

CHANGE LEADERS - DRIVING ENTREPRENEURSHIP



Dr. Christian Feichtinger

Executive Director

International Astronautical Federation (IAF),

Paris, France

With more countries becoming actors in the space arena, and participating in international space organizations such as the IAF, and with the private sector reaffirming its important role, the global governance landscape is becoming more diverse and intrinsically more complex, with all the challenges that it entails.

A plethora of technical innovations are generated by space programmes - improved medical instruments, better home appliances safety through dangerous weather warnings, advancements in farming equipments, faster communications and more precise maritime and aerospace technologies.

December 2021

Dr. Christian Feichtinger took up the post of IAF Executive Director on 1 January 2012. Before moving to the IAF, Feichtinger, who comes from Austria, spent three years as senior advisor on exploration at the European Space Agency (ESA). Prior to that, he was head of ESA's permanent mission in the Russian Federation, after having worked as the Agency's representative for human space flight and exploration in Moscow during 10 years.

Previous positions Feichtinger held include: flight operations support manager for the Euro-Russian EUROMIR-94 and 95 missions at the Russian mission control centre near Moscow; liaison officer to Russian organisations within the EUROMIR-94 and 95 mission management teams at the ESTEC technical centre in the Netherlands; and technical manager of the Soviet-Austrian AUSTROMIR project and follow-on missions. Feichtinger holds a PhD in space experimentation from Graz University of Technology, Austria. In this absorbing interview with D.V. Venkatagiri, CEO, Explore The Space and The Global Trade Driver, Dr. Feichtinger talks in detail on key issues like Space Technologies, IAF Events International Cooperation, Current Trends in Space Exploration, etc...

“Change Leaders”, is a series of interviews by The Global Trade Driver & Explore The Space, with leaders in business, academia and government, whose actions and ideas have a positive and big impact in their field of work. Please give your valuable feedback to info@tgtd.biz or info@explorespace360.com

CHANGE LEADERS



1. In a recent press statement, you have said that “Lower Space Rim is for the experts to recommend” ... could you please elaborate a bit on what led to such a statement.

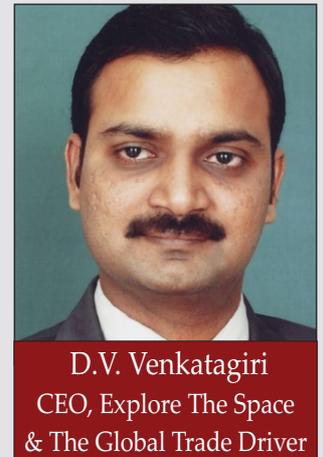
The hot issue of the delimitation between outer space and Air Space still awaits international agreement. There are some existing approaches that could circumvent the difficult challenge of the lack of a clear boundary between Air Space and Outer Space, and I am specifically referring to the approach which states that those performing space missions should be governed by space law, whereas those performing Earth transportation should be governed by air law. However, the predominant view among states seems to point to other directions, considering aerospace objects as space objects when passing through outer space, and as aircraft while flying in the airspace.

The ambiguity remains also as to the legal status of near space, the intermediate zone between what is definitely airspace and what is definitely outer space. The need for a holistic and regulatory framework can be regarded as one of the most arduous challenges that we and future generations will be facing. I remain confident that the discussion can lead to compelling incentives for the international community and settle the issue of delimitation between airspace and outer space if it is triggered by a collective approach of international experts. With this in mind, the IAF through its dedicated network of more than 1500

committee members from all space disciplines can play a key role in finding a consensus that would reconcile the functionalist and the spatiality approach. All stakeholders need to actively work together and decide on the right course of action in order to address these challenges.

