To provide meteorological analysis, forecasts and warnings over the tropical and subtropical oceans for the protection of life and property
• Born in Cuba in 1987, came to the United States with my parents and sister in 1999

• Bachelors of Arts and Sciences in Meteorology in 2011 & Masters in 2014 from Florida International University

• Worked on the Atlantic Hurricane Reanalysis Project (2010-2017)

• StormGeo in Houston (2017-2018)

• WFO Key West (2018-2021)

• NHC (2021 through retirement)
Our Customers:
The Mariners and the Mets
Our Customers: The Mariners and the Mets
Economic Impact of Marine Trade

- 80% of all traded goods globally are carried by sea
- In 2018, the American Blue Economy contributed $373 billion to the nation’s Gross Domestic Product (GDP), supporting 2.3 million jobs
- In 2020, the U.S. offshore oil and gas industry supported approximately:
  - 176,000 jobs
  - $11.9 billion in labor income
  - $20.6 billion in value added (contribution to GDP)
- Maritime commerce is expected to triple by 2030

### Ten Ocean Sectors Sales in 2018

<table>
<thead>
<tr>
<th>Sector</th>
<th>Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tourism and Recreation</td>
<td>$227 Billion</td>
</tr>
<tr>
<td>Defense and Public Administration</td>
<td>$190 Billion</td>
</tr>
<tr>
<td>Offshore Oil and Gas</td>
<td>$80 Billion</td>
</tr>
<tr>
<td>Transportation</td>
<td>$59 Billion</td>
</tr>
<tr>
<td>Fisheries and other Bio-products</td>
<td>$26 Billion</td>
</tr>
<tr>
<td>Shipbuilding</td>
<td>$19 Billion</td>
</tr>
<tr>
<td>Power Generation</td>
<td>$6.8 Billion</td>
</tr>
<tr>
<td>Construction</td>
<td>$4.4 Billion</td>
</tr>
<tr>
<td>Research and Education</td>
<td>$4.2 Billion</td>
</tr>
<tr>
<td>Professional and Business Services*</td>
<td>$51 Million</td>
</tr>
</tbody>
</table>
A Bad Cruise
Global High Seas Forecasts
- International Maritime Organization
Ships over the Open Ocean

https://www.marinetraffic.com/
Typical areas for gale conditions

Note that the main areas for gales are near gaps and coastal terrain - this is not a coincidence!
Typical areas for tropical storms and hurricanes

June

July

August

September

October

November
A worldwide program of the World Meteorological Organization (WMO) to recruit ships & platforms to voluntarily observe and report marine meteorological and oceanographic conditions to ensure Safety Of Life At Sea (SOLAS), and reduce commercial loss.

23 Countries Currently Participate

* There is only 1 Ship Observation For every 1000 Land Based Observations

https://www.vos.noaa.gov/
GOES-16: A new era of geo-stationary satellite imagery and data
Tools – Incorporating NHC’s Tropical Storm/Hurricane Forecast

**Current information:**
- **Hurricane Ida**
  - Saturday August 28, 2021
  - 7 AM CDT Intermediate Advisory 8A
  - NWS National Hurricane Center

**Center location:**
- 24.4 N 85.7 W
- Maximum sustained wind: 85 mph
- Movement: NW at 16 mph

**Forecast positions:**
- Tropical Cyclone: 86W
- Post/Potential TC: 88W
- S 39-73 mph
- H 74-110 mph
- M > 110 mph

**Potential track area:**
- Day 1-3
- Day 4-5

**Watches:**
- Hurricane
- Trop Stm

**Warnings:**
- Hurricane
- Trop Stm

**Current wind extent:**
- Red: Hurricane
- Blue: Trop Stm

Note: The cone contains the probable path of the storm center but does not show the size of the storm. Hazardous conditions can occur outside of the cone.
Tools - Workstations
Satellite Imagery – Dvorak Technique

Katrina August 24

Rita September 18
Unified Surface Analysis
Areas of Responsibility

https://www.nhc.noaa.gov/tafb_latest/USA_latest.gif
Tropical Weather Discussions

The Tropical Weather Discussion describes major synoptic weather features and significant areas of disturbed weather in the tropics.

