

Title:/Titre:/Titel: **Die photomechanische Methode der Nadirentzerrungen von Übergeneigten Luftbildaufnahmen.**

Author (s)/Auteur (s)/Autor (en): **Dr Ing. Bohdan Bohonos**

Abstract:/Sommaire:/Zusammenfassung: **Die Luftbilder deren Nadirdistanz grösser als Normalfall ist, können nicht mit den Analogauswertegeräte in konventioneller Weise ausgewertet werden. Um solche Auswertung zu ermöglichen man muss entweder Aufnahmeflug wiederholen oder die Aufnahmen verarbeiten. Aus Mangel an Digitalkartiergeräte, vorteilhaft ist zuerst diese Bilder in streng Senkrechtbilder im Massstab 1:1 entzerren und demnach im Analoggerät auswerten.**

**Die Methode setzt die Anwendung der Bildmessmarken als Passpunkte voraus. Eine vorteilhafte Anordnung dieser Punkte versichert eine gute Entzerrungsgenauigkeit. Angegeben sind: Beschreibung der Nadirentzerrungsmethode, Formeln für Berechnung der Passpunkte und erhaltene Ergebnisse.**

Title:/Titre:/Titel:

Remote Sensing and Information Systems.

Author (s)/Auteur (s)/Autor (en):

A. Boud

Abstract:/Sommaire:/Zusammenfassung:

The knowledge industry is the most rapidly growing area of social production. Along with this, remote sensing has developed as an important data source for natural resource and environmental monitoring. The combination of both forms of data, remote sensing along with more conventional information sources, substantially increases the potential use of each.

Image processing technology can be used to improve: (a) geocoordinated data entry from maps; (b) image restoration; and (c) multispectral classification.

By combining and comparing the digital output of a geographical information system and digital remote sensing data, the remotely sensed data can: (a) be more accurately positioned; and (b) have more rigidly defined classification.

In this way, well registered remote sensing data can then be incorporated into a resource information system.

This is the start of a long-term and ambitious program at the University of Toronto to develop an expert system in resource management.

Title:/Titre:/Titel: The Role of the Cadastre in a Geographic Information System

Author (s)/Auteur (s)/Autor (en): Robert Burtch

Abstract:/Sommaire:/Zusammenfassung:

One of the problems of a geographic information system (GIS) is that often the smallest unit is larger than the individual parcel. This is true for large area GIS's. Because of that, proper land use classification may not be properly identified unless field verification were performed. While on-site investigations are necessary to ensure proper classification, it can be minimized through utilization of information contained in the cadastre which could help delineate residential areas, multiple vs. single family units, environmental areas, etc. In addition, it provides a vehicle by which updating could be easily performed with greater accuracy.

Title:/Titre:/Titel: THE GALILEO MISSION: ANOTHER LOOK AT THE JOVIAN SYSTEM.

Author (s)/Auteur (s)/Autor (en): Michael H. Carr, U.S. Geological Survey Menlo Park, CA, U.S.A.

Abstract:/Sommaire:/Zusammenfassung:

In the Spring of 1986 the United States will launch an elaborately instrumented spacecraft that will encounter Jupiter in August of 1988. 150 days before arrival it will release a probe which will enter the Jovian atmosphere and make a wide range of measurements before contact is lost at a pressure level of 15-20 bars. The main spacecraft will be placed in orbit around Jupiter. During the following 2 years it will make eleven close passes by the three outermost Galilean satellites, Europa, Ganymede and Callisto. Close observations of Io are possible only during the initial orbit insertion phase. The orbiters will carry a variety of instruments to study Jupiter, its satellites and its magnetosphere. Of main interest for mapping are a solid state imaging system (SSI) and a near infrared mapping spectrometer (NIMS). The SSI consists of a 800 x 800 element charge coupled device (CCD) and a 1500 mm focal length, f/8.5, all spherical catadioptric Cassegrain telescope. The NIMS consists of a telescope, a grating spectrograph, and a detector array. Wavelength dispersion is provided by the spectrograph, spatial dispersion by a rocking secondary mirror and motion of the scan platform. Areal coverage and resolution for the two mapping instruments depend on the satellite encounter sequence chosen, but the SSI is expected to obtain about 50% coverage of Europa, Ganymede and Callisto at a resolution of 2 km or better and about 3% coverage at 200 m resolution or better.

