

1. Priority Needs for Metadata in Transportation

A. General Themes

Most pressing areas for coordinated approaches to describing transportation data are...

- Where data serves a critical function and impacts key decisions (e.g. fund allocation, management strategy) – and therefore consequences of misinterpreted or misused data are large.
- Where different data sources need to be combined (e.g. aggregation of different data sets for model development, combining pavement data from multiple jurisdictions to get a statewide perspective) – and therefore sufficiently precise definitions of data elements are required to determine whether elements are the same or different, and what (if any) transformations or adjustments are needed.
- Where data are shared across multiple agencies (e.g. GIS coverages) – and therefore a consistent approach to data description would save considerable staff time – both on the data user and provider side.
- Where data producers are removed from data consumers (e.g. data posted on the web for general use, federated database initiatives) – and therefore personal contact with the data provider is not a viable option for a data consumer wishing to understand how to interpret a data element, or how a data set was produced and what its limitations are.
- Where data are published to a large population of users with different needs (e.g. road weather data) – and therefore it is critical to have information needed to determine suitability of the data for an intended use.
- Where data value depends on end-user understanding of data quality.
- Where data value depends on effectiveness of automated discovery tools (e.g. web search for statistics or research results on a topic of interest). This use of metadata will continue to grow in importance as progress is made on development of the semantic web.

B. Types of Data and Applications for Coordination on Metadata (Examples – not an exhaustive list)

- Safety
 - Crash Data
 - Commercial Vehicle Inspection
- Emergency Management
- Performance Measurement
- Road Weather Data
- Travel Monitoring
 - Archived ITS Data
 - Real-time data (new SAFETEA-LU requirements)
 - Traffic Counts
 - AADT

- ESALS
- Federal Reporting
 - HPMS
 - Highway Statistics
 - Traffic Monitoring
 - Transit Performance (e.g. 5311)
- Highway Inventory/Asset Management
 - Highway System Mileage data
- Planning
 - Socio-economic data
 - Environmental data
 - Survey results (O-D, On-board, etc.)
 - Travel demand modeling (combining multiple sources, sharing model results)
 - Freight – e.g. commodity classification
 - Public Involvement
 - Geo-spatial data

2. Future Transportation Metadata Research Initiatives

The metadata subcommittee has identified the following research initiatives. Shaded rows indicate tentative priorities for next year.

Name	Objectives
Transportation Metadata White Paper	Provide a foundation document for transportation metadata initiatives, including definition of terms, summary of metadata issues from different perspectives (data user, data producer, standard developer, data steward, system developer, etc.), and value proposition for metadata initiatives.
State of the Practice Survey on Transportation Agency Metadata Applications	Understand how transportation agencies are currently generating and using metadata, and assess (1) types of transportation data that are currently being described with metadata, (2) the nature of current metadata applications (3) the value perceived from these efforts, (3) awareness and use of existing metadata standards, and (4) planned future directions. This research will provide a foundation for understanding “what is” with respect to metadata usage. This understanding is needed to identify and prioritize future transportation metadata research and information dissemination initiatives.
Synthesis of Best Practice	Identify best practices in use of metadata in order to build a resource base for transportation agencies. Practices may be from within the transportation community or from non-transportation efforts (e.g. DOD, Homeland Security)
Investigation of Metadata Use for Standard MPO Datasets	Determine how MPO’s utilize metadata for modeling and GIS-T.

Name	Objectives
End-user needs for metadata	Identify the most critical business processes where better metadata would have the most benefit by understanding end-user needs.
Feasibility Study for a Transportation Metadata Registry or Clearinghouse	Investigate and determine promising approaches to establishment of an on-line clearinghouse of transportation metadata elements. This is to be distinguished from a data clearinghouse (e.g. for household travel survey data). The clearinghouse would not seek to establish or promote any given metadata standard. Rather, it would allow agencies seeking to improve or establish metadata standards for their agencies to easily determine what metadata elements are in use by other agencies (e.g. how data quality is described).
Gaps in Metadata Standards for Transportation Data	Research leading to filling gaps in metadata standards for transportation data (based on findings from prior activities)
Metadata Standards Crosswalk and Code List Catalogue	Provide awareness of existing metadata standards (including standard code lists) and how they relate to one another. This will help to avoid duplicative effort, and provide a resource for identification of where gaps exist and where pursuing harmonization of existing standards would be fruitful.

