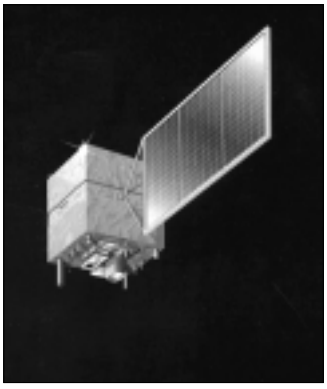
From Our Members

The CBERS Satellites: New Earth Observation Tools

By Carlos Santana, INPE, Brazil

The launching of the first China-Brazil Earth Resources Satellite, CBERS-1, on 14th October 1999, marked the beginning of a new series of Earth observation satellites that will both complement and enhance the existing remote sensing systems. Besides being equipped with a data collecting system to gather data on the environment, the CBERS-1 satellite provides repetitive, synoptic coverage of continental surfaces with three cameras operating in the visible, near-infrared, short-wave and thermal infrared regions of the electromagnetic spectrum. It is a unique system due to the simultaneous use of on-board sensors which combine features that are especially designed to resolve the broad range of space and time scales involved in the monitoring and preservation of large ecosystems. In fact, the largest satellite-based monitoring project in the world, the yearly monitoring of gross deforestation of the Amazon region, will benefit greatly from the newly available CBERS products since the other systems affording global coverage do not provide the critically important temporal resolution needed by the project.



The CBERS-1 Satellite Sensors

The CBERS-1 was launched from the Taiyuan Satellite Launch Center, in China. At launch it weighted 1500 kg. It orbits the Earth at an altitude of 778 km in a sun-synchronous orbit crossing the equator at 10:30 AM that repeats itself every 26 days.

Its CCD camera can detect objects of about 20 m across, within 113 Km square scenes. Its oblique viewing capability enables it to acquire stereopairs from which the relief of the terrain can be reconstructed, and to repeat observation of the same area within three days. It operates in the panchromatic band (510 – 730 nm) in three visible bands (450 – 520 nm; 520 – 590 nm; 630 – 690 nm) and in the near-infrared band (770 – 890 nm).

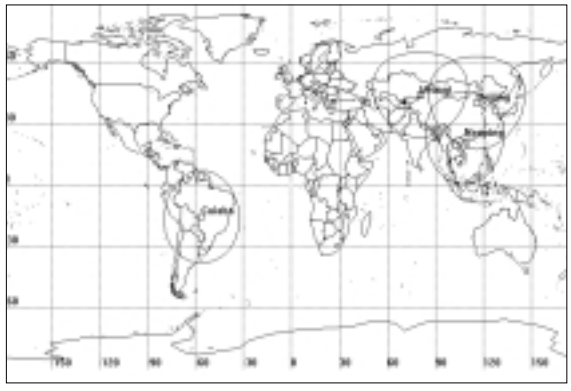
Its infra-red multispectral scanner operates in four spectral bands (550 – 1100 nm; 1550 – 1750 nm; 2080 – 2350 nm; 10400 – 12500 nm). It images a 120 Km swath with a resolution of 80 m (160 m in the thermal region) and provides a complete coverage of the Earth in 26 days.

Its wide field imager has a ground swath of 890 km with a spatial resolution of 260 m. The Earth surface is completely covered within five days in two spectral bands (630 – 690 nm and 770 – 890 nm).

Its data collecting system relays to ground the signals transmitted to the satellite in real-time by small autonomous stations. The data from thousands of these stations located anywhere on Earth are directed at the same time to processing centres and to the end-users, by means of transmissions in different frequencies.

