Ship Traffic Management and Traffic Organization with Moving Havens

Thomas Porathe, AFNI
Professor of interaction design, Norwegian University of Science and Technology, Trondheim
e-Navigation

Human Factors
Human-Machine Interface
Information Design

Route Exchange
STM
“Intended and suggested routes”
“Moving Havens” (submarine operation)
Voyage plan

WP 1

WP 2
Voyage plan

WP 1

WP 2
Voyage plan

WP 1
11:40 UTC

WP 2
12:00 UTC
Moving haven

WP 1
11:40 UTC

WP 2
12:00 UTC
Moving havens

WP 1
11:40 UTC

WP 2
12:00 UTC
MASS infrastructure

STM/TOS infrastructure

The Helge Ingstad accident November 2018
In the early hours of 8 November 2018, the frigate HNoMS Helge Ingstad and the tanker Sola TS collided in the Hjeltefjord near Bergen.
Human Error? No, Bad Design

(Donald Norman)
Simple fairway (centre-line)
Traffic separated fairway ("recommended routes")
Digital rutetjeneste - routeinfo.no

Den digitale rutetjenesten er tilgjengelig for fartøy som anløper havner i farvannet mellom svenskegrensen i øst og Haugesund i sørvest. Tjenesten blir trinnvis gjort tilgjengelig fra sør til nord og vil dekke hele kysten i løpet av 2020.
Routes and Route information from the Norwegian Coastal Administration (NCA)

Disclaimer:
Find NCA's reference routes by searching for port/port facility/quay or route name in the search field above, or navigate and select directly in the map. When a route is selected, important route information is displayed. Download the routes in RTZ-format (WGS84) to bring the route into any navigation platform for route planning. On board the vessel assure the routines given for route-import are followed.

15.11.2019: NCA have decided to adjust terminologi to assure the routes are used in the right way. The term «Recommended Routes» have been replaced with «Reference Routes» See more about reference routes and other issues in FAQ.

Video guide 1: How to use a reference route
Video guide 2: Route information

https://www.routeinfo.no/
<?xml version="1.0"?>
<route xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" version="1.0"
xmlns="http://www.cirm.org/RTZ/1/0">
  <routeInfo
    routeName="NCA_Ardal_Skudefjorden_Out_20190704"
    validityPeriodStart="2019-07-04T02:00:00+02:00"
    validityPeriodStop="2020-08-14T02:00:00+02:00"
    vesselName="Norwegian Coastal Administration"
    vesselVoyage="NO-320010" />
  <waypoints>
    <defaultWaypoint radius="0.10">
      <leg
        starboardXTD="0.04" portsideXTD="0.04"
        safetyContour="30.00" safetyDepth="30.00"
        geometryType="Loxodrome"
        staticUKC="0.00"
        dynamicUKC="0.00" />
    </defaultWaypoint>
    <waypoint id="1" name="Ardal">
      <position lat="59.14432287" lon="6.1542135" />
    </waypoint>
    <waypoint id="2" name="Kvannholmen">
      <position lat="59.14189573" lon="6.08508445" />
    </waypoint>
    <waypoint id="3" name="Smaskjaerene">
      <position lat="59.13572616" lon="6.08322484" />
      <leg
        starboardXTD="0.07" portsideXTD="0.07" />
    </waypoint>
  </waypoints>
</route>
Traffic separated fairway (time coordinated)

Now  +30 min  + 60 min
Traffic separated fairway (time coordinated)
Traffic separated fairway (time coordinated)

Now +30 min + 60 min
Traffic separated fairway (time coordinated)

Now +30 min + 60 min
Traffic separated fairway (time coordinated)

Now +30 min + 60 min
Traffic separated fairway (time coordinated)

Now +30 min + 60 min
Traffic separated fairway (time coordinated)

Now +30 min + 60 min
Traffic separated fairway (time coordinated)
When Cross Track Distances are properly set to each leg of a voyage plan then route checking assists in checking for potential obstructions, dangers and insufficient depths.
In 15 kn a 3-minute Moving Haven will be 7.5 cables long (1389 m)
With 15 knots, a 1 minute Moving Haven will be 2.5 cables long (463 m)
With 15 knots a 1 minute Moving Haven will be 2.5 cables long (463 m)
With 15 knots a 1 minute Moving Haven will be 2.5 cables long (463 m)
North Sea Region
estimated traffic
2025 (2012)
Results from the survey of Suggested route service

What is your opinion about the tested Suggested route concept?

- Very good: 1
- Good: 8
- Don't know: 0
- Bad: 0
- Very bad: 0

n=9

Do you think a similar Suggested route concept will become reality in the future?

- Most probably: 3
- Probably: 6
- Don't know: 0
- Probably not: 0
- Most probably not: 0

n=9

Safe haven in ECDIS during a technical tests Korea 2013