# Narrative Account of a Voyage from Greenland to Newcastle Upon Tyne

# August/September 2011

This voyage is divided into 4 parts being:

1. A circumnavigation of Milne Land, Scorebysund N.E. Greenland
2. Scoresbysund to Iceland
3. Iceland to Shetland
4. Shetland to North Shields

The account of the leg from Iceland to Shetland (#3) is submitted as part of the narrative required for an Ocean Yachtmaster examination being in excess of 600nm log run distance and over 96 hours with other required conditions being met. The other legs are described briefly for interest and by way of additional material.

The vessel

The yacht 'Polar Bear' was one of the Challenge Business 72' steel hulled yachts built to race around the world. It was also used by Dee Caffrey for a single handed circumnavigation against the prevailing wind. It was bought by the present owners in 2006 and fitted out as a high latitudes expedition vessel.

The main particulars are attached in Appendix 1

On Board Organisation

The vessel is usually organised with 2 or 3 professional crew and up to 10 clients of varying abilities ranging from experienced sailors to other groups such as photographers, mountaineers or kayak groups often with little or no sailing experience.

For shorter mainly sightseeing operations (particularly in ice where it would be imprudent to sail at night) the watch system is based on daywork with anchoring or mooring to shore by early evening. For longer voyages a staggered watch system is mostly used dependent on the numbers. More of this in the main leg description.

**Circumnavigation of Milne Land, log distance 366nm. 20-26th Aug. 2011 (see Figure 1 below)**

The weather for this part was characterised by a large seasonal high pressure area leading to bright but cold days and even colder nights. Parts of the sound are subject to katabatics which are difficult to predict with regard to strength.

Scoresbysund is the largest fjord system in the world and at 71 degrees N it is affected by both glacial and pack ice. Milne land is situated at the western end and in summer should be accessible in all regions. 2011 however experienced the worst ice conditions for 45 years and the passages only became fully navigable in the week before transit. There were many large bergs present which are calved from the enormous glaciers in the region and many of these bergs are in excess of 10000t being fast aground in 400m depth.

Although easily avoided when underway care has to be taken when anchoring as the ice is continually

moving and breaking up.

Figure 1.



**Scoresbysund to Iceland, log distance 328 nm. 27-30th August 2011 (see Figure 2)**

The weather systems leaving Constable Point started to change and the passage route was dictated in part by the ice conditions and a necessity to avoid the pack ice coming down from the North. In addition the cold East Greenland current gave rise to fog banks and poor visibility for at least half the passage. There is a particular problem in low visibility and of course at night with truck sized 'growlers' which are difficult to see in breaking waves. Use was made of the satellite derived ice maps (Figure 3) as well as a twice a day grib file downloads for weather prediction. The blue outline on Figure 3 indicates the limit of the pack ice at the time and because of this we had to go much further South than a simple rhumb line course to Akureyri in Northern Iceland. An early attempt to transit the blue line from nearby Kap Tobin at the North of the entrance to Scoresbysund had to be aborted due to ice but such is the movement that it had largely cleared by the following day. After Kap Brewster had been cleared on the South side, for the most part the Denmark Strait suffered from

poor visibility with contrary winds and much use of the engine. However on 28th the sun appeared briefly, sufficient for a mid-morning sextant sight and a meridian observation at local noon. The workings and position for the sun-run-sun position obtained are attached separately (Exh. 1).

Figure 2.

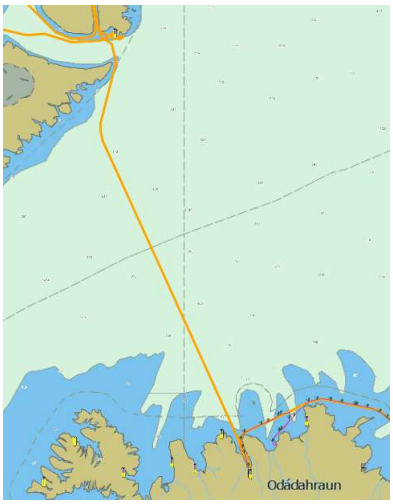
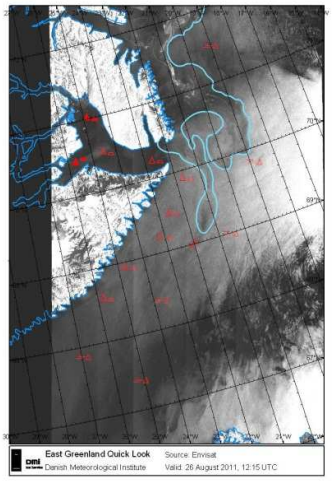



