



INTERAGENCY OPERATIONS ADVISORY GROUP

Work Plan 2012

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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 interoperability 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 2012 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 2012 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 2012 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 2012 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 2012; 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 resources assigned by the IOAG participating agencies.

The activities conducted by the IOAG in 2012 will include the preparation of presentations to the IOP-3, which should take place in 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 2012.

Four core tasks have been identified for 2012:

- Core 12.1 = Improvement of accuracy and visibility of the IOAG Mission Model, Cross Support Mission Model, Communication Assets and Standards Infusion Status.
- Core 12.2 = Draft definition of a Solar System Internetworking candidate Architecture (Internet Protocol and Delay Tolerant Network)
- Core 12.3 = Completion of the study on the utilization of optical links in the domain of cross supports.



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- Core 12.4 = Future plans concerning the Mission Operations domain of the Consultative Committee for Space Data Systems (CCSDS).

The IOAG TOR and Procedures Manual were revisited in 2009; therefore, there is no plan to update these documents in 2012.

A key objective in IOAG 2011 Work Plan, assigned by the IOP-2, was the endorsement of the IOAG Service Catalog # 2, which was achieved in February 2011.

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 2012:

- Liaison 12.1 = 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 12.2 = 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 position and interfaces between IOAG and CCSDS.
- Liaison 12.3 = 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 12.4 = 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.

As a first activity for the above tasks, the identified organizations need to be approached to consolidate the goals and work to be performed. These consolidated objectives have to be verified to confirm the work that can be completed in 2012.

The task identified in the IOAG 2011 Work Plan with the International Lunar Network (ILN), to collect their requirements in the domain of Space Communications and Navigation was completed in 2011 and is reflected in the SISG report.

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. 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 12.1" in Annex-2.

6 Reporting Activities

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 2012 Work Plan.

The Annual Report will be posted on the public IOAG website (<https://www.ioag.org>) no later than January 2013.



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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 interoperability and enunciating policies furthering interoperability. 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 interoperability 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



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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 interoperability 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 interoperability, in particular, maintaining compatibility with prior recommendations.



ANNEX-2: TASK DEFINITIONS

WP-Core-12.1: Improvement of accuracy and visibility of the IOAG Mission Model, Cross Support Mission Model, Communication Assets and Standards Infusion Status.

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| Definition: | <p>The IOAG Mission Model, the IOAG Cross Support Mission Models and the Communication Assets list were improved in 2011 and need to be maintained up to date in 2012.</p> <p>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 was initiated with the 2010 Service Catalog #1 and the 2011 Service Catalog #2; those references may now serve for the evaluation of the agencies infusion plans.</p> |
| Related Objectives: | <p>TOR – (a), (b), (c)</p> <p>IOP-2 (1), (3), (7)</p> |
| Activities : | <ol style="list-style-type: none">1. Establish a template for agency inputs to the reference tables and an associated user guide for the agencies to complete the template and for the secretariat to produce the IOAG aggregate tables.2. Continue to collect the inputs from the IOAG Members to fill the IOAG tables with information pertaining to assets and missions of their Agencies.3. Establish a Communication assets table with inputs from commercial providers.4. Synthesize the inputs from the IOAG Members in the table showing the infusion status of the recommended standards in their Agency.5. Display the above elements in the public pages of the IOAG web site, for information of the agencies, the standard organizations or the user communities.6. Keep the above elements up to date on the website. |
| Implementation: | <p>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-15b.</p> <p>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.</p> |
| Expected Outcomes: | <ol style="list-style-type: none">1. A comprehensive template available on the private web site for the Agencies to provide periodically their inputs to the IOAG reference tables.2. A user guide available on the private web site.3. Current and complete IOAG mission model graphics, IOAG cross support mission model table, IOAG communication assets table available on the public website.4. Current and complete IOAG mission model table available on the private website.5. A Communication assets table with inputs from commercial providers available on the private web site.6. IOAG services and standard infusion tables collected from all Agencies available on the private website (referring to Service Catalog #1 and to |



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Service Catalog #2).

