

*The Effect of Evolving IT Applications on
Broadband Wireless Requirements*

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Outline of Presentation

- Interoperability/ Information Sharing Within the Criminal Justice and Public Safety Communities
- NIJ's AGILE Program and Standards
- IT and Wireless Requirements and Associated Technical Specifications
- Summary



INTEROPERABILITY:

for Wireless Telecomm. & IT Applications



Communication and Shared Information

- Any exchange that will assist in accomplishing any public safety activity.
 - Audio (real-time interactive voice, pre-recorded messages)
 - Still images (mug shots, fingerprints, facsimile)
 - Video (forensic recordings, surveillance footage)
 - Textual data (physical descriptions, auto registration info)
- For day-to-day missions, mutual aid missions, and task force operations
- With priorities for exchange types and flows



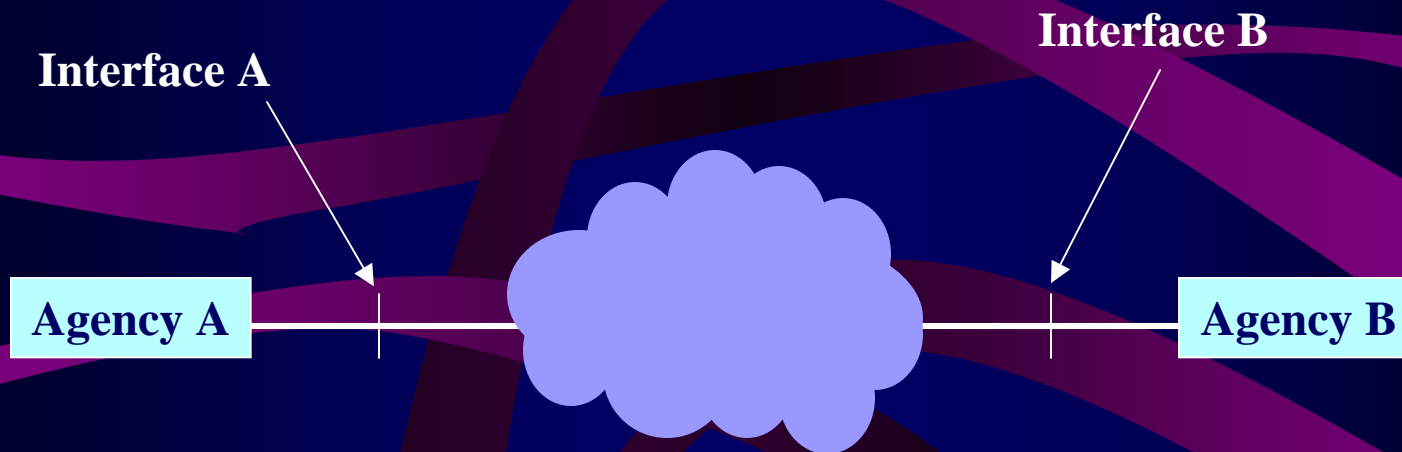
ADVANCED GENERATION OF INTEROPERABILITY FOR LAW ENFORCEMENT (AGILE)

A Program of the National Institute of Justice (NIJ)

The AGILE Program

- Three Primary Thrusts
 - Research, development, testing and evaluation of interoperability technologies
 - Identification/development of open architecture standards
 - Outreach, education, and technology assistance
- Focused on Meeting User Requirements for Wireless and IT Applications

