

ABSTRACT

“ Rapid Map Updating Procedures Using Orthophotos”

The General Directorate of Surveying and Mapping (GDSM) of the Ministry for Municipal and Rural Affairs (MOMRA) of the Kingdom of Saudi Arabia has the mandate for large scale mapping of 200 Saudi Arabian cities.

During the last 30 years all of these cities have been mapped in 3D at least once using stereo photogrammetric procedures. The output of these maps is in digital vector files with more than 300 types of features coded.

Mapping at the required scales of 1:10 000 for the urban and suburban areas and at 1:1000 for the urban areas has been a lengthy and costly process, which did not lend itself to regular updating procedures. For this reason the major cities, where most of the developments took place, have been newly mapped at about 10 year intervals.

To record the changes of urban landscapes more rapidly orthophoto mapping has recently been introduced. Rather than waiting for about 10 years for the line mapping of a large city after the inception of a mapping project, orthophotos could be produced a few months after a new aerial flight was made.

While new, but slow stereomapping in 3D provides accurate results in conformity with the usual urban mapping specifications, the geocoded superposition of outdated maps with the more recent orthophotos provided a very useful monitoring of the urban changes.

At the same time the use of orthophotos opens up a new possibility for urban map *updating by on-screen digitizing in 2D*. This can at least be done for the most relevant features, such as buildings, walls, roads and vegetation. As this is a faster and much more economical method than 3D stereo plotting a lesser geometric accuracy is to be expected for the on-screen digitization.

There is a need to investigate and to compare the two methods with respect to accuracy and speed of operation as a basis for a decision, whether to continue with new 3D stereomapping every 10 years or to introduce rapid map updating in 2D via on-screen digitization every 3 to 5 years.

The thesis proposes to investigate these aspects for a chosen test area covering one 1:10 000 and one 1:1000 map sheet over the city of Huraymilah, where aerial photography was taken last year and Aerial Triangulation was completed.