



*International Academy of Astronautics*

*IAA Space Debris Committee*

*September 17<sup>th</sup>, 2022*



# *Agenda*

1. IAC – Administrative part
  - 1.1. IAA Space Debris Committee
  - 1.2. Lessons learned from Dubai 2021
  - 1.3. General statistics concerning Space Debris Symposium A6
  - 1.4. Status of Space Debris Symposium for Paris 2022
  - 1.5. Preparation of Space Debris Symposium for Baku 2023
2. Exchanges
  - 2.1. Past events: workshops, conferences, congresses, ...
  - 2.2. On the Agenda
  - 2.3. General information
  - 2.4. Round table – Open discussion
3. IAA Study Groups
  - 3.1 SG 5.17 IAA Situation Report on Space Debris



## *1.1 IAA Space Debris Committee*

### **General frame:**

- Officially created within IAA in 2012
  - Independent Committee
  - Permanent Committee
  - Attachment to Commission V. Could be independent if it would present any interest
- Actions of the Committee:
  - Position Paper on Orbital Debris in 1993, revised in 2000
  - Position Paper SG 5.1 on Space Debris Mitigation in 2006
  - Position Paper SG 5.5 on Space Debris Remediation in 2013
  - Participation to SG 5.10 on Orbital Debris Removal: Policy, Legal, Political and Economic considerations
  - Participation to SG 4.23 on Post-Mission Disposal for Micro and Smaller Satellites: Concepts and Trade Studies
  - Review of the SG 5.15 on Space Traffic Management, finished and published
  - Situation Report Paper 2016 SG 5.14 finished and distributed
  - Situation Report Paper 2019 SG 5.17 on going
  - Numerous presentations (UNCOPUOS, ...)



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## *1. IAA Space Debris Committee*

### **Membership:**

No need to be member of IAA !

- Members of the IAA A6 Symposium Program Committee (chairs & rapporteurs)
  - ⇒ Note that the IAC Program Committee is exclusively selected among the IAA SDC members
- Members of the Program Committee of other IAA sponsored conferences with Space Debris concerns
- Members of Space Debris related working groups (IADC, UNCOPUOS, COSPAR, ISO ...)
- Academics, Labs, Universities, Industrials... working on the topic

However, **it is requested to be “active”**:

- Participation to the meetings
- Debriefing of activities during the meetings
- Cross information with other members
- Contribution to studies and reports
- To see the work which is done, visit our web page

<https://iaaspace.org/about/permanent-committees/#SA-PERMCspacedebris>

Two meetings per year:

- One during IAC ⇒ Includes the status of the sessions, workshops, round tables... of the week
- One during IAC March Meeting ⇒ Includes the pre-selection of the abstracts for the following IAC



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## 1. IAA Space Debris Committee

### Current membership:

Agapov Vladimir	Finkleman David	Krag Holger	Santoni Fabio
Aglietti Guglielmo	Fitz-Coy Norman G.	Lemmens Stijn	Schaefer Frank
Ailor William	Flohrer Tim	Letizia Francesca	Schildknecht Thomas
Alby Fernand	Francesconi Alessandro	Liou Jer-Chyi	Seitzer Pat
Anilkumar A.K.	Francillout Laurent	Martinez Peter	Shen Lin
Anselmo Luciano	Gong Zizheng	Martinot Vincent	Singh Balbir
Anz-Meador Philip	Grishko Dmitriy	Marzioli Paolo	Siminski Jan
Auburn John	Hanada Toshiya	Masson-Zwaan Tanja	Skinner Mark
Bastida-Virgili Benjamin	Howard Diane	McKnight Darren S.	Smith Lesley-Jane
Berend Nicolas	Hyde James	Metz Manuel	Somma Gian Luigi
Brachet Gerard	Jah Moriba K.	Nassisi Annamaria	Sorge Marlon E.
Christiansen Eric L	Jankovic Marko	Oltrogge Daniel L.	Spencer David B.
<i>Colombo Camilla</i>	Kawamoto Satomi	Omaly Pierre	Stokes Hedley
Crowther Richard	Kelso T. S.	Opromolla Roberto	Traineau Jean-Claude
Dasgupta Upasana	Kerr Emma	Pardini Carmen	Tung Helen
Dolado Perez Juan-Carlos	Kibe Seishiro	Piergentili Fabrizio	Usovik Igor
Faucher Pascal	Kim Hae-Dong	Plattard Serge	Wiedemann Carsten
	Kitazawa Yukihito	Rossettini Luca L.	Yasaka Tetsuo
	Klinkrad Heiner	Sanchez-Ortiz Noelia	

### Chairs & Secretary:

Bevilacqua Riccardo  
Bonnal Christophe  
Omaly Pierre

### Note:

*Members in italics are not yet mentioned on the IAA website... Complex process...*

### To be removed?

### New members?

Alary Didier  
Agueda Alberto  
Cordelli Emiliano  
Del Campo Lopez Borja  
Nitta Kumi  
Forshaw Jason  
Rossi Alessandro

### Synthesis:

83 members

See appendix 1 for today's list of participants

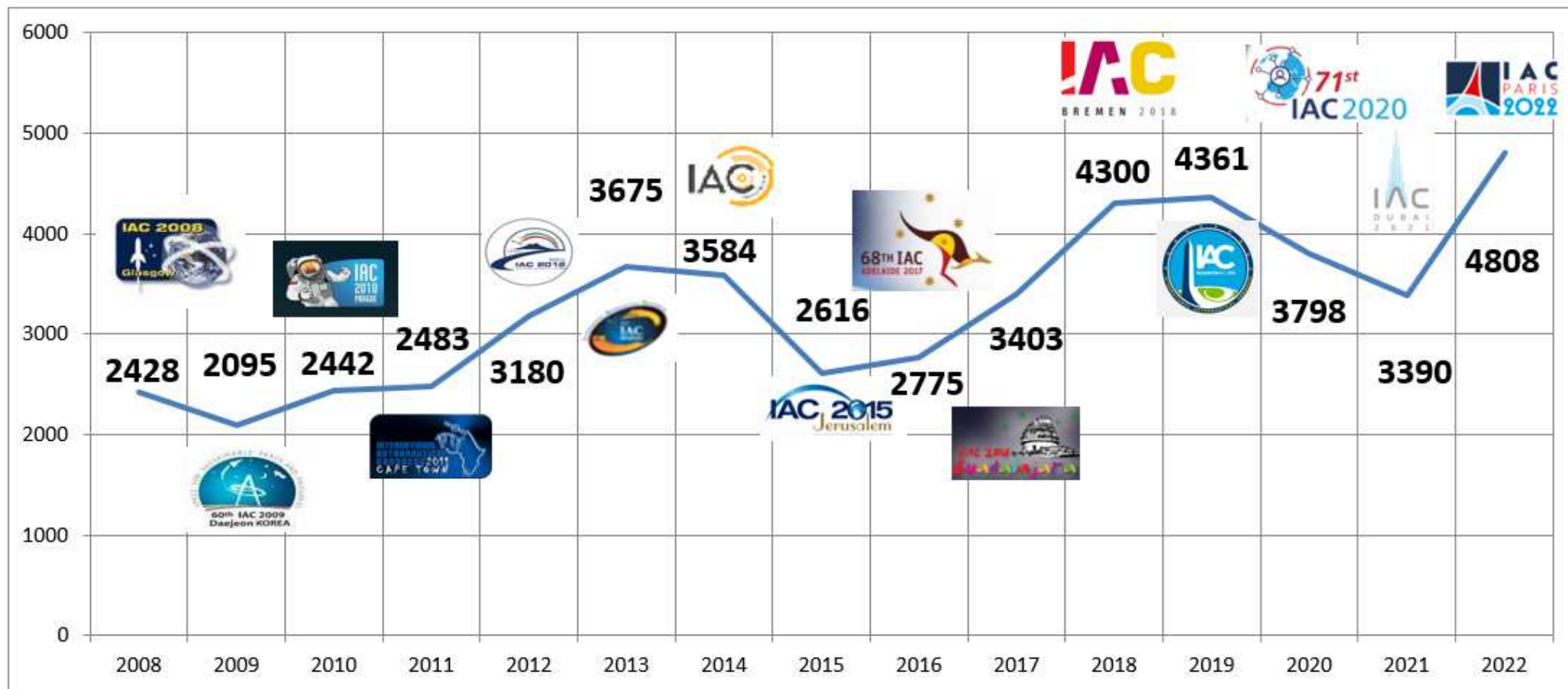
It is reminded that Program Committee (Chairs + Rapporteurs) is selected among members only



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## 1.2 General evolution of IAC

*Number of IAC abstracts since 2008*





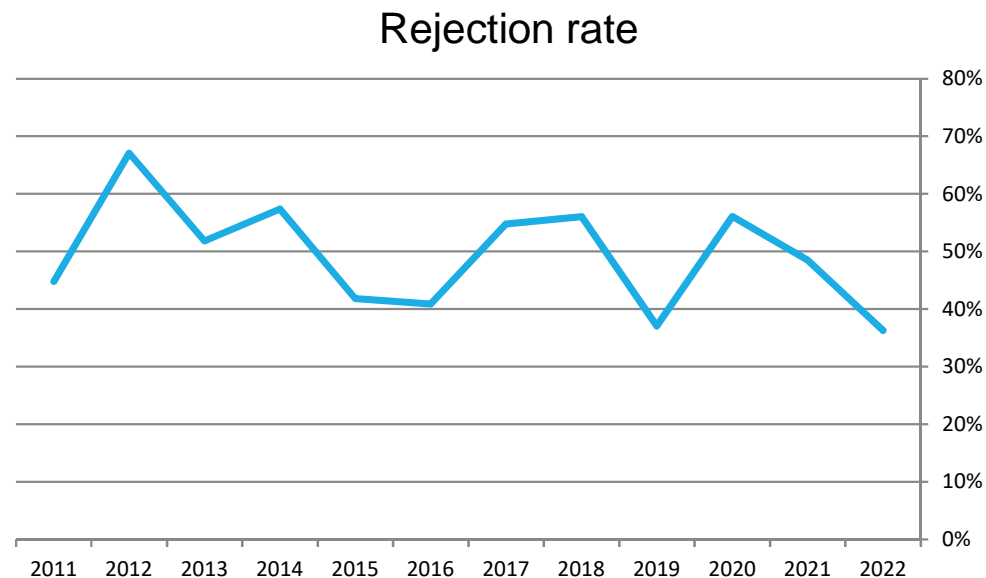
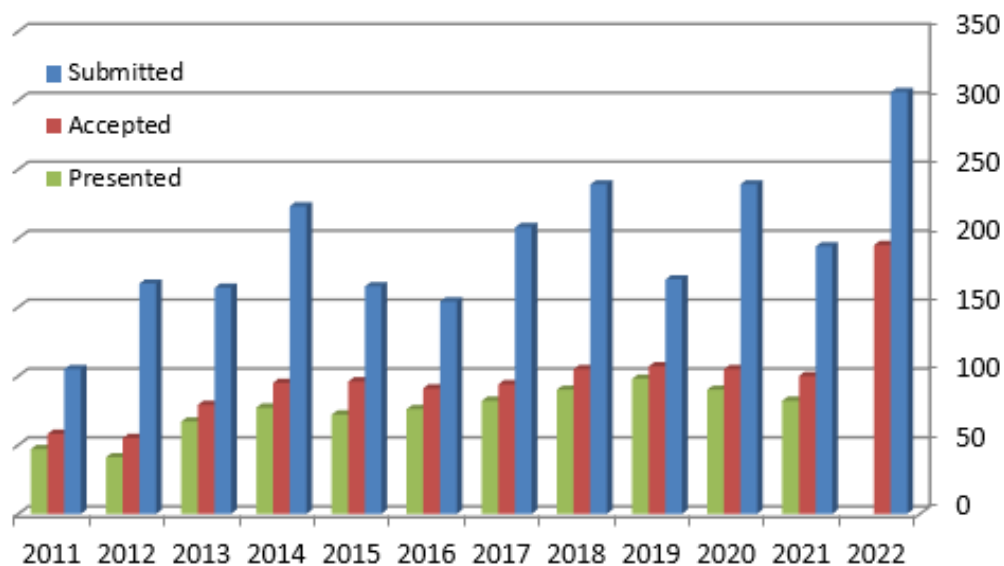
## 1.3 General statistics concerning A6

