The relevance of accurate geospatial data and databases

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Abstract

With precision comes differentiation. By having the freshest and most accurate maps, customers have the tools to separate themselves from their competition.

Business intelligence, personal navigation, itinerary planning, geo-coding, geo-spatial analysis, fleet management, customer support, business expansion and automotive applications are just some of the areas being exploited by enterprise and government using high quality maps. Complex geographic relationships are easily understood and analysed so organisations can respond rapidly to changing market conditions and achieve significant cost savings.

Maps are created using a number of methods, ranging from satellite imagery to digital and paper maps. Included amongst these are community inputs (these maintain the freshness of content), mobile mapping van (capturing vital information on routes such as height, depth and important road signage), aerial photography, field surveys and input from partners and customers alike. Combining “crowd sourcing” with professional GIS back office QA/QC processes delivers the freshest, most accurate spatial databases.

Datasets created and maintained in this manner include: African country boundaries, provinces or states, community or other administrative boundaries, metropolitan or greater town boundaries, town boundaries, suburb or city subdivision boundaries, similarly named or functionally related suburbs grouped together in groups, centre points of towns and places of habitation, South African postal code areas and colloquial names, gated communities and sectional title schemes.

Keywords

geospatial data, maps, government, enterprise, datasets

Introduction

MapIT offers organisations high quality maps with accurate and extensive coverage of Africa and the rest of the globe through its association with its shareholder TomTom Africa. Over 200 countries and territories, including 37-million km of road, is covered globally. In Africa 56 countries including 10,5-million km of road and over 1,2-million points of interest shows the result of over 56 years of mapping the African continent.

Coverage is important

Enterprise and government are expecting accurate information of all types in urban as well as rural areas and one of the methods of delivering on this expectation is through the use of up to date aerial imagery. To quote a client: “Your aerial imagery for the area required by my customer is far superior to anything else available, to the extent that I am able to provide them with detailed classification on their privately owned roads which in turn helps them with quality control.” This imagery is updated continuously and is available at 50 cm resolution across the country and resolutions of between 20 – 40 cm in selected urban environments. South African organisations are active across the globe (47% of corporates and 33% of SMMEs according to a recent LBS market survey by World Wide Worx) – so extending aerial/satellite imagery outside of our South African borders seamlessly to users is also very important to ensure that they can verify information visually no matter what the area of operation. This is provided through a global Digital Globe image web service.

Use cases

Business intelligence, personal navigation, itinerary planning, geo-coding, geo-spatial analysis, fleet management, customer support, business expansion and automotive applications are just some of the areas being exploited by enterprise and government using these high quality maps or imagery. Complex geographic relationships are easily understood and analysed so organisations can respond rapidly to changing market conditions and achieve significant cost savings.

A classic example of government harnessing accuracy can be seen in a project that MapIT assisted with in Uganda. This involved providing an addressing solution to an area that was fraught with conflict and lack of information. Effectively, the use of a unique seven character address code assigned to a building/house linked to a GPS co-ordinate resolved the issue of position. By creating a lookup of the address code the government was able to accurately determine home ownership, liability for tax purposes and at the same time create a solution for the delivery of both goods and services. MapIT is actively involved in a similar project in Kenya – the benefits to service delivery etc. are immense- for the first
time in history it will be possible to address households/schools/hospitals/clinics etc. and place them on a map allowing
the application of the power of location based services such as spatial business intelligence, voice guided turn-by-turn
navigation, itinerary planning, geo-coding, geo-spatial analysis, fleet management, customer support and so on.

Methodology

Maps are created using a number of methods/source materials, ranging from imagery to digital and paper maps.
Included amongst these are community inputs (these maintain the freshness of content), mobile mapping van (capturing
vital information on routes such as height, depth and important road signage), aerial photography, field surveys and
input from partners and customers alike. Combining “crowd sourcing” with professional GIS back office QA/QC
processes deliver the freshest, most accurate spatial databases.

Challenges experienced when collecting data and surveying in Africa:

- Lack of infrastructure, organisation and planning at official level
- Updated town planning, street name, and address information seldom available
- Limited or no reliable external data providers/sources
- Absence of road furniture and conventional network structure make for challenges when determining road classes
  or types and related avoidances
- Requires a high degree of manual data collection and attribution of map features
- Constant changes and new development necessitates high update frequency
- Unique and Africa/region specific feature collection is crucial for successful route calculation; local knowledge
  and understanding is essential
- Regular political and regional safety issues can effect planning and execution of projects.

The use of field teams plays an incredibly important role in the updating of existing data. The primary task is to update
existing attributes and capture additional information that was not previously visible. Field collected data gives the
production team views not able to be seen on imagery, like road conditions, restricted access areas, blocked passages
and other valuable attribute information. A field collector App is widely used by the field team and by both the mapping
and general community to provide accurate and relevant information at the touch of a button. The App allows an area or
points and locations to be verified by the field worker on demand. The use of newer technologies like digital video
cameras has added value by giving a real time view of what the field worker is seeing and feeding this back to the
production teams. This is critical due to the fact that there is often little or no data available from municipal or
government sources.

In the case of the short term insurance industry that uses this attribute information to either penalise or reward
customers based on their driver behaviour, the currency of the data is of paramount importance. They have taken their
role in the gathering of pertinent attributes very seriously and interact with data suppliers on a regular basis ensuring the
highest quality outputs are available at all times.

Content

Datasets created and maintained in this manner include: african country boundaries, provinces or states, community or
other administrative boundaries, metropolitan or greater town boundaries, town boundaries, suburb or city subdivision
boundaries, similarly named or functionally related suburbs grouped together in groups, centre points of towns and
places of habitation, South African postal code areas and colloquial names, gated communities and sectional title
schemes.

An example of the use of accurate content has been established by one of MapIT’s technical partners who has stated the
following with respect to the speed information contained in the TomTom data:

“The speed codes that are contained in TomTom data are more realistic than other available data in both absolute and
relative terms. The other speed codes appear to have speeds that are faster than generally observed in the real world for
both highways and surface streets. As a result, the travel times or ETA’s of the routes calculated on those datasets can
be very optimistic as compared to real-world experience and also some routes stay on smaller streets and not prefer to
get on highways as they should. Superior routes with TomTom will be immediately seen in all of the server
environments with no software changes. In fact as a preview, we have reviewed some cases of customer problems in
this area, checking the routes against TomTom and seeing better quality routes with TomTom data.”

No matter which way you try and skin this cat – without fresh, accurate spatial data as input many a derived decision
will be inherently fraud – can you afford not to know where or what has influenced your poor decision?

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