



SPACE SOLUTIONS

SUSTAINABLE  
DEVELOPMENT GOALS

# TACKLING SOCIETAL CHALLENGES



European Space Agency



The need for global action to address the multiple challenges facing society is increasingly urgent and space-based applications are at the forefront of the green transition and the shift to a more digital, sustainable future. This report demonstrates the crucial role ESA continues to play in the development of innovative solutions and presents an overview of the activities undertaken in the Business Applications and Space Solutions (BASS) programme between 2009 and March 2024 which have generated a positive impact on people and society (Societal Value).

**Space-based assets have proven instrumental in delivering positive societal impact across a multitude of sectors, including healthcare, education and conservation**



## INTRODUCTION

The European Space Agency Business Applications and Space Solutions (BASS) programme brings the value of space to improve everyday life on earth, combining economic, environmental and societal sustainability.

Across the world, people face multiple challenges, including income inequality, limited access to education, discrimination, and inadequate healthcare. At the same time, the need for sustainable development has never been more urgent, with increasing pressures on the environment from the acceleration of climate change and the biodiversity crisis. Tackling these issues is essential to create an inclusive and equitable future.

Global initiatives, such as the European Union Pillar of Social Rights<sup>1</sup> and the United Nations (UN) 2030 Agenda for Sustainable Development<sup>2</sup> (otherwise known as the 17 Sustainable Development Goals SDGs), recognise the need for global solutions to address these concerns.

The 2030 Agenda for Sustainable Development is an internationally renowned plan of action for people, the planet and prosperity which aims to enhance global peace and freedom, arguing that eradicating all forms and dimensions of poverty is the foremost global challenge and a crucial prerequisite for sustainable development.

The UN SDGs were conceived in 2015 with a target completion date of 2030 and their implementation involves all 191 Member States of the United Nations, along with stakeholders in collaborative partnerships. Currently, only 15% of the SDGs are on track<sup>3</sup>, largely due to the Covid 19 pandemic, increased levels of conflict, the climate crisis and the cost-of-living crisis, which together have reversed years of progress<sup>4, 5</sup>.

In 2023, 691 million people were estimated to be living in extreme poverty, surviving on \$2.15 USD a day, which is only just lower than the level at the start of the pandemic, indicating little to no progress since 2019<sup>6, 7</sup>.

In the same year, over 281.6 million people across 59 countries and territories experienced food insecurity and malnutrition, showing no improvement from the previous year<sup>8</sup>.

Sustainable development is inherent to the ESA BASS programme, which has a strong focus on supporting the development of innovative space-based services providing societal value. Space-based assets have proven instrumental in delivering positive societal impact across a multitude of sectors, including healthcare, education and conservation.

BASS supports companies to develop commercially sustainable business models, helping them to scale their projects to maximise their societal benefits, and the number of companies who are keen to engage in such initiatives is constantly growing. Since 2009, over 80% of completed projects have addressed at least one SDG and 51% of these projects achieved sales during the project phase, proving the economic viability of sustainable development.

The SDGs balance the economic, social and environmental dimensions of sustainable development, recognising the inter-connectedness of the challenges facing society. Working together to achieve the SDGs is vital and ESA BASS has demonstrated its commitment and value in supporting European companies who want to contribute to the peace and prosperity of society in exploiting the potential offered by space-based assets and data.

1. European Pillar of Social Rights – Building a fairer and more inclusive European Union – Employment, Social Affairs & Inclusion – European Commission (europa.eu)
2. Transforming our World: The 2030 Agenda for Sustainable Development | Department of Economic and Social Affairs (un.org)
3. Overcoming the World's Challenges –The Global Goals
4. Alarming number of people worldwide suffer high levels of acute food insecurity – European Commission (europa.eu)
5. Life is a game of inches – and every action counts – The Global Goals
6. Poverty is back to pre-COVID levels globally, but not for low-income countries (worldbank.org)
7. Homepage (worldbank.org)
8. Global Report of Food Crises (GRFC) 2024 (fsinplatform.org)



## KEY CHALLENGES AND OPPORTUNITIES

### IMPACT INITIATIVES

#### Creating Societal Benefit

- The SDGs were established in 2015 but currently only 15% are on track for the 2030 target.
- BASS aims to increase space impact and investment in projects across the largest possible number of UN Sustainable Development Goals as currently the greatest share of investment has fallen under 4 SDGs: 'Industry, Innovation, and Infrastructure', 'Good Health and Wellbeing', 'Zero Hunger', and 'Sustainable Cities and Communities'.

#### Partnership

- BASS has established strong partnerships with non-space sectors to identify specific needs and the number of companies engaging in projects is constantly growing.
- BASS strives to leverage space-based technology to address worldwide issues requiring cooperation between companies and ecosystems.

