

Modernizing SSU and High Seas Workflows (Hazard Services JTTI Updates)

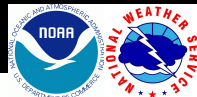
Interdepartmental Hurricane Conference

Nate Hardin, Taylor Trogdon, Daniel Nietfeld, Darrel Kingfield

March 4, 2021



Why Joint Technology Transfer Initiative?

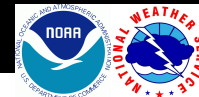


- Provide opportunity to demonstrate new tools and technologies for NWS in alignment with NWS
- Close collaboration between GSL and NHC, OPC, HFO, OCP, OSTI, AFS, and OAR/WPO
- Funded by OAR, not NWS!



WEATHER PROGRAM OFFICE
National Oceanic and Atmospheric Research

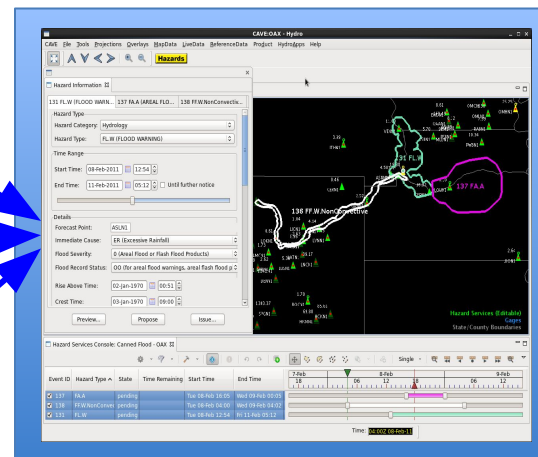
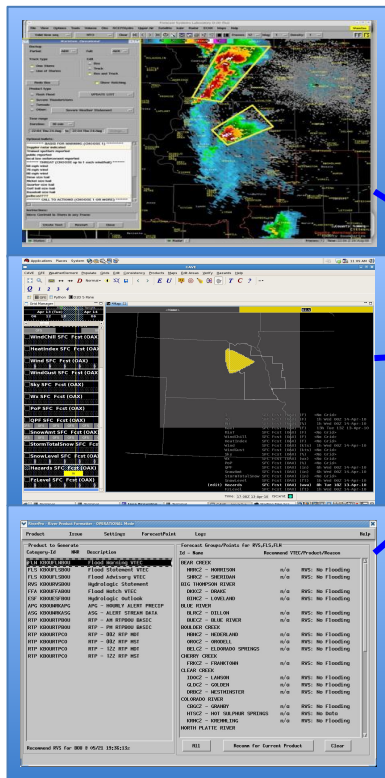
Motivation for Hazard Services



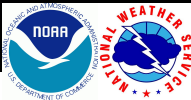
WarnGen
(<1 hour)

