PORT INFRASTRUCTURE AND HYDROGRAPHY

Capt. Salvatore Rassello
Director Nautical Management

Carnival

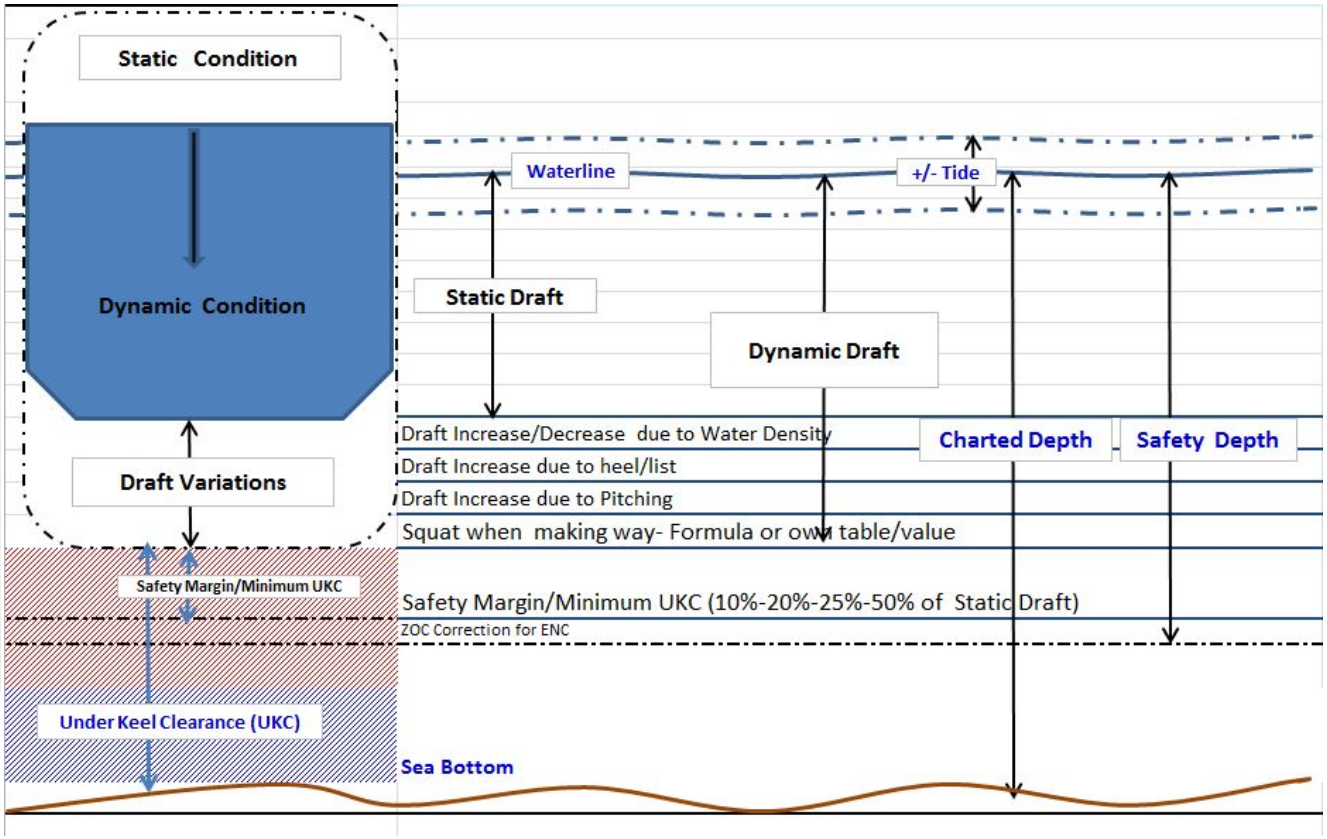
AGENDA

- Available depth of water/dredging concerns vs. dynamic draft considering squat and heel angle
- Desire of better instrumented ports (Port Ecdis)
- Pilots and ports: Coordination- Standard systems for precise e-navigation

