Introduction to the Data Management Roles of the National Data Buoy Center (NDBC)

Kevin Kern, Dawn Petraitis, and Richard Bouchard

For the:
The OFCM 2nd Observational Data Workshop
22-24 May 2018
Silver Spring and College Park, MD

NDBC

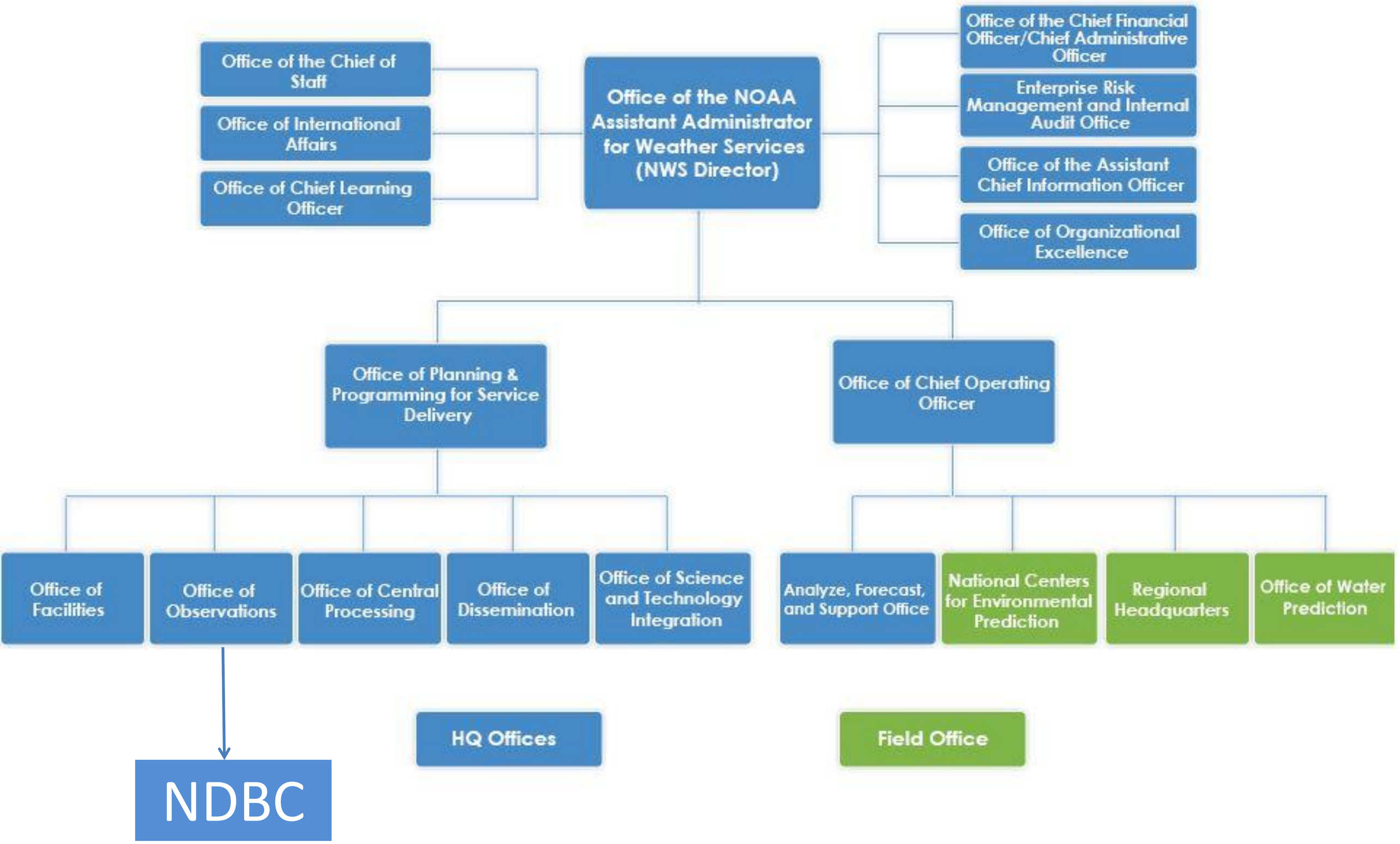
Our Vision

A sustainable and resilient marine observation and monitoring infrastructure which enhances healthy ecosystems, communities, and economies in the face of change.

