

Airborne detection of minefields:

Preliminary results Songo, Mozambique

The Songo minefield can be regarded as a defensive minefield. The purpose was to protect the dam and the hydro-electricity power plant. The Portuguese and later Frelimo, from the beginning of the 70's onwards, needed 8 years to complete the minefield. The minefield was patrolled daily and if access paths were seen new mines were laid. Some general sketch maps are available based on local information. It was also stated that a number of accidents have happened. A cleared section visited in the field showed several alignments of AP mines with a density of a mine per metre. The width of the minefield differs from about ten to twenty metres to about 80 metres. The remaining layout of the non-cleared minefield has not determined by a level 2 survey until now.

In the recent cleared area the positions of the individual mines are indicated by markers, which show the high density. Most of the minefield fencing has been removed over time. At the edge of the minefield some short metal posts are still visible, extending about 20 cm. above the ground.

All of the mines found so far are AP mines and AG mines: AUPS, with and without metal fragmentation sleeves. The PRB 35 BG mines which are placed with the detonator down. All found PRB's have a metal ring below them, diameter of 8 cm. The mines are surface laid up to a maximum depth of 3 to 4 cm. In the area many boulders are present at the surface and on some mines were cemented. There are few UXO's present, the area is furthermore contaminated with metal fragments. At present nearly 10.000 AP/AG mines have been detected and cleared.

Some of the valleys and riverbeds were re-surveyed after clearance and mines were found due to the displacement of mines during the rainy season of mined areas within the catchment area. Dog detection was used for the survey of the riverbeds as these are important places where people go to collect water during the dry season (intermittent drainage, people make hand dug shallow wells). Important additional information for mine surveys is the estimated degree of erosion which could indicate displacement or accumulation of sediments which could indicate depth to mines as well as some idea about the catchment areas where the minefield is situated to determine the possible spread of displaced mines. This morpho-dynamic mapping can be accomplished also using the survey data collected.

The area marks the mountain front. As the minefield is very long (could be identified for more than 30 km.) all types of terrain configuration can be found, moderate undulating terrain along the main valleys to very steep terrain up in the mountains.



Position cleared mines shown with sticks



Mountainous terrain topography



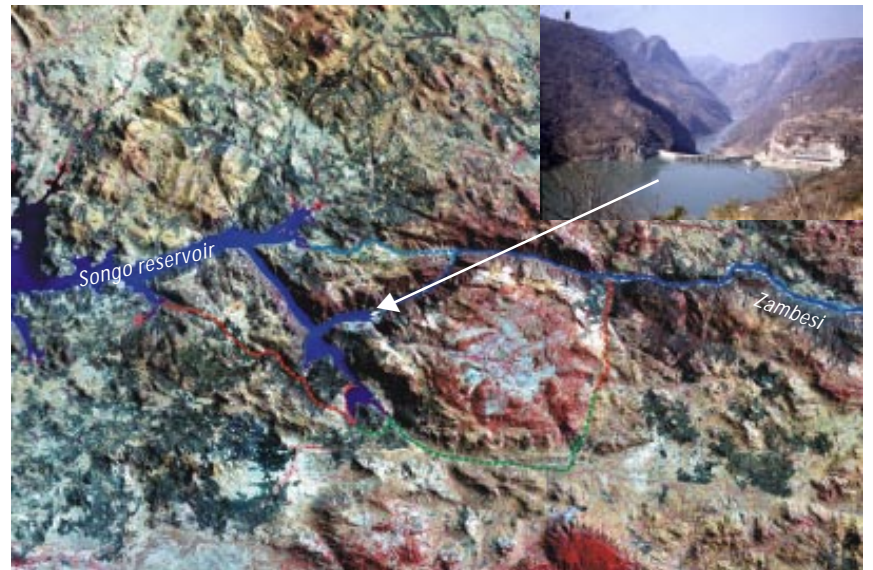
Mines are even cemented on top of rock outcrops.



Mines found in the minefield



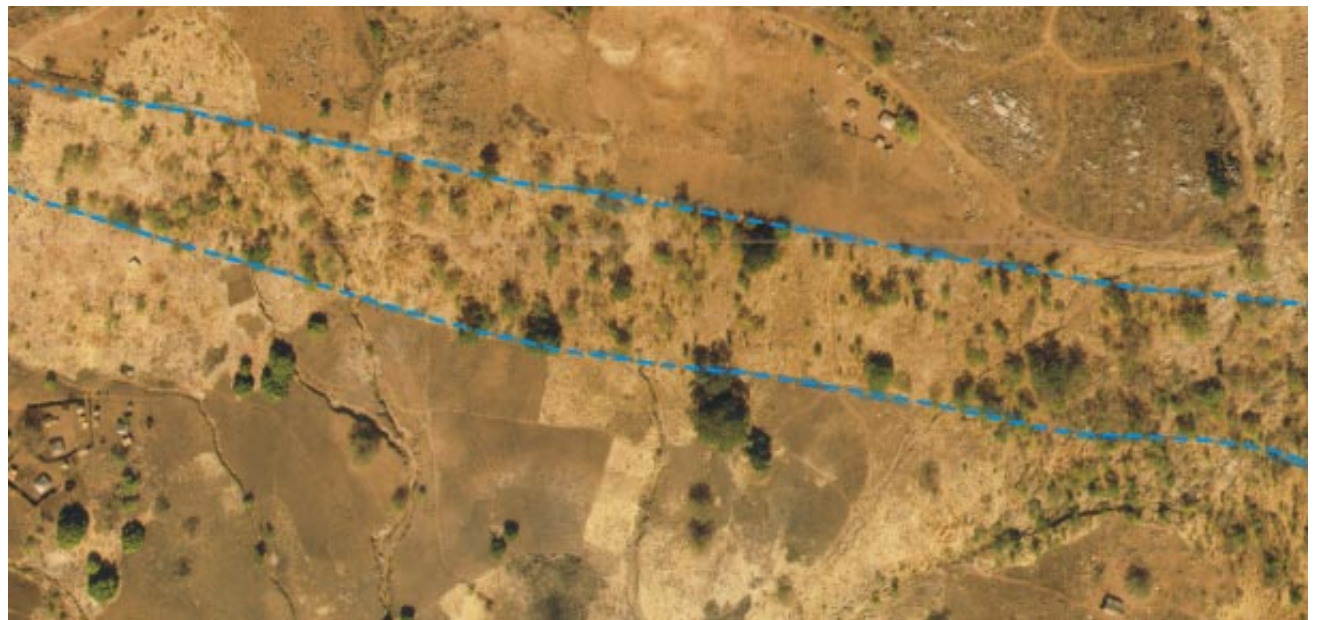
Level 1 survey information obtained to plan the airborne campaign. On the satellite image the terrain configuration and identified minefield are shown.



Landsat Thematic Mapper satellite image, colour composite of bands 4,3,2 (RGB), September 1984. The identified minefield is indicated (green: cleared by NPA, red: airborne identified minefield, blue: potential minefield continuation identified on satellite change detection images).



Direct evidence: In the western section near the reservoir some remnants of the fencing system still appears showing the exact location of the minefield (see arrow)



Indirect evidence: The strip of unused (potential arable) land is a remarkable indicator. The sharp boundary shows the minefield limits. Note the erosional features intersecting the minefield extending into the arable land.

References:

Final Project Proposal:
Pilot project for airborne minefield detection (May 1997).

or

<http://www.itc.nl/ags/conference>
<http://www.itc.nl/ags/projects>

For more information:

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