Please!
Turn OFF cell phones
and paging devices

ALLHAZ Field level Emergency Operations Concept

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Jackson State University
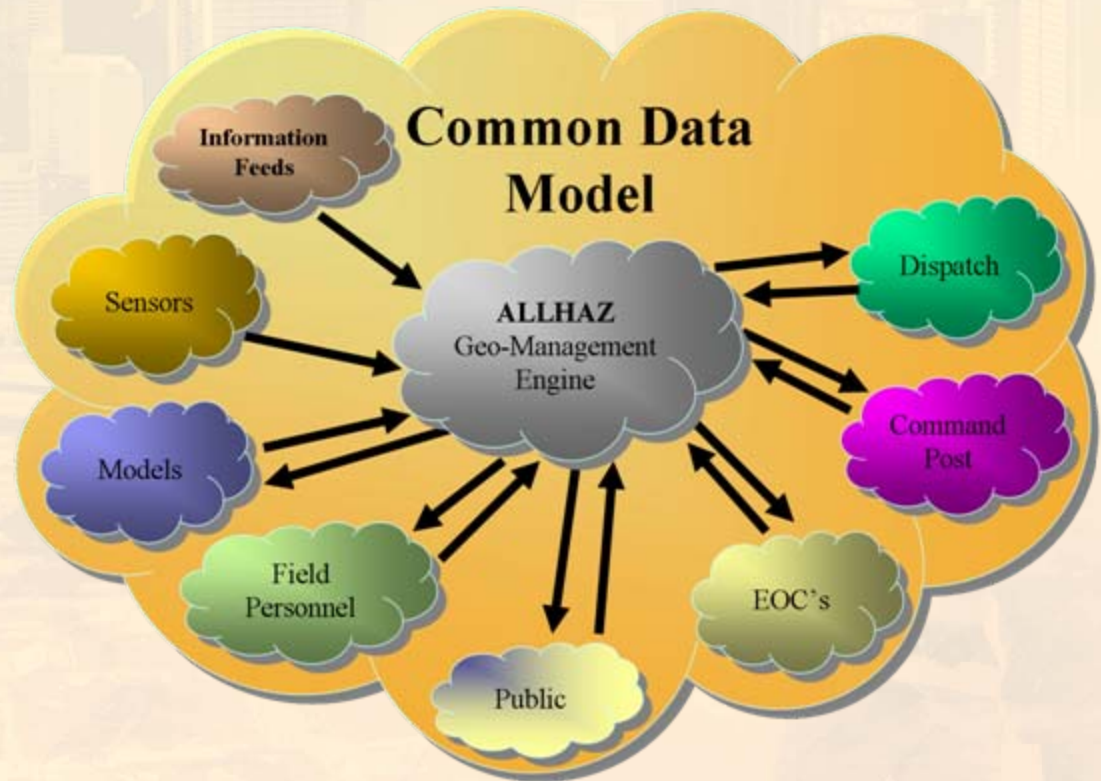
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**Jackson State University**

Dave Kehrlein

ESRI Professional Services

Overview

- **What is ALLHAZ?**
- **How did we get here?**
- **Inputs**
- **Users**
- **Pulling it all together**
- **A vision for the future**

Common Data Model

Information Feeds · Sensors · Models · Field Personnel · Public · ALLHAZ Geo-Management Engine · Dispatch · Command Post · EOC's

What is ALLHAZ?

