Collaborative Arrangements
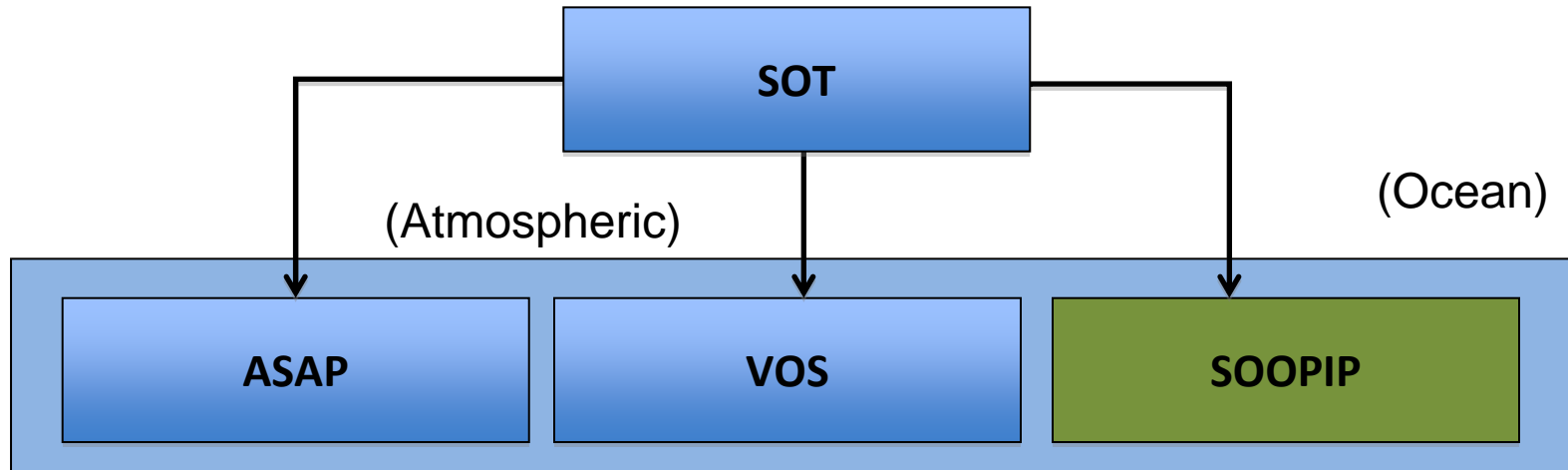
Gustavo Jorge Goni
National Oceanic and Atmospheric Administration
Atlantic Oceanographic and Meteorological Laboratory
Miami, FL

Fourth International Port Meteorological Officer Conference (PMO-IV)
and Support to Global Ocean Observations Using Ship Logistics

Ship Of Opportunity Program Implementation Panel (SOOPIP)

