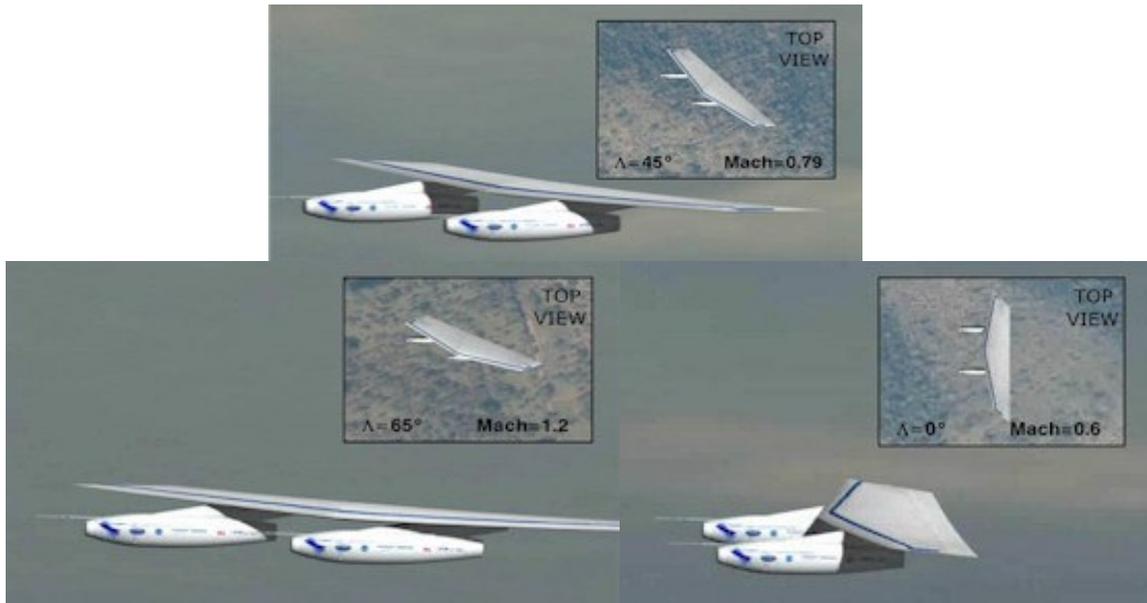


T.W.I.T.T. NEWSLETTER



Northrop Grumman's concept of what the OFW X-Plane will look like in flight. Counter clockwise from bottom right: at Mach 0.6 with 0 degrees of wing sweep; at Mach 0.79 with 45 degrees sweep; and at Mach 1.2 at 65 degrees sweep. These are part of a concept video you can download. Source: <http://www.obliqueflyingwing.com/>

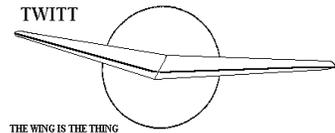
T.W.I.T.T.

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., 0711 means this is your last issue unless renewed.

Next TWITT meeting: Saturday, November 17, 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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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

This month I have taken the majority of the space to complete the Boeing 306 article from Airpower. As I noted last month this is to allow those members without Internet capability or knowledge to benefit from Paul Spatrisano's great work in getting permission for the reprint.

Next month I will have some new material from several sources, but mainly from Ferdinando Gale in Italy. He has been taking excellent advantage of his new Internet connection and retirement to get back into tailless aircraft.

The next time you visit the hanger you will see many more changes in the layout. We are consolidating the TWITT library and archive files into the main hanger to free up the space in the back hanger for its owner to begin restoring the Stinson Voyager. This will make the library more accessible, which means we will have to come up with a few controls over removing anything from the hanger. We will prepare some signage for this purpose since we need to ensure we don't lose anything.

The front area is also being gradually cleaned up and re-arranged. The refrigerator has been removed so I will have to remember to bring a cooler with drinks for meetings in the future. We will still have hot drinks.

As we move into the winter months I am hoping that some of you that have been building and flying will have some time to sit down and write us a short article.

We would all love to hear what you are doing, the reasons behind your decisions on configurations and airfoils and, any other aspect that would help others decide on a solution to their problems. Don't forget this type of sharing is one of the reasons for TWITT and so we don't have members re-inventing the wheel when it comes to building either models or a full sized aircraft. So please share, share, share.

Andy



NOVEMBER 17, 2007 PROGRAM

As of the publication date we didn't have a formal program lined up for this month. I will be at the hanger and you are more than welcome to come by for a little hanger flying, but don't drive a long way just for that.

If anyone had a lead on a January 2008 program, I would be open to suggestions.



LETTERS TO THE EDITOR

August 7, 2007

Last year my long time association with TWITT has been interrupted because of TMB (Too Many Birthdays) and related drawbacks. I am now in full swing again in spite of my age (82) and will look at the tailless configuration with a never-ending interest.

During my grounding I have completed a book on the Horten tailless planes, which will be published by an Italian publisher who has already printed several books of mine.

The title is Tuttala Horten – Storia-Tecnica-Teoria (Horten Tailless: History-Technique-Theory). It covers not only the life of the Horten brothers, but also their design theory (Bell lift distribution, "mitteneffekt", twist values, etc.) with a completely unbiased approach.

My job has been facilitated by the correspondence I had exchanged years ago with Dr. Horten in Argentina; in spite of having been in the USA 51 times (Silicon Valley) I never succeeded in making a deviation in order to visit Dr. Horten in Cordoba. Dr. Horten had been very helpful when I was writing another book of mine (TAILLESS TALE), which has been published in the US by B² Streamlines.

I will send you a complimentary copy as soon as available (next Autumn). Although the text is in Italian, from the illustrations you shall be able to grab what it is all about.

In order to complete my collection of TWITT newsletter I would like to purchase all the missing issues from February 2006 up to now. Please let me know the total amount due (including airmail postage), which I will send by return mail.

If you prefer, you can send the requested information via the Internet address of my son-in-law.

Thanks a lot for your attention to this letter.

Regards,

Ferdinando Gale
Via Marconi 10, Citofono 13-B
28831 BAVENO VB, ITALY
<ferdigale@alice.it>

(ed. – Since the airmail cost would high I wrote to Ferdi through his son-in-law explaining that we had all the issues he needed on the web site and that they could be downloaded.

Since that time you can see he has obtained his own link to the Internet and is now part of the electronic world. I am sure this is going to make corresponding with other tailless enthusiasts as they learn of his e-mail address.

We look forward to receiving a copy of the new book and adding it to the library.)

August 31, 2007

I am really impressed with your web site and I view it regularly. I have the solution for the wing you are looking for. Can you help me with IP issues.

