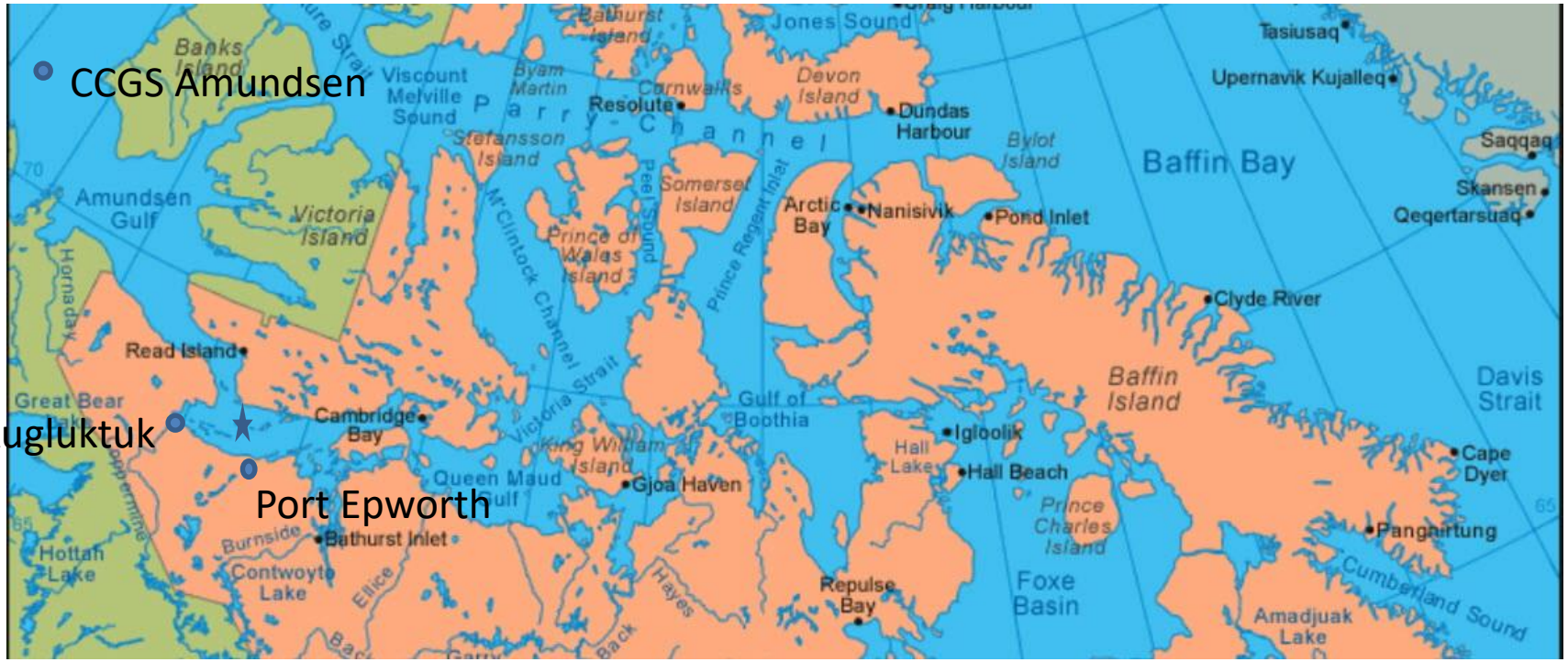
Why Did the Clipper Clip It?

Bruce Calderbank, FRICS, CLS, CH, P. Eng.
Chartered Hydrographic Surveyor
Certified Hydrographer Level 1
Hydrographic Survey Consultants Intl.
Calgary, Alberta, Canada

