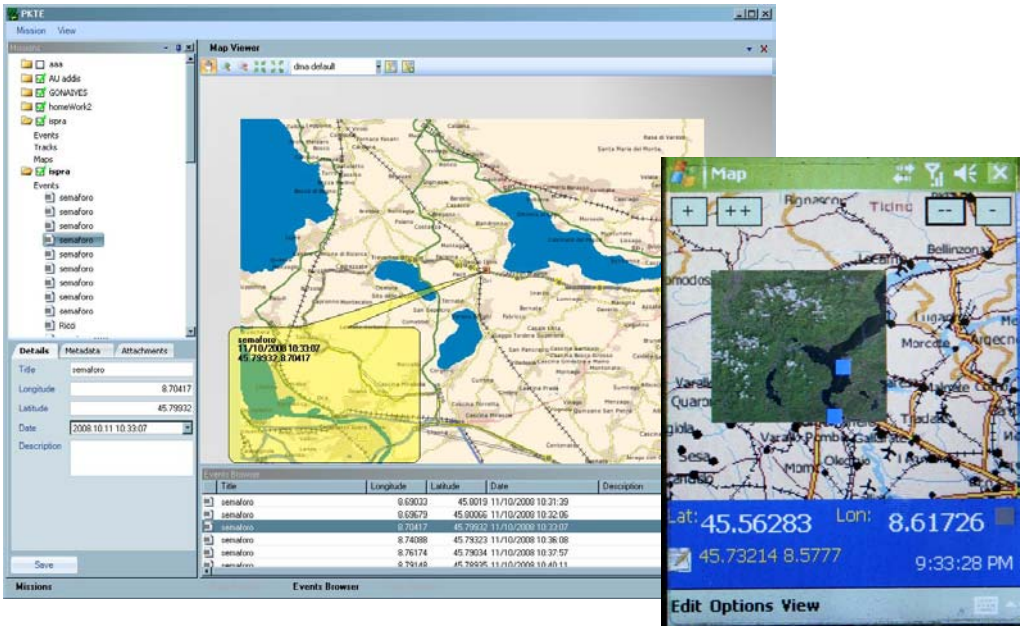
JRC Scientific and Technical Reports

JRC Field Tracking Tool

Status report

A. Annunziato, D. A. Galliano, R. Guana



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1 Introduction

The objective of this software suite is to create a tool that can be used whenever there is the need of a quick situation assessment at high level. The task is to be able to shorten as much as possible the data retrieval, the data assessment and the data transfer between various levels of an organization.

A typical organization we considered is a field base, a field explorer team and a Headquarter in another location.

The work originated by a request for the development of such a system by UNDPKO. When a mission is prepared in the field Base camp, maps are selected together with the scope and the taxonomy of the situations that may be expected; if needed, collection of previous missions data for reference can be added also.

The application is therefore conceived as follows:

- Notebook Application
  - Prepares the maps for the PDA
  - Communicate with the server to get new maps or upload draft situation status
  - Fuses various contributions
- PDA Application
  - Collects field data
  - Communicate with the server to get new maps or upload draft situation status
  - Communicate with the Notebook Application
- Server Application
  - Collects the data and automatically prepares the web pages to visualize the data

This report will describe the objectives of the various applications and their status and should serve as working document in order to get feedback from the future possible users.

