

# How EuroSDR together with EuroGeographics contribute to the wider geo ecosystem?

Prof. dr. ir. Joep Crompvoets – Secretary-General

## One of the oldest universities in Europe (1425)

- **Number of students (2018)**

In total 56,108, > 9000 international, > 5000 PhD  
#47 THE (2018) – 12th European university

- **Education (2017)**

55 Bachelor, 133 Master  
48 Master-after-master  
International programmes

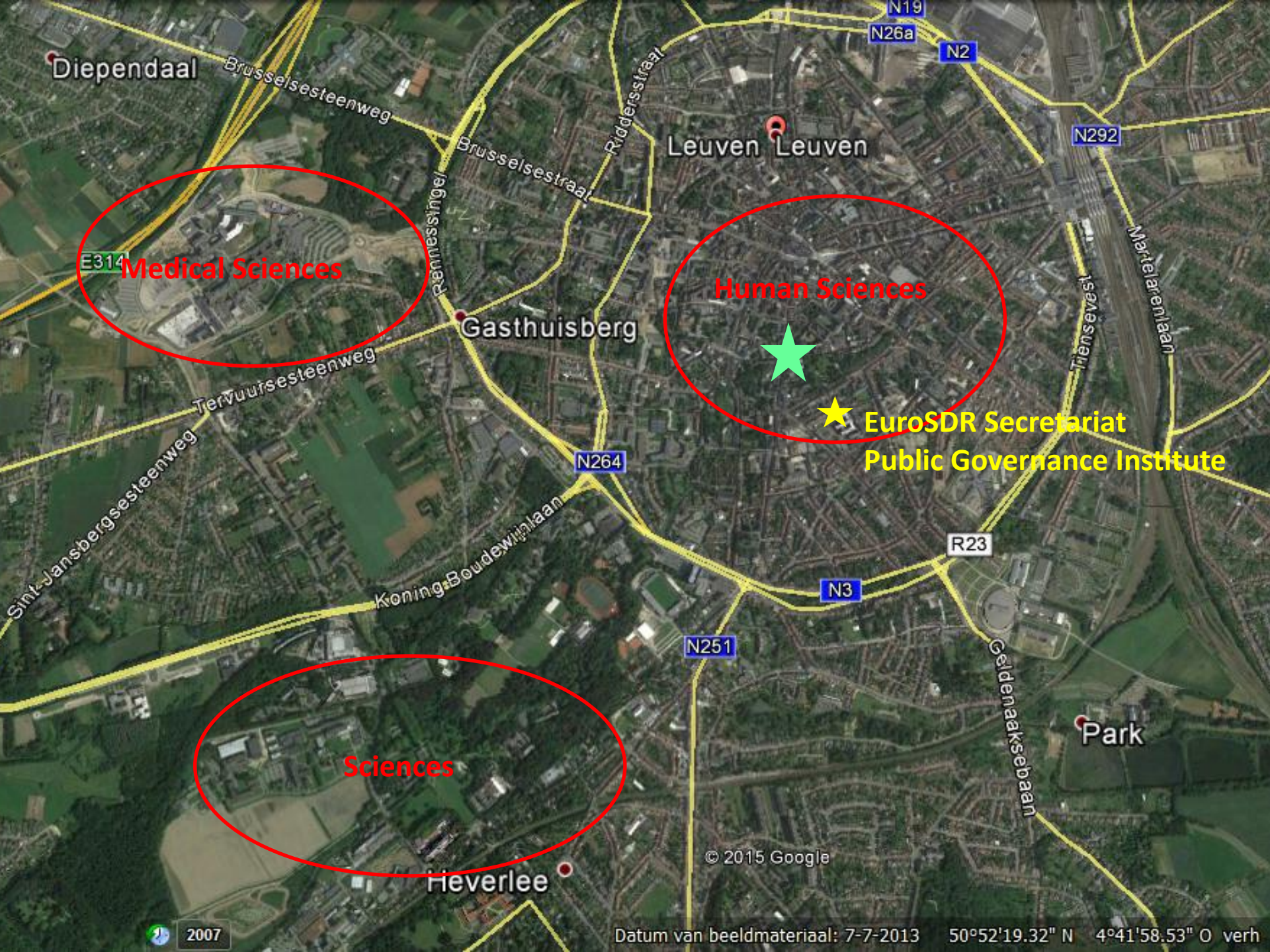
- **Staff** Currently 20,436 (incl. hospital)

- **Research**

Annual Expenditure 455 million € (2015)  
Most innovative European university (2016/17/18) – Reuters







