NCST Investigation of the Champlain Towers South Partial Collapse

Investigation Introduction & Progress

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NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
U.S. DEPARTMENT OF COMMERCE

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Background: National Construction Safety Team (NCST) Act

National Construction Safety Team (NCST)

- The NCST Act was passed in October 2002
- Evaluate hazard/failures events against deployment criteria
- Conduct NCST investigations and studies under various authorities
- Manage onboarding of NCST Advisory Committee (NCST AC) members and NCSTAC meetings
- The NCST AC prepares annual reports to Congress by Jan 1
- NIST prepares annual reports to Congress by Feb 15
- NIST coordinates statutory activities across federal programs related to disasters and failures

NIST Activities Under the NCST Authority

- Conduct technical investigations of building failures that resulted in loss of life or the potential for loss of life, using engineering and scientific tools
- Conduct technical investigations of the emergency response and evacuation activities and communications, using engineering and scientific tools
- Based on the results of investigations, make recommendations for changes to building codes, standards, practices to improve safety
- After the completion of investigations, draft and vote on proposals for changes to building codes, standards, practices

What NIST Cannot Do Under its Authorities

- NIST cannot make/require changes to building codes, standards, or practices
- NIST cannot inspect for or certify safety of existing/new buildings or sites
- NIST cannot approve plans for renovations to existing buildings or sites
- NIST cannot pass laws (e.g., regarding building design, inspection, approval)
- NIST cannot conduct criminal investigations or find fault associated with building failures, or prosecute, or punish any parties

CTS Investigation: Years 1-3 Activities

- Collected Physical Evidence
- Non-Destructive Testing
- Subsurface Investigation
- Created Investigation Plan
- Established Team Leaders
- Enumerated Failure Hypotheses
- Created Collapse Timeline
- Received Congressional Funds
- Conducted Initial Interviews

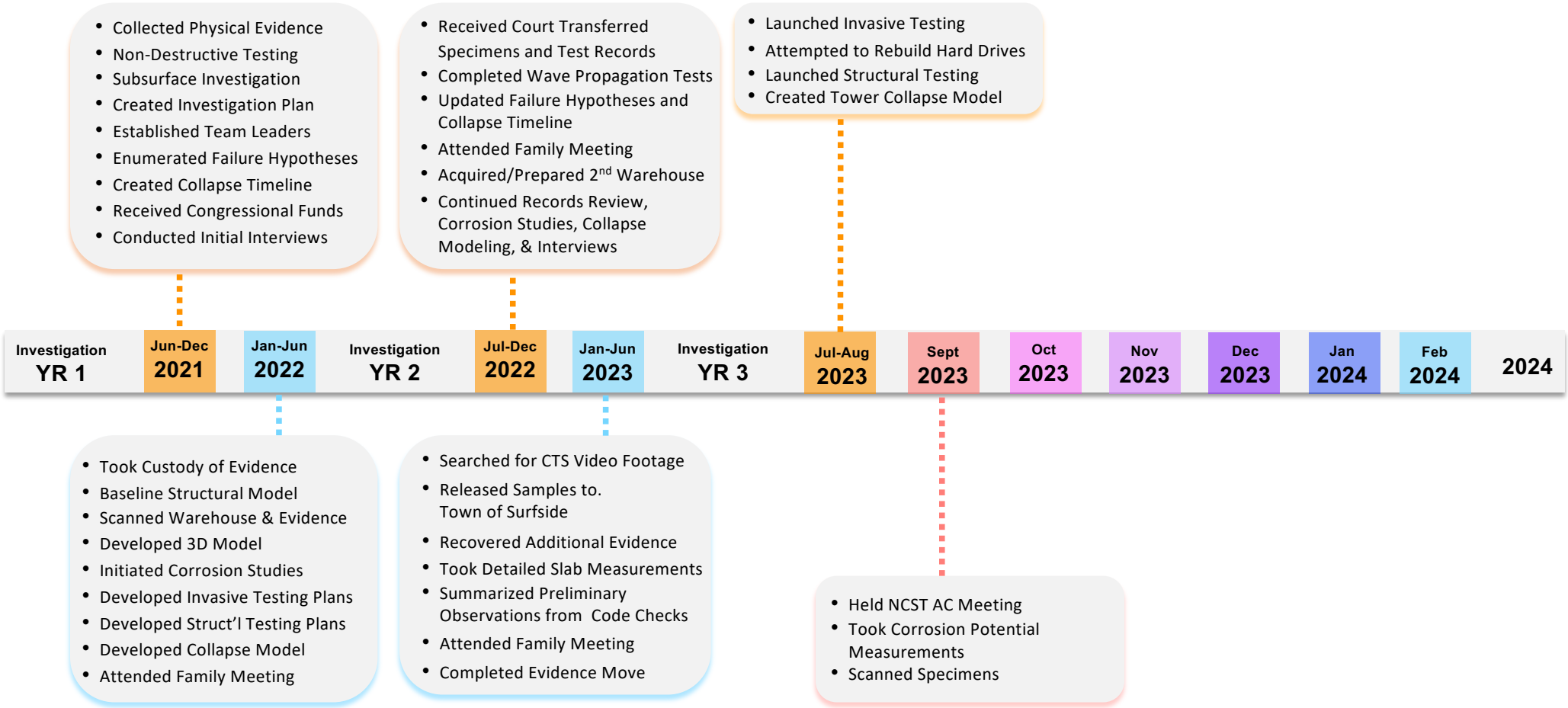
- Received Court Transferred Specimens and Test Records
- Completed Wave Propagation Tests
- Updated Failure Hypotheses and Collapse Timeline
- Attended Family Meeting
- Acquired/Prepared 2nd Warehouse
- Continued Records Review, Corrosion Studies, Collapse Modeling, & Interviews

