TIGHAR TRACKS

October 2011

Coming in ~~October~~ December

TIGHAR Journal 2011

Publication of the *TIGHAR Journal 2011* has been rescheduled for December. Research results that we expected would be in by now have been delayed until November and we want the *Journal* to be as complete an account of the status of the Earhart Project as we can make it. Thanks for your patience.

RADIO SIGNALS CATALOG

TIGHAR's Catalog and Analysis of Post-Loss Radio Signals During the Search for Amelia Earhart in June 1937 has been completed and is on the TIGHAR website at http://tighar.org/Projects/Earhart/Archives/Research/ResearchPapers/Brandenburg/signalcatalog.html.

Radio signals, although invisible and fleeting, are just as real as bones and artifacts. Today, scientific evaluation of electromagnetic transmissions is an established forensic discipline and a cornerstone of many fields of study, including law enforcement and national security. In TIGHAR's investigation of the Earhart disappearance, digital information management systems, antenna modeling software, and radio wave propagation analysis programs have made it possible to conduct the first comprehensive study of the alleged signals from the lost plane. You're going to be hearing a lot more about this.

TIGHAResearcher

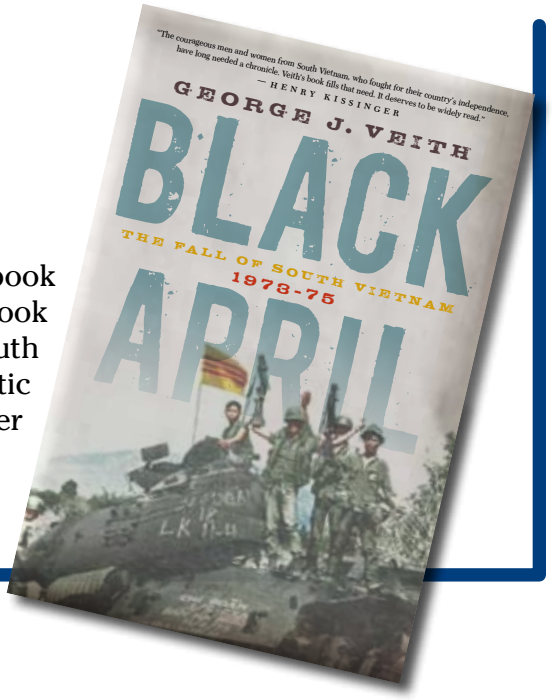
The new TIGHAResearcher membership category is growing by leaps and bounds. More than one hundred TIGHAResearchers have received their free DVD of the Discovery Channel special *Finding Amelia*. TIGHAResearcher renewals, upgrades and new members are coming in daily.

In December, TIGHAResearchers will receive a CD of the July 8, 1937, *March Of Time* radio broadcast that includes a segment dramatizing the then on-going search for Amelia Earhart. Many of the reports of distress calls from the plane were incorrectly assumed to be misunderstandings of the broadcast's simulated radio calls of Earhart trying to call the cutter Itasca.

Use the enclosed form to upgrade or renew your membership as a TIGHAResearcher or do it on line at http://tighar.org/membership.html.

MEMBERS CORNER

Long-time TIGHAR member Jay Veith will be publishing his third book this fall. Entitled *Black April: The Fall of South Vietnam, 1973-75*, the book presents a wide range of new evidence from North Vietnamese, South Vietnamese, and U.S. archives on one of America's most traumatic foreign policy disasters of the 20th Century. It is published by Encounter Books, and is due in late November 2011.



THE PRICE OF KNOWLEDGE

Everyone understands that expeditions are expensive. The price tag for direct expenses associated with last year's Niku VI Expedition was $658,203. But acquiring the data and artifacts in the field is only the first step. Once the ships are back in port and everyone is safely home the more mundane, but just as important, job of identification and analysis begins.

TIGHAR is fortunate to have scientists and experts in a wide range of disciplines working as volunteers but sometimes we have to go outside the organization for special skills. When we do, we have to pay for those services. Here's a tally of what we've spent on contract work since the expedition.

Extraction and analysis of DNA	$25,074
Identification and analysis of 2,824 fish bones	$1,280
Identification and analysis of 2,433 bird bones	$3,809
Identification and analysis of 533 clam shells	$5,500
Analysis of broken glass for evidence of secondary (tool) use	$400
Laboratory materials identification of artifacts	$4,875
Total	**$40,938**

We make these reports available to the public on the TIGHAR website and we count on public support to cover these costs.

Contributing is easier than ever. We've added secure "Donate" buttons to both the TIGHAR website and TIGHAR's Facebook page. Please use them.

A couple of clicks and a couple of bucks from the thousands of people who visit TIGHAR on line every day quickly add up. Your small contribution makes a big difference.

