



## UNITED NATIONS GLOBAL GEODETIC CENTRE OF EXCELLENCE

MODERNISING GEOSPATIAL REFERENCE SYSTEM  
CAPACITY DEVELOPMENT WORKSHOP

Developing business cases for increased  
investment in geodesy

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Day 4, Session 2 [4\_2\_1]

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# Session Overview

- Insights on how to develop a strong business case for securing investments
- Addressing Geodetic Needs
- Motivations for {Increased} Investment for Geodesy
- Options for Securing Investment
- Communicating these Needs and Motivations
- Case Studies
- Group Activity



# Motivations for Increased Investment – ‘Internal’



## Software Upgrades

Enhance data processing and analysis capabilities.



## Training and Resources

Build a skilled workforce to manage geodetic operations.



## Hardware Modernization

Improve accuracy and reliability of geodetic measurements.



## Maintenance & Support

Ensure continuous operation of geodetic infrastructure.



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# Developing strong cases for securing funds – Why?

Developing a strong business case for securing geodetic investments is critical to..

- Stay operational
- Provide redundancy
- Support and maintain systems
- Extend capability (eg. densify/extend coverage)
- Upgrade systems (eg. more constellations)
- Train and sustain personnel and processes

=> Modernise the GRS



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# Crafting a Strong Business Case



