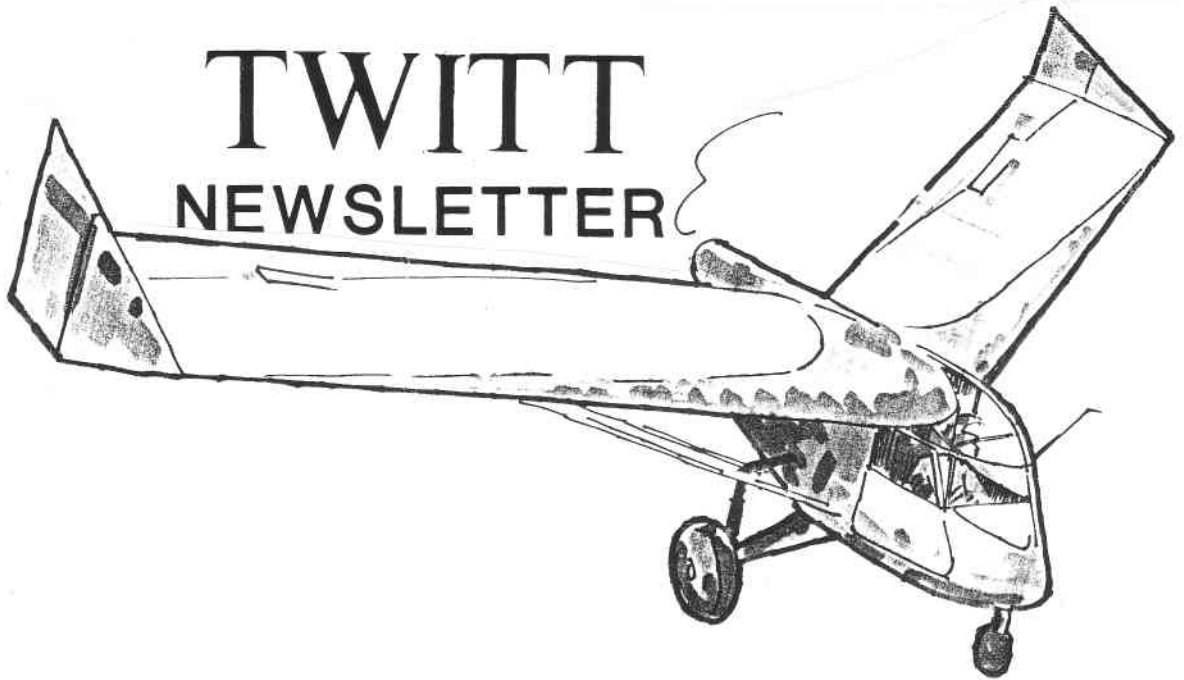


NO. 39

SEPTEMBER 1989

TWITT NEWSLETTER



TWITT
(The Wing Is The Thing)
PO Box 20430
El Cajon, CA 92021

The numbers to the right of your name indicate the last issue of your current subscription; e.g. 8906 means this is your last issue.

NEXT TWITT MEETING: Saturday, September 16, 1989, beginning at 1330 hours. The location is Hanger A-4, Gillespie Field, El Cajon, Calif., in the first row of hangars on Joe Crosson Drive.

MINUTES OF THE TWITT MEETING,
AUGUST 19, 1989

Andy Kecskes opened the meeting at 1:41PM with a brief status report. No progress had been made on the incorporation of TWITT since the previous meeting--Bob and Andy were both too busy to coordinate the necessary meetings. A FAX machine has been lent to TWITT--it maybe donated to TWITT in the future. The question now being considered was how best to use it. Install a phone line at the hanger or place the machine in someones home?

The raffle prize for this month was a copy of the book Waldo, about aviation pioneer Waldo Waterman. Next month the prize will be a ride in a P-51 owned by Bill Speers. The raffle take will be given to Bill to pay for gasoline and other operating expenses of his warbird. Ground rules for the September raffle will be that tickets can only be sold at the meeting, so only those actually present can buy them. One exception will be made for people willing to trust someone to buy their tickets for them on raffle day.

SNA's Tehachapi get-together will occur over the Labor Day weekend; Friday evening through Sunday. Bruce Carmichael mentioned that Vern Oldershaw will demonstrate a very large tailless RC model glider. Bob Fronius mentioned that Harald Buettnier had recently bought four acres of land near Tehachapi.

Bernie Gross brought in his scrapbook and a forties book on model airplanes for perusal by TWITTs during the break. The cover featured one of Bernie's early flying wings.

Bruce Carmichael then rose to give his Oshkosh report. This year's festivities included a flight demo of a Lockheed SR-71. New aircraft that caught Bruce's eye were a KFM-engined pusher motor-glider, and a pod-and-boom job with a V tail. Marske was there with his Monarch; he says a new Pioneer version is on the way.

Jerry Blumenthal then rose to give a short talk which he called "The True Flying Wing." He first subdivided flying wings into six types: plank, delta, swept-forward, swept-aft, tandem wing (essentially two tailless airplanes rigidly connected) and Quetzacoatlus Northropi (the giant pterodactyl). Jerry then made the point that, in engineering as everywhere else, there is no such thing as a free lunch. Stability must be achieved somehow, usually at some cost in performance.

