The Transnational Geo-portal Italian-Slovenian of the Cross-Border Park Area

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INTRODUCTION

The project SISTEMaPARC (Spatial Information Systems for Transnational Environmental Management of Protected Areas and Regions) in Central, Adriatic, Danubian and South-East European Space (CADSES) aims to foster transnational levels of management and development of cross-border national park regions (Wagenknecht, 2006). This research examines three aspects in more depth: GI-interoperability, metadata and reference data homogenization applied to a heterogeneous spatial database cross-border the Prealpi Giulie Nature Park (Italy) and Triglav National Park (Slovenia). Efficient methods of data processing and data diffusion were experimented following common GI standards. The output was the transnational Geo-portal which performs also the metadata display, browsing the information in standard format.

INTEROPERABILITY AND DATA HOMOGENIZATION

The standard agreement has a meaning and an important purpose: making interoperable the geospatial data and services. There are standards dealing with the manipulation of geographic data (spatial standards) as ISO 19111, and standards for the geographic data diffusion (metadata) as ISO 19115.
To create a consistent reference dataset across national boundaries, it was necessary to agree on the specification for the data in terms of content, structure and quality. We had the task to connect spatially the data related the Italian-Slovenian cross-border park area. In Europe the standard spatial reference system is represented by the ETRS89 (Annoni, 2000). The mapping projection follows the ISO 19111 that defines the conceptual scheme for the description of spatial referencing by coordinates. The exact relationship to transform the local CRS to ETRS89 exists only locally. It is possible to use the set of parameters defined by EuroGeographics in collaboration with the IAG Subcommission for European Networks (EUREF) and the German Bundesamt für Kartographie und Geodäsie (BKG) (http://crs.bkg.bund.de/crs-eu/). They are related to an entire country, using few common points and they are not very accurate (3-4 meters).
This research had the purpose to find a reliable set of Datum transformation parameters increasingly the accuracy (below the meters). To perform this task in September 2005, collaborating with the Slovenian partners, we realized a GPS network across the Italian and Slovenian Parks. By means the points of this network we calculated a set of new transformation parameters using the Bursa-Wolf least square Datum transformation (from geocentric to geocentric), an approximation of the Seven Helmert Parameter Transformation (case: Position Vector) (Bursa, 1962; Wolf, 1963).
The method was implemented in a new software (*TrasfDatumPP20*) realized in visual basic standard code (Figure 1) (Barborič, 2006).