### Globally healthy symposium:

Average 206 papers submitted every year these last 10 years: large variations (standard deviation = 47.2)

Very good rejection rate: average last 10 years 51%  $\Rightarrow$  Evolution in 2022 due to the very high number of IPs

Very good presentation rate: average (2012-2019) = 81%







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## 1.4. General information on Paris 2022

Thank you Myriam... 😊

# Status of the Technical Programme



Abstracts in total: **4988**  
Abstracts accepted: **3377**  
    **2192** Oral Presentations  
    **1185** Interactive Presentations  
Abstracts rejected/withdrawn: **1611**



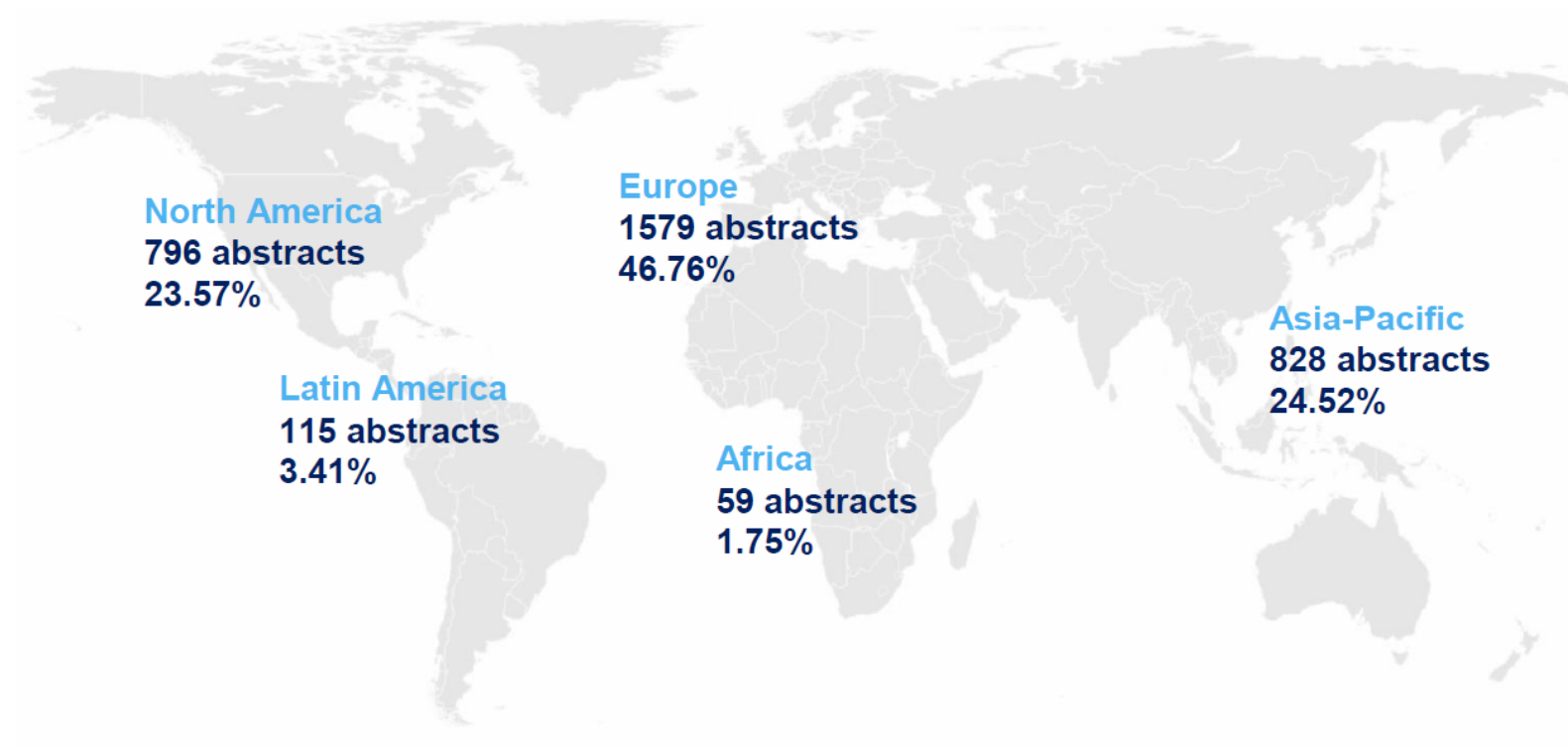
- Papers uploaded: **2457**
- Interactive Presentations published: **800+**

- Confirmed presentations: **2995**





## Status Report – Accepted abstracts (Regional Group Distribution)

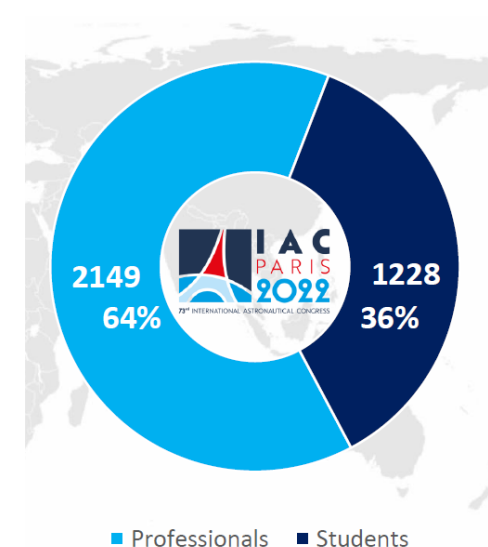
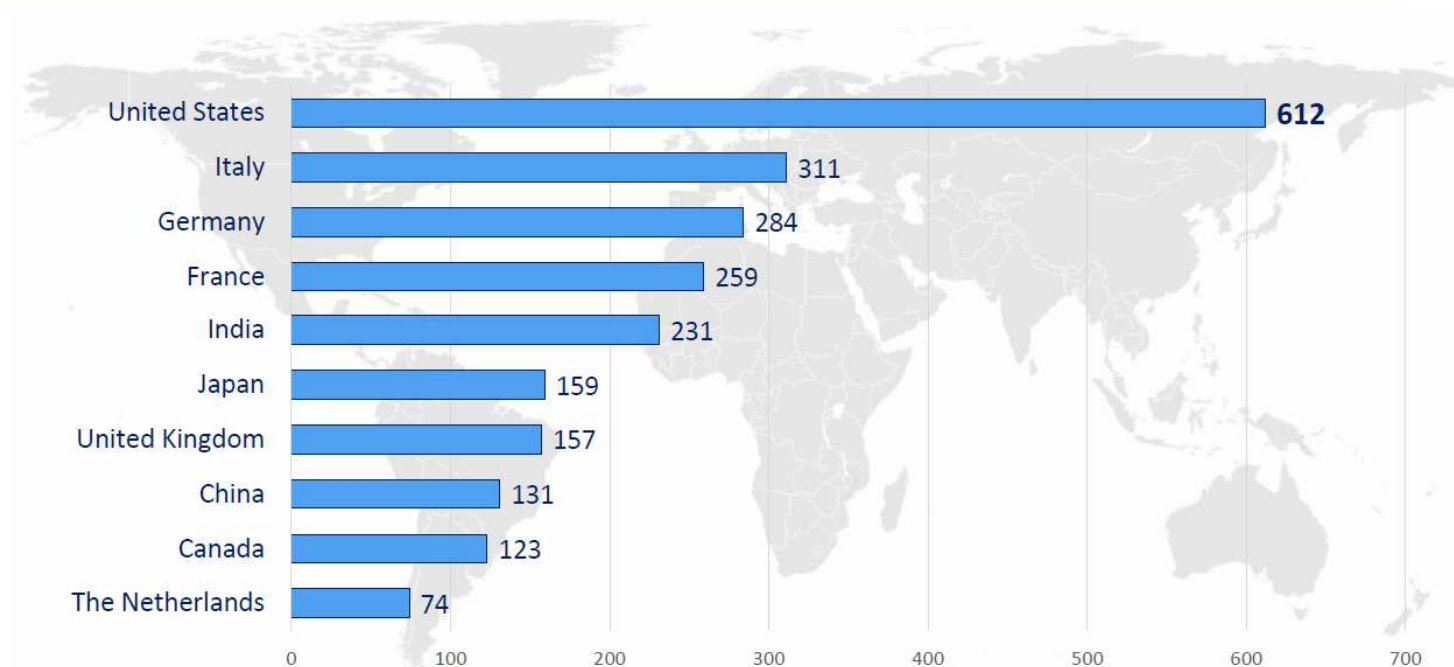




