International Academy of Astronautics
IAA Space Debris Committee
October 9th, 2020
1. **IAC**
   1.1. IAA Space Debris Committee
   1.2. Lessons learned from Washington 2019
   1.3. Status of Space Debris Symposium for Cyber IAC 2020
   1.4. Preparation of Space Debris Symposium for Dubai 2021

2. **Exchanges**
   2.1. Past events: workshops, conferences, congresses, …
   2.2. On the Agenda
   2.3. New achievements
   2.4. Round table – Open discussion

3. **IAA Study Groups**
   3.1 SG 5.17 IAA Situation Report on Space Debris
1. IAC
   1.1. IAA Space Debris Committee
   1.2. Lessons learned from Washington 2019
   1.3. Status of Space Debris Symposium for Cyber IAC 2020
   1.4. Preparation of Space Debris Symposium for Dubai 2021
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, …)
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 Yukihito
- Krag Holger
- Le May Samantha
- Lemmens Stijn
- Martinot Vincent
- Masson-Zwaan Tanja
- McKnight Darren S.
- Metz Manuel
- Nassisi Annamaria
- Oltrogge Daniel L.
- Omaly Pierre
- Opromolla Roberto
- Pardini Carmen
- Piergentili Fabrizio
- Plattard Serge
- Rossettini Luca L.
- Sanchez-Ortiz Noelia
- Santoni Fabio
- Schaefer Frank
- Schilknecht 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: ?

Chairs:
- Klinkrad Heiner
- Liou Jer-Chyi
- Bonnal Christophe

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

Please send your name today for the list of participants
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, potentially with a Secretary
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 Spring Meeting 2021
Potential election of one chair for 4 years, every 2 years
First election in October 2021 in Dubai to replace one of the chairs: please inform us if you wish to candidate
Potential re-election once for 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
1.2 Feedback from Washington IAC 2019
General statistics prepared by IAF secretariat

See Appendix 2.
1.2 Feedback from Washington IAC 2019

General statistics prepared by IAF secretariat

- 14 Press Conferences
- 6949 Delegates
- 7 Plenaries
- +1200 General Public
- 1 Billion #IAC2019 Users
- 272 Exhibitors
- 52 IAF GNF Sessions
- 181 Technical Sessions
- +1800 Technical Papers
- 80 Countries
Technical Programme Abstracts

- Abstracts in total: 4361
- Abstracts accepted: 2507
  - 2122 Oral Presentations
  - 382 Interactive Presentations

- Papers uploaded: 1798
  - 1676 Oral Papers
  - 122 Interactive Papers
- Interactive Presentations submitted: 240+

- Confirmed presentations: 2139
- Withdrawn presentations: 324
- Unconfirmed: 44

Accepted = 57% (Submitted)
Confirmed = 85% (Accepted)
Uploaded = 72%(Accepted)
# 1.2 Feedback from Washington IAC 2019

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**FINAL STATISTICS**

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# A6: Good scores among top 5

#2 on min attendance
### A6 Statistics:
- Globally well equilibrated among the 10 sessions: no weak session anymore
- Very low Withdrawns and No-Shows
- Fairly good IP (thanks for the Chairs!)
### 1.2 Feedback from Washington IAC 2019

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- Globally only 40% of the submissions are finally presented
- Very low number of papers selected but not presented: 28% was good
1.3 Cyber IAC 2020

Number of IAC abstracts since 2008
1.3 Cyber IAC 2020

IAC 2020 – Technical Presentation Statistics

- Abstracts in total: 3798
- Abstracts accepted: 2707
- Abstracts rejected: 1091
- Abstracts accepted: 2707
- Abstracts confirmed: 1478
- Withdrawn: 697
- Unreplied: 532

- Confirmed among accepted: 1481
- Video lectures uploaded: 1301 (87.8%)
- Confirmed/Not uploaded: 180

- High percentage of withdrawals (697) (= 28% of accepted) to be re-submitted for IAC 2021 in Dubai, U.A.E. And undergo review process again

**Impressive, and totally unexpected**

**IAF Connecting @ll Space People**
1.3 Cyber IAC 2020

Video Lectures per Regions
1.3 Cyber IAC 2020

#6... Not bad...

