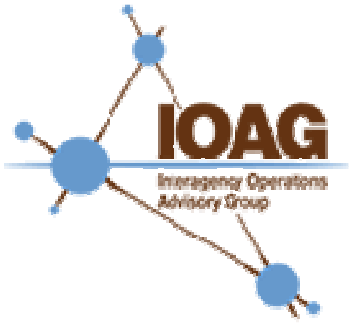

INTERAGENCY OPERATIONS ADVISORY GROUP

Work Plan 2013

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Prepared by: Jean-Marc Soula, Chairman (2009-2013)
Michael Schmidt, Chairman (2013+)

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1 Introduction

The overall scope of the Interagency Operations Advisory Group (IOAG) is to undertake activities to establish a multi-agency coordination related to space cross support and space communications. A specific IOAG goal is the achievement of full Inter-Operability among member space agencies.

To achieve these goals, some permanent objectives are defined in the IOAG Terms of Reference. The Inter-Operability Plenary (IOP) has also assigned specific objectives, as described in Section 2.

The Work Plan details the IOAG work objectives for 2013 and defines an associated implementation plan. The higher-level objectives for the next several years are also identified to highlight the need for continuity in some tasks or new activities that need to be initiated. It is anticipated that the IOAG Work Plan will be updated on an annual basis to remain more current and provide more details on the medium-term objectives and implementation schedules.

The IOAG Work Plan 2013 responds to three overarching strategic objectives:

- Establish or enhance all elements of the IOAG organization required to achieve its role as the premier international focal point for matters related to cross support in the space communication and navigation domain.
- Continue effective and value added use of the IOAG in 2013 with achievements that further the goals of IOAG and are of mutual benefit to the participating Agencies and interfacing organizations.
- Increase the visibility of IOAG by communicating its existence and purpose to relevant international groups and organizations.

2 Objectives

The objectives of IOAG are defined in its Terms of Reference (TOR) and are also driven by the IOP-2 communiqué. Annex-1 includes a detailed description of the IOAG objectives.

The IOAG work for 2013 has been classified into four activity lines: (i) core tasks (section 3); (ii) tasks performed in collaborations with other existing international groups/organizations (section 4); (iii) improvement of IOAG internal processes (section 5); and (iv) reporting activities (section 6).

Annex-2 includes detailed definitions of the following: task; activity identification; implementation approach; expected outcomes for tasks for the year 2013; and, as applicable, continuation as follow-up tasks. Also identified are the connection between the core tasks and both the objectives assigned by the second IOP (IOP-2) and the objectives in the IOAG TOR.

Annex-3 includes an overview of the participation by the IOAG agencies to the activities herein.

The activities conducted by the IOAG in 2013 will include the preparation of presentations to the IOP-3, which will take place in June 2013, with the aim to trigger decisions on the related subjects, but also to elaborate the new objectives assigned to the IOAG for the next period.

3 Core Tasks

IOAG tasks are classified as core tasks if their implementation is primarily performed by IOAG (instead of working groups not related to the IOAG) and if they lead to clearly identified and concrete outcomes in 2013.

Five core tasks have been identified for 2013:

- Core 13.1 = Improvement of completeness, accuracy and visibility of the IOAG Mission Model, Cross Support Mission Model, Communication Assets and Standards Infusion Status.
- Core 13.2 = Follow-on of the definition of a Solar System Internetworking candidate Architecture (Internet Protocol and Delay Tolerant Network)
- Core 13.3 = Follow-on of the study on Optical Communications.
- Core 13.4 = Completion of the study on the utilization of Ka band (26 GHz) in the domain of LEO satellites.
- Core 13.5 = Future plans concerning the Mission Operations domain.

The Core Task 13.1 requires contributions and updates from all Members of IOAG. Several agencies have been deficient in the last years to provide such inputs. This anomaly needs be addressed in the course of year 2013. At the IOP-3, commitments will be asked from all agencies and the Membership situation needs to be confirmed.

The 2012 Core Tasks 12.2 on the definition of a Solar System Internetworking and 12.3 on the study on Optical Communications were completed in 2012 and the produced reports are available on the IOAG public web site. These activities will be presented and follow-on activities will be decided at the IOP-3.

