



CLS Argo Data Management Report 2010

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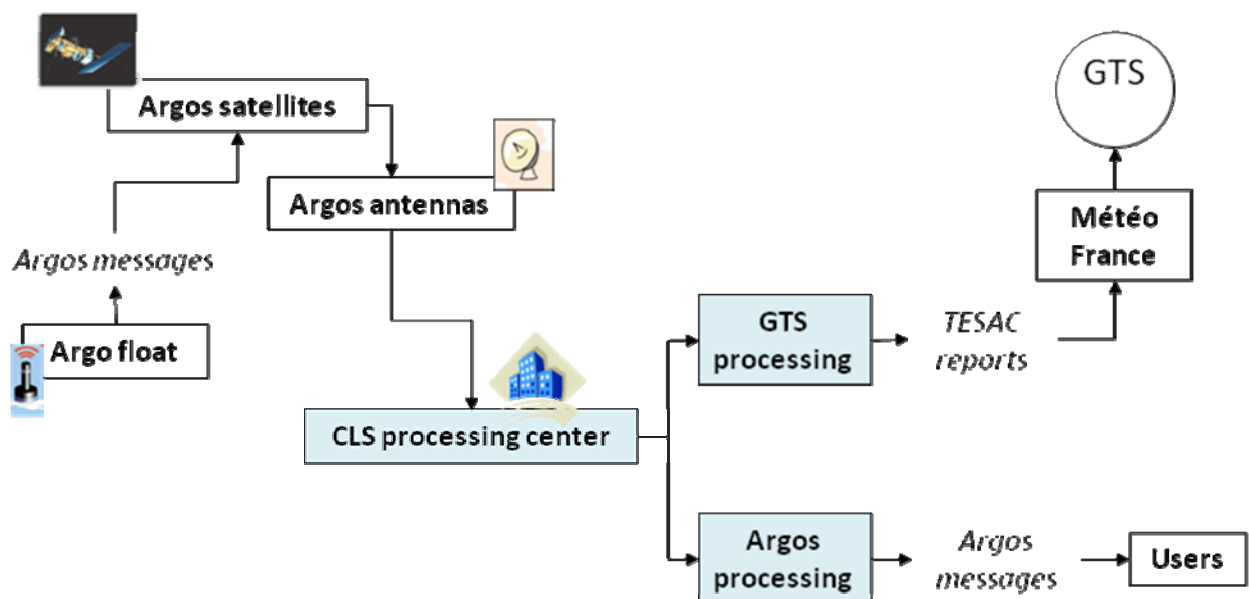
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1. CONTEXT

The CLS Company, responsible for Argos system, has a DAC (Data Assembly Center) function for Argo programs which do not have real time processing capabilities. This operational (24h/24h on 365 days/year) data processing is a free added value Argos service. Argo data are processed by CLS for GTS distribution both in CLS France and CLS America Incorporation.

In September 2010, CLS America and AOML processed 1612 U.S. Argos floats and 74 Iridium floats from University of Washington. CLS America converts the Argos/Iridium raw data into a “phy” format (defined by NOAA/AOML) and inserts these files in real-time into the Argo server in CLS America computing center. That server is “operated” by AOML and “hosted” by CLS America. The approved Argo QC is performed on the server and then GTS bulletins are created and sent via ftp to the NWS (National Weather Service) gateway for dissemination onto the GTS. The details of U.S. floats monitoring are presented in the Argo National Data Management Report of United States provided by AOML.

In September 2010 CLS processed in real-time 122 floats for GTS distribution with the GTS-Argos subsystem. Data for these floats are sent via ftp to Meteo-France (Toulouse) in TESAC and BUFR bulletins and then Meteo-France put them on the GTS (Global Telecommunication System). The synoptic below summarizes the Argo data flow since their transmission by the float until their dissemination on the GTS.



