ARGOS FORUM # 83

12 / 2016

ARGOS, PROTECTING ENDANGERED SPECIES

Photo courtesy of: Simon Goodman, University of Leeds

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Argos, protecting endangered species

EDITORIAL

Dr. Kim Holland
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Institute of Marine Biology
Wildlife Telemetry Representative of User Group in Argos JTA

The recent meeting of the IUCN World Conservation Congress in my hometown of Honolulu, Hawai'i, reminded me of the central role that Argos telemetry plays in protecting endangered and vulnerable species from all biomes – marine, terrestrial and avian. Satellite telemetry reveals key conservation parameters such as population connectivity, the location of critical habitats such as spawning, nesting and nursery grounds, refuging areas, migration routes and flyways. Satellite telemetry is essential for assessing the post-release survival of animals released from fishing gear or following rehabilitation in captivity.

Many Argos-mediated discoveries have been truly surprising and often involve unexpectedly large movement patterns such as trans-oceanic movements of sharks, turtles and whales. Geese have been shown to fly over the highest mountain ranges and some supposedly "surface oriented" species of sharks and fishes actually spend large amounts of time at great depth. Understanding the distribution of animals within their environments allows for better estimation of their actual population size and therefore better estimation of their vulnerability and need for protection.

Satellite telemetry studies have yielded 'actionable' results that impact day-to-day human behaviors such as where and when to fish to reduce impacts on turtles, which shipping lanes to use to avoid whale strikes and where to place wind farms to reduce impacts on bird flyways. My own group is involved with evaluating the best ways to release sharks from industrial fishing gear.

This ArgosForum highlights the important work done by Argos users to understand and protect endangered species worldwide.

As the challenges involved with the effective conservation of nature intensify, Argos telemetry will continue to be an essential tool.

All Argos publications are available at:
www.argos-system.org

ARGOS Forum is published by CLS (www.cls.fr) ISSN: 1638 -315x – Publication Director: Christophe Vassal – Editorial Directors: Marie-Claire Demmou; Yann Bernard ybernard@cls.fr
Editor-in-Chief: Marianna Childress mchildress@cls.fr - Contributed to this issue: Debbie Stakem debbie@clsamerica.com, Garance Weller gweller@cls.fr
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Design: Ogham – Printing: Imprimerie DELORT certified ISO 14001 - Printed on recycled paper

CASPIAN SEAL ECOLOGY AND CONSERVATION

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By Lilia Dmitrieva, Simon J. Goodman, School of Biology, University of Leeds, UK

The Caspian seal (*Pusa caspica*) is a small-bodied, ice-breeding phocid, endemic to the landlocked Caspian Sea in Central Asia. The species is listed as 'Endangered' by the International Union for the Conservation of Nature (IUCN), having declined by around 90% from a population exceeding 1 million individuals at the start of the 20th century, primarily due to unsustainable hunting. It is now subject to a range of threats including high levels of mortality from fishing by-catch and other anthropogenic sources, and habitat loss and disturbance caused by industrial and urban development. Little was known about its' movement and dive patterns, until a group of scientists from Estonia, Kazakhstan, Russia and the UK deployed 75 Argos satellite tags on Caspian seals from 2009 to 2012. Their results, originally published in the Marine Ecology Progress Series, "Individual variation in seasonal movements and foraging strategies of a land-locked, ice-breeding pinniped," provide valuable data to support conservation efforts in the region, as this adaptation of their article points out.

Observing seal movements by satellite

One of the most effective ways to study movement patterns of marine mammals is through satellite telemetry, which has been used to address questions relating to resource selection, foraging strategy, dispersal, migration, home range, survival, population abundance and distribution (Folkow et al. 2004, Lake et al. 2006, Freitas et al. 2008, Dietz et al. 2013).

In our article, "Individual variation in seasonal movements and foraging strategies of a land-locked, ice-breeding pinniped," we present the first extensive study of Caspian seal movement, based on deployments of Argos satellite tags on 75 individuals, spanning 4 consecutive years (2009 to 2012). We assess seasonal dispersal at the population level and individual variation, describe basic movement parameters and dive capabilities of Caspian seals, and test whether there is variation in foraging strategy among individuals.

The results are relevant for identifying important habitat areas and the design of conservation strategies for the species.

Methods

Caspian seals were captured at 2 sites in Kazakhstan - on Kendirli sand bank in October to November 2009, 2010 and 2012, and in Komsomolets Bay in April 2011. Seals were caught using a 'rush-and-grab' approach with hoop nets, or tangle nets deployed in shallow waters around haul-out groups from rigid inflatable boats. Argos satellite tags were attached to the seal's head fur with epoxy glue (Fedak et al. 1983, Mazzaro & Dunn 2009).