## Identify Critical Needs

Assess current gaps in geodetic infrastructure and capabilities

## Highlight Motivations

Articulate compelling reasons for increased investment in geodesy

## Explore Funding Options

Evaluate various sources and partnerships for securing investments

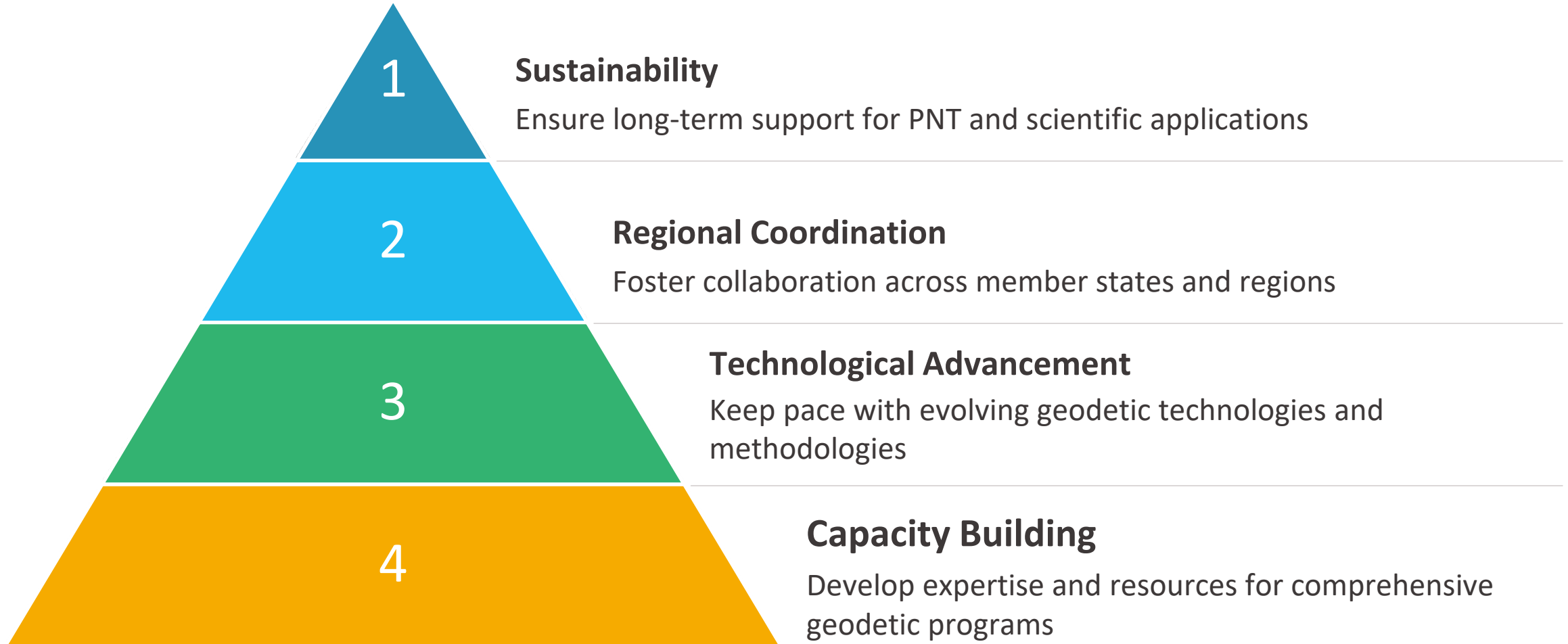
## Showcase Revenue Potential

Demonstrate how additional services can generate income



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# Addressing Geodetic Needs



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# Landscape of National Motivators and Stakeholders

Consider the Motivators for your Country or Region, for example



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# Landscape of National Motivators and Stakeholders

**EXAMPLE** of Motivators for your Country or Region:

**EXAMPLE**

## Top 3 Industries

1. Natural Resources
2. Agriculture
3. Shipping

## Top 3 Govt Projects

1. Infrastructure
2. Water Supply
3. Cyber Security

## Top 3 Growth Areas

1. Space Sector
2. Telecoms
3. Medical Research

## Top 3 Challenges

1. Climate Change & Natural Disasters
2. Energy Costs
3. Border Security

## Top 3 'Geodesy' Needs

1. Geoid Model Update
2. CORS Extension
3. Data Centre Upgrade

**EXAMPLE**



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# Mini-Activity — Landscaping of National Stakeholders

Spend 5 minutes mapping the Landscape of your Nation...

## Top 3 Industries

- 1.
- 2.
- 3.

## Top 3 Govt Projects

- 1.
- 2.
- 3.

## Top 3 Growth Areas

- 1.
- 2.
- 3.

## Top 3 Challenges

- 1.
- 2.
- 3.

## Top 3 'Geodesy' Needs

- 1.
- 2.
- 3.



*\*Use this landscape overview to help identify potential partners and stakeholders in your business cases*

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# The Role of Geodesy.....

... for Infrastructure and Sustainable Development

... for Infrastructure Planning and Design

... for Maintenance and Monitoring of Infrastructure

... for Sustainable Urban Development

... for Sustainable Climate Change Monitoring



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# Common Sources of Geodetic Data Inaccuracies

## Measurement Errors

Human error, equipment limitations, and environmental factors can contribute to inaccuracies in geodetic measurements.

## Data Processing Errors

Errors in data processing, such as incorrect coordinate transformations or faulty algorithms, can distort the accuracy of geodetic data.

## Data Interpretation Errors

Misinterpretations of data or lack of understanding of geodetic concepts can lead to errors in analysis and decision-making.

## Outdated References

Geodetic data is often referenced to outdated datums, which may no longer align with the current Earth's shape and size.



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# The Impact on Various Industries and Applications

## INDUSTRY

## IMPACT

Construction

*Misaligned structures, compromised infrastructure, costly repairs*

Navigation

*Incorrect routes, accidents, delays*

Resource Management

*Inefficient resource allocation, environmental damage, economic losses*

Mapping

*Inaccurate maps, misleading information, poor decision-making*

Emergency Response

*Delayed response times, inaccurate location data, increased risk*



**Safety Risks**

**Economic Losses**

**Environmental  
Impacts**



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# Why Invest in Geodesy? Key Benefits and Applications



