

ITEP Work Plan, project 1.2.4 APOPO – PARADIS development and field tests

Proposal (2006)

Introduction: description of the APOPO and PARADIS programmes

APOPO is a Mozambique-based NGO that has developed a technique of explosive vapor detection using African rats. This technique is applied to Humanitarian Demining (HD) to carry out the detection of landmines in suspected areas, and has proved to be very accurate and faster than other techniques that use human-made sensors. The IND (National Institute for Demining of Mozambique) in collaboration with the GICHD (Geneva Institute for Humanitarian Demining) conducted licensing tests based on the IMAS standards on the sniffer rats and their trainers, and since October 2004 a first detection capacity has been operationally deployed. APOPO currently works in partnership with Handicap International; the latter is responsible for the marking of the suspected zone, the clearance of safe lanes and the removal of explosive objects detected by the APOPO rats.

PARADIS is a project funded by the Belgian Defense and aims at improving the planning of humanitarian demining campaigns. The system is designed to follow the work progress from global (country) to local (field) scale, and to provide geo-information to the different actors involved in the demining campaign. Two classes of users have been identified -planner and field operator- hence the system consists of two separate but complementary interfaces: the Planning Interface helps the manager in the process of making judicious decisions, while the Field Interface enables the deminer entering precious data in the system safely and easily. The system is being developed for the SEDEE-DOVO (Belgian Bomb Unit) for their missions in developing countries.

After a first discussion in the beginning of 2005 it appeared that the two systems could benefit from each other, and a field trial was set up in Mozambique in October 2005. The trial clearly showed the great potential of the PARADIS system, not only for APOPO but also for other NGOs based in Mozambique.

Use of PARADIS: envisaged advantages

The following list of advantages is not specific to APOPO and can be applied to demining organizations such as Handicap International or IND for example:

- **Centralization of the data**
The process of planning a HD campaign corresponds to managing a huge amount of heterogeneous data such as perimeter of minefields, accidents spots, deminers' equipment etc. Regularly data are deteriorated because, for example, the corresponding paper form has been damaged or lost. As a solution to this problem PARADIS compiles the whole set of data in a central database, easily accessible from both Planning and Field Interfaces.
- **Map-based support for planning**
Most of HD data have a geographic component, this is why PARADIS presents them in the most natural and readable way: on a map. This representation enables a better understanding of the data, hence a better planning of the operations.

- **Reduction of errors while editing/reading the data**
The previous feature also helps reducing encoding errors, as the user can for instance check if the geographic point that he just entered the coordinates of is correctly placed on the map. Also, the data is stored in digital format so that the reading of a report by user X doesn't depend on the handwriting of user Y.
- **Integration of aerial/satellite images**
HD operators need accurate and up-to-date maps of the regions of work. But as usually HD campaigns take place in developing countries, often those maps are not available. To cope with this problem, PARADIS integrates all kind of satellite and aerial imagery and compiles those data in a map that HD operators can safely rely on.
- **Useful information brought to the field**
Not only the data is crucial for operations planning, it is also useful for the work on the field. The Field Interface runs on a PDA (Personal Digital Assistant) and thus compiles the data in a small and lightweight package that can easily be brought to and used on the field.
- **Smart reporting and coordination**
The built-in reporting tools in the system allow for the compilation of a detailed report at any stage of the campaign with a single button click. PARADIS also acts as a planning tool that gives accurate forecasts of time and resources needed.
Both reducing the time devoted to reporting and enhancing the planning enable a better coordination of the demining campaign.
- **User-driven design**
Usual HD information systems target as large an audience as possible. Indeed, those systems aim at being distributed all over the world. However, end-users needs slightly differ from place to place. In order to answer the needs of everyone there should be as many different versions of the software as there are end-users. This is obviously not feasible for simplicity sake and maintenance concerns; hence those systems remain too general. There is a need, at the level of the demining organization, for a dedicated information system which would be dedicated to the given organization only and hence totally fit its specific needs. In this context, PARADIS is being developed as a tailored tool for the SEDEE-DOVO; a similar approach could be adopted in the framework of a PARADIS-APOPO collaboration.

To illustrate the last point ("User-driven design") with a Mozambican example, IND uses IMSMA for keeping records of the minefields in the whole country. It happens that an NGO X begins the clearance on a minefield, and after some time it has to move on to another minefield. Then an NGO Y comes to the minefield in order to end the clearance work. But as IMSMA gives only a general description of the area cleared by X –i.e. not a detailed sketch of the cleared square meters- NGO Y just doesn't know which part of the zone was cleared. The advantage of using PARADIS is clear here, as it describes the clearance work to the level of the square meter.

Use of PARADIS: envisaged advantages for APOPO

A one-week field trial on APOPO's training field has showed the great potential of the PARADIS system for APOPO's daily activities, from field tasks to resources management to coordination. The following possibilities have been identified:

- **Reduction of staff and risk**
APOPO's current system relies on the deployment of 3 people; 2 trainers and 1 observer. The indications of the animals could easily be entered in the PARADIS PDA by one of the trainers, thereby eliminating the need for an observer and reducing the number of

people that are needed in the risk area;

- **Reduction of cost price**
Consequently money will be saved on salary and insurance costs, hence the overall end-cost will be lower;
- **Improved exchange of information**
After APOPO rats have ended the detection work the partner organization comes to the minefield in order to carry out the disposal work with manual deminers. With the immediate input of the rats' indications in the PARADIS system, the exchange of information with the partner organization becomes faster and more accurate; follow-up of the manual deminers can be added to the animals' indications, and detailed information of every aspect of the clearance process becomes available.
- **REST**
This method consists of taking air and dust samples at the surface of the ground in the suspected area, to then analyze these samples in a lab where they are placed in a linear or square analysis cage, that rats walk through while smelling the filters through holes in the bottom of this cage. The system's accuracy can be a considerable asset in the REST application; moreover PARADIS can provide a graphic representation of the 'caption area' of specific filters, and the system also allows input of various types of information related to the caption areas.
- **Research**
The precision of PARADIS, and the ongoing development of the system allow for programming that can be tailored to various needs, thereby providing a powerful mapping tool for any possible application of APOPO's research in mine detection as well as in tuberculosis screening.