Two types of satellite tags were used in this study: (1) 42 Smart Position-Only Tags (SPOT5, Wildlife Computers), which return location and wet/dry data, were deployed from 2009 to 2012; (2) 33 SPLASH Mk10 tags (Wildlife Computers), which provide position and information on diving and haul-out behaviour, were deployed from 2010 to 2012.

Key findings

The historic observational view of Caspian seal movements was of a homogeneous migration with seals dispersing from northern moulting sites to the mid and southern Caspian via the east and west coasts from late April, followed by a return to the north Caspian from September (Badamshin 1969). Our data support the broad-scale seasonal movements reported in older literature, with a southerly shift in the median latitude of locations from May to September, coincident with increasing Sea Surface Temperatue (SST) and Net Primary Productivity (NPP), and a return north from October onwards (Fig. 1) as SST and NPP decline.

However, the Argos telemetry data revealed a high degree of individual variation in the timing, destination, and consistency of movement patterns, indicating that migratory movements are much more heterogeneous than previously thought.

Movement during the winter was similarly heterogeneous. In contrast to earlier assumptions, rather than staying in the ice pack for the whole season, animals made frequent return trips out of the ice, presumably to forage, with some ranging as far south as Kendirli. The longest track recorded over 11.5 months was more than 14,000 km and the deepest dives exceeded 200m and 20 minutes duration. An accompanying video to the paper can found here: https://www.youtube.com/watch?v=aFDIg8ykRBQ.

Credit: Simon Goodman, University of Leeds.

▲ Figure 1: A Caspian seal about to be released after tagging with a Wildlife Computers SPOT tag.

Caspian seal conservation

A Caspian Seal Conservation Action Plan developed by the Caspian Environment Programme was accepted by Caspian governments in 2007, but many of its key recommendations remain to be introduced. There are still very high rates of human-caused mortality, particularly from by-catch in illegal fishing gear. While plans for dedicated protected areas for seals have been discussed, none are yet fully implemented, and intensive human activity overlaps with many areas of crucial seal habitat. The most vital conservation steps needed for Caspian seals are therefore to reduce by-catch and establish protected areas encompassing important breeding, moulting, resting and foraging locations, and the migration routes which connect them.

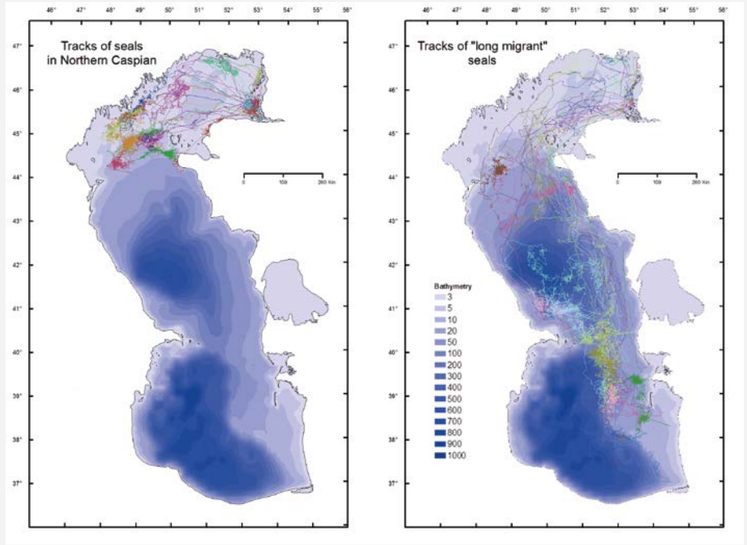
Crucial data for conservation

Intensive human activity throughout the Caspian, including fishing, oil and gas extraction, shipping and coastal development overlap with the seal movements identified here.

A seal 'migration corridor' along the Kazakh coast connecting the north-east and mid-Caspian overlaps with intensive shipping and fishing activity. Areas used by seals along the western coast also overlap with commercial fishing grounds. The north Caspian, which is an important year round habitat used for moulting, transit, foraging, resting and breeding, is an area of intensive oil and gas development and also has high levels of sturgeon poaching activity which generates substantial bycatch of seals (Dmitrieva et al. 2013). In view of these environmental pressures, Argos telemetry data can help assess impacts from human activities and contribute to conservation measures such as defining protected areas which encompass critical habitats for Caspian seals.

