



FOSS4G 2010 *Barcelona*

A comparison of GIS Mobile Applications

Miguel Montesinos & Javier Carrasco
mmontesinos/jcarrasco@prodevelop.es



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Agenda



1. Introduction
2. Products
3. Platforms
4. Open source analysis
5. Feature comparison
6. Performance tests
7. Conclusions

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Introduction

In the beginning it was ArcPad + MS PocketPC + Old PDAs



Introduction

The evolution followed these trends:

- Competitors far far away from ESRI
- MS leading the path
- PDAs evolving to smartphones
- No Open-Source projects



Introduction

Some OS initiatives started:

- MOSS4G – FOSS4G BOF 2006
- gvSIG Mobile
- Enebro



Introduction

Mobile phones swallowed PDAs

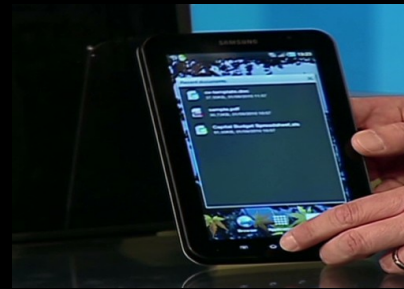
- MOSS4G – FOSS4G BOF 2006
- gvSIG Mobile
- Enebro



Introduction

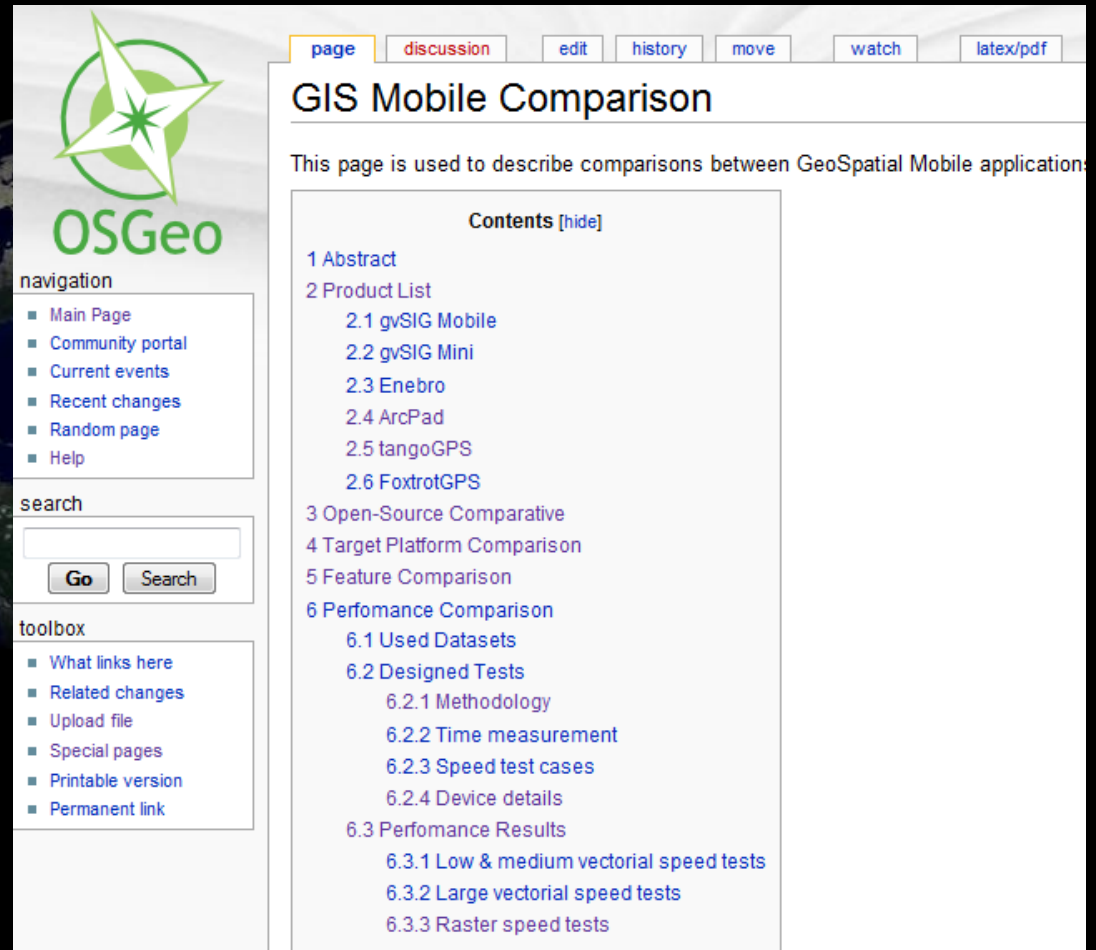
PDAs are not personal any more
¿EDAs?

- Windows Mobile based GIS
- Newcomers



Introduction

Article with details available at OSGeo wiki



The screenshot shows the OSGeo wiki page for 'GIS Mobile Comparison'. The page features a navigation sidebar on the left with links for Main Page, Community portal, Current events, Recent changes, Random page, and Help. Below this is a search box with 'Go' and 'Search' buttons, and a toolbox with links for What links here, Related changes, Upload file, Special pages, Printable version, and Permanent link. The main content area includes a table of contents for the article, listing sections from 1 Abstract to 6.3.3 Raster speed tests. The OSGeo logo is visible in the top left corner of the page content.

OSGeo

page discussion edit history move watch latex/pdf

GIS Mobile Comparison

This page is used to describe comparisons between GeoSpatial Mobile applications.