**Title:/Titre:/Titel:**

THE FORMULATION OF NEW AERIAL TRIANGULATION SPECIFICATIONS AND THEIR IMPACT ON USERS

**Author (s)/Auteur (s)/Autor (en):**

Cherian K. Chaly

**Abstract:/Sommaire:/Zusammenfassung:**

Photogrammetric aerial triangulation process involves the preparation of aerial photographs, point transfer and marking, mensuration and numerical processing besides other minor intermediate steps. During the last twenty years, procedures have been developed and used to control these component steps autonomously, and few attempts have been made to simultaneously integrate these into a consolidated set of specifications. In addition, the photogrammetric mapping process was continuously revolutionized in the past two decades with the introduction of new instrumentation, and various organizations have adopted modified or new procedures to optimize the overall process. This paper describes a formalized new set of specifications which includes the basic considerations, requirements and standards to be satisfied in the production process. Further it describes a manual of aerial triangulation procedures that has been compiled to provide in-sight into the production methods and techniques. Finally, the experience of working with this set of specifications and the manual of procedures is discussed with particular emphasis on their impact on users and contractors.

**Title:/Titre:/Titel:**

A NEW APPROACH TO MAP QUALITY CONTROL BY PHOTOGRAMMETRY

**Author (s)/Auteur (s)/Autor (en):**

Cherian K. Chaly  
David H. Armstrong

**Abstract:/Sommaire:/Zusammenfassung:**

Sophisticated photogrammetric methods have immense potential for controlling the quality of maps. It not only saves time and assures quality but provides a means to integrate production and quality inspection. The current paper examines the conventional methods and their drawbacks, and highlights the need for a proper statistical sampling of the item being inspected for quality. The sampling techniques selected provide a measure on the risks involved in choosing a particular sample. The paper also discusses sampling techniques by attributes, binomial distribution and hypergeometric distribution and describes single, double and multiple sampling plans based on acceptable quality levels. Finally, it explains the photogrammetric procedures, the precautions, and the extend to which the quality investigation is to be pursued.

Title:/Titre:/Titel:

Status and Future of Satellite Image Mapping

Author(s)/Auteur(s)/Autor(en):

Alden P. Colvocoresses

Abstract:/Sommaire:/Zusammenfassung:

Since 1972 the Landsats have been producing data highly suitable for conversion into image maps. 1:250,000-scale maps have been produced from the 75 meter resolution element data of the Multispectral Scanner and 1:100,000-scale maps from the 30 meter data of the Thematic Mapper. These maps meet accuracy standards and provide image detail compatible with the unaided human eye. Soon SPOT will be producing 10 and 20 meter data and acceptable image maps of at least 1:50,000 scale will surely be published as a result.

Title:/Titre:/Titel:

Acquisition and Processing of Space Data for Mapping Purposes

Author(s)/Auteur(s)/Autor(en):

Alden P. Colvocoresses

Abstract:/Sommaire:/Zusammenfassung:

As directed by the President of the ISPRS a committee was formed in 1982 to define a space system which would contribute to the mapping of the Earth's surface. This committee, which is sizable, has prepared its report which recommends a specific electro-optical system with three dimensional mapping as its primary objective. The defined system also has multispectral capabilities and resolution down to 10 meter elements. The final products envisaged include image maps of 1:50,000 scale with a 20 meter contour interval.

Title:/Titre:/Titel:

A trial on digital processing of panoramic photograph

Author (s)/Auteur (s)/Autor (en):

Chu Liangcai

Abstract:/Sommaire:/Zusammenfassung:

A panoramic photograph has several advantages: vast coverage, high resolution (central part), short taking time and flexible flying height. Therefore it is widely applied in some fields. On the other hand, a panoramic photograph has some disadvantages too: big scale change and large panoramic deformation. It is difficult to rectify a panoramic photograph without special equipments. Hence the panoramic photograph is less applicable to the users of economic construction.

Recently, a digital processing of panoramic photograph and analytical correction of deformations have been carried out. Meanwhile, the panoramic image has been enhanced in order to improve the image quality. Thus, a way for advancement of geometric accuracies of the panoramic photograph has been tested.

Title:—

SCOPE AND LIMITATION OF PHOTOGRAMMETRIC  
AUTOMATION IN A CONVENTIONAL SURVEY ENVIRONMENT

Author's name:—

/ PRAFULLA R. DATTA

Abstract:—

The thrust towards photogrammetric automation techniques—like electronic image correlators—in developed countries has been motivated by three factors: (a) need for conservation of scarce manpower, (b) need for accelerating production of maps, and (c) market pressure for development and sale of advanced digital hardware and computer software.

