INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (OF UNESCO)

WORLD METEOROLOGICAL ORGANIZATION

ARGOS JOINT TARIFF AGREEMENT

THIRTY-THIRD MEETING

Paris, France, 30 September – 2 October 2013

JTA-33 record of decisions

Revision 1

(group picture)

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RECORD OF DECISIONS

NOTES

WMO DISCLAIMER

Regulation 42

Recommendations of working groups shall have no status within the Organization until they have been approved by the responsible constituent body. In the case of joint working groups, the recommendations must be concurred with by the presidents of the constituent bodies concerned before being submitted to the designated constituent body.

Regulation 43

In the case of a recommendation made by a working group between sessions of the responsible constituent body, either in a session of a working group or by correspondence, the president of the body may, as an exceptional measure, approve the recommendation on behalf of the constituent body when the matter is, in his opinion, urgent, and does not appear to imply new obligations for Members. He may then submit this recommendation for adoption by the Executive Council or to the President of the Organization for action in accordance with Regulation 9(5).

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C O N T E N T S

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RECORD OF DECISIONS

1. INTRODUCTION

1.1 The Argos Joint Tariff Agreement (JTA) scheme has served as a robust example of international cooperation for more than 30 years. It continues to provide an effective, pragmatic, self-governing global forum through which users' needs are presented, reviewed, and carried forward in a constructive dialogue with the Argos agent. As such, it may serve as a model for similar arrangements that may in due course be established with other service providers.

1.2 As in previous years, the report of the JTA-33 Session covers the following topics[1]:

- Introduction;
- Actions and decisions of past meetings with review status;
- Action sheet of this Meeting, with records of necessary information and decisions;
- Records of formalities, including elections and decisions for the next Meeting;
- Annexes containing all necessary supplementary information.

1.3 Mr Frank Grooters, the Chairperson of the Argos JTA, led the Meeting. Many participants subsequently assisted Mr Grooters and the secretariat in the production of this report.

1.4 The Executive Secretary of IOC of UNESCO, Dr Wendy Watson Wright, welcomed the participants, and wished for a successful meeting. She recalled the importance of satellite data telecommunication for the collection of data from ocean observing platforms. She recalled the long-standing collaboration between WMO and IOC in this regard, particularly with regard to the Argos system. The collaborations between governments and research institutes, which have made this possible, have for years been facilitated and encouraged in the Argos community by the CLS through the mechanisms put in place at the JTA meetings. She also explained that the expansion of this technology through animal tagging and tracking is very exciting.

1.5 The WMO Secretariat Representative welcomed the participants, and recalled that the Argos system is operated on a cost-recovery basis by CLS under a Memorandum of Understanding between some governmental agencies (CNES[2], NOAA[3], EUMETSAT[4], and ISRO[5]) sponsoring the Argos System. Tariff negotiations for scientific governmental programme are conducted between Members/Member States through the JTA and under the WMO and IOC umbrella.

1.6 The list of participants and the agenda are reproduced as ***Annex I*** and ***Annex II*** of this report. 24 participants, including 11 Representatives of Country (ROCs) and Responsible Organizations (ROs), attended the Meeting.

2. REPORT OF THE CHAIRPERSON OF THE JTA

2.1 The Chairperson of the JTA, Mr Frank Grooters, presented a report on his activities in support of the participants in the JTA since the previous Meeting (JTA-32, Fremantle, Australia, 8-10 October 2012).

2.2 The meeting agreed that the JTA EC would again review the Operating Principles and, if applicable, would propose changes and modifications as deemed needed, for discussion by the members during JTA-33.

1 The format of the report was decided at the 28th Meeting (2008) and noted in the JTA Operating Principles. As in the case of previous meetings, the report will be available online via the JCOMM website.
2 Centre National d'Etudes Spatiales, France
3 National Oceanic and Atmospheric Administration, USA
4 European Organisation for the Exploitation of Meteorological Satellite
5 Indian Space Research Organisation

2.3 After briefly summarizing the outcome of the previous JTA Session (JTA-32), Mr Grooters reported that the JTA EC met immediately after JTA-32 on 9 October 2012 for a seventh meeting (JTA EC-7) to review the session and to decide on necessary actions to be made in relation to the decisions and agreements reached at JTA-32. The report of JTA EC-7 is given in ***Annex III***. At JTA EC-7 it was agreed that the EC should meet again in the first half of 2013.

2.4 As agreed at JTA EC-7, the Executive Committee met for its eighth meeting (JTA-EC-8) from 16 to 18 April 2013 in Annapolis, Maryland, USA at the kind invitation of NOAA. At this meeting the EC reviewed the Action Items from JTA-32, remaining issues from JTA-EC6 and JTA-EC7, the Operating Principles, the use of the JTA funds, the management of the ARGOS ID numbers, the 5-Year Plan, the status of the WMO Plan on an International Forum of Satellite Data Communication Users, the evaluation of the drifter programme, the progress in the Real Time Antenna Optimization Project, the agenda and document plan for JTA-33 and other JTA issues. The EC agreed on additional action items for the EC and provided guidance to the Chairperson regarding issues to be reported at the forty-seventh meeting of the Argos Operations Committee (OPSCOM-47, 21-23 May 2013, Easton, USA). The report of the Eighth Meeting of the JTA EC is provided in ***Annex IV***. An updated list of ROCs is available in ***Annex XIII***.

2.5 The Chairperson attended OPSCOM-47, hosted by NOAA, where he presented the main results of JTA-32 with regard to OPSCOM interest, including the status of the 5-Year Plan (2010-2014). OPSCOM-47 expressed its concern regarding the technological issues on the drifting buoy program. OPSCOM-47 expressed interest in the next steps regarding the establishment of the Forum of Users of Satellite Data Communication Systems and noted that an *ad hoc* International Forum of Users of Satellite Data Telecommunication Systems was organized on 3-4 October 2013 at IOC of UNESCO Headquarters. OPSCOM-47 requested the JTA Chairman to represent the JTA and OPSCOM interests as discussed and proposed at OPSCOM-46. The report as presented by the Chairperson to OPSCOM is given in ***Annex V***.

2.6 The Chairperson also reported on the results of his visit to CLS in Toulouse in early September 2013 to discuss the CLS input to JTA-33, the status of the Five-Year Plan 2010-2014, a first draft of the next Five-Year Plan 2015-2019 and other CLS issues in support to the JTA.

3. REVIEW OF THE ACTION ITEMS FROM JTA-32

3.1 The meeting reviewed the action items from past JTA Sessions, as well as those pending actions items from the eighth meeting of the JTA-EC (JTA-EC-8).

3.2 While reviewing the action items, the meeting decided on the following actions:

- The meeting requested the DBCP to provide the JTA with the expected report on the outcome and findings of the Argos 3 Pilot Project (***action; DBCP Chair; JTA-34***); and
- The meeting invited the user community to take steps to possibly increase their Argos usage (***action; Argos users; JTA-34***).

3.3 Updated status of actions from these Meetings, along with those arising at JTA-33, are listed and described in ***Annex VI***.

4. REVIEW OF THE 2013 GLOBAL AGREEMENT

4.1 CLS presented a report on activity within the 2013 Global Agreement. The full report, given in ***Annex VII***, is summarised below:

OVERALL USAGE TRENDS

4.2 The total number of active PTTs and PTT-years show a slight decrease over the last 3 years, including the last 12 months. The decrease of the consumption over the last 3 years is mainly due to reduced buoy deployments. Although there is a continuing increase, in Wildlife number of PTTs deployed and corresponding consumption, it has not been sufficient to compensate for the total reduction of PTT-years.

4.3 The JTA noted that the core of the Argos system activity is now with the animal tracking community.

4.4 The JTA noted with appreciation that the higher than normal failure rate of the drifting buoys operated under the Global Drifter Program (GDP) is being addressed by the Data Buoy Cooperation Panel (DBCP), that the causes of the failures have now been identified, that the manufacturers have taken steps to correct the problems for newly deployed units, and that it is expected to see the total number of reporting drifting buoys now increasing and resume to normal level.

4.5 Overall, the active PTTs and thus the number of transmitters in the field are stable. The following was noted in terms of actual PTT-Year consumption among categories:

- Consumption of “Animals” continue to progress and almost match those of “Buoys & others” category which started dropping in 2010. This year the animal consumption increase is expected to be 2.2%.
- “Floats” consumption is decreasing by 20 PTT-years (9%) compared to 2012
- “Fixed Stations” consumption in PTT-years remains stable.

TIME SLOTS and 12 DAY CAPPING

4.6 Further to JTA-27 decision the consumptions for animal platforms are capped at 12 day-units (48 time slots). These features of the tariff have been used extensively by users in order to decrease Argos costs, as recommended during JTA-27 to JTA-29.

4.7 All “Animals” and “Sub Floats” categories are significantly benefiting from the time slots. As an average “Animals” PTT are transmitting 41% of the day, Moored Buoys are transmitting 80% and “Sub Floats” PTT are transmitting 51% of the day. Other categories of platforms keep transmitting 94% of the day.

4.8 In 2012, 757 PTTs (average active PTT per month) took advantage of the capping, representing 192 PTT-years. The number of animals taking advantage of the capping is remaining stable: 757 in 2012, compared to 777 in 2011.

4.9 For 2013 the capping represents a projected impact of 172 PTT-years.

INACTIVE STATUS[6]

4.10 As stated in the Terms and Conditions of the Global Agreement, this status is intended for those platforms that continue to transmit but for which the location or data collection are of no further use to the user or the community. The following conditions must be met to qualify:

(*1*) *Inactive Status will apply if, and only if, Inactive Status is declared by the signatory of the System Use Agreement for platforms, which continue to transmit beyond the programme termination. In that case, further charges will no longer be levied.*

6 Recall: since year 2004, transmissions from Inactive IDs are no longer charged.

(2) The platforms must have operated in Basic Service for a minimum of 2 months.

(3) Data or location information cannot be retrieved nor can the platform revert to any category of service.

(4) It is intended that Location and/or data collection may not be computed using a Local User Terminal or other direct readout facility.

(5) ID numbers of such platforms are actually returned to CLS who will recycle them after the platform stops transmitting.

4.11 While the number of Inactive PTTs greatly increased in 2011, the JTA noted that in 2012 the number of IDs in Inactive Status remained stable compared to 2011: 417 PTTs are counted every month (compared to 390 in 2011) representing 109.14 PTT-year.

4.12 As discussed at previous JTA Sessions, these PTTs, which are unused but are still transmitting are increasing the system occupancy. The JTA noted that CLS keeps highlighting this to the users and manufacturers encouraging them to program their PTTs only for the duration of the experiment.

4.13 The JTA urged again users and manufacturers to consider this issue when programming their PTTs.

4.14 The meeting noted that GSM technology can in some cases compete with the Argos system for animal tracking purposes, but is lacking the global coverage capability of Argos, which is crucial for a large number of such programmes.

5. REPORT ON THE DEVELOPMENT AND OPERATIONS OF CLS

ARGOS OPERATIONS AND SYSTEM IMPROVEMENTS

5.1 Mr Bill Woodward (CLS America) presented reports on Argos operations and system improvements during 2012-2013. The JTA recalled that Argos is a global satellite-based location and data collection system dedicated to studying and protecting our planet's environment. CLS, as a unique operator of the Argos system on behalf of NOAA, CNES, EUMETSAT and ISRO, continues to maintain and improve a high operational service for all Argos users, especially for the meteorological and oceanographic community.

5.2 Operations highlights from the last 12 months include:

- The French Argos processing centre successfully moved to the new CLS building on October 20th, 2012;
- Following almost 11 years of service NOAA-17 (NOAA-M prior to launch) was decommissioned on April 10, 2013;
- Collection and Localization Processing/Distribution is operational for METOP-B and SARAL since April 29, 2013;
- 2 days of service interruption on the Argos US processing centre due to violent storms in the Washington D.C. area (July 2012);
- 5 hours of distribution service interruption (Web/Telnet/Web services) on the Argos French processing centre due to air conditioning problems;
- Set-up of an Argos-3 platforms activity monthly report for JCOMMOPS;
- VGTS tool (GTS processing statistics tool) upgrade to be BUFR format compatible; and
- Development of a new tool to improve the real-time monitoring of the Argos HRPT antennae network.

5.3 The meeting noted the following system improvements:

- 2 new satellites operational with Argos payload (METOP-B (MB) launched September 17, 2012, and SARAL (SR) launched February 25, 2013);
- Argos Real-Time Antenna Network Upgrade Project continues;
- The installation of an Argos reference beacon network;
- The upgrade of the Argos ground segment for SARAL;
- The upgrade of the Argos ground segment for ARGOS-4;
- The moving of the Toulouse data centre into new facilities;
- Argos computed trajectories downloadable on ArgosWeb since July, 2013;
- Observations data available via the Argos WebServices since April, 2013;
- Development of a new Argos direction finder (goniometer); and
- New Argos orbitography module to not use OpenVMS anymore.

5.4 The meeting noted the following outlook for ongoing and future developments:

- Continue optimization of Real-Time Antenna Network;
- Online Archive data downloading feature through ArgosWeb (last 12 months available);
- Upgrade of the Oracle database version: Migration to the Oracle 11GR2 version;
- The last 20 days of data available on ArgosWeb instead of 10;
- A new Android application available for all Argos users to consult on Smartphone/pad their Argos platforms positions;
- Development of a low-cost Argos-3/4 chipset development project (SHARC (**S**atellite **H**igh-performance **A**RGOS-3/-4 **R**eceive/transmit **C**ommunication). The JTA noted the substantial benefits to be gained from the new chipset in terms of size, power consumption, and reception/transmission scheme programming flexibility, in particular for the animal tracking community
- Development of a BCH (Bose, Ray-Chaudhuri et Hocquenghem) message coding/decoding to improve Argos message transmission in noisy regions;
- Argos Doppler location algorithmic improvements; and
- Study to improve the Argos orbitography accuracy.

Optimization of Real-Time Antenna Network

5.5 The JTA noted that improvements are still focused on redundancy locations and coverage extension. Today, both Toulouse and Lanham processing centres receive Argos real-time data from approximately 60 stations located all over the world.

5.6 In 2012, CLS was still focused on the Real-Time Antenna Upgrade Project that consists of upgrading selected antennas in order to be compatible with NOAA, METOP and SARAL. This project also aims to optimize in terms of performance the real-time receiving stations network.

5.7 In 2012-2013, the real-time network is quite steady with two new ground stations added (Ali al Salem in Kuwait operated by US Air Force, and Soto Cano in Honduras also operated by US Air Force). These two new stations acquire real-time datasets from all NOAA satellites.

5.8 Today, the real-time Argos ground station network consists of about 65 antennas. If all of them are capable of receiving NOAA POES satellites data, only 19 receives METOP satellites data and, for the moment, 7 out of these 19 receives also SARAL data.

5.9 The meeting noted that it is taking more time than expected to install an antenna on Ascension Island due to technical difficulties and administrative delays. However, the meeting noted that the authorization has now been given, and that another stations will also be installed in Gabon in addition to Ascension Island. Plans are underway to install the station on Ascension Island in medium-term, although it is difficult to indicate a date.

5.10 Regarding the South Pacific area (Easter Island antenna), the meeting noted that discussions have begun with WMO and that WMO is interested in having an operational real-time antenna in Easter island that would be implemented within the framework of the Regional ATOVS Retransmission Service (RARS) project. This station would be dual-band (X and L). The JTA noted that if CNES and CLS together have the capability of funding the antenna, WMO would be ready to collaborate/negotiate regarding the costs of installation, operation and data transmission.

5.11 CLS continues to provide the GTS processing for all DBCP Argos equipped drifters and moored buoys in compliance with WMO and DBCP Task Team on Data Management recommendations. The CLS GTS processing system as well as the quality of the data and the entire Argos system performance is monitored 24/7.

5.12 During 2012, Argos instruments were onboard 6 POES's spacecrafts. During beginning of year 2013, two spacecraft with Argos-3 payload were launched (METOP-B, SARAL) and one with Argos-2 payload was decommissioned (Noaa-17, NM).

5.13 In thanking Mr Woodward for his presentation, the Meeting noted that the full report on 2012-2013 operations, on system improvements and progress in projects is reproduced as ***Annex VIII***.

ID MANAGEMENT

5.14 The meeting recalled that at JTA-30, CLS was requested to create a project specifically dedicated to the recycling of 20-bit ID numbers. The management of ID numbers is an essential part of all communication systems. Applying an unused fee to ID numbers that have not transmitted in 24 months has been the management method of choice in recent years for the JTA.

5.15 At JTA EC-8 (April 2013), CLS presented the results of the recycling campaign which exceed the initial expectations. The EC members thanked CLS for the outcome of the project, and also asked to continue to monitor the situation. Per JTA-EC recommendation, the JTA decided to continue charging the unused ID fee for a further two years, to encourage users to recycle their IDs. The JTA thanked CLS for the good progress in this regard, and encouraged them to continue the efforts.

5.16 The JTA urged once again ROCs to consult the national list of unused IDs on the website and to be proactive in contacting users with regard to ID recovery.

6 REVIEW OF USER REQUIREMENTS AND ISSUES

Requirements of the Data Buoy Cooperation Panel (DBCP)

6.1 The Chair of the Data Buoy Cooperation Panel (DBCP) Mr Al Wallace (Canada) reported on the DBCP Argos user requirements put forward to the JTA. He noted that the 29th Session of the Panel did not have a specific item on user requirements for the JTA and that should be interpreted as a general level of satisfaction. It was noted that Panel members reaffirmed their need for timely reports on the GTS.

6.2 Mr. Wallace thanked the JTA for the opportunity to present the user needs of the buoy community. The DBCP has had a long and productive relationship that has brought many benefits to its members, and looks forward to continuing cooperation. In difficult fiscal times, the Panel appreciates the efforts of JTA to manage costs to keep them stable. Mr. Wallace noted the increasing trend toward the use of Iridium communication for both drifting and moored platforms. The Argos system now accounts for about 75% of satellite telecommunications services, and Iridium the remaining 25%. It is understood that this changing profile may impact the work of JTA. The Chair of DBCP noted with appreciation the efforts made by CLS Argos to address the installation of ground stations, and he encouraged them to proceed with the planned implementations at Ascension Island and Easter Island so that timeliness of observations can be

improved, and data gaps reduced. He also recognized the continued investment in technological development (for example, Argos chip set), and the engagement with drifting buoy manufacturers to optimize power management of data transmitters. On behalf of DBCP, Mr. Wallace acknowledged the value of the integrated solution, including data collection, standards, transmission on the GTS, and provision of quality management, comprehensive reporting, and client engagement provided by CLS Argos. The Panel looks forward to the continuation of this effective working relationship.

6.3 The DBCP noted with some concern the lack of coherence in the provision of similar services from Iridium value added resellers (VAR). It is critically important for the Panel that standards for data collection, timeliness, formats, insertion of GTS, metadata, report generation, and consultation with its Technical Coordinator be established. It is hoped that outcomes of the upcoming SATCOM forum will address these concerns.

6.4 The JTA also noted that CLS worked directly with Pacific Gyre, Scripps and DBi to develop optimal Argos PMT setting configurations for the drifters to maximize their lifetimes. The results were presented at the DBCP-29 Scientific and Technical Workshop (Paris, France, 23 Sept. 2013).

Real-time antenna network

6.5 The JTA noted that performance in terms of data mean disposal time has improved during the last year primarily due to (i) new satellites in the system (MetOp-B & Saral), (ii) more HRPT Stations receiving MetOp-A and B (Miami, Monterey, Hawaï, Lannion, Lima, Cape Town, Hatoyama, La Réunion, EARS Stations,…), and (iii) upgraded HRPT Stations to track Saral Satellite: strong improvements with the TM_100min capability. Indeed SARAL is downloading to compatible HRPT stations all datasets acquired in the last 100 minutes. CLS efforts will continue to improve the coverage of the real-time antennas in the regions where it is needed. The two primary areas of focus are: South Atlantic and South Pacific.

6.6 The meeting discussed the continuing request from the DBCP to explore the possibility of including Easter Island in the southeast Pacific as a candidate upgrade site in the CLS Real-Time Antenna Upgrade Project. See further discussion in this regard under paragraph 5.10.

6.7 Concerning the South Atlantic area, the JTA noted that an agreement between CNES and ESA is in place to study the installation of a new antenna on Ascension Island. This installation is currently targeted for the first quarter of 2014.

Expanding Argos Data on line

6.8 The meeting recalled that JTA-32 had invited CLS to develop the capability of expanding the online access to Argos data. The JTA noted with appreciation that such developments have now been completed with the following options:

- Option 1: extending up to 20 days rolling online (Web service/Argosweb) instead of the current 10 days. This capability will be available early 2014.

- Option 2: giving access to archived data via an Online request tool for 12 months. This capability will be available before the end of2013.

6.9 Regarding the collection of environment data to address the requirements of the Observations and Monitoring Pillar of the Global Framework for Climate Services (GFCS), the JTA noted that issue ought to be discussed at the forthcoming *ad hoc* Satcom Forum meeting (Paris, France, 3-4 October 2013).

7. REVIEW OF THE STRUCTURE OF THE TARIFF AGREEMENT AND RELATED MATTERS

Review of the guiding principles for negotiating the Tariff

7.1 Guiding principles for negotiating the tariffs remain unchanged as planned in the original Five-Year Plan.

Review the Five-Year (5Y) Plan

2012 FINANCIAL SITUATION: CLOSE OF ACOUNTS

7.2 Details of the finalized Argos operating costs for 2012 are given in ***Annex IX***, and are summarised below:

- The Argos basic costs have remained at approximately the same level from 11.96 M€ in 2011 to 12.01 M€ in 2012. The Argos basic costs for science have remained stable whereas the Argos basic costs for fishing have increased, mainly because of a continued interest in Argos from a number of countries to track their fishing vessels. The Argos basic costs for sensitive use have decreased while the activity has stabilized after a significant decrease in 2011.

- In 2012, the costs to be attributed to the JTA are calculated at 6.98 M€ that represents a 1.45% increase while the average active PTTs processed and distributed (or not) remained stable at 12 488 (12071 active PTTs and 417 in Inactive Status) compared to 12 502 in 2011. This small cost increase is mainly due to the transfer of the French Argos processing centre in the new CLS building in Ramonville.

- In 2012, CLS recorded revenues from JTA participating countries at a level of 7.13 M€. This was slightly different from the revenues expected from the JTA at 7.53 M€. This shortage in revenue is explained mainly by the technical issues affecting the global drifter program. So in 2012, the JTA realized a small excess of 0.15 M€ which is going to add to the excess carried forward from the previous year of 2.98 M€ to bring the cumulative balance to 3.13 M€.

2013 JTA PROJECTION TO YEAR END

7.3 The JTA projection for the year 2013 is estimated from figures based on seven months of usage, extrapolated until the end of the year, and is detailed in ***Annex IX***.

7.4 At this point of time, the JTA considered that the JTA in 2013 will likely be able to pay its portion of the cost.

7.5 In view of the situation summarized above, the JTA encouraged CLS to pursue their efforts to reduce operational costs while promoting increased usage.

7.6 Overall, the JTA basic income is expected to be 6.68 M€ in 2013, 13.5% under the figure planned in the original 5Y plan. The breakdown of expected income by platform type is shown in the table 1 below:

	Total in M€
Buoys	0.70
Floats	0.49
Animals	4.08
Fixed stations	0.15
Large program Buoys/Floats	1.26
Total	**6.68**

Table 1: Breakdown of expected income by platform type

7.7 The additional revenues are expected to be in the order of 194 K€ in 2013- based on the invoicing of unused Id.

7.8 As in 2012, the JTA costs have been closely controlled in 2013.

7.9 Non-JTA activity remains stable and may increase should CLS continue to find new applications eligible to the Argos System.

7.10 Total projected income is expected to be 6.87 M€ in 2013, compared to projected costs of 7.2 M€, resulting in a small negative year-end balance of -0.32 M€, and a net accumulated balance of 2.81 M€.

7.11 In conclusion, the expected financial situation for 2013 is considered safe. The accumulated balance would remain significantly positive. Nevertheless, risks will continue to be monitored very closely by CLS.

7.12 The JTA acknowledged that CLS has been successful to reduce the cost. The meeting nevertheless requested CLS to manage the cost in the view to control the losses to the minimum (***action; CLS; JTA-34***). In parallel, the JTA also invited the user community to take steps to possibly increase their Argos usage (***action; Users; JTA-34***).

7.13 In reviewing the 5 year plan, the meeting noted that the 2012 usage by the OCO large programme (1192 PTT-years) had not quite reached the threshold of 1200 PTT-years that were required to justify its preferential day rate (40% of the basic rate paid by all other users). Nonetheless the meeting recognised that 2012 had been a difficult year for the oceanographic community, with many premature buoy failures, and agreed that OCO should, exceptionally, be allowed to enjoy the 1200 PTT-year day rate for 2012 without penalty. However, the meeting decided that the JTA EC should consider the situation for 2013 at its next meeting and find a way forward to address the 1200 threshold issue. (***action; JTA-EC; JTA-34***).

Next Five-Year Plan (2015-2019)

7.14 Based on a request from the JTA, CLS prepared a draft of a new format for the Five Year Plan 2015-2019. The new format is aimed at streamlining the planning process and more easily informing the JTA members of the evolution of the expected and actual usage and revenues regarding the individual application areas. Ms Seema Owen (CLS America) presented the draft format to the meeting and requested comments/suggestions. The meeting requested CLS to refine the proposal to be discussed at the mid-year 2014 JTA-EC meeting, and then submitted to the thirty-fourth JTA Session (***action; CLS; JTA-EC-10***) (***action; CLS; JTA-34***). On the basis of the new draft format proposed by the JTA-EC, a new Five Year Plan will also be populated by CLS with the projections for the 2015 - 2019 time period and presented at JTA-34 (***action; CLS; JTA-34***).

8. TERMS AND CONDITIONS OF THE 2014 GLOBAL AGREEMENT

8.1 Based on (i) the projections for 2013 and 2014, in which it was expected that the income was balancing the JTA cost, (ii) the positive situation in the accumulated balance in the FYP at this moment, (iii) the uncertainties and possible risks due to the technical problems of the drifters, the meeting decided not to change the Tariff in 2014. The Meeting adopted the Terms and Conditions for the 2014 Agreement as given in ***Annex X***.

8.2 The 2014 Agreement is materially identical to the 2013 Agreement, with the following minor amendments:

(i) 2013 is replaced by 2014;

8.3 The essential elements of the tariff remain unchanged for 2014, namely:

(i) "USER BASIC SERVICE CHARGES", A and B coefficients for all platform categories are as follows:

Category	A (€)	B (€)
Buoys and others	15	5
Fixed Stations	15	3
Animals*	15	7.5
Subsurface Floats	15	7.5

*12 days per month cap applied

(ii) "DISCOUNT SCHEME FOR LARGE PROGRAMMES", the rates are as follows:

Number of platform-years	PTT-day unit (B) Buoys & others	PTT-day unit (B) Floats
600	4	6
900	3	4.5
1200	2	3

8.4 As in previous years, CLS was requested to provide a scanned, signed copy of these Terms and Conditions to ROs and ROCs.

9. FUTURE PLANS AND PROGRAMMES

National reports

9.1 Twelve national reports were submitted in written form by Australia, Botswana, Canada, China, Germany, India, Netherlands, New Zealand, South Africa, Sweden, UAE, and USA. These are provided in ***Annex XII***.

9.2 Representatives of Country (ROCs) present at the meeting also presented the following national reports: Australia, Canada, China, Germany, India, New Zealand, UAE, and the UK. The JTA was unanimous in agreeing that such reports were central to its prime motivation in being a practical and open forum for the exchange of information, experience (both positive and negative), problems and needs arising from the extensive Argos user community.

9.3 The meeting thanked all the presenters, and noted the following from the national reports presentations:

- Small and volunteer organizations are concerned about the cost of the Argos system;
- Argos-4 will provide more bandwidth to address the requirements of some applications to transmit higher resolution data or more data;
- More satellites with Argos might be needed for collecting more frequent and timely data from Argos platforms deployed in low latitude;
- Better coordination of CLS with the ROCs is encouraged;
- Consider new opportunities to reduce tariff for very large programmes (.e.g. for animal tracking) (to be considered by the new proposed Task Team)

9.4 The meeting requested CLS to address the following issues arising from the national reports presentations (***action; CLS; JTA-34***):

- There is a complicated or unclear terminology used in Argos forms, which are difficult to interpret;
- Technical training is desirable. CLS indicated that their office in Tianjin, China will provide such training;
- Possibility to pay the bill on a semestrial basis;
- Extend the free on-line availability of Argos data (now 20 days);
- Check the correctness of the mailbox and addresses regularly to guarantee the reception of invoices by the customers;
- The Indian ROC reported an inconsistent performance of some Argos transmitters of their buoy systems (***Annex XV***).

9.5 The meeting requested the Executive Committee to consider the following issues to also be considered as part of the Terms of Reference of the new proposed Task Team on Best Practices for Wildlife Argos Applications and for the review of the Operating Principles (***action; JTA-EC; JTA-34***):

- Absence of GPS locations for Argos mapping on Argos Web;
- Consider new opportunities to reduce tariff for very large programmes; and
- A Study could be made of system occupancy for various range of users, and how this could impact on the tariff structure so that the scheme will remain fair to all users.

User presentations

9.6 The following user presentations were made:

- Chistophe Guinet (France), provided an overview of CNRS activities with regard to the study of the migration of some bird species. It was noted with appreciation that the geophysical observations (e.g. Temperature profile data) made from marine mammals followed by CNRS were distributed in real time on the Global Telecommunication System (GTS).
- Barney Dickson (UNEP) reported on the activities of the UNEP World Conservation Monitoring Centre (WCMC), which is undertaking UNEP's biodiversity assessment in support of decision making. The meeting discussed the possible role of WCMC with regard to representing the interest of the wildlife community in the JTA. Primary interest of WCMC is not in research as such, but with providing guidance to governments for decision making purposes. An organization more deeply involved with research activities would probably be more appropriate than WCMC or UNEP for representing the animal tracking community in the JTA, e.g. Movebank[7], the Bio-logging science symposium[8], the Convention on Migratory Species, IUCN[9]. The JTA agreed that groups representing the wildlife community, including Movebank should be approached to begin with (***action; JTA-EC; JTA-34***).

9.7 The meeting noted the following:

7 https://www.movebank.org/
8 The 5th symposium is planned in Strasbourg, 22-26 September 22014 - http://bls5.sciencesconf.org/
9 International Union for Conservation of Nature - http://www.iucn.org/

- Argos-4 will be able to address the requirements of data relayed satellite tags (e.g. longer Argos messages to transmit both behavioural and oceanographic data)
- The estimation of Argos costs for research proposals is sometimes perceived as too complex (e.g. shark community). CLS is invited to assist Argos users for making such estimates (***action; CLS; ongoing***)
- With increasing number of data relayed tags a clearer policy of data transmission cost is needed (new proposed Task Team – see below – to address this issue)
- Different prices for the same service between countries mainly due to variations in exchange rates

9.8 The meeting recognized the diversity of wildlife applications of Argos, and that it was difficult to receive consolidated requirements from that community. The meeting agreed that it would therefore be useful to establish a Task Team on best practices for wildlife applications (TT-Wildlife) with membership comprised of wildlife tracking community using Argos. The Task Team would represent the interest of that community in the JTA discussions. The meeting requested the JTA-EC to propose Terms of Reference and membership of the Task Team for discussion and possible adoption at the next JTA Session (***action; JTA-EC-10; JTA-34***). It was noted that the DBCP experience could be regarded as an example. The Terms of Reference shall also be included in the JTA Operating Principles. The JTA agreed in principle to eventually allocate a small budget to this activity in order to allow the Task Team to function properly.

10. REVIEW OF THE OPERATING PRINCIPLES

10.1. The Meeting reviewed the JTA Operating Principles and approved them with the following modifications highlighted in red below:

- Role of CLS (item (viii) of 3.4.1): to operate the Global processing centres under quality of service agreements and deliver data collected to the user community (including international programmes such as WIGOS, IODE, GFCS, MOVEBANK, OBIS, etc.) according to international standard data exchange requirements, and protocols;

- Secretariat support to the JTA Chair (item (ix) of 3.6): Need to capture actions and issues from national reports, as well as reporting upon action items as stipulated at JTA and JTA-EC meetings, and provide them to the Chairperson;
- ***Annex H***, ToR of the Executive Committee:

    1. Assist the chairperson and secretariat in the preparation of reports, reviewing action items of previous JTA meetings, and their submission, if needed, to the IOC and WMO Secretariats for distribution;

    2. Annually review the functions and duties of the JTA and recommend any changes to the Chairperson for discussion and approval at the JTA Session;

    3. Review and facilitate the implementation of action items from previous JTA sessions;

    4. …

10.2 The new approved Operating Principles are provided in ***Annex XI***.

10.3 The Meeting reaffirmed that JTA's international status should be maintained and enhanced, and should seek continued WMO and IOC involvement and visibility.

11. ANY OTHER BUSINESS

International forum of Users of Satellite Data Telecommunication Systems

11.1 The meeting recalled its discussion at the previous JTA session regarding the establishment of an international Forum of users of satellite data telecommunication systems (Satcom Forum). Per the outcome of the preparatory workshop for the Forum (Toulouse, France, April 2012), an organizing committee was established to organize an ad hoc Forum at the IOC of UNESCO headquarters in Paris, France, from 3 to 4 October 2013, i.e. the two days following the end of this JTA Session.

11.2 The JTA recalled the changes proposed to the Terms of Reference of the Satcom forum as discussed at the previous JTA Session. The JTA proposed some further clarifications and adjustments to these ToR, which are reflected in ***Annex XV***. However, the JTA noted that these draft ToR have been substantially shortened in the mean time, and that the JTA comments will have to be considered as part of the Satcom Forum Operating Principles. The JTA Chair will represent the JTA at the *ad hoc* Forum. The JTA agreed with the following perspective on the Satcom Forum to be presented by the Chair of the JTA to the ad hoc Satcom Forum meeting:

Anticipated Relationship of JTA and SATCOM:

- Become an Indirect Programme of SATCOM;
- Develop Operating Principles consistent with Argos OpsCom Requirements;
- Assist SATCOM in Developing Financial Principles and Mechanisms for Tariff Negotiations;
- Participate in SATCOM Decision Making Process.

Other

11.3 The meeting wished to remind all those contributing documents in preparation of the Session that these documents should be posted on the website before the event. The meeting also recommended that there should be only one presentation focusing on the budget and finances (3 presentations have been presented, and the JTA found this too confusing).

12. ELECTION OF THE EXECUTIVE COMMITTEE

12.1 The Meeting noted the Terms of Reference of the JTA Chairperson (***Annex F*** to the Operating Principles), indicating the term for this position as two years, eligible for re-election but in principle only for one subsequent term.

12.2 The Meeting noted the Terms of Reference of the JTA Vice-Chairperson (***Annex G*** to the Operating Principles), indicating the term for this position as two years, eligible for re-election but in principle only for one subsequent term.

12.3 The Meeting noted the Terms of Reference of the JTA Executive Committee (***Annex H*** to the Operating Principles), and recalled that the membership shall include the Chairperson, the Vice-Chairperson, the IOC Secretariat, the WMO Secretariat, and three additional members proposed by the Chairperson and elected by the JTA, serving a term of two years with an optional two-year re-appointment.

12.4 The Meeting noted that the current composition of the JTA EC as detailed in Table 2 below:

Role	***Current incumbent***	***Last elected at***	***Until***	***Terms***
Chair	Frank Grooters (Netherlands)	JTA-31	End of JTA-33	Ending his 2nd Term (first elected at JTA-29); not available in principle for re-election to this post at JTA-33
vice-chair	Eric Locklear	JTA-31	End of JTA-33	Ending his 2nd Term (first

	(USA)			elected at JTA-29); not available in principle for re-election to this post at JTA-33
Member	Joe Linguanti (Canada)	JTA-32	End of JTA-34	In middle of his 2nd Term (first elected at JTA-30); not available in principle for re-election to this post at JTA-34
Member	Johan Stander (South Africa)	JTA-32	End of JTA-34	In middle of his 2nd Term (first elected at JTA-30);not available in principle for re-election to this post at JTA-34
Member	Birgit Klein (Germany)	JTA-32	End of JTA-34	In middle of her 2nd Term (first elected at JTA-30);not available in principle for re-election to this post at JTA-34
Ex-officio	Tom Gross (IOC)	n/a	n/a	n/a
Ex-officio	Etienne Charpentier (WMO)	n/a	n/a	n/a
Ex-officio	CLS	n/a	n/a	n/a

Table 2: Current composition of the JTA-EC (for the past intersessional period until the end of this JTA Session)

12.5 The meeting recalled the requirements for succession planning, and while noting that most of the JTA-EC members were not eligible for re-election, recalled that this is a critical period for the JTA (development of the next FYP, consideration of the requirements of the animal tracking community, relationship with the Satcom forum) and that some level of continuity with regard to the JTA-EC membership was required. The meeting, taking into consideration the proposal from the chair regarding the new Executive Committee members, therefore elected the officers listed in Table 3 below.

Role	***Current incumbent***	***Elected at***	***Until***	***Status***
Chair	Eric Locklear (USA)	JTA-33	End of JTA-35	Beginning of 1st Term (first elected at JTA-33), and available for re-election for this post at JTA-35
vice-Chair	Johan Stander (South Africa)	JTA-33	End of JTA-35	Beginning of 1st Term (first elected at JTA-33), and available for re-election for this post at JTA-35
Member	Salim Javed (UAE)	JTA-33	End of JTA-35	Beginning of 1st Term (first elected at JTA-33), and available for re-election to this post at JTA-35
Member	Joe Linguanti (Canada)	JTA-32	End of JTA-34	In the middle of his 2nd Term (first elected at JTA-30); not available in principle for re-election to this post at JTA-34
Member	Birgit Klein (Germany)	JTA-32	End of JTA-34	In the middle of her 2nd Term (first elected at JTA-30) not available in principle for re-election to this post at JTA-34
Ex-officio	Tom Gross	n/a	n/a	n/a

	(IOC)			
Ex-officio	Etienne Charpentier (WMO)	n/a	n/a	n/a
Ex-officio	CLS	n/a	n/a	n/a

Table 3: New composition of the JTA-EC (for the next intersessional period until the end of JTA-34)

12.6 The meeting wished to warmly congratulate and thank Mr Frank Grooters for the outstanding contributions he has provided to the JTA since he was first elected as JTA Chair. The meeting wished the new members of the JTA-EC, including new Chair and vice-Chair for successful achievements in guiding the JTA in the future.

12.7 In order to prepare the elections for JTA-34, the meeting invited the ROCs to consider becoming JTA-EC members, and being candidates for the JTA Chair and Vice-Chair positions at JTA-35.

13. DATE AND PLACE OF THE NEXT MEETING

13.1 The meeting noted the following events of interest to the JTA:

- The Thirtieth session of the Data Buoy Cooperation Panel (DBCP-30), Tianjin, China, hosted by the National Centre of Ocean Standards and Metrology (NCOSM) of the State Oceanic Administration (SOA), October 2014
- The fifth Bio-logging science symposium is planned in Strasbourg from 22 to 26 September 2014
- The User Conference on Argos Wildlife Applications in Baltimore, Maryland, USA, in November 2014.

13.2 The meeting decided to organize the JTA-34 in Tianjin in China in conjunction with DBCP-29 in October 2014. The dates remain to be decided and will be discussed between the Secretariat and the host.

14. CLOSURE OF THE MEETING

14.1 In closing the Meeting, the Chairperson, Mr Frank Grooters, thanked all participants for their contributions to the Meeting. In so doing, he particularly thanks the Secretariat for the excellent organisation of the meeting, IOC for the excellent venue, and CLS for their continued openness in interacting as fully as possible with the JTA community, and for their efforts to reduce the operating cost induced by the JTA.

14.2 Mr Grooters also asked the Meeting to note and thank the important and continued contributions of the WMO and IOC secretariats in ensuring the success of the Meeting.

14.3 The Chairperson reminded the Meeting of the valuable work done by the Executive Committee during the inter-sessional period, which definitely contributes to an efficient and effective formal JTA meeting.

14.4 The meeting once again congratulated Mr Grooters for the outstanding contributions he has brought to the JTA since elected for the position of JTA Chair.

14.5 Mr Grooters and the host concluded in wishing all participants a safe journey back to their home destinations.

14.6 Finally the meeting thanked the Chair for his leadership to run this meeting and support the work of the JTA during the intersessional period.

14.7 The Meeting closed at 11:07 on 2 October 2013.

ANNEX I

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ANNEX II

AGENDA

1. ORGANIZATION OF THE MEETING
   1.1 Opening of the Meeting
   1.2 Adoption of the Agenda
   1.3 Working Arrangements
   1.4 Selection of the Writing Group (WG)
2. REPORT OF THE CHAIRPERSON OF THE JTA
3. REVIEW OF THE ACTION ITEMS FROM JTA-XXXII
4. REPORT ON THE 2013 GLOBAL AGREEMENT
5. REPORT ON THE DEVELOPMENT AND OPERATIONS OF CLS
6. REVIEW OF USER'S REQUIREMENTS AND ISSUES
   6.1 Discussion of establishment of a Task Team for Best Practices
7. REVIEW OF THE STRUCTURE OF THE TARIFF AGREEMENT AND RELATED MATTERS
   7.1 Review of the guiding principles for negotiating the Tariff
   7.2 Review the Five Year Plan
8. TERMS AND CONDITIONS OF THE 2014 GLOBAL AGREEMENT
9. FUTURE PLANS AND PROGRAMMES
10. REVIEW OF THE OPERATING PRINCIPLES
11. ANY OTHER BUSINESS
    11.1 Report on the Preparations for the Ad hoc International Forum of Users of Satellite Data Telecommunication Systems (SATCOM-2 Forum)
    11.2 Roundtable
12. ELECTION OF THE CHAIRPERSON, VICE-CHAIRPERSON AND MEMBERS OF THE EXECUTIVE COMMITTEE
13. DATE AND PLACE OF THE NEXT MEETING
14. CLOSURE OF THE MEETING

ANNEX III

REPORT OF THE 7TH MEETING OF THE JTA EXECUTIVE COMMITTEE (JTA EC-7)
(Fremantle, 9 October 2012-10-09)

Participants:

JTA-EC members:

Frank Grooters (Chair)
Eric Locklear (USA)
Joe Linganti (Canada)
Johan Stander (South Africa)

Ex-officio members:

Bill Woodward (CLS America)
Anne-Marie Bréonce (CLS)
Seema Owen (CLS America)
Fabienne Jacq (CLS)
Tom Gross (IOC Secretariat)
Etienne Charpentier (WMO Secretariat)

General comments about the JTA-32 Session

Despite concerns about reduced JTA income cause mainly by technical failures of the drifters, the result of the meeting was found satisfactory. The meeting went smoothly also thanks to the work of the Executive Committee in preparing this meeting.

Special request was made to CLS to monitor very closely the FYP, and notify the JTA-EC if needed.

The meeting decided on 6 action items to be carried out by CLS. These are reflected in the final report of JTA-32.

Items to be discussed at JTA-EC-8

The JTA-EC proposed items for discussion at JTA-EC-8:

1. **FYI 2012 results, and the status of 2013**

2. **Operating Principles, in particular the ToR of the EC**

   The chair proposed to allow the JTA-EC to make some decisions on behalf of the JTA on administrative and financial matters, while reporting at the following JTA Session.

3. **Preparation for the OPSCOM-47**

   CLS informed the JTA-EC that the OSPCOM-47 will tentatively be organized in the USA from 29-31 May 2013.

4. **Situation regarding the drifter failures, and expected effects on the FYP until JTA-33**

   CLS to provide information, and seek feedback from the DBCP.

5. **Relationship with the Satcom Forum**

- Preparation for the ad hoc Satcom Forum meeting, e.g. who will be representing the JTA at the meeting.
- Inviting the Chairman of the ad hoc Satcom Forum organizing committee to address the good relationship with the Satcom Forum.
- It's too early at this point to invite a representative of the Satcom Forum to JTA-EC meetings.

6. Antenna for Easter Island.

Proposals to be proposed on how practically to move forward, including with regard to the funding the antenna.

7. Inviting users to JTA-EC-8 to make presentations

The Paris venue should facilitate invitation of suitable user representatives.
JTA-EC members, and CLS to propose names.

8. Tentative Date and place of the JTA-EC-8

JTA-EC-8 should be organized before OPSCOM-47.

Proposed dates: 16-17 April 2013 prior to the SOT-7 meeting.

Bill Woodward and Eric Locklear will discuss and propose a venue in the USA.

9. Agenda of the next JTA meeting

JTA-EC-8 will discuss the agenda for JTA-33.

10. Financial information to be presented to the JTA

Baring in mind that the JTA-EC-8 will be held prior to the OPSCOM-47 meeting, some financial figures will be provided to the JTA-EC-8, although not as complete as what will be submitted to the OPSCOM.

Financial information (e.g. FYP and its projections; preliminary status of the finances then completed figures) should be provided by CLS to the JTA-EC members prior to the JTA meeting.

11. Need to organize a JTA-EC meeting between JTA Sessions

JTA-EC-8 will discuss whether it should be required to have JTA-EC meetings between JTA-EC.

12. Interactions with the ROCs

JTA-EC need to think about how the JTA-EC should interact with the ROCs. Some background information need to be provided to them.

Note: some other items for JTA-EC-8 to discuss are also included in the action list.

ANNEX IV

ABRIDGED[1] REPORT OF THE 8TH MEETING OF THE JTA EXECUTIVE COMMITTEE (JTA EC-8)

(Annapolis, USA, 16-18 April 2013)

Participants:

Members, JTA-EC:

- Frank Grooters (Chair, JTA-EC, the Netherlands)
- Eric Locklear (Vice-Chair, JTA-EC, USA)
- Birgit Klein (Germany)
- Johan Stander (South Africa)
- Joe Linguanti (Canada) (not present)
- Tom Gross (IOC) – ex-officio

Invited persons:

- Seema Owen (CLS America)
- Bill Woodward (CLS America)
- Anne-Marie Breonce (CLS)

1 Organization of the Meeting

The eighth Meeting of the Argos Joint Tariff Agreement (JTA) Executive Committee took place in Annapolis, USA, 16-18 April 2013.

Frank Grooters opened the official meeting of the JTA Executive Committee with welcome and discussion of logistics. Frank congratulated Johann for the appointment to JCOMM chair and thanked Johann for representing JCOMM at this meeting.

The Committee accepted the draft agenda.

2 Status of Action Items from JTA-XXXII

The meeting reviewed action items from past JTA Sessions (see Annex I). The meeting decided to include all ongoing actions from previous JTA meetings in the continuing action items.

The committee discussed Action Item 3.1.2 concerning strategies to increase the participation of ROCs in the activities of the JTA. Members suggested that the strategy should also encompass RUGs, while noting that the action item was concerned with ROCs exclusively. The strategy will be to identify and invite ROCs/RUGs to make presentations to JTA-33. It was agreed that the chair should individually invite relevant ROCs to participate actively in the JTA-33 session.

Further discussions identified three points for the strategy: 1) Energize the ROCs with largest Argos usage to participate in JTA activities; 2) Designate a RUG which can represent a large cross section of wildlife users of Argos; 3) Find a suitable intergovernmental organization to cooperate

1 The annexes of the report have been removed to avoid duplication with other annexes of this JTA-32 report. The complete JTA-EC-6 report can be obtained upon request from the JTA Chair or the Secretariat.

with IOC and WMO to eventually represent JTA management of ecological needs at intergovernmental level. The session noted that the role of JTA vis-à-vis the Forum will be affected by these issues.

The committee noted that, compared to previous years, the JTA action items have been satisfactorily executed and the list of previous year action items greatly reduced.

3 Issues from the Sixth and Seventh Meeting of the JTA EC

3.1 Report of the Project Team on Unused IDs

CLS reported a significant success with programmes to recycle IDs. See table: Recycled ID Status for January through March 2013.

Type of ID's	Projection for Success	Actual ID's Recycled
20 Bit	100	183
28 Bit	3500	2169

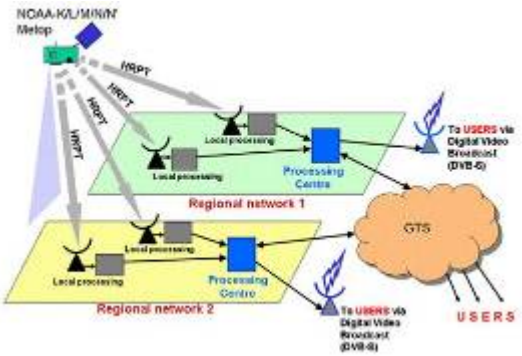
3.2 Real Time Antenna Optimization Project (update)

CLS reported on status of Upgrade Schedule for Real Time Antennas. See Table

- UPGRADE 3 CLS STATIONS:
  - LIMA, HATOYAMA , LANNION — Completed
- UPGRADE 9 'NON-CLS' EXISTING STATIONS:
  - La REUNION — Completed
  - MONTEREY, — Mid 2013?
  - MIAMI — Completed
  - BALI — Apr. 2012/SARAL update 2013/06
  - [RESOLUTE BAY, -> KANGERLUSSUAQ — Closed
  - OMAN — 2013
  - ATHENS — 2013/6
  - LAS PALMAS — 2013/9
  - PAPEETE — 2013/10
- PROCURE AND INSTALL 2 NEW STATIONS:
  - [CAPETOWN] — Completed
  - [ASCENSION ISLAND] -> LIBREVILLE — 2013/06
- UPGRADE 3 EXISTING AUS/NZ STATIONS:
  - [DAVIS, CAPE FERGUSON, WELLINGTON] — End 2013

3.2.1 Antenna Easter Island

Development of the Easter Island project to install an antenna was optimistically reported. The **R**egional **A**TOVS **R**etransmission **S**ervices (RARS) are operational arrangements for the real-time acquisition of polar-orbiting satellite data over a wide region containing a network of direct readout stations and their rapid delivery to the global user community through regional Processing Centres. EC agreed that CLS should explore interaction with the WMO RARS Programme for possible collaborative efforts regarding installing an antenna.



EXISTING CNES DORIS ANTENNA ON EASTER ISLAND

3.3 Inactive Status (update)

417 PTTs were transmitting under inactive status during 2012 on a monthly basis, representing 109 PPT years. It was considered stable, so it was decided that no further actions should be taken. CLS will monitor the situation carefully and report to JTA any actions if necessary.

3.4 Argos-3 Pilot Project: Report?

The pilot project is completed (see DBCP-27 report).
EC chair to query the DBCP chair for availability of report.

3.5 Five-Year Plan 2010-2014: review 2012, status 2013

CLS presented updated data for JTA Usage Plan. Decreases in usage are mainly attributable to the engineering problems with the drifting buoys, as animal usage has increased. Future projected usage will be based on success of manufacturers in producing reliable, standardized equipment.