Content:
Special Features
• Tropical Disturbances
• Tropical Cyclones
• Gales/Storm/Hurricane Warnings

Tropical Waves

ITCZ Discussion

https://www.nhc.noaa.gov/text/MIATWDAT.shtml
HURRICANE WARNING...
HURRICANE JOAQUIN NEAR 23.3N 74.7W 935 MB AT 0900 UTC OCT 02 MOVING NW OR 315 DEG AT 3 KT. MAXIMUM SUSTAINED WINDS 115 KT GUSTS 140 KT. TROPICAL STORM FORCE WINDS WITHIN 160 NM W SEMICIRCLE...140 NM NE QUADRANT AND 180 NM SE QUADRANT. SEAS 12 FT OR GREATER WITHIN 400 NM NE QUADRANT...150 NM SE QUADRANT...120 NM SW QUADRANT...AND 300 NM NW QUADRANT WITH SEAS TO 39 FT. ELSEWHERE S OF 28N BETWEEN 70W AND 75W E WINDS 20 TO 25 KT SEAS 8 TO 10 FT. REMAINDER OF AREA S OF 21N BETWEEN 65W AND 78W AND OUTSIDE OF THE BAHAMAS WINDS 20 KT OR LESS. SEAS 8 TO 11 FT IN MIXED SWELL.
TAFB National Digital Forecast Database
Gridded Marine Forecasts

Spatial/Temporal resolution
- 10 KM
- 6 Hourly out to 144 hr
  (3 Hourly to 72 hr)

Parameters
- 10-M Wind/ Gusts
- Significant Wave Height
- Hazards

https://digital.weather.gov/
How do I get weather forecasts over the open ocean?

**NOAA Weather Radio** - Reliable weather broadcasts out to 25nm from shore

**HF radio** - Long distance broadcast range with coastal and offshore weather information

**VHF radio** - Marine radio on channels 16 and 22A - Primarily broadcasts for coastal areas

**NAVTEX** - Medium Frequency weather broadcasts on 518 khz with a range up to 200 nm - Low cost and automated

**InMarsat C SafetyNET** - Satellite transmission of High Seas forecasts and warnings – Part of Global Marine Distress and Safety System

**Iridium SafetyCast** – Satellite transmission of High Seas forecasts and warnings - Part of Global Marine Distress and Safety System (Becoming operational now)

**FTPMail** - User can request and receive NWS text and graphic products via email using ftp commands - Low bandwidth email


For more information: [https://weather.gov/marine](https://weather.gov/marine) (Dissemination menu)
TAFB High Seas

• High Seas Forecast is a text forecast issued primarily for large ocean-going vessels.

• High Seas Forecast includes synopsis of primary weather features and a 48-hour forecast.

• High Seas Forecast primarily for strong winds (25 KT or greater) and/or seas 8 FT or higher.

• TAFB issues two text high seas forecasts four times a day.

https://www.nhc.noaa.gov/text/MIAHSFAT2.shtml
• OFF’s are designed for recreational/smaller fishing vessels up to giant cargo/cruise ships.

• Warnings are issued for conditions up to 48 hours from issuance time. A headline such as “Gale Conditions Possible” can be included for events beyond 48 hours.

• Tropical Storm and Hurricane Warnings normally based on 34kt/64kt wind radii given in the tropical cyclone advisory.