Planning for Niku VII

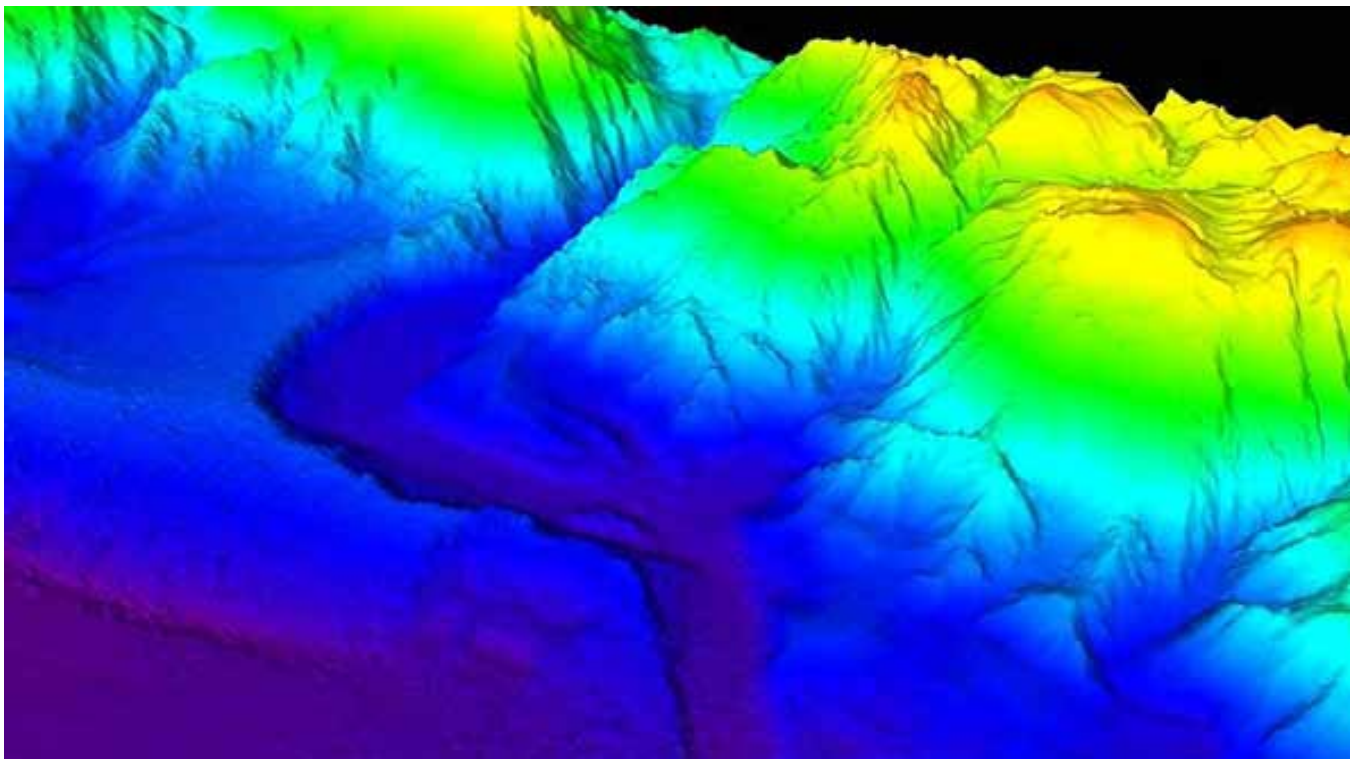
Next year will be the 75th anniversary of the Earhart disappearance and planning for next summer's Niku VII expedition is moving forward. Our principal objective is to thoroughly search the area off the west end of Nikumaroro where the available evidence suggests the wreckage of the the Earhart Electra should be. The ROV (Remote Operated Vehicle) search we did during Niku VI in 2010 was a purely visual inspection using HD underwater video. We got some pretty pictures and a feel for what the underwater environment looks like at depths on the reef no one had ever before seen, but we didn't find anything that was identifiable as airplane wreckage. Despite technical problems that greatly limited the area that could be covered, we did learn some valuable lessons:

- There is a surprising dearth of man-made material on the reef slope.
- We need to go deeper than 300 meters (984 feet)
- A visual search is not the way to go unless and until we can identify specific targets to investigate.

What we need is a multi-beam sonar with sub-bottom profiling capability that can map the bottom down to at least a thousand meters, including two or three meters into any "talus" (sand, silt) that is present. That, in itself, is not a problem. There are plenty of research ships with hull-mounted sonars that can do that. The problem is that those ships go for several tens of thousands of dollars per day, driving the cost of the expedition into the millions. So far, no one with pockets that deep has offered to help. We need to find an affordable way to do it.

The good news is that we have identified some possibilities. We'll say more as soon as we can. Meanwhile, your donations make it possible for us to continue researching how best to put together this search. Please do what you can. You can donate on line via our website or Facebook, or use the enclosed form to send us a check or your credit card information. Every donation is important!

This is an example of what a multi-beam sonar map looks like.



The Flying Cement Mixer

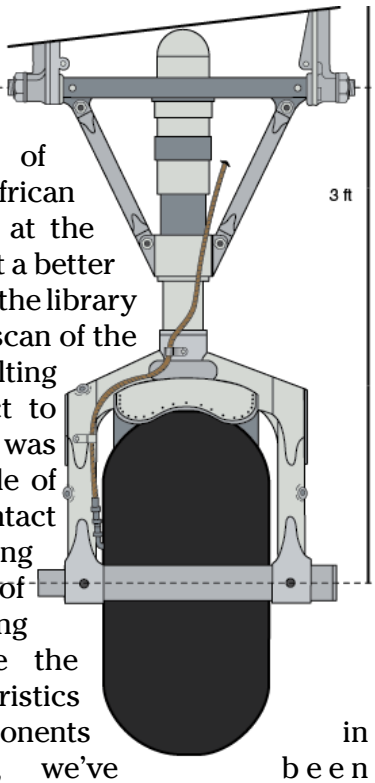
For previous Research Bulletins on this subject see Hiding in Plain Sight and The Nessie Hypothesis on the TIGHAR website, www.tighar.org.