- Launched Invasive Testing
- Attempted to Rebuild Hard Drives
- Launched Structural Testing
- Created Tower Collapse Model

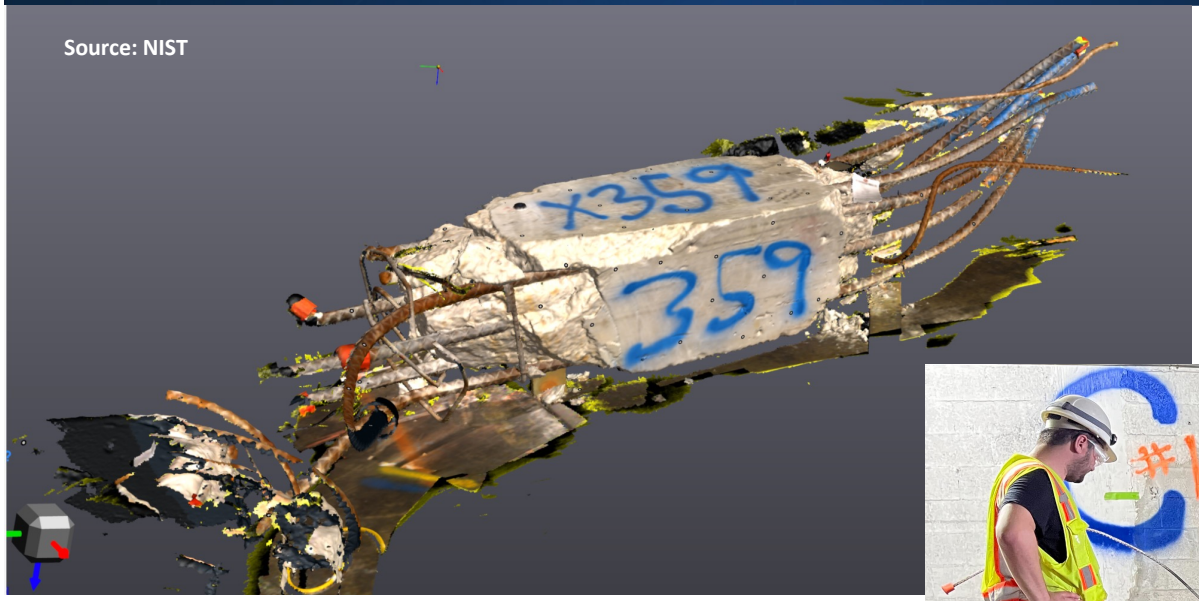
- Took Custody of Evidence
- Baseline Structural Model
- Scanned Warehouse & Evidence
- Developed 3D Model
- Initiated Corrosion Studies
- Developed Invasive Testing Plans
- Developed Struct'l Testing Plans
- Developed Collapse Model
- Attended Family Meeting

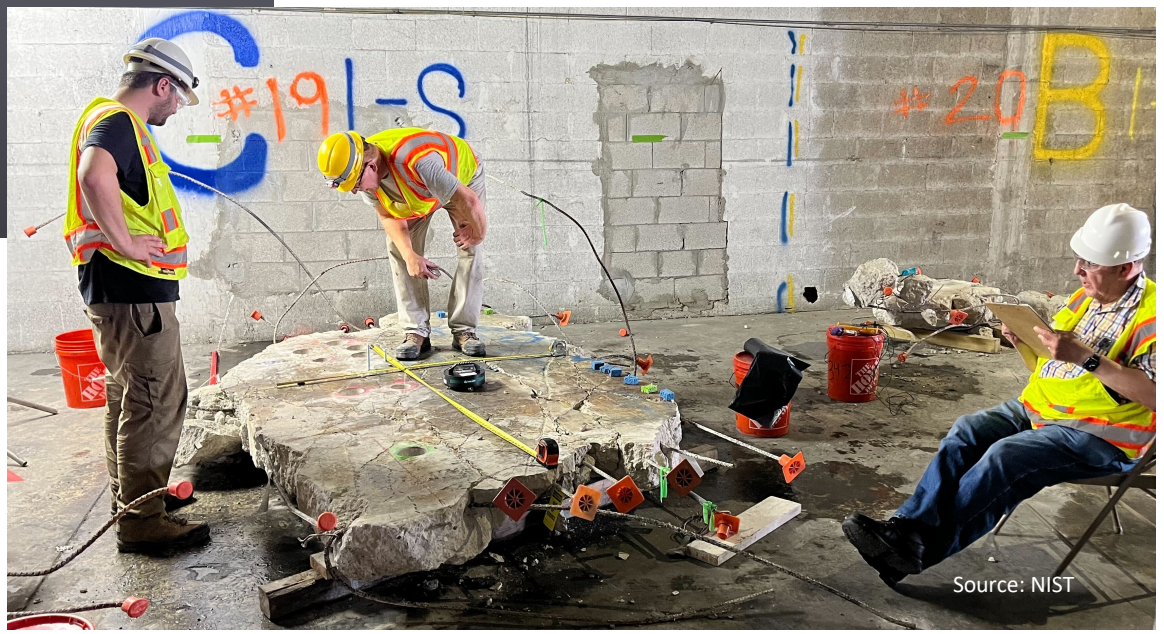
- Searched for CTS Video Footage
- Released Samples to Town of Surfside
- Recovered Additional Evidence
- Took Detailed Slab Measurements
- Summarized Preliminary Observations from Code Checks
- Attended Family Meeting
- Completed Evidence Move

