

# S-10X

## The Digital Maritime Boundary Product Specification under S-100

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# Disclaimer

All views and opinions voiced in this presentation and paper are the authors' and not necessarily those of their respective employers / governments!



# Overview

- Why is a digital standard needed?
- Requirements of a standard
- History of S-57 vs. what's in S-10x
- Nuts and Bolts
- Roadmap
- Considerations and Conclusions





# Why a (new) digital standard

- Exchange by Paper Charts and/or List of Coordinates is limited by scale and volume
- Production already digital – so digital exchange is the logical result
- Digital Data transfer is ubiquitous in our age
- Standard useful for ease of exchange and reduction of limitations
- There is none yet, really



# Requirements for a standard

A successful standard should be:

- compatible with ISO standards
- non-proprietary = open
- flexible
- non-prescriptive
- rigorous
- easy to maintain



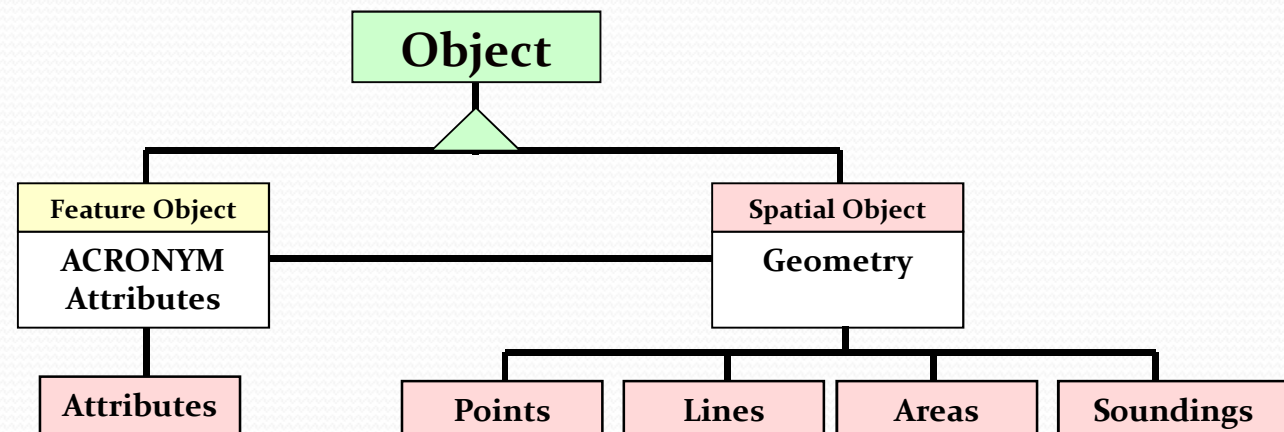
# Reqmnt's maritime boundary

- Fulfill a legal role
  - UN Repository
- Meet users spatial requirements
  - Accuracy
  - GIS / ECDIS display
  - MSDI
- Carry all relevant attribution



# Past Standard – S57

- Created with ENC' s / ECDIS in mind
- Navigator' s needs
- Limited Objects and Attributions
- Little Used Spatial Encoding
- Frozen!



## S-57 (3.1.2) – Objects and Attributes

- Limitations in Objects
  - STSLNE(L), TESARE(A), CONZNE(A), EXEZNE(A), COSARE(A), ADMARE(A)
- Limitation in Attribution
  - NATION, INFORM, NINFORM, NTXTDS, TXTDSC, SCAMIN, SCAMAX, RECDAT, RECIND, SORDAT, SORIND
  - TESARE: RESTRN
  - CONZNE: DATEND, DATSTA, STATUS
  - ADMARE: JRSDTN, OBJNAM, NOBJNM, PICREP