Read the original article: Dmitrieva L, Jüssi M, Jüssi I, Kasymbekov Y and others (2016). Individual variation in seasonal movements and foraging strategies of a land-locked, ice-breeding pinniped. Mar Ecol Prog Ser 554:241-256 http://www.int-res.com/abstracts/meps/v554/p241-256/

Learn more about Caspian seals: Goodman, S. & Dmitrieva, L. 2016. Pusa caspica. The IUCN Red List of Threatened Species 2016: e.T41669A45230700. http://dx.doi.org/10.2305/IUCN.UK.2016-1.RLTS.T41669A45230700.en. http://www.iucnredlist.org/details/41669/0



▲ Figure 2: Example tracks for Caspian seals tagged in April 2011 showing some of the variation in migration patterns observed. Left seals which made long distance movements into the mid and southern Caspian, right seals which remained in the northern Caspian for the whole deployment period April 2011-April 2012.

© Simon Goodman, University of Leeds

From left to right, Kobey Karamendin, Mart Jussi, Lilia Dmitrieva, Simon Goodman, Timur Baimukanov, Yermukhammet Kassymbekov.

This work was conducted by an international team of European, Russian and Kazakh researchers, (Caspian International Seal Survey (CISS)), who have been interested in Caspian seal ecology and conservation since 2004. The lead author of the paper is Dr. Lilia Dmitrieva, a post-doctoral research fellow in marine mammal ecology at the University of Leeds, UK, working with the programme leader Dr. Simon Goodman. Dr. Goodman's research spans marine mammal ecology, conservation biology, and population genetics, and he is a member of IUCN Pinniped Specialist Group. The team would like to thank Agip KCO and NCOC for financial support under the North Caspian Sea Production Sharing Agreement (NCSPSA) Venture, which made the work possible.

For more information about Caspian seal research see: www.goodmanlab.org and http://ihe.kz/en/

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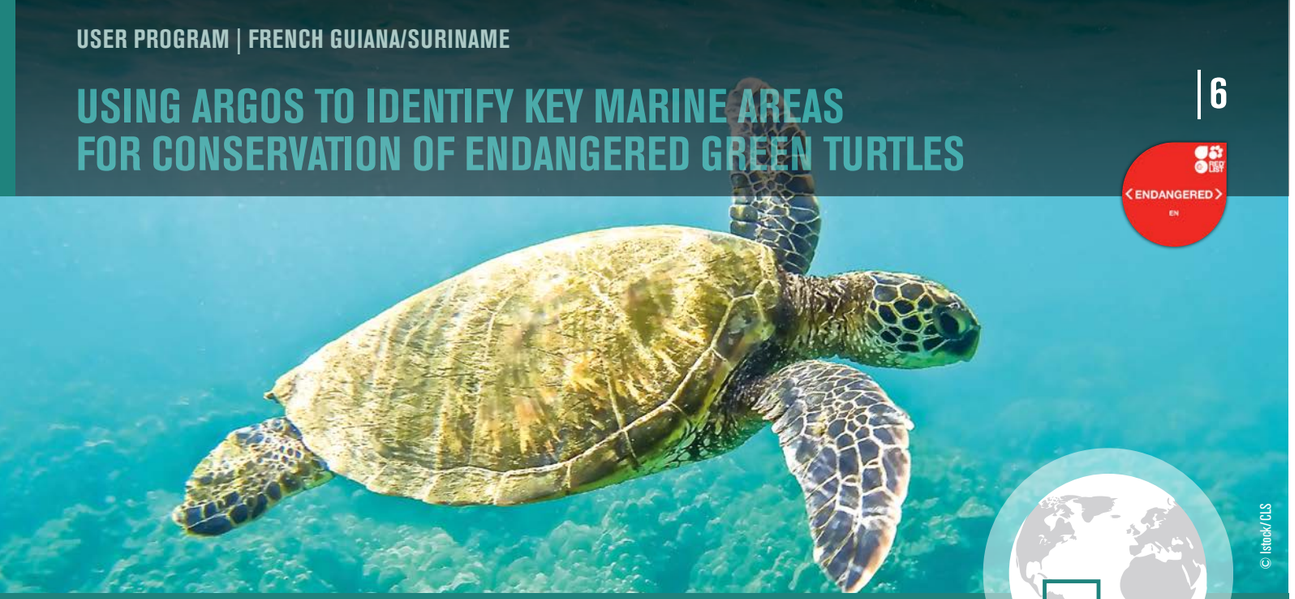
USING ARGOS TO IDENTIFY KEY MARINE AREAS FOR CONSERVATION OF ENDANGERED GREEN TURTLES



