UNITED NATIONS SECRETARIAT
Department of Economic and Social Affairs
Statistics Division

ESA/STAT/AC.279/P9
October 2013
English only

United Nations Expert Group on the Integration of Statistical and Geospatial Information
First Meeting
New York, 30 October - 1 November 2013

Agenda: Item 6

Towards a Global Statistical Geospatial Framework – Geospatially coding statistics [1]

Prepared by Germany

[1] This document is being produced without formal editing

Federal Agency for
Cartography and Geodesy

Towards a Global Statistical Geospatial Framework – Geospatially coding statistics

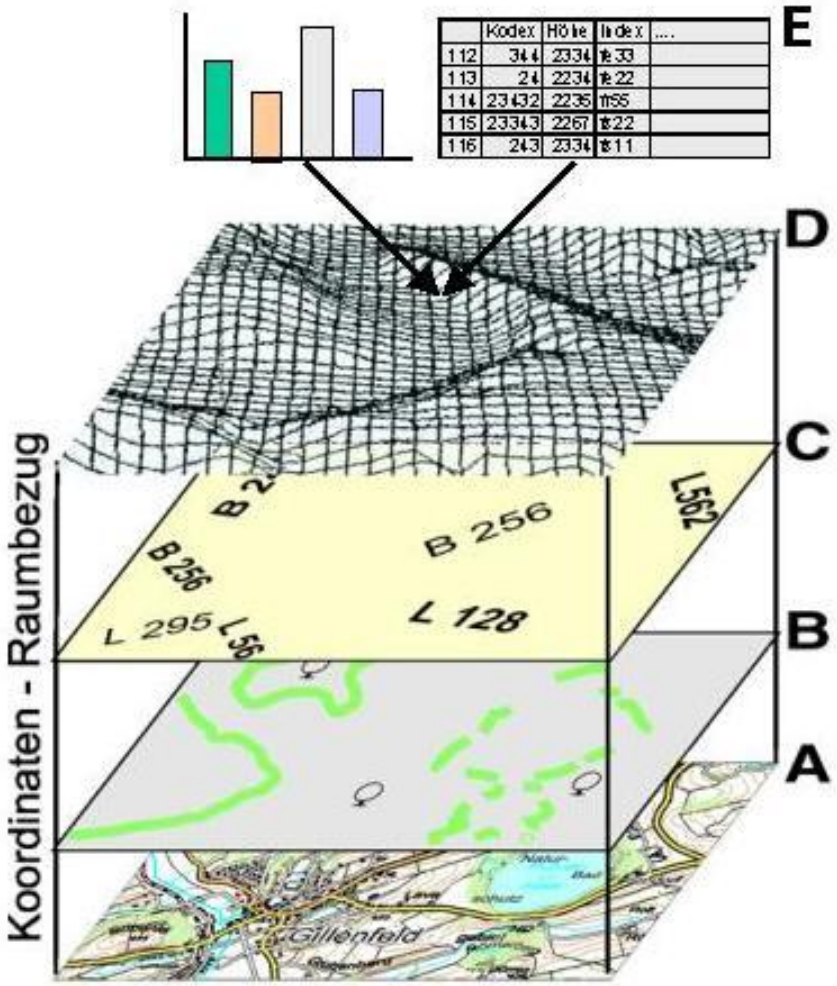
Geographic data linking

Dr. Bernd Richter, Markus Brühl

Federal Agency for Cartography and Geodesy

Frankfurt / Main, Germany

Harmonized Geographic Information



Supplementary data (e.g. statistical information)