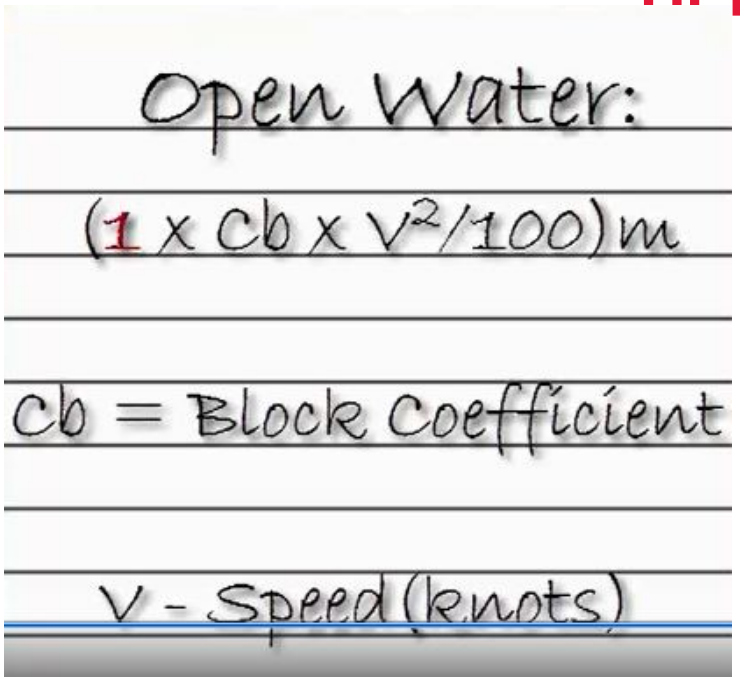
AVAILABLE DEPTH OF WATER/DREDGING CONCERNS VS. DYNAMIC DRAFT CONSIDERING SQUAT AND HEEL ANGLE

Safety Depth Calculation

Static Draught	8.5m
Squat (+)	1.3m
Safety Margin (+)	2.6m
Dynamic Draught (=)	12.4m
ZOC (+)	1.6m
*Tide (-/+)	-2.0m
**Safety Depth (=)	12.0m