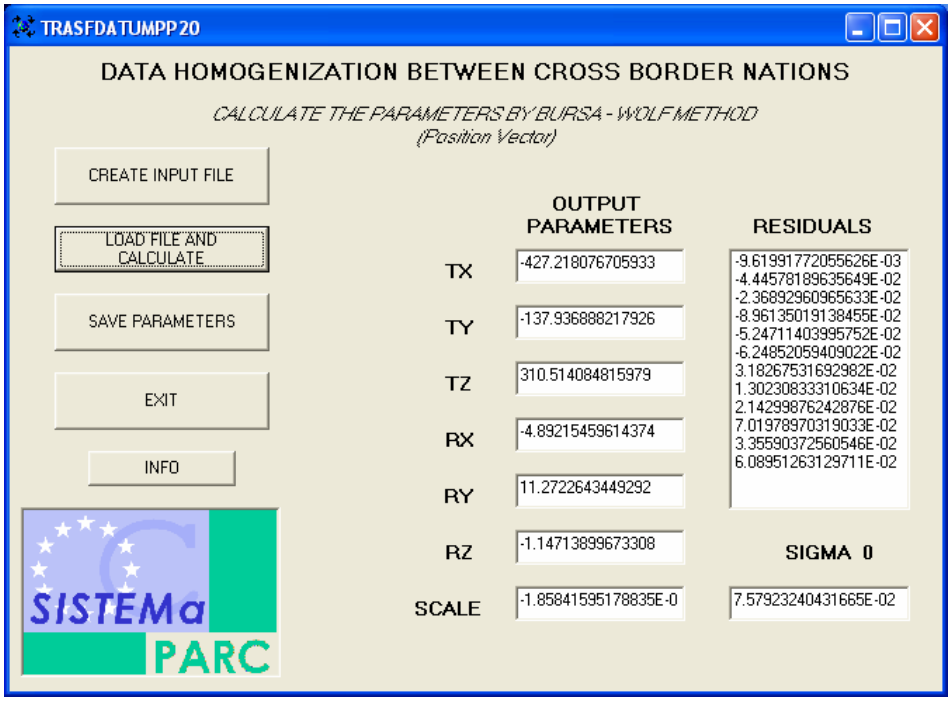

Figure 1: The Prealpi Giulie Nature Park parameters computed by *TrasfDatumPP20.*

COLLECTION AND MANAGEMENT OF CROSS-BORDER SPATIAL DATA TO CONSTRUCT THE GEOPORTAL

The Triglav National Park covers 83807 hectares of the Slovenia's part of the Julian Alps. The Prealpi Giulie Nature Park has approximately a surface of 10000 hectares and covers two different geographical areas: the Julian Alps and Subalps. The construction of the spatial database was possible collecting geographical and thematic data both in raster and shape format related to the two parks and performing in the GIS the spatial data homogenization (Figure 2).

The Geo-Portal was realized on standards and specifications from European and International organizations (ISO, CEN, OGC, W3C). It is an organized database accessible by Web pages which helps to discover and access to a wide variety of geographic information and not only, improving transnational networks of spatial information systems and structures for cooperation.

For the construction of the Geo-portal we used one of the most known Web-GIS Open Source software: UMN Map Server release 4.8, freely downloadable from the official site http://mapserver.gis.umn.edu.

The Figure 3 shows the Corine Land Cover (CLC) thematic maps without gaps along the boundary of the two park areas displayed into the transnational Geo-portal Web page. Another opportunity is to make some queries into the layers, selecting a special box (Figure 4) or the management of the metadata. The last ones follow the rules set out by the current ISO 19115 to facilitate the archiving and maintenance of spatial information moreover in the Web (Kresse, 2004). We performed the editing of the metadata by Arc-Catalog (ESRI). Following the download and display of the HTML file were available by means the procedures of PHP code and activated by the selection of the special button "View Metadata" in the Geo-portal Web page (Figure 5).

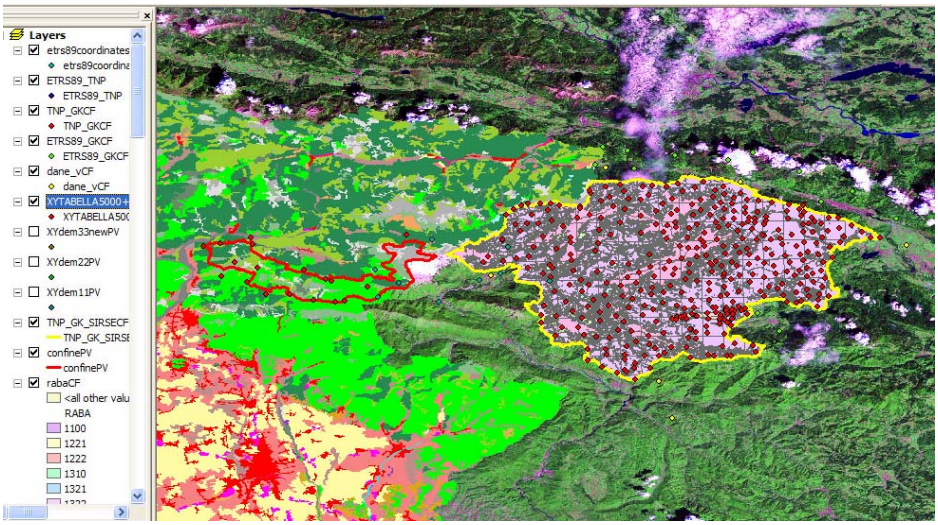

Figure 2: The database without gaps between the cross-border park areas.

