

# **ISPRS**

**2004**

---

## **FIRST PLENARY SESSION AND OPENING CEREMONY**

**Opening Speech by Orhan Altan Congress Director**

**Welcome Speech by John Trinder, ISPRS President**

**Welcome Speech by General A. Fuat Saraç, President TUFUAB**

**Address of the Guest of Honor His Excellency the Minister of National Defense of the  
Republic of Turkey Vecdi Gonul**

**Welcome Speech by Orhan Altan Congress Director**

**Awards presented at the Opening Ceremony 14 July 2004**

## OPENING SPEECH BY ORHAN ALTAN CONGRESS DIRECTOR

Honorable Minister,  
Dear Colleagues,  
Ladies and Gentlemen,



It is with great pleasure that the Turkish Organizing Committee, and I, as its director welcome you all to Istanbul for the XXth ISPRS Congress.

Four years ago, when preparing our application to the delegates at the nineteenth Congress in Amsterdam, we debated long and hard over a suitable and memorable slogan to signify both the concept and the location of the candidate city of Istanbul. One of the brighter members of our committee suggested that we develop the theme of “Bridging Continents”, a concept that after remarkably little discussion, we unanimously accepted and finalized as “Geo-Imagery Bridging Continents”

You, the attendants at this conference are currently sitting in Europe and should you turn your heads to the east, you will be looking over at Asia. But the underlying concept of our logo is not as simple as the physical location of a city, far more does it represent both the crossroads and junction at which ideas meet, clash or blend before being disseminated worldwide. Today in our technological world, the geospatial sciences and technologies play an important role in

resource management for land, water and equally important in the management of natural resources.

For this Congress to be considered a success, it must have provided a suitable atmosphere and venue for you all to meet to, get to know each other as persons working in the same or allied fields and exchange ideas and experiences. If by the 23<sup>rd</sup> of July you have not renewed old acquaintances, made new contacts or are unable to follow them up for a fruitful exchange of ideas and experiences, then as organizers of this Congress we have failed in our stated aim in bridging continents and I would like here and now to offer our sincere apologies.

Yet, I would like to take you back in time, about six centuries, to the middle of the fifteenth century when the Byzantine Empire was experiencing its last days. Around that time, a learned Byzantine priest took the only known copy of the Alexandrian mathematician and geographer Cladius Ptolomy’s “Geographia” from a monastery in what was called Byzantium, today Istanbul, to Rome. Here, once its importance and significance was realized, it was translated into the lingua Francka of the period Latin and based on the text, maps of the universe as it was known were published in numerous printings in many countries. Ptolomeic maps represented the visual concept of our universe until they were replaced by the Mercator projection in the middle of the 17<sup>th</sup> century.

If we were to exemplify “Imagery Bridging Continents”, we could not find a better example. A scientist from Africa, whose opus was kept and guarded in Asia, before being brought to Europe, then living in the dark ages, where it was translated, printed and disseminated into the then known world, where it was unrivalled for nearly 200 years.

Would it be a presumptuous to expect a similar outcome from our Congress at the start of the 21<sup>st</sup> century?

Presumptuous did I say?

Yes, certainly.

But then, maybe

Well why not!

## WELCOME SPEECH BY JOHN TRINDER, ISPRS PRESIDENT

Honorable Minister,  
General Ali Fuat Saraç  
Professor Orhan Altan, Congress Director  
Distinguished guests  
Professor Milan Konecny President of the International  
Cartographic Association,  
Professor Holger Magel President of the International  
Federation of Surveyors  
Professor Gehard Beutler President of the International  
Association of Geodesy  
Vice Admiral Alexandros Maratos, President of the  
International Hydrographic Organization  
Mr. Peter Jolley, President of the International Map  
Traders Association  
Professor Fraser Taylor, Chairman of the International  
Steering Committee on Global Mapping  
Honorary Members,  
Ladies and Gentlemen

It is my great pleasure to welcome you to Istanbul, and the 20<sup>th</sup> Congress of the International Society for Photogrammetry and Remote Sensing. It is marvelous to see that so many people have traveled long distances to attend this important event for ISPRS. I am sure you will benefit from your efforts in coming here.

