

# FEMA-NASA Planetary Impact Emergency Response Working Group (PIERWG)

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**President's Council of Advisors on Science and Technology (PCAST)  
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# Planetary Impact Emergency Response Working Group (PIERWG) Goals

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Established by the partnership of the Federal Emergency Management Agency (FEMA) and National Aeronautics and Space Administration (NASA) to:

- Develop guidance to prepare for any potential impact of our planet by a large natural object, and
- Coordinate responsibilities and resolve preparedness and operational issues relating to interagency response and recovery activities at the national level.

***The PIERWG provides a forum for developing the essential information and recommendations needed by senior leadership to make informed decisions to respond to the unique challenges of an impending near-Earth object impact.***



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# PIERWG: FEMA's Role

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Upon notification from NASA of an impending NEO impact threat to the United States, FEMA takes the lead to notify appropriate Federal, State, and Local authorities and emergency response institutions utilizing existing resources and mechanisms.

- Analogous to large re-entering space debris and/or hurricane warning procedures;
- The information to make an informed decision about implementing these procedures will likely be sparse; and
- Timelines for decision making can vary from years to days or hours .



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# PIERWG: NASA's Role

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On October 15, 2010, OSTP reaffirmed U.S. Government roles and responsibilities in the event of a predicted or actual NEO impact on Earth.

- NASA is the lead U.S. Government agency to coordinate the detection, tracking, and characterization information of NEOs from all organizations, domestic and international, within the astronomical observation community.
- NASA's notification procedures are set into motion only after the necessary observations, analyses, and characterization efforts have taken place to determine that a space object indeed represents a credible threat to people or property.



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# PIERWG: Goals and Objectives

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## Primary Objectives are to:

- Promote cohesiveness in planning, organization, equipment, training, exercises, and operations to facilitate interagency response, recovery, and preparedness.
- Identify policy issues affecting the interagency community to elevate to decision-makers in order to ensure a collaborative and coordinated approach.
- Serve as a steering committee for all phases of interagency risk and planning analysis, including informing strategy, procedural courses of action, draft products, and approving completed products.
- Determine how PIERWG recommendations could be integrated into Department/Agency planning initiatives and doctrine.



# PIERWG: Roles and Responsibilities

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- PIERWG members are individuals who can speak authoritatively on behalf of their respective organizations.
- PIERWG members will be responsible for reviewing developments and maintaining situational awareness with regard to procedures
- As communications and early warning procedures are developed and discussed, PIERWG will forward any findings to the ESFLG and RSFLG leadership for consideration.

## Membership Includes:

- FEMA, NASA, the Department of Defense (DoD), the White House Office of Science and Technology Policy (OSTP), the Department of State, members of the interagency Emergency Support Function Leadership Group (ESFLG), Recovery Support Function Leadership Group (RSFLG), and other organizations



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# PIERWG: Roles and Responsibilities, Continued

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Specific PIERWG roles and responsibilities include:

- Advising senior leadership to ensure a consistent and coordinated Federal response in preparing for, during, and after any NEO impact scenario.
- Identifying interagency emergency management issues that cannot be resolved by the Task Teams, especially those identified through ongoing all-hazards planning efforts.
- When necessary, link PIERWG issues, concerns, and recommendations with their respective agency or department program office.
- Informing and providing insights to the development and maintenance of Federal interagency operational plans that may be applied to address the hazards of a NEO impact.
- Providing subject matter expertise and advice through all phases of interagency risk analysis, strategic planning, and capability building related to response and recovery.
- Developing and documenting collaborative interagency courses of action for executing recommendations by the PIERWG.
- Developing, authorizing, and distributing national-level event focused public information guidelines with key themes, messages, and talking points for use during a NEO impact scenario.
- Establishing PIERWG task teams that address issues of immediate concern.