The next item was supposed to be a videotape, but a careful scan showed that the one Bob had brought was not the right one. A break ensued, during which the TWITTs present drowned their disappointment in Coca-Cola.

Next on the agenda was the design forum. Syd Hall, a long-time soaring pilot, had submitted preliminary drawings for a swept-forward flying wing motor-glider. Bruce Carmichael rose to introduce the design and the designer, and to moderate the discussion. He and Syd shared the dream of a light, cheap, easy-to-build sailplane and had shared their thoughts on the subject over the years. Bruce opened the discussion by commenting that the slight sweep forward (4.5 degrees at the quarter-chord line) allowed the elevators and ailerons to be separate and independent. Because the wing was swept, however, Syd would need to take into account the "kick" (fore-and-aft) load where the spars come together in the center. One proposed

feature--diffuser tips--was quickly disposed of; all agreed they were not appropriate in a swept-forward wing, where they would have the undesired effect of unloading the tips which on this type of wing need to be highly loaded to provide static stability. Somebody noted that the elevators should be quite effective, as this machine had more sweep forward than Marske's and his were quite effective. Marc de Poulenc, returning to an earlier remark by Bruce about the independence of control surfaces, noted that Vern Oldershaw, who has built numerous swept-forward wings as RC models, had had numerous problems in the beginning with control surface kinematics, particularly with roll-pitch coupling, and had compensated by elaborate cross-coupling arrangements, differential movement and so on. Harald Buettnier commented that he didn't like canards, and that aerodynamically speaking this machine was a canard. Somebody commented that he would prefer a constant-chord wing for "safety." Bruce and others commented that the considerations involved in the design of this type of machine would make constant chord a liability (the separation needs to start at the tips in order to prevent divergent stall behavior). As usual, a large group of malcontents felt that projected performance needed improvement, and cries went up for "more span" and "more area!" Bruce commented that small increases in span gave large improvements in sinking speed, sailplanes being sensitive to the value of the weight divided by the span squared. There was some comment on the placement of the rudders: Bruce felt they were far enough apart to avoid mutual interference, but noted that their support structure required that the elevators be split spanwise.

Bob Fronius then introduced Wolfgang Hopff, a friend of TWITTER Thomas Bircher, who introduced TWITT to a tailed, but still unconventional 15m sailplane by Frit Mahrer: the Delfin. The Delfin's Eppler-section wing has a unique full span camber- and chord-increasing flap which fairs into the overall wing contour at all positions from retracted to fully extended. This obviates the need for water-ballast, allowing the wing to be optimally "tuned" for either thermalling or cross-country flight. The third prototype of this machine is currently under construction.

The winner of the raffle was Mark Motley, a resident of Orange, California, and a student at Orange City College and Long Beach State University. Mark is a Horten fan.

With the raffle complete the meeting was adjourned. See you all next month.

SEPTEMBER SPEAKERS

John Chalmers, back from a recent trip to West Germany, will make a slide presentation on the Stemme S-10, high performance motor glider, the B-10 - an interesting Flying Wing ultralight and the antique gliders and sailplanes at the Wasserkuppe Museum.

Harald Buettnier will then give a talk entitled Basic Composites for Starters.

PRESIDENT'S CORNER

August's meeting was a great success, partly due to Bruce Carmichael's forum on Syd Hall's proposed design, and partly due to Harald Buettner's tour of his new designs drawings. I want to thank both TWITTERs for their contributions.

As of this writing I am not sure what will be the main topic of September's meeting. The big event should be the P-51 ride raffle. This is too good to pass up. With vacations all over with, we should have a good turnout. Hopefully, Bob will find the right videotape this time, which is supposed to be flying wing footage, afterall, isn't what this is all about.

Unfortunately, timing has been bad this month to coordinate a meeting with Dr. Don Hunsaker, who is the primary individual we need to talk with about the final steps toward incorporation. We should know more about his schedule by next meeting and will keep you informed.

The Letters to the Editor contains one from Mike Nelson who has offered to do computer graphics for us. I know we will have a need for this in the near future, and I want to thank Mike in advance for his contribution. If there are any others out there who have access to computer software that can produce drawings, performance data, or any other helpful information, please let us know. We would like to start a roster of such capabilities, since buying commercial computer time on our limited budget is out of the question at the present time. If you will be using employer equipment, please make sure there are no software licensing or employer property claims problems with any of the work.

We are publishing the most current roster in this month's newsletter. Give it a look and see who else lives in your area or region. As you can see, there are more TWITTERs living somewhere other than southern California. It would be interesting for some of you to get together periodically and discuss your mutual interests and ideas. If you do this, please have someone forward the results to us so we can share them with the entire group. The larger the forum of discussion and ideas, the better the end result will be.

Although, I don't think Bob envisioned this much interest when he and Hernan first started TWITTER, it is gratifying to know there are so many enthusiasts. We would like to hear from more of you, and learn about your current projects and ideas. As they say, "Keep those cards and letters coming."

Well that's about it for this month. I've got to go see how much money there is in the piggy bank so I can buy lots of raffle tickets and win that P-51 ride.

Andy.

Aerobile N54P at Gillespie Field, article and drawings courtesy of Paul R. Matt and the Historical Aviation Album. Contributed by Al Backstrom.

