

Tracker News

MICROWAVE TELEMETRY, INC.



The Early Bird Catches the Worm

Dear Customers, Friends, and Colleagues:

Reflecting upon 2018, we are grateful for all that has been accomplished and those who helped to make our Earth a better place. As a company, we view this mission and responsibility with utmost urgency. As employees of MTI, we appreciate the opportunity to make tools for researchers around the world, which provide vast and valuable data used to help species remain extant—something we do not take lightly. To achieve this, we must support one another as an agile and unified team. This mentality permeates every single aspect of our organization with great pride. Our newsletters, new website and online Production Portal system, email correspondence and, of course, our transmitters are all held to the same standard of excellence.

For us to maintain the quality standard of our product and best serve you, we must routinely assess, adjust, and optimize our operations. Thus, we have increased our lead time for ordering transmitters to 10 weeks; 12 weeks for 2g and 5g PTTs, and fish tags. As all devices are crafted to your projects' specifications, we rely on the end user to provide the necessary information (Production Form) to start the process. So, please keep in mind, as our production slots are quickly allocated, it will be the early bird that catches the worm!

In this issue of Tracker News, André Raine, Josh Adams, and Tracy Anderson tell us about their study focusing on rescued Newell's Shearwaters on Kauai. David Newstead and Lindsay Brown discuss their findings on Black Skimmers migrating from Texas. Amazing work! Additionally, our long-time collaborators at CLS provide an update on the bright future of the Argos constellation. Thanks, Yann! We are so grateful for your contributions.

May 2019 bring great success to you and your teams.

Sincerely,
Lucy and the Team at MTI



Photo by André F Raine

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into the Decline
of Black Skimmers

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One of this year's Save Our Shearwaters rescue birds, ready for release with its tag. Read more about rescuing Newell's Shearwaters on page 3.

Black Skimmers: Ongoing Investigations into the Decline of an Iconic Coastal Species

David Newstead and Lindsay Brown work for the Coastal Bend Bays & Estuaries Program based in Corpus Christi, Texas. Their bird program focuses on habitat management for colonial nesting waterbirds, and research and conservation of a wide range of migratory shorebirds. Recognizing the importance of full life-cycle stewardship, the program works with partners throughout the flyways that intersect in the Western Gulf.



Described by R.C. Murphy in 1936 as “unworldly...aerial beagles hot on the scent of aerial rabbits” – the Black Skimmer (*Rynchops niger*) is one of the most instantly recognized and uniquely adapted of all the world’s seabirds. It is an iconic coastal species in the Western Gulf of Mexico that can be found there year-round, but their abundance seems to decrease in the area in winter. This pattern suggests the species is a partial migrant – in which some proportion of its population is migratory while the rest are more or less sedentary. More so than some of their closely related tern relatives, the species is declining at an alarming rate in much of its Gulf and US Atlantic range, so understanding where these birds are going, and what threats they may be facing is crucial to figuring out what can be done to help them.



Pacific slope at the Isthmus of Tehuantepec in southern Mexico. The narrow “waist” between mountain

ranges there has been known to be a major highway for many raptors migrating to South America, and this study along with other recent tracking studies confirm it is also heavily trafficked by waterbirds and shorebirds. Another area of importance was the Golfo de Fonseca – encompassing coastlines of El Salvador, Honduras, and Nicaragua – where several birds spent most of the winter in a sprawling complex of aquaculture farms.

Skimmers seem to survive quite well once they reach maturity, suggesting they may be more limited by their reproductive output and the survival of young birds to

In spring 2017, with generous support from US Fish & Wildlife Service’s Region 2 Coastal Program and ConocoPhillips Global Signature Program, we began deploying satellite transmitters on skimmers to finally answer this question. We started by deploying 5g Argos PTT tags on adult birds with the objectives to determine important breeding and post-breeding sites, as well as observe which individuals migrated, and to where they migrate. We captured birds scattered across sites spanning the coast of Texas. After the initial nine tag deployments, five more were deployed at roosting sites following the breeding season.

The data showed that these birds vary considerably in their habits. In the month following the first deployments, some birds moved east along the coast into Louisiana while others moved south into northern Tamaulipas, Mexico, and the rest settled in to nesting sites on small islands in coastal bays of Texas. *Was this transience? Do these birds wander somewhat haphazardly across the coast in no specific direction until they find something they like?* Fortunately, many of the transmitters continue to transmit well into their second year of life so we are finding that – though the movements initially seemed unpredictable – at the individual level they are showing a lot of consistency in the timing of their movements and the locations they roost and go to nest. For example, in April 2018 most of the birds were at just about the very same spot 365 days before!

