



He 176

3-Views and Artist's Conception

Heinkel He 176 by Rick Koehnen

The history of rocket powered aircraft can be divided into two categories, solid and liquid powered rockets. The solid fueled rockets offered ease of handling and differing power requirements by just adding rocket units to the aircraft. The first rocket powered aircraft was a modified Ente glider which was financed by Fritz von Opel. This was followed by the well publicized Julius Hatry built RAK-1 utilizing Alexander Sander built solid rockets. Hatry built the RAK-1 specifi-

cally for the purpose of testing rocket power. Fritz von Opel offered financial support and his overwhelming persona took over the project to the degree of painting out Hatry's name on the tail of the aircraft when filmed in flight. This aircraft and its entire development history are included in the Twelve Squared 1/72 model #2-19 Opel Hatry RAK-1, \$9.50 plus shipping. Other names involved with rocket powered aircraft involve Lippisch (which eventually led to the Me163), Max Valier and Espenlaub (read reference #5).

The sudden disappearance of these experiments were the result

of a 1929 decision by the Reichswehr on the recommendations of Dr. (later Gen.) Becker of the Ballistics and Munitions Branch. The purpose was to develop an inexpensive weapon capable of launching what today on ICBM's is called a MIRV warhead. The main missile would carry a warhead of multiple solid fuel rockets to be cluster launched 3-5 miles from the target. The second objective was to develop a simple cost effective liquid-fueled rocket for research. Hence rocket development became a "black program" in Germany. The two shining stars in this research

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TCAH This Month

The monthly meeting will be held Saturday July 12, at Fleming Field, South St. Paul, beginning at 1:30 pm. Vendor baiting will begin about 12:30, so come early.

Picture your model here! Send me a photo of your model, and it'll be used to fill these little white spaces at the ends of the columns.

GENERAL MEETING MINUTES – June 2008

Bob Maderich called the meeting to order at 1:15. We had one visitor who plans to join our club next month. Our friend from across the pond, Mikael Kuokkanen, has returned to us for a few months. Welcome back. There was no treasurers report, and Axel being the only vendor this month gave us updates on what's new in the book business. TCAH will sponsor a trophy package for The IPMS nationals.

Due to only one "finished" entry in the "Ground Pounders" contest. It has been extended to August.

Also there is a challenge to the contest. Steve Jantscher and Bob Ferreria are building A-4 Skyhawks and are challenging other members to join in with them for the GP contest. And Bernie Kugel has announced a contest for next February. Any type of model (Aircraft, Armor, Auto, Ship) but it must be handpainted. Spray and airbrush will only be allowed for Primer, Gloss, and Flat coat. Everything else must be painted by hand.

We have a request by a member looking for a magazine article. Aircraft Modelworld, July 1988, "Modeling the P-51 to Cavalier" Contact Rick Koehnen if you have this.



From the President by Bob Maderich

Summertime and the modelin' is easy...oooh, that was bad. Anyway, hope everyone's summer is going well. As a group, we need to start concentrating on the upcoming Nordicon show:

1) Bernie will be holding some prep meetings till the event and we need all the volunteers we can get.

2) Everyone, go thru that collection and pull out a few kits for the raffle.

3) If you are sponsoring a special award, please get your money to Tom, so we can get this on the new ad.

On another note, Thanks to all the great forums we have had so far this year. Larry deserves a round of applause for all his work organizing these and generally being a great VP.

Also, don't forget Merrill's "Ground Pounders" challenge and we'll see you in July.



From the Vice President by Larry Donovan

Ahhh, summertime! Barbecue, the great outdoors, "honey-do" lists for the lawn and garden from my (much much) better half, the return of our state bird (the mosquito, and NOT the DeHavilland one either!)... livin' is easy! Yet, what is this...how did this small insect imbed itself into the newly painted headrest on my Hasegawa Frank? I thought I had that well covered...argh!

I feel summer really is the modeler's challenge season. Let's look at some of the obstacles we climb from June through September (the length depending on your own personal views of global warming): high humidities do wonders for airbrushing (I just emptied the moisture trap a minute ago!), and aforesaid humidity does nothing to hasten drying time!