Contents [hide]

- 1 Abstract
- 2 Product List
 - 2.1 gvSIG Mobile
 - 2.2 gvSIG Mini
 - 2.3 Enebro
 - 2.4 ArcPad
 - 2.5 tangoGPS
 - 2.6 FoxtrotGPS
- 3 Open-Source Comparative
- 4 Target Platform Comparison
- 5 Feature Comparison
- 6 Performance Comparison
 - 6.1 Used Datasets
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 - 6.2.1 Methodology
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 - 6.2.3 Speed test cases
 - 6.2.4 Device details
 - 6.3 Performance Results
 - 6.3.1 Low & medium vectorial speed tests
 - 6.3.2 Large vectorial speed tests
 - 6.3.3 Raster speed tests

http://wiki.osgeo.org/wiki/GIS_Mobile_Comparison

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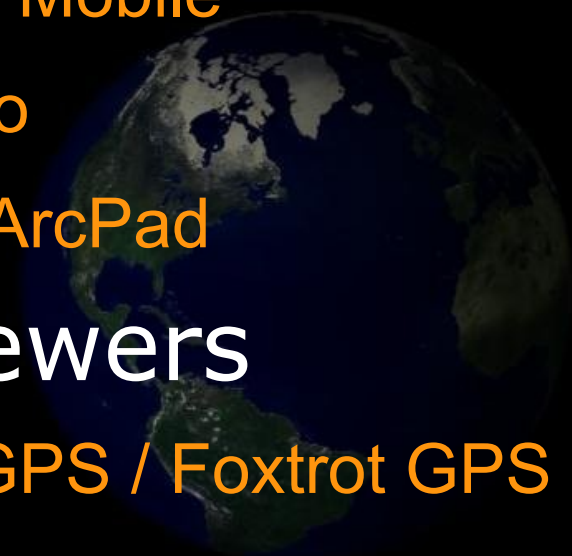
Mobile GIS Products

Real GIS

- gvSIG Mobile
- Enebro
- ESRI ArcPad

Mobile Viewers

- TangoGPS / Foxtrot GPS
- gvSIG Mini
- Layar



Products. gvSIG Mobile

Member of gvSIG family

Funded by Reg. Gov Valencia, Spain

GPL

Community

Alive & kicking



| Feature | Value |
|--------------------|---|
| Name | gvSIG Mobile |
| Version | 0.3 / 1.0 alpha |
| Release Date | November 2009 |
| Open-Source | Yes |
| Free (cost) | Yes |
| Website | http://www.gvsig.org/web/projects/gvsig-mobile/description-2/view?set_language=en |
| Main Organization | gvSIG Association |
| User Documentation | Yes (English, Spanish, German) |
| Languages | English, Spanish, French, German, Italian |

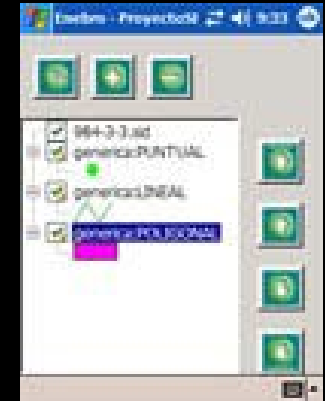
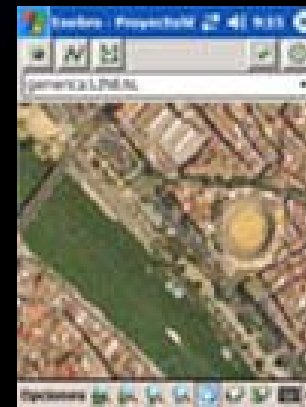


Products. Enebro



Funded by Reg. Gov Andalucía, Spain
Open Source
No Community / Open Development

| Feature | Value |
|--------------------|---|
| Name | Enebro |
| Version | 2.0.37 |
| Release Date | August 2008 |
| Open-Source | Yes |
| Free (cost) | Yes |
| Website | http://www.gvsig.org/web/projects/gvsig-mobile/description-2/view?set_language=en |
| Main Organization | Junta de Andalucía / Guadatel |
| User Documentation | Yes (Spanish) |
| Languages | Spanish |



Products. ArcPad



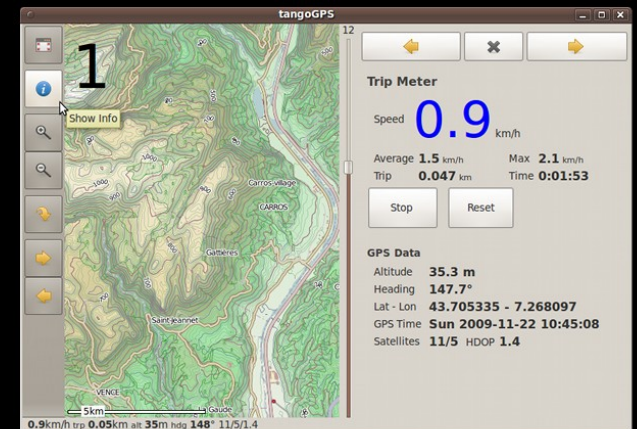
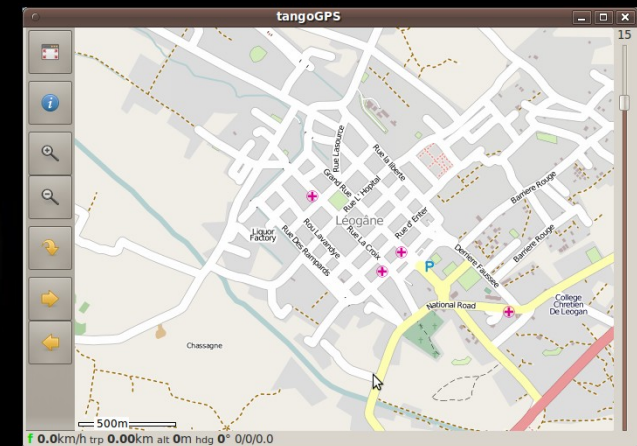
ESRI product
Private Software
Active Development