The Image Receiving System

There are currently four image receiving stations for the CBERS-1 satellite: one in Brazil (Cuiaba) and three in China (Beijing, Nanning and Urunqi) capable of covering most of South America and Asia. Each station receives about 50 scenes a day. All these scenes can be radiometrically and geometrically corrected to be delivered to the users within one day of the request. The users are able to query image browse data from the archive to determine if it contains suitable information. Data from the archive can be ordered and delivered either electronically or in a digital format by common carrier. CCD image data from regions not covered by the Brazilian or Chinese stations can be obtained by the use of the on-board tape recorder. Since the CBERS image transmission system has many similarities with other existing satellite systems, it is expected that stations in countries other than Brazil and China will soon be licensed to directly receive the CBERS image data.



Looking Ahead

The CBERS is a long-term program that will have no service discontinuity. Besides the satellite now in orbit, two additional and similar satellites are being prepared for launch: the CBERS-2 satellite is already being integrated for launch in 2001 and CBERS-3, in the final stage of manufacturing, for launch in 2004. However, the CBERS program will not end after CBERS-3. The governments of Brazil and China are already committed to build CBERS-4 and –5, which will extend and improve upon the present services. CBERS-4, scheduled to be launched in 2006, will start a new generation of more advanced CBERS satellites whose sensors are now being defined with the concurrence of the international remote sensing user community.

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La Cameroon Geomat or the 103rd Ordinary Member of International Society for Photogrammetry and Remote Sensing: The Ordinary Member for Cameroon

By Happi Mangoua Frederic, Professor of Technical Education Geomatician

The story of the 103rd ordinary member of ISPRS started from contacts that we had with Pr. Dr. Karl Kraus, the Head of the Institute of Photogrammetry and Remote Sensing of the Technical University of Vienna (Austria) who sent our request for membership to Prof. John Trinder. That was on the August 3rd 1998. Four months later, we received literature and papers about ISPRS. From the papers and documents, it appeared not possible for an individual to become member of ISPRS. Only National organisation/association can be accepted.

During a discussion with some colleagues in my office, I suggested the possibility to create an NGO which will be involved in Geomatics particularly in the domains of interest of ISPRS: Photogrammetry, Remote Sensing and Spatial Information Sciences. The idea was approved. The next step in our way to ISPRS membership was to seek information on how to create an NGO. We visited the Senior Divisional Officer for the Mezam Division (Bamenda). His second assistant gave us the requirements for an application for legal recognition: The main was the Statutes and Bylaws of the prospective Organisation. With the help of the ISPRS Bylaws and Statutes, and other literature, we achieved the writing of our texts. We were now able to submit both applications :

- The first, to The Senior Divisional Officer of Mezam (Bamenda) for our official acceptation;
- The second, to The Secretary General of ISPRS for our membership.

That was on the 15th December 1998 for our legal recognition, and the 17th of the same month for our ISPRS membership.

On the 2nd June 1999, we received an acknowledgement Receipt of our official existence under the No 2037/AR/E.29/1111/Vol.8/APPB from the Senior Divisional Officer for Mezam Division. Two months and four days later, we received the e-mail of The Secretary General of International Society for Photogrammetry and Remote Sensing confirming our acceptation by the other ordinary members after the ballot's vote. Since 6th August 1999, we are the ordinary member for Cameroon of ISPRS. We do not know how to express our full joy and big satisfaction for being accepted among the world's scientists Society, a higher intellectual Society.

So far, we were not sleeping. We continued with the idea of Geomatic clubs in the secondary schools within students of my Department. This is an original idea developed at the Bonaberi Polyvalent Technical High School, the only institution at the level of Secondary Education, were most of Cameroonians surveyors were trained and be informed about the existence of Photogrammetry as linking subject to surveying before 1992.

We held some meetings around the country (Bamenda, Yaoundé and Douala).

La Cameroon Geomat was present at UNISPACE III, a United Nations Conference for the Peaceful Uses of Outer Space under the ISPRS's delegation in Vienna (Austria).

My paper entitled 'De la Topographie Conventionnelle vers la Geomatique: Une évolution Technologique de l'Enseignement Technique dans le Système éducatif Camerounais, for La Cameroon Geomat' was selected to be communicated last December in Cotonou (Benin), where UN and ISPRS organised a Symposium on Technologies Transfer and Geomatics Education in Africa.