2 PKTS Architecture

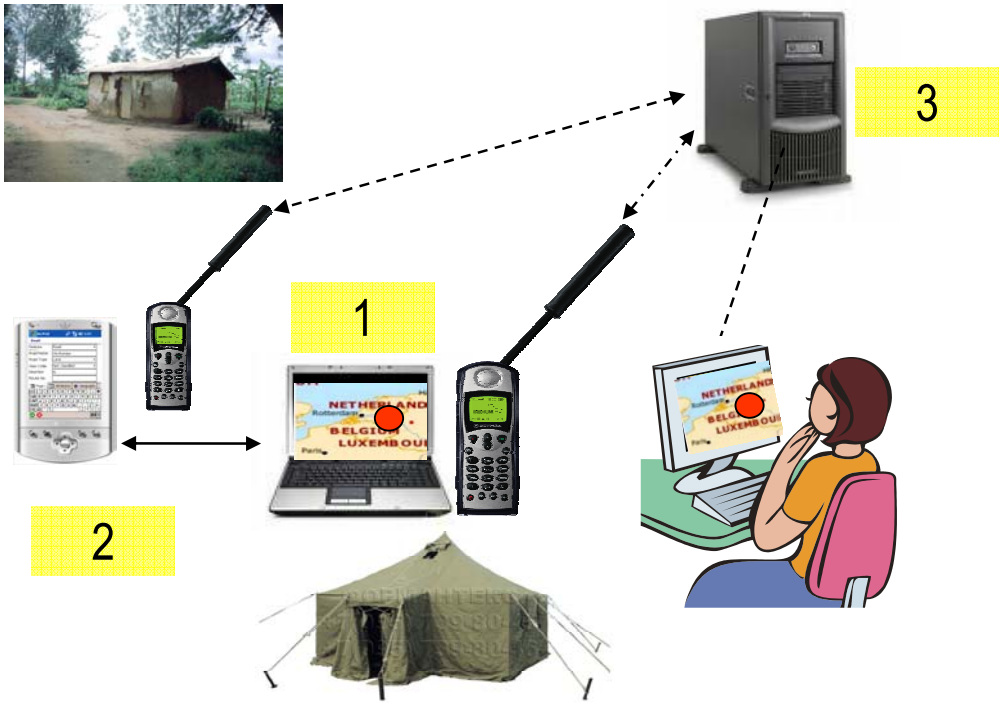
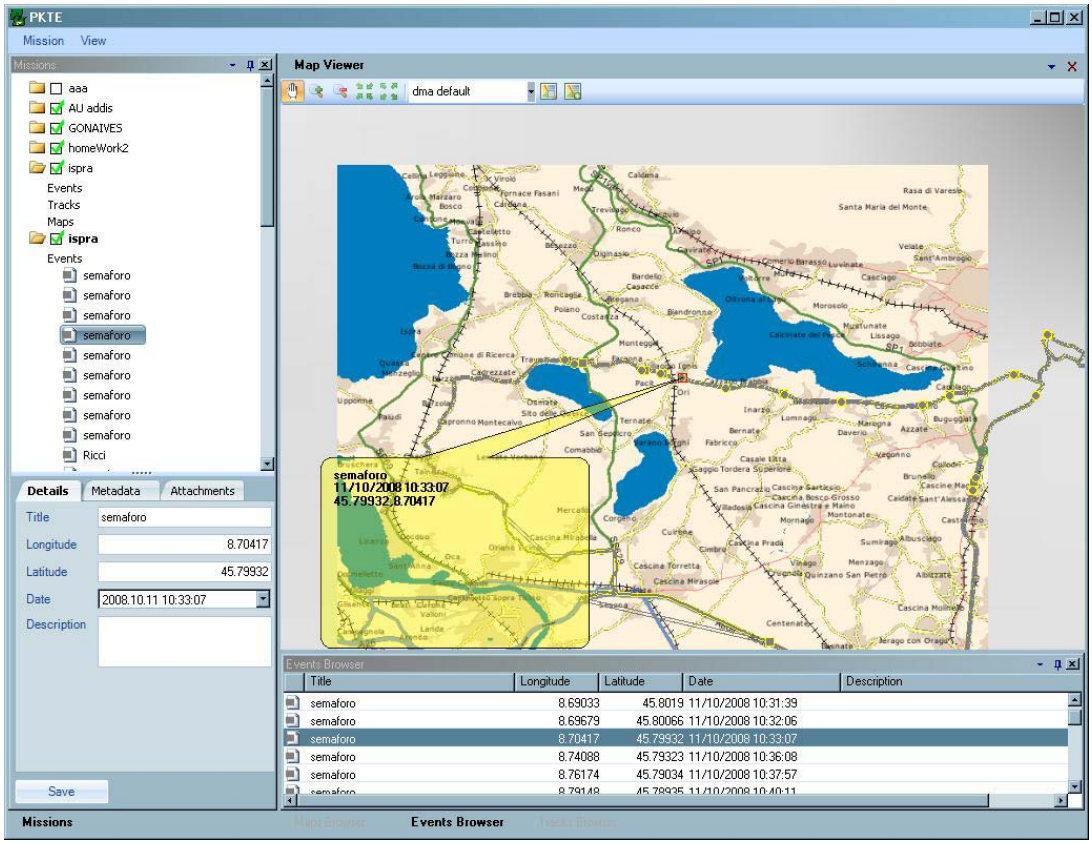


Figure 1 – architecture of the PKTE application

2.1 Notebook Application

The Notebook application is used to prepare a mission, collect the maps, and to reduce their size appropriately if needed for the lower performance PDA application. In order to preserve the needed details, tiling strategies are used.
Also it will serve to communicate with the server to upload and download data when an internet communication is achieved.
After the field mission, this application can be used to edit easily collected data, to organize them and integrate them with other information.



2.1.1 Preparation of a new mission

An appropriate button in the main screen of the application allows to create from scratch a new mission. The window below will appear which allows to indicate the title and a description of the mission.

