



BanDeMar
Networks

UMDNJ



SCHOOL OF
PUBLIC HEALTH

University of Medicine & Dentistry of New Jersey

Delivering Time-Critical Mobile
Multimedia to Deployed Personnel:

Responding to Changes
in the Wireless Industry



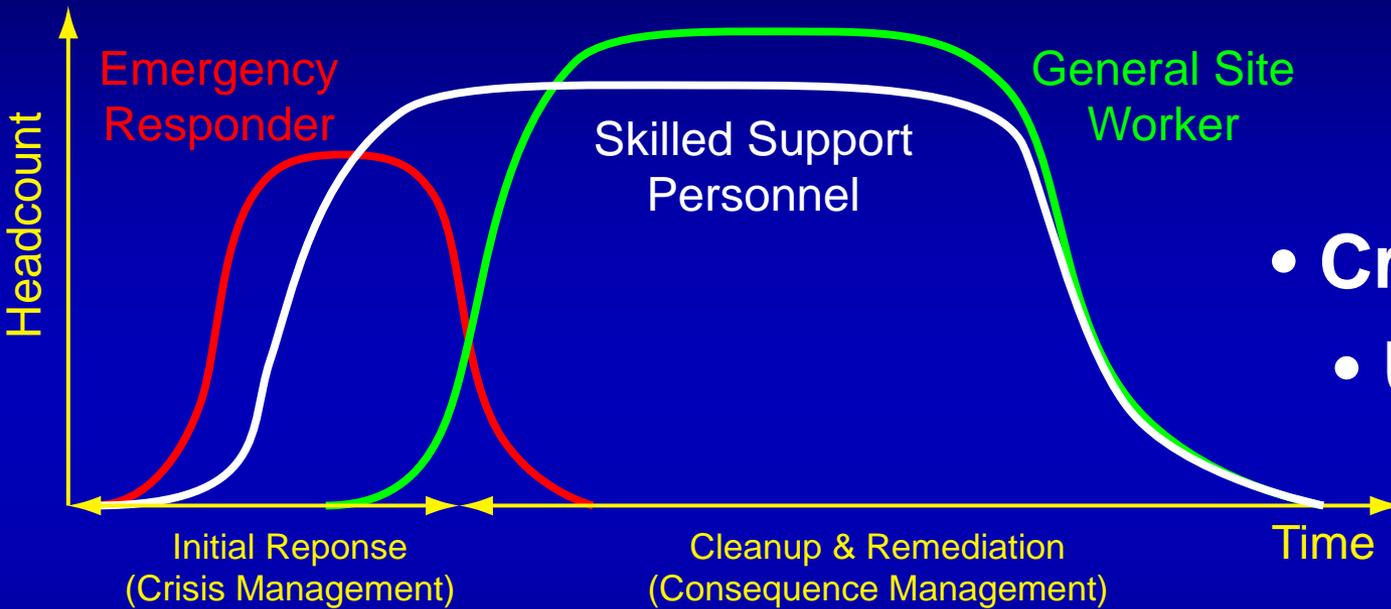
NIEHS

National Institute of
Environmental Health Sciences

Cesar Bandera
BanDeMar Networks
cesar@bandemar.com



Goal: On-Site HAZMAT Guidance to Skilled Support Personnel



- Carpenters
- Steelworkers
- Crane Operators
- Utility Workers
- Laborers
- Etc.



