GIS connects our world: From an Austrian to a global solution...
SHAPEFILE PROJECTIONFINDER by Manfred Egger
A new way to find and define the coordinate system of GIS data automatically

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INTRODUCTION AND OVERVIEW:

For The Austrian Service for Torrent and Avalanche Control a tool was developed which can automatically find and define the unknown projection of GIS data for ten Austrian coordinate systems. Since the solution works the support time for problems with gis data and unkown coordinate decreased rapidly.
Here a solution which integrates all projected coordinate systems based on world-wide registered EPSG-Codes will be presented.
GIS-Users with almost no knowledge of coordinate systems and projections have often problems to integrate gis data in their projects, because the datasets have a wrong or no projection definition. Specialized knowledge about coordinate systems and projections is necessary to integrate data fast in a existing gis project.
In Figure 1 is an example where gis data is in the wrong country.
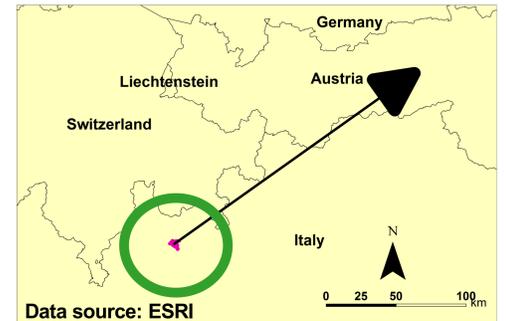
Data source: ESRI
Figure 1: Unknown projection.

PRESUMPTIONS FOR A GLOBAL SOLUTION:

- all places in the world have unique names and latitude/longitude coordinates
- GIS data of the same location can be saved in different coordinate systems

So with the combination of geographic name, latitude/longitude and projected
coordinates it is possible to almost automatically detect and determine the unknown coordinate system of the GIS data.
There are different ways to develop such software solutions:
- changing the coordinate system of the gis project until the unknown data is displayed in correct position.
- using names and polygons of adminstrative units (for instance a district).
- distance between latitude/longitude and a sample coordinate of unkown gis data.

OPEN SOURCE SOLUTION:

A proposal for a solution was developed with this open source projects basing on Java and NetBeans IDE 8.0.2:
- projfinder.com (open source project by Aaron Racicot)
- geonames.org
- geotools.org (2.7.0)
- spatialrefrence.org
The relevant parameter is the distance value, which describes the distance between latitude/longitude and the center coordinate of the GIS data of unknown origin (look at figure two and three).
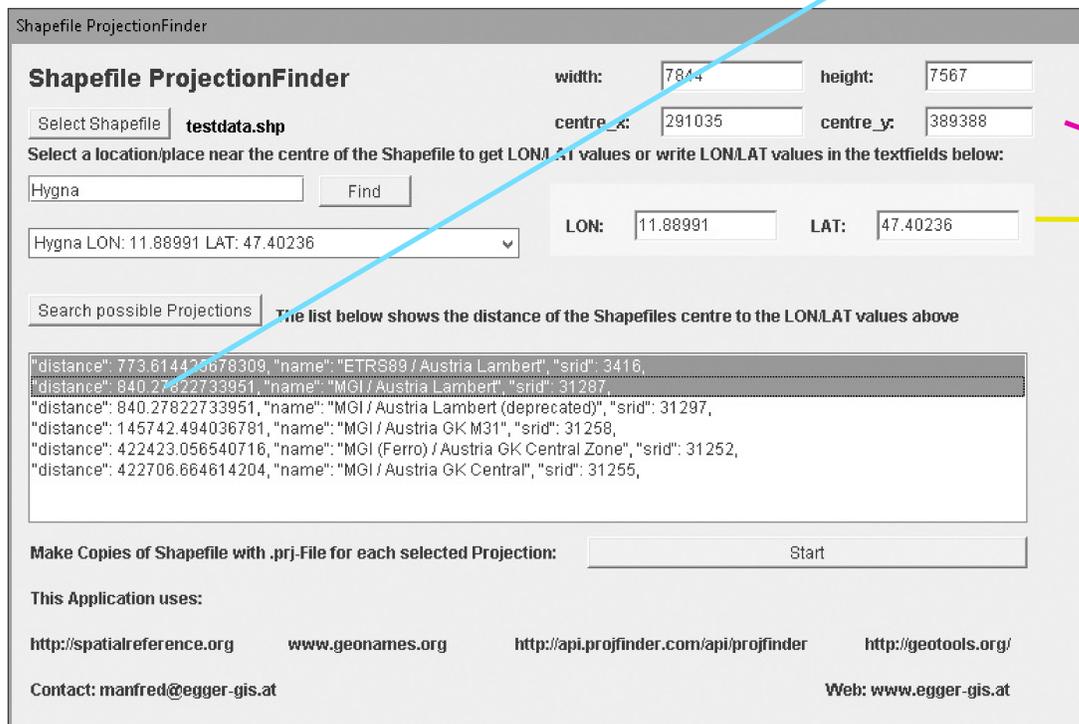
Figure 2: GUI.
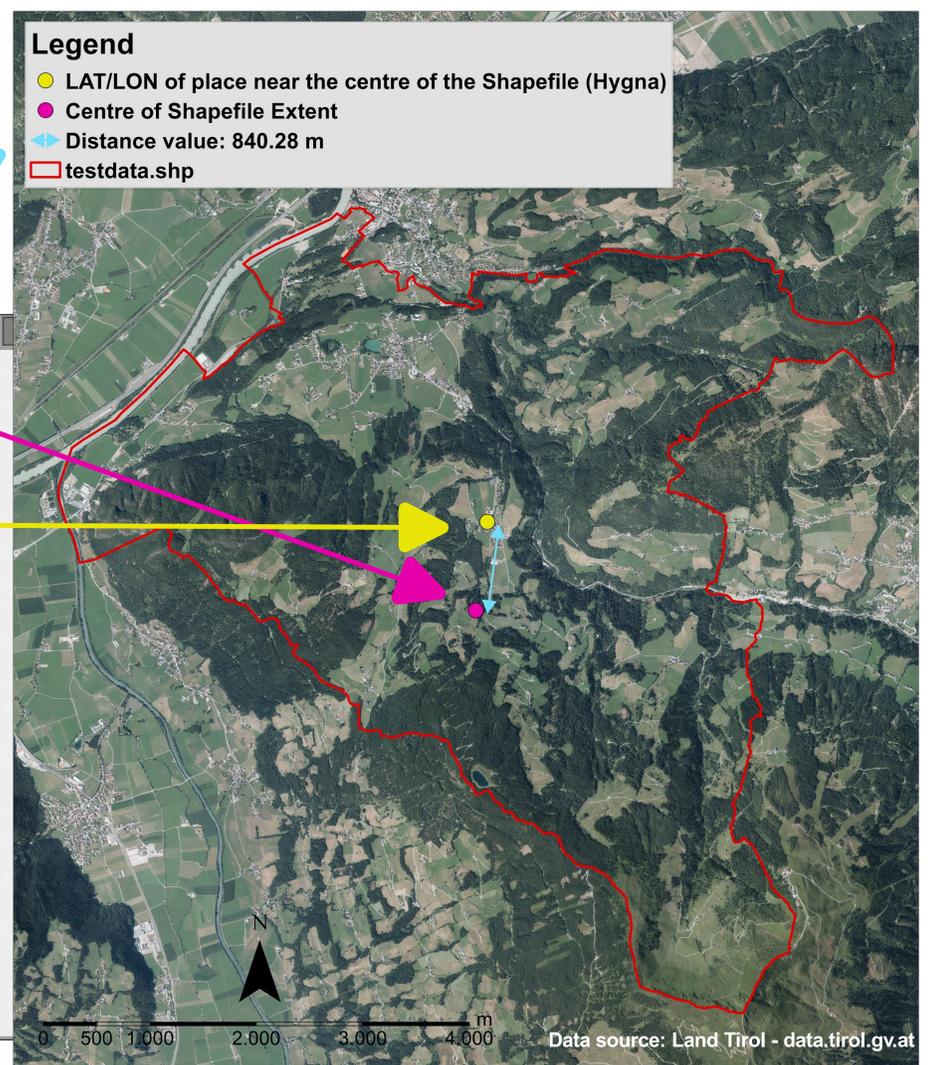
Figure 3: Explanation of distance value.

CONCLUSIONS:

A first proposal to find and define the coordinate system of GIS data automatically was presented. Applications like SHAPEFILE PROJECTIONFINDER help gis users to integrate gis data to their projects fast.
But not all problems can be solved: CUSTOM-Projections, gis data with geographic coordinates or data in print units will make problems. Maybe there are problems with coordinate systems basing on different reference ellipsoids (for instance UTM 32 N (WGS84 and ETRS98)). For this situations it is possible to make copies of gis data and visually select the correct coordinate system in the gis project.