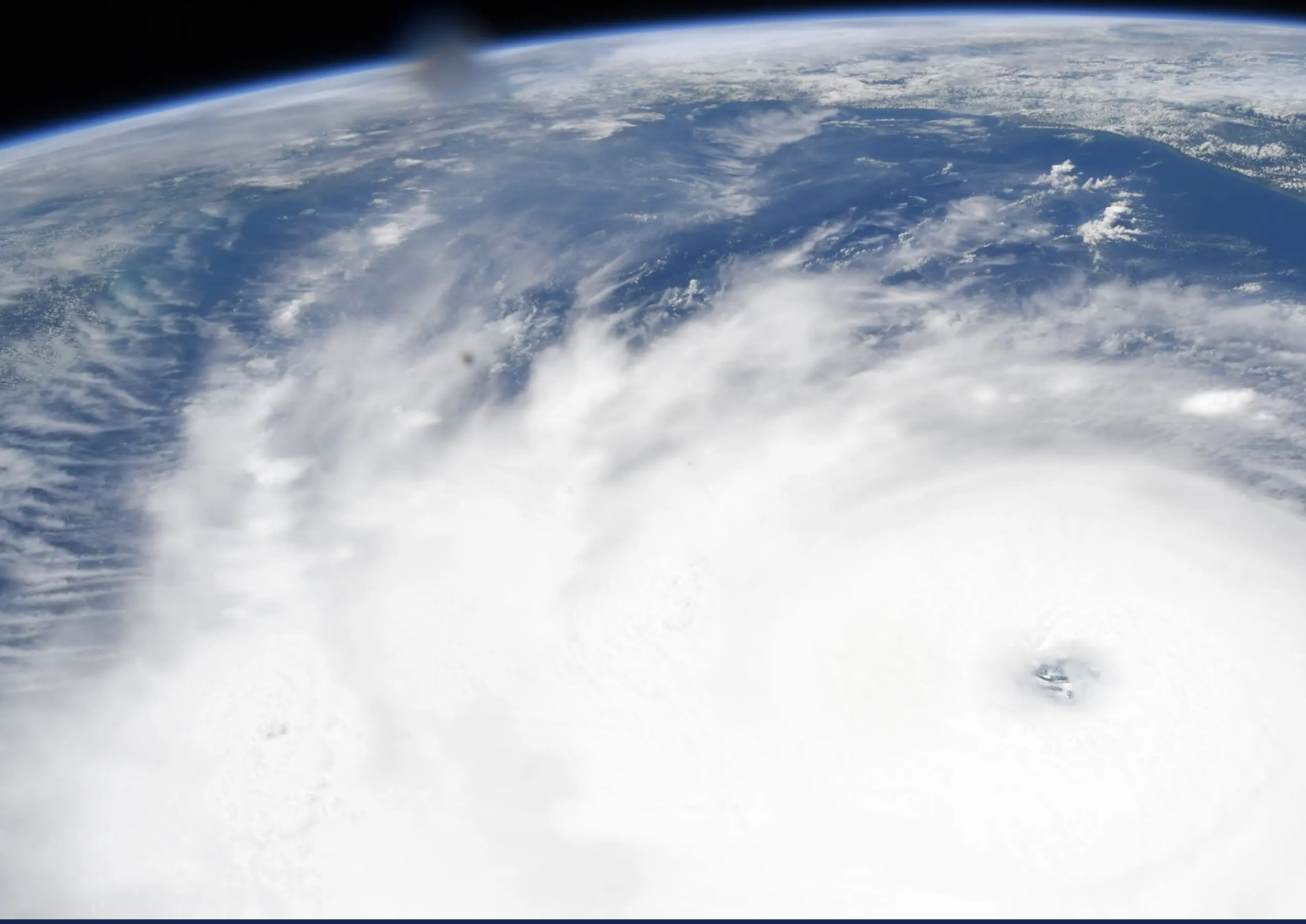

Hurricane Laura
Traffic System Response

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Section Traffic Manager

October 2020

ARRL
North Texas Section
Amateur Radio in North Texas

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Hurricane Laura Traffic System Response

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October 2020

Cover image: From the International Space Station astronaut Chris Cassidy took this photo of Hurricane Laura as it neared the Gulf Coast on August 26, 2020 at 2:27 pm CDT. NASA/Chris Cassidy

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Introduction

Two tropical cyclones, Marco and Laura, threatened the Gulf Coast of the United States within three days of each other. While Marco significantly weakened before making landfall as a tropical storm near the mouth of the Mississippi River on August 24, 2020, Laura intensified while over the Gulf of Mexico and made landfall as a Category 4 hurricane near Cameron, Louisiana in the early hours of August 27.

As these cyclones crossed the Atlantic Ocean, I and other members of the North Texas Section leadership team monitored their development and took action as they approached and made landfall. Traffic handlers within the North Texas Section prepared and responded by:

- Preemptively meeting ahead of Laura's arrival to review the latest information from the National Hurricane Center and verify traffic system readiness
- Continuously sharing information about traffic volumes, types of messages, and actions taken to dynamically increase and decrease traffic system capacity based on what we were observing and the potential for storm-related traffic to start coming from affected areas
- Discussing this event after it concluded to review response effectiveness and identify ways to improve

This report outlines how the traffic system plays a critical role within a hurricane response plan, and details how we in the North Texas Section responded to these cyclones, including outreach to other Section Traffic Managers, coordination efforts amongst traffic handlers, remaining agile when recognizing the need for a centralized traffic system information dashboard, and winding down the response after the need for this extra traffic handling capacity passed.

Background

The traffic system is a key component of a comprehensive response plan

Despite ever-evolving cellular network and other communications technologies, we continue to face the potential for system failures. For example, wireless subscribers in areas of the Florida Panhandle had limited service for over a week after Hurricane Michael, a Category 5 hurricane, made landfall in October 10, 2018 [1]. The day after it made landfall, seven counties in the Florida Panhandle had between 61 and 100 percent of their cell sites out of service, as shown in Figure 1 provided by the FCC.

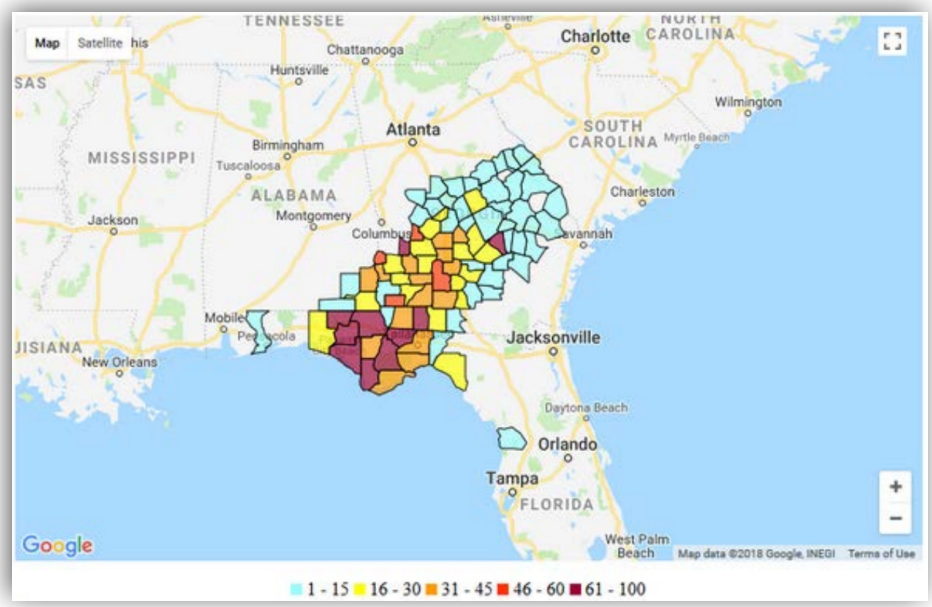


Figure 1 - Percent of out-of-service cell sites by county as of October 11, 2018 due to Hurricane Michael [1].

These communication failures quickly escalate beyond responding to the emergency. People in the impacted area are unable to contact their family members to let them know they are OK. For family members outside of these areas looking in through the lens of television news reports and stories of widespread destruction, this inability to reach their loved ones can create anxiety and fear that the worst has happened. For example, as written in an article for the *Tallahassee Democrat*:

"It was crazy, especially after the hurricane, not being able to contact any of your family members to let them know if you were OK or not," said Lillie Whitfield, a store manager at St. Joe Shrimp Company on Cape San Blas. Nearby Port St. Joe where she

rode out the storm and its immediate aftermath went without cellular for at least two weeks, she said. [2]

When largescale communications system failures occur, amateur radio operators are able to quickly stand up communication tools and restore the ability to send information into and out of affected areas. This information can include:

- **Emergency messages** related to life-and-death matters, such as requests for supplies or specific instructions vital to relief of affected populations
- **Priority messages** notifying about injuries, or detailing requests where time is of the essence
- **Welfare traffic** providing information about the health and welfare of individuals in an affected area

One way amateur radio operators provide critical communications is through traffic handling, such as through the National Traffic System, a program sponsored by the ARRL. The NTS is a network of amateur radio operators who move information during disasters and other emergencies. These messages, called traffic, can be relayed through the NTS across town, across the state, across the country, and beyond as needed by an incident's particular communications requirements.

These emergency communications capabilities can be quickly deployed, such as through the use of amateur radio go-kits, which some amateur radio operators personally build and test ahead of time, and some government emergency services departments have on hand and make available to amateur radio operators who are members of sponsored volunteer groups, such as the Amateur Radio Emergency Service or the Radio Amateur Civil Emergency Service.

Traffic system structure

The traffic system has numerous nets that operate at different levels, such as at the local level covering a metro area, regional nets such as statewide areas, and area nets for large portions of the country. Ideally, traffic starts and ends at the local net level, relaying up to nets covering larger distances, and then back down to a local net in its delivery area. For example, for traffic headed from Dallas, Texas to Denville, New Jersey, this traffic enters the system at the local Dallas/Fort Worth Traffic Net, and is then relayed through traffic nets covering larger distances. Once crossing the country to New Jersey, this traffic is relayed back down to the local net level and then delivered to its destination. Figure 2 below provides a high-level view of the traffic system structure.

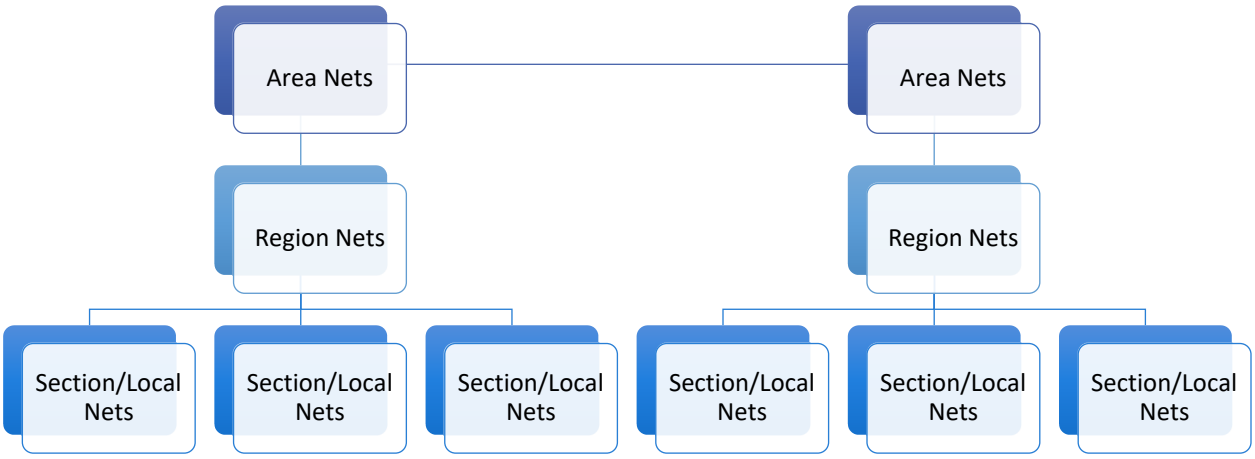


Figure 2 - Traffic flows from one net to the next, with an emphasis on traffic starting and ending its relaying at the local net level.

Traffic handlers

The traffic system is empowered through the participation of traffic handlers. These amateur radio operators have built skills related to relaying information with high accuracy and speed, and provide this critical communication service to the public in times of need, such as when powerful storms cause widespread damage and destroy communications infrastructure. Some of these traffic handlers have demonstrated their dedication to the traffic system through continuous participation, exhibiting quality traffic handling practices, and showing a constant desire to grow their skills. A list of many of these dedicated amateur radio operators who continuously help with traffic handling for the North Texas Section, participating as Official Relay Stations, Net Managers, and Net Control Stations, appears on page 20 in the Appendix.