EOHSI Clinical Center	5
The Mid-Atlantic Asbestos Training Center	6
NIOSH 582: Sampling & Evaluating Airborne Asbestos Dust	
Asbestos Awareness Training	
AHERA Inspector	
AHERA Management Planner	
Annual Refresher for AHERA Inspectors & Management Planners	
Atlantic OSHA Training Center	12
<i>NEW in 2005</i>	
OSHA 5600 Disaster Site Train-the-Trainer	
OSHA 7105 Introduction to Evacuation & Emergency Response	
OSHA 7400 Trainer Course in Construction Noise	
OSHA 7500 Introduction to Safety & Health Management	
OSHA 7600 Disaster Site Worker Course	
10-Hour OSHA Compliance for the Construction Industry	
10-Hour OSHA Compliance for General Industry	
OSHA 101A Introduction to Safety & Health Management	
OSHA 102 Principles of Ergonomics	
OSHA 226 Permit-Required Confined Space Entry	
OSHA 301 Excavation, Trenching, and Shoring	
NJ Asbestos Safety Technician	
Asbestos Operations & Maintenance	
Asbestos Operations & Maintenance Refresher	
Asbestos Control for Supervisor & Contractors and Workers & Handlers	
Asbestos Refresher for Supervisors & Contractors and Workers & Handlers	
OSHA 500 Trainer Course in Occ S&H Stan for the Construction Industry	
OSHA 501 Trainer Course in Occ S&H Standards for General Industry	
OSHA 502 Update for Construction Industry Outreach Trainers	
OSHA 503 Update for General Industry Outreach Trainers	
OSHA 510 Occupational S&H Standards for the Construction Industry	
OSHA 511 Occupational Safety & Health Standards for General Industry	
OSHA 521 OSHA Guide to Industrial Hygiene	
OSHA 600 Collateral Duty Course for Other Federal Agencies	
OSHA 7000 OSHA 101A Introduction to Safety & Health Management	
OSHA 7001 OSHA 102 Principles of Ergonomics	
OSHA 7002 OSHA 226 Permit-Required Confined Space Entry	
OSHA 7003 OSHA 301 Excavation, Trenching, and Shoring	
OSHA 7100 Introduction to Machinery & Machine Safeguarding	
OSHA 7200 Bloodborne Pathogen Exposure Control for Healthcare	
The New Jersey/New York Hazardous Materials Worker Training Center	18
40-Hour Health and Safety for Hazardous Waste Site Investigation Personnel	
Refresher for Health and Safety for Hazardous Waste Site Investigation Personnel	
Hazardous Materials Identification and Control	
Supervisors of Hazardous Waste Operations	
Lead Training	20
Lead Awareness	
Lead Inspector and Risk Assessor (LIRA)	
Refresher for Lead Inspector and Risk Assessor	
Nurse & Physician Training	21
Occupational Health & Safety Principles and Nursing Certification Review	
Principles of Disability and Workers' Compensation Case Management & Case Management Certification Review	
Physicians Training in Occupational Hearing Conservation	
The Universities Occupational Safety and Health Education and Research Center (UOSHERC)	22
Assessing, Sampling and Controlling Microbial Contamination in the Indoor Environment	
NIOSH Approved (#43) Spirometry Training	
Occupational Hearing Conservation Training & Certification	
Occupational Medicine Seminars Series	
Comprehensive Industrial Hygiene Review	
NIOSH Spirometry Update	
Occupational Hearing Conservation Recertification	
Respirator Program Administration with Fit-Testing Workshop	

Why Do SSP Need On-Site Guidance?

1. Exposed to same hazards as first responders but lack the same training
2. Train in skill development, not hazards or personal protective equipment
3. Too many possible emergency scenarios

Approach: Timely and Essential Mobile Multimedia Instruction

- **Push** the instruction
- Do not require any new equipment
- Improved retention from multimedia
- Images, video with Incident Command
- JITTEIS: “Just-in-Time Training for Emergency Incidents System”



Challenge: message delivery must overcome limitations of the carrier, subscription plan, device, and user

