New trends of GIS terrain mapping with modern low cost GNSS technology

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GIS & Mapping Technology Trends

- Similarly to the cellphone industry, GIS/GPS market and users demands are forcing manufacturers to make GPS receivers more feature-rich, in smaller form factors and at lower and lower price
- This added functionality at lower price results in large democratization of the GIS/GPS solutions use and in bigger and bigger number of users
- Low-cost mapping systems are being purchased in large quantities as the cost-effective benefits are realized
- At the same time, originally complex and complicated devices and solutions become more and more easy-to-use, intuitive and requiring less technical knowledge

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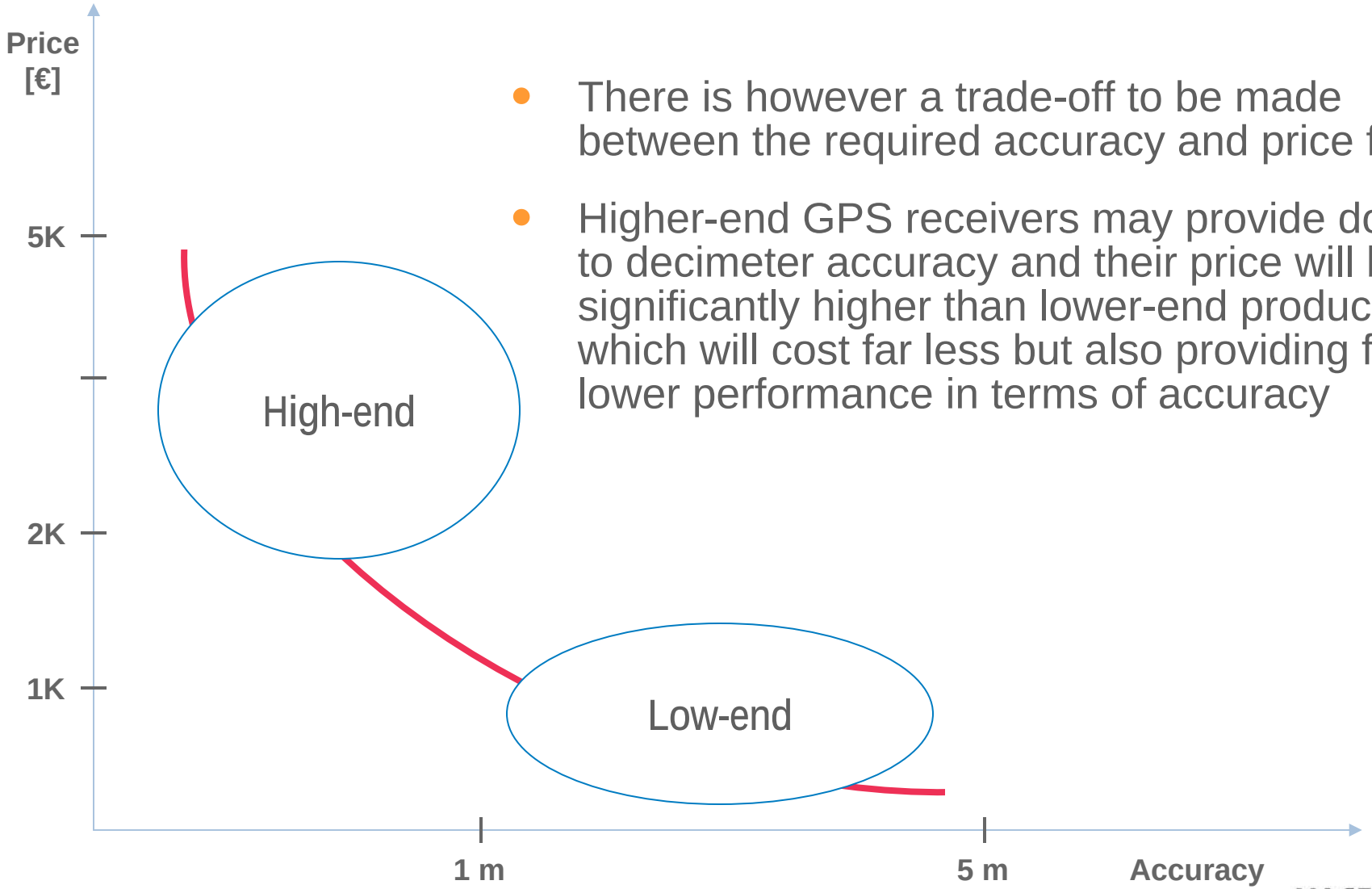
Mobile GIS challenges

