

# THE **SPACE ECONOMY** INITIATIVE

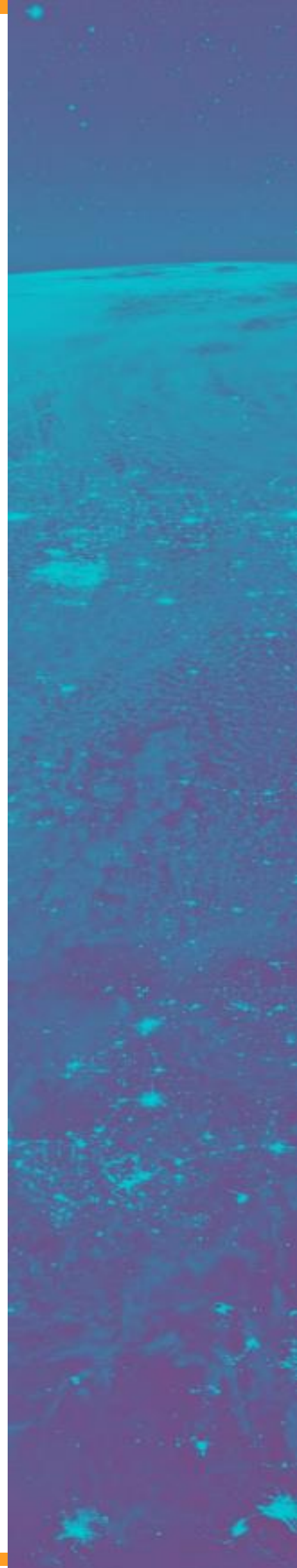
International Cooperation to  
grow responsible and  
sustainable space activities

## **Insights Report**

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# INTRODUCING THE **SPACE ECONOMY**

The level of political and economic capital being invested in space is higher than ever. Estimates indicate the global space economy grew to \$ 414,75 billion in 2018. Space and satellite technology are pillars of modern society. They provide policymakers with invaluable data and information, helping make effective fact-based decisions across a range of policy areas – from urbanisation to national crisis response, with the COVID-19 pandemic being the most recent example of ‘space-enabled’ policy decisions being made at scale.

Expanding the global space economy, responsibly and sustainably, is a fundamental driver behind efforts to bring the benefits of space to everyone, everywhere. Further, these developments can support countries in efforts to ‘build back better’ using space services to face policy challenges, while contributing to innovation, job and revenue creation.

Around the world, many space activities at the national level include a role for a publicly funded ‘space agency’ or similar institution. This central public entity is often also part of a much broader stakeholder ecosystem including both private and other public sector entities, all contributing to the national space sector. Moreover, to truly identify and realise the socio-economic benefits of a strong space sector, we must look beyond just the immediate context; from agriculture to finance, from education to transport, space is making tangible contributions across a huge range of fields.

At the United Nations Office for Outer Space Affairs (UNOOSA), ‘Space Economy’ is a concept that captures, in the broadest sense, the role space is playing to support sustainable socio-economic development. Unpacking such a complex picture is what we aim to achieve with the Space Economy Initiative. We seek to spotlight insights, success stories and experiences from across the international space community. We want to identify the key elements of growing healthy, prosperous space economies and then share such building blocks with all stakeholders pursuing responsible and sustainable space economy growth.

# THE WEBINAR SERIES

To unpack how different countries are strengthening their respective space sectors UNOOSA has established a webinar 'space economy' series to bring together space economy experts from across the international space community.

The sessions are designed to tackle this complex subject by focussing on some of the more fundamental elements of a healthy space economy. For example, we will provide a platform to share insights from commercial space entities on how to go from the 'start-up' phase to being well-established. Further, we will look at financing space activities, exploring success stories on how mixed public-private funding models are helping space economies thrive. The series will touch upon the nexus between government, industry and academia, and how to leverage this nexus to maximise innovation and growth in the space economy. We will also look at what this all means outside the immediate domestic context and the link between growing space economies at the national level and supporting responsible and sustainable space activities at the international level.

All these considerations will be taken in the context of the current developments with regards to how space economy can play a key role in supporting socio-economic development, as countries build-back-better in response to the COVID-19 crisis.

