Report on TIGHAR’s
Niku V Earhart Project Expedition

An Explorers Club Flag Expedition

From July 12 to August 9, 2007 a fifteen-person team of volunteers conducted archaeological survey operations in the Central Pacific as part of TIGHAR’s on-going efforts to solve the mystery of the 1937 disappearance of aviators Amelia Earhart and Frederick J. Noonan during an attempted 'round-the-world flight. This was our ninth Earhart Project expedition since the project’s inception in 1988. The expedition scientific team included three Explorers Club members:

Richard Gillespie (FN ’07) – Expedition Leader
Thomas F. King, Ph.D. (FN ‘02) – Senior Archaeologist
Carolyn Schorer (MN ) – Kite Aerial Photography

Explorers Club Flag #101 was carried on the expedition.

Back row, l. to r.: Barbara Norris, Mark Smith, David Mason, Andrew McKenna, Carolyn Schorer, John Clauss, Karen Ramey Burns, Ph.D., Robin Acker, M.D., Gary Quigg, R. Walter Holm. Front row, l. to r.: Thomas Roberts, Joshua Gillespie, William Carter, Richard Gillespie, Thomas King, Ph.D.
**Background.**

TIGHAR’s research to date is described in two books – *Finding Amelia* by Ric Gillespie (Naval Institute Press, 2006), and *Amelia Earhart’s Shoes* by Thomas King, Randall Jacobson, Karen Burns and Kenton Spading (AltaMira Press, 2004) – as well as on TIGHAR’s website, www.tighar.org. Briefly, we hypothesize that Amelia Earhart and Fred Noonan, when they disappeared on July 2 1937, made their way to Gardner Island, now known as Nikumaroro, an uninhabited atoll in the Phoenix Group about two thousand miles southeast of the Hawaii. The available evidence suggests that Earhart and Noonan landed safely, but were not seen by the search planes that flew over a week later, and eventually died on the island. We have found a variety of pieces of evidence supporting this hypothesis – airplane parts in the ruins of Nikumaroro’s colonial village, anecdotal accounts of wreckage and human bones being found, a detailed official (Western Pacific High Commission) account of the discovery of a partial human skeleton, a woman’s shoe and a sextant box at the southeast end of the island in 1940, our own discovery of a aircraft debris and personal effects consistent with the Earhart flight.

**Research at the Colonial (1938 – 63) Village**

In the old colonial village on Nikumaroro, the focus of our archaeological work was on the village carpenter shop, which we had identified from historical sources and briefly recorded in 1989, and on an apparent debris field east of the carpenter shop (toward and around the now-destroyed wireless station). Prior research has shown that the colonists “quarried” aluminum from an airplane wreck or wrecks and brought it into the village to make into things like fishing lures, hair combs, and inlay on wooden boxes. In 1989, on our first visit to the island, we recorded a still-standing wall at the carpenter’s shop, with shelves attached on which machine parts were piled. We did not excavate at that time. It seemed likely that airplane parts would have wound up among the stockpiled machine parts. We also know that the wall and shelves disappeared in a storm in 1990, but we have found aircraft parts to its east in what we suspected was a debris field formed of material distributed by the storm winds. Although the prevailing trade winds blow out of the east-northeast, storms frequently strike the island from the west-southwest, and this appears to have been the direction the storm was moving that destroyed the carpenter’s shop.

The village work involved clearing dense heaps of coconut deadfall off the sites of the carpenter’s shop and Dado Alley, metal detecting, mapping and excavating test units. The entire apparent debris field was swept with metal detectors, however. Clearing the Carpenter’s Shop area revealed that while the standing wall observed at the site in 1989 was long gone, many of the machine parts were still more or less in place where they had fallen when the wall blew down. Four 1x1 meter excavation units were excavated to expose and examine these items. Everything found was recorded in place, but only those objects that might have been associated with an airplane were collected. The rest of the material was piled at a specific location on a nearby concrete building platform, whose location was carefully recorded for future reference.

Dado Alley was similarly cleared and swept with metal detectors but only a few small aluminum pieces were found and collected. The most intriguing of the artifacts found are nine bronze bushing sleeves. A number stamped into one of the sleeves identifies it as a part that was used in a variety of applications from aircraft to earthmoving equipment. The U.S. Coast Guard Loran station on the island had a bulldozer. These may be spare parts for that machine. Analysis of the recovered material is continuing.
Research at the Seven Site.

The Seven Site – so called for the natural seven-shaped clearing in the mao that covers this part of the island – lies on the windward side of the island’s southeast end. It closely matches the description given by the Western Pacific High Commission’s officer in charge of the Phoenix Islands Settlement Scheme, Gerald Gallagher, of the site where a partial human skeleton was found in 1940. In 2001 we cleared a portion of the site and found a number of suggestive artifacts and features, including a number of “burn features” where bird, fish, and turtle had been cooked. There was also a large hole on the site, which we speculated might be where the colonists buried the skeleton’s cranium when they found it, and where Gallagher subsequently dug it up. We excavated the hole and its backdirt in 2001 looking for bones or teeth, but found none. Since we were not sure we had reached the hole’s bottom, one task for 2007 was to re-open our excavation and complete the job. Other tasks included scanning the site surface for bones and teeth and discovering and excavating additional burn features.