By Damien Chevallier, Yvon Le Maho, CNRS-IPHC, University of Strasbourg

The green turtle (*Chelonia mydas*) is classified as an endangered species on the IUCN Red List since 1982. This species is especially threatened in South America due to bycatch by fisheries along the northeastern coasts. Overall, bycatch, habitat degradation, human consumption of turtle meat and eggs and the sale of their shells have led to a 48–66% decrease in green turtle populations throughout the world (Seminoff et al., 2002). However, the current knowledge on the green turtle movement patterns is still very poor. Understanding how this species moves at sea is crucial if we hope to develop and implement more effective bycatch mitigation measures (Hays, 2008; Wallace et al., 2013). Argos satellite tracking can provide key data for conservation, as shown in this adaptation of an article "Identification of key marine areas for conservation based on Argos satellite tracking of post-nesting migrating green turtles (*Chelonia mydas*)", originally published in Biological Conservation.

Sea turtles are among the most impressive navigators of the animal kingdom. They follow migratory pathways which sometimes go across entire ocean basins. With the exception of the breeding season, when the females lay their eggs on nesting beaches, it is however difficult to observe sea turtles in their natural environment. The tracking of individuals through the Argos Satellite system may however provide a very fine-scale analysis of the pelagic movements of this species which regularly comes up at the sea surface to breathe (Kaplan et al., 2010), allowing identification of its feeding and breeding areas and of its migration path (Schofield et al., 2010; Maxwell et al., 2011).

In the present study, we analyzed the migration of 16 turtles that were tracked by satellite during their postnesting migration along the coasts of Suriname, French Guiana and Brazil. We determined their migration route, the distance traveled by each green turtle and their individual characteristics, and identified their migratory stopovers. Our study highlights the importance of identifying and mapping this migration corridor, which links nesting and feeding sites and crosses three RMUs (Wallace et al., 2010).

The Method

From February 29th to June 2012, sixteen Argos/GPS Fastloc 10-F400 satellite tags (Wildlife computer. Redmond. Washington. USA. http://www.argos-system.org) were deployed on 16 adult female green turtles during the nesting season on both sides of the Maroni River: 8 turtles in Suriname (Galibi Nature Reserve beaches) and 8 turtles in French Guiana (Awala-Yalimapo, Amana Nature Reserve beaches) (53°57OW, 5°45ON). The PTT were fixed during nesting at night, using a red light to minimize the disturbance of the turtles.

Results

The 16 green turtles were tracked between 1 and 5 months. On average, 1118 ± 490 locations were recorded per turtle. The migratory paths remained close to the coast (10–15 km off the coast), except when crossing the Amazon river plume, which pushed individuals 30 –200 km away from the coast (Fig. 2). On average, the 16 turtles traveled 3683 ± 1007 km and moved at 1.6 ± 0.2 km h-1. However, much higher speeds were also identified, with bursts of speed attaining 10 km h-1. The number of stopovers obtained for each turtle varied from zero to five. Among the 16 turtles, only four did not make any stopover at all during their migration.

Conclusions

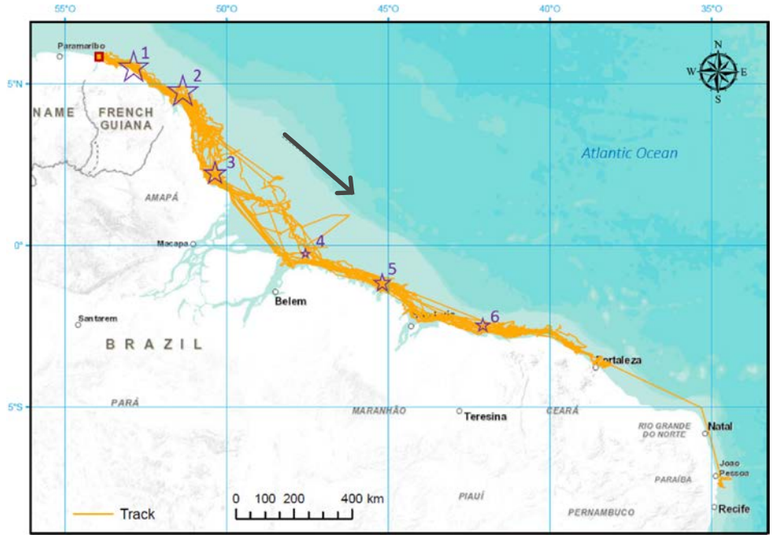
This study provides detailed information about the postnesting migratory paths of green turtles nesting at the border between French Guiana and Suriname, describes the areas used by turtles (resting areas) along the Brazilian coast and identifies the hot spot that appears to be their goal at the end of their travel. A high rate of bycatch occurs along this migratory path (Davies et al., 2009; Wallace et al., 2013) and could have a substantial impact on the green turtle population.