ALLHAZ provides all field operations personnel with a standardized, scalable, geospatially enabled tool that they can use to assist in planning for, mitigating, responding to and recovering from All Hazards of all sizes
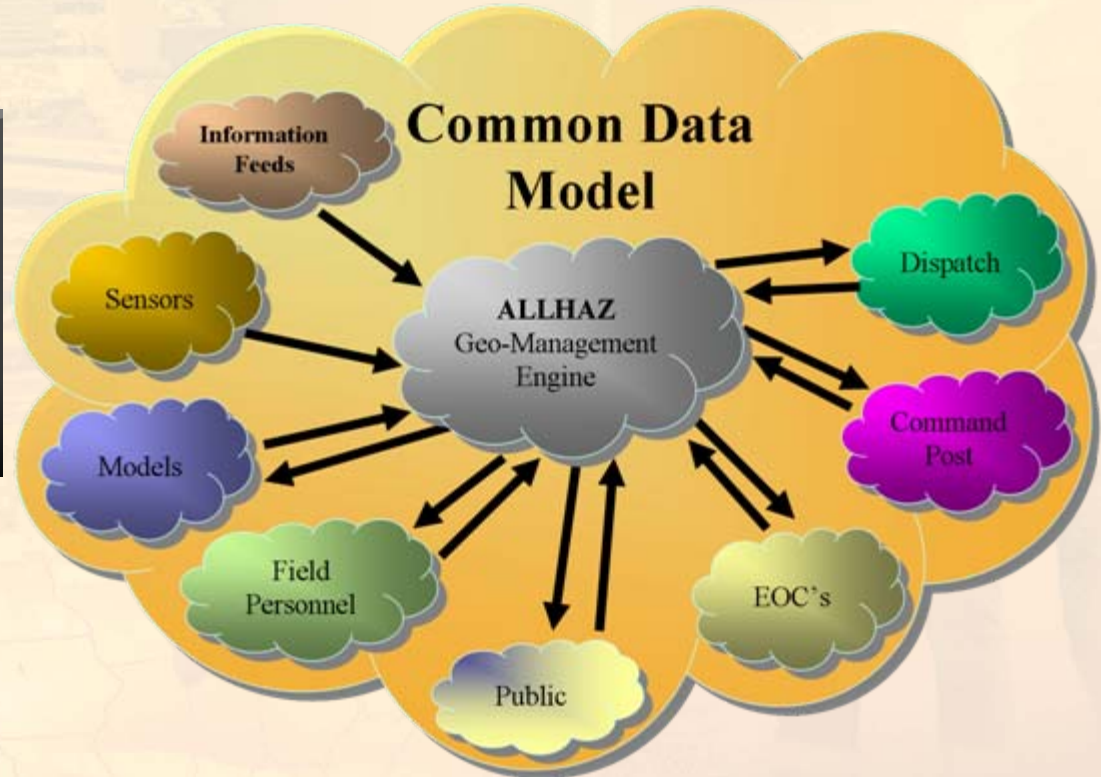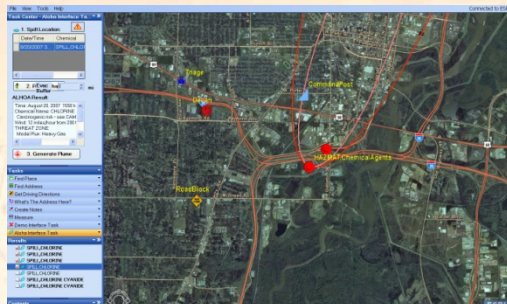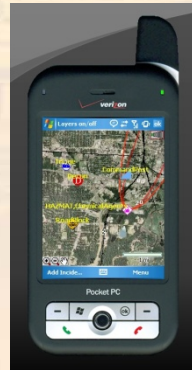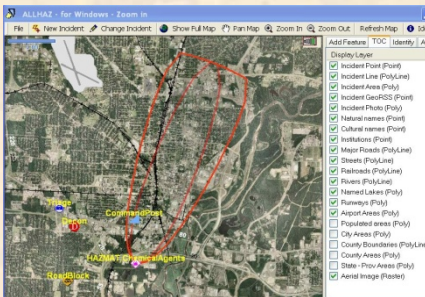
How did we get here?

- **Traditional GIS systems target technical end users.**
  - – **Complicated to use**
  - – **Inconsistent format**
  - – **Diverse, disconnected data.**
- **Different solutions for each type of event**
  - – **User interface**
  - – **No standard Data Model**
  - – **No standard data sharing environments**
- **Lack of Scalability**
  - – **Systems break when the event gets too big**

GISLAB COTTONWOOD FIRE AUGUST 1994

British Columbia 2003

Landscape Assessment

Historical approach

- **Different system for different disasters**
- **Systems designed to be run by technician**
- **Different data bases – little or no sharing**
- **Limited mobile capabilities**
- **Limited scalability**
- **Limited data sharing across jurisdictions (Local ↔ State ↔ Regional ↔ Federal)**

Landscape Assessment

ALLHAZ provides:

- **Single user interface for all hazards**
- **Scalable to grow with event**
- **Handheld, Tablet, Desktop, Server, Internet**
- **DHS National Data Model (Fusion Centers & Project Homeland)**
- **Shareable data at all jurisdiction levels**
- **NIMS forms integration**
- **NRP ESF compliant reporting**

ALLHAZ Scenarios

- **HAZMAT Spill – demo**

- **Logistics resource Management**
  - **Check in/ Dispatch trucks**
  - **Log load & distination**
  - **Near real time advisory to receiving point**
  - **Reporting**

- **Shelter Management**
  - **Resources management /requests / receipt**
  - **Arrivals / Departures of evacuees**
  - **Beds & services available**

ALLHAZ Scenarios

- **Fire Mitigation & Planning**
  - **Property assessment / inspections**
  - **Mitigation plan monitoring**
  - **CCC / FS /DOW / Board of Realtors / Schools / Ski Corp / Banks / Investors**
- **Boarder Patrol**
  - **Situational Awareness**
  - **Sightings / trails / tunnels / signs of crossings**
- **USAR**
  - **Locate survivors & victums**
  - **Track search areas and coverage**

ALLHAZ Scenarios

- **Disease outbreak (Avian Flu)**
  - **Locations / quarantine zones**
  - **Evacuation area / routes**
  - **Hospital / triage locations / decon**
- **Dam Break & Flooding**
  - **Locations / impact areas (models)**
  - **Evacuation area / routes / shelter locations / shelter availability (animal & human)**
- **Damage Assesment (general)**
  - **Location / type / immediate needs/ repetitive loss**
  - **Evacuation area / routes / shelter locations, etc.**
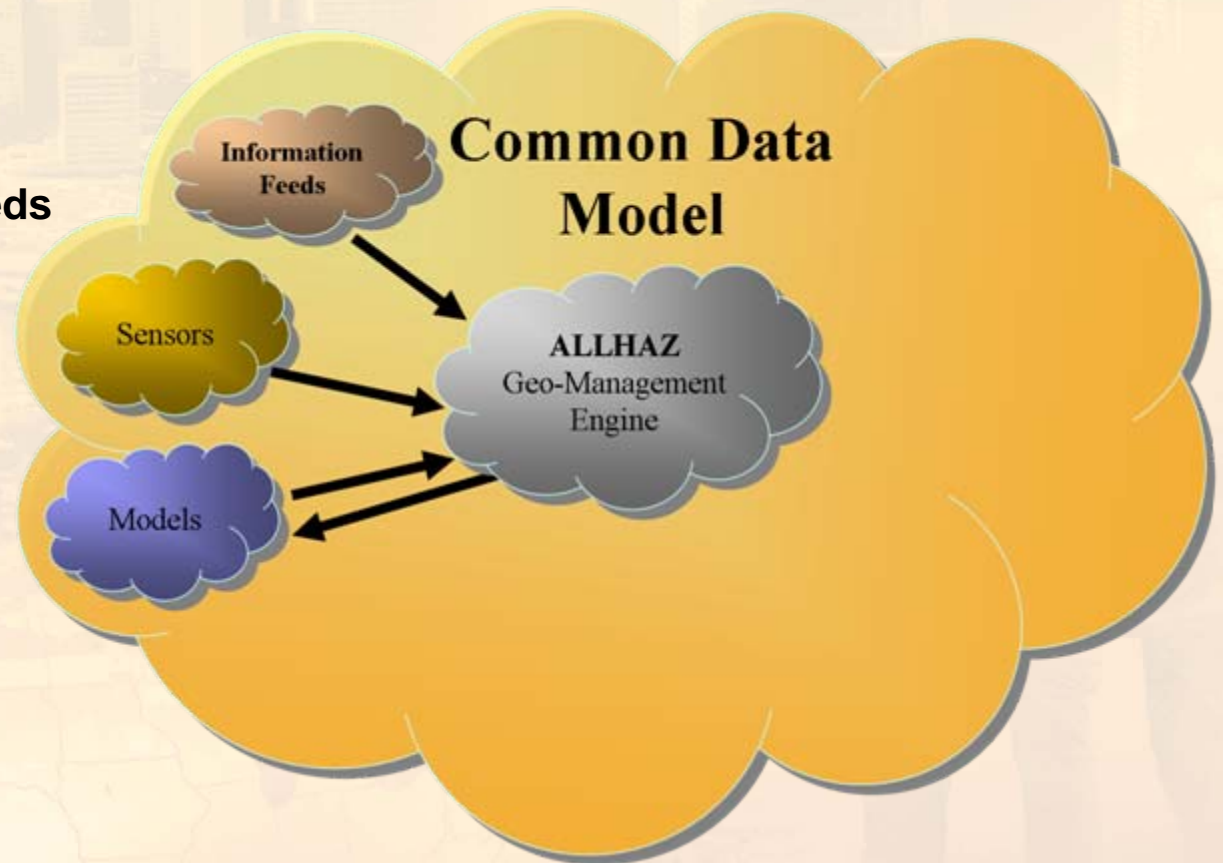
ALLHAZ Scenarios

