

## **Session Program**

**7-11 Nov 2022**



## **2nd International Stardust Conference**

**----- STARCON 2 -----**

## ***SPACE ENVIRONMENT MANAGEMENT & SUSTAINABILITY SYMPOSIUM***

ESA ESTEC, Newton meeting room  
Noordwijk, ESA Estec, 2201 AZ Noordwijk, Netherlands

# Monday 7 November

09:15

## SPACE ENVIRONMENT MANAGEMENT & SUSTAINABILITY SYMPOSIUM: Space Environment Management

**Session** | **Location:** ESA ESTEC, Newton meeting room, Noordwijk, ESA Estec, 2201 AZ Noordwijk, Netherlands |  
**Convener:** Massimiliano Vasile

09:15–09:30 **Opening**

**Speaker**

Massimiliano Vasile

09:30–10:15

### KEYNOTE - AI-controlled Space Traffic. An overview of AI applications for Space Traffic Management

**Speaker**

Jesus Tirado

10:15–10:30 **All vs All Conjunction Detection**

**Speaker**

Clara Grassi

10:30–10:45

### A Deep Learning-based Framework for Operational All-vs-All Conjunction Screening using Iterative Transfer Learning

**Speaker**

Emma Stevenson

10:45–11:00

### Close encounter decision-making: comparing CASSANDRA and CNES operational processes

**Speaker**

Luis Sanchez

11:00

11:30

## SPACE ENVIRONMENT MANAGEMENT & SUSTAINABILITY SYMPOSIUM: Space Environment Management

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**Convener:** Massimiliano Vasile

11:30–12:00

### Debris risk metrics and orbital capacity: from technical assessments to policy tools"

**Speaker**

Francesca Letizia

12:00–12:15

### Fast and reliable computation of the instantaneous orbital collision probability

**Speaker**

Matthieu Masson

12:15–12:30 **Multi-Static Radar for Manoeuvre Detection**

**Speaker**

Simao da Graca Marto

12:30–12:45

**Operational challenges for collision avoidance operations****Speaker**

Jan Siminski

12:45–13:00

**Growth of the European STM Industrial Landscape: the GMV Case****Speaker**

Jesús Tirado

13:00

14:00

**SPACE ENVIRONMENT MANAGEMENT & SUSTAINABILITY SYMPOSIUM:  
Space Environment Management****Session** | **Location:** ESA ESTEC, Newton meeting room, Noordwijk, ESA Estec, 2201 AZ Noordwijk, Netherlands |**Convener:** Massimiliano Vasile

14:00–14:45

**Demystifying the Chaos in LEO.****Speaker**

Darren McKnight

14:45–15:00

**Removing barriers for transitioning into the new space infrastructure paradigm****Speaker**

Stéphane Estable

15:00–15:45

**Keynote - Sustainability of Orbital Operations: status of Space Pollution and proposed actions****Speaker**

Christophe Bonnal

15:45

16:15

**SPACE ENVIRONMENT MANAGEMENT & SUSTAINABILITY SYMPOSIUM:  
Space Environment Management****Session** | **Location:** ESA ESTEC, Newton meeting room, Noordwijk, ESA Estec, 2201 AZ Noordwijk, Netherlands |**Convener:** Massimiliano Vasile

16:15–16:30

**ABACO, an Autonomous Board for Avoiding COLLisions****Speaker**

Dario Modenini

16:30–16:45

**Technical overview of the ASTRA project****Speaker**

Luca Rosignoli

16:45–17:00

**Ultra Wide-field Optical Tracking of LEO Objects: The Astra Project****Speaker**

Alberto Buzzoni

17:00–17:15

**Recent activities at the Warwick Centre for Space Domain Awareness****Speaker**

James Blake

17:15–17:30

**Resident Space Object Proper Elements for Maneuver Detection**

**Speaker**

Aaron Rosengren

17:30–17:45

**Apparent Colours as Manufacturing Markers for GEO Satellites**

**Speaker**

Alessandra Di Cecco

17:45

## Tuesday 8 November

09:15

### SPACE ENVIRONMENT MANAGEMENT & SUSTAINABILITY SYMPOSIUM: Modelling & Evolution of the Space Environment

**Session** | **Location:** ESA ESTEC, Newton meeting room, Noordwijk, ESA Estec, 2201 AZ Noordwijk, Netherlands |  
**Convener:** Alessandra Celletti