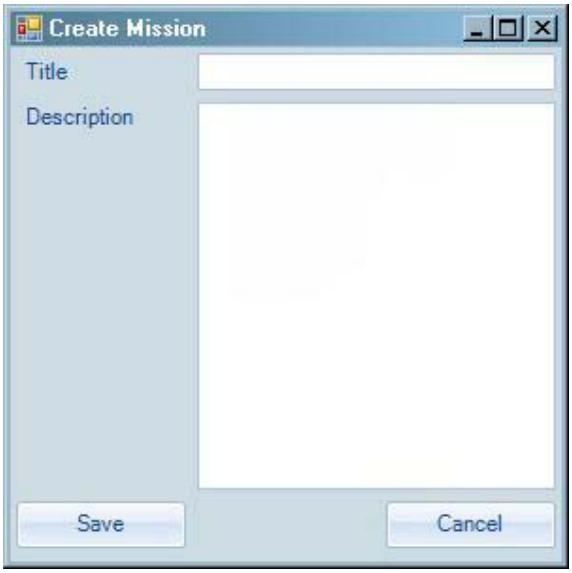
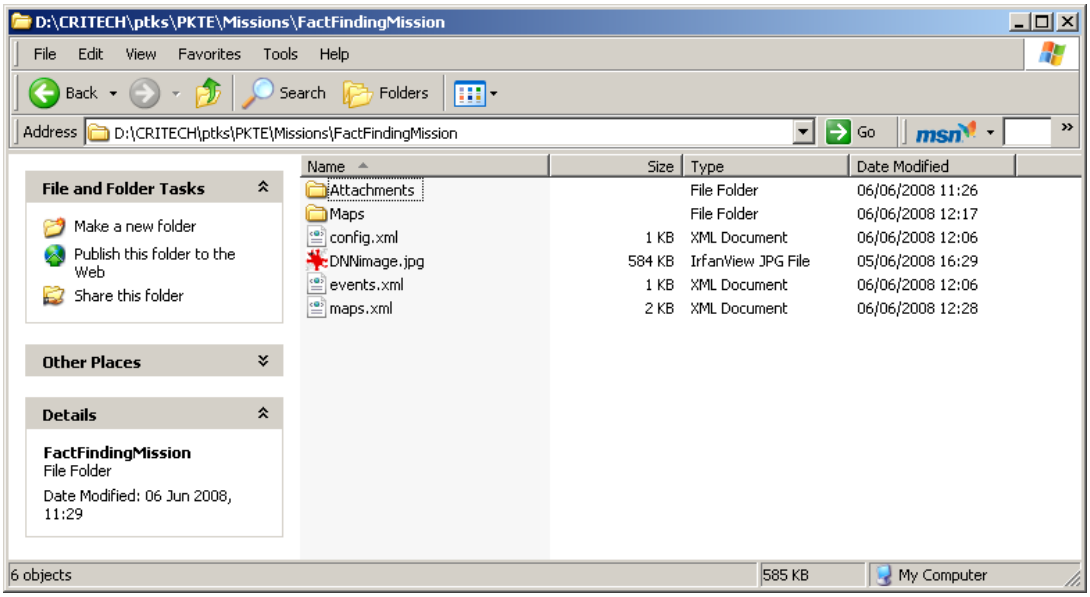


Figure 2 - Mission Creation Screen



Every mission data is included in a folder and the folder contains always the following files:

- Config.xml file, containing the name of the mission and other details as the creation date
- Maps.xml, which contain a list of maps used in that mission. The maps, in picture format, are stored in a subfolder called Maps
- Events.xml, will contain the list of events collected
- Tracks.xml, will contain collections of points to be drawn as tracks

The mission folder will also contain the following folders:

- Attachments, which will contain files that have been attached to a specific event
- Maps, which contains the files representing the basic maps

Once the mission is prepared, the full folder is copied (then it will be synchronized) to the PDA for the data collection.

Access to data on the web server can be accessed publicly or after an identification, that is requested by the Login window.

Figure 3 Login form

Credentials are stored for the whole session.

Missing elements:

- *Synchronization of the files*
  - *date of creation, date of the last update, indication of the team*

2.2 Map Builder

A map builder window allows to define the maps needed and prepares the set that will be then transferred to the PDA application for the data collection.

It is possible to select a square area and request the creation of a map for that area through a WMS service.
In the same tool, we can interact with a tile set, thus achieving very high detailed maps of proper size.

