March 26-27, 2015
NCST Advisory
Committee Meeting

Presentation on Repository Development Update:

Joplin/Moore tornados and Chile Earthquake data repositories

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Outline

- Purpose of Disaster Data Repository
- Development History
- Activities since the December 2013 AC Meeting
- Demo of Chile and Joplin Repositories
- Thoughts Going Forward

Purpose of Disaster Data Repository

- **New tool** for archival, research, and analysis of disaster data and information related to performance of the built environment, emergency response procedure, and other technical, social, and economic factors
- **National archival database** for significant hazard events that enables future study, analysis, and comparison with subsequent disaster events.

Development History

- **Task 1: WTC investigation**
- **Task 2:**
  - **Use HUBzero® Platform** – an open source software package used to create web sites called “Hubs” that are used for research, education, and online collaboration
    - Currently there are 60+ Hubs in different scientific areas (nanotechnology, molecular diagnostics, manufacturing, pharmaceuticals, cancer research, environmental modeling, cybersecurity, earthquake engineering (NEES))
  - **Create database technologies for building disaster data repositories – Build Pilot Hubs**
    - Chile Earthquake
    - Joplin Tornado
    - Add Newcastle-Moore Tornado

Development History *(cont'd)*

- **Task 2** ***(Cont'd)***
  - **Two Hubs for each event**: Internal and External
    - Internal Hub:
      - For NIST Investigators only, used by NIST to create, update, analyze, compare disaster data repositories
      - "Tagging Tool" for uploading and annotating repository files
      - Restricted and unrestricted data
      - Process for transferring unrestricted data to Public Hub
    - External (Public) Hub:
      - Unrestricted data for public view, search, and exploration.
      - Linked from NIST Disaster and Failure Studies web page

Development History *(cont'd)*

- **Task 2 *(cont'd)***
  - **Pilot Hubs**:
    - **2010 Chile EQ:**
      - Data types: Photographs, Building Plans, Ground Motion Records
      - Installed on Internal Hub (11/2012). Working to replace map data source and transfer unrestricted data to External Hub.
    - **2011 Joplin Tornado:**
      - More data types: Photographs and Videos (geo-located), Audio files, Building Plans, Maps (static and GIS data), Reports, Other documents, Results of NIST analysis.
      - Installed on Internal Hub (9/2014). Working to finalize, improve tool and software, and transfer unrestricted data to External Hub.
    - **2013 Moore Tornado:** Being developed

Activities since 2013 NCST AC meeting

- **Continued Task 2 work to complete Chile Earthquake, Joplin Tornado, and add Moore Tornado**
  - **Geospatial Enhancements (12/2013):**
    - Replaced Google Maps with Open Street Maps as the map data source
    - Enhanced geospatial data view and data exploration capabilities to handle more data types in Joplin vs. Chile
    - Redesigned 'home page' using EL template. Completed and currently available on Internal Hub
  - **Process Improvement (9/2014):**
    - Finalize the Joplin Tornado and Chile Earthquake Repositories
    - Process flow improvements to overall repository system
    - Create Newcastle-Moore Tornado repository
    - Finalize the repository system and Newcastle-Moore Dataset

Activities since 2013 NCST AC meeting *(cont'd)*

- **Continued Task 2 work *(cont'd)***
  - **Process Improvements *(Cont'd)***
    - **Finalize the Joplin Tornado and Chile Earthquake Repositories (late Spring, 2015)**
      - Tag/input remaining sets of Joplin data
      - Store all restricted and unrestricted data on Internal Hub
      - Develop automated process for bringing unrestricted data from Internal Hub to Public Hub

Activities since 2013 NCST AC meeting *(cont'd)*

- **Continued Task 2 work *(cont'd)***
  - **Process Improvements** *(Cont'd)*
    - **Process improvements to overall repository system (Summer 2015):**
      - **Tagging Tool:** Improve robustness for use by NIST researchers
      - **Database:**
        - Enhance overall database structure
        - Implement schema for adding new tornado event (same types of data as the Joplin data repository)
      - **Overall Repository System:**
        - Generalize methodology for bringing unrestricted data from Internal to External Hub

Activities since 2013 NCST AC meeting *(cont'd)*

- **Continued Task 2 work *(cont'd)***
  - **Process Improvements** *(Cont'd)*
    - **Create Moore Tornado repository (Fall 2015)**
      - End–to-end test of entire Hub system
      - NIST will create and manage a Moore Tornado repository on its own without contractor help.
    - **Finalize repository system and transfer unrestricted data to External Hub (January 2016)**
      - Repository will be unified for Chile, Joplin and future databases
      - Complete flexibility for users storing files during tagging
      - Easy expansion for Hub storage management

Activities since 2013 NCST AC meeting *(cont'd)*

- **Prepared IT infrastructure (November 2014)**
  - **Installed software and hardware for External Hub**
  - **Transformed External Hub into "read only" environment**
    - Disclaimer plugin
    - Disable is handled by script and documented instructions
    - "Help" is handled as an email to NIST
- **IT Support**
  - **New Hire (August 2014): Database architecture background** (T. Chen, supporting both D&FS and Resilience)
  - **Existing ELSA staff:** supporting repository development (S. Barber)

Demo of Chile and Joplin Repositories

- Demo:

  “Public-Prep” Hub:

Thoughts Going Forward

- **Process to date:** Reactive, Event-based. Serves immediate need to organize and store data and to release data to public (FOIA)
- **Long-term strategy: Take into consideration**
  - **Issues discussed in 2013 NCST AC meeting**
    - Repository Management – Data validation (non-NIST studies), Scalability (data volume), Access control
    - Balance between accessibility and NIST-centric – Federated environment (Meta-database management system)
  - **Discussion with newly established Community Resilience Center of Excellent (CoE)**
    - Consider resilience-related data (recovery time)
    - Common needs for standardized data ontology, data architecture, and data management tools

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Questions/Discussion

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