



Environment  
Canada

Environnement  
Canada

Canada

# Overview of Environment Canada's AVOS Network and PMO Program



**Chris Marshall** – Manager of  
Marine Networks –  
Meteorological Service of  
Canada  
Weather and Environmental  
Monitoring Directorate



## Topics to cover

- Overview of EC-MSC Automated VOS (AVOS) Network
- Canadian PMO Program and ISO 9000
- Challenges and opportunities



## AVOS Overview

- System designed, and supported by AXYS Technologies Inc. first deployed in late 1990's as replacement to manual VOS fleet.
- Automated weather station coupled with "Bridge PC" allowing for generation of FM13 (MANMAR) observations that include both **automated** AND **manual** weather observations.
- AVOS delivers scheduled (hourly) observations to INMARSAT (older systems) or IRIDIUM (updated systems)
- Bridge PC is the interface that provides the following functionality:
  - *Read-out of latest automated weather observations*
  - *System status*
  - *GUI for input of manual observations (i.e. sky condition, visibility and sea state)*
  - *Quality control of automated and manual observations*



## Overview of Network

- Current network comprised of 53 vessels.
- All hardware now procured to expand the network to **75 vessels** (2-test / training sites included in total) **15** of these will be targeted on ships that operate in Arctic waters.
- Significant LCM and Capital investment in AVOS Network over the past 2-years, allowed for mid-life refit.
- Transition to Iridium telemetry has yielded much improved performance in northern waters, and hourly data updates. In addition;
  - Reduction in total communication costs for AVOS
  - Retrofit of WM100 payloads has allowed us to upgrade aging equipment.
- AVOS network provided **~92K** obs in 2009, will be near **180K** for 2010



# AVOS Bridge PC touch-screen interface

**DO NOT USE FOR NAVIGATION**

17:20 Time **System time synchronized to GPS** → 12/07/04 17:27:33 (UTC)

**NORMAL** Report type

3.39 N Latitude **updated every 10 minutes**

23.24 W Longitude

0.0 Ship Speed

269.9 Ship Direction

997.11 Barometer Corrected to MSL

997.11 Barometer as Read

3.8 Air Temp (°C) **1 Hz RT wind** →

4.00 SST (°C) [Check QC]

95 Rel. Humidity (%)

Observer Initials

Ship Hove To - Dockside MSL to SMLL Correction (m)

AVWRB,041207,172008,INFO,10minMET SOG-COG 0 270  
 AVWRB,041207,172008,INFO,WIND 0.0 293.5  
 AVWRB,041207,172017,EDR:NO,CYSD AVBR

AVR1D,172731,0.4,242,242,097.25,3.6,94,3.93,3.2,13.5  
 AVR1D,172732,0.6,227,227,097.24,3.5,95,3.93,3.2,13.5  
 AVR1D,172733,0.6,225,225,097.24,3.6,91,3.2,13.5

