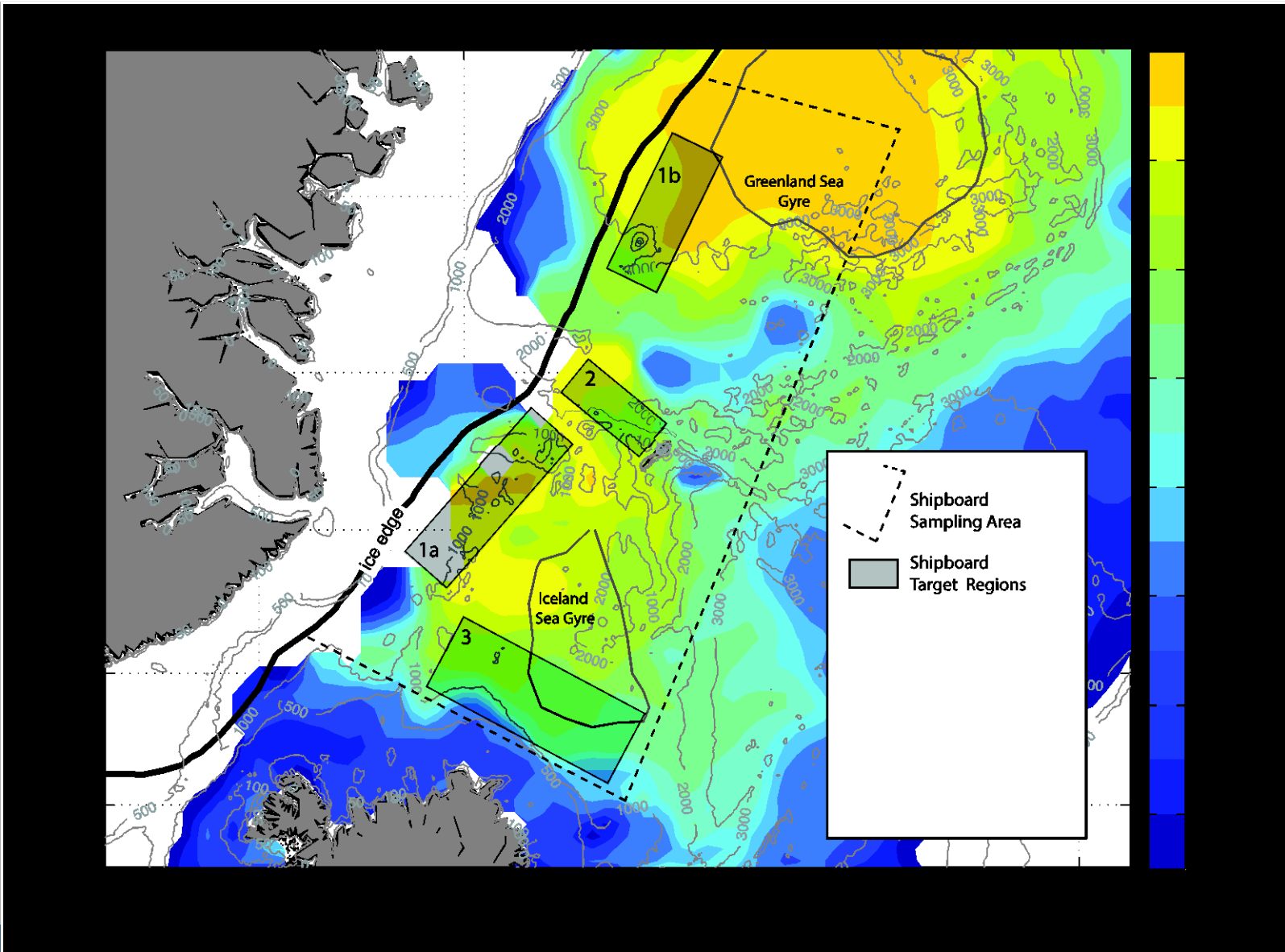


STO - CMRE



NRV ALLIANCE POLAR OPERATIONS

Ian Sage
Director, Marine Operations



