



International Astronautical Federation

International Aeronautical Federation (IAF)
International Project/Programme Management Committee (IPMC)

2018 Young Professional Workshop Statement of Work

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Bremen, Germany

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1 Introduction

1.1 Scope

This Statement of Work (SoW) describes the workshop activities to be executed and the deliverables required by the IAF's International Project/Programme Management Committee (IPMC) with respect to a set of recommendations that shall be derived to support ongoing development of young professionals in the international space industry and the development of the next generation workforce.

1.2 Background for the Workshop

Young professionals throughout the space industry face daily challenges when it comes to making the transition from their student careers to their professional careers and from starters to experienced professionals and leaders. These challenges arise from either their perceived, or demonstrated, lack of professional work experience as students and continue into the first five to ten years of their careers. Early career professionals are not only faced with the steep learning curves associated with obtaining real-world skills but are also faced with the need to earn the respect of their more experienced colleagues.

In recognition of these challenges, the IPMC member organizations welcome the active participation of early career employees in identifying challenges, opportunities, and new approaches to nurturing a highly motivated and experienced aerospace workforce. These efforts are being pursued through workshops involving selected young professionals and overseen by an appointed organizing committee. The expected output of these workshops are observations, conclusions and recommendations that can be employed by (aero) space organizations to ease the transition of young professionals into their careers and facilitating transfer of know how to new generations of workforce. The workshop observations and recommendations can also benefit early career employees by helping them to navigate and advance in the early stages of their careers.

1.3 Reference Documents

The following documents can be consulted by the workshop participants as they contain relevant background information. These documents can be consulted on the 2018 IPMC YP Workshop Delegates Folder.

Reference Documents			
No.	Title	Author	Date
RD1	IAF-IPMC Young Professionals Workshop – Delegate Handbook	WOC	2012
RD2	IAF-IPMC Young Professionals Workshop – Workshop Results Report	Workshop Delegates	2012
RD3	IAF-IPMC Young Professionals Workshop – Delegate Handbook	WOC	2013
RD4	IAF-IPMC Young Professionals Workshop Report	Workshop Delegates	2013
RD 5	IAF-IPMC Young Professionals Workshop – Delegate Handbook	WOC	2014
RD 6	IAF-IPMC Young Professionals Workshop Report	Workshop Delegates	2014
RD 7	IAF-IPMC Young Professionals Workshop – Delegate Handbook	WOC	2015
RD 8	IAF-IPMC Young Professionals Workshop Report	Workshop Delegates	2015
RD 9	IAF-IPMC Young Professionals Workshop – Delegate Handbook	WOC	2016
RD 10	IAF-IPMC Young Professionals Workshop Report	Workshop Delegates	2016
RD 11	FIVE YEARS OF IAF IPMC YOUNG PROFESSIONALS WORKSHOP	Birgit Hartman and Maarten Adriaensen	2016
RD 12	IAF-IPMC Young Professionals Workshop Report	Workshop Delegates	2017
RD 13	IAF-IPMC Young Professionals Workshop – Delegate Handbook	WOC	2017

1.4 WOC organization

The WOC is organised along the following work distribution:

Birgit Hartman	WOC Project Manager
Marié Botha	Operations Manager
Peter Batenburg	Logistics Manager
Kavya Manyapu	Boeing Implementation Officer
Elizabeth Barrios	Data Manager
Jennifer Sizemore	Assistant WOC

The WOC team can be reached via ipmc.yp.workshop@gmail.com

1.5 Acronyms and Abbreviations

IAC	International Astronautical Congress
IAF	International Astronautical Federation
IPMC	International Project/Programme Management Committee
SOW	Statement of Work
WOC	Workshop Organising Committee
YP	Young Professional (participants - delegates)

2 Objectives of the Workshop

The goal of the IPMC YP Workshop is to gather inputs from young professionals in the international space community to gain the knowledge they need to better develop and empower the next generation workforce. For that purpose, the conducted research by the working groups is intended to produce thoughtful and well-rounded observations and recommendations on the assigned topics.

