

ASPRS 2001 - "Gateway to the New Millennium"

The ASPRS 2001 Annual Conference was entitled "Gateway to the New Millennium". In part, this was an acknowledgement of the fact that the meeting was being held in the city of St. Louis, Missouri with its famous Gateway Arch - the gateway to the American West. The Conference was staged in the America's Center located in Downtown St. Louis, although it only occupied a small part of this enormous convention and conference complex.

By Prof. Gordon Petrie

The meeting took place over the five days from April 23rd to 27th in the familiar format of the last few years. Thus the first two days (Monday and Tuesday) were devoted to workshops, user group meetings and technical visits. The main part of the Conference comprising an intensive programme of lectures, special sessions, panel discussions and poster presentations took place over the remaining three days (Wednesday to Friday). The accompanying Technical Exhibition was reduced to one full day (Thursday) and two half-days (Wednesday afternoon and Friday morning).

Educational Sessions

Needless to say, with 325 presentations being given over three days and with between 9 to 12 parallel sessions being run simultaneously, it was quite impossible to do anything but sample a tiny proportion of the lecture programme - especially if time was also to be spent in the large Technical Exhibition. Thus your reporter confined his attendance to the particular sessions concerned with airborne and spaceborne imaging and digital photogrammetry. Luckily those sessions that he did attend were all of a very high standard. However, unfortunately, with the Conference proceedings no longer being published in hardcopy form, a substantial number of authors no longer submit their papers to be included on the Conference CD-ROM. Thus often it was not possible to read the papers that one couldn't attend - or even some of those that one did attend!

• ISPRS Commission I

Four consecutive sessions held throughout the Thursday had been set aside to form a mini-symposium for ISPRS Commission I, which is concerned with Sensors, Platforms & Imagery.



Fig. 1: Following the acquisition of the Azimuth company by LH Systems, the AeroScan lidar will now be marketed and sold as the ALS40 Airborne Laser Scanner. (Source: LH Systems)

This Commission is in the hands of the U.S.A. for the period 2000 to 2004 till the next ISPRS Congress. Taken together, the four sessions constituted a first-class programme. The first session was especially interesting. Prof. Konecny from Hannover gave his usual excellent presentation - with a comprehensive and up-to-the-minute review of the situation regarding present and future high-resolution space imagery. This was followed by a most interesting account by David Hargreaves of MDA (one of the leading suppliers of ground receiving stations) of the design and implementation of generic image processing systems for use with all the many different types of space imagery that may be encountered with these receiving stations. Then Joe Thurgood of EarthWatch provided an account of the current situation at his company following the unfortunate loss of its QuickBird-1 satellite. The company is now concentrating on its preparations for the launch of the QuickBird-2 satellite. These include (i) the substitution of a Boeing Delta-II launcher in place of the Russian rocket used with

QuickBird-1; and (ii) the use of a lower orbital height to allow the satellite imager to acquire higher resolution (60cm ground pixel) imagery to take advantage of EarthWatch's new licence from the U.S. Dept. of Commerce. Finally Charles Toth of Ohio State University gave a first-class account of current developments in airborne digital frame cameras utilizing CCD areal arrays.

• NASA's EO-1 Satellite & Imagers

Picking out another outstanding session, this was presented by a group from NASA's Goddard Space Flight Center (GSFC) on the Friday morning. They provided an overview of the preliminary results from the EO-1 satellite launched in November 2000, including the first images from this mission that most of the audience had seen. These included both the pan images (with 10m ground pixel) and the multi-spectral images (with 30m ground pixel size) from the Advanced Land Imager (ALI) which is validating the new linear array and optical technologies that are being proposed for use on the Landsat follow-on mission. Equally interesting were the results from Hyperion, the first hyperspectral imager to be operated from a spaceborne platform. This features 220 narrow bands covering the spectral/wavelength (λ) range from 0.4 to 2.5 μ m. The third device is an atmospheric corrector designed for use with the ALI multi-spectral imagery. Since the first few months of EO-1's operation have taken place during the northern winter, most of the images that were shown had been acquired over Australia, Argentina and Hawaii.