## Precision Agriculture

Optimizes crop yields and reduces resource waste



## National Security

Enhances military operations and border surveillance



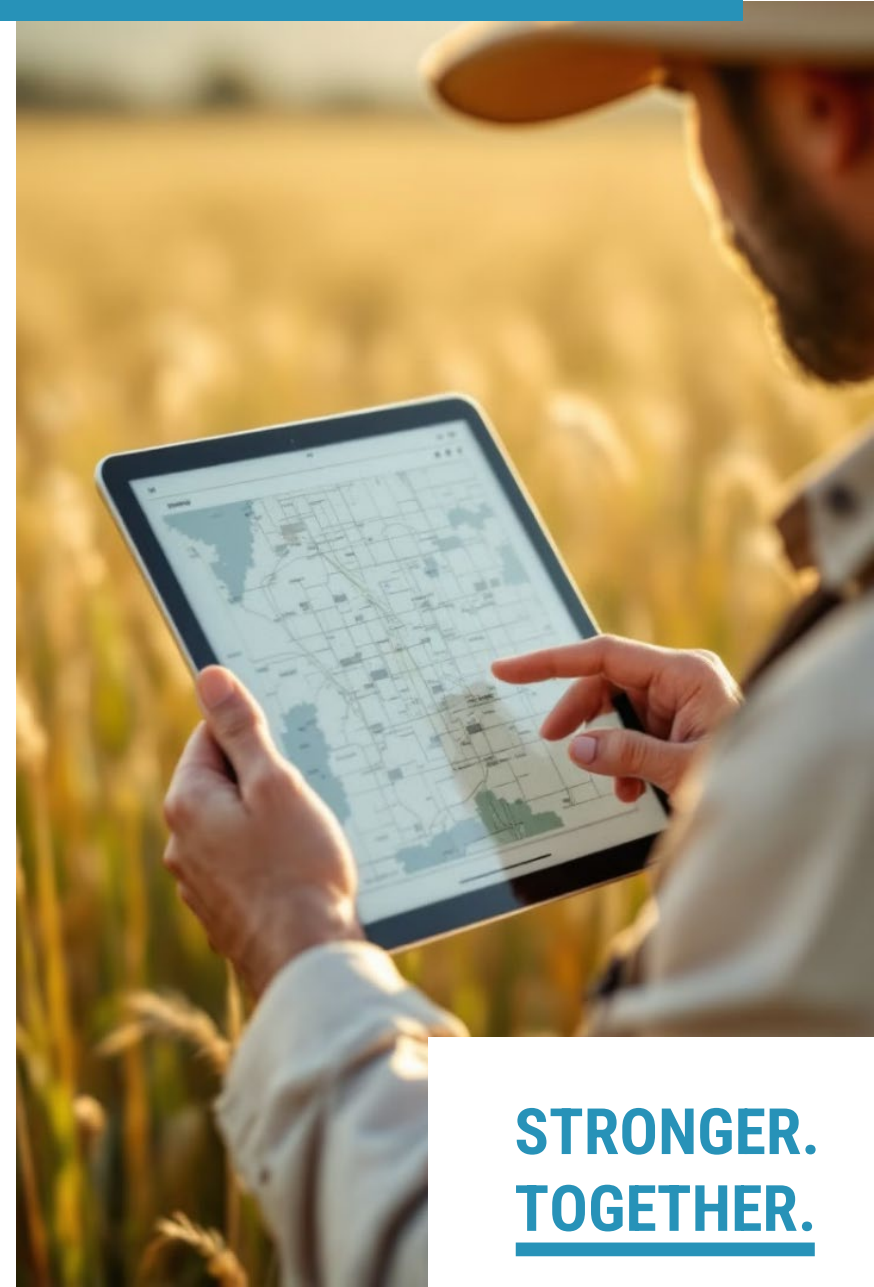
## Economic Growth

Supports industries like shipping, aviation, and telecommunications



## Environmental Protection

Aids in monitoring and managing natural resources



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# Operating critical infrastructure

“15 of 18 critical infrastructure and key resources sectors relied on the Global Positioning System (GPS) including telecommunications, emergency services and financial exchanges.”

*~ U.S. Department of Homeland Security*



Dana Goward, NSC director: GPS 'Still a Single Point of Failure', (*GPS World*, 4 Jan. 2022) <https://www.gpsworld.com/nsc-director-gps-still-a-single-point-of-failure/> accessed 28 May 2024.

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# Driving economic growth

“Over the next decade, revenue from GNSS, EO and satellite telecommunications – which cover over 80% of the space industry market revenue – is expected to grow at a mean annual growth rate of approximately 9%, reaching a total of almost €800 billion.