The observations and recommendations will be gathered in the IPMC YP Workshop report and delivered to the IPMC participants, their member organizations and the other member organizations of the IAF. The YP Workshop report will also be made publicly available on the IAF website (www.iafastro.org)

3 Topic Descriptions

For the purposes of the workshop, delegates are allocated into separate groups, each of which will be responsible for one of the topics hereunder.

3.1 Topic 1 – Continuation of the 2015 IPMC YP “Decision Factors for Aerospace Young Professionals” Survey

As part of the 2015 IPMC Young Professionals Workshop, the topic group was requested to quantify the relevance of decision factors that might influence young professionals to enter into the aerospace sector and to assess the attractiveness of the sector in general.

The key question to be addressed by delegates in this topic is:

Further analyses of the “Decision Factors for Aerospace Young Professionals” survey outcome and propose follow-up / implementation actions.

Key in this group is to take the survey as the base for the continuation of the research and build on the information already at hand. It is not suggestion to conduct another survey.

The following elements should be covered in the research:

- Analysis on STEM student diversity
- Identify PM approaches from different cultures.
- Quantifiable benefit and/or disadvantage of younger / more senior management in PM.
- Analysis of the availability and accessibility of internships in agencies / organizations.
- The evolution of work/life balance requirements for YP’s working in the aerospace sector and do these requirements differ from other sectors.
- What defines and attractive (aero)space employer.
- A YP’s definition of exciting projects and how can a YP rapidly be fully engaged in this “exciting project”.
- How can the space sector maintain non-technical YP’s working space.
- Cost analysis of attracting and keeping YP’s working in the aerospace sector.

The presentation at the workshop should present clear and constructive recommendations for the IPMC member organizations and possible ways of implementation.

Please consult the findings in previous workshops, and especially the 2015 Decision factor survey report as a reference.

3.2 Topic 2 – Fostering Project Management in the world of Diversity

In today's aerospace industry, efficient communication between this ever increasing diverse workforce is essential and project managers are having to employ new methods to achieve successful intergenerational, diverse collaboration. The effect of this new workforce on the aerospace industry and its potential to propel the industry forward should be covered.

The key assignment to be addressed by the delegates in this section is:

To provide realistic recommendations to address the Diversity within the aerospace industry through Project Management techniques

The following elements should be covered in the research:

- Discuss how Diversity is represented in the aerospace industry.
- Does such a diverse workforce influence the retention rate of the Young Professionals in the aerospace industry? If so, what are ways project managers can alleviate the identified downfalls that would cause a YP to leave the aerospace industry?
- Do knowledge transfer (KT) tactics need to change when considering diversity?
- What drawbacks and benefits would be observed when considering how this diverse workforce interacts and communicates and how would this influence the progress within the aerospace industry? Are there different drawbacks and benefits when considering established space businesses (i.e. government) versus industry or startups?
- How can a project manager promote open collaboration and communication within this diverse workforce to alleviate possible drawbacks?
- How would a project manager handle the “Innovator’s Dilemma” / disruptive inventions / new ways of thinking.
- Benefits of diverse PM approaches.

The main goal of this topic is to build upon previous workshops that explored generational diversity and to give an understanding of such a diverse workforce while offering plausible solutions to project managers for alleviating some downfalls. This type of discussion focuses on ways to make the aerospace workforce work more efficiently to propel our journeys in space exploration forward.

3.3 Topic 3 – Space 4.0 and the evolution of the (aero) space Sector

Digitalization and connectivity developments are enabling new businesses and industries to grow and are revolutionizing the way businesses and industries work. These developments allow for faster reaction and development times, and cost optimization. A trend has developed where new space companies have emerged and introduced new development techniques similar to other technologies fields.

The key assignment to be addressed by delegates in this section is:

Provide clear, coherent, analysed and realistic recommendations for agencies and industries to adapt project management approaches to better allow new space industry to enter the space business and how to optimize this collaboration.