CTS Investigation: Years 1-3 Activities

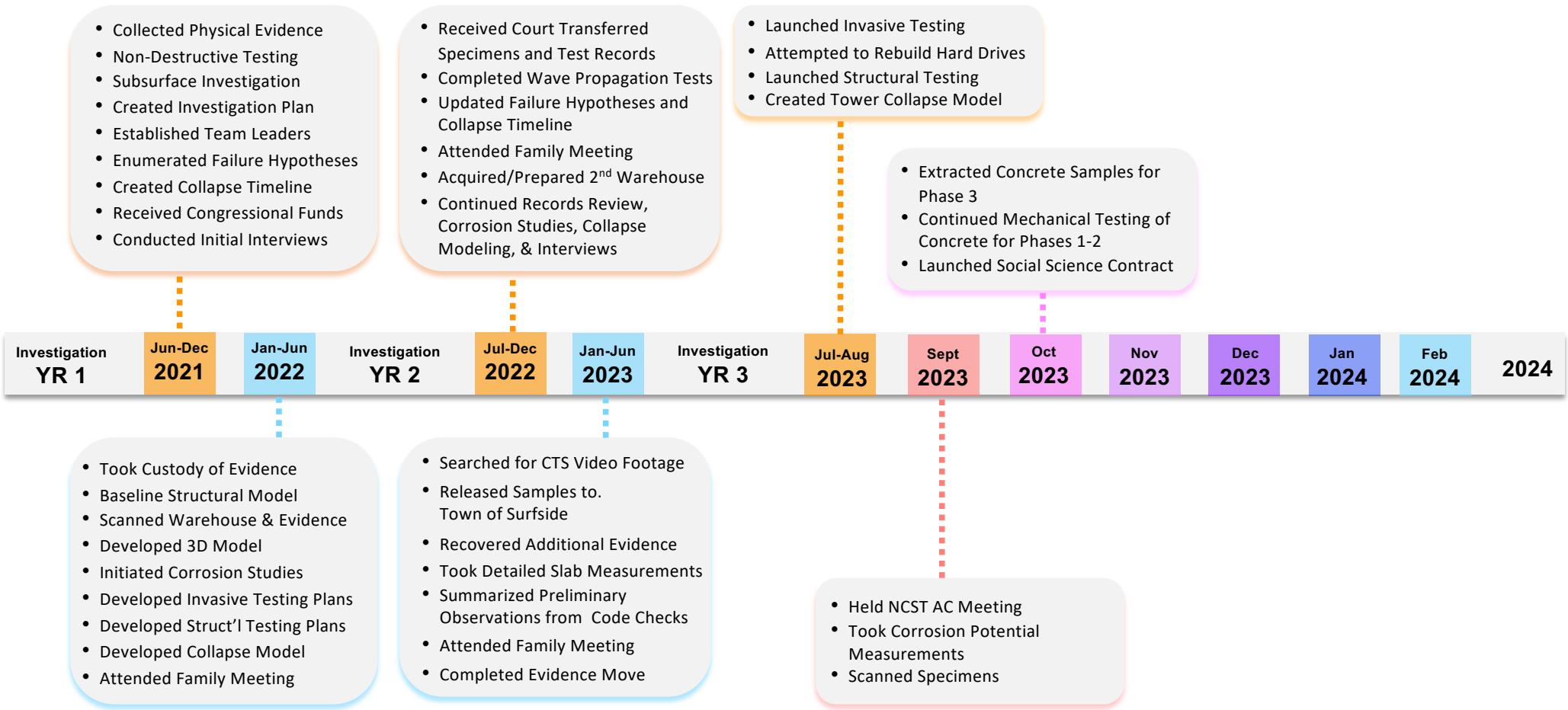


CTS Investigation: September 2023 Activities





CTS Investigation: Years 1-3 Activities