During our study, the GPS signal was lost for two individuals a few weeks after tracking commenced, suggesting that they were caught by fishermen.

▲ Figure 1: The PTT were fixed during nesting at night, using a red light to minimize the disturbance of the turtles.

The next step should be to investigate how far legal and illegal fishing overlap with the paths and final destination of migrating turtles. International conventions, regional protection plans and transnational actions such as those already implemented in Argentina (González-Carman et al., 2012) or in the state of Sergipe in Brazil (Coelho Dias da Silva et al., 2010) should be also applied in these foraging areas of green turtles if we want to ensure the conservation of this species.

Article reprinted from Biological Conservation with permission from Elsevier: Marie Baudouin, Benoît De Thoisy, Philippine Chambault, Rachel Berzins, Mathieu Entraygues, et al. Identification of key marine areas for conservation based on satellite tracking of post-nesting migrating green turtles (*Chelonia mydas*). Biological Conservation, Elsevier, 2015, 184, pp.36-41. <10.1016/j.biocon.2014.12.021>. <hal-01107575>



▲ Figure 2. Tracking of 16 green sea turtles along the north-eastern coast of South America. The red square indicates the starting locations and the arrow shows the direction of their migration from the nesting sites in French Guiana and Suriname. The areas of particular interest (stopovers) are indicated by stars that are proportional to the number of turtles remaining in these areas, at least 5 days during their travel (in order: 7, 7, 5, 2, 4, and 3).

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Damien Chevallier

Damien Chevallier is a French biologist, and CNRS researcher at the Institut Pluridisciplinaire Hubert Curien, in Strasbourg. He is responsible for the CNRS's research program on marine turtles. His research is based on a multidisciplinary approach, combining functional ecology, ecophysiology and biology in order to best understand the adaptations of animals to spatio-temporal variations in their environment.

Yvon Le Maho

Director of research emeritus at CNRS (Institut Pluridisciplinaire Hubert Curien, Strasbourg and Scientific Centre of Monaco) and member of the French Academy of Sciences, Yvon Le Maho is also president of the French Ministry of Ecology and Sustainable development's Scientific Council for Natural Heritage and Biodiversity. He is also a member of the Advisory Board for the Oceanography Institute, Foundation Albert 1er, Prince of Monaco. He began the CNRS research program on marine turtles in French Guiana in the 1990s.

A CONSERVATION SUCCESS STORY: THE WHOOPING CRANE (*GRUS AMERICANA*)

Photo courtesy of Glenn H. Olsen, USGS

By Glenn Olsen, USGS Patuxent Wildlife Research Center, Laurel, Maryland USA

Whooping Cranes (*Grus americana*) are considered the most endangered crane species in the world. The population reached its low point in 1941 with only 22 birds, and today there are only 382 birds in the wild. Multiple factors have led the Whooping Crane to the brink of extinction, including habitat loss and unregulated hunting prior to the 1900s. With only one remaining migratory North-American wild flock, an organization of U.S. Federal Government, State Government and private non-profit organizations came together in the late 1990s to start a second migratory population of whooping cranes in eastern North America. One of the challenges was to teach the captive juvenile cranes to migrate nearly 2,000 kilometers, from Wisconsin to Florida. Glenn Olsen explains how Argos tracking plays a key role in keeping an eye on the fledgling flyers.

An ambitious project

The partners included the US Fish and Wildlife Service, the International Crane Foundation (ICF), Operation Migration, the Wisconsin Department of Natural Resources, the Wisconsin Natural Resources Foundation, USGS Patuxent Wildlife Research Center, and USGS National Wildlife Health Center. Wisconsin was chosen as the release and breeding site, while several US Fish and Wildlife National Wildlife Refuges on the Florida Gulf Coast were chosen as the wintering destination.

All the Whooping Cranes were hatched and reared by costumed caregivers at USGS Patuxent Wildlife Research Center, in Laurel, Maryland, by Patuxent and Operation Migration staff. We already had experience with costumed people rearing Whooping Cranes in captivity in a non-migratory population. The chicks were taught to follow, starting at a young age of two weeks, the costumed caregivers out to the ultralight aircraft and to run around behind it. All this was in preparation for their following the costumed caregivers as they fly the ultralight aircraft to Florida.

From Maryland to Wisconsin - by airplane

The chicks were shipped on a private airplane from Maryland to Wisconsin when they were about 45 days old. When the cranes were fully grown, at about 90 days of age, they began to actually fly behind the ultralight aircraft. At first flights were short loops, gradually increasing in length until one day in October everyone would fly south.