#### Economic Benefits and Market Potential

- 51% of activities have generated sales during projects, demonstrating the potential to achieve economic and societal benefits.
- There is untapped market potential and unexploited opportunities in areas such as Africa, Asia and South America, where the number of pilot activities has been much lower than in Europe or North America.
- There are emerging markets in areas such as 'Responsible Consumption and Production', which offer opportunities for future growth with the development of the circular economy.

**51%**  
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## PARTNERS DRIVING SOCIAL

## IMPACT INITIATIVES

Stakeholders from non-space sectors are at the heart of ESA's BASS programme activities and they play a pivotal role in identifying priority areas in response to the most pressing societal challenges. By engaging with major stakeholders across a wide range of non-space market segments, BASS has gained invaluable insights which have informed and underpinned the launch of initiatives to ensure space-enabled commercial services address the needs and challenges faced by society.

Examples demonstrating the benefits of partnerships and collaborations:

### National Health Service UK (NHS)

Cooperation with the National Health Service (NHS) has been supported by the UK Space Agency with the aim of promoting innovative solutions to benefit the NHS ecosystem. The ESA-NHS collaboration leverages both terrestrial and space-based opportunities and has already resulted in several successful operations which have delivered substantial benefits in terms of access to services, faster response times and optimisation of resources.

### Toilet Board Coalition

The Toilet Board Coalition is a business-led partnership which brings together business, sanitation development stakeholders and experts from the global sanitation community with the goal of addressing the global sanitation crisis. ESA has joined forces with the Toilet Board Coalition to utilise advanced digital and space technologies to help address the challenges and support improved sanitation for developing economies.

### UN Global Compact CEO Water Mandate

ESA and the UN Global Compact CEO Water Mandate signed a Memorandum of Intent (MoI) to promote the development of space-enabled applications to support innovation in addressing water challenges. The CEO Water Mandate (CWM) runs an industry-driven, CEO-led

initiative called the Water Resilience Coalition (WRC), comprised of companies such as the Coca-Cola Company, Heineken, Levi Strauss & Co., Bayer, Colgate, Danone, GSK, 3M, AB InBev, Diageo, Dow Inc., Ecolab, Gap Inc., and Microsoft. Together, the CEO Water Mandate and WRC invest in new technologies to address the water crisis in its three dimensions: availability, quality and accessibility. Improving water, sanitation and hygiene (WASH) and wellbeing is a shared ambition for BASS and CWM with the aim of providing equitable, sustainable and resilient access to water and sanitation for at least 300 million people.

### India Energy Storage Alliance (IESA)

The IESA is an industry alliance focused on the adoption of emerging clean technologies in India. The development of decentralised microgrids and creation of localised distribution networks are an important and cost-effective alternative to extending the main electric grid, however, many developing countries are unable to finance rural electrification. The ESA-IESA partnership uses satellite data to optimise the impact of microgrid electrification projects for rural or 'off-grid' communities.

### International Centre for Missing and Exploited Children (ICMEC)

The ICMEC works to protect children around the world from going missing by providing resources for governments, law enforcement, NGOs, and families. Hundreds of thousands of children are reported missing each year but this is just a snapshot of the true number as statistics are often unavailable or not recorded. ICMEC work with technology companies and the financial sector to develop global solutions to protect children from exploitation, abuse and the risk of going missing. ESA is working with ICMEC to improve existing tools and develop new ones to keep children safe across the globe.



## SHOWCASES

### Alizeti

Alizeti supports smallholder farmers growing high-value crops in Kenya through a web platform which connects farmers to agri-processors. The project provides farmers with better access to information and advice throughout the growing season to improve access to markets, increase income opportunities and contributes to sustainable economic growth and poverty reduction.

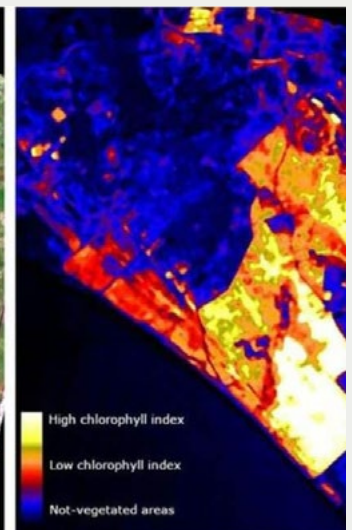
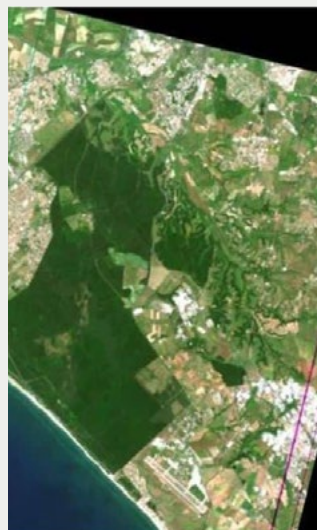
Alizeti was developed by German company AgriBora and integrates Earth observation and location data with meteorological information to provide insights to farmers and agri-processors on the expected harvest as well as improved traceability of the crops being purchased. Over 75,000 farmers were added to the platform during the pilot phase, generating \$150,000 USD in transactions, and the service is currently expanding their offer through AgriKopa to support farmers accessing credit.