The western shoreline of Gardner Island photographed by British Colonial Service officer Eric Bevington on October 15, 1937.

We have been investigating the possibility that an object seen sticking up out of the water in an October 1937 photograph of the western shore of Gardner Island (now Nikumaroro) is a landing gear leg from a Lockheed Electra. The photo was taken by British Colonial Service officer Eric Bevington at the conclusion of a three-day visit to assess the uninhabited island for possible future settlement. The subject of Bevington's photo is the island coastline and a profile view of the wreck of SS *Norwich City* aground on the reef. The object in question appears to have been caught by accident.

A copy negative of the photo has been in TIGHAR's collection since 1992 when Executive Director Ric Gillespie and President Pat Thrasher visited Bevington at his retirement cottage in the south of England, but the print made from the negative was cropped to exclude the left hand side of the image. The anomaly went unnoticed until 2010 when forensic imaging specialist Jeff Glickman, while reviewing historical photos of the island as part of preparations for TIGHAR's Niku VI expedition, examined the original full-frame copy negative and discovered the mysterious object.

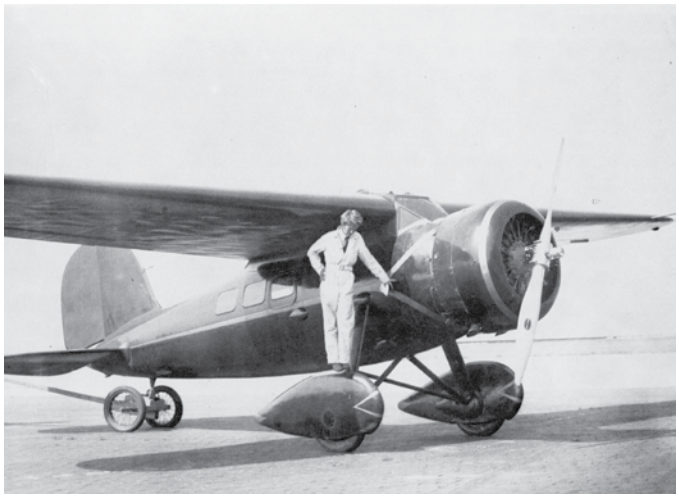
When Eric Bevington died his papers and photo-album were donated to the Bodleian Library of Commonwealth and African Studies at Rhodes House at the University of Oxford. To get a better look at the object we asked the library to make a high-resolution scan of the original print. The resulting image revealed the object to be more complex than was initially apparent – a tangle of debris rather than an intact structure. Forensic imaging specialist Jeff Glickman of Photek has been working to sort out and define the properties and characteristics of the various components in the image. Meanwhile, we've been learning as much as we can about Lockheed Electra landing gear and we've stumbled upon a possibly important detail that is not mentioned in the literature.



In 1936 Lockheed made a major change in the landing gear retraction mechanism of the Model 10. Earhart's Model 10E Special, delivered on July 24th of that year, was the last of only 54 Electras built with the original system – Lockheed Landing Gear Installation 40650.[1] When you know what to look for the change is easy to spot, but it took a bit of research to piece together how and why the modification was made.

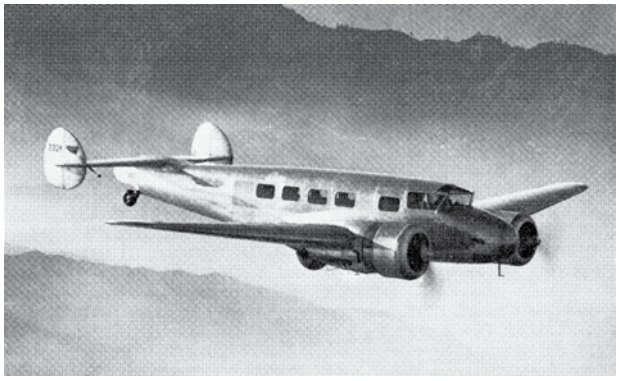
New Company, New Star

Introduced in 1934, the Model 10 was the tenth design marketed by Lockheed. Like the earlier Model 5 "Vega," Model 8 "Sirius," and Model 9 "Orion," the new design was named for a star, in this case "Electra," the "lost star" of the Pleiades cluster in the constellation Taurus. Despite the appearance of continuity, this was a new Lockheed Aircraft Corporation and the new airplane was a radical departure from previous designs. Lockheed had built its reputation on fast single-engine airplanes with sleek molded-plywood bodies and cantilevered wooden wings designed by Jack Northrop and flown by customers with names like Post, Earhart, Lindbergh and Kingsford-Smith. However, fame proved to be no antidote to the Great Depression and on June 16, 1932 the doors of the Burbank factory were closed.



The Vega in which Earhart flew the Atlantic was typical of the classic Lockheed designs of the late 1920s and early '30s.

