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KVARKEN
SPACE CENTER

Kvarken Space Center

Space Data, AI and Digital Intelligence for Energy and Environment

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SPACE DATA
Earth Observation
& GNSS

AI & DIGITAL
Intelligence
& Analytics

ENERGY
Smart Energy
Solutions

ENVIRONMENT
Sustainable Future
for Our Planet

*From Space to Solutions for a **Sustainable** Tomorrow*

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- Rapid growth of the global space data economy
- Explosion of Earth Observation satellite missions
- Increasing role of AI and cloud-based data infrastructures
- Importance of space data for climate, energy, and sustainability

Space data is becoming a critical infrastructure for digital and green transition.

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Why Space Data Matters for Europe

Global and European developments are rapidly increasing the importance of space-based information for society and the economy.

Key drivers include:

- **European Green Deal and climate neutrality targets**
- **Fit for 55 and REPowerEU**
- **Rapid growth of the Copernicus Programme and open Earth Observation data**
- **Increasing demand for AI-enabled geospatial and digital services**
- **Strong regional energy and technology ecosystem in the Vaasa region**

Applications:

- ✓ Renewable energy mapping
- ✓ Environmental monitoring
- ✓ Climate risk assessment
- ✓ Smart infrastructure

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Why Kvarken Region?

- ❑ Strategic location between Finland and Sweden
- ❑ Strong energy and industry sector
- ❑ Digital infrastructure
- ❑ Arctic/Baltic environmental monitoring needs

Kvarken region as a hub for space-based environmental and energy intelligence.

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Vision of Kvarken Space Center:

To become a leading Nordic hub for space data systems, AI-driven Earth intelligence, and sustainable digital services.

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Focus Areas and Missions of Kvarken Space Center

- Earth Observation data systems
- AI-powered geospatial analytics
- Energy transition monitoring
- Environmental intelligence services
- Commercial space ecosystems, emerging space models

- ✓ Research and innovation in space data systems
- ✓ Development of AI-driven Earth analytics
- ✓ Support energy and climate transition
- ✓ Educate next-generation space data experts
- ✓ Enable industry and public sector services

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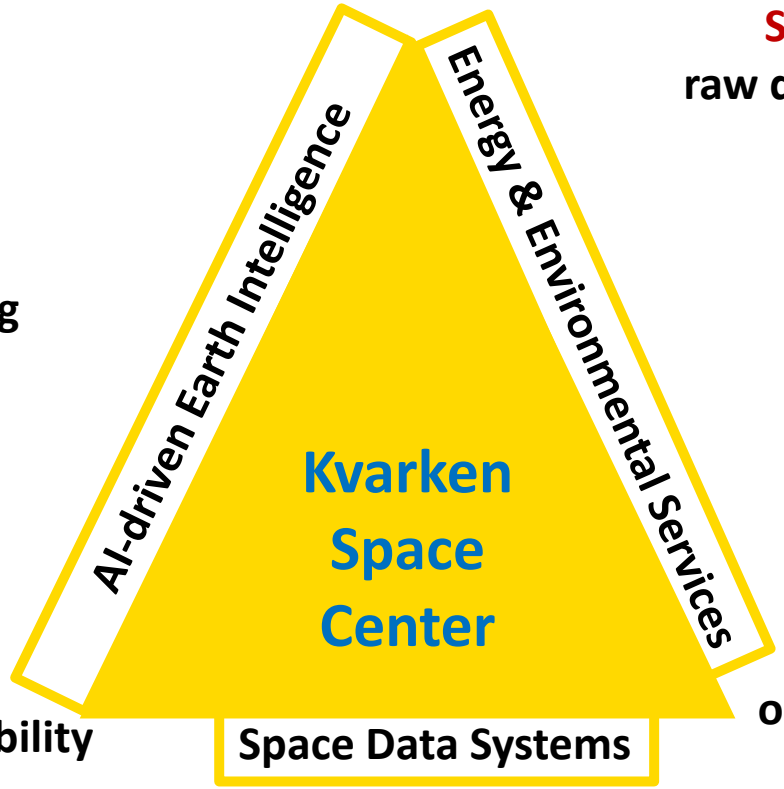
Satellite systems provide the data, AI and digital platforms enable analysis, and the resulting insights support energy, climate, and environmental decision-making



Space Infrastructure

raw data from space systems

- Earth Observation Satellites
- Copernicus Programme
- GNSS Systems
- Satellite Data Streams
- Remote Sensing Platforms

Digital Technologies

data processing and analytics capability

- ✓ Artificial Intelligence
- ✓ Machine Learning
- ✓ Cloud Computing
- ✓ Big Data Analytics
- ✓ Digital Earth Platforms

Applications

operational services and solutions

- ✓ Energy Systems Monitoring
- ✓ Renewable Energy Mapping
- ✓ Climate Monitoring
- ✓ Environmental Intelligence
- ✓ Infrastructure Monitoring

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Research Pillars

Pillar 1 Space Data Systems

- ❑ Satellite data integration
- ❑ Multi-source data fusion
- ❑ Data infrastructures

Pillar 2 AI for Space Data

- ❑ Machine learning
- ❑ Environmental modeling
- ❑ Predictive analytics

Pillar 3 Energy & Climate Intelligence

- ❑ Renewable energy monitoring
- ❑ Environmental indicators
- ❑ Infrastructure monitoring