The ISPRS mission states that it is devoted to the development of international cooperation for the advancement of knowledge, research, development, education and training in the photogrammetry, remote sensing and spatial information sciences, their integration and applications, to contribute to the well-being of humanity and the sustainability of the environment. The quadrennial ISPRS Congress is the major event in the conference calendar of the Society which contributes to this mission. It brings together more than 2000 people who wish to learn about the latest developments in the technologies with which ISPRS is involved, present details of their work and share knowledge and experiences with their colleagues.

Before we progress further I would like to pause for a period of silence to remember our colleagues who passed away since we last met. I would appreciate if you would stand please..... Thank you.

This Congress is the culmination of 4 years of work of thousands of people who will contribute to its success. Foremost amongst these people are the organizing committee in Turkey led by the Congress Director Professor Orhan Altan, the Council, the Technical Commission Presidents and their secretaries and the Working Group officers. There are many people who I cannot recognize because of the shortage of time, but I acknowledge the work of everyone who has made a contribution to the Society since the last Congress.



The Congress comprises many aspects, including the Plenary and Technical Sessions that will be held over the next 10 days, the Commercial Exhibit that will be open next week, the General Assembly, the decision making body of the Society, which will meet in 4 sessions. We will have announcements and inauguration of the newly formed ISPRS Foundation that aims to raise funds of over half million dollars over the next 5 years or so, to provide funding for deserving individuals to improve their skills and experience in the areas of ISPRS. We will also have meetings of international groups, social events, technical visits, a youth forum and many more. I also hope that you will be able to find time for some sightseeing in this exciting city of Istanbul. I am sure it will be an exciting and beneficial experience for all of us.

There have been a number of significant advances in the technologies available to individuals in ISPRS, that have impacted on the Society's activities since we last met in 2000. For example, the price/performance of computers, according to Moore's law, has increased by a factor of at least 5. Developments in digital imaging systems have improved significantly. Mature technologies in the fields of photogrammetry, remote sensing and spatial information sciences include direct orientation of imaging systems in flight, high resolution satellites, DPWs, terrain laser scanning, interferometric SAR, polarimetric SAR, hyperspectral sensing, Web based GIS, GIS for decision support systems, precision farming and many more. Launching of Earth observation satellites continues at a pace, to the extent that it is estimated that about 50 satellites for Earth observation will be launched in the next 10 years for measuring many environmental parameters.

Here is just a glimpse of some of the new developments that you can expect to hear about or experience at this Congress.

Commission I will emphasize small and intelligent satellites and global monitoring systems, as well as wide-angle sensors, and laser scanning (LiDAR)

systems. It will report on joint project between ISPRS and France's CNES to study the quality of elevations derived from the SPOT HRS sensor. Emphasis will also be placed on the developments in the joint CEOS/ISPRS task force on radiometric and geometric calibration standards.

In Commission II, researchers are facing the challenge to develop increased automation in mobile mapping systems so that it can be accepted in the market place. High accuracy digital terrain data with accuracies of the order of 20cm are now achievable from the increasing number of terrain laser scanners that are available on the market, which now include improved processing software. GIS will be applied to decision support systems, while automated geospatial data production and updating by digital systems will be an important topic.

In Commission III, progress, though slow, in the automation of photogrammetric analysis and extraction of information from images, will be described. Multi-sensor, multi-resolution, multi-spectral, and multi-temporal imagery are essential to this research. The transition from film-based photogrammetry to digital cameras is predicted to cause a paradigm shift in photogrammetry, from the minimization of the number of images acquired and processed for mapping projects, to acquiring a highly redundant set of images. The debate between film based and digital image acquisition will be followed by many with interest.

In Commission IV a shift towards 3-dimensional and temporal models of spatial data and applications will be observed. We will also see new developments in the modeling and visualization of spatial and thematic uncertainty of spatial data. There are new approaches in the generalization of 3D building data and in the continuous data visualization. Progress will be given on the establishment of global databases to address specific environmental and socio-economic issues.

Commission V will cover the acquisition and visualization of our cultural heritage, while techniques of scene modeling and virtual reality for displaying and visualization of buildings, other structures and the landscape will be demonstrated.

In Commission VI, for the third Congress, researchers will compete for prizes in the CATCON competition for software designed for computer assisted teaching and learning. The important topics of computer assisted and Web based learning for developing countries will be part of this Commission's activities.

In Commission VII scientific papers will cover a wide spectrum of Earth observation applications related to sustainable agriculture, forestry, water resources, geo-science, global change, human settlement analysis, besides disaster monitoring, mitigation and damage assessment.

