THE LIFE AND WORK OF WILLY ACHIM FIEDLER,

Designer, test pilot, aeronautical and missile engineer
1908-1998

by Rit Staalman and Monica Wagner-Staalman

1. Germany

PERSONAL RESUMÉ
(source: Biographical Data Form 'Who's Who in Science and Engineering', First Ed. 1992-1993)

Youth and Education
Fiedler, Willy Achim, Designer, Test Pilot, Aeronautical and Missile Engineer, Consultant
born: Freudenstadt, Würtemberg, Black Forest, Germany, 23 January 1908;
father: Carl Fiedler (photographer); mother: Caroline Kurz
married to: Greta Lange; later to: Monica Wagner
children: Petra, Monika, Achim, Karen

Willy on his way to school (ca. 1916)

Willy Fiedler, cont'd

Professional Education:

Dipl.Ing.	Technische Universität	Stuttgart	D	1928-1933
Flugbaumeister	DVL (Prof. Hoff)	Berlin	D	1937

Career History

designer	British Aircraft Ltd	Feltham	GB	1936
a/c study + piloting	DVL	Berlin-Adlershof	D	1937
a/c assessment + piloting	G-Fieseler Werke	Kassel	D	1938
Test Direction	G-Fieseler Werke "V1"	Peenemünde	D	1942-1944
Co-owner, Techn. Director	Bachem Co. ("Natter")	Waldsee	D	
Civil Service 9 – 4514	US-Navy, NAMTC	Point Mugu CA	USA	1948-1956
Mgr. Scient. Staff	Lockheed Missile & Space	Sunnyvale CA	USA	1956
MSD Chief Scientist	idem	idem	USA	1956-1974

Career-Related Activities

Consultant/Define	TRIDENT Missile config.	IDA/US Navy	Wash. DC	1966
Advisor to Pacific Missile Range Comm.		Point Mugu	CA	1958
Consultant	Defense Science Board Meetings	Washington	DC	1950-1954

Award

Distinguished Civilian Service Award	Dept of Defense/US-Navy	1954

Carl Fiedler, photographer, Willy's father

FREUDENSTADT AND WÜRTTEMBERG

Freudenstadt Germany; Fiedler company building

Dutch General map of Germany, showing the major cities

Map of Würtemmberg, showing Freudenstadt, Friedrichshafen and Stuttgart (source: Wiki)

WÜRTTEMBERG AND AVIATION; UNIVERSITY OF STUTTGART

When tracing aviation history in this part of Germany, it would be unjust not to mention the *godfather* of the 'Flugzeug Metallbauweise': C*ount Ferdinand von Zeppelin (1838-1917).* Zeppelin (for short) was a fiery cavalry officer from Württemburg, Germany. He had been observing the use of balloons on the battlefields of the American Civil War. Their lack of steerabilty he saw as a great disadvantage and the idea of making the unruly things *dirigible* became an obsession to him.

He owed his allegiance to the king of Württemberg. When he was passed over for the command of a cavalry division in the Reich's army being newly formed at that time, he said farewell to the service to dedicate himself fully to his passion of flying. The king provided his loyal subject with a site located at Lake Konstanz (Bodensee) to build a factory for 'airships,' or should we call it a wharf?

Carl Fiedler aboard zeppelin Sachsen

In 1899 Zeppelin bought the exclusive rights to the use of that wonder metal of the Victorian era: *'aluminum'*. He obtained the rights from *Carl Berg (1851-1906)* of Ludenscheid, Westphalia, who was one of the first manufacturers of rolled aluminum profiles and sheet. By the time the Wright brothers were flying their first motorized airplane (1903), Zeppelin had constructed his first airship with the new material at Friedrichshafen, Lake Konstanz.

By the beginning of the First World War he had built one dozen more[1] for civilian use alone and started *DELAG*, a regular airline flying to and from Berlin using zeppelins.[2] With these exploits he had achieved an enormous popularity with the German people and certainly with the Württembergians.

The 'zeppelin' airship had an aluminum skeleton, in effect a huge, riveted three-dimensional space framework, determining the outline of the large, cigar-like form, which was covered with rubber-soaked linen. The invention of the gasoline engine by Daimler had provided an excellent means of propulsion for the floating giants. Their whole appearance indeed resembled a ship. Accommodation for the passengers was roomy; there was even an observation deck and the people aboard could walk about freely or look down at the earth below through the large windows (see picture of Willy's father aboard the airship 'Sachsen', 1913).

[1] Karl Grieder (1989)

[2] Henry Cord Meyer (1991)

By 1914, Zeppelin's enterprise had grown to a major industrial undertaking in Friedrichshafen and at least 10 'zeppelins' were in the service of the Army and the Navy. When World War I erupted, they were put to use for observation and bombing. As a military weapon, they were a failure, however. By the end of the war no less than ninety of the total fleet of ninety-seven had been destroyed by the Allies.
Of great importance for the advancement of aviation in Germany, the Count furthermore sponsored the appointment of *Dipl.Ing. Alexander Baumann (1875)* as *Professor Luftschifftechnik at the T.H. Stuttgart.* It was at this university that Willy Fiedler was going to study.[3]

First Flight

As told to M. W.-S.

"You ask me when it was that I first flew," replied my dear Willy to my query. "Well, come and sit on the patio with me. Pull up a chair, here in the shade. But first bring me a glass of wine. No, no, not the expensive one. The Carlo Rossi is every bit as good. No sense wasting pennies…"

That was my dear late husband, Willy Fiedler. We had but five years together, he and I. His last ones; we knew it would be short. For the last two we were man and wife also to the public at large. But before I had agreed to come live with him, it was perfectly clear that he expected more of me than just my presence. And tacitly I had agreed, never expecting it to become official. Everybody loved my Willy. I was no exception. And he loved me.

We were both in dire straits at the time. He in his mid eighties, with advancing dementia—still only just apparent, but there if you but looked. I, with my industry having died a rapid death at the hands of the Apple Computer revolution in typesetting—unwilling to change careers at this late stage (I was in my early 50's) and not trained for the changes that were taking place in my line of work, advertising typography. To continue in my chosen field, I would have had to become an artist as well, something I am decidedly not. My pleasure was to take the ideas of art directors and their assistants and translate them into black and white masterpieces of typography.

So I brought my dear Willy his glass. We always had a table under the Monterrey pines that graced our home with shade (and needles). So many gatherings had taken place there, even during these last few years together. As he was able to travel less and less, I invited his friends—many of whom lived within a short distance of the Los Altos Hills house he had built largely with his own hands and to his own idiosyncratic plans. Without me, he would not have been able to stay. Without him…who knows?
The love we shared, the companionship, was to cheer us with warmth despite the long decline.

[3] Willy Fiedler's tuition at the TH Stuttgart was underwritten by his uncle who owned what would one daybecome an important manufacturer of photo development equipment, in the hope that Willy would one day return to work for him. [M.W.-S.]

“I was about eight when I started to fly. Well, you might not call it flying, but I would.

“I was an average little boy. My father was very strict, and my teacher at the lyceum was a magician. He could appear suddenly behind you when you were whispering with a friend, and, WHACK, a ruler would land on your knuckles. Both gave me reason to seek my solitude.

“Please don’t get me wrong. I had lots of fun. Besides, I sat behind the only girl in our class—she had gotten in because she was so very smart—and I was in love with her, she was so beautiful. Many years later, her sister would be the first girl I would ever kiss, pretending it was her. I never got up the nerve to ask her out.

“But that was not what we were talking about.

“You know, I was born in January of 1908, so I grew up pretty much along with human flight. In 1914 the war started—we lived fairly near the border. Freudenstadt was never in any danger, up there in the middle of the mountains of the Schwartzwald—no industry to speak of, no garrisons, though in World War II they bombed the place to smithereens, but that’s another story.

“My father was the town’s only professional photographer. To visit the outlying areas for taking portraits, he had the first car in our town. An open vehicle, with only one front wheel. What fun to ride, the wind whipping back your hair!

“He happened to be friends with Graf von Zeppelin, whose company was headquartered at the nearby Bodensee, Lake Constance to you. When I was about six, Papa managed to talk the Graf into taking him up with cameras to photograph many of the town’s houses from the air. Also ones in the surrounding countryside. He took me with him, you know, in *an airship*! My mother cried the whole time we were up in the air—somewhere I still have photographs… But, you’ll be surprised; this was not really *my* first flight.

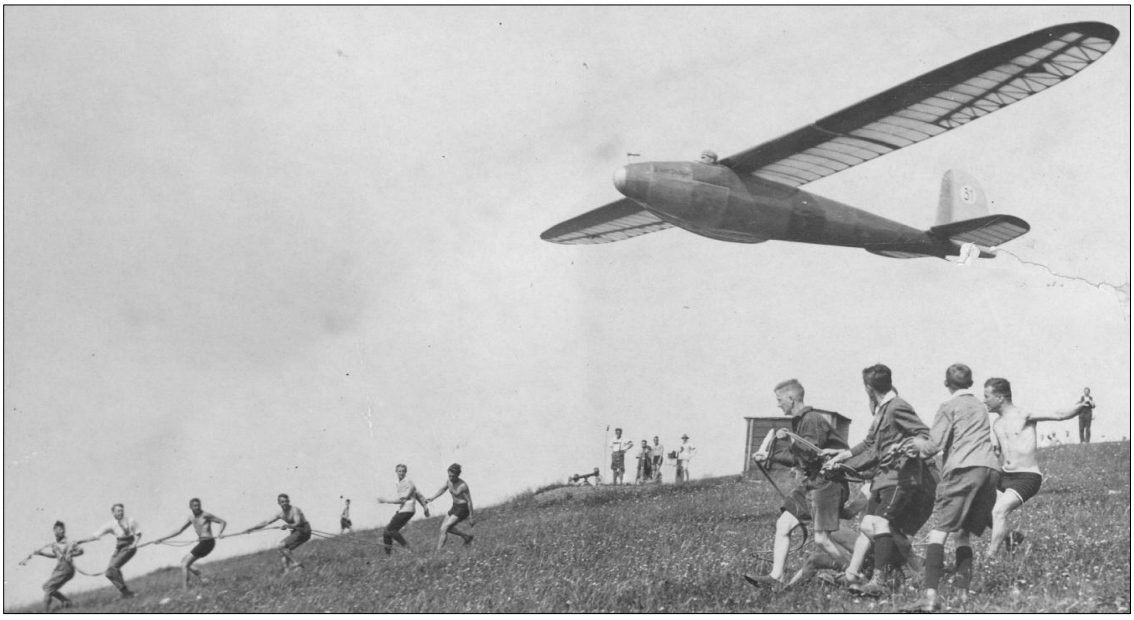
“Afterwards I went with my father to many of the farmhouses and rural estates to sell them pictures of what their houses looked like from the air. There were many takers. People really liked having photos of their homes from that perspective. So unique! They felt very special, you know. Not everyone had such a picture on the mantle. Papa did rather well at this, as did I. Almost every housewife would feed me cookies or cake.

“Now, Freudenstadt is high in the mountains, so supplies were hard to haul in, particularly before trains and automobiles. As much as possible, people therefore use local building materials. Well, the mountains all around are made of dark red, very hard sandstone, making excellent building material, so we of course had a quarry. Here one tends to think of quarries as holes in the ground, but that was not the case with ours. Near where we lived, above the Hotel Christophsaue (now sadly closed) was what we call the *Steinbruch,* a place where one breaks stones. A quarry, in other words. But it was up against a low mountain, not dug out of a hole. This quarry forms cliffs in what is otherwise well-rounded countryside. Even better, these cliffs overlook the drop-off into the valley where one of our neighboring villages is situated, the town of Wittensweiler.

"Now. After school, to avoid going home and doing chores or homework, or to hear the angry growls of my father for some surely imagined infraction of mine, I would climb up above the quarry and look out across the world. Very often, one would see birds using the updrafts here, soaring ever higher and higher. I loved to watch those birds! Oh, how I wanted to be like them and fly! Luckily, my mother never found out, but finally I decided to lean far out over the cliff-side, sure that if the air held up the birds, it would also hold up…me. So I spread my arms, stepped to the edge … and leaned, leaned against the flow of air! I flew!

"You see. I am still here—eighty years later! "

SOARING AT RHÖN



Rhönwettbewerb 1929 ; Erich Bachem starts in the glider '*Stadt Stuttgart*'

Akaflieg Stuttgart

The „Akademische Fliegergruppe Stuttgart" or „Akaflieg Stuttgart" was founded in 1926 by members of the Technical Aviation Study Group TH Stuttgart to foster the construction of airplanes of own design.

Designs

F1 Fledermaus This glider was the first development of the group. Its design was optimized in the wind tunnel. Instead of a vertical rudder it had two wing tip rudders (Endscheiben) for directional steering. With a weight of the fuselage of no more than 21 kg the airplane was an absolute lightweight champion and after its first flight in 1933 it won several prizes at the Rhön glider competition of that year. It was constructed of wood.

Later, in 1938, Willy Fiedler would be also involved in the construction of the top performance glider fs **18** (max L/D ratio: 26.9).

See: http://de.wikipedia.org/wiki/Akaflieg#Akaflieg_Stuttgart

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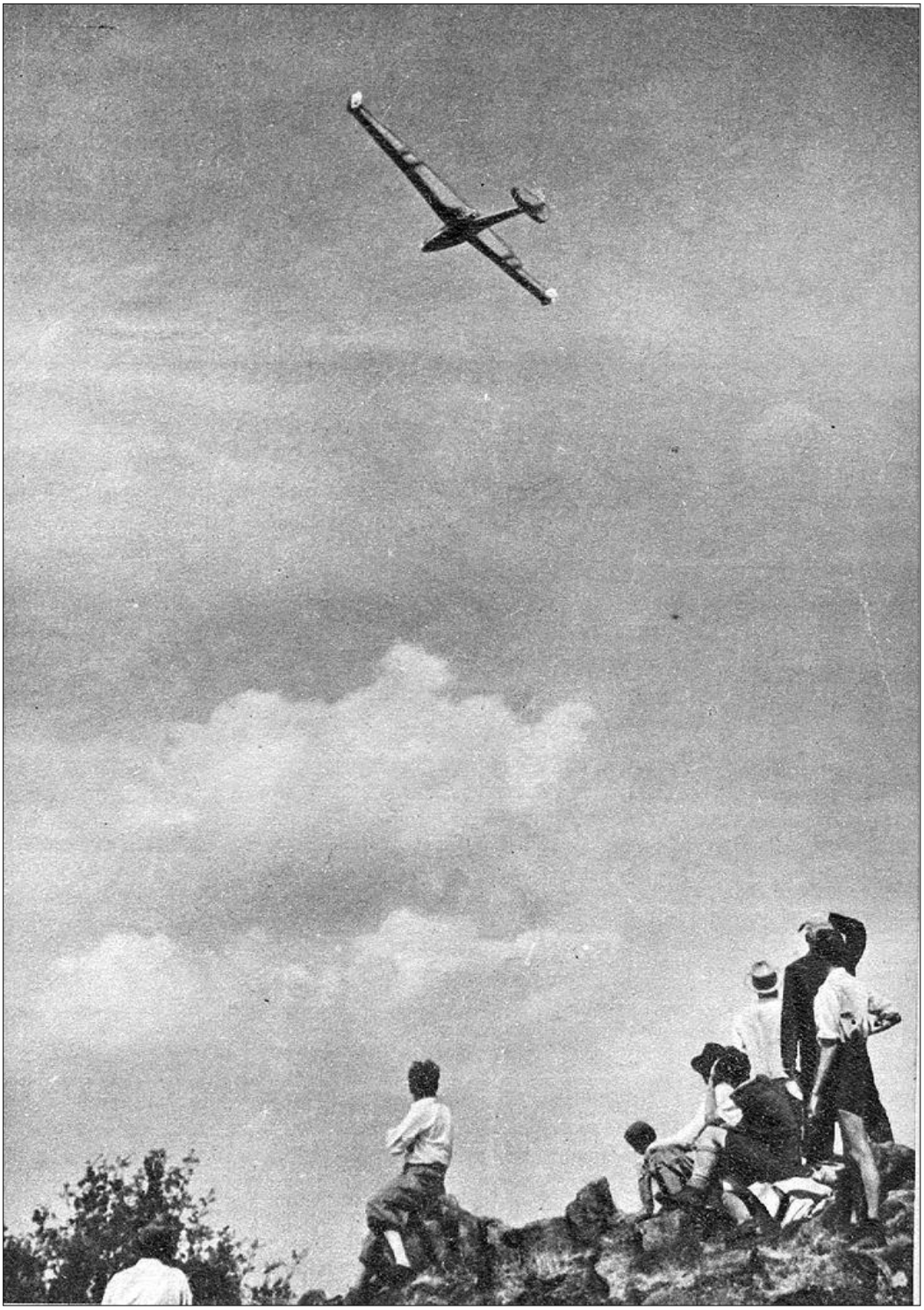
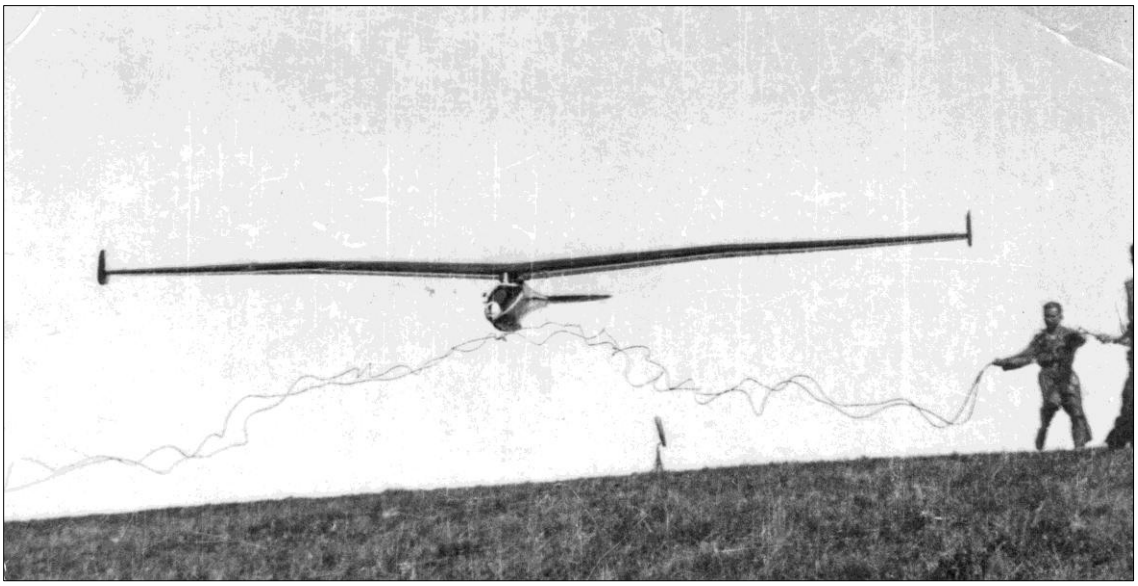




Fiedler F-1 Fledermaus being started (*Notice the advanced wing design)*

As a student at the Technische Universtät Stuttgart Willy Fiedler was, like many students, a fervent glider pilot. As part of his final examination he designed and built a remarkable glider the F-1, later called: *'Fledermaus'*. A special feature of this craft was the absence of a tail rudder. Its function was delegated to two small vertical surfaces at the wing tips, not unlike the 'winglets' of today. This innovation however did not quite perform as expected and, after a difficult landing of his friend and fellow student *Karle Baur* and at the direction of his professor, Willy had to modify his design and add a conventional vertical tail fin. Karl Baur earned his "Silver C badge" with the Fledermaus in 1934. For it, he had to stay in the air for five hours, cover a distance of 50 km and gain at least 1000 meters in altitude.

