



# DATA WITHOUT A NET

INTERNET MAP SERVERS ARE COMMON THESE DAYS. RECENT EXPERIENCES HAVE SHOWN, HOWEVER, THAT SITUATIONS EXIST WHERE GEODATA NEED TO BE DISTRIBUTED WITHOUT THEM.

After the earthquake that struck Northern Pakistan in October 2005, all services are down initially, including power, telephone, and the transport network. The initial relief work environment is difficult. Staff may work and live in tents, but GIS services still need to be provided, from manual data collection and visual analysis, to satellite image interpretation and large-scale colour printing.

As every GIS professional knows, the database content is linked to spatial objects like hospitals, roads or regions. This information can be used to analyse the spatial distribution of the data in many ways. Initially, as rescue crews arrive and prepare to set up operations, overview maps are essential. These are best provided in paper format, so that groups can work with them easily. Speed is crucial.

Orientation and coordination of activities between the various activities takes centre stage next. "Who does what where" information needs to be provided, together with data on road closures, population movements, aid deliveries and so on – essential thematic mapping.

One application we developed in Pakistan was the "Map Pak" interactive mapping tool for early response providers. Built on the ESRI ArcPublisher and ArcReader technology, it allowed for the quick dissemination of map data in a controlled fashion. ArcPublisher is an extension to the ArcGIS software suite, and is used to package a map layout in pmf format.

The content is created by preparing a polished map layout in ArcGIS,

complete with colors and symbology, labels and map tips, legend and text, even zoom ranges. The data queries are defined, as are hyperlinks and joins. All information is then packaged in one compressed document.

The user controls the content of the map by switching the available map layers on or off. Our Map Pak contained information on roads and rivers, settlements, administrative boundaries and the impact area and epicenter of the earthquake. Several updates were produced for locations that a liable to change, such as Helicopter landing sites (Helipads), Camps of internally displaced persons, Health Facilities and Relief Storage Sites. Several images were included as a backdrop, such as topography and a satellite image. In addition to the mapping component the application also included a gazetteer of place names (Pcodes) with search facility and GPS coordinates, and a selection maps in pdf format.

But in case of novices, we are entering a world of red rivers and blue roads, giant or unreadable labels, and layers that obscure each other – in other words, unusable maps and easy frustration. This can be partially overcome, however, by distributing the map data with a pre-defined layout or project. The user will then be presented with all the map layers properly set up, even if there is no guarantee where he goes from here. Again, language is a limiting factor as most generic GIS viewers offer an interface in one idiom only. An exception are the TatumGIS Free Viewer and gvSIG. While TatumGIS offers 15 different languages that can be



Using maps in the relief effort

switched on-the-fly, gvSIG can be configured by the user to re-start in one of 12 idioms.

A customised GIS viewer is a mapping tool developed by a programmer, using tools from a GIS program vendor. All the major players in the GIS software arena offer some sort of mapping control that can be combined with one of the common programming languages and allow the design of a completely new user interface. One pitfall is the need to pay royalties to the GIS program vendor for every installation of the program that has been developed. If we need to distribute the program free of cost and in unlimited numbers, the choice of available programming tools narrows considerably. TatukGIS offers a Developer Kernel Toolkit that is free of royalties. ESRI offers the same with the MapObjectsLT edition. It is a pity that further development of this tool has been suspended, before a replacement became available. There are rumors, however, that ESRI will make royalty-free programming tools available again.

An example of a customised GIS viewer is SIGpaS, a map-based health information system for the Dominican Republic. The application has a Spanish user interface and contains data

for over 9000 health centers, clinics and hospitals. More than 400 indicators can be visualised. Data can be queried and exported to Excel with one click. Raster data like country-wide satellite images and more than 100 scanned and mosaiced topographic maps are included in compressed MrSID format and therefore still fit on one CD. More than 3500 copies of this program were distributed to health and education stake holders, free of charge and royalties.