| Feature | Value |
|--------------------|---|
| Name | ArcPad |
| Version | 10 |
| Release Date | June 2010 |
| Open-Source | No |
| Free (cost) | No (aprox. \$700.00 single-user license) |
| Website | http://www.esri.com/software/arcgis/arcpad/index.html |
| Main Organization | ESRI |
| User Documentation | Yes (English, Spanish ¿other languages?) |
| Languages | Chinese (Hong Kong), Chinese (Simplified), Danish, Dutch, French, German, Hebrew, Hungarian, Japanese, Norwegian, Polish, Portuguese (Brazil), Romanian, Spanish, Swedish |



Products. Tango GPS

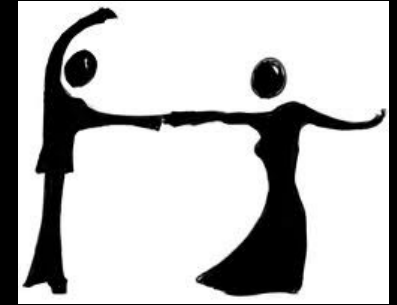
GPS-flavoured product
Open Source
Linux platforms
Forked by Foxtrot GPS



| Feature | Value |
|--------------------|---|
| Name | tangoGPS |
| Version | 0.99.4 |
| Release Date | June 2010 |
| Open-Source | Yes |
| Free (cost) | Yes |
| Website | http://www.tangogps.org/ |
| Author | Marcus Bauer |
| User Documentation | Yes (English) |
| Languages | English |



Products. Foxtrot GPS



GPS-flavoured product
Open Source
Linux platforms
Active OSGeo list: `foss-gps`



| Feature | Value |
|--------------------|---|
| Name | FoxtrotGPS |
| Version | 0.99.4 |
| Release Date | June 2010 |
| Open-Source | Yes |
| Free (cost) | Yes |
| Website | http://www.foxtrotgps.org/ |
| Author | Community around a mailing list at OSGeo |
| User Documentation | No (English) |
| Languages | English |

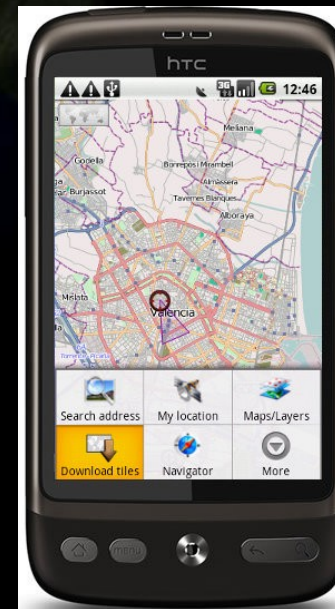


Products. gvSIG Mini



GPS-flavoured product
Open Source
Android / Java ME CLDC

| Feature | Value |
|--------------------|---|
| Name | gvSIG Mini |
| Version | 1.0 |
| Release Date | September 2010 |
| Open-Source | Yes |
| Free (cost) | Yes |
| Website | http://www.gvsigmini.org |
| Main Organization | Prodevelop / gvSIG Association |
| User Documentation | Yes (English) |
| Languages | English, Spanish, German, Italian |



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Platform Execution

| Name | Open Source | W. Mobile | Java CLDC | Android | iPhone | Linux PDA | Windows PC | Linux PC |
|--------------|-------------|-------------------|-----------|-------------------------|--------|---------------------|-----------------|--------------------------|
| gvSIG Mobile | Yes | Yes(WM 2003/5/6) | No | No | No | Yes OpenMoko, Maemo | Yes (W 2000/XP) | Yes |
| gvSIG Mini | Yes | Yes(JVM) | Yes | Yes (Android 1.5 - 2.2) | No | No | No | No |
| Enebro | Yes | Yes (WM 2003/5/6) | No | No | No | No | Yes (W 2000/XP) | Yes (Guadalinex v.3.0.1) |
| ArcPad | No | Yes (WM 2003/5/6) | No | No | No | No | Yes | No |
| TangoGPS | Yes | No | No | No | No | Yes | No | Yes |
| FoxtrotGPS | Yes | No | No | No | No | Yes | No | Yes |

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“Open-Source-ness”

| Name | Progr. Language | Open Source | License | Public Version Control | Public Bugtracker | Mailing List | Developer Doc. | Active Development | Contributors |
|-----------------------------|-----------------------------|-------------|----------------------------|------------------------|-------------------|-------------------|----------------|--------------------|----------------------|
| gvSIG Mobile ^[1] | Java ME - CDC | Yes | GPL 2+ | Yes (SVN) | Yes | Yes (Very Active) | Partial | Yes | 7 |
| gvSIG Mini ^[1] | Java ME CLDC / Java Android | Yes | GPL 2+ | Yes (SVN) | No | Yes (Active) | Yes | Yes | 4 |
| enebro ^[2] | C++ | Yes | Non-standard/Under request | No | No | No | No | No | Unknown |
| ArcPad ^[3] | C++ | No | N/A | No | No | Yes (Very Active) | Yes | Unknown | Unknown |
| TangoGPS ^[4] | C | Yes | GPL 2 | Yes | No | Yes (Active) | No | Yes | Marcos Bauer + helps |
| FoxtrotGPS ^[5] | C | Yes | GPL 2 | No | No | Yes (Very Active) | No | No | 3 |