Diependaal

Brusselsesteenweg

Brusselsestraat

Riddersstraat

Leuven Leuven

N19

N26a

N2

N292

Martelarenlaan

Tiensevestraat

E314

Medical Sciences

Gasthuisberg

Human Sciences



EuroSDR Secretariat  
Public Governance Institute

N264

R23

N3

N251

Koning Boudewijnlaan

Tervuursesteenweg

Sint-Jansbergsesteenweg

Geldenaksebaan

Park

Sciences

Hieverlee

© 2015 Google

2007

Datum van beeldmateriaal: 7-7-2013 50°52'19.32" N 4°41'58.53" O verh



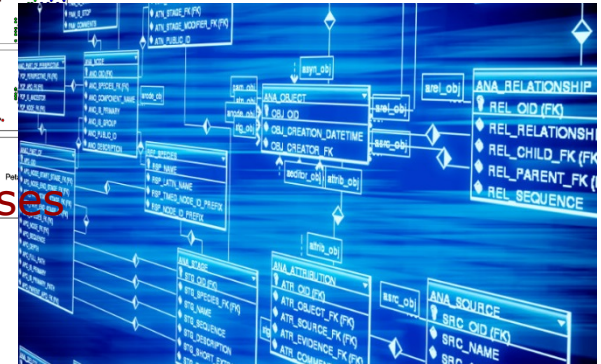
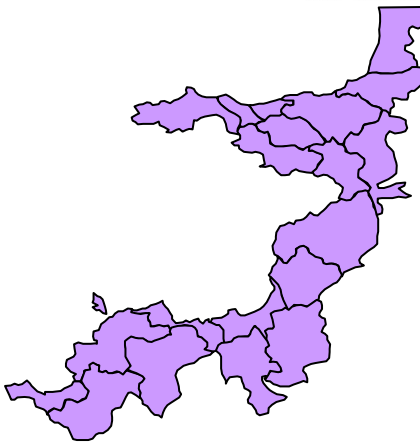
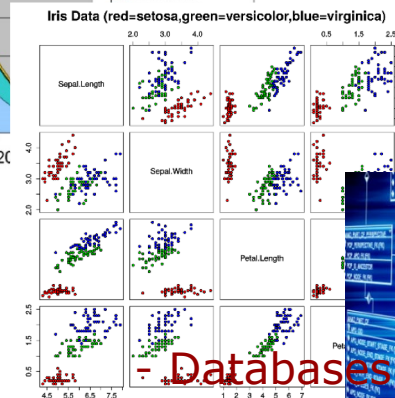
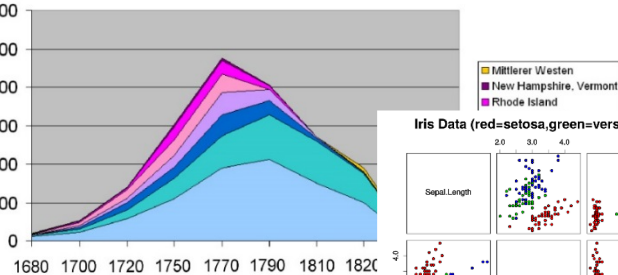
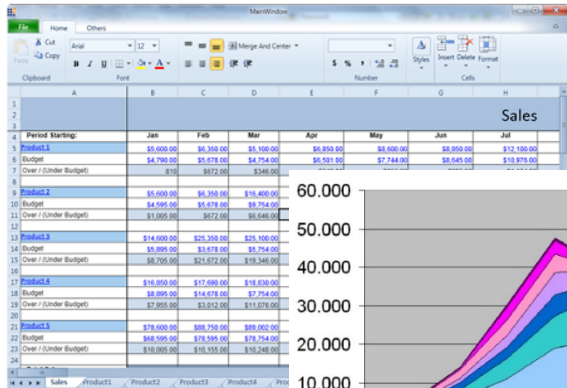
# How EuroSDR together with EuroGeographics contribute to the wider geo ecosystem?



# Data, Data, Data

=> Foundation for geo ecosystem

What **WAS** happening with data?



# Data, Data, Data

What **IS** happening with data?