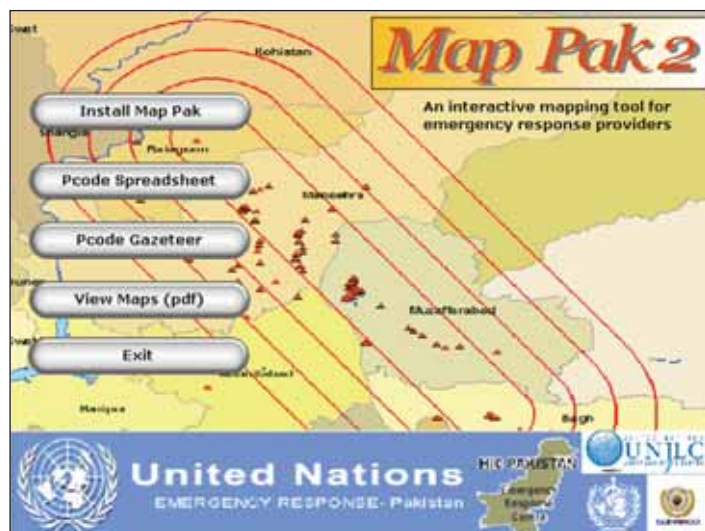
One key design aspect was a user interface that lets novice GIS users work with a wide range of data in an intuitive way. All layers are 'pre-loaded' and fit seamlessly. The order is pre-arranged so that boundaries lie on top of roads, and roads over rivers, etc. This insures that the user is always presented with a map that makes sense and is readable. The user chooses which of the layers are visible, which layers are labelled, and which colors are used. One raster backdrop can be selected that shows topography and satellite images. If temporal data such as average temperature or rainfall are chosen, they can be stepped-through on a month by month basis. Apart from the one-click export

function to Excel, data packages can also be exported in Excel, Access, EpiMap and SIGEpi formats through a data portal. This gives advanced users the opportunity to further analyse or update the data.

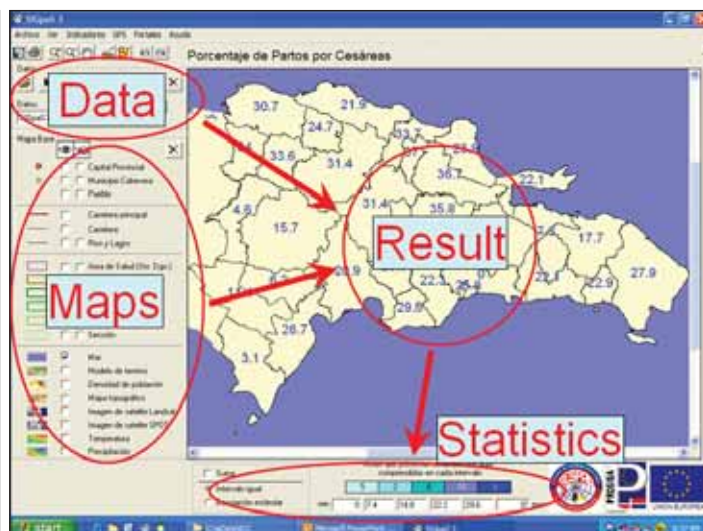
A special capability is that numerical data are automatically symbolized by equal interval or standard deviation, together with some basic statistics like maximum and minimum, sum and median. Point data are automatically symbolized by point size, giving a visual impression of their distribution. Labels can be used to see the actual values, and a 'map tip' function is available to display the name of each point location as the cursor moves over it. The user can switch between a map-centric view, and a view that shows the map and the data simultaneously.

The map data of the base map, like boundaries, roads and the digital elevation model, are present in standard GIS formats on the CD and can be readily utilized by users with access to other GIS software. SIGpaS is therefore a data warehouse as much as a map viewer and data portal. The usefulness of this approach became clear during the widespread flooding that affected parts of the Dominican Republic and Haiti in 2004. When relief crews arrived from overseas, bringing advanced GIS resources with them, they could immediately utilise the information stored within SIGpaS for the relief effort. Usually it would have been necessary to first collect this information from a variety of government agencies in the capital, followed by further work to align data and unify projections, etc. GIS viewers are therefore a good way to 'pre-distribute' data to areas or institutions where they might be needed in an emergency.

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Map Pak installation screen



Structure of the SIGpaS user Interface