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Basic and symbology

| Feature | gvSIG Mobile 1.0 alpha | gvSIG Mobile 0.3 | Enebro | tangoGPS / FoxtrotGPS | ArcPad | gvSIG Mini | Layar |
|--|------------------------|------------------|--------|-----------------------|--------|-----------------|------------------------------|
| Multilayer | Yes | Yes | Yes | No | Yes | No | Yes Only public point layers |
| Multiple coordinate systems | Yes | Yes | No | No | Yes | Yes | No |
| Symbology (change representation) | | | | | | | |
| — Simple | Yes | Yes | Yes | No | Yes | No | No |
| — Scale | Yes | Yes | Yes | No | Yes | No | No |
| — Labeling | Yes | No | No | No | Yes | No | No |
| — Range | Yes | Yes | No | No | Yes | No | No |
| — Unique value | Yes | No | No | No | Yes | No | No |
| Hyperlink | No | No | Yes | No | Yes | No | Yes |
| Find by attributes | Yes | Yes | No | No | Yes | Yes Online only | Yes Online only |

Offline formats support

| Feature | gvSIG Mobile 1.0 alpha | gvSIG Mobile 0.3 | Enebro | tangoGPS / FoxtrotGPS | ArcPad | gvSIG Mini | Layar |
|------------------------|---------------------------|---------------------|--------|--------------------------|--------|------------|-------|
| Offline support | | | | | | | |
| — shapefiles | Yes | Yes | Yes | No | Yes | No | No |
| — GML | Yes | Yes | No | No | No | No | No |
| — KML | Yes | Yes | No | No | No | No | No |
| — GPX | Yes | Yes | No | Yes | No | No | No |
| — ECW | Yes | Yes | Yes | No | Yes | No | No |
| — MrSid | No | No | Yes | No | Yes | No | No |
| — Jpeg2000 | No | No | No | No | Yes | No | No |
| — tiles | No | No | No | Yes | No | Yes | No |

Online formats support

| Feature | gvSIG Mobile 1.0 alpha | gvSIG Mobile 0.3 | Enebro | tangoGPS / FoxtrotGPS | ArcPad | gvSIG Mini | Layar |
|-----------------------|---------------------------|---------------------|--------|--------------------------|--------|------------|-------|
| Online support | | | | | | | |
| — WMS | Yes | Yes | No | No | No | Yes | No |
| — WFS | Yes | No | No | No | No | No | No |
| — WFS-T | No | No | No | No | No | No | No |
| — tiles | No | No | No | Yes | No | Yes | No |
| — ArcIMS | No | No | No | No | Yes | No | No |

GPS

| Feature | gvSIG Mobile 1.0 alpha | gvSIG Mobile 0.3 | Enebro | tangoGPS / FoxtrotGPS | ArcPad | gvSIG Mini | Layar |
|--------------------------|---------------------------|---------------------|--------|--------------------------|--------|------------|---------|
| GPS | | | | | | | |
| — Satellite information | Yes | Yes | Yes | Yes | Yes | No | No |
| — External GPS support | Yes | Yes | Yes | Yes | Yes | Yes | Unknown |
| — GPS aided editing | Yes | Yes | Yes | Yes | Yes | No | No |
| — tracklog storage | Yes | Yes | Yes | Yes | Yes | No | No |
| — waypoint storage | Yes | Yes | Yes | Yes | Yes | No | No |
| — Real-Time DGPS | No | No | No | Yes | Yes | No | No |
| — Vertex point averaging | Yes | Yes | No | No | Yes | No | No |

Editing

| Feature | gvSIG Mobile 1.0 alpha | gvSIG Mobile 0.3 | Enebro | tangoGPS / FoxtrotGPS | ArcPad | gvSIG Mini | Layar |
|---------------------------|---------------------------|---------------------|--------|--------------------------|--------|------------|---------|
| Editing | | | | | | | |
| — Geometry editing | Yes | Yes | Yes | No | Yes | No | No |
| — New layers creation | No | No | No | No | No | No | No |
| — Alphanumeric editing | Yes | Yes | Yes | No | Yes | No | No |
| — Custom Forms | Yes | Yes | No | No | Yes | No | Partial |
| — Attribute table editing | Yes | No | No | No | Yes | No | No |
| — Split and union | No | No | No | No | Yes | No | No |
| — Sketch | Partial | No | No | No | Yes | No | No |
| — Snapping | Yes | No | No | No | Yes | No | No |
| — Export | | Yes | No | No | No | No | No |

Other features

| Feature | gvSIG Mobile 1.0 alpha | gvSIG Mobile 0.3 | Enebro | tangoGPS / FoxtrotGPS | ArcPad | gvSIG Mini | Layar |
|--|---------------------------|---------------------|--------|--------------------------|---------|------------|-----------|
| Extensibility through plugins | Yes | No | No | No | Yes | No | No |
| Custom toolbars | No | No | No | No | Yes | No | No |
| Ease to use | Medium | Medium | Medium | Easy | Easy | Easy | Easy |
| Ease to install | Hard | Medium | Easy | Easy | Easy | Easy | Easy |
| Spread (google search results number) | 35.500 | 35.500 | 12.200 | 18.200 + 6.180 | 147.000 | 3.970 | 2.200.000 |
| Camera support | No | No | No | No | Yes | No | Yes |
| Rangefinder support | No | No | No | No | Yes | No | No |