Perhaps more surprising was what the birds did in winter. Of course we already had a sense that a proportion of the population went elsewhere – likely south – during the winter months. The birds that wintered outside of Texas went much farther than we anticipated though, and all wintered on the Pacific coast between Acapulco, Mexico and Costa Rica. Southward migration was protracted, with major movements starting in August and continuing into November. This new data highlighted the importance of several sites. Most birds crossed from the Gulf to the



Photo by David Newstead

A recently fledged Black Skimmer waiting as the satellite tag is attached.

maturity (“recruitment”). Our program spends a lot of effort on managing nesting sites to provide these and other colonial nesting birds the best chance for reproductive success we can provide. Not knowing what they do for the first couple years of their life until they join the breeding population is a major knowledge gap – we need to know which phase(s) of their life history is most limiting in order to effectively address population declines. Following the 2018 breeding season we deployed six more transmitters to “hatch-year” birds to try to solve this mystery. Preliminary results show the young birds utilizing much the same habitats as adults, though they tend to wander inland to freshwater sources more frequently than adults. Already, several of these young birds have moved south to the Pacific coast. *Will they return next spring? Will they stay in Central America for a couple years (that’s what I’d do!). Or will they join breeding populations in those areas?* The Argos transmitters are giving us new insight into this fascinating species, and helping us forge new partnerships with people working on conservation in Latin America.

Photo by David Newstead

What Happens Next? Tracking Shearwaters After Rescue and Rehabilitation

Dr. André F Raine is the Project Manager of the Kauai Endangered Seabird Recovery Project. He has been working with Hawaii's endemic seabirds for the last eight years. He has worked on conservation and research projects around the world including Bermuda, the Peruvian Amazon, Zambia, Malta and England. Dr. Josh Adams is a research biologist with the U.S. Geological Survey's Western Ecological Research Center. He is the lead biologist in charge of the Seabird Studies program located at WERC's Santa Cruz Field Station. Dr. Adams' work focuses on understanding the distribution and abundance patterns of seabirds at sea, nesting biology, foraging ecology and conservation science. Dr. Adams' current studies are focused in the California Current and Hawaii. Tracy Anderson has been the program co-ordinator of the Save Our Shearwaters program since 2011, where she rehabilitates a wide range of native and endangered birds including shearwaters and waterbirds. She has rehabilitated wildlife in 3 countries – Canada, United States and Belize – and is also an accomplished bird bander.



In the mist-shrouded mountains of Kaua'i, the Newell's Shearwater *Puffinus newelli* still manages to cling to existence. An endangered shearwater endemic to the Hawaiian islands, the species has suffered dramatic historical declines, with populations crashing by 94% in recent decades. The reasons are manifold, including powerline collisions, the ravages of introduced predators such as feral cats and light attraction. Light attraction is a particularly important threat. The shearwater



This year's satellite tags, ready for deployment in Upper Limahuli Preserve. Photo by André F Raine

chicks spend their formative months in the darkness of their mountain burrows, and are not accustomed to human light sources. As the breeding season comes to a close they exercise for a few weeks outside of their burrows and then one night they launch themselves into the dark skies, flying

swiftly over forested ridges and head out to sea. Unfortunately, this maiden voyage often brings them over Kauai's towns, where bright lights disorientate them causing them to circle like moths before crashing to the ground. Once downed, they are easy prey to the island's huge cat and dog population, or they are run over by cars – a sad end for such a beautiful bird.

Luckily, the people of Kauai are well aware of the problem – thanks mainly to the Save Our Shearwaters (SOS) program. Initiated by the State of Hawaii in the late 1970s, it was created as a public conservation effort, educating people about the importance of the bird and providing them with a place for rescued fledglings. Every year, public service announcements remind everyone of the start of the fallout season and aid stations (they look a bit like mail boxes) are set up at fire stations around the island for concerned citizens to put the birds in. SOS staff collect the birds, do a thorough assessment of their health and then either release them or bring them back for rehabilitation. Since its inception, the SOS has processed 31,812 Newell's Shearwaters. That's a huge number of endangered seabirds.

