

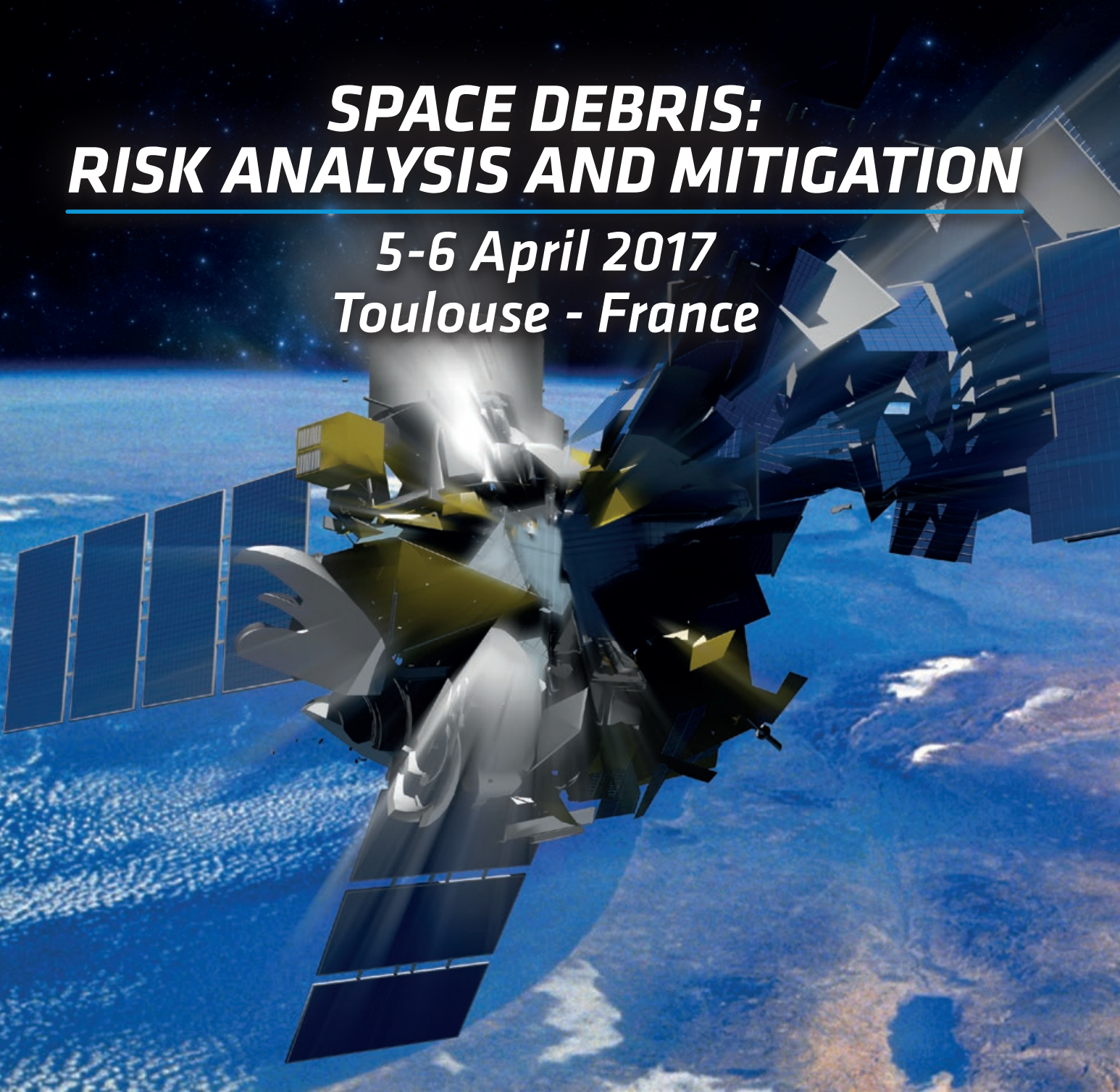


**INTERNATIONAL ASSOCIATION  
FOR THE ADVANCEMENT OF  
SPACE SAFETY**

*IAASS Professional Training Course*

# ***SPACE DEBRIS: RISK ANALYSIS AND MITIGATION***

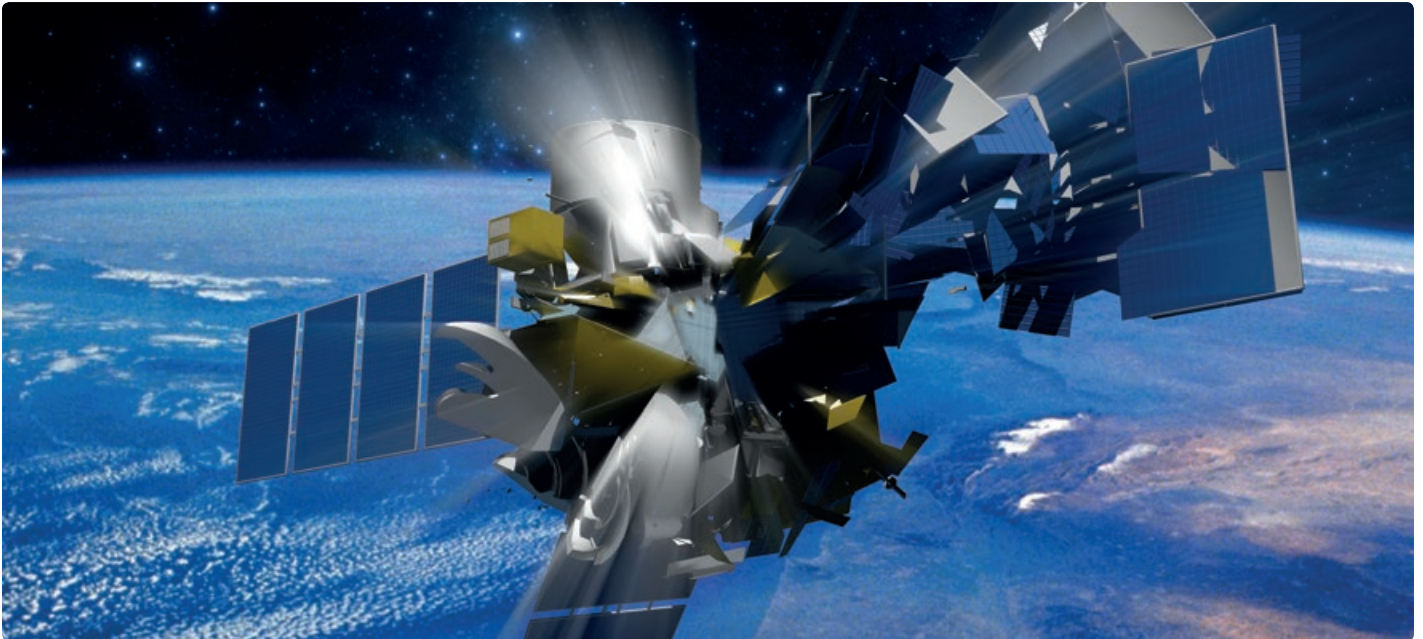
***5-6 April 2017  
Toulouse - France***



*Course Description & Registration Form*

# 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 analysis 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.



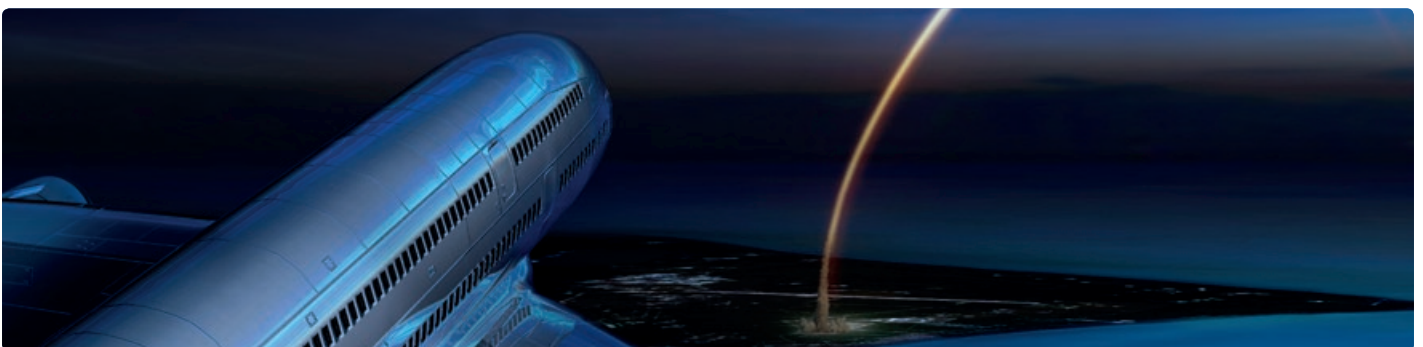
*Fernand Alby*

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.





## IAASS PROFESSIONAL TRAINING COURSE

### REGISTRATION FORM

Course: **Space Debris: Risk Analysis & Mitigation (C008)**

Date: 5-6 April 2017

Location: Météo France, 42 avenue Gaspard Coriolis, Toulouse - France

Please fill in all details on this registration form. One registration form per person.

#### **DETAILS:**

First name: \_\_\_\_\_

Last name: \_\_\_\_\_

Organization name: \_\_\_\_\_  
\_\_\_\_\_

Organization billing address:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Phone number: \_\_\_\_\_

Email: \_\_\_\_\_

Signature/date: \_\_\_\_\_

#### **HOW TO REGISTER**

Please fill in and sign this registration form, and email to: [iaass.academy@gmail.com](mailto:iaass.academy@gmail.com) not later than **3 March 2017**. If you require more information please call: +31643552918 or +31712020023

#### **TERMS & CONDITIONS**

The course enrollment fee is **Euro 1350** for non-IAASS Member; **Euro 1250** for IAASS Members. Course material included.

#### **PAYMENT**

The IAASS will send an invoice to the organization of the enrolling participant. The payment shall be performed not later than two weeks before the start of the course.

#### **CONFIRMATION**

Confirmation of registration will be sent by email.

#### **CANCELLATIONS/TRANSFERS**

If the minimum number of participants (15) will not be reached, the IAASS reserves the right to cancel the course.

#### **REFUNDS**

- Refunds will be made if the course is cancelled.
- Refunds can be issued if more than ten working days notice is provided prior to the course.
- Transfers between staff from the same organization are permitted.
- Registered participant which does not attend will incur the full fee.