

SPACE FOR CLIMATE ADAPTATION

FEASIBILITY STUDY

ESA Business Applications and Space Solutions
Iñigo Alonso Etxebarria

04/10/2023

1. ESA Business Applications and Space Solutions
2. Space for Climate Adaptation – Feasibility Study
 1. Study Objectives and outcomes
 2. Value of space
 3. Funding
 4. Work logic
 5. Context and opportunity
 6. How to apply
3. Prevention always, development wherever possible, humanitarian action when necessary.
4. Leveraging space technology for climate adaptation.

Business Applications: space-enabled services

BASS aims at reaching **commercial exploitation of space assets, data and capabilities** addressing **technical feasibility and business development**. This includes the development of **operational services for a wide range of users** through the combination of different systems, and **support in creating viable companies as well as to existing companies**



- ❑ To advance the **growth and global competitiveness of the space downstream and new space industries** of the Participating States;
- ❑ To explore **a wider combination of space techniques, tools and technologies**, possibly together with terrestrial systems, multiplying the range of space-dependent services and products that can be delivered to customers;
- ❑ To attract **a wider range of actors into the end-to-end space value chain**, able to generate innovative services and products that will be sustained through private investment and user funding sources;
- ❑ To attract **a wider range of users** of services based on space technology, especially in sectors of major economic importance;
- ❑ To **attract actors starting new businesses** implementing space technologies in innovative ways; and
- ❑ To promote the emergence of space-based sustainable services addressing: **societal challenges, UN Sustainable Development Goals, the green transition, and climate change.**

SOCIO-ECONOMIC

Social, green value and economic sustainability



SPACE USE

Utilisation of space in new markets and user communities



INDUSTRY COMPETITIVENESS

European Industry competitiveness on global space and non-space markets





Earth Observation

- Land, sea, air monitoring
- Environmental risk and change detection
- Weather and pollution forecasting



Satellite Communication

- Reliable and secure communication
- Remote connectivity (maritime, oil rigs, developing areas)
- Backup to terrestrial infrastructure