The flying automobiles lay dormant throughout the war years. Waldo went into semi-retirement in 1946 but plans of getting away from it all brought on more projects and ideas than if he had a job. He had to keep busy and the "Arrowbile" concept returned to his plans. New ideas, which he had long nurtured, had to be tried out. All the spare parts that could be located from the old projects and the fabricated parts from No. 6 were gathered together and from these emerged a new Waterman roadable airplane, ship No. 6 — the "Aerobile." Construction started at a leisurely pace in 1947. In 1951 he settled down in his old home town of San Diego where he set up a workshop and work on the machine gained momentum until it was completed in 1957.

The basic design, layout and configuration was similar to that of the "Arrowbile." The defunct Tucker Automobile Company provided a new power plant and system of power control. The Tucker engine was a Franklin air-cooled aircraft motor converted to liquid cooled. Granted license N-54P it made its first flight with Waldo at the controls in May 1957.

The main mechanical features of No. 6 were rigid attachment of the two wing panels so that they both came off together as a single unit. The control system became immediately operative when the wing was attached in place. Previous "Arrowbiles" used a quick connecting device on six cables at parting points of wings and car. The "Aerobile" was a three place machine with more room and generally refined appointments.

It was flown many times before being presented to the National Air Museum in March 1961. The "Whatsit" and "Aerobile" are both in storage for future display by the Museum.

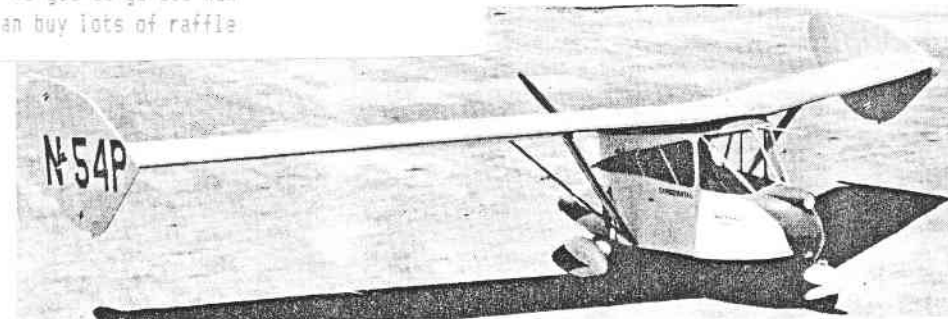
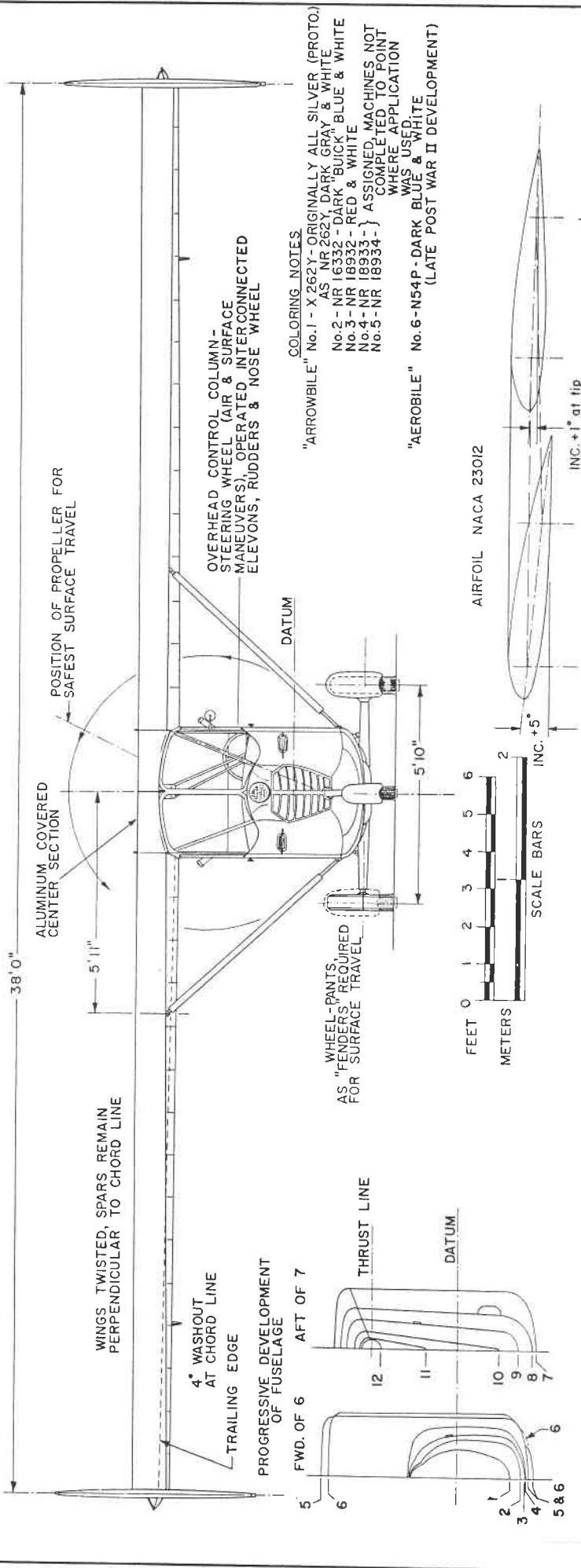


