Creation and usage of geospatial data in Central Statistical Office of Poland
Usage of spatial data in CSO Poland

**the preparatory works**
- creation of spatial address databases,

**during census**
- field works supporting

**Geostatistics Portal:**
- dissemination of georeferenced census data
- dissemination of georeferenced statistical data other than census results
- multidimensional spatial analysis
The preparatory works
Spatial data collected and maintained within official statistics

**Statistical address points database**
- address points for residential buildings

**Statistical distribution boundaries**
- statistical regions
- census enumeration areas
Spatial address database creation
Address point identification system

- XXXXXX X: ID of administration levels
- YYYYYY Y: ID of city, town, village
- RRRRRR O: ID of statistical area
- UUUUU: ID of street
- Building No.: ID of building
- Dwelling No.: ID of dwelling
Spatial address point Identification system

- XXXXXX X: ID of administration levels
- YYYYYY Y: ID of city, town, village
- RRRRRR O: ID of statistical area
- UUUUU: ID of street
- Building No.
- Dwelling No.
- X Y: Coordinate system
Statistical address points

address locations for buildings with dwellings

needed for censuses in Poland

• to navigate enumerators
• to visualise census results on maps
Reference materials

Resources acquired mainly from the mapping agency and used for digital maps preparation
Data exchange with NMA

- Orthophotomap *
- Cadastral data*
- PRG (National Register of Borders) *
- LPIS (Land Parcel Identification System) *
- Roads and streets network
- PRNG (National Register of Geographical Names) *
- BDOT (Database of Topographic Objects) *
- Records of towns, streets and addresses *

* - Obtained free of charge under the Public Statistics Research Program
x,y GEOCODING

- Territorial Identification Registry (System TERYT) provides location data of all statistical units as the address-point of a related building.

- Location of buildings is specified using geographical x,y coordinates, giving the exact location of each building and make possibility to linking microdata from several registers.
x,y GEOCODING

- This eliminate the necessity to recalculate data when administrative boundaries are changing. Furthermore, the point assignment will allow easy aggregation and processing of statistical data in any chosen area - even for the GRID - based dissemination,

- x,y geocoding is crucial in all three stages of the census:
  - the preparatory works,
  - management of enumerators during the fields works,
  - and for multidimensional spatial analysis.
Summary of preparatory works

In 6 months (I – VI 2010) GIS operators in official statistics created spatial address databases with 6 million address points.
Spatial data as the base of real-time census management
Use of address points in census data collection:

MODERN CENSUS IN POLAND
Mixed Model
for Population and Housing Census

Mixed model – a combination of data from administrative sources with data acquired from statistical surveys
Data collection channels

- **Administrative sources** – including spatial data reference registers

  **ON_LINE:**

- **SelfEnumeration by Internet**
  - (CAII – Computer Assisted Internet Interview)

- **Telephone Interview**
  - (CATI - Computer Assisted Telephone Interview)

- **Sample surveys** (using hand-held terminals with GPS and GIS service – HTC Touch HD with GPS)
  - (CAPI - Computer Assisted Personal Interview)
CAxI

- CAII - Computer Assisted Internet Interview,
- CAPI - Computer Assisted Personal Interview,
- CATI - Computer Assisted Telephone Interviewing.
Census Supervisor duty- regional level

- Enumerator activity monitoring – using GPS/GIS technology
  - Census Progress
  - Localization and tracking
- Census completeness monitoring
- Emergency situation management
  - Providing help for enumerators
- Providing necessary information to enumerators
Address point assignment
Hand-held terminal with GIS application
Enumerator – enumeration area level

- Visiting all assigned holdings
  - Filling electronic questionnaires
- Daily synchronisation
- Contact with the supervisor in terms of task scheduling
- Adding newly identified holdings
Enumerator – GIS technology

- Map module - GIS
  - Ortophotomap
  - Cadastral Data
  - Assigned Tasks
  - Started Tasks
  - Completed Tasks
Enumerator
Enumerator

L10.1a. Jaka jest Pana(i) narodowość? Przez narodowość należy rozumieć przynależność narodową lub etniczną - nie należy jej mylić z obywatelstwem.

- polska
- białoruska
- czeska
- karaimska
- litewska
- łemkowska
- niemiecka
- ormiańska
- romska
- rosyjska
- słowacka
- tatarska
- ukraińska
- inna

Przyczyna
- Brak mieszkania
- Mieszkanie niezamieszkałe
- Nieobecność respondenta
- Odmowa spisu
- Odwołanie umówionego spotkania
- Spis w CAII
- Zaplanowanie spotkania w innym terminie

Relacje Gotowe
Ankiety 0 z 4
 enumerable

- Alarm procedure
  - In emergency situations, enumerators have a possibility of sending an alarm signal to their supervisors
  - Alarm notice is sent to the supervisor application and via SMS to the supervisor
  - Supervisor was able to send a police or other service to pointed address (x.y coordinates)
Data collection supported by GIS technology enables linking statistical data to geospatial data.

- Data collected in the census assigned to address points.
- Statistical data with x, y coordinates can be used to create various visualisations.
## Profits

<table>
<thead>
<tr>
<th>Census in 2002</th>
<th>Census 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>180 thousands of census enumerators</td>
<td>18 thousands of census enumerators</td>
</tr>
<tr>
<td>120 mln of questionnaires</td>
<td>0 questionnaires</td>
</tr>
<tr>
<td>1 000 tons of papers</td>
<td>0 tons of papers</td>
</tr>
<tr>
<td>At the end shredding census questionnaires</td>
<td><strong>ca. 50 mln € less</strong></td>
</tr>
<tr>
<td></td>
<td>better data</td>
</tr>
<tr>
<td></td>
<td>the more reliable results</td>
</tr>
<tr>
<td></td>
<td>statistical surveys in the future</td>
</tr>
</tbody>
</table>
Dissemination and spatial analysis
Homeless survey

All data have been positioned by x,y coordinates

quick results achieved next day
Structure of „roof-less” in Poland
„Roof-less” in Gdynia city
“Roof-less” in Warsaw
Census data dissemination
The main objectives of the Portal

• The spatial presentation of collected data, in particular:
  • Agricultural Census 2010
  • Population and Housing Census 2011
  • Local Data Bank – a huge database with statistical data for years 2009-2012
• The spatial presentation of the geostatistical analysis results.
• Completing tasks associated with INSPIRE Directive guidelines implementation.
The portal allows statistical data presentation in form of any spatial unit:

- 5’ grid
- 1 km² grid
- administrative division
- urban division
- statistical division
- any other polygon
Publishing statistical data on grids

GEOSTAT project
Merging statistical data and geospatial information
Total population in 1km² grid
Geostatistics Portal functionality
Default view
Object identification
Choropleth map
One phenomenon – various presentation levels
Diagram maps
Bar chart
Population map on a level lower than LAU2

cadastral units
statistical regions
census enumeration areas
Advanced spatial analysis on microdata

- All census results collected with reference to an address point.
- Spatial analysis possible in any desired area.
- Available for users within official statistics (confidentiality issue).
Geostatistics Portal – benefits

- easy access to a huge amount of data on agriculture and demography (statistical data merged with geospatial data)
- a variety of cartography presentation methods
- spatial analysis tools
- INSPIRE compliant network services
- in the future:
  - geovisualization platform for data from other statistical sources
New phenomena presented spatially

Figure 6 Value of the development rate in a 1x1 km grid [%]
New methods of cartographic presentation
Good cooperation between statistical services and register-keepers, including Mapping Agency, is crucial for using spatial data for statistical purposes.
Thank you for your attention