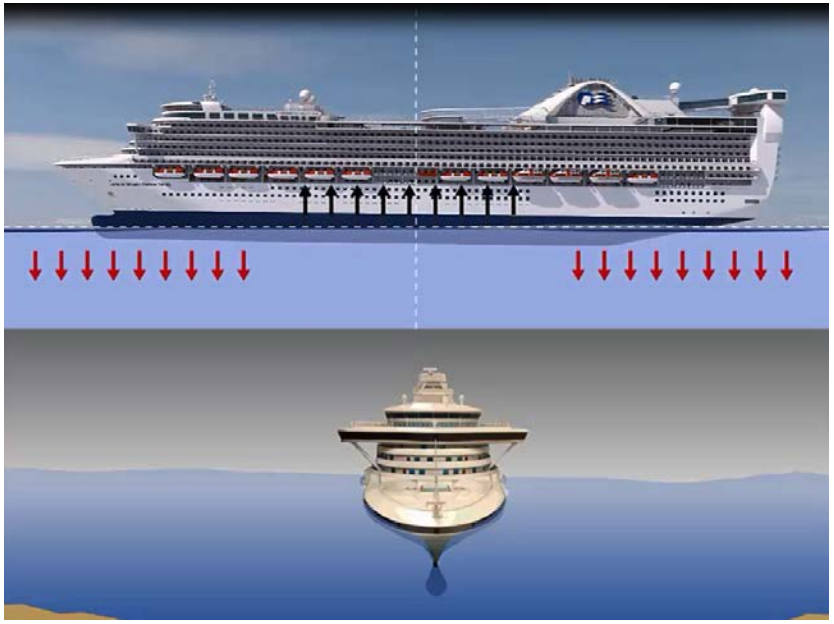


AVAILABLE DEPTH OF WATER/DREDGING CONCERNS VS. DYNAMIC DRAFT CONSIDERING SQUAT AND HEEL ANGLE

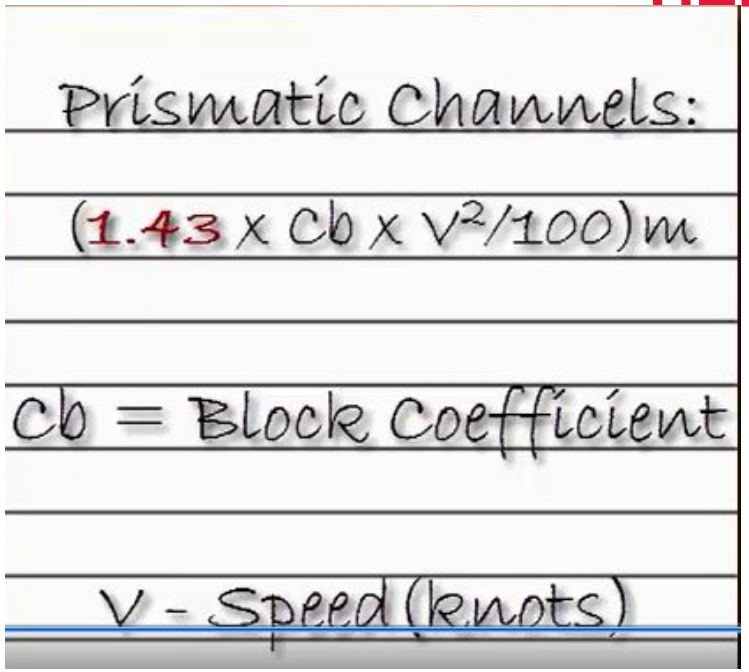


Squat OW

Squat



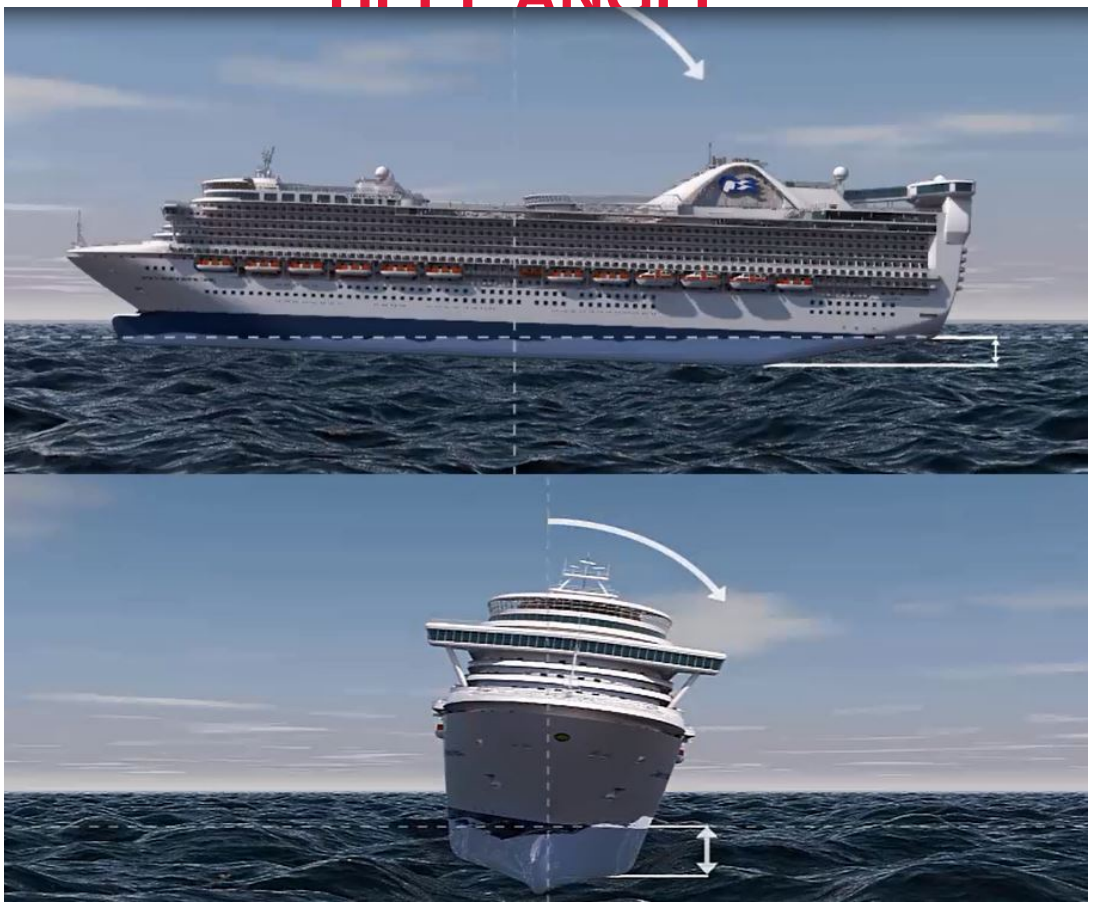
AVAILABLE DEPTH OF WATER/DREDGING CONCERNS VS. DYNAMIC DRAFT CONSIDERING SQUAT AND HEEL ANGLE



