

Microwave Telemetry, Inc.



Our Tenth Year Celebration Continues!

Dear Customers and Friends,

Thank you for the many wishes and kind words of encouragement we have received as we celebrate our tenth anniversary. We appreciate the very positive feedback about our website—many of you have commented how informative and interesting it is. I would like to thank once again those who contributed photographs to our website.

Our tenth anniversary celebration continues. We congratulate Joe Nuffer and Lauren Wilde, the two recipients of our scholarships (see page 2). We also congratulate the four schools that were awarded the free transmitters for a school project (see below). We will close the year with a reception on December 7, to which you are invited (see page 2).

Last, but not least, we thank Willem Van den Bossche, Peter Berthold, Yuri Darman, Vladimir Andronov, Mikhail Parilov and Ulrich Querner for their fascinating article on the Oriental White Stork. We would also like to thank Molly Lutcavage, Rich Brill, Julie Porter, Greg Skomal, Brad Chase, Anne Everly, Cookie Murray, Mike Genovese, Bill Chaprales and Anthony Mendillo for their article on tracking bluefin tuna.

We wish you a great field season and look forward to continuing to work with you. If you have not done so already, be sure to look us up on the web at www.microwavetelemetry.com.

Sincerely,

Paul and the staff at MTI



Kids are the Winners in PTTs for School Projects

Students from around the world will benefit from our award of free transmitters to support research that includes participation by school children.

In the fall edition of our newsletter and in celebration of our tenth anniversary, we offered free transmitters for use in a project that involved school children. Our goal is to foster a love of biology by giving students an introduction to this state-of-the-art technology and an opportunity to experience field research firsthand.

We agonized over which of the dozen proposals submitted would receive the award and were convinced that all the applicants were worthy of our support. Ultimately, we decided to support four projects rather than one. Selection of the recipients was based upon the scope of the project, the degree of student involvement and the benefit to the children.

The winning entries were from the following schools: Palmerston North Girls High School, New Zealand; Ecole Secondaire de Payerne et Environs, Switzerland; Yankeetown Middle School and Cedar Key High School, Florida, USA (Submitted one proposal together); Liberty Bell Jr/Sr High School, Washington State, USA.

Congratulations to all of the recipients and especially to the young people whose participation will encourage and ensure continuation of important field research into the future. Watch for articles about these school research projects in upcoming newsletters. ❖



Students from Palmerston North Girls High School, New Zealand will study the New Zealand Falcon. They are one of four schools that will receive free PTTs.



Scholarships Awarded

Congratulations to graduating seniors Joseph Nuffer (Hammond High School, Columbia, MD) and Lauren Wilde (Long Reach High School, Columbia, MD) who are the recipients of the Microwave Telemetry Scholarship Awards in celebration of our tenth anniversary. They were selected for their high academic achievement and involvement in the community.

Joseph is interested in molecular biology and will attend the University of Virginia in the fall. He states that the study of biology "is a worthwhile way to spend my life, allowing me to contribute to society and save lives through gene expression."

Joe has been a member of the Boy Scouts for ten years and has earned the rank of Eagle Scout, the highest rank achievable. He is also a member of the National Honor Society and chairs his school's Adopt-a-Road program. Joe loves to compete, and as captain of the cross country track team, states that running is his most important extracurricular activity.



Joe Nuffer

Lauren has always had an interest in science—particularly biology. She will attend Wake Forest University in the fall and plans to major in biology with a special interest in genetics. Her ultimate goal is to study learning disabilities caused by genetic disorders.



Lauren Wilde

This active teenager has won several awards and is the National Honor Society president at her high school. She has been a volunteer for the Special Olympics for four years and is active at school as a member of the junior varsity volleyball team, sports editor, member of the class council, student government delegate and peer leader.

We wish Joe and Lauren the best as they enter the next exciting stage of their academic careers. We hope to follow their progress throughout their college years and we will keep you posted. Although we originally intended to award two 500 dollar scholarships, we were so impressed by these two terrific students, we decided to award them 1000 dollars each.

You are Invited...

To wind up our tenth anniversary, we are planning a Holiday Party on December 7, 2001.