If, like your present writer, you are modeling in, say a garage or shed-like workspace, you may be contending with our friends from the insect side of the Animal Kingdom. These guys are curious....I'm sure the one I mentioned above, currently imbedded in the Frank,

Airline Chatter

by Terry Love

Airbus sold 6 Airbus A-350 wide-body airliners to MAZ Aviation of Saudi Arabia for \$1.5 Billion.

American Airlines plans to cut flights 12% in the fourth quarter, lay off thousands of employees, and charge for all checked baggage. This is all due to jet fuel prices. Also they are going to park MD-80 jets. American Airlines has around 300 MD-80s. American will drop Chicago to Buenos Aires, Chicago to Honolulu, and Boston to San Diego. American will also vastly cut back its Puerto Rico flights. American Eagle will drop to only 33 flights out of the present 55 daily flights from San Juan, Puerto Rico. They will move their ATR-72 turbo-props to Dallas and park all of their 26 SAAB-340 aircraft.

Midwest Airlines, beginning in September, will park all of their MD-80s, and operate only their 26 Boeing 717s (latest version of the DC-9). That is a third of their entire fleet that they will be parking. Associated layoffs will then happen.

Jet Blue will defer delivery of 21 Airbus A-320s scheduled for delivery between 2009 and 2011 due to high fuel costs.

United Airlines and US Air have called off merger talks. United is just too big of a mess for U S Air. However, United Airlines and Continental Airlines were in talks about merging, but Continental Airlines also backed out because United is a basket case. But United and Continental did form a marketing alliance.

United Airlines is planning to park another 70 airliners next year. This year United plans to park 64 Boeing 737-300s and 30 Boeing 737-500s. They also plan to park 6 Boeing 747-400s.

Delta Airlines will begin non-stop service from Atlanta to Kuwait

using Boeing 777-200ERs starting on November 7.

Boeing pushed back its designing of a 737 replacement, saying it needs more time to advance and research new technology. Real reason is that the 737s are selling very well, and Boeing has a very large backlog of the airliner.

KD Avia, a Russian low cost airline, ordered 25 Airbus A-319s. Capitalism at its best!!!!

American Airlines will begin flights from Chicago to Moscow this summer.

Champion Airlines ceased operations on May 31. It was a known and planned event - not a surprise. They operated the last passenger flying Boeing 727s in the U S. One of the Boeing 727s, N697CA, was the last Boeing 727 built - number 1824. A few of the 16 Boeing 727s will go to foreign carriers, thought many will be permanently grounded, never to fly again. The market for a used Boeing 727 is ZERO!!!

Airlines, in general, are benefiting from the delays in the Boeing 787 Dreamliner program. With fuel costs so high, most airlines are parking their current airplanes. With so many of the airlines parking relatively new and maintained airliners, the resale prices for used airliners are really CHEAP right now. So wealthy individuals and corporations are looking very close at the aircraft.

Delta Airlines says that more than 40% of their flights are international destinations. On June 12, Delta Airlines began service from Salt Lake City to Paris.

Air Tran Airlines put off deliveries of 18 Boeing 737-700s until 2013 and 2014.

United Airlines will eliminate its TED airline of coach-only domestic service. Fares were too



cheap to make any money. United will add first class seats, and put the Boeing 757s back into the regular United fleet. 1100 jobs will be lost. United's effort to cover fuel costs with fare increases and new baggage - checked fees, have fallen WAY short of their revenue goals.

Delta Airlines is cutting domestic flights by 12% this fall.

Spirit Airlines will layoff 60% of their flight attendants, 40% of their pilots, and close its Detroit hub - all due to high fuel prices.

Air One, a fast growing Italian low cost carrier, ordered 12 Airbus A-350-800s, plus 12 options, and 12 Airbus A-330s plus 8 options.

Hawaiian Airlines has a fleet of 18 Boeing 767-300 aircraft on 16 daily flights to 14 destinations outside of Hawaii. Hawaiian Airlines has 150 inter-island daily flights using Boeing 717s - the latest version of the Douglas DC-9. Hawaiian is adding four more Boeing 717s to meet increased demand created by the shutdown of Aloha Airlines. Hawaiian has hired ex-Aloha Airlines employees.

Airbus has received 470 airliner orders by the end of May.

U S Air will lay off 1700 or 5% of their employees and will cut more capacity.