Pillar 4 Space Economy

- ❑ Space Ecosystems
- ❑ Emerging Space Business Models
- ❑ Space Geopolitics

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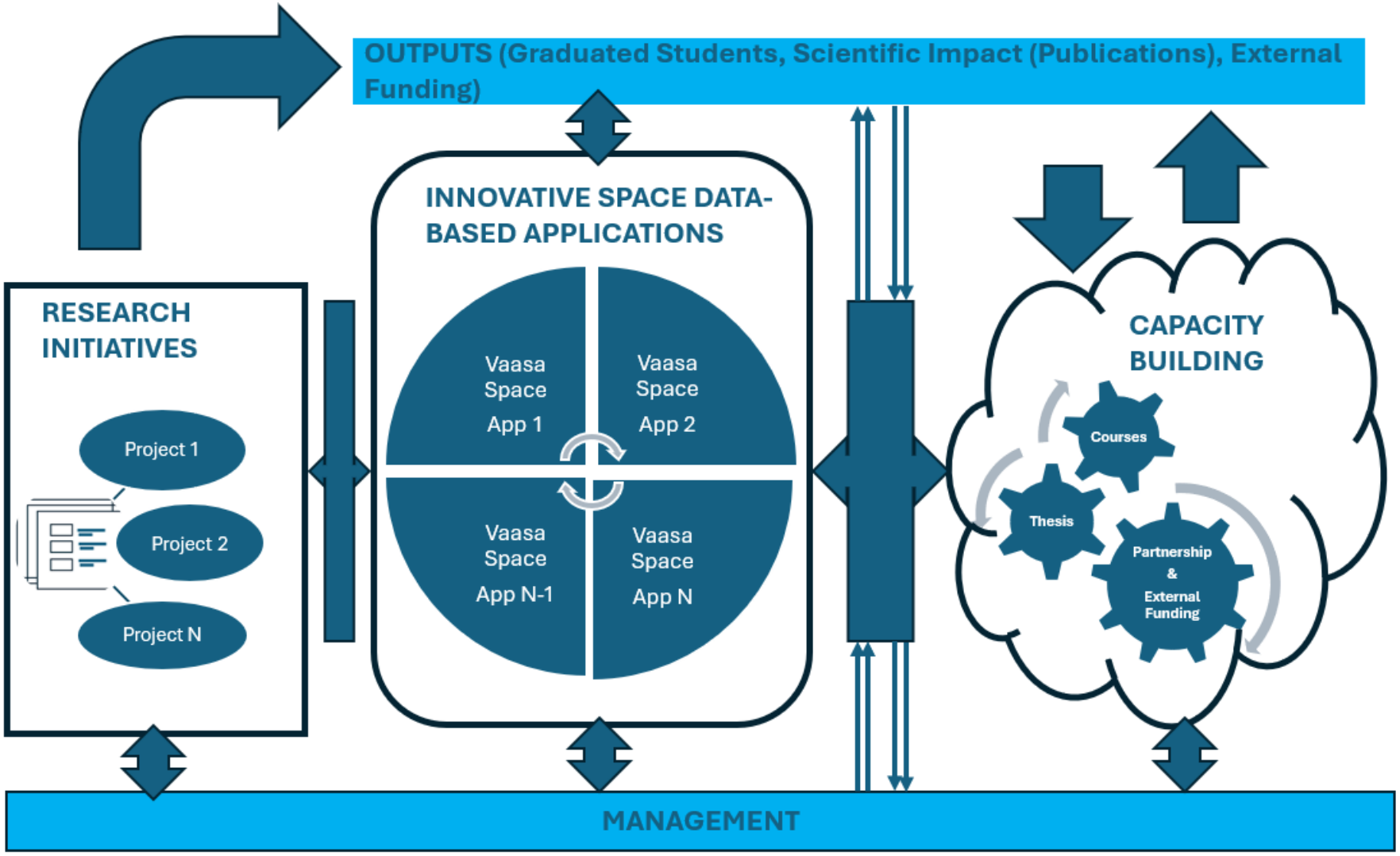
Conceptual framework for the Space Data Innovation Ecosystem at the University of Vaasa



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University of Vaasa Space Strategy Map

VISION

European academic leadership in AI-enabled Space Data Systems and Services

- Education & Talent
- Research Excellence
- Innovation & Impact
- Partnerships & Funding
- Infrastructure & Visibility

Implementation Platform

Kvarken Space Innovation Hub

- External Funding Growth
- Scientific Publications
- Skilled Graduates
- Industry Collaboration
- International Visibility
- Regional Impact

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Core Components of the Kvarken Space Center

- ❑ Space Data Infrastructure
- ❑ AI for Earth Analytics
- ❑ Energy & Climate Applications
- ❑ Education & Talent Development
- ❑ Innovation & Industry Collaboration

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Application Domains

The Kvarken Space Center supports multiple societal and industrial domains:

- **Renewable energy systems**
- **Energy infrastructure and grid monitoring**
- **Carbon and climate services**
- **Marine and coastal monitoring**
- **Urban and regional systems**
- **Resilience and policy**

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Space Data Systems and Services Value Chain

The University of Vaasa develops expertise across the full downstream value chain:

- **Earth Observation and GNSS systems**
- **Data access and preprocessing**
- **Cloud-based geospatial processing**
- **AI and machine learning for space data**
- **Application development**
- **Operational services and demonstrators**
- **Innovation and service design**

Thank you!

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