National Consortium on Remote Sensing in Transportation – 
Environmental Assessment

Annual Report on Program Progress and Accomplishments

Executive Summary

The environmental assessment component of the NCRST under the lead of Mississippi State University has made significant progress toward the definition, development, and completion of initial research activities, coordination activities, and outreach activities. Consortium partners including the University of Alabama – Huntsville, Auburn University, the University of Mississippi, USRA, MSFC, and industry partners have collaborated to develop projects and preliminary deliverables that provide a tangible demonstration of the value of remote sensing technology to the process of environmental assessment in transportation. Specific focus on project efforts that emphasize streamlining the process of environmental assessment has resulted in the coordinated development of new applications of remotely sensed data that will gradually increase the awareness and acceptance of this technology. The first year of funded efforts began in March of 2000, a late date to begin University research activities and this necessitated extensions for specific milestones in the year one research activities/deliverables. The deliverables of this effort in the form of an oversight committee, printed and on-line informational materials, a national forum, progress reports, annual reports, and synthesis reports will help to assure that the efforts of the National Consortia on Remote Sensing in Transportation will reach the intended audience and provide the technology and understanding needed for the eventual wide-spread acceptance of this important technology in transportation applications. New deliverable products and outreach activities for the second and following years will provide product implementation guidelines (cookbooks) to improve the ability of transportation professionals to implement remote sensing products in their workflows, and international outreach activities will help develop international awareness for technologies being develop by the United States remote sensing community for transportation application.
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Activities

The activities of the National Consortium on Remote Sensing in Transportation – Environmental Assessment can be broadly grouped into research, coordination, and outreach activities. The following activities segments of this report will provide information about specific activities within each grouping.

Research Activities

Year 1 Research Activities

For the first year of consortia activities, many of the activity/deliverable items were funded as of March resulting in lost opportunity to staff up until the summer or fall semesters. The result of the late start can be seen in the extensions requested and received for specific milestones within many of the activities/deliverables. The following section provides a list of activities and a brief narrative of the completion status of the various milestones that are included in the agreement #DTRS56-00-T-0001, modification 03.

Activity/Deliverable 1: Consortium Management and Data Brokering

Milestones 1.1 through 1.8 were completed as required by the sponsor. The publication of quarterly newsletters was discontinued due to role of TRB and their general role to assist the consortia with communications, coordination, and distribution of news and for their assistance in developing a national forum. Due to the late start of the project and the nature of the research funding, status reports for the first year have been developed for payables and activities as needed or requested by the sponsor. The lead University has work closely with the sponsor and consortium partners to negotiate cost extensions as needed, and regular quarterly reporting will commence in year two of the project.

Activity/Deliverable 2: Needs Assessment

Needs assessment were conducted as part of an effort to “Identify High-Impact Applications of Remote Sensing for EIS.” A portion of this deliverable/activity (milestone 2.2) that called for a “Technical Synthesis Report” was carried forward to the following year and has been completed and delivered.

Activity/Deliverable 3: Use of Remote Sensing to Assess Transportation Infrastructure Growth – Mississippi Gulf Coast

The deliverable/activity to develop case studies for Remote Sensing on the MS Gulf Coast in a GIS was partially completed resulting in development of a research plan and technical notes published for investigating change in the I-10 corridor area. Historical image data were acquired; background baseline data collected, and new data were acquired in the completion of milestone 3.1.
Milestone 3.2 was extended and is currently scheduled for completion on 9/01. Progress on this deliverable/activity has been steady and shows all indication of being completed on or about the currently scheduled completion date.

Activity/Deliverable 4: Use of Remote Sensing to Assess Transportation Infrastructure Growth – Southern Appalachian Region

The deliverable/activity to develop case studies for remote sensing in the southern Appalachian region was partially completed resulting in a research plan and technical notes published for investigating change due to transportation infrastructure at the watershed scale and at the regional scale. The deliverable/activity was extended with milestones 4.2 and 4.3 scheduled for completion on 9/01 and 6/01 respectively. Part of milestone 4.3 ($23,000) was completed as part of a NASA/MSFC IAW reimbursable agreement. Due to technical issues, elevation data that were procured for this effort have been delayed and have contributed to the project delays. The current schedule for milestone completion in this activity is achievable, but may be optimistic given the delays in data availability. However, good progress has been made on all components of research not depending on procured data products (that are delayed).