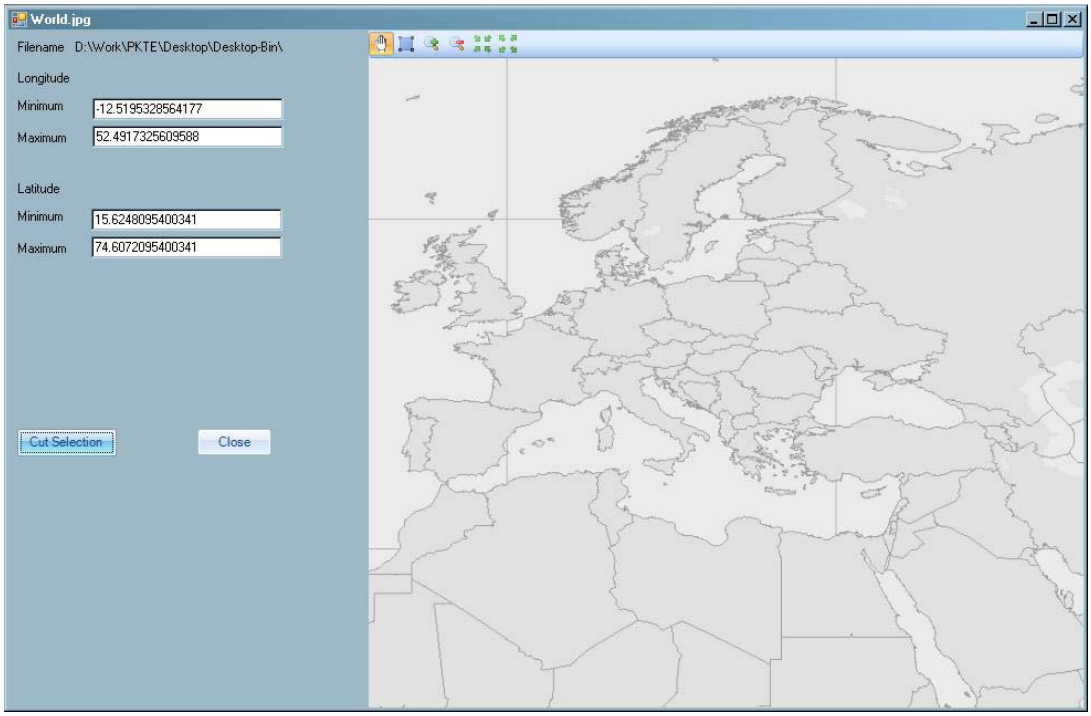


Figure 4 - Map builder screenshot

Currently we included few JRC WMS services and one service from NASA, but it is possible to configure the WMS services to be used.

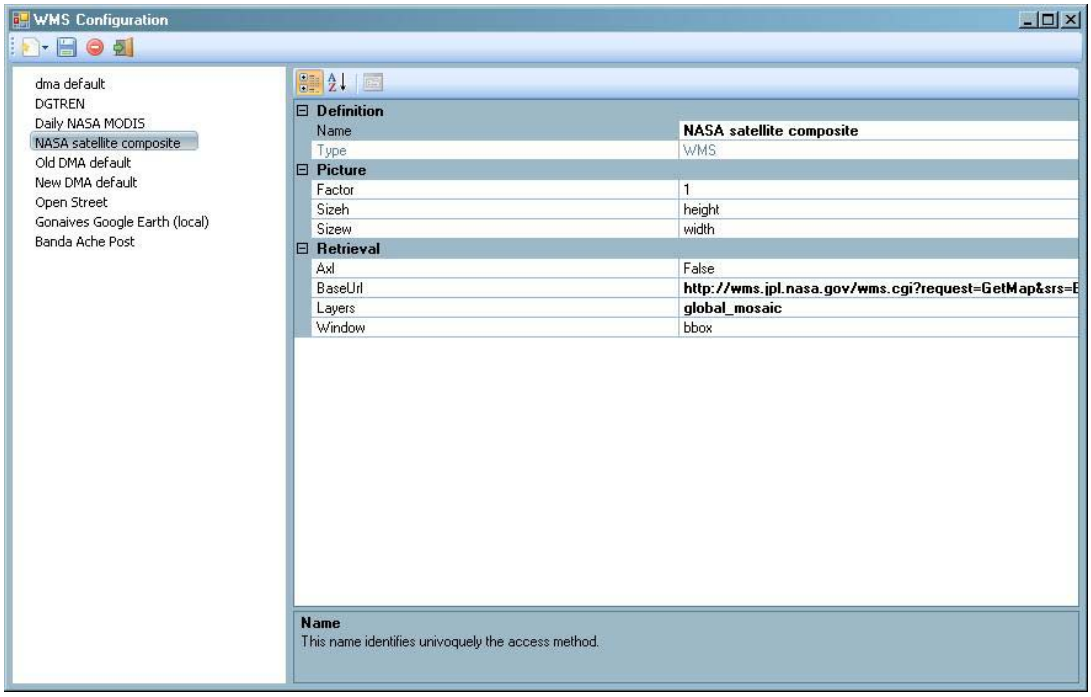
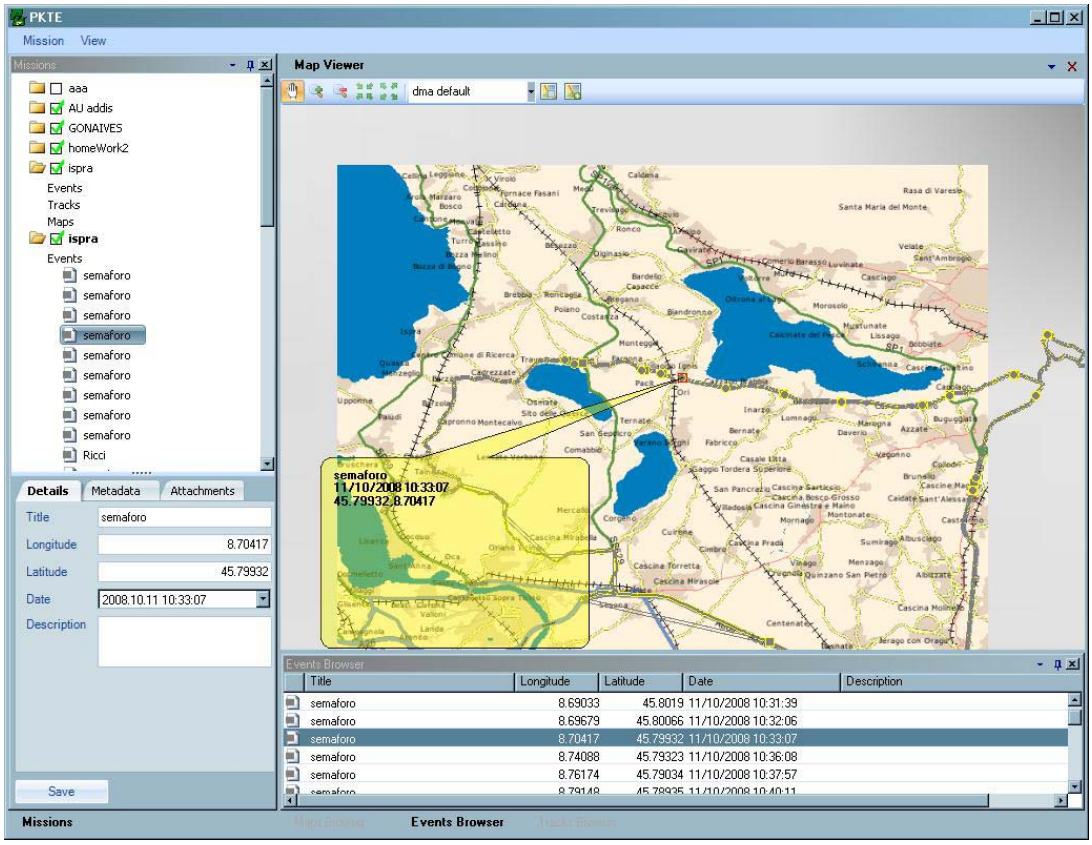


