INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (OF UNESCO)

WORLD METEOROLOGICAL ORGANIZATION

ARGOS JOINT TARIFF AGREEMENT

THIRTY-FIRST MEETING

Geneva, Switzerland, 3-5 October 2011

RECORD OF DECISIONS

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NOTES

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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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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 service provider. 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-31 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 National reports were submitted in written form by Canada, China, Germany, India, Netherlands, New Zealand, Russian Federation, South Africa, Spain, Sweden, Switzerland and United Arab Emirates. These are attached in ***Annex XII***.

1.5 The list of participants and the agenda are reproduced as ***Annex I*** and ***Annex II*** of this report. Nineteen participants, including eight 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-30, Oban, United Kingdom, 1-2 October 2010).

2.2 Among the decisions made at JTA-30 was the approval of a number of modifications to the Operating Principles, drafted during the Third Meeting of the JTA Executive Committee (JTA EC-3). It was 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-31.

2.3 The JTA EC met immediately after JTA-30 to review the session and to decide on necessary actions to be made in relation to the decisions and agreements reached at JTA-30. The report of the Third Meeting of the JTA E (JTA EC-3) is given in ***Annex III***. At JTA EC-3 it was agreed that the EC should meet again in the first half of 2011.

2.4 As agreed at JTA EC-3, the Executive Committee met from 27 to 29 April 2011 in Miami, Florida, USA at the kind invitation of Mr Eric Locklear. At this Meeting, the EC reviewed the Action Items from JTA-30, the JTA Operating Principles, the use of JTA funds, the management of Argos ID numbers, the 5-Year Plan, the status of the WMO plan for an International Forum of Satellite Data Communication Users, the status of the Secretariat Support to the JTA and other JTA issues. The EC further agreed on action items for the EC and provided guidance to the Chairperson

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.

regarding issues to be reported at the 45th OPSCOM Meeting. The report of the Fourth Meeting of the JTA EC (JTA EC-4) is provided in ***Annex IV***.

2.5 As the result of the actions agreed at JTA EC-4, a message was sent in May 2011 to the ROCs, asking for confirmation of their role as ROC for their country. After a large but not yet complete set of responses, an updated list of ROCs is now available (see ***Annex XIII***).

2.6 A further action from JTA EC-4 was to write a letter to the WMO and IOC Secretariats requesting confirmation of their respective levels of support to the Argos JTA, in the light of the financial contributions made by the JTA, as agreed at JTA-30. Both organisations have responded to that letter and have committed to a set of supportive tasks on behalf of the JTA.

2.7 The Chairperson attended the 45th Meeting of the OPSCOM (Friedrichshafen, Germany, 30 May to 1 June 2011), hosted by EUMETSAT. The main results of JTA-30 relevant to OPSCOM interest were presented, including the status of the 5-Year Plan (2010-2014). The report as presented by the Chairperson is given in ***Annex V***.

2.8 Unfortunately the Chairman was not able this year to distribute a mid-term message to the JTA members to inform them about on-going JTA-related activities. A planned visit to CLS in Toulouse for preparing JTA-31, and reviewing the financial status of CLS and the expected results of the first year in the 5-Year Plan, was also postponed due to unexpected circumstances.

3. STATUS OF ACTIONS

3.1 Actions from previous Meetings, along with those arising at JTA-31, are listed and described in ***Annex VI***.

4. REVIEW OF THE 2011 GLOBAL AGREEMENT

4.1 CLS presented a report on activity within the 2011 Global Agreement. The full report, given in ***Annex VII***, is summarised below:

OVERALL USAGE TRENDS

4.2 Previous years' statistics show 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. JTA programmes consumed 63% of Argos capacity in 2010, and, overall, science represents 70% of the Argos system use. The growth in science is mainly attributed to increased usage by the wildlife community, representing 35% of total Argos system use in 2010. Physical oceanography and meteorology applications (28% of Argos system use in 2010) remain stable.

4.3 The number of active PTTs shows a regular increasing trend in the period August 2010 to July 2011, whereas the number of PTT-years remains 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. The main category contributing to this increase is, as in previous years, 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" is still the major player in terms of consumption despite a 16% decrease in PTT-years over the last year;
(ii) "Animals" consumption has increased by 7.6% during this time;
(iii) "Floats and Fixed Stations" consumption remains stable.

TIME SLOTS and 12 DAY CAPPING

4.4 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.

4.5 It was noted that all animal categories benefit significantly from time slots. As an average, these PTTs transmit for 40% of the day. In 2010 the benefits to the animal category from time-slot accounting was equivalent to 93 PTT-years.

4.6 Further to the JTA-27 decision that monthly charges for animal platforms be capped at 12 day-units (48 time slots), 690 PTTs took advantage of the capping in 2010, a saving of 173 PTT-years. The number of marine animals taking advantage of the capping is increasing every year: more than 400 in 2010 compared to 333 in 2009. For 2011, capping represents a projected impact of ~175 PTT-years.

INACTIVE STATUS

4.7 This category of use applies to platforms that continue to transmit even when the data are no longer useful to the project. The JTA recalled that, since 2004, transmissions from inactive IDs are no longer charged. The JTA noticed that in 2010 the number of IDs in inactive status was about 189, equivalent to 87 PTT-years, mainly in the animal and drifter platform category. The JTA recalled that these PTTs are making wasteful use of system capacity, and urged users and manufacturers to consider this issue when programming their PTTs.

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 2010-2011. 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 and EUMETSAT, continues to maintain and improve a high operational service for all Argos users, especially for the meteorology and ocean community.

5.2 The JTA noted that the Argos instruments are currently onboard five NOAA POES and one EUMETSAT spacecraft. In January 2011, real-time Argos data were transmitted from all the NOAA satellites, but only in selected geographical zones from METOP-A due to technical problems. This year EUMETSAT actually extended the activation of the METOP-A HRPT zone to cover much of the southern hemisphere. There were only three anomalies to notice (two for NOAA-19 and one for METOP-A) since September 2010, with very few impacts for users.

5.3 The JTA further noted that in addition to the three existing northern hemisphere (Svalbard, Fairbanks and Wallops) global antennas that acquire the globally recorded Argos telemetry transmitted by the satellites, a new antenna, McMurdo in Antarctica, acquiring one half-orbit of telemetry from METOP-A, has been operational since June 2011. While this antenna had improved data timeliness with METOP-A, the JTA noted with concern a recent downward trend in timeliness with NOAA-18 and -19 which could not readily be explained, and asked CLS and NESDIS to investigate.

5.4 The JTA noted with appreciation that the real-time Argos antenna network is still growing. 60 regional antennas were operational in July 2011 included 15 compatible antennas with METOP-A AHRPT telemetry. Ongoing improvements to the real-time antennas are focused on redundancy of locations and coverage extension. In January 2010, the Tromsø antenna was removed from the network (no impact on the network performance) and eight new real-time antennas have been added (Resolute Bay, Edmonton, Moscow, Gander, Muscat, Manas, Al Udeid and Halley).

5.5 Improving Argos data timeliness continues to be a high priority for CLS (55 stations have mean dataset availability < 25 minutes). After improving the situation in the Indian Ocean last year, CLS is now focusing on the South Atlantic with two new stations since January 2010 (Halley and McMurdo). As a result of the Argos real-time station upgrade project, two future new antennas will be provided by CLS and CNES (Ascension Island and Cape Town) and one existing station upgraded (Davis), all to be capable of acquiring data from NOAA, METOP and SARAL satellites.

5.6 Improvements in the performance of the existing antenna in Tahiti have contributed to some extent in improving the data timeliness in the southeast Pacific region. Additional scheduled upgrades to this antenna are expected to further improve timeliness. Finally, the effect of installing an antenna on Easter Island in the southeast Pacific has been examined and shows significant potential improvement in timeliness for this region. Installing an antenna on Easter Island is, however, not currently in the budget of the Argos Real-Time Antenna Upgrade Project.

5.7 The JTA noted that the two Argos global processing centres in Toulouse and Lanham have been operating without problem since January 2010 with a 99.5% average system availability. The disaster recovery architecture implementation located into CNES Toulouse was completed in 2010. As is normal every year, several software improvements were implemented in 2010 and 2011 in order to address user requirements. The main application improvements have addressed the implementation of the new Argos location processing method, access to the Argos data via the web service, and new functionalities and better performances for the Argos web site.

5.8 CLS has implemented a formal project aimed at determining the level and type of long-term Argos data archiving that is required to satisfy the needs of the Argos user community. Technical issues, including storage and retrieval approach and capabilities, archive length, user needs, etc, are now being analyzed.

5.9 Kalman filtering for location processing became available for Argos users on March 15, 2011. In less than four months, 70% of Argos PTTs (85% of oceanographic platforms) have switched to the new processing algorithm, thus benefiting from more locations and better accuracies.

5.10 The JTA noted with interest that the third generation Argos system, Argos-3, has been fully operational on the METOP-A satellite since early 2007. Two new satellites carrying Argos-3 instruments are expected to be launched in mid-2012: METOP-B (EUMETSAT) and SARAL (ISRO).

5.11 Mr Woodward concluded that CLS is providing GTS processing for all DBCP drifters and moored buoys in compliance with WMO and DBCP TT-DM recommendations. The CLS GTS processing system is monitored 24/7 in real-time in terms of operations, data quality and overall Argos system performance.

5.12 In thanking Mr Woodward for his presentation, the Meeting noted that the full report on 2010-2011 operations, on system improvements and progress in projects is reproduced as ***Annex VIII***.

ARGOS-3 PILOT PROJECT

5.13 In this context, the Meeting noted with approval that this DBCP-CLS Pilot Project was now complete, pending the delivery of the final report, with four manufacturers having been involved and 57 Argos-3 drifters deployed globally in order to test Argos-3 capabilities.

5.14 The JTA agreed that final Argos-3 pricing strategies should not be defined before a complete analysis of the DBCP-CLS Argos-3 pilot project and other exercises.

ID MANAGEMENT

5.15 At JTA-30, CLS was requested to create a project specifically dedicated to the recycling of 20-bit ID numbers. The JTA requested that the team, comprised of Anne-Marie Breonce (CLS), Seema Owen (CLSA) and Joe Linguanti (Canada), provide a first analysis and the results of this project at JTA-31.

5.16 CLS identified and contacted over 600 programme managers in an attempt to recover more than 7,000 unused 20-bit IDs, and a monthly record was kept of the number of 20-bit IDs returned. The project was very successful in recovering more than 3,000 20-bit IDs over a 12 month period, allowing the creation of more than 48,000 new 28-bit IDs.

5.17 The JTA thanked CLS for their efforts, which were essential to assure a supply of new IDs for future system expansion, and asked CLS to consider new approaches to unused ID recovery, including the distribution of a fact sheet to users along with SUA renewal and JTA Catalogue mailings, and by giving the issue higher prominence on the Argos website. It also urged ROCs to consult the national list of unused IDs on the website and to be proactive in contacting users with regard to ID recovery. The JTA also decided to continue charging the un-used ID fee for a further two years, to encourage users to recycle their IDs.

6 REVIEW OF USERS' REQUIREMENTS

6.1 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.

6.2 The Panel noted with approval the improvements in the antenna network, including the planned installation of new antennas at Cape Town and Ascension Island. The Panel appreciated the improvements in data timeliness as a result of the continued optimization of the Argos antenna and processing systems. While data timeliness had improved, the Panel nonetheless noted that there were still gaps where objectives were not being met, and it encouraged CLS to continue to work proactively to address those problem areas, particularly in the SE Pacific, where planned antenna upgrades would make little impact on data delays.

6.3 There was an ongoing need to work collaboratively on understanding the data timeliness issue, and the DBCP welcomed the initiative for CLS to work with JCOMMOPS to provide information from the CLS simulation model on the web site. The Panel noted with appreciation the CLS participation in the Argos 3 Pilot Project, and now that the project was complete, voiced its expectations that CLS would contribute to the final report.

6.4 The Panel also noted the offer from CLS to work with manufacturers to facilitate a transition to Argos-3, demand for which was expected to grow after planned launch of the next two satellites with Argos-3 capability.

6.5 The DBCP wished to explore opportunities for 'one stop shopping' for satellite data transmission systems, and welcomed the participation of CLS in studying this proposal. The Chairperson also noted that many operators have to manage fiscal pressures, and asked the JTA and CLS to pursue cost efficiency measures as a way of reducing costs.

7. THE TARIFF AGREEMENT AND THE 5-YEAR PLAN

2010 FINANCIAL SITUATION

7.1 Details of the finalized Argos operating costs for 2010 are given in ***Annex IX***, and are summarised below:

(i) For the calendar year 2010, total basic Argos operating costs were 12.44 M€ (up 1.3%) compared to a total Argos income of 13.99 M€ (up 0.4%);

(ii) Within these overall figures, the costs attributable to the JTA were 7.15 M€ (up 4.5%), compared to a JTA income of 7.91 M€ (up 4.1%);

(iii) The increase in JTA costs reflects the increase in JTA active PTTs as a proportion of total Argos active PTTs, this ratio being the basis for apportioning costs;

(iv) JTA income in 2010 increased despite an overall tariff reduction, due to a rapid increase in wildlife applications, unexpected stability in oceanographic applications (especially floats and large programmes), and the retention of the Unused ID fee;

(v) The JTA surplus for 2010 is 0.75 M€, which, when added to previous years' surpluses, results in a net positive balance of 2.41 M€;

(vi) As regards non-JTA activities, attributable costs fell to 5.29 M€ (down 2.8%) and income fell to 6.08 M€ (down 4.1%);

(vii) The non-JTA surplus was 0.79 M€, and the non-JTA accumulated loss fell to 4.49 M€.

2011 JTA PROJECTION

7.2 The JTA projection for the year 2011 is estimated from figures for seven months of usage, extrapolated until the end of the year, and is detailed in ***Annex IX***.

7.3 The projection takes account of the following observations:

(i) Wildlife consumption is currently above expectations by 14%, although the year-end increase is expected to be less than this owing to northern hemisphere seasonality effects;

(ii) Although the US large buoy programme showed an unexpected increase of 10% in 2010 due to additional deployments from inventory, a decrease of 20% is currently observed;

(iii) The number of fixed stations has decreased by 13%.

7.4 Under these circumstances, the impact of migration towards alternative communications solutions cannot yet be evaluated.

7.5 Overall, the JTA income from Argos basic costs is expected to be 7.17 M€, remaining positive by 0.10 M€ compared to the 5-Year Plan. The breakdown of expected income by platform type is shown in the table below:

	Total in M€
Buoys	0,85
Floats	0,48
Animals	3,94
Fixed stations	0,17
Large Program Buoys/Floats	1,73
Total	**7,17**

7.6 Additional income attributable to the JTA is expected to be 0.19 M€, in part due to the continuation of the Unused ID fee.

7.7 Non-JTA activity is expected to continue to show a gradual decline, meaning that the JTA share of Argos basic costs is expected to continue to rise.

7.8 Total projected income is expected to be 7.36 M€ (down 7.5%), compared to projected costs of 7.48 M€ (up 4.6%), resulting in a small negative year-end balance of -0.12 M€, and a net accumulated balance of 2.29 M€.

7.9 In conclusion, despite a significant risk, the expected financial situation for 2011 is considered safe, and the 5-Year Plan will be followed for 2012. Nevertheless risks will continue to be monitored very closely by CLS.

8. 2012 GLOBAL AGREEMENT

8.1 The Meeting adopted the Terms and Conditions for the 2012 Agreement as given in ***Annex X***.

8.2 The 2012 Agreement is materially identical to the 2011 Agreement, with the following trivial amendments:

(i) 2011 is replaced by 2012;

(ii) 365 is replaced by 366;

8.3 The essential elements of the tariff remain unchanged for 2012, 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. JTA OPERATING PRINCIPLES

9.1. The Meeting reviewed the JTA Operating Principles and approved them with modifications, as described in ***Annex XI***.

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

9.3 The Meeting agreed and acknowledged that, at a level not exceeding 0.5% of the Argos costs attributed to the JTA, the JTA will continue 1) budgetary support for the JTA Executive Committee, and 2) contribution to the WMO and IOC Secretariats. The Meeting also agreed to maintain the present arrangements for the funding of the independent JTA Chairperson through the DBCP Trust Fund at a level of USD 15k per annum.

10. NATIONAL REPORTS

10.1 For the first time, the JTA had been able to support the attendance of representatives of specific user groups, and welcomed Mr Gavin Reynolds from Botswana, who gave a presentation on his work in tracking cheetahs using Argos. The Meeting expressed its appreciation of this process and encouraged the EC to issue further invitations in subsequent years.

10.2 The Meeting then heard 13 national report presentations, and 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.

10.3 The Meeting particularly welcomed the participation of a number of new countries and ROCs at the session, and a large number of presentations on the unique capabilities of Argos for wildlife tracking applications. These stimulating presentations were felt to be central to the purpose of the JTA, and it was agreed that in future they should occupy an earlier place in the agenda, so that any issues arising from the user community could be properly considered and acted upon by the Meeting.

10.4 Nonetheless, despite the fact that 32 countries were now benefitting from the JTA, ROCs continued to be under-represented at the JTA session. The Meeting considered that further work was needed to improve both ROC participation and better representation of the range of user groups, especially animal trackers (see action 1 under item 3.1, and action 15 under item 3.3). In the same context, the JTA Chairperson encouraged the ROCs to submit national reports if they had not already done so. Available national reports are appended in ***Annex XII***.

11. PROPOSED FORUM OF SATELLITE TELECOMMUNICATION USERS

11.1 The Meeting discussed the recommendation from the WMO sixteenth congress (Geneva, Switzerland, 16 May – 3 June 2011) regarding establishment of an international forum of users of satellite data telecommunication systems together with the IOC and FAO:

> *Congress supported establishment of an international forum of users of satellite data telecommunication systems covering a wide user base, and to address remote data communication requirements - including tariff negotiations as needed - for automatic environment observing systems coordinated through WMO and partner organizations such as IOC and FAO. Congress requested the Secretariat to approach the partner organizations, and coordinate with the Argos Joint Tariff Agreement (JTA) with the view to establish such a forum during the next intersessional period. Congress emphasized that such a forum should not only consider tariff negotiations but should take a very broad view of available technologies, options and prices as well as cooperative mechanisms through the Data Collection Platform (DCP) services of meteorological satellites.*

11.2 The JTA, in discussing this item, was concerned to ensure that it was suitably represented in the planning process, and that its central purpose, enshrined in more than 30 years of successful activities, would not be negatively impacted, to the detriment of both the wider user community and CLS's future viability.

11.3 In this regard, the Meeting was to some extent reassured by the secretariat view that the proposed forum would be entirely focused on maximising user benefit from satellite communications, that it would by no means be solely directed towards financial issues, and that it would be likely to promote the Argos JTA as a proven model of the sought-for dialogue between the user community and the service providers.

11.4 The Meeting recommended that any tariff negotiations within the forum should be conducted system by system, and should be careful to respect any commercially sensitive information that might be requested or reported.

11.5 In further discussion, the Meeting heard further outline proposals from Mr D Meldrum, the JCOMM lead for developing the forum concept, that would seek to establish a small working group to sketch out the scope of the forum in advance of a wider consultation, and that such a group should draw heavily on the JTA methodology that had been evolved over more than 30 years. The Meeting listened to a suggestion that such a working group should be convened back-to-back with EC-6, with the view of enlisting JTA wisdom to the fullest extent, and asked its EC to work with Mr Meldrum to see if this proposal might be feasible without imperilling its own activities.

11.6 In closing this item, the Meeting invited the DBCP Chair to participate in the working group or to nominate a representative. The Meeting also welcomed the offer of Mr Scott Rogerson of NOAA-NESDIS, not an EC member, to be involved with this process as an informed observer.

12. ELECTIONS

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. The Meeting re-elected Mr Frank Grooters as its independent Chairperson, to hold office until the end of JTA-33.

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. The Meeting re-elected Mr Eric Locklear as its unpaid Vice-Chairperson, to hold office until the end of JTA-33.

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. Noting that Mr Joe Linguanti (Canada) and Mr Johan Stander (South Africa) had been elected at JTA-30, and that they would be required to stand down, the Meeting nonetheless re-elected them for a further two-year term.

12.4 The Meeting noted that the composition of the JTA EC was now comprised of:

Chair, Frank Grooters until JTA-33, not available for re-election to this post
Vice-chair, Eric Locklear until JTA-33, not available for re-election to this post
Member, Joe Linguanti until JTA-33, not available for re-election to this post
Member, Johan Stander until JTA-33, not available for re-election to this post
Member, Birgit Klein until JTA-32, available for re-election to this post
Member, IOC secretariat, *ex officio*
Member, WMO secretariat, *ex officio*
Member, CLS representative, *ex officio*

13. DATES AND VENUE FOR THE NEXT MEETING

13.1 In line with the agreement of the preceding 27th session of the Data Buoy Cooperation Panel, it was agreed to hold the 32nd Meeting of the JTA in Perth, Australia to be hosted by the Bureau of Meteorology (BOM). Tentative dates for the Meeting were provisionally noted as 1 to 3 October 2012. However the EC noted an action from the Meeting to consider how the proposed dates and venue might impact upon its desired representation at the session, and to debate this issue at EC-6 with a view to arriving at a consensus opinion as to where JTA-32 might be held.

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 applauded new participants for their willingness to contribute, for the invigoration that they had brought to the proceedings, and for their enthusiasm for the possibilities afforded by Argos, and the usefulness to them of the JTA in achieving these possibilities. He also thanked CLS for their continued openness in interacting as fully as possible with the JTA community, and for continuing to embrace the cost-recovery model which had become a unique cornerstone of JTA principles.

14.2 Mr Grooters also asked the Meeting to note and thank the important contributions of the WMO and IOC secretariats in ensuring the success of the Meeting, and for the excellent facilities that had been put at its disposal by WMO.

14.3 The Meeting closed at 1100 on 5 October 2011.

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ANNEX I

LIST OF PARTICIPANTS

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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-30

4. REPORT ON THE 2011 GLOBAL AGREEMENT

5. REPORT ON THE DEVELOPMENT AND OPERATIONS OF CLS

6. REVIEW OF USER'S REQUIREMENTS

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 2012 GLOBAL AGREEMENT

9. REVIEW OF THE OPERATING PRINCIPLES

10. FUTURE PLANS AND PROGRAMMES

11. ROUNDTABLE

12. ELECTION OF THE CHAIRPERSON AND VICE-CHAIRPERSON

13. DATE AND PLACE OF THE NEXT MEETING

14. CLOSURE OF THE MEETING

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ANNEX III

REPORT OF THE 3RD MEETING OF THE JTA EXECUTIVE COMMITTEE (JTA EC-3)
(Oban, Scotland, 2 October 2010)

Participants

- Frank Grooters (NL, Chairperson)
- Eric Locklear (USA, vice-Chairperson)
- Birgit Klein (Germany, member)
- Johan Stander (South Africa, member)
- Joe Linguanti (Canada, member)

Ex-officio

- Boram Lee (IOC)
- Etienne Charpentier (WMO)

Observers

- Fabienne Jacq (CLS/Service Argos)
- Anne-Marie Breonce (CLS/Service Argos)
- Seema Owen (CLS America)
- Bill Woodward (CLS America)

Agenda

1. Review of results of JTA-30
2. Items to be discussed at JTA EC-4
3. Date and place JTA EC-4

Outcomes

1. The report on the 2009 Global Agreement shows a small increase (PTT-years) but some applications (buoys, floats) remain stable. Accordingly the daily fees for buoys & others, floats and animals were decreased following the projections in the 5YP.
2. The Argos real-time stations upgrade, once completed, will resolve a large part of the time delay problems in the South Atlantic and the South Pacific.
   The CLS proposal for setting up a project team for the establishment of a management scheme (e.g. return) for the unused IDs (mainly for the 20-bit IDs) was accepted.
3. The Meeting adopted a positive statement (for the next CBS-Ext) regarding the proposed "enlargement of the JTA".
4. Thanks to the effective and efficient work of the EC, the discussions and decisions taken during JTA-30 could be held within the limits of the available time period set for the meeting.
5. Items to be discussed at the fourth meeting JTA EC will be (in random order):
   - First report of the Project Team on Unused IDs + ToR of the Project Team (Joe)
   - Guiding Principles for Negotiating the Tariff (draft Eric)
   - Enlargement of the JTA (CBS recommendations)
   - Review of the Operating Principles
   - Analyse lists of ROCs
   - How to select and encourage ROCs for financial support
   - Try to get more countries to attend the JTA meeting (draft letter Joe, possibly based on AMDAR letter)
   - Review Action Items JTA-30
   - Developments and Operations CLS and Review 5YP
   - Duration of JTA meetings
   - Policy for writing the JTA Final Report
6. JTA EC-4 will be held in the USA (kind invitation by Eric), duration 3 days, in the first week of May 2011 (probably 3-5 May if no clash with other international meetings), venue TBD.

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REPORT OF THE 4TH MEETING OF THE JTA EXECUTIVE COMMITTEE (JTA EC-4)
(Miami, USA, 27-29 April 2011)

Venue	Atlantic Oceanographic and Meteorological Laboratory (AOML), Miami (Florida, USA)
Time & Duration	27-29 April 2011
Purpose	Review JTA-30 and Action Items; review JTA Operating Principles; review status 5-Year Plan; prepare JTA-31

1. Attendees:

Name & Surname	Designation/Responsibility
Frank Grooters	JTA Chairperson
Eric Locklear	JTA Vice-Chairperson
Joe Linguanti	JTA EC member
Johan Stander	JTA EC member
Anne-Marie Bréonce	CLS/Service Argos Toulouse
Seema Owen	CLS America
Bill Woodward	CLS America

2. Apologies

Name & Surname	Designation/Responsibility
Birgit Klein	JTA EC member
Fabienne Jacq	CLS/Service Argos Toulouse
Etienne Charpentier	WMO Secretariat
Boram Lee	UNESCO/IOC Secretariat

3. Discussion Record

<table>
<tr><th>Topic #</th><th>Topic/Point of Discussion</th><th>Details of Discussion</th><th>Action/Responsibility (incl. due date)</th></tr>
<tr><td>1.</td><td>Organization of the Meeting</td><td>Mr Frank Grooters opened the meeting with thanks to the participants and organizers for their interest in participating, the facilities and accommodations.

Mr Grooters added an item to the agenda requested by JCOMMOPS between items 6 and 7 for a suggestion on general funding support of JCOMMOPS operations.

Mr Grooters has notes from JCOMMOPS to be distributed for the new agenda item

A question arose regarding IOC support, who will replace the outgoing IOC Secretariat, Ms. Boram Lee? Will there be any support at all to the JTA? Should we continue to pay a stipend to IOC and WMO when we're not getting similar support provided other committees?

The JTA-EC noted that it appears that there has been a large improvement in the working arrangements since the establishment of these working principles.</td><td>
<table>
<tr><th></th><th>Action</th><th>Who</th><th>Deadline</th></tr>
<tr><td>1</td><td>Engage with IOC and WMO at the upcoming Congress about what they see their role is in supporting the JTA</td><td>Frank Grooters</td><td>WMO Congress May, 2011</td></tr>
<tr><td>2</td><td>JTA Chairman to send a letter to IOC and WMO asking for clarification of their role in supporting JTA-EC</td><td>Frank Grooters / Bill Woodward</td><td>JTA-31</td></tr>
<tr><td>3</td><td>Clarify where the CLS contribution for the JTA support ended up at IOC and WMO, how much was given, where did it go, what was it used for.</td><td>Frank Grooters</td><td>JTA-31</td></tr>
</table>
</td></tr>
<tr><td>2.</td><td>Status of Action Items from JTA-30</td><td>Actions items from tables 2.1, 2.2 and 3.0 were reviewed and updated with the following changes:

1. Table 2.1: Item 1 removed and put into an "ongoing list of action items"
2. Table 2.1: Item 5 removed and put into an "ongoing list of action items"
3. Table 2.1: Item 6 Status changed to "Closed"</td><td>
<table>
<tr><th></th><th>Action</th><th>Who</th><th>Deadline</th></tr>
<tr><td>4</td><td>Recommend at JTA-31 to organize tables.</td><td>Frank Grooters</td><td>JTA-31</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Topic #</th><th>Topic/Point of Discussion</th><th>Details of Discussion</th><th>Action/Responsibility (incl. due date)</th></tr>
<tr><td></td><td></td><td>4. Table 2.1: Item 8 changed from Ken Jarrott to Eric Locklear
5. Table 2.2: Item JTA-28 2.2 No. 3, Change Status to “Done”
6. Table 3.0: Item 5 status changed to “Closed”
7. Table 3.0: Item 6 status changed to “Closed”
8. Table 3.0: Item 8 status changed to “Closed”</td><td></td></tr>
<tr><td>3.</td><td>Review of JTA Operating Principles</td><td>The JTA Operating Principles were reviewed. The adjacent table lists the proposed changes to be presented at JTA-31.</td><td>
<table>
<tr><th></th><th>Action</th><th>Who</th><th>Deadline</th></tr>
<tr><td>5</td><td>Section 3.6 – Clarify the 1st paragraph to assure it is Argos…”in particular in terms of Argos satellite…”</td><td>Frank Grooters</td><td>JTA-31</td></tr>
<tr><td>6</td><td>Modify 1st bullet in accordance with Frank’s write-up which includes support for the JTA-EC meetings as well as the JTA.</td><td>Frank Grooters</td><td>JTA-31</td></tr>
<tr><td>7</td><td>Section 6.1 – Change to include deliberative and report producing sessions over THREE days and not two days.</td><td>Frank Grooters</td><td>May 2011</td></tr>
<tr><td>8</td><td>Section 6.3 – Chairman has issue with the way in which the invitations are conducted by WMO, which only sends communication to the PRs. Only informal invitations are sent to the JTA. Need further review before any official action.</td><td>Frank Grooters</td><td>June 2011</td></tr>
</table>
</td></tr>
</table>

Topic #	Topic/Point of Discussion	Details of Discussion	Action/Responsibility (incl. due date)			
			9	Section 6.4 – Review this section to see how the writing of the Final report can now become the responsibility of the Secretariats.	Frank Grooters	Sept 2011
			10	ANNEX A: Enabling Actions to Support the ROCs Role: Replacement text as follows for 5th Bullet: CLS/Argos provides a dedicated Argosweb access account to each ROC for accessing Unused IDs and programme activity reports of his country.	CLS	JTA-31
			11	ANNEX C: Section #1: Only to be used when a nomination goes through a PR of the WMO and IOC. Proposal to eliminate bullet #3 and add a new #2 covering the situation where a ROC does not come from a member country.	Frank Grooters	JTA-31
			12	ANNEX C: Section #5: Put in brackets around [s] in groups.	Frank Grooters	JTA-31
			13	ANNEX C: Section #10: Change text to: “monitors the usage of the Argos system by its users using statistical information made available by CLS on the Argos Web”.	Frank Grooters	JTA-31
			14	ANNEX D: Section #10:	Frank	JTA-31

<table>
<tr><th>Topic #</th><th>Topic/Point of Discussion</th><th>Details of Discussion</th><th>Action/Responsibility (incl. due date)</th></tr>
<tr><td></td><td></td><td></td><td>
<table>
<tr><td></td><td>Change text to be identical to ANNEX C.</td><td>Grooters</td><td></td></tr>
<tr><td>15</td><td>ANNEX G: Bullet #1: Proposed text to read ”The Chairperson shall deputize the vice-Chairperson for all the duties in the tor of the chairperson except # 7 as required”.</td><td>Frank Grooters</td><td>JTA-31</td></tr>
<tr><td>24</td><td>ANNEX H: Proposed Membership to include the Argos Service provider as a permanent member of the committee.</td><td>Frank Grooters</td><td>JTA-31</td></tr>
<tr><td>25</td><td>ANNEX H: Proposal to make IOC and WMO “ex-officio”</td><td>Frank Grooters</td><td>JTA-31</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>4.</td><td>Issues from JTA EC-4</td><td>
<table>
<tr><th>Action</th><th>Who</th><th>Dead-line</th></tr>
<tr><td>Item 4.1: Include the ToR for the unused ID project</td><td></td><td></td></tr>
<tr><td>Item 4.2: Eric to write-up a statement that concludes this action item</td><td>Eric Locklear</td><td></td></tr>
<tr><td>Item 4.3: Johan will develop a logo for use by the JTA. After receiving various logos from CLS and Frank</td><td>Johan Stander</td><td>JTA-31</td></tr>
<tr><td>Item 4.4: Frank mentioned working with the new DBCP technical coordinator in preparing JTA document for publication under the JCOMM</td><td>Frank Grooters</td><td>JTA-31</td></tr>
</table>
</td><td></td></tr>
</table>

<table>
<tr><th>Topic #</th><th>Topic/Point of Discussion</th><th>Details of Discussion</th><th>Action/Responsibility (incl. due date)</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><td>database. ACTION: Frank will report to the next JTA meeting.</td><td></td><td></td></tr>
<tr><td>Item 4.4: Frank to contact the combined list of ROCs to validate their current ROC status. Frank to send Johan all the ROC contacts for RA1 and the letter sent to the ROCs.</td><td>Frank Grooters</td><td>June</td></tr>
<tr><td>Item 4.4: Mr Johan Stander will contact the Botswana ROC and assist her in making this request.</td><td>Johan Stander</td><td>June</td></tr>
<tr><td>Item 4.5: Eric to draft talking points for JTA-EC to review, and contact Fred Bransky</td><td>Eric Locklear</td><td>JTA-31</td></tr>
<tr><td>Item 4.6: Establish a survey baseline for the survey for customer responsiveness by proposing a survey for distribution to the users regarding the value of Argos. Johan to provide an electronic customer feedback form to be used.</td><td>Joe/Eric/ Johan</td><td>Johan May</td></tr>
<tr><td>Provision of amended agenda to WMO/IOC for JTA-31</td><td>Frank Grooters</td><td>June</td></tr>
</table>

Section 4.3: Johan discussed using the draft Meeting Agenda for use for the JTA-EC meetings and adopting an ISO-9001 type of documentation for JTA.