The first challenge at the Seven Site was to clear the mao (scaevola frutescens) while protecting the site surface, on which we knew there were delicate distributions of artifacts. We accomplished this using fewer than usual of the traditional bush knives and chainsaws, instead using long-handled pneumatic loppers powered by dive tanks. These worked remarkably well, and allowed us to clear an area of some 1200 square meters in about three days. We then scanned much of the surface for bones and teeth, using a solar-powered daylight ultraviolet scanner designed by team member John Clauss. We gave the surface a detailed visual inspection, raked much of it, and swept it with metal detectors. We re-opened the hole excavation and carried it to 120 cm. depth, where we encountered loose coral rubble with many void spaces and abandoned hope of finding bones or teeth. Finally, we excavated a number of locations where there were suspicious surface features, distributions of artifacts, or evidence of cooking fires.

We also did kite aerial photography (KAP) to help document the site in its environment and used a robotic total station surveying instrument to update, expand, and correct the site map prepared in 2001. The UV scanner did not reveal any human teeth or bones, but coupled with raking, metal detecting, and visual inspection did allow us to define two burn features for excavation. We excavated these using 2x2 meter excavation units and putting all soil through ¼˝ screens. We also excavated a concentration of sea turtle bones associated with the remains of a small barrel, and two locations around particularly interesting surface artifacts – part of a small pocket knife and a piece of beveled glass that may be from a small mirror. Three small pieces of red material have a chemical content consistent with that of early 20th century cosmetic rouge. None of these items is easily attributed to Kiribati colonists or U.S. Coast Guardsmen, the two groups known to have been in the vicinity at various times. One of the fire features contained the broken and mostly melted remains of two bottles. Analysis is underway on these and other recovered materials.

Taphonomic Experiment

Physical anthropologist Karen Ramey Burns, Ph.D. was in charge of the taphonomy experiment, assisted by Dr. Robin Acker and videographer Mark Smith. The purpose of the experiment was to determine how fast and in what directions the coconut crabs and strawberry hermit crabs move bones away from a fresh corpse, transforming it into the kind of partial skeleton that the colonists found in 1940.

The experiment involved laying a butchered pig carcass on the ground at a site near the landing, monitoring it regularly, and photographing it throughout the day and night hours employing time-lapse photography. In addition, Drs. Burns and Acker mounted titanium screws in each of the pig’s bones and attached pieces of fluorescent ribbon to aid in plotting where the bones were carried.

In the course of 14 days, the crabs significantly reduced the bones of the pig skeleton, but most of those that disappeared were not recovered. As the weather grew hotter and the pig got dryer,
predation by crabs dropped off considerably. Dr. Burns is currently preparing a full report on this part of the project.

**Tree Survey**

On previous expeditions we have done the best we could to identify trees and other major plants on the island, as part of overall documentation of our research sites, but none of us has been an expert. On this trip, biologist/forester Joshua Gillespie had the task of identifying tree species and keying them to satellite imagery, so that a basic vegetation map of the island can be prepared. Mr. Gillespie’s report is in preparation. Among his useful findings were that we had been mistaken in identifying a stand of trees on the lee side of the island’s southeast end as the culturally and historically important kanawa (*Cordia subchordata*). Mr. Gillespie had trouble finding kanawa until almost the last day of the project, when he discovered a small grove in the colonial village – ironically, next to the trail we had traveled every day in crossing the island.

**Mapping the Nutiran Reef**

The robotic total station was used first to establish a point at the mouth of Tatiman Passage relative to the landing site, where we have collected detailed tide data. Having securely determined the relative elevation of this point, we then established the elevations of several points on the Nutiran reef in the area where we hypothesize that Earhart landed. These efforts revealed that the Nutiran reef is slightly higher than the reef at the landing channel, where we have established water depths under a range of tidal conditions and found the tidal intervals to closely match those at Orona. Analysis of these data is continuing, but preliminary results indicate that the Nutiran reef flat would have been fairly dry at the time Earhart arrived at the island, assuming our hypothesis is correct, making a landing relatively an easy matter.

We went on to collect more topographic data on the reef flat, using both the robotic total station and kite aerial photography.

**Conclusions**

TIGHAR’s archaeological investigations on Nikumaroro in 2007 made significant contributions to the growing body of evidence which suggests that the castaway whose bones were discovered on the atoll in 1940 was Amelia Earhart.

Richard E. Gillespie (FN ’07)
Executive Director
TIGHAR