During the past four years, ISPRS Council reviewed the terms of reference of the Technical Commissions and following a postal vote amongst members in 2003, the General Assembly approved new terms of reference for eight Technical Commissions for the period after this Congress. This is significant step in the scientific activities of the Society, since it will be the first time that the number of Commissions has been increased since 1952.

The General Assembly, the decision making body of the Society has already met today and decided on a number of important issues, including ISPRS as a not for profit corporation, ratified the formation of ISPRS Foundation and decisions made by Council in the past 4 years. It will determine the location of the next Congress in 2008, appoint the new Council and the persons who will become the Technical Commission Presidents for the coming 4 years, and approve the resolutions of the Congress.

The impact of humankind on many aspects of the environment is alarming. Since we last met in Amsterdam 4 years ago, the human population has increased from approximately 6.08 billion to 6.4 billion, a growth of approximately the population of a large part of Europe. Aspects of the environment, such as biodiversity and the planet's resilience to cope with environmental changes are being increasingly under pressure. The carbon dioxide load on the atmosphere is ever increasing alarmingly and is now said to be 30% more than it was several hundred thousand years ago. This is unprecedented in the living history of the Earth. The consequences of this increased carbon dioxide load have been predicted to cause global warming with the average temperature increasing by a minimum of several degrees. Significant environmental impacts will result, such as rises in sea level, increased storms, flooding, increased drought and desertification. While these changes cannot be accurately predicted, they must be monitored and assessed. The areas covered by ISPRS in the photogrammetry, remote sensing and spatial information sciences should become increasingly important in this process.

While we are here at the Congress viewing the new developments and sharing knowledge with others I believe we need to ask, why are we doing this work? What is the purpose of developing new mapping systems, data management systems and these new technologies? Of course we are providing important services to our communities. Spatial information is said to be essential for more than 80% of all decision making affecting communities. I would like to think that we could look more broadly at the application of our knowledge, particularly for the benefit of the global community and towards the sustainability of the planet. Are we doing enough to convince decision makers of the essential nature of the information that we are dealing with and its potential applications?

These are some essential aims of our Society and I hope that you will be able to consider how you might contribute to these issues at this Congress and in the future.

I commend these thoughts to you as we enter the next 10 days of this important event for ISPRS. I am sure it will be a memorable experience for all us.

Thank you ladies and gentlemen.



Welcome Cocktail



Folk Dancers at the Opening Ceremony



Congress Center, Anadolu Auditorium – Opening Ceremony

## WELCOME SPEECH BY GENERAL A. FUAT SARAÇ, PRESIDENT TUFUAB



Mr. President,  
Members of the Council,  
Distinguished delegates,  
Ladies and gentlemen,

As the Commander of the National Mapping Agency, General Command of Mapping, and President of Turkish National Society for Photogrammetry and Remote Sensing, I have the honor to welcome you all to Istanbul for the XXth Congress of International Society for Photogrammetry and Remote Sensing (ISPRS).

It gives me great pleasure to be hosting such a magnificent ISPRS event for the first time ever in Turkey. I would like to take this occasion to thank all those people again for all their efforts which made this meeting to be held in Istanbul, the pearl of Turkey.

Istanbul which connects continents is now connecting all colleagues coming from different parts of the world to meet each other, share experiences, learn new initiatives, witness recent developments and

achievements in the world of photogrammetry, remote sensing and spatial information sciences, and decide on the way ahead under a new vision that matches the emerging requirements of 21st Century

Today, the point that brings us together is Geographic Information, the importance of which is already very well appreciated by us.

Though unrecognized and undervalued within the whole information society, geographic information proves to be an indispensable part of our world. Within the information infrastructure, the valuable work performed by the geographic societies cannot be overstated. The geographic information is central to the development of the information society that increasingly puts before us new requirements, which in turn forces and encourages us towards new research and products.

Through technology, the transition from paper to digital format has fortunately given us, the geographic information providers, more flexibility in manipulating the data and developing new products with a view to meeting the needs of the society. It is very clear that technology will continue to improve.

I believe, among the topics of primary interest to the community will be the recent developments and research about digital aerial cameras and high resolution satellite images.

Despite a highly interesting schedule, I do hope that you will find the opportunity of seeing the sights of Istanbul.

I wish you a very successful and enjoyable Congress.  
Thank you.



