



Learn. Reach. Achieve.

2022 Space Disposal and Debris Mitigation Conference

January 12-13, 2022
Online | Central Time



"Very informative."

Ph.D. Student, Dalhousie University



TAG US #LRAInstitute
FOLLOW US @LRAInstitute



LRA is authorized by IACET to offer 0.9 CEUs for this event

Overview

A new space age is upon us, with countries and corporations around the globe moving to collectively add tens of thousands of satellites into Low Earth Orbit. This increasing proliferation of technological constellations has driven a need for more aggressive space traffic management, which will necessarily include processes for mitigating the threat presented by existing orbital debris as well as managing future endeavors in a way that avoids increasing the debris population. Highly complex processes that enable the disposal of existing orbital debris, the application of on-orbit services, and the use of various deorbit methodologies are key to maintaining the scale of investment in satellite deployment projected in the coming decades.

The Space Disposal and Debris Mitigation Conference will examine the latest advances in strategies and technological processes involved in orbital space policy. Register now for this virtual summit to address these issues and more. Attendees will come away with a clearer understanding of the potential for protecting and maximizing future endeavors planned for the near-Earth environment.

Learning Objectives

- Develop a situational awareness of the low-Earth orbital environment
- Discuss the major space deorbit methods for comprehensive debris mitigation
- Recognize the factors that impact Space Traffic Management (STM)
- Examine the effects of governmental and global policies on space enterprise
- Study design techniques for integrating deorbit technologies within satellite systems
- Review technologies being employed in remediation efforts
- Discuss the complexities of constellation launches in the new space environment
- Analyze on-orbit service options available for debris mitigation and remediation efforts
- Identify satellite deorbiting project costs, designs, and compliance

Who Should Attend

The 2022 Space Disposal and Debris Mitigation Conference will provide a unique forum for information exchange, technical discussions, and technological demonstrations for:

- Space Industry Decision Makers
- Satellite Development Companies
- Jet Propulsion System Developers
- Data Collection Services
- Launch Services Companies
- Space and Ground Systems Operators
- Space Debris Researchers
- Mechanical Engineers
- Space Lawyers
- Business Development Directors
- Financiers
- Space Industry Officials
- Space Academics
- Environmental Non-profits
- Insurance Underwriters
- Space Traffic Specialists
- Orbital Debris Removal Services
- Space Policy Agencies
- Government Space Authorities
- Space Industry Associations and Orgs

Online Conference Agenda

WEDNESDAY, JANUARY 12, 2022 - CENTRAL TIME

8:45 – 9:00 am

Log In

9:00 – 9:30 am

KEYNOTE: Understanding the Orbital Environment to Manage Enterprise Risk

This session will provide an overview of the orbital environment, best practices for mission planning, and risk management considerations that influence the launching of satellites into space and their placement into low-Earth orbit. Beside the tens of thousands of new satellites predicted to be added to low Earth orbit in the next decade, space operators also must contend with the existing millions of pieces of debris that remain in orbit from previous space missions. What are the obligations of space operators in planning future missions? What are the essentials of mitigating enterprise risk for space missions? How does current space policy impact the near-Earth environment?

Dr. Jer-Chyi Liou, Chief Scientist for Orbital Debris, NASA

9:30 – 10:15 am

Space Operations Assurance Requires Balance

In order to ensure the future reliable operations of evolving space systems, the aerospace community must execute a balance of activities between space traffic management (STM) and space debris management (SDM). STM refers to the tools and technologies that permit operational satellites to avoid catastrophic collisions with trackable objects. SDM comprises debris mitigation (reducing the amount of debris generated and left in orbit) and debris remediation (elimination of the collision risk for debris already abandoned in orbit). While STM practices need to be continually enhanced as the number of operational satellites grows, SDM efforts have twice the influence of STM efforts on the future debris population. This session will examine why it is critical that we put at least as much effort into strengthening debris mitigation guidelines and operationalizing debris remediation operations.