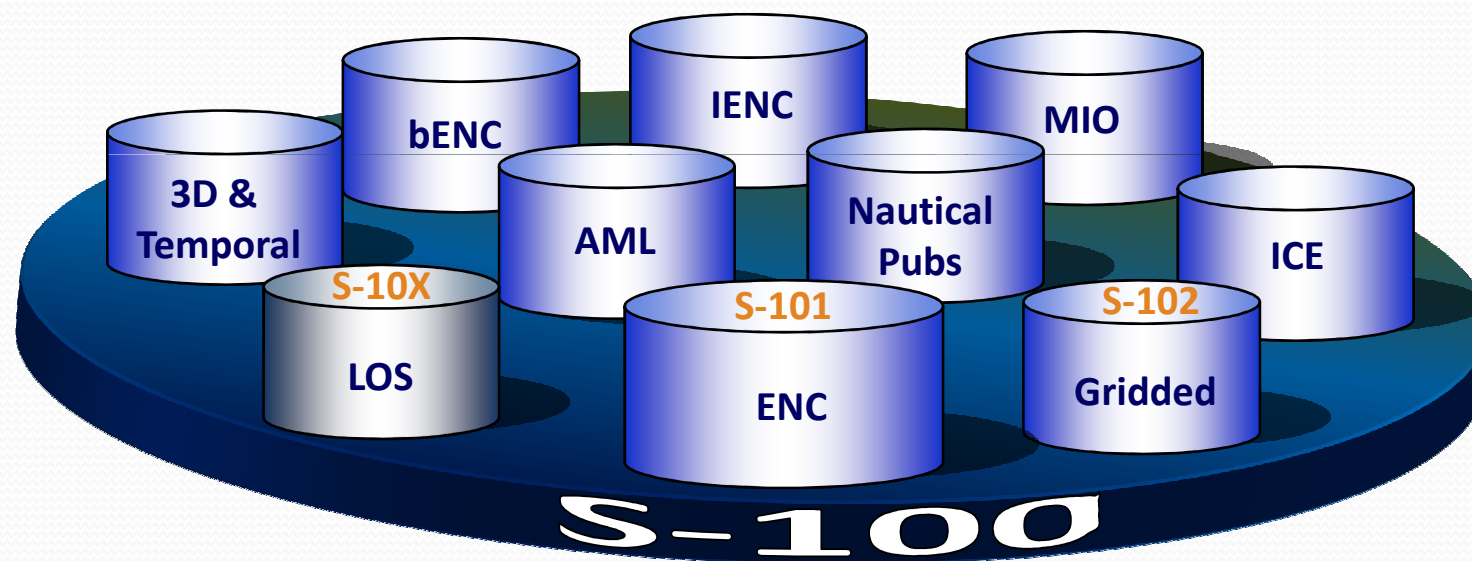


# S-57 (3.1.2) – Spatial Encoding

- ISO 8211
  - Really only used widely for ECDIS systems
  - Points, lines and areas
- Binary Encoded
- Complex Geometry
  - Shared edges between multiple features
  - Extensive testing of geometry in production

# Proposed S-10X

- Draft: [www.iho-ohi.net/mtg\\_docs/com\\_wg/TSMAD/TSMAD19/TSMAD19-4.9.1\\_S-10X\\_MaritimeBoundaryPS\\_Apprvd.doc](http://www.iho-ohi.net/mtg_docs/com_wg/TSMAD/TSMAD19/TSMAD19-4.9.1_S-10X_MaritimeBoundaryPS_Apprvd.doc)





# S-10X – Spatial Encoding

- GML – ISO 19136
- Points, lines and areas (polygons)
- ASCII Encoded
- OGC Compliant and Maintained
- Open – Non-Proprietary

```
<s100:featureMember>
  <s106:RouteInformation s100:id="_1">
    <s106:routeName>First test route</s106:routeName>
    <s106:inputIdentifier>tomr</s106:inputIdentifier>
    <s100:Polygon>
      <s100:exterior>
        <s100:LinearRing>
          <s100:posList>50.32783 -4.17668 50.33603
            -4.17668 50.33603 -4.16475 50.32783
            -4.16475 50.32783 -4.17668</s100:posList>
        </s100:LinearRing>
      </s100:exterior>
    </s100:Polygon>
  </s106:RouteInformation>
</s100:featureMember>

<s100:featureMember>
  <s106:Waypoint s100:id="_2">
    <s106:userRemarks>First test waypoint</s106:userRemarks>
    <s106:inputIdentifier>tomr</s106:inputIdentifier>
    <s106:objectName/>
    <s106:selection>planned</s106:selection>
    <s106:turningRadius>56</s106:turningRadius>
    <s106:rudderAngle>50</s106:rudderAngle>
    <s100:Point srsName="EPSG:4326">
      <s100:pos>50.32783 -4.17668</s100:pos>
    </s106:Waypoint>
  </s100:featureMember>
```



# S-10X - Objects

- BASLNE – Baseline
  - Point or Line
- MARLIM – Maritime Limit
  - Point or Line
- MARBND – Maritime Boundary
  - Point or Line

# S-10X – Attributes - BASLNE

- OBJNAM – Object Name
- CATBLN – Category of Baseline
  - Normal Baseline
  - Straight Baseline
  - Archipelagic Baseline
- NATION
- NOBJNM – Object Name in National Language
- COORLA / COORLO – Published Coordinate (in case of resolution difference)
- SORLAT / SORLON – Original Latitude/ Longitude Coordinate (in case of non-WGS 84)
- LEGSOU – Legal Source of Boundary



# S-10X – Attributes - MARLIM

- OBJNAM – Object Name
- CATLIM – Category of Limit
  - Territorial sea
  - Roadstead
  - Contiguous zone
  - Exclusive economic zone
  - Continental shelf
- NATION
- NOBJNM – Object Name in National Language
- COORLA / COORLO – Published Coordinate
- SORLAT / SORLON – Original Latitude/ Longitude Coordinate
- LEGSOU – Legal Source of Boundary



# S-10X – Attributes - MARBND

- OBJNAM – Object Name
- CATBDY – Category of Boundary
  - Territorial sea
  - Roadstead
  - Contiguous zone
  - Exclusive economic zone
  - Continental shelf
  - International Boundary
- NATION
- NEIGHB – Neighbouring states
- NOBJNM – Object Name in National Language
- COORLA / COORLO – Published Coordinate
- SORLAT / SORLON – Original Latitude/ Longitude Coordinate
- LEGSOU – Legal Source of Boundary

# Roadmap – from Draft to Standard

- Special Working Group (SWG) @ IHO
  - Within TSMAD
  - Interested Parties
- Further develop Standard
  - Coordinate with DOALOS, TSMAD, Interested States
- Encode into S-100
- Sponsorship by one state to become international standard
  - UNCLOS need for international standard
- Maintain and update down the road
- Create Cookbook





# Considerations

- Line Types?
  - Clarity should be provided to distinguish between geodetic lines and loxodromes
  - Would densified lines do the trick?
  - Mandatory Attributes?
    - What about points?
- Final limit lines or zones?
  - Can states produce established coordinates for limits?
  - Is an option needed for auto-creating zones in the standard?
- Additional Attributes to create MIO?



# Conclusions

- S-10x has the potential for a unique exchange standard not seen before for Law of the Sea L&B data.
  - Exceeding Paper Charts and Lists of Coordinates
- Draft stage discussions should include more than HO's
  - e.g. Other government agencies
- The use of data outside the Law of the Sea GIS sector (e.g. MSDI) should be kept in mind.
- Maintenance is of importance for future updates to meet needs of states and users
  - The S-100 framework offers the benefit of easy maintenance & update

# Thank You!

Or are there questions?

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