

# Tracker News

Microwave Telemetry, Inc.

CELEBRATING

25 years

Dear Customers and Friends,

As I reminisce about the past 25 years, I'm humbled to realize the part we have played in some amazing discoveries. Some of these findings have resolved long-standing questions whilst others have been key to saving rapidly declining species. Several contributions come to mind:

In the mid-1990s, a single PTT led to the discovery of the wintering locations of the Eider Duck (within the pack ice of the Bering Sea). Similarly, one PTT was used to track a Swainson's Hawk into Argentina where the main cause of their disappearance became obvious when thousands were found dead, killed by monocrotophos pesticide. The subsequent banning of this pesticide halted the rapid population decline in the species. In 1997, we introduced the very first pop-up satellite tags, and the first of these to be deployed revealed mixing of the western and eastern Atlantic bluefin tuna stocks. The nonstop, 9-day, trans-Pacific flight of a Bar-Tailed Godwit from Alaska to New Zealand in 2007 explained another long-standing mystery in this species' life history.

As I write this, one of the first 2 gram PTTs has been carried by a Red Knot on a >4500 km journey, from the Netherlands to Ellesmere Island via Iceland, and over the Greenland icecap (see page 7). With the ability to now satellite track such lightweight species, who knows what discoveries will be made in the next 25 years!

In this issue of our newsletter, we learn about studies involving more animals that have suffered tremendous population declines, a common theme over the years. Vikash Tatayah discusses his efforts to understand the movements of the Mauritius Fruit Bat in relation to fruit crops, in an attempt to prevent future culls of this misunderstood mammal. Simeon Marin, Gradimir Gradev, and Pavlin Zhelev summarize their work on tracking reintroduced Lesser Kestrels in Bulgaria, while Jayson Ibanez shares information about the journeys of an orphaned Philippine Eagle from Davao – a special place to the Howey/Jordan family since Lucy and Lance's son, Kent, is originally from Davao City. We are so grateful for the authors' contributions. Thanks for telling your stories.

May we wish you all continued success with your research.

Sincerely,  
Paul and the Team at MTI

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# Survivor: Philippine Eagle Sinabadan

Jayson C. Ibanez is the Director for Research and Conservation of the Philippine Eagle Foundation, a non-governmental, non-profit conservation organization based in Davao City, Mindanao Island, Philippines. As of this writing, his team has instrumented and monitored 16 Philippine eagles in the wild.



The IUCN “critically endangered” Philippine eagle (*Pithecophaga jefferyi*) is endemic to the Philippines where it is the national bird. No more than 400 adult pairs are estimated for my country’s top forest predator, which is restricted to only four major islands of the archipelago, namely Luzon, Leyte, Samar and Mindanao. Of these four islands, more than half of the extant population is believed to be on Mindanao, Southern Philippines.

Historical deforestation destroyed more than 80% of the original Philippine forest cover. Being highly forest dependent, massive habitat decimation resulted in outright losses in numbers. Population decline was made even more abrupt by shooting, hunting, and trapping as a result of more human and eagle encounters than when the forests were still vast and intact. Being slow reproducing (only a single young reared every two years) and late-maturing (young reach sexual maturity at 5–6 years) makes the species even more susceptible to extinction.

Representative of this species’ current troubles is the story of one immature Philippine eagle living in Mindanao on Mount Apo, the country’s tallest mountain.

Meet Philippine eagle “Sinabadan,” namesake of the Indigenous Bagobo Tagabawa people’s organization who works with the Philippine Eagle Foundation (PEF) to conserve eagles and their forest habitat at Mt. Apo. Sinabadan is over two years old now, but the eaglet lost her father when she was only 7 months old. For another year, her parents would have taken turns feeding her until she became fully independent.