09:15–09:30 **Opening**

**Speaker**

Alessandra Celletti

09:30–10:15 **LUNISOLAR RESONANCES - OLD BUT NOT OBSOLETE.**

**Speaker**

Sławomir Breiter

10:15–10:30 **Chaos in the Geminid meteoroid stream**

**Speaker**

Ariane Courtot

10:30–10:45

### Computation of Proper Elements. Reconnecting Groups of Simulated Space Debris

**Speaker**

Tudor Vartolomei

10:45–11:00

### Secular Lunisolar Resonances in the MEO Region and the Eccentricity Growth Phenomenon

**Speaker**

Edoardo Legnaro

11:00

11:30

### SPACE ENVIRONMENT MANAGEMENT & SUSTAINABILITY SYMPOSIUM: Modelling & Evolution of the Space Environment

**Session** | **Location:** ESA ESTEC, Newton meeting room, Noordwijk, ESA Estec, 2201 AZ Noordwijk, Netherlands |  
**Convener:** Catalin Gales

11:30–12:15

### Keynote - Natural perturbations as allies for space debris mitigation and long-term sustainability: the case of the solar radiation pressure - oblateness coupled effect.

**Speaker**

Elisa Maria Alessi

12:15–12:30

### Initial orbit Determination of Cislunar Objects using Only Optical Data

**Speaker**

Xiyun Hou

12:30–12:45

### Chebyshev-based Polynomial Algebra Monte Carlo Propagation with Generalised Equinoctial Orbital Elements

**Speaker**

Mr Max Hallgarten La Casta

12:45–13:00

**Circumplanetary dust dynamics****Speaker**

Xiaodong Liu

13:00

14:00

**SPACE ENVIRONMENT MANAGEMENT & SUSTAINABILITY SYMPOSIUM:  
Modelling & Evolution of the Space Environment****Session** | **Location:** ESA ESTEC, Newton meeting room, Noordwijk, ESA Estec, 2201 AZ Noordwijk, Netherlands |**Convener:** Christos Efthymiopoulos

14:00–14:45

**Keynote - Orbital Perturbations of Charged Dust and Space Debris due to Space Weather Effects****Speaker**

Christoph Lhotka

14:45–15:00

**Secular evolution of debris in highly eccentric and inclined orbits****Speaker**

Anargyros Dogkas

15:00–15:45

**Keynote - Space Situational Awareness (SSA) Office Towards a unified SSA framework to address short- to long-term challenges****Speaker**

Vincent Ruch

15:50

16:15

**SPACE ENVIRONMENT MANAGEMENT & SUSTAINABILITY SYMPOSIUM:  
Modelling & Evolution of the Space Environment****Session** | **Location:** ESA ESTEC, Newton meeting room, Noordwijk, ESA Estec, 2201 AZ Noordwijk, Netherlands |**Convener:** Christos Efthymiopoulos

16:15–17:00

**Keynote - Monitoring of high-altitude space traffic and distant satellite disposal design.****Speaker**

Ioannis Gkolias

17:00–17:15

**An overview of the resonances arising from the coupling of the Earth's oblateness with the solar radiation pressure effect****Speaker**

Roberto Paoli

17:15–17:30

**Space debris environment propagation through a continuum approach****Speaker**

Lorenzo Giudici

17:30–17:45

**Ensuring the sustainable future use of space: a new tool for tracking environment health and mission impact**

17:45

**Speaker**

Juan Luis Gonzalo

## Wednesday 9 November

09:15

### SPACE ENVIRONMENT MANAGEMENT & SUSTAINABILITY SYMPOSIUM: In-orbit servicing, manufacturing and recycling, Part I

**Session** | **Location:** ESA ESTEC, Newton meeting room, Noordwijk, ESA Estec, 2201 AZ Noordwijk, Netherlands |  
**Conveners:** Marko Jankovic, Kurt Schwenk

09:15–09:30

#### In-orbit servicing, manufacturing and recycling, Part I

##### Speakers

Kurt Schwenk, Dr Marko Jankovic

09:30–10:15

#### New approaches for orbital robotics at ESA

##### Speaker

G. Visentin

10:15–10:30

#### European Operations Framework

##### Speaker

Sebastian Dittrich

10:30–10:45

#### On-Orbit Servicing initiative in Europe: the EROSS projects suite

##### Speaker

Stéphanie BEHAR-LAFENETRE

10:45–11:00

#### Making Active Debris Removal a Reality: The Clearspace-1 Mission

##### Speaker

Jean-Sébastien Ardaens

11:00

11:30

### SPACE ENVIRONMENT MANAGEMENT & SUSTAINABILITY SYMPOSIUM: In-orbit servicing, manufacturing and recycling, Part I

**Session** | **Location:** ESA ESTEC, Newton meeting room, Noordwijk, ESA Estec, 2201 AZ Noordwijk, Netherlands |  
**Conveners:** Marko Jankovic, Kurt Schwenk