Traffic system incident response lifecycle

When included in a comprehensive emergency response plan, traffic handlers help mitigate the potential for loss of life or property should regular communications systems fail. The traffic system follows a continuous incident response lifecycle consisting of four general phases:

- **Phase 1: Continuous practice**. Daily traffic nets and routine traffic continuously build skills and prepare traffic handlers for incident-related traffic.
- **Phase 2: Incident preparation.** Discussions and coordination take place ahead of a potential need for incident communications.
- **Phase 3: Incident response actions.** Traffic handlers are monitoring for and relaying any emergency, priority, and welfare traffic related to the incident.
- **Phase 4: Post-incident activities.** Traffic system operations are normalized, and attention focuses on lessons learned.

This lifecycle is illustrated in Figure 3 below.

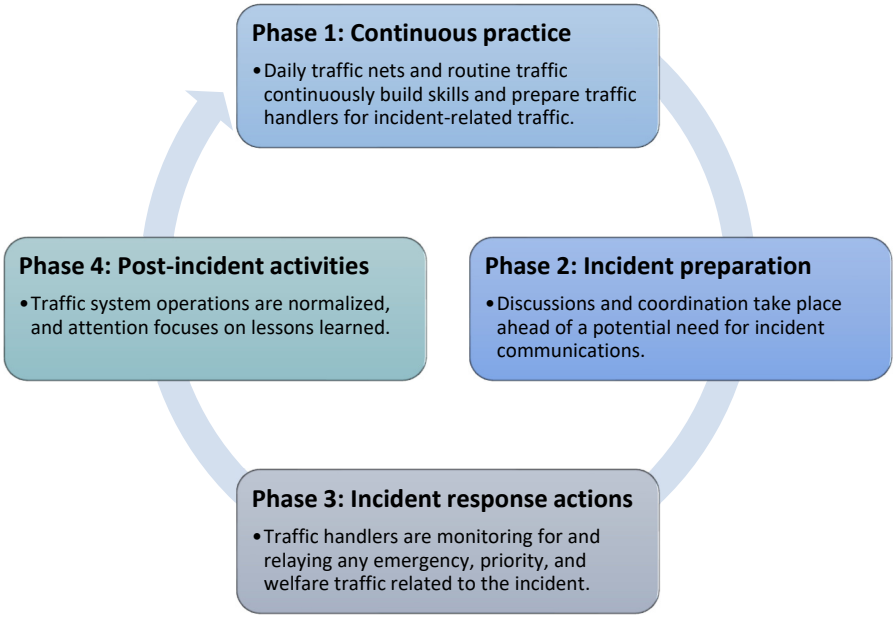


Figure 3 - The traffic system incident response lifecycle has four phases.

The current response phase is generally reflected in the NTS Status level to help disseminate information about how traffic handlers are assisting during an incident. While not an exact 1-to-1 mapping with response phases, these status levels provide an easy-to-understand way for those not regularly participating in the traffic system to quickly understand what is occurring. Table 1 below defines these status levels.

Table 1 - NTS Status definitions

NTS Status	Response phase	Definition
Normal operation	Phase 1	Traffic nets are operating within their regular schedules. No known potential sources of emergency, priority, or welfare traffic at this time.
Standby	Phase 2	The potential exists for an event that may lead to emergency, priority, or welfare traffic. Traffic handlers are prepared to respond if needed.
Responding	Phase 3	Actions are actively underway to support an event that has a high probability of or is currently generating emergency, priority, or welfare traffic.
Monitoring	Phase 4	The event that could or did cause emergency, priority, or welfare traffic has passed. Traffic handlers continue to operate outside of normal operation for a short period as a precaution. Discussions take place to capture and document lessons learned.

Traffic system response

During Laura, the response timeline for the traffic system in North Texas generally ran from August 25, 2020 15:29 to August 27 20:27 Central Daylight Time, with full system wind-down the evening of August 29 and the follow-up discussion about lessons learned on August 30. Figure 4 below shows a general summary of key events during this timeline.

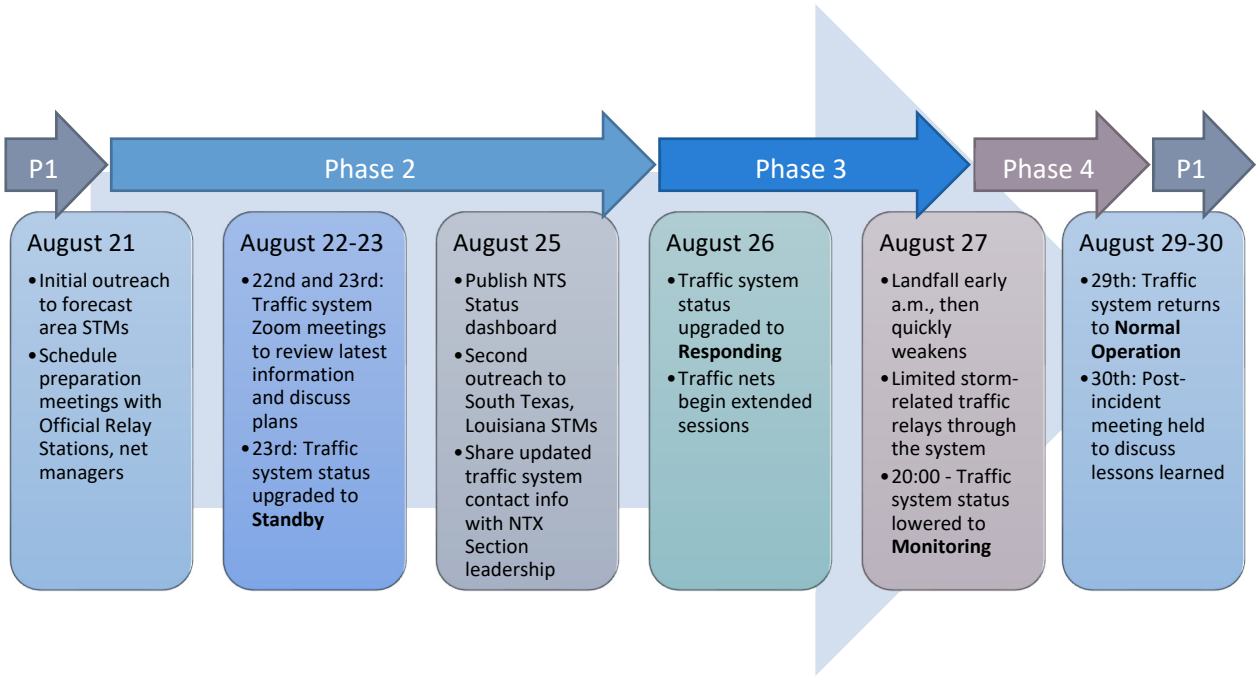


Figure 4 - This general timeline provides information on key activities during Hurricane Laura, and how they follow the incident management lifecycle.

Phase 1: Continuous practice

North Texas traffic nets in operation prior to and during Laura

In addition to area, regional, and digital traffic networks that comprise the entire traffic system, the traffic nets listed in Table 2 serve the North Texas Section as pathways to move traffic into, within, and out of the Section.

Table 2 - Traffic net list

Net	Manager	Affiliation	Website
7290 Traffic Net (7290)	Jo Ann Keith, KA5AZK	Independent	7290trafficnet.org
DFW Metroplex Traffic Net (DFW)	Sean Peoples, AA5SA	National Traffic System	dfwtrafficnet.org
Texas CW Net (TEX)	Position open (Steven Phillips, K6JT)	Independent	k6jt.com
Texas Slow Net (TSN)	Jason Patterson, KD5RQB	National Traffic System	atcweb.com/tsn/Texas_Slow_Net.htm
Texas Traffic Net (TTN)	Russell Plocheck, WE5TXS	National Traffic System	daytimetexastrafficnet7285.org

Daily routine traffic builds and sharpens traffic handler skills

Before Laura, these traffic nets were holding regular net sessions and relaying routine traffic. This traffic includes general greetings offering well-wishes, and test messages to measure delivery success rates and transit times. When not responding to the potential for emergency, priority, or welfare traffic, this routine traffic is relayed **every day**, 365 days a year, as part of continuously practicing, including helping amateur radio operators learn about the art of traffic handling, and honing the skills of long-term traffic net participants. By continuously practicing, when an incident does occur, we are ready and to assist at a moment's notice with quality, effective emergency communications.

Phase 2: Incident preparation

August 21 (Friday) – Initial traffic system preparation

With the tropical cyclones moving closer to the United States and the expectation that they would strengthen prior to making landfall, I started taking steps to connect with key contacts. I scheduled Zoom meetings with Net Managers and Official Relay Stations in the Section for Saturday and Sunday, and I reached out to Section Traffic Managers (or Section Managers for those sections without an appointed STM) throughout the southeast to discuss potential response and to answer questions. This pre-incident collaboration reaffirms our ability to assist, helps set expectations on how the response will flow, and provides an opportunity to answer any incident-specific questions in terms of how the traffic system can assist.

I received responses from STMs in the Northern Florida and West Central Florida Sections that provided useful information, such as that 80 meters was working better for folks versus 40 for traffic handlers there. At that time, Florida was in the potential impact area, and I appreciate hearing back from them.

I also published the first update related to these cyclones to various North Texas Section communication channels. Links to these resources are in the Appendix, and include the Section Traffic Manager email list, the North Texas Section Groups.io discussion group, and STM twitter account. It is important that amateur radio operators receive updates as it helps answer questions about how amateur radio is assisting with the incident, reaffirms the understanding that emergency communications are the highest priority and must be treated as such, and mitigates misinformation from spreading. Copies of this first update and other updates I provided are in the Appendix. This first update explained that I and other

leadership from the Section are monitoring the tropical cyclones and that I would be meeting with key contacts over the next few days to review storm information and discuss potential response.

In addition to sending this update, I discussed this information during the DFW Metroplex Traffic Net sessions' announcements periods and was available for any questions that may have come up. Given I am a regular participant in this traffic net, I knew there would be an unspoken expectation that I would provide updates for those monitoring. This also provided an additional way to raise awareness, as not everyone participating in traffic nets is subscribed to the North Texas Section communication channels.

August 22 (Saturday) – First traffic system meeting

We held our first Zoom meeting with net managers and Official Relay Stations to review best practices and answer any questions. This provided an opportunity for traffic handlers to meet outside of regularly scheduled traffic nets to review the latest weather information and to verify understanding on how the system would work. While the system prioritizes all traffic flowing through it, even when there isn't an incident taking place, setting up these meetings provides time to set expectations ahead of the storms, allow new Official Relay Stations to meet other key traffic handlers, and answer questions specific to the incident.

I sent another update via the North Texas Section communications channels explaining that the storm forecast cones changed, with Louisiana now expected to be impacted by both cyclones. I also updated those monitoring the DFW Metroplex Traffic Net sessions during their announcements periods.

Given the forecast shift away from Florida and towards Texas and Louisiana, Helen Straughn, WC4FSU, the Section Traffic Manager for the ARRL Northern Florida Section emailed me to offer their assistance should our area need it, an offer that I am very appreciative of.

August 23 (Sunday) – Second traffic system meeting

We held our second Zoom meeting with net managers and Official relay stations to review the latest weather information and again answer questions. Holding a second meeting also provided an option for traffic handlers that could not attend the first meeting. Shortly after this meeting I upgraded our Section's traffic system status from Normal Operations to Standby to reflect ongoing activity under Phase 2 of the incident response lifecycle, and going forward we monitored for any storm-related traffic entering the system due to Marco or Laura.

August 25 (Tuesday) – Two days before landfall

With Marco weakening, our focus became Laura as it was expected to intensify greatly in strength. At this point I realized the need for a central location for the latest information and status of the traffic system in North Texas. At 13:00 I started building the NTS Status dashboard. A screenshot from part of this dashboard appears in Figure 5 below. It included information about traffic nets running extended sessions, forecast cones from the National Hurricane Center, wind maps, and links to key resources such as the National Weather Service pages for impacted areas.

Over time, the dashboard evolved to provide additional details relevant to our response, such as radar imagery, NWS warnings, and audio briefings from the National Hurricane Center, and wound down as Laura weakened. This agility means we can tailor the dashboard for the particulars of an incident and provide relevant information as it becomes needed, versus hosting a static page with limited information that may lose relevance as the incident progresses.