The IOAG TOR and Procedures Manual were revisited in 2009; therefore, there is no plan to update these documents in 2013. Decisions at the IOP-3 might lead to a revisit of this statement.

4 Tasks in Collaboration with Other Organizations

The interface of IOAG with existing groups, as directed by the IOP-2, will be primarily to coordinate space communications and navigation aspects, and to ensure the consistency of the tasks conducted by the multiple communities.

Four strategic tasks have been identified for 2013:

- Liaison 13.1 = Continuation and improvement of the relationship with the International Space Exploration Coordination Group (ISECG) to collect their requirements in the domain of Space Communications and Navigation.
- Liaison 13.2 = Continuation and improvement of the existing liaison with the CCSDS to convey the requirements from the IOAG and the users' communities in a timely manner relative to the domain of the standards for Space Communications and Navigation, and to clarify interfaces between IOAG and CCSDS.
- Liaison 13.3 = Continuation and improvement of the existing liaison with the Space Frequency Coordination Group (SFCG) to convey the requirements from the IOAG and the users' communities in a timely manner relative to the domain of the frequencies and spectrum for Space Communications and Navigation.
- Liaison 13.4 = Definition and implementation of a liaison with the International Committee on Global Navigation Satellite Systems (ICG) to exchange on both parties requirements in the domain of Space Communications and Navigation.

5 Initiatives for Improvement of IOAG Processes

In many areas of IOAG activities, the flow of information within the IOAG with external organizations of interest and with the agencies or their partners is critical with respect to the overall outreach and efficiency of the organization. An important part of improving information flow is defining organizational relationships among IOP, IOAG and all other requirements and standards organizations. Annex-4 presents this relationship. The special tasks assigned to the Secretariat for improvement of the tools and methods used in the various procedures of the IOAG and for better outreach on the IOAG achievements and recommendations are identified as "Process 13.1" in Annex-2.

6 Reporting Activities

Year 2013 will be the occasion to hold the third Inter-Operability Plenary meeting (IOP-3) which will be the occasion for the IOAG to report on its activities and to seek guidance on the activities in the years to come. Most of this guidance will be related to Core or Liaison tasks; the preparation of the IOP-3 concerning those tasks is not subject of a specific task in the present Work Plan and will be described with each individual task in the Annex-2, wherever applicable.

The Chairman will develop, with support from the Secretariat, an Annual Report that will summarize the activities and achievements. The Annual Report will include inputs from all participating Agencies and a progress report on the implementation of activities in the 2013 Work Plan.

The Annual Report will be posted on the public IOAG website (https://www.**ioag**.org) no later than January 2014.

ANNEX-1: OBJECTIVES

According to the TOR, areas for consideration for the IOAG objectives and activities include:

ToR (a) Identifying the space and ground networks support capabilities needed by potential cooperative programs and projects to achieve their scientific objectives.

ToR (b) Maintaining a list of interoperable facilities and services operated by the space agencies.

ToR (c) Promoting the use of internationally recognized standards in the design and implementation of cooperative flight programs including: spacecraft, ground and space networks.

ToR (d) Monitoring the work of relevant standards organizations and assisting in the agreement, adoption and implementation of new standards by space agencies.

ToR (e) Identifying inconsistencies in the data transmission, capture, handling, and processing systems used by agencies. The IOAG should inform relevant standards organizations (such as the CCSDS or the SFCG) of these inconsistencies, using methods described in the IOAG Procedures Manuals, as well as IOP Members, inviting them to undertake the development of new international standards.

ToR (f) Establishing priorities for the implementation of systems and services needed to achieve full Inter-Operability and enunciating policies furthering Inter-Operability. Such priorities should be passed to relevant organizations and to the IOP Delegations.

ToR (g) Assessing the resources needed to implement these requirements and urging IOP Delegations to make these resources available within their agencies.

ToR (h) Defining and maintaining a reference architecture that will enable Inter-Operability and cross support across space agencies (this could be the Space Internetworking Strategy Group (SISG) Operations Concept and Architecture document).