Location Map

- **Amundsen** 540 nm [40 hours] from grounding

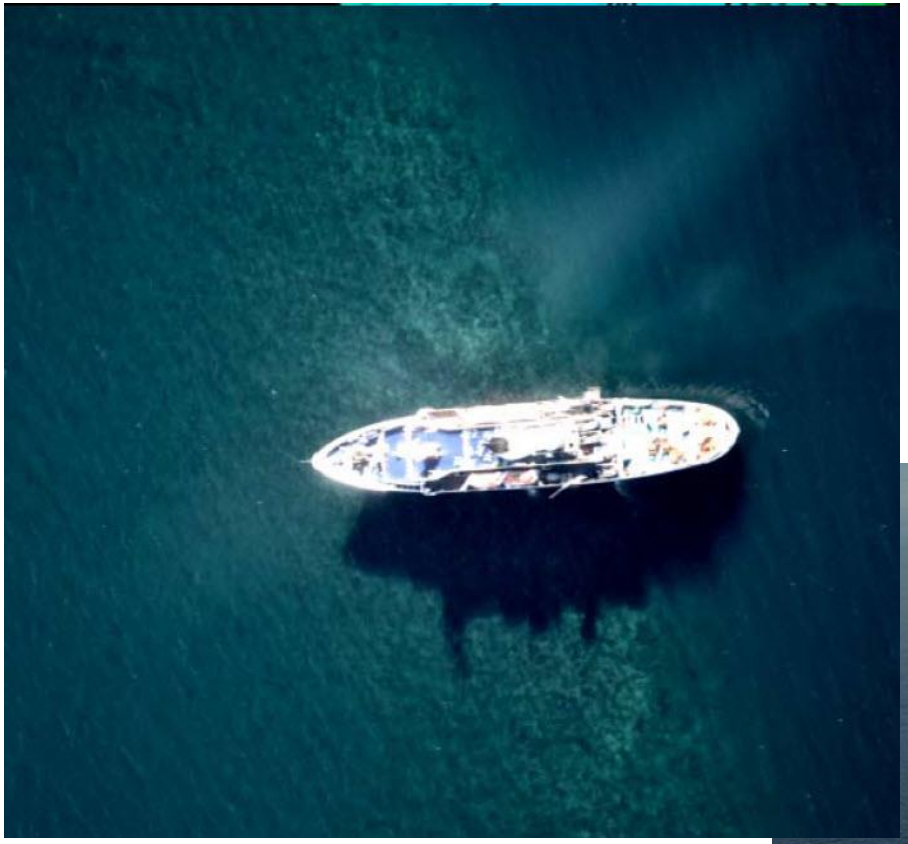


Grounding Location

Other 2010 Arctic Groundings

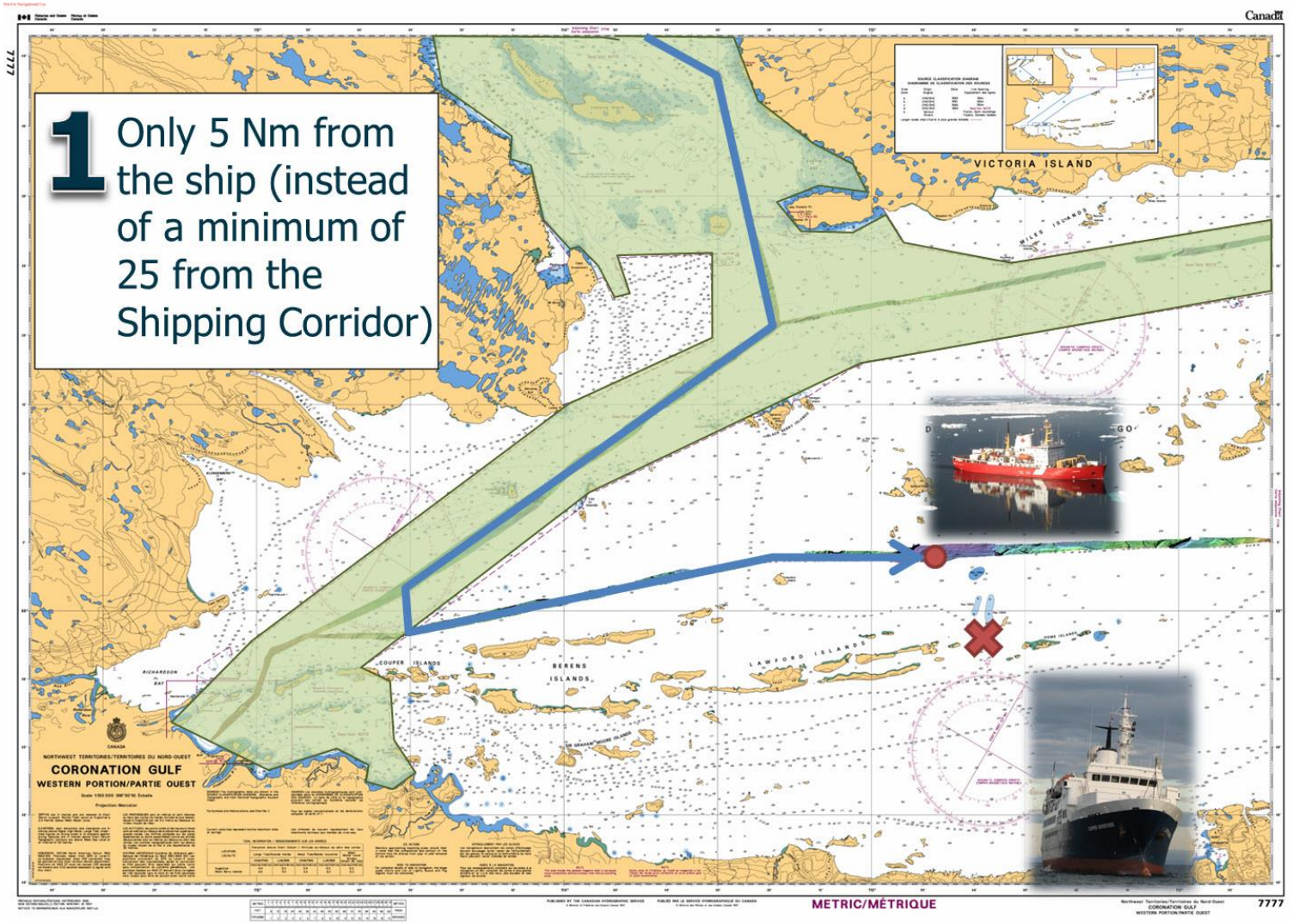
- MV Mokami near Pangnirtung
- MV Nanny near Gjoa Haven

