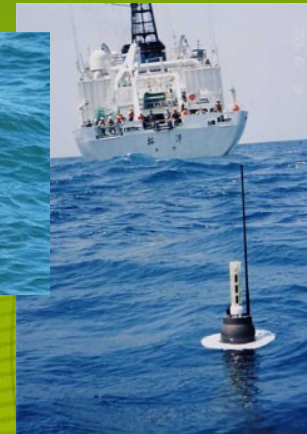
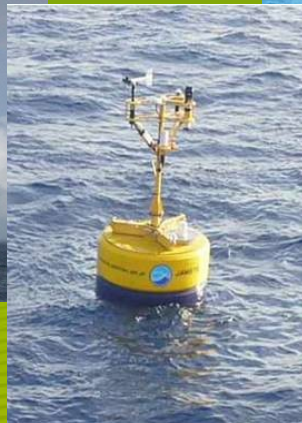


# Implementing Argos-3 in Ocean Platforms

by Yann Bernard



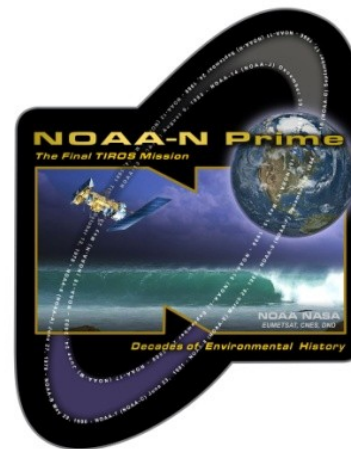


# Argos system status



## Current constellation:

- 4 Argos-2
- 2 Argos-3



## Next satellites :

- 3 Argos-3: 2010, 2011 and 2014
- Argos-4 in development



***Argos program lifetime is expected until 2030 !***

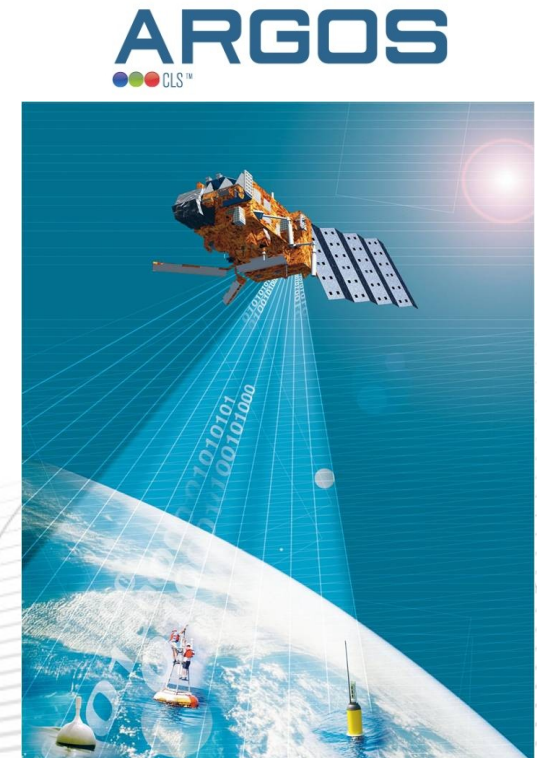


# What's new with Argos-3



## With Argos-3 we can:

- ✓ Send More data
- ✓ Improve transmission efficiency
- ✓ Send Commands to Platforms







# Enhancement Targets for floats



## ✓ Send more data:

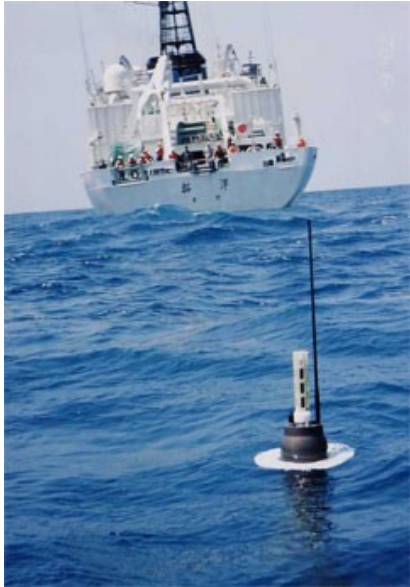
- Interactive data collection
- **High Data rate link (0.5 Kbytes/msg)**

