

How Bartolomeo x ClimCam Project Contributes to the SDGs

Institution: Airbus Defence and Space, Egyptian Space Agency

AIRBUS



Interviewee: Simone Sasse, Key Account Manager, Airbus Defence and Space

Ayman Mahmoud Ahmed, Project Coordinator of the ClimCam Team,
Egyptian Space Agency

Date: Interview conducted with Airbus on 13 May 2022 and with the Egyptian Space Agency on 11 May 2022

Background:

The [Bartolomeo programme](#) is part of the Hypergravity/Microgravity Track of the [Access to Space for All initiative](#). The [United Nations Office for Outer Space Affairs \(UNOOSA\)](#) and [Airbus Defence and Space](#) issued an Announcement of Opportunity (AO) for utilizing the Airbus Bartolomeo external platform on the International Space Station (ISS) at the International Astronautical Congress (IAC) in Washington D.C. in October 2019. Through this opportunity, the selected team will have their payload hosted on the Airbus Bartolomeo platform free of charge for one year. The mission is expected to address the Sustainable Development Goals (SDGs). In 2021, on the occasion of the IAC in Dubai, UNOOSA and Airbus announced the awardees of the first round. The selected team is a joint effort of 3 East African institutions, the Egyptian Space Agency, Kenya Space Agency, and the Uganda National Space Programme within the Ugandan Ministry of Science, Technology and Innovation forming the [ClimCam Team](#).



Announcement of Awardees at IAC Dubai ©IAF



Image of Bartolomeo over Africa ©Airbus

Interview: First, we talked with Simone from our partner, Airbus.



Simone has been working on this cooperation from the beginning
©Airbus

Q: What is Bartolomeo?

Bartolomeo is an application platform on board the European Columbus module of the ISS located on its outer shell. It has multiple boxes that allow various sized payloads to be tested externally with different views and axis that provide many different options for experiments. The types of experiments that can be conducted are endless, such as robotics, life science, physical science, Earth observation, and more.



Q: What is the objective of the Bartolomeo programme from the perspective of Airbus?

The underlining idea is to provide access to space to developing countries. We want to facilitate and support the endeavour of new nations to develop space capabilities and join the international space family at the ISS. The cooperation is a strategic decision of the company, not only in the field of space but also in aeronautics, as we want to open up the solutions and opportunities we have to developing countries. The interest and of course the outcomes of research in space are growing and it provides solutions to make our Earth a better place.

In 2018, we began to work with UNOOSA to assess the interest in the United Nations Member States for this opportunity. Happily, our joint Call for Interest attracted more than 60 responses. In 2019, we officially opened a call to collect concrete applications providing information about the intended solutions, effects, and contributions to the SDGs.

“We want to support the endeavour of new nations to develop space capabilities and join the international space family at the ISS.”



The Announcement of Opportunity held at the IAC in Washington D.C. in 2019 ©Airbus

Q: How does your programme contribute to capacity building in developing countries?

We believe that through the Bartolomeo programme, we can motivate and facilitate access to space, support the development of space capacities and promote space research and its benefits to humanity. Additionally, Airbus hopes to offer consultations and guidance to the partners.

Q: How does your programme contribute to solving the SDGs?

“With the ClimCam team, we are able to contribute to multiple SDGs.”



As the future of the space industry depends on a well-educated and motivated workforce, we hope this project will contribute to greater interest in STEM fields. At the same time, we want to promote innovation and investigate possibilities in new technologies since Bartolomeo itself is perfect for testing innovative new technologies. Therefore our priorities are SDG4 Quality Education and SDG9 Industry, Innovation and Infrastructure. However, through the various applications, we were hoping to be able to reach more goals, and indeed with the ClimCam team, we are able to contribute to multiple SDGs. That being said, with this international partnership between an international organization: UNOOSA, industry from space-faring country: Airbus, and research institutes from developing countries: ClimCam team, we are also in line with SDG#17 Partnerships for Goals.



Q: What made the ClimCam team stand out in the selection process? Do you have any advice for the next round of applications?

It was a very tight decision because we received many interesting experiment ideas. However, the fact that the proposal was an international effort and that the team was gender and background diverse helped tilt the decision towards ClimCam. We also felt they understood our objective by proposing a project that met many of the SDGs. These were not set just to meet our standards, but they were trying to solve actual issues and we saw a very high benefit to supporting the Eastern African region’s effort to tackle climate change.



The Announcement of Awardees held at the IAC in Dubai in 2021 ©IAF

Q: How has Access to Space for All helped your organization?

Access to Space for All has helped raise awareness of the opportunities and impact of executing microgravity experiments on board the ISS with Bartolomeo. We appreciate the opportunity to intensify the exchange with new and emerging space nations. It was extremely interesting for all of us at Airbus to receive many different, dedicated ideas from international teams. It was the perfect chance to really understand the needs of the world.