Squat PC

Prismatic Channels

AVAILABLE DEPTH OF WATER/DREDGING CONCERNS VS. DYNAMIC DRAFT CONSIDERING SQUAT AND HEEL ANGLE



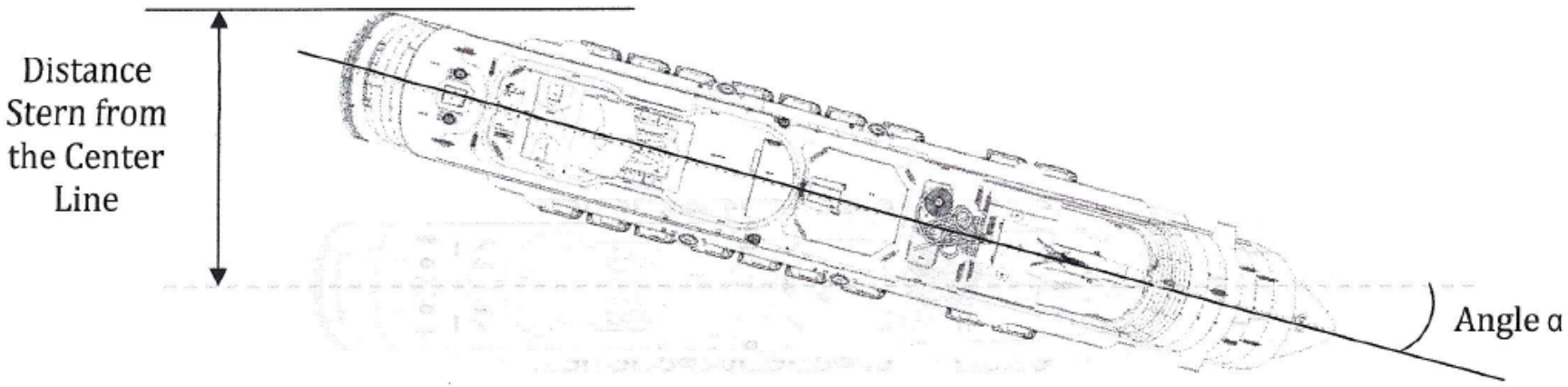
Safety Margin

Safety Depth | Port Instrumentation | Pier Fittings | Pilot/BRM Engagement | Pilots and Ports | Hi-res ENCs | Gangways