**LR (400 bps) : 100 levels T,S,P in 1 satellite pass**

**HR (4800 bps) : 1000 levels T,S,P in 1 satellite pass**



# Enhancement Targets for floats



## ✓ Reduce Surface Time :

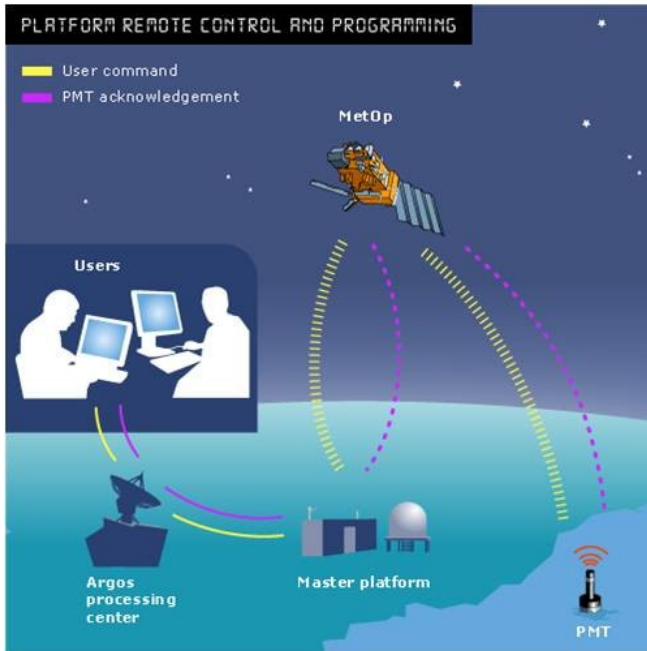
- Possibility to Rendez-vous with satellite
- Better transmission efficiency
- Faster data transfer

→ Limit drift and fouling

→ Power saving = increase float lifetime



# Enhancement Targets for floats



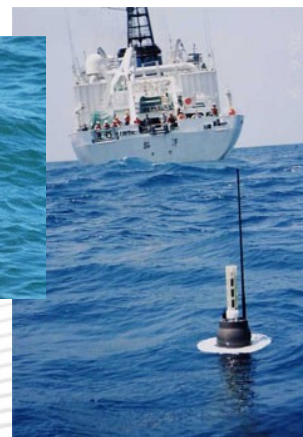
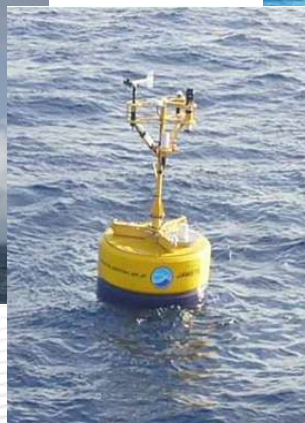
## ✓ Remote management:

- Two-way communication
- Send commands to your float from your desktop
- **Get command reception ack**

→ Tuning float mission

→ Adapting transmission strategy / power

# Argos-3 pilot operations





# Argos-3 on Drifters



## DBCP Pilot Program :

- 50 SVPB Argos-3 buoy deployment in 2009
- 5 Main Buoy Manufacturers Involved
- Use LR interactive session on Argos-3
- Use LR pseudo ack mode on Argos-2

## First results :

- Transmissions are reduced by 75% = **Power savings** → **Greater lifetime & smaller power pack** (drifter/shipment prices are also reduced)
- **Regular samplings** (no data lost)
- **Remote management** : sensor sampling rate, ...



# Argos-3 on Drifters



## CO2 Buoy Project :

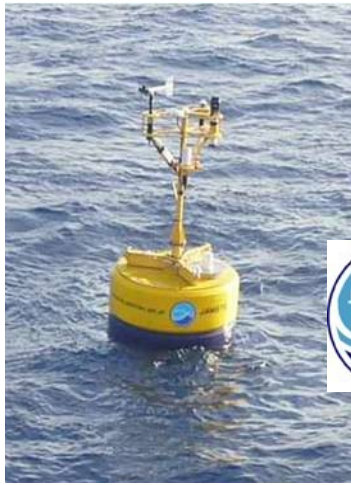
- Integration of Argos-3 modem in CO2 buoys
- Will use transmission management & commands
- Hundreds of Units expected
- 1<sup>st</sup> deployments end 2009



## Goals :

- Remote management of sampling
- Reduce the transmission time = extending lifetime

# Argos-3 on Moored Buoys



## TRITON Buoys

- Use only Argos-3 High Data Rate channel
- 1<sup>st</sup> unit deployed on March 09 in Indian Ocean
- Acquires one dataset of 192 bytes each 10 min