- The right choice of the GIS/GPS receiver requires trade-offs between key device characteristics *(“you cannot have a small device with a big screen”):*
  - Accuracy
  - Price
  - Size
  - Weight
  - Ruggedness
  - Autonomy
  - …
- Let’s focus on the two first items: Accuracy & Price

Accuracy vs. Price



- There is however a trade-off to be made between the required accuracy and price for it
- Higher-end GPS receivers may provide down to decimeter accuracy and their price will be significantly higher than lower-end products which will cost far less but also providing far lower performance in terms of accuracy

Applications & Return on Investment

- Using GNSS technology does not cost any money, it makes money
- In the past, high GPS receiver costs combined with unknown or uncertain returns have prevented many users from investing in this technology. Today investment returns can be demonstrated in several different ways
  - Productivity
  - Infrastructure Management
  - Land Use Management

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Productivity

- GIS field work is less physically demanding and more productive while the mapping and data collection maintain the same precision or better than previously
- A GIS job that would have required two weeks to complete a decade ago, can be accomplished in one day
- GNSS technology provides worldwide coverage, is precise, helps to keep all of the measurements and data on the same datum and does not rely on visible landmarks to calculate a position, the information does not become obsolete over time

- **Thanks to GIS/GPS, the increased productivity saves time and money**

Infrastructure Management

- Precise knowledge of an asset's location, type and condition provide provides power to respond timely and effectively to problems and disasters
- Instead of responding to problems, GIS managers can preempt and prevent them
- Sometimes the landscape is occluded due to smoke or darkness; GNSS technology is independent of these factors so its reliability remains very high at times when other positioning techniques simply fail
- **Return on investment in the management of infrastructure is often seen in the form of saved lives**

Land Use Management

- GNSS technology provides an increasing interest in the management of natural resources for their effective management and protection
- Many regions do not have precise knowledge of their land divisions and boundaries
- Governmental agencies realized that thanks to refined land ownership and boundaries, the taxes can be assessed more accurately

- **Return on investment in land use management is characterized by facilitating assessment of taxes, long-term planning and protection of environmental resources**

MobileMapper CX

- **GIS/GPS handheld from Magellan Professional**
- **Highly flexible, accurate, affordable and rugged for universal GIS use**
  - Sub-meter real-time and even, down to sub-foot (< 30 cm) post-processing accuracy
  - The most cost effective handheld GPS in the market for high-accuracy mobile mapping
  - Rugged and compact design for demanding environmental conditions

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Product description

High level specifications

- **Firmware**
  - Windows CE.NET 5.0 operating system
    - Up-to-date operating system from Microsoft
  - WIN CE Network Generation content
    - Integrated GPS accurate to sub-meter in real-time and sub-foot in post-processing
    - Field-worthy rugged and waterproof design
    - All-day rechargeable and replaceable battery
    - DGPS corrections over Internet (NTRIP and Direct IP)
    - Intuitive Bluetooth manager
    - NMEA messages output management
    - 128 MB SDRAM and NAND Flash memory

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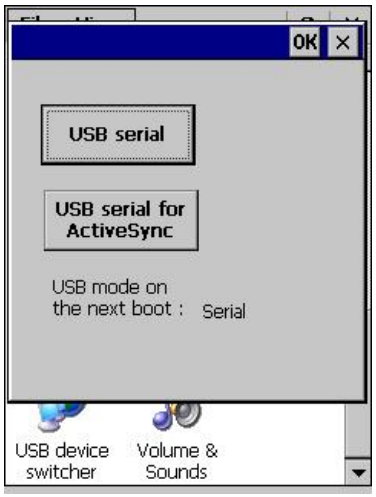
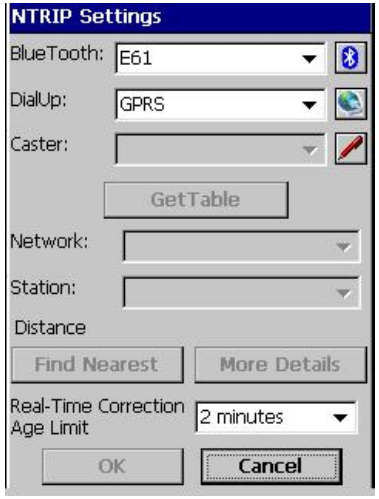
Product description