## 1.4. General information on Paris 2022

Thank you Myriam... ☺

### Status Report – Accepted abstracts (Top 10 by Country)



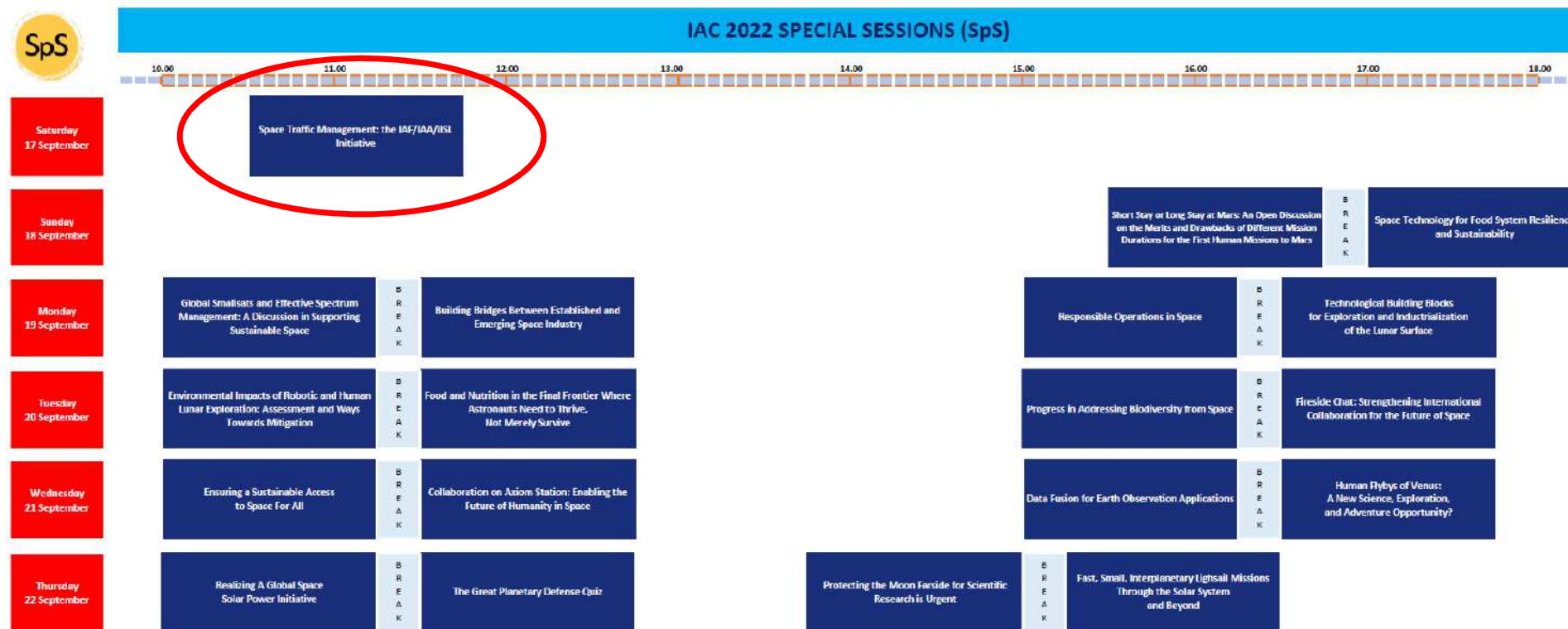


## 1.4. General information on Paris 2022

Thank you Myriam... 😊



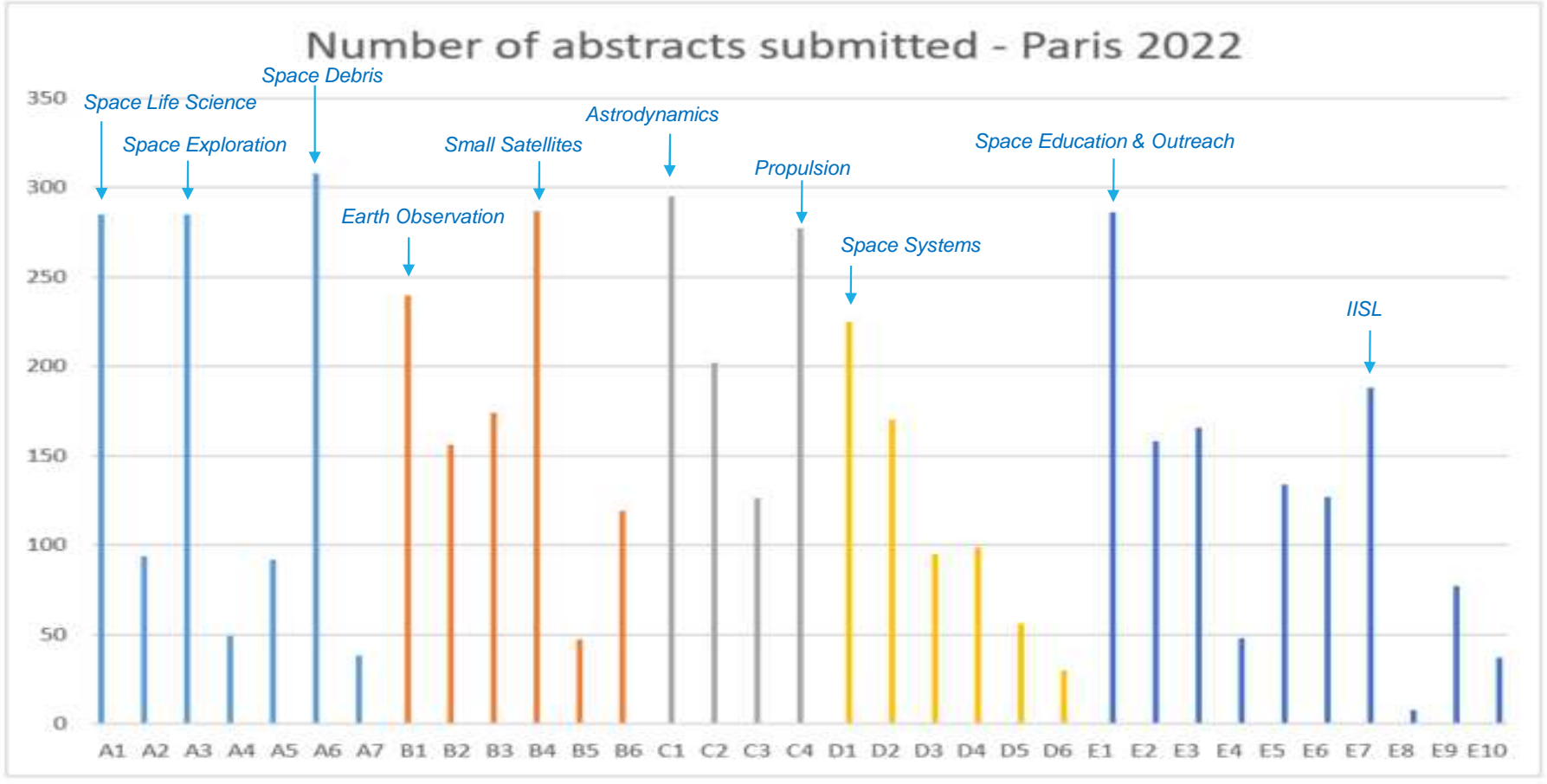
# Status Report – Special Sessions





# 1.4. Space Debris Symposium for Paris 2022

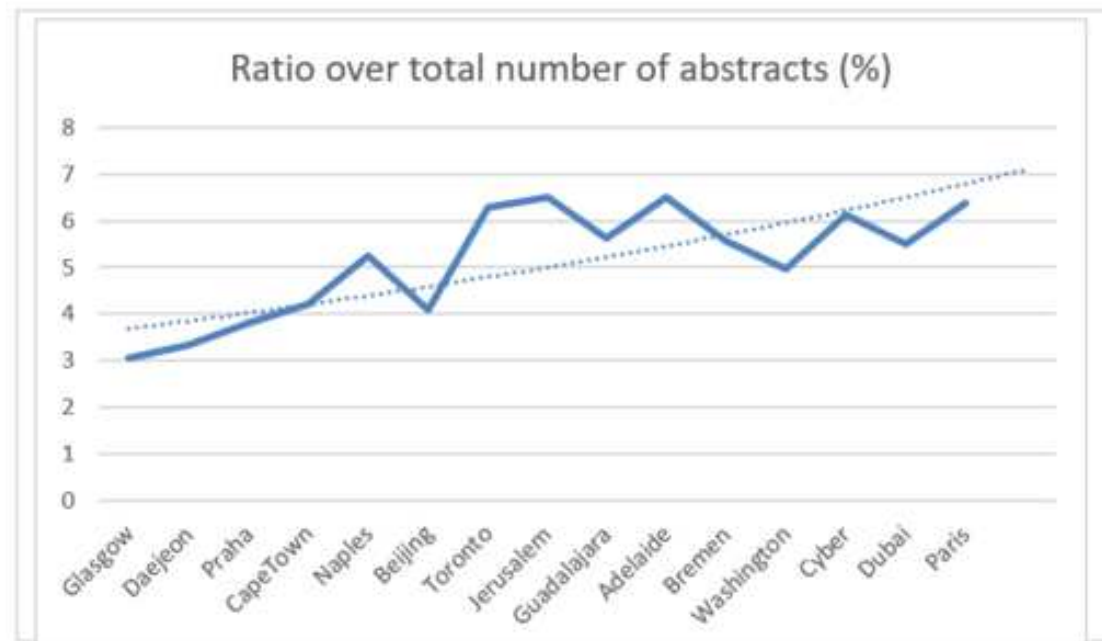
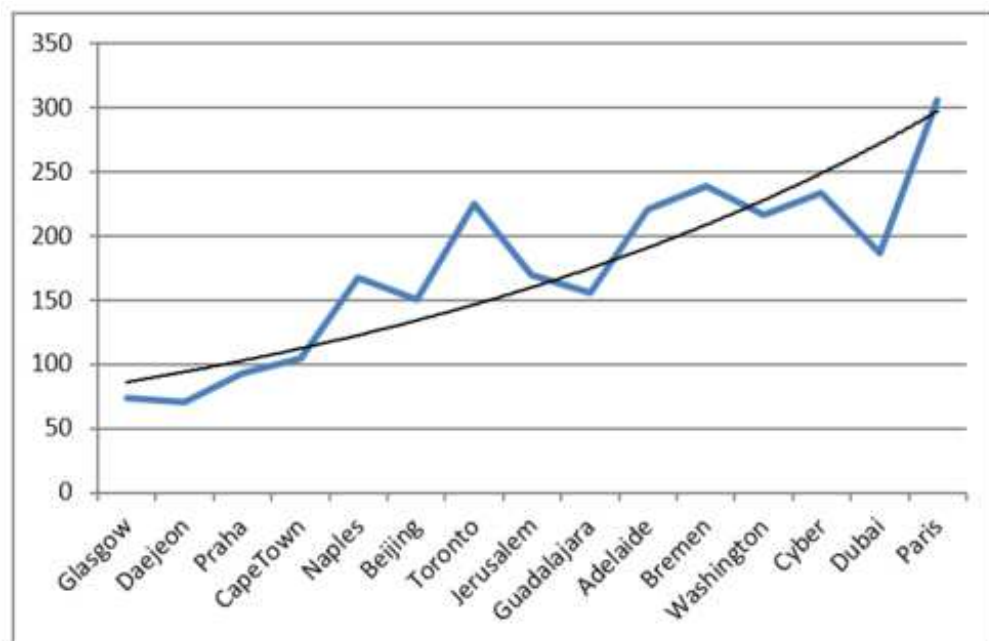
306 abstracts submitted to A6 this year





## 1.4. General information Paris 2022

### Number of abstracts, Space Debris Symposium, since 2008





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## *1.4. Space Debris Symposium for Paris 2022*

*Initial list, as per the website*

### ***A6: Space Debris Symposium:*** Bevilacqua – Bonnal – Omaly

The Symposium will address the complete spectrum of issues associated to space debris, including orbital sustainability and operations in debris dominated environment.

It will cover every aspect of Space Environment Management (SEM) including Mitigation and Remediation measures, Space Surveillance and Tracking (SST), Space Situational Awareness (SSA), Space Traffic Management (STM), including all aspects of measurements, modelling, risk assessment in space and on the ground, re-entry, hypervelocity impacts and protection, mitigation and standards, post-mission disposal, remediation, debris removal, Space Surveillance, collision avoidance as well as non-technical topics associated to space debris dominated environment.

### ***A6.1: Space Debris Detection, Tracking and Characterization - SST:*** Skinner – Agapov Piergentili – Schildknecht

This session will address every aspect of SST (Space Surveillance and Tracking), advanced ground and space-based measurement techniques, relating processing methods, and results of space debris characterization.

### ***A6.2: Modelling and Risk Analysis:*** Sorge – Oltrogge – Pardini

This session will address the characterization of the current and future debris population and methods for in-orbit and on-ground risk assessments. The in-orbit analysis will cover collision risk estimates based on statistical population models and deterministic catalogues, and active collision avoidance.

### ***A6.3: Impact-Induced Mission Effects and Risk Assessments:*** McKnight – Gong – Traineau

This session addresses disruptions of spacecraft operations induced by hypervelocity impacts including spacecraft anomalies, perturbation of operations, component failures up to mission loss, and spacecraft fragmentations. It includes risk assessments for impact vulnerability studies and corresponding system tools. Further topics are spacecraft impact protection and shielding studies, laboratory impact experiments, numerical simulations, and on-board diagnostics to characterize impacts such as impact sensors, accelerometers, etc.





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## 1.4. Space Debris Symposium for Paris 2022

*Initial list, as per the website*

### **A6.4: Mitigation - Tools, Techniques and Challenges - SEM:** Omaly – Kawamoto – ~~Krag~~ Colombo

This session will focus on the Mitigation part of the SEM (Space Environment Monitoring), implementation of debris prevention and reduction measures; vehicle passive protection at system level including end of life strategies and tools to verify the efficiency of the implemented measures. The session will also address practical experiences in the planning and verification of measures and issues and lessons learnt in the actual execution of mitigation actions.