# PIERWG: Task Teams

The PIERWG may establish task team(s) as needed. These task teams will:

- Guide the development of the requisite procedures for response and recovery activities under the NRF and NDRF, as well as other Federal Interagency and National planning efforts.
- Representation on task groups will be open to selected departments and agencies and FEMA Regions, as appropriate.

A task team's purpose may be to:

- Convene when necessary for specific issues, and disband upon completion of the specific assigned task;
- Inform the inclusion of NEO risks within national risk and capability analysis efforts;
- Address issues that require appropriate department/agency participation for researching and developing procedures to operationalize and execute policy decisions;
- Identify and suggest process improvements to the PIERWG for approval;
- Provide input from subject matter experts; and
- Provide expertise to FEMA to address tasks including the research and development of potential options/courses of action and drafting of documents, recommendations, and procedures to improve Federal interagency coordination, integration, and incident response.



# Planetary Impact Emergency Response Working Group (PIERWG)



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## Next Steps

- Plan for next meeting
  - Warning Protocols: Do not re-invent the Wheel.
    - Integrate NASA Asteroid Warning Template into FEMA System?
    - Challenge translate NASA science confirmation process over to FEMA Warning Network
      - In Stages; Will it be different for no-notice and notice or format be the same
      - Use current satellite re-entry message format
      - How would this integrate into International Asteroid Warning Network (IAWN)
      - Plan for Next Tabletop Exercise
    - Third TTX will take a different approach
      - Involve FEMA Region, State and Local emergency officials
      - Consider conducting TTX outside of Washington, DC area
      - Develop Exercise goals?
- Task Teams being established for above projects  
Integrate PIERWG actions with the OSTP Interagency Working Group for Detecting and Mitigating the Impact of Earth-bound Near-Earth Objects (DAMIEN) effort



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# Back Ups



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# FEMA-Response Mission

*FEMA's mission is to support our citizens and first responders to ensure that as a nation we work together to build, sustain, and improve our capability to prepare for, protect against, respond to, recover from, and mitigate all hazards.*

*To build, sustain and improve our ability to coordinate and provide the core Federal disaster response capability needed to save lives, reduce suffering, and protect property in communities throughout the Nation that have been overwhelmed by the impact of an incident, regardless of cause.*



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# Principles of Incident Management

## National Incident Management System

Standardizes incident management at every level to enable coordinated response



## National Response Framework

Guides national response, roles, & activities for all domestic incidents

### PRINCIPLES

Engaged Partnership

Tiered Response

Scalable & Flexible

Unity of Effort

Readiness to Act



Homeland Security



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# Incident Support at the Federal Level

## *Emergency Support Functions*



**President** leads national incident response



**Secretary of Homeland Security** is principal federal official for domestic incidents



**FEMA Administrator** is principal advisor to the President & coordinates response through ESFs

### Emergency Support Functions

# 1	Transportation
# 2	Communications
# 3	Public Works & Engineering
# 4	Firefighting
# 5	Emergency Management
# 6	Mass Care
# 7	Logistics & Resource Support
# 8	Public Health & Medical
# 9	Search & Rescue
# 10	Oil & HazMat Response
# 11	Agriculture & Natural Resources
# 12	Energy
# 13	Public Safety & Security
# 14	Long-Term Community Recovery (removed)
# 15	External Affairs



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# Principles of Federal Evacuation Support

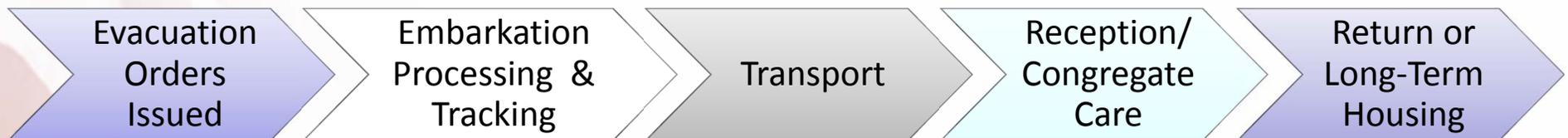
*Primarily for Non-CBRNE Events*

## Federal evacuation measures will be taken when:

- State/local resources are overwhelmed & Governor requests Federal assistance.
- In catastrophic incidents when State and local governments are incapacitated.

