The development from analytical to digital photogrammetry involves the integration of many conventional photogrammetric and cartographic tasks into digital photogrammetric systems. A good example is the orthoimage (digital orthophoto, cf. Kreiling 1975). Today, orthoimages are becoming standard products of digital photogrammetry and can be computed rapidly and inexpensively. They form the basis of orthophoto maps and are also increasingly introduced into the data bases of geo-information systems. In comparison to line maps, orthophoto maps contain a large variety of topographic information, and details are perceived much more realistically. The example presented is intended to serve mountaineers and scientists as an easy-to-use guide.

The input for the orthoproduction consists of a digital image, the parameters of interior and exterior orientation of this image and a digital terrain model (DTM) of the area. For the presented example, a strip of analogue colour images at a scale of 1:32,000 was acquired in August 1990. The aerotriangulation was carried out on the analytical plotter Zeiss Planicomp PI. Subsequently, one image was scanned in three colour bands at a resolution of 30 μm each using the Zeiss Photo Scan PSI. Approximately 12,000 breakline points and 37,000 grid points were measured interactively on the Planicomp using the data acquisition program PROSA. From these data, a DTM with a 20 m-grid was produced, including an exact representation of the geomorphological information (breaklines) as generated using the DTM program package HIFI (Ebner et al. 1988).

The area for which the orthoimage has to be computed (6.1 x 4.9 km²) is divided into square orthoimage pixels of constant predefined size. The so called pixel-by-pixel method (Mayr and Heipke 1988), which can preserve the high DTM accuracy including the representation of the geomorphological information, was chosen for this project. As a next step, the printing master copies were produced using the Hell Scanner CI X 330 of
Finally the colour orthophoto was superimposed with contour lines being digitally derived from the DTM and combined with common cartographic information in a conventional photomechanical process.

One general problem of photogrammetry is present by occlusions. In orthoproduction these lead to wrong image contents, a problem which can be overcome in the digital domain if occluded areas are determined beforehand from the DTM and the orientation parameters. These areas can then be filled with image information from a different image, which is generally available. In the present example, however, this was not carried out. Another problem encountered was the fact that the high dynamic range of the analogue image was not reflected in the scanned version. Brightness and contrast adjustment partly compensated for this deficiency.

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