

MARNIS RISK CONCEPT

**FINAL PRESENTATION OF MARNIS
IALA FEB 2009**

Objectives of risk considerations

The most important objective is:

▪ **Improvement of safety and the protection of the environment;**

The following aspects play a role

- Improvement of efficiency and reliability of information flows;
- Furtherance of the economy of sea transport;
- Improvement of the efficiency of legal and organisational aspects regarding enforcing of rules and regulations in the “European maritime zone”

Fundamental equation

$$P(i) = F_{\text{flag}} * F_{\text{age}} * F_{\text{wind}} * F_{\text{vis}} * F_{\text{nav}} * \text{EXP}(i) * \text{CASRAT}(i, \text{type}, \text{size})$$

$P(i)$ = Probability of a certain accident type (i)

$\text{EXP}(i)$ = Exposure for a certain accident type (i)

$\text{CASRAT}(i, \text{type}, \text{size})$ = Casualty rate for a certain accident type (i),
ship type and ship size

F_{flag} = multiplication factor for flag state

F_{age} = multiplication factor for age of the ship

F_{wind} = multiplication factor for wind

F_{vis} = multiplication factor for visibility

F_{nav} = multiplication factor for the navigation status

Risk in VTS areas and SRR monitoring areas

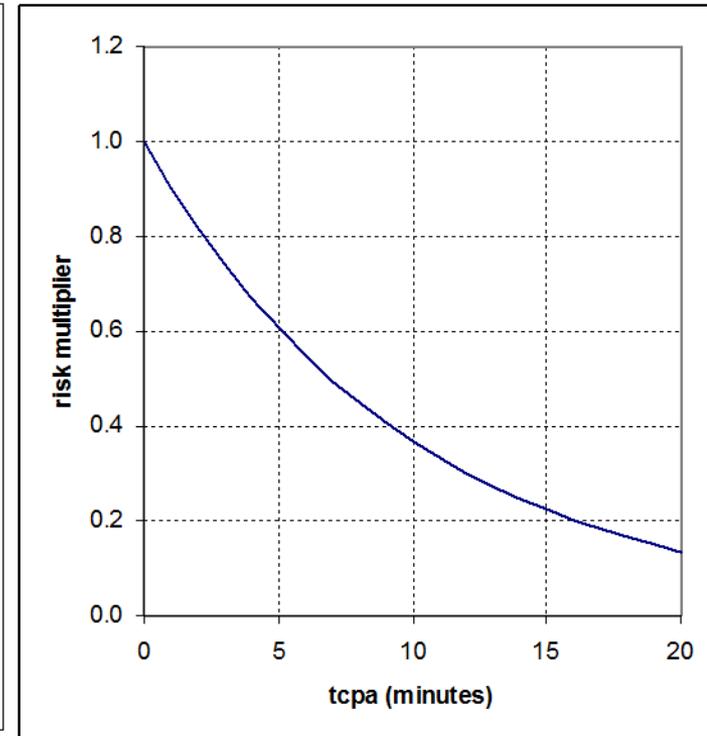
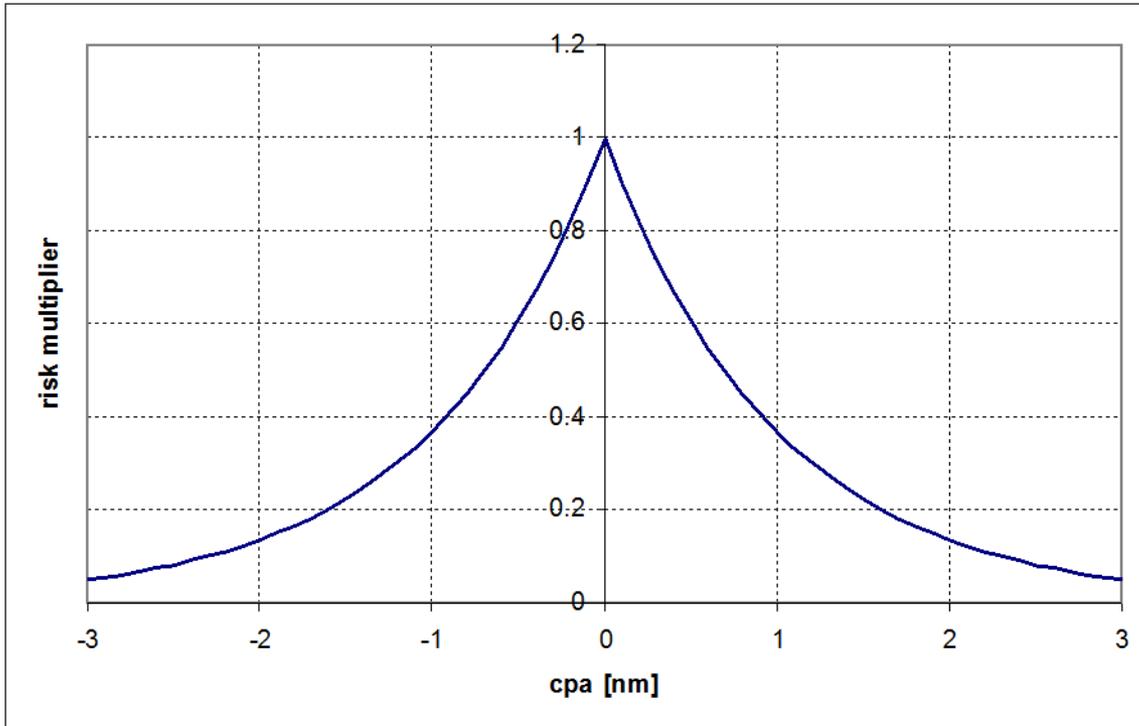
The risk approach can be used:

- in a VTS area of the reporting area of a Member State;
- in an area where SRReporting is enabled;
- LRReporting provide a traffic image.

The difference is caused by the presence of other ships which can affect the risk of own ship. When vessels approach each other in a fashion that a “risk of collision” exists the collision risk part of the risk equation may be higher than the threshold and the vessel becomes an Alert Ship. The VTS (MOS) operator may watch the behaviour of the vessels more closely and give information (and instructions as the case may be) to the vessels as required.

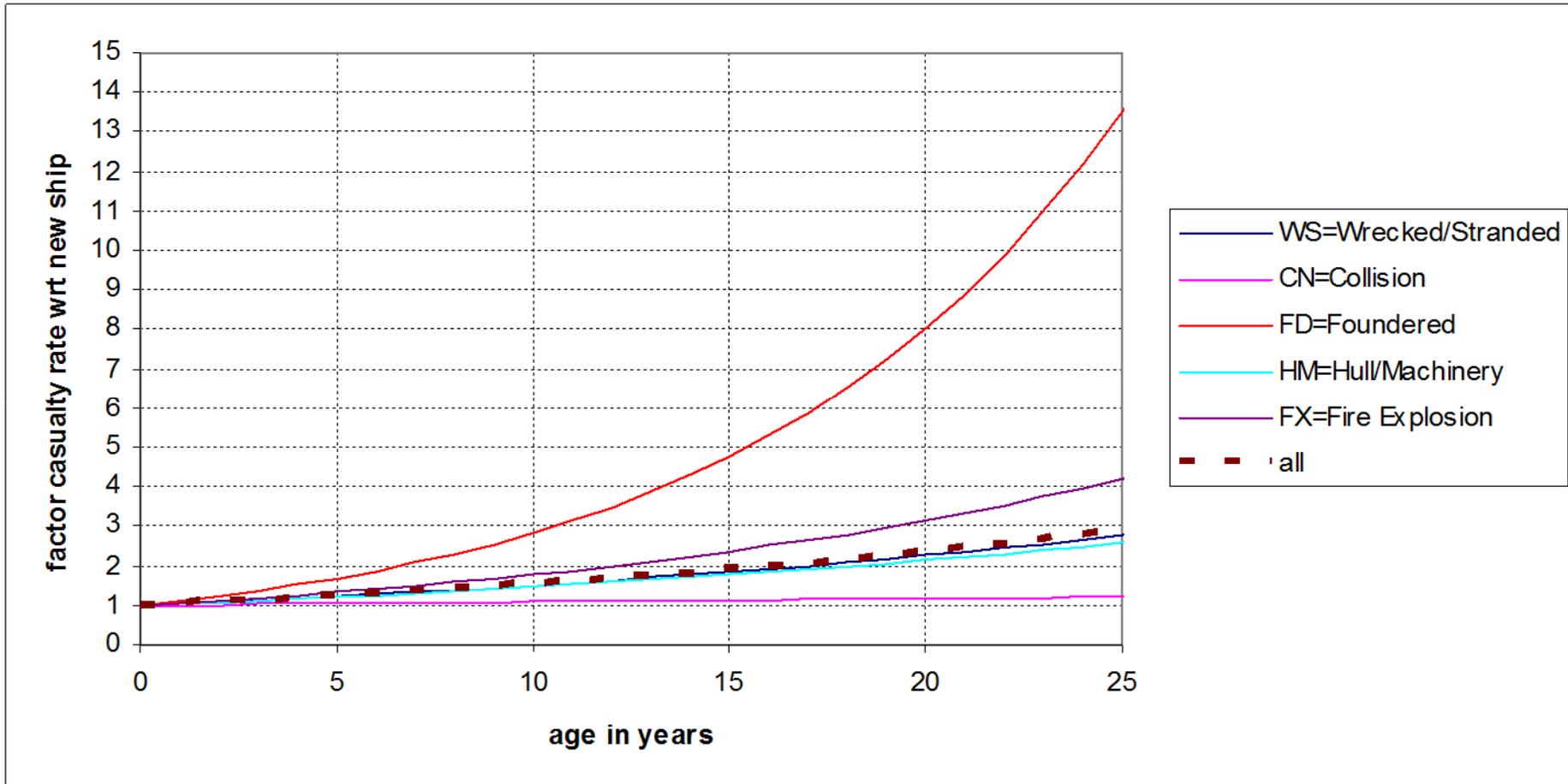
The risk approach may also applied for monitoring symptomatic behavior of vessels. In this case the average collision risk in an area is being used that reflects the trend of the risk better.

Risks in encounters



Collision risk depends on CPA (Closest point of Approach) and TCPA (Time to CPA)

