Architecture prior to IOP-3.

Other challenges that IOAG is addressing are:

- Consolidation of its central role for coordination of international cross support
- Operational strategy for transitioning to Solar System Internetworking
- Future work:
  - Service management deployment status in IOAG agencies
  - Expansion of domain of interest to Mission Ops (SC#3)
  - Plans for use of optical links
  - Coordination on navigation issues (internal)

Mr. Soula stated that IOAG has identified some issues to discuss with CCSDS during the joint session on these subjects before formulating new advice or recommendations to CCSDS. This includes:

- CFDP Magenta books vs fwd/return file transfer services
- CSTS fwd/rtn space packet and encapsulation packet services



IOAG will formulate independent statements on:

- Mission ops and service architectures
- SSI architecture
- Service catalogues

IOAG noted its previous request that a Magenta book defining recommended mission application profiles should be produced in association with the LDPC Blue books.

Regarding SC# 1, Mr. Soula stated that it resulted from IOP-2 Resolution #4, which includes two types of services (“Core” and “Extended”) that respectively show the applicability to all IOAG members (Core) or to bilateral agreements (Extended). In conclusion, he stated that the IOAG has reviewed the infusion status of the services and related standards in its SC#1. The infusion of the core services is quite positive among the IOAG members.

Mr. Calzolari presented SC#2 and stated that further IOAG discussion is needed to set priorities.

Mr. Schmidt presented the SSI Concept of Operations, and discussed next steps of interfacing with CCSDS:

- Transfer the Operations Concept
- Work with CCSDS to reach agreements on the precise set of SSI Architecture and Standards to be produced
  - Agree with CCSDS on the process
  - Agree with CCSDS on the schedule
  - Generate a work plan based on the agreements
    - Should ensure a readiness of the basic SSI Architecture in 2012, in time for the IOP-3
    - Work plan can go beyond IOP-3 as necessary to complete the necessary architectural and standards details.

The IOAG Secretariat was tasked to ensure that SC#2 is available to CCSDS (**Action Item 14-20**). Ms. Adde noted that SC#2 is available to CCSDS through its liaison via the IOAG website. The Chairman stated that there needs to be a CCSDS acceptance of the SSI Operations Concept as a starting point.

#### 6. Improvement of relationship between CCSDS and IOAG

The CCSDS General Secretary stated that the relationship is working well, and that the loosely coupled liaison relationship is appropriate.

Mr. Kearney made the following minor suggestions for improvement:

- Harmonization of membership would help
- Communication of resolutions seems to add complexity and delays.
- Meeting schedule/location coordination
  - Meetings should be either joint or appropriately separated
  - Avoid conflicting overlap (with SpaceOps meeting as well)



Mr. Hooke made a proposal that the Service Catalogues could serve as a very effective way to track the status of work flowing back and forth between CCSDS and IOAG. Instead of issuing “communiqués and responses” to exchange views, IOAG and CCSDS could simply use the Service Catalogues as an “Interface Control Document” in which IOAG’s standardization needs and need dates could be identified and in which the CCSDS response could be tracked. Dr. Warhaut strongly endorsed this approach and the corresponding ending of the formal communiqué process. Mr. Soula noted that the IOAG meetings will be scheduled more frequently to better match the CCSDS calendar, which might make possible more opportunities for joint meetings.

The IOAG chairman also stated that he would like to hear how CCSDS reconciles the “mission pull” versus “technology push” tensions when allocating priorities for standards development. He also offered the services of the IOAG to provide CCSDS with advice on selection of future work, if the CMC perceives this to be useful.

#### **Thursday, 4 November, 2010 – IOAG session**

##### **8. IOAG Discussion and preparation of reports**

Mr. Perko presented the draft Terms of Reference for the proposed Optical Links Study Group (OLSG). He stated that it would have co-chairs with quarterly meetings, and requested volunteers from interested agencies; the co-chairs were appointed as follows:

NASA co-chair: John Rush

ESA co-chair: Klaus-Juergen Schulz

All agencies were invited to provide poc’s to the OLSG (**Action 14-14**).

The agency points of contact (POC’s) were tasked to provide input on the first two items of the draft Terms of Reference to the co-chairs (**Action Item 14-15**). The OLSG was tasked to review the CCSDS draft Optical White Book for discussion at IOAG-14a (**Action Item 14-13**) and to report on the results of study and recommendations to determine next steps (**Action Item 14-16**).

Mr. Liebrecht discussed NASA’s proposal for a Mission Operations Study Coordination Group (MOSCG), stating that while NASA is going to start internally, they are glad to work with others. It was agreed to begin with review of CCSDS activities in this area and co-leads were appointed:

NASA co-chair: Mike Kearney

ESA co-chair: Paolo Ferri

An action was assigned for NASA and ESA co-leads to report on the status of IOAG mission operations at IOAG-14a (**Action Item 14-25**). All agencies were invited to provide poc’s to an informal mission operations group (MOSCG) (**Action item 14-24**).



