



# WHEELER TECHNOLOGY INC.

## CUSTOMER NEWSLETTER



March 1992

Gig Harbor, Washington

### JIM WARNER'S N119NC

N119NC has now flown some 40 hours, and Jim is preparing to fly it to the April Sun 'N Fun Fly-in in Florida. Jim comments that his EXPRESS flies hands-off and handles superbly. Like N300EX, it does not exhibit any of the problems Mr. Betts reported.

Jim hasn't installed the pants and fairings yet, so he's getting about 156 knots TAS at 75% power, 7500 feet. Never-the-less, a Mooney flown by customer Russ Porterfield for in-flight photos, couldn't catch up to take the pictures. In fairness, the Mooney had four aboard, while Jim was solo, but Jim had to pull it way back for them to catch up and then stay even.

### OTHERS CLOSE TO COMPLETION

We've shipped 50+ tails so far, with many being installed, and several completed. Ed Bernard's plane is on its gear in a hangar, and others are close to that stage too. The tail is reported by all to be easy to assemble, but we've gotten constructive feedback on improving it too. Builder John Hobson of Alaska is pretty well finished with his, and has offered some good hints as well as finding time to write up a procedure on hinging the aft right seat. If you'd like a copy let us know.

### NEWSPAPERS, TESTING AND 1500 HOURS ON FOUR EXPRESS'

A recent article in the General Aviation News (March 1, 1992) misquoted Ken Wheeler, but it brought up an interesting point also. It stated that "Ken Wheeler points to the 220 hours logged in N300EX as proof that the EXPRESS is a safe airplane". While he does accept those hours as evidence of safety, he doesn't consider them proof of safety. Only testing proves safety, hours flown without failure tends to confirm it. From the inception of the design of the EXPRESS, we have relied only on extensive testing of both the structure and the flight characteristics of the EXPRESS to determine its safety.

But the comment does bring up the fact that the combined total time on four different EXPRESS aircraft is now over 1500 hours with no evidence whatsoever of any structural failure, weakness, flutter or any other design problem affecting its safety. Two of those planes have been built by customers following the same factory assembly instructions used in the construction of N210EX, and each of the four have been built by altogether different groups. While our confidence in the safety of the EXPRESS design comes from the testing we have done, 1500 hours in four different aircraft without any significant design problem in its handling or structure is reassuring.

### EXPANDING N300'S ENVELOPE

N300 now sports a new instrument panel, main gear leg fairings, and other refinements, but the main change is the **Lycoming IO-54Q 260 HP engine**.

This engine makes the EXPRESS faster, but there are other advantages too:

1. Outstanding high density altitude take-off performance at full gross weight.
2. This series of engines are generally considered to be Lycoming's most reliable.
3. The 235 hp version enables builders to use auto gas and still have outstanding performance.
4. This engine family is commonly available on the used engine market, and at this time, less expensive than the 200 hp Lycoming.
6. Although this engine gives the EXPRESS a substantial performance increase, it doesn't complicate the airplane, nor does it impair handling or manageability.
7. 260 HP offers the speed gain of retracted landing gear without the complication or expense.

### 260 HP PERFORMANCE

Because much work remains, it's too early to report final performance data, but the first 25 hours tells us the change is in the right direction. At 7500 feet and 22 X 2500, N300 indicates 171 kts for a true airspeed of 197 kts! The initial rate of climb is 1900 fpm, and continuing the climb at 87 kts, it goes through 10,000 feet at 1000 fpm! At 3000 feet and 25° we get 180 kts indicated. And she still stalls at 43 kts indicated. At 7500 feet and 55% power, true airspeed is about 180 kts, which with a fuel burn of 12 gph yields a range of nearly 1200 nautical miles with reserves. These figures are with full fuel (54 gal.) and a 180 pound pilot. The induction isn't right yet (no ram), and there are a number of cleanup details remaining, so we'll better all these numbers in the next few weeks, but needless to say, we're pleased so far. CHT and oil cooling is excellent.

This series of 540 cubic inch engines ranges from 235 hp to 260 hp and are relatively light weight. So far we have identified some 23 models that are appropriate for the EXPRESS, and we will publish that info when complete, along with a list of the changes required to make these engines work in the EXPRESS. The actual weight increase of N300EX from the IO-360 to the IO-540 was only 75 pounds, including the McCauley 3 blade propeller, so the useful load remains high at 1095 pounds! The CG moved forward, but remained well within the design CG envelope, which increases the amount of baggage weight possible in the aft compartment. We have added a trim tab, so there is now one on each elevator to maintain sufficient trim authority for the CG shift. The motor mount, exhaust system



and other parts necessary to install this engine in the EXPRESS will be made available shortly.