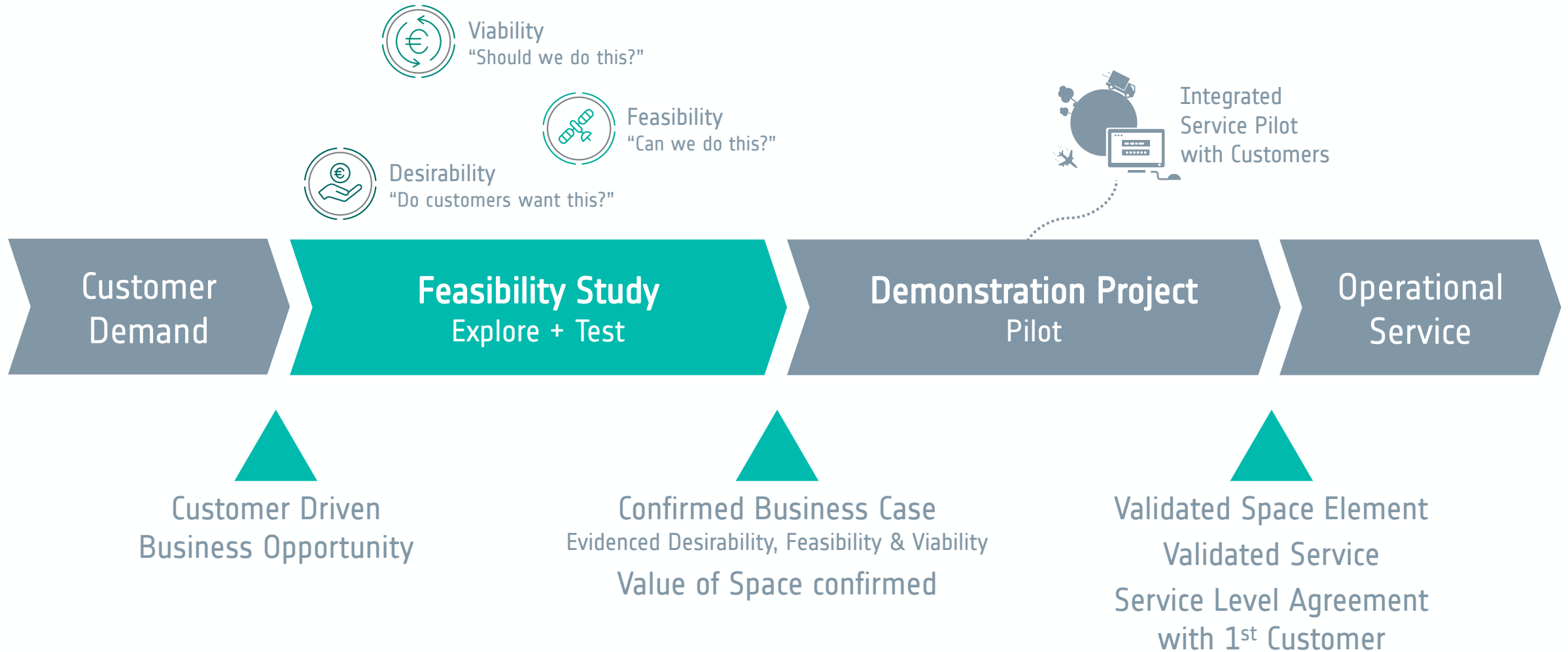


Satellite Navigation

- Geo-tagging, positioning, navigation
- Precision timing
- Activity tracking and tracing
- Route optimisation

Estimated activity duration:	(up to) 12 months
Estimated ESA co-funding:	max. €200K per activity (zero-equity funding) max. 80% of total cost per activity
Eligibility for funding	Companies must be based in a Member State subscribing to ESA BASS *

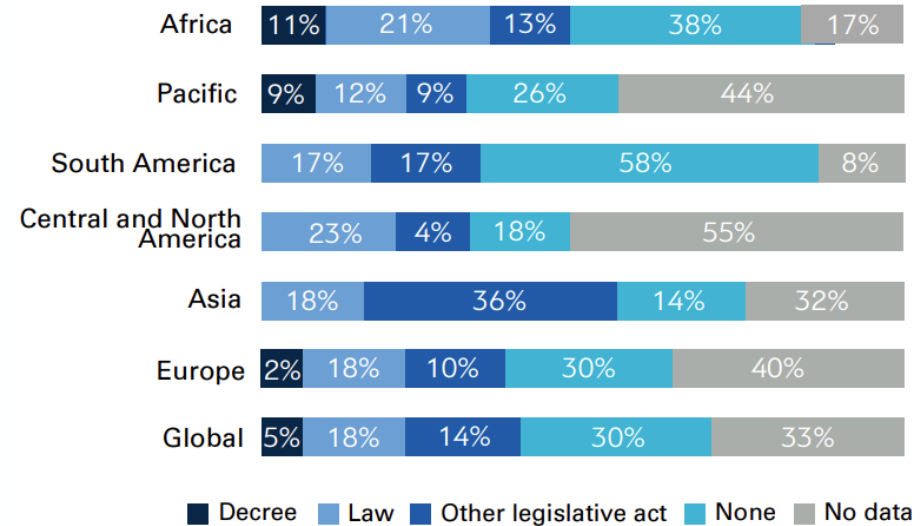
* (the official call documents should be consulted)






Areas of Application:

- **Anticipatory Action** for Disaster Impact Reduction.
- Services for Financial **Climate-Risk Modelling**.
- **Urban Resilience**.
- **Early Warning Services**.



A photograph of a rocket launch at night. A bright orange arc of light curves across the dark blue sky, starting from a launch site on the ground and ending at the top of the frame. The launch site is visible in the lower right, with some lights and structures. The foreground shows a dark landscape with some water or wet ground.

**Prevention always,
development wherever possible,
humanitarian action when necessary**

Markus Enenkel, Space for Climate Adaptation, 4 Oct 2023

Where does climate change adaptation sit?

**Climate Change
Mitigation**



Reduce Emissions

**Climate Change
Adaptation**



**Adjustment of
human and
natural systems**

Loss and Damage



**Deal with impacts
whenever CCA is
not enough**

From Data to actionable Knowledge



Users mostly do not care about the chosen dataset, algorithm, or cloud processing infrastructure

They do care about spatial resolution (often more than about data quality)

Entry barriers are often more trivial than data/service providers realize

The superpower of space-based data comes through combination with socioeconomic data and advanced analytics

Past climate conditions are a bad predictor of future risks

Early Warning Services



Anticipatory Action



Climate Risk Financing



+

Benefits outweigh costs

Locally-led and pre-agreed

Can prevent emergencies from turning into crises

-

Early warning vs early action; no focus on people with disability

Dozens of pilots, but no large-scale deployment

Transparency and affordability

Early Warning Services (EW4All)



Possible Impact Pathways for space-based Data

- Close gaps between national weather stations
- Predict critical (e.g. crop) conditions via ML

Added-value

- Data quality and national risk ownership
- Provision of sub-national crop health/yield data

Anticipatory Action



Possible Impact Pathways for space-based Data

- Up-to-date vulnerability information
- Evaluation of project results

Added-value

- Impact-based forecasting
- Faster, cheaper generation of lessons learned

Climate Risk Financing



Possible Impact Pathways for space-based Data

- Advanced risk modeling
- Combination of climate variables

Added-value

- Better understanding of possible future scenarios
- Higher accuracy of payout triggers

What Disruption really means

Understand users capacities and concerns

**Forget buzzwords unless the underlying concept
matters to the application**

Thrive in failure

Leveraging Space Technology for Climate Adaptation

Overview of demand for financial applications

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ESA Space Solutions for Climate Adaptation Event, 04 Oct 2023



Gallagher Re

Public Sector & Climate Resilience Solutions Global Practice

Our global centre of expertise is dedicated to the financial risk management of climate & systemic risks for public sector clients in developing countries.

