

Work Session on Geographical Information Systems  
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Item 6 of the provisional agenda

**STEPS TOWARDS GIS DEVELOPMENT AT THE NATIONAL STATISTICAL  
INSTITUTE OF BELGIUM**

Submitted by the National Statistical Institute of Belgium <sup>1</sup>

CONTRIBUTED PAPER

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## **I. PROJECT DESCRIPTION**

### **I.1 Project GIS: Build-up of a GIS for the management of the statistical sectors**

#### **I.1.1 Build-up of a database focusing on statistical sectors**

1. A cartographic database is being built in order to manage statistical sectors. It will include vectorized statistical sectors, communal boundaries, road and railway networks, SPOT satellite images, a selection of orthophotos and probably the topographical maps of Belgium (1/10.000). A link to the census 1991 and demographic databases will be performed.

#### **I.1.2 Use of satellite images for the 2001 updating of statistical sectors**

2. The Belgian National Institute of Statistics (NIS) has decided to adjust its basic census districts or statistical sectors for the 2001 census of population and housing. Indeed, many statistical sectors and agglomerations' boundaries do not fit anymore due to urban growth and the development of rural settlement. The last updating took place on the occasion of the 1981 census. It was a lengthy job undertaken using the traditional method based on aerial photointerpretation. To accelerate the work and make it more objective, the NIS has decided to take advantage of new technologies. A convention has been prepared and is being signed to carry out a pilot-project (1998-1999) within the framework of the TELSAT 4 research program "Earth observation from satellite" funded by SSTC/DWTC<sup>2</sup>. A methodology developed by Laboratoire Surfaces<sup>3</sup> will be used. It is based on an image processing system and on SPOT satellite images.

3. The succession of activities will be as follows:

- i) Geometrical correction of the SPOT images;
- ii) Merging of the XS and panchromatic images;
- iii) Tracing of the built area map by classification;
- iv) Delimitation of built areas and construction of a Boolean image; dilatation followed by erosion procedure in order to regroup built areas closer than 100 meters from each other;
- v) Selection of all built-up areas from 3.0 to 9.9 ha, from 10.0 to 19.9 ha and 20 ha and more;
- vi) Selection of all rural sectors to be split and of relevant high resolution digital orthophotoplans;
- vii) Creation of a selection of new statistical sectors by heads-up digitising on top of the selected orthophotoplans;
- viii) Boundary determination of urban agglomerations over 2500 ha according to 200 meter EUROSTAT distance criteria;
- ix) Trial of a selection of new digital very high resolution images;

<sup>2</sup>SSTC/DWTC stands for Ministry of Prime Minister, Scientific, Cultural and Technical Affairs

<sup>3</sup>Laboratoire Surfaces is a department of the State University, Liège, Belgium.

- x) Printing of a selection of maps of statistical sectors;
- xi) Updating of the street-file for a selection of redefined sectors;
- xii) Training of NIS staff.

4. Laboratoire Surfaces is mainly required to deliver a digital cartography with inhabited areas which have appeared since 1981, a selection of the relevant orthophotoplans and a digital cartography with urban agglomeration boundaries determined according to 200 meters EUROSTAT criteria, as well as trained staff. These data will allow NIS to finalise the statistical area partition, to determine its content in terms of street sections and buildings for the 2001 census and to propose urban areas for the future European urban statistical system.

## **I. 2 Steps towards an integrated GIS**

4. During March and April 1998, a GIS trainee spent several weeks meeting staff in charge of various statistics with the aim of introducing the GIS culture within the NIS and to identify needs. As thematic mapping proved to be the application most in demand, a link between Arcview 3.0 GIS- and DB2-supported databases was carried out and an explanatory note on the use of the cartographic tool in Excel 7.0 was written down. An application oriented towards health survey monitoring was proposed.

## **II. DATA SOURCES**

### **II.1 Statistical data**

5. Only NIS owned data should be used for the GIS build-up.

### **II.2 Cartographic data**

6. We have: (i) vectorized version of the statistical sectors owned by regional governments which, up to now, may be used for internal purpose; agreements have to be drawn for diffusion; (ii) vectorized road and railway networks which are useful for delimitation of statistical sectors; they may be used for internal purposes; and (iii) a collection of other digital data such as land use plans, environmental data, etc..

7. We also plan to bring in: (i) vectorized recent communal boundaries owned by the official mapping agency (IGN); (ii) SPOT satellite images - these will be provided by SSTC for the above mentioned pilot-project; (iii) a selection of orthophotos owned by the official mapping agency (IGN); (iv) topographical maps (1/10.000) owned by the official mapping agency (IGN); the cost is high, however, and could be a problem.

## **III. OUTPUT FROM THE GEOGRAPHICAL INFORMATION SYSTEM**

8. At present there is no output from the Geographical Information System. In the future we hope to have maps of statistical sectors, thematic maps, support to statistical division, with possibly an environmental impact.

#### IV. SOFTWARE AND HARDWARE

9: **Software:** At present, one licence Arcview 3.0 GIS; 250 licences Excel 7.0. In the future, four licences Arcview 3.0 GIS will be ordered. The purchase of an image processing system is being considered.

10. **Hardware:** At present, one PC Olivetti, Pentium 100 with a normal screen. In the future (end of 1998), six PC's, 266 Mhz, 64Mb, 6 screens 21" large, one server, one colour printer A0, one digitizer A0+.

#### V. PERSONNEL AND COST

11. **Personnel:** One geographer is partly involved in a GIS project "Build-up of a GIS for the management of statistical sectors". At the moment, barely any resources are allocated to an integrated GIS development.

12. **Budget:** 60.000 ECU's will be available in 1998 for the purchase of hardware and software.

13. **Future development:** Updating of the boundaries of statistical sectors and development of the related GIS project (until 12/2001); when time is available, development of integrated GIS.