The series is composed of topic-specific sessions, touching upon the elements below:

- **Introducing 'Space Economy'**
- **Making the Case for Space:** building the policy case, public support and initial investment.
- **Scaling-Up:** Success stories from the scale-up to established phase.
- **Access to finance:** building a sustainable financial system for space
- **International cooperation to grow responsible and sustainable space activities:** bringing the international normative framework into the domestic context.
- **Innovation and growth in the Space ecosystem:** the nexus between government, industry and universities.
- **Using space to building back better:** supporting countries post-COVID 19 recoveries.

During the series UNOOSA collates the experiences being shared by experts, to build insights of 'what works' with regards to building strong, responsible and sustainable space economies.

These success stories will play a key role towards publishing a set of 'building blocks' that can be used as a reference point in support of further growth in the global space economy and how this growth can help bring the benefits of space to everyone, everywhere.

# INSIGHTS REPORT

## International Cooperation to grow responsible and sustainable space activities

This insights report captures the remarks and experiences shared during our fifth webinar session with space economy experts. This webinar addressed the role of international cooperation to support space economies. We heard from experts how Member States and international space actors, including UNOOSA, work to foster cooperation in the peaceful uses of outer space. Experts from German Federal Ministry for Economic Affairs and Energy, Ministry of Foreign Affairs of Costa Rica and Angolan National Space Programme Management Office shared their insights on their activities in the context of a global collaboration and global priorities, and how to conduct space activities in a responsible and sustainable manner.

The recording of the webinar is available on [oosa.org](https://oosa.org) and can be viewed [here](#).

## SPEAKERS

## INSIGHTS

Space Economy experts from across the international space sector were each given time for remarks on their personal experiences working in the field before switching into a moderated discussion to dig deeper into the topics and insights that had been shared.

- *Kai-Uwe Schrogl, German Federal Ministry for Economic Affairs and Energy*
- *Ana Maricela Avila Becerril, Ministry of Foreign Affairs of Costa Rica*
- *Eduina Teodoro, Angolan National Space Programme Management Office*

Kai-Uwe Schrogl

**German Federal Ministry for Economic Affairs and Energy**

*Mr Schrogl is currently seconded to the German Federal Ministry for Economic Affairs and Energy and serves as Advisor to the German EU Council Presidency. Until 2020 he was Chief Strategy Officer of the European Space Agency. From 2007 to 2011 he was the Director of the European Space Policy Institute (ESPI) in Vienna, Austria. Prior to this, Mr Schrogl worked as Head of the Corporate Development and External Relations Department in the German Aerospace Center (DLR) in Cologne, Germany. Previously, he also worked with the German Ministry for Post and Telecommunications and the German Space Agency (DARA) in Bonn, Germany.*

Mr Schrogl presented the German initiative ‘Establishing key principles for the global space economy’ implemented in the context of the EU Council Presidency<sup>[1]</sup>. This initiative responds to the increasing importance of space infrastructures, services and products as an export and import good for the global economy and the global society as a whole.

During the remarks, Mr Schrogl highlighted that international economy in the space sector means ‘global’ and that space is for all countries, not simply big space-faring nations. Europe has put more stress on these international exchanges and wants international relations and international economic relations to be based on multilaterally developed rules. The German initiative shall foster the global space economy with rules-based global competition in a level-playing field.

The dimension of the global space economy is continuously increasing. Manufacturing and services differ in terms of resources surrounding them. The global economy value last year equalled roughly \$366 billion and it can be expected that by the end of the decade, it could reach one trillion per year. However, opportunities need to be for everybody, both established and non-established space nations.

The initiative ‘Establishing key principles for the global space economy’ focuses on 4 elements:

1. Rules for the global space economy to set a level-playing field based on reciprocity;
2. Joint approach on Space Traffic Management to find rules internationally negotiated to conduct activities in outer space;
3. Financing of space activities on all levels. Globally a broader acceptance of the UNIDROIT Space Protocol could benefit various commercial activities;
4. How to secure Intellectual Property Rights, how to conduct and set standardization on a global level and guarantee for everybody in space activities to have cybersecurity and cyber resilience for its activities.

With these elements, the German initiative in the context of its EU Council Presidency intends to contribute to fair international cooperation and the responsible use of Outer Space .

<sup>[1]</sup> The European Council is one of the European Union institutions. The Presidency of the European Council rotates every 6 months among EU Member States. A country holding the presidency leads the implementation of regular EU activities and may set new initiative. Germany has held the EU Council Presidency from July to December 2020.