JTA USAGE	**2010**	**2011**	***2012***	**2012**	**2013**	**2014**
	Actual	**Actual**	**Projected**	**Actual**	**Projected**	**Projected**
Activity: Actual and Forecast						
Growth Active PTTs (%)	5.7%	0%	*7%*	***-3%***	*7%*	*7%*
Growth PTT-yrs (%)	6.9%	-7.4%	*4%*	***-10%***	*4%*	*2%*
Active Ptfs (Total)	12,398	12,418	*13,465*	***12,071***	*14,435*	*15,494*

PTT-yrs (Total)	3,296	3,050	*3,135*	***2,744***	*3,261*	*3,322*
Active PTTs (w/o large program)	8,886	9,234	*9,995*	**9,271**	10,793	11,667
PTT-yrs (Buoys & Others)	454	382	*489*	***320***	*489*	*489*
PTT-yrs (floats w/o large pgm)	86	92	*96*	***102***	*99*	*101*
PTT-yrs (Animal)	916	973	*895*	***1,002***	*940*	*987*
PTT-yrs (Fixed stations)	140	129	*152*	***128***	*152*	*152*
Active PTTs (large pgm)	3,512	3,184	*3,470*	***2,800***	*3,641*	*3,827*
PTT-yrs (large pgm) Buoys & Others	1,572	1,341	*1,361*	***1,065***	*1,429*	*1,429*
PTT-yrs (large pgm) Floats	128	133	*142*	***127***	*153*	*164*

The EC requested new presentations of the data which could better visualize the change in usage and the change of projected usages. The EC suggested the use of a graphical visual aid which people can take action on.
JTA-EC discussed analyzing the cost implications of buoy failure, as it affects tariffs and cost per buoy.

3.6 Status of the Global Drifter Programme (effects on 5YP)

The Global Drifter Programme has been negatively affected in recent years by manufacturing problems with buoys resulting in greatly shortened lifetimes and therefore fewer PTT-days. Engineering improvements have been implemented and as new buoys with 400+ day lifetimes are deployed it is expected that the array will improve in the next year. Number of buoys deployed since Jan. 1, 2013: 175. Number of Argos buoys: 166.

3.7 User Presentations

Presentations by users of Argos for wildlife applications were presented on Wednesday at the CLS offices.

- Alicia Berlin (USGS) and Ron Therien (USGS): *Atlantic and Great Lakes Sea Duck Migration Study*
- Barbara Schroeder (NOAA NMFS): *Observing Sea Turtles*
- Jennifer Dittmar (Baltimore National Aquarium): *Marine Animal Rescue Program at National Aquarium*

Discussions with the users concerning their needs and issues for the Argos system revealed a concern for ease of use of data retrieval, and availability/cost of transmitter hardware. Some commented that the web interface was overly complicated. Several commented that their solution to this problem has been in the use of third party web based analysis software on SeaTurtle.Org. Hardware engineering for tags and attachment methods is not well coordinated, but as science research the on-going efforts seem comfortable with this situation. The community expressed concern at the apparent high costs of some tags, but as these were small batch manufactures the costs were deemed appropriate to recover development costs.

The EC asked if the users could identify international representation for wildlife user groups. IUCN International Union Conservation of Nature was mentioned, but most other organizations seemed to be organized around taxonomic groups, not technical methodologies.

4 Review of the JTA Operating Principles (also taking agenda items 2 and 3 in consideration) (see Record of Decisions JTA-XXXII, Annex XI)

The Executive Committee reviewed JTA Operating Principles and suggested several amendments which will be presented to the JTA-33.

The EC discussed certain perceptions by members of the JTA that the EC was not leaving significant decisions up to the JTA. The EC recommended that the chair should present the past action items with more background and history of the action items, emphasizing the role of the JTA in approval of actions taken on action items.

The EC discussed their budgetary decision responsibilities and concluded that the EC should make recommendations on fee structures, but should not usurp the role of CLS in allocating resources for programme development.

The EC noted that the information about the reserve in the Five Year Plan should be interpreted as an indicator of the validity of the fee structure as a measure of cost and revenue balance.

The EC recommended that the ToRs include a duty of the EC to review action items coming from the JTA meetings. The EC recommended a change to the ToR of secretariat obligations to emphasize action items as well as meeting reporting. The EC recommended an addition to the ToRs for the CLS to recognize that data user community includes international programmes such as WIGOS, IODE, GFCS, MOVEBANK, OBIS etc.

5 Discussion on Draft Five-Year Plan 2015-2019

The EC concluded that the data is not yet available to make forecasts of annual activity of the next five year plan. Work on the 2015-19 plan may begin in Oct. 2013. The EC recommends that CLS propose an improved format for the Five year plan, which will be available for comments at the next intersessional JTA EC meeting (Spring 2014).

6 Organizational Issues

6.1 Ad-hoc Forum of Users of Satellite Data Communication Systems: Update Activities

The EC noted that the *ad hoc* Forum will be held 3-4 Oct. 2013 in Paris, following the DBCP, JTA meetings. No agenda for the *ad hoc* Forum is yet available for discussion. The EC is advised to note the *ad hoc* Forum website, available at http://Jcomm.info/satcom1. The position of JTA at the *ad hoc* Forum will be discussed at the JTA-33.

The EC recommended that David Meldrum be asked to present a “Report on the Preparations for the 2nd ad hoc International Forum of Users of Satellite Data Telecommunication Systems (SATCOM-2 Forum)”.

6.2 How can JTA contribute to GFCS

Johan Stander introduced a topic to be further discussed at JTA-XXXIII concerning the interaction of JTA with the Global Framework for Climate Services, GFCS, and the WIGOS. Johan delivered

a presentation about the Global Framework for Climate Services which is strongly supported by the WMO as a framework for delivery of services in the near and far future. The EC suggested that CLS should explore a potential role in GFCS, for example as a Global Data Assembly Center.

7 JTA-XXXIII

7.1 Draft Agenda

The draft agenda was amended to include an item 6.1: “Establishment of a Task Team for Best Practices for Wildlife Applications”. (The annotated agenda will be amended accordingly).

7.2 Documentation Plan

The chairman of EC will prepare a draft position paper to facilitate discussion on JTA position at the Ad-hoc Forum.

7.3 Support WMO/IOC

7.4 Policy of writing the JTA Final Report

Efforts begun by Secretariat to base Final Report on preparatory documentation will be continued.

7.5 Date, Place and Duration of JTA-33

The JTA-33 will be held Sept. 30-Oct. 2 2013, Paris, France using facilities at UNESCO Miollis Annex.

7.6 Discussion on how to secure/maintain stability in JTA

The chair made the committee aware that the following positions are available for election and to please assure that candidates are available to assure continuity of JTA.
The following members’ terms will expire after JTA-33, and these positions are, in principle, to be re-elected.

- Frank Grooters (Chair, JTA-EC, the Netherlands)
- Eric Locklear (Vice-Chair, JTA-EC, USA)
- Johan Stander (South Africa)
- Joe Linguanti (Canada)

The following member’s term will expire with JTA-34

- Birgit Klein (Germany)

7.7 Discussion how to optimize work/responsibilities of JTA and EC.

Chair informed that efforts to optimize work/responsibilities of JTA and EC have been addressed by alterations to the ToRs, efforts to empower JTA ROC representation at JTA, and recognition that the JTA should be allowed sufficient time to discuss Action Items and other issues during session.

8 47th OPSCOM Meeting, 21-23 May 2013, Easton, MD

Chair informed the EC of preparations of the Report to be delivered to 47th Operations Committee (Easton, Md, USA, 21-23 May 2013) on behalf of the JTA and proposed a few amendments to the draft text.

9 Next Meeting of the JTA EC (see also Item 11 in JTA EC7 Report)

The EC proposed to shift the JTA EC-10 meeting of 2014 to be held in the middle of June, after the OPSCOM. Final decision will be made at JTA-EC-9.

10 Other Business

EC requests chair to deliver letter to Canadian ROC acknowledging Joe Linguanti's contributions to JTA and to emphasize the importance of providing continuity of Canadian participation in JTA. The letter should also invite Joe Linguanti to attend JTA-33.

11 Closure of the Meeting

The chair thanked the Executive Committee for a substantive and effective meeting. The chair also thanked the hosts, Eric Locklear and Bill Woodward, for the pleasant meeting facilities and activities.
The meeting was adjoined at 13:30 on April 18, 2013.

ANNEXES (OF ANNEX IV)

ANNEX I – List of Participants (removed from this abridged version of the JTA-EC-8 report; refer to the preamble of this report for the list of participants, and Annex I for JTA-33 report for their contact details)

ANNEX II – List of actions (see below)

ANNEX III – JTA-33 Documentation Plan (removed from this abridged version of the JTA-EC-8 report, refer to the actual documentation plan of JTA-33).

ANNEX IV – JTA-33 Provisional Agenda (removed from this abridged version of the JTA-EC-8 report, refer to the actual provisional agenda of JTA-33)

ANNEX II (OF ANNEX IV) – LIST OF ACTIONS

1. Status of open actions from JTA-30

No (JTA-30).	Ref. (JTA-30)	Action item	By whom	Deadline	Status
1	3.1.2	Design a strategy for improving ROC/RUG participation, particularly comprising animal trackers and other type of users	JTA-EC	JTA-EC-8	Strategy completed: ~~Chair to Reprt to JTA-33 Identify and invite ROC/RUGs to make presentations to JTA-33. See annex 11e Final Report JTA-32 r.e. RUG participation. IOC/WMO directed to send official invitation letters to ROCs for JTA-33. Chair of JTA directed to personally encourage selected ROC/RUGs to participate in JTA-33.~~

2. Actions and decisions of JTA-31

No. (JTA-31)	Ref. (JTA-31)	Action/decision item	By whom	Deadline	Comment
2	JTA-31 Item 4.7	Action: users and manufacturers are urged to consider programming their PTTs to switch off after they have ceased to collect useful data	Users, manufac-turers	April 2013	Platforms in 'inactive status' wastefully use system capacity To become action by CLS to contact the ROCs in case there is an issue in the annual reports. JTA-EC to write a letter to all manufacturers on behalf of the JTA to propose new approaches to be investigated by them (liaise with CLS for drafting the letter) Since number of inactive PTTs has stabilized in past year, this issue is no longer critical. CLS has developed plan to limit inactive PTTs and introduced Gonio instrument to locate and remove inactive PTTs. CLS will monitor system and if necessary take action. Action closed.

No. (JTA-31)	Ref. (JTA-31)	Action/decision item	By whom	Deadline	Comment
3	JTA-31 Item 5.3	Action: EC and NESDIS to investigate negative trend in data timeliness from NOAA-18 and -19	CLS, Scott Rogerson	By EC8	Closed: CLS reported on this issue at JTA-32
4	JTA-31 Item 5.8	Action: DBCP to report to JTA-EC on its needs, if any, for access to archived raw data	Chair DBCP	By JTA-33	Pending. TC DBCP will inform CLS on DBCP investigations
5	JTA-31 Item 5	Action: CLS to investigate extending the online availability of Argos data beyond the current 10-day cut-off	CLS	By JTA-33	Completed: 3 options proposed by CLS.CLS has developed one option further, and will report at JTA-33. EC recommends to be closed.
6	JTA-31 Item 5.15	Action: activities by CLS to recover unused IDs to continue	CLS	Ongoing	Suggestions include sending fact-sheet to users along with annual catalogue of services and with SUA renewals, ID buy-back Ongoing Status to be reported at JTA-33. EC recommends to be closed.
17	JTA-31 Item 10	Action: CLS and Secretariat to consider if a suitable international/intergovernmental body exists that might represent the needs of wildlife trackers (e.g. UNEP, CBD) within the JTA	CLS, assisted by Secretariat	JTA-33	CLS contacted WWF (will participate at JTA-33) and IUCN Pending EB requests ROCs to be more active in initiatives to contact organizations.

3 – Action items from JTA-EC-6

No. (JTA-EC-6)	Ref.	Action item	By whom	Deadline	Comment
3	JTA-EC-6	To contact the DBCP Chair, to request to add discussion on the outcome of the Argos-3 Pilot Project to the DBCP-28 agenda (action).	Chair	31 May 2012	DBCP report pending JTA chair to write to DBCP chair to make report available and JTA-EC recommends item be closed.

No. (JTA-EC-6)	Ref.	Action item	By whom	Deadline	Comment
7	JTA-EC-6	To write to the Secretariat, to reaffirm that the JTA can continue to operate as an independent body under the Forum once established, and express the desire to have other communities (e.g. biologists, animal trackers, who are also using Argos and other Satcom systems) involved in the future Forum	Chair	1 Jan 2013	To be done (letter to be sent to the Chair of the Satcom Forum interim committee for the preparation of the ad hoc Satcom Forum in 2013) EC recommends item be closed upon sending of letter by JTA chair
8	JTA-EC-6	To invite the Satcom Forum interim committee Chair to invite the World Wide Fund (WWF) or other suitable body to the Forum, to seek their support to the Forum, and to send the final report of the Satcom Preparatory workshop to the WWF and other appropriate bodies	Chair	1 Jan 2013	Chair to send to the Chair of the Satcom Forum interim committee for the preparation of the ad hoc Satcom Forum in 2013

4. Actions and decisions of the present JTA-32 meeting

No. (JTA-32)	Ref. (JTA-32)	Action/decision item	By whom	Deadline	Comment
1	JTA-32 Item 5	CLS to approach the wildlife community and invite them to consider best practices to limit impact of inactive PTTs	CLS	EC-8	See JTA-31 Action item 2.
2	JTA-32 Item 5	Investigate what reasonable percentage of inactive PTTs could be acceptable	CLS	EC-8	See JTA-31 Action item 2.

No. (JTA-32)	Ref. (JTA-32)	Action/decision item	By whom	Deadline	Comment
3	JTA-32 Item 5	Study further the online data access issue during intersessional period, and provide recommendation to JTA	JTA-EC	JTA-33	See JTA-31 Action item 5.
4	JTA-32 Item 5	Survey requirements for online data access again through the ROCs (informing them that a new charge might be introduced) to the users	CLS, ROCs	EC-8	CLS has completed. EC recommends item be closed.
5	JTA-32 Item 11	EC to ensure adequate interaction with the secretariat regarding the development of the IOC/FAO/WMO satellite communications forum	JTA-EC	JTA-33	AD-hoc workshop for the establishment of an international Forum of users of satellite data telecommunication systems (Satcom Forum), Paris, 2013 Refer to Action items 7 and 8 of EC-6.
6	JTA-32 Item 6	Action: to address the issue of installing an antenna on Easter Island, and possibly propose solutions at the next JTA meeting	JTA-EC	JTA-33	[Request the EC to consider modes of financial support for this activity]

ANNEX V

REPORT ON THE 32ND JTA MEETING AT THE 47TH MEETING OF THE ARGOS OPERATIONS COMMITTEE (OPSCOM)

(Easton, Maryland, USA, 21-23 May 2013)

47th Operations Committee (Easton, Md, USA, 21-23 May 2013)

H-1. Programs

H-1-1 Report on JTA Meeting

Frank Grooters presented the report on the 32nd JTA meeting.

- The 32nd meeting on the ARGOS JTA was kindly hosted by the Australian Bureau of Meteorology and took place in Fremantle, Australia, from 8 to 10 October 2012. Ten ROCs and representatives of User Groups were present at the meeting, together with the DBCP Chairman and several representatives from the Australian Bureau of Meteorology and the CLS Group. The meeting was jointly organized and served by the IOC and WMO Secretariats.
- The Meeting reviewed and discussed in an appropriate way, several JTA issues, in particular
    - The activity under the 2012 Global Agreement,
    - The report on the Development and Operations of CLS,
    - User's Requirements, including those recommended by DBCP,
    - The 2013 Tariff Agreement and related matters,
    - The status of the 5-Year Financial Plan for the period 2010-2014,
    - The JTA Operating Principles, and
    - The proposed Forum of Satellite Telecommunication Users.

  The Meeting noted with satisfaction that usage of the Argos system has continued to grow, especially since 2007. The growth is mainly concentrated in the science segment, while fisheries and sensitive use domains have decreased in the last few years. The total number of active PTTs and PTT-years showed however a slight decrease over the last 12 months since JTA-31, mainly due to a reduced (-16% in PTT-years) buoy deployment. Wildlife activity showed an increase (+7.6%), but not sufficient to compensate the total reduction of PTT-years.
- The overall number of active PTTs was stable over the period August 2011 to July 2012, whereas the number of PTT-years remained also quite flat. This may be explained by time slot accounting and by the 12-days-per-month charging cap applied to animal platforms. Overall, the numbers of active PTTs and thus the number of transmitters in the field increased over the same period, mainly due to the wildlife category. Consumption by the floats and fixed stations category seems to be rather stable. Buoys and others have declined by nearly 16% during the period. In summary:
  (i) "Buoys and Others" still represent the most consumption of any category despite the slightly reduced number of active PTTs;
  (ii) "Animals" consumption continues to increase, this year by about 6.27%;
  (iii) "Floats and Fixed Stations" consumption in PTT-years remains stable.
- All animal categories benefit significantly from time slots, as recommended during JTA-27 to JTA-29. As an average, these PTTs transmit for 40% of the day. In 2011, due to the time slot accounting, the total benefits (all categories) were equivalent to 174.39 PTT-years.

- Further to the JTA-27 decision that monthly charges for animal platforms be capped at 12 day-units (48 time slots), 777 PTTs took advantage of the capping in 2011, a saving of 177 PTT-years. The number of animals taking advantage of the capping is increasing every year, 777 in 2011 compared to 690 in 2010, with an increase of 21% for birds PTTs, while the number of marine animal PTTs remained rather stable. For 2012, capping represents a projected impact in the order of 167 PTT-years. The Meeting agreed to continue the current scheme without modification.
- Under the User's Requirements the Meeting received a report by the Data Buoy Co-operation Panel (DBCP) Chairperson, Mr Al Wallace (Canada), regarding the Panel's requirements and its recommendations to CLS.
  He noted that the 28th Session of the Panel did not have a specific item on User Requirements for the JTA and that should be interpreted as a general level of satisfaction. It was noted that Panel members reaffirmed their needs for timely reports on the GTS, and the Panel recognized and applauded the improvements in data timeliness from Argos that resulted from the establishment of the Cape Town, South Africa, antenna and the downloading of blind orbits at the Svalbard, Norway, facility.

  It was relayed to the JTA that DBCP members had noted that the use of Iridium telecommunications resulted in delivery of data reports that exceeded standards for timeliness and reliability.

  Mr Wallace noted that the DBCP had been focused on technical issues related with declining buoy lifetimes, early drogue loss and maintenance of the global array. He informed the JTA that the DBCP Task Team on Instrument Best Practices and Drifter Technology Development (TT-IBP) had formed a working group to address on an urgent the technological problems associated with water infiltration, battery leakage, etc. He also noted that power management with the new PMT functioning in PTT mode was problematic, but that one of the buoy manufacturers had made a presentation to the DBCP on how to deal with the issue. Mr Wallace encouraged CLS to work with the TT-IBP to develop optimal configurations for the PMT.
- Since 2004, transmissions from inactive IDs are no longer charged (decision at JTA-27). The meeting noticed that in 2011 the number of IDs in Inactive status increased greatly compared to 2010. More than 390 PTTs were counted every month to 189 PTTs in 2010, representing 137.47 PTT-year. Mainly "Animals & Drifters" platforms benefit from this service, continuing to transmit even when the data is no longer useful to the project. These PTTs are increasing the system occupancy. CLS insisted again on the recommendation to users and manufacturers to consider this by programming their PTTs for the duration of the experiment.
- The 5-Year financial Plan for 2010-2014 was reviewed. It was noted that the 2011 cost attributed to JTA had decreased, versus 2010, by 3.7% to 6.88 M€. Opposite to that was the JTA income 7.44 M€, a decrease of 5.9% due to the tariff reduction adopted in 2010 and also a significant decrease in the buoy activity caused by technical failures, partly compensated by the retention of the Unused ID fee.

  The resulting positive surplus for 2011 of 0.57 M€ was added to the cumulated balance in the 5-Year Plan to an amount of 2.98 M€.
- The Meeting reviewed the projection for 2012 in the 5-Year Plan, calculated on the basis of a 7-month of usage and extrapolated until the end of the year. The projection

of the results was negative by a 10% decrease in terms of overall PTT-years consumption with a relative stability of the number of active IDs, based on the following observations:

(i) the buoys program are facing significant decrease due to technological issues currently being recovered both by GDP and manufacturers, the observed decrease is 19% on GDP and 10% on the non large programs. Two manufacturers ceased their activity. Meanwhile the ARGO program is behaving well under plans;

(ii) the Wildlife activity has compensated such oceanography issues until 2011. In 2012, the wildlife consumption is facing also a reduction in growth, growth limited to 1.6%, due mainly to the lack of equipment on the manufacturing side, available for procurement and deployment, refraining the activity from growth. Actions have been done by CLS to search for new manufacturers i.e. in Russia, China and France;

(iii)the number of fixed stations is stable.

The JTA income was expected to be 6.82 M€, which was in the original 5Y Plan. The additional revenues are expected to be around 300 K€, based on the invoicing of unused IDs, making the overall expected income 7.12 M€.
The JTA costs have been closely controlled in 2012 and it is anticipated that the Argos basic costs attributed to JTA could be limited to 7.2 M€ (increase 4.7% compared to 2011), resulting in a small negative year-end balance of 0.08 M€ and a net accumulated balance of 2.89 M€.

Despite a significant risk, the expected financial situation for 2012 was considered safe, with a significantly positive accumulated balance due to cost savings performed in 2011 and already anticipated in 2012, and the Meeting decided to follow the 5-Year Plan for 2013 and requested CLS to continue monitoring the risks continuously.

The Terms and Conditions of the 2013 Global Agreement were adopted accordingly, only changing the year (2012 into 2013) and the number of days (366 to 365).

<u>Proposed Forum of Satellite Telecommunication Users</u>:

- The meeting noted the outcome of the preparatory workshop for the establishment of an international Forum of users of satellite data telecommunication systems (Satcom Forum), which was held in Toulouse, France, from 23 to 27 April 2012.
- The meeting recalled that the future Forum is meant to provide an international mechanism, covering the wide user base that exists within the co-sponsoring Organizations, to address remote data communication requirements – including tariff negotiations as needed – for automatic environment observing systems using satellite data telecommunication systems (Satcom systems). Regarding tariff negotiation issues, the workshop agreed that the current Argos Joint Tariff Agreement (JTA) can eventually operate as an independent sub-group of the future Forum.
- The workshop reviewed the draft Terms of Reference of the Satcom Forum and proposed some changes. It also drafted operating principles, and updated the work plan leading to the formal establishment of the Forum by the co-sponsoring Organizations.

- Mr Grooters reported that the co-chairs of Opscom-46 have decided to review the draft ToR of the Forum as this was discussed and agreed by the preparatory SATCOM Workshop and to submit their comments to the JTA "for further distribution with the intention to clarify the Argos JTA relationship to this (future) Forum so that the activities may be run in a constructive and efficient way". The JTA reviewed the proposed changes, proposed some adjustments, and agreed with the changes proposed (see Annex).
- The JTA agreed to reword as follows Section 2.2 of the Operating Principles in order to reflect the reality of the Argos JTA status: *"The Argos Tariff Agreement (JTA) exists under the Argos OPSCOM authority. The Argos JTA contributes as a sub-programme of the Forum on the basis of the ToR and Operating Principles of the JTA agreed upon at the 31st session of the JTA. Its scope is to address requirement for using the Argos system, and to provide a mechanism for negotiating Argos Tariff amongst Argos governmental users."*
- The JTA noted tentative plans to organize the *ad hoc* Satcom Forum meeting in conjunction with the DBCP and JTA meetings in fall of 2013. The JTA invited the Secretariat to consider organizing the Forum before the DBCP-29.

<u>JTA Operating Principles</u>

- The Meeting reviewed the JTA Operating Principles and approved them with modifications as proposed by the Chairman.
  The Meeting reaffirmed that JTA's international status should be maintained and enhanced, and should seek continued WMO and IOC involvement and visibility.

<u>Elections</u>

- The Meeting reelected Mr. Frank Grooters as the Chairperson, and Mr. Eric Locklear as its Vice-Chairperson. Following the Terms of Reference, both persons should hold office until the end of JTA-33.
- The Meeting also re-elected the members of the JTA Executive Committee.

<u>On the JTA Executive Committee</u>:

- The JTA Executive Committee, established at JTA-29 in 2009, has proven to be a very effective and efficient tool during the inter-sessional period. It has, for instance, reduced the number of pending and continuous action items reduced from 32 in 2010 to 10 in 2013.

- The JTA-EC held his 7th meeting on the 9th of October to review the results of JTA-XXXII and to decide on the issues to be discussed at the (mid-term) 8th meeting of the JTA EC.
- At the kind invitation of NOAA, the 8th Meeting of the JTA EC was held in Annapolis, Maryland, USA, 16-18 April 2013. The EC reviewed the Action Items from JTA-32, Issues from the 6th and 7th Meeting of the JTA EC, the JTA Operating Principles and the status of the Five Year Plan for 2010-2014. Also the upcoming meeting of the ad-hoc Forum of Users of Satellite Data Telecommunication Systems (Paris, 3-4 October 2013), the status of the project for the management of Argos IDs and the proposed

upgrade of the Argos regional antenna network, in relation with specific user requirements, were discussed.

- The EC further agreed on the agenda for JTA-XXXIII, together with the supporting documentation.
- The Committee noted that the Global Drifter Programme is still negatively affected by manufacturing problems, but that engineering improvements have been implemented and are currently tested. It is expected that the number of drifters array will increase, starting next year.
- The decrease in number of Platform Years in the 5-Year Plan, compared to the projections, are mainly attributable to the engineering problems with the drifting buoys, as the animal tracking has increased. The financial effects on the 5-Year Plan will be presented by CLS at Opscom-47.
- The Executive Committee was presented by CLS on the progress in the Real Time Antenna Optimization Project and noted with appreciation that a possible solution for the installation of an additional antenna (Easter Island) might be found.
- The EC decided to request the Chairman of the ad-hoc Forum Meeting to prepare a presentation on the preparation and objectives of the meeting in order to provide the members at JTA-33 the necessary information for preparing a JTA-position at that meeting. The JTA will also present the changes to the ToR of the Forum, as proposed by the Opscom co-chairs.
- The Executive Committee reviewed the JTA Operating Principles and suggested amendments which will be presented to and discussed at JTA-33.
- The management for the recycling of unused IDs has been very successful, resulting so far in more returned IDs than expected, providing CLS with a longer period in which the new type ID can be redistributed to the user community.

Annex (of Annex V)

PROPOSED CHANGES TO THE TERMS OF REFERENCE OF THE SATCOM USERS FORUM

Comments made by the Opscom co-chairs to the draft SATCOM Forum ToR

The co-chairs of Opscom-46 have decided to review the draft ToR as this was discussed and agreed by the preparatory SATCOM Workshop and to submit their comments to the JTA "for further distribution with the intention to clarify the Argos JTA relationship to this (future) Forum so that the activities may be run in a constructive and efficient way".
The comments made by the Opscom co-chairs read as follows:

- *Page 1 – Section 1 last bullet: we would recommend that the bullet ("Recommended certain providers for certain requirements ?") be reworded into "Maintain an up to date matrix of the compatibility between the proposed capabilities of the different systems and the user requirements" so that the forum does not appear as interfering with the negotiation that the users may have with the different operators;*
- *Page 1 – Section 3: What is understood as DCP service and the type of cooperative mechanisms which are addressed in this section is unclear.*
- *Page 2 – Section 8: reference is made to stakeholders in this section but there is no definition of such stakeholders; such a definition should be introduced in order to guarantee consistency with the membership rules which are described at the end of Page 2. Since the ToR make reference to the operating principles, the draft version of the operating principles have been reviewed by the Argos OPSCOM co-chairs and the resulting comments are here below:*
    - *Page 2 – Section 2.2 – In order to reflect the reality of the Argos JTA status, it is requested that the section is reworded into "The Argos Tariff Agreement (JTA) exists under the Argos OPSCOM authority. The Argos JTA contributes as a sub-programme of the Forum on the basis of the ToR and Operating Principles of the JTA agreed upon at the 31st session of the JTA. Its scope is to address requirement for using the Argos system, and to provide a mechanism for negotiating Argos Tariff amongst Argos governmental users."*

The OPSCOM co-chairs thank you in advance for transmitting the here above provided comments and request for rewording.

[Proposed changes *BY JTA* are highlighted in yellow]

The International Forum of users of satellite data telecommunication systems is an entirely self-funded body jointly sponsored by the World Meteorological Organization (WMO) and the Intergovernmental Oceanographic Commission (IOC) of UNESCO, of the United Nations in the view to address the requirements of these two Organizations for the timely collection of environment data from observing platforms.

Main goals

- It ensures proper coordination amongst the users of satellite data telecommunication systems and represents their collective interests in working with the satellite telecommunication service providers in order to advance the awareness and understanding of user requirements
- to advance the awareness and understanding of available and planned capabilities
- to facilitate adoption of interoperability and quality standards and principles
- to provide guidance to best meet user needs of each considered application.

Activities

The Forum shall:

1. Review available technologies, share experiences, and address the following requirements in the view to document capabilities, and identify strengths and weaknesses of the different satellite data telecommunication systems to address the requirements of specific uses.

    - Global and regional coverage; specifically polar regions and third pole
    - Network services and data access technology;
    - Data transmitter technology, including radio-frequencies, interface programming, and electric power consumption;
    - Data transmission rates;
    - Data transmission quality;
    - Real-time capability and data timeliness;
    - Location capability;
    - One-way vs. two-way data communication;
    - Ground segment data processing, quality control, and distribution requirements;
    - Data collection, and ground segment data processing pricing;
    - Etc.
    - Reliability
    - Future developments / maintaining current system
    - Size
    - Bandwidth

    - Maintain an up to date matrix of the compatibility between the proposed capabilities of the different systems and the user requirements

2. If appropriate, propose common approaches for specific user needs, and identify the best and more cost-effective satellite data telecommunication systems options to be used for the relevant observing platforms;

3. Make proposals for establishing cooperative mechanisms through the Data Collection Platform (DCP) services of meteorological satellites;

[Item 3 above needs to be clarified; define DCP; define what cooperation mechanisms are proposed]

4. Facilitate negotiations between users and the satellite data telecommunication system operators for

    - Inclusion of specific user requirements in their respective development programmes;
    - Continuity of cost-effective data telecommunication services by encouraging tariff negotiating schemes such as the existing Argos Joint Tariff Agreement (JTA).

5. Facilitate negotiations with the manufacturers of platform transmitters for the inclusion of specific user requirements in future models of the transmitters;

6. Review and agree on its operating principles. The operating principles define the aims and principles of the Forum; the roles and responsibilities of the stakeholders and the Secretariats of the co-sponsors; the Terms of Reference of the Executive Committee; the structure and frequency of meetings; and their desired outcome; as well as the reporting procedure of the Forum;

7. Elect a Chairperson and vice-Chairperson from its participants;

8. Elect an Executive Committee, chaired by the Forum's Chairperson, and including the vice-Chairperson, and stakeholder representatives; Amount of users/service providers?

[In item 8 above, the stakeholders need to be defined; operating principles of the Satcom Forum should make reference to the operating principles of the JTA]

9. Report through the Chairperson to the Executive Bodies of the Co-Sponsor Organizations, and submit its recommendations as appropriate for their agreement;

Decisions shall be agreed unanimously by the Forum. If decisions cannot be agreed unanimously, they will be deferred to the Executive Committee for further discussion and decision.

Membership:

Membership is open to all representatives of the co-sponsors stakeholders. Invitations to participate in the Forum are issued by the Secretariats of the co-sponsors to their respective Members/Member States, as well as to their relevant programmes and bodies. Representatives of the satellite data telecommunication providers, and the platform transmitter manufacturers can participate in the Forum as observers. Representatives of the Secretariats of the co-sponsors participate as ex-officio members of the Forum.

These Terms of Reference are agreed upon by the Executive Bodies of the Co-sponsors.

_____

ANNEX VI – LIST OF ACTIONS

1. Status of open actions from previous JTA Sessions

No.	Ref. (agenda item)	Action/decision item	By whom	Deadline	Status
J30#1	J30/3.1.2	Design a strategy for improving ROC participation, particularly comprising animal trackers and other type of users	JTA-EC	JTA-EC-8	Completed
J31#2	J31/4.7	Action: users and manufacturers are urged to consider programming their PTTs to switch off after they have ceased to collect useful data	Users, manufac-turers	April 2013	Closed (new action proposed)
J31#3	J31/5.3	Action: EC and NESDIS to investigate negative trend in data timeliness from NOAA-18 and -19	CLS, Scott Rogerson	By EC8	Closed
J31#4	J31/5.8	Action: DBCP to report to JTA-EC on its needs, if any, for access to archived raw data	Chair DBCP	By JTA-33	Pending. TC DBCP will inform CLS on DBCP investigations
J31#5	J31/5	Action: CLS to investigate extending the online availability of Argos data beyond the current 10-day cut-off	CLS	By JTA-33	Completed
J31#6	J31/5.15	Action: activities by CLS to recover unused IDs to continue	CLS	Ongoing	Closed
J31#17	J31/10	Action: CLS and Secretariat to consider if a suitable international/intergovernmental body exists that might represent the needs of wildlife trackers (e.g. UNEP, CBD) within the JTA	CLS, assisted by Secretaria t	JTA-33	Closed

No.	Ref. (agenda item)	Action/decision item	By whom	Deadline	Status
J32#1	J32/5	CLS to approach the wildlife community and invite them to consider best practices to limit impact of inactive PTTs	CLS	EC-8	Closed
J32#2	J32/5	Investigate what reasonable percentage of inactive PTTs could be acceptable	CLS	EC-8	Closed
J32#3	J32/5	Study further the online data access issue during intersessional period, and provide recommendation to JTA	JTA-EC	JTA-33	Closed
J32#4	J32/5	Survey requirements for online data access again through the ROCs (informing them that a new charge might be introduced) to the users	CLS & ROCs	EC-8	Completed (by CLS)
J32#5	J32/11	EC to ensure adequate interaction with the secretariat regarding the development of the IOC/WMO satellite communications forum	JTA-EC	JTA-33	*Closed*
J32#6	J32/6	Action: to address the issue of installing an antenna on Easter Island, and possibly propose solutions at the next JTA meeting	JTA-EC	JTA-33	[Request the EC to consider modes of financial support for this activity]

3 – Action items from JTA-EC-8

No. (JTA-EC-8)	Ref.	Action item	By whom	Deadline	Comment

No. (JTA-EC-8)	Ref.	Action item	By whom	Deadline	Comment
3	JTA-EC-6	To contact the DBCP Chair, to request to add discussion on the outcome of the Argos-3 Pilot Project to the DBCP-28 agenda (action).	Chair	31 May 2012	Closed
7	JTA-EC-6	To write to the Secretariat, to reaffirm that the JTA can continue to operate as an independent body under the Forum once established, and express the desire to have other communities (e.g. biologists, animal trackers, who are also using Argos and other Satcom systems) involved in the future Forum	Chair	1 Jan 2013	No letter was sent. Email communication took place between JTA Chair and Satcom committee Chair
8	JTA-EC-6	To invite the Satcom Forum interim committee Chair to invite the World Wide Fund (WWF) or other suitable body to the Forum, to seek their support to the Forum, and to send the final report of the Satcom Preparatory workshop to the WWF and other appropriate bodies	Chair	1 Jan 2013	Completed

4. Actions and decisions of the present JTA-33 meeting

No. (JTA-33)	Ref. (JTA-33)	Action/decision item	By whom	Deadline	Comment
J33#1	3	To work with the manufacturers to make sure that they take into account the Argos 2-way telecommunication specifications in such a way that the PTTs can switch off after they have ceased to collect useful data	CLS	JTA-34	
J33#2	3	DBCP to provide Argos 3 Pilot Project report	DBCP Chair	JTA-34	
J33#3	7.13	JTA EC to consider the large programme situation for 2013 at its next meeting and find a way forward to address the 1200 threshold issue	JTA-EC	JTA-34	
J33#4	7.12	CLS to manage the cost in the view to control the losses to the minimum	CLS	JTA-34	
J33#5	7.12	User communities to take steps to possibly increase their Argos usage	Argos users	JTA-34	
J33#6	7.14	To refine the proposal for the format of the next FYP to be discussed at the mid-year 2014 JTA-EC meeting, and submitted to the next JTA Session	CLS	JTA-EC-10	
J33#7	7.14	To populate the new FYP according to the draft format proposed by JTA-EC	CLS	JTA-34	

No. (JTA-33)	Ref. (JTA-33)	Action/decision item	By whom	Deadline	Comment
J33#8	7.14	To discuss the proposal of CLS concerning the format of the next FYP	JTA-EC	JTA-34	
J33#9	9.7	Assist users with regarding to the estimation of Argos costs for research proposals (shark community in particular)	CLS	Ongoing	
J33#10	9.6	To approach groups representing the wildlife community, including Movebank in the view to seek their participation in the JTA to represent the animal tracking community	JTA-EC	JTA-34	
J33#11	9.4	To address the issues identified in the national reports session	CLS	JTA-34	
J33#12	9.5	To consider the same issues to also be considered as part of the Terms of Reference of the new proposed Task Team on Best Practices for Wildlife Argos Applications	JTA-EC	JTA-34	
J33#13	9.8	to propose Terms of Reference and membership of the TT-Wildlife for discussion and possible adoption at the next JTA Session	JTA-EC	JTA-34	

ANNEX VII - REPORT ON THE 2013 AGREEMENT

(submitted by CLS)

Country Name	Buoys & Others		Floats	
	Average Active PTTs/Month	PTT YEARS	Average Active PTTs/Month	PTT YEARS
AUSTRALIA	**29**	**13,36**	**267**	**16,90**
BOTSWANA				
BRAZIL	**0**	**0,01**		
CANADA	**38**	**28,47**	**86**	**5,59**
CHILE	**0**	**0,05**	**0**	**0,04**
CHINA	**21**	**12,00**	**112**	**9,88**
DENMARK				
FINLAND	**3**	**2,78**	**5**	**0,18**
FRANCE	**108**	**64,91**	**229**	**15,39**
GERMANY	**23**	**9,46**	**165**	**9,53**
INDIA	**29**	**19,30**	**79**	**5,93**
ITALY	**10**	**4,03**	**7**	**1,20**
KOREA, REPUBLIC OF	**7**	**4,59**	**83**	**5,64**
NETHERLANDS	**1**	**0,04**	**35**	**2,58**
NEW ZEALAND	**3**	**2,26**		
NORWAY	**12**	**3,58**		
OTHERS	**6**	**0,57**	**3**	**0,43**
PORTUGAL	**0**	**0,00**		
RUSSIAN FEDERATION	**1**	**1,08**		
SOUTH AFRICA	**3**	**0,28**	**1**	**0,05**
SPAIN	**18**	**8,52**	**34**	**2,12**
SWEDEN	**1**	**0,12**		
SWITZERLAND				
TANZANIA, UNITED REPUBLIC OF				
UNITED ARAB EMIRATES				
UNITED KINGDOM	**22**	**11,44**	**143**	**8,16**
UNITED STATES	**1643**	**1197,88**	**1623**	**145,17**
Total général	**1981**	**1384,75**	**2871**	**228,79**

Table 1a: Average number of active PTTs per month and total PTT-years per country and per PTT category, in 2012 (First half table)

Country Name	Animals		Fixed Stations	
	Average Active PTTs/Month	PTT YEARS	Average Active PTTs/Month	PTT YEARS
AUSTRALIA	425	76,15	11	10,20
BOTSWANA	10	1,61		
BRAZIL	37	8,23		
CANADA	1595	155,14		
CHILE	19	1,75		
CHINA	34	5,01	1	0,61
DENMARK	47	6,05	2	2,09
FINLAND	35	3,52		
FRANCE	106	23,02	26	16,94
GERMANY	130	24,51		
INDIA	24	3,81		
ITALY	44	6,78	12	10,38
KOREA, REPUBLIC OF	9	1,12	2	2,20
NETHERLANDS	13	2,31	38	18,13
NEW ZEALAND	27	3,30	1	1,00
NORWAY	86	8,24		
OTHERS	17	2,48		
PORTUGAL	24	3,18		
RUSSIAN FEDERATION	30	6,58		
SOUTH AFRICA	96	17,77		
SPAIN	331	49,91		
SWEDEN	16	2,76		
SWITZERLAND	28	3,45		
TANZANIA, UNITED REPUBLIC OF	5	1,06		
UNITED ARAB EMIRATES	451	100,27		
UNITED KINGDOM	260	45,70		
UNITED STATES	3155	438,65	75	66,16
Total	7051	1002,37	168	127,71

Table 1b: Average number of active PTTs per month and total PTT.years per country and per PTT category, in 2012 (Second half table)

All Applications, All Countries Average Active PTTs/Month	All Applications, All Countries PTT-YEARS
12 071	2743,61

Table 1c: Average number of active PTTs per month and total PTT.years all countries and all categories, in 2012

1. **1. Average active PTTS per month per country: Extrapolated 2013 compared to 2012**

Country Name	Average 2012 Active PTTs/Month	2013 Extrapolated Active PTTs/Month
AUSTRALIA	**731**	**666**
BOTSWANA	**10**	**8**
BRAZIL	**37**	**25**
CANADA	**1719**	**1468**
CHILE	**20**	**19**
CHINA	**169**	**197**
DENMARK	**49**	**54**
FINLAND	**42**	**40**
FRANCE	**470**	**433**
GERMANY	**317**	**261**
INDIA	**132**	**118**
ITALY	**73**	**68**
KOREA, REPUBLIC OF	**101**	**95**
NETHERLANDS	**87**	**88**
NEW ZEALAND	**31**	**58**
NORWAY	**98**	**79**
OTHERS	**26**	**35**
PORTUGAL	**24**	**14**
RUSSIAN FEDERATION	**31**	**43**
SOUTH AFRICA	**100**	**108**
SPAIN	**384**	**384**
SWEDEN	**17**	**17**
SWITZERLAND	**28**	**25**
TANZANIA, UNITED REPUBLIC OF	**5**	**3**
UNITED ARAB EMIRATES	**451**	**476**
UNITED KINGDOM	**426**	**450**
UNITED STATES	**6496**	**6588**
Total général	**12071**	**11820**

Table 2: Average number of Active platforms per month and per country, actual in 2012 and extrapolated in 2013 from January-July average

An active PTT is a PTT which transmitted at least once in a month. The average is the total number of Active PTTs divided by number of months.

It is estimated there will be 2% decrease in number of active platforms based on the extrapolated 2013 usage.

2. **2. Extrapolated 2013 Consumption per country (PTTs.years) compared to 2012**

Country Name	Actual PTT YEARS 2012	Extrapolated PTT YEARS 2013
AUSTRALIA	**116,61**	**111,31**
BOTSWANA	**1,61**	**1,47**
BRAZIL	**8,25**	**5,96**
CANADA	**189,21**	**158,99**
CHILE	**1,84**	**1,55**
CHINA	**27,50**	**37,31**
DENMARK	**8,14**	**8**
FINLAND	**6,48**	**6,19**
FRANCE	**120,25**	**91,33**
GERMANY	**43,50**	**37,18**
INDIA	**29,03**	**28,74**
ITALY	**22,40**	**19,51**
KOREA, REPUBLIC OF	**13,55**	**10,14**
NETHERLANDS	**23,06**	**24,42**
NEW ZEALAND	**6,56**	**7,68**
NORWAY	**11,82**	**10,32**
OTHERS	**3,76**	**6,02**
PORTUGAL	**3,19**	**1,66**
RUSSIAN FEDERATION	**7,66**	**8,34**
SOUTH AFRICA	**18,10**	**21,27**
SPAIN	**60,55**	**64,39**
SWEDEN	**2,60**	**2,38**
SWITZERLAND	**3,45**	**3,15**
TANZANIA, UNITED REPUBLIC OF	**1,06**	**0,35**
UNITED ARAB EMIRATES	**100,27**	**110,75**
UNITED KINGDOM	**65,30**	**67,47**
UNITED STATES	**1847,85**	**1735,39**
Total général	**2743,61**	**2581,27**

Table 3: Numbers of PTT.years Actual consumption in 2012 and extrapolation for 2013 based on January-July actual consumption

The PTT-years are the numbers of day units with time slot calculation where appropriate divided by 365 days

It is estimated there will be 6% decrease in number of PTT-Years based on the extrapolated 2013 usage.

3. 3. Consumption evolution over 1 year

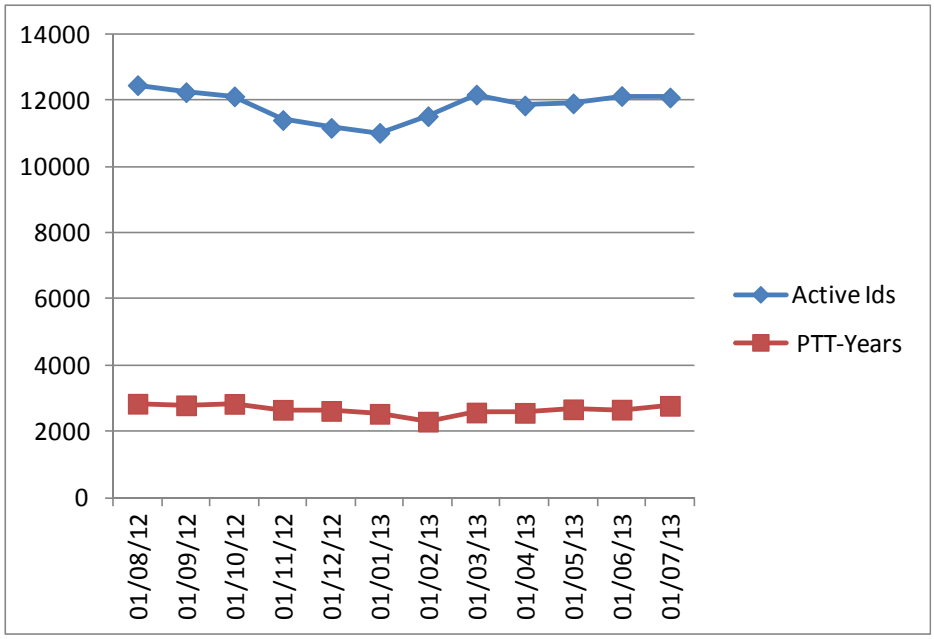
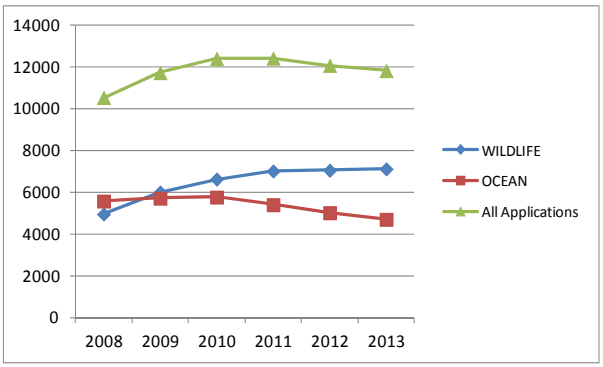


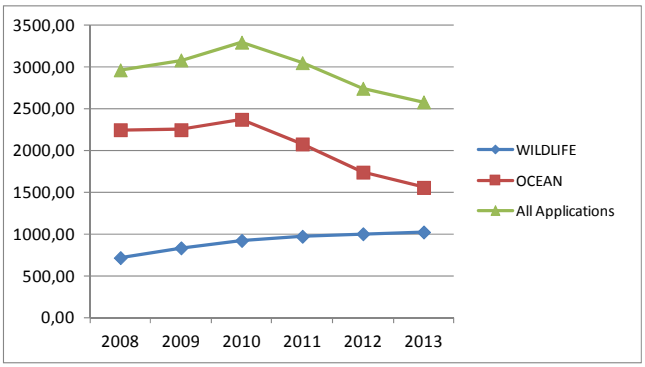
Figure 1: Consumption evolution over the previous 12 months in Active PTTs and PTT.years

The charts below show the trends in the past five years with the extrapolated 2013 usage.

Active PTT



PTT-Year



The decrease of the consumption over the last 3 years is mainly due to reduced buoy deployments. Although there is a continuing increase, in Wildlife number of PTTs deployed and corresponding consumption, it hasn't been sufficient to compensate for the total reduction of PTT-years.

4. 4. Monthly evolution by platform category

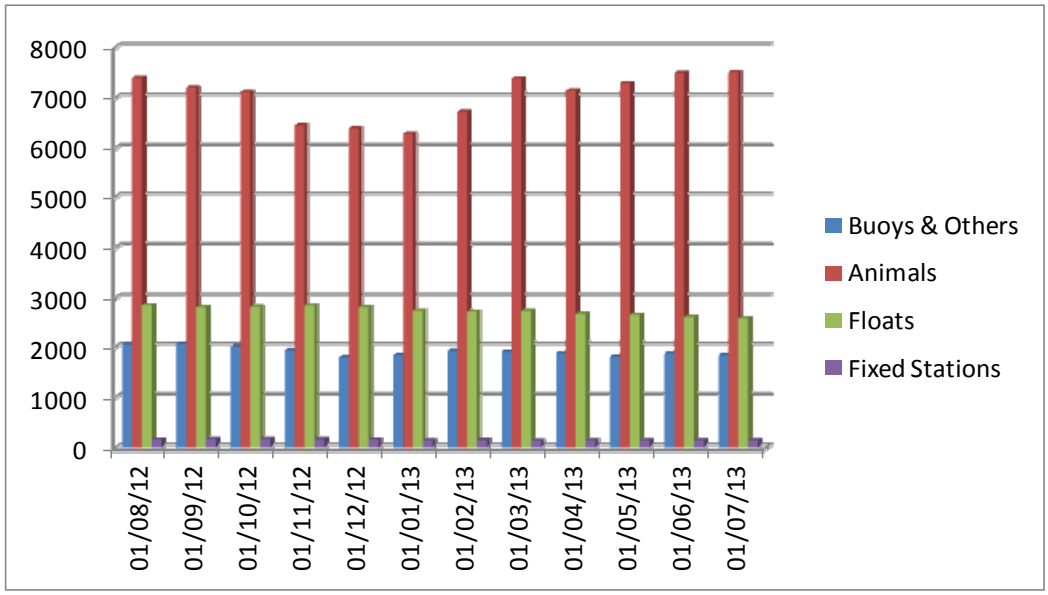


Figure 2: Active PTT evolution for 12 months

Overall, the active PTTs and thus the number of transmitters in the field are stable.