Unfortunately, a gunshot took the life of the male eagle parent. Field biologists from the PEF, a conservation organization dedicated to saving the eagle from extinction, trapped the male eagle in 2014 and tagged it with an LC4 GPS satellite transmitter. But in August of the same year, satellite fixes showed that all of his latest GPS locations clustered in just one place. Ten days later, the same



Photo by Ron Taraya and PEF

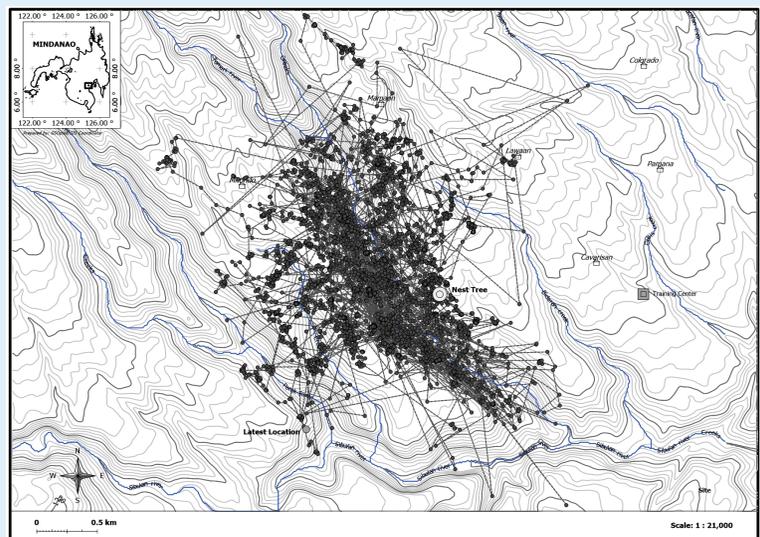
The 7-month old eaglet with GPS transmitter left fatherless by the death of the adult eagle at Mt. Apo.

clustering was observed. When the field crew investigated, they found the bird already dead and decomposing. A necropsy later showed that its keel bone had a crack, presumably from a gunshot.

We were worried Sinabadan would not survive. We had two choices — take her from the wild and to the Philippine Eagle Center where she would join the rest of our captive birds, or attempt food provisioning to augment whatever prey her mother provides. We chose the latter. But interestingly, neither the young nor the female eagle took the supplemental food (rabbit) we had tethered. Remarkably, the female eagle seemed to have doubled her hunting effort. The adult female eagle was also instrumented with an LC4 GPS unit and so we were able to track her too.

Sinabadan survived the post-fledging period, but not without the challenges of living in a remnant forest inhabited by people.

Our field crew re-captured her in December 2015 to replace her transmitter with a 70g solar-powered GPS/GSM unit. The trapping attempt was providential as the bird also had a nylon rope, about a meter long, dangling from one finger of her right foot. It appeared the young eagle was caught in a



Philippine eagle Sinabadan's movements from September 2014 to March 2016.

native noose trap intended for birds and small mammals. The finger that caught the thin rope was slightly swollen, apparently from the limited blood flow to the digit. Previously, we had one case concerning a satellite-tagged eagle that died from getting strangled in a noose trap intended for wild pigs and deer.

Sinabadan was also observed snatching domestic piglets from her human neighbors along forest edges. This happened on few occasions when wild prey was apparently scarce. But because we have provided rural livelihood assistance to the community, local families do not mind the bird taking pets and livestock as food once in a while. Part of the campaign by the Indigenous Bagobo Tagabawa forest guards, who watch over the eagles, is to remind households to keep their domestic animals safe. The forest guards also demonstrate how the locals can safely drive the eagle away whenever she comes close to livestock and pets.

We have effectively combined active patrolling by our indigenous forest guards and remote tracking through the bird’s GPS/GSM unit in monitoring the health and survival of eagle Sinabadan. As of the last monitoring, she has moved within 1000 hectares of forest, with the furthest point she has reached being 4 km away from the nest. Thanks to remote surveillance offered by modern tracking technology, we are making a difference in the life of this single, but equally precious, Philippine eagle at Mt Apo.