## First results :

- Send **48** High Rate messages (0.576 Kb length) per day
- For the moment, **no data lost** (each dataset are received)
- **27.6 Kb** of good data are sent per day (*15.6 times more than with Argos-2*)
- Transmission power consumption Argos-3/Argos-2 = **1:6 / 1**

# Argo floats



OPTIMARE 

## NEMO floats

- Optimare has already integrated the Argos-3 modem in NEMO floats
- Use like an Argos-2 transmitter for the moment



**Next step** : Implementation of Argos-3 capabilities



# Argo floats



## ARVOR floats

- Ifremer with NKE have implemented a dual band (401 and 466 MHz) Argos 3 antenna.
- Ifremer is currently working on Argos-3 transmission strategies

## Goal : Stay less than 45 minutes on the surface

- Program the arrival time at surface
- Transmit a full Argo profile (T,S,P) in one Argos-3 pass (15 min)
- Compute a good Doppler Argos location (class 3 or 2)
- Receive system broadcasts and user commands

# Argo floats



TELEDYNE  
WEBB RESEARCH  
A Teledyne Technologies Company

## APEX floats

- Webb Apex antenna is Argos-3 dual band compatible.
- University of Washington is working on Argos-3 implementation in Apex floats.

## SOLO floats

- SCRIPPS willing to implement the Argos-3 HD solution in SOLO-2 floats.