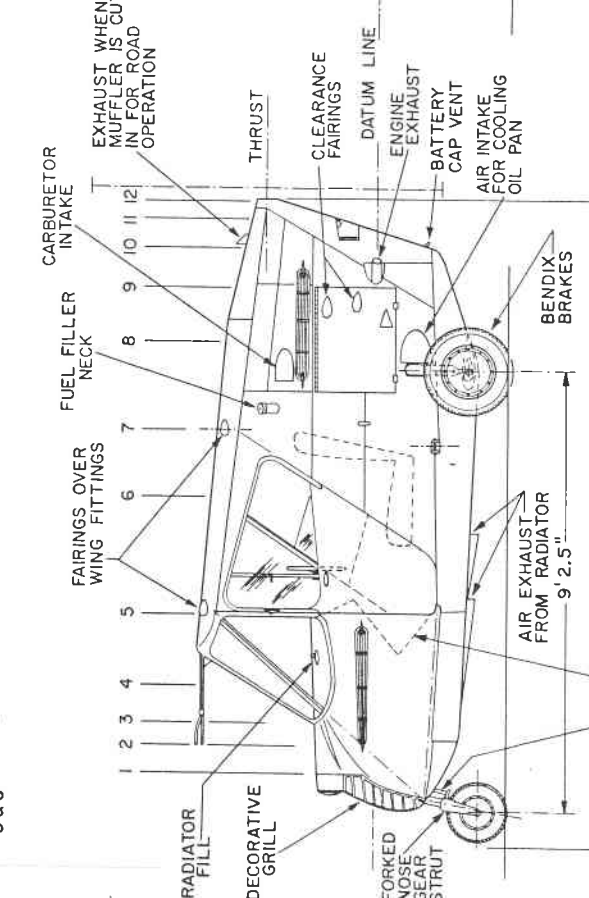
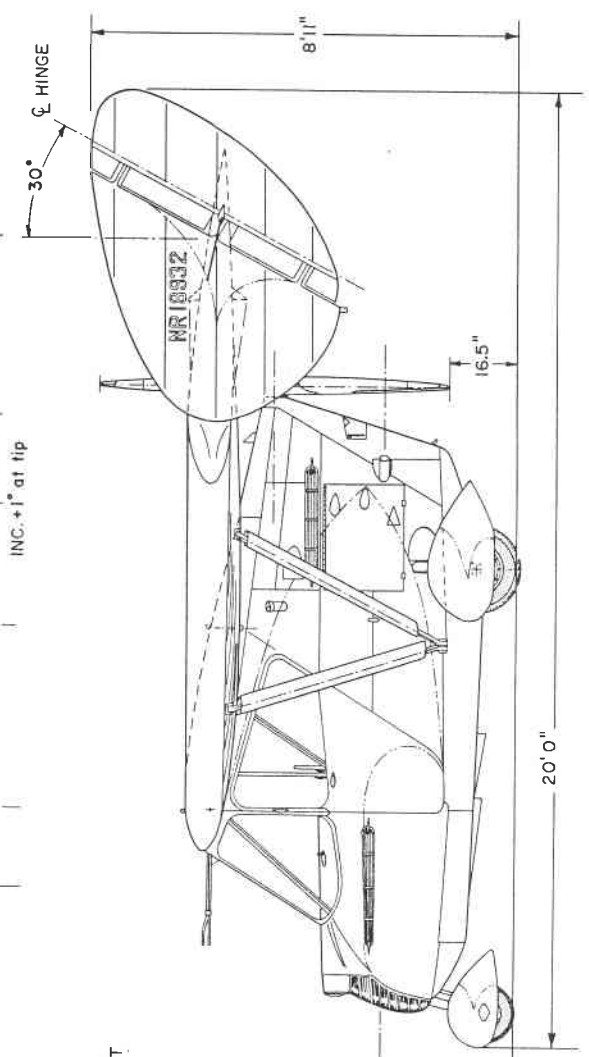
Photo courtesy Waldo Waterman

Final variant, the "Aerobile" of 1958, with liquid cooled Tucker engine and modified rudders. Car was "Buick-Blue" and white, wings silver. It was 3 place; wings detached in one piece for surface travel.



"ARROWBILE" No. 1 - X-262X - ORIGINALLY ALL SILVER (PROTO).
 AS NR 2621, DARK GRAY & WHITE
 No. 2 - NR 16332 - DARK BUICK BLUE & WHITE
 No. 3 - NR 18932 - RED & WHITE
 No. 4 - NR 18933 - } ASSIGNED, MACHINES NOT COMPLETED TO POINT WHERE APPLICATION WAS USED.
 No. 5 - NR 18934 - }

"AEROBILE" No. 6 - N54P - DARK BLUE & WHITE (LATE POST WAR II DEVELOPMENT)