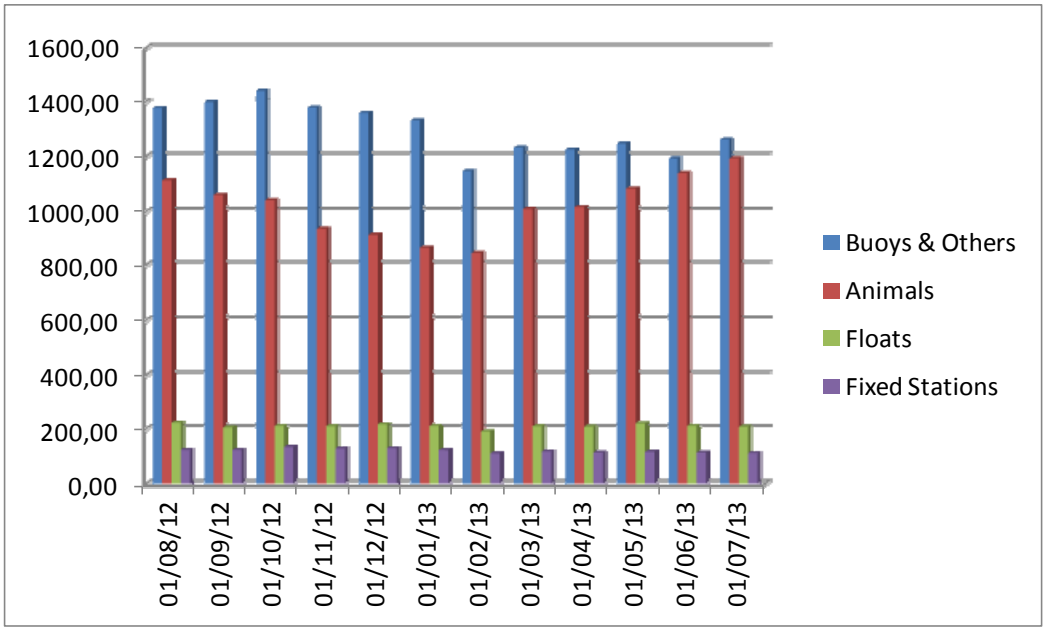


Figure 3: PTT-years evolution for 12 months

The PTT-years picture shows the differences in terms of actual consumption among categories:

- Consumption of “Animals” continue to progress and almost match those of “Buoys & others” category which started dropping in 2010 (as showed in figure 4 below). This year the animal consumption increase is expected to be 2.2%.
- “Floats” consumption is decreasing by 20 PTT-years (9%) compared to 2012
- “Fixed Stations” consumption in PTT-years remains stable.

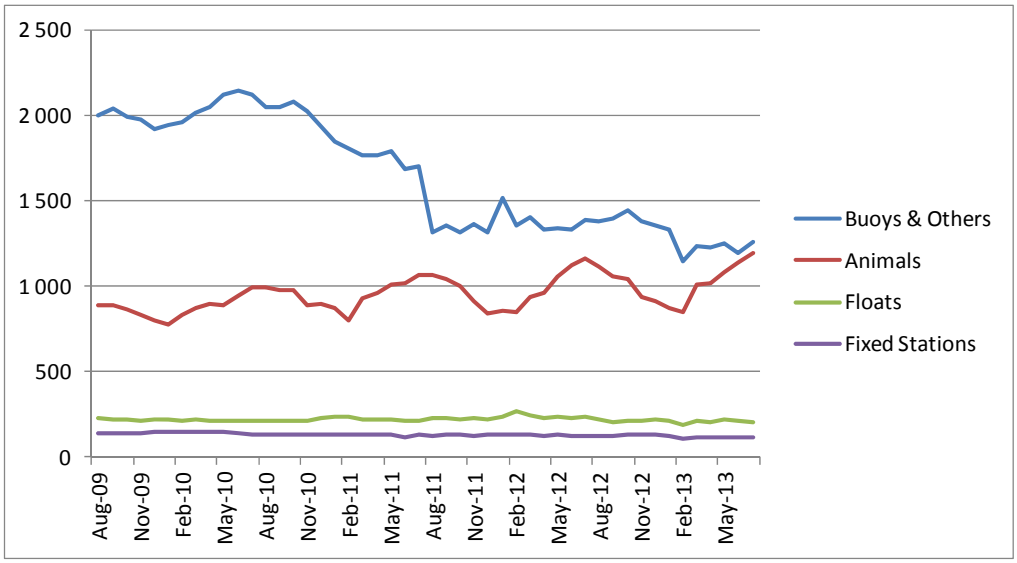


Figure 4: PTT-years evolution for 4 years

5. 5. Time slot analysis

In order to take into account the platforms' emission cycles, a system of time slots accounting has been implemented in 2005.
The day is thus divided into 4 time slots, each with a duration of 6 hours
(UTC Time). Any PTT transmission collected into a given time slot produces 0.25 day
units.

"Animals and Sub floats" Platforms have benefited from time slot accounting since 2005. "Buoys & Others" and "Fixed Stations" started benefiting from time slot accounting in 2007.

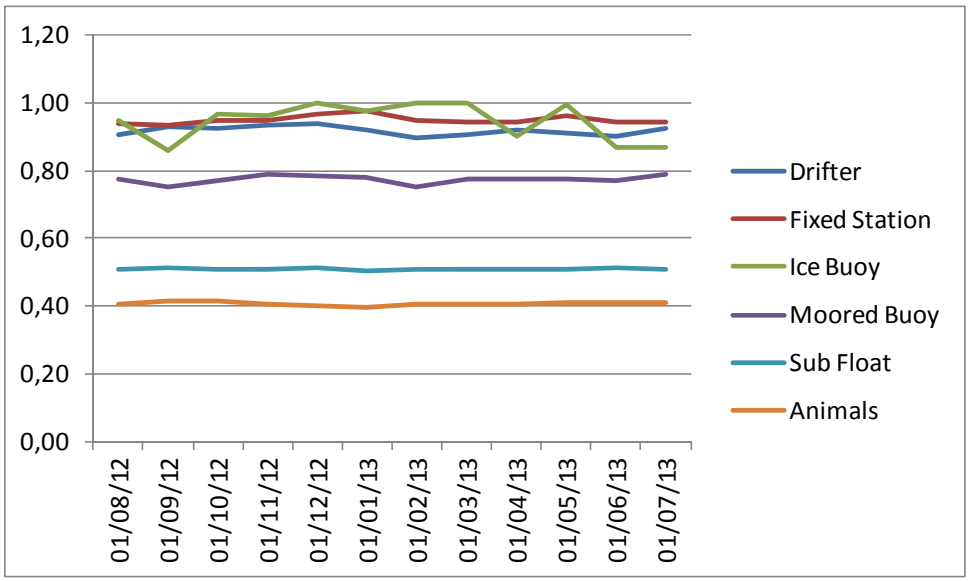


Figure 5: Average time slot level by platform category

This diagram shows the monthly evolution of the average time slot ratio for the all platforms categories.
For a given PTT, the monthly time slot ratio is calculated as the number of day units divided by the number of transmission days in the month.

It can be noticed that all "Animals" and "Sub Floats" categories are significantly benefitting from the time slots. As an average "Animals" PTT are transmitting 41% of the day, Moored Buoys are

transmitting 80% and “Sub Floats” PTT are transmitting 51% of the day. Other categories of platforms keep transmitting 94% of the day.

6. 6. Impact of the 12 day.unit capping

Further to JTA XXVII decision the consumption for animal platforms is capped at 12 day-units (48 time slots).

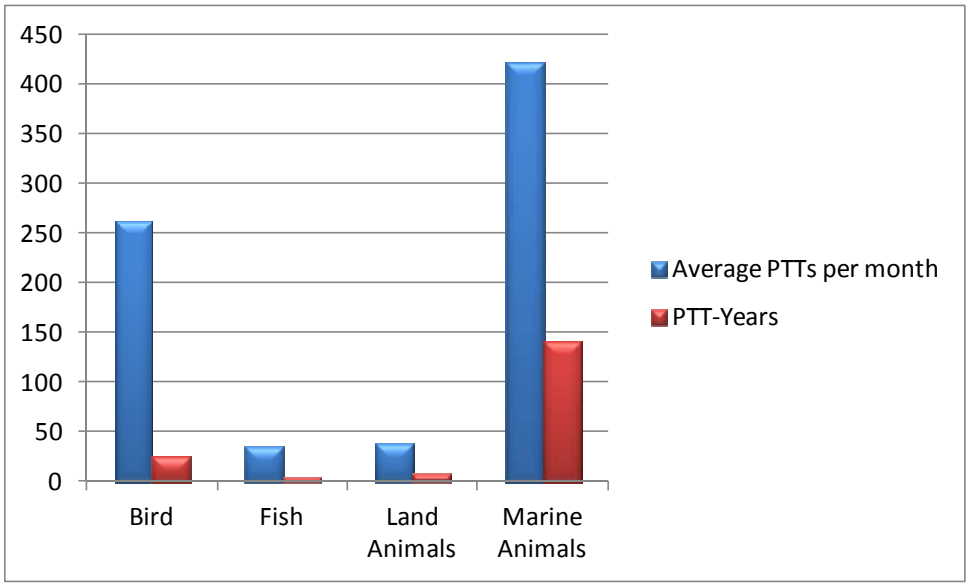


Figure 6: Average PTTs affected and PTT-years “gain” by animal category

In 2012, **757** PTTs (average active PTT per month) took advantage of the capping, representing **192 PTT-years**. The number of animals taking advantage of the capping is remaining stable: 757 in 2012, compared to 777 in 2011.

For 2013 the capping represents a projected impact of **172 PTT-years.**

7. 7. Inactive status:

Recall: since year 2004, transmissions from Inactive IDs are no longer charged.

As stated in the Terms and Conditions of the Global Agreement, this status is intended for those platforms that continue to transmit but for which the location or data collection are of no further use to the user or the community. The following conditions must be met to qualify:

(*1) Inactive Status will apply if, and only if, Inactive Status is declared by the signatory of the System Use Agreement for platforms which continue to transmit beyond the programme termination. In that case, further charges will no longer be levied.*

(2) The platforms must have operated in Basic Service for a minimum of 2 months.

(3) Data or location information cannot be retrieved nor can the platform revert to any category of service.

(6) It is intended that Location and/or data collection may not be computed using a Local User Terminal or other direct readout facility.

(7) ID numbers of such platforms are actually returned to CLS who will recycle them after the platform stops transmitting.

If the number of Inactive PTTs greatly increased in 2011, we can note that in 2012 the number of IDs in Inactive status remain stable compared to 2011: 417 Ptts are counted every month (compared to 390 in 2011) representing 109.14 PTT-year.

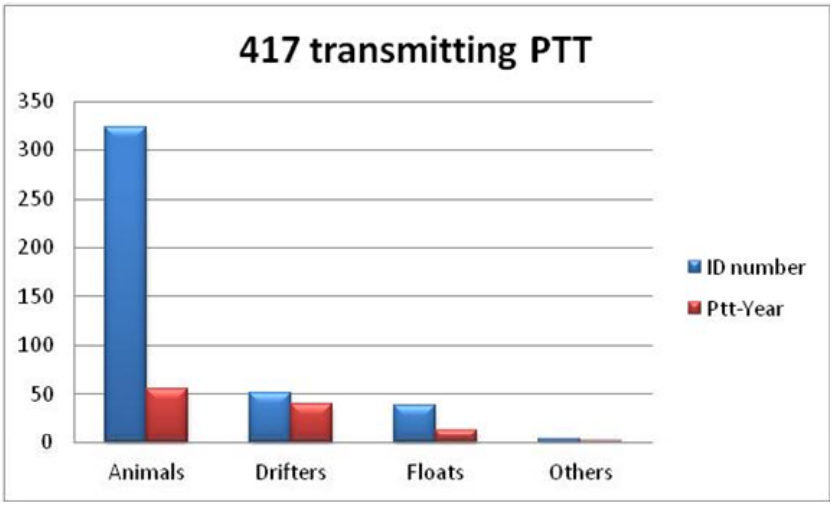


Figure 7: Inactive PTTs in term of number of IDs and PTT-Years for 2012

As mentioned in previous JTA reports, these PTTs which are unused but are still transmitting are increasing the system occupancy. CLS keeps highlighting this to the users and manufacturers encouraging them to program their PTTs only for the duration of the experiment.

8. History of the JTA participation from 1982 to 2013

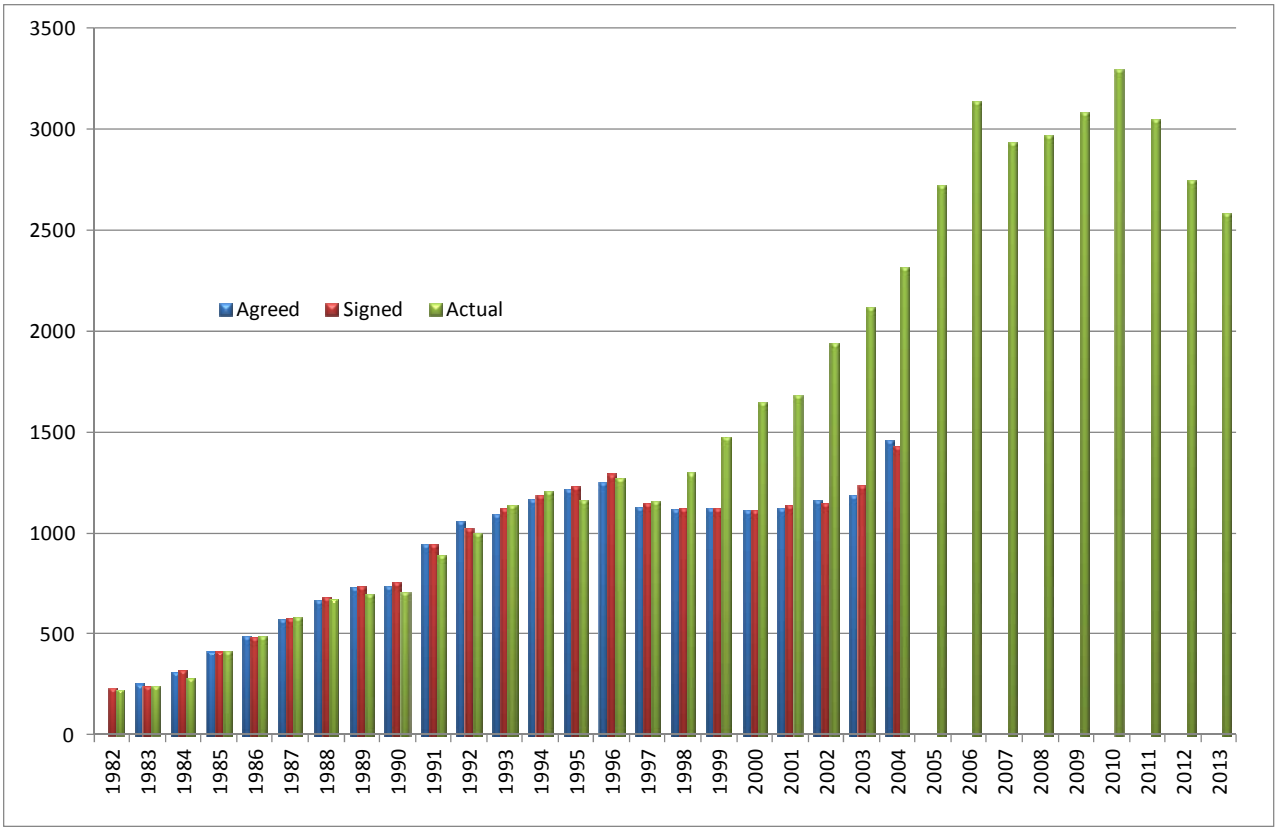


Figure 8: Agreed, signed and actual consumption in PTT-years for all countries

Notes:

1) Since the implementation of the new tariff structure in 2005, we only provide actual consumption.
2) Consumption decreased in 2007 (~46 PTT-year) by applying the time slots to all categories.
3) In 2008 and 2009, the consumption in PTT-years decreased by ~138 PTT-years due to the capping mechanism being applied to all animals, and also by applying the time slots to all categories.
4) The increase in 2010 is due to a combination of increased animal program activity and maximum deployment opportunities with increased buoy lifetimes for the Global Drifter program.
5) The decrease in consumption since 2011 is due to a combination of both premature buoy failures in the Global Drifter program and migration away from Argos (Value for 2013 is a projection based on January to July 2013 consumption).

ANNEX VIII

REPORT ON 2012-2013 OPERATIONS AND SYSTEM IMPROVEMENTS
(Submitted by CLS)

8. 1. 2011-2012 Argos Highlights

1.1. Operations

- The French Argos processing center successfully moved to the new CLS building on October 20th, 2012
- Following almost 11 years of service NOAA-17 (NOAA-M prior to launch) was decommissioned on April 10, 2013
- Collection and Localization Processing/Distribution is operational for METOP-B and SARAL since April 29, 2013
- 2 days of service interruption on the Argos US processing center due to violent storms in the Washington D.C. area (July 2012)
- 5 hours of distribution service interruption (Web/Telnet/Web services) on the Argos French processing center due to air conditioning problems
- Set-up of an Argos-3 platforms activity monthly report for JCOMMOPS
- VGTS tool (GTS processing statistics tool) upgrade to be BUFR format compatible
- Development of a new tool to improve the real-time monitoring of the Argos HRPT antennae network

1.2. System improvements

- 2 new satellites operational with Argos payload:
    - METOP-B (MB) launched September 17, 2012
    - SARAL (SR) launched February 25, 2013
- Argos Real-Time Antenna Network Upgrade Project continues
- The installation of an Argos reference beacon network
- The upgrade of the Argos ground segment for SARAL
- The upgrade of the Argos ground segment for ARGOS-4
- The moving of the Toulouse data center into new facilities
- Argos computed trajectories downloadable on ArgosWeb since July, 2013
- Observations data available via the Argos WebServices since April, 2013
- Development of a new Argos direction finder (goniometer)
- New Argos orbitography module to not use OpenVMS anymore

1.3. Outlook

- Continue optimization of Real-Time Antenna Network
- Online Archive data downloading feature through ArgosWeb (last 12 months available)
- Upgrade of the Oracle database version: Migration to the Oracle 11GR2 version
- The last 20 days of data available on ArgosWeb instead of 10
- A new Android application available for all Argos users to consult on Smartphone/pad their Argos platforms positions
- Development of a low-cost Argos-3/4 chipset development project (SHARC (**S**atellite **H**igh-performance **A**RGOS-3/-4 **R**eceive/transmit **C**ommunication)
- Development of a BCH (Bose, Ray-Chaudhuri et Hocquenghem) message coding/decoding to improve Argos message transmission in noisy regions
- Argos Doppler location algorithmic improvements
- Study to improve the Argos orbitography accuracy

2. **2. Argos space segments**

During 2012, Argos instruments were onboard 6 POES's spacecrafts.

During beginning of year 2013, two spacecraft with Argos-3 payload were launched (METOP-B, SARAL) and one with Argos-2 payload was decommissioned (Noaa-17, NM).

Figure 9: METOP-B launched by Soyuz (left) and SARAL launched by PSLV-C20 (right)

The current status information on each spacecraft and its Argos various subsystems is described as follow:

Satellites	Launch date	Status	Real time data (HRPT)	Stored data (STIP)	Data AVHRR
SARAL (SR)	25-Feb-13	N/A	Ok	Inuvik, Kiruna	N/A

METOP-B (MB)	17-Sep-12	AM Primary	Ok	Svalbard	Ok
METOP-A (MA)	19-Oct-06	AM Backup	Ok/Nok*	Svalbard	Ok
NOAA-19 (NP)	06-Feb-09	PM Primary	Ok	Gilmore, Wallops, Svalbard	Ok
NOAA-18 (NN)	20-May-05	PM Secondary	Ok	Gilmore, Wallops	Ok
NOAA-17 (NM)	24-Jun-02	DECOMMISSIONED on 10 April, 2013			
NOAA-16 (NL)	21-Sep-00	PM Secondary	Ok	Gilmore, Wallops	Ok
NOAA-15 (NK)	13-May-98	AM Secondary	Ok	Gilmore, Wallops	Ok

Figure 10: Argos Constellation

* Scheduled activities are defined on Orbit Switch ON and Switch OFF (see below for more details).

2.1. METOP-A HRPT Switch Zone

To minimize the risk of failure to the AHRPT-B unit whilst still offering the user community a service, EUMETSAT has implemented a "partial" AHRPT service in those areas where the risk of damage from heavy ion radiation is reduced.

For southbound passes, AHRPT side B was activated for all orbits over the North Atlantic and European area, starting at around 60°N. The AHRPT will then be switched off before the spacecraft reaches the Southern Atlantic Anomaly region at around 10°N.

In January 2011, EUMETSAT announced the extension of this activation zone while maintaining the same operational restrictions over the polar caps and South Atlantic anomaly. Furthermore, AHRPT operations will also be made in ascending orbits, but with more stringent risk reduction measures than applied for the descending passes given the availability of data via the Fast Dump Extract System (FDES) to cover the North Hemisphere.

Figure 11 shows the extended activation zone of the AHRPT for both descending and ascending parts of the orbit. The extended AHRPT coverage is effective since 18 January 2011 as a pre-operational service.

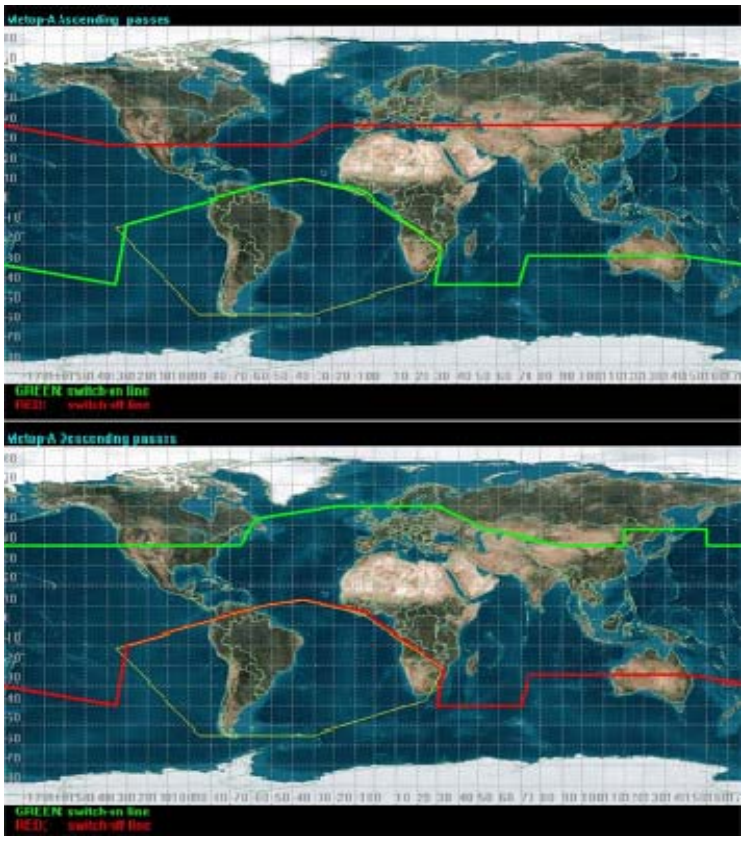


Figure 11 : METOP-A HRPT Extended Switch Zone (Descending and Ascending orbits)

2.2. Ascending Nodes Local hour

The diagram here below presents the local time of ascending notes in April 2013

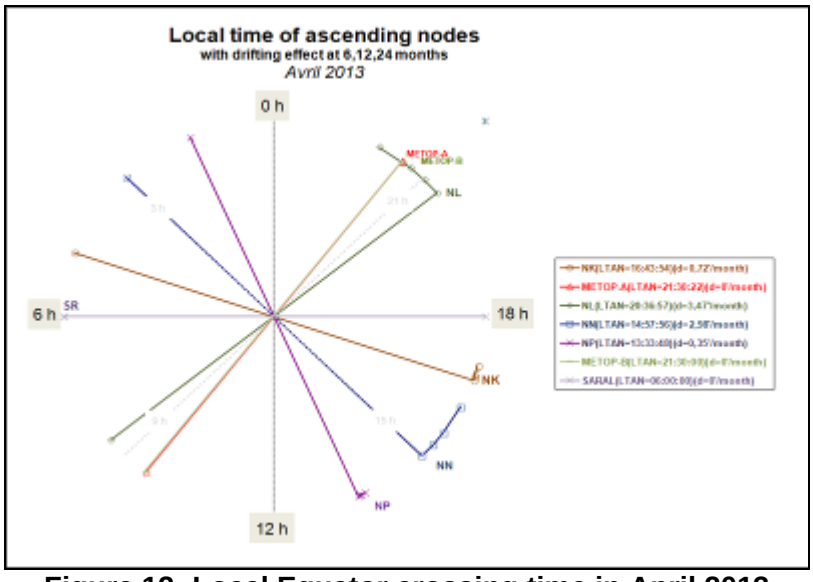


Figure 12: Local Equator crossing time in April 2013

- **Next launches of satellites with Argos instrument**

METOP-C (EUMETSAT) with an Argos-3 instrument in 2017

3. 3. Argos ground segment

3.1. Global antennas (store and forward mode)

The Argos global antennas network is composed by seven stations:

- The two NOAA global stations of Fairbanks and Wallops acquire the global recorded telemetry transmitted by N15, N16, N18 and N19.
- The EUMETSAT global receiving station of Svalbard acquires the global recorded telemetry transmitted by Metop-A and Metop-B as well as the 2 daily blind orbits of N19 for NOAA stations.
- The NOAA Svalbard antenna that delivers NOAA 15/16/18 blind orbits for Fairbanks and Wallops when not in conflict with NOAA-19.
- Inuvik (Canada) and Kiruna (Sweden) stations for SARAL operated by EUMETSAT.

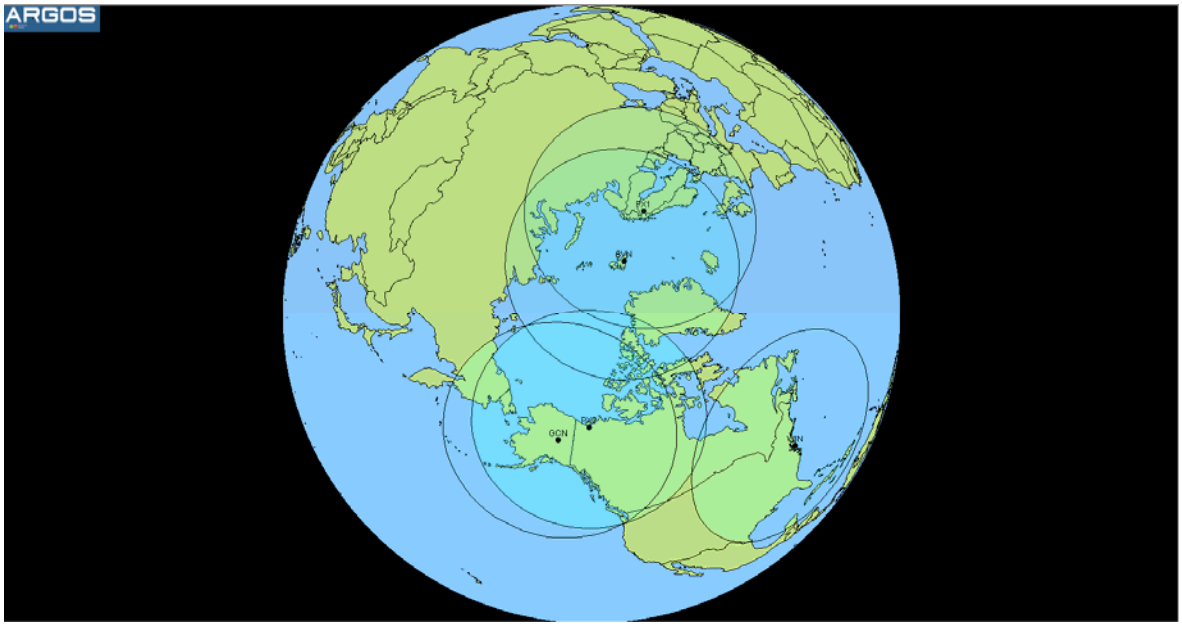


Figure 13 : The Argos Global antenna network (without McMurdo)

- Data recovery from MetOp-B will occur at Svalbard and McMurdo (ADA). Timeliness benefit of McMurdo data recovery is for MetOp-B only. MetOp-A data will continue to NOAA on a best effort basis and without the timeliness benefits of half orbit dumps at McMurdo.

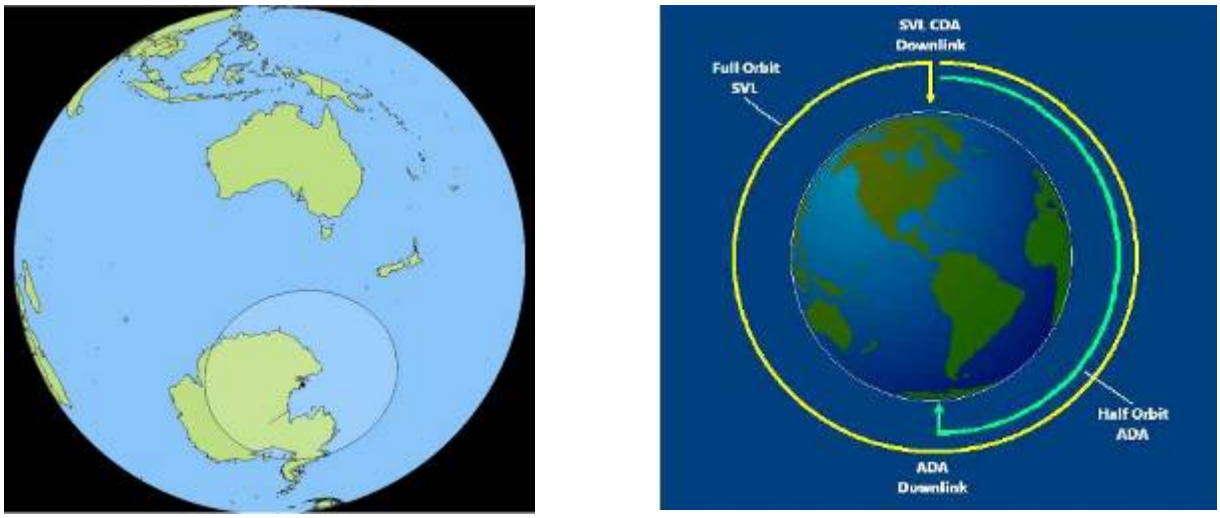


Figure 14 : METOP-B Mc Murdo Global antennas coverage and principle

3.2. Regional antennas (real-time mode)

3.2.1. Operation and improvements

Improvements are still focused on redundancy locations and coverage extension. Today, both Toulouse and Lanham processing centers receive Argos real-time data from 68 stations located all over the world.

In 2012, CLS was still focused on the Real-Time Antenna Upgrade Project that consists of upgrading selected antennas in order to be compatible with NOAA, METOP and SARAL. This project also aims to optimize in terms of performance the real-time receiving stations network.

In 2012-2013, the real-time network is quite steady with 2 new ground stations added:

- Ali al Salem in Kuwait operated by US Air Force
- Soto Cano in Honduras also operated by US Air Force

These both new stations acquire real-time datasets from all NOAA satellites.

Today, the real-time Argos ground station network consists of about 65 antennas. If all of them are capable of receiving NOAA POES satellites data, only 19 receives METOP satellites data and, for the moment, 7 out of these 19 receives also SARAL data.

Here below are displayed the Argos HRPT coverage world map and the list of the 68 operational stations part of the Argos real-time antennas network in 2013.

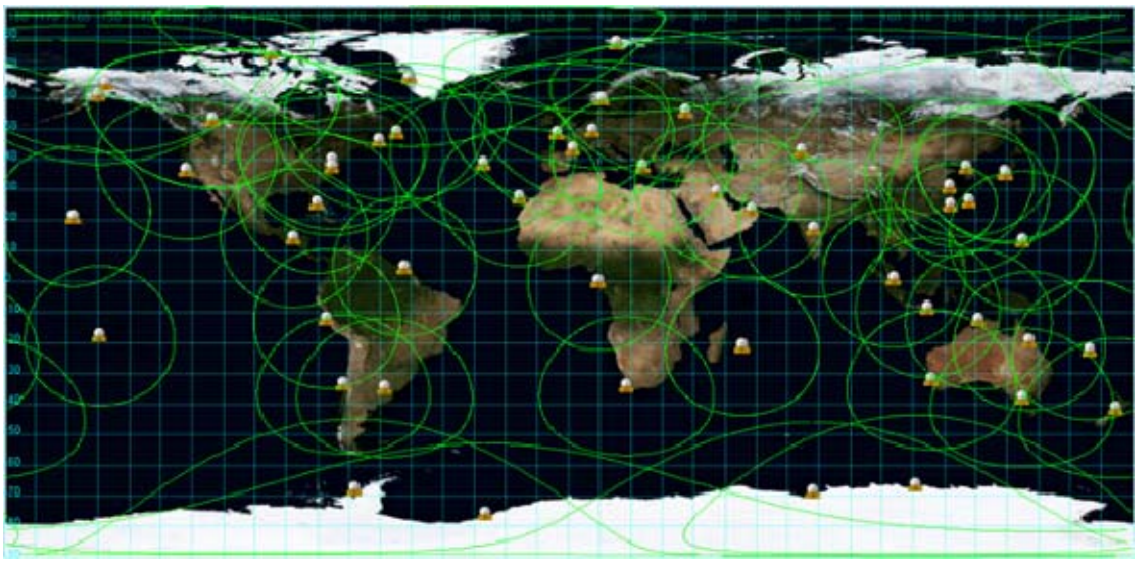


Figure 15 : May 2013 Real-time coverage map

Name	Code	Country	Operator	Possible satellites						
Andersen	AN	GU	US AIR FORCE	NK	NL	NN	NP			
Ali Al Salem	AS	KW	US AIR FORCE	NK	NL	NN	NP			
Athens	AT	GR	CLS	NK	NL	NN	NP			
Buenos Aires	BA	AR	INTA	NK	NL	NN	NP			
Bali (currently in Melbourne)	BL	ID	PT CLS INDONESIA			NN	NP	MA	MB	
Casey	CA	AU	BOM	NK	NL	NN	NP			
Cape Ferguson	CF	AU	NOAA NESDIS	NK	NL	NN	NP			
Santiago	CH	CL	METEO CHILE	NK	NL	NN	NP			
Cayenne	CY	FR	IRD	NK	NL	NN	NP			
Darwin	DA	AU	BOM	NK	NL	NN	NP			
Davis	DV	AU	BOM	NK	NL	NN	NP			
Edmonton	ED	CA	ENVIRONNEMENT CANADA	NK	NL	NN	NP			
Elmendorf - Anchorage	EL	US	US AIR FORCE	NK	NL	NN	NP			
Lannion	FL	FR	METEO-FRANCE					MA	MB	SR
Reunion Island HRPT4	FR	FR	METEO FRANCE			NN	NP	MA		SR
Libreville - N Koltang	GB	GA	CLS	NK	NL	NN	NP			
Gilmore Creek	GC	US	NOAA NESDIS	NK	NL	NN	NP		MB	
Sondre	GR	GL	DMI	NK	NL	NN	NP			

Halifax	HF	CA	CANADIAN COAST GUARD	NK	NL	NN				
Hickam - Honolulu	HI	US	US AIR FORCE	NK	NL	NN	NP			
Halley	HR	GB	British Antarctic Survey		NL	NN	NP			
Hatoyama	HT	JP	Jaxa	NK	NL	NN	NP	MA	MB	SR
Hawaïi	HW	US	NOAA NWS	NK		NN	NP	MA	MB	
Hyderabad	HY	IN	INCOIS	NK		NN	NP			
Jamstec - Tokyo	JM	JP	CUBIC-I	NK	NL	NN				
Kandena- Okinawa	KA	JP	US AIR FORCE	NK	NL	NN	NP			
Lajes - Portugal(Acores)	LA	PT	US AIR FORCE	NK	NL	NN	NP			
Lima	LM	PE	CLS PERU	NK	NL	NN	NP	MA	MB	SR
Miami	MA	US	NOAA AOML	NK	NL	NN	NP	MA	MB	
Melbourne	ME	AU	BOM	NK	NL	NN	NP			
Miami Capture	MI	US	CLS FR					MA	MB	SR
Mc Murdo	MM	AQ	NOAA						MB	
Manas	MN	KG	US AIR FORCE		NL	NN	NP			
Montererey	MO	US	NOAA NESDIS	NK	NL	NN	NP	MA		
Nouméa	NO	NC	IRD	NK		NN	NP			
Wellington	NZ	NZ	NIWA		NL	NN	NP			
Oslo	OS	NO	NMI	NK	NL		NP			
Perth	PE	AU	BOM	NK	NL	NN	NP			
Lima	PR	PE	CLS PERU	NK	NL	NN	NP			
Polar Bande-X Saral	PX	SE	Eumetsat							SR
Resolute Bay	RB	CA	Environment Canada	NK	NL	NN	NP			
Reunion Island	RE	FR	IRD		NL	NN	NP			
Reunion Island	RN	FR	METEO FRANCE			NN	NP			
Rothera	RO	GB	British Antarctic Survey	NK	NL	NN				
Lannion Old Metop traking	RS	FR	Meteo France					MA		
Ramonville	RV	FR	CLS	NK	NL	NN	NP	MA	MB	SR

Cape Town	SA	ZA	SAWB	NK	NL	NN	NP	MA	MB	SR
Soto Cano	SC	HN	USAF	NK	NL	NN	NP			
Séoul	SE	KR	KMA			NN	NP			
Singapore	SG	SG	SMM	NK	NL	NN	NP			
Shanghai	SH	CN	EAST CHINA SEA FISHERIES	NK	NL		NP			
Sembach	SM	DE	US AIR FORCE	NK	NL	NN	NP			
Svalbard	SN	NO	NOAA			NN	NP	MA	MB	
Svalbard	SV	NO	EUMETSAT					MA	MB	
Svalbard NOAA	SW	US	NOAA	NK	NL	NN				
Papeete	TA	FR	IRD	NK		NN	NP			
Taïwan	TW	TW	NTOU	NK	NL	NN	NP			
Valley Forge (Test)	UA	US	US AIR FORCE		NL	NN	NP			
Lannion Noaa tracking	WE	FR	METEO FRANCE			NN	NP			
Wallops Island	WI	US	NOAA NESDIS	NK	NL	NN	NP		MB	
Athens EARS	XA	GR	EUMETSAT		NL	NN	NP	MA		
Edmonton EARS	XE	CA	EUMETSAT	NK	NL	NN	NP			
Gander EARS	XG	CA	EUMETSAT	NK	NL	NN	NP			
Kangerlussuaq EARS	XK	GL	EUMETSAT	NK	NL	NN	NP			
Maspalomas EARS	XM	ES	EUMETSAT	NK	NL	NN	NP	MA		
Muscat EARS	XO	OM	EUMETSAT EARS	NK	NL	NN	NP	MA		
Moscou EARS	XR	RU	EUMETSAT	NK	NL	NN	NP	MA		
Svalbard EARS	XS	NO	EUMETSAT		NL	NN	NP	MA	MB	

Figure 16 : List for Operational Antennas on May 2013 and tracked satellites

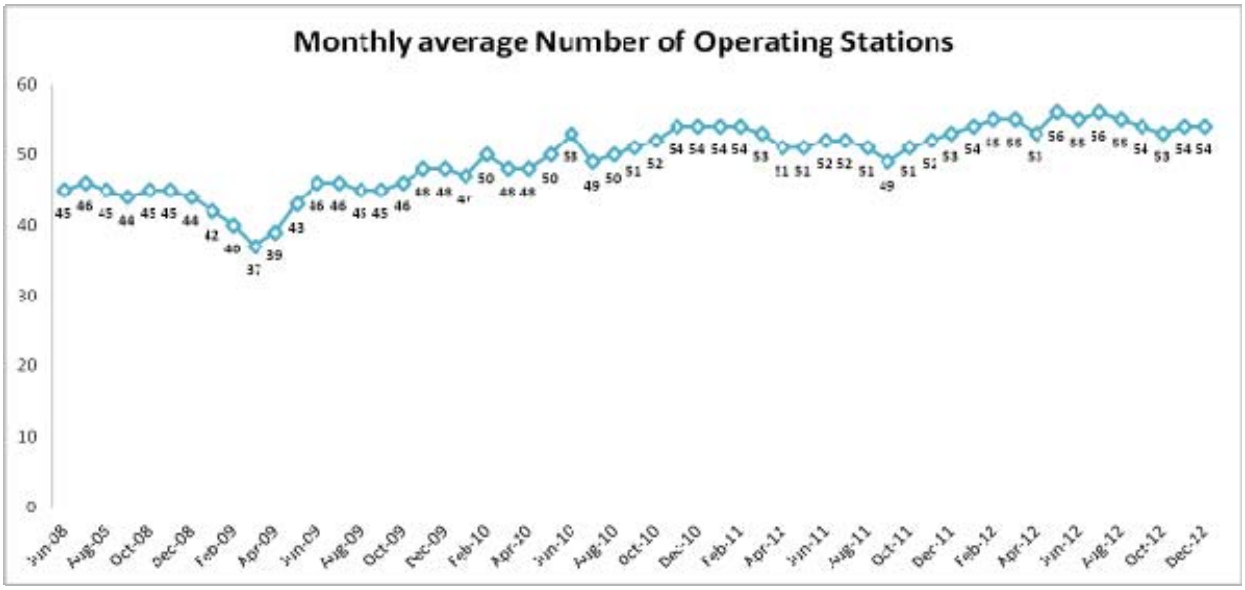


Figure 17 : Operational Argos real-time antennas since January 2008

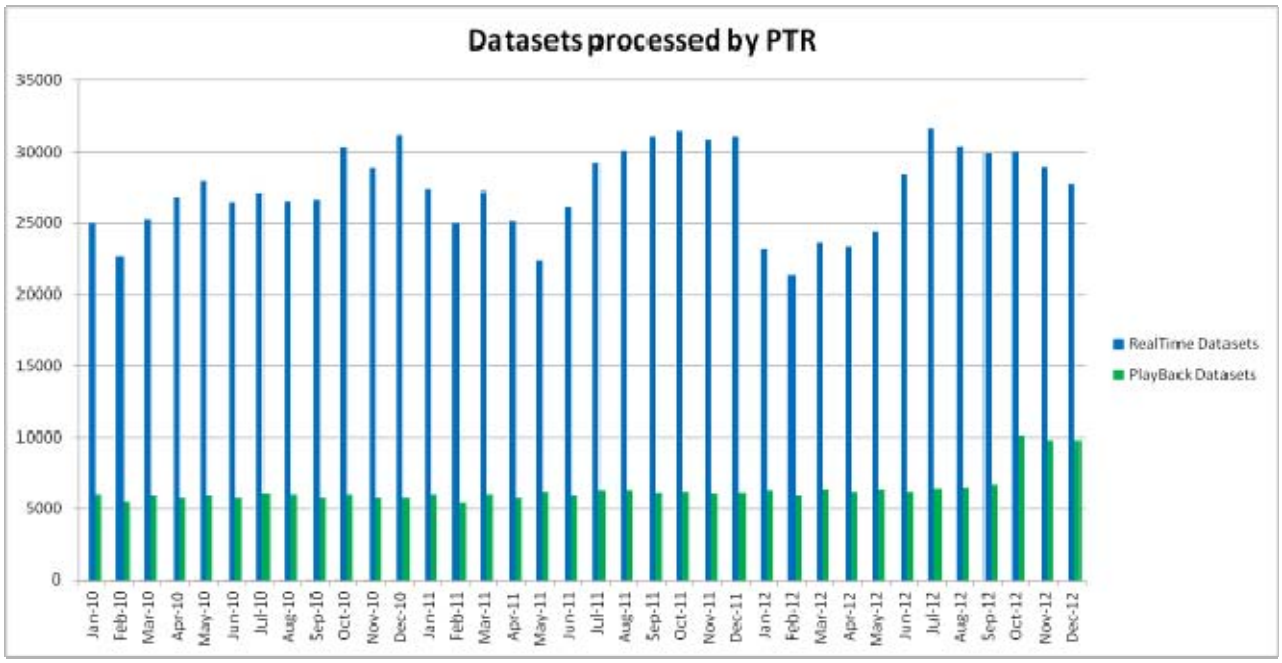


Figure 18 : NOAA and METOP Playback and Real-time datasets processed per Month

3.2.2. METOP real-time coverage

All METOP HRPT compatible antennas were configured to track Metop-B except EARS Station network.

- Metop-A by NOAA ESPC: Monterey, Ewa Beach, Miami
- Metop-B by NOAA ESPC: Ewa Beach, Miami, Gilmore Creek, Wallops Island
- Metop-A by Eumetsat : EARS network
- Metop-B by Eumetsat : In August 2013 only Svalbard, Maspalomas, and Athens are tracking Metop-B. Others EARS stations will be updated soon.

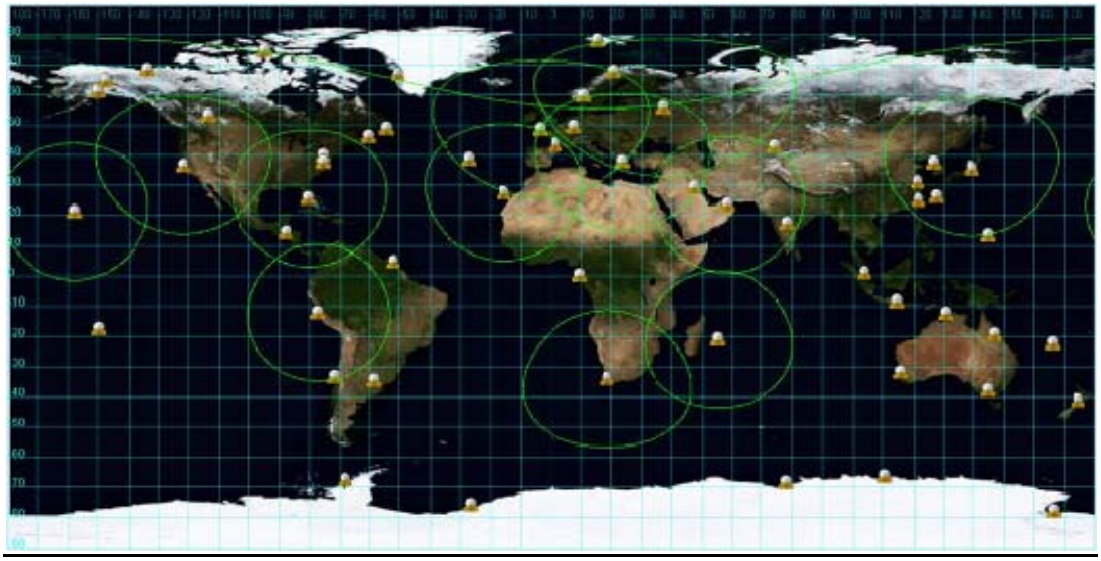


Figure 19 : Current METOP-A (and soon METOP-B) coverage

3.2.3. HRPT-A4 project

This project had been initiated in 2010 and was presented for the first time during the 43rd Operation Committee. It consists in upgrading a significant part of the network so that it is capable of acquiring data from NOAA, METOP and SARAL satellites. The very flexible technology of the receiver should make it compatible with the future satellites which will carry Argos-4 payloads.

On the basis of a system study aiming at selecting the minimal subset of ground stations to be upgraded to get the better overall system performances, a group of 17 stations as shown on the map below have been chosen.

From an engineering point of view, all the equipment requested to upgrade an existing station is tested and ready to be deployed. From a deployment point of view, it has to be noticed that the negotiation with the host organizations is taking much more time than expected at the beginning of the project.

We have to notice that the upgrade of the station of Resolute bay has been given up to be replaced by the antennas of Inuvik and Kiruna. The Davis antenna has been replaced by the one of Casey.

On the date of May 2013, the status of the deployment is as follows:

- Operational ground stations (surrounded by green on the map below):
    - Lima
    - Lannion
    - La Réunion
    - Hatoyama
    - Miami
    - Bali
    - Cape Town
- Upgrade scheduled in 2013 (surrounded by blue on the map below):
    - Mascate

- Las Palmas
- Athens
- Monterey
- Tahiti

- <u>Upgrade scheduled in 2014</u>

  - Ascension Island (Under discussion with ESA)
  - Cape Ferguson (Under discussion with BOM)
  - Wellington (Under discussion with BOM)
  - Casey (Under discussion with BOM)

Figure 20 : May 2013 HRPT-A4 network status

3.3. Argos reference beacon network

This project has been initiated in 2010 and consists in developing, validating, deploying and testing the reference beacon network. Following these phases, the network will be operated at CLS. The main goal of the reference beacons is to estimate the performances of the Argos System in several worldwide places. In that goal, the reference beacon will be able to transmit and receive following scenarios representative of user applications.

The reference beacon is based on PMT equipment compatible with Argos 2 and Argos 3 satellites meaning that it will be able to transmit using all the existing modulation scheme (A2 = BPSK, A3 = QPSK, HD = GMSK). The parameters which will be observed are:

- the transmitted frequency,
- the transmitted power,
- the repetition period,
- the message length.

These parameters will be observed following 7 defined scenarios which are:

- Continuous Random transmission
- Cycled Random transmission
- Random transmission only during satellite passes
- Random transmission using pseudo acknowledgment

- Interactive mode transmission
- Continuous Random transmission on Argos 2 satellites and interactive transmission using A3 or HD on Argos3 satellites
- Cycled Random transmission on Argos 2 satellites and interactive transmission using A3 or HD on Argos3 satellites

The first Argos reference beacon has been produced and validated in 2012. The phase of deployment of the Argos reference network will start in 2013 by installing around 10 beacons in the following sites (chosen according the level of noise):

- Jakarta, Taipei, Seoul, Toulouse for Asia and Europe in which the noise is really important
- Svalbard for Europe which is a moderately quiet area
- Washington for America which is a really quiet area.

4. **4. Processing centers**

The two global processing centers in Toulouse and Lanham were nominal over 2012 and first semester of 2013. Redundancy is used at least once a month (Up to two times on one month). Redundancy means all Argos users rerouted to CLS or CLSA during an anomaly on the nominal global processing center.

Figure 21 : Global and Regional Processing Centers

In October 2012, to face the increase of its activities, CLS has built a new building which includes a new control room and a new data center as well.

Personnel, IT infrastructure and all operations staff moved in September/October 2012 into the new facility. All Operations staff was mobilized in order to satisfy all Customer services and minimized the operations' impacts. This moving has been transparent for the Argos users.

Figure 22 : CLS Toulouse new building

Figure 23 : CLS Toulouse Control Room

Figure 24 : CLS Global Processing Data Center

4.1. Argos global processing centres architecture

In 2011, https architecture in CLS France was updated and CLS America firewalls were replaced to get the same hardware and software version as CLS France. CLS also initiated a rebuilt of ARGOS application servers, in order to prepare the next decade. This process started on the development configuration in CLS France. The application server is now based on CentOS Linux release 6.0, 64 bits (rather than RedHat, 32bits).

In 2012, these changes on operating systems have been propagated up to the operational configurations, both in CLS America and CLS France datacenters. In order to address the increase of quantity of data to be processed (due to the launch of METOP-B and SARAL spacecraft), space disk have been increased and few processing servers have been added. The databases backup mechanism has been optimized and updated.

In 2013, the servers of Argos the processing chain will be virtualized on a VMWARE solution. In both CLS and CLS America sites.

