International Academy of Astronautics
IAA Space Debris Committee
Paris, March 25\textsuperscript{th}, 2020
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, UNCOPUOS, 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
Aglietti Guglielmo
Ailor William
Alby Fernand
Anilkumar A.K.
Anselmo Luciano
Anz-Meador Philip
Auburn John
Berend Nicolas
Brachet Gerard
Christiansen Eric L
Crowther Richard
Dolado Perez Juan-Carlos
Faucher Pascal
Finkleman David
Fitz-Coy Norman G.
Flohrer Tim
Flury Walter
Francesconi Alessandro
Francillout Laurent
Gong Zizheng
Gorman Alice
Hanada Toshiya
Howard Diane
Hyde James
Jah Moriba K.
Jankovic Marko
Kaliapin Mykhailo
Kawamoto Satomi
Kelso T. S.
Kerr Emma
Kibe Seishiro
Kim Hae-Dong
Kitazawa Yukihiro
Krag Holger
Le May Samantha
Lemmens Stijn
Martinot Vincent
Masson-Zwaan Tanja
McKnight Darren S.
Metz Manuel
Nassisi Annamaria
Oltragge Daniel L.
Omaly Pierre
Opromolla Roberto
Pardini Carmen
Piergentili Fabrizio
Plattard Serge
Rossettini Luca L.
Sanchez-Ortiz Noelia
Santoni Fabio
Schaefer Frank
Schildknecht Thomas
Seitzer Pat
Shen Lin
Singh Balbir
Skinner Mark
Smith Lesley-Jane
Somma Gian Luigi
Sorge Marlon E.
Spencer David B.
Stokes Hedley
Traineau Jean-Claude
Tung Helen
Usovik Igor
Wiedemann Carsten
Yasaka Tetsuo

To be removed: ?

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

Chairs:
Klinkrad Heiner
Liou Jer-Chyi
Bonnal Christophe

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
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
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


A6.4: 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


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

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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.
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.