Photo courtesy of PEF

Jayson with eagle.

# Green Balkans Track the Recovery of the Lesser Kestrel as a Breeder in Bulgaria Using 5g PTTs

Simeon Marin, Gradimir Gradev, and Pavlin Zhelev have been working for Green Balkans for years – one of Bulgaria’s biggest nature conservation NGOs. Simeon was one of the founders of Green Balkans, being an active member of the Organization since its establishment in 1988. Gradimir and Pavlin have been part of the society for more than 15 years – first as volunteers and later as members of the professional team of the Organization. Currently, the three of them are part of Green Balkans’ project “Lesser Kestrel Recovery,” implemented with the support of the LIFE program of the European Union.

The Lesser Kestrel (*Falco naumanni*) is one of the smallest falcon species found in Bulgaria and Europe. Although these graceful falcons were widespread in the mid-1990s, by the close of the century, their population in all European countries suffered a significant decline. Thus, the Lesser Kestrel went extinct as a breeding species in Bulgaria. The last confirmed breeding of Lesser Kestrels was recorded by Green Balkans in the late 1980s. Since then, there have been only sightings of vagrant and non-breeding individuals. Therefore, in the latest edition of the Red Data

Book of Bulgaria, the Lesser Kestrel is listed as a critically endangered species (CR) in accordance with the IUCN criteria.

Considering all of this, the conservationists from Green Balkans launched a program aimed at reinforcing and restoring the breeding of the species in Bulgaria. The applied approach

is based on translocation of ex-situ hatched juveniles from Spain. The subsequent release into the wild is done through a Lesser Kestrel Release and Adaptation Module (the so called "hacking facility"), developed according to the design elaborated by the Spanish organization DEMA – a partner within the project. Within a specialized project funded by the LIFE program of the European Union, more than 200 chicks were released into the wild in the period 2013–2015. Thus, the species recovered as a breeder in Bulgaria and the first colony seen in decades was recorded in Sakar SPA (BG0002021), part of the Natura 2000 Ecological Network.

Green Balkans tagged individuals with satellite transmitters to track the adaptation of the birds from the newly established colony and identify their hunting grounds, dispersal areas, roosting sites, migration routes, and wintering habitats. Given the small size of the Lesser Kestrels of only about 130–150 g, the team considered 5g Solar PTT backpacks to be the most suitable devices for tagging the individuals. These transmitters do not exceed 3–4% of the body weight of the birds tagged; hence, they do not affect the activity and the behavior of the tracked Lesser Kestrels. Such devices were used for the first time in Bulgaria, as these were the smallest birds tracked through satellite transmitters.