Clipper Adventurer Grounding

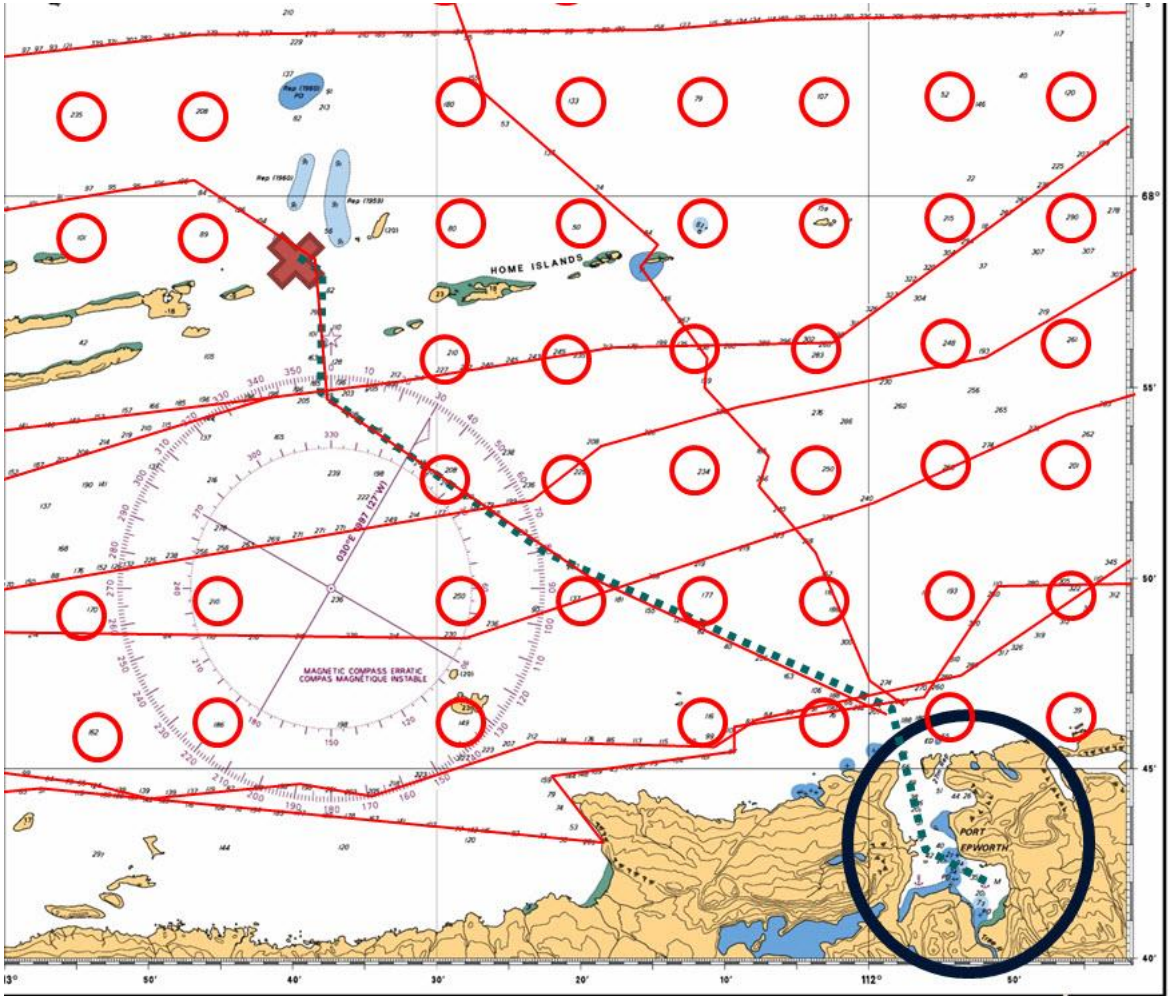


27 Aug 2010 at
13.9 knots over
rock shoal

Amundsen Route to CA



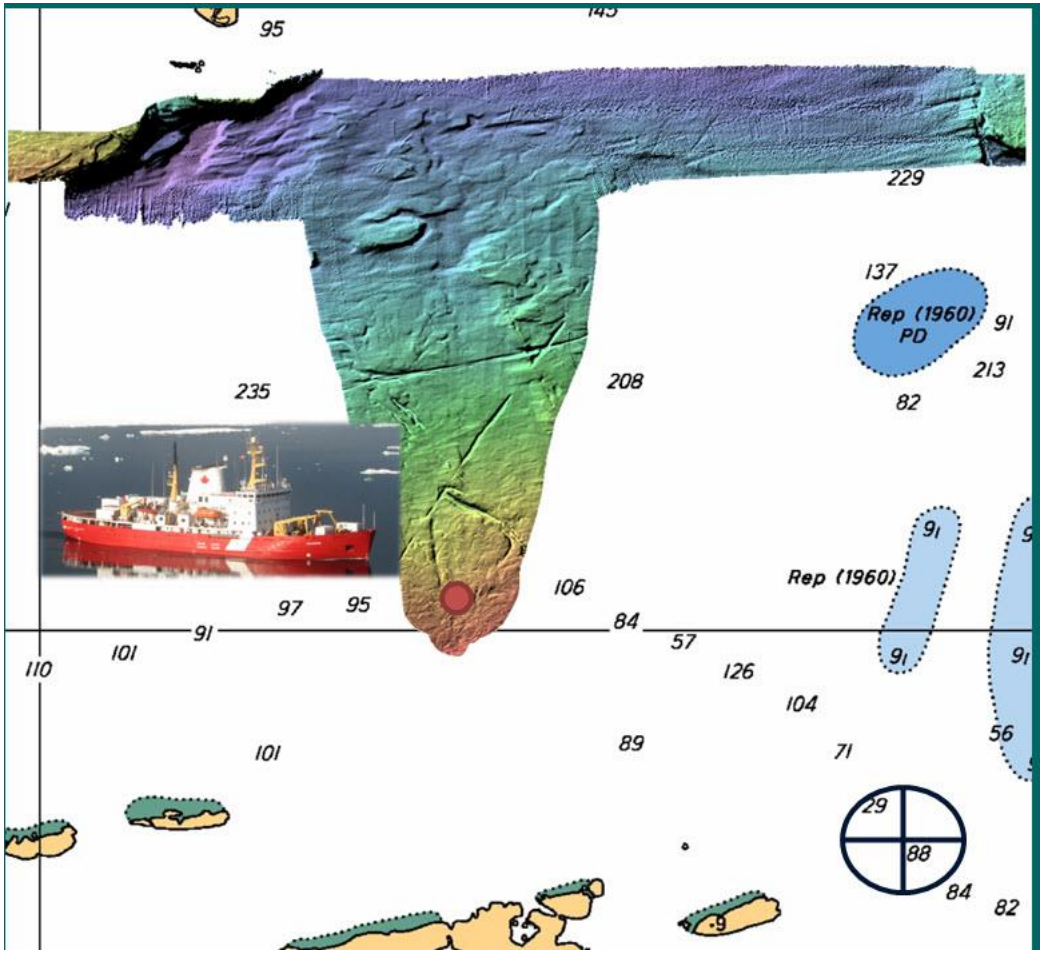
Inadequately Surveyed Areas



Amundsen Barge

- Carried onboard **Amundsen** since June 2010
- Kongsberg EM302 multibeam echo sounder