Digital terrain model

Classification of traffic routes

e.g. Natural reserve layer

Topography layer

INSPIRE Directive

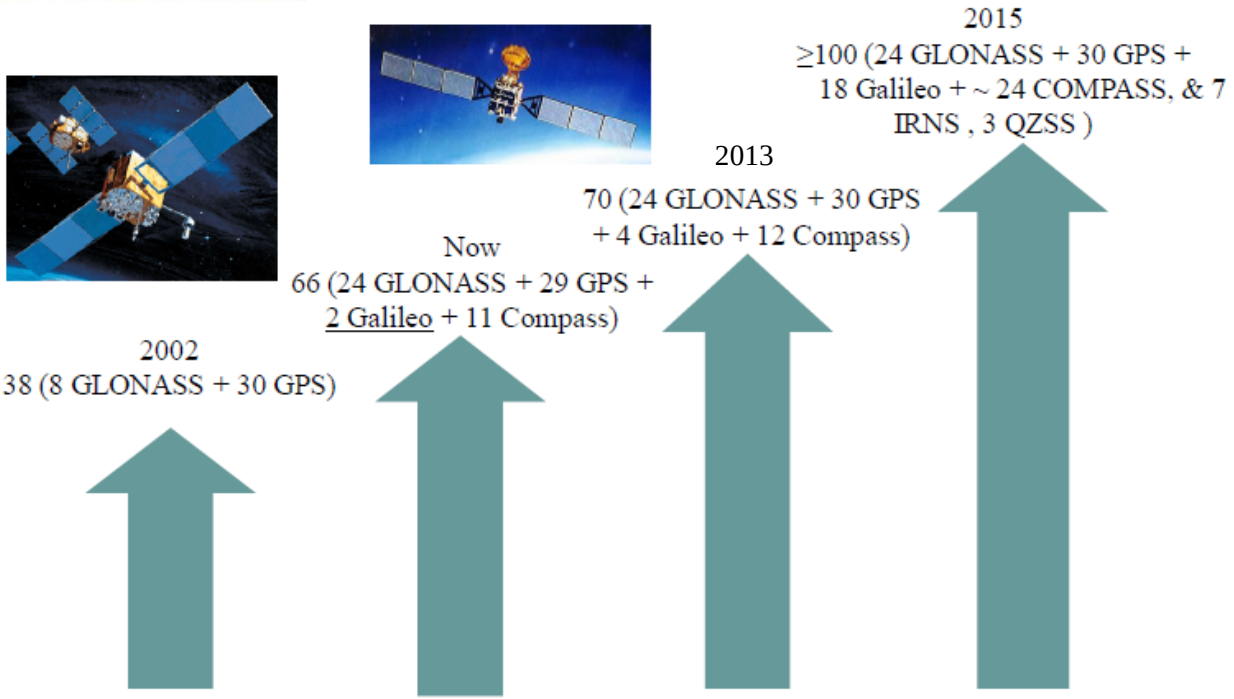
- Directive 2007/2/EC of the European Parliament and of the Council [**Directive 2007/2/EC**], adopted on 14 March 2007 aims at establishing an Infrastructure for Spatial Information in the European Community (INSPIRE) for environmental policies, or policies and activities that have an impact on the environment.
- INSPIRE will make available **relevant, harmonized and quality geographic information** to support the formulation, implementation, monitoring and evaluation of policies and activities, which have a direct or indirect impact on the environment.

INSPIRE Directive

- To ensure that the spatial data infrastructures of the Member States are compatible and usable in a Community and trans-boundary context, the Directive requires that common Implementing Rules (IR) are adopted in the following areas.
  - Metadata;
  - The interoperability and harmonization of spatial data and services for selected themes (as described in Annexes I, II, III of the Directive);
  - Network Services;
  - Measures on sharing spatial data and services;
  - Co-ordination and monitoring measures.