- **Hurricane / Tornado / Earth Quake**
  - **Evacuation area / routes**
  - **Resource logistics**
  - **Shelter locations (Animal and Human)**
  - **Damage assessment**
  - **Search and Rescue**

Inputs

- **Common Ground**
  - **User Interface**
  - **Data models**
  - **Common Symbology**

- **Sensors , Information Feeds**
  - **Weather**
  - **Flood**
  - **Chemical**

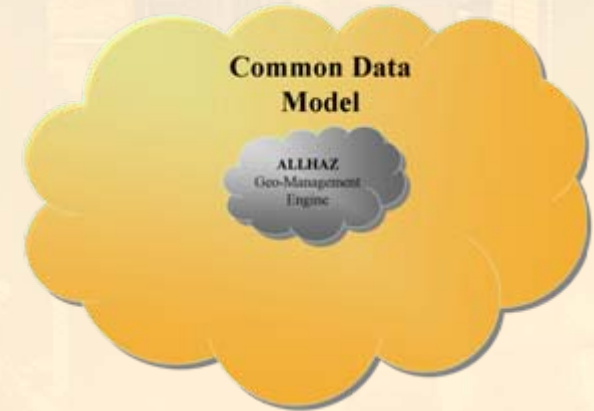- **Models**
  - **Plume**
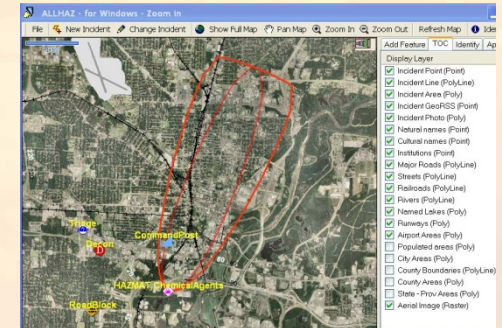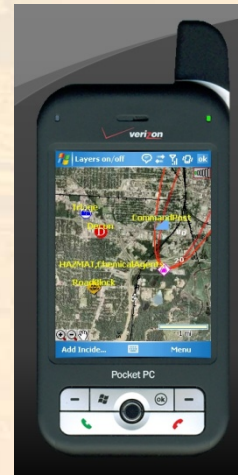 - **Buffer**
  - **Hydro**
  - **Fire**

Common Ground

- **Common Ground**
  - User Interface
  - Data models
  - Common Symbology

Emergency Assessment and Activities

Operations Assessment and Activities

Common Data Model — ALLHAZ Geo-Management Engine

Pocket PC

Homeland Security Working Group — Symbology Reference

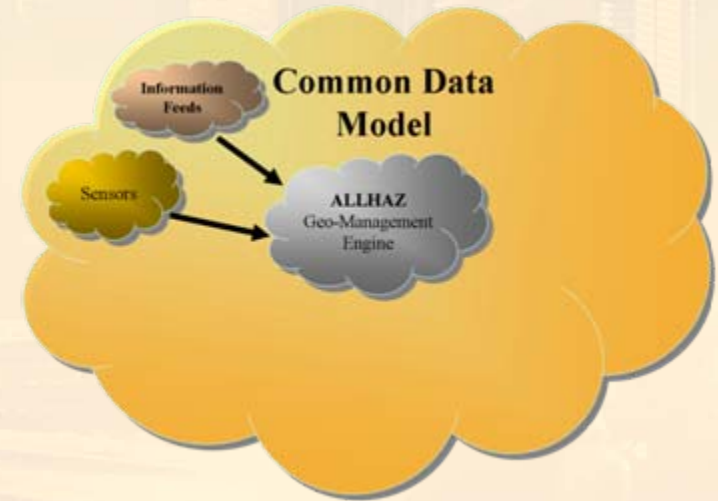| Home Page	Symbology Background	Incidents REFERENCE	Natural Events REFERENCE	Operations REFERENCE	Infrastructures REFERENCE	Damage/Operational REFERENCE	Sample Maps	Download Symbols	Evaluation Results	FAQ