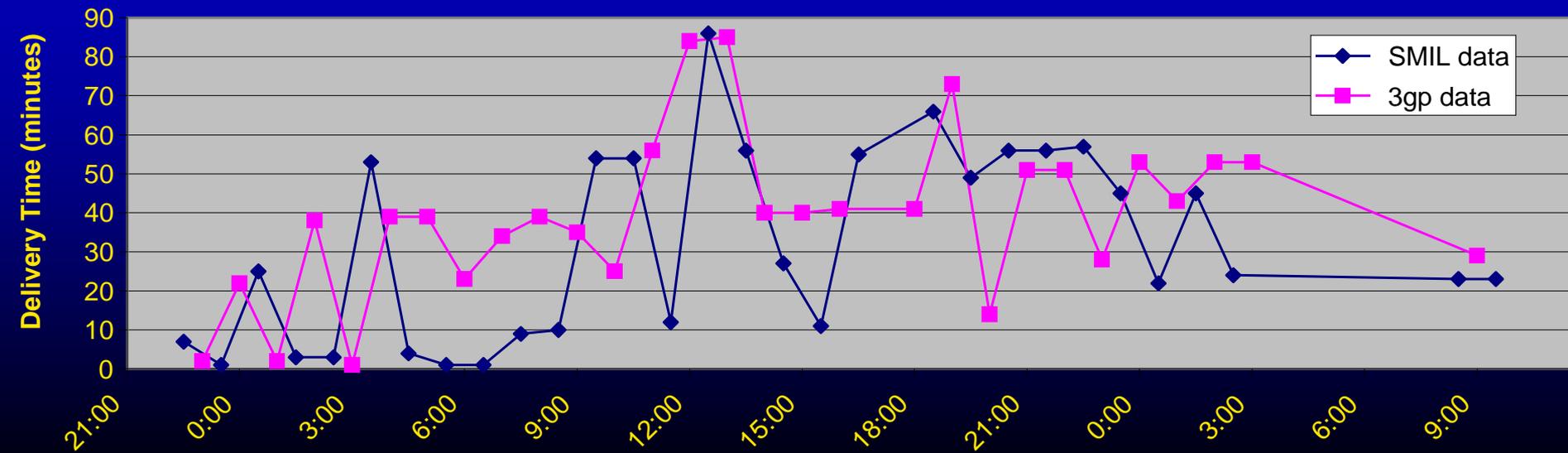
- **Lack of interoperability between “Walled Gardens”**
- **Poor compliance with ratified standards**
- **Technology divergence from differentiation**

Encouraging Signs

- **Adoption, social networking, and price trends**
- **COWs that go queue**
- **Residual bandwidth**
- **Been there, done that**
 - remember email and the web on Prodigy, CompuServe, AOL?

Challenge: Walled Gardens

- Phone crippling
- No new software or change of settings on phone
- Poor interoperability among carriers
 - Long delays
 - Content decimation (“adaptation”)

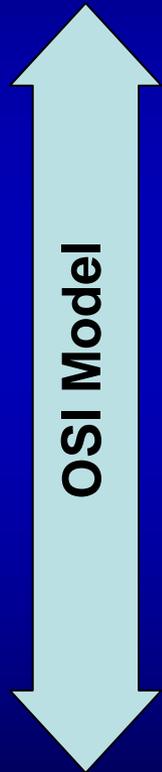


Challenge: Poor Standards Compliance

- **Standard ratification organizations:**
 - World Wide Web Consortium
 - Motion Picture Experts Group
 - International Telecommunications Union
- **Offenders:**
 - Mobile device manufacturers
 - media languages (HTMLL, XHTMLL, SMILL)
 - Carriers
 - data protocols (WAP, MM1)
 - User Agent Profiles

