# Integrated Wireless Phone Based Emergency Response System (WIPER - DDDAS)

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# Mobile Phone Database

- **Real phone call records**
  - 7 million users
  - 2004 April → today (1.5 years)
  - Who calls whom/Call duration
  - Services (SMS, WAP, images)
  - Time resolved data (1 month)
  - Social data (sex, age, zip, phone)
  - Several **billion** phone call records
  - Attributes of the calls, not the calls themselves
- Cell phones are an ad hoc **distributed sensor net**
- Location of all cell phones (that are powered-on) during an emergency can be determined
- Abnormal call patterns during an emergency or incident
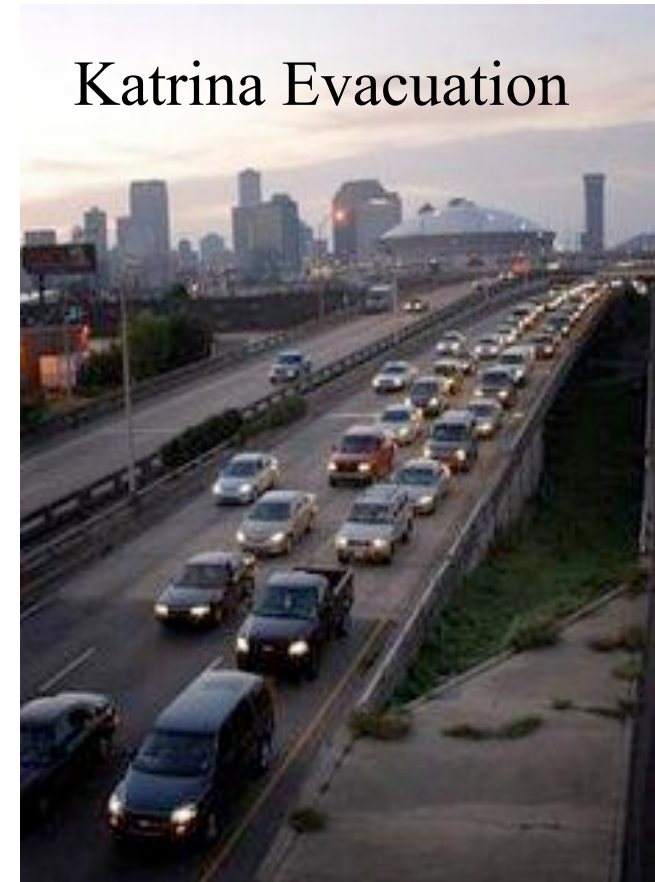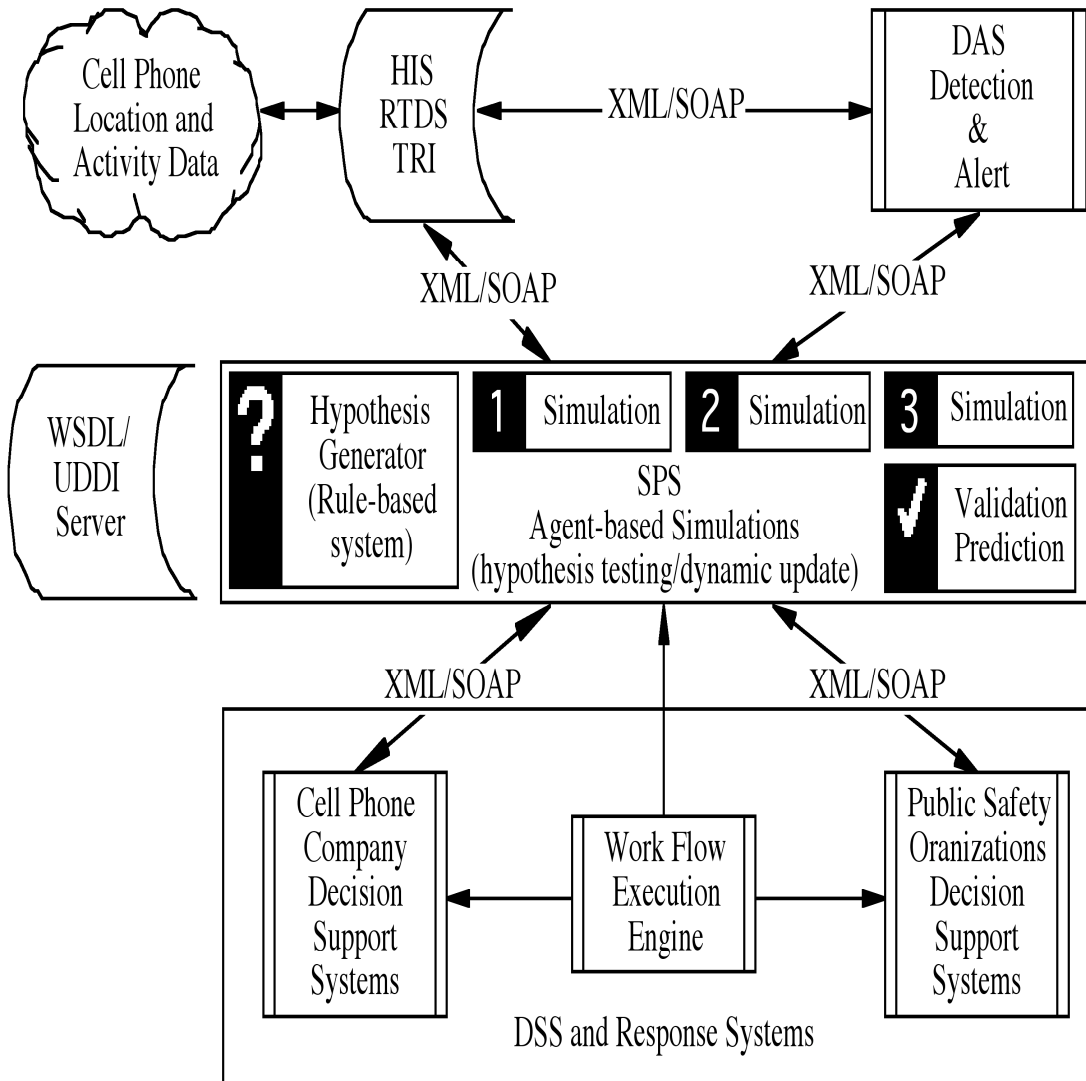- Focus on aggregate properties
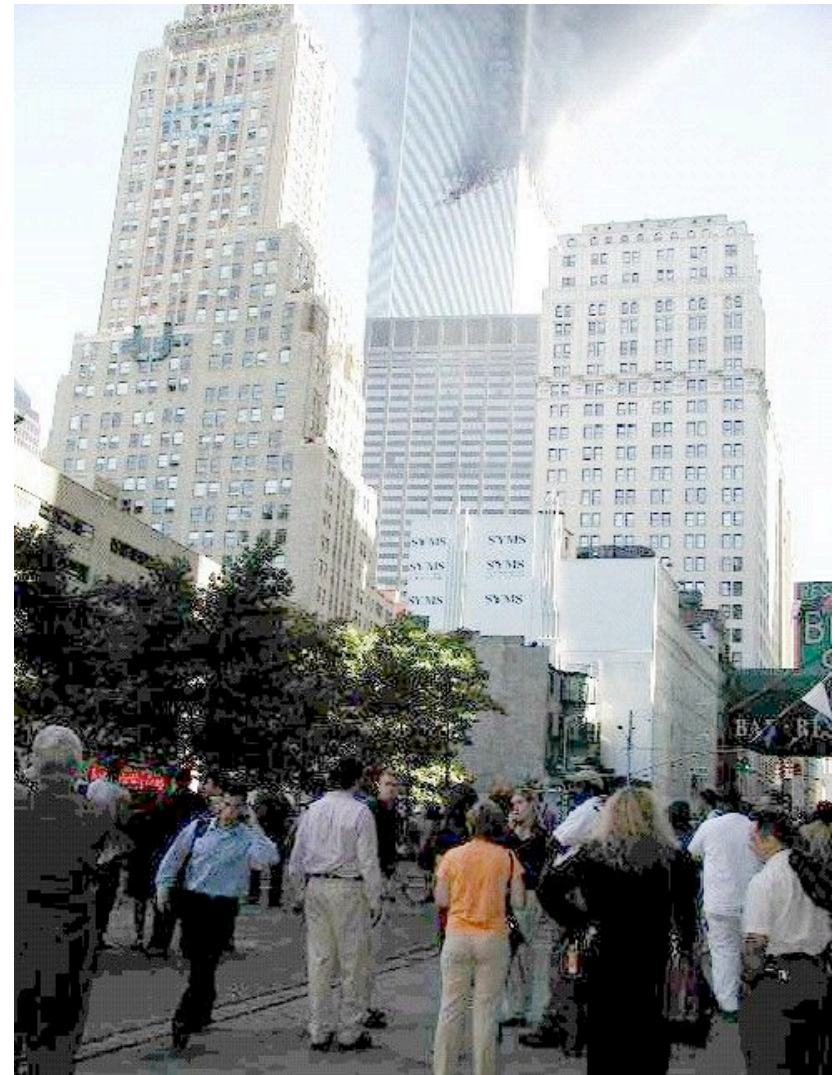
# WIPER - DDDAS
## Three Layer Architecture