**Information Msgs** ←

**1 Hz RT Met Data** ←

**Wind Direction**  
 Bow  
 Relative  
 135  
 Port 50 90 50 120 120 150 150  
 Stern

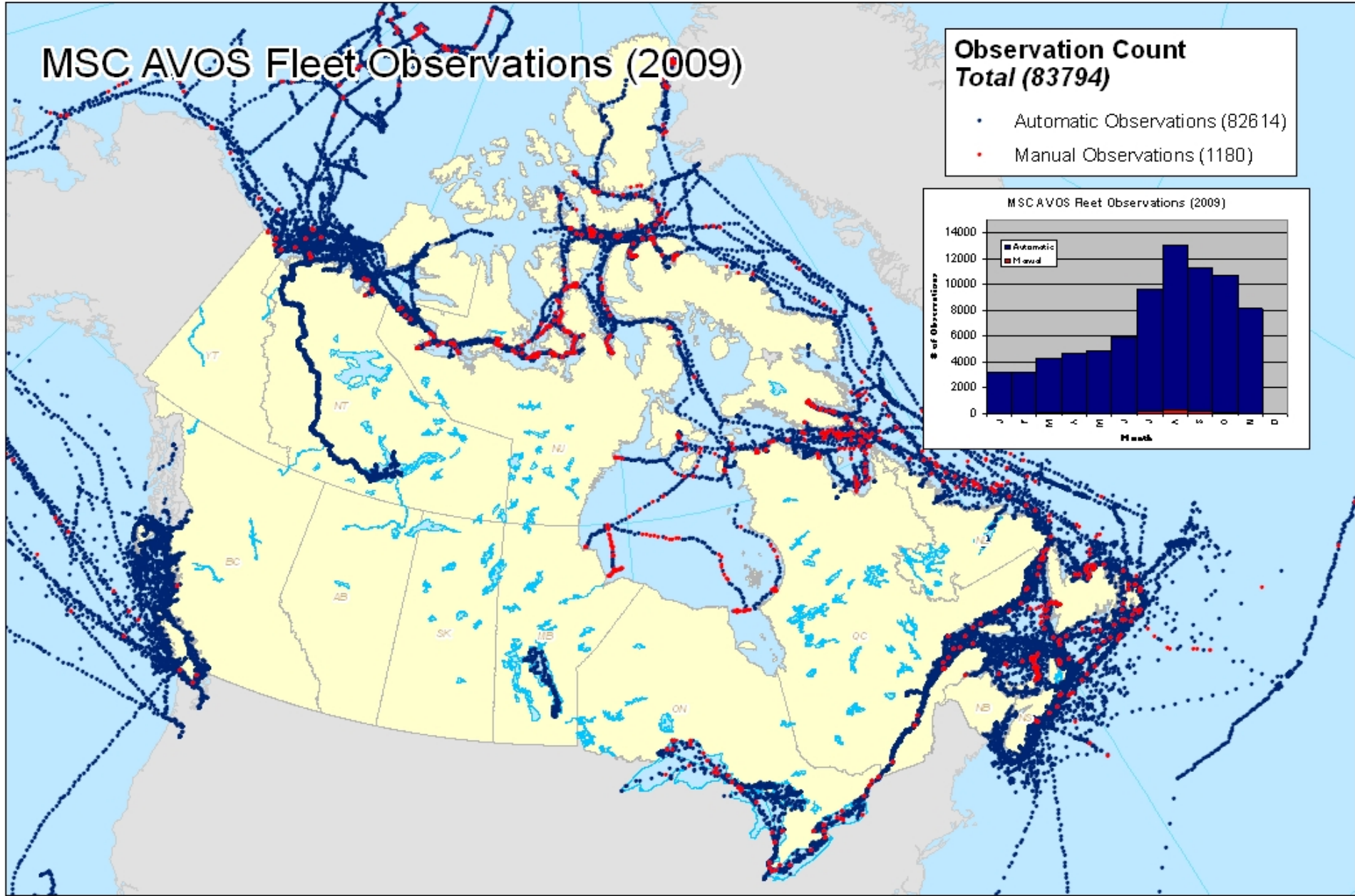
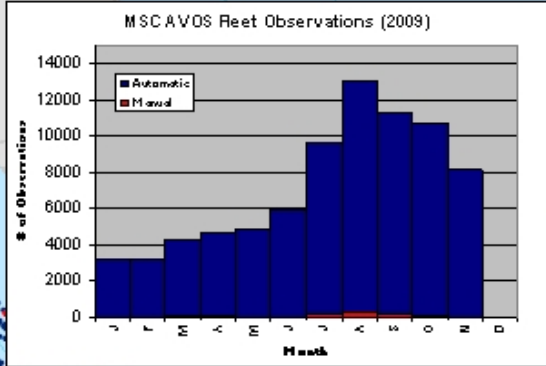
**Wind Speed**  
 knots  
 0.6  
 0 10 20 30 40 50 60 70 80 90 100 110 120