Each global processing center is autonomous and can work alone. In normal mode, both processing centers receive, process and distribute Argos data to:

- North American users for CLS America
- Users of the rest of the world for CLS France

In case of problem with one of the two centers, the other one stays alive and is capable of receiving, processing and distributing Argos data to ALL users. The switch to the remaining alive center is completely transparent for the users. It means that the users continue to receive or to access to their data, without changing anything on their side, as if nothing has happened.

Hereafter is the IT architecture schema of the CLS Toulouse (on the left) and the CLS America (on the right) infrastructure. We try to preserve a similar architecture on both sites in order to avoid

issues when deploying new versions of switching users from one center to another. The architectures of CLS France and CLS America processing centers are quite similar and based on the same principle. We find three main subsets:

- the processing chain
- the Oracle database service
- the Web distribution

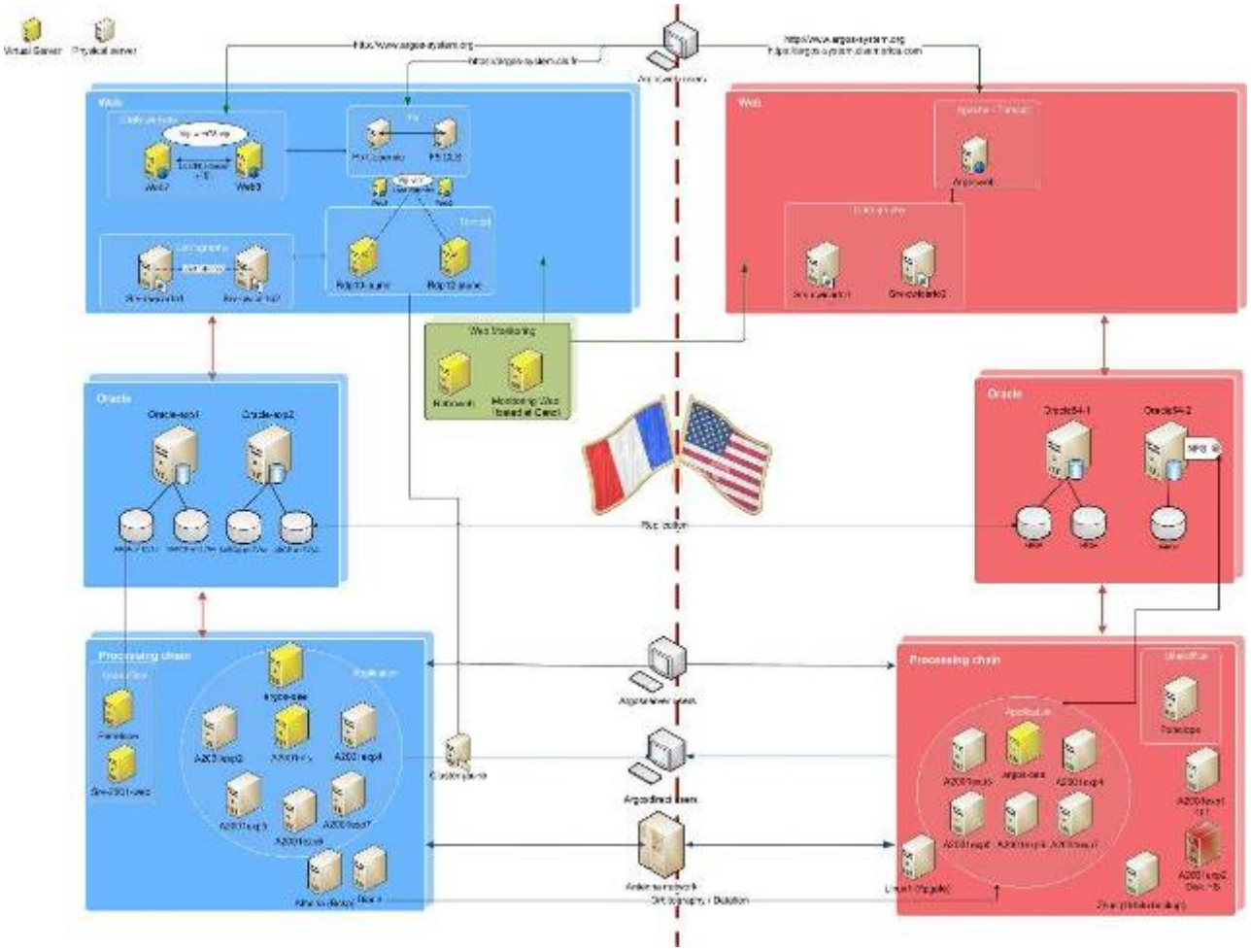


Figure 25: IT architecture schema of the both Argos processing centers

4.2. The CLS Argos processing chain

Composed of different software modules, the processing chain is in charge of receiving and processing the Argos data issued from the satellites and acquired by the global and real-time ground stations networks.

Argos data are processed in terms of collect and location, and stored into a database.

The processing chain is also in charge of distributing the data by ADS (Automatic Distribution System) or allowing users to access to their data using Telnet, ArgosWeb or the web services.

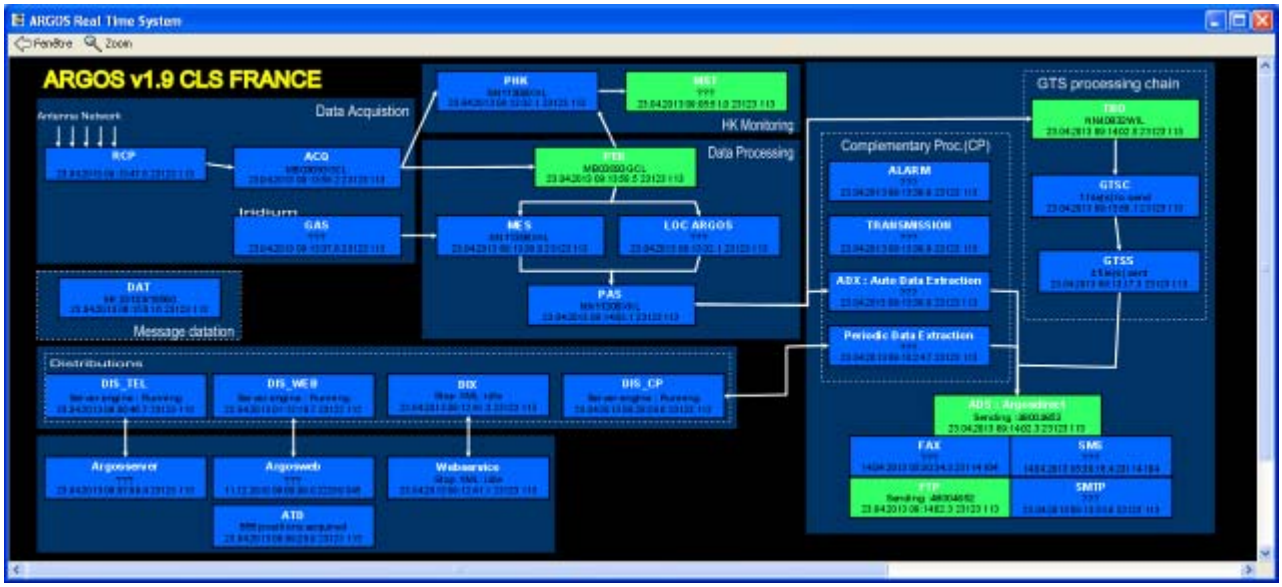


Figure 26: Synoptic of the CLS Argos processing chain

4.3. The Oracle database

At the heart of the computing architecture, the Oracle database is used to store the Argos declarative data as well as the processed data.

In order to keep a perfect coherency between CLS France and CLS America centers (mandatory to guarantee the redundancy between both centers), an automatic mechanism of replication is implemented between CLS France and CLS America databases.

4.4. The Argos data distribution

ArgosWeb site

Based on a farm of Apache Web servers, the Web distribution allows the users to access their data using a Web cartographic interface. Two cartographic servers on which are running the mapping engines C-Map for the marine cartography and MapInfo for the terrestrial one support the service of maps. The application server is supported by Tomcat.ArgosWeb is a free web site for Argos users. They can access their data via the Internet, by logging on to a secure website (http://www.argos-system.org) with their username and password (assigned to them by User Services).

ArgosWeb gives users secure and easy access to Argos data via an attractive and user-friendly website. With ArgosWeb, users can view platform trajectories on land and marine maps. Users can

also personalize data download formats (table or map format). Users have immediate access to information on their Argos account, as well as platform and program settings.

The annual availability of the French ArgosWeb site (FR) in 2011 is 99.61%
The annual availability of the U.S. ArgosWeb site (US) in 2011 is 99.27%

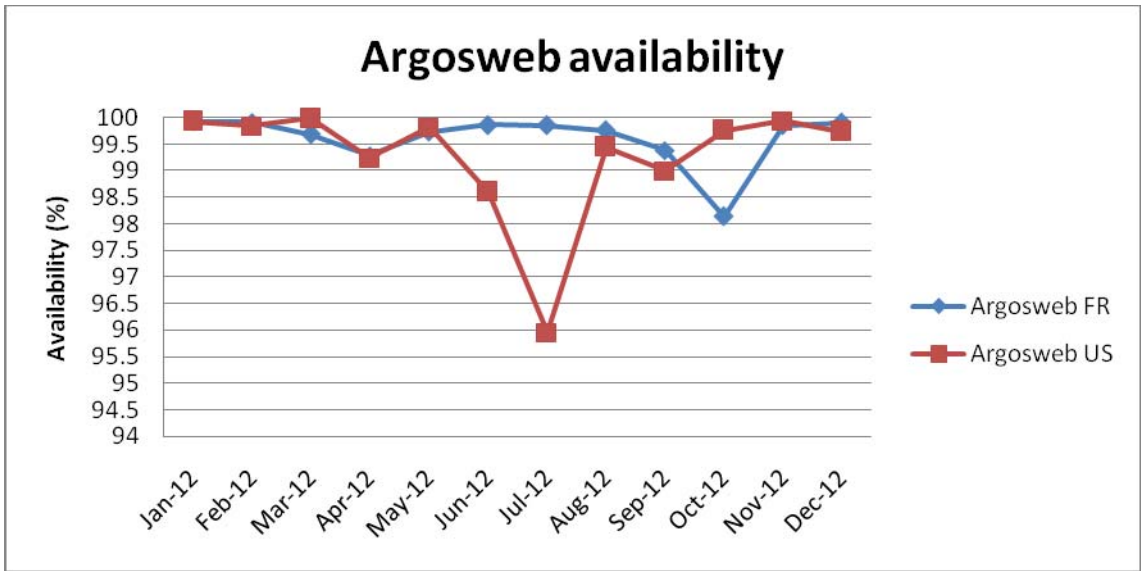


Figure 27 : Argosweb availability in 2012

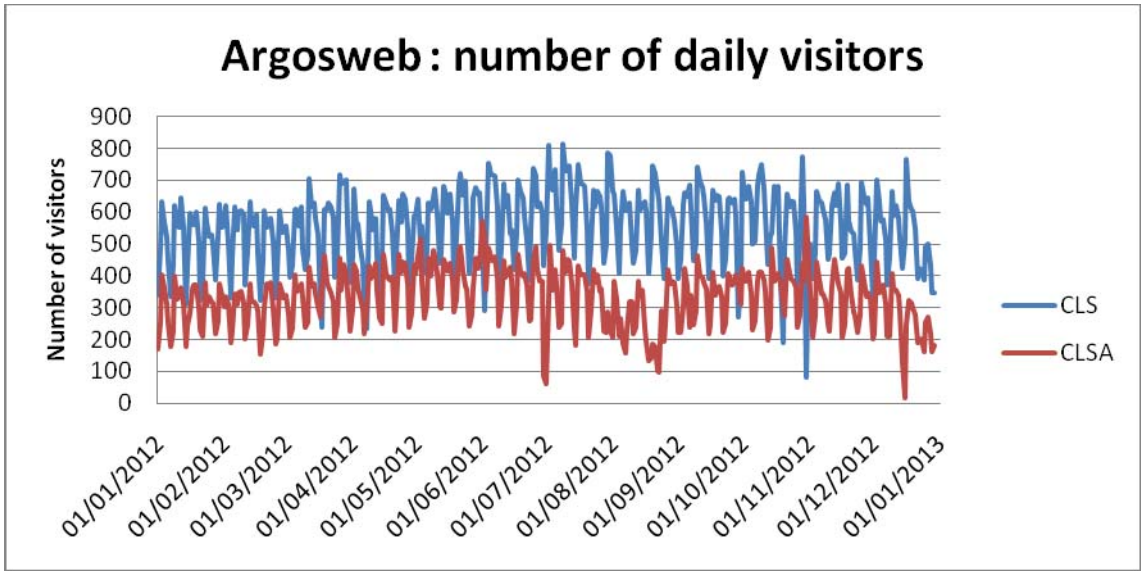


Figure 28 : Number of daily Argosweb accesses in 2012

ArgosServer

With ArgosServer, the Argos users can logon to Argos Processing Centers and access their data via TELNET. TELecommunication NETwork is a network protocol used by all TCP/IP compatible networks. A Telnet session with CLS's servers can be opened by typing the "Telnet" command on most operating systems (Windows, Unix...). Addresses of the both ArgosServers are:

- ArgosServer.cls.fr
- ArgosServer.clsamerica.com

The annual availability of the French ArgosServer site (FR) in 2012 is 99.73%
The annual availability of the U.S. ArgosServer site (US) in 2012 is 99.27%

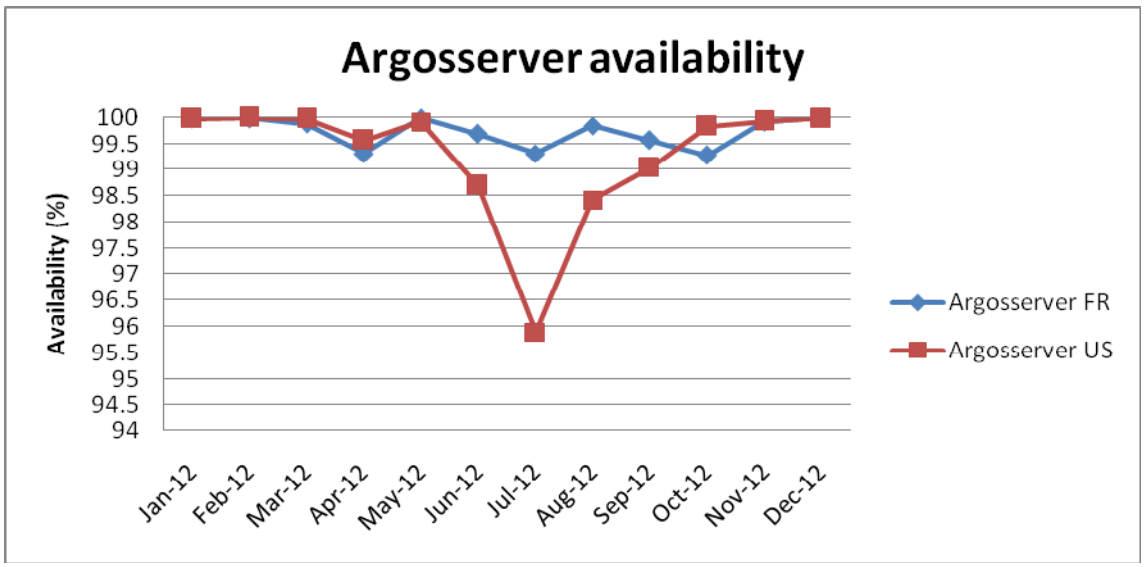


Figure 29 : Argosserver availability in 2012

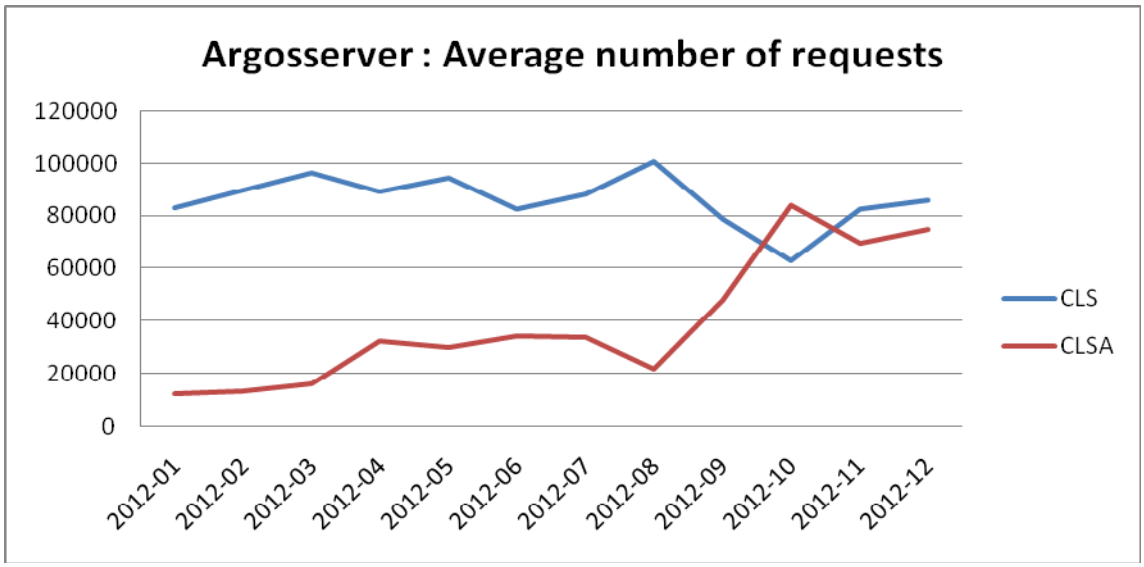


Figure 30 : Argosserver number of requests in 2012

ArgosDirect

ArgosDirect automatically sends data to users by e-mail, FTP or CD-ROM. ArgosDirect allows users to receive their data in several available format (tabular, DS, DIAG…).

The annual availability of the ArgosDirect service in 2012 is 99.91%

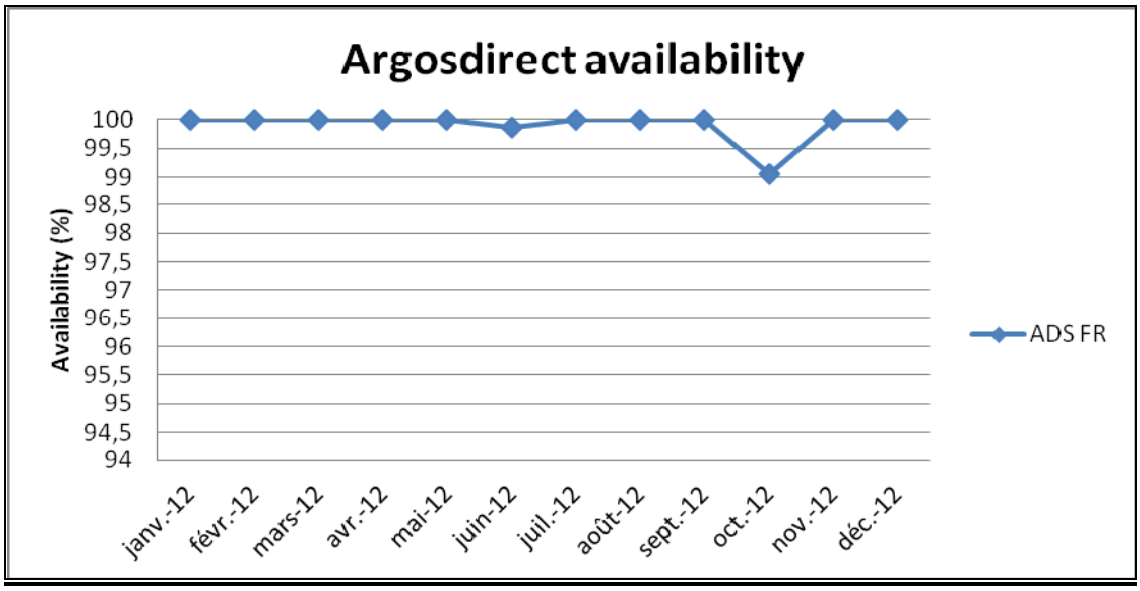


Figure 31 : ADS availability

ADS unavailability corresponds to periods where no sendings have been made (excluding the backup periods). The cause could be ADS, but actually, unavailability is mainly due to CTA related issues (no datasets processed => no datasets to be sent). In October, an air-conditioning system outage on the new CLS datacenter impacted all services.

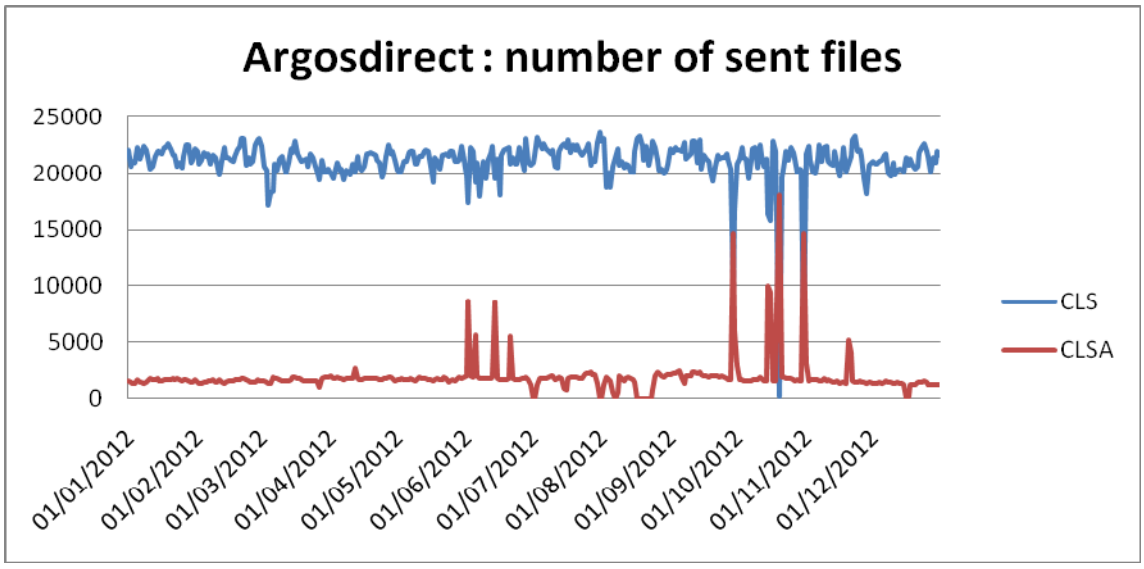


Figure 32 : ADS sendings in 2012

Argos WebService

CLS has developed a new machine-to-machine/automatic interface called WebService in order to distribute Argos data. This modern alternative to ArgosServer (Telnet) is free of charge and makes it possible for Argos users to contact CLS's data base directly, via internet, and receive their data in **CSV, XML and KML (GoogleEarth) format**. The Argos WebService delivers useful information such as positions, error estimates,diagnostic data, raw messages, sensor data, etc. The user can choose the different types of data to download via filters.

The annual availability of the French Webservice (FR) in 2012 is 99.89%
The annual availability of the U.S. Webservice (US) in 2012 is 98.87%

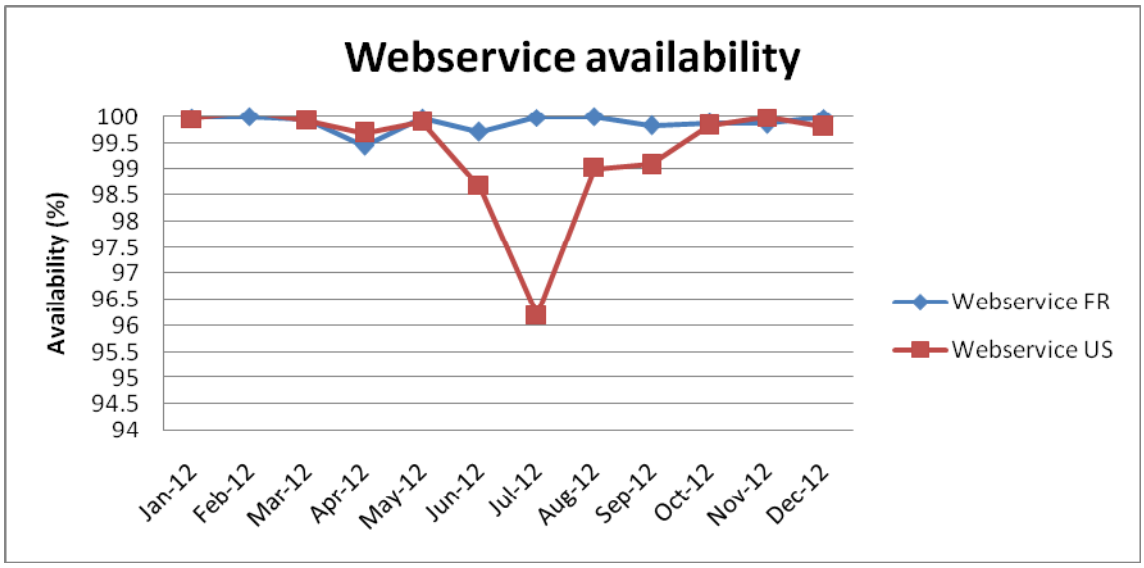


Figure 33: Webservice availability in 2012

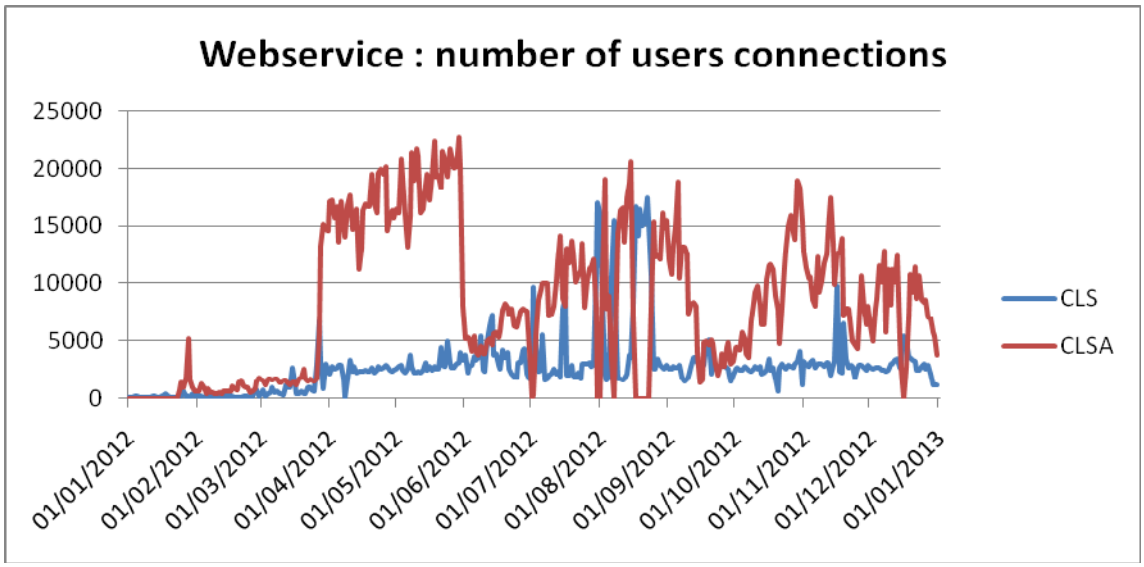


Figure 34: Webservice number of connections in 2012

4.5. Disaster recovery architecture

Disaster recovery architecture implementation is completed. The computer room is located into CNES Toulouse. Some of the Argos architecture components are DR compliant in order to improve services availability. However, the main backup is based on the 2 global processing centers (Toulouse & Lanham).

Figure 35 : Disaster Recovery Room located in CNES

4.6. Data processing statistics

The Argos Operations missions at CLS are:

- Availability and reliability of Argos Products and Services in accordance with the SLAs,
- Support internal or external Argos projects, or proposals,
- Control and reduce operational risks and costs in order to ensure 24h/24, 7 days per week operational services.

In order to monitor the Argos processing centers, statistics are produced in real-time:

- on the availability of Argos data distribution tools,
- on the data delivery time for sample platforms,
- on Argos location delivery time for sample platforms,
- and on the percentage of data available in less than one hour.

In 2012, the processing performance indicator was 97,57%. This indicator corresponds to the percentage of real time datasets processed in less than 10 minutes (Between Pre-Processing component PTR and PAS component in charge of inserting data in database for user requesting). This number doesn't include periods when French site was in backup mode on the US site.

In this context, decreasing availability could be observed in case of pending datasets inside the processing chain. For example, when several Global datasets are received at the same time, during these periods, other datasets are queued and are waiting to be processed increasing the time they passed between PTR and PAS modules.

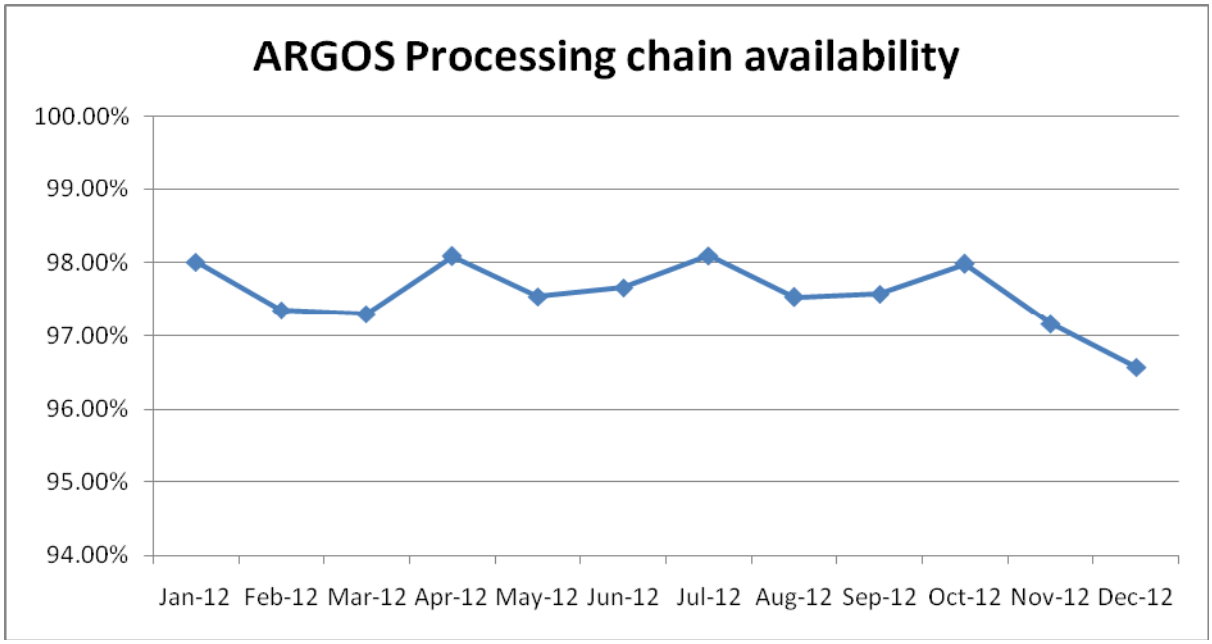


Figure 36: 2012 Processing chain availability

4.7. Number of Argos messages and locations processed

Number of locations and messages computed every day by the Washington and Toulouse Centers are, in average:

Number Per day	2008	2009	2010	2011	2012
Messages received	1 969 658	2 273 233	2 871 885	2 904 476	2 790 580
Distinct Messages received	1 164 717	1 272 459	1 470 953	1 451 938	1 443 247
Argos Locations	66 176	77 837	94 151	92 168	93 343
GPS Locations	187 829	185 496	205 259	212 587	224 857

Figure 37: Argos messages and locations per day (table view)

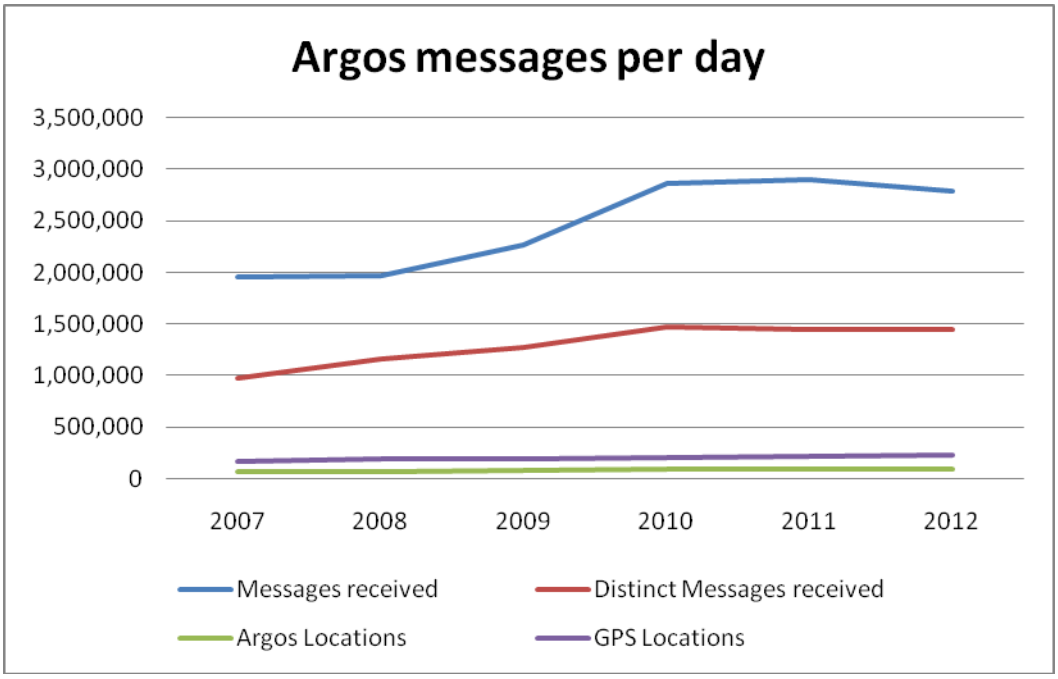


Figure 38 : Argos messages and locations per day (Chart view)

4.8. Argos location and data collection latencies

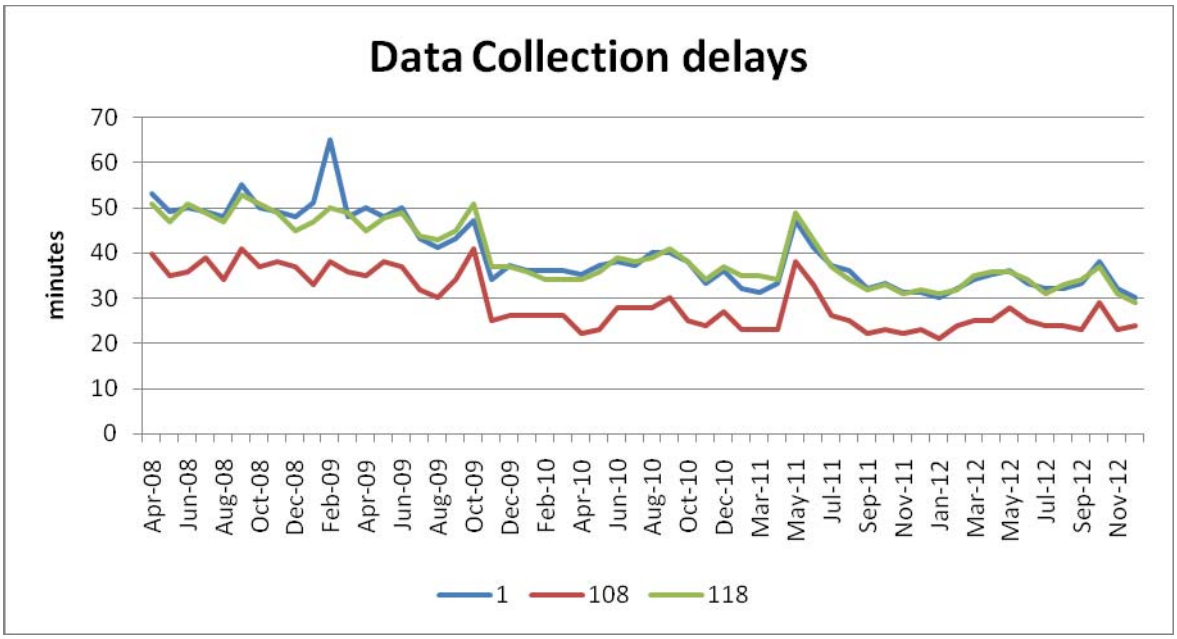


Figure 39 : Average latency on Argos data collection for sample platforms* since 2008

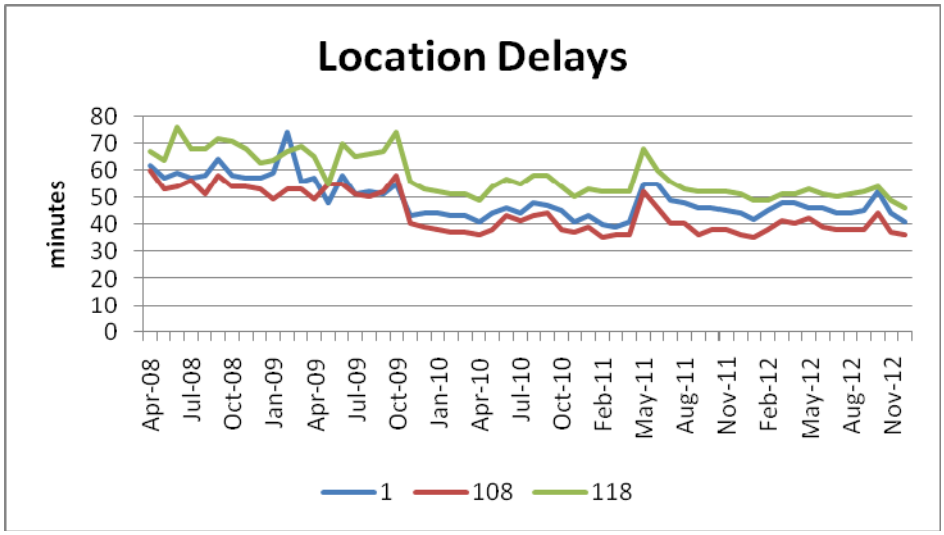


Figure 40 : Average latency on Argos locations for sample platforms* since 2008

* Sample platforms are timing and orbit determination platforms. Every hour, the last data collection and location times for these three platforms are controlled. Collection and location latency on ID 108 (Fairbanks) is under latency of Ids 1(Toulouse) and 118 (Wallops Island) due to the transmitter location and the higher number of passes over this transmitter.

We can see major improvement on data and Argos location delivery time since 2008 due to a better real-time antennas network, new operational Argos satellites (NOAA-19, METOP-B and SARAL) and enhancements of the Argos data processing performance. Increase during May 2011 is due to processing issue (Database insertion driver issue). The average latency on Argos data collection in Northern hemisphere is now less than 30 minutes.

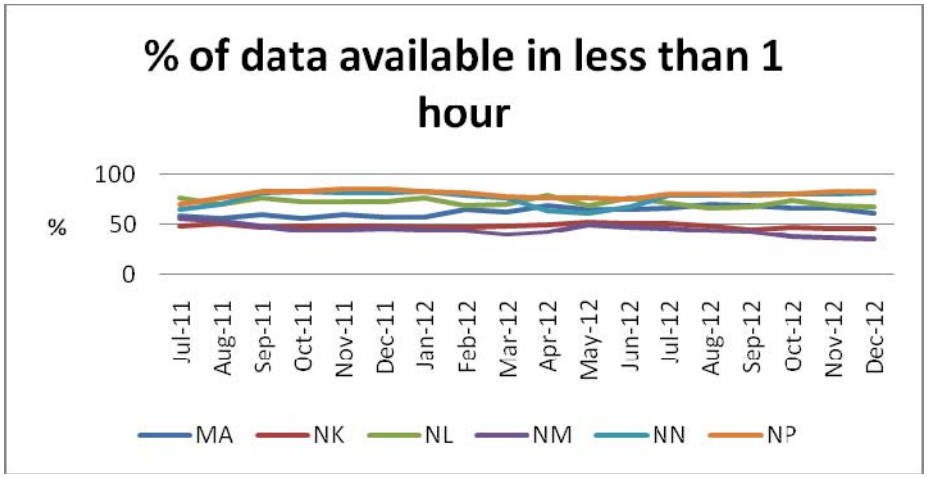


Figure 41 : Data available in 1 hour

Percentage of data available in less than one hour means which percentage of raw data has been processed one hour after its recording on board of the Argos Instrument. NOAA N, M and P operational satellites get a better coverage than NK and NL. For clarification, the Data Timeliness calculations include this metric plus the satellite revisit time.

5. **5. System improvements**

As every year, several software improvements were implemented in 2012 in order to fit with the user requirements. During this year, 85 system anomaly forms have been addressed as well as 63 system change proposals. Main application improvements have concerned the following topics.

5.1. METOP-B and SARAL

The integration of these two new satellites in the processing chains of the Argos processing centers has been prepared during the previous year with a quite long qualification period to make all the tests, verifications and last adjustments. The opening of the service for these 2 new satellites has been made during last April (29th).

A new module has been developed to process automatically the SARAL maneuvers. This module is currently in qualification and will be put in operation at the end of the second quarter of 2013. In a next step, it will be also used for METOP maneuvers as long as we can get a standardized maneuver configuration file.

5.2. Switch BUFR V3 top BUFR V4

The switch between BUFR V3 to BUFR V4 was effective on September 11th, 2012.

5.3. Studies status

Several studies have been scheduled for year 2012. The status of the following studies is as follows:

- Migration of Argos operating system (OS): the migration has been done for development and technical qualification environments. This migration is ongoing for validation environment.
- Migration of the Argos useroffice HMI (Human Machine Interface) originally developed with the middleware Forms (Oracle software) to Java technology: a try of automatic conversion of 5 out of the major useroffice forms has been performed. The results are encouraging but require human adjustments. The migration will go on in 2013.
- Migration of Oracle 10g to Oracle 11g: This new version of the database software is major with expected impacts on the Argos application software. A study at making an inventory of these impacts is in progress.
- Alternative to the Argos orbitography software: The current orbitography software was developed in 1986 and is still running under the OpenVMS operating system which is no longer supported. For this reason and also for synergy aspects, we have decided to use a software developed by CNES which is operated by CLS to compute the Doris orbit. We need to adapt this software to interface it with the Argos application software.

5.4. 2013 planned improvements

2013 will see new improvements. Among the ones which are already planned we can list:

- Migration of Argos operating system (CentOS) for validation and operational environments,
- End of the study regarding the migration from Oracle 10g to Oracle 11g,
- Integration of the new Argos orbitography software, to improve operations and fix the obsolescence risks,
- Development of off-line tool to allow users to extract their data from archive database,
- Modify Argos web and web service to allow users to access on-line to 20 days of data instead of 10 days,

- Development of a BCH message coding to improve Argos message transmission in noisy regions.

6. 6. Review of Users requirements

6.1. Real-Time Antenna Upgrade project

Performance in terms of data mean disposal time has improved during the last year primarily due to:

- New satellites in the system: MetOp-B & Saral
- More HRPT Stations receiving MetOp-A and B (Miami, Monterey, Hawaï, Lannion, Lima, Cape Town, Hatoyama, La Réunion, EARS Stations,…)
- Upgraded HRPT Stations to track Saral Satellite: strong improvements with the TM_100min capability. Indeed SARAL is downloading to compatible HRPT stations all datasets acquired in the last 100 minutes.

Our efforts will continue to improve the coverage of the real-time antennas in the regions where it is needed. The two primary areas of focus are: South Atlantic and South Pacific.

Concerning the South Atlantic area, an agreement between CNES and ESA is in place to study the installation of a new antenna on Ascension Island. This installation is currently targeted for the first quarter of 2014.

Concerning the South Pacific area, discussions have begun with WMO (Mr Lafeuille) and they are very interested in having an operational real-time antenna in Easter island that would be implemented within the framework of the Regional ATOVS Retransmission Service (RARS) project. This station would be dual-band (X and L). If CNES and CLS together have the capability of funding the antenna, WMO would be ready to collaborate/negotiate regarding the costs of installation, operation and data transmission.

6.2. Drifter Technology Issues

The Working Group that was proposed by the DBCP to operate within the TT-IBP to address drifter technology problems did not materialize. Nevertheless, CLS worked directly with Pacific Gyre, Scripps and DBi to develop optimal Argos PMT setting configurations for the drifters to maximize their lifetimes. The results will be presented at the DBCP-29 S&T Workshop in Paris.

6.3. Expanding Argos Data on line

As proposed at the JTA XXXII meeting CLS has developed the capability of expanding the online access to Argos data with 2 options.

Option 1: extending up to 20 days rolling online (Web service/Argosweb) instead of the current 10 days. This capability will be available early 2014.

Option 2: giving access to archived data via an Online request tool for 12 months. This capability will be available in the fall 2013.

ANNEX IX

REVIEW OF THE STRUCTURE OF THE TARIFF AGREEMENT AND RELATED MATTERS

(Submitted by CLS)

9. 1. Report and recommendations from the Operation Committee

1.1. Report on JTA XXXII Meeting

For the JTA Chairperson's report, see Annex V

1.2. Status of U.S. Programs

Mr. Eric Locklear thanked the OPSCOM chairs for the opportunity to present a status of the U.S. programs as the U.S. Representative of Country (ROC). He started off by outlining his presentation, which is focused on 2 areas, the current and future situation. He continues to characterize the current situation as "strained" for 2 principle causes. The first cause is the anomalous drifting buoy failures and the second cause is the continued budget reductions for Climate Research by the U.S. government.
Mr. Locklear presented a snapshot of the U.S. usage from 2008 – 2012. Based on the ARGOS JTA Report from Freemantle, Australia, he estimated that the 2012 U.S. usage will declined by a net of 288.5 ptt years with the principal reduction because of drifting buoy failures. However, he noted that a lot of work has been done over the last year to correct problems by the manufacturers and expects the buoy array to climb back to its design size of 1,250 buoys, but probably at a slower rate than initially expected. The current array as of today is 938.

The second cause is total budget dollars available for climate research. For 2 years in a row, the program that provides funding for the U.S. floats and drifters has received a budget cut. These budget cuts are a big threat to sustaining the arrays at their designed level unless cost reductions can be found.

In conclusion, Mr. Locklear expects the GDP program to build its array back to 1,250, although it may take longer that initially expected. More attention by the U.S. users to their program requirements and costs will be the focus of the upcoming year in order to design a sustainable program given the likelihood that budgetary resources will remain at this reduced level.

1.3. Financial Status of Agent

Christophe Vassal presented the meeting with the CLS methodology to derive the Argos basic costs to be attributed to the JTA.

It showed that the Argos basic costs have remained at approximately the same level from 11.96 M€ in 2011 to 12.01 M€ in 2012. The Argos basic costs for science have remained stable whereas the Argos basic costs for fishing have increased, mainly because of a continued interest in Argos from a number of countries to track their fishing vessels. The Argos basic costs for sensitive use have decreased while the activity has stabilized after a significant decrease in 2011.

In 2012, the costs to be attributed to the JTA are calculated at 6.98 M€ that represents a 1.45% increase while the average active PTTs processed and distributed (or not) remained stable at 12 488 (12071 active PTTs and 417 in Inactive Status) compared to 12 502 in 2011. This small cost increase is mainly due to the transfer of our French Argos processing center in our new building in Ramonville.

At the 32th JTA meeting in 2012, the following was decided:

- The projection of the results is negative this year by a 10% decrease in terms of overall PTT-years consumption with a relative stability of the number of Active IDs.
- Overall, the JTA income is expected to be 6.82 M€, compared to 7.34 M€ which was the original 5Y plan.
- In conclusion, despite a significant risk, the expected financial situation for 2012 is considered safe. The accumulated balance would remain significantly positive due to significant costs savings performed in 2011 and already anticipated in 2012.

Nevertheless, risks will continue to be monitored very closely by CLS.

- Based on the projections for 2012 and 2013, in which it was expected that the income was balancing the JTA cost, the positive situation in the accumulated balance in the FYP at this moment, the uncertainties and possible risks due to the technical problems of the drifters, the meeting decided not to change the Tariff in 2013.

Confirmation of 2012 tariffs at 32nd JTA meeting

The 32nd JTA Meeting adopted the Terms and Conditions for the 2013 Agreement materially identical to the 2011 Agreement.

The 2013 tariffs were implemented:

- 0,2% budget was allocated to the JTA expenses
- The 2013 tariffs to be implemented are in agreement with the five year plan

Category	A (€)	B (€)
Buoys and others	15	5
Fixed Stations	15	3
Animals*	15	7.5
Subsurface Floats	15	7.5

"DISCOUNT SCHEME FOR LARGE PROGRAMMES", the rates are as follows:

Number of platform-years	PTT-day unit (B) Buoys & others	PTT-day unit (B) Floats
600	4	6
900	3	4.5
1200	2	3

2012 JTA financial close of accounts

In 2012, CLS recorded revenues from JTA participating countries at a level of 7.13 M€. This was slightly different from the revenues expected from the JTA at 7.53 M€. This shortage in revenue is explained mainly by the technical issues affecting the global drifter program. So in 2012, the JTA realized a small excess of 0.15 M€ which is going to add to the excess carried forward from the previous year of 2.98 M€ to bring the cumulative balance to 3.13 M€. The non-JTA incomes increased in 2012 from 6.06 M€ to 6.27 M€, and the corresponding applications (fishing and sensitive) are still exceeding their portion of the costs.

Consequently, the non-JTA accumulated loss at the end of 2012 is calculated at 3.37 M€.

At the date of the meeting, we believe the JTA in 2013 will likely be able to pay its portion of the cost.

In view of this situation, CLS and CLS America are encouraged to pursue their efforts to reduce operational costs while promoting increased usage.