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2. STATUS OF THE CLS DAC IN SEPTEMBER 2010

- **Data acquired from floats :**
 - o 171 floats were declared in the CLS GTS database
 - o 122 instruments were active in this month
 - o 122 floats disseminated data profiles on GTS
 - o 30 floats are inactive (no more transmission) or grey listed (failing status)
 - o 19 floats are not yet deployed
 - o 364 profiles from CLS were sent on GTS in September 2010

- **Description of the 171 floats :** CLS processed in real time floats for Argo program which are not hosted by a national DAC:
 - o 78 INCOIS floats (India)
 - o 53 SOA floats (China)
 - o 40 KORDI floats (Korea)

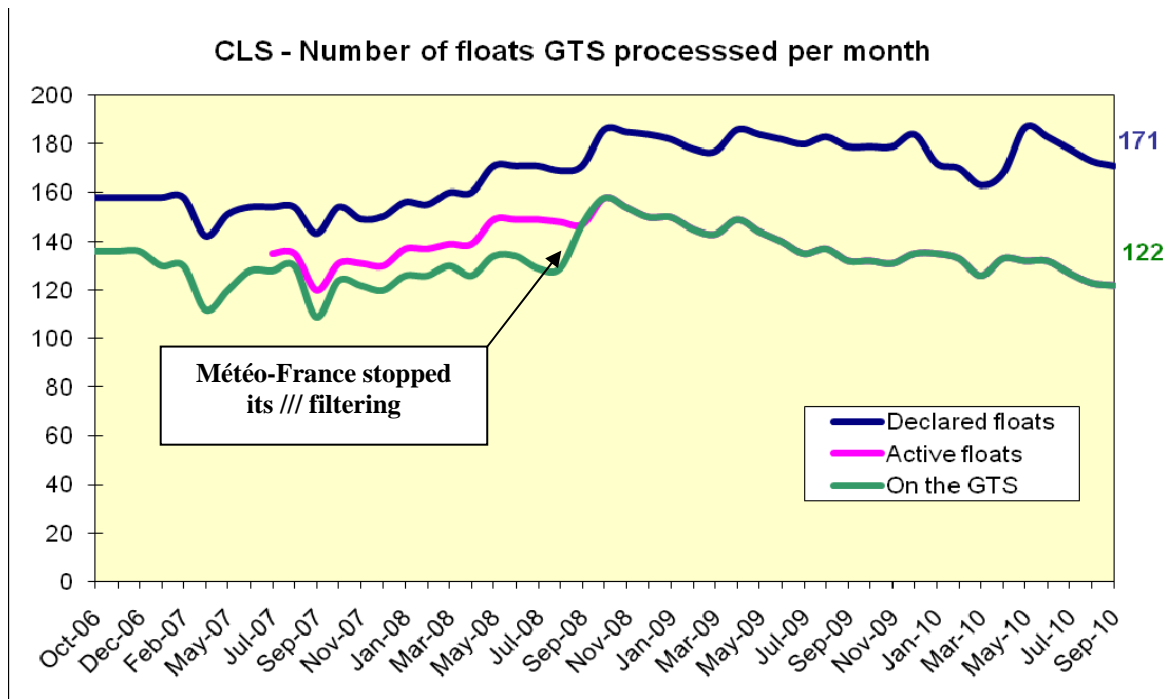
All these floats are Webb Apex floats with 15 different Argos data formats.

- **Data issued to GTS:** All data processed by CLS are distributed on the GTS by way of Météo-France. This operation is automatically performed and TESAC bulletins are sent to Météo-France every 2 minutes. Before the encoding in TESAC bulletins, Argo data are filtered by Argo QC procedure. The GTS processing at CLS is operational and in backup with the CLS America processing center in Largo, Washington DC, 7/7 24/24.
 - o 5325 profiles were relayed onto GTS between September 2009 and September 2010 (source: Météo-France)
 - o 100% of TESAC produced by CLS are on the GTS (no more filtering by Météo-France)

- **Argo Real Time processing monitoring:** All different data formats are referenced and each format has a dedicated template (processing model) in the CLS GTS database. Each month, a monitoring is made for Argo floats present in the CLS GTS database:
 - o Argos transmissions in the last month are checked for all floats,
 - o GTS disseminations in the last month are checked for all floats,