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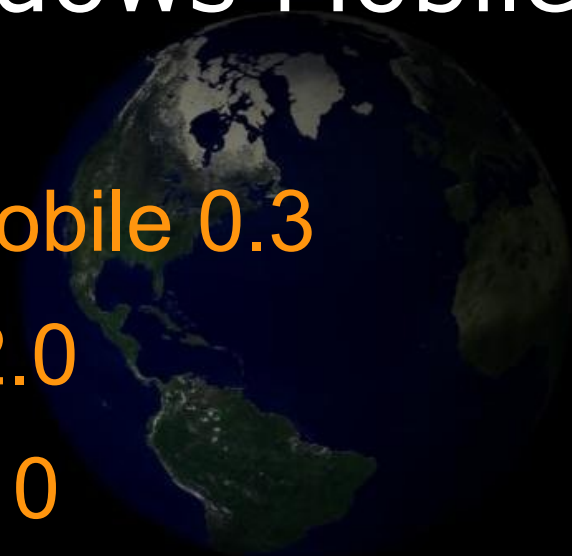
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Performance Tests

Only for Windows Mobile Products

- gvSIG Mobile 0.3
- Enebro 2.0
- ArcPad 10

Only for common data formats



Performance Tests. Datasets

Vectorial Datasets

FOSS4G 2010 Dataset (ShapeFile)

Raster Datasets

ECW from CNIG (Spanish Nat. Mapping Agency)

| Datasource | Type | Number of Features | Type | Size |
|-------------------------------|----------|--------------------|--------|---------|
| Vector layers | | | | |
| point-labels-for-geometry.shp | Point | 265 | Small | 241 KB |
| motorway.shp | Polyline | 79 | Small | 106 KB |
| settlement.shp | Polygon | 257 | Small | 152 KB |
| ramp.shp | Polyline | 635 | Medium | 334 KB |
| contour.shp | Polyline | 3429 | Large | 12,8 MB |
| industry.shp | Polygon | 5070 | Large | 1,34 MB |
| Raster layers | | | | |
| bcn_recorte_5000.ecw | ECW | 5000x5000 px | Medium | 7,5 MB |
| bcn_recorte.ecw | ECW | 14273x21693 px | Large | 82,9 MB |



Performance Tests. Methodology

Manual measurement. Stopwatch.

Averaging

Minimal threshold = 0,2 s.

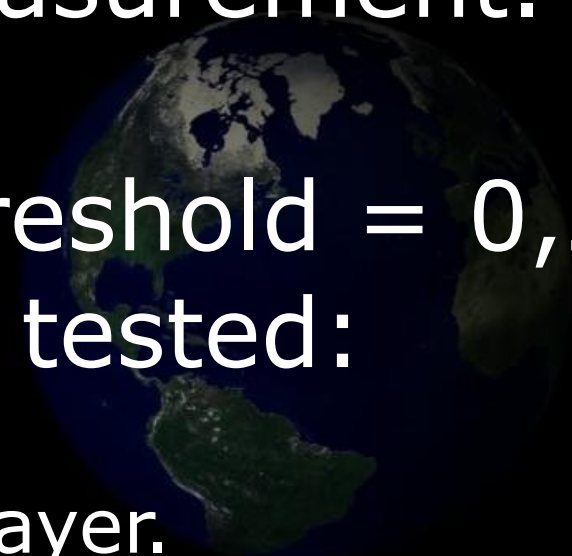
Operations tested:

Add a layer.

Zoom to a small area.

Pan.

Fit all (Zoom to Extent)