Challenge: Format Wars

APPLICATION
LAYER

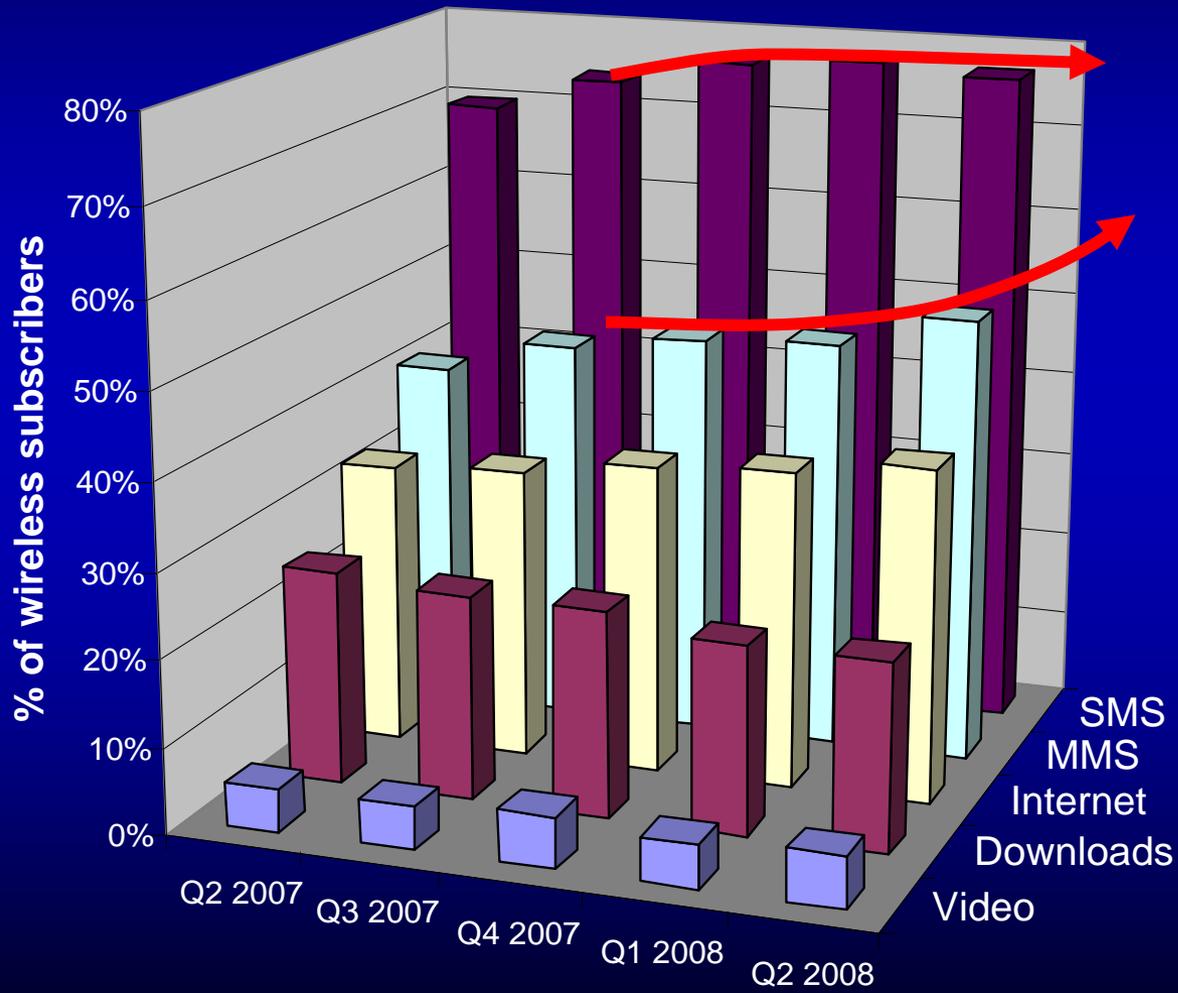


PHYSICAL
LAYER

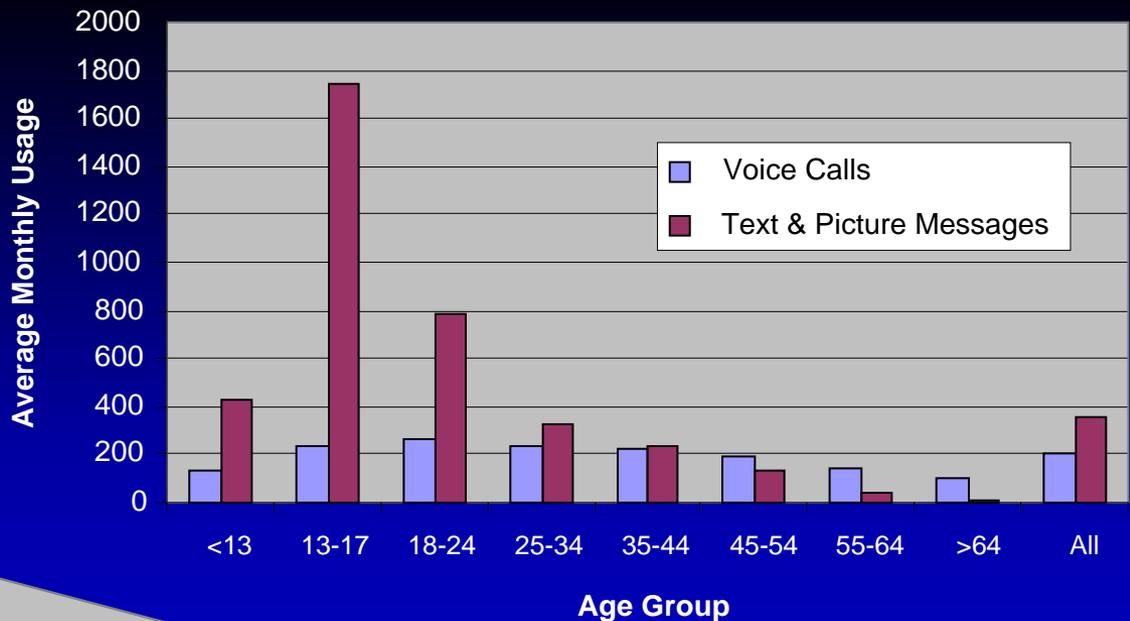
- **Operating systems:**
 - Symbian, BREW, Windows
- **Delivery protocols (middleware):**
 - PCS Vision, Media Net, BREW