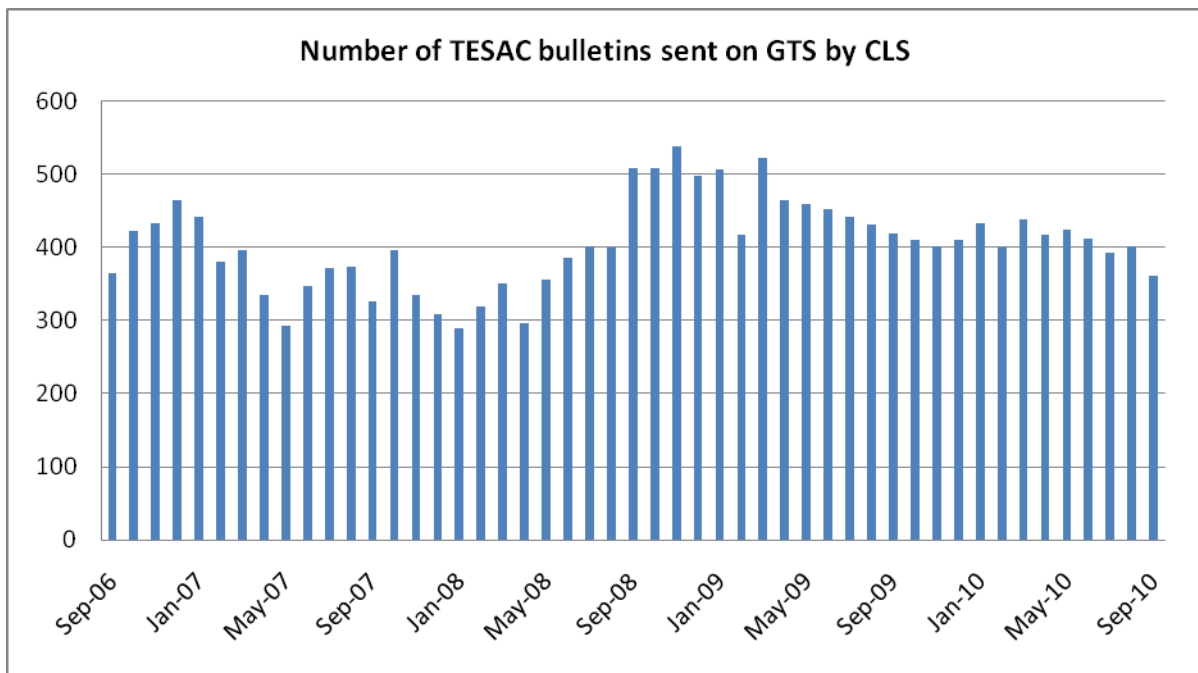
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- New floats to be set up for GTS are implemented in CLS GTS data base at each beginning of month with a list (table 10: “Floats to be set up for GTS”) provided by JCOMMOPS (M. Belbeoch) in the Argo Information Centre Monthly Report.
- Active floats to be grey listed are removed from the CLS GTS database at each beginning of month with a list (table 15: “Active floats Grey list”) provided by JCOMMOPS (M. Belbeoch) in the Argo Information Centre Monthly Report.