In a large developing country with a long mapping history, condition (a) mentioned above does not exist but condition (b) does, and condition (c) also exists partly. In this situation, it may be necessary to introduce automation in photogrammetric production but delineate its area of application clearly so that the equilibrium of conventional mapping techniques is maintained or at least slowly changed through a gradual, evolutionary process. An attempt is made in this paper to delineate and separate the application areas, in a rational manner.

Title:/Titre:/Titel:

GEODETIC CONTROL FOR PLANETARY MAPPING

Author (s)/Auteur (s)/Autor (en):

Merton E. Davies

Abstract:/Sommaire:/Zusammenfassung:

The Mariner 9 and Viking missions to Mars, the Mariner 10 mission to Mercury, and the Voyager missions to Jupiter and Saturn carried vidicon imaging systems mounted on scan platforms and returned to Earth high resolution pictures. Because all vidicon cameras have large geometric distortions, a reseau was incorporated on the photocathode during manufacture. Geodetic control networks have been established on Mercury, Mars, the Galilean satellites of Jupiter (Io, Europa, Ganymede, Callisto), and six satellites of Saturn (Mimas, Enceladus, Tethys, Dione, Rhea, Iapetus) using fairly conventional analytical triangulation techniques. Control points are identified on the pictures and their positions measured by counting pixels. The reseau is used to scale these measurements to the faceplate of the vidicon tube and to remove geometric distortions. The analytical triangulation programs developed for planetary application differ from those developed for aerial mapping because of the particular characteristics of the cameras and pictures.

Title:/Titre:/Titel: A STUDY OF THE STEREOPLOTTED CONTOUR CURVES DISPLACEMENT

Author (s)/Auteur (s)/Autor (en): Valdemar Antonio Demétrio  
Roberto Lopes de Moraes  
Antonio Vitório Lorenzon Filho

Abstract:/Sommaire:/Zusammenfassung: This paper aims to exhibit a methodology development fitted for the study of the displacement verified on stereoplotted level contours in 1:2000 scale compared to those located directly in the field through the usual topographic methods. The supplementary ground control points survey methods, for aerial photogrammetric restitution were: - electronical, horizontal and vertical traverses; - geometrical leveling. Level contours with fixed altitudes were located in the field covering areas with the following slope classes: A (0-3%); B (3%-6%); C (6%-13%); B (13%-25%). Analyses and results interpretation allowed the following conclusions: a) The equivalence between geometrical and trigonometrical methods in measuring altitudes of the supplementary ground control point was tested by the fitting of simple linear regression model  $Y = a + bx$ . The general equation obtained was:  $Y = 1,3981 + 1,0037 x$ . b) The horizontal displacement of the stereo plotted level contours is most clear in uniform and plane areas.

Title:/Titre:/Titel:

Metric Accuracy of Landsat-4 TM Imagery

Author (s)/Auteur (s)/Autor (en):

Eugene E. Derenyi

Abstract:/Sommaire:/Zusammenfassung:

The ability of Landsat-4 TM imagery for planimetric mapping was investigated. Natural colour composite diapositive was the data source. Cartographic content was evaluated through ranking the interpretability of specific features on the image. Position accuracy was ascertained by transforming image coordinates of well defined points into a ground coordinate system. The potential of map compilation was tested by plotting a manuscript in a stereo-plotter followed by the preparation of a multicolour map at 1:250000 scale. The overall metric accuracy of the TM image was established by relating the results of the above operations to existing maps. Comparison was also made with the findings of a similar study conducted on Skylab S190A and 190B photography.

Title:/Titre:/Titel:

Topography by Interferometric Radar

Author (s)/Auteur (s)/Autor (en):

Richard M. Goldstein

Abstract:/Sommaire:/Zusammenfassung:

An interferometric technique, to be presented, enables synthetic aperture radar to obtain accurate elevation measurements of each picture element in the scene. Signals are combined from two separated antennas, not necessarily at the same time. Greater antenna separation improves the sensitivity to elevation; however, if too large, decorrelation noise is introduced.

Examples of interferometric topography from Seasat data, taken several days apart and with several baselines will be presented.