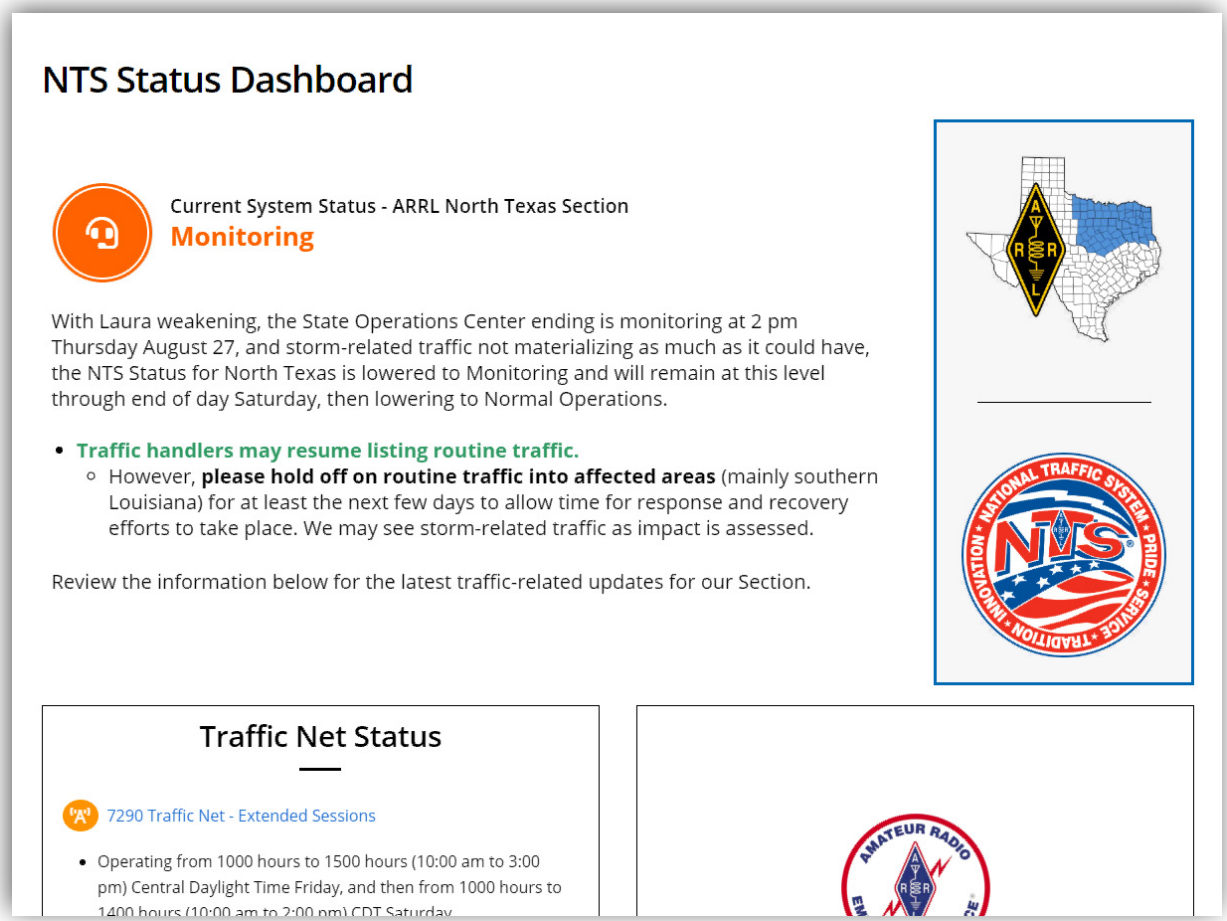


Figure 5 - The NTS Status Dashboard, such as seen here during Phase 4, provided a central location for the latest traffic system information, along with radar and satellite imagery, updates from the National Hurricane Center, and high-level information about ARES response.

By 14:30 the dashboard was complete and published. I then sent an update to the North Texas Section communication channels about what the dashboard provides and how to access it. I also emailed details the NTS Groups.io discussion group so that traffic handlers outside of our Section could find the latest information in a centralized manner. This was important as welfare traffic from affected areas could relay to areas outside of the Texas/Louisiana area, and traffic handlers should have current, relevant information available to help them understand what they may see coming through the system.

This dashboard had many visitors, with 82 page views on its first day, 191 on its second day as Laura approached Louisiana, and 54 visits on its third day post-landfall. Figure 6 below shows where visitors were located when visiting the dashboard.

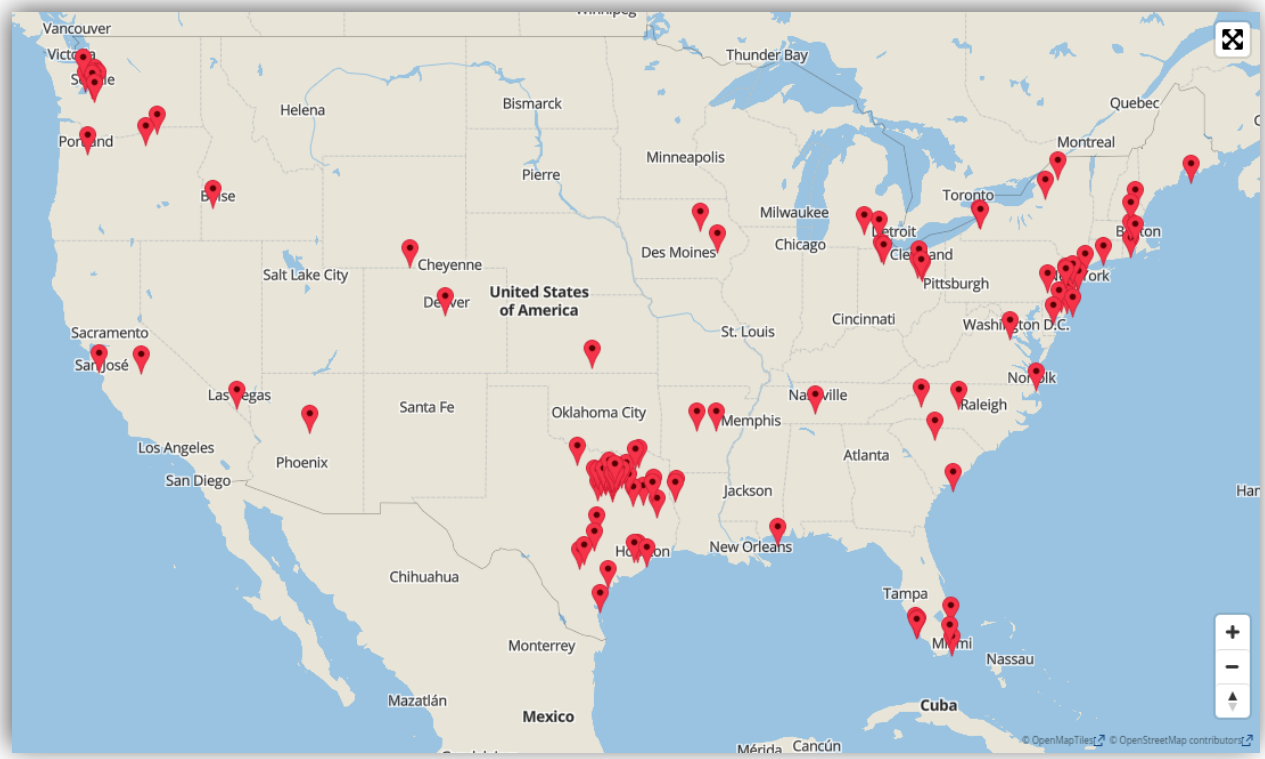


Figure 6 – With over 300 visits from across the country, the NTS Status Dashboard provided real-time information about how the traffic system was responding and details, including radar, satellite, and wind imagery about Hurricane Laura.

The dashboard is only as powerful as the information feeding it. Jo Ann Keith, KA5AZK, is the net manager for the 7290 Traffic Net, and to help me stay up to date on their response, she emailed me a schedule for their extended net session plans. Even though the 7290 Traffic Net is an independent traffic net versus an NTS-affiliated net, this update, and others I received from her throughout our response, were extremely helpful as I continued to monitor and communicate about how the traffic system is responding. I also received regular updates from Sean Peoples, AA5SA, the net manager for the DFW Metroplex Traffic Net, an NTS-affiliated net, to remain aware of readiness at the local net level. I appreciate Jo Ann and Sean working to ensure I was updated throughout Laura's approach, landfall, and weakening.

In addition to creating the dashboard and sending an update, I shared up-to-date contact information with North Texas Section leadership, net managers, and Official Relay Stations to verify they had it readily available in case of an immediate traffic system need. While the traffic system can immediately accept and relay emergency, priority, and welfare traffic without prior notification, if a specific need arises, such as a need to establish a link between the system and a traffic handler deployed to an impacted area, having contact information readily available helps provide a faster response.

Last, I set up a Discord server as a backup communications tool should Zoom and/or email become unavailable. While this risk was extremely low, I felt it appropriate to mitigate it and send information about how to access it before it was potentially needed. While we did not need it, we will keep this as a

tool we can utilize for future incidents, or for other purposes as we explore options on how to respond to future incidents.

Phase 3: Incident response actions

August 26 (Wednesday) – The day before landfall

Shortly after midnight I sent the next update via the North Texas Section communication channels. This update explained that the 7290 Traffic Net was starting extended operations, and I asked that traffic to affected areas be avoided so that the system could focus on any emergency, priority, or welfare traffic coming from affected areas. While the system is able to property triage traffic and relay the most urgent traffic first without prior coordination or planning, avoiding a potential increase in traffic headed into an affected area allows for traffic handlers to stand by for any traffic from affected areas needing immediate attention.

I also provided other details in this update, such as adding satellite imagery and National Weather Service warnings for Texas and Louisiana to the NTS Status dashboard, and cautioned against self-deploying. Deploying to an incident without being requested could disrupt the response plans, or cause injury to the person self-deploying or others. While the desire to self-deploy is backed by positive intent, you should travel to an affected area to assist **only when you are officially requested**, responding as part of a known volunteer response organization such as Civil Air Patrol, Community Emergency Response Team, Red Cross, Medical Reserve Corps, Amateur Radio Emergency Service, or other volunteer organizations active in disasters (VOADs).

At 02:30, with Laura continuing to intensify, I upgraded the traffic system status from Standby to Responding to reflect the actions in motion to stand up extra traffic handling capacity and monitor for storm-related traffic, an action taken under Phase 3 of the incident response lifecycle.

In a few instances, I have been asked why using the term Responding is appropriate when we haven't yet seen storm-related traffic. Within the *National Response Framework,* the term response "includes actions to save lives, protect property and the environment, and meet basic human needs. Response also includes the execution of emergency plans and actions to support short-term recovery [3]." Emergency traffic cannot wait for the traffic system to stand up; it needs to be relayed without delay at the moment it is created. This traffic could come from a hospital, a school, an amateur radio operator at their home, or from a ship or offshore structure in the Gulf of Mexico where the storm is currently strengthening. There is also potential for emergency, priority and welfare traffic related to storm surges which arrive before the hurricane makes landfall. Given we are executing actions to support emergency traffic that may arise at any moment without warning, upgrading the status to Responding was warranted at this point.

After updating the NTS Status dashboard with new details, I sent another update via the North Texas Section communication channels, as well as the NTS Groups.io discussion group. This included a request to hold off on any routine traffic to the South Texas and Louisiana sections, and a request that traffic handlers in the North Texas Section hold any routine traffic so that traffic nets operating could focus on any potential storm-related traffic coming from those areas.

At 10:15 I added the ability to listen to current National Hurricane Center audio briefings to the NTS Status dashboard, and at 17:15 I added radar imagery given Laura was now within range of coastal

weather radar sites. Later that day, I updated stations monitoring the 18:30 session of the DFW Metroplex Traffic Net during its announcements period.

19:04 brought the second-to-last update to the North Texas Section communication channels, where I explained that the Texas State Operations Center checked in and was monitoring one of our traffic nets along with other Emergency Operations Center resources. I also informed that we had not seen any storm-related traffic, and provided details about the NTS Status dashboard updates.

Phase 4: Post-incident activities

August 27 (Thursday) – Laura makes landfall

Laura made landfall in the early morning hours and quickly weakened thereafter. Thankfully, the need for storm-related traffic in the system did not occur. The Texas State Operations Center ended monitoring the traffic system at 14:00. After reviewing situation reports from net managers explaining there was only one piece of storm-related traffic containing a welfare request from outside the affected area, and reviewing the latest weather information, the traffic system status was lowered to Monitoring, reflective of entering Phase 4 of the incident response lifecycle.

