

## IAF ENTREPRENEURSHIP AND INVESTMENT COMMITTEE (EIC)

### Space Commercialization Bringing Together New Actors & Opportunities & IAF-EIC Members are Supporting this Trend

#### 1. Introduction

The commercialization of space: Seeks to identify the opportunities for commercialization, business, and new trends in the global space market. The EIC members are actively promoting the diversification of the budget for all space industry sectors. The Entrepreneurship and Investment Committee (EIC), inaugurated in 2007, promotes dialogue among entrepreneurs, established companies, government, and academia, focusing on encouraging economic innovation and the attraction of private investment. The EIC New Leadership: We want to congratulate our distinguished EIC member Clayton Mowry (Blue Origin/Voyager Space), who is the new incoming IAF President. He will officially take over from Pascale Ehrenfreund in October 2022. We also want to welcome our new EIC leadership. Warm thanks to Ken Davidian (FAA), our former Chair, welcome the new Chair Nancy C. Wolfson (AIAA) and our new Vice-Chairs, Joerg Kreisel (AIAA), Gary Martin (ISU), and Ken Davidian (FAA).

#### 2. Latest Developments

In 2022, governments are increasingly partnering with the private sector to develop space products and services. These new trends are helping to the diversification of budgets for various sectors of the space industry.

- NASA recently awarded contracts to develop commercial space stations to Jeff Bezos' Blue Origin, Nanoracks, and Northrop Grumman, who is a longtime defense contractor. The objective is to help companies fly science experiments and various payloads to the ISS.

- The Cape Canaveral Space Force Station in Florida has grown tremendously as the top launch pad in the world for both public and private launches.
- Elon Musk and SpaceX are now regularly shuttling NASA astronauts to and from the ISS.
- Ken Davidian, FAA, continued the FAA industry-led research alliance development with the assistance of four distinguished consultants. At the same time, I began the development of a university-led research consortium to conduct innovation foresight research. He also continue his work as Editor-in-Chief of the peer-reviewed journal New Space and as an adjunct instructor at the Virginia Tech Pamplin College of Business.
- Juergen Drescher, DLR Technology Marketing and the DLR Institute of Aerospace Medicine in Cologne [https://www.dlr.de/me/en/desktopdefault.aspx/tabid-1746/21653\\_read-74238/](https://www.dlr.de/me/en/desktopdefault.aspx/tabid-1746/21653_read-74238/) Launched a technology demonstration experiment on the SpaceX CRS-23 Mission to ISS with the German ESA Astronaut Matthias Maurer. During this COSMIC KISS Mission, an AI-supported Retina Diagnostics experiment will be conducted to investigate further the pathophysiology of the Space Associated Neuro-ocular Syndrom SANS. Using the Crew iPad and a unique optical lens adapter, the eye fundus of astronauts will be diagnosed during a 6-month mission. It will detect typical signs of eye-brain diseases like microcirculatory disturbances and increased intracranial pressure, a red risk for future long-term human space exploration beyond LEO. The German hyperspectral camera DESIS on MUSES is the first DLR scientific-commercial experiment onboard ISS. Since 2017 DLR and Teledyne Brown Engineering in Huntsville / AL have utilized this applied remote sensing approach.
- Gary Martin, ISU, the ISU has a new President,

Pascale Ehrenfreund, and she has hit the ground running to update and upgrade ISU's programs and administration. Current priorities include working on designing the Southern Hemisphere Space Studies Program (SHSSP) in Adelaide, Australia, and the Space Studies Program (SSP 2022) in Lisbon, Portugal. NASA has provided a new seconded Director for SSP and SHSSP, Kenol Jules, from JSC. The Masters of Space Studies (MSS) has restored in-person teaching at the ISU Central Campus in Strasbourg, France.