Figure 3




**Iceland to Shetland, log distance 724nm, 1-7th Sept. 2011**

For this leg I acted as navigator and ran a watch and as such wore two hats. My principal responsibility therefore was to safely navigate the yacht using all methods open to me to plan and keep the vessel and crew safe. However I also had to comply with the requirements of the Ocean Yachtmaster examination and as such sextant observations and DR positions are as best as can be done independently of the main electronic navigation aids. The voyage here from Akureyri in Northern Iceland to Lerwick in Shetland is described briefly under a number of headings relating to planning and execution.

i. Check of boat and equipment

The Polar Bear is a coded vessel certified for unlimited range and as such has an appropriate inventory as regards sea survival equipment. It was built of steel to withstand the rigours of the Southern Ocean and all running and standing rigging had a mast-out overhaul at the start of the season. Nevertheless time was again spent preparing the vessel for expected bad weather with checks on the safety equipment, engine/gearbox, autopilot, nav. equipment and wind instruments, pumps and hull piercings . Stowage of all moveable items and stores and on deck items such as the anchor lash down was carried out. The sail furlers and operating lines were freed, reef lines and jackstays checked and storm sails made ready in forepeak. Much of this had been done leaving Greenland but was essentially repeated here.

ii. Proposed route, ports of refuge, hazards, weather

The proposed route from Akureyri was north and then east around the 'top' of Iceland before clearing Langanes Point on the north east and then steering 129T (great circle) to the entrance to Yell Sound in the North of Shetland. The proposed route was as shown in Figure 4 below.

Figure 4


The ship's chart plotter only had access to a low resolution raster chart so for the most part more detailed paper charts of the entire course were used. The magnetic variation around Iceland is significant and varies from 15°W at the start to 4°W at Shetland. There are also local anomalies to take into account.

I also had access to my own PC based high res. vector charts which had the facility to take satcomms downloaded grib files and run a full weather sequence for up to 10 days ahead although in practice 3 or 4 days was used. In addition the Icelandic Met. Service and coastguard provide good periodic weather reports and forecasts and prior to departure a variety of downloaded synoptic and other weather charts were studied. At the time a number of low pressure areas spawned from hurricane activity on the east coast of America were showing up as making their way towards our area of operations so a lot of thought was given to the best time to leave Iceland.

The North coast of Iceland is particularly hazardous in poor visibility with high cliffs, overfalls and heavy seas in any wind from the west through North to the East. East of Langanes Point seas from the Southern quarter can be expected with the cold south going East Iceland current running at about 0.5 kt in the first half of the route. After this diminishes the effects of the Gulf Stream start to be felt which can also affect the local climate.

There are a few points of refuge along the North and to a lesser extent the N.E coasts but not all are suitable for a yacht with 3.1m draught. The most obvious ones are Husavik, Raufarhofn and Borshofn.

After Langanes the route is fairly straightforward to the Faroes some 300nm distant although the rhumb line c.p.a. would at best be about 30nm and therefore not visible. The ultimate landfall is at the top of Yell Sound at around 670nm followed by an interesting sail of approximately 40nm amongst the islands to Lerwick. The Shetland Pilot describes the passage in some detail, much of the text having been drawn from Admiralty Sailing