At 20:27 I sent the last update to the North Texas Section communication channels with these details, explained that routine traffic may resume as normal, and asked traffic handlers to continue holding off on any routine traffic into affected areas for the next few days given the potential for storm-related traffic containing storm assessments or other related information. I also mentioned that if we did not see anything further, after the 7290 Traffic Net resumed normal hours on Saturday, the system status would return to Normal Operation Saturday evening.

August 29 (Saturday) – Normal operations

With no additional storm-related traffic or other indicators showing the potential for storm-related traffic, the traffic system status was lowered to Normal Operation at 18:34.

August 30 (Sunday) – Post-incident discussions to review response and capture feedback

One final Zoom meeting took place, again with net managers and Official Relay Stations, to review the response, discuss how we can improve, and answer final questions. Key takeaways from this discussion are in the **Lessons learned** section below.

Lessons learned

An important component of any incident response is taking time to review how response activities carried out and capture any lessons that can be learned. Here are some key takeaways based on the traffic system's response during Laura, including some general recommendations.

Pre-incident meetings are critical for setting the stage

While the traffic system regularly relays traffic on a daily basis and can immediately adapt to and accept any emergency, priority, and welfare traffic introduced into it, holding a pre-incident meeting with key traffic system personnel helps set the stage for the response. This discussion is an opportunity to raise awareness about an important aspect of the incident one person noticed that other may have otherwise missed. Amateur radio operators that have participated in similar past incidents can offer guidance and data points that can help mold next steps and action items. It also clarifies participation, especially when new Official Relay Stations or net managers are involved for the first time.

Recommendation: Section Traffic Managers, net managers, and Official Relay Stations should meet regularly outside of traffic nets to discuss how the system is working in their area, and meet ahead of upcoming potential needs for emergency, priority, and welfare traffic to ensure everyone is on the same page and ready to act. Net managers should also meet with net control stations regularly and before potential incidents for these same reasons.

Offer training sessions detailing how to manage traffic during an incident

Today the North Texas Section offers recurring training that introduces amateur radio operators to traffic handling and how participation helps build their skills. Traffic handlers that have built their routine traffic handling skills, but have not yet assisted during an incident, may have questions about managing emergency, priority, and welfare traffic, and would benefit from additional training. Questions this additional training could cover include:

- When is it appropriate to send welfare traffic into an affected area?
    - *When traffic handlers in the affected area indicate they are ready to take this traffic.*
- What about resuming routine traffic to that affected area?
    - *When traffic handlers in the affected area indicate they are ready to take this traffic.*
- If routine traffic is in the system and headed into an affected area, but that area is not ready, what should be done?
    - *This is dependent on the particulars of the incident. Generally, when the traffic is originated, it should relay via appropriate liaison stations. As it approaches the affected area, the station bringing it to that area can hold it, or a station close to but outside the affected area can accept the traffic, as instructed by the Net Control Station. Service messages should be sent to originating stations as appropriate, such as if a piece of traffic is being held for an extended period until the affected area indicates they are ready to take it.*

- How should incident-related activities be tracked and accounted for, such as for Station Activity Reports and Public Service Honor Roll?
    - *Document your service hours, attended public service nets, and traffic handling activities as normal. Also, complete ICS 214 Activity Logs as required in your area.*
- When and how are Incident Command System Activity Logs (ICS 214 forms) appropriate?
    - *This depends on the type of incident, the requirements from your Section Traffic Manager or other leadership, or requirements from the agency being served.*

Recommendation: Develop and hold live training sessions outlining these and other area-specific items. This training, possibly a combination of PowerPoint presentation and question-and-answer periods, must welcome all traffic handlers new and experienced, and mention that in some cases, there is no clear if-this-then-that approach and that traffic handlers may need to pull an appropriate approach from the "traffic handler's toolbox" based on what is known at the time and what set of actions makes the best sense. Clarify use of ICS 214 forms in your area.

Consider tools that can notify traffic handlers of an immediate need

Incidents such as hurricanes have the luxury of forewarning, but there may be cases where there is no preparation phase, meaning the system needs to immediately go from Phase 1 (Continuous practice), to Phase 3 (Incident response actions) without notice. Some emergency response teams use tools such as text message notifications, phone blasts, or similar approaches that are provided by tools like CodeRED or Everbridge. Traffic handlers in North Texas do not have a notification system like this in place.

Such "immediate need" cases are rare, but there is potential. For example, on June 15, 2020 T-Mobile suffered a service outage causing calls and text messages to fail [4]. Thankfully, this event did not escalate to a long-term communications system failure.

It is also important to note that solutions dependent on text or phone call notification methods use the same communications systems we expect to fail in a widescale incident. This could present a race condition in that our ability to receive a notification becomes dependent on:

- How fast the main communications systems fail
- How quickly key personnel issue a notification after an official request to activate
    - And by extension, acknowledge the risk that if the person sending the notification receives a "notification sent successfully" response, but communication systems fail completely while the notification is in transit or the notification is otherwise not delivered, that person could falsely believe traffic system resources were notified
- How rapidly the notification traverses various systems to reach appropriate contacts before the communications system fails completely

Again, circumstances warranting an "immediate need" are rare, and the risk of encountering this race condition is even rarer. However, while there may not be an immediate use case that comes to mind for this notification system, it is worthwhile to investigate.

Recommendation: Investigate if there is a strong need for a notification system for your traffic handling team, and if so, research appropriate tools, analyze risks, and implement. If not, document the information used to reach this determination so that it can be referenced later.

Offer a single resource for the latest incident response information

The NTS Status Dashboard proved to be a valuable resource during Hurricane Laura. Traffic handlers from within and outside the Section thanked me for having these datapoints in a single, real-time updated location. It saved them time from needing to look through past emails, monitor individual traffic nets, or visit various weather-related websites for the latest information.

Recommendation: Create and actively update a single online resource where traffic handlers, other amateur radio operators, and the public can go to find the latest traffic system response information for your Section.

Clarify how to convert an ICS 213 General Message form to the radiogram form for relaying in the traffic system

While this did not occur during Laura, in the past there have been attempts to relay an ICS 213 General Message form without first transferring it to a radiogram, the format used by the traffic system. While there are commonalities between what these forms contain, an ICS 213 form does not have components that aid with relaying over the air, such as metadata in the radiogram's header section, to help with efficiency, such as information that helps prevent errors in the message text.

One challenge that could occur is if the message exceeds the 25 words (groups) available on the typical radiogram form. While digital traffic nets relay these without any noticeable impact, a phone (voice) or CW net will need to take extra time to complete relaying them, and the potential increases for errors to make their way into the message. The 25 blanks on the radiogram template, while not indicative of a maximum message length, help ensure fast relaying, which keeps capacity open through efficient and concise message text, and limits the amount of chance that mistakes can work their way into the traffic. Like with any traffic entering the system, striking a quality balance between brevity and clarity is paramount. If the message is a request for supplies, and it needs 45 words to get that request through, the radiogram should, of course, carry all 45 words.

Additionally, unless the traffic system has stood up additional traffic handling capacity, such as 24-hour traffic nets during a widescale incident, the radiogram carrying the ICS 213 will relay through the system based on normal operating hours. Given ICS 213 forms are used as part of the Incident Command System, a standardized approach to emergency response, it is reasonable to expect that the person bringing the radiogram traffic carrying the ICS 213 will need it relayed to its destination without delay, when in reality it could be a day or two before it is delivered to its destination. Use good judgment when accepting into the traffic system a radiogram carrying an ICS 213's contents.

Recommendations:

If an ICS 213 form is brought to a traffic net without being transferred to a radiogram first, this attempt to relay should ideally move to a different frequency with someone from the traffic net staff to assist, such as with transferring to a radiogram in real-time over the air, or if necessary, find ways to relay it outside the traffic system, to keep the message moving towards its destination. Ideally, pre-incident discussions and trainings will cover how to copy an ICS 213 form into the radiogram format so that this issue does not occur.

While transferring an ICS 213 to a radiogram prior to listing it helps ensure that the message can traverse the system like any other radiogram, it is also understandable that a traffic handler may not feel comfortable with receiving this traffic as it will contain "extended data" in various locations like OP NOTEs, or may go well beyond the 25 blanks available on the radiogram template. In these cases, the traffic handler should kindly decline taking the traffic and another traffic handler should take it instead.

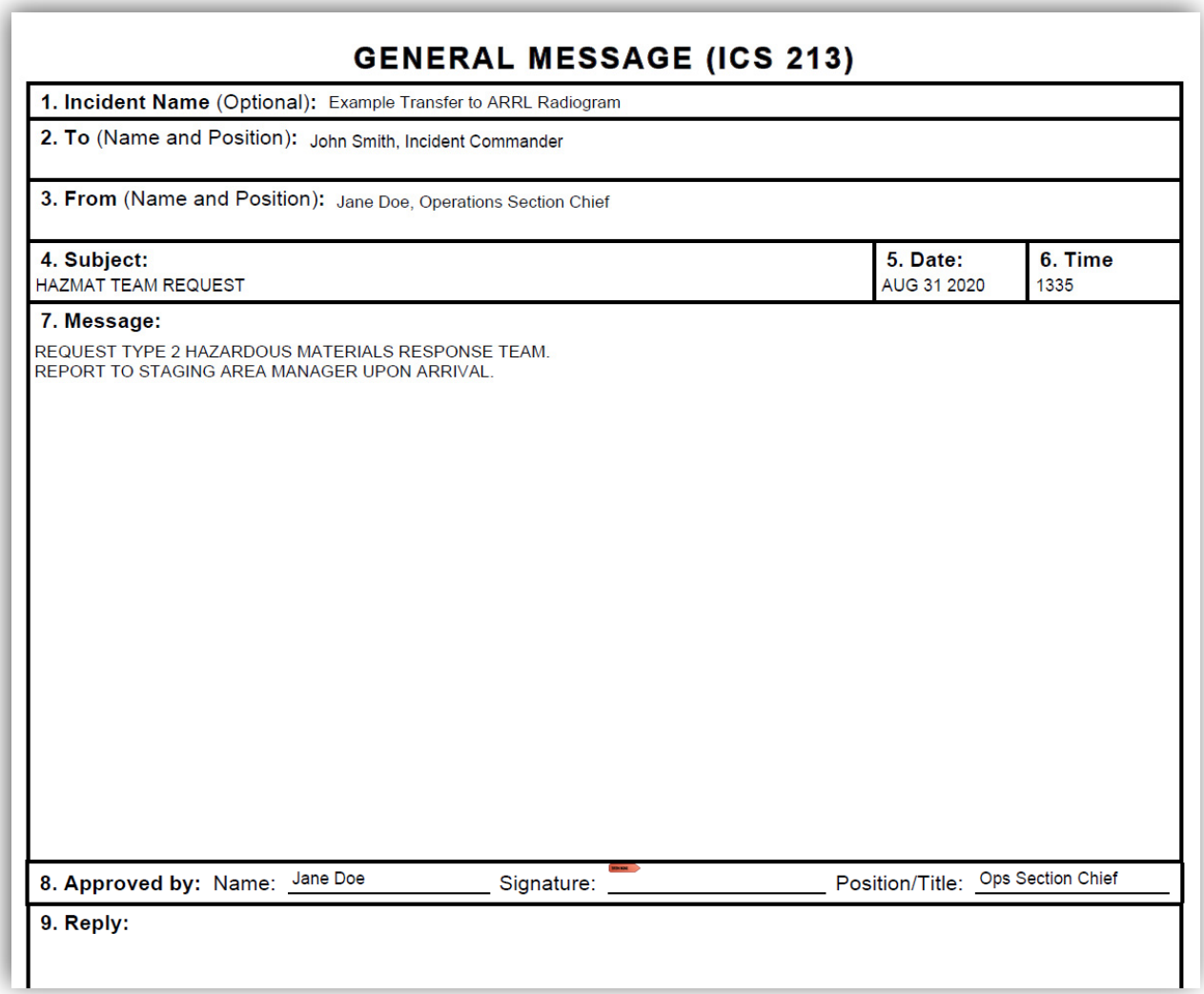
To transfer an ICS 213 to a radiogram for relaying in the traffic system, you can use the suggested method in Table 3 below. Note that this is one approach to transferring a 213 to a radiogram; it is not a standard, and some Sections and other amateur radio groups may have other solutions in place.