2. What has been the experience of IAF in doing the latest IAC event in Dubai?

The Covid-19 context has challenged the organization of the IAC in many aspects, so it is not simple to provide a complete picture considering how quickly the situation has been changing over the past months. With this congress being the first face-to-face IAC in two years, resilience has been our driving force behind the phenomenal success of the IAC 2021. Remaining faithful to its mission, the IAF connected all space people, offering the global space community the opportunity to meet in-person in a safe environment, and take part in the most stimulating and passionate discussions about space.



D.V. Venkatagiri
CEO, Explore The Space
& The Global Trade Driver

The IAC never ceases to amaze us. With 5000 delegates from a record number of 110 countries, and 1500 additional participants during the Public Day, an exhibition showcasing more than 90 companies, the IAC in Dubai was wildly successful beyond all expectations. We are particularly proud that our Federation reconfirmed its pivotal role for the younger space generation, with a wide array of activities dedicated to them and around 50% of the registered delegates below the age of 35. All in all - a fascinating, challenging, and rewarding experience at the same time!

3. How will you compare the experience / outcome of IAC in Washington 2019 with the recent Dubai show?



Each IAC experience is unique and unrivalled. IAC 2019 in Washington D.C. will be certainly remembered as the IAC of all records with more than 6600 delegates from 80 countries. Besides marking the 70th anniversary of the IAC, this was also the exciting occasion to celebrate the 50th Apollo 11 anniversary. The Exhibition featured more than 270 exhibitors, one of the largest ever seen at an IAC. The Vice President of the United States, Mike Pence, welcomed the IAC 2019 delegates to Washington, D.C. and announced USA plans to land the first woman and the next man to the lunar surface by 2024. In recognition and celebration of the impressive legacy of the Apollo mission, the IAF World Space Award was handed out to the Apollo 11 Crew members.

Buzz Aldrin, the grandson of Michael Collins, and the son of Commander Neil Armstrong, attended the ceremony in person to receive the prestigious award. On Industry Day, Blue Origin founder, Jeff Bezos was awarded the first IAF Excellence in Industry Award for Blue Origin's amazing accomplishment with the New Shepard launcher. As to IAC 2021 in Dubai, the event will be imprinted on our minds as the IAC of recovery, optimism and hope.

The UAE has become the first-ever Arab country to host the IAC in its seventy-year history. In addition to the great number of space missions undertaken throughout the year such as NASA's Perseverance Rover looking for signs of past life in a region of Mars, the UAE's Hope Probe studying the lower atmosphere of Mars and capturing high-resolution images, our Chinese colleagues who are making impressive progress with their very first Mars mission Tianwen-1, and Crew Dragon 2, the first crewed mission for NASA and SpaceX. 2021 is also a year full of accomplishments to celebrate, including the 70th anniversary of the IAF.

“The legacy of the IAC 2021 will wander across the region, and serve as a catalyst for many other Arabic nations to establish space centers and agencies. Each IAC leaves an unforgettable legacy and brings a new dimension to Space.”

Our hope now, is that the legacy of the IAC 2021 will wander across the region, and serve as a catalyst for many other Arabic nations to establish space centers and agencies. Each IAC leaves an unforgettable legacy and brings a new dimension to space.



4. Space Sciences and Technology are making sweeping changes in all spheres of our lives - the way we work, travel, learn and communicate. In the current scenario, what are the major technologies that are driving the changes in the field of Space Technology?

Space technologies have become permanent part of our daily lives and are closer than we might think. After decades of development and utilization, a number of important scientific breakthroughs with practical value have been achieved, which provided the possibility not only to improve our daily lives but also to solve global social issues. Just to name a few: GPS technology is used every day in cell phones, location services and apps comes from navigation satellites. For example, when we withdraw money from an ATM, that transaction is times tamped using GPS technology.

Every year, a plethora of technical innovations are generated by space programmes: improved medical instruments, better home appliances, safety through dangerous weather warnings, advancements in farming equipment, faster communications, more precise maritime and aerospace technologies.