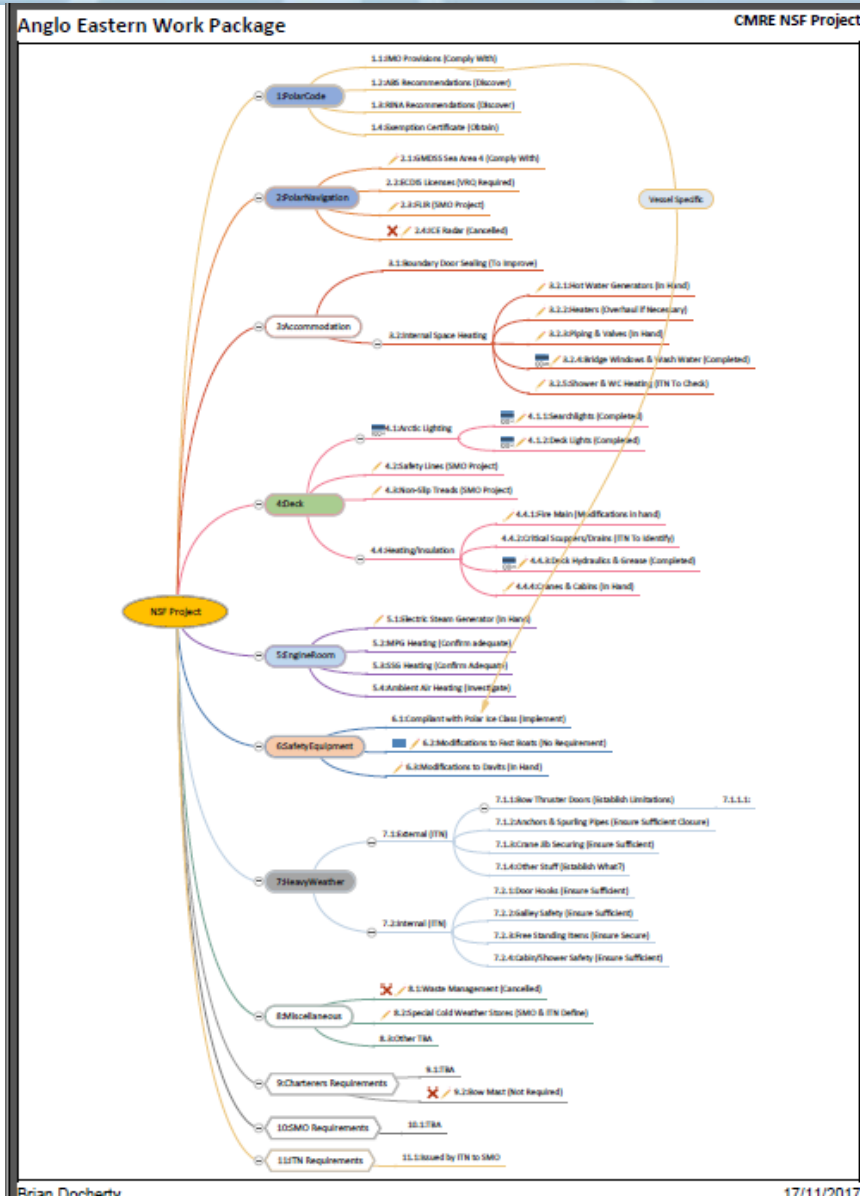


POLAR SHIP CATEGORIES

The Polar Code divides ships into three categories: Category A, B or C.