Information Feeds and Sensors

- **Sensors , Information Feeds**
  - **Weather**
  - **Flood**
  - **Chemical**

Daily Streamflow Conditions
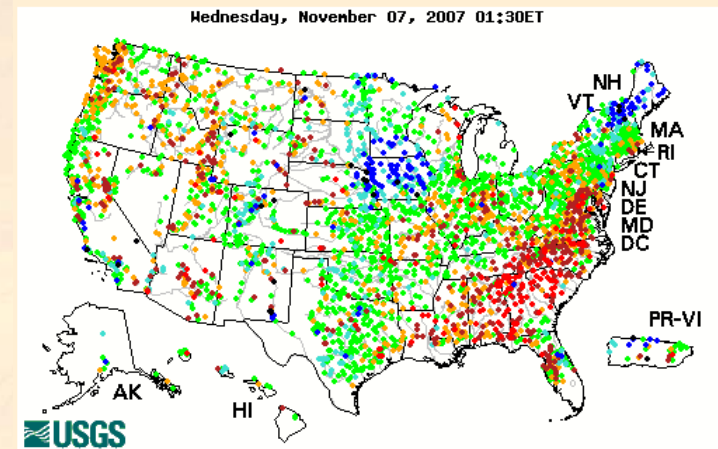
Information Feeds and Sensors

GEORSS Feeds

object Overview

AirTrak Ambulance

Air Ambulance

Traffic Accident

REDINET Diversion Status

AirTrak Fire Truck

Weather map

AirTrak Rescue Airship

CURE Feed Server

Other Online Map Services

CALTRANS Highway Traffic

GeoRSS Feed

GeoRSS Feeds

Other GeoRSS Feeds

CURE Mobile GIS

CURE Map Viewer

ArcGIS Online

CURE Mobile GIS User

LLUMC Telemedicine

CURE Web user

Models

- **Models**
  - **Plume**
  - **Buffer**
  - **Hydro**
  - **Fire**
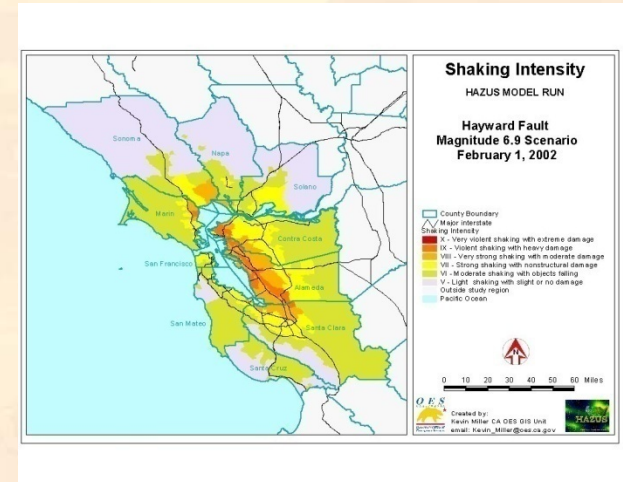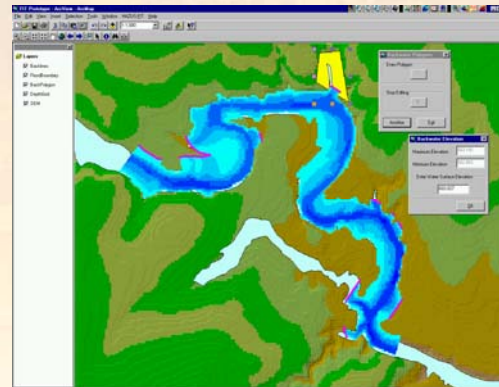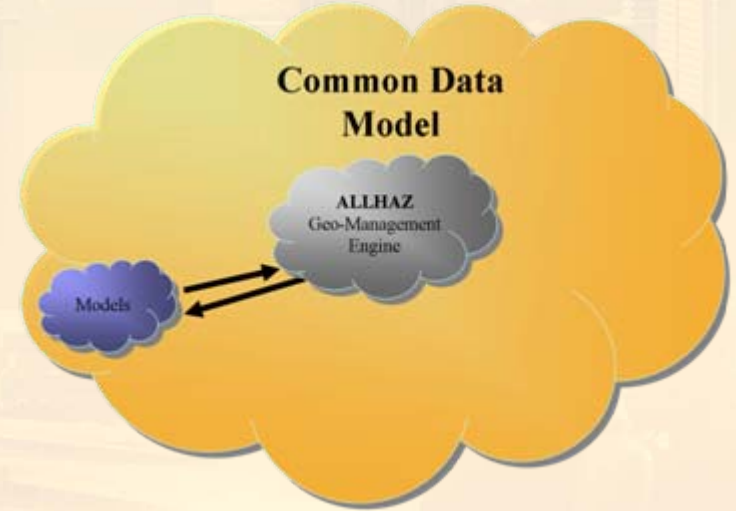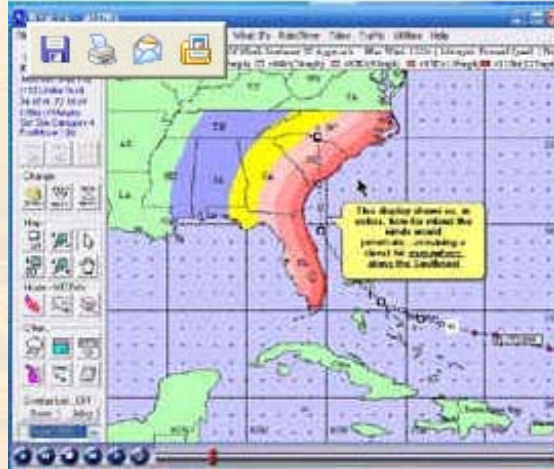
User Communities