ToR (i) Encouraging the distribution of communication and navigation techniques to accelerate the deployment of interoperable solutions.

At the 2nd Inter-Operability Plenary meeting (IOP-2), held 8-10 December 2008 in Geneva, Switzerland, the objectives of the IOAG for the upcoming years were established. As the parent organization of the IOAG, the IOP-2 then adopted the following resolutions that task the IOAG on some additional and specific objectives:

IOP 2 (1). The IOP charges the IOAG to continue as the international focal point for fostering and leading interoperable space communications and navigation matters for cross-support of spaceflight missions, and approves the amended IOAG TOR dated June 2007. IOAG participating Agencies should strive to comply with the IOAG's strategic guidance.

IOP 2 (2). The IOP considers it as strongly beneficial for the IOAG to admit Membership of those Agencies having significant and relevant missions and assets respectively requiring and providing space communications and navigation cross-support The IOAG is encouraged to invite observers from other Agencies to participate in IOAG meetings as deemed necessary.

IOP 2 (3). Furthermore, IOAG organizational processes should be adapted to collect and process in a timely manner all the space communications and navigation requirements of other international space coordination groups (e.g., the International Space Exploration Coordination Group [ISECG], International Lunar Network [ILN], and international Mars exploration, inter alia), and to provide strategic guidance to the relevant standardization organizations. This includes the CCSDS and the Space Frequency Coordination Group (SFCG).

IOP 2 (4). The IOAG's ground-based Cross Support Service Catalog should be completed and agreed by all IOAG participants in order to establish a common basis across the Agencies for the consolidation of ground-based cross support by 2012. Agencies should agree to implement IOAG recommendations for missions, which may benefit from cross-support and/or international cooperation. It is an IOAG goal to have a plurality of the participating Agencies capable of providing ground-based cross support of an agreed common IOAG Service catalog by the end of calendar year 2015.

IOP 2 (5). In order to achieve an enhanced end-to-end cross support service catalog that will provide the platform of standardization for extending cross support into space, the IOAG should prioritize the requirements relevant to space communications Inter-Operability and cross-support and should urge the CCSDS to adjust their work accordingly. In this regard, the IOP-2 endorses IOAG Resolution 12.9.1. IOP-2 recognizes the authority of the IOAG to prioritize future work as necessary.

IOP 2 (6). The SISG should formalize a draft Solar System Internetwork (SSI) Operations Concept and candidate architectural definition in time for IOAG-13 and should prepare a mature architectural proposal for review and endorsement at the third Inter-Operability Plenary meeting (IOP-3). At that time, the IOAG is requested to present an enhanced service catalog for endorsement. The IOP Agencies should ensure representation from their programs and projects to work with SISG to identify potential missions that may benefit from adoption of the SSI-related standards, leading to a gradual build up of in-space and ground-based space internetworking infrastructure.

IOP 2 (7). In the course of its deliberations, the IOP-2 was encouraged by the progress made to date, and stressed the importance of safeguarding the achievements made throughout the past years in cross-support and Inter-Operability, in particular, maintaining compatibility with prior recommendations.

ANNEX-2: TASK DEFINITIONS

WP-Core-13.1: Improvement of accuracy and visibility of the IOAG Mission Model, Cross Support Mission Model, Communication Assets and Standards Infusion Status.