“AccSpace4All has helped create awareness, making the world aware of opportunities and impact of executing microgravity experiments.”

Q: What are your future plans for the Bartolomeo programme?

First of all, we are focusing on the execution of the current project. The time schedule is challenging and there are many things to do such as testing, certifying, launching and setting up the experiment in space. The Covid-19 pandemic has amplified these difficulties, nevertheless, our commitment to this programme has remained strong and we hope to reinforce our strategic relationship with the United Nations.

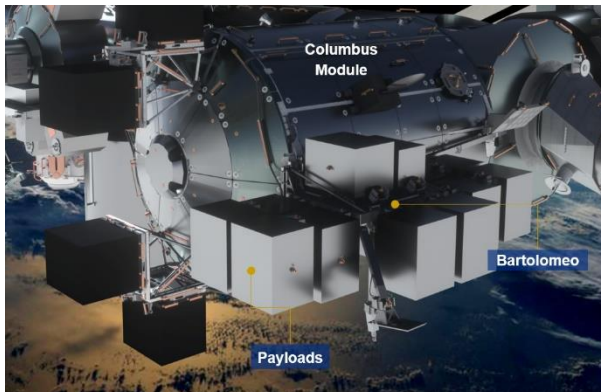


Image of Bartolomeo ©Airbus



Second, we talked with Ayman, the Project Coordinator of the ClimCam team from the Egyptian Space Agency (EgSA).

Q: Why did you decide to undertake a space project? What benefits do you see in space and how does your space project contribute to your country/region?

Space is not anymore a luxury but a necessity. Space programmes need to be planned and driven by the demands and needs of the country and to meet its objectives. Egypt has a robust space programme spanning over 15 years and is now overseen by EgSA which was established in 2019. It was born through the realization that space assets are important tools for building a sustainable future, and thanks to the growing recognition of the benefits provided by space technology and its applications over the years. The role of EgSA is to develop and utilize space technology and its applications for the benefit of the country.



Ayman is leading the ClimCam team
©EgSA

In Egypt, there is a strategy called “Egypt Vision 2030”, which takes into account the 2030 Agenda for Sustainable Development of the United Nations. This vision covers various areas such as agriculture, industry, health, water management, and education. Speaking of the continent as a whole, there is the “Africa Agenda 2063”. It is a major blueprint that aims to transform Africa into a global powerhouse in 50 years. It sees space as a driver for socio-economic development. Furthermore, driven by Africa Agenda 2063, there is the “Science, Technology, and Innovation Strategy for Africa 2024” (STISA 2024) which focuses on STI including various disciplines for STEM education. How to support and encourage the use of space technology is a topic in STISA 2024. With the intent to proceed with STI as a region, the African Space Policy has been in discussion at the African Union level, focused on the approach of building blocks. The African Space Strategy was developed in 2019 to build the capacity to overcome the regional challenges directly and indirectly, for a stronger and sustainable economy. These discussions have led to putting together the African Space Agency.

Owing to this clear direction in the region and in the country, EgSA is able to proceed with our space programmes with specific goals. Egypt is responsible for hosting the African Space Agency and therefore is mandated to implement international collaboration within the continent.



“Africa Agenda 2063 sees space as a driver for socio-economic development.”

(Top) Ground Track of the ISS ClimCam footprint ©EgSA

(Bottom) Coverage of East Africa region by ClimCam-ISS Track over one week ©EgSA



That is why EgSA joined forces with Kenya and Uganda on this ClimCam project for the Bartolomeo programme. By working closely with neighbouring Eastern African nations, we were able to work on solutions for the common problem we face: monitoring climate change. Africa is one of the vulnerable regions to the effects of climate change and using the AI system we will be able to detect changes that can be very crucial to life in East Africa such as food security. Through ClimCam, we definitely address many SDGs:

SDG2 Zero Hunger: Through detecting changes in the climate that can affect food security.

SDG4 Quality Education: By working together as a team among 3 different countries, we hope to evaluate each other and elevate the base level of space education in Africa. We are working with universities to be able to provide internships for students to leverage the hands-on training opportunities we have through the development of the ClimCam project.

SDG9 Industry, Innovation & Infrastructure: Developing an innovative camera system in-house in the African region.

