



Using the HUB to Study Disaster Events

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Problem Statement

- A comprehensive archival repository of disaster and failure data does not currently exist. Data that are gathered during and after an event may be lost or inaccessible relatively soon after.
- A repository is needed to preserve data to enable the study and analysis of the current event as well as future disaster events.



Repository Purpose

- The repository will serve as a national archival database where NIST and other organizations can store the results of the study and analysis of disaster and failure events.
- The results of these studies and analyses will lead to recommended improvements to codes, standards, practices and/or new knowledge.
- By making these data available, NIST hopes to enable the efficient dissemination of data on disaster and failure events.



NIST Repository Workplan

- Phase 1 – World Trade Center database
 - High level of interest in data collected
 - Goal of releasing before 10-year anniversary
- Phase 2 – Chile earthquake and Joplin Tornado pilots
- Phase 3 – Full scale implementation



Phase 1 – World Trade Center

- Data previously released from NIST's 7-year investigation on the collapses of three buildings at New York City's World Trade Center
- Over 94,000 photos and videos
- Computer simulations
- Complete set of technical reports
- Repository created and managed by NIST
- Website publically released in August 2011



Phase 2 – Chile Earthquake Pilot

- Develop event-specific, web-based repository
- Data-rich event that will also support the National Earthquake Hazards Reduction Program (NEHRP)
- Opportunity to leverage with the Network for Earthquake Engineering Simulation (NEES)
- NIST retained a contractor to assist with obtaining data previously collected by others (American Society of Civil Engineers - ASCE, Earthquake Engineering Research Institute - EERI, and Los Angeles Tall Buildings Council)
- Release late 2013 on NIST's website (NIST HUB)



Phase 2 - Joplin Tornado Pilot

- Supports NIST's Technical Investigation of event
- In development, to be released late 2013 on NIST HUB
- Diverse data set
 - Structural drawings
 - Modeled tornado wind field
 - Geolocated data on Open Street Maps



Phase 2 - Joplin Tornado Pilot

The Joplin Data Repository [edit](#)

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Abstract

Following the May 22, 2011 tornado that struck Joplin, Missouri, the single deadliest tornado since official records began in 1950, the National Institute of Standards and Technology (NIST) launched an investigation to study the impacts of the disaster and make recommendations based on the findings of the investigation, as warranted, for improvements to codes, standards and practices related to the design and construction of buildings and to emergency communications .

This database has been created to supplement the NIST report of their investigation and findings, found [here](#). It is hoped that the public and researchers will use this data to help minimize the damage and loss of life in future tornadoes. It includes photographs, videos, maps, reports, drawings, and other documents related to meteorological conditions, warnings, and performance of buildings and other structures affected by the tornado.

What's in the database?

Many different types of data were collected throughout the investigation carried out by NIST and are stored in this database:



Photos



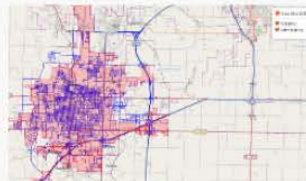
Drawings



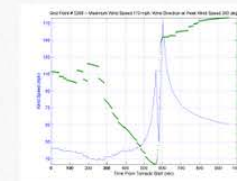
Documents



Audio-Video



Geographic Data



Wind Speed Study



Phase 2 - Joplin Tornado Pilot

The Joplin Photo Repository

The photograph collection consists primarily of images of damage to buildings and their surroundings in Joplin, with a few photographs from the adjacent city of Duquesne, MO. Many of the photographs were taken by NIST, but some were obtained from other organizations and photographers. The repository also includes a few hundred pictures of street sign failures obtained from the City of Joplin Public Works Department, and several dozen pictures of other subjects.

There are three main collections of photographs. Each photograph is tagged according to its content, location and photographer.



[Building Damage and Surroundings](#)

More than 2,500 photographs were taken post-disaster. The photographs document the damage sustained by commercial, residential and institutional buildings and other structures (e.g., power substation) and their surroundings.