Figure 5 - WMS Configuration Tool

A tool is available in order to help configuring the big button menus on PDA.

Figure 6 Symbol Configuration Tool


PKTE
Mission
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Missions
aaa
AU addis
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homeWork2
ispra
Events
Tracks
Maps
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Events
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Ricci
Details
Metadata
Attachments
Title
semaforo
Longitude
8.70417
Latitude
45.79932
Date
2008.10.11 10:33:07
Description
Save
Map Viewer
dma default
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11/10/2008 10:33:07
45.79932,8.70417
Events Browser
Title
Longitude
Latitude
Date
Description
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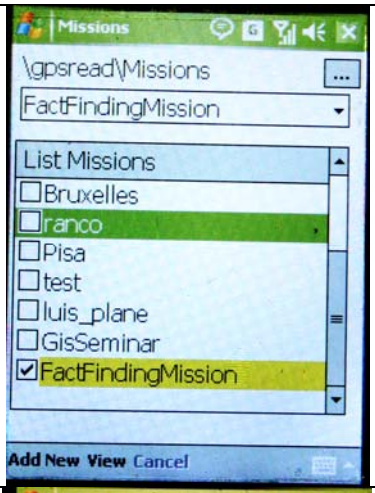
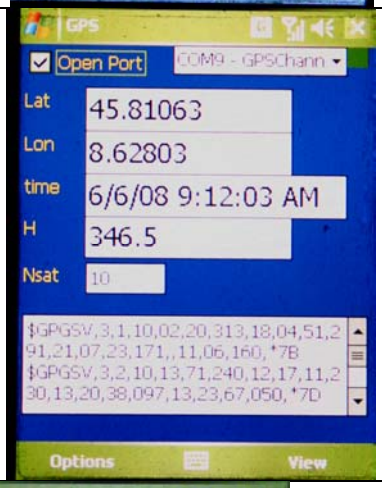
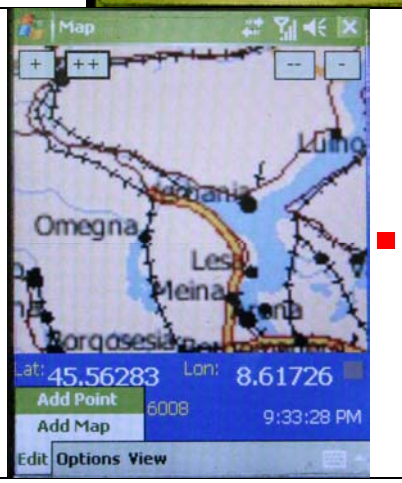
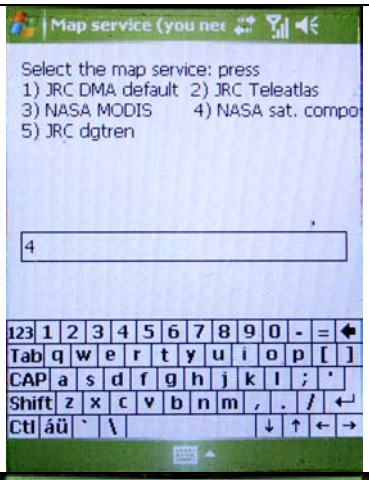
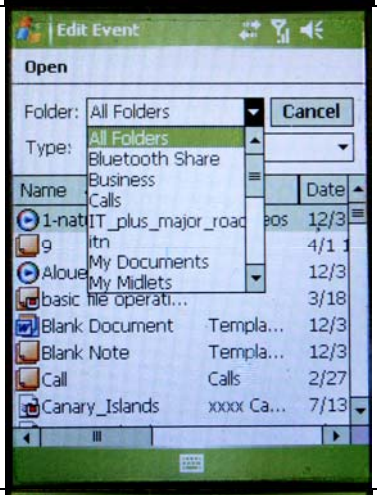
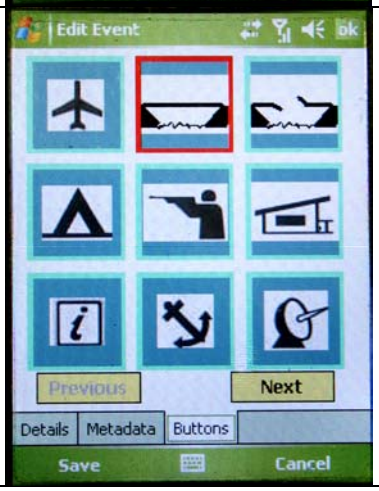
semaforo 8.69679 45.80066 11/10/2008 10:32:06
semaforo 8.70417 45.79932 11/10/2008 10:33:07
semaforo 8.74088 45.79323 11/10/2008 10:36:08
semaforo 8.76174 45.79034 11/10/2008 10:37:57
Missions
Events Browser