Dr. Darren McKnight, Senior Technical Fellow, LeoLabs

10:15 – 11:00 am

KEYNOTE: ESA's Space Safety Program and Orbital Debris Strategies

This session will detail the European Space Agency's efforts in pursuit of space safety and sustainability and provide an update on ongoing and new space debris mitigation and remediation activities.

Tim Flohrer, Head of Orbital Debris, European Space Agency

11:00 – 11:30 am

Millennium Space Systems' DRAGRACER Flight Experiment

Dr. Rob Hoyt will discuss Tethers Unlimited's work to develop practical solutions for mitigating and remediating space debris. TUI recently completed a demonstration of full, rapid deorbit of a spacecraft using its Terminator Tape deorbit module, and Dr. Hoyt will present flight data and analysis of the module's performance.

Dr. Rob Hoyt, Founder, Tethers Unlimited

11:30 am – 12:00 pm

Lunch Break

12:00 – 12:45 pm

Don't Forget LEO Disposal Hazards

A key requirement for the long-term sustainability of space activities, and particularly for sustainment of LEO space activities, is responsible disposal of existing and planned space hardware. This presentation will discuss mitigation of in-orbit and reentry hazards associated with the disposal of satellites, the hazards posed to other operating satellites while disposed objects are transiting toward Earth and after final capture by Earth's atmosphere, and recommendations for satellite disposal activities for operators and government regulators that would help minimize hazards associated with space object disposal.

Dr. William Ailor, Ph.D, Technical Fellow, The Aerospace Corporation

Online Conference Agenda

WEDNESDAY, JANUARY 12, 2022 - CENTRAL TIME (CONTINUED)

12:45 – 1:30 pm

Survey of the Growing Portfolio of On-Orbit Services

Cutting-edge technologies and promising early tests have given rise to an increasing interest in on-orbit services and their potential impact on addressing the challenges of orbital debris. In this session, Jonathan Goff, founder of Altius Space Machines and Vice President of On-Orbit Servicing at Voyager Space Holdings will examine various on-orbit deployments, including on-orbit docking for satellite service, refueling, and repair (to extend mission life) and on-orbit capture (for debris remediation), and examine future technology solutions for active debris mitigation and mission success.

Jonathan Goff, Vice President, On-Orbit Servicing, Voyager Space

1:30 – 2:15 pm

Inclination Zero: The Commercial Use of Equatorial Orbits for Space Debris Remediation, Enhancement of National Security Capabilities, and Delivery of Commercial Services

The density distribution of small-sized debris in low Earth orbit is a critical function of object size. For large objects, the numbers are extremely low given the volume of space in the near-earth zone. Debris objects which are smaller than 5 cm in size make up almost all of the vast population of discarded materials. New technologies have made it possible to permanently reduce and control the population of small orbiting debris objects such that the threat of encounters with operating satellites may be sustained at acceptable levels. The methods described in this session focus on small debris removal and enable the removal of large numbers of small debris objects without complicated and propellant-intensive in-orbit operations.

Dr. Marshall H. Kaplan, CTO, Launchspace Technologies Corp.

2:15 – 2:30 pm

Afternoon Break

2:30 – 3:15 pm

The Impacts of Space Policy on the Orbital Environment

Although there are mitigation standards for new orbital missions, only an estimated 40% of space operators are employing the mitigation strategies necessary to avoid contributing additional debris to the low-Earth environment. What policies can we pursue to increase compliance? Additionally, even after achieving 100% compliance on mitigation efforts, where no additional debris is left in orbit by future missions, the question about what to do about existing debris remains. What rules and regulations would help to support orbital debris removal activities and technologies? This session will explore policy approaches that could strengthen opportunities to depopulate debris.

Therese Jones, Senior Director of Policy, Satellite Industry Association

Dan Oltrogge, Director, Integrated Operations and Research, COMSPOC

3:15 – 3:45 pm

Architectures to Enable Commercial Remediation of LEO Debris

Under a NASA Space Act Agreement, NASA-Langley and Tethers Unlimited are studying the technical feasibility and commercial viability of an architecture for active remediation of space debris in low Earth orbit. LaRC and TUI will present interim results of this study, including evaluation of propulsion solutions to enable collection of debris across a wide range of orbit altitudes and inclinations, as well evaluation of technologies for recycling or repurposing this debris in order to defray the costs of active debris remediation.