United Airlines say that its jet fuel bill of 208 will over \$10 Billion.

Continental Airlines will stop flying to more than 40 domestic and international destinations from its hubs on September 3. Continental will also eliminate 3000 jobs or 6.5% of its work force, and retire 97 airliners. Continental will also cut 11% of its domestic capacity.

Northwest Airlines, this fall, will reduce its capacity by 9.5%. NWA will park 33 Douglas DC-9s and 14

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Boeing 757s and Airbus A-320s. NWA will be down to 61 Douglas DC-9s by Christmas time. Four years ago, NWA had 172 Douglas DC-9s.



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was one of those model show judges you hear horror stories about: he had his little flashlight to look for seams or glue spots or some other flaw (well at least HE got his come-uppence!). Undeterred, others of his ilk flitter around just to annoy this diligent modeler so that he has to swat at them at the same time holding that teeny tiny part in the tweezer to attach to his model. And these critters are some kind of "uberbug"! One would think after bug-bombing the garage, and with ALL the other noxious chemicals we modelers use, these guys would have long gone to their eternal reward. Maybe it is because of these chemical compounds they have become so fearsome? Maybe we should amend the labels from "Warning the State of California" (and what doesn't California warn us of?) to "Warning these chemicals are creating a master race of super insects who will dominate the planet".

Long periods of daylight. A problem? How? Well in October-March what does it matter if we retreat to our model benches at 7 PM (or 8 or 9 PM as is your habit); it is already dark out, you can't really mow the lawn (you'll run into the flower bed); the light in the living room is really not conducive to painting the walls. Now comes May, June, July, August: stays light until 9 PM or even later. Guilt! Should I not be cutting the grass/tending the weeds/sitting on the porch instead of spending an hour working on the Heller Bloch 174? Ok, even working on the Bloch is cause for enough guilt, but hopefully you get the picture here. And readers, I ask you which is worse: an underheated workspace in winter or an undercooled

workspace in summer? Remember, you can always add layers in winter; let us pass unstated the options for the opposite season.

And don't let anyone tell you "it's the humidity not the temperature". Heat has a funny way of messing with your thinking processes. Like forgetting to really rub down the Tamiya tape masking on that canopy...if anyone wants an (mostly) OD canopy, I've got one for you! Some modelers put their "sweat, blood and tears" into their creations...me, it's mostly sweat. Well at least Floquil/Testors Plastic Prep works on this body secretion.

So my readers (those that have stayed this far!) if you have started and finished kits in summertime despite these and many other sundry terrors, my hat is truly off to you. Think I'll sit on the porch tonight and have a nice ice-tea, it's a beautiful summer evening!

A couple of final notes:

1. We are almost halfway through the year, and I just want to acknowledge all the guest speakers for volunteering their time and talent; and I am looking forward to the speakers for the second half of the year.

2. Get those production lines going: Merrill's Groundpounders contest will be at the August meeting, and Bernie Kugel's "Brushpainting" challenge.

3. If you are interested in helping with Nordic Con, we need you! We will have Nordic Con meetings after the main meeting for July and August. These Nordic Con meetings are short, I don't think we've had one go over 30-45 minutes in the 4 years or so I've been volunteering.

See you at the July meeting!



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were both young men working at separate facilities. Wernher von Braun formerly worked at the Re-inickendorf Raketenflugplatz and then for Ballistics and Munitions at Kummersdorf. The other was Hellmuth Walter who at the Germania-Werft in Kiel was working on a propellant for a wakeless torpedo using hydrogen peroxide. Von Braun's rocket used methyl alcohol and liquid oxygen while Walter's propellant used a mixture containing 80% hydrogen peroxide (T-Stoff) which when mixed with a solution of calcium permanganate (Z-Stof) rapidly decomposed leaving a trail of superheated steam. While Walter was perfecting his rocket, von Braun had finished his and was looking for a test bed. He mounted the rocket in an old Junker A 50 Junior fuselage. The 30 second test of the 650 lb rocket showed that the Junker couldn't take the stress.