Source: FAO, ITU

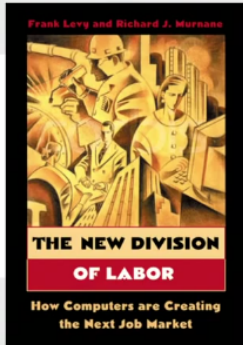
# Data, Data, Data

*What will happen with (geo)data?*





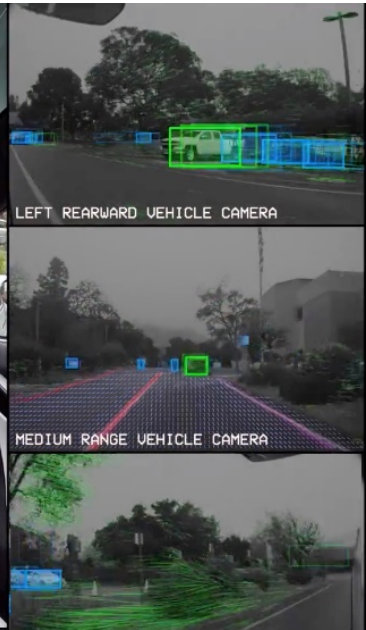
# Data, Data, Data



2004

“...it is *hard to imagine* discovering the set of rules that can *replicate a driver’s behavior*.”