*~ EUSPA Market Report and Euroconsult*



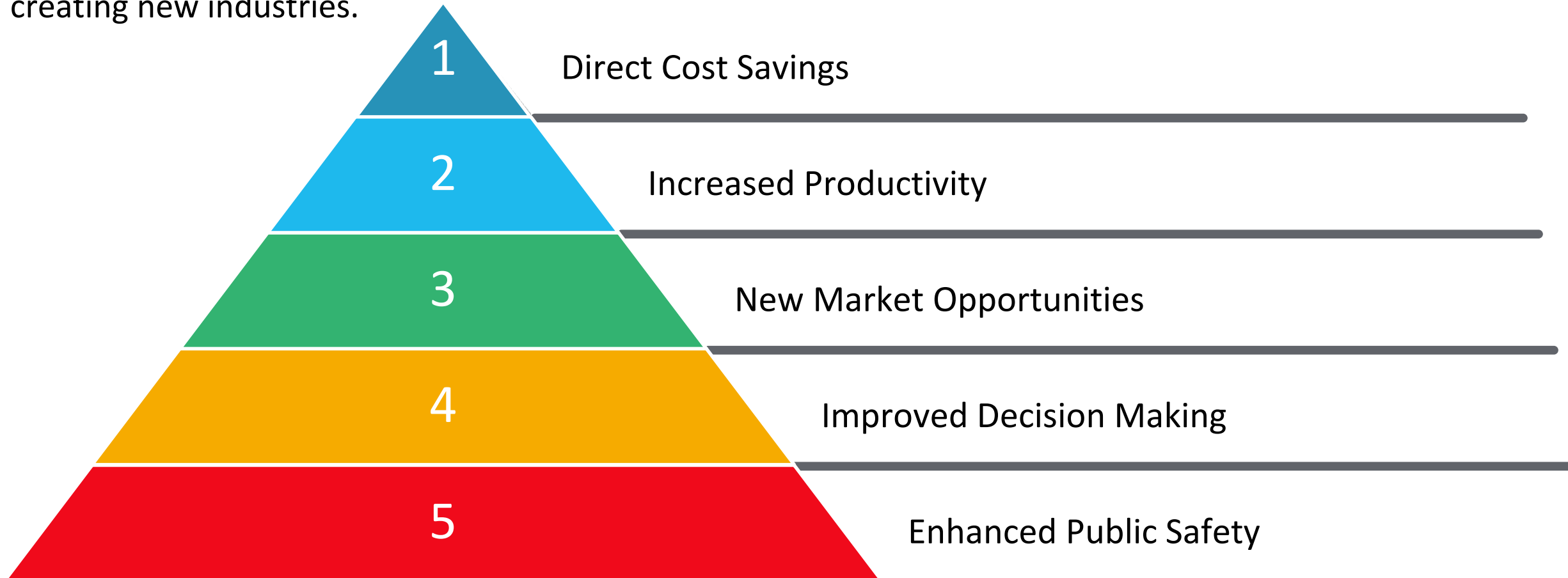
EUSPA, Market Report 2022, [https://www.euspa.europa.eu/sites/default/files/uploads/euspa\\_market\\_report\\_2022.pdf](https://www.euspa.europa.eu/sites/default/files/uploads/euspa_market_report_2022.pdf) accessed 28 May 2024.

Euroconsult, 2022, Euroconsult estimates that the global space economy totaled \$370 billion in 2021, <https://www.euroconsult-ec.com/press-release/euroconsult-estimates-that-the-global-space-economy-totaled-370-billion-in-2021/> accessed 28 May 2024.

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# Measuring the Economic Impact of Geodetic Applications

Geodetic applications contribute to economic growth through multiple avenues, from direct savings to creating new industries.



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# Increased Geodesy Investment – Challenges and Solutions

THEME	CHALLENGE	STRATEGY
LACK OF AWARENESS	Many decision-makers are unaware of broad impact of Geodesy	Educate policymakers and industry leaders on economic benefits of geodesy
COMPETITION FOR FUNDING	Geodesy competes with other scientific fields for limited resources	Develop public-private partnerships (PPP) to support geodetic infrastructure investments
LONG-TERM INVESTMENT	Benefits of geodetic investments often materialize over extended periods	Expertise - Invest in training programs to build a skilled geodetic workforce
TECHNICAL COMPLEXITY	The intricacies of geodesy can be challenging to communicate effectively	Promote standardization and interoperability of geodetic data and systems



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# Potential Funding Sources for Geodetic Projects

## Government Agencies

Agencies like NASA, NOAA, and USGS often support geodetic projects through grants and contracts.

## Foundations

Private foundations, such as the National Science Foundation (NSF) and the Gordon and Betty Moore Foundation, provide funding for scientific research, including geodesy.