Definition:	The IOAG Mission Model, the IOAG Cross Support Mission Models and the Communication Assets list need to be maintained up to date in 2013. A table with Communication Assets belonging to non-IOAG members was established in 2012 and need to be extended to more partners and to be maintained up to date in 2013. There is a need to clearly point out the services and supporting standards agreed upon by the IOAG Member Agencies. Such services and standards must be known and their infusion status must be provided by all Member Agencies: This refers to the 2010 Service Catalog #1 and the 2011 Service Catalog #2; those references serve for the evaluation of the agencies infusion plans.
Related Objectives:	TOR – (a), (b), (c) IOP-2 (1), (3), (7)
Activities :	1. Continue to collect the inputs from the IOAG Members to fill the IOAG tables with information pertaining to assets and missions of their Agencies. 2. Continue to collect the inputs to fill the IOAG tables with information pertaining to assets and missions of commercial providers. 3. Synthesize the inputs from the IOAG Members in the table showing the infusion status and plans of the recommended standards, and derive the information required to populate the IOAG-CCSDS Product Agreement (ICPA). 4. Keep the above elements up to date on the website. 5. Conduct an action to study how to simplify the collection of the information in the IOAG models, with the objective to complement the tables with the SFCG similar ones.
Implementation:	The IOAG Secretariat is responsible for collecting the inputs from the Agencies. The Secretariat is also in charge of managing these elements and their subsequent updates on the website. This will be coordinated via email with the objective to have all information available on the website at IOAG-17 (mid-May 2013). The Heads of Delegations will ensure that the information required to fill these tables is provided in due time by their Agency. They will provide updates as required so that the information on the web pages is always current. NASA will conduct the action to simplify and improve the process to collect the inputs from the IOAG members and the SFCG.
Expected Outcomes:	1. Current and complete IOAG tables and graphics available on the public website. 2. A Communication assets table with inputs from commercial providers available on the private web site. 3. A report on infusion status and plans that may be used to populate the IPCA in interface with CCSDS. 4. A simplified process to collect input data for the IOAG reference tables.

Next steps:

The cross support services are mainly those required by the current point-to-point and simple multipoint internetworking cross support scenarios, which will later be enhanced with the elaboration of the SSI Operations Concept and Architecture.

To keep the tables up to date is a collective permanent action of the IOAG delegates, under coordination by the secretariat. It will be a pre-requisite for the new members to provide the information related to their agency before they are formally admitted to IOAG and for the members to maintain their membership status.

WP-Core-13.2: Follow-on of the definition of a Solar System Internetworking candidate Architecture (Internet Protocol and Delay Tolerant Network)	
Definition	The IOP-2 has established the objective of an advanced proposal for a SSI at the IOP-3; this includes a consolidated architecture definition. As a first step in that direction, the SISG established a draft SSI Operations Concept at IOAG-14. Based on this document, the CCSDS has accepted to take care of defining SSI Architecture elements which became available by early 2013. The SISG has been put in dormant mode since 2011. The main task of the SISG will be to interact with the CCSDS working groups as required after their architecture is published and to prepare for the IOP-3, in particular defining the next steps in terms of roadmap beyond the IOP-3.
Related Objectives	TOR (e), (f), (h). IOP-2 (6)
Activities	The SISG will be revived in 2013 to prepare for the IOP-3 and will : 1. Review and validate the produced CCSDS documents at IOAG level. 2. Identify potential missions that may serve as demonstrators/users for the SSI-related standards. 3. Elaborate a roadmap on the infusion and deployment of the SSI architecture and concepts. 4. Prepare presentations and proposals for IOP-3, for endorsement by the IOAG-17.
Implementation	The activities are expected to be conducted by the SISG from end 2012; nevertheless, it is likely that mission opportunities need be continuously explored in the next years.
Expected Outcomes	Agreed CCSDS candidate SSI architecture; Plans towards IOP-3 and beyond.
Next steps	After the IOP-3, the activities to be conducted will depend on the directions given by the IOP to the IOAG in this domain. Later on, the IOAG will continue to identify candidate missions that may benefit from adoption of SSI-related standards, in order to build up an internetworking architecture. The final product will include an enhanced IOAG service catalog, relying on a global operations concept, a mature architecture and a governance concept for the SSI.

WP-Core-13.3: Follow-on of the study on Optical Communications links in the domain of cross supports.