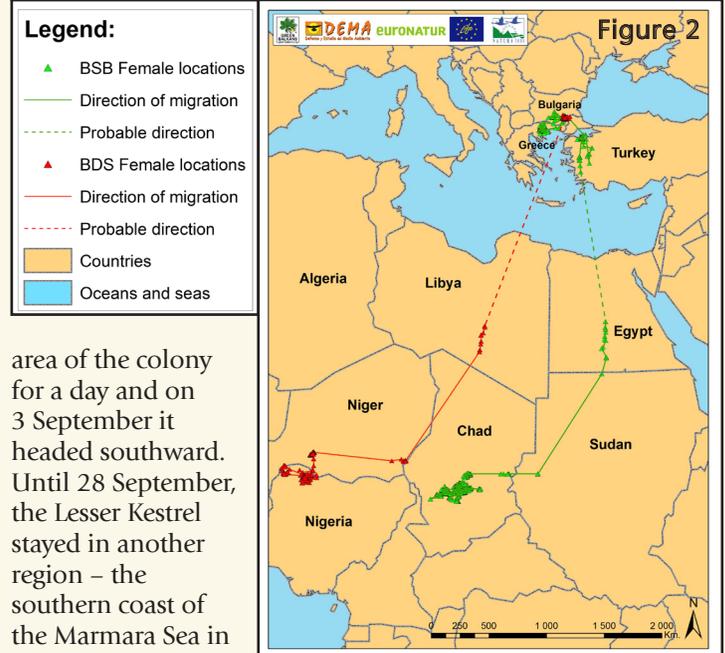
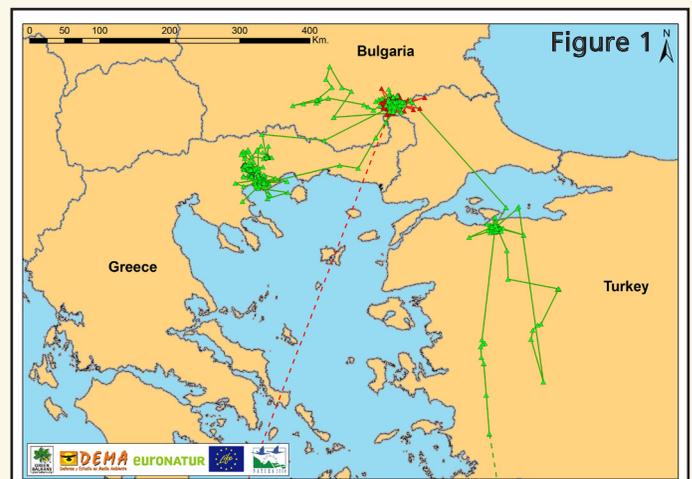
For the purpose of these studies, 4 PTTs were used in 2015. Detailed data were collected only for two of the birds tagged, providing information about the breeding period, pre-migration vagrancy, migration routes, and wintering

grounds. These were two female individuals from breeding pairs, banded with orange PVC rings with black inscriptions - BSB and BDS. In total, more than 2000 positions from various parts of the Balkan peninsula and Africa were recorded. The two birds demonstrated relatively different behavior in the post-breeding period.

BSB showed significant pre-migration vagrancy and left the colony relatively early, spending the period of 16 July – 2 September 2015 in northern Greece (Figure 1). On-site inspection carried out by the team recorded concentration of up to 10 more individuals of this species. The bird returned to the



A Lesser Kestrel banded with color and metal ornithological rings.



area of the colony for a day and on 3 September it headed southward. Until 28 September, the Lesser Kestrel stayed in another region – the southern coast of the Marmara Sea in Turkey, then headed to Africa (Figure 2). It settled to overwinter in Chad. The longest recorded distance traveled between two positions of this individual was 1307 km within 46 hours, during the period 28 – 30 September, when BSB migrated between Turkey and Egypt.

BDS launched its migration on 15 September heading directly southwards to Africa (Figure 2). Forty-nine hours later, the bird was already in Libya, 1921 km away from the location of the last recorded position. Perhaps the bird had traveled an even longer distance, but it cannot be confirmed if it had flown straight across the Mediterranean or followed the coastline. This bird overwintered in the border area of Nigeria and Niger.

Green Balkans is excited to continue the tracking project by tagging two more Lesser Kestrels in 2016.



Having done the calibration, now it's time for tagging.

# Tracking the Mauritius Fruit Bat: A Tribute to the Late Christiane Howey

Vikash Tatayah is the Conservation Director of the Mauritian Wildlife Foundation, a Mauritian conservation non-governmental organization of global repute. He has been at the forefront of initiatives to better understand the importance of bats, increase public awareness, and find non-lethal solutions to the human-fruit bat conflict.



Links between the Howeys and Mauritius span several decades through personal connections with Mauritian Wildlife Foundation (MWF) staff and the fact that the late Christiane Howey was of Mauritian origin. Paul and Christiane visited us in 2008 to give a powerpoint presentation on Microwave Telemetry and share with us some small company gifts! At this time, they also promised to use MTT's technology to help with projects requiring telemetry.



Photo by Jacques de Speville

Mauritius Fruit Bat in flight.