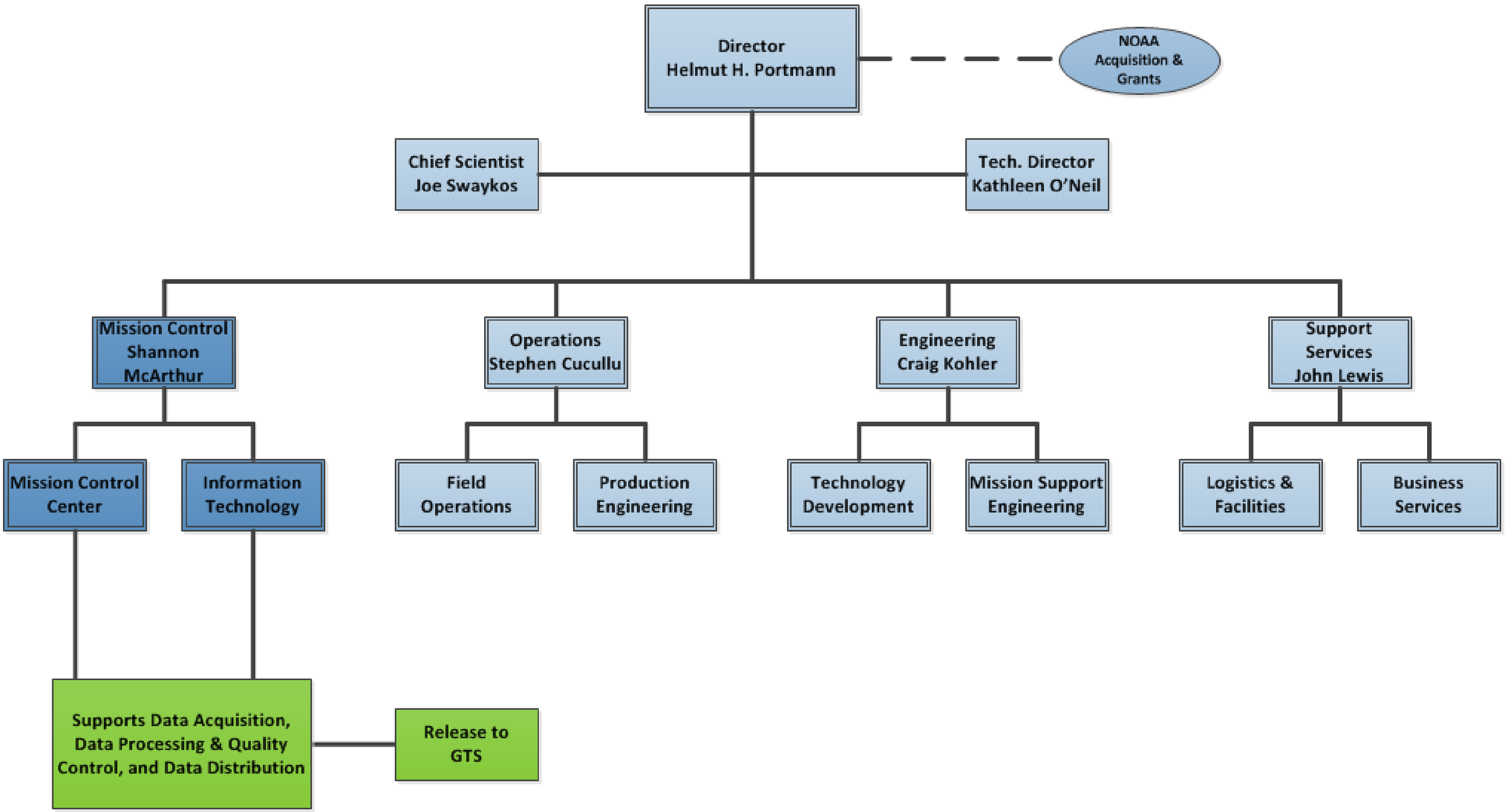
Our Mission

To provide quality observations in the marine environment in a safe and sustainable manner to support the understanding of and predictions to changes in weather, climate, oceans and coast.