We would be delighted if you could join us. The party will either be a luncheon or a dinner, depending on the number of people attending. Please let us know as soon as possible—by September 28 at the latest—if you can attend (e-mail: cathy@microwavetelemetry.com). We hope that many of you can join us at this celebration.

At that time we will have a drawing for two free transmitters—a 70 gram GPS PTT and an 18 gram Solar PTT.

Entry Rules

Entries must be postmarked no later than October 31, 2001 (entries from abroad should be airmailed).

Send entries to: **Microwave Telemetry, Inc.**
8835 Columbia 100 Parkway
Suites K & L
Columbia, MD 21045, USA

One entry per customer—entry forms may not be duplicated
Drawing will be made at our Holiday Party, December 7, 2001
Winner need not be present to win
No purchase necessary
Winners will be notified by December 10, 2001
All decisions are final
Winners will assume Argos costs
Employees or family members of our competitors are disqualified!

Free 70 gram GPS PTT

Name _____
Address _____

E-mail _____

Free 18 gram Solar PTT

Name _____
Address _____

E-mail _____

Third in a series of *Feature Articles*

(Printed with permission)

Satellite-tracking Helps to Discover Stopover Sites of the Threatened Oriental White Stork (*Ciconia boyciana*)Willem Van den Bossche¹, Peter Berthold², Yuri Darman³, Vladimir Andronov⁴, Mikhail Parilov⁴, Ulrich Querner².¹Belgische Natuur- en Vogelreservaten vzw, BirdLife Belgium, Kon. St. Mariastraat 105, B-1030 Brussels, Belgium.²Vogelwarte Radolfzell, Schloss Möggingen, Schlossallee 2, D-78315 Möggingen, Germany.³WWF Russia, Pologaya Str. 68-411, 690090 Vladivostok, Russia.⁴Khingon Nature Reserve, Dorozhny Pereulok 6, 676740 Arkhara, Russia.

The Oriental White Stork has unfortunately become a very rare species, with an estimated population of 2,500 to 3,000 individuals. This low population level is caused by the loss of breeding habitat, shrinkage of the breeding range, loss of wintering habitat and persecution along the migration route and on wintering grounds. The Oriental White Stork is a migratory species, migrating about 3,000 km from the breeding grounds in the Amur region in China and Russia to the main wintering ground in the Yangtse basin in China.

The individual migration pattern, choice and behavior at stopover sites and the behavior on wintering and summering grounds has only fragmentarily been studied until now. Therefore, Russian scientists and researchers of the Max Planck Research Centre Vogelwarte Radolfzell tagged Oriental White Storks breeding in the Amur region in Russia, in a first attempt to describe these unknown aspects of the migratory behavior.

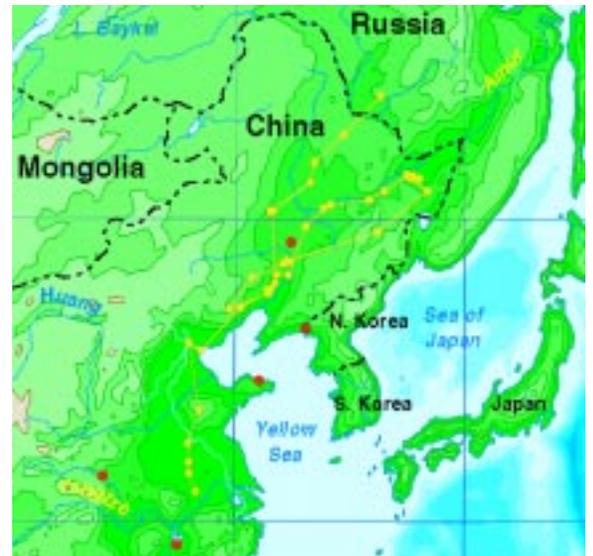
In the summers of 1998, 1999 and 2000, we equipped a total of six Oriental White Stork nestlings with 35 gram solar powered Microwave PTT-100 transmitters. We tracked all six storks on autumn migration and two of them on spring migration.

