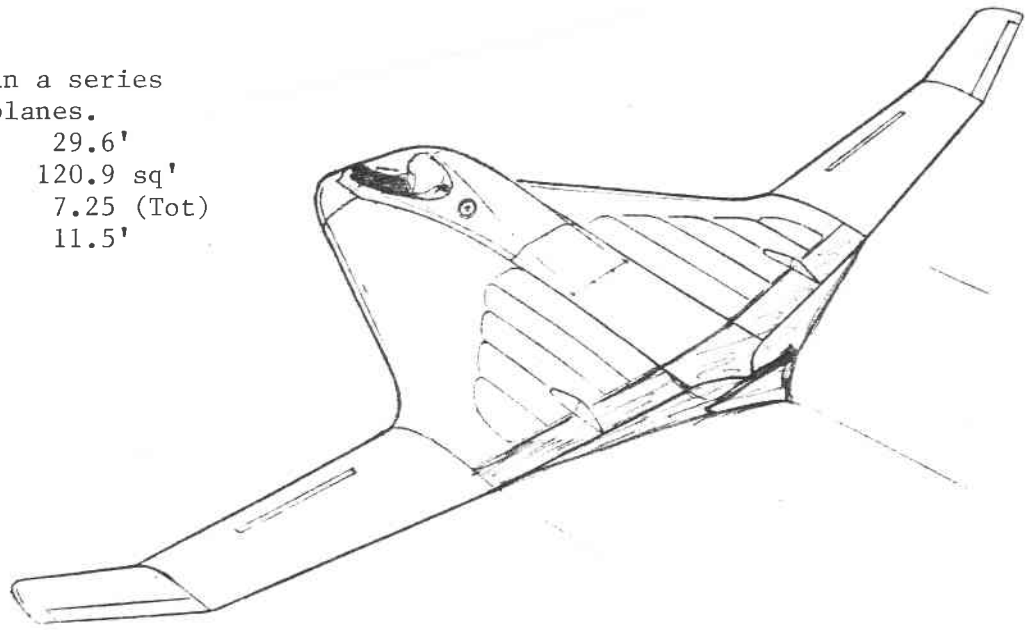
No. 53 NOVEMBER 1990

TWITT NEWSLETTER

BULLSEYE - Forth in a series blended wing sailplanes.

Span	29.6'
Area (Total)	120.9 sq'
Aspect Ratio	7.25 (Tot)
Length	11.5'

By: G. Blumenthal
10/27/90



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TWITT
(The Wing Is The Thing)
P. O. Box 20430
El Cajon, CA 92021

The number to the right of your name indicates the last issue of your current subscription, e.g., 9011 means this is your last issue unless renewed.

Subscription rates are $15 per year for U.S. mailings and $19 per year for foreign mailings due to higher postage rates.

Next TWITT meeting: Saturday, November 17, 1990 beginning at 1330 hrs at hanger A-4, Gillespie Field, El Cajon, Calif. (First hanger row on Joe Crosson Dr.)

PRESIDENT'S CORNER

Not much to say this month since mail activity has been low and everyone seems to be busy with other projects. We did receive a donation of an IBM compatible computer and monitor from Like Computers of San Diego owner Rick Keerikoolparn. It has one 5 1/4" disk drive and a 10mb hard drive and I am donating a copy of the Framework II integrated software package. I hope this will enable us now to begin cataloging the library since the computer will be located in the hanger next to the files which will make it convienent for anyone to help with this project.

The only piece to the system we currently don't have is a printer. We only need a simple dot matrix printer, such as, an Epson FX/MX series, Star Gemini, etc., and the appropriate CPU card to drive it. If anyone out there has an old one they would like to get rid of let us know.

As you will see in the Minutes, we had a short discussion on the issue of not having meetings during the summer. I would appreciate comments at the next several meetings from those who attend regularly as to whether it will impact their enthusiasim for the goals of TWITT. I would also like to hear from those of you don't attend as to whether you would like getting more technical material versus minutes of meetings which at times do not deal directly with flying wings. Please let us know what you think so we can make the right decision on this.

Well, that is all I can think of for this month. Besides it leaves more room for the things you guys are really interested in.

Andy

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NOVEMBER PROGRAM

Phillip Burgers, TWITT Secretary, educator, and aeronautical engineer, will be speaking about his experiences with a research of Dr. Horten and his flying wings. Phillip will have viewgraphs and handouts to supplement his talk and stimulate audience questions. He has portions of secret WWII German reports on several subjects, including drag calculations and wind tunnel testing of captured P-51 airfoils. This should prove to be an interesting meeting for everyone, but especially for those of you who want more information about Horten and his aircraft.

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MINUTES OF THE OCTOBER 20, 1990 MEETING

Andy opened the meeting asking for any visitors and found Larry Smothers had returned for a second time looking for information on how to join. He then announced the day's program, which was to be Don Westergren talking on how to use scales models to perform proof of concept testing, and Jerry Blumenthal showing us his new conceived design. For some reason Arnold Thierens did not arrive for his presentation on the JetVet. He also announced that since there was such a small turnout the raffle would not be held. (See the program announcement for the November meeting to see what it was and will be.)

Andy reminded those present that TWITT hats were available for $8 each, back issues of the newsletter were $.75 each ($1.58 foreign) and that information packets were $2 (including one newsletter). Bob has printed enough of these to keep some on hand at the hanger and home, so if someone is interested they can get information right away by just stopping off at the hanger Mon - Thurs, Sat & Sun after about 11:30AM.

Andy then showed the group an English translation the French LE CARRERES catalog of old books, magazines, brochures covering various fields of flight. This was done for us by Stewart Midwinter or Calgary, Alberta Canada. (The first two pages are reproduced elsewhere in the newsletter and has been added to our advertisement section for those of you who maybe interested.)

Andy then opened the floor to discussion of the idea of not having meetings during the summer. One person spoke up in favor and one with a disapproval. Budd Love felt that it would be a mistake to cancel that many meetings in a row, and that the group could loose its momentum. Andy explained the reason for the suggestion being the difficulty in obtaining quality programs during the summer and the low member turnout due to vacations, the heat, etc. The benefit would be the publishing of more technical data in place of the minutes during those months, since the newsletter would still be sent. The issue needs further discussion during subsequent meetins, and hopefully, others will let us know what they think through the mail. If it appeared there would be no loss in enthusiasim for TWITT by doing this, it will probably happen, so PLEASE let us know your thoughts.