7. A report on infusion status and plans on the public website.

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 the 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-12.2: Draft definition of the architectural elements of a Solar System Internetwork

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| Definition | <p>The IOP-2 has established the objective of an advanced proposal for a SSI at the IOP-3 (not earlier than 2013); this includes a mature architecture and an enhanced service catalog. As a first step in that direction, the SISG established a draft SSI Operations Concept at IOAG-14.</p> <p>Based on this document, the CCSDS has accepted to take care of defining SSI Architecture elements which should become available by mid-2012. The SISG was subsequently put in dormant mode in 2011.</p> <p>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 towards the IOP-3 and beyond.</p> |
| Related Objectives | <p>TOR (e), (f), (h). IOP-2 (6)</p> |
| Activities | <p>The SISG will prepare for the IOP-3 and will :</p> <ol style="list-style-type: none"> 1. Review and validate the produced CCSDS documents at IOAG level. 2. Identify potential missions that may serve as demonstrators for the SSI-related standards. 3. Elaborate a roadmap on the infusion and deployment of the SSI architecture and concepts. 4. Prepare reports and proposals for IOP-3, for endorsement by the IOAG-16. |
| Implementation | <p>The activities are expected to be conducted by the SISG from after mid 2012; nevertheless, it is likely that mission opportunities need be continuously explored in the next years.</p> |
| Expected Outcomes | <p>Agreed CCSDS candidate SSI architecture; Plans towards IOP-3 and beyond.</p> |
| Next steps | <p>After the IOP-3, the activities to be conducted will depend on the directions given by the IOP to the IOAG in this domain.</p> <p>Later on, the IOAG will identify potential missions that may benefit from adoption of SSI-related standards, in order to build up an internetworking architecture.</p> <p>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.</p> |



WP-Core-12.3: Completion of the study on the utilization of optical links in the domain of cross supports.

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| Definition | <p>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 interoperability of optical assets.</p> <p>An intermediate report was provided at IOAG-15, including the study of other mission scenarios (e.g., LEO) and partial results on use cases and on the constraints and requirements that will apply for the definition of the related standards.</p> |
| Related Objectives | <p>TOR (e), (f), (h). IOP-2 (1), (5)</p> |
| Activities | <p>At the IOAG-15 it was decided to extend the OLSG until mid-2012 to:</p> <ol style="list-style-type: none">1. Complement the study with other mission scenarios (e.g., LEO) and results on use cases and on the constraints and requirements that will apply for the definition of the related standards.2. To investigate the opportunities of early demonstrators to validate the findings of the OLSG.3. To identify the standardization needs and convey to CCSDS the conclusions of the OLSG.4. Prepare for a presentation at the IOP-3 with the objectives to inform on the opportunity to reach agreement on this new cross support capability and with proposals for next steps so as to obtain guidance from the IOP. |
| Implementation | <p>The study will be conducted in the first half of 2012. The OLSG will report on its progress at each IOAG intermediate meeting.</p> |
| Expected Outcomes | <p>The study will be completed with a report to be approved at IOAG-15b (TBC) for information of CCSDS and SFCG, as appropriate. The preparation of the IOP-3 will be conducted subsequently, with the objective of a consolidated approach at the IOAG-16.</p> |
| Next steps | <p>After the IOAG-16 and pending the resolutions and actions to be decided then, the following activities may be anticipated:</p> <ol style="list-style-type: none">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.3. Iterations between IOAG and OLSG for the final preparation of the IOP-3. <p>For the longer term, guidance from the IOP will drive any further activity. 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.</p> |



