

**1992-1996 NATIONAL REPORT OF THE
AMERICAN Society FOR PHOTOGRAMMETRY AND REMOTE SENSING**

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ABSTRACT:

The National Report of the U.S. summarizes the structure and membership of ASPRS since the XVII Congress in Washington, D.C., describes the three main service sectors provided by the Society, highlights advances in the core technologies, and briefly comments on the future prospects of the Society and the profession. The primary service sectors of ASPRS are represented by meetings, publications and member services while the three membership sectors are private practice, government civil service and academia. Membership in the Society is approximately 7500 spread more or less equally between the three membership sectors.

1. INTRODUCTION

The "mapping sciences", which collectively includes photogrammetry, remote sensing, image interpretation, GIS, GPS and other related fields, has matured and continues to expand in the U.S. (U.S.). In government and private sectors the use of these technologies is commonplace and is being applied in many innovative ways related to visualization, modeling, enterprise location, real estate, disaster relief and future-mitigation planning, vehicle navigation, tracking and routing, virtual workplace GIS applications via the Internet, insurance, intensive agriculture and direct mail marketing.

The future of the mapping sciences should be even more promising in the U.S. and elsewhere because of several synergistic trends and likely future occurrences. The recent past continues to show the trends of computer equipment becoming more powerful and less costly, applications software is also becoming more robust and useable by a larger sector of the population, more geospatial data is becoming available and its cost of development is declining, more people and business sectors are becoming aware of the utility of the technologies or are being trained in their use, and the core technologies of photogrammetry, remote sensing, GIS and GPS are becoming more fully integrated. In addition, standards for data exchange, content standards for geospatial metadata and tools for searching those files, expanded Internet access and utility, and federal government initiatives like the National Spatial Data Infrastructure, all make the availability and access to data easier and more economical. The pending promises of new commercial high resolution satellites, additional suites of government-sponsored satellites for environmental monitoring and

modeling and less restricted use of intelligence community data and technology should further stimulate growth of the mapping sciences.

A more complete National Report of ASPRS is envisioned for publication in Photogrammetric Engineering and Remote Sensing (July, 1996). It will contain more comprehensive treatment of the topics addressed in this report. Nevertheless, we hope this shortened report will portray the most salient information related to the ASPRS and the mapping sciences that have occurred in the U.S. since the last National Report.

2. SOCIETY STRUCTURE AND MEMBERSHIP

The American Society for Photogrammetry and Remote Sensing (ASPRS) is the U.S. Ordinary Member to the International Society for Photogrammetry and Remote Sensing (ISPRS). ASPRS was founded in 1934 and currently has a total of approximately 7500 active, student, and other categories of members worldwide. There are also 152 corporate Regular Sustaining Members and 2 Multiple Sustaining Members with 6 Subsidiaries.

Membership in ASPRS has remained fairly stable since the last national report in 1992, with a current retention rate of 80% for active members. Membership demographics categorized into general professional sectors indicate the following composition: Private (30%), Academic - including students (28%), Federal and State Government Service (24%) and Other - including no data (18%). There has been a noticeable shift in the number of members from government service to private sector caused by various governmental streamlining, downsizing and outsourcing activities. Information about those members reporting specializa-

tions by professional field are shown in Table 1, and indicates the predominance of members are involved in remote sensing and GIS.

Table 1. Member Professional Specialization*

Field of Specialization	Number
Photogrammetry	382
Remote Sensing	575
Surveying	169
GIS	571
GPS	161
Other	100

* Data from 1994/95 paid member demographics database

ASPRS members are organized geographically into 17 regions, each with its own committees, technical and social programs and locally elected officers and Regional Director, who serves on the national Board of Directors. Until just recently there were 18 regions, but at the request of the affected regions the Texas-Louisiana Region merged with

national committees and three joint national committees, the latter of which address joint Society matters with our sister Society American Congress of Surveying and Mapping (ACSM). Table 2 shows the current makeup of divisions, committees and joint committees. More specific information on activities of some of these entities is included in other sections of the report. In addition, it should be noted that Electronic Communications Committee is completely new and tasked with taking the Society forward in the areas of using Internet and other communications technologies. The Data Preservation and Archiving Committee is the result of reengineering the former Preservation of Aerial Photography Committee and it has a new, expanded mission. The Strategic Planning Committee has replaced the former Long Range Planning Committee, while Satellite Mapping and Remote Sensing Committee is no longer a joint committee with ACSM.