The IAF celebrates women in space for the World Space Week 2021

Space technology has become more and more useful on the Food Security front, especially in two areas: remote sensing and communications through satellite systems (through mobile phones Internet, a very useful tool for education, disaster warning and telehealth). Persons aware of the benefits of space technologies have the ability to influence decision makers and support governments in financing such endeavors.

5 a) What has been the effect of Covid-19 and lockdown on the projects of IAF?

When the Covid-19 pandemic erupted, our mission “Connecting @ll Space People” has always remained our top priority and we took the new context as a test to adapt our projects to a business climate that is changing daily. The IAF sees change as an on-going process and embraced the long-view since the beginning of the pandemic, by founding opportunities and innovative ideas amid difficult constraints. As a result, the organization of the IAC 2020 “The CyberSpace Edition” was a spectacular experience and marked a turning point in the IAC History. The “New Normal” is all about adapting and innovating, and the International Astronautical Federation took on the challenge by fulfilling its motto “Connecting @ll Space People” in every sense of the terms.

The IAC 2020 has generated so much enthusiasm and interest, reaching our highest numbers with over 13000 online participants and catapulting the global space

community to the spotlight. During this period, the IAF has also released the IAF Digital Library - the world's largest database of full-text articles covering all disciplines related to space. Counting over 50,000 papers, the digital heritage of the IAF Digital Library is an extraordinary source worldwide of resources consulted by the scientific community and space enthusiasts.

With such a powerful testimony of the IAF's outreach, we are delighted that we have managed to move into a new virtual dimension and share leading-edge content. We redesigned the agenda from the ground up to ensure we could bring the most pressing space topics to the table and deliver an exceptional experience for everyone. This was a historic moment and a successful journey for the entire space community.

5 b) As the world recovers from one of the most severe crisis caused due to the pandemic, what kind of changes do you foresee in Space research and Technology in the days to come?

The pandemic has revealed the relevance of research, technology and innovation for the well-being of people, and advances in the space field are necessary not only to recover better from the crisis, but also to address other global challenges. The world has recognized the potential of space stakeholders in shaping the future of global health, particularly in enhancing the monitoring and mitigation of COVID-19, and in the surveillance, preparedness and prevention of pandemics that may occur in the future.



Global health is another domain where the space sector brings individuals from different countries, cultures and backgrounds to work together in areas such as telehealth / telemedicine, tele-epidemiology, virtual care, space spinoffs, space agencies and industry as a whole in order to address epidemics or pandemics such as Covid-19.

6) What has been the experience of IAF in the India Market so far, and what do you want to achieve in the India market, particularly in the context of growing privatisation of the Space Industry in India.

India is an emerging space faring nation with a space programme spanning more than five decades demonstrating excelling Indian technology and widespread utilization of space services, and acting as a key player in the vibrant space collaboration at international level. The IAF sees the New Space ecosystem taking shape in India as a real potential to explore and an opportunity to generate new dynamics in the space environment. Private commercial space industry provides great support to research and development, and India is experiencing a phase of fast-paced and progressive development with an industrial economy powered by the large workforce of



Dr. Christian Feichtinger meeting with Indian Minister, Dr. Jitendra Singh at New Delhi, July 2019

professionals and young entrepreneurs. Space has a wonderful proposition for India's economy and solutions to many of the problems, such as resource depletion and its increasing population. The IAF strongly recommends space faring nations such as India to embrace private investments, entrepreneurship and development in the space sector as an integral strategy, not only to derive support for its missions but also for creating necessary social and economic impacts while increasing global presence of Indian players and boosting their position in the global space arena.

7) What are the challenges that you foresee in global space cooperation among different countries?

Our Federation's mission is a call for international aspirations and global cooperation in space because the world needs Space. Global space cooperation is undoubtedly an intricate and sophisticated process that needs to be carefully assessed in order to fully take advantage of the opportunities it represents. It is important to remind that space cooperation has not only fostered relationships within the political context, but has generated opportunities to develop technical and scientific consensus standards on the international level while also developing long-and short-term space exploration strategies on the national level.