Fiedler F-1 Fledermaus, rudderless glider (source: www)

GLIDER AIRPLANE F 1 – "FLEDERMAUS"

of the Academic Flight Stuttgart
by Willy Fiedler

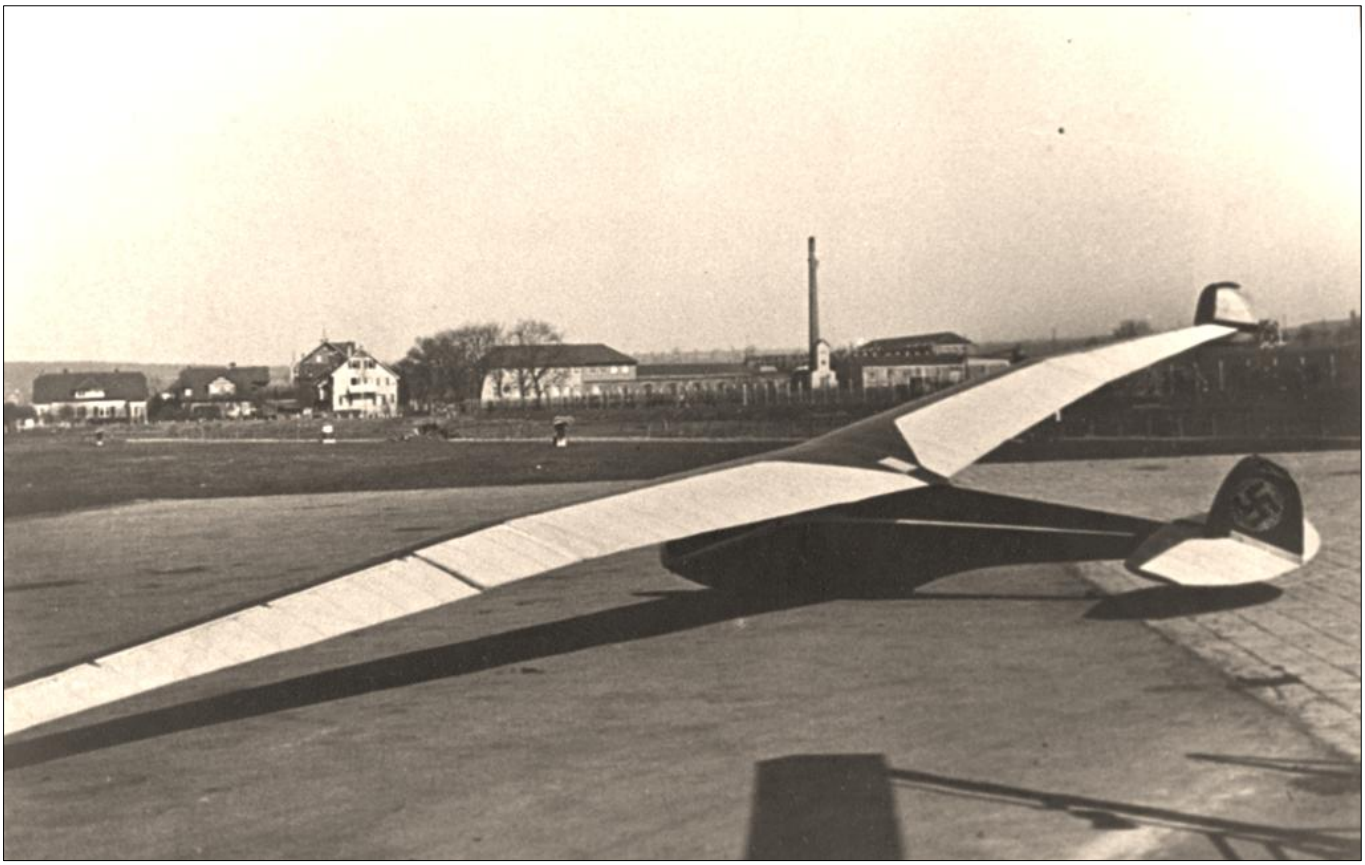
The design goals for this *high-performance* airplane were, obviously apart from good flying characteristics, the ability to turn tightly within thermals, the possibility to spoil the glide angle in order to land in small fields, sufficient stability around all three axes for flight in clouds, high safety standards for the pilot and capability for aerobatics. The wingtip rudders will fulfill these requirements to some degree, without increasing parasite drag. It is to be expected that they will also improve the general performance of the wing, decrease the danger of sliding into a spin while banking steeply and afford control to recover from a spin.

The wing is in three parts with a span of 16.6 m, an area of 15.4 m^2. It is a gull type wing like the Fafnir, with the usual single spar construction and a safety factor of 8.8. The center has a wing section Göttingen 535, the outer wings are Göttingen 527. The nose is diagonally laminated with 1 to 2.5 mm thick plywood. Fractile pressure is 110 kg/m^2. Eigen frequency wing is 150 Hz. No vibrations were felt when towed to the Rhön Competition at 120 km/h, even with undampened elevator. In order not to load the auxiliary spar, the ailerons (each 1.3 m^2) are attached to the main spar. This has not increased their effectiveness, yet the steering forces have remained small. The hinging axis lies in the wing upper skin; the rudders are being activated by hidden pusher rods with differential action. The vertical disks at the wing tips (Endscheiben) consist of a fin and a rudder. Foot pedals activate the rudders; left/right pedal for directional steering and both pedals together for air braking.

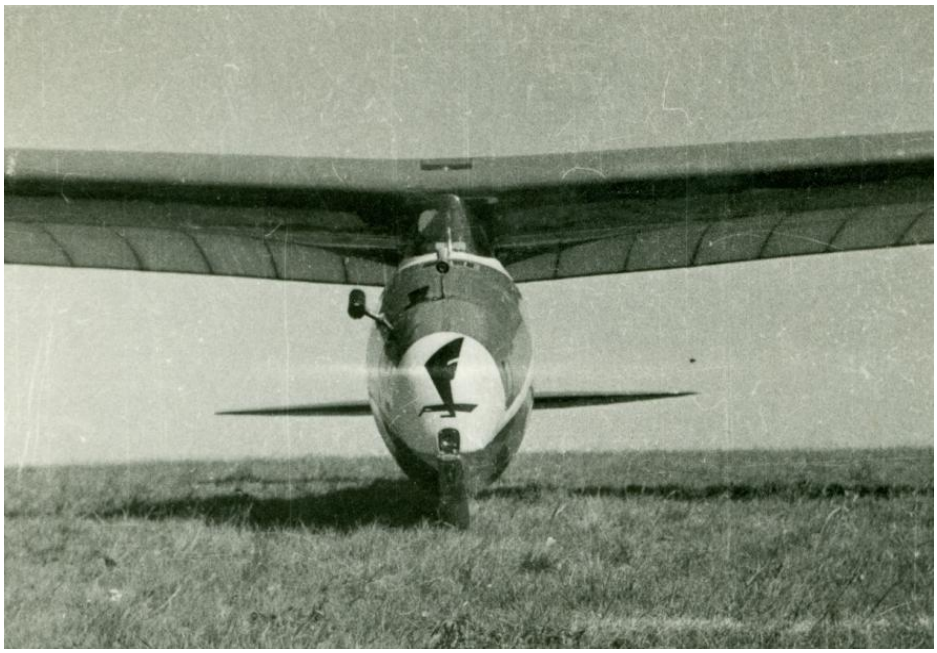
The chief characteristic of the fuselage is that its principal axis is not a horizontal straight line, but that it is curved , following the downwash of the streamlines around the wing. The fuselage is relatively short; (in general it is kept long in order to increase rudder effect.) Cross section is elliptic at front, at the back round to get better keel action. At front two bands from starting hook to rear; at the back two bands on top of each other to absorb the elevator moments. There is no vertical rudder. The upper part of the fuselage front can be taken off completely to facilitate exit with parachute but also to make for easy entrance. The main frames are at an inclined angle to relieve the plywood skin in case of a hard landing; the robust T-keel absorbs much energy in case of a crash. The landing skid has shock absorbers with a 10 cm play and has such a length that the tail of the plane will not touch the ground. This results in weight savings and short take off. To avoid damage, the bottom of the hull is bent upward after the skid; this is done among others by a suspension rod that allows the lower part of the fuselage to be built slimmer. Including all instruments the fuselage only weighs 25.3 kg and it has a relative small surface area.

A model of this novel glider fuselage was tested during spring 1932 in the wind tunnel of the aviation engineering Institute of the TH Stuttgart, whereby it passed all qualitative tests with success. [translation rs]

Fiedler F-1 Fledermaus; detachable front end



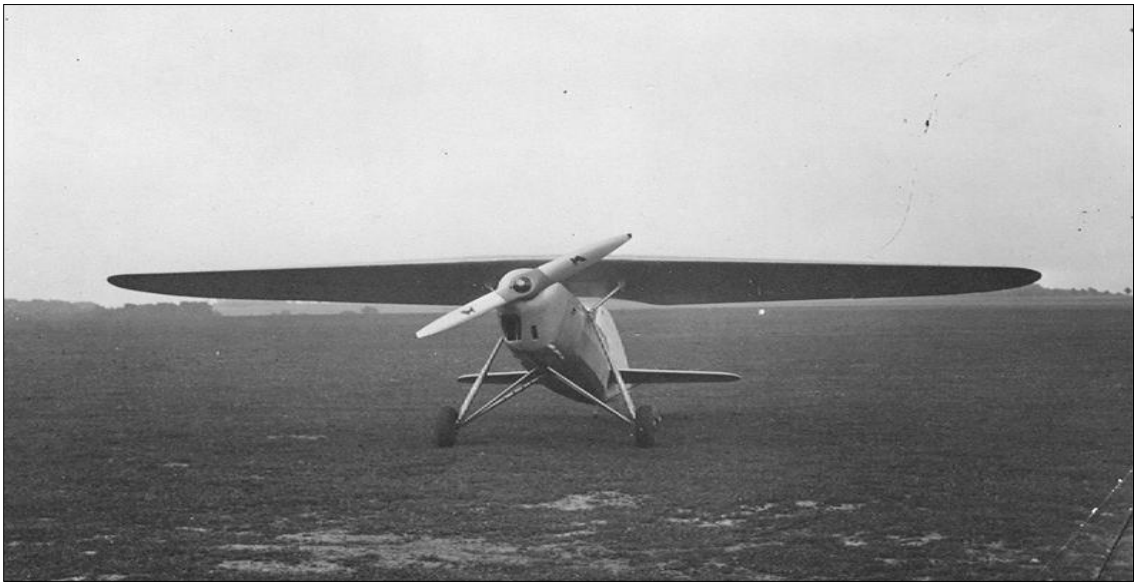
Fiiedler F-1 Fledermaus, with later conventional tail fin added



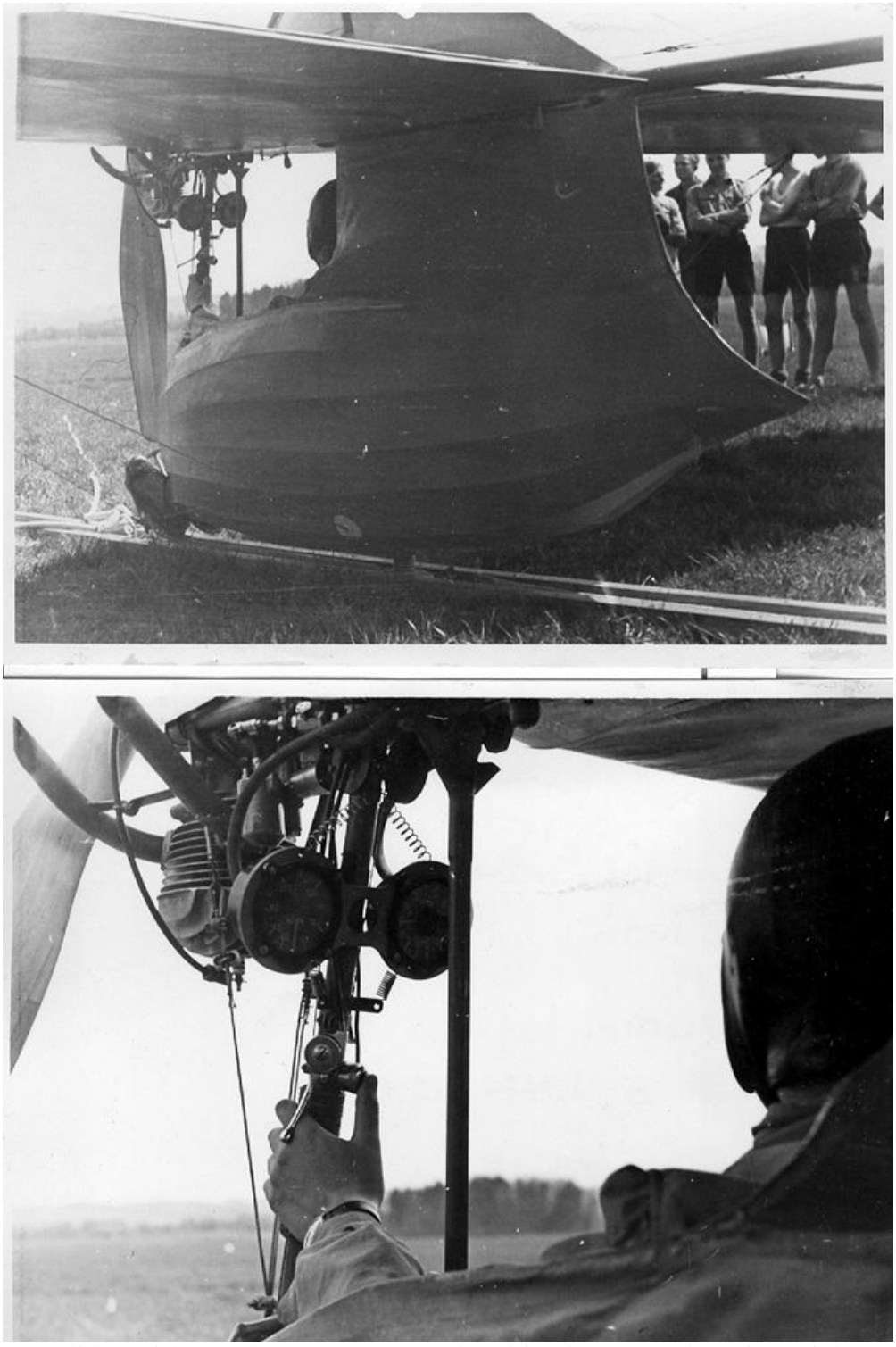
Fiedler F-1; front view

OTHER PROJECTS

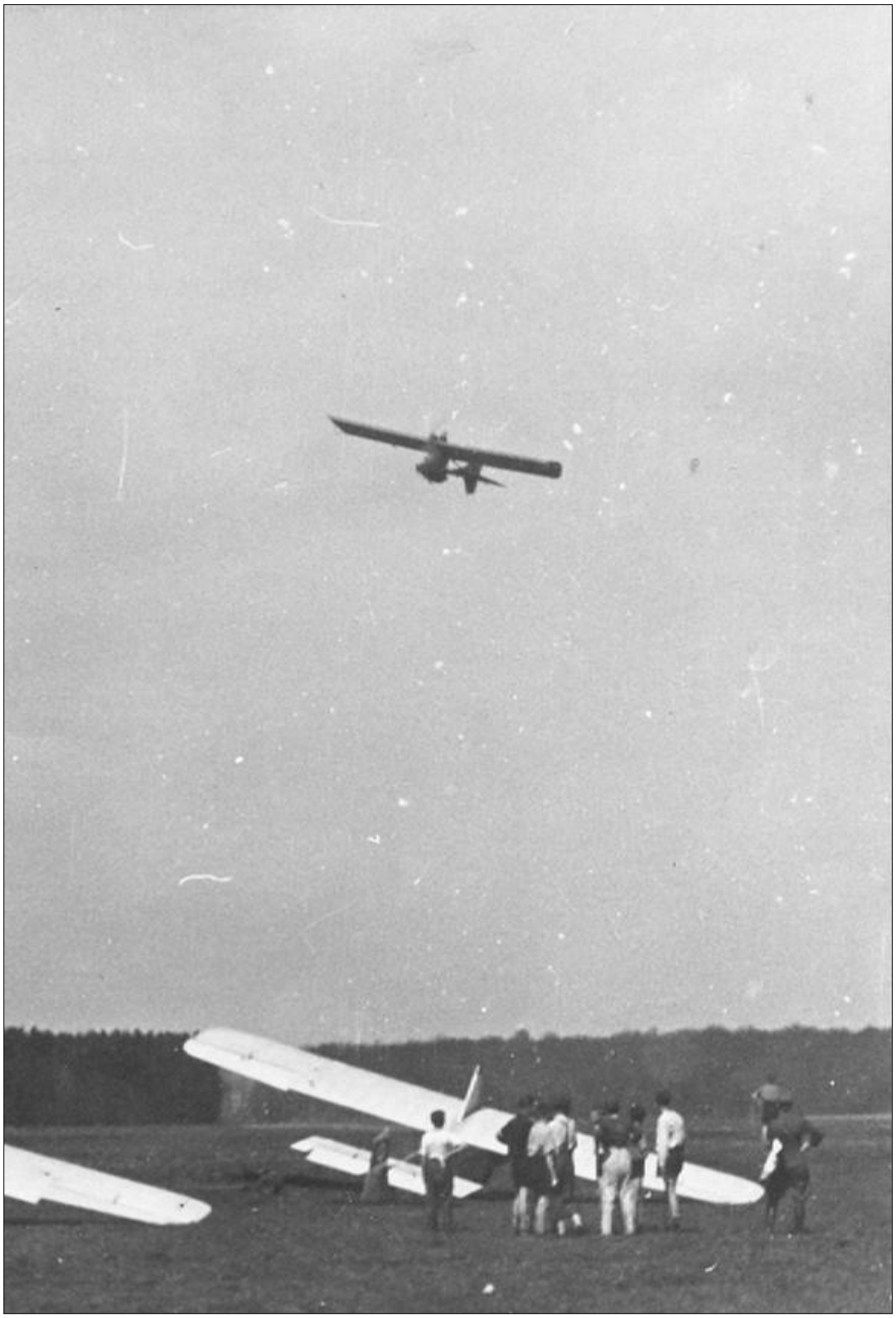
In 1935 Willy Fiedler took a job in England.
Before he left he worked at different projects, such as testing and flying a glider with motor power.
Fiedler also designed a very promising looking single seat trainer, the RM-2 (see below)



Ruhrthaler RM-2 single seat trainer designed by WF (1935?)



Glider with Zündapp motor; speed + altitude meters; hanging stick



Motor glider in the air

TECHNISCHE HOCHSCHULE
STUTTGART

erteilt durch diese Urkunde auf Grund der Verordnung vom 22. Januar 1900

dem Studierenden des Maschineningenieurwesens

Herrn **Willy Fiedler**

geboren am 23. Januar 1908 zu Freudenstadt

DEN GRAD EINES

DIPLOM-INGENIEURS

nachdem er den Besitz eines vorschriftsmäßigen Reifezeugnisses sowie die vorgeschriebenen Hochschulstudien nachgewiesen und die ordnungsmäßige Diplom-Prüfung

für das Maschineningenieurfach

und zwar die Vorprüfung an der Technischen Hochschule in Stuttgart
im Jahre 1930 mit dem Gesamturteil

— bestanden —

die Hauptprüfung im Jahre 1934 mit dem Gesamturteil

— gut bestanden —

abgelegt hat.