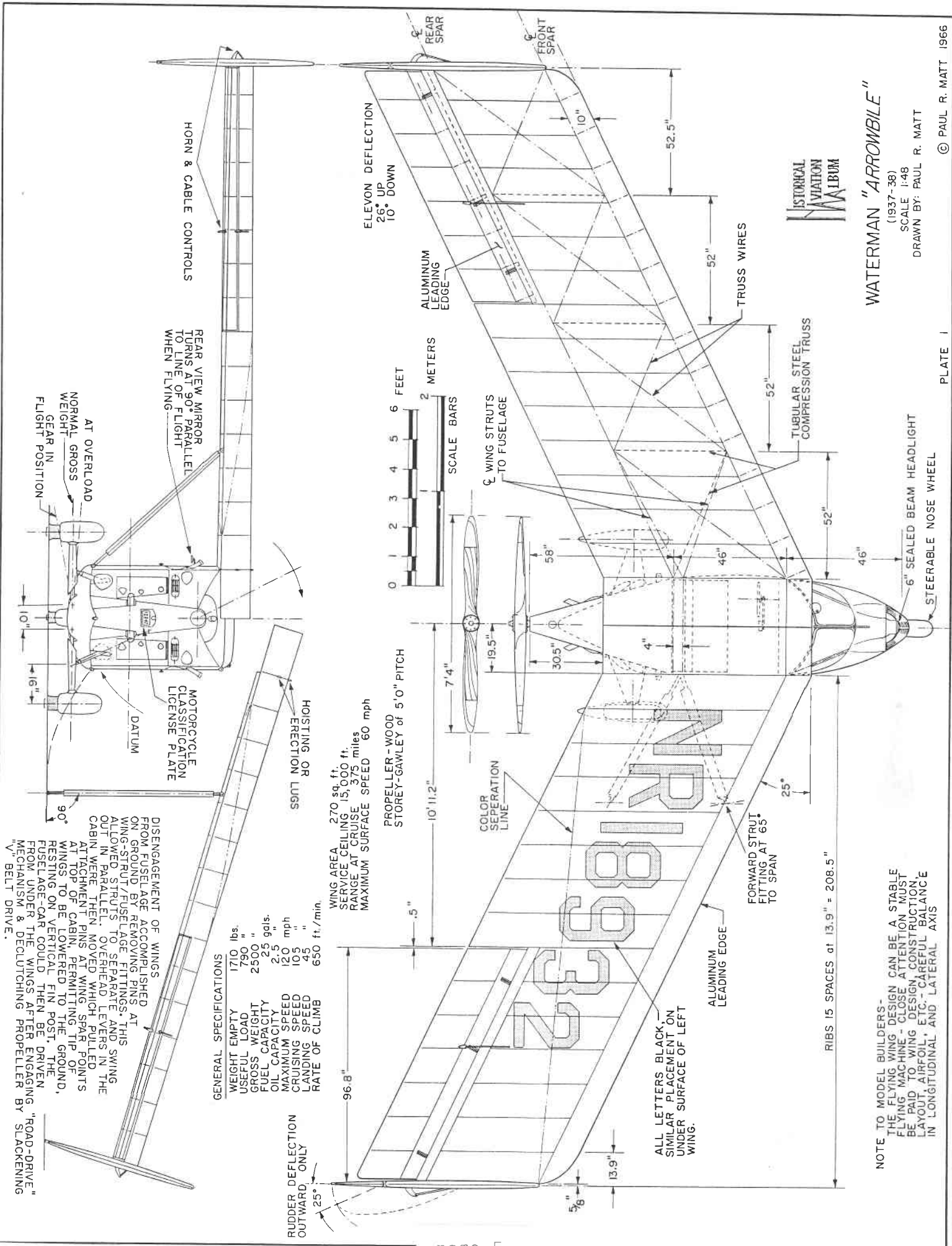


WATERMAN
ARROWBILE

TRADE MARK

HISTORICAL AVIATION MUSEUM

WATERMAN "ARROWBILE"
 (1937-38)
 SCALE 1:48
 DRAWN BY: PAUL R. MATT



WATERMAN "ARROWBILE"

(1937-38)
SCALE 1:48
DRAWN BY: PAUL R. MATT

© PAUL R. MATT 1966

PLATE 1

GENERAL SPECIFICATIONS

WEIGHT EMPTY	1710 lbs.
USEFUL LOAD	790 "
GROSS WEIGHT	2500 "
FUEL CAPACITY	25 gals.
OIL CAPACITY	2.5 "
MAXIMUM SPEED	120 mph
CRUISING SPEED	105 "
LANDING SPEED	45 "
RATE OF CLIMB	650 ft./min.

WING AREA 270 sq. ft.
SERVICE CEILING 15,000 ft.
RANGE AT CRUISE 375 miles
MAXIMUM SURFACE SPEED 60 mph

PROPELLER - WOOD
STOREY-GAWLEY of 5'0" PITCH

DISENGAGEMENT OF WINGS FROM FUSELAGE ACCOMPLISHED ON GROUND BY REMOVING PINS AT WING-STRUT/FUSELAGE FITTINGS. THIS ALLOWED STRUTS TO SEPARATE AND SWING OUT IN PARALLEL. OVERHEAD LEVERS IN THE CABIN WERE THEN MOVED WHICH PULLED AT ATTACHMENT PINS AT WING SPAR POINTS AT TOP OF CABIN, PERMITTING TIP OF WINGS TO BE LOWERED TO THE GROUND, RESTING ON VERTICAL FIN POST. THE FUSELAGE-CAR COULD THEN BE DRIVEN FROM UNDER THE WINGS AFTER ENGAGING BY "ROAD-DRIVE" MECHANISM & DECLUTCHING PROPELLER BY SLACKENING "V" BELT DRIVE.