11:30–11:45

#### Astroscale: A Perspective on Space Sustainability and Commercial Debris Removal Servicing

##### Speaker

Jason Forshaw

11:45–12:00

#### In-Orbit Servicing - building a sustainable space infrastructure

##### Speaker

Salvatore Andrea Bella

12:00–12:15

#### ReMoVE - Rendezvous Modelling Visiting and Enhancing

##### Speaker

Gabriella Gaia

12:15–12:30

#### The Future of Collaboration and Development of Space Robotics

##### Speaker

Esther Rayssiguie

12:30-12:45

## **Mechanics & Control of Orbital Robotic Systems from Simulations, to Lab & Flight Experimentation**

### **Speaker**

Marcello Romano

12:45-13:00

## **Post-capture estimation of tethered space debris via tension measurements and feature tracking**

### **Speaker**

Eleonora Botta

13:00

14:00

## **SPACE ENVIRONMENT MANAGEMENT & SUSTAINABILITY SYMPOSIUM: In-orbit servicing, manufacturing and recycling, Part I**

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**Conveners:** Marko Jankovic, Kurt Schwenk

14:00-14:45

## **Relative Navigation Challenges for Active Debris Removal Missions and the Role that Artificial Intelligence Can Play**

### **Speaker**

Hodei Urrutxua

14:45-15:00

## **EO-based pose estimation for spacecraft relative navigation to support autonomous In-Orbit Servicing missions**

### **Speaker**

Roberto Opromolla

15:00-15:15

## **THALES SERVICES NUMÉRIQUES (TSN) SPACE ACTIVITIES WITH A SPECIAL FOCUS ON SST ACTIVITIES.**

### **Speakers**

Mr Alex Nardi, Philippe MOREIRA

15:30

## Thursday 10 November

09:15

### SPACE ENVIRONMENT MANAGEMENT & SUSTAINABILITY SYMPOSIUM: In-orbit servicing, manufacturing and recycling, Part II

**Session** | **Location:** ESA ESTEC, Newton meeting room, Noordwijk, ESA Estec, 2201 AZ Noordwijk, Netherlands |  
**Convener:** Dr Marko Jankovic

09:15–10:00 **Challenges of pose estimation for future OOS missions**

**Speaker**

Ksenia Klionovska

10:00–10:15

### Continuous Delivery for a Real-Time Robotic Test Facility: Modernization of Facility Monitoring and Control System of the European Proximity Operations Simulator

**Speaker**

Matthias Burri

10:15–10:30

### Experimental Methods for Re-entry Aerothermodynamics Analysis - from Ground Based Measurements to Airborne Detection

**Speaker**

Stefan Loehle

10:30–10:45

### Close-range relative navigation with EPOS 6D pose estimator

**Speaker**

Karl Martin Kajak

11:00

11:30

### SPACE ENVIRONMENT MANAGEMENT & SUSTAINABILITY SYMPOSIUM: In-orbit servicing, manufacturing and recycling Part II

**Session** | **Location:** ESA ESTEC, Newton meeting room, Noordwijk, ESA Estec, 2201 AZ Noordwijk, Netherlands |  
**Convener:** Dr Marko Jankovic

11:30–11:45 **Powder-based additive manufacturing in micro-gravity conditions**

**Speaker**

Anushanth Karalasingam

11:45–12:00

### Intelligent Characterisation of Satellites from Hyperspectral Time Series Analysis

**Speaker**

Lewis Walker

12:00–12:15

### Towards Sequential Controller Composition for Robotic Active Debris Removal

**Speaker**

Shubham Vyas

12:15–12:30

### Spacecraft Charging Considerations for On-Orbit Servicing and Debris Mitigation in High Earth Orbit

**Speaker**

Julian Hammerl

12:30–12:45

**How In-Orbit Services are building up a sustainable approach to Space Economy****Speaker**

Francois Mazieres

12:45–13:00

**Calibration of ablation models for atmospheric entry thermal protection systems****Speaker**

Anabel del Val

13:00

14:00

**SPACE ENVIRONMENT MANAGEMENT & SUSTAINABILITY SYMPOSIUM:  
Re-entry analysis and design for demise****Session** | **Location:** ESA ESTEC, Newton meeting room, Noordwijk, ESA Estec, 2201 AZ Noordwijk, Netherlands |**Convener:** Marco Fossati