WP-Core-12.4: Preliminary evaluation of the Mission Operations domain of CCSDS

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| Definition | <p>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 should be suspended.</p> <p>It is now expected 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.</p> |
| Related Objectives | <p>TOR (e), (f), (h). IOP-2 (1), (6)</p> |
| Activities | <p>At IOAG-15 it has been decided to revive the MOSCG to :</p> <ol style="list-style-type: none">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 roadmap after the IOP-3 and beyond. |
| Implementation | <p>At IOAG-15 it was decided that the MOSCG would be revived 6 months prior to the IOP-3.</p> <p>As appropriate, a report on activities (1), (2) and (3) will be submitted by the MOSCG at the IOAG-16 or at any subsequent IOAG meeting, as will match the MOSCG – IOP schedules.</p> <p>Depending the findings and recommendations in this report the activities (2) and (3) may be further iterated and possibly consolidated up to the IOP-3. Before the IOP-3, in 2013, some iteration with CCSDS may also be required.</p> |
| Expected Outcomes | <p>Report and recommendations from the MOSCG. Plans for after IOP-3.</p> |
| Next steps | <p>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.</p> |



WP-Liaison-12.1: Continuation and improvement of the relationship with the International Space Exploration Coordination Group (ISECG)

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| Definition | <p>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.</p> <p>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 2012.</p> <p>The IOAG should make the ISECG aware of its works in the domain of Space Communications and Navigation, both to make sure the IOAG recommendations are taken into account in the ISECG roadmap and the ISECG requirements are taken into account in IOAG works. Service catalogs and SISG documents were handed over to ISECG Architecture WG in 2011.</p> |
| Related Objectives | <p>TOR (a), (b).</p> <p>IOP-2 (1), (3).</p> |
| Activities | <ol style="list-style-type: none"> 1. Make sure that IOAG recommendations are taken into account by the ISECG and are properly referenced in the next version of the ISECG Roadmap. 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 preliminary architectures for the Exploration Missions, for presentation at the 2012 ISECG plenary meeting and later on at the IOP-3. |
| Implementation | <p>For the activities (1) and (2), ISECG and IOAG will contribute to each other's activities with liaison statements, documents, and presentations in meetings, as appropriate and according to opportunities</p> <p>The activity (3) should be completed before September 2012.</p> |
| Expected Outcomes | <p>The 2012 ISECG roadmap should reference IOAG and possibly, CCSDS recommendations.</p> <p>Adaptations of the service catalogs or the SSI documentation should be revisited, as needed, to reflect the high level Exploration Mission requirements.</p> |
| Next steps | <p>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.</p> <p>The reporting to either organization will be made, as felt appropriate, on the occasion of an ISECG or an IOAG meeting (or videoconference).</p> |



WP-Liaison-12.2: Continuation and improvement of the existing liaison with the Consultative Committee for Space Data Systems (CCSDS)

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| 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 | <ol style="list-style-type: none"> 1. Continue to use the existing liaison as the main support for the exchanges between the two organizations. Adrian Hooke (NASA) and Nestor Peccia (ESA) act as liaison officers between IOAG and CCSDS. In the short term, this activity will concentrate on the cross support services and the internetworking, as discussed on both sides. 2. Finalize the “IOAG – CCSDS Product Agreement” tool (ICPA) initiated in 2011, 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. 4. Iterate with CCSDS on the subjects of interest already identified in 2010 and related to the IOAG core activities number 3 (SSI), 4 (Optical links) and 5 (Mission Operations). 5. Contribute to each other’s activities with monitoring and update of the ICPA, liaison statements, documents, and presentations in meetings, as appropriate. |
| Implementation | <p>The activities (1) and (2) are under the responsibility of the nominated liaison officers.</p> <p>Activity (3) will be coordinated by the IOAG Secretariat together with the liaison officers.</p> <p>The liaison activities are expected to be summarized at the IOAG-15 in order to consolidate a way forward on the related subjects, as part of the plans to be presented at the IOP-3.</p> <p>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.</p> |
| Expected Outcomes | <p>Improved coordination on the development of the standards needed by the projects.</p> <p>ICPA effective between the two organizations and used to analyze the deviations between developments and needs.</p> <p>SSI Architecture approved by both IOAG and CCSDS.</p> <p>Elements of the roadmaps to be presented at IOP-3.</p> |
| Next steps | The liaison with CCSDS being permanent, the activity (5) is 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 |



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occasion of CCSDS or IOAG meetings (or videoconferences).