Observations Programmes

SOT
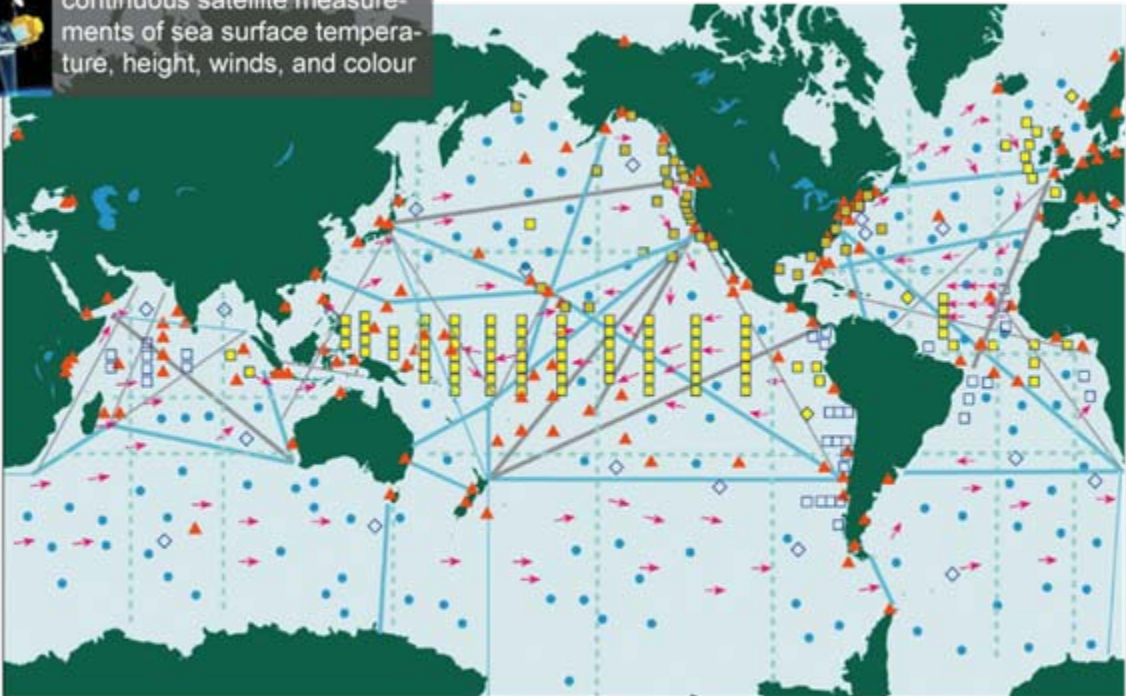
Argo

DBCP

GLOSS

OceanSites

TIP

Global Ocean Observing System:
An international effort

Total completed **62%** **January 2010**

continuous satellite measurements of sea surface temperature, height, winds, and colour

100% **Surface measurements** from volunteer ships (VOSclim)
200 ships in pilot project

100% Global **drifting surface buoy** array
5° resolution array: 1250 floats

59% **Tide gauge** network (GCOS subset of GLOSS core network)
170 real-time reporting gauges

80% **XBT** sub-surface temperature section network
51 lines occupied

100% **Profiling float** network (Argo)
3° resolution array: 3000 floats

Reference time series 48%
34% Global **reference mooring** network
58 sites
29 moorings planned

73% Global tropical **moored buoy** network
119 moorings planned

62% Repeat **hydrography** and **carbon inventory**
Full ocean survey in 10 years

SOOP: Recommended XBT transects

From OceanObs09 white paper

Not just recommended transects, but also on data management and science.

Not just XBTs, SOOP provides a platform to deploy/install other probes/instruments

SOOP:
Recommended XBT transects

• **International effort**

• **Mostly from cargo ships,
but also from research vessels and
cruise ships (TSGs)**

• **Repeat transects**

• **Three modes: HD (science), FR (science and model
initialization)**

• **Depth is derived from time of descend**

• **Strong scientific justification**

• **Most data transmitted in real-time**

eXpendable BathyThermographs (XBTs): Recruitment

Logistics:
Ships are usually found using schedules posted on web sites
Some ships are recruited with help from PMOs
Initiate contact with shipping company by phone or email
Provide brochures on NOAA SOOP activities
Recruiting information can be obtained from NOAA/AOML web site:
http://www.aoml.noaa.gov/phod/goos/docs
Special needs if TSG needs to be installed

Frequently Repeated transects:
We train crew to deploy XBTs and provide written instructions
We visit ships and download data

High Density transects:
Need authorization to take a rider
We train rider in AX10 (NYC to Puerto Rico)
A scientific rider deploys the XBTs following instructions of the cruise plan

eXpendable BathyThermographs (XBTs):
Collaboration with PMOs

Recruitment

Load and resupply ships

Obtain feedback from crew

Provide feedback to crew

Store probes, floats, drifters, computers

Currently involved:
Tim Kenefick
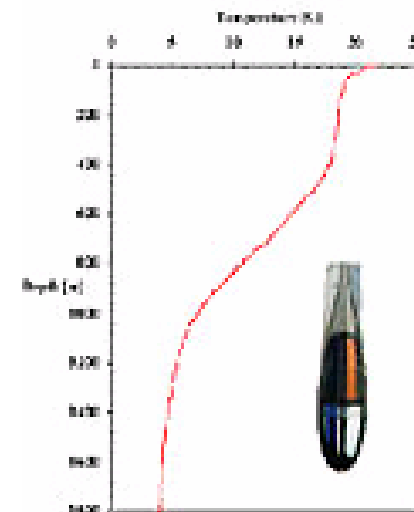Peter Gibino
Paula Rychtar
David Delinger
Jim Luciani
Gus Mckay

