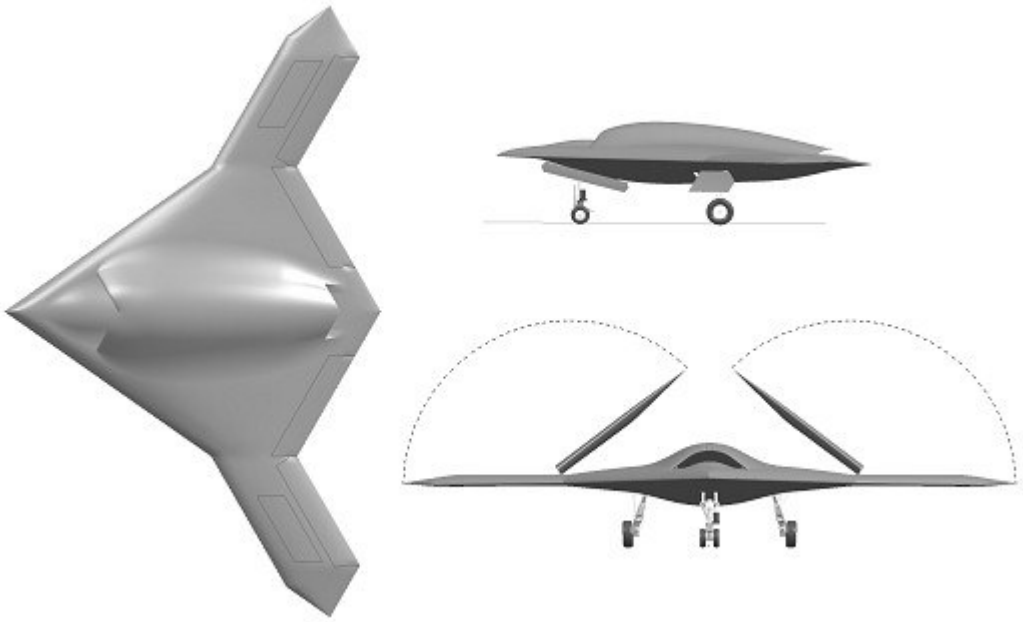
No. 246 DECEMBER 2006

T.W.I.T.T. NEWSLETTER

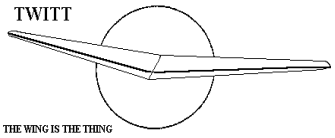


Northrop-Grumman X-47B. See Program Recap for more information on this future unmanned surveillance flying wing. Source: Northrop-Grumman public release concept drawings.

T.W.I.T.T.
The Wing Is The Thing
P.O. Box 20430
El Cajon, CA 92021

The number after your name indicates the ending year and month of your current subscription, i.e., **0612** means this is your last issue unless renewed.

Next TWITT meeting: Saturday, January 20, 2007, beginning at 1:30 pm at hanger A-4, Gillespie Field, El Cajon, CA (first hanger row on Joe Crosson Drive - Southeast side of Gillespie).



THE WING IS THE THING (T.W.I.T.T.)

T.W.I.T.T. is a non-profit organization whose membership seeks to promote the research and development of flying wings and other tailless aircraft by providing a forum for the exchange of ideas and experiences on an international basis. T.W.I.T.T. is affiliated with The Hunsaker Foundation, which is dedicated to furthering education and research in a variety of disciplines.

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Archivist: Gavin Slater

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Password – **member02**

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36oz/36	30.00	32.00	22.00
48oz/48	40.00	42.00	30.00
60oz/60	50.00	53.00	37.00

Meetings are held on the third Saturday of every other month (beginning with January), at 1:30 PM, at Hanger A-4, Gillespie Field, El Cajon, California (first row of hangers on the south end of Joe Crosson Drive (#1720), east side of Gillespie or Skid Row for those flying in).

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PRESIDENT'S CORNER

You will notice this came to you a little late this month. I have been working out of town for the past couple of weeks and couldn't get it mailed until Saturday morning versus Wednesday. Since there is no program for December (one of our off months) so at least you won't be missing a last minute reminder.

I would like to thank Doug Fronius for doing the November program. I know he is extremely busy with the Firescout program, but took the time to tell us as much as he could on the Northrop-Grumman X-47B demonstrator development. I found it interesting that the mission specifications basically drove the design into a flying wing, as I am sure it has for Boeing's entry in the selection process for further design development going forward.

It has been an interesting year for TWITT. We have actually grown in membership due to the addition of the PayPal electronic payment option on the web site. One of the new members has elected to receive his issue electronically, which is easily accomplished through its publication on the web site in the members only section. I foresee that this will become an more frequently requested option, especially since you get to see all the pictures in color. I don't do grayscale pictures like what would be necessary for a traditional copying of each issue. I use the original color photograph or image for the newsletter so the electronic versions are the best possible.