[Street Sign Damage \(City of Joplin\)](#)

Nearly 300 photographs of street signs are included in the Repository, along with a [street sign spreadsheet](#) documenting the sign types, locations, and damage.




[Miscellaneous](#)

There are about two dozen photographs in this collection, including interviews with residents, signs with messages of hope, and beginnings of rebuilding.

[View Entire Photo Repository](#)



Phase 2 - Joplin Tornado Pilot

 **File Repository Manager** Toggle Header

Select File Type: [Photos](#) / [Joplin H.S.](#) / [NIST](#) [[New Directory](#)] [[Data view for this dir.](#)]









Photos

Locations: [\[Update\]](#) [\[View\]](#) Keywords: [\[Update\]](#) [\[View\]](#)

Sources: [\[Update\]](#) [\[View\]](#) Credit: [\[Update\]](#) [\[View\]](#) Collector: [\[Update\]](#) [\[View\]](#)


Repository Reports Derivative Works Briefings

Scroll on

	DSCN1743.jpg	2.79 MB	2013-02-16 19:04:35 (Nathan Daniel Boltz)	<input type="button" value="Delete"/>
	DSCN1744.jpg	2.83 MB	2013-02-16 19:04:23 (Nathan Daniel Boltz)	<input type="button" value="Delete"/>
	DSCN1745.jpg	2.50 MB	2013-02-16 19:04:36 (Nathan Daniel Boltz)	<input type="button" value="Delete"/>
	DSCN1746.jpg	2.86 MB	2013-02-16 19:04:26 (Nathan Daniel Boltz)	<input type="button" value="Delete"/>
	DSCN1747.jpg	2.68 MB	2013-02-16 19:04:24 (Nathan Daniel Boltz)	<input type="button" value="Delete"/>
	DSCN1748.jpg	2.54 MB	2013-02-16 19:04:02 (Nathan Daniel Boltz)	<input type="button" value="Delete"/>
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	DSCN1750.jpg	2.74 MB	2013-02-16 19:03:48 (Nathan Daniel Boltz)	<input type="button" value="Delete"/>



Phase 2 - Joplin Tornado Pilot

 **File Repository Manager** Toggle Header

Select File Type: Photos / Joplin H.S. / NIST [New Directory] [Data view for this dir.]

Photos

[+ Add files](#) [Start upload](#) [Cancel upload](#) [Delete](#)





Locations: [\[Update\]](#) [\[View\]](#)

Sources: [\[Update\]](#) [\[View\]](#)

Credit: [\[Update\]](#) [\[View\]](#)

Keywords: [\[Update\]](#) [\[View\]](#)

- Aerial
- Debris**
- Elevation
- Exterior
- Facade
- Interior
- Roof
- Surroundings
- Tree
- Vehicle

	DSCN1743.jpg	2.79 MB	2013-02-16	
	DSCN1744.jpg	2.83 MB	2013-02-16	
	DSCN1745.jpg	2.50 MB	2013-02-16 19:04:36	[Nathan Daniel Boltz] Delete
	DSCN1746.jpg	2.86 MB	2013-02-16 19:04:26	[Nathan Daniel Boltz] Delete



Phase 2 - Joplin Tornado Pilot



Update Location data

Toggle Header

Location list:

St Johns Regional Medical C

Location Center Point:

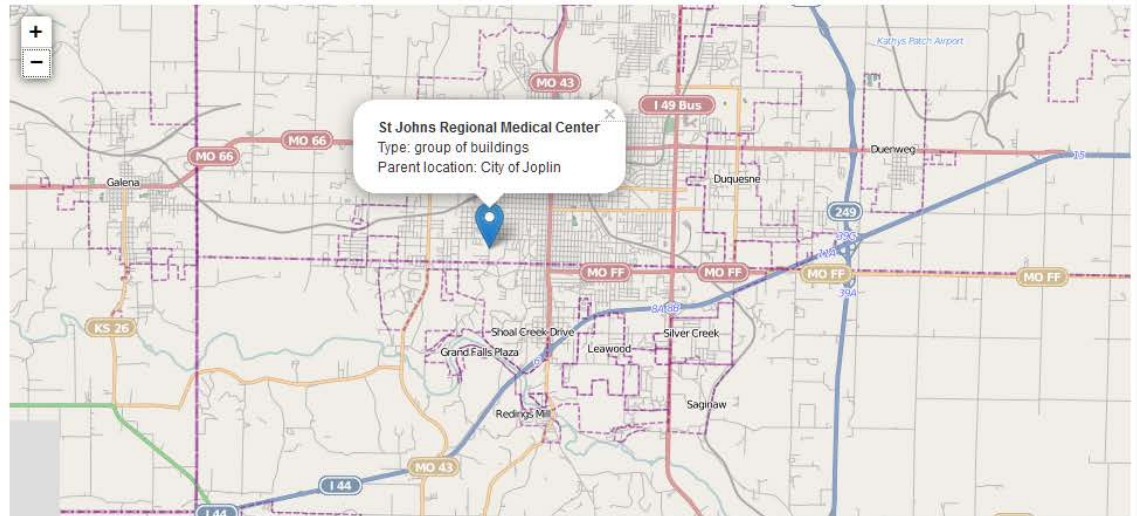
37.0600013,-94.5321295

Location Area:

Invert Lat/Lng for area

Show on Map

Save Location Changes



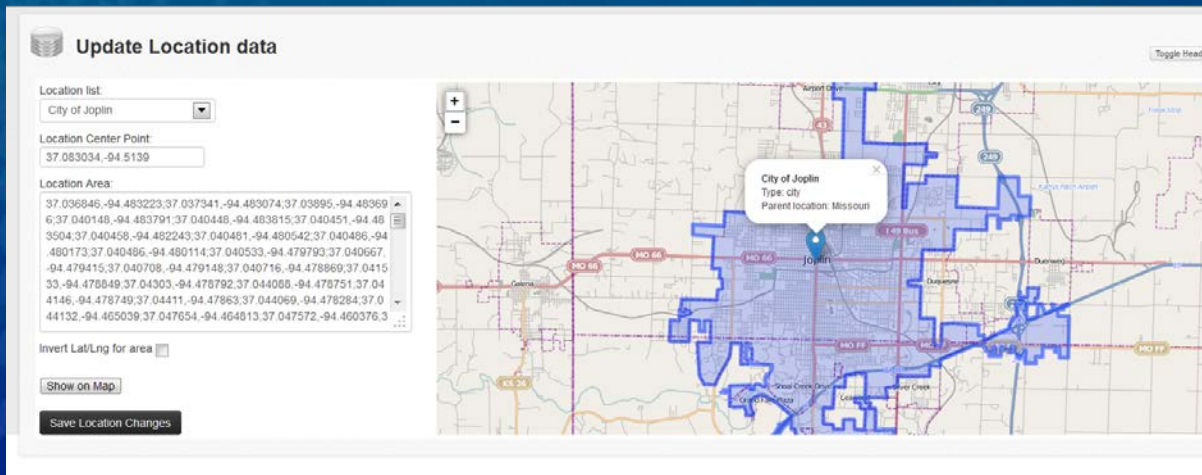
Phase 3 – Design Challenges

- Criteria for activating repository (which hazard events)
- Finalizing which types of data to be included
- Set minimum requirements for data to be accepted by NIST for the repository (quality, data formats, legal/copyright/use)
- Standardizing / optimizing data collection for each hazard type (earthquake, etc)
- Creating standard taxonomy / ontology for each hazard type



