

The All Roads Network (ARNOLD)

Tom Roff and Joe Hausman

GIS-T 2013

Presentation 2.1.1

May 6, 2013



FHWA Office of Highway Policy Information

David Winter, PE

Highway Finance and Recovery Act

Chris Allen
Team Lead

- Responsible for highway finance data collection (an extensive amount of input on Federal, State, and local governments).
- The Recovery Act provides significant new funding for transportation infrastructure.

Motor Fuel and Tax Evasion

Ralph Davis
Team Lead

- Analyzes and compiles monthly state data on the amount of gallons taxed by each state.
- Provides data to be used in the attribution process.

Highway System Performance

Ralph Gillmann
Team Lead

- The HPMS is a national program responsible for data on our nation's highways to the extent of the condition, performance, use and operating characteristics.

Travel Monitoring and Surveys

Tianjia Tang, PE
Team Lead

- Responsible for maintaining national programs to track traffic trends, vehicle distributions, and weight to meet data needs specified in federal highway legislation.



August 7, 2012, Memorandum

- Joint memo from FHWA Offices
 - Office of Highway Policy Information
 - Office of Planning
- Highway Performance Monitoring System (HPMS)
 - Currently - uses State linear referenced (LRS) networks
 - State data for Federal-aid highway centerlines
 - Beginning June 15, 2014 States must:
 - Include **all public roads** in LRS networks
 - Use **dual carriageway** representation
 - Plan for action due June 15, 2013



Mileage by Functional Class

2011 Mileage	Rural	Urban	Total
Interstate	30,256	16,944	47,242
Other Freeways and Expressways	4,224	11,547	15,771
Other Principal Arterial	91,280	65,382	156,704
Minor Arterial	135,650	108,301	244,182
Major Collector	420,136	115,701	536,080
Minor Collector	263,053	3,304	266,602
Local	2,037,783	787,783	2,827,866
TOTAL	2,982,383	1,108,960	4,094,447

Fed Aid

Non-Fed Aid

Source: HPMS 2012



Why All Public Roads

- Certified public road mileage (23 CFE 460)
- Safety data on all public roads (23 USC 148)
 - Highway Safety Improvement Program (HSIP)
- National Bridge Inventory on all public bridges
- Transportation for the Nation (TFTN)
- State Planning and Research (SP&R)
 - FY 2013, 2014, and 2015



ARNOLD

- All Roads Network Of Linear-referenced Data
- National States Geographic Information Council (NSGIC)
- Transportation for the Nation (TFTN)
- Highway Performance Monitoring System (HPMS)
- General Accounting Office (GAO)



State Authority

- Each State has primary authority over all public non-federal highways in their State
 - e.g., governor certifies public road mileage
- States may delegate authority to subordinate jurisdictions
 - States coordinate with subordinate jurisdictions
- Exceptions -
Federal Lands Highways