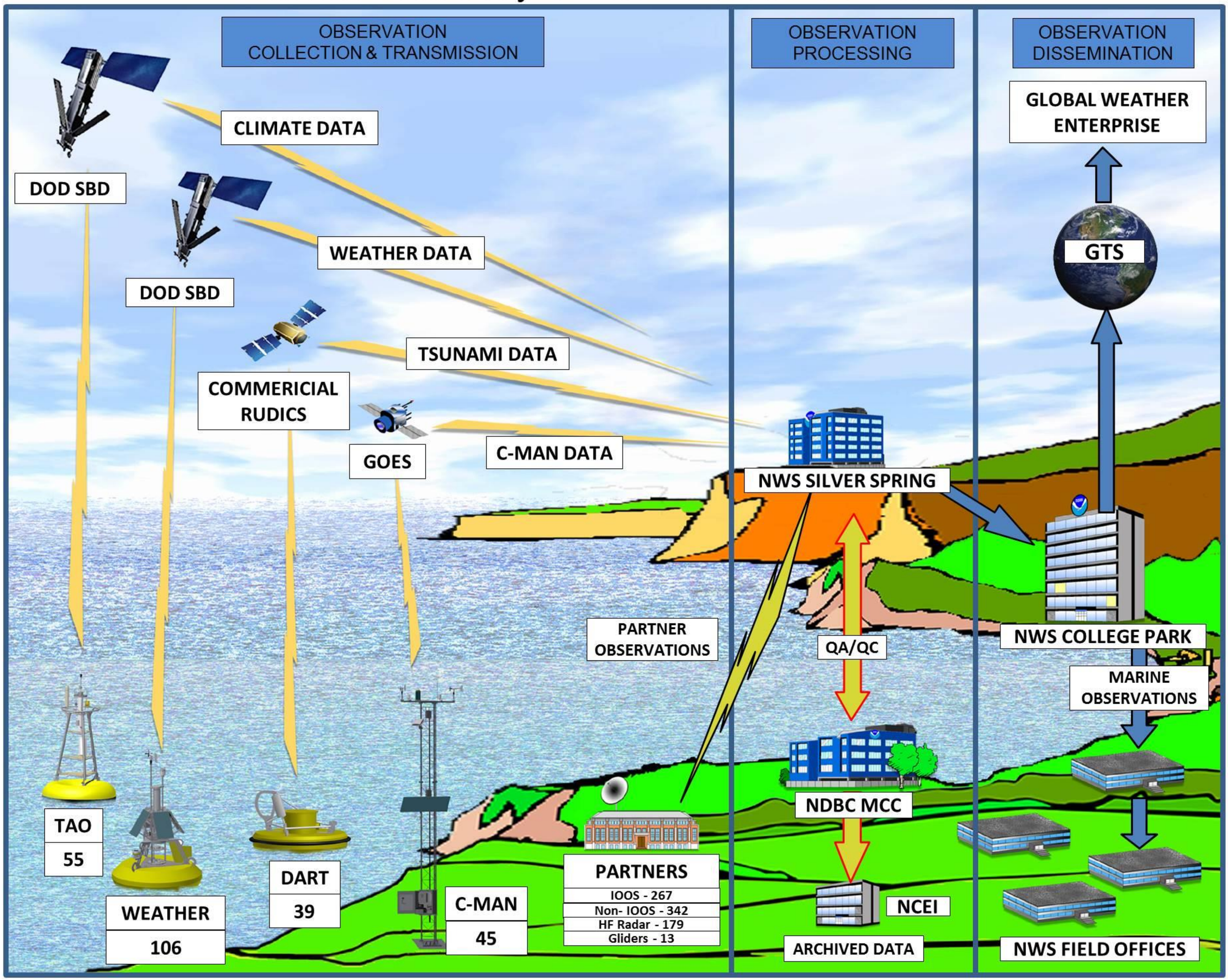
NWS Organizational Structure



NDBC Organization



National Data Buoy Center SYSTEM OVERVIEW



Quality Control

- NDBC performs
  - automated QC prior to release to GTS
  - manual QC prior to archive at NCEI