Definition	The Optical Links Study Group (OLSG) was formed with the objectives first to collect information from the member agencies on their plans and views, and later to assess the need for cross support in various mission scenarios and the required coordination to identify the technical aspects to be agreed upon to enable the Inter-Operability of optical assets. An addendum to the 2011 report was provided at IOAG-16, in December 2012, including the prioritized efforts for standardization. The main task of the OLSG will be to consolidate on priorities and to prepare for the IOP-3, in particular defining the next steps beyond the IOP-3.
Related Objectives	TOR (e), (f), (h). IOP-2 (1), (5)
Activities	At the IOAG-16 it was decided to extend the OLSG until the IOP-3 to: 1. Elaborate on a reduced set of core optical communication standards (low hanging fruits) that reuse as much as possible from existing CCSDS standards. 2. Address as complements: Downlink (PPM, BPSK, DPSK); Meteorological measurements; Review of existing TDM/ODM formats for adding new meteorological information; Protocols; Analysis of adequacy of IOAG Service Catalogues 1 & 2. 3. Make a preliminary effort estimate for CCSDS standardization activities for core set. 4. Prepare for a presentation at the IOP-3 of entire OLSG Report with the objective to make proposals for next steps so as to obtain guidance from the IOP. This will include ppotential insertion opportunities, updated Roadmap Chart and draft Resolution for IOP-3 endorsement.
Implementation	The studies will be conducted in the first half of 2013. The OLSG will report on its progress at IOAG -17 meeting.
Expected Outcomes	The study will conclude with a report to be approved at IOAG-17. The preparation of the IOP-3 will be conducted concurrently, with the objective of a consolidated presentation at the IOAG-17.
Next steps	After the IOP-3, the activities to be conducted will depend on the directions given by the IOP to the IOAG in this domain. Later on, the IOAG will continue to identify candidate missions that may benefit from adoption of Optical links-related standards. Pending the resolutions and actions to be decided then, the following activities may be anticipated: 1. Iteration with CCSDS on the best practices and on the definition of the elements to be standardized in the domain of optical links, to enable cross supports. 2. Iteration with SFCG on the recommended practices for utilization of optical links, as required. It is anticipated that the IOAG may need to adapt its service catalogues and its reference tables to better address the optical assets and their associated services.

WP-Core-13.4: Completion of the study on the utilization of Ka band (26 GHz) in the domain of LEO satellites.

Definition	At IOAG-15b it has been decided to create the LEO26SG to facilitate the utilization of 26 GHz K-Band (i.e. (25.5-27.0 GHz) direct space to Earth data downlink for future LEO missions, in the context of cross-supports.
Related Objectives	TOR (a), (c), (f), (i).
Activities	The LEO26SG will : . Develop High-level Concepts of Operations and Business Cases for a 26 GHz K-Band LEO spacecraft and ground communications system. . Identify preliminary Architecture inputs for a 26 GHz K-Band ground system. . Identify Standards, Models and Technology Development Needs.
Implementation	At IOAG-16 it was decided that the LEO26SG would present an intermediate report at the IOP-3. A final report is expected end of 2013, on the occasion of the IOAG-18 meeting (TBC).
Expected Outcomes	The preparation of the IOP-3 will be conducted in the first half of 2013, with the objective of a consolidated presentation at the IOAG-17. The study will later conclude with a report and recommendations from the LEO26SG to be approved at IOAG-18.
Next steps	.After the IOP-3, the activities to be conducted will depend on the directions given by the IOP to the IOAG in this domain. Later on, the IOAG will continue to identify candidate missions that may benefit from adoption of LEO26SG links-related standards. Pending the resolutions and actions to be decided then, the following activities may be anticipated: • Iteration with CCSDS on the best practices and on the definition of the elements to be standardized in the domain of Ka-band links for LEO satellites, to enable cross supports. • Iteration with SFCG on the recommended practices for utilization of Ka-band links, as required.