## ADDRESS OF THE GUEST OF HONOUR HIS EXCELLENCY THE MINISTER OF NATIONAL DEFENSE OF THE REPUBLIC OF TURKEY VECDI GONUL



Director of the Congress,  
Mr. President,  
Distinguished Council Members,  
Dear Delegates,  
Ladies and Gentlemen,

It is my pleasure and privilege to welcome all of you as the Minister of National Defense of the Republic of Turkey. I wish you all a pleasant stay and success in your studies.

I want to begin my speech by expressing my happiness in hosting you in the XXth ISPRS Congress, which is being held in my country in one of the most important geo-political regions of the world. ISPRS is the most important society for the science of gathering current and healthy geographical information. I believe that holding this Congress in a place which is the intersection of cultures, religions, languages and races since the beginning of history increases the significance of geographical information.

As you are all well aware, natural resources below and above the ground are rapidly decreasing, pollution is increasing and the rapid increase in the population brings many problems varying from health to education. The main platform of discussion of this Congress will be data gathered from the air and space by different systems and techniques and the interpretation and evaluation of the information gathered. The results reached, will form the milestone for leaving a greener, better, cleaner and healthier world to the coming generations.

As I have said at the beginning of my speech, I would like to express my wish to show the distinguished participants of this Congress coming from different parts of the world, the beautiful geography we live in during the time left after your intensive scientific studies.

I also wish to thank you for having given us this chance of gathering people from all parts of the world in a place where the continents meet. I hope that this Congress, which I believe will render a great service to mankind, will be very successful in the results obtained, and I also hope that you will leave with good memories leaving a part of yourself here. Thank you for your kind attention.



Prof. P. Patias, Prof. R. Navalgund, Prof. Ammatzia Peled, G. Begni and L. Fritz during the Opening Ceremony

## WELCOME SPEECH BY ORHAN ALTAN CONGRESS DIRECTOR

Dear Colleagues,  
Distinguished Guests,

Here I would like to give you some information about the scientific program of the congress. This Congress is a long one lasting ten days. Within the program, there are three plenary sessions, to be held in this auditorium, with 9 presenters, and 109 technical sessions to be held in 5 different halls and 58 poster sessions. After the 19<sup>th</sup> of July, the exhibition with the participation of exhibitors, displaying the latest products and services, inventions, developments in the fields of geographic information systems, mapping, image processing, machine vision, computer graphics and in the many fields of application will be open in the adjoining building. 2368 participants have registered for the Congress and we are expecting this number to increase with on-site registrations.

Besides the scientific sessions, we have prepared a rich social program to acquaint you with the local culture and to help you to relax. It is our wish that you will participate in the various tours to enjoy yourself and to forget the drudgery of the day.

What you have seen so far and what you will experience as of now, are the fruits of our labors going back over six years.

When I considered taking on the organization of this Congress, my friends warned me of the difficulties I would face as a Congress Director. They were right!

Being a Congress Director is truly hard. However, what made it relatively easier was the sustained and effective international cooperation that was extended to me.

I would therefore like to start off by thanking those individuals and organizations who have unstintingly helped me. For their wholehearted support during our candidature and their continued support after our nomination, I would like to express my thanks to the Presidency and the Turkish Government.

To you, the participants in this Congress, many thanks for your attendance and the papers you are presenting.

Equally, my thanks go to the many international companies whose diverse exhibits will be on view from Monday the 19<sup>th</sup>.

No international congress of this importance could possibly be contemplated without the contribution of many people and institutions.

I would therefore like to take this opportunity to introduce my Organization Committee and thank them both for their dedication and contribution.

- At the top of my list are my friends in the ISPRS Council. Their creative criticisms and suggestions have been vital to the planning and materialization of this Congress
- My gratitude to the Technical Commission Presidents who have each contributed to the very high level of scientific excellence of our proposed program.

- As a first for this particular Congress, we have created an International Advisory Board whose counsel has greatly motivated us. To you all many thanks.

- As Director of this Congress, I have had the pleasure of working with an organization committee who has cooperated perfectly

with me during the period of our candidacy and especially during the period of the preparation of this Congress.

My eternal gratitude to all of them. I also thank Magister Tours for their valuable contributions to this congress.

Now, the time has come to give a few personal thanks.

During all these long years of preparing for this Congress, I have been always supported by my close family, in particular by my wife. I owe them all a great debt of thanks.

I would like to mention Mustafa Aytaç, my teacher to whom I am eternally grateful, as it was he who had encouraged me to choose photogrammetry as my career.