NOTE TO MODEL BUILDERS - THE FLYING WING DESIGN CAN BE A STABLE FLYING MACHINE - CLOSE ATTENTION MUST BE PAID TO WING DESIGN, CONSTRUCTION, LAYOUT, AIRFOIL, ETC. - CAREFUL BALANCE IN LONGITUDINAL AND LATERAL AXIS

The Clovis Point

a second generation flying wing designed by Alan Halleck, named after a type of arrow head produced by Northwest Indians

This new plane differs from the first generation Halleck design in the following areas:

New airfoil, swept wing planform, larger, no fuselage, blue foam with hand laid 4 oz. glass & carbon fiber, silicon hinges.

It retains the elongated cord center section with a separate control surface.

Specifications

Wing Area 780 sq. inches

Total weight 85 oz.

Wing loading 15.7 oz./sq. ft.

CG 8 $\frac{3}{8}$ to 8 $\frac{1}{2}$ inches from leading edge at center

Washout none

Dihedral none

Mean sweep angle 15 degrees

Airfoil Elina

The radio system is an Airtronics/Atracs system configured to allow the following control features: In-flight CG adjustment, choice of elevons/flap or ailerons/elevator. The safety mode puts the CG all the way forward, and hangs the flap down with the ailerons up for the slowest possible landing approach. Servos are permanently mounted in the wing, with direct linkage to the control surfaces. This means there are no ballcranks, torque tubes, etc. to create slop.) The Elina airfoil is a 10% Quabeck symmetrical plotted on the mean line of the NACA 23112-75. This is reputed to be one of the fastest airfoils available.

On it's first outing, the Clovis Point appeared to have a lot of potential. All control systems worked according to design. The CG was a bit forward of the optimum, and needs more testing and adjusting. The plane is VERY fast, and does nice axial rolls and good clean loops. There was no evidence of yaw problems that have been experienced with some other flying wing designs.

After exploring the adjustments and testing the flight characteristics thoroughly, I plan to build the 3rd generation using vacuum bagging techniques to reduce the overall weight by approximately one pound. This will allow me to fly in light lift, and to add ballast as the conditions require.

Editors note: Alan Halleck's plan view and the "Clovis Point" specifications do not agree. We are publishing as received.

John Chalmers, one of the September T.W.I.T.T. speakers, wants information on the profile of Horstmann and Quast DFVLR Braunschweig HQ 41/14.35.

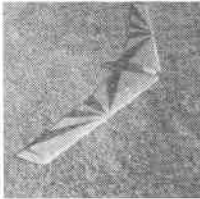
NOTE: In the August issue, page 9 of T.W.I.T.T. is Page 6 of the ByLaws and page 10 of T.W.I.T.T. is Page 3 of the ByLaws. I failed to check!

ALAR 4

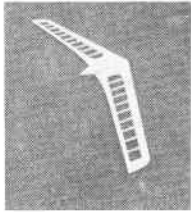
SLOPE/THERMAL



TWO SIDE (RELEVANT)



AREA 576
SPAN 72



9% eppler 228

eppler 228

25 1/16

8% eppler 228

8"

4"

1 5/16

5"

9 1/2

14

2

15/8

8 3/16

5 3/4

1 3/16

11 7/8

13 3/16

2 3/8

16"

2 1/2

10

21"

ballast

cg

rec

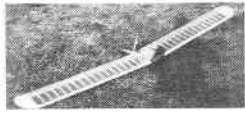
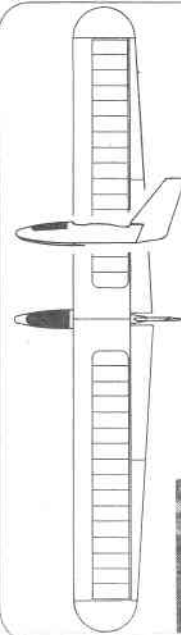
bat

78 3/4

SPORT SLOPE

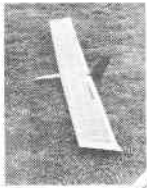
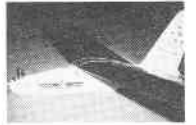
blue foam 2oz glass

STANDARD PLANK

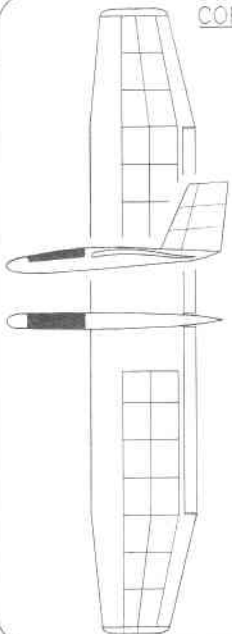


*FOR THERMAL SLOPING

AREA.....1090 SQUARE INCHES
SPAN.....100 INCHES



CONDOR



AREA 1550
SPAN 99.5

STANDARD GLASS COMPETITION
SLOPE AND THERMAL



LITTLE PLANK II

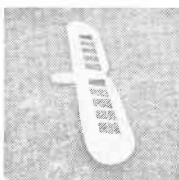


*FOR SLOPE



SPAN.....72
AREA.....896
CHORD.....13
LENGTH.....21
WEIGHT.....21 (SOLARFILM)

*MAY BE POWERED
.051-.10



LETTERS TO THE EDITOR

Dear Members of TWITT:

I am very happy to learn about your cause and would be glad to help in any way I can. I work daily on a McDonnell Douglas Unigraphics II CAD/CAM. This gives me full 3D design and machining capability. I just switched employers recently and don't know what access I have to CNC's yet, but I can certainly plot very accurate airfoils for you and possibly cut templates. Also, any 3D design work that you can explain to me through a letter or a phone call I'd be glad to do. If you would like an example of some plots just send me the ordinates of the airfoil you like as well as the chord lengths needed.

