



Sept. 28, , 2017
NCST Advisory
Committee Meeting

Summary of Progress on Implementation of the Joplin Tornado Investigation Recommendations

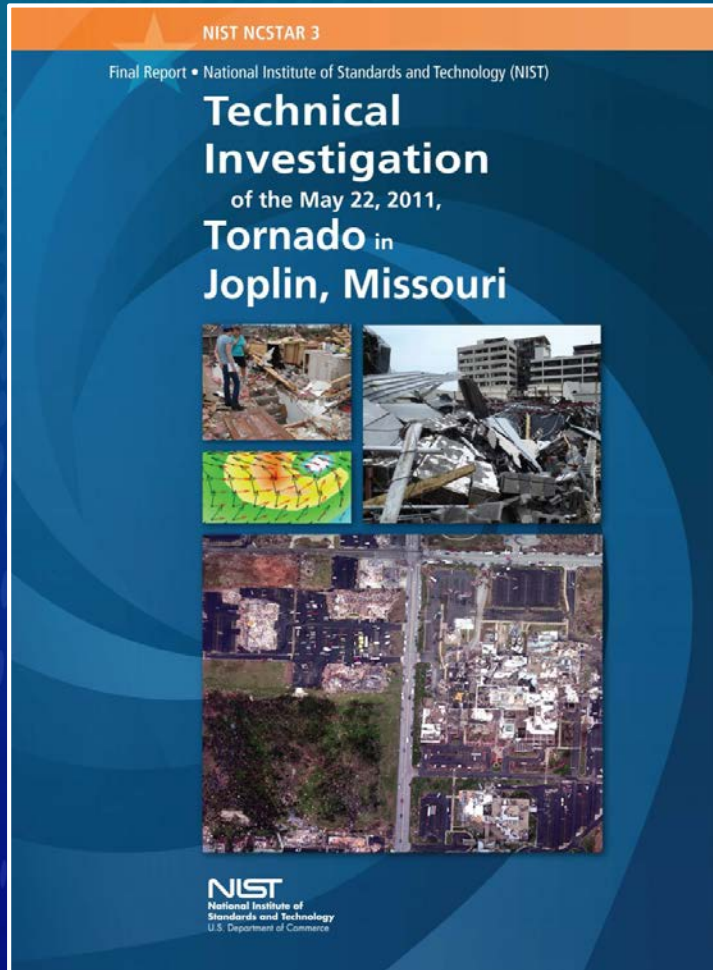
Judy Mitrani-Reiser *Director, DFS Program*

Long Phan *Leader, Structures Group*

Marc Levitan *Director (Acting), NWIRP*

Erica Kuligowski *Leader, WUI Fire Group*

Joplin Tornado Technical Investigation



<http://dx.doi.org/10.6028/NIST.NCSTAR.3>

The first study to investigate storm characteristics, building performance, emergency communication and human behavior - and assessment of the impact of each on fatalities

- **47 findings**
- **16 recommendations for improving:**
 - Tornado hazard characterization
 - Building design/construction in tornado-prone regions
 - Emergency communications that warn of threats from tornadoes.



Joplin Recommendation Overview

- Nationally accepted standards for tornado-resistant design and design methodologies
- Uniform national guidelines that enable communities to create safe and effective public sheltering strategies, tornado shelter standard for existing buildings, and installation of tornado shelters in new and existing buildings
- National codes and standards and uniform guidance for clear, consistent, recognizable, and accurate emergency communications and joint plans by emergency managers, the NWS, and the media to make sure that accurate and consistent emergency alert and warning information is communicated in a timely manner
- Research, technologies and strategies to advance tornado wind measurements, strengthen emergency communications, increase warning time, derive more accurate tornado hazard maps and improve public response



List of Joplin Recommendations

Hazard Characteristics

Buildings, Shelters, Designated Safe Areas, and Lifelines

Emergency Communication

R #	RECOMMENDATION	LEAD
1	Development and deployment of technology to measure tornado wind fields	NOAA
2	Archival of tornado event data	NWS
3	Development of tornado hazard maps	NIST
4	Improvement of EF Scale; means for continued improvement; adoption by NWS	NWS
5	Development of performance-based standards for tornado-resistant design	ASCE
6	Development of performance-based tornado design methodologies	NIST, FEMA
7	a) Development of tornado shelter standard for existing buildings; b) Installation of tornado shelters in more buildings in tornado-prone regions	ICC
8	Development of guidelines for public tornado sheltering strategies	FEMA
9	Development of guidelines for selection of best available refuge areas	FEMA
10	Prohibition of aggregate coverings or ballast in tornado-prone regions	ICC
11	Development of requirements for enclosures of egress systems in critical facilities	ICC, NFPA
12	a) Development of tornado vulnerability assessment guidelines for critical facilities; b) Performance of vulnerability assessments by critical facilities in tornado-prone	FEMA
13	Development of codes, standards, and guidance for emergency communications; Development of joint plan by emergency mgrs/media/nws for consistent alerts	NFPA
14	Deployment of “push” technologies for transmission of emergency information	FEMA
15	Research to identify factors to enhance public perception of personal risk	NSF, NIST
16	Develop technology for real-time, spatially-resolved tornado threat information	NOAA

Overview of Implementation Progress

	R #	RECOMMENDATION IMPLEMENTATION (red – in progress, black – in planning)	LEAD
Hazard Characteristics	1	Development and deployment of technology to measure tornado wind fields	NOAA
	2	Archival of tornado event data	NWS
	3	Development of tornado hazard maps	NIST
	4	Improvement of EF Scale; means for continued improvement; adoption by NWS	NWS
Buildings, Shelters, Designated Safe Areas, and Lifelines	5	Development of performance-based standards for tornado-resistant design	ASCE
	6	Development of performance-based tornado design methodologies	NIST, FEMA
	7	a) Development of tornado shelter standard for existing buildings; b) Installation of tornado shelters in more buildings in tornado-prone regions	ICC
	8	Development of guidelines for public tornado sheltering strategies	FEMA
	9	Development of guidelines for selection of best available refuge areas	FEMA
	10	Prohibition of aggregate coverings or ballast in tornado-prone regions	ICC
	11	Development of requirements for enclosures of egress systems in critical facilities	ICC, NFPA
	12	a) Development of tornado vulnerability assessment guidelines for critical facilities; b) Performance of vulnerability assessments by critical facilities in tornado-prone	FEMA
Emergency Communication	13	Development of codes, standards, and guidance for emergency communications; Development of joint plan by emergency mgrs/media/nws for consistent alerts	NFPA
	14	Deployment of “push” technologies for transmission of emergency information	FEMA
	15	Research to identify factors to enhance public perception of personal risk	NSF, NIST
	16	Develop technology for real-time, spatially-resolved tornado threat information	NOAA

Highlights of Implementation Activities and Successes since Last Meeting

- Significant progress on development of tornado hazard maps (R3)
- ASCE/SEI/AMS Tornado Wind Speed Estimation Standard Committee has begun subcommittee balloting of draft chapters (R2 and R4)
- New NFPA 1616 Standard on Mass Evacuation, Sheltering, and Reentry Programs published in 2017, including major contributions from NIST on building safety considerations and emergency communications (R8)
- Report documenting minimal economic impact of proposed restrictions on aggregate-surfaced roofing in tornado prone regions (R10)
- Held Workshop on Outdoor Siren Policies, in collaboration with the Fire Protection Research Foundation and NOAA (R13)
- Continued progress and operational pilot testing on Forecasting a Continuum of Environmental Threats (FACETS) (R16)