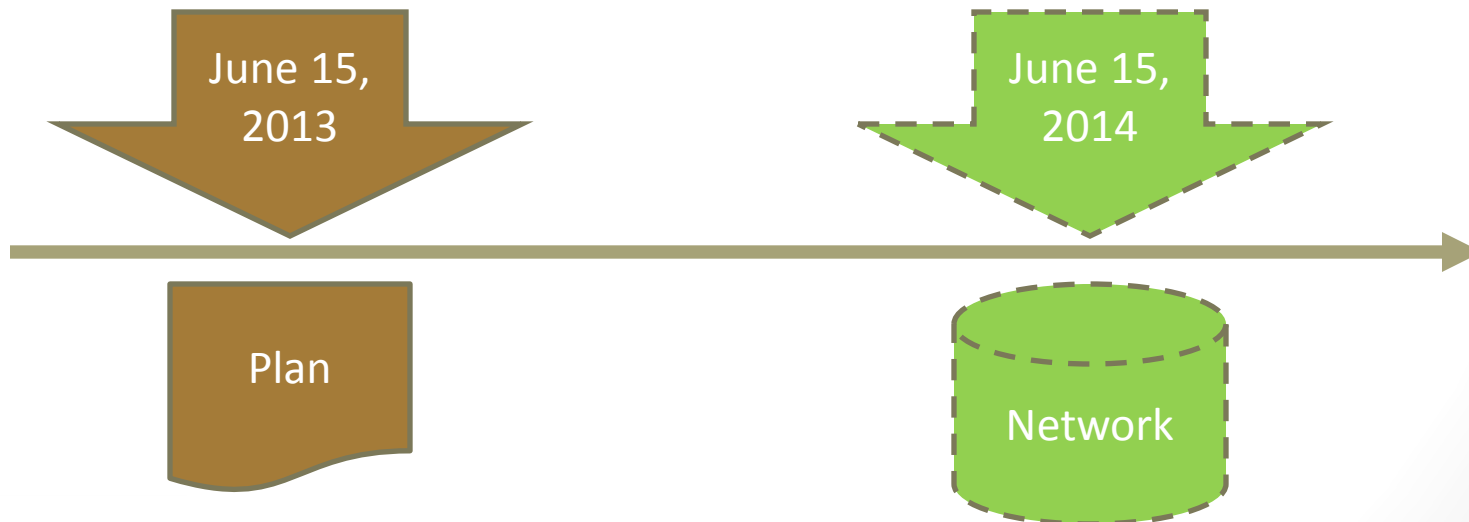
Network Specification

Scope	All States, District of Columbia, and U.S. Territories
Extent	All Public Highways including Ramps and Frontage Roads
Authority	Federally-owned Highways – Federal Agency Owner Other Highways – State DOTs
Directionality	Dual Carriageway Representation, Defined as Positive Barrier Median or Median width of 4' or greater.
Linear Reference	Begin and End Calibration accurate to .001 mile
Geodetic Datum	Network will be stored in WGS 84
Geospatial Accuracy	1:24,000 or better
Topology Rules	TBD (Example-Cluster tolerances, gap and sliver rules)
Unit of Measure	Miles
Attributes	Year, State, Route ID, Shape Geometry



Plan of Action

- Due June 15, 2013
- Work that has already been accomplished
- Steps being taken to meet the requirement
- Challenges and obstacles anticipated
- Funding needed and what will it be used for



Plan Template- Delivered April 19th

ARNOLD Plan	Linework		Linear Reference		Dual Carriageway			
Functional Classification	Miles	Percent	Miles	Percent	Miles	Percent		
Interstate								
OFE	ARNOLD Plan		Linework		Linear Reference		Dual Carriageway	
OPA	Government Level		Miles	Percent	Miles	Percent	Miles	Percent
Minor Arterial	State Owned							
Major Collector	County Owned							
Minor Collector	Municipal and City Owned							
Local	Other Non-Federal							

2. Identify Challenges
3. Funding Required
4. Other FHWA Assistance – example Briefings to locals
5. Pooled Fund study interest
6. Addressing as part of a wider State DOT initiative
7. Edge Matching efforts with neighboring states