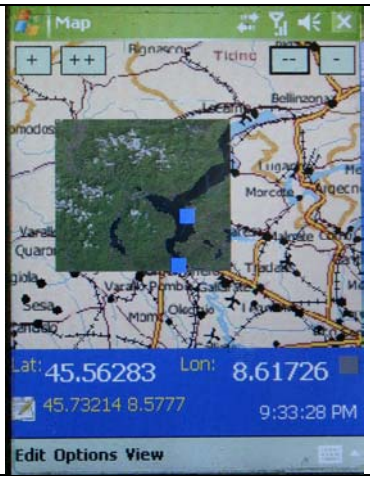
3 PDA Application

The PDA application will receive a mission prepared by the previous application. Alternatively a completely new mission can also be prepared directly with the PDA itself.

The first screen of the PDA application shows the list of available missions and allows to set the active mission. The Active mission is the one for which the events will be added. On the same map it will be possible also to visualize data from other missions if they are checked in the list presented.	
The second operation to be done is to activate the GPS which will receive the data. The GPS can be integrated in the PDA or as an external antenna. In both cases it is necessary to know which is the COM port corresponding to the GPS in order to get its data. The GPS window shows the position in latitude longitude, the time (UTC) and the height in m. It is also possible to log the GPS and a continuous recording of the position is performed (one point/5s).	
When selecting the **Map view** the map selected with the previous phase are displayed. On the map a red square indicates the current position. It is also possible to activate a "Follow me" option so that if in movement the map is continuously updated and moved to keep the current point visible.	

If you would like to improve the quality of the map and you don't have a suitable map on the PDA, should you have internet connection (by wireless or by a sat phone) you can request a new map to the wms server. We included 5 services from 2 servers for testing. Specifying the service, you may get a better map as background (see next image)	
It is always possible to remove one map or to hide temporary one or more maps that overlay each other.	
Once you are ready with the background maps, you can add a point that will set on the current point indicated by the GPS.	

The form on the side is initialized with the current date and time and the lat/lon. You can then add the title and the description. Every point is better described using categories. The ontology will list a set of attributes for each category allowing the definition of different metadata for every type of point. Metadata are free or typed, and this allows building a quantitative database out of these data.		
It is also possible to upload files or images to that particular event (i.e. a picture just taken on that location or a Word file).		
Instead of writing a text, that sometime is not easy with a PDA and its small stick, it is also possible to use a series of buttons with icons that represent an event (airplane, bridge, broken bridge, etc in the example on the side). By clicking the button a new event is added with lat/lon and date/time, using a standard configurable definition for that event		

Once you have completed the introduction of points you have all the points marked on the map. By clicking them you can still edit or delete them.	

