

CAP 2000 PROJECT INFORMATION SUMMARY
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Framework Project Summary

Agreement Number: 00HQAG0136

Title: A Collaborative Multi-Jurisdictional Approach to Building A Geospatial Ground Transportation Database for Montana

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(1). PROJECT DESCRIPTION

(a). Project description: The goal of this effort is to advance the capacity of users to access and use digital, geographic, ground transportation databases to meet their information needs. This project, a multi-jurisdictional collaborative undertaking, will seek to leverage existing transportation data holdings by employing the NSDI Framework Transportation Identification Standard - Version 3 (July 22, 1999) as a unifying concept that brings data creators and user together to create and maintain a multi-jurisdictional geographic ground transportation framework in Montana.

This project has four major objectives:

- I. Determine if NSDI Framework Transportation Identification Standard - Version 3 (July 22, 1999) can advance the technical methodologies and institutional arrangements necessary for integrating ground transportation data from multiple jurisdictions.
2. Provide recommendations to GIS coordinating groups, and public and private entities in Montana on the development, institutionalization and sustainability of a statewide geospatial ground transportation framework.
3. Evaluate how ground transportation framework data integrates with other ongoing framework efforts in Montana such as the Montana Cadastral Project.
4. Facilitate a shared understanding of the terminology and, concepts associated with a ground transportation framework.

(b). Relationship to existing standards: In 1999 the Montana Geographic Information Council (MGIC) endorsed the FGDC Metadata Standard (Version 2.0) as a statewide standard. The Council also located the NSDI Clearinghouse within the Natural Resource Information System at the Montana State Library. This

clearinghouse is the point-of-entry and distribution mechanism for geospatial data in Montana. This project intends to fully comply with these recommendations. This project will also investigate how the FGDC Metadata Standard (Version 2.0) and clearinghouse technology can facilitate the use and distribution of ground transportation framework data described by the FGDC Transportation Identification Standard.

(c). Relationship to other efforts: This implementation of the NSDI Framework Transportation Identification Standard will contribute to similar efforts by offering a better understanding of how to overcome organizational and technical barriers associated with cross-jurisdictional framework development. A successful implementation will instill further confidence in the Standard and potentially spawn investigative efforts elsewhere. In addition, a successful demonstration of a common multi-jurisdictional registry may contribute to other framework development efforts. This project extends and compliments recent investigative efforts by Minnesota, Kansas, and Vermont on the FGDC NSDI Framework Transportation Identification Standard. During the course of our investigation, this project will seek additional familiarity with their findings. Within the past year Montana has initiated framework efforts in transportation and land-use. Montana currently has active framework efforts in geodetic control, orthoimagery, hydrography and cadastral with most having completion dates during 2001.

(2). *PROJECT APPROACH*

The strength of the underlying data model described by the Transportation Identification Standard is that it provides a software, cartographic and application independent non-topological data exchange format that can support multiple representations and resolutions of the same transportation segment. It appears that very little oversight coordination is required to successfully implement the Standard, and the Standard could easily adapt to cross-jurisdictional situations.

The weakness of the model is that it is relatively untested in real-world situations. Without a prototype test and evaluation it is difficult to assess how well this model will support the exchange of transportation data in support of key applications. The model shows promise in Montana because it is not a radical departure from data models currently in use, but questions about data integrity and the institutional requirements of implementation remain.

(a). Tasks and procedures necessary to accomplish objective: A process model (Boehm, Barry W. "A spiral model of software development and enhancement," Computer, May 1988, Pages 61-72) will guide the investigative process. The primary function of this process model is to guide the order of investigation and establish transition criteria, including resource allocation, for progression from one stage of investigation to the next. This process model is a risk-driven approach with the goal of reducing uncertainty.

(b). Methodology and project administration: In early 1999 representatives from the Montana Interagency GIS Technical Working Group (ITWG) and the Montana Local Government GIS Coalition (MLGGC) established the Montana Transportation Working Group. The purpose of the Working Group is to focus on ways in which geospatial ground transportation data can be more effectively and efficiently shared among cooperating entities in Montana. The Montana Transportation Working Group has defined the following management structure to successfully execute this collaborative project:

- Project and Technical Lead: Ted Chase, GIS Coordinator for Montana Natural Resource Information System (NRIS) at the Montana State Library will be the project's technical lead. Chase will be responsible for day-to-day coordination of tasks, technical oversight, and compilation of final technical reports.