## Federal Support Focus Areas (National Response Framework)

- Coordination & communication across affected jurisdictions
- Support to air, ground, and rail transportation efforts
- Ensuring fuel availability along evacuation routes
- Sheltering, feeding, and reunification support of evacuees
- Evacuation of household pets
- Medical evacuation support
- Providing for public safety & security



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## Evacuation Phases

# FEMA-NASA Potentially Hazardous Object Tabletop Exercises (TTX)

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- The NASA Science Mission Directorate, Planetary Sciences Division, Near Earth Object Program Office and the FEMA Response Directorate have conducted two Near Earth Asteroid Impact Emergency Tabletop Exercises in April 2013 and May 2014.
- The purpose of the exercise was to inform the FEMA leadership and members of the Emergency Support Functions Leadership Group (ESFLG) on the issue in general and to assess leadership reactions, information requirements, and responses to a hypothetical prediction of a potentially hazardous object (PHO) impact with Earth in a short time.
- The exercise included a scripted approach by a threatening PHO, and information collected during the exercise will be used to help guide a detailed study of short warning threats.



# Impact Emergency Response Exercise #2



## EXERCISE

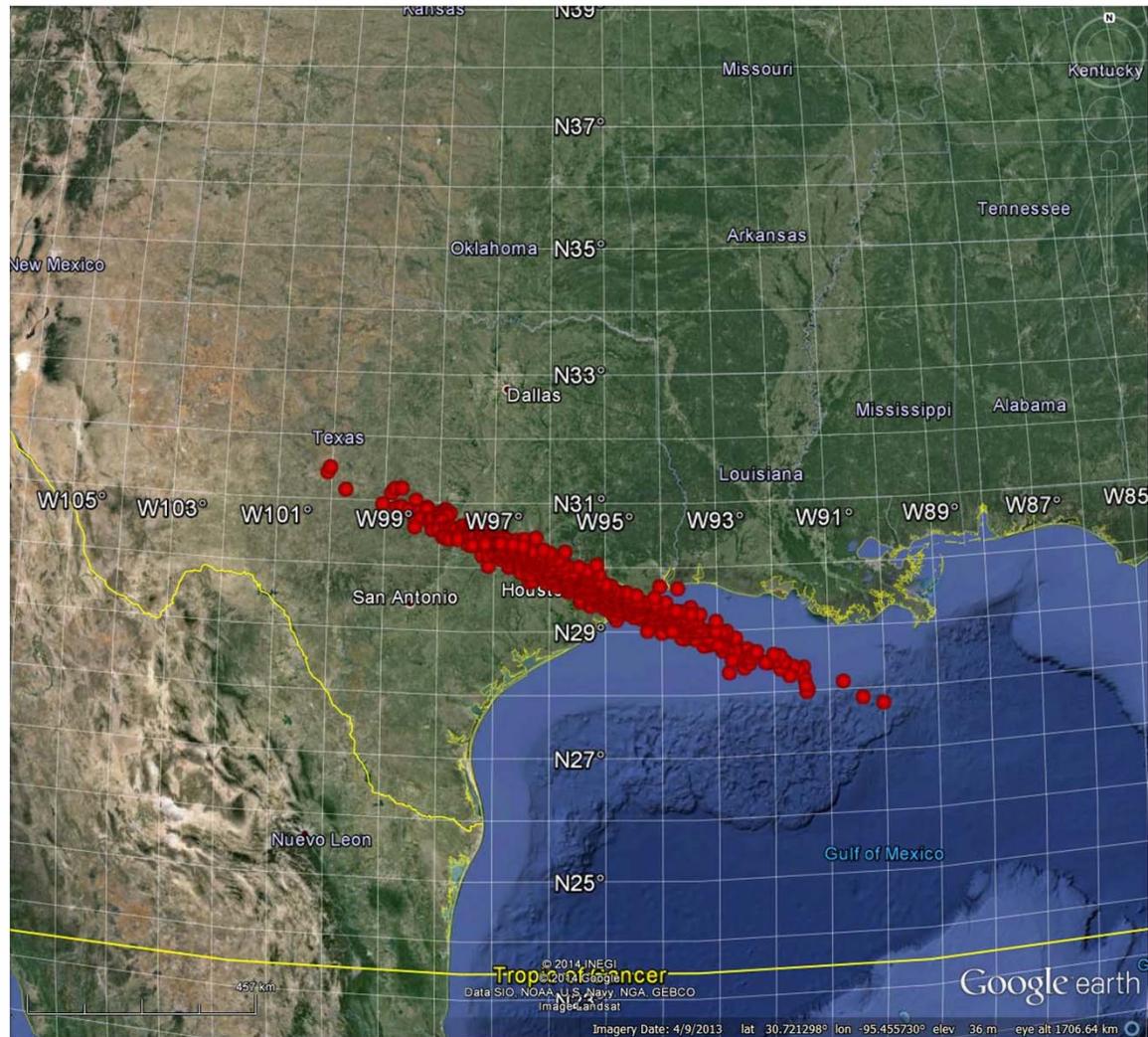
30 Days prior to Impact  
Optical only tracking