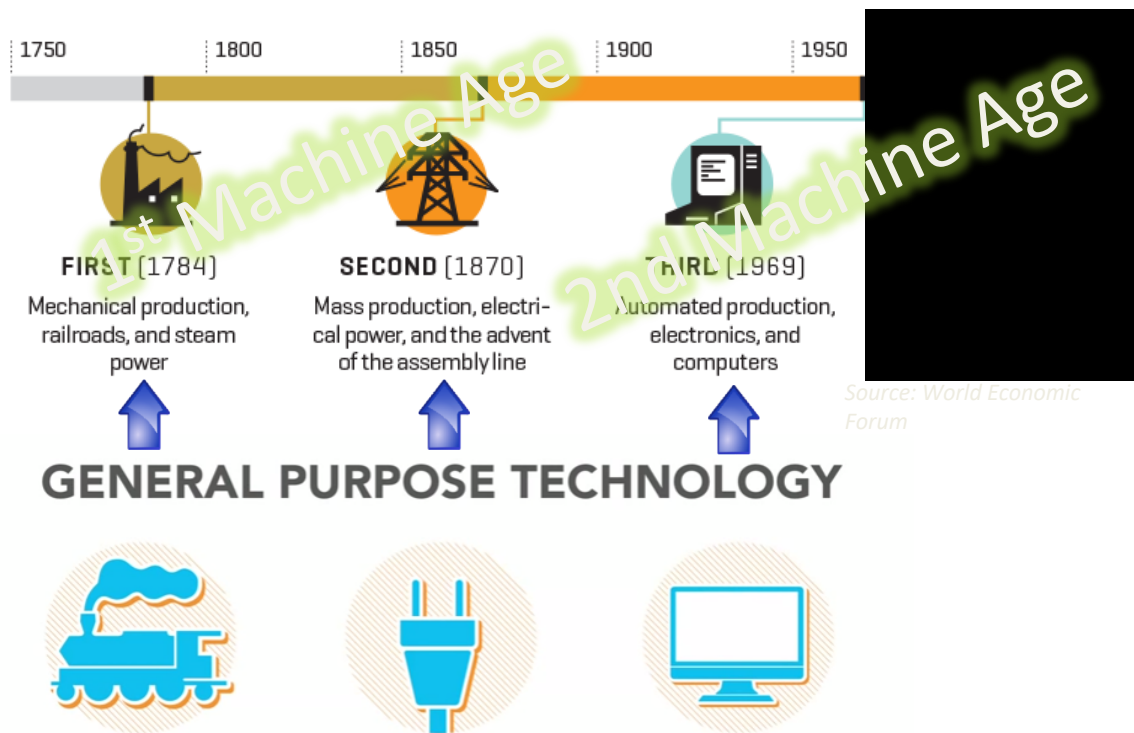
2014



GeoData-driven Disruption

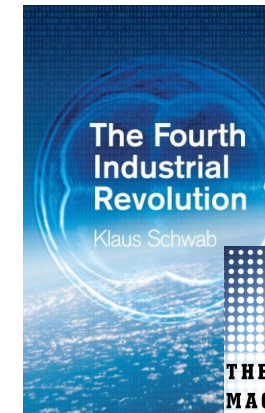
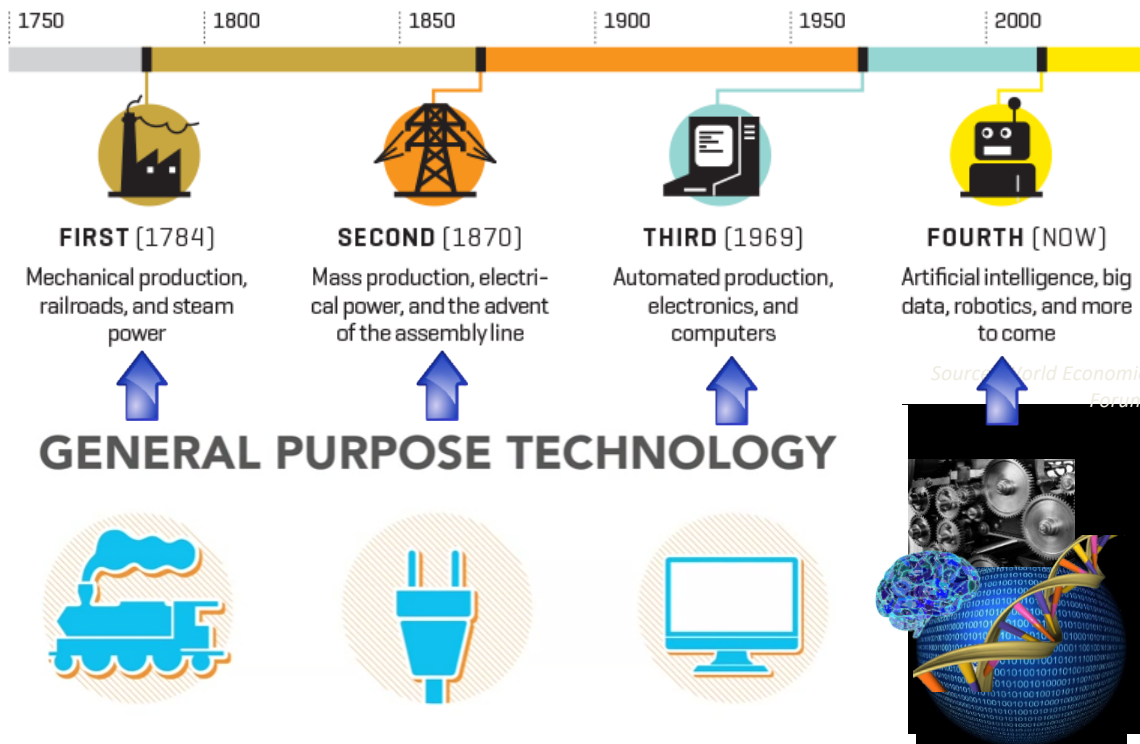
# Data, Data, Data

## THE FOUR INDUSTRIAL REVOLUTIONS



# Data, Data, Data

## THE FOUR INDUSTRIAL REVOLUTIONS



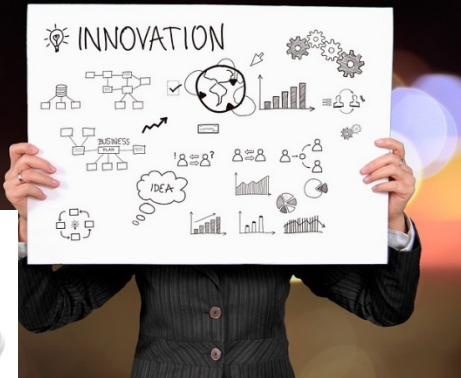
- Previous industrial revolutions liberated humankind from animal power.
- 4<sup>th</sup> Industrial Revolution: characterized by new technologies fusing physical, digital and biological worlds impacting all disciplines, economies and industries, and even challenging ideas about what it means to be human.



# Data, Data, Data

*What will happen with (geo)data?*

*Impact on geo-organisations*



# Data, Data, Data

## The Data Sphere



- Scale = Zettabytes  $10^{21}$ , billion trillions
- Every 2 days we create as much information as we did from the beginning of time until 2003
- The number of Bits of information stored in the digital universe is thought to have exceeded the number of stars in the physical universe

# Data, Data, Data

## From where all this (geo)data come from?

### Sources:

- Internal enterprise DB&ERP, CRM, SCM systems
- Archives
- Websites
- Transactions
- eCommerce platforms and portals
- Social networks and platforms
- GPS signals
- IoT
  - ✓ Machinery
  - ✓ Electric/home devices
  - ✓ Vehicles
  - ✓ All types of sensors
- Mobile phones
- Open public data
- Human body
- Content generation e.g. music, films, video, photos, papers
- Digital personal trail