Activity/Deliverable 5: Air Quality Analysis – Lead University of Mississippi

The deliverable/activity was in part completed resulting in a research plan and technical notes that will be published on selected case studies for air quality and analysis related to transportation. Milestone 5.2 of the deliverable/activity to complete air quality measurements at test sites was extended for completion 6/01. Data are reported to have been collected and further news will be made available to the sponsor for related payable items in the near term.

Activity/Deliverable 6: Coordinated Educational Outreach

An outreach brochure and web page was developed in the completion of milestone item 6.1 and a national forum was held 12/00 in the completion of item 6.2.

Year 2 Research Activities

For the second year of consortia activities, the following list of activities has been developed, submitted, approved, and funded. Most of the activities/deliverables are follow-on items for the first year activities. However, several of the items arise out of further definition of specific activities related to first year projects (activities 5 and 6) and other new items arise from changes in priorities that will lead to additional outreach, technology support, and workforce development (activities 8, 9, and 10). Quarterly progress and status reports will be prepared and
submitted to the sponsor based on the approved activities and the respective milestones and completion dates. The following section provides a list of funded activities for the second year of the project.

Activity/Deliverable 1: Consortium Management and Data Brokering

Activity/Deliverable 2: Needs Assessment

Activity/Deliverable 3: MS Gulf Coast (I-10) Assessment

Activity/Deliverable 4: Regional Assessment

Activity/Deliverable 5: Watershed Assessment

Activity/Deliverable 6: Integration and Use of Multispectral and Multiscale Data

Activity/Deliverable 7: Air Quality Analysis

Activity/Deliverable 8: Consortia Outreach, Support, and International Programs Development

Activity/Deliverable 9: Application Development and Cookbooks Development

Activity/Deliverable 10: Development of a Center of Excellence

**Consortium Coordination Activities**

Consortium coordination activities have included semi-annual meetings of the consortium leadership team, PIs, and oversight committee; attendance of the National Academy of Science TRB National Forum for Remote Sensing in Transportation; attendance of the annual TRB meeting, attendance of the annual AASHTO meeting; attendance of the annual GIS-T conference of the consortium leadership team; and attendance of GIS and remote sensing trade shows and workshops. For subsequent years, the scope of coordination activities will include additional international coordination activities targeted at reaching out to and capturing international interest for U.S. R&D and products emerging from the NCRST program. The international outreach activity will include participation by the consortia in significant international remote sensing symposia such as the Pecora, Land Satellite Information, ISPRS Commission Symposium planned for November of 2002.

**Outreach Activities**

- **Technical Outreach** – Technical services to states and locals are being conducted to provide targeted transfer of specific knowledge, data, and techniques for the applied use of remote sensing technologies to specific ongoing transportation projects. These
activities include work that is either ongoing or in various stages of development with Virginia DOT, Iowa DOT, North Carolina DOT, Mississippi DOT, Florida DOT, and Washington DOT.

- **Workforce Development** – Workforce development activities in the form of applied technology seminars are currently being planned for the application of remote sensing to the environmental assessment component of transportation planning. Preliminary efforts have been directed at working with the first year TAPs to provide industry-level workshops and seminars to highlight the success of the projects that applied remote sensing technology to the process of streamlining environmental assessment. Future activities include building on the initial workshop/seminar concept and potentially developing a series of certificated training classes that could be attended by transportation professional for hands-on technical training that would result in a certificate of training.

- **Curriculum and Center of Excellence Development** – The recognition of lead consortia universities as Centers of Excellence in the theoretical and applied use of remote sensing in the respective application areas and the development of relevant advanced curriculum are important components of consortia activities. The development of such curriculum and advanced lab facilities are ongoing at Mississippi State and will result in courses in Computational Remote Sensing for Environmental Analysis and advanced computer facilities at the newly formed Computational GeoSpatial Technologies Center within the Mississippi State University Engineering Research Center.

- **Congressional Outreach** – A Congressional briefings and a reception at the Russell Senate Office Building highlighted a series of meeting, presentations, and briefings held in Washington, D.C., between May 14 and May 17, 2001. All consortia groups attended and provided newly developed presentation materials and display stands recently acquired by each consortium. The first round "Technical Application Partners" (TAPs) also presented their results and findings to RSPA, USRA, and the NCRST consortia directors. The event was widely attended.

