Horizon Scanning and Research Lead Innovation

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Future Challenges, Future Cooperation

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Objectives

1. EuroSDR
2. Horizon Scanning
3. Research Lead Innovation
4. Final Remarks
1. EuroSDR
European Spatial Data Research Network

- Not-for Profit Organisation (+ Member Organisation)
- Linking National Mapping and Cadastral Agencies with Research Institutes and Universities
- For the Purpose of Applied Research in Spatial Data Provision, Management and Delivery.
Research and Dissemination Cycle

Research Proposals → Rolling Research Plan → Scientific Meetings → Projects, Workshops, Taskforces → Reports → Official Publications and EduServ Courses
EuroSDR activities

- **Research projects** -> Reports / Official Publications
- EuroSDR Workshops - **Building the Network**
- **Reports / Official Publications** (61)
- **Education Service** - Transferring Results of Research to Production Domain
- Engagement with **Standards and Specifications** Organisations
  - Permanent Working Group on Standards
  - Persistent Test Bed
  - Web Services
- **Leading in Calibration and Validation** Initiatives
Structure

• Commissions:
  – Commission 1: Sensors, Primary Data Acquisition and Georeferencing
  – Commission 2: Image Analysis and Information Extraction
  – Commission 3: Production Systems and Processes
  – Commission 4: Data Specifications
  – Commission 5: Network Services

• Regularised Arrangements with Related Organisations
2. Horizon Scanning
Horizon Scanning

What Research Topics do you see at the Horizon?
Horizon scanning (EuroGeographics General Ass.)

- E-Services
  - European Emergency Management
  - Product Re-pricing
  - European Location Framework
- Location-based services
  - Sensor Technology
  - Digital Single Market
- E-Platform
- Interoperability
- New GNSS Real-Time Positioning Techniques
- Economic Model
  - (Open data / Freemium)
- Public Security
- Collaborative Mapping
- Drones
- GMES Urban Atlas
- Community Sourcing
- Funding Model
  - (Precise Point Positioning)
Horizon scanning (EuroGeographics General Ass.)

- Modernisation of Land Administration
- New Public Service Paradigm
- Climate Adaption
- LIDAR
- Network Service Provision
- Urban Hazard Mapping
- Private Sector Cooperation
- Essential Standardisation
- Authentication of Crowd-Sourced Data
- User needs assessments
- Spatial Data Infrastructure Management
- Ethics
- Effective Governance Structure
- Effective Administration
- Spatially Enabled Society
- High Resolution Sensors
## Horizon scanning UNGGIM

**Vanessa Lawrence** *(Future trends in Geospatial Information)*

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Horizon scanning (from EuroSDR Perspective)

- E-governance
- Coordination models
- Geospatial Web Services
- Imaging Sensors
- Open data
- Data Archiving
- Mobile Mapping
- Smart City
- City GML
- Cloud
- Spatio-Time Modelling
- Registries
- Open Standards
- Crowd-Sourcing
- Mobile Laser Scanning
- 3D Cadastres
- Automated Change Detection
- Data Archiving
3. Research Lead Innovation
Commission 1: **Sensors, Primary Data Acquisition and Georeferencing**

**Key Research Topics**
- **Geometric** Orientation and Calibration
- **Radiometric** Modelling and Calibration
- Orientation and Calibration of **Multi-Sensor Systems**
- Precise Navigation and Kinematic Positioning: Progress in **GNSS and INS Technology**
- Progress in **Imaging Sensors**
- Orientation and Navigation of **Unmanned Systems**
- Orientation and Navigation of Terrestrial **Mobile Mapping Systems**
- **Standardization and Certification** of Photogrammetric and Remote Sensing Systems

European Spatial Data Research – www.eurosdr.net
Research Lead Innovation

Commission 1: **Sensors, Primary Data Acquisition and Georeferencing**

**Current Projects**
- Radiometry Aspects of Digital Photogrammetric Images
- Digital Airborne Camera Orientation & Calibration
- UAV in Mapping

[Image: UAV tracking with Tacheometry]

[Image: UAV in mapping]
Commission 2: **Image Analysis and Information Extraction**

**Key Research Topics**
- Dense Image Matching
- Change Detection in High-Resolution Geodatabases
- Pattern Classification in Remote Sensing
- Mobile Laser Scanning
- Laser Intensity Calibration
Current Projects

- Benchmarking for Dense Image Matching
- Change Detection in High-Resolution Land Use/Land Cover Geodatabases (at Object Level)
- Test on Pattern Recognition in Remote Sensing
- Forest Border and Classification Benchmarking
- Mobile Laser Scanning - Road Environment Mapping using Vehicle-based Laser Scanning
- Radiometric Calibration of ALS Intensity
Commission 3: Production Systems and Processes