Die Einzelergebnisse der Hauptprüfung sind in dem umstehenden Auszug aus dem Prüfungsprotokoll zusammengestellt. Für die Vorprüfung ist seinerzeit ein besonderes Zeugnis ausgefertigt worden.

STUTTGART, den 1. Juni 1934.

DER REKTOR
der Technischen Hochschule:

Göring

DER VORSITZENDE
des Prüfungsamtes:

Veesenmeyer

Motor glider landing on skid after first flight by Willy Fielder

THE BRITISH AIRCRAFT COMPANY, FELTHAM GB, 1935/1936

British Aircraft Co design staff

In 1933, the British Klemm Aeroplane Co Ltd was formed, and produced 28 BK Swallows and six BK.1 Eagles, in rented premises in the northeast section of the former Whitehead factory. In 1935, it was renamed British Aircraft Manufacturing Co Ltd, and went on to produce 107 Swallow 2s, plus 36 Eagle 2s, one British Aircraft Cupid, three British Aircraft Double Eagles, and two Cierva C.40s, until 1937. In 1934, the British Aircraft Company was taken over by Robert Kronfeld, and in 1935 he moved its operations from Maidstone to Hanworth. It was renamed British Aircraft Company (1935) Ltd, later Kronfeld Ltd, and it produced 33 B.A.C. Drones and one Kronfeld Monoplane before receivership in September 1937. (source: Wiki)

In 1935, Willy Fiedler went to England with his friend and fellow student, the son of Walter Gropius, well known architect at Dessau, Germany. They went from aircraft

design company to company looking for a job. The young Gropius said that as his English was superior, he would be the one to go in and try to talk their way into a position of employment. After several tries, Willy became impatient and said, "No, this time I will try." The company he entered was British Aircraft Corporation, a small firm near London. When he walked out, he told young Gropius, "Okay, we have a job." Willy and his friend remained for exactly one year in England, leaving on the same day of the year as they had arrived. They were thrown a big party at the end (picture below), showing Willy with a number of his co-workers all sitting in a cartoon airplane. While he was there, he designed what was (I believe) a single-engine aircraft that was then flown to South Africa. Somewhere along the way, its undercarriage gave out and it landed nose first. "Hab einen Fehler gemacht. Untergestell war nicht stark genug…" (I made a mistake. The undercarriage was not designed sturdy enough…)

Little would they know that in a few years, Willy would be testing flying bombs aimed directly at Britain. This despite the fact that he had loved being in England, had watched a new King being crowned while there, and had no hostile feelings against the country. [M.W.-S.]

The boys of BAC take leave of Willy Fiedler in 1936

ALL COMMUNICATIONS TO BE ADDRESSED TO THE COMPANY AND NOT TO INDIVIDUALS

TELEPHONE: FELTHAM 2614
TELEGRAMS: BRITAIRCO FELTHAM
CODES: A.B.C. 6TH ED. MARCONI

BRITISH AIRCRAFT MANUFACTURING Co LTD

DIRECTORS
THE RT HON. LORD WILLOUGHBY DE BROKE, M.C.
ADMIRAL H. W. GRANT, C.B. CHAIRMAN
MAJOR HERBERT MUSKER, O.B.E.
AIR COMMODORE R.F.M. FELLOWES, D.S.O.
DERMOT J. MOONEY
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J. H. L. MUSKER
CHARLES BEST
D. H. EMBY, MANAGING DIRECTOR

HANWORTH AERODROME
VICTORIA ROAD
FELTHAM
MIDDLESEX · ENGLAND

DESIGNERS & CONSTRUCTORS OF MONOPLANES

YOUR REF.
OUR REF. MI/GM.

9th October, 1936.

TO ALL WHOM IT MAY CONCERN.

This is to certify that Mr. W. Fiedler has been employed by us on our Technical Staff from the 10th October, 1935 to the 10th October, 1936.

During this time, he has worked on all branches of aircraft design and during the latter half, as my personal Assistant in laying out new types of complete aeroplanes and of detailed mechanisms and structures.

From every point of view, as a Draughtsman and Designer and as a Mathematician, he has given us every satisfaction and we consider him to be an extremely clever Engineer.

We are very sorry to lose him and wish him every success in the future, feeling sure that he will justify any trust which is given him.

For and on behalf of
BRITISH AIRCRAFT MANUFACTURING CO. LTD.,

Marcus Langley

ASSISTANT DESIGNER.

Willy Fiedler, Flugbaumeister, 1937

THE STUDY FOR FLUGBAUMEISTER

In Germany the *Deutsche Versuchsanstalt für Luftfahrt* **DVL**, (Institute for Aviation Research) had the official task of approving the design of new aircraft and setting the standards to which the design of aircraft had to adhere. Within the DVL, the *Institut für Ingenieursnachwuchs* offered graduate courses to ensure a sufficient supply of qualified engineers and pilots to execute this task. The institute supported advanced education at colleges and universities, especially at the aviation faculties. Young participating engineers were called "aeronautical pilots" (*Flugbauführer*). They received a three year graduate course for a position in the higher echelons of aviation services. After passing a second examination they graduated as *Flugbaumeister (*"aeronautical engineer ").

[source: STARTEN UND FLIEGEN Das Buch der Luftfahrt und Raumfahrt, p.163)

Flugbaumeister class of 1937; Fiedler left of Prof. Otto Fuchs [?](in leather coat), in front of Junkers Ju-52 3m.

Im Namen des Reichs

Ich ernenne
den Flugbauführer
Dipl. Ing. Willy Fiedler
geboren am 23.1.1908 zu Freudenstadt
nach bestandener Staatsprüfung für Flugtechnik
zum

Flugbaumeister

Berlin, den 16. Nov. 1937
Namens des Führers und Reichskanzlers:
Der Reichsminister der Luftfahrt
In Vertretung:
Milch

THE GERHARD FIESELER WERKE, KASSEL

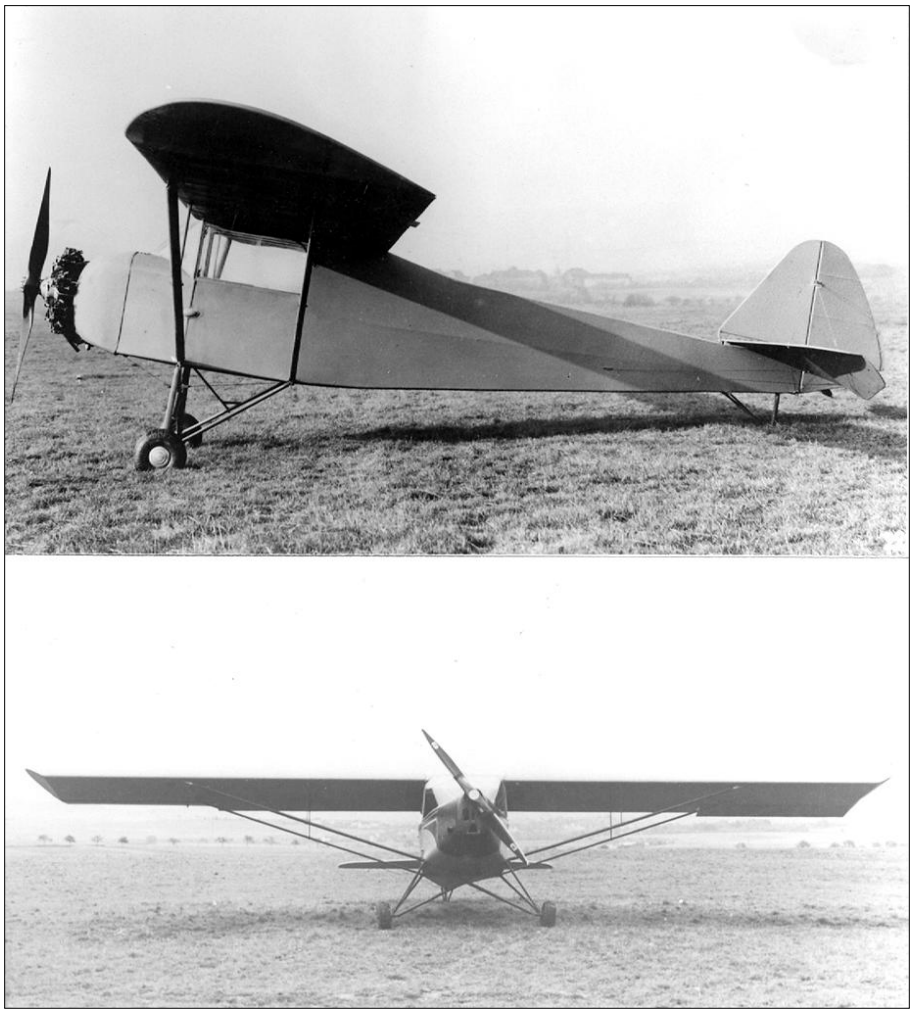
"….Waldau is a suburb of Kassel, lying on the southeastern side of the town. The airfield of Waldau began life as a military exercise area, being leased to the aircraft builder Dietrich, who founded the Dietrich-Gobiet Luftverkehrsgesellschaft (Airline Company) in 1924. They built the first hangar on the northwestern corner and on August 24 1924 the airport was officially opened. At the end of 1925 the company moved out and a new one was formed. Kurt Katzenstein and the stunt flyer Antonius Raab established the Raab-Katzenstein Flugzeugwerke to manufacture sports aircraft, run a flying school, take aerial photographs and organize flying days. They took over the facilities, enlarging and developing them as necessary. Due to the world depression in the 1930s the company, like many others, got into financial difficulty and went bankrupt in 1932. Raab then moved to Krefeld where he started again.

After gaining twenty two victories in aerial combat on the eastern front in World War I, *Gerhard Fieseler* became famous as an acrobatic pilot, culminating in becoming World Acrobatic Champion in 1934.
He bought a shareholding in the Raab-Katzenstein company in1926, becoming involved in pilot training and also being influential in the design of the aerobatic airplanes that he flew himself. In April 1930 he bought the *Segelfluzeugbau Kassel*, which was a small sailplane manufacturing plant based at Irhingshausen. With his talent for judging the flight characteristics of aircraft in the design and prototype phase, *Fieseler* soon established himself as the principle force in the company, renaming it after himself in 1933. The fifth aircraft he produced, the Fi-5, proved to be a success because of its pleasant flying properties. It was produced in series. Also remarkable was the Fi-97, a four-seater tour plane developed for the "Europa Rundflug" in 1934, with good VTOL properties thanks to Fowler flaps and special landing gear.
Fieseler expanded his company and his success soon resulted in the Government rewarding him contracts for license production of several aircraft types of Heinkel, Klemm, Arado and Focke-Wulf. Fieseler then took over the production facilities of Raab-Katzenau at Waldau…." He also hired a technical director, *Dipl. Ing. Erich Bachem*, to assist him in running the company.

The first really successful design from the company was the *Fi-156 'Storch'*; its production commencing in 1937. License production of the Messerschmitt *Bf-109* fighter began at the end of the same year. At the beginning of war in September 1939, the Bf-109E was being built alongside the Fi-156 Storch, as well as preparations were made for the series production of the *Fi-167*, a biplane with excellent landing characteristics, especially designed for use on aircraft carriers.

[Originally Hitler had approved the construction of two aircraft carriers. By 1940 this was reduced to one, the "Graf Zeppelin", which had been launched at "Deutsche Werke" in Kiel, in December 1938. It measured 31,400 tons, later increased to 36,000 tons, and had a length of 243 meters at the waterline. It would be equipped by 13 Junkers J-87Cs, 10 Messerschmitt Bf-109Ts and twenty Fi-167s. Fieseler received the production order for the Bf-109T by the end of 1940.
Work on the Graf Zeppelin at Kiel was suspended in the middle of 1940 and resumed in 1942. The ship was 95% complete when work was finally cancelled in 1943. In the face of the advancing Russian army the huge ship was scuttled in 1945. [4])]

[4] This section is based on *Francis L. Marschall:* "SEA EAGLES; The Messerschmitt 109-T", 1994, Air Research Publications, Walton on Thames, GB, p.14



Fieseler F-253 Spatz (1937)

Prototype Fi-156 V-1 (source: www)

Fieseler Fi-156 Storch without engine at Chino Planes of Fame Museum CA (2011, photo rs)

Fieseler Fi-156, production version

WILLIE FIEDLER, TEST PILOT AT THE FIESELER AIRCRAFT CO.

Gerhard Fieseler mentions *Willy Fiedler* as 'a representative of a new breed of test pilot' for the first time in 1936.[5]) G.F. probably refers to the study of 'Flugbaumeister' that his employee had completed at the Deutsche Versuchsanstalt für Luftfahrt in Berlin. The DVL controlled the technical specifications to which both military and civilian aircraft design in Germany had to adhere to, somewhat like the FAA in the USA. Their two (or three?) year graduate course for engineers included an examination for 'Flugbauführer' and a second one for 'Flugbaumeister'. Willie himself was very proud of the title and of having completed the full course.

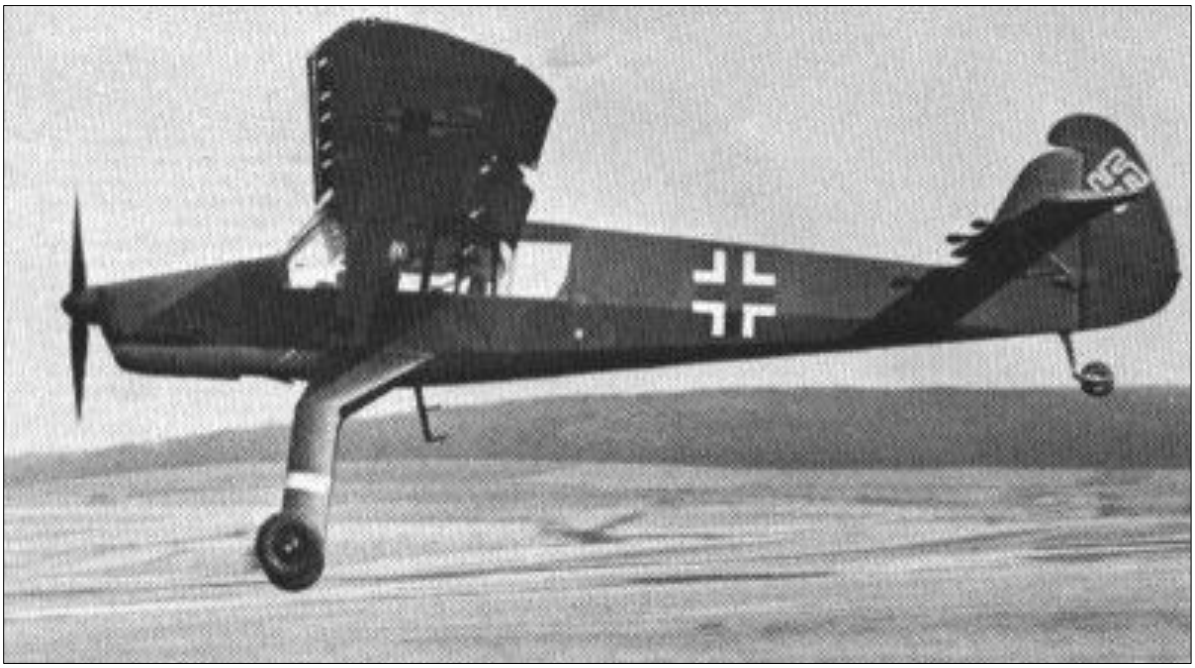
Willy says that he entered Fieseler's service at a later date than 1936. It is certain however that he tested the prototype of the Fi-156 and found its undercarriage faulty in design: it could not stand up to a rough landing in strong crosswinds. Fieseler himself had been arguing this point with its designer, *Dr. Winter*, who took his leave of the firm after the incident. It did not prevent Dr. Winter from claiming in years to come that he had been the designer of the Storch. We know from Fieseler that this is not true; a major contribution to the design had been made by dipl. Ing. Mewe and his project staff, as well as by Gerhard Fieseler himself.
As is well known, thanks to its remarkable VTOL capabilities, the Storch proved to be a great success. In nine years time more than 9000 were built. The Nazi leaders used it as a show piece; they donated for example one to Mussolini with 'Saffianlederbezug'.
The first Fieseler-built Messerschmitt for the aircraft carrier Graf Zeppelin was completed and flown by the end of January 1941. The initial flight of each aircraft as it came out of the factory was made by one of the Fieseler test pilots. As of 1938 the chief test pilot being *Willie Fiedler*. The other pilots were *Biedermann, Gehlhaar, Otto Schwalbe, Lüddemann, Heinz Wallischeck and Gerhard Gleuwitz*. [6]

Fieseler Storch in competition with Cierva autogiro (in background)
[original of the WF photo collection; WF has circled the swastika]

[5] *Gerhard Fieseler:* "Meine Bahn am Himmel", 1979, C. Bertelsmann Verlag, München
[6] *Francis L. Marschall,* p. 26

Willy Fiedler tells the following anecdote in connection with the above photograph:
"I was in 1939 demonstrating the Storch in one of the Baltic countries (Latvia?)
It really was a contest for an order for STOL aircraft by their national air force.
Our competitor was the British Cierva autogiro company.
I managed to fly my plane against the wind very slowly and even to hover (!) straight above the autogiro.
I won the contest.
On the way back to Kassel I was amazed that I saw no other airplanes over Poland and Germany.
Only after landing I learned that that very day war had been declared." [as told to Monica W-S.]

A successor to the Fi-156 was developed in 1940-1941: the Fi-256.
The new light airplane could fly so low and slow and turn so tight that, by skilful maneuvering, it could stay out of the gun sights of fast fighter aircraft. A limited series only was built (approximately fifteen) because of other Luftwaffe priorities. The Fieseler staff used the plane for its own transport.



The prototype F-256; Willy Fiedler at the controls [source: Luftarchiv.de]

Der Flugbaumeister
Dipl. Ing. Willy Fiedler

ist berechtigt, die Dienstbezeichnung

Flugkapitän

zu führen.