Status of CLS Argo GTS processing

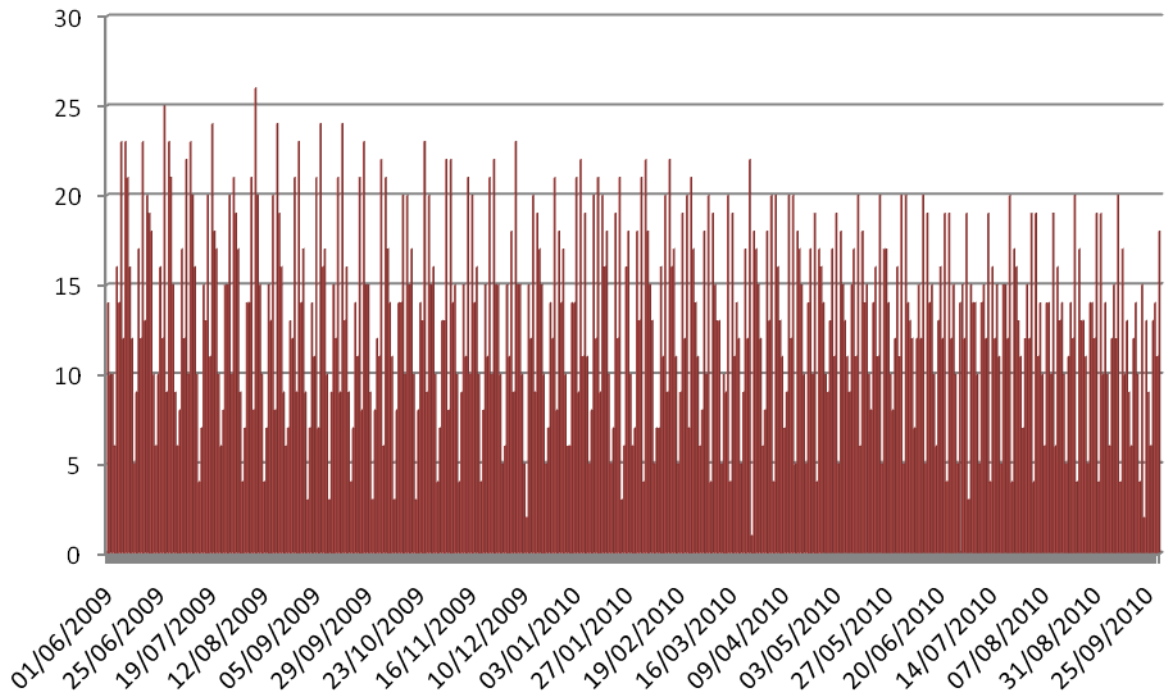
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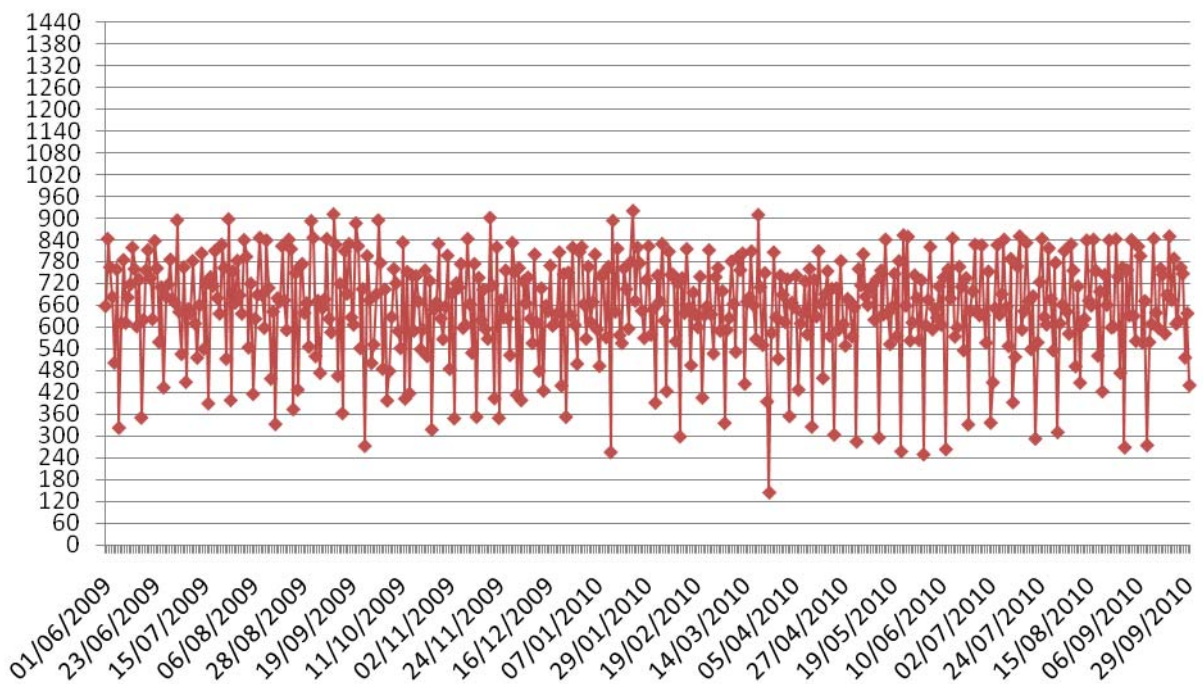
Number of profiles sent on the GTS by CLS per month

- **Web pages:** All GTS observations (profiles for Argo) are available on <https://argos-system.cls.fr/cwi/Logon.do>. It consists of a user access to his observation data.
- **BUFR format:** BUFR bulletins are produced in addition of TESAC bulletins for all floats GTS processed by CLS with only one header: IOPX92 LFVW.
- **Time of delivery on GTS:** A monitoring delay tool, specified with JCOMMOPS is operational since September 2008 at CLS. The average time of TESAC delivery on GTS is less than 6 hours. This time is computed with date/time of observation and the date/time of bulletin sending to Météo France. It depends of the float model and especially of the number of different Argos messages necessary to build the profile (= number of points in the profile). See below statistics on last three months.