Andy then asked Jerry Blumenthal to come up and show us his latest project. Jerry has been drawing up a number of new ideas (see the cover of the October 1990 Newsletter) and this month had a flying model of his current master stroke at solving flying wing problems. He told us that he had a intuition that there were some things wrong with the current thoughts and designs of flying wings. Among these faults were: bent spars, either swepted back or forward due to the changes in load factors; short tail moments; controls usually subtract from the lifting wing area; and, little, if any, directional stability.

His new design is an attempt to rectify these things. He calls it a canard flying wing, since it has lifting area ahead of the main wing and that the two are blended together to make a one wing design. It has inherent directional stability, plenty of longitudanal stability and its lateral stabilty is fine due to the upturned tips since they are behind the CG providing lateral area. He plans on putting

together a radio control model within the next year to further test this new concept.

Budd Love asked about the problem of maintaining proper CG with a prone pilot. Jerry commented that this was being handled by the reflect airfoil. Harald Buettner suggested that one solution would be to put the pilot into a severe reclining position without much sacrafice in canopy area. Jerry was appreciative of the suggestions, and commented that he has a lot more research and analysis to perform to determine the final outcome.

Andy commented that this is the type of things we need at the meetings. Models, rough drawings, a new concept, etc., can be discussed by the group and suggestions made which may or may not help the builder. We need to use the talent available within TWITT to help each other accomplish a common goal.

Andy then introduced Don Westergren, who has given use several excellent presentations in the past. This time he brought along a series of small scale models of challenging aerodynamic theories he uses to test ideas for both full size aircraft and scale models of existing aircraft.

The first one he had was a balsa version of one of the initial test models of an ultra light canard meant for a trans-Atlantic attempt. He showed the group what can be done with them using a variety of CG positions. One test of stability he finds helpful is to hold the aircraft above your head and drop it so it free falls. A forward CG will cause the nose to drop before it hits the floor. When it falls flatly you have probably reached the aft CG position and can now try to fly it and check for stability. This technique can also be used to check for spin recovery possibilities by giving it a twist as you go of it.

Don uses all types of materials to make his test models, including: balsa wood, manila folder cardboard, styrofoam, hardwood, etc. The idea is to acheive the basic shape and balance. He had models of the space shuttle, F-16s, F-4s, and the old circular flying wing of Lee Richards (which he went on to build as a radio control model).

Don used his shuttle model to show how to determine the forward CG limit. By giving the model full up elevator and adjusting the CG until it will still fly correctly, the forward CG can be found and the CG range determined.

He then pulled out a scale model of the current USS Enterprise from Star Trek. With sufficient clay to provide balance for the engine pods on the rear, Don was able to show it can be flown in the atmosphere. The CG apparently is just ahead of the bridge area, which would make performance of the separation maneuver a little tricky to control. Don hasn't thought out all the problems associated with trying to put engines in the pods and feels they probably will have to kept very light with the engine on the front of the saucer.

Don then narrated a video he brought that shows some of the various models he has built over the years. These included the Voyager, Shuttle, Lee Richards #3 flying toilet seat, and a flying dragonfly (double wings and all). (We have not included his discussion during the tape here since it would be difficult to relate his comments to the events on the tape.)

We then showed Bernie Gross' video of the Bumble Bee during set, flight and tear-down. These were from old films converted to video so there was no sound, but it was all varily self explanatory. There were also a few scenes from Oshkosh which gave us a little flavor of what it was like this year.

After the video there was no other business and the meeting was adjourned.

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LETTERS TO THE EDITOR

10/19/90

TWITT:

I very much have enjoyed reading your newsletters. However, I seem to have missed a few issues.

Would it be possible to send the following back issues: #4 (Sept 86), #37 (July 89), and #44 (Feb 90). To cover costs of copying/mailing I have enclosed funds for this, my annual renewal and a little extra for the kitty to keep up the good work.

Would it be possible to visit and look at the tailless wing library in the near future? If you would include your phone number, I would be happy to call you to see if/when it would be possible (convienent).

Thanks very much for your assistance with this matter.

Bert Postma
Stanford Flying Club

(Ed. Note: First, we would like to thank Bert for his donation to the TWITT fund. Bob Fronius, in whose hanger TWITT is headquartered, can be reached at (619) 224-1497 after about 9:00PM during the week and weekends. We would like you to consider coordinating your trip to San Diego to occur during one of our regular meetings, and if possible give us a report on what is happening in your area or your own personal experiences with tailless aircraft. This would also give you an opportunity to meet some of the other members and discuss common issues. Meetings are on the third Saturday of the month, except December has no meeting. Please give Bob a call.)

TWITT:

While I realize that most of our members are primarily interested in tailless gliders and light aircraft, my collection of data on winged things includes many military jets. I'll send in a few drawings, three views, and

articles for the newsletter and we'll see who else is interested.

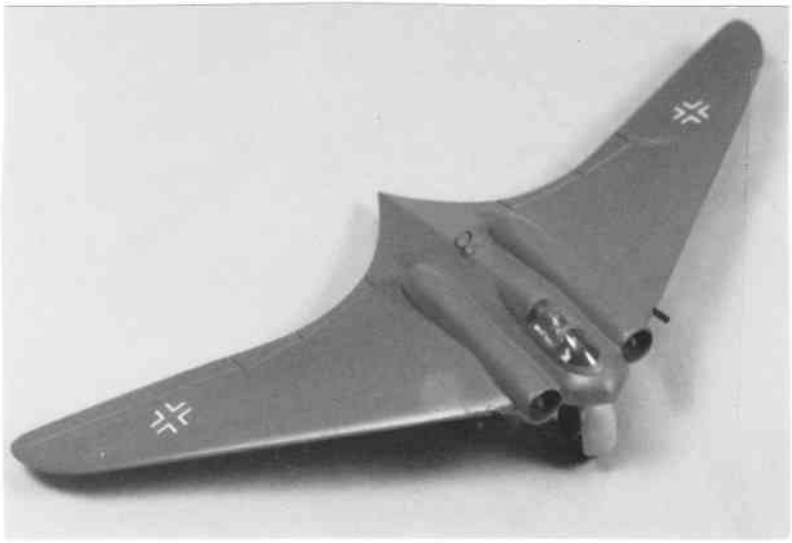
The enclosed items if from Lloyd Jones book U.S. Fighters. The Douglas F4D-1 Skyray (also called the "Ford") has always been a personal favorite of mine. The aerodynamics were developed mainly from captured documents dealing with Lippisch's work.