New Survey Area



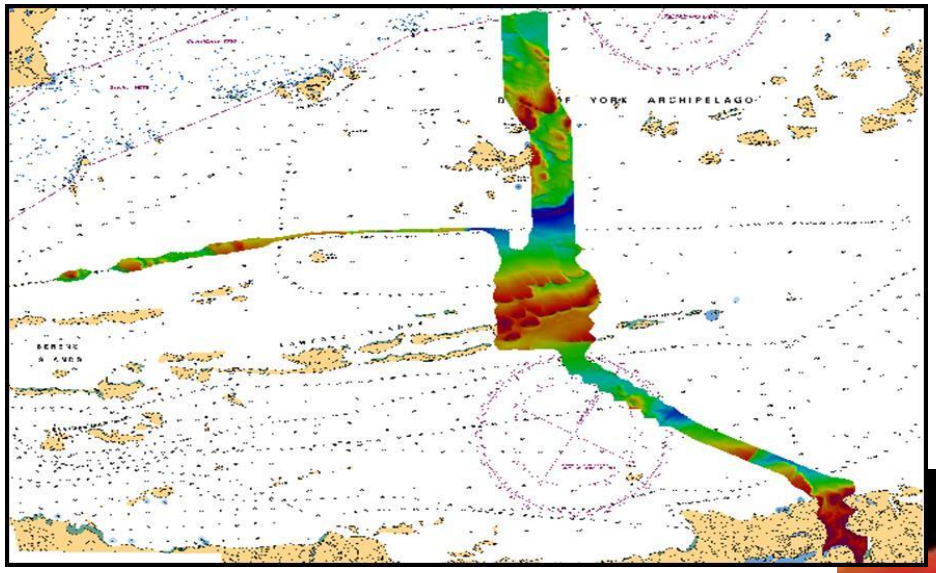
Salvage Operation

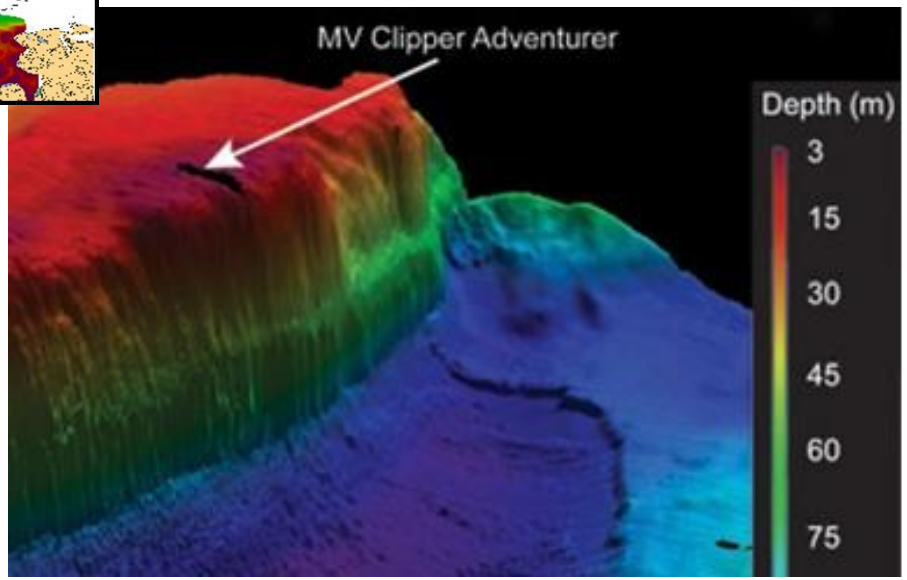
- 29 Aug. – Passenger recovery by **Amundsen** to Kugluktuk
- 31 Aug. – **Sir Wilfrid Laurier** on site
- 11 to 14 Sept. – Further damage dt weather
- 14 Sept. – Pulled off by 4 tugs and taken to Port Epworth
- 17 to 18 Sept. – Towed to Cambridge Bay
- 25 to 28 Sept. – Towed to Pond Inlet
- 07 to 12 Oct. – Towed to Nuuk, Greenland
- 28 Oct to 11 Nov. – Towed to Gdansk, Poland