**Title:/Titre:/Titel:**

New solutions in the manufacturing of stereoorthophotography using modernized Topocart with Orthophot of Zeiss-Jena

**Author (s)/Auteur (s)/Autor (en):**

Józef Jachimski  
Adam Boroń

**Abstract:/Sommaire:/Zusammenfassung:**

At laboratories of the Stanislaw Staszic University of Mining and Metallurgy were made certain changes in optical canal of Orthophot enabling acquisition of differential images as well from the left as from the right film holder of the plotter. This adaptation results in the simplification of works connected with manufacturing of stereomates and in a very good accuracy of the product. Paper gives a short description of new technical solutions and presents the obtained accuracy.

**Title:/Titre:/Titel:** An automatic production procedure for relief models or plastic relief maps with aerial photographs or digital images.

**Author (s)/Auteur (s)/Autor (en):** JANIN Benoît  
(Institut géographique National-France)

**Abstract:/Sommaire:/Zusammenfassung:**

A new application for Digital Terrain Models has been developed in the Institut Géographique National-France to produce automatically relief models or plastic relief maps at various scales with a digital milling-machine.

The author describes the different methods for computing D.T.M. according to the data set nature (random data set, plotted contour-lines or digital images), for correcting the D.T.M., and at last the milling process.

Moreover plotted planimetric data can be used to settle the planimetric elements on a relief model.





Title:/Titre:/Titel:

Photogeological Interpretation of the Gulf of Suez Area.

Author (s)/Auteur (s)/Autor (en): H.E. Klitzsch & H.W. Linke

Abstract:/Sommaire:/Zusammenfassung: An area of about 15.000 km<sup>2</sup>, framing the Gulf of Suez, was mapped at a scale of 1:100.000. We used a time-saving and low cost combination of conventional interpretation of aerial photography and processed Landsat imagery as geometrically corrected planimetric base-map. The methodology applied turned out to be useful for mapping of large areas at a high level of accuracy.

Title:/Titre:/Titel:

Considerations on the design of multi-purpose cadastral data bases, with emphasis on data structuring

Author (s)/Auteur (s)/Autor (en):

J. Kure and M.M. Radwan, ITC.

Abstract:/Sommaire:/Zusammenfassung:

This paper first outlines the general considerations that have to be taken into account in the design of a flexible, multi-purpose cadastral data base system. Particular attention is paid to data structuring, whereby, according to the number and nature of the attributes that have to be referenced to each parcel for various fields of application such as land registration, taxation, mapping, planning, etc., flexibility is sought in the establishment of separate attribute files to permit efficient linkage, storage and retrieval of data for each individual application.

Cartographic and Thematic Mapping Potential and Procedures for the  
Space Shuttle Large Format Camera (LFC)

Author: Ronald J. Ondrejka  
Advanced Planning Consultant  
Whitefish Bay, Wisconsin - U.S.A.

The Space Shuttle Large Format Camera (LFC) and Attitude Reference System (ARS) will provide a powerful new data acquisition system for global cartographic and thematic mapping. Because of the exceptional area coverage, very high photo-optical quality and photogrammetric precision (including star-field recordings for angular orientation), the LFC/ARS has the potential for providing topographic products from space data that until now were possible only from airborne stereo photography. This potential can only be realized, however, by practicing exceptional procedures in the photolab, the photogrammetric lab and in the viewing, digitizing, interpretation and analysis of the imagery. This paper describes the standard products that will be available along with recommended equipments, materials and procedures for photographic, photogrammetric and digital treatment of the data. The paper will recognize the range of international applications and skills and facility levels. (Most of the material used in this paper will be generated as part of NASA Contract NAS-9-16979 being performed by the Author for the Lyndon B. Johnson Space Center of the National Aeronautics and Space Administration.)

Title:/Titre:/Titel:

Revision of Base Maps - A Survey of Procedures and Problems

Author (s)/Auteur (s)/Autor (en):

Anders Östman and Håkan Malmström

Abstract:/Sommaire:/Zusammenfassung:

The Swedish municipalities are producing and revising base maps, covering city areas and other areas of economical interest. The scale varies between 1:400 and 1:2000. Such maps serve as a base for production of other maps, such as cadastral maps, utility network maps etc.

During the last years there has been an increasing interest in the revision of the base maps. The paper describes a survey of the current methods used for map revision and the problems associated with the present procedures.

Title:/Titre:/Titel:

Integrated Digital Techniques for development of the Geographic Information System in Indonesia.

