SOME POSSIBLE PROTOCOLS OF ACQUISITION FOR OPTIMAL USE OF THE "APERO" OPEN SOURCE SOFTWARE IN AUTOMATIC ORIENTATION AND CALIBRATION.

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IGN has developed a "suite" of free open source photogrammetric software allowing to build 3D models from images. Compared to others open source solutions, like the well known bundler-PMVS pair of tools, the IGN's tools are currently more complex to use but, we think, also more complete and accurate. Tools targeted for people aim to deal with totally unordered set of image collection, in a push button approach, and consider the 3D model as communication tool that is to be evaluated on the visual aspect. Conversely, our software are targeted for scientific community (architect, archaeologists, geomorphologists ...) who consider the 3D model as a tool to make accurate 3D measurement in a cost effective way.
In this metrologic background, it is necessary that the system can integrate all of the a priori information affordable to the user to maximize the accuracy of the final results. These information can be far more complex than the only tie points between images, non exhaustively it can be : GPS measurements on summit or ground points, acquisition configuration (stereo rig, panoramic images), knowledge on some part of the scene (planes, straight lines) , partial or full knowledge of intrinsic calibration ... Integration of such heterogeneous information require a highly tunable system which lead to some (reasonable) complexity. To take the maximum benefit of these tools, it is also necessary that the user has some very basic notion of photogrammetric constraints so that he can select, for each real scene, an acquisition protocol that will fulfil his objective. But before that, it is also important that the user has some precise objectives, which also one of the main difference between scientifics' and people's usage of photogrammetry !
This paper focus on APERO, the calibration-orientation tool of IGN's photgrammetric suite; we describe the main technical characteristics of APERO and we illustrate, on some case studies, typical acquisition protocol and the main idea of parametrization that will allow their exploitation in APERO. These case studies include modelisation of interior scenes using a fish-eye lens, modelisation of distant object using a mix of average and very long (400mm) focal length, sub milimetric resolution modelisation of small objects with macro photography, geo-referenced aerial acquisition using embedded GPS and/or ground control points.