With more countries becoming actors in the space arena, and participating in international space organizations such as the IAF, and with the private sector reaffirming its important role, the global governance landscape is becoming more diverse and intrinsically more complex, with all the challenges that it entails. Given the imperative to cooperate and substantial challenges such as technology transfer constraints or exceptionalism perspectives, nations shall remain focused on solid frameworks such as integration and interdependence as no nation can fulfill alone the most ambitious projects of mankind. The mechanisms and organizational structures for space activities will have to become more robust politically and significant improvements are also needed in the outreach strategies as the general public is the core of the politicians' interests.

8) To what extent international politics is shaping the course of Space Industry?

Some industries flourish as a result of normal market forces or are indeed the result of coordinated political action. The space sector is diverse with multiple specificities, driven by market dynamics as well as complex geopolitics. While strongly tied to defence and sovereignty, it remains a strategic sector for many countries as it relies on its peace-developing and sustainability - developing responsibility, due to the reaction forces from political, economic, legal, technology and science environments.

9) If sweeping powers are given to you, to regulate and support the growth of the global Space industry, what are the three important things that you would like to do?

Bridge the gap between space and society. Due to the growing number of actors in the space field, the concept of space divide becomes particularly apparent as it threatens growth and increases inequalities in the industry. It is vital to channel appropriate opportunities provided by countries who have space capabilities to institutions in developing countries, and attain a sustainable and safe world.

Harness the potential of space activities to solving global social issues. Space science and technology have great significance in solving global social challenges, such as resources, energy, food crisis, natural disasters and as we have seen over the past months, it can alleviate global medical crisis. We need to rely on continuous technological and scientific advances, and global nations need to work hand in hand so as to bring greater benefits and hope for human kind.

Build a more inclusive space sector, focusing on diversity and equity. Inclusion is not an illusion, but it needs work and commitment. We need to build a space community that feels accessible to everyone, make them feel that they belong, are seen, heard, respected and valued, and that everyone can contribute to the space legacy.

10) As more and more countries join the Space race, what kind of scenario do you foresee in the future, particularly with reference to usage and access of Space Technologies?

The space race has elevated human's ambitions and imaginations. Mainstream theories on international relations tend to lead up to statements focusing on the great power competition and rivalry that characterized the Cold War. But the international landscape is

changing, and it is rather anticipated that non-state actors, key individuals, widespread public support, and international collaboration will play a decisive role and will add a whole new dimension to the space race. As Stephen Hawking said in 2016, *“We are entering a new space age and I hope this will create a new unity. Space exploration has already been a great unifier, we seem able to cooperate between nations in space in a way we can only envy on Earth.”*



IAF Executive Director receives the Roscosmos award - cosmos without borders!

11) As an NGO – Explore The Space - promotes Space Education, with the following objectives / mission statement -

- i) to encourage the global youth to pursue Space Education,**
- ii) facilitate Industry-Institution Linkages in Space and Allied Industries and**
- iii) to emphasise on global Space Cooperation.**

Your valuable opinion on this please.

The IAF places a heavy emphasis on collaborations with the space community and other organizations to help their endeavors, and we are particularly proud to see the emergence of NGOs like Explore the Space which promotes Space Education through pragmatic, rigorous and ambitious missions. It is realized that space education and awareness in space science, technology and applications is indispensable and remains the backbone for growth of economy of any country. Such initiatives will nurture and inspire the next generations, and will leave a positive outcomes.

International Webinar Series on Future of Space Technology and Exploration

Objectives of the Webinar Series:

- i) to encourage the global youth to pursue Space Education,
- ii) facilitate Industry-Institution Linkages in Space and Allied Industries and
- iii) to emphasise on global Space Cooperation.

Edition 1 – 25th June 2021

Advanced Materials for Space Exploration Vehicles

*Inaugural Address Dr. T.V. Nagendra Prasad, Consul General
Consulate General of India, San Francisco, USA*

*Keynote Speaker: Mr. Tim Dyer, President
Elcon Precision LLC, California, USA*

Edition 2 - 14th September 2021

NASA's Artemis Mission -Humanity's Return to the Moon

*Inaugural Address: Her Excellency Ms. Grace Akello
High Commissioner of Uganda to India*

*Keynote Speaker: Dr. Jaydeep Mukherjee
Director, NASA FSGC, Florida, USA*

Edition 3 - 24th November 2021

Micro Satellites - Manufacturing and Operational Technologies & Challenges

*Inaugural Address: His Excellency Mr. Nitirooge Phoneprasert
Consul General, Royal Thai Consulate General, Chennai, India*

*Keynote Speaker: Mr. Tim Dyer, President
Elcon Precision LLC, California, USA*

12. What are the main areas / sub-sectors in Space Technology offering good opportunities for the start-ups in the Space Industry ?

The most recent statistics suggest to us that there is a long-term trend of investment appetite in space start-ups as they raised 7 \$billion in 2020, double the amount from just two years earlier and this general trend is continuing. The start-ups that have investor's attention are in every sector of the space industry, including launchers and satellite communications, supply chains and energy or human life support. Investors rather support companies that have a real business model on the known market and on Earth. It is a fact that the majority investments are targeted towards players in the downstream part of the space sector, like companies that collect and use computer data from satellites to make services or applications for the benefit of other industries such as precision agriculture, transport, finance, security, energy, etc.

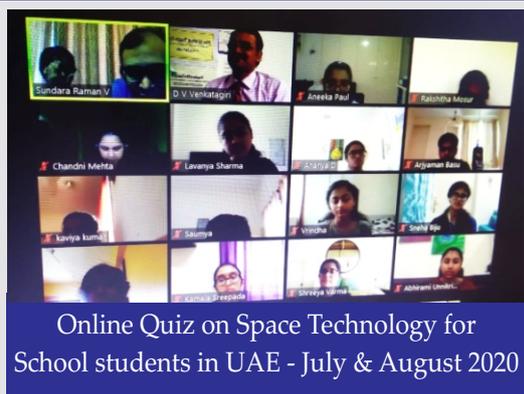
The rest is devoted to the upstream sector focusing on space actors who are responsible for the design and manufacture of space infrastructures in the field of satellites and launchers. It is important to recall that the European Commission announced in January 2021 the setting-up of a €1 billion European Space Fund to boost

start-ups and space innovation that would cover the whole innovation cycle, from business ideas to industry growth. There are also many programmes catered to future entrepreneurs such as CASSINI which offer competitions and mentoring as a fast way forward to develop products meeting important customer needs, exploring new business models and crafting go-to-market plans. These initiatives are real opportunities to seize today and enable the space start-ups to position themselves in the booming New Space Market.

13) What is your word of advice for all those who look up to Space as an opportunity area?

Still few people have the courage to think seriously about a space career. There are even less people who are trying to make this dream come true. The space sector seems elitist, unreachable, inaccessible and requiring extraordinary skills. Meanwhile, the reality is totally different. Space is about technology, exploration, perspective and imagination. Space is also unparalleled opportunities, it is about breaking free, courage, audacity and moving from fiction to reality, but space is above all about diversity, passion and connectedness. Space is for all, just join us and start your incredible journey!

Glimpses of Explore The Space



"Explore The Space" is an educational NGO, registered in NITI Aayog, Government of India and works to promote awareness on Space Sciences and Technology among Schools and Colleges through seminars, quiz programmes, study tours and research. ETS connects Institutions and Industry through its programmes.

Established in 2010, The Global Trade Driver (TGTD), is a niche facilitator of Businesses connecting Indian Companies within the domestic market and International Markets, particularly USA through Business Delegations, B2B meetings, Strategic Consultancy, Advocacy and other programmes.