This offer did not fall on deaf ears. Since the early 2000s, there has been a growing human-Mauritius Fruit Bat (*Pteropus niger*) conflict, arising from the increasing bat population and furthered development that has brought humans in closer proximity to bat populations, leading to unsubstantiated claims that bats are causing exaggerated lychee and mango losses. The Mauritius Fruit Bat is an endemic species to the island. This species once occupied Réunion, a nearby French island, but is now considered extinct there (ca. 1800). While often viewed as pests, fruit bats play a critical role in the pollination and seed dispersal necessary for helping to maintain the population of fruit trees on which they are considered to vex.

As the calls for culling bats were getting more insistent, the MWF realized that it had to bring in good science to offset violent actions being taken against these valuable players in the ecosystem. One key piece of information necessary for this was determining how widely the bats travelled on the island and exploited the commercial fruits as opposed to feeding in native forests. Paul spoke to us about the brand new GPS/GSM tag that he was developing, as well as Microwave Telemetry's annual award to start-up projects, and how he hoped Mauritius could benefit. Considering these tags are simply the most high-tech of their kind on the market at the moment, the offer was gladly accepted!

During a visit to Mauritius in 2013, Paul, Russell, Lucy, and Lance (who all work at Microwave Telemetry) tested some of the tags and attachments on captive Mauritius Fruit Bats on Ile Aux Aigrettes, a small island that the MWF was given full control of in 1987. Isolated from the mainland by 800 m, it represents the only remaining example of a dry

coastal forest in Mauritius. Captive fruit bats are held on the island for educational purposes, and many Mauritian school children, including Lucy and Russell's cousins, have visited the island to learn about nature. The captive bats presented the perfect opportunity to test the attachment and observe how the species would react to the device.

After observing the fruit bats, Paul and Russell made some more tweaks at MTT's headquarters in the USA. Microwave Telemetry then provided 10 tags to the project. The first tags were deployed by a MWF post-doctoral student, and since then, bat movements have been tracked on Mauritius, giving insights into the formidable daily evening dispersals of fruit bats on the island (see maps below for displacements). These bats are capable of flying from one end of Mauritius (45 x 65 km) to another and back to their daytime roosts during their nightly feeding trips.



Photo by Vikash Tatayah

Mauritius Fruit Bat with a specially modified GSM transmitter weighing roughly 35 grams.

The tracking of fruit bats started in 2014, but unfortunately, the information gathered through this technology was not sufficient to prevent an official cull of 20,000 bats by the army along with the illegal cull of thousands more in parallel in 2015. The Mauritius Fruit Bat has come to the forefront of the Mauritian Wildlife Foundation's priority projects due to this highly controversial action of slaughtering bats to mitigate unsubstantiated levels of damage to fruiting trees. The project continues to gather valuable data on the bats' movements that will help identify their food resources and, ultimately, improve our understanding of bat feeding behaviour. Such knowledge will allow

us to advise on ways to reduce damage caused by bats in a non-lethal manner and determine means of future forest restoration that is mindful of bats.

The Mauritian Wildlife Foundation is grateful to Microwave Telemetry for not just a simple project that seeks to understand the habits of a species, but one that will probably help to save tens of thousands of bats that are vital in maintaining Mauritius' biodiversity. I am sure that Christiane would have liked this thought.

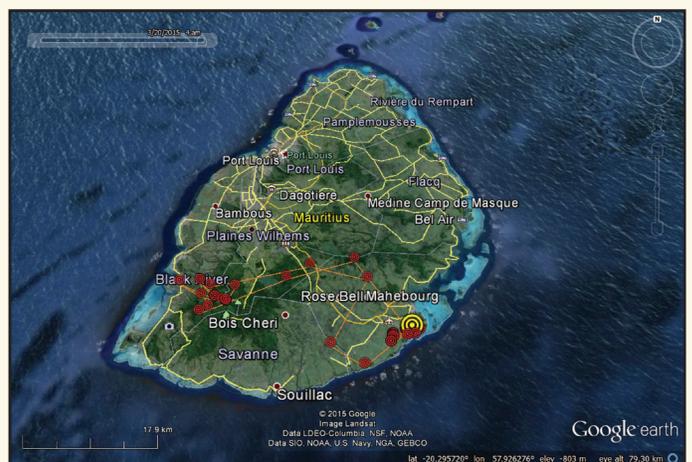


Photo by Vikash Tatayah

Tatayah with a recently tagged Mauritius Fruit Bat.