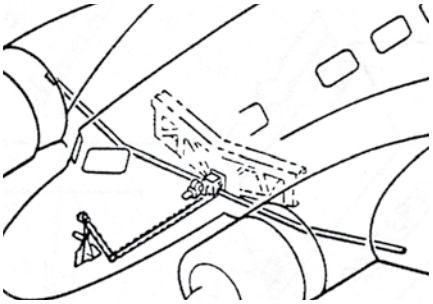
Just five days later Lockheed Aircraft Corporation was reborn, its assets purchased by a group of investors for $40,000. A new design team headed by Lloyd C. Stearman began sketching out an all metal, ten-seat, single-engine airliner until the primary investor and new Treasurer, Robert Ellsworth Gross, convinced them that the future of commercial sales was in multi-engine aircraft. A second engine was added and the new Lockheed company's first offering was an all-metal, twin-engine, low wing monoplane with retractable landing gear.[2]



Introduced in 1934, the first Electra – c/n 1001 – featured the then-fashionable forward slanting "Fokker style" windshield.

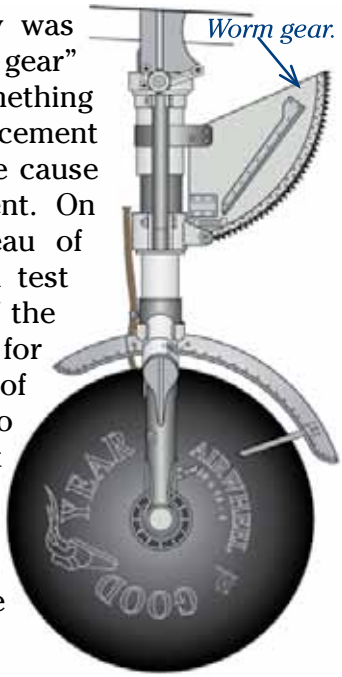
The Flying Cement Mixer

Like the rest of the airplane, the system devised for retracting the wheels was straightforward and robust. Steel drive shafts extended out from a centrally mounted electric motor and transmission. A "worm" on the end of each shaft engaged the cogs of a steel "worm gear" – Part Number 41065 – bolted to the rear of each landing gear strut. When the shaft rotated, the worm walked the worm gear and the attached strut and wheel rearward and upward into the engine nacelles.



As illustrated in the Model 10 Maintenance Parts Catalog, the Electra's retractable landing gear was driven by steel shafts that extended out from an electric motor and transmission mounted on the girder-like main beam.

The price of simplicity was weight. The massive "worm gear" has been described as "something you'd normally see on a cement mixer" and its bulk was the cause of the first Electra accident. On the prototype's final Bureau of Air Commerce certification test flight in August 1934 one of the wheels failed to extend for landing. Apparently one of the drive shafts was not up to the task. Lockheed test pilot Marshall "Babe" Headle made a successful one-wheel landing but the cost of repairs was a blow to the struggling young company.[3]



Landing Gear Installation 40650

In this photograph the worm gear can be seen on the left main landing gear strut of Earhart's Electra.

Learning from Junior

Despite some birthing pains, the Model 10 was well received and by the end of 1935 nearly fifty Electras had been delivered to airlines such as Northwest, Pan American, Eastern, and Delta.[4] Hoping to expand on the success of the basic Model 10 formula, Lockheed entered a Bureau of Air Commerce design competition for a small twin-engine transport to serve feeder lines. By scaling down to a shorter fuselage with accommodation for six, rather than ten, passengers while keeping the same 450 HP engines, the Model 12 "Electra Junior" (there was no Model 11) would be faster and have better over-all performance than the Model 10, but weight reduction would be key. In the end, the Model 12 weighed in a full 18% lighter than its big sister, aided in large part by a new, lighter, faster landing gear retraction system.[5] Instead of the clunky worm gear, the Electra Junior's landing gear featured an articulating "drag strut" that was hinged in the middle and jack-knifed forward as the wheel was pulled up and back.

The Model 12 Electra Junior was smaller, lighter and faster than its big sister.

Babe Headle made the first takeoff in the prototype Model 12 on June 27, 1936, three days before the Bureau of Air Commerce competition deadline. The new design clocked a top speed of 225 mph at 5,000 feet and delivered a cruising speed of 213 mph (compared to 202 mph and 190 mph for the Model 10A) and won the Bureau of Air Commerce competition.[6] Adapting the new retraction system to the Model 10 was a no-brainer and, beginning with constructor's number (c/n) 1056 – a Model 10B delivered to Chicago & Southern Airlines – Landing Gear Installation 45100 replaced 40650 on all subsequent Electras.

In this photo of Lockheed Model 10A c/n 1130, under rebuild at the National Museum of Naval Aviation, the drag strut of the "new" retraction system – Installation 45100 – is clearly visible.

Lockheed test pilot Marshall "Babe" Headle with Amelia Earhart. "You see Amelia? We got rid of that heavy worm gear mechanism like the one on your airplane and replaced it with this new drag strut system." Ironically, the Electra in the photo is Model 10A c/n 1060, registered VH-UXH and destined for Guinea Airways in Lae, New Guinea.