Table 3 - Suggestion on how to transfer an ICS 213 to a radiogram

ICS 213 field	Equivalent radiogram field
1. Incident Name (Optional)	If possible, do not include an incident name. If it is necessary, place it in the addressee section OP NOTE along with an indicator the radiogram is carrying an ICS 213. For example: OP NOTE ICS 213 INCIDENT NAME HURRICANE LAURA
2. To (Name and Position)	Addressee section
3. From (Name and Position)	Signature
4. Subject	Addressee section OP NOTE, along with an indicator the radiogram is carrying an ICS 213. For example: OP NOTE ICS 213 SUBJECT SHELTER SUPPLY REQUEST
5. Date	Date
6. Time	Time filed **Note**: Time filed reflects when the traffic entered the traffic system, which, from the incident's perspective, is when the message was first created. For example, when relaying the message, "I need a generator in 6 hours," the time filed is not based on when the radiogram was first relayed, but when the traffic was written onto the form. To be clear, from the incident's perspective, the time on the ICS 213 is the moment when the traffic started moving, and is the correct time to place on the radiogram when transferring it. I recognize this goes against what is described in the NTS Methods and Practices Guidelines document which says time filed is when the message enters into the system by the station of origin. I agree with this approach when the station of origin is also the author of the message and is relaying routine traffic. I recommend the approach described above when the station of origin is not the author of the message, regardless of the precedence. From the message author's perspective, when you take their message, that is the moment the message enters the system, because from their perspective, you ***are*** the system.
7. Message	Place in the text section. Unless not possible and extremely necessary, the message should try to remain within the 25 words

	(groups) used on the radiogram form. If more words are necessary, place all words in the message. **Do not remove words from the message in an attempt to fit within the 25 blanks on the template, ever.**
8. Approved by (Name and Position/Title)	If necessary, place in signature OP NOTE. For example: JANE DOE OPERATIONS SECTION CHIEF OP NOTE APPROVED BY JOHN SMITH INCIDENT COMMANDER
9. Reply	Do not transfer
10. Replied by (Name, Position/Title, Signature)	Do not transfer
Fields on a radiogram but not on an ICS 213	
Precedence and Handling Instruction	Use the appropriate precedence and, if warranted, handling instruction.
Station of Origin	As usual – the amateur radio operator introducing this radiogram into the traffic system should use their call sign.
Place of Origin	Use the incident location or source of the ICS 213, if known. If not, use the location of the amateur radio operator introducing this radiogram into the traffic system.
Addressee section OP NOTE	Ideally, include an OP NOTE here indicating that the radiogram is carrying an ICS 213 form, even if no subject or incident name is included: OP NOTE ICS 213

Below are ICS 213 and radiogram examples that exemplify this suggested approach.



GENERAL MESSAGE (ICS 213)

1. Incident Name (Optional): Example Transfer to ARRL Radiogram

2. To (Name and Position): John Smith, Incident Commander

3. From (Name and Position): Jane Doe, Operations Section Chief

4. Subject:	**5. Date:**	**6. Time**
HAZMAT TEAM REQUEST	AUG 31 2020	1335

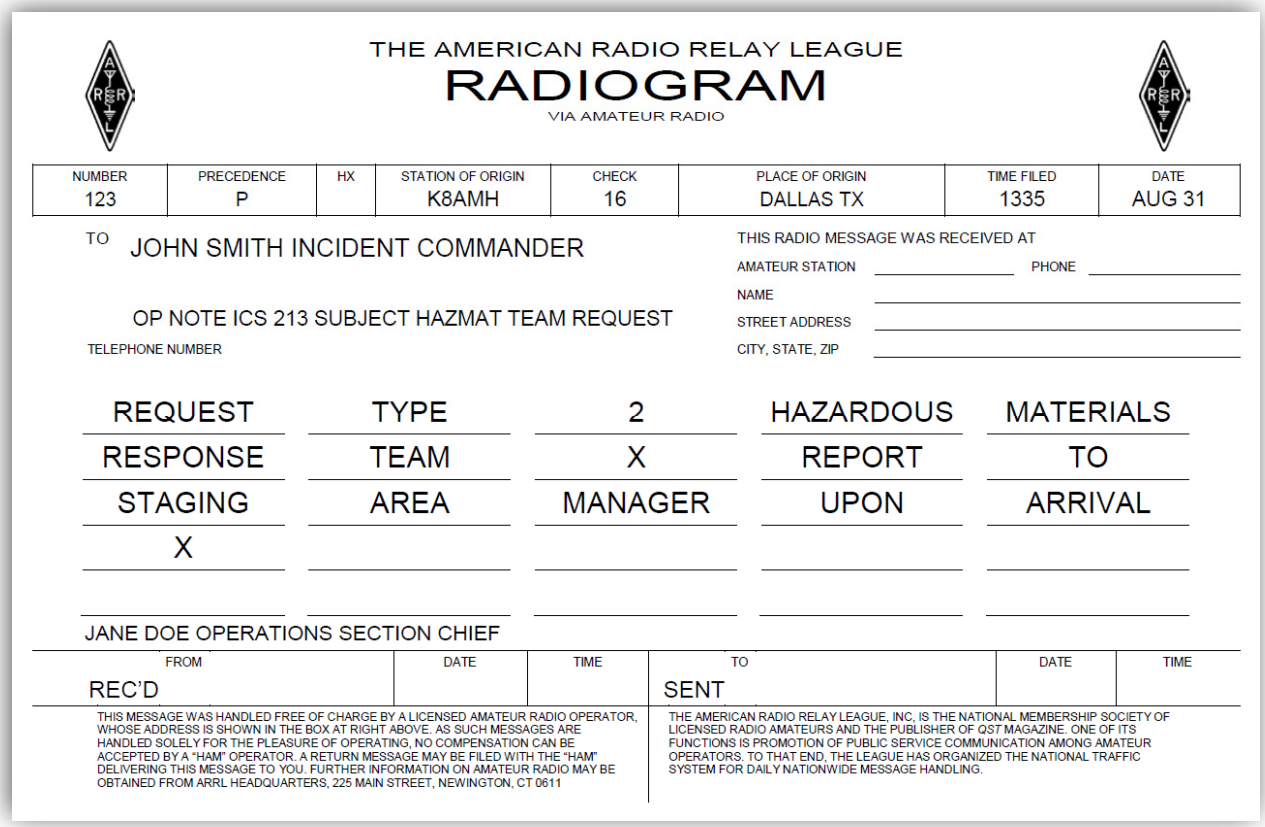
7. Message:

REQUEST TYPE 2 HAZARDOUS MATERIALS RESPONSE TEAM.
REPORT TO STAGING AREA MANAGER UPON ARRIVAL.

8. Approved by: Name: Jane Doe Signature: Position/Title: Ops Section Chief

9. Reply:

Figure 7 - Exaple ICS 213 General Message form.



THE AMERICAN RADIO RELAY LEAGUE

RADIOGRAM

VIA AMATEUR RADIO

NUMBER	PRECEDENCE	HX	STATION OF ORIGIN	CHECK	PLACE OF ORIGIN	TIME FILED	DATE
123	P		K8AMH	16	DALLAS TX	1335	AUG 31

TO JOHN SMITH INCIDENT COMMANDER

OP NOTE ICS 213 SUBJECT HAZMAT TEAM REQUEST

TELEPHONE NUMBER

THIS RADIO MESSAGE WAS RECEIVED AT

AMATEUR STATION _____ PHONE _____

NAME _____

STREET ADDRESS _____

CITY, STATE, ZIP _____

REQUEST	TYPE	2	HAZARDOUS	MATERIALS
RESPONSE	TEAM	X	REPORT	TO
STAGING	AREA	MANAGER	UPON	ARRIVAL
X				

JANE DOE OPERATIONS SECTION CHIEF

FROM	DATE	TIME	TO	DATE	TIME
REC'D			SENT		

THIS MESSAGE WAS HANDLED FREE OF CHARGE BY A LICENSED AMATEUR RADIO OPERATOR, WHOSE ADDRESS IS SHOWN IN THE BOX AT RIGHT ABOVE. AS SUCH MESSAGES ARE HANDLED SOLELY FOR THE PLEASURE OF OPERATING, NO COMPENSATION CAN BE ACCEPTED BY A "HAM" OPERATOR. A RETURN MESSAGE MAY BE FILED WITH THE "HAM" DELIVERING THIS MESSAGE TO YOU. FURTHER INFORMATION ON AMATEUR RADIO MAY BE OBTAINED FROM ARRL HEADQUARTERS, 225 MAIN STREET, NEWINGTON, CT 0611

THE AMERICAN RADIO RELAY LEAGUE, INC, IS THE NATIONAL MEMBERSHIP SOCIETY OF LICENSED RADIO AMATEURS AND THE PUBLISHER OF *QST* MAGAZINE. ONE OF ITS FUNCTIONS IS PROMOTION OF PUBLIC SERVICE COMMUNICATION AMONG AMATEUR OPERATORS. TO THAT END, THE LEAGUE HAS ORGANIZED THE NATIONAL TRAFFIC SYSTEM FOR DAILY NATIONWIDE MESSAGE HANDLING.

Figure 8 - Example radiogram carrying the ICS 213 General Message form above.

Appendix

Traffic handlers during Hurricane Laura

The traffic system would not be able to operate without the help of numerous traffic handlers both inside and outside the Section. Below are just some of the amateur radio operators that practice traffic handling virtually every day in preparation for potential emergency and welfare communications needs, and my sincere thanks for the lasting contributions they have made to providing this critical public service.

I also want to thank the countless amateur radio operators who participate in traffic nets across the country and beyond. The system works because of your dedication, and what we are able to achieve together in providing quality emergency communications when all else fails would not be possible without your help. Please know that I deeply appreciate you.

Sean Peoples, AA5SA
***Net Manager**, DFW Metroplex Traffic Net*

Victor Gunnoe III, AF5OS
***Alternate Net Control**, 7290 Traffic Net*

Ross Watson, AF5QK
***Net Control Station**, DFW Metroplex Traffic Net*

Glenn Langhoff, AI4VW
***Net Control Station**, DFW Metroplex Traffic Net*

George Bobo, K5BMR
***Net Control Station**, 7290 Traffic Net*

Tim Staley, K5TGS
***Net Control Station**, 7290 Traffic Net*

Steven Phillips, K6JT
Official Relay Station
Digital Traffic Network

Jo Ann Keith, KA5AZK
Official Relay Station
***Net Manager**, 7290 Traffic Net*

Larry Burchett, KC0M
***Alternate Net Control**, 7290 Traffic Net*

Shelly Smith, KC5MGY
***Net Control Station**, DFW Metroplex Traffic Net*

Jason Patterson, KD5RQB
***Net Manager**, Texas Slow Net*

Dave Edwards, KE5DME
***Alternate Net Control**, DFW Metroplex Traffic Net*

Randy Patterson, KE5JIT
***Net Control Station**, DFW Metroplex Traffic Net*

Mary Peelman, KE5LTA
***Net Control Station**, 7290 Traffic Net*

Roger Elkinton, KE5YTA
Official Relay Station
***Net Control Station**, DFW Metroplex Traffic Net*
Digital Traffic Network

John Hazelton, KF5IOU
Official Relay Station
***Net Control Station**, DFW Metroplex Traffic Net*
***Alternate Net Control**, 7290 Traffic Net*
Digital Traffic Network

Justin Lentz, KF5IVJ
Official Relay Station
***Net Control Station**, DFW Metroplex Traffic Net*

Ron Ford, KF5OMH
Official Relay Station

George Bradford, KF5QEZ
Net Control Station, 7290 Traffic Net

Korky Kathman, KG5NNA
Official Relay Station
Assistant Net Manager, DFW Metroplex Traffic Net

David Ricker, KG5VSR
Official Relay Station
Net Control Station, DFW Metroplex Traffic Net

Melissa Tanner, KI5GRH
Official Relay Station
Alternate Net Control, DFW Metroplex Traffic Net

Alan Walraven, N5MSE
Net Control Station, 7290 Traffic Net

Larry Altman, N5QGD
Alternate Net Control, 7290 Traffic Net

Tony Mendina, NT5TM
Alternate Net Control, DFW Metroplex Traffic Net

Gary Pierce, NV5Y
Alternate Net Control, 7290 Traffic Net

Sam Sitton, W5CU
Alternate Net Control, 7290 Traffic Net

Newt Campbell, W5DAD
Net Control Station, 7290 Traffic Net

Jim Bomer, W5IM
Net Control Station, 7290 Traffic Net

Tom Earnest Sr, W5UFO
Net Control Station, 7290 Traffic Net

Ray Lindsay, W7BBQ
Net Control Station, DFW Metroplex Traffic Net

Calvin Gluck, W7KYG
Net Control Station, DFW Metroplex Traffic Net

Don Murray, W9VE
Net Control Station, DFW Metroplex Traffic Net

Gary Sherard, WA5FLV
Alternate Net Control, 7290 Traffic Net

Gary Caywood, WA5VAS
Alternate Net Control, 7290 Traffic Net

Russell Plocheck, WE5TXS
Net Manager, Texas Traffic Net

Cotton Inks, WO5R
Net Control Station, 7290 Traffic Net

Traffic system updates

These are the email updates I sent during our response to Laura.