All tagged storks chose a wintering site situated southwest of the Amur region but they did not fly in a straight line from the breeding to the wintering site. Three tagged storks left the breeding grounds already in August and one in October and all storks stayed for a long time in the Amur, Nen Jiang and Songhua Jiang floodplain. The tagged storks started to migrate again in the second half of October and arrived between 2 and 21 November on the wintering grounds in the Yangtse basin.

To cover the 2,000 to 2,500 km in real distance from the breeding to their wintering ground the storks needed 49 to 89 days. Exceptional was the long migration period of no. 27187—it needed 103 days to cover 1,300 km. During this migration period the storks flew more than 50 km a day during 13 to 29 days, respectively. On autumn migration all tagged storks stopped their migratory flight for several days. The storks chose to fly towards different stopover sites, often not in the direct flyway from the breeding to the wintering grounds.

Stopover periods differed from 1 to 41 days. No.s 8883, 8885 and 27186 made a few stops for a mean period of 9 to 11 days. No. 27187 made two longer stops of 41 and 31 days. No. 27186 migrated in spring only 1000 km but without any stops. No. 8885 made six stops in spring for a total of 24 days.

The three tagged storks that reached the wintering area stayed at different sites in the Yangtse basin at the Han Shui River, Chao Lake, Hongze Lake and Poyang Lake in the Hubei, Anhui, Jiangsu and Jiangxi province, respectively. The tagged storks moved for several tens to hundreds of km during the winter period, which could mean that their main food supply, fish, is insufficient at these locations. The young storks left the



Route of Oriental Stork from the breeding grounds in the Amur region to the wintering grounds in the Yangtse basin. Red dots show where the birds died.



Oriental White Stork fitted with a 35 gram solar PTT



Photos courtesy of Willem Van den Bossche

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Vogelwarte Radolfzell (Germany) and Willem Van den Bossche (BirdLife Belgium) have been studying the migration of White Storks from Europe to Africa since 1990! You can find some results of this satellite tracking program at <http://www.ooievaars.vlaanderen.be>

You Need to Know...

■ Storage of bird PTTs and Pop-up tags



As instructed in the field manual included with every order, all battery powered PTTs and Pop-up tags should be stored in a refrigerator in original packaging.

■ Storage of solar PTTs

Solar PTTs should not be stored in the dark for more than a few days. If the transmitter is going to be left switched off for an extended period, it is recommended that it should be periodically exposed to sunlight (four hours each month) to maintain a charge in the batteries.

■ Backup IDs

We once again bring this crucial information to your attention—**when you give us your Argos ID numbers to program into your transmitter, you must ensure that you are giving us valid IDs.** (That is, be sure the numbers are still assigned to your program and in active mode—not in backup mode.) Problems with IDs will stall production and may delay delivery beyond your deadline.

■ Returning PTTs to us

We have noticed an improvement in utilization of the proper paperwork when returning PTTs. However, our international customers should always ship PTTs back via Federal Express. All other carriers charge us a customs clearance fee of 100-125 dollars. We have no alternative but to add this fee to your invoice.



Further Update on tracking Swallow-tailed Kites with 18 gram solar powered PTTs

Dr. Ken Meyer, of the Avian Research and Conservation Institute of Florida, continues to get amazing results from the diminutive Swallow-tailed Kite he has been tracking for over a year with one of our 18 gram solar PTTs. It returned to its nest site on March 16, having taken two months to migrate from its Brazilian wintering grounds. Dr. Meyer continues to get daily data from the PTT while the kite is tending to its offspring after successful breeding.

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wintering area at 15 and 27 March. One stork summered in the region of Qiqihar in Heilongjiang province, China, 523 km from its birth place.

BirdLife International classifies the Oriental White Stork as an endangered species because of the predicted increased rate of population decline and the small population. Our tagged storks disappeared before they were old enough to breed and that is a very worrying factor. Three out of five birds died along the migration route and two birds died in the wintering area. We have no real data on how the birds died but at least two of them disappeared after taking an aberrant route. Most storks can be found on wintering areas that have already a protected status but, overfishing and disturbance remain a problem even inside the nature reserves.