#### **BUT IT WON'T EVER DO 260 KNOTS**

While we want the EXPRESS to be reasonably fast, we're not trying for speed at all costs. Achieving higher speeds is not a mystery, but with airplane performance, you don't get something for nothing; that realm of top speed would necessarily sacrifice the easy flying, land-anywhere character of the EXPRESS and probably require recurrent training in order to stay proficient (as AOPA Pilot magazine recommended for the Lancair 4).

Wing loading is a great indicator of both top speed and low speed handling ease. A very high wing loading is typical of the super fast kit planes, but to find loadings that high in factory airplanes, you have to look to the twins. Consider the Cessna 402C, a popular 8 passenger commuter twin with a top speed of 235 knots and stall of 68 knots. Its wing loading of 30.3 makes it considerably more demanding to fly than the factory singles, all of which are below the low 20's, but then the 402 is flown by professional pilots.

To coax the EXPRESS to 260 knots we would need 300+ horsepower, a thin, high speed airfoil section, a smaller wing by some 25%, fowler flaps, and retractable gear. But an airplane like that would be expensive, complicated, hot over the numbers, and no longer a pussycat to fly. For most pilots, the added difficulty of building and maintaining an airplane that complicated isn't attractive, and the demands on the pilot of a "hot" airplane detract from the pleasure of flying. That's not what the EXPRESS is all about.

#### **GETTING THE BUGS OUT**

In this engine swap we encountered the usual assortment of bugs which slowed us down. However, one was very dangerous, so we want to alert everyone to its possibility and keep it a non-event.

The engine in N300EX was used, so after installing it, we went through the usual diagnostic checks and of course ran it several hours in various tests before ever flying it. After 23 flight hours on the engine it began to run rough, and we spent several days checking out all the possibilities. Finding two suspicious hydraulic valve lifters, we replaced them and prepared to fly again.

After a long taxi, long careful runup, and holding for arriving traffic (30 minutes of running), Larry pulled onto the runway for takeoff. Applying full throttle, N300EX accelerated well and then suddenly lost power. Converting the takeoff to a high-speed taxi, it seemed fine again. Back at the hangar, the idle seemed slightly rough. Puzzled, and unwilling to fly until we resolved the problem, we decided to again check the fuel system as the likely culprit.

We finally discovered that the mechanical fuel pump was partially blocked, and upon disassembly, found a 1/4" diameter X 3/4" long insect pupae partially plugging the pump exit. The only way it could have gotten there was

while the pump inlet was open to atmosphere, although the engine was delivered to us with the inlet taped closed.

It's surprising that the engine could operate for 23 hours without revealing the problem, but it did, and needless-to-say, the outcome could have been unpleasant. Bottom line: Operational checks such as measuring the fuel flow are inadequate with an engine which may have had an open fuel system downstream of the gascolator, even for a short time. It probably doesn't take a bug long to set up housekeeping in your fuel pump, so keep the inlet sealed if disconnected from the line. Critters can't get past the pump though, so its disassembly and a visual inspection makes sure that the inevitable bugs in your new airplane won't have legs.

#### **SUN 'N FUN**

N300EX will be at Lakeland and there will be a forum on the EXPRESS on Wednesday, April 8. This year our display is in Exhibit building D, booth #39, an indoor space. We have that space because in last year's turmoil we overlooked the application deadline. By the time we caught the oversight there were no more outdoor spaces available. Although we can't show everything our customers are used to seeing, at least our display won't flood or blow over, both of which happened last year (and each year before that, now that I think about it). Maybe we'll stay indoors.

#### **SUN 'N FUN DISCOUNT**

Through April 30th, we're offering a discount of \$250 on each of the first four kits ordered. Delivery time is dependant on our backlog at the time of order, which is now about a month.

#### **ONWARD**

This is a short newsletter, but the season is starting and we've got our hands full with builders and their airplanes instead of legal activities, a pleasant change. With Jim Warner's N119NC flying well, more airplanes soon to fly, a new surge of builder enthusiasm and the enhanced performance of N300EX, we're looking forward to the 1992 season.

#### **WHEELER TECHNOLOGY INC.**

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