	ICE CLASS	OPERATING CAPABILITY	
A	Category A ship means a ship designed for operation in polar waters at a least medium first-year ice, which may include old ice inclusions. This corresponds to vessels built to the IACS Polar ice classes PC1 to PC5.	PC1	Year-round operation in all polar waters
		PC2	Year-round operation in moderate multi-year ice
		PC3	Year-round operation in second-year ice, which may include multi-year inclusions
		PC4	Year-round operation in thick first-year ice, which may include old ice inclusions
		PC5	Year-round operation in medium first-year ice, which may include old ice inclusions
B	Category B ship means a ship not included in Category A, designed for operation in polar waters at a least thin first-year ice, which may include old ice inclusions. This corresponds to vessels built to the IACS Polar ice classes PC6 and PC7.	PC6	Summer/autumn operation in medium first-year ice, which may include old ice inclusions
		PC7	Summer/autumn operation in thin first-year ice, which may include old ice inclusions
C	Category C ship means a ship designed to operate in open water or in ice conditions less severe than those included in Categories A and B. This corresponds to ships of any Baltic ice class or without ice strengthening at all.	ICE 1A / E6	First-year ice to 1.0 m
		ICE 1A / E5	First-year ice to 0.8 m
		ICE 1B / E2	First-year ice to 0.6 m
		ICE 1C / E1	First-year ice to 0.4 m
		ICE 0 / E0	Light ice conditions
	None	Ice-free/open water conditions	

Notes: In combination with other ice class notations, vessels are evaluated on a case-by-case basis to determine their equivalent polar ship category (for example, the IACS DNV icebreaker ice classes ICE-PC1, ICE-PC2 and POLAR 10, 20 or 30).



NSF PROJECT (2018)		Cost	Summary	Remarks	DirectSupport	Completed
1	PolarCode					
1.1	IMO Provisions (Voluntary Compliance)	€0			✓	100
1.2	ABS Recommendations (Discover)	€0		Documents only	✓	100
1.3	RINA Recommendations (Discover)	€1,200		Possible Survey Fee		
1.4	Exemption Certificate (Obtain)	€0		Requested from RINA		25
			€1,200			
2	PolarNavigation					
2.1	GMDSS Sea Area 4 (Comply With)	€2,500		PO issued to Telemar		25
2.2	ECDIS Licenses (Provide)	€15,000		Sea areas still unknown		0
2.3	FLIR (Investigate)	€0		SIMO Project (In-house transfer)	XX	0
2.4	ICG-Header (Investigate)	€0		SIMO Project (S1-222-2-see-expenses)	XX	0
			€17,500			
3	Accommodation					
3.1	Boundary Door Sealing (Improve)	€20,000	€20,000	10nos Doors & Frames		0
3.2	Internal Space Heating					
3.2.1	Hot Water Generators (Commission)	€15,000		Work in Hand	✓	50
3.2.2	Heaters	€10,000		Clean in situ	✓	10
3.2.3	3-way Valves	€10,000		function test	✓	50
3.2.4	Bridge Windows & Wash Water (Confirm Function)	€0		checked ok	✓	100
3.2.5	Shower & WC Heating	€15,000				
			€50,000			
4	Deck					
4.1	Arctic Lighting					
4.1.1	Searchlights	€0		Tested and are OK	✓	100
4.1.2	Deck Lights (Upgrade to LED)	€10,000		Completed	✓	100
4.2	Safety Lines (Provide)	€10,000		Work in Hand (SMO)		25
4.3	Non-Slip Treads (Investigate)	€5,000	€25,000	Work in Hand (SMO)		25
4.4	Heating/Insulation					
4.4.1	Fire Main (Provide)	€15,000		Thermal Blankets 110v		0
4.4.2	Critical Scuppers/Drains (Provide)	€8,000		ITN to identify	XX	0
4.4.3	Deck Hydraulics & Grease	€5,000		Provided to vessel	✓	100
4.4.4	Cranes & Cabins	€5,000		Enquiry with TTS & Barco	✓	20
			€33,000			
5	EngineRoom					
5.1	Electric Steam Generator	€14,000		Work in hand	✓	80
5.2	MFG Heating (Confirm adequate)	€2,000				
5.3	SSG Heating (Confirm Adequate)	€2,000		Ask Meggill		
5.4	Ambient Air Heating (Investigate)	€5,000				
			€23,000			
6	SafetyEquipment					
6.1	Compliant with Polar Ice Class (Implement)	€20,000		SMO activity		0
6.2	Modifications to Feet Boxes (Establish Need)	€50,000		Not required	✓	100
6.3	Modifications to Davits (Implement)	€20,000		Planned for December		30
			€90,000			
7	HeavyWeather					
7.1	External					
7.1.1	Bow Thruster Doors (Establish Limitations)	€15,000	€15,000			
7.1.2	Anchors & Spurling Pipes (Ensure Sufficient Closure)	€5,000		ITN Crew Activity	XX	0
7.1.3	Crane Jib Securing (Ensure Sufficient)	€5,000		ITN Crew Activity	XX	0
7.1.4	Other Stuff (Establish What?)	€5,000	€15,000	Skinnerom	XX	0
7.2	Internal					
7.2.1	Door Hooks (Ensure Sufficient)			ITN Ship Crew	XXXXXX	0
7.2.2	Galley Safety (Ensure Sufficient)			ITN Ship Crew	XXXXXX	0
7.2.3	Free Standing Items (Ensure Secure)			ITN Ship Crew	XXXXXX	0
7.2.4	Cabin/Shower Safety (Ensure Sufficient)			ITN Ship Crew	XXXXXX	0
8	Miscellaneous					
8.1	Waste Management (Investigate)			Not required	✓	100
8.2	Special Cold Weather Stores (Define)			SMO purchases/supply	✓	100
8.3	Other TBA					
9	Charterers Requirements					
9.1	TBA					0
9.2	Bow Mast (?)	€0		Not Required	✓	100
10	SMO Requirements					
10.1	TBA			See Above		
11	ITN Requirements					
11.1	List Submitted to SMO		€289,700	All ITN items already foreseen here	✓	100