Berlin, den 29. März 1941

Der Reichsminister der Luftfahrt

In Vertretung

Flights with and without passenger; Hanna Reitsch

Willy Fiedler at the beginning of the Second Wo0rld War

WORK ON THE FLYING BOMB Fi-103, better known as V-1

The Fi-103 project was started in 1942. It really originated with *Argus*, the makers of the remarkable simple and easy-to-build *pulse motor*, who thought it would be an excellent means of propulsion for a simple unmanned little airplane carrying a bomb.
The overall design was entrusted to *Dipl. Ing. Robert Lusser*, who had been Chief designer at Messerschmitt and Heinkel and who was offered the position of Director of Development at Fieseler.
From 1942 on *Willy Fiedler* directed the overall testing of the Fi-103 V-1 flying bomb at *Peenemünde*. At this secret center of German arms development the west part of the area was reserved for Luftwaffe experiments, while at the east side since year and day gigantic efforts were under way to develop a huge ballistic supersonic missile, *the A-4*, later to be known as the *V-2*. The name of the originator of that project is of course well known: *Wernher von Braun*. He worked under special approval of the Führer and direct supervision of the S.S. general *Walter Dornberger.* Now, with the little meager flying bomb being flown at the neighboring coast, it was as if a poor nephew had come to live on the same exclusive block. According to the very interesting book of Jürgen Michels:[7] *Willy Fiedler directed the first launch of the V-1 on December 23, 1942. The launch was successful and the Fieseler crew celebrated Christmas at home.*

The real work of testing had still to come. It proved to be of a very intensive and at times most discouraging nature: "…The autopilot, designed by Askania, was a brilliantly conceived device that could maintain the little aircraft in a stable flying condition. After launch no external

[7] "Peenemünde und seine Erben in Ost und West", Bernard & Graefe, 1997; ISBN 3-7637-5960-3

guidance was needed. Distance flown was measured by counting the revolutions of a little nose-mounted propeller. When a predetermined count was reached the vehicle would be put in a steep dive to hit the ground. (For a long time the English could not figure out how the range of the bomb was set and they suspected the machine was radio-controlled.)
The flight testing of the autopilot was done at the flight testing centre at Peenemünde. Unfortunately this took place simultaneously with the testing of the airframe, engine and the catapult. For this reason troubles were very often difficult to isolate; some of them were never cleared up. It was also a disadvantage that the tests were made over the sea, so the missile could not be retrieved and examined for the reasons of failures.
Most of the V-1 missiles were launched by catapult, a few only by carrier plane. At first, when short distances up to 30 km were sufficient for testing, the flights were carried out in a northerly direction. Later, after the distances were extended up to 250 km, the flights went along the coast of Omen.[?] Altogether about 300 tests were made before operational deployment. In these tests the character of the flight-path, the attitude of the missile and the position of its rudder and elevator were taken as indications of the quality of the controlling process and of the behavior of single control components by different methods.
A film was taken of each take-off. From this it was possible to study the flight-path and attitude of the V-1 during the first stage of the flight. In the second stage, still in the range of optical sight, the path was checked by cine-theodolite and once out of the optical sight by radar. Occasionally the last part of the flight was also checked by radio bearing. A few of the test-missiles, about 40, were equipped with transmitters for telemetry."[8]

Flying bomb with pulse engine (Planes of Fame Museum Chino CA; photo rs)

[8] fragment describing the complexity of testing is from: "History of German Guided Missiles Development". The Advisory Group for Aeronautical Research and Development; NATO, 1957; *H.Temme*: The V-1 Auto-Pilot, p.75ff

"The test procedure was at follows: at first the behavior of the V-1 was studied during short climbing only. The initial results indicated that longitudinal and lateral stability were sufficient. The functions of the autopilot were then gradually extended, necessitating step by step adjustments as more refinements of the system were built in. As an example, the proper adjustment of the compass was most cumbersome. A big problem was the elimination of the strong aberration originating from the airframe, which was built almost entirely *out of sheet steel*. It was impossible to adjust the compass for it, for the engine vibrations during flight made it decrease indefinitely. In order to get only a small but known deviation, those parts of the airframe close to the compass were knocked with wooden hammers, after the airframe had been adjusted to the desired course within a room which contained no iron. The momentary matrix-loosening effect by the knocking allowed most of the magnetic dipoles to take up the direction of the earth's magnetic field. In this way the aberration was decreased to 1 degree and less.
It took also a great deal of effort to recognize the cause of crashes which frequently occurred after the transient of the missile from climb to level flight. It was not the auto-pilot that was responsible for these crashes, as it had first been assumed, but a rolling moment of the airframe, caused by a difference in the angles of attack of both wings after they had undergone the acceleration at take-off. The auto-pilot was not able to compensate for this rolling moment and the machine banked as a result. It took some time to come up with an effective answer."[9]

Failures like this caused embarrassing situations, for instance when the guided weapon crashed in view of an official high Wehrmacht commission that had to decide on the continuation of its development. On the same day, two examples of that other weapon of destruction, the A-4 rocket, were also launched before the commission. One of these launchings also failed miserably. The commission decided nevertheless that work on both systems had to be continued. Too much money and effort had already been invested in the A4 and a relative cheap weapon like the Fi-103 was only too badly needed.
The work was executed under great stress. The Fieseler factory was in 1943 (as a result of the devastating bombing attacks by the Allies), spread out over 65 geographic locations. Moreover, the pressure from the RLM (German Air Ministry) was immense. Lusser was forced to deliver the drawings for series production before testing had been completed. Afterwards more than 150 engineering changes had to be made during production, which caused extra delays.
Production was at that time no longer in the hands of Fieseler
Gerhard Fieseler states that Willy Fiedler always kept his cool. He performed always well under the difficult circumstances. He took everything in his stride. Only once saw Gerhard Fieseler Willy loose his temper, that was when he talked about the inefficient and wasteful expenditure of resources for the A-4 project. To Willy, who had a frugal nature, this was an outright crime. (Later on, when Hitler personally saw the effectiveness of the V-1 weapon he came to the same point of view and he very nearly cancelled the A-2/V-2 project.)

In the spring of 1944, when the V-1 became operational, *Willy Fiedler* and *Robert Lusser* had already transferred for some time to a new project: that of the Fi-103 *manned bomb*. It was started at the command of *Generalfeldmarschall Milch* himself and executed in a little factory at *Reichenberg,* near Berlin Schönefeld, that Willy Fiedler called his own.
Gerhard Fieseler was kept in the dark; by this time the communication lines between Air Ministry and the directors/owners of the aviation industry had broken down.

[9] *H.Temme*: The V-1 Auto-Pilot, p.75ff

THE MUSSOLINI INCIDENT (1943)

[Wikipedia, search: ***Mussolini liberation***] Most entries state that *Walter Gerlach* (personal pilot of *General Student*) flew the Storch. Willy Fiedler is not mentioned, although he later claimed to have been the pilot.[M.W.-S.]
Wiki writes:
"The Storch could be found on every front throughout the European and North African theaters of operation in World War II. It will probably always be most famous for its role in *Operation Eiche*, the rescue of deposed Italian dictator *Benito Mussolini* from a boulder-strewn mountain top near the Gran Sasso, surrounded by Italian troops. German commando *Otto Skorzeny* dropped with 90 paratroopers onto the peak and quickly captured it, but the problem remained of how to get back off. A Focke Achgelis Fa 223 helicopter was sent, but it broke down en route. Instead, pilot Walter Gerlach flew in a Storch, landed in 30 m (100 ft), took aboard Mussolini and Skorzeny, and took off again in under 80 m (250 ft), even though the plane was overloaded. The Storch involved in rescuing Mussolini bore the radio code letters, or *Stammkennzeichen*, of **"SJ + LL"** in motion picture coverage of the operation for propaganda purposes."

THE REICHENBERG PROJECT (1944)

Fieseler Fi-103 Reichenberg; manned version of V1, flown by test pilot Willy Fiedler a.o.
(photograph from www)

In her book "Fliegen, mein Leben" the well known German acrobatic and test pilot *Hanna Reitsch* describes how she and several others came to the conclusion in 1943 that the course of the war had to be drastically changed by successful attacks on major targets that would cripple the enemy's war effort. [10]) Targets that she envisaged were power plants, major bridges,

[10] Hanna Reitsch: " Fliegen, mein Leben", gebundene Ausgabe – 1. Januar 1956

munition factories, harbor installations, etc. To obtain a high success rate the attacks had to be carried out by *manned* bombs. She tried to interest the High Command for her idea, but *Fieldmarschalk Milch* of the German Air Ministry (RLM) turned her down. She then happened to meet *Adolf Hitler*, but he also had no ears for the plan. His hope was pinned on more conventional jet bombers, which were in an advanced stage of development. It then turned out, however, that the Luftwaffe had already formed a unit of suicide pilots. Hanna flew tests for them with the Messerschmitt 238 fighter, but the production stagnated. Next she was approached by the SS-general *Otto Skorzeny*, well known for his daring liberation of Mussolini in 1943. Skorzeny had the backing of no one less than *Himmler* and the German Navy which had the intention of attacking major allied war ships kamikaze fashion. According to *Reitsch* different types of suicide planes would be needed: single seat test and trainer planes that could land and were equipped with landing flaps and a central wooden skate. Also two-seaters that would be used for training the suicide pilots and that obviously could be landed by the instructor. There was no need to teach the operational pilots how to land. The one-seat operational bomb model of the Fi-103 that they would use had therefore no provisions for landing.

In 1944 Milch gave the go ahead to *Dipl. Ing. W.A. Fiedler and Dipl. Ing. R. Lusser* to convert the Fi-103 into a piloted bomb. W. A. Fiedler's workshop in Berlin-Schönefeld was called 'Segelflug Reichenberg GmbH', which gave the manned Fi-103 its name. It took little time to build the first one-seater Fi-103 (Reichenberg III). The flight testing was started at the airfield Lärz near Rechlin. At the first flight *Willy Fiedler* was at the controls himself. A catapult could not be used for take-off because of the high 'g-forces' generated. The Reichenberg was therefore carried underneath the wing of a Heinkel-111 bomber. It had for this first flight no pulse engine.

Fiedler was a most accomplished test (and glider) pilot and he was able to touch down very smoothly after his 6 minute gliding flight, although the final velocity was extremely high. Other pilots also took part in the testing program, among which *Heinz Kensche* and *Hanna Reitsch*, which led to several accidents. One of these was caused by Willy Fiedler's old friend *Karl Baur*, the very experienced Chief test pilot of Messerschmitt.

On March 5, 1945 *Walter Starbati*, Chief Test pilot at *Luftschiffbau Zeppelin GmbH*, lost his life in an accident with the Reichenberg. "Although the wings of the manned flying bomb had been lengthened compared with the original V1, the spars were the same. During the test flight the skin of the wings was ripped away and Starbati crashed in the Nebelsee, close to the airfield of Lärz. Because of all these heavy accidents, the command of the KG 200 squadron of the Luftwaffe recommended to cancel the Reichenberg project."[11]

Meanwhile, two-sitter *Fi-103 Rs* had been constructed so that flight instruction could be given. Most of the Reichenberg machines were probably assembled in Neu Tramm near Dannenberg an der Elbe during 1944/45. According to *Jochen Tarrach* 54 were built. Practically all were captured by the U.S. Army's 5th Armoured Division on April 23 1945. Most of them were carried off by the Americans, to the regret of the British, who reached Neu Tramm in May 1945.

Wilhelm Hellmold [12]) finally mentions a navy version of the Reichenberg which would land on sea, shed its wings and then proceed beneath the water surface to hit the target ship below the water line. Tests with this vehicle were carried out in the test tank of the Henschel factory, under the direction of *Herbert Wagner.*

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[11] See "Zeppelins Flieger" , Zeppelin Museum Friedrichshafen, 2006, ISBN 38030 33160, p 260
also bassed on: http://www.cockpitinstrumente.de/Ausr%FCstung/Waffen/V1.htm

[12] Wilhelm Hellmold: "Die V1, eine Dokumentation", Bechtle

THE BACHEM WERKE, WALDSEE 1942

In 1942 *Dipl. Ing. Erich Bachem* leaves the Fieseler company after having been its Technical Director for ten years and starts his own firm in Waldsee, Württemberg. He obtains the go ahead from RLM to develop a vertically starting manned rocket, which will later be called the '*Natter*'.

"Bachem now pulled strings to get his proposal accepted. The strings that he pulled belonged to Reichsführer *Heinrich Himmler*, head of the SS. Himmler saw the possibility of establishing a fleet of aircraft beyond the control of the Luftwaffe and the RLM and signed an order for 150 of Bachem's machines using SS funds. Alarmed, the RLM now approved Bachem's design and placed their own order for 50 of the aircraft under the designation Ba-349 Natter (Adder). With orders from both the Luftwaffe and the SS Führungshauptamt (Planning Office), Bachem set up a factory to design and build his dream at Waldsee in the Schwarzwald (Black Forest) about 25 miles (40 km) from the Bodensee (Lake Constance). Wind-tunnel models which were built early in the program were shipped off for testing and the only results returned to the Bachem designers were that it would be satisfactory up to speeds of about 685 mph (1,102 km/h)." [13]

[In 1944 Erich Bachem is joined by *Willy Fiedler* who becomes co-owner of the firm and its Technical Director.(rs)]

"An initial series of 50 Natters was built within three months of the launching of the project, and unpowered gliding trials began in November 1944. The first successful pilotless launch was accomplished on December 22, 1944, with a dummy in the cockpit. A Heinkel He-111 bomber carried one to 18,000 ft (5490 meters) and released it. The pilot found the aircraft easy to control. At 3,200 ft (1000 meters), he fired the explosive bolts and the escape sequence worked as designed.

A powered vertical launch failed on December 18 because of faulty ground equipment design. On December 22, the aircraft made its first successful launch with the solid fuel boosters only because the Walter motor was not ready. Ten more successful launches followed during the next several months. Early in 1945, the Walter engine arrived and the Natter launched successfully with a complete propulsion system on February 25, 1945, carrying a dummy pilot. The launch proved that the complete flight profile was workable. All went according to plan, including recovery of the pilot dummy and Walter rocket motor.

Although Bachem wanted to conduct more pilot-less tests, he was ordered to begin full-power piloted trials immediately. On February 28, 1945, a volunteer, Oberleutnant *Lothar Siebert*, attempted the first manned, full-power Natter launch. However, the cockpit canopy detached itself at an altitude of 1,650 ft because of improper locking. Siebert was knocked unconscious as the Natter continued to climb to 4,800ft before nosing down and crashing, with fatal consequences. More pilots volunteered to fly and the Bachem team launched three flights in March. Manned flights continued, seven of them, but only 36 of the 200 Natters ordered were completed."

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[13] The previous and following quotations are from:
http://all-aero.com/index.php/component/content/article/59-planes-b-c/1298-bachem-ba349-natter?tmpl=component&print=1&page= **:]**

Like all industrial work in Germany at the end of the war, the manufacturing of the Natter took place with the aid of forced labor (see picture below).

Bachem Werke, 1943?

1945: MAN RIDES ROCKET

The German pilot *Lothar Sieber* was the first rocket flyer of the world. He may even have the dubious honor of having flown faster than the speed of sound.[14]

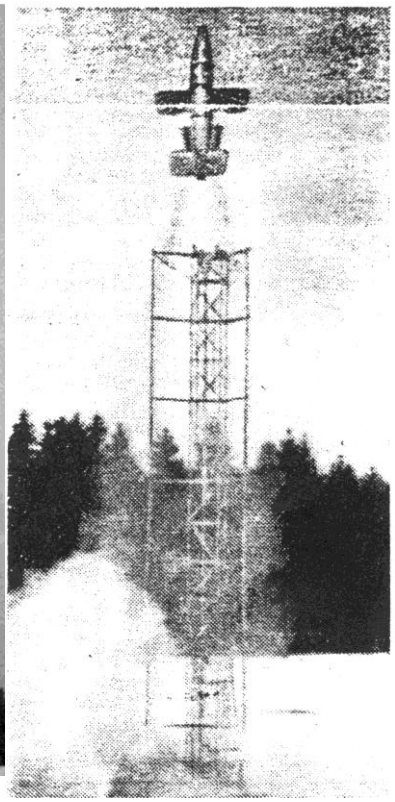
[The following fragment is an interview made by Ing. H. Steuer of Willy Fiedler in an unknown German periodical found in the personal papers of the latter:]

"…..In the mix-up after the war it has been forgotten that a vertically launched one-man-rocket with two short stubby wings has carried a twenty-three year old pilot, *Lothar Sieber*, straight into the sky. Fortunately descriptions and pictures of this unique rocket launching have been saved.
The vertically launched "Natter" rocket was intended to combat high flying enemy bombers and was equipped with both fluid rocket motors and solid fuel boosters In spite of the fact that preparation time had been insufficient; the rocket launch of the "Natter" took place on the Hauberk.
For the first time the questions were faced whether Man could survive the initial accelerations, the disorientation of his senses after the launch and the difficulty of returning to Earth alive by means of parachute.
The night before launch the group at the test site of Heuberg are informed that the rocket will be flown by the lean civilian who has been present at the pre-trials during the weeks before. It is Lothar Siieber, a young but experienced flyer, who has proven to remain quiet and effective during dangerous flying situations. This is how an eyewitness, test pilot and Flugkapitän *Willy Fiedler*, currently living in the United States, describes the first manned rocket take off:

[14] see also http://de.wikipedia.org/wiki/Lothar_Sieber

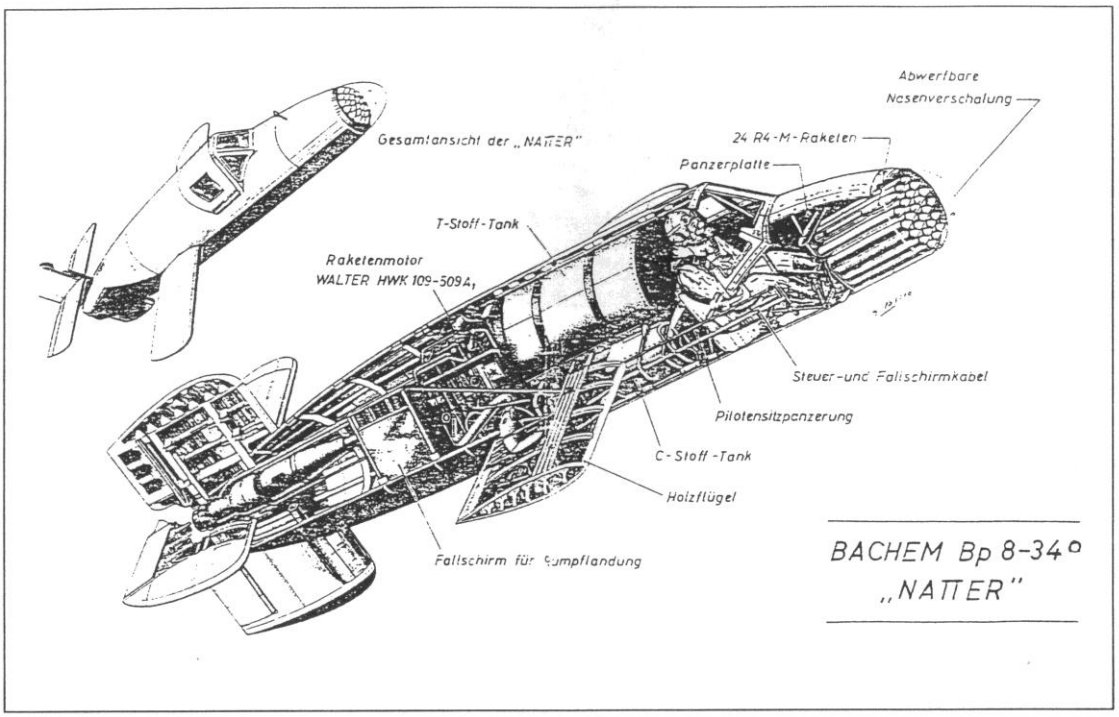
Bachem Natter, manned rocket for vertical start, 1944 (Planes of Fame Museum, Chino)

"Although I had been present at many hundreds of dangerous rocket launches in the past, I felt conscious of the special conditions of this first manned rocket start as I greeted *Lt. Lothar Sieber* underneath the high towering starting rig in the snow-covered Senke near Heuberg. While at the launching site technicians perform their last tasks and engineers check each part of the machine the tank truck arrives with the T-fuel and Sieber and I review once more the starting procedures. While smoking one cigarette after the other, he listens attentively to my explications. The site is now almost deserted; the tank trucks leave the concrete platform. With her nose pointing to heaven, the Natter stands straight up in the starting tower, the steel guide rails glistening in the cold winter morning.
Green flare. Platform empty! Sieber takes a last draw from his cigarette and waves for the last time. The technician shifts the heavy Plexiglas canopy over the pilot, jumps from the starting tower, closes the electric switch and runs into the snow-covered valley. Via the telephone I give from the command bunker the last indications. "All OK", sounds Siebel's voice from the speaker, "I am going".