The Chairman led the discussion on prioritization of all SC#1 and SC#2 standards together. It was agreed that the Chairman will develop two or three levels of priorities with definitions for an IOAG-CCSDS Interface Control Document (ICD) for approval by all members (**Action Item 14-23**). This item is linked to: 6. Improvement of relationship between CCSDS and IOAG above where the proposal (i.e. build ICD from Catalogs) is recorded. A grading system will be established and these priorities will be reviewed annually.

The following draft top priorities were approved for presentation to CCSDS\*:

\* **green = preliminary agreement**  
**blue = important to at least one agency**

Security  
Delta DOR

**SM&C Core Services**  
Conjunction Message

Optical Link

**LDPC**  
**26 GHz**  
**CDMA**

Data Link Security Layer  
GMSK, High Rate Telemetry & Ranging

DTN (ISS – Moon – Mars)  
**Last Hop/First Hop Delivery**

**SOIS Services (Avionics)**

All agencies were tasked to review the list of Draft Top Priorities in the domain of Space Communications (**Action Item 14-26**). The Chairman will propose a draft list of Top Priorities based on these inputs (**Action Item 14-27**).

A meeting schedule was established:

IOAG-14 debrief – 2 December, 2010 (teleconf)  
IOAG-14a – 30 March, 2011 (teleconf/WebEx)  
IOAG-14b – 2 June, 2011 (mini-meeting on outskirts of SpaceOps meeting in Stockholm)  
IOAG-14c – 20 September, 2011 (teleconf/Webex)  
IOAG-15 – 6-8 December, 2011 in Toulouse (location to be confirmed)

An action was taken for proposals to host IOAG-15 (**Action Item 14-29**), and for nominations for the next term of IOAG Chairman (**Action Item 14-30**).



## **Thursday, 4 November, 2010 – Second Joint IOAG/CCSDS Session**

### **12. CCSDS Report**

Mr. Kearney presented the CCSDS liaison report, including a description of the resources and priorities process for commitment on a working group level. Mr. Hooke again outlined the proposed development of an ICD to enable better communication between the organizations regarding the status of standards (see item “6. Improvement of relationship between CCSDS and IOAG” of the MoMs). He took an action on the CCSDS side to develop the ICD jointly with Mr. Calzolari on the IOAG side. The ICD will be maintained by both Secretariats.

### **13. IOAG Report**

Mr. Soula presented the IOAG report, as discussed during the morning session, including optical links and mission operations.

Mr. Linick stated that the IOAG has agreed that NASA and ESA will co-lead an informal coordination group to address mission operations with a view to provide status and strategic guidance on related priorities and schedules. In order to minimize the impact on limited CCSDS resources, this IOAG MOSCG will assure continued alignment with:

- NASA internal analysis and with the CCSDS work done so far in this area
- Existing forums and mechanisms (e.g., CCSDS Mission Operations and Information Management Services [MOIMS])

This informal group will report to the IOAG at the next meeting. IOAG can determine whether further IOAG-sponsored activity is appropriate and if IOAG recommendations should be formulated.

Mr. Soula presented the SC#1 draft top priorities, noting that they were not prioritized within the list, but were organized loosely by technical area. He concluded that the IOAG addressed the three special topics from CCSDS liaison statements, with one left unanswered. An ICD will be developed to address priorities.

Mr. Soula also presented the tentative IOAG meeting schedule, which was met with approval by CCSDS.

With joint gratitude of the organizations expressed to the UK Space Agency for hosting the meeting, the CCSDS and IOAG chairmen adjourned the meeting.



## IOAG-14 RESOLUTIONS

**RESOLUTION 14-01:** In its 14<sup>th</sup> meeting in London, November 2010, IOAG resolved to meet on quarterly basis between annual meetings, to better match the schedules of CCSDS and other international bodies. These meetings can be video- or teleconference, as well as “mini-IOAG” meetings.

**RESOLUTION 14-02:** In its 14<sup>th</sup> meeting in London, November 2010, IOAG resolved that all IOAG agencies should endorse critical nature of protecting 7-8 GHz during Conference Preparatory Meetings (February 2011) and at the WRC-12 meeting. [Due date: February 2012]

**RESOLUTION 14-03:** In its 14<sup>th</sup> meeting in London, November 2010, IOAG resolved to recognize the achievements of the Space Internetworking Study Group (SISG) and has resolved to an inactive/standby mode, until at least IOP-3, in order to be able to answer any questions as the SSI Architecture is developed by CCSDS.