Federal Agency for Cartography and Geodesy

Geo-location
Use of In-Situ- and Realtime-Data



International Terrestrial Reference System

- Latest realization of the International Terrestrial Reference System (ITRS) is the **International Terrestrial Reference Frame 2008 (ITRF2008)**
- **WGS84** is identical with the **ITRF2008**
- Regional densification and realizations e.g. **European Terrestrial Reference Frame 89 (ETRF89)** or **SIRGAS** for North- and South America
- Realizations at national level e.g. **GREF**

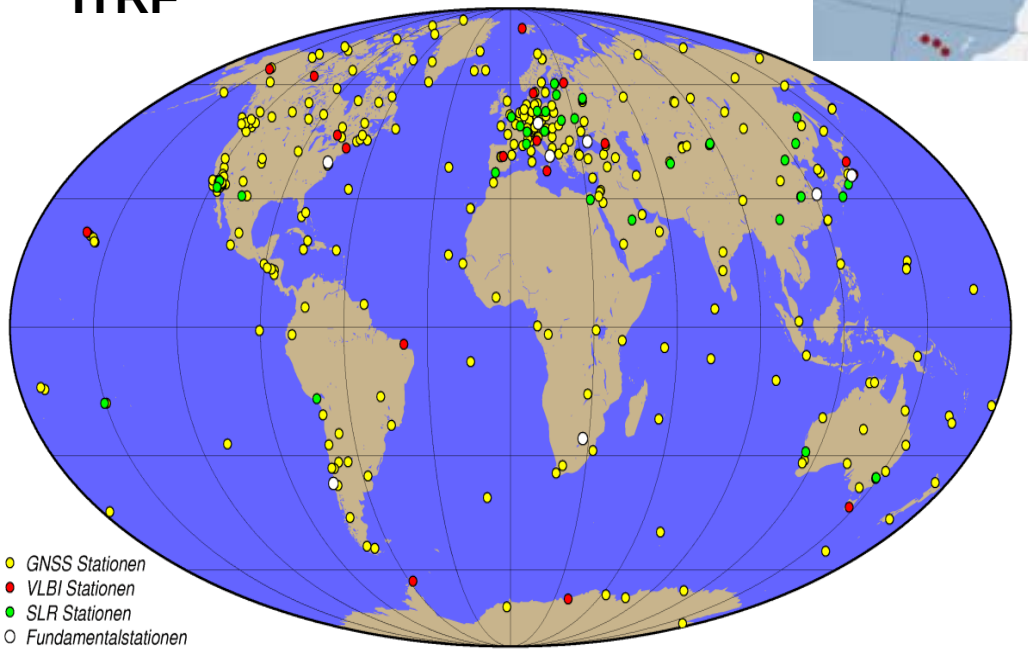
- **ONE Global** available **Reference System** can serve for **all geospatial applications**