The following elements should be covered in the research:

- The developments of Artificial Intelligence (AI), human and communicative aspects in Project Management and its associated risks.
- Model Based Systems Engineering (MBSE); utilization and implementation, benefits and challenges
- Is Space 4.0 inspiring and motivating for the next generation? If so, how?
- Demographic progression of Space 4.0, who is leading the revolution of the Space 4.0 and in what way?
- Supplier certification - how is the supply chain managed/integrated/established in emerging / established (aero) space businesses and how is the link developing towards non space sectors.
- Which are the business models of new space players (cost/risk assessment/product focused/new space and non-space oriented businesses/etc.) and how can today's Project Managers collaborate between the new and established businesses.
- How has digitization progressed in the new space industries and what are the implication for PM? Is the human interaction still a necessity for successful PM?
- Which are the business models of new space players (cost/product focussed/new space and non-space oriented businesses/etc.) and how can today's Project Managers collaborate between the new and established businesses.
- Identify PM methodologies and platforms that will mitigate the risks associated with new entrants to space projects.
- What disruptive technologies utilized by new space companies are key in the development of the space industry.
- How does the adoption of new technologies in the space industry impact the existing project management methods utilized in the industry and how should PM adapt?
- Is the development of Space 4.0 influencing PM in the next 5 years? Define the impact, the risk and the future competencies to manage

Starting point for your research should be the IPMC YP Workshop report from 2017 as well as the IPMC YP workshop report from 2013 and 2016.

The study shall include, but shall not be limited to the elements above. International trends in new and established space companies and space project should be identified and mapped.

3.4 Topic 4 - Challenges faced by multi-disciplinary teams working on space projects between emerging and legacy space economies

Space projects have become increasingly globalized and teams multi-disciplinary. Adding to the complexity of space projects is the entrance of new space economies and the increased dependence on agile supply chains. This topics aims to capture the complexities of working on space projects within multi-disciplinary teams, between new entrants from emerging space economies as well as legacy space economies.

The key assignment to be addressed by delegates in this section is:

Identify areas and methods of optimized collaboration between team members working on the same projects from either emerging space economies or legacy space economies, ensuring ease of integration of first team space project team members.

The following elements should be covered in the research:

- Define and identify possible multi-disciplinary capacity that would work on a defined space project.
- What unique value proposition could the composition of a multi-disciplinary project team bring to the final outcome of the project?
- Identify project management methods and platforms that will mitigate the risks associated with new entrants to space projects.
- What is the main differences between project team members who have participated in space projects previously, and the new entrants to the space project?
- Ways to promote multi-disciplinary projects and encourage new entrants to the space project team.
- What would be considered a successful project for a new entrant from an emerging space economy to the space project?
- What unique value proposition could the new entrants from the emerging space economies bring to the legacy space economies team members?
- How can we help establish a new space economy? Are the emerging economies and companies what is needed for the development of future space programs?
- Looking at the space program development, what is the demand and are emerging space economies following this demand.

- The challenges of making collaborations with new entrance business model based (non) space players and space agencies profitable.
- Revenue of investment, is the space sector revenue driven and how are emerging and legacy space agencies working towards this goal.
- Define the challenge or benefit of the changing mind set between “new space” (startups) and “established space”.
- What is the risk appetite of new space and how does this affect the aerospace sector.

It is recommended that the team starts by researching the outcomes of previous IPMC YP workshop, as there have been a number of related topics that research various aspects pertaining to this topic. To gather data for this topic, it is proposed that interviews be conducted with various professional organizations from various nations, across different levels of management.

3.5 Topic 5 Knowledge Management practices

Knowledge Management (KM) practices ensure the identification, capture, preservation and sharing of knowledge in order to continuously improve the organization’s effectiveness and efficiency in pursuing its mission.

The key assignment to be addressed by delegates in this section is:

Define the KM best practices, tools and methodologies in today’s aerospace sector, provide concrete recommendations on KM to enable Knowledge Capturing for the next generation workforce.

The following elements should be covered in the research:

- KM practices in place across the space sector to ensure the preservation of both technological and managerial lessons learned.
- Identify differences in KM practices in startups vs established space companies/organizations
- From a YP perspective, what Knowledge is expected when starting a new project
- What KM is missing from existing tools and methodologies for YP’s to rapidly engage in the project.
- Identify knowledge transfer mechanisms to utilize during the project management to ensure capturing of learning and best practices.
- What can be considered success criteria for KM and do these criteria change between generations and / or organizations
- Competencies
- Knowledge is required by YP’s and knowledge can be shared by senior management, are the expectation equally defined?
- When is something information, or knowledge, or data? What do we transfer and in what way?