1.4. The Five Year Plan for 2010-2014

In euro	2010 actual	2011 actual	2012 actual	2013 *Projected*	2014 *Projected*
JTA Costs (M€)					
cost increase %	5,0%	-3,78%	1,45%		2,0%
Actual & Forecast	7,15	6,88	6,98	7,98	8,15
Agreed 5YP JTA Cost	***7,10***	***7,48***	***7,81***	***7,98***	***8,15***
JTA Income	**2010**	**2011**	**2012**	**2013**	**2014**
	Actual	Actual	Actual	*Projected*	*Projected*
Activity: Actual and *Forecast*					
Growth Active PTTs (%)	5,7%	0%	-3%	*7%*	*7%*
Growth PTT-yrs (%)	6,9%	-7,4%	-10%	*4%*	*2%*
Active Ptfs (Total)	12 398	12 418	12 071	*14 435*	*15 494*
PTT-yrs (Total)	3 296	3 050	2 744	*3 261*	*3 322*
Active PTTs (w/o large program)	8 886	9 234	9 271	10 793	11 667
PTT-yrs (Buoys & Others)	454	382	320	*489*	*489*
PTT-yrs (floats w/o large pgm)	86	92	102	*99*	*101*
PTT-yrs (Animal)	916	973	1 002	*940*	*987*
PTT-yrs (Fixed stations)	140	129	128	*152*	*152*
Active PTTs (large pgm)	3 512	3 184	2 800	*3 641*	*3 827*
PTT-yrs (large pgm) Buoys & Others	1 572	1 341	1 065	*1 429*	*1 429*
PTT-yrs (large pgm) Floats	128	133	127	*153*	*164*
Basic Service Income					
Monthly fee (€)	15,0	15,0	15,0	15,0	15,0
Daily fee (€) buoys and others	5,50	5,00	5,00	5,00	5,00
Daily fee (€) floats	8,25	7,50	7,50	7,50	7,50
Daily fee (€) animals	8,25	7,50	7,50	7,50	7,50
Daily fee (€) fixed stations	3,00	3,00	3,00	3,00	3,00
Monthly fee (€) OCO	15	15	15	15	15
Daily fee (€) OCO buoys	2,00	2,00	2,00	2,00	2,00
Daily fee (€) OCO floats	3,00	3,00	3,00	3,00	3,00
Month unit income (M€)	1,60	1,66	1,67	1,94	2,10
Day unit income (M€)	4,08	3,75	3,75	3,90	4,04
Large pgm Day Unit Income (M€)	1,92	1,70	1,42	1,87	1,91
Total basic service expected (M€)	**7,60**	**7,11**	**6,84**	**7,72**	**8,05**
Additional revenue	**0,301**	**0,335**	**0,298**	**0,194**	**0,194**
Year Balance	0,75	0,57	0,15	-0,07	0,09
Carried forward from previous year	1,66	2,41	2,98	1,86	1,79
Cumulated Balance	2,41	2,98	3,13	1,79	1,89

2. 2. Financial Statement

2.1. Annual Expenses (in kEuros) for Year 2012

		Personnel	Costs	Amortization	Total
Management		***443***	***540***	***0***	***983***
Operational costs					
	Quality	65	10	0	75
	Studies & development	775	112	376	1 263
	Processing center	1 291	210	207	1 708
	Client support/customer service	1 067	379	0	1 446
Sub-total Operational		***3 198***	***712***	***582***	***4 492***
Marketing costs					
	Promotion Communication	1 306	1 182	19	2 507
	Travels, hosting	0	442	0	442
Sub-Total Marketing		***1 306***	***1 624***	***19***	***2 949***
Administrative costs					
	Administration, finance, audit	1 137	343	5	1 485
	Costs for presence	63	1 141	94	1 298
Sub-Total Administrative		***1 200***	***1 484***	***99***	***2 783***
Taxes, bad debts provision & financial costs					
	Taxes	0	246	0	246
	Financial costs	0	279	0	279
	Provisons	0	283	0	283
Sub-Total		***0***	***808***	***0***	***808***
Total		**6 147**	**5 168**	**700**	**12 015**

Detail on 2012 Expenses in k€

Details of Amortization Items

	Amortization	Description
Operational costs		
Quality	0	
Studies & development	376	*GTS, SSA3, Argos 2001*
Processing center	207	*Maintenance processing center (hardware and software)*
Sub-total	**582**	
Marketing costs		
Promotion	6	*Exhibit, International meetings, User Conference Costs*
Communication	13	*Exhibit, documentation Costs*
Sub-total	**19**	
Administrative costs		
Management control	5	*Accounting system, Argos registred mark*
Costs for presence	94	*Office furniture, safety, general equipment*
Sub-total	**99**	
Total	**700**	

Detail of Amortization Items in k€

Annual Incomes (in millions of Euros)

Incomes (M€)	2011	2012
JTA	7,43	7,13
Non JTA	6,06	6,27
Total	13,50	13,40

JTA and non JTA 2011, 2012 Incomes

Details of JTA and non JTA Incomes and Expenses (in million Euros)

	2011	2012	
Incomes			
JTA CLS	3,28	3,32	
JTA CLS America	4,16	3,81	
	7,43	**7,13**	**-4,11%**
Non JTA CLS	5,46	5,59	
Non JTA CLS America	0,60	0,68	
	6,06	**6,27**	
Total basic Argos incomes	**13,50**	**13,40**	**-0,71%**
Expenses			
Total basic Argos expenses	**11,99**	**12,01**	**0,24%**

Detail of JTA and non JTA Incomes and Expenses

JTA Annual Balance (in millions of Euros)

	2011	2012
JTA Operating Costs	6,88	6,98
JTA Income	7,44	7,13
Difference	0,57	0,15
Cumulated Balance	2,98	3,13

For year 2012, the costs to be attributed to the JTA, calculated using the methodology developed by CLS since 4 years now, is 6.98 M€.

3. 3. Other Issues Relating to Argos Funding

3.1. Management of ID numbers

The management of ID numbers is an essential part of all communication systems. Applying an unused fee to ID numbers that have not transmitted in 24 months has been the management method of choice in recent years for the JTA.

In 2010, at the JTA XXX, CLS was asked to generate an analysis on ID management and implementing an ID recovery policy. During the next three years, CLS was successful in retrieving the 20 and 28 bit Ids.

At the 8th JTA EC meeting held from 16-18 April 2013, CLS presented the results of the recycling campaign which exceed the initial expectations. The EC members thanked CLS for the outcome of the project, and also asked to continue to monitor the situation. The JTA EC decided to continue charging the unused ID fee.

3.2. Argos-3 (Downlink messaging and high data rate channel) tariff

It was decided that the Argos-3 pricing should be defined after gaining experience on the actual usage during the DBCP Argos-3 pilot project. Despite the end of the pilot project, the decision for Argos-3 pricing structure has been deferred until an adequate number of Argos Users take advantage of Argos 3 capabilities.

ANNEX X

TERMS AND CONDITIONS OF THE GLOBAL AGREEMENT FOR 2014

(As agreed at JTA-33, October 2013)

These Terms and Conditions outline costs for and services to be provided by Collecte Localisation Satellites (affiliate of CNES).

TIME PERIOD OF COVERAGE:

These Terms and Conditions are valid for the time beginning on **January 1 and ending on December 31, 2014.**

DEFINITIONS

"Platform-year" is defined as 365 days of operation of an acceptable Platform Transmitter Terminal (PTT).

"ROC" is the Representative of Country representing a country or a group of countries.

"RO" is the Responsible Organization representing an agreed set of Argos User programmes for the purposes of their collective participation in the JTA.

The "Agreement" includes all those participating countries which agree to the Terms and Conditions contained herein and are listed in Annex A to this Agreement.

The "Large Programmes" are defined as those programmes that are funded and managed by a single organisation.

BASIC SERVICES PROVIDED BY CLS

CLS will perform the following categories of services associated with PTTs of the authorized users:

(1) Location determination or both location determination and data collection for PTTs with a repetition period equal to or less than 120 seconds, application of calibration curves to the data when appropriate, access to the data and distribution of the data according to the paragraph below entitled "Distribution of processed data" and archiving for three months;

(2) Data collection for (fixed station) PTTs with a repetition period equal to or greater than 200 seconds, application of calibration curves to the data when appropriate, access to the data and the distribution of the data according to the paragraph below entitled "Distribution of processed data" and archiving for three months;

(3) Location service plus / auxiliary location;

(4) On-line data access;

(5) GTS Processing and Distribution.

USER BASIC SERVICE CHARGES

BASIC SERVICE

Basic service charges for authorized users under this Agreement are in accordance with the payment on consumption.

They are calculated according to the following formula:

Price per month, per platform = **A** + **B** x **n**

where:

- **A** represents the monthly charge per active PTT (an active PTT is one that transmits at least once during a given calendar month);
- **B** represents the PTT-day unit rate;
- **n** is the number of day units. The day is divided into 4 time slots (0 - 6; 6 - 12; 12 - 18; 18 – 24 UTC). Any PTT transmission collected into a given time slot produces a 0.25 day unit.

A and B coefficients for all platform categories are provided in table below:

Category	A (€)	B (€)
Buoys and others	15	5
Fixed Stations	15	3
Animals*	15	7.5
Subsurface Floats	15	7.5

Buoys and others – PTTs in this category are drifting and moored buoys and, more generally, all those PTTs which do not belong to categories below.

Fixed Stations – PTTs in this category are land fixed PTTs.

Animals – PTTs in this category are those that are used to track animals.
*Charges for platforms in this category will be capped at n=12 Day Units per month.

Floats – PTTs in this category are subsurface floats such as the Argo programme floats.

DISCOUNT SCHEME FOR LARGE PROGRAMMES

Number of platform-years	PTT–day unit (B) Buoys & others	PTT-day unit (B) Floats
600	4	6
900	3	4.5
1200	2	3

UNUSED IDs

PTTs which have not transmitted during a period of 24 months will be charged 5 € per month from the 25th month until the ID numbers are returned to CLS. This amount of unit charge will be applied until the ID number is formally returned to CLS by the User. The purpose of this fee is to recover IDs no longer required.

SILENT SERVICE

IDs remaining silent but still being used in an agreed programme will be considered by CLS on a case-by-case basis.

INACTIVE STATUS

This status is intended for those platforms that continue to transmit but for which the location or data collection are of no further use to the user or the community. The following conditions must be met to qualify:

(1) Inactive Status will apply if, and only if, Inactive Status is declared by the signatory of the System Use Agreement for platforms which continue to transmit beyond the programme termination. In that case, further charges will no longer be levied.

(2) The platforms must have operated in Basic Service for a minimum of 2 months.

(3) Data or location information cannot be retrieved nor can the platform revert to any category of service.

(4) It is intended that Location and/or data collection may not be computed using a Local User Terminal or other direct readout facility.

(5) ID numbers of such platforms are actually returned to CLS who will recycle them after the platform stops transmitting.

ADDITIONAL SERVICES PROVIDED BY CLS AND NOT INCLUDED IN BASIC SERVICES

Additional services such as ArgosDirect (the former ADS, Databank) service, ArgosMonitor, Moored Buoy monitoring and others are provided by CLS and charged according to the yearly catalogue of prices.

DESIGNATED ROC / RO

.....
.....
.....
.....

DISTRIBUTION OF PROCESSED DATA

(1) These Terms and Conditions do not cover the costs of special additional services made to provide the processed data back to the users. These must be made by the user directly with CLS.

(2) However, it is understood that CLS will continue to provide data from PTTs via the World Weather Watch Global Telecommunication System (WWW/GTS) of the World Meteorological Organization (WMO) according to procedures established by WMO.

BILLING AND PAYMENT

CLS will send invoices on a two monthly basis (CLS America on a monthly basis) based on consumption to the organizations covered by the country agreement.

GENERAL CONDITIONS OF AGREEMENT

(1) The designated ROC / RO and CLS jointly agree the list of users included in the Agreement and will update this list as appropriate. To assist in this process CLS will notify the ROC/RO of any new programmes that might qualify for this agreement.

(2) For additional services not provided within this Agreement, individual users under this Agreement must negotiate directly with CLS. Payments associated with these negotiations must be settled on receipt of the invoice. If these conditions are not met, CLS may stop the distribution of the user's processed data.

(3) Authorized users are defined as those implementing PTTs which are government funded. However, other users of agencies or organizations which are considered "non-profit" may be authorized. PTTs funded partly or entirely by private companies or organizations cannot be included in the conditions of this Agreement, even if data are supplied free of charge to national or international organizations. If these rules are not followed, CLS may stop the distribution of this user's data. Should this situation occur, CLS will immediately notify the ROC/RO. Nevertheless, active PTTs received by the system will be counted in the platform-year total and data stored.

(4) All authorized users must sign a purchase order for each programme, either for the current year or for the duration of the programme, in order to clearly specify the services they request, whether these services are provided under this Agreement or not.

(5) VAT will be charged to EU Members in accordance with EU rules.

Signed on behalf of the participating countries by the JTA Chairperson, Mr Frank GROOTERS

Signed by CLS Chief Executive Officer, Mr Christophe VASSAL

ANNEX XI

JTA OPERATING PRINCIPLES
(as agreed at the JTA-33 Meeting)

Table of contents

1. Introduction

The JTA provides for an international mechanism to provide for cost-effective location and data processing of data collected through the Argos system. The JTA is functioning through stakeholders whose roles are mainly to negotiate the Argos service level and tariff, and ensure appropriate coordination amongst Argos users in order to represent their collective interests with regard to Argos tariff and requirements. Stakeholders include:

i. Representatives of Country (ROCs) representing a country or a group of countries from responsible government organizations using Argos;
ii. Responsible Organizations (ROs) representing an agreed set of Argos user programmes;
iii. Representatives of Users Groups (RUGs);
iv. Representatives of the Argos satellite system operator and service provider;
v. Representatives of the Argos Operations Committee (OPSCOM);
vi. Representatives of the WMO and IOC Secretariats.

2. Basic aims and principles of the Argos Joint Tariff Agreement (JTA)

2.1 The basic aims and principles, based on the discussion at the JTA-23 (Angra dos Reis, 2003), was agreed at the JTA-29 (Paris, 2009) as follows:

i. The benefits of JTA participation should be shared equally amongst all participants (Users).
ii. The revenue collected from Users should meet the costs of providing the service.
iii. Developments required by Users should be funded by Users.
iv. Costs of developments not of benefit (or of marginal benefit) and not driven by User requirements should not fall on Users.
v. There should be a clear division between a basic (funded) service and other (e.g. value added) services.
vi. The Tariff structure should be simplified to reduce the number of service categories.
vii. System developments should be fully endorsed by JTA and those affecting Users agreed in advance.

2.2 The Terms of Reference of the Argos Joint Tariff Agreement (JTA) are given in Annex XI-B.

3. The stakeholders' representation

3.1 Representatives of Country (ROCs)

ROCs are representing a country or a group of countries from responsible government organizations using Argos. The role of the ROCs is detailed in Annex XI-A. The Terms of Reference of the ROCs, including mechanism for their nomination are provided in Annex XI-C.

3.2 Responsible Organizations (ROs)

3.2.1 An RO is the Responsible Organization representing an agreed set of Argos User programmes for the purposes of their collective participation in the JTA. The concept of RO can accommodate groups of countries such as E-SURFMAR, as well as large individual programmes as necessary or convenient.

3.2.2 As agreed at JTA-24, the functions of an RO include:

i. preparing consolidated estimates of Argos usage for the annual JTA budget planning and negotiation of tariff Terms and Conditions;

ii. representing the collective interests of the User programmes in respect of the Argos service provision and forward planning

3.2.3 A RO would provide local support for Argos applications, and facilitate the interface between CLS Argos and the User programmes for which the RO is responsible, including:

i. providing support to members of the RO's User group

3.2.4 The Terms of Reference of the ROs are provided in Annex XI-D.

3.3 Representative of a User Group (RUG)

3.3.1 A Representative of a User Group (RUG) is an individual who can fairly represent the overall consensus view of a significant Argos JTA user community. Such communities might reasonably include the operators of data buoys, floats, ice platforms, animal tags, land stations, ship stations and airborne stations, or bodies with agreed international responsibilities for the promotion, sponsorship or validation of any aspect of environmental observation using Argos (e.g. IOC, WMO, WWF). The RUG will work with CLS and the JTA Executive Committee to identify opportunities that might bring the JTA session into closer contact with his/her user group, with a view to establishing within that group the benefits of the JTA process.

3.3.2 The Terms of Reference of a JTA Representative of a User Group (RUG), including mechanism for their nomination are provided in Annex XI-E.

3.4 CLS

3.4.1 CLS is the designated agent of CNES to operate the Argos system ground segment and to promote the use of it. Those Argos basic services are provided at cost to the users under the oversight of the Argos Operation Committee (CNES, NOAA, EUMETSAT).

3.4.2 CLS role with regard to the Argos and the JTA is:

i. to report to the JTA on developments and operations, related to the use and performances of the system;
ii. to report to the JTA on overall costs and recovery of expenditures through service charges; this includes, in particular, the preparation of and the annual assessment of the JTA Five Year Plan (FYP);
iii. to collect requirements from the user community and implement required solutions when possible;
iv. to interface with the participating space agencies to assist in providing system upgrades if requested;
v. to interface with manufacturers to certify their transmitter products and to provide engineering assistance to them to insure their hardware operates correctly and efficiently with the Argos system, thereby increasing and optimizing Argos system usage;
vi. to develop and maintain the ground system and the Global data processing centres;
vii. to operate the Argos ground segment;
viii. to operate the Global processing centres under quality of service agreements and deliver data collected to the user community (including international programmes such as WIGOS, IODE, GFCS, MOVEBANK, OBIS, etc.) according to international standard data exchange requirements, and protocols;
ix. to perform multiple levels of quality of control on the data;
x. to store all data processed for a duration of 12 months and to make it easily extractable in response to user requests;
xi. to monitor and control the overall performances of the systems so as to guarantee the level of quality and continuity of service;
xii. to promote the use of the Argos system and market new user communities, with the goal of minimizing the cost of using Argos;
xiii. to support users through responsive customer service for any request, claim or declaration of equipment;
xiv. to support the JTA Executive Committee in JTA management and operations;

xv. to support ROCs and ROs as needed especially by facilitating access to and interaction between them and the user communities;
xvi. CLS to present breakdown of JTA income by platform type.
xvii. to ensure web availability of data required by ROC's

3.5 The Argos Operations Committee (OPSCOM)

3.5.1 The Argos Operations Committee (OPSCOM) was established by the Memorandum of Understanding (MoU) signed by the National Oceanic and Atmospheric Administration (NOAA) of the United States of America, and the Centre National d'Etudes Spatiales (CNES) of France, who affirmed their desire to conduct a space applications project of mutual interest for peaceful purposes. The MoU was intended to govern the cooperation between NOAA and CNES for the implementation and the use of the Argos Data Collection and Platform Location System (Argos Data Collection System).

3.5.2 Agencies signing the MoU recognize their common interest in promoting maximum use of the Argos system through enhanced service and cost-effective operations. In this context, one of the objectives is to achieve a self-sustaining system with revenues from users fully offsetting operating costs. The Argos Operations Committee is reviewing the implementation and supervising the operations of the Argos Data Collection System. The Committee meets in principle, annually.

3.5.3 The OPSCOM in particular reviews the Argos Data Collection System development and implementation activities and recommends to the Project Managers and the signatories to the MOU appropriate measures for accomplishing the objectives of the project. It reviews and approves applications and formulates criteria for approval of applications received from prospective platform operators for the use of the Argos Data Collection System.

3.5.4 The arrangements, including cost considerations, for the performance of platform allocation, verification of the calibration data, system quality control, conversion of telemetry data into physical parameters, and computations for platform location is delegated by CNES to its agent and operations capacity according to the tariff structure and other guidelines submitted to and approved by the Operations Committee.

3.5.5 Tariffs associated with these functions are collected to offset the operating costs of the Argos Data Processing System. Tariff receipts that exceed these costs are used for Argos Data Processing System improvements and/or to reduce tariffs to System platform users as approved by the Operations Committee.

3.6 The WMO and IOC Secretariats

The World Meteorological Organization (WMO) and the Intergovernmental Oceanographic Commission (IOC) of UNESCO recognize that satellite data telecommunication systems are important components for the implementation and sustainability of global met-ocean observing networks. WMO and IOC endorse the JTA as a mechanism to cost-effectively address the requirements of WMO and IOC Programmes and Co-sponsored Programmes, in particular in terms of Argos satellite data telecommunication and related data processing, quality control, data encoding according to international standards, and data distribution to their end users. In order to facilitate the JTA achieving its goals, the Secretariats of both Organizations will provide support for the following functions:

Support the JTA Chairperson in the following manner:

i. Working with the JTA Executive Committee (JTA-EC), and its Chairperson to identify hosts for the regular meetings; and to work with the hosts to gather and disseminate logistical information to the participants;
ii. Providing financial assistance and administrative support to JTA participants who have been nominated by the JTA-EC to receive such assistance;

iii. Issuing JTA meetings' invitation letters to the Argos JTA Representatives of Countries (ROCs) with copies to the Permanent Representatives of WMO Members participating in JCOMM activities;
iv. Managing the documentation in preparation of the JTA meetings;
v. Participating at the Sessions of the JTA and its Executive Committee meetings;
vi. Preparing the session's final report template, and collaborating with the Chair, and the JTA Executive Committee for recording the Session's decisions, and issuing reports of JTA Sessions;
vii. Finalizing the issuance and distribution of Session reports of the JTA to WMO Members, IOC Member States, as well as to the ROCs and other participants;
viii. Coordinating and communicating with the ROCs, the JTA Chair and the Executive Committee on all related issues during the intersessional periods;
ix. Need to capture actions and issues from national reports, as well as reporting upon action items as stipulated at JTA and JTA-EC meetings, and provide them to the Chairperson;
x. Serve as members of the JTA Executive Committee (*ex officio*).

The representatives of WMO and IOC will participate in JTA Sessions as stakeholders, representing the interests of both Organizations.

Reimbursement to the IOC and WMO for Administrative support should be made by the JTA. The amount reimbursed is to be reviewed annually by the JTA-EC and approved by the Chairperson for the upcoming session.

4. JTA office bearers

4.1 The JTA elects a Chairperson and vice-Chairperson at JTA Sessions. The primary duty of the Chairperson is to ensure that the JTA negotiations proceed in as open and equitable a way as possible, and to assist in reconciling the needs of Argos stakeholders through an agreed negotiation process regarding future service level provision and costs. The vice-Chairperson shall deputize for the Chairperson in his/her duties if required by the Chairperson.

4.2 The Terms of Reference for the JTA Chairperson, and the JTA vice-Chairperson, details about their election and terms are provided in Annexes XI-F and XI-G respectively.

5. The JTA Executive Committee (JTA-EC)

5.1 The function of the JTA Executive Committee (JTA-EC) is to conduct the sessional and intersessional business, as well as all other matters in support of the Chairperson's duties to meet the needs of the JTA members.

5.2 The Terms of Reference of the JTA Executive Committee are provided in Annex XI-H.

6. Regular meeting of the JTA

6.1 Structure

The structure of the meeting consists of deliberative and report producing sessions over 3 days that are directed by the Chairperson to achieve the desired outcome. It is expected that the agenda, as adopted by the JTA at the start of the session, will be followed.

6.2 Desired outcome:

The desired outcome of the JTA Session is to be an open forum for all members to discuss and agree by consensus on any matter that affects their use of the Argos satellite data communications and processing system.

6.3 Invited participants

There is an open invitation to all members of all stakeholder groups to attend the JTA annual meeting. However, official invitation by the IOC and WMO will be made to the following:

- Representatives of Country (ROCs) representing a country or a group of countries from responsible government organizations using Argos
- Responsible Organizations (ROs) representing an agreed set of Argos user programmes
- Representatives of the Argos satellite system operator and service provider
- Representatives of the Argos Operations Committee (OPSCOM)
- The Executive Committee may appoint a consultant(s) /advisor(s) which may not necessarily be formally related to a particular group, organisation or country to assist in specific tasks.

6.4 Secretariat

It is expected that Secretariat support for the JTA meetings will be provided by the WMO and IOC on a rotating basis. Responsibilities of the Secretariats in administering the meeting are outlined in letters from IOC and WMO to the JTA Chair.

6.5 The typical agenda for JTA meetings is provided in Annex XI-I.

6.6 Frequency

The JTA Session should be held annually, but the schedule may be changed at the discretion of the Chairperson.

7. Typical intersessional workplan and reporting process

The following schedule is proposed. The actual workplan will be implemented by the Chairperson and will include a combination of meetings, teleconferences, and email. A typical intersessional workplan and the reporting process is detailed in Annex XI-J.

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ANNEX XI-A

ROLE OF THE JTA REPRESENTATIVE OF COUNTRY (ROC)
(as agreed at the JTA-28)

HISTORICAL OVERVIEW

The concept of ROC was introduced at the first meeting on Argos Joint Tariff Agreement (JTA-I) (Geneva, Switzerland, December 1981). The Meeting adopted a proposal «which foresees that agreements will be signed directly between the user Representative* and Service Argos.» The note under the * reads: «Representative is a unique Representative Organization for a country or a group of countries as given in the Global Agreement.» The Global Agreement starts with the following sentence: «These Terms and Conditions outline costs to and services to be provided by Service Argos of CNES and the (*)..... jointly providing support to their own authorized users for the location and data processing associated with the implementation and testing of remote platforms communicating with the satellites of the TIROS-N series.» The note under the (*) reads: «Quote the country and its own organization in charge of the Agreement with regards to CNES Service Argos. Hereafter defined by "ROC", i.e., a unique Representative Organization for a Country or a group of countries.»

That wording remained unchanged (except «Service Argos of CNES» being replaced by «Collecte Localisation Satellites», beginning in 1987, and «the satellites of the TIROS-N series» being replaced by «Argos capable satellites», beginning in 2003) until and including the "usual" Global Agreement for 2005. In the Agreement for 2005 regarding the Pilot Programme for the New Tariff Scheme, one reads: «These Terms and Conditions outline costs to and services to be provided by Collecte Localisation Satellites (1) hereafter referred to as "CLS" and the countries listed below, but not be limited to: [etc.]», and the note reads: «Quote the country and its own organization in charge of the Agreement with regard to CLS. Hereafter defined by "ROC / RO / Programme Manager", i.e. a unique Representative Organization for a country, a group of countries, or a single programme.» In addition, under DEFINITIONS, the following is added: «"RO" is the responsible Organization representing an agreed set of Argos User programmes for the purpose of their collective participation in the JTA.»

The Global Agreement for 2006 comes back to the initial wording, with a slight change in the note: «Quote the country and / or the organization in charge of the Agreement with regard to CLS, hereafter defined by "ROC / RO"» and the addition, under DEFINITIONS, of: «"ROC" is the Representative of Country and "RO" is Responsible Organization.»

The Global Agreement for 2007 reads: «These Terms and Conditions outline costs to and services to be provided by Collecte Localisation Satellites (affiliate of CNES in charge of operating the Argos system), hereafter referred to as "CLS" and all the countries participating in the JTA.» The definitions of ROC and RO remain unchanged.

Lastly, the Global Agreement for 2008 reads: «These Terms and Conditions outline costs for services to be provided by Collecte Localisation Satellites (affiliate of CNES).» The definition of ROC becomes the one adopted by JTA-27 and used in this document.

CONTEXT

The terms of the Joint Tariff Agreement require that the agreement is negotiated within an intergovernmental forum. This is achieved because, and only because, the invitation letters to the meetings are addressed by the joint Secretariat to the official representatives of Members / Member States of WMO / IOC. These invitation letters are systematically copied to the ROCs, who therefore may attend the meetings, whatever their official status may be (governmental representatives or "advisers"). This has been done on purpose since the first meeting because: (i) the ROCs are the only really knowledgeable people in their countries regarding JTA activities; and

(ii) nobody could foresee what might be the official status of the ROC in each and every country (see "NOMINATION AND RECOGNITION OF ROC" below).

The tariff agreement has been negotiated annually since its inception, with the objective of assuring the long term viability and development of the CLS / Argos data service, and in turn securing preferential (cost-recovery) and globally-consistent pricing arrangements for government or not-for-profit funded environmental monitoring programmes within the JTA participant countries.

The Representative of Country (ROC) is the person representing a country or a group of countries from a responsible government organization. The ROC may be required to keep other government agencies informed of the activities of CLS / Argos in order to justify the use of the Argos transmitters (PTTs) within national boundaries and their status within current communication policies. The ROC is the Responsible Authority representing an agreed set of Argos User programmes for the purposes of their collective participation in the JTA.

The tariff structure, price-setting arrangements and relationships between CLS / Argos, User Programmes and the ROCs have changed significantly since 2005. Changes include the introduction of a simplified tariff, the establishment of direct contracts and billing arrangements between CLS / Argos and end-user programmes, and, in some cases, the entry of local CLS / Argos representatives with the capacity to provide end user support. In the process, the “traditional” role of ROCs, their relationship with users and with CLS / Argos, and their contribution to annual tariff negotiations have been altered. ROCs’ roles around the world have also become less homogeneous.

This document sets out the role of a ROC, and the relationships, expectations and obligations between ROCs, end users, CLS / Argos and other stakeholders (e.g. OPSCOM), in the context of the current tariff structure.

NOMINATION AND RECOGNITION OF ROC

Each and every country nominates (or not, see below) its ROC as it wishes. In general, the ROC is nominated by an official representative of the Member / Member State of WMO / IOC and has therefore the status of a governmental representative. But this is not always the case: in some instances, for example, the ROC may be just "defined" through an agreement between a programme manager and CLS, and accepted as such by the JTA Meeting because of its de facto position. Other possibilities may (and do) happen. None would impinge upon the intergovernmental status of the Meeting on Argos Joint Tariff Agreement (see 1st paragraph in the "CONTEXT" section above).

ROLE OF THE ROC - GENERAL

The ROC is to ensure that the Argos system meets the basic requirements of all system user groups in the most cost-effective way within the principles of fairness, openness and the promotion of science.

ROC ROLES – CLS/ARGOS INTERFACE

- Tariff charge rate negotiation. Review CLS / Argos financial analyses, and approve the level of expenses to be attributed to JTA user programmes support. Negotiate tariff structures (including for Iridium services) that will fund the costs of the JTA service, to achieve globally consistent, predictable and equitable service pricing arrangements for all user classes (i.e. across the range of environmental science applications);

- High level advocacy of user programmes and user service classes. Provide high level collective advocacy of all user programmes and user service classes to CLS /

Argos to assure long term stability of the environmental data service for all end user service classes, and effective management of service or charge rate transitions;

- Representation of user requirements: Gather user requirements (current service, shortcomings, enhancements and future requirements) and relay to CLS/Argos as a basis for system enhancement, ground system corrective actions, enhancements or strategic investment.

- Endorsement of service investments. Review and endorse investments needed to sustain and enhance the CLS / Argos provision of basic services, and ensure the forward funding basis for such investments;

- Provision of independent advice to end-users. Represent CLS / Argos service capabilities to end-users (existing or candidate) and provide limited support to enable users to make appropriate decisions, and to resolve service problems. Support may be in the form of technical advice, referral to peer programmes, etc. It is to be provided in the context of existing primary support through equipment suppliers and CLS / Argos channels, not as an alternative to those arrangements;

- Adjudication of JTA programme eligibility. On referral from CLS / Argos, adjudicate the eligibility of new user programmes for inclusion in the JTA;

- Submission of a National Report to the JTA Meeting. Provide a National Report to the JTA meeting, at least one month prior to the meeting. The content shall follow the current report guidance; and

- Attendance at JTA meetings. ROCs are expected to attend JTA meetings. Alternatively they are to consider the materials circulated prior to the JTA meeting, and to ensure that the interests of the user programmes they represent are adequately conveyed through a ROC who will be attending the meeting, or else through their National Report.

- News items. Provide suitable Argos news items to CLS and to NESDIS

Enabling Actions to Support the ROC's Role

- CLS / Argos is to provide transparent and timely disclosure of the costs attributed to providing JTA services, and the basis for such cost attribution, at least 3 weeks in advance of new tariff negotiations;

- Outcomes of the most recent OPSCOM review of CLS finances are to be made available to ROCs through the JTA Chairperson's report to the JTA;

- CLS / Argos is to notify ROCs of user sign-ups as they occur, and to provide regular reporting of service usage by programmes in the country (or countries) represented by a ROC. The CLS / Argos Usage Reports are to be provided quarterly, in a spreadsheet form that enables ready analysis of the data;

- The CLS / Argos is to provide advice to all users on the ROC's role, and the contact details of the local ROC at the time of initiating new service contracts; and

- ROCs are to invite user communication, and may solicit specific user feedback on matters pertinent to their role, but are not expected to initiate formal user group surveys. CLS/Argos shall notify ROCs of user forums that it organizes.

Issues

- Commercial sensitivity of material. The potential for the introduction of competitors to CLS / Argos in data communications and data management services may further affect the role of the ROC, and the nature of the JTA's strategic planning and budgeting process. It may also increase the potential for perceived conflict in the relationships between CLS / Argos and ROCs, and the sensitivity of information disclosures needed for the tariff negotiation. In such circumstances, it may become prudent to conduct some aspects of tariff negotiation through a smaller group, operating on behalf of the full ROC membership; and

- Funding of ROC participation in JTA. CLS / Argos is requested to consider options for collecting funding through the JTA revenues for funding of ROC participation in the JTA. Any funding of the ROC through CLS must be done very carefully to avoid a real or perceived conflict of interest.

  Decision regarding the use of the funds should be made by the JTA Chairperson after consultation with the EC. The JTA Chairperson will then inform the DBCP Chairperson who will in turn request WMO to make expenditures.

ROC ROLES - INTERFACE WITH END USER PROGRAMMES

ROCs provide the following value to end users:

- Insight into CLS / Argos operation and directions. Provide insight into the operations of the CLS / Argos data service, how it (and the tariff) operates, how it might change in the future, and what affect that might have on user programmes;

- Assurance of global tariff consistency, stability and predictability;

- Opportunities for cross - fertilization. Provide a point of reference to other (like or complementary) programmes, nationally or globally; and

- Impartial, high-level representation to CLS / Argos. Provision of an influential, impartial voice in tariff negotiations and in specific problem resolution.

ROC ROLES - SUPPLIER INTERACTIONS

- There is no formal relationship or exchange required between ROCs and suppliers, but ROCs are encouraged maintain a level of familiarity with PTT technology appropriate to their role.

Enabling Actions to Support the ROC's Role

- CLS / Argos is to ensure suppliers are familiar with the ROC's role, and to encourage supplier contact with ROCs; and

- CLS / Argos is to facilitate ROC / supplier interactions, e.g., by invitation to user-supplier forums organized by CLS / Argos.

ROC ROLE - OPSCOM RELATIONSHIP

OPSCOM requires nationally-based user representation in tariff negotiations. No formal direct relationship is required with the ROC, only interactions through the JTA.

ROC - ROC RELATIONSHIP

- It would be a time challenge but regular teleconferences (once every three months), to discuss user issues and provide recommendations to the JTA meeting, might be an idea. It is probably more realistic to have the discussion using email in which case a ROC's mailing list needs to be hosted somewhere; and

- *To be further developed*.

ANNEX XI-B

TERMS OF REFERENCE OF THE ARGOS JOINT TARIFF AGREEMENT (JTA)

The JTA provides for an international mechanism to provide for cost-effective location and data processing of data collected through the Argos system. The JTA is functioning through stakeholders whose roles are mainly to negotiate the Argos service level and tariff, and ensure appropriate coordination amongst Argos users in order to represent their collective interests with regard to Argos tariff and requirements. Stakeholders include:

i. Representatives of Country (ROCs) representing a country or a group of countries from responsible government organizations using Argos;
ii. Responsible Organizations (ROs) representing an agreed set of Argos user programmes;
iii. Representatives of Users Groups (RUGs);
iv. Representatives of the Argos satellite system operator and service provider;
v. Representatives of the Argos Operations Committee (OPSCOM);
vi. Representatives of the WMO and IOC Secretariats.

The JTA shall:

1. be responsible for negotiating on a yearly basis fair, cost-effective, and simple terms and conditions of the global agreement covering Argos user charges that are applicable to Argos programmes funded by national governments of WMO and IOC Members/Member states and/or other JTA approved organizations;

2. review requirements from Argos user groups and make proposals for inclusion of specific developments in the Argos development programme taking into account their potential impact on the Argos tariff;

3. approve the role of the ROCs;

4. elect an Executive Committee, chaired by the JTA Chairperson, and including the vice-Chairperson, and stakeholder representatives;

5. review and agree on its operating principles;

6. report, through the Chairperson, to the Argos Operations Committee (OPSCOM) and submit its recommendations regarding Argos tariff and required Argos system developments for agreement.

Decisions shall be agreed unanimously by the JTA. If decisions cannot be agreed unanimously, they will be deferred to the Executive Committee for further discussion and decision.

ANNEX XI-C

TERMS OF REFERENCE OF THE REPRESENTATIVE OF COUNTRY (ROC)

The Representative of Country (ROC):

1. should be nominated by a (semi-) governmental (e.g. non-profit) organization being an Permanent Representative of a Member (State) of WMO or IOC; ROCs are designated through either of the following mechanisms:

   i. An agency or consortium who wishes to become a ROC consults with CLS to check whether there is already a ROC in the country, and whether there are other institutions using Argos in the country;

   ii. The agency or consortium consults with other Argos users in the country;

   iii. If not being the Permanent Representative of a Member (State) of WMO or the IOC Action Addressee, the agency or consortium writes to the Permanent Representative of a Member (State) of WMO or the IOC Action Addressee asking the Permanent Representative of a Member (State) of WMO or the IOC Action Addressee to inform the JTA Chairperson that the agency is to be added in the list of ROCs;

   iv. In case there are two or more agencies in a country asking to be a ROC, the JTA Chairperson writes to the WMO or IOC Secretariats asking them to contact the Permanent Representative of the Country with WMO, or the IOC Action Addressee from that country in order to suggest that the country makes a formal nomination through the WMO and/or IOC channels, i.e. by means of either:

      a. A letter issued by the Permanent Representatives of a country to WMO to the Secretary General of WMO;
      b. A letter issued by the IOC Action Addressee of a country to the Executive Secretary, IOC;

2. should collect (changes in) requirements from national users and bring these to the attention of CLS/Argos at JTA meetings;

3. could designate an alternate to act on its behalf at JTA meetings by means of a letter to the JTA Chairperson;

4. decides on nominations and proposals put forward by the Executive Committee (EC);

5. is the only authority in the JTA to represent the user groups in a country and to decide on matters related to the global tariff and service level;

6. should initiate interaction with their users, or act as the focal point when deemed to be appropriate or being considered necessary;

7. will provide basic support to (new) users based on information made available by CLS;

8. interacts with CLS when deemed to be necessary or required;

9. participates in the yearly negotiation for the tariff and service level based on a financial review by the OPSCOM and the EC;

10. monitors the usage of the Argos system by its users using statistical information made available by CLS on the Argos Website;

11. will provide a report to the JTA meeting at least 1 (one) month prior to the meeting date, in a format following the current reporting structure which will include the capturing of actions and issues from the national report for circulation prior to the meeting and for discussion;

12. will, at the request of CLS, agree on new user programmes that qualify for inclusion under the Global Agreement;

13. may, if national law requires that, be obliged to keep other national governmental agencies informed about the activities of CLS in order to justify the use of the Argos transmitters (PTTs, PMTs) within national boundaries and their status within current communication policies;

14. should, upon request of CLS, not distribute or communicate commercially sensitive information provided by CLS to the ROCs;

15. Need to capture actions and issues from national reports, and provide them to the Chairperson;

16. to consult web list of unused IDs and to be proactive with their users;

17. to provide suitable Argos news items to CLS.

ANNEX XI-D

TERMS OF REFERENCE OF THE REPRESENTATIVE OF ORGANIZATION (RO)

The Representative of Organization (RO):

1. should be nominated by a (semi-) governmental (e.g. non-profit) organization being an official representative of a Member (State) of WMO or IOC;

ROs are designated through either of the following mechanisms:

i. An agency or consortium who wishes to become a RO consults with CLS to check whether there is already a RO for the consortium, and whether there are other institutions using Argos in the corresponding country(ies);
ii. The agency or consortium consults with other Argos users and ROCs in the corresponding country(ies);
iii. If not being the Permanent Representative of a Member (State) of WMO or the IOC Action Addressee, the agency or consortium writes to the Permanent Representative of a Member (State) of WMO or the IOC Action Addressee asking the Permanent Representative of a Member (State) of WMO or the IOC Action Addressee to inform the JTA Chairperson that the agency is to be added in the list of ROs;
iv. The ROs are formally endorsed at the annual JTA session.

2. should collect (changes in) requirements from its users and bring these to the attention of CLS/Argos at JTA meetings;

3. could designate an alternate to act on its behalf at JTA meetings by means of a letter to the JTA Chairperson;

4. decides on nominations and proposals put forward by the Executive Committee (EC);

5. is the only authority in the JTA to represent the agency or consortium and to decide on matters related to the global tariff and service level;

6. should initiate interaction with their users, or act as the focal point when deemed to be appropriate or being considered necessary;

7. will provide basic support to (new) users based on information made available by CLS;

8. interacts with CLS when deemed to be necessary or required;

9. participates in the yearly negotiation for the tariff and service level based on a financial review by the OPSCOM and the EC;

10. monitors the usage of the Argos system by its users using statistical information made available by CLS on the Argos website;

11. will provide a report to the JTA meeting at least 1 (one) month prior to the meeting date, in a format following the current reporting structure which will include the capturing of actions and issues from the national report for circulation prior to the meeting and for discussion;

12. will, on request of CLS, agree on new user programmes that qualify for inclusion under the Global Agreement;

13. may, if national law requires that, be obliged to keep other national governmental agencies informed about the activities of CLS in order to justify the use of the Argos transmitters (PTTs, PMTs) within national boundaries and their status within current communication policies;

14. should, upon request of CLS, not distribute or communicate commercial sensitive information provided by CLS to the ROs;

15. Need to capture actions and issues from national reports, and provide them to the Chairperson;

16. to consult web list of unused IDs and to be proactive with their users;

17. to provide suitable Argos news items to CLS.

ANNEX XI-E

TERMS OF REFERENCE OF A JTA REPRESENTATIVE OF A USER GROUP (RUG)

The Argos JTA meeting is an open meeting that solicits views from Argos 'stakeholders' (representatives of user groups, ROCs, intergovernmental and international bodies, the satellite operators and service providers), and attempts to address and reconcile the needs of these bodies through negotiation regarding future service level provision and costs.

RUGs are designated through either of the following mechanisms:

i. An agency or consortium who wishes to become a RUG consults with CLS to check whether there is already a RUG for the consortium, and whether there are other institutions using Argos in the corresponding country(ies);
ii. The agency or consortium consults with other Argos users, ROCs, and ROs in the corresponding country(ies);
iii. If not being the Permanent Representative of a Member (State) of WMO or the IOC Action Addressee, the agency or consortium writes to the JTA Chairman that the agency is to be added in the list of RUGs
iv. The RUGs are formally endorsed at the annual JTA session.

In this context a Representative of User Group' (RUG) is defined as follows, with the following Terms of Reference:

i. A RUG will be an individual who can fairly represent the overall consensus view of a significant Argos JTA user community. Such communities might reasonably include the operators of data buoys, floats, ice platforms, animal tags, land stations, ship stations and airborne stations, or bodies with agreed international responsibilities for the promotion, sponsorship or validation of any aspect of environmental observation using Argos (e.g. IOC, WMO, WWF).
ii. It is accepted that for certain user groups (e.g. animal trackers), accreditation as above might be difficult to establish in the short term. Nonetheless the JTA-EC will work proactively to seek and encourage the identification of RUGs as essential components of any meaningful JTA negotiation process, and will be lenient in applying the above constraint.
iii. Notwithstanding the above, the JTA sessions are open with observer status to any interested person (see JTA TORs).
iv. If accredited, a RUG will be obliged to consult as widely as possible with his/her user community regarding their use and expectations of the Argos system, and to make the results of these consultations publicly available well in advance of JTA sessions.
v. The RUG will also be expected to act as an impartial focal point for the dissemination of relevant information regarding Argos that might be of benefit to his/her user community.
vi. In return, the RUG will receive a letter of accreditation, and may be able to request some level of financial support from CLS for attendance at meetings and for other activities approved by the JTA-EC and CLS.
vii. The RUG will work with CLS and the JTA-EC to identify opportunities that might bring the JTA session into closer contact with his/her user group, with a view to establishing within that group the benefits of the JTA process.
viii. Need to capture actions and issues from national reports, and provide them to the Chairperson;
ix. To consult web list of unused IDs and to be proactive with their users;
x. To provide suitable Argos news items to CLS.

ANNEX XI-F

TERMS OF REFERENCE OF THE JTA CHAIRPERSON

The Argos JTA meeting is an open meeting that solicits views from Argos 'stakeholders' (representatives of user groups, ROCs, intergovernmental and international bodies, the satellite operators and service providers), and attempts to address and reconcile the needs of these bodies through an agreed negotiation process regarding future service level provision and costs. The primary duty of the Chairperson is to ensure that these negotiations proceed in as open and equitable a way as possible.

The JTA shall elect a Chairperson from WMO and IOC Members/Member States at JTA Sessions. The term for the Chairperson will be for two years. The Chairperson shall be eligible for re-election in his/her capacity as Chairperson, but in principle only for one subsequent term.

Terms of Reference for the JTA Chairperson:

1. The Chairperson shall be impartial and shall not favour any particular group, organisation or country.

2. In consultation with the Secretariat, the Executive Committee (JTA-EC) and CLS, the Chairperson shall prepare the agenda, and confirm the venue for the annual session for distribution by the secretariat.

3. The Chairperson shall conduct the annual session of the JTA, and promote free, equitable and open discussion of agenda items.

4. The Chairperson shall convene intersessional meetings of the JTA-EC as necessary.

5. The Chairperson shall regularly liaise with CLS with regard to developments that might impact the JTA and its members and may visit CLS as the need arises;

6. The Chairperson shall routinely circulate information to the JTA participants during the intersessional period as appropriate;

7. The Chairperson shall deputize the vice-Chairperson if required.

8. The Chairperson shall represent the agreed views, decisions, and requirements of the JTA at OPSCOM and other sessions as appropriate, and report back on the outcomes to subsequent meetings of the JTA-EC and JTA.

9. The Chairperson, assisted by the secretariat and members of the JTA-EC if required, shall prepare and finalize reports of the JTA and its JTA-EC, and submit them to the Secretariats for publication if necessary.

10. The Chairperson, in consultation with the JTA-EC and other stakeholders, shall nominate membership of the JTA-EC, and approve new ROCs and ROs.

11. Need to capture and summarize actions and issues from national reports.

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ANNEX XI-G

TERMS OF REFERENCE OF THE JTA VICE-CHAIRPERSON

The Argos JTA meeting is an open meeting that solicits views from Argos 'stakeholders' (representatives of user groups, ROCs, intergovernmental and international bodies, the satellite operators and service providers), and attempts to address and reconcile the needs of these bodies through an agreed negotiation process regarding future service level provision and costs. The primary duty of the Chairperson is to ensure that these negotiations proceed in as open and equitable a way as possible.

The JTA shall elect a vice-Chairperson from WMO and IOC Members/Member States at JTA Sessions. The term for the vice-Chairperson will be for two years. The vice-Chairperson shall be eligible for re-election in his/her capacity as vice-Chairperson, but in principle only for one subsequent term.

Terms of Reference for the JTA vice-Chairperson:

- The Chairperson shall deputize the Vice-Chairperson for all of the duties (except for item number 7 of the JTA Chairperson's ToR) if required.

ANNEX XI-H

TERMS OF REFERENCE OF THE JTA EXECUTIVE COMMITTEE

The function of the JTA Executive Committee (JTA-EC) is to conduct the sessional and intersessional business, as well as all other matters in support of the Chairperson's duties to meet the needs of the JTA members.

Terms of Reference

The specific tasks of the JTA-EC are to:

1. Assist the chairperson and secretariat in the preparation of reports, reviewing action items of previous JTA meetings, and their submission, if needed, to the IOC and WMO Secretariats for distribution;

2. Annually review the functions and duties of the JTA and recommend any changes to the Chairperson for discussion and approval at the JTA Session;

3. Review and facilitate the implementation of action items from previous JTA sessions;

4. Annually review the tariff structure and recommend changes to the chairperson; and

5. Analyze the JTA administrative costs to be reimbursed by the JTA, and make recommendations to the Chairperson.

Membership

1. The membership shall include:

i. Chairperson
ii. Vice-Chairperson
iii. Representative of the IOC Secretariat (ex officio)
iv. Representative of the WMO Secretariat (ex officio)
v. Three additional members proposed by the Chairperson and elected by the JTA. These members will serve for one term and may in principle be eligible only for one subsequent term.
vi. Representative of CLS Argos

2. Careful consideration should be made to ensure a proper mix that represents nations, user groups, and subject matter experts.

3. JTA members may attend the JTA-EC meetings as an observer, subject to the availability of adequate meeting room space. If required, the Chairperson of the JTA-EC will make a final decision as to which observers may attend, and may also invite other persons to attend at his / her discretion

Meetings

1. As necessary, the Chairperson will convene and organize all JTA-EC meetings. The meetings can be in person, or teleconference.

2. If decisions are needed by the JTA-EC as permitted/requested by the JTA Session or the Chairperson during the intercession, elections for those decisions may be organized with a quorum consisting of at least four members of the JTA-EC, including the Chairperson or his nominated deputy.

ANNEX XI-I

TYPICAL AGENDA FOR A JTA SESSION IN YEAR *YYYY*

1. ORGANIZATION OF THE MEETING

    1.1 OPENING OF THE MEETING
    1.2 ADOPTION OF THE AGENDA
    1.3 WORKING ARRANGEMENTS
    1.4 SELECTION OF THE WRITING GROUP (WG)[11]

2. REPORT OF THE CHAIRPERSON OF THE JTA

    2.1 REPORT ON THE EC

3 REVIEW OF ACTIONS

4. REPORT ON THE *YYYY* GLOBAL AGREEMENT

5. REPORT ON THE DEVELOPMENT OF CLS

6. REVIEW OF USER'S REQUIREMENTS AND ISSUES

7. REVIEW OF THE STRUCTURE OF THE TARIFF AGREEMENT AND RELATED MATTERS

8. TERMS AND CONDITIONS OF THE *YYYY*+1 GLOBAL AGREEMENT

9. FUTURE PLANS AND PROGRAMMES

10. REVIEW OF THE OPERATING PRINCIPLES

9. NATIONAL REPORTS

11. ANY OTHER BUSINESS

12. ELECTION OF THE CHAIRPERSON, VICE-CHAIRPERSON, and EC MEMBERSHIP

13. DATE AND PLACE OF THE NEXT MEETING

14. CLOSURE OF THE MEETING

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11 : The purpose of the WG is to assist the Secretariats in taking the minutes and compiling a draft report of the proceedings for approval of the JTA.

ANNEX XI-J

TYPICAL JTA INTERSESSIONAL WORKPLAN AND REPORTING PROCESS

- JTA Session : 0 Months October

- E-mail from the Secretariat informing ROCs about the achievements of the meeting (final report on the web) 2 Months December

- Intersession #1 3 Months January
  - Email from Chairperson that outlines the work to be accomplished and assign actions to JTA-EC.

- Intersession #2 6 Months April
  - Prepare documents and Chairperson for OPSCOM meeting in June

- Intersession #3 7 Months May
  - Secretariat issues invitation letters
  - Agenda, and documentation plan for the next Session

- Intersession #4 9 Months July
  - Status of actions assigned in Intercession #1. Make adjustments as necessary
  - Report from the OPSCOM Meeting
  - Chairperson communicating to the JTA on recent outcomes, and plans for the next Session

- Intersession #5 11 Months September
  - Preparatory documents for the JTA Session made available to all participants

- JTA Session: 12 Months October

ANNEX XI-K

FORMAT FOR THE NATIONAL REPORTS TO THE JTA

JTA National Report

Year:
Country:

Section 1. Overall Summary

The objective of this section is to provide a short narrative statement that characterizes a country's Argos participation, programme, and future directions. This section can also be looked at as an abstract of section 2 – section 6.

Section 2. Future Plans

Please provide information on national future plans.