WP-Core-13.5: Future plans concerning the Mission Operations domain	
Definition	The Mission Operations Services Coordination Group (MOSCG) was formed with the objective to investigate the status of the activities related to the Mission Operations domain of CCSDS and to propose strategic guidance to IOAG on the way forward. In mid- 2011, the MOSCG presented its report and it was decided that the IOAG needs guidance from the IOP in this domain; meanwhile, the MOSCG was suspended. At IOAG-16 it was agreed that this informal group will be revived before the IOP-3 and will prepare a presentation to the IOP to decide whether further IOAG-sponsored activity is appropriate and what could be the medium term objectives for the IOAG actions.
Related Objectives	TOR (a), (c), (d), (f), (i).
Activities	At IOAG-16 it has been decided to revive the MOSCG to : 1. Update the status of the activities in the agencies. 2. Prepare a report and to propose strategic guidance to the IOP on the way forward. 3. Elaborate on the next steps in terms of plan of work after the IOP-3 and beyond.
Implementation	MOSCG will have first to confirm both the agencies interest and the IOAG role in driving development of MO standards. Then MOSCG will identify: • The potential benefits and the missions that could benefit from the standards; • The consensus on the functions that should and could be implemented in the foreseeable future; • The effort that will be necessary to implement the agreed functions; • A preliminary plan of work to be consolidated and developed in an incremental approach after the IOP-3. MOSCG will elaborate a plan of work and draft decisions to be endorsed at IOAG-17 for presentation at the IOP-3.
Expected Outcomes	The study will conclude with a progress report at IOAG-16a and a final one to be approved at IOAG-17. The preparation of the IOP-3 will be conducted, with the objective of a consolidated presentation at the IOAG-17.
Next steps	For the longer term, guidance from the IOP will drive any further activity. Depending on the actual involvement of IOAG in this domain, the ultimate outcome of this initiative could be a Service Catalogue #3, still to be identified and consolidated.

WP-Liaison-13.1: Continuation and improvement of the relationship with the International Space Exploration Coordination Group (ISECG)

Definition	The IOP-2 has identified the International Space Exploration Coordination Group (ISECG) as a crucial organization to interface with the IOAG and to represent the user community of the Space Exploration missions. In 2011, the ISECG published a first version of a roadmap that identifies two scenarios for the precursor exploration missions (Moon and Asteroid). The roadmap provides first architecture elements that need be defined and developed with the next version of the roadmap, to be published in late 2012. The IOAG made the ISECG aware of its works in the domain of Space Communications and Navigation, to make sure the IOAG recommendations are taken into account in the ISECG roadmap.
Related Objectives	TOR (a), (b). IOP-2 (1), (3).
Activities	1. Make sure that the ISECG is aware and kept updated on the IOAG recommendations and that ISECG do not duplicate activities unnecessarily. 2. Bring to the attention of the ISECG the CCSDS recommendations in the domains of Mission Operations and On board Interfaces, to evaluate if they should also be referenced in the next version of the ISECG Roadmap. 3. Reach an agreement on references for the Exploration Missions, for presentation at the IOP-3 and the 2013 ISECG plenary meeting.
Implementation	For the activities (1) and (2), ISECG and IOAG will contribute to each other's activities with liaison interface, documents, and presentations in meetings, as appropriate and according to opportunities The activity (3) should be completed before mid 2013.
Expected Outcomes	No duplication of activities on communications and navigation within the ISECG. Presentation to be given at IOP-3.
Next steps	Adaptations of the service catalogs or the SSI documentation should be revisited, as needed, to reflect the high level Exploration Mission requirements. The interface with ISECG being potentially permanent, the activity (3) is expected to be iterated and the exchanges will be as frequent as required to reflect the improvements in the definition of the exploration architecture to be reflected in subsequent versions of the roadmap. The reporting to either organization will be made, as felt appropriate, on the occasion of an ISECG or an IOAG meeting (or videoconference).