Icons: Home, Back, Print, Erase, Help, Settings, Refresh, Stop, Power, Weather

# MSC AVOS Fleet Observations (2009)

**Observation Count  
Total (83794)**

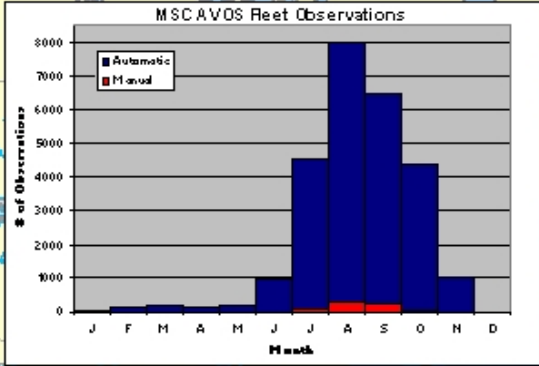
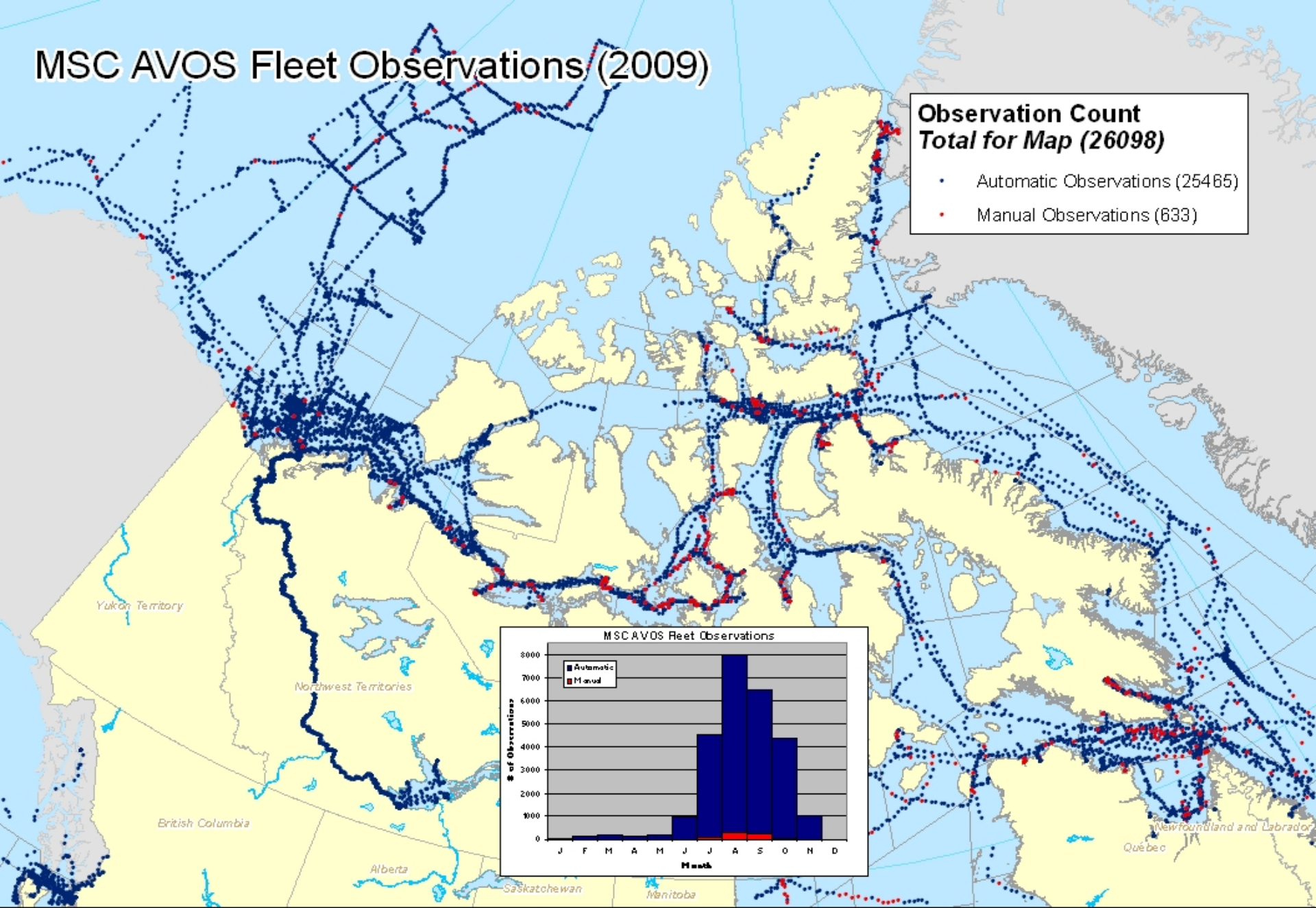
- Automatic Observations (82614)
- Manual Observations (1180)