• Currently, Offshore Waters Forecasts extend out 5 days

• Winds less than 5 ft are described as “Variable Wind Less than 5 kt”

https://www.nhc.noaa.gov/marine/offshores.php
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Navigational Telex (NAVTEX)

NAVTEX is an internationally required broadcast of coastal urgent marine safety information to ships. In the United States there are 12 U.S. Coast Guard transmitter locations. TAFB products are transmitted from Miami, San Juan, and New Orleans, and contribute to the Charleston broadcast.

https://www.nhc.noaa.gov/text/MIAOFFN04.shtml
High Frequency Voice Broadcasts (VOBRA)

The USCG broadcasts basic weather information prepared by the NWS (Ocean Prediction Center, National Hurricane Center and Honolulu Forecast Office) via high frequency voice broadcasts (VOBRA) to vessels operating in areas beyond the range of coastal NOAA Weather Radio. The VOBRA forecasts are prepared at a lower resolution than the offshore forecasts.

MARINE RADIOFAX
TAFB provides graphical products for three U.S. Coast Guard transmitters:

NEW ORLEANS (NMG)
POINT REYES (NMC)
HAWAII (KVM70)
Surface Prog Graphics

- Fronts, troughs, tropical cyclones, tropical waves, ridges
- 24, 48, and 72 hr Forecasts
- W. Atlantic, Caribbean, Gulf of Mexico, and E. Pacific
- Issued twice daily

https://www.nhc.noaa.gov/tafb_latest/atlsfc72_latestBW.gif
Sea State Analysis Graphics

- Significant Wave Height Analysis (the average height of the highest one-third of the waves) and Primary Swell Direction
- W. Atlantic, Caribbean, Gulf of Mexico, and E. Pacific
- Issued twice daily

https://www.nhc.noaa.gov/tafb_latest/atlsea_latestBW.gif
WIND / WAVE Forecast Graphics

- Surface Winds and Significant Wave Height Predictions
- 24, 48, and 72 hr Forecasts
- W. Atlantic, Caribbean, Gulf of Mexico, and E. Pacific
- Issued twice daily

https://www.nhc.noaa.gov/tafb_latest/atl72_latestBW.gif
WAVE PERIOD/DIRECTION Forecast Graphics

- Dominant wave period and direction
- 48 and 72 hr Forecasts
- W. Atlantic, Caribbean, Gulf of Mexico, and E. Pacific
- Issued twice daily

https://www.nhc.noaa.gov/tafb_latest/atl48per_latest.gif
High Wind and Seas Graphic

- 48 hr forecast depiction of Gale, Storm, and Hurricane-Force Wind Warnings (with peak seas)
- W. Atlantic, Caribbean, Gulf of Mexico, and E. Pacific
- Issued four times daily
- Issued 1 December to 14 May

https://www.nhc.noaa.gov/tafb_latest/hiwind_pac_latestBW.gif
Marine Composite Page – Winds, Waves, Warnings, and Features

https://www.nhc.noaa.gov/marine/forecast/enhanced_atlcfull.php

Red: Gale Warning
Orange: Winds > 23 kt  Blue: Seas ≥ 8 ft

Colors: Seas (in feet)
Flags: Wind barbs (in knots)
Marine Composite Page – Winds, Waves, Warnings, and Features

https://www.nhc.noaa.gov/marine/forecast/enhanced_atlcfull.php

Gray: Hurricane Warning
Light Blue: Tropical Storm Warning
Orange: Winds > 23 kt  Dark Blue: Seas ≥ 8 ft

Colors: Seas (in feet)
Flags: Wind barbs (in knots)
Marine Composite Page – Winds, Waves, Warnings, and Features

Maximum Winds Forecast (in knots, over 5 days)

https://www.nhc.noaa.gov/marine/forecast/enhanced_atlcfull.php
Marine Composite Page – Winds, Waves, Warnings, and Features

https://www.nhc.noaa.gov/marine/forecast/enhanced_atlcfull.php

Red: Gale Warning
Orange: Winds > 23 kt
Green: Storm Warning
Blue: Seas ≥ 8 ft

Colors: Seas (in feet)
Flags: Wind barbs (in knots)
EL FARO
33 fatalities when it sank in Hurricane Joaquin (2015)