However once the birds are released out to sea it is very hard to understand what happens to them next. They become a diminishing black speck on the blue horizon and then they are gone. Do they survive? To answer this question, the Kauai Endangered Seabird Recovery Project partnered up with SOS and USGS. We decided to use satellite tags to track the birds after they have been released and see if they survived once they were out at sea. Since 2014 we have been tracking fledglings from SOS using Microwave Telemetry's Solar PTT 9.5g tags. Newell's Shearwaters are adept divers, chasing squid and flying fish down to a depth of 50 m, so we had the tags potted to withstand depth dives. We also had them specially modified with four suture tubes so that the tags could be sutured in place. All of the tagging work was done under a federal bird banding permit and through funding from the St. Regis Princeville Resort (via Earthjustice and American Bird Conservancy) and the Kauai Island Utility Cooperative.

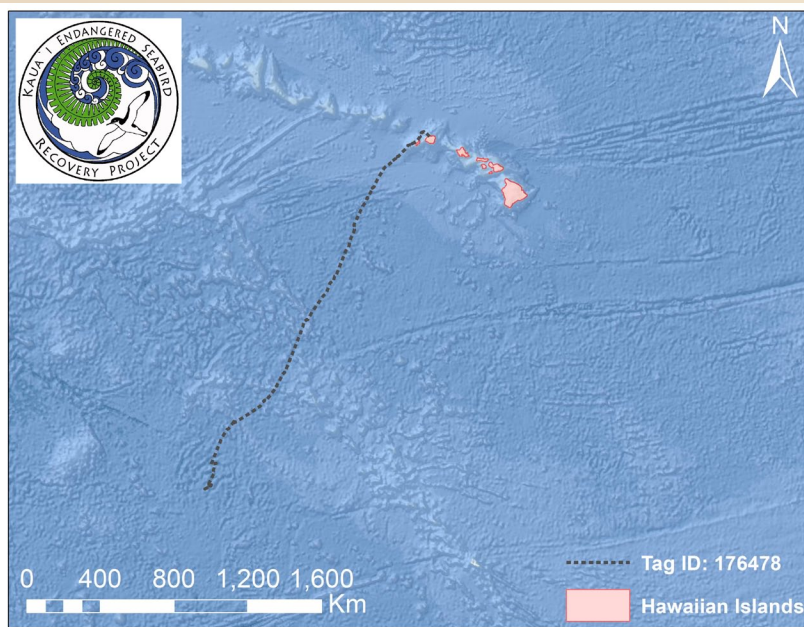
Of course, once we had settled on the method, putting the project into practice required a lot more thought. Firstly, birds come in to the SOS program in a range of conditions, from those that can be immediately released to those that need intensive health care and rehabilitation. So, the SOS birds were split into those that were released immediately, those that required one day of evaluation and those that spent two or more days in rehabilitation. Secondly, we needed to compare these birds with birds that were not grounded in the first place. That required helicopter trips into the remote mountain ranges of the north-west of the island, where shearwaters nest on steep valleys under dense fern cover in a wet montane forest. We tagged birds in their burrows in the Upper Limahuli Preserve (managed by the National Tropical Botanical Garden) just before they fledged.

We are now finishing up our study, with the last cohort of birds currently flying away from Kaua'i and out over the deep blue sea. Once they have finished transmitting we will have all of the data we need to see how well the rehabilitated birds fare compared to their wild fledging counterparts, so more to come on this soon! The tracking work has also allowed us to get a better understanding of the first few months of the bird's lives at sea, revealing key areas for newly fledged birds. It turns out that our birds head away from the Hawaiian islands to an area of sea 2500 km away which is (hopefully) rich in squid and flying fish (see map below). The next stage of their life currently remains a mystery, but five years later they will return to our island to find a mate and start digging their own burrows. We will continue to work hard to make sure their island home is safe for their return.



A Newell's Shearwater chick at Upper Limahuli Preserve.

Photo by André F Raine



Argos: A Bright Future Ahead

By Yann Bernard, Director of Environment and Climate Business Unit, CLS

Copyright Fab & Fab



Copyright CNES

View of the first Argos Nanosatellite ANGELS (on the right), precursor of the future Kinéis nanosat, with an Argos-4 payload. The constellation of 20 nanosats makes it possible to have a much faster revisit time.

Since the late 1970s, Argos is the only satellite system that caters to biologists, with miniaturized platforms, low power transmitters, and the ability to send data in extremely difficult conditions. Thanks to collaboration between Argos users, tag manufacturers, such as Microwave Telemetry, and the French Space Agency, who designs Argos instruments, the limits of Argos satellite telemetry have been pushed ever further, to track more than 1,000 species today.

Capitalizing on its long experience in state-of-the-art, innovative instrumentation, the French Space Agency, CNES, improved the capabilities of the Argos system, by investing in a new generation of Argos payloads, called Argos-4, that will fly on the satellites of its international partners starting in 2019.