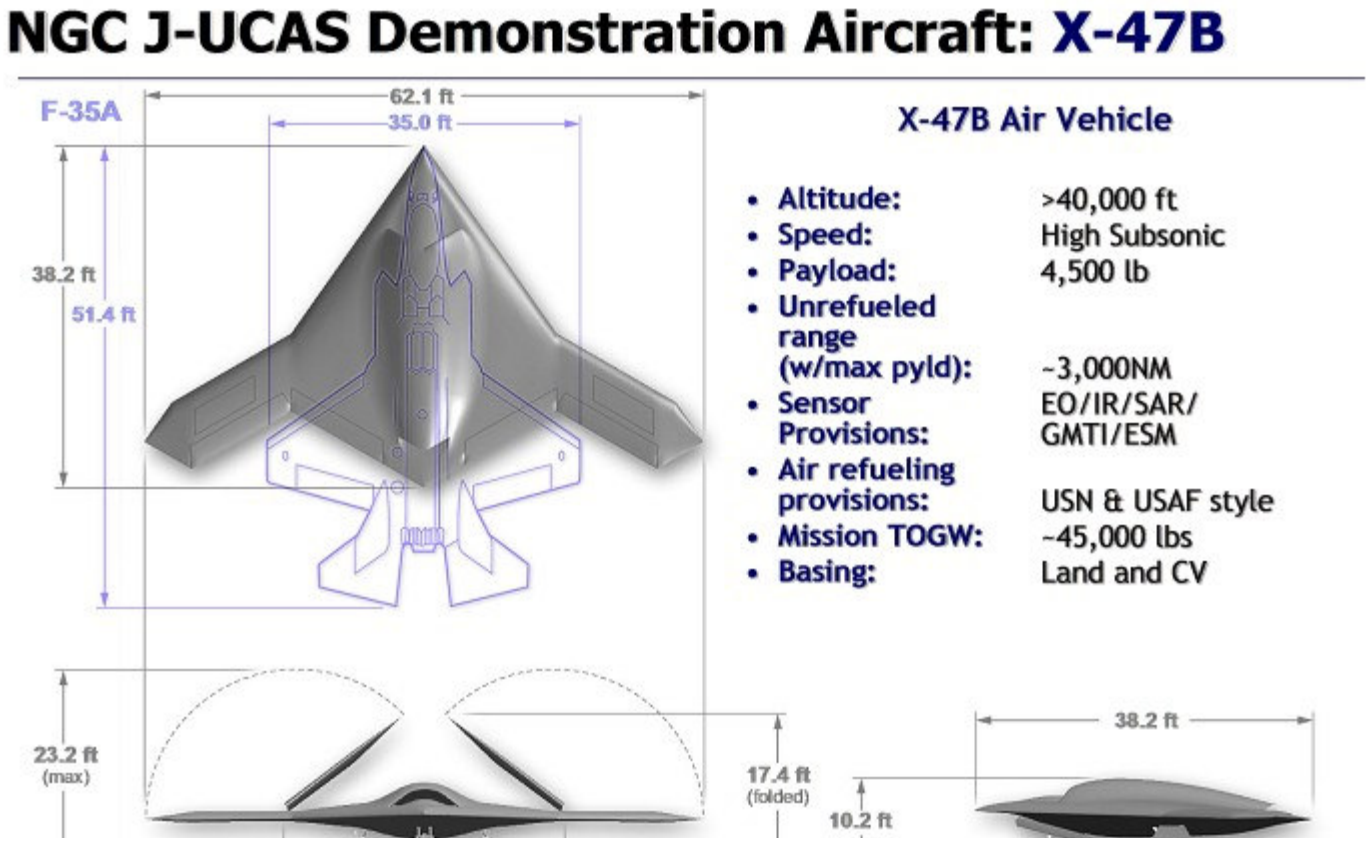
We had a good year with several good programs at our El Cajon location, but they weren't as well attended as in the past partly due to the lack of members in the local area and difficulties for members in the southern Los Angeles area to make the trip.

I hope that everyone has a joyous holiday season and a happy new year. May you get your projects in the air, no matter if full size or a model, and my they fly as straight and true as you desire.

Andy

NOVEMBER 18, 2006 MEETING RECAP

Andy introduced Doug Fronius, Navy Firescout Program Director, at Northrop-Grumman's unmanned systems division who would give us an update on the Naval Unmanned Combat Air Systems (N-UCAS) X-47B. Doug opened by telling the group about the little known fact that San Diego is the center of the universe for unmanned aircraft. About 70% of DOD dollars for UAV (Unmanned Air Vehicles) come directly to the Rancho Bernardo suburb of San Diego. This work is done by Northrop-Grumman and General Atomics, which produces the Predator series of surveillance aircraft.