**Graphical
Hazard
Generator**
(Hours,
Days)

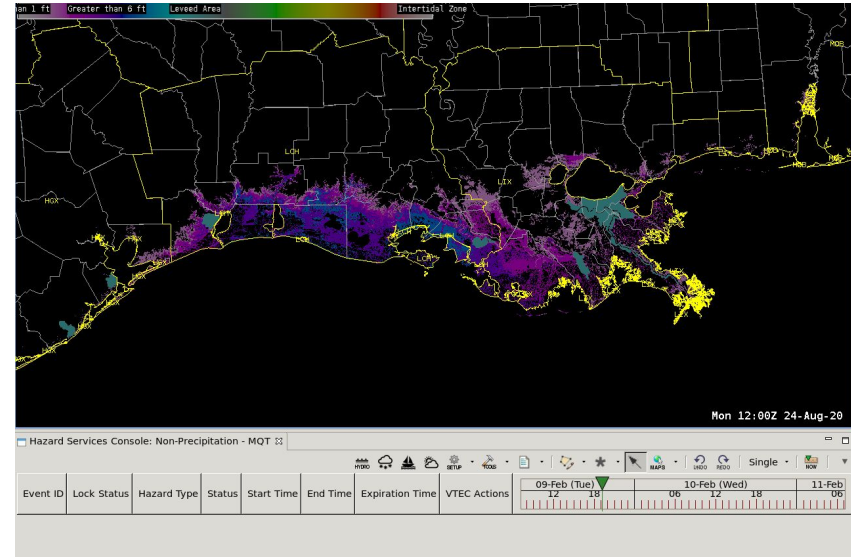
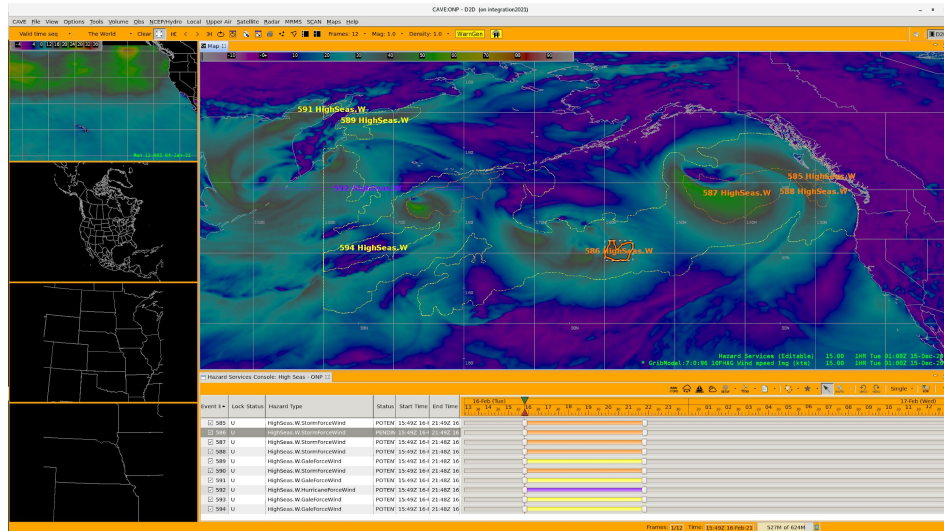
RiverPro
(Days)