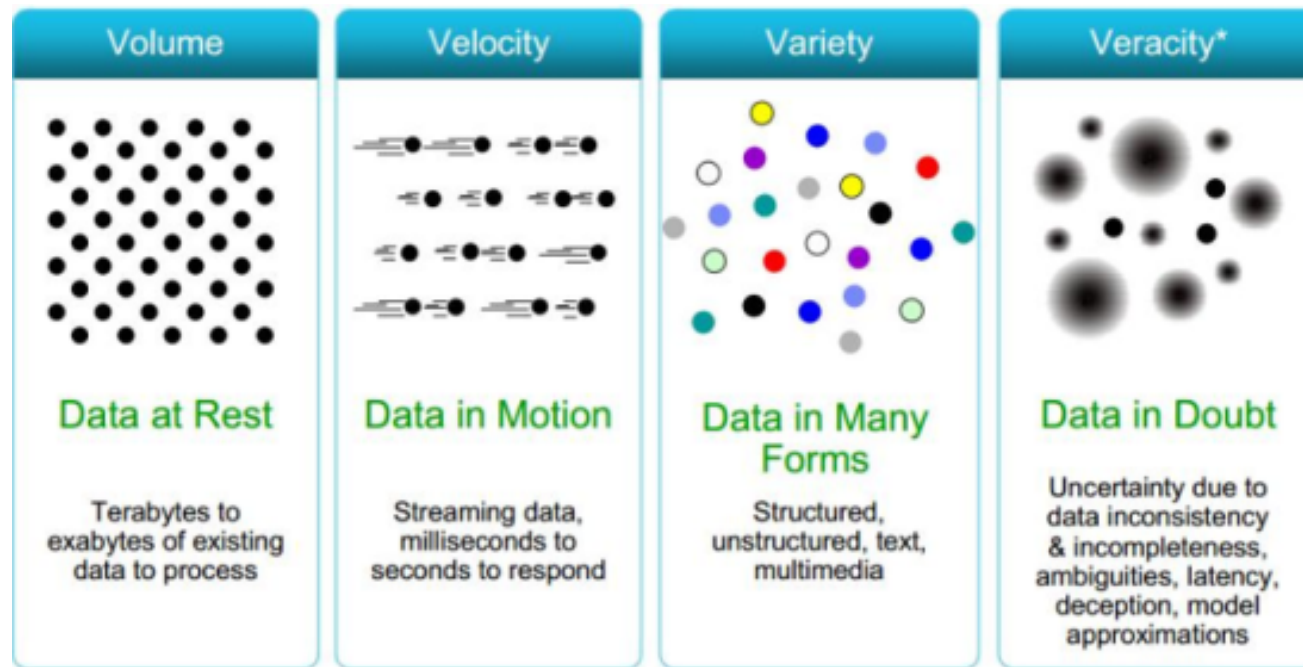


Foundation for geo ecosystem



# Data, Data, Data

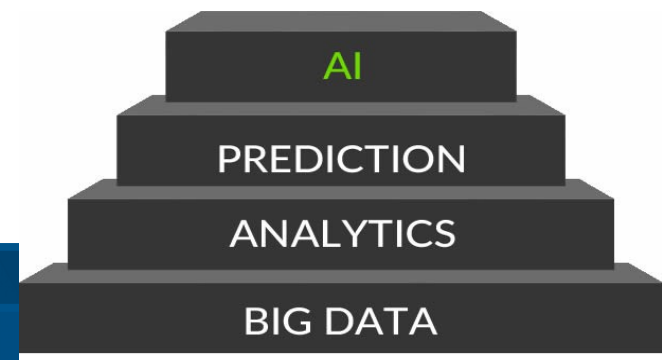
Current (Geo)Data characteristics: 4 Vs



# Data, Data, Data

Important data management trends in the **Geo ecosystem**:

- I. Rapid growth of new types of unstructured geodata (Social Media, Location data, Sensors data, Web data, Customers data)
- II. The rise of cloud computing infrastructure makes the potential of (big) geodata increasingly accessible to more and more businesses
- III. Rapid development of new capabilities for managing and making sense of geodata (e.g. computing power / data modelling)
- IV. From raw (geo)data... to Artificial (Geo)Intelligence (AI)
  - Shift from (geo)data production to (geo)data analysis
  - Big (Geo)Data + Cloud + (Geo)Data Analytics =  
Raw material for (Geo)AI
- V. The use of disruptive technologies



# EuroSDR

- a European Spatial Data Research Network

Not-for-profit organisation

linking National Mapping and Cadastral agencies with  
Research Institutes, Universities and Industry