Additionally, NRIS has experienced technical staff and equipment at their disposal that can adapt to the flexibility of the project. Should a site participant not be able to fully realize their **responsibility to the project due** to unanticipated technical or administrative constraints, NRIS has the flexibility and resources necessary to execute that portion of the investigation.

- Administrative Support: Stu Kirkpatrick, GIS Coordinator for the State of Montana. Kirkpatrick will be responsible for monitoring the budget, making appropriations as necessary to meet project objectives, and filing financial reports or claims.
- Organizational and Communications Support : Michael Sweet, GIS Coordinator for the School of Forestry at The University of Montana, and Doug Burreson, GIS Coordinator for Missoula County serve as co-Chairs of the Montana Transportation Working Group. These individuals will monitor and assess progress on this project, provide and maintain a website on the activities of the Working Group, and this project, as well as schedule, facilitate, and document coordination meetings and workshops.
- Project Site Participants: In addition to the management structure described above, the Montana Transportation Working Group has identified the following jurisdictions as site participants. The site participants will have primary responsibility for implementing the investigation and developing prototypes.
 - Lewis and Clark County and the City of Helena
 - Gallatin County and the City of Bozeman
 - Montana Department of Transportation
 - U.S. Forest Service, Helena and Gallatin National Forest

(c). Work Plan, Tasks and Milestones: The first phase of this project will employ independent tests to evaluate an implementation of the FGDC Transportation Identification Standard in a welldefined geographic area that contains a collection of transportation features maintained by a local government and the Montana Department of Transportation. The Montana Transportation Working Group will establish evaluation criteria to test the consistency, completeness and correctness of a bi-directional translation between existing data models and the Transportation Identification Standard. To understand the technical and operational aspects of building and maintaining a common registry the results of the initial prototypes will be merged. Transactional tests that update or modify existing elements will be used determine the robustness of the Standard and the registry. Finally, additional complexity is added as the prototype registry is extended to other domains. With communication as precursor to acceptance, progress reports and workshops are provided after all key tasks.

Task I - Determine the scope of the problem, and evaluate existing approaches: During 1999 the Montana Transportation Working Group reviewed efforts by local, state and federal agencies in Montana to develop and implement geospatial ground transportation databases. As part of this review, a one-day workshop on the FGDC Transportation Identification Standard was held with **Bruce Spear** from the U.S. Department of Transportation Bureau of Statistics. Milestones: An understanding of existing approaches and the selection of a potential standard that will support a multi-jurisdictional transportation framework. Participants: The Montana Transportation Working Group Time Period: April 1999 to November 1999

Task 2 - Select a test area for development of a prototype implementation of the NSDI Framework Transportation Identification Standard - Version 3 (July 22, 1999) Establish selection criteria and select a representative geographic area to focus the prototype geographically. The selection of a representative geographic area is bounded by the following constraints: (1) The geographic area must include at least 2 counties, 1 or more cities, a **federally administered** area, and, state highways. Tribal, and large corporate or utility participation are preferable but not required. (2) A digital geospatial database for transportation must already exist for each of the participating entities in the selected geographic area.

Milestones: Identified a geographic area that satisfies the selection criteria, and established evaluation criteria to determine consistency, completeness and correctness of representation in target data model. Participants: The Montana Transportation Working Group and site participants Time Spent : 32 hours over one-day

Task 3 - Apply the Standard to the prototype area, with independent testing and evaluation of the selected area by a local government and the Department of Transportation: Select a limited portion of the study area that contains transportation elements under the jurisdiction of the Montana Department of Transportation and one of the local government participants. In cooperation with the Project Lead, these two participants will independently apply the Transportation Identification Standard to transportation elements under their jurisdiction.

Milestones: Completed a prototype application of the Transportation Identification Standard, and created associated database representations. Satisfactorily applied the evaluation criteria developed in Task 2. Completed an interim progress report documenting the translation process, problems incurred and unresolved questions. Distributed documentation and captured feedback.

