

Improving Weather and Emergency Management Messaging: The Tulsa Weather Message Experiment

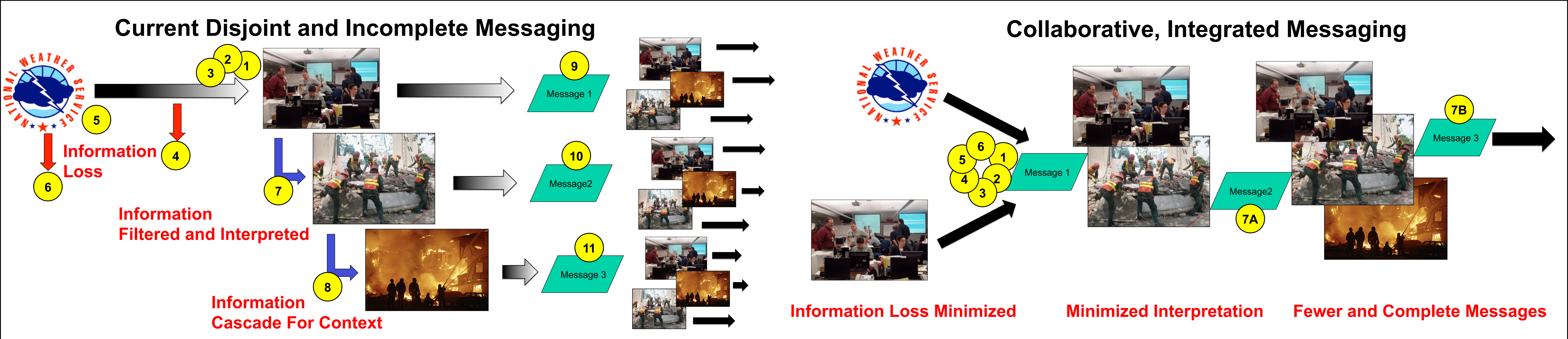
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Acknowledgment: NOAA/OAR Grant NA12OAR4590114



We're Talking But What Is Being Understood?



Background Assumptions

- Emergency Management (EM) is a complex, dynamic, and often ad hoc set of communities.
- EM consists of official EM agencies, public venue operations, media, and individuals.
- Everyone is looking to “understand” a situation beyond being “aware.”
- Weather understanding is based on 6 critical elements: WHAT, WHERE, WHEN, HOW LONG, CURRENT IMPACTS, and HOW SURE ARE WE?
- Situational understanding is based on context of what actions to take.
- Decisions are based on clear understanding of all information as a knowledge “packet.”
- The packet needs to change based on decisions, actions, and timelines that vary across organization or individual responsibility.
- Information gathering, interpretation, and dissemination leads to information flow issues.
- Situational Understanding is compromised due to content and dissemination shortfalls.
- Correcting and confirming understanding takes time, expertise, and access to information.

Survey Results

- EMs emphasize need to find, understand and apply 6 critical elements, with mostly favorable results for what, when, and where and less usable feedback on how long, current, and confidence understanding.
- 80% of emergency managers pass information along to other emergency managers.
- Of this passing information along, 75% report they interpret and filter information first.
- 50% of emergency managers consider that they are in direct contact with the National Weather Service with nearly half using interactive chat to seek clarification and ask questions.
- When information is incomplete, emergency managers will contact NWS, figure things out on their own, seek other sources, talk to other EMs, or make their best guess based on experience.
- Technologies can be a barrier to communication and consistency of information.
- 61% are mostly aware and comfortable with NWS information products.
- Nearly half of EMs report inconsistency issues as a problem and 65% say it gets worse in time.

Tulsa Findings

- Localizing messages with direct information on 6 elements increased understanding of weather events.
- Minimizing how many filter information helps in clarifying and developing consistent operational choices.
- Having the ability to communicate clearly, concisely and consistently reduces the chance of misinterpretation and delays in decision making.
- Ability to add local operational actions into messages suggest new channels would be used to communicate more directly with managers and responders.
- Dissemination consistency and channel availability suggest that who and what is being communicated would change and be oriented to local management control versus centralizing gathering and coordinating.



