



**Department of
Transportation**

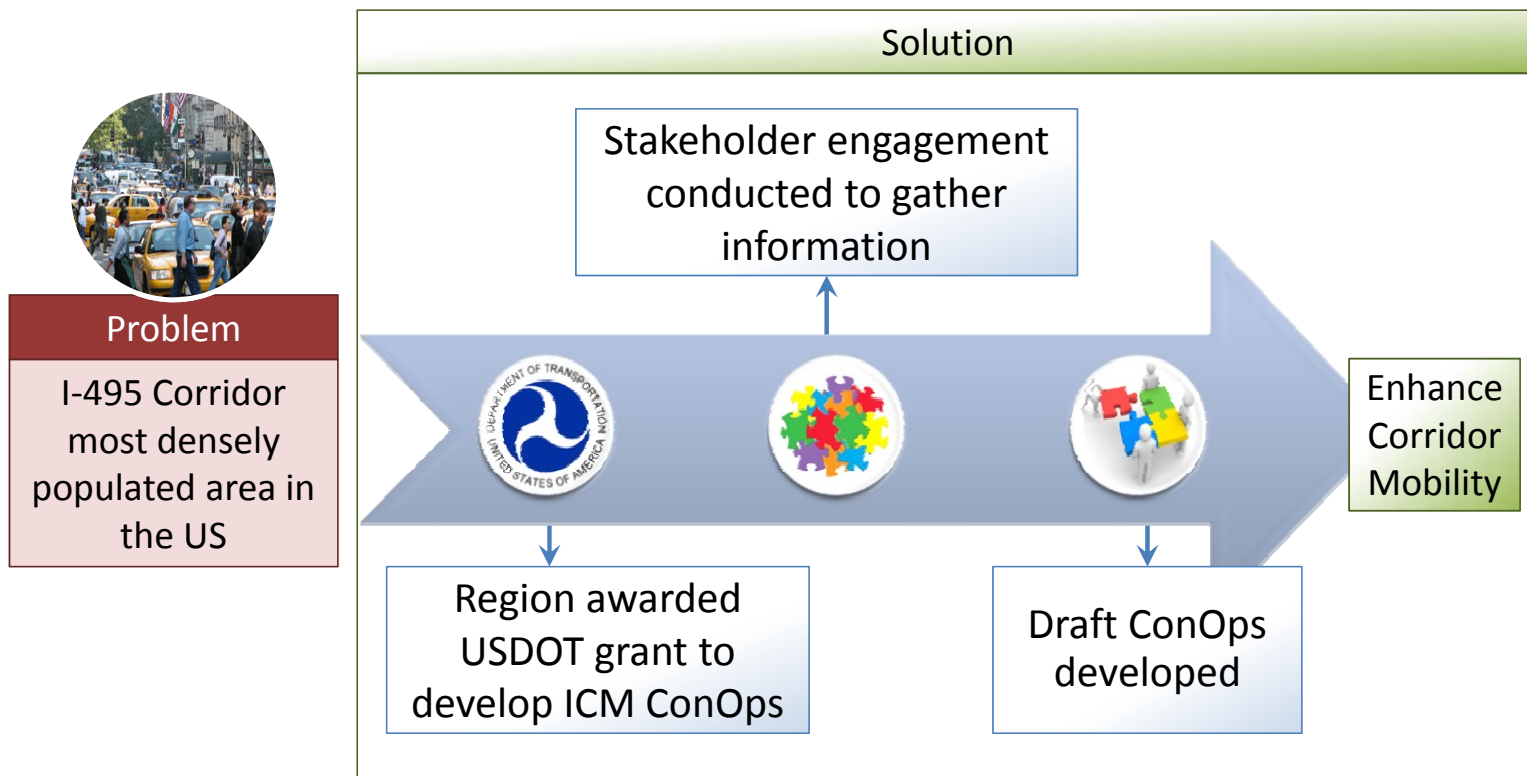


ICM-495 ConOps Executive Summary

June 30, 2017
Arup & ICF



How Did We Get Here?