Northrop-Grumman has become one of the largest defense contractors by acquiring a number of related companies. Doug's division is called Integrated Systems and is composed of the old Northrop, old Grumman and what used to be Ryan Aeronautical in San Diego. Integrated Systems is the aircraft portion of the division and is made up of tactical systems, long-range strike systems, and unmanned systems.

Doug pointed out that unmanned aircraft aren't anything new, since one of the first ones was purchased by the military in 1940 as a target drone. Ryan got into the business by building the Firebee target drone in 1948 and has continued delivering these advanced aerial target systems to the military. In fact, the target production line is delivering the highest number of airframes, approximately 60 per year, to the military at the present time. Global Hawk became the largest of Northrop's unmanned surveillance aircraft now being delivered to the Air Force at Beale AFB in northern California, with two also delivered to the Navy for evaluation.

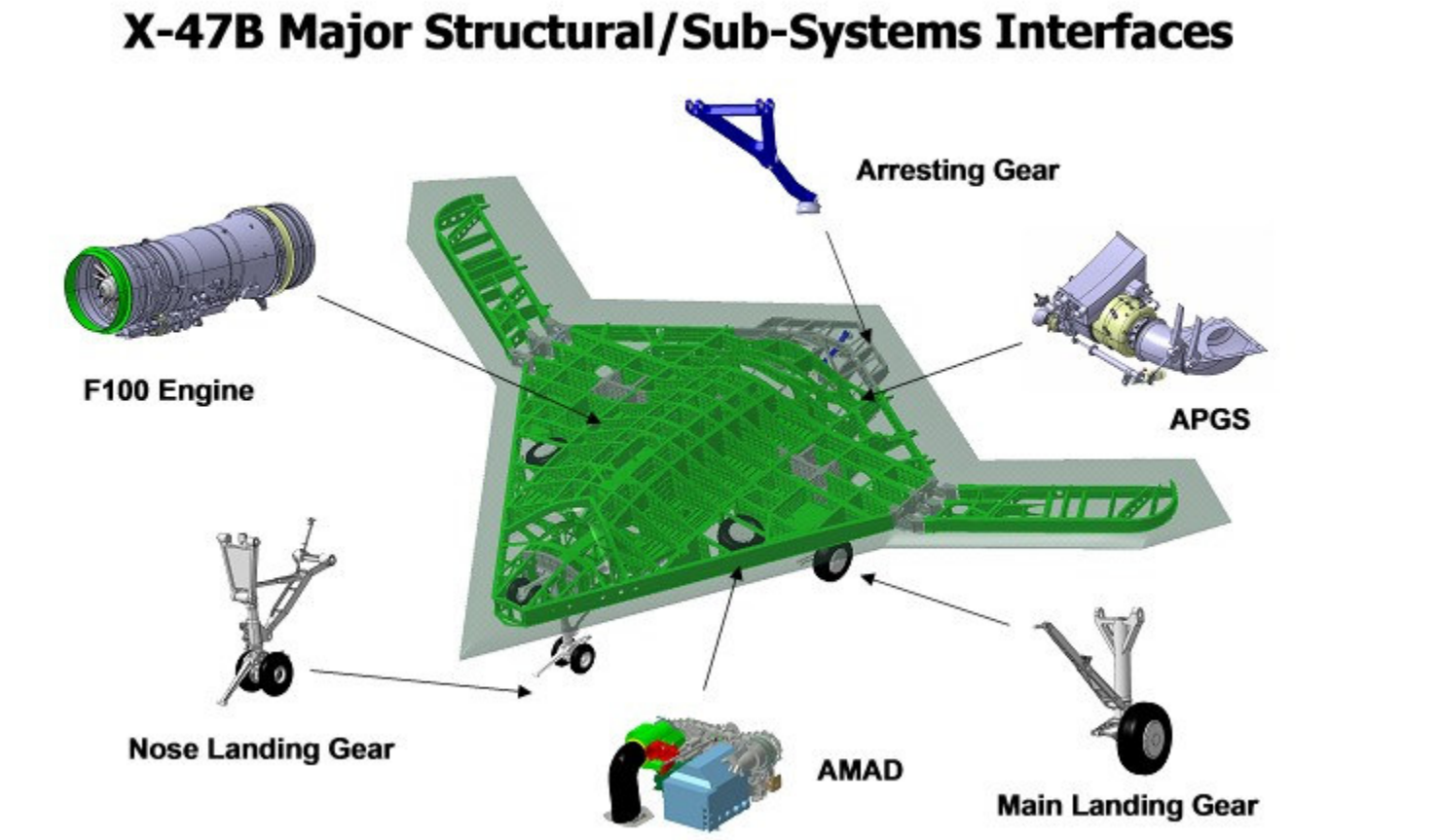
From an engineering point of view, Unmanned Systems is comprised of several elements. There is the aircraft portion that most everyone is familiar with, and includes airframes, propulsion and sub-systems. There is also the vehicle management system, which is the hardware and software that flies the airplane, essentially replacing the pilot. The last part if the sensor management unit that controls the payloads and weapons, which is actually a much harder job then the unmanned flying part. Once all this is done, there is the ground control segment that ensures the aircraft does what it was designed for when flying the mission. One of the biggest elements for a UAV is the communications link between the control center and the aircraft no matter where it is in the world.

