



Center for Advanced Infrastructure Technology

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**Innovation in Technology, Computer
Modeling, Materials, Methods**

**Innovation in Transportation Safety,
Efficiency, Security, Simulation**

**Innovation in Remote Sensing and
Spatial Technologies, 3-D Visualization**

CAIT Founder: *Professor Waheed Uddin*

CAIT was established in December 1999 to conduct advanced computer modeling & simulation and apply modern remote sensing & spatial technologies for enhancing infrastructure asset management and sustainable development with emphasis on surface transportation, aviation, energy & community.

10th Anniversary Celebration, Accomplishments, and Milestones

Dr. Uddin, in collaboration with the University Foundation assistant vice chancellor, received \$ 4.6 million geospatial software university wide gift from IAVO with initial implementation in Transportation Modeling & Visualization Laboratory (*from University of Mississippi Newsdesk story, 28 August 2009*).

CAIT celebrating its 10 year anniversary in December 2009; attracted over \$ 7 million grants

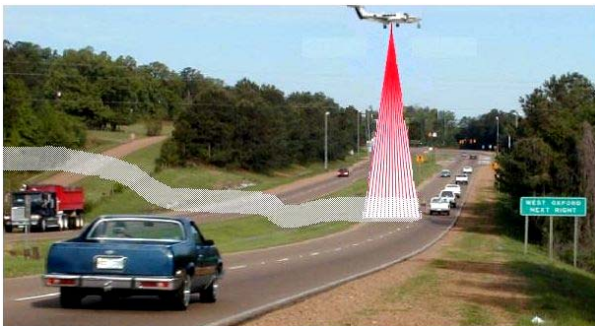
- \$4.6 million Geospatial software grant to the university (industry gift)
- Two competitive grants from National Academy of Sciences (FAA and USAID funding)
- One prestigious Eisenhower graduate fellowship from U.S. Department of Transportation (USDOT)
- One grant from NASA and Mississippi DOT
- One 5-year competitive grant from USDOT in collaboration with the Mississippi State University Consortium (air quality and environment study)
- Two congressional grants on transportation projects (Asphalt , City of Oxford ITS project)
- Three competitive grants from USDOT and Mississippi DOT (highway research projects)

CAIT /Dr. Uddin developed new areas of expertise through research projects

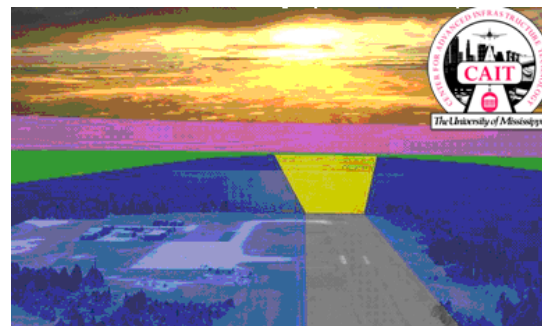
- Geospatial visualization of transport infrastructure and built environment
- Highway & airport safety and efficiency
- Infrastructure asset management, ITS
- Nondestructive evaluation technologies
- Sustainability & air quality in cities & urban areas
- Global warming and energy issues related to transportation and development
- Imagery-based disaster impact assessment
- Computer modeling and simulation

CAIT /Dr. Uddin's research project funding support to graduate and UG students

- Graduate students from USA and 10 other countries received funding support from CAIT
- 7 PhD students (3 completed and one in progress)
- 25 MS students (15 completed)
- Over 50 UG students received funding support
- In-kind and research advise support to visiting scholars and students from Alcorn (Mississippi), UK, Italy, Azerbaijan, Armenia, Turkey, Pakistan



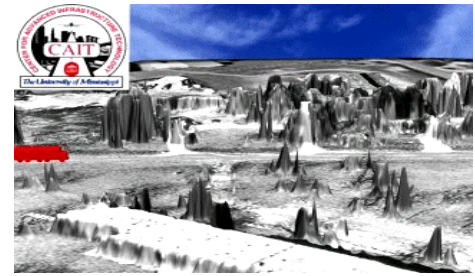
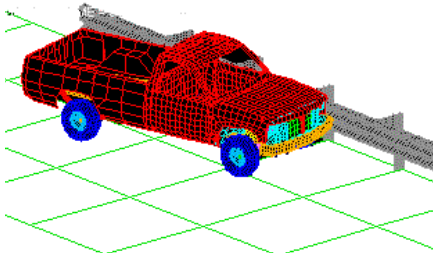
**CAIT Remote Sensing and Geospatial Data
Analysis Laboratory**
Intergraph Registered Research Laboratory
Remote Sensing LIDAR, GIS & Geospatial Analysis