Author (s)/Auteur (s)/Autor (en):

M. Mostafa Radwan, ITC, and Paul Suharto, Bakosurtanal.

Abstract:/Sommaire:/Zusammenfassung:

Digital techniques are recognised as the way to achieve high level of efficiency, cost effectiveness and improve responsiveness in the production of maps and related information. Lately, Bakosurtanal had purchased the computerized graphic system Comarc, computer controlled orthophoto system, automatic recording equipment for photogrammetric plotters, digital image processing system (DIPIX) for Landsat data, program packages for aerial triangulation, DTM, contour generation, etc. Unfortunately, the lack of integration between these "individual" sub-systems has reduced their effectiveness in achieving objectives. Further, attempting to interface the existing photogrammetric system with the Comarc system involves many problems due to the slow response of the existing computer. Under the ITC-Bakosurtanal/World Bank cooperation project, a specially designed system, tailored to the existing capabilities and priorities, is set up for the interaction between the data base subsystem and the various input, output and digital data manipulation systems. The supporting software package takes care of the formatting and structuring of the output of the existing photogrammetric system, orthophoto system, the processed Landsat data, etc. Using the digital mono plotting concept for updating the existing data base is also included.

Title:/Titre:/Titel: VENUS RADAR MAPPER 1988 MISSION

Author (s)/Auteur (s)/Autor (en): R. STEPHEN SAUNDERS

Abstract:/Sommaire:/Zusammenfassung:

The next NASA mission to a terrestrial planet will be a Venus orbiter using synthetic aperture radar. The resolution of the images will be one km line-pair or better. In addition to imaging, global altimetry will be obtained and knowledge of the gravity field will be improved.

The Venus Radar Mapper will be launched from the Shuttle using a Centaur launch vehicle in April 1988. Arrival at Venus will be in July 1988. The mapping will be done from a 3.1 hour elliptical polar orbit taking a nearly pole-to-pole image swath 15-25 km wide on each orbit. In this manner, about 96% of the planet can be mapped in 243 days, one Venus year.

The significant products to be derived from the image, altimetry, and gravity data will be the cartographic materials. Maps will use projections appropriate to the latitude, Mercator, Lambert, and polar stereographic.

Title:/Titre:/Titel:

OPEN-PIT MINES SURVEYING BASED ON ORTHOPHOTO

Author (s)/Auteur (s)/Autor (en):

Prof.Dr. Zbigniew SITEK

Abstract:/Sommaire:/Zusammenfassung:

A pilot study was carried out to demonstrate the feasibility of the technology based on orthophoto technique; applied to open-pit mines surveying. Orthophoto survey used for compilation and revision of basic, review and special maps of mine surface, can be applied also to the another mine measurements. During orthophoto production the elevations of the terrain can be collected and volume of exploited masses can be determined. The orthophotos and aerial photos can be used also for interpretation of geological features.

Title:/Titre:/Titel:

EIN BERICHT ÜBER WEITERE ERFABRUNGEN MIT  
STEREOORTOPHOTOS FÜR WALDGEBIETE GEMÄSSIGTER ZONEN

Author (s)/Auteur (s)/Autor (en):

Dr.Ing.Ing. Zdenko Tomašegović  
Universität Zagreb, Jugoslavien

Abstract:/Sommaire:/Zusammenfassung:

Für ein Gebiet der Buchen-bzw.Buchentannenwälder Jugoslaviens wurden mittels dem Avioplan Wild OR 1, Ortophotos samt zugehörigen Stereopartners im Masstab 1:5000 hergestellt. Die Grundkarte in demselben Masstab wurde in Form von Strichkarte am Autograhen Wild A 10 erzeugt. An Hand von Geländemessungen sind durch errechneten Raumkoordinaten sieben Punkthaufen geschaffen die zur Durchführung von vergleichenden Beobachtungen in den vorhandenen Ortophotos bzw.in der Grundkarte führten (Zuverlässigkeit der Strecken, Lagegenauigkeit, Grad der Konformität, sowie der kartographischen Äquivalenz). Für konkretes Gelände ist auch die Wirtschaftlichkeit der Ausarbeitung der Unterlagen geschätzt.

