



International Academy of Astronautics

IAA Space Debris Committee

Paris, March 25th, 2020



Agenda

Exchange by e-mail only: no meeting

No “virtual” meeting (visio, skype, telecom...) due to time differences between members

IAC

1. IAA Space Debris Committee
2. Lessons learned from Washington 2019 ⇒ **To be provided later**
3. Status of Space Debris Symposium for Dubai 2020
4. General statistics on Symposium A6 ⇒ **To be provided later**
5. Preparation of Space Debris Symposium for Paris 2021

No further aspects considered due to current health situation at worldwide level



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, ...)



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, UNCOUOS, COSPAR, ISO ...)
- Academics, Labs, Universities, Industrials... working on the topic

However, it is requested to be somehow “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

1. IAA Space Debris Committee

Current official membership (as per web site):

Agapov Vladimir	Francesconi Alessandro	Masson-Zwaan Tanja	Somma Gian Luigi
Aglietti Guglielmo	Francillout Laurent	McKnight Darren S.	Sorge Marlon E.
Ailor William	Gong Zizheng	Metz Manuel	Spencer David B.
Alby Fernand	Gorman Alice	Nassisi Annamaria	Stokes Hedley
Anilkumar A.K.	Hanada Toshiya	Oltrogge Daniel L.	Traineau Jean-Claude
Anselmo Luciano	Howard Diane	Omary Pierre	Tung Helen
Anz-Meador Philip	Hyde James	Opromolla Roberto	Usovik Igor
Auburn John	Jah Moriba K.	Pardini Carmen	Wiedemann Carsten
Berend Nicolas	Jankovic Marko	Piergentili Fabrizio	Yasaka Tetsuo
Brachet Gerard	Kaliapin Mykhailo	Plattard Serge	
Christiansen Eric L	Kawamoto Satomi	Rossettini Luca L.	
Crowther Richard	Kelso T. S.	Sanchez-Ortiz Noelia	
Dolado Perez Juan-Carlos	Kerr Emma	Santoni Fabio	
Faucher Pascal	Kibe Seishiro	Schaefer Frank	
Finkleman David	Kim Hae-Dong	Schildknecht Thomas	
Fitz-Coy Norman G.	Kitazawa Yukihito	Seitzer Pat	
Flohner Tim	Krag Holger	Shen Lin	
Flury Walter	Le May Samantha	Singh Balbir	
	Lemmens Stijn	Skinner Mark	
	Martinot Vincent	Smith Lesley-Jane	

Chairs:

Klinkrad Heiner
Liou Jer-Chyi
Bonnal Christophe

To be removed: ?

Please indicate whether you would like to be removed from the SDC and/or the distribution list

New members:

Bevilacqua Riccardo
Dasgupta Upasana (elected in 2018)
Martinez Peter

Invitations have been sent by IAA
Don't forget to answer!

Synthesis:

73 members

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



1. IAA Space Debris Committee

Election of the chairs:

Currently 3 chairs, but only 2 coordinators of A6 Symposium

No precise respective roles

Will be reduced to 2

Typically 3 functions:

- Global coordination
- Preparation of the general yearly synthesis for IAA
- Coordination of the “exchange” among members during our meetings

Dedicated Terms of Reference to prepare for Dubai

Potential election of one chair for 4 years, every 2 years

First election in October 2020 in Dubai: please inform us if you wish to candidate

Potential re-election once of a departing chair

Voters are limited to members of Space Debris Committee

If possible, not two chairs from the same geographic region

Transparent process with secret ballots

Confirmed by IAA that candidates shall be Full or Corresponding Members of IAA

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



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3. Space Debris Symposium for Dubai 2020

A6: Space Debris Symposium: Liou – Bonnal

A6.1: Space Debris Detection, Tracking and Characterization: Skinner - Schildknecht – Agapov ⇒ 45 abstracts

A6.2: Modelling and Risk Analysis: Pardini – Oltrogge – Sorge ⇒ 21 abstracts

A6.3: Impact-Induced Mission Effects and Risk Assessments: Kerr – Gong – Traineau ⇒ 6 abstracts

A6.4: Mitigation - Tools, Techniques and Challenges: Kawamoto – Omaly – Krag ⇒ 16 abstracts

A6.5: Post Mission Disposal and Space Debris Removal 1: Singh – Francillout – Opromolla ⇒ 32 abstracts

A6.6: Post Mission Disposal and Space Debris Removal 2: Auburn – Berend – Wiedemann ⇒ 24 abstracts

A6.7: Operations in Space Debris Environment, Situational Awareness: Sanchez-Ortiz – Kelso – Martinot ⇒ 20 abstracts

A6.8 (joint with Space Security Committee): Political, Legal, Institutional and Economic Aspects of Space Debris Mitigation and Removal: From SDC: Le May – Spencer From SSC: Plattard – Soucek ⇒ 36 abstracts

A6.9: Orbit Determination and Propagation: Dolado-Perez – Klinkrad – Santoni ⇒ 13 abstracts

A6.10 /B6.X: Joint Space Operations / Space Debris Session: From SDC: McKnight – Tung – Fitz-Coy – Anilkumar – From SO: Auburn ⇒ 9 abstracts

A6.IP: Interactive Presentations, Yasaka – McKnight – Jankovic – Bonnal ⇒ 6 abstracts

👉 **Grand total 228 abstracts**



5. Space Debris Symposium for Paris 2021

A6: Space Debris Symposium: Liou – Bonnal

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: Jah – Skinner - 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 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, and component failures up to mission loss. 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.



5. Space Debris Symposium for Paris 2021

A6.4: Mitigation - Tools, Techniques and Challenges - SEM: Kawamoto – Omaly – 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: Wiedemann – Jankovic – 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.



5. Space Debris Symposium for Paris 2021

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 – LeMay From SSC: Plattard

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 aspect of space debris mitigation and removal. Political, legal and institutional aspects includes role of IADC and UNCOPUOS and other multilateral bodies. Economic issues including 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

Klinkrad – Santoni – Dolado-Perez

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 / B6.5.: Joint Space Operations / Space Debris Session – STM Operations

From SDC: Fitz-Coy – Tung - Agapov From SOC:

This joint session will deal with every aspect of STM Operations and Security. It facilitates discussions between Space Operations and Space Debris communities for shared understanding of the challenges/issues in operating in a debris-rich environment. It deals with STM – Operations and security. Lessons learned from CAM operations, HSF and PMD are especially welcome. Looking into the future: improved STM; automated CAM; and large constellation operations in LEO are key challenges for the community and require the appropriate regulatory environment.

A6.IP: Interactive Presentations, Kerr – Le May – Santoni – Opromolla – Jankovic – Bonnal