• Commercial Observation Satellites

A special session was also provided to mark the launch of the new book on "Commercial Observation Satellites: At the Leading Edge of Global Transparency" [ISBN: 08330-2872-3 (hardback) and 0-8330-2951-7 (paperback)], published jointly by ASPRS and the RAND Corporation. This session gave the opportunity for oral presentations by the three editors - John Baker and Kevin O'Connell of RAND and Ray Williamson of the George Washington University - and two of the 25 contributors - John Gates of NIMA and C. Minkel of the University of Tennessee. The editors were also on hand for two book-signing sessions on the ASPRS stand. With 25 chapters, 642 pages, several large appendices and numerous illustrations, the book deals exhaustively with issues of intelligence gather-

ing, international security, policies regarding national and international remote sensing programmes and the application of high-resolution space imagery to help monitor or solve various international problems or disputes. These last include examples from the Balkans, the Ecuador/Peru border, the South China Sea, Asian nuclear sites, etc. Notwithstanding its length and the inevitable overlaps resulting from the numerous different authors, it is a "must buy" item for everyone interested in high-resolution space imagery.

Technical Exhibition

This may not have had quite as many exhibitors as at last year's exhibition held in Washington, D.C., but still it was of a high quality with plenty of exhibits and stands and lots of interesting items to see and to discuss with those manning the stands. Space only allows a very small selection of the exhibits to be discussed.

• **LH Systems**

While the company had a number of interesting items to report, including the delivery of the first production example of its new ADS40 airborne pushbroom scanner to PASCO in Japan, much of the time of visitors to the stand was concerned with discussions regarding the fall-out and implications of the various takeovers concerning LH Systems and its Leica Geosystems parent that were announced during the Conference.

(i) In the first place, LH Systems bought the business of the small Azimuth company based in Massachusetts that manufactures the AeroScan lidar system. This will now be offered as the ALS40 Airborne Laser Scanner, in parallel with the ADS40 Airborne Digital Sensor.

(ii) Leica Geosystems bought out (at a price of \$15 million) the 50% share in LH Systems that was held by its partner, BAE Systems. Thus Leica Geosystems now owns 100% of LH Systems.

(iii) Leica Geosystems also acquired the ERDAS company for the sum of approximately \$30 million, plus 60,000+ shares in the Leica Geosystems company. This purchase included the share in ERDAS previously held by ESRI.

Of course, a complete article could be written on the actual and potential implications of

these events taking place at Leica and their impact on the whole geoinformatics industry. However sticking to the facts as presently known, at least for the moment, LH Systems and ERDAS will remain separate entities forming the core units of the new GIS and Mapping Division of Leica Geosystems. The respective CEOs, Bruce Wald of LH Systems and Lawrie Jordan of ERDAS, will report directly to Bob Morris, the President of the new Division. The units already within Leica Geosystems concerned with field data acquisition for GIS, e.g. those responsible for the Arc Survey product and for the maintenance of the older Infocam GIS system, will also be included in the new Division.

• **Z/I Imaging**

On the Z/I Imaging stand, the news was less about acquisitions and more about the introduction of new products. Probably the biggest item was the widely expected introduction of

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its new ImageStation Automatic Triangulation (ISAT) 2001 software for automated aerial triangulation. This is intended to replace the MATCH-AT software from Inpho that was offered previously. This new ISAT product was complemented by the introduction of the POS Z/I 510 system for the direct georeferencing of aerial images using INS and DGPS data. This has been produced in collaboration with Applanix now that Z/I's previous cooperative agreement with IGI from Germany appears to have come to an end. Besides these new products, Z/I also showed higher performance versions of its existing ImageStation DPW and

PhotoScan film scanner. Finally the TerraShare data management software package has been enhanced through the addition of an image analysis module based on the eCognition software from the German Definiens company