- **Primary user community**
  - **Command Post**
  - **Field Operations**
- **Secondary user community**
  - **Dispatch**
  - **EOC**
    - **Local**
    - **State**
    - **Federal**
  - **JFO**

- **Public**
  - **Warning**
  - **Evacuation**
  - **Sheltering**

Common Data Model

ALLHAZ Geo-Management Engine

Dispatch

Command Post

Field Personnel

Public

EOC's
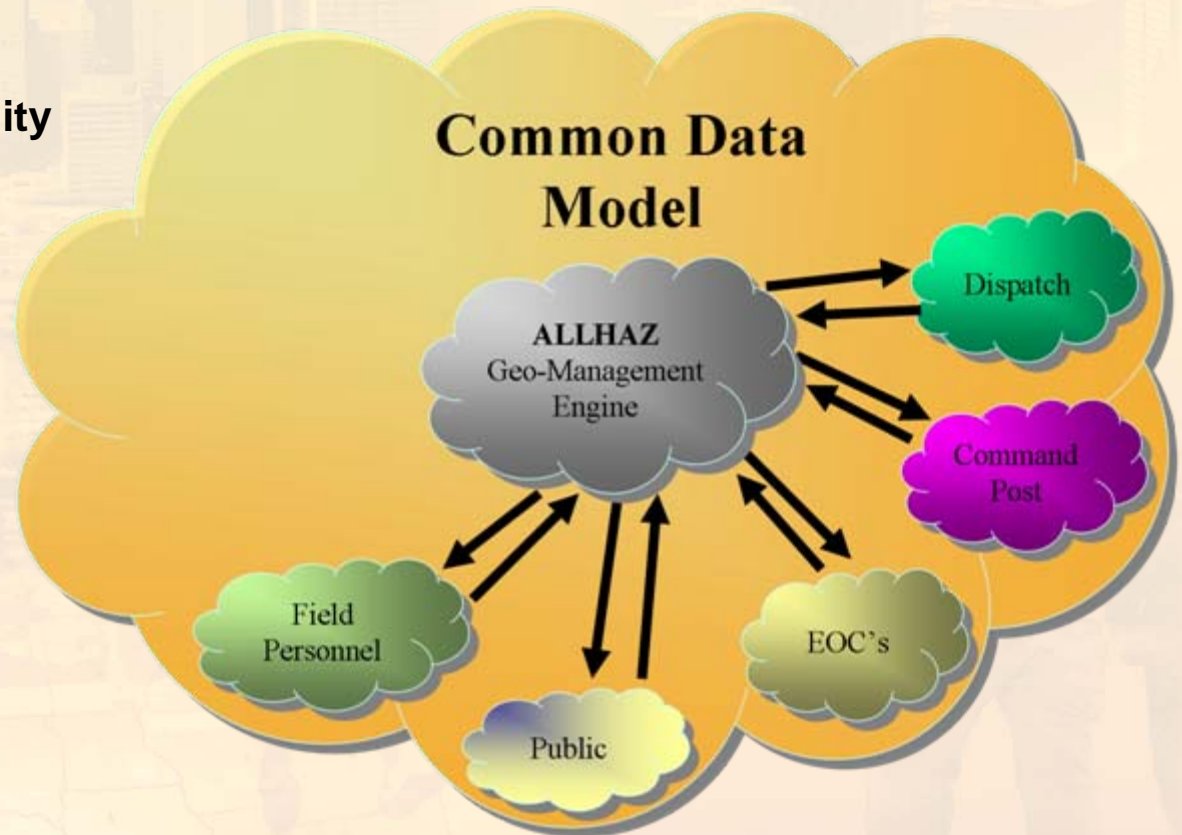