eXpendable BathyThermographs (XBTs):
Collaboration from crew for deployments

HD: XBTs deployed by scientific rider
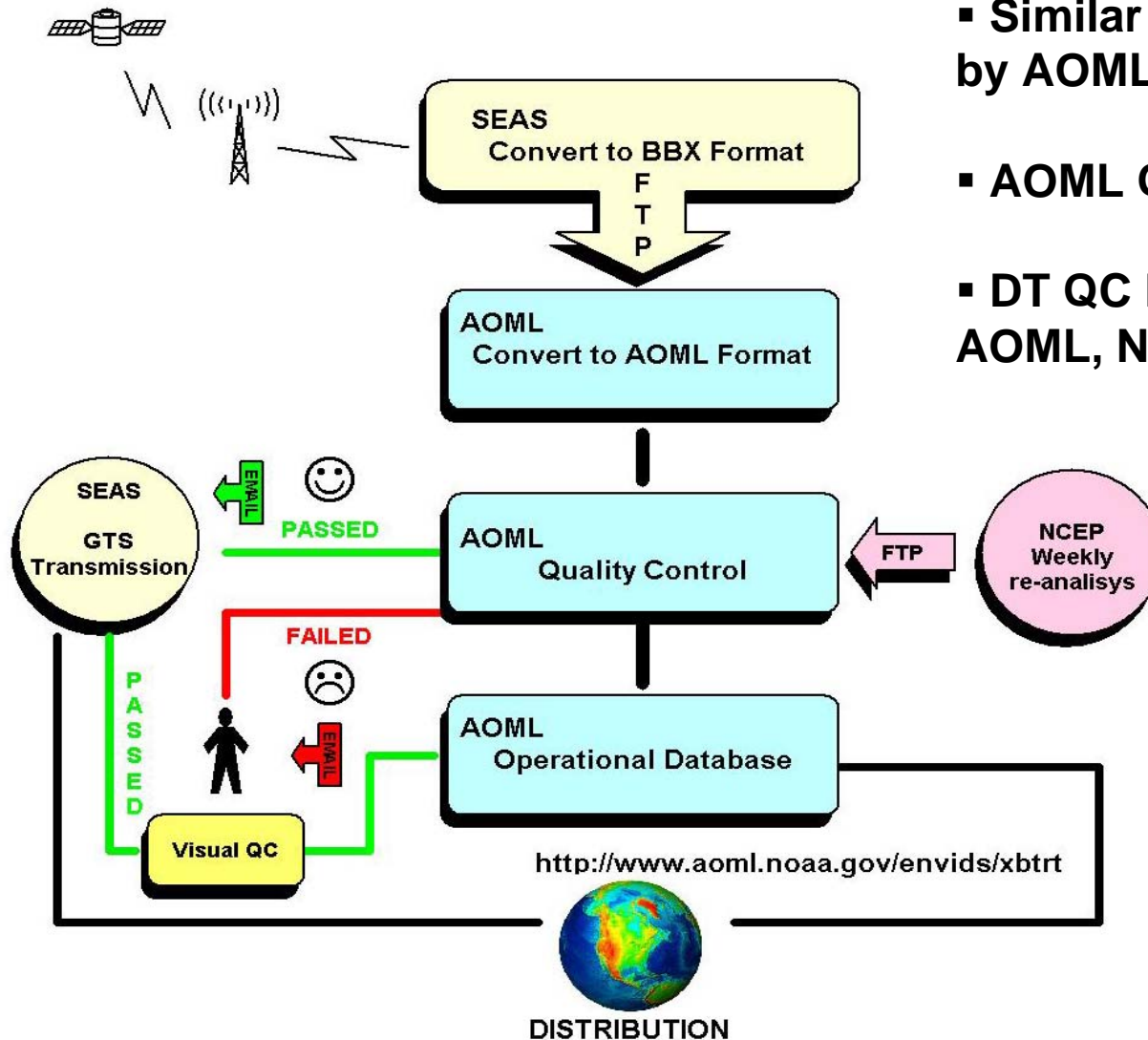FR: XBTs deployed by crew

2.5 m is recommended height of deployment (actual 2m-15m)
Launch should be at 17-20knts (sometimes done <10knts)
Probes do not measure depth: Depth is derived from time of descend

Automatic QC RT data:
Collaboration with universities

- **Similar procedures done by AOML and CSIRO**

- **AOML QCs SIO data**

- **DT QC by SIO, CSIRO, AOML, NODC**

SEAS
Convert to BBX Format
FTP

AOML
Convert to AOML Format

SEAS
GTS Transmission

EMAIL

PASSED

AOML
Quality Control

FTP

NCEP
Weekly re-analisys

FAILED

PASSED

EMAIL

AOML
Operational Database

Visual QC

http://www.aoml.noaa.gov/envids/xbtrt

DISTRIBUTION

SEAS:
Collaboration with NWS

- **Developed at NOAA/AOML for NWS met observations acquisition and data distribution**

- **Maintained by NOAA/AOML**

- **Used by the US Coast Guard for Search and Rescue operations**

- **Enhanced for *ocean* (XBTs, TSGs, pCO2) data acquisition and transmission, installed in cargo and cruise ships**