Section 4.4.1: The ROC is contributing to JTA, or operating a marine or buoy programme. Getting travel support for ROC’s is limited to current ROCs
</td><td></td></tr>
</table>

Topic #	Topic/Point of Discussion	Details of Discussion	Action/Responsibility (incl. due date)
		participating in the JTA, and because there are limited funds, then this opportunity is not to be broadly announced and limited to ROCs who are active, participating, and the ROC has to ask for funds. Any exception to these criteria is subject to the Chairman's approval. After the reception of a request, more details will be required before approval is granted. Section 4.5: No new information. JTA-EC will assist where possible. Section 4.7.1: Antennas: The CLS Real-Time Antenna Optimization Project is now in its implementation phase. An update of the project was presented at the meeting which focused on the modifications to the original plan that have been made in the South Atlantic region. In particular, it has been determined that the high mountains on the north side of Gough Island make that Island an unsatisfactory location for installing an antenna. An alternate location further to the north, Ascension Island, was chosen as the preferred location for the antenna. Simulations have demonstrated that there will be little or no reduction in the real-time performance in that region due to this change. Additionally, CLS has decided that a new, upgraded antenna, that will receive Argos data from NOAA, SARAL and METOP satellites, will be installed at Cape Town. The target for these installations is December 2011. Section 4.7.2: Argos-3 Pilot Project: Phase 2 of the Argos-3 Pilot Project is underway. Twenty-three buoys	

Topic #	Topic/Point of Discussion	Details of Discussion	Action/Responsibility (incl. due date)
		equipped with an Argos PMT have been deployed in the Tasman Sea, the South Atlantic and the Eastern Mediterranean Sea with excellent support from our colleagues in those regions. The buoys were manufactured by Marlin-Yug, Clearwater and Pacific Gyre. At the date of the JTA-EC4 meeting, 6 of these buoys had failed and the remaining buoys are operating well with the data from them being posted onto the GTS. Analysis is ongoing by the Pilot Project Team and a full report will be provided in September at the DBCP & JTA meetings in Geneva. Section 4.7.3: Inactive Status: CLS reported that while this isn't a big problem on the system, there is something to be considered when reviewing the data. (See also Attachment A). Section 4.8: Status 5-Year Plan: The 5-Year Plan for 2010-2014 was updated and presented on the basis of the actual 2010 activity. The financial status will be finalized and reported at OPSCOM 45 in June 2011. The number of active PTTs in 2010 shows a very good level of increase (5.7%), resulting in a 6.9% increase in PTT-year consumption which is even better than forecasted at JTA-30. This increase is mainly in the Wildlife category. The trends for 2011 are very similar, with stable activity of the ocean applications, and a continuing increase in wildlife applications. User Presentations: Presentation by Chris Basso from NOAA Fisheries Improved service would include improved location quality, greater data transmission, consistent latitudinal coverage and accuracy	

Topic #	Topic/Point of Discussion	Details of Discussion	Action/Responsibility (incl. due date)
		CLS to offer Chris a service (TBD) as a demo and paid by the US ROC. Presentation by Rick Lumpkin Losing the current 1,250 drifter configuration would be devastating to the time-records More precise location measurements are the desired Argos capability.	
5.	Preparation for JTA-31	Document 1 (Provisional Agenda): Fine Document 2: Suggest the annotated agenda combine agenda item #10 into #6 and rename #6 "Review of User's Requirements, Future Plans, and Programmes" with strong encouragement to prepare and present a national report. Take out the second paragraph and replace it with Frank's write-up. Section 1.4: May change based upon the discussions the JTA Chairman has with the Secretariats at the WMO Congress Documentation Plan: The plan needs to be renumbered, and redone based on the merger of item #6 and #10.	Secretariat
6.	OpsCom-45	Frank to circulate a draft report of the Chairman's Report to OPSCOM for Review.	Frank
	Funding and Support JCOMMOPS	After much discussion, the JTA-EC concluded that no funds are to be made available to the JCOMMOPS because their costs should be paid by the member nations and any accrued JTA surpluses are to be distributed back to the users or into system improvements (antennae installations)	Frank

Topic #	Topic/Point of Discussion	Details of Discussion	Action/Responsibility (incl. due date)
7.	Next EC Meeting	To be discussed and concluded in Geneva during the JTA-31	

4. NEXT MEETING

5. CONFIRMATION OF MINUTES

I hereby declare that the contents of this document is a true reflection of the participants' attendance, details of the meeting, discussions undertaken, supporting decisions taken, and responsibilities assigned.		
	Name & Surname	
	Designation/Responsibility	
	Signature	
	Date	

Record Reference assigned:	

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APPENDIX 2
(Attachment A to the Report of JTA EC-4)

Inactive Status

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

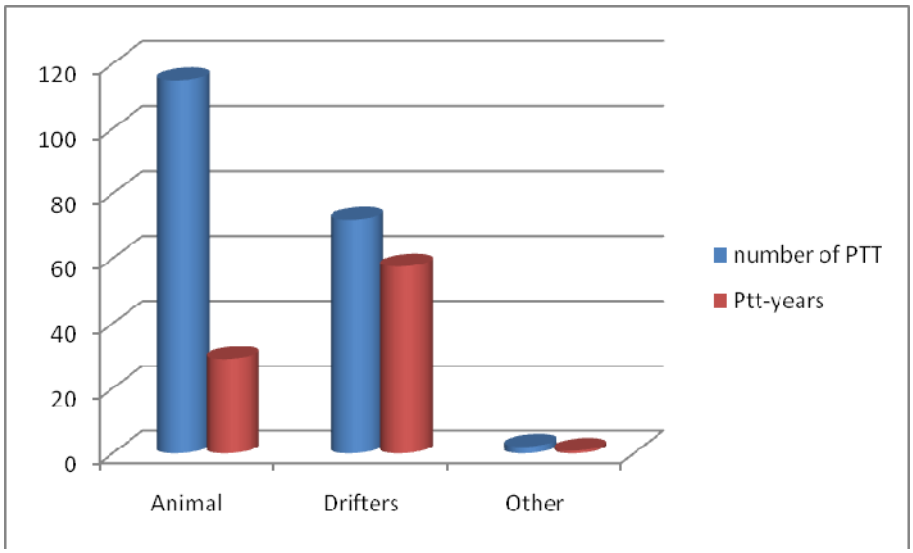

Figure 1: Inactive PTTs in term of number of IDs and PTT-years for 2010

It can be noticed that in 2010 the number of IDs in Inactive status varies around **189** representing **87.37 PTT-years**. Mainly "Animals & Drifters" platforms benefit from this service, continuing to transmit when the data is no longer useful to the project.

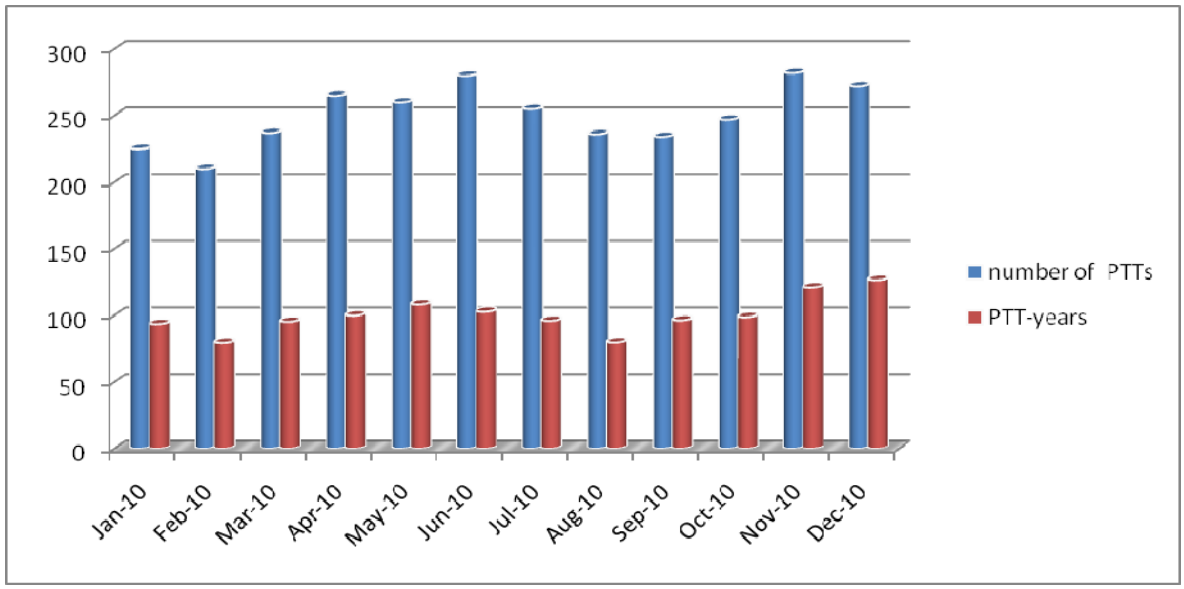

Figure 2: Inactive PTT evolution in term of number of IDs and PTT-years

As already mentioned in previous JTA reports, these PTTs are increasing the system occupancy. CLS insists again on the recommendation to users and manufacturers to take this into account by programming their PTTs for the duration of the experiment.

Agenda for the 4th Meeting of the JTA Executive Committee

:

TITLE OF MEETING	4th Meeting of the JTA Executive Committee	
PURPOSE	Review JTA-30 and JTA EC-3; Preparation JTA-31	
DATE	27-29 April 2011	
TIME / DURATION		
VENUE	NOAA/AOML, Miami (FL)	
CHAIRPERSON / FACILITATOR	Frank Grooters/Eric Locklear	
MINUTES		
MEMBERS		Frank Grooters Eric Locklear Joe Linguanti Johan Stander Birgit Klein Fabienne Jacq
INVITED PERSON/S		Boram Lee Etienne Charpentier Bill Woodward Seema Owen

Meeting Agenda

Item No	Item	Brought by
1	Organization of the Meeting 1.1 Opening 1.2 Adoption of the Agenda 1.3 Working arrangements 1.4 Announcements	Chair/Facilitator
2	Status of Action Items from JTA-30) (see Final Report JTA-30, Items 2 and 3)	Chair
3	Review of the JTA Operating Principles (see Final Report JTA-30, Annex VIII)	Chair
4	Issues from the Third Meeting of the JTA EC 4.1 ToR and First Report of the Project Team on Unused IDs (Joe) 4.2 Guiding Principles for Negotiating the Tariff (Eric) 4.3 Proposed Agenda and Minutes Template (Johan) 4.3.1 Logo 4.4 Analysis List of ROCs (Frank) 4.4.1 How to select and encourage ROCs for financial support 4.5 Enlargement of User Support (CBS Recommendation) (WMO) 4.6 Expected Requirements from User Community (AOML presentation?) 4.7 Other JTA-issues (Bill) 4.7.1 Real Time Antennas 4.7.2 Argos-3 Pilot Project (update) 4.7.3 Inactive Status 4.7.4 …. 4.8 Five-Year Plan (update) (Fabienne/Ann Marie)	Joe Eric Johan Frank WMO AOML? Bill CLS

5	Preparation JTA-31 5.1 Draft Agenda 5.2 Documentation Plan 5.3 Support WMO/IOC 5.4 Policy of writing the JTA Final Report 5.4.1 Format Minutes of the Meeting 5.5 Duration of the Meeting	Chair
6	45th OPSCOM Meeting, 30 May-1 June 2011, Friedrichshafen, Germany	Chair
7	Next Meeting of the JTA EC	
8	Any Other Business	All
9	Closure of the Meeting	Chair
10		
11		
12		

Supporting documents:

- Final Report/Record of Decisions JTA-30
- Minutes of the Third Meeting of the JTA Executive Committee
- Provisional Agenda (JTA-31, Doc. 1)
- Annotated Provisional Agenda (JTA-31, Doc. 2)
- Documentation Plan (JTA-31, INF. 2)

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ANNEX V

REPORT ON THE 30TH JTA MEETING AT THE 45TH OPSCOM MEETING

Mr Frank Grooters presented the report on the 30th JTA meeting:

- The 30th meeting on the Argos JTA was hosted by the Scottish Marine Institute of the Scottish Association for Marine Science (SAMS) in Oban, Scotland (UK), from 1 to 2 October 2010. Twelve ROCs and representatives of User Groups were present at the meeting, together with the DBCP Chairman, CLS/Service Argos and CLS/America. The meeting was organized and served by the Joint Secretariat for JCOMM (IOC and WMO Secretariats).

- The meeting discussed and reviewed in an appropriate way, several JTA issues, in particular:

  - User's Requirements,
  - Tariff Agreement and related matters,
  - 5-Year financial Plan, and
  - The WMO Plan on an International Forum for Satellite Data Communication Users.

- Under the User's Requirements the JTA discussed a report by the DBCP Chairperson regarding DBCP requirements and recommendations to CLS regarding the improvements in timeliness and the upgrades proposed for the satellite antenna network.

  - Further improvement in data timeliness would be suggested by installing a third new station over the southern parts of the Indian Ocean.
  - DBCP will continue further support to the Pilot Project on Argos-3 while requesting the ongoing participation and contribution from CLS and the JTA.
  - It was recognized that the new Kalman filter process was a proposal to improve data and service, but some concerns were expressed and CLS was requested to work collaboratively with representatives of the Panel.
  - The new monitoring tools that are now routinely provided by CLS, including regarding data timeliness in specific WMO areas, were noted with appreciation.

- CLS has agreed to the related actions and the JTA agreed on the according actions for the intersessional period.

- Under the Tariff Agreement the Argos operating costs were presented. The introduction of the Time Slots and, in particular the 12-day capping seemed to be one of the main reasons for the increase of the use of the Argos System by animal trackers. It was agreed to continue the current scheme without modification.

- In 2009 more than 630 PTTs (related to 95.21 PTT-years) took advantage of the 12-day unit capping for animal platforms, with an impact estimated at 142 PTT-years.

- Since 2004 transmissions from inactive IDs are no longer charged (decision at JTA-27). The number of ID's in Inactive Status is in the order of 250 platforms (projected consumption for 2009 of about 100 PTT-years). Because these PTTs are increasing the system occupancy, the meeting again urged users and manufactures to programme their PTTs in accordance with the duration of the experiments.

- The 5-Year financial Plan for 2010-2014 was reviewed and discussed in depth. It was noted that, due to the implementation of Argos-3 upgrades at the technical level and to the promotion of new services, the 2009 cost attributed to JTA had increased by 5.2%. Encouraging however was the significant increase of 11.7% in active PTTs under the JTA, resulting in a 4% increase in PTT-years for 2009. The resulting positive 2009 balance of 1.66 M€ was carried forward to year 2010 in the 5-Year Plan.

- The Meeting reviewed the projection for 2010 in the 5-Year Plan, calculated on the basis of a 7-months consumption and noted a number of opportunities and risks. The final outcome was however expected to remain positive compared to the 5-Year Plan, with a projected annual balance of 460 k€. Considering the healthy position of the financial situation for 2010, the Meeting decided to pursue with the 5-Year Plan as planned for 2011, resulting in a 9.1% reduction in Daily Fee for the categories Buoys and Others, Floats and Animals.

On the International Forum of Users of Satellite Data Communication:

- The Implementation and Coordination Team on the Integrated Observing System (ICT/IOS) of the WMO Commission for Basic Systems has made the following recommendation to DBCP-26:

  WMO Secretariat to approach partner organizations such as IOC and FAO, in the view to expand the scope of the Argos Joint Tariff Agreement (JTA); to address remote data communication requirements system deficiencies, negotiate tariffs and potential improvements for automatic environment observing systems (coordinated through WMO and those partner organization) with all relevant operators of satellite data telecommunications systems.

- JTA-30 discussed this topic in the light of benefits and threats to the current relation and agreements between CLS as the service provider and JTA as the Argos user representation. No conclusion no position was taken because this proposal still had to go for adoption to the CBS. The Meeting however thanked CBS for recognizing the benefits provided to the ocean observing community over the past 30 years, and welcomed the opportunity to assist CBS in designing an appropriate framework for extending these benefits to other user groups.

- The Commission for Basic Systems at its extraordinary session (CBS-Ext. (2010)) endorsed the following statement:

  CBS recognized that it would be beneficial having a strong user base covering multiple applications to address system deficiencies, negotiate tariff and potential improvements of the rendered services with all relevant operators of satellite data telecommunication systems. It requested the Secretariat to approach partner organizations such as IOC and FAO, and coordinate with the Argos Joint Tariff Agreement (JTA) with the view to establish such a forum to address remote data communication requirements - including tariff negotiations as needed - for automatic environment observing systems coordinated through WMO and those partner organizations.

  CBS referred this subject for final discussion and decision to the WMO Congress.

- The results of the discussion in CBS and the expected way forward (provided by WMO) was further discussed in the 4th Meeting of the JTA Executive Committee.

- The Executive Committee expressed its concern regarding the recommendation made by WMO on the establishment of an International Forum of satellite data telecommunication systems. Obviously the success of the JTA has been regarded as an efficient and practical example for other users of satellite communication systems, but the JTA was specifically set up for the Argos system, which differs substantially from other satellite service providers like Inmarsat and Iridium. JTA should be very careful not losing its specific role and identity once such a forum becomes operational. JTA is to follow closely (and be part of) the developments pursued by WMO after the decisions made by Cg-XVI.

- CLS, as the agent of the Argos Executive Committee, has followed the JTA discussions .and CLS supported the JTA concern about the risk on JTA identity, the JTA goals and the system of cost-recovery.

- At 16th Congress (16th May – 3rd June 2011) the following text on this issue was proposed (and adopted) for inclusion in the General Summary of Cg-XVI:

  Congress supported establishment of an international forum of users of satellite data telecommunication systems covering a wide user base, and to address remote data communication requirements - including tariff negotiations as needed - for automatic environment observing systems coordinated through WMO and partner organizations such as IOC and FAO. Congress requested the Secretariat to approach the partner organizations, and coordinate with the Argos Joint Tariff Agreement (JTA) with the view to establish such a forum during the next intersessional period.

- The results of the decisions made at the WMO on this topic will further be discussed at JTA-31.

- The Meeting reelected Mr Frank Grooters as the Chairperson and Mr Eric Locklear as its Vice-Chairperson.

On the JTA Executive Committee:

- The JTA Executive Committee, established at JTA-29 in 2009, has proven to be a very effective and efficient tool during the intersessional period.

- The JTA-EC held his 3rd meeting on 2nd October to review the results of JTA-30 and to decide on the issues to be discussed at the (mid-term) 4th meeting of the JTA EC.

- At the kind invitation of NOAA, the 4th Meeting of the JTA EC was held at the Atlantic Oceanographic and Meteorological Laboratory (AOML) in Miami (FL), 27-29 April 2011. The EC reviewed the Action Items from JTA-30, the JTA Operating Principles and the status of the Five Year Plan. Proposed solutions for the management of Argos IDs were presented and the proposed upgrade of the Argos regional antenna network, in relation with specific user requirements, was discussed.

- The EC further amended the agenda for JTA-31 allowing more for the user segment of the meeting and decided to request WMO and IOC formally to confirm their supporting role to the JTA.

- The EC noted with appreciation the work done by CLS to improve the data timeliness and looked forward to the realization of the proposed upgrade of the network of ground stations which would significantly improve the data timeliness in certain sensitive regions.

- The EC also re-emphasized the critical importance of the data timeliness issue (being one of the most relevant user requirements) particularly with respect to the real-time coverage in the South Atlantic.

- With this in mind CLS indicated that a new station will be installed at Ascension Islands instead of Gough due to the mountain ranges to the North of Gough Island. Studies indicated that time delay will improve significantly if the station is rather installed at Ascension and Cape Town instead of Gough island where only data to the south will be captured.

- The EC reiterated the importance of the Argos-3 Pilot Project and supported the continuation of the evaluation since Argos-3 is 100% operational on METOP-A.

Conclusion 1:

The OPSCOM recommends that the Argos JTA remains as an independent body that may contribute to the Forum. The OPSCOM encourages the JTA to follow closely the evolution regarding the Forum in WMO.

Conclusion 2:

The OPSCOM endorses the report of the JTA chairman.

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ANNEX VI – LIST OF ACTIONS

1. Status of actions from the previous meeting

No (JTA-30).	Ref. (JTA-30)	Action item	By whom	Deadline	Status
1	3.1.2	Design a strategy for improving ROC participation, particularly comprising animal trackers and other type of users	JTA-EC	JTA-EC-3 in May 2011	Ongoing Discussed at JTA EC-4 (April 2011) and to be presented at JTA-31 Has been effective for JTA-31
2	3.1.3	ROCs to provide national reports	ROCs	JTA-31	Ongoing
3	3.3.1, 3.3.2	To investigate the possibility of installing a third new station over the southern part of the Indian Ocean	CLS	DBCP-27	Part of the CLS Real-time Antenna Optimization Project. CLS to report at JTA-31
6	3.3.1, 3.3.2	To provide the data to JCOMMOPS relating to the new monitoring tools	CLS	ASAP	Provided by CLS. Closed (now solved that DBCP has new Technical Coordinator)
7	3.4.2	Project Team to produce the results of a review of the 20-bit unused ID numbers and submit to the JTA-EC	AM Breonce,S Owen, J Linguanti	March 2011	Through increased effort CLS reported a larger return of 20-bit IDs than projected. CLS to report at JTA-31. Ongoing.
8	4.3	CLS to provide a scanned, signed copy of the Terms and Conditions for 2011 Global Agreement	CLS	December 2010	Done
9	5.2	Develop guiding principles regarding the tariff structure for negotiating the tariff	E Locklear lead / JTA-EC	March 2011	Small adjustments to the current principles were discussed at EC-4 and will be presented at JTA-31 Resolved by JTA-EC (Miami, 2011) and included in new Terms and Conditions Completed
10	5.4	Continue budgetary support for 1) JTA Executive Committee, 2) WMO and IOC Secretary, and 3) Independent JTA Chairperson.	JTA-EC	JTA-31	Ongoing

2. Pending and ongoing actions from previous meetings

No.	Ref.	Action item	By whom	Deadline	Status
11	JTA-30 3.3.1, 3.3.2 No. 4	To support the Argos-3 PP Steering Team for its independent evaluation of the Argos-3 technology	CLS	Continuous	Closed DBCP-CLS/Argos-3 Pilot closed and report to be published
12	JTA-30 3.3.1, 3.3.2 No. 5	To work with DBCP representatives and respond to requirements from the evaluation of the new Argos location scheme	CLS	Ongoing	Ongoing DBCP/GDP satisfied with current location scheme Argo also switched to Kalman filter
13	JTA-29 2.1 No.3	To pursue negotiations for the installation of new antennas to cover the South Atlantic and the Indian Ocean regions	CLS / SAWS	ASAP	Ongoing (see CLS report) Progress with regard to SA antenna (location identified and negotiations nearly completed – operational S Africa early 2012, Ascension Is. Oper. End 2012)
14	JTA-29 2.1 No.5	To ensure data from NOAA-15, 16, 17, and 18 are being received by IRD and Météo France stations in La Réunion Island	IRD-Météo France - CLS	ASAP	Planned to be completed by the end of 2011
15	JTA-29 2.1 No.20	To communicate with OPSCOM through the JTA Chair on incorporating various users' requirements, including the animal trackers	ROCs/Chair	ASAP and ongoing	Ongoing (JTA chair to take actions)
16	JTA-29 2.1 No.21	To communicate with various users to incorporate their requirements in the regular meeting	ROCs	JTA-32 (Oct. 2012)	Ongoing (link to action #1 for JTA-30)
17	JTA-28 2.2 No.3	Users who need downlink capability to start using the demonstration PMTs as soon as they become available	Users	JTA-32 (Oct. 2012)	Ongoing
18	JTA-28 2.2 No.4	To promote the PMT pilot activity at the national level	ROCs	JTA-32 (Oct. 2012)	Ongoing ROCs to inform the user community about operational status of Argos-3
19	JTA-28 2.2 No.6	To install new antennas according to the following priority areas: the South Atlantic, the Indian Ocean, and the Southwest Pacific Ocean.	CLS	JTA-32 (Oct. 2012)	In process (target completion date end of 2012) JTA-32 for providing status information Easter Island antenna currently unfunded

3. Actions and decisions of the present meeting

No. (JTA-31)	Ref. (JTA-31)	Action/decision item	By whom	Deadline	Comment
1	JTA-31 Item 3	Action: need to capture actions and issues from national reports for circulation prior to the meeting and for discussion under agenda item 3	ROCs, Chair, secretariat	1 Sep 2012	
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	Ongoing	Platforms in 'inactive status' wastefully use system capacity
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 EC6	% of data availability within 60 mins from two newest NOAA satellites has deteriorated over first half of 2011
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-32	
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-32	This requirement appeared in a number of national reports
6	JTA-31 Item 5.15	Action: activities by CLS to recover unused IDs to continue	CLS	Ongoing	
7	JTA-31 Item 5.15	Decision: unused ID charge to remain in place for 2012 and 2013 agreements		JTA-33	
8	JTA-31 Item 5.15	Action: CLS asked to consider other approaches for unused ID recovery	CLS	Ongoing	Suggestions include sending fact-sheet to users along with annual catalogue of services and with SUA renewals, ID buy-back
9	JTA-31 Item 5.15	Action: ROCs urged to consult web list of unused IDs and to be proactive with their users	ROCs	Ongoing	
10	JTA-31 Item 6	Action: CLS to improve web availability of data required by ROCs	CLS	By JTA-32	EC5 will propose suggestions in consultation with CLS
11	JTA-31 Item 7	Action: Chair to write to DBCP chair re potential negative impact on JTA Argos tariff of poor buoy lifetimes	Chair	ASAP	Buoy PTT-year usage has declined significantly since 2010, possibly because of poor lifetimes

No. (JTA-31)	Ref. (JTA-31)	Action/decision item	By whom	Deadline	Comment
12	JTA-31 Item 7	Action: CLS to present breakdown of JTA income by platform type	CLS	At JTA-32	
13	JTA-31 Item 8	Decision: Terms and conditions of the 2012 Argos Agreement to remain materially unchanged			
14	JTA-31 Item 8	CLS to provide a scanned, signed copy of the Terms and Conditions for 2012 Global Agreement	CLS	Dec 2011	
15	JTA-31 Item 10	Action: The EC to consider re-ordering the agenda to take national reports and issues arising therefrom much earlier in the session	EC	JTA-32	
16	JTA-31 Item 10	Action: ROCs to send suitable Argos news items to CLS and to NESDIS (Scott Rogerson)	ROCs	Ongoing	
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 proposed forum	CLS, assisted by Secretariat	JTA-32	Venkat will provide CBD link
18	JTA-31 Item 11	Action: EC to ensure adequate interaction with the secretariat regarding the development of the IOC/FAO/WMO satellite communications forum	EC	ASAP	Proposed to run satcom forum initial working group back-to-back with EC6
19	JTA-31 Item 13	Action: EC to consider date and place for JTA32 in the light of ensuring maximum participation	EC	EC6	

ANNEX VII - REPORT ON THE 2011 AGREEMENT
(submitted by CLS)

Country Name	Buoys and Others		Floats	
	Average Active PTTs/Month	PTT YEARS	Average Active PTTs/Month	PTT YEARS
AUSTRALIA	53	37,82	236	14,46
BELGIUM				
BOTSWANA				
BRAZIL	2	0		
CANADA	69	49,97	131	8,8
CHILE	1	0,09	6	1,19
CHINA	38	23,75	50	3,99
DENMARK				
EUROPE	13	11,45		
FINLAND	1	0,67	1	0,05
FRANCE	148	71,99	184	12,98
GERMANY	30	11,09	141	7,79
INDIA	27	20,51	77	5,86
ITALY	13	5,3	2	0,25
KOREA, REPUBLIC OF	12	8,32	98	5,71
NETHERLANDS	1	0,1	26	1,85
NEW ZEALAND	12	11,45		
NORWAY	13	5,25	1	0,65
OTHERS			1	0,05
PORTUGAL				
RUSSIAN FEDERATION	3	1,85		
SOUTH AFRICA	2	0,48	2	0,1
SPAIN	25	10,36	10	0,52
SWEDEN	4	1,2		
SWITZERLAND				
TANZANIA				
UNITED ARAB EMIRATES				
UNITED KINGDOM	31	21,09	125	7,27
UNITED STATES	2214	1733,9	1785	142,45
Grand Total	2712,00	2026,64	2876,00	213,97

Table 1a : Average number of active PTTs per month and total PTT-years per country and per PTT category, in 2010 (first half table)

Note: we have added country “Europe” for E-SURFMAR programme since 2008.

Country Name	Animals		Fixed Stations	
	Average Active PTTs/Month	PTT YEARS	Average Active PTTs/Month	PTT YEARS
AUSTRALIA	295	53,63	13	12,06
BELGIUM	4	0,57		
BOTSWANA	14	1,31		
BRAZIL	6	0,52		
CANADA	1669	174,54	1	0,19
CHILE	17	1,36		
CHINA	29	3,26	1	0,35
DENMARK	158	25,22	10	9
EUROPE				
FINLAND	15	2,08		
FRANCE	80	14,61	27	15,18
GERMANY	197	31,59		
INDIA	31	6,79		
ITALY	78	13,32	12	11,06
KOREA, REPUBLIC OF	5	1,20	3	2,83
NETHERLANDS	30	3,79	29	12,89
NEW ZEALAND	19	2,52	1	1
NORWAY	123	18,88	1	0,53
OTHERS	21	2,58		
PORTUGAL	41	7,60		
RUSSIAN FEDERATION	30	6,73		
SOUTH AFRICA	55	9,79	1	1
SPAIN	287	41,66		
SWEDEN	22	2,94		
SWITZERLAND	16	2,18		
TANZANIA	4	0,58		
UNITED ARAB EMIRATES	288	54,93		
UNITED KINGDOM	270	43,46		
UNITED STATES	2825	388,19	82	73,47
Grand Total	6629,00	915,83	181,00	139,56

Table 1b : Average number of active PTTs per month and total PTT-years per country and per PTT category, in 2010 (second half table)

All countries Average Active PTTs per month	All countries PTT-years
12 398	3 296.00

Table 1c : Average number of active PTTs per month and total PTT-years all countries and all categories, in 2010

1. Average active PTTs per month per country

Country Name	2010 Average Active PTTs/Month	2011 Extrapolated Active PTTs/Month	Extrapolated progression
AUSTRALIA	597	622	4.19%
BELGIUM	4	4	-3.57%
BOTSWANA	14	10	-27.55%
BRAZIL	8	11	35.71%
CANADA	1870	1898	1.49%
CHILE	24	19	-22.62%
CHINA	118	124	5.33%
DENMARK	168	92	-44.98%
EUROPE	13	3	-79.12%
FINLAND	17	32	90.76%
FRANCE	439	434	-1.20%
GERMANY	368	350	-4.85%
INDIA	135	146	8.36%
ITALY	105	72	-31.16%
KOREA, REPUBLIC OF	118	111	-6.05%
NETHERLANDS	86	85	-1.33%
NEW ZEALAND	32	17	-45.98%
NORWAY	138	137	-1.04%
OTHERS	22	23	4.55%
PORTUGAL	41	40	-3.14%
RUSSIAN FEDERATION	33	36	9.09%
SOUTH AFRICA	60	96	60.48%
SPAIN	322	393	22.09%
SWEDEN	26	30	13.74%
SWITZERLAND	16	21	30.36%
TANZANIA	4	4	0.00%
UNITED ARAB EMIRATES	288	321	11.41%
UNITED KINGDOM	426	442	3.79%
UNITED STATES	6906	7000	1.36%
Total	12398	12573	1.41%

Table 2 : Average number of Active platforms per month and per country, actual in 2010 and extrapolated in 2011 from January-July average

Note: E-SURFMAR programme was attached is attached to “EUROPE” in 2008.

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.

2. Consumption per country (PTT-years)

Country Name	2010 Actual PTTs.years	2011 Extrapolated PTTs/.years	Extrapolated progression
AUSTRALIA	117.97	102.20	-13.37%
BELGIUM	0.57	0.55	-3.56%
BOTSWANA	1.31	1.08	-17.74%
BRAZIL	0.52	0.45	-12.36%
CANADA	233.50	215.79	-7.59%
CHILE	2.64	1.86	-29.38%
CHINA	31.35	29.19	-6.88%
DENMARK	34.22	16.35	-52.22%
EUROPE	11.45	2.09	-81.73%
FINLAND	2.80	3.87	38.27%
FRANCE	114.76	111.43	-2.90%
GERMANY	50.47	49.06	-2.80%
INDIA	33.16	36.39	9.76%
ITALY	29.93	20.78	-30.56%
KOREA, REPUBLIC OF	18.06	17.64	-2.35%
NETHERLANDS	18.63	18.72	0.52%
NEW ZEALAND	14.97	9.74	-34.93%
NORWAY	25.31	20.41	-19.34%
OTHERS	2.63	3.91	48.62%
PORTUGAL	7.60	6.85	-9.94%
RUSSIAN FEDERATION	8.58	13.58	58.30%
SOUTH AFRICA	11.37	17.95	57.86%
SPAIN	52.54	66.55	26.68%
SWEDEN	4.14	5.40	30.38%
SWITZERLAND	2.18	2.73	25.15%
TANZANIA, UNITED REPUBLIC OF	0.58	0.54	-6.88%
UNITED ARAB EMIRATES	54.93	66.65	21.33%
UNITED KINGDOM	71.82	76.58	6.63%
UNITED STATES	2338.01	2171.75	-7.11%
Grand Total	3296.00	3090.10	-6.25%

Table 3 : Numbers of PTT-years. Actual consumption in 2010 and extrapolation for 2011 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.

3. Consumption evolution over 1 year

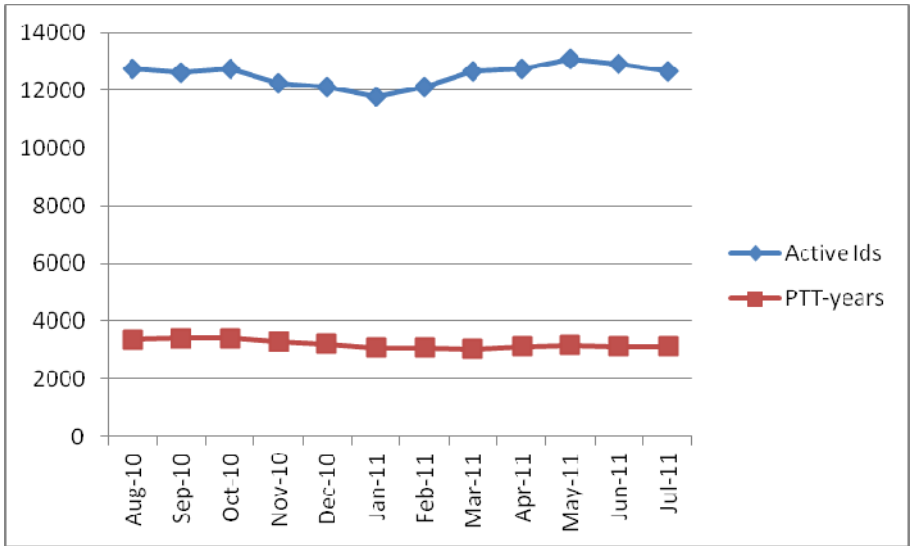

Figure 1: Consumption evolution over the previous year in Active PTTs and PTT-years

The number of active PTTs shows a regular increasing trend while the number of PTT-years remains rather stable. This is explained by the time slot accounting and capping up to 12 days applicable to animal platforms.