Ten seconds to go. For the lonely man laying on his back in the pilot seat of the Natter it must seem an eternity. In the dampened silence of the Heuberg the red starting flare suddenly explodes. The Walter propulsion unit comes screeching to life and then to full power. A flame emits from the jet stream at the tail and in the steam clouds surrounding the rocket I see the flames of the four solid start rockets. The moment that the machine is torn loose from its clamps in the tower must mean a feeling of release for Siebel. As planned, the manned rocket rises completely straight up into the air. We stare at its path. Is the pilot conscious, has he survived the starting forces? My hands automatically move to the right as if they handle a joystick that can influence the machine in the air. The trajectory of the projectile begins now to lean backward. The Natter rolls a half turn and speeds upward steeply. This maneuver I have agreed on with Sieber two minutes ago, so all must be well, the launch has been successful. But what is this? A dark spot is flying from the speeding machine. Immediately thereafter the Natter is enveloped by clouds. “The Natter is gone”, one of us says. We all stare into the milky clouds. One can still hear the noise of the rocket motor. 30 seconds, 40, 50, then the sound becomes weaker. After 55 seconds I see at a distance of about 10 kilometer a black body smash itself straight into the ground. It is the Natter. Both rocket and pilot are obliterated.

It is possible that Sieber had become disoriented during his flights in the clouds and had traversed them downward instead of upward. Or it could be that Sieber’s head had been pressed so violently against the headrest by the wind after the canopy flew off, that he had lost consciousness.”
We know from the last letters of Lothar Sieber that with this dangerous mission military ambition was far from him. As a passionate flyer he offered his life for the conquest of space.
[translation rs]



Konstruktionsplan der „Natter".

Segelflugwettbewerben in der Rhön mit Erich Bachem bekannt. Seine berufliche Laufbahn begann er in der Firma des Schwiegervaters von Erich Bachem, der Ruhrtaler Maschinenfabrik Schwarz und Dyckerhoff in Mülheim a. d. Ruhr. Nach Tätigkeiten bei British Aircraft und bei der Deutschen Versuchsanstalt für Luftfahrt (DVL) in Berlin wurde er 1938 Chefpilot der Mustererprobung bei den Fieseler-Werken in Kassel. Seine Tätigkeit in Waldsee war eher beratender Natur. Schwerpunkt seiner Arbeit war die Entwicklung einer bemannten Version der V 1, der Fi 103, in Peenemünde auf der Insel Usedom. Die Führungsmannschaft des Bachem-Werkes bestand so gut wie ausschließlich aus Leuten der „Akaflieg" von Stuttgart. Wie kam es gerade zu dieser Betriebsgründung in der schwäbischen Provinz? Ende der 20er Jahre mußte das Waldseer Zweigwerk der *Oberrheinischen Dampfsäge- und Hobelwerke, Offenburg,* wegen wirtschaftlichen Schwierigkeiten schließen. Deshalb war die Stadt Waldsee in den Folgejahren um die Neuansiedlung von Betrieben bemüht. Auch das württembergische Wirtschaftsministerium schaltete sich ein, und es stellte dann den Kontakt zu Erich Bachem her. Die Wohnraumbeschaffung für die Beschäftigten des Bachem-Werks bereitete große Probleme und war bis Kriegsende häufig Anlaß von Konflikten. Die Stadt Waldsee, gedrängt vom württembergischen Wirtschaftsministerium und vom Rüstungsministerium in Berlin, konnte nur mit großer Mühe der wachsenden Zahl der Mitarbeiter des Bachem-Werkes entsprechende Wohnquartiere beschaffen. Es verwundert, daß in diesen Zeiten nicht alles, was kriegswirtschaftlich notwendig war, einfach beschlagnahmt wurde. Zum Schluß waren im Bachem-Werk ungefähr 300 Personen beschäftigt, einheimische Frauen, Kriegsgefangene und Deportierte aus den besetzten Ländern.

Willy A. Fiedler hatte Glück, er konnte ein Ausgedinghaus in Haisterkirch beziehen. Die Kriegsgefangenen und Deportierten dagegen wurden teilweise in Baracken auf dem Werksgelände untergebracht. Die Behandlung dieser Personen war aber, von Einzelfällen abgesehen, korrekt.

Bis zum Sommer 1944 war das Bachem-Werk nur Zulieferer für die Fieseler-Werke, die Hirth-Betriebe und die Dornier-Werke, außerdem wurden Baugruppen für luftgestützte Torpedos produziert. Erst im Frühjahr 1944 gewannen die Bachem-Werke plötzlich eine rüstungspolitische wie auch technikgeschichtliche Bedeutung.

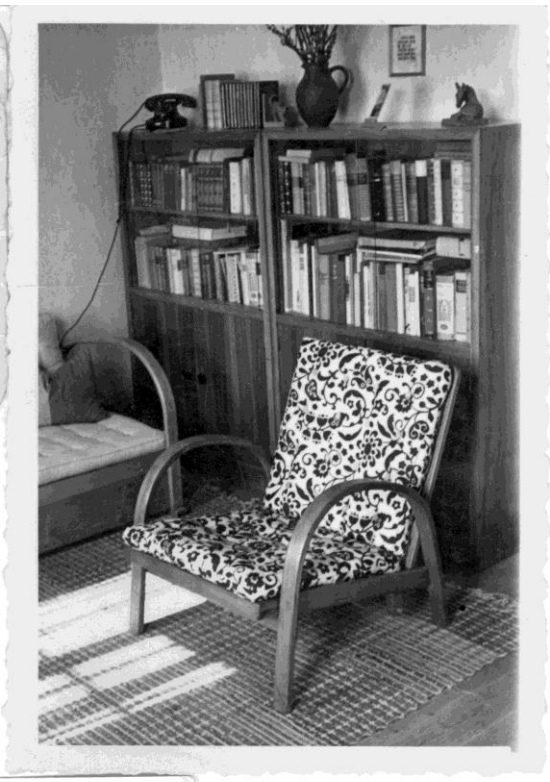
Die Ausschreibung des Reichsluftfahrtministeriums (RLM)

Ein Blick auf die Situation im Frühjahr 1944. Zur militärischen Lage: Im Osten hatte die Rote Ar-

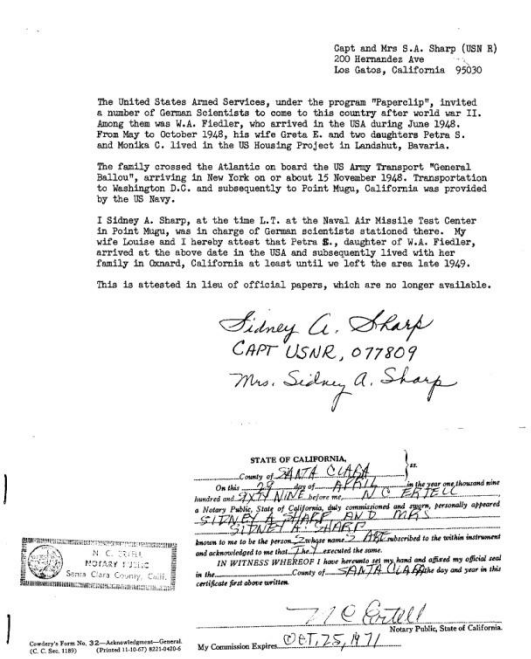
AFTER THE WAR, UNTIL 1948

Bachem/Fiedler "Lerche", Ultra Light Airplane

Willy Fiedler and the Bachem Company concentrated in the years immediately after the war on articles of straightforward design that were needed most. The airplane shown in the picture doesn't so much figure in that category, but was an irresistible challenge to those who had built in the recent past rocket vehicles out of wood. The other articles shown were most certainly in demand by families, probably by their own in the first place. The simple camper promised a way out of the (destroyed) city into the country side, leaving the questions: 'who has a car?' and 'how are the roads?'unsettled. The home furniture was built of that raw material which can be found abundantly in the countryside of Fiedler's origin, the Black Forest. It shows the mind at work of a straight thinking engineer who knows how to arrive at the simplest shape for things that will carry the weight, thereby achieving a stylish result in the process.



2. The United States



Capt and Mrs S.A. Sharp (USN R)
200 Hernandez Ave
Los Gatos, California 95030

The United States Armed Services, under the program "Paperclip", invited a number of German Scientists to come to this country after world war II. Among them was W.A. Fiedler, who arrived in the USA during June 1948. From May to October 1948, his wife Greta E. and two daughters Petra S. and Monika C. lived in the US Housing Project in Landshut, Bavaria.

The family crossed the Atlantic on board the US Army Transport "General Ballou", arriving in New York on or about 15 November 1948. Transportation to Washington D.C. and subsequently to Point Mugu, California was provided by the US Navy.

I Sidney A. Sharp, at the time L.T. at the Naval Air Missile Test Center in Point Mugu, was in charge of German scientists stationed there. My wife Louise and I hereby attest that Petra E., daughter of W.A. Fiedler, arrived at the above date in the USA and subsequently lived with her family in Oxnard, California at least until we left the area late 1949.

This is attested in lieu of official papers, which are no longer available.

Sidney A. Sharp
CAPT USNR, 077809
Mrs. Sidney A. Sharp

STATE OF CALIFORNIA,
County of SANTA CLARA } ss.
On this 29 day of APRIL in the year one thousand nine hundred and SIXTY NINE before me, N C FRIEL a Notary Public, State of California, duly commissioned and sworn, personally appeared SIDNEY A SHARP AND MRS SIDNEY A SHARP
known to me to be the person whose name SUBSCRIBED to the within instrument and acknowledged to me that HE executed the same.
IN WITNESS WHEREOF I have hereunto set my hand and affixed my official seal in the County of SANTA CLARA the day and year in this certificate first above written.

N C FRIEL
NOTARY PUBLIC
Santa Clara County, Calif.

N C Friel
Notary Public, State of California.

Cowdery's Form No. 32—Acknowledgment—General. (C. C. Sec. 1189) (Printed 11-10-67) 8231-04D-6

My Commission Expires OCT. 25, 1971

In 1948 Willy Fiedler and his family moved to California. He went to work for the US Navy Missile Test Center at *Point Mugu*, on the Pacific coast, not far from Los Angeles.
Point Mugu is to this day a Navy facility. Near the entry of the camp an open air exhibit gives an overview of the development of various weaponry of the missile kind between the end of the Second World War and 1960. The last missile shown is the Polaris, which was the first missile that could be launched vertically from a submerged submarine.
At the entrance of the so-called "Missile Park" a real life F-4 Phantom jet fighter functions as a gate keeper. This airplane played a role in following and observing the flight path of the missiles. According to Willie Fiedler he flew on occasion the mighty machine himself.

Instrumental in the move from Germany had been *Dr. Herbert Wagner*, leading German scientist on the development of guided missiles, who himself was employed at the Naval test facility. Wagner and Fiedler had known each other in Germany during the war at the test center in Peenemünde where Fiedler had been chief of the test program of the V1. Wagner had been director of missile development at Henschel. Noticing the troubles of the *Loon* testing program, which were very similar to the tribulations in Peenemúnde, he had recommended calling in Willie Fiedler.

Martin Hollmann writes: [15]
"In June of 1948, *Willy Fielder* came to the US with his family under "Operation Paperclip." They moved to Oxnard, California so that Willy could easily commute to work at the Pt. Mugu Air Missile Test Center. Eleven other scientists including *Dr. Hans E. Hollmann, Dr. Herbert Wagner and Robert Lusser* were

[15] in 'SCIENTISTS AND FRIENDS", a periodic publication of Martin Hollmann, Monterey CA.
http://www.scientistsandfriends.com/

among these Paperclip scientists. In Germany, Fiedler had been in charge of the flight testing of the Reichenberg (V-1) cruise missile or "Buzz bomb," as it was often called, at the Fieseler Aircraft Co. and in charge of the design of the Natter at the Bachem-Werke. Robert Lusser, who was also one of the Paperclip scientists, designed the V-1 in 1942 [while working for the Fieseler Company].

Point Mugu CA, Missile Park; Loon missile [photo rs]

The Navy was especially interested in Dipl.-Ing. Fiedler's extensive experience with testing (and flying) the Fieseler Fi-103 or "V-1" Flying Bomb. The Navy had plans to adapt its own flying bomb, *the Loon missile*, for launching from submarines. The Loon was a straight derivative of the V-1 and was intended to be used against the Japanese. Development of the Loon had started in 1944 and 1200 had been built by Republic Aviation in New York. Obviously the experience of *Dipl.-Ing. Robert Lusser*, the original designer of the V-1 and Dipl.-Ing. Willy Fiedler, its Chief Director of Testing, were of special interest to the Navy program.

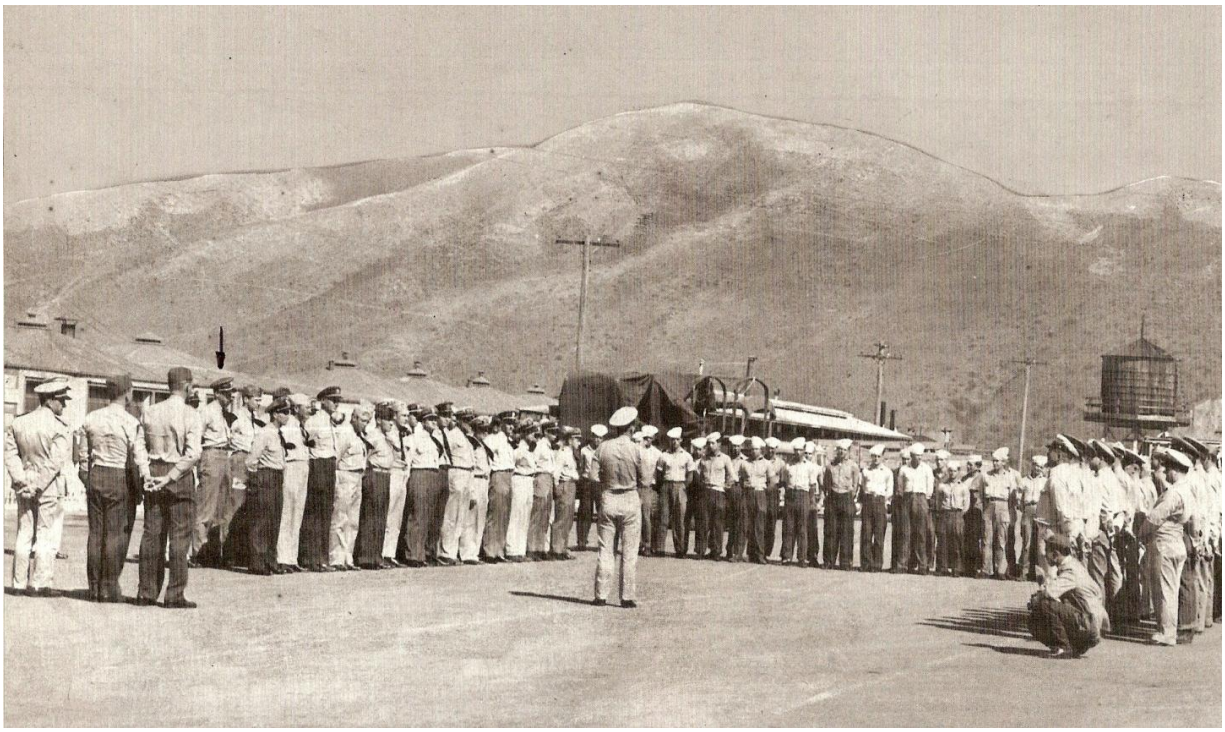
A recently published article: "EARLY MISSILE LAUNCHES FROM SUBMARINES", by LeRoy E. Day, Cdr USNR Ret, gives a fascinating insight in the progress of the Navy project and of the contributions of Willy Fiedler therein.[16]

The following text consists largely of an extensive quotation of the aforementioned article, with the kind permission of the author:

....." On the cool foggy morning of 1 October 1946, all Navy personnel of the Pilotless Aircraft Unit at Pt. Mugu, California, were assembled for a short ceremony to mark the commissioning of the new US Naval Missile Test Center. I am identified on the end of one rank. On my left is

[16] "EARLY MISSILE LAUNCHES FROM SUBMARINES", by LeRoy E. Day, Cdr USNR Ret, May 25, 2012

Ensign Philip Hasell, one of my classmates from Georgia Tech, also an aeronautical engineer. At that time Pt. Mugu more resembled a "prisoner of war camp" than a Navy installation. The few buildings were a combination of metal Quonset huts, temporary beach buildings left from the days when Pt. Mugu was a fishing camp and a few newly constructed wooden structures. The one landing strip was made of Marsten mat, the metal "grid" used by the SeaBees to construct landing strips on the Pacific islands in WW II."…..



Commissioning of the Naval Missile Test Center, Pt. Mugu, CA, Oct 1, 1946 [Navy photo]

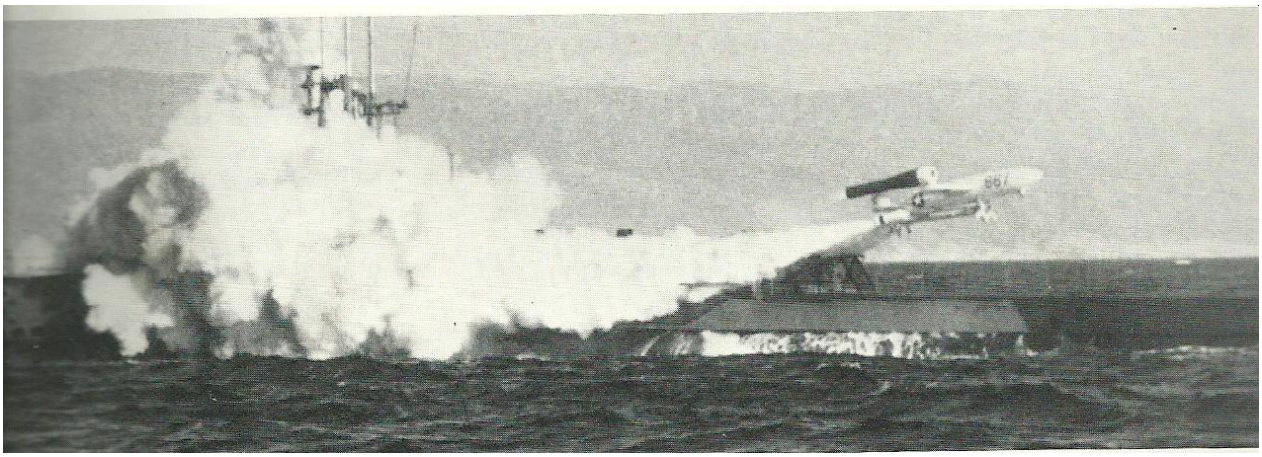
……"The Navy was developing a sea test range for guided missiles at Pt. Mugu. Pt. Mugu had been selected because of its location on the coast of California, some 50 miles north of Los Angeles. There were also several islands offshore (the Channel Islands) which could serve as targets and tracking stations.