WP-Liaison-12.3: Continuation and improvement of the existing liaison with the Space Frequency Coordination Group (SFCG)

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| Definition | The IOAG has established since 2005 a permanent liaison with the Space Frequency Coordination Group (SFCG). From then, a member of each organization serves as liaison officer between them. The IOAG person in charge of this liaison or, when the need arises, both officers attend the IOAG or SFCG meetings and report on the statements that they collect on the other side. |
| Related Objectives | TOR (c), (d), (e), (f), (g). IOP-2 (1), (3). |
| Activities | <ol style="list-style-type: none"> 1. Continue to use the existing liaison as the main support for the exchanges between the two organizations. Enrico Vassallo (ESA) acts as liaison officer between IOAG and SFCG. In the short term, this activity will concentrate on the frequency and spectrum utilization for inter-satellite links, for the Earth, Moon and Mars missions. 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. SFCG liaison participates to correctly interpret inputs and provide comments to the mission model. Contribution to the following IOAG meeting would be an update of the established Moon/Martian missions by e-mail. 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 | <p>The activities (1, 2, 3 and 4) are under the responsibility of the nominated liaison officer: Enrico Vassallo (ESA).</p> <p>The activities (3) and (4) will be conducted with the support of the IOAG Secretariat.</p> <p>The liaison activity will be summarized at the IOAG-16 in order to possibly establish the work plan for the next years.</p> |
| Expected Outcomes | <p>Improved IOAG Mission Model that better reflects the mission profiles of SFCG interest.</p> <p>Improved processes and relationship between SFCG and IOAG.</p> |
| 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-12.4: Definition and implementation of a liaison with the International Committee on Global Navigation Satellite Systems (ICG)

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| Definition | <p>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.</p> <p>In 2011, the IOAG was given a position of Observer with the ICG. Exchanges of views were initiated up to IOAG-15 and actions were identified then to prepare for a reporting to the ICG, on the Navigation Mission Model.</p> |
| Related Objectives | <p>TOR (c), (d), (e), (f), (g). IOP-2 (1), (3).</p> |
| Activities | <ol style="list-style-type: none"> 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 | <p>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.</p> <p>The liaison activity will be summarized at the IOAG-16 in order to possibly establish the work plan for the next years.</p> |
| Expected Outcomes | <p>Navigation Mission Model submitted by the IOAG Agencies to the ICG. Possibly, presentation of the IOAG to the ICG Fall 2012 meeting.</p> |
| Next steps | <p>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).</p> <p>Periodical cross attendance to each other's meetings may be anticipated starting from end of 2012.</p> |



WP-Processes-12.1: Improvement of the IOAG internal processes

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| Definition | <p>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.</p> <p>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.</p> |
| Related Objectives | IOP-2 (3). |
| Activities | <ol style="list-style-type: none"> 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, ILN, 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 | <p>The Secretariat is in charge of all activities. The schedule of implementation of the different tasks is made by the Agency funding the Secretariat. The achievements may need an acceptance by the IOAG Chairman only or by the members, depending upon the case.</p> |
| Expected Outcomes | <p>Improved website.</p> <p>Reliable tools and processes.</p> <p>Better knowledge of IOAG activities, achievements and recommendations, inside and outside the IOAG community.</p> <p>Support for presentation of IOAG's role, achievements and plans at the Space Ops 2012 conference (June).</p> |
| Next steps | <p>New objectives will be established every year so as to improve the outreach of IOAG and its internal efficiency.</p> |

ANNEX-3: RESOURCES

| X: Lead Function | Secretariat | Chairman | ASI | CNES | DLR | ESA | ISRO | JAXA | NASA | RFSA | UKSA | KARI |
|---|--------------------|-----------------|------------|-------------|------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|
| x: Participant | | | | | | | | | | | | |
| 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 | | | x |
| COLLABORATIONS WITH OTHER ORGANIZATIONS | | | | | | | | | | | | |
| Interface with ISECG | x | X | | | | x | | | | | | |
| Liaison with CCSDS | x | 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 | | | |