Multiplication factor due to age of vessel

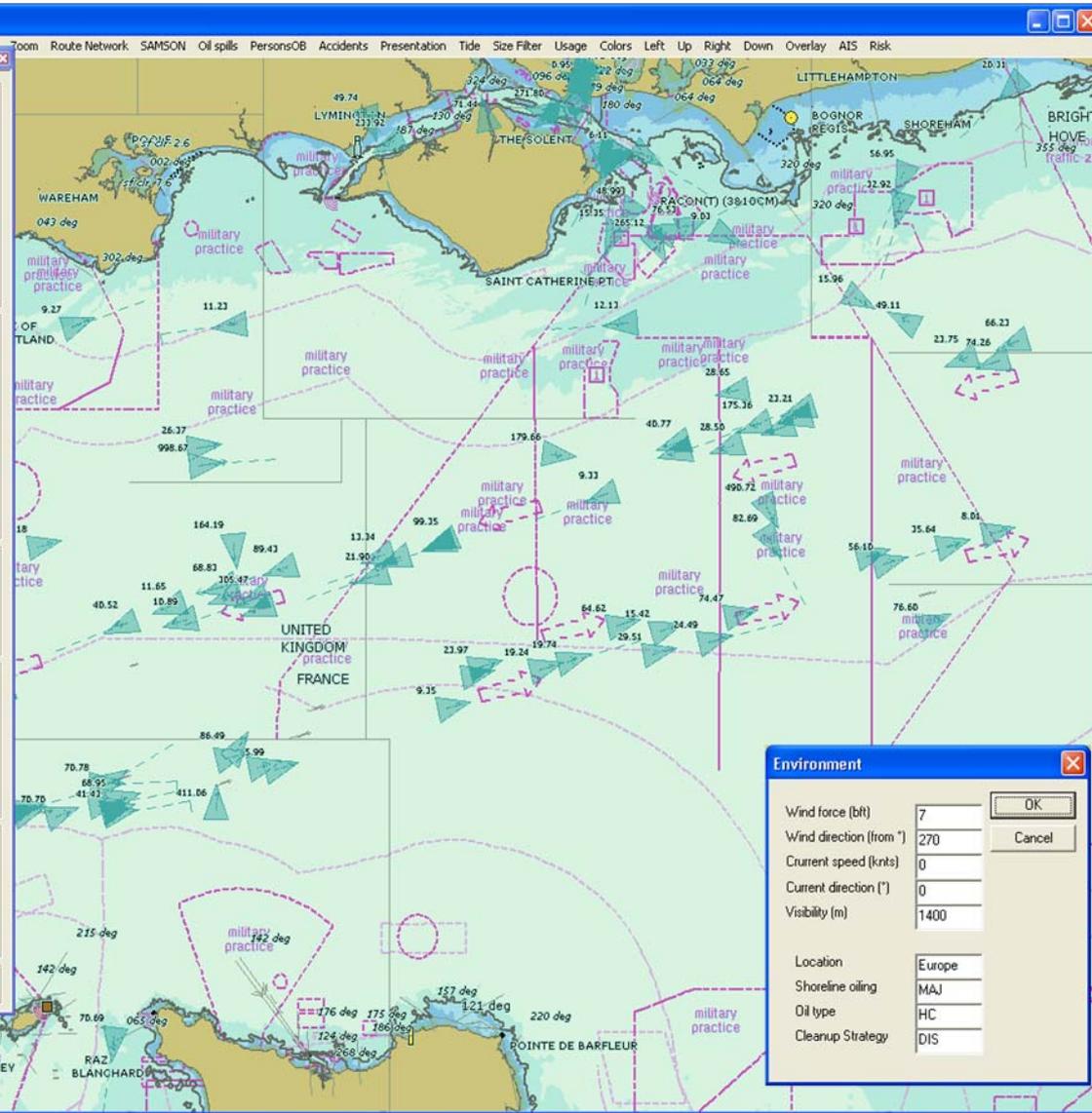


Example risk index

FSA-result

AIS Ship Details

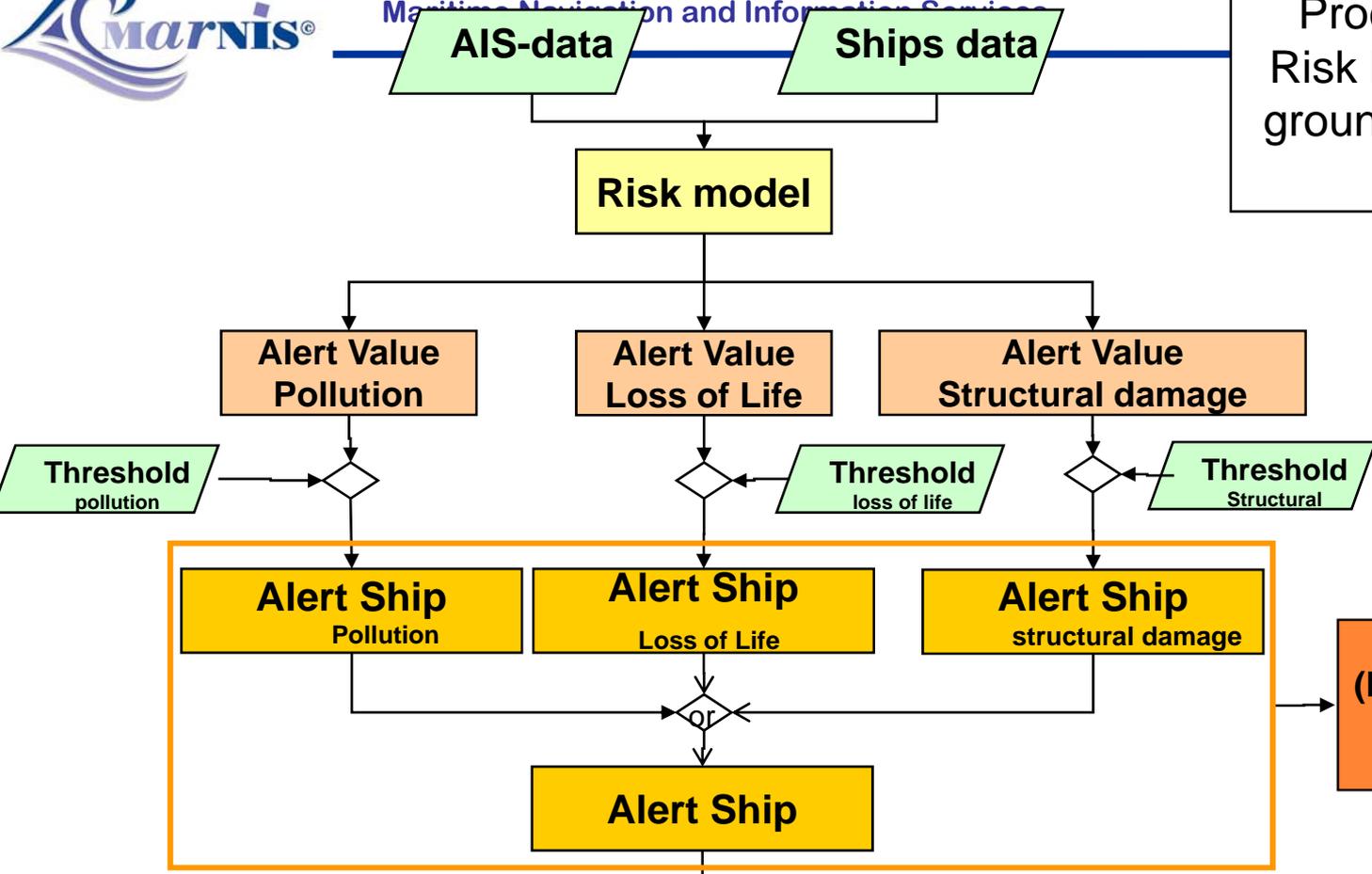
Static data	
MMSI-number	232089000
Ship name	QUEEN ELIZABETH 2
Call sign	GBTT
IMO number	6725418
Dead weight	15521
Length over all	293
Breadth	36
Antenna.A	129
Type of ship	Passenger
Dynamic data	
Latitude	5021.13
Longitude	-151.90
Pos. integrity	high
Time (UTC)	5
COG [°]	82.0
HDG [°]	85
SOG [kts]	22.1
Nav. status	under way
ROT	0.0
Voyage related data	
Draught [m]	9.8
Destination	SOUTHAMPTON
ETA	17/11 04:15
Hazard cargo	
Probability per hour	
Collision	0.000004348
WS Nav Error	0.000000000
WS Eng Fail	0.000000000
Foundered	0.000000577
Hull failure	0.000002342
Fire/Explosion	0.000006288
Casualty costs [Euro/hr]	
Loss of Life	806.64
Pollution	5.75
Struct. Damage	186.28
Total Costs	998.67
Major Casualty	foundered
Further attributes	
Local time	17/11/2006 00:56:07



Environment

Wind force (bit)	7	OK
Wind direction (from °)	270	Cancel
Current speed (knts)	0	
Current direction (°)	0	
Visibility (m)	1400	
Location		
Shoreline oiling	MAJ	
Oil type	HC	
Cleanup Strategy	DIS	