CTS Investigation: October 2023 Activities

Source: NIST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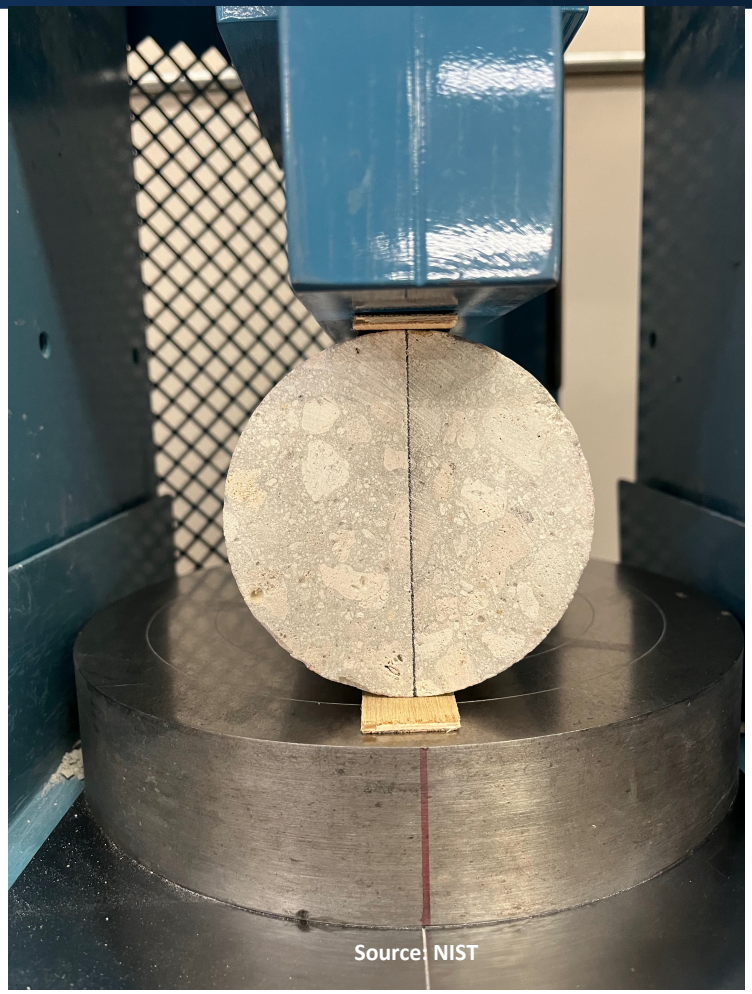
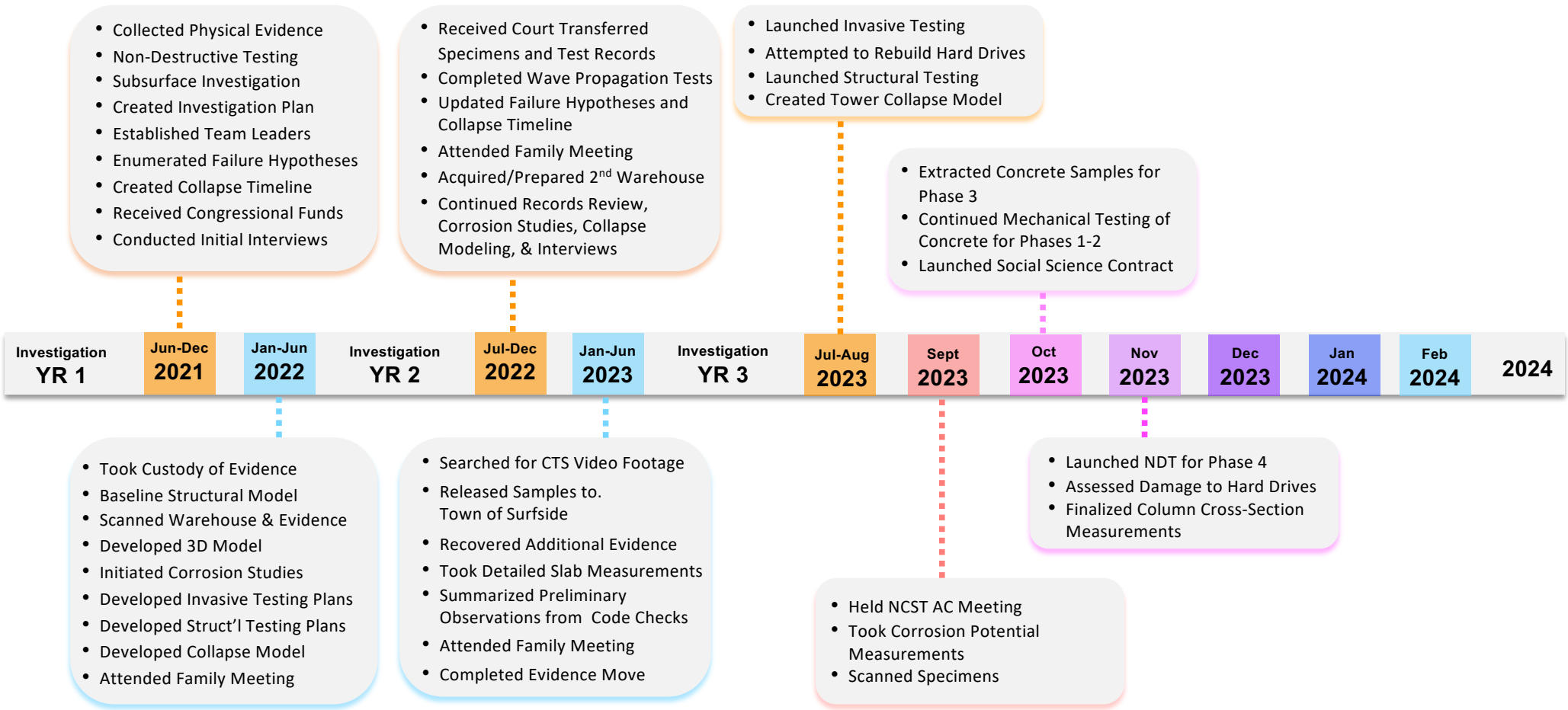