AVAILABLE DEPTH OF WATER/DREDGING CONCERNS VS. DYNAMIC DRAFT CONSIDERING SQUAT AND HEEL ANGLE

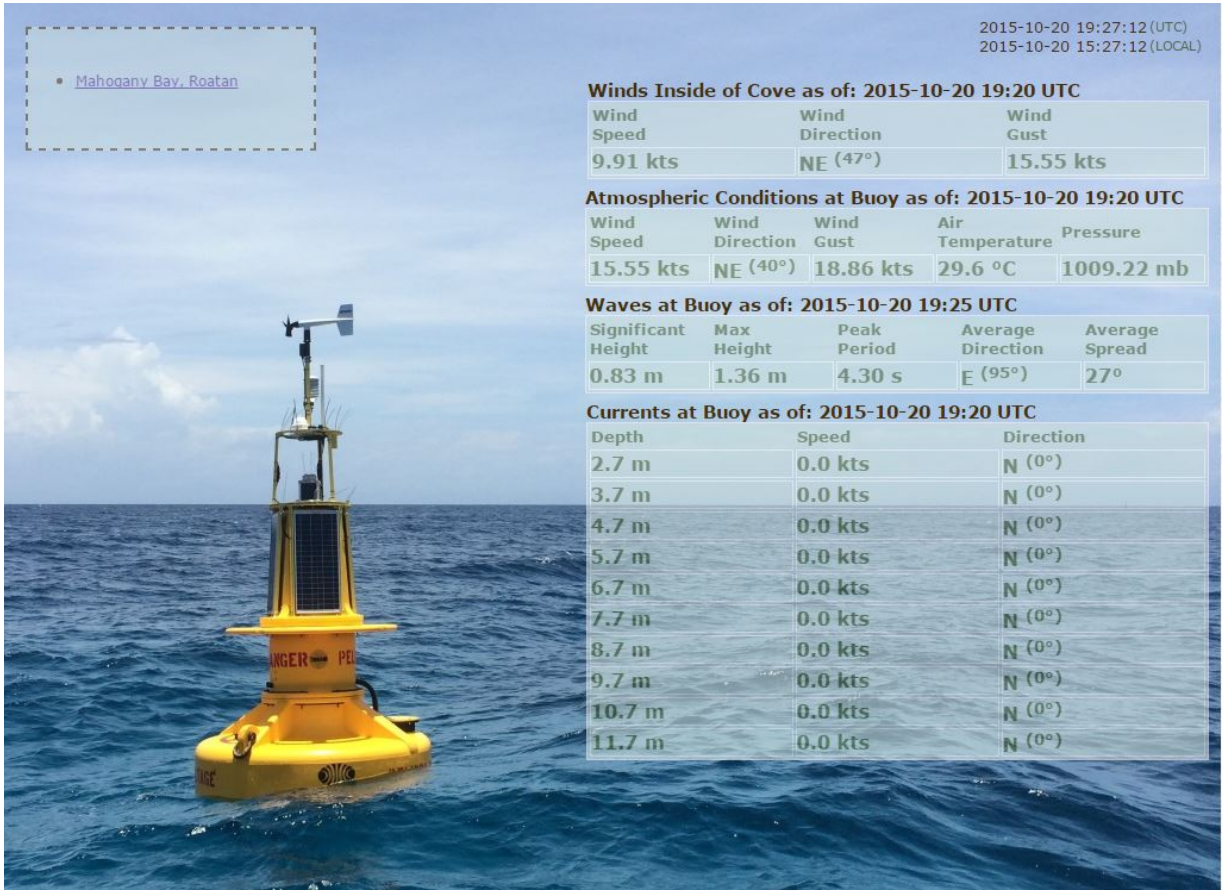
Zone of Confidence

Swept Path



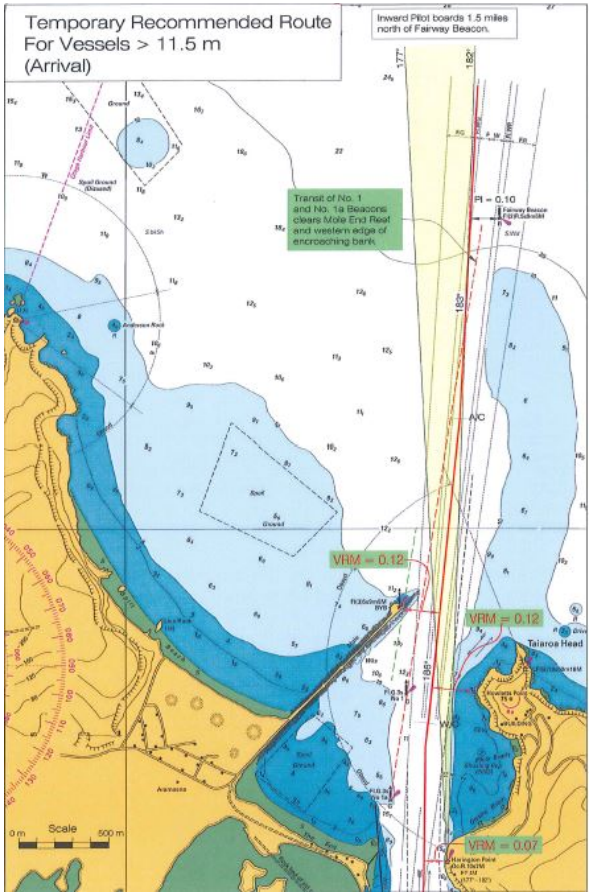
Vessel Length (LOA) m		260	280	300	320
Angle of Holding Up (deg.)	14	59	63	68	72
	12	50	54	58	62
	10	42	45	48	51
	9	37	40	43	46
	8	33	36	38	41
	7	29	31	33	36
	6	25	27	29	31
	5	21	22	24	26
	4	17	18	19	20
	3	12	13	14	15
	2	8	9	10	10
	1	4	5	5	5