Earhart's Model 10E Special, c/n 1055, was the last airplane built with the old worm gears.[7] It is a bit surprising that the system was not upgraded when the airplane was in the shop for extensive repairs following the Luke Field debacle but that was probably because time and money were in short supply. Photos of NR16020 in Lae, New Guinea leave

In Lae, New Guinea Fred Noonan assists with maintenance on the left engine propeller hub of NR16020. The bottom edge of the worm gear is clearly visible on the rear side of the left main landing gear strut.

no doubt that the airplane still had the 40650 system when it disappeared.

Components of the debris seen in the October 1937 photo of Gardner Island appear to match the tire and struts of the landing gear of a Lockheed 10 but, more significantly, one of the components appears to match the shape and dimensions of "Lockheed Part #41065 GEAR – worm." More work needs to be done to confirm the analysis, but if we have a photo of that part on the reef at Gardner Island (now Nikumaroro), what aircraft could it be from? Of the fifty-four airplanes that had that part only two ever traveled west of California. Model 10A, c/n 1034, was delivered to the Mesta Machine Co. in Pittsburgh, PA in August 1935 and, at some later time, was sold to Qantas Empire Airways in Brisbane, Australia. That airplane was destroyed in a crash near Charlville, Queensland in February 1949.[8] The only other candidate is Amelia Earhart's Model 10E Special, c/n 1055, and the wreckage on the reef can only be from that aircraft … unless somebody misplaced a cement mixer.

Notes

1 Lockheed Model 10 Maintenance Parts Catalog – 1939.

2 Francillon, René. *Lockheed Aircraft since 1913*, Naval Institute Press, 1987.

3 Emmert & Larkins. "Lockheed's Model 10 Electra" in *Journal of the American Aviation Historical Society*, Summer 1978.

4 *Ibid.*

5 Francillon.

6 *Ibid.*

7 Lockheed.

8 Emmert & Larkins.

À COUER VALLIANT

Next year will be a landmark anniversary of aviation history's most important disappearance.

No, not that one.

Navigator François Coli stands in the cockpit to guide pilot Charles Nungesser as he taxis l'Oiseau Blanc across a flower-strewn field. TIGHAR collection.

The quest to find The White Bird is TIGHAR's oldest, and in some ways dearest, project. So when someone claims to have found important new evidence, we take a close look. On May 8, 1927 – eight-five years ago – two French World War One aces, Charles Nungesser and François Coli, lifted their giant white biplane l'Oiseau Blanc (the White Bird) from Le Bourget Field outside Paris and headed westward across the Atlantic only to vanish, as Lindbergh later wrote, "like midnight ghosts." If they had landed in New York, winning the $25,000 Orteig Prize – as everyone, including Lindbergh, expected – the Lone Eagle would not have flown to Paris a few days later and the tremendous boost to American aviation interest and innovation that resulted from his solo triumph would not have happened. The consequences, in the light of later events, can only be imagined.

GETTING IT WRONG

Today this hingepin of history, when it is remembered at all, is commonly misunderstood and misrepresented. As recently as September 6 of this year, the front page of the *Wall Street Journal* carried an article headlined "Charles Lindbergh Won the Prize, but Did His Rival Get There First?" The answer, of course, is no. The prize was for the first nonstop flight, in either direction, between Paris and New York. Wherever Nungesser and Coli ended up, it wasn't New York. Lindbergh made it all the way to Paris. N'est ce pas?

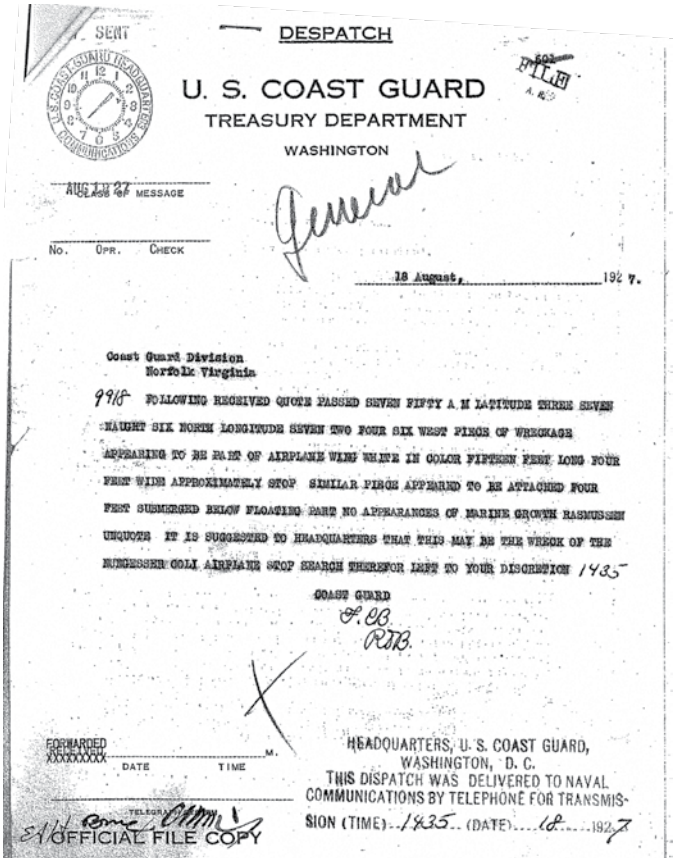
The *Wall Street Journal* article described the research of French aviation enthusiast Bernard Decré who "is on his own quest – to rewrite history." Decré is out to prove that l'Oiseau Blanc flew over Newfoundland before crashing off the coast of Canada. "Messrs. Nungesser and Coli would then have held the world flight distance record if only for 12 days and under tragic circumstances." Wrong again. A record requires a successful flight. A trip that ends with the loss of the aircraft and the death of the crew is hardly successful.