4. Monthly evolution by platform category

Drifters & others, Floats, Animals, Fixed stations

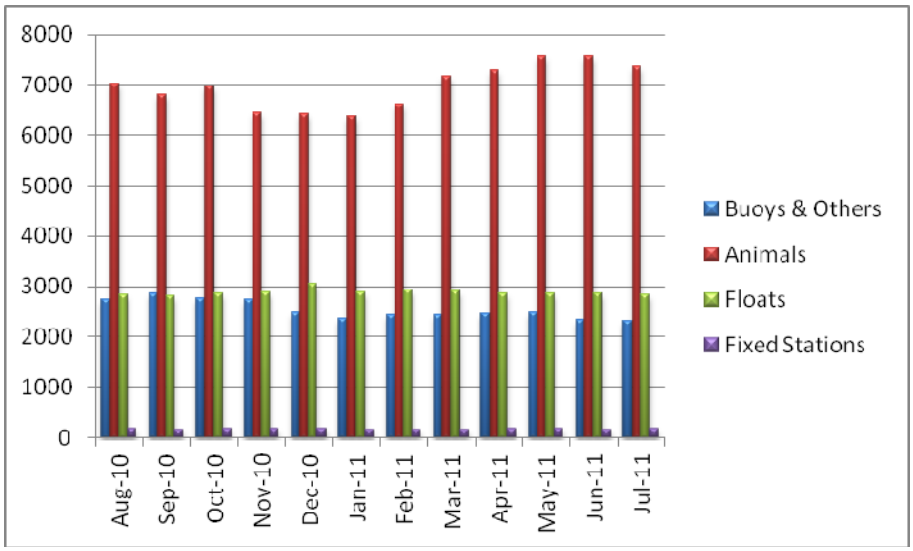

Figure 2: Active PTT evolution for 12 months

Overall, the active PTTs and thus the number of transmitters in the field are increasing. The main category contributing to this increase is, as in previous years, the “Animals” family. The “Subsurface floats and Fixed stations” are rather stable. Buoys and others have declined by nearly 16%.

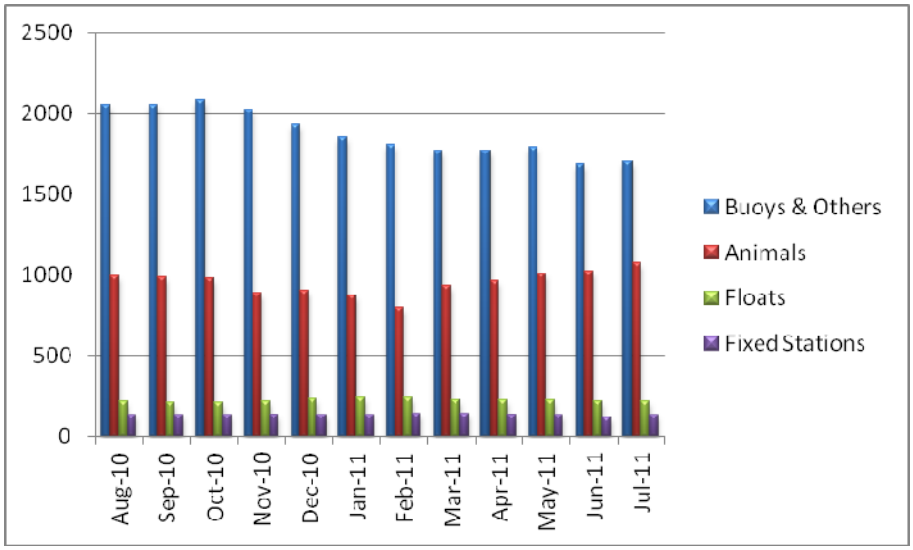

Figure 3: PTT-years evolution for 12 months

This figure shows month-by-month differences in term of actual consumption between categories:

- "Buoys & Others" is still the major player despite a 16% decrease over the last 12 months.
- "Animals" consumption has increased by 7.6% during this time.
- "Floats" and "Fixed Stations" consumptions in PTT-years remained stable.

5. Time slot analysis

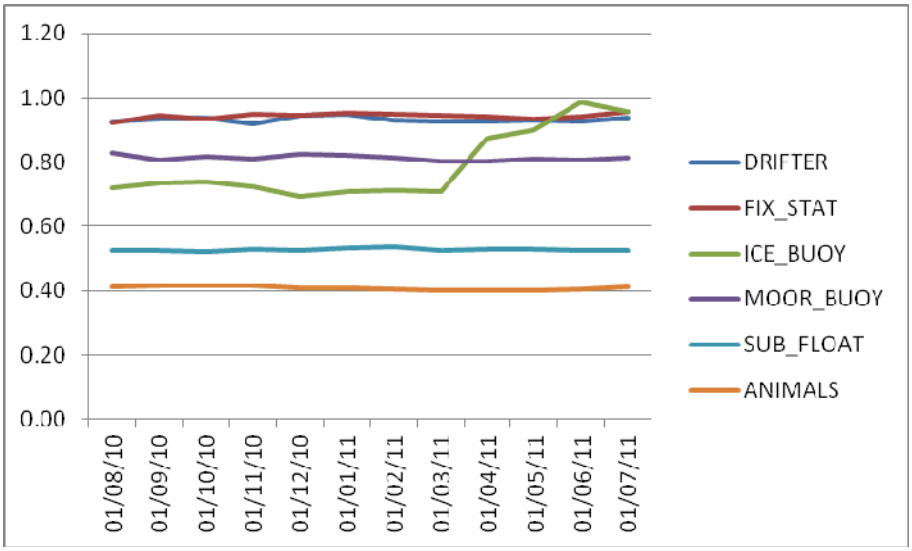

Figure 4: Average time slot level by platform category

This diagram shows the monthly evolution of the average time slot ratio for the all platforms categories[2]. 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.

2 : Animals and sub_floats" have benefited from time slot accounting since 2005. "Buoys & Others" and "Fixed Stations" started benefiting from time slot accounting in 2007

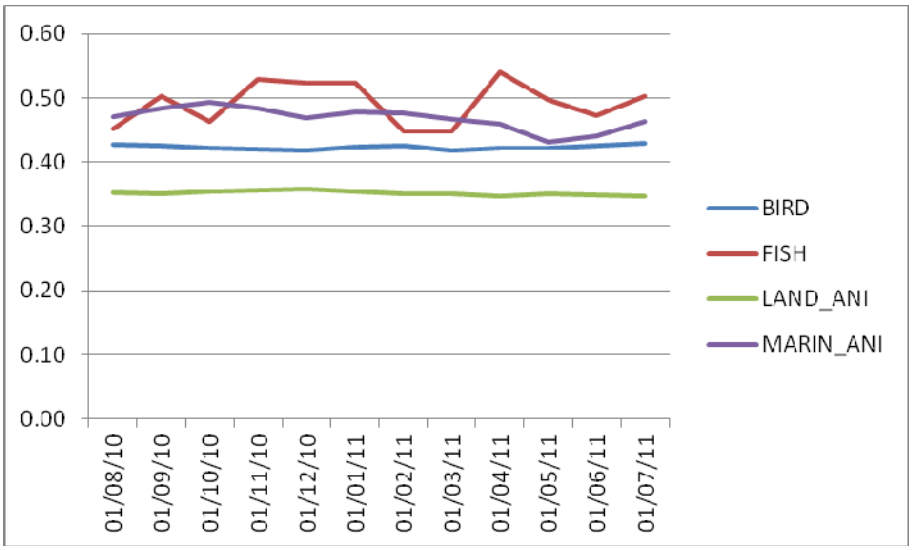

Figure 5: Average time slot level by Animals platform category

It can be noticed that all animal categories are significantly benefitting from the time slots. As an average these PTTs are transmitting 40% of the day.

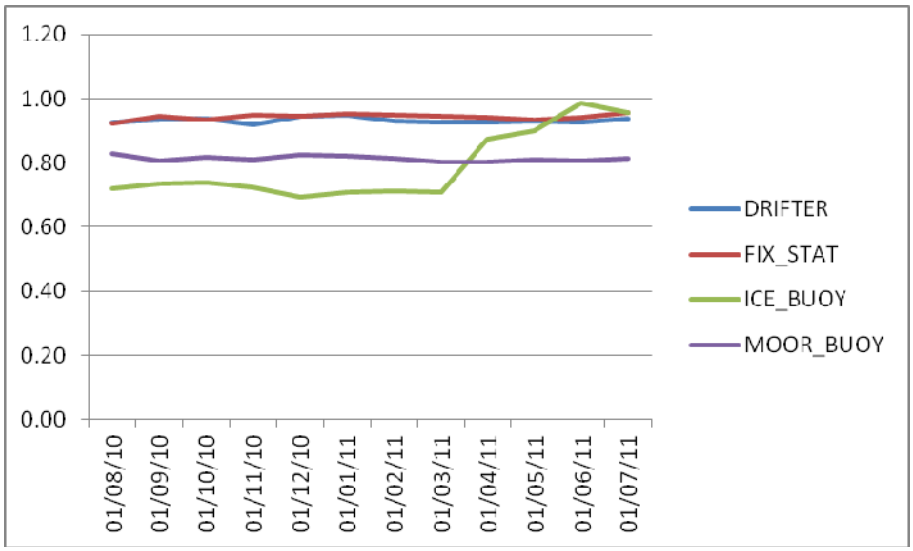

Figure 6: Average time slot level by platform category (buoys and others)

In 2010, due to the time slot accounting, the overall consumption of these platforms has been reduced by **93.32 PTT-years.**

6. Impact of the 12 day-unit capping

Further to JTA-27 decision the consumptions for animal platforms are capped at 12 day-units (48 time slots).

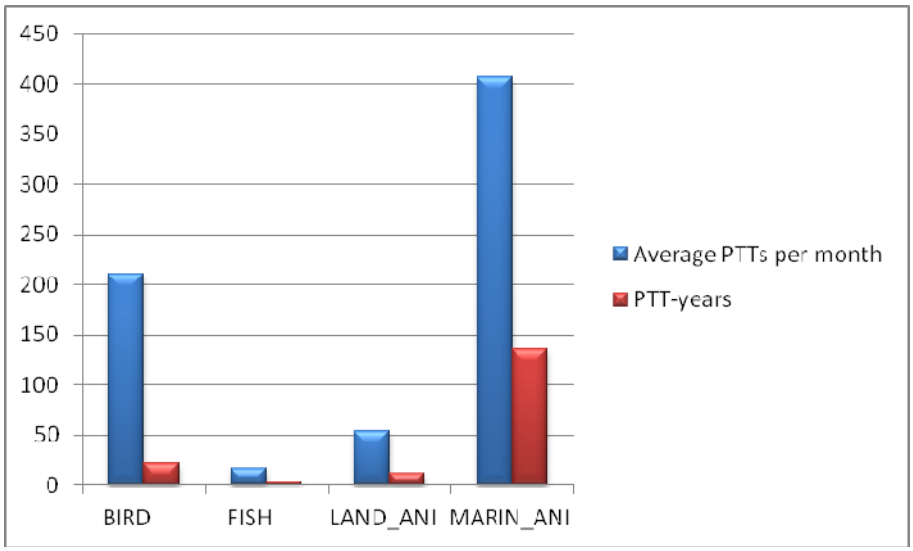

Figure 7: Average PTTs affected and Projected PTT-years "gain" by animal category

In 2010, **690** PTTs took advantage of the capping, representing **173 PTT-years**. The number of marine animals taking advantage of the capping is increasing every year: more than 400 in 2010 compared to 333 in 2009. For 2011 the capping represents a projected impact of ~**175 PTT-years**.

7. Inactive status

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

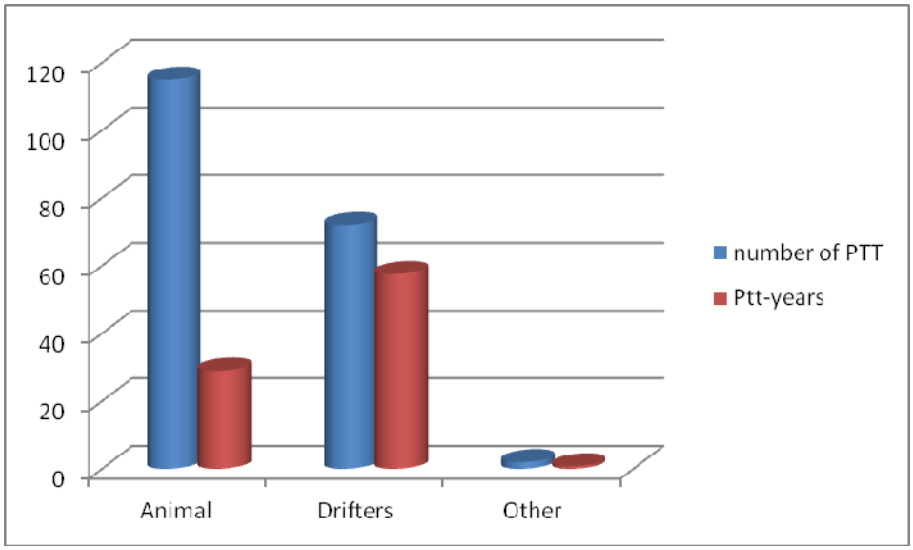

Figure 8: Inactive PTTs in term of number of IDs and PTT-years for 2010

It can be noticed that in 2010 the number of IDs in Inactive status varies around **189** representing **87.37 PTT-years**. Mainly "Animals & Drifters" platforms benefit from this service, continuing to transmit even when the data is no longer useful to the project.

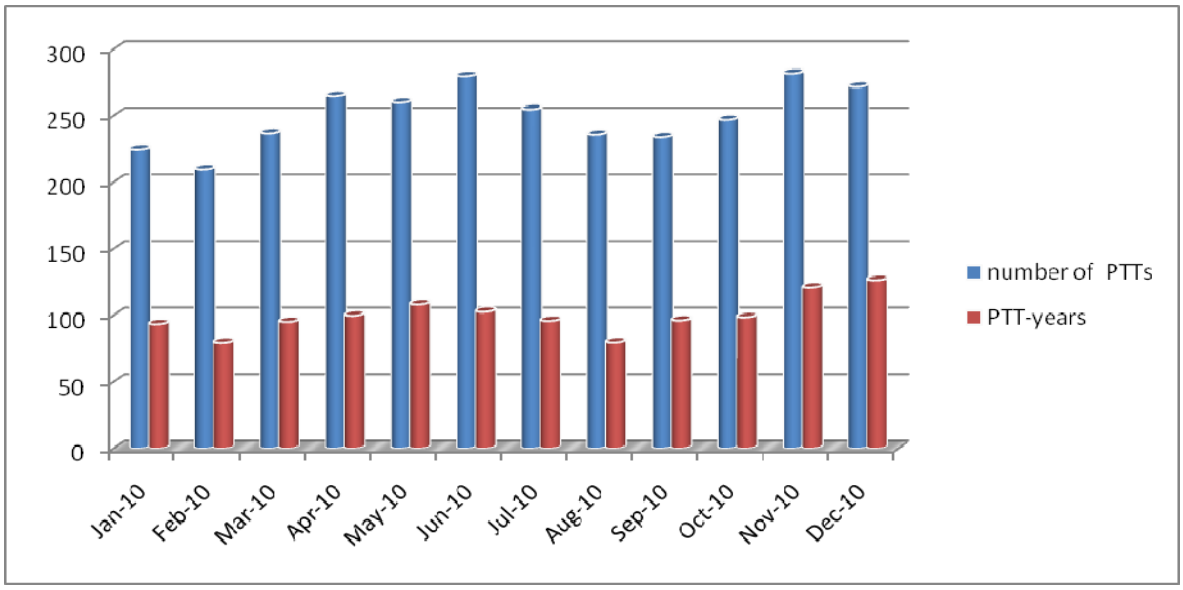

Figure 9: Inactive PTT evolution in term of number of IDs and PTT-years

As already mentioned in previous JTA reports, these PTTs are increasing the system occupancy. CLS insists again on the recommendation to users and manufacturers to consider this by programming their PTTs for the duration of the experiment.

8. History of the JTA participation from 1982 to 2011

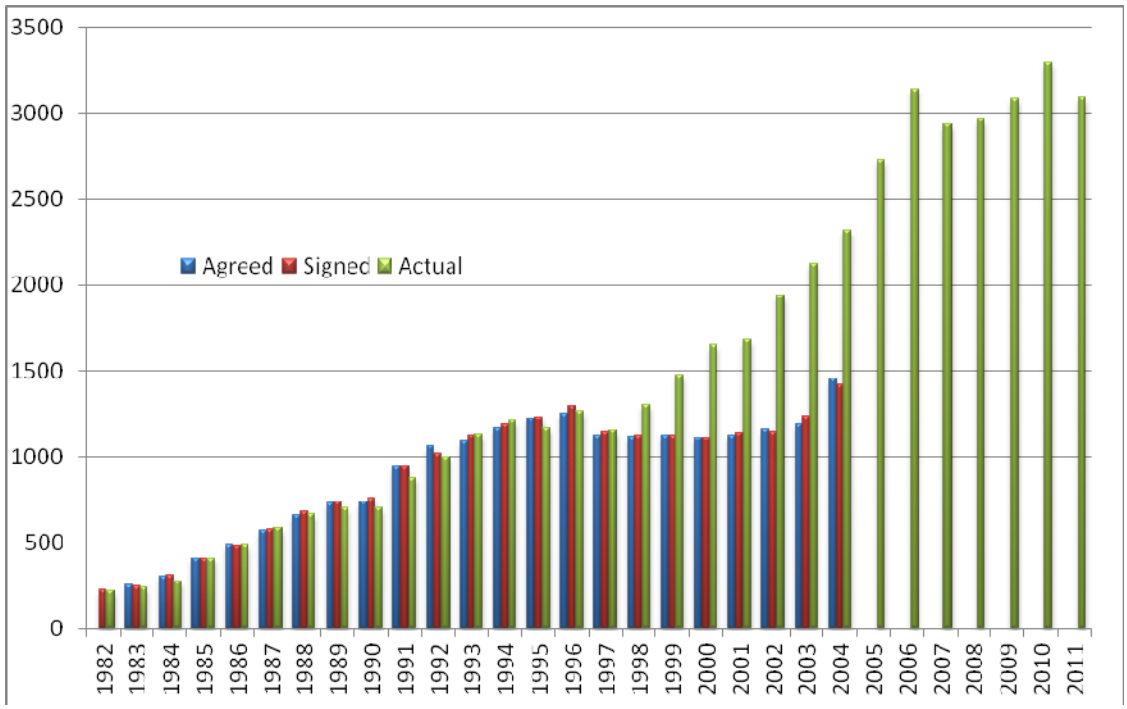

Figure 10: Agreed, signed and actual consumption in PTT-years for all countries

Notes:

1) Since the implementation of the new tariff structure in 2005, we only provide actual consumption.

2) Consumption decreased in 2007 (~46 PTT-years) 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 programme activity and maximum deployment opportunities with increased buoy lifetimes for the Global Drifter programme.

5) Value for 2011 is a projection based on January to July 2011 consumption.

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ANNEX VIII

REPORT ON 2010-2011 OPERATIONS AND SYSTEM IMPROVEMENTS
(Submitted by CLS)

1. 2010-2011 Argos Highlights

1.1 Operations

- New METOP-A HRPT coverage extension zone since 18 January 2011.
- METOP-A / A-DCS anomaly in August and December 2010
- NOAA-19 DSP restart in August 2010
- Power outage done at CLS America in 2010 (no test in France in 2010)

1.2 System improvements

- 1 new global receiving station (1/2 orbit) for METOP-A in Antarctica
- 7 new HRPT antennas
- 2 production Database servers in France have been replaced by 2 new and powerful database servers
- Implementation of the new Argos location method (Kalman filtering algorithm)
- Implementation of multi-broadcast of Argos-3 commands
- Improvement of the Argos web functionalities and performances
- Improvement of the Argos data processing performances

1.3 Outlook

- Continue to setup the new HRPT optimized network
- Integration of a new digital elevation model based on the model SRTM3
- Upgrade the BUFR version in the GTS processing chain: BUFR V3 to BUFR V4
- Possibility to send Argos-3 commands by e-mail
- Improvements of the Argos monitoring tools
- Reprocessing of Argos messages on archive database to improve the quality of the data delivered to users
- “One way” declarative data replication between the 2 global processing Centres.
- Integration of SARAL in the Argos processing
- METOP-B and SARAL satellites launch in 2012 with an Argos-3 instrument
- Procuring and installing new ground HRPT stations
- Development of an Argos-3/Argos-4 receiver chipset with CNES and the Norwegian Space Agency.

2. Argos space segments

2.1 Operational status

During 2010, Argos instruments were onboard five NOAA POES and one EUMETSAT spacecrafts. The status information on each spacecraft and its Argos various subsystems is described as follows (Figure 1):

Satellites	Launch date	NOAA status	Real time data (HRPT)	Stored data (STIP)	Data AVHRR
METOP-A (MA)	19-Oct-06	AM Primary	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	AM Backup	Ok	Gilmore, Wallops	Ok
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 1 : Argos Constellation

2.2 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 risks of damage from heavy ion radiation are 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 was then 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 2 shows the old METOP A-HRPT activation zone.

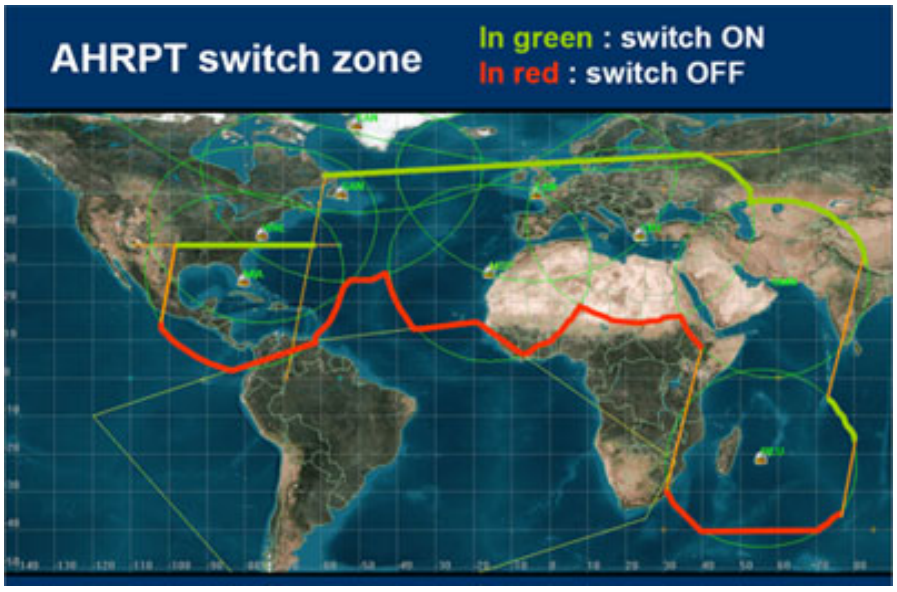


Figure 2 : A-HRPT Old Switch Zone

Figure 3 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.

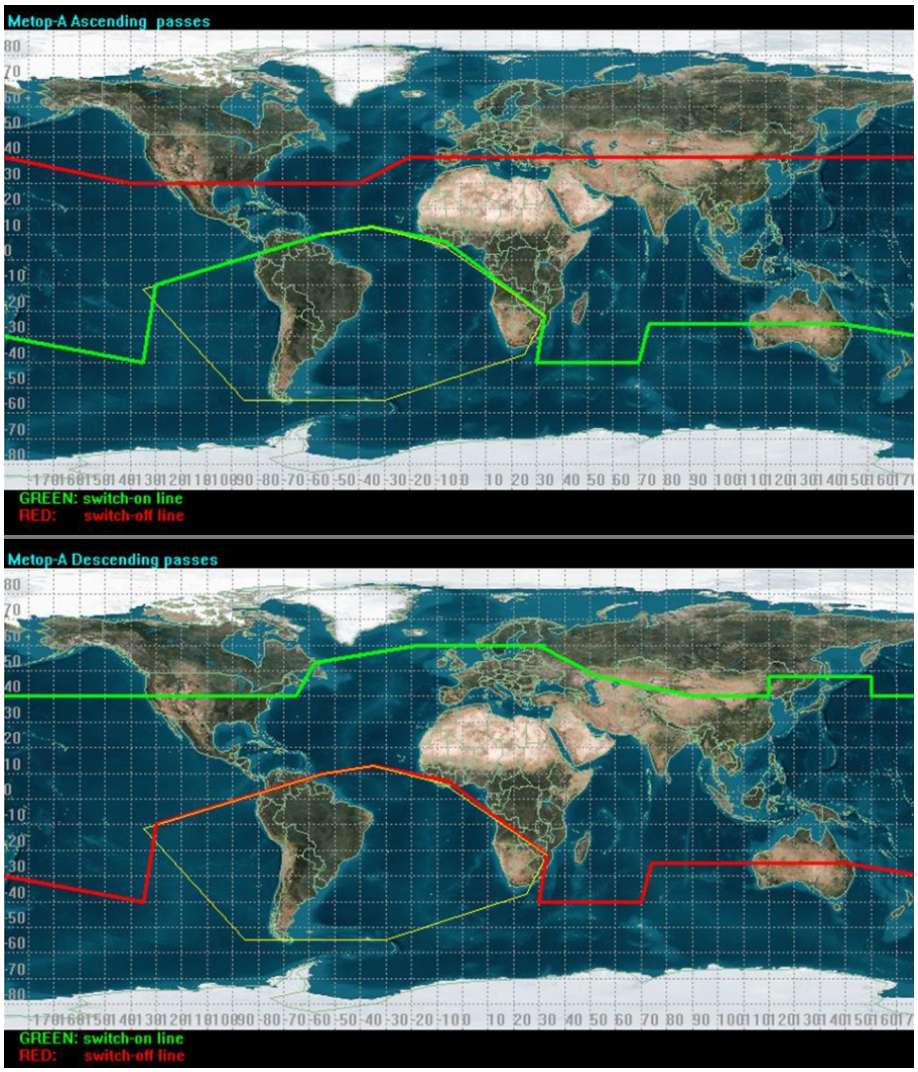


Figure 3 : A-HRPT Extended Switch Zone (Descending and Ascending orbits)

2.3 Ascending Nodes Local hour

Situation in March 2011

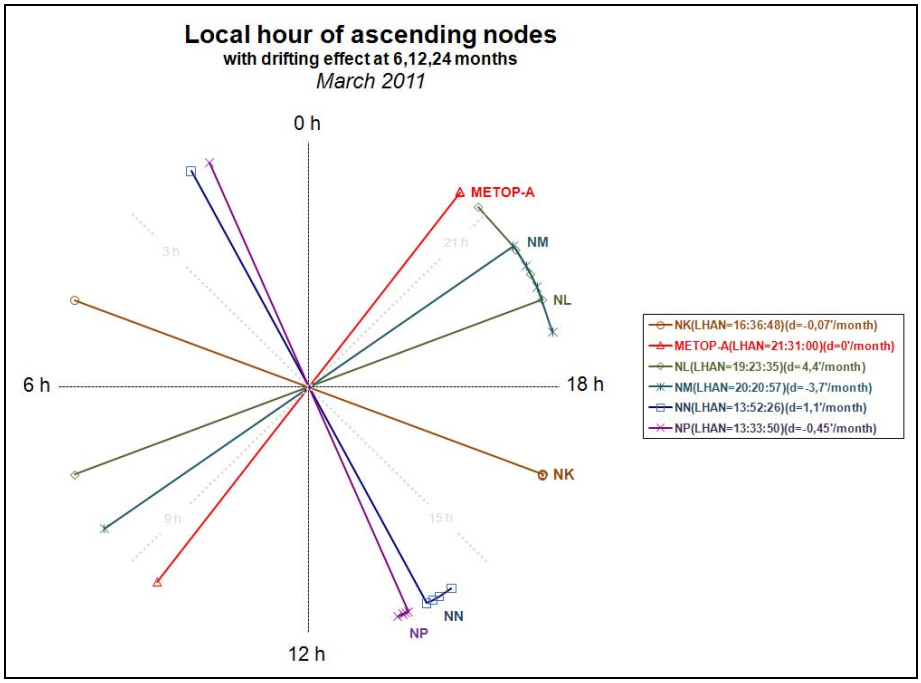


Figure 4 : Local Equator crossing time in March 2010

<u>Projection in March 2012</u>

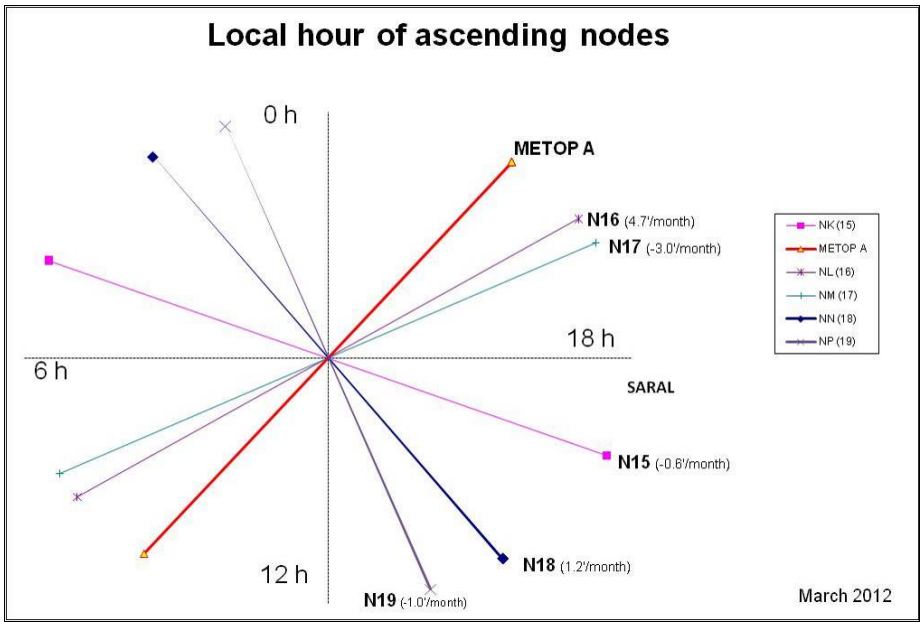


Figure 5 : Local Equator crossing time in March 2012 (Projection)

2.4 Next launches of satellites with Argos instrument

- METOP-B (EUMETSAT) with an Argos-3 instrument in 2012
- SARAL (ISRO) with an Argos-3 instrument in 2012
- METOP-C (EUMETSAT) with an Argos-4 instrument in 2017

The joint US civilian-military NPOESS satellite programme has been cancelled. The civilian side is being replaced by the NOAA “Joint Polar Satellite System” (JPSS). JPSS-1 is scheduled for launch in 2016 but will not carry either an Argos or a Sarsat system. NOAA is investigating the use of other platforms to carry these systems.

3. Argos ground segment

3.1 Global antennas (store and forward mode)

3.1.1 Operations

The two NOAA global stations of Fairbanks and Wallops acquire the global recorded telemetry transmitted by N15, N16, N17, N18 and N19. The Argos global centre of Toulouse and Landover receive for each of these satellites, 14 orbits per day. Two of these 14 orbits per day and per satellite are blind orbits and, consequently, received with a delay except for N18 and N19 (see below).

The EUMETSAT global receiving station of Svalbard acquires the global recorded telemetry transmitted by METOP-A as well as the two daily blind orbits of N18 and N19.

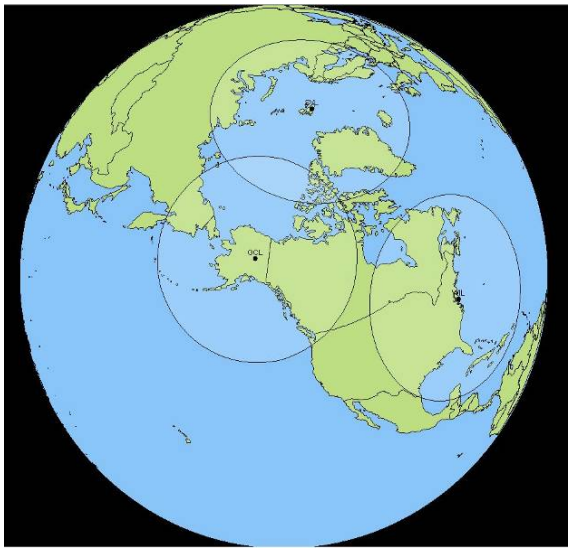


Figure 6 : Global antennas network

3.1.2 System improvements

A new global station at McMurdo in Antarctica (1/2 orbits) only for METOP-A is operational since 08/06/2011. Timeliness for the provision of METOP-A data collected out of HRPT coverage to users has improved from 115 to 65 minutes.