### **A6.5: Post Mission Disposal and Space Debris Removal 1 - SEM:** ~~Singh~~ Jankovic – Opromolla – Francillout

This session will focus on the Remediation part of the SEM, dealing with ADR (Active Debris Removal), JCA (Just in time Collision Avoidance), LDTM (Large Debris Traffic Management) among solutions. It will address post-mission disposal and active removal techniques “ground and space based”, review potential solutions and identify implementation difficulties.

### **A6.6: Post Mission Disposal and Space Debris Removal 2 - SEM:** Jankovic – Grishko – Auburn

This session will focus on the Remediation part of the SEM, dealing with ADR (Active Debris Removal), JCA (Just in time Collision Avoidance), LDTM (Large Debris Traffic Management) among solutions. It will address post-mission disposal and active removal techniques “ground and space based”, review potential solutions and identify implementation difficulties.

### **A6.7: Operations in Space Debris Environment, Situational Awareness - SSA:** Martinot – Kelso – Sanchez-Ortiz

This session will address the multiple aspects associated to STM (Space Traffic Management) and SSA (Space Situational Awareness) including safe operations in space dealing with Space Debris, operational observations, orbit determination, catalogue build-up and maintenance, data aggregation from different sources, relevant data exchanges standards and conjunction analyses.





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## *1.4. Space Debris Symposium for Paris 2022*

### ***A6.8 / E9.1 (joint with Space Security Committee): Political, Legal, Institutional and Economic Aspects of Space Debris Mitigation and Removal - STM Security***

From SDC: Spencer – Masson-Zwaan – Kerr    From SSC: Plattard - ~~Seueck~~

**This session will address all non-technical aspects of Operations and Security in a Debris Dominated Environment. This STM session will mainly include the non-technical aspects of space debris mitigation and removal. Political, legal and institutional aspects include role of IADC and UNCOPUOS and other multilateral bodies. Economic issues include insurance, financial incentives and funding for space debris mitigation and removal. The role of international cooperation in addressing these issues will be considered**

### ***A6.9: Orbit Determination and Propagation - SST***

~~Siminski~~ Cordelli – Dolado-Perez – Marzioli

**This session will address every aspect of orbit determination coming from the SST (Space Surveillance and Tracking), related to assessment of raw and derived data accuracy, optical measurements processing and modelling and risk analysis of space debris**

### ***A6.10 / E10.2: Joint “Near Earth Objects & Space Debris” – SSA***

From SDC: Schildknecht – McKnight – Colombo    From NEO: Mazanek – Haddaji – Maier

**This Artificial and natural space debris pose a growing concern while the awareness about hazards associated with Earth-crossing asteroids and comets is increasing. The rising number of artificial satellite objects in LEO, HEO, GEO as well as cis-lunar space, the potential for a rapid increase in the associated collisional debris could cause long-lasting impediments if not explored further. Similarly, Near-Earth Objects (NEOs) span sizes from micrometeorites to km-scale objects, posing a potential hazard to people and property both in space and on Earth.**

**This Joint Session aims to explore common aspects of these challenges by inviting papers that...**

***A6.IP: Interactive Presentations***, Kerr – Letizia – Marzioli – Opromolla – Jankovic – Bonnal ⇒ To be updated

## 1.4. Space Debris Symposium for Paris 2022

Date	# Sess	Att Min	Att Max	Att Ave	Att/session	Pap Sub	Pap Acc	Pap Pres	Pap Wd	Pap No-Sh	Up Manu	% Pap Rej	% Pap Acc	% Pap Pres	% Pap Wd	% Pap No-Sh	% Up Manu vs Acc	% Up Manu vs Pres
2022	10					306	195 ★					36%	64%					
2021	10	339	454	397	35,3	194	100	82	18	11		48%	52%	82%	18%	11%	0%	0%
2020	10	0	0	0	0,0	239	105	90	11	4	97	56%	44%	86%	10%	4%	92%	108%
2019	10	390	654	475	47,5	170	107	98	6	3	96	37%	63%	92%	6%	3%	90%	98%
2018	10	547	809	691	69,1	239	105	90	11	4	97	56%	44%	86%	10%	4%	92%	108%
2017	10	505	698	602	60,2	208	94	82	19	5	84	55%	45%	87%	20%	5%	89%	102%
2016	9	365	531	448	49,8	154	91	76	13	3	75	41%	59%	84%	14%	3%	82%	99%
2015	10	374	521	448	44,8	165	96	72	20	4	73	42%	58%	75%	21%	4%	76%	101%
2014	9	492	653	572,5	63,6	223	95	77	14	4	74	57%	43%	81%	15%	4%	78%	96%
2013	8	360	521	440,5	55,1	164	79	67	10	4	63	52%	48%	85%	13%	5%	80%	94%
2012	7	270	348	309	44,1	167	55	41	10	4	55	67%	33%	75%	18%	7%	100%	134%
2011	6	285	375	330	55,0	105	58	47	10	1	48	45%	55%	81%	17%	2%	83%	102%
Avg	9,1	357,0	505,8	428,4	47,7	194,5	98,3	74,7	12,9	4,3	76,2	51%	49%	81%	17%	4%	84%	104%

★ Beware, not directly comparable to other years: 195 = 93 Oral + 102 IP



## 1.4. Space Debris Symposium for Paris 2022

*Updated: current situation*

		Submitted	Oral	Keynote	Withdrawn	Rejected	IP
<a href="mailto:Bevilacr@erau.edu">Bevilacr@erau.edu</a>	A6						
<a href="mailto:christophe.bonnal@cnes.fr">christophe.bonnal@cnes.fr</a>							
<a href="mailto:pierre.omaly@cnes.fr">pierre.omaly@cnes.fr</a>							
<a href="mailto:mark.a.skinner@aero.org">mark.a.skinner@aero.org</a>	1	73	10		1	21	
<a href="mailto:mark.skinner@alum.mit.edu">mark.skinner@alum.mit.edu</a>							
<a href="mailto:vladimir.agapov@gmail.com">vladimir.agapov@gmail.com</a>							
<a href="mailto:thomas.schildknecht@aiub.unibe.ch">thomas.schildknecht@aiub.unibe.ch</a>							
<a href="mailto:Marlon.E.Sorge@aero.org">Marlon.E.Sorge@aero.org</a>	2	29	10		1	4	
<a href="mailto:dan@comspoc.com">dan@comspoc.com</a>							
<a href="mailto:carmen.pardini@isti.cnr.it">carmen.pardini@isti.cnr.it</a>							
<a href="mailto:darren@leolabs.space">darren@leolabs.space</a>	3	10	8	1	2		
<a href="mailto:gongzz@263.net">gongzz@263.net</a>							
<a href="mailto:jean-claude.traineau@orange.fr">jean-claude.traineau@orange.fr</a>							
<a href="mailto:pierre.omaly@cnes.fr">pierre.omaly@cnes.fr</a>	4	21	10		1		
<a href="mailto:kawamoto.satomi@jaxa.jp">kawamoto.satomi@jaxa.jp</a>							
<a href="mailto:Holger.Krag@esa.int">Holger.Krag@esa.int</a>							
<a href="mailto:balbir.s@manipal.edu">balbir.s@manipal.edu</a>	5	39	10		2	21	
<a href="mailto:roberto.opromolla@unina.it">roberto.opromolla@unina.it</a>							
<a href="mailto:laurent.francillout@cnes.fr">laurent.francillout@cnes.fr</a>							
<a href="mailto:marko.jankovic@dfki.de">marko.jankovic@dfki.de</a>	6	25	10			8	
<a href="mailto:dim.gr@mail.ru">dim.gr@mail.ru</a>							
<a href="mailto:j.auburn@astroscale.com">j.auburn@astroscale.com</a>							



## 1.4. Space Debris Symposium for Paris 2022

*Updated: current situation*

		Submitted	Oral	Keynote	Withdrawn	Rejected	IP
<a href="mailto:vincent.martinot@thalesaleniaspace.co">vincent.martinot@thalesaleniaspace.co</a>	7	37	7		3	14	
<a href="mailto:ts.kelso@celestrak.com">ts.kelso@celestrak.com</a>							
<a href="mailto:noelia.sanchez.ortiz@gmail.com">noelia.sanchez.ortiz@gmail.com</a>							
<a href="mailto:dbs9@psu.edu">dbs9@psu.edu</a>	8	51	12		1	21	
<a href="mailto:s.plattard@ucl.ac.uk">s.plattard@ucl.ac.uk</a>							
<a href="mailto:t.l.masson@law.leidenuniv.nl">t.l.masson@law.leidenuniv.nl</a>							
<a href="mailto:alexander.soucek@esa.int">alexander.soucek@esa.int</a>							
<a href="mailto:emelkerr@gmail.com">emelkerr@gmail.com</a>							
<a href="mailto:jan.siminski@esa.int">jan.siminski@esa.int</a>	9	14	10			2	
<a href="mailto:jc.dolado@lookupspace.com">jc.dolado@lookupspace.com</a>							
<a href="mailto:paolo.marzioli@uniroma1.it">paolo.marzioli@uniroma1.it</a>							
<a href="mailto:thomas.schildknecht@aiub.unibe.ch">thomas.schildknecht@aiub.unibe.ch</a>	10	7	6				
<a href="mailto:darren@leolabs.space">darren@leolabs.space</a>							
<a href="mailto:daniel.d.mazanek@nasa.gov">daniel.d.mazanek@nasa.gov</a>							
<a href="mailto:Alissa_haddaji@alumni.brown.edu">Alissa_haddaji@alumni.brown.edu</a>							
<a href="mailto:philipp.maier@community.isunet.edu">philipp.maier@community.isunet.edu</a>							
<a href="mailto:camilla.colombo@polimi.it">camilla.colombo@polimi.it</a>							
<a href="mailto:francesca.letizia@esa.int">francesca.letizia@esa.int</a>	IP	6					97
<a href="mailto:paolo.marzioli@uniroma1.it">paolo.marzioli@uniroma1.it</a>							
<a href="mailto:roberto.opromolla@unina.it">roberto.opromolla@unina.it</a>							
<a href="mailto:marko.jankovic@dfki.de">marko.jankovic@dfki.de</a>							
<a href="mailto:emelkerr@gmail.com">emelkerr@gmail.com</a>							
<a href="mailto:christophe.bonnal@cnes.fr">christophe.bonnal@cnes.fr</a>							
		306	93	1	11	91	196
		312					97

## 1.4. Space Debris Symposium for Paris 2022

### Evaluation of presentations:

- On the web site, under “Responsibility area”, “2022”, “IAC-22/A6/1”, “Evaluate presentations” – Same for IP and IPB

Home

CURRENT CONGRESS

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SESSION EVALUATION FORM

A6.1. Space Debris Detection, Tracking and Characterization - SST

Date: 22 September 2022

Time: 13:45

SESSION ATTENDANCE

session

Start

Middle

End

2/100

PAPERS

ID	Order	Title	Speaker	Review	Confirmed	Presentation delivered onsite	Manuscript uploaded	Presentation uploaded	Withdrawn	No-Show	Manuscript evaluation	Presentation evaluation	Pre-selected for Acta Astronautica
68152	1	Maneuvering into the Future: Open-Architecture Data Repository (OADR) prototype: towards civil and commercial space traffic coordination	Dr. Mark A. Skinner	accepted	<div>YES</div> <div>NO</div>	<div>YES</div> <div>NO</div>	<div>yes</div>	<div>yes</div>	<div>YES</div> <div>NO</div>	<div>YES</div> <div>NO</div>	<div>5</div> <div>4</div> <div>3</div> <div>2</div> <div>1</div> <div>0</div>	<div>5</div> <div>4</div> <div>3</div> <div>2</div> <div>1</div> <div>0</div>	<div>YES</div> <div>NO</div>