As you have completed the introduction of points or at any time you can upload the points on the server (if you have internet connection) or transfer them to the notebook for further processing and then upload to the server.

The server component (see next section) will take care of storing all the points and the related attachments or maps that compose the mission.

3.1 Server Application

The server application is used to store, publish and share the information collected on a portal.

On the portal the is a list of all the mission uploaded on the server.

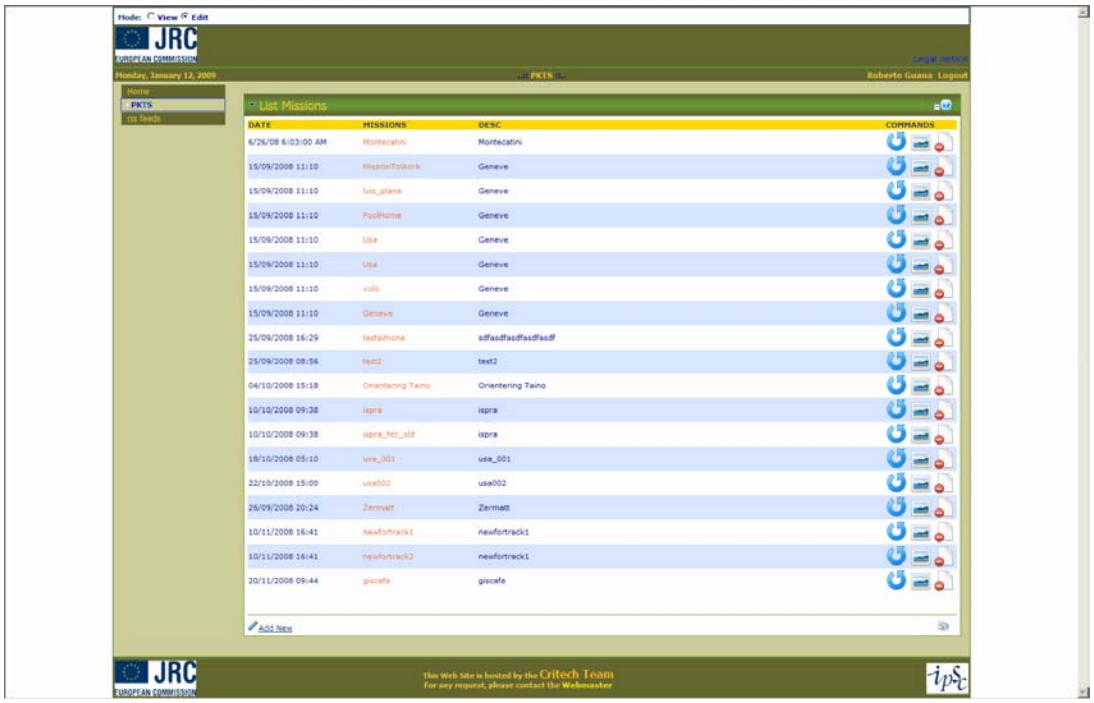


Figure 7 - List of missions present on the portal.

For each mission the is a dedicated page with:

- A map of the mission with all the points and the tracks collected during the mission;
- File rss of all the point taken and the relative image of the point;
- Link to download all the data in different format (kml,kmz,shapefile,rss and zip file);