The initial concentration was on the development of ship-launched missiles, particularly from submarines. The Navy had contracted with Republic Aviation toward the end of WW II in Europe to make a number of copies of the German V-1 "Buzz Bomb." The Navy hoped to be able to use them in the Pacific War. However, the war in the Pacific ended before they were able to do so. The CNO had approved a plan that a missile test facility be established at Pt. Mugu in January 1945. However, it wasn't until November 1945 that a small detachment under Cdr. Jack Shoenhair actually arrived at Mugu and began preparations to test launch the V-1 which the Navy had designated the LOON.

Initial launchings of the LOON were made using a catapult. In the six months from January 1946 to June 1946, 21 launches were made with no successes. The causes of the failures were

multiple. Gradually the launches were more successful over the next year. A milestone was reached on November 5, 1946 when LOON No.38 was successfully launched with the catapult and flew a controlled flight of 48 miles. The objective of the Navy was to demonstrate a launch from a surfaced submarine and a catapult was not deemed practical for the sub application. So, the next method attempted was a rocket launch.

The LOON was launched atop a cradle with four JATO rockets. Each of these rockets had to be carefully aligned by an optical system, with close tolerances, through the center of gravity of the assembled LOON-cradle. Although the alignment could be done accurately, albeit time consuming, once the rockets fired, there were deflections in the cradle which resulted in the thrust line deviating from its static position. The result was often a trajectory that put the missile in an attitude at burnout that was impossible for it to recover. The LOON might be in a steep bank or pitched up at an angle impossible to correct before impact in the ocean. Burnout of the rockets was at about 250 miles per hour. In the first six months of 1947, the success rate for LOON launches was about 10 percent. Among these were some rocket launches using the four JATO bottles. Despite the poor success record, one of these launches was a significant milestone: a successful launch from a surfaced submarine, the USS Cusk commanded by LCDR Fredrick "B" Clarke USN, in February 1947.



First launch of the LOON missile from a submarine USS Cusk (1947) [Navy photo]

At about this time, twelve German scientists arrived at Pt. Mugu. They were part of Project Paperclip which brought a large number of captured German engineers and scientists to the U.S. after the end of the war in Europe. They were dispersed to several military facilities: Wright Field, Fort Bliss, Pt. Mugu and others.

Prof. Herbert Alois Wagner (1900-1982)

Those assigned to Mugu were from the "small missile" side of Peenemünde, the secret German missile test site on an [peninsula] in the Baltic Sea, [in] northern Germany. Dr. Herbert Wagner was the senior man of the group assigned to Pt. Mugu. A large contingent of several hundred associated with the V-2 program under Dr. Wernher von Braun were sent to Fort Bliss, Texas.

U.S. Loon missile at test base (1948) [Navy photo]

Three of these men who came to Mugu were assigned to the Guidance Laboratory at Mugu where I worked. At the time, I was on active duty as an Ensign. I worked closely with one man, Reinhard Lahde. We were testing and analyzing the autopilot of the LOON trying to determine why there were so many launch failures. Both Lahde and I became quite familiar with the flight control of the LOON. The LOON was steered by a rudder; it had no ailerons for roll control. One task we worked on was to incorporate a single aileron which later showed an improvement in the recovery from severe roll attitudes at burnout of the booster rockets.

Meanwhile, in the Propulsion Division of our department, they were working on the problem of improving the method of launching the LOON from a submarine. Working in that division was

another German scientist named Willy Fiedler. Fiedler had had an interesting career in Germany during WW II. He was [chief] test pilot for the production [at Fieseler] of the famed German fighter, the Messerschmitt BF-109. He was also one of two [?} pilots who flew a manned version of the V-1 "Buzz Bomb" during its development at Peenemünde.

While in Germany, Fiedler had invented a device called the Jetevator. It was a ring shroud, gimbaled in two axes, which could be mounted at the exit plane of a rocket nozzle to alter the direction of the thrust line. If the Jetevator was driven by servo motors, it could change the thrust line a maximum of about 7 degrees in both pitch and yaw. He had verified this with tests on several rockets in the test pits at Pt. Mugu. Fiedler had the idea that the way to launch the LOON was to sling a single large rocket under it and have a Jetevator controlled by the autopilot. The result would be thrust vector control. The autopilot would control the thrust line during rocket burn and avoid the earlier launch mishaps. He was also working on a design for a "zero length launcher" which would be more practical for sub launches.

Fiedler knew he needed a flight demonstration to gain acceptance of his idea. With the help of Robert Helmholz, a senior manager at Mugu, he was able to convince the Navy brass to give him a surplus rocket large enough to launch the LOON. He came down to our division one day and asked if I could perform an analysis of a LOON launch with the single rocket using his Jetevator controlled by the LOON autopilot. I was quite flattered and proceeded to apply my knowledge of aerodynamics and stability and control of aircraft. The boost phase lasted only a few seconds, accelerating the vehicle from zero to about 250 miles per hour. Only toward the end of the boost was the LOON flying fast enough for there to be any aerodynamic effects. In other words, I found that the task was to stabilize the 5,000 pound LOON and have its attitude at burnout such that it could fly a safe trajectory. All the aerodynamic terms were reduced to second order effects, leaving the mass and inertia of the vehicle as the controlling factors. I was amazed at the simple solution and had my results checked by Reinhard Lahde, an experienced aeronautical engineer. I determined the "gearing" between the LOON attitude and the Jetevator controlling the thrust line such that the system was stable. Fiedler took my results, rigged up the autopilot and Jetevator and proceeded to plan for a launch.

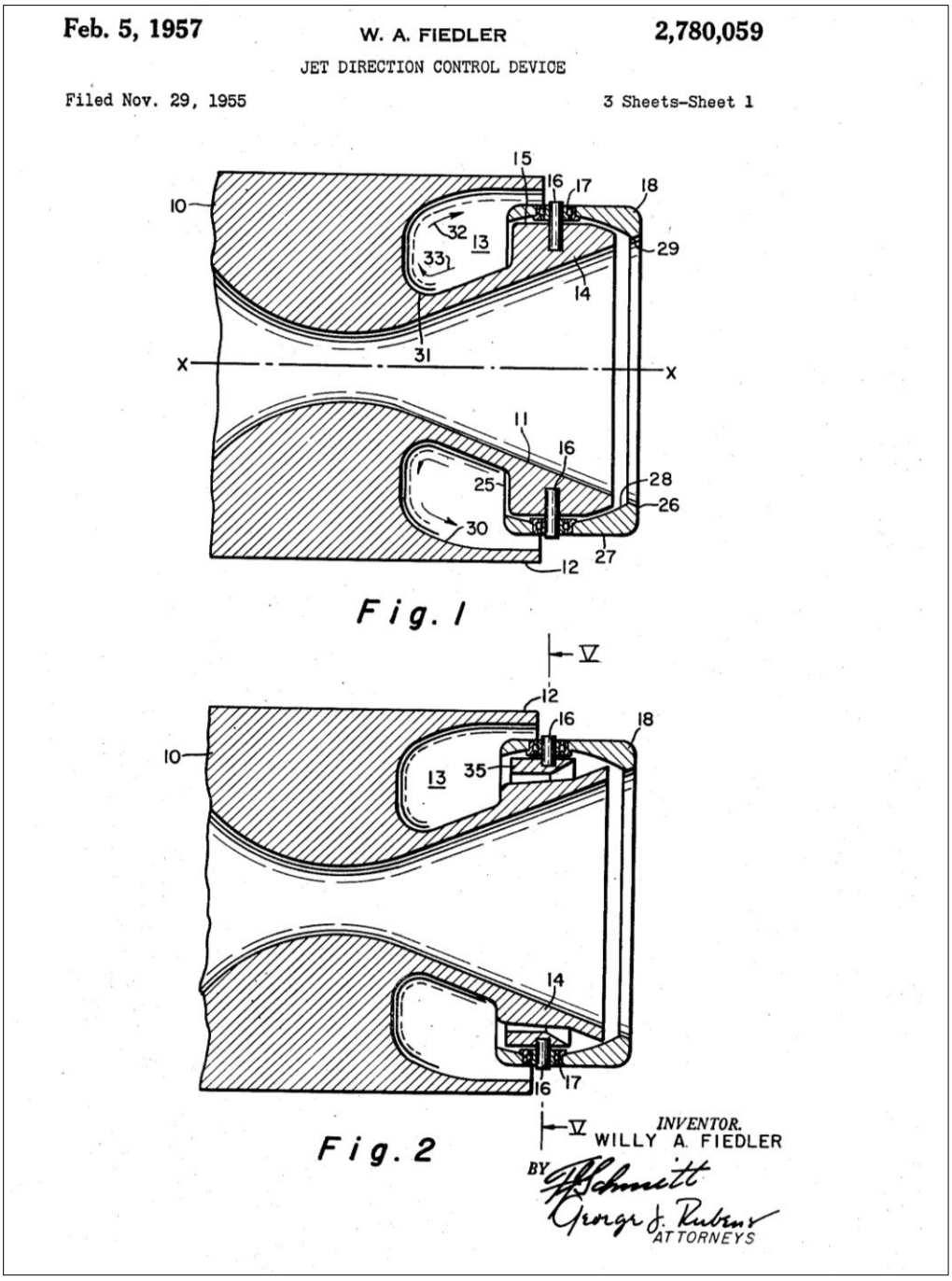


Illustration from Willie's patent on the Jetavator

With the help of senior management at Mugu, top Navy brass and civilians from Washington were invited for the test launch. The combined rocket-LOON was planned to be launched from a short-ramp launcher of Fiedler's design. If successful, the test would demonstrate the feasibility of a thrust vector controlled launch from a zero-length launcher which Fiedler was designing. It's applicability to launch from a surfaced sub was obvious.

A large crowd assembled at the LOON launch site on the beach on the day of the planned launch. A dozen chairs were set up for the most senior Navy and civilian visitors. Willy Fiedler was introduced to describe the test and its implications. Fiedler was an excellent speaker and exuded calm confidence. I was standing behind the crowd and more than a little bit nervous, wondering if my simplified study had correctly analyzed the problem.

Fiedler gave the background of the many LOON failures and then described the test they were to see. He explained, "However careful we have been in aligning the four Jato rocket launches, it's never been good enough. The static alignment can be right through the c.g. (center of gravity) but when those rockets fire, each one is a little different, and the cradle bends just a little and that's enough to cause a misalignment. What it does is pitches the missile into some bad attitude and the LOON hits the water before it can recover. What is needed is some way to have the autopilot control the thrust line to keep it right through the c.g. during the entire boost period. That's what we have today, using the Jetevator which I described to you earlier."

Fiedler paused, took a few questions and continued, "Now, I have set up this launch so it will be a real test of the effectiveness of the Jetevator in providing thrust control. The rocket nozzle is aligned so that the thrust line will be 1 inch above the c.g., not through the c.g. If the Jetevator cannot correct the thrust line, the missile will be pitched downward, take a ballistic trajectory and will impact the ocean about 500 yards from the beach. We've done this to provide a good test of the autopilot controlling the thrust line during boost. If there are no further questions, we will begin the countdown."

I was astonished to realize that Fiedler had rigged the launch to really demonstrate the effectiveness of his thrust control. I wasn't sure that the Jetevator could provide enough change in the thrust angle to overcome this "intentional misalignment." In the few seconds of the countdown, I became very nervous that I was about to become a "party to a failed launch." ---- 5,4,3,2,1 Fire! The LOON lifted from its short-ramp launcher with a tremendous roar and a great cloud of exhaust smoke! In fact, the exhaust plume from the rocket partially obscured the missile from where I stood and I couldn't tell if it was climbing on its intended flight path or not. Seconds later the LOON was in the clear and climbing toward the western sky at the correct angle. In fact, it looked like it was on a rail in the sky—climbing exactly as planned. The assembled crowd gave a shout and there was much clapping. The ranking admiral stepped forward and heartily shook Fiedler's hand.

Fiedler had made his point. Later, the first zero length rocket launch of the LOON using the Jetevator was made on January 26, 1949 from the USS NORTON SOUND, a surface ship. Launches from surfaced submarines followed.

Regulus II at Pt Mugu Missile Park [photo rs]

The Navy had originally planned to use cruise missiles launched from surfaced submarines. Thus there followed the development of the Regulus I and II missiles. However, it became apparent that launching a cruise missile from a submarine on the surface had serious strategic drawbacks. The submarine was very vulnerable during the time required to prepare and launch the missile. The difficulty of launching in rough seas was another problem. Therefore the decision was made in 1955 to develop a missile system that could be launched from a submerged submarine. The Navy established a high priority organization known as the SP Project under Admiral Raborn. Based on his earlier work with launching the LOON, Willy Fiedler was invited to join the SP Project in the development of the Polaris missile which was to be launched from a submerged submarine. Fiedler worked in the SP Project for some time and then relocated to Lockheed Missiles in California. Lockheed was the contractor for building the solid rocket Polaris. Fiedler became the Chief Scientist for Lockheed. I remember visiting Willy once in the 1970's when I was at Lockheed on NASA Space Shuttle business

The SP Project reached its first major milestone July 20, 1960 with the launch of a Polaris missile from the USS George Washington submerged off the coast of Florida. In a little over a decade, the Navy had progressed from the rudimentary surface launching of the LOON to a long range nuclear missile launched from a submerged submarine……"

[End of fragment with kind permission of ***LeRoy E. Day CDR. USNR Ret.*** *November 20, 2012]*

Monica Wagner-Staalman tells the following anecdote about the initial launch of the Polaris concept:

"I've been told on many sides how the idea of under-water launches came about.
Seems Willy was asked to come to a meeting in Washington. The question was a vertical launch of rockets from submarines from the surface. At that point, it was not deemed feasible to launch underwater. I believe the drag imposed by water was thought to be insurmountable. I think he was sitting next to *Lt. Sidney Sharp*, and whispered to him, 'Oh, that's no problem. The compartment could be filled with air, and the missile would launch with its rise to the surface...'
Sid said, "Raise your hand, go on up! Tell them!!"

"Oh, no... I couldn't."
"Oh, yes, you could," was Sid's reply and he raised Willy's hand for him.
So Willy, who was still working at Pt. Mugu at the time, was offered the job at Lockheed to head the Polaris project. At the time Lockheed was in Burbank, as you most likely know. Willy hesitated at first. "I'll have to discuss it with my wife," was his reply. This was partly true, but he also wanted to play just a little "hard to get." He'd made up his mind then and there, and just had to come up with a plan to broach the subject with Greta.

I am in personal possession of the letter sent by *Adm. Rayborn* to Willy, thanking him for the work he did on the Polaris. For some reason, his children didn't want it. I have the booklet prepared by Lockheed at his retirement as well."

Martin Hollmann describes this incident and its aftermath as follows:

Solid fuel rockets had already been launched from the submerged submarine U-511 at Peenemünde in 1942. However, the idea was dormant for 13 years until Willy Fielder suggested how it could be done to the US Navy.

In the summer of 1955, Willy attended a joint military/industry conference with his good friend, Sydney Sharp. At the meeting the Navy proposed to develop a larger submarine from which a number of guided missiles could be launched. The topic of launching these from the submerged submarine was raised but no one thought that this could be done. Willy told Sydney Sharp that he knew how to by using pressurized air to shoot the missile vertically out of a tube and then igniting its rocket motor once it had breached. Sharp said "go up there and tell them!" And that is just what Willy did. So the seeds for the birth of the submarine launched ballistic missile (SLBM) had been sown.

Fielder became the chief scientist at Lockheed Missiles and Space Co. in 1958 and helped design the Polaris and Poseidon missiles for the Fleet Ballistic Missile System.

By 1962, eight Polaris submarines with 16 missiles each had been commissioned. Eventually there were 41 submarines. It was the most significant Cold War deterrent against the Soviet threat and most likely prevented WWIII.

United States Navy

CERTIFICATE OF AWARD

In appreciation of
Distinguished Civilian Service
to the United States Navy

The Secretary of the Navy

takes pleasure in presenting the

DISTINGUISHED CIVILIAN SERVICE AWARD

to MR. WILLY A. FIEDLER

for services set forth in the following

CITATION

In recognition of distinguished service to the United States Navy. By virtue of your exceptional initiative, originality and technical ability in originating and developing devices and improvements for launchers, launching configurations and missile structure, great improvements have resulted in the reliability and effective use of guided missiles. Through these truly significant contributions in the field of guided missiles, you have distinguished yourself in a manner richly deserving of the Navy's highest civilian award.

27 January 1954
Date

R. B. Anderson
Secretary of the Navy

LOCKHEED AND MISSILES

[This chronology is to a large extent based on *Walter J. Boyne's*: "Beyond the Horizons"- The Lockheed Story – 1998, St. Martin's Press, NY]

1954

LMSD Lockheed *Missile Systems Division* is formed.
LMSD builds X-17 rocket for USAF to study reentry problems.
Concept comes from *Irv Culver*, who had been in the first group of Lockheed engineers who moved from airplanes to missiles. *Dan Tellep* directs and analyzes the reentry body data (telemetry)

1955

National Security Council recommends that part of the Intermediate Range Ballistic Missile force (IRBM) shall be *sea-based*; the program to achieve this shall be called *Fleet Ballistic Missile FBM* program.
Navy gets the task of adapting the Army developed JUPITER IRBM for use at sea.
Admiral Burke[17] gives absolute priority to the project.
A special project office (SPO) is created. *Rear admiral William F. ("Red") Rayborn* (an aviator, aerial gunnery expert, veteran of war in Pacific) gets the command. He gets all support from Burke. Rayborn picks 40 civilian and military people for his team. He then selects within twenty days the major FBM contractors on the basis of one-day presentations.
Rayborn's team's initial task is to develop the JUPITER into a 1,500 mile range missile to be fired from shipboard – to be operational Jan. 1, 1960. Launch from submarine 5 years later: Jan. 1965.
JUPITER used cryogenic liquids, very hazardous and possibly lethal in submarine. Also a stable platform is needed for launching; a ship is not stable. Fortunately a series of technical developments occur that give a far better alternative than the JUPITER. Among them, it is learned from *Edward Teller* of the AEC, that future warheads would weigh only 30% of the JUPITER payload. *Dr. Charles Draper* develops a guidance system that is 85% lighter than the JUPITER's. Then there is the discovery that solid-propellant fuel can deliver more power if metallic aluminum is added.

1956

Lockheed starts building its facilities at *Sunnyvale, CA*.
The Navy charges *Captain Levering Smith* with the design of a new missile. Working with Lockheed and other contractors, he produces in one week's time the essential details of a two-stage solid-propellant missile with a 1,500 mile range. The missile is approved by the Secretary of Defense in December 1956 and Admiral Raburn names it *POLARIS*. Because of the now simpler design and also because of external political pressures (the surprising appearance of Soviet Sputnik), the deadlines for completion are moved forward, The interim launching capability from subs is put at January 1st, 1961 and the full operational POLARIS Model B is to be ready June 1963.

[17] *Admiral Arleigh Albert '31-knot' Burke (October 19, 1901 – January 1, 1996)* admiral of the United States Navy, who distinguished himself during World War II and the Korean War, and who served as Chief of Naval Operations during the Eisenhower and Kennedy administrations. [Wikipaedia]

1957

The size of the missile is set by the dimensions of the available submarine. It is agreed that the diameter will be 54 inch, the length 28.5 ft and the weight (ultimately) 28,500 lb.