Mr Schrogl's slides are available [here](#).

His insights start at 7:33 min in the recording [here](#).

Ana Maricela Avila Becerril

## **Ministry of Foreign Affairs, Costa Rica**

***Ms Avila Becerril is an official of the Ministry of Foreign Affairs for the Government of the Costa Rica. She is the former Costa Rican delegate to the United Nations Committee on the Peaceful Uses of Outer Space in Vienna.***

Ms Avila Becerril highlighted some examples of international cooperation conducted in Costa Rica.

In March 2016, Costa Rica, together with UNOOSA, organized the Human Space Technology workshop to showcase space activities in the country. As side event, Costa Rica launched the [Costa Rica Aerospace Cluster](#) composed by 50 companies working on different elements of the space sector such as software development, electromechanical components, rocket propulsion and many others. This was a way to use the international platform provided by this workshop and UNOOSA to showcase the capabilities of the private space industry of Costa Rica.

Another example of international cooperation is the IDASU project for the launch of the first Central-American satellite. This was organized and completed by an NGO, a civil society group that was very inclusive towards the local population, as if the project belonged to everyone. Although prepared by a civil society organization, this requested international efforts through the government or directly by the organizers. There was a Memorandum of Understanding with Kyutech, a university in Japan, to launch the satellite in April 2018 and deployed in May 2018 by the Kibo Module.

In 2020, the private company LeoLabs announced to build a phased array radar in Costa Rica and this is the first international company building this kind of space infrastructure in the country. Such technology will be used to track small objects and Situational Space Awareness. The company chose Costa Rica because of its long tradition of being environmentally sustainable and protecting the environment; and also because of the work of one of Costa Rica's astronauts, who worked hard to attract more space opportunities to the country.

All these cooperation opportunities require a legal and policy framework. The Congress passed legislation to develop a National Space Registry and they are now working on the regulations and how to implement it. In this context, Costa Rica is also working with UNOOSA to improve the Registry and be in line with international regulations. In addition, the Congress is discussing the creation of a national space agency and they are trying to identify examples and learn best practices from emerging-space faring nations that have already some experience. As part of its efforts, Costa Rica aims to

become part of the UNOOSA Space Law for New Space Actors project, where emerging countries are receiving assistance in law and policy<sup>1</sup>.

*Ms Avila Becerril's insights start at 18:22 min in the recording [here](#).*

Eduina Teodoro

## **Angolan National Space Programme Management Office**

***Ms Eduina Teodoro is a representative of the Legal and Cooperation Department of the Angolan National Space Programme Management Office.***

GGPEN is the Angolan Management Office that has the goal to manage and monitor the Angolan National Space Programme.

Among its competences, GGPEN operationalize and manage the space programme portfolio of projects; manage human resources, ensure training, and establish technical cooperation protocols with technical and scientific institutions in the field.

Some partnerships that help develop the national space programme. UNISEC University Space Engineering Consortium in the area of capacity building for the construction of small satellite. Through this partnership GGPEN created initiatives with young people and academies in Angola, and to promote courses for the construction of small satellites. GGPEN has partnerships with: satellite companies such as Airbus; ISAE SUPAERO to offer master's degrees; Thales Alenia to provide resources and capacity building in Earth Observation; TSTI which gave the first training to GGPEN technicians; and Russia that provide support to build satellites. Angola has also a project of research concerning droughts with MIT, and on space governance with Arizona University. GGPEN plans more collaboration with ESA and the Portugal Space Agency.

The National Space Strategy sets out the general objectives and guidelines that govern space activities in Angola, taking into account the recognition of the vital importance that the use of space has for socio-economic development and strategic positioning of the Republic of Angola. One of the priorities of the government, at the moment, is to ratify the Outer Space Treaty and the Registration Convention. Such a priority is aligned with one of the pillars of the national strategy that is to position itself at international level and to become member of COPUOS to participate in space international arena.