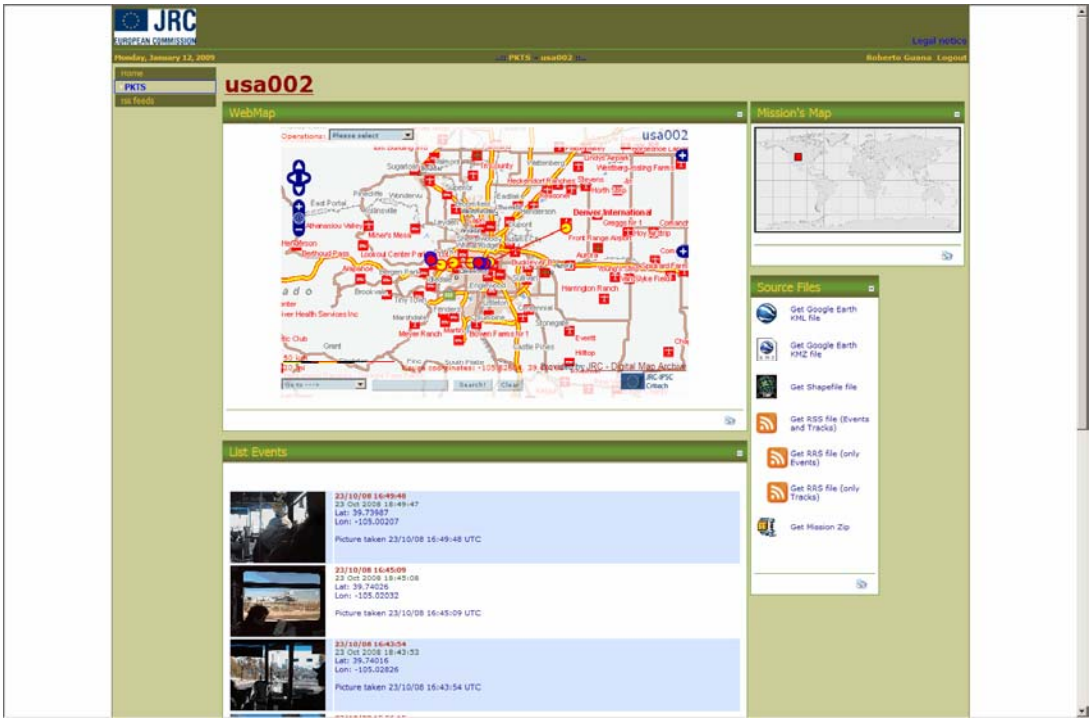


Figure 8 - Example of mission page

3.2 Add a new mission

Once the mission is uploaded on the server, it is possible create a new mission.
To add a new mission it is necessary to click on "Add New" on the bottom of the main list and than select the name of the mission from the menu that appear on the page.

3.3 Update an existing mission

When new data of an existing mission is uploaded on the server, the page of the mission is automatically updated.

4 Conclusions

The report described the first version of the Field Collection Tool that has been set-up at JRC in order to create a tool that could be useful in all the situations in which field collection teams (e.g. damage assessment teams) need to store geographical information and make them available to headquarters.

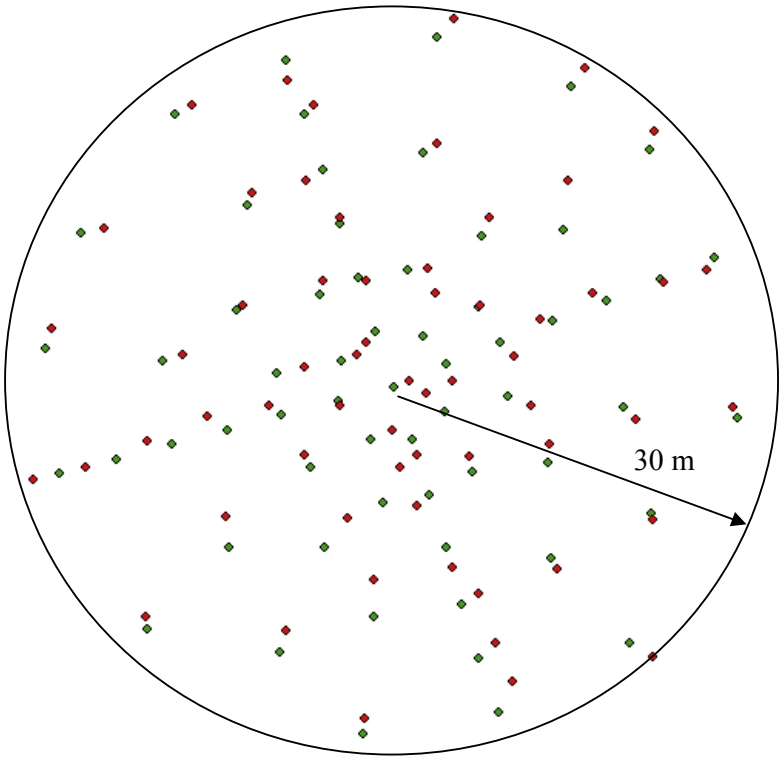
In this scenario the European Commission, the United Nation and the World Bank jointly performed a Post Disaster Need Assessment (PDNA) exercise to estimate the extent of damage and to assess the needs in order to support the international response and founding. This was the first joint operation after an international agreement was signed in September 2008 in order to commonly address post-disaster support and recovery.

The tests run in Haiti were designed with particular attention to understanding the potential of the system for collecting GPS tracks and georeferenced punctual information and pictures, to enable real-time communications between the field teams and the situation room, to understand the grade of situation awareness achievable and to tune and refine a set of pre-defined procedures for rapid and collaborative mapping. The tests run were also to assess and evaluate a set of system features such as:

- the performance, the reliability and the robustness of the MobileFTT and the PDA devices in a severe environment;
- the limits of communications among field teams and between the field team and the crisis room;
- the usability and the ergonomics of the systems;
- the learning curve for beginners.

The results of the testing in Haiti is described in a dedicated report on the matter.

Appendix A



Error from GPS data as from the comparison of real measurements (GPS differential data) with a commercial GPS antenna built in the PDA device. The green are the exact positions and the red are the commercial GPS one. The error ranges between 0 and 2m which is quite good for a commercial GPS.

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Abstract
The report describes the activities performed for the JRC Field Collection Tool. The programme uses 3 components: one for a PDA, one for a Notebook and a server in order to collect data on the field and display them immediately on a server. The Notebook section is used to prepare the mission.

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