Funding Options

1. SP&R with the State Match waived
2. HSIP Funds
3. Pooled Fund Study
4. Other sources



HPMS Section Data

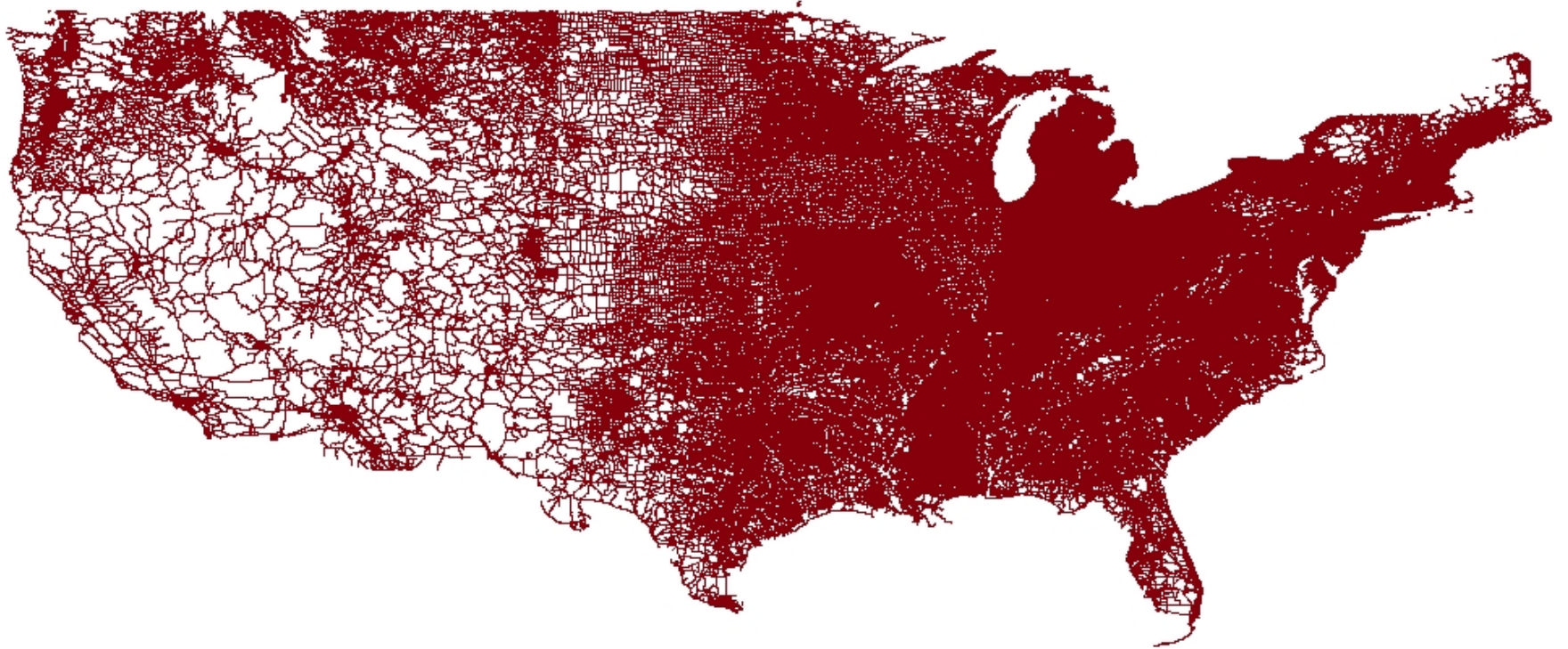
- HPMS Field Manual
- National Highway System (NHS)
- Local and Rural Minor Collector, non-NHS
 - **No additional data required**
- Metadata
 - ISO Data Standard



Beyond HPMS

- National Highway Planning Network (NHPN)]
- Freight Analysis Framework (FAF)
- Routing
- Addressing
- Other layers





ARNOLD V1

Research – Guidance – Pooled Funds



U.S. Public Roads and Attributes Geospatial Representation Study

- Research study and pooled-fund project
 - FHWA contribution: \$1.5 million
- Purpose –
to assist States to acquire this information in a way that is consistent across States and provides a National highway baseline.