Number of Argo floats processed per day



Daily average TESAC delivery time (in min) on GTS



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3. NEW PROJECTS AT CLS FOR ARGO PROGRAM

- **Argos Web Service:** all Argos data, including diagnostics data, are now available via a web service. This new service allows all Argo programs to get their data from the CLS database, via an XML request, in CSV format, XML format and soon in KML format (Google Earth format).

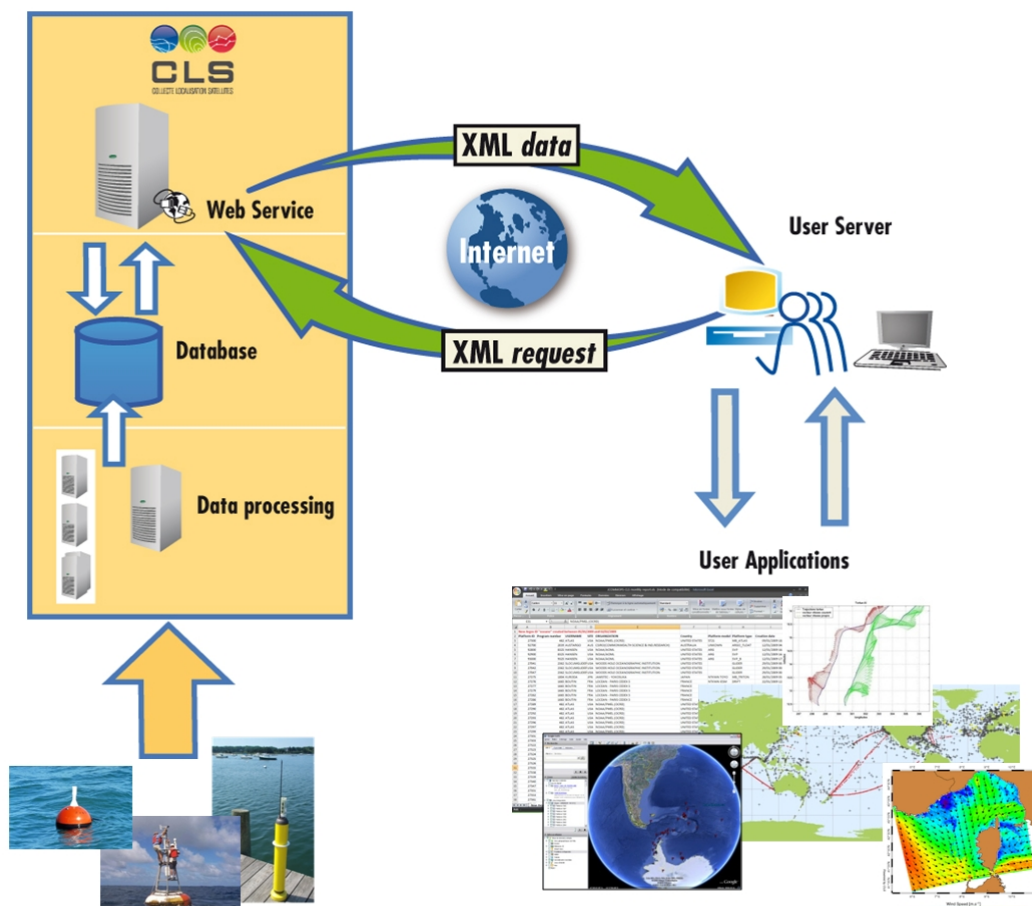
This Machine to Machine distribution data tool is free and specifications can be asked to ybernard@cls.fr.

The protocol used to communicate between the Argos processing center and the user is based on SOAP (Simple Object Access Protocol) over HTTP. The SOAP protocol allows exchanging data in XML format. This is an RPC (remote access protocol) object oriented in XML. The SOAP protocol can be used over HTTP, HTTPS, SMTP ...