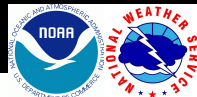
JTTIs Involving NHC



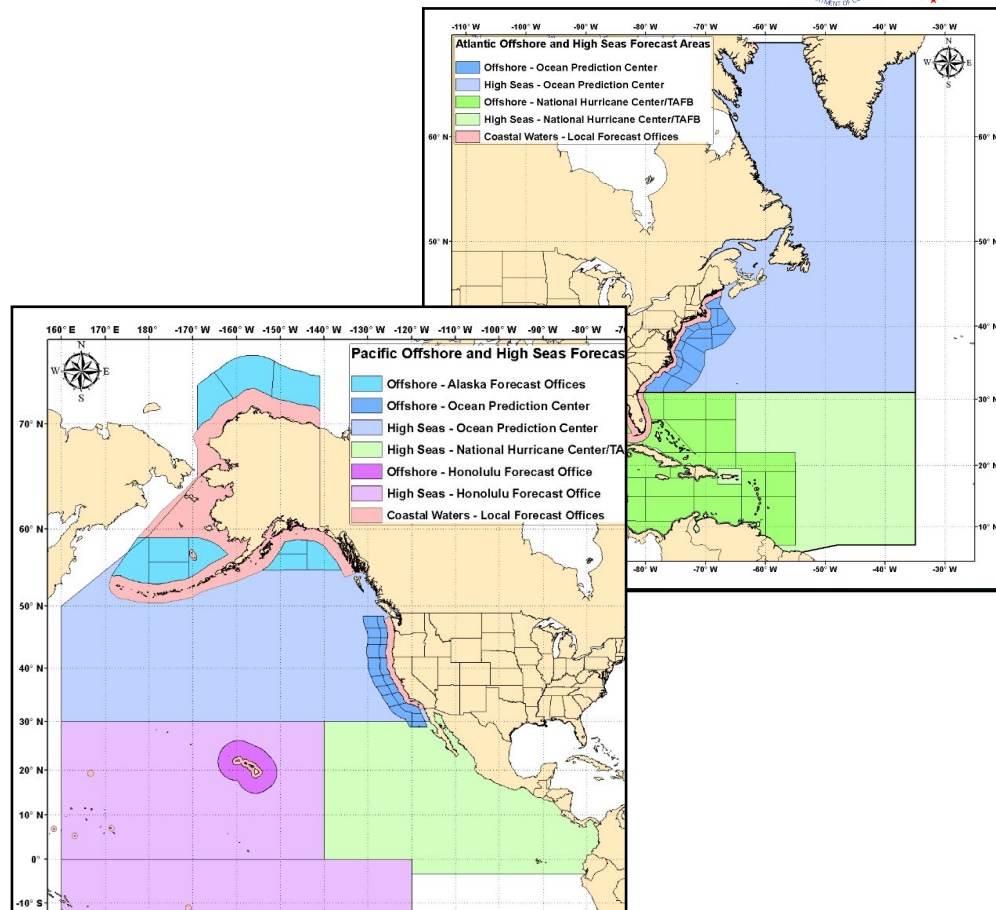
- FY 19-21: High Seas Workflow
- FY 20-22: Storm Surge Watch/Warning