# Interactive Presentations (IP) - updates



**800 published IPs** for Paris  
(vs 250 published IPs for Dubai)

↗ **+220%**

**Submission of a paper** is now  
obligatory for IP presenters



IPs include standard IPs, Back-Up  
abstracts transferred to IP and  
Late-Breaking Abstracts (LBA)

716 back-up abstracts in total  
**447 back-up abstracts** transferred  
to IP Session (IPB)

157 LBA submissions in May 2022  
**83 accepted LBA** transferred to IP  
Session (LBA)



## 1.4. Space Debris Symposium for Paris 2022

### Interactive Presentations:

First Name	Last Name	Poster ID	Poster URL	Title	filepathname	owner_company	spCaption	speaker_company	speaker_country	spName	Date	Time	Screen
Andreas	Hornig	70152	<a href="#">iac2022-ig</a>	Results of	IAC-22/A6/IPB	Jena-Optro	20th IAA S	Jena-Optro	Germany	A6	Monday 19 September	13:00-13:10	#18
David	Gooding	73800	<a href="#">iac2022-ig</a>	Novel low-	IAC-22/A6/IPB	[unlisted]	20th IAA S	[unlisted]	United King	A6	Monday 19 September	13:10-13:20	#18
Aleksandr	Kuznetsov	70959	<a href="#">iac2022-ig</a>	Research c	IAC-22/A6/IPB	Moscow In	20th IAA S	Moscow In	Russian Fe	A6	Monday 19 September	13:20:13:30	#18
Wiebke	Brinkmann	69295	<a href="#">iac2022-ig</a>	A Standard	IAC-22/A6/IPB	DFKI Robo	20th IAA S	DFKI Gmb	Germany	A6	Monday 19 September	13:00-13:10	#19
Shrouti	Dutta	69583	<a href="#">iac2022-ig</a>	Effect of lin	IAC-22/A6/IPB	McGill Univ	20th IAA S	McGill Univ	Canada	A6	Monday 19 September	13:10-13:20	#19
Daniel	Stelzl	71301	<a href="#">iac2022-ig</a>	ADEO &#8	IAC-22/A6/IPB	HPS GmbH	20th IAA S	HPS GmbH	Germany	A6	Monday 19 September	13:20:13:30	#19
Celina	Pasiecznik	70746	<a href="#">iac2022-ig</a>	A Dynamic	IAC-22/A6/IPB	Massachus	20th IAA S	Massachus	United Stat	A6	Monday 19 September	13:00-13:10	#20
Emiliano	Cordelli	71769	<a href="#">iac2022-ig</a>	Demonstra	IAC-22/A6/IPB	GMV, Spac	20th IAA S	GMV, Spac	Germany	A6	Monday 19 September	13:10-13:20	#20
Eun Jung	Choi	73790	<a href="#">iac2022-ig</a>	kasiopeia:	IAC-22/A6/IPB	Korea Astr	20th IAA S	Korea Astr	Korea, Rep	A6	Monday 19 September	13:20:13:30	#20
Shun	Isobe	70664	<a href="#">iac2022-ig</a>	Formation	IAC-22/A6/IPB	Kyushu Un	20th IAA S	Kyushu Un	Japan	A6	Monday 19 September	13:00-13:10	#21
Adam	Camilletti	73061	<a href="#">iac2022-ig</a>	The UK Sp	IAC-22/A6/IPB	UK Space	20th IAA S	UK Space	United King	A6	Monday 19 September	13:10-13:20	#21
Cristina	Pérez Herr	73593	<a href="#">iac2022-ig</a>	data fusion	IAC-22/A6/IPB	CDTI (Cen	20th IAA S	CDTI (Cen	Spain	A6	Monday 19 September	13:20:13:30	#21
Mahiro	Tanahashi	70684	<a href="#">iac2022-ig</a>	Estimation	IAC-22/A6/IPB	Kyushu Un	20th IAA S	Kyushu Un	Japan	A6	Monday 19 September	13:10-13:20	#22
An	Zhu	70887	<a href="#">iac2022-ig</a>	Compliance	IAC-22/A6/IPB	Fuzhou Un	20th IAA S	Fuzhou Un	China	A6	Monday 19 September	13:20:13:30	#22
Andrea	Riccobelli	73340	<a href="#">iac2022-ig</a>	Space Clea	IAC-22/A6/IPB	University	20th IAA S	University	Italy	A6	Monday 19 September	13:00-13:10	#23
Scott	Dorrington	72935	<a href="#">iac2022-ig</a>	Developme	IAC-22/A6/IPB	Massachus	20th IAA S	Massachus	Australia	A6	Monday 19 September	13:10-13:20	#23
Toshihisa	Tanaka	71421	<a href="#">iac2022-ig</a>	Developme	IAC-22/A6/IP	Kawasaki	20th IAA SYMPOSIUM ON SPACE			A6	Monday 19 September	13:00-13:10	#47



First Name	Last Name	Poster ID	Poster URL	Title	npathname	owner_company	spCaption	speaker_company	speaker_name	spName	Date	Time	Screen
José Pedro	Ferreira	74473	<a href="#">iac2022-ia</a>	Quantifying	IAC-22/LBA/A6	Viterbi Sch	20th IAA S	Viterbi Sch	United States	A6	Tuesday 20 September	13:00-13:10	#32
Okchul	Jung	74395	<a href="#">iac2022-ia</a>	Deep Learning	IAC-22/LBA/A6	Korea Aerosp	20th IAA S	Korea Aerosp	Korea, Rep	A6	Tuesday 20 September	13:10-13:20	#32
Janet	Tinoco	74421	<a href="#">iac2022-ia</a>	space debris	IAC-22/LBA/A6	Embry-Rid	20th IAA S	Embry-Rid	United States	A6	Tuesday 20 September	13:20-13:30	#32
Troy	Morris	74274	<a href="#">iac2022-ia</a>	ADR Space	IAC-22/A6/IPB	[unlisted]	20th IAA S	Kall Morris	United States	A6	Tuesday 20 September	13:10-13:20	#47
Michele	Bechini	74248	<a href="#">iac2022-ia</a>	Robust Mo	IAC-22/E6/IP	Politecnico	20th IAA S	20th IAA S	Italy	A6	Tuesday 20 September	13:10-13:20	#49
First Name	Last Name	Poster ID	Poster URL	Title	npathname	owner_company	spCaption	speaker_company	speaker_name	spName	Date	Time	Screen
Aleksandr	Golubek	69988	<a href="#">iac2022-ia</a>	Determinat	IAC-22/A6/IP	OlesHonchar	20th IAA S	Oles Honch	Ukraine	A6	Wednesday 21 Septemb	13:50-14:00	#11
Ninoshka	Sutcliffe	72453	<a href="#">iac2022-ia</a>	from fragm	IAC-22/A6/IP	Universityo	20th IAA S	University o	United States	A6	Wednesday 21 Septemb	14:00-14:10	#11
Naveen	Rajamanick	69799	<a href="#">iac2022-ia</a>	Cleaning L	IAC-22/A6/IP	Spaceonov	20th IAA S	Spaceonov	India	A6	Wednesday 21 Septemb	14:10-14:20	#11
Calum	Turner	71255	<a href="#">iac2022-ia</a>	Developing	IAC-22/A6/IP	[unlisted]	20th IAA S	AstroAgen	United Kingdom	A6	Wednesday 21 Septemb	14:20-14:30	#11
Marcel	Becker	69404	<a href="#">iac2022-ia</a>	ArianeGro	IAC-22/A6/IP	ArianeGro	20th IAA S	ArianeGro	Germany	A6	Wednesday 21 Septemb	14:30-14:40	#11
Bruno	Coelho	72306	<a href="#">iac2022-ia</a>	Developing	IAC-22/A6/IP	Instituto de	20th IAA S	Instituto de	Portugal	A6	Wednesday 21 Septemb	14:40-14:50	#11
Iva	Ramuš Cve	72021	<a href="#">iac2022-ia</a>	When the	IAC-22/A6/IP		20th IAA SYMPOSIUM		Slovenia	A6	Wednesday 21 Septemb	14:50-15:00	#11
Andrii	Dreus	68597	<a href="#">iac2022-ia</a>	thermal op	IAC-22/A6/IP	O.Honchar	20th IAA S	O. Honcha	Ukraine	A6	Wednesday 21 Septemb	13:30-13:40	#12
Jinfeng	Li	71663	<a href="#">iac2022-ia</a>	Image Rec	IAC-22/A6/IP	SchoolofA	20th IAA S	School of A	China	A6	Wednesday 21 Septemb	13:40-13:50	#12
Katia	Caceres	70911	<a href="#">iac2022-ia</a>	How will C	IAC-22/A6/IP	CDTI(Cent	20th IAA S	CDTI (Cen	Spain	A6	Wednesday 21 Septemb	13:50-14:00	#12
Haiping	Ai	70129	<a href="#">iac2022-ia</a>	Composite	IAC-22/A6/IP	FuzhouUni	20th IAA S	Fuzhou Un	China	A6	Wednesday 21 Septemb	14:00-14:10	#12
Charlotte	Croison	71272	<a href="#">iac2022-ia</a>	Overview of	IAC-22/A6/IP	Euroconsu	20th IAA S	Euroconsu	France	A6	Wednesday 21 Septemb	14:10-14:20	#12
Daria	Andrievska	68066	<a href="#">iac2022-ia</a>	Analysis of	IAC-22/A6/IP	ISAE-Supa	20th IAA S	ISAE-Supa	France	A6	Wednesday 21 Septemb	14:20-14:30	#12
Aditya	Baraskar	70995	<a href="#">iac2022-ia</a>	Laser base	IAC-22/A6/IP	SkyPerfect	20th IAA S	Sky Perfec	Japan	A6	Wednesday 21 Septemb	14:30-14:40	#12
Asha	Jain	67976	<a href="#">iac2022-ia</a>	A Model of	IAC-22/A6/IP	Massachus	20th IAA S	Massachus	United States	A6	Wednesday 21 Septemb	14:40-14:50	#12
Shawn Se	Choi	70965	<a href="#">iac2022-ia</a>	Real-time d	IAC-22/A6/IP	[unlisted]	20th IAA S	[unlisted]	Korea, Rep	A6	Wednesday 21 Septemb	14:50-15:00	#12
Massimilia	Vasile	71532	<a href="#">iac2022-ia</a>	Hyperspec	IAC-22/A6/IP	Universityo	20th IAA S	University o	United Kingdom	A6	Wednesday 21 Septemb	13:30-13:40	#13
Baptiste	Ronfard	68958	<a href="#">iac2022-ia</a>	Using unus	IAC-22/A6/IP	EcolePolyt	20th IAA S	Ecole Poly	France	A6	Wednesday 21 Septemb	13:40-13:50	#13
Gaetano	Zarcone	73839	<a href="#">iac2022-ia</a>	Large data	IAC-22/A6/IP	Universityo	20th IAA S	University o	Italy	A6	Wednesday 21 Septemb	13:50-14:00	#13
Neil	Dhingra	70583	<a href="#">iac2022-ia</a>	Efficient S	IAC-22/A6/IP	OrbitLogic	20th IAA S	Orbit Logic	United States	A6	Wednesday 21 Septemb	14:00-14:10	#13
Giulio	van Ginkel	69243	<a href="#">iac2022-ia</a>	Challenges	IAC-22/A6/IP	CGIGROUP	20th IAA S	CGI GROU	Germany	A6	Wednesday 21 Septemb	14:10-14:20	#13
Mahhad	Nayyer	67831	<a href="#">iac2022-ia</a>	Analyzing L	IAC-22/A6/IP	GrazUniver	20th IAA S	Graz Unive	Pakistan	A6	Wednesday 21 Septemb	14:20-14:30	#13
Mahhad	Nayyer	67765	<a href="#">iac2022-ia</a>	Streamlini	IAC-22/A6/IP	GrazUniver	20th IAA S	Graz Unive	Pakistan	A6	Wednesday 21 Septemb	14:30-14:40	#13
Luis Felipe	Alves de O	67874	<a href="#">iac2022-ia</a>	A key role	IAC-22/A6/IP	Universida	20th IAA S	Universida	Brazil	A6	Wednesday 21 Septemb	14:40-14:50	#13
Pierre	Letellier	67201	<a href="#">iac2022-ia</a>	The econo	IAC-22/A6/IP	Institut d'E	20th IAA S	Institut d'E	France	A6	Wednesday 21 Septemb	14:50-15:00	#13



