

Paper for Consideration by HSSC

S-412 Weather and Wave Warnings and S-98 Interoperability

Submitted by:	United States (NOAA)
Executive Summary:	The HSSC is requested to include S-412 Weather and Wave warnings as part of the S-98 Interoperability specification as an overlay for Marine Safety Information.
Related Documents:	Any relevant documents and references to the extent that they are known to the originator.
Related Projects:	Any related projects that may impact upon considerations

Introduction / Background

NOAA's National Weather Service on behalf of the World Meteorological Organization is leading the development of S-412 Weather and Wave Warnings (Polygons) for the use in ECDIS as part of the Marine Safety Information infrastructure. S-412 will be a polygon based warning product that will produce 24 hour swaths of information that will eventually replace the traditional NAVTEX information, and enhance GMDSS. The concept behind S-412 is similar to that of S-124 Navigation Warnings.

Analysis/Discussion

As noted above S-412 may be the eventual replacement for weather related NAVTEX information for use on shipboard navigation systems. S-412 will also help those responsible for METAREAs to comply with SOLAS Chapter V, regulation 5 – Meteorological services and warnings which states the following:

1 Contracting Governments undertake to encourage the collection of meteorological data by ships at sea and to arrange for their examination, dissemination and exchange in the manner most suitable for the purpose of aiding navigation. [footnote](#) Administrations shall encourage the use of meteorological instruments of a high degree of accuracy, and shall facilitate the checking of such instruments upon request. Arrangements may be made by appropriate national meteorological services for this checking to be undertaken, free of charge to the ship.

2 In particular, Contracting Governments undertake to carry out, in co-operation, the following meteorological arrangements:

.1 to warn ships of gales, storms and tropical cyclones by the issue of information in text and, as far as practicable graphic form, using the appropriate shore-based facilities for terrestrial and space radiocommunications services.

.2 to issue, at least twice daily, by terrestrial and space radiocommunication services [footnote](#), as appropriate, weather information suitable for shipping containing data, analyses, warnings and forecasts of weather, waves and ice. Such information shall be transmitted in text and, as far as practicable, graphic form including meteorological analysis and prognosis charts transmitted by facsimile or in digital form for reconstitution on board the ship's data processing system.

.3 to prepare and issue such publications as may be necessary for the efficient conduct of meteorological work at sea and to arrange, if practicable, for the publication and making available of daily weather charts for the information of departing ships.

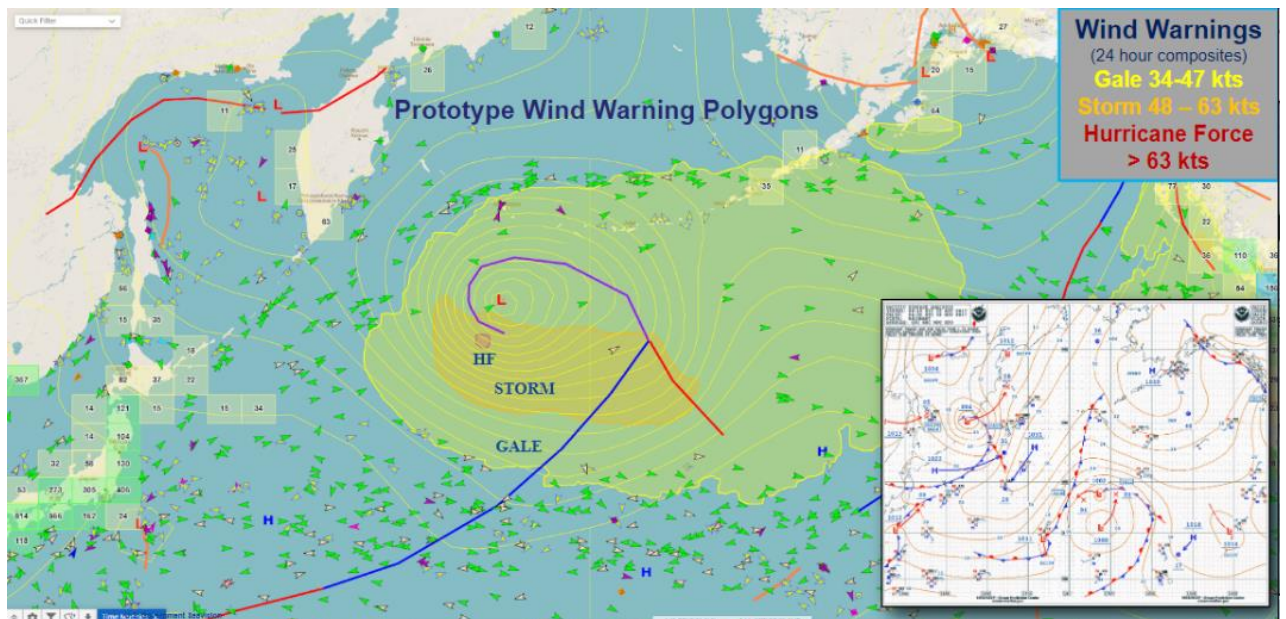
.4 to arrange for a selection of ships to be equipped with tested marine meteorological instruments (such as a barometer, a barograph, a psychrometer, and suitable apparatus for measuring sea temperature) for use in this service, and to take, record and transmit meteorological observations at the main standard times for surface synoptic observations (i.e. at least four times daily, whenever circumstances permit) and to encourage other ships to take, record and transmit observations in a modified form, particularly when in areas where shipping is sparse.