August 21, 2020 17:03 CDT - Update regarding the upcoming storms

Hello everyone,

With tropical storm 13 (now named Laura) and tropical depression 14 moving towards the Southeast, I wanted to give an update regarding the traffic system and preparations that are underway.

Traffic system involvement will depend on the impact these storms have, such as on communications, electrical, and other infrastructure. There may be no or very little traffic related to these storms, or there may be some traffic, or more.

I have reached out to Section Traffic Managers across the Southeast to check in on any specific needs that we in our Section can assist with, such as setting up additional traffic net hours, and I will meet with traffic handlers and net managers in our Section to discuss these storms.

If you have friends or family within the tracks of these storms, establish an **out-of-area contact**. Those affected can update the out-of-area contact, and then other friends and family can receive updates from the out-of-area contact. This saves the need for those affected to try and update a large number of people, especially when communications infrastructure may be impacted. This person can also serve as a destination for any radiogram-based welfare traffic. Please ask anyone you may know in these areas that may be impacted by these tropical depressions to identify their out-of-area contact, and then let your friend and family know who that contact is.

The time to prepare is now, as once the storms arrive the time to prepare ends. Please know that I, along with other Leadership in the Section including Steve Lott Smith (KG5VK) our Section Manager and Greg Evans (K5GTX) our Section Emergency Coordinator are monitoring these storms and will provide updates should they be warranted.

You can monitor the latest through your local news outlets and the National Hurricane Center.

As always, my thanks to traffic handlers in our Section that help keep traffic moving and work so diligently to provide this vital service. While I hope there will not be a need for traffic or any other amateur radio assistance related to these storms, I stand confident in our capabilities in the National Traffic System, the Amateur Radio Emergency Service, and beyond should the need arise.

73,
Aaron | K8AMH

August 22, 2020 18:35 CDT - Update on Tropical Storms Laura and Marco

This is an update regarding the traffic system and tropical storms Laura and Marco.

Updated forecast cones have tropical storm Marco making landfall as a hurricane in Southeast Louisiana at 1 pm Monday, impacting the cities of New Orleans and Baton Rouge, and Mobile Alabama. Marco will then take a more westerly path to central Louisiana by 1 pm Tuesday as a tropical storm, and then moving to East Texas by 1 pm Wednesday as a tropical depression. Assuming this current forecast holds, here in the Dallas/Fort Worth Metroplex we would experience wind and rain, but as to what extend will depend on what happens over the next couple of days.

Tropical storm Laura, according to its forecast cone, will make landfall as a hurricane in, again, Southeast Louisiana at 2 pm Wednesday and affecting the same areas as Marco. Turning north at this point, it will seemingly follow the Mississippi River, moving to the Louisiana/Alabama/Arkansas border meeting point by 2 pm Thursday.

Earlier today I met with net managers and official relay stations within the Section met to discuss these storms and how we would manage any storm-related traffic. This includes setting up additional traffic net hours should the extra capacity be warranted, and also ensuring that any traffic destined for affected areas is focused on welfare, priority, and emergency traffic, kindly asking that any routine traffic, such as general greetings, hold off while affected areas manage what is occurring in their areas. Welfare traffic into affected areas may also need to stand by while shelters or other such resources are established, especially if people are displaced from their homes.

As part of maintaining awareness and readiness, I will meet again tomorrow with net managers and official relay stations to review updated forecast cones and discuss if any changes are needed to our approach, but I feel we are in a good position and we are ready to assist with any weather-related traffic that would need to be relayed into or through our Section.

At this moment the main thing stations can do is ensure their personal preparedness supplies are ready to go, such as ensuring batteries are charged, and with Marco potentially coming in our direction, being ready to remain at home for a bit while the storm moves through the area, such as having fuel for generators available, food and other supplies on hand, and maintaining awareness on the ever-changing forecast cones for these storms.

If you have any questions, feel free to email me at k8amh@arrl.net.

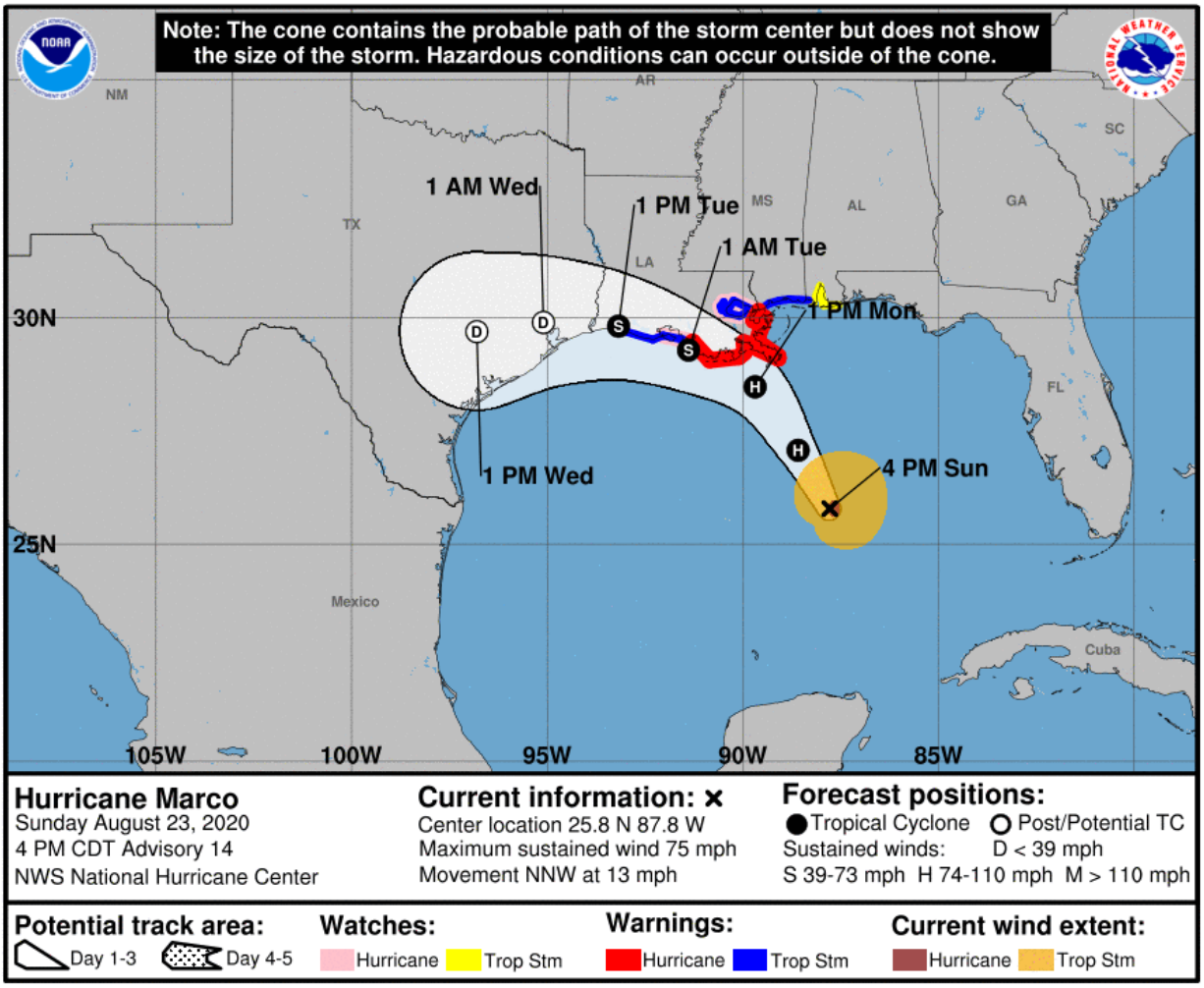
73,
Aaron | K8AMH

August 23, 2020 17:53 CDT- Update on Tropical Storm Laura and Hurricane Marco

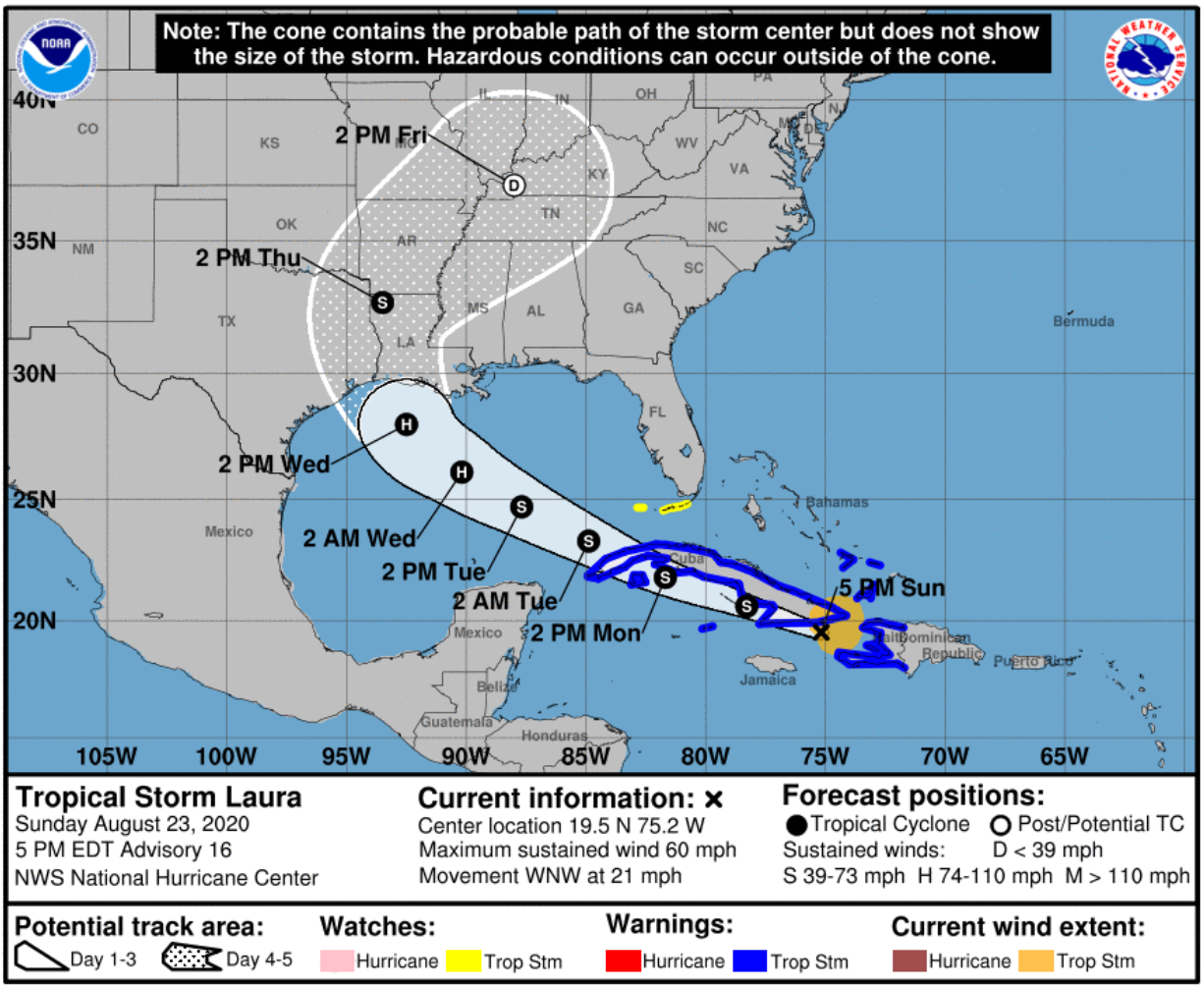
We are ready to help!

This is an update regarding the traffic system, Tropical Storm Laura, and Hurricane Marco.

The forecast cones continue to change as new data comes in. Hurricane Marco is now expected to make landfall late Monday in Southeast Louisiana, turning west, and following the coast before moving inland to the South Texas Section as a tropical depression. Here is the latest forecast cone for Hurricane Marco.



