

# AMERICAVIEW'S REMOTE SENSING EDUCATION MISSION

T. Cecere<sup>a</sup>, R. Landenberger<sup>b</sup>, T. Mueller<sup>c</sup>, J. Morgan<sup>d</sup>, K. Czajkowski<sup>e</sup>, R. Dodge<sup>f</sup>

<sup>a</sup>U. S. Geological Survey, Reston, Virginia, USA – tcecere@usgs.gov

<sup>b</sup>West Virginia University, Morgantown, West Virginia, USA – Rick.Landenberger@mail.wvu.edu

<sup>c</sup>California University of Pennsylvania, California, Pennsylvania, USA – Mueller@calu.edu

<sup>d</sup>Towson University, Baltimore, Maryland, USA – jmorgan@towson.edu

<sup>e</sup>University of Toledo, Toledo, Ohio, USA – Kevin.Czajkowski@utoledo.edu

<sup>f</sup>Midwestern State University, Wichita Falls, Texas, USA – Rebecca.dodge@mwsu.edu

**Abstract** -- AmericaView is a national consortium of 37 state-level, university-led institutions and is the current awardee of a competitive grant issued by the United States Geological Survey for the promotion of the use of remotely sensed imagery through education, outreach and research activities. AmericaView's mission involves supporting the utilization of federal public domain aerial and satellite imagery, developing and supporting K-12, undergraduate, and graduate student remote sensing education, applied remote sensing research, and outreach related to the use of remotely sensed data. Because of the unique nature of each state partnership, "StateViews" have the freedom to implement the AmericaView mission in a way that best meets their state's specific education and research needs. All StateViews implement a variety of educational projects, ranging from museum, science fair, and conference displays, to GIS Day exhibits and workshops, to week-long, intensive teacher training in remote sensing, GIS, and GPS. Recently, states have been forming regional partnerships such as the SATELLITES program and an annual Earth Observation Day event, combining resources to leverage and enhance the strengths that each state brings to its educational mission. This paper will showcase materials and courses developed by AmericaView related to remote sensing for K-12, college level and professional development (including on-line training) along with the SATELLITES program and how AmericaView is working with the WETMAAP activity.

**Keywords:** AmericaView, education, partnerships, SATELLITES, WETMAAP

## 1. INTRODUCTION

AmericaView is a non-profit organization consisting of a nationwide partnership of remote sensing scientists who support applied remote sensing research, science, technology, engineering and mathematics (STEM) education for K-12+ students, workforce development, and technology transfer. Funded by a competitive grant from the United States Geological Survey (USGS), AmericaView is composed of university-led, state-based consortia working together to sustain a network of state and

local remote sensing scientists, educators, analysts, and technicians. Currently 37 states are represented (called "StateViews") within AmericaView as either full members, associate members, or affiliate members, with over 300 educational institutions within those states participating. Figure 1 provides a breakdown of all of the membership categories present within the StateViews that make up AmericaView. The AmericaView networks, facilities, and capabilities are highly leveraged and utilized for sharing and applying public domain remotely sensed data in a wide range of civil applications, spanning formal and informal education, ecosystem analysis, natural resources management, and disaster response. The organization's primary goal is to support the many beneficial uses of remotely sensed satellite and airborne data in service to society.

The purpose of this paper is to introduce the reader to the remote sensing related educational resources either developed or utilized by AmericaView. Even though AmericaView efforts are primarily concentrated on moderate resolution satellite-based remote sensing, the concepts are applicable to any remote sensing platform that images the Earth from above.

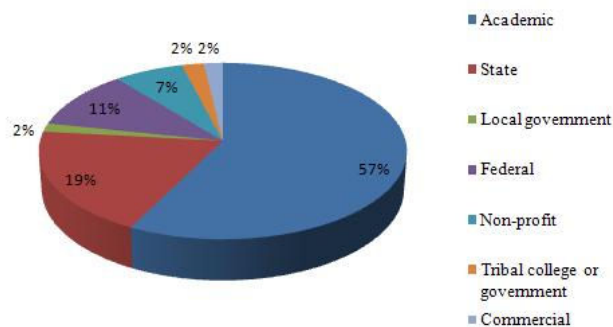


Figure 1. AmericaView membership categories.

## **2. REMOTE SENSING EDUCATION RESOURCES**

### **2.1 Students And Teachers Exploring Local Landscapes to Interpret The Earth from Space (SATELLITES)**

SATELLITES is a cooperative effort between teachers, students and scientists aimed at enhancing hands-on science and technology education in a wide range of topic areas including Earth and space science, geography, environmental science, biology, and physics. This is a national educational initiative based on the K-12 Earth systems science curriculum, introducing K-12 teachers and students to basic geographic concepts and geospatial technologies such as remote sensing, Geographic Information Systems (GIS), Global Positioning Systems (GPS), and digital elevation modeling. This effort originated in the state of Ohio in 1998 with funding from the National Aeronautics and Space Administration (NASA) which continues as the main sponsor of this effort. Each year, OhioView and several other AmericaView partners conduct summer institutes in Earth science and technology content, project-based learning and student inquiry.

Through SATELLITES, teachers receive extensive training on utilizing Landsat images to enhance their curriculum, various types of Earth science data, and computer programs. To date, more than 500 K-12 teachers representing over 300 schools have received training via SATELLITES. The teachers then take what they have learned to the classroom, teaching their students the concepts that are implemented in follow-on field collection campaigns. More than 10,000 students representing all 50 US states plus the countries of Poland, Estonia, Trinidad and Tobago and the Dominican Republic have participated in data collection efforts during field campaigns. Additional information regarding this effort can be found at <http://satellitesk12.org>.

