

Proposal to Encode Nautical Chart Symbols Used in Running Text

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Photo
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A quick overview of the proposal and background on nautical symbols

	xx0	xx1
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
A		
B		
C		
D		
E		
F		



The Case For Encoding

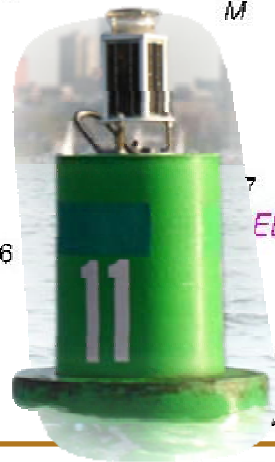
Nautical Chart Symbols are:

- In ongoing current use
- Used in some form world wide
- Used regularly in running text

This proposal is concerned with those characters that have been found in running text.

These slides explain the notational conventions for nautical symbols as they apply to this subset and how the repertoire for this proposal was selected.

A Nautical Chart



EL TRAFFIC SERVICES AREA
(see note D)

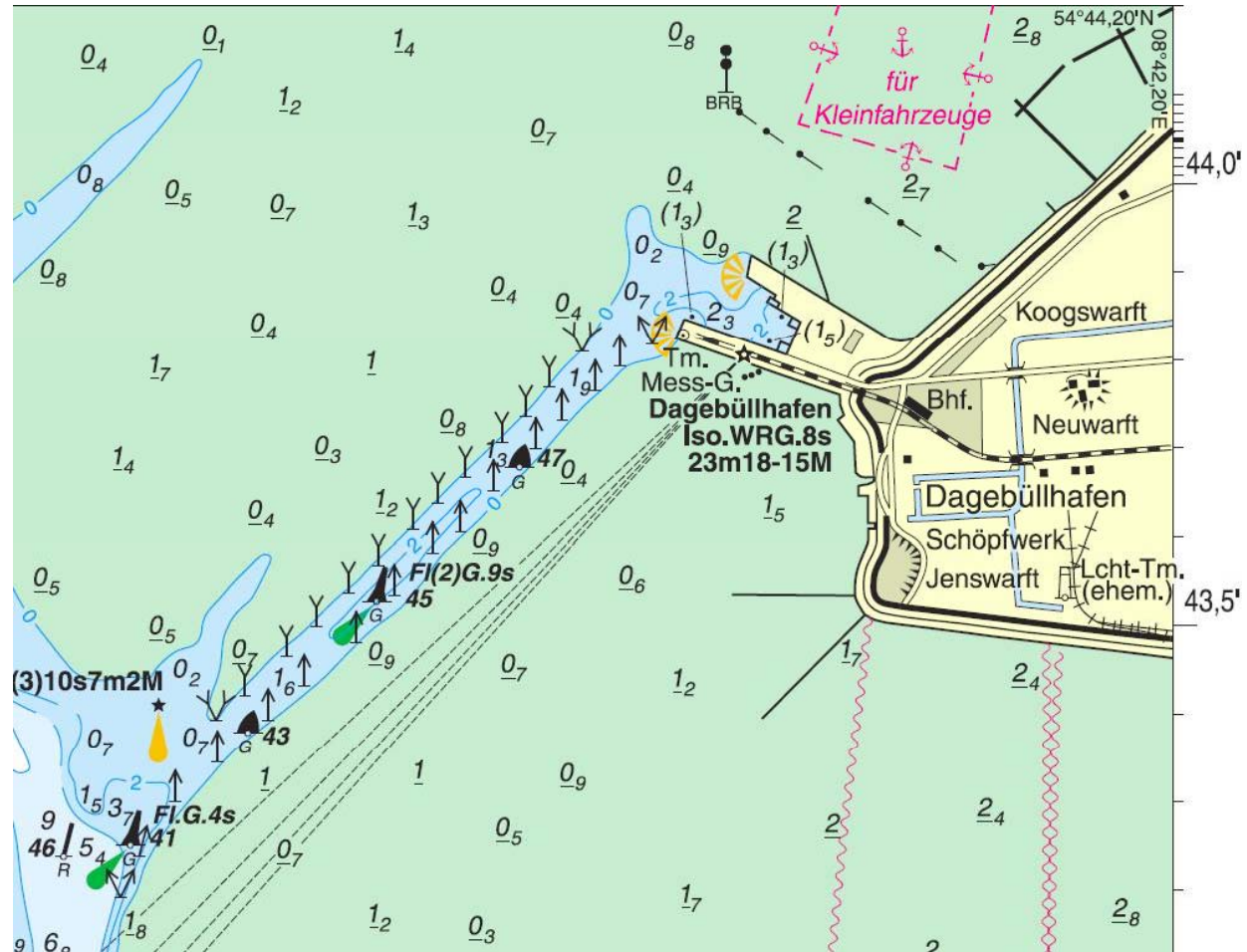
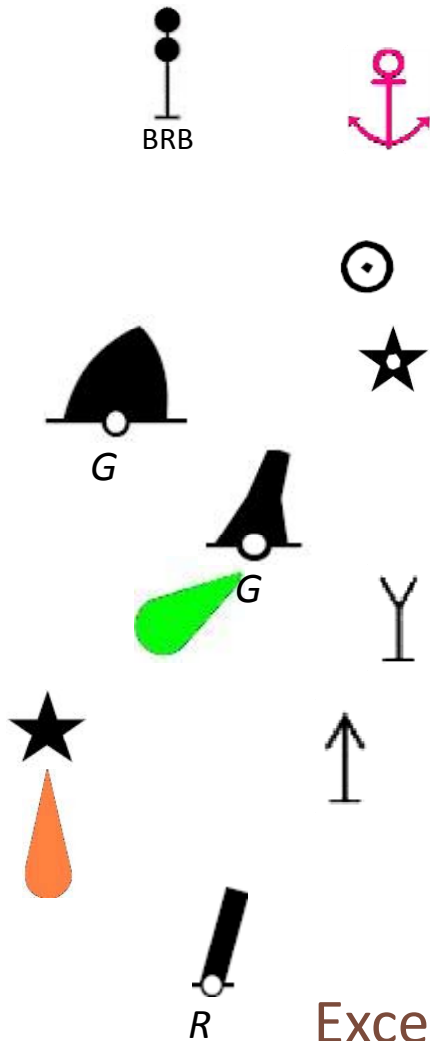
TEST AREA
(see note)