- **1000+ ships with SEAS for met observations, 300k obs.**

- **80 ships with SEAS for ocean observations, 15k obs.**

SOOP:
International Collaboration

US: NOAA/AOML, SIO, NOAA/NEFSC

Australia: CSIRO and BOM

France: IRD (Brest and Noumea)

South Africa: UCT (Cape Town), Weather Service, Fisheries

Brazil: FURG (Rio Grande do Sul)

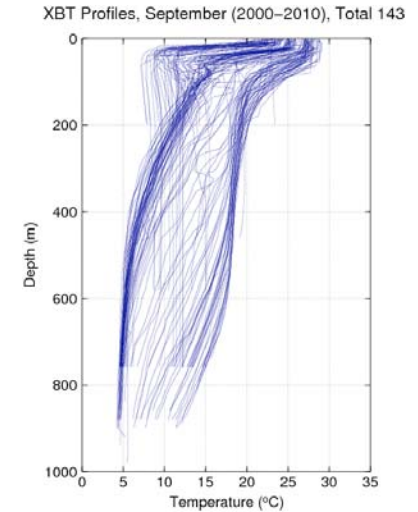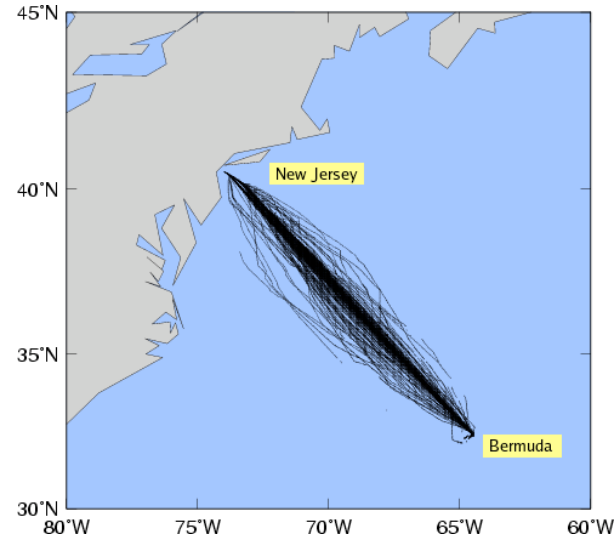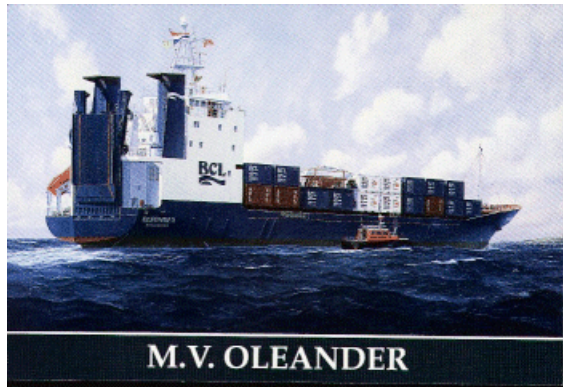**Germany**: Bundesamt für Seeschiffahrt und Hydrographie (*BSH*, Hamburg)

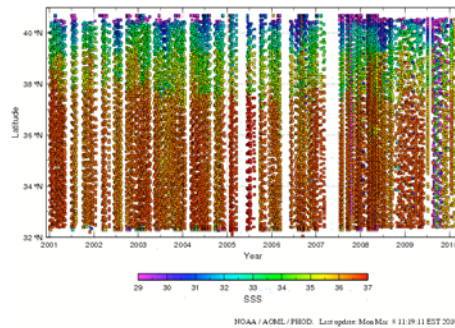**India:** NIO (Goa)

Japan: Tohoku U.

Argentina: SHN

The Oleander Project:
Multi-institutional collaboration on interdisciplinary research

M.V. OLEANDER

XBT Profiles, September (2000–2010), Total 143

URI-SUNY-NOAA

- CPR since 1971
- TSG since 1977
- XBTs since 1977
- ADCP since 1992
- pCO2 since 2008