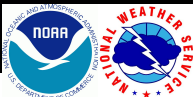
High Seas in Hazard Services



- Background/Purpose
 - Generate S-412 compliant polygons for ship navigation display (International Hydrographic Organization requirement)
 - Existing NAWIPS functionality does not meet this requirement
 - Establish common framework for NHC, OPC, and HFO
 - Modernize text formatters



High Seas in Hazard Services



- Current Status
 - Individual text and S-412 compliant GML
 - Updated legacy collaborative product (e.g. EPI)
 - Winds and Waves Recommender from NDFD and Model output

The screenshot displays the CAVE.OXP - D3D application interface, which is used for managing and visualizing hazard data. The interface is divided into several panels:

- Hazard Information Panel:** Shows details for a hazard event with ID 596, titled "HighSeas.W.GaleForceWind". The category is "High Seas" and the type is "High Seas Gale Force Wind Warning (HighSeas.W.GaleForceWind)". The time range is from 16-Feb-2021 19:28 to 17-Feb-2021 01:28, with a duration of 8 hrs. The area specifier is "GULF OF TEHUANTEPEC".
- Map Panel:** Displays a map of the Gulf of Tehuantepec region, with a yellow polygon highlighting the "forecast 1+24" area. The hazard is labeled "596 HighSeas.W".
- Product Editor Panel:** Shows the XML metadata for the hazard, including the GML product identifier and the XML structure for the hazard event.
- Hazard Services Console:** A table at the bottom shows the event details, including the event ID (596), lock status, hazard type, status, start time, and end time.

```
<xml version="1.0" encoding="UTF-8"?><weather:DataSet xmlns:weather="http://www.sho.int/S412/gml/1.0" gml:id="Atlantic_HS_596"><gml:boundedBy><gml:Envelope srsName="urn:ogc:def:crs:epsg:4326"><gml:lowerCorner>-20.000 -188.000</gml:lowerCorner><gml:upperCorner>90.000 100.000</gml:upperCorner></gml:Envelope></gml:boundedBy><gml:datasetInfo><S100:encodingSpecification>S-100 Part 10b</S100:encodingSpecification><S100:encodingSpecificationEdition>1.0</S100:encodingSpecificationEdition><S100:productIdentifier>S-412</S100:productIdentifier><S100:productEdition>0.1</S100:productEdition><S100:applicationProfile><S100:datasetFileIdentifier>Basin_HS_Surface_F000_20210216T192800</S100:datasetFileIdentifier><S100:datasetTitle>Basin_HS_Surface_F000_20210216T192800</S100:datasetTitle><S100:datasetReferenceDate>2021-02-16</S100:datasetReferenceDate><S100:datasetLanguage>S100:datasetLanguage</S100:datasetLanguage><S100:datasetTopicCategory>climatology</S100:datasetTopicCategory></gml:datasetInfo><gml:datasetStructureInfo><S100:datasetCoordinateSystem>0.0</S100:datasetCoordinateSystem><S100:datasetCoordinateSystem>0.0</S100:datasetCoordinateSystem><S100:datasetCoordinateSystem>0.0</S100:datasetCoordinateSystem><S100:coordinateSystem>0.0</S100:coordinateSystem><S100:coordinateSystem>0.0</S100:coordinateSystem><S100:coordinateSystem>0.0</S100:coordinateSystem></gml:datasetStructureInfo><gml:member><weather: gml:id="596"><scaleMaximum>70000000</scaleMaximum><scaleMaximum>1100000</scaleMaximum><validDate>20210216T192800</validDate><dateLineStart>20210216T192800</dateLineStart><dateLineEnd>20210217T012800</dateLineEnd><format:topProvidedFor/></scaleMaximum></gml:member></gml:boundedBy><S100:Curve gml:id="GALE000000E_0"><gml:segment><gml:LineStringSegment><gml:posList>15.99 -95.43 15.19 -95.99 14.46 -96.20 13.54 -95.88 13.31 -94.43 14.14 -93.30 14.93 -93.13 15.01 -93.59 16.12</gml:posList></gml:LineStringSegment></gml:segment></S100:Curve></weather: gml:member></weather:DataSet></gml:boundedBy></xml>
```

