

# INAV LTD. INK

SEPTEMBER/OCTOBER 1985

Dear Friends,

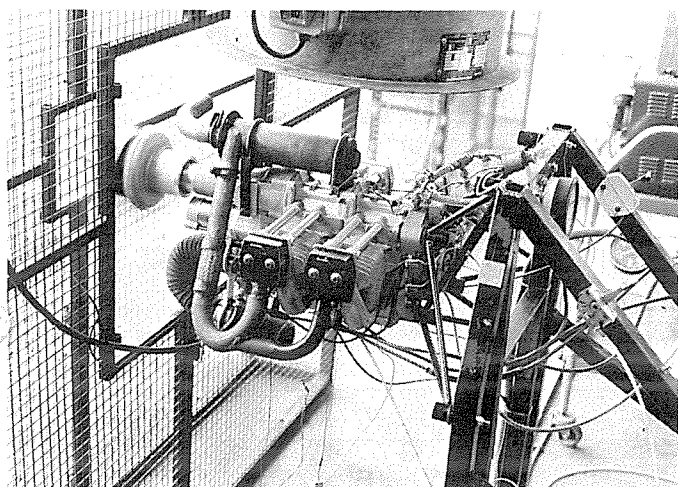
As Carol and Livia answer the phone thru-out the day, many times I hear a pause and a repeat of "INAV, Ltd" then an explanation ensues. . ." INAV, capitol I as in India, N as in Nov. . . . etc." And we thought Monnett Experimental Aircraft was a mouthful! Then follows the dialogue about how INAV has purchased the assets of MEA. Some people even hang up thinking they have the wrong number, only to call back a few minutes later. Obviously, not every one has heard about our big news which occurred on July 27th. But we know that all of you newsletter subscribers keep up with what's happening!

In that case you must know about the latest . . . John and I just returned home from a trip to London, England to visit our parent company, Aviation Composites, and the people