**RESOLUTION 14-04:** In its 14<sup>th</sup> meeting in London, November 2010, IOAG resolved to establish a liaison relationship between the IOAG and the International Committee on Global Navigation Satellite Systems (ICG) with the initial objectives of awareness of each other’s activities and of exchanging on subjects of common interest.

**RESOLUTION 14-05:** In its 14<sup>th</sup> meeting in London, November 2010, IOAG resolved to accept the CCSDS June report with some remaining comments to be later tracked in future meetings using the ICD format.

**RESOLUTION 14-06:** In its 14<sup>th</sup> meeting in London, November 2010, the IOAG resolved: i) to adopt the Orbit Data Message (ODM) as an additional core standard within Service Catalogue # 1 and ii) that the production of CSTS Transfer File Service (CFXS) standard as defined in Service Catalogue #1 needs to be initiated by CCSDS as soon as possible, as a high priority for the IOAG.

**RESOLUTION 14-07:** In its 14<sup>th</sup> meeting in London, November 2010, the IOAG resolved to thank its host, the United Kingdom Space Agency for its gracious hospitality in hosting both the IOAG and the CCSDS for its joint meeting.

**RESOLUTION 14-08:** In its 14<sup>th</sup> meeting in London, November 2010, the IOAG recognized the benefits of the joint meeting with CCSDS and resolved to continue the relationship through the liaison already in place, but also with some less formal joint meeting (e.g.: teleconferences, Webex conference or mini-IOAG), as required for focused discussions on subjects of interest.

**RESOLUTION 14-09:** In its 14<sup>th</sup> meeting in London, November 2010, the IOAG resolved to thank Mr. James Costrell on the occasion of his retirement from the US National Aeronautics



and Space Administration for his role in the creation of the IOAG and his dedicated service in pursuit of international interoperability and cooperation in the ensuing 11 years.



## IOAG-14 ACTIONS

**ACTION 14-01:** Chair to draft annual report (1-2 pages) and a draft 2011 Work Plan for review and comment by delegations. [Due date: 16 December, 2010]

**ACTION 14-02:** All heads of delegations to review and provide comment to Chair and Secretariat on draft 2011 Work Plan and annual report. [Due date: 20 January, 2011]

**ACTION 14-03:** Secretariat to place aggregated mission and asset models on the IOAG public website; all individual agency models will be placed on the private website. These models should include references to agencies that submitted specific data. [Due date: 2 December, 2010]

**ACTION 14-04:** Secretariat to draft letters for Chair to send to heads of delegation of those member agencies without input to IOAG models and ask them to provide information (ISRO, CNSA, RFSA) and to inform IOAG on their intentions regarding membership (CNSA) [Due date: 2 December, 2010]

**ACTION 14-05:** Secretariat to create a separate Communication Assets table for commercial assets, in IOAG-like format, to be maintained on private website and updated annually prior to the face to face IOAG meeting. Chair to coordinate with delegates for input regarding specific providers. [Due date: 30 December, 2010]

**ACTION 14-06:** Chair to contact commercial providers to provide inputs to populate the Communications Commercial Assets table to be maintained on private website in an aggregated format. [Due date: 15 March, 2011]

**ACTION 14-07:** SFCG liaison to cross-check contents of IOAG Mission Model and, comment on the information in there and provide additional missions information from the SFCG records. [Due date: 31 January, 2011]

**ACTION 14-08:** Chair to contact ISECG's new Working Group on Architecture to make them aware of IOAG progress in definition of Service Catalogues and SSI Ops Concepts, and to inform on the good coordination with CCSDS on the development of the related standards. [Due date: 19 November, 2010]

**ACTION 14-09:** Secretariat to prepare an e-vote on proposed document naming convention, based on a document that is consistent with presentation in Secretariat Report. [Due date: 2 December, 2010]

**ACTION 14-10:** All heads of delegations to report on their experience and analysis regarding Ka-band performance and operations considerations. [Due date: 1 November, 2011]



**ACTION 14-11:** Secretariat to place paper regarding Ka-band performance and operations considerations on private website for IOAG members' awareness before IOAG-15. [Due date: 4 November, 2011]

**ACTION 14-012:** Secretariat to add DTN demonstration to next IOAG meeting agenda. [Due date: 4 November, 2011]

**ACTION 14-13:** Optical Links Study Group (OLSG) co-leads (J. Rush/NASA and K-J. Schulz/ESA) to review CCSDS draft Optical White Book and to update the draft Terms of Reference for OLSG provided by K. Perko/NASA and M. Schmidt/ESA for discussion at the next IOAG teleconference. [Due date: 2 December, 2010]

**ACTION 14-14:** All Interested agencies to nominate a point of contact to participate to the activities of the OLSG, and to inform the co-leads, Chair and Secretariat. [Due date: 2 December, 2010]

