

Gamma Remote Sensing AG

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RESEARCH AND DEVELOPMENT

EC Project SIBERIA

In October 2000 the EC Environment and Climate Programme, Framework 4, CEO Project SIBERIA was successfully completed. The SIBERIA team produced an extensive forest map of a large part of Siberia, a geographical region for which only limited information was previously available but for which detailed information is of immense scientific, environmental and commercial interest, both to specific customers and to the general population. The forest map was derived primarily from state-of-the-art satellite data and remote sensing techniques. These included multitemporal and interferometric data from dual-frequency spaceborne radar instruments, which, although relatively recent in development, have shown huge potential for the mapping and monitoring of the Earth's surface, especially in regions where cloud cover is persistent. The generated forest map will serve as a unique planning and monitoring tool for the sustainable management of the natural resources of Siberia, for its socio-economic development and for a better understanding of the role of boreal forest in climate change.

GAMMA's main responsibility was the SAR and interferometric processing of the data of the Japanese JERS-1 satellite. Furthermore, Gamma participated in the methodological research for the forest and topographic mapping algorithm development. For GAMMA this project was an unique opportunity to develop and demonstrate its capability for SAR data based mapping and information retrieval for very large regions.

EC Project ERA-ORA

GAMMA is a partner of the EC Environment and Climate Programme, Framework 4, Concerted Action, ERA-ORA, a forum of remote sensing specialists to support each others research activities with data and models.

KTI - CIRSTEN

The KTI project Combined Remote Sensing Natural Monitoring (CIRSTEN) is a cooperation between the Institute of Geodesy and Photogrammetry of the ETH Zürich and GAMMA to combine the potential of optical and SAR EO data for mapping applications, in particular the mapping of natural hazards. During the first year of this 2-years project the work concentrated on the mapping of forest damage caused by winter storms in December 1999.

ESA - GSTP

In cooperation with Joanneum Research, Graz, and the University of Innsbruck, GAMMA won the contract for the ESA GSTP Study on Multi-Sensor and Interferometric Retrieval Techniques. In the frame of this two years project GAMMA will investigate the potential of remote sensing, and in particular SAR, to map natural hazard events, including forest storm damage, flooding, and avalanches.

ESA - DUP

After the end of phase 2 in December 1999 GAMMA's Data User Programme (DUP) Project Differential Interferometric Applications in Urban Areas had to be interrupted in spite of an accepted phase 3 proposal due to financial problems of the DUP. Being convinced of the very good potential of SAR interferometric deformation mapping GAMMA continued its development. Later in 2000, under the 3rd call for proposals in the frame of the DUP GAMMA re-submit a reduced phase 3 proposal which was accepted and started in September.

GAMMA succeeded in demonstrating SAR interferometric deformation mapping for slow (mm/year) to fast (m/year) deformation velocities. At the same time the application became more robust and operational. GAMMA is ready now to provide related commercial services and products.

ESA - EOEP

The objective of ESA's EOEP Market Development Element is to enable ESA and industry to respond jointly to market demands and new opportunities. GAMMA proposed an activity to reach market readiness for the interferometric deformation mapping application. Thanks to the already advanced stage of this application ESA selected this short-term activity under the first call of the Programme. GAMMA's activity Geophysical Surface Deformation Mapping Service concentrates on the integration of new commercial EO products and services and on strengthening GAMMA's market position.

ERS, ENVISAT, JERS, ALOS, and SRTM

GAMMA was selected through Announcements of Opportunity to conduct ERS, ENVISAT, JERS, ALOS, and SRTM research and development projects.

PRODUCTS AND SERVICES

Coherence Product

In early 2000 Spotimage (<http://www.spotimage.fr>) and GAMMA finalized the development of the Coherence Product, a standard data product based on ERS Tandem coherence and backscattering coefficients. The Coherence Product was brought on the market by Spotimage (<http://www.spotimage.fr>) to make this valuable source of information available to non-SAR-specialists. The Coherence Product is produced by GAMMA and is offered in different image geometries. Data and documentation are in DIMAP format using XML and GEOTIFF files.

In mid 2000 ERS-1 ceased operation after nine years. This development prevents new acquisitions for production of the Coherence Product. However the Coherence Product continues to have a huge potential thanks to the extensive archive of ERS Tandem acquisitions.

Forest storm damage mapping

In early 2000 GAMMA was involved in the mapping of forest damage caused by the December 1999 storms in France and Switzerland. Damaged forest stands were mapped using ERS Tandem acquisitions before and after the storms.

Interferometric DEMs

An interferometric DEM of a part of Borneo was generated using JERS interferometry.

Interferometric Deformation Maps

Interferometric deformation maps were generated for parts of the German Ruhr Region, for Bologna, Venezia, Abano, Modena, Ravenna, Mexico City and Las Vegas.

Consulting

GAMMA's consulting activity included SAR and interferometric processing related aspects, application development support, and system design.

GAMMA SOFTWARE

In 2000 GAMMA continued to provide licenses for its user-friendly and high quality software to support the entire processing from SAR raw data to products such as digital elevation models, deformation, and landuse maps. The software consists of the Modular SAR Processor (MSP), Interferometric SAR Processor (ISP), Differential Interferometry and Geocoding (DIFF&GEO), and Land Application Tools (LAT).

Developments

Recent software developments include: full functionality on workstations (UNIX) and PCs (LINUX, NT), use of faster FFT routines to further reduce processing times, improved display tools using GTK with full portability to PCs (LINUX and NT). The functionality, flexibility, and accuracy of the offset estimation programs was further enhanced to allow coherence and feature tracking for monitoring of fast glacier motion and large seismic displacements. Range extended SAR processing was added, increasing by up to 15% the available image area.

Sales activity

Sales activities were continued with new licenses sold in Europe, USA, Japan, and Australia. User contacts indicate that our competent support is an important feature of our software. This is also confirmed by an increasing number of running maintenance contracts.

VARIA

Tazio Strozzi of GAMMA spent the year 2000 at the University of Wales, Swansea, where he worked part time for a project of the University and part time for GAMMA. His research with the University is focusing on glacier velocity monitoring with SAR interferometry.

For the cover of the CDROM with the Proceedings of the ESA Fringe 1999 Conference which took place in late 1999 ESA selected a deformation map of Bologna generated by GAMMA.

At the ERS-ENVISAT Symposium held in Gothenburg Sweden, GAMMA had a commercial stand. Thanks to our good presence at the conference we had a large number of contacts.

A new format was given to the GAMMA homepage <http://www.gamma-rs.ch>.

GAMMA's company and software brochures were updated. Additional brochures on specific services and products are under development.

PUBLICATIONS

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