Core Components of ICM

- Coordinated responses to conditions
 - ↳ **An agreed upon operational decision support framework**
- Multimodal engagement
 - ↳ **Tighter integration of traffic and transit operators and centers (especially transit bus operations)**
- Performance-driven management of entire corridor
 - ↳ **Proactive assessment of impacts of conditions**
- Emphasis on trip reliability/person throughput
 - ↳ **New tools for dynamic management of corridor assets**

ConOps Features

- **Solution-agnostic**
 - Defines DSS functions
 - Does not recommend system type (separate vs. system enhancement)
- **Incremental**
 - Recognizes agency roles and functions
 - Leverages existing investments and legacy systems
- **Practical**
 - Realistic role for decision support
 - “Human in the Loop”

Justification for Changes

ICM-495 is driven by the following Corridor challenges:

1. Continued challenges with travel time reliability in the Corridor
2. High prevalence of incidents and incident-related delay
3. Pronounced supply-demand imbalance
4. High incidence of planned events that stress Corridor operating conditions
5. Rapidly evolving landscape of traveler information technology, modes, and expectations
6. New opportunities for operational collaboration through data sharing and IT



Identified User Needs

User needs form the basis for ICM-495 Concept development

No.	User Need Description
1	Enhance corridor-wide agency situational awareness particularly during incident response
2	Enhance protocols to create unified agency definitions for corridor events
3	Improve corridor-level decision-making on agency incident response practices
4	Improve incident response and clearance times along the Corridor
5	Support and prioritize higher occupancy vehicle trip reliability (HOVs, bus transit) along the Corridor
6	Proactively manage short-term demand surges and ongoing diversions on facilities in the Corridor
7	Dynamically manage (through Active Traffic Management) for key bottleneck areas
8	Provide actionable traveler information at key decision points outside and along the corridor
9	Improve customizability of messages for management of freight demand and regulation of truck traffic
10	Enhance corridor manager engagement with key stakeholders such as employers, special event managers, parking operators, private sector partners on demand management

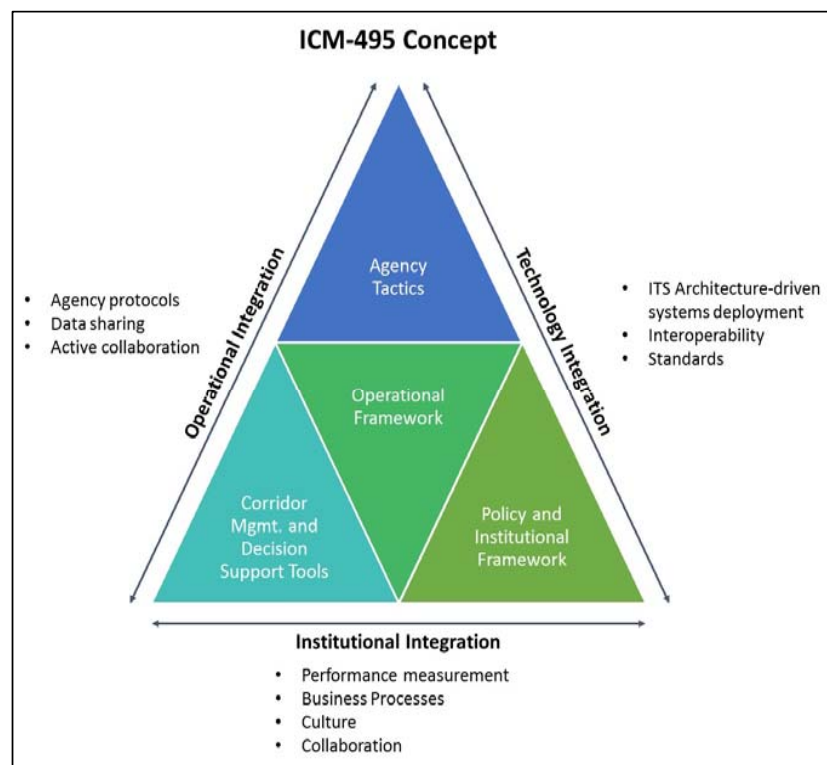
ICM-495 Framework

Supporting Corridor's complex environment requires a framework that accounts for:

- Legacy systems
- Existing ITS architectures
- Info-sharing resources

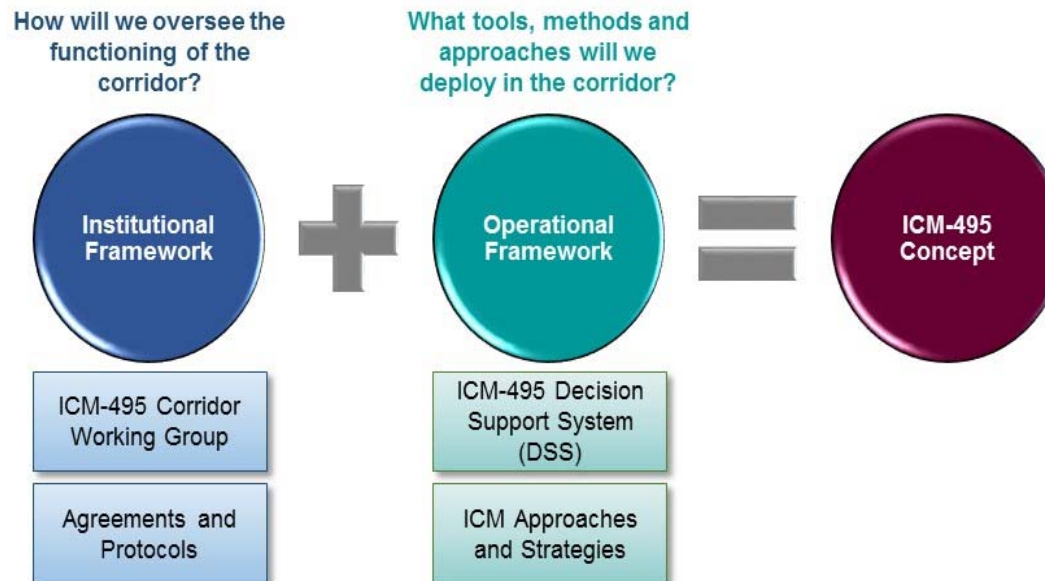
ICM-495 Concept built on four dimensions of change

- Policy and Institutional Framework
- Operational Framework
- Decision Support Tools
- Agency Tactics



ICM-495 Concept

Coordinates management techniques among agencies and their network through two layers: institutional and operational



Operational Framework

ICM-495 Concept

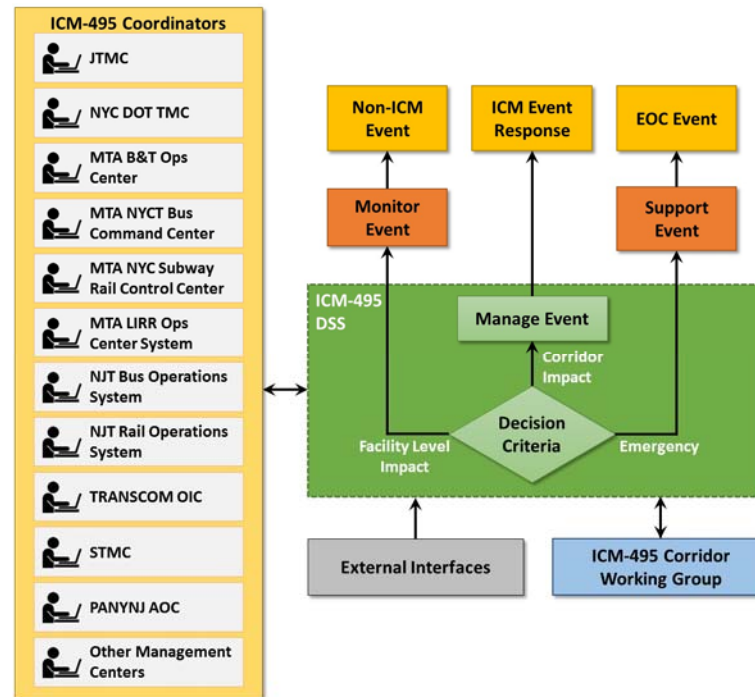
Two-element framework which describes day-to-day operations of the Corridor