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## 1.4. Space Debris Symposium for Paris 2022

First Name	Last Name	Poster ID	Poster UR	Title	npathname	owner_co	spCaption	speaker_c	speaker_c	spName	Date	Time	Screen
Nijanthan	Vasudevar	68574	<a href="#">iac2022-ia</a>	System De	IAC-22/A6/IP	SpaceGen	20th IAA S	Drexel Uni	United Sta	A6	Wednesday 21 Septemb	13:30-13:40	#14
Maria Nep	Kardassi	72652	<a href="#">iac2022-ia</a>	Initial Con	IAC-22/A6/IP	Universityc	20th IAA S	University	United Kin	A6	Wednesday 21 Septemb	13:40-13:50	#14
Nicola	Cimmino	73092	<a href="#">iac2022-ia</a>	Performan	IAC-22/A6/IP	Universityc	20th IAA S	University	Italy	A6	Wednesday 21 Septemb	13:50-14:00	#14
Andreas	Hornig	70314	<a href="#">iac2022-ia</a>	Satellite ar	IAC-22/A6/IP	Jena-Optro	20th IAA S	Jena-Optro	Germany	A6	Wednesday 21 Septemb	14:00-14:10	#14
Alexandru	Apostol	68551	<a href="#">iac2022-ia</a>	Synoptes -	IAC-22/A6/IP	Romanian	20th IAA S	Romanian	Romania	A6	Wednesday 21 Septemb	14:10-14:20	#14
Veronica	Moronese	73359	<a href="#">iac2022-ia</a>	Considera	IAC-22/A6/IP	SpaceGen	20th IAA S	Space Ger	Italy	A6	Wednesday 21 Septemb	14:20-14:30	#14
Arjun	Chhabra	69582	<a href="#">iac2022-ia</a>	An actor ne	IAC-22/A6/IP	Universityc	20th IAA S	University	Canada	A6	Wednesday 21 Septemb	14:30-14:40	#14
Michele	Jamrozik	71536	<a href="#">iac2022-ia</a>	Image Enh	IAC-22/A6/IP	Universityc	20th IAA S	University	Luxembou	A6	Wednesday 21 Septemb	14:40-14:50	#14
Clarissa	Luk	67923	<a href="#">iac2022-ia</a>	Regulating	IAC-22/A6/IP	TheUniver	20th IAA S	The Univer	Australia	A6	Wednesday 21 Septemb	14:50-15:00	#14
Paolo	Guardabas	68521	<a href="#">iac2022-ia</a>	Massive G	IAC-22/A6/IP	ISAE-Supa	20th IAA S	ISAE-Supa	France	A6	Wednesday 21 Septemb	13:30-13:40	#15
Alyssa	Goessler	73640	<a href="#">iac2022-ia</a>	Environme	IAC-22/A6/IP		20th IAA SYMPOSIUM		United Sta	A6	Wednesday 21 Septemb	13:40-13:50	#15
Lauren	Fleming	67572	<a href="#">iac2022-ia</a>	Incentivin	IAC-22/A6/IP		20th IAA SYMPOSIUM		United Sta	A6	Wednesday 21 Septemb	13:50-14:00	#15
Manuel	Sanjurjo-R	71271	<a href="#">iac2022-ia</a>	A Novel Me	IAC-22/A6/IP	Universida	20th IAA S	Universida	Spain	A6	Wednesday 21 Septemb	14:00-14:10	#15
Hamed	Nosrati	71287	<a href="#">iac2022-ia</a>	Space Obs	IAC-22/A6/IP	CSIROAstr	20th IAA S	CSIRO Ast	Australia	A6	Wednesday 21 Septemb	14:10-14:20	#15
Priyank	Dubey	69306	<a href="#">iac2022-ia</a>	Mitigation c	IAC-22/A6/IP	IndianInsti	20th IAA S	Indian Inst	India	A6	Wednesday 21 Septemb	14:20-14:30	#15
Anne	Bettens	72734	<a href="#">iac2022-ia</a>	Machine le	IAC-22/A6/IP	TheUniver	20th IAA S	The Univer	Australia	A6	Wednesday 21 Septemb	14:30-14:40	#15
Dejia	Che	70850	<a href="#">iac2022-ia</a>	a multi-mo	IAC-22/A6/IP	Northwest	20th IAA S	Northwest	China	A6	Wednesday 21 Septemb	14:40-14:50	#15
Jiang	Tao	73182	<a href="#">iac2022-ia</a>	Lightweigh	IAC-22/A6/IP	NanjingUn	20th IAA S	Nanjing Un	China	A6	Wednesday 21 Septemb	14:50-15:00	#15
João	Pandeirad	72291	<a href="#">iac2022-ia</a>	ATLAS: De	IAC-22/A6/IP	Institutode	20th IAA S	Instituto de	Portugal	A6	Wednesday 21 Septemb	13:30-13:40	#16
Lorenzo	Giudici	73762	<a href="#">iac2022-ia</a>	Phase spa	IAC-22/A6/IP	Politecnico	20th IAA S	Politecnico	Italy	A6	Wednesday 21 Septemb	13:40-13:50	#16
Benedetta	Cattani	73958	<a href="#">iac2022-ia</a>	Commerci	IAC-22/A6/IP	DelftUnive	20th IAA S	Delft Unive	The Nethe	A6	Wednesday 21 Septemb	13:50-14:00	#16
Alessandr	Colombo	74064	<a href="#">iac2022-ia</a>	VIS-TIR ca	IAC-22/A6/IP	Politecnico	20th IAA S	Politecnico	Italy	A6	Wednesday 21 Septemb	14:00-14:10	#16
Felicitas	Niebler	69218	<a href="#">iac2022-ia</a>	Compact g	IAC-22/A6/IP	GermanAe	20th IAA S	German Ae	Germany	A6	Wednesday 21 Septemb	14:10-14:20	#16
Rebecca	McFadden	72214	<a href="#">iac2022-ia</a>	Light curve	IAC-22/A6/IP	DeimosSp	20th IAA S	Deimos Sp	United Kin	A6	Wednesday 21 Septemb	14:20-14:30	#16
Benjamin	Feuge-Mill	68799	<a href="#">iac2022-ia</a>	A-contrario	IAC-22/A6/IP	TheUniver	20th IAA S	The Univer	United Sta	A6	Wednesday 21 Septemb	14:30-14:40	#16
Riccardo	Cipollone	73624	<a href="#">iac2022-ia</a>	A re-entry a	IAC-22/A6/IP	Politecnico	20th IAA S	Politecnico	Italy	A6	Wednesday 21 Septemb	14:40-14:50	#16
M S	Dhanyavar	70301	<a href="#">iac2022-ia</a>	A Novel De	IAC-22/A6/IP	RamaiahIr	20th IAA S	Ramaiah I	India	A6	Wednesday 21 Septemb	14:50-15:00	#16
Alexis	Petit	69003	<a href="#">iac2022-ia</a>	Multi-Teles	IAC-22/A6/IP		20th IAA S	[unlisted]	France	A6	Wednesday 21 Septemb	13:30-13:40	#17

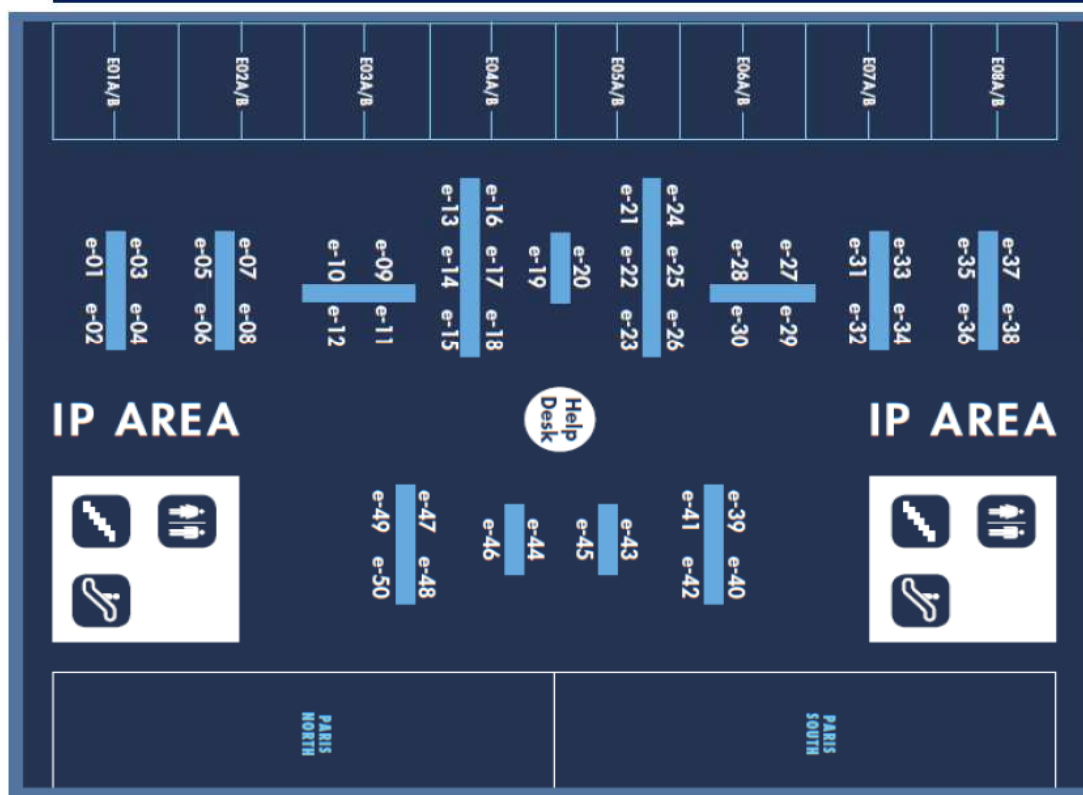


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## 1.4. Space Debris Symposium for Paris 2022



### IP sessions – IP Area



#### Hall 7.3

Monday 19 September  
(IP Session)

12:50 – 13:30

Tuesday 20 September  
(IP Session)