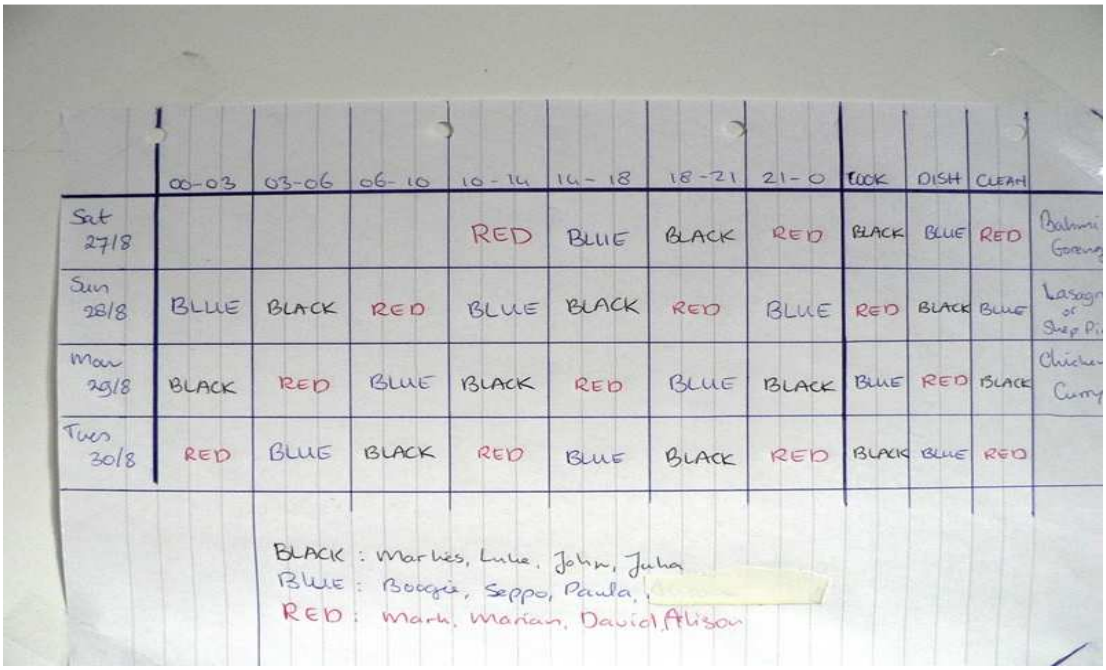
Directions for the large tankers going to the terminal at Sullon Voe. A key feature is the necessity to arrive at the top of Yell Sound as the tide changes in our favour some 5 hours before HW at Lerwick as parts of the Sound have tides of 7 kts on springs.

iii. Organisation of watches and other duties

For this sea passage there were sufficient personnel to organise a staggered 3 watch system of 3 persons with on-watch periods of 3 hours at night and 4 hours during the day. This gave a rest period of up to 7 hours once in every 24 hours. For simplicity the watches were designated RED, BLUE and BLACK which also allowed sharing of essential chores such as cooking and cleaning. The schedule used is shown below.

Generally speaking it was organised so that the Skipper had the most experienced people with him which gave opportunity to get on with other things or to get some rest or to switch around with the navigator (myself) when some aspect of the navigation such as weather reports and subsequent routeing needed my attention.

Note. The schedule below recognises 11 people and was for the trip from Greenland to Iceland. There were 9 for the next leg from Iceland to Shetland.



| | 00-03 | 03-06 | 06-10 | 10-14 | 14-18 | 18-21 | 21-0 | COOK | DISH | CLEAN | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Sat 27/8 | | | | RED | BLUE | BLACK | RED | BLACK | BLUE | RED | Bahmi Goreng |
| Sun 28/8 | BLUE | BLACK | RED | BLUE | BLACK | RED | BLUE | RED | BLACK | BLUE | Lasagn of Sheep Pi |
| Mon 29/8 | BLACK | RED | BLUE | BLACK | RED | BLUE | BLACK | BLUE | RED | BLACK | Chicke Curry |
| Tues 30/8 | RED | BLUE | BLACK | RED | BLUE | BLACK | RED | BLACK | BLUE | RED | |

BLACK : Markes, Luke, John, Juha
BLUE : Borgia, Seppo, Paula,
RED : Mark, Marian, David, Alison

iv. Victualling and fuel

In broad terms, for water we allowed 2 litres for drinking and for food followed the recommendations of 150g per person per day with a balanced mix of protein and carbohydrates although in view of the climate there tended to be an emphasis on the latter. . In the artic zones people tend to drink less and eat more (sometimes much more) than in say a temperate or tropical zone. The water tanks were topped up before leaving Akureryi and

there was an R.O water maker aboard. Nevertheless water was loaded on the basis of one of the two tanks being contaminated and assumed complete breakdown of the R.O. plant. There was therefore in addition bottled supplies on the basis of 10 days + 50% for 10 persons using 2 litres per person per day this translating into 60 off 5 litre bottles available if required. In addition there were boxed drinks such as orange and apple. The ship's water tank was used for washing, cooking and drinking and in the event the bottled reserves were not called into use. Water consumption however was monitored as a daily log item.