3. Current Practice Identification

The metadata subcommittee is maintaining a list of current metadata standards, tools, and implementation examples.

A. Standards and Related Research

Name	Description	Reference
FGDC Metadata Standard	Content Standard for Digital Geospatial Metadata	http://www.fgdc.gov/clearinghouse/clearinghouse.html
ASTM ADUS E17.54	Three standards – one published (general guidance on ADMS including types of metadata), two in development: Standard Practice for Metadata to Support ADMS (expected 2005), Metadata for Traffic Monitoring (expected 2006)	http://www.standards.its.dot.gov/Documents/ADUS_advisory.htm (HTML) http://www.standards.its.dot.gov/Documents/ADUS_Advisory.pdf (PDF)

Name	Description	Reference
ISO 19115	Metadata content standard for describing geographic information	http://www.isotc211.org/scope.htm#19115
ISO 19139	XML Schema encoding of ISO 19115	http://metadata.dgiwg.org/ISO19115/models.htm
Data Documentation Initiative (DDI)	International effort to establish a standard for technical documentation describing social science data.	http://www.icpsr.umich.edu/DDI/
ISO 11179	Standard for Metadata Registries	http://metadata-standards.org/11179/
ISO 14817	Requirements for ITS/TICS Data Dictionary	http://www.iso.ch/iso/en/CatalogueDetailPage.CatalogueDetail?CSNUMBER=36030&scopelist=
IEEE P1488/1489	ITS data dictionaries for data elements and messages – similar to ISO 14817	http://www.standards.its.dot.gov/Documents/IEEE-1488.pdf http://www.standards.its.dot.gov/Documents/FSP1489_r2.PDF
Dublin Core	Metadata element set for cross-domain information resource description – ISO standard, widely used in library science	http://dublincore.org/
MARC, MARC 21, MODS, METS	Library of Congress metadata standards	http://www.loc.gov/standards/mods/ http://www.loc.gov/standards/mets/
TransXML	NCHRP Research project (20-64) to define XML data exchange formats for surface transportation	www.transxml.org

Name	Description	Reference
Federal Enterprise Architecture – Data Reference Model	High-level reference model defining standardization areas for data description and discovery	http://www.whitehouse.gov/omb/egov/a-5-drm.html

B. Tools

Name	Description	Reference
Networked Social Science Tools and Resources (NESSTAR)	– European social sciences data publishing and metadata authoring tools	http://www.nesstar.com/ http://www.iassistdata.org/conferences/2002/presentations/1
Language-Independent Metadata Browsing of European Resources (LIMBER)	Multilingual thesaurus for social science domain and associated metadata formats, editing and query tools.	http://www.limber.rl.ac.uk/External/external.htm
DCMI Tools	Variety of tools for Dublin Core metadata creation, extraction, conversion, browsing, etc.	http://dublincore.org/tools/
FGDC Tools	Variety of tools based on the FGDC standards	http://www.fgdc.gov/metadata/toollist/ogrip/ http://sco.wisc.edu/wisclinc/metatool/

C. Implementation Examples

Name	Description	Reference
Penn State RWIS	Metadata Center for road weather information stations	http://www.tfhr.gov/its/pubs/04109/section1.htm http://pasc.met.psu.edu/MESONET/metadata/
Minnesota Geographic metadata guidelines (MGMG)	Statewide adoption of FGDC-based metadata guidelines	http://www.gis.state.mn.us/stds/metadata.htm
WA-Trans	Multi-agency data sharing effort, including agreement on data and metadata standards	http://www.wsdot.wa.gov/mapsdata/transframework/default.htm
Clarus Initiative	Design of Integrated surface transportation weather observing, forecasting, and data management system – incorporates metadata for quality checking and stakeholder needs	http://www.clarusinitiative.org/
EPA System of Registries (SOR)	Agency-wide set of registries supporting exchange of environmental data	http://www.epa.gov/sor/