SCRIPPS INSTITUTION OF  
OCEANOGRAPHY  
GLOBAL DISCOVERIES FOR TOMORROW'S WORLD





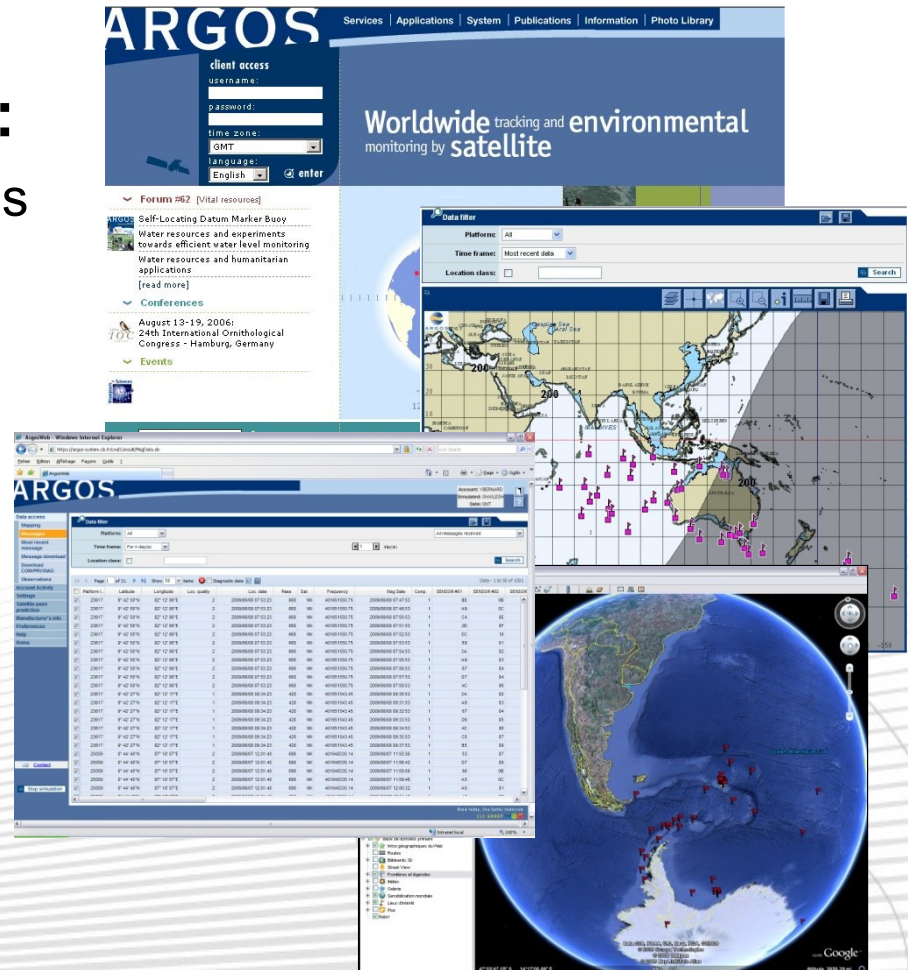
✓ **Argos-3 team**



✓ **ArgosWeb, a single web to :**

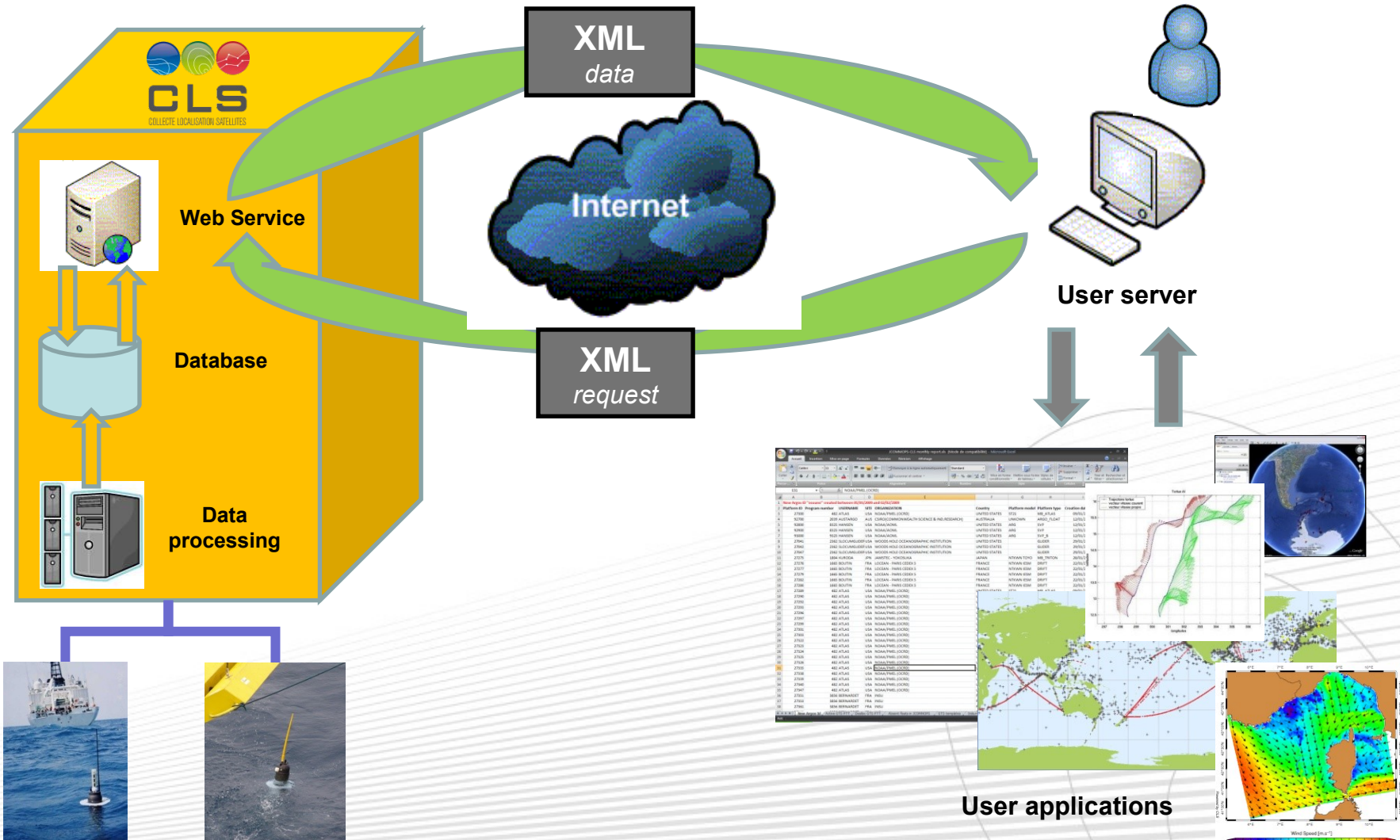
- Send commands to the platforms
- View/download messages
- Consult expert data (diagnostic data, observations,...)

✓ **Manufacturer web pages** including documents, FAQ, news, Guidelines, System performance etc...





# Future: Argos Web Service





## **MAIN ADVANTAGES :**

- A performing Argos distribution for operational center (DACs, ...)
- Flexible data format (with new all parameters: diagnostic, raw, sensors, ...)
- Limitation on request period will be extended
- XML format will be in agreement with OGC standard (Open Geospatial Consortium)

# CONCLUSION



- ✓ **Argos = Sustainable & reliable**
- ✓ **Larger data volume transfer in shorter time**
- ✓ **Better transmission efficiency = power savings, increasing lifetime of platforms**
- ✓ **Improvements will continue with Argos-4...**





**Thank you for your attention !**