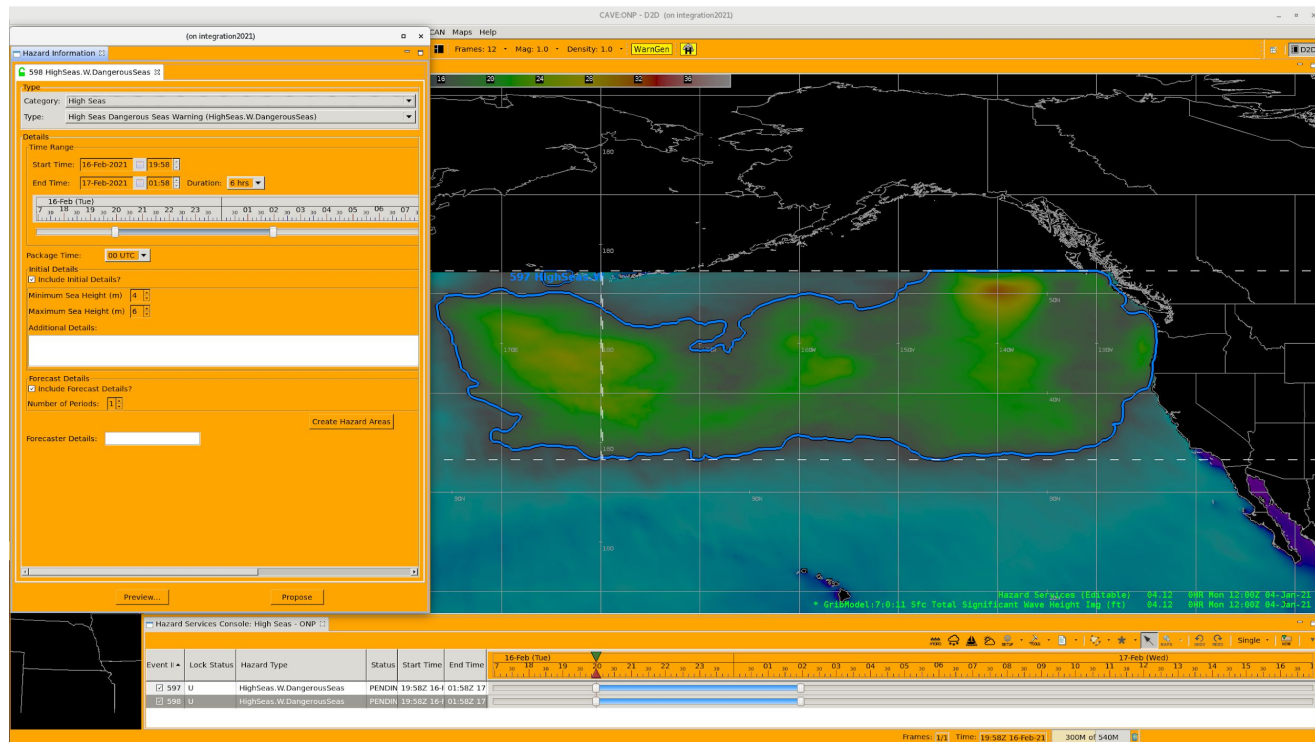


High Seas in Hazard Services



Future Tasks

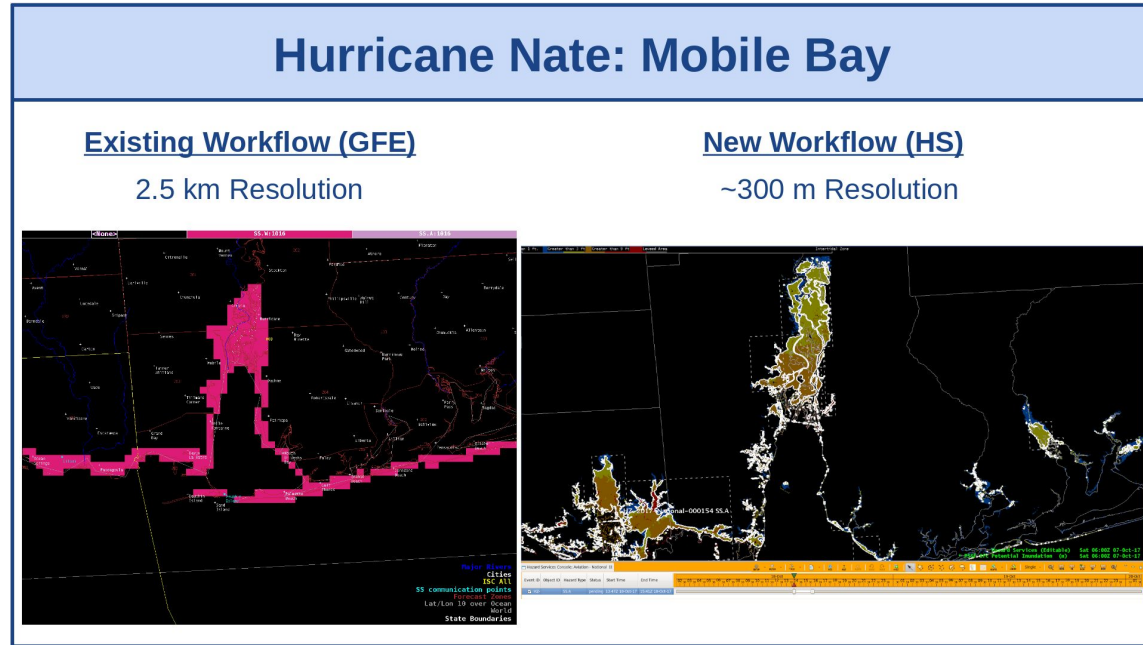
- Smoothing and Simplification
- Test, Test, Test!
- Demo, Feedback, Iterate
- Forecaster evaluation late summer 2021



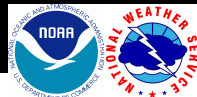
Storm Surge W/W in Hazard Services



- Background/Purpose
 - Consistency between operational products
 - Improved resolution and flexible output formats (e.g. CAP)
 - Same warning software as WFOs for collaboration