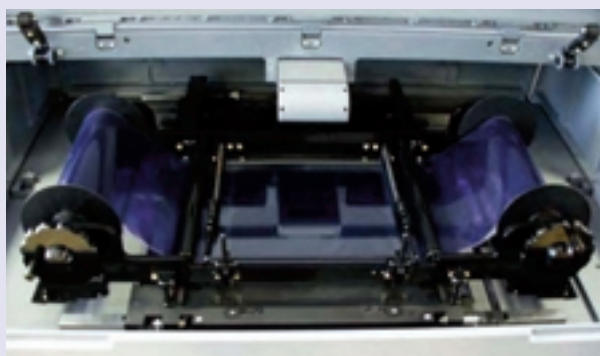
• **Inpho**

Inpho, the principal architect and cornerstone of the GeoToolBox Team, seems to be particularly active. On the one hand, it has opened a new American office located in Estes Park in Colorado. On the product front, it introduced a new version (3.0) of its MATCH-AT software that now offers automatic interior orientation and the handling of airborne INS/DGPS data from both the Applanix POS and IGI CCNS/AEROcontrol systems, including a graphical representation of the data and the results from the subsequent analysis. Furthermore the long-established SCOP program suite has been augmented with the capability of processing airborne lidar data processing. This includes the filtering of the measured cloud point data and its classification into ground and non-ground data, followed by the editing and re-classification of the processed data.

Besides these enhancements of existing well-known and well-proven products, Inpho also reported the successful implementation of its new COBRA software product. This offers a fully automated solution for use with small-format airborne frame camera data (e.g. from the Kodak DCS460 CIR camera), starting with the airborne image data and finishing with an orthophoto mosaic. Of especial interest to computer buffs is the use of parallel data processing using PCs equipped with multiple processors running under the Linux OS or Windows NT. Inpho also introduced its OrthoMaster product. This can handle either air photos or satellite imagery, including the possibility of using exterior orientation data from the MATCH-AT or PAT-B packages, in conjunction with a DEM to produce an orthophoto or orthoimage, as the case may be. If no DEM is available, then a plane rectification procedure will be carried out. OrthoMaster can be bundled together with OrthoVista (from Stellacore, another of the GeoToolBox Team partners) to form the OrthoBox product. Finally it is also worth mentioning that Inpho was offering the

Mapility digital cartographic production software from MapTech AG in Switzerland. It is not clear as to whether this means that MapTech will become a member of the

Fig. 2:
a)The Wehrli RM-3 RasterMaster photogrammetric film scanner.
(b)The negative roll film mechanism of the RM-3. (Source: Wehrli Associates)



Inpho-led GeoToolBox Team or whether Inpho will simply act as the distributor for Mapility in the U.S.A.

• **DAT/EM**

Also a member of the GeoToolBox Team, the DAT/EM company showed its Summit Evolution DPW, a much improved and augmented version of its basic Summit DPW that is designed to carry out 3D feature extraction directly into AutoCAD and MicroStation. It includes a map editor to allow editing to be carried out within either of these two packages. The new product is also integrated with Inpho's MATCH-T automated DEM data collection software and now has colour superimposition capabilities for the display of the collected DEM data. Another new feature is the ability of the software to interact with the PAT-B, Albany, AeroSys and BINGO-F aerial triangulation packages. The original more basic Summit PC will still be available as a low-cost entry-level DPW used purely for data collection.

• **Autometric**

In the case of Autometric, which, at the corresponding meeting last year, was in the middle of its own takeover by Boeing, the emphasis on this occasion was on the latest version of its Kork Digital Mapping System (KDMS). This featured a series of new built-in macros designed to improve the photogrammetric collection of vector data.

• **Cardinal Systems**

A most interesting newcomer was Cardinal Systems from Florida. The people behind this company had previously been the developers of the CADMAP software (later bought over by Zeiss). Their first product is called VrOne. This is a vector-based 3D data collection and editing system with an attached DTM engine allowing the measured data to be draped over the DTM for quality control purposes. The second product, called VrTwo, is essentially a basic DPW running on a standard PC equipped with a stereo card and either active or passive stereo-viewing glasses. Naturally it uses the VrOne vector graphics software to provide its data collection and editing capabilities.