There is a further complicating factor however that food is very expensive in Iceland and even more so in Greenland (e.g 1 leek cost €3!). Polar Bear had both a deep freeze and a modest sized fridge but even so there was a strong dependency on UK sourced supplies of easily kept staples of pasta, rice, muesli, porridge, biscuits, chocolate and a variety of bottled and tinned foodstuffs. Fresh vegetables were of course difficult although potatoes and onions keep well.

An expedition yacht with paying clients does have an expectation of schedules to be met, usually for flight commitments and which means that a high percentage of time is spent under engine. Polar Bear has quite a small diesel engine for its displacement but still requires 7 to 8 litres per hour giving an economical speed of 6 to 7 knots. However in adverse sea and wind conditions this speed could be down to <5kts through the water. It is a <u>minimum</u> of 710nm from Akureyri to Shetland which at the speed noted above would require around 1200L of diesel fuel. Add to this a requirement for the diesel heater and a 30% margin and Polar Bear would require at least 1600L in her tanks. We therefore bunkered 1500L in Iceland before leaving to add to existing bunkers giving a total of around 2500L. Whilst this may seem excessive it gave the option to increase speed to the maximum in the event of prior delays.

v. <u>Operational amendments</u>

Late season at these latitudes gives an expectation of adverse weather conditions and the route therefore was regarded as a work in progress and as new weather information was received decisions regarding route amendments were implemented to give safe passage. An outline of these is given on a day to day basis below and the final course sailed is shown for comparison with the planned route in Figure 5.

A comprehensive log was kept with each watch entering relevant details of navigation, ship condition, weather and other comments.

*<u>Day 1/2</u>*

The grib files for 1st Sept. indicated a slowly developing low to the South West of Iceland and this was confirmed with the barometer falling from 1003mb to 996mb throughout the day with the Icelandic Coastguard VHF weather reports confirming the general situation. At the time the wind forecast was still moderate and we departed Akureyri at 0920hrs motoring up the long fjord in calm conditions. The wind filled in at dusk from the SE at 18kts with the boat now sailing close on starboard tack with reefed main and a staysail.

At around midnight the wind had increased to 35kts and backed and the new grib file and the coastguard indicated that the developing low had deepened with the centre now tracking North East. Of concern were the predicted sea conditions in the N.E of Iceland with 4-5m waves and increased wind right on the nose, although this was expected to moderate after 12 hours. Progress would have been very slow and with 2 crew members seasick we decided to close into the bay at Husavick and let the gale blow over.

*Day 3*

After a relatively peaceful night we set sail at dawn with wind 12-20kts, moderate sea but poor viz. and drizzle. Sea state deteriorated throughout the day with fog keeping viz. between 1 cable and 1nm.

As land derived bearings were not possible due to the poor visibility a DR position could only be made by log run distance, estimated COG and depth. To be realistic, at this point the main objective was to keep clear of the coast so use of the chart plotter and/or paper charts, radar and GPS was the safe option. The fog continued throughout the day, motor sailing with reefed main and confused sea. Sun out occasionally but no horizon, progress slow. Engine overheating problem occurred around 0600hrs and communicated with 'Plancius' a small passenger ship who offered help. However we fixed the engine (water filters) and continued. Finally clear of the northernmost point of Iceland (briefly back in Artic Circle) and altered to 129T.

*Day 4*

Changed course briefly to 140T to keep speed on, barometer now rising, grib files for next 2 days showing 12 kts from the SSW giving a close reach on stbd. Viz. still poor with advection fog, low temperatures and generally miserable motor sailing conditions. Wind predicted to free but in the event did the opposite and backed again.

0900hrs sun finally appeared and a quick series of 4 sights taken with Davis sextant, however no chance of a sun meridian as fog quickly reinstated for rest of day.

*Day 5*

No stars or planets a.m. but sun meridian pass at local noon and afternoon sun, 3 sights at around 1520hrs with ship's Celestaire sextant. Further attempt at this at1700hrs but sun now at $14^{o}$ 20′ so probably not so accurate. Wind moving about but generally light to moderate and always forward of the beam. Gribs predict wind to swing around to stbd. beam within 6 hours. Course now142T and effects of Gulf Stream more evident with increased sea and air temperatures

Wind backed and increased to 24 knots after noon. Finally sailing with 2 reefs, staysail and yankee, speed to 10 kts.

*Day 6*

Final noon sight taken on this leg although 3m to 4m breaking waves hampered accuracy. Entered Yell Sound at 1430hrs just as tide turning in our favour.

Continued in a good breeze with a combination of fast sailing and engine, alongside in Lerwick 1945hrs.

vi. Sights

The sights that were taken could perhaps best be described as 'opportunistic' in that although each day sights of planets and the main stars were planned for twilight, in the event most of the voyage leg was spent either in conditions of poor visibility (up to 10/10 cloud) or with an unseen horizon. In all 5 noon sights , 3 other sun sights and 1 moon sight (after Lerwick) and 1 compass check by amplitude were taken as shown in Table 1 below. This gave opportunity for 3 sun-run-sun and 1 sun-run-moon calculations of position. These are attached with workings and plotting sheets and

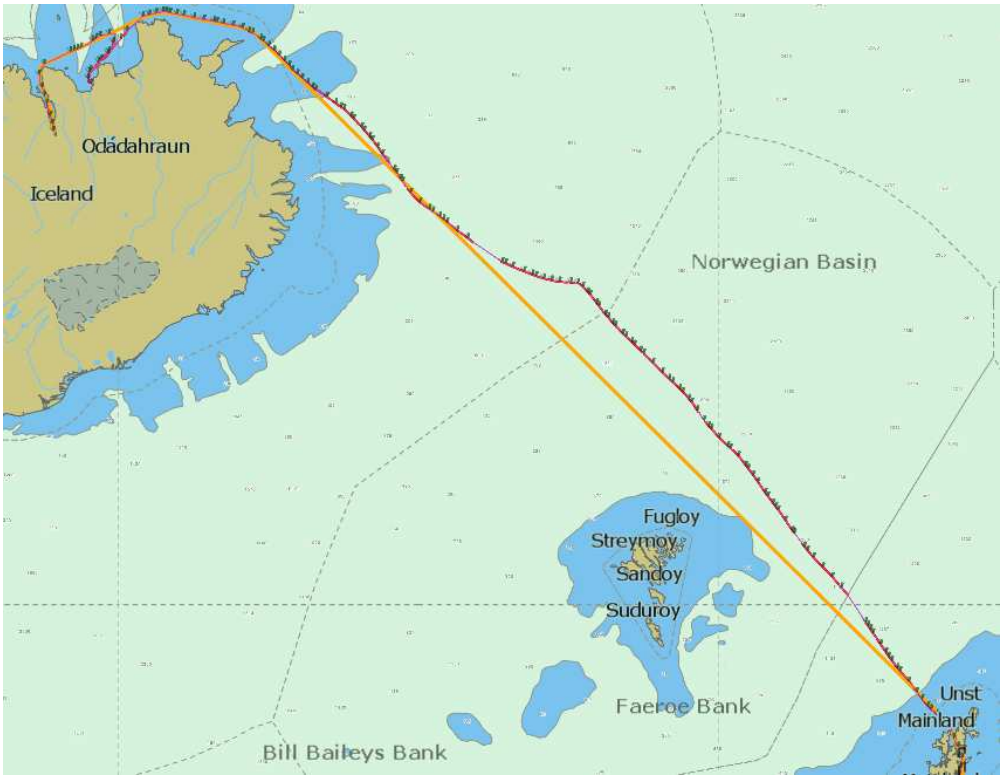
also plotted on the paper chart. The ref. shown refers to attached scans of the plotting sheets and associated calculations extracted from the workbook at the time.