The Navy's "*Special Task Group*" meets for the first time on January 7, 1957.

LMSD submits a "POLARIS Master Development Plan", presented by *Willis Hawkins, Stan Burris, Frank Bednarz, Dr. Louis Ridenour* (head of Lockheed's Research Lab), *Sid Brown* and ***Willy Fiedler***, "one of our German scientists", who managed the German V-1 pilotless bomb program in WWII.

DEPARTMENT OF THE NAVY
OFFICE OF THE SECRETARY
WASHINGTON

My dear Mr. Fiedler:

It is a pleasure to inform you that the Navy Incentive Awards Board has reviewed your contribution with respect to your design of a new type dummy missile, and has approved an additional award of five hundred ninety-five dollars. This award is in addition to the initial award of three hundred dollars previously granted by the Naval Air Station, Point Mugu.

On behalf of the Navy, I wish to commend you for the resourcefulness and initiative which you have displayed in this achievement. The Navy appreciates your valuable contribution which constitutes a significant improvement in the Navy's operations. I hope you will continue your endeavors and develop other constructive ideas leading to superior accomplishment.

A copy of this letter will be placed in your personnel folder.

Sincerely yours,

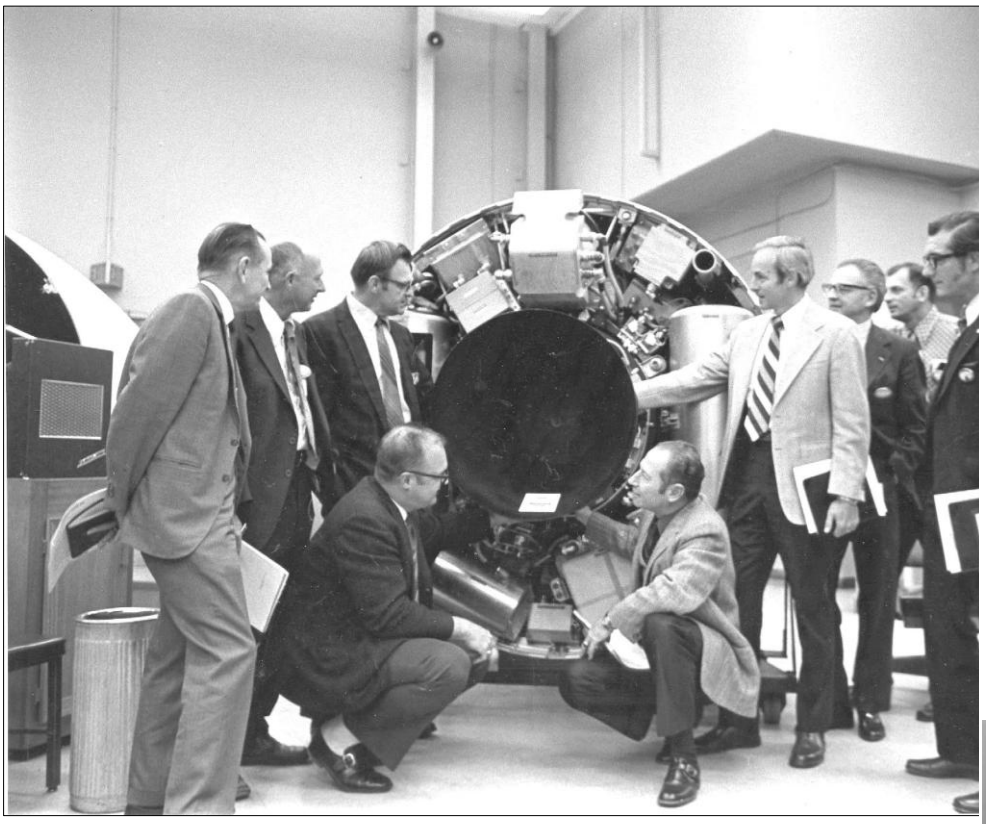
Charles S. Thomas

Mr. Willy A. Fiedler
c/o Commanding Officer
U. S. Naval Air Station
U. S. Naval Air Missile Test Center
Point Mugu, California

The problems in ballistic missile development are many: general configuration, nozzle design, thrust and vector control, terminating thrust. Use on submarines adds to this the problems of storage, maintenance, underwater launch[18] and first-stage ignition.
LMSD expands again, this time with test facilities at *Santa Cruz*. Under the direction of *Art Hubbard* the POLARIS is tested in more than three hundred captive firings.

1958
On September 24 the flight tests begin at *Cape Canaveral*. As is not unusual, problems manifest themselves. At higher elevations and speeds, a backflow of hot gases disrupts the airflow around the missile and damages equipment. It is determined that the rocket thrust can be controlled by "thrust vectoring", using **Willy Fiedler**-designed "jetevators", metal quadrants activated in the rocket exhaust.

1959
The first truly successful flight is on April 20, by the AX-6 missile. By August 27 the POLARIS is successfully launched from a ship: the *Observation Island.*

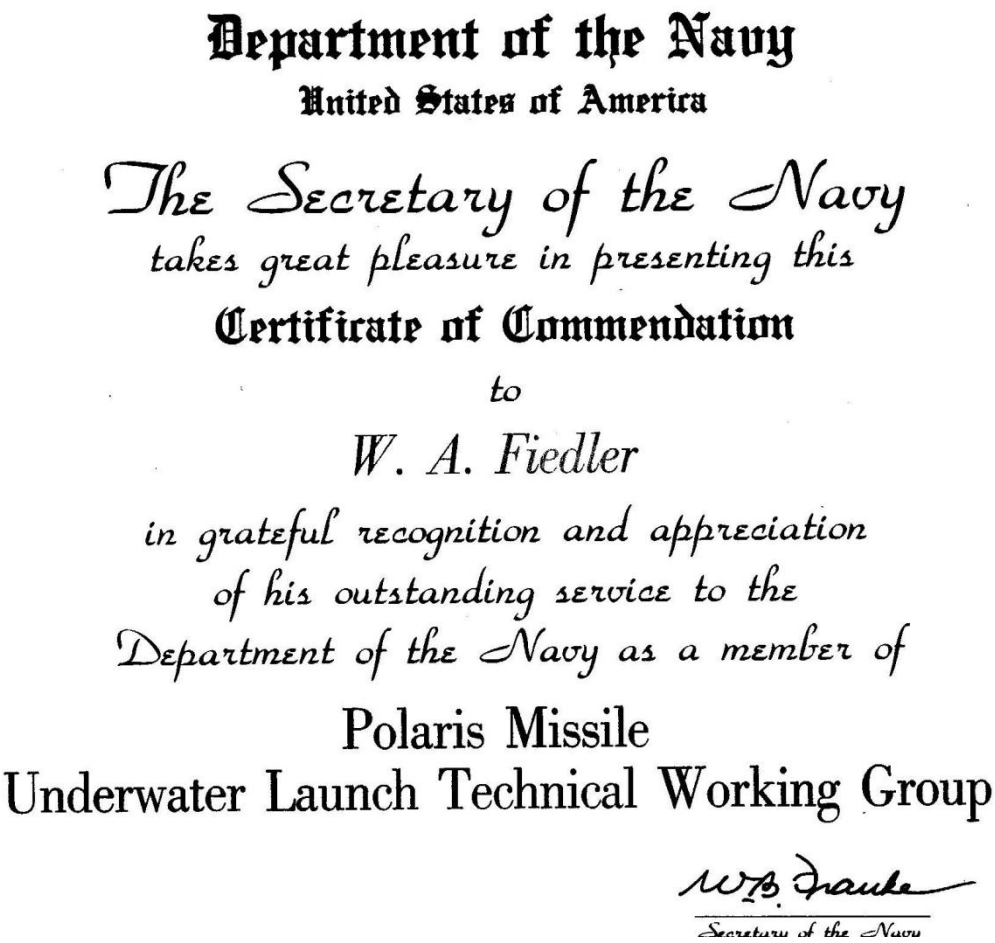


1960
The next series of prototypes is tested exhaustively during the next year. Out of forty flights, only twenty-eight are completely successful; twelve are partly successful. As time is running out, a decision is made to launch

18) As it turns out, underwater launch provides the sought after stable platform.

the first operational POLARIS A1 missile from the submarine *George Washington*, on July 20, cruising of the coast of Cape Canaveral.

"The 1,000-mile flight down the range was a success, and in what some called bravado but was really well earned confidence, a second missile was launched three hours later. Admiral Raburn sent "success "messages from the submarine to the president and to Navy officials".[Walter Boyne].



Department of the Navy

United States of America

The Secretary of the Navy

takes great pleasure in presenting this

Certificate of Commendation

to

W. A. Fiedler

in grateful recognition and appreciation

of his outstanding service to the

Department of the Navy as a member of

Polaris Missile

Underwater Launch Technical Working Group

W B Franke

Secretary of the Navy

1961

LMSD is now *called Lockheed Missiles and Space Company* or *LMSC* with two divisions, the *Missiles System Division MSD* and a *Space Systems Division SSD*.

By the deployment date, January 1, the POLARIS A1 has met all the interim requirements, including the initially demanded 1,200 nautical-mile range.

[Following chronology partly based on http://www.ssp.navy.mil/fb101/themissiles.shtml]:

The first launch of a POLARIS A2 test vehicle from a submerged submarine takes place on 23 October 1961. The missile is successfully launched from the USS Ethan Allen off the coast of Cape Canaveral, FL.

1963

The first launch of a *POLARIS A3* missile from a submerged submarine takes place on 26 October. The missile is launched from USS Andrew Jackson while cruising submerged about 20 miles off the coast of Cape Canaveral, FL. The completely successful test is followed by a

successful launch of an A2 missile from the same submarine on 16 November 1963, witnessed by President Kennedy from USS Observation Island.
POLARIS A3 represents a significantly greater technological advancement over A2, than that of A2 over A1. In terms of hardware design, POLARIS A3 is approximately an 85 percent new missile. The increase in range provided by A3 leaves *no land target inaccessible* and at the same time gives the submarines an enormous increase in sea room. Sixty percent increase in range to 2500 miles implied a requirement for greater accuracy. Advanced engineering introduces new thrust-vector controls, revised reentry-body materials, new ablative shield and more powerful propellants. [Boyne]

1964
POLARIS A3 becomes operational on September 28, one year ahead of schedule.

V-1 Rocket Developer

Pioneer Praises Polaris

The Polaris missile is probably the best war-deterrent in the world today, Willy A. Fiedler, a founding father of modern - day rocketry, said here last night.

And, he added, Charleston is playing a vital role in the Polaris program.

Mr. Fiedler, manager of the scientific staff of the missile systems division of Lockheed Missiles and Space Co., was one of the Germans who helped develop the V-1 rocket for Adolph Hitler. He came here yesterday to address approximately 250 Lowcountry engineers at their annual banquet, a highlight in the local observance of National Engineers Week.

The people in the Charleston area should be proud of the fact that Charleston is playing such an important part in the overall fleet ballistic missile program, Mr. Fielder continued.

THE UNITED STATES' only shore facility for Polaris missile assembly is located north of Charleston on the upper reaches of the Cooper River.

There, at the Naval Weapons Annex of the Naval Ammunition Depot, employes of Lockheed, many of whom are local people, and naval personnel test, assemble and load the lethal weapons in the rapidly growing Polaris submarine fleet.

Charleston has also become the primary supply point and one of the primary training centers for Polaris missile submarine personnel, and in the near future this port will become home for two nuclear-powered Polaris sub squadrons.

WILLY A. FIEDLER
Addresses Engineers

MR. FIEDLER described the Polaris missile as an interesting weapon politically. Not being stationary it can be pulled back, for example, along a line if this is politically expedient.

Polaris is not a provocative weapon, he added.

"By that I mean it is not like an airfield. It doesn't invite, by its very nature, to be hit."

The German-born scientist worked at the U. S. Naval Air Missile Test Center in Point Mugu, Calif., from 1945 until he joined Lockheed in 1956. He has been associated with Polaris from its earliest experimentation stage.

He said Polaris and the V-1 were hardly comparable and added that the U.S. weapon is infinitely more complicated.

BECAUSE OF the complexity of this weapon, many tests are required, to iron out the bugs.

He added that these tests, in his opinion, are given too much publicity.

"I don't think our failures should be publicized so much," he said. "Too many people don't understand. It is a rare failure that doesn't teach us something.

"In Germany, we learned by failures. We had no publicity at all."

Mr. Fiedler said efforts are going forward now to make the Polaris even more reliable than it already is.

Now an American citizen and holder of the U.S. Navy's Distinguished Civilian Service Award, the Navy's highest civilian service award, Mr. Fiedler's headquarters are in Sunny Vale, Calif.

The meeting last night at the Francis Marion Hotel was sponsored by the National Society of Professional Engineers.

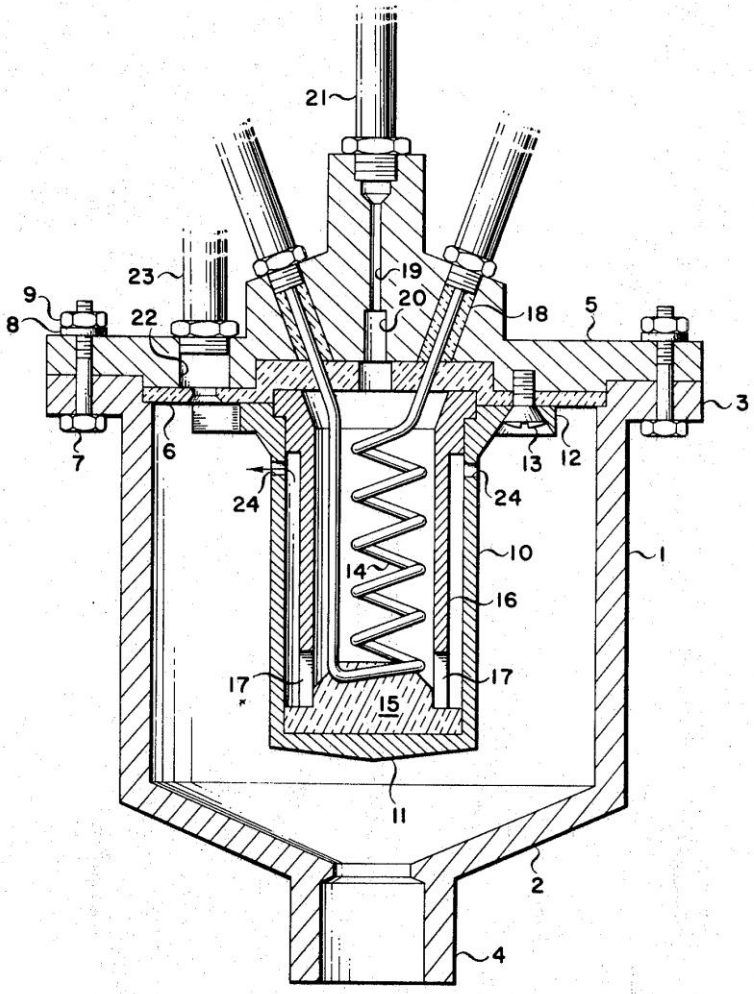
1965

POLARIS A1 is officially retired from active duty when USS Abraham Lincoln, the last of the first five submarines to carry it, returns to the U.S. on 14 October 1965 for her initial overhaul.

Oct. 13, 1970 W. A. FIEDLER ET AL **3,533,233**

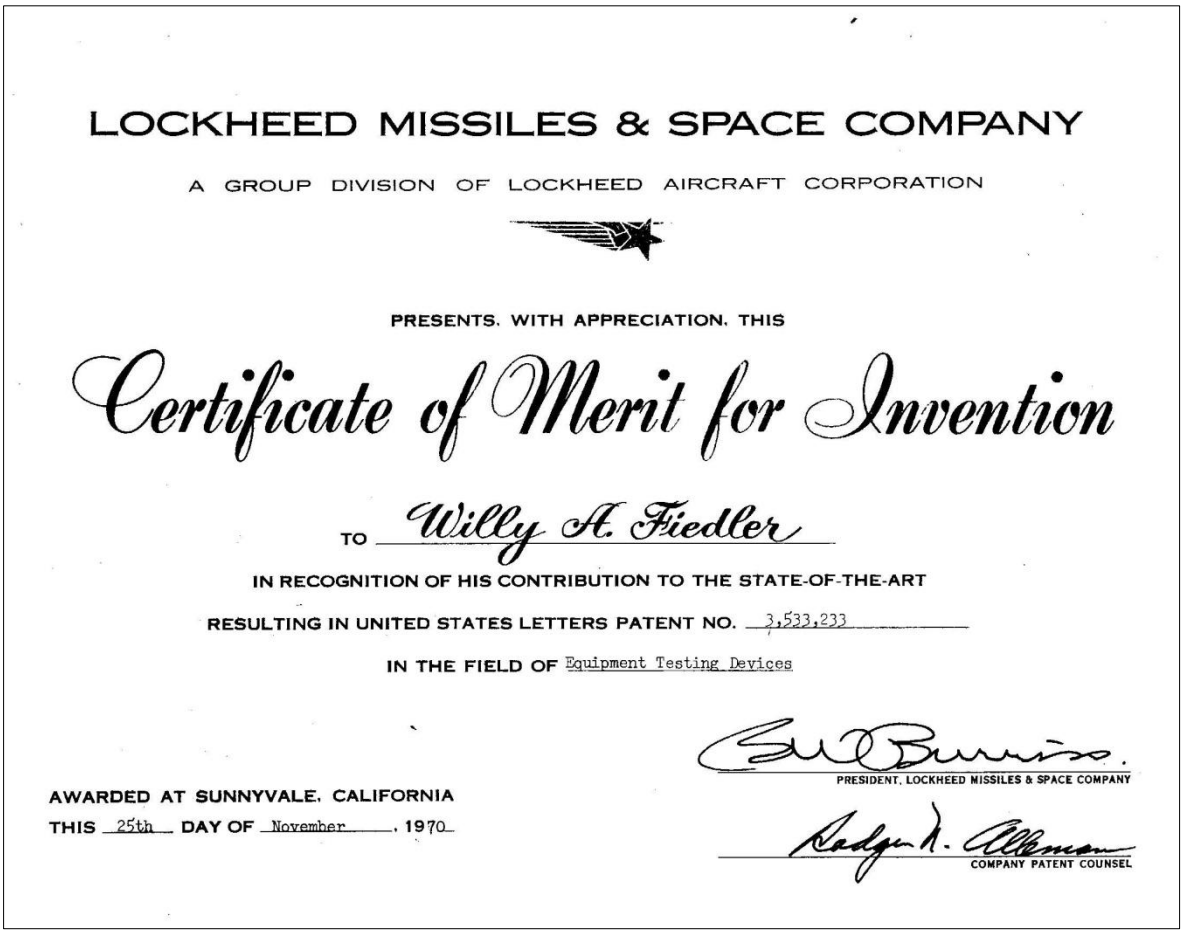
HOT GAS GENERATOR UTILIZING A MONO-PROPELLANT FUEL

Filed Sept. 13, 1967



INVENTORS.
WILLY A. FIEDLER
WILLI K. KRETSCHMER
GEORGE A. HONZIK
BY George C. Sullivan
Agent

Willy Fiedler was a great inventor, who considered himself "a hardware man" as opposed to working only in theory. He wanted literally to get his hands on the project before him. He was an excellent man with machine tools. [Monica Fiedler]