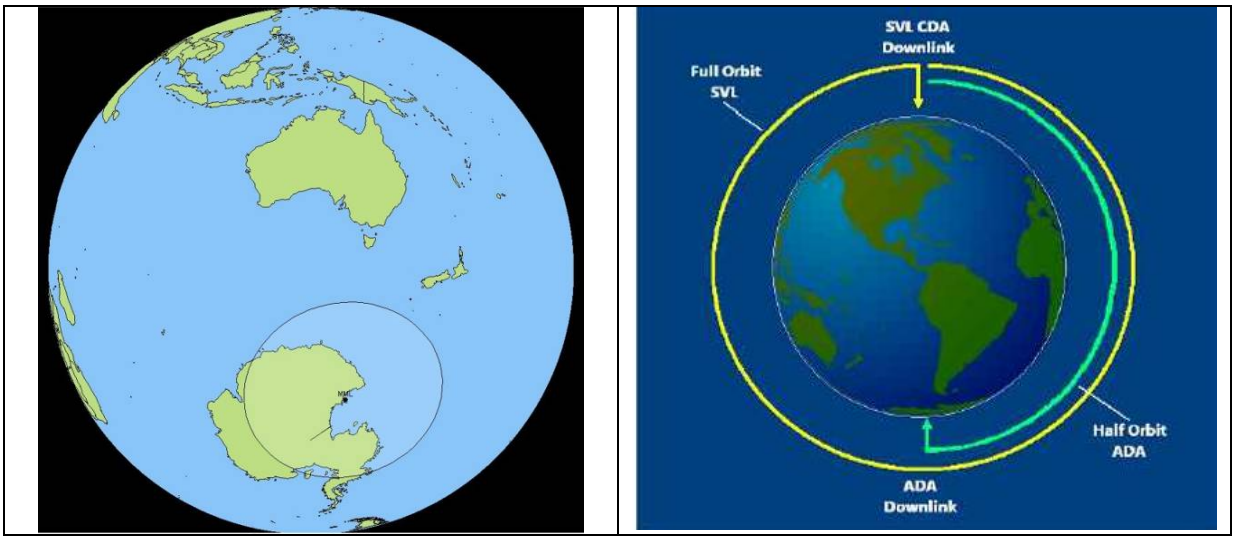


Figure 7 : METOP-A McMurdo Global antenna coverage

Comparison of METOP-A data delivery time with and without McMurdo station:

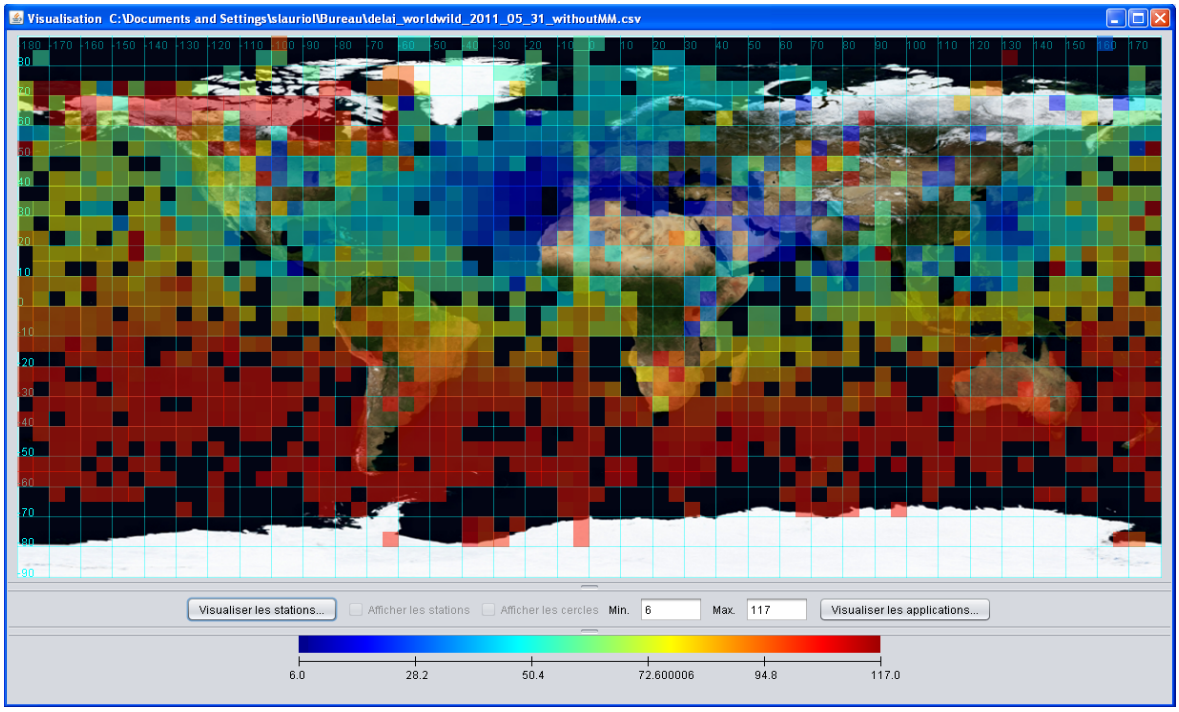


Figure 8 : METOP-A Data Mean Disposal Time in June 7, 2011 (in minutes)

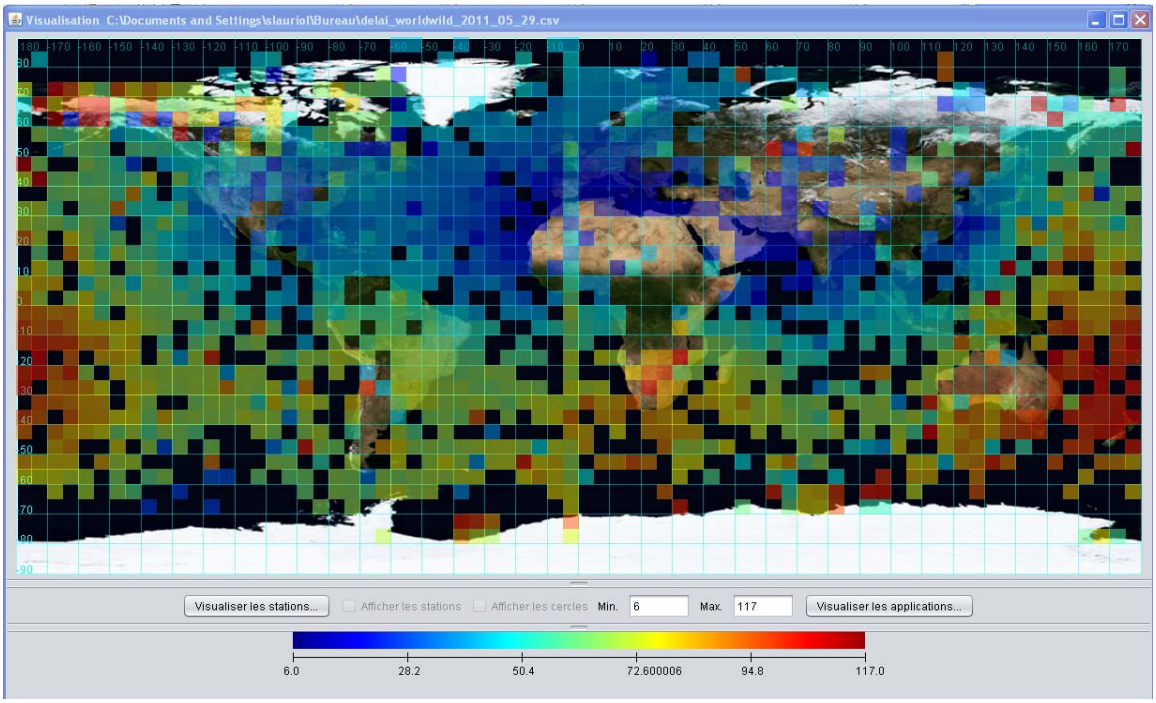


Figure 9 : METOP-A Data Mean Disposal Time in June 9, 2011 (in minutes)

Figure 10 : View of McMurdo site in Antarctica

3.2 Regional antennas (real-time mode)

3.2.1 Operations

The real-time network is still growing. Improvements are focused on redundancy locations and coverage extension. Today, both Toulouse and Landover processing centres receive Argos near real-time data from an average of 60 stations located all over the world. The Tromsø Antenna is removed from the network (no impact on the network performance).

Figure 11 : Regional antenna network in 2011

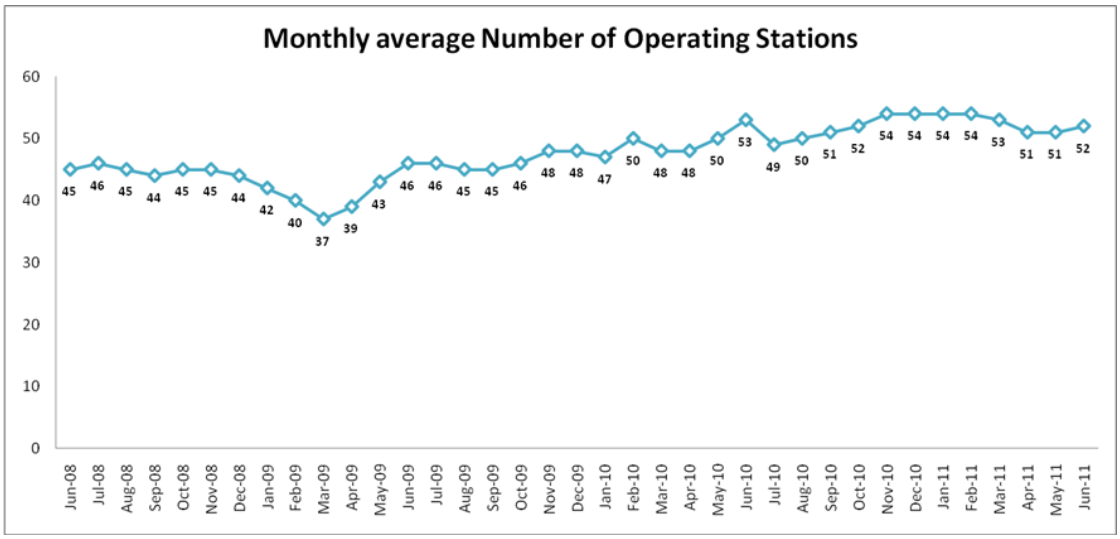


Figure 12 : Regional antenna monthly availability since 2008

List of operational antennas

Code	Station	Country	Operator	Longitude	Latitude	Recovery delay average (min)
AN	Andersen	GUAM	US AIR FORCE	145,53	13,98	14
AT	Athens	GREECE	CLS	23,91	37,73	12
BA	Buenos Aires	ARGENTINA	INTA	301,50	-34,50	36
BL	Bali	INDONESIA	PT CLS INDONESIA	114,63	-8,39	12
CA	Casey	AUSTRALIA	BOM	110,72	-66,29	21
CF	Cape Ferguson	AUSTRALIA	NOAA NESDIS	147,32	-19,47	39
CH	Santiago	CHILE	METEO CHILE	289,60	-33,27	45
CY	Cayenne	FRANCE	IRD	307,70	5,00	18
DA	Darwin	AUSTRALIA	BOM	130,08	-12,47	15
DV	Davis	AUSTRALIA	BOM	77,97	-68,57	15
ED	Edmonton	CANADA	ENVIRONNEMENT CANADA	246,54	53,55	10
EL	Elmendorf - Anchorage	UNITED STATES	US AIR FORCE	150,38	61,39	15
GB	Libreville - N Koltang	GABON	CLS	9,68	0,36	15
GC	Gilmore Creek	UNITED STATES	NOAA NESDIS	212,50	64,98	11
GR	Sondre	GREENLAND	DMI	308,00	67,50	14
HF	Halifax	CANADA	CANADIAN COAST GUARD	296,40	44,70	10
HI	Hickam - Honolulu	UNITED STATES	US AIR FORCE	158,61	21,54	13
HR	Halley	UNITED KINGDOM	British Antarctic Survey	333,93	-75,08	17
HT	Hatoyama	JAPAN	Jaxa	139,83	36,00	10
HW	Hawaïi	UNITED STATES	NOAA NWS	204,50	19,50	15
HY	Hyderabad	INDIA	INCOIS	78,28	17,23	12
KA	Kandena-Okinawa	JAPAN	US AIR FORCE	128,30	26,56	15
LM	Lima	PEROU	CLS PERU	282.97	-12.3	10
MA	Miami	UNITED STATES	NOAA AOML	279,70	25,75	31
ME	Melbourne	AUSTRALIA	BOM	144,97	-37,82	13
MN	Manas	KYRGYZSTAN	US AIR FORCE	74,48	43,06	8
MO	Montererey	UNITED STATES	NOAA NESDIS	238,10	36,60	14
NO	Nouméa	NEW CALEDONIA	IRD	166,50	-22,30	21
NZ	Wellington	NEW ZEALAND	NIWA	174,77	-41,30	18
OS	Oslo	NORWAY	NMI	10,80	59,90	17
PE	Perth	AUSTRALIA	BOM	115,97	-31,95	14
PR	Lima	PERU	CLS PERU	282,97	-12,30	15
PT	Petropavlovsk	RUSSIA	CLS	158.39	53.01	12
RB	Resolute Bay	CANADA	Environment Canada	265,43	74,43	9
RE	Réunion Island	FRANCE	IRD	55,48	-20,85	22
RN	Réunion Island	FRANCE	METEO FRANCE	55,48	-20,85	10

RO	Rothera	UNITED KINGDOM	British Antarctic Survey	291,87	-67,57	12
RS	Lannion METOP	FRANCE	METEO FRANCE	356,53	48,75	9
SA	Cape Town	SOUTH AFRICA	SAWB	18,22	-35,55	15
SE	Séoul	KOREA, REPUBLIC OF	KMA	126,94	37,54	12
SG	Singapore	SINGAPORE	SMM	103,80	1,30	15
SH	Shanghai	CHINA	EAST CHINA SEA FISHERIES	121,55	31,29	11
SM	Sembach	GERMANY	US AIR FORCE	8,46	49,88	14
SV	Svalbard NOAA	NORWAY	NOAA	10	76	
TA	Papeete	FRANCE	IRD	210,45	-17,38	19
TW	Taïwan	TAIWAN, REPUBLIC OF CHINA	NTOU	120,27	25,05	18
UA	Valley Forge (Test)	UNITED STATES	US AIR FORCE	75,66	40,16	14
WE	Lannion	FRANCE	METEO FRANCE	356,53	48,75	13
WI	Wallops Island	UNITED STATES	NOAA NESDIS	284,54	37,95	13
XA	Athens EARS	GREECE	EUMETSAT	23,91	37,73	14
XE	Edmonton EARS	CANADA	EUMETSAT	246,54	53,55	20
XG	Gander EARS	CANADA	EUMETSAT	54,57	48,94	22
XK	Kangerlussuaq EARS	GREENLAND	EUMETSAT	50,71	67,02	17
XM	Maspalomas EARS	SPAIN	EUMETSAT	344,41	27,79	17
XO	Muscat EARS	OMAN	EUMETSAT EARS	58,60	23,62	17
XR	Moscou EARS	RUSSIAN FEDERATION	EUMETSAT	37,57	55,76	16
XS	Svalbard EARS	NORWAY	EUMETSAT	15,38	78,23	17

Figure 13 : List of Operational Antennas on March 2011 and delay statistics

Only four stations have mean dataset availability > 25 minutes, so CLS group has to help the following stations to improve their time responses:

- ✓ Buenos Aires (BA, Argentina)
- ✓ Cape Ferguson (CF, Australia)
- ✓ Santiago (CH, Chile)
- ✓ Miami (MA, United States)

METOP-A

The regional antenna network dedicated to METOP-A satellite is still growing with 15 compatible stations in July 2011:

Code	name	operator
FL	France Lannion	METEO FRANCE
HT	Hatoyama	JAXA
HW	Hawaï	NOAA NWS
LM	Lima	CLS PERU
MA	Miami	NOAA AOML
MM	McMurdo	NOAA
MO	Monterey	NOAA NESDIS
RV	Ramonville	CLS
SN	Svalbard	NOAA
SV	Svalbard	EUMETSAT
XA	Athens EARS	EUMETSAT
XM	Maspalomas EARS	EUMETSAT
XO	Muscat EARS	EUMETSAT
XR	Moscou EARS	EUMETSAT
XS	Svalbard EARS	EUMETSAT

Figure 14 : List of METOP-A compatible antennas on July 2011

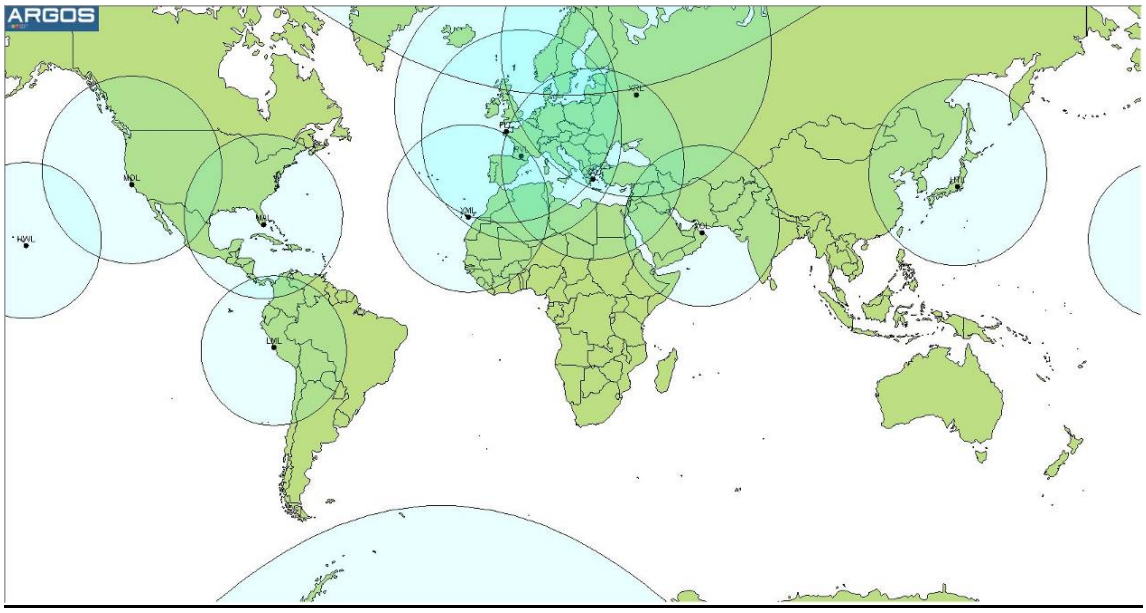


Figure 15 : Current METOP-A real-time coverage

3.2.2 System improvements

CLS is still focusing on the project of upgrading and optimizing in terms of performances this real-time receiving stations network. Since January 2010, 7 new real-time stations have been added to the Argos HRPT global network with 4 thanks to the EUMETSAT EARS network extension. Here below is the list and the map of new Argos HRPT stations since January 2010:

Creation date	code	Station	country	operator	longitude	latitude	Delay (min)
27/10/10	RB	Resolute Bay	CANADA	Environment Canada	265,43	74,43	9,00
30/03/10	XE	Edmonton EARS	CANADA	EUMETSAT	246,54	53,55	20,00
30/03/10	XR	Moscow EARS	RUSSIAN FEDERATION	EUMETSAT	37,57	55,76	16,00
30/03/10	XG	Gander EARS	CANADA	EUMETSAT	54,57	48,94	22,00
27/07/10	XO	Muscat EARS	OMAN	EUMETSAT EARS	58,60	23,62	17,00
18/08/10	MN	Manas	KYRGYZSTAN	US AIR FORCE	74,48	43,06	8,00
09/11/10	HR	Halley	UNITED KINGDOM	British Antarctic Survey	333,93	-75,08	16,00

Figure 16 : List of New Operational Antennas on March 2011 and their delay statistics

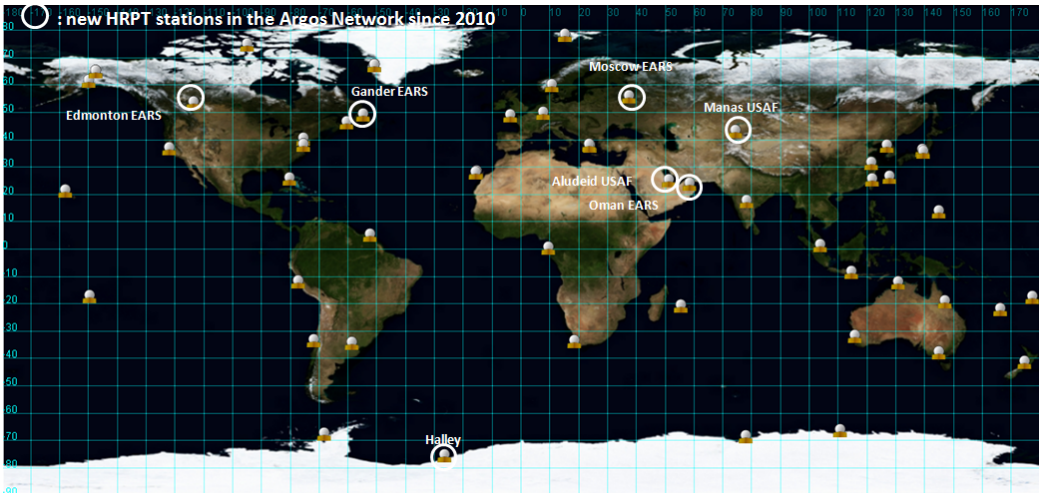


Figure 17 : New regional stations in 2010

The next figures represent the simulated Argos Data Mean Disposal Time taking into account the Argos satellites constellation, the Argos ground stations and data processing centre performance. Data disposal time is defined as the elapsed time between when an observation is collected by an Argos platform and is available to the user. The Data Mean Disposal Time is composed of four typical delays:

- the revisit time (time for a platform to be seen by one of the Argos satellite),
- the time for the data to be downloaded to a ground station (nearly instantaneous for an HRPT station or it's the time for the satellite to reach a global station),
- the data retrieval time (average time for the data to be transmitted to the Argos Data Processing Centres),

- the processing time (requisite time for the data to be processed in the Argos Data Processing Centre and to be available for the users).

See below for a comparison between March 2010 and March 2011:

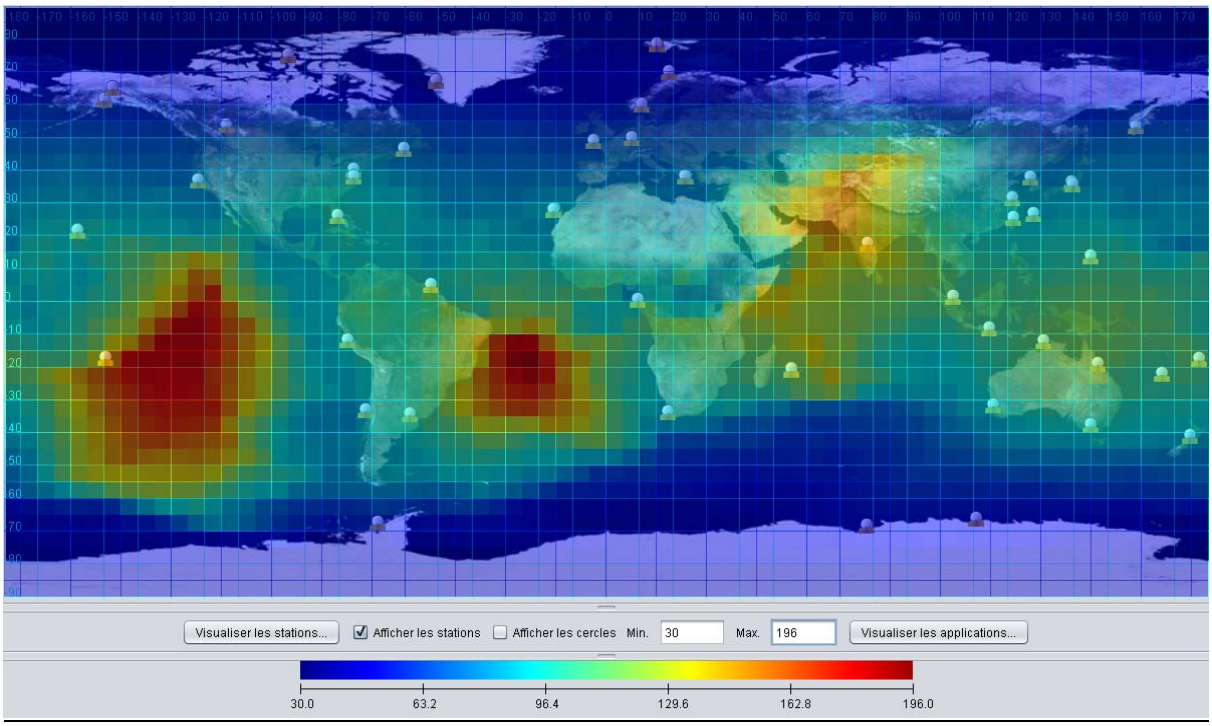


Figure 18 : Argos Data Mean Disposal Time in March 2010 (in minutes)

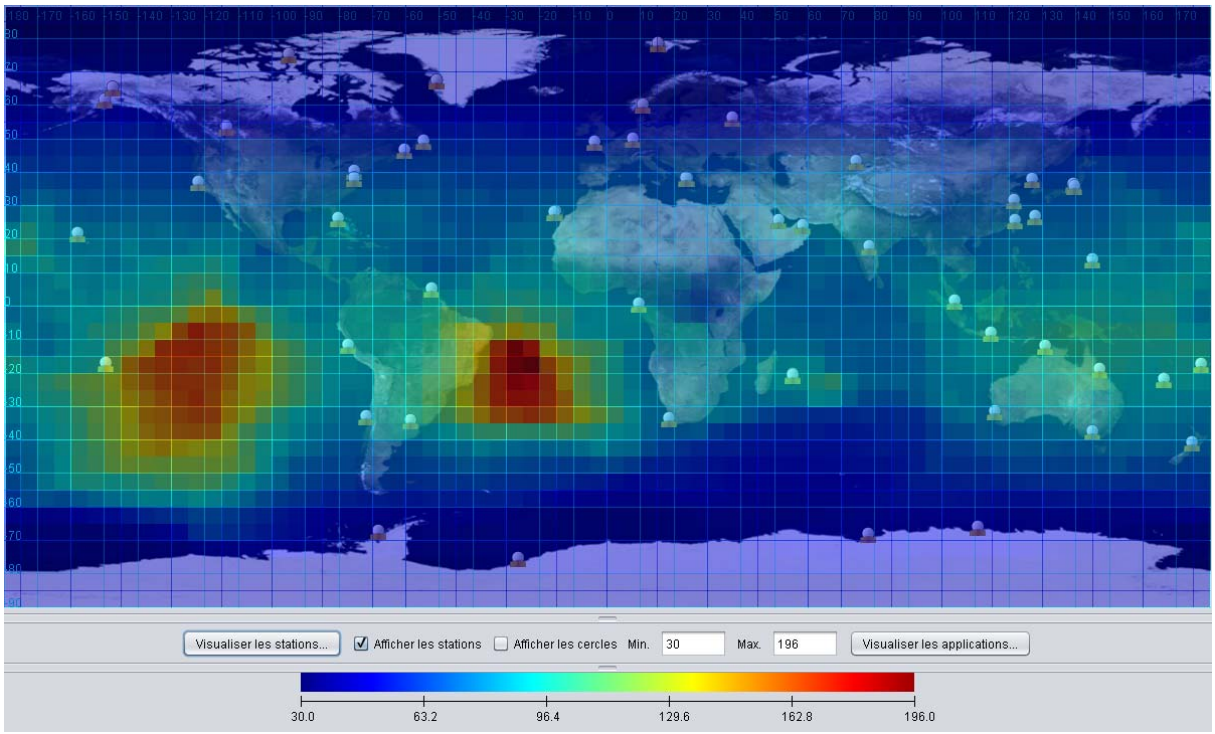


Figure 19 : Argos Data Mean Disposal Time in March 2011 (in minutes)

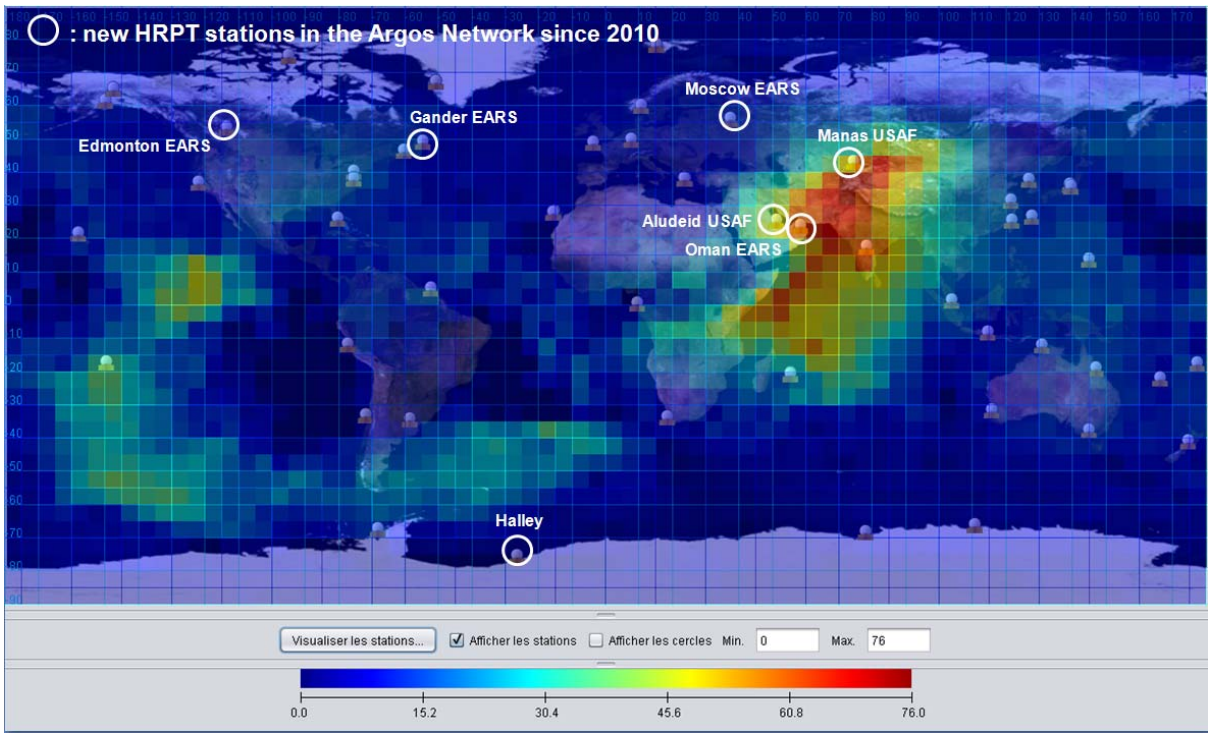


Figure 20 : Disposal time improvements* and new regional antennas locations
(*average time saved in minutes between March 2010 and March 2011 situation)

The improved performances in terms of data mean disposal time observed during the last year are mainly due to:

- improvements of the data retrieval time from HRPT ground stations to the Argos Data Processing Centres,
- greater availabilities over the year for some HRPT ground stations of the network,
- the extension of the METOP-A HRPT zone.
- new HRPT stations which have been incorporated in the Argos ground stations network since the last year (see white circles on the Figures 17 and 20).

3.2.3 Status of the Argos real-time stations upgrade project

This project (presented during the 43th Operation Committee) aims at upgrading a significant part of the network so that it is capable of acquiring data from NOAA, METOP and SARAL satellites. Since the receiver developed in the frame of the upgrade is "agile" and multi missions, it should be possible to perform a light update to receive data issued from the future satellites which will carry the Argos-4 instruments. This project is led by CLS with the strong help and support of CNES.

System design studies
The system studies, as presented last year, allow us to select a set of 19 stations which will be upgraded. Among these 19 stations (see Figure 21):

- 12 stations will be upgraded using our upgrade equipment (white circles)
- 2 new stations will be deployed (red circles)
- 2 stations will be upgraded by NOAA (yellow circles)
- 3 stations will be upgraded in partnership with Australia (orange circles)

Engineering
From an engineering point of view, the upgrade has been designed to be as flexible and easy as possible to be integrated in the existing station and to be operated. In that purpose:

- The interface with the existing station is strictly limited to a connection on the RF input;
- No interface is required from the station command and control system (except initializing the new sat to track);
- The upgrade doesn't modify the operational mission of the station since SARAL can be declared as a low priority sat.

During 2010, the new receiver has been developed and the acceptance tests have been successfully performed. At this time, 13 receivers have been manufactured and are ready to be installed in host stations.

Deployment
The deployment started early this year. Lannion (France), Lima (Peru) and Bali (Indonesia) were installed and operational. Hatoyama (Japan) has been postponed. Unfortunately, on April 4th, 2011 the Bali facilities were affected by a fire and all equipment were lost except the antenna and the radome. Tahiti and La Réunion are scheduled for the 2nd half of 2011. For the other stations:

- the discussions are on the run with EUMETSAT for EARS network stations
- the negotiations are on the run with Australia
- the last two stations upgraded by NOAA are to be confirmed.

New stations procurement
The two new stations are in AIT phase. The acceptance tests are done since June 2011. Contacts are on the run with the installation sites, respectively Ascension Island and Cape Town in South Africa.