## Crowdfunding

Crowdfunding platforms like Kickstarter and Indiegogo allow researchers to raise funds directly from the public for specific geodetic projects.

## Private Companies

Companies with a stake in geospatial data, like Google, Apple, and SpaceX, may invest in projects that advance their own interests.



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# Partnerships with Private Companies and Investors

- 1 Identify companies with geospatial data **needs** or interests in geodetic applications.
- 2 Develop a mutually beneficial partnership that leverages company resources and expertise.
- 3 Ensure a clear understanding of expectations, roles, and responsibilities for all parties involved.
- 4 Document the partnership agreement, including intellectual property rights, data ownership, and profit sharing arrangements.



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# Leveraging Existing Infrastructure and Expertise

1

## Collaboration

Connect with universities, research institutions, and government agencies that have existing geodetic expertise and infrastructure.

2

## Data Sharing

Explore opportunities for data sharing and joint research projects, leveraging existing datasets and resources.

3

## Joint Projects

Collaborate on research projects that combine complementary strengths and address shared research goals.

4

## Capacity Building

Support the development of new geodetic expertise and infrastructure through training programs and educational initiatives.



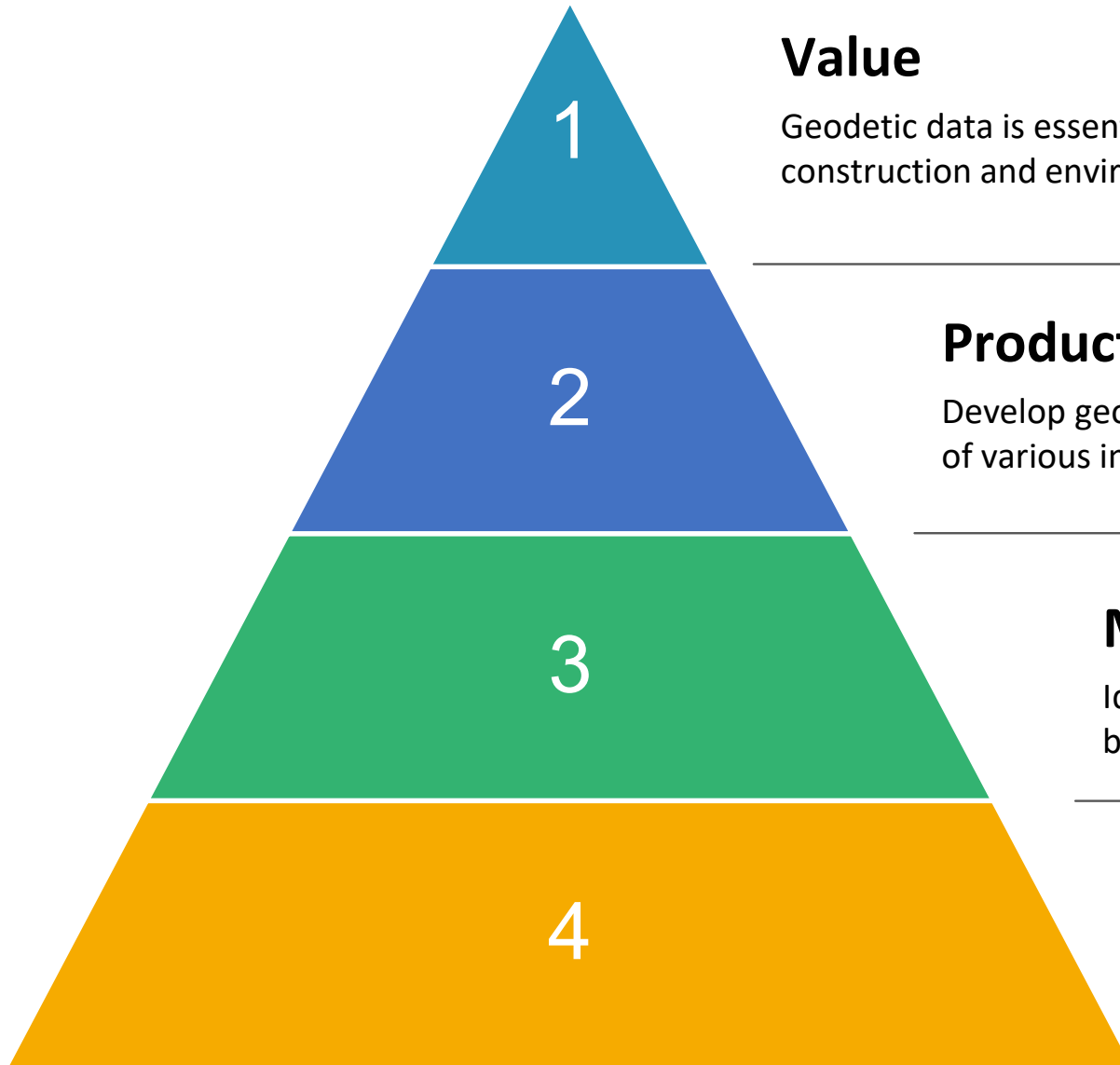
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# The 2030 AGENDA

