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# MOBILE TECHNOLOGIES: UXO LAO'S EASY SKETCH MAP

by Hayashi Ontoku Akihito [ JICA adviser to UXO Lao ]

Established in 1996, the Lao National Unexploded Ordnance Programme (UXO Lao) promotes risk education and clears land for agriculture, community purposes (e.g., schools, hospitals, temples and water supplies) and other development activities. UXO Lao is working in the nine most impacted Lao provinces nationwide. Although recent changes occurred to UXO Lao's survey procedure, the program continues mapping out contaminated areas throughout the country.

Introduced in 2013, a new mobile technology altered survey operations to produce accurate maps for clearance work. In the past, organizations created maps by hand, which may have resulted in the production of less accurate maps. Moreover, the process of developing a map required time and multiple team members. The newly introduced application, which works on an Android tablet, makes the operation faster and more accurate.

## Past Operations

Before clearance could begin, UXO Lao's procedure required the use of a sketch map for each clearance site. Initially, a four-member general survey team began by hand drawing a sketch map, which was time-consuming. A team would visit a site before clearance and use GPS to measure latitude and longitude, a compass for bearing between two turning points, and tape to measure distance between those turning points. A team member wrote down all necessary information and brought this back

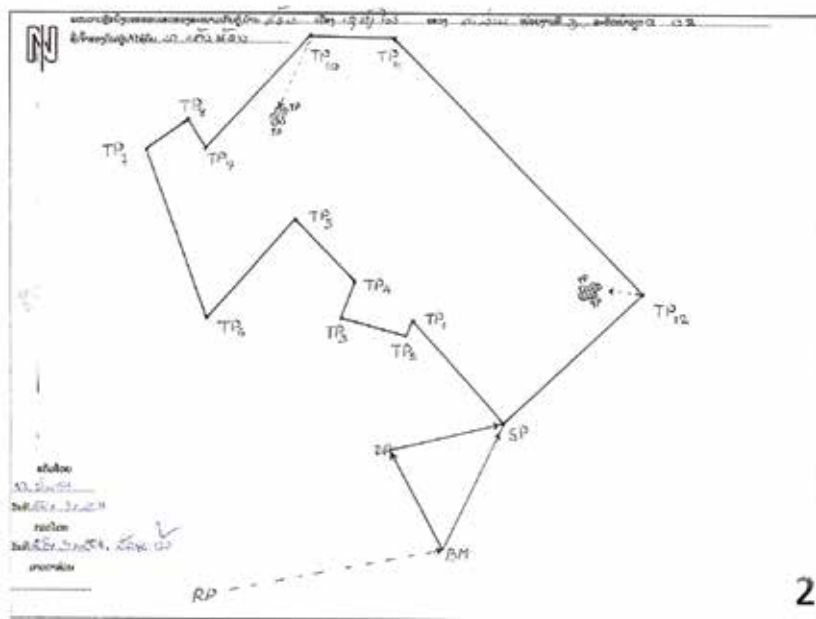


Figure 1. UXO Lao's procedure requires the use of a sketch map for each clearance site before beginning clearance.

All figures courtesy of the author.

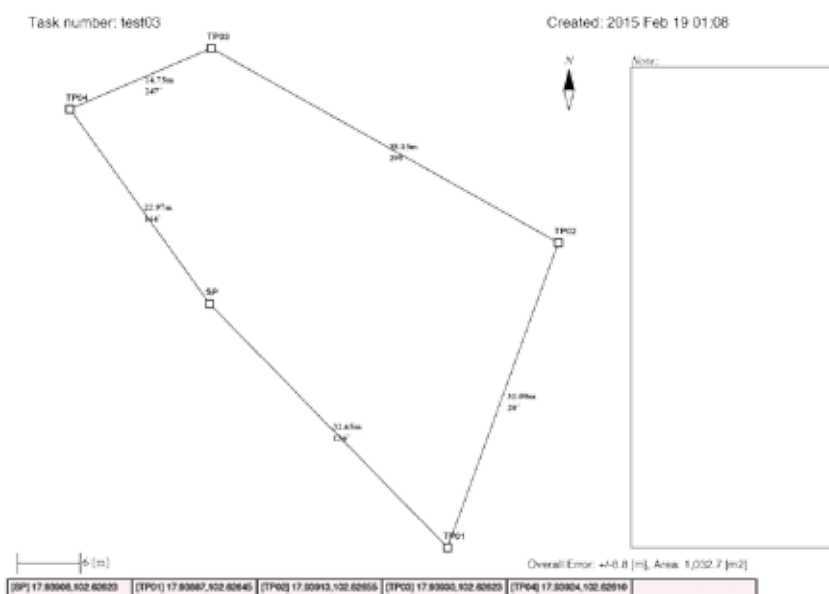


Figure 2. The Easy Sketch Map mobile application enables survey teams to create sketch maps more efficiently.

to the office, where the team continued working on the sketch map by calculating the size of the clearance site (see Figure 1). Used by UXO Lao in the past, this procedure required one to two hours to obtain all the necessary information at the site. In addition, creating a handwritten sketch map took the team another two to three hours.

### Impact of Easy Sketch Map

The Easy Sketch Map application significantly altered the procedures of general survey operations, enabling the survey teams to create a sketch map faster and with less effort. With this application, a staff member from a general survey team walks along the boundary of a clearance site with a tablet and clicks a button at each boundary turning point. After recoding all of the turning points, the application automatically produces a sketch map in portable document format (PDF) file, which the team can easily share and print out (see Figure 2).

This application reduces the workload of the general survey teams in two ways. First, the amount of time required to produce a map is reduced, because going through the manual process of creating a sketch map is no longer needed. Second, fewer team members are required. In the past, four staff members of a general survey team had to work at the site, whereas one staff member can produce a map using the application.

During the trial phase, a general survey team in a province produced a report comparing the old and new methods. They compared the accuracy of latitude and longitude, distance, bearing and the land size in respective methods. The result showed that the application met UXO Lao's requirements and concluded that the application was capable of producing a map with the same accuracy as the old processes with less effort.

### Technical Features

Apart from the practical function, the application has a number of technical features:

- The application can run on GPS-enabled tablets and smartphones equipped with Android 4.0 or above.
- Latitude is automatically corrected when determining the distance between turning points. The distance varies depending on latitude even if the points are on the same longitude.
- Red, yellow and green lights indicate the accuracy of the GPS. A user clicks the recording button when the light turns green, ensuring the recording is accurate.
- The application produces a PDF file in vector graphics, so that lines and fonts are smooth and may be enlarged for displays and printed materials.
- The application produces a comma separated value (CSV)

file of the recorded data, and can record and store multiple tasks.

The files are versatile in that the CSV format can be converted to keyhole markup language, which is accessible through Google Earth. This technical feature makes clearance site data accessible in multiple ways.

Instructors in the IT department at the National University of Lao developed the Easy Sketch Map application in 2013 with support from the technical cooperation project on IT, supported by Japan International Cooperation Agency (JICA). UXO Lao provided the information for the development of the application, and the instructors contributed to its development. Japanese advisers took the lead during the initial stages in order to define the specific requirements of UXO Lao, but Lao instructors developed the actual application. Thus, repair and maintenance of the application can be done locally, which is another advantage of the Easy Sketch Map application.

In 2015, general survey teams were renamed as non-technical survey (NTS) teams, which have different functions from the general survey operation. Accordingly, the application's functions need to be reviewed to meet the NTS teams' needs. ©

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