There is a great deal of solid documentary evidence to suggest that L'Oiseau Blanc did get as far as Newfoundland but M. Decré's hypothesis that it crashed into the sea near the French-owned islands of St. Pierre and Miquelon is based on a sketchy story about fishermen hearing something crash into the sea in the fog. He considers his best supporting evidence to be a document he discovered in the U.S. National

Archives. The *Wall Street Journal* describes it as "a 1927 telegram that reported sighting parts of the plane three months after the flight." Specifically, "A Coast Guard officer said he had seen a pair of joined white wings floating several hundred miles off the coast." M. Decré remembers, "My heart started pounding."

On his blog (http://whitebird.over-blog.net/7-index.html) M. Decré says:

> After having analysed 80 archives boxes, we have discovered texts confirming the presence of pieces of white aeroplane wings, floating from Saint Pierre & Miquelon, the French territory, to Portland!
>
> The most interesting piece is a telegramme, written by a Coast Guards ship captain on August 18th, 1927, to inform his superiors that two white wings, attached one on top of the other, were floating near his ship, and seem to be the wings of Nungesser & Coli's aircraft. The analysis of sea current (Labrador) at those dates (from May to August 1927) match.



SENT

DESPATCH

U. S. COAST GUARD
TREASURY DEPARTMENT
WASHINGTON

AUG 1 to 27 CLASS OF MESSAGE

No. Opr. Check

18 August, 192 7.

Coast Guard Division
Norfolk Virginia

9918 FOLLOWING RECEIVED QUOTE PASSED SEVEN FIFTY A M LATITUDE THREE SEVEN NAUGHT SIX NORTH LONGITUDE SEVEN TWO FOUR SIX WEST PIECE OF WRECKAGE APPEARING TO BE PART OF AIRPLANE WING WHITE IN COLOR FIFTEEN FEET LONG FOUR FEET WIDE APPROXIMATELY STOP SIMILAR PIECE APPEARED TO BE ATTACHED FOUR FEET SUBMERGED BELOW FLOATING PART NO APPEARANCES OF MARINE GROWTH RASMUSSEN UNQUOTE IT IS SUGGESTED TO HEADQUARTERS THAT THIS MAY BE THE WRECK OF THE NUNGESSER COLI AIRPLANE STOP SEARCH THEREFOR LEFT TO YOUR DISCRETION 1435

COAST GUARD

FORWARDED XXXXXXXXX DATE TIME M.

HEADQUARTERS, U. S. COAST GUARD, WASHINGTON, D. C.
THIS DISPATCH WAS DELIVERED TO NAVAL COMMUNICATIONS BY TELEPHONE FOR TRANSMISSION (TIME) 1435 (DATE) 18 192 7

TELEGRAPH

OFFICIAL FILE COPY

U.S. Coast Guard telegram dated August 18, 1927. National Archives.

A closer reading of the telegram might have stilled his pounding heart. Translating from telegramese, it says:

> Following received, "Passed at 07:50 AM, latitude 37°06´ North, longitude 72°46´ West, piece of wreckage appearing to be part of airplane wing, white in color, 15 feet long, 4 feet wide approximately. Similar piece appeared to be attached four feet submerged below floating part, no appearance of marine growth. Rasmussen." It is suggested to headquarters that this may be the wreck of the Nungesser/Coli airplane. Search therefore left to your discretion.

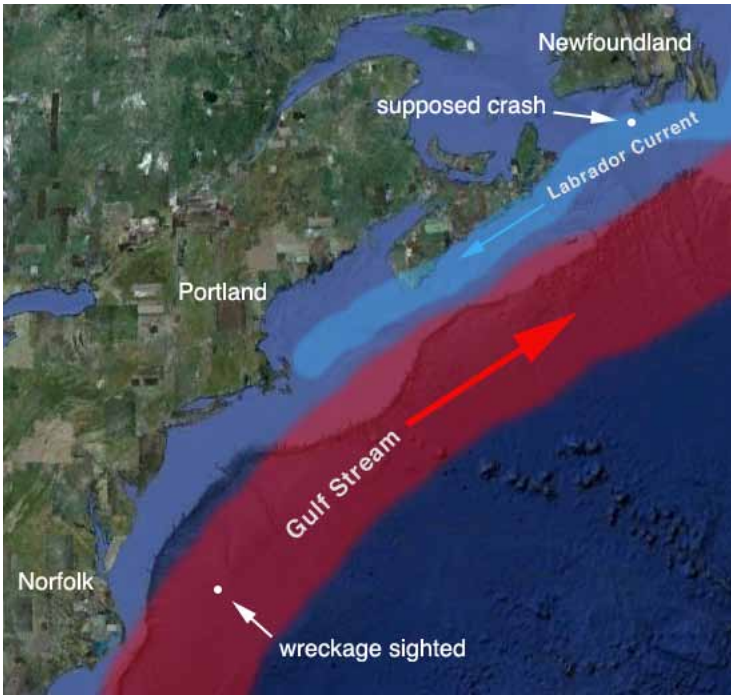
M. Decré's interpretation of the telegram is mistaken on several counts.