Phase 3 – Design Challenges

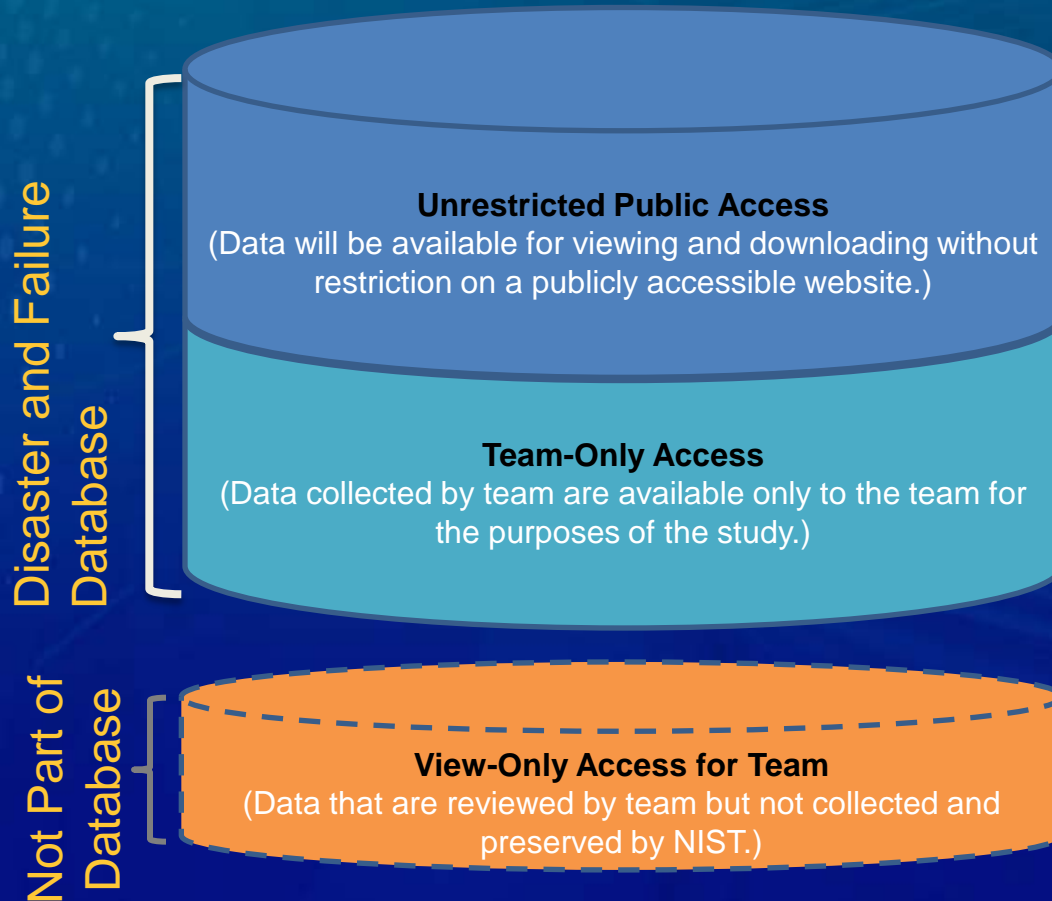
- Geospatial enhancement of repository



- Obtaining permissions from data source owners
- Dealing with sensitive data collected that should not be released
- Continued compliance with Federal Security Management Act of 2002 (FISMA)



Levels of Access – HUB Design at NIST



Phase 3 – Full-Scale Implementation

- Finalize user requirements / create “proof of concept” document
- Select operating platform
- Develop cost estimate to maintain, update, operate and improve accessibility of the repository
- Populate with selected high-impact historical and future events
- Disseminate information to stakeholder / user community
- Maintain ongoing communication with stakeholder / user community