▲ Figure 1: Several costumed caregivers holding puppet heads and leading young Whooping Cranes on a walk. Following the costumed caregivers is important, as this is a form of exercise, plus introduction to natural foods, pointed out with the puppet heads. In addition, the chicks will now follow the costumed caregiver when that person gets into the seat of an ultralight aircraft to lead them on migration. Photograph was taken at USGS Patuxent Wildlife Research Center, Laurel, Maryland, USA shortly before chicks were to be shipped to Wisconsin for final few weeks of flight training. Photograph by Glenn H. Olsen

On the way south, all the young Whooping Cranes wear legbands with small half ounce VHF radio transmitters on a legband. This allows those of us on the ground crew to locate a crane if it decides to drop out of formation and land in unfamiliar territory. These VHF radio transmitters are good for locating a bird at a short distance of several miles. Once the cranes reach Florida, some of them receive light-weight Argos satellite transmitters that can be picked up by the Argos satellites no matter where they are.

On their own - flying north

After learning the route on their south-bound journey, the young Whooping Cranes migrate north on their own. The combination of the Argos transmitters on some birds and the VHF transmitters on others helps us to locate the group as it progresses north over about 1,200 miles (1,931 kilometers) from Florida to Wisconsin.

From 2001 to 2005 the ultralight aircraft method was the only method used for this reintroduction. As we were successful in establishing this new migratory population, we were able to develop additional release methods that were not as dependent on long periods of contact with costumed humans.

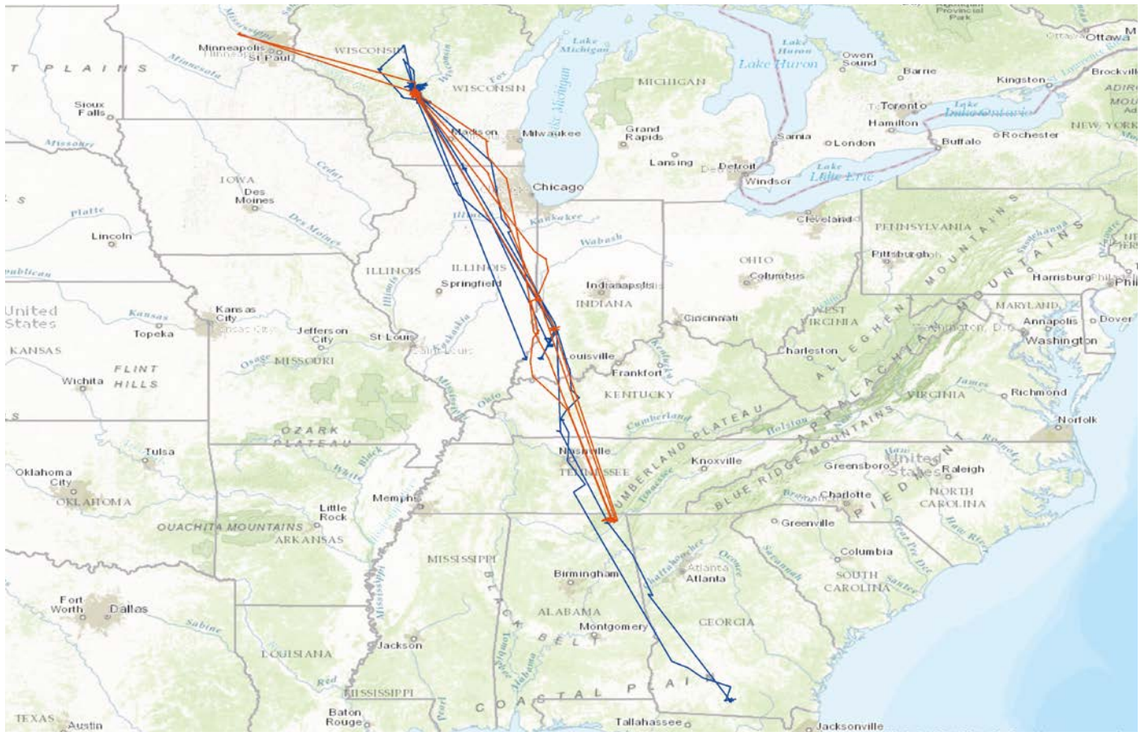
Towards more natural reintroduction

The first of these methods was developed by researchers at the ICF and was called Direct Autumn Release. Basically, caregivers in costumes reared Whooping Crane chicks for release with adult Whooping Cranes in Wisconsin who had already learned the migration route by following the ultralight aircraft. The adults would lead the new chicks south. A second method developed in 2013, called Parent-rearing, involves having some of the adult Whooping Cranes at Patuxent and ICF rear their chicks. These chicks are then released in the fall with adult Whooping Cranes in Wisconsin, an adoption of sorts. All these young released Whooping Cranes in this research project have had an Argos satellite transmitter on a legband, as we rely on the Argos system to track the migrations of our young Whooping Cranes to and from their wintering sites.