The web services defined hereunder are available upon following URLs:

<http://ws-argos.cls.fr/argosDws/services>

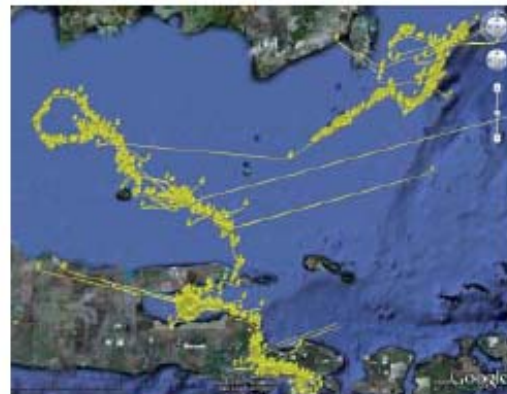
<http://ws-argos.clsamerica.com/argosDws/services>



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- **New Argos location algorithm:** a new processing system for Argos positioning will be available at the end of 2010 for all Argos platforms, included Argo floats. It will reduce positioning errors, eliminate mirror locations and provide systematic information about the precision obtained.

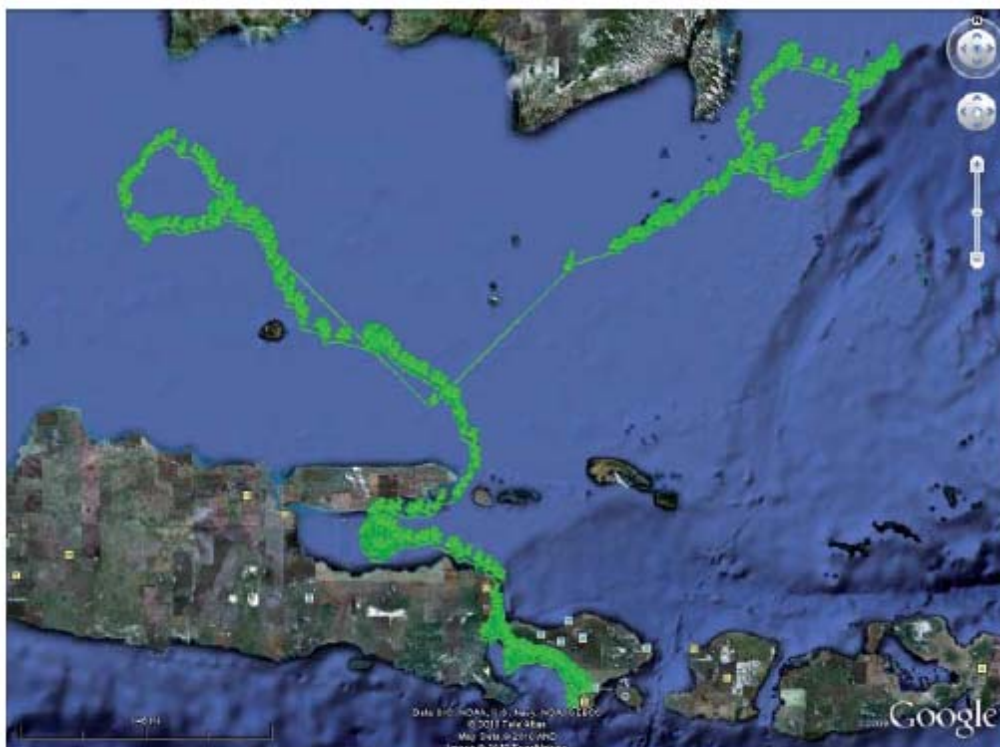
With the current processing system, positions are calculated by a traditional 'least squares' estimation method. In the new system, positions are estimated by applying Kalman filtering to the Doppler measurements. Using this filter requires choosing a movement model for the beacon being tracked. A simple random walk is sufficient to obtain significantly improved positioning.



ARGOS trajectory before switching to the new processing system.

In order to validate precisely this new method, CLS has chosen a representative sample of Argos platforms, included Argo floats in nominal cases

but also in extreme situation as beached floats or iced over floats. The results of validation will be presented to the Argo community and the trajectory working group.



ARGOS positions calculated using the new ARGOS processing system. The mirror locations have disappeared.