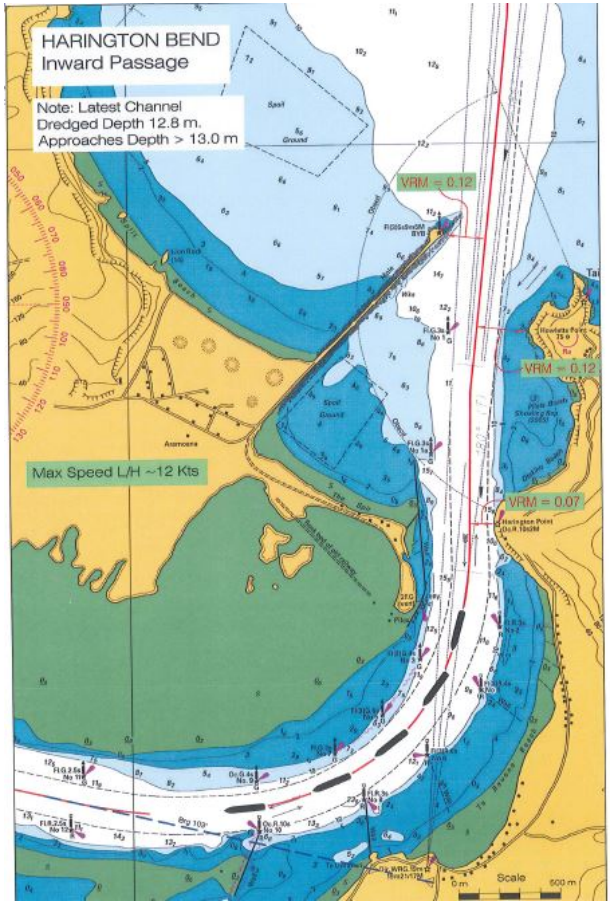
DESIRE OF BETTER INSTRUMENTED PORTS

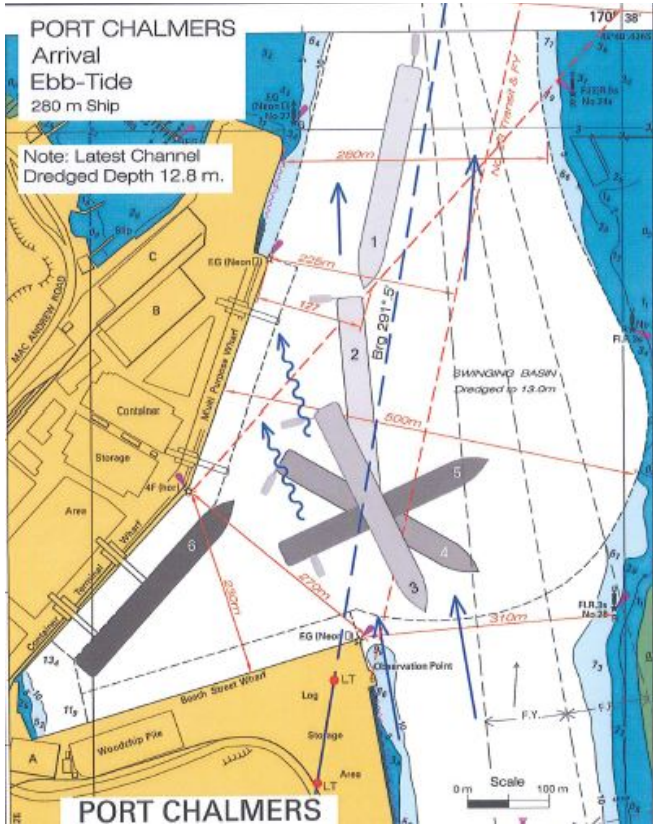


Sample of weather buoy

PILOTS AND PORTS: STANDARD SYSTEMS FOR PRECISE E-NAVIGATION





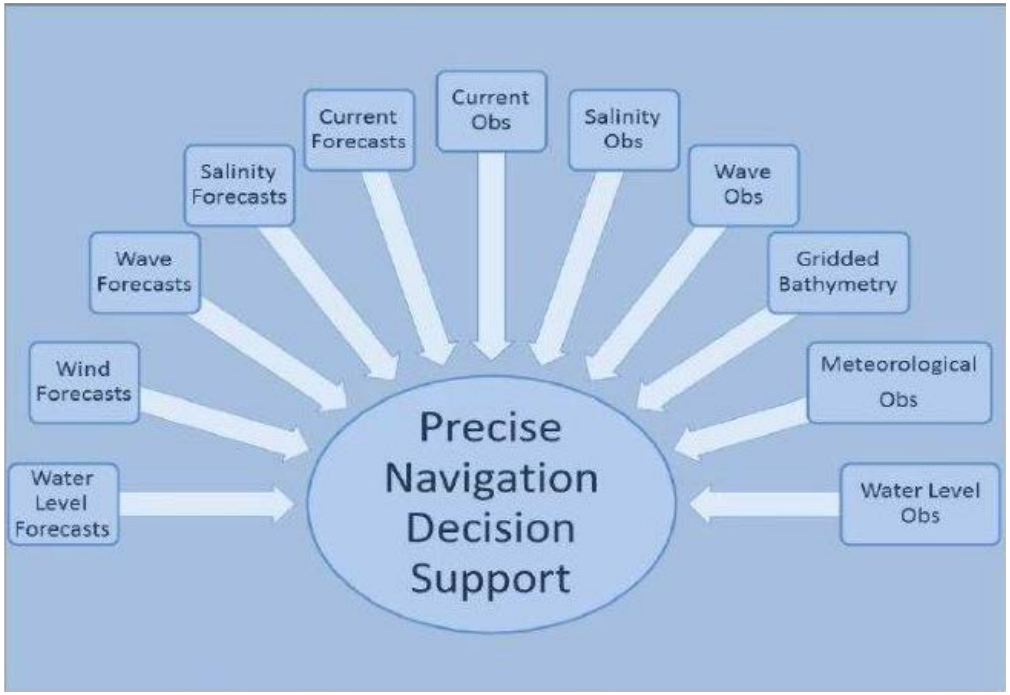


Safety Depth | Port Instrumentation | Pier Fittings | Pilot/BRM Engagement | **Pilots and Ports** | Hi-res ENCs | Gangways

PORT ENC

- The chart requirements for maneuvering big ships in narrow fairways (harbor access channels) and harbors and for the port maintenance go far beyond the current ECDIS standard in scale, accuracy, chart objects and attributes (“object catalogue”, in future "feature catalogue") and call for a specific “Port ECDIS”. The development of a Port ENC standard focuses on high precision operations in ports.
- Valuable tool to maximize Port and channel usage –
- Wave and tide (spatial) forecasts
- High resolution topographic and bathymetry data

HI-RES ENCS



NOAA data streams can support a precision navigation support tool, such as PROTIDE

VISION OF THE FUTURE OF NAVIGATION

- Port ECDIS
- Harmonized coordination between Ship's Operator, Pilot , Association, VTS (Vessel Traffic Services) ,working on the same ECDIS navigation platform.