Architectural Framework for Information Sharing



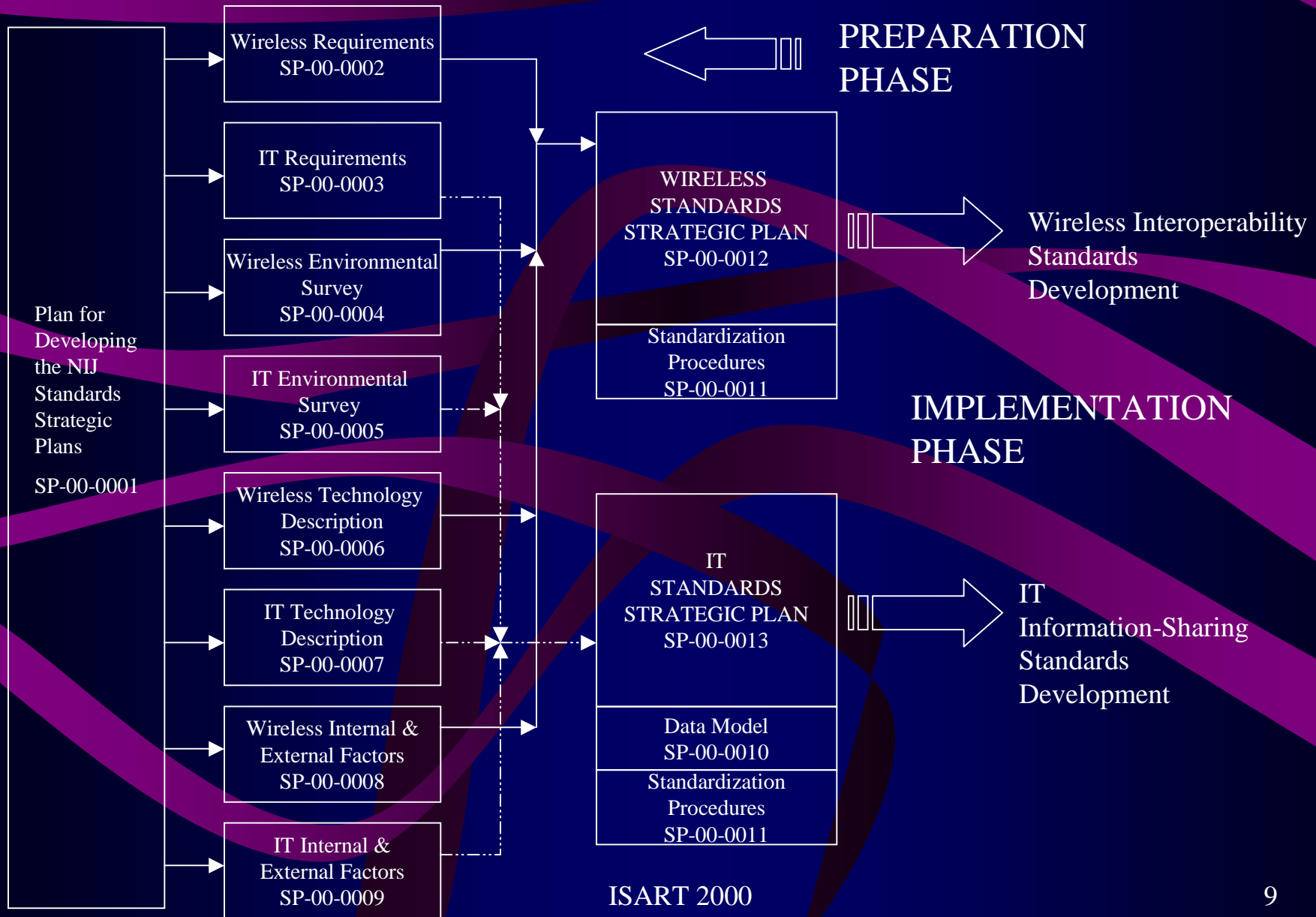
The types of standards that will be dealt with are those required to achieve both functional and semantic interoperability between Agency A and Agency B. This is accomplished by standardizing, specifying, profiling and establishing specifications for the interfaces to those agencies. This includes electrical, radio and optical signals and protocols, data syntax and data format.

AGILE Standards Project

Areas of Standardization

- **Wired Network Standards**
 - provide mechanism for transferring data for wired terminals
 - e.g., TCP/IP, ftp, email/MIME, http
- **Wireless Network Standards**
 - provide mechanism for universal voice communications
 - provide mechanism for transferring data for portable terminals
- **Data Representation and Access**
 - enable transferred data to be interpreted and used
 - e.g., ODBC, fingerprint standard, standardized rap sheet
- **Security and Authentication**

AGILE Strategic Planning Elements



Wireless Requirements

- Approach
 - Consider LE, Prosecution, Defense, Courts, Corrections, Probation & Parole, Fire, EMS
 - Consider Mission & Business Objectives, Organizational Functions, Current and Desired Telecomm. Interoperability & Information Sharing
 - Use available documentation
- Sources
 - PSWAC Report, NPSTC, APCO, NASTD, NCC, PSWN, Projects 25 & 34, State Telecomm Plans, Operational Scenarios, APD Baseline Report

Wireless Requirements (Cont'd)

- Results
 - General Features/Functions of Agencies
 - Supported services & Modes of Operation
 - Communication Links, Call Types, Coverage Areas
 - Availability, Reliability, Privacy & Security
 - Administration
 - Interoperability Issues
 - day-to-day
 - mutual aid
 - task force

Wireless Requirements (Cont'd)

– Functional Requirements

- frequency band, channel access method
- modulation, channel coding, bandwidth
- air interface, Vocoder
- Text Data, Image Comm., Video Codec
- Encryption and Over-the-Air Rekeying
- Mobility Mgt and Inter-System Interface)