Source: NIST

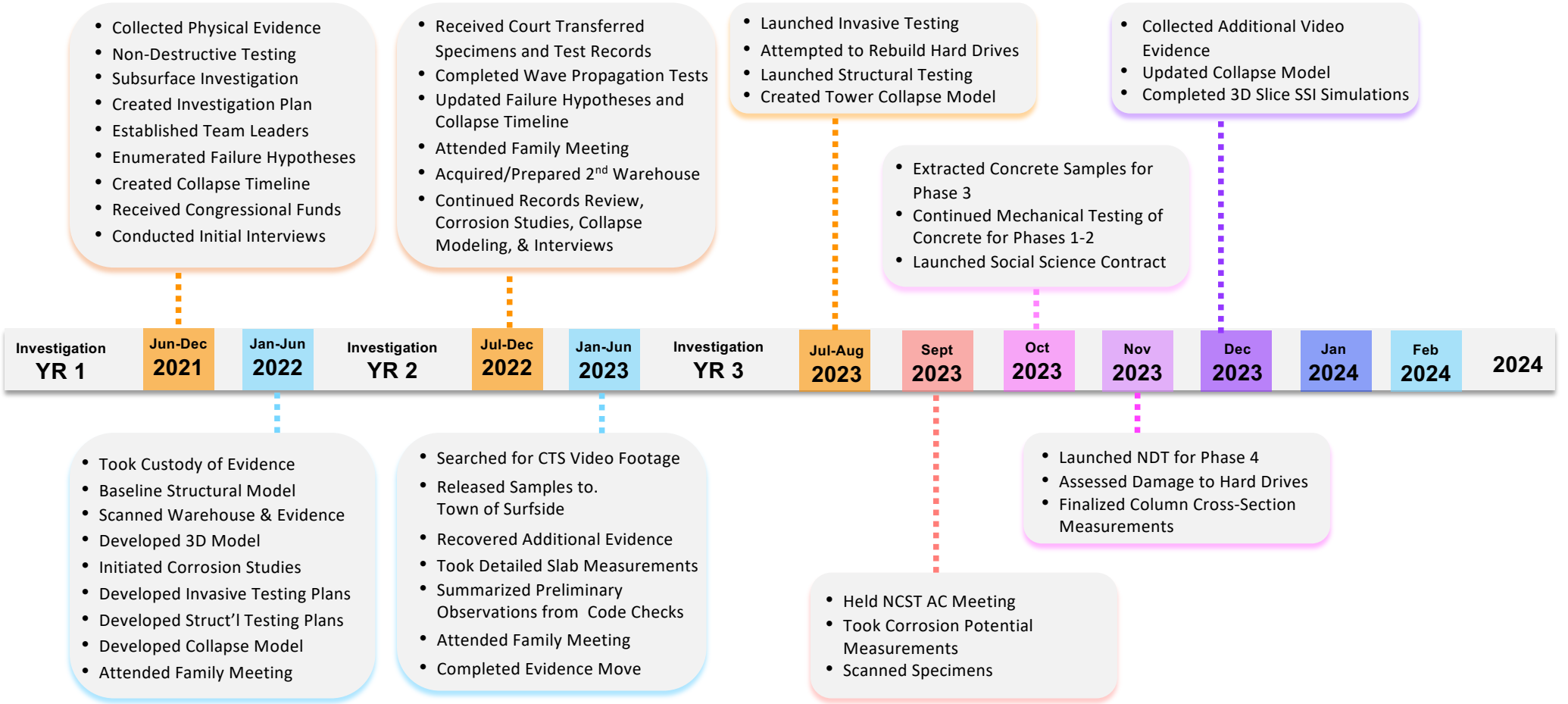
CTS Investigation: Years 1-3 Activities



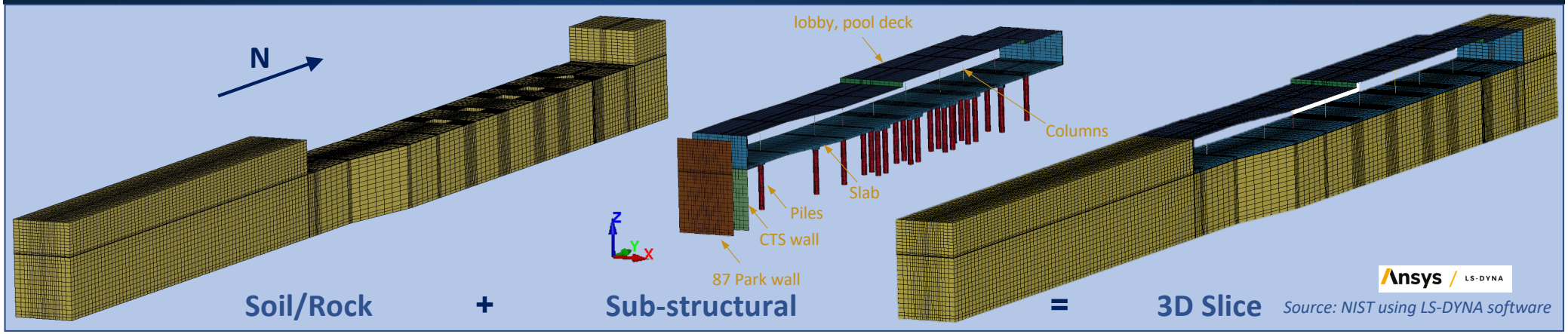
CTS Investigation: November 2023 Activities

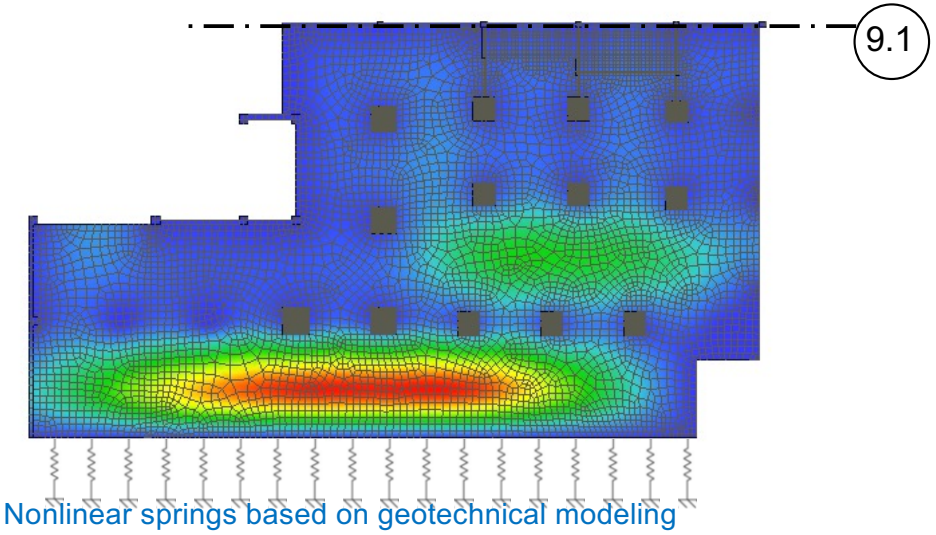
CTS Investigation: November 2023 Activities