Federal Agency for Cartography and Geodesy

Terrestrial Reference Frames

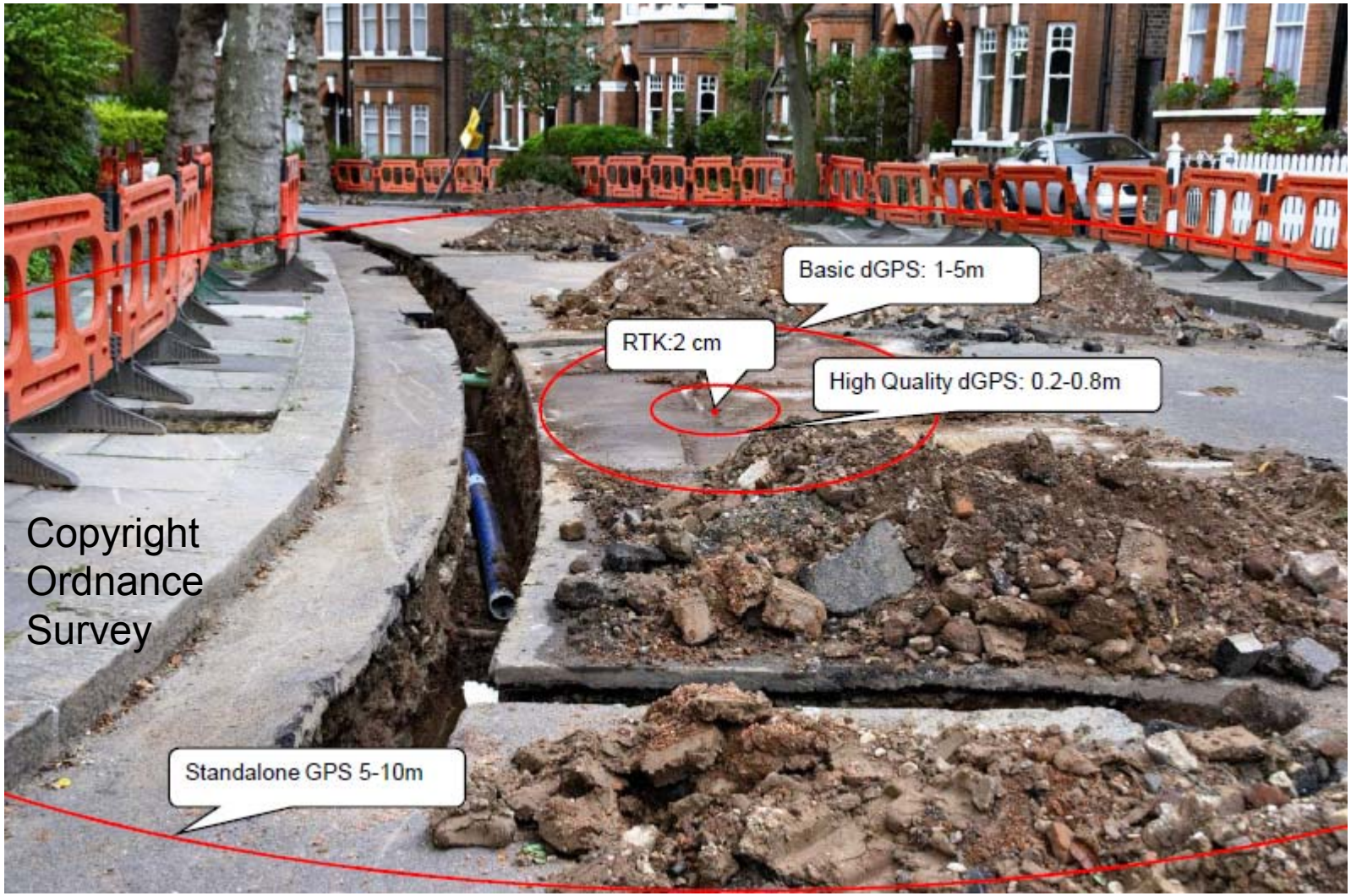
ETRF

ITRF



GREF

Geo-location
Use of In-Situ- and Realtime-Data

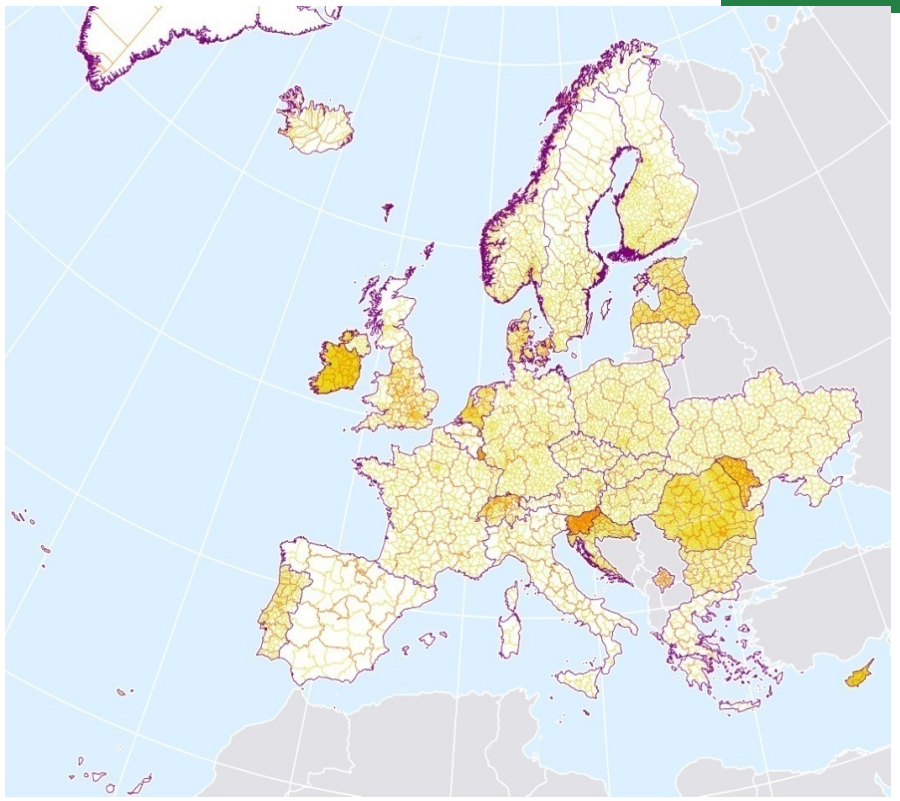


- Properties of statistical data utilizable for georeferencing:
  - Geographical coordinates (GPS coordinates) → usually not collected
  - Geographical names (names of settlements, buildings, ..) → understandable, but not identical or unique
  - Addresses
  - Thematic unique identifiers → abstract, unique
  - ...
- A lot of statistical data is collected based on administrative units
  - Properties: name and unique identifiers
  - Most effective georeferencing: link statistical information to the geographical representations (polygon or centre point) of administrative units by unique identifiers

Euro Boundary Map

- The **EuroBoundaryMap** project is the activity of National Mapping and Cadastral Agencies (NMCAs), members of EuroGeographics, producing and maintaining the **EuroBoundaryMap product of Europe** at the scale 1:100,000.
- The product development and quality assurance is managed by the *Bundesamt für Kartographie und Geodäsie* (BKG), Frankfurt, Germany.

Dataset



The current version of **EuroBoundaryMap** contains all administrative units from country Down to the commune level of all EU members and 12 other European countries.
Contributions provided by NMCAs have been edge matched at international boundaries.
They incorporate a linkage between the SHN codes of administrative units for all EU countries and the corresponding statistical codes according to the NUTS regulation issued by EUROSTAT.

Harmonization Process

- The harmonization process from national contribution to EuroBoundaryMap product is controlled by a conversion procedure consisting in several steps that are documented:
- Pre-processing: validation of national contributions with regard to the requirements of the EuroBoundaryMap specification
- Transformation of coordinates from national map projection to geographic coordinates when necessary
- Processing of geometry: harmonization with neighboring countries, derivation of geometry on national upper administrative levels (USE-Regions) and geometry of NUTS-Regions for EU27
- Quality control of final product

Federal Agency for Cartography and Geodesy

CRSEU

Coordinate Reference Systems in Europe

Home

- News
- CRS Overview
- CRS Description
- References
- Links

Service

- Sitemap
- Contact
- Imprint

› Home

Information and Service System for European Coordinate Reference Systems

This Information and Service System for European Coordinate Reference Systems was established to support the users of spatial information in Europe.

It is a common project of:

Bundesamt für Kartographie und Geodäsie

Bundesamt für Kartographie und Geodäsie (Federal Agency for Cartography and Geodesy), Germany