19 MEMBERS
Caribbean Governments

3 Central American Governments

1 Caribbean Electric Utility

54 COUNTRIES COVERED

\$245 MILLION in Parametric Catastrophe Insurance for:

- Tropical Cyclones
- Earthquakes
- Excess Rainfall
- Fisheries
- Electric Utilities

Caribbean Risk Pool
Sovereign risk management and parametric risk transfer solutions

African Risk Capacity, Sovereign Parametric
Sale R/I broker and risk advisor for African Union's 15-country risk pool, against drought and food insecurity

Morocco, Sovereign Parametric
Risk Advisor to Morocco's Ministry of Finance (parametric protection of government's contingent liability against EQ risk)

Public-Private Catastrophe Risk Transfer Schemes:
Bringing Resilience to Scale in Africa

Public Sector & Climate Resilience Solutions Global Practice

Accelerating action through scalable risk transfer



World Bank, West & Central Africa Agricultural Risk Solutions
Risk advisor to the World Bank and francophone Africa client countries on agricultural risk analytics and transfer



Senegal Solidarity Fund's Climate and Disaster Risk Financing Strategy

Senegal Drought & Wildfire Risk Financing
Risk Advisor to Ministries of Finance and Solidarity

Mobilizing Risk Finance, Capital & Expertise at scale
through public private partnerships & holistic risk financing strategies

- Government's Reserves & Budget Reallocation
- Donors & Development Partners' Funding
- Contingent Line of Credit
- Insurance, Reinsurance & Alternative Markets
- Individual Policyholders

Climate & Systemic Risk Analytics
Supported by our Climate & ESG, CAT, ILS & Analytics teams: Exposure, Hazard, Macro-Economic & Fiscal, Multi-Peril/Compounding Shocks, Climate Change, Global & Interconnected Risks

Risk Transfer & Financing Products
Emergency Budget/Reserves
Indemnity/Parametric Risk Transfer, Contingent Credit

Strategic & Policy Advisory
Holistic Risk Understanding, Instrument-Layering, Climate Risk Financing Strategy, Policy advice

Public Sector & Climate Resilience Solutions Global Practice

Strong Regional Presence & Network of Partners
Brokers, Modelers, Actuaries

Practical Solutions Implementation Framework
addressing wide range of climate and systemic risks, through turnkey solutions covering

- Policy
- Regulatory
- Legal
- Actuarial
- Budgetary
- Fund Raising
- Exposure Mapping
- Risk Modelling
- Structuring
- Placement
- Claims
- Comms and M&E

Advisory
Capacity Development & Intermediation

Corporate Clients
Insurance, Reinsurance, Banks & MFIs

Governments
Ministries of Finance, Regulators & Public Authorities

Development Partners
Institutional Donors, Implementation partners & NGOs

Scalable Solutions fully customized to country needs
reflecting government's risk appetite, exposures, priorities, political & financial constraints

- Emergency Response
- Government's Contingent Liability
- Agriculture & Crop / Food Insecurity
- Tourism & Fiscal Revenues
- Residential & Commercial buildings
- Critical Public Infrastructure



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Introduction



Problem Statement

Traditional risk modelling approach shows **significant limitations where data is scarce, phenomenon complex or trends relatively recent**. Risk information, models, triggers are largely insufficient to support scaled-up risk financing especially in data-poor environments. Drought index insurance or difficult-to-model flooding are very visible examples of how and why current risk information needs to be complemented with more timely, better correlated, independent views of risk.

This leads to the **need for more timely and more robust risk information addressing a broader range of disasters and shocks**.

The **ESA Call for Proposal on Climate Adaptation** can help leverage large amounts of near real-time satellite data for earlier, more reliable financial response in countries affected by climate and disaster events. Remote-sensing and big data have the potential to enable new risk financing applications and provide decisive risk information to client countries and development partners.