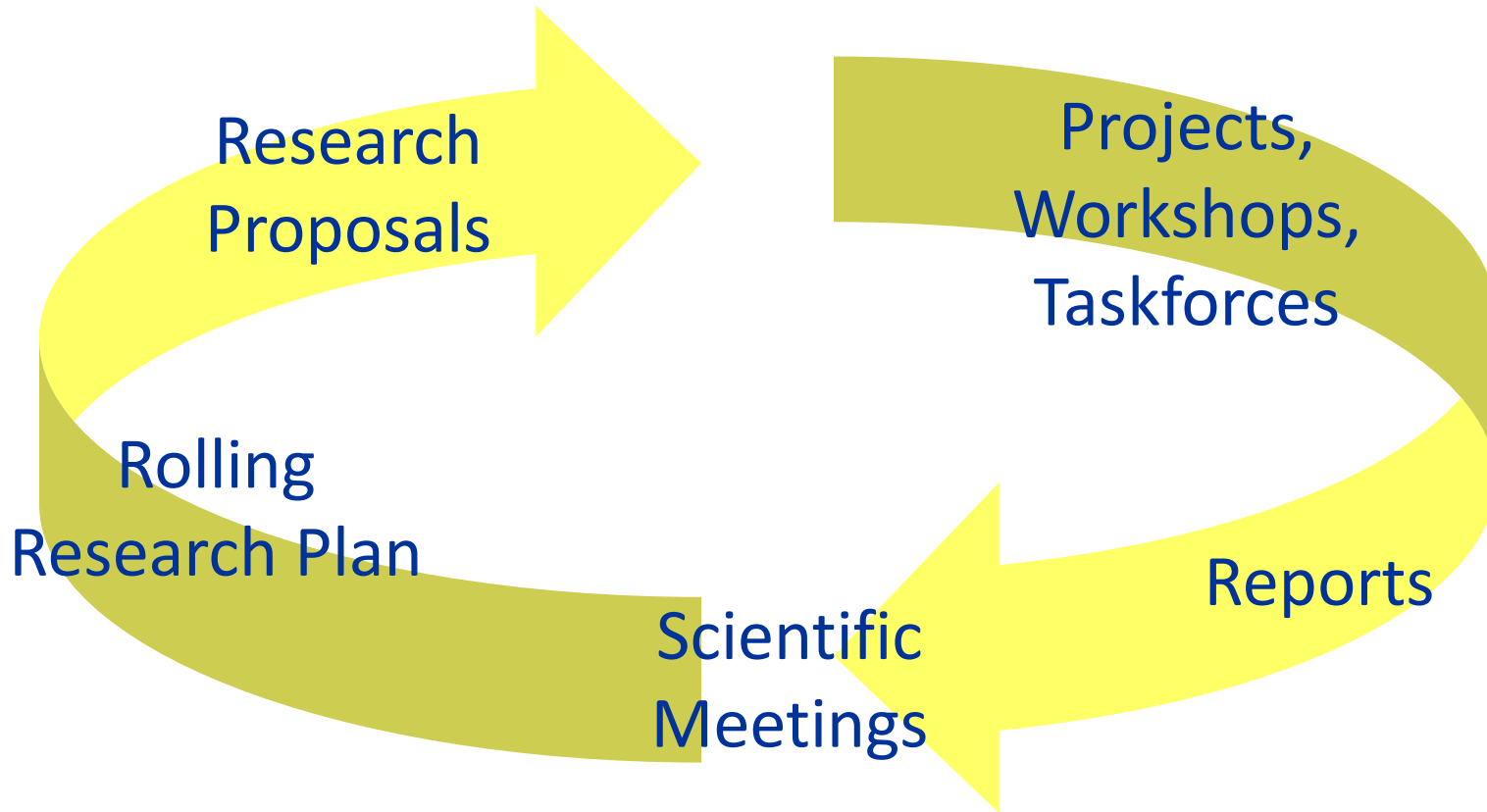
for the purpose of applied research in data management  
of the geo ecosystem

20 country members

Foundation (OEEPE): 1953



# Research and Dissemination Cycle



Mapping Agencies together with Academia/Industry

Official Publications and EduServ Courses

# EuroSDR – EuroGeographics cooperation

Cooperation Agreement (5 March 2015)



# EuroSDR – EuroGeographics cooperation

Presentations at EuroGeographics General Assembly (2012 - ...)