BOURBON RHODE
11 fatalities when it sank in Hurricane Lorenzo (2019)

BOUNTY
2 fatalities when it sank in Hurricane Sandy (2012)

FANTOME
31 fatalities when it sank in Hurricane Mitch (1998)
Hurricane Delta - 2020  October 8th, 9am EDT  Weather Avoidance by Ships

marinetraffic.com
Hurricane Delta - 2020 Weather Avoidance by Ships

October 8th, 5pm EDT

marinetraffic.com
Hurricane Delta - 2020  October 9th, 9am EDT  Weather Avoidance by Ships
Hurricane Delta - 2020  October 10th, 1pm EDT  

Weather Avoidance by Ships

marinetraffic.com
MEMORANDUM OF AGREEMENT
BETWEEN
THE UNITED STATES COAST GUARD
AND
THE NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION
NATIONAL WEATHER SERVICE
REGARDING
THE MANAGEMENT OF MARINE
WEATHER INFORMATION

APPROVED: 03/30/2020

Louis W. Uccellini
NOAA Assistant Administrator
for Weather Services

APPROVED: 3/31/20

Richard V. Timme
Rear Admiral, USCG
Assistant Commandant for
Prevention Policy

SPOT FORECAST FOR SAR - RCC ALAMEDA...USCG
NWS NATIONAL HURRICANE CENTER MIAMI FL
537 AM PDT Wed Apr 13 2022

Forecast is based on forecast start time of 0900 PDT on April 13.
If conditions become unrepresentative...contact the NWS
National Hurricane Center/Tropical Analysis and Forecast
Branch at (305)229-4425.

.DISCUSSTION...
Latitude = 0.5N  Longitude = 104.25W

Gentle S winds with southerly swell are expected in the short term. The
southerly swell will cause significant wave heights to be near 7 ft. No
significant showers or thunderstorms are expected.

.REST OF TODAY...

Sky/weather........Mostly cloudy (75-85 percent).
Max temperature.....Around 78.
Surface winds (kts).Southeast winds around 5 knots late in the
morning becoming light, then becoming south 5
to 7 knots late in the afternoon.
Swell height........South swell 6 feet.
Wave height........7 feet.
Wave period........14 SECONDS.

<table>
<thead>
<tr>
<th>TIME (PDT)</th>
<th>9 AM</th>
<th>NOON</th>
<th>3 PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sky (%)</td>
<td>80</td>
<td>84</td>
<td>84</td>
</tr>
<tr>
<td>Weather cov.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weather type</td>
<td>NONE</td>
<td>NONE</td>
<td>NONE</td>
</tr>
<tr>
<td>Tstm cov.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temp.</td>
<td>78</td>
<td>78</td>
<td>78</td>
</tr>
<tr>
<td>SFC wind (kts)</td>
<td>SE 5G10</td>
<td>S 4G8</td>
<td>S 5G10</td>
</tr>
<tr>
<td>Swell hgt (ft)</td>
<td>S 6</td>
<td>S 6</td>
<td>S 6</td>
</tr>
<tr>
<td>Wave period (s)</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Wave height (ft)</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>SST (F)</td>
<td>81</td>
<td>81</td>
<td>81</td>
</tr>
</tbody>
</table>
2022 Impact-based Decision Support Services to U.S. Coast Guard Districts by Tropical Analysis and Forecast Branch (TAFB)/National Hurricane Center (NHC)

54 Spot Forecasts by NHC/TAFB for 2022 U.S. Coast Guard District Operations
USCG District 8
Hurricane Tabletop Exercise
April 20-21, 2022

Planning

- Stephen Konarik led the TAFB team with Andrew Hagen and Amanda Reinhart
- Began planning with USCG District 8 in January 2022
- Two separate, simultaneous hurricanes impacting District 8/Gulf of Mexico (Texas coast and Florida Panhandle/Mobile Bay
- Alexandria Andonian (Storm Surge Unit) provided the Storm Surge forecasts