Performance Tests. Methodology

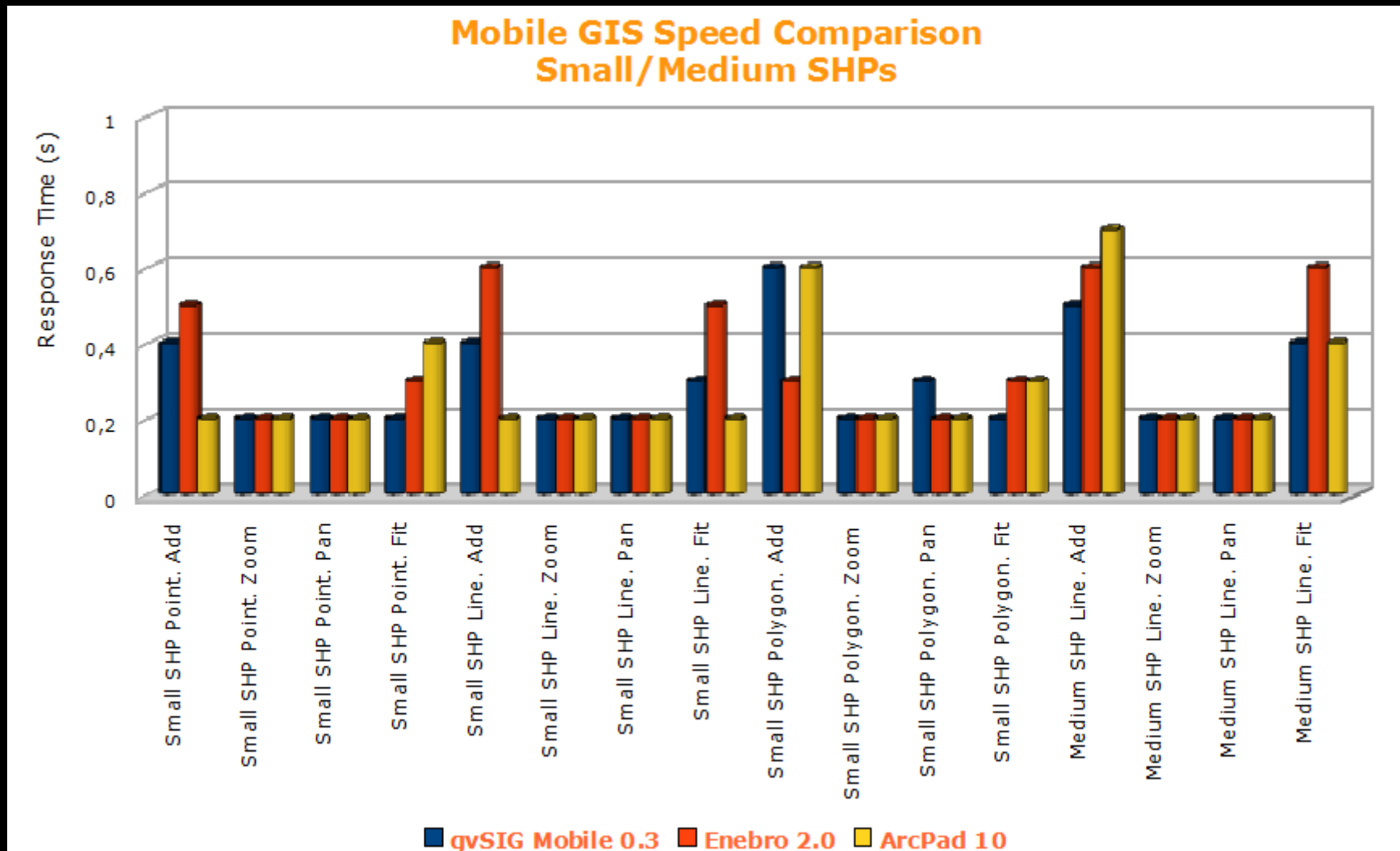
Used device. PDA:



- Acer S200
- Processor: Qualcomm 1 Ghz
- Memory: 256 KB SDRAM.
- ROM: 512 KB.
- Screen: 480 x 800 px.
- O.S.: Windows Mobile 6.5