Operational Framework - DSS

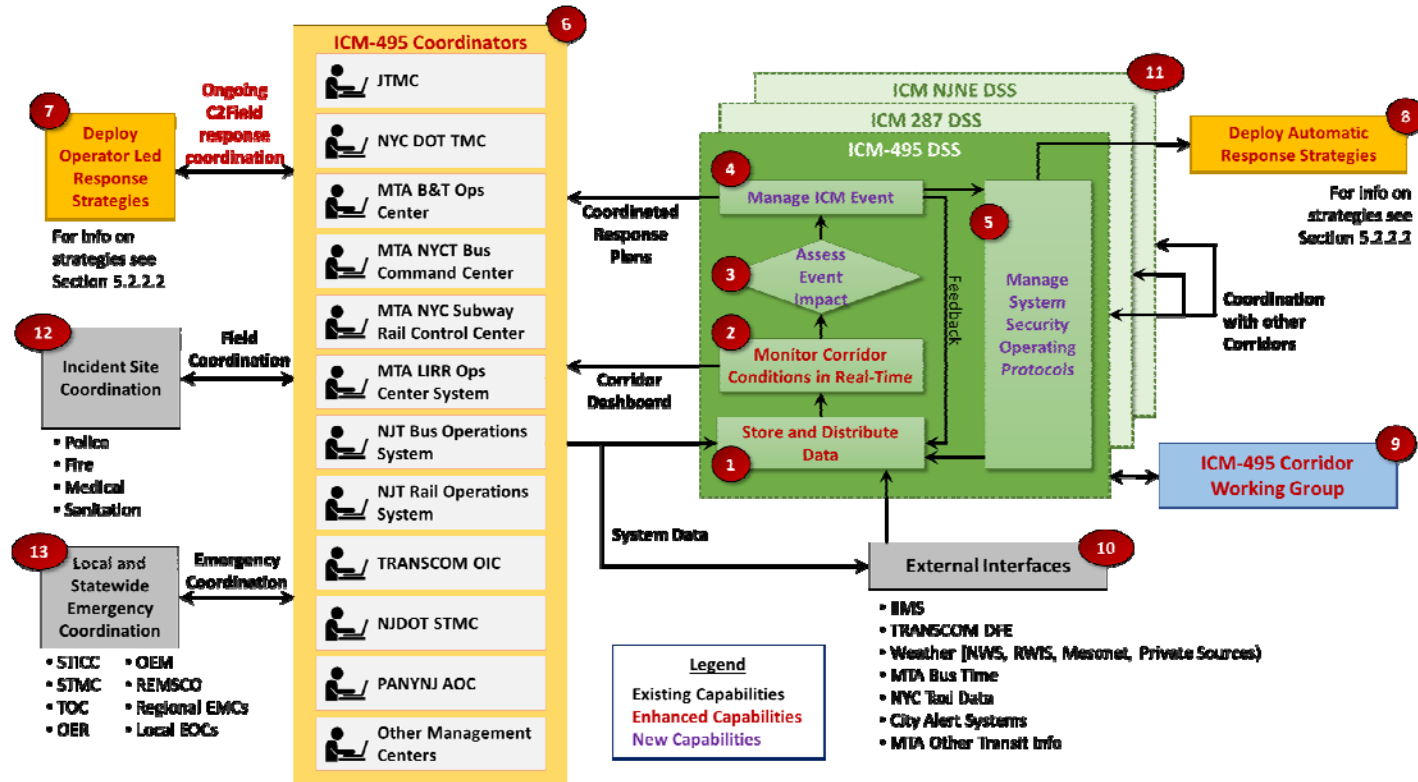
ICM-495 Concept

- **Establishes a core capability** for the Corridor to which future capabilities can be added
- **Defines functionality** but not implementation (new system vs. enhancements to existing systems)
- **Relies on an human element** to coordinate responses due to Corridor complexity



Operational Framework – Functional View

ICM-495 Concept



Ops Framework – Tools and Approaches (1 of 2)

ICM-495 Concept

Enhanced “tools” in individual agency’s “toolbox” to manage their facilities along with overall corridor wide improvements

Operational Approach	ICM Strategies
A. Improved Corridor Monitoring	1. Enhance volume detection in corridor 2. Improve access to arterial speed detection in corridor 3. Improve incident/event reporting especially on arterials 4. Add RWIS sensors in the corridor with grip sensors at key locations 5. Install truck height sensors and overheight warning systems at key locations upstream from tunnels
B. Enhanced Traveler Info	1. Create freight-specific portal of information/messaging on 511 2. Use proactive messaging of weather conditions on DMS and 511 3. Comparative travel time between key crossings at decision points 4. Unified communications strategy on traveler information for incidents and events
C. Corridor-Based Demand Mgmt.	1. Expand and enhance a corridor-focused employer-based telework program 2. Implement emergency playbooks with TDM Operators to support operations during adverse weather