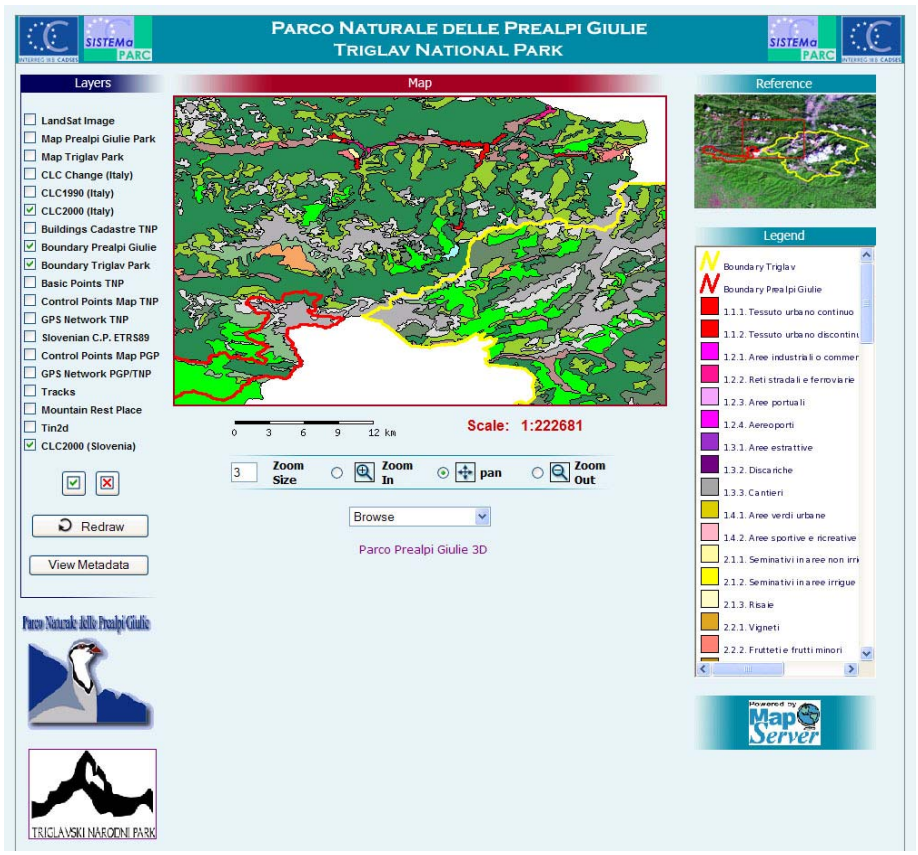

Figure 3: Web page of the transnational Geo-portal.

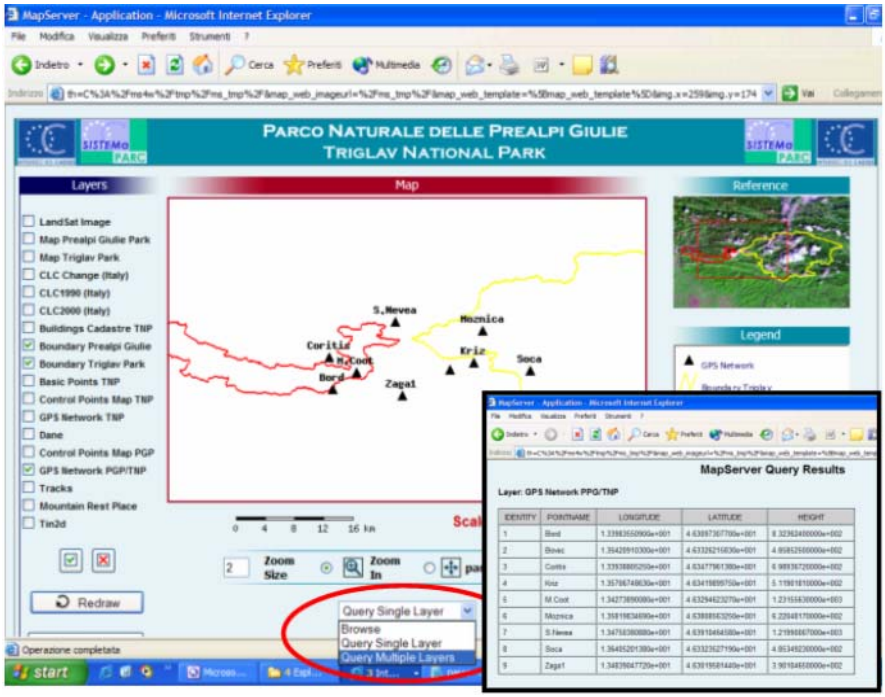

Figure 4: The query results.