14:00–14:45

**Keynote - Design for Demise: Open points and Future challenges.****Speaker**

Cristina De Persis

14:45–15:00

**Challenges in Testing and Validation of Space Debris Demise****Speaker**

Oliver Chazot

15:00–15:45

**Space Environment Sustainability and Space Situational Awareness at NASA****Speaker**

Alinda Mashiku

15:45

16:15

**SPACE ENVIRONMENT MANAGEMENT & SUSTAINABILITY SYMPOSIUM:  
Re-entry analysis and design for demise****Session** | **Location:** ESA ESTEC, Newton meeting room, Noordwijk, ESA Estec, 2201 AZ Noordwijk, Netherlands |**Convener:** Marco Fossati

16:15–16:30

**Vibrational kinetics in 2D High enthalpy flows using GPUs****Speaker**

Gianpiero Colonna

16:30–16:45

**Transport properties for planetary atmospheres: the hybrid approach.****Speaker**

Annarita Laricchiuta

16:45–17:00

**Development of a Multi-fidelity Framework for Destructive Atmospheric Entry Simulation****Speaker**

Fabio Morgado

17:00–17:15

## Development of an Uncertainty Framework for Risk Analysis During Atmospheric Re-entry

### Speaker

Sai Abhishek Peddakotla

17:15–17:30

## A data driven approach to modelling and simulating atmospheric entry.

### Speaker

Julia Graham

17:30–17:45

## Session closing remarks

### Speaker

Marco Fossati

18:15

## Friday 11 November

09:15

### SPACE ENVIRONMENT MANAGEMENT & SUSTAINABILITY SYMPOSIUM: Sustainable exploration and exploitation of outer space.

**Session** | **Location:** ESA ESTEC, Newton meeting room, Noordwijk, ESA Estec, 2201 AZ Noordwijk, Netherlands | **Convener:** Andrew Wilson

09:15–09:30 **Opening.**

**Speaker**

Andrew Wilson

09:30–10:15

#### Space sustainability: a dialogue between research, industry and policy makers

**Speaker**

Emmanuelle David

10:15–10:35

#### An Evaluation into the Sustainability of Global Spaceports and the Role of Space Technologies in Supporting Sustainable Practices,

**Speaker**

Euan Harvey

10:35–10:55

#### A Transport Network for In-Orbit Recycling Exploiting Natural Dynamics.

**Speaker**

Maria Anna Laino

10:55

11:20

### SPACE ENVIRONMENT MANAGEMENT & SUSTAINABILITY SYMPOSIUM: Sustainable exploration and exploitation of outer space.

**Session** | **Location:** ESA ESTEC, Newton meeting room, Noordwijk, ESA Estec, 2201 AZ Noordwijk, Netherlands | **Convener:** Andrew Wilson

11:20–11:40 **The Strathclyde Space Systems Database (SSSD).**

**Speaker**

Andrew Wilson

11:40–12:00

#### Life-cycle and atmospheric impact analysis of future reusable launch vehicles.

**Speaker**

Guillermo Joaquin Dominguez Calabuig

12:00–12:20

#### ESA CSR and Strategy for overcoming CLIMATE and SUSTAINABILITY challenges

**Speaker**

Marion Mirailles

12:20–12:40

#### Understanding Corporate Strategy in the New Space Era: Perspectives on Space Debris

	<p><b>Speaker</b> Maximilian Münch</p>
	<p>12:40–13:00 <b>The Importance of LCA to the future of space sustainability</b></p>
13:00	<p><b>Speaker</b> Max Gill</p>
14:00	<p><b>SPACE ENVIRONMENT MANAGEMENT &amp; SUSTAINABILITY SYMPOSIUM: Stardust-R Project Working Groups</b></p> <p><b>Session</b>   <b>Location:</b> ESA ESTEC, Newton meeting room, Noordwijk, ESA Estec, 2201 AZ Noordwijk, Netherlands   <b>Convener:</b> Massimiliano Vasile</p>
15:00	
15:00	<p><b>SPACE ENVIRONMENT MANAGEMENT &amp; SUSTAINABILITY SYMPOSIUM: Andrea Milani Challenge Prize Ceremony</b></p> <p><b>Session</b>   <b>Location:</b> ESA ESTEC, Newton meeting room, Noordwijk, ESA Estec, 2201 AZ Noordwijk, Netherlands   <b>Convener:</b> Christos Efthymiopoulos</p>
15:45	