### SES5G

SES5G offers an integrated solution for the management of wide green areas, including nature reserves and urban parks, to protect environmental resources and reduce instances of fires, crime and other offences. Real-time overviews of park situations can result in faster response times and more effective interventions, making these green areas more usable and attractive for citizens.

SES5G was developed by Italian company Leonardo and piloted in the Castel Fusano Pine Forest Reserve, providing constant fire monitoring during the summers of 2021 and 2022. The service is underpinned by satellite communication and 5G to ensure a resilient and effective infrastructure in challenging scenarios and combines drone patrols, audio-video sensors, and firefighting systems which can detect even very small outbreaks of fire up to 15km away.





## SHOWCASES

### MOWGLI

MOWGLI, developed by Italian company i-EM, is a satellite-based solution which facilitates rural and urban electrification in developing countries. The system identifies the best microgrid size and design depending on the availability of local energy sources as well as the potential sustainability, scalability and stability of the design. MOWGLI also monitors the microgrid and manages load balancing, black-out prevention and control, fault detection and prediction, and sustainable maintenance.

MOWGLI uses satellite data and Earth observation and has demonstrated time, cost and energy savings across the microgrid lifecycle, reducing design hours by 50-70% compared to conventional processes and operating costs by up to 15%. The company currently has more than 800 renewable plants in 20 nations across five continents and is working with partners to expand its services.



Credit: I-EM and CES



### SEDDCR

SEDDCR, by UK company Skyports, is an end-to-end drone delivery service designed to improve healthcare for NHS Highland patients. The drone delivery service provides fast, reliable and regular collections of samples to support faster treatment and early isolation of infected patients. NHS staff can order medicine, pathology tests and equipment and track their location, providing a previously unseen level of transparency and traceability in the supply chain.

SEDDCR piloted in the Highlands and 1800 diagnostic samples from 884 patients were transported, saving 11,000 hours of transport time and flying more than 14,000 km Beyond Visual Line of Sight (BVLOS). Skyports is working with regulatory authorities to take SEDDCR into permanent commercial operation and has secured over 103 MEUR funding to build vertiports and accelerate its drone business.





## SHOWCASES

### B-SURE

B-SURE was developed by AnsuR, Norway and is based on ASIGN, a United Nations Information Management tool for major disasters. B-SURE reduces the costs, risks and response time of disaster management by letting users prioritise limited bandwidth on the parts of videos or photos which contain the most relevant content. This enables faster decision times and reduces operational costs as the service provides an efficient and secure means to communicate operational information in the field.

Satellite communication and data ensure connectivity, even in challenging conditions, and provide accurate and reliable location data. B-SURE was used to direct the response to the 2021 floods in Germany and is being used by the Oslo Police. UN peacekeeping forces have issued a tender to procure the system, and it is also running at the United Nations Satellite Centre (UNOSAT) in Geneva.



### ONE CLASS!

ONE CLASS! from Openet Italy, aims to broaden access to education beyond the traditional classroom, widening opportunities for educational experiences, content and relations. The pilot project helped educational services tackle the “multiclass challenge” in the Basilicata Region of Italy, and support social integration services provided for Foreign Unaccompanied Minors (FUM) hosted in Italian reception centres. A total of 732 students from seven schools were involved in the activities; 66 FUM completed the classroom activities, which helped the students adapt to their new environment and integrate into the local community. ONE CLASS! utilises satellite connectivity, to ensure the service is suitable for areas affected by the digital divide or with limited connectivity.







## SHOWCASES

### AIRMINE

At least 1.5 billion people globally are affected by asthma and pollen allergies. Airmine provides a hyper-localised pollen forecast and quantification system, enabling people to understand what they react to and respond proactively. The system integrates with smart home solutions so users can regulate their windows and ventilation to create the optimum indoor environment for their health.

Norwegian company Airmine, use satellite images to map and classify vegetation which is combined with weather data and ground-based sensors to forecast pollen risk to a 40x40 metre resolution. After being piloted in Nordic countries, the Airmine app has been successfully launched worldwide forecasting model runs daily for the UK, Nordics, South-east Australia and the Buenos Aires-Montevideo regions.



### ISOLATION PLUS

Isolation Plus was developed in response to the COVID-19 outbreak to support the identification of hidden, vulnerable people affected by the pandemic. The pandemic meant many people, who had not previously been classed as vulnerable, suddenly needed help but were unknown to local authorities or community voluntary organisations.