Section 3. Technological Changes that affect User Requirements

This objective of this section is to provide information on any advances in instrument development, techniques, or other technology that may affect future development of the Argos system.

Section 4. User issues, problems, and level of satisfaction with Argos

The objective of this section is to highlight any user issues that need to be brought to the attention of the JTA and CLS Executives.

Section 5. Successful programme use of Argos

The objective of this section is to highlight the successful use of Argos in helping users achieve their objective.

Section 6. Analysis of Local Operational Issues

The objective of this section is to present any Argos issue that affects users in a particular location, country, or platform family that may not shared by other user groups.

ANNEX XII

NATIONAL REPORTS TO THE JTA
(JTA National Report on Current and Planned Argos Use)

APPENDIX I OF ANNEX XII

Year	**2013**
Country	**AUSTRALIA**

Section 1. Overall Summary

In 2013, Wildlife researchers, particularly those working on Marine species, continued to dominate Argos usage for Australia. Of the 86 programs from which transmissions were received between January and July 2013, 71 were wildlife tracking programs, which contributed 66% of the total PTT years and 75% of the work units (prior to capping) for Australia. The Sydney Institute of Marine Science, Sydney Botanic Gardens Trust and Rio Tinto were the Key players in the Wildlife sector with their respective research on Seals, Flying Foxes and Turtles. The remaining 44% of PTT years were consumed by Profiling Floats, Buoys (& others) and Fixed Platforms generating 13, 12 and 8 percent of total consumed PTT years respectively. The Commonwealth Scientific and Industrial Research Organisation's (CSIRO) "Argo" float program was responsible for all Profiling float usage, while the Australian Antarctic Division was the largest "Buoy and Other" and "Fixed Platform" user.

Overall, Argos usage has diminished a little following last years "growth spurt" (20.17%), with a projected PTT years total of 111.308, down 4.48% on 2012 actual PTT consumption of 116.293. However, "Buoys and Other" activity has improved marginally and Wildlife activity has picked up following a drop over the Australian summer.

Generally, Australian users report a moderate to high level of satisfaction with Argos, with the high cost of satellite time being the most frequently reported issue. Cost is of particular importance to smaller organizations and volunteer organisations that rely on donations to fund satellite time – here cost can become a limiting factor.

Actual usage (1 January – 31 July)	Average active PTTs per month	Total PTT.Years
Buoys and others	30.14	8.01351
Profiling floats	231.86	8.50613
Animals	393.29	42.58698
Fixed stations	10.29	5.26428
TOTAL	665.58	64.3709

PROJECTED 2013 PTT YEARS TOTAL	111.308

Section 2. Future Plans

Future goals, aims and objectives for Australian Users differ dramatically between organisations, and programs. While many organisations form associations and will work together to raise funds

and data share where goals are mutual, there are no formal national plans for Australian Argos use.

Section 3. Technological Changes that affect User Requirements

Section 4. User issues, problems, and level of satisfaction with Argos

Based on responses to a recent survey, Australian users report a moderate to high level of satisfaction with Argos. Reported issues include the high cost of satellite time, which becomes very limiting for some users, particularly small Wildlife users from universities and volunteer organizations reliant on government funding, grants and donations to fund satellite time. Other issues include:

- Complicated or unclear terminology on Argos forms
- **Limited time frame for data available through Argos Web** (Hopefully, this issue resolved soon),
- Latency
- Argos Direct/Databank fees unclear in Pricelist
- Time before automatic log out on Argos Web too brief

Section 5. Successful programme use of Argos

Following are examples of achieved goals made possible through the Argos system:

"*Already we have been able to gain detailed insight into the home-range of adult wedge-tailed eagles, which has not previously been done before"*

"We have used Argos to successfully determine foraging locations for seabirds breeding on the GBR that are in the central Coral Sea, up to 1000km from breeding colonies"

"Due to the almost real-time availability of data, I am able to organise access to the colony in order to retrieve my tags. The availability of the maps on Google earth also allows me to rapidly share the information on the penguins' locations"

"The data obtained through Argos has identified important night roosting sites (of Carnaby's Cockatoos) *and foraging areas around those roosts. This information is hoped to be used to identify conservation actions and to be considered in urban planning decisions and assessments of development proposals"*

Section 6. Analysis of Local Operational Issues

Refer to Appendices A – C.

Appendix A

Argos PTT years, Active PTT's and Work Units in Australia

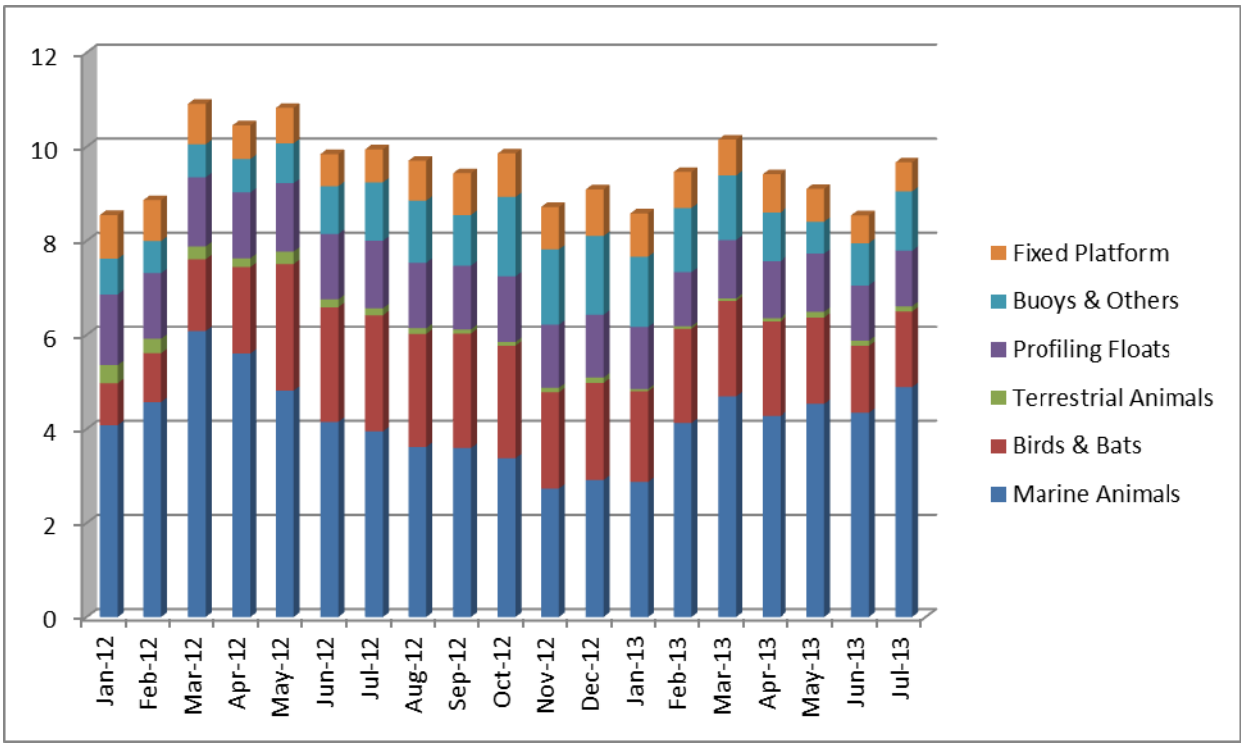


Figure A1: PTT years by Platform Type. January 2012-July 2013

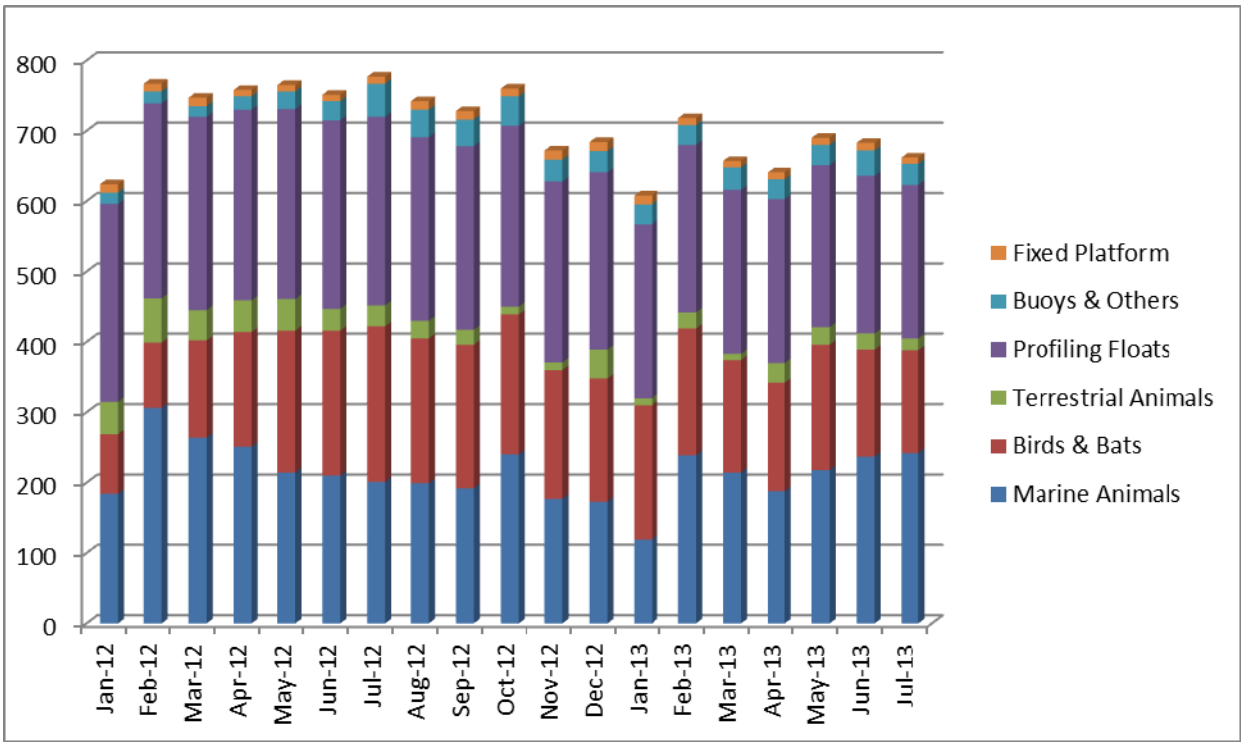


Figure A2: Active PTTs by Platform Type

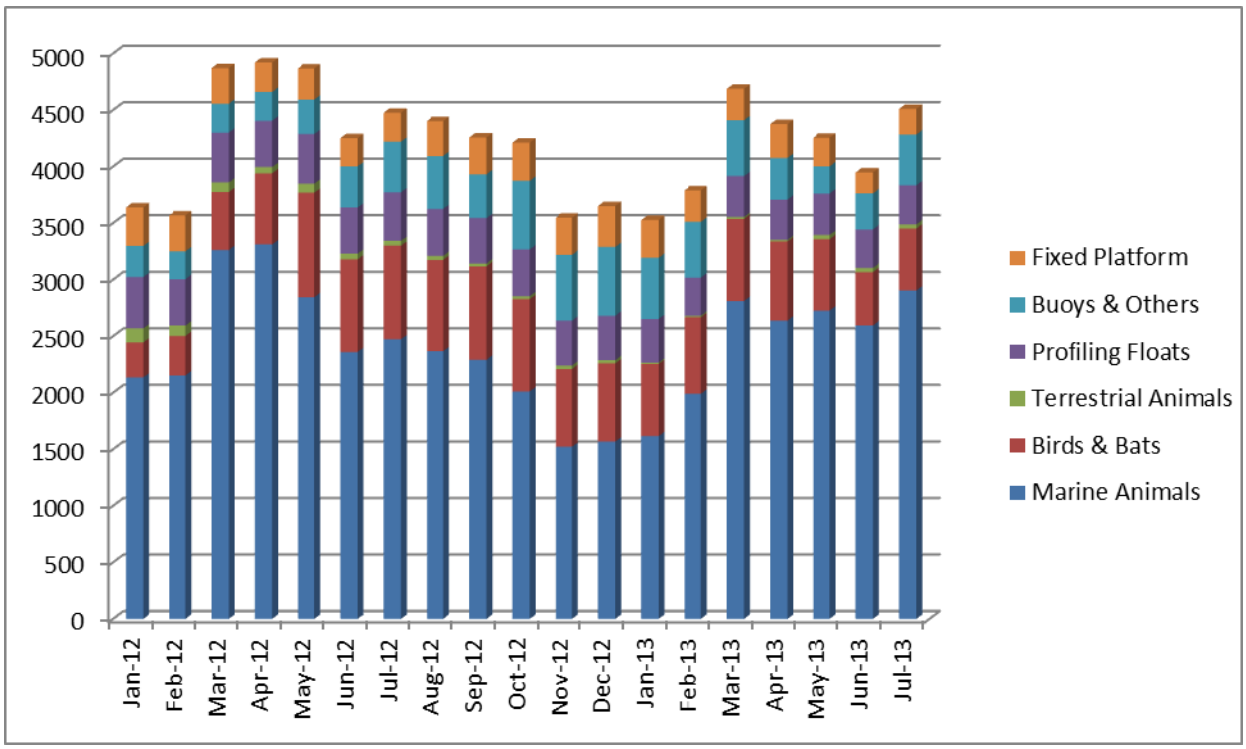


Figure A3: Work Units before Capping by Platform Type

Appendix B

PTT Years by Organisation. 1st Jan- 31st July

Program	Program name	PTT years	Class	Buoys & Others	Profiling Floats	Animals	Fixed Platforms	Organization	PTT years tot
1155	SEA ICE DYNAMICS	4.08008	A	4.08008				AUSTRALIAN ANTARCTIC DIVISION	12.50814
13440	SS PGM 2240 FORAGING ECOLOGY OF MARINE MAMMALS	2.64876	C			2.64876			
366	ANTARCTIC SURFACE METEOROLOGICAL PROCESSES	2.34721	D				2.34721		
1366	WEATHER OBSERVATION AIR TRANSPORT	2.289	D				2.28900		
11068	FORAGING ECOLOGY OF EMPEROR PENGUINS	0.9918	C			0.99180			
2440	APPLIED MARINE MAMMAL ECOLOGY	0.12394	C			0.12394			
4068	FORAGING ECOLOGY OF EMPEROR PENGUINS	0.02735	C			0.02735			
2039	CSIRO PROFILING FLOAT PROGRAM	8.50613	B		8.50613			CSIRO (COMMONWEALTH SCIENCE & IND.RESEAR.ORG)	9.82948
1715	WHALE SHARK TRACKING	0.68292	C			0.68292			
2214	TUNA AND BILLFISH MIGRATION	0.59523	C			0.59523			
4255	CSIRO SLOCUM GLIDER PROJECT	0.0452	C			0.04520			
4135	IMOS ANTARCTIC SEALS	6.30253	C			6.30253		SYDNEY INSTITUTE OF MARINE SCIENCE	6.30253
4246	SYDNEY BOTANIC GARDENS GREY-HEADED FLYING-FOX	4.74385	C			4.74385		BOTANIC GARDENS TRUST	4.74385
4106	CAPE LAMBERT TURTLE MONITORING	4.48319	C			4.48319		RIO TINTO	4.48319
5106	DEAKIN UNIVERSITY - BANDED STILT RESEARCH	2.06774	C			2.06774		DEAKIN UNIVERSITY	3.67446
4826	SPATIAL ECOLOGY OF PACIFIC BLACK DUCK IN SOUTH	1.35606	C			1.35606			
5315	ECOLOGY OF BASS STRAIT FUR SEALS	0.25066	C			0.25066			
9085	AUSTRALIAN DRIFTING BUOYS	1.74243	A	1.74243				BUREAU OF METEOROLOGY (BOM)	2.87733
86	AUSTRALIAN AUTOMATIC WEATHER STATIONS	0.62465	D				0.62465		
799	DEVIL XBT BOM	0.51025	A	0.51025					
527	MARINE TURTLE TRACKING	1.96657	C			1.96657		JAMES COOK UNIVERSITY	2.84878
4222	POST REHABILITATION SUCCESS OF MARINE TURTLES	0.5089	C			0.50890			
3191	SOUTHERN GBR SEABIRD TRACKING	0.28974	C			0.28974			
10527	MARINE TURTLE TRACKING (SS PGM 527)	0.08357	C			0.08357			
3623	AUSTRALIAN FACILITY FOR OCEAN GLIDERS	1.21366	A	1.21366				UNIVERSITY OF WESTERN AUSTRALIA (UWA)	2.09308
5163	ROOST SITE FIDELITY & RESOURCE USE BY CARNABY'S	0.87942	C			0.87942			
5077	HENDRA VIRUS INFECTION DYNAMICS	2.029	C			2.02900		BIOSECURITY QUEENSLAND - DEEDI	2.02900
4064	CVA ECO BEACH FLATBACK SEA TURTLE MONITORING	1.54389	C			1.54389		CONSERVATION VOLUNTEERS AUSTRALIA (CVA)	1.67951

5405	CVA - COBOURG PENINSULA SEA TURTLE MONITORING	0.13562	C			0.13562			
1527	NEW ZEALAND FUR SEALS AND FISHERIES INTERACTIONS	1.5658	C			1.56580		SARDI AQUATIC SCIENCES	1.56580
5209	MARINE HOTSPOTS	1.21645	C			1.21645		MACQUARIE UNIVERSITY	1.21645
1446	MARINE TURTLE MIGRATION STUDY	0.74385	C			0.74385		AQUATIC THREATENED SPECIES UNIT	1.12471
5076	DUGONG MITIGATION PROJECT	0.38086	C			0.38086			
11345	KTSLA BLUE SHARK SUB PGM	0.64382	C			0.52670		SEA LIFE	0.88355
5345	SEA LIFE AUS/NZ	0.23973	C			0.20685			
5354	FISHERIES NSW (WHALER SHARK TAGGING)	0.61713	C			0.61439		NSW DEPARTMENT OF PRIMARY INDUSTRIES-COFFS HARBOUR	0.61713
4226	MOVEMENT OF PINK-EARED DUCKS	0.56233	C			0.56233		VICTORIA UNIVERSITY (AUS)	0.56233
3874	MOVEMENTS OF BROLGA (GRUS RUBICUNDA)	0.53896	C			0.53896		UNIVERSITY OF BALLARAT	0.53896
5152	FISH TAGGING PROGRAM	0.48492	C			0.48492		UNIVERSITY OF TASMANIA	0.50821
5328	UTAS SHARK PAT PROGRAM	0.02329				0.02329			
5377	DEPT. OF ENVIRONMENT & CONSERVATION SEA TURTLE PRG	0.4774	C			0.28697		DEPARTMENT OF ENVIRONMENT & CONSERVATION-BENTLEY	0.47740
5158	GREEN SEA TURTLES REHABILITATION	0.38838	C			0.38838		MELBOURNE AQUARIUM	0.38838
2006	AUSTRALIAN FUR SEAL	0.35686	C			0.35686		PHILIP ISLAND NATURE PARK	0.36914
3622	LITTE PENGUIN ECOLOGY	0.01228	C			0.01228			
4158	TRACKING OF AUSTRALIAN FUR SEALS	0.30414	C			0.30414		JERVIS BAY MARINE PARK	0.30414
5215	MARINE DEBRIS TRACKING	0.27944	A	0.27944				CENTRAL QUEENSLAND UNIVERSITY	0.27944
3603	NSW DPI WILD DOG MOVEMENT PROJECT	0.24435	C			0.24435		NSW DEPARTMENT OF PRIMARY INDUSTRIES	0.24435
4008	TRACKING ESTUARINE CROCODILES	0.13691	C			0.13691		QUEENSLAND UNIVERSITY	0.23484
3809	SOUTH EAST QUEENSLAND TIGER SHARK RESEARCH	0.0541	C			0.05410			
4115	PROJECT MANTA (MEMMS)	0.04315	C			0.04315			
5093	GREY NURSE SHARK RESEARCH & COMMUNITY ENGAGEMENT	0.00068	C						
4927	PSGLMP TURTLE MONITORING & RESEARCH	0.23289	C			0.23289		PORT STEPHENS-GREAT LAKES MARINE PARK	0.23289
3148	NT CROCODILE TRACKING	0.23016	C			0.23016		WILDLIFE MANAGEMENT INTERNATIONAL	0.23016
5122	FLYING-FOX DIARIES	0.2137	C			0.21370		OFFICE OF ENVIRONMENT & HERITAGE	0.21370
2236	GREEN TURTLES MIGRATION	0.20959	C			0.20959		PENDOLEY ENVIRONMENTAL PTY LTD	0.20959
5301	BMRG FERAL PIG SATELLITE TRACKING PROGRAM	0.16164	C			0.11301		BURNETT MARY REGIONAL GROUP FOR NRM LTD	0.16164
4224	REEF CHANNEL	0.15822	C			0.15822		REEF CHANNEL	0.15822
3492	WHALE SHARK MONITORING - PHILIPPINES	0.14036	C			0.14036		ECOCEAN INC.	0.14036
5240	IMPACT OF GHOST NETS ON TURTLE POPULATION IN THE ATS	0.13699	C			0.13699		NAMRA - CDU	0.13699
5451	UNDERWATER WORLD TURTLE REHABILITATION	0.12809	C			0.09521		UNDERWATER WORLD	0.12809

3849	WAVERIDER BUOY AT PORT HEDLAND	0.12534	A	0.12534				PORT HEDLAND PORT AUTHORITY	0.12534
5275	RESILIENCE OF LITTLE PENGUINS FOLLOWING EXTREME	0.09794	C			0.01095		MURDOCH UNIVERSITY	0.11575
5258	BLACK COCKATOO HEALTH, DEMOGRAPHICS & ECOLOGY	0.01781	C			0.01781			
4890	BULL SHARK TAGGING RESEARCH	0.10407	C			0.10407		INDUSTRY & INVESTMENT NSW	0.10407
5090	SUPPORTING SEA TURTLE SURVIVAL AT QUEENS BEACH-	0.07602	C			0.07602		QUEENS BEACH ACTION GROUP	0.07602
3974	GAWLER RANGES BOUNCEBACK FERAL GOAT CONTROL	0.06575	C			0.06575		DEPARTMENT OF ENVIRONMENT AND HERITAGE - WUDINNA	0.06575
3424	UNDERSEA DISTRIBUTED NETWORKED ACOUSTIC SYSTEMS	0.05889	A	0.05889				DEFENCE SCIENCE & TECHNOLOGY ORGANISATION	0.05889
5313	WEDGE-TAILED EAGLE SATELLITE TELEMETRY PROJECT	0.05752	C			0.02944		INSIGHT ORNITHOLOGY	0.05752
5415	EVALUATING EFFICACITY OF STATE BARRIER FENCE	0.0568	C			0.05338		DEPARTMENT OF AGRICULTURE & FOOD WA	0.05680
5177	FSRF WHITE SHARK TRACKING	0.05616	C			0.05616		FOX SHARK RESEARCH FOUNDATION	0.05616
4265	FLYING-FOX TRACKING	0.04725	C			0.04725		MONASH UNIVERSITY	0.04725
5243	DARWIN HARBOUR TURTLE MONITORING PROGRAM	0.02397	C			0.02397		CARDNO ECOLOGY LAB	0.02397
4855	BILLYRAMBIJA KOALA JOINT VENTURE	0.02603	C			0.02603		BILLYRAMBIJA LANDCARE GROUP INCORPORATED	0.02329
4108	CONNECTIVITY OF LARGE SHARK SPECIES IN THE SOUTH	0.02464	C			0.02464		GRIFFITH UNIVERSITY - GOLD COAST 2	0.02054
5316	TRACKING POSTMOULT ROCKHOPPER PENGUINS	0.01507	C					DEPARTMENT OF ENVIRONMENT & CONSERVATION	0.01918
5042	PEEL-HARVEY PIG PROJECT	0.00411	C			0.00411			
4103	WOODSIDE BROWSE TURTLE STUDIES	0.01644	C			0.01644		INPEX BROWSE LTD	0.01644
5308	CAPTIVE EMU RELEASE PROGRAM	0.01644	C			0.01644		SINCLAIR KNIGHT MERZ - NEWCASTLE	0.01644
5460	QLD HAMMERHEAD SHARK PROJECT	0.01027	C			0.01027		AUSTRALIAN MARINE SCIENCE (AIMS)-TOWNSVILLE	0.01027
5214	MSLS TURTLE TRACKING	0.00957	C			0.00957		SYDNEY AQUARIUM CONSERVATION FUND - MANLY	0.00957
3398	KI FERAL ANIMAL CONTROL	0.00615	C			0.00615		KANGAROO ISLAND NRM BOARD	0.00615
3117	FORAGING DISTRIBUTION & ECOLOGY OF ABBOTT'S BOOBY	0.00615	C			0.00615		HAMBURG UNIVERSITY	0.00615
3306	SLOCUM GLIDER TIMOR SEA AND LEEUWIN CURRENT	0.00342	A	0.00342				AUSTRALIA GLOBAL OCEAN OBSERVATION SYSTEM	0.00342
2971	SAZ SEDIMENT TRAPS	0.00342	D				0.00342	ANTARCTIC CLIMATE & ECOSYSTEM COOPERATIVE RESEARCH	0.00342
5449	ROCK WALLABY TRANSLOCATION-LITTLE SANDY DESERT	0.0034	C			0.00340		DEPARTMENT OF ENVIRONMENT & CONSERVATION-KARRATHA	0.00340
4086	MIDDLEBACK ALLIANCE FERAL GOAT MONITORING	0.00137	C			0.00137		ECOLOGICAL HORIZONS	0.00137
	TOTALS	**64.92982**		**8.01351**	**8.50613**	**42.58698**	**5.26428**		

Appendix C

JTA 33 User Survey Responses

Program Details	Satisfaction with Argos 1-5 (1 = Very Unsatisfied, 5 = Very Satisfied)	Problems and Issues	Successful Argos Use
University of Western Australia Argos beacon for Subsurface mooring	4		We haven't used the program yet, so I don't have much to comment yet. This is also why I only gave 4/5 for the satisfaction. So far, everything has been smooth to get the program started but again we haven't actually used the beacons yet.
Pendoley Environmental Marine Turtle Tracking	5	cheaper satellite time	
Insight Ornithology - Wedge-tailed Eagle tracking to monitor the home range of adult birds and dispersal of juveniles, based in Western Australia.	5	PTTs have only been deployed for 2 months and during this time no issues have arisen that pose any problems. I am very happy with the technology!	Already we have been able to gain detailed insight into the home-range of adult wedge-tailed eagles, which has not been done before. Continued research over the next 12 months will give further detail. More information is available at simoncherriman.blogspot.com.au
Deakin University Tracking of marine predators (fur seals)	5		The great personal service.
Global Environmental Modelling Systems - on behalf of Port Hedland Port Authority. Use of Argos service mainly for oceanographic equipment position monitoring and data transmission.	5	Terminology on application forms can sometimes be confusing. Technically, Argos service is reliable and consistent.	

James Cook University - Seabird tracking	4	I would like to be able to access data from longer time periods as a single file rather than having to down load within ten day blocks and collate files	We have used agros to successfully determine foraging locations for seabirds breeding on the GBR that are in the central Coral Sea, up to 1000km from breeding colonies
QUEENS BEACH ACTION GROUP INC MARINE TURTLE TRACKING	4	prices must be kept to a minimum to allow volunteer organisations to use the service as there funds are limited and we use tracking as a teaching tool for our schools and this exposes argos to a wider audience	
Conservation Volunteers Australia. Sea turtle tracking.	4	No issues to this point in my level of understanding the service.	We are only just scratching the surface of migratory tracking, with limited results produced to date.
CSIRO Marine and Atmospheric Research (Marine turtle tracking, fish and shark tracking)	5		
Murdoch University, Little Penguin tracking	4	No issues.	Due to the almost real-time availability of data, I am able to organise access to the colony in order to retrieve my tags. The availability of the maps on Google earth also allows me to rapidly share the information on the penguins' locations.

University of Western Australia and Western Australian Department of Parks and Wildlife (formerly Department of Environment and Conservation). Tracking Carnaby's cockatoo (Calyptorhynchus latirostris) - a large endangered black parrot endemic to south west Western Australia	4	Sometimes delays of an hour or more between a satellite finishing its pass overhead and the location fix being available on ArgosWeb. Databank fee was not advised when I requested a switch from being emailed data every 3 hours to once a month. The databank fee is considerably more than the Argos Direct internet delivery of data fee and users should be warned. Would like the option to increase the time that Argos Web will allow you to remain logged on. I follow the flocks containing my study birds via vehicle in the metropolitan area and regularly log in to check for satellite fixes to assist me.	I am nearing the completion of the data collection phase of my project so I have not analysed or implemented the outcomes of my study. However, the data obtained through Argos has identified important night roosting sites and foraging areas around those roosts. This information is hoped to be used to identify conservation actions and to be considered in urban planning decisions and assessments of development proposals.
Ballarat University tracking of birds	5		Prompt and helpful advice

APPENDIX 2 OF ANNEX XII

Year	**2013**
Country	**BOTSWANA**

Section 1. Overall Summary

The use of the Argos system in Botswana continues to be primarily for tracking wildlife for research purposes, mostly via GPS/Argos collars. Users in Botswana are all small NGOs or research groups that operate independently of each other. As such, we have little specific information of what specific types of collars are being used and on what species. Our own organization uses collars to track cheetah for various research purposes.

Section 2. Future Plans

As users of the Argos system in Botswana are small NGOs and independent research organizations, each pursuing its own specific research objectives. There are no overarching national programs relating to Argos systems, and there are no integrated or consolidated national plans that we are aware of.

Section 3. Technological Changes that affect User Requirements

None that we are aware of.

Section 4. User Issues, Problems, and Level of Satisfaction with Argos

The ongoing issue for Argos users in Botswana is the cost and the cost structure using "6-hourly charging blocks." Because Argos users in Botswana are small NGOs and research programs, funds and available budgets are always limited. This often means that – in order to conserve funds -- use of the collars is determined by the charging structure rather than the biology of the animal, and this may not be ideal for research purposes.

For example, if you are dealing with a crepuscular species (i.e., active during the early morning and late afternoon to early evening periods, generally inactive in between) such as a wild dogs, you might want to take fixes and transmit these from 0400-0800 and 1600-2000 hours. However, these periods cover all four Argos charging blocks and would result in download charges for the full day, every day.

It would be better for biologists (and our budgets) if Argos divided the day into 24 hours. If you transmit within an hour you pay for that hour. In this way, biologists could set the PTT duty-cycles to match the animals' behaviour and not have to set them to match Argos time slots.

We might also suggest that Argos consider a pricing structure that is based on a sliding scale relative to the user's ability to pay, such that a small NGO operating on limited budgets pays at a lower rate than a large organization or one with considerable budget flexibility (e.g., governmental entities or large corporations).

Section 5. Successful Program Use of Argos

The only program using the Argos system that we have specific details of is our own. At various times, we have successfully had different 8 Argos platforms (collars) on cheetah to collect data on movements, ranging and territorial patterns, and to identify prey kill sites. Our collars are fitted with devices to automatically release and drop the collar at predetermined dates and times, allowing us

to retrieve the unit when further data from a particular animal are no longer needed. At the moment, we currently have no collars active, but do plan to reactivate some of the platforms in the future.

Section 6. Analysis of Local Operational Issues

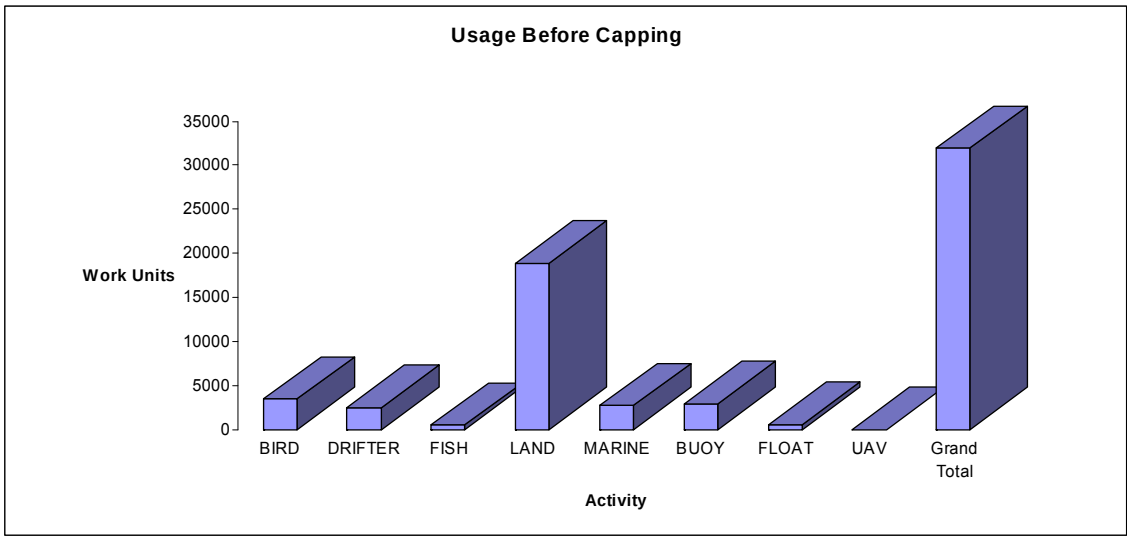
Amongst users we have talked to it is generally thought that the data transmission rate from the collars via the Argos system is not very fast, efficient, or reliable). This is particularly true for small users such as ourselves, operating on a very limited budget and trying to minimize the amount of communication time with the Argos system. Often, such users will calculate a minimum amount of satellite communication time to (theoretically) transmit the information required but find that, in practice, the estimated amount of time does not allow enough data to be transmitted. This may be due to relatively poor satellite coverage for users nearer the equator, poor communication links caused by animals moving under trees or into other areas where communication with the satellites is poor, or for some other reasons we are not aware of.

APPENDIX 3 OF ANNEX XII

Year	**2013**
Country	**CANADA**

Section 1. Overall Summary

Canadian researchers consumed over ninety-three platform years from the start of the year to the end of July, 2013. Overall, bird, fish and land animal tracking accounts for 80% of usage in Canada and the total usage by the end of year is expected to be 160 PTT-Years down from 173 estimated for 2012 and 215 PTT-Years from 2011.



Canadian usage in 2013. Work Units are essentially transmitter-days. The LAND and MARINE categories refer to animal tracking, the dominant activity for

Animal tracking was the dominant activity as policy makers, resource developers and habitat managers ask for hard data from researchers to guide their decisions. Populations of caribou, bison, grizzly and polar bears, sea birds, foxes and others are being monitored by Argos transmitters for their responses to rapidly changing conditions, especially in the Arctic.

Government agencies have long been using Argos for operational programs as well as research activities. The Canadian Meteorological Service continues to operate data buoys and drifters along with the Canadian Ice Service and the Coast Guard Rescue units but reports that they are converting to Iridium data transmission to save on costs. Fisheries and Oceans maintains its share, about 100, of the Argo float program as well as fish and marine mammal research programs. Some of these activities are in decline because of increasing use of Iridium transmitters but can be expected to continue because of their recognized high priority.

Activity is maximum during the late spring and summer months as a reflection of the field season when new transmitters are deployed but the intensity of Argos activity declines only partly as most programs are designed to collect year-round data.

Local issues typically involve transmission anomalies in wooded areas or snow cover affecting the antenna. Arctic buoy operators report that the Argos antenna performs better than Iridium when covered with snow.

Many users mention the issue of cost and it is apparent that many programs are under cost pressure. This, and the apparent decline in usage this year, are perhaps a reflection of increased difficulty in getting research funding in Canada.

See Appendix 1 for individual program summaries

Section 2. Future Plans

Lack of funding continues to be an issue for future growth in general. However, the increased transition to iridium transmitters will have a direct impact on Argos use. See Appendix 2 for individual comments.

Section 3. Technological Changes that Effect User Requirements

Lighter, smaller equipment continues to be the technological driver, but in general users seem to be happy with the hardware especially with GPS fixes. Some users are switching to Iridium for the greater data volume and, in some cases, reduced cost. See Appendix 3 for individual comments.

Section 4. User Issues, Problems and Level of Satisfaction with Argos

The level of user satisfaction with Argos is high but some areas of concern do exist that are making participants consider alternative technologies. The primary concern is costs associated with communications compared to other options such as Iridium. Secondary problems are associated with data download, namely limitations in size, format and the reception of remote signals. See Appendix 4 for individual comments.

Section 5. Successful Programme Use of Argos

All users indicate that Argos has been a critical cornerstone to the success of their programs. Data is of high quality and is being used in peer-reviewed publications. It has been an indispensable and cost-effective way to monitor wildlife populations, especially in remote locations and the data is showing meaningful interpretations for ecological and monitoring studies. It has been a primary component to the success of oceanographic and freshwater investigations and reported to be important for Search and Rescue operations. See Appendix 5 for individual comments.

Section 6. Analysis of Local Operational Issues

There are a small number of local operational issues. Cost continues to be cited and there are concerns of erroneous data points and lost transmissions from tagging collars that were deployed in remote locations. The latter however, has not been directly identified to be an issue with Argos itself. See Appendix 6 for individual comments.

Appendix 1 (of Appendix 3). Summaries of Programs

As in previous years, animal tracking has dominated Argos activity in Canada this year with meteorological and oceanographic applications being significant Argos participants. The effects of Arctic climate change and habitat loss on migration and dispersion of species such as caribou, polar bears, arctic fox, snowy owl and seals are being studied intensely and Argos technology is contributing strongly to wildlife management efforts.

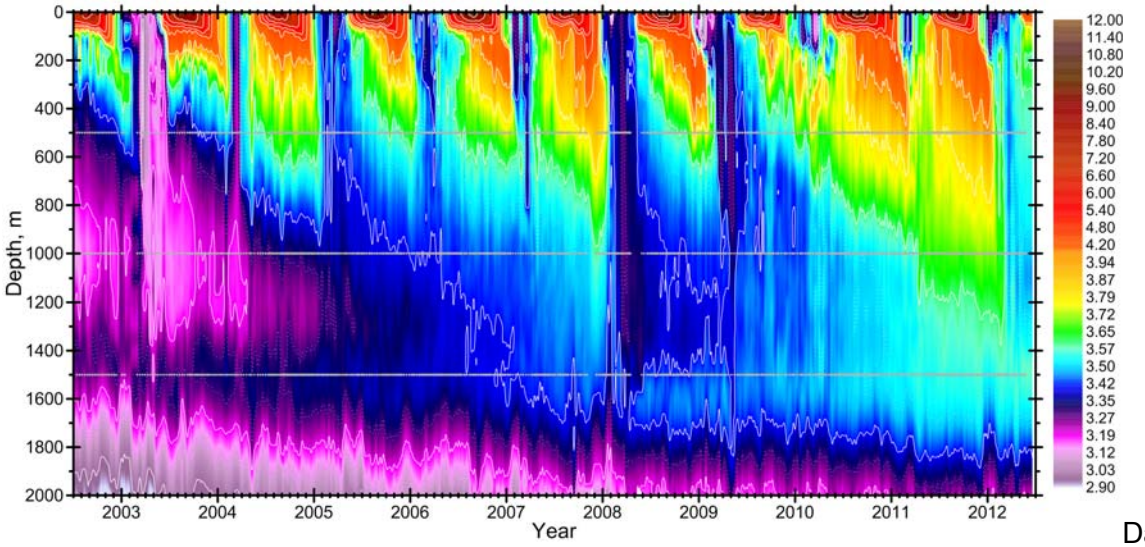
Twenty-eight operators replied to the questionnaire, some with multiple programs. Among these, animal trackers dominate with strong representation from large ungulate and seabird research. Ocean moored and drifting buoys operated by Environment Canada and the Argo programme of drifting, profiling floats operated through the Department of Fisheries and Oceans are gradually changing over to Iridium because of the reduction in cost to transmit large data files.

Below are the responding programmes. All responders were generally satisfied with their service with some suggesting improvements which will be covered in the appropriate sections below.

1. **Canadian Argo Profiling Floats**
   Argos Programme Number 2442
   Agency: Department of Fisheries and Oceans

http://www.argo.ucsd.edu/Canada_Nat_Rep_AST14.pdf
Canada is deploying profiling floats in the north Atlantic and north Pacific in support of Argo, which is a component of the Global Ocean Observing System. Data from around the world within this program is freely available to all and can be accessed through two Argo data centres. Examples of Canadian data products can be found at:
http://www.dfo-mpo.gc.ca/science/publications/article/2012/12-13-12-eng.html .

An example of a data product from the showing deep convection in the Labrador Sea is shown below.



Data from annual ship surveys along Line AR7W in the Labrador Sea is augmented with Argo data to provide a continuous record of seasonal changes.

Scientific publications from the Canadian Argo program include:
Freeland, H. J. 2013. Vertical velocity estimates in the North Pacific using Argo floats. Deep-Sea Res. II, 85, 75-80. doi : 10.1016/j.dsr2.2012.07.019 (a special issue of Deep-Sea Research for Tom Rossby

2. Government of Quebec Has Three Caribou Tracking Programs
Argos Programme Numbers 959, 22857, 4229
Agency: Ministère des Ressources naturelles et de la Faune du Quebec

Caribou management currently relies on demographic and behavioural parameters that are mostly derived from remote sensing data. The Argos system has been used for over 20 years to achieve long term information and is still central to population monitoring programs in Québec. Remote sensing is promoted as a valuable tool in the implementation of conservation and management plans for upcoming years.

3. Arctic Buoy Program, Moored Met. Buoy Programs
Argos Programme Numbers 323, 627, 693, 5626, 5693, 6693
Agency: Environment Canada

Environment Canada's Meteorological Service of Canada (EC-MSC) continues to utilize ARGOS communications for a number of drifting meteorological and oceanographic buoys deployed in the North Pacific, North Atlantic, and the Arctic Basin. ARGOS is used on moored weather buoys as a redundant (back-up) communications on the Pacific Coast, and also provides redundant position reports should primary GOES and GPS systems onboard the moored buoys fail. Below is shown an air launch of an Arctic buoy.

4. Canadian Ice Service, Ice Fragment Tracking
Argos Programme Number 633
Agency: Canadian Ice Service (CIS)

CIS has been involved in tagging Multi-year ice floes, Ice Island fragments, ice shelf fragments and icebergs in the past decades. The daily track obtained for each beacon eventually serves to validate Ice or Iceberg drift model over the Arctic and east coast domain.
2012 marks the last year of Argos telemetry beacon deployments by CIS; planned deployments this year could provide information for another 2 years due to Lithium battery usage.

5. Ring-Billed Gull Tracking
Argos Programme Number 4203
Agency: Université du Québec à Montréal

We purchased 22 22-g solar GPS PTTs to track Ring-billed gulls breeding in a colony near Montreal, Quebec. Our main objective is to study the post-breeding dispersal of these birds and to identify their migration routes and wintering areas. This is part of a larger study on the ecology of this species (http://gull.uqam.ca). A total of 25 birds were marked between 2010 and 2012 because some PTTs were recovered and deployed for a second time. Eleven units have been lost due to predators, car accidents or have ceased transmitting for unknown reasons. A proportion of birds dispersed rapidly in late summer in all directions before they undertook their fall migration to their wintering areas. Some birds, however, remained in the Montreal area before leaving for the winter. We will continue our tracking until the PTTs will last. Tracking the same birds over a year is particularly interesting to determine repeatability in their dispersal pattern and fidelity to their migration routes and wintering areas.

6. **Department of National Defence Search and Rescue**
   Argos Programme Number 2019
   Agency: Department of National Defence (Canada)

DND utilizes Argos to track and report location on the Self Locating Datum Marker Buoy (SLDMB) that is used to refine search area parameters for Search and Rescue. The SLDMB is programmable to one of 99 discrete channels to permit flexibility for multiple searches. Annual usage is highly variable since it depends on the number and types of searches. Usage tends to be highest in late Summer and early Fall.

7. **Snowy Owl Tracking**
   Argos Programme Number 3471
   Agency: Department of Biology and Centre d'études nordiques, Université Laval

The objective of my program is to study annual movements, habitat use and breeding dispersal of arctic-nesting birds. The main species of interest is the snowy owl. During the first phase of the project, we deployed 12 PTTs on Bylot Island (NU) in summer 2007 and 4 additional ones on Herschel Island (YK) in 2008. We successfully tracked these animals across the Canadian Arctic for up to 3 years, until summer 2010. This program has revealed new and unexpected information on migratory movements, habitat use and breeding dispersal of this nomadic species. Winter use of sea-ice by snowy owls in the eastern Canadian Arctic was documented, a behaviour that was previously unknown. Hence, we continued our study to learn more about the pattern of winter habitat use by snowy owls. We deployed one PTT at Mary River (NU) in summer 2011 and 10 additional ones in Nunavik at Raglan (QC) in summer 2013.

8. **Wolf Tracking in the Northwest Territories**
   Argos Programme Number 4201
   Agency: Government of the NWT, Dept. of Environment & Natural Resources

Collared wolves tracked by satellite are required to estimate the number of wolves associated with caribou on the Bathurst winter range. GPS locations of collared wolves, in association with other field surveys, are used to quantify predation rate on caribou in winter. The number of collared wolves will need to be augmented for one or two more winters. Collared wolves also assist in a pup survey in late August to estimate recruitment.

9. Sandhill Crane Tracking
Argos Programme Number 4157
Agency: Long Point Waterfowl

Program 4157 employs NorthStar Science and Technology, Inc.® solar-powered GPS transmitters mounted on PVC leg-bands to track the migration chronology of Eastern Population Sandhill Cranes (Grus canadensis). We captured 17 cranes in 2010 and affixed nine transmitters to collect GPS fixes every six hours for 3-5 years. At present, six of the original nine units deployed remain functional. Remote data collected via transmitters and relayed through the Argos satellite system will be analysed in conjunction with ground-based data to provide a comprehensive understanding of migration in a previously understudied population of the species.


10. Caribou Tracking
Argos Programme Number 2814
Agency: Government of Northwest Territories, Department of Environment & Natural Resources, Fort Simpson

Photo Credit: Dannny Allaire

Two programs, both with similar goals but with different species of northern large ungulates; boreal woodland caribou and wood bison. Location information addresses movements, range use,

seasonality, calving timing/location, critical habitats, use/avoidance of naturally disturbed (forest fire) and anthropogenic disturbed areas at landscape level as well as finer detail.

Telonics ARGOS collars have been instrumental in allowing us to determine the actual date and location of calving by boreal caribou females, or if they did not have a calf. Females make distinct movement patterns associated with calving. We found remarkable consistency in the dates of calving by individual females which was part of the presentation and is indicated on the jpeg slide. I have also attached a copy of our progress report on boreal caribou to give a better background of what we are doing. We also have Telonics ARGOS collars on wood bison for the Nahanni population. The collars have provided critical data to better map the range of distribution of this population which covers three provincial/territorial jurisdictions and is being used by COSEWIC on their status report for bison.

Photo Credit: John Nagy

11. Hudson Bay Polar Bears
Argos Programme Number 00947
Agency: Environment Canada

The objective is to study the use of sea ice habitat in Hudson Bay, Canada by polar bears by using satellite telemetry to monitor seasonal movements of up to 5 (five) individuals. The program just began last September. The collars deployed last year are still active and have provided some very useful data on habitat use by polar bears in Hudson Bay. These data will be used by several graduate students at the University of Alberta as part of their graduate programs. It is important to enable a better understanding of habitat use by polar bears and the impacts of climate change on that use. Intentions are to continue annual deployments of 5-10 collars, although this will very much be funding driven

12. Wild Turkey Tracking
Argos Programme Number 4196
Agency: Quebec Ministère des ressources naturelles et de la faune

We will use GPS/ARGOS transmitters to identify precisely the habitat used by wild turkey. We have put PTT on a total of 26 wild turkey from January 2011 to January 2012, and we follow it until December 2013 .

13. Grizzly and Polar Bear Tracking
Argos Programme Number 11572, 12846
Agency: Government of Northwest Territories, Department of Environment & Natural Resources

ENR in Inuvik region has been participating in Argos programme since 1996 to track the movements of bears to assist in management decisions as well as for scientific researches of the caribou, grizzly bear, and polar bear in the region and in the Northwest Territories. Polar bears have been monitored since 2007 in collaboration with the University of Alberta. There are 25 polar bears that are currently monitored (29 collars deployed in 2012, 8 collars deployed in 2013). Argos has provided years of tracking data and thus allowed us to gain invaluable insight into their movements in areas where continuous monitoring/tracking would be impossible to achieve otherwise. The plan for future deployment is to be determined, however currently active collars will be continuously monitored until 2015 when they will be dropped off. Work is also underway within ENR to update its database management system this year.

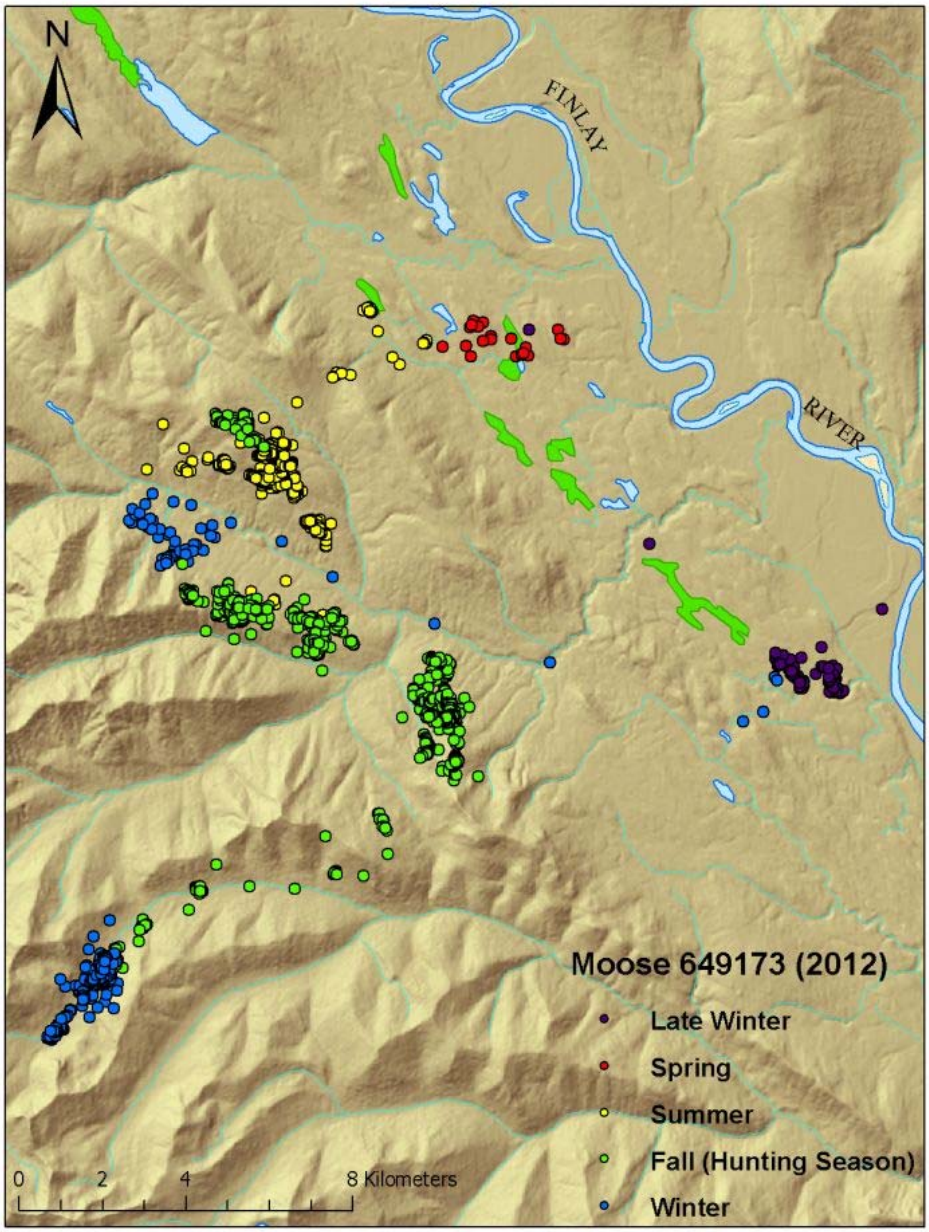
14. Caribou Tracking
Argos Programme Number 1572, 10572
Agency: Government of Northwest Territories, Department of Environment & Natural Resources

ENR in Inuvik region has been participating in Argos programme since 1996 to track the movements of barren ground caribou to assist in management decisions as well as for scientific researches of the caribou herds in the region and in the Northwest Territories. With years of tracking data, it has become possible to gain greater understanding of the caribou in such areas as migration, home range and seasonal utilization, and inter-herds interactions. A total of 104 collars were deployed in the spring of 2012 to track and record the detailed movement of the caribou for the next three years. There have been a few occasions where erroneous points are observed, and also transmissions from deployed platforms/collars are completely lost without explanations. To replace the 2012 deployments and continue the effort of the monitoring, another deployment is scheduled in 2015. Work is also underway within ENR to update its database management system this year.