Dr. Rob Hoyt, Founder, Tethers Unlimited

Dr. Robert Moses, Aerospace Technologist and System Engineer, NASA

3:45 – 4:30 pm

Defining the Challenges of Remediation Technology and Processes

At present, the goal of developing a process for removing millions of existing pieces of debris from orbital space is aspirational, but present efforts are paving the way for future innovations that could make that ideal more easily achievable. This session delivered by former OneWeb director and current CTO of Astroscale Mike Lindsay will touch on the innovative technologies and approaches being investigated and proposed in the effort to address the challenges of remediation.

Mike Lindsay, Chief Technology Officer, Astroscale

Online Conference Agenda

WEDNESDAY, JANUARY 12, 2022 - CENTRAL TIME (CONTINUED)

4:30 – 5:00 pm Networking and Card Sharing

5:00 pm Day One Adjourns

THURSDAY, JANUARY 13, 2022 - CENTRAL TIME

8:45 – 9:00 am Log In

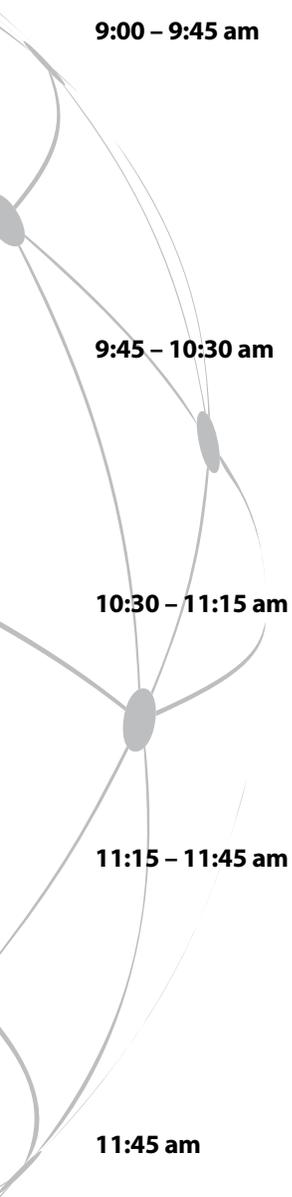
9:00 – 9:45 am KEYNOTE: STM and Mitigation Considerations for Large Constellations
Iridium completed the most significant technology refresh in space history, replacing its entire constellation of Low Earth Orbit (LEO) satellites. As part of that endeavor, Iridium developed and implemented a deorbit program for its original (Block 1) satellites to remove them from orbit and ensure space is safer for future generations. The 2009 collision of Cosmos-2251 and Iridium-33 during Block 1 operations strengthened Iridium's resolve to take all steps necessary to assume a leading role in space stewardship. In this session, Iridium's Walt Everetts will discuss how the company incorporates space sustainability concerns for the low-Earth environment into their satellite efforts.
Walt Everetts, Vice President, Space and Ground Services, Iridium

9:45 – 10:30 am A New Operational Paradigm: Space Sustainability Ratings
This session will examine the benefits presented by the development of a uniform civil system for Space Traffic Management to increase cooperation and coordination between space vehicle operators, regulatory agencies, and air traffic users. The Space Sustainability Ratings (SSR) system relies on assessing each project by six metrics to provide a score representing a mission's sustainability as it relates to debris mitigation and alignment with international guidelines.
Emmanuelle David, Deputy Director, EPFL Space Center (eSpace)

10:30 – 11:15 am Gas Stations in Space™
In 2019, the Furphy mission demonstrated the ability to transfer water between two satellite testbeds, measuring the effectiveness of the company's propellant transfer technology in microgravity and displaying the potential for establishing infrastructure for satellite refueling. This session will describe the elements of Orbit Fab's proposed Gas Stations in Space™ for satellite refueling and the potential to extend satellite lifespan by overcoming limitations imposed by fuel considerations.
Daniel Faber, CEO, and/or Jeremy Schiel, CDO, Orbit Fab