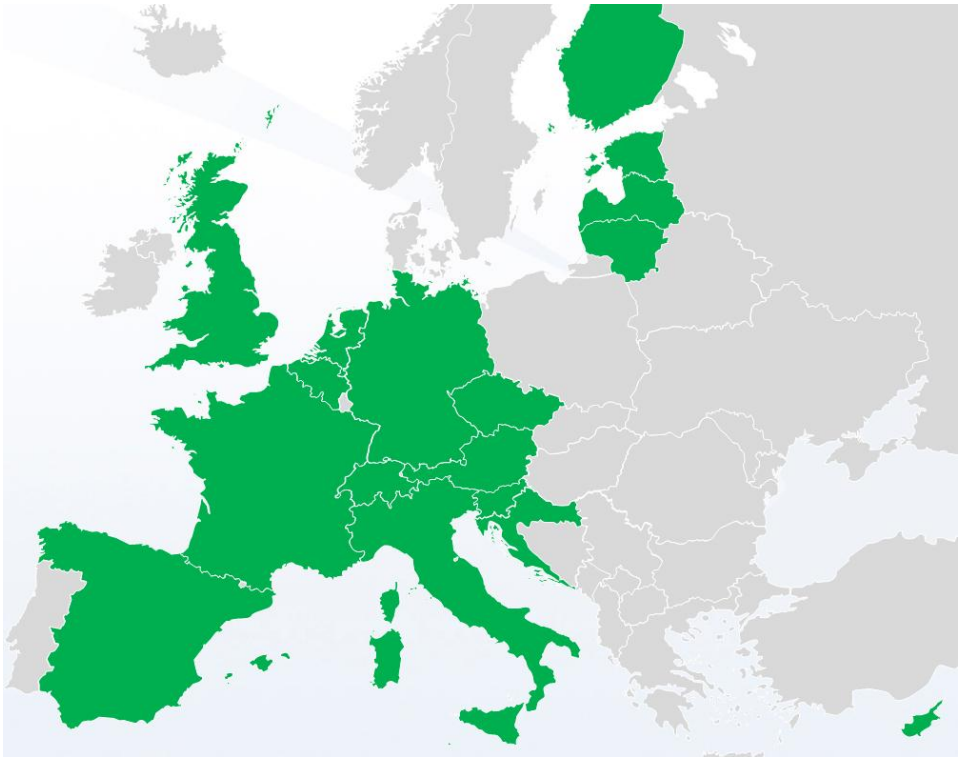
eurogeographics

EuroGeographics as the central-hub for Europe's Geographic Information (GI) developments
- a unique and diverse network working of all concerned with European GI, National Mapping and Cadastral Agencies (NMCAs), the European Commission and others

EUREF (European Reference Frame) as Sub-Commission of IAG's (International Association of Geodesy) Commission X on Global and Regional Geodetic Networks with the main task to establish and to maintain the European Reference Frames

EuroGeoNames (EGN)

- **EuroGeoNames (EGN)** combines Geographic Names from the National Mapping and Cadastral Agencies across Europe to create a unique service and data set.



- EuroGeoNames (EGN) started as a successful eContentplus funded project. It is now being implemented by EuroGeographics and its partners.
- ***17 countries are now*** connected to EuroGeoNames.

EuroGeoNames (EGN)

- EuroGeonames provides location information by:
  - Reliable, high quality, comprehensive Geographic names from *official* sources.
  - Translations for these into 25 languages.
  - A sustainable approach to updates.
- A web interface that allows simple, search and reference in all languages.
- The service based infrastructure in both collection and delivery was set up and operated by *Bundesamt für Kartographie und Geodäsie* (BKG) for more than 10 years and is now hosted by the Finish Geodetic Institute.
- And, because EGN adopts INSPIRE principles, Nations can meet their legal obligations under this legislation simply by linking their data to this service.
- EuroGeoNames is also recognized by the United Nations Group of Experts on Geographic Names *(UNGEGN)*

Example Europe

Statistical data:

National Statistical Institutes (NSI)

↓

Eurostat

Geographical data:

National Mapping and Cadastral Agency (NMCA)