One of the more important functions of these surveillance aircraft is getting the information to the soldier on the ground and in the air in real time. The UAV like Global Hawk is equipped with an on-board

computer server that is just like having a connection on the Internet. By using a narrow-band radio the guy on the ground can actually access his spot and find out what is going on around him at that moment in time in order to make better command decisions. This level of equipment will be in integral part of the X-47B.

There was a question from the floor about possible radio signal jamming against the UAVs. Doug noted that the Northrop aircraft are all fully autonomous, unlike the Predator (he likened it to the Volkswagen of UAVs), which needs a pilot for takeoff and landings. (Yep there is someone sitting at a monitor with a joy stick and rudder pedals to do the takeoff and landings like a big video game.) Global Hawk, Fire Scout and future Northrop UCASs could have all communications links broken and the aircraft would complete their mission and land at the programmed destination. The discussion moved over to how it does this, which is primarily GPS that we have all become accustomed to with the navigation systems in our cars and private airplanes. There are commercially available programs that will allow accuracy to less than a foot and are being used today in areas like farming to improve crop yields. By using GPS they don't have to rely on instrument landing systems, which expands the number of airfields they can use in more remote locations.

Doug noted that Northrop-Grumman is now in a competition with Boeing for the UCAS contract with a down select next year. At that point one company will be selected to complete an operational aircraft and take it to sea trials. So with that in mind, the information Doug presented on the X-47B was necessarily limited to already publicly released material, but not the latest stuff since that has been taken company confidential.



A technology demonstrator, the X-47A, was built a few years ago and looked like the B-model except without the outer wing panels. It did fly at China Lake NAS in that configuration, which is stealthy by design.

Moving onto the X-47B, Doug talked about why the military is moving in the direction of UCAS. The theater of operation is projected to change over the years and become more and more difficult for aircraft of penetrate deep into enemy territory. Manned aircraft that have stealth capabilities can reach some of these target areas, but are restricted by human limitations from staying there for any extended period of time. The UCAS, on the other hand, can reach the target, remain there longer, go to a refueling point and then return for additional time on target. Aircraft systems become the limitation rather than the human factor. Then you have to consider that targets are getting more mobile, so there needs to be this

persistence in coverage in order to ensure things like mobile missile launchers are kept under surveillance so they can be eliminated, when necessary. Remember the troubles the Air Force and Navy fighters had in trying to keep track of the SCUD missiles during the first Iraq war. Although there is the loss of life consideration for the manned aircraft that seems to get a lot of the attention, it is not as big a player today as we have generally been led to believe.

The X-47B will provide the first Navy an asset having true stealth capabilities. In a wartime scenario, they don't have many aircraft that can do deep theater penetrations and gather data like the Air Force does with the F-22 and B-2. They did have another stealthy flying wing proposal on the table years ago called the A-12, but it never made it much further than some initial studies.

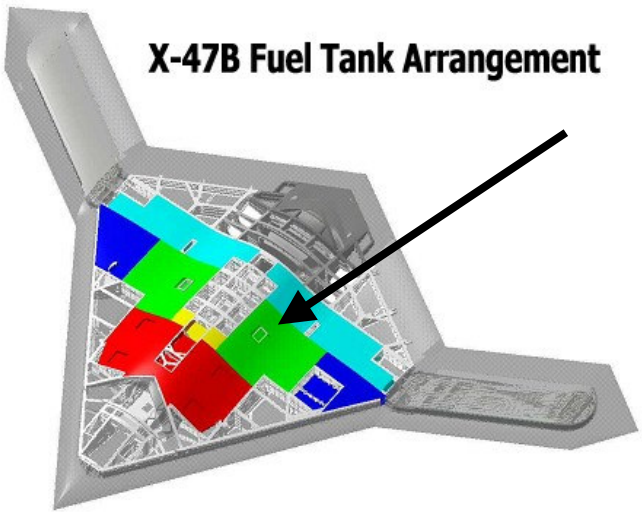
aircraft successfully fly much later in the development process.