1st Hurdle
- Getting there





Personnel Safety





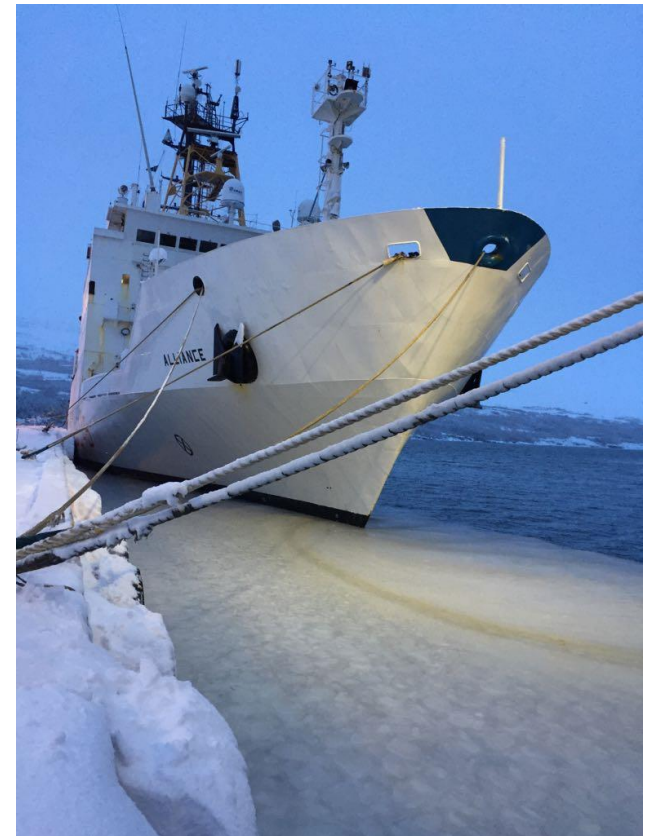
Doing the science safely



In the MIZ



No let up in port



Work in extreme conditions requires comprehensive preparation
Polar Code useful but not clear in application
Useful information available from IACS on winterisation of ships
Do not underestimate the cost