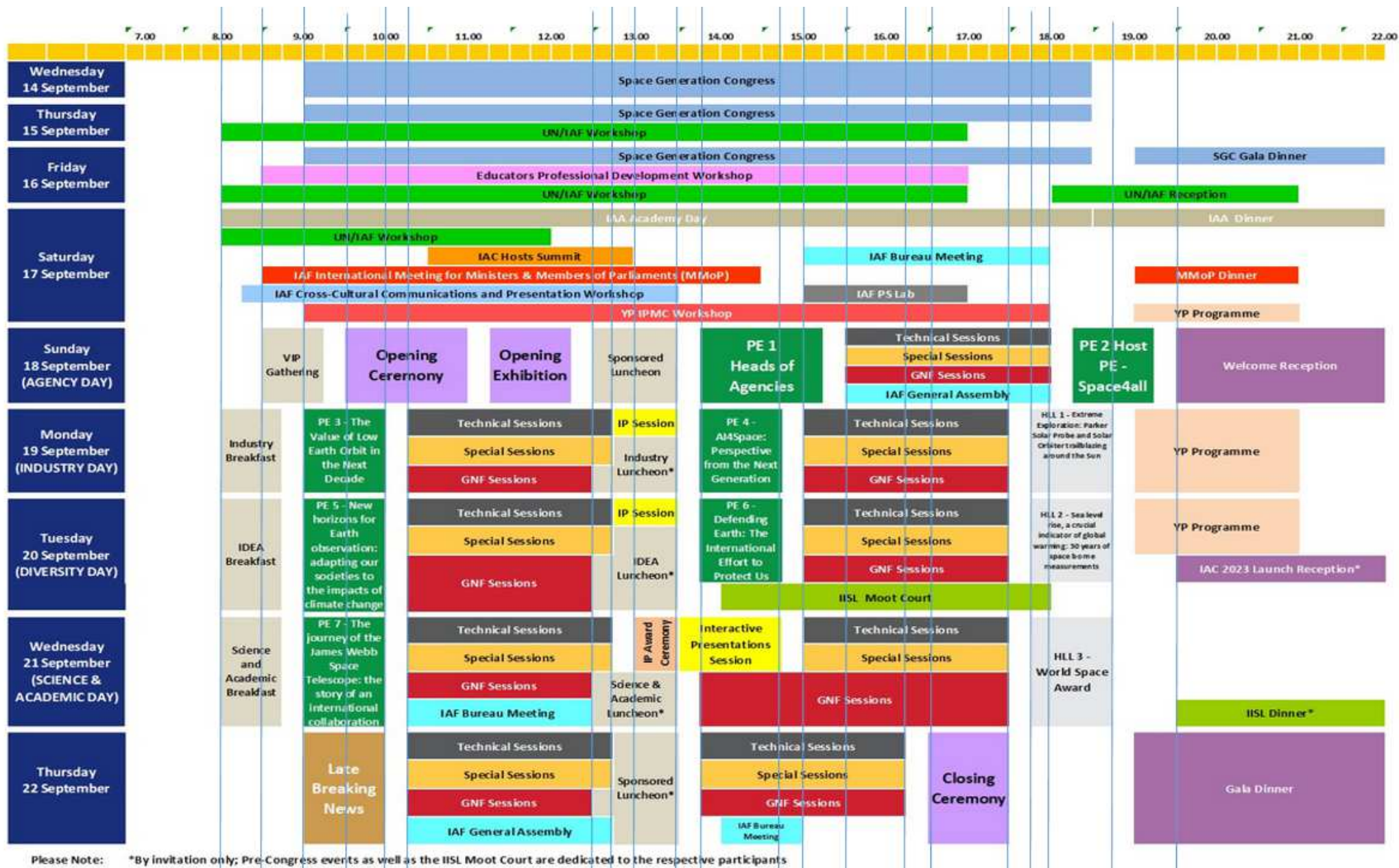
12:50 – 13:30

Wednesday 21 September  
(IP Award Ceremony and IP Session)

13:00 – 15:00







Please Note: \*By invitation only; Pre-Congress events as well as the IISL Moot Court are dedicated to the respective participants



Date	18/09/2022	19/09/2022	19/09/2022	20/09/2022	20/09/2022	21/09/2022	21/09/2022	22/09/2022	22/09/2022
Time / Room Number	15:15-17:45	10:15-12:45	15:00-17:30	10:15-12:45	15:00-17:30	10:15-12:45	15:00-17:30	10:15-12:45	13:45-16:15
N04	A3.1	A3.2A	A3.2B	A3.3A	A3.3B	A3.4A	A3.5	A3.2C	A3.4B
S06	D2.1	D2.3	D2.2	D2.4	D2.5	D2.6	D2.7	D2.8/A5.4	D2.9/D6.2
S05	C1.1	C1.2	C1.3	C1.4	C1.5	C1.6	C1.7	C1.8	C1.9
S04	A6.7	A6.9	A6.4	A6.3	A6.2	A6.5	A6.6	A6.8/E9.1	A6.1
S03	B3.1	B3.2	B3.3	B3.4/B6.4	B3.5	B3.6/A5.3	B3.7	B3.8	A6.10/E10.2
S02	B4.2	B4.1	B4.3	B4.4	B4.5	B4.6B	B4.7	B4.8	B4.6A
S01	E7.1	E7.2	E7.3	E7.4		E7.6/E3.5	E10.1	E7.5	E7.7
W08	C4.1	C4.3	C4.5	C4.2	C4.6	C4.7	C4.8/B4.5A	C4.9	C4.10/C3.5
W06	C2.1	C2.2	C2.3	C2.4	C2.5	C2.6	C2.7	C2.8	C2.9
W05	A1.1	A1.2	A1.3	C4.4	A1.4	A1.5	A1.6	A1.7	A1.8
W04	A2.1	A4.1	A4.2	A2.2	A2.3	A2.4	A2.5	A2.6	A2.7
W03	D1.1	D1.2	D1.3	A5.1	A5.2	D1.4A	D1.4B	D1.5	D1.6
W02	B1.1	C3.1	C3.2	B1.2	B1.3	B1.4	B1.5	B1.6	C3.4
E04B	E9.2	E3.1	E3.2	E3.3	E3.4	A7.1	E3.6	A7.2	E8.1
W01	E5.1	D5.1	E5.2	D5.2	E5.3	D5.3	E5.4	E5.5	E5.6
731/732	B5.1	B2.1	B2.2	B2.3	B2.4	B2.5	B2.6	B2.7	A7.3
E08B	E1.1	E1.2	E1.3	E1.4	E1.5	E1.6	E1.7		E1.9
E06B	D4.1	D4.2	D4.3	D3.1	D3.2A	D4.4	D4.5	D3.2B	D3.3
E03A	E2.1	E2.2	B6.3	E2.4	B5.2	B5.3	B6.1	B6.2	B6.5
W07	B2.8/GTS.3	D6.1	E2.3/GTS.4	D6.3	E6.5/GTS.1	C3.3	B4.9/GTS.5	D5.4	B3.9/GTS.2
733/734		E6.4	E6.3	E6.2	E4.1	E4.2	E6.1	E4.3	
ISZ								E1.8	

Category A:  
Science  
& Exploration

A1--> A7

Category C:  
Technology

C1--> C4

Category E:  
Space  
& Society

E1--> E10

Category B:  
Applications  
& Operations

B1--> B6

Category D:  
Infrastructure

D1--> D6





# Updates on KPI data gathering



- IAC 2021 served as a DRY RUN
- To be effective from IAC 2022, Paris
- The audience satisfaction survey  
(7 questions - please remind the delegates to complete the survey during/after your session, instructions will be on a screensaver)

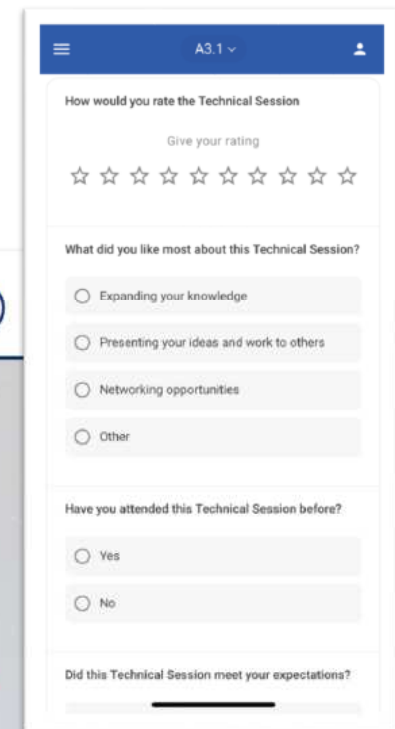


**(LESSON LEARNT)** – Survey will be kept open after the end of each Technical Session

### SHARE YOUR FEEDBACK



Join through [www.slido.com](https://www.slido.com) and put [#iac2022tp](#) or scan the QR code and share your comments.  
Thank you!



A3.1

How would you rate the Technical Session

Give your rating

☆☆☆☆☆☆☆☆

What did you like most about this Technical Session?

☐ Expanding your knowledge

☐ Presenting your ideas and work to others

☐ Networking opportunities

☐ Other

Have you attended this Technical Session before?

☐ Yes

☐ No

Did this Technical Session meet your expectations?



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## *1.4. Space Debris Symposium for Paris 2022*

### Tasks of IPC members



SHARE YOUR FEEDBACK



Join through [www.slido.com](https://www.slido.com) and put [#iac2022tp](https://twitter.com/iac2022tp)  
or scan the QR code and share your comments.

Thank you!

To remind the delegates to  
complete the survey  
during/after your session,  
instructions will be on a  
screensaver





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## *1.4. Space Debris Symposium for Paris 2022*

# Audience TS Evaluation Survey

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1. How would you rate the Technical Session?
2. What did you like most about this Technical Session?
3. Have you attended this Technical Session before?
4. Did this Technical Session meet your expectations?
5. Would you recommend this session to someone?
6. What were your favourite experiences or moments?
7. How can we improve the Technical Programme for next year?

Rating poll

Multiple choice

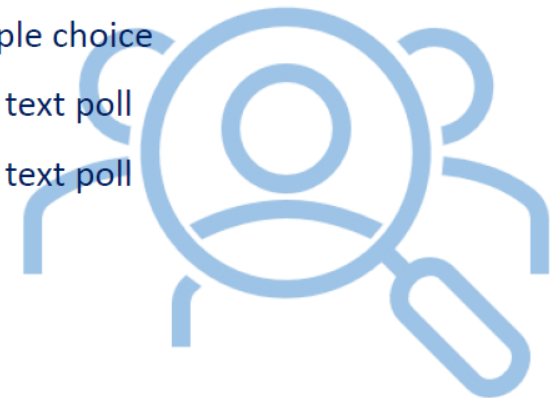
Multiple choice

Multiple choice

Multiple choice

Open text poll

Open text poll





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## 1.5. Space Debris Symposium for Baku 2023