An overlay of the X-47B with an F-35 shows the relative size and that it is not a toy airplane by anyone's standards. With a span of 62' it is as large as it can be and still be launched from a modern carrier. The size was maximized in order to carry the fuel necessary for the persistence factor discussed earlier. Northrop-Grumman was looking for the highest aspect ratio they could get to provide the most airframe space for carrying everything internally to maintain stealth. All these characteristics needed for the mission basically narrowed the confirmation down to a flying wing. The wings fold to reduce the on-board storage size to 87% of what an F/A-18 requires, so it will actually make better use of the limited space on a carrier.

ABOVE: The original slide had all of these labeled, but you wouldn't have been able to read it anyway. The aircraft carries some of these in various combinations, not all at once. A typical load might be one 4,000 pounder or two 2,000 pounders. All ordinance is carried internally to maintain stealth.

The UCAS program is to build two demonstrators that are full size aircraft to confirm the proof of concept. Then somewhere around 2012-2014 the military will make a decision whether to put something into production and become operational around 2020. One of the unusual things about this DOD competition is that there won't be the typical fly-off we have seen with past programs. The final contractor will be chosen based on the technology they can apply to make the

It has a 40,000' ceiling, cruises at high sub-sonic speed and has a 4,500-pound payload capability over an un-refueled range of 3,000 miles. There was a question from the floor about why not fly faster. However, this would be counter productive to the mission requirements, which is stay on target as long as possible not go from place to place at high speeds. The payload can be a combination of sensors and/or weapons. It can carry imaging sensors similar to those of the Global Hawk and is air-refuelable from any standard tanker using a probe and drogue system. Surprisingly, programming it for the refueling is not as hard as it seems, but it does require a visual system that can recognize the drogue and help align the aircraft for engagement. In fact, NASA just did it with an F/A-18 using systems designed for UAVs.



ABOVE: In B&W it might be hard to see where the tanks are located, but the shaded areas across the center section of the fuselage are the fuel tanks. The other areas are filled with the various sensors and operating systems.

The X-47B has a take-off gross weight of 45,000 pounds, can be launched with a standard carrier catapult and, recovered with the standard hook and trap cables. The tricky part is programming the deck handling capability since it can't be different than a

ABOVE: This is a full sized mockup at the Martin-Marietta test facility evaluating the stealth characteristics of an early version of the X-47B in a joint program with Northrop-Grumman. Source: http://www.spacewar.com/news/uav-05zzzzx.html

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manned aircraft. The deck routine cannot be interrupted to go out and get the UCAS with a tractor since that would delay other aircraft recoveries. The key deck crew will have a small handheld controller that will allow them to take over and maneuver the aircraft to its parking spot, with everyone still following the same hand signals used by manned aircraft.

ABOVE: Concept composite image that shows the X-47B size relative to the F/A-18 on the carrier deck. Source: http://kuku.sawf.org/News/1241.aspx

The demonstrator has a PW F-100 engine, which is a very standard engine that also reduces development costs and provides some known reliability. The engine inlet is hidden in a slot on the top of the wing and the tailpipe is flat and spread out similar to the F-117 and B-2 to reduce the heat signature. Both the inlet and exit slots are serpentine, again to provide the best stealth. The shape also is determined to some degree by the need for a reduced radar signature.

ABOVE: Northrop-Grumman concept composite image titled "Over Bagdad". Source: http://www.is.northropgrumman.com/gallery/us_navy/jucas.htm

The structure is an aluminum and titanium frame with graphite composite skins. The structure is very

beefy to handle the punishment of deck landings with the hook. The goal for the first demonstrator is to actually perform shipboard traps, rather than just show the capability on a land-based runway. It carries about 16,000 pounds of fuel, all in internal tanks. It can also carry a large array of precision-guided weapons in different combinations depending on the mission profile.

ABOVE: Northrop-Grumman concept composite imge titled "Carrier Takeoff". Source: http://www.is.northropgrumman.com/gallery/us_navy/jucas.htm

In summary, today's military planners see a real gap in our ability to do persistent surveillance and attack in around 10-15 years from now. This is based on the rate at which potential adversaries are developing technologies that need to be counteracted. The X-47B is designed to fill part of that gap by providing a system that can fly for up to 50 hours with in-flight refueling. The selection program is focused on reducing the risk of acquisition by providing a technology demonstrator before committing to the final production. This is a long-term project as seen by the fact the demonstrator being built in Palmdale right now won't reach operational status until about 2020. All of this is predicated on the funding continuing to be available for the project, which is always an iffy situation in the current political climate, but what else is new from Washington.

ABOVE: Concept composite image of an automated carrier landing. Source: http://www.airforce-technology.com/projects/x47/

LETTERS TO THE EDITOR

October 30, 2006

VHS Tape of Al Bowers' Presentation To The Horten H Xc

Dear Andy,

Thank you very, very much for your efforts to make these presentations available for us. Immediately I picked up the PDFs. Now I would like to get the VHS presentation as well. But if possible I would prefer it as DVD or a VHS in PAL-format. Would you please kindly tell me whether this would be possible and how much I would have to pay for it?