- **Data encapsulation:**
 - 3G, MMS, BAS
- **Media encoding:**
 - MP3, AMR, AWB, AAC, QCELP, WMA
- **Signal coding:**
 - CDMA, GSM

...and this is just for audio!

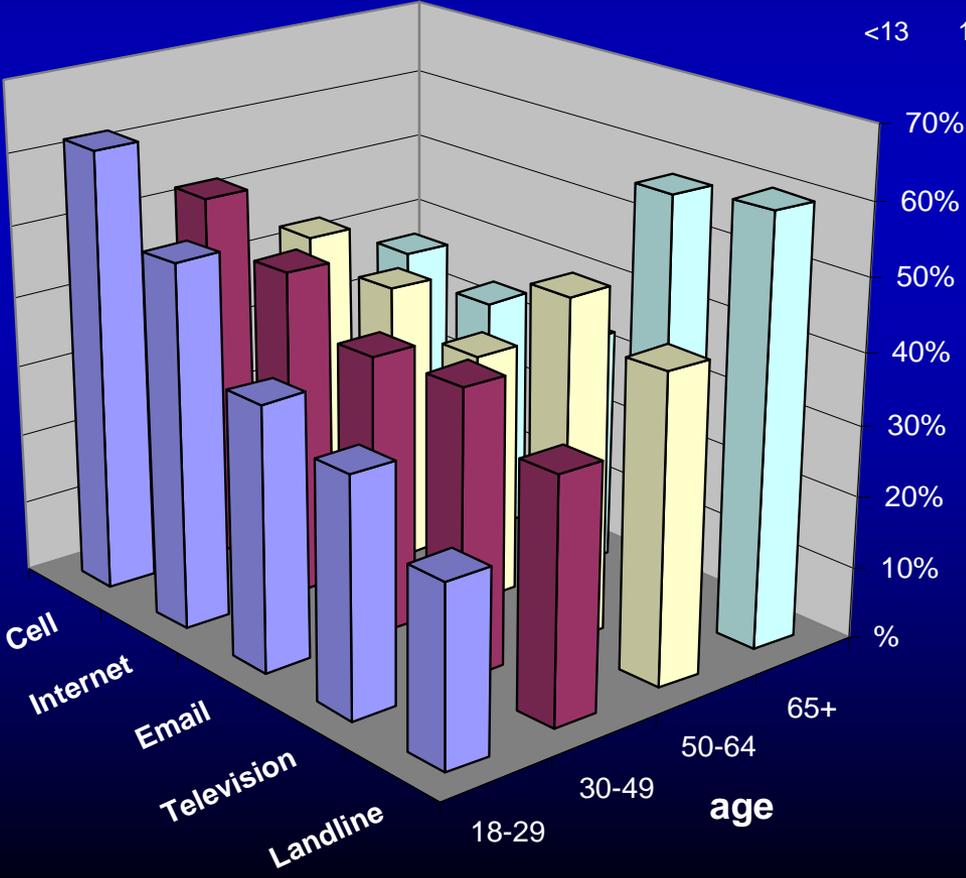
Multimedia Messaging is the Fastest Growing and 2nd Largest Mobile Data Service