IAC	Year	Location	Session 1	Session 2	Session 3	Session 4	Session 5	Session 6	Session 7	Session 8	Session 9	Session 10	Interactive Presentations
67th	2016	Guadalajara	D. Oltrogge [C] T. Schildknecht [C] V. Agapov [R]	C. Pardini [C] M. Sorge [C] B. Bastida-Virgili [R]	N. Fitz Coy [C] F. Schaefer [C] A. Francesconi [R]	H. Krag [C] C. Cazaux [C]	S. Kibe [C] F. Piergentili [C] F. Santoni [R]	N. Berend [C] L. Innocenti [C] G. Haussmann [R]	T.S. Kelso [C] J-C. Dolado-Perez [C] C. Wiedemann [R]	S. Plattard [C] D. Finkleman [R]	M. Jah [C] H. Klinkrad [C]		T. Yasaka D. McKnight C. Bonnal
68th	2017	Adelaide	F. DiPentino [C] T. Schildknecht [C] V. Agapov [R]	C. Pardini [C] D. Oltrogge [C] M. Sorge [R]	F. Schaefer [C] N. Fitz Coy [C] A. Francesconi [R]	C. Cazaux [C] D. Finkleman [C] H. Krag [R]	B. Bastida-Virgili [C] F. Santoni [C] F. Piergentili [R]	N. Berend [C] L. Innocenti [C] B. Singh [R]	T.S. Kelso [C] J-C. Dolado-Perez [C] C. Wiedemann [R]	D. McKnight [C] S. Plattard [C] A. Soucek [R]	H. Klinkrad [C] M. Jah [C] H. Lewis [R]	D. Oltrogge [C] L. Rossettini [C] C. Cazaux [R]	T. Yasaka D. McKnight C. Bonnal
69th	2018	Bremen	F. DiPentino [C] T. Schildknecht [C] V. Agapov [R]	L. Anselmo [C] D. Oltrogge [C] M. Sorge [R]	N. Fitz Coy [C] F. Schaefer [C] D. McKnight [R]	H. Krag [C] P. Omalý [C] Y. Usovik [R]	F. Piergentili [C] B. Bastida-Virgili [C] F. Santoni [R]	N. Berend [C] B. Singh [C] L. Rossettini [R]	C. Wiedemann [C] T.S. Kelso [C] J-C. Dolado-Perez [R]	D. Spencer [C] S. Lemay [R]	S. Kibe [C] H. Lewis [C] H. Klinkrad [R]	M. Jah [C] Anilkumar [C] Kitazawa [R]	T. Yasaka D. McKnight C. Bonnal
70th	2019	Washington	M. Skinner [C] T. Schildknecht [C] V. Agapov [R]	M. Sorge [C] C. Pardini [C] D. Oltrogge [R]	JC Traineau [C] M. Jah [C] N. Fitz Coy [R]	H. Krag [C] S. Kawamoto [C] P. Omalý [R]	F. Santoni [C] A. Nassisi [C] L. Francilout [R]	L. Rossettini [C] E. Kerr [C] N. Berend [R]	C. Wiedemann [C] N. Sanchez-Ortiz [C] T.S. Kelso [R]	D. Spencer [C] S. Lemay [R]	H. Klinkrad [C] J-C. Dolado-Perez [R] F. Piergentili [R]	U. Dasgupta [C] Y. Usovik [C]	T. Yasaka D. McKnight C. Bonnal
71st	2020	Cyber	T. Schildknecht [C] M. Skinner [C] V. Agapov [R]	C. Pardini [C] D. Oltrogge [C] M. Sorge [R]	Z. Gong [C] E. Kerre [C] JC Traineau [R]	S. Kawamoto [C] P. Omalý [C] H. Krag [R]	B. Singh [C] L. Francilout [C] R. Opromolla [R]	J. Auburn [C] N. Berend [C] C. Wiedemann [R]	T.S. Kelso [C] N. Sanchez-Ortiz [C] V. Martinot [R]	S. Plattard [C] S. Lemay [C] A. Soucek [R] D. Spencer [R]	H. Klinkrad [C] J-C. Dolado-Perez [R] F. Santoni [R]	D. McKnight [C] H. Tung [C] A. Anilkumar [R]	T. Yasaka D. McKnight M. Jankovic
72nd	2021	Dubai	M. Skinner [C] M. Jah [C] T. Schildknecht [R]	M. Sorge [C] D. Oltrogge [C] C. Pardini [R]	D. McKnight [C] Z. Gong [C] JC Traineau [R]	P. Omalý [C] S. Kawamoto [C] H. Krag [R]	B. Singh [C] R. Opromolla [C] L. Francilout [R]	M. Jankovic [C] C. Wiedemann [C] J. Auburn [R]	V. Martinot [C] T.S. Kelso [C] N. Sanchez-Ortiz [R]	D. Spencer [C] T. Masson-Zwaan [C] S. Lemay [R]	H. Klinkrad [C] F. Santoni [C] J-C. Dolado-Perez [R]	V. Agapov [C] H. Tung [C] A. Anilkumar [R]	E. Kerr S. Lemay F. Santoni R. Opromolla M. Jankovic
73rd	2022	Paris	M. Skinner [C] V. Agapov [C] T. Schildknecht [R]	M. Sorge [C] D. Oltrogge [C] C. Pardini [R]	D. McKnight [C] Z. Gong [C] JC Traineau [R]	P. Omalý [C] S. Kawamoto [C] H. Krag [R]	B. Singh [C] R. Opromolla [C] L. Francilout [R]	M. Jankovic [C] D. Grishko [C] J. Auburn [R]	V. Martinot [C] T.S. Kelso [C] N. Sanchez-Ortiz [R]	D. Spencer [C] T. Masson-Zwaan [C] E. Kerr [R]	J. Siminski [C] J-C. Dolado-Perez [R] P. Marzioli [R]	T. Schildknecht [C] D. McKnight [C] C. Colombo [R]	E. Kerr F. Letizia F. Santoni R. Opromolla M. Jankovic P. Marzioli



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## *1.5. Space Debris Symposium for Baku 2023*

*Evolutions of the text – Evolutions of the Chairs & Rapporteurs*

**A6: Space Debris Symposium:** ~~Bennal~~ – Bevilacqua – Omaly

The Symposium will address the complete spectrum of issues associated to space debris, including orbital sustainability and operations in debris dominated environment.

It will cover every aspect of Space Environment Management (SEM) including Mitigation and Remediation measures, Space Surveillance and Tracking (SST), Space Situational Awareness (SSA), Space Traffic Management (STM), including all aspects of measurements, modelling, risk assessment in space and on the ground, re-entry, hypervelocity impacts and protection, mitigation and standards, post-mission disposal, remediation, debris removal, Space Surveillance, collision avoidance as well as non-technical topics associated to space debris dominated environment.

**A6.1: Space Debris Detection, Tracking and Characterization - SST:** Skinner – Agapov – Schildknecht

This session will address every aspect of SST (Space Surveillance and Tracking), advanced ground and space-based measurement techniques, relating processing methods, and results of space debris characterization.

**A6.2: Modelling and Risk Analysis:** Sorge – Oltrogge – Pardini

This session will address the characterization of the current and future debris population and methods for in-orbit and on-ground risk assessments. The in-orbit analysis will cover collision risk estimates based on statistical population models and deterministic catalogues, and active collision avoidance.

**A6.3: Impact-Induced Mission Effects and Risk Assessments:** ~~McKnight~~ Kitazawa – Gong – Traineau

This session addresses disruptions of spacecraft operations induced by hypervelocity impacts including spacecraft anomalies, perturbation of operations, component failures up to mission loss, and spacecraft fragmentations. It includes risk assessments for impact vulnerability studies and corresponding system tools. Further topics are spacecraft impact protection and shielding studies, laboratory impact experiments, numerical simulations, and on-board diagnostics to characterize impacts such as impact sensors, accelerometers, etc.



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## 1.5. Space Debris Symposium for Baku 2023

### ***A6.4: Mitigation - Tools, Techniques and Challenges - SEM:*** Omaly – Kawamoto – Krag

This session will focus on the Mitigation part of the SEM (Space Environment Monitoring), implementation of debris prevention and reduction measures; vehicle passive protection at system level including end of life strategies and tools to verify the efficiency of the implemented measures. The session will also address practical experiences in the planning and verification of measures and issues and lessons learnt in the actual execution of mitigation actions.

### ***A6.5: Post Mission Disposal and Space Debris Removal 1 - SEM:*** Singh – Opromolla – Francillout

This session will focus on the Remediation part of the SEM, dealing with ADR (Active Debris Removal), JCA (Just in time Collision Avoidance), LDTM (Large Debris Traffic Management) among solutions. It will address post-mission disposal and active removal techniques “ground and space based”, review potential solutions and identify implementation difficulties.

### ***A6.6: Post Mission Disposal and Space Debris Removal 2 - SEM:*** Jankovic – Grishko – ~~Auburn~~ Forshaw

This session will focus on the Remediation part of the SEM, dealing with ADR (Active Debris Removal), JCA (Just in time Collision Avoidance), LDTM (Large Debris Traffic Management) among solutions. It will address post-mission disposal and active removal techniques “ground and space based”, review potential solutions and identify implementation difficulties.

### ***A6.7: Operations in Space Debris Environment, Situational Awareness - SSA:*** Martinot – Kelso – Sanchez-Ortiz

This session will address the multiple aspects associated to STM (Space Traffic Management) and SSA (Space Situational Awareness) including safe operations in space dealing with Space Debris, operational observations, orbit determination, catalogue build-up and maintenance, data aggregation from different sources, relevant data exchanges standards and conjunction analyses.



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## 1.5. Space Debris Symposium for Baku 2023

### **A6.8 / E9.1 (joint with Space Security Committee): *Policy, Legal, Institutional, Economic and Security Aspects of Debris Mitigation, Debris Remediation and STM***

From SDC: Spencer – Masson-Zwaan – Kerr    From SSC: Plattard – ~~Seuek~~ Capurso - Samson

**This session will address all non-technical aspects of debris mitigation, debris remediation and STM. Papers may focus on aspects of responsibility, liability and registration, on the role of bodies such as UNCOPUOS or IADC, as well as on insurance, financial incentives and funding. In addition, security-related aspects and the role of international cooperation in addressing these issues may be considered.**

### **A6.9: Orbit Determination and Propagation - SST**

Siminski – Dolado-Perez – Marzioli

**This session will address every aspect of orbit determination coming from the SST (Space Surveillance and Tracking), related to assessment of raw and derived data accuracy, optical measurements processing and modelling and risk analysis of space debris**

### **A6.10 / XXX: Joint XXX / Space Debris Session**

From SDC: Schildknecht – ~~McKnight~~ – Colombo    From XXX:

**A6.IP: Interactive Presentations,** Kerr – Letizia – Marzioli - Opromolla – Jankovic – ~~Bonnal~~





## *1.5. Space Debris Symposium for Baku 2023*

### **General messages on A6 Space Debris:**

What about the Joint Session A6.10?

- 2022: E10.2 NEO 7 abstracts 6 presentations
- 2021: B6.5 Space Operations 13 abstracts, 22 participants
- 2020: B6.5 Space Operations 11 abstracts
- 2019: B4.10 Small Satellites 14 abstracts, 59 participants
- 2018: C1.7 Astrodynamics 12 abstracts, 60 participants
- 2017: B4.10 Small Satellites 12 abstracts, 55 participants
- 2015: YPVF Young Professionals Virtual Forum 7 abstracts, 5 participants (2 presenters + 2 chairs + 1 lost in the room...)
- Good suggestion made during the Spring meeting:
  - Joint Session with E6 "IAF Business Innovation Symposium"; contact point Ken Davidian
  - Topic "How to make money with Space Debris?" or anything similar... "Debris and Economics??"
  - ⇒ First contacts did not lead to any concrete action... May be to late... Maybe just another "regular" debris session...

**Choice made today is to have a session on "Space Capacity Management" ⇒ Camilla Colombo will propose an organization asap**

Joseph P. Loftus Jr. IAC A6 lecture

- Not done again in Baku; need first for feedback from Paris
- What should be the selection strategy? Should we write Terms of Reference? **Question is not solved – will come back later**

Invited Keynote Lectures included in Technical Sessions: please propose if relevant



## *2. Exchanges*

## 2. Exchanges

**See dedicated presentation in annex 2**

+

- Planetary Defense Activities in China  
Zizheng Gong  
See Appendix 4
- 1<sup>st</sup> LEO Kinetic Space Safety Workshop  
Lausanne, 4 – 5 May, 2022  
<https://swfound.org/media/207332/2022-leo-kinetic-space-safety-workshop-flyer.pdf>  
Chairman Darren McKnight
- 6<sup>th</sup> Workshop on Space Debris Modeling & Remediation  
Milan, 18 – 20 May 2022  
Chairs Camilla Colombo – Juan-Carlos Dolado-Perez
- 9<sup>th</sup> EUCASS-3AF Conference <https://eucass-3af-2022.eu/>  
Lille, 27 June – 1<sup>st</sup> July 2022  
Successful sessions on “sustainable space” – Proceedings by end of September  
Chairman Luciano Anselmo





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# *Agenda*

## **3. IAA Studies**

### **3.1 For Information:**

**IAA Study Group 5.10 Orbital Debris Removal: Policy, Political, Legal, and Economic Considerations**

Lesley Jane Smith and Ray A. Williamson (eds.)

**Has been published - ISBN/EAN IAA : 978-2-917761-79-3**

**Congrats to Lesley Jane and Ray !**

### **3.2 SG 5.17 ⇒ See Appendix 3**