Ernst Heinkel had already made up his mind to donate a fuselage from a He112 fighter toward rocket research and was so impressed with von Braun's unit that he also sent one of his best engineers, Walter Kunzel along with several riggers to assist. The He112 cockpit was sandwiched between the liquid oxygen tank forward and the methyl alcohol tank aft with the rocket motor behind it and the combustion chamber in the *very* tail. Initial tests were done remotely at Kummersdorf. The first He112 fuselage was totally blown apart as well as a second. Finally it was felt that tests were far enough along to warrant a flight test aircraft and He112 V5 (fifth prototype) was donated to the project.

In early March, 1937, Erich Warsitz, who was a test pilot from Rechlin and the one who convinced Heinkel to put up a flight worthy aircraft, prepared to take off in the He112 The Junker Jumo 210 engine was left in the nose and after it was warmed up, Warsitz advanced the rocket levers. Instantly the aircraft disintegrated with parts spread over a large area. Miraculously

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Warsitz was thrown clear and other than some minor scratches was OK. Warsitz was bitten by the bug and pleaded with Heinkel to give him another aircraft. This time a late B model He112 with a Daimler-Benz DB 600 engine was modified. This time Warsitz took off under the power of the recip engine and when level at 2,600 feet and indicating 190 mph, he cut the engine and ignited the rocket. He was slammed back into the seat and the speed jumped to 250 mph, the aircraft began to climb and the speed continued to increase until after 30 seconds and at 285 mph the rocket quit. A liquid propellant rocket had at last powered an aircraft by itself.

A second flight was made, again with partial fuel, followed by a third, the first with full tanks. After the third rocket test, while coming in to land, the aircraft suddenly nosed over and crash landed gear up in scrub next to the field. Warsitz thought the aircraft was on fire as the cockpit filled with smoke. He felt he was too low to bail out and opted to belly in. When he shut down the rocket, the flames tongue had been drawn into the tail of the aircraft scorching the interior. It was smoke from this that had filled the cockpit. On a separate occasion Air Ministry technicians observed Warsitz take off under the dual power of both powerplants. Very impressed with the climb angle and performance they felt the future of rockets were in auxiliary power units for large aircraft. By the end of June Warsitz had made the first complete flight using only the rocket.

While it launched the first liquid rocket powered aircraft, von Braun's rockets would be more famous for putting V2's into downtown London and men on the moon. Meanwhile Walter's unit was appearing to be more adaptable to aircraft use. It was simpler, more reliable, and didn't use hard to get liquid oxygen. He also was well along in developing a pump to handle the T-Stoff rather than using compressed air, which would enable an increase in thrust potential.

In 1937 Heinkel met with both von Braun and Warsitz concerning a rocket powered high-performance aircraft. Heinkel had always been fascinated with speed records and was at that time preparing a special version of his new He-100 to go for the speed record. (It broke 463.92 mph 18 months later). Discussions with Walter disclosed he was within a year of offering a rocket motor that would weigh only 220 pounds and generate 1,300 pounds of thrust. von Braun was working on a 2,000 pound thrust rocket, but was more than two years from releasing it. Heinkel felt that if the aircraft was tailored around the powerplant and pilot, developing the smallest aircraft possible, the speeds he was after just might be attainable with the Walter powerplant. His goal was to break 1,000 kph. The project was overseen by Heinkel's Technical Director and Chief of Development, Heinrich Hertel. Walter, along with Heinkel's talented designer, Siegfried Gunter, worked up an aircraft barely 17' by 17'. Using a 6' 1" pilot they envisioned a near circular cross-sectioned fuselage only 28" wide and 3' deep. A clean cantilever wing would be mounted behind the cockpit mid way up the fuselage. The pilot would have to be semi-recumbent with his knees and shoulders being at the same height. The stick would be between his knees and the rudder pedals in the nose. His head would barely protrude from the cockpit opening but would be shielded by a small windscreen. The 16' 5" wing only gave 58.12 sq. feet of lifting surface. The petite aircraft would have fixed cantilever tricycle gear with a track of only 28". With the forward position of the aircraft and light weight of the rocket unit, a tail skid was added so the aircraft could rest in a tail low three point attitude until the pilot got in, then it would rest in a level three point attitude.

It was decided from the start that it would be best to build two aircraft, designated He176. Both would be private ventures financed solely by Heinkel. The first aircraft would be used for preliminary work

and utilize the Walter engine. The second He176 would be of similar size but would be more streamlined and geared for speed utilizing von Braun's larger rocket unit. This way the first aircraft could research the slow speed handling characteristics and build rocket flight experience in preparation for the speedier machine.