I would like to talk about ideas and learn what you have found about wings in the US patents. I have tried to do the same but because I live in Australia it was very difficult to access info in the US.

I have a great wing design but I am finding it difficult to "show and tell, because I don't have any IP protection, it is makes it hard for me show anyone, so that they can see what it is!!!!!! Can you see my dilemma??? Can you help?

It would be great to hear from you.

Regards

Raffaele Giampaolo
<raffaele.giampaolo@gmail.com>

(ed. – I wrote back asking for a little more information in order to better direct him and got the following.)

Thank you for writing back to me, I was really happy to see your email. I am aware you are not a commercial organization, but it is good to talk to someone about my wings. You might, however, be able to assist me with some suggestions about whom I might contact.

As you assumed, I am concerned about loosing control of my design, as basically this idea has haunted me since I was 4 years old, back in the hills of Italy where I was born. I have searched the TWITT site for

some time now and I regularly go to the TWITT site to see new ideas. The one that has interested me the most is the one on bird flight, and particularly the one on the sea gull and the eagle... I can't remember the gentleman's name at hand... Do you know the one mean?? My idea is similar, but, is the next step in the process. About 5 years ago I found a startling solution when studying math at university. This set me on the path to finally solving the problem that will be the next step to aircraft design since the Wright brothers.

Further research has shown me that the aerodynamic characteristics are, of course, related to the shape or form of the wing. After many hrs of work and research I realised that deriving the ultimate shape can only be done using the mathematical formula I have discovered.

I hope to hear from you again soon.

Raffaele

(ed. – I wrote back, “You might want to contact Phillip Burgers who wrote one of the articles on bird flight. His e-mail address is philburgers@yahoo.com. Another member who is very in tune with mathematics and design is Phil Barnes whose address is pelicanag@aol.com. He is also very attuned to bird flight and would probably fully understand what you are looking at. You could communicate with them initially with a proposal before passing along your actual formulas to assure yourself they will not used them in any other manner than what you wish.”)

Thank you for your reply. I will keep you informed of the outcome. I have heard of the gentlemen you are recommending.

Thanks for your support.

Raffaele

September 7, 2007

The September 2007 issue of "Flying Models" has an article on a 1/8 scale BKB-1 R/C glider. Plans are for sale at <http://www.flying-models.com>. It is plan number FM09-2007, may be found by searching for CD325 and cost 12.00. The plans used to come with a copy of the article, but you may need to ask for one or buy a copy now. It apparently flies and can do the tumble that you read about.

Have fun,

James McLellan
jwmcl@att.net

(ed. – This looks like a great model. I might even have to think about getting one for when I retire and get back into R/C flying.)



September 30, 2007

My name is Dale Bowers and I am building a 1/3 scale model of a BKB-1 sailplane. I am looking for any pictures of the cockpit, cockpit controls and the aircrafts structure. I was wondering if you had any of this in your library or if you could suggest where I might look? This would be of great help to me. I would like to do a good job of it on this model.

Thank you for your time.

D. R. Bowers
<bowersdale@hotmail.com>

(ed. - I don't recall having any of the pictures you are looking for in our library, but I will take a look so see what we have that might be of help. This will probably take a week or so since I don't have the library file handy in my home and must go to the hanger.)

October 6, 2007

I just came along your name and would like to show you my R/C bird:

http://www.youtube.com/watch?v=STrwjm_zUv8

Have a nice day.

Robert Musters
<bluefalcon@home.nl>

(ed. – This is short video of his Accithopter which is an R/C version of a Goshawk Boris. I couldn't get a picture from the video, but it seems to fly well.)

October 12, 2007

Slick Goodwin (sp?) a friend who recently Flew West held the "rights" to these designs. He also as The Bell Pilot set up and proved the concept of the X1 which later broke the sound barrier. He was a smart businessman and made a living later from aircraft He was living in the Palm Beach area when he died and his wife phoned me to let me know.

Also, This place has been working on a "Kit" plane not too successfully for some time. The model they flew had a "accident" when they tried it in a wrong WX condition

Walt Scott

(ed. - These are the patents Walt is referring too.

<http://www.twitt.org/PreBurnelliPatents.html> - top

This is the Atlantica site:

<http://www.wingco.com/>)

(ed. – This was sent out to the Vintage Sailplane Association by Gary and forwarded to TWITT by Doug Fronius. I thought it was hilarious.)

Here's something for you and the VSA news.
<http://www.doctormacro.info/Movie%20Summaries/M/MGM%20Shorts.htm>

Click on "Air-Tight" and hang on for the ride. Much of the film appears to have been filmed at the Long Beach Airport and there is at least one mention to a Bowlus school on one of the buildings. Enjoy and share with others!

Gary Fogel

From the U-2 Group:

August 14, 2007

I am new to this list, I live in Stockholm, Sweden, and I am the test pilot on Tibor Hajnal's U2.

The machine has been in storage since 1990, and has now been put into flyable condition again by me and Tibor. On Saturday, August 4, I took it to the air after a series of successful high-speed taxiing. First flight was at 6 feet along the runway and on the second I took it around the path. No problems at all.

The ship flies wonderfully, has excellent control characteristics and a good climb. It cruises at 55 knots with the Rotax 277 (27 Hp) and a three-blade Ivo prop.

I have until today accumulated 15 flights and 5 hours in it.

Compared to flying my Mitchell wing B10 (I have 100 hours since 2001), I find this ship to be more stable, having better control (no adverse yaw at all!), better climb and higher speed.

The only drawbacks compared to the B10 is that you cannot see the ground below you and it has no kind of shock absorption in the landing gear. Also, it needs considerable back-pressure on the stick. (the CG is verified to be 2 inches in front of the back rest). However, in the U2 I haven't to be afraid of the height.

Carl Hyllander
<carl.hyllander@bredband.net>

Is your U2 possibly the ship that was build by Mr. Jan Larsson in Bergby Sweden. It makes sense because he used a Rotax 277 in that ship. I was once interested to buy it and I also partly built a U2 in the city of Östersund were I live. I know that both these ships went to Stockholm but I have not heard of them since. Interesting to know if there is any connections.

All the best,

Robert Krockmar
<<mailto:robert.krockmar@tikab.se>>

(ed. – I think it is interesting that there seems to be more interest in the Mitchell designs, especially the U-2 in Europe than in the US. The PUL 10 is another example and we will have more information on this design in the next issue.)