• **Wehrli Associates**

For several years, this small company has been offering its RasterMaster RM-1 and RM-2 film scanners at the lower end of the market in terms of the price range for these devices. These existing models did not feature a negative roll film adapter. Now however, the company has entered an alliance with the GeoSystem company from Ukraine, by which the latter's DeltaScan film scanner will form the mechanical and optical components of a new RasterMaster RM-3 scanner complete with roll film adapter. The software, electronics and mechanical enhancements to the new scanner are being supplied by both partners in the alliance.

• **Veridian**

The origins of the remote sensing and GIS activities of this company lie in the well known Environmental Research Institute of Michigan (ERIM). First of all, this Institute spun off all its commercial activities into the ERIM International company. This has since become part of the Veridian company. However the company's system division is still located close to ERIM in Ann Arbor, Michigan. Previously it has acted as the principal developer and supplier of the Eagle Vision II (EVI) transportable ground receiving station for the U.S. Dept. of Defense (see the article on this subject in the issue of GeoInformatics for July/August 2000). Now it is developing the next generation of this transportable station design called "International Eagle". This offers an even more compact design and the acquisition and processing of additional types of space imagery. Also included in the system is Veridian's GeoWorx software, both to carry out these processing operations and to provide highly automated orthoimage generation. The Geospatial Division of the company based in Arizona has also developed various extensions to ESRI's ArcView software, including (i) the capture and display of ArcView images on a palmtop computer with its so-called View2go product; and (ii) its Battlespace Mapper package designed to carry out mission planning

and map production for military operations in urban areas.

• **Airborne Digital Frame Cameras**

Besides the Z/I Digital Modular Camera (DMC) that was introduced last year at the ISPRS Congress, the Technical Exhibition at St.Louis gave the chance for participants to see and hear something about corresponding American developments in the airborne digital camera field. The main development is in cameras producing small-format multi-spectral frame images. The first of these American companies was Airborne Data Systems from Minnesota. Like the arrangement with the DMC multi-spectral camera, its Spectra View system features a set of multiple identical camera modules. Each of these modules comprises a separate CCD areal array and lens, but with synchronized shutters to ensure simultaneous exposures of the individual images. These modules are all mounted with parallel optical axes in a single box, which also contains a ring laser IMU and a DGPS to provide airborne position and attitude information. By contrast, the approach taken by Duncan Technologies from California is somewhat different. Its Model 3100 camera is a single lens design with a beam splitter situated behind the lens to send the appropriate spectral data to each of the spectral channels and areal arrays needed to produce RGB or CIR imagery. However the company also produces its Model 1100 design with separate camera modules to form much the same configuration as the Z/I and Airborne Data Systems imagers.

Readers may recall that, at the ISPRS Congress last year, Inpho introduced its inCAM digital modular camera developed in cooperation with SensorVision. However the latter company has now withdrawn from the GeoToolBox Team and the situation regarding the camera is at present unresolved.

Conclusion

The ASPRS Annual Conference continues to maintain its high standards with such a huge range of presentations and exhibits that all participants should be satisfied, no matter what their main interests are. Certainly your reporter was very happy with his participation and found the Conference extremely stimulating and rewarding. Next year's Conference will be held in conjunction with the FIG Congress which will take place at the Marriott Wardman Park Hotel in Washington, D.C. between April 19th and 26th, 2002.

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Fig.3:
(a) The Spectra-View airborne digital multi-spectral camera manufactured by Airborne Data Systems Inc. This example is equipped with five lenses and CCD areal arrays - with four of these optical units covering the blue, green, red and near infra-red bands, while the fifth covers the thermal infra-red band.
(b) The Spectra-View camera seen from the back, complete with the laptop computer and hand controller used on-board the aircraft during flight.
(c) A multi-spectral frame image covering part of Downtown St.Louis that was acquired during the ASPRS Conference. The image includes the Busch baseball stadium and the Gateway Arch. (Source: Airborne Data Systems Inc.)