Kind regards.

Sincerely,

Peter F. Selinger
Landschreiberstrasse 21
70619 Stuttgart
Germany
<peter.f.selinger@jocki.org>

(ed. – I wrote back to Peter indicating I would look into finding a way to convert the video to either DVD or a PAL formatted VHS tape. I did a little research on the Internet and found some services, but I am leery of sending my original to some company I know nothing about. I haven't have time to find someone locally, but will try to get to it soon.

There are machines out there for the home that do this sort of VHS to DVD transfer, so I am also going to look a little harder at that option so I can offer the service on a more global basis. This will also bring us into the 21st Century and the world of DVDs. More to come.)

November 14, 2006

Membership Request

I have just ordered a membership subscription through your pay pal facility, If you need any further information to process my application please do not hesitate to get in touch,

Thanks,

Colin Weir
<weirc@deeside.ac.uk>

(ed. – I wrote back with the following that I have been trying to do with every new member we are getting from the new PayPal payment link to let them know I have received it and inform them of the on-line newsletters. So if you happen to going to England and want to visit another flying wing enthusiast you now have a contact.

"Thank you for joining our group. I have received your payment and have just one request. Could you send me a message with your mailing address properly formatted for the mailing label? I want to make sure it gets to you a quickly as possible and any errors in structuring my cause delays. Thanks.

The most frequent question is how to get back issues. Part of that has been answered through access to the members only section where there are PDF issues dating back to January 2002. You can see these with the user ID of twittmbr and a password of member02, both in lower case letters. I will get the November 2006 issue linked shortly.

I hope you enjoy the material as you go through the past issues. If you have any questions for the membership or have a thought to offer the group, please don't hesitate to write.")

Thanks for the prompt response Andy, I have followed the TWITT web for a good while now and thought it about time I took advantage of your credit card facility!! I look forward to many fascinating hours of reading!!! My correct postal address is as follows:

Kingsford,
The Village,
Burton,
South Wirral,
Cheshire.
CH64 5TH
United Kingdom

Thanks again for the response and welcome, I shall have to make it an ambition to attend a meeting one day!!

All the best,

Colin

November 16, 2006

Turkey Vulture

To: Bob Hoey <bobh@antelecom.net>, <twitt@pobox.com>

Dear Bob,

I am purchased the plans and received all the articles and written materials. There are pictures about the building procedure here:

http://www.kullonjarat.fw.hu/kullonjarat/turkey_vulture.htm

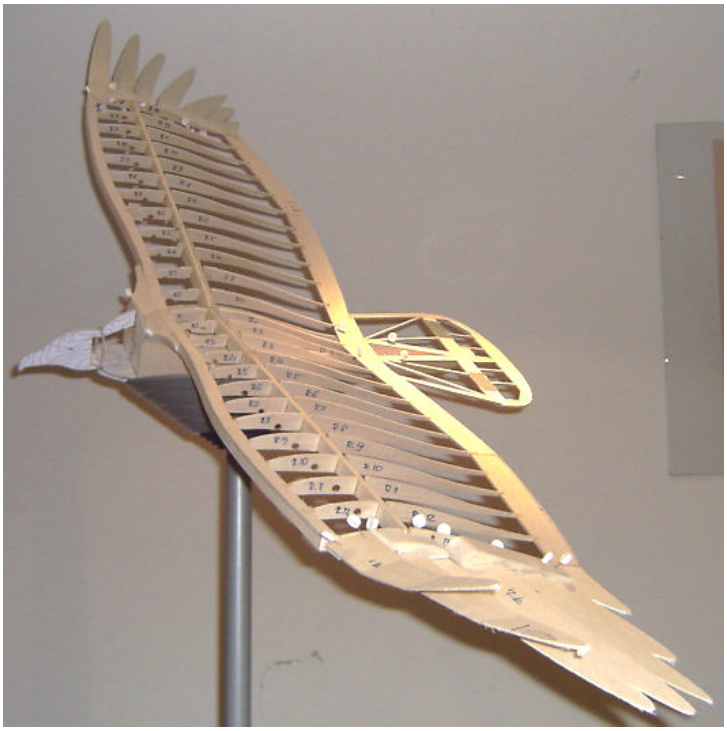
Getting closer and closer to the servo installation and setting I still have an open question I was not able to figure out from the articles: which direction the feathers should move to initiate a turn?

For example: if the left wing feather block forward end rising and the aft going down which side the bird will turn?

Kind regards,

Major Béla
<bmajor@vnet.hu>

(ed. – It is nice to see that modelers are out there building there own "robotic birds". I haven't seen an answer back from Bob yet, but will forward it along once it comes in. I have included one of the pictures from the web site to let you know how far along his project has gotten and what a nice job he had done.)