CSL Kinglett and Gannet

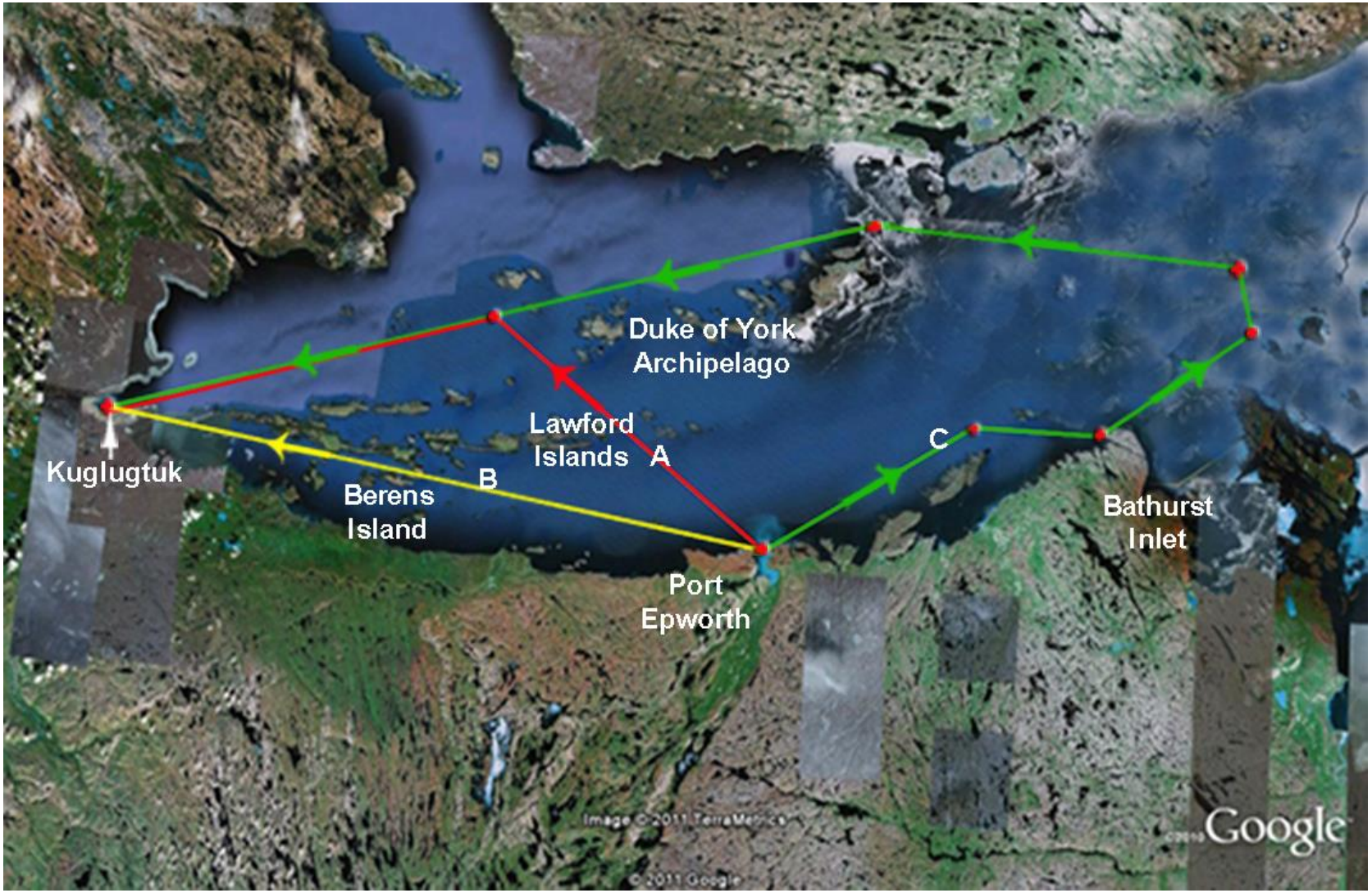
- Kundsen 320M single beam echo sounder

New Bathymetry and Rock Shoal





Clipper Adventurer Voyage Planning



Routes and Master's Choice

- A = 90 nm => 6 knots => 15.1 hours
- B = 85 nm => 6 knots => 14.2 hours
- C = 200 nm => 13 knots => 15.4 hours
- 03 August Navigation Officer with Master planned only for route A.
- 27 August Master confirmed route A at 13.9 knots

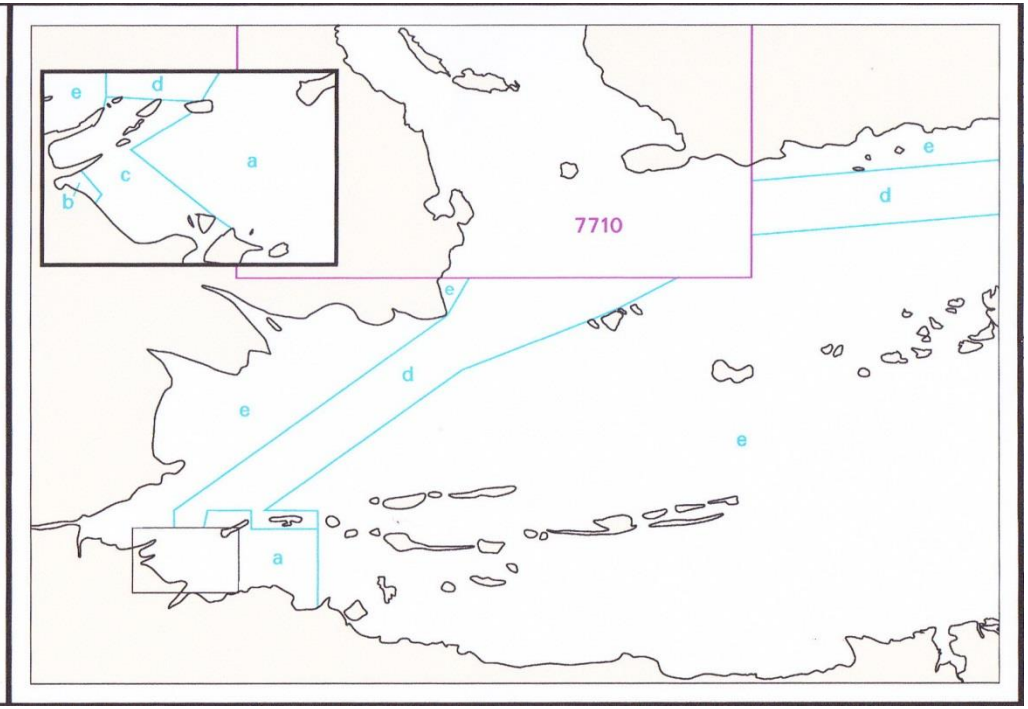
Source Classification Diagram

- Chart 7777 edition 1997 had many inadequately surveyed areas represented by “e”