Argos, a key tool for tracking the reintroduced cranes

We have documented the success of these more natural rearing and release methods, through our use of the Argos system, and this year for the first time, did not use the ultralight aircraft led migration method. We now have over 100 Whooping Cranes in what we call the Eastern Migratory Population. About a third of the Whooping Cranes have had Argos system transmitters, all 18 g PTT 100 solar powered transmitters specially mounted on our legbands by Microwave Telemetry, Inc, (Columbia, Maryland, USA). The success of this project has been in using artificial human methods to reintroduce a migratory population of birds where none had existed in recent historic times. The project is still ongoing, improving our release methods and encouraging the continued reproductive efforts of the existing introduced population.

Mention of commercial products, trade names or companies does not imply US Government endorsement.



▲ Map of Argos satellite migratory pathway of Whooping Crane chicks 19-14 (blue) and 20-14 (red-orange), parent-reared at USGS Patuxent Wildlife Research Center, Laurel, Maryland USA in the summer of 2014 and released in September of 2014 with different allo-parents at Necedah National Wildlife Refuge, Necedah, Wisconsin USA. The paths show migration south to southern Indiana one year and to Georgia in another year for 19-14 and to northeastern Alabama both years for 20-14. Spring and summers were spent in central Wisconsin after release. Map by Jonathan Fiely, USGS Patuxent Wildlife Research Center.

Glenn H. Olsen

Glenn H. Olsen, DVM, PhD is the veterinary medical officer at Patuxent Wildlife Research Center, part of the US Geological Survey. Prior to this position, he worked as a research biologist in the National Biological Survey, in refuge management in the US Fish and Wildlife Service, and as an assistant professor at Louisiana State University. In addition to working with whooping cranes, Dr. Olsen also does research on ducks.

NEW ARGOS CHIPSET WILL REVOLUTIONIZE ANIMAL TRACKING

Photo courtesy of Michel Gugue

By Peter de Maagt, Head of the Antenna and Submillimetre Wave Section - Electromagnetics & Space Environments Division - European Space Agency - Camilla MacMillan-Hughes - Writer / Editor: Launchers and Telecommunications & Integrated Applications - Communication Department EJR-Quartz for ESA

In 2012, under its ARTES Advanced Technology programme, the European Space Agency commissioned the development of an Argos chipset. The project, SHARC (Satellite High-performance ARGOS-3/-4 Receive/transmit Communication), aims to design, manufacture and test a prototype of a miniaturized, low-cost Argos chipset. The chipset communicates with all Argos satellites and enables two-way communication when possible. The project also includes the development and deployment of a low-cost pop-up tag for tracking pelagic species based on the new Argos chipset, as Peter de Maagt, ESA's Project Manager, explains.

Building a consortium

ESA selected AnSem in Belgium to develop the ARTIC microchip that has been built into a marine tag manufactured by Star Oddi (http://www.star-oddi.com/) in Iceland. Thanks to the Argos-3 technology, this tag can be controlled remotely by commands, has improved battery lifetime, and will be able to transmit much more recorded data thanks to a more efficient transmission with Argos-3 satellites.

End-users, who are involved in the development of the pop-up tag, and responsible for its deployment, include the French non-profit organization dedicated to basking shark research and protection, APECS (http:// www.asso-apecs.org/), and the World Wildlife Fund (WWF).

The chipset advantage

So, what is so revolutionary about the chipset? First, its small size, just 7 mm x 7 mm, is noteworthy. It can be integrated into the smallest, most light-weight tags. Second, these new tags are able to perform what is known as a "handshake" with passing Argos 3-4 satellites. Once the first contact has been made, all stored data is transferred to the satellite.

On receiving an acknowledgment from a satellite that its data have been received, the tag stops retransmitting the same sensor data.

Ten times more data

Thanks to greater transmission efficiency, much more data can be transmitted by an Argos tag fitted with a chipset Argos-3/4 (in some conditions ten times more data than with Argos-2) while conserving battery lifetime.

The two-way link with the satellite is the key. The increased efficiency has had knock-on benefits that have unveiled new opportunities for better, less invasive tracking.

