

WTI Systems Engineering and Integration of Transportation Technology Program (SEITTP) Concept Document

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Executive Summary

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EXECUTIVE SUMMARY

Development and deployment of advanced transportation technologies is, of necessity, a multidisciplinary process requiring the application of advanced skills in civil engineering, computer science, electrical and computer engineering, industrial engineering, mechanical engineering, human factors engineering, and sciences such as ecology, chemistry, and economics. Currently, the transportation industry has a severe shortage of personnel who have the knowledge and experience to bring these disciplines together into effective teams and solutions, particularly in rural and small urban settings. There is also a lack of knowledge about best management practices for integrating the products of these disciplines.

Development and deployment of advanced transportation technology is a process of seven interdependent steps: (1) identify the need for a technological solution to a problem, (2) research the underlying technical questions about the operational principles of the technology, (3) engineer to convert the underlying principles of the technology into practice, (4) deploy the technology into the transportation infrastructure, (5) operate and maintain the technology, (6) evaluate the technology, and (7) decommission the technology when its useful life is completed. Systems engineering and integration link these steps together as a structured engineering process. This process is often neglected due to lack of resources such as funding, time, manpower, and expertise necessary to bring together an effective, multidisciplinary team.

To address this problem, the Western Transportation Institute at Montana State University-Bozeman proposes to leverage its existing status and expertise to form a Systems Engineering and Integration of Transportation Technology Program (SEITTP). This program will bring together a multidisciplinary team of engineers, scientists and students from a broad range of university departments to address the education, research, and application issues of systems engineering and integration in relation to advanced transportation technology.

WTI is the largest national Research and Special Programs Administration University Transportation Center focused on rural transportation. A cooperative transportation research effort between the California Department of Transportation, Nebraska Department of Roads, Montana Department of Transportation, and Montana State University-Bozeman, WTI has an ongoing \$8 million annual budget and a portfolio involving 35 states and six countries. WTI has an expanding emphasis on rural public transit, advanced transportation technologies, winter mobility, transportation infrastructure, and vehicle/wildlife interactions.

WTI, through the SEITTP and in conjunction with the Montana State University College of Engineering, will provide education, research and application support for systems engineering and integration to client organizations by:

- providing workforce development and continuing education opportunities in systems engineering and integration for transportation professionals. It will promote systems engineering and integration training as part of the undergraduate and graduate engineering curriculum, and will provide students with the opportunity to apply what they've learned in the classroom to "real-world" problems.
- providing multidisciplinary transportation-related research and development opportunities for engineering and science faculty, staff and students, and will use and promote WTI, COE and other MSU labs and facilities for systems integration efforts. It

will use technology transfer and the publishing of research results to promote the application of transportation-related research in systems engineering and integration.

- supporting the development of emerging transportation technologies, and assisting to evaluate and implement state-of-the-art technology, evaluating existing conceptual design products under actual use conditions, and developing and providing best management practices for integration of these technologies.