↓

EuroGeographics

NUTS

Nomenclature of Territorial Units for Statistics

Maintained by Eurostat

Linkage via unique identifiers

EuroBoundaryMap

All European administrative units with names and identifiers

Managed by BKG

Federal Agency for Cartography and Geodesy

Example Germany

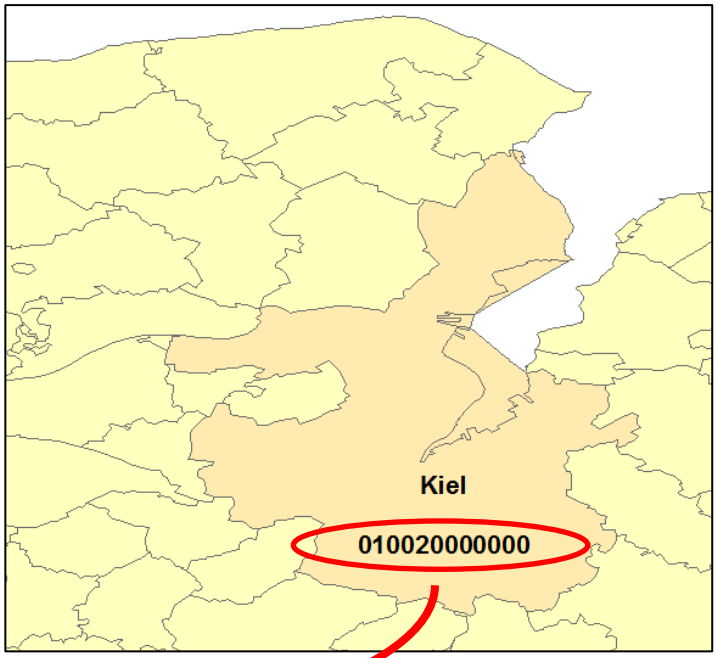
Statistical data:

Statistisches Bundesamt (DESTATIS)

Regionalschlüssel (RS)					Gemeindename	Fläche km² am 31.12.2012 (Jahr)	Bevölkerung insgesamt
Land	RB	Kreis	VB	Gem			
Gebietsstand am 31.12.2012 (Jahr)							auf Gr
01					Schleswig-Holstein	15 799,61	2 806 531
01	0	01			Flensburg, Stadt	56,74	83 462
01	0	01	0000		Flensburg, Stadt	56,74	83 462
01	0	01	0000	000	Flensburg, Stadt	56,74	83 462
01	0	02			Kiel, Landeshauptstadt	118,65	239 866
01	0	02	0000		Kiel, Landeshauptstadt	118,65	239 866
01	0	02	0000	000	Kiel, Landeshauptstadt	118,65	239 866
01	0	03			Lübeck, Hansestadt	214,21	211 713
01	0	03	0000		Lübeck, Hansestadt	214,21	211 713
01	0	03	0000	000	Lübeck, Hansestadt	214,21	211 713
01	0	04			Neumünster, Stadt	71,63	76 951
01	0	04	0000		Neumünster, Stadt	71,63	76 951
01	0	04	0000	000	Neumünster, Stadt	71,63	76 951

Geographical data:

Bundesamt für Kartographie und Geodäsie (BKG)



Linkage via unique identifier

Regionalschlüssel

Federal Agency for Cartography and Geodesy

Georeferenced Buildings and Adresses by Coordinates

Challenges of administrative units as base of statistical data

- Not stable (but changes are well documented)
- Hierarchical structure of administrative units differs between countries (sometimes also within countries) → NUTS classification defined by Eurostat to create comparable units
- Ongoing process to simplify public administration (merging of units) → loss of granularity

Challenges of statistical grids

- Advantage: identical size of grid cells, hierarchical structured, stable, …
- Needed: geo-referenced point datasets with high spatial accuracy
- NMCAs provide for geo-referenced point datasets:
  - Address registers
  - Buildings
  - Points of interest
  - …

German E-Government Act

- The German law for the promotion of e-government, the E-Government Act, came into effect on 1 August. Its aim is to facilitate electronic communication with the administration and to enable federal, state and local governments to provide simpler, more user-friendly and efficient e-government services.
- The main provisions in the E-Government Act are amongst others :
  - Regulation for the **supply of machine-readable data files** by the administration ("open data")
  - **Georeferencing** of Registers with geospatial relevance.

This will lead to a geospatial framework for information in general and for statistical data in particular