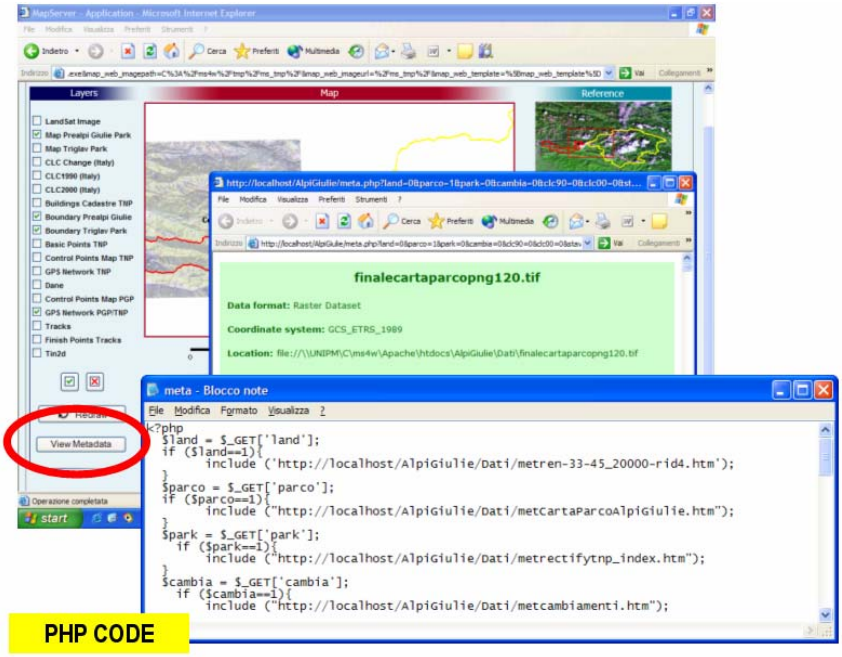

Figure 5: How to link the metadata in standard format into the Web-GIS.

CONCLUSIONS

The development of the international GI standardization process has been one of the fastest and most successful standard processes in our time. The role of standardization is removing barriers to the use of spatial information and opens the way of the interoperability. The experience of the SISTEMa-PARC project has been successfully improving the co-operation at transnational level. The results obtained in term of generation of a transnational database network and a database management include easy-to-handle software tools for data processing and communication procedures in accordance with the international standards. The transnational communication Geo-portal involves the development and management of protected areas in CADSES.

BIBLIOGRAPHY

Annoni, A., Luzet, C.: Spatial Reference Systems for Europe, Proc.of the Workshop Spatial reference systems for Europe, Marne-La Vallée,29-30 Nov. 1999. Joint Research Centre EUR 19575, (2000).

Barborič, B., Mesner, N., Malinverni, E.S.: Coordinate Homogenisation In Triglav National Park. NatureProtectionGIS Symposium, Dresden (2006).

Bursa, M.: The theory for the determination of the non-parallelism of the minor axis of the reference ellipsoid and the inertial polar axis of the Earth, and the planes of the initial astronomic and geodetic meridians from the observation of artificial Earth satellites. Studia Geophysica et Geodetica 6 (1962) 209-214.

Kresse, W., Fadaie, K.: ISO Standards for Geographic Information. Springer, Heidelberg, New York, Tokyo, (2004).

Wagenknecht, S., Csaplovics, E.: Ecological networks. Geo: Geoconnexion International Magazine, vol. 5 issue 10 (2006) 59-61.

Wolf, H.: Geometric connection and re-orientation of three-dimensional triangulation nets. Bulletin Géodésique vol. 68 (1963) 165-169.