17 Goals  
169 Targets and  
230 Indicators



# Opportunities for Commercialisation of Geodetic Data



## Value

Geodetic data is essential for a wide range of industries, from agriculture and transportation to construction and environmental monitoring

## Products

Develop geodetic data products and services that meet the specific needs of various industries and sectors

## Markets

Identify target markets for geodetic data products and services, such as businesses, government agencies, and research institutions

## Business Model

Develop a sustainable business model for commercializing geodetic data products and services, ensuring profitability and long-term success

# Landscape of National Motivators and Collaborators

It is very useful to consider the Motivators for your Country/Region,

## Top 3 Industries

1. Natural Resources
2. Agriculture
3. Shipping

## Top 3 Govt Projects

1. Infrastructure
2. Water Supply
3. Cyber Security

## Top 3 Growth Areas

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# Options for Securing Investment – Services

Examples: How additional Services / Public-Private Partnerships (PPP) can generate revenue e.g.

- **CORS RTK Services** (by Institutional or Industry providers, or partnerships)
- **GNSS Data Post-processing services** (in addition or instead of RTK)
- **Data/information sharing** with scientific community (i.e. RINEX data, Meteorological applications)
- **Licensing of additional Services through Outsourcing**
- **Taking on OPEX will enable (potential) profit sharing**

Hint: Focus on Revenue-generating opportunities which can support:

- a primary need (i.e. geodetic infrastructure) AND
- enable secondary services to one or more industry sectors (eg precision agriculture, construction) are becoming commonplace



**Facilitating Benefits for multiple Stakeholders is Key**

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# Group Activity – Drafting Business Cases

**Purpose:** Create feasible candidates for viable geodesy-themed business cases based on your National Landscape for Motivators & Stakeholders

## **Working in Buddy-pairs:**

1. Identify 3 situations where Geodesy investment is required in your country (e.g. Modernisation, Upgrade, extensions, etc)
2. For each situation, discuss where new opportunities could happen thanks to this investment (e.g. could it improve the output or efficiency of an industry, help improve quality of life, help achieve a UN-SDG (Sustainable Development Goal), where could it fit on the Landscape of National Motivators?)
3. What can the participants do with these ideas??



We appreciate that you are Engineers & Scientists,  
NOT procurement or policy writers.... 😊

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# Group Activity – Business Cases Ideas

TASKS	Situation #1	Situation #2	Situation #3
Identify 3 situations of Geodesy in your country, requiring financial investment.... (and how much)?			
What new benefits would appear when this situation is resolved? What Motivator(s) does it align with?			
What can you do to help secure this funding?			

# Group Activity – Feedback

A number of buddy-pairs will be invited to present one scenario to the entire group.

1. Identify 1 situation of Geodesy in your country, requiring financial investment.... (and how much)?
1. What will new opportunities could appear if this situation received financial investment? Which top motivators does it match with?
1. What can you do to help secure this funding?



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# Summary

Session on developing business cases for investment in geodesy covering investment strategies and approaches

Developing and aligning investment business cases with partners / stakeholders is recommended

Having a primary goal and multiple additional goals is seen as beneficial to funding providers (=> Two for the price of one!, Buy One, Get One Free)

Discussions and Group activity gave many examples where Additional investment is:

- Required to sustain geodesy in your member states
- Provide benefit and value to multiple parts of society, industry and government



*How could GGCE assist you in crafting strong business cases???*

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