High level specifications

- **Firmware**
  - Up to 4 GB SD card support
  - WiFi driver
  - NMEA output at 1200 baud
  - NMEA USB output
  - DGPS configuration





Key Benefits

- **Universal GIS open platform**
  - Up-to-date standard operating system
  - Ready for a wide range of GIS mobile applicati
  - Turn-key solution with Magellan Mobile Mappin software
  - Car navigation capabilities

- **Advanced high performance GPS**
  - Sub-meter real-time positioning
  - Sub-foot (< 30 cm) in post-processing
  - Large support of DGPS modes: SBAS, Beacon, VRS, RTCM

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Key Benefits

- **Extremely rugged and waterproof**
  - Design for extreme outdoor conditions
  - Rugged, compact and lightweight form factors
  - Peace of mind in the field where consumer-grade devices cannot perform

- **Long lasting battery life**
  - Typical 8 hours autonomy and even up to 12 hours depending on the product use (backlight level, running applications…)
  - No limit of the work time with field-replaceable battery

- **Built-in alphanumeric keyboard**
  - Easy data entry and one-hand operations
  - Intuitive cell-phone like design

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Positioning and Key messages

Universal GIS/GPS solution

- **Enhanced flexibility for increased productivity**
  - Open design allow you to choose the GIS software that is right for you
  - State-of-the-art technologies (BT, WLAN, 4 GB SD) give you more freedom for your data management
- **Extremely accurate GPS handheld**
  - The most versatile GIS/GPS system – thanks to its multiple DGPS operating modes – ensuring accurate positioning whenever and wherever you use it
  - Sub-meter and even sub-foot (< 30 cm) GPS accuracy
- **Affordable GPS solution for large scale deployment**
  - The most cost-efficient GIS/GPS solution in the market
  - Reduces your cost and investment thus allowing a larger scale deployment to field
- **The most robust and rugged product for field use**
  - Best-in-class rugged and waterproof deign
  - Able to withstand weather conditions that would leave consumer grade products damaged

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Introducing MobileMapper 6

Versatile mobile GIS solution

- An affordable and easy-to-use, yet professional GPS/GIS handheld receiver

- Mapping device providing a complete set of all necessary features for productive data collection and efficient asset management in the field

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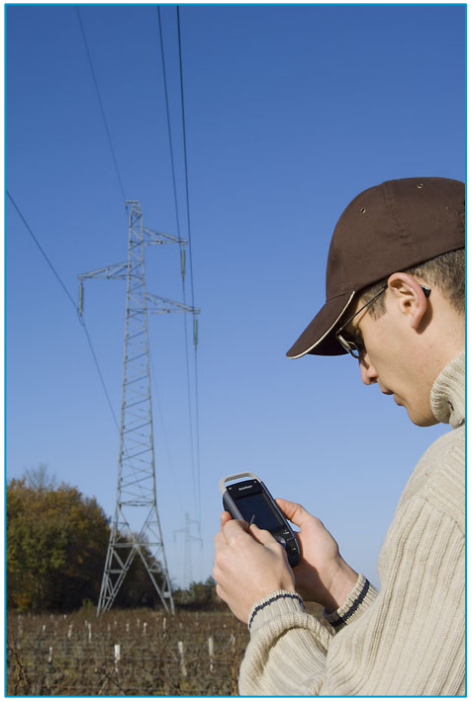
High level specifications

Key features

- Professional design
  - Rugged and waterproof (IPX7)
  - Compact form factors: 14.6 x 6.4 x 2.9 cm
  - Lightweight: 224 g
- High-sensitivity GPS
  - Sirf III Star
  - Fast GPS position acquisition
  - 12 channels
  - 2-5 meter real time (SBAS)
- Windows Mobile 6 based platform
  - 400 MHz processor
  - 128 MB flash / 64 MB RAM
- Integrated 2 Mpix digital camera
- Bluetooth technology
- SD card (up to 4 GB, SDHC compatible)
- AA type batteries



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Value proposition

Key points

- **Affordable** offer
  - Very competitive price
  - Allows large scale GIS deployment
- **Robust** GIS/GPS receiver
  - Rugged and waterproof design
  - Suitable for all field use
- **Mobile** GIS solution
  - Small form factors and weight
  - Wireless connectivity
- **Productive** GPS product
  - High-sensitivity GPS sensor
  - Integrated digital camera
- **State-of-the-art** open platform
  - Latest Windows Mobile 6 OS
  - Broad GIS software compatibility