3. SERVICE SECTORS

As indicated in the last national report to ISPRS the "look and feel" of ASPRS continues to evolve in response to the

Table 2. ASPRS National Committees/Divisions & ASPRS/ACSM Joint Committees*

Divisions:

Geographic Information Systems*	Photogrammetric Applications*	Primary Data Acquisition
Professional Practice*	Remote Sensing Applications	

National Committees:

Awards	Bylaws	Environment
Division Directors	Electronic Communications*	Evaluation for Certification*
Inter-Organization Liaison	Journal Policy	Membership
Memorial Lecture*	Nominating	Data Preservation and Archiving*
Professional Conduct	Public Relations	Publications
Satellite Mapping and Remote Sensing	Scholarship*	Strategic Planning
Student Activities*	Workshop Coordination	

Joint Committees:

Convention Advisory	Government Affairs	Sustaining Members
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* portion of report contained elsewhere in this Nation Report

the Mid-South Region. New student chapters have been formed or reactivated at Michigan State University, University of Connecticut, University of Florida, University of Massachusetts, and University of South Florida since 1992. The professional interests of the membership are primarily served by five divisions, while many of the programmatic activities of the Society are administered through the 20

overarching responsibility to meet the needs of a multi-sector professional Society involved in fields of rapidly changing technology and burgeoning applications. Strategic planning is helping ASPRS create new opportunities and services for its members. Nevertheless, the basic service sectors of the Society continue to be meetings, publications and member services.

3.1 Meetings

ASPRS continues to host its annual conventions with the American Congress on Surveying and Mapping (ACSM), while the GIS/LIS conference is now sponsored by six member associations. Table 3 portrays the major meetings sponsored or cosponsored by ASPRS for the years 1992-1996. Attendance at the annual meetings has declined compared to the 1988-1991 time period, while GIS/LIS meeting attendance has tended to plateau. This decline or lack of growth is most likely the result of several factors such as, competition from software user group meetings and the saturation of the market with similar meetings, fluctuations in the economy, government downsizing, maturation of the core disciplines, and basic changes in professional and personal paradigms. However, two recent ASPRS specialty conferences have been major successes in the aspects of attendance, technical program, exhibit and attendee/vendor satisfaction. This may indicate that more focused meetings and strategic alliances with varied sets of sponsoring partners may be a better model to meet the needs of the mapping sciences profession in the future.

3.2 Publications

ASPRS continues to have an active publications program, which is one of the main avenues used to keep members and non-members informed about the Society and the profession. *Photogrammetric Engineering and Remote Sensing* (PE&RS), the Society's monthly journal, continues to improve and most of the backlog of approved articles has been published. The following is a list of major publications since the XVII ISPRS Congress in 1992: *The Glossary of the Mapping Sciences, International Symposium on Spatial Accuracy of Natural Resource Data Bases, Pecora 12: Land Information from Space-Based Systems, Mapping & Remote Sensing Tools for the 21st Century, 15th Biennial Color Workshop, 14th Biennial Workshop on Color Aerial Photography and Videography for Resource Monitoring, The GIS Applications Book: Examples in Natural Resources, ISPRS Commission IV: Proceedings of the Symposium on Mapping and GIS, AutoCarto XI, Annual Proceedings for '93, '94, '95, and '96, GIS/LIS '92, '93, '94, '95, Land Satellite Information in the Next Decade Proceedings and Data Notebook, Decision Support 2001, Mobile Mapping*

Table 3. Major ASPRS Sponsored and Co-Sponsored Meetings, 1992-1996.