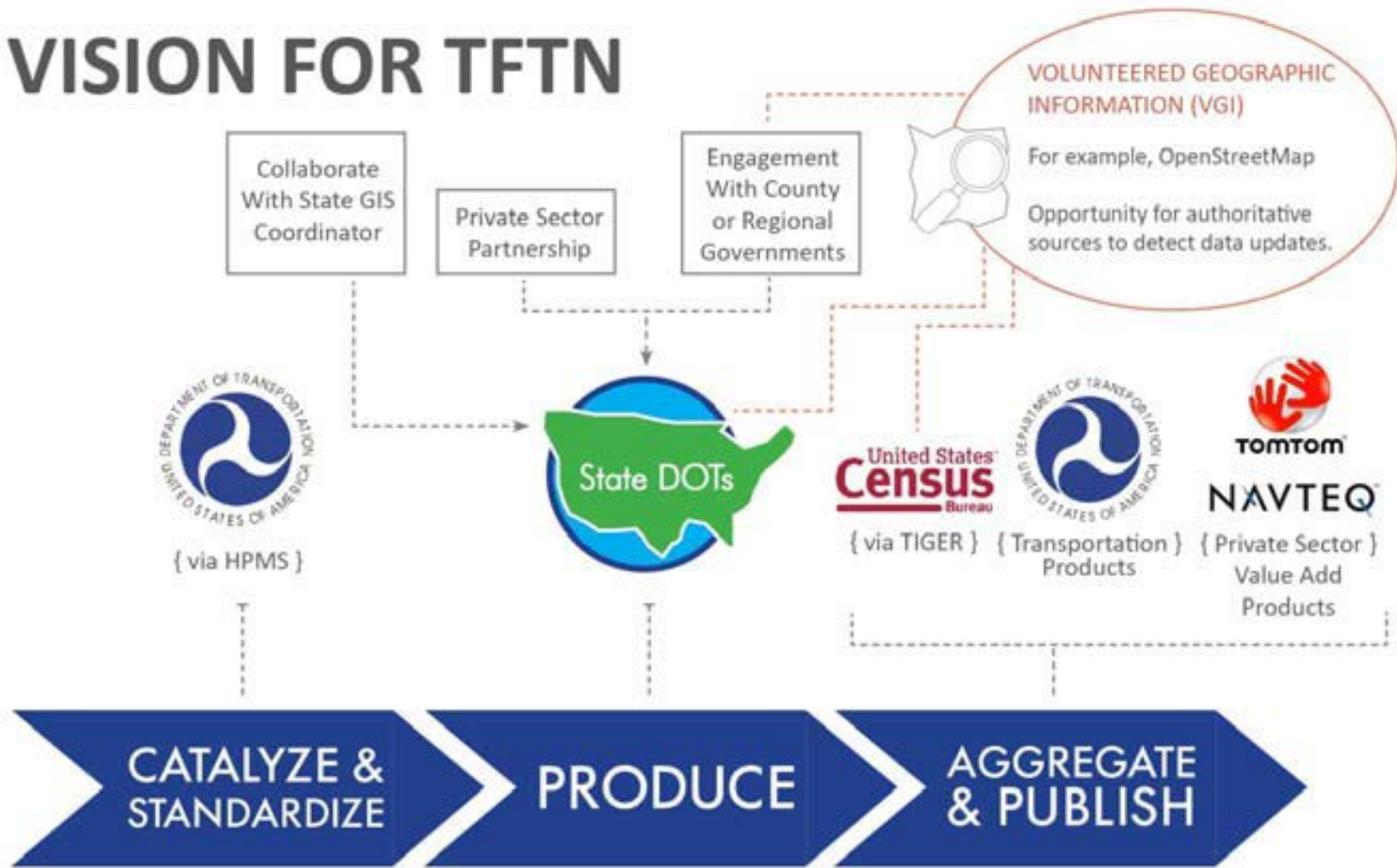


An Extension of the TFTN Strategic Plan

Build upon the US Department of Transportation Geospatial Information Officer's Transportation for the Nation (TFTN) Strategic Plan, utilizing its recommendations, guidelines and principles.



VISION FOR TFTN



http://www.nsgic.org/public_resources/TFTN_StrategicPlan_vFinal.pdf

Primary Goals of the Study

- Guidance
 - Develop a **systematic approach to assist State and Local Governments** in building a LRS for public roads that are Functionally Classified as Rural Minor Collector and Local.
- Best Practices
 - Examine Federal State, Local Government and Private Industry technical practices concerning the collection, development of geospatial products, of LRS and related data.



Study Considerations

- Temporality
 - Mechanisms to maintain LRS over time
- Dual Carriageways
 - Ramps, Interchanges, roundabouts and other highway system components
- Topological relationships
- Addresses
- GPS to LRS
 - Efficiency and consistency of data transfer



Support for ARNOLD

- Guidance Document
 - long-term systematic approach to developing a geospatial linear referencing system for all public roads
- Pooled Fund Study
 - Implement the developed guidance in States that need or desire help in undertaking the All Public Roads LRS/GIS requirement



HPMS 9.0

- Preliminary Planning
 - Modular Approach
- Transactional Based
 - Enterprise Based
 - ARNOLD Support



HPMS Academic Workshop

- Tuesday August 6, 2013
- NHI Facility, Arlington, VA
- Make your Plans Now
 - It's Free!



Questions and Comments

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