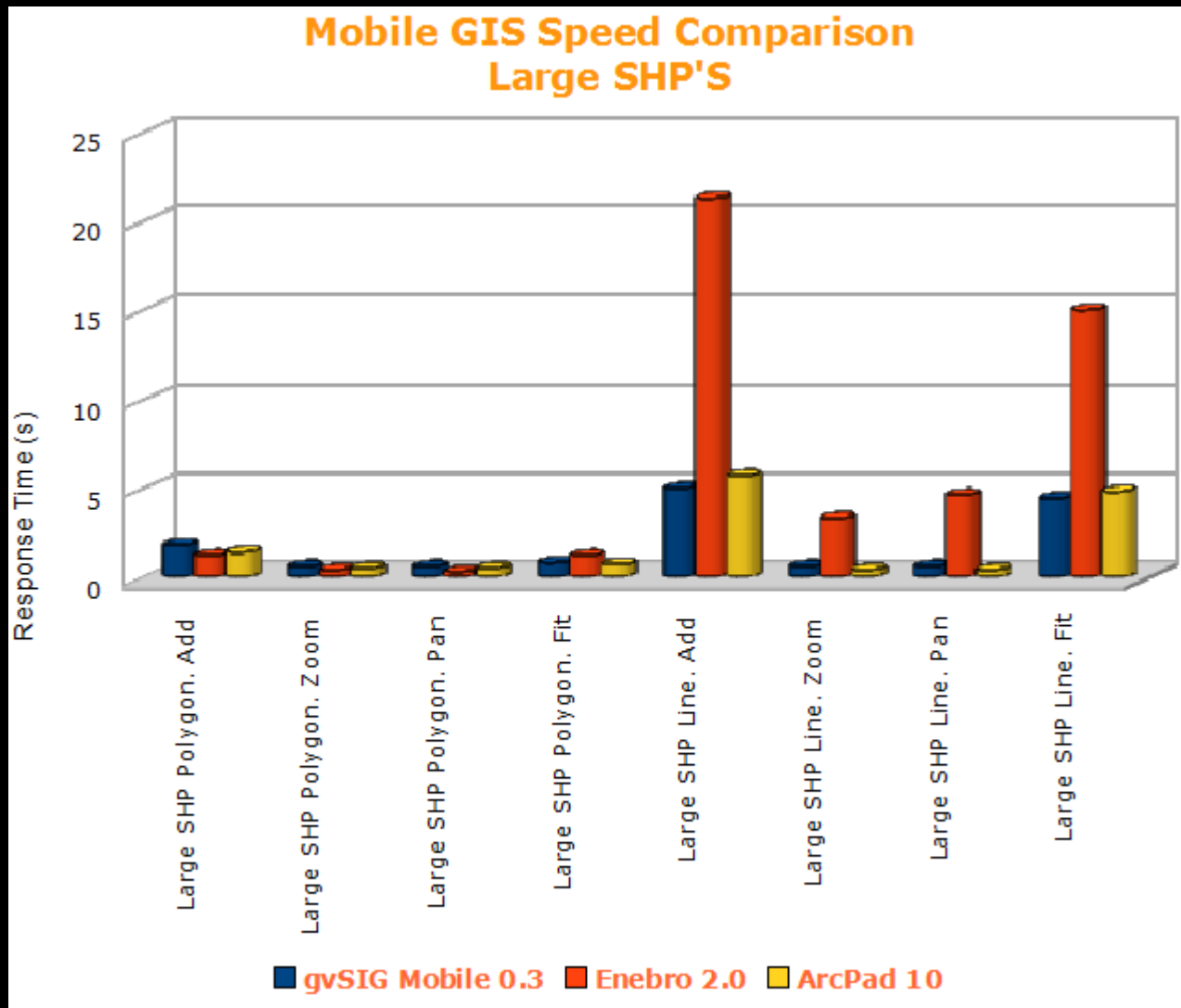
Performance Tests. Results

Vectorial Datasets. Small/Medium



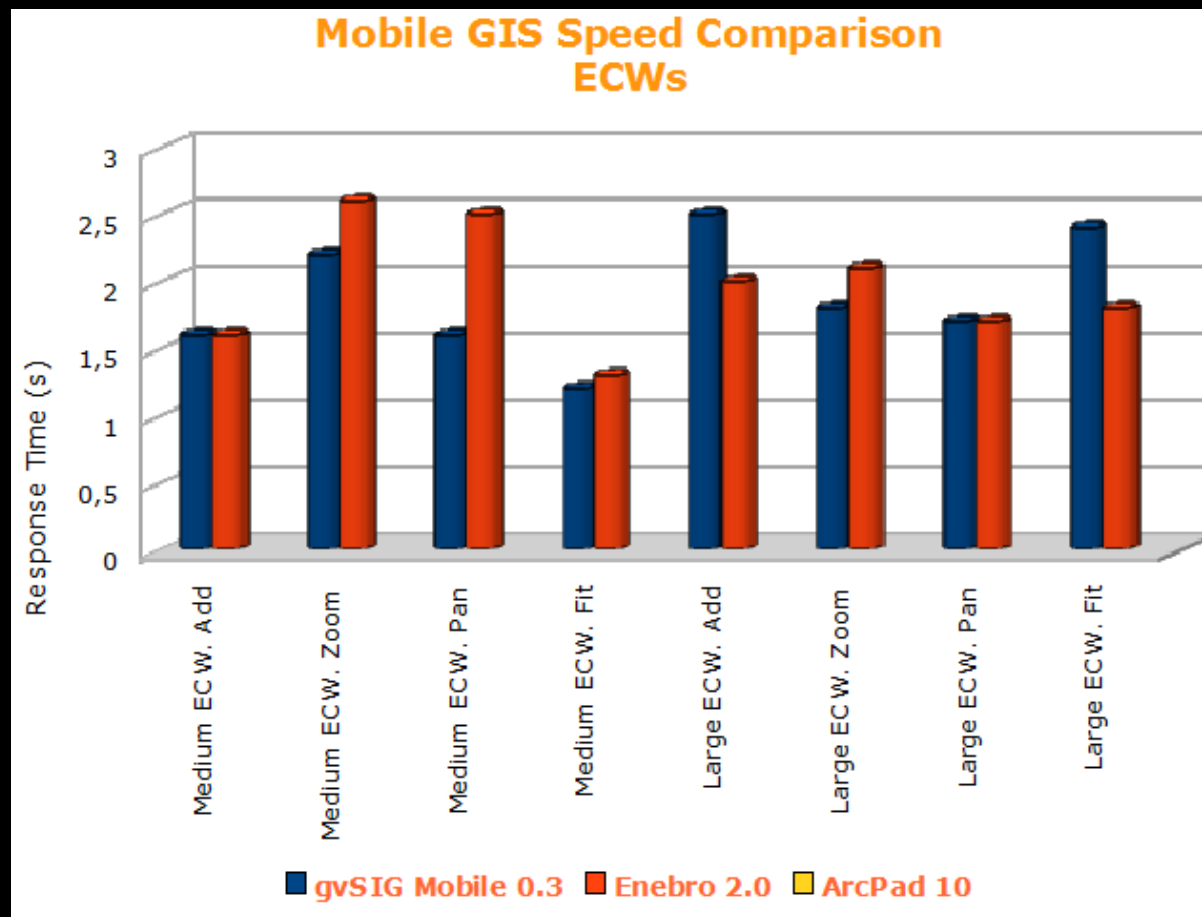
Performance Tests. Results

Vectorial Datasets. Large



Performance Tests. Results

Raster Datasets



For small zooms, no response in Enebro within 5 mins.

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Enebro

- Very good software, quite fast and free
- Not open development, no public repositories
- No developer documentation
- Confusing license
- Very few spread

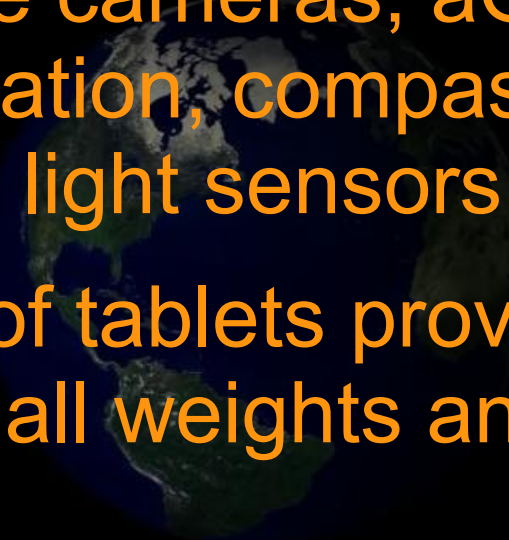


Very light applications

- Application like gvSIG Mini or TangoGPS that support only tiles (OSM, yahoo maps...) or WMS are fast and light and powerful
- This kind of applications are growing in number
- With a few more work is possible to add custom forms and POI creation to do asset inventory and maintenance and incidence reporting