This makes it easier to monitor how wildlife is coping in our fast-changing environment. We anticipate a new generation of low-cost tags, which will be a huge benefit for biologists.

Next steps...

Currently, several prototype chipset development kits are available from CLS for interested manufacturers/ integrators. In 2017, the manufacturers will integrate the chipset and CLS will provide technical support and advice as new chipset tags are tested.

> **"This technology opens the door to brand new possibilities. For the first time, we will be able to program the tag remotely, a huge step forward for animal tracking.**
>
> Hélène Gadenne, Marine Biologist, APECS

From Europe: new revolutionary technology for Argos users worldwide

◀ Figure 1: The SHARC consortium, led by Belgium's ANSEM, includes partners from France, Iceland and Spain.
© Hélène Gadenne - APECS, CLS Argos-users meeting 2016

Project lead and funded by:

esa
European Space Agency
Agence spatiale européenne

SHARC

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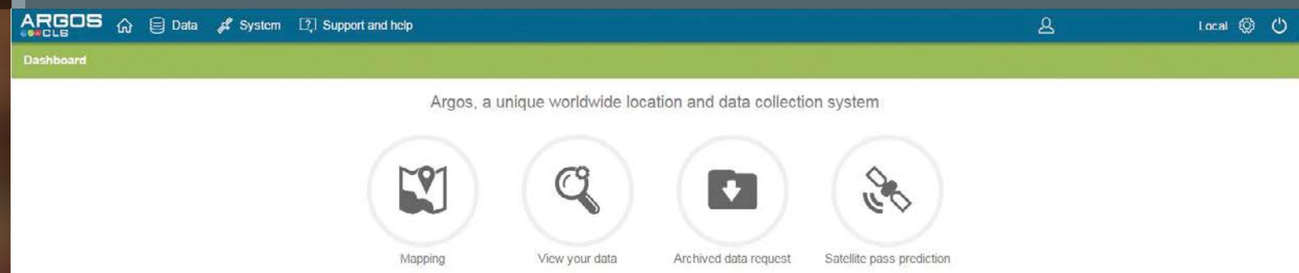
INTRODUCING THE NEW ARGOSWEB INTERFACE – A BETTER WAY TO ACCESS YOUR DATA



By Anna Salsac-Jimenez, User Services, CLS

What Argos users have to say about the new web interface:

The new ArgosWeb is an attractive, practical and user-friendly website designed and created by CLS to provide you with secure and easy access to your Argos Data. This new responsive design version works on all browsers and tablets (Android, iPad) and has a new mapping tool with 6 different map types available including two dedicated to the North and South Poles as well as new tools such as animating trajectories. Choose from a new selection of icons to personalize your new mapping tool and you can now export 1 year of your data in CSV, Excel, PDF, HTML and KML. If you need further assistance, please don't hesitate to contact your local customer service.

> *The first use impression of the new Argosweb was good, all is new. Mapping tool and mapping settings looks great compared with the old version. The new ArgosWeb is much better compared with the previous version. "*
>
> Chenxing Yu, KMUTT, China

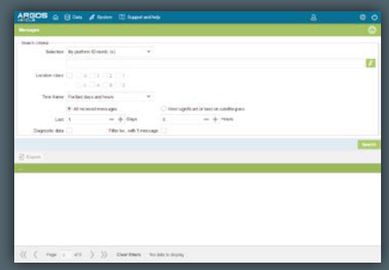
> *Globally satisfied on the different aspects, the new Argosweb has a good design and easy access. The data access and download tools are User-friendly, the mapping tool is also well designed and user-friendly. "*
>
> Volen Arkumarev, BSPB/Birdlife, Bulgaria

> *Really appreciate the polar mapping capability of the new ArgosWeb interface as well as the new map backgrounds and more user-friendly data access. "*
>
> Charles-André Bost, IPHC-CNRS, France

> *The new-look Argos website is loaded with features and is a great value addition to Argos users. "*
>
> Sàlim Javed, UAE Environment Agency, Abu Dhabi

New mapping interface is intuitive and easy to use.

Polar projection mapping tool



Download data in .xls, .csv, .pdf, .html and .kml formats.

How to use the new ArgosWeb
Visit our website for a video tutorial, quick start manual and user guide: http://www.argos-system.org/support-and-help/
For any questions or help: useroffice@cls.fr; userservices@clsamerica.com

WE WELCOME YOUR CONTRIBUTIONS!

We know your work is interesting.
Let us publish it!

Email : mchildress@cls.fr

CLS
COLLECTE LOCALISATION SATELLITES

Photo courtesy of Glenn H. Olsen

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