Pulling it all together

- **All Hazards can play in the same application**
- **Information flows between all user communities**
- **Fosters coordination and collaboration**
  - **Real time information**
  - **Multi-agency**
  - **Multi-incident**
- **Sharing**
  - **Data**
  - **Models**
  - **Responsibility**
  - **Resources**
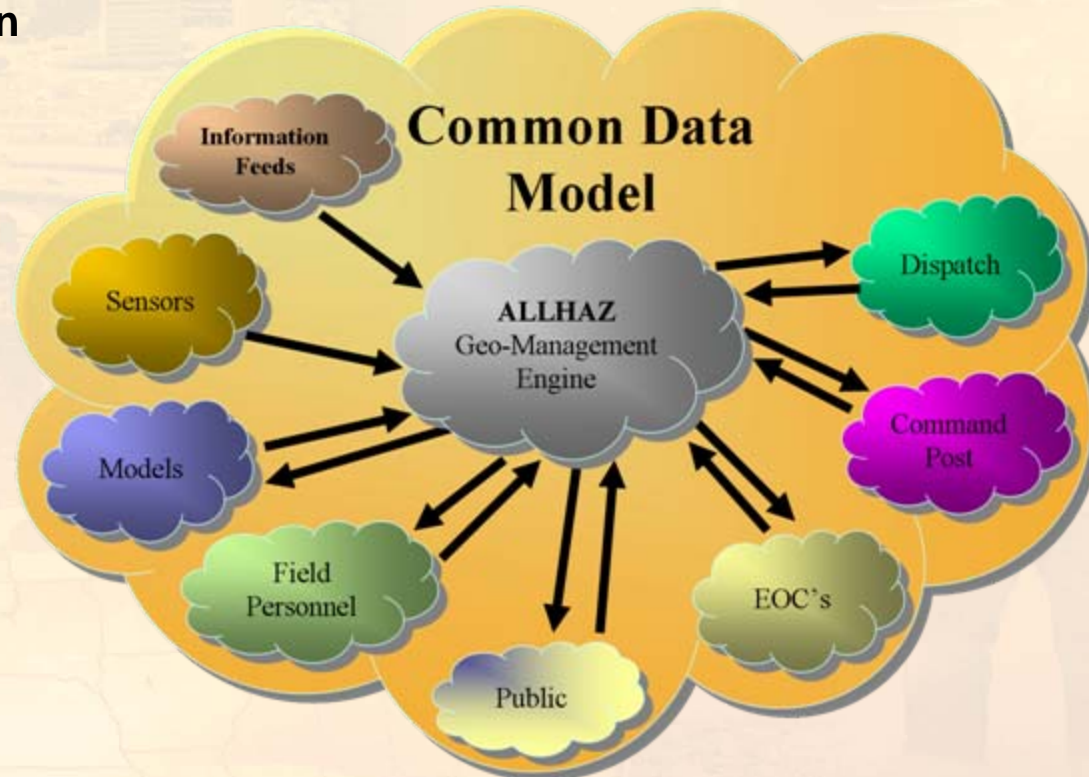
ALLHAZ Architecture
Overall