In general Reeds Astro Navigation Tables 2011were used with Air Navigation tables for Lat. 39-89 degrees for sight reduction. A check of all the sight reductions were also made using formulae.

Table 1.

| **Body** | **Date 2011** | **Time (UTC) Hh mm ss** | **Sextant Alt.** | **H.E. (m)** | I.E. | **Comments** | | Ref |
|---|---|---|---|---|---|---|---|---|
| Sun | 28/8 | 10 31 07 | 23° 35′.2 | 3 | 0 | Average of 3 obs. | Sun - run- sun | Exh. 1 |
| Sun | 28/8 | 13 29 | 30° 17′.0 | 3 | +0.4 | Mer. Pass. | | |
| Sun | 5/9 | 09 21 24 | 22° 36;.8 | 4 | +8.0 | Average of 4 obs. | Sun - run - sun | Exh. 2 |
| Sun | 5/9 | 12 34 | 32° 07′.8 | 4 | +2.0 | Mer. Pass. | | |
| Sun | 6/9 | 12 18 | 33° 17′.2 | 4 | +1.0 | Mer. Pass. | Sun - run - sun | Exh. 3 |
| Sun | 6/9 | 15 22 23 | 24° 18′.6 | 3 | +1.0 | Average of 3 obs. | | |
| Sun | 7/9 | 12 05 | 35° 07′.6 | 4 | +1.0 | Mer. Pass. | | |
| Sun | 8/9 | 12 03 | 35° 43′.8 | 4 | +1.0 | Mer. Pass. | Sun - run - moon | Exh. 4 |
| Moon | 8/9 | 19 04 13 | 09° 32′.8 | 2 | 0 | Indistinct/low quality | | |
| Sun | 9/9 | 18 33 | Amplitude | | | Compass 280° | | Ampl. |

Figure 5.




**Shetland to North Shields, log distance 326nm. 8-10th Sept. 2011**

This was a relatively straightforward run South after leaving Lerwick. The weather had improved briefly to allow a rather low level but hazy moon sight in the early evening and an amplitude for a compass check the following evening sunset. After that the increasing presence of high cirrus from an approaching Atlantic low yet again precluded any further astro. observations.

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**Appendix 1.**

# Polar Bear:
## Technical Information

Dimensions
Length overall 22 metres (72 feet)
Length waterline 18.8 metres (61 feet)
Beam 5.5 metres (18 feet)
Height of mast (above waterline) 29 metres (95 feet)
Draught (below water surface) 3.1 metres (10 feet)
Displacement (full load) 43 tonnes
Ballast keel weight 12 tonnes

Fuel and water
Water (in 4 tanks) 1775 litres (390 gallons)
Weight of water 1.8 tonnes
Fuel (in 4 tanks) 3310 litres (736 gallons)
Weight of fuel 2.7 tonnes

Construction
Hull 50A mild carbon steel
Keel Steel fin and lead bulb
Deck and coamings 316 stainless steel
Builders Devonport Yachts, Devonport Royal Dockyard, 2000

Engine / Generator
Main Engine Perkins Sabre 130hp (8kts cruising)
Generator Northern Lights (domestic charge)

Telecommunications/Navigational
MF / HF Radio Icom 200 watt SSB
VHF Radio 25 watt
GMDSS (Distress push button)
Hand held VHF Icom x 3
Radar - Raymarine
Satellite Communications Inmarsat Standard C, Iridium
Chart plotter with MaxSea raster charts (low res.)
Celestaire sextant
In addition the author operated an independent PC based Jeppeson high res. vector chart system running on MaxSea Timezero s/w. Also own Davis Mk 25 sextant.

Domestics
Berths 18 ‘pipe-cots’ in 6 cabins
Heads 2 heads (fwd) each with hot showers
Galley 2 sinks, hot and cold water
Gas oven, grill, 5 burner stove
Full inventory of kitchen utensils
Electrics Domestic inverter 220 volt with 3 pin sockets
Diesel blown air heater
Saloon Large dining table, seating for 16 people

Other.

2 x foldable kayaks
2 x RIBs with 30hp outboards