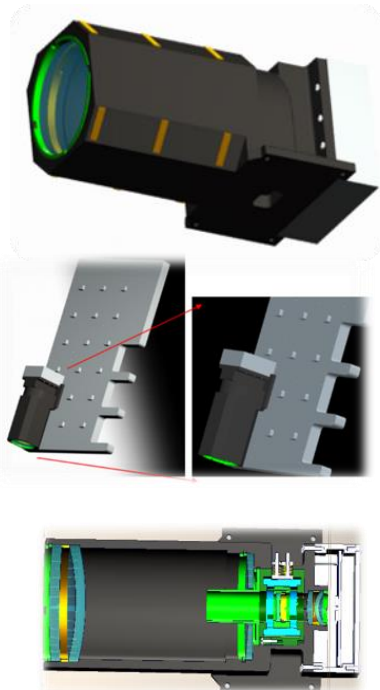
SDG13 Climate Action: The main objective of the project is to acquire data on measuring the impacts of climate change in different areas.

SDG17 Partnerships for the Goals: Through intercontinental partnerships, we hope to strengthen the cooperation between the 3 countries. This could be a pilot project for more cooperation within Africa.

“By working closely with neighboring Eastern African nations, we were able to work on solutions for the common problem we face: monitoring climate change.”



Q: Can you elaborate in detail on the current status and objectives of your project?



The main objective of the ClimCam project is to build a camera to monitor and provide images of Earth, especially the East Africa region. This would allow us to collect data related to agriculture and water management. The camera will be mounted on the Barotolmeo platform outside the European Columbus module, on board the International Space Station. As an emerging space nation, building an entire satellite on our own would be expensive, complicated, and time-consuming. Thanks to this opportunity under the Access to Space for All initiative we are thrilled to have an affordable and sustainable option to access space.

(Top) Outer design of the ClimCam ©EgSA

(Middle) Installed of ClimCam at Argus Module-simulation ©EgSA

(Bottom) Cross section of the ClimCam including interior optical and electrical components ©EgSA



To make full use of this opportunity, we want to make sure this will be a regional effort. There are 7-10 engineers in the team from each of the countries and as explained earlier, we aim to be able to provide educational opportunities to the young generation. Through internships and summer training, students can experience and learn from hands-on activities, utilizing theoretical knowledge from their studies. Taking advantage of the abundant wisdom and expertise at Airbus, as one of the industry leaders with strong standards methods of work, this is a fantastic learning opportunity. This technology demonstration mission on African-designed subsystems between Egypt, Kenya, and Uganda will bring confidence in our system design and work.



Team Photo ©EgSA

The ClimCam team is discussing how to cross-check each other's work and ensure the success of the mission. The final check will be done in Egypt since EgSA has all the necessary testing facilities. The production of the payload will start soon, followed by testing and certification, and the final launch to the ISS is planned for mid-2023.

At the kick-off meeting with Airbus and UNOOSA in February 2022, we received the technical requirement documents about CRD models that we need to consider when designing and manufacturing our payload. In more intense discussions that we started within the ClimCam team to start the design process, we have already found some challenges that can be foreseen, such as how to assure the quality of the payload during the testing phase.

Q: How has Access to Space for All helped your organization?

The most important benefit is that this technology demonstration opportunity allows us to develop and deploy a camera in orbit for 1 year. This would not have been possible on our own. There are still many countries, especially in Africa, which cannot yet achieve Technology Readiness Level (TRL) 9, which is flight-proven technology. We believe that with this unique opportunity, we can achieve this level.

"Participating in the initiative is a cost-effective, sustainable and reliable solution to access to space."

Participating in the initiative is a cost-effective, sustainable, and reliable solution to access space. It provides an opportunity for motivating engineers and allowing chances for them to express their ideas, which we were never able to provide before. We are thankful for the initiative and hope that more opportunities will be provided so that more African countries, that are not yet on the starting line, will benefit from these activities. In order to facilitate that, we believe that awareness-raising both on the significance and impact of space technology and applications, and



STEM School Students ©EgSA

also about the opportunities under the Access to Space for All initiative, is very crucial and needs to continue. In the point of awareness-raising, the initiative has brought us major exposure to the international community. EgSA is still a new and young agency and the announcement event at the IAC was truly beneficial for raising our profile. It sparked extensive media coverage in Africa and many discussions also at the Ministerial level.



Q: What are your future plans?

“This mission will be a success story in the region that can encourage many African countries to work collaboratively in future missions.”

Once we demonstrate our ability to develop this camera, we will be able to expand our activities to use the acquired technology in other more complex missions. We hope this mission will become a success story in the region and encourage many African countries to work collaboratively in the future. We also anticipate that this will expand and deepen our network of engineers, researchers, and academia in Egypt to build a sustainable and growing workforce. The data that we acquire from ClimCam can also be used to build capacity both locally and regionally. We are also working with university students, not only with STEM backgrounds, but those majoring in communication to make a documentary of the whole development cycle as part of their graduation projects. We aim to record our work and be able to share it with the whole region and future generations.