Now I declare the XXth ISPRS Congress is duly open! Friends and colleagues, welcome all to our opening cocktail.

Let merriment and good fellowship begin!

Let old acquaintances be renewed!

And let new friendships blossom!



## AWARDS PRESENTED AT THE OPENING CEREMONY 14 JULY 2004

**The Brock Gold Medal Award is presented by ASPRS President, Russel Congolton and ISPRS President, John Trinder to Krishnaswamy Kasturirangan**

### The Brock Gold Medal Award



**The Brock Gold Medal Award** is donated by the American Society for Photogrammetry and Remote Sensing, and is awarded for an outstanding landmark contribution in the evolution of the photogrammetry, remote sensing and spatial information sciences, which is a proven contribution to these sciences and technologies of whatever form, whether a major completed project or program, some fundamentally new equipment, system or fundamentally new technique, or other new departure. The winner is Krishnaswamy Kasturirangan (India).

Krishnaswamy Kasturirangan is presently a Member of Parliament of the Upper House of India. As Chairman of the Indian Space Research Organization, the Space Commission, and Secretary to the Government of India in the Department of Space, from which he stepped down in August 2003, he has made significant contributions in developing the Indian Space

Programme. Under his leadership, the Indian space program has witnessed several major milestones including the successful launching and operationalization of the India's prestigious launch vehicle, the Polar Satellite Launch Vehicle (PSLV) and more recently, the first successful flight testing of the all important Geosynchronous Satellite Launch Vehicle (GSLV). Further, he has also overseen the design, development and launch of some of the world's best civilian satellites, IRS-1C and 1D, realization of the second generation and initiation of third generation INSAT satellites, besides launching ocean observation satellites IRS-P3/P4. He was instrumental in developing a strategic direction of Indian space endeavors for the future. These efforts have put India as a pre-eminent space-faring nation among the handful of countries that have major space programmes.

He was earlier the Director of ISRO Satellite Centre, where he oversaw the activities related to the development of new generation spacecrafts, Indian National Satellite (INSAT-2) and Indian Remote Sensing Satellites (IRS-1A & 1B) as well as scientific satellites. He was also the Project Director for India's first two experimental earth observation satellites, BHASKARA-I & II and subsequently was responsible for overall direction of the first operational Indian Remote Sensing Satellite, IRS-1A.

Krishnaswamy Kasturirangan is a member of many important scientific academies, both within India and abroad. For example, he is presently the President of the Indian Academy of Sciences at Bangalore and General President of the Indian Science Congress.

**The Otto von Gruber Award is presented to Stephen Heuel by Ian Dowman, Secretary General of ISPRS and Martien Molenaar, Rector of ITC of the Netherlands**

### The Otto von Gruber Award

**The Otto von Gruber Award**, which is donated by (ITC) consists of a medal and a monetary grant, and is presented to the author, under 35 years of age, of a paper of outstanding merit in the photogrammetry, remote sensing and spatial information sciences over the 4 years prior to the Congress. The winner of the award is Stephan Heuel (currently from Switzerland).

Stephan Heuel is a very capable young scientist; he obtained his PhD degree from the University of Bonn, Germany. He successfully developed a unified approach for projective geometry and statistics in the field of photogrammetry. His research deals with the uncertainty



aspects of projective geometry applications in computer vision; in this work he integrated concepts from computer vision and photogrammetry.

Some of the ideas he developed with Prof. Förstner, but he can nevertheless be considered as an independent thinker. He developed a very fundamental approach in this respect. His work provides an excellent consistent algebraic description of points, lines, planes and their transformations in the context of projective geometry. He integrated statistics into the algebraic framework by analyzing the behavior of homogeneous covariance matrices. Stefan Heuel delivered a proof of concept by

applying the derived methods to the task of polyhedral object reconstruction.

His PhD thesis is being published by Springer Verlag with the title "Uncertain Projective Geometry – Statistical Reasoning for Polyhedral Object Reconstruction". He has presented his work with great enthusiasm and clarity to scientific conferences of both the computer vision and photogrammetric communities, and publishes his work in both journals and conference proceedings of both communities. He was recently awarded the DAGM (The German Association for Pattern Recognition) prize.