KEN-chairs presentations at EuroSDR Board of Delegates meetings (2015 - ...) + Breakout sessions

KEN < - > EuroSDR Meetings (2015, 2016, 2017, 2018)

Contribution to EuroGeographics Position / Supporting Papers

Exchange news / announcements / relevant information

Informal meetings

# EuroSDR – EuroGeographics cooperation

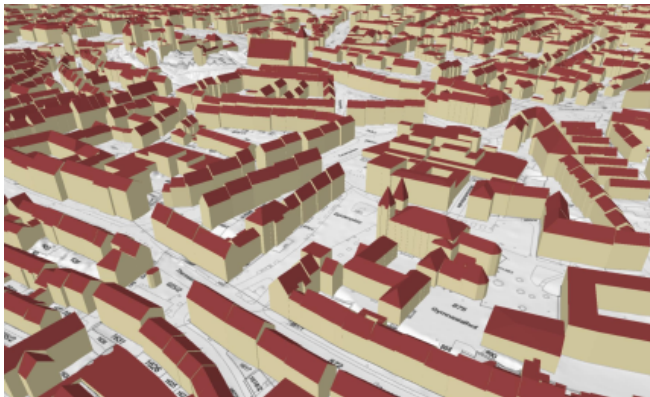
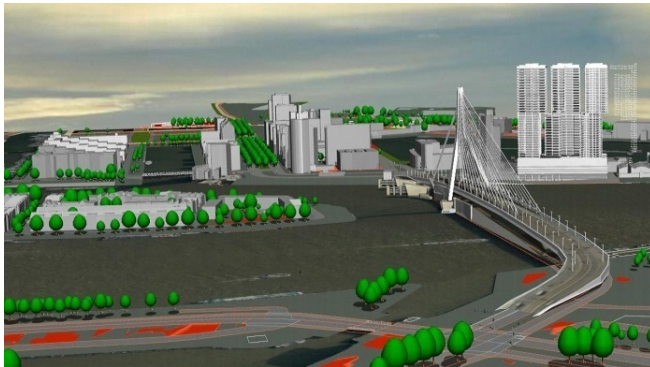
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## Support each others' events

- EuroSDR/EuroGeographics Seminar 'Data Linking by Indirect Spatial Referencing Frameworks' (Paris, 4-5/2018)
- 2nd International workshop on '*Spatial Data Quality*' (Malta (6 - 7 February 2018))
- POLKEN supporting EuroSDR project on '*Sustainable Open Data Business Models*' (Delft, 18-19 September 2017)
- *INSPIRE Extension* (EuroGeographics, EuroSDR and Geonovum) (Marne-la-Vallée (France), 20-21 June 2017)
- EuroGeographics Quality KEN '*Improving the Usability of Geospatial Data*' workshop (Southampton (UK), 14 June 2017)
- EuroGeographics/EuroSDR/JRC INSPIRE Validation Workshop (2-3 June 2016, Marne-la-Vallée)



# 3D Special Interest Group (3D-SIG)



Addressing current issues of NMCAs

- 3D data models
- capturing 3D objects
- producing 3D objects
- updating of 3D objects
- consistency of 3D data
- benefits of 3D data

# Project ‘Crowdsourcing and mapping’

## Updating national databases project



Кишинёв

2012

Картографические данные © Участники OpenStreetMap, CC-BY-SA



# EduServ – Educational Service

- Knowledge distribution via **e-Learning**
- Completed **projects and additional topics**
- **Intensive participation of EuroGeographics Members**





# EuroSDR Educational Service 2018

The 16<sup>th</sup> series of short e-learning courses from EuroSDR will begin with a **pre-course seminar** hosted by Prof. Markus Gerke, Institute of Geodesy and Photogrammetry, Technical University of Braunschweig from 26<sup>th</sup> to 27<sup>th</sup> February 2018. The goal of the seminar is to (i) introduce the topics and content of four e-learning courses; (ii) present the Moodle learning platform; (iii) give an opportunity to meet the participants with the tutors which among others creates a good base for further on-line communication. The seminar will be followed by e-learning. Each course requires about **thirty hours of online study** and it will be completed over a period of **two weeks** during spring 2018.



## Oblique Aerial Camera Systems for Mapping Purposes

*Tutors: Fabio Remondino & Isabella Toschi (FBK Trento), Francesco Nex (ITC/University of Twente), Markus Gerke (TU Braunschweig)*

Oblique airborne photogrammetry is rapidly maturing and being offered by service providers as a good alternative or replacement of the more traditional vertical imagery and for very different applications. Nowadays many companies and most of the European National Mapping and Cadastre Agencies (NMCAs) still rely on the traditional workflow based on vertical photography but changes are slowly taking place also at production level. Some data providers have already run some tests internally to understand the potential for their needs whereas others are discussing on the future role of the oblique technology and how to possibly adapt their production pipelines. At the same time, some research institutions and academia demonstrated the potentialities of oblique aerial datasets to generate textured 3D city models or large building block models. The course provides an overview of oblique camera systems, processing methodologies and best practices with also practical works on oblique aerial blocks.