CTS Investigation: Years 1-3 Activities



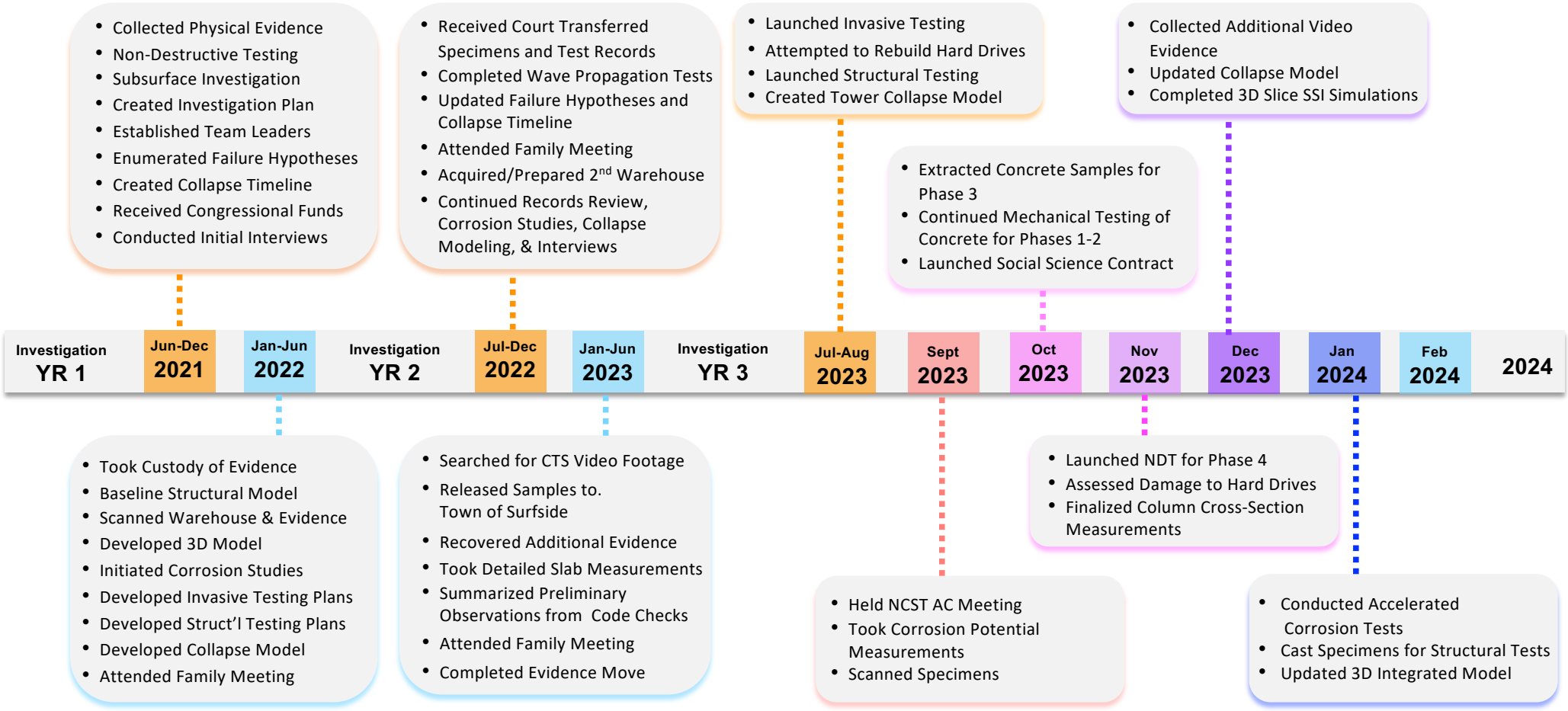
CTS Investigation: December 2023 Activities