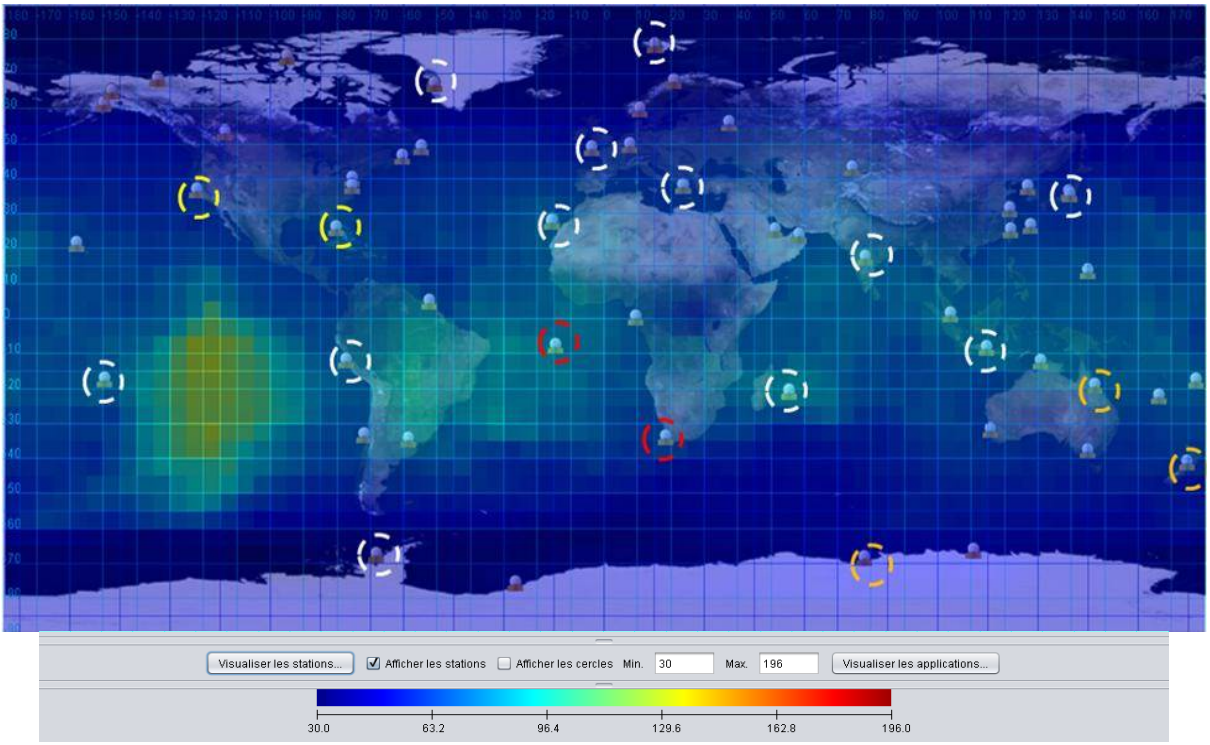


Figure 21 : Argos real-time stations upgrade project network

3.3 Processing centres

3.3.1 Operations

The two global processing centres in Toulouse and Largo were nominal over 2010 and first semester of 2011. 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 centre. CLS America moved to a new building in May 2011:

Figure 22 : CLS America new building

The disaster recovery architecture implementation was completed in 2010. The computer room is located into CNES Toulouse. Some of the Argos architecture components are DR compliant in order to improve services availability. But the main backup is based on the 2 global processing centres.

Figure 23 : Disaster Recovery Room located in CNES

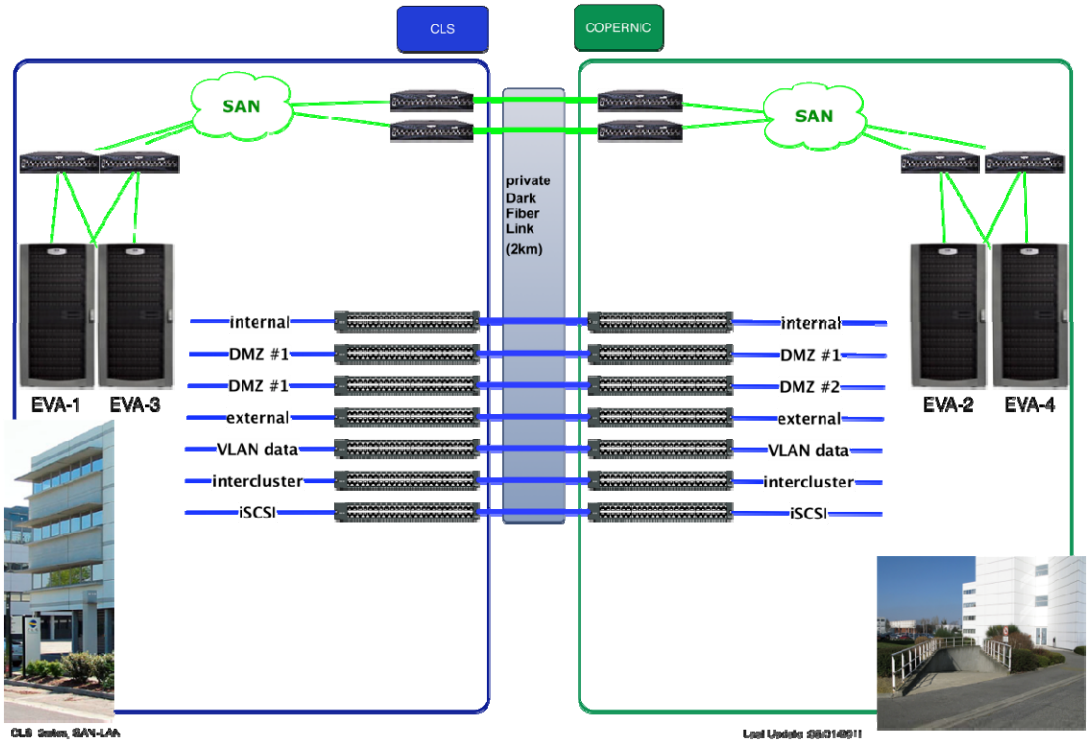


Figure 24 : Disaster recovery architecture diagram

Monitoring

In order to monitor the Argos processing centres, 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.

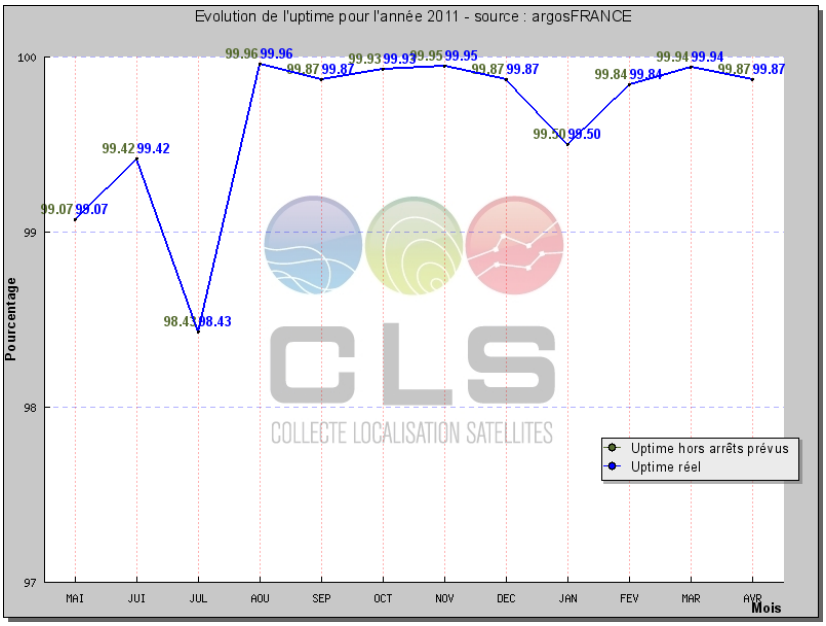


Figure 25 : ArgosWeb time availability in 2010 – 2011

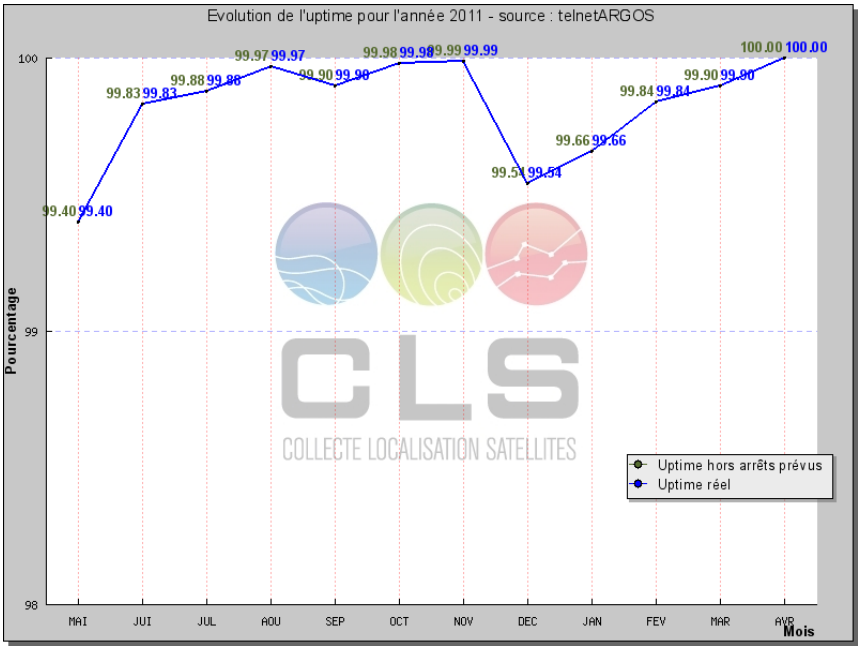


Figure 26 : ArgosServer time availability in 2010 – 2011

Data collection and location delays for sample platforms
'Sample' platforms are timing and orbit determination platforms. Every hour, the last data collection and location times for these three platforms are monitored. Collection and location latency on ID 108 (Fairbanks) is less than the 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 improvements in data and Argos location delivery time since 2008 due to a better real-time antennas network, a sixth operational Argos satellite in 2009 (NOAA-19) and enhancements of the Argos data processing performance.

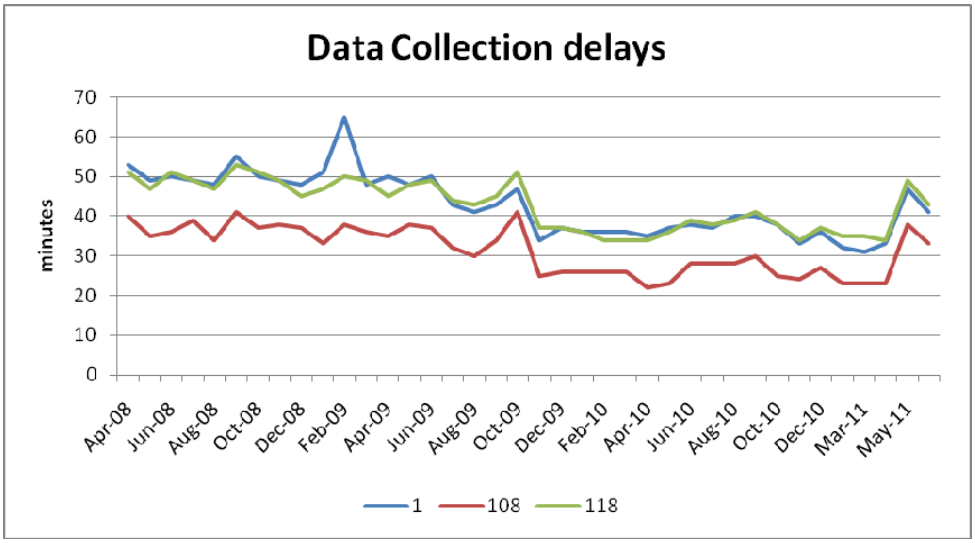


Figure 27 : Data delivery time for sample platforms*
(*Increase during May due to processing issue on 07 May (Database insertion Driver issue))

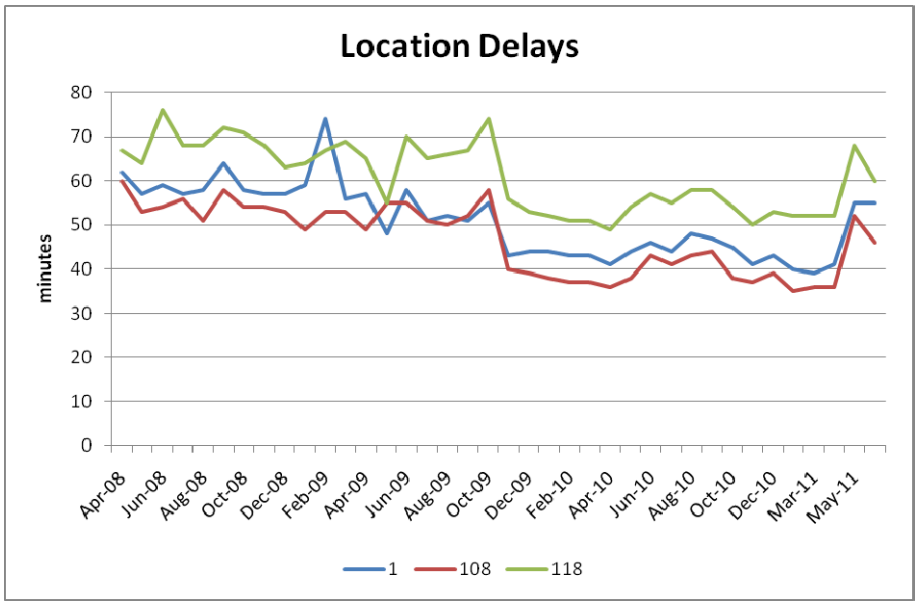


Figure 28 : Argos location delivery time for sample platforms*
(*Increase during May due to processing issue on 07 May (Database insertion Driver issue))

Percentage of Argos data available in less than one hour

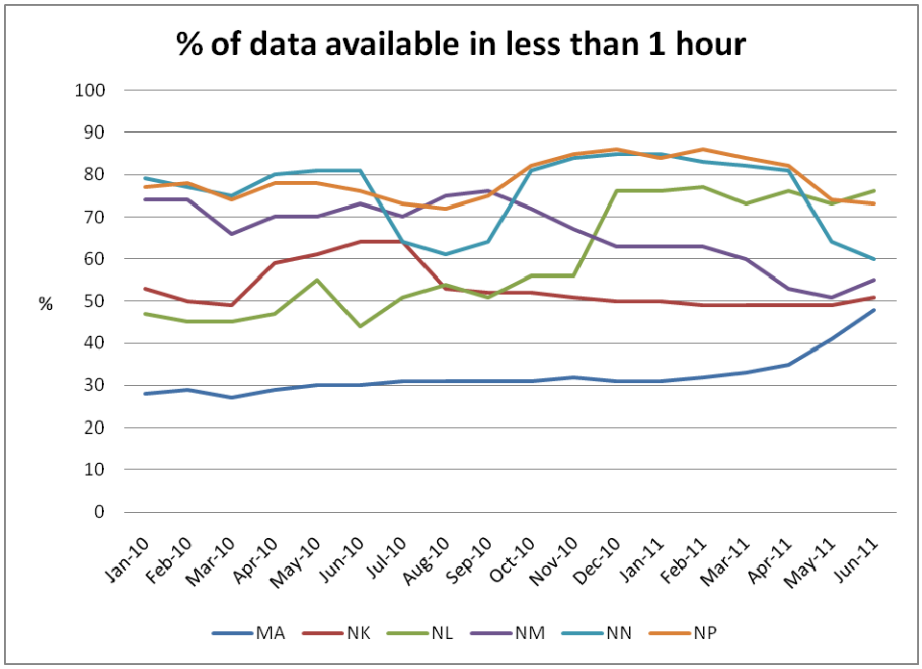


Figure 29 : Percentage of Argos data available in less than one hour*

*Percentage of data available in less than one hour means percentage of raw data processed one hour after its recording on board of the Argos Instrument. These statistics are representative of the real-time antennas network global coverage for each Argos satellite.

MA has a limited HRPT coverage due to HRPT problem onboard and the incomplete rollout of compatible stations: 15 real-time antennas compatible in July 2011. NOAA N and M, operational satellites, get a better coverage than NK and NL.

3.3.2 Architecture

Each global processing centre is autonomous and can work alone. In normal mode, both processing centres 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 a problem with one of the two centres, the other one stays alive and is capable of receiving, processing and distributing Argos data to ALL users. The switch to the remaining alive centre is completely transparent for the users. It means that the users continue to receive or to access their data, without changing anything on their side. CLS has a 99.5% system availability with three processing centres in back-up (two nominal and one disaster recovery)

Figure 30 : CLS Toulouse Global Processing Centre

The architectures of CLS France and CLS America processing centres are quite similar and based on the same principle. Each has the same three main subsets:

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

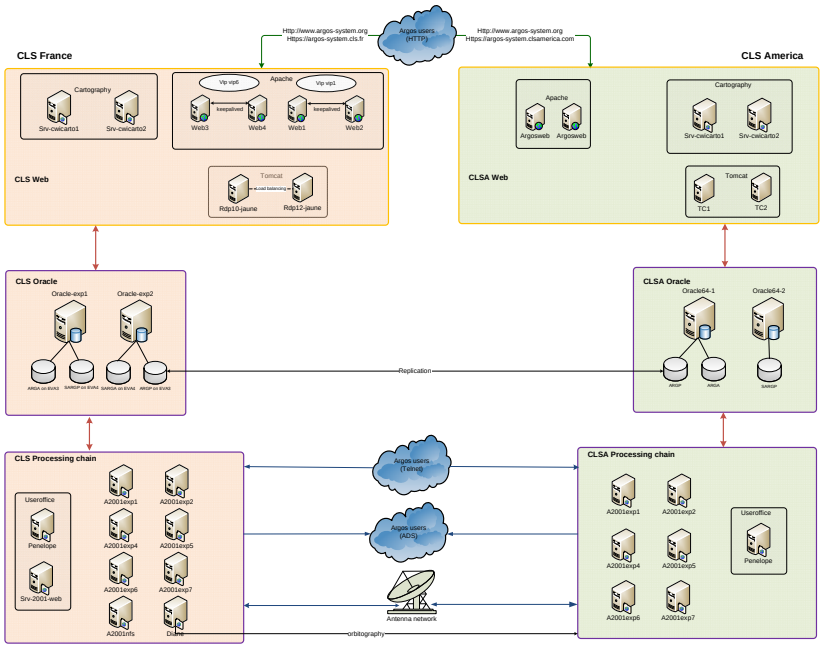


Figure 31: Architecture of the CLS France and the CLS America global processing centres

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.

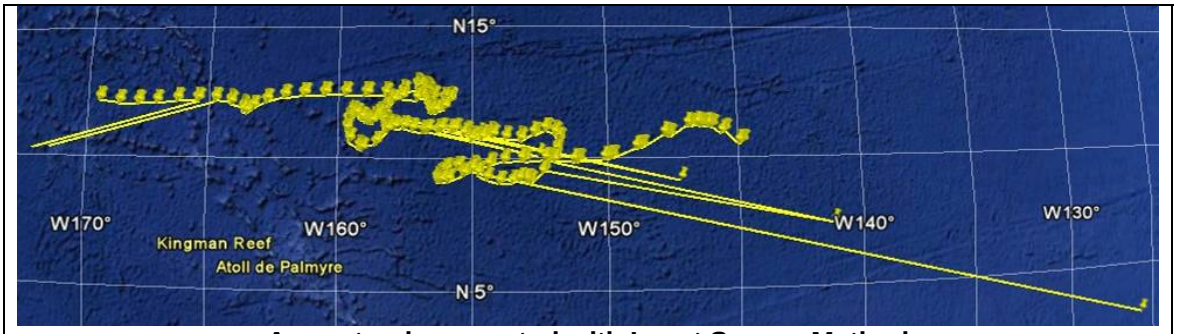
Oracle database service
At the heart of the computing architecture, the Oracle database is used to store the Argos declarative data as well as the processed data. In order to keep a perfect coherency between CLS France and CLS America centres (mandatory to guarantee the redundancy between both centres), an automatic mechanism of replication is implemented between CLS France and CLS America.

Web distribution
Based on a farm of Apache Web servers, the Web distribution allows the users to access their data using a Web cartographic interface. The service of maps is supported by two cartographic servers on which are running the mapping engines C-Map for the marine cartography and MapInfo for the terrestrial one. The application server is supported by Tomcat.

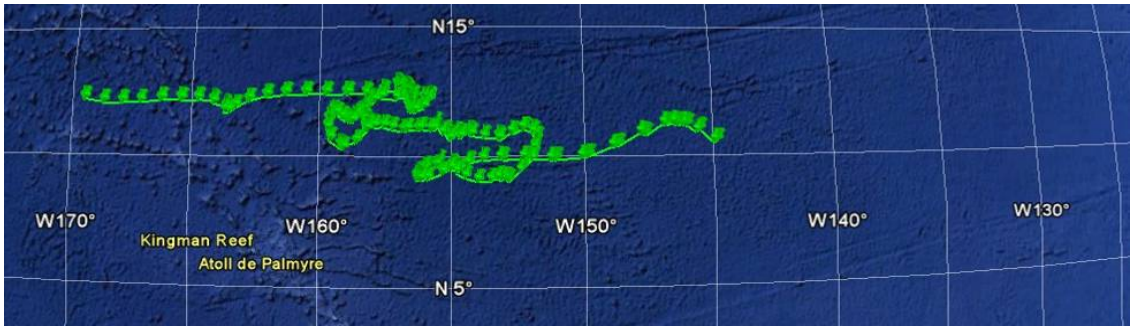
3.3.3 System improvements

As every year, several software improvements were implemented in 2010 and 2011 in order to fit with the user requirements. These application improvements have concerned:

New location processing
Now the users can choose between two location algorithms: Least square method ("original" algorithm proposed to the users up to now) or Kalman filtering algorithm (new algorithm proposed to the users). The Kalman filtering algorithm offers many advantages, especially in case of harsh conditions locations. It delivers more accurate locations and it also allows computing locations with only one message in certain conditions. CLS also offers to the users the possibility to reprocess locations from January 1st 2008 using one or the other algorithm.



Argos track computed with Least Square Method



Argos track computed with Kalman Filtering Method

Figure 32: Comparison of both Argos location calculation methods for an Argo float

Access to the Argos data using Web service
CLS has developed in 2010 a new machine-to-machine/automatic interface called Web Service in order to distribute Argos data. This modern alternative to ArgosServer (Telnet) makes it possible for Argos users to contact CLS's database directly, via internet, and receive their data in CSV, XML and KML (Google Earth) format. The Web Service is a free access tool and 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.

Improvement of the Argos web functionalities and performances
Several improvements have been made on Argos Web interface:

- Possibility of accessing the Argos web through a PDA or a smart phone,
- Possibility of creating or renewing a SUA,
- Possibility of requiring new Id numbers,
- Possibility of consulting the most recent observation,
- Possibility of displaying only messages with checksum OK,
- Possibility of displaying locations of the observations.

The problem on Argos web performances (slow access from some countries, especially in Asia) has been found and solved by a modification of Argos web architecture.

Multi-broadcast of Argos-3 commands
To improve the Argos-3 downlink service, it is now possible to download one Argos-3 command on all the active Argos-3 payloads. In this case, only the first acknowledge received is taken into account.

Monitoring of the satellites housekeeping telemetry
Many improvements have been made on this new module to keep it more operational (performance improvements, bugs correction, integration of several change proposals).

Improvement of the Argos data processing performances
The improvement of the Argos data processing performances is a permanent action. The major performance improvements concerned HK and TM processing and also value added processing.

Pay bills online
Through web interface it is now possible for the users to pay their bills online.

SARAL ground segment upgrade

SARAL (Satellite with Argos and Altika) will carry an Argos-3 and a Doris instrument as well as a band Ka altimeter. The purpose of this internal CLS project is to upgrade the Argos Processing Centres in order to take into account this new Argos-3 instrument which will be aboard SARAL.

The project includes the following activities:

- Developments: decoding and processing of telemetry plus computation of ephemerides.
- Qualification: integration of X and L-Band global and regional stations.
- Operation: update of procedures and instrument monitoring.

4. DBCP Requirements

4.1 Data Timeliness and Real-Time Antennas

This section covers the following action Items:

A. *JTA-30 Final Report, Para. 2.1 Status of actions from the previous meeting (JTA-29)*

Item 1. Implement strategy for the improvement of data timeliness.

B. *JTA-29 Final Report, Para. 2.2 Pending and continuous actions from previous meetings*

JTA-29 2.1 No. 3. To pursue negotiations for the installation of new antennas to cover the South Atlantic and the Indian Ocean regions.

JTA-29 2.1 No. 5. To ensure data from NOAA-15, 16, 17 and 18 are being received by IRD and Météo France stations in La Réunion Island.

JTA-28 2.2 No. 6. To install new antennas according to the following priority areas: the South Atlantic, the Indian Ocean, and the Southwest Pacific Ocean

C. *JTA-29 Final report, Para. 3 Actions and Decisions of the Current Meeting*

Item 3. To investigate the possibility of installing a third new station over the southern part of the Indian Ocean.

Item 6. To provide the data to JCOMMOPS relating to the new monitoring tool.

Minimizing the elapsed time between when a meteorological/oceanographic observation is collected and when it is inserted onto the Global Telecommunications system (GTS) is a high priority requirement of the DBCP community. By establishing operational regional satellite receiving stations at critical locations the data transmitted to the Argos system, and then immediately retransmitted by the satellite to the ground in real-time, can be received by CLS and disseminated within a very short period of time. CLS has been managing an evolving network of regional receiving stations for many years responding primarily to the expressed needs of the DBCP community for timeliness of their data. An update of the current efforts and plans is given below.

4.1.1 South Atlantic Region

Improving the Argos data timeliness continues to be a high priority for CLS. Data timeless in high latitudes has already begun improving with the addition of two new stations in Antarctica (in yellow on Figure 35):

- The Halley regional antenna operated by the British Antarctic Survey.
- The McMurdo global antenna for METOP-A operated by NOAA.

The three figures below are global snapshots in time of the calculated Argos Data Mean Disposal Times that illustrate the evolving improvements in the South Atlantic Region. The three time periods are:

- March 2011
- June 2011
- Mid-to-late-2012 (the time period when all HRPT antenna improvements are complete)

March 2011: This calculation takes into account improvements on METOP-A HRPT coverage (more stations compatible and communication on descending and ascending orbits).

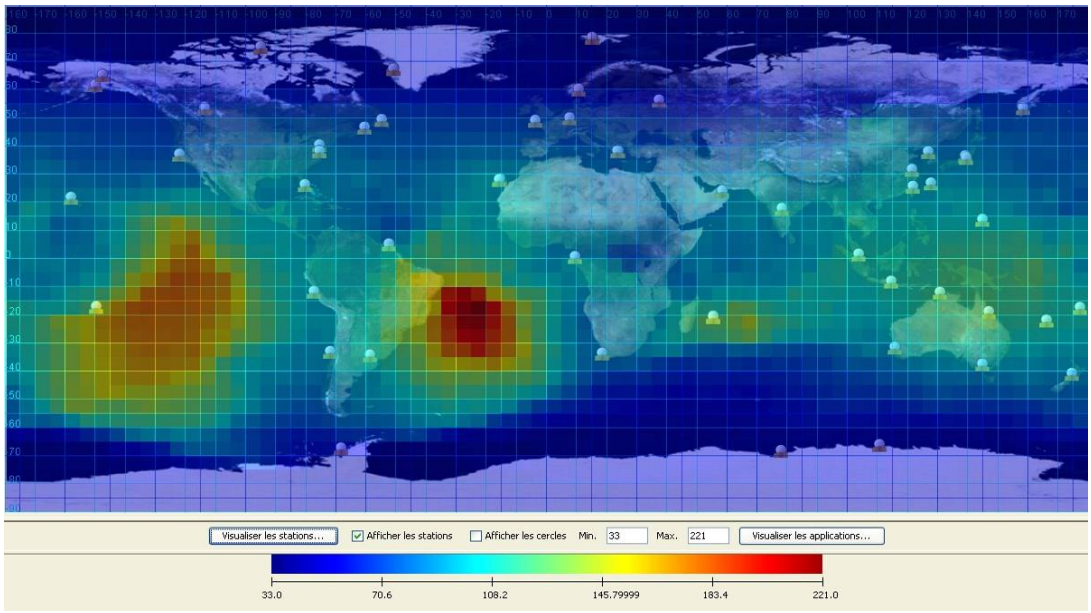


Figure 33 : Argos Data Mean Disposal Time March 2011

June 2011: This calculation takes into account:

- 3 stations upgraded : RSL Lannion already compatible with METOP-A before the upgrade, LML Lima still in the exclusion area = no METOP-A HRPT data and BLL Bali, which burned = no visible impact of the upgrade project for the moment
- 1 new global station for METOP-A : McMurdo in Antarctica very effective because data are sent from Antarctica to CLS in less than 20 minutes.(in yellow on Figure 35)
- The Halley regional antenna operated by British Antarctic Survey (in yellow on Figure 35)

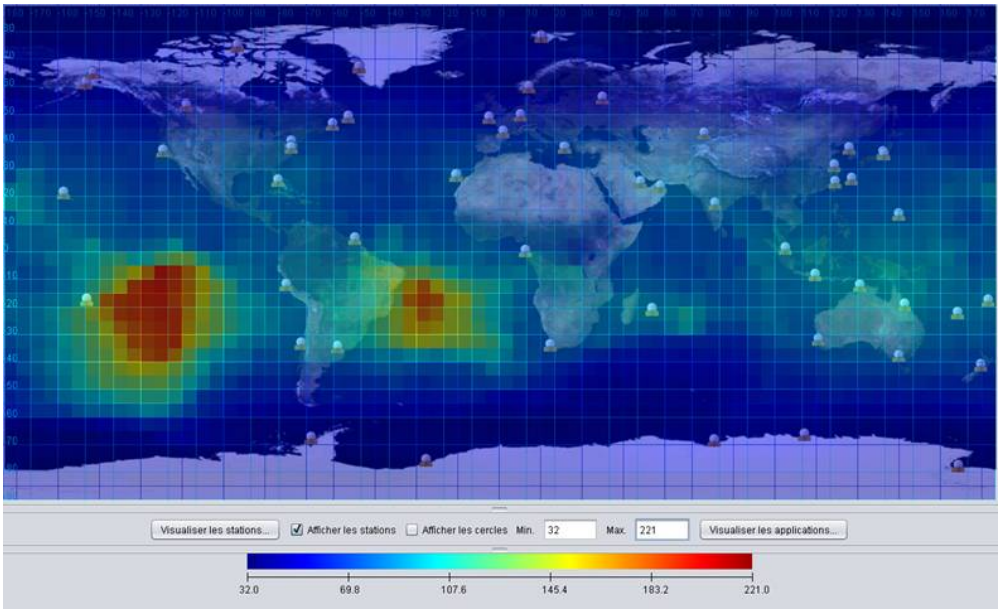


Figure 34 : Argos global Data Mean Disposal Time June 2011

Target Date of mid 2012: This calculation takes into account all of the actions of the Argos Real-Time Antenna Upgrade Project. The following are the specific actions that affect the South Atlantic region:

- Two new stations: one on Ascension Island (United Kingdom) and another in Cape Town (South Africa) will be added in the Argos real-time stations network in 2012. Both antennas are in AIT phase and contacts are on the run with the installation sites (in red on Figure 35).
- Two existing stations in Antarctica: Davis operated by The Bureau Of Meteorology (Australia) and Rothera operated by the British Antarctic Survey (United Kingdom), will be upgraded in 2012 to be capable of acquiring data from NOAA, METOP and SARAL satellites (in white on Figure 35).

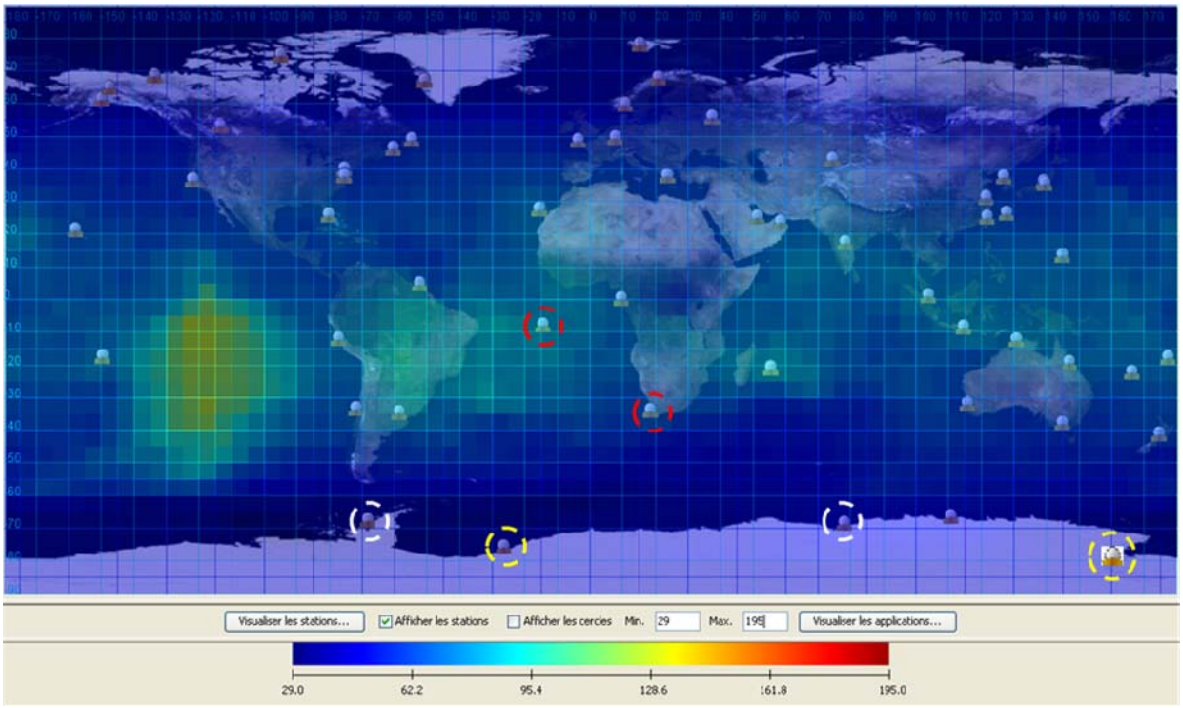


Figure 35 : Expected global data timeliness after all HRPT improvements

4.1.2 Indian Ocean Region

Improving the Argos data timeliness in the Indian Ocean continues to be a high priority for CLS. Efforts last year (2010) were focused on improving the performance of the existing antennas at Hyderabad and La Réunion Island. Also, in July 2010 CLS began receiving datasets from the EUMETSAT EARS antenna in Muscat, Oman for satellites N-15, N-16, N-17, N-18, N-19 and METOP-A. These actions have contributed significantly to improvements in the Argos data timeliness in the Indian Ocean. Additionally a USAF antenna in Al Udeid, Qatar was also connected during the past 12 months primarily to provide redundancy with the antenna in Muscat, Oman. This antenna in Al Udeid is currently experiencing technical problems and is not operational at the moment. Additionally, the installation in June 2011 of the antenna at McMurdo to collect METOP-A playback data (½ orbit) is expected to provide further improvement in the timeliness in this region.

In response to the continuing requests from the DBCP to improve data timeliness in the Indian Ocean CLS will upgrade the Muscat and La Réunion stations in 2011/2012 with the new Kongsberg receivers which will collect data from all the NOAA satellites, from METOP-A (and

beginning next year, from METOP-B) and also next year from SARAL. The station at Davis (Antarctica), operated by the Australian BOM is also scheduled to be similarly upgraded and is expected to have a positive impact on the data timeliness in the southern Indian Ocean. Figure 35, above, represents the expected data timeliness resulting from these improvements. CLS will work closely with the DBCP, in particular Météo France, to monitor and measure the impacts of these improvements as they are put in place.