Argos-4 technology promises to be a turning point in Argos history, especially for animal tracking applications. With increased bandwidth (7 times more capacity than Argos-3), Argos-4 caters to very low power transmitters. The spectrum analyzer function on-board will be able to check the overall frequency bandwidth and identify interferers, and small transmitters will be deployed in dedicated “clean” and “uncrowded” frequency bands. With the ongoing collaboration of innovative Argos tag manufacturers, who continuously strive to push the system limits ever further, the objective is to decrease output power of tags to 100 mW.

Argos-4 also provides an improved Argos downlink @ 466 MHz, representing a new modulation (spread spectrum), compatible with US frequency regulations and ensuring better performance in noisy environments.

Argos-4 will send ever more data even more efficiently, improving performance for existing applications as well as opening the door for a host of new ones, including investigation of the ecology of species. It is completely compatible with all existing generations of Argos tags.

In parallel, CLS, with the support of the French Space Agency CNES, is working to develop a completely new generation of dedicated satellites, using nanosat technology to decrease drastically the satellite revisit time for the transmitters (10-15 minutes on average) everywhere and thus add new dimensions to Argos animal tracking. This constellation of 20 nanosatellites, called Kinéis, based on Argos-4 technology and fully compatible with already existing Argos tags, builds on the dynamic of the NewSpace movement while keeping close ties to the international space agencies (CNES, ISRO, EUMETSAT, NOAA) who have historically managed the Argos system.

CLS's subsidiary, Kinéis, aims to become a major player in NewSpace and allow, by 2030, several million objects to be

connected wherever they are on the surface of the globe. Thanks to the increased capacity of this system, biologists as well as the general public, will have access to a global satellite location and connectivity service, which will be very easy to use and very affordable. The constellation of nanosatellites will be developed with strategic partners: Thales Alenia Space, Nexeya, Syrlinks.

With Argos-4 and Kinéis, CLS and its partners are revolutionizing Argos and democratizing a system that has enabled the history of animal migration to be rewritten. More efficient, easier and affordable, the unique and universal connectivity offered by Kinéis provides service continuity to today's faithful users of the Argos system. In parallel, the international space agencies continue to maintain the Argos system with Argos-4 payloads and beyond launched on satellites of the European Agency for Meteorological Satellites (EUMETSAT) until 2036.

For 40 years, Argos has been the key tool of Earth scientists and life scientists to study our physical environment and reveal the mysteries of the animal world. As we enter a new era of satellite telemetry, CLS, Argos users and Microwave Telemetry, Inc. will continue to work together to find the best-adapted solutions for tracking highly migratory species, collecting essential data along their trajectory, understanding and analyzing their behavior, and thus continuing to protect biodiversity around the globe.

TIMELINE

- Current constellation status: 7 operational satellites by January 2019 (Argos-2 and Argos-3)
- Argos-4 will be launched in 2019 by ISRO on OceanSat-3
- U.S. government is committed to continue support of the Argos system
- CNES is launching the Argos ANGELS project (Argos NEO Generic Economic Light Satellites) with the launch of the 1st Argos nanosat in 2019
- The European Agency for Meteorological Satellites, EUMETSAT, is committed to launching Argos payloads onboard European satellites until 2036
- End 2021: Kinéis, subsidiary of CLS, will launch new connectivity based on 20 nanosatellites

www.argos-system.org • www.kineis.com

Holiday Helping Hand

Less than 5 miles from our office rests Main Street, Ellicott City. A popular hangout for tourists and locals alike, Main Street is home to numerous small businesses, restaurants, and museums. This spring, the area suffered a devastating flood that caused significant damage to many historic buildings. This is the second flood of this nature to take place in recent years.

This holiday season, we want to support our Ellicott City neighbors as they do their best to recover once again. We hope our contribution will provide some small peace of mind as they rebuild.



Photo by Preservation Maryland

Buildings damaged by one of two "thousand-year" floods to hit Ellicott City, MD since the summer of 2016.

We are also making two donations to organizations helping our Earth and our community:

Pinnacles National Park Foundation raises funds to support Pinnacles National Park programs that are not completely covered by the Park's budget. This includes the ongoing efforts to re-establish a healthy breeding population of California Condors. A special thank you to Jennifer Westphal for all of her help in making our trip to Pinnacles earlier this year a success!

Grassroots is a local organization that provides 24-hour services to people in crisis. While we strive to care for our environment every day, they strive to care for the health and well-being of our community, and we cannot thank them enough.