Test area
maintained
Unrestricted
this test area
are respons

All ves
seaplan
or landi

This is the chart for the location on the title slide. While most of the chart is a line drawing, buoys, lights and landmarks are shown as symbols



Symbols Plotted in Charts




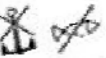
Excerpt from a German chart, with symbols used in it

Symbols In Running Text


When charts need updating, symbols aid in describing the corrections.


Replace  with  Fl.R.4s10m5M


 in Bau, betonnt/under construction
in dem Gebiet/in the area


 une légende
Zone de mouillage

Norderaue

 (21) 107
3013
Letzte NfS 44/11
Verlege
Relocate

 Fl(2)G.9s
23



 25

 30



nach/to 54° 39,17' N 008° 27,41' E
nach/to 54° 39,62' N 008° 29,10' E
nach/to 54° 39,93' N 008° 29,02' E

(WSA Tönning 141/11) 45/11

★ 23年209項 四国南岸 — 灯浮標設置

記載 『  Mo(U) 8s No 20』 (海図W157上は、 『  』)

(1) 33-01-00N 133-35-00E

『  Mo(U) 8s No 21』 (海図W157上は、 『  』)

Examples from weekly chart updates called “Notices to Mariners”

Where Symbols Appear in Text

- As Part of (weekly) Chart Update Notices
- Published weekly on websites (HTML, PDF)
- Republished by other nations (at times)
- Distributed to ships via commercial service
- Republished monthly in boating magazines

Which Symbols Appear in Text?