WP-Liaison-13.2: Continuation and improvement of the liaison with the Consultative Committee for Space Data Systems (CCSDS)	
Definition	The IOAG has established since 2004 a permanent liaison with the CCSDS. From early 2006, the CCSDS Engineering Steering Group (CESG) co-chairs serve as liaison agents between the two organizations. In turn or depending on opportunities, they attend the IOAG meetings and report on the statements that they collect on the CCSDS side, during the CCSDS Management Council meetings. Also, they convey the IOAG messages back to CCSDS Committees.
Related Objectives	TOR (c), (d), (e), (f), (g). IOP-2 (1), (3).
Activities	1. Continue to use the existing liaison as the main support for the exchanges between the two organizations. Wallace Tai (NASA) and Nestor Peccia (ESA) act as liaison officers between IOAG and CCSDS. In the short term, this activity will concentrate on the subjects of common interest, as they will be directed by the IOP-3 resolutions. 2. Update the "IOAG – CCSDS Product Agreement" tool (ICPA) initiated in 2012, for the two organizations to formulate priorities on the development of standards (IOAG) and to report on the progress made to take such requests are taken into account (CCSDS) so as to identify any issue in this process and to concentrate on their resolution. 3. Hold intermediate meetings between IOAG annual plenary meetings, via tele/video conference, scheduled in a way that will allow to efficiently convey requests and report messages between the two organizations, via the liaison officers.
Implementation	The activities (1) and (2) are under the responsibility of the nominated liaison officers. Activity (3) will be coordinated by the IOAG Secretariat together with the liaison officers. The liaison activities are expected to be summarized at the IOAG-17 in order to consolidate a way forward on the related subjects, as part of the plans to be presented at the IOP-3.
Expected Outcomes	Improved coordination on the development of the standards needed by the projects. ICPA effective between the two organizations and used to analyze the deviations between developments and needs. Presentation to be given at IOP-3.
Next steps	The need and the opportunity of joint meetings at a regular pace is not identified in the short term but an IOAG slot on the agenda of the CMC meetings will be planned. This will be used to have focused discussions on the subjects of common critical interest. The liaison with CCSDS being permanent, the activities are expected to be continuous and the exchanges will be as frequent as required and the reporting to either organization will be made, at the minimum once a year, on the occasion of CCSDS or IOAG meetings (or videoconferences).

WP-Liaison-13.3: Continuation and improvement of the liaison with the Space Frequency Coordination Group (SFCG)	
Definition	The IOAG has established since 2005 a permanent liaison with the Space Frequency Coordination Group (SFCG). From then, a member of SFCG serves as liaison officer between IOAG and SFCG. The liaison officer attends the IOAG or SFCG meetings and reports on the statements that they collect on the other side. The coordination is established to reach agreement on how to address the spectrum and frequency issues that may arise on the SFCG or ITU sides.
Related Objectives	TOR (c), (d), (e), (f), (g). IOP-2 (1), (3).
Activities	1. Enrico Vassallo (ESA) acts as liaison officer between IOAG and SFCG and the main support for the exchanges between the two organizations. In the short term, this activity will concentrate on the preparation of the ITU WRC-15 conference and the positions of the IOAG agencies. 2. SFCG liaison participates to check completeness or discrepancies, to correctly interpret inputs and to provide comments to the IOAG mission model. 3. Collect the suggestions of the SFCG for future improvements of the interface, in particular on the expectations of the SFCG on inputs to their works. 4. Contribute to each other's activities with liaison statements, documents, and presentations in meetings, as appropriate.
Implementation	The activities (1, 2, 3 and 4) are under the responsibility of the nominated liaison officer: Enrico Vassallo (ESA). The activities (3) and (4) will be conducted with the support of the IOAG Secretariat. The liaison activities are expected to be summarized at the IOAG-17 in order to consolidate a way forward on the related subjects, as part of the plans to be presented at the IOP-3.
Expected Outcomes	Coordination made on the items on the agenda of the ITU WRC-15 conference. Improved IOAG Mission Model that better reflects the mission profiles of SFCG interest. Presentation to be given at IOP-3. Improved processes and relationship between SFCG and IOAG.
Next steps	The liaison with SFCG being permanent, the activity (4) is expected to be continuous and the exchanges will be as frequent as required and the reporting to either organization will be made, at least once a year, on the occasion of a SFCG or an IOAG meeting (or videoconference).