Process Alert / High Risk based on nautical grounds; three different thresholds



Risk control options (NOT actions towards the ship); monitoring; reporting

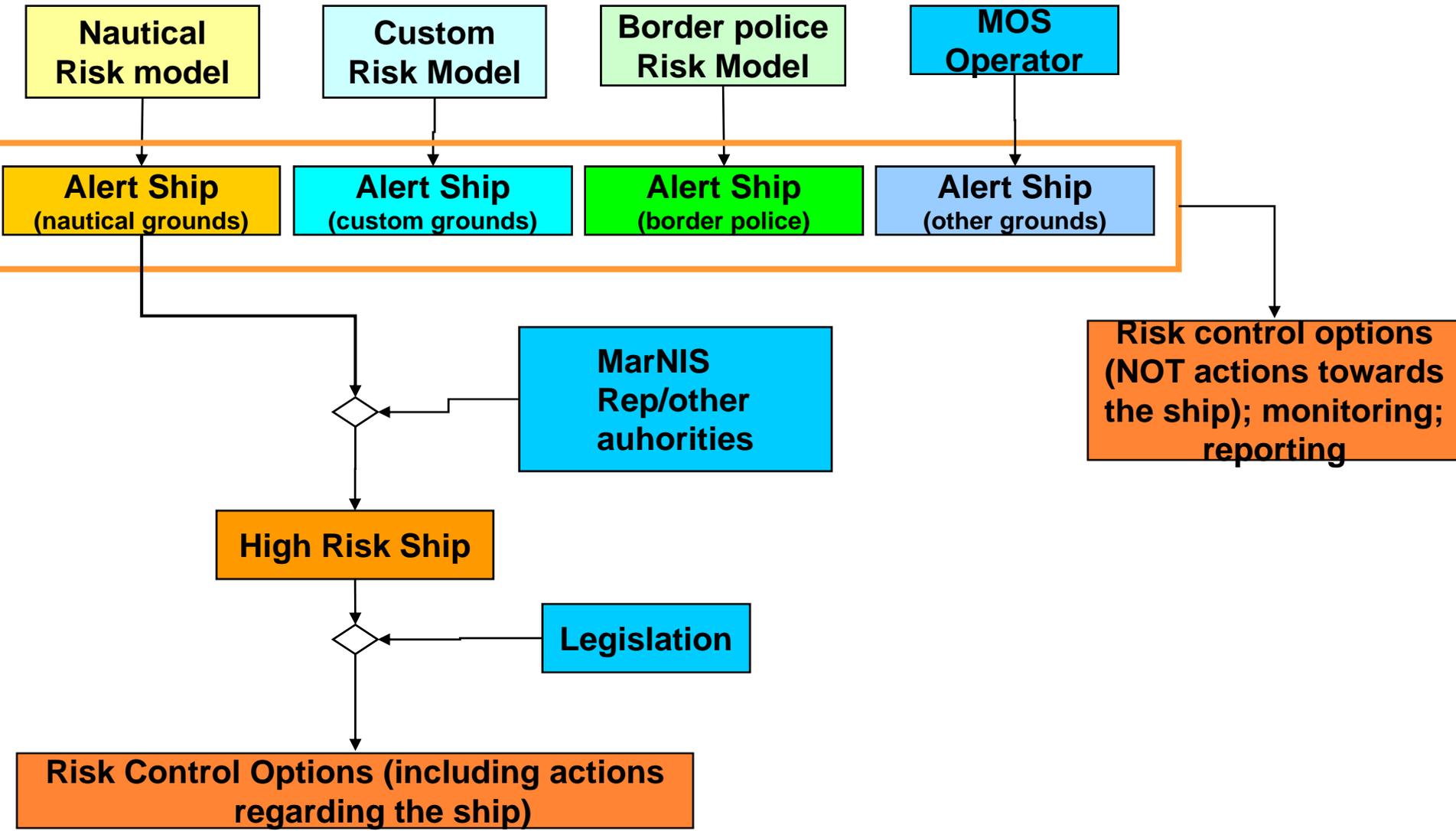
MarNISrep

High Risk Ship

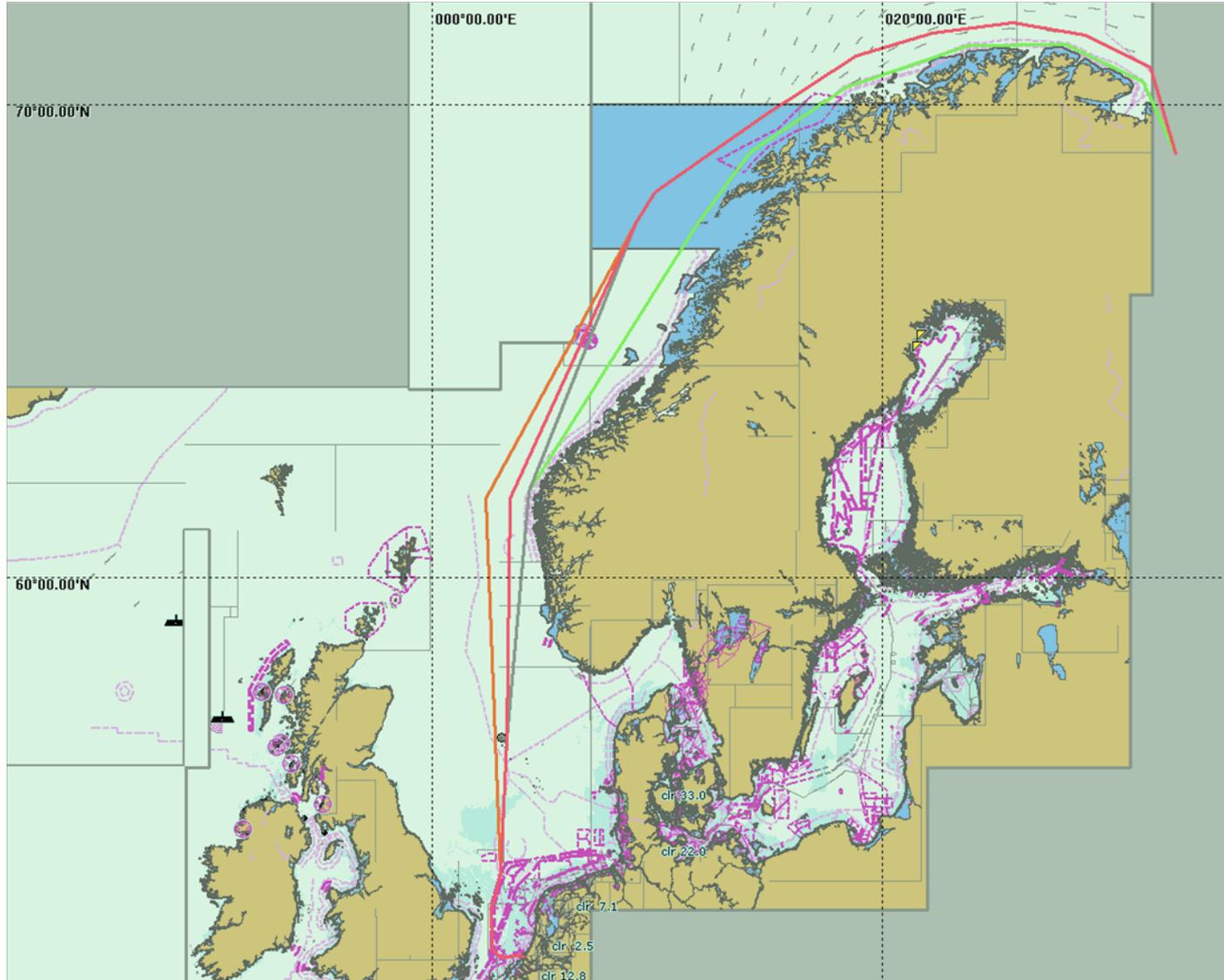
Legislation

Risk Control Options (including actions toward the ship)

Process Alert / High Risk based on different risk models



An example



Risk and voyage costs of a 100,000 tons tanker with BF 4

distance from coast	risk costs of the voyage	distance [nm]	speed reduction	costs of voyage	Total costs	Risk as % of total
5	€ 1.728	1686	1,00	€ 193.411	€ 195.139	0,9%
30	€ 1.655	1692	1,00	€ 194.105	€ 195.760	0,8%
60	€ 1.619	1704	1,00	€ 195.413	€ 197.032	0,8%

Optimum distance (y) from the coast for W wind

