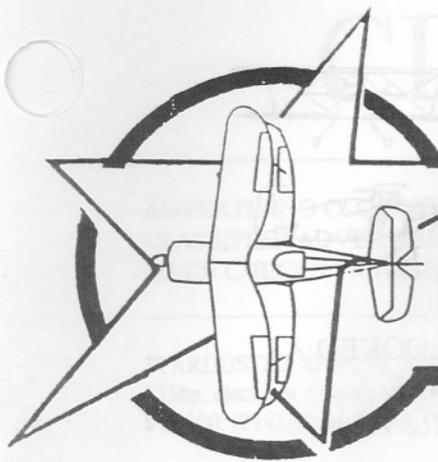


CLASSIFIEDS



Starduster

MAGAZINE



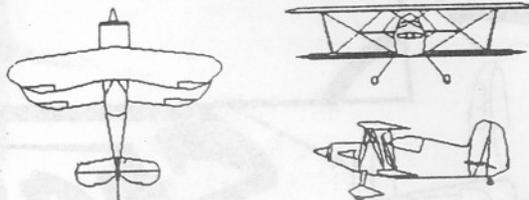
P.S. LIFE IS GOOD

January

1996

Dedicated to the
ACTIVE Homebuilders

JANUARY 1996



PRESIDENTS COMMENTS:

WITH THE HOLIDAYS PASSING, AM SURE MOST OF US HAVE LOOKED AT OUR ACCOMPLISHMENTS OF "95" WITH CONTENTMENT AND ARE LOOKING FORWARD TO "96" WITH RENEWED HOPE AND INSPIRATION.

MY PERSONAL REFLECTIONS ARE THAT I SPENT 20 YEARS GROWING UP - USED UP ANOTHER 20 YEARS WITH A SATISFYING CAREER IN THE US AIR FORCE, THEN STARTED WITH " STARDUSTER" AND AM ABOUT TO BEGIN MY 24TH YEAR HERE. THOSE YEARS ADD UP TO RETIREMENT TIME. WANT TO LEAVE "STARDUSTER" IN CAPABLE AND EAGER HANDS SO THERE IS SATISFACTION, IN MY MIND AND HEART, THAT OWNERS AND BUILDERS OF OUR AIRPLANES WILL CONTINUE TO RECEIVE THE SUPPORT THEY EARN AND DESERVE..

BEING "MR. STARDUSTER" HAS BEEN VERY REWARDING AND SATISFYING OF PERSONAL GOALS - ONLY ONE REMAINS "RETIREMENT". BRENDA AND I WOULD LIKE TO MOTORHOME AROUND GOOD OLE US OF A AND VISIT OUR FRIENDS AND BUILDERS WE'VE NEVER GOT TO MEET. THEN AFTER A COUPLE OF YEARS, HALFWAY SETTLE DOWN AND THEN MAYBE THE STARDUSTER EXECUTIVE COULD BECOME A REALITY. IN SUMMATION, STARDUSTER CORPORATION IS AVAILABLE TO A WILLING, ABLE AND QUALIFIED PERSON OR PERSONS WHO HAVE THE DESIRE TO BE REWARDED BY THE WARM WELCOMES OF THOSE WHO HAVE COMPLETED THEIR PROJECTS AND SHAPE IN THEIR PRIDE S, THEIR WARMTH AND COMMADARIE. AND IN THIS CLOSING I AND BRENDA WOULD LIKE TO THANK YOU ALL FOR YOUR STRONG AND CONTINUED SUPPORT AND CONFIDENCE.

SINCERELY

BILL CLOUSE
"BC" PREZ

P.S. LIFE IS GOOD

Stolp Starduster Corp.

4301 TWINING
RIVERSIDE, CA 92509
(909) 686-7943

FAX (909) 784-0072

WATS 1-800-833-9102

HOME BUILT AIRPLANE PLANS
SUPPLIES • COMPONENTS • MATERIALS

JANUARY 1996

THIS MAGAZINE USES MATERIAL SUBMITTED BY IT'S READERS. SOME ARTICLES OR STATEMENTS MAY NOT BE IN AGREEMENT WITH STOLP STARDUSTER CORPORATION OR IT'S EDITOR. INFORMATION AND ARTICLES USED ARE AT THE READERS RISK AND STARDUSTER MAGAZINE ASSUMES NO LIABILITY.

TABLE OF CONTENTS

PRESIDENTS COMMENTS	2
ODDS & ENDS FROM YOUR EDITOR	4
SAFETY ADS AND THE LIKE	6
TECH TIPS - EAA TECHNICAL COUNSELOR NEWS	8
TECH TIPS - LYCOMING FLYER	10
STARDUSTER HISTORY N1189B "GIRL SAN"	16
LETTERS	22
LEARN THE LANGUAGE	25
MORE LETTERS	27
FIRST FLIGHTS	30
LEWIS AND CLARK TRIP BY OSCAR BAYER	37
16TH ANNUAL STARDUSTER OPEN HOUSE	41
CLASSIFIEDS	42

We would like to thank all of this issues contributors and respond to one and all for some interesting information and photos.

FRONT COVER - N77GG Craig Coben's beautiful yellow and red Acroduster Too. Craig is from 2866, Colon Dr., Copley, Ohio 44321. Picture taken at Wautoma, WI during Oshkosh / Wautoma Starduster gathering.

BACK COVER - N8121B Mike Mattei's equally beautiful all silver with polished aluminum Acroduster Too. Front cockpit covered. Mike is with his family, wife Tracy and the twins Amanda and Brianna. They live at 19775 Silver Ct., Bend, OR 97702.

REMINDER : SUBSCRIPTION RENEWAL

Please mail your checks to Stolp Starduster Corporation. They are due by the first of January 1996. Subscriptions run from January to January of each year. Those who subscribe in the middle of the year will receive all four issues for that year.

Current subscription rates for 1996 are still \$12.00 per year. I don't know how much longer we can do this, due to postage, printing and handling costs. By 1997 we will more than likely have to raise the cost of a subscription.

Checks should be made out to STOLP STARDUSTER CORPORATION, and sent to 4301 Twining St., Riverside, California 92509. Thanks.

JANUARY 1996

ODDS & ENDS FROM YOUR EDITOR

A new year starts and 1995 ends, will 1996 be as good or better than 1995? I certainly think so. I would like to start out by apologizing to Harvey Newman, Bob Hammond and Charles (Fritz) Eisenbiser. Harvey, for my brain fade - some how was missed as the first place award at Oshkosh/Wautoma and the awards should have read: Grand Champion Bob Hammond, followed by first place. I thought that I had written down that names and awards in the proper order - so much for historical accuracy. Also I did not list Fritz Eisenbiser as attending. He was the fellow most responsible for getting his son Jeff's Starduster Too finished and flying, and of course he has been a great help to Bill Clouse and Starduster Corp. on numerous occasions over the years. You might recall that Bill Clouse flew Jeff's airplane N81582 the silver and black maltese cross O470 powered Starduster Too to Oshkosh/Wautoma and then on to the east coast in 1994. Again my apology, as it certainly was not intentional.

Good news, more first flights to report. My good friend Bryant Anderson's Starduster Too N8233X flew for the first time November 15, 1995, (letters and pictures elsewhere in this issue). Also Bob Griffins N507RG flew for the first time in the late summer Of 1995, and I wish he would send me some pictures and a detailed report of this successful event. Between the article in Sport Aviation's December issue, page 109 and the letter elsewhere in this issue from Jerry Rinehart also a Starduster builder and Bob's hangar partner is how I was able to report on this event. It also looks like Jerry Rinehart's airplane will soon be joining the ranks of flying Starduster Toos and we certainly look forward to that.

Also in the issue are pictures and a little more information on Wayne Ensey's and Mike Mattei's Acroduster Too which both flew this past summer. And along with these we would like to add John Snyders Starduster One to first flights. Letters and pictures elsewhere in this issue.

On another pleasant note we at Starduster Corporation and Starduster Magazine would like to again thank Lou Stolp for designing one of the most beautiful airplanes ever. He and his wife Joy were just recently recognized for their input and improvements during their ownership of the Redlands California Airport, and received awards for that ten year period from 1969 thru 1979.

Several other community airports in California celebrated their exsistance recently and both of them had Starduster Toos on display. French Valley Airport in Murietta, California was one and it boasted John Renquest, N8331A a beautiful yellow and red Starduster Too. And along with this John Helton and old Starduster Corporation and airshow pilot flew his Cub to a successful landing on top of a moving Chevy van. The other airport was San Luis Obispo, California and was graced with Oscar Bayers equally beautiful Starduster Too N490B. Oscar's story about his and Les Homan's return trip from Oshkosh / Wautoma following the Lewis and Clark Trail is also elsewhere in this issue.

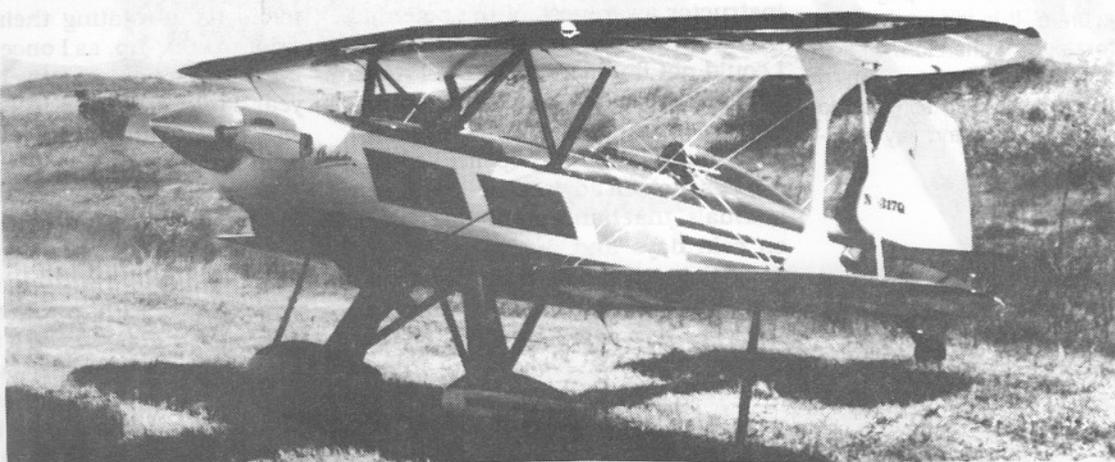
As a side note your editor has for the last several years attended the Sauerkraut Festival and did so again this year, it is off airport and requires a police escort as it is at least 3 miles from the airport to downtown Scappoose, Oregon. Hap Schanse also attended with his Ranger powered Starduster Too N26AH A.K.A. "Rangeduster".

The other enjoyable event I attended was with some of the antique bunch a spur of the moment overnight camping trip and cookout at a small 2000' grass strip called Daybreak located on the south fork of the Lewis river in Southern Washington State near Woodland, Washington. Great food, great friends and a beautiful place to fly in and camp. I really want to do this sort of thing again.

More pleasant information, aviation to some degree and especially Stardusters have enjoyed an increase in interest as Bill Clouse has sold over 30 sets of plans for the Starduster Too this past year. Not bad for a 30 year old design whose peak years were during the 1970s.

I would like to close with the fact that aviation and homebuilding is, like everything else, on the internet. I am computer illiterate but my daughter Trish and son David are the ones who continue to save me. My point is if you use the internet and run across anything regarding safety, Stardusters or items for sale including airplanes or aerobatics please make copies and send them to either Bill or myself.

Happy and safe flying for 1996,
Editor DCB



FIRST PLACE AWARD OSHKOSH/WAUTOMA 1995
THIS IS A FINE EXAMPLE OF THE S/D TOO
RED ORANGE AND CREAM 540 LYCOMING
POWERED WITH MUCH ATTENTION TO DETAIL
N5317Q IS OWNED AND FLOWN BY HARVY
NEWMAN WHO LIVES AT 660 SILVER VALLEY
WALNUT CA 91789 909-594-4605

On Medical Exams and Your AME

Michael F. Van Hoomissen
Attorney at Law



Under current regulations, most of us (including students) are operating general aviation aircraft with a third class medical certificate. This article contains some common sense believed helpful to insure that your next AME visit is a good experience.

Know your AME and select one who is an active general or commercial aviation pilot. Not all doctors do the same things nor do they proceed in the same fashion. They do not use identical testing equipment. Their staff vary considerably. Their personalities, moods, prejudices and opinion are as varied, I suppose, as the general populace and the group they examine.

Approach the exam seriously and not casually. You should always be preparing for the exam. Right now (I mean now), find out when your current medical expires (the last day of the 24th month after you passed your last one) and write it on your appointment calendar. Then enter a date 4 months before it expires and on that date make your AME selection. Get an appointment for your exam 60 - 90 days before your current exam expires. An early exam will provide you time in the event that you are found to have any "condition" that requires further testing before your old medical expires. And for the further reason that if a decision has to be made by the Oklahoma FAA medical office you will give them time to act on your case.

Your further immediate preparation should include getting and/or staying in shape and talking to your fellow pilots about their experience with their AME. The former can help you be ready when TEST DAY comes and the latter will help you choose your AME. If in doubt, have your eyes and glasses checked by an expert before the person in the AME's office does it.

Consider scheduling an early A.M. appointment when you are well rested, after you first urinate and before eating a big meal. Precede your exam with a non-stressful, healthy, fully-rested week. As you fill out the FAA Form 8500-8 (you fill out most of the first page and the AME the second) be accurate. It is imperative that you closely read the top perforated and often torn off and discarded page entitled "Information For Applicant" which has two sides of small print. The AME is to suppose to provide it to you (some do not). Ask for it and pay atten-

tion to the warnings. When completing the form it is best if you take and refer to a copy of your last exam. Ask if you will be given a copy of your new exam report when it is completed. Proceeding in this fashion (expect resistance) saves mistakes, makes realistic the notation "previously reported" and reduces uncertainty. It also lets you know what they found and reported and saves you using a FOIA request to get this from the FAA.

Make sure you understand all the physical exam tests and instructions first. Ask, if you don't. If your AME has put his ear testing device under the air-conditioning fan and next to the telephone bell (as some are), or some other distraction or if the exam instructions are inadequate, discuss it with the examiner before proceeding.

The urinalysis can be a problem. It is known as a gross test. It can show the presence of protein or sugar and if it does you are in for, at least, more tests, expense and delay. The test is "gross" because it doesn't prove anything except the existence of something in your urine which *may possibly* indicate something for which you *might* be disqualified. An adverse finding here or in any other areas will likely require further testing and delay prior to certification. Hence, it is best to take your exam well ahead of time.

If you have had any experiences you would like to share that could be used in another round of this discussion, please send them to me. Thanks.

Stop Prop Strikes

I just read the report, "Complacency Cited in Prop Strike" (Oct. 15), involving the death of a highly experienced pilot. I was also a victim of an inadvertent propeller start in January 1994. Luckily, no one was hurt and my aircraft suffered only minor damage. Following my incident, I researched the subject of inadvertent propeller starts and discovered the following:

- The branch of the FAA I reported to was reluctant to increase pilot and instructor awareness of the potential threat of an inadvertent propeller start. I could not find anyone in the FAA to officially agree to implement any increased awareness or increased instruction relative to propeller safety.

- Cessna still advises, in its owner's manuals, that hand-propping engines on cold days and during periods of nonuse, is recommended. This recommendation is refuted by a report by Textron Lycoming and almost all mechanics and other experts.

- Nowhere in any student training or any FAA check ride is it mandatory that any instructor or FAA examiner teach any pilot the dangers concerning hand-propping.

I have spoken with and received technical documents from engineers within Teledyne Continental (Bendix),

Mattituck Aviation and Textron Lycoming concerning the unmet potentials for a "hot magneto" scenario. All technicians agree that hand rotation of a propeller is potentially dangerous in light of a potential magneto or ignition system failure. The common conclusion is that no pilot should ever assume his ignition system is working and that a "hot magneto" condition may exist any time.

Each winter, I witness hundreds of pilots hand-rotating their propellers prior to start-up, as I once did, believing this practice is relatively safe. Each year, I read about or witness unnecessary deaths and destruction resulting from propeller accidents.

Something needs to be done. I have recommended that a warning placard be placed on all propellers stating, "Danger: Manual rotation of this propeller by hand may cause engine to unexpectedly start, even if the ignition system is turned off. Serious injury or death may result." More information on caution regarding propellers should be included in owner's manuals, and manufacturers should strongly discourage *all* hand-rotation of propellers. I also have recommended that the FAA require all biennial rev and pilot certificate training to include mandatory guidance regarding propeller safety.

Paul D. Adler
Chilmark, Mass.



Red Bluff FSS Closed

The Red Bluff FSS was closed on September 28 which made it the last FSS in the Western-Pacific region. This was a very popular FSS for many Northwest pilots who used Red Bluff for a fuel stop and weather briefing and food before taking off through the Siskiyou or heading south through California.

Pilots now must contact Rancho Murieta Automated Flight Service Station (AFSS) just outside Sacramento Call on phone 1-800-WX-BRIEF. Rancho Murieta now provides all FSS services for the entire central valley from Bakersfield and Tehachapi in the South to the Oregon Border in the North and from the Sierras in the East to the Coast Range in the West which is more than 90,000 square miles according to the FAA. Progress?

**GIVE ME THE OLD DAYS
SO I CAN TALK TO A
REAL LIVE PERSON
WHO IS ON THE SPOT.**

DCB EDITOR

Enforcement

If there's one thing FAA doesn't accept too well, it's excuses. This is especially true when it comes to maintenance. The Feds brook no deviations—sometimes with good reason, and sometimes out of mere bureaucratic inertia.

In this context, IAs are sometimes accused of doing work to "pad" the annual inspection bill. Owners wind up grumbling because, "Geez, every year he goes through and checks the same ADs over and over again," or, "Why does he have to waste time checking the TC Data Sheet?" It's not that your IA is a moron who can't remember from one year to the next what applies and what doesn't. Nor is it just a scam to drill and extract more dollars from the owner's pocket. IAs are forced to go through these exercises (or, at least according to FAA, they're supposed to go through these exercises) every year on every aircraft. Just because something is installed on the aircraft when it shows up at his front door doesn't mean it's legal to be there—even if it's been on the aircraft for years.

A case in point that illustrates and enumerates the annual inspection paperwork duties of the IA is a civil penalty case brought by FAA against an IA who signed off an annual inspection on a hot-air balloon that had been illegally modified. The IA presented what may have seemed like plausible excuses for the mistaken signoff, but FAA wasn't

EDITORS NOTE I HAVE STOPPED AT AND USED THE RED BLUFF RBL CALIFORNIA FSS ON MANY OCCASIONS IN MY TRAVELS NORTH AND SOUTH AND IN MOST CASES THEY WERE HELPFUL FRIENDLY AND ACCURATE. AS FOR RANCHO MURIETA I HAVE FOUND THEM TO BE JUST THE OPPOSITE. EVEN HERE IN OREGON ALL OF THE FSSs ARE CLOSED EXCEPT FOR ONE MC MINVILLE MMV. BY FAR THE WEATHER MORE THAN ANYTHING ELSE IS THE SINGLE MOST CHALLENGE IN FLYING A LIGHT A/C AROUND THE COUNTRY. IS THE FORCASTING BETTER? ARE THEY TRULY MORE COST EFFECTIVE ARE WE PILOTS REALLY SAFER

◆ The FAA has proposed an airworthiness directive (AD) that would affect more than 46,000 Lycoming engines in this country alone. The proposed AD, applicable to **Lycoming 235-, 290-, and most 320- and 360-series engines**, would require initial and repetitive inspections of the crankshaft's inner diameter for corrosion and/or cracks, and replacement of those cranks that are beyond tolerable limits. The proposed AD would allow operation of engines that have corrosion pitting but no cracks, as long as repetitive inspections are performed every five years until overhaul or engine disassembly. Lycoming Mandatory Service Bulletin 505A diagrams most of the inspection and repair guidelines. However, the proposed AD will require additional inspections using a fluorescent penetrant. A Piper Warrior that made a forced landing in the United Kingdom following an inflight propeller separation prompted that country's Civil Aviation Authority to issue the equivalent of an emergency AD on crankshaft corrosion and cracks. To comment on this NPRM, send comments in triplicate to the FAA's New England Region, Office of the Assistant Chief Counsel, Attention: Rules Docket No. 94-ANE-44, 12 New England Executive Park, Burlington, Massachusetts 01803. Comments must be received by January 29. A copy of the NPRM is available through AOPA's AvFax service (document number 5526) or on AOPA Online on CompuServe in the Active Rulemaking Library (94ANE44.TXT).

◆ A new airworthiness directive, applicable to **McCaughey three-blade propellers** installed on many popular light twins, will require initial and repetitive visual and dye-penetrant inspections of the hubs for cracks. A one-time eddy-current inspection is also required to inspect for cracks in the threaded areas of the hubs. The hubs are then to be filled with a red-dyed oil as a terminating action to the repetitive inspections. Propeller models C35, C72, C74, C75, C80, C86, C87, C92, and C93 installed on Beech C55, D55, E55, and 58-model Barons; Cessna 310 models K through R; 320 D, E, and F; 335; 340; 401; 402; 411; 414; 421; Colemill Executive 600 converted 310s; RAM 340 conversions; and other aircraft are affected. Compliance after the December 18, 1995, effective date will depend on the propeller time in service and age. For more details, a copy of the AD is available through AOPA's AvFax service (document number 5527) or on AOPA Online on CompuServe from the Active Rulemaking library (filename 94ANE47.TXT).



LORD MOUNTS ARE SHOCKING

From *Lake Flyer*, May/June 1995
by Dick Buckmaster, EAA #46804

While recently "annualing" another type of aircraft, the owner was somewhat saddened when we advised that his Lord mounts (shock absorbers between the engine and the engine mount) had to go. Unfortunately, the fact that they appeared to be originals over 20 years old did not impress him as much as did their replacement cost.

Lacking any authoritative specified useful-life data for these items, I decided to question the manufacturer, Lord Corporation. As an example, I provided them the part number of those earlier installed on our Lake Buccaneer during its top overhaul—J-7402-6. I found that these J-type mounts are made using natural rubber, so applicable Mil-Spec guidelines recommend an acceptable life of 3-5 years. This recommenda-

tion at first seems extremely conservative, but considering the static and dynamic loads absorbed and their heat/vibration environment, it is quite realistic. Thereafter, very close inspections are in order.

If in your preflight, you see a shiny wear spot on the front side of the engine mount at the Lord mount pocket, it is an indication that the big, flat washer (P/N MS-2002-C7) has been contacting it. The Lord mount is excessively tired, or the mount bolt is loose. Check it out.

Incidentally, Lord mounts are "shockingly" expensive, especially our particular Lake part (naturally, right?). At the time I changed ours, the best price I could find was at the Aerofab factory. So, if yours needs replacing, give Cheryl a call.

BARRY ENGINE MOUNTS ARE CERTIFIED TO REPLACE LORD MOUNTS

From *Cessna Pilot Association Magazine*
Volume 12, #2, April/May 1995

Engine changes always require more money than the actual cost of the engine. Control cables, exhaust repairs, accessory overhauls and new engine mounts add to the total bill very quickly.

Engine mounts, also called vibration isolators, should be changed at every engine overhaul. There are also occasions between overhauls when changing a mount or pair of mounts is indicated. Any natural rubber mount (black in color) will be attacked by fuel or oil if in constant contact. This is often the case on the left front mount on a C-182 due to its location directly below the oil filler on the engine.

Cessna 210s and T210s compress the front two engine mounts before overhaul periods, sometimes even allowing the baffling to contact and wear the front cowling. This condition is easy to see by checking the fit of the nose cowl to the prop spinner. Even with brand new mounts and S1450-7N32-125 spacer washers as specified in Cessna Service Information Letter SE80-71, the lineup isn't perfect. If the prop spinner is out of alignment by three quarters of an inch and the exhaust stack isn't centered in the cowling hole, the mounts are compressed. SE80-71

details this condition, which can result in increased vibration in the cabin and wear of heat shields, cowling and baffles.

In the very late (1985-86) model of T-210 and P-210, Cessna modified the forward mount system to use two mounts instead of one. At this time a retrofit to install the four mount system in two mount aircraft is not available; although Atlantic Aero, Wipair and Bonaire are installing four mount systems with their IO-550 engine upgrades.

Cessna parts specifies mount systems manufacturing by Lord in their parts catalog. Barry Controls Aerospace of Burbank, California, manufactures FAA-PMA approved engine mounts for almost every single-engine Cessna, at prices substantially below what Cessna sells Lord mounts for. For instance, by using Barry Controls mounts when installing an engine on a 1975 C-182, savings of more than \$110 (40%) can be realized.

Barry Mounts are marketed by many houses, or information about distributors can be obtained from Barry Controls Aerospace, P.O. Box 7710, Burbank, CA 91505, or by calling telephone 818/843-1000 or faxing 818/845-6978.

EAA Flight Advisor™

One Flight Advisor's report covers a Pulsar. The builder test flew with the help of a qualified pilot. Unfortunately, the builder made a mistake in not flying for the four years that it took to build the aircraft, and did not do enough taxi tests. He crashed on the third landing with no injury to himself, but too much to the Pulsar. Refer your builders to the Flight Advisor Program, and we can cut down on that type of accident. For further information, contact Joyce Reynolds, EAA Government Programs, P.O. Box 3086, Oshkosh, WI 54903-3086; telephone 414/426-6522.

A PILOT'S "RAMP RIGHTS"

From Flight Paths: News About Aviation 260, Vol. 29, #7, July 1995

Ramp checks are one way the FAA enforces safety. Conducted at random, they can increase a pilot's stress factor (especially if the pilot is a student). But this need not be the case if pilots clearly understand their rights and have a pre-established course of action should such a situation arise.

First, failure to adhere to two FARs can set your ramp check on the wrong heading. FAR 61.3(h), Inspection of Certificate, states: "Each person who holds a pilot certificate, flight instructor certificate, medical certificate, authorization, or license required by this part shall present it for inspection upon request of the Administrator, an authorized representative of the National Transportation Safety Board, or any federal, state, or local law enforcement officer."

FAR 61.51(d), states "a pilot must present his logbook (or other records required by this section) for might consider giving it to their students.

RAMP RIGHTS

1. **ATTITUDE:** Don't panic. Be polite and cooperate. Belligerence has never helped anyone.
2. **AUTHORITY OF REQUESTER:** Ask the inspector to present his or her FAA identification for your inspection, and copy the information on it. Inspectors don't wear a uniform, so their ID is the only way you can verify their authority to conduct the ramp check.
3. **WITNESSES:** If at all possible, have one or two witnesses present to listen and to observe the ramp check, in case there is some future dispute about what actually occurred during it.
4. **INQUIRE:** Unless the information is volunteered, ask why the ramp check is being conducted and what the inspector will be doing during it.
5. **NO WARRANT NECESSARY:** Keep in mind that an inspector does not have to have a warrant to conduct a ramp check, but he or she must observe that you are the pilot of the aircraft. There is no "Miranda Warning". These proceedings are civil in nature.
6. **DON'T VOLUNTEER INFORMATION:** If questioned, cooperate with the basics; give your name, acknowledge that you are the pilot, and show the required documents the inspector is authorized to request. You need do no more, and babbling on has turned many a ramp check

inspection upon reasonable request by the Administrator, an authorized representative of the NTSB or any State or local law enforcement officer."

If pilots always have their pilot and medical certificates on their persons when they fly, they will generally not have a problem, unless their medical has expired. Pilots need not have their logbooks with them when they fly, unless they are students on a solo cross-country (or recreational) pilot flying in circumstances listed in FAR 65.51(d)(3).

In other words, pilots holding private certificates or better need not present their logbooks on the spot. Students and recreational pilots should have their log in the situations described in FAR 61.51, and they should have the proper flight instructor endorsements.

With the above in mind, keep the following checklist in a convenient place.

7. **AIRCRAFT INSPECTION NOT INCLUDED:** The investigator does not have the right to touch or board your aircraft. If he or she is about to, courteously ask him/her to refrain.
 8. **NO RETALIATION:** If you feel you're being harassed, treated discourteously, or discriminated against, keep your cool and remain courteous and cooperative. After the ramp check, you and your witnesses should immediately and independently document what happened. Then seek legal advice to protest the inspector's actions. The inspector must be reasonable and you should be caused no undue or inappropriate burden.
 9. **NO LOSS OF CERTIFICATE CUSTODY:** Inspectors have no right to confiscate or retain your pilot certificate. They only have the right to "inspect" it. You need not give up your certificate.
 10. **CONTINUED AIRCRAFT OPERATION:** Finally, do not allow the inspector to ground you or your aircraft based on a ramp check. Take the inspector's advise into consideration, but the final decision is yours.
- That's it. These are your "RAMP RIGHTS". All pilots should be aware of their responsibilities and obligations, as well as their rights. Every airman should be aware of the limits to a ramp check as a part of safe aircraft operation.

By John Scott Hoff, flight instructor and attorney, and Theodore J. Young, law student at Loyola university.

This disclaimer is presented for informational purposes only. It does not constitute an offer of insurance or any other financial product. The information herein is not intended to be used as a substitute for professional advice. Please credit the original source of the materials, and the TECHNICAL COUNSELOR NEWSLETTER.

DISCLAIMER

No responsibility is assumed for the exchange of ideas and opinions. No responsibility is assumed for the exchange of information and as a result of any action taken by any party using the suggestions, ideas or examples expressed herein. Any materials published herein may be reprinted without permission. Please credit the original source of the materials, and the TECHNICAL COUNSELOR NEWSLETTER.

Some Definitions Of Terms

If you are not sure of the meaning of such terms as **normally aspirated, turbocharged, supercharged or direct drive engines**, then perhaps you'll want to read our simplified definition of them.

The **Normally Aspirated Engine** is one that is not turbocharged or supercharged. If the airplane has a manifold pressure gauge, at full takeoff power at sea level on a standard day it would indicate a MP reading of approximately 29" of Hg. Takeoff power at 5,000 ft. density altitude airport would read about 24" MP. The normally aspirated engine uses atmospheric pressure and is thereby altitude limited.

Direct Drive Engines are those piston powered engines where the propeller is bolted on the end of the crankshaft and the prop turns at the same speed as the crankshaft.

Geared Engines are usually the higher powered, more complex engines using a reduction gear on the nose of the aircraft, and with the prop attached to it. As a result, the prop will turn somewhat slower than the crankshaft, resulting in a lower prop noise level. When the engine is geared, we precede the engine designation with a "G". Thus a geared, opposed (O) normally aspirated Lycoming engine with a 480 cubic inch displacement of the cylinders would be designated a GO-480 model.

Turbocharged Engines as manufactured by Lycoming simply consist of a turbocharger unit with a small turbine wheel attached by a common shaft to a compressor wheel, and utilizes the engine exhaust gas by directing it over the turbine wheel to drive the compressor. The horsepower loss in operating the turbocharger is negligible. Turbocharging can provide greater utility to the piston engine by providing sea level horsepower, in some models, as high as 20,000 feet; or it can be used to add horsepower to the engine particularly for takeoff. The faster the engine runs, the more air the turbocharger can pack into the cylinder to compensate for the thin air of altitude, or to increase the horsepower. Although this definition is somewhat over-simplified, it is a basic definition of turbocharging of General Aviation power-plants.

Where turbocharging is used with a fuel injected, opposed Textron Lycoming engine with a 540 cubic inch displacement, we designate it as a TIO-540 model. "T" represents the turbo-charging.

Supercharged Engines as manufactured by Textron Lycoming use a compressor wheel to pack air into the cylinders; but the compressor is driven by the crankshaft through an intricate gearing system, which takes considerable horsepower from the engine to operate. In comparison with a turbocharged engine, it is a medium altitude powerplant.

The trend in manufacturing is away from supercharging and definitely to turbocharging because of the several advantages of the latter.

A supercharged, geared, opposed, fuel injected Textron Lycoming engine with cylinders of 540 cubic inch displacement is designated an IGSO-540 model. "S" represents supercharging.

How To Get Textron Lycoming Engine & Accessory Maintenance Publications

All publications may be ordered through authorized Textron Lycoming distributors or direct from Textron Lycoming, Williamsport Plant. If ordered direct from Textron Lycoming Williamsport Plant, payment must be submitted with the request as outlined in the latest revision of Textron Lycoming Service Letter No. 114.

The available maintenance publications for Textron Lycoming engines and accessories consist of the following:

OPERATOR'S MANUAL

The Operator's Manual contains information of use to pilots and maintenance personnel. It contains engine specifications, inspection procedures, operational information and is used in conjunction with the Pilots Operating Handbook for the aircraft.

OVERHAUL MANUALS

The Overhaul Manual is a guide for major repair of the engine. It contains complete disassembly, inspection, repair, reassembly and test procedures for the various Textron Lycoming engines. When used in conjunction with applicable parts catalog, this manual provides an authoritative text for complete overhaul of the engine.

PARTS CATALOGS

Textron Lycoming Parts Catalogs are illustrated to permit identification of parts; they are kept up-to-date by revision and supplemental listings. A referenced numerical list is also included.

SERVICE BULLETINS, INSTRUCTIONS, LETTERS

These publications are issued as required. Service Bulletins are generally of a mandatory nature and require some modification to be accomplished on the engine within a specified time. Service Instructions are not of a mandatory nature and cover a variety of subjects; such as repair processes, modification procedures, inspection procedures and overhaul methods. Service Letters are of an informative nature usually pertaining to service policy or vendor products.

SPECIAL SERVICE PUBLICATIONS.

These publications are concerned with topics of general interest or subjects that are too lengthy for inclusion in maintenance manuals.

Determining Engine Condition Of High Time Piston Powerplants

As an engine gets considerable time on it and approaches the manufacturer's recommended total overhaul hours, the question arises concerning the decision to either continue flying, or top overhaul, major overhaul, or exchange engines. Here below is a quick reference checklist to help make such a decision, followed by a brief explanation of the ten points.

1. Oil Consumption—any unusual increase?
2. Fuel consumption—any drift lean at higher than cruise power?
3. General engine history.

PERMISSION TO REPRINT

Permission to reprint material from the Lycoming "Flyer" is granted, so long as the context of information remains intact and appropriate credit is given.

Low Time Engine May Not Mean Quality and Value

Reading the "Aircraft for Sale" advertisements can be interesting and misleading. As aviation-oriented people, we are conditioned to look for certain bits of information which we believe will allow us to evaluate the product offered for sale. In the case of airplanes, this information can generally be segregated in three categories—airframe, avionics, and engine. For purposes of this article, you are on your own with respect to airframe and avionics. There does seem to be information on engines which cannot be emphasized too strongly.

Engine information is usually provided as hours of operation since new or from some major maintenance event. For example, 700 TTSN would indicate that this aircraft and engine have been flown for 700 hours since new from the factory. Other, but not all, engine related abbreviations include SMOH (hours since major overhaul, SPOH (hours since prop overhaul), STOH (hours since top overhaul), and SFRM (hours since factory remanufacture). Assuming that the recommended TBO of the engine being considered is 1800 or 2000 hours, it would appear that hours of use in the 400 to 800 hour range would automatically make this engine a very valuable commodity. Unfortunately this is not always true, and therefore an advertisement like those discussed earlier may state numbers and facts which are absolutely correct, but still misleading.

Consider a situation which occurred recently. A Lycoming IO-360 engine with less than 700 hours since new was reported to be using oil at the rate of two-thirds quart per hour and losing oil pressure during flight. On closer examination, it was determined that deterioration and wear had caused metal contamination throughout the engine. An engine overhaul was necessary and it included replacement of items such as the camshaft, oil pump gears, and pistons. Why should an engine with less than 700 hours since new be in this sad state?

It should be apparent that the number of hours the engine has operated is only part of the story. We need to know all the facts if we are to understand what may have happened to this normally reliable engine and also if we are to determine the value of a low time engine in a pre-owned airplane.

The engine with metal contamination and less than 700 hours of operation had been installed brand new from the factory—MORE THAN 12 YEARS before. The engine log book shows that during the first 10 years of service this engine had averaged less than four hours of flight time each month. Chances are excellent that there were some months when the engine was not flown at all.

Textron Lycoming Service Letter No. L201B states that the recommended TBO is based on the use of genuine Lycoming parts, average experience in operation, and continuous service. Continuous service assumes that the aircraft will not be out of service for any extended period of time. If an engine is to be out of service for longer than 30 days, it should be preserved as specified in Textron Lycoming Service Letter No. L180. Service Letter No. 201B also states that because of the variations in operation and maintenance, there can be no assurance that an individual operator will achieve the recommended TBO.

The point of this discussion is simple. A low time engine may not add value to an aircraft, and the buyer should be aware of all factors which may affect the condition and value of the engine. An engine which is not flown frequently is subject to

deterioration as a result of not being used. When the engine does not achieve flight operating temperatures on a regular basis, the moisture and acids which form as a result of combustion and condensation are not vaporized and eliminated through the exhaust and crankcase breather. As moisture and acids collect in the engine, they contribute to the formation of rust on the cylinder walls, camshaft, and tappets.

As the engine is run after rust has formed, the rust becomes a very fine abrasive causing internal engine wear, particularly to the camshaft and tappets. As these components wear, they make more metal which attacks the softer metals in the engine. Piston pin plugs are examples of parts which may wear rapidly when rust becomes an abrasive inside the engine. This wear could eventually lead to failure.

The infrequently flown engine is just one example of a low time engine not meeting the expectations of a buyer or new owner. The term zero SMOH is always enticing since it indicates the engine has been overhauled, has zero hours since overhaul, and now may be expected to fly happily on through a full manufacturer recommended TBO. This will happen in some cases, but in others, there will not be a chance of this happening. It depends on the quality of the overhaul.

Textron Lycoming Service Bulletin No. 240 recommends parts to be replaced at overhaul regardless of the apparent condition of the old parts. The number of these new parts used in the engine at overhaul will probably determine the possibilities of achieving a full TBO. Consider that most overhaulers install reconditioned cylinders on the engines they overhaul. These cylinders are not traceable. There is no requirement to maintain a record of their previous history. They may have only 2000 hours of operation, but they could just as easily have 5000, 7000, or more hours of operation. Those cylinders may have been cracked and repaired by welding—a procedure which Lycoming metallurgists do not recommend because the strength of a repaired cylinder head may be significantly less than that of a new head. There is no requirement to let a prospective engine buyer know if cylinders have been welded and this cannot be determined even by close examination. The possibility of finding a reconditioned cylinder with cracks after a few hundred hours of operation is very real. Should this happen, it will be a costly experience.

The lesson to be learned here is a very old one—"Buyer Beware". Whether you are looking at those "Aircraft for Sale" advertisements or looking for a replacement engine for an aircraft you already own, consider carefully what you are about to buy. What do you really know about the engine other than the low time number? How much validity does that number really have? What questions can you ask which may help you to insure that this engine will meet your expectations?

Perhaps simply re-reading the paragraphs you have just read may help you to formulate questions you want answered before taking the plunge. In the case of a low time engine with a history of infrequent flight, borescope examination of the cylinders and an inspection of cam and tappet surfaces by a competent and knowledgeable A & P mechanic would be a very wise move. Always remember that low numbers in the hours of operation records do not guarantee reaching TBO with many long hours of trouble free operation. The buyer must investigate every detail of engine history as closely as possible, and be satisfied that the product does have the value which the low hours of operation number suggests.

STANDARDIZATION OF USE OF HEAT

It is necessary to carefully differentiate between the methods of applying heat to the various flat opposed piston engines in induction icing conditions. Most light airplanes with float-type carburetors do not have a carburetor air temperature gage, and therefore must use the heat position only in the full on, or full off positions, and with the mixture leaned to compensate for the richer fuel/air ratio mixture with carburetor heat.

Because flight instructors and other experienced pilots fly various models of manufacturers' airplanes and engines, it would be helpful to standardize the instruction of the use of heat in the landing configuration on aircraft using the float-type carburetor. Textron Lycoming has no objection to the consistent standardized use of carburetor heat in the landing configuration.

THE GO-AROUND

Whenever carburetor heat is used in the landing configuration, and a go-around takes place (either unexpected or touch-and-go), there are some important phases of operation for the pilot to remember. We don't insist on throttle first, nor heat off first. However, if throttle is first, it **must** be a smooth application. A straight-arm of the throttle generally results in the carburetor failing to respond, and no power.

If the pilot forgets to remove carburetor heat on a go-around, loss of power may become critical at low altitude and low airspeed. In addition, on the higher performance powerplant, there is the danger of detonation and/or engine damage using full heat and takeoff power on the go-around.

OTHER TYPES OF INDUCTION ICING.

Thus far our discussion has limited itself to the float type carburetor which can incur ice in VFR flight conditions if there is the right combination of moisture, temperature and fuel mixture. In the case of fuel injection and pressure carburetors, it is the IFR type flight condition which generally causes induction system icing. The fuel injected engine does not have the threat of icing at the venturi; but other parts of the induction system can gather ice such as bends in the system, the impact tubes, or on the air filter.

The pilot of a turbocharged powerplant should not be too concerned with induction system icing except in extreme conditions because of the high temperature of the induction air when the compressor is running. However, slush/snow can be a blockage threat to the air filter if there is not easy availability to alternate air. Impact ice at high altitude with some turbocharged engines may cause a loss of 4 to 6 inches of MP when going to the alternate air source.

The pressure carburetor is similar to the fuel injector in that it is not very vulnerable to icing, other than that outlined in the previous paragraph. When a **float-type carburetor** is placed next to a pressure carburetor for a visual inspection and comparison, note that the float carburetor fuel jet is below the venturi and throttle butterfly, which means fuel is being squirted into the worst possible place for icing — the carburetor venturi. On the other hand, the **pressure carburetor** jets are squirting fuel farther downstream beyond the venturi refrigeration chamber, which accounts for the less likelihood of icing in this

type of system.

All Lycoming pressure carburetors have automatic mixture controls. On the ground, any application of heat will affect the AMC unit so as to make it temporarily unpredictable in its effect on the carburetor. If for some reason the pilot used heat on the ground (i. e. checking the heat system), he must wait at least two minutes before takeoff in order to avoid an erratic fuel flow because of the effect of the heat on the AMC unit. Don't forget to check operation of manual alternate air controls before entering icing flight conditions. If alternate air is used, remember that heat means some loss of power and a richer mixture. Do something to get the power back — increase power 2 inches manifold pressure over former setting, and lean mixture with a manual mixture control.

CONCLUSION

Now that the operator understands how ice forms in the fuel metering device, and how the engine reacts when heat is applied, he can cope with an icing problem without panic because he knows what is happening in his powerplant.

Cold Weather Tips

First, let's make it clear that we are speaking of normal cold weather operation experienced at temperatures to -25° F. For tips on operating below -25° F., we'll let the people who operate in those temperatures give us the word.

A good place to start would be to realize that we are all stuck with three cold weather starting penalties. They are:

1. The lower the temperature, the more cranking energy required.
2. The lower the temperature, the more reluctant the fuel/air mixture is to ignite.
3. The lower the temperature, the lower the battery output.

Now that we are aware of these penalties, let's not impose other unnecessary penalties upon the engine through neglect or lack of knowledge. Therefore, before cold weather sets in, have the spark plugs and magneto points inspected for serviceability and proper gapping. Check for proper operation of carburetor heat controls, priming, exhaust, induction and ignition system. A defect in any one, or combination of several of the aforementioned items, can be the difference between no start or good start.

This next cold weather tip is worthy of a separate little sentence all of its own — have the heating system checked for leaks. Remember, you can't smell carbon monoxide.

Let's examine some tips, starting with preflight inspection right through actual flight to landing.

Guard against condensation in the fuel system. Simplest precaution—keep fuel tanks full.

Drain the fuel sump religiously before the flight. Don't attempt to save fuel here. Moisture may collect at a low point in the system and a skimpy sump drain may only move the moisture to another point in the system.

At ground temperatures of $+10^{\circ}$ F and below, the engine and complete oil system should be preheated.

that the master switch is always OFF while the aircraft is parked between flights. If left on, the battery will discharge and freeze. These rather minor mistakes can be quite expensive.

Oil is another factor to be considered in the cold weather starting process. All oils are affected by temperature and tend to thicken as the temperature drops. The engine may be reluctant to turn over when the oil is stiff; a summer weight oil is not suitable in cold weather. It is also the condition which brings out the primary advantage of multi-viscosity oils. Because these oils are thinner (lower viscosity), they allow the engine to be turned over more easily. Because they flow more easily and quickly, they also are available to lubricate the internal parts of the engine more quickly when it does start. Since the proper oil viscosity is so important in all aspects of engine starting and operation, the recommendations of oil grade vs. temperature range shown in Textron Lycoming Service Instruction No. 1014 should be followed.

Preheat is another factor which must be considered prior to starting the engine. There are specific guidelines in Textron Lycoming service instructions which establish when preheat should be used, but how much, or the method of preheat is generally left to the good judgement of the pilot or maintenance person doing the preheating. Use of the heated dip stick is not recommended by Textron Lycoming, although most other methods are considered to be satisfactory. For most Lycoming models, preheat should be applied anytime temperatures are below 10 degrees F. The exception to this rule is all 76 series models; these engines should be preheated when temperatures are below 20 degrees F. It is recommended that these guidelines be followed even when multi-viscosity oil is being used. In addition to hard starting, failure to preheat the entire engine and oil supply system as recommended may result in minor amounts of abnormal wear to internal engine parts, and eventually to reduced engine performance and shortened TBO time.

Probably the most important factor in starting an engine is achieving a fuel/air mixture which is satisfactory for combustion. Since the engine usually starts very easily, many pilots are unaware of or ignore the change of starting procedure needed to successfully start under varying temperature conditions. In warm weather the air is less dense and therefore must be mixed with a lesser amount of fuel than in cold weather. In addition to this, in warm weather the fuel will vaporize easily and make starting easier. Simply stated, as temperatures go down it becomes more and more important that we have a plan for priming which will achieve the correct fuel/air mixture.

When priming a carbureted engine, the pilot's plan must consider the temperature, the number of cylinders which have priming lines installed, and the number of strokes of the primer which are needed to produce the correct fuel/air mixture. The primer lines are ordered or installed by the airframe manufacturer and not all aircraft are configured the same. Some aircraft have actually been produced with only one cylinder being primed and these engines are extremely hard to start in cold weather. The number of cylinders which are primed must be considered since the total fuel delivered by the primer will be divided and sent to these cylinders. As the air becomes colder and denser, the amount of prime used must be increased, but the number of strokes to be used should be planned as a result of some trial and error experimentation for each aircraft a pilot

flies. When the correct number of primer strokes for each temperature range has been established, the engine will usually start very quickly. We may find that an engine starts easily when one stroke of the primer is used in the sixty degree range, two strokes in the fifty degree range, three strokes in the forty degree range, etc. This is an example of the trial and error we might use to establish the number of primer strokes to use under any particular temperature condition.

While discussing the priming of an engine, there have been situations where primer lines become clogged. This makes engine starting difficult and negates any trial and error experimentation which may have been done. When maintenance is done on an aircraft before the start of winter, it may be wise to have those primer lines checked to insure that fuel will flow through them.

The amount of fuel needed to achieve the correct fuel/air mixture for starting a fuel injected engine is controlled by timing rather than number of primer strokes. With the electric fuel pump on, moving the mixture control to the rich position allows fuel to flow to the cylinders. For cold weather starting, it may be necessary to keep the mixture control in rich somewhat longer than in warm weather.

The fuel part of the fuel/air mixture may be the part we have the most control over during the engine start, but keep in mind that the amount of throttle opening does have an effect on the air which is pumped through the engine. Just as we compensate for cold/dense air by adding more fuel for start, it may also be appropriate to reduce the air part of the mixture when the temperature is very cold. For example, if the throttle is normally set open one half inch for warm weather starting, it may be helpful to reduce this to one quarter inch in cold weather. Again, it will require some experimentation to determine what is needed to achieve the correct fuel/air mixture for any particular aircraft at any temperature range.

When an engine does not start easily, it can be frustrating. Of course this can occur at any time of the year and it is very tempting to just keep grinding away with the starter in an attempt to get it going. Should this happen to you, RELAX. Take care of that starter or it may fail. The general rule for starters is that they should not be operated for more than 10 to 12 seconds; then a five minute cooling off period is required. Without this time limit for operation and an adequate cooling off period, the starter will overheat and is likely to be damaged or to fail completely.

The previous paragraphs have addressed several issues which relate primarily to cold weather starting. There are some other cold weather items which should be considered in the operation of the engine.

Water is one of the most likely contaminants of aviation gasoline. The engine will not run on water, and although we may get away with small amounts of moisture in the fuel during warm weather, flight into freezing temperatures makes any amount of moisture in the fuel system very critical. Even a tiny bubble of moisture may freeze in the fuel line and totally cut off the flow of fuel. Two steps should be taken to avoid this problem. First, avoid water contamination if possible. Keep fuel tanks full to prevent condensation and be sure fuel caps do not allow leakage if the aircraft is parked outside in rain or snow. Second, look for contamination before every flight by draining fuel tanks and sumps religiously.

Once on board the aircraft, check the fuel selector valve for freedom of movement. It may be frozen fast and you'd better find it out while still on the ground.

Assuming the engine has kicked off on the first attempt, check for indication of oil pressure. Again, learn the characteristics relative to response of oil pressure indications of your aircraft-engine combination. On most single engine aircraft an almost immediate response is noted. On twin engine aircraft the response may be much slower. On some twins the oil pressure may go up and during warm up may drop again for a short period of time then again rise to normal. All cases mentioned may be normal, but the important thing is to know what to expect from your aircraft-engine combination.

After start, do not idle engine below 1000 RPM. It's not good practice to idle engines below 1000 RPM at any time. This is particularly true during cold weather to prevent lead fouling of spark plugs. (Exception — Piper Pressurized Navajo).

No take-offs should be made with carburetor heat on. The only exception being, should outside temperature be so low that an increase in RPM is noted with the application of carburetor heat, (in Arctic region).

Now here's a tip for the novice pilots. When setting up for cruise configuration, be precise, read your instruments and remember what you read. Example: If you decide on 22 inches of manifold pressure, set it right on 22. If the RPM is to be 2350, make it 2350. Select an altitude. Trim the aircraft to hold that selected altitude. Note airspeed. Now — if anything changes, barring turbulent air, it has to be a change in power. Perhaps it is carburetor or induction air icing. Suppose you picked up a bit of carburetor ice and the engine suffers a slight power loss. There will be a slight drop in manifold pressure, a loss in airspeed, and the aircraft will want to lose altitude and if you hold altitude you'll find back pressure on the wheel is required. Therefore, even though you didn't discover the power loss through instrument scanning, you'll get a warning through the "heavy" wheel or stick.

During cruise, check your oil temperature. Should it be lower than normal (below 165° F) we recommend steps be taken to increase the temperature to normal. Install the oil cooler kit supplied by the manufacturer.

Remember, engines must breathe and in so doing, they take in moisture. Normally the oil temperatures are high enough to evaporate this moisture. If oil temperatures are too low, the moisture will collect in the crankcase and rocker box covers causing rust. We have drained many a wet sump engine that contained as much as a quart of water. Keep the operating temperatures up.

If flight is planned for bad weather, the preflight inspection should include observation of the relief opening in the engine breather tube so that any freezing of moisture at the end of the breather will not result in a loss of engine oil. (See "The Whistle Slot" in this book.)

During flight in very low temperatures, exercise constant speed props about every 30 minutes to help prevent congealing of oil in the prop dome.

Should one engine of a twin, for any reason indicate the prop must be feathered, don't tarry too long with reduced power in very cold weather. At reduced power, the oil may congeal making feathering an impossibility.

Again, mostly for the novice, don't run one set of fuel tanks nearly dry before switching tanks. Switch with plenty of fuel remaining in the tanks first used. This is "money in the bank" should you find the selector valve frozen.

Avoid power-off let downs. When possible, plan your descents far enough away from your destination that a power let down can be made. If a fairly rapid descent must be made, we suggest the aircraft be slowed and the gear and flap be lowered so that some power may be retained.

Should a reduced power let down be necessary through possible icing conditions, don't hesitate to peak the exhaust temperature gauge if one is installed. This will assure the greatest possible engine heat for the power setting selected.

Cold Weather Operations

A note that came in the mail from a *Flyer* reader included a suggestion which went something like this, "How about an article dealing more extensively with the cold start problem..." A review of past *Flyer* issues indicates that this suggestion is a good one. It has been a long time since any cold weather considerations have been addressed in the *Flyer*, and as the mailing list continues to grow, there are many new readers to share our thoughts on this subject.

Most of the time, we think of starting any engine as a very simple process. Just engage the starter and listen for the engine to start purring. Unfortunately, when the weather turns cold it is not always that simple. When dealing with a reciprocating aircraft engine, it may be essential to get a start on the first try in order to avoid icing over the spark plugs and making an immediate start impossible. In order to achieve a start on the first try, there are a number of factors to be considered. Those factors will be discussed in the following paragraphs.

Let's start with the general health of the engine. When attempting a start under adverse conditions, it is imperative that the engine be well maintained and in excellent operating condition. Spark plugs and magneto points should be properly gapped and ready to function effectively. In addition to the ignition system, the proper functioning of other systems such as the induction, priming, exhaust, and carburetor heat can have an effect on the starting and operation of the engine.

Although it might be good procedure to use an external power source for starting during very cold weather, most of us expect our battery to do the job. We should remember that the battery is handicapped by cold weather. Particularly when a single viscosity oil is being used, the colder the temperature, the more cranking energy required. Combine this with reduced battery output at lower temperatures and it can be a serious handicap.

While on the subject of batteries, remember that freezing temperatures provide a perfect opportunity to destroy an aircraft battery. The battery with a full charge survives nicely, but one which is discharged will freeze. Once this happens, the problem can only be remedied by replacing the battery, so it is very worthwhile to take preventive measures. Should the battery be run down during an attempt to start, do not leave it; get it charged immediately. And finally, be absolutely certain

Although carburetor ice is not necessarily a winter time phenomena, a check of carburetor heat should be made during the engine run-up. Generally speaking, we can say that carburetor heat should never be used for takeoff, but there is one exception. This exception occurs when operating in temperatures so cold that application of carburetor heat produces a rise in RPM. Most pilots will never find themselves in circumstances which require use of carburetor heat for takeoff and climb; those who fly carbureted engines will almost certainly have occasion to use carburetor heat during cruise or let down. Use of the full hot or full cold position is recommended. An intermediate setting should only be selected if the aircraft is equipped with a carburetor air temperature (CAT) gage.

Engine operating temperature is another item which is not usually given enough consideration in cold weather. We usually are very cautious about high oil temperature which we know is detrimental to good engine health, while a low oil temperature is easier to accept. The desired oil temperature range for Lycoming engines is from 160 degrees to 245 degrees F. If the aircraft has a winterization kit, it should be installed when operating in outside air temperatures (OAT) which are below the 40 to 45 degree range. If no winterization kit is supplied and the engine is not equipped with a thermostatic by-pass valve, it may be necessary to improvise a means of blocking off a portion of the air flow to the oil cooler. Keeping the oil temperature about the minimum recommended temperature is a factor in engine longevity. Low operating temperatures do not vaporize the moisture which collects in the oil as a result of combustion. When minimum recommended oil temperatures are not maintained, oil should be changed more frequently than the normally recommended 50 hour change cycle. This is necessary in order to eliminate the moisture which collects and contaminates the oil.

And finally, power-off let downs should be avoided. This is especially applicable to cold weather operations when rapid cylinder head cooling will be more pronounced. Plan ahead, reduce power gradually and maintain some power throughout the descent. Also keep the fuel/air mixture leaned out during the descent. If an exhaust gas temperature gage is installed with a normally aspirated engine, keep it peaked to insure the greatest possible engine heat for the power setting selected; for a turbocharged installation, lean to peak during descent unless otherwise specified in the Pilot's Operating Handbook or under conditions where the limiting Turbine Inlet Temperature would be exceeded.

Exposure to snow, frost and cold weather while flying requires the consideration of many factors, both airframe and engine related. This discussion deals strictly with issues relating to the engine. While there may be other issues, those items which are asked about most frequently have been discussed. Safer flying and longer engine life could result from careful consideration of the material addressed.

SPECIAL NOTE

In each issue of the Flyer we have listed all the Lycoming Service Bulletins, Service Instructions, and Service Letters which have been printed since the previous Flyer. Concerned operators should retain this listing for their reference and utilize it consistently.

PREVENT POWER LOSS ON TAKEOFF WITH DIRECT DRIVE ENGINES IN COLD WEATHER

In cool or cold weather, pilots should take extra care prior to attempting to takeoff with a cold engine and cold oil, and thereby prevent a temporary power loss during a critical part of the takeoff. Cold or heavy oil can and quite often does affect normal operation of the hydraulic lifters. Remember that aviation lubricants are heavier when cold than the commonly used automotive engine oils and require a little more time in warm-up to obtain normal flow in order to function properly throughout the air cooled aircraft engine.

To prevent possible power loss, a proper warm-up should be conducted. The engine is usually warm enough for pre-flight ground check in above freezing temperatures after 2 to 3 minutes running at 1000 to 1200 RPM. Below freezing temperatures, the warm-up period should be longer. With turbocharged powerplants, cold oil and cold engines require a longer warm-up period to assure proper controller operation and prevent manifold pressure overboost.

After the above recommended warm-up period in cool or cold weather, including magneto and runup check, if the oil pressure is consistently over maximum red line, have a knowledgeable mechanic adjust oil pressure so that it does not exceed red line at takeoff or climb powers, and yet it is within the recommended green arc area at cruise. Cold weather tends to require a longer warmup period.

Frequency Of Flight And Its Effect On The Engine

We have firm evidence that engines not flown frequently may not achieve the normal expected overhaul life. Engines flown only occasionally deteriorate much more rapidly than those which fly consistently. Pilots have asked — What really happens to an engine when it's flown only one or two times per month? An aircraft engine flown this infrequently tends to accumulate rust and corrosion internally. This rust and corrosion is often found when an engine is torn down. Some operators are running the engines on the ground in an attempt to prevent rust between infrequent flights. This may harm rather than help the engine if the oil temperature is not brought up to approximately 165° F, because water and acids from combustion will accumulate in the engine oil. The one best way to get oil temperature to 165° F is fly the aircraft, for during flight the oil gets hot enough to vaporize the water and most acids and eliminate them from the oil. If the engine is merely ground run, the water accumulated in the oil will gradually turn to acid, which is also undesirable. Prolonged ground running in an attempt to bring oil temperature up is not recommended because of inadequate cooling which may result in hot spots in the cylinders, or baked and deteriorated ignition harness, and brittle oil seals causing oil leaks. If the engine can't be flown, then merely pull it through by hand or briefly turn the engine with the starter to coat the critical parts with oil. If the engine is flown so infrequently that it does not accumulate the operating hours which recommend an oil change (25 hours for a pressure screen system and 50 hours for a full-flow filter system), then the oil should be changed at four month intervals to eliminate water and acids.

STARDUSTER HISTORY N1189B - Girl San

In keeping with my intent to write about some of the first plans built Starduster Toos I have picked Girl San, N1189B built by A.C. and Lucille Boyles. The airplane was started on July 17, 1966 in San Fernando, California. I was an employee of Starduster Corporation during this time and met both of these fine people on several occasions when they were there at Flabob airport to pick up parts and material. A.C. was an aviation instructor at Gendale Junior College so was well equipped to deal with most of the problems associated with building the airplane. They originally decided on the Starduster Too because of their past experience in owning a Stearman during the early 1950s. So the open cockpit plus the beautiful lines of the Starduster made the decision easy.

They started with the normal problems most builders can identify with, where to put the cars, or how to work around them in the garage and of course how to get the airplane in and out of the garage with the landing gear on. They built a temporary gear out of wood with lawnmower wheels. The non-flying neighbors were of course concerned about their sanity. One back bedroom was turned into a fine storage area after the finished wings were waiting for cover. The airplane was originally powered with an 0320 A1A 150hp and a fixed pitch metal propeller. The airplane was covered with Dacron fabric and was doped with nitrate and Butyrate dope. The colors were red and white with black trim. The windshields were three piece like on Stearmans and a small headrest was installed on the rear cockpit. Two items that made their airplane different from most other Stardusters, were the absence of upper ailerons. The lowers being increased in size to make up for the difference. (Editors note I do not recommend that current builders do the same as heavy ailerons coupled with a much poorer roll rate will result.) The other item which I think really helped the looks of N1189B were the wheel pants. They had cut outs on the side similar to the Boeing P6E and the Curtis Sparrow Hawk, Lou also used them on the second prototype Starlet N2300 and Wil Neubert used the same type on his Starduster Too N7X.

It made a very pretty airplane that much prettier. The airplane was flown at Mojave, California. The first time February 8, 1969. It's climb performance was around 1,200 FPM and it cruised at about 110 MPH. So after 2 1/2 years of construction and a successful test flight. Plans were being made to take the airplane to Rockford Ill. for the big fly in and on to the East Coast to finish out the vacation by visiting friends and relatives.

I've often wondered what it would be like to fly cross country in an open biplane over 25 years ago. The problems, how much the same, or how different. So the following is an excerpt of A.C. and Lucille's trip that summer of 1969.

Their trip started at the end of July 1969 at 5:00 pm after work. They left from San Fernando Airport and set their course East bound towards Needles and the Colorado River which was their first stop.



**ABOVE N1189B AT FLA-BOB AIRPORT
RIVERSIDE CALIFORNIA EAA CHAPTER #1s
OPEN HOUSE DURING THE EARLY 1970s**

**BELOW N1189B AT FLABOB AIRPORT
FOR STARDUSTER OPEN HOUSE MAY 1985
THEN OWNED BY CHARLES R ENZ**

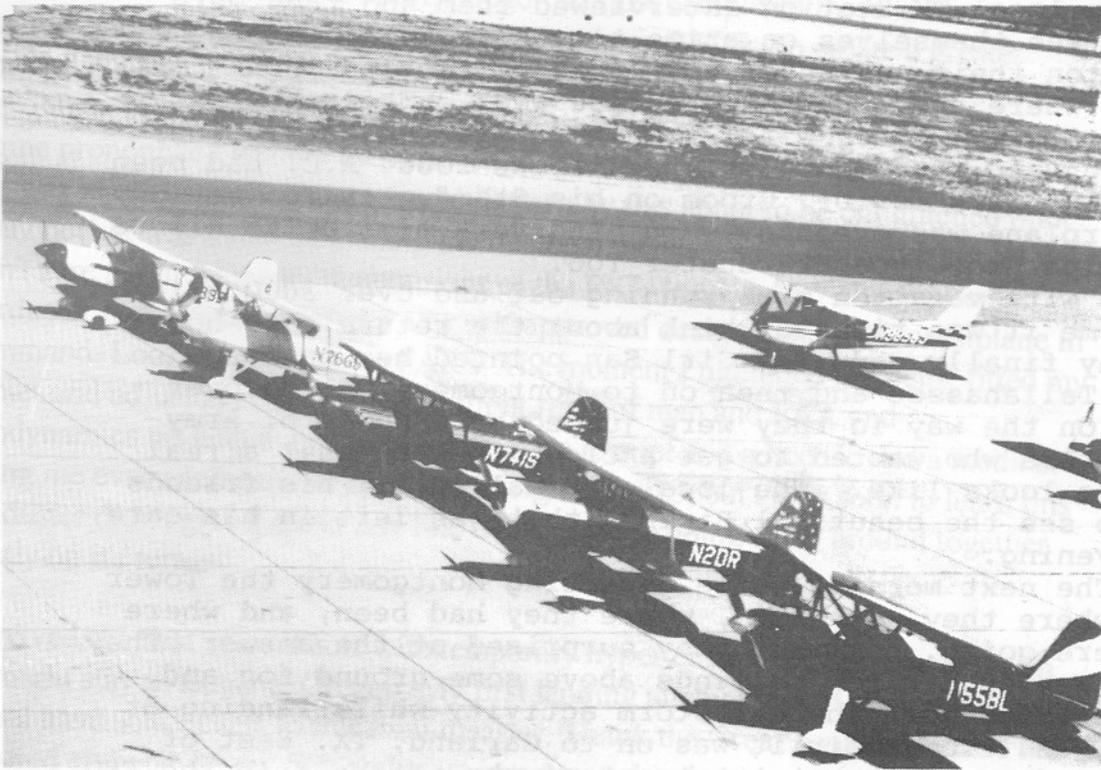


High temperatures and baggage was still a problem then and now. Maps and navigation were also a problem. They solved it with a rolling map of sectionals grafted together about 80 miles wide. I have a picture of Lucille with this map wrapped all around her. They also were equipped with an Alpha 200 radio and VOR head. I wonder how well it worked. I suspect not very well especially at low altitude. They had planned on following railroads and checking names on water towers especially in the Mid West. I can attest to the fact that not very many places are putting names on water towers or grain silos anymore and even the railroad tracks have been pulled up all over the midwest. The rail beds are still there and are pretty easy to spot but which one is which? Good pilotage and dead reckoning was a must in the late 1960s. Not so today with Loran and now GPS. The information is now endless and the accuracy incredible. Weather, then as it is now was still a challenge as their was only a few days out of the entire trip that they didn't get rained on. At one point or another during the day the visibility and the sight seeing was spectacular in between the weather and they were just like me on my many trips East. Impressed with the vast open areas with little in the way of population and again like me, they saw very little in the way of traffic. I think they saw only 5 other airplanes while enroute during their entire trip. So much for the crowded sky of 1969.

Their next stops were Winslow, AZ, Albuquerque, NM and Guyman OK. Their flight service reported thunder storms in the area, but they were able to circumvent them and make Dodge City KS for their next over night. From Dodge City it was on to Topeka KS and then into Rockford ILL for the EAA fly-in. This was the last year 1969 the fly-in was held at Rockford and 1970 was the first year the fly-in was held at Oshkosh.

I do not know how many Starduster Toos were at Rockford that year. Very few I suspect, but the previous years attendance of N1300s the prototype Starduster Too made for so much interest in their airplane. All of the questions, the pictures, they and Girl San was besieged with endless admirers. After Rockford they visited the EAA museum then located at Hales Corners WI from there they were off to Dayton, Ohio for a visit to Wright Patterson AFB and their museum. They made friends with Charles Gebhardt who was at the time in charge of aircraft restoration for Wright Patterson and were invited to spend the night with him at his farm strip. They were also treated to a trip around the local area in Mr. Gebhardt's Mono Coupe. Also while in Dayton they made a side trip to Troy, Ohio to visit with Jim Johnson a local Waco expert. From Dayton it was on to Philadelphia PA with a stop in Pittsburgh for fuel. Philadelphia is where Lucille's sister lives. After a pleasant 4 day visit they set out for Charleston, South Carolina with a stop for fuel at Suffolk County Virginia.

After fuel and conversation with two Navel officers who were building Starduster Toos it was again off to Charleston, SC. Severe head winds, low fuel, and marginal weather forced them to land just short of Myrtle Beach at a private strip. They were also treated to a wonderful fish dinner before pushing on to Charleston. It was here they



STARDUSTERS ON LINE AT MOJAVE CALIF
FLY-IN LATE SUMMER OF 1976 AIRCRAFT ARE
FROM LEFT TO RIGHT N1189B AC BOYLES,
N76GS GARY SOLMI, N741S JACK SWAN, N2DR
DEAN REED, AND N55BL ANTOINE LE FAIVRE



STARDUSTERS IN FLIGHT ALSO AT MOJAVE
LEFT TO RIGHT N1189B, N76GS, N741S ,

stayed several days with long time friends.

The local TV Station interviewed them and they were able to see themselves on prime time that Friday night. From Charleston their next stop was Jacksonville and then Miami. This is where they stayed an entire week. Their hosts were Dr. Joe Groom and his wife. They were treated to fishing, swimming, and some incredibly delicious food. A.C. had been doing some work for Dr. Groom on his Starduster Too N69JG. This airplane was eventually painted very similar to N1300S Lou Stolps prototype Starduster Too.

So with vacation time running out and over 3000 miles from home it was time to think about the return trip home. That day finally came and Girl San pointed her nose to Tampa, Tallahassee and then on to Montgomery, AL to over night. On the way in they were jumped by a bunch of Army Helicopters who wanted to get a close look at what a real airplane looks like. The local FBO called all his friends over to see the beautiful Biplane that was left in his care that evening.

The next morning while departing Montgomery the Tower asked where they were from, where they had been, and where they were going. Boy were they surprised at the answer. They headed West under low ceilings above some ground fog and later skirted more thunder storm activity while landing at Monroe, LA. From there it was on to Garland, TX. East of Dallas and to the worst treatment of the entire trip the FBO there could have cared less about service or over night hanger accommodations. After that experience they were happy to be off with their next stop Amarillo and then on to Albuquerque again. This is where A.C. was once stationed as an Air Force Air Traffic Controller and the local FBO Cutter Aviation was where A.C. and Lucille both worked part time it is also here where they were able to take relatives on some enjoyable local flights. Out of Albuquerque at 6:00 AM the following morning with fuel stops at Gallup, Holbrook AZ, Blythe CA, and on into the Southern CA basin. Finally landing at Santa Palla CA. Home base over 7,000 miles 31 days the trip then cost them only \$750.00 dollars for everything in a delightful airplane, visiting many friendly helpers and wonderful people.

Lucille said at the time they were trying to decide just where their next flying vacation would take them.

As for their airplane N1189B Girl San it was shortly there after repowered with a 180 HP Lycoming. A.C. owned the airplane into the late 1970s. I do not know the name of the person he sold it to around 1978. That person owned it only a short period of time. The second and final owner was Charles Enz of Alta Loma, California. Charles never really got the airplane figured out as shortly after he purchased it. While attempting to land the airplane was flipped over on its back quite violently, sliding some distance on its back. Neither Charles or his passenger were seriously injured. Charles rebuilt the airplane over the next several years. It was at the Starduster Open House at Fla-Bob finished and flying in May 1985. Although unrecognizable as A.C.'s airplane due to paint and other changes it was however a beautiful rebuild now painted white and grey with two tone blue trim. I never saw the airplane again, but in August of 1987 shortly after take off from Hemet, CA the

engine failed and an off airport force landing occurred.

Charles was seriously injured and the airplane substantially damaged. Rumor has it that the airplane was bulldozed and never rebuilt. I tried to contact Charles for his input regarding this article but there is no telephone listing for his last known address. The airplane is still on FAA records. So if anyone knows the whereabouts of Charles Raymond Enz or the remains of N1189B I would certainly like to know.

Other Airplanes in the pictures are left to right N1189B A.C.Boyle's, N76GS Gary Solmi's now owned by Max Bennett, N741S, SA 300RG Jack Swan's now owned by Dennis Salvic, N2DR re-registered N73JH Dean Reed now owned by National Aviation Inc. and N55BL Antoine (Bud) Le Faivre disassembled sold for parts due to liability concerns. I attempted to contact many of the above listed people but was unsuccessful. So if you know their current address or phone numbers please let me know. Several of these pictures were supplied to me by Gary Solmi and were taken at a fly in which was held at I believe Mojave, California during the late summer of 1976.

Editor D.C.B.
Starduster History



Arthur Griffin, treasurer of EAA Chapter 117 (Niles, OH), joined EAA in 1968 and went to the fly-in at Rockford, IL. While there his son Bob (age 9 at the time), picked his favorite airplane—a Starduster Too. He is shown in one of the photos posing beside that aircraft. He spent the biggest part of the week standing or sitting by it and dreaming someday of flying one. Bob Griffin is now 36 and has been the owner of a Champ, a Luscombe, a Cessna 180, a Citabria and a Kitfox which he built. After the Kitfox was finished and flying he purchased a project, putting his heart and soul into it. He saw his dream come true when N507RG, a Starduster Too, was completed. Bob Griffin is Vice-President of EAA Chapter 117.

SEE LETTER NEXT PAGE FROM ♦
JERRY RHINEHART McDONALD OH

October 24, 1995

Hi Bill,

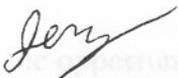
I just wanted to drop you a line and inform you of my progress on the Starduster. It is at the airport in the same hangar as Bob Griffin's. Bob has about 22 hour on his so I can't wait for a ride. It's nice having a completed one there to look at if you have any questions.

About all I have left to finish is the final rigging, fairings and windshields. I hope to have it going sometime before spring. I have just sold my house and will be starting to build a new house so progress will slow. The new house will have a 2500' grass strip along side and the garage is big enough for the cars and the Starduster. I'm looking forward to that since I had to build mine in a one car garage.

I took your advice on the Scott 3200 tail wheel. I also ordered flying wire in place of the bottom tail braces. I just wasn't satisfied on the fit of my braces. I have enclosed the forks that you sent me for the braces a little while back.

Thanks again with all the help throughout the project. I may be in LA in November, so I will try to stop. Also enclosed is a picture of Bob's and my Stardusters.

Sincerely



Jerry Rhinehart
440 Indiana Ave.
McDonald, OH 44437
216-530-6108 H
216-373-5201 W

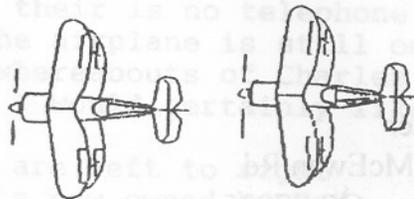
RIGHT JERRY RHINEHART's S/D TOO



engine failed and an off airport force landing occurred.

Charles was seriously injured and the airplane substantially damaged. Rumor has it that the airplane was bulldozed and never rebuilt. I tried to contact Charles for

Russ Ward
957 Laguna Ave
Burlingame
CA 94010
11-16-95



Dear Dave,

Thanks for the 'Starduster History', it certainly makes good reading, please find enclosed check for \$30, and it will be my pleasure to buy you and your wife dinner. I am confidant my Acroduster II will be at the Starduster Open House in Santa Rosa next May - I'll even let you fly it!!

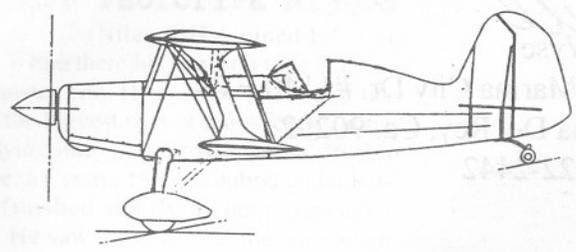
Spoke to Lowell Slatter last Friday night, he told me he had moved both his wings forward one inch, and that I may have to move my top wing forward one inch. His engine weighs 70lbs more than mine, so the weight and balance may not be such a big deal. My battery sits in the rear cockpit, plus I have a lightweight starter and alternator, so I am doing my best to keep the weight down. Originally I had intended to fly it initially as a single place open cockpit, but now it has a full two place canopy.

Currently I am in engine assembly mode. Hopefully, by the end of this month (Nov) I will have the engine assembled, and will be able to do an initial weight and balance. At that stage the cylinders go to Darryl Buhl at Magnum for the Flow/Port process (I already have one of his camshafts installed) and then I can complete the rest of the systems. (i.e. electrical panel)

As I mentioned I am installing a full electronic fuel injection and electronic ignition. I already have an aerobicic (short) sump, and cold air (Monty Barrett) induction system. Hopefully I will be at least 100 lbs lighter than Lowell, and possibly 15% up on power - time will tell.

I haven't decided on a paint/color scheme yet - perhaps you may have some ideas. As soon as the electronic ignition/fuel injection system is complete, I will write you an article for the 'Starduster' magazine.

Sincerely,



SEE LETTER NEXT PAGE FROM
JERRY WHINEHARTS McDONALD OR

11/23/95

David Baxter
5725 S.W. McEwan Rd.
Lake Oswego, OR 97035

Hello David:

Here's a belated thank you for the rigging info you were kind enough to forward to me. It helped a great deal and N27CG is just about flying hands and feet off at cruise settings of Mach two. Anyway, your info was a great help and thanks again.

I guess I'm the only Starduster now at Santa Monica. Haven't seen Kurts white plane for a long while. Don't know exactly what happened. We do have two Great Lakes, a couple of Pitt's and a Waco UPF-7. And some Stearmans. But, there's nothing like the little Starduster, it's always a head turner when on the taxi way.

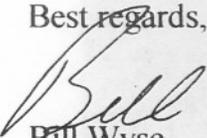
Had the opportunity to give a navy test pilot from PAX River a ride some months ago...after landing he smiled like a fourteen year old after his first kiss. Great to give rides to people who really enjoy the experience. As all have.

I'm enclosing a short article that might be of interest to you and your readers and hope it's what you might be looking for.

Your newsletter is great. I appreciate the amount of time required to produce it and look forward to each issue.

Thanks again for your help.

Best regards,

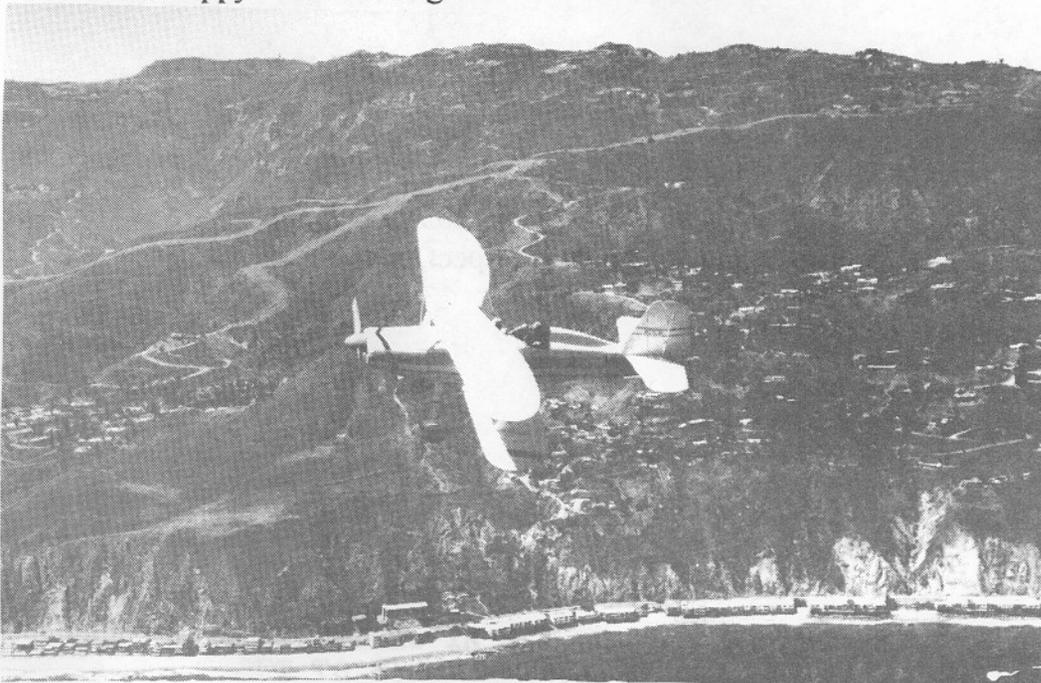

Bill Wyse
4335 Marina City Dr. #1140 ETS
Marina Del Rey, Ca. 90292
310-822-2442

Learn the Language

In September 1991 I sat in the rear cockpit of Starduster N27CG ready for takeoff at the end of a runway in Newport, Oregon. I'd just completed three landings and takeoffs from the front seat, but had no solo time in 27CG. To create a greater sense of adventure or disaster, I had never seen this aircraft before that day and was only confident it had two beautiful elliptical wings, a 260 hp Continental engine pronounced healthy by some tongue clucking mechanics and a tail wheel that was likely to survive any miscalculations by this about to be enlightened pilot. In my pocket was a receipt making me the legal owner. I soon learned N27CG didn't care about receipts, registrations or the PIC's legal rights. This particular Starduster had already created a new self-approved designation...BIC or Biplane in Command. Look that up in your FAR's! The moment I tightened the belts, fitted my helmet and adjusted my goggles, the flight rules of man and FAA and aerodynamics no longer applied. I may have a receipt and a license and a medical giving me every authority to exercise my rights as PIC, but I was soon to learn this Starduster didn't give a damn and like it or not we're going to fly around together strictly on it's terms.

I survived the first solo takeoff with temporary hypertension and set course for an overnight stay in Eugene, Oregon. My first landing attempt was at dusk and I should have sold tickets to this mini-disaster. Thank the Great Aviation Guru I had authored and obeyed my first and most important chiseled in granite mandate for safely flying this plane. **IF THE LANDING APPROACH ISN'T JUST RIGHT THROUGH TOUCH DOWN AND ROLL OUT, DON'T TRY TO SAVE IT..GO AROUND! AND AROUND AND AROUND...(check fuel) and around and.....**

By the second approach, night had made things rather dicey for this rapidly aging pilot, but the Starduster took pity, showed some compassion and allowed me to semi-control a squash down without closing the runway or getting our picture in the morning paper. With N27CG safe in a hanger and me safe in a motel, I knew we were both happy to call it a night.



Four years and 450 hours later I can speak with some erudition about the classic love/hate romance with 1400 lbs. of spruce, aluminum, steel, fiberglass, rubber, wires and just plain glue stirred meticulously together by a patient wizard I never met to give this 63 year old pilot enough thrills, smiles, exhilarations and instant puckers to fill a trunk with happy logbooks.

Starduster 27CG and I have roamed the skies of Southern California and Arizona together without serious calamity because I've learned some of the language.

Example: While taxiing to my hanger I noticed a very slight shifting from the tail during my S turns. It was hardly a magnitude 10 demanding that I eject immediately and run for my life. It was much more subtle, like a wife's slight glance when you've missed an important cue. The next day I took extra care examining the tail wheel assembly and what did I discover? One mounting bracket securing the main tail wheel spring had loosened. 30 seconds with a wrench on both sides and I knew greater respect for the language. I developed another axiom: Be aware and receptive to changes in anything about your Starduster. The engine sound. Control movement, pressures and inputs. Ground steering. Trim positions. Takeoff acceleration. Braking. No one knows better how your plane feels or sounds or speaks or sometimes shouts than you do. Any change means something. Maybe not serious, but certainly worth investigating now or before the next flight.

Once, I noticed the engine sputtered several times during shut down. It had never done that before. Something had changed. But what? Anxious to return home, I didn't investigate at that moment. A few minutes later, while attempting a hot start, a friend standing to one side yelled, "Fire." The engine started, I applied a good amount of throttle and blew out the fire. Maybe not the best thing to do, but it worked just before someone produced a fire extinguisher. My mechanic discovered the idle shutoff didn't completely restrict the fuel flow, that accounted for the sputtering. Residual fuel had remained in the injection system. This fuel ignited in the exhaust during the hot start. Another experience to confirm my belief that every change, no matter how slight, means something. I never ignore them now.

Up there, we're enjoying the ride because of many forces in balance...any imbalance might cause Mr. Clouse to hang his head for a few days. So, I concentrate on listening, feeling, knowing and shaking hands with my Starduster before, during and after every flight. I must remind myself to leave any cavalier flying attitudes on the ground and treat my plane with respect, especially knowing the language whenever N27CG speaks.

Bill Wyse

LETTERS

NOEL ANDERSON

11/29/95

David,

Good talking to you - enclosed is a check for the "Starduster History". A great part of my life was spent building and flying my Starduster. The best of memories. I still have my KR-1 and am now rebuilding a 1941 T-Craft in my garage. Have a great Christmas and New Year.

Vince Hostetler N27VH
382 Hillview Dr.
Grand Junction, CO 81503

Dave,

12/22/95

Just a quick note to say thank you so much for the Starduster History book & pictures, love the swimsuit one. Just received it yesterday. We had our EAA [#113] meeting last night - can't get over how many people really like the Starduster.

Thank you also for the Michigan mailing list - will try and get in touch with some of them - I have not called Jim Kilborne as of yet. Look forward to talking to you in the future.

Sincerely,

Mike Sayer

P.S. Please add me to your Michigan list next time you update.

NOEL ANDERSON

63 Foote Avenue
PO Box 342
Canaan, CT 06018-0342

Telephone (203) 824-7022

E-Mail: noel@li.com

December 14, 1995

David C. Baxter
5725 S.W. McEwan Road
Lake Oswego, OR 97035

David;

Thanks very much for the Starduster History and other information which I will find most helpful. I have enjoyed reading the history immensely and the color photographs have added a great deal to the book.

I must say that at this point I am an enthusiast but hopefully will be an owner sometime in the future. I have just received my medical back after a 19 year struggle with the FAA and this would be a perfect airplane for me having begun flying in the tailwheel era in a J3 cub. I currently own a Moni motorglider but it really doesn't meet my needs.

I have visited with Dick Jablonski of Simsbury High School here in Connecticut who have just completed their Starduster Too after 12 years of effort. They have built a very nice airplane. What a wonderful accomplishment for the students and their teacher. The project was funded over the years by the Board of Education. They have not received the final FAA approval as yet, but expect to do so over the winter with the first flight planned for the spring. I have asked to be invited to the first flight and will take lots of pictures which I will send to you. Perhaps Dick will write up a short piece for the newsletter.

Take care and thanks for the info. Best wishes for a Merry Christmas and a Happy New Year.

Regards;



SCAPPOOSE COMMUNITY CLUB

PO BOX 933

SCAPPOOSE, OREGON 97056

November 8, 1995

Starduster
David Baxter
5725 SW McEwan Rd
Lake Oswego, Oregon 97035

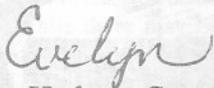
Dear Dave,

On behalf of the Scappoose Community Club, I would like to thank you for your participation in the 1995 Scappoose Sauerkraut Festival. It is only with the cooperation of everyone that this festival was again a success. We greatly appreciate your time to bring your plane out to Scappoose to have as a display for our Festival.

The estimated attendance for this years event was 20,000 people. Right or wrong on the number we showed them, with PRIDE, community effort from the small town of Scappoose. Thank you for your part in helping to make this a successful day. The Festival next year will be October 12th and we hope you will again save that day for us. Thank you again.

Sincerely,

SCAPPOOSE SAUERKRAUT FESTIVAL



Evelyn Hudson, Coordinator

cc: Scappoose Community Club

NEWS FROM CHAPTER 23



EAA CHAPTER 23

210 North 600 East
Bountiful, Utah 84010



MESSAGE FROM THE PRESIDENT

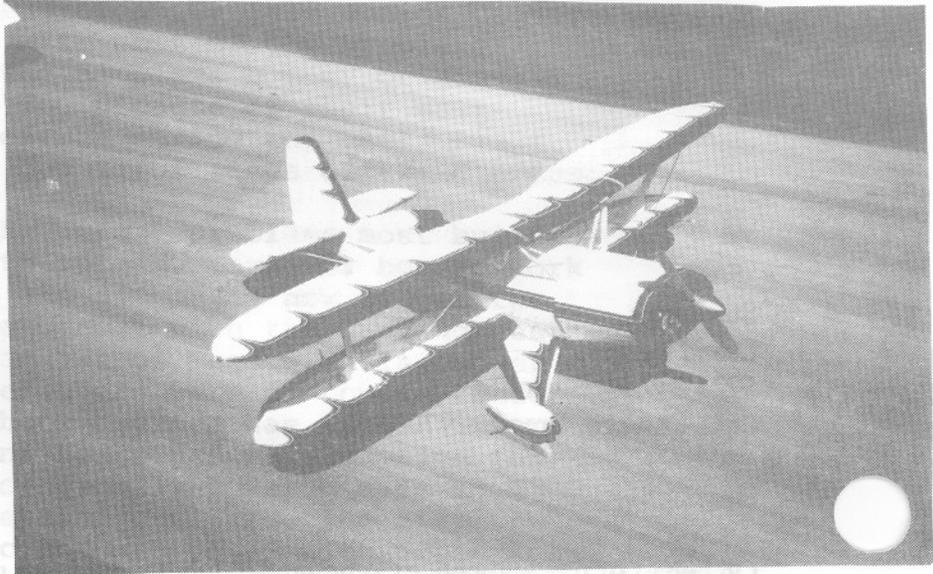
Brian T. O'Leary

Talk about a good time!

The Heber Valley Fly-In was GREAT! After cremating my first two griddles full of pancakes, I finally mastered the fine art of "Flapjack-Flippin"—well, at least kinda-sorta. The ones that got a little dark were later used as Frisbees, and the real bad ones will be saved for gasket material. A lot of hard work made the event a success with a good time had by all.

My sincere thanks to all of the dedicated people who helped out so much, and thanks to everyone who attended. This is truly how aviation in Utah should be and can be if WE make it that way.

YOUR EDITOR HAS IN THE PAST ATTENDED THE HEBER VALLY FLY-IN AND FOUND IT TO BE VERY ENJOYABLE. SOME OF THESE LOCAL EVENTS ARE VERY REWARDING IN THAT THE YEAR I WAS THERE FIVE STARDUSTERS SHOWED UP.



HEBER IS OF COURSE BRY'S HOMEBASE AND IS THE AREA WHERE BRY ANDERSON HAS ALSO BUILT A NUMBER OF BEAUTIFUL HOMES ENCLUDING HIS OWN. HE HAS ALSO BEEN A WONDERFUL HOST ALONG WITH HIS WIFE JEAN DURING OUR TRAVELS THROUGH UTAH. CONGRATULATIONS BRY FOR THE BEAUTIFUL

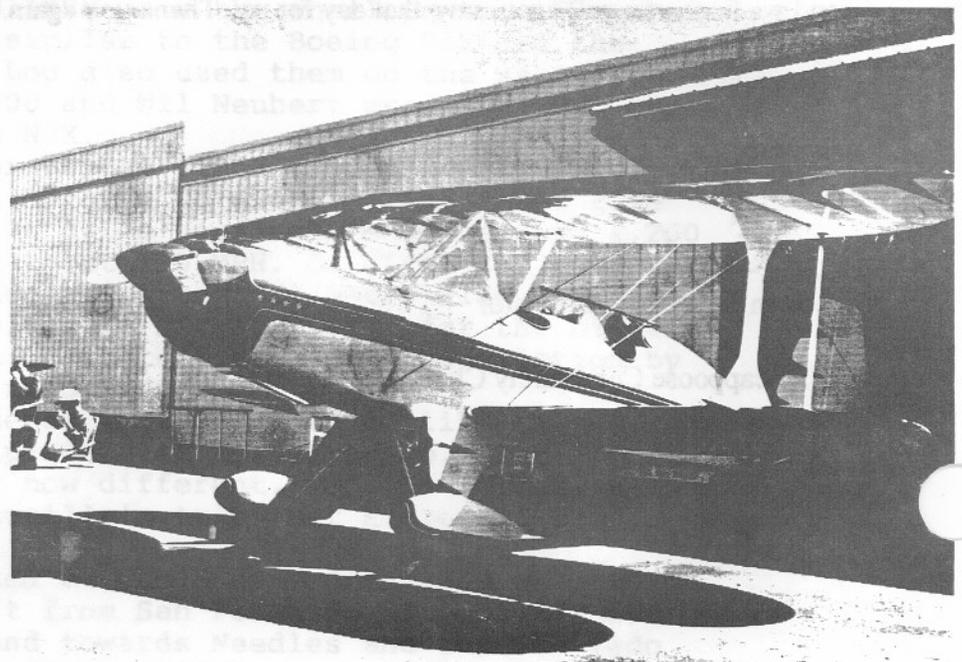
JOB ON BUILDING AND THE SUCCESSFUL FIRST FLIGHT OF YOUR STARDUSTER TOO N8233X WHAT A PERSONAL SENSE OF ACCOMPLISHMENT

EDITOR DCB

Bry Taxies His Starduster Too

On the Wednesday before the Heber fly-in Bry Anderson was ready to fly his recently completed Starduster Too, but the FAA had a scheduling problem and was unable to perform the final inspection. However, he had run up and down the runway a few times and worked out the zero AGL bugs.

Although he had not flown the plane, he put it on the line at the Heber fly-in. Bry was pleasantly surprised to discover that his plane had earned the first place award for plans-built airplanes. Congratulations Bry!



Dave Baxter
5725 S.W. McEwan Road
Lake Oswego, OR 97035

November 26, 1995

Hello Dave,

Believe it or not, the Starduster is finally finished except for a little tinkering. After four years plus of hard work and about two months of red tape with the FAA, she is ready to fly.

The whole process had been one of trail and error and do and re-do. Without my good friends and mentors Glen Olsen and Weldon Glines, I could not have accomplished the project.

On November 14th, the FAA passed off the final inspection and Glen took her out for her maiden flight on the 15th. Johnathan Livingston Seagull had nothing over on her.

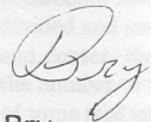
He then took on the tremendous responsibility of teaching me how to fly her. All of my previous flying has been of the cream puff variety; this baby takes a real pilot. She definitely separates the pigeons from the eagles. I have racked up six hours at this point and will need at least another six before solo.

Visions of hopping in her upon completion and taking off like a bird have been floating through my mind for years. I am thankful that I had enough sense to realize that this was not the smart thing to do. A word of advise that I might give to other builders, unless they are trully experienced, give the glory of that first flight to someone who is well qualified.

Enclosed are pictures of the airplane and a copy of Chapter 23's Newsletter which covers the Utah State EAA and Fly-In held at Russ McDonald Field in Heber Valley on October 20th and 21st. First place in the Plan Built Category went to N8233X which is my beautiful Star Duster Too.

I am truly grateful for the encouragement and help that I received from you and Bill Clouse. It's great to have guys like you supporting the home builders. Sports Aviation has certainly received a big boost from the likes of yourselves, L&U Stolp and many other dedicated men.

See you in the spring,


Bry

Bryant Anderson
825 No. Pine Canyon Road
Midway, Ut. 84049

LETTERS

Stalp Starduster Corp.
4301 Twining St.
Riverside, California 92509

Nov.15,1995

Dear Starduster Corp.,

Enclosed are a couple of pictures of my SA-100, with a few modifications that make it better from my point of view.

- The wing ribs are 1.5 mm birch plywood with spruce stiffeners, capstrips.
- Wing tips have laminated wooden bow, filled in with foam glass.
- Fiberglass parts are used extensively; horizontal stabilizer, landing gear, spinner, nosebowl, turtleback, windshield, cabanes(partially complete), & seat.
- Airfoil is a 23012 and handles beautifully.
- Landing gear has been lengthened 3".
- Seat was tilted back 4" at top for more comfort.
- Engine is a Lycoming O-320-E2D (150HP) with a Sensenich wooden prop and a 1.4"extension.
- Wing and tail surfaces modified to resemble SA-300 as was the firewall to add a tunnel at the bottom for exhaust pipes and cooling.
- Added one landing wire to wings.
- Crossover exhaust system.
- Side cooling gills (openings) were relocated at bottom of the cowling and are now louvered openings.
- Polyfiber covering, finishing system used.
- Nav lights installed.
- Lightweight starter used, gell cell battery.
- Canopy keeps cold wind off head, shoulders.
- Indicates 140 mph at 2550 rpm, but may not be completely accurate.

This is a fine airplane; I built a Starduster Too N6JS during the 70's and this flies similarly, it just requires more attention to takeoffs and landings. The Stardusters are the most beautiful airplanes ever designed and fly just as well.

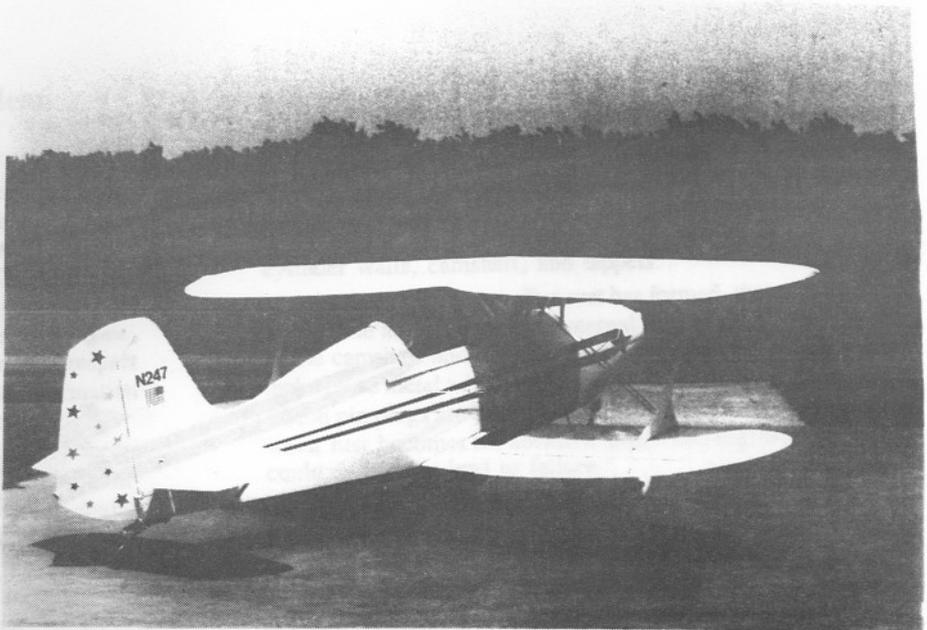
Thanks,

John Snyder N247
910 Loganwood Ave.
Richardson, Texas 75080
(214) 235-9672

Low Time Engines New & Not New
Quality and Value

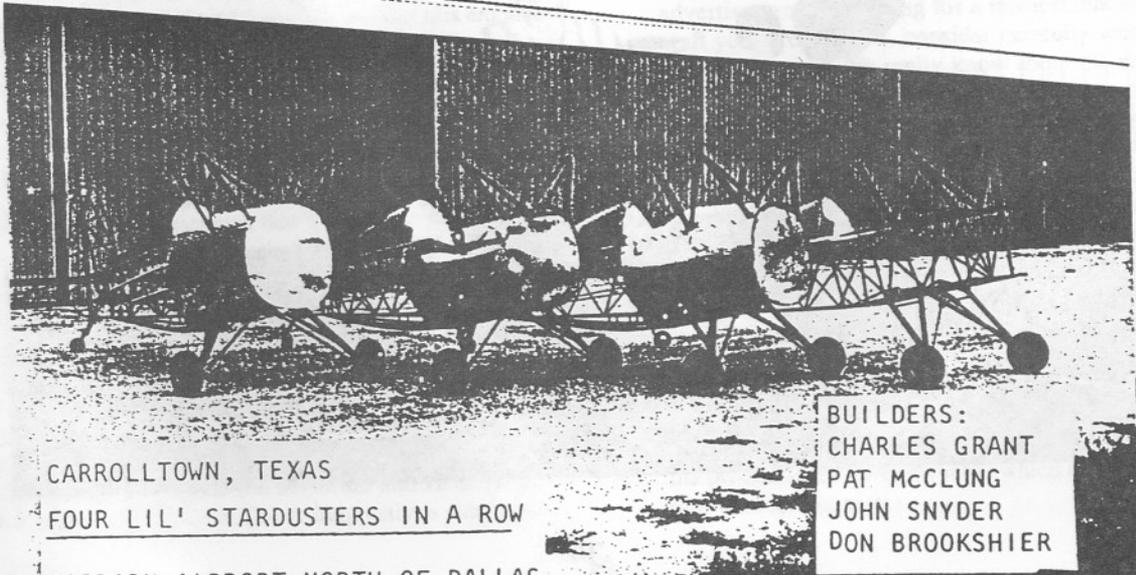
N247 JOHN SNYDERs STARDUSTER
ONE, BRAND NEW ONLY 9 HOURS
SINCE ITS FIRST FLIGHT.

YOU MAY RECALL MY INQUIRY
ABOUT ALL FOUR LIL, S/Ds IN
A ROW AT CARROLLTON TEXAS



THEY WERE STARTED AROUND
THE EARLY 1980s AND ARE
NOW ACCOUNTED FOR
SEE COVER OF S/D MAGAZINE
JULY 85 & JANUARY 95 AS
APPARENTLY CHARLES GRANT
OWNS TWO SINGLE PLACE S/Ds

N17192 & N227FG THE OTHER
AIRPLANES ARE PAT McCLUNGs
N2XM AND NOW JOHN SNYDERs
N247 ALONG WITH DON BROOK-
SHIERs PROJECT THAT IS NOW
OWNED BY BOB DWYER MAKES
FIVE AIRPLANES NOT BAD FOR
EAA CHAPTER # 168



CARROLLTOWN, TEXAS
FOUR LIL' STARDUSTERS IN A ROW
AIRPARK AIRPORT NORTH OF DALLAS

BUILDERS:
CHARLES GRANT
PAT McCLUNG
JOHN SNYDER
DON BROOKSHIER



N94WE OWNED AND BUILT BY WAYNE ENSEY WHO LIVES AT 3510 NE DORCHESTER WAY CORVALLIS OR 97330 503-926-8942 FIRST FLIGHT THIS PAST JULY, BEAUTIFUL WHITE WITH RED AND BLUE TRIM AND IS POWERED BY A 180HP LYCOMING THIS AIRPLANE NOW HAS ALMOST 100HRS GOOD JOB WAYNE!





**N8121B OWNED AND BUILT BY MIKE MATTEI
WHO LIVES AT 19775 SILVER CT BEND OR
97702 503-385-5662 FIRST FLIGHT ALSO
THIS PAST JULY ALL SILVER WITH POLISH
AND WAXED ALUMINUM AND IS POWERED BY
A 200HP LYCOMING AND THIS AIRPLANE
ALSO HAS ABOUT 100 HRS GOOD JOB MIKE!**



To All
Vintage Festival Pilots:

September 12, 1995

VINTAGE FESTIVAL



DAVID C. BAXTER

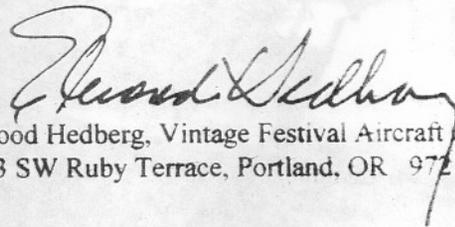
Like fire breathing dragons, seven hot air balloons filled the air over the North parking lot on Saturday morning to mark the opening of the 8th Vintage Festival at Sportsman Airpark. The light winds out of the North made for a fast track for the early risers, and it was only 20 minutes or so before those leaving first had landed near McMinnville. The air was clear, the day was warm (it could have been HOT but for the cooling breezes) and the smells of good food and friendly laughter filled the grounds. It was a perfect day.

Joining the automobiles, motorcycles, classic boats, the Evergreen International 1929 Ford Tri-motor was parked on the grass to the delight of photo buffs. Of the 36 pilots who promised to attend, 26 made the event. There were several reasons some could not make it...you should know about these. Dale DeTour discovered a broken tailwheel lock Friday night and couldn't repair it in time. TV Ridgeway and Marika were there in a booth full of wares from the Irvington Booknook (brought in their classic stake sided pickup). Art Armstrong was flat on his back per doctors orders recovering from eye surgery. Carol and Hal Skinner were disappointed that Hal wasn't quite recovered enough from recent surgery to bring the Interstate. Ron Ochs was winding up harvest and couldn't make the trip from Madras.

All the invited show planes at the Festival are "winners", and as is the custom, there was no formal judging. But there were six planes that were of special note and those pilots were presented with "Special Award" plaques: Gerry Wallin drew rave reviews for bringing his spanking new restoration of a 1936 Stinson SR-8 Reliant. John Wigmore brought an outstanding example of a Luscombe 8E Silvaire, and Tim Townsend wowed everyone with his restoration of a Cessna 120 in three shades of Red, with flecks of gold. Collin and June Powers just had to be recognized for their absolutely classic 195B (which was awarded best of class at Oshkosh in August). Steve and Bert Zimmerly proudly showed their Bucker Jungmann (with a new engine), and last but not least was the beautiful Ranger powered Red Starduster brought by Hap Schnase of Scappoose.

The presence of your aircraft, and your willingness to let the public "get close" was a major factor contributing to the success of this event. As the committee makes plans for next year, and the invitations go out, we hope you will again respond. If you have thoughts about the day, how you were treated, or of ways to make future events even better, please let me know. A REMINDER: If you haven't used your fuel voucher, please remember it is only valid through November 1.

The committee extends best wishes for the continued health of you and your airplane during the months ahead....be sure to keep your tail up in the turns!



Elwood Hedberg, Vintage Festival Aircraft Committee (503) 246-7611
7903 SW Ruby Terrace, Portland, OR 97219

Newberg Area Chamber of Commerce
115 N. Washington
Newberg, OR 97132
(503) 536-2014

EDITORS NOTE I HAVE
Red Bluff FSS C... Oscar Bayer



Starduster Too
N490B

Dear Dave:

I received the Starduster Magazine this week and after reading through it realized that I hadn't filled you in on our adventures after leaving Wautoma. So, I will try to give you a rundown on our trip from Wisconsin to St. Louis and up the "Lewis and Clark trail."

Roy and I in N490B and Les and Mary in N4226Y departed Wautoma about 9 AM on Monday 31 July and headed south in loose formation. We had fairly decent weather with no particular ceiling and pretty good visibility. We made pretty good time down through the farm country with a stop at Kewanee, Illinois for fuel and a soda. Shortly before noon we reached St. Louis and after a quick turn around the "Gateway Arch", flew back up the Mississippi River to the mouth of the Missouri. We turned west here and following the route of the Lewis and Clark expedition who left this same point on 14 May 1804 pressed on. We skirted the north side of St. Louis along the river and landed at Creve Coeur Airport for some more fuel and lunch. By now the temperature was well into the 90's and the humidity about the same. Our hope was to see some of the Antique and Classic aircraft that are based at this little airport, but most of the hangars were closed and we suspected that many of the aircraft were up at Oshkosh anyway.

We agreed to press on and after clearing the "Class D" airspace at the "Spirit of St. Louis" airport, settled down at about 1000 feet above the Missouri River and flew westward past the Missouri Capitol "Jefferson City" and on into Lexington, Missouri - just to the east of Kansas City. We landed here for gas primarily, but the weather was getting a bit iffy and after finding that the FBO had pumped the last of his 100 octane we decided to call it a day.

Back at the airport the next morning things weren't looking good, the ceiling was about 700 feet and the visibility down to 3 miles. On top of that, the fuel truck hadn't arrived. The local folks suggested that we fly over to the East Kansas City airport (Grain Valley) about 15 miles to the southwest. We ran the scud over there and after filling the aircraft, sat in front of the TV in the pilots' lounge to sweat out the weather. The downtown KC airport was reporting 400 and 1 mile, but the forecast was for considerable improvement by noon.

After lunch and some more checking with Flight Service, it was apparent that things were not going to get much better, maybe for a couple of days! We had a stationary front stalled right over Kansas City, blocked by a tropical storm moving northwest through Texas, with low ceilings and embedded showers and thunderstorms. On up the Missouri River behind the front the weather improved rapidly, in fact the weather at St. Joseph was 2500 feet and 10 miles and further up the river at Omaha it was clear. About three o'clock in the afternoon Kansas City International was reporting 700 feet and 5 miles so the four of us quickly decided to get the heck out of there, abandon the river

route through Kansas City. circle the International airport to the north and rejoin the river near Atchison, Kansas, just south of St. Joseph, MO.

By 3:30 we were in the air with Les and Mary flying about a quarter-mile off our right wing so that we could all watch for antennas and other obstacles to our aircraft. Passing Atchinson we rejoined the river and turned northwest cruising along just a comfortable distance above the water. Our next stop was at Council Bluffs, Iowa just to the southeast of Omaha, for a pit stop and gasoline.

As we had plenty of daylight remaining and nothing but clear skys ahead we pressed on around Omaha and on north past Sioux City, Iowa and Yankton, South Dakota before reaching Pickstown, on the Missouri. From here we flew into the nearest airport at Wagner, SD. The Wagner airport is pretty typical of a small-town flying facility, a few old beatup hangars, a gas pump and an FBO office with the door open and a note on the desk "if you need anything call _____". Trouble was nobody answered the call, and it was the same at the local Motel who advertised "we will pick you up!". Although it was 7:30 PM there was a welder working on a new hangar and he took us into town.

The next morning back at the airport we found the airport manager who filled up the aircraft and we were shortly airborne back over to Pickstown on the Missouri River then continued on northwest up past Pierre, South Dakota to Mobridge for our first fuel stop of the day. Out of Mobridge we passed Bismarck, North Dakota and the town of Mandan where nearby, Lewis and Clark spent the winter of 1804/1805. Continuing along the river we now turned more westerly and detoured to Hazen, North Dakota where we bought some gas and borrowed the airport "courtesy car" for a trip into town for lunch. Out of Hazen we flew over Lake Sakakawea for about 80 miles and just past Williston came to the point where the Yellowstone River joins the Missouri from the south. We continued into the Big Sky airport at Culbertson, Montana for a quick gas stop. The landing here turned into an exciting undertaking as we had a direct 20+ MPH direct crosswind on the only runway. Both Les and I got down OK but it wasn't the prettiest landing either one of us ever made.

After fueling and buying a soft drink, we were back in the air almost due west now as the Missouri had reached its most northward course, less than 60 miles from the Canadian border. On west we continued, and after reaching the Fort Peck Dam, turned north to Glasgow, Montana where we landed, tied down the machines and went to town for the night.

The next morning turned out bright and clear and before long we were airborne back to the Fort Peck Dam then west along the lake to the Musselshell River and then northwest again to Big Sandy, Montana for a fuel stop. From Big Sandy the river came from a more southwesterly direction and we continued on past Great Falls and Helena. We had planned on landing at Three Forks, the beginning of the Missouri River,

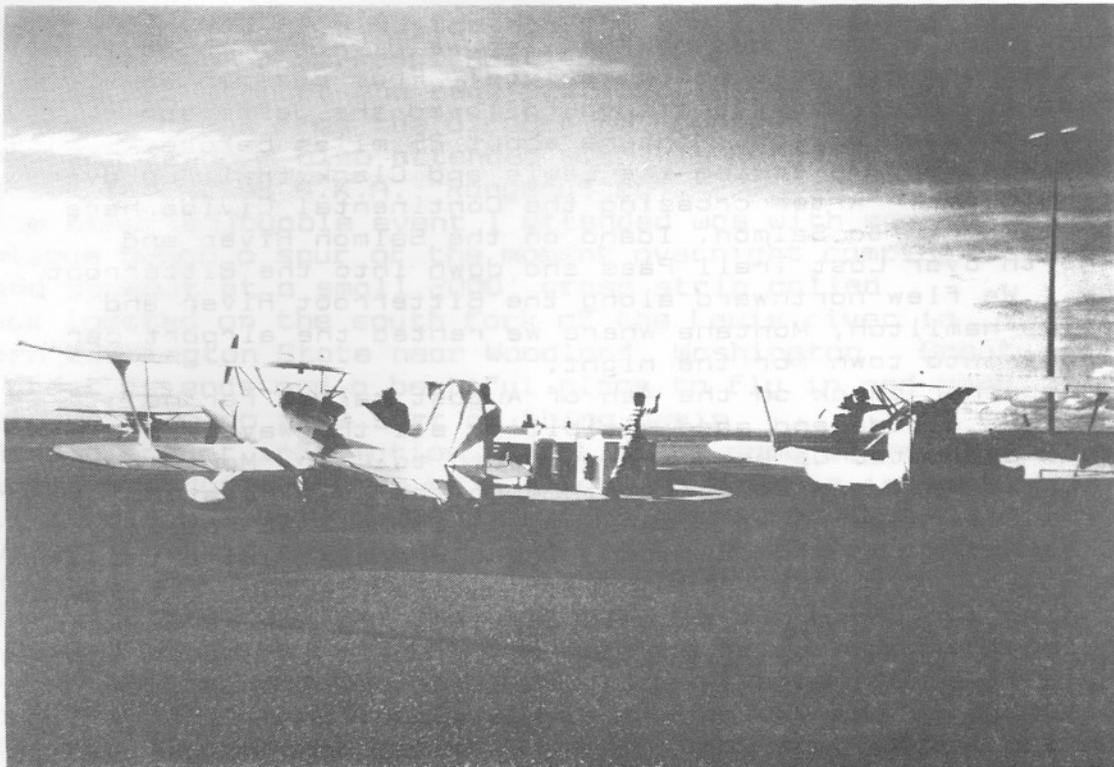


PHOTO BY
LES HOMAN
BIG SKY MOUNTAIN

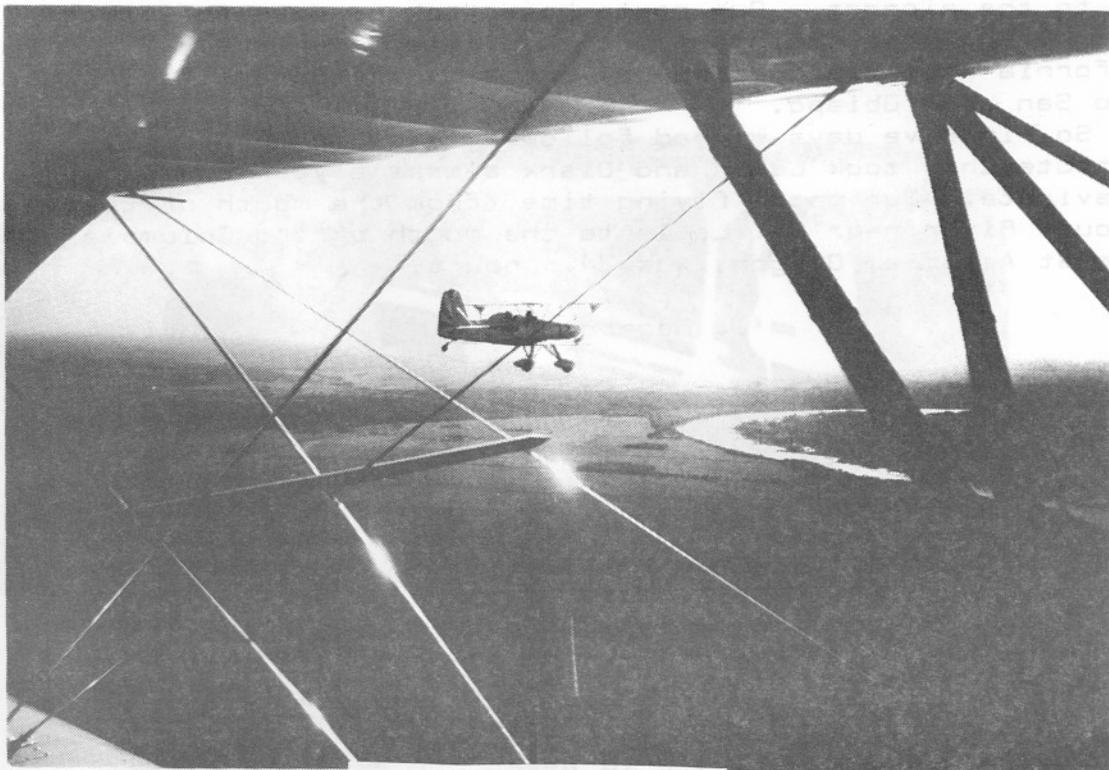


PHOTO BY LES HOMAN
MISSOURI RIVER

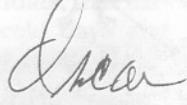
but the local airport had no fuel, so we diverted to Bozeman and filled the aircraft and ourselves! From Bozeman we returned to Three Forks and then followed the Jefferson River south past Dillon, Montana about 25 miles before turning west and following the Lewis and Clark trail up over the Lehmi Pass. After crossing the Continental Divide here we turned north to Salmon, Idaho on the Salmon River and then north over Lost Trail Pass and down into the Bitterroot valley. We flew northward along the Bitterroot River and landed at Hamilton, Montana where we rented the airport car and drove into town for the night.

A weather check on the 4th of August called for no significant clouds and good visibility all the way to the coast. We mounted up and flew on north to Lolo, Montana and then turned west and southwest through the Lolo Pass and over the Clearwater River near Kamiah, Idaho. We followed the Clearwater down to Lewiston, Idaho where it joins the Snake River. We landed, bought some gas and after stretching our legs, got back in the air. We now were following the Snake River and continued until it joined the Columbia River at Pasco, Washington. We then flew on down the Columbia to The Dalles where we stopped for a final fuel fillup and lunch. The last leg to Astoria, Oregon took us down the river past Portland, Oregon and Longview, Washington before reaching the Pacific and landing at the old Coast Guard airport.

Our arrival left us plenty of time to locate a ride and make the short trip to Fort Clatsop, the 1805/06 winter headquarters of the Lewis and Clark expedition. We toured the National Monument and took some pictures before driving back to the airport. Our route home took us down to Cottage Grove, Oregon for the night and then into Livermore, California where we dropped Les and Mary off before flying on to San Luis Obispo.

So, in five days we had followed as close as possible the route that took Lewis and Clark almost a year and a half to navigate. Our total flying time, from the mouth of the Missouri River near St. Louis to the mouth of the Columbia River at Astoria, Oregon, was 24.1 hours.

Regards,



Oscar Bayer
250 Stanton Rd.
Arroyo Grande, CA 93420-5609

16th ANNUAL STARDUSTER OPEN HOUSE

WHEN: MAY 3rd, 4th and 5th of 1996.

WHERE: Hopefully in the Bay area, perhaps Columbia, Porterville or even back at Fla-bob. If anyone has some good ideas or would like to host this event please contact us at one of the numbers below.

WHY: FLY, FOOD, FUN AND FRIENDSHIP.

We would like to fill the Open House with biplanes, Stardusters, Acrodusters, V-stars, Starlets or any homebuilt enthusiast. We would love to see you there with your airplane. Come help us celebrate our 16th anniversary. Please join us for a weekend of fun. Camping will be allowed on what ever airport we end up at.

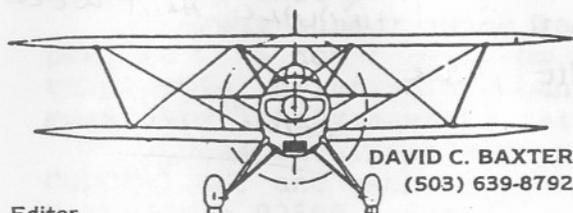
Please let us know if you have any ideas:

Bill Clouse 1-800-833-9102
Dave Baxter 1-503-639-8792
Les Homan 1-510-516-1094

Our original intent was to have this event again at Santa Rosa but some of our best promoters will not be able to attend or be involved so it will require more work and a different approach. We will certainly have an Open House on these dates but where it will be at this point is not certain. So please think and if possible get involved.

Thanks
Editor DCB

STARDUSTER MAGAZINE



DAVID C. BAXTER
(503) 639-8792

Editor
5725 S.W. McEwan Rd. Lake Oswego, OR 97035

1978 Starduster Too

Registered Owner:
Doug & Alison Thiel
14609 Ave 24 1/2
Chowchilla, Ca 93610

N102MB
SS# 843

Liens: County Bank of Merced

Engine: O-360 Lyc (180 H.P.)
Christen Inverted Oil System
Propeller: Fixed Pitch

TTAF 630 Hrs.
SMOH 277 Hrs.

Avionics:
KY 97A Comm
Kt 76A XPDR w/enc
Flybuddy Loran
Intercom
Stereo

Modified Gear
Empty Wt. 1210 lbs.
Paint: Dark Blue (Average: Probably the weakest point of the A/C, but acceptable)
Interior: Good

We've owned the airplane since April '94
The engine runs good

Reason for Selling: Wife is interested in competition Aerobatics so we need to step up.

Note: A/C has logbooks; however the original logs were lost in 1983 and have been reconstructed.

Price: \$27,500

Doug & Alison Thiel
(209)665-7319



*THIS IS A GOOD AIRPLANE AND WELL
WORTH THE PRICE
EDITH DUB*

CLASSIFIEDS

ADVERTISING CLOSING DATES : DECEMBER 1, MARCH 1, JUNE 1 AND SEPTEMBER 1.
CLASSIFIED ADVERTISING RATES \$3.00 PER COLUMN INCH, MINIMUM CHARGE \$3.00.
MAKE CHECKS PAYABLE TO STOLP STARDUSTER CORPORATION. THANK YOU.

STARDUSTER ONE, 75 TT, Lycoming 0290G, 135hp, electrical system, great flying airplane. \$12,900. (314) 756-4502.

STARDUSTER TOO, 400 TTE/AF, 180 hp, CSP, rear sliding canopy, two fuel tanks, new annual, complete instrumentation F/R, escort 110, Nav lights, always hangered, creampuff, champion Oshkosh, asking \$28,500. Nights (405) 262-9338.

1978 STARDUSTER TOO, 180hp Lyc. , 550 hrs TT, 250 SMOH, Con radio w/txp./enc., Loran, intercom, (209) 665-7319. \$27,500.

WANTED: STARDUSTER TOO COWLING, also exhaust system for 0-470. Ed Hedlund, P.O. Box 445, South Haven, MI 49090. (616) 637-2302.

STOLP STARLET, HAPI VW conversion, 1800CC, 14 hrs TTAE, King NavCom, beautiful, \$34,000 invested, take \$17,000 trades. Call 1-906-774-5136.

ACRODUSTER, 840TT, O-360A4A, Christen inverted fuel and oil, Gell Cell, smoke, ICom radio, parachute, setup for competition aerobatics, \$18,500. Glenn or Neil, (405) 282-6792, FAX (405) 282-4250.

STARDUSTER TOO, 200 hp, inverted oil and fuel, featured in 9/95 Sport Aviation. Asking \$31,500. Brian, (602) 991-8700 days; (602) 502-1820 evening.

STARDUSTER TOO, 750TT, 400-SMOH on IO540 260 hp, inverted systems, fuel totalizer, C/S prop, Narco 810, lights, \$32K. (602) 554-4607.

STOLP STARLET PARTS, wing lift struts, cabanes, controls, tanks, center section, tail wires, gear with wheels, brakes, turtle deck, fuselage, empennage and wings damages. \$1900. (206) 431-9732.

STARDUSTER TOO. COMPLETE AIRFRAME less engine and prop. New gear and wing tank. Needs wiring, plumbing and fuselage fabric. \$11,000. Bob Redding, (406) 628-2367 eves.

STARDUSTER / SKYBOLT WANTED. O360, latest gear mod, clean, under \$30K, will also consider restoration project. Leave message, John, (707) 539-5816.

STARDUSTER TOO, WINGS ready for cover, fuselage needs formers, stringers, controls and has been test rigged, new SS wires, swing mount for W670, also Dynafocal mount. Asking \$10,500. (904) 546-3106.

ACRODUSTER TOO FUSE. on gear, wings, tail group ready for rigging. \$11,250. (404) 228-1918.

NEW STARDUSTER TOO, STUNNING metallic maroon and silver, IO-540, 0 SMOH, A&P built, professionally flight tested, full instrumentation, strobes, 6 channel CHT/EGT, christen inverted oil & fuel, King Nav-Com, mode C, intercom, quality construction, \$39,950. (619) 723-1731 or (619) 723-3923.

1981 STARDUSTER TOO, IO360 constant speed prop, full inverted, 480TT airframe, 480 SMOH engine, spring gear, always hangered, \$35,000. (910) 393-0326.

STARDUSTER TOO, BEAUTIFUL, 670TT, Cont. O-470R, 230hp, constant speed prop, June annual. \$29,900/offer. (970) 225-1119.

ACRODUSTER ONE PROJECT, wings, landing gear, wheels, brakes, nose bowl, wheel pants, fuselage materials, lots extras. (319) 392-4178, evenings.

CLEANING HANGER: Acroduster Too, welded fuselage and tail, fiberglass turtle deck, \$600. (803) 243-3032.

STARDUSTER TOO - 525 TTAF/SMOH, Lyc. O-360-A1A 180hp, Beautiful well built airplane, factory spring gear, Comm, Mode C Txpr, intercom/DC headsets, many extras - asking \$23,000. (707) 838-0261.

AS ALWAYS YOUR ORDERS WILL RECEIVE OUR PROMPT ATTENTION. QUALITY PRODUCTS AND WORKMANSHIP AT A COMPETITIVE PRICE.



CLASS

ADVERTISING CLASS DATES: DECEMBER 1-5, 1990
PLEASE ADVISE RATES TO OUTRIGGER
HOTEL CHECKS PAYABLE TO STOP STARDON

CLASS ONE 11/27-30/90
CLASS TWO 11/27-30/90
CLASS THREE 11/27-30/90

CLASS FOUR 11/27-30/90
CLASS FIVE 11/27-30/90
CLASS SIX 11/27-30/90

CLASS SEVEN 11/27-30/90
CLASS EIGHT 11/27-30/90
CLASS NINE 11/27-30/90

CLASS TEN 11/27-30/90
CLASS ELEVEN 11/27-30/90
CLASS TWELVE 11/27-30/90

CLASS THIRTEEN 11/27-30/90
CLASS FOURTEEN 11/27-30/90
CLASS FIFTEEN 11/27-30/90

CLASS SIXTEEN 11/27-30/90
CLASS SEVENTEEN 11/27-30/90
CLASS EIGHTEEN 11/27-30/90

CLASS NINETEEN 11/27-30/90
CLASS TWENTY 11/27-30/90
CLASS TWENTY ONE 11/27-30/90

CLASS TWENTY TWO 11/27-30/90
CLASS TWENTY THREE 11/27-30/90
CLASS TWENTY FOUR 11/27-30/90

CLASS TWENTY FIVE 11/27-30/90
CLASS TWENTY SIX 11/27-30/90
CLASS TWENTY SEVEN 11/27-30/90

CLASS TWENTY EIGHT 11/27-30/90
CLASS TWENTY NINE 11/27-30/90
CLASS THIRTY 11/27-30/90