4.1.3 Southwest Pacific Ocean Region

Improvements in the performance of the existing antenna in Tahiti have contributed to some extent in improving the data timeliness in this region. This antenna in Tahiti is also scheduled to be upgraded with the Kongsberg receiver in 2011/2012. It is expected that this will improve timeliness even more, as illustrated by comparing Figures 34 and 35 above.

Finally, the effect of installing an antenna on Easter Island in the southwest Pacific on the data timeliness in this region has been examined. Figures 36 and 37, below illustrate the calculated timeliness before and after installing an antenna on Easter Island. Note the significant improvement in this region.

Please note carefully that there is a difference in the colour scale between Figures 33, 34 and 35 and Figures 36 and 37. Also note that installing an antenna on Easter Island is not currently in the budget of the Argos Real-Time Antenna Upgrade Project.

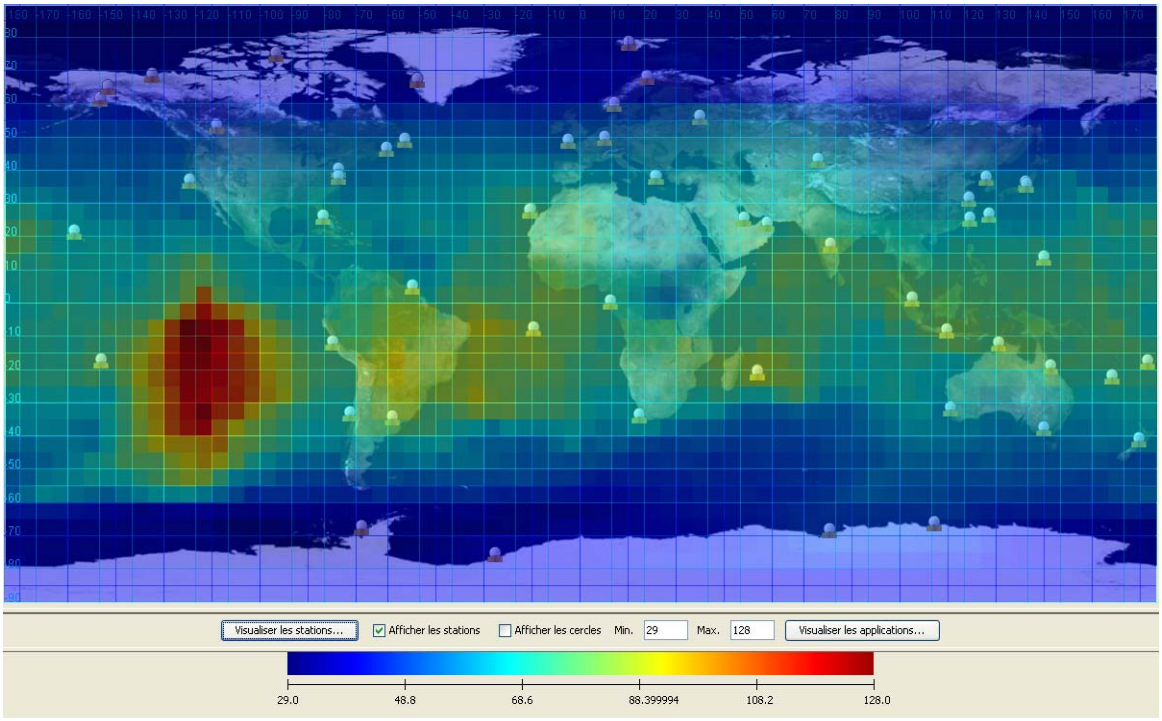


Figure 36 : Expected data timeliness before installing Easter Island antenna

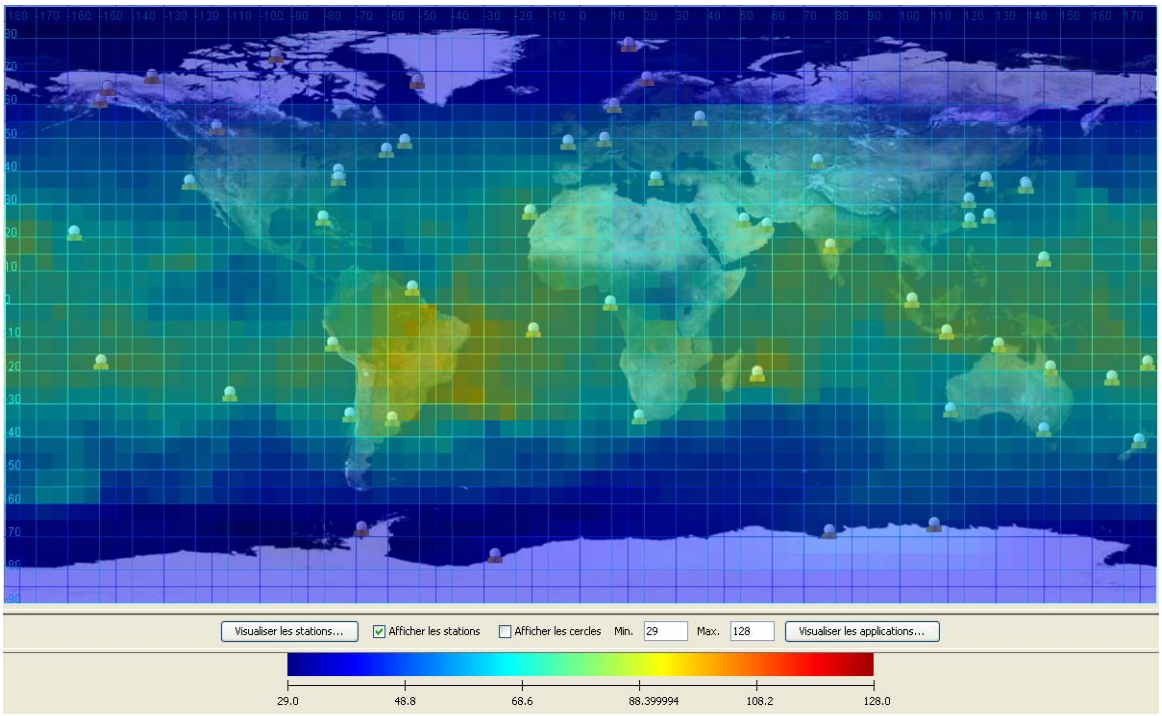


Figure 37 : Expected data timeliness after installing Easter Island antenna

4.2 Argos-3 Pilot Project (JTA-30, Action No. 4)

The objectives of the Project are to:

i) Independently and objectively evaluate Argos-3 for use by the global data buoy community.
ii) Foster Argos-3 integration by buoy manufacturers.
iii) Provide Argos-3 equipped drifting buoys to the community for evaluation.

The first phase of the project began in September 2009. A total of 32 Argos-3 buoys (including 11 equipped with barometer) manufactured by Clearwater (10), Pacific Gyre (10), Metocean (10) and Marlin-Yug (2) were deployed in Pacific and Atlantic Oceans, Black and Mediterranean Seas, during that first phase in order to test Argos-3 capabilities all over the world. All of these buoys stopped transmitting at various times during 2009-10.

The second phase of the project began in September 2010. A total of 28 barometer buoys - Clearwater (10), Pacific Gyre (10) and Marlin-Yug (8) - were purchased and so far 24 of these buoys have been deployed in the Tasman, Mediterranean, Ligurian, South Pacific, North and South Atlantic Seas.

Thanks to Dr Luca Centurioni (Scripps Institution of Oceanography), the chairman of the Argos-3 Pilot Project steering team, ship opportunities were well coordinated for deployment of the drifters by our DBCP colleagues around the world. The Argos-3 PP steering team is evaluating the performance of the buoys and a report will be presented by Dr Centurioni.

Figure 38 : Marlin-Yug Argos-3 SVP-B deployed in Tasman Sea (courtesy J. Fletcher)

4.3 Evaluation of the new Argos (Kalman Filter) location scheme (JTA-30, Action No.5)

CLS has developed a new location processing algorithm for Argos. The new technique continues to measure the Doppler frequency shift while introducing two significant additions: the integration of platform dynamics and the use of a Kalman filter to calculate positions. The new location processing has been subject to intensive operational testing for all Argos applications (animal tracking, buoys, floats, boats…). The tests were designed to gather comparative data between Argos and GPS positions for Argos platforms equipped with GPS receivers.

Before its operational implementation, several hundred platforms and 112,000 Argos positions have been tested to compare the two processing systems and determine positioning errors. This extensive comparison between Argos positions and GPS fixes (serving as reference) has demonstrated what the new algorithm can do and has generated the confidence needed to make this new service operational.

Platform Type	4 messages or more	Less than 4 messages
Birds	1-3 %	50-85 %
Land animals	3-12 %	34-48 %
Marine animals	6%	56 %
Boats	1-3 %	40-47 %
Buoys	2%	47 %

Figure 39 : Percent gain in the number of valid positions.

DBCP-26 recognized that the new Kalman filter location processing was a proposal to provide improved service but expressed some concerns. As a result the panel requested that CLS work collaboratively with representatives of the Panel and respond to requirements and results from the evaluation of the new Argos location scheme.

The panel designated Luca Centurioni (Scripps) and Rick Lumpkin (NOAA) to take responsibility for collecting requirements and evaluating the new algorithm. They released independently calculated assessments of the two position algorithms for a set of 44 drifters equipped with GPS.

Considering the results of these tests, and further to the request of GDP programme manager, all buoys have been switched to the new algorithm on **June 1st, 2011**. During the same period, CLS and JCOMMOPS also performed additional tests for the Argo community. A recommendation was made to switch all Argo floats at the same time, which has been confirmed and also implemented on **June 13th, 2011**.

In summary, Kalman filtering for location processing became available for Argos users on March 15, 2011. In less than four months, a 70% of Argos PTTs (85% of oceanographic platforms) have switched to the new processing algorithm, to benefit from more locations and better accuracy in their Argos positions.

4.4 Blind Orbit Support

*Extracted from OPSCOM-45 Minutes, May 30 – June 1, 2011 (**G-1-2. Blind orbit support**):*

Scott Rogerson presented an update on plans to use the NOAA Svalbard antenna for blind-orbit support of NOAA-15, 16, 17 and/or 18. Following meetings in March and May, the Office of Satellite and Product Operations (OSPO) Mission Operations Division (MOD), who are responsible for the command and control of NOAA POES, agreed to pursue a 30-day pilot programme with NOAA-16, tentatively planned for June/July 2011. The initial goal is to assess the operational feasibility of scheduling one satellite for blind orbit passes at NOAA Svalbard as a proof of concept. Additional satellites may be added if all goes well and if scheduling conflicts can be effectively managed.

Updated Information, August 12, 2011:

Testing was done with NOAA-15 in late June 2011. The tests were generally successful; some problems were identified and then fixed in July. The next round of testing is scheduled for late August 2011. As a reminder, the EUMETSAT antenna in Svalbard currently collects blind orbit data from NOAA-19.

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ANNEX IX

REVIEW OF THE STRUCTURE OF THE TARIFF AGREEMENT AND RELATED MATTERS

(Submitted by CLS)

1. Report and recommendations from the Operations Committee (OPSCOM-45)

1.1 Report on JTA-30 Meeting

For the JTA Chairperson's report, see ***Annex V***.

1.2 Status of US Programs

Mr Eric Locklear (US ROC) presented the status of US programs.

He opened the discussion by thanking the chairs and members of the OPSCOM for the invitation to present on the status of the US programs, and began with discussing the composition of their annual consumption. Mr Locklear noted that the dominant user family for annual usage remains oceanography, and is likely to be so for quite some time. He also went on to note the US Number of Projects Data is skewed and further investigation is necessary to understand why this anomaly in the data occurred.

Next, the Kalman Filter Method (KFM) versus the Least Squares Method (LSM) computational technique was discussed. Since the announcement in Oban of CLS' intention to completely switch to KFM, two US Global Drifter Program (GDP) researchers performed a comparative analysis between the two methods to evaluate location accuracy, drifter velocity accuracy, and the presence of biases in velocity and mean kinetic energy. In summary, the researchers concluded that KFM was better than LSM with a significant advantage in providing more "high quality" fixes and fewer "low quality" fixes per day. It is expected that the GDP will adopt KFM starting June 1st, 2011.

Next, Mr Locklear presented last year's slide regarding the differences between the assigned IDs, active IDs, and unused IDs and the difficulties managing IDs. Because of the concern with running out of IDs for future uses, the JTA created a 20-bit ID recovery project team to aggressively collect these unused IDs. The team consisted of a member of CLS, CLS-America, and the JTA Executive Team. The team was able to recover 1,050 20-bit IDs, which can be used to create over 16,000 new 28-bit IDs. Mr Locklear wanted the OPSCOM to know that their concerns are heard and actions are taken when necessary to address problems.

Mr Locklear concluded his presentation summarizing the overall US program by re-emphasizing that the US programs remain in a steady state mode, that the KFM will be adopted by the GDP program, and that ID management will continue to be a concern to be reviewed at the JTA.

A question was asked about the missing JTA charts that summarized usage by country. Mr Locklear responded that the charts are provided but were not discussed, and, in the future, these charts will be provided as an appendix to the report because of the growing size of the charts.

Lastly, Mr Locklear was asked about his position regarding the users' needs for a 3-satellite constellation versus the possibility of a 2-satellite constellation as presented the previous day. Mr Locklear stated that it is a difficult balance between users' needs and wants versus what is required and it is important to understand the economics of these competing priorities.

1.3 Financial Status of Agent

Ms Fabienne Jacq presented the meeting with the CLS methodology to derive the Argos basic costs to be attributed to the JTA, showing that the Argos costs have remained at approximately the same level between 2009 and 2010 with an increase of 2.6% and a total amount of 19,924,305 €.

When analysing the Argos basic costs (used to calculate portion of the costs attributed to JTA), it could be seen that basic costs had remained really stable over the year. With an activity growing significantly on the science side, nearly 7% PTT-years more of the scientific JTA applications, basic costs had been increased only by 3.5%. The Argos basic costs for fisheries had increased by 3%. This was due to the fact that the promotion effort had to be maintained in countries where Argos is established (Africa, Latin America, China and Russia).

Then, comparing incomes versus costs, it could be seen that JTA tariff reductions had been compensated by the increase of the use, with a positive balance at year end. On the fisheries, Argos was still positive and active and depreciation of investments was now decreasing. Nevertheless problems were evident with the sensitive use category, which was decreasing slowly in terms of incomes, with costs remaining important. In 2010, there was a negative balance as in 2009, and this is likely to persist in 2011.

In 2010, the costs to be attributed to the JTA were calculated at 7.15 M€, which is slightly above forecasts and JTA 5-year plan. But this had been compensated by a significant increase in use of 6%.

At the 30th JTA meeting, the following was agreed:

- In 2009, CLS recorded revenues from JTA participating countries at a level of 7.59 M€. This was slightly above the revenues expected from the JTA at 7.23 M€. Also in 2009, all platforms continued to benefit from the time slot calculations. This represented a few percent savings for every transmitter. As decided at past JTA meeting, the implementation of a fee for unused ID has contributed to JTA incomes at a level of 280 k€ while waiting for users to revert to CLS these IDs for reallocation.

- So in 2009, the JTA realized a small excess of 0.75 M€ which is going to add to the excess carried forward from the previous year of 0.91 M€ to bring the cumulative balance to 1.66 M€. The non JTA incomes decreased in 2009 from 6.72 M€ to 6.34 M€, but the corresponding applications are still exceeding their portion of the costs all together.

- Consequently, the non JTA accumulated loss at the end of 2009 is calculated at 5.20 M€.

- The financial status in 2009 confirms the expectations. It validates the decision taken at JTA 29th to adopt a new five year plan contemplating a significant tariff decrease right from year 1 of the plan.

- At the date of the meeting, we believe the JTA in 2010 will likely be able to pay its portion of the cost.

- It has been agreed that future JTA FYP tables will make reference to large programmes instead of OCO.

The 2010 tariffs were implemented as planned in the five-year plan in 2010:

- 0.5% budget was allocated to the JTA expenses;

- The 2011 tariffs to be implemented are in agreement with the five year plan;

- CLS was asked to produce a thorough analysis and rationale for an unused ID monthly fee and monthly ID charge to be submitted to JTA-EC (April 2011).

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

JTA EC-3 meeting (2 Oct 2010) agreed:

- A project to recover unused ID and report to next EC JTA meeting
- Letter to encourage ROC activity and presence to JTA

JTA EC-4 meeting (27 Apr 2010) agreed:

- Existing unused ID fee maintained for 2 years (dissuasive)
- 3 days meeting with ROC presentations, many attendees planned

In 2010, CLS recorded revenues from JTA participating countries at a level of 7.9 M€. This was exceeded revenues that were expected to be lower due to the applied tariffs reduction by 9%. This is due to 3 major events:

- The wildlife applications, supposed to increase by 5% in the plan, increased by more than 10% which was really promising.
- The oceanography applications (especially floats and large programmes) were supposed to be slowed down because of OCO Plans postponed by 2 years. This had not occurred and the OCO plan remained nominal with deployments of floats already in store.
- Lastly, the JTA decided to keep a dissuasive fee for unused ID that called for 300 k€ revenues.

So in 2010, the JTA had an excess of 0.75 M€ to add to the excess carried forward from the previous year, bringing the cumulative balance to 2.41 M€.

The non JTA incomes decreased again in 2010 from 6.34 M€ to 6.08 M€, but the corresponding applications are still exceeding their portion of the costs.

Consequently, the non JTA accumulated loss at the end of 2010 is calculated as 4.49 M€.

1.4 The Five Year Plan for 2010-2014

In euro	2010 actual	2011	2012	2013	2014
JTA Costs (M€)					
cost increase %	5,0%	5,0%	4,4%	2,0%	2,0%
Actual & Forecast	7,15	7,48	7,81	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**
Activity: Actual and *Forecast*					
Growth Active PTTs (%)	*5,7%*	*6%*	*7%*	*7%*	*7%*
Growth PTT-yrs (%)	*6,9%*	*1%*	*4%*	*4%*	*2%*
Active Ptfs (Total)	*12 398*	*12 607*	*13 465*	*14 435*	*15 494*
PTT-yrs (Total)	*3 296*	*3 018*	*3 135*	*3 261*	*3 322*
Active PTTs (w/o large program)	8 886	9 267	9 995	10 793	11 667
PTT-yrs (Buoys & Others)	*454*	*489*	*489*	*489*	*489*
PTT-yrs (floats w/o large pgm)	*86*	*93*	*96*	*99*	*101*
PTT-yrs (Animal)	*916*	*852*	*895*	*940*	*987*
PTT-yrs (Fixed stations)	*140*	*152*	*152*	*152*	*152*
Active PTTs (large pgm)	*3 512*	*3 340*	*3 470*	*3 641*	*3 827*
PTT-yrs (large pgm) Buoys & Others	*1 572*	*1 296*	*1 361*	*1 429*	*1 429*
PTT-yrs (large pgm) Floats	*128*	*136*	*142*	*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	1,67	1,80	1,94	2,10
Day unit income (M€)	4,08	3,65	3,77	3,90	4,04
Large pgm Day Unit Income (M€)	1,92	1,70	1,77	1,87	1,91
Total basic service expected (M€)	**7,60**	**7,01**	**7,34**	**7,72**	**8,05**
Additional revenue	**0,301**	**0,194**	**0,194**	**0,194**	**0,194**
Year Balance	0,75	-0,28	-0,27	-0,07	0,09
Carried forward from previous year	1,66	2,41	2,14	1,86	1,79
Cumulated Balance	2,41	2,14	1,86	1,79	1,89

2. Financial Statement

2.1 Annual Expenses (in k€) for Year 2010

		Personnel	Costs	Amortization	Total
Management		*381*	*492*	*0*	*873*
Operational costs					
	Quality	76	21	0	97
	Studies & development	633	175	345	1 152
	Processing center	1 731	332	210	2 272
	Client support/customer service	1 219	248	0	1 468
Sub-total Operational		*3 658*	*776*	*555*	*4 989*
Marketing costs					
	Promotion Communication	1 375	1 007	21	2 403
	Travels, hosting	0	375	0	375
Sub-Total Marketing		*1 375*	*1 382*	*21*	*2 778*
Administrative costs					
	Administration, finance, audit	1 331	415	5	1 751
	Costs for presence	65	982	97	1 144
Sub-Total Administrative		*1 396*	*1 397*	*102*	*2 895*
Taxes, bad debts provision & financial costs					
	Taxes	0	270	0	270
	Financial costs	0	322	0	322
	Provisons	0	311	0	311
Sub-Total		*0*	*903*	*0*	*903*
Total		**6 810**	**4 951**	**678**	**12 439**

Details of 2010 Expenses in k€

2.2 Details of Amortization Items in k€

	Amortizatio	Description
Operational costs		
Quality	0	
Studies & development	345	*GTS, SSA3, Argos 2001*
Processing center	210	*Maintenance processing center (hardware and software)*
Sub-total	**555**	
Marketing costs		
Promotion	5	*Exhibit, International meetings, User Conference Costs*
Communication	16	*Exhibit, documentation Costs*
Sub-total	**21**	
Administrative costs		
Management control	5	*Accounting system, Argos registred mark*
Costs for presence	97	*Office furniture, safety, general equipment*
Sub-total	**102**	
Total	**678**	

Details of Amortization Items in k€

2.3 Annual Incomes in M€

Incomes (M€)	**2009**	**2010**
JTA	7,59	7,91
Non JTA	6,33	6,08
Total	13,93	13,99

JTA and non JTA 2009, 2010 Incomes in M€

2.4 Details of JTA and non JTA Incomes and Expenses in M€

	2009	2010	
Incomes			
JTA CLS	3,38	3,56	
JTA CLS America	4,21	4,35	
	7,59	**7,91**	**+4,13%**
Non JTA CLS	5,77	5,54	
Non JTA CLS America	0,57	0,54	
	6,33	**6,08**	
Total basic Argos incomes	**13,93**	**13,99**	**+0,44%**
Expenses			
Total basic Argos expenses	**12,28**	**12,44**	**+1,30%**

Detail of JTA and non JTA Incomes and Expenses in M€

2.5 JTA Annual Balance (in M€)

	2009	2010
JTA Operating Costs	6.84	7.15
JTA Income	7.59	7.90
Difference	0.75	0.75
Accumulated Difference	1.66	2.41

The difference remaining from 2008 was 0.91 M€.

For year 2010, the costs to be attributed to the JTA, calculated using the methodology developed by CLS since 3 years now, are 7.15 M€.

3. Other Issues Relating to Argos Funding

3.1 Management of ID numbers

Analysis

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.

To provide a mathematical basis for future projection, CLS created a simple model that takes into account several parameters including the number of IDs currently assigned, the number of 28-bit IDs currently available, the number of 20-bit and 28-bit IDs returned each year, and the number of 28-bit IDs assigned each year. The model was run using three different scenarios and the results were presented and discussed during the JTA-30 meeting.

The analysis indicated clearly that returning 28-bit ID numbers can help, but the long-term availability of 28-bit ID numbers for assignment depends critically on the return to CLS of the currently assigned 20-bit ID numbers.

Recovery 20-bit IDs project

In recognition of the above analysis, CLS designated a project specifically dedicated to the recycling of 20-bit ID numbers. This project plan included the following:

- Identify the programmes with 20-bit IDs.
- Contact the programme managers to request the recycling of 20-bit IDs.
- Keep a monthly record of:
    - the number of programmes contacted with the numbers of IDs within each programme;
    - the number of 20-bit IDs returned/recycled (these IDs will be kept in a recycling programme for between 1 to 5 years depending on the status of the ID at the time of return);
    - the number of 20-bit IDs added to the availability status;
    - the number of cases when a recycled ID transmitted through an oversight of the customer.

At the JTA EC-4 meeting held from 24-27 April 2011, CLS presented an update on the Argos 20-bit un-used ID project: 602 programmes with 7187 un-used 20-bit IDs were contacted requesting the return of the unused IDs.

The results far exceeded the expectations with the return of 1050 20-bit IDs.

Conclusions

The JTA EC proposal was to continue the recovery rate at the same pace for the near term and to continue the existing JTA unused ID fee for at least two years to encourage the management of IDs.

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

It was decided that Argos-3 pricing should be defined after gaining experience on the actual usage during the DBCP Argos-3 pilot project.

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ANNEX X

TERMS AND CONDITIONS OF THE GLOBAL AGREEMENT FOR 2012
(As agreed at JTA-31, 2011)

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, 2012.**

DEFINITIONS

"Platform-year" is defined as 366 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

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

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

24/10/11

Signed by CLS
Chief Executive Officer
Christophe VASSAL

17/10/2011

ANNEX XI

JTA OPERATING PRINCIPLES
(as agreed at the JTA-31 Meeting)

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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 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.

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. 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)

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 (see Annex XI-L).

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.

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*.

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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.

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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;

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.

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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;

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.

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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.

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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 and vice-Chairperson 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 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 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;

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 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.

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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 Chairperson and vice-Chairperson 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 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.

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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 in the preparation of reports, 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.

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

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 a term of 2 years with an optional 2-year appointment
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.

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.

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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)[3]

2. REPORT OF THE CHAIRPERSON OF THE JTA

    2.1 REPORT ON THE EC
    2.2 REVIEW OF ACTIONS

3. REPORT ON THE *YYYY* GLOBAL AGREEMENT

4. REPORT ON THE DEVELOPMENT OF CLS

5. REVIEW OF USER'S REQUIREMENTS AND ISSUES

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

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

8. THE FUTURE OF THE JOINT TARIFF AGREEMENT, INCLUDING REVIEW OF THE OPERATING PRINCIPLES
9. NATIONAL REPORTS

10. FUTURE PLANS AND PROGRAMMES

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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3 : 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

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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. Platform Types

Please complete the table below based on actual and estimated use for the current year.

	Average active PTTs per month	Total PTT-years
Buoys and others		
Profiling floats		
Animals		
Fixed stations		
TOTAL		

The objective of this section is to provide some data on platform distribution and use. Historical graphs and charts depicting the country's programme are encouraged.

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.

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ANNEX XI-L

LETTERS FROM THE IOC AND WMO TO THE JTA CHAIR, 2011

INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
COMMISSION OCÉANOGRAPHIQUE INTERGOUVERNEMENTALE
COMISIÓN OCEANOGRÁFICA INTERGUBERNAMENTAL
МЕЖПРАВИТЕЛЬСТВЕННАЯ ОКЕАНОГРАФИЧЕСКАЯ КОМИССИЯ
اللجنة الدولية الحكومية لعلوم المحيطات
政府间海洋学委员会

UNESCO

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E-mail: a.fischer@unesco.org

14 October 2011

Ref. AF/DM/lf

Subject: IOC Support to the Argos Joint Tariff Agreement (JTA)

Dear Mr. Grooters,

Thank you for your letter dated 8 June 2011 regarding IOC and WMO support to the Argos Joint Tariff Agreement (JTA).

Firstly, I would like to acknowledge the excellent contribution of the JTA over the last thirty years in expanding Argos usage and permitting a systematic decrease in the Argos tariff, to the benefit of IOC and WMO users of the Argos system.

I would also like to thank the JTA for its contribution since JTA-29 (Paris, 2-3 October 2009) to the IOC and WMO Secretariats that support this activity, noting that this serves the interests of all IOC Member States and WMO Members using the Argos System. As you know, the WMO Sixteenth Congress (Cg-XVI – Geneva, 16 May - 3 June 2011) supported the establishment of an International Forum of Users of Satellite Data Telecommunication Systems (Forum) covering a wide user base, and addressing remote data communication requirements - including tariff negotiations as needed - for automatic environmental observing systems coordinated through UN bodies such as IOC, FAO, UNEP and WMO. I should like to draw your attention to the fact that, assuming negotiations with UN partner organizations in this regard will reach a consensus, the IOC support to the JTA will in principle continue to be realized through the new Forum. From an IOC perspective, the plan is also in principle to develop those Terms of Reference in such a way as to include an item on the necessity of engaging in negotiations with satellite data telecommunication system operators for: (i) inclusion of specific user requirements in their respective development programmes; and (ii) pricing of data telecommunication services. In particular, specific tariff negotiating schemes such as the existing Argos Joint Tariff Agreement would, in all probability, eventually be managed through the Forum as a sub-programme.

Mr. Frank Grooters
Chairman, Argos JTA
Royal Netherlands Meteorological Institute
Postbus 201
NL-3730 AE de Bilt
The Netherlands

.../...

In this context, and assuming the JTA contribution to the Secretariats will continue, I would like to inform you that the IOC Secretariat[1] is committed to achieve the following tasks for the JTA, to be reviewed on an annual basis:

(i) Working with the JTA[2] 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[3] and administrative support to JTA participants who have been nominated by the JTA-EC to receive such assistance;

(iii) Assist in issuing JTA[2] meeting invitation letters to the Argos JTA Representatives of Countries (ROCs), with copies to IOC Action List of organizations participating in JCOMM activities;

(iv) Managing the documentation in preparation for the JTA[2] meetings;

(v) Participating at the Sessions of the JTA[2] and its Executive Committee meetings;

(vi) Preparing the Session's final report template, and collaborating with the Chair and the JTA[2] Executive Committee in recording the Session's decisions, and issuing reports of JTA[2] Sessions;

(vii) Finalizing the issuance and distribution of Session reports of the JTA[2] to IOC Member States and WMO Members, as well as to the ROCs and other participants;

(viii) Coordinating and communicating with the ROCs, the JTA[2] Chair and the Executive Committee on all related issues during the intersessional periods.

Again, I would like to thank the Argos Joint Tariff Agreement for its continued support to IOC and WMO observing programmes.

Yours sincerely,

Albert Fischer
Acting Head
Ocean Observations and Services

cc: JTA Executive Committee
Mr. Al Wallace, DBCP Chairman

1: Support to be shared with the Secretariat(s) of partner organization(s) as appropriate.
2: Presently the JTA, and then the Forum once established.
3: Using funds committed by the JTA through the DBCP Trust Fund at WMO

World Meteorological Organization
Organisation météorologique mondiale

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Mr Frank Grooters
Chairman, Argos JTA
Royal Netherlands Meteorological Institute
Postbus 201
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The Netherlands

GENEVA, 4 August 2011

Subject: WMO Support to the Argos Joint Tariff Agreement (JTA)

Dear Mr Grooters,

Thank you for your letter dated 8 June 2011 regarding WMO/IOC support to the Argos Joint Tariff Agreement (JTA).

Firstly, I would like to acknowledge the excellent contribution of the JTA over the last thirty years to expand Argos usage and permit systematic decrease in the Argos tariff to the benefit of WMO and IOC users of the Argos system.

I would also like to thank the JTA for its contribution since JTA-29 (Paris, 2-3 October 2009) to the WMO and IOC Secretariats that support this activity, noting that this serves the interests of all WMO Members and IOC Member States using the Argos System. As you know, the WMO Sixteenth Congress (Cg-XVI – Geneva, 16 May - 3 June 2011) supported the establishment of an International Forum of Users of Satellite Data Telecommunication Systems (Forum) covering a wide user base, and addressing remote data communication requirements - including tariff negotiations as needed - for automatic environment observing systems coordinated through WMO and partner organizations such as IOC and FAO. Cg-XVI emphasized that such a Forum should not only consider tariff negotiations but should take a very broad view of available technologies, options and prices as well as cooperative mechanisms through the Data Collection Platform (DCP) services of meteorological satellites. Cg-XVI requested the WMO Secretariat to approach the partner organizations, and coordinate with the Argos Joint Tariff Agreement with the view to establish such a Forum during the next intersessional period (2011-2015).

I should like to draw your attention to the fact that assuming negotiations with partner Organizations in this regard will reach a consensus, the WMO support to the JTA will in principle continue to be realized through the new Forum (once established). The goal is to have the Forum receive intergovernmental status and its Terms of Reference adopted by the WMO Executive Council in 2013, pending similar agreements from the partner Organizations. From a WMO perspective, the plan is also in principle to develop those Terms of Reference in such a way as to include an item on the necessity of engaging negotiations with satellite data telecommunication system operators for: (i) inclusion of specific user requirements in their respective development programmes; and (ii) pricing of data telecommunication services. In particular, specific tariff negotiating schemes such as the existing Argos Joint Tariff Agreement would eventually be managed through the Forum as a sub-programme.

In this context, and assuming the JTA contribution to the Secretariats will continue, I would like to inform you that the WMO Secretariat[1] is committed to achieve the following tasks for the JTA:

(i) Working with the JTA[2] 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[3] and administrative support to JTA participants who have been nominated by the JTA-EC to receive such assistance;

(iii) Issuing JTA[2] 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[2] meetings;

(v) Participating at the Sessions of the JTA[2] and its Executive Committee meetings;

(vi) Preparing the session's final report template, and collaborating with the Chair, and the JTA[2] Executive Committee for recording the Session's decisions, and issuing reports of JTA[2] Sessions;

(vii) Finalizing the issuance and distribution of Session reports of the JTA[2] to WMO Members, IOC Member States, as well as to the ROCs and other participants;

(viii) Coordinating and communicating with the ROCs, the JTA[2] Chair and the Executive Committee on all related issues during the intersessional periods.

Again, I would like to thank the Argos Joint Tariff Agreement for its continued support to the WMO and IOC Applications.

Yours sincerely,

W. Zhang

(W. Zhang)
Director, Observing and
Information Systems Department

cc: JTA Executive Committee
Mr Al Wallace, DBCP Chairman

1: Support to be shared with the Secretariat(s) of partner Organization(s) as appropriate.
2: Presently the JTA, and then the Forum once established.
3: Using funds committed by the JTA through the DBCP Trust Fund at WMO

ANNEX XII

NATIONAL REPORTS ON CURRENT AND PLANNED PROGRAMMES

2011 JTA National Report for Canada

Section 1. Overall Summaries of Programmes

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 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.