**CAIT Transportation Modeling and Visualization
Laboratory**
Traffic Simulation & Air Quality Modeling Software
GeoGenesis 3D Visualization and Terrain Modeling

CAIT /Dr. Uddin's international collaboration

- International collaboration with NED University, Karachi, Pakistan (3-year USAID grant to improve urban transportation and traffic in Pakistan)
- International Journal of Pavements (Dr. Uddin has been the Chief Editor since 2002)
- International Society of Maintenance and Rehabilitation of Transport Infrastructures (iSMARTi), established in Portugal, 2004 (Dr. Uddin was the Founder President, 2004-2007)
- International collaborative agreement of University of Mississippi and Mackenzie University, Sao Paulo, Brazil, 2006
- Second International MAIREPAVE conference, 2001 (organized by CAIT in collaboration with Auburn University and Mackenzie University)
- Cooperated in over 10 international conferences and workshops (Mexico, Brazil, UK, Portugal, Italy, Greece, China, Australia, Brunei, Pakistan)



Transportation Safety Analysis

- Vehicle crash simulations, 3-D modeling of airport obstruction space & approach surface
- 2007-2009 ACRP/National Academies/ Federal Aviation Administration, \$ 350,000: "ACRP 03-01 Light Detection and Ranging (LIDAR) Deployment for Airport Obstructions Surveys"

Remote Sensing for Environmental Studies and Disaster Impact Assessment

- 2000-2004 Transportation related air quality analysis project sponsored by U.S. DOT / Mississippi State University
- 2007-2008 New Orleans DELTA project sponsored by Canadian Space Agency- NASA-USGS with additional imagery data from Digital Globe and GeoEye

Remote Sensing and Geospatial Technologies for Corridor Assessment, Landuse Mapping, and Urban Planning

- 1999-2002 LIDAR Evaluation–Raleigh Bypass Project: Sponsored by Mississippi DOT, Mississippi Space Commerce Initiative/NASA Stennis Space Center; CAIT and WEI collaboration
- Extraction of surface type and traffic counts and landuse mapping from high resolution satellite imagery; 2007-2010 Pakistan-USAID transportation project

ASPHALT LABORATORY TEST FACILITIES

Asphalt Superpave Binder Test Equipment
 Asphalt Mixing and Dynamic Test Equipment
 Fumehood and Test Accessories

High resolution imagery and airborne LIDAR data fusion

ITS Technologies, Traffic Management

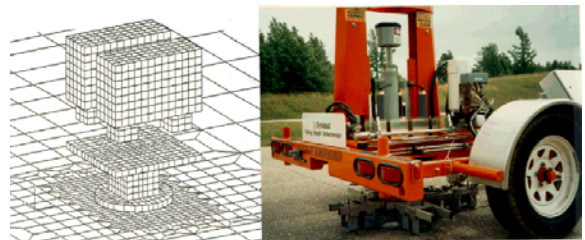
- 2001 Assistance to City of Oxford for high accuracy GPS markers and terrain mapping/ GIS workplan related to the \$1.5 million ITS project, Mississippi
- 2007-2010 Pakistan-USAID ITS-based traffic management project, Karachi, \$94,000
- 2008-2010 Mississippi DOT- Performance evaluation of roundabouts in Oxford, \$70,590

Infrastructure Assets – Preservation, improvement, safety, and security needs



Airport, Highway, and Bridge Assets

- 1999-2007 Sponsors: Mississippi DOT, USDOT Federal Highway Administration, iBSi



Pavement evaluation by falling weight deflectometer (FWD)

Material Characterization and Modeling

- In situ nondestructive evaluation (NDE) for structural and material characterization
- Waste tire rubber, coal tar, coal flyash, and cement byproducts in asphalt highway pavements