The latitude/longitude coordinates in the telegram do not describe a point near Portland, Maine. The position is 150 miles east of Norfolk, Virginia – fully one thousand miles from St. Pierre and Miquelon.

The telegram is not a report of a sighting by a Coast Guard officer. Coast Guard Headquarters in Washington received a message from a source identified only as "Rasmussen." Someone at headquarters typed up the telegram and telephoned it to Naval Communications for transmission to the Coast Guard's Norfolk Division. Any Coast Guard officer in the Atlantic off Norfolk should have reported a wreckage sighting to Norfolk Division, not Washington. The sighting was probably made and reported by a commercial vessel.

"Rasmussen" did not connect the wreckage with the White Bird. It was someone at Coast Guard headquarters, who came up with that idea. Apparently Norfolk Division didn't think it was worth investigating further. It's not hard to understand why.

The sighting did not occur in the Labrador current which flows southwestward along the North American coast as far as Cape Cod. The debris was seen in the Gulf Stream which flows notheastward. It's difficult to imagine how a floating wing could travel a thousand miles southwestward in a northeasterly flowing current.



GETTING IT RIGHT

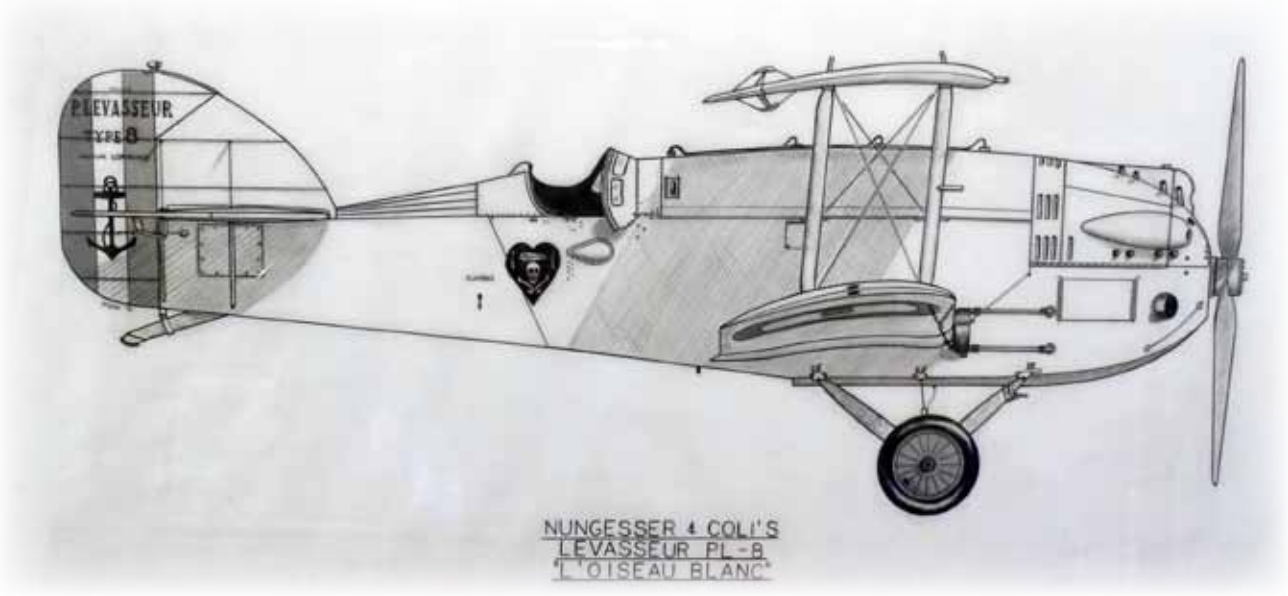
Twenty TIGHAR search expeditions in the hills of eastern Maine and nine in Newfoundland have tracked the probable crash site of the White Bird to a few square miles of desolate muskeg on Newfoundland's fog-shrouded Cape Shore peninsula. All that now likely remains of what was basically a biodegradable wood and fabric aircraft is its massive engine.

L'Oiseau Blanc was powered by a 450 hp 12-cylinder Lorraine Dietrich engine like this one on display at the Musée de l'Air. TIGHAR collection.

Finding it among the countless moss-covered boulders and shallow ponds is a matter of identifying and deploying the right technology. We're currently investigating some new possibilities. If we can find the crash site we might also be able to find the gold, silver and platinum teeth, plates, and pins used to repair Nungesser's numerous wartime injuries. One-eyed Coli's trademark black monocle should also be there.