SOURCE CLASSIFICATION DIAGRAM
DIAGRAMME DE CLASSIFICATION DES SOURCES

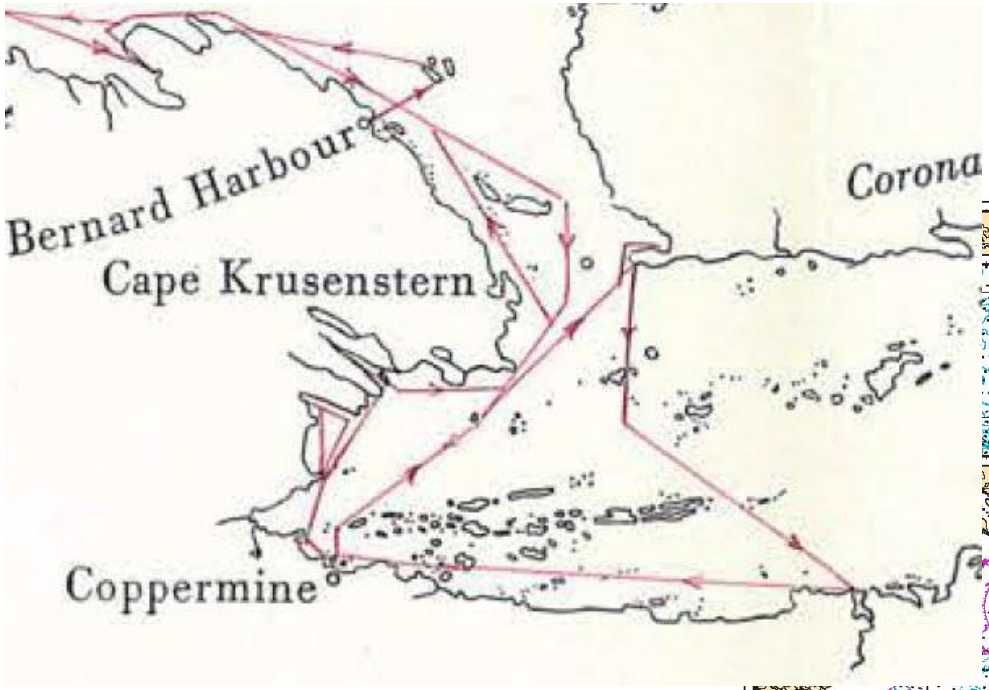
Area Zone	Origin Origine	Date	Line Spacing Espacement des lignes
a	CHS/SHC	1993	50m
b	CHS/SHC	1991	100m
c	CHS/SHC	1965	150m
d	CHS/SHC	1993	See/Voir NOTE
e	Various Divers	-	Tracks, Spot soundings Trajets, Sondes isolées

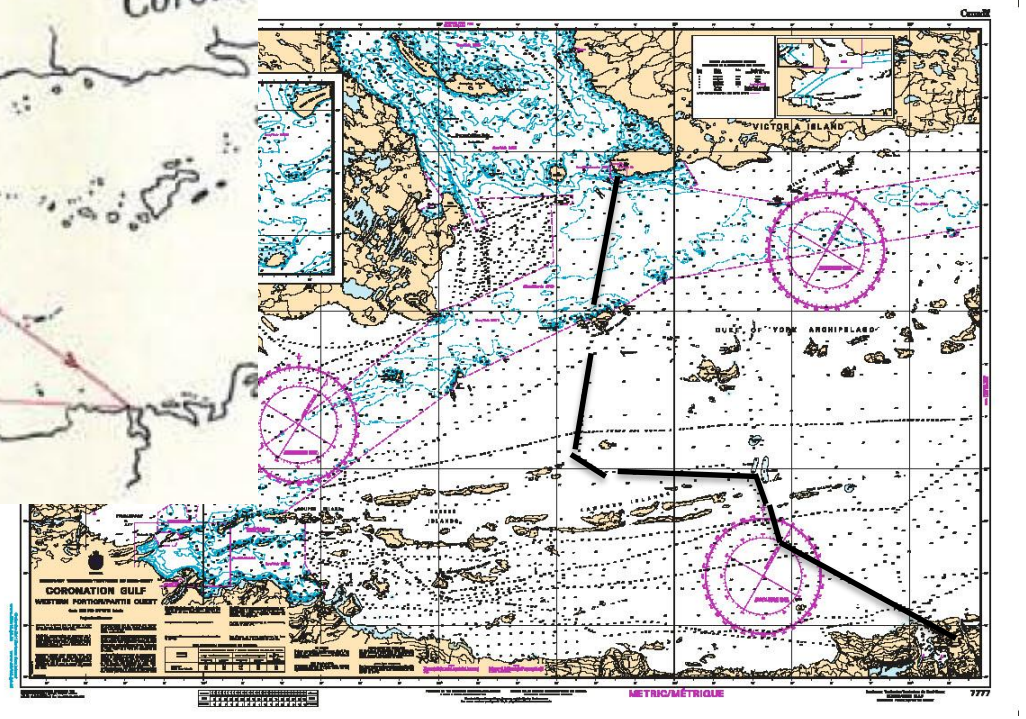
Larger-scale chart/Carte à plus grande échelle ——



1965 CSS Richardson Survey

- 26 Aug. 1965 – Lady Franklin Point to Port Epworth; dist. 70.8 nm, speed 5.5 to 6 knots





Survey Equipment

- Islands and mainland mapped using uncontrolled aerial photography on CHS Chart 7617
- Decca Type 404 radar
- Sperry Mark XIV gyrocompass
- Kelvin Hughes MS 26B single beam echo sounder
- Horizontal positioning approx. ± 130 metres
- Vertical positioning approx. ± 1 metre
- Rock shoal not found

NOTSHIP and NOTMAR

- 13 Sept. 2007 – rock shoal found by **Sir Wilfrid Laurier** whilst conducting scientific research
- 16 Sept. 2007 – NOTSHIP A102/07 issued
- Summer 2009 – survey of rock shoal
- June 2010 – NOTMAR should have been issued, but unfortunately due to CHS internal management issues, the update was not carried out.