40 to 60 meter object  
Impact Probability 100%

Date/Time (UTC)  
2021 Sep 5 17:02

Center Point  
Latitude  
29.7  
Longitude  
-95.3

Footprint size  
1000 x 50 km  
Major axis Azimuth (deg)  
130



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EXERCISE

# FEMA-NASA Potentially Hazardous Object TTX

## *Key Findings: Questions Asked During Exercise*

Understand and appreciate the science behind what you are doing but for public policy development it would be beneficial to direct some correlations between the science and public needs it serves. There is a need to find a credible and authoritative way to communicate with the public in a way that they can understand and absorb information. Maintaining authority as the source of authentic information may be a challenge.

- What research, tools and or methods will help you figure out where it will land?
- How soon will you tell public officials outside of the planetary defense community that there is an impact possibility?
- What determines how much time you can give public officials to react? (remember the CNN factor, this will not be a secret for long)
- How can the current research help explain to public what's going on?
- Can you explain why characterization is important? What risks does that help emergency managers prepare for? Why does it matter if it is a stony or iron or whatever?
- Impact studies, how important, can you tell me what will be different if it lands on the continental shelf. Does depth of water matter? Is the west coast undersea topography different from the east coast? Blast studies in urban area vs rural area? How will it affect critical infrastructure?
- Your information will help guide public policy, you will not be making it. The response part will be under those officials. However, they will need to know or want to know what your deflection or mitigation plans might be.
- Will whatever you do make it worse? Can your research support doing nothing at all or will it show the consequences of not doing anything will be too high. This will probably be a public policy driven decision (political) not a science decision.



# Potentially Hazardous Object TTX

## *Key Findings: National Plan*

- The U.S. has a developed emergency response system and FEMA has deliberate plans for many types of emergencies. Many are covered in the Federal Interagency Operational Plans (FIOP) documents. There is no FIOP for hazards from space.
- **In previous asteroid impact tabletop exercises a lesson learned indicated that it may be beneficial to working through some of the issues identified, including pre-identification of agency roles and responsibilities (who will lead, when), with clear lines of authority and communication.**
- In the case of a 'No-Notice Event,' FEMA might choose to use the same protocols as a manmade disaster or use an all-hazards plan/checklist.
- The Planetary Impact Emergency Response Working Group (PIERWG) is advisory in nature and will act as a group of SME's which will help develop and advise senior interagency leadership on the way forward for this possible scenario.