Dates: 5<sup>th</sup>–16<sup>th</sup> March 2018

<b>Fees</b>	600 € for pre-course seminar + 1 or 2 courses
	700 € for pre-course seminar + 3 or 4 courses
	100 € for pre-course seminar only

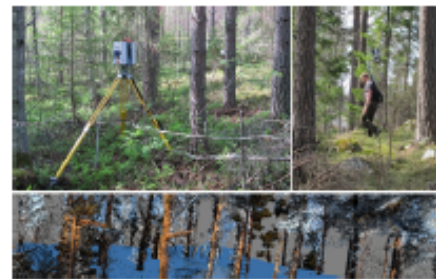


## Topographic Maps by Classification of Remotely Sensed Imagery and Cartographic Enhancement

*Tutors: Joachim Höhle (Aalborg University), Sébastien Lefèvre & Bharath Bhushan Damodaran (Université Bretagne Sud)*

The course introduces advanced classification schemes with the goal to produce and update 2D topographic databases. The inclusion of the spatial descriptors such as geometry and shape are important to characterize the topographic objects in the orthoimages. This course will present some of the challenges in mapping from high resolution orthoimages. The solution to these challenges will be provided by the efficient and effective tool called as morphological attribute profiles. They are multi-scale attributes and are constructed by hierarchical representation of the images, thus enabling object-based image analysis. These characterizations are classified using well-established machine learning methods and different data sources (either raw or derived features). Different approaches to assess the thematic and geometric accuracy of maps will be discussed, and lastly the cartographic enhancement of the classification maps at different levels of quality will be presented. Solutions to the tasks are given by means of detailed course material including open source programs.

Dates: 9<sup>th</sup>–20<sup>th</sup> April 2018



## Terrestrial Point Cloud for Forest Modelling

*Tutors: Liang Xiridian, Juha Hyyppä, Yunsheng Wang (National Land Survey of Finland)*

Forest data are conventionally collected through labor-intensive and time-consuming manual measurement. Terrestrial point cloud became practically available twenty years ago, which documents three-dimensional (3D) environment with millions to billions of 3D points. The last two decades witnessed a rapid growth in the studies and applications. Tremendous efforts were put into research trying to answer key questions of using point cloud data in the forest measurement. The course aims at giving an overview on the state-of-the-art of forest modelling utilizing terrestrial point clouds, e.g. from terrestrial laser scanning, mobile laser scanning and series of images. The course will cover several topics, ranging from the background information (e.g. the instrument, the measurement principles and the potential applications), the summary of the research progresses in the last two decades, the fundamental steps in the data processing chain (e.g. noise reduction, tree detection, tree modelling and parameter estimations), to the pioneering studies. The course will also work on selected topics to discuss the influences of the terrestrial point clouds on the forest modelling.

Dates: 14<sup>th</sup>–25<sup>th</sup> May 2018



## Open Spatial Data Infrastructures

*Tutors: Bastiaan van Loenen (TU Delft), Joep Crompvoets (KU Leuven), Lars Bernard (TU Dresden)*

This is an introductory course to Open Spatial Data Infrastructures (Open SDI). SDIs facilitate more and more the accessibility to open (spatial) data and provision of open services. Open SDI refers to standards, technologies, policies, and institutions necessary for opening the open data and services. This course gives a comprehensive overview on the state-of-the-art in Open SDI and its key components, introduces the participants to the underlying principles of Open SDI and lets them experience hands-on what it means to establish and maintain an Open SDI. A number of topics will be discussed: key standards, architectures, (network) services, relevant EU-regulations and policies, governance strategies, and key institutions. At the end of the course, participants are informed about Open SDI strategies around the world, aware of the main strengths, weaknesses, opportunities and threats of Open SDI, familiar with the latest technological developments, capable to facilitate the opening of open data using latest developed tools, and able to evaluate Open SDIs.

Dates: 28<sup>th</sup> May – 8<sup>th</sup> June 2018

For more information visit  
<http://www.eurosd.net/education/current>





# Conclusions

Geodata-driven disruption in Geo Ecosystem

EuroSDR together with EuroGeographics contribute to the wider geo ecosystem!!

**TOGETHER WE ARE STRONGER!!**

Many thanks for the constructive / fruitful cooperation during the years (and hopefully the next years ahead)