<u>Title</u>	<u>Location</u>	<u>Sponsor(s)</u>
1992		
Annual Meeting & Convention	Albuquerque, New Mexico	ASPRS & ACSM
Global Change & XVII ISPRS	Washington, D.C.	ASPRS, ISPRS & RTI
GIS/LIS	San Jose, California	ASPRS, ACSM, URISA, AAG & AM/FM
1993		
Annual Meeting & Convention	New Orleans, Louisiana	ASPRS & ACSM
GIS/LIS	Minneapolis, Minnesota	ASPRS, ACSM, URISA, AAG & AM/FM
1994		
Annual Meeting & Convention	Reno, Nevada	ASPRS & ACSM
Mapping & Remote Sensing Tools for 21st Century	Washington, D.C.	ASPRS & MAPPS
GIS/LIS	Phoenix, Arizona	ASPRS, ACSM, URISA, AAG & AM/FM
1995		
Annual Meeting & Convention	Charlotte, North Carolina	ASPRS & ACSM
Land Satellite Information in the Next Decade	Vienna, Virginia	ASPRS, NASA, NOAA & USGS
GIS/LIS	Nashville, Tennessee	ASPRS, ACSM, URISA, AAG, AM/FM & APWA
1996		
Annual Meeting & Convention	Baltimore, Maryland	ASPRS & ACSM
GIS/LIS	Denver, Colorado	ASPRS, ACSM, URISA, AAG, AM/FM & APWA

Symposium, and Calibration Guide: First International Airborne Imaging Spectrometer Calibration Workshop.

In an effort to provide better service to its members and the profession, ASPRS is providing more targeted and current information through a series of compendia, monographs, CD-ROMs and other materials. For example, the GIS Division is striving to meet the needs of new, as well as, experienced GIS users. This is being accomplished in part via the publication of compendiums such as *Remote Sensing Thematic Accuracy Assessment* and *Remote Sensing and Geographic Information Systems: An Integration of Technologies for Resource Management*. Both publications were produced jointly with the ASPRS Remote Sensing Applications Division. Work is beginning on the Manual of GIS which will be part of ASPRS's Science and Engineering Series. A revision of the widely distributed Careers Brochure is currently underway in conjunction with the Education Committee.

The following examples of soon-to-be-available publications also reflect the aforementioned goals: *Manual of Remote Sensing - Sensors and Platforms* (CD-ROM) and *Principles and Applications of Radar Remote Sensing*, *Manual of Photographic Interpretation*, *Digital Photogrammetry: An Addendum to the Manual of Photogrammetry*, *Proceedings of GAP Analysis Symposium*, and *Monographs No. 1-2 (Accuracy Assessment of Land Cover Change Detection and History of CORONA and the Contribution of ASPRS Members)*.

3.3 Member Services

ASPRS provides many member and professional services in response to long-standing as well as filling new niches identified through the strategic planning process. The following is a sampler of the wide variety of services. Note the synergism among the various committees and divisions which was created by the strategic planning process.

- Members of the GIS Division are working with the Professional Practice Division's Standards Committee to provide input and evaluate the National Spatial Data Transfer Standard. They are also participating on the Federal Geographic Data Committee.

- The Data Preservation and Archiving Committee is a new standing committee, formed in 1994 to address archiving issues for geospatial data. These data include satellite imagery, aerial photography, other digitally acquired imagery, and digital data created by geographic information systems. Committee members represent private, government, and academic sectors who are knowledgeable about, and have a concern for data preservation and archiving practices. The Committee sponsored a technical session and panel discussion on data preservation, accessibility, and continuity at the 1996 ASPRS Annual Meeting. Current activity is focused on producing a *Directory of Sources of*

Historic Photos, Images, and Maps.