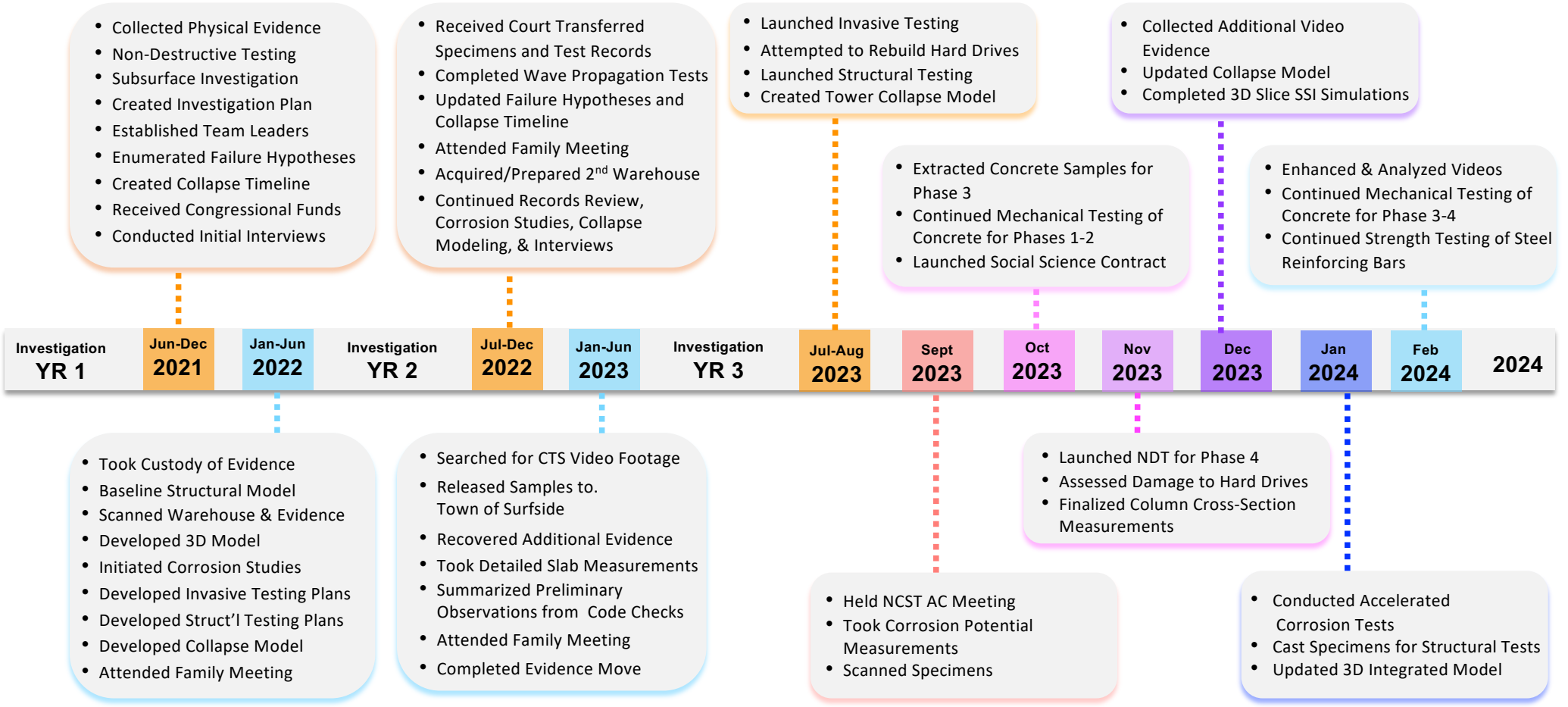
PRELIMINARY ANALYSIS RESULTS

CTS Investigation: Years 1-3 Activities

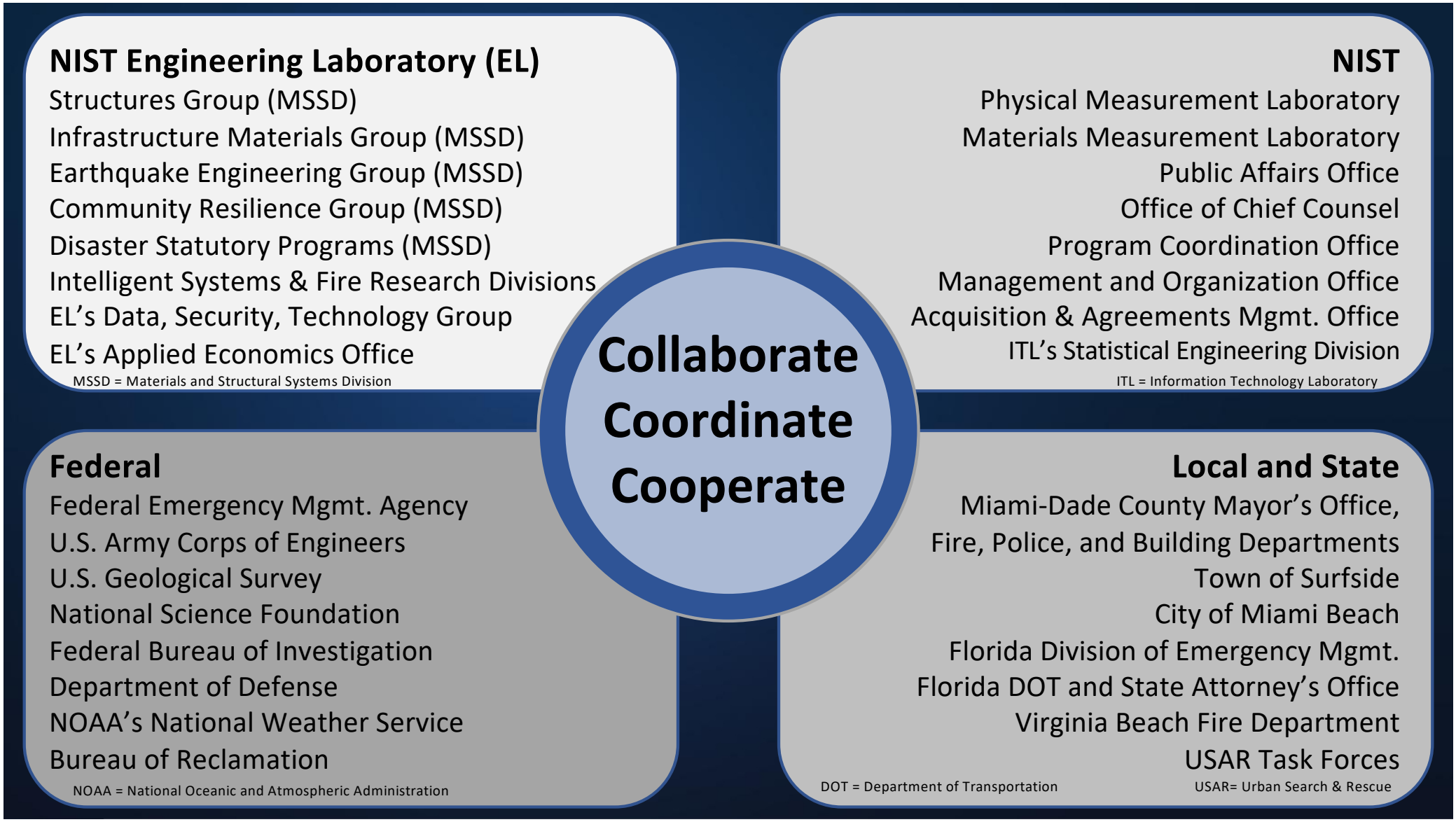


CTS Investigation: January 2024 Activities

CTS Investigation: Years 1-3 Activities



CTS Investigation: February 2024 Activities


NIST Engineering Laboratory (EL)
Structures Group (MSSD)
Infrastructure Materials Group (MSSD)
Earthquake Engineering Group (MSSD)
Community Resilience Group (MSSD)
Disaster Statutory Programs (MSSD)
Intelligent Systems & Fire Research Divisions
EL's Data, Security, Technology Group
EL's Applied Economics Office
MSSD = Materials and Structural Systems Division
NIST
Physical Measurement Laboratory
Materials Measurement Laboratory
Public Affairs Office
Office of Chief Counsel
Program Coordination Office
Management and Organization Office
Acquisition & Agreements Mgmt. Office
ITL's Statistical Engineering Division
ITL = Information Technology Laboratory
Collaborate
Coordinate
Cooperate
Federal
Federal Emergency Mgmt. Agency
U.S. Army Corps of Engineers
U.S. Geological Survey
National Science Foundation
Federal Bureau of Investigation
Department of Defense
NOAA's National Weather Service
Bureau of Reclamation
NOAA = National Oceanic and Atmospheric Administration
Local and State
Miami-Dade County Mayor's Office,
Fire, Police, and Building Departments
Town of Surfside
City of Miami Beach
Florida Division of Emergency Mgmt.
Florida DOT and State Attorney's Office
Virginia Beach Fire Department
USAR Task Forces
DOT = Department of Transportation
USAR= Urban Search & Rescue

CTS Investigation: FY22-24 Overview (by the numbers)

40+
NIST EMPLOYEES

600+
EVIDENCE SPECIMENS

15+
LOCAL AND FEDERAL AGENCIES

24+
FAILURE HYPOTHESES

30+
WORK ORDERS AND CONTRACTS AWARDED

3+ TB
PHOTOS AND VIDEOS

FY22-FY23
Appropriated Funds

Labor: $ 7.5M (34%)
Other Objects*: $ 15.5M (66%)

**contracts, equipment, travel, misc.*

FY23-24
Disaster Supplemental Funds
Spent to Date

Labor: $ 1.1M (17%)
Other Objects*: $ 5.6M (83%)

**contracts, equipment, travel, misc.*

NIST Seeks Additional Data

NIST Search NIST Menu

Resilience https://www.nist.gov/disaster-failure-studies/data-submission-portal

DISASTER & FAILURE STUDIES

- About the Disaster & Failure Studies Program
- National Construction Safety Team (NCST) +
- Champlain Towers South Collapse NCST Investigation
- Hurricane Maria Program
- Joplin Tornado NCST Investigation
- World Trade Center NCST Investigation
- Studies by Hazard Types +
- Impacts & Recommendations
- Data Submission Portal
- Data Archive +
- Recent Activities
- FAQs

Data Submission Portal

General Overview

Traducción al español

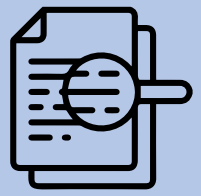