11:15 – 11:45 am Insights on the Orbital Debris Removal Business Case
Five times as many satellites are being launched this decade than in all of human history. This growing proliferation of space access and utilization has added to the business case for orbital debris removal. Management of congested orbits including LEO constellations and scarce resource orbits like GEO will be focal points for the first wave of commercial debris removal activities. This session will provide an overview of the debris removal problem, the evolving business case, and how current efforts lead to an exciting future space economy.
Trevor Bennett, Co-Founder and CEO, Starfish Space

11:45 am Day Two Adjourns



Instruction Methods

PowerPoint presentations, video, and Q&A will be used in the program.

IACET Credits



EUCI has been accredited as an Authorized Provider by the International Association for Continuing Education and Training (IACET). In obtaining this accreditation, EUCI has demonstrated that it complies with the ANSI/IACET Standard which is recognized internationally as a standard of good practice. As a result of their Authorized Provider status, EUCI is authorized to offer IACET CEUs for its programs that qualify under the ANSI/IACET Standard.

EUCI is authorized by IACET to offer 0.9 CEUs for the event

Online Delivery & Participation Details

We will be using Microsoft Teams to facilitate your participation in the upcoming event. You do not need to have an existing Teams account in order to participate in the broadcast – the online course will play in your browser and you will have the option of using a microphone to speak with the room and ask questions, or type any questions in via the chat window and our on-site representative will relay your question to the instructor.

- You will receive a meeting invitation which will include a link to join the meeting.
- Separate meeting invitations will be sent for the morning and afternoon sessions of the online course.
 - o You will need to join the appropriate meeting at the appropriate time.
- If you are using a microphone, please ensure that it is muted until such time as you need to ask a question.
- The remote meeting connection will be open approximately 30 minutes before the start of the online course. We encourage you to connect as early as possible in case you experience any unforeseen problems.

Requirements for Successful Completion

You must be logged in for the entire presentation and send in the evaluation after the online course is completed.

Please Select

2022 SPACE DISPOSAL AND DEBRIS MITIGATION ONLINE CONFERENCE: JANUARY 12-13, 2022: US \$995 (Single Connection)

PACK OF 5 CONNECTIONS: US \$3,980 (20% Discount)

PACK OF 10 CONNECTIONS: US \$6,965 (30% Discount)

PACK OF 20 CONNECTIONS: US \$11,940 (40% Discount)

Please call us at 303-770-8800 if you have any specific questions on the volume discounts.

** all other discounts do not apply to license packs*

Registration Info...

Register online
www.LRAinstitute.com

OR

Mail Directly To:
LRA Institute
6400 S Fiddlers Green Cir., Suite 1620
Greenwood Village, CO 80111

phone: 1-888-305-0392
email: questions@lrainstitute.com

How did you hear about this event? (direct e-mail, colleague, speaker(s), etc.)

Print Name

Job Title

Company

Address

City

State/Province

Zip/Postal Code

Country

Phone

Email

CREDIT CARD INFORMATION

Name on Card

Billing Address

Account Number

Billing City

Billing State

Exp. Date

Security Code (last 3 digits on the back of Visa and MC or 4 digits on front of AmEx)

Billing Zip Code/Postal Code

OR Enclosed is a check for \$ _____ to cover _____ registrations.

Substitutions & Cancellations

Your registration may be transferred to a member of your organization up to 24 hours in advance of the event. Cancellations must be received on or before December 10, 2021 in order to be refunded and will be subject to a US \$195.00 processing fee per registrant. No refunds will be made after this date. Cancellations received after this date will create a credit of the tuition (less processing fee) good toward any other LRA Institute event. This credit will be good for six months from the cancellation date. In the event of non-attendance, all registration fees will be forfeited. In case of course cancellation, LRA's liability is limited to refund of the event registration fee only. For more information regarding administrative policies, such as complaints and refunds, please contact our offices at 1 888-305-0392 . LRA reserves the right to alter this program without prior notice.