- Buoys and Beacons



- Daymarks



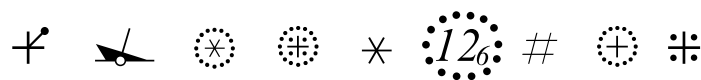
- Lights, Sound, Radar



- Landmarks for Navigation



- Rocks and Obstructions



- Areas and Limits



etc.

...and which normally do not?

- Vegetation
 - Nature of the Coastline
 - Cultural Features
 - Port Facilities
- etc.



Update information might instead be given by text description, or by a drawing.

Nautical Symbols Usage Conventions

- More a “notation” like math than emoji

⇒ **floating** marks use *inclined* symbols 

⇒ **fixed** marks use upright symbols 

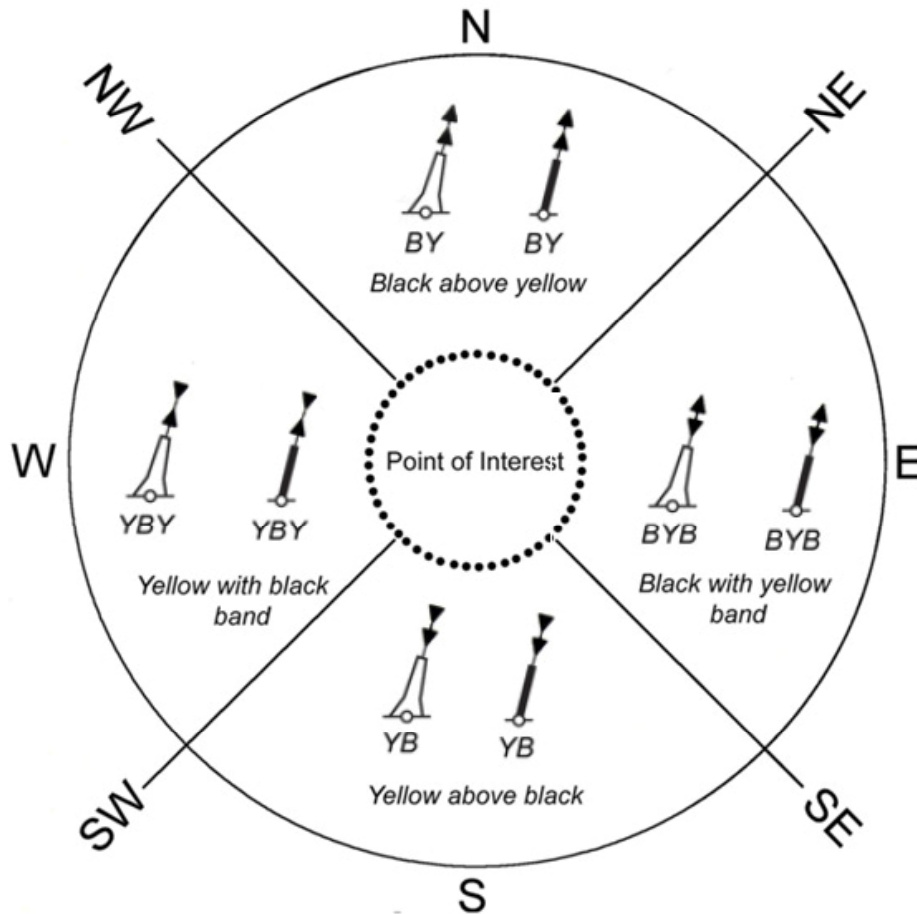
⇒ starboard vs. port hand side 




⇒ depth values use oblique/italic digits 

⇒ “**colors**” and “**topmarks**” have defined meanings 

– see examples on next slide

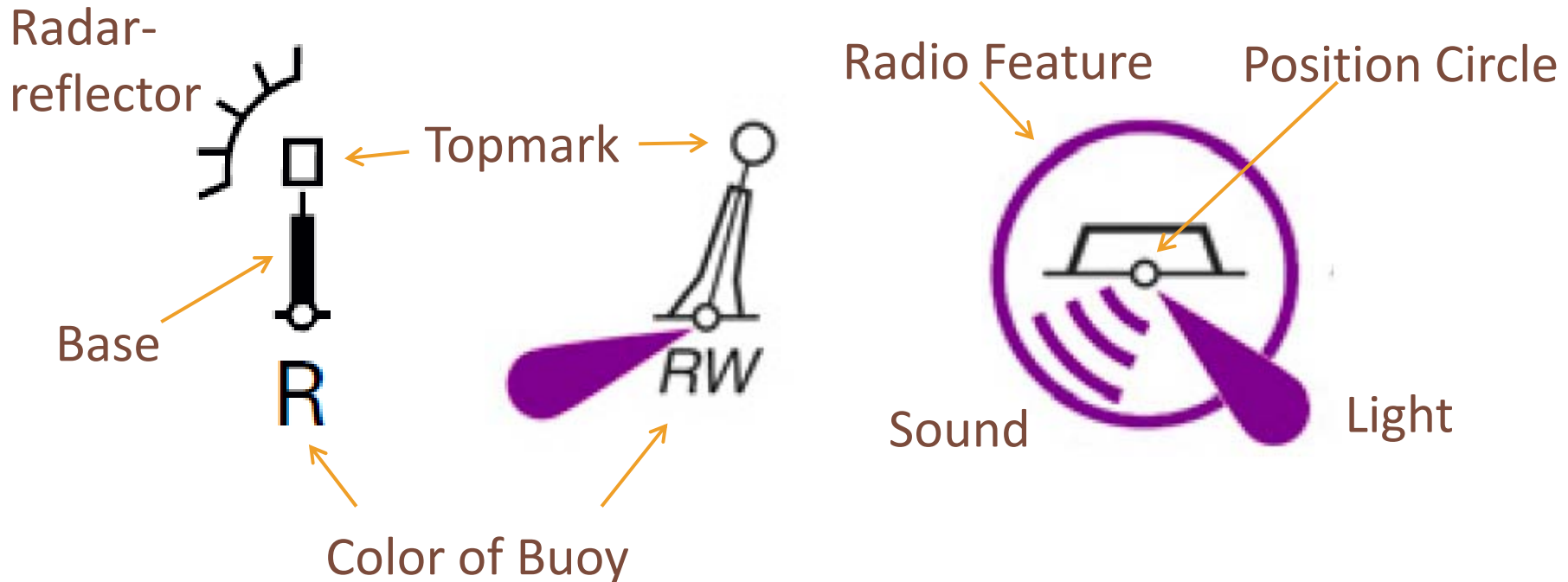
Conventions for Topmarks and Colors



Isolated Danger Marks	
	← topmark ← color
Safe Water Marks	
	
Special Marks	
	

IALA defined conventions for Cardinal Marks and Other Marks

Compound Symbols



Topmarks, colors, lights, sound and other features can be realized with combining marks and overlays.


Bases, colors and topmarks come both *inclined* and upright.


How are Symbols Used?

- Simple and common symbols are handled with font technology
- Including standard compounds (overlays)
- Rare or complex symbols are handled as drawings, inline or as “block” (chartlet)
- Contours, vegetation, ports, cultural features are consistently not part of textual updates
 - Type of zones and limits are shown with symbols


Simple ↔ Complex

★ (16) 1512 Schumachergrund. Knaakrücken. Sandhof
3006
Letzte NfS 20/11
Trage ein
Insert