See NDBC Handbook of Automated Data Quality Control Checks and Procedures.

http://www.ndbc.noaa.gov/NDBCHandbookofAutomatedDataQualityControl2009.pdf

NDBC currently releases the following data to the GTS via the NWSTG:

- Weather Buoy Data: FM13 SHIP (provide wind and swell waves), FM65 for spectral wave data
- C-MAN: Form of FM12
- Tropical Atmosphere-Ocean Array (TAO): BUFR Moored Buoy and FM18
- DART (Tsunami): DART-specific format
- Glider (IOOS DAC, UW, Navy): BUFR ARGO Float Template and FM64 TESAC
- ADCP Data (Partners): FM64 TESAC
- IOOS: FM12 (C-MAN type stations), FM13, FM64, FM65
- Scottish Association for Marine Science (SAMS) Data: FM14
- Ice Tethered Profiler (ITP) Data (WHOI): FM64
- NOAA Vessel CTD casts Gulf of Mexico (NOAA Southeast Fisheries): FM64 TESAC (probable transition to future OMAO/NCEI pathway)
- US Naval Academy/USAFR 53rd Weather Squadron: Airborne Expendable Bathy Thermographs (AXBT): FM63 BATHY
- NDBC also provides HFRadar data to NWSTG (currently used by NowCoast): GRIB and raw radial files

NDBC's WMO/GTS Activities

- NDBC currently handles the assignment for U.S.A:
  - WMO Station Identifiers for Moored buoys, Drifting buoys, Argo Floats, Gliders and Subsurface Profiling
  - Coastal Automated Meteorological Stations (NWS/NDBC C-MAN, NOS NWLON, *etc*) using NWS Location Identifiers

- NDBC serves as the IOOS gateway to the GTS

- WIGOS Task Team on Metadata

- JCOMM (Joint Commission WMO/IOC):
  - Data Buoy Cooperation Panel (DBCP)
  - DBCP Task Team on Data Management
  - Task Team on Wave Measurement and Testing
  - International Tsunami Partnership (ITP)
  - WMO Task Team – Moored Buoys

- WMO Region IV Regional Marine Instrumentation Centre (RMIC)

NDBC BUFR Migration

- NDBC is currently targeting the end of July/August to release BUFR
- NDBC plans to dual release in both BUFR and TAC for a transition period (TBD)
- The planned headers are detailed in the following slide
- For Buoys & C-MAN, NDBC will be using the Moored Buoy Template 315008
  - 315008 accommodates FM64 TESAC and FM65 WAVEOB
- For subsurface profiling gliders: BUFR ARGO Float Template & FM64 TESAC
  - Transitioning FM64 TESAC to BUFR ARGO Float Only
  - BUFR ARGO Float “creative” acceptable to OPCs so far
  - Status of development of glider WMO BUFR Template?
- NDBC will work with NCEP to stop the BMT release of our data upon release (preliminary discussions have occurred)
- The DART/Tsunami data will not be included in the initial release
  - Some issues with the BUFR template: DART II specific; new generation DART or non-DART systems (e.g., India, MSM (Ecuador & Colombia), Sonardyne)
  - Will continue with DART-specific format until BUFR template more flexible
- Future work to include full support of the 7-digit WMO id’s within all NDBC systems