Demand and Gaps Overview 1/2

High-level overview

Exposure Mapping: Improving the quantification of population density at more granular levels, accounting for latest settlements and urban developments

Parametric Trigger Adequacy: Augmenting the accuracy and reliability of indices and proxies used in financial risk transfer products for governments in developing countries

More comprehensive data coverage : Improving the time and spatial resolution of loss estimates, during and after catastrophe events

Monitoring climate change: accounting for and quantifying climate trends in hazard and risk estimates



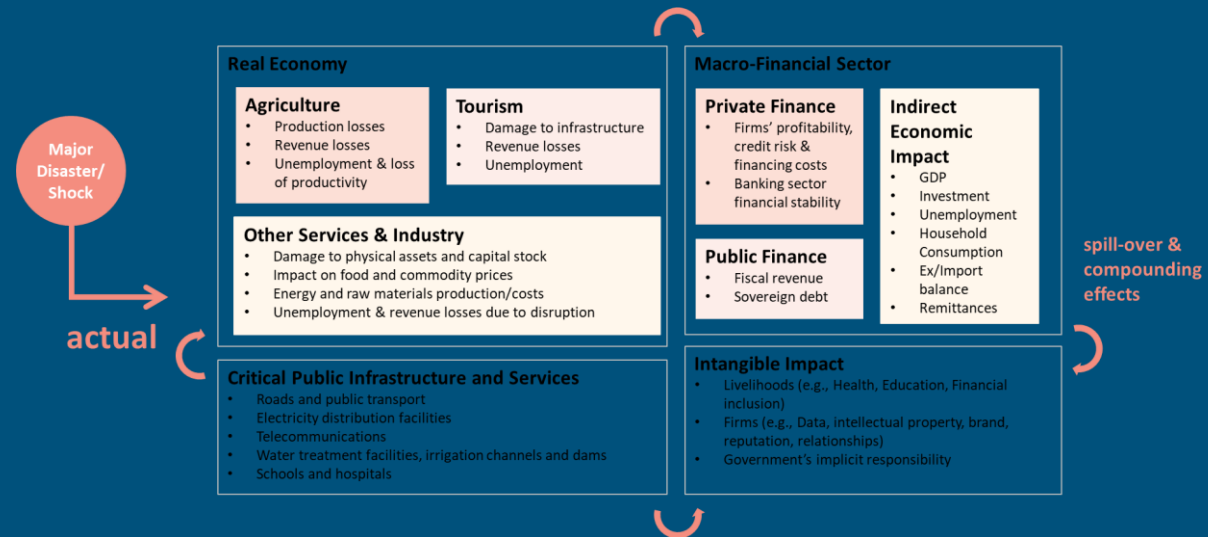
Demand and Gaps Overview 2/2

Specific Areas

Drought Risk Analytics & Triggers:

- Complementing existing drought risk models (including on near real time or forecast basis, e.g., with moisture/EVT/T data in addition to vegetation indices)
- Identifying simpler proxies for large-scale portfolio type of applications (e.g., covering multiple countries) for alternative risk transfer (e.g., capital market-based CAT Bonds)

Flood Risk Analytics & Triggers: providing a risk and loss quantification process for accurate, portfolio-level insurance/risk transfer applications in data/model-poor environments (e.g., mapping flood extent in urban environments)



Holistic Risk Evaluation: offering a more comprehensive understanding of catastrophe impact on entire sectors and regions (e.g., impact of droughts on agricultural value chain, flood-related disruptions on economic activity)



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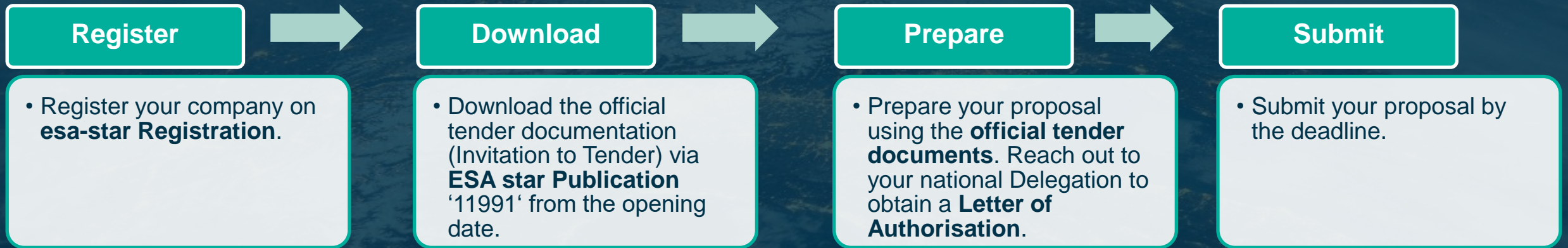


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Thank you



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Opening date: 24 October 2023 *
Closing date: 12 December 2023 *

* tentative dates, subject to change

This opportunity:

<https://business.esa.int/funding/intended-tender/space-for-climate-adaptation>

Esa-star:

<https://doing-business.sso.esa.int/>

BASS program:

<https://business.esa.int/>