# MSC AVOS Fleet Observations (2009)

**Observation Count  
Total for Map (26098)**

- Automatic Observations (25465)
- Manual Observations (633)





## Requirement for More Manual Observations

- Only **1,500** observations included manual input in 2009.
- **Manual Observations add significant value to the AVOS network, and are important because:**
  - Often only source of in-situ observations in data sparse regions
  - Provide situational awareness to Marine forecast/warning program.
  - Numerical weather prediction will provide better forecasts, if more complete data is available.
  - Sky/Weather condition and sea state important info for other Mariners, and for long-term climate record.
  - Validation for new remote sensing tools





## An update on the Canadian PMO Program

- With migration to smaller number of AVOS in the early 1990's, different regional offices chose to deliver core "PMO function" in different manner.
- In most EC Regional Offices, staff work on a range of marine and terrestrial networks including:
  - Maintenance and verification of moored buoys
  - Maintenance and verification of AVOS
  - Often also have responsibility for other networks such as coastal automatic sites, and climate stations.
  - Significant liaison with Canadian CCG for planning on buoy tender and AVOS service.
  - Deployments of drifting buoys via ships of opportunity.



## What happened to former EC VOS?

- Top performing VOS, including nearly all CCG vessels were selected for an AVOS installation.
- Other ships were given the option to keep the legacy weather observing equipment (no ongoing support from EC), or arrange for EC staff to remove and decommission.
- The program to retire the former VOS ships was not well executed, with both internal and external groups challenging the decision.
- The reputation of EC was tarnished, and relationships with commercial shipping community have still not recovered.
- But its not all bad....



# The Obs keep coming

- Mariners have observed the weather long before there was a Canadian MSC and will continue to long after we've gone.
- As was presented yesterday when you decommission a ship if possible send it to another country for recruitment – and that's what evolved...



# The US PMOs Step Up

- Give me your tired, your poor,  
Your huddled masses yearning to breathe free,  
The wretched refuse of your teeming shore.  
Send these, the homeless, tempest-tost to me,  
I lift my lamp beside the golden door!"





## PMO Program – 2009 and onwards

- Recognition from EC Management that there is requirement for a consistent and national PMO program.
- Core Services to be delivered:
  - **AVOS maintenance and calibration**
  - **Data quality control and metadata management.**
  - **“Service” role as EC representative to marine community**
  - **Deployment of drifting buoys and floats**
  - **Support for international VOS (where/when possible).**
- Important to note that PMO functions may not be delivered by one individual, but instead *shared* between different people in a regional centre.
- EC Port Met Offices located in: Vancouver, Edmonton (Arctic), Hamilton, Montreal, Halifax and St. John's



Environment  
Canada

Environnement  
Canada

Canada

# ISO 9001:2008 International Standard

- The **ISO 9000** family of standards relate to quality management systems and are designed to help organizations ensure they meet the needs of customers and other stakeholders
- ISO 9000 deals with the fundamentals of quality management systems (. [ISO 9001](#) deals with the requirements that organizations wishing to meet the standard have to meet.
- Independent confirmation that organizations meet the requirements of ISO 9001 may be obtained from third party certification bodies. Over a million organizations worldwide are independently certified making ISO 9001 one of the most widely used management tools in the world today.
- Bottom line. Qualified Staff (PMO's), Certified Test and Measurement Equipment, Controlled Documentation. All to a STANDARD.