**The U.V. Helava Award is presented to Changno Lee from South Korea and James S. Bethel, USA by ISPRS President John Trinder and Peter Fricker of Leica and Floris Siteur of Elsevier**

### **The U.V. Helava Award**



**The U.V. Helava Award**, sponsored by Elsevier B.V. and Leica Geosystems GIS & Mapping LLC, was established to encourage and stimulate submission of high quality scientific papers by individual authors or groups to the ISPRS Journal of Photogrammetry and Remote Sensing, to promote and advertise the Journal, and to honor the outstanding contributions of Dr. Uuno V. Helava to research and development in Photogrammetry and Remote Sensing. The award consists of a monetary grant of SwF 10,000, certificates and a silver plaque, partly funded by the Institute of Photogrammetry and Remote Sensing, Helsinki University of Technology (the University where Helava studied). The plaque was designed by the 1980-88 ISPRS Technical Commission III President, Einari Kilpelä, previously Professor at the Helsinki University of Technology.

A five-member jury, comprising experts of high scientific standing, whose expertise covers the main topics included in the scope of the Journal, evaluated 114 papers for the period 2000-2003. For each year of the four-year evaluation period, the Best Paper was selected and has been announced in the ISPRS Journal, ISPRS Highlights and on the WEB sites of ISPRS and Elsevier. The paper receiving the U.V. Helava Award was selected from these four papers. It was published in Vol. 58, Issue 5-6, by Changno Lee (South Korea) and James S. Bethel (USA), entitled "Extraction, modeling, and use of linear features for restitution of airborne hyperspectral imagery".

The jury stated: This clearly written, instructive and informative paper deals with the semi-automated line extraction incorporating the orientation process for linear array CCD sensors. It is an interesting, important and very relevant topic, considering the current development of digital aerial cameras and existing problems in the orientation of linear CCDs. The authors use up-to-date techniques for trajectory modeling, line feature extraction and their integration into the geometric sensor model and provide convincing and thorough experimental tests and a transparent analysis of the results. This research provides a very good balance between theory and practice, while its high practical significance is increased by the use of GPS/INS and the reduction of the needed for control line features.

### **Presentation by President John Trinder for the Election of Lawrence Fritz as Honorary Member of ISPRS**

An individual is elected as an **Honorary Member** in recognition of distinguished services to the ISPRS and its aims. Honorary Members shall be nominated by a committee, chaired by the most recent Honorary Member and composed of members from the current and three previous Councils, and elected by the

Congress. There may not be more than seven living Honorary Members of the Society at any given time. The Committee has nominated Lawrence W. Fritz (USA) for election as an Honorary Member of ISPRS. Lawrence W. Fritz has served with distinction in ISPRS activities since his early involvement in 1968.

His major achievements include: Chair WG II/1 “Analytical & Hybrid Photogrammetric Instruments” (1980-1984); President Technical Commission II “Instrumentation for Data Reduction and Analysis” (1984-1988); Congress Director (1988-1992); Secretary General (1992-1996); President (1996-2000); and 1<sup>st</sup> Vice President (2000-2004). He initiated and/or produced for ISPRS, the “Evaluation Guide for Analytical Plotters” (1979), ISPRS Archives A from the Washington Congress (1994), the Annual Reports (1993), now continuing in *ISPRS Highlights*, the Calendar of Events (1993), *ISPRS Highlights* (1996), the 2000 Strategic Plan (1997) and The ISPRS Foundation (2002). He has contributed to the development of many changes to the ISPRS Statutes/Bylaws, Guidelines, MOUs/MOAs and contracts. He has represented ISPRS in many international fora, including a number of UN divisions, ICSU and CEOS.

Lawrence Fritz’s major accomplishments in research and development include: originator of stereoscopic superimposition; prime designer and consultant on major data base systems such as MSDDDB, IDPF, ANCS-II; developer of calibration methodology; designer of super precise camera stellar calibration, photobathymetry, laser comparator and photogeodesy systems.



His managerial experience includes: Director of NOAA Charting R&D Laboratory; Chief of Photogrammetry Division, NOAA; and in ISPRS.

His roles in policy and technical guidance have included: Senior Policy Analyst, Executive Office of the President USA; Senior Staff Scientist, Lockheed Martin Corporation; Member, Board of Directors, Open GIS Consortium (OGC). He has won many awards including Brazilian Ordem do Merito Cartografico, 1999, Honorary Cosmonaut, Russian Academy of Cosmonautics, 1995 and The ASPRS Photogrammetric (Fairchild) Award, 1987.



Folk dancers at the Opening Ceremony