- Nancy C. Wolfson, AIAA, is the former Vice-Chair of the IAF Planetary Defense (PD) & Near-Earth Objects (NEO) Technical Committee, Proposer, and Founder of the IAF Planetary Defense-NEO Symposium, innovating this initiative by uniting the topics of NEO-Space Debris in a Joint Session. On September 3, 2021, her initiative was approved and signed by 30 members from both of the TCs (IAF-PD/NEO TC and IAA-IAF Space Debris TC). Some core team members included Dan Mazanek, Mariella Graziano, Alan Fitzsimmons, and Alejandro Roman. The extended core team members who provided valuable monthly feedback on the weekly updates included Zhao Changyin, Joseph Mousel, Philipp Maier, and Smiriti Srivastava, and others along with approval/input from members of the larger PD-NEO community. Nancy is responsible for creating a multidisciplinary approach to the Organizational Design, Communication, Partnership-Decision-Making, Implementation Plan, and Logistical processes. In October 2021, the IAF Bureau approved the initiative with code E Space and Society (E-10), which will be implemented in 2022.
- Sinéad O'Sullivan, Harvard | Business| School, Created a new course: Business + Economics of Space, focusing on growth strategies for space entrepreneurs. Wrote several articles on Space Business + entrepreneurship: NZ Times: Rocket Lab exit to have a profound impact on NZ tech ecosystem, FT: Privatising Astronauts, FT: Space ETFs and SPACs, Currency: New Space Race, Created a new class with Masterclass: Interplanetary Economics.
- Dapeng Wang, Biehang University, We have developed a cloud-based platform to provide SaaS services and privately deployed application systems to end-users, which are mainly industry customers. If interested, it would be great to collaborate with EIC members and other friends. I was elected as an IAA member in 2021 in the Basic Sciences section.
- Jose Pedro Ferreira, University of Southern California, is working on concluding the CDR of the INFANTE SAR microsatellite project. You can see how it was last here at PDR (<https://infante.space/iac2020/>). He continues lecturing duties (through web-based apps) and approached a new research

area concerning the impact on the atmosphere that de-orbiting large constellations would cause. Here goes a sneak peek at his presentation in this year's: <https://iafastro.directory/iac/author/josepedrodsf/paper/66781/> On the Commercial Space Project Group of SGAC, he highlighted the Space-Faring Africa research to assess the key factors to foment investment in Africa (In publication process with the NewSpace Journal), and the Idea Pre-Accelerator Program. Furthermore, Some of his outreach events with the AIR Center (<https://www.aircentre.org/netfridays-sgac/>) and a presentation at the 58<sup>th</sup> STSC of COPUOS.

### 3. Breakthroughs in the Industry

The space industry and the IAF Entrepreneurship and Investment Committee (EIC) have entered a new era where space commercialization brings together actors from academia, space agencies, and the private sector. Together are identifying innovative approaches for public and private cooperation for manned and unmanned missions and other space-related activities such as exploration, satellites, habitats, resources utilization, and creating new markets for businesses and job opportunities for people. We see entrepreneurs seeking to collect orbital debris and make space travel more sustainable. "2021 is the biggest year for private equity and venture capital investment in space startups and early-stage space venture companies with more than \$10 billion invested in the industry through the third quarter, according to Space Capital." Companies such as Boeing's Starliner commercial crew capsule, SpaceX's Starship, Sierra Nevada's Dream Chaser spacecraft, and Rocket Lab, among others, opened the path for many more companies to join the commercial race to space. The number of firms capable of satellite and orbital spacecraft launch is expected to double in 2022.

### 4. Action plan for the year

**ACTION 1-** EIC Working Groups (WG): The EIC Chair and the members are working on developing 3 EIC. WG- 1 SPACE SUSTAINABILITY AND RESOURCES UTILIZATION, WG-2: SPACE PUBLIC & PRIVATE PARTNERSHIP FOR MANNED-UNMANNED MISSIONS, WG-3: SPACE INVESTMENTS & NEW BUSINESS MODELS. We aim to be part of the current, critical dialogue, promote it, create new international partnerships with other organizations and Space Agencies by supporting recent research, and join efforts to develop critical collaborative initiatives.

**ACTION 2-** The NewSpace Business Plan Competition (BPC) has been developed by the EIC Working Group "Space Investments and New Business Models" in

collaboration with the Center for Space Commerce and Finance in the US and the International Astronautical Federation. This collaborative initiative aims to engineer financial tools for space entrepreneurs from all sectors of the space industry and investors to catalyze space commerce for expansion, sustainability, industrialization, exploration, and settlement.

**ACTION 3-** The EIC - E6 Symposium (including Technical Sessions E 6.1, E 6.2, E 6.3, and E 6.5) seeks to contribute to the new trends in Space Businesses and Developments,

providing platforms for discussion, research, and international collaboration. Our current coordinators: are Ken Davidian, Federal Aviation Administration Office of Commercial Space Transportation (FAA/AST)- United States, and Coordinator: Nancy C. Wolfson, American Institute of Aeronautics and Astronautics, United States. There is growing interest in participating in the technical EIC program at the IAC 2022. This year the EIC-E6 Symposium got over 100 abstracts submitted from 34 countries to the 5 different EIC-E6 Sessions.