Since 6th March 2000, we are on Internet. We reacted to the announcement made by the WG VI/4 chaired by Prof. Chen (Taiwan) about the request to ordinary members for ISPRS members Homepages. Our Home page is www.geocities.com/isprs_Cameroon. We are very grateful to Prof. Chen for his excellent job. I should not forget that he accepted to be our Webmaster.

Also, with Prof. Chen, we are presently seeking for funds to invite him in Cameroon from 10th -15th July 2000. The Principle of the visit is accepted. We are hoping to be able to receive him. The purpose of his visit is to give tutorials

and training of webmasters. The tutorials will be based on the Internet as powerful tool for Training and Education, particularly for Photogrammetry, Remote Sensing and Spatial Information Sciences. If we achieve this project, this will constitute a good example of technology transfer. La Cameroon Geomat is trying to prepare the XIX International Congress of International Society for Photogrammetry and Remote Sensing. I am very happy to announce that my paper entitled 'Toward the Restructuring of Photogrammetry curriculum in the Cameroon Education System' has been selected for an oral presentation during the Congress. We suggested that the idea of ISPRS network Training and Education should be discussed in Amsterdam. We are hoping that the Congress will give us the possibilities of contacts within ISPRS among ordinary members, associate members and sustaining members for effective co-operation.

As 'last born' of ISPRS, we want really to have faith on co-operation within ISPRS Society. Our means are very limited. On the purpose of the dissemination and up-dating knowledge on photogrammetry, Remote Sensing and Spatial information Sciences, to allow Cameroonians to be informed from images, because geo-information should be for ALL, we have initiated the project of La Cameroon Geomat training centre with focus on Cameroon Natural Resources Informations System (CNRIS). We taught that our objectives can be achieved trough such centre.

On the behalf of our executive, I want to say thank to all other members for their positive vote for our admission in the ISPRS family. We will like to inform prospective lecturers, engineers, industrials that our doors are opened for them in Cameroon. They will be welcome. Discussion for their visit will be highly appreciated.
Our current objective is to grow with and within ISPRS. For this, we need care (assistance-Advises) from other members.

It will be a pleasure for us to better know all the other members of our Society during the Congress.
Hoping to meet you ALL in Amsterdam!

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Nahbereichsphotogrammetrie: Grundlagen, Methoden und Anwendungen

By THOMAS LUHMANN. Wichmann Verlag, Heidelberg, 2000. ISBN 3-87907-321-X. 175x245mm. xiv + 571 pages. 467 figures. Price DM 168.00, ÖS 1 226.00, SFr 149.00 hardbound.

Reviewed by Stephen Kyle, Leica Geosystems Ltd, UK

All right, I admit it; I have a credit in this book, but only for assisting in checking parts of one chapter when it was in preparation. Only now have I had a chance to review the complete and published book, which provides excellent coverage of close range photogrammetry.

Whilst trapped into confessions, let me admit also that the author and I were colleagues at Kern and Leica in Switzerland where he made very real and practical contributions to system development. Professor Luhmann can therefore write with real authority and should not be dismissed as an academic who has lost his exit pass from the university library.

His book has much of value for the large scale metrologist such as myself, although it is not exclusively devoted to large scale metrology. Roughly speaking, this particular field addresses three dimensional measurements in a volume of tens of metres to an accuracy of tens of microns. Close range photogrammetry, however, is often also the tool of choice for those recording the shape of historic buildings or tunnel deformations, to select but two from many other application areas which appear in the book.
The book is written in German; if English is your preferred language and you wish to delve into close range photogrammetry, you will have to select from the limited field available such as Karara's "Non-topographic photogrammetry" (1989) or Atkinson's "Close Range Photogrammetry and Machine Vision" (1996). Both are referenced here; both have contributions from a number of photogrammetrists and machine vision experts. In contrast, the German book is a unified presentation by a single highly respected worker in this field.