Videos per Symposia
1.3 Cyber IAC 2020

### Top 10 Countries

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### Congress at a glance

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<tr>
<th>Time</th>
<th>Monday 12 Oct</th>
<th>Tuesday 13 Oct</th>
<th>Wednesday 14 Oct</th>
<th>Thursday 15 Oct</th>
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#### Opening Ceremony
- **Monday 12 Oct**
  - **9:00 AM Sydney**
  - **6:00 AM Paris**
  - **12:00 PM Los Angeles**
  - **10:00 AM Beijing**

#### Technical Sessions Online Gallery
- Accessible 24 hours from Monday 12 October, 14:40 Paris Time to Wednesday 14 October, 17:30 Paris Time
- **Monday 12 Oct**
  - **9:00 AM Sydney**
  - **6:00 AM Paris**
  - **12:00 PM Los Angeles**
  - **10:00 AM Beijing**

#### Virtual Exhibition
- Accessible 24 hours from Monday 12 October, 14:40 Paris Time to Wednesday 14 October, 17:30 Paris Time
- **Monday 12 Oct**
  - **9:00 AM Sydney**
  - **6:00 AM Paris**
  - **12:00 PM Los Angeles**
  - **10:00 AM Beijing**

#### Closing Ceremony
- **Thursday 15 October**
  - **9:00 AM Sydney**
  - **6:00 AM Paris**
  - **12:00 PM Los Angeles**
  - **10:00 AM Beijing**

---

**IAF General Assembly**

**Cyber IAC 2020**
1. IAC 2020 - Virtual Technical Presentations

- **The Technical Gallery hours:**
  Monday 12 Oct 14:40 (CET) - Wednesday 14 October 16:30 (CET)

- Accessible from the platform [iac2020.vfairs.com](iac2020.vfairs.com)

- In addition the TP will include two livestreamed Special Sessions (SpS)
  - **STATE AND RESPONSE OF THE GLOBAL SPACE SECTOR DURING COVID-19**
  - **UNLEASHING THE POTENTIAL OF ARTIFICIAL INTELLIGENCE & MACHINE LEARNING INTO SPACE**
1.3 Cyber IAC 2020
1.3 Cyber IAC 2020

Exhibitors Index

- Alan Space
- Airbus
- Australian Space Agency
- Boeing
- Darmstadt / Darmstadt - City of Space

How it Works

1. Scroll the exhibitor booths above from left to right, or top to bottom in the Exhibitor’s Index to the left.
2. Click on the pictures to learn more about each exhibitor.
3. Click “Chat” to join a group discussion and click on a user name for individual chat or to schedule a video meeting.
1.3 Cyber IAC 2020
IAC 2020 - Virtual Technical Presentations

- Video lecture of 10 minutes
- Size max 500 MB
- 16:9 landscape
- Displayed in a Technical Gallery
- Ordered by Symposium
1.3 Space Debris Symposium Cyber IAC 2020

Number of abstracts in A6, Space Debris Symposium, since 2008

- Glasgow
- Daejeon
- Praha
- CapeTown
- Naples
- Beijing
- Toronto
- Jerusalem
- Guadalajara
- Adelaide
- Bremen
- Washington
- Cyber

Inc 27 IP

Total: 233
A6: Space Debris Symposium: Liou – Bonnal


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


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

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

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

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


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


A6.VP: Virtual Presentations: Yasaka – McKnight – Jankovic – Bonnal
# Status of the A6 Symposium

<table>
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<th>Date</th>
<th>Accepted</th>
<th>Withdrawn</th>
<th>No news</th>
<th>Remaining</th>
<th>Remaining % over Acc.</th>
<th>Presentations</th>
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% over accepted: 31.1, 7.4, 61.5

% over remaining: 89.2

Papers: 53.3

Missing: 86.7
Chairs and Rapporteurs: 3 roles

- Report on your session using the template downloadable from your session page on the web-site:
  Example:

<table>
<thead>
<tr>
<th>Order</th>
<th>Title</th>
<th>Speaker</th>
<th>Presentation Type &amp; Length</th>
<th>Presentation Confirmed</th>
<th>Withdrawal</th>
<th>No-Show</th>
<th>Paper uploaded</th>
<th>Manuscript evaluation</th>
<th>Presentation evaluation</th>
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<tr>
<td>1</td>
<td>Investigation of the radar parameter subspace for different beam-park simulations with the TIRA system</td>
<td>Mr. Matteo Budoni</td>
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<tr>
<td>2</td>
<td>Research on space debris observation with multi telescopes in Antarctica</td>
<td>Mr. Gongqiang Li</td>
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<td>3</td>
<td>Approach on the Tracklets Association of CHES</td>
<td>Dr. Ting-Lei Zhu</td>
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<td>4</td>
<td>Justification of the need to develop means of panoramic survey of the sky</td>
<td>Dr. Igor Molotov</td>
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<tr>
<td>5</td>
<td>Detection and Tracking of Space Debris from Low-Earth Orbit</td>
<td>Dr. Mathias Benn</td>
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<td>6</td>
<td>Correlation between light curve observations and laboratory experiments using a debris scale model in an optical simulator</td>
<td>Dr. Toshifumi Yanagisawa</td>
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<td>bistatic optical measurements for dynamic characterization of LEO objects</td>
<td>Mr. Lorenzo Mariani</td>
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- Recommendation for Submission to Acta Astronautica, either following the template also on the web-site, or directly by mail to me
  - 3 maximum per session (except if exceptional!)
  - Suggest 2 or 3 reviewers

- Short report just for us, as usual, 2 pages max, with general feeling of the session selection and recommendations for the future
Program Committee
- As Dubai 2020 was cancelled and replaced by CyberSpace 2020, the role of Chairs and Rapporteurs this year was exceptionally low

- It is propose to keep the same selection for Dubai 2021 than the one done for Dubai 2020

- However:
  - Need to identify those who already know they will not attend Dubai 2021
  - Potentially some changes if you decide so…

Open points to be discussed and decided
- Joint Sessions A6.8 and A6.10
- Keynote lecture (Joseph P. Loftus Jr. Keynote Lecture) at the beginning of one of our sessions
  - Any proposal for this first one? Duration? In which session?
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.

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.

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.
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.

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.
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 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
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. 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.

2. Exchanges
  2.1. Past events: workshops, conferences, congresses, …
      2\textsuperscript{nd} IAA ICSSA
      1\textsuperscript{st} IODC
  2.2. On the Agenda
      European Conference on Space Debris (see following 2 pages)
      3\textsuperscript{rd} IAA ICSSA
      September 13-15, 2021 at GMV in Tres Cantos, Madrid,
      The University of Florida will also provide a remote participation option, just in case the pandemic will not be resolved by then.
  2.3. New achievements
      ISO 24113 – 23312 – 20893
  2.4. Round table – Open discussion
Abstract Submission

Authors are invited to submit their abstracts according to the procedure described below. Each Abstract (approximately 500 words) should clearly outline major achievements and innovative ideas.

Papers will be selected on the basis of:
- interest in the subject by the target audience
- relevance to the conference topics
- originality of the ideas presented
- quality and clarity of the content

Papers must be submitted in English, according to the “instructions to authors”. English will also be the working language at the conference.

Abstracts must be submitted by 15 November 2020.


Proceedings from the previous conferences are available via https://conference.sdo.esoc.esa.int/

Target Audience

The conference will provide a unique forum for information exchange, technical discussions and networking between space debris researchers, engineers & decision makers of industry, policy makers & space lawyers, insurance underwriters, space & ground system operators, institutional organizations (e.g. space agencies, EU, UNCOPUOS, IAA, COSPAR), academia, and the defense sector.