UK company Astrosat used satellite data, including thermal measurements of residential property, to estimate localised fuel poverty levels. This enabled local authorities and voluntary organisations in the UK to identify where the 'hidden vulnerable' were likely to reside and reach out to provide the support they needed. The pilot activities successfully engaged 14 organisations and 46 users.





## SHOWCASES

### IBISA Climate Insurtech

Despite producing 70% of the world's food supply, more than 500 million farmers lack access to insurance for their fields, leaving them completely exposed to weather risks. Traditionally, insurance companies have avoided the agricultural micro-insurance market because of prohibitive costs and complexity in distribution, administration and claims handling.

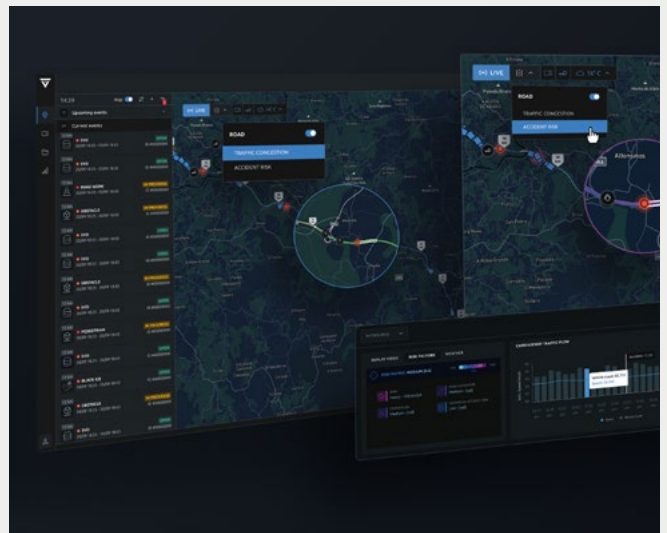
Luxemburg's company IBISA developed the IBISA platform, which uses satellite data to enable mutuals and insurers to define, distribute, and manage parametric insurance products for agriculture. Their service provides insurance to more than 200,000 policy holders in India, Senegal and the Philippines, with the aim of expanding to other countries in the future.



### Equant ITS

Valerann, an intelligent transportation system (ITS) provider, has developed and implemented its AI powered solution, Equant, in several countries, including Chile, UK, Spain, Israel, and the US. It uses real-time traffic analytics to optimise traffic flow, reduce congestion and minimise accidents by aggregating data from various sources, including CCTV cameras, vehicle telematics, social media, and satellite positioning data. Road operators adopting the service have reported a 20% reduction in congestion and a 35% decrease in accidents.

Valerann's service was successfully deployed during the UEFA Women's Euro 2022 tournament in the UK, positively impacting traffic flow and safety. This boosted the company's profile and Valerann has secured USD 25 million in funding, doubled its UK workforce, and expanded its customer base across Europe, South and Central America, and the US.





## INVESTMENT IN DEMONSTRATION PROJECTS

### ADDRESSING SDGS

Total industry and ESA investment for 311 demonstration projects with societal value between 2009 and March 2024



## CONCLUSION AND

### NEXT STEPS

Since 2009, the BASS programme has increased investment in projects addressing all UN Sustainable Development Goals and more than half have achieved a level of commercial success, which is comparable to the wider BASS portfolio. This demonstrates the commercial potential of a sustainable economy where economic return and societal benefit coexist and contribute to a better future for all.

There are further opportunities for sustainable, commercial development in Africa, Asia and South America. Partnerships with stakeholders can prove invaluable in tapping into markets where commercial uptake is particularly challenging. Partnerships have been established with champion stakeholders to address key societal challenges in different sectors and specific



initiatives have been consistently proposed by BASS following dialogue with non-space partners, offering opportunities to both newcomers and established companies to support sustainable development and have a positive impact on society.



## FIND OUT MORE

### ESA Task Forces

ESA's commitment to working with leading stakeholders from specific sectors has led to the launch of four Task Forces to:

- Task Force for Innovation in Energy Through Space
- Task Force for Green and Smart Cities
- Task Force for Maritime Sustainability
- Bioeconomy Task Force.

Each Task Force member of the task force brings its unique expertise and know-how, also participating in dedicated working groups which develop and deliver innovative projects, trials of technologies and user driven solutions to combat the challenges facing these sectors, generating both green and economic impact.

The Task Forces have identified priority areas for action which inform current and future funding opportunities.

For further information visit [ESA Space Solutions](#) and scroll to Focus Areas on the menu.

### Funding

ESA is launching several new initiatives offering European companies funding and support to develop new services, technologies and products. To find out more, please visit [business.esa.int/funding](https://business.esa.int/funding)

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