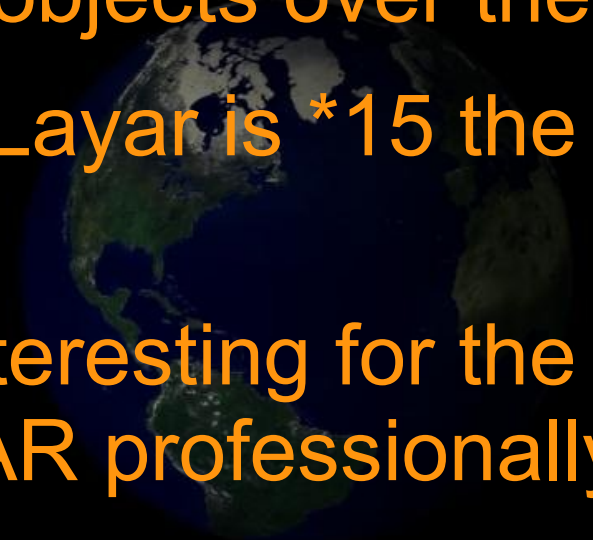
New devices and platforms

- Android and iOS devices are “cheap” and powerful, include cameras, aGPS, WiFi and CellId based location, compass, accelerometers, light sensors and so on.
- The new boom of tablets provides bigger screens with small weights and good battery consumption
- Multitouch screens require new interfaces
- The number of users is astonishing



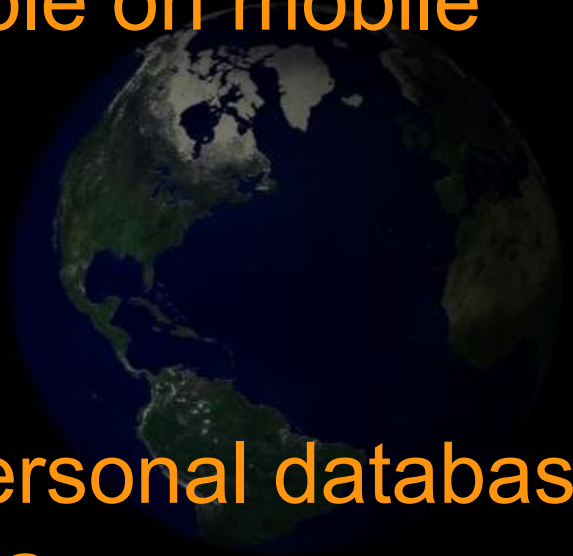
Layar and Augmented Reality

- Augmented reality provides users the possibility to see located objects over the real world
- The spread of Layar is *15 the spread of ArcPad
- ¿Could it be interesting for the GIS community to use mobile AR professionally?



Web based touch applications

- There are some initiatives to make the web mapping possible on mobile
 - TouchMapLite
 - Openlayers
 - more?
- With HTML5 personal database is possible to have offline data
- We will keep an eye on those projects



Desktop applications optimized for mobility

- Beegis is an application developed to be used by geologists on outdoor surveys
- Is built on top of Jgrass, so it has a lot of functionality
- It works on tablet-PCs
- Its key functionalities are
 - Geonotes tool
 - GPS tool



The number of applications

- We searched very hard for FLOSS mobile Geo applications with very few results
- Did we missed any important software?
- What are the reasons for such a few results?



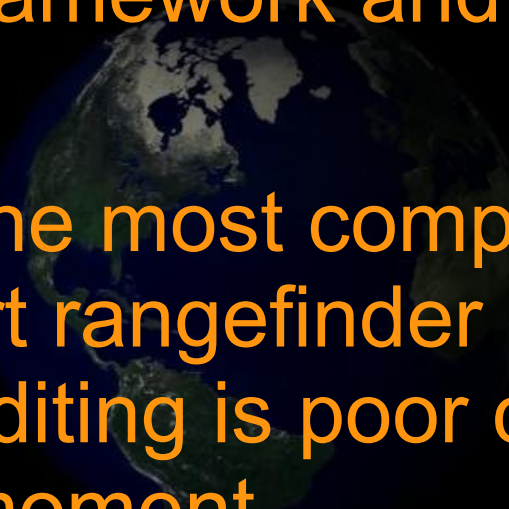
Are the OS applications comparable to ArcPad? (I)

- In both FLOSS apps and ArcPad Is possible to:
 - field mapping
 - inventory and mantainment of assets
 - incidence reporting
 - inspections
- ArcPad does not support any open or OGC format
- Performance is perfectly comparable and in some cases gvSIG Mobile is even faster



Are the OS applications comparable to ArcPad? (II)

- ArcPad has great documentation, a good customization framework and good integration with ArcGIS
- gvSIG Mobile (the most complete OS App) does not support rangefinder or dgps or camera and geometry editing is poor compared to ArcPad at this moment



To do

- **FLOSS Mobile GIS still have to work on**
 - Making better documentation and tutorials
 - Making the software easier to install and use
 - Expand the user and developer community
 - Support professional equipment like rangefinder and dgps
- **Keep an eye on new interactions (multitouch), new hardware (+1GB RAM, Sensors), new approaches (AR) and new possibilities (HTML5, WiFi and CellID location)**





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