Sich stützend auf eine verbesserte Methode sind verhältnismässig umfangreiche Beobachtungen von Höhenunterschieden in Stereoortophotos mittels einem Klappspiegelstereoskopes und Stereomikrometers durchgeführt die zu überraschend guten Ergebnissen führten,

Title:/Titre:/Titel:

Die analytische Orthoprojektion im Verbundsystem

Author (s)/Auteur (s)/Autor (en):

Dipl.-Ing. Karl Tönnessen

Abstract:/Sommaire:/Zusammenfassung:

Für eine systematische Erneuerung des flächendeckend vorliegenden Luftbildkartenwerkes 1:5000 in Nordrhein-Westfalen wird seit 1981 der Orthocomp Z 2 eingesetzt. Um dessen Kapazität bestmöglich zu nutzen, ist zweierlei erforderlich:

- Bereitstellung aller zur Steuerung des Z 2 erforderlichen Paßpunkt-, Orientierungs- und Profilhöhendaten durch Datenbanken und
- Zusammenschluß der beteiligten analytischen Auswertegeräte zu einem Verbundsystem mit einheitlicher Datenorganisation.

Beim Landesvermessungsamt Nordrhein-Westfalen sind in den letzten Jahren diese Voraussetzungen geschaffen worden. Über die dabei gesammelten Erfahrungen wird berichtet.

Title:/Titre:/Titel

ANALYTICAL PLOTTERS AND DIGITALLY CONTROLLED DIFFERENTIAL RECTIFICATION

Author (s)/Auteur (s)/Autor (en):

E VOZIKIS : Wild-Heerbrugg Ltd., R&D dpt., Heerbrugg/Switzerland

Abstract:/Sommaire./Zusammenfassung:

The rapid development of photogrammetric plotting systems in which the operator still observes the model by optical means but where restitution is continually supported on-line by a computer integrated in the system has also affected the field of digitally controlled differential rectification.

Data acquisition, data checking and the computations required for the differential rectifier can be carried out by the system's computer. Other off-line operations, such as contour interpolation and plotting can be carried out by the same computer and completely in-house. As a result, orthophotos, stereo-orthophotos and orthophoto maps can be produced faster, independently of other units and far more economically.

## Title:/Titre:/Titel:

Mapping from Satellite Image Data in the 1980's

## Author (s)/Auteur (s)/Autor (en):

Welch, R.

## Abstract:/Sommaire:/Zusammenfassung:

The 1980's have seen the development and utilization of a number of new satellite sensor systems featuring improved spatial resolution and geometric characteristics. These sensor systems are discussed and inter-relationships between spatial resolution, geometric fidelity and map scale/accuracy standards examined. Comparisons of realized/anticipated positional accuracies (X, Y, Z) and the adequacy of spatial resolution for topographic and image maps of various scales will be presented.

## Title:/Titre:/Titel:

Geometrische Entzerrung von Radar- und Zeilenabstastdaten durch Überlagerung mit digital hergestellten Orthophotos.

## Author (s)/Auteur (s)/Autor (en):

Joachim Wiesel

## Abstract:/Sommaire:/Zusammenfassung:

Am Beispiel des ISP-Fernerkundungsdatensatzes werden eine Bendix MMS- und eine SAR X-Band-Szene geometrisch entzerrt und überlagert. Als Referenz für die Entzerrung werden aus digitalisierten Reihenmeßkammerbildern digital hergestellte Orthophotos verwendet. Für die geometrischen Transformationen werden zweidimensionale nicht-parametrische Interpolationsansätze verwendet. Die notwendigen Paßpunktkoordinaten werden durch Korrelationsrechnung gewonnen.

**Title:/Titre:/Titel:**

DIGITAL MAPPING AND THE REALITY OF GENERATING AND USING THREE-DIMENSIONAL TOPOGRAPHIC DATA BASES

**Author (s)/Auteur (s)/Autor (en):**

CHARLES C. K. WONG

**Abstract:/Sommaire:/Zusammenfassung:**

Traditionally, the compilation of digital topographic and cartographic data bases have been in the form of two dimensional coordinates derived principally from planimetric information while contour and digital elevation models seemed to satisfy the requirements for hypsographic information. This was dictated by the state of technology and instrumentation available to mapping organisations at the time and resulted in the establishment of parallel but separated data bases of digital line graphic and elevation information.

In this digital era where recent advances in computer technology allow a more effective use of the inherent capabilities of photogrammetric instrumentation and where several major mapping agencies are involved in the conversion of analog to digital information, there is a demand for integrated three-dimensional data bases of collected terrain features.

The paper discusses problems and methods of generating and maintaining three-dimensional topographic and cartographic data bases, and in addition, describes the operational procedures involved in converting the data stored from a quiescent to an active state in response to user demands.