- The ASPRS Memorial Lecture Committee recognizes that knowledge of the historical development of photogrammetry, remote sensing, geographic information systems and related mapping sciences technologies is important to a full understanding of continued progress in these fields. A key means of capturing this history is to share the past accomplishments of pioneers and leaders in our science with current and future professionals through a program of memorial lectures. Therefore, in 1971, ASPRS established a tradition of recognizing its outstanding departed members by means of a series of Memorial Lectures presented at each annual meeting. All of these lectures have been published in the Society's journal and those presented between 1971 and 1986 have been collected and published by ASPRS in a volume entitled *Pioneers in Photogrammetry*.

- The Student Activities Committee is designed to study and recommend policy to the Society, establish and foster communication among student members, plan and establish student programs and related activity at Society symposia and conventions, and liaise with related ASPRS entities. The committee will target learning materials to the member's level of education and interest, to spread successful interaction ideas between regions and chapters by designing templates of involvement, and to build an Internet structure for effective communication. In addition, it is advisable to create links between ASPRS committees, between industry and academia, between full members and student members, and between job seekers and job suppliers. By building a structure for student activities, future committee members can concentrate their efforts on implementing the ideal.

- In the past four years, the Professional Practice Division (PPD) has worked with the membership on several programs and initiated new agendas to meet future needs. PPD has closely coordinated its activities with the certification programs for photogrammetrist and mapping scientist (GIS and remote sensing), which are described separately for this report. The new written examination for photogrammetrists is being developed so that ASPRS and, perhaps later, state licensing boards, will use it to license photogrammetrists and mapping scientists.

- The Standards Committee provides leadership within ASPRS to ensure the Society's participation in the development, review, and implementation of national standards related to the spatial data sciences. Included among these are the ANSI-GIS X3L1 Standards Committee activities that have resulted in national standards. ASPRS has also participated in review activities for data and metadata standards within the U.S. Federal Geographic Data Committee, and has organized a Digital Orthophoto Standards Working Group to address the requirements and models for acquisition and use. A formal standards liaison activity has been established with URISA.

The Draft "Standard Specifications for Aerial Photogra-

phy" document was published in *PE&RS* for review and comment by the ASPRS membership. Following evaluation of all comments, PPD will revise the draft document and publish the guidelines as an ASPRS publication.

ASPRS, as a result of a PPD initiative, is sponsoring "First-Time Conference Attenders" receptions at the annual and GIS/LIS conferences. These events enable the officers and board members of ASPRS to meet and to welcome those attending conventions for the first time, and to encourage membership and participation in ASPRS technical division and committee activities.

The new PPD Legal and Ethical Committee, was formed to provide a focus and mechanism for dealing with legal and/or ethical issues that arise within ASPRS. To date, the committee has addressed two requests from ASPRS members for *amicus curiae* letters.

Another new ASPRS committee has been formed to deal with public relations issues. The committee plans to provide ASPRS a venue for participation by members in increasing the visibility of the Society within the community at large.

PPD developed federal job classification standards for the GIS and the remote sensing specialties in cooperation with the U.S. Office of Personnel Management. These standards were undergoing review when the National Performance Review reinvented the personnel management system of the U.S. Government, eliminating the opportunity to create new job series.

PPD developed a draft *Guidelines for Federal Procurement of A&E Services for Photogrammetric and Cartographic Work*. The draft guidelines were reviewed by the membership but further work halted due to conflicting priorities.

The future emphasis of PPD activities will focus on the certification programs, the written examination for photogrammetrists, national and international standards, legal and ethical issues, technical program sponsorship, and other initiatives that contribute to the continued well-being of the ASPRS membership with respect to professional practice.

- The Scholarship Committee oversees the large ASPRS scholarship program, with a history that extends over most of the Society's 62 years of existence. Investments in the outstanding students of today are one of the ways the Society supports development and future growth in both the Society itself and its members. Currently ASPRS offers 5 annual awards:

Robert E. Altenhofen Memorial Scholarship - To encourage and commend students who display exceptional interest and ability in the theoretical aspects of photogrammetry.