.5 to encourage companies to involve as many of their ships as practicable in the making and recording of weather observations; these observations to be transmitted using the ship's terrestrial or space radiocommunications facilities for the benefit of the various national meteorological services.

.6 the transmission of these weather observations is free of charge to the ships concerned.

.7 when in the vicinity of a tropical cyclone, or of a suspected tropical cyclone, ships should be encouraged to take and transmit their observations at more frequent intervals whenever practicable, bearing in mind navigational preoccupations of ships' officers during storm conditions.

The figure below demonstrates a prototype of S-412 Wind Warning polygons overlaid with AIS data to demonstrate the importance of this safety related information to navigation. The inset shows the traditional weather map supplied to mariners as a daily snapshot.



S-412 will be 24 hour swaths of the information and provide a timely "heads up" of potentially adverse to extreme weather through the next 00-24 hours and 24-48 hours. The warning period will be for 48 hours per the WMMIWS.

However, due to the nature of the updated ECDIS performance standard, S-100 based product specifications for use in ECDIS are controlled via S-98 which is under the domain of the IHO. In order for weather MSI information to be used onboard an ECDIS, S-412 will need to be included as one of the specifications for S-98 Data Product Interoperability in S-100 Navigation Systems.

Currently, S-98 specifies the interoperability for S-100 based product specifications that are critical to the route monitoring mode (phase 1). It is proposed that S-412 be added to S-98 as part of the inclusion of products designated for the route planning mode (phase 2).

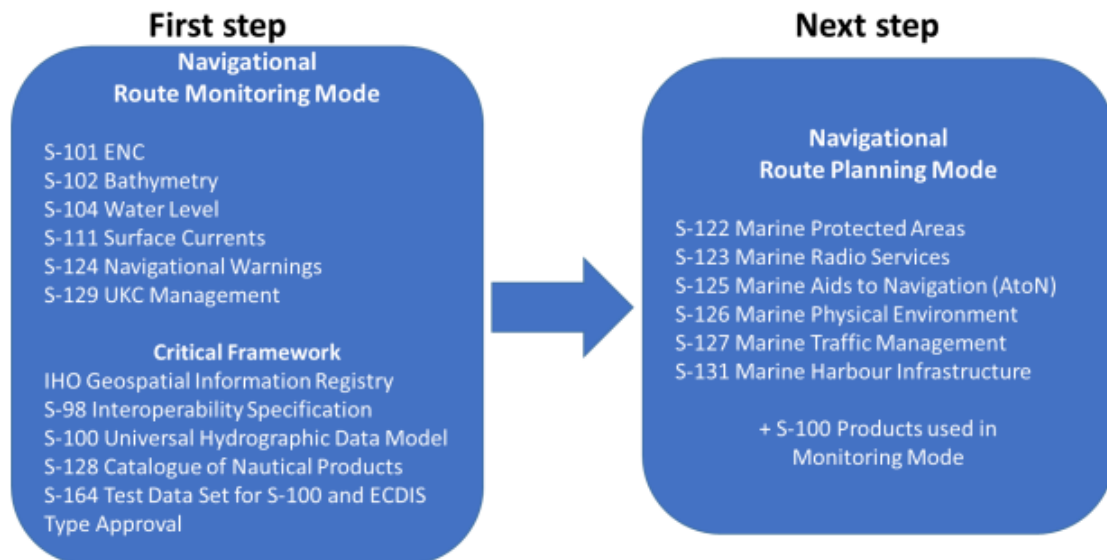


Figure 2 The IHO Navigational Package to be handled by the Interoperability Specification S-98. Additional layers may be added in the future.

Even though S-412 is under development by the WMO, they are leveraging the IHO S-100 Infrastructure to register their features and develop the feature and portrayal catalogues. In addition, they liaise closely with the S100 working group as part of their development.

Conclusions and Recommendations

As noted, S-412 is an important piece of MSI information that need to be considered as part of the S-98 Data Product Interoperability in S-100 Navigation Systems. It is also recognized that the IHO is on the critical path for S-100 based ECDIS and even though S-412 would normally be considered as part of the MSI framework needed for route monitoring, because of the timelines, it is recommended that S-412 be included as part of the Route Planning mode updates to S-98 which will occur after 2026.

Justification and Impacts

Weather information is one of the cornerstones of MSI information that is governed by the IMO SOLAS convention. The WMO has been working under the S-100 framework to develop S-412 Weather and Wave warnings for use in ECDIS and in order for this to be fully realized S-412 must be included as part of S-98 so that the overlay will be displayed as part of the complete navigation picture. At this time, the United States is only asking that S-412 be included as part of the S-98 development work to be undertaken by the S-100 working group for route planning, which is expected to commence in 2026. In addition, the S-100 Working Group should continue to liaise with the WMO on the development of S-412 and leveraging the IHO's S-100 infrastructure to ensure that it will be a fully compliant S-100 product specification that can be used in an ECDIS. In addition, this will also require inclusion of appropriate tests in S-164 as part of the route planning updates to S-98. Justification for any proposed action or recommendations.

It should be noted that S-411 Ice information will also need the same considerations as S-412 in the near future.

Action Required of HSSC

The HSSC is invited to:

- a. Note the paper
- b. endorse the proposal to include S-412 as part of S-98 route planning
- c. agree to include S-412 into S-98 as part of the route planning updates expected to commence in 2026.