15. Moose Tracking
Argos Programme Number 4195
Agency: British Columbia Ministry of Forests

By determining moose movements, I was able to demonstrate that neither the presence of roads nor the traffic on those roads affected moose distribution or movement rates. All moose survived the duration of this research. Because of the Argos system, if any moose had died, I would have known in time to inspect the death site to determine the cause of death. Rapid response is important because snow can quickly cover evidence in winter and scavengers in

summer quickly disturb the site in summer.



16. Polar Bear Tracking
Argos Programme Number 2846
Agency: University of Alberta

Tracking of polar bears is being conducted in the Beaufort Sea and Hudson Bay in Canada to assess how bears are responding to rapidly changing sea ice conditions. Habitat analyses are being conducted using remote sensing of sea ice habitats and are integrated into sea ice projection models to assess population status. Monitoring of date onto and date off of sea ice are critical population monitoring parameters.

17. Great Lakes Drifters
Argos Programme Number 3041
Agency: Environment Canada

The purpose of this program is to track four Clearwater, surface layer drifters which will be deployed during periodic times throughout the summer months (April-October). The units will be deployed during selected periods (while other experiments are being conducted at the same location) throughout the summer season, mainly in the Great Lakes (and elsewhere in Canada) to assist in measuring the water velocity at the surface for these water bodies.

18. Marbled Godwit Connectivity
Argos Programme Number 5376
Agency: Environment Canada

Determining migration routes and wintering sites of Alberta, Canada, Marbled Godwits (Limosa fedoa) – in initial year 2013, 4 adults banded at nest.

19. JUVENILE NORTH PACIFIC ALBACORE TUNA TRACKING
Argos Programme Number 5381
Agency: Fisheries and Oceans Canada

The goal of this program is to understand the migration and behaviour of juvenile albacore tuna (Thunnus alalunga) in the eastern Pacific Ocean (waters east of 150°W longitude) with pop-up satellite archival tags (PSATs) to improve stock assessment modeling. Specific objectives are to (1) assess short-term (daily) and long-term (seasonal) movement patterns of juvenile albacore, (2) assess horizontal and vertical habitat utilization in space and time (on daily and monthly time-scales, and (3) assess the performance of different tag designs/sensor packages.

20. Woodland Caribou Tracking
Argos Programme Number 4132, 3869, 4049
Agency: Ontario Ministry of Natural Resources

Between winter 2010 and winter 2012, the Ontario Ministry of Natural Resources (OMNR) successfully deployed 119 PTT's (GPS/Argos telemetry collars) on adult female woodland caribou with a planned 3 year monitoring period for each PTT (scheduled to end in winter 2013, 2014, or 2015, depending on deployment date). The 4132 program is a subcomponent of a broader provincial monitoring program for woodland caribou in Ontario, with PTT's deployed in monitoring ranges overlapping areas where commercial forestry occurs on Crown land in Ontario. Forest-dwelling caribou are a species at Risk in Ontario and potential land use planning outcomes related to forestry, mineral development, access, dedicated protected areas, and subsistence harvest levels of caribou are all factors that may contribute to increased risk to caribou populations. The information collected from PTT monitoring will improve understanding of the behaviour and demography of caribou in relation to habitat dynamics and potential limiting factors, and assist OMNR in developing alternative policy options in relation to land use planning and conservation objectives. As of June 2013, 68 collars remained active under this program. No future plans for PTT monitoring are being considered under program 4132 at this time.

21. Ferruginous Hawk Tracking
Argos Programme Number 5192
Agency: University of Alberta

My ongoing study with the University of Alberta and Environment Canada has utilized the Argos system since May 2012 by allowing us to achieve our goal of monitoring breeding ferruginous hawks in the Canadian Prairies. Eight satellite GPS/Argos satellite transmitters have been attached to hawks and have provided data over 2 breeding seasons allowing my research team to successfully track the movements of this endangered species. Particularly, we are interested in learning how they use landscapes that have been altered with industrial activity and agriculture.

This bird was captured during the summer of 2012, migrated to Texas, and returned to the same nest site to breed again in 2013.

22. Bowhead Whale
Argos Programme Number 01142
Agency: Fisheries and Oceans Canada

Canadian Arctic marine mammals are instrumented with satellite-linked position only or time-depth recorders and tracked for 6 months to a year depending on the success of the attachment and provided there is no damage to the equipment. At present, this program targets bowhead whales, beluga, narwhals, killer whales and ringed seals. The objectives are to understand the seasonal spatial distribution of the animals, the habitat use and their dive activity. This information is important to assess their numbers and trends and to understand their habitat requirements.

Action shots of whale tagging:

23. SABS Caretta
Argos Programme Number 5039
Agency: BEDFORD INSTITUTE OF OCEANOGRAPHY

Program dedicated to studying movements and diving behavior of free-swimming and incidentally-caught cheloniid turtles tagged in Canadian waters

24. Sea Duck Tracking
Argos Programme Number 3261
Agency: Canadian Wildlife Service of Environment Canada

The CWS of Environment Canada is participating, through the Sea Duck Joint Venture, to the tracking of sea ducks. The “Atlantic and Great Lakes Sea Duck Migration Study” is a large-scale, multi-year, multi-partner satellite tracking program for sea ducks along the Atlantic coast and Great Lakes, with the following primary objectives:

- Fully describe the annual migration patterns for four species of sea ducks (surf scoter, black scoter, white-winged scoter, long-tailed duck) in the Atlantic flyway and Great Lakes by 2014.
- Map local movements and estimate length-of-stay during winter for individual radio-marked ducks in areas proposed for placement of wind turbines (e.g., Maine-Penobscot Bay, Nantucket Sound, and coastal Rhode Island).
- Identify near-shore and offshore habitats of high significance to sea ducks to help inform habitat conservation efforts.
- Estimate rates of annual site fidelity to wintering areas, breeding areas, and molting areas for all four focal species in the Atlantic flyway.

More than 250 satellite transmitters will be deployed in sea ducks from 2009-2013. The project is funded in part by the Sea Duck Joint Venture (http://seaduckjv.org/index.html) and in part by various partners.

Some results can be seen at:
http://www.seaturtle.org/tracking/index.shtml?project_id=395
http://www.seaturtle.org/tracking/index.shtml?project_id=499
http://www.seaturtle.org/tracking/?project_id=538
http://www.seaturtle.org/tracking/?project_id=759

Appendix 2 (of Appendix 3). Future Plans

Comment	Program
The Argos system has provided valuable information that serves as basis for the long term monitoring of caribou population dynamics. The performance of other systems is currently compromising the use of Argos transmitters in future monitoring programs.	959
EC-MSC will continue to see a steep decline in the usage of ARGOS system, as nearly all drifting buoys deployed are now equipped with Iridium telemetry. Iridium has been selected due to cost savings, timeliness of the data, along with improved back-office tools and ability to access and map long periods of data. ARGOS system will continue to be used by existing ICEX and AXIB buoys (buoys deployed in the Arctic). These buoys will ideally operate for another 1-2 years in field, however any future deployments of these type of buoys will use Iridium. ARGOS may continue to be used on CALIB (Compact Air Launch Ice Beacons) as the ARGOS system performs better when covered by snow than the Iridium modems. Within 1-2 years, ARGOS will no longer be used on EC-MSC moored buoys, as the legacy system is being replaced with Iridium as back-up to GOES primary communications.	323, 627, 633, 693, 5626, 5693, 6693
Argos telemetry beacons are coming to an end for CIS. We currently only have 2 units which are still operating in the Arctic. One of them has an intermittent signal and both should die this summer / fall. Most of MSC has switched to the Iridium transmitters so Argos telemetry usage is unsure for the future. CIS usage falls under the MSC program managed by Chris Marshall.	633
We will continue tracking the four remaining gulls that still have their PTTs. No other birds will be fitted with PTT in 2013-2014.	4203
DND will continue to use the current Argos SLDMB for the next 1-3 years and then will probably transition to a new SLDMB that uses a different communications protocol.	2019
We still have 6 PTTs left to deploy. We hope to deploy them on Bylot Island in summer 2014.	3471
It is important to enable a better understanding of habitat use by polar bears and the impacts of climate change on that use. Intentions are to continue annual deployments of 5-10 collars, although this will very much be funding driven.	947
29 collars (19 Argos-GPS collars for the program number 11572, and 10 Argos-GPS collars for the program number 12846) deployed in the spring of 2012 is scheduled to end in the summer of 2014. 8 new collars were deployed in the spring of 2013 (two of which were placed on the same animals collared in the previous year to replace the collars) and will end in the summer of 2015. There are 25 active polar bears currently and they are continuously monitored for their movements. At this point, there is no concrete plan for further deployment. ENR has also been working to consolidate and streamline the management of/request for the Argos/GPS data collected throughout the Northwest Territories by developing enterprise database and applications. This should come on line in the summer of 2013.	11572, 12846
Monitoring of 104 collars (39 Argos collars for the program number 1572, and 56 Argos-GPS collars for the program number 10572) deployed in the spring of 2012 is scheduled to end in the summer of 2015. Another deployment is scheduled in 2015 (number and platforms to be determined)	1572, 10572

to continue tracking of caribou for management purpose and scientific study of the barren ground caribou herds in the Inuvik management region	
Monitoring of polar bears by satellite telemetry is intended to continue as part of long-term monitoring of the species. The focal population is in western Hudson Bay and the research is coordinated with Environment Canada	2846
These Clearwater, surface water drifters will be used in the future in the Great Lakes (and elsewhere in Canada) where necessary to augment liminological information for research studies and to provide information on surface water velocity where necessary.	3041
Uncertain – dependent on funding. Ultimate plan is to increase numbers in AB, and expand into SK, MN, MT and ND.	5376
PSATs will be deployed at two locations and times of the year designed: (1) to track the entry of juvenile albacore into the eastern Pacific Ocean and follow their movements north along the coast of North America, and (2) to track the movements of juvenile albacore as they leave Canadian waters off the coast of BC. Tag deployment has not occurred yet, but is anticipated in fall 2013.	5381
Expect to have 30 active PTTs in 2014.	1142
The large pelagic group has not used the Argos program in 2012. However, we intend to deploy 5 mini PAT tags from wildlife computer in September-October 2013 on Atlantic bluefin tuna in northern Newfoundland. The aim is to determine the migration patterns and range of Atlantic bluefin tuna.	2376

Appendix 3(of Appendix 3). Technological Changes that Effect User Requirements

Comment	Program
The one aspect I find good is the omni-directional signal provided by Argos PTT as it handles wet snow and total snow cover effects better than Iridium-type beacons. Mind you, the Iridium testing under various weather conditions or antenna angle is still on going.	633
We implement a mounting system for transmitter devices specific to our study species, the Sandhill Crane. Our application is rather unique, at least in comparison to the broad spectrum of applications in the field, in that we were required to modify standard North Star Inc. 28g solar-powered GPS units to attach to PVC leg-bands and collect sufficient solar energy in a vertical orientation underneath the host organism by attaching two additional lateral solar panels	4157
An important aspect of animal remote sensing is related to the animal and transmitter mass ratio. Transmitters are constantly evolving to a lower mass to reduce the potential effect on animal behavior and fitness. Also, analytical tools are powerful and research questions are limited by the capacity to generate data. Argos transmitters should evolve to improve their efficiency to reduce the battery size and therefore the collar mass.	959
In cooperation with the US Fish and Wildlife Service and the manufacturer of our polar bear collars (Telonics, Mesa, Arizona) attempts are being made to improve the collar design. Materials are being selected to reduce the weight of the collars and to improve their flexibility in extreme cold.	2846
Other collar systems are coming online that use Iridium data transfer that appears to be cheaper than ARGOS costs. ENR is piloting this technology and depending on results this may reduce our usage in the future.	1572, 12846, 1572, 10572
Two-way communication with Argos-linked tags to enable tag parameter changes that can enhance instrument recovery.	5039

Appendix 4 (of Appendix 3). User Issues, Problems and Level of Satisfaction with Argos

Comment	Program
Nothing but satisfaction; the only problem has to deal with cost of usage. CIS is part of the Meteorological Service of Canada (MSC) and MSC has moved towards Iridium PTT because of cost saving issues.	633
Argos monthly fees are higher than Iridium and Globalstar that also have better energetic efficiency.	959
EC-MSC continues to be frustrated with the limitations in access to long-term records of data from the ARGOS web application. The web tools limit the volume (number of obs) to be downloaded and plotted on maps, and requests for bulk downloads incur at very high costs. EC-MSC would like to see less restriction on volume of data that can be downloaded, and ability to obtain entire buoy lifetime of data. Additionally, it would be great extract data in KML type formats for use in Google Earth.	323, 627, 633, 693, 5626, 5693, 6693
We also have Telonics ARGOS collars on wood bison for the Nahanni population. The collars have provided critical data to better map the range of distribution of this population which covers three provincial/territorial jurisdictions and is being used by COSEWIC on their status report for bison.	2814
The Argos system has provided valuable information that serves as basis for the long term monitoring of caribou population dynamics. The performance of other systems is currently compromising the use of Argos transmitters in future monitoring programs. Argos monthly fees are higher than Iridium and Globalstar that also have better energetic efficiency.	959
On few occasions, erroneous points were recorded. These points tend to be located far from where they could possibly be, and also recorded outside of scheduled time (Argos-GPS collars).	1572
We have no major issues or problems to report. We are very satisfied with the Argos platform's performance for this particular project.	4157
We have cancelled our ArgosDirect service because it proved to be very expensive (ranging between 10 to 50% of Argos monthly cost). We are now only requesting monthly Databank CD. The issue with that service is that the CD arrives 3 weeks into the following month. A faster delivery service would prove a better value.	1142
ARGOS fees represent a large proportion of tagging project budgets. This is an ongoing concern as financial resources become increasingly hard to secure for marine animal tracking studies. Iridium-based tags are therefore gaining in popularity because associated fees are more affordable. How can ARGOS fees be reduced?	5039
Our primary issue was in the lower than expected success rate for data retrieval via the Argos system; however limitations of the telemetry receivers (and software programming) as available from 3rd party vendors may contribute this problem. By comparing the successful data capture from ground-retrieved GPS collars to the same data retrieved from theses collars during regular Argos system downloads, we observed a success rate of approximately 65%. Given that most of the collars could not be readily retrieved from remote locations, this poor success rate remains the biggest limitation to the combined ARGOS/GPS technology available at the time we initiated this project.	3869

Appendix 5 (of Appendix 3). Successful Programme Use of Argos

Comment	Program
The Argos system is reliable and has good customer service.	959
EC-MSC has had success with ARGOS equipped buoys deployed in the Canadian High Arctic (82 North). In addition, ARGOS communications have allowed for long-lived buoys, with ICEX and AXIB buoys now reporting for over 3 years.	323, 627, 633, 693, 5626, 5693, 6693
We are still in the process of getting the data but we have already showed some fidelity in dispersal patterns.	4203
DND is unable to provide specific details; however, the data provided by the SLDMB through Argos has been instrumental in the successful completion of many Search and Rescue incidents since 1999 and has also contributed to DND's knowledge and understanding of ocean currents and conditions.	2019
The first phase of our project (2007-2010) was highly successful and resulted in 2 published papers (see below). We expect to have the same success with our new deployed PTTs in the future. Therrien, J. -F., G. Gauthier & J. Bêty. 2011. An avian terrestrial predator of the Arctic relies on the marine ecosystem during winter. Journal of Avian Biology 42:363-369. Therrien, J. -F., G. Gauthier & J. Bêty. 2012. Survival and reproduction of adult snowy owls tracked by satellite. Journal of Wildlife Management 76 :1562-1567.	3471
Telonics ARGOS collars have been instrumental in allowing us to determine the actual date and location of calving by boreal caribou females	2814
The Argos platform has enabled LPW to successfully collect locational data from nine Sandhill Crane outfitted with leg-band mounted solar-powered GPS units throughout annual movements between Ontario, Canada and Florida, USA.	4157
• Analyzing timing and pattern of movement in relation to the sea ice • Assessing home ranges/areas of seasonal usage and their shifts over the years • Determining life cycle events such as denning • Analyzing intraspecific interactions • Locating/recapturing collared animals • Collecting data on mortality	1572, 12846, 1572, 10572
Argos allowed me to reach my research objectives. I was able to determine moose movements inexpensively in a remote location. By monitoring the Argos messages I could have determined if a moose had died, in time to inspect the site to determine cause of death. At this time all moose are still alive.	4195
Satellite telemetry is a central feature of polar bear research in Canada. It is a central component for the successful monitoring of key ecological parameters.	2846
We have used these drifters to successfully determine surface water velocity for a number of different studies in Lake Ontario, Lake Erie and a small mountain lake (Lake O'Hara) in Eastern British Columbia.	3041
The Argos system is generally a highly useful and cost-effective means to monitor wildlife populations across our large and remote landscapes. The information gather from this program has contributed to the success of our	4132, 3869, 4049

caribou monitoring program, improved knowledge of caribou behaviour and populations, and will be critical for future evaluations of change in relation to land management. Our data has been used to support graduate student theses, peer-review publications, and environmental assessments.	
Arctic Marine mammals travel great distances and live in remote location where access is very expensive and limited in time. The use of Argos satellite tracking devices has proved to be the most cost effective way of studying those species. Over the past 20+ years, the Argos system has allowed us to gather significant information on the movements, diving behaviour and habitat use. The work continues as the tag technology is improving and more environmental data are becoming available. Now the challenge is to analyse the large amount of data into valuable species specific habitat use, migration pattern and movement range.	1142
The network provides good coverage at high latitudes, but insufficient detection of surface behaviour at mid and low latitudes.	5039

Appendix 6 (of Appendix 3). Analysis of Local Operational Issues

Comment	Program
For CIS the precise location of a unit is not as critical as other user's need. As such we have little use for GPS accuracy. Unfortunately, this is not the only driver within the organisation; communication cost is a much bigger issue. I'm not sure if the Argos communication cost was lower whether MSC would switch back to Argos PTT; time will tell.	633
• In few occasions, erroneous points were recorded. These points tend to be located far from where they could possibly be, and also recorded outside of scheduled time (Argos-GPS collars). • In approximately one year, there are 5 of 29 collars (Argos-GPS) that have completely lost transmission. This may be the platform issue but the true cause is unidentified.	11572, 12846, 1572, 10572
JTA negotiated rates are too costly for Canadian users.	5039

APPENDIX 4 OF ANNEX XII

Year	**2013**
Country	**CHINA**

Section 1. Overall Summary

During Aug. 2012 and Jul. 2013, there are 23 institutes or organizations operating 30 programs using Argos to transmit data in China. The total of average active PTTS per month is 154.08 and profiling floats take up larger proportion which is about 64%.

Ocean related agencies and universities such as National Ocean Technology Center, South China Sea Branch of State Oceanic Administration, First Institute of Oceanography SOA, Ocean University of China, South China Sea Oceanology Institute (SCSIO) carried out massive ocean observing using Argo floats and drifters with the aid of Argos system.

Animal related organizations such as Beijing Zoo, Capital Normal University, Liaoning Ocean & Fisheries Sciences Research Institute, Chinese Academy Forestry, East China Sea Fish Research Institute, conducted fruitful research on animal behavior by using satellite trackers.

Section 2. User Types by family (Table of PTT use by the country)

	Average active PTTs per month	Total PTT.Years
Buoys and others	28.92	18.6
Profiling floats	116.83	7.98
Animals	24.58	2.65
Fixed stations	2.08	1.57
TOTAL	145.57	30.8

Section 3. Technological Changes that Affect User Requirements

As the CLS's Chinese partner and the largest Argos users in China, **Tianjin Hrydrowise Technology Development Center** is the domestic supplier of Argos communication module in China. It has produced more than 80 sets of Argos-3 based profiling floats of different types. Cooperated with U.S. Antocom Corporation and Fifth institute of China Aerospace Group, Tianjin Hydrowise solved the design requirement of Argos-3 antenna under harsh environmental conditions. Together with Chengdu Baotong Company, East China Sea Fisheries Research Institute and several other units, Tianjin Hydrowise jointly developed terrestrial and marine animals Argos tracker, which is planned to be put on the market by 2014. This will greatly facilitate the solving of imported Argos tracker problem encountered by domestic animal protection.

The Chinese version of Argos user manual will be soon translated and released. It will be available to Chinese users in October 2013.

Section 4. User issues, problems, and level of satisfaction with ARGOS

National Huidong Sea Turtle Reserve suggests carrying out the technical training, allowing users to master the basic use of the website functions. It would be very helpful if the lecturer or trainer has professional knowledge about animal tracking. Alternatively, an expert of Argos system participating in some of the satellite tracking projects would be highly appreciated.

National Ocean Technology Center recommends paying the bill every six months or once a year.

As the CLS's Chinese partner and the largest Argos users in China, **Tianjin Hydrowise Technology Development Center** points out that the choice of cost-effective Argos antenna manufacturers is too limited. Hydrowise offers a few recommendations as follows.

(1) Extend the free on-line availability of Argos data, since many conservationists are facing the restriction of working conditions, therefore cannot download the required data in time.

(2) According to most customers' feedback, the simplification of remittances from abroad would be highly appreciated. For example, users can prepay communication costs for six months in advance, and based on the monthly usage, CLS could notify the customer about account balance.

(3) Check the correctness of the mailbox and address every six months, to guarantee the reception of invoice by the customer and to avoid missing payment.

Section 5. Successful program use of ARGOS

China Argo Real-time Data Center (Second Institute of Oceanography, SOA)

From August 2012 to July 2013, **China Argo Real-time Data Center** has the following three projects using Argos satellites as communication system of Argo profiling floats. More than 1400 profiles from 63 Argo floats are obtained within the range 0-2000m. In the next year (2013-2014), about 50-60 Argo floats are expected to use Argos system for oceanography studies.

(1) Marine scientific research and public service project "Northwest Pacific Argo profiling floats observation and its application" (Project Number: 200705022; August 2007 - July 2009)

(2) National Key Basic Research and Development Program (973 Program) " The upper ocean structure, variability and prediction based on real-time global ocean observing project (Argo)" (Project Number: 2007CB816000; July 2007 - August 2011)

(3) Marine scientific research and public service project "Indian Ocean Marine Environment Numerical Forecasting System pilot project" (Project Number: 201 005 033; July 2010 -2013 in June)

National Ocean Technology Center

Since April 2011, the State Oceanic Administration of China began to monitor nuclear radiation in China coastal seas and western Pacific. Surface drifting buoys and Argo floats with nuclear radiation monitoring function were deployed in the relevant waters.

In 2012, 14 surface drifting buoys used Argos satellite communication system. In the first half of 2013, 5 surface drifting buoys and 2 Argo floats were deployed, with five buoys in operation currently.

In the next 6 months, 10 surface drifters, and 2 Argo floats are scheduled to be deployed in the West Pacific Region.

National Huidong Sea Turtle Reserve

Guangdong National Huidong Sea Turtle Reserve conducted many turtles satellite tracking activities in 2012. Seven sea turtle migratory routes were obtained and studied. In January 2013, a new sea turtles tracking experiment was carried out by the Reserve Administration in Huizhou Xunliao Golden Bay. So far, 31 turtle migratory routes have been tracked by Argos satellite for the last 13 years, and fruitful results have been gained. The detail information about turtles satellite tracking at Yangjiang Hailing Island in August 2012 are described below:

Family Cheloniidae	Green Sea Turtle
Characteristics	Weight：~70kg； CCL：85cm； Gender：female
Electronic Identification (PIT	999001003313400

chip)	
Tag manufacturer	Wild Life Computers, USA
Tag No.	TAG：73060；Serial No.：SPOT5-AM-S244A
Releasing location	Yanjiang Hailing Island
Tag installation date	31st July 2012
Transmission start date	1st August 2012
Transmission end date	14th October 2012
Last reported location	240 km southwest to Dongsha Islands
Tracking days	75 days

During the period of 1st Aug. -- 19th Oct. 2012, Huidong Administration tracked the migratory route along the Guangdong coastal waters of sea turtle code name 73,060 using Argo satellite system. The trajectory information shows that the turtle mainly wander along the 200m isobath waters near the coast, probably because of the rich biomass in coastal waters. Moreover, the turtles did not come ashore to lay eggs. It is estimated that 2012 may be its intermittent spawning year.

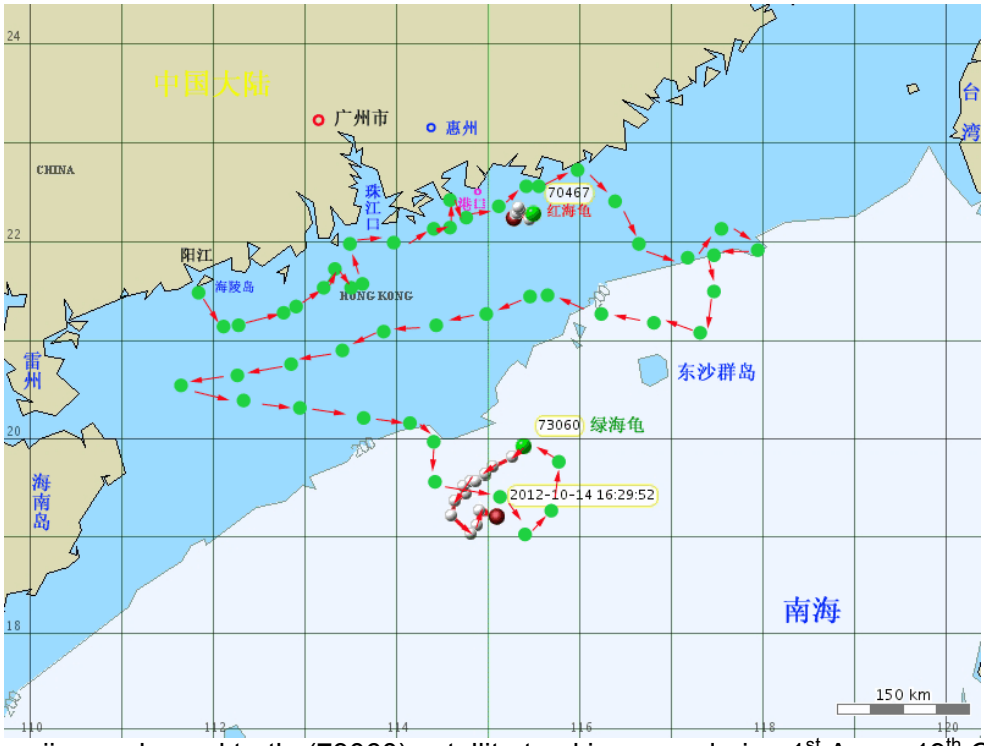


Figure 1. Yangjiang released turtle (73060) satellite tracking map during 1st Aug. –19th Oct. 2012

Section 6. Analysis of Local Operational Issues

None.

APPENDIX 5 OF ANNEX XII

Year	**2013**
Country	**GERMANY**

Section 1. Overall Summary

1. Water masses in the Nordic Seas

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ARGOS Programme Number 592

The aim of the program is to monitor the water masses in the different basins of the Nordic Seaswith the data from profiling floats (Greenland Sea , Norwegian Sea, Iceland Sea, Lofoten Basin).Since 2001 floats were deployed in the Greenland Sea, since 2004 also in the Norwegian Sea andLofoten Basin and since 2005 in the Iceland Sea. Changes in the water mass transformationprocesses and therefore also in the water mass characteristics are examined in the context of climate change The floats are part of the international ARGO programme. No more floats have beendeployed in the report period. *More information is available at*
http://www.ifm.zmaw.de/forschung/regionale/projekte/mersea/

Deployment of a float during heavy weather at the Lofoten Basin in 2012 from RV Poseidon

2. IFM-GEOMAR: Mooring ARGOS beacon

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ARGOS Programme Number 783

The aim of the project is to monitor subsurface moorings that get accidentally released and are at drift by usingARGOS beacons. The beacons are equipped with a pressure or conductivity sensitive switchwhich activates them when at the sea surface. *More information is available at* http://www.ifmgeomar.de/index.php?id=physoz&no_cache=1

3. Norwave

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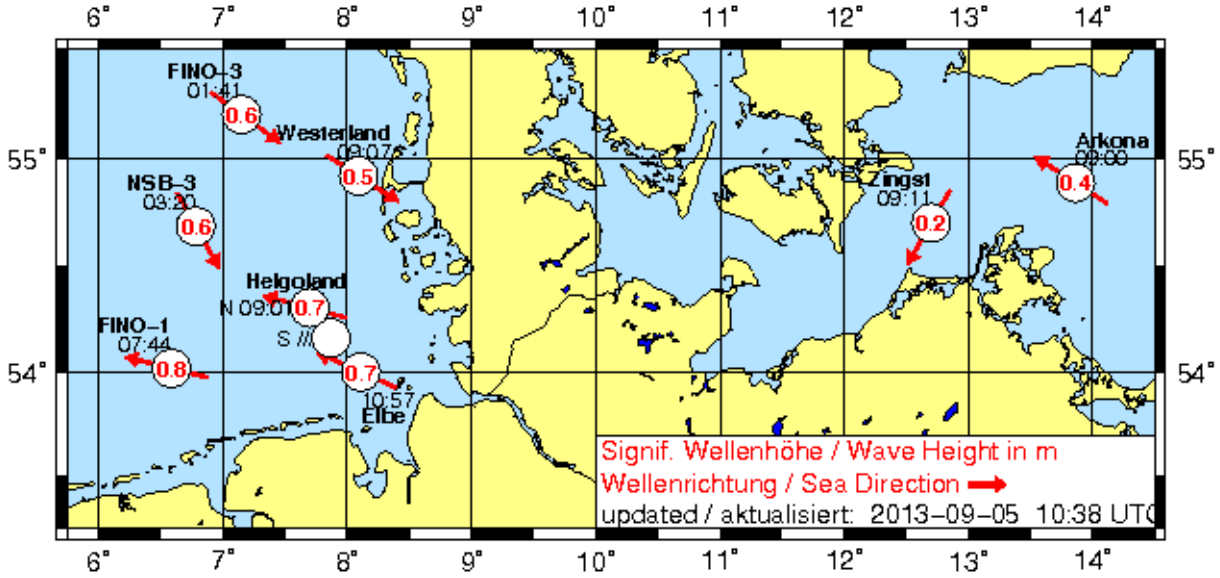
Bundesamt für Seeschifffahrt und Hydrographie, Bernhard-Nocht-Str. 78, 20359 Hamburg, Germany
ARGOS Programme Number 948

The Norwave measurements take place at fixed monitoring stations in the North Sea and Baltic Sea (see Marnet programme).Waverider buoys are measuring sea state conditions, one of these is transmitting data through the ARGOS satellite system. Watchdog services are used for the other buoys. *More information is available at*
http://www.bsh.de/de/Meeresdaten/Beobachtungen/Seegang/index.jsp



Permanent measurement stations in the North Sea and Baltic equipped with wave instruments.

4. Bird migration in Africa and Eurasia - a pilot study
Martin Wikelski, martin@ORN.MPG.DE
Max Planck Research Centre for ornithology, Migration and Immuno-ecology (Vogelwarte Radolfzell), SchloßMöggingen, Schloßallee 2, 78315 Radolfzell, Germany
ARGOS Programme Number 983

5. Full scale wave measurements
Peter Perthun, peter.perthun@gkss.de
Helmholtz-Zentrum Geesthacht, Max-Planck-Straße 1, 21502 Geesthacht, Germany
ARGOS Programme 1027

The project is part of the wave measurement activities of the Institute of coastal research.

6. Migration of raptors
Bernd Meyburg, BUMeyburg@aol.com
World working group on birds of prey and owls (Berlin), Wangenheimstr. 32, D-14193 BERLIN, Germany.
ARGOS Programme Number 1126
The W.W.G.B.P. has been active for thirty years now and today plays an important role in thepromotion of raptor conservation and research on an international level. Its membership list todaycomprises over 3,000 raptor specialists and enthusiasts in all parts of the world, and anybody withan interest in raptors is welcome to become a member. The W.W:G.B.O tracks birds of preyworld-wide since 1992. Theses raptors are belonging to 14 species. Resulting publications are
available as PDF files: www.raptor-research.de".
More information is available at http://www.raptors-international.de/index.htm

7. Lander

Bo Jorgensen (contact Frank Wenzhoefer), fwenzhoe@mpi-bremen.de
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Argos Programme 1461

The aim of the project is to monitor deep sea landers that get accidentally released and are at drift with ARGOS beacons. The beacons are equipped with a pressure or conductivity sensitive switch which activates them when at the sea surface. The deep sea landers are carrying different sensors to carry out experiments at the ocean floor and are deployed for periods from days to months.

The crew of RV Roger Revelledeploys a lander with the deck crane. The micro-electrodes attach to the landerwill monitor environmental conditions in the sediment. (Foto: Jan Fischer, Max-Planck-Institut für Marine Mikrobiologie, Bremen).
*More information is available at*http://www.mpi-bremen.de/en/In_Situ_Technologies.html

8. Migratory behaviour of Antarctic seals

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ARGOS Programme Number 1535

The Marine Mammal Tracking (MMT) project of AWI and its Partner Institutions concentrates onthe Southern Ocean. Variations in the foraging ranges and movements of marine mammals are animportant source of information about environmental variability integrated over a wide range ofspatial and temporal scales. The complex synthesis of data on marine mammal positioningand feeding locations with oceanography and bathymetry aims to identify those parameters whichare characteristic for feeding areas of top predators in the respective regions, and will provideclues as to why some areas of the Antarctic Ocean are important to these animals while othersare not. This will further our understanding of the distribution patterns of marinemammals in Antarctic and Subantarctic marine ecosystems of the Southern Ocean. Moreinformation is availabe at http://www.wdc-mare.org/projects/mmt.html

Tagged southern elephant seal

9. IfM-Geomar: gliders

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ARGOS Programme Number 1783

The gliders are equipped with Argos beacons to be located in case other navigational andcommunication devices fail. More information is available at http://www.ifm-geomar.de/index.php?id=glider

Testing a glider at sea.

10. Bigset

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ARGOS Programme Number 1806

The project BIGSET (in situ experiments using benthic chamber landers) studies processes at the benthic boundary layer. The autonomous instrument carrier systems are equipped with ARGOS beacons for retrival. The landers are usually deployed on the seafloor at depths of several hundred to 6,000 metres beyond the reach of remote sensing and conventional systems. More information is available athttp://www.ifm-geomar.de/index.php?id=mg_observatorien

11. German-Argo/BSH

Birgit Klein, BIRGIT.KLEIN@BSH.DE
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ARGOS Programme Number 1895

The aim of the program is to contribute to the international Argo programme with about 50 floats per year. Presently all 132 BSH floats are transmitting their data through the ARGOS system. The BSH is using Argo data to monitor water mass changes in the North Atlantic since they arechanging inflow conditions for waters entering the North Sea. Main deployment areas will be theAtlantic and source regions in which deep water formation occurs in the polar areas. Moreinformation is available at http://www.german-argo.de.

Deployment of a float of an APEX float in the Atlantic from RV Knorr

12. Marnet, BSH

Kai Herklotz, KAI.HERKLOTZ@BSH.DE
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ARGOS Programme Number 2120

The Marnet program consists of fixed monitoring stations in the North Sea and Baltic Sea which measure oceanic parameters as temperature, salinity, oxygen and currents in the water column.Waverider buoys are measuring sea state conditions, one of these is transmitting data through theARGOS satellite system. Watchdog services are used for the other buoys. More information isavailable athttp://www.bsh.de/de/Meeresdaten/Beobachtungen/MARNET-Messnetz/index.jsp

Positions of fixed measurement stations in the North Sea and Baltic (MARNET).

13. Iffezheimer Störche auf Reisen

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Initiativgruppe Naturschutz, Severin-Schäfer-Str. 3, 76473 Iffezheim
ARGOS Programme Number 3100

The conservation initiative Iffezheim has ringed a storch in 2006 which hatched in Iffezheim. TheArgos transmitter is used to study the migrationary behaviour of this bird. More information isavailable at http://www.iniffezheim.de/

14. European Whitefronted Geese ResearchProject, European whitefronted goose (Blessgans)

Helmut Kruckenberg, HELMUT.KRUCKENBERG@BLESSGANS.de
Europäisches Blessgans Forschungsprogramm, Am Steigbügel 3, D-27283 Verden (Aller), Germany
ARGOS Programme Number 3189

The project studies the European White-fronted Goose (Anseralbifrons)- its migration, behavior,and ecology. The White-fronted Goose is the most numerous goose species wintering in WesternEurope. By satellite tracking important new facts about migration behavior and routes were found.The project used microwave GPS transmitters for 36 birds and relays data via ARGOS, a specialinternet tool (live tracking) based on GoogleEarth was developed in 2006. The project is support by NIOO (Wagenigen). Additional transmitters (microwave solar GPS, 30g) have been used to tag three Lesser White-fronted Goose (Ansererythropus) and three more taggings are underway.
*More information is available at*http://www.blessgans.de

Reports / Publications:
Rien E. van Wijk, Andrea Kölzsch, Helmut Kruckenberg, Barwolt S. Ebbinge,
Gerhard J. D. M. Müskens and Bart A. Nolet, 2011, Individually tracked geese follow peaks of temperature acceleration during spring migration, Oikos 000: 000–000, 2011, doi: 10.1111/j.1600-0706.2011.20083.x.
Helmut Kruckenberg und Andrea Kölzsch, 2012, Fazinierende Zugstrategie von Blässgänsen im Frühjahr, 2012_Kruckenberg_Koelzsch_GreenWave_ViD_DDA.pdf
MaikeBuchin, Helmut Kruckenberg und Andrea Kölzschz, 2012, Segmenting Trajectories by Movement States, 2012_Buchin_et_al_segmentation_sdh2012.pdf

Transmittered bird (Geert) with its mate (c) K. Veldkamp

15. Montagu'sHarrier
Klaus-Michael Exo, MICHAEL.EXO@IFV-VOGELWARTE.DE
Institut für Vogelforschung, "Vogelwarte Helgoland", An der Vogelwarte 21, 26386 Wilhelmshaven, Germany
ARGOS Programme Number 3338

The project studies the migration routes as well as the location of stopover sites and winteringareas of Circus pygargus (Montagu's Harrier, Wiesenweihe) breeding in NW- and NE- Europe,respectively. The German project has been terminated but the research is continued unter Dutch ledad. Circus pygargus is an endangered long distance migrant, breeding in northernEurope and wintering in sub-Saharan W-Africa. Reports can be downloaded at
http://www.ifv-vogelwarte.de//downloads/96/wiesenweihe_dbu_abschlussbericht_ifv_jan_2009.pdf
http://www.ifv-vogelwarte.de/files/Dateien/DBU_Bericht_2011_IfV.pdf

Montagu's harrier *Rudi on its migration*

16. ESA precursor, Tracking of individual birds
Klaus-Michael Exo, MICHAEL.EXO@IFV-VOGELWARTE.DE
Institut für Vogelforschung, "Vogelwarte Helgoland", An der Vogelwarte 21, 26386 Wilhelmshaven, Germany
ARGOS Programme Number 3490

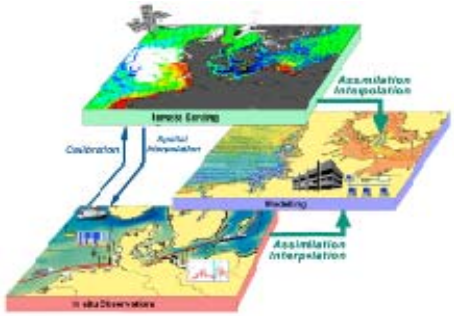
The project is carried out in the context of the ESA FlySafe activities. It analyses the technical prospects and limits in using satellite based bird tracking and monitors small scale and large scale movements. The work includes analyses of medium- and long-range bird migration behavior as well as smale scale feeding flights (study species: Herring Gull Larusargentatus, Lesserblackbacked Gull Larusfuscus, Barnacle Geese Brantaleucopsis). A report is available at
http://www.ifv-vogelwarte.de//downloads/96/esa_report_sovon_cover_2008-10.pdf

Figure 5.1 (ESA report): Colour marked Herring Gull (M.AFH) carrying a GPS PTT on the beach of Texel, Netherlands, on 24-10-2007. Photograph by Pieter Veeling

17. Cosyna

Franciscus Colijn
Helmholtz-Zentrum Geesthacht, Max-Planck-Straße 1, 21502 Geesthacht, Germany
ARGOS Programme Number 3932

The principal goal of the COSYNA-Project is the construction of a long-term observatory for the German part of the North Sea. Elements of the observatory should also be deployed as prototype modules in arctic coastal waters. This is expected to strengthen and bundle expertise and infrastructural equipment existing at the two Helmholtz Association centres GKSS and AWI with expertise available within the consortium of German marine research (KDM) in order to create a centrally managed, operational, large-scale monitoring and modelling system. By providing knowledge as well as hardware, the system will, in addition, enable future research projects pursued by individual partners within the consortium. In cooperation and agreement with the German Federal Maritime and Hydrographic Agency (BSH), GKSS seeks to pinpoint the German role in the international development of marine monitoring and long-term observational strategies. As a nationally funded project COSYNA is aimed to link to European partners.



Schematic of the COSYNA programme.

More information is available at
http://www.hzg.de/institute/coastal_research/structure/operational_systems/KOK/projects/ICON/

18. Nordatlantik
Monika Rhein, wboeke@uni-bremen.de
Institut für Umweltphysik, Abt. Ozeanographie, Universität Bremen, Postfach 33 04 40, D-28334 Bremen, Germany
ARGOS Programme Number 3991

The aim of the project is to monitor subsurface moorings when they get accidentally released and are drifting at the surface using ARGOS beacons. The beacons are equipped with a pressure or conductivity sensitive switch which activates them when at the sea surface.

*More information is available at*http://www.ocean.uni-bremen.de/

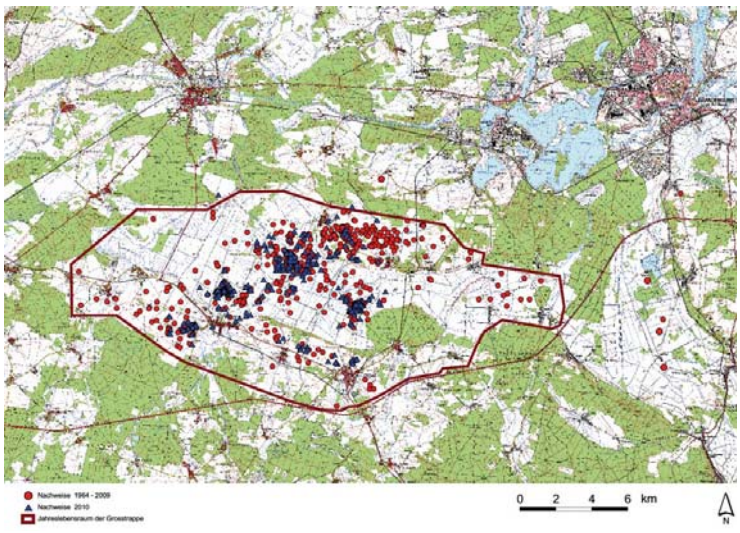
19. Hobby falcon
Bernd Meyburg, BUMeyburg@aol.com
World working group on birds of prey and owls, Wangenheimstr.32, D-14193 BERLIN, Germany.
ARGOS Programme Number 4126 (sub-PGM of PGM 1126)

The W.W.G.B.P. has been active for thirty years now and today plays an important role in thepromotion of raptor conservation and research on an international level. Its membership list todaycomprises over 3,000 raptor specialists and enthusiasts in all parts of the world, and anybody withan interest in raptors is welcome to become a member. The W.W:G.B.O tracks birds of preyworld-wide since 1992. Theses raptors are belonging to 14 species. Resulting publications areavailable as PDF files: www.raptor-research.de".

More information is available at http://www.raptors-international.de/index.htm

20. Great Bustard Research Programme
Sabine Schwarz, Gf-VereinGrosstrappe@web.de
Förderverein Großtrappenschutz e.V., Geschäftsstelle Buckower Dorfstraße 34, 14715 Nennhausen OT Buckow, Germany
ARGOS Programme Number 4163

The program is part of the bird monitoring activities of Saxony-Anhalt. It aims at studying and improving habitat conditions for the Great Bustard (Otis tarda) in the FFH area Fiener Bruch in Saxony-Anhalt.



Occurrence of Great Bustard in the Fiener Bruch and surrounding areas from 1964–2010.

*More information is available at*http://www.sachsen-anhalt.de/fileadmin/Elementbibliothek/Bibliothek_Politik_und_Verwaltung/Bibliothek_LAU/Wir_ueber_uns/Publikationen/Sonderhefte_der_Berichte_des_LAU/Dateien/SH_1_2011_Vogel-Monitoring_in_Sachsen-Anhalt_2010.pdf

21. Tracking of Silver eel during their spawning

Klaus Wysujack, Klaus.Wysujack@TI.Bund.de
Thünen Institutes of Sea Fisheries and Fishery Ecolog, Palmaille 9, 22767 Hamburg
ARGOS Programme Number 4237

The project is part of the activities of the Thünen Institutes of Sea Fisheries and Fishery Ecology to study the biology and management of diadromous fish. The European eel (Anguilla anguilla) has a complex life cycle, characterized by long distance migrations from freshwater habitats through the Atlantic Ocean to the spawning grounds in the Sargasso Sea. There are, however, still some fundamental gaps in knowledge about eel migrations, in particular regarding the migrations of silver eels through the Atlantic Ocean to the spawning grounds. In the studies of the TI/FI, pop up satellite transmitters (X-Tag, Microwave Telemetry Inc.) were used to track the marine spawning migrations of eels and to document their behavior. Between December 2010 and December 2011, in total 34 female silver eels were equipped with X-tags and released in the Baltic Sea, the Sargasso Sea and the lower River Eider (close to the North Sea). The last transmissions were received in summer 2012. The program ended in July 2013 and in the moment there are no concrete plans for studies using the satellite tags.

A tagged eel ready to be released.

More information is available at http://www.ti.bund.de/en/startseite/institutes/fisheries-ecology/research-areas/wanderfischarten.html

22. Intra-African Migration of Black Coucals

Wolfgang Goymann, Wolfgang@goymann.org
Max Planck Institute for Ornithology, Eberhard-Gwinner-Strasse, 82319 Seewiesen
ARGOS Programme Number 4288

The project studies the behavior of the African Black Coucal*(Centropusgrillii)* in Tansania. It aims at determining the habitat of these birds outside the breeding season. Two birds have been tagged in 2011 and 2012, but unfortunately the transmitters only lasted for a short period.

*More information is available at*http://www.orn.mpg.de/660928/employee_page?employee_id=26284

23. Behaviroral ecology of pectoral sandpiper

MihaiValcu, valcu@orn.mpg.de
Max Planck Institute for Ornithology ,Department of Behavioural Ecology and Evolutionary Genetics ,
Eberhard-Gwinner-Strasse, 82319 Seewiesen
ARGOS Programme Number 4805

The program is part of the research of the Department of Behavioural Ecology and Evolutionary Genetics which focuses on the evolution of mate choice and sexual ornaments in birds.To answer these questions, birds are studied in their natural habitat, as well as in captivity and a combination of behavioural observations and molecular methods is used , including microsatellite analysis and a candidate gene approach. In the tundra near Barrow (Alaska), the institute studies the mating strategies of two shorebirds: the monogamous semipalmated sandpiper (Calidrispusilla) and the polygynous pectoral sandpiper (Calidrismelanotos).

An attentive male sandpiper on the lookout for potential competitors. © Bart Kempenaers

More information is available at http://www.orn.mpg.de/2622/Department_Kempenaers

24. CV Turtle Tracking

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Helmholtz-Zentrum für Ozeanforschung Kiel, GEOMAR, Düsternbrooker Weg 20, 24105 Kiel, Germany
ARGOS Programme Number 4810

The department of marine ecology studies the endangered Loggerhead Sea Turtle, which boosts the third largest nesting aggregation at the islands of Cape Verde. On a couple of turtles, have been tagged with satellite transmitters equipped with CTD sensors (Conductivity, Temperature and Depth) and oxygen optodes to get a grip on the habitat turtles live in. However such devices can only be mounted on adult and subadults.