Important Dates

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>1 Oct 2020</td>
<td>Abstract submission starts</td>
</tr>
<tr>
<td>1 Nov 2020</td>
<td>Registration opens</td>
</tr>
<tr>
<td>15 Nov 2020</td>
<td>Deadline for abstracts</td>
</tr>
<tr>
<td>15 Jan 2021</td>
<td>Notification of authors</td>
</tr>
<tr>
<td>1 Mar 2021</td>
<td>Final program</td>
</tr>
<tr>
<td>10 Apr 2021</td>
<td>Deadline for full papers</td>
</tr>
<tr>
<td>20 – 23 Apr 2021</td>
<td>8th European Conference on Space Debris</td>
</tr>
<tr>
<td>July 2021</td>
<td>Publication of proceedings</td>
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</table>

Conference Venue

The conference will be organised in a virtual format. On-site participation at the European Space Operations Centre ESA/ESOC, Robert Bosch Strasse 5, 64293 Darmstadt, Germany, may still be possible and will be confirmed by 1 March 2021 at the latest.

Registration Fees

Registration fees for both, the virtual conference and for on-site participation, will be published at the conference website during October 2020.

Point of Contact

Conference Website
https://space-debris-conference.sdo.esoc.esa.int/

Genius GmbH – science & dialogue
Darmstadt, Germany
Tel: +49 (0) 6151-627 23 20
Fax: +49 (0) 6151-627 23 21
E-mail: contact@space-debris-conference.com

8th European Conference on Space Debris

Virtual conference
20 – 23 April 2021
**Debris Background**

Since 1957, nearly 6,000 space launches have led to an on-orbit population today of about 26,000 trackable objects. Large constellations are being deployed. Today, a total of about 3000 objects are functional spacecraft. The remaining are space debris, i.e. objects which no longer serve any useful purpose. Most of the routinely tracked objects are fragments from about 550 break-ups, explosions, collisions, or anomalous events resulting in fragmentation of satellites or rocket bodies. In addition, there is evidence of a much larger population of debris that cannot be tracked operationally. An estimated number of 900,000 objects larger than 1 cm and 128 million objects larger than 1mm are expected to reside in Earth orbits. Due to relative orbital velocity of up 56,000 km/h, centimeter-sized debris can seriously damage or disable an operational spacecraft, and collisions with object larger than 10 cm will lead to catastrophic breakups, releasing hazardous debris clouds of which some fragments can cause further catastrophic collisions that may lead to an unstable debris environment in some orbit regions ("Kessler syndrome").

Space debris mitigation measures, if properly implemented by spacecraft designers and mission operators, can curtail the growth rate of the space debris population. Active removal of large intact objects has been shown to be necessary to reverse the debris increase. In addition, it becomes important for each and every mission, whether a large constellation or a single 1U CubeSat, to quantify the impact it has on the space environment and other operators in order to achieve a sustainable space environment.

Facing the challenges set by a rapidly growing population of space objects requires a better understanding of the space debris environment as well as strategies to handle the related risks. A sustained use of space as a scarce resource needs the collaboration of a multitude of technical disciplines. The active exchange among recognized experts is the aim of the conference.

**Conference Scope**

Focussing at scientific exchange the European Conference on Space Debris is the largest dedicated gathering on the subject. Since 1993 internationally renowned scientists, engineers, operators, industry experts, lawyers and policy makers meet here every four years and discuss different aspects of space debris research, including measurement techniques, environment modelling theories, risk analysis techniques, protection designs, mitigation & remediation concepts, and standardisation, policy, regulation & legal issues.

During four days the Eighth European Conference on Space Debris will provide a forum to define future directions of research based on latest findings and results. Panels and special sessions will be devoted to space safety topics, e.g. environment impact, mitigation and regulation technology and tools, novel services and servicing, as well as concepts for operations in a congested environment.

The conference program will highlight all classical disciplines of space debris research:
- radar, (active) optical and in-situ measurements
- debris environment modeling and prediction
- orbit prediction, determination, and cataloguing
- operational collision avoidance and services
- space situational awareness systems & applications
- debris aspects of large constellations
- on-orbit and re-entry risk assessments
- debris mitigation techniques and processes
- active removal, servicing, remediation concepts
- environmental impact assessments
- regulatory aspects, standardisation, policies
- hypervelocity impacts, protection and shielding
The 8th Satellites End of Life Workshop and Space sustainability technologies has been organized by CNES in January 2020 22nd and 23th. This WS is takes place each 2 years since 2006. Initially it was only dedicated to the geostationary satellites end of life operations but progressively it was natural to extend the scope to all orbit and not only to operation but also the technologies needed to perform End Of Life activities. The first objective of this workshop was to present the status of the on-going discussions concerning the mitigation rules and their evolution since the first versions issued some years ago. Our goal is of course to promote these rules and to encourage their implementation to preserve this region in space. Our goal is also to prepare the future: tomorrow these rules evolution will become mandatory and we have to be prepared. In the mean time, several operators have already performed such operations. The second objective of the workshop is to take benefit of your experience when performing these operations and to get your feed-back. These are the 2 main objectives of the workshop: to inform and to get your feed-back.