Tropical Storm Laura will make landfall late Wednesday in Southwest Louisiana, moving north until reaching the Louisiana/Arkansas border as a tropical storm, and then turn northeast. Here is the latest forecast cone for Tropical Storm Laura.



Warnings have been issued for the Louisiana and Mississippi coasts related to Hurricane Marco. No warnings have been issued related to Tropical Storm Laura at this time.

Today I again met with net managers and official relay stations in our Section to review these developments and our action plan should we see storm-related traffic. Information has also been sent to net control stations discussing these plans and how additional information will be provided should any actions outside of normal net operations be needed from them during traffic nets. The traffic system already categorizes traffic based on whether it is Emergency, Priority, Welfare, or Routine (general) traffic, and we will treat any storm-related Emergency, Priority, and Welfare traffic coming from affected areas with significant regard.

I have also heard back from other Section Traffic Managers, including Helen Straughn, WC4FSU, the Section Traffic Manager for the ARRL Northern Florida Section, who has offered her assistance to us given how these newer storm forecasts have them moving into our area instead of Florida.

Based on how these forecasts have evolved and the intensity these storms are expected to have when making landfall, we do not expect a large influx of storm-related traffic. However, if the need does arise, the traffic system is standing by and ready to assist.

Also worth noting, Greg Evans (K5GTX) our Section Emergency Coordinator has updated the Amateur Radio Emergency Service section status to Readiness Review. Just as I have asked traffic handlers to prepare for and monitor these storms, Greg asks that all ARES members check their equipment and readiness, including verifying their go-kits are well stocked and that batteries are charged. If ARES members have any questions, please reach out to your ARES Emergency Coordinator for more information.

Given the Traffic System, both inside our Section and in surrounding Sections, has reviewed these storms and is now standing by for any storm-related traffic, this will be my last update for now. Should we see large amounts of storm-related traffic come from affected areas, I will provide further updates on our activities, and net managers will update their teams with new information.

And as always, my thanks to traffic handlers and net managers here in our Section for working to move traffic on a daily basis as part of practicing and preparing for emergencies, and for working so diligently to prepare ahead of these storms. **We are ready to help!**

If you have any questions, feel free to ask me on the air, or to email me at k8amh@arrl.net.

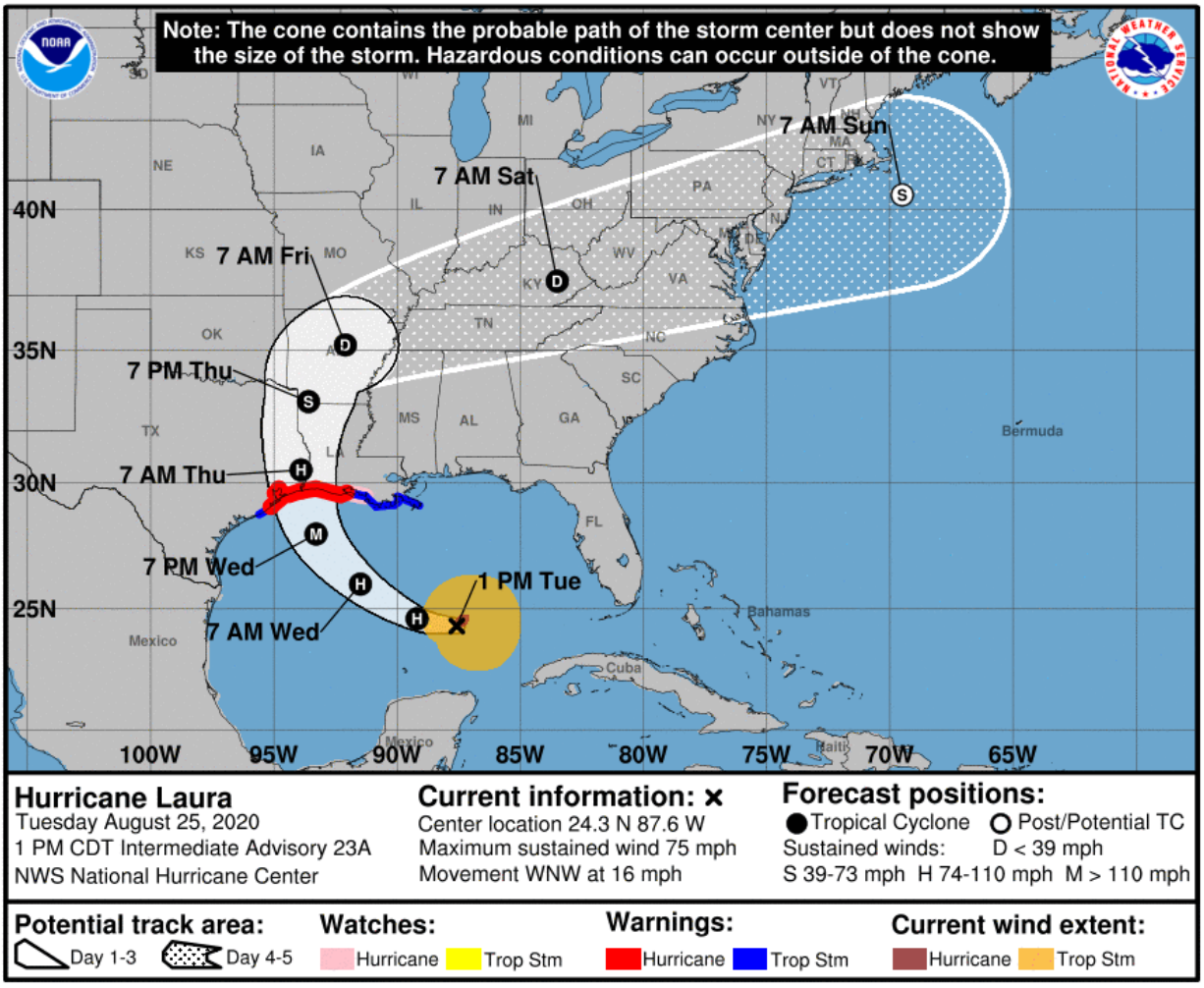
73,
Aaron | K8AMH

August 25, 2020 14:30 - NTS Status Dashboard, Update on Hurricane Laura

This is an update regarding the traffic system and Hurricane Laura, and a dashboard I have put together to provide the latest traffic-related information to you in a centralized location.

We in the ARRL North Texas Section Leadership Team are continuing to monitor the ever-changing forecast for Hurricane Laura. As of right now the forecast has Laura making landfall somewhere near the Texas/Louisiana border in the Wednesday/Thursday overnight hours. Both mandatory and voluntary evacuations have been ordered for counties in the forecast area.

Here is the latest forecast map from the National Hurricane Center.



The National Traffic System and traffic nets in our Section are continuing to stand by to assist should we be needed. The 7290 Traffic Net will begin operating extended net sessions starting tomorrow, running from 0900 hours to 1600 hours (9:00 am to 4:00 pm). Additional hours will be added should they be needed. All other traffic nets in the section are operating during their normally scheduled hours at this time.

Given the ever-evolving conditions of this hurricane, **I have put together a NTS Status Dashboard** to provide the latest information via a single resource, including news from net managers in the Section

regarding their operations, as well as my email updates. As this is a new dashboard, its layout and content will evolve as we move forward.

>> Click here to visit the NTS Status dashboard <<

I will also note that Greg Evans (K5GTX) our Section Emergency Coordinator has upgraded the ARES Section Status to STANDBY. All District Emergency Coordinators and Emergency Coordinators are asked to place their steams on Standby. If you have any questions, please contact your local ARES Emergency Coordinator for more information.

If you have any questions, feel free to ask me on the air, or to email me at k8amh@arrl.net.

73,
Aaron | K8AMH

August 26, 2020 00:38 CDT - Update on Hurricane Laura, NTS Trivia suspension

This is an update regarding the traffic system and Hurricane Laura.

Please avoid sending traffic to affected areas

As we move from the planning phase into the response phase, the primary focus is relaying traffic out of affected areas, and only relaying traffic back in when it is related to requests, such as a response to a request for supplies. Traffic going into affected areas should be avoided at this time.

NTS Status dashboard

Throughout the day I have revised and added information to the NTS Status dashboard, including the status of traffic nets operating extended hours, NWS warnings, satellite imagery, and more. It will continue to serve as the hub for the latest traffic-related information as part of responding to Hurricane Laura.

Visit the NTS Status dashboard

The latest storm forecast continues to indicate Hurricane Laura will make landfall along the Texas/Louisiana border, **ETA Wednesday evening with 110+ MPH sustained winds**. Numerous hurricane warnings and evacuation orders are in effect in this area. You can find the latest forecast images at the NTS Status dashboard.

The 7290 Traffic Net will now operate extended hours, as noted on the dashboard.

DO NOT GO TO THIS AREA UNLESS REQUESTED AS PART OF AN ORGANIZED RESPONSE

Your safety is the number one priority. If you are part of a response program, such as Civil Air Patrol, Community Emergency Response Team, Red Cross, Medical Reserve Corps, Amateur Radio Emergency Service, or other similar organization, you should wait for instructions from your appropriate organization. If you travel to these areas without being requested, personnel on scene are not expecting you – they will not have a function for you to perform, nor food or shelter supplies for you. Please, do not travel to the affected area unless requested as part of an organization you serve.

NTS Trivia suspended

To help the traffic system focus on storm-related traffic, the NTS Trivia program that operates out of our Section has suspended issuing new questions until the hurricane has passed and storm-related traffic is winding down.

ARES Status: STANDBY

The ARES NTX Section Status remains at STANDBY and ICS-205 and ICS-217 documents are now available. See this NTX ARES Monitor Notice for more information.

If you have any questions, please feel free to email me at k8amh@arrl.net.

73,
Aaron | K8AMH

August 26, 2020 03:58 CDT - Traffic System status updated to RESPONDING

Relay stations in the North Texas Section are now actively RESPONDING to Hurricane Laura, including monitoring traffic and hurricane nets, and operating extended net hours to relay storm-related traffic.

As the National Traffic System is an emergency communications resource and a component of the North Texas Section ARES Incident Radio Communication Plan**, traffic handlers in the Section should refrain from originating non-storm related traffic until after the hurricane has weakened and storm-related traffic winds down**. Even if we are not seeing storm-related traffic at a particular moment, the potential for storm-related traffic must be kept in mind as it may come in at a moment's notice, and while traffic is categorized as emergency, priority, welfare, or routine and this precedence dictates the order things are relayed in, minimizing routine traffic allows for better focus on other traffic categories.

I also ask that stations outside of the Texas/Louisiana area hold off on originating traffic headed to this region so that area and regional HF traffic nets serving Texas and Louisiana can focus on storm-related traffic coming out of affected areas.

You may hear stations relaying storm-related traffic originating from areas affected by Hurricane Laura. **Please treat these communications with your highest regard, especially if they are EMERGENCY traffic.**

In my NTS trainings I mention that once the disaster begins the time to prepare ends. If you have not practiced traffic handling before, please know that while I appreciate your willingness to help, please allow our expert traffic handlers to manage relaying storm-related traffic, and consider attending an NTS training session and participating in traffic nets after the hurricane has dissipated so that you can build your skillset ahead of the next incident.

Per the Hurricane Laura Public Advisory from the National Hurricane Center, updated at 1:00 am Central Daylight Time (0600 UTC), Hurricane Laura should approach the Upper Texas and southwest Louisiana coasts on Wednesday evening and move inland near those areas Wednesday night or Thursday morning.

Data from an Air Force Reserve Unit reconnaissance aircraft found that maximum sustained winds have increased to near 105 miles per hour with higher gusts. Laura is expected to strengthen significantly during the next 24 hours, making landfall as a major hurricane with 110+ MPH winds, and then weakening rapidly afterwards.

Once this weakening occurs and storm-related traffic winds down (which may or may not be close timewise), the traffic system status for the Section will change to STANDDOWN, indicating that the incident is concluding and we can resume normal traffic relaying, before returning to Normal Operation for day-to-day traffic relaying and continuous practice.

I will continue to update the Dashboard as this progresses.

>> Click here to visit the NTS Status dashboard <<

Please feel free to contact me at k8amh@arrl.net if you have any questions.

73,
Aaron | K8AMH

August 26, 2020 19:04 CDT - Traffic system continuing to RESPOND

The traffic system continues to RESPOND to Hurricane Laura as it approaches the Texas/Louisiana coast.

I have been monitoring traffic and hurricane nets today, and expect that we will see more storm-related activity tomorrow versus what we saw today. Bringing things online before we need them allows for key entities to get equipment set up and verify functionality. For example, the Texas State Operations Center checked in and was monitoring one of our traffic nets today along with other Emergency Operations Center resources.