Situational Awareness:
Insufficient for Taking Action

Situational Understanding:
Empowers Taking Action



Problem and Hypothesis

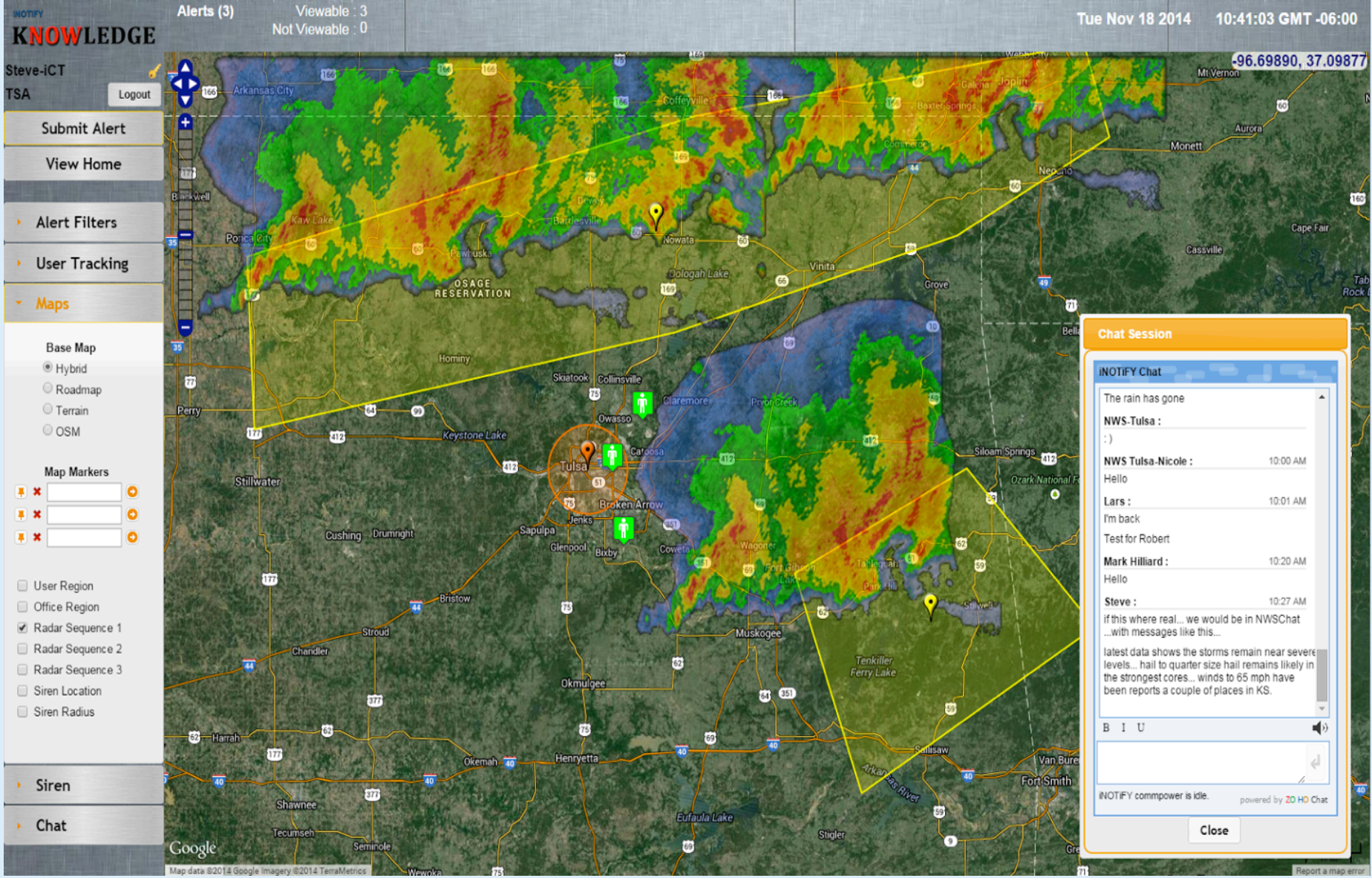
- Weather and Emergency Management messaging is incomplete and fragmented making it hard to understand and contextualize decisions and actions for broad range of EM needs.
- Dissemination fragmentation makes gathering and passing along information difficult.
- By providing a collaborative pathway for gathering, contextualizing, and dissemination of information, a clearer, concise, and consistent understanding of a situation is achieved leading to improved EM decision making.

Approach, Part A - Survey

- Survey Emergency Managers including Emergency Support Functions to ascertain a) what information are they needed to develop understanding, b) what EMs do with the information, and c) what EMs do if the information is incomplete
- Devise an experiment to enlighten and test ideas that improve weather messaging in emergency management communities.

Message Content Integration

Users integrating information for 6 elements leads to improved situational understanding. Multiple player chat leads to understanding, insight and actions. Messages are, on-the-fly, to add context and relevance. Users collaborate to identify critical areas of concern to pass along.



Approach, Part B – Tulsa Message

- Establish an experiment with large public venues in Tulsa as surrogate for safety operations needing weather information: schools, airports, EMs, industrial park, retail outlet, sports arena, concert arena.
- Create weather scenario where combined messaging adds context.
- Implement iNotify infrastructure to allow public venues and NWS to interact to create integrated messaging: gather and dissemination capabilities.
- Create and inject messages to local weather and operational context to users.
- Collect EM reporting improvements or distractions to messaging and conveyance of knowledge of the 6 elements and meaning to operations.
- First test: local EMs, schools, and sports arena.