Thomas Luhmann's book brings the subject up to date, for example regarding digital image acquisition. This is necessary in a fast moving digital world and Chapter 3 includes a current review of digital image hardware and its operating principles. Elsewhere, I found examples of the very latest cameras being used in industrial photogrammetric systems. However, older equipment and methods are not ignored, and rightly so: the Zeiss UMK may no longer be in production but is certainly still in use.

Of course, it is hard to cover everything, even everything in a limited technical field. This book can take detail only so far, although its 570 pages underline its extensive coverage. Despite the fact that it cannot be an encyclopaedia, it performed well under a minor test. Some weeks ago a friend called to discuss a problem with his panoramic camera, not

the most common of photogrammetric tools. I gave, I hope, an intelligent response; when by chance the book arrived for review some days later, I checked the index. Sure enough, "Panaromakamera" had two entries, one of which briefly described a rotating, scanning camera with a linear CCD array for image acquisition, similar to my friend's. There was a handy diagram and a reference for further information. The book did not itself have every detail but enough to keep me moving and, I hope, my friend happy.

A book which deals with a vision technology should have plenty of illustrations. Here it does not disappoint this reviewer who is still waiting for the adult comic strip which explains photogrammetry as a series of images with minimal text. (Yes, I make another admission – I always look at the pictures first and a book may never be opened again if there are none.).

You will need to polish up your vector and matrix algebra before digesting many of the equations; the full mathematical background seems to be here, in some cases right down to the differential coefficients necessary for the solution to the orientation problem – finding where the camera is with respect to other cameras and the object to be measured.

The mathematical toolbox is wide-ranging, handling, for example, the calculation of shapes such as circles and cylinders as well as many image processing techniques. In fact, if you want an introduction to image processing, you could do worse than try Chapter 5.

There can be no ideal arrangement of information and the book's structure is eminently sensible. However my own wish for a handy guide to camera calibration would lead me to combine the geometric configurations of Chapter 7 with the mathematics in Chapter 3. Still, the cross-references are there so I didn't get lost.

The real world is not far away in this book, with useful information on currently available photogrammetric systems and a range of applications to tempt the uncommitted.

Finally, one amazing thing about photographic images is their phenomenal information content. Several of the images here relate to the external measurement of a building which is quite clearly advertising one of my favourite German beers, Jever Pilsner. One can only hope that the accurate and detailed photogrammetric measurement of the outside of the building was complemented by an equally detailed examination of the inside. Indeed, I understand that background advertising is not unknown in, say, a Bond movie. Perhaps photogrammetrists should seek further opportunities such as this to fund their, er, professional activities.

This is a good book but what we really need is the English language version (no, this is not an offer of translation!).

IAG / ISPRS International Summer School
Mobile Mapping Systems
Rottenmann, Austria, September 25 – 29, 2000

Objective

Mobile Mapping technologies are gaining importance in numerous disciplines that deal with spatial data, such as geomatics, remote sensing, navigation, civil and environmental engineering, risk management, precision farming, etc. The school aims at familiarising young scientists and potential users with mobile mapping technologies in an intensive course by a group of internationally highly recognised researchers and experts, industry developers, and users.

The program is designed to present the key elements of mobile mapping, starting from its theoretical background, through navigation and imaging sensors mounted on a moving platform, via data handling by geographical information systems, to automated feature extraction. Demonstrations of operational mobile mapping systems, dedicated hands-on labs, poster sessions and an industry forum panel discussion supplement the presentations.

Organisers

Prof. Dr. H. Sünkel, Graz University of Technology, Austria (local organiser)
Prof. Dr. A. Grün, ETH Zurich, Switzerland
Prof. Dr. K.P. Schwarz, University of Calgary, Canada

Detailed information: http://www-geomatics.tu-graz.ac.at/MMSS2000

Further Information

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