Who is Using MMS?



% who say it would be difficult to do without



Ethnicity	MMS users	Cell users who MMS
White	54%	73%
African American	56%	79%
Hispanic	76%	90%

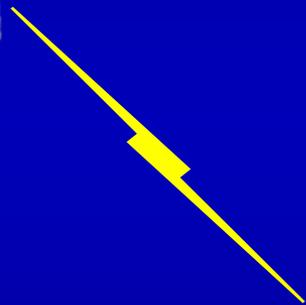
Cells on Wheels

- **Rapid re-deployment**
- **All asynchronous data traffic uses reliability techniques:**
 - **Queues**
 - **Residual bandwidth**
 - **(Resumable downloads)**

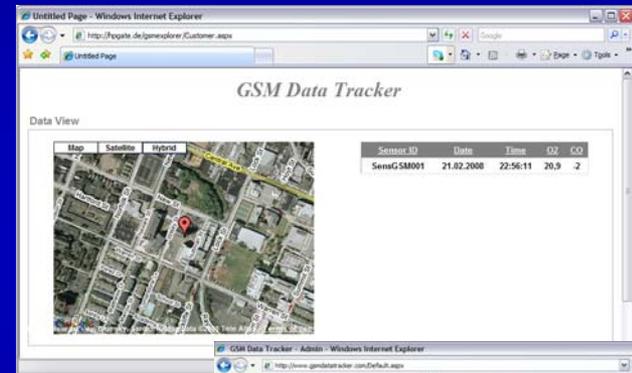


Sensors Are Also Multimedia Sources

Biosystems PhD Ultra gas sensor networked via JITTEIS



Gas Readings from:
NJIT Campus, Newark NJ



Downtown Nurnberg,
Germany

Conclusion

- **MMS for emergency notification focuses on broad support, not the latest device features**
- **Ultimately, interoperability wins out:**
 - **Today's ISP's were not the first one the scene, but the first ones support inter-domain email**
 - **SMS offerings became profitable only after inter-carrier SMS**
- **Differentiation seems to ensure the need of the Rosetta Stone for the foreseeable future**

Project Status

- Xanadu construction site (4.1Mft² \$2B amusement/retail park on brownfield wetlands)
- MONOC paramedics (100K responses per year with ground and air vehicles covering 2,500 miles²)



Bad Joke



Q: How hard was it for God to create the universe in only six days?!?

A: Easy!
He didn't have to be backwards-compatible with anything!