ARGOS REAL-TIME ANTENNA UPGRADE PROJECT

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TODAY’S PRESENTATION

• WHY UPGRADE THE CURRENT NETWORK?

• THE UPGRADE OBJECTIVE & APPROACH

• PLAN/SCHEDULE

• IMPACT TO DBCP
TODAY’S NETWORK – 60 STATIONS

SOUNDS LIKE A LOT – WHY UPGRADE IT?

• NON-UNIFORM & LIMITED MIX OF SATS THAT ARE RECEIVED – METOP/SARAL ARE NEEDED
• LOCATION/OPERATORS ARE NOT OPTIMUM
• DAYS IN OPERATION ARE NOT CONSISTENT
• % OF DATASETS RECEIVED vs. EXPECTED IS LOW
• DATA DELIVERY TIMES ARE VARIABLE AND NOT RELIABLE

“CREATE THE NETWORK WE NEED NOT JUST USE WHAT MIGHT BE AVAILABLE”
OBJECTIVE

IMPLEMENT AN OPTIMIZED AND RELIABLE GLOBAL NETWORK OF REAL-TIME ANTENNAS WHICH MINIMIZES THE DELIVERY TIME OF ARGOS PTT/PMT DATA
UPGRADE APPROACH

• UPGRADE A SUBSET OF EXISTING L-BAND ANTENNAS TO RECEIVE DATA FROM ALL SATELLITES CARRYING ARGOS (NOAA, METOP, SARAL)

• INSTALL NEW ANTENNAS AND/OR CONNECT TO OTHERS WHERE NEEDED

• CONDUCT SYSTEM STUDIES TO DEFINE CANDIDATE ANTENNAS – BUDGET LIMITED TO ~ 20
WHAT WAS CONSIDERED:

• LOCATION/AVAILABILITY OF EXISTING STATIONS

• EXISTING SATELLITES (6) + SARAL & METOP-B

• APPLICATIONS WITH SENSITIVE DATA DELIVERY TIMES

• GEOGRAPHIC DISTRIBUTION OF MAIN APPLICATIONS & AREAS REQUIRING PRIORITY COVERAGE

• EXISTING STATIONS WHICH QUALIFY FOR UPGRADING TO ADEQUATE DISH SIZE TO ENSURE LINK BUDGETS

• NEW SARAL REAL-TIME STRATEGY (last 100 minutes)
ANTENNA SELECTION

• REFINING ANTENNA CHOICES BY ANALYZING DELIVERY TIME PERFORMANCE OF UPGRADE SCENARIOS WITH CLS DEVELOPED SIMULATION TOOL

• TOOL CALCULATES THE AVERAGE TIME FOR A PLATFORM TO DELIVER ITS DATA AS A FUNCTION OF:
  – THE ARGOS SATELLITE CONSTELLATION (real parameters, simulated SARAL)
  – THE REAL ANTENNAS OF THE NETWORK AND THEIR CHARACTERISTICS

• RESULTS DISPLAYED ON A 5° X 5° GRID
ARGOS AVERAGE REVISIT TIME
CURRENT 6 SATELLITE CONSTELLATION
A 6-satellites as exists today or a potential 8-satellites constellation (2012-2015 period) insure optimized revisit time around 1 hour for equatorial latitudes and around 30 min above 60° of latitude.

The target limit of 2h of data disposal time to users is almost covered for all applications (~95% with the 6-satellites constellation today, ~100% with the potential 8-satellites constellation for the 2012-2015 period). Furthermore, the HRPT stations upgrade plan, currently in progress, would significantly improve the amount of Argos data made available to users within 1h (goal of ~50%)
UPGRADE SCHEDULE

• UPGRADE 3 CLS STATIONS:
  [LIMA, HATOYAMA, LANNION]  Completed

• UPGRADE 9 ‘NON-CLS’ EXISTING STATIONS:
  [REUNION, MONTERY, MIAMI, BALI]  End of 2011
  [RESOLUTE BAY, OMAN, ATHENS, LAS PALMAS, PAPEETE]  End of 2012

• PROCURE AND INSTALL 2 NEW STATIONS:
  [CAPETOWN]  Late 2011
  [ASCENSION ISLAND]  During 2012

• UPGRADE 3 EXISTING AUSTRALIAN STATIONS:
  [DAVIS, CAPE FERGUSON, WELLINGTON]  During 2012

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SEPTEMBER 26, 2011
SELECTED ANTENNAS

YELLOW - CLS STATIONS (3)
RED - New Antennas (2)
ORANGE - Upgraded by BOM/ES&S (3)
WHITE - Existing Stations (9)

1 Spare
MARCH 2011

- ADDING OMAN STATION
- IMPROVING HYDERABAD AND REUNION STATION PERFORMANCE
- INCREASED METOP-A HRPT COVERAGE (more stations + descending and ascending orbits)
JUNE 2011

- 3 UPGRADED CLS STATIONS
- 2 ANTARCTIC STATIONS: MCMURDO & HALLEY
REDUCTION IN MEAN DISPOSAL TIME BETWEEN MARCH 2011 AND JUNE 2011
END 2012

- UPGRADE PROJECT COMPLETED
- 2 SATELLITES ADDED: METOP B & SARAL
THE SOUTHWEST PACIFIC
EXCEPTED DATA TIMELINESS BEFORE INSTALLING AN EASTER ISLAND ANTENNA

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EXPECTED DATA TIMELINESS AFTER INSTALLING EASTER ISLAND ANTENNA
BEFORE EASTER ISLAND ANTENNA

AFTER EASTER ISLAND ANTENNA

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