Planned Tracks 1

2012 TSB Report, Appendix D

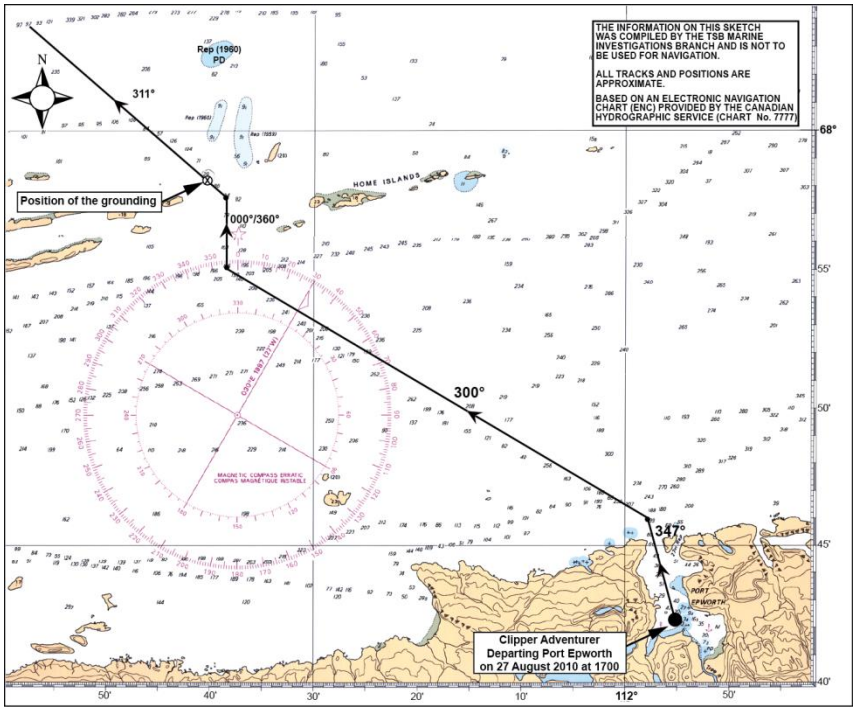
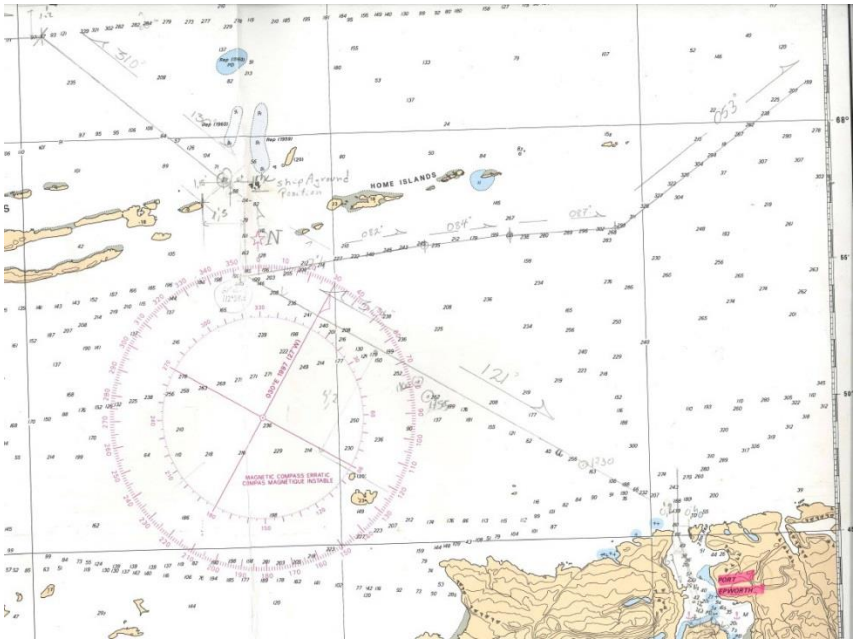


Chart 7777 Used on Clipper Adventurer



Planned Tracks 2

- At trial accepted planned track by Nav Officer was approved by Master
- Following a track of sounding was common practice in Arctic => artistic endeavor
- #2 to #3 offline track by 1.2 kilometres
- White space 10.5 kilometres but no plan for zodiac with echo sounder to proceed vessel
- No Vessel Data Recorder data – not backed up properly (no apparent penalty)