Photo by Preservation Maryland [CC BY-SA 2.0 (<https://creativecommons.org/licenses/by-sa/2.0/>)], via Wikimedia Commons

Just a reminder that our office will be closed December 24th – January 1st for the holidays. Have a Happy New Year!

Adventure Awaits

Many years ago, Christiane Howey recognized MTI needed office support and was determined to find someone with great organizational skills and an infectious can-do attitude. So, when her longtime friend, Bonnie Davis Hopkins, retired (for the first time!) from her managerial role at Verizon, Chris quickly cut her retirement (very) short and offered Bonnie an opportunity to utilize her enthusiasm and drive to make a difference—exactly what she has been excelling at for the past 14 years. We are all going to miss your initiative, Bonnie! But we are excited to vicariously follow along on your next adventures. We promise to let this retirement last a little longer!

What are you planning to do in your retirement?

My husband and I would like to travel. We're looking at taking a European river cruise next year, and we want to finish visiting all 50 of the United States—I only have 4 left on my list (Oregon, Nebraska, Oklahoma, and Idaho). And while we're out west, we'd like to go back to some of the National Parks.

What are some fun memories you have from your time with the company?

I really enjoyed the conferences and trips we took as a team. Especially our trip to California in the spring; that one was certainly the most exciting for me, as I organized the trip and was very excited to see condors and meet people I've long known via the phone. I also loved to rearrange the front office. The differing roles the staff took on required us to shift things around every so often and it was fun figuring out where the desks, furniture, and people would be resituated.

I do believe that working with the young people here has kept me young because there's always something new to learn! I will miss seeing the familiar friendly faces on a regular basis.

In addition to being a close friend to the Howey family, Bonnie is much loved by the whole MTI family. We wish her nothing but the best in her retirement and offer our sincerest thanks for many years of dedicated work and guidance.

Bon voyage!



HAPPY ANNIVERSARY

CONGRATULATIONS TO TWO HARD-WORKING INDIVIDUALS WHO ARE CELEBRATING SPECIAL ANNIVERSARIES OF BEING ON THE MTI TEAM

25 CATHY
YEARS
AT MTI

Many of our customers are familiar with Cathy through friendly phone and email correspondence. She is always ready to assist a customer in need!

10 RORILYN
YEARS
AT MTI

Rorilyn is a master with a paintbrush. Her positive attitude keeps our office upbeat and her precision skills keep our transmitters looking polished!



We've launched the new www.microwavetelemetry.com

We are proud to announce the launch of our new website and Production Form Portal. We hope that you will explore all the newly updated features and information.

Our new Production Form system is restructured to provide you with a more intuitive ordering experience. A complete Production Form and official order commitment (Purchase Order, signed MTI Sales Agreement, official letter of intent) or prepayment are still required for each transmitter order.

We are grateful for all those who helped us along the way but especially our team members, Vicki Devlin and Archana Subramanian, for their drive and diligence in making our new site look and function so elegantly.

Visit us online and explore!



CHRISTIANE HOWEY RISING SCHOLAR AWARD

To honor the life of Christiane Howey, her incredible dedication to our company, and her passion for conservation and helping researchers worldwide, we created the Rising Scholar Award. This annual award is intended to foster career development in researchers starting on their professional journeys. This award has allowed previous recipients to make an impact with projects involving conservation, anthropogenic implications, and community outreach.

We are pleased to announce the winner of the 2019 award. Once again, the applicants have made our choice difficult.

We had so many excellent proposals it was impossible to choose just one winner. So, we chose two winners this year: **Marta Serra Acacio**, from the University of East Anglia, and **Amy Carlson**, from the Coonamessett Farm Foundation. Marta will use GPS/GSM transmitters to study migratory behavior in a partially migratory population of juvenile Black Storks in Portugal. Amy will use X-Tags to examine post-stranding behavior in *Mola mola* that are beaching in Cape Cod. We look forward to hearing more about these studies in the near future.



CONGRATULATIONS MARTA AND AMY!

Interested in applying for the 2020 Rising Scholar Award?

See our upcoming Spring 2019 edition of Tracker News or visit www.microwavetelemetry.com for our call for proposals.

Bits & Pieces

Remember:
Please proofread your Production Form thoroughly before submitting!

Please contact us if you are planning to send back a transmitter for refurbishment **before** shipping the device.

Contact us if you would like a PDF copy of a Production Form that you had submitted before the launch of our new website.

FUN FACT:
The combined antenna lengths of all new MTI transmitters made in 2018 surpasses the height of the Eiffel Tower by almost 90 feet!