Key Research Topics
- 3D City models
- 3D Cadastres
- Smart City
- Automated Change Detection for updating Nat. Databases
- Data Archiving
- Crowd-Sourcing
Commission 3: Production Systems and Processes

Current projects
- COST Semantic Enrichment of 3D City Models for Sustainable Urban Development
- 3D Data Management in Urban Areas
- Working Group on Common Goals and Requirements of European NMAs in Change Detection -> Provision of Test data
- Historic Technologies in Geospatial Data Collection and Processing
- Use of Crowd-Sourced Data for Update Intelligence and Metadata Enrichment of National Mapping
- Working Group on Geographic Data Archiving
EuroSDR Archiving Working group

- 13 participants from 7 countries: Finland, Sweden, Norway, UK, Germany, Switzerland, France
- National Mapping Agencies (NMAs) and Archivists/Librarians
- 4 workshops over the last 16 months
- Problem: How should NMAs archive geographic data?
- Objective: to create best practise paper for geographic data archiving for NMAs by end of 2012: published
- www.eurosdr.net/archiving
Geospatial Data Archiving:

An issue for every data producer.
A problem not very well understood.
16 principles as a starting point for everybody.
Principle 3

Do we need to archive this dataset?
Principle: If in doubt, keep it

Archive
everything
badly

Archive selected items extremely well

Be selective in what you archive and what you choose to loose.
GI+100: Long term preservation of digital Geographic Information —
16 fundamental principles agreed by National Mapping Agencies and Archives

by Carsten Rönsdorf and Paul Mason, Ordnance Survey; Urs Gerber, swisstopo; Marguérite Bos, Schweizerisches Bundesarchiv; Arif Shaon, Rutherford Appleton Laboratory; Kai Naumann Landesarchiv Baden-Württemberg; Michael Kirstein, Generaldirektion der Staatlichen Archive Bayerns; Göran Samuelsson, Mid Sweden University; Marja Rantala, Maanmittauslaitos; Sidsel Kvarteig, Statens kartverk and Wolfgang Stößel, Landesamt für Vermessung und Geoinformation Bayern
Principles

1. Archiving of digital Geographic Information begins at the point of data creation, rather than at the point of withdrawal from active systems.

2. The backbone for any archiving business case is the establishment and agreement of a common preservation planning process and a set of common preservation objectives between data producers and archives.

3. Be selective and decide what to archive and what to lose.

4. Consider preservation timeframes of 1, 10, 100 years.
Principles

5. Migration or emulation is inevitable in the medium and long term. Be prepared and choose which properties to preserve in advance.

6. The output of the archival planning process should also be preserved over the long-term to accommodate future preservation requirements.

7. Archiving is not back-up. You should also back-up your archive.

8. Geographical data should be preserved in a way that non geo-specialists can handle.

9. Information objects should be self-contained and independently understandable.

10. Preferably keep the gold copy version of the 100 year data archive in open, file based repositories, not in databases, nor other complex environments.
11. Try to keep a graphical representation alongside the logical representation of the data.

12. Restrict the number of formats and encodings to a widely agreed set of open, simple and well-documented file formats.

13. Prefer simple data models and schemas over complex ones.

14. Keep the access mechanism for archived data simple. Focus on basic current user requirements – an archival viewing system does not need to be a fully functioning GIS.

15. Ensure effective management and quality assurance of the metadata associated with your data.

16. Make some assumptions about future use, but don’t be too restrictive.
Commission 4: **Data Specifications**

**Key research topics**

- INSPIRE Implementing Rules for Data Specifications
- Open Data, Open Source, Open Standards
- Automated Generalisation
- CityGML
- Cartography for Geo-portals and View Services
Commission 4: **Data Specifications**

**Current projects**
- Use of Open Source PostGIS Database Technology by NMCAs
- Automated Generalisation Procedures
- 3D & CityGML

CityGML 2.0
Commission 5: **Network Services**

**Key research topics**
- Geospatial Web Services
- Spatial Data Infrastructure (incl. Architectures)
- Repositories & Registries
- Test Beds
- Distributed Geo-processing Apps

**Current projects**
- Persistent Test-bed for Authenticated Access to European Spatial Data Sets
4. Final Remarks

Numerous New Topics appears at the Horizon --> High Demand to Research

Extremely Wide Diversity of Research Topics --> Innovation

Non-technological Research (Legal, Governance, Economic, Ethical)

Interdisciplinary Research

NMCA’s Demand Driven Research

Strong links with other Associations (AGILE, EuroGI, ICA, ISPRS, OGC, and EuroGeographics)

Link Eurogeographics --> European Location Strategy!!
Thank You