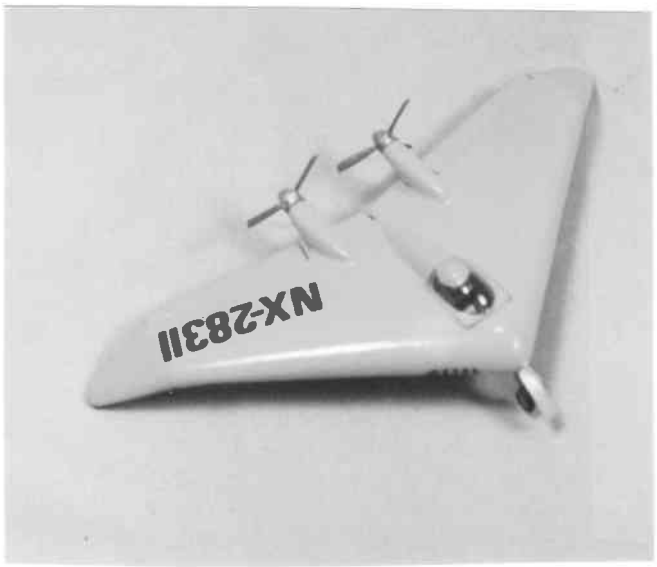
I've also enclosed two photos of models from my collection. The Horten IX is from a Pioneer kit, and the Northrup N-1M is from a Vacuform. Both are 1/71 scale.

Best Wishes

Kevin Renshaw
10056 Farmers Branch
Fort Worth, TX 76108

(Ed. Note: Thanks for the input. The model pictures and Skyray information can be found elsewhere in this issue. If any others of you are interested in this type of tailless aircraft let us know so we can make sure stuff like this gets into the newsletter. You might also want to correspond directly with Kevin.)





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Flight Engineering and Developments
2453 Liberty Church Road
Temple, GA 30179
(404) 562-3512

The following was found in the Los Angeles Times newspaper on about May 4th or 5th. Hopefully someone from TWITT will be able to provide some help.

RESTORING '40s Northrop N9MB Flying Wing, need experienced volunteer woodworkers. Saturday work only. Call David Murray at (818) 369-8056 for details.

FLYING WING SAILPLANE PLANS AND KITS: Two time-proven, 13m homebuilt designs suitable for the novice pilot. Build either the MONARCH "F" ULTRALIGHT (19 to 1), or the PIONEER II-D (35 to 1) sailplane. Info packs $8 each, or $15 for both. Marske Aircraft Corp., 130 Crestwood Drive, Michigan City, IN 46360

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AVAILABLE PLANS/REFERENCE MATERIAL

Tailless Aircraft Bibliography
by Serge Krauss
Cost: $20
Order from: Serge Krauss
3114 Edgehill Road
Cleveland Hts., OH 44118

Horten H1c construction drawings with full size airfoil layout. 30 sheets 24" x 36" with specification manual. Price: $115.

Horten Newsletter
Cost: $5 per year for US/$7.50 foreign
Order from:

AVIATION NOTES

From the September 1990 Sport Aviation magazine.

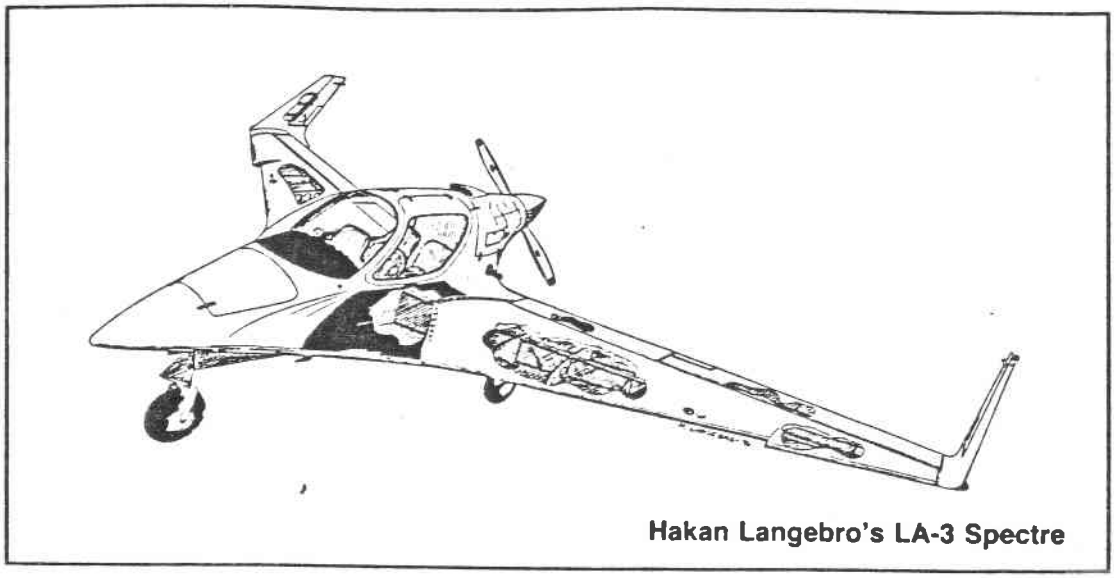
Finalists Announced In Aircraft Spruce Design Contest

Five designers have been selected as finalists in the Aircraft Spruce & Specialty Modern Aircraft Design Contest...chosen from 160 submissions from all over the world. All designs were required to incorporate one or more 150 hp Buick/Rover engine conversion. As announced at Oshkosh '90 by Aircraft Spruce president Jim Irwin, the finalists were: *(Ed Note: We have only included the one finalists that happen to be a flying wing design.)*

Hakan Langebro, a 24 year old aeronautical

engineer from Malmo, Sweden. His design, called the LA-3 Spectre, is a 4-place flying wing constructed almost entirely of composity materials. Langebro is currently an assistant chief designer and project engineer for a 4-seat, composite light transport and utility aircraft.

(Other winners were: Guy Lockwood of Phoenix; Edward MacDonough of Atlanta; Buckley Stamps of Vero Beach; and James Terry of Andover, KS.)



Hakan Langebro's LA-3 Spectre

From The Flier, The Publication of the San Diego Hang Gliding Association

"How Far Have We Come, How High Can We Go" by Marcus Salvemini

(Ed. Note: The following was extracted from Marcus' article. As you may recall he was a guest speaker at the Febrary 1990 meeting where he demonstrated the Paraglider.)

Every year for the past 15 years the town of Telluride has hosted a hang gliding festival and the world aerobatics championships. This year several Paraglider pilots were invited to come and fly along and demonstrate the capabilities of these new wings (often referred to as 'pair-a-panties' derived from the French work for paraglider "parapente".)

When I arrived on Tuesday I was met by an enthusiastic Ed Pitman who was excited about his flight of the previous day where he had managed to get to 15,500' in his paraglider, a new record for this site.

Lauch was at 12,250' MSL and the valley floor was at 8,800' MSL. After surviving the perilous drive up the mountain...

I knew I was in for good flight when I saw the clouds building about 10,000' above launch, and... I launched in almost zero wind and immediately hooked a 500 fpm thermal. I stuck with it until about 15,000' and vario finally stopped going off. I found myself about a quarter mile behind launch and started heading for a thermal... This was the elevator I was looking for, and it took me up at about 800 fpm to just under 17,600'.

As soon as I got over 17,000' the air was so smooth I could not go wrong. Thinking I was doing just great I looked around at the other para-pilots climbing below me not noticing that some other guy in a red glider had gotten higher than me already! I could not believe my eyes!! Ed Pitman and one other local, Joel, managed to get to 17,900'.

The next day I did the same flight but with oxygen this time and although I just made it to 17,000', I managed to go across the valley to the other range about 6 miles away from launch.

(Ed Note: Developments within the hang glider and paraglider fields have progressed quite rapidly. These kinds of performance, along with some 300 mile straight line flights, could make one wonder if flying a $25,000 high performance glass job is really that much of a challenge any more.)

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ADDITION TO TWITT LIBRARY

Tasso Proppe has donated the following to the library:

A set of 3" x 4" viewgraph slides of WWII German jet engine designs entitled Lehrbildreihe Nr. 240 (Zell u. Farbdia) Jumo-Sondertriebwerk, 109004 B-1, published October 1944.

There appears to be about 50 slides in the set. Tuto Figueroa, our resident engine expert will probably enjoy going through these and perhaps we can convince him to give us an overview presentation at some future meeting.

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DOUGLAS F-6 SKYRAY (F4D-1)

From: U.S. Fighters, by Lloyd Jones

In selecting the name Skyray, Douglas could not have chosen a more descriptive title for their F4D-1. The Skyray was a compact design with smoothly flowing lines giving it an unmistakable planform. Its semi-delta wing was developed from the research done by Dr. Alexander Lippisch for Germany during World War II.

Design of a short-range, fast climbing, carrier-borne interceptor was requested by the Navy's Bureau of Aeronautics in 1947. The Bureau was intrigued with the potential offered by the delta configuration and asked Douglas engineers to investigate this shape. Extensive wind tunnel tests led to the creation of the bat-like form, which was not strictly a delta but a highly-swept wing of very low aspect ratio. All the horizontal flying controls were attached to the wing trailing edge classifying the Skyray as "tailless."

Two XF4D-1's were ordered in 1948, these to be built around the Westinghouse J40 then under development. The engines were not ready by the time the airframes were completed so Allison's 5,0000 lb. J35-A-17 was substituted for the initial flights, the first of these taking place on January 23, 1951. The alternate engine, with its lesser power output, complicated the flight test program and the Skyray was unable to reveal its potential performance until an XJ40-WE-6 was installed. However, with 2,000 lbs. more power, the XF4D-1 was still underpowered. On March 15, 1953, the Navy decided to install a Pratt & Whitney J57-P-2 on production Skyrays, eventually canceling the Westinghouse engine.

The changeover to the Pratt & Whitney engine necessitated a redesign of nearly eighty percent of the airframe to accommodate the larger engine. To save time, the redesign was done while the first production planes were taking shape.

While the modifications were taking place on the production line, the second XF4D-1, re-engined with an afterburning J40-WE-8, established a world's speed record of 753.4 mph on October 3, 1953, becoming the first carrier plane to hold that honor. Eventually, the Skyray set no less than seven official speed records.

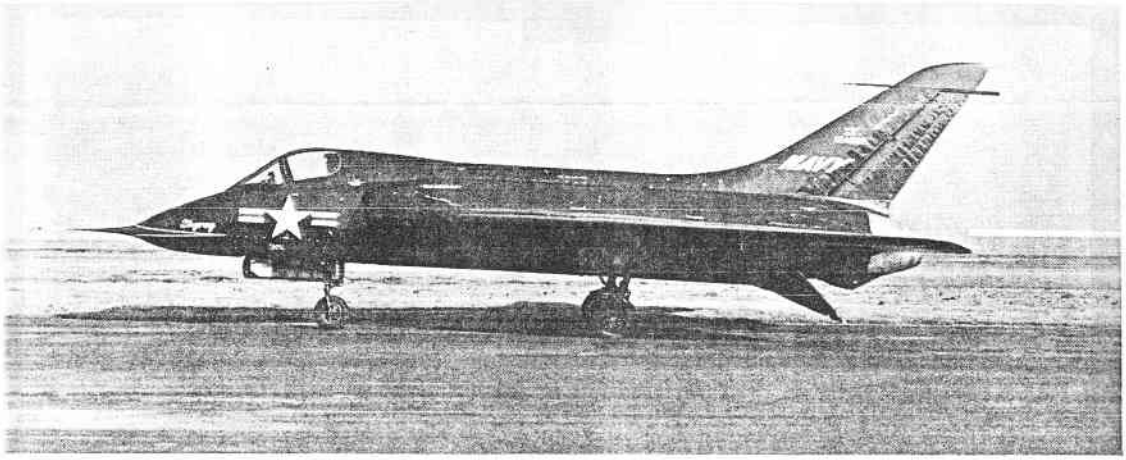
The initial flight of the first production F4D-1, with the Pratt & Whitney engine, took place on June 5, 1954; the plane easily slipped past Mach 1 in level flight. A change in the inlet duct to improve the engine air flow was required before the Skyray was ready for delivery; then the fighter was absorbed into Navy and Marine squadrons. The last Skyray was completed in December 1958, making a total of 420 F4D-1s.

The span of the Skyray's 557 square foot wing was 33' 6". Overall length was 45' 8", height was 13'. Empty weight was 16,024 lbs, gross weight was 27,000 lbs with 1240 gallons of fuel in both internal and drop tanks. Operational Skyrays had a maximum speed of 695 mph at 36,000' using the Pratt & Whitney J57-P-8B of 10,500 lbs with the afterburner. Service ceiling was 55,000'.

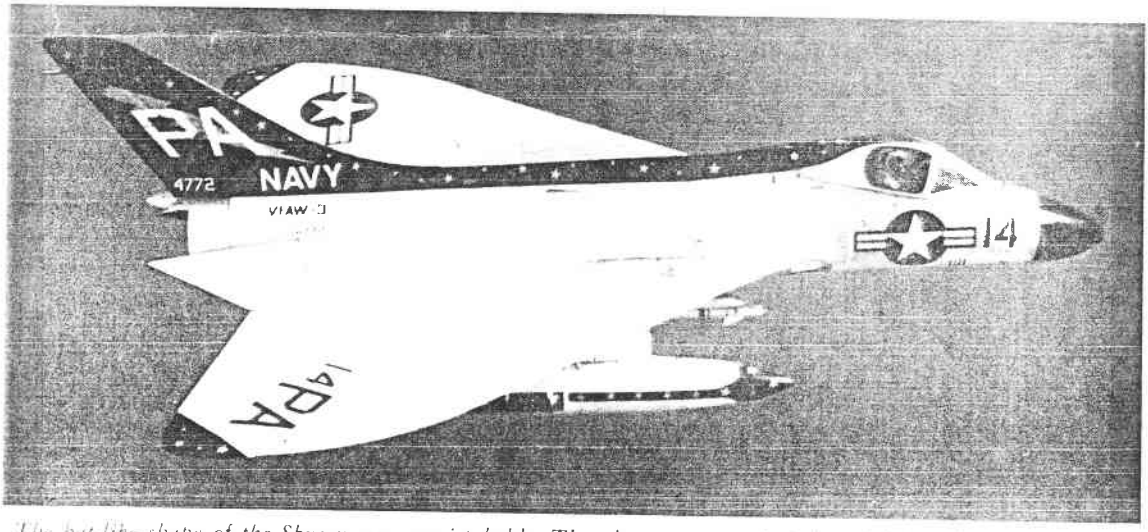
Four 20 mm cannons were located in the Skyray's wing. Two Sidewinder missiles and two rocket pods carried nineteen 2.75" FFAR's supplementing the cannons on intercept missions.

(Pictures and a three view can be found on succeeding pages.)

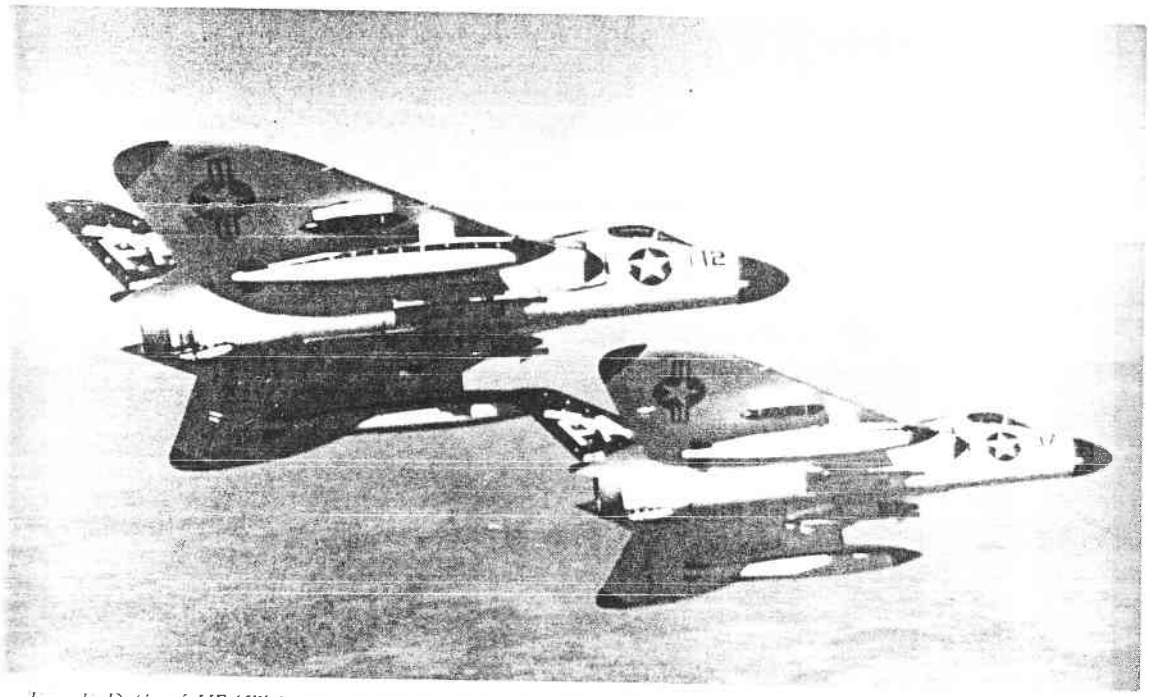
DOUGLAS
F-6 SKYRAY (F4D-1)



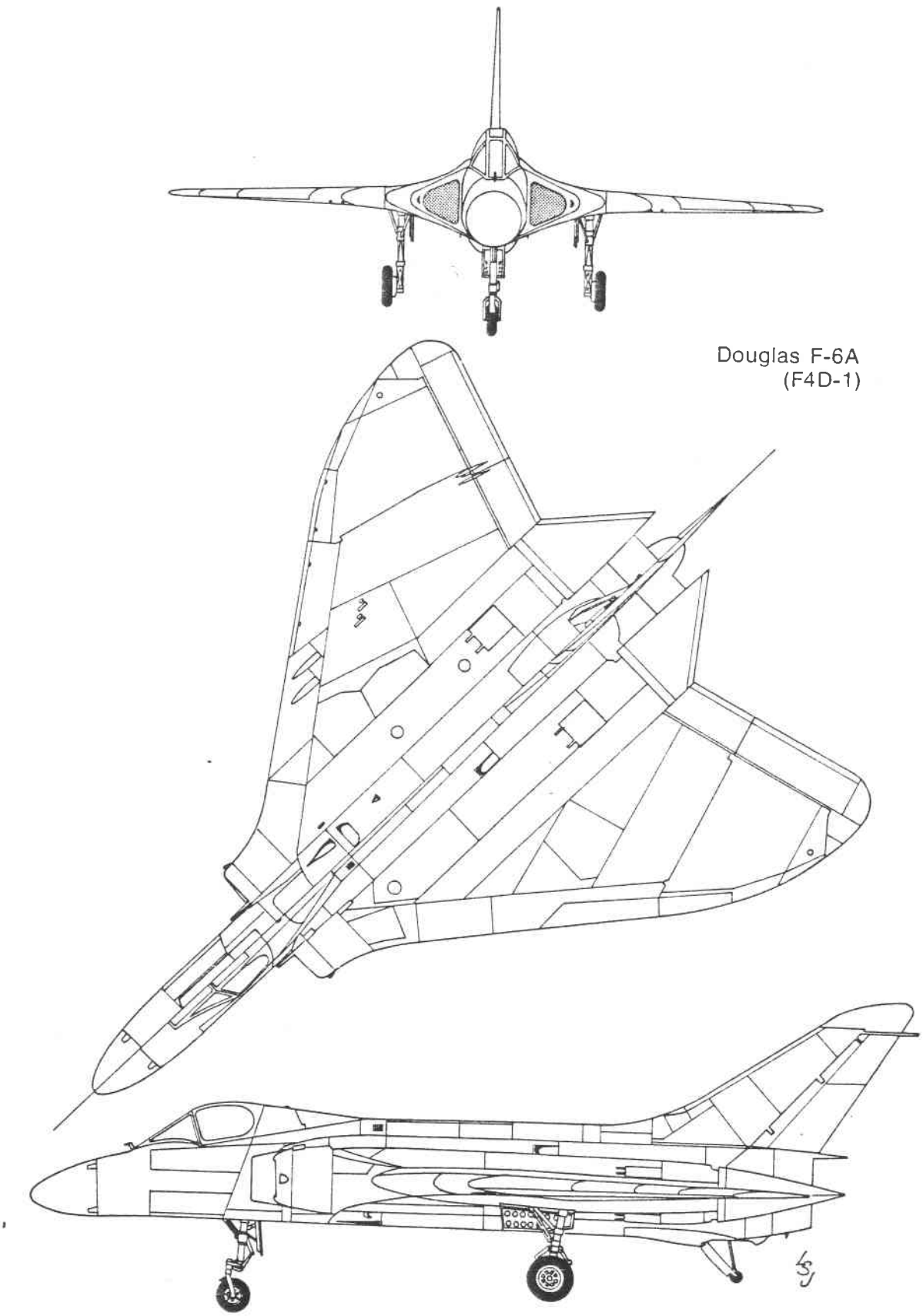
The prototype Skyray with the Westinghouse engines. *Douglas*



The bat-like shape of the Skyray was unmistakable. The plane was very popular with its pilots. *Douglas*



Two F4D-1's of VFAW-3, on a tactical mission for TAC. This squadron was on loan to the Air Force and operated with TAC squadrons for a time. *Douglas*



Douglas F-6A
(F4D-1)

25 FEET

From: S.H.A.pTalk Newsletter
Vol.IX No.8 August 1990

CONTEST ENTRY: WINGTHING

Wingthing Design Targets

1 All pieces and parts must be beautiful, especially when assembled.
2 From trailer to flight in five minutes.
3 Easier to build than most, and less expensive.
4 Above average performance, but safer to fly.

Condensed Description

Wingthing aims at outstanding control, especially at very low airspeed, like landing. Clean simplicity, good proportions, and the right airfoil predict it will fly as well as the model, which makes stable tight turns,one rudder moving out only, and together (to 80^0 out) eliminates spoilers.

Twin sticks control elevons separately or together, twist grips control rudders, eliminating pedals. Separate mounting in each half allows wings to fold (bottomside) without disturbing controls. They fold in half ($12\frac{1}{2}$ ft. span) with integral fins and rudders. $5\frac{1}{2}$ foot elevons literally plug in, self-aligning with controls.

Capsulated Comment

1 The first objective is too subjective to deserve comment.

2 Only 3 pieces. Heaviest hunk about 50 lbs. No tools needed. Assembly takes a lot less long, and CAN'T be got together rong.

3 Less like it looks than it looks. Laminated balsa trailing edges* make short work of curvaceous contours. (Pointed remarks about pointy tail will be ignored). Foam core spars skinned with skinny plywood, carbon caps and mummified with fiberglas. Endless canopy iterations became 3 clean flat faces. Mylar skin (unspoiled by spoilers) bonds to all surfaces via 3M's Very High Bond tape.

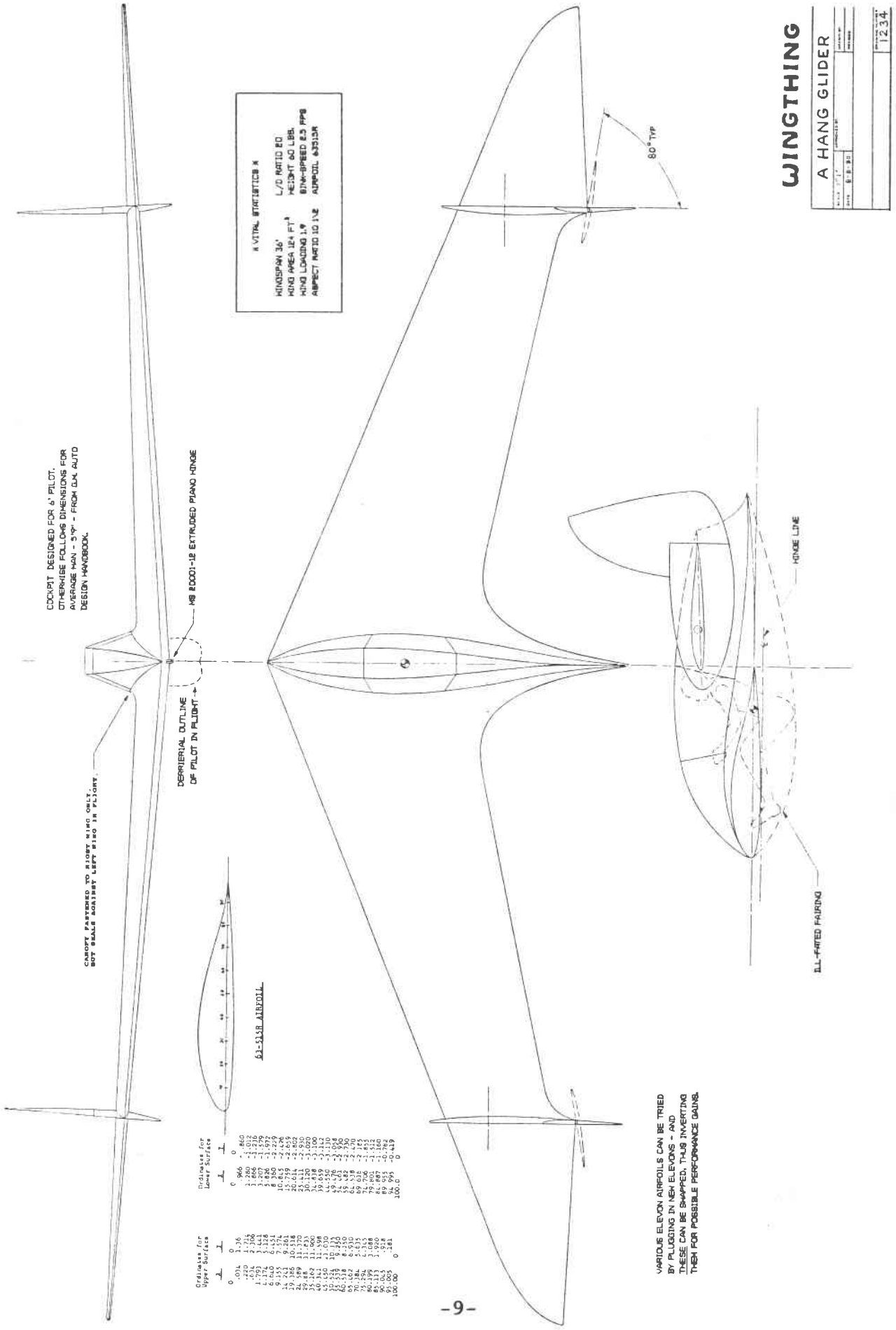
4 Pilot and airframe C.G.'s coincide. Sticks move fore and aft only, and rudders turn out only. Lowering wingloading by half lowers turning radius by half. Will wingthing circle with buzzards?

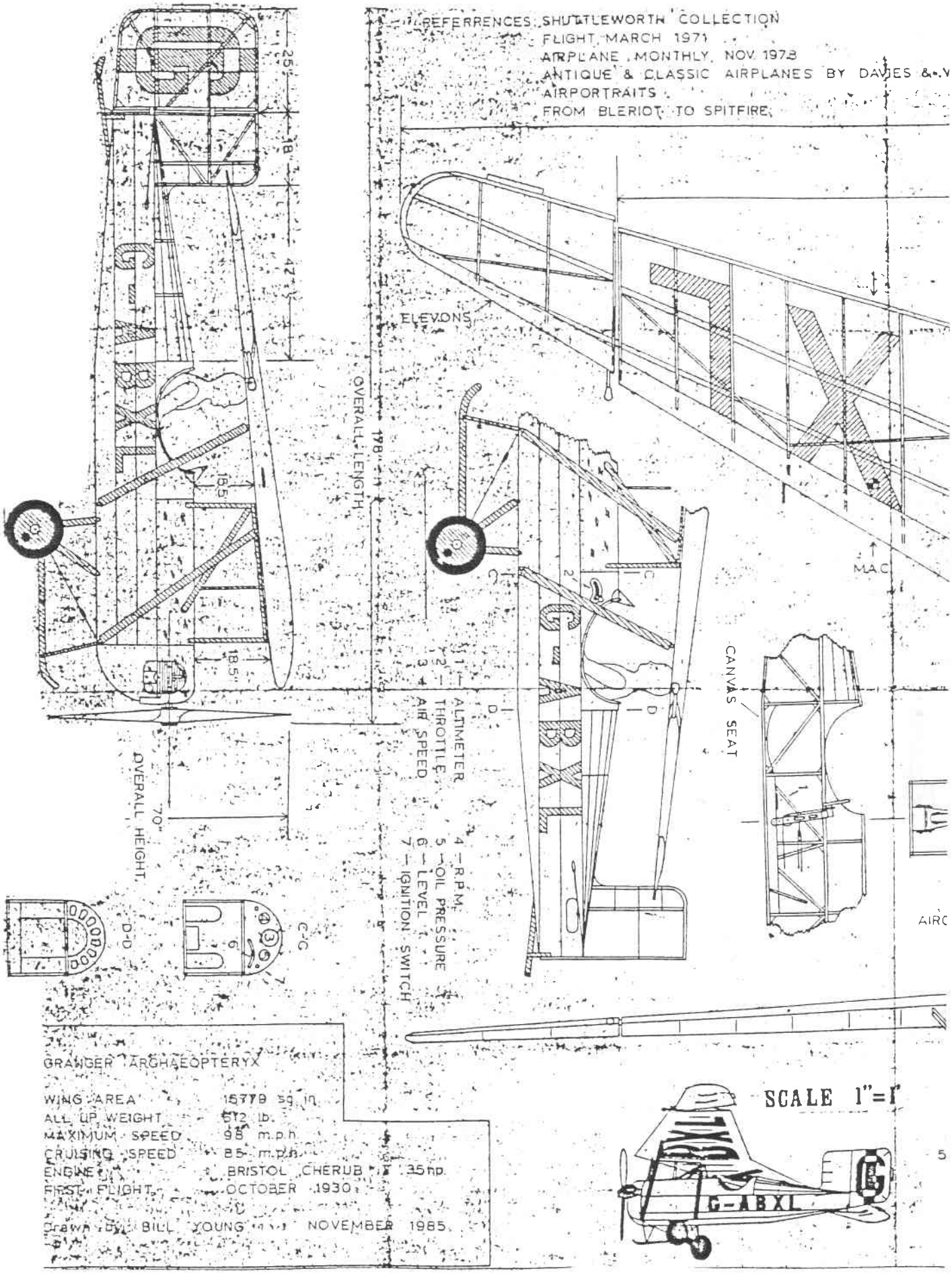
Disadvantages

1 Having any.
2 Hang gliders are least popular with homebuilders.
3 Therefore, plans for self-launching Wingthings were underway (2 ft. more span, fully encl. etc.) when time ran out, forcing them to hibernate.
4 Wingthing's finest feature forced open-bottomed cockpit. Wing couldn't fold when faired.
5 Wingthing's (and pilot's) bottom turbulate a terrible toll in L/D.

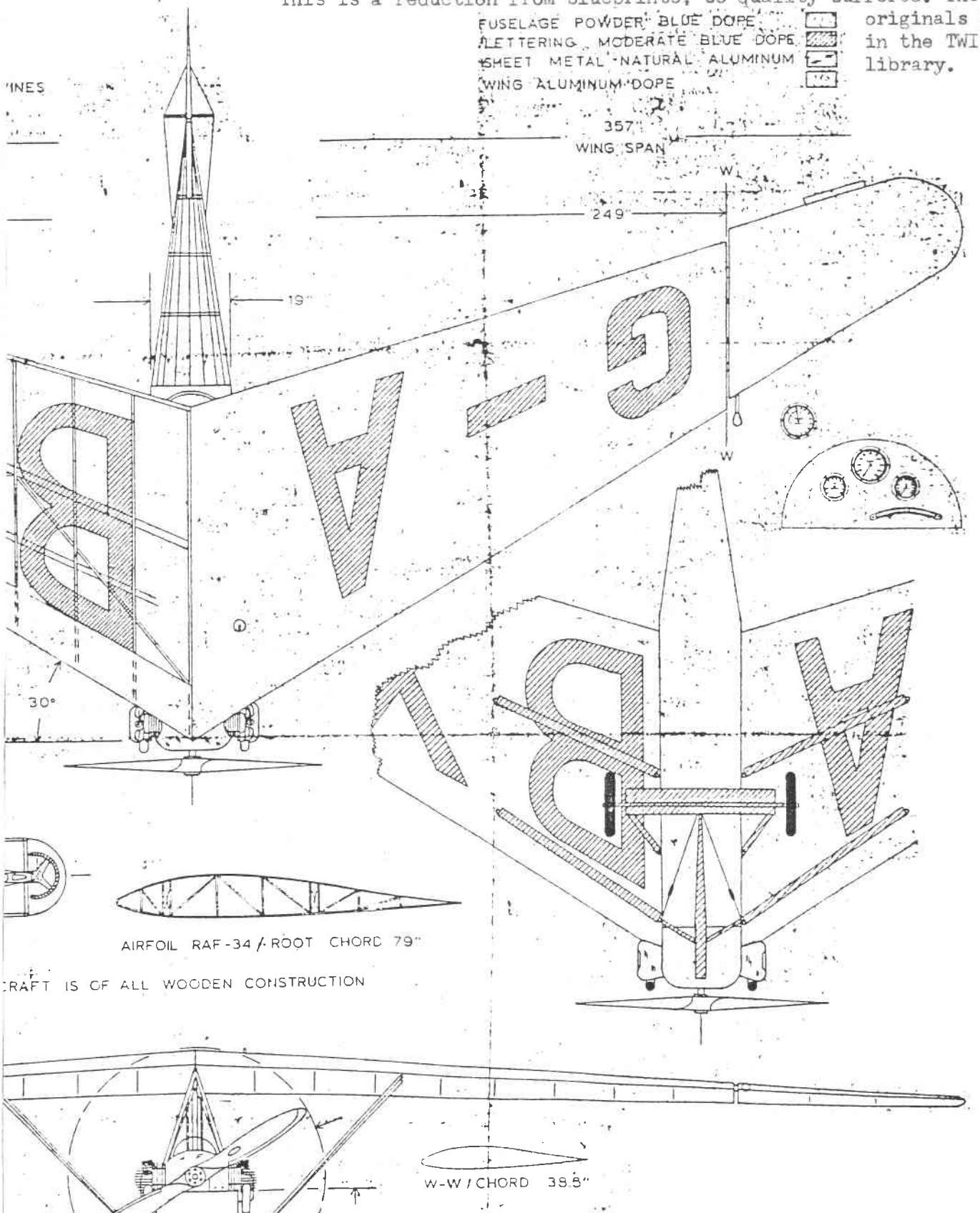
* More proof that popular opinion is the greatest lie in the world: The REAL reason Voyager flew its famous flight was to prove balsa trailing edges could do it.

From: S.H.A.pTalk Newsletter
Vol.IX No.8 August 1990




REFERRENCES: SHUTTLEWORTH COLLECTION
FLIGHT MARCH 1971
AIRPLANE MONTHLY NOV 1978
ANTIQUE & CLASSIC AIRPLANES BY DAVIES &
AIRPORTRAITS
FROM BLERIOT TO SPITFIRE
ELEVONS
M.A.C.
CANVAS SEAT
OVERALL LENGTH
OVERALL HEIGHT
ALTIMETER
THROTTLE
AIR SPEED
R.P.M.
OIL PRESSURE
LEVEL
IGNITION SWITCH
D-D
C-C
GRAIGER ARCHAEOPTERYX
WING AREA 1577B sq in
ALL UP WEIGHT 512 lb.
MAXIMUM SPEED 98 m.p.h.
CRUISING SPEED 85 m.p.h.
ENGINE BRISTOL CHERUB 35hp
FIRST FLIGHT OCTOBER 1930
Drawn by BILL YOUNG NOVEMBER 1985.
SCALE 1"=1'
G-ABXL

This is a reduction from blueprints, so quality suffered. The originals are in the TWITT library.



AIRFOIL RAF-34 / ROOT CHORD 79"

CRAFT IS OF ALL WOODEN CONSTRUCTION

AIRFOIL ORDINATES L.E. RAD. 1.29

STA	0	2.5	5	10	20	30	40	50	60	70	80	90	95	100
UPR.	0	2.82	4.11	5.83	7.72	8.32	8.08	7.21	5.87	4.31	2.70	1.26	0.64	0
LWR	0	-2.14	-2.81	-3.53	-4.16	-4.32	-4.32	-4.11	-3.69	-3.09	-2.30	-1.34	-0.75	0