Please sign me up as a member and let me know how many back issues are available of your publication.

Best of lift,
Mike Nelson
(513) 237-1932

(Ed. note: Mike, your offer is most certainly generous, and we hope that your services will be needed in the near future to help finalize the TWITT design concept.)

June 12, 1989

Dear TWITT:

A friend of mine introduced by to your TWITT newsletter and I was very impressed. I was told I could become part of TWITT, receive newsletters and submit periodic items for publication. Enclosed is a check for a one year subscription and enough for all your back issues.

I have enclosed pictures and a detailed description of my latest wing, along with the plan view of the general layout.

I look forward to hearing from you and receiving TWITT. I thank our friends Bill and Bunny Kuhlman (B squared) for introducing us to TWITT.

Sincerely,
Alan Halleck

(Ed. note: The specs and drawing are included elsewhere in this issue; space allocation problems you know. We look forward to more on your experiences in flying model wings in the future.)

April 16, 1989

Dear Marco:

When I first contacted Bob Fronius, I sent a number of pictures of my project. As I noted, the project is certainly not newsworthy, since it is a simple Backstrom Plan with no window dressing. The aerodynamic cleanup was to follow. This first attempt was simply to get airborne and try control systems.

The only really remarkable thing is that the weight, although all metal, keeps it in the ultralight class, and it actually leaves the ground with less than 9 horsepower. The engine is rated at 9.5 HP, but the propeller allows absorption of only 8.5, and with the diameter of 33" the prop efficiency is very low. I'm in the air with about 4.5 HP.

Since there is no reserve power for safe climb, I have limited all my flight tests (42 to date) to the airspace over the runway - practicing roll, pitch, S-turns, takeoffs, and landings. If only I had been a TWITT member two years ago I would not have made so many mistakes and my project would be much better advanced. It takes so much time to correct the errors.

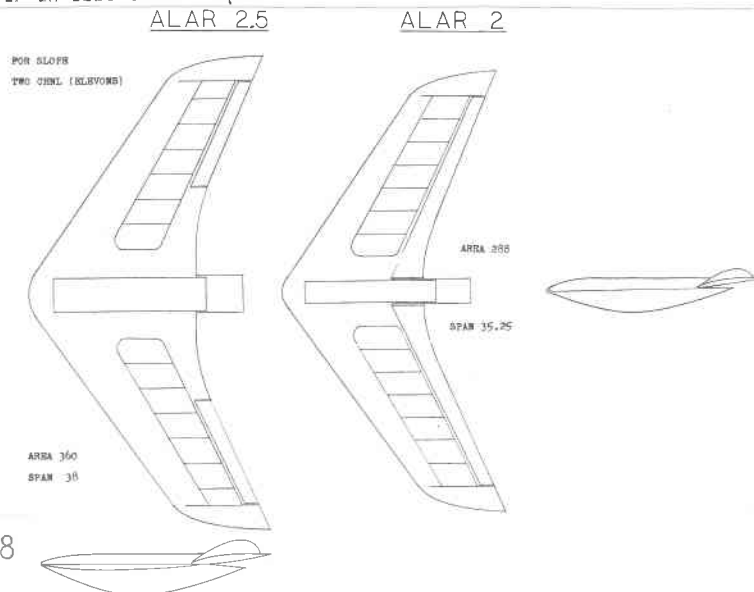
Mr letter to Al Backstrom was to request section characteristics on the 15% airfoil which he used, or any other available data with finite wings. I will be teaching a BASIC aerodynamics course to mechanical engineers in the fall and wish to have them analyze the EPB-1 and its variations. I am presently flying a 1" scale model of the EPB-1C built from plans given to Bucknell University by Al Cleave. The simple glider has a 1/16" balsa sheet wing warped carefully to the curve of the mean line of Al Backstrom's wing section. The model has a beautiful, stable glide with a slope of 6/1. After each flight a little more is shaved from the rudder. You know what I am aiming for, of course.

Any hope of getting some airfoil data? If not I'm going to have to use the NACA M-6 section curves. What were the problems with the Mini Bat and its present status?

I live in an area where there is an aeronautical vacuum - that is why all the questions.

Thanks for your help,
Sincerely,
Lewis Dewart

(Ed. note: See the roster in this issue for Lewis' address if any TWITTERs can be of help in answering his questions or provide airfoil data. Lewis has corresponded with TWITT quite extensively, and we hope to hear more goods things from his work. Lewis is right, there is only one other TWITTER in PA, but several in NY and NJ. You all need to get together for an east coast chapter.)