November 16, 2006

Kasper Type Wing Tip

Currently, I have designed a Kasper type wing tip for my Kolb Mark III Classic. They are of Lexan material and I plan to set them with a seven-degree toe in and a 30-degree from vertical out angle. They are 2 chords high and a half chord low at the trailing edge. Should be finished by end of year and tested by spring. Witold told me one day in Washington that his tips are for swept wings only.

My wings are typical Kolb, which are similar to a Hershey bar wing. I believe he said that because, in slow flight, the rudder becomes ineffective. Your organization has probably experimented with his design concept.

Vic Gibson
Sacramento
<APilot@webtv.net>

(ed. – I don't recall if we have ever had a question about this type of tip and its application to a plank type flying wing. Does anyone have an opinion on their effectiveness with this wing and what might be a better solution is this is not correct? Let us know.)

November 19, 2006

Do you have an image of David Myhra? What would I have to do to see Hortens restored aircraft? Will a check, not a card be accepted? Is there a paper form to filled out instead of on a computer?

Kent Woolums
<afossagroup@sbcglobal.net>

(ed. – This came in through our web site guest book, which is why it is a series of questions versus a more normal looking e-mail.

I wrote back letting him know he could Horten restoration pictures on our web site, but we didn't have any pictures of Myhra. I also let him know a check would be fine to pay for a membership and that we don't have any forms to be filled out. So far I haven't seen a check, but perhaps in the future.)

November 29, 2006

EULOGY FOR BERNARD GROSS

Written by Bruce Gross (BruceGross@aol.com) to be read at his father's funeral on Tuesday November 7, 2006

I would like to remember my father who had a great impact on my life and on the lives of many other people. He was a man who had many accomplishments like overcoming his deafness to become the world's first deaf licensed pilot to build and fly two airplanes. They were a seaplane also known as the "Deaf Duck" and a glider known as the "Deaf Hawk". I remember very vividly that he took me on an airplane ride around the Statue of Liberty in New York City. He also flew over a summer camp in New England where I attended and circled the camp with his airplane. At that time we formed a human chain on the ground saying something like "hello" to my father who was flying overhead in his airplane. His two airplanes are now hanging at the Wings of History Museum in San Martin, in Northern California.

My father also was a great photographer and a mechanic. He also built a boat and loved life. He was married to my beloved mother Eva for many years before she passed away in 1997. Shortly after my mother's passing he met Helga and they got married in 1999 in Las Vegas.

My father was born on January 20, 1921 in New York. He is worthy of great praise and respect for his own many accomplishments. He also was a handyman repairing things in people's homes including mine. He

loved to help deaf people, as he was a TTY repairman installing TTYS for deaf people so they could communicate with each other. My father also had hearing friends especially in the aeronautical community and my dad loved to attend many air shows in many places including Oshkosh, Wisconsin with his airplane. He even got many awards for his design and work with the experimental aircraft. His name was mentioned in newspapers and magazines.

My father lived most of his life in Flushing, New York with my mother and worked at the Aeroflex Company in Plainview on Long Island before moving to Kissimmee, Florida to work at an important job with Martin-Marietta for a few years. After his retirement both my parents moved to Palmdale, California to live near me for many years. After he married Helga, both my dad and Helga moved to Ramona in San Diego County where he continued to show his passion for airplanes by flying model planes and going to the local airport there.

My father loved my mother and Helga very much. He loved me too as he wanted to see me succeed in life. I thank my father for guiding me to become an educator of the deaf. He loved science and kept a collection of science magazines and we loved to talk about technology so that is probably why I enjoy technology including photography. My father was a complex man with strong opinions who made his contributions to the world around him.

I know that my father's mind and heart is now in the heavens in his airplanes, and his spirit has traveled even further. Many of us who knew my father would agree with me that he was a very talented human being.

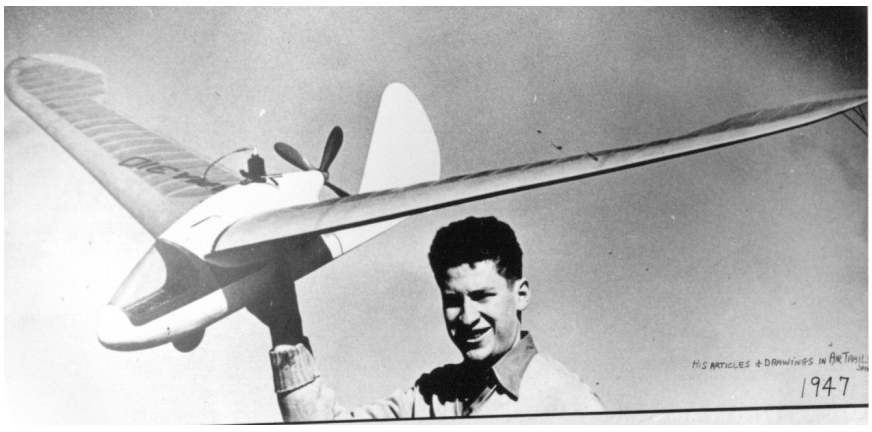
My stepmother Helga and I as well as other people in my father's life will miss him very much with our hearts, but we know my Dad is now at peace and not suffering at all from his illness. He is even smiling at us now with his airplane flying over us.