As of right now the 7290 Traffic Net is the only net that has informed me of extended operating hours, including plans to run extended hours through Saturday with more days possible based on need. 7290 is also not relaying routine traffic at this time.

With Laura now close to the coastline, I have added radar imagery to the dashboard to help provide further quick situational awareness on things. I've also added the National Hurricane Center's Audio Briefings feed and you can now play the latest briefing directly from the dashboard.

Click here to visit the NTS Status dashboard

General guidance to traffic handlers

- Traffic handlers in the Section should **refrain from originating non-storm related traffic (a.k.a. routine traffic)** until after the hurricane has weakened and storm-related traffic winds down.
- Welfare and other traffic headed into affected areas should be avoided at this time – **the focus is on traffic leaving affected areas.**

Unless breaking information comes up, my next update will be tomorrow evening around this time. In the meantime, please focus traffic handling on storm-related traffic for the moment. And, my thanks to the many traffic handlers in and outside our area who are already responding to Hurricane Laura.

73,
Aaron | K8AMH

August 27, 2020 20:27 CDT - Traffic System status lowered to Monitoring

With Laura weakening, the State Operations Center ending its monitoring at 2 pm today, and storm-related traffic not materializing as much as it could have, the NTS Status has been lowered from RESPONDING to Monitoring and will remain at this level through end of day Saturday. At that time, unless storm-related traffic begins to flow out of southern Louisiana as storm assessments take place, the status will lower to Normal Operations.

Key items at this point:

- **Traffic handlers may resume listing normal traffic.**
    - However, **please hold off on routine traffic into affected areas** (mainly southern Louisiana) for at least the next few days to allow time for response and recovery efforts to take place. We may seem storm-related traffic as impact is assessed.
- While we did not see large amounts of storm-related traffic, the Texas State Operations Center and several Emergency Operations Centers were checked into traffic nets during the storm, and some storm-related traffic includes an inquiry about a marina in Lake Charles, along with general questions to net control stations related to the storm.
- The 7290 Traffic Net will continue operating extended hours through Saturday
    - Tomorrow from 1000 hours to 1500 hours (10:00 am to 3:00 pm Central Daylight Time)
    - Saturday from 1000 hours to 1400 hours (10:00 am 2:00 pm)
    - Normal hours resume thereafter
- The NTS Status Dashboard will remain as-is through end of day Saturday, at which point I will update it to indicate normal operations and wind down the weather-related content. I will keep this page available as a tool going forward for future incidents that may warrant traffic system response.

I will also mention that ARES Status is now at Normal Readiness for all North Texas ARES Districts.

Unless we see a rise in storm-related traffic as assessments continue in south Louisiana, this will be my last update regarding Laura and traffic system response.

With the response winding down, I'd like to reflect on how traffic handlers inside and outside of the Section came together to help, including several that contacted me directly to understand how else they could help right now, and confirmations that folks were holding routine traffic for the moment to help make sure storm-related traffic remained front and center to relay through the system. I am very thankful for everyone coming together to jump in and help. This is what really makes the traffic system such a powerful resource and tool, and while I would prefer that we not be needed, I am proud of our ability to provide quality emergency communications should we be called upon to assist.

73,
Aaron

ICS 214 Activity Log

I have previously and continue to volunteer with organizations utilizing the Incident Command System, including in the North Texas Section such as by our Section Emergency Coordinator and others. To help ensure that traffic system activities are properly documented and available for review, and possibly submission to FEMA or other agencies, I completed an ICS 214 Activity Log with my notable activities during our response and have included it below.

The Incident Command System (ICS) provides a standardized approach to the command, control, and coordination of emergency response, allowing multiple agencies to effectively interact under a common framework. As a component of the National Incident Management System (NIMS), ICS provides several key concepts during an emergency, such as unity of command, common terminology, span of control, and the creation and updating of Incident Action Plans (IAPs). Traffic handlers are encouraged to learn more about the Incident Command System through these free online FEMA trainings:

- IS-100.c - Introduction to Incident Command System
- IS-200.c - Basic Incident Command System for Initial Response
- IS-700.b - An Introduction to the National Incident Management System
- IS-800.d - National Response Framework, an introduction

ACTIVITY LOG (ICS 214)

1. Incident Name: Hurricane Laura 2020	**2. Operational Period:** Date From: 21AUG2020 Date To: 27AUG2020 Time From: 15:29 Time To: 20:27	
3. Name: Aaron Hulett – K8AMH	**4. ICS Position:** Section Traffic Manager	**5. Home Agency** (and Unit)**:** ARRL North Texas Section

6. Resources Assigned:

Name	ICS Position	Home Agency (and Unit)
Sean Peoples – AA5SA	Net Manager	DFW Metroplex Traffic Net
Jo Ann Keith – KA5AZK	Net Manager	7290 Traffic Net
Jason Patterson – KD5RQB	Net Manager	Texas Slow Net
Rusty Plocheck – WE5TXS	Net Manager	Texas Traffic Net
David Ricker – KG5VSR	Official Relay Station	ARRL North Texas Section
John Hazelton – KF5IOU	Official Relay Station	ARRL North Texas Section
Justin Lentz – KF5IVJ	Official Relay Station	ARRL North Texas Section
Korky Kathman – KG5NNA	Official Relay Station	ARRL North Texas Section
Melissa Tanner – KI5GRH	Official Relay Station	ARRL North Texas Section
Roger Elkinton – KE5YTA	Official Relay Station	ARRL North Texas Section
Ron Ford – KF5OMH	Official Relay Station	ARRL North Texas Section
Steve Phillips – K6JT	Official Relay Station	ARRL North Texas Section

7. Activity Log:

Date/Time	Notable Activities
21AUG 15:29	Email Section Traffic Managers in Texas, Louisiana, Mississippi, Alabama, Florida, and Georgia
21AUG 16:30	Begin preparing messaging related to tropical storms Laura and Marco
21AUG 17:03	Send update via email list, Groups.io, Twitter, etc. regarding NTS and inbound storms
21AUG 18:30	Announce NTS-related information during DFW Metroplex Early Traffic Net
21AUG 22:30	Announce NTS-related information during DFW Metroplex Late Traffic Net
22AUG 15:00	Host Zoom call to discuss approaching storms with net managers, Official Relay Stations
22AUG 18:30	Announce NTS-related information during DFW Metroplex Early Traffic Net
22AUG 18:35	Send update via email list, Groups.io, Twitter, etc. regarding NTS and inbound storms
22AUG 22:30	Announce NTS-related information during DFW Metroplex Late Traffic Net
23AUG 15:00	Host Zoom call to discuss approaching storms with net managers, Official Relay Stations
23AUG 17:53	Upgrade traffic system status from normal operations to STANDBY
23AUG 17:53	Send update via email list, Groups.io, Twitter, etc. regarding NTS and inbound storms
23AUG 18:30	Announce NTS-related information during DFW Metroplex Early Traffic Net
23AUG 22:30	Announce NTS-related information during DFW Metroplex Late Traffic Net
25AUG 13:00	Begin building NTS Status Dashboard

8. Prepared by: Name: Aaron Hulett_____ Position/Title: Section Traffic Mgr__Signature: /*Aaron Hulett*/_____

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ACTIVITY LOG (ICS 214)

1. Incident Name: Hurricane Laura 2020	**2. Operational Period:** Date From: 21AUG2020 Date To: 27AUG Time From: 15:29 Time To: 20:27

7. Activity Log (continuation)**:**

Date/Time	Notable Activities
25AUG 14:30	Publish NTS Status Dashboard, send update via email list, Groups.io, Twitter, etc.
25AUG 14:52	Send update via NTS Groups.io with system status details and a link to the Dashboard
25AUG 16:20	Compile spreadsheet of traffic system contacts, email to appropriate contacts
25AUG 18:30	Announce NTS-related information during DFW Metroplex Early Traffic Net
25AUG 19:45	Email South Texas, Louisiana Section Traffic Managers to check in ahead of hurricane's arrival
25AUG 20:30	Set up Discord server for Official Relay Stations, net managers
25AUG 22:20	Update NTX Facebook, Twitter with ARES Section Status *STANDBY*, link to announcement
25AUG 22:30	Announce NTS-related information during DFW Metroplex Late Traffic Net
25AUG 23:54	Send email to NTS Trivia participants announcing suspension during Hurricane Laura
26AUG 00:38	Send update via email list, Groups.io, Twitter, etc. regarding NTS and Hurricane Laura
26AUG 02:27	Upgrade traffic system status from STANDBY to RESPONDING
26AUG 03:58	Send update via email list, Groups.io, Twitter, etc. regarding NTS and Hurricane Laura
26AUG 03:58	Send update via NTS Groups.io with request to hold off on routine traffic to TX/LA area nets
26AUG 10:15	Add National Hurricane Center Audio Briefings feed to the NTS Status dashboard
26AUG 17:15	Add radar imagery to the NTS Status dashboard
26AUG 18:30	Announce NTS-related information during DFW Metroplex Early Traffic Net
26AUG 19:04	Send update via email list, Groups.io, Twitter, etc. regarding NTS and Hurricane Laura
26AUG 22:30	Announce NTS-related information during DFW Metroplex Late Traffic Net
27AUG 18:30	Announce NTS-related information during DFW Metroplex Early Traffic Net
27AUG 20:27	Lower traffic system status to Monitoring, unless further storm-related traffic appears on the
-	system, status will lower to Normal Operation at end of day Saturday; send update via email
-	list, Groups.io, Twitter, etc.
-	[END]

8. Prepared by: Name: Aaron Hulett_____ Position/Title: Section Traffic Mgr__Signature: /*Aaron Hulett*/_____

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Bibliography

[1] FCC, "October 2018 Hurricane Michael's Impact on Communications: Preparation, Effect, and Recovery," May 2019. [Online]. Available: https://docs.fcc.gov/public/attachments/DOC-357387A1.pdf. [Accessed 12 September 2020].

[2] J. Schweers, "'Breakdown': Poor cell service after Hurricane Michael traced to several causes, FCC reports," 12 May 2019. [Online]. Available: https://www.tallahassee.com/story/news/local/state/2019/05/12/poor-cell-service-after-michael-had-several-sources/1163828001/. [Accessed 12 September 2020].

[3] FEMA, "National Response Framework," 28 October 2019. [Online]. Available: https://www.fema.gov/sites/default/files/2020-04/NRF_FINALApproved_2011028.pdf. [Accessed 12 September 2020].

[4] T-Mobile, "Update on T-Mobile Network Issues," 15 June 2020. [Online]. Available: https://web.archive.org/web/20200629022153/https://www.t-mobile.com/news/update-for-customers-on-network-issues. [Accessed 29 June 2020].

Additional resources

ARRL National Traffic System Groups.io discussion group / email list

An online discussion tool for traffic handlers to discuss traffic handling and other related topics. http://arrlnts.groups.io/

ARRL North Texas NTS Status Dashboard

A single resource for information related to the traffic system in North Texas, including details related to traffic system response, such as radar and satellite imagery, National Hurricane Center briefings, and other related information that adjusts based on the event taking place. https://www.k8amh.com/nts-status/

ARRL North Texas Section communication channels

A set of communication tools available to provide updates to amateur operators in North Texas. These channels include:

- ARRL North Texas Facebook page: https://www.facebook.com/ARRLNTX/
- ARRL North Texas Groups.io discussion group: https://arrlntx.groups.io/g/section
- ARRL North Texas twitter account: https://www.twitter.com/arrlntx
- ARRL North Texas website: https://www.arrlntx.org
- Section Traffic Manager email list: https://www.k8amh.com/email-list/
- Section Traffic Manager twitter account: https://www.twitter.com/arrlntxstm

National Traffic System Methods and Practices Guidelines

A working reference manual on message formatting and handling, and traffic net procedures. http://www.arrl.org/files/file/NTS_MPG2014.pdf

National Traffic System and Traffic Handling Training

I hold a monthly NTS training session where I explain the traffic system's layout and how it operates, the skills you can learn from traffic handling, the radiogram format and some hands-on practice, and how you can find information about traffic nets in your area. https://www.k8amh.com/events/

Traffic Nets

- 7290 Traffic Net – https://www.7290trafficnet.org/
- DFW Metroplex Traffic Net – https://www.dfwtrafficnet.org/
- Texas CW Net – https://k6jt.com/
- Texas Slow Net – https://sites.google.com/site/arsw5ese/home/texas-slow-net
- Texas Traffic Net – http://www.daytimetexastrafficnet7285.org/