Participants: NRIS, Montana Department of Transportation (MDOT), Lewis & Clark County

Task 4 - Integrate the implementations from the previous tasks into a common registry for the prototype area: Employing the prototype developed in Tasks 2-3, merge the database tables and representations for transportation elements under both jurisdictions. The purpose of this task is to understand the technical and operational aspects of building and maintaining a common registry.

Milestones: Completed a cross-jurisdictional prototype application of the Transportation Identification Standard, and created associated database representations. Developed a better understanding of the interoperability requirements. Completed an interim progress report documenting the process, problems incurred and unresolved questions. Distributed documentation and captured feedback. Participants: NRIS, MTDOT, Lewis & Clark County

Task 5 - Conduct transactional tests on the registry developed for the Prototype area Within each jurisdiction identified in Tasks 2-4 and employing the prototype developed in Tasks 2-4, test the transactional characteristics of the Standard (adding/deleting nodes and segments).

Milestones: Completed transactional testing of the Transportation Identification Standard. Developed an improved understanding of the transactional characteristics of the

Standard. Completed an interim progress report documenting transactional test results.
Documentation distributed and feedback captured.
Participants: NRIS, MDOT, Lewis & Clark County

Task 6 - Conduct a workshop to report on the results of the tests from previous tasks: Conduct a one to two-day workshop for host sites, project participants, and the Montana Transportation Working Group to present and discuss the results from Tasks 2-5. The purpose of this workshop is education, with the goal of developing a common understanding of the Standard and associated terminology. This session will determine if there has been sufficient progress to proceed, and whether or not subsequent tasks, as defined, are valid.

Milestones: Completed review of Tasks 2-5. Developed a shared understanding of the translation process, associated terminology, problems incurred and unresolved questions. Completed an interim progress report and filed the report with FGDC, GIS Coordination Groups in Montana, and host sites. Participants: - The Montana Transportation Working Group and project participants

Task 7- Test the robustness of the registry by encompassing additional complexity that includes multiple jurisdictions, increased feature complexity, increased data volume, and application dependencies: The registry created in Tasks 2-5 will be extended and enhanced to test increased feature complexity, increased data volume, and application dependencies. The selected geographic areas -for this task do not have to be coincident with the prototype area. Site participants and applications will be selected from among the Working Group members. The purpose of this task is to determine repeatability of results, and identify problems or unresolved questions as they apply to target applications or geographic extents not covered in the more limited tests in Task 2-5.

Milestones: Completed a prototype application of the Transportation identification Standard in a test of one or more prototype applications of a cross-jurisdictional scenario. Conducted tests that had sufficient complexity to challenge the robustness of the Standard. Completed an interim progress report documenting the test results, problems incurred and unresolved questions. Distributed documentation and captured feedback. Participants: The Montana Transportation Working Group and project participants

Task 8 - Conduct a workshop to report on the results of the tests from previous tasks: Conduct a one to two-day workshop for project participants and the Montana Transportation Working Group to present and discuss the results from Task 7.

Milestones: Completed review of Task 7. Developed a shared understanding of the Transportation Identification Standard as it applies in Montana. Completed an interim progress report and filed the report with FGDC, GIS Coordination Groups in Montana, and host sites. Moved forward to the out-reach phase, with successful determination of suggested topics for future research, and identification of requirements for long-term institutionalization and maintenance. Participants: The Montana Transportation Working Group and project participants

Task 9 - Prepare final report to FGDC and Montana GIS coordinating groups:

Milestones: Submitted a final project report to **FGDC, ITWG, MLGGC and MGIC with specific** recommendations in regard to the institutionalization of the FGDC Transportation Identification Standard in Montana. Participants:- NRIS with contributions, participation and review by all members of the Montana Transportation Working Group

Task 10 - Conduct outreach and continue to determine the requirements for success institutionalization of the Standard:

Milestones: Completed presentations in April 2001 to regional (NSGIC, GIS-T, Intermountain GIS Conference) and local (ITWG, MLGGC, MGIQ geospatial coordinating groups, and received support for the institutionalization of findings. Implemented a successful outreach program to private and public sector partners who could benefit from implementation of the Standard. Participants: The Montana Transportation Working Group and project participants