The problem of pilot egress in sitting in front of such a volatile powerplant proved challenging. An ingenious arrangement was developed where the entire forward fuselage ahead of the wing would be blown off by compressed air. The forward fuselage would have a parachute to slow it somewhat allowing the pilot to get out of the cockpit on the way down and use his personal chute. Several dummies of Warsitz were built and the system was tested from a Neill between 20-30,000 feet. As long as the nose separated, the pilots chances of survival were acceptable. This second aircraft would have a fully enclosed cockpit with a glass nose to keep the pilot fully protected yet in a semi-recumbent position. The landing gear would be tail dragger with a fixed tail skid but with the main gear being retracted straight up on either side of the fuel tank.

Heinkel was required to keep the Air Ministry Research Department up to date on his progress. Dr. Lorenze of this department, unlike many others, saw a great future in rocket interceptors but felt that Heinkel's design was too small and too generic. He felt only a radical new design could be successful. Lorenz approached Dr. Lippisch who had designed the original rocket powered Ente if he could come up with something based on his tailless Delta IV to use rocket power. The project would be simply referred to as "Project X". The Deutsches Forschungsinstitut für Segelflug (DFS or German Research Institute for Gliding Flight) had continued work on the Delta IV. While they were experienced with wood working, the metal work was to be sub-contracted to Heinkel.

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With continual security harassment, and problems dealing with Heinkel over the fuselage, Lippisch, along with his DFS.194 test bed, decided to leave DFS. At the end of 1938 Lippisch came to an agreement with Willy Messerschmitt and on the first of the year his DFS.194 and twelve co-workers took up residence at the Messerschmitt plant at Augsburg. The rest of the Me163 Komet story is well documented

The unassembled and untested first He176 was transported to a brand new test facility at desolate Peenemunde where von Braun and all rocket research had moved to. There it was felt that Warsitz should get the feel of the handling qualities of the He176 prior to the rocket tests. They attempted to tow the aircraft behind Heinkel's 7.6 litre Mercedes down the smooth beach. These were unsuccessful due to the Mercedes getting bogged down in the sand.

The new Walter engine, HWK R I-203 had a pump for the T-Stoff and was to provide 1,320 pounds thrust. It was also temperamental and already destroyed an entire building, more than once. The Z-Stoff tended to clog the jets and with too little catalyst, the pressure and thrust fluctuated considerably.

Rocket motors had no means of controlling thrust at this stage of their development. It was all or nothing at all, reminiscent of the rotary engines of WWI. It was proposed that Warsitz first flights be by using repetitive short bursts of power to build up speed to allow more control over the aircraft. The first flight nearly was disastrous. The He176 shot forward like a bullet and with the 28" wide landing gear began to snake wildly. Warsitz cut the power. Eventually initial control was solved but a more serious and embarrassing problem arose. The He176 wouldn't take off.

It was obvious to all that the wings (identical on both aircraft) were too small for the available thrust to get airborne. A new wing with a different airfoil section might

do the trick but even then there wasn't enough runway to guarantee a safe aborted take off. Simultaneously work began on extending the runway and on building a new wing back at Marienehe. The new wing arrived at Peenemunde in the spring of 1939 and after ground runs the first flight of the He176 took place on 20 June, 1939. It staggered into the air for an extended 50 second flight that barely exceeded 170 mph. Word of the flight soon reached the RLM and soon Goring's deputy, Erhard Milch, and the Luftwaffe Chief of Aircraft Procurement, Ernst Udet and arrived for the second flight. Neither of these experienced pilots had previously expressed any interest in rocket propelled aircraft. The size immediately turned them off, Udet questioned Warsitz; "You want to fly with that? It has no wings

those are running boards!" After a protracted takeoff, Warsitz flew once around the field, cut the rocket power and in a steep gliding approach touched down at high speed. Udet was upset, considering the demonstration and design irrational and a dangerous stunt lacking any practical application. He then forbade any further flight of the aircraft. Warsitz argued for further tests, but Udet was firm. Finally after personally traveling to Berlin, Heinkel was able to get Udet to lift his ban. Flight tests had just resumed when they were suspended again by Berlin with the stipulation that the aircraft must be at Rechlin experimental center on 3 July for a "special demonstration". Puzzled by the order, Heinkel pressed Udet for more information, hoping for a change of attitude and perhaps the support he long had hoped for. Heinkel was shattered. He later related Udet said, "The Fuhrer must be shown something new, and I suddenly remembered your comical bird! If it can get around the airfield that will be good enough."