- **National Forum** – As part of the required deliverables a national forum has been tasked and developed in cooperation with the NAS TRB. This event will serve to provide an adequately scoped level of participation for developing and heightening interest and knowledge of this area or research. Ideally, this forum will serve to increase transportation professionals’ awareness or this technology and will eventually server to bring the research to the application areas of the industry practitioner.

- **International Outreach** (New Outreach Item for Second Year and Following Years) – A new component of international outreach has been stated as being an important area of activity for years two and three of the NCRST’s efforts. Consortium have been asked to develop international outreach global areas of focus and the environmental assessment group is tentatively looking at developing international
outreach activities in South and Central America. Current activities involve identifying US vendors and RS companies that currently have a strong presence there and identifying appropriate times and venues for such international outreach activities to occur.

**Deliverables**

- **Consortium Oversight Committee** – An oversight committee has been developed for the NCRST-E, the members of which are recognized experts from academia, industry, and state and local transportation agencies. The committee met twice during the first year of consortium activities and provided significant input and guidance to the research activities of the consortium. Information about the Oversight Committee members can be found at the following on-line location:

  [http://www.ncrste.msstate.edu/committee/committee.html](http://www.ncrste.msstate.edu/committee/committee.html)

- **Consortium Outreach Brochure and Web Page** – An outreach brochure and a web site for information about the consortium have been developed. The outreach brochure has been made available at various industry and professional meetings and information materials on the web page have been placed on-line. Additional informational materials for the web page are planned and are in the process of being developed and will be published to the web.

  Consortium Web Page:

  [http://www.ncrste.msstate.edu/](http://www.ncrste.msstate.edu/)

  Planned Consortium Informational Materials:

  [http://www.ncrste.msstate.edu/publications/publications.html](http://www.ncrste.msstate.edu/publications/publications.html)

- **Consortium National Forum** – The NCRST, with the assistance of the TRB has developed a National Forum for Remote Sensing in Transportation. The National Forum consists of a series of meetings, technical presentations, workshops, and user needs assessment activities held annually at the National Academies of Science. The National Forum was well attended by transportation professionals from academia, industry, and state and local transportation agencies for first year event. The National Forum was hailed as a success and plans for the second forum meeting have been held to build upon the success of the first year event.

- **Quarterly Status and Progress Reports and Newsletter Releases by the Consortium Lead Institution** – The reporting of news and significant activities has largely been undertaken by the TRB. Presently the development of quarterly newsletters has been discontinued due to the excellent status and progress reporting done by TRB. Given further indication that this task should be resumed a newsletter web site will be
reactivated, information and news gathered, and resultant news articles will be
distributed in electronic format and announced via an on-line list server. The list
server will be deployed in any case and may be used to announce any significant
events or news of any NCRST consortium group or partner.

• Annual Report on Program Progress and Accomplishments – An annual report has
been prepared that provides information about the NCRST-E consortium’s progress
and accomplishments.

• Technical Synthesis Report – The first edition of the technical synthesis report has
been developed and distributed. The report provided a good first year compilation of
consortia activities and presented a technical overview of remote sensing as it is
currently applied to various areas of transportation research, planning, design,
operation, and maintenance.

• Cookbooks (New Deliverable Item for Fear Two and Following Years) – A series of
product implementation guidelines for specific application areas are planned. These
products will provide information about new and emerging data types and
technologies for the appropriate use of these data in the major application areas of the
consortia. NCRST-E has elected to title this information product series “Technology
Guidelines” and has defined this to be “A detailed document that is 20 to 30 pages
long that provides users with specific information about data, processing procedures,
limitations of use, recommended practices, and other guidance that are needed for the
applied use of remotely sensed data and information in a transportation related digital
work flow activity.” Technology guidelines currently planned for year two are as
follows:

  • NCRSTE_TG001: Using Remote Sensing Information to Improve Wetland
    Identification, Delineation, and Mapping Efforts
  • NCRSTE_TG002: Developing a GeoSpatial Data Library of Framework Data
    for Transportation and Environmental Assessment
  • NCRSTE_TG003: Watershed Delineation and Characterization Using
    Standard Data and Processing Methods

The technology guidelines listed above will be developed as part of a technical outreach
process wherein state and local transportation agencies will partner in the development of
the document and guidelines requirements. These efforts will be linked with specific on-
going efforts at transportation agencies and the reports will provide information about
specific products and application areas as well as case studies of how remote sensing
products have been implemented. For additional information about information products
that are planned by the NCRST-E please refer to the following on-line location.

http://www.ncrste.msstate.edu/publications/publications.html