For the first time this year it lasted 2 days in order to allow our colleagues outside Europe to participate. It give the opportunity to setup round table to add
Thanks European, US, Russian, Chinese and Japan colleagues to have travelled to us.

Next session in 2022
## 3. IAA Study Groups

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<tr>
<th>IAA Study Groups as of October 17, 2019</th>
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<td>1.3 Satellite remote sensing of aerosols in the Earth atmosphere</td>
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<td>1.13 Planetary Science Enabled by the New Generation of Smaller Instruments</td>
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<td>02-Final report expected</td>
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<td>1.14 Integrated Precursor Distinguish in Multi-Geophysical Flows: Weim trivial/Comerio/Kuznetsov/Zhang</td>
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## 3. IAA Study Groups

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3.1 SG 5.17 IAA Situation Report on Space Debris – Update

Proposal to have a fast-track action in order to progress, at last

- Based on the existing Report 2016
- I propose not to change significantly the structure of the document (will do for the following one…)

- Identification, chapter per chapter, of what exactly is needed to update, correct, complement, renew references

Need to have small teams of 3 - 4 volunteers per chapter
  - Have to be good experts of the topic, of course!
  - But help from younger members is welcome!
  - Preferably from diverse countries
  - Continuity with previous authors would be perfect

- Appendix 3 is the zip of all 14 chapters in Word format

Let’s produce rapidly an updated version with minimal effort and highest efficiency
3.1 SG 5.17 IAA Situation Report on Space Debris – Update

- 0. Executive Summary & Table of Contents ⇒ Darren and I
- 1. Introduction ⇒ Darren and I
- 2. Current status (12 pages) ⇒ Need for someone who masters MASTER-ORDEM or equivalent, so preferably ESOC + NASA + Russia ? Japan ?
- 3. Measurements (13 pages) and 4. SSA (16 pages)
  - Could be merged into a unique chapter explaining the “how it works”
  - Description of the SSA systems themselves placed in an Annex
  - Strong wish to have extra systems, mainly ESA, EUSST, China, Australia, …
  - Personal opinion: no significant effort to update, fundamentally structure of the chapter
- 5. Collision Avoidance (6 pages) ⇒ Easy to update, potentially to be completed with new techniques and modern examples
- 6. HVI and Protection (13 pages) ⇒ Only minor points to update
- 7. Reentering Space Objects (16 pages) ⇒ Only some statistics to update
- 8. Future Orbital Debris Environment (11 pages) ⇒ Obviously a bit more work to do 😊
  - Updates of statistics
  - Inclusion of Small-sats and Constellations
  - However, most of the IADC WG2 derived work can be reused, unchanged
3.1 SG 5.17 IAA Situation Report on Space Debris – Update

- 9. Mitigation (9 pages) ⇒ Mostly update,
  - Well known to members of International Standards Working Groups
  - Important to update the summaries of PMD practices
- 10. Debris Remediation (12 pages) ⇒ Darren and I + any volunteer!
- 11. Legal (9 pages) ⇒ Update already done last year by Tanja; to be re-read
- 12. International (6 pages) ⇒ To be restructured, easy. Christophe
- 13. Synthesis & Further References (7 pages) ⇒ To be restructured, partially merged with §12, some can be deleted due to duplications… Christophe
- Appendix (3 pages) ⇒ Currently
  - Appendix 1 List of Contributors, Authors and Reviewers
  - Appendix 2 List of Acronyms and Abbreviations
  - Proposal to have one major Appendix with all the SSA systems: we need additional contributions, and colleagues must not complain afterwards if they are not in; if they did not provide anything 😊