National Data Buoy Center - GTS Headers as of 3 May 2018

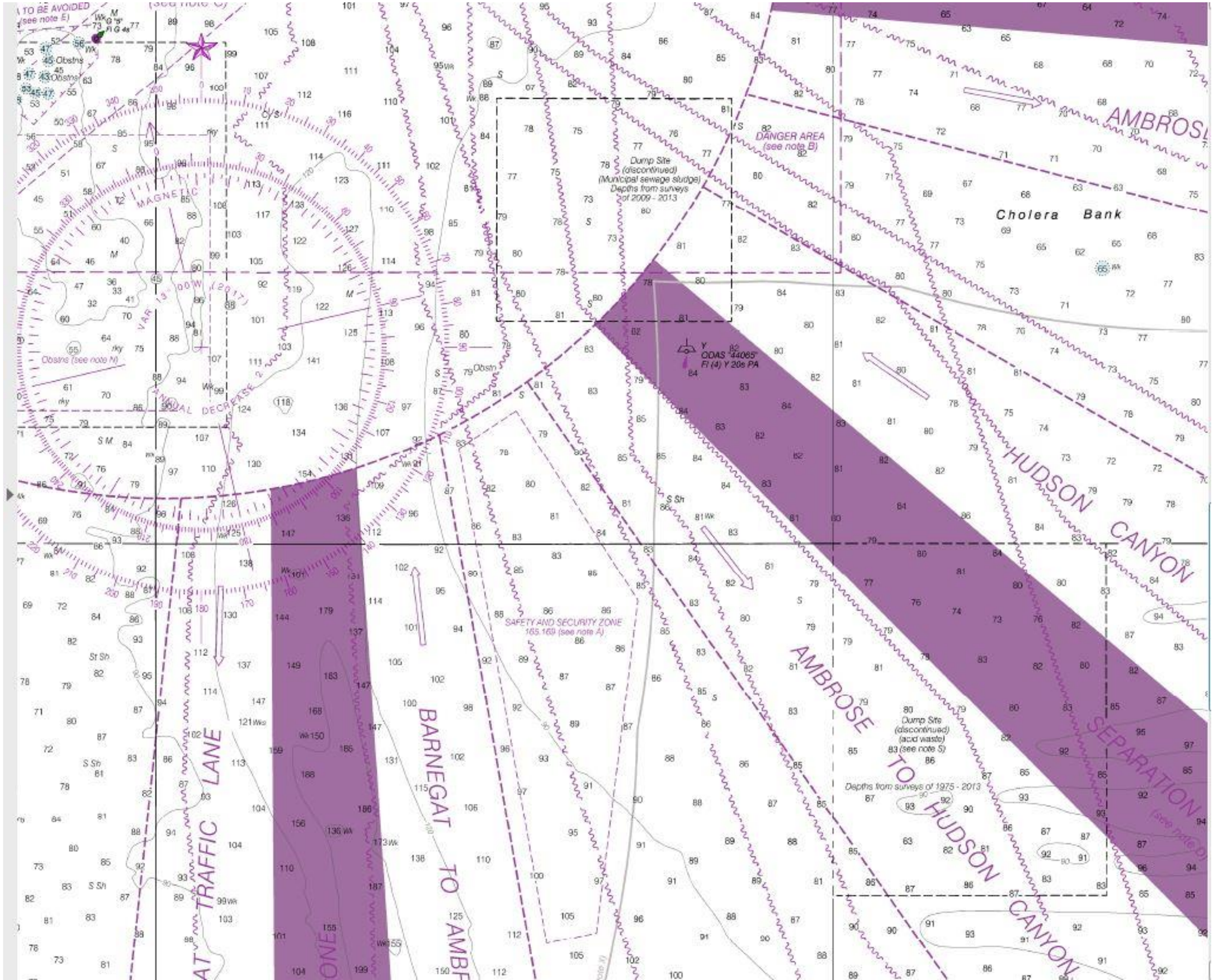
GTS Header	Proposed BUFR	Notes
CMAN Messages		
SXUS20 KWNB	ISSA20 KWNB	East Coast
SXUS21 KWNB	ISS+21 KWNB	Gulf of Mexico and Caribbean
SXUS22 KWNB	ISS+22 KWNB	Great Lakes
SXUS23 KWNB	ISSB23 KWNB	West Coast and Pacific
	ISSS23 KWNB	South Pacific
		WHERE + REPRESENTS A FOR ZERO TO NINETY DEGREES WEST, OR B REPRESENTS NINETY TO ONE HUNDRED EIGHTY DEGREE WEST
FM13 SHIP MESSAGES (Moored Buoy)		
S?VD15 KWNB	IOB+15 KWNB	Atlantic Offshore and Gulf of Mexico
S?VD17 KWNB	IOBB17 KWNB	Pacific Offshore
S?VD19 KWNB	IOBB19 KWNB	Alaska and Bering Sea
S?VD20 KWNB	IOBA20 KWNB	Atlantic Coastal
S?VD22 KWNB	IOBB22 KWNB	Pacific Coastal
S?VD45 KWNB	IOB+45 KWNB	Great Lakes
S?VE15 KWNB	IOBB15 KWNB	Hawaii
	IOBS17 KWNB	South Pacific
WHERE ? REPRESENTS THE SYNOPTIC INDICATOR N, M, OR I		WHERE + REPRESENTS A FOR ZERO TO NINETY DEGREES WEST, OR B REPRESENTS NINETY TO ONE HUNDRED EIGHTY DEGREE WEST
FM18 BUOY MESSAGES		
SSVX02 KWNB	Complete - TAO	TAO Adrift
SSVX08 KWNB	Complete - TAO	TAO Moored
FM65 WAVOB MESSAGES		
SXVX?0 KWNB	See Note below	Southeast nondirectional
SXVX?1 KWNB	See Note below	Gulf of Mexico nondirectional
SXVX?2 KWNB	See Note below	Northeast nondirectional
SXVX?3 KWNB	See Note below	Great Lakes nondirectional
SXVX?4 KWNB	See Note below	Mid-Atlantic nondirectional
SXVX?5 KWNB	See Note below	Atlantic/Gulf of Mexico directional
SXVX?6 KWNB	See Note below	Pacific nondirectional
SXVX?7 KWNB	See Note below	Pacific nondirectional
SXVX?8 KWNB	See Note below	Pacific nondirectional
SXVX?9 KWNB	See Note below	Pacific directional
WHERE ? IS 4 OR 6. 4 REPRESENTS A NON-SYNOPTIC HOUR; 6 REPRESENTS A MAIN SYNOPTIC OR INTERMEDIATE HOUR.		Note: WAVEOB (FM65) will be included in the applicable part of the Moored Buoy BUFR template (under the IOB header)
NBC uses BUFR Moored Buoy Template 3015008 for Buoy/C-MAN		