Nature protection NGOs from Asia, Europe and the United States try to stop the population decline. Most of the breeding areas have recently been protected, but spring fires threaten breeding sites and destroy nest trees. In some regions there is a big lack of nest trees which is tackled by putting up artificial nesting platforms.

Another major problem is that many of the stopover and wintering sites of the Oriental White Stork urgently need to be protected. The results of this and other studies are important to identify the most important areas. One way to give the protection measures more chance to succeed is to include the Oriental White Stork in the further development of the Asian Crane Site Network. This network of nature reserves and organizations aims to protect the four globally threatened Crane species endemic to North East Asia (Red-crowned Crane, Siberian Crane, Hooded Crane and White-naped Crane) which often use the same staging and wintering sites as the Oriental White Storks. We hope that all this work will improve the general awareness of the value of nature and its protection needs. ❖

Results of Pop-Up Satellite Tagging of Atlantic Bluefin Tuna Yield Surprises

Dr. Molly Lutcavage¹, Dr. Rich Brill², Dr. Julie Porter³, Greg Skomal and Brad Chase⁴, Anne Everly¹ and U.S. tuna fishermen Ed Murray Jr., Mike Genovese, Bill Chaprales, Anthony Mendillo⁵

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²Honolulu Lab, NMFS, 2570 Dole Street, Honolulu, HI 96822

³Department of Fisheries and Oceans, Biological Station, St. Andrews, New Brunswick E5B 2L9, Canada

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⁵Palm Beach Gardens, FL; Cape May Courthouse, NJ; Marstons Mills, MA; Isla Mujeres, Mexico

Beginning in 1997, in a collaboration between scientists and fishermen, our research group conducted satellite tagging of giant Atlantic bluefin tuna, *Thunnus thynnus*, in New England and Canada. Our goals were to determine the long-term movements, origins and behavior of bluefin tuna schools found on the New England shelf in summer and fall. We targeted adult fish comprising spawning-size classes (>80 inches SFL) and programmed the majority of the satellite tags to detach from the fish over their presumed spawning period (April to July).

From 1997 to 1999, all successfully released single point satellite tags reported from the central Atlantic roughly between Bermuda and the Azores. Each year, about 30 percent of tags on New England fish reported from east of the 45° W stock-division line, and none of the giant bluefin were in or near their only known spawning grounds in the Gulf of Mexico or Mediterranean Sea. Since none of the giant bluefin tagged in the Gulf of Maine were located in either spawning ground when their tags reported, it seemed possible that a previously unknown spawning area might exist in the Central North Atlantic. The alternative hypothesis, that bluefin tuna do not spawn annually, is also an astonishing, although remote, possibility.

Another possible explanation of why giant bluefin were not found in either known spawning area is that the timing of tag releases was insufficient to detect spawning. In 1999, we deployed 21 of Microwave Telemetry's newly developed pop-up archival tags (PTT-100) on New England giant bluefin for attachments of up to one year.

These pop-up archival tags are pressure tested to 3,300 psi, record ambient light levels at two minute intervals, and temperature ($\pm 0.2^\circ$ C) and depth once an hour and at sunrise and sunset. As a fail-safe, the tag can be programmed to detach at a preset depth (e.g., 1,000 m), or when the tag stays at a user-defined constant depth for a predetermined interval. The tag transmits raw data defining temperatures, pressures and estimates of sunrise and sunset time. The data is processed by the manufacturer, and longitude and latitude estimates are generated with proprietary software; estimated errors are given as about one degree of longitude and several degrees of latitude.

In February 2000, at the PFRP Symposium "Tagging and Tracking Marine Fish with Electronic Devices," we presented estimated migration paths from the first two pop-up satellite archival tags. The two 400 pound fish, schoolmates released from a purse seine set in October 1999, had crossed the Gulf Stream and taken similar routes to the southeast, but were thousands of miles apart when their tags jettisoned on Christmas day (fig. 1).