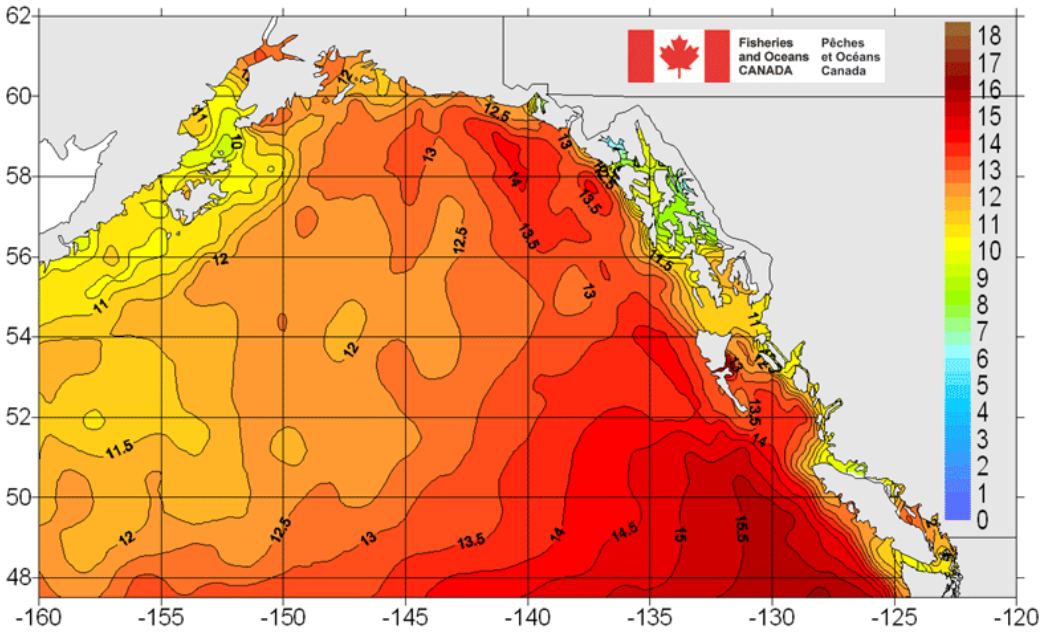
Only 23 operational programmes operated by 85 managers replied to the questionnaire, some overlapping and some reporting no activity. Among these, animal trackers dominate with strong representation from large ungulate and seabird research. Ocean moored and drifting buoys operated by Environment Canada are also significant programmes along with the Argo programme of drifting, profiling floats operated through the Department of Fisheries and Oceans.

Below are the responding programmes' summaries in order of their usage to date, from highest to lowest. All responders were very well 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.meds-sdmm.dfo-mpo.gc.ca/isdm-gdsi/argo/index-eng.html

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 is freely available to all and can be accessed through two Argo data centres.



NEUTRAL Summer Ocean Temperature (°C) at 0010 m depth

2. Ecology and Conservation of Northern Carnivores
Argos Programme Number 2846
Agency: University of Alberta

Large carnivore ecology, conservation, and management are the focus of projects in my lab. My interests are to conduct research to improve our understanding the ecology of large carnivores with specific reference to how they are affected by human activities. My research over the past 20 years has focused on polar bears but I have a broad interest in all carnivores and plans are to expand the number of species as opportunities arise. My main focus will be north of 60° N working in cooperation with territorial and federal government agencies. Current species under study are polar bears in the Beaufort Sea and Hudson Bay, grizzly bears in the Mackenzie Delta, and wolves in the Central Rockies Ecosystem.

Placing a GPS –Argos satellite linked telemetry collar on an adult female grizzly bear near Inuvik, NT. The objective of this study is to examine the habitat use and movements of grizzly bears in the oil and gas development in the Mackenzie Delta to develop mitigative measures.

3. **Arctic Fox Tracking**
   Argos Programme Number 3297
   Agency: Université du Québec à Rimouski

The main objective of our program is to better understand habitat use and large scale movements of arctic foxes throughout the seasons in the Canadian Arctic. Our program also includes red foxes, which are gradually expanding their range to higher latitudes. In addition to characterizing both species movements, our objective is to better understand interactions between these two species, factors influencing their movements such as food resources availability, sea ice composition, and juvenile dispersal in the current climate change context. This program will continue again for 2012 with 20 to 30 collars active.

4. **Caribou and Wood Bison Tracking in Northwest Territories**
   Argos Programme Number 2814
   Agency: Government of Northwest Territories, Department of Environment & Natural Resources, Fort Simpson

a. Two programs both with similar goals but with different species of northern large ungulates; boreal woodland caribou and wood bison.
b. Location information to address movements, range use, seasonality, calving timing/location, critical habitats at landscape level as well as finer detail.
c. Caribou, satellite and majority GPS collars, currently 25. Should be maintaining 25-30 for at least another 3 years.
d. Bison, satellite and GPS collars, currently 7. These will be monitored throughout remaining 14-20 month lifespan. After this future undecided on more collaring.
e. All animals range in SW NWT – Dehcho Region and into NE BC and NW AB.

5. **Bird Tracking at Environment Canada (EC)**
   Argos Programme Number 22375
   Agency: Environment Canada, PYR Region

We plan to continue to mark birds with implant transmitters for the foreseeable future. I have at least another 2 years of marking to do for Barrows goldeneye and then will move on to other species. Also, I have just arranged for a multi-year, national, standing offer between EC and CLS America so that requisitions for contracts can be set up easily by any EC researcher.

6. **Arctic Marine Bird Tracking**
   Argos Programme Number 2443
   Agency: Environment Canada

My study has been ongoing since 2003, tracking various types of Arctic marine birds to determine the timing of their movements, key habitats that they use when away from the breeding colony, and their use of international waters.

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

The Argos service is used to locate caribou. The data are used for scientific research and management purposes.

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

Through partnership with NRC-Canadian Hydraulics Centre, the Canadian Coast Guard (CCG), and the University of Ottawa, the CIS beacon program consists of the following:

Previous year deployments still transmitting (3 CALIBs):

1. One CALIB from 2009, (PTT 16795) on an Ice Shelf fragment in the central Arctic; not expected to transmit much longer.
2. Two CALIBs from 2010, (PTT 12993 & 12994) both on Ice Shelf fragments; one in the high Arctic the other in the central Arctic.

2011 deployments and attempted deployments to date:

1. In March 2011, 4 CALIBs (PTT 11254, 12995, 12997 and 16797) were deployed along the Labrador Coast and transmitted for a period of less than one week (wind storm crushed the ice).
2. Also in March 2011, one CALIB (PTT 93694) was successfully launched in the central Arctic to replace PTT 16795 but failed to transmit after deployment (approximately two weeks of transmitting occurred during the testing period).

Anticipated further 2011 deployments:

1. Two CALIBs (PTT 16791 & 16792) are expected to be deployed in late August / September 2011 on multi-year ice floes or Ice Island fragments in the Western Arctic as part of the MetArea program.
2. One CALIB (PTT 16793) to be deployed in Baffin Bay in August 2011
3. One CALIB (PTT 11247) was expected to be deployed in July 2011, but its deployment is now uncertain.

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

We have 22 22-g solar GPS PTTs to track Ring-billed gulls marked in a breeding 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).
Ten birds were marked in 2010 and 14 in 2011 including two PTTs that were recovered from last year. A proportion of birds dispersed rapidly in late summer in all directions before they undertook they fall migration to their wintering areas. Some birds, however, remain in the Montreal area before leaving for the winter. We will continue our tracking until the PTT will last. Tracking the same birds over a year is particularly interesting to determine fidelity in the dispersal pattern.

10. **Canadian Arctic Marine Mammals Tracking**
    Argos Programme Number 1142
    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.

11. **Raptor Tracking**
    Argos Programme Number 2900
    Agency: Environment Canada

I will continue to track three species of raptors; peregrine falcons, short-eared owls and burrowing owls. Funding limits the sample size to 10 transmitters currently.

12. **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.

13. **Greater Snow Geese Tracking**
    Argos Programme Number 3082
    Agency: Service canadien de la faune, Environnement Canada

The main objective of the program is a large monitoring program on Greater Snow Geese. The Greater Snow Goose is an overabundant population and conditions that led to this situation are still present of even increasing (development of agriculture and climate changes) and the impacts on their staging and reproductive habitat are not well known. The Canadian Wildlife Service from Environment Canada had published a management plan. The conclusions of this project will help us for a good follow-up of the population and habitat, one of the objectives of the plan. The data from the Argos system will be used on two different projects. The first one is to validate the survey methodology used to evaluate population size from the annual spring survey. The proportion of radio marked geese detected during the spring survey will be used to estimate the proportion of the population not photographed by the survey. This will allow us to develop an index enabling us to evaluate the real population size, the management plan basis. The second project is the monitoring of bird migration from the East Coast of the United States where they overwinter, to the High Arctic (Bylot Island) where they reproduce. We want to learn more about the landscape structure of the habitat use by the geese and their related reproductive output. The Argos system is the only way to follow them over such a large range. Environment Canada (Canadian Wildlife Service) has three main partners in these projects, Université de Sherbrooke, Université du Québec à Rimouski et Université du Québec à Montréal. We are at the end of the project.

14. 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 expected 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. We intend to continue this project as we have 17 new PTTs ready to deploy. However, we were unsuccessful in catching snowy owls on Bylot Island in summer 2011. We will try again in summer 2012.

15. Canada Lynx
Argos Programme Number 3816
Agency: University of Alberta

Photo by Keith Williams

The Canada lynx is listed as a threatened species in the US under the US Endangered Species Act and lynx numbers are low in the southern portions of Alberta and BC. The agencies responsible for management of Canadian lynx and lynx habitat in both Canada and the US need information on which to make sound management decisions. The overall objectives of the Lynx Cycles and Barriers (Lynx CAB) project are to determine the distribution, habitat requirements, population dynamics, and dispersal potential of lynx in Canada and their connection with US populations.

Little is known about the habitat needs and selection of dispersing lynx. Even with adequate gene flow to maintain a genetically connected population, the cycles of lynx in the southern range may depend on substantial immigration from the northern core of the population. Tracking live lynx is the only way to add to the knowledge of habitat selection, which is vital to maintain lynx in the southern range and to maintain immigration corridors. Lynx are the most widely dispersing land mammals on earth, with recorded movements up to 1500km. Although in winter it is possible to snow track animals through some habitats, this only provides a restricted picture of habitat use compared to typical lynx movement. This is a unique opportunity to gather movement data on dispersing lynx, with a high likelihood of gathering data even when the subjects leave the immediate study area.

16. Tracking Problem Bears
Argos Programme Number 1015
Agency: Parks Canada

Photo by Harvey Barrison

Radio telemetry collars with Argos satellite and GPS technology have been used successfully for monitoring bears in scientific research projects in Kluane National Park for many years. We hope to continue to use this technology to monitor bears that have been involved in negative human bear interactions and have been deemed problem bears. These bears are difficult to monitor and in many cases end up being destroyed. By being able to capture and radio collar these bears and monitor their activities in real time it may provide additional opportunities for alternative management response (i.e. aversive conditioning) rather than simply destroying the bear. Continuing to utilize a limited number of GPS collars with Argos uplink capability on bears that we handle as part of our management activities may result in fewer control kills as well as an opportunity to augment existing data. As bears become increasingly

pressured by human development and activity it is crucial that we develop new methods to deal with human wildlife problems if we ultimately want to preserve grizzly bears and their habitat.

17. **Drifters in the Great Lakes**
    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. **Wild Turkey Habitat Study**
    Argos Programme Number 4196
    Agency: Ministère des ressources naturelles et de la faune

We will use GPS/Argos transmitters to identify precisely habitat used by wild turkey. We have put PTTs on 11 wild turkeys in January 2011 and followed them all year long. However, worst climatic conditions (heavy snow) during winter 2011 have resulted to a high mortality on wild turkey populations, as a result that actually only 2 animals are still alive. We expected to capture others wild turkey in January 2012 to increase the number of animals with PTT in our study site.

Section 2. Platform types in Canada (projected to year-end)

Overall, animal tracking accounts for 77% of usage in Canada and the total usage is not expected to exceed 210 PTT-Years.

	Average active PTTs per month	Total PTT-years
Buoys and others		41.7
Profiling floats		8.3
Animals		165.7
Fixed stations		0
TOTAL		215.7

Section 3 Technological Changes that affect User Requirements

CLS's Iridium services have benefitted the Argo program:
"Canadian Argo has just one float operating on the CLS/RUDICS system. This float has so far returned 110 perfect high-resolution profiles since launch in 2008. We conclude that this is a very successful process and we should be looking to increase the number of floats using Iridium."

I don't know if this is possible but it would be great if Argos could set up a program that automatically checks the PTT temperature sensor to determine if the bird has died (eg, temperature < 37 deg C) and then to warn the user. The problem is that if we don't check our data on a daily basis and if a bird dies and continues to transmit then it costs $ for data that are pretty well useless.

One issue has to do with the optimal duty cycle to use at different latitudes. In the sea duck world we want to lengthen the DC as much as possible to achieve PTT longevity to understand site fidelity across years while at the same time recording enough high quality data for each season, and not wasting data (and $). Some ON periods (eg 4-5h ON) generate lots of high quality data that we can't use due to pseudo-replication. We are experimenting with 2h ON periods and having some success… my point here is that Argos should be working with researchers directly (and supplying free data) to determine the optimum DCs, rather than the researchers having to experiment on their own and at their own expense.

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

The level of satisfaction was almost universally high in spite of some issues noted below.

"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."

"We continue to have issue with the rigidity of breaking a transmission day down into four 6-hour periods 0000-0559, 0600-1159, 1200-1759, and 1800-2359 UTC. This creates unnecessary restrictiveness when setting transmission schedules that are of 4-6 hours in length. Can't we be billed for actual usage given some minimum?" (To some extent, the 12 days per month capping addresses this issue.)

"Service Argos is a straight-forward system to use and the company, CLS, is easy to work with. I always find CLS employees to be highly responsive to my needs."

Development is encouraged toward smaller transmitters with reduced power consumption and more accurate locations.

Keeping the data available a bit longer would help one user:
Request: "access to more than the last 10 days of data ".

Lynx Tracking: "Level of satisfaction was high. Battery pack was bulky. Would have preferred to have a different VHF signal when battery was running low."

Section 5. Successful Programme Use of Argos

All users felt that their Argos-based programs were successful.

“The best news about Argos is that it has been around for a long time, worked well 20 years ago and continues to work well today. Well done.”

“The data provided through Argos has been instrumental in the successful completion of many Search and Rescue incidents since 1999 and has also contributed significantly to DND’s knowledge and understanding of ocean currents and conditions.”

“The extra services provided by CLS to upload beacon/buoy messages onto GTS is always a great help. It allowed the program to run relatively smoothly with minimal involvements from Operational Staff.”

“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.”

“Argos satellite data are essential to meet our needs of tracking remote breeding birds, and has been very effective for us since 2003.”

“In the past year I have successfully tracked peregrine falcons, short-eared owls and burrowing owls.”

Argos allowed us to track a male lynx as he completed a 200 km dispersal outside of the study area. The 2-hour GPS fix data was the first of its kind to be recorded on this type of journey.

We are still in the process of getting the data but we already shoed some fidelity in dispersal patterns of ring-billed gulls.

Telemetric data is central to study animal behaviour. The remoteness of our study area requires satellite transmissions to obtain geographic information on a regular basis. This data is a key aspect in the management of caribou.

For boreal caribou work has been essential in our providing information at the national level for critical habitat and ultimately the production of a recovery strategy. The quality of has been critical in describing how boreal caribou use the landscape in the southwestern Northwest Territories. First Nation’s people have begun to embrace the importance of the information provided by collared animals and have been using this scientific knowledge along with local traditional knowledge based studies to better understand boreal caribou ecology. A thesis and a number of scientific publications have resulted from the boreal caribou location data collected over the past 5-8 years in the NT. Now we have managed to keep the collars on the wood bison the information has been key in expanding the known distribution of occupancy of animals and highlighting their constant use of linear features on the landscape.

Section 6. Analysis of Local Operational Issues

“We have discovered a result that is not unexpected but has to be accounted for in our study of boreal caribou. In some localized parts of the boreal forest in this region there are relatively expansive stands of high density tall timber. Some of the individually collared caribou whose annual home ranges include these stands tend to spend more time in them than other caribou. The collars on these caribou that frequent these stands have had shorter life spans than anticipated and shorter than the other caribou in the study. We have attributed this to the increased length of time it will take to get a satellite fix from within these more heavily timbered stands.” Note: The Russians have similar problems and have developed a new antenna. It might be worth adopting their approach.

2011 JTA National Report for China

Section 1. Overall Summary

In 2011, there are 16 institutes or organizations operating 21 programmes using Argos to transmit data in China. The total of average active PTTs per month is 105.28 and profiling floats take up larger proportion which is over 50%.

Section 2. Platform types

Family	Average active PTTS per month	Total PTT-years
Buoys and others	27.14	10.68
Profiling floats	55.71	2.89
Animals	21.85	1.38
Fixed stations	0.57	0.265
Total	105.28	15.22

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

There is one thing we need propose. An institute may miss its data on some occasions. The charge for historical data is very high. Actually, the data had been paid. So, could it be free or cheaper for historical data requiring?

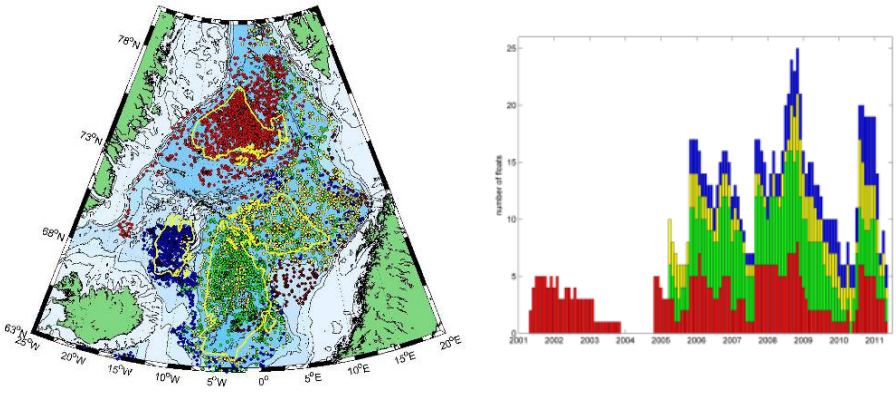
2011 JTA National Report for Germany

Section 1. Overall summary

1. Water masses in the Nordic Seas

Detlef Quadfasel, Detlef.Quadfasel@zmaw.de
Hamburg University, Zentrum für Meeres- und Klimaforschung, Insitut für Meereskunde, Bundesstr. 53, 20146 Hamburg, Germany
Argos Programme 592

The aim of the programme is to monitor the water masses in the different basins of the Nordic Seas with 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 and Lofoten Basin and since 2005 in the Iceland Sea. Changes in the water mass transformation processes and therefore also in the water mass characteristics in the context of climate change are examined. The floats are part of the international Argo programme. No more floats have been deployed in the report period. More information is available at http://www.ifm.zmaw.de/forschung/regionale/projekte/mersea/



Data profiles collected from Argo Floats in the period 2001-2011

2. Hamburg Ice Buoy Programme

Burkhard Bruemmer, Burghard.Bruemmer@zmaw.de
Meteorological Institute, ZMAW, University of Hamburg, Bundesstr. 55, 20146 Hamburg, Germany
Argos Programme 636

The project studies processes in key regions of the climate system using air crafts and data buoys. Examples are atmospheric cold air outbreaks and their influence on deep water production in the North Atlantic and the influence of cyclones on the advection of Atlantic waters into the Arctic**.** More information is available at http://www.mi.uni-hamburg.de/8.0.html

3. IFM-GEOMAR: Mooring Argos beacon

Jürgen Fischer, jfischer@ifm-geomar.de
Leibniz-Institut für Meereswissenschaften, IFM-GEOMAR, Düsternbrooker Weg 20, 24105 Kiel, Germany
Argos Programme 783

The aim of the project is to monitor subsurface moorings that get accidentally are at drift by 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.ifm-geomar.de/index.php?id=physoz&no_cache=1

4. Sea ice processes in polar regions

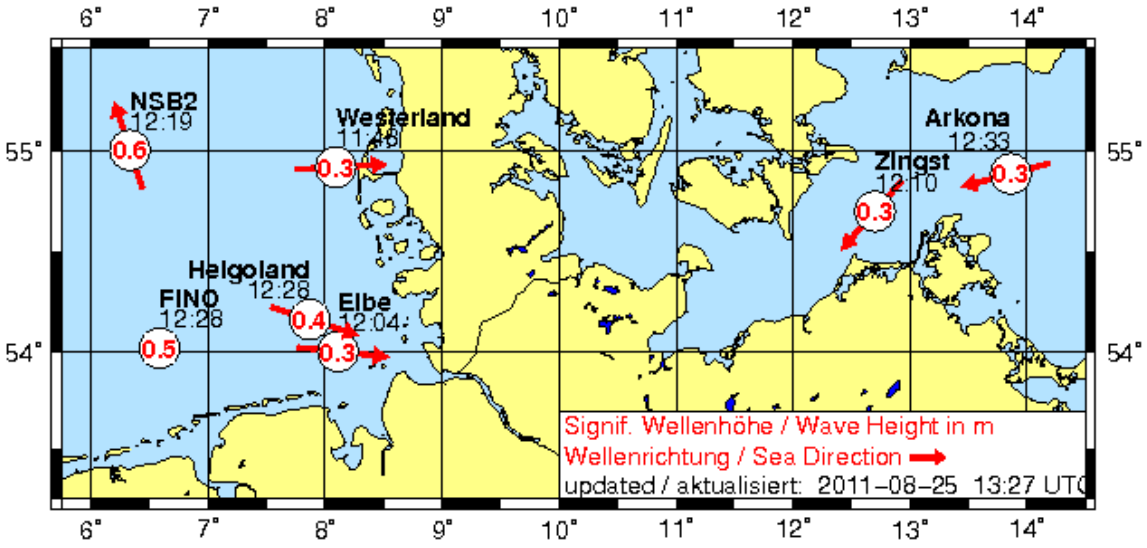
Gerd Rohardt, Gerd.Rohardt@awi.de
Alfred Wegener Institute, P O Box 120161, 27515 Bremerhaven, Germany
Argos Programme 919

The aim of the project is to monitor moorings with Argos watchdogs. More information is available at http://www.awi.de/de/forschung/fachbereiche/klimawissenschaften/messende_ozeanographie/instrumente/verankerungen/

5. Norwave

Dieter Schrader, Dieter.Schrader@bsh.de
Bundesamt für Seeschifffahrt und Hydrographie, Bernhard-Nocht-Str. 78, 20359 Hamburg, Germany
Argos Programme 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.

6. 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), Schloß Möggingen, Schloßallee 2, 78315 Radolfzell, Germany
Argos Programme 983

The International Cooperation for Animal Research Using Space (ICARUS) mission is working towards establishing a remote sensing platform for scientists world-wide that can track small organisms globally, enabling observations and experiments over large spatial scales. A white paper is available at http://www.icarusinitiative.org

Global satellite tracking of small animals by ICARUS –
International Cooperation for Animal Research Using Space.

7. 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 1126

The WWGBP has been active for thirty years now and today plays an important role in the promotion of raptor conservation and research on an international level. Its membership list today comprises over 3,000 raptor specialists and enthusiasts in all parts of the world, and anybody with an interest in raptors is welcome to become a member. The WWGBP tracks birds of prey world-wide since 1992. These raptors belong to 14 species. Resulting publications are available as PDF files at www.raptor-research.de. More information is available at http://www.raptors-international.de/index.htm

8. Migratory behaviour of Antarctic seals

Joachim Plötz, jploetz@awi-bremerhaven.de
Alfred Wegener Institute, PO Box 120161, 27515 Bremerhaven, Germany
Argos Programme 1535

The Marine Mammal Tracking (MMT) project of AWI and its Partner Institutions concentrates on the Southern Ocean. Variations in the foraging ranges and movements of marine mammals are an important source of information about environmental variability integrated over a wide range of spatial and temporal scales. The complex synthesis of data on marine mammal positioning and feeding locations with oceanography and bathymetry aims to identify those parameters which are characteristic for feeding areas of top predators in the respective regions, and will provide clues as to why some areas of the Antarctic Ocean are important to these animals while others are not. This will further our understanding of the distribution patterns of marine mammals in Antarctic and Sub-Antarctic marine ecosystems of the Southern Ocean. More information is available at http://www.wdc-mare.org/projects/mmt.html

Tagged southern elephant seal.

9. IFM-GEOMAR: gliders

Gerd Krahmann, gkrahmann@ifm-geomar.de
Leibniz-Institut für Meereswissenschaften, IFM-GEOMAR, Düsternbrooker Weg 20, 24105 Kiel, Germany
Argos Programme 1783

The gliders are equipped with Argos beacons to be located in case other navigational and communication devices fail. More information is available at http://www.ifm-geomar.de/index.php?id=glider

Testing a glider at sea.

10. Bigset

Olaf Pfannkuche, opfannkuche@ifm-geomar.de
Leibniz-Institut für Meereswissenschaften, IFM-GEOMAR, Düsternbrooker Weg 20, 24105 Kiel, Germany
Argos Programme 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 retrieval. The landers are usually deployed on the seafloor at depths of several hundred to 6000 metres, beyond the reach of remote sensing and conventional systems. More information is available at http://www.ifm-geomar.de/index.php?id=mg_observatorien

11. Tracking of penguins at sea

Klemens Pütz, klemens.puetz@ewetel.net
Antarctic Research Trust, Am Oste-Hamme-Kanal 10, 27432 Bremervörde, Germany
Argos Programme 1857

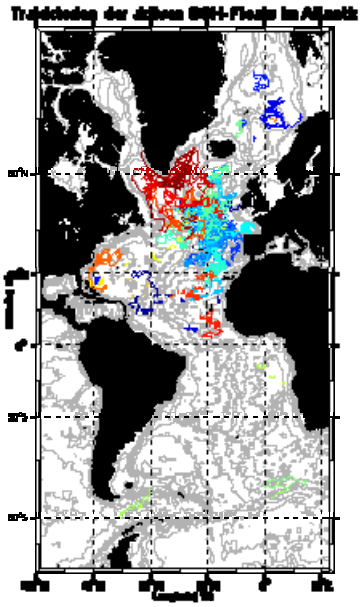
In this project the foraging behaviour of penguins in the Southern Ocean is investigated on a seasonal and inter-annual scale. The project is momentarily suspended but is expected to continue in 2012. More information is available at http://www.antarctic-research.de/

Equipment of Black-browed Albatross fledglings from South Georgia with satellite transmitters to study their postnatal dispersal.

12. German-Argo/BSH

Birgit Klein, birgit.klein@bsh.de
Bundesamt für Seeschifffahrt und Hydrographie, Bernhard-Nocht-Str. 78, 20359 Hamburg, Germany
Argos Programme 1895

The aim of the programme is to contribute to the international Argo programme with about 50 floats per year. Presently all 116 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 are changing inflow conditions for waters entering the North Sea. Main deployment areas will be the Atlantic and source regions in which deep water formation occurs in the polar areas. More information is available at http://www.german-argo.de

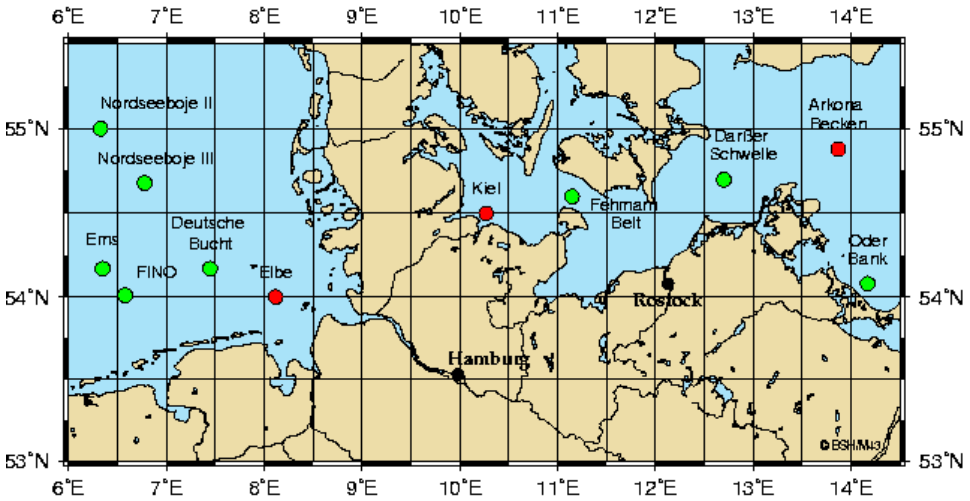


Positions and tracks of active floats in the BSH Argo programme in the Atlantic

13. Marnet, BSH

Kai Herklotz, kai.herklotz@bsh.de
Bundesamt für Seeschifffahrt und Hydrographie, Bernhard-Nocht-Str. 78, 20359 Hamburg, Germany
Argos Programme 2120

The Marnet programme 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 the Argos satellite system. Watchdog services are used for the other buoys. More information is available at

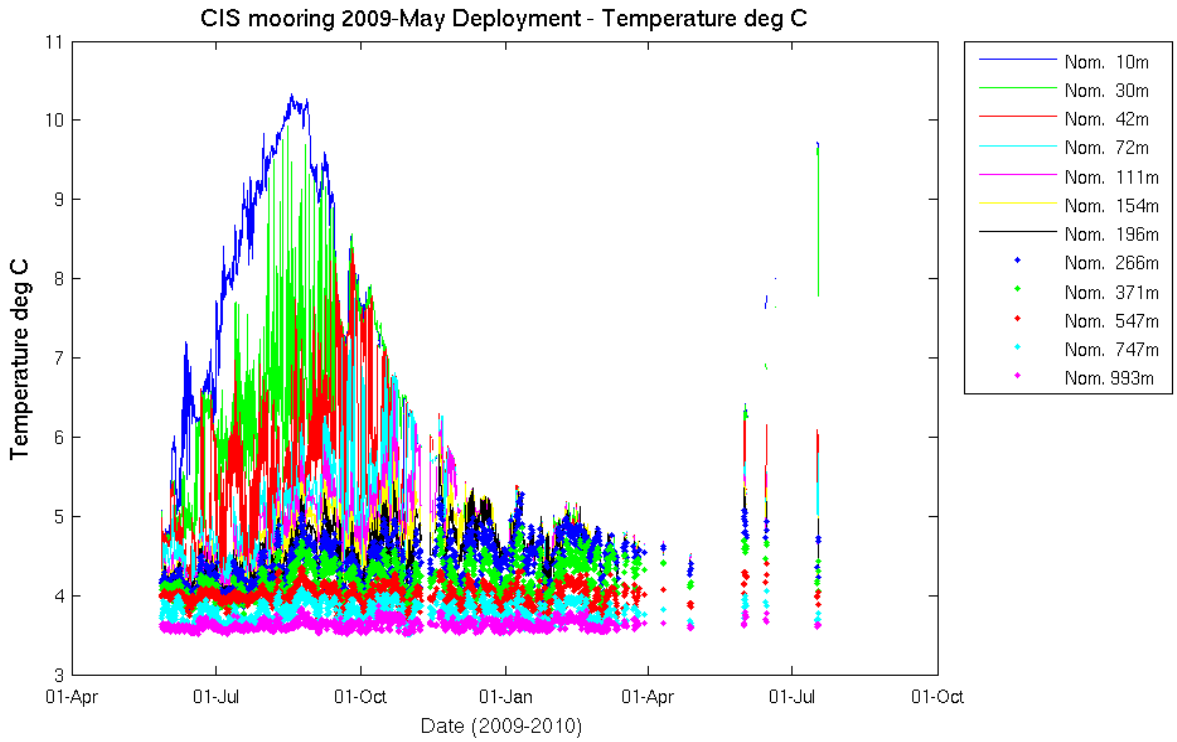


http://www.bsh.de/de/Meeresdaten/Beobachtungen/MARNET-Messnetz/index.jsp
Positions of fixed measurement stations in the North Sea and Baltic (MARNET).

14. IFM-GEOMAR: moored data buoys

Johannes Karstensen, jkarstensen@ifm-geomar.de
Leibniz-Institut für Meereswissenschaften, IFM-GEOMAR, Düsternbrooker Weg 20, 24105 Kiel, Germany
Argos Programme 2736

The project uses Argos telemetry to transmit mooring data in near-real time to land. A surface module collects data from subsurface instrumentation which are inductively coupled to the mooring wire. Subsequently the surface module transmits the data via Argos telemetry to a land station. More information is available at http://www.ifm-geomar.de/index.php?id=telemetrie and http://www.eurosites.info/cis/data.php



Temperature data from 12 instruments between 10 and 1000m depth from the central Irminger Sea. Data have been transmitted between June 2009 and April 2010 via an Argos-based surface telemetry buoy.

15. Iffezheimer Störche auf Reisen

Herbert König, kingscastle@t-online.de
Initiativgruppe Naturschutz, Severin-Schäfer-Str. 3, 76473 Iffezheim, Germany
Argos Programme 3100

The conservation initiative Iffezheim has ringed a stork in 2006 which hatched in Iffezheim. The Argos transmitter is used to study the migratory behaviour of this bird. More information is available at http://www.iniffezheim.de/

16. European White-fronted Geese Research Project, European white-fronted goose (Blessgans)

Helmut Kruckenberg, helmut.kruckenberg@blessgans.de
Europäisches Blessgans Forschungsprogramm, Am Steigbügel 3, D-27283 Verden (Aller), Germany
Argos Programme 3189

The project studies the European White-fronted Goose *Anser albifrons*: its migration, behavior, and ecology. The White-fronted Goose is the most numerous goose species wintering in Western Europe. 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 special internet tool (live tracking) based on GoogleEarth was developed in 2006, with support of Vogelschutz-Komitee eV and Alterra Institute

Wageningen. More information is available at http://www.blessgans.de

Reports / Publications:

Kruckenberg, H., A. Kondratyev, J.H. Mooij, C. Zöckler & E. Zaynagutdinova (2008): White-fronted Goose Flyway Population Status. – Angewandte Feldbiologie 2: 1-63. ISSN 1861-227X

Kruckenberg, H., G.M.M.J. Müskens & B.S. Ebbinge (2007): Satellitentelemetrie von Blässgänsen *Anser albifrons albifrons* auf dem Frühjahrszug 2006 und 2007. – Vogelwarte 45: 330-331

Kruckenberg, H., G.M.M.J. Müskens & B.S. Ebbinge (2008): Satellite tracking of Greater White-fronted Geese *Anser albifrons* during spring migration 2006 - preliminary results. – Vogelwelt 129: 338-342.