GTS Header	Proposed BUFR	Notes
FM64 TESAC MESSAGES		
SOVD83 KWNB	See Note below	All TESAC messages
		included in the applicable part of the Moored Buoy BUFR template (under the IOB header)
DART MESSAGES		
SZIO01 KWNB		Indian Ocean
SZNT01 KWNB		North Atlantic
SZPN01 KWNB		North Pacific
SZPS01 KWNB		South Pacific
Glider Profiles		
IOSX05 KWNB	Complete	BUFR, ARGO Profile Template
HF Radar Surface Currents		
OUTA98 KWNB		GRIB all areas
HF Radar Radial Files		
SHFR50 KWNB		Text Files for NCEP CO only
BUOY BUFR Messages		
IOBF08 KWNB	Complete	TAO East of 180
IOBG08 KWNB	Complete	TAO on or West of 180
International Partner Data		
IOBX03 KWNB	Complete	OpenGTS - Proposed
NDBC use the ARGO Float Template for Gliders		

Top 3 Ocean Data Challenges

- BUFR template for Gliders and Tsunami Stations
- WMO Identifier changes/impacts
- Clarification of WMO/GTS guidance while planning (i.e proper headers)

Impact of WIGOS IDs on Navigation Charts?
Presently Use 5-digit WMO



For Processing or BUFR issues Contact:
Kevin Kern, kevin.kern@noaa.gov, (228) 688-1721

For WMO & C-MAN ID Assignments Contact:
Dawn Petraitis, dawn.petraitis@noaa.gov, (228) 688-2940

For Data Related Questions/Issues Contact
NDBC Mission Control Center (MCC)
Available 24 x 7
228-688-2835
DMAC@noaa.gov

DART Template Issues

Background Slide

- Rigidly follows the DART II Format
  - All examples are DART II; no generic examples
  - Uses DART II-specific message types: Standard Mode, Random Event, and Hourly Event
  - Uses older DART II format from 2007 which was changed in 2010 and not documented (added manual trigger messages)
- The system table does not include MSM, Sonardyne, DART Near-field (4^{th} Gen)
- Includes parameters not necessary for tsunami detection like battery voltage & # attempts to communicate
- Does not identify type of tsunami detection algorithm
- DART Near-field (4^{th} Gen) has changes to the DART-specific format