Disasters and failure events provide important opportunities for scientists and engineers at the National Institute of Standards and Technology (NIST) to learn how we can improve the safety of buildings, their occupants, and emergency responders. NIST has studied and investigated more than 50 earthquakes, hurricanes, building and construction failures, tornadoes, and fires since 1969. The goal for these post-event assessments is to recommend improvements to building codes, standards, and practices. The Disaster and Failure Studies Program provides leadership, coordination and management for all disaster studies at NIST.

To fully understand a damaging event, NIST must gather all possible evidence, including photos, videos, or other documentation that may be owned and held by the public that contain clues about the event, the buildings affected, or the emergency response. For this purpose, NIST established the NIST Disaster Data Portal to serve as an entry point for the general public and other stakeholders to upload files for investigations and studies of disaster and failure events. The Portal helps ensure that this valuable information is organized and maintained to enable study, analysis, and comparison with subsequent severe disaster and failure events.

Click on the button below to submit data including photos, video, and other documentation associated with a disaster or failure event. Submitters will be asked to complete a form for each submission that includes a description of the data, credits, and permissions.

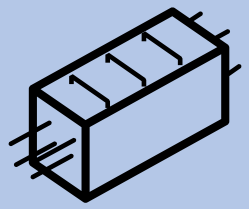
Access the Data Portal

Theme 1:
Timeline and Evidence Collection



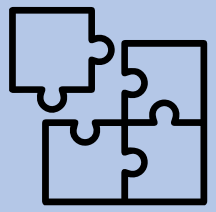
Judith Mitrani-Reiser, N. Emel Ganapati, David Goodwin, Christopher Segura, Jonathan Weigand, Kam Saidi, Jack Moehle

Theme 2:
Analysis and Testing Updates



Fahim Sadek, James Harris, Christopher Segura, Kenneth Hover, Jack Moehle, Sissy Nikolaou,

Theme 3:
Analysis of Failure Hypotheses



Glenn Bell, Fahim Sadek, Georgette Hlepas, Scott Jones, James Harris, Youssef Hashash

Disclaimers for Presentations

⚠ IMPORTANT: ALL DATA ARE PRELIMINARY

- These presentations describe preliminary data gathered to date as well as preliminary analyses of these data. Data and analyses are subject to change.
- Once all data are finalized and analyzed, they will inform a broader understanding of the likely technical cause or causes of the collapse – and NIST's findings and recommendations.
- These presentations do not constitute NIST findings or recommendations.
- All survey and interview data collection included a consent process that specifies the allowable uses of data and protections of respondents.
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Questions?

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