**ACTION 14-15:** All agencies to provide input on first two items of Optical Links draft Terms of Reference to co-leads, Chair and Secretariat. [Due date: 30 January, 2011]

**ACTION 14-16:** Optical Links co-leads, J. Rush/NASA and K-J. Schulz/ESA, to report on first results of study and on recommendations to determine next steps. [Due date: 29 March, 2011]

**ACTION 14-17:** IOAG chair and Secretariat to prepare a message to CCSDS as an answer to their June 2010 liaison statement, and circulate for discussion and approval. Such message will include introduction of the notion of an ICD between IOAG and CCSDS to keep track of requirements / priorities and of plans and schedules, with reference to the service catalogs. [Due date: 30 November, 2010]

**ACTION 14-18:** Secretariat to place all 3 SISG documents on the public website after final clearance by NASA. [Due date: 2 December, 2010]

**ACTION 14-19:** Secretariat to draft a letter to establish a liaison relationship between International Committee on Global Navigation Satellite Systems (ICG) and the IOAG. [Due date: 3 January, 2011]

**ACTION 14-20:** Secretariat to make Service Catalogue #2 available to CCSDS for initial review and comment. [Due date: 14 November, 2010]

**ACTION 14-21:** Gian-Paolo Calzolari to revise and pass to Secretariat the final draft of Service Catalogue #2 for distribution to IOAG. [Due date: 30 December, 2010]

**ACTION 14-22:** Secretariat to distribute Service Catalogue #2 for final review to IOAG heads of delegation and prepare an e-vote with 3 weeks open period. [Due date: 7 January, 2011]



**ACTION 14-23:** Chair to develop 2 or 3 levels of priorities with definitions for IOAG-CCSDS ICD, and circulate for discussion and approval. [Due date: 24 November, 2010]

**ACTION 14-24:** All agencies to provide points of contact to informal mission operations group, which will be led by TBD/NASA and Paolo Ferri/ESA. [Due date: 2 December, 2010]

**ACTION 14-25:** TBD/NASA and Paolo Ferri/ESA to report on the status of IOAG mission operations initiative at next meeting. [Due date: 29 March, 2011]

**ACTION 14-26:** All agencies to review list of Draft Top Priorities in the domain of Space Communications, as presented to CCSDS at the joint meeting on 4 November, 2010 and to inform the Secretariat and Chair about their own priorities. [Due date: 31 January, 2011]

**ACTION 14-27:** Chair to propose a draft of the IOAG Top Priorities, based on the inputs received from the agencies, at next meeting. [Due date: 29 March, 2011]

**ACTION 14-28:** Secretariat to establish an IOAG Power Point template for utilization if presentations in the name of IOAG. [Due date: 30 December, 2010]

**ACTION 14-29:** Any proposals for hosting IOAG-15 to be provided to the Secretariat two weeks before the 2 December IOAG-14 Debrief teleconference so that a decision can be taken during that teleconference. [Due date: 24 November, 2010]

**ACTION 14-30:** Any nominations for replacement of the Chairman from 2012, to be provided to the Secretariat for distribution in advance of vote at IOAG-14a teleconference. [Due date: 15 March, 2011]

**ACTION 14-31:** Secretariat to draft letter for Chair to thank James Costrell for his years of service to IOAG. [Due date: 2 December, 2010]

**ACTION 14-32:** Adrian Hooke to distribute a written report to IOAG delegates in advance of the March 29 IOAG-14a, with feedback from CCSDS on the subjects addressed by the CMC actions below:

[[CMC-A-2010-11-16](#) - CESG to perform an assessment of the ability of CCSDS (CSTS WG) to line up with priorities associated with Service Catalog 1 described by the IOAG. [Due date: 1 January, 2011]

[[CMC-A-2010-11-06](#) - The CCSDS Liaison to the IOAG (Adrian Hooke) will pick up the planned January draft of Service Catalog #2 from the IOAG website and circulate it within the CCSDS community for comments. [Due date: 31 January, 2011]



CMC-A-2010-11-07 - CESG to take the SISG documentation provided by the IOAG and develop a proposed change to the CCSDS plan of work to produce the SSI architecture approach and associated standards to be developed in CCSDS. [Due date: 1 January, 2011]

CMC-A-2010-11-16 - The SLS Area Director will make the current draft White Paper report on Optical Comm available to the IOAG. To be delivered to the IOAG Secretariat. [Due date: 30 November, 2010]

**ACTION 14-33:** All heads of delegations to provide names and points of contact for commercial providers of which they are aware to the Chair for inclusion in the commercial provider table. (See action item 14-06). [Due date: 16 December, 2010]

**ACTION 14-34:** All heads of delegations to review and comment on the Chair's proposed levels of priorities for IOAG-CCSDS ICD. (See action 14-23). [Due date: 16 December, 2010]