Storm Surge W/W in Hazard Services



- Current Status

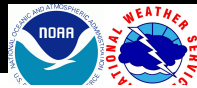
CAP Formatter

```
<?xml version="1.0" encoding="UTF-8"?><alert
xmlns="urn:oasis:names:tc:emergency:cap:1.2">
<identifier>NWS-HZ-2019-OKX-OKX-63-1-1576718142541</identifier>
<sender>w-nws.webmaster@noaa.gov</sender>
<sent>2019-12-18T20:15:00-05:00</sent>
<status>Actual</status>
<msgType>Alert</msgType>
<scope>Public</scope>
<code>IPAWSv1.0</code>
<note/>
<info>
<language>en-US</language>
<category>Met</category>
<event>STORM SURGE WARNING</event>
<responseType>Execute</responseType>
<urgency>Expected</urgency>
<severity>Extreme</severity>
<certainty>Likely</certainty>
<eventCode>
<valueName>SAME</valueName>
<value>SS</value>
</eventCode>
<eventCode>
<valueName>NationalWeatherService</valueName>
<value>SSW</value>
</eventCode>
<effective>2019-12-18T20:15:00-05:00</effective>
<onset>2019-12-18T20:15:00-05:00</onset>
<expires>2019-12-19T04:15:00-05:00</expires>
<senderName>NWS New York NY</senderName>
<headline>STORM SURGE WARNING issued December 18 at 08:15PM EST expiring December 19 at
08:00AM EST by NWS Upton</headline>
<description/>
<instruction>Life-threatening storm surge is likely within the warning area.
</instruction>
<web>http://www.weather.gov</web>
<parameter>
<valueName>VTEC</valueName>
<value>O.NEW.KOKX.SS.W.0001.191219T0115Z-191219T1300Z</value>
</parameter>
<parameter>
<valueName>EAS-ORG</valueName>
<value>WXK</value>
</parameter>
<parameter>
<valueName>PIL</valueName>
<value>SS</value>
</parameter>
<parameter>
<valueName>eventEndTime</valueName>
<value>2019-12-19T08:00:00-05:00</value>
</parameter>
```

The screenshot shows a web-based interface for managing hazard information. On the left, a 'Hazard Information' panel displays details for a 'Storm Surge Watch (SS.A)'. The main area features a map with a color-coded 'Warning Area' and 'Intertidal Zone'. Below the map, a table lists hazard events with columns for Type, Status, Start Time, End Time, Expiration Time, and VTEC Actions. The table shows a pending event for 'Storm Surge - MQT' starting on Dec 18 at 19:13Z and ending at 21:13Z. A 'CAP Formatter' panel on the right displays the XML output for this event, including metadata, event details, and VTEC information.

Type	Status	Start Time	End Time	Expiration Time	VTEC Actions
Storm Surge - MQT	PENDIN	19:13Z 09+	21:13Z 09		

Storm Surge W/W in Hazard Services



● Future Tasks

- Refine CAP message generation
- TCV/text formatter
- KML output
- Demonstrate capability of user-defined severity to inform WEA issuances
- Idealize balance between computational time and hazard resolution

Milestone	Start Date	Stop Date	Metric
Gather requirements	1 Sept 2020	1 Jan 2021	Google document delivered to NHC and CP
Write design	1 Jan 2021	1 Apr 2021	Google document delivered to NHC and CP
Design review	1 Apr 2021	30 Apr 2021	Design approved by ARB
Deliver Design	1 May 2021	1 May 2021	Design presented to NHC.
Configure new hazard type	1 May 2021	15 May 2021	New Storm Surge Hazard Type
Product Generation for SSWW	15 May 2021	15 Jul 2021	Functional text and CAP formatted products
Develop Recommender to create first guess hazard extent	15 Jul 2021	15 Oct 2021	Successfully run recommender that uses Potential Storm Surge Flooding Map output as input for first guess field
Demonstrate initial workflow to NHC for evaluation and feedback	15 Oct 2021	30 Oct 2021	Prototype demonstration via webex
Iterative development following feedback	30 Oct 2021	1 Feb 2022	Updates to software based on evaluation by SSU forecasters
Finalize code and code check in	1 Feb 2022	1 Mar 2022	Check in code for review using VLAB Hazard Services repository
Code Review	1 Mar 2022	1 May 2022	Code review approved by ARB merged into Hazard Services integrated version
Deliver code for evaluation	1 May 2022	15 May 2022	Laptop staged with AWIPS-II docker container containing

Where Do We Go After JTTI?



- By design, JTTI ends at RL7
- Code in VLAB, designs approved, and code reviews merged
- Transition Plans signed by receiving office directors and presented to NWS leadership
- Office of Central Processing (OCP) would need to support official transition into AWIPS baseline



Contact, Demos, and Updates

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