Kruckenberg, H., J. Bellebaum, G. Müskens, B.S.Ebbinge & A.Kondratyev (eingereicht): Tracking European Greater Whitefronts *Anser albifrons* by satellite transmitters during spring migration in 2006, 2007 and 2008. Ornis Svecica spec. issue.

van Wijk, R. E., A. Kölzsch, H. Kruckenberg, B. S. Ebbinge, G.J.D.M. Müskens & B.A.Nolet (eingereicht): Individually tracked geese follow the green wave during spring migration. OIKOS

Tagged bird (Geert) with its mate: (c) K Veldkamp

17. Montagu's Harrier

Klaus-Michael Exo, michael.exo@ifv-vogelwarte.de
Institut für Vogelforschung, "Vogelwarte Helgoland", An der Vogelwarte 21, 26386 Wilhelmshaven, Germany
Argos Programme 3338

The project studies the migration routes as well as the location of stopover sites and wintering areas of *Circus pygargus* (Montagu's Harrier, Wiesenweihe) breeding in NW- and NE- Europe, respectively. *Circus pygargus* is an endangered long distance migrant, breeding in N Germany and wintering in W Africa. A report can be downloaded at
http://www.fh-oow.de/ifv//downloads/96/wiesenweihe_dbu_abschlussbericht_ifv_jan_2009.pdf.

Montagu's harrier Rudi on its migration

18. Biota Maroc, Hamburg University
Manfred Finckh, mfinckh@botanik.uni-hamburg.de
Biozentrum Klein Flottbek, Systematik der Pflanzen, Ohnhorststr. 18, D-22609 Hamburg, Germany
Argos Programme 3455

Biota Maroc is part of the BIOTA AFRICA project invented by African and German researchers aiming at the establishment of research supporting sustainable use and conservation of biodiversity in Africa. The project tracked movements of three nomadic herds in the Atlas mountain range using Argos and GPS transmitters. More information is available at http://www.biota-africa.org/

Photos from Biota MAROC test-sites

19. 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 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 behavior as well as small scale feeding flights (study species: Herring Gull *Larus argentatus*, Lesser black-backed Gull *Larus fuscus*, Barnacle Geese *Branta leucopsis*). A report is available at
http://www.fh-oow.de/ifv//downloads/96/esa_report_sovon_cover_2008-10.pdf

Herring Gull marked M.AFH carrying GPS PTT 41750 on the beach of Texel, Netherlands, on 24 Oct 2007. Photograph by Pieter Veeling.

20. **Transdrift–TR**
Guenther Heinemann, heinemann@uni-trier.de
Umweltmeteorologie, Uniiverstität Trier, Behringstraße 21 (Campus II), 54286 Trier, Germany
Argos Programme 3635

The project uses data buoys to study the effects of polynas in the Laptev Sea for the system atmosphere-ocean-sea ice. More information is available at http://www.uni-trier.de/index.php?id=15138&L=2#c21459

21. Hobby falcon
Bernd Meyburg, BUMeyburg@aol.com
World working group on birds of prey and owls, Wangenheimstr. 32, D-14193 Berlin, Germany
Argos Programme 4126 (sub-programme of Programme 1126)

See: ***7. Migration of raptors***

22. Argo Floats
Jürgen Fischer, jfischer@ifm-geomar.de
Leibniz-Institut für Meereswissenschaften, IFM-GEOMAR, Düsternbrooker Weg 20, 24105 Kiel, Germany
Argos Programme 8165

The project studies the circulation and water mass anomalies in the tropics using autonomous profilers. The floats are part of the international Argo programme. More information is available at http://www.ifm-geomar.de/index.php?id=argo

23. Subsurface mooring monitoring
Gerd Rohardt, Gerd.Rohardt@awi.de
Alfred Wegener Institute, PO Box 120161, 27515 Bremerhaven, Germany
Argos Programme 8919 (sub-programme of Programme 919)

See: ***4. Sea ice processes in polar regions***

24. Norwave
Dieter Schrader, Dieter.Schrader@BSH.de
Bundesamt für Seeschifffahrt und Hydrographie, Bernhard-Nocht-Str. 78, 20359 Hamburg, Germany
Argos Programme 9948 (sub-programme of Programme 948)

See: ***5. Norwave***

25. Bulgaria
Bernd Meyburg, BUMeyburg@aol.com
World working group on birds of prey and owls, Wangenheimstr. 32, D-14193 Berlin, Germany
Argos Programme 10126 (sub-programme of Programme1126)

See: ***7. Migration of raptors***

26. Argo sub-surface
Olaf Boebel, oboebel@awi-bremerhaven.de
Alfred Wegener Institute, PO Box 120161, 27515 Bremerhaven, Germany
Argos Programme Number 10919 (sub-programme of Programme 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 to withstand the ice season during winter. The floats are part of the international Argo programme. Due to winter surface ice coverage the transmission of the floats is switching to Iridium, due to shorter 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

27. Red Kite
Bernd Meyburg, BUMeyburg@aol.com
World working group on birds of prey and owls, Wangenheimstr. 32, D-14193 Berlin, Germany
Argos Programme 11126 (sub-programme of Programme 1126)

See: ***7. Migration of raptors***

28. Seismic ice flow drifter
Gerd Rohard, Gerd.Rohardt@awi.de
Alfred Wegener Institute, PO Box 120161, 27515 Bremerhaven, Germany
Argos Programme 12919 (sub-programme of Programme 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. More information is available at http://www.awi.de/en/research/research_divisions/geosciences/geophysics/projects/seismology/seismology_ridges_move/agave2007/?0

A lonely seismic station on an ice floe

29. Imperial eagle
Bernd Meyburg, BUMeyburg@aol.com
World working group on birds of prey and owls, Wangenheimstr. 32, D-14193 Berlin, Germany
Argos Programme 21126 (sub-programme of Programme 1126)

See: ***7. Migration of raptors***

30. Eagles
Bernd Meyburg, BUMeyburg@aol.com
World working group on birds of prey and owls, Wangenheimstr. 32, D-14193 Berlin, Germany
Argos Programme 31126 (sub-programme of Programme 1126)

See: ***7. Migration of raptors***

31. 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 4852

About 40% of the birds using the Lower Saxony 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. 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 *Pluvialis squatarola* and the Bar-tailed Godwit *Limosa lapponica*, using satellite transmitters as well as geolocators.

Section 2. Platform types

	Average active PTTs per month	Total PTT-years
Buoys and others	34	
Profiling floats	~200	
Animals	hundreds	
Fixed stations	37	
TOTAL		

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

Programme 6 is in contact with Argos to establish a link to MOVEBANK http://www.movebank.org/#page=search_map .

Programme 2 mentioned precision problems using Argos location in ice drift measurements. Temperature data were spiky. Is there a problem with interference from other transmitters?

Programme 16 mentioned the need for individual bills for each transmitter. The project costs are sponsored by private associations which would prefer to pay only for the transmitter for their respective animal.

Programme18 mentioned precision problems using Argos locations. Mountain effects resulted in few and imprecise locations. The allocation of a single time slot for transmission was also problematic and the costs of transmission were high compared to the project budget.

The bird trackers in general mentioned higher accuracy needs in locations and needs for smaller and lighter transmitters.

The collection of data for the above table is difficult. Argos itself probably would be able to provide much more accurate numbers.

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2011 JTA National Report for India

(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 and moored buoys. From next year, India will also use Argos services for fish tagging

Section 2. Platform types

	Average active PTTs per month	Total PTT-years
Buoys and others	20	18.77
Profiling floats	80	6.32
Animals	20	5.51
Fixed stations	10	0.68
TOTAL	**130**	**31.28**

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.

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 satellites are required for the low latitude regions for better repeatability,

Section 5. Successful programme use of Argos

Low cost, low power one way communication is very much suitable for some platforms, but it will not cater all platforms.

2011 JTA National Report for the Netherlands

Section 1. Overall summary

Royal Netherlands Meteorological Institute

Dutch Argo (prog 2936).

Bureau Waardenburg (for three different customers)

Dutch Purple Herons *Ardea purpurea,* Eurasian Bittern *Botaurus stellaris* and Greylag Geese *Anser anser* with satellite transmitters (prog 3447). Herons and geese are equipped with transmitters. These include standard solar PTT transmitters as well as GPS-PTT transmitters. The aim is to track down migration routes and habitat use of birds in order to get information about protection of habitats. The project started in 2007 and was extended to 2010-2011. Further extension depends on results in the first years and available budgets.

Institute for Marine and Atmospheric Research (IMAU)

Land ice change and sea level change monitoring (prog 1238). As a contribution to the European Project on Ice Coring in Antarctica (EPICA), IMAU has installed at one time a maximum of eight Automatic Weather Stations (AWS) in Dronning Maud Land, Antarctica. Four are currently operational. These AWSs were installed on a transect ranging from the coast to the plateau Amundsenisen, and alongside the Swedish research stations Wasa and Svea. The goal of this project is to extend the knowledge of the climatological conditions of this particular part of Antarctica and to obtain a better understanding of the surface energy and mass balance of the Antarctic ice sheet. Therefore surface and subsurface (bore holes up to 600 metres) temperatures, relative humidity, wind speed and direction, snow height, air pressure, short and long wave incoming and outgoing radiation is measured. Together with GPS positioning the data are transmitted as two hour averaged values through the Argos system.

See for more information: http://www.phys.uu.nl/~wwwimau/research/ice_climate/aws/aws antarctica.html.

Besides the AWSs we have also a combined Argos / GPS system, Automatic Velocity Monitoring System (AVMS) in Svalbard and Antarctic. At the end of this year / beginning next year our total number of platforms will be:

AVMS Svalbard	13
AVMS Antarctica	6
AWS Antarctica	9

Free University of Amsterdam, Centre for World Food Studies

'Following the Afar' programme. The programme is in its initial phase and will start its activities by the end of 2011 or early 2012.

Natuurmomumenten

Protection of spoonbills along the west-palearctic (prog 3685). All PTTs are mounted on spoonbills and make contact with an Argos satellite every three days to send GPS data.

Section 2. Platform types

	Average active PTTs per month	Total PTT-years
Buoys and others		
Profiling floats	36	2
Animals	5-10 plus 9	2007-2011 In 2011 a maximum of 11 platforms was active
Fixed stations	28 (2011)	17 (2011)
TOTAL	**78-83**	**30**

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

Royal Netherlands Meteorological Institute
Highly satisfied – no problems

Section 5. Successful programme use of Argos

Bureau Waardenburg

The data handling and speed of data provision is satisfactory. Additional overviews of costs per transmitter ID provided by CLS make it very easy to split costs between our customers.

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2011 JTA National Report for New Zealand

Section 1. Overall Summary

The NZ JTA Argos usage in 2011, consists of one large programme (MetService Buoy programme), and 8 smaller programmes covering a range of animal tracking applications and land conservation projects. The animal applications track birds, fish and mammals. An application monitoring crater lake levels and lake temperatures on an active volcano has been ongoing since 2009.

Section 2. Platform types

The Table below shows the major 2011 NZ usage, but is incomplete because only 5 Users (out of 9) provided input to this report.

	Average active PTTs per month	Total PTT-years
Buoys and others	7	7
Profiling floats		
Animals	Number unknown	2+
Fixed stations	1	1
TOTAL	**?**	**Approx. 10**

Section 3. Technological Changes that affect User Requirements

During 2011, MetService NZ has participated in the Iridium and the Argos3 Pilot Programmes by deploying buoys of each type to trial the systems. The hourly data from the Iridium buoys is available on GTS by H + 12 which is very timely. If MetService was to move to using Iridium for all buoys this would significantly impact on NZ Argos usage. Under this section, a NZ seal tracker commented that ‘a change in algorithm was good’.

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

In general, a high level of satisfaction with Argos was expressed by Users. MetService reported that User Office support was excellent and the processing and QC of buoy data for GTS is highly reliable. The Crater Lake Monitoring Programme said that the Argos system met their requirements, but that extra data capacity would be helpful. Other users had no issues.

Section 5. Successful programme use of Argos

One user advised that many internationally peer-reviewed papers on satellite tracking of NZ sea lions had been published. The MetService buoy programme is an operationally excellent programme for which data has been delivered 24/7 since the late1980s. The Shark tagging programme had successfully tracked white shark migrations to the tropics and back, had recorded a dive to 1200m, and had identified diel vertical migrations in porbeagle sharks. The Volcano Crater Lake monitoring is recording the temperature and level or the lake very hour, even when the PTT is buried in snow. This monitoring gives confidence that eruption precursory heating of the lake will be detected.

Section 6. Analysis of Local Operational Issues

NZ Users have expressed satisfaction with the service provided by the Argos User Office in Melbourne. Users like the pay on consumption tariff, it is simpler for all and easier to understand and administer. MetService has some concerns about how the increased use of Iridium will impact on the future Argos JTA tariff price.

2011 JTA National Report for Russia

Section 1. Overall Summary

The use of the Argos system for scientific research in Russia increased in 2011.

Russian scientific institutions continue to track Siberian cranes, gray whales, beluga whales, Greenland seals, tigers, wolves, reindeer, and brown, polar and Tibetan bears. At the same time, new monitoring programmes have begun for gray seals, leopards, snow leopards, musk oxen and horses. Currently, teams of Russian scientists have started implementing tracking projects for walruses, snow sheep, wild deer, elk, and wild boar.

The success scientists have had in tracking wild animals has prompted the organizations that control hunting in Russia to begin preparing the first project to monitor hunted animals. The aim is to collect data needed for the government to make decisions about authorised hunting seasons and zones. Projects for monitoring reindeer and elk are currently being prepared.

Finally, the latest project, which is very important for Russia, concerns the tracking of large herds of domestic animals. There is a clear need for satellite monitoring of horses in the Sakha Republic (Yakutia), and of domestic reindeer in Chukotka, in the Sakha Republic, and in the northern European part of Russia. For the first project of this kind, we began tracking domestic horses 200 km from Moscow.

Most of the projects mentioned above use equipment manufactured in Russia. Russian transmitter tags have been developed that take into account the very specific operating conditions namely the cold, the difficult terrain, the dense vegetation, and electromagnetic noise. Russian specialists continue to develop tags that are more and more reliable electronically and mechanically.

For maritime and Arctic studies, Russian organisations are continuing their research on ocean currents and ice movements in the Okhotsk Sea and projects for monitoring pack ice and icebergs in Northern Russia. A network of oceanographic buoys equipped with Argos transmitters was deployed in the Black Sea. The interesting results from these projects help in promoting Argos services for Russian scientific institutes specialising in maritime studies.

In addition, in 2011, the first Russian programme for transmitting environmental data using fixed Argos stations was undertaken. This project aims to monitor the level and temperature of groundwater along the gas pipeline. Similar programmes are being prepared.

Most Russian maritime and environmental projects use Argos buoys manufactured in Ukraine. The close relationship of the Russian and Ukrainian organisations has helped foster cooperation between Russian users and Ukrainian manufacturers. However, to facilitate the success of similar Russian projects, there are plans to develop the range of Russian Argos buoys using Ukrainian equipment. The first joint project between Russia and Ukraine involves the development of an Argos buoy fitted with a parachute which can be dropped from an aircraft. Such a buoy could be conveniently deployed in the Arctic by an aircraft or helicopter and could help generate new applications of the Argos system.

Section 2. Platform types

	Average active PTTs per month	Total PTT-years
Buoys and others	**10**	**5**
Profiling floats	**0**	**0**
Animals	**34**	**8**
Fixed stations	**1**	**0.5**
TOTAL	**45**	**13**

Section 3. Technological Changes that affect User Requirements

Russian scientific organizations conduct their animal monitoring programmes under very unusual conditions of intense cold (down to -60ºC), difficult terrain (mountains, hills), dense vegetation (especially in the Far East), and electromagnetic noise (particularly in the southern European part of Russia and in the Far East

near the Chinese border). It is clear that these projects can only be successfully achieved by using equipment that is specially designed to withstand these conditions.

The Argos / GPS tags developed in Russia for monitoring wild land animals have the following features:

- Unlike collars made in other countries, which are composed of an electronic unit above and a battery unit below, the Russian Argos / GPS tag forms a single unit (electronics + antennas + batteries) attached to the collar just below the animal's head. Such a design eliminates the need for wires between the two units, which considerably enhances the mechanical reliability of the equipment;

- Despite this kind of design, and the less-than-optimal direction of the antenna, the tag is still able to define the GPS coordinates and to send Argos messages to satellites;

- to further enhance mechanical reliability, the Argos antenna is incorporated into the tag and protected by a layer of resin;

- the tag is capable of measuring the ambient temperature and then changing the operating modes depending on the season;

- Argos messages are encoded using a special code that can correct up to seven bit errors after the receipt of the message by the Argos system. Thus, nearly all of the messages received by the satellites can be read correctly in spite of the dense vegetation and electromagnetic noise;

- if problems occur in defining the GPS coordinates due to the specific behaviour of an animal, the tag changes the operating mode and begins transmitting short messages to facilitate the location of the animal, by exploiting the Doppler effect ;

The operating periods for Argos transmitters are adapted to each specific project and even to each area in which wild animals are captured, taking into account when Argos satellites are scheduled to pass overhead.

The development and implementation of this equipment has greatly improved animal monitoring in Russia. New products are being developed. The first Argos collar with a GPS / GLONASS receptor was recently commissioned. In addition, we have begun to study development opportunities for collars for the Argos-3 system.

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

The main problem in Russia is to ensure stable reception by satellites of messages from Argos tags subject to the unusual conditions of the Russian environment. Unfortunately, there is no way to solve this problem at the level of the satellite system or in the Argos data processing chain. Thus, the only way to solve the problem is to adapt Argos tags to these operating conditions. The development and adaptation of the tags is underway in Russia.

Section 5. Successful programme use of Argos

In 2010 and 2011, Russian scientists achieved some very impressive results using the Argos system. Their main success concerns research on the Okhotsk-Korean population of grey whales. After decades of studying grey whales near Sakhalin Island without the use of space technology, an Argos transmitter was attached to a whale in 2010. Thanks to this tag, scientists were able to discover that the whale migrated to California instead of migrating to Korean waters as had been expected. Activity within the framework of this programme has increased in 2011.

Moreover, some results obtained from other programmes (monitoring of beluga whales, reindeer, etc.) are extremely interesting and call into question previous theoretical knowledge of Russian scientific organizations.

Lastly, in 2011, Russian organisations began to implement projects for relating the movements of marine animals obtained through the Argos system to oceanographic data and ice conditions in the areas studied. The preliminary results of this research are interesting and work in this area will continue.

2011 JTA National Report for South Africa

Role Player 1 – South African Weather Service

Role Player 2 – Institute for Maritime Technology

Role Player 3 – Ezemvelo KZN Wildlife

Role Player 4 – Department of Environmental Affairs

Role Player 5 - Percy FitzPatrick Institute of African Ornithology and DST/NRF Centre of Excellence

Section 1. Overall summary

RP1: As active members of the ISABP, IPBIO and IPAB, the South African Weather Service uses the Argos System to transmit data from the drifting weather buoys as well as the fixed stations (on the Islands of South Thule and Tristan da Cunha).

RP2: South Africa receives, archives and makes available Argo float data to its user community and participating organizations via the Southern African Data Centre for Oceanography (SADCO). It is evident that the number of profiles from this source is increasing at a faster rate that from other sources and is especially so in the past 5 -10 years. It is a perception that the value of this resource has not been realized fully here yet, but that it is an extremely important to continue. A single example of a PhD student using Argo data is provided below in Section 6. It is proposed here that Argo Executives consider a new parallel technology to cover for the data shortfall on all continental shelf regions (see Section 3).

RP3: Argos GPS solar PTTs are currently being used for wildlife tracking purposes. These PTTs have been fitted to bearded vultures whose distribution range covers the Maluti-Drakensberg Mountain range in southern Africa. The project is part of the implementation of the Bearded Vulture conservation Action Plan which aims to determine and address the threats to the species to reduce the decline in population numbers.

RP4: The deployment of 20 loggerhead turtle PTTs at Kosi Bay (Jan 2011 and Dec 2011) will form the single largest deployment for the group. These turtles breed within South Africa where they are protected, but move outside of South African territorial waters where they become susceptible to fishing by-catch. Presently 10 sub Antarctic fur seals have been satellite tagged and 8 are currently transmitting at the Prince Edward Islands. Two PAT tags will be deployed during 2011. 16 PTTs for seabirds were deployed at Prince Edward Islands and one black footed cat collar was deployed at Kimberly. These are transmitting 5 hours a day to save costs.

RP5: Satellite data is used to quantify the movements of Ground-Hornbills in the Associated Private Nature Reserves of South Africa ranging in the temporal scale from hourly to annually. The patterns of habitat of the more and less successful breeding groups can now be compared and linked to satellite and aerial images.

Section 2. Platform types

	Average active PTTs per month	Total PTT-years
Buoys and others	33	46.2
Profiling floats	16	16
Animals	20	20.2
Fixed stations	2	2
TOTAL	**71**	**84.4**

Section 3. Technological Changes that affect User Requirements

Role players 3 – 5 do not have comments on this section.

RP1: It was previously reported that additional HRPT stations should be installed to improve the data delivery time. Confirmation has been received that CNES/CLS will install one new station on Ascension Island (South Atlantic) and one at Cape Town. This is very exciting news and we are looking forward to the installation.

RP2. It is proposed here that Argo executives consider development of a similar concept as drifting Argo floats but using a recently proven new retractable technology for the shelf (shallow water) regions as developed by the Institute for Maritime Technology. Further communications to explore this are requested.

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

RP1: As mentioned in Section 3, the data delivery time should improve once the two new HRPT stations have been installed. In general the South African Weather Service is satisfied with the service that we receive.

RP2: The number of datasets in the oceanic regions of Southern Africa have contributed significantly to the data pool of information and in some cases exceeded those measured by other means, especially in the past 5 years. This increase in available profile information provided a valuable resource for the local scientific community whom has not really taken large advantage of yet.

RP3: Reduced costs for wildlife monitoring programmes are welcome since this programme is funded by provincial conservation organisations and donors. This is particularly true for GPS data which cannot be obtained via the website. The immobility detection works to a limited extent.

RP4: Satellite costs to the user are becoming a major proportion of costs with respect to user's budget requests.

RP5: We are very satisfied with the service and performance of Argos. Since the project started, only one set of data has 'gone missing' (not received).

Section 5. Successful programme use of Argos

RP1: Since South Africa is in a data sparse region of the Southern Hemisphere, being able to track and monitor the drifting weather buoys is a big advantage.

RP2: Significantly added to the temperature salinity data pool within the Southern African Data Centre for Oceanography (SADCO).

RP3: To date 16 Bearded Vultures have successfully been tracked using the Argos system. Valuable data on their seasonal movement patterns and threats to the species (i.e. cause of death) have been obtained.

RP4: Argos has been highly successful in revealing the distribution and movement of top predators but despite new filters accuracy of standard PTT reports still show high variation in the 0 codes.

RP5: This study involves satellite tracking of Southern Ground-Hornbills *Bucorvus leadbeateri* in the Associated Private Nature Reserves (APNR), South Africa. This 180 000 ha privately-owned conservation area lies adjacent to Kruger National Park. The conservation status of ground-hornbills in South Africa is of grave concern, with the species having lost *ca* 65% of its range and numbers in the past three generations (100 years). The birds are cooperative breeders, living in groups within which only the dominant pair breeds. However, they disperse singly: successful dispersal thus depends on the disperser joining an existing group. For this reason, their potential for self-reintroduction to areas from which they have disappeared is very low, even if the cause of their initial disappearance is no longer operative. For this reason, managed reintroduction is the only option for recolonisation. This is effected through the harvesting of second chicks (which invariably die in the wild), raising these in captivity to maturity, forming 'managed' groups and releasing these into the wild. This is a very expensive process, making it imperative to ensure that the probability of successful reintroduction and reproduction are maximised. This requires an understanding of optimal habitat configurations for ground-hornbill groups – the primary objective of this study. We have 10 years of reproductive data for the APNR ground-hornbills, indicating that groups vary greatly in their reproductive success. We suspect that much of this variability is explained by habitat quality, but quantifying

habitat usage by the birds on the ground is tricky because a) groups occupy exclusive home ranges of *ca* 100 km^2 (and are therefore difficult to locate), and b) the terrain is such that by the time an observer can approach closely enough to quantify the birds' behaviour, the birds' behaviour changes. Even radio tracking has failed to solve these problems. However, satellite data allow us to quantify movements (plotted on an existing geo-referenced vegetation map) at temporal scales from hourly to seasonally or annually. We can thus compare patterns of habitat usage by successful and less successful groups, and link these to satellite imagery/aerial photography of the same area. Once this is done, we can use GIS technology to identify potential reintroduction sites where habitat configurations are optimal for the birds.

Section 6. Analysis of Local Operational Issues

Role players 1and 3 – 5 do not have comments on this section.

RP2: Used in naval oceanographic research projects. Case study – Argo floats data specifically used within an explorative project to predict thermal water column conditions from a single sea surface value (e.g. remotely sensed SST). PhD study in progress.

Compiled by S.Marais and S. du Toit and approved by Johan Stander
For the JTA National Report, July 2011

2011 JTA National Report for Spain

Section 1. Overall summary

Animal tracking dominated Argos activity in Spain in 2011. 45 programmes for Wildlife and 13 for Oceanography are currently active. The animal applications track mainly birds, mammals, fish and sea turtles, in order of importance.

Section 2. Platform types

	Average active PTTs per month	Total PTT-years
Buoys and others	40	14
Profiling floats	30	2
Animals	330	50
Fixed stations	0	0
TOTAL	**400**	**66**

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

The INGRES programme, that uses the Argos SMM (Subsurface Mooring Monitoring), reported that they are interested in the development of SMS mobile phone alerts, due to the speed in the sending of the message. They need to notify as soon as possible the nearby boats to pick up the measuring instruments when they are moved, so they will prefer to have the option of a SMS mobile phone alert.

The SEFAS 78 programme (Animal tracking) would like to increase the position accuracy up to six decimal places. They also requested to reduce the error range of locations and have commented that the ArgosDirect service has proved to be very expensive.

The price of the service is a point that all the programmes that have contact us have commented on.

2011 JTA National Report for Sweden

Section 1. Overall summary

Satellite tracking of migrating birds (prog 1204, Thomas Alerstam, Lund University)

Section 2. Platform types

	Average active PTTs per month	Total PTT-years
Buoys and others		
Profiling floats		
Animals	20	2.5
Fixed stations		
TOTAL		

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

Tomas Alerstam is satisfied with the support Argos is giving to the research programme.

2011 JTA National Report for Switzerland

Section 1. Overall summary

Different users are working on several projects all of which involve animal tracking (mainly birds, one project on mammals in Africa, one on sharks in the Atlantic Ocean). At the moment there are still some conventional Argos PTTs working on animals (some of them since more than 8 years), but in 2011 and presumably also in the future, only combined Argos-GPS PTTs were and will be applied. So all applications are within the following 3 themes: bird migration, animal conservation, marine ecosystems. As a rule and due to problems in finding funds, all projects work with only few PTTs.

Section 2. Platform types

	Average active PTTs per month	Total PTT-years
Buoys and others		
Profiling floats		
Animals	30	1.59
Fixed stations		
TOTAL	**30**	**1.59**

Section 3. Technological Changes that affect User Requirements

Instrumental: Size / weight of the PTTs.

Data processing: Longer access to archive; access to data by smart mobile phones ("app" for iPhone, any android system).

Added value: Improved map quality on the web access (visualizing locations).

2011 JTA National Report for United Arab Emirates

Section 1. Overall summary

The United Arab Emirates started its 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. So far nearly 350 Asian Houbara have been tagged and tracked. In 2005, EAD started a tracking programme for flamingos and other birds and so far nearly 45 birds have been tagged and tracked. In 2010 the Emirates Wildlife Society-WWF started a satellite tracking programme for marine turtles in the Arabian Gulf Region.

Programme 01440 (NARC-IFHC): The Argos programme run by NARC, now under the International Fund for Houbara Conservation (IFHC) aims to study the ecology of the Asian Houbara Bustard over its distribution range, collecting information on migration pattern (routes, speed, dates of migration…), bird behavior, survival, breeding behavior. PTTs are deployed mainly in UAE and Kazakhstan, but also in lesser numbers in Yemen, Iran and the Kingdom of Saudi Arabia. Other aspects of the programme include post-release monitoring of rehabilitated falcons (survival, migration routes), and the study of the ecology of the Arabian Bustard in Yemen. All transmitters used in this programme are produced by Microwave Telemetry. By the end of 2011, 155 additional PTTs are planned to be deployed and another 170 PTTs in 2012. Therefore, it is expected that as many as 300 PTTs might be active by the end of 2011 and up to 350 in 2012, depending on mortality and losses.

Programme 03763 (RENECO): Working on behalf of the IFHC, RENECO, a private company mandated by IFHC to run the programme of conservation of the Houbara Bustard, has also deployed 6 transmitters on Asian Houbara in Uzbekistan. This programme is sponsored by Dubai Emirate.

Programme 04189 (Marine Turtle Conservation Project, EWS-WWF): This is a three year research project to monitor post-nesting hawksbill turtles in the Gulf region to identify their migratory routes and key foraging grounds. Since 2010 EWS-WWF has monitored a total number of 44 post-nesting hawksbill turtles with 39 transmitters active in 2011 (of which 24 were deployed in 2011 and 15 in 2010). Of the 39 transmitters that signaled during 2011, 22 continue to be active till now. The programme is regional, with Hawksbill turtles tagged in UAE, Iran, Oman and Qatar. The programme plans to tag another 20-25 turtles in 2012. All turtles have been tagged with Sirtrack transmitters K1G 191A.

Programme 03567 (EAD): The Argos programme run by the EAD is focused on birds, largely some waterbirds and birds of prey. Currently 14 PTTs are working and by the end of 2011 another 4 birds will be fitted with satellite transmitters. The programme is targeted to document movement and migration patterns of key species of wintering and breeding birds and other ecological information. In 2012 about 12 PTTs are planned to be deployed and it is expected that around 20 PTTs will be working by end of 2012. All birds have been tagged with Microwave Telemetry satellite transmitters.

Section 2. Platform types

	Average active PTTs per month	Total PTT-years
Buoys and others	None	None
Profiling floats	None	None
Animals	None	None
Houbara & others (01440, 03763)	305	166.67
Marine Turtle Programme (04189)	39	17.04
Birds Programme (03657)	15	9.6
Fixed Stations	None	None
TOTAL	**359**	**193.31**

*Error! Not a valid link.*Section 3. Technological Changes that affect User Requirements

Overall improvement in data delivery time is needed. It would be very useful to get Argos and GPS locations nearly in real time, i.e. decrease the gap between time of the locations and accessibility to the information.

Additionally development of a service providing movement alerts or mortality alerts by email or text message (SMS) according to user defined criteria.

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

More reliability in determining flight altitude and also problems with mirror locations need to be resolved. Argos has been continuous trying to improve the services and supporting users in various ways. Although the new Kalman filtering was supposed to provide much better and more accurate information, we do not see such changes. Users also expect reduced Argos tariff, particularly for programmes which are using large numbers of transmitters.

Section 5. Successful programme use of Argos

UAE has successfully used Argos for tracking animals and birds. Use of technology has helped in determining migration routes, measuring survival, and identifying breeding events for Asian Houbara.

Satellite tracking on flamingos has established origin, migration routes and stopovers sites of flamingos wintering in the UAE besides helping in the discovery of a new breeding colony of flamingos in the country in 2009. Tracking of other species has also provided some new and interesting information which is essential for the conservation of species, both locally and internationally.

By use of Argos system for tracking marine turtles, scientists were able to analyse the signals from post-nesting hawksbill turtles to identify migration routes, create density plots and map potentially new and key foraging grounds used by the tagged turtles.

Section 6. Analysis of Local Operational Issues

Most of the records gathered by turtle tagging programme are of Class A and B quality, towards the lower end of the accuracy range, which is linked to the extreme northern range for this species, whereby the satellites are picking them up at the extremes of their range. However, overall this does not impact the project results, since location plots are used to identify a fairly straight line from one signal to another and hence identify the potential migration routes of the turtles.

ANNEX XIII

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ANNEX XI

ARGOS JOINT TARIFF AGREEMENT (JTA) EXECUTIVE COMMITTEE BUDGET

JTA Budget for 2012 APPENDIX H

	2010		2011				2012		
	Contributions	**Spent**	**Brought forward**	**Contributions**	**Budget**	**Spent**	**Brought forward**	**Contributions**	**Budget**
JTA Chair	15000	15437	0	15000	15000	15000	0	15000	15000
JTA Executive Committtee	30000	9996	20004	10269	30273	9239	21034	8966	30000
WMO Secretariat	10000	10000	0	10000	10000	10000	0	10000	10000
IOC Secretariat	10000	10000	0	10000	10000	10000	0	10000	10000
TOTAL	**65000**	**45433**	**20004**	**45269**	**65273**	**44239**	**21034**	**43966**	**65000**

JTA EC expenditures 2010:

Mission J. Stander, Sydney, 04/2010	4273
Mission E. Charpentier, Sydney, 04/2010	3321
Mission J. Stander, Oban, 10/2010	2402
TOTAL	**9996**

WMO Secretariat expenditures 2010:

Mission, G. Reed, IPET-DMI, 04/2010	1823
TOTAL	**1823**

JTA EC Expenditures 2011:

Mission J. Stander, April 2011	1224

Planned Expenditures 2011:

Mission ROC Botswana	4000
Mission J. Stander	4015
TOTAL	**8015**

Note: The CLS contribution for 2010 is based on an expected expenditure of USD 10,157 for JTA EC. The actual experndiTure is however UDS 9,996. The difference will be corrected in the contribution for 2012.

ANNEX XV

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
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
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
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)
SAWS	South African Weather Service
SCD	Satélite de Coleta de Dados (Data Collection Satellite, Brazil)
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
UNESCO	United Nations Educational, Scientific and Cultural Organization
USD	US Dollar
VOS	Voluntary Observing Ship
WMO	World Meteorological Organization
XML	Extensible Markup Language

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