NOAA 2010 Environmental Hero's Award

Recognition and Awards
for ship industry and international collaboration

**Happag Lloyd
August 2010**

**Argentine Navy
July 2010**

Semester At Sea:
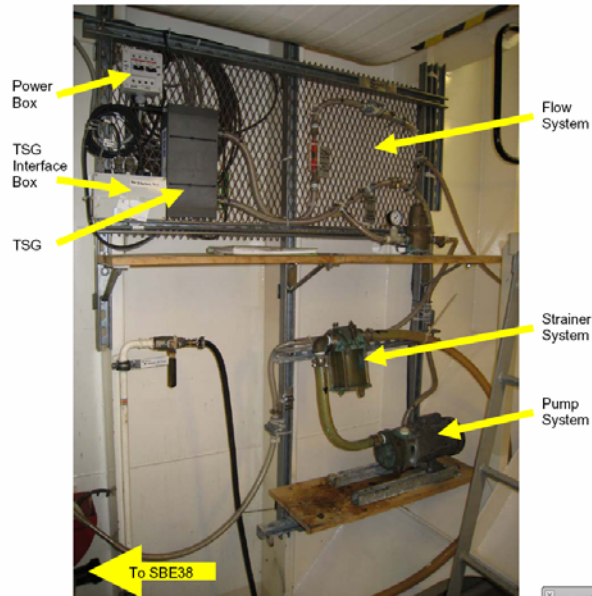## Collaboration with University of Virginia

Power Box

Flow System

TSG Interface Box

TSG

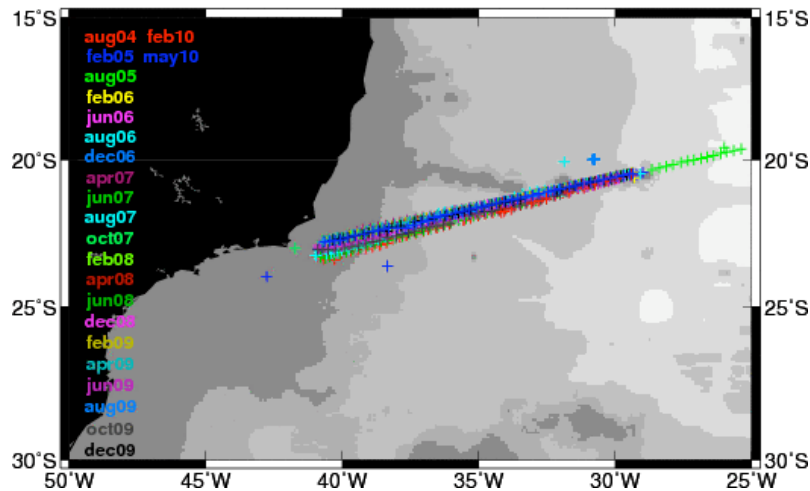Strainer System

Pump System

To SBE38

Figure 8. Full Explorer TSG system

Collaboration with Navies and Coast Guards

Former WHOI Atlantis, now PNA Bernardo Houssey

FURG-Brasilian Navy-AOML AX97

Cape Nelson survivors

AOML XBT/TSG/SEAS Annual Workshop:
An opportunity for interaction between the US SOOP and the US VOS communities

Date: 5-6 April, 2011 (tentative)

Location: NOAA/AOML, Miami, FL

Goal: bring together all components of AOML SEAS-related operations

Who: AOML SEAS/XBT/TSG personnel, data managers (NODC), collaborators (NMFS, AMAO), PMOs (Rychtar, Dellinger, ...).

Collaboration

Among different laboratories: NOAA/AOML, SIO, CSIRO

Among different offices: NOAA/AOML and NOAA/NWS PMOs

International: Donation of XBTs to countries

Providing scientific riders: Brazil, Argentina, and South Africa

Providing logistical support

Utilizing civilian government vessels: Agulhas to Antarctica

Utilizing university ships: University of Virginia's Semester At Sea

Utilizing Navy's ships: Brazil

Coast Guard ships: Argentina (observations), US (Search and Rescue)

Providing easy access to quality controlled data

SOOP: Key issues

Constant changes in ship Routes:

Economy and ship routes

Problematic routes:
    AX18 (Cape Town to Buenos Aires/Montevideo)
    AX08 (Cape Town to New York)
    PX50 (New Zealand to Valparaiso)

Raider Fees

Funding

Non Issues, yet: Piracy

Work Ahead

Implementation: Increase international collaboration,
need to have more countries involved (UK?)

Recruiting: Enhance collaboration with PMOs, and use of more
sophisticated tools to search for potential recruits

Science: Continue use of data in science and operations: First XBT
Science workshop, July 2011 in Melbourne (Australia).

Technological: Include (2?) pressure switches in XBTs

Collaborative Arrangements

Gustavo Jorge Goni
National Oceanic and Atmospheric Administration
Atlantic Oceanographic and Meteorological Laboratory
Miami, FL

Fourth International Port Meteorological Officer Conference (PMO-IV)
and Support to Global Ocean Observations Using Ship Logistics