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Little Elm, TX 75068

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Thomas Bircher 8905
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Dave Laney 9005 7700 Whispering Palms Drive Sacramento, CA 95823	Mike Nelson 9006 5210 Old Troy Pike Huber Heights, OH 45424	Tasso Proppe 9002 1786 Eldora Street Lemon Grove, CA 92045	Rod Smith 8905 P.O. Box 19111 San Diego, CA 92119
Ronald Leffler 8910 16430 Fourteen Mile Road Battle Creek, MI 49017	David Nelson 8911 2807 Sheldon Grand Haven, MI 49417	Robert Ratliff 9002 215 Ocean Richardson, TX 75081	Alex Strojnik 9004 2337 E. Manhattan Drive Tempe, AZ 85282
Ed Leiser G Curator, SD Aerospace Museum 2001 Pan America Way Baiboa Park San Diego, CA 92101	Dr. Karl L.E. Nickel 8911 Inst. f. Angewandte Mathematik Hermann-Herder-Strasse 10 7800 Freiberg i. Br. WEST GERMANY	Bill Rickson 9002 517 Fallon Avenue San Mateo, CA 94401	Reg Todhunter 8912 89 Merin Street Tewantin, QLD 4565 AUSTRALIA
Alan Lewis 8912 PAL Engineering P.O. Box 81 Paddington, NSW 2021 AUSTRALIA	Larry Nicholson 9003 13326 Community Road, #8 Poway, CA 92064	RC Soaring Digest c/o Jim Gray P.O. Box 1079 Payson, AZ 85547	Barnaby Wainfan 9004 2503 Hardwick Street Lakewood, CA 90712
Ed Lockhart 9004 11211 Gem Hill Lane Lakeside, CA 92040	Bill Otto 8909 1154 N. Kraemer Place Anaheim, CA 92806	Timothy Rosauer 9003 27097 Banbury Drive Valley Center, CA 92082	Donald Webb 9008 3931 Alabama Street San Diego, CA 92104
Fred Maier 8910 60 W. Balcom Street Buffalo, NY 14209	Richard Papenguth 9008 Box 2386 Culver City, CA 90231	Martin P. Roy 9002 115 Espanas Glen Way Escondido, CA 92026	Kenneth Wayand 8911 1815 Parkside Drive Anchorage, AK 99501
Bud Manning 9008 1822 Wickham Royal Oak, MI 48073	Frank Park 8911 P.O. Box 280417 San Francisco, CA 94128	Eldon Runkel 9001 1104 Woodbine Madison, AL 35758	Ralph Wilcox 9004 10165 Fuerte Drive La Mesa, CA 92041
Bill McDaffrey 9001 P.O. Box 20725 San Diego, CA 92120	Dr. Jack Parry 9008 6935 Birch Street Falls Church, VA 22046	Robert Ryan 8909 4974 Bayard Street San Diego, CA 92109	Mike Woodward 9005 2108 Grand View Avenue Manhattan Beach, CA 90266
Chuck McGill 9006 P.O. Box 304 Mercer Island, WA 98040	Jorge Paullada 8909 65 Mitscher Chula Vista, CA 92010	Karl Sanders 9003 26514 via Marquette Lomita, CA 90717	
Gil Metcalf 9008 1441 Langley Drive Gardnerville, NV 89410	Charles Pearson 8911 2576 Mountain Woods Drive Birmingham, AL 35216	Klaus Savier 8909 11893 Geode Fountain Valley, CA 92708	
Don Mitchell 9002 P.O. Box 1021 Mariposa, CA 95338	Bob Peck 9001 P.O. Box 2498 La Mesa, CA 92044	Rodney E. Schapel 8912 Shapel Aircraft Company P.O. Box 60039 Reno, NV 89506	
Mark Motley 9008 18182 Romelle Avenue Santa Ana, CA 92705	Harold Pio 9004 196 Old Julian Ramona CA 92065	Don Seiveno 8909 P.O. Box 4188 Norton AFB, CA 92409	
	Dave Pio G P.O. Box 1147 Ramona, CA 92065	Peter Selinger 9002 Landschreiberstrasse 21 D-7000 Stuttgart 75 WEST GERMANY	

SECTION 3. NOTICE OF MEETING

Notice of a regular meeting shall be given either personally or by mail or other means of written communication, addressed to the member at the address of such member appearing on the books of the corporation or given by the member to the corporation for the purpose of notice; or if no address appears or is given, at the place where the principal office of the corporation is located. Notice shall be deemed to have been given at the time when delivered personally or deposited in the mail.

Notice of a membership meeting shall designate the place, date and time of the meeting. The notice of the annual meeting of members at which Directors are to be elected shall include the names of all those who are nominees at the time notice is given to members.

SECTION 4. QUORUM FOR MEETINGS

A quorum shall consist of at least one-third of the voting members of the corporation. The members present at a duly called and held meeting at which a quorum is initially present may continue to do business notwithstanding the loss of a quorum at the meeting due to a withdrawal of members from the meeting provided that any action taken after the loss of a quorum must be approved by at least a majority of the members required to constitute a quorum at a later meeting.

Notwithstanding any other provision of this Article, if this corporation authorizes members to conduct a meeting with a quorum of less than one-third of the voting power, then, if less than one-third of the voting power actually attends a regular meeting then no action may be taken on a matter unless the general nature of the matter was stated in the notice of the regular meeting.

SECTION 5. MAJORITY ACTION AS MEMBERSHIP ACTION

Every action or decision done or made by a majority of voting members present at a duly held meeting at which a quorum is present is the action of the members, unless the law, the Articles of Incorporation of this corporation, or these Bylaws require a greater number.

SECTION 6. VOTING RIGHTS

Each member is entitled to one vote on each matter submitted to a vote by the members. Voting at duly held meetings shall be by voice vote. Election of Directors, however, shall be by ballot.