EOSAT Award for Applications of Digital Landsat TM Data - To support remote sensing education and

stimulate the development of applications of digital Landsat Thematic Mapper (TM) data.

William A. Fischer Memorial Scholarship Award - To facilitate graduate-level studies and career goals that address new and innovative uses of remote sensing techniques that relate to natural, cultural, or agricultural resources of the Earth.

Leica Inc. Photogrammetric Fellowship Award - To encourage and assist graduate and undergraduate students to pursue education in photogrammetry or surveying and promote the development of photogrammetric sciences.

Ta Liang Memorial Award - To facilitate research-related travel for an outstanding graduate student in remote sensing.

- In 1994 the ASPRS made a decision to adopt state-of-the-art information technology by connecting its headquarters office to the Internet. Connectivity was implemented early in 1995, with capability for electronic mail and text-only browsing. All headquarters staff were given e-mail and Internet training. Later in 1995 the headquarters office upgraded to multimedia browsing and a faster data connection. Early in 1995 the need was recognized for the creation of an Electronic Communications Committee (ECC). Its first meeting took place at the 1995 Annual Convention. By late 1995 the ASPRS home page <<http://www.asprs.org/asprs>> had become completely operational and was moved to an Internet provider local to the ASPRS headquarters office. Currently the ECC is coordinating efforts with ASPRS staff for maintenance and expansion of the home page, encouraging the development of home pages for each ASPRS region, and developing a procedure for electronic publishing of PE&RS award-winning papers. A home page editor position has been established to provide oversight, develop home page guidelines, and to interface with the PE&RS editor.

- Twenty one years ago the ASPRS established a Certified Photogrammetrist Program. After 16 years of successful program application, it was modified to require recertification of certified persons every five years to assure proficiency with modern standards and also established two Certified Mapping Scientist categories - the Remote Sensing Scientist and the GIS/LIS Scientist. The main responsibilities are: evaluate applicants and recommend appropriate actions; maintain integrity of the program by assuring evaluations are performed according to standards; continuously evaluate the program to assure the requirements for certification are adequate to assure protection of the health and welfare of the public; and in cooperation with the Professional Practice Division, study the needs nationwide for certification and possible registration by States and other governing bodies and assist them in their programs.

The program is a voluntary one available to all in the profession. It has made great strides in the U.S. and in other countries. Its popularity stems from the fact that users of the

certified mapping scientists professional skills now have a method of evaluation of their professionalism and know that they operate under a strict Society Code of Ethics.

4. ADVANCES IN CORE TECHNOLOGIES

As stated in the introduction, the level of synergism created by enhanced, widely-affordable, computer capabilities and the integration of photogrammetry, remote sensing, GIS, GPS and related technologies has fostered an environment for new applications and expanding routine use of the technologies. Recent advances in photogrammetric applications are primarily in the fields of softcopy photogrammetry and GPS photogrammetry.

Over the last several years, softcopy photogrammetry has achieved operational status in numerous organizations, both private and governmental. Advances in several areas of hardware and software development have combined to produce commercial softcopy mapping systems that meet the needs of users with various accuracy and performance requirements, at varying cost levels. These advances include:

- Improved geometric and radiometric scanner resolution and accuracy.
- The availability of scanners of different optical and mechanical characteristics that cover a wide range of price/performance ratios.
- Significant advances in softcopy photogrammetric workstation performance. This field has been one of the main beneficiaries of the incredible gains in raw workstation CPU performance and storage capacity seen everywhere in the computer industry.
- Ongoing improvements in softcopy software, both in terms of user interface, as well as algorithmic capabilities.

Of great interest for the future will be the increased use of direct digital imagery from a variety of sensors, including those on board the new very high resolution digital Earth orbiting satellites. In addition, research will focus on the area of image compression, storage, and distribution across the Internet. Interest will also focus on further developments in the fields of feature extraction and object recognition.