- Best practices tools and methodologies in place for KM and PM, IBM-Watson, MBSE, Wiki, etc.
- Create a case study for a KM plan that can be implemented in the both new space companies and the established (bigger) space companies.

The concept of the retirement wave has been widely acknowledged and it is agreed that action needs to be taken. In light of this, the importance of KM is growing. To gather valuable information and insight on this topic interviews can be conducted as well as small and controlled surveys can be considered. It is also recommended to review previous IPMC YP workshop results.

4 Requirements for Management, Meetings, Deliverables and Reporting

4.1 Management

Each topic group shall have an appointed group leader who will be responsible for overseeing the timely execution of the tasks assigned to that group. The group leader will represent his or her group at all relevant meetings with the WOC. At such a time where the group leader cannot attend a meeting, the group leader should appoint an ad hoc representative. The group leader shall be the main point of contact between the group and the WOC.

Duties of the group leader include:

- Establishment of a project schedule including major milestones and deliverables
- Scheduling and execution of regular group meetings
- Representation of group at all relevant meetings of the WOC
- Accountability for all group deliverables and their quality.

Each group shall have an appointed rapporteur who will be responsible for the compilation and distribution of group minutes of meeting and reports.

The group leader will be in charge of organising it's team as they wish, provided the various tasks will be shared between the team members and all deliverables will be submitted timely.

4.2 Meetings

Each group is required to hold regular meetings (at least twice per month) to ensure project tasks are on schedule and in line with WOC expectations. One member of the WOC is to be in

attendance regularly during these meetings to offer guidance and insight as requested by the group members.

The Kick-off Meeting will be held in June to officially begin the pre-workshop activities. All delegates and members of the WOC are expected to be in attendance. Those who cannot attend must inform their group leaders. Group leaders who are not able to attend must inform the WOC and appoint a representative in their place. The workload of the workshop is estimated at 3 hours per week, with peaks just prior to the workshop to ensure timely finalization of the report and presentation.

Group leaders are expected to submit their final input to the IPMC YP Workshop 2018 report one week before the workshop. A final meeting will be held during the IAC. On the day of the workshop minor details can be corrected and or added.

4.3 Deliverables

Each group shall provide a detailed analysis of their group's topic which will be used for the 2018 report.

The following list of deliverables shall apply:

- 1) Group meeting minutes of meeting (living google document is sufficient) including work distribution, planning and execution of research and writing/editing
- 2) Draft presentation
- 3) Draft report
- 4) Final presentation
- 5) Final report

As much detail as possible should be provided in all major deliverables. As a rule, enough detail should be provided in each document such that a reader who was not involved in the research can clearly follow the steps taken in the research in order to reproduce the results.

4.4 Reporting

As the 3 reports of the participants will be inserted into 1 final report to IPMC, a unified structure, format and referencing has to be adopted.

For your preliminary and final report submission, the use of **APA style referencing** is mandatory. APA referencing system uses the author-date citation system in text. All sources are cited in the references.

Structure for the Group Reports is:

1. Introduction
2. Methodology
3. Research/Investigation/Discussion
4. Concluding remarks, observations, suggestions
5. Annexes

The discussion groups should keep the draft sections they prepare as concise and to the point as possible. Each topic section should be a maximum 10 pages (25 pages including references and appendices).

Manuscripts format:

- US English
- Times New Roman for text, font 12
- Arial for graph/picture/table labels
- 1 line spacing for entire document
- Justified alignment for text
- Centered alignment for graphs/pictures/tables and their labels
- No break pages and blank pages
- All drafts are kept in google doc format
- Submission of documents as deliverables in the execution plan shall be done in excel or word format and pdf format
- Number all headings
- References and footnotes should include and show the full link to any online sources

A link to a quick APA citation guide can be found here:

http://www.libraries.psu.edu/content/dam/psul/up/lls/documents/APA_Quick_Citation_Guide.pdf

Link to a FAQ on APA:

<http://www.apastyle.org/learn/quick-guide-on-references.aspx#Websites>

4.5 Evaluation by IPMC

The final report will be edited by the WOC before end of 2018. Once finalised the report will be distributed to the IPMC members. The final report will also be distributed to all IAF member organizations and published on the IAF website.