Browser clients

Mobile clients

Desktop clients

Clients can access any server any client

Data Sync

Data Sync

Mobile Command Center

Data / tasks available to all clients

Data / tasks available to all clients

Replicate

State Servers

Regional Servers

Data / tasks available to all clients

Data / tasks available to all clients

Federal Servers

ALLHAZ
HAZMAT Scenario

Spill location
captured of plume
are generated

Spill geographic
report – plume
generated

Road Blocks Set

Spill location entered

Xplore Tablet with wireless Service in Field

Spill location distributed

Plume distributed to all clients

Laptop with wireless service in EOC

Command Center, Triage, Decon Set

Command Center, Triage, Decon Distributed

Road Blocks Distributed

Servers in California

Mobile Phone with Verizon Service in Field

Road Blocks Set

Mobile Phone with Cingular Service in Field

ALLHAZ Architecture

Client Applications

Mobile

Browser

2-D &* 3-D Desktop Viewers

Desktop GIS

Mobile devices work in connected or disconnected mode

Data pulled and pushed to and from all clients

Data / Services below available to all clients above

Geo-processing Services

Open Web Services

Tracking Services

GIS Data

Data Streams

Plumes
Flood Areas
Line of Sight
Routes
Demographics
Reports

Web Services Platform

GeoPortal

Catalog Services

Catalog

- **Channels**
- **Link Browser Map**
  - **Download:**
    - **ArcGIS Explorer**
    - **Toolbar for ArcMap**
    - **…**
  - **Collaboration**
    - **State Clearing Houses**
    - **CI and Data Fusion Data warehouses**

Enterprise GeoPortal

GEORSS

External Feeds

2-D Base Map (Cache)

3-D Base Map (Cache)

Data Warehouse

ArcGIS Mobile Mapping and Field Data Forms – OFFLINE Mode

Provides Current Location — GPS

Handheld Device (with GPS)

Base Map Display — Background Map Map Cache

ALLHAZ Field Data — ALLHAZ Incident Data Cache

Field Data Collection — Build Collection Forms — Field Data Menu & Question Definitions

Store Field Data — ALLHAZ map & Form data In USB memory/ Secure Disk media

Background Map Map Cache (on SD Card)

ALLHAZ Authoring Application

ArcMap & ArcCatalog

Mapcache Extractor — Build Mobile Cache

Mobile Form Builder — Build Form Questions And Lookups

Author Services — Map files Geodatabase models Geoprocessing models

Map files Geodatabase models Geoprocessing models

Publish Services and Models

ArcGIS Mobile Mapping and Field Data Forms – ONLINE Mode

Handheld Device (with GPS)

Refresh Form Data — ALLHAZ Form Data

Refresh Map — ALLHAZ Geodatabase

Automatic Data Synchronization

ArcGIS Server and ALLHAZ Geodatabase

| Map Service |
| Mobile Service |
| Editing Service |
| Geocoding Service |
| Routing Service |

ArcGIS Server

Geodatabase & Geoprocessing Models

SQL Server 2005

Web Browser-Based Mapping & Integrated Workflow Application

Web Browser

Input Forms And Reports

Show Map — Web Server

Formbuilder

Servers

- **Perform hazard specific analysis, data management, data access**

- **Replicate data between servers**

- **Data streamed via webservice (or cached locally on mobile client)**

Mobile clients

- **Support for Windows Mobile 5, CE 2.0, Mobile for Pocket PC 2003, 2003 CE and XP operating systems (smart phones, tablets, laptops)**
- **"Sometimes Connected" environment**
  - **map data stored locally**
  - **continous data collection and use**
  - **Bi-directional data flow when connected or synced**
- **Initiate geoprocessing tasks from field and receive results**

Desktop Clients

- **Viewers including browser based and free 2D and 3D desktop applications.**

- **Viewers customized with hazard-specific tasks and functions.**

- **Existing COTS professional GIS applications access data via webservice**

A Vision for the future

- **The Public is our greatest and least utilized asset**

- **Follow the technology. Where is it going?**

- **All disasters are local. Lead from the bottom not the top. (Local vs. Federal guidance and direction setting)**