WP-Liaison-13.4: Definition and implementation of a liaison with the International Committee on Global Navigation Satellite Systems (ICG)	
Definition	At IOAG-14 the idea of a new liaison with the International Committee on Global Navigation Satellite Systems (ICG) to exchange information on the user requirements and possible services in the domain of Positioning, Navigation and Timing (PNT), in particular for the GNSS Space Service volume, was approved. In 2011, the IOAG was given a position of Observer with the ICG. Exchanges of views were initiated up to IOAG-16 and actions were identified then to prepare for a reporting to the ICG, on the Navigation Mission Model.
Related Objectives	TOR (c), (d), (e), (f), (g). IOP-2 (1), (3).
Activities	1. James Miller (NASA) acts as IOAG Observer in the ICG meetings. In the short term, this activity will concentrate on the Navigation Mission Model and the requirements for the GNSS Space Service Volume. A list of the issues to be addressed in the short, medium or long term, under this liaison, should be established and updated to support the reporting on both sides. 2. Establish processes and organization within IOAG that enables the reception and processing of special requests from the ICG. 3. Contribute to each other's activities with liaison statements, documents, and presentations in meetings, as appropriate.
Implementation	The activity (1) is under the responsibility of the nominated liaison officer. The activities (2) and (3) will be conducted with the support of the IOAG Secretariat. The interface activities are expected to be summarized at the IOAG-17 in order to consolidate a way forward on the related subjects, as part of the plans to be presented at the IOP-3.
Expected Outcomes	Navigation Mission Model submitted by the IOAG Agencies to the ICG. Presentation to be given at IOP-3. Possibly, presentation of the IOAG to the ICG Fall 2013 meeting.
Next steps	The relationship with ICG being potentially permanent, the activities are expected to be continuous and the exchanges will be as frequent as required and the reporting to either organization will be made, at least once a year, on the occasion of an ICG or an IOAG meeting (or videoconference).

WP-Processes-13.1: Improvement of the IOAG internal processes	
Definition	The IOAG Secretariat supports the organization in many of its areas of activities and plays a central role in the flow of information within the IOAG, with external organizations of interest and with the agencies or their partners. The tools utilized by IOAG and managed by the Secretariat need be kept as efficient as possible so as to facilitate the activities of all.
Related Objectives	IOP-2 (3).
Activities	1. Continue to improve the IOAG website on the public side, to reflect the role, activities and achievements of the IOAG. The final outcomes of the IOAG core tasks in the present Work Plan should be displayed on the public website of IOAG. 2. Continue to improve the IOAG website, on the secure side, to provide tools for the members to access the documentation related to each meeting. Special areas of interest are the action items (lists, elements of progress or closure), the resolutions submitted for discussion, the documents submitted for review and comments, the announcements of events in the IOAG domain of interest, the schedules for next IOAG videoconferences or meetings. 3. Identify opportunities and propose ways to support the promotion of the services selected by the IOAG to support the cross support scenarios, through presentations at workshops or conferences. 4. Identify how to efficiently exchange information with the organizations having liaisons with IOAG: initially, ISECG, CCSDS, SFCG and ICG. Also, the schedules of the meetings of such organizations could be integrated into a global IOAG schedule (2 year horizon). 5. Support the IOAG in the preparation of the IOP-3.
Implementation	The Secretariat is in charge of the improvement of all processes. The schedule of implementation of the different tasks is made by the Agency funding the Secretariat. The implementations may need an acceptance by the IOAG Chairman only or by the members, depending upon the case.
Expected Outcomes	Improved website. Reliable tools and processes. Better knowledge of IOAG activities, achievements and recommendations, inside and outside the IOAG community. Support for presentation of IOAG's role, achievements and plans at the Space Ops 2012 conference.
Next steps	New objectives will be established every year so as to improve the outreach of IOAG and its internal efficiency.

ANNEX-3: PARTICIPATION OF AGENCIES

X: Lead Function x: Participant	Secretariat	Chairman	ASI	CNES	DLR	ESA	ISRO	JAXA	NASA	RFSA	UKSA	KARI
CORE TASKS												
Mission models, Communication Assets and Standards Infusion	X		x	x	x	x	x	x	x	x	x	x
Solar System Internetwork (SISG)				x	x	X		x	X		x	
Optical Links Study Group (OLSG)				x	x	X		x	X			x
Mission Operations Services Coordination Group (MOSCG)				x	x	X		x	X			
LEO 26 GHz Study Group (LEO26SG)				x	x	X		x	X			
COLLABORATIONS WITH OTHER ORGANIZATIONS												
Interface with ISECG	x	X				x						
Liaison with CCSDS	x	x				X						
Liaison with SFCG	x	x				X						
Interface with ICG	x	x							X			
IMPROVEMENT OF IOAG TOOLS AND METHODS												
Improvement of tools and methods	X	x							x			

Annex-4: Organizational Relationship