A bat tagged in Pamplemousses (north) that flew to Black River (southwest) and Souillac (south) before returning to the north. The bat also explored northeast Mauritius.



Female bat tagged near an airport (southeast Mauritius), stayed there for a while, went to the southwest coast for a few days, and moved back to the southeast.



## Our 2016 Photo Contest is Here! Enter for a Chance to Win a Free Transmitter

Now is the time to have your cameras ready! Once again, MTI is hosting a photo contest to find the best pictures of the amazing species our transmitters are tracking!

First prize will be a **free transmitter** of your choice.

Second prize is a **free refurbishment of an eligible transmitter**.

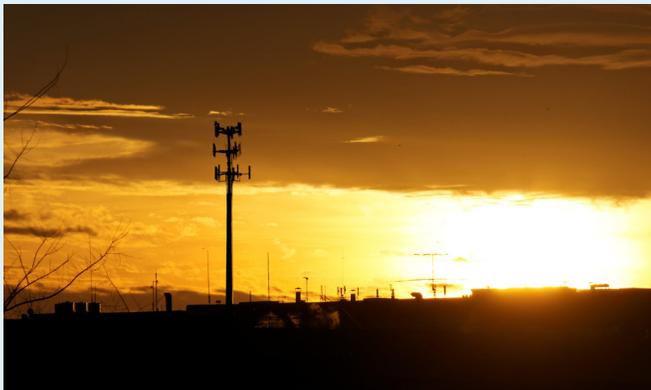
All photo entries must depict animals tagged with MTI transmitters in the animals' natural environment. Groups or organizations, as well as individuals are eligible to enter. Be sure to include the photographer's name and affiliated organization. Please send all entries in high resolution (preferably a minimum of 2100 x 3000 pixels) digital format to:

[support@microwavetelemetry.com](mailto:support@microwavetelemetry.com)

Write "Photo Contest" in the subject line of your email. Please submit your entries no later than November 1, 2016. Photographs will be judged anonymously, and all winners will be announced and featured in our winter newsletter. Photos previously used in our publications are ineligible. All contestants submitting entries grant permission for the future publication of their photos by Microwave Telemetry, Inc.; appropriate photo credit will be given. Multiple entries are permitted and encouraged.



## Sunsetting of the 2G GSM Network in North America



With increasing demand for higher data throughput, driven mainly by the mobile phone industry, network carriers (e.g., ATT, T-Mobile) are phasing out second-generation (2G) cellular equipment. This "sunset" will be complete by 31 December 2016. At the beginning of 2016, MTI began replacing its 2G module with a 3G module for devices sold to customers deploying devices in North America. This change makes the devices functional in both North and South America. Customers deploying devices in places other than the Americas will still receive GSM units with 2G modules.

MTI is constantly faced with adapting with (and to) new technologies, which is a good thing in general. However, this instance is unfortunate as the change will affect those customers who have active GSM units deployed in North America. Upon completion of the 2G phase-out, devices sold prior to 2016 will no longer function in North America. If your birds migrate to South America, the archived data will still upload to a 2G network upon connection. Additionally, should a 2G unit be physically recovered from a North American project, we will be able to download archived data and upgrade the device with the newer 3G module. Please contact us for more information about the upgrade.

## 2017 Christiane Howey Rising Scholar Award

### ~~~ Call for Entries ~~~

In addition to granting many educational awards for transmitters over the years, Christiane Howey quietly found ways to help young researchers and start-up programs. To honor Chris, and to carry on in her spirit of generosity, we are proud to offer an annual award in her name: the Christiane Howey Rising Scholar Award.