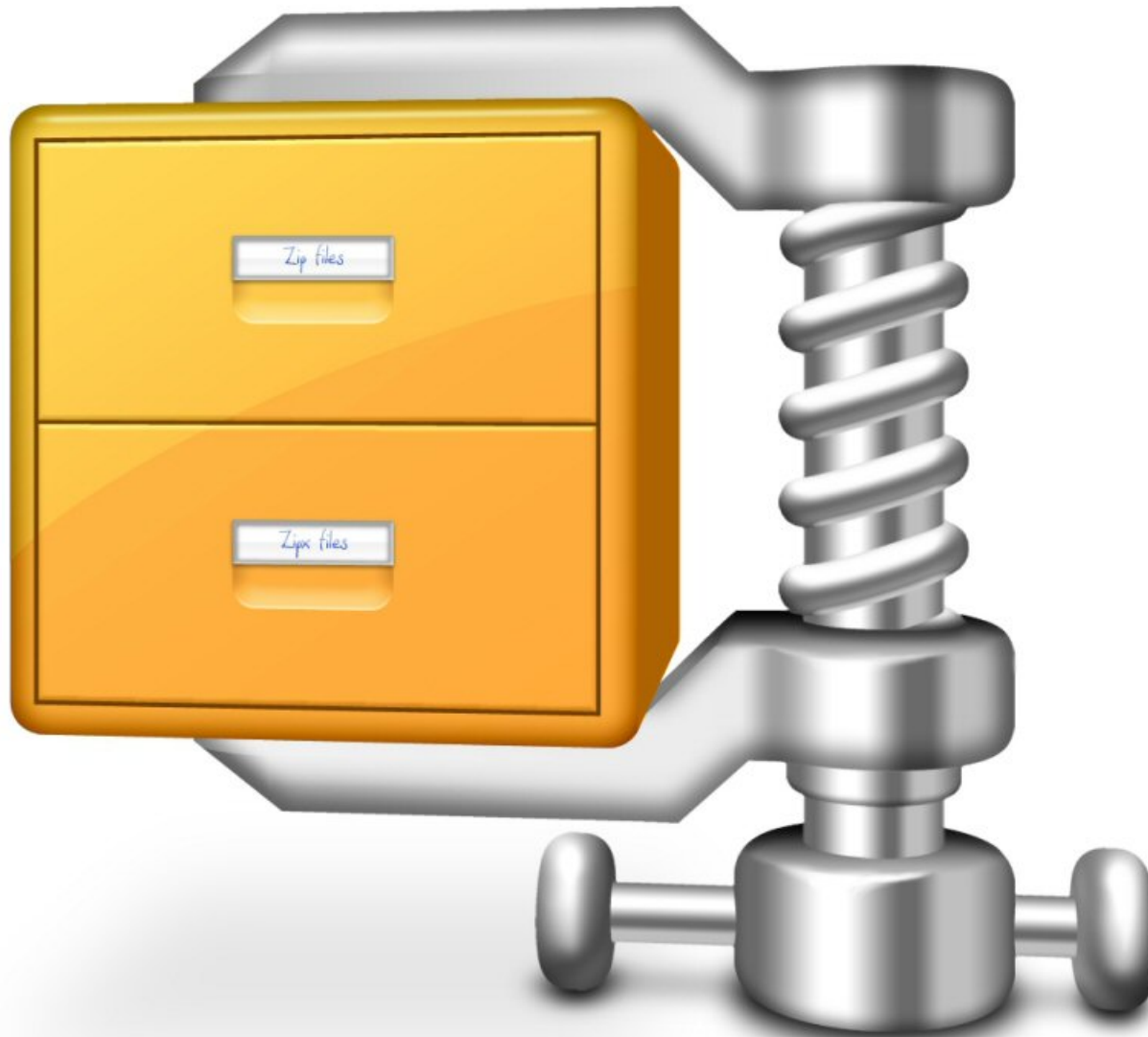
The Challenge

- Drawings
- Sensor Records
- Reports
- Photos
- Videos
- Audio Files
- Coordinates
- Test Results





The Solution is to make a Huge Zip



When

file...