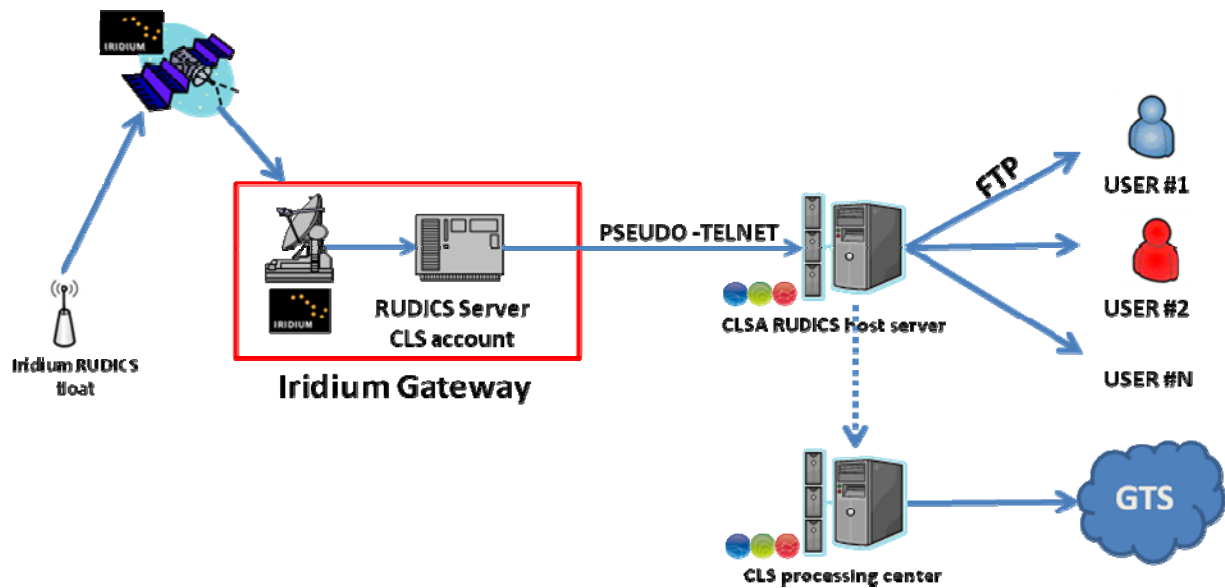
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- **Iridium data services:** In 2010 CLS started to provide Iridium data (Short Burst and Dial Up Data). Thanks to a VAR (Value Added Reseller) agreement with Iridium, CLS is an Iridium data provider for Argo. It's already the case for several Argo programs as Second Institute of Oceanography (China) Med Argo and Argo Norway.

Thanks to an IP connection with the Gateway, CLS and CLS America receive Iridium raw data from floats, then process and distribute them to the Argo users by email, FTP or Web service. The service is fully operational 7/7 24/24. If needed, GTS real-time processing (TESAC and BUFR bulletins) can be done by CLS. For all further information, please contact ybernard@cls.fr.

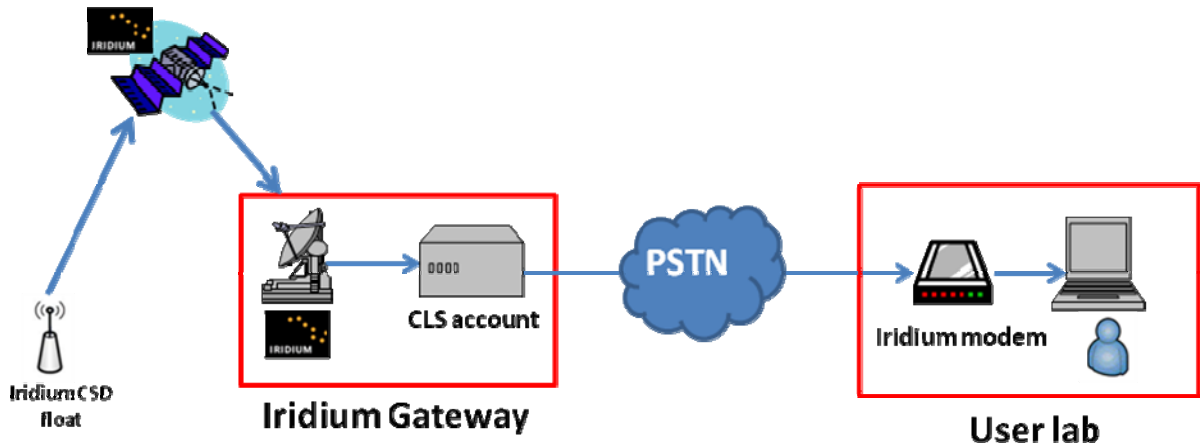
Synoptic below summarize the Argo data flow since their transmission by floats via the Iridium system until their distribution to the users for the 3 communication protocols used by Argo floats.

Iridium RUDICS float:



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Iridium Circuit Switched float:



Iridium SBD float:

