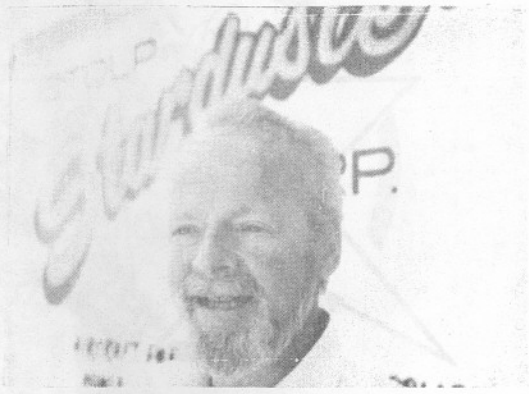
# Starduster


Dedicated to the ACTIVE Homebuilders

OCTOBER 1984

# PRESIDENT'S COMMENTS



OshKosh 1984 is over and as usual was bigger and better than previous years. We had some beautiful Starduster products there, and Clint Anderson of San Diego area, won Reserve Grand Champion. Bob Wyse of Athens, Texas won the Designers First Place Award. We have a partial list of the visitors to The Starduster Booth on pages 10 & 11.

We want to thank you all for stopping by, visiting, and renewing friendships. A lot of airplane building was discussed. I beleive most left OshKosh satisfied. We missed the Canadians at our dinner at "Herb's Acey Ducey"; Maybe next year!

Starduster is attempting to open an East Coast Store to save shipping costs to our customers, east of the Mississippi. We hope to inform you all in the near future.

Starduster also went to Europe to establish a better market there. Unfortunately, there are so many restrictions that it is considered a bad venture at this time. An example: The Starduster Too and The Acroduster Too are popular designs in Holland, but the Government has a 135 Hp limit on all homebuilts. This would of course, eliminate both planes.

Switzerland has a noise pollution law that is gauged by aircraft weight. They allow a certain number of decibels per pound. This would eliminate most homebuilts. Canada, The United Kingdom, and Australia are all very restrictive. We Americans are most fortunate to have as liberal a Federal Aviation Association as we have.

The promised article on servos versus spades is not ready for this issue, because of my excessive absenteeism. Next issue.

B.C.

BILL CLOUSE

October STARDUSTER MAGAZINE 1984



Table of Contents



Front Cover Photo: This Starduster "2" belongs to Mr. J.V. Withrow of Central City, Kentucky.

Back Cover Photo: This V-Star belongs to Mr. Art Morgan of Lexington, Kentucky!

(305) 247-8439

VICTOR W. TATELMAN

18900 S.W. 232 STREET,
MIAMI (GOULDS), FL 33170, U.S.A.

September 19, 1984

Bill Clouse
Stolp Starduster Corp.
4301 Twining - Flabob Airport
Riverside, CA 92509

Dear Bill;

When I built my ACRODUSTER II some years ago, I installed a Lycoming IO-360-A1B engine. Jim Osborne had just recommended that the nose bowl he had been using 'til then be disconcontinued (the front air intake area was so large, reducing the inherent strength, it was subject to cracking) and suggested using the Piper nose bowl (I think it was for the PA-22). But it didn't fit precisely - too narrow and the top was too low to make a straight line (side view) from the cockpits to the nose bowl.

So I decided to make my own nose bowl. With the help of a local boat builder (who was proficient in the use of fiberglass), we built up a mock-up, made it fit precisely, called it our "plug" and from that, made the mold.

You'll note the air scoop is designed into the bowl under the spinner and faired in in line with the carburetor (See Photos #1 & #2). An aluminum tube fits into the shaped hole in which is installed a butterfly valve with the operating lever connected to a push-pull cable leading back to a "T" handle in the rear cockpit with an appropriate placard (See Photos #3 & #4).

A metal, washable, air filter is clamped onto the rear of the aluminum tube aft of the butterfly valve and fitted to an adapter that bolts to the carburetor (See Photo #3). Thus, for take-offs, landings, and all ground operations we use filtered air (we have lots of bugs in South Florida) but after take-off, the butterfly valve is opened and straight ram air is injected into the carburetor. I don't detect any difference in manifold pressure with the butterfly valve opened or closed either in the air or on the ground.

I mounted the two oil coolers, connected in series, on the top of the engine just behind the nose bowl, on two angles curved to the shape of the top of the nose bowl and in the ram air pressure zone of the air stream (See Photo #5). Therefore, a portion of the air is forced through the oil coolers and out through rearward facing vents on the top cowl (See Photos #6 & #7). This arrangement provides

more working space behind the engine where the oil coolers are normally mounted. Even in a "full bore" climb to 8000 feet, both the cylinder head temperature and the oil temperature remain well "in the green."

Best regards,

Vic

Vic Tatelman

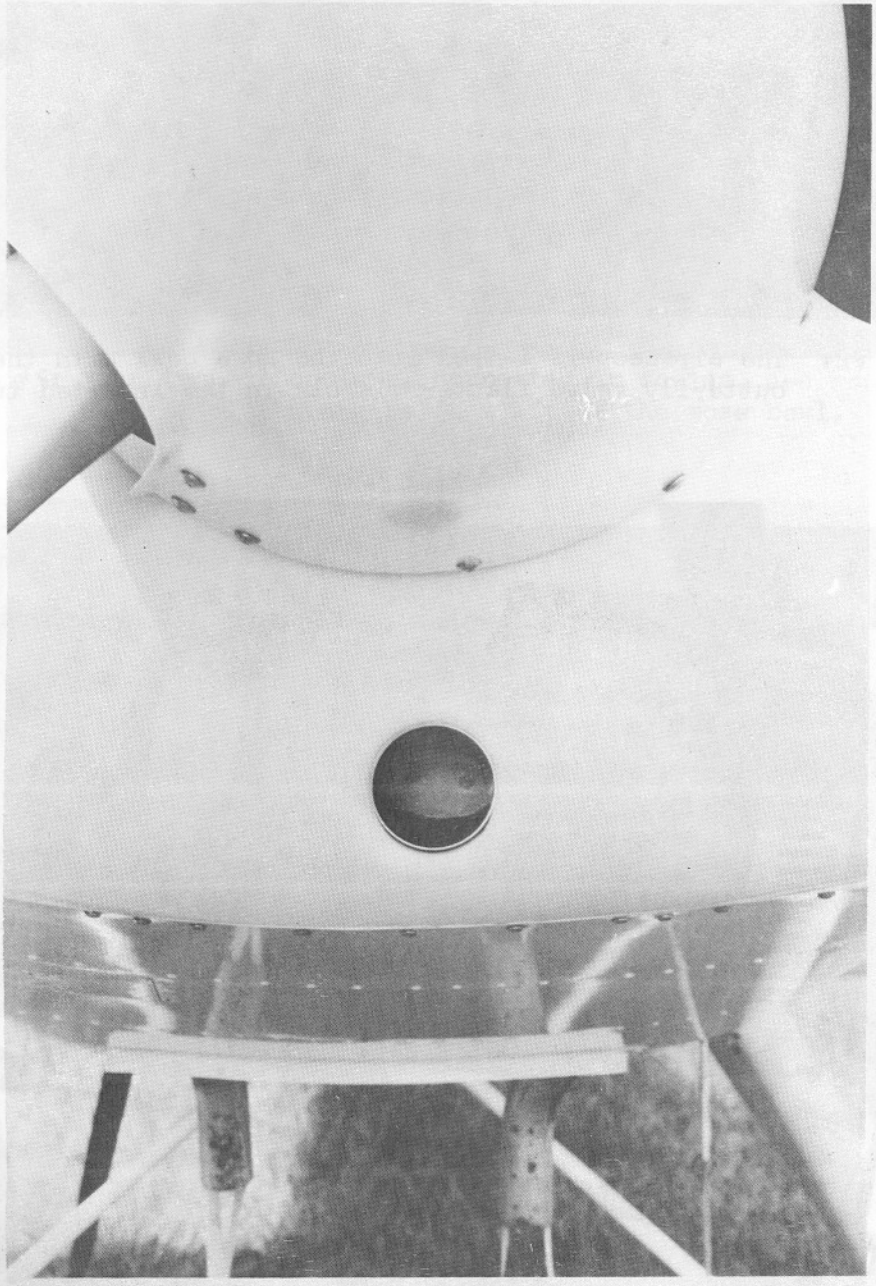


Photo #1: The airscoop is faired into the nose bowl with the butterfly valve flapper visible in the inserted tube.

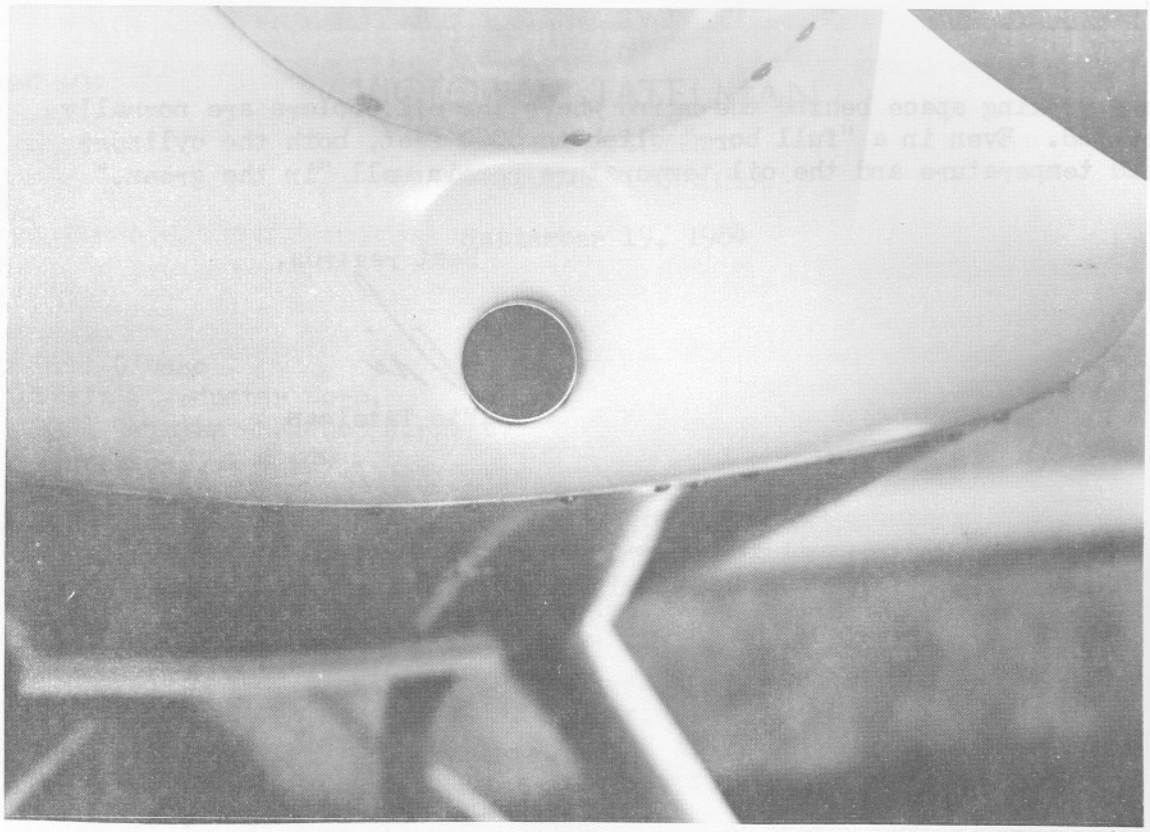


Photo #2: The airscoop is faired into the nose bowl with the butterfly valve flapper visible in the inserted tube.

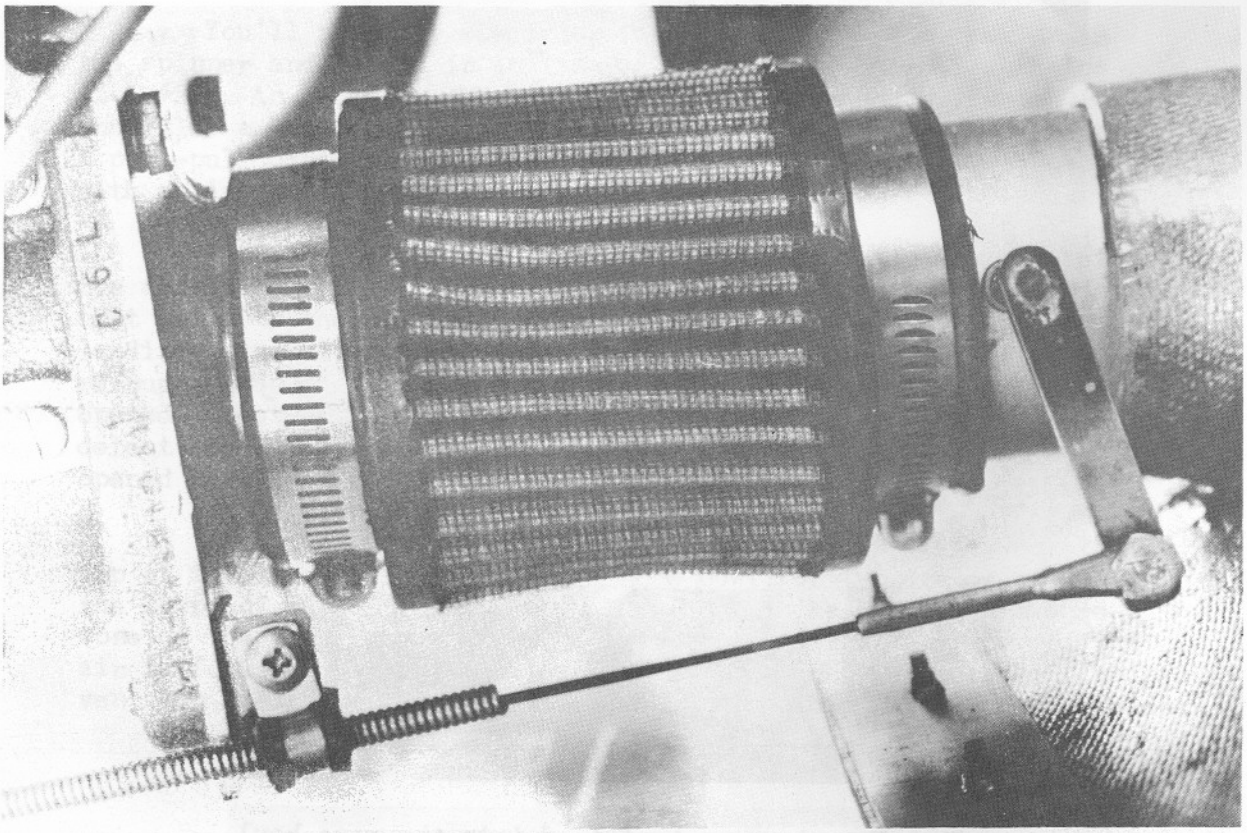


Photo #3: The butterfly valve operating lever is controlled by a push-pull cable leading to the rear cockpit. The air filter is clamped between the butterfly valve and the carburetor.

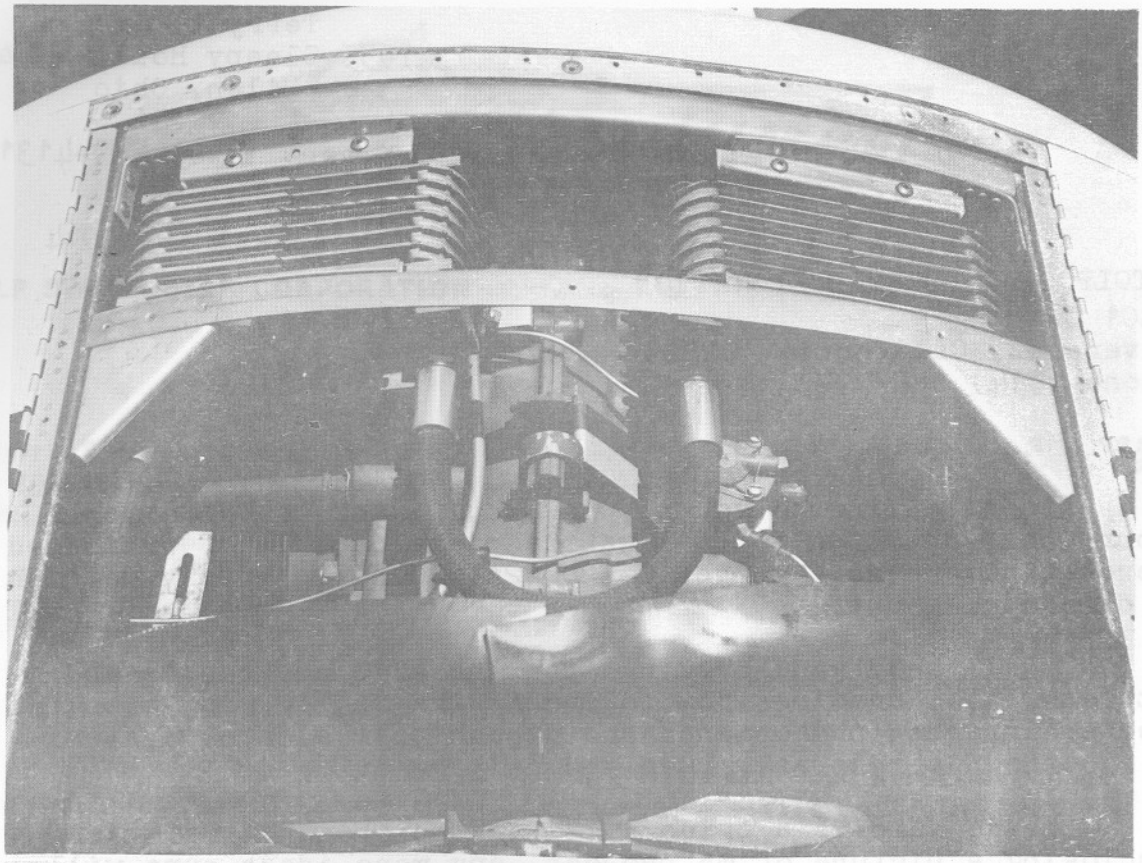


Photo #5: The two oil coolers, connected in series, are mounted on top of the engine just aft of the nose bowl.

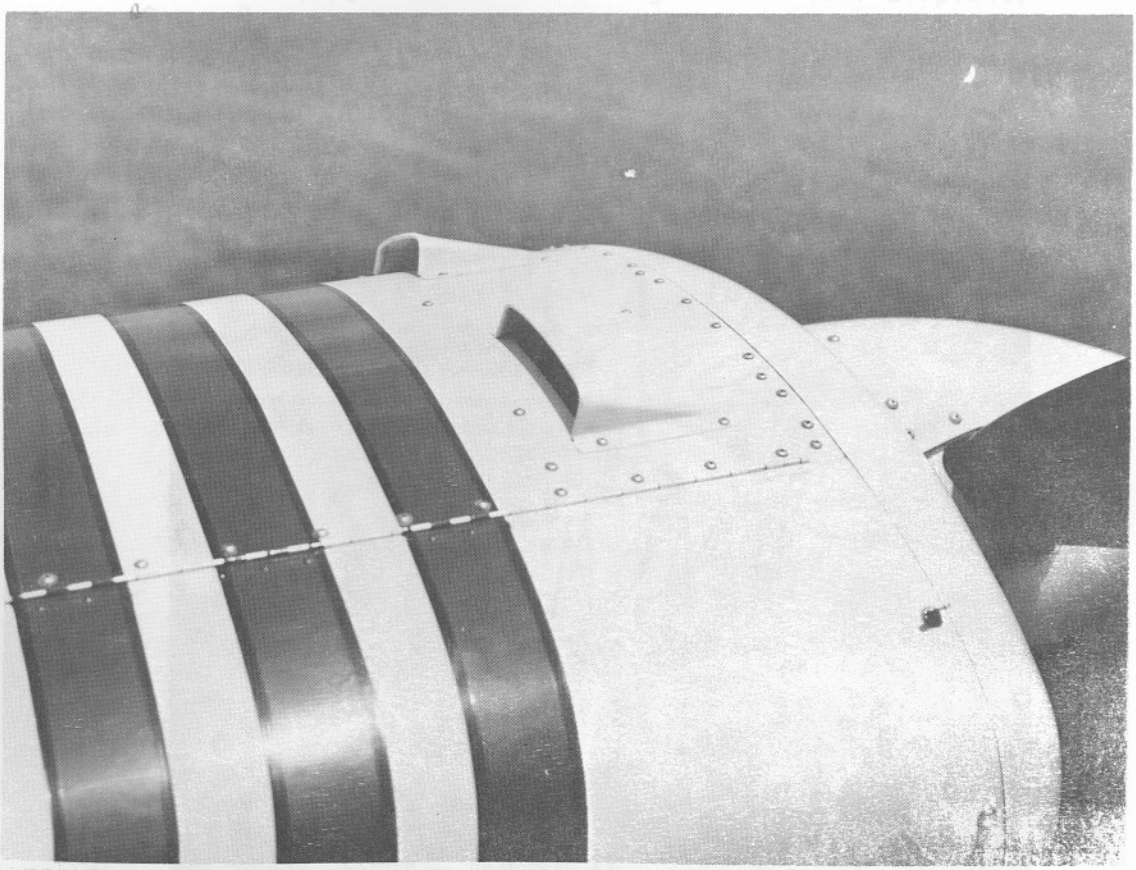


Photo #7: Rearward facing vents are located on the top cowl over the oil coolers.

Terry L. Graham
1955 Sleepy Hollow Road
Milan, Ohio
44846
Phone (419) 499-4131

August 12, 1984

STOLP STARDUSTER CORPORATION
4301 Twining
Riverside, California 92509
Phone (714) 686-7943

Dear Mr. Clouse,

After talking to you at Oshkosh, I want to use some of your ideas on my SA 100. I want a plane capable of unlimited aerobatics. I have a Lyc. O-320 E2A. Can you supply me with a dynafocal mount?

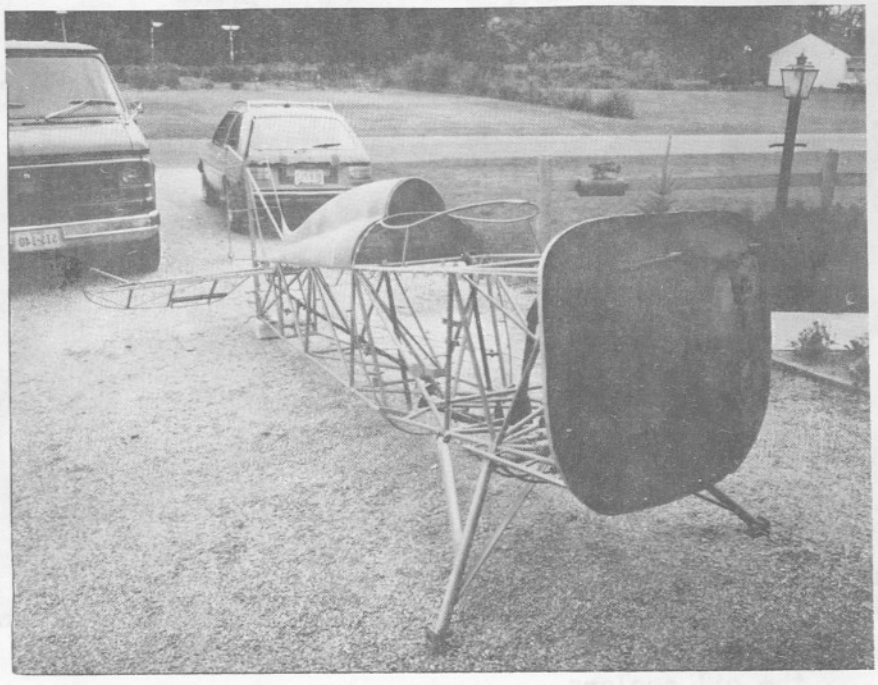
I will need your drawings for the ACRO one cabain and I strusts, also drawings how to modify the SA-100 wing ribs for better inverted preformance and a push pull alerons system. I also need a gas tank. Can you help me out?

Please send me a price list for the above items. I am enclosing a picture of my project, any more ideas sure will be appreciated.

Sincerely yours,

Terry L. Graham

Terry L. Graham




**STOLP STARDUSTER CORPORATION** 4301 Twining, Flabob Airport, Riverside, California 92509 / (714) 686-7943

Mr. Terry L. Graham
1955 Sleepy Hollow Rd.
Milan, OH 44846

Sept. 5, 1984

Dear Terry,

Sorry about the delay in answering your letter. Yes we can build you an engine mount and an inverted gas tank.

The tail has to be beefed-up, four wires and four struts would be used. The Acro 1 Cabane and 1 struts need a little modifying from our drawings, but will work fine.

Push pull controls will be easy and I recommend four Ailerons. Norm Weis modified his Airfoil for better performance. You may want to communicate with him to see how successful his Airfoil is. You must also add a flying wire and a landing wire to your airplane.

| | |
|---|---|
| Engine Mount: | $325.00 |
| Gas Tank | $305.00 |
| Flop Tube | $ 20.00 |

P.S. Enclosed you will find Norm Weis's address.

Respectfully,

Bill Clouse

Bill Clouse

September 13, 1984

ART MORGAN

1192 DEVONSHIRE CIRCLE
LEXINGTON, KENTUCKY 40504

Dear Bill,

I have included a picture of The V-STAR (Serial #74)* that was completed this spring. First flight was June 27th. The engine is a 100 Hp (0200A) Continental.

Major changes include; center section is cut out for easier entry-exit from the cockpit. Also added a sub spar to horizontal stabilizer to facilitate mounting stabilizer in available space.

As of September 12th, the craft has logged 34 hours of trouble-free operation. It's really a fun airplane. Use the pictures in anyway you like.

* See back cover photo.

Regards,

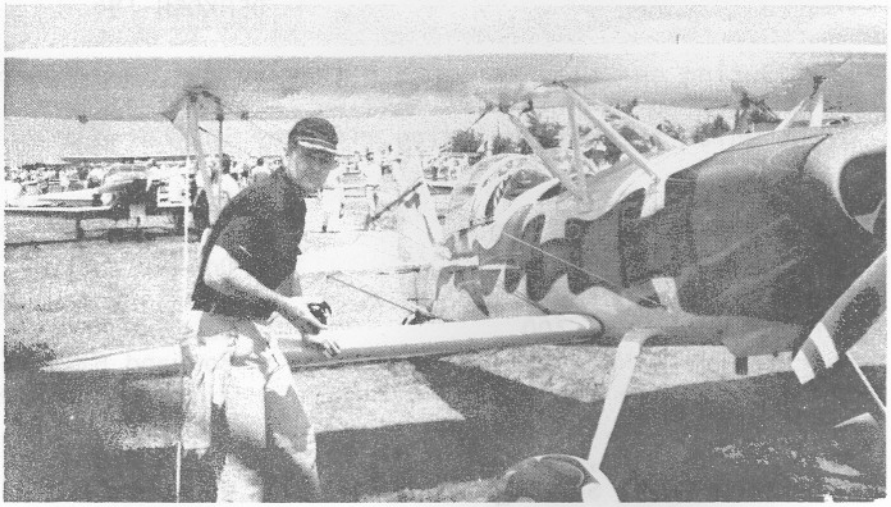
Art Morgan

During our stay at Oshkosh this summer, many people took the time to sign our guest register. Below is a list of them, with the mane of the plane which they are building, if they indicated one.

G.T. Buechle, SA 750
Richard Osborne, SA 300
John Upton, SA 300
Edwin Daniels, SA 300
Gerry Ruschke, SA 300
Butch Harvey, Hatz CB-1
Betty Jo Bussie
Allen Henderson, SA 300
Dewey E. Ballard, SA 100
William Morgan, SA 100
Judi Schroeder
T.J. Nielsen
John & Debbie Hattan, SA 750
Ken Meech, SA 300
Kerwood Cassens, SA 300
Bob Ridding SA 300
Arthur E. Bustian, SA 300
Jerry Hrdy, SA 900
M.F. Perez, SA 750
Mike Spence, Tiger Moth
Bob Kemmerer, SA 300
Del Ireson, 182
Dick Fennell, SA 750
Gary Kutler, SA 300
Floyd John, SA 100
George Phillips, SA 750
Wayne Moulder, Citabra A
Halsey Hines, SA 300
Bob Coyle, PD-28-180
Joe Naphas, SA 750
Harold Williamson
Ted Peterson, SA 300
Sue Hass, C 172
Hank Brandenberger, SA 300
Lee Elliot, Cessna 195
Steve Fusco, SA 300
Stan Brecob
Ken McDonald, SA 300
H.M. Woodrow, SA 100
David Moore, SA 300
Dorothy Jones
M.W. Morris
Terry Graham, SA 100
Paul D. Carmichael
Al Pregler, SA 300
Bob Messenger, SA 300
Thomas Schmitt
Kenneth Perkins, SA 700
Maynard Asmus, SA 300
Nate Rump
C. Roger Grantham, Piper Cherokee 140
Jim Buckley, SA 700
Jon Pollack

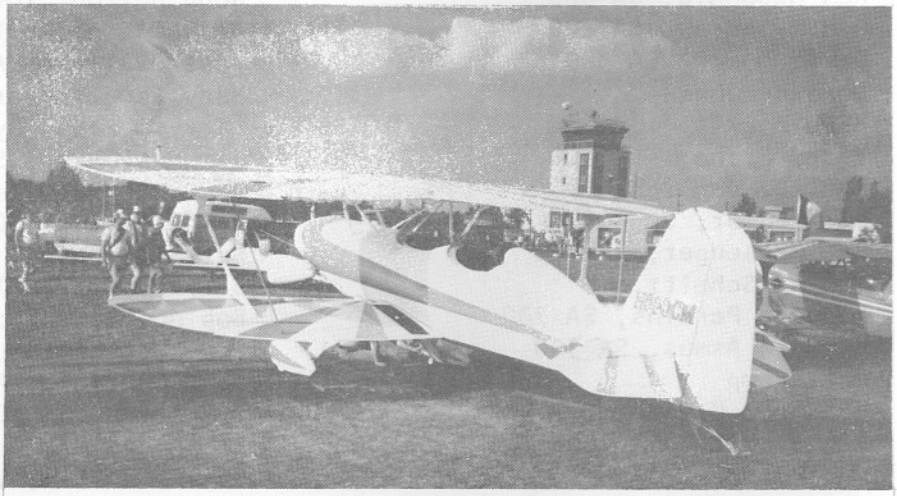
Paul Baker, SA 300
Rafe Tomsett, Populair
Don Mercer, SA 300
Roy Garrett, SA 300
David Spencer, SA 700
Rowland Hill
Jim Braithwaite
Bobby G. Lewis, Skybolt
Keith Jackson, Ercoupe
Wayne D. Fredline, SA 100
Tom & Judy Garrett
Ray George, SA 100
Bob & Jean Hammond, SA 750
Bill Collum, SA 300
Morgan Bishop
Nathen Walls, Weed Hopper
John Gelps, Skybolt
Dan Gugilee, SA 300
W.B. Rees, SA 750
Charles Farthing
Franz Schrask, P28/200
Bob Wyse, SA 300
Neil Reyngoudt, SA 300
Johnnie Ripillo
Pete Pemrick, SA 750
Nick D'Apuzzo, D-201
Roger Baumert C-185
Joe Ferraro, SA 300
Dave Darr, N69J6, Too
Harry Riblett, SA 300
L.A. Wach, Auto Sport
Jim Tinsman, SA 750
Thom Pomeroy, C-182
Al Andelse, SA 300
Jack McManey, SA 300
Steve Gray
George Ramin, N7X
John Helton, Interstate CAdet
Al Gallarno, C-152A
Jess Denison, SA 300
Marv Schollmeyer, SA 300 & V-Star
Larry & Kathy Rydberg, Stinson 10-A
Jim Maslowski, Skyhawk
Marvin Crane, Seahawk
Ryan Seals SA 900
Mark Kasuloski, Cessna
Bill Sattler, 2) SA 750 1) SA 300 2) T-18's Thorpe
Bob Hoover, Monq
R.D. Waltermine, SA 300
Kent Pietsch, SA 300
Tom Green, SA 300, SA 750, SS 101
Robin Taylor, Dragonfly, Starlet, Cygnet
Max E. Mullen, V-Star

Colin J. Corley, SA 300
J. Umbaugh, SA 300
Bob Beck, SA 750
Art Royon Cassutt
Bill Humphrey, SA 300
Jack Wallace, SA 100
Henry C. Rohlf, SA 100
Dane Crane, SA 300
Richard Yaskiw, SA 750
Dave & Mickey Scott, SA 100
Bob Koppe, SA 300
Tom Tschida, SA 300
Dr. L. Smith
Frances Grott, Rockwell
Jim Keller, Star
Geoff Peters, SA 300
Art Morgan SA 900
Joe Hamilton, SA 300
Roger & Dorothea Boggs SA 300
Walter Szeremeth, SA 300
Al Tomlinson, SA 300
Clinton Anderson, SA 300
J. Bull Stirling, SA 300
Doug Pfundheller, SA 300
David Ebershoff, Skybolt
John Adolfson, SA 300
Earl Brown
Gordon Moore, SA 750
Albert Rogers, SA 300
Virg Buhler, SA 100
W.G. Berry, Skybolt
Larry McDonald, SA 300
Rey Walton, SA 300
Charles Lewis, SA 300
Bob Kershaw, N43496
John E. Davidson, SA 300
Roger Byers, C-150
Mr. & Mrs. B. Stabnau
John Barnabey, Lance
Frank C. Iram, SA 750
B Power-Waters, SA 300
Steve Stompanato, Falco
Don Reuszer, SA 300
Daniel Cerna, SA 300
William B. Nash, SA 300
Tom Keithley, SA 300



Owner: Jim Tinsman of Missouri

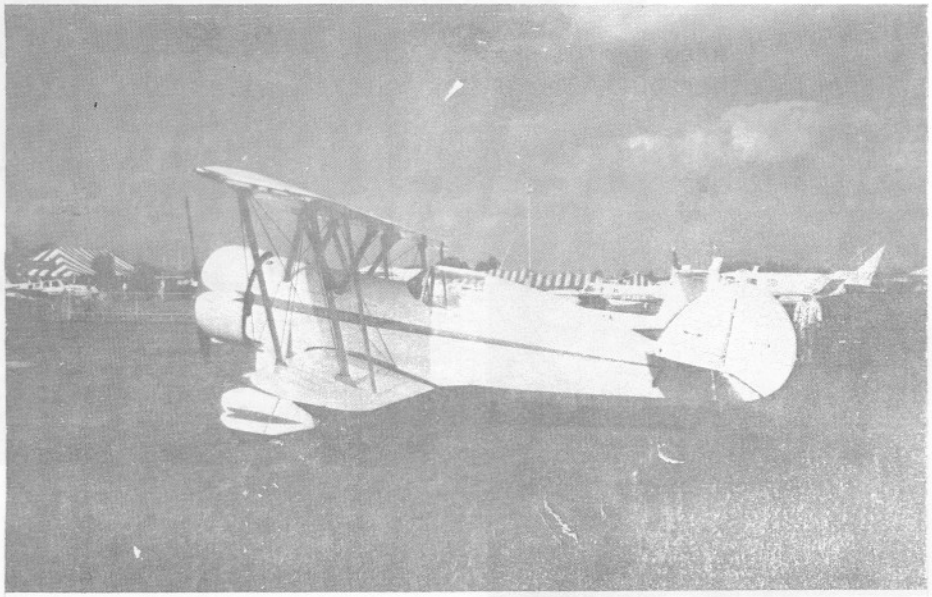
Owner: Unknown; (If this is your plane or you know who it belongs to) please contact Stolp Starduster!



Owner: Clint Anderson of CA

Owner: Roy Garrett of Michigan

Owner: Bob Wyse of Texas



A WACO ??

12 Roy E. Uptegraff
Box 182
Scottdale, PA 15683

Oct. 30, 1984

Dear Bill,

Enclosed are some pictures showing the way my aileron slave struts are connected. Do you think replacing all those washers with a piece of teflon bar stock would be an improvement? I wonder why the mount for the rod is so wide? Your advice would be appreciated. I've managed to get rid of the tendency for aileron flutter by adjusting the jam nut and positioning the strut more into the wind.

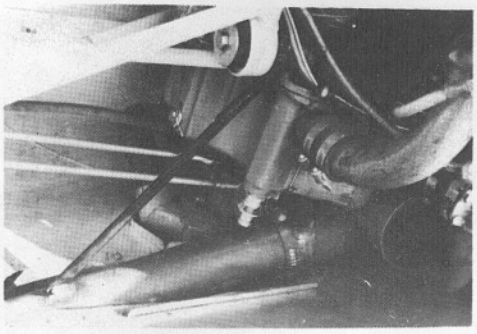
Also, note the modifications I made on the exhaust system. I lost the entire pipe one day as it had no support. This exhaust system is from a Grumman/American Yankee which had alot of AD's on it. As you can see, I cut the pipe, put a slip joint on it and added a brace from the engine block. After 15 hours of flying, it's all still there. Maybe this will keep the pipe from hitting somebody else's backyard garden!

N1011Z continues to keep em smiling here in the Pittsburgh area. Next month I'm putting it on static display at our Guard base at Greater Pittsburgh International.

Sincerely yours,

Roy E. Uptegraff III

Roy E. Uptegraff III



Dear Roy,

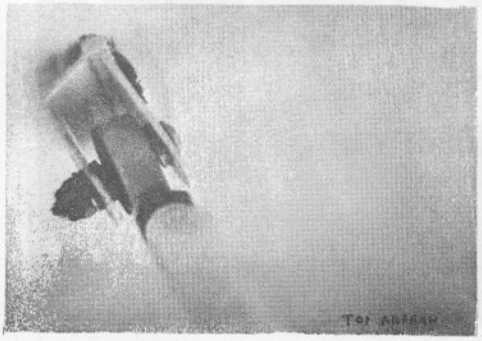
Thanks for the pictures with the letter. We will use it in the next magazine. The Teflon Bar, stock cut to size will be the perfect answer. The opening is oversize because of difficulty in fabricating the part, the short bend offset is hard to do.

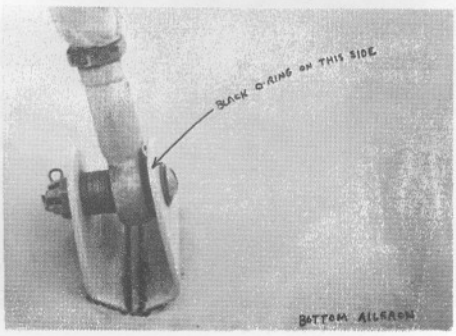
I also approve of your fix on your exhaust system. I am sure it will help other builders in the future.

Let us know how you made out at the static display.

Regards,

Bill Clouse



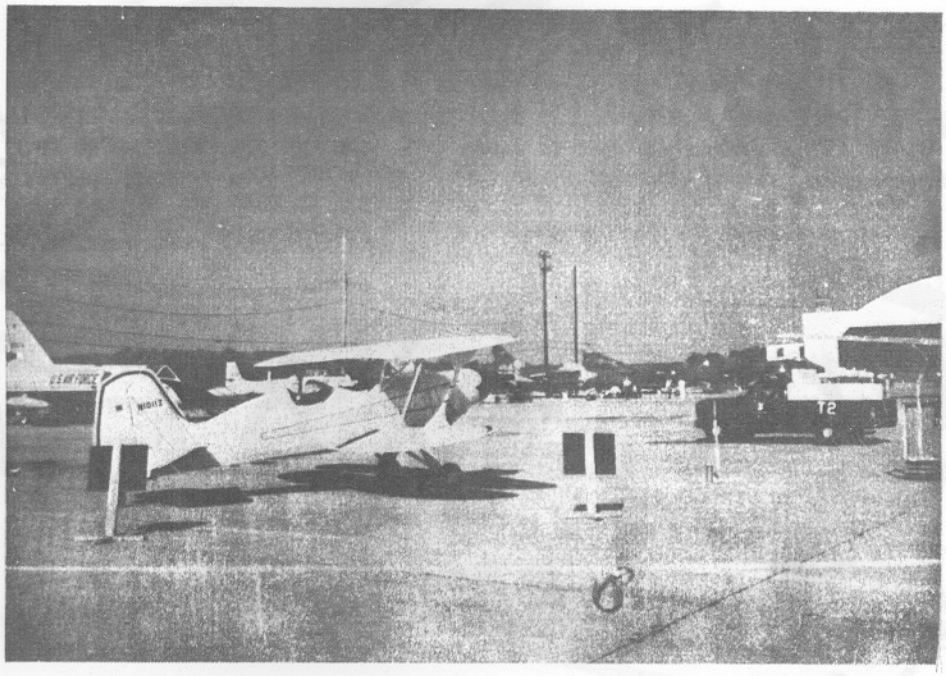
Roy E. Uptegraff
Box 182
Scottdale, PA 15683

Oct. 30, 1984

Dear Bill,

If you look closely at this snap-shot, you'll notice an F-106, T-33, F-16, A-7K, F-4D, A-10, and oh yes; an SA 300. The picture was taken before the gates opened at the Pittsburgh Air National Guard's Open House, Pittsburgh International Airport. I called the approach control supervisor prior to takeoff and received permission to venture into the TCA with my Starduster equipped with a Terra TPX-720 hand-held battery operated radio. They radar vectored me to final and I had no problem taxxing to The Guard Base since I co-pilot the KC-135's there. When the Open House got under way I can honestly say that I got more attention than some of the fighters. The crowd loved The Starduster. I was in my military flight suit which caused some of the fans to think the Starduster was an Air Force aircraft! Light Observation?? Anyway, I enjoyed the opportunity to show off the plane, but I wish people wouldn't ask ne how much I paid for it. My standard reply to that is, "How much did your shoes cost?"

It is now starting to get cold in the northeast. The leather jacket and scarf is getting some use and the Starduster is performing better in the cold weather. The question I enjoy the most from people is; "Why do you fly this airplane?" FUN!

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WINDSHIELDS
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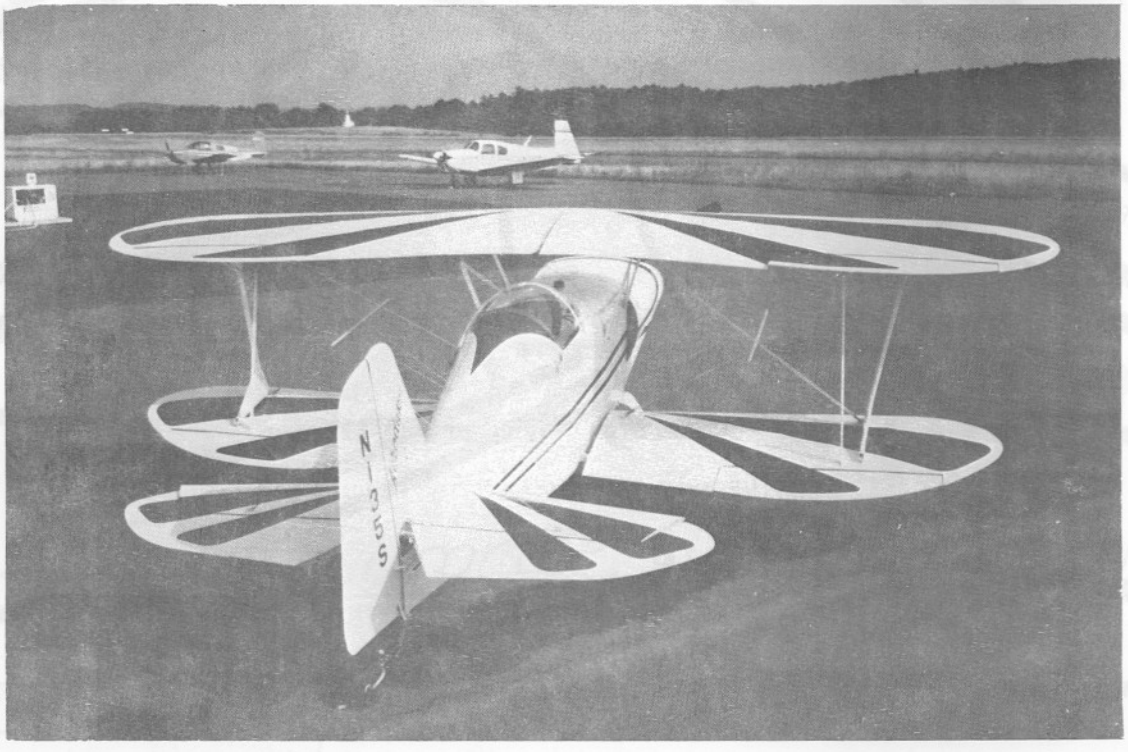
LOG BOOKS
FIBERGLASS PARTS
GAS TANKS
MANUALS
ENGINE MOUNTS

This plane belongs to Dave Spencer of Martinsville, VA. Mr. Spencer is the gentleman that is opening The East Coast Store, ( as mentioned on the first page ).

Dave has an enviable reputation as a builder and restorer of all types of aircraft. The ACRODUSTER 1 shown below is an example of Dave's talents.

We are looking forward to his success in serving our Eastern Builders!!




N-53
Acrobatic

## Something Interesting and Factual about Stress

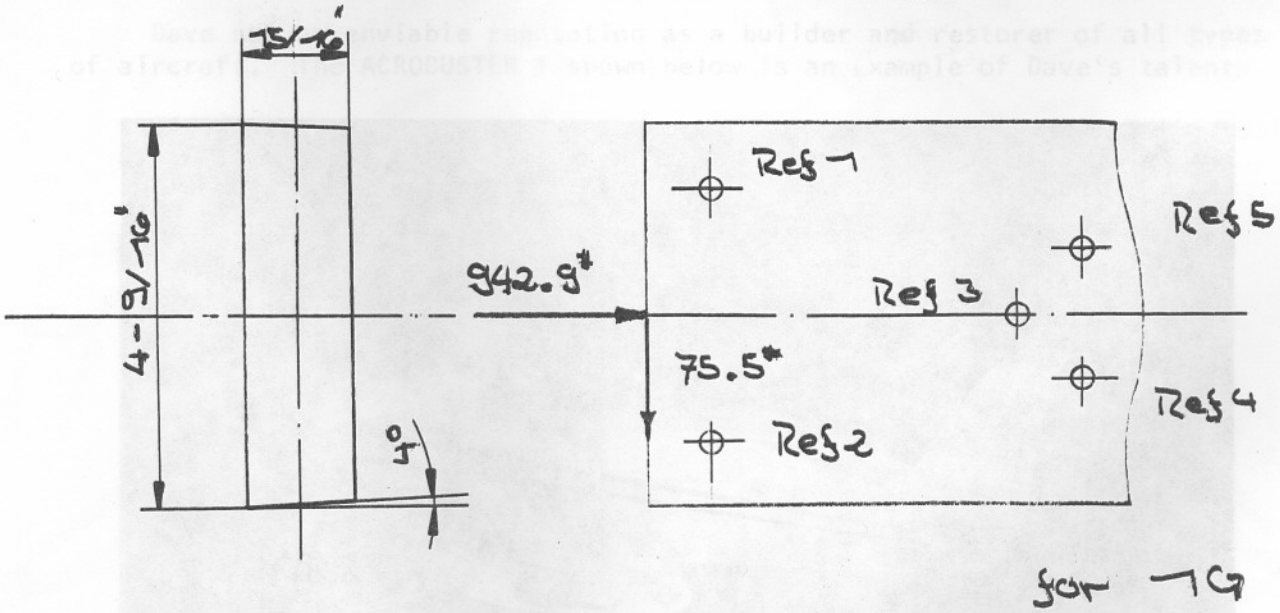
Mr. R.D. McDonald asked us for some support to verify the ultimated load for his ACRODUSTER TOO of 9G's, required from the Experimental Aircraft Association of Canada ( EAAC ).

Their stress analysis for the spar fitting at the fuselage attachment has shown an ultimated load factor of 6G's or yield factor of 4G's.
Knowing the fact, that several ACRODUSTER TOO pilots exceeded this limit without any structure failure, we tried to find the reason for this difference.

FRONT SPAR :

area : $A = 4.216$ sqinch

area of hole for AN 4 bolt : $A_b = 0.2344$ sqinch




The normal way to solve the problem is to calculate the pressure inside the wood. In this case, compression between the bolts and wood in the holes. The result is, that the spruce is two times overstressed for 9G's.

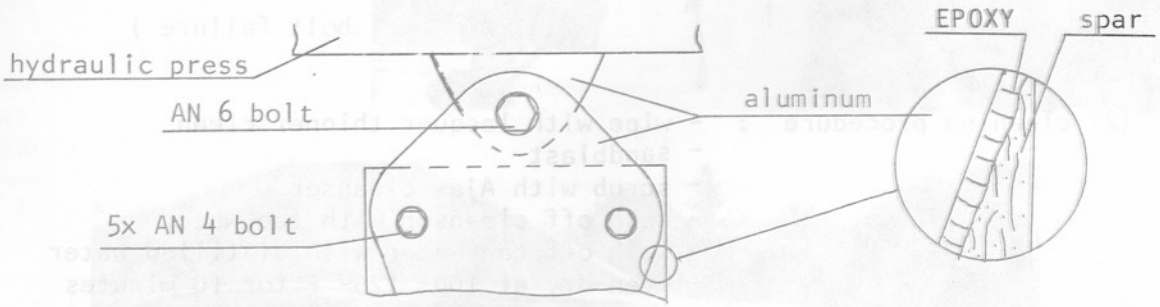
Why then are all the pilots still alive who pulled more than 3 or 4 G's?

The answer is friction. Friction between the assembled parts easily carries 2/3 of the whole load.
In a more detailed analysis we found out that a moment of:

$M_a$ = 128 inch lbs. is necessary for tightening the bolts.

Here is one important problem; if we use well oiled screws it is impossible to achieve the moment without overstressing the wood. So, this calculated moment is only a theoretical value which, is very close to the normal moment for tightening bolts and nuts without torque wrench, but explains very well the situation.

To satisfy our dedication of flying safely, we tried to find a simple modification to increase our load factor. We glued the fitting to the spar with EPOXY adhesive. The results were surprisingly excellent. Our calculation showed that the glue would carry about 100% of the ultimate load. During the test movement of the epoxied attach fitting was nil. Only the appearance of very few lines indicated the beginning of overstress in the EPOXY material, when the AN 6 bolt sheared off at a load of some more than 18,000 lbs. or *** 19 G's *** .




So, the best procedure is to epoxy <u>all</u> front spar fittings to the wood, before varnishing.

Remark: The front spar carries 90% of the whole wing load.
The Gross Weight is 1,800 lbs.

# TEST REPORT

Test with front spar elements on hydraulik press has shown, that the fuselage attachment is safe for

*** 9 G's ***

Test objects :

1. complete assembly of front spar fitting at the fuselage attachment :
   - 13/16 x 4-9/16 spruce
   - 2 mm birch plywood glued with T 88
   - .160-2024-T3 aluminum attached with 5x AN 4 bolts : torque 100 inch lbs.
2. same arrangement but fitting glued with T 88 by cleaning procedure (2)

| Test Results | Test (1) | Test (1) | Test (2) | Test |
|---|---|---|---|---|
| load | | | | |
| yield | 8670 lbs. | | 13820 lbs. | |
| | ( 9.1 G ) | | ( 14.5 G ) | |
| max. | 10680 lbs. | | 18850 lbs. | |
| | ( 11.2 G ) | | ( 19.8 G ) | |
| | | | ( bolt failure ) | |

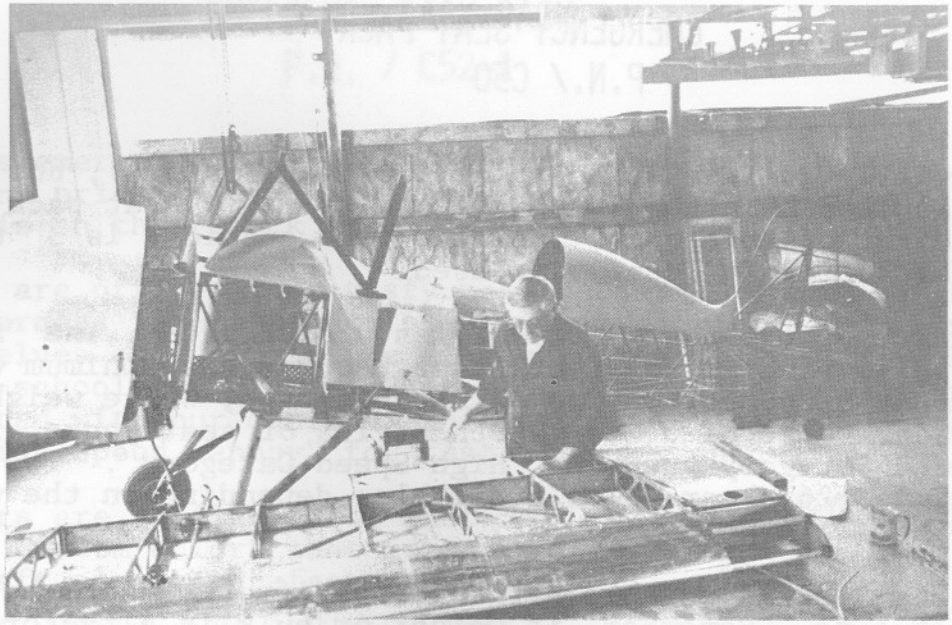
(2) cleaning procedure :
- wipe with lacquer thinner clean
- sandblast
- scrub with Ajax cleanser
- wash off cleanser with tap water
- wash off tap water with distilled water
- oven-dry at 100- 125° F for 10 minutes

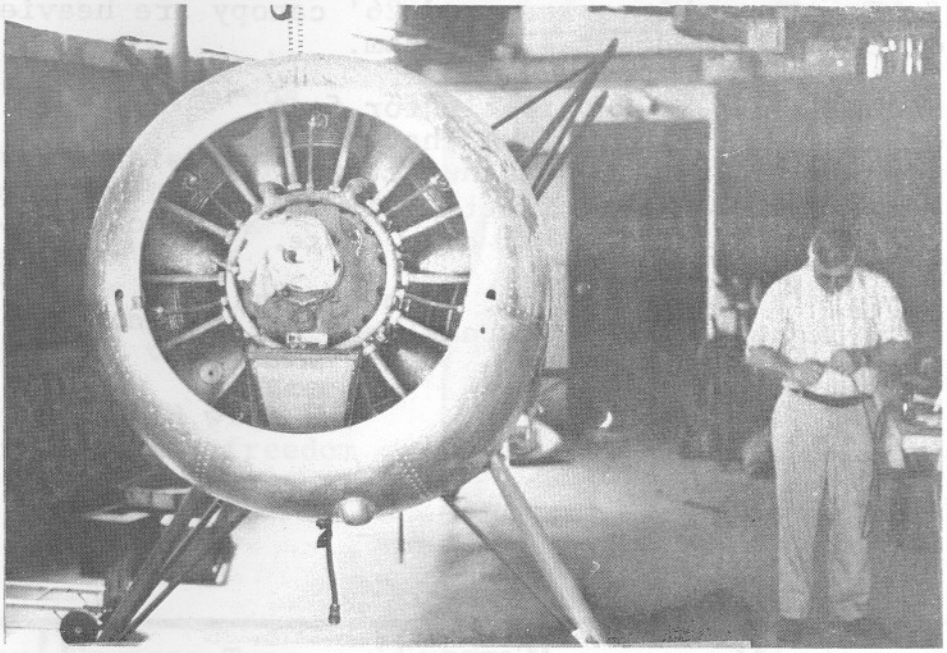
I wish to thank Ray, George and Dennis and of course, Hank Schmel from the Universal Studios for their kindness and support in passing the tests.

Riverside, CA 6 November 1984

C. Reuter

Carsten Reuter





Another BEAUTIFUL STARDUSTER
being put together by Al Peterson,
of Astoria, Oregon!

# EMERGENCY SEAT PACK
## P.N./ C50

This seat pack will fit in a standard seat pan ( 13"x15" ), but will not push up .the pilot too high in his seat, as with other seat pack parachutes. The height of this pack, including the cushion, is 3" to 4½" depending if the 24' or 26' canopy is used.

As with our back type parachute, two styles are offered. The "Semi-Adjustable" type is offered to pilots that require the minimum weight, and maximum amount of comfort. The Adjustable type, while weighing more, will fit a broader range of sizes. Both styles of seat packs are offered in the "Low Speed Category" and the "High Speed Category". Two sizes of canopies ( 24' & 26' ) are also available, depending on the users weight. ( See the table below. )

When ordering the Semi-Adjustable harness, specify the users height, weight, and belt size. Remember, if weight or bulk is a factor, the fully adjustable system and 26' canopy are heavier than the 24' canopy or the "Semi-Adjustable system.

Stock colors are available for fast delivery. Custom colors that match your aircraft, can be manufactured in a very short time. Contact STOLP STARDUSTER for delivery time and color choice.

Consult the table below, when determining which type of seat pack best fits your needs.

| Part # | Category | Canopy Size | Harness Type | Weight * | Pack Size | Maximum user wt. |
|---|---|---|---|---|---|---|
| # 90500 | Low Speed | 24' or 26' | Semi-Adjustable | * 12 lb | 13x15x3½ | 24'-#200<br>26'-#250 |
| # 90501 | Low Speed | 24' or 26' | Fully Adjustable | * 13 lb | 13x15x3½ | 24'-#200<br>26'-#250 |
| # 90502 | Hi-Speed | ** 26' | Semi-Adjustable | 15½ lb. | 13x15x4½ | 250 lbs. |
| # 90503 | Hi-Speed | ** 26' | Fully Adjustable | 16½ lb | 13x15x4½ | 250 lbs. |

* Add 1.5 lbs. if the 26' canopy is used.
** A 24' canopy is not available in the "Hi-Speed" version.
*** Weights may vary due to harness size.

# EMERGENCY BACK PACK
## P.N. / C52-1

This pilots emergency back pack is quite impressive in size, weight, comfort, and price. In fact,most pilots can hardly believe that a parachute is on their back at all!

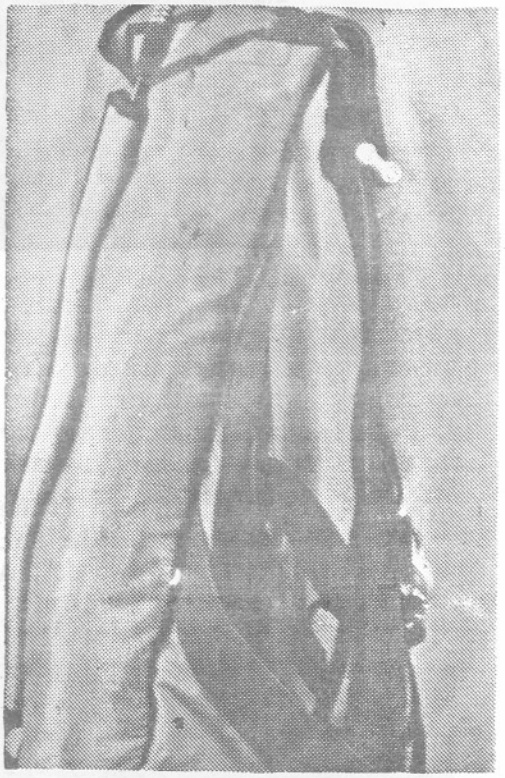
Two styles are offered to satisfy most needs. The semi-adjustable style of harness is offered to pilots that require a parachute that fits themselves only, while the "fully adjustable type" is designed for flight schools or clubs. Either of these type parachute packs can be fitted with our optional 26' canopy for the really big person, and our "High Speed canopy" for fast aircraft such as a P51.

Stock colors are available for fast delivery. Custom colors that match your aircraft,can be manufactured in a short time. Contact STOLP STARDUSTER for delivery time and color choice.

Consult the table below, when determining which configuration will suit your needs.

When ordering the "Semi-Adjustable" type, specify your height, weight, belt size, and size of canopy. If weight or bulk is a factor, remember that the "Fully Adjustable" systems weight more than the "Semi-Adjustable" style, also the 24' canopy weighs less than the 26' version.

All parachute systems are equipped with a split saddle harness for complete freedom of movement and comfort.



| Part # | Category | Canopy Size | Harness Type | Weight * | Pack size | Maximum user wt. |
|---|---|---|---|---|---|---|
| # 90504 | Low Speed | 24' or 26' | Semi-Adjustable | *11½ lb | 15x26x1½ | 24'-#200<br>26'-#250 |
| # 90505 | Low Speed | 24' or 26' | Fully-Adjustable | *12½ lb | 15x26x1½ | 24'-#200<br>26'-#250 |
| # 90506 | High Speed | **26' | Semi-Adjustable | 14½ lb | 15x26x2½ | 250 lbs |
| # 90507 | High Speed | **26' | Fully-adjustable | 15½ l | 15x26x2½ | 250 lbs |

* Add 1.5 lbs. if the 26' canopy is chosen.
** A 24' canopy is not available in the "high Speed Version".
*** Weights may vary due to harness size.

For Trade Branson, Missouri
Table Rock Lake
Two 1/3 Acre Waterfront Lots; Magnificent.
All utilities are in gas, electric, & sewer.
Adjacent to Pvt. Airport; Kimberling City
Airways (See Kansas City Sectional). Tie
Downs & Hangars are available. WILL TRADE
FOR PERFECT STARDUSTER TOO. Taxes are $25.
per year. Contact Peter Suarez, P.O. Box
59906, Oklahoma City, OK 73144 (405) 681-
2331. c/o Catlin Aviation Co.

Two Security 150's Parachutes-Chair Pack.
$400.00 each. Contact Al McGihon, 2842
Temple Ave; Long Beach, CA 90806; Phone
(213) 427-5485.

Starduster "1" Partially complete O-120G
engine. Modified to "D". Ready to run
less, harness & carb float. Wheels,
brakes, w/plans and many instruments,
Aero Prop. Call Clyde Pray 619-245-2646
Also Basket Case 0290G-Partially Modified.

Starduster "2" 523H

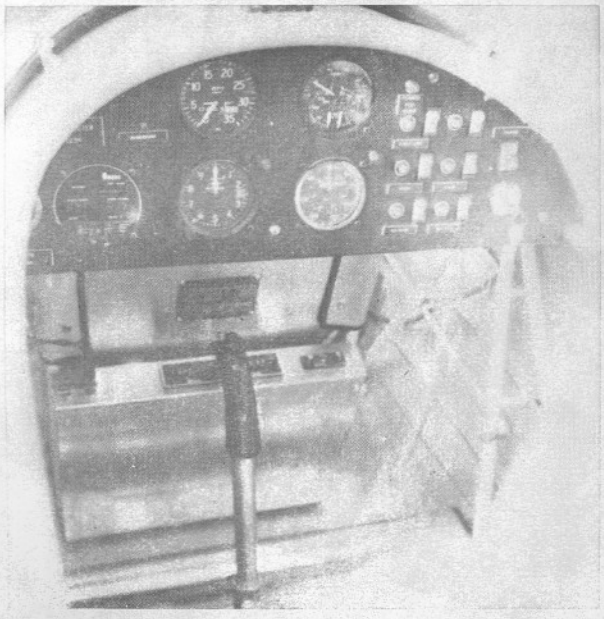
Listed below are some of the features and equipment:

Terra navigation and communication radios with digital CDI indicator. Sigtronics intercom with open cockpit modification. Schneck overhauled PS5 carb. Christen inverted oil system. Stolp inverted fuel system. Hooker deluxe color coordinated 5-belt aerobatic harnesses with seperate seat belt attachments. Panel mounted electrical switches and breaker. Landing lights. Navigation lights. Cessna-type red strobe on vertical post. Stolp wheel pants. Upper and lower baggage compartments. Aluminum floor boards. Complete electrical system. Ball-bearing aileron hinges. Center section and fuselage fuel tanks (20 & 26 gals.). Fixed pitch prop with spinner. New Bendix blue ignition harness and spark plugs. All firewall mounted things have nut plate backings. Stolp bubble windshields. Cleveland wheels and brakes. Front and rear controls and brakes. Mechanical-type fuel gauge. All modifications and reinforcements made according to Stolp Starduster. Seat slings for parachute or seat cushion. Push handles on fuselage.

Performane specs:

Cruise: 125 mph.
Stall 50 mph.
Blimb 1500-2000 fpm.
Fuel consumption 9 gph.
Range 4 hrs. plus reserve.

Price- $28,000.00. Includes two New Parainnovator seat-pack parachutes.
For more detailed information contact: Dr David Crane (715) 723-7175



REAR COCKPIT 523H
DR. DAVID D CRANE


DR. DAVID CRANE
CHIPPEWA FALLS, WI
715 723-7175