Proposals for the 2017 Christiane Howey Rising Scholar Award will be accepted before October 31, 2016 and reviewed prior to the publication of the Winter 2016 issue of *Tracker News*. The award recipient will be notified in late December to schedule a production slot. Proposals will be judged by an internal committee. Applicants are encouraged to include an educational component in their research, but this is not required. This award is intended to provide researchers who are starting out their careers with the means to get their projects off the ground. It will provide the recipient with five transmitters of his/her choice. Proposals should include an outline of the project indicating the scope and expected outcome. Please include a timeline and let us know what model of transmitter you are interested in using. We are looking for a maximum of 5 pages. The recipient will be responsible for any Argos (or GSM) data distribution costs and any duties/taxes. For more information, please email [support@microwavetelemetry.com](mailto:support@microwavetelemetry.com) or visit our website.



# MTI SPECS

## 25 Years in the Making



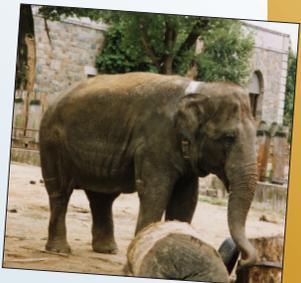
We are offering **FREE GROUND TRACK** throughout 2016!



A lone eagle tagged with a battery-powered PTT was the company logo until 2011.



A 45g battery-powered transmitter was once recovered from the remains of a black stork. Sadly, the bird was stoned and burned after landing on a church, but the PTT was still transmitting!



In 1995, Paul worked with the National Zoo to test a specialized transmitter for elephants.

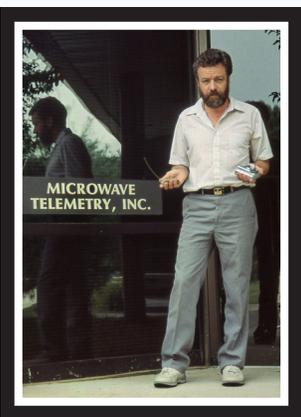


Volume 1 of the MTI newsletter was printed in the summer of 2000.

In 1991, Paul and Christiane Howey started Microwave Telemetry with the hope that they could make a difference in the world, if only in their own small way. Now, 25 years later, we continue to embrace that paradigm, recognizing the ways we changed animal tracking, as well as some of the ways we have changed as a company.

# 23

The number of employees MTI has today. When the company began, the only employee was Paul.



# 0

The number of windows in the original MTI office. The company started in Paul and Chris' basement and has since moved 3 times to accommodate our expansion. We have been at our current location for 16 years and have 14 large windows.



Lucy and Russell were both less than 10 years old when their parents started this company. Now grown, they have taken on their own important roles to help keep MTI at the head of its field.

# <10



# 10x

Today, Cathy contacts about 10 people through email for every 1 person she used to contact via fax.



# 250x

The increase in how many components can now be soldered to circuit boards in an hour. Each component was originally soldered by hand, but the addition of our pick-and-place machine has made the process significantly more efficient.



# 500+

Modern GSM transmitters can take GPS fixes over 500 times in a day, compared to early battery-powered PTTs which could only provide about 10 Argos locations every other day. (And you can see how mapping our animals' routes has changed as well - Paul used to mark a bird's location with pushpins on a paper map!)



# 2g

Our smallest and lightest PTT so far. In the beginning, MIT's only product was the 95g Battery Powered PTT-100. The new 2g Solar PTT (shown below, actual size) weighs a mere 2.1% of its 95g ancestor (shown right, actual size).



## 2 gram PTT Update

As reported in the previous newsletter, we are working to productionize a novel, very tiny PTT. We have made significant progress – the first production version, weighing about 2.5 grams, will be available in limited quantities starting in October of this year.