The assembly at Rechlin included Hitler, Goring, Milch, Udet, Jeschonnek, von Keitel and Jodl. Unlike the first demonstration by

Warsitz which was shaky at best, he accelerated the He176 rapidly down the runway and rotated directly in front of the viewers. He rocketed steeply up to 2,500 feet, tightly circled the field under full power and then he cut the throttle. Gliding fast back toward the runway, just prior to touchdown, he relit the rocket and made a half circuit under full power til he ran out of fuel, then glided down to a soft landing. Hitler complimented Heinkel on the spectacular demonstration of the He176. When Goring asked Warsitz what he thought of the aircraft, he replied he didn't think there would be many aircraft with propellers in a few years. Goring's condescending voice replied, "Warsitz, you are something of an optimist."

Three days later von Braun submitted a proposal for a 'High-performance Reaction-propelled Aircraft'. With the successful experience with his A3 rocket, von Braun proposed a 11,145 pound interceptor powered by a 22,000 pound thrust rocket launched off two 20 foot vertical guide rails. It would fly on a 3-axis gyro autopilot until it reached 26,250 feet in 53 seconds at which time the pilot would take over manually and switch to a 1,600 pound thrust auxiliary rocket chamber which would provide a maximum speed of 447 mph. After burn out the pilot would glide back and land on retractable skids. The Air Ministry's Technical Department thought the proposal far fetched and ironically passed it to the most experienced rocket group for their opinion, Heinkel. Heinkel's Development Director, Dr. Motzfeld, was unenthusiastic, pointing out only the negatives. The proposal was discarded although the idea was picked up and modified by Erich Bachem which resulted in the Natter.

The Air Ministry withheld permission for Heinkel to finish work on the second He176 and the first model was shipped to the Air Museum in Berlin and displayed as a tongue in cheek example of aircraft development. Unfortunately the

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RAF destroyed it in a bombing raid. Hence at the end of the war the only documents to be found were the completed drawings of the second unbuilt aircraft. For years this has been erroneously depicted as the He176.

When war broke out the leaders felt they could win in a few months with weapons on hand. The Me163 program was barely alive and headed the way of the He176. One must believe that the early demonstrations of the He176 and later the DFS194 and Me163a kept the idea alive and the door cracked for the eventual development of the first operational rocket fighter the Me163.

NOTE: There are NO photos in existence of the He176. Most references refer only to the second streamlined version which never was built, but give the credit of the first type. Text #5 is the only one that gives anything other than a side view of the first version.

REFERENCES:

1. German Jet Genesis, David Masters, 1982, Janes.
2. German Jets, Model Art #348, 1990, Model Art (Japan).
3. Heinkel, An Aircraft Album, Turner, 1970, Arco.
4. Jet Aircraft of the World, Green & Cross, 1955, McDonald.
5. Rocket Fighter, Green, 1971,

Ballantine Books.

1. A fascinating book covering 197 project titles of WWII German jet and rocket aircraft. Most only get a paragraph and line sketch. Operational types (Me262) several pages (8x11). He176 gets one page, history specs and artist sketch of both types.

2. Excellent book on all German jet and rockets types to make hardware stage and many of the major paper projects being worked on at the end of the war (ie. Ta 183, Ta 283, P13 etc), 10 pages (7x10) in color, numerous excellent line drawings, many photos and construction breakdown illustrations. Still available from Model Art Co., Ltd, Iidabashi 2-chome, Chiyodaku, Tokyo 102 Japan. Ask for a listing of available titles and mention Twelve Squared.

3. First in a series of company histories that included Messerschmitt, Junkers, Boeing, Avro, Hawker, and Bristol. Each produced type gets photo, text and spec coverage. He176 gets one page (7x9), artists drawing.