Ops – Tools and Approaches (2 of 2)

ICM-495 Concept

Enhanced “tools” in individual agency’s “toolbox” to manage their facilities along with overall corridor wide improvements

Operational Approach	ICM Strategies	
D. Coordinated Incident & Event Mgmt.	1. Arterial DMS to support route choice 2. Improve towing contracts/capabilities for quick-response especially for heavy-vehicle wrecks 3. Expand HELP program functionality	
E. Transit Bus Tech Improvements	1. Improve Bus Time application to incorporate impact of diversions 2. Explore unified fare media	
F. Work Zone Coordination	1. Standardized WZ traffic mgmt. plan impact assessment and approval 2. Work Zone traffic management plan compliance monitoring	
G. Active Traffic Management	1. Adaptive ramp metering 2. Contraflow lanes 3. Dynamic toll pricing 4. Open road tolling 5. Speed harmonization 6. Transit signal priority	6. Arterial parking restrictions 7. Dynamic merge control 8. Hard shoulder running 9. Dynamic reversible lane 10. Queue warning system

Key Performance Indicators

Performance measures and evaluation targets identified to assess operational and management processes

- Account for differences among agencies in data collection, protocols, and performance assessment

Dynamic Management PMs	Short-Term Management PMs	Strategic Management PMs
• Evaluation day-to-day ops on specific areas in Corridor • Real-time, or short-term timeframes • Mobility, reliability, and incident management measures	• Evaluate governance and mgmt. scheme • Monthly/bi-monthly timeframe • Stakeholder and strategy coordination measures	• Evaluate strategies/actions over long-term • Measures assess progress toward vision • Network-wide progress • Geography specific progress

Impacts

Institutional Impacts

- Corridor-focused operational investments and culture
- Support for defined ICM Coordinator role within agencies
- Improvements/changes in protocols and policies
- Commitment to corridor-based DSS

Operational Impacts

- New agreements
- Harmonized maintenance procedures
- Harmonized incident mgmt. procedures
- Common project and policy framework
- Common testing procedures

Technology Impacts

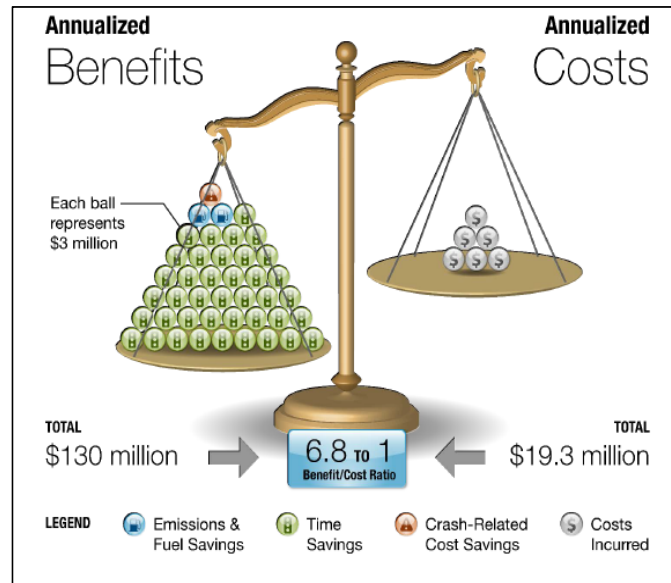
- New decision support capabilities
- Automated data analysis and system operations
- New equipment
- New procedures
- New requirements

Financial Impacts

- Benefit from improved travel time
- Benefit from reduction in crashes
- Benefit from reduction in emissions and fuel consumption
- Additional costs of ICM interventions

Potential Impact of ICM: High-Level BCA

- **Improved travel time** for bus riders, passenger vehicles, and freight operators
- **Reduction in crashes** including avoided injury, clean-up, and repair costs, avoided lost productivity, and reduced delay
- **Reduction in emissions and fuel consumption** based on reduced delays, more even speeds, and reduced idle times



Every \$1.00 invested in ICM-495 generates \$6.77 in benefits for facility users.