 VHF 9 Pfeile in Richtung 038°/161°/218°/315°
arrows pointing 038°/161°/218°/315°

 VHF 9 Pfeile in Richtung 026°/206°/333°
arrows pointing 026°/206°/333°

Streiche
Delete



 VHF 9


Germany:
graphics for > 2 directions



This common form uses a **glyph**

UK: descriptive **text**
for > 2 directions

Chart 3441 [previous update 3846/11] FINNISH DATUM

Replace  7, direction of vessel movement 51°/231° with ,

 direction of vessel movement 51°/231°

 symbol, radio reporting point, 2, direction of vessel movement 9°/52°/175° with  symbol, radio reporting point, direction of vessel movement 9°/52°/175°

Symbol can be associated with 1, 2 or more vessel directions.
Only the forms for 1 and 2 directions are needed as characters.

More on Symbol Use in Notices

- Each Hydrographic Office consistently uses one set of symbols as glyphs in running text
- Each uses international and national symbols
- Some use glyphs (symbols) more aggressively, some never use them (empty set)
- Some use inline drawings as well as symbols, some do not
- Some get publication/technical assistance from other offices

Key Aspects Of “Legacy” Use

- Shared Font
 - Used in preparing original reports in PDF or HTML
 - Distributed to allow viewing reports in HTML
 - Used by third-party software to manage chart updates⇒ De facto compatibility set
 - HTML format viewable with standard browsers
 - No special-purpose layout support
 - Font uses combining glyphs for topmarks, colors, obstructions
- ⇒ Chars from this font form the repertoire’s core

Plain or Rich Text?

Notices to Mariners are formatted documents

⇒ They use “vanilla” rich text features

⇒ They have a plain-text “backbone”

⇒ They don’t assume special layout engine

⇒ HTML versions are viewable on all browsers

– (fonts can be downloaded & don’t use OpenType)

Who Defines Nautical Symbols?

- Internat. Hydrographic Organization (IHO)
 - Charged with developing common chart format
 - Chart INT-1* contains listing of symbols
- National Hydrographic Offices
 - Define national symbols (compatibility)
 - Issue charts and “Notices to Mariners”
 - Issue translations of INT 1 showing local symbols
 - Some countries reference the INT 1 of others

*) The IHO version is more like a template for the national versions

Symbols for Obstructions

Chart 4508 (INT 508) [previous update 166/12]

Chart 120 (INT 1479) [previous update 5842/11]

Replace $\overline{18} \text{ Wk}$ with $\overline{40} \text{ Wk}$

Delete \oplus

$\underline{39} \text{ Wk}$ with $\underline{56} \text{ Wk}$

- Dotted outline means “significant elevation above the seafloor”
- Overbar, underbracket shows how depth was measured
- Outlined depth is implemented today with simple sequence

Chart 913 (INT 5254) [previous update 170/12] WGS84 DATUM

Insert $\overline{16}_i \text{ Wk}$

\circ *Obstn*

\oplus

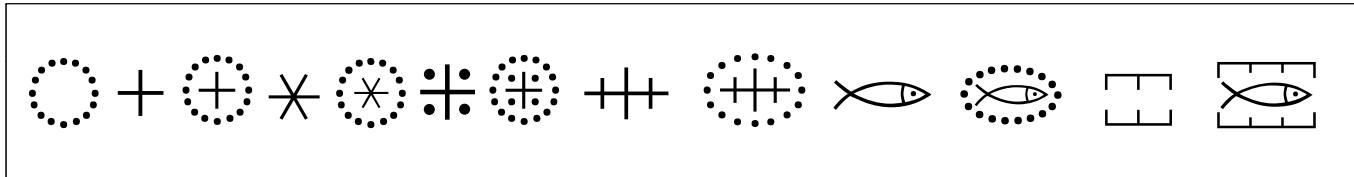
depth 0_2




Insert $16!$, Wk \rightarrow Insert $\overline{16}_i \text{ Wk}$

Depths are oblique, subscripts are minor units (fathoms, feet)