4. Excellent reference with 1/2 to 2 pages on every jet or rocket powered aircraft up to 1955. History, three view and at least 2 photos or drawings of each type. Jet helicopters and engine testbeds (ie. B17 with turbo-prop in nose) are all covered. Great book if this is your

era. He176 gets 1/2 page (9x11), 3-view, text, two sketches.

5. Excellent 160 page history of rocket fighter development beginning with the RAK-1 glider (Twelve Squared #2-19 \$9.50) through the SR-53 with WWII ending on page 150. One of the Ballantine Books Illustrated History of World War II, Weapons (Blue spine) #20. Medium sized (5x8) paperback sold for \$1 can be found in used book stores for \$5. Numerous photos and 3views of German, American, Japanese and Russian war project. What's invaluable is Green's narration of the people and events that developed these projects. History portion of this instruction was drawn primarily from this work.

SPECIFICATIONS:

Span	16' 5"
Length	17' 1"
Wing area	58.13 sq ft
Weight	1,720 lbs (empty)
Weight	3,572 (max-loaded)
Range	68 miles
Max speed	466 mph

(second a/c ?) Powerplant 1 - 1,323 lb thrust Walter HWK-R1 203 rocket.



ON THE TABLE June 2008

Name	Model	Scale	Manufacturer
Bob Maderich	Euro-copter	1/72	Revell
"	Dewotine 501	1/72	Heller
"	Junkers D.1	1/72	Roden
Steve Erickson	Polikarpov I-16 type 6	1/48	Eduard
Sean Brzozowski	F-16 WIP	1/48	Tamiya+Wolfpack
Nora Verner	F-8 Crusader	1/72	ESCI
Bernie Kugel	SU-25 Frogfoot	1/48	Monogram
"	Pfalz D.III	1/48	Eduard
"	Hanroitt HD.I	1/48	Eduard
"	Neiuport 16	1/48	Eduard
Ken Jensen	Race Car	1/12	Caukcraft
Don Stauffer	F3F-2	1/48	Accurate Miniatures
Gary Anderson	4 Buckley class DE	1/2400	GHQ

Directions to the Club Meeting Location

Where: South St. Paul Municipal Airport, a.k.a. Fleming Field, located on the southern extremity of South St. Paul, south of I-494, west of Concord Street and East of Highway 52.

If coming from the western Twin Cities going east on 494:

- Exit at the 7th and 5th Avenue exit (Exit No.65)
- Turn right (South) on 7th Ave and go approximately .6 miles to a 4-way Stop sign. This is South Street W. To your left there will be a McDonald's; to your right front there will be a Walgreen's.
- Turn left (East) at the 4-way Stop onto
- South Street W and go approximately .6 miles. Along the way you will encounter three more Stop signs—the third Stop sign (Henry Avenue) will be a "T" intersection. At the "T" intersection on your left will be homes and on your right softball fields.
- Turn right (south) onto Henry Ave. and go approximately .2

miles toward the Fleming Field airport terminal building.

If coming from east Twin Cities on westbound 494:

- Exit at the 7th and 5th Avenue exit (Exit No.65)
- Turn left (South) on 7th Ave and go approximately .6 miles to a 4-way Stop sign. This is South Street W. To your left front there will be a small strip mall; to your right there will be an Amoco station.
- Turn left (East) at the 4-way Stop onto
- South Street W and go approximately .4 miles. Along the way you will encounter two more Stop signs—the third Stop sign (Henry Avenue) will be a "T" intersection. At the "T" intersection on your left will be homes and on your right softball fields.
- Turn right (south) onto Henry Ave. and go approximately .2 miles toward the Fleming Field airport terminal building.

The terminal is on the right with parking available.

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Return address requested

The Aero Historian is published monthly by the Twin City Aero Historians, Inc., a joint chapter of the American Aviation Historical Society and International Plastic Modelers Society/USA, for members and readers as part of their annual dues or fees.

The group is open to aviation enthusiasts from teenagers on up who are interested in aviation modeling, photography, collecting, art and writing. For more information contact Ken Hornby at 651-552-0888

The Twin Cities Aero Historians (TCAH) meet the second Saturday of every month at 1:30pm.

See above for the new meeting locations and directions.

Mail Newsletter material and address changes to the treasurer.

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