(ed. – Bernie was a long-time member of TWITT and attended a great many of the meetings by driving the three hours down from Palmdale. We have featured his models and Pioneer II on covers of our newsletter over the years. I regret not having spent more time getting to know Bernie during these brief encounters, since I think I could have learned a lot from his attitude toward life and things related to aviation. Bruce is right in that Bernie will be missed by all who knew him.

Bruce sent along a collage of his father with those people and things closest to him.)

Top: Left - With my mother Eva. Right - My father and his dog " Foxy".
Middle: Left - My father, mother and I at Bally's Hotel in Las Vegas on New Year's Eve. Right - My father, Helga, and their dog " Foxy".
Bottom: Left - My father at his old Palmdale house.
Right Top - My father's " Deaf Duck" seaplane.
Right Bottom - My father's " Deaf Hawk" glider.

BELOW: Bernie and one of his models.



November 23, 2006

Just before I put this issue of TWITT into my files (I have all the issues since TWITT started and intend to use them as a text for a class that I hope to give to the local school in connection with my LOPTER), but I'd like to suggest to Al Bowers and Doug Halverson that rather than do all the math and geometry for the Klingberg-Horten on a model one might be well advised to cheat at bit, thus: 1/ Go 1/4 and 3/4 ths out the span and establish two hinge points (I suggest a 1mm ID tube that can be swiped from Big-O while coffee is swilled – as they change your tires to studs for winter skiing). And when the glue sets, one can do a bit of sanding and introduce the appropriate number of intermediate hinge sections and get flying. Do not be too pure on a small model.

And to Bruce Carmichael and Andy Kecskes: I have never received a reply on my hoped for overview of the LOPTER, which would have done me a lot of good, but I intend to run it in the local paper (to get it into the public domain) and I'll send you a copy in hopes that you'd like to reconsider and thus help me. (This is, after all a wing, or rather four such, and they counter-rotate at low power). I think it fits TWITT's format.

Guess I may as well save 39 cents and enclose a check and best wishes in spite of the fact that I am a bit pushed out of shape by your failure to respond to my offer of some time ago.

Happy silly season,

Syd Hall

(ed. – Thank you for the suggestions on the Klingberg-Horten wing. I will pass it along to the Nurflugel group for their consideration on the project.

On Bruce and myself responding to your LOPTER proposal, I can only speak for myself in that I don't have the aeronautical background to make any assessment one way or the other. As for Bruce, I do not know why he did not respond to your questions and comments. Perhaps this will refresh his memory, however, I am not sure in which issue we published this information since a quick scan of my back issues didn't find it. The lack of an index makes this search even harder and although I am the editor, I can't remember specifically which issues contained pertinent articles.)

November 29, 2006

About July or August this year the name Bill Young was at a Teesdale address in Hollywood, CA. Bill Young, with over fifty years flying knowledge is at:

Bill Young Hobbies
2708North 4th Street
Flagstaff, AZ 86004
1-920-526-8666

Eugene Turner

(ed. – This was in response to an item from the Nurflugel bulletin board on AV-60 plans, so I will pass it along. I looked for his hobby shop on the Internet, but didn't find anything. It would have been nice to see some type of on-line catalog of what flying wing models he has to offer.)

AVAILABLE PLANS & REFERENCE MATERIAL

Coming Soon: Tailless Aircraft Bibliography Edition 1-g

Edition 1-f, which is sold out, contained over 5600 annotated tailless aircraft and related listings: reports, papers, books, articles, patents, etc. of 1867 - present, listed chronologically and supported by introductory material, 3 Appendices, and other helpful information. Historical overview. Information on sources, location and acquisition of material. Alphabetical listing of 370 creators of tailless and related aircraft, including dates and configurations. More. Only a limited number printed. Not cross referenced: 342 pages. It was spiral bound in plain black vinyl. By far the largest ever of its kind - a unique source of hardcore information.

But don't despair, Edition 1-g is in the works and will be bigger and better than ever. It will also include a very extensive listing of the relevant U.S. patents, which may be the most comprehensive one ever put together. A publication date has not been set yet, so check back here once in a while.

Prices: To Be Announced

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