The last five years have seen GPS photogrammetry evolve from a process requiring very specialized expertise and execution to a more robust and operational technology. Much of the operational improvement can be attributed to the cooperative relationship between the various user groups and vendor communities. What were major obstacles to implementation a few years ago have been simplified or eliminated through improvements in hardware, software, and system integration. The use of GPS in the aerial photogrammetric process, with the subsequent reduction or elimination of ground control, is now considered by many to be routine. Specific improvements include:

- Greatly enhanced GPS satellite coverage.
- Higher performance and lower cost GPS receivers.
- Widespread implementation of On-The-Fly integer resolution software, reducing the need for continuous lock during long flights.
- Better integration between photogrammetric cameras and GPS receivers.
- more robust enduser GPS processing software, with enhanced usability.
- Improved bundle adjustment software that takes full advantage of GPS parameters.

The scope of GPS photogrammetry has lately broadened to include the integration of sensors other than aerial cameras, and the integration of inertial navigation systems in addition to GPS. The scope of application is also no longer restricted to airborne platforms, as ground-based mobile mapping systems, which utilize some of the same principles as the airborne systems, become operational. There is every reason to expect that the application of GPS to all aspects of photogrammetry will continue to increase in the next five years.

“Geographic information systems (GIS) allow decision-makers to analyze complex spatial inter-relationships between variables that affect a particular problem. It is important to note such systems not only facilitate more timely, efficient, and cost-effective decision-making, they also foster better decision-making since they enable users to conduct unique, and otherwise often infeasible, analytic tasks.” These words written by James Merchant and William Ripple in the forward of the first annual GIS edition of *PE&RS* in October of 1987 are even more appropriate today as the use of GIS continues to grow exponentially and the technology evolves to help us answer increasingly complex resource management questions. Developing and enhancing interfaces with other technologies such as remote sensing and global positioning systems is also of primary importance.

Remote sensing and GPS technologies, while important in stand-alone applications, also have become critical data sources for new photogrammetric and GIS applications. Less costly, more portable, highly accurate and fully integrated GPS systems have become widely used and provide the accurate and precise locational information for photogrammetric, remote sensing and GIS applications. The potential availability of a constellation of high resolution commercial satellites is an exciting and important advancement for the remote sensing community. The proposed capabilities of one meter plus resolution with some combination of multispectral and/or panchromatic and/or stereo imagery advances these systems into new photogrammetric and GIS applications. These applications, coupled with the advances in GPS-linked aircraft platforms with digital cameras, scanners or video systems, presents a wide range of options for performing high resolution applications that had

previously been the exclusive domain of aerial photography. Broad scale applications will also continue to derive benefit from existing and planned commercial satellite systems, as well as the new government-sponsored systems from the U.S. and several other countries.

5. FUTURE

Predicting the future is always difficult, but when the current nature and magnitude of change, in general, is combined with its impact on an already rapidly changing technological profession, making prognostications is even more difficult. Nevertheless, there are trends within ASPRS and the profession that will affect their respective futures. The following are some that will likely be encountered between now and the XIX ISPRS Congress at the turn of the century.

An important multifaceted issue being examined is how to enhance ASPRS presence in "cyberspace". This includes, but is not limited to, how that presence effects relationships with ASPRS committees and programs or with other societies in general, developing an electronic version of *PE&RS*, developing job listings/electronic "job fair", advertising, and various other types of community services that could be provided via the home page and the potential for "virtual" workshops and specialty conferences.

ASPRS is likely to develop short- and long-term strategic alliances and collaborative partnerships with a broader range of organizations in the area of meetings and publications. This is necessary to achieve the goals of being more timely, creative and flexible in providing services to our existing and future members, the latter of which will likely have needs that vary significantly from those of today.

The potential for further relaxation of restrictions to intelligence community technologies and data should reinforce mapping sciences applications in a number of areas, including natural resource applications. This, coupled with the potential for further advances in the core technologies, should continue to strengthen and broaden the profession.

All of the above have the potential to increase ASPRS membership and associated activities. The challenge, however, will be in making sure ASPRS and similar societies can remain relevant to current and future members in these dynamic times.