LOCKHEED MISSILES & SPACE COMPANY

A GROUP DIVISION OF LOCKHEED AIRCRAFT CORPORATION

PRESENTS, WITH APPRECIATION, THIS

Certificate of Merit for Invention

TO *Willy A. Fiedler*

IN RECOGNITION OF HIS CONTRIBUTION TO THE STATE-OF-THE-ART

RESULTING IN UNITED STATES LETTERS PATENT NO. 3,533,233

IN THE FIELD OF Equipment Testing Devices

PRESIDENT, LOCKHEED MISSILES & SPACE COMPANY

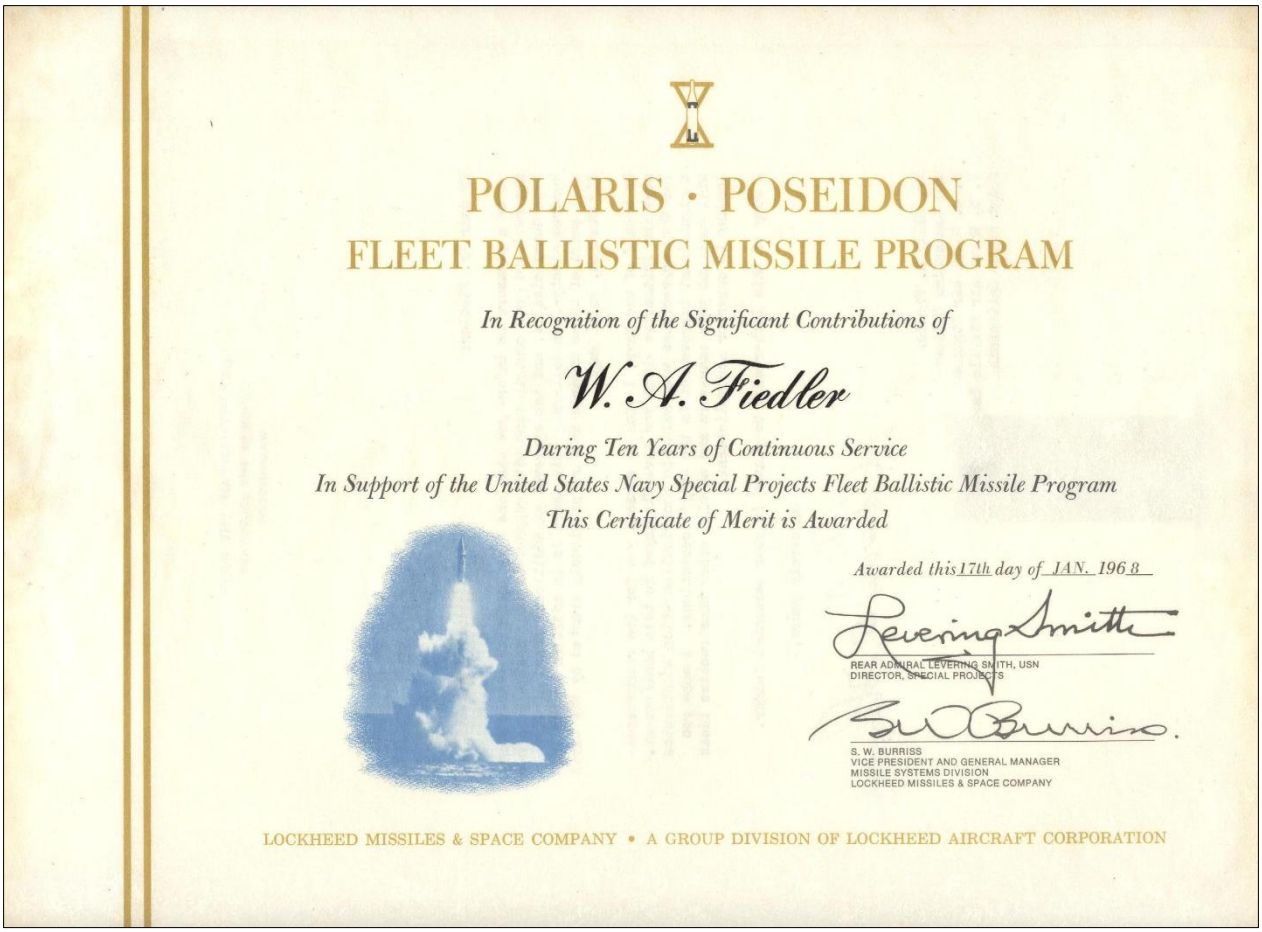
COMPANY PATENT COUNSEL

AWARDED AT SUNNYVALE, CALIFORNIA
THIS 25th DAY OF November, 1970

1970

POSEIDON, which had its roots in POLARIS technology, is a two-stage, solid propellant missile capable of being launched from a submerged FBM submarine. It is only 2 feet longer than the 32-foot POLARIS A3 missile, but has a much larger diameter, 74 versus 54 inches, and is 30,000 pounds heavier. Despite this increase in size, the growth potential of the FBM submarines allows POSEIDON missiles to fit into the same 16 missile launch tubes that carry POLARIS. POSEIDON is also a 2500 nautical (2880 statute) mile range missile; however, it is outfitted with multiple warheads, each of which can be targeted separately. This capability, known as MIRV, enables POSEIDON to cover an increasing number of targets.

The first launch of a POSEIDON missile from a submerged submarine is successfully conducted on 3 August 1970. The missile is launched from USS James Madison as she cruises submerged off the coast of Florida near Cape Canaveral.



POLARIS · POSEIDON

FLEET BALLISTIC MISSILE PROGRAM

In Recognition of the Significant Contributions of

W. A. Fiedler

During Ten Years of Continuous Service
In Support of the United States Navy Special Projects Fleet Ballistic Missile Program
This Certificate of Merit is Awarded

Awarded this 17th day of JAN. 1968

REAR ADMIRAL LEVERING SMITH, USN
DIRECTOR, SPECIAL PROJECTS

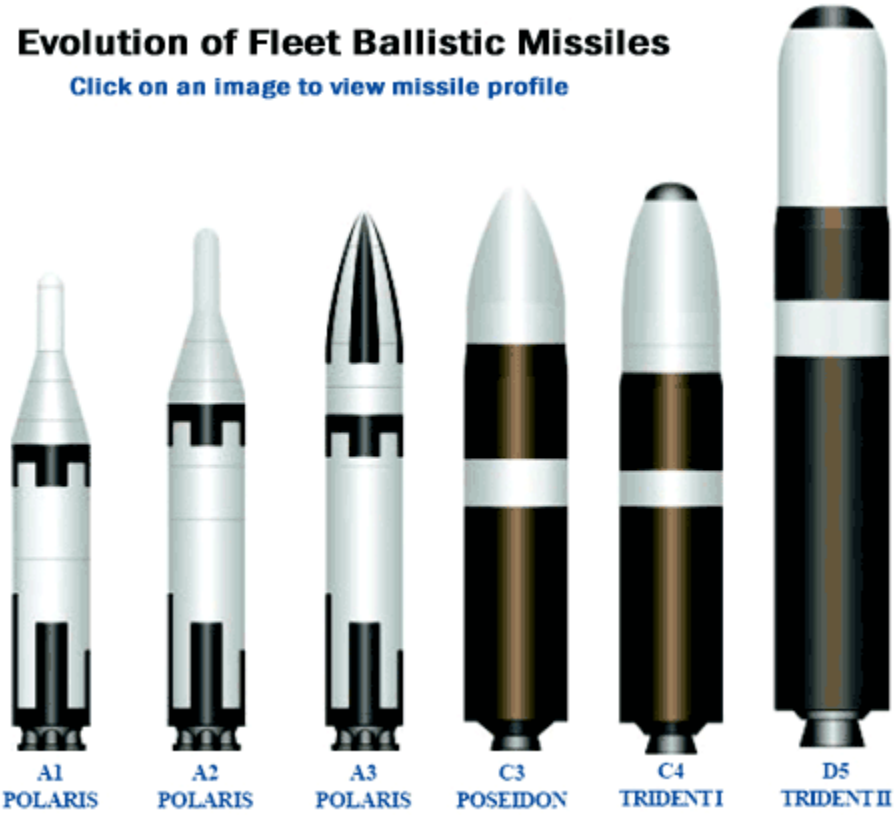
S. W. BURRISS
VICE PRESIDENT AND GENERAL MANAGER
MISSILE SYSTEMS DIVISION
LOCKHEED MISSILES & SPACE COMPANY

LOCKHEED MISSILES & SPACE COMPANY • A GROUP DIVISION OF LOCKHEED AIRCRAFT CORPORATION

1971
The POSEIDON C3 becomes operational on 31 March 1971, when USS James Madison begins her initial operational patrol, carrying 16 tactical POSEIDON C3 missiles.

1972
The TRIDENT program is started. This missile has a more powerful three-stage engine, decreased inert weight and more efficient energy management. More propellant is carried, doubling the range to almost 5000 miles with the same payload and accuracy. Advances in electronics permit the installation of *a stellar-inertial guidance system* and improved navigation and fire control systems. Composite graphite-epoxy materials reduce the weight of structures to 40 percent compared with aluminum. The science of aerodynamics contributes an unusual and unexpected improvement with the invention of a deployable *aerospike*, a needlelike extension that extends shortly after launch and *reduces the frontal drag of the missile by 50 percent*. [Boyne]

1977 and later
The C4 missile development flight test program commences on 18 January 1977 when C4X-1 is launched from a flat pad at Cape Canaveral, FL.
The first tactical patrol of a back fitted POSEIDON submarine is in October 1979, and the first TRIDENT submarine deploys in September 1982 from Bangor, WA. The TRIDENT/Ohio Class submarines are quieter, more capable, and more difficult to detect than their predecessors.



[http://www.ssp.navy.mil/fb101/themissiles.shtml]:

The FBM program was an unqualified success. It was executed with great dedication and diligence by the Navy and its major contractor Lockheed Missile Systems Division. At both ends, teams of highly skilled personnel worked in good cooperation for years on end on the various projects, meeting in all cases the design goals and deadlines.[19]
As Walter Boyne writes: "The Fleet Ballistic Missile Program was an almost miraculous accomplishment, squeezed into a time table that any sensible manager would have deemed impossible. And it was due to the incredible cooperation – and ability – of the Navy-Lockheed team, who had not addressed but assaulted problems to insure their solution."

Willy Fielder fitted like a glove into this organization. His experience in testing missiles of all sorts was unsurpassed. He had an intuitive grasp of the problems at hand.
He could rally people to the task with his enthusiasm, leading to solutions that were often original. His relations with his peers as well as with his superiors were equally positive due to his expertise, cheerful nature and optimistic outlook. [Monica W.-S.]

[19] In order to supervise the timely completion of the myriad subtasks, new computer techniques were implemented around the 1960s (PERT).

DEPARTMENT OF THE NAVY
STRATEGIC SYSTEMS PROJECT OFFICE
WASHINGTON, D. C. 20360

Dr. Willy A. Fiedler, Chief Scientist
Missile Systems Division
Lockheed Missiles & Space Co., Inc.
P.O. Box 504
Sunnyvale, CA 94088

Dear Dr. Fiedler:

On the occasion of your retirement after a distinguished career in aeronautical and ordnance engineering capped by seventeen years in which you and I have been associated in the Fleet Ballistic Missile Program, I wish to express officially the gratitude of the Navy and the Special Projects Office for the invaluable service you have rendered, as well as to extend to you my personal thanks and best wishes.

Your participation in our program and your dedication to the task have been constant. Your contributions, especially in thrust vector controls and underwater launch, were essential to success in the early and very critical development of the Fleet Ballistic Missile System. Throughout the years, your inventiveness and critical analysis have been of continuing and substantial value.

As we move ahead to maintain the effectiveness of the deterrent system in which your energies were so valuable, your daily presence on the FBM team will be sorely missed.

Thank you and smooth sailing.

Sincerely yours,

Levering Smith

LEVERING SMITH
Rear Admiral, U. S. Navy
Director, Strategic Systems Projects

Rear Admiral Levering Smith

A favorite story about Fiedler occurred during the celebration of the first successful Polaris missile launched. Everyone was celebrating and throwing each other in a pool. The pool treatment was given only to respected leaders said chief engineer Frank Bednarz, who expected to be next and handed Willy his wallet and eyeglasses.

The revelers walked right past Bednarz and flopped Willy - with Bednarz's valuables - into the pool. [Martin Hollmann]

W. F. RABORN
VICE ADMIRAL, USN (RET.)
1606 Crestwood Lane
McLEAN, VIRGINIA. 22101

March 18, 1974

Dear Willy:

It surely was a heart-warming letter which you wrote under the date of 28 February and in return please let me say that I know of no one in the whole POLARIS family who was more innovative and productive than you!

So in return let me assure you that your dedicated efforts have affected the lives of millions of Americans because of the resounding success of the POLARIS weapons system to which you made such a major contribution.

I thank you so much for your thoughtful invitation to spend an evening with you and there is nothing which I would like better to do than that. Perhaps on one of my periodic (quarterly) visits to LMSC by pre-arrangement we could do just that.

In the meantime may I wish you and your nice wife Greta all of the wonderful benefits and happiness which you both richly deserve.

Sincerely,

"Red"

W. F. Raborn

Dr. Willy Fiedler
12758 Leander Drive
Los Altos Hills, Calif. 94022

To Willy Fiedler, with warm appreciation

Your shipmate, W. Red Raborn

Vice Admiral USN

DEPARTMENT OF THE NAVY
STRATEGIC SYSTEMS PROJECT OFFICE
WASHINGTON, D.C. 20376

IN REPLY REFER TO
14 OCT 1975

Dr. W. A. Fieldler
12758 Leander Drive
Los Altos Hills, CA 94022

Dear ~~Dr. Fieldler,~~ Willie:

As our Navy celebrates its 200th Birthday and our Country prepares to celebrate its Bicentennial, we in the Strategic Systems Project Office find ourselves preparing to celebrate the Twentieth Anniversary of the POLARIS/POSEIDON/TRIDENT Programs.

The outstanding team which began this program, came into being on 17 November 1955. The enthusiasm and perseverance of these pioneers established the basis for the dedication and uncompromising excellence which still imbues the contractors, laboratories, and military activities which remain dedicated to strategic system excellence.

It seems appropriate, then, that all of those individuals, past and present, who have labored so successfully and selflessly for the success of POLARIS, POSEIDON and TRIDENT Programs should join together to mark this Twentieth Anniversary. To that end a Commemorative Committee has been established and with traditional Special Projects vigor has organized a dinner/dance to be held on 15 November 1975.

Individual invitations have been sent to as many as space, time and records would permit us to contact. We plan to make the evening a team affair and seat the celebrants accordingly. Tables will be arranged so as to mingle old timers, present contractors and SSPO employees on the basis of common interest and common goals. Although some degree of solemnity is inevitable, our purpose is to enjoy the company of old friends and present participants in our common effort.

14 OCT 1975

By separate mail I have sent your invitation and supporting information about the party. I hope you will be able to accept and I look forward to seeing you on the 15th of November.

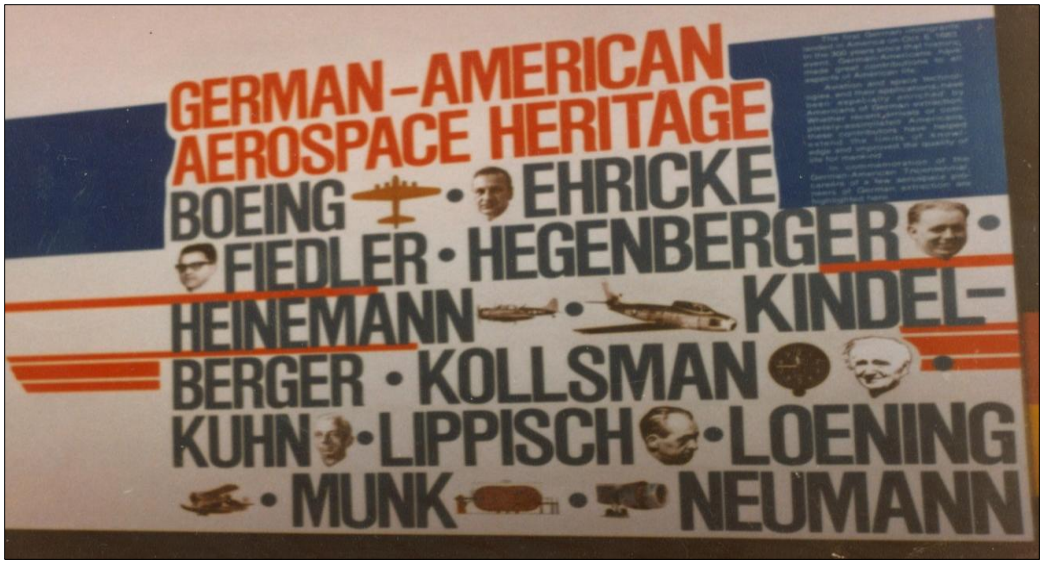
Sincerely yours,

Levering

LEVERING SMITH
Rear Admiral, U.S. Navy
Director, Strategic Systems Projects

Willie Fiedler (seen on the back) talking to Dan Tellep,
(CEO of Lockheed at the time of the merger with Martin)

Willie Fiedler lecturing about the Polaris



Tribute to German-American scientists (at the occasion of the Lockheed celebration?)

source: Roy Day

In retirement Willie Fiedler visits Missile Park Point Mugu

Willy Fiedler on the front steps of his house shortly before going on a vacation to Europe (1990?)

In those years (1994?) he also made a glider flight at Santa Ynez CA (near Santa Barbara) where he piloted himself. In 1996 Willy enjoyed a last glider flight at Hollester CA where he flew for 45 minutes with a lady-instructor. On return the woman stated she was highly impressed by the flying skills of her 87-year old co-pilot.
“He has such delicate touch”, she said.
[source: M. W.-S]

Willy Fiedler, before his last flight at Hollister CA, fall 1996

In 1997 he made a last trip to Europe (with the Chrystal Harmony, a cruise ship) to visit his daughters.

Willie died shortly before his 90th birth date, on the 17th of January 1998.

HOOVER INSTITUTION
ON WAR, REVOLUTION AND PEACE

HOOVER INSTITUTION ARCHIVES

February 16, 1995

Answer Febr. 22

Mr. Willy A. Fiedler
12758 Leander Drive
Los Altos Hills, CA 94022

Dear Mr. Fiedler:

It was such a pleasure to meet with you and your daughter at the Hoover Institution Archives. The materials that you have donated on the development of missiles will add to our understanding of the role of technology in postwar defense policy. Beyond security issues, your own life story is fascinating and a wonderful addition to our holdings. I hope that you and your secretary continue to work on the oral history project. As you complete tapes and also as you run across other materials, perhaps from Germany, I hope that you continue to add to your collection at the Hoover Institution.

There is one housekeeping chore to take care of. As I mentioned, we need to have a deed of gift to finalize the transaction. I am enclosing two deeds for your consideration. If the wording meets with your approval, kindly sign and return one copy. The other copy is for your records.

I very much enjoyed looking at the photograph album from your retirement party. Your daughter suggested that we return the album to you so that you can also enjoy it.

The xeroxes with this letter come from the Wiegand collection that I mentioned to you. In the collection are photographs of Dipl. Eng. Rudolph Nebel, the director of the Raketenflugplatz in Berlin.

Best wishes,

Sincerely,

Elena S. Danielson

Elena S. Danielson
Associate Archivist

ESD:gt
Enclosures