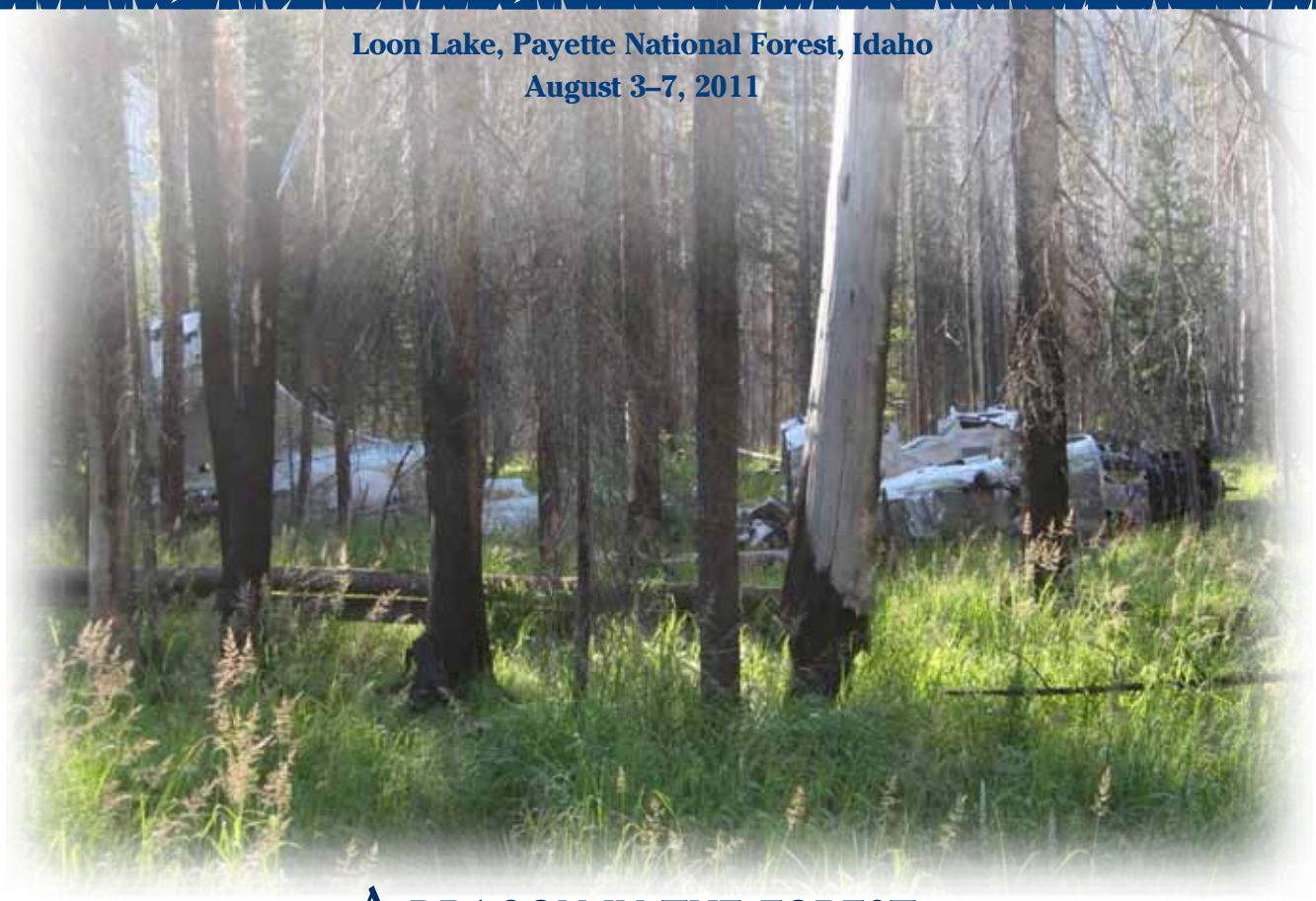
Explaining his macabre personal coat of arms, Nungesser is reported to have said, "À coeur vaillant rien d'impossible, même dans ses aspects terribles." (To the valiant heart nothing is impossible, even in its most terrible aspects).

When valiant hearts vanish – whether their names are Amelia and Fred or Charles and François – they should be found. We'll find them yet.



TIGHAR Aviation Archæology Field School

Loon Lake, Payette National Forest, Idaho
August 3–7, 2011



A DRAGON IN THE FOREST.

Douglas B-23 "Dragon" 39-052 is the most intact WWII-era wreck in the continental U.S. This year's Field School was the third time we have used this historic crash site as the subject for the school. Photo courtesy of Mark Petersen.

The hike to the site is a seven-mile trek along a good trail. An outfitter transports the packs, tents, and heavy gear. TIGHAR photo.

Upon arrival there is a problem. The rickety log that served as a bridge across the stream between the campsite and the aircraft is gone. We need to build a new bridge – and it has started to rain. Undaunted, the team gets to work, and soon there is one log across. (TIGHAR photos.)

An elegant structure. TIGHAR photos.

Warmth and pride. L to R, Principal Instructor Megan Lickliter-Mundon, Instructor Craig Fuller, student Andrew Sanger. TIGHAR photos.

Campfire classroom. Craig Fuller explains how to use GPS to map a crash site. TIGHAR photo.

Aluminum classroom. L to R, students Kelly Thorpe, Joe Cerniglia, Mark Petersen, Ernie LeRoy, Instructor Craig Fuller. TIGHAR photo.

Mascot and shameless thief "Tiger." TIGHAR photo.

We'll publish the particulars for the 2012 Aviation Archaeology Field School and begin accepting registrations soon after the first of the year.

Photo courtesy of Andrew Sanger.