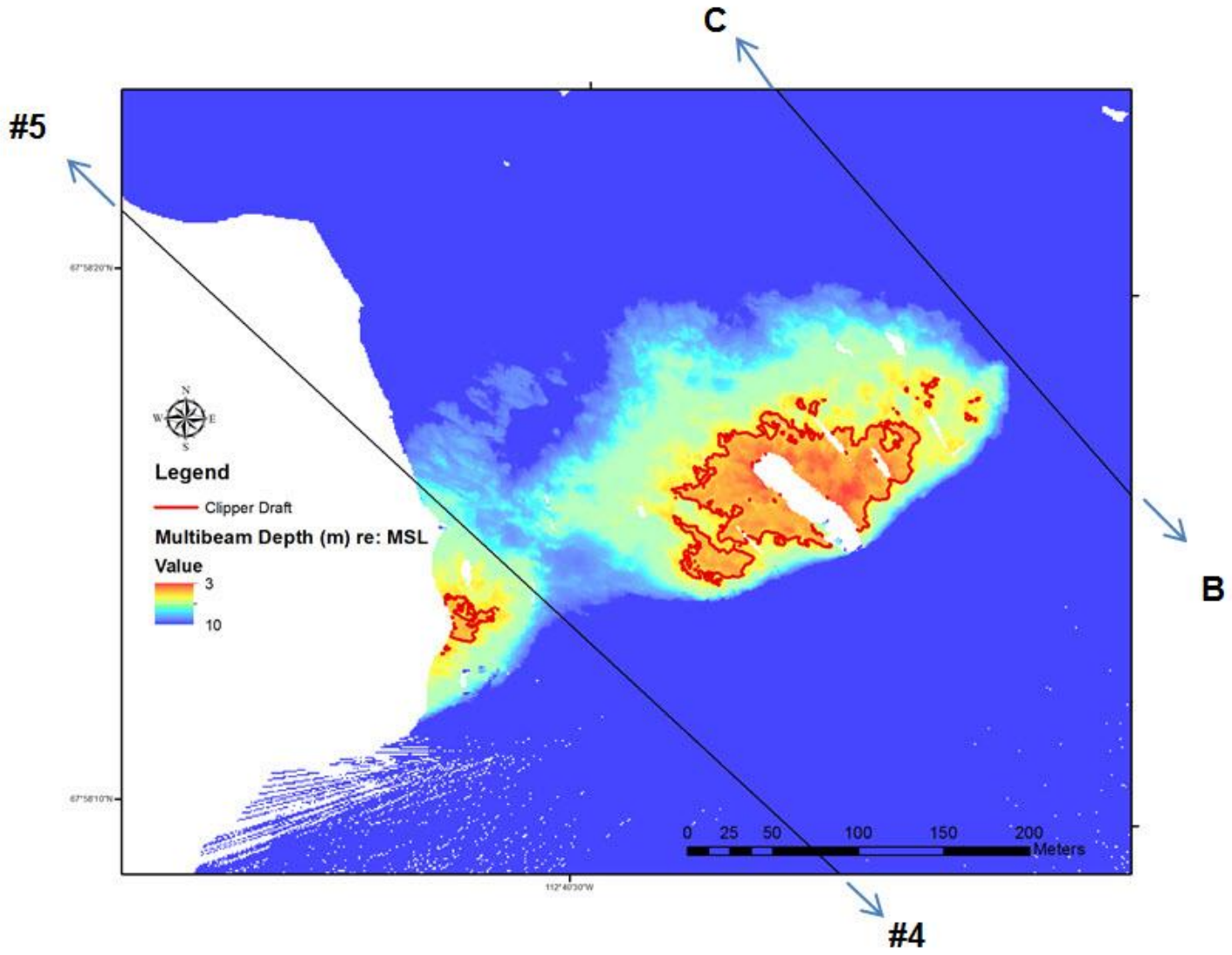
Grounding Location

- Federal Court – 340 metres West of actual location
- 2012 TSB Report – 122 metres South of actual location
- Exhibit 141 and **Amundsen Barge** locations agree

3 Planned Tracks – Perpendicular Distance from Planned Track to Exhibit Number 141 Grounding Location

- #21 – Voyage Planning form – 292 metres to East
- #139 – On or about 27 August – 151 metres to East
- #140 –Blunder (incorrectly entered longitudinal coordinate for Waypoint #5) – 142 metres to East
- Track of Soundings – 147 metres to West
- If followed any of these – safe passage!

Grounding Outcome



Forward Looking Sonar

- Not operational
- Range 330 or 440 metres
- Hence 46 or 61 seconds to impact at 13.9 knots
- Crash stop => 7.2 minutes
- Sharp turn to avoid => Possibly holed ship on rock shoal (and sunk)

Past Arctic Cruises

- 04 Sept. 2008 – **Akademik Ioffe** passed shoal unknowingly – Only previous vessel to visit Port Epworth in 18 years
- From 2006 to 2012 – 105 distinct cruise ship voyages by 7 different passenger vessels
- In 2010 – 22 cruise ship voyages
- 26 Aug. 1996 – Cruise ship **Hanseatic** grounded in Simpson Strait near Gjoa Haven similar to MV **Nanny** in 2010.

Future Arctic Cruises

- **Crystal Serenity** – 16 Aug. to 16 Sept. 2016
- – 15 Aug. to 16 Sept. 2017
- Accompanied by icebreaker RSS **Ernest Shackleton**
- Typically at 12 knots
- To be repeated in 2018

Improved Notification and Pilotage

- From 2012 Season, CCG started proactively informing vessels entering NORDREG of NOTSHIP's
- From 2013, CHS to update Arctic charts when a hazard to navigation is discovered by a credible source, as per international standards.
- Are pilots required for North West Passage?

Conclusions 1

- The master decided to sail at 13.9 knots in a limited surveyed area, when the voyage plan only required 6 knots.
- The information in the CHS Chart 7777 edition 1997 source classification diagram does not appear to have been appreciated by the bridge team.
- The track of soundings in question was only followed in a general manner, where part of the planned track was 1.2 kilometres from the track of soundings in question.
- Had the voyage continued, the **Clipper Adventurer** would have sailed 10.5 kilometres over an area which had never been surveyed.
- The Voyage Planning route was not followed but another was created on or about 27 August and when input into the ECS the longitudinal coordinates for the planned track alongside the rock shoal was input incorrectly.

Conclusions 2

- The grounding location provided by the 2012 TSB report and in the Federal Court decision did not match the actual grounding location.
- At the time of the grounding the **Clipper Adventure** was off track by 142 metres to the East. If the planned track had been followed the vessel would NOT have gone aground.
- At the time of the grounding the **Clipper Adventure** was not following the track of soundings but was 147 metres to the West. If the planned track of soundings had been followed the vessel would NOT have gone aground.
- If operational, the forward looking sonar would not have provided sufficient time to act as the **Clipper Adventurer** was sailing at 13.9 knots.
- A pilotage regime may be necessary as more vessels use the North West Passage.

Thank You

If you would like a copy of the associated paper please provide me with your name and email address or contact me at: bruce_calderbank @nucleus.com

Have a Great Summer!