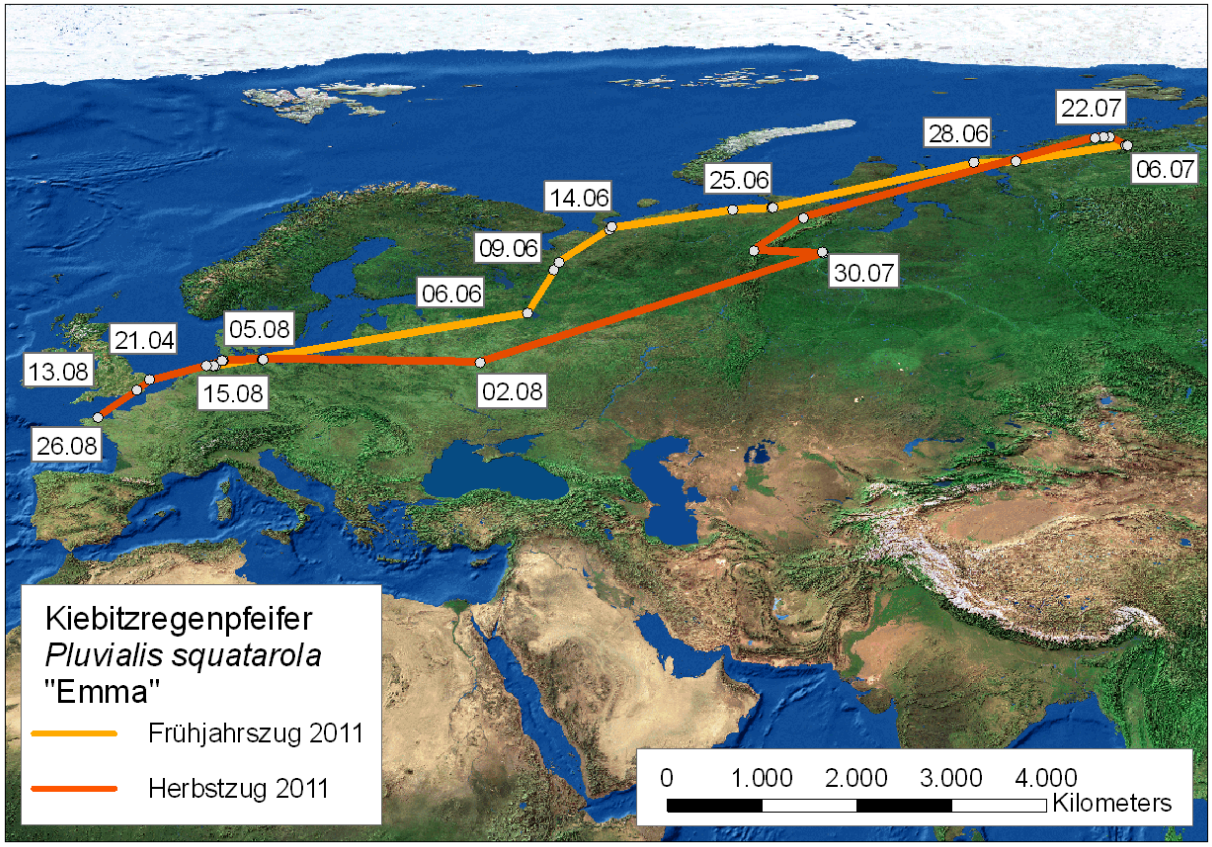
Tagged turtle, photo Victor Stiebens, Christophe Eizaguirre

More information is available at http://www.geomar.de/de/forschen/fb3/fb3-ev/schwerpunkte/marineleben/conservation-genetics/

25. Studies to understand the decline in migratory waterbirds using the German Wadden Sea

Klaus-Michael Exo, MICHAEL.EXO@IFV-VOGELWARTE.DE
Institut für Vogelforschung, "Vogelwarte Helgoland", An der Vogelwarte 21, 26386 Wilhelmshaven, Germany
ARGOS Programme Number 4852

About 40% of the birds using the Lower Saxon Wadden Sea during migration declined during the last decades. The main aim of the project is to analyze (ecological) factors that may cause the decline, therefore migration routes and connectivity between the Wadden Sea and Arctic breeding grounds as well as African wintering areas will be analyzed for a few selected species, the Grey Plover Pluvialissquatarola and the Bar-tailed Godwit Limosalapponica, using satellite transmitters as well as geolocators.



Spring and autumn migration routes of a Grey Plover marked April, 4, 2011 with a 5 g PTT (from Exo et al. 2012, Jber. Institut für Vogelforschung 10: 10-12).

26. Satellite Tracking ofCuckoos

Dr. Andreas von Lindeiner a-v-lindeiner@lbv.de, Friederike Herzog f-herzog@lbv.de
Landesbund für Vogelschutz in Bayern e.V. , Eisvogelweg 1, 91161 Hilpoltstein, Germany
ARGOS Programme Number 5362

The aim of the project is to identify the migration routes, stop-over sites and wintering locations of German and Belorussian cuckoos. The knowledge that the study will provide, should be used for conservation measures for the endangered species. At the moment there are 13 active PTTs in the project.

*More information about the project is available at*www.lbv.de/kuckuck.

Cuckoo with satellite tag from the LBV project (© LBV)

27. Argo Floats

LotharStramma, lstramma@GEOMAR.DE
Helmholtz-Zentrum für Ozeanforschung Kiel, GEOMAR, Düsternbrooker Weg 20, 24105 Kiel, Germany
ARGOS Programme Number 8165

The floats were deployed in the eastern South Pacific to study the circulation and water mass anomalies. The floats are equipped with additional oxygen sensors. The floats were provided by the SFB-754.*More information isavailable at*http://www.sfb754.de

28. Subsurface mooring monitoring

Gerd Rohardt, Gerd.Rohardt@awi.de
Alfred Wegener Institut, Helmholtz Zentrum für Polar- und Meeresforschung, P.O.Box 120161, 27515 Bremerhaven, Germany
ARGOS Programme Number 8919 (sub-program 919)

The aim of the project is to monitor moorings with Argos watchdogs. About 50 watchdogs have been pooled in this programme.*More information is available at:*
http://www.awi.de/de/forschung/fachbereiche/klimawissenschaften/messende_ozeanographie/instrumente/verankerungen/

29. Norwave

Kai Herklotz, kai.herklotz@bsh.de
Bundesamt für Seeschifffahrt und Hydrographie, Bernhard-Nocht-Str. 78, 20359 Hamburg, Germany
ARGOS Programme Number 9948 (see 948)

The Norwave measurements take place at fixed monitoring stations in the North Sea and BalticSea (see Marnet programme). Waverider buoys are measuring sea state conditions, one of theseis transmitting data through the ARGOS satellite system. Watchdog services are used for the otherbuoys. More information is available at
http://www.bsh.de/de/Meeresdaten/Beobachtungen/Seegang/index.jsp

30. Argo sub-surface

Olaf Boebel, OBOEBEL@AWI-BREMERHAVEN.DE
Alfred Wegener Institut, Helmholtz Zentrum für Polar- und Meeresforschung, P.O.Box 120161, 27515 Bremerhaven, Germany
ARGOS Programme Number 10919 (Sub-program of program 919)

The project studies variability and long-term changes in warm deep water in the Weddell Gyre. It also monitors convection events. The floats are equipped with special ice sensing technology towithstand the ice season during winter. The floats are part of the international ARGO programme.A total of 33 floats are registered in the programme. Due to winterly surface ice coverage the transmission of the floats are switching to Iridium, due toshorter surface transmission times.
More information is available at
http://www.awi.de/en/research/research_divisions/climate_science/observational_oceanography/projects/weccon/

Nemo float deployed in the polar ocean.

31. Red Kite

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World working group on birds of prey and owls, Wangenheimstr.32, D-14193 BERLIN, Germany.
ARGOS Programme Number 11126 (Sub-program of PGM 1126)

The W.W.G.B.P. has been active for thirty years now and today plays an important role in thepromotion of raptor conservation and research on an international level. Its membership list todaycomprises over 3,000 raptor specialists and enthusiasts in all parts of the world, and anybody withan interest in raptors is welcome to become a member. The W.W:G.B.O tracks birds of preyworld-wide since 1992. Theses raptors are belonging to 14 species. Resulting publications areavailable as PDF files: www.raptor-research.de".More information is available at http://www.raptors-international.de/index.htm

32. Seismic ice flow drifter

GerdRohard, Gerd.Rohardt@awi.de
Alfred Wegener Institut, Helmholtz Zentrum für Polar- und Meeresforschung, P.O.Box 120161, 27515 Bremerhaven, Germany

ARGOS Programme Number 12919 (sub-program of 919)

The project uses Argos beacons to locate seismometers on ice floats during expeditions. The use of the beacons is suspended at the moment and will be used again in 2013. A total of 6 beacons are registered in the programme.

More information isavailable athttp://www.awi.de/en/research/research_divisions/geosciences/geophysics/projects/seismology/seismology_ridges_move/agave2007/?0=

A lonely seismic station on an ice floe

33. European whitefronted ringing Project
Martin Wikelski, martin@ORN.MPG.DE
Max Planck Research Centre for ornithology, Migration and Immuno-ecology (Vogelwarte Radolfzell), SchloßMöggingen, Schloßallee 2, 78315 Radolfzell, Germany
Argos Programme Number 14983 (sub-program of 983)

34. Eagles
Bernd Meyburg, BUMeyburg@aol.com
World working group on birds of prey and owls, Wangenheimstr. 32, D-14193 BERLIN, Germany
ARGOS Programme Number 31136 (sub-PROGRAM OF PGM 1126)

The W.W.G.B.P. has been active for thirty years now and today plays an important role in thepromotion of raptor conservation and research on an international level. Its membership list todaycomprises over 3,000 raptor specialists and enthusiasts in all parts of the world, and anybody withan interest in raptors is welcome to become a member. The W.W:G.B.O tracks birds of preyworld-wide since 1992. Theses raptors are belonging to 14 species. Resulting publications areavailable as PDF files: www.raptor-research.de".
More information is available at http://www.raptors-international.de/index.htm

The following projects have been terminated:
Programme 636 (Hamburg Ice Buoy Programme), Programme 919 (Sea ice processes in polar regions), programme 1857 (Tracking of penguins at sea), programme 2736 (IfM-Geomar: moored data buoys), programme 3455 (BIOTA Maroc), programme 3635 (Transdrift-TR), programme 10126 (Bulgaria) and programme 31126 (Imperial Eagle).

Section 2. Future Plans

GEOMAR activities will be continued at the same level. That is relevant for the following programs: 8165 (Argo equivalent float missions), 1783 (Glider missions), 783 (mooring watchdogs).

Programm 5362 will run until December 2015. At the moment, there are 13 active PTTs (5g). Probably, there will be about 10 additional PTTs in Germany and Belarus in use in spring 2014.

Programme 3189 reports plans to use additional GSM transmitters with high resolution data loggers next year. Those transmitters and loggers have already been tested on a joint expedition to Russia with MPI.

Programme 3189 also reports that a Webtool with a gateway to MOVEBANK will be ready next year.

Section 3. Technological Changes that affect User Requirements

Section 4. User issues, problems, and level of satisfaction with Argos

Programme 5362 asks for higher accuracy of the coordinates. This would be fantastic, so it would be possible to use the data not only for the migration study, but also for studies in the breeding area.

The bird trackers in general mentioned higher accuracy needs in locations and needs for smaller and lighter transmitters.

Section 5. Successful programme use of Argos
Programme 5362 is using the Argos telemetry successfully.

Section 6. Analysis of Local Operational Issues
The compilation of a list of users for each individual country has helped a lot in compiling the national report. The new format for the national report is also very helpful

APPENDIX 6 OF ANNEX XII

Year	**2013**
Country	**INDIA**

(Report submitted by M. Ravichandran, INCOIS, India)

Section 1. Overall Summary

India is using ARGOS services for Ocean Observation platforms such as Argo floats, drifting buoys, fish tagging and moored buoys.

Section 2. User Types by family (Table of PTT use by the country)

	Average active PTTs per month	Total PTT.Years
Buoys and others	28	20.04
Profiling floats	75	5.96
Animals	15	2.73
Fixed stations	-	
TOTAL	**118**	**28.73**

Section 3. Technological Changes that Affect User Requirements

Since the bandwidth is low, we could not acquire higher vertical resolution of temperature and salinity. Also, the floats need to be longer time on the surface for transmission, it quickly drifting to the shore or beached. Further, we could not communicate to the float/buoy, once deployed. Hence, we started using some of the floats with Iridium communication. ARGOS can think about higher bandwidth and also two way communication (ARGOS-3)

Section 4. User issues, problems, and level of satisfaction with ARGOS

Though ARGOS could cater many useful services with low cost, bandwidth need to be increased. Also, more number satellites are required for the low latitude regions for better repeatability,

Section 5. Successful program use of ARGOS

Low cost, low power one way communication is very much suitable for some platforms, but it will not cater all platforms. Improvement in location accuracy is good initiative by ARGOS.

Section 6. Analysis of Local Operational Issues

Nil

APPENDIX 7 OF ANNEX XII

Year	**2013**
Country	**NETHERLANDS**

Section 1. Overall Summary

Dutch users are using the Argos system for many years now with great satisfaction and good success. However, a trend seems visible that less users are using less PTT's, but it's not clear whether this is a real trend or that the right information is missing.

Section 2. Future Plans

It seems that the use of the Argos system by Dutch users is diminishing, every year less users and less PTT's. At least this trend results from feedback as derived from the existing users that are known to KNMI. From the six current users only two have fixed plans for 2014, involving in total 58 installed PTT's using 16 PTT years. The other four users don't know yet but will most probably use less PTT years or stop with any Argos use.
There might be new Dutch users of the Argos system that are not known to KNMI. Is there a system within JTA that tracks down new users and reports them to the national reps?

Section 3. Technological Changes that affect User Requirements

Not much feedback on this is given by the Dutch users. Only one user mentions that they plan to move to the Iridium system, mainly because of the much lower costs of the Iridium system. Another user has stopped with the Argos system to local readout of GPS-PTT's (by Bluetooth and zigbee), because of the higher frequencies of bearings and the lower costs involved with GPS-PTT's.

Section 4. User issues, problems, and level of satisfaction with Argos

In general the Dutch users are quite satisfied with the Argos system. The relatively high costs are for some users a reason to look for alternatives, like the Iridium system that costs 3 times less than the Argos system.

Section 5. Successful programme use of Argos

ARGOS transmitters and the ARGOS service have proven to be very effective when recovering moorings, especially in case of unexpected and unduly surfacing of a mooring.
Another successful use of Argos in the Netherlands is bird monitoring.
The Argos system is used in the European Project on Ice Coring in Antarctica (EPICA) for the datacom of meteo and snow/ice measurement data in remote areas. See:
http://www.phys.uu.nl/~wwwimau/research/ice_climate/aws/aws_antarctica.html.
Finally, KNMI successfully uses the Argos system in the Argo buoy project.

Section 6. Analysis of Local Operational Issues

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APPENDIX 8 OF ANNEX XII

Year	**2013**
Country	**NEW ZEALAND**

Section 1. Overall Summary

The NZ JTA Argos usage in 2013 consists of the MetService Buoy Program, plus about 12 small programs tracking animals and one fixed monitoring station. The animal programs track a range of birds, mammals and fish, while the fixed station monitors the Mount Ruapehu Crater Lake.

Section 2. Future Plans

The MetService NZ buoy program will in the near future focus on Iridium Drifters, providing a comparison with current Argos-based SVPs. Will shall closely monitor all technical developments and the performance of buoys in terms of communications and buoy lifetime.

Section 3. Technological Changes that affect User Requirements

This objective of this section is to provide information on any advances in instrument development, techniques, or other technology that may affect future development of the Argos system.

Section 4. User issues, problems, and level of satisfaction with Argos

Users continue to express a high level of satisfaction with Argos. MetService reported that User Office support was excellent, and that the processing and quality control of buoy data for the GTS is highly reliable. Users did not report any problems.

Section 5. Successful programme use of Argos

The MetService Buoy Program continues to be one of operational excellence, for which data has been delivered since the late 1980s.
The program monitoring the Mount Ruapehu Crater Lake has been using Argos for five years, and has been reporting every hour or so, even through the winter when the transmitter is buried by snow. This highly important program contributes significantly to the early warning system for volcanic eruptions.

The objective of this section is to highlight the successful use of Argos in helping users achieve their objective.

Section 6. Analysis of Local Operational Issues

Across the board, Argos users in New Zealand remain satisfied with the performance, level of service and the technical support provided by the Argos User Office in Melbourne. The Argos system continues to provide reliable communications and precise positioning. The ongoing trials of Iridium based systems have highlighted the lower communications costs of that platform, and users are keenly following the developments.

APPENDIX 9 OF ANNEX XII

Year	**2013**
Country	**SOUTH AFRICA**

Role Player 1 – South African Weather Service (SAWS)

Role Player 2 – University of Pretoria – Mammal Research Institute (MRI)

Role Player 3 – Ezemvelo KZN Wildlife

Role Player 4 – Department of Environmental Affairs (DEA)

Role Player 5 – University of the Witwatersrand (Wits)

Section 1. Overall Summary

RP1: SAWS has been deploying drifting weather buoys on behalf of the Global Drifter Program for the past year. These deployments fall under the DBCP's respective programmes (ISABP, IBPIO and IPAB). They also act as liaison between the Governments of South Georgia, the Falklands and Tristan da Cunha for assistance in deployment and permission to place fixed weather buoys on the Islands of Tristan da Cunha and South Thule for atmospheric pressure measurements. The drifting weather buoys make use of the Argos System to transmit the data.

RP2: Southern Elephant Seals (Mirounga leonina) have been tracked using the Argos system since 1999. In total, 172 animals have been tracked, with an average of 5.4 animals per month since 1999.

In 2009 the 5 year "Maternal foraging behaviour of fur seals from Marion Island" program started. Argos linked satellite trackers were deployed on both species of fur seal occurring on Marion Island - Subantarctic fur seals (Arctocephalus tropicalis) and Antarctic fur seals (A. gazella). Argos-linked satellite trackers were deployed on A. tropicalis at two different locations on Marion Island - one on the western side and the other on the north-eastern

side of Marion Island. We deployed on A. gazella on the southern side of Marion Island. Devices are put out twice during a year: in December at the start of the pupping season to cover summer foraging trips and in April to cover winter foraging behaviour. Initially 5 devices were put out at each of the study colonies for each season. This totals to 15 devices being deployed each season and 30 in total per year. The actual number of devices deployed is lower because some devices failed to switch on or collect data (manufacturer problems). During the last two years deployment effort is being tapered off because the 5-year program ends in 2014. The average and total values in the above table is only PTT numbers active since January 2013.

RP3: As part of the Maluti Drakensberg Vulture Project, 11 Bearded Vultures and 1 Cape Vulture are currently fitted with microwave telemetry PTTs. A further 1 PTT will be fitted to Bearded Vulture in 2013 and 2 to Cape Vulture. The objective is to determine the causes of mortality of these birds and to obtain more information on the spatial and temporal use of their home range to assist in the conservation of these two red data species.

RP4: The Department is presently concentrating on protected top predator species such as African penguins and the Marion seabirds from a conservation perspective. This also includes interactions between Cape fur seals and seabirds at Vondeling Island as seals recolonize this historically extirpated island. Other concerns are Green and Hawksbill turtle within the iSiimangaliso Wetland Park which were tagged for the first time in SA to determine their movements within the Park. Concerns with respect to Tiger sharks being exploited by ecotourism within Aliwal Shoal MPA were tagged using Spot Ptts, acoustic and PAT tags to determine their movement and feeding behavior and look at interactions with the tourist vessels.

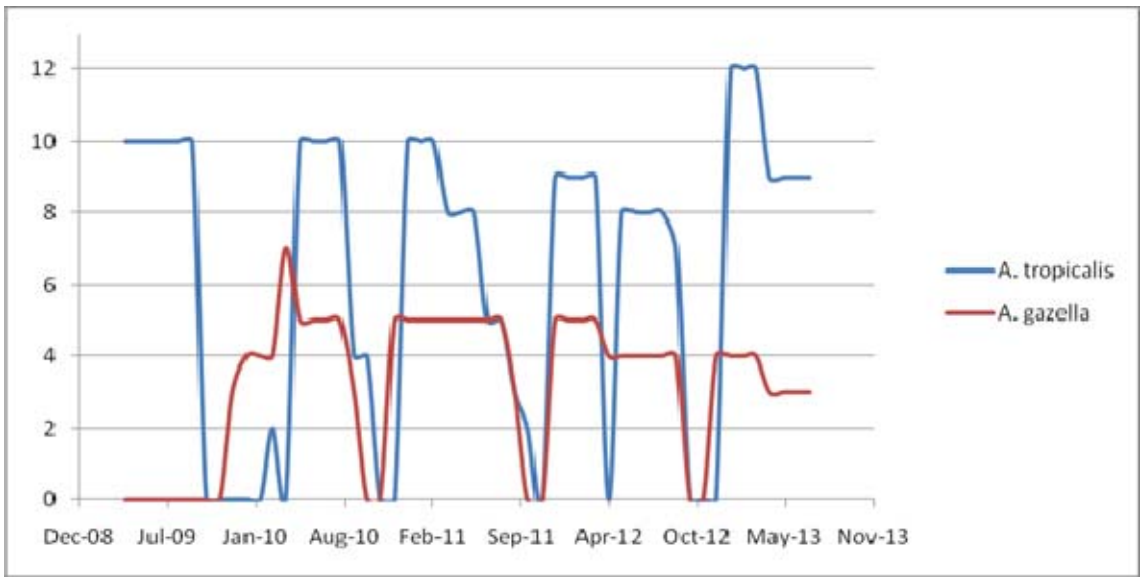
RP5: My research programme uses ARGOS technology in association with GPS receivers in telemetry collars. We are satisfied with the ARGOS service to date, and do not anticipate and changes in our requirements.

Section 2. User Types by family (Table of PTT use by the country)

	Average active PTTs per month	Total PTT.Years
Buoys and others	45	45
Profiling floats	18	18

Animals	10	10
Fixed stations	2	2
TOTAL	**75**	**75**

RP2: The graph below depicts the number of PTT's active within each month during since April 2009.



Section 3. Technological Changes that Affect User Requirements

RP1: None

RP2: None

RP3: None

RP4: As instrumentation improves on marine animals such as sharks, tags last longer but are being affected by bio-fouling which requires better anti-fouling paints. Manufacturers need to push for more research into preventing bio-fouling.

RP5: None

Section 4. User issues, problems, and level of satisfaction with ARGOS

RP1: No issues, but need to update the contract. Very satisfied with the service we are receiving.

RP2: There were no problems from the Argos side. Several devices failed to switch on or collect data, but that problem lies with the manufacturers of the devices and not with CLS itself.

RP3: Ezemvelo KZN Wildlife requires a contract to be completed with Argos/CLS in order to process payments through their new SAP financial system. Contract signing is in progress.

RP4: We have no other issues and are happy with the service being provided by ARGOS although satellite time is becoming very expensive.

RP5: Very satisfied with the service.

Section 5. Successful program use of ARGO

RP1: Argos is used to verify that the drifters are operational before deployment, as well as track and download the data.

RP2: None

RP3: The use of Argos in obtaining GPS locations of a number of individual vultures on an hourly basis has provided information on their daily movement patterns that can be used to inform planned wind-farm developments.

RP4: There are a number of projects from African penguins to tiger sharks and Marion seabirds that are providing new insights into conservation issues while we sit at our PC's. In the penguin chick project it appears that present day movements are being controlled by historical imprinted movements even though these areas have been affected by overfishing resulting in high mortality resulting in limited recruitment. It appears that penguins are travelling to depleted feeding areas in Namibia.

RP5: ARGOS has been very helpful in getting real-time data on resource use and distribution of our study animals.

Section 6. Analysis of Local Operational Issues

RP1: We have no problems with ARGOS.

RP2: No problems were experienced.

RP3: No problems were experienced.

RP4 It seems to me that SA may be more affected by bio-fouling than other areas such as the USA with respect to sharks. Water conditions in this area also affect transmissions on a greater scale.

RP5: No problems to report.

Compiled by S.Marais and S. du Toit and approved by Johan Stander

For the JTA National Report, July 2013

APPENDIX 10 OF ANNEX XII

Year	**2013**
Country	**SWEDEN**

Below are status for ARGOS program of Thomas Alerstam, Lund University reported.

Section 1. Overall Summary

Satellite tracking of migrating birds (project nr 1204), continues at a moderate level. Presently there are 5 active PTTs on raptors and cuckoos.

Section 2. Future Plans

The plans are to focus on continued tracking of cuckoos and raptors also during the coming years. Long term tracking of the same individuals for many years are particularly important for the project, and the number of individuals may increase a bit during the coming years.

Section 3. Technological Changes that affect User Requirements

Section 4. User issues, problems, and level of satisfaction with Argos

Tomas Alerstam is satisfied with the support Argos is giving to the research project..

Section 5. Successful programme use of ARGOS

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Section 6. Analysis of Local Operational Issues

APPENDIX 11 OF ANNEX XII

Year	**2013**
Country	**UNITED ARAB EMIRATES (UAE)**

Section 1. Overall Summary

The United Arab Emirates started the satellite-tracking programme in 1994 through the National Avian Research Center (NARC) of the Environment Agency – Abu Dhabi, primarily for studying movement and migration of the Asian Houbara. The number of programmes and use of the technology has grown since then and at present 12 programmes and sub-programmes are in operation in the country. Although nearly half of these are on birds, there are programmes on marine turtles, dugongs, Sharks and ungulates. The use of Argos programme in the country has been highly successful in improving our understanding of migration routes, stopover sites and feeding and foraging habitat use and even to the discovery of new important areas, helping the overall conservation of the species and their habitats. Details about each of the programme is provided in the following sections:

Family	Program Number	Program Name	Organization name	Program Manager
Bird	1440	Wildlife in Asia and Africa	Environment agency	Mohammed S. Al Baidani
Bird	3763	Emirates Centre for the Conservation of Houbara	Emirates Centre for the Conservation of Houbara (ECCH) Uzbekistan.	Yves Choquet
Bird	3416	Survey of Houbara bustard	ECWP (Emirates Centre for Wildlife Propagation) Morocco.	Yves Hingrat
Bird	4162	Post-natal dispersal of Houbara bustards	Emirates Bird Breeding Centre for the Conservation of Houbara-Abu Dhabi (EBBCC)	Keith Scotland
Bird	3657	Birds Arabia	Environment Agency	Salim Javed
Dugong	23657	Dugongs in AD (sub program of 3657)	Environment Agency	Himansu Das
Bird	5421	Socotra cormorant foraging ecology	United Arab emirates university	Sabir Muzaffar
Marine Animals	4189	Gulf turtle project (sub-program 4189)	Emirates Wildlife Society-WWF	Lisa Perry Shrake
Marine Animals	14189	Gulf turtle project (sub-program 4189)	Emirates Wildlife Society-WWF	Lisa Perry Shrake
Land Animals	24189	Ungulates (sub-program 4189)	Emirates Wildlife Society-WWF	Lisa Perry Shrake
Marine Animals	4828	Shark watch Arabia	Heriot-watt university	David Robinson
Marine Animals	5073	Burj al Arab	Burj al Arab	Warren Baverstock

Asian Houbara Programme 1440 (NARC-SKHBC-IFHC):

The Argos programme run by the National Avian Research Center (Abu Dhabi) and the Sheikh Khalifa Houbara Breeding Center (SKHBC, Kazakhstan), under the leadership of the International Fund for Houbara Conservation (IFHC, Abu Dhabi – United Arab Emirates), aims to study the ecology and behaviour of the Asian Houbara Bustard (*Chlamydotis macqueenii*) over its distribution range. It helps collecting information on resident and migrant populations (routes, main stopover areas and dates of migration), breeding behaviour and survival of wild and released captive-bred individuals.

The ARGOS programme 1440 is active since 1994 and was previously shared between NARC and EAD (former ERWDA). Since 1994, **914 satellite transmitters** (PTT of GPS-PTT) were registered under this programme and fitted on more than **10 animal species** totalling **1160 individuals** monitored. Microwave Telemetry produced almost of all transmitters used in this programme, barring few from North Star.

Of these, **743 transmitters** were deployed on **974 Asian Houbara**. Transmitters were deployed mainly in UAE and Kazakhstan, but also in less numbers in Yemen, Iran, Pakistan, China and the Kingdom of Saudi Arabia.

Other aspects of the programme include post-release monitoring of rehabilitated falcons (survival, migration routes) with **129 transmitters** used on **133 falcons**, and ecological studies of the Arabian Bustard in Yemen with 7 transmitters used on 9 bustards. Few other transmitters offered to third party to assist them in the study and conservation of Bengal Florican in Cambodia are still running (21 transmitters deployed on 22 individuals).

Currently, about **208 PTT are functioning in the field** (179 on Asian Houbara, 4 on Arabian bustard, 11 on rehabilitated falcons and 14 on Bengal Florican).

Asian Houbara Programme 3763 (ECCH):
The Emirate Center for Conservation of the Houbara (ECCH, Navoi Region, Republic of Uzbekistan) deployed **30 transmitters** (GPS-PTT) allowing to monitor **35 Asian Houbara** in Uzbekistan (17 wild and 18 captive bred released houbara). Currently, **25** GPS-PTT are functional (7 wild and 18 captive-bred released). Microwave Telemetry produces all transmitters used in this programme.

North African Houbara Programme 3416 (ECWP-IFHC):
The Argos programme run by the Emirates Center for Wildlife Propagation (Missour, Morocco), under the leadership of the International Fund for Houbara Conservation (IFHC, Abu Dhabi – United Arab Emirates) aims to study the ecology and behaviour of the North African Houbara Bustard (*Chlamydotis undulata undulata*) over its distribution range. Microwave Telemetry produces all transmitters used in this programme. Two PTTs were also deployed on rehabilitated vultures (*Gyps fulvus).*

Since 2004, ECWP deployed 221 satellite transmitters (PTT or GPS –PTT), which allowed to monitor 322 African Houbara (45 wild and 277 captive bred released birds) and two vultures. Currently the project monitored 153 Houbara with GPS-PTT.

Post-natal dispersal of Houbara Programme 4162
No information received from the Program manager

Birds Programme 3657
The bird programme has been in existence for more than 7 years now. The programme started with tracking of Greater Flamingos in 2005 and has grown substantially since then and has expanded to cover other important migratory bird species such as Ospreys, Marsh Harriers, Sooty Falcon, Steppe Eagle, Spotted Eagle among the birds of prey. Waterbirds such as Sooty Gull, Crab Plover and Terns have also been tracked under the programme. During 2013 nearly 12 transmitters were active. The programme successfully tracked spring migration of 5 Marsh Harriers and two Spotted Eagles, beside four flamingos during the year.

Dugong Programme 23657
During 2013 no tagging was done as in 2012, the tethers got detached earlier than expected due to mechanical failure. Satellite tagging programme for dugongs in Abu Dhabi waters will resume in

2014 once custom built tethers which are being designed in Australia are available. Plans are to tag at least 3 dugongs in 2014, once the tethers are received.

Socotra Cormorant Foraging 5421

The programme plans to deploy 12 Platform Transmitter Terminals on the Vulnerable Socotra Cormorant. Birds will be captured on Siniya Island and deployment will occur in November 2013.

Marine Turtle Conservation Project 4189

The Marine Turtle Conservation Project, implemented by the Emirates Wildlife Society (EWS) in association with WWF was developed to collect data on feeding grounds of hawksbill turtles in the Arabian/Persian Gulf region. As part of the Marine Turtle Conservation Project, 75 Sirtrack transmitters have been deployed in a three-year research effort to monitor post-nesting hawksbill turtles (*Eretmochelys imbricata*) in the Gulf region. A total of 27 transmitters continued to send signals through 2013.

Marine Turtle Conservation Project 14189

The sub- programme 14189 has been created under the EWS-WWF programme (04189) and has been used by the Environment Society of Oman (ESO) and the Ministry of Environment and Climate Affairs of Oman (MECA), project partners in Oman. ESO and MECA deployed one transmitter in 2012 and four transmitters in 2013.

Land Animals Project 24189

The deployment is yet to take place.

Section 2. Future Plans

A large number of deployments is planned towards the end of the year and beginning of 2014, mainly within the Houbara programme and various bird programmes. By the end of 2013, 215 additional PTTs will be deployed on captive bred Asian Houbara to be released in the Arabian Peninsula and Asia under Programme 1440 and 50 under the programme 3763 . By the end of 2013, 100 additional GPS-PTTs are planned for deployment on captive bred Houbara in North Africa under Programme 3416. Another 8-10 transmitters are likely to be deployed under Bird Programme 3657. About 12 transmitters would be deployed towards the end of 2013 on Socotra Cormorant under programme 5421.

The Programme 4189 is expected to continue to receive a number of satellite tracking data in 2014 generated by the transmitters already deployed in 2012. EWS-WWF is currently assessing the feasibility to continue with satellite tracking relevant to the marine turtle conservation initiative. Under Programme 24189, 8 transmitters will be deployed as part of a research project in 'Wadi

Waraya', a mountainous area recently declared as protected by Fujairah Municipality (UAE). This research will aim to assess grazing pressure by feral goats on endemic vegetation in the area.

Section 3. Technological Changes that affect User Requirements

None

Section 4. User issues, problems, and level of satisfaction with Argos

Data retrieval through the website: to cover a period longer than 10 days.

Section 5. Successful programme use of Argos

UAE has successfully used Argos for tracking a range of species from fishes, to birds, reptiles and mammals. Given the success of the first programme in 1994 on Asian Houbara, many new programmes have been registered covering much wider spectrum of species. The use of technology has allowed government and non-government organisations in understanding the migration routes, stopover sites, foraging areas of key animal species in the country and beyond. With the use of satellite telemetry, the movement and residency time of hawksbill turtles has been analysed to map key foraging areas within the Gulf.

The use of the technology has provided many new information, led to the discovery of new important area and hence directly contributed to the conservation of the species and their habitat, not only within the country but also along their migratory routes.

Section 6. Analysis of Local Operational Issues

Programmes are registered without the knowledge of ROC and it becomes difficult to follow-up on the programmes. No information was received from 4162 whereas; for programme 4828, although in the ROC report shows, registered in the UAE, is registered in the UK as informed by the Project Manager.

APPENDIX 12 OF ANNEX XII

Year	**2013**
Country	**UNITED STATES OF AMERICA (USA)**

Section 1. Overall Summary

On average, the United States has over 6,500 active PTTs transmitting on a monthly basis around the world. The projects range from buoys and floats transmitting oceanographic and meteorological data to tracking Emperor Penguins in Antarctica and grizzly bears in the Yellowstone National Park.

ANNUAL U.S. CONSUMPTION BY FAMILY
(PTT Years)

	2009	2010	2011	2012	2013 Projected	Delta
Buoys Others	1,578.4	1,733.9	1,542.0	1,158.6	1,210.0	51.4
Floats	151.7	142.5	140.2	161.1	153.0	(8.0)
Animals	350.5	388.2	381.9	463.6	480.0	16.4
Fixed Stations	75.2	73.4	72.3	64.5	70.0	5.5
Total	2,155.8	2,338.0	2,136.3	1,847.9	1,913.0	65.1

Section 2. Future Plans

The U.S. programs are experiencing significant budget reductions that will continue to negatively impact the programs using Argos, especially the buoy programs. Since 2011, the parent organization that funds the buoy programs has lost $40.3 million dollars.

Section 3. Technological Changes that affect User Requirements

The U.S. users have adapted their requirements to best make use of the Argos system. However, there is an ongoing need for better satellite coverage (more passes), 2-way communication, and higher data transmission rates.

Section 4. User issues, problems, and level of satisfaction with Argos

Listed below are comments from a few U.S. users:

Ocean Platforms: “It's very important to not need to re-engineer our remote comms, because we have limited resources and because reliability is so critical for remote deep-ocean platforms. So, we're concerned about the continued availability of transmitters. We are very satisfied with Argos. The service from the User Services group is really outstanding, at least a 9.9 out of 10. In terms of their response time, ability to deal with distraught users at sea, and general helpfulness, they really do an outstanding job. In overall terms of satisfaction with the Argos system, it fills a critical role in our operations. Of course we'd like bigger payloads and lower costs, but we appreciate the service and have really come to rely on it.”

Animal Tracking: “The main issue is coverage of the satellites and ability to connect to our collars. We have had frequent failures. Our area of study is the Greater Yellowstone region of northwestern Wyoming.”

For the other users who responded to the survey, CLS America consistently scored 8 out of 10 in terms of customer satisfaction.

Section 5. Successful programme use of Argos

Animal Tracking: The Argos equipped collars save money and resources for remotely tracking animals by not having to use airplanes for conducting aerial surveys.

Section 6. Analysis of Local Operational Issues

Buoys: Because of the long deployments of moorings, there are hard limits for power usage. Consequently, the users must balance power consumption, Argos message size limits, desired throughput, and desired data resolution. There have been issues with interference with a variety of sensors over the years; this is exacerbated by the need to transmit constantly for good Argos throughput, especially sites near the equator.

Animal Tracking: The fact that the Argos system is placed on Telonics radio collars and deployed on grizzly bears in the Greater Yellowstone Ecosystem is challenging for data transmission. The terrain and location and movements of the bears are likely problems for connections to satellites.

ANNEX XIII

LIST OF REPRESENTATIVES OF COUNTRY (ROCS) FOR THE ARGOS JTA
(October 2013)

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ANNEX XIV

ARGOS JOINT TARIFF AGREEMENT (JTA) EXECUTIVE COMMITTEE BUDGET

Argos Joint Tariff Agreement (JTA) budget within DBCP Trust Fund
(as of 9 Sept. 2013, estimates in blue)

Year	Item	Income & Expenditure	1 CHF	Income & Expenditure	Income & Expenditure for JTA	JTA balance	Income & expenditure for WMO	WMO balance	Comment
		CHF	*USD*	*USD*	*USD*	*USD*	*USD*	*USD*	
2010	**Initial JTA balance**					***0***		**0**	
	CLS Contribution to DBCP TF at WMO (2010)			55,000.00	45,000	45,000	10,000	10,000	
	Mission, J. Stander, JTA-EC, Sydney, 04/2010			-4,273.00	-4,273	40,727	0	10,000	
	Mission, E. Charpentier, JTA-EC, Sydney, 04/2010			-3,321.00	-3,321	37,406	0	10,000	
	Mission, J. Stander, JTA-30, Oban, 10/2010			-2,402.00	-2,402	35,004	0	10,000	
	Mission, Greg Reed, IPET-DMI, 4/2010			-1,823.00	0	35,004	-1,823	8,177	
	Frank Grooters JTA contract (SSA), 10/2010			-15,437.00	-15,437	19,567	0	8,177	
2011	**CLS Contribution to DBCP TF at WMO (2011)**			**35,269.00**	**25,269**	**44,836**	**10,000**	**18,177**	
	Mission, J. Stander, JTA-EC, Miami, 4/2011			-1,224.00	-1,224	43,612	0	18,177	
	Mission, D. Meldrum, RMIC2, Tianjin, 7/2011			-3,247.00	0	43,612	-3,247	14,930	
	Mission, S. Issara, RMIC2, Tianjin, 7/2011			-3,829.00	0	43,612	-3,829	11,101	
	Mission J. Trinanes, IPET/DRC, Melbourne, 9/2011			-1,638.00	0	43,612	-1,638	9,463	
	Mission ROC Botswana, JTA-31, Geneva, 9/2011			-4,051.00	-4,051	39,561	0	9,463	
	Mission J.Stander, JTA-31, Geneva, 9/2011			-3,781.00	-3,781	35,780	0	9,463	
	Frank Grooters JTA contract (SSA), 10/2011			-15,000.00	-15,000	20,780	0	9,463	
	Mission, E. Charpentier, Toulouse, 12/2011			-2,178.00	0	20,780	-2,178	7,285	
2012	**CLS Contribution to DBCP TF at WMO (2012)**			**34,028.00**	**24,028**	**44,808**	**10,000**	**17,285**	
	Mission J. Stander, JTA-EC, Toulouse, 4/2012			-3,080.25	-3,080	41,728	0	17,285	
	Mission E. Charpentier, JTA-EC, Toulouse, 4/2012	-2216	1.06045	-2,349.96	-1,175	40,553	-1,175	16,110	50% JTA support (Satcom - JTA-EC)
	Mission J. Stander, JTA-32, Fremantle, 10/2012	-3113	1.06045	-3,301.18	-3,301	37,252	0	16,110	
	Frank Grooters JTA contract (SSA), 10/2012			-15,000.00	-15,000	22,252	0	16,110	
2013	**CLS Contribution to DBCP TF at WMO (2013)**			**32,748.00**	**22,748**	**45,000**	**10,000**	**26,110**	
	IODE-22 (S. Woodruff, G. Rosenhagen)			-2,357.00	0	45,000	-2,357	23,753	
	JTA-EC 2013, Annapolis (J. Stander, T. Gross)			-2,379.00	0	45,000	-2,379	21,374	
	RMIC workshop for RA-I, Casablanca, 2013			-10,000.00	0	45,000	-10,000	11,374	
	Frank Grooters JTA contract (SSA), 10/2013			-15,000.00	-15,000	30,000	0	11,374	
	Satcom forum			-10,000.00	0	30,000	-10,000	1,374	
	JTA-33 (J. Stander, J. Linguanti)			-3,342.00	-3,342	26,658	0	1,374	
2014	**CLS Contribution to DBCP TF at WMO (2014)**			**28,342.41**	**18,342**	**45,000**	**10,000**	**11,374**	

ANNEX XV

PERFORMANCE REPORT FOR ARGOS TRANSMITTER FITTED WITH OMNI(OCEAN MOORED BUOY NETWORK IN NORTHERN INDIAN OCEAN) BUOY SYSTEM

(Report submitted by R. Venkatesan,
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This document describes about the Argos transmitter fitted with the OMNI buoy system for position identification and tracking.

About OMNI buoy System:

The OMNI buoy systems are equipped with sensors up to 500 m of depth. This project is a major technological breakthrough in collection of meteorological and oceanographic parameters in ocean in Indian waters.

Cyclone Prediction:

The data provided by these systems were significantly used in prediction of cyclone pathway and alerting the coastal communities from threat. The cyclones such as Jal and Thane were effectively predicted with the data from this buoy system by various organizations under Indian Government as this data is shared to all such organizations working in this field. The data also enables effective climatic study and monsoon analysis. The data from the OMNI buoy system were also fed to the weather prediction models by various government agencies for daily weather predictions.

It is very important to maintain this buoy system for continuous operation with multiple redundant mechanism to operate/track/control during the event of black out.

Implementing Argos Tracker is one of the mechanism to have an independent tracking and position indication system for these buoy systems.

Argos Transmitter: Ocean Observation Systems uses Argos Transmitter for variety of applications such as for tracking and recovery of buoy systems, Correlation of buoy location with INMARSAT/INSAT Satellite Transceiver's GPS/Stand-alone GPS system, Search and recovery of Deep Sea Bottom Pressure recorders.

Transmitter Model: WildCAT PTT
Battery : 7.2V, 26Ah Primary Lithium
Life of Operation: >1 Year.

Figure: 1 Argos Transmitter from CLS

Transmitter Details:

Internally the Argos transmitter from CLS has a WildCAT PTT Transmitter manufactured from Seimac.

Figure 2: WildCAT Platform Transmitter (PTT)

The WildCAT PTT represents a new generation of ARGOS transmitter. It is small, extremely battery efficient and fully user configurable. As with its predecessor, the SmartCAT PTT, WildCAT offers the user a PTT that provides quality ARGOS data and location positioning through the selection of high quality Temperature Compensated Crystal Oscillators (TCXO). WildCAT is also easily matched to a variety of antenna configurations and provides rugged design for demanding environmental applications. WildCAT is available as a fully user programmable and fully functional ARGOS PTT with a five-volt digital controller or as a miniature OEM RF board ideal for biological or any other low power applications.

Applications of Argos Transmitter:

The Argos Transmitters are effectively used for tracking the buoy system even during failure/damage of the buoy system's primary position indicating equipment. It acts as a redundant position indicator during emergency/Vandalism/Buoy snatch

Power System Architecture for Argos Transmitter:

The PTT has a wide operating voltage range of 5.5 to 20 Volt and the typical current consumption pattern is given below
Sleep mode : 55uA
Data Acquisition mode : 10mA
Transmission mode : 600mA

Battery used for powering Argos Transmitter:

In order to continuously power the Argos Transmitter for one year of operation High Energy Density Lithium Thionyl Chloride batteries of 26 Ah Capacity is used at 7.2V Supply.

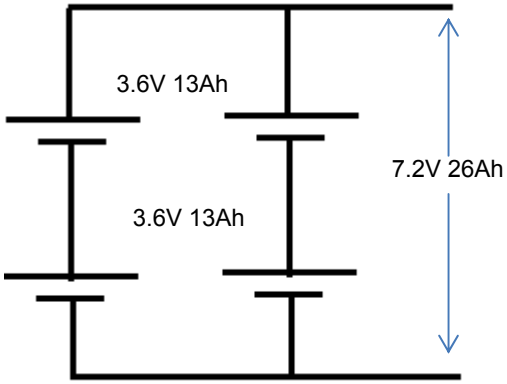

Figure 3: Battery Configuration for Argos Transmitter

Failure of Battery system fitted with the Argos Transmitter:

The Lowest voltage of a normal lithium thionyl chloride cell is around 2V and for the above configuration shown in figure the minimum voltage after exhaust is expected to be 4V.But the Lithium thionyl chloride battery was fully drained unlike Normal and 0 Volt was observed during recovery of battery from Argos Transmitter.

Possible Reasons

- The Circuitry could have short circuited the battery thereby causing the internal fuse of cell to blow off.
- Poor performance of the battery.

Operational Characteristics of Argos Transmitter:

The Intended operational life of these Argos transmitters is 1 year and it was noticed that some of the transmitters are failing before the normal operational life. The peak current delivering capacity of the battery pack is 3.6 A which is very high compared to the peak current requirement of the Argos transmitter which is only 0.6A.
The details of the performance of Argos is indicated below with the respective Argos ID Number.

Deployed Date	Stopped Date	Stopped Date	Argos ID	Operational Days
15-06-2013	01-10-2013	Functional	76721	108
16-06-2013	01-10-2013	Functional	76742	107
30-03-2013	08-06-2013	08-06-2013	76649	70
02-04-2013	01-10-2013	Functional	76691	182
21-03-2013	01-10-2013	Functional	76703	194
13-08-2013	01-10-2013	Functional	76655	49
16-08-2013	01-10-2013	Functional	76645	46
20-10-2012	01-10-2013	Functional	76631	346
22-10-2012	13-08-2013	08-06-2013	76716	295
23-10-2012	06-06-2013	08-06-2013	76531	226
26-10-2012	01-10-2013	Functional	76694	340
25-10-2012	01-10-2013	Functional	76699	341

Summary:

The Importance of maintaining the buoy system at harsh environment for valuable data related to Cyclone/storm Surges and providing timely alert to the coastal community about the impending natural calamity is globally accepted. The role of Argos Transmitter in maintaining a successful buoy network is necessary. Hence the Manufacturer has to ensure these points into consideration and deliver a reliable product.

LIST OF ACRONYMS AND OTHER ABBREVIATIONS

5YP	Argos JTA Five Year Plan
ADS	Automatic Distribution System (Argos)
AHRPT	Advanced High Rate Picture Transmission
AOML	Atlantic Oceanographic and Meteorological Laboratory, NOAA (USA)
Argo	International profiling float programme (not an acronym)
ASAP	As soon as possible
BOM	Bureau of Meteorology (Australia)
BUFR	Binary Universal Form for Representation of Meteorological Data
BUOY	Report for Buoy Observations
CBS	WMO Commission for Basic Systems
CDA	Command Data Acquisition
CLS	Collecte Localisation Satellites
CLSA	Collecte Localisation Satellites America
CNES	Centre National d'Etudes spatiales (France)
DBCP	Data Buoy Cooperation Panel (WMO-IOC)
DCS	Data Collection System
EC	JTA Executive Committee
E-SURFMAR	Surface Marine programme of the Network of European Meteorological Services, EUMETNET
EUMETNET	Network of European Meteorological Services
EUMETSAT	European Organization for the Exploitation of Meteorological Satellites
EUROArgo	European component of the Argo array
ESPC	NOAA Environmental Satellite Processing Center (USA)
FAO	Food and Agriculture Organization
FRGPC	French Argos Global Processing Centre
FTP	File Transfer Protocol
FYP	Five-Year Plan (of JTA)
GAC	Global Area Coverage
GDP	Global Drifter Programme
GIS	Geographic Information System
GTS	Global Telecommunication System (WMO)
HRPT	High Rate Picture Transmission
IABP	International Arctic Buoy Programme
IBPIO	International Buoy Programme for the Indian Ocean
ICT/IOS	CBS Implementation/Coordination Team on the Integrated Observing Systems
ID	Platform Identification Number
IJPS	Initial Joint Polar-Orbiting Operational Satellite System (NOAA, EUMETSAT)
IMB	Ice Mass-balance Buoy
INCOIS	Indian National Centre for Ocean Information Services
INPE	Instituto Nacional de Pesquisas Espaciais (Brazil)
IOC	Intergovernmental Oceanographic Commission of UNESCO
IRD	Institut français de Recherche scientifique pour le Développement en coopération (formerly ORSTOM)
ISABP	International South Atlantic Buoy Programme
JCOMM	Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology
JCOMMOPS	JCOMM *in situ* Observations Programme Support Centre
Jrev	permanent JTA review mechanism
JTA	Argos Joint Tariff Agreement
JTA-EC	JTA Executive Committee
KML	Keyhole Markup Language
LAC	Local Area Coverage
LDR	Low Data Rate
LUS	Limited Use Service (Argos)
LUT	Local User Terminal (Argos)

METOP	Meteorological Operational satellites of the EUMETSAT Polar System (EPS)
MOU	Memorandum Of Understanding
NARC	National Avian Research Center
NESDIS	NOAA Satellites and Information Service
NOAA	National Oceanographic and Atmospheric Administration (USA)
NPDBAP	North Pacific Data Buoy Advisory Panel
NPOESS	National Polar-orbiting Operational Environmental Satellite System (USA)
NWP	Numerical Weather Prediction
OCO	NOAA Office of Climate Observation (USA)
OPSCOM	Argos Operations Committee (NOAA, CNES, EUMETSAT)
PDF	Adobe Portable Document Format
PMT	Platform Messaging Transceivers
POES	Polar-orbiting Operational Environmental Satellite
PTT	Platform Transmitter Terminal
PTT-year	Equivalent to a PTT reporting in every time-slot during one year
QC	Quality Control
RO	Responsible Organization representing an agreed set of Argos User programmes (JTA)
ROC	Representative of Country representing a country or a group of countries participating in the JTA
RUG	Representative of a User Group
SAI	Service Argos, Inc. (USA, now CLS America)
SATCOM	Satellite Data Telecommunication
SAWS	South African Weather Service
SCD	Satélite de Coleta de Dados (Data Collection Satellite, Brazil)
SLA	Service Level Agreement
SOOP	Ship-Of-Opportunity Programme
SOOPIP	JCOMM Ship-Of-Opportunity Programme Implementation Panel
SOT	Ship Observations Team (JCOMM)
SSA3	Argos 3 Ground Segment project
SST	Sea Surface Temperature
STIP	Stored TIROS Information Processing
SUA	Argos System Use Agreement
TAO	Tropical Atmosphere Ocean array
TIP	TAO Implementation Panel
TT	Task Team
TT-DM	DBCP Task Team on Data Management
TT-IBP	DBCP Task Team on Instrument Best Practices and Drifter Technology Development
UAE	United Arab Emirates
UNESCO	United Nations Educational, Scientific and Cultural Organization
US	United States (of America)
USD	US Dollar
VOS	Voluntary Observing Ship
WMO	World Meteorological Organization
XML	Extensible Markup Language

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