*Ms Teodoro's slides are available [here](#).*

*Her insights start at 28:40 min in the recording [here](#).*

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<sup>1</sup> The "Space Law for New Space Actors" project will provide UN Member States with ad hoc expertise in drafting national space legislation and national space policies aligned with international space law. The aim is to promote the long-term sustainability of outer space activities. More information here: <https://www.unoosa.org/oosa/en/ourwork/spacelaw/capacitybuilding/advisory-services/index.html>

# QUESTIONS & ANSWERS

## **What are the challenges that developing countries are facing in entering the space economy?**

Ms Avila Becerril: one of Costa Rica's challenges is that the country does not have a central institution that is leading the process of establishing space activities. Many initiatives are coming from research institutes, universities, private sector or the civil society and having so many actors that are not centrally-led is challenging.

Ms Teodoro: one of the challenges of Angola is to acquire the knowhow, building skills and expertise and have specialised human capital. Angola is addressing this challenges through partnerships.

## **What are the driving factors for STM and in which direction should we move forward?**

Mr Schrogl: space traffic management increases in urgency and relevance and is driven by the issue of space debris, and the growing amount of actors and activities in outer space. If we look at mega-constellations, it is evident that orbits are more crowded and that threats to the secure conduct of space activities are growing. Mr Schrogl underlined that it is necessary to find rules to keep activities in outer space safe and to coordinate our behaviour through STM. STM could be based on a binding convention that would set out the principles, it would further have an international agreement which would contain the traffic rules and additionally should be complemented with standardization of the technical pre-requisites to act in outer space. The drafting of such instruments should also involve non-state actors. The legal architecture of ITU or ICAO could be a model of how STM could be managed.

## **How relevant is South-South cooperation?**

Ms Avila Becerril: it is important to look at countries that have the same level of development of the sector rather than looking only at highly-developed countries. It is easier to understand similar countries and learn best practices from those countries that are going through the same process of establishing a space economy. One example is the Central American Integration System (SICA), the economic and political organization of Central American states. SICA is currently building a Central American satellite using resources and knowledge from member countries, and it has been selected for the 5<sup>th</sup> round of UNOOSA/JAXA KiboCUBE cooperation<sup>2</sup>.

Ms Teodoro: common projects to promote knowledge and knowhow are very important. Angola is part of the Southern African Development Community Satellite Sharing System. Through this initiative, each country shares resources, space technology and infrastructure to develop space activities and mutually benefit from each other.

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<sup>2</sup> More information here: <https://www.unoosa.org/oosa/en/ourwork/psa/hsti/kibocube.html>



Mr Schrogl: in Europe, no country could do much on its own in the past and a regional organisation, which later became the European Space Agency, was created. ESA represents a model of regional cooperation that can work also for other world regions. Regional cooperation can be done at institutional or project level and this helps figuring out common goals and objectives, but also to build strengths and capabilities in these countries. Europe is supporting regional cooperation, for instance through the ESA Tiger Initiative on water management in Africa. ESA supports South-South cooperation, which is necessary to strengthen the capabilities of countries to become part of the global space economy.

# CONCLUSIONS and NEXT STEPS

International cooperation remains an essential element to preserve outer space. To contribute to such objective, European States are working on the establishment of a Space Traffic Management regime to ensure a level-playing fields for countries. Emerging space-faring nations are entering the global space economy and common rules are desirable to enable them developing their space capabilities.

Working with other countries is crucial to learn and grow. Many examples of national, regional and international cooperation were presented during the webinar. The countries showcased, Costa Rica and Angola, highlighted that working with well-developed space-faring nations as well as emerging ones is equally important. Learning from peers has been identified as very useful because countries going through the same experience and facing similar challenges can be very effective in helping each other.

As space activities intensify, countries seek advice to establish their national space legal framework, and UNOOSA provides supports to comply with international space law. Through international and regional cooperation, both Costa Rica and Angola are demonstrating great progress towards the establishment of healthy and responsible space economies.

## THANK YOU

The webinar was made possible with time, support and expertise of our speakers: Eduina Teodoro, Kai-Uwe Schrogl and Ana Becerril Avila.

Thank you to all UNOOSA colleagues who supported the webinar's delivery.

Moving forward, the Space Economy Initiative aims to support healthy space economies in both theory and practice. For an initiative funded entirely by voluntary contributions, donor support is crucial to realising this vision. Should you be interested in contributing to this work to build responsible and dynamic space economies that accelerate sustainable socio-economic development, please get in touch with Ian Freeman at [ian.freeman@un.org](mailto:ian.freeman@un.org) or Veronica Cesco at [veronica.cesco@un.org](mailto:veronica.cesco@un.org).