Exercise

- Organized 5 full briefings with each having 2 “mini” briefings within them (24 separate briefings altogether)
- On May 8, Chris Landsea, Stephen Konarik, Amanda Reinhart, Brad Reinhart, and Aidan Mahoney toured D8 facilities in New Orleans and provided additional training
2022 Impact-based Decision Support Services to U.S. Coast Guard Districts by Tropical Analysis and Forecast Branch (TAFB)/National Hurricane Center (NHC)

D7/Miami:
- Hurricane FIONA (6 briefings)

D8/New Orleans:
- Trop. Storm ALEX (3 briefings)
- Hurricane IAN (2)
- Hurricane NICOLE (7)

34 Live Briefings in Support of USCG’s Life-saving Mission
NHC team,

The forecasts and support you and your team provided [during Hurricane Ian] were excellent and were heavily relied on to make operational decisions to move aircraft and cutters. The flexibility of your team to meet CG meeting schedules was greatly appreciated.

Once again NHC has exceeded expectations and enabled the Coast Guard to make informed decisions to best protect resources and respond to those in distress. Thank You

CAPT Aaron Ortenzio
CG District Seven Chief of Incident Management
NHC/TAFB’s 2022 Foreign Nation IDSS

TAFB’s Spanish-speaking forecasters (Aguirre-Echevarria, Delgado, Ramos, Rivera-Acevedo, Rubio, Stripling, Tichacek) provided critical Impact-based Decision Support Services during the 2022 Hurricane Season:

For NHC/Hurricane Specialist Unit - Coordinating Watches/Warnings:
- Colombia – 12 times
- Cuba – 6
- El Salvador – 3
- Honduras – 8
- Nicaragua – 10
- Costa Rica – 3
- Dominican Republic – 3
- Guatemala – 4
- Mexico – 50
- Venezuela – 5

For NOAA Public Affairs – Conveying Forecasts/Impacts to the Spanish Media:
- 95 Live Interviews during Tropical Storm Alex, Hurricane Fiona, and Hurricane Ian
Weather-Ready Nation Ambassador

- From People to Ports to Communities, we are working to build a Weather-Ready Nation
  - Ready, Responsive and Resilient to extreme weather and other hazards

Weather-Ready Nation Marine Ambassador Network
- Comprehensive toolkit/marine weather hazard training
- Promotes weather safety messaging to their stakeholders
- Engages with NOAA personnel on collaboration opportunities
- Sharing Success Stories of Preparedness and Resiliency
- Virtual WRN recognition and share the WRN logo for your use
- Direct line of feedback for NWS product improvements
- Quarterly newsletter from the NWS about marine weather

https://www.weather.gov/wrn/
https://www.weather.gov/wrn/wrna-marine
Mariners Weather Hazards Workshop

- Workshop at National Hurricane Center (NHC) every March
- Purpose: Increase awareness and understanding among mariners of the various forecast products and services available from the National Weather Service
- Attendees:
  - Cruise Lines
  - Cargo Ships
  - Oil Tankers/Oil Platforms
  - Commercial Fisheries
  - U.S. Coast Guard/U.S. Navy
  - Large Recreational Vessels
  - Maritime Academies
- Organizers:
  - NHC/Tropical Analysis and Forecast Branch
  - Ocean Prediction Center
  - Weather Forecast Offices
  - Port Meteorologists
2022 TAFB
Social Media Highlights

2022 Twitter Stats

Tweets Sent
1,774 - 807 manual tweets

Profile Visits
709,000

Followers
34,925 - an increase of 5,765

Tropical Atlantic Marine Weather Briefing
- 5-day Briefing posted each Sunday and Thursday available publicly on NHC YouTube Channel; link also posted to TAFB Twitter
- This new service began 1/1/2023

Automated Marine Warning Tweets began January 2020

https://twitter.com/NHC_TAFB
Familiarization Tours