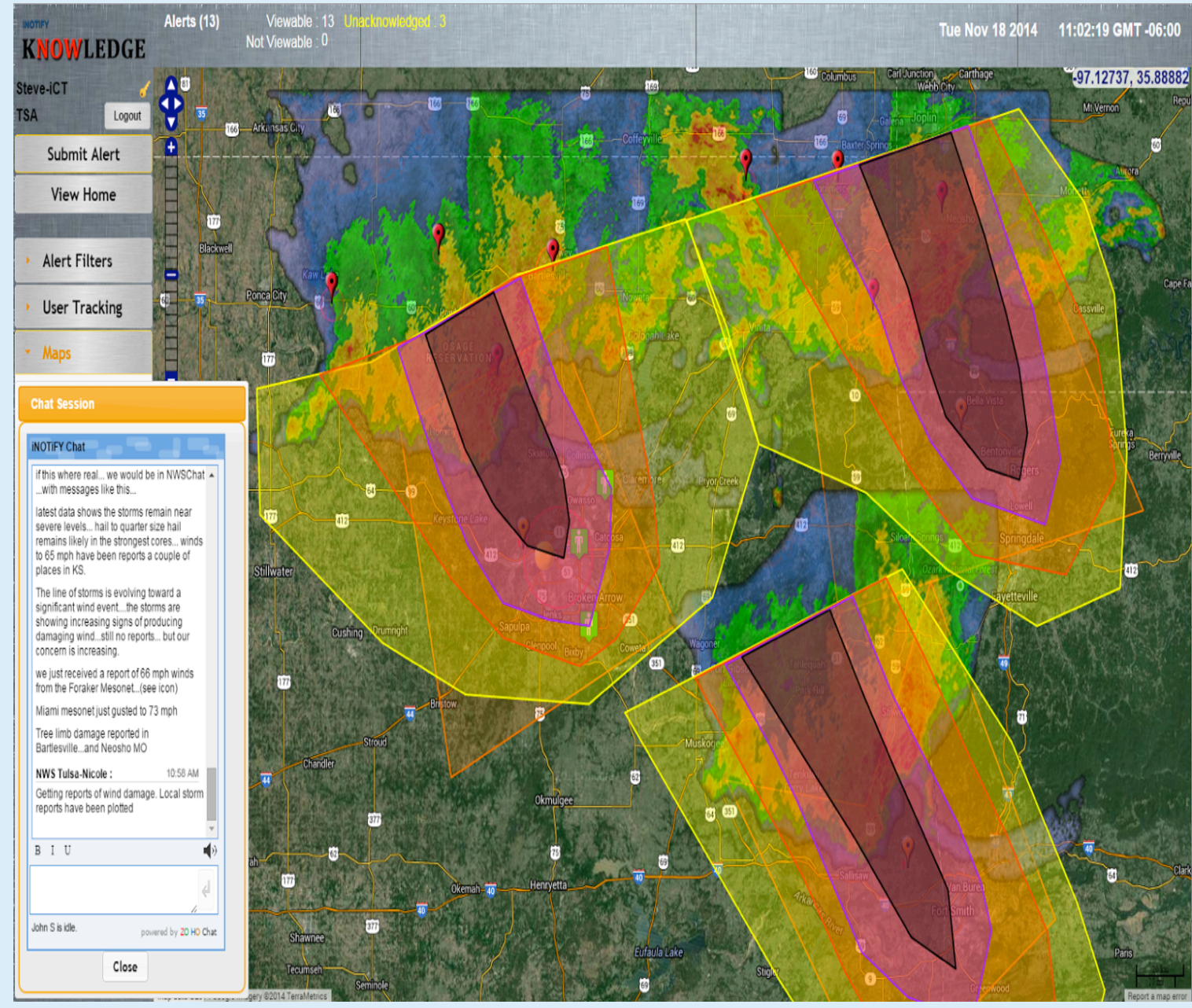
Gather

Add and Integrate

Disseminate

Communicating 6 Critical Elements

Use of Tulsa “Petals” to localize tornado what, when and where increased understanding. Adding petals to integrated communications enabled EMs to tailor operations more readily with improved confidence.



Conclusions

- Conveying 6 Critical Elements is essential for developing a consistent and accurate situational understanding.
- Minimizing EM need to gather, organize and interpret information leads to improved understanding, higher confidence, and quicker actions including passing along of information to other EMs.
- Providing a seamless communication pathway for gathering and disseminating information reduces time requirements, enhances delivery to others normally out-of-the-loop, and enables better communications to the public through various channels.
- Ability to work together improves context and ground truth.
- Ability to collaborate enhances the localization and application of information as it relates what is about to happen with what actions to take.
- Testing with more EMs with complex scenarios is recommended.