IT Requirements

- Approach
 - Consider LE, Prosecution, Defense, Courts, Corrections, Probation & Parole, Fire, EMS
 - Consider Mission & Business Objectives, Organizational Functions, Current and Desired Telecomm. Interoperability & Information Sharing
 - Use available documentation
- Sources
 - SEARCH, Intergovernmental Information Sharing Conference of States, ISTF, Workshop on Building a Business Case for Integration of Criminal Justice Information Systems, State CJIS Planning Documents, Operational Scenarios, BJS

IT Requirements (Cont'd)

- Results
 - Interoperability Issues: strategic, tactical and administrative information sharing
 - Functional Requirements (e.g., security, privacy, and authentication; interworking with CAD, NIBRS, and NCIC 2000; accurate and up-to-date RAP and CCH information)
 - Meeting Security and Data Model Requirements will be the most difficult tasks

Op.Scenario #1- Child Abduction

- Child's picture is scanned at the home with police portable scanner
- Picture is transmitted immediately, with background textual info, to PS agencies, mobile data terminals (and portable data terminals)
- Picture and background are sent to local and state PS data bases in the region and distributed, and sent to National Center for Missing and Exploited Children

Op. Scenario #2 - Fire

- Fire teams in trucks (with data terminals on board) respond to call. re: fire and explosion
- Initial address info is validated and pointer displayed on street map at dispatch and mobile terminals. Hazmat icon appears based on data base info for location
- When fire hydrants appear on maps, Incident Commander directs teams to precise locations. He requests aerial surveillance platform, and weather data for the area.
- Detailed Hazmat info is transferred to all terminals from data base, including instructions for fire fighters.

Op. Scenario #2 – Fire (Cont'd)

- Aerial platform transfers full-motion video of incident site to dispatch, Incident Commander, and all mobile units. Switches to thermal imaging, identifies hot spots, and transfers that info.
- Weather data and video of hazmat plume is used to project possible contamination area.
- Evacuation order is broadcast to all PS agencies in the area, and to radio and TV stations. Mobile units of PS agencies receive full details of incident.
- Command Van is deployed to the incident site and controls all actions from that location.

Op. Scenario #2 – Fire (Cont'd)

- Firefighters and Search and Rescue personnel are tracked as they work via GPS in portable radios.
- Vital sign telemetry is established for all firefighter personnel, and monitored automatically.
- Newly called local units (and those from neighboring agencies) are provided with background data and video en route to the scene.
- Command Van continues direction to units, and issues status reports (with appropriate video and data), until the incident is resolved.

Op. Scenario #3 –ID of Unknown

- Portable fingerprint reader and/or retina scanner used to identify “unknown” person (e.g., victim or possible criminal)
- Data sent immediately from person’s location to local, state, and Federal data bases
- Data bases return with personal data (including most recent photo), any “wants or warrants”, and historical data (e.g., past criminal activity, abuse by others, etc.)
- In the case of a victim abused previously, the name, address, and photo of the former abuser can be forwarded to local and state police

Functional Requirements to Technical Specifications

- Considerations
 - Quality of Information (e.g., required resolution of images and video)
 - Reliability/Integrity of Info Transfer (e.g., what protocols, error correction approaches and encryption schemes are required)
 - Timeliness of Info (e.g., when all desired parties are required to receive information)

Functional Requirements to Technical Specifications (Cont'd)

- Example from Operational Scenario #1
 - 640x480 scanned image (400 Kbit compressed file) can go to dispatch in 60 seconds @ 6.7Kbps, but reliable (sequential) transfer to each of 30 patrols cars will take more than 30 minutes. A (400 Kbps) transfer to all 30 cars in about 30 seconds may save a child's life.

Functional Requirements to Technical Specifications (Cont'd)

- Examples from Operational Scenario #2
 - Full motion video to locate people at a fire using Quarter Common Intermediate Format (QCIF) may only require 75 Kbps. Using CIF (at 4 times the resolution and 200 Kbps) may be needed to see if a person has a gun.
 - Transfer of 12 files (10 Mbits) of building plans (with 640x480 resolution) in 2 minutes to 4 fire trucks en route would require about 333 Kbps

Summary

- Information Sharing among local, State, and Federal Public Safety agencies will increase, particularly when interoperability standards are established
- Requirements for Multimedia (Voice/video/ computer data) information extend to locations served most effectively by wireless technologies
- Broadband wireless will play a major role in the success of expanded information sharing activities within the Public Safety Community