Environment  
Canada

Environnement  
Canada

Canada

# GENOT for Algoport

- NOCN01 CWA0 111825
- GENOT TLTP. NO. 037
- ACTION - AVOS DECOMMISSIONED / ENLEVE DU SERVICE
- STATION - ALGOPORT
- IDENTIFIER / INDICATIF - VCDT
- INDEX NUMBER / INDICATIF INTERNATIONAL - N/A
- TYPE - AVOS
- LATITUDE - N /A
- LONGITUDE - N /A
- ELEVATION - 0.0 M
- CIRCUIT HEADER / EN-TETE TLTP - S(I, M,N)VD80 KWBC PROGRAM / PROGRAMME - SN HOURLY WEATHER REPORT / MESSAGE METEOROLOGIQUE HORAIRE SN 0100 0200 0400 0500 0700 0800 1000 1100 1300 1400 1600 1700 1900 2000 2200 2300 UTC/TU SM SYNOPTIC WEATHER REPORTS / MESSAGES METEOROLOGIQUES SYNOPTIQUES SM 0000 0600 1200 1800 UTC/TU SI INTERMEDIATE SYNOPTIC WEATHER REPORTS / MESSAGES METEOROLOGIQUES SYNOPTIQUES INTERMEDIAIRES SI 0300 0900 1500 2100 UTC/TU OPERATION - DAILY / TOUS LES JOURS 0000 - 2359 UTC / TU ASYNOPTICALLY / ASYNOPTIQUES
- PARAMETERS / PARAMETRES -
- WIND DIRECTION SPEED AND GUSTS / DIRECTION VITESSE ET RAFALES DE VENT AIR AND SEA SURFACE TEMPERATURE / TEMPERATURE DE L AIR ET DE LA SURFACE DE LA MER WAVE HEIGHT AND PERIOD / AMPLITUDE ET PERIODE D ONDE HOURLY PEAK WAVE HEIGHT / AMPLITUDE D ONDE MAXIMALE HORAIRE SPECTRAL WAVE DATA / DONNEES SPECTRALES DE VAGUE MEAN SEA LEVEL PRESSURE / PRESSION AU NIVEAU MOYEN DE LA MER
- REMARKS / REMARQUES -
- AVOS BRIDGE COMPUTER, PROCESSOR, SENSORS AND TELEMTRY EQUIPMENT REMOVED FROM THE SHIP ALGOPORT / L ORDINATEUR DE LA PASSERELLE DE L AVOS, L UNITE CENTRALE, LES CAPTEURS ET EQUIPEMENT DE TELEMTRIE ONT ETE ENLEVES DU NAVIRE.
- EFFECTIVE / EN VIGUEUR - APRIL 27 2009 / 27 AVRIL 2009 GRIMES ADMA-MSC / SMA-SMC TORONTO
- Genot\_stn\_changes mailing list
- Genot\_stn\_changes@internallists.ec.gc.ca
- [http://internallists.ec.gc.ca/cgi-bin/mailman/listinfo/genot\\_stn\\_changes](http://internallists.ec.gc.ca/cgi-bin/mailman/listinfo/genot_stn_changes)



BoatNerd.Com







ALCOPORT  
SAULT STE. MARIE



Environment  
Canada

Environnement  
Canada

Canada

# Thanks/Merci!

Chris Marshall

Manager of Marine Networks

Environment Canada – Meteorological Service of Canada

Weather and Environmental Monitoring

[Chris.marshall@ec.gc.ca](mailto:Chris.marshall@ec.gc.ca)

416-739-4468