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Windows Mobile 6

State-of-the-art operating system

- **Standard, well known UI, tools and applications**
  - Office Mobile: Word, Excel, PowerPoint
  - Virtual keyboard
  - Handwriting recognition
  - Internet Explorer and e-mail
  - Calendar, contacts, notes
  - Pictures & videos viewer
  - Windows Media Player
  - File Explorer
  - ActiveSync

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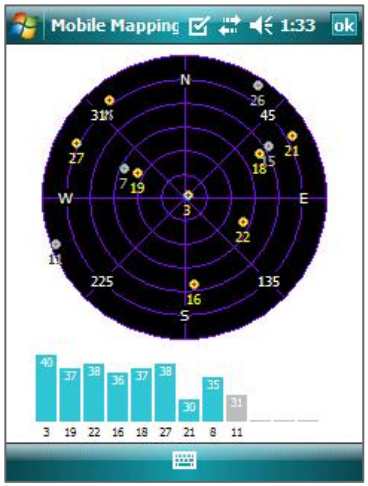
Magellan Mobile Mapping application

Entry-level GIS software



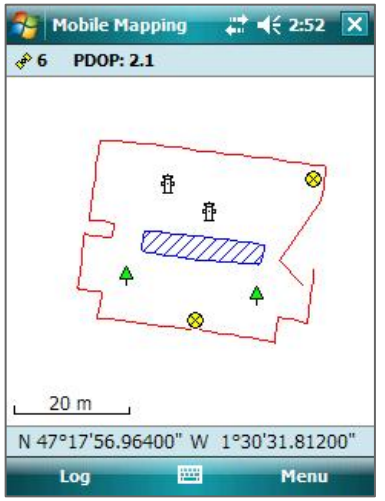
- **Easy-to-use and simple, yet powerful GIS data collection software**
  - To create and update maps for analysis and maintenance in a standard GIS system
  - Includes all necessary features without the burden of complicated and rarely used functions
  - Very intuitive and easy-to-use, requiring minimum training

"All the good stuff is here! Very simple, yet powerful."

Magellan Mobile Mapping software application

Key features

- GPS data collection and mapping
- Vector layers (point, line and area) in SHP format
- Raster data geo-referenced images support
- Area and perimeter calculation
- Digital camera for geo-referenced picture attributes
- Offset measures for all feature types
- Points nesting while mapping a line or area
- Pre-defined and custom coordinate systems
- ActiveSync for data transfer and PC synchronization



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7. Examples of GIS applications

GIS Community

Generic GIS field data collection

ESRI

Digiterra

Gemini Positioning Systems

Positioning Resources

Forestry, Tree inventory

Arbor Vision

Farm Works

Form tools for field data collection

Global Bay

Agriculture

Farm Works

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Compatible hardware solutions

Complete GIS solutions

- **Laser rangefinder**
  - TruPulse family (200B, 360B)

LASER TECHNOLOGY INC
Measurably Superior

- **Cable locator**
  - 3M Dynatel loc

3M
Dynatel™

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Mobile Mapper 6

What MobileMapper 6 is

- New rugged handheld GIS/GPS receiver for entry-level markets
- Highly affordable, robust, mobile, productive and state-of-the-art product
- Turn-key solution together with Mobile Mapping, DigiTerra Explorer or ArcPad
- Very compelling offer matching and even surpassing competitive offerings

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Become a Software Business Partner

Concept

- Magellan is actively building Business Partnerships for software development and is focused on customer needs for complete GPS/ GIS solutions.

- These GPS/ GIS applications, integrated into the MobileMapper CX platform, provide customers with simple all-in-one GIS solutions, allowing them to focus on the task at hand rather than device configuration.

- Become a Software Business Partner and expand your business through joint marketing, demand generation and close collaboration with Magellan.

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Conclusion

- GNSS/GIS technology is an efficient and reliable tool for mapping and asset management
- Price of these systems, originally prohibitively high, have declined over the recent years while performance has increased
- New GNSS/GIS low-cost systems will benefit developing regions by lowering the price barrier while providing effective and rapid return in investment
- The benefits of precise geospatial information will be realized in more and more disciplines as GNSS/GIS devices enriches in functionalities for less and less money

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Map anything. Anywhere. In any way.

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