We obtained high reporting rates with these new tags (17 out of 21 tags, or 81 percent) and they returned data capable of depicting daily geolocation estimates and ambient temperatures (80–340 days) of 12 fish. Without exception, these migration paths overlap reporting locations of single-point tags from previous years, and stretch to the Azores. It was also apparent that not all Gulf of Maine giant bluefin return annually to the New England shelf. Furthermore, migration

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Fig. 1. Estimated migration paths of two bluefin tuna released from a purse seine on October 8, 1999. Their pop-up archival tags reported on December 25, 1999.

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paths deduced from pop-up archival tags showed that fish did not interrupt their residencies in the Central North Atlantic to visit either known spawning area.

The economic and conservation implications of possible spawning of bluefin tuna in the Central Atlantic are enormous. Since 1981, Atlantic bluefin tuna have been managed by ICCAT as two exclusive biological units separated by a management line at 45° W. The biological rationale of this management division is based partly on the presumed separate and exclusive spawning grounds (in the Gulf of Mexico and the Mediterranean Sea), and very low mixing rates (<4-7 percent) across the line. An important result of the satellite tagging is the recent organization of an exploratory research cruise, scheduled for June, 2001, to locate and determine the reproductive status of giant bluefin tuna in the North Central Atlantic.

In the summer of 2000, we deployed ten pop-up archival tags on giant bluefin tuna in New England; these tags are due to report in September, 2001. This summer and fall, we

plan to release 80 giant bluefin tuna outfitted with these high tech, fishery-independent tags. Hopefully, this will yield the most extensive portrayal of their migration paths in the North Atlantic to date.

Researchers and fisheries managers alike are faced with the thorny question: are the warm waters of the Central North Atlantic home to spawning bluefin tuna? If not, then what is the role of this poorly-studied region in the bluefin tuna's life cycle? The initial longline cruise planned for bluefin research in summer 2001 will journey to these distant regions. It carries a high risk of failure, but with luck, we may soon have the answer to these critical management questions. Even then, the fact remains that Gulf of Maine bluefin comprise only a fraction of the combined Atlantic and Mediterranean population. High-tech satellite tags, remote sensing tools, extensive financial resources, and an expert, international scientific team will be needed to clarify the migration paths and spawning habits of this long-lived, highly migratory species.

A better understanding of the bluefin tuna's movements, behavior and spawning areas is vitally needed to improve international management and conservation of this valuable marine resource. ❖



Archival Pop-up tags record the water temperature and depth as well as the time of sunrise and sunset each day. These times are transmitted back to the user via Argos after the tag pops up. They are subsequently used to calculate a daily location estimate and hence reconstruct the track of the fish.

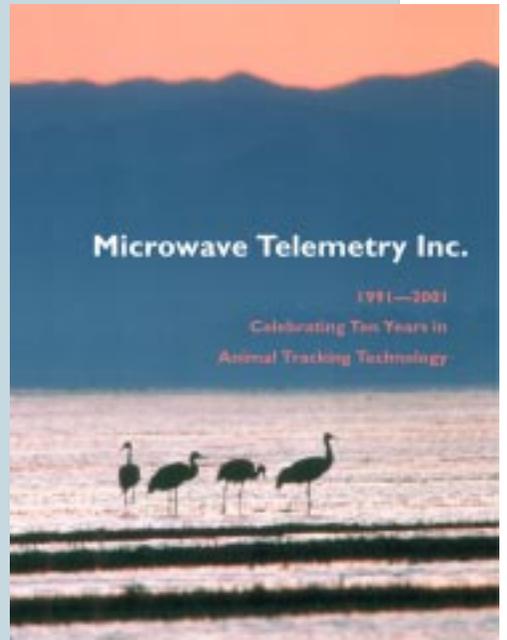
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Our Cover Photo Contest Winner!

Claire Mirande and Kate Fitzwilliams of the International Crane Foundation submitted the winning slide for our Cover Photo Contest. This beautiful image, shot by George Archibald, features Black necked Cranes in silhouette against a sunset in Caottai, China. They plan to deploy their free PTT on a Crane in Russia.

Look for your updated catalog in the fall.



Many thanks to all who visited our booth at the recent Argos International Conference in Annapolis, Maryland. We enjoyed talking to you all and appreciated the feedback.