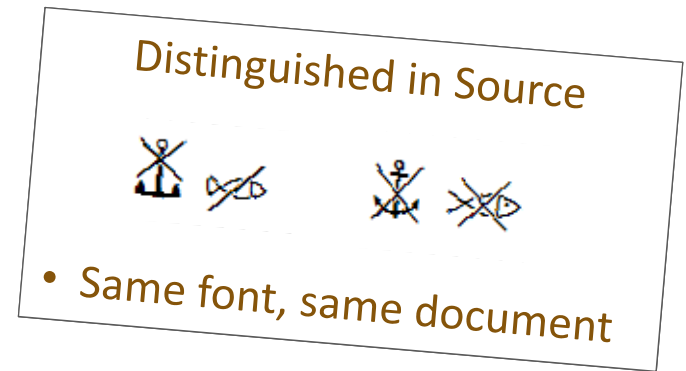
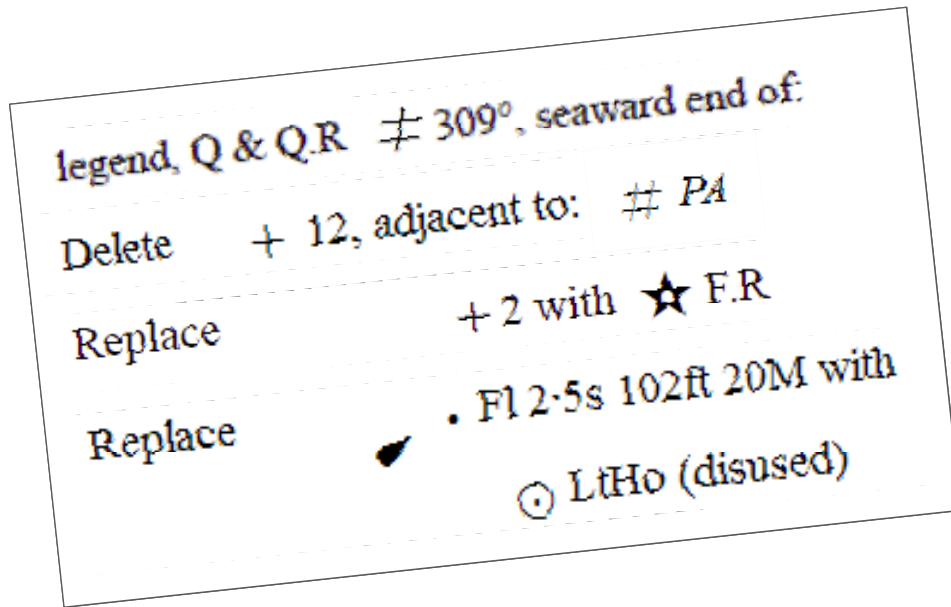
Obstructions (cont'd)

- These characters form a series of symbols for **rocks**, **wrecks**, **obstructions** and **fish farms**



- The  has a consistent meaning, but on the character level, it is not a combining character
 - The  does not surround the + * ⌘ characters as they are
 - Surrounds smaller versions of these shapes
 - Wrecks and fish havens use an oval outline instead
 - The  is not productive. The set is fixed and small

Deemed Not Unifiable



- Superficial similarities with existing characters
- But: representing entirely unrelated function + different style, size and/or vertical alignment

Repertoire

- Superset of fonts officially distributed for viewing of FR and UK Notices
 - Precomposed removed
 - Duplicates removed
 - Obvious unifications with existing chars removed
- Survey of German and other Countries' Notices
 - + Additional base and combining characters
 - Complex symbols not added
 - We have received an offer of official verification

Names

- Names are based on description in INT-1
- Except:
 - INT-1 uses some symbols in several contexts
 - IHO S-57 provides a name for the symbol as such
 - example: POSITION CIRCLE
 - Unicode conventions for BLACK / WHITE used
 - Topmarks named by shape in 2-D appearance
 - TWO BLACK CIRCLES, not TWO BLACK BALLS