### **2.2 Geospatial Technology for Educators**

South Dakota View is actively involved in Geospatial Technology for Educators, an annual workshop which provides information on geospatial technologies and how they can be used to enhance curriculum in areas such as Earth science, geography and physics. The geospatial tools utilized include GIS, GPS and remotely sensed data. Funding for the workshop has been provided by federal grants from NASA via the Upper Midwest Aerospace Consortium's Education Public Access Resource Center and the South Dakota Space Grant Consortium, and from the USGS grant awarded to AmericaView. During the intensive four-day workshop, participant teachers learn how to collect data using GPS units, where to look for various types of geospatial data, how remote sensing imagery is collected and utilized, and how GIS software is used to integrate and analyze various types of geospatial data. Presentations by scientists and land managers expose the teachers to real-world examples of how geospatial technology is becoming an increasingly important part of today's society. Participants receive a GPS unit, a GIS textbook, and

geospatial data and software. The 2010 Geospatial Technology for Educators workshop marked the twelfth year that it has been offered.

### **2.3 Earth Observation Day**

Earth Observation Day is intended as an annual event that recognizes the importance of using remotely sensed data to monitor the Earth and its environment and promote the use of remotely sensed data by K-16 teachers and students. The first Earth Observation Day was held on September 21, 2006 to commemorate the U.S. Department of the Interior announcement of the Earth observing satellite program. Earth Observation Day 2010 celebrated the 25th anniversary of the Landsat 5 satellite.

Earth Observation Day 2011, scheduled for April 8, will focus on the concept of land cover as a critically important environmental variable in the study of Earth system science. Like the oceans and atmosphere, land cover influences the Earth's climate in complex ways and forms the foundation for terrestrial biodiversity upon which all human life depends. Because any student, regardless of location, can study land cover using simple but powerful tools such as satellite images and other geospatial technologies, Earth Observation Day 2011 offers an opportunity for teachers to introduce the concept of land cover into their science curricula. For additional information, visit the Earth Observation Day website at <http://earthobservationday.com>.

### **2.4 Undergraduate Education**

AmericaView supports undergraduate student education through the StateView lead and partner academic members and their state natural resource management and planning partners. StateView academic institutions offer courses in introductory and advanced remote sensing, digital image processing, GIS science and applications, and related geospatial technologies such as GPS technologies. This provides opportunities for undergraduate students to engage in applied geospatial research projects with university scientists, government agencies, non-profit organizations, and the private sector. StateViews also support undergraduate students through scholarships and mini-grants, research assistantships, internships, and travel funding for field work and conference presentations. Material developed in one state is often shared with AmericaView members in other states. Resources include lecture materials, laboratory assignments, and specialized course content that would not otherwise be available without an effective network of educators and scientists. In this way, AmericaView partners have been able to increase the number of undergraduate remote sensing courses to help meet the need for trained technicians and scientists in the rapidly growing field of geospatial science and technology.

One such collaborative effort is AmericaView University, an online educational resource for AmericaView led by

CaliforniaView and GeorgiaView. AmericaView University provides undergraduate remote sensing and related geospatial technology education courses in an online format using PG STEAMER as the remote sensing software. This resource is also available for the international community to utilize. For more information, please visit [www.avuniv.org](http://www.avuniv.org).

## 2.5 Current Workforce Training

AmericaView offers a variety of training programs for the current workforce in order to improve the knowledge base regarding remote sensing applications, the availability of remote sensing imagery, and various data analysis tools. StateViews offer short courses for employees at all levels of government including tribal agencies; for groups such as farmers, ranchers, land managers, and meteorologists; and for academic colleagues in other disciplines at the university level. Examples of program topics include: Synthetic Aperture Radar (SAR), image processing, data classification, Unmanned Aerial System (UAS)-based data acquisition and analysis, Federal Emergency Management Agency (FEMA) Hazards United States (HAZUS) training, metadata management, and remote sensing data analysis software. The programs range from two-hour presentations at state or regional conferences or meetings to week-long resident workshops, a number of which are offered in remote rural communities. In 2009, twelve StateViews assisted in training more than 900 members of the current U.S. workforce.

Many StateViews offer follow-up support after training is completed. Because of their inherent academic positions and demonstrated commitment to education, StateView members are often available to answer questions, provide feedback, and otherwise provide follow-up support to those whom they have already trained. This follow-up improves effectiveness and strengthens the formal and informal partnerships that form the basis of successful professional development and training.

## 2.6 Wetlands Education Through Maps and Aerial Photography (WETMAAP)

WETMAAP is an activity operated by CNLWorld, a non-profit organization. WETMAAP's goals are to:

1. Introduce educators to wetland habitat functions and values
2. Introduce educators and students to wetland mapping, digital databases, and GIS technology
3. Assist educators with the integration of wetland issues into existing curricula
4. Promote public awareness of wetland loss issues and provide an understanding of the causes and effects of wetland change

WETMAAP accomplishes its goals by making extensive use of aerial photography or, in some cases, satellite imagery, plus area maps and local knowledge which may include field observations. LouisianaView and TexasView have participated in and sponsored workshops, and several other StateViews have expressed interest in future workshops or in adapting the WETMAAP methodology to other types of land cover analysis. For more information on WETMAAP, visit [www.wetmaap.org](http://www.wetmaap.org).

## 3. SUMMARY

AmericaView offers a wealth of resources and experience regarding the education of the current and future workforce in the understanding and utilization of aerial, satellite and in some cases field collected remotely sensed data. Some of these resources are directly accessible by the international community while other activities demonstrate methods of fulfilling AmericaView's educational goals. Additional information about AmericaView can be found at <http://americaview.org>.