One of the pre-production prototypes was recently attached to a Red Knot (below) in the Netherlands by Theunis Piersma and his colleagues at NIOZ. This map shows the surprisingly detailed track flown by the bird, including its first unsuccessful attempt to cross the Greenland ice cap and nonstop return to Iceland before its second successful trans-Greenland flight. The low power requirement of this very advanced Argos 3 PTT, together with the new high output solar cells, allows it to transmit virtually continuously, hence the near-continuous track. We're excited to see where this little one goes next!



## Support 2019 Satellite Launch of Argos Instruments: *Avoid Potential Data Gaps!*

The existing constellation of NOAA polar orbiting satellites that currently supports Argos instruments is aging and operating past its design lifetime. Although no data exist to indicate these satellites are failing, operational lifetimes of other similar satellites suggest that they are ready for an update. However, if NOAA is unable to deliver a new space-based Argos module by 2019, there will be a possible gap in service which could cause data loss for Argos-based projects. NOAA received funding in the President's Fiscal Year 2017 Budget to support a new satellite launch in 2020, delaying an earlier goal for a 2019 launch. The solution: NOAA advances their proposed timeline for the launch forward by one year with the goal of a hosted payload launch of Argos instruments in 2019.

At the end of April 2016, a group of representatives from CLS America, US Argos users, and PTT manufacturers convened in Washington, D.C. The purpose was to meet with Congressional leaders and convey a unified message — please support an acceleration in funding so that a new Argos module can be launched into orbit in 2019. Lance and Paul represented MTI, meeting with the staff from 10 Congressional offices to help explain the unique properties that define the Argos constellation (low-power devices, global coverage, etc.) and the urgency for continued satellite coverage. Argos users from the US are encouraged to reiterate the message. Please see the CLS America website for more information on how you can help.



Paul and Lance feeling awkward in their suits in front of the U.S. Capitol Building, looking equally odd as it undergoes restoration.

[www.clsamerica.com](http://www.clsamerica.com)



# CLS AMERICA

## MTI Employee Spotlight

*We have decided to feature one of our employees in each of our future issues, so you can meet the team behind the transmitters. This issue, we are introducing you to:*

### Joe Downey – Assembly Technician

**Q: Tell us a little about yourself.**

A: I'm originally from nearby Silver Spring, Maryland. After high school, I joined the Navy and spent several years on a base in San Diego. The Navy trained and employed me as a helicopter repair man. It was there that I learned about (and learned that I had a love for) electronics repair and circuitry. I joined MTI as a technician in 2010.

**Q: What do you do here at MTI?**

A: I'm lucky to be able to do many tasks at MTI that I enjoy. Most of my time is spent assembling transmitter housings, soldering and assembling parts, and building circuitry on the pick-and-place machine that I operate.

**Q: What is your favorite part about your job?**

A: Overall, I like the challenge that working at MTI presents. Every day has a lot of variety and keeps me very busy. I feel proud when I see the finished product that we worked as a team to put together. My favorite task is definitely operating the pick-and-place machine. I like seeing the miniature parts (that are useless by themselves) be precisely placed on circuit boards to make this highly complex product.

**Q: Do you have a favorite memory or story from your time here at MTI?**

A: Definitely my interview. I arrived for my job interview, which was supposed to last "roughly an hour," in a very uncomfortable, itchy suit. Immediately, when I walked in, Paul jokingly told me that I was overdressed, adding to my nervousness and sweating. During my interview, Lance told me, "they were very busy, and would I like to try out working with him on some real transmitters?" I quickly agreed and ended up staying almost the entire day. I haven't left since! Well, I've gone home and stuff, but you know what I mean—I've worked here ever since!

My second favorite memory has to be when I tricked our high school intern into thinking that everyone at MTI dressed up elaborately for Halloween. He arrived on Halloween day dressed in a real firefighter suit and had to work the entire day in a very heavy and hot suit. Not quite the correct attire to assemble small machinery!