- Data Source and Measurement
- Detection, Simulation, and Prediction
- Decision Support System (DSS)
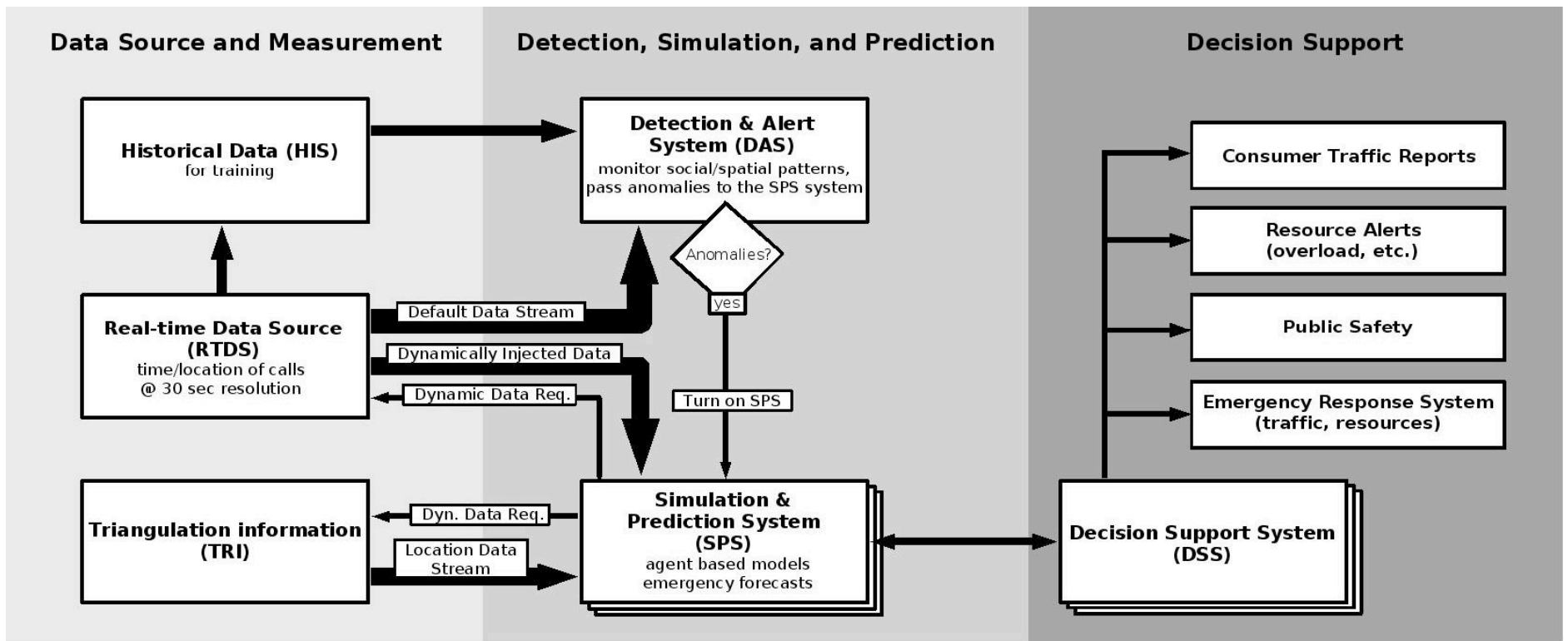
# DDDAS SERVICE ORIENTED ARCHITECTURE



Katrina Evacuation

# WIPER - DDAS will

- Detect abnormal patterns in mobile call activity and locations
- Initiate dynamic data driven simulations to predict the evolution of the abnormality
- Initiate higher resolution data collection in localities of interest
- Interface with emergency response Decision Support Systems

Hurricane Rita I45N Freeway Gridlock