INTERNATIONAL ASSOCIATION
FOR THE ADVANCEMENT OF
SPACE SAFETY

IAASS Professional Training Course

SPACE DEBRIS: RISK ANALYSIS AND MITIGATION

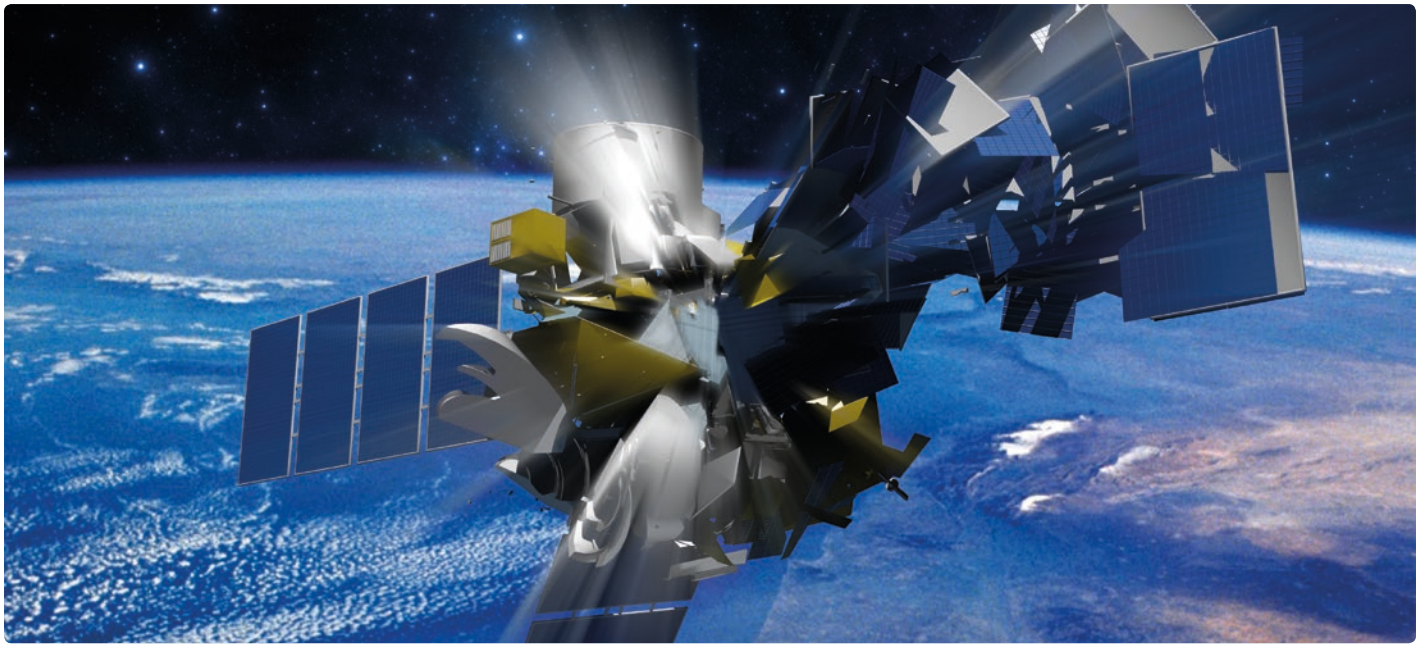
17-18 September 2019
Toulouse - France

Registration:
https://www.conftool.net/iaass-courses-workshops-2019-EU/index.php?page=login

Course Description

SPACE DEBRIS: RISK ANALYSIS AND MITIGATION

Code 008



The Challenges

The course is designed to provide the participant with an understanding of the orbital debris environment, and of the hazards that space debris represent for spacecraft on orbit and for public on ground. The course explains the regulations for space debris mitigation, ways of compliance, and the application of risk analyses methods and tools.

Scope of the Course

The student will gain an understanding of the following topics:

- Main sources of space debris location in space, orbital lifetime
- Observation means: radar, optical, on-ground or in-orbit, system
- On orbit and reentry risks analysis
- Protection and prevention measures
- Introduction to remediation measures
- Overview of regulations and standards
- On orbit risk analysis models and tools

Target Audience

Design and operations engineers and managers new to space debris risks and mitigation principles, processes and regulations.

What You Will Learn

- Definition of space debris, main sources, distribution in space, lifetime, comparison with meteoroid, future evolution
- Definition of risks: in-orbit collisions, atmospheric reentries, other risks
- Observation means: radar, optical, on-ground or in-orbit, system
- Distribution and models for space debris
- How to evaluate probability and consequences of collisions with small and large debris
- Concepts for protection, prevention, remediation and their application
- Process of destructive reentry, risks to people on ground and to airplanes
- How to predict uncontrolled reentries and mitigate the risks
- How to applied international and national regulations, standards and guidelines
- How to find and use main tools for prevention of risks and application of mitigation measures

How You Will Learn It

- Verbal instructions using PowerPoint presentations
- Videos and photographs
- Cases studies
- Software tools demonstrations

Why You Need to Know This

- To understand the threat linked with space debris population
- To applied in an efficient way space debris mitigation requirements

What You Will Take With You

- A USB flash drive with all the above and a set of available standards and practices
- A certificate of course completion

COURSE AGENDA

DAY 1

09:30 Welcome and course introduction

09:45 General introduction

10:30 Space surveillance

11:00 *Coffee break*

11:30 Space surveillance (Continued)

12:00 Risks analysis on orbit

13:00 *Lunch Break*

14:00 Risks analysis on ground

15:00 Risks mitigation: Protection

16:00 *Coffee break*

16:30 Risks mitigation: Prevention

17:30 *Adjourn*

DAY 2

09:00 Risks mitigation: Prevention (Continued)

10:00 Active debris removal

11:00 *Coffee break*

11:30 Risk mitigation on ground

12:30 Risk mitigation at launch

13:00 *Lunch Break*

14:00 Regulations and standards

15:30 Models and tools

16:00 *Coffee break*

16:30 Models and tools (Continued)

17:00 Attendances certificate and end of courses

Instructors

The course will be taught by **Fernand Alby** and **Bruno Lazare**.

Mr. **Alby** has devoted most of his career to space debris studies. He was responsible of space debris and space surveillance activities at the French Space Agency (CNES) until his retirement in 2014. His field of work included flight dynamics studies, operations and regulations. He participated to all important committees dealing with space debris such as UN-COPUOS, IADC and ISO. Mr. Alby is Honorary Member of IAASS, and winner of the J. *Loftus Space Sustainability Award*.

Fernand Alby

Mr. **Lazare** has over 30 years of experience in the field of space safety and quality management, performing launch and reentry risk analysis, drafting launch safety standards and developing a Launch and reentry risk assessment tool. He participates to several committees dealing with space debris and safety such as UN-COPUOS, IADC, ISO and IAASS.

Bruno Lazare

The instructors are authors and co-authors of numerous technical papers and reports. They have been major contributors to the drafting of the French Space Operations Act technical regulations.