BOEING FLYING WINGS OF 1935

Model 306 Flying Boat Study

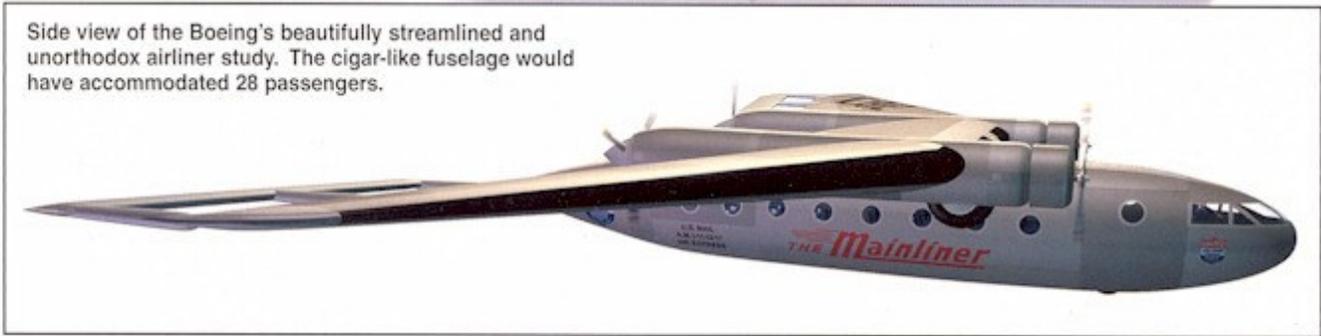
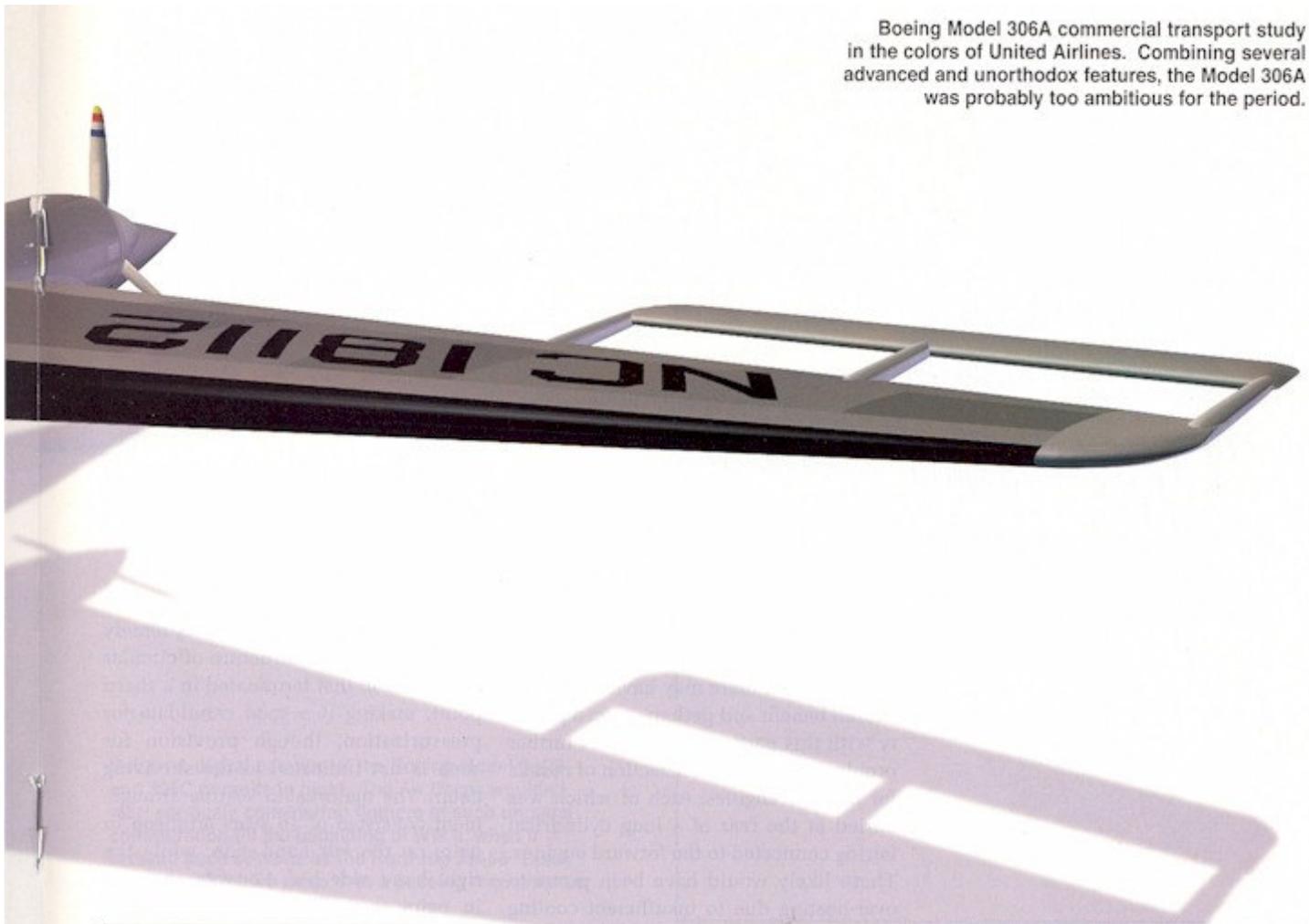
Based on surviving evidence, this study was not seriously considered as a viable proposition and quickly abandoned. Only a profile view of this strange flying boat seems to have been drafted, and even it is incomplete in that it lacks any sort of sponsons or outboard floats to stabilize the aircraft in the water. Perhaps the designer envisioned some sort of retractable floats that were completely flush with the wing when retracted; it is difficult to say without more information. The basic concept appears to have been to use the wing design of the Model 306 bomber, eliminating the dihedral in the process, and adapting it to a flying boat hull, which parallels the developmental story of the famous Boeing Model 314 airliner, the wing of which was based on that of the XB-15. The Model 306 flying boat's stubby hull is vaguely reminiscent of the Blohm & Voss BV 138 "Flying Clog" and is not a particularly elegant design. The study appears to be intended for commercial use, based on the placement of portholes along

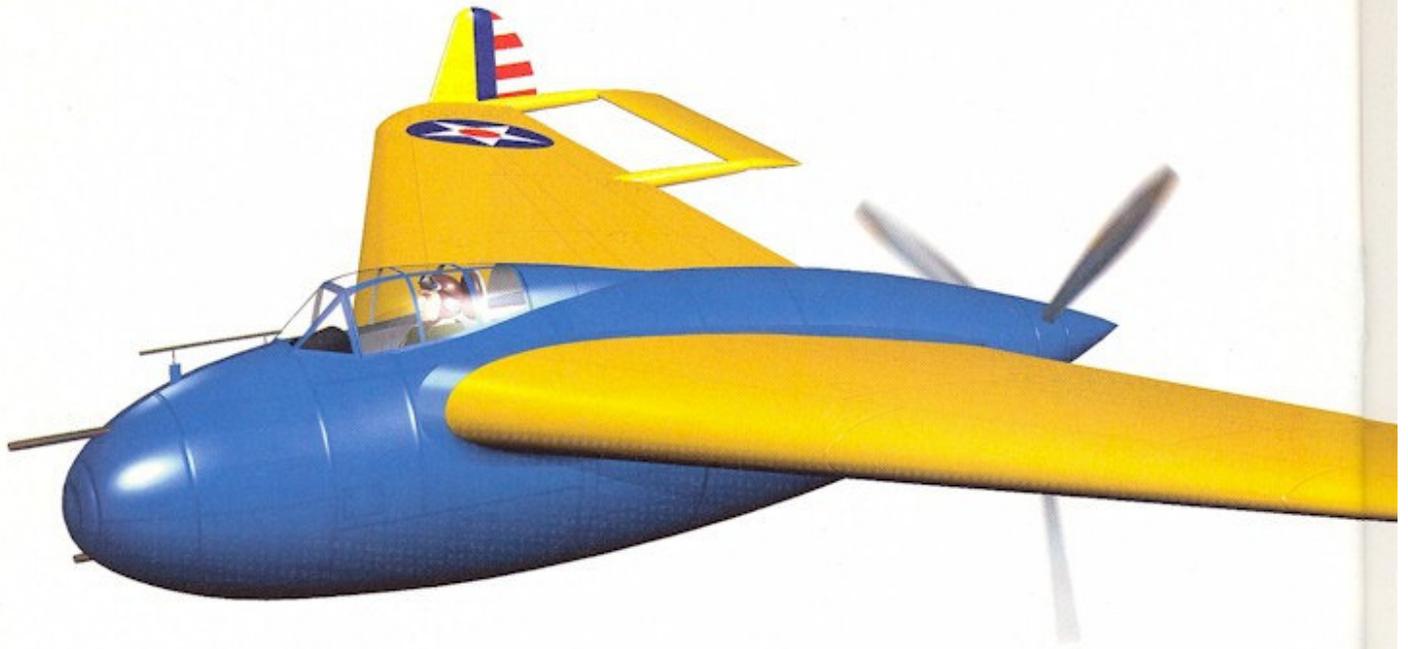
the fuselage sides and the lack of defensive armament. The engines were likely the same Allison V-1710s used on the Model 306 bomber. The top and front views shown in the general arrangement drawings are reconstructions, based on the assumption that the flying boat project likely had the same span as that of the bomber. The accompanying artist's impressions depict the aircraft in the colors of Pan Am. It should be noted that this wasn't the only tailless flying boat project of the 1930s; in the United Kingdom, the Westland-Hill Pterodactyl Mk VII was conceived along similar lines, and also remained an unbuilt curiosity.

Model 306A

Had this airliner been built in the 1930s, it no doubt would have caused a sensation. A very avant-garde design for a commercial transport, the Model 306A had the same basic wing planform of the previous studies, though the span was smaller at 106 ft. A substantial change was made with the engine arrangement, which consisted of four Pratt & Whitney S1EG Hornet radials installed in push-pull tandem pairs. Though the Model 306A's engine installation was cleaner than that of a conventional four engine tractor arrangement, the rear propellers would have been at a minimum 10% less efficient than the front ones due to the disturbed airflow, a fact that had

Boeing Model 306A commercial transport study in the colors of United Airlines. Combining several advanced and unorthodox features, the Model 306A was probably too ambitious for the period.



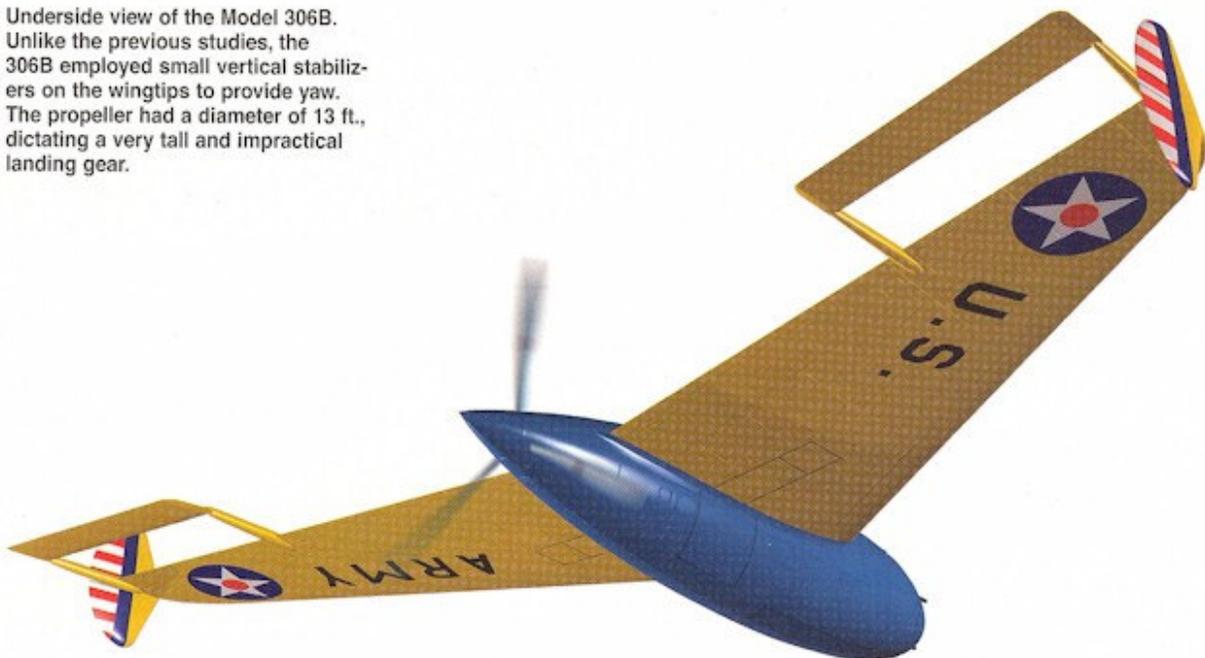


BOEING FLYING WINGS OF 1935

been proven with the Handley Page V/1500 bomber nearly two decades before. Thus, there may have been little overall benefit and perhaps even a penalty with this particular layout. A further problem concerns the selection of radials for the rear engines, each of which was buried at the rear of a long cylindrical fairing connected to the forward engines. These likely would have been prone to over-heating due to insufficient cooling

airflow. The fuselage was an extremely clean cigar-shaped structure of circular cross section that terminated in a sharp point, making it a good candidate for pressurization, though provision for such is not indicated in the surviving data. The main cabin seating arrangement consisted of 16 seats arranged in pairs on the left hand side, while the right hand side had 12 seats arranged in pairs as well as two single seats.

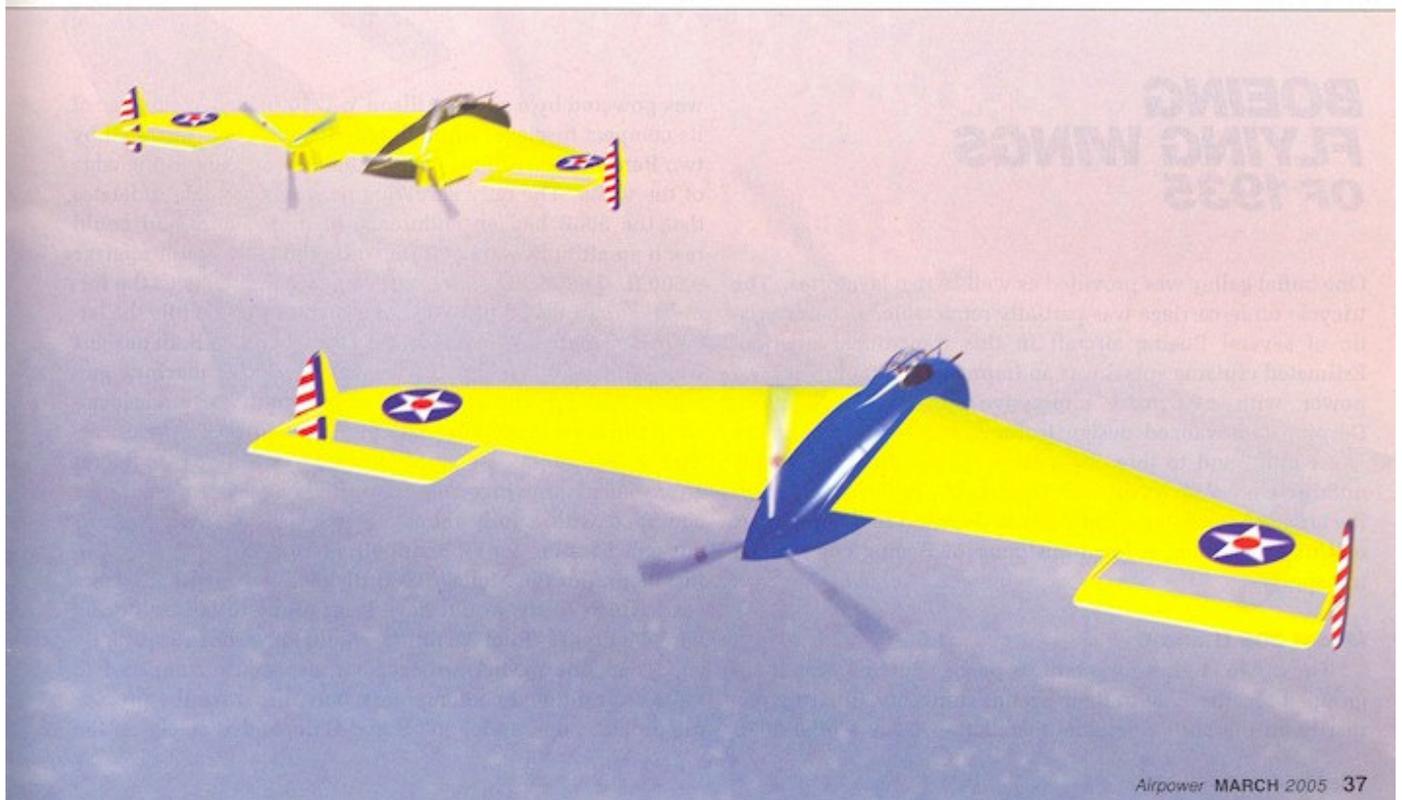
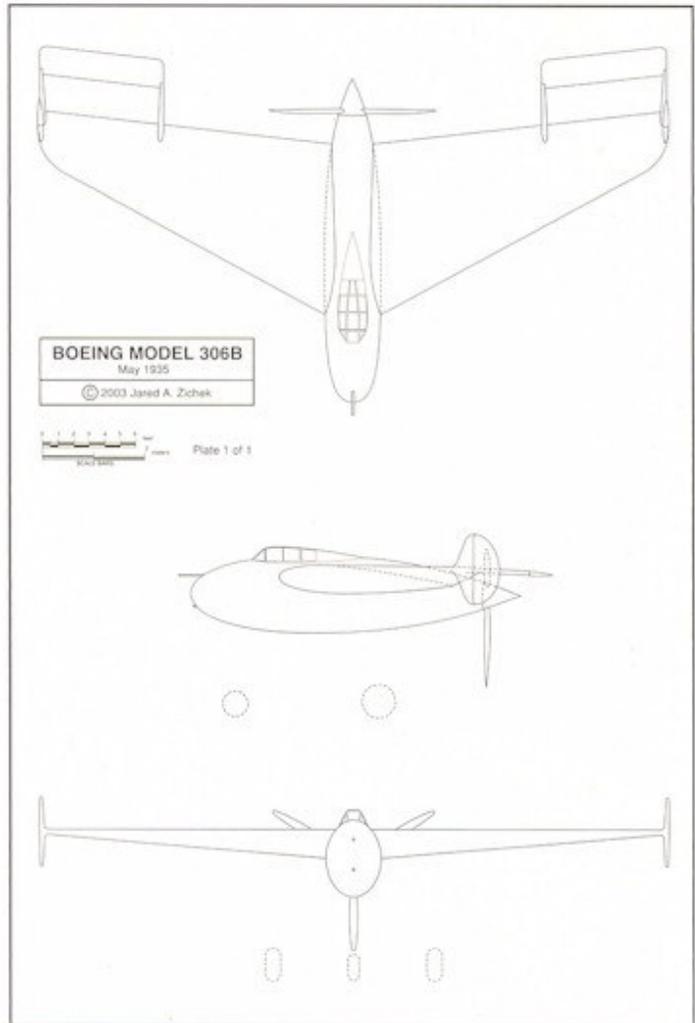
Underside view of the Model 306B. Unlike the previous studies, the 306B employed small vertical stabilizers on the wingtips to provide yaw. The propeller had a diameter of 13 ft., dictating a very tall and impractical landing gear.



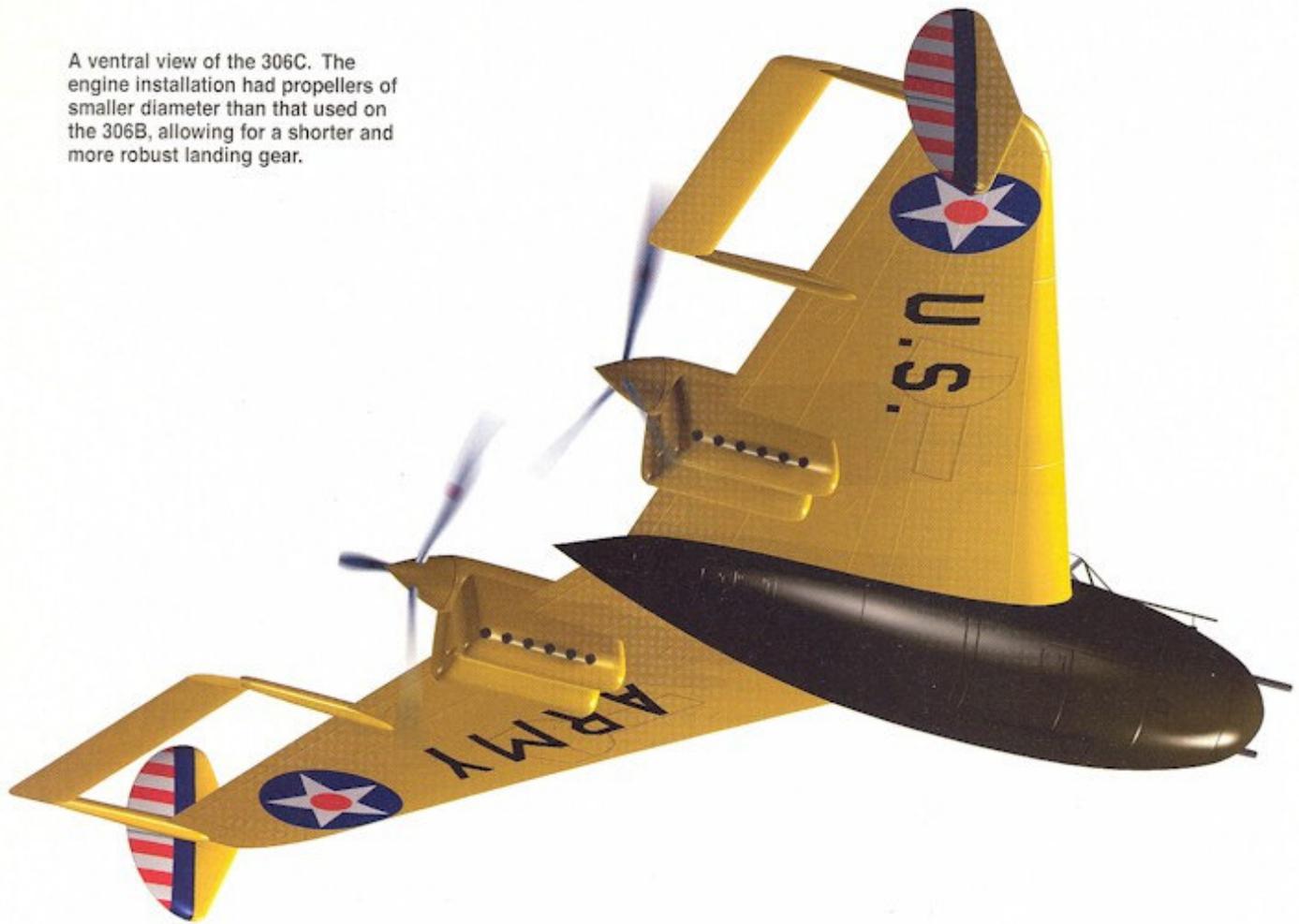
Boeing Model 306B pursuit in the blue and yellow scheme employed by the USAAC in the 1930s. The pusher configuration provided excellent visibility for the pilot and allowed the armament to be concentrated in the nose.



Below: A digital painting of the Boeing Model 306B and 306C pursuits in flight. The Air Corps wouldn't start seriously considering fighters of such unusual configuration till the beginning of WW II, when it ordered such oddities as the Northrop XP-56 "Black Bullet," which bore more than a passing resemblance to these Boeing studies.



A ventral view of the 306C. The engine installation had propellers of smaller diameter than that used on the 306B, allowing for a shorter and more robust landing gear.



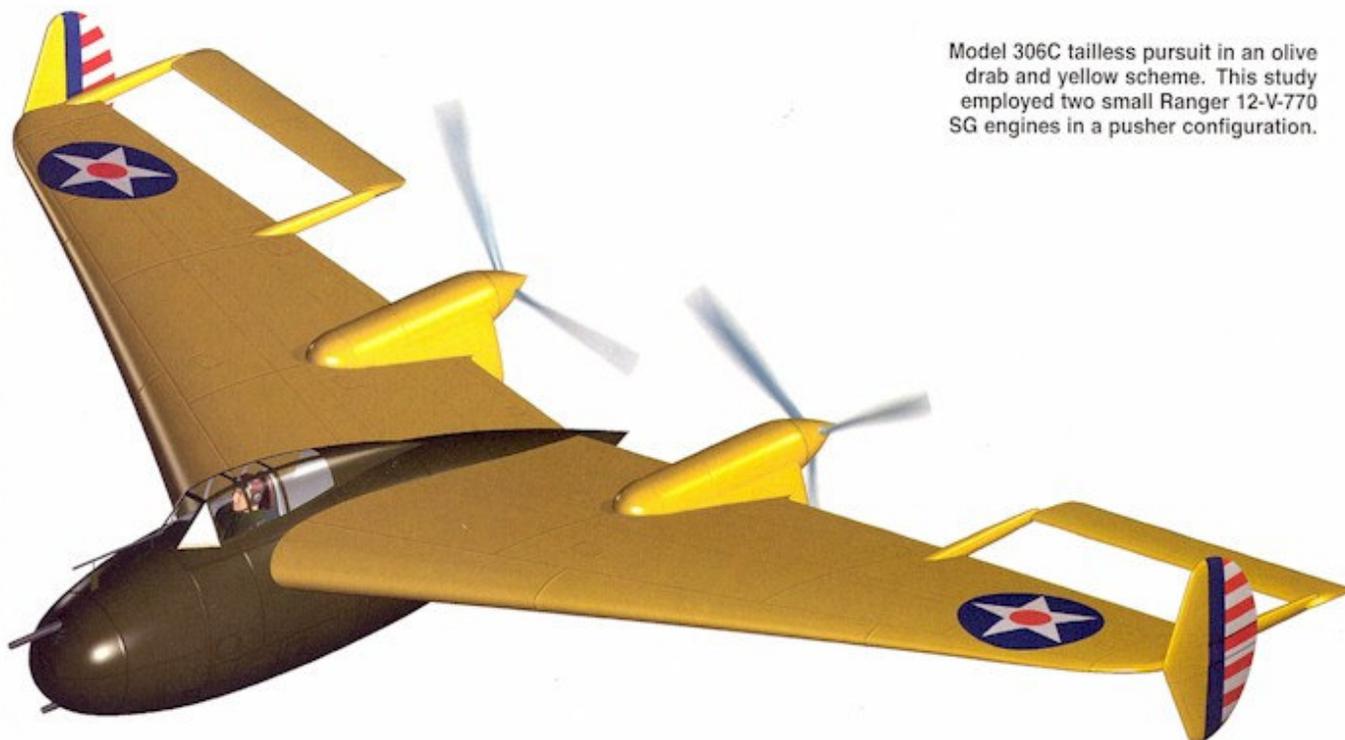
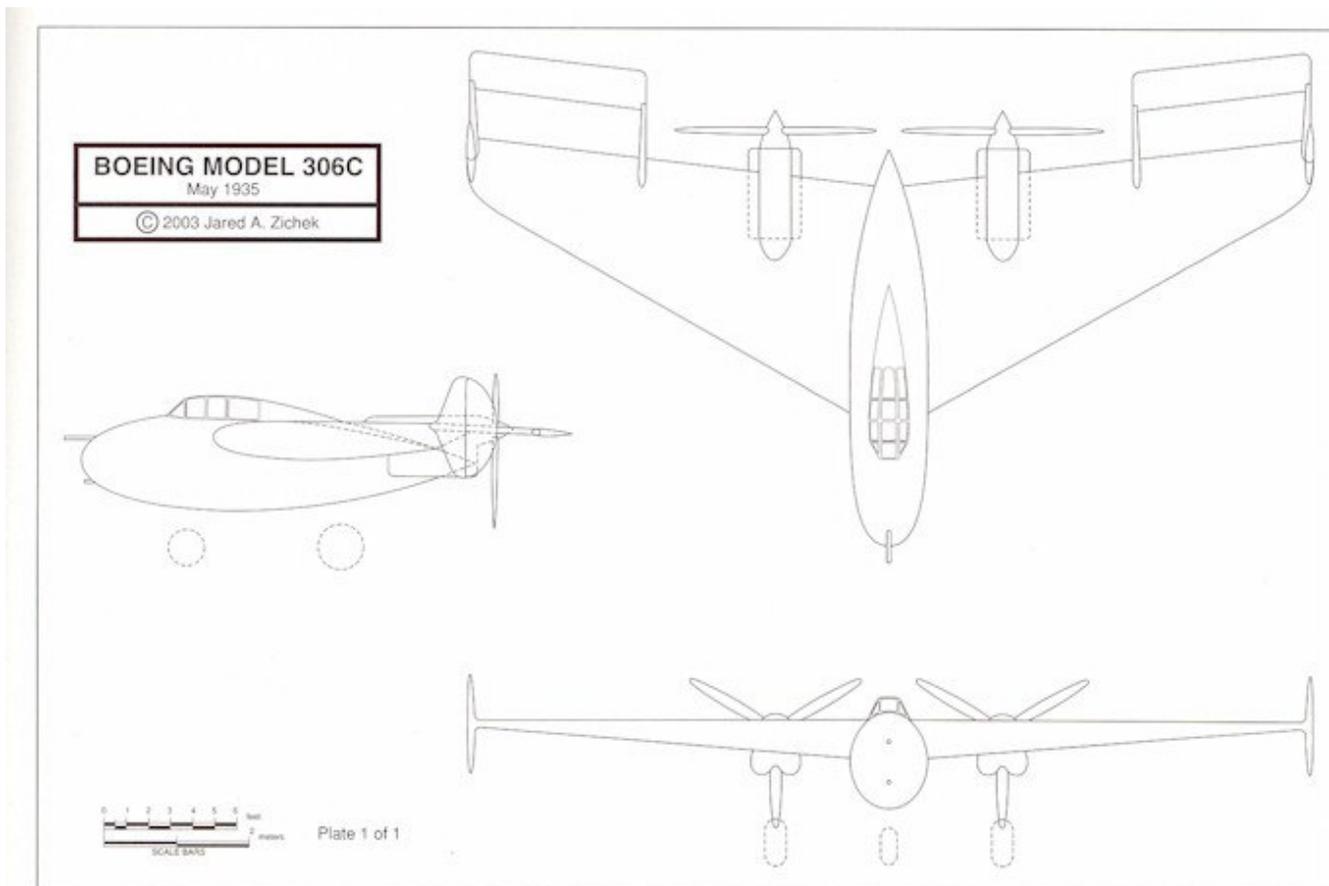
BOEING FLYING WINGS OF 1935

One buffet galley was provided as well as two lavatories. The tricycle undercarriage was partially retractable, a characteristic of several Boeing aircraft in this transitional period. Estimated cruising speed was an impressive 200 mph at 60% power, with an equally impressive range of 1,200 miles. Despite its advanced design features, the Model 306A was never built, and to this day a large tailless airliner remains nothing more than a tantalizing prospect. In the accompanying artist's impressions, the study is depicted in the markings of United Airlines, a loyal customer of Boeing commercial transports.

Model 306 B and C

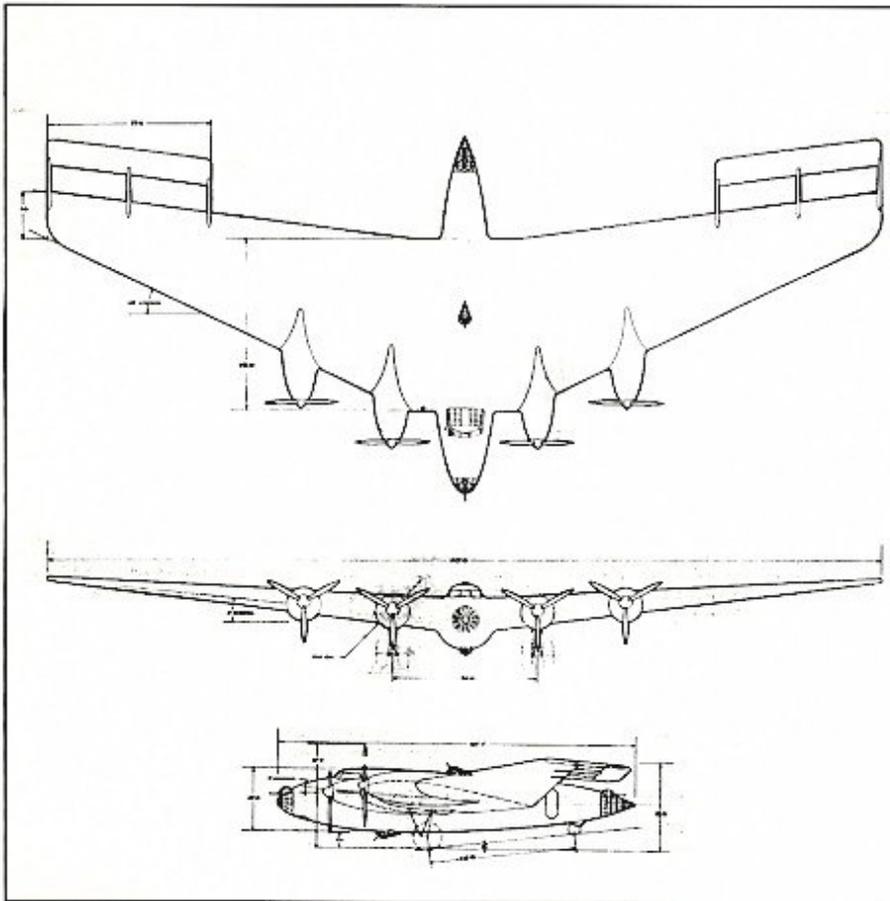
These two studies for a tailless pusher pursuit aircraft are grouped together due to their overall similarity, differing primarily on the basis of engine installation. The Model 306B

was powered by a single Allison V-1710 placed at the rear of its compact fuselage, while the Model 306C was powered by two Ranger 12-V-770 SG engines located on the trailing edge of the wing. The only surviving performance data indicates that the 306B had an endurance of three hours and could reach an altitude of 15,000 ft., while the 306C could manage 9,000 ft. The 306B was slightly larger than the 306C, the former having a length of 23 ft. and a span of 40 ft., while the latter had a length of 22 ft. 2 in. and a span of 38 ft. Both designs were single-seaters, armed with one .50 caliber machine gun with 200 rounds and one 37 mm cannon with 50 rounds located in the nose. Surviving data indicate that each aircraft carried an additional .50 caliber machine gun, but the general arrangement drawings suggest only one. Each design was equipped with a fully retractable tricycle undercarriage, an advanced feature for a pursuit aircraft. However, the engine installation of the Model 306 B dictated very tall and stalky gear, which likely would have been prone to failure during hard landings. Pilot visibility would have been especially good with the pusher arrangement, especially compared to more conventional contemporary pursuits. Like the preceding projects, the Model 306 B and C depended solely on the

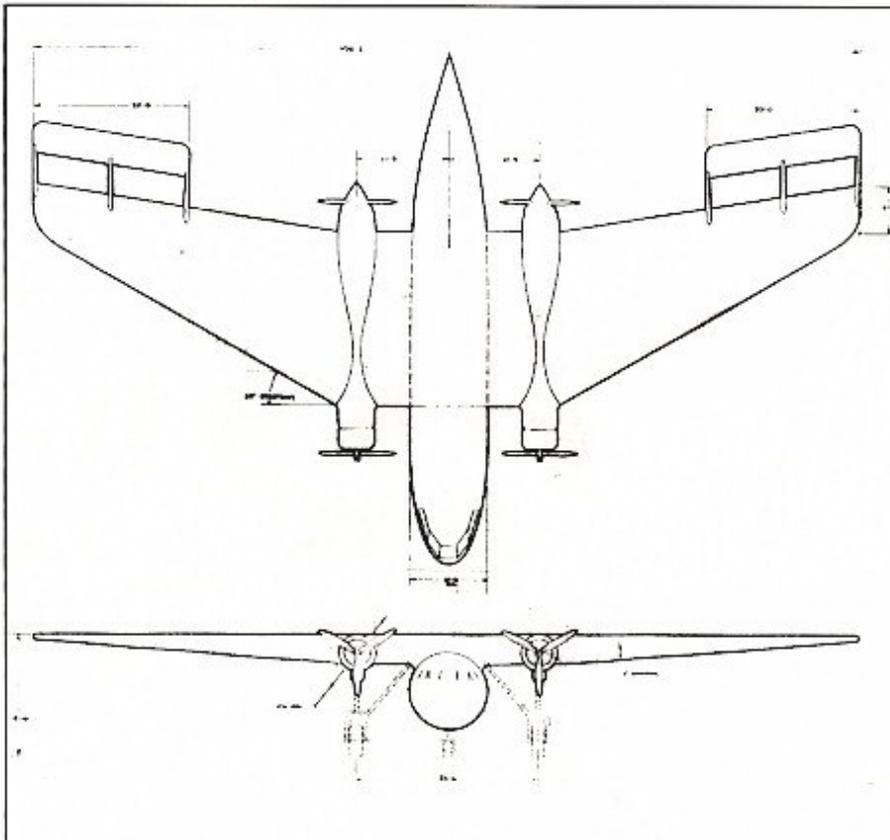


Model 306C tailless pursuit in an olive drab and yellow scheme. This study employed two small Ranger 12-V-770 SG engines in a pusher configuration.

BOEING FLYING WINGS OF 1935



Above and below are the original Boeing technical drawings which served as graphic source material for artist Zichek's colorful and convincing renderings.



external trailing elevons for control. It is interesting to note the passing similarity between these early Boeing pursuits and the Northrop XP-56 "Black Bullet" of 1944, a radical but unsuccessful design that suffered from severe controllability problems which were never entirely solved. Given the overly optimistic assumptions that went into the design of the Boeing Model 306 B and C, a similar fate might have befallen these aircraft, had they been built. They are depicted in the colors typical of interwar Army pursuits in the accompanying illustrations.

CONCLUSION

In light of the unfortunate fate of the Northrop XB-35 and its follow-on developments, which were cancelled due to a combination of technical and political factors, Boeing may have been right to not aggressively pursue the development of the aforementioned studies and to avoid the flying wing layout generally. However, one should note that the company has now come full circle and has several high-profile flying wing and tailless aircraft under development, including the Blended Wing Body airliner and the X-45A Unmanned Combat Air Vehicle. It is also part of the team of companies behind the B-2 Spirit, building primary structural components for what is presently the ultimate vindication of the flying wing concept. As distant relatives of these promising modern aircraft, the Model 306 studies merit some recognition for being perhaps the earliest products of Boeing's flying wing research.

ACKNOWLEDGMENTS

The author would like to thank Jennings Heilig of Airway Graphics International, LLC, for provision of the United Air Lines markings used in the illustration of the Boeing Model 306A; Evan L. Mayerle, for explaining the principles of the external elevon; and Tom Lubbesmeyer and Mike Lombardy of the Boeing Historical Archive, for allowing me access to the primary documents.