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

2022 Young Professionals Workshop Statement of Work

Saturday September 17th, 2022

Paris, France

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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 aerospace organizations to ease the transition of Young Professionals into their careers, and to facilitate transfer of know-how to new generations of workforce. The workshop observations and recommendations can also benefit early career employees by helping them 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 2022 IPMC YP Workshop Delegates Folder.

Reference Documents			
No.	**Title**	**Author**	**Date**
RD1 to RD10	IAF-IPMC Young Professionals Workshop – Workshop Results Report (issues from 2012 to 2021)	Workshop Delegates	2012 - 2021
RD 11	Five Years of IAF IPMC Young Professionals Workshop	Birgit Hartman and Maarten Adriaensen	2016
RD 12	The Future Workforce on Learning From and With Peers While Navigating Through The Era of Space 4.0	Birgit Hartman and Marie Botha	2018

1.4 WOC Organization

The WOC is organized along the following work distribution:

Eleonora Zeminiani	WOC Project Manager
Birgit Hartman	Strategy and Implementation Manager
Linn Boldt-Christmas	Communications Manager
Mark Fittock	Operations Manager
Takeshi Shoji	Delegates Manager
Ekaterina Seltikova	Correspondence Manager

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 Organizing 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 – Commercial space: challenges and opportunities for Project Management

The space sector has experienced a transition from an institutionally driven field to a context shaped equally by agencies/governments and commercial players. This has brought new ambitious visions, disruption in what is considered achievable (for all project axes: performance, schedule and cost), a rise in private funding and investment, and a previously unheard-of level of risk appetite in the industry.

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

> ***How do commercial space projects differ from institutional ones? Which new challenges and opportunities meet the Project Manager in this context? What is most striking or impactful for Young Professionals who are just joining the workforce?***

A key success factor for this group is to identify which are the distinctive traits of commercial space projects, understand if there is a change in PM role and skills, and pinpoint what makes a successful commercial project/project manager. Young Professionals are also encouraged to share how they perceive and rate this evolution of the market, and what it means for their professional lives.

The following elements could be considered in the research:

- How the "commercial space trend" is affecting different space verticals (telecommunications, Earth observation, science, launch vehicles…), and in particular those that have traditionally been institutionally led (e.g. human spaceflight).
- Which are the challenges and the opportunities at program level coming from the work being performed in a commercial instead of institutional context, e.g. different contractual schemes, different risk management, etc.
- What is changing for the PM when the entity performing the work is also heavily investing in the activities, e.g. change in tasks or skills associated with the transition from supplier vs entrepreneur mindset, or with the need to manage a large financial exposure.
- How the 2021 IPMC YP WS findings on STARTA approaches fit into this wider topic, e.g. which is the relevance of shorter lifecycles and rapid turnaround in new space, and how it compares to other characteristics such as financial sustainability or technological disruption.
- What are the differences across the world for this wave of commercial undertakings, i.e. what changes in different geographical areas, different economies, and for countries with different heritage in space activities.
- What is happening to the inclusion of non-space industries in space projects, and cross-contamination with their business models and management styles.

Young Professionals may consider the presence of commercial stakes and initiatives in the space sector completely normal, the same way everybody today accepts the commercial nature of aviation, while in its infancy it was initially strongly managed by governments. In addition, Young Professionals may have experienced a change in the job market and in their careers associated with the new wave of entrepreneurs and startups entering the field. Delegates are therefore encouraged to reflect upon their different exposure to commercial space projects, and to propose their own understanding of how commercial initiatives are shaping the future of the space sector and its workforce.

The presentation at the workshop should present sound recommendations on how to successfully manage commercial space projects and their impact on the workforce.

This is a new Topic that has not been researched in previous workshop editions. Delegates shall nonetheless consider results from the 2021 report on START A approaches. In addition, Delegates shall consult reports from previous years to better understand how to structure and convey their research and recommendations.

3.2 Topic 2 – Delivering digital transformation and building Digital Governance in an ESG-focused world

Most of the current space projects are very complex due to both high-tech software/hardware and international collaboration among many organizations. New digitally-enhanced space products and services are being designed and set into operation. Furthermore, project managers are called to work with a distributed and remote workforce and to make quicker decisions, based on larger volumes of data. Given these circumstances, applying digital transformation in space projects is important to (i) share all information and hence support the PM's decision making, and (ii) properly manage the intrinsic technical complexity of digital products.

At the same time, bridging digital transformation and social responsibility goals is becoming one of the many challenges that space players must face. To this end, Digital Governance encompasses norms and ethical guidelines that shape the development and use of these technologies. It can be argued that Digital Governance is becoming just another axis of the so-called Environmental, Social, and Governance (ESG) Criteria. Through ESG strategies and practices, space players strive to go beyond the goal of maximizing profits on behalf of their shareholders. They seek to improve and grow into areas that match the interests and values of a new wave of investors and stakeholders. In this context, Digital Governance has long-term commercial and political implications, especially in view of the growing geostrategic competition in cyberspace.

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

> ***What are the effects and consequences of digital transformation on space projects? Which new responsibilities are added to the PM's mandate? How to best implement digital transformation at both process and product/service level while at the same time ensuring proper Digital Governance?***

A key success factor for this group is to identify the extent of maturity of the space sector when it comes to digital transformation and Digital Governance, and to understand the implications of product and process digitalization on project management practices. The group must identify knowledge, skill, and normative gaps in the field and propose recommendations to address them.

The following elements could be considered in the research:

- How the space sector is scoring in the global digital transformation process, e.g. which are success cases and best practices; which are unsuccessful cases and lessons learnt; how the space industry compares with other industries.
- At which level (project or entity) digital transformation is set in place, and if the rollout happens because of technology push, market pull, or to fulfill a need intrinsic in the project or entity, e.g. improving efficiency.
- Which are the different areas to which digital transformation is applied (processes, products, services), and why.
- Which are the social and ethical implications of digital transformation and how they can be managed with proper Digital Governance.
- What are the cybersecurity threats associated with digitalization and what are the impacts in terms of risk and risk management.
- How digital transformation might be effectively applied in space projects, and what are the risks of digitizing or centralizing all project information to make it readily available and shared among team members.
- How is project management evolving to take into account risks coming from digitalization of processes and products.
- What is the status of skill availability in this field.
- Which are the links between digital transformation and knowledge management.
- How space entities, and in particular corporations, are responding to the need of a sound Digital Governance as part of strategic ESG pactices.

Young Professionals are regarded as digital natives and techno-savvy, open to embrace the change coming with digitalization, and well apt to grasp its impact and ramifications. Oftentimes information technology, digitalization, and cybersecurity are part of their undergraduate curriculum. Also, younger generations are part of the new wave of investors that are transforming business and economy by putting their money where their values are. Delegates are therefore encouraged to compare their experiences about digital transformation in the space sector, to investigate how digitalization is currently managed, how it is evolving, and to suggest how to better harness the challenges and opportunities it brings along, including Digital Governance aspects.

The presentation at the workshop should present sound recommendations on how to successfully implement digital transformation at project level and how to manage the associated Digital Governance ramifications.

This is a new Topic that has not been researched in previous workshop editions. Delegates can nonetheless consider results from the previous reports on Knowledge Management and from 2020 reports in which the implications of remote work and virtual teams have also touched aspects of digitalization. In addition, Delegates shall consult reports from past years to better understand how to structure and convey their research and recommendations.

3.3 Topic 3 – Project management in a VUCA world: effects on the workforce wellbeing

By being historically concerned with large and long-term projects, the space field has been somehow shielded from the advent of the so called VUCA era: a time of increased volatility, uncertainty, complexity, and ambiguity challenging the way business is done. However, recent changes – such as the exponential growth of New Space, or the 2020 coronavirus pandemic – have shown that space is not immune from disruption. In the space sector, perhaps COVID-19 has exacerbated a trend towards extreme productivity, quick response, stretch goals and profitability that was already underway due to increasing scientific and technological competition worldwide.

Project managers shall be able to carry out their mandate to deliver on quality, on cost, and on schedule even in such a challenging context. However, project managers can only execute through their team and must be able to understand and control the factors affecting employees' wellbeing.

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

> ***What are the effects of rapid and unexpected change on the space workforce? Which is the role of project managers in navigating the VUCA world? How can PMs positively affect workload management and team members' well-being?***

A key success factor for this group is to understand the implications of a VUCA context on the workforce, and to identify the actions PMs can undertake to improve cohesion, workload management, and wellbeing in their teams. The group must investigate how project management can govern these aspects, and present recommendations on how to sustainably foster effective and efficient team work.

The following elements could be considered in the research:

- What are the repercussions of a VUCA context on the space workforce.
- What is the trend in space projects in terms of workload amount and efficiency demanded of each team member, and how this is impacting employees' wellbeing and their work-life balance.
- How PMs can foster team building and positive team dynamics in a VUCA world.
- How team-members' well-being affects project execution and what PMs can do to strike a balance.
- Which actions can PMs undertake to help nurture and retain talent in a very competitive, stressful and uncertain job market.
- What kinds of skills are required to succeed in space projects in this VUCA era, e.g. what workforce population is best suited to handle the challenge (specialists, generalists, "versatilists", STEM, non-STEM, etc.).
- What opportunities arise for YPs in this framework, e.g. possibility to take the initiative and suggest or implement their own ideas for new projects.
- How YPs can seize those opportunities, e.g. what kind of (leadership) skills do they need.
- What is the role of intergenerational solidarity, and how senior professionals can enhance psychological safety in their younger peers and create positive workplace circumstances.

Young Professionals are starting their careers in a time of uncertainty. They may have already experienced the effects of rapid changes on the space business and its workforce. Delegates are therefore encouraged to compare their daily-job experiences, to reflect upon the role and impact of project management practices on team workload and wellbeing, and to identify examples of good practices and areas for improvement.

The presentation at the workshop should present the case for enhancing team well-being and proper workload management via specific PM actions and behaviors. Delegates are also encouraged to discuss the challenges and opportunities for YPs, and the role of cross-generational interactions in setting the tone of the workplace.

This is a new Topic that has not been researched in previous workshop editions. Delegates can consider results from previous reports, especially from 2020 when the consequences of disruptive events on workforce well-being have been partially explored. Delegates shall also consult reports from past years to better understand how to structure and convey their research and recommendations.

3.4 Topic 4 – Space projects without frontiers: how to leverage cooperation and organizational diversity

The relevance of human diversity in organizations has been slowly emerging since the 1970s. Workforce diversity has long since been identified as an asset, and the space sector has been following in the wake of global EDI trends. However, a parallel can be drawn between the effects of people diversity and the effects of "entity diversity" inside space projects.

In particular, when considering the different organizations contributing to space projects, there are at least two areas of diversity that come into play: geographical diversity (i.e. international collaboration) and industrial sector diversity (i.e. collaboration between space and non-space entities).

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

> ***What are the roles and effects of organizational diversity in space projects? What accelerates and enhances collaboration among diverse organizations? How can organizational diversity be effectively governed?***

A key success factor for this group is to understand how space projects currently score in terms of international collaboration and collaboration among space and non-space organizations. The team must identify bottlenecks or barriers that prevent wider organizational diversity, propose recommendations to accelerate collaboration, and investigate how diverse projects can be successfully managed, notwithstanding diverse PM styles in different fields.

The following elements could be considered in the research:

- What rationale and what kind of benefits can be postulated to advocate for international collaboration in space projects.

- Which kinds of topics and space projects are more suited for international collaboration, and why. Conversely, what kind of topic or project is off-limits in international collaboration, and why.
- What are the peculiarities to be managed in international projects, and how they can be managed (e.g. data sharing).
- How the space sector is evolving in terms of international cooperation, e.g. which are the areas of innovation, and how can international cooperation be enhanced or accelerated.
- What rationale and what kind of benefits can be postulated to advocate for collaboration among space and non-space organizations in space projects.
- Which kinds of topics and projects are more suited for collaboration across industrial sectors, and why. Conversely, what kind of topic or project is unsuitable for cross-domain contamination, and why.
- Which are the peculiarities to be managed in projects involving both space and non-space entities, and how they can be managed.
- How the space sector is evolving in terms of cross-industry collaboration, positive contamination, spin-in and spin-off, e.g. which are the areas of innovation, and how can participants of non-space industries in space projects be enhanced or accelerated.
- How can successful project management be implemented even if different PM styles and practices are adopted in space vs. non-space organizations.

Young Professionals today have many opportunities to come in contact with diverse organizations and get to work in international contexts. They were born in a globalized world, where interconnectedness and transversality are an asset. Delegates are therefore encouraged to analyze how the space field takes advantage of collaboration among different nations and different industries, and to bring forward their recommendations on how to accelerate cross-contamination and virtuous synergies.

The presentation at the workshop should explain how the concepts of equality, diversity, and inclusion translate when addressing organizations instead of people, explain in which cases there is room and motivation for collaboration across borders and industries, and pinpoint recommendations to remove obstacles, accelerate and better manage organizational diversity in space projects.

This is a new Topic that has not been researched in previous workshop editions. Delegates can consider results from the 2018 report on areas of cooperation between Old Space and New Space. Delegates shall also consult reports from past years to better understand how to structure and convey their research and recommendations.

3.5 Topic 5 – Sustainability of space projects

The most often quoted definition of sustainability comes from the UN World Commission on Environment and Development: “sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”
In practice, sustainability has several definitions in several domains: economical, technical, environmental, societal…

Space activities have recently come under scrutiny for sustainability. Stakeholders are urging to include sustainability KPIs and measures in space programs; for example, ESA pushing EC sustainability goal considerations in its projects, or UNOOSA being concerned with long-term sustainability of outer space activities, or NASA putting sustainability at the heart of the Artemis Accords.

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

> ***Which sustainability axis is most relevant to Young Professionals in the space field and why? What is the interplay between space project management and international sustainable development goals? How can PMs contribute to more sustainable space activities?***

A key success factor for this group is to understand how space projects are linked to sustainability issues, and assess how relevant sustainability is to today's space sector and workforce. The team must pick a sustainability axis, analyze how it can be linked to project success, and identify actions at the PM level that can help foster sustainable processes and products.

The following elements could be considered in the research:

- Which initiatives and public bodies are already ushering space activities towards sustainability.
- Which of the different sustainability angles is most relevant for Young Professionals today, and why.
- How space projects contribute (positively or negatively) to the sustainability of humankind's activities.
- Which sustainability axis (or definition) is more tightly coupled to project management and how sustainability and project management influence each other.
- How space entities (agencies, companies, ONGs…) perceive and approach sustainability, e.g. as an "externally imposed" constraint or a "self instilled" motivator.
- Which are the effects of sustainability goals on project planning and execution.
- Which are the tensions and trade-offs that may push the industry and the market in totally different directions, e.g. project profitability vs. societal benefits, or technical performance vs. ecological impact…
- How PMs can devise a win-win solution to embed sustainability into successful project execution.

Young professionals represent the next generation that is bound to face the consequences of today's actions. As such they are a key stakeholder in the sustainability debate and might have a strong position on the role played by the space sector and space projects. Delegates are encouraged to compare their standpoints and come to an agreement on which one of the sustainability axes they consider most relevant and more tightly coupled with project management, and why. Delegates shall also provide sound recommendations for PMs to better foster sustainability in and through space projects.

The presentation at the workshop should explain how space activities and sustainability are linked, pinpoint the most relevant sustainability axis for Young Professionals, provide clear recommendations to bridge the dichotomy between conflicting interests and make sure space projects have positive sustainability impacts.

This is a new Topic that has not been researched in previous workshop editions. However, Delegates shall consult reports from past years to better understand how to structure and convey their research and recommendations.

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 the team as they wish, provided the various tasks will be shared between the team members and all deliverables will be submitted timely.

4.2 Mentor

Each topic group will be assigned a Mentor.
A mentor is an experienced senior professional who has years of valuable experience, built profound knowledge on the topic, and should be considered as the voice of reason and the group's "reality check".

The mentor is requested to share their insightful knowledge with the Young Professionals; guide them through the topic; highlighting important aspects to be researched, suggest literature reviews, the right questions to ask when interviewing peers, etc. If time permits, the mentor can be invited to proofread the deliverables.

Depending on the group's requirements, the mentor can be present at each meeting, or regularly attend meetings. This will be up to the mentor and the group to decide.

The groups are invited to listen to the mentor and take their input to heart.

The mentors role is not necessarily to promote their own organization, but to share their inputs to the groups based on their overall experience and acquired knowledge.

4.3 Meetings

Each topic group is required to hold regular meetings (advised is at least weekly during the first few weeks, twice per month during the central months, and again weekly the weeks leading up to submission deadlines and the workshop) 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. However, it is the task of the group leader to define a meeting agenda and moderate the meeting.

A Kick-off Meeting will be held in May 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 4 hours per week per person, 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 2022 report one week before the workshop, please refer to the section 4.4 as described below.

4.4 Deliverables

Each group shall provide a detailed analysis of their group's topic which will be used for the 2022 report.

When writing the report, please ensure the manuscript format complies with the rules described in the next section.

The following list of deliverables shall apply:

1. Group meeting minutes (living Google document is sufficient) including work distribution, planning and execution of research and writing/editing
2. Draft report, including the full and complete outline of the report (see section 4.5 below) – due week 28. Draft report shall include a 4 to 5 pages Executive Summary.

3. Draft presentation, including an overview of the total intended content for presentation (and clearly showing the chosen format) – due week 28
4. Final report (maximum 50 pages not including references and annexes; shall include a 4 to 5 pages Executive Summary) – due week 36
5. Final presentation – due week 37

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.

4.5 Reporting

As the individual reports of the different groups will be inserted into one final report to the IPMC, a unified structure, format, and referencing style 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. Do not use the automatic referencing style of Google documents.

Accompanying the Group Report must be an Executive Summary. The Executive Summary should be **between 4 to 5 pages**. An Executive Summary should summarize the key points of the report. It should restate the purpose of the report, highlight the major points of the report, and describe any results, conclusions, or recommendations from the report. It should include enough information so the reader can understand what is discussed in the full report, without having to read it.

Structure for the Group Reports is:

1. Executive Summary (4-5 pages)
2. Methodology
3. Research/Investigation/Discussion
4. Recommendations
5. Concluding remarks
6. Annexes

The discussion groups should keep the executive summaries they prepare as concise and to the point as possible.

Manuscripts format:

- US English
- **Third person (the team, the group)**
- **Past tense**
- 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 nor blank pages
- Number all headings
- References and footnotes should include and show the full link to any online sources
- All drafts shall be 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

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

4.6 Evaluation by IPMC

The final report will be edited by the WOC before the end of 2022. 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, accessible to the general public.