Photogrammetry and Remote Sensing Found in Transition

Photogrammetry and Satellite Remote Sensing have originally developed along separate tracks. With the successful launch of the first dedicated earth observation satellite Landsat 1 on 23 July 1972 the technology of earth observation from space platforms received a significant boost.

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With its MSS sensor Landsat produced digital image data at 80 m footprint. Now the stage was set for digital image processing using single images for many years to come. Contrary to that, in the 70s photogrammetry was still largely working with analogue and analytical devices, with analogue film-based images, but preferably in stereo mode or even, especially in close-range applications, in multi-image modes. This situation changed dramatically when digital cameras, based on CCD sensor technology, became available at affordable prices. Parallel to that the computer technology improved its performance in terms of CPU times, storage capacity and bandwidth of data transfer continuously. So since the early 80s photogrammetry went fully digital, first a bit slow but steady in the close-range field and later, since the late 80s, also in the aerial imaging domain. However, until recently the processing platforms for satellite imagery, aerial and close-range images developed independently from each other. They even differed from each other to an extend that images from one domain could not even be processed with software of the others.

This situation has changed. Nowadays we see the first systems which are capable of dealing with images of all domains, at least with respect to some functions.

It is rather surprising that this trend towards unified software platforms has not emerged earlier, as we can observe already for quite some time a convergence of processing paradigms and methodologies, especially concerning the following factors: Use of digital images, strict sensor models, multi-image acquisition and processing, 3D processing, sensor and data integration, and postprocessing functions.

With the new generation of highresolution satellite sensors (SPOT 5, ALOS PRISM, Cartosat, IKONOS, Quickbird), and more planned for the near future (GeoEye-1 with 41 cm spatial resolution, etc.), the issue of 3D modeling is gaining much more prominence also in satellite remote sensing. Photogrammetric techniques provide for appropriate processing tools to achieve these tasks. On the other hand, radiometric analyses are also attaining more attention in photogrammetry. We observe that the originally different techniques in optical remote sensing and photogrammetry are converging strongly towards a unified concept.

Photogrammetry and optical remote sensing have expanded their techniques very much in recent years – mostly towards the joint goal of precise georeferencing and 3D modeling. This has opened many new fields of applications. The pressing need for modeling and monitoring our 3D environment from terrestrial, aerial and highresolution satellite images will have a tremendous impact in natural and man-made hazard monitoring, risk analysis, car navigation, Location-based Services, virtual tourism and in many more novel applications.

> *"The joint goal of precise georeferencing and 3D modeling."*

Google Earth, Microsoft Virtual Earth, the latest and future mapping and robot rover missions on Moon and Mars and other activities with great publicity have helped tremendously in making the public aware of the discipline of Geomatics, which is generating these datasets. The issue of Digital Earth is on many people's agenda.

Already now, but even more in the near future, we are and will be overwhelmed by huge amounts of images, emerging from satellite, aerial and terrestrial platforms. A good deal of those images will have to be processed quantitatively using photogrammetric techniques. This is why we see a very bright future for a joint approach to photogrammetry and optical remote sensing in R&D, education and with respect to business opportunities.

After some years of stagnation and even recess we diagnose a widespread shortage of experts in the geo-related imaging sciences, be it on university level, in government agencies or with system developers. Even China, a country with seemingly unlimited personal resources, which has provided the world with capable young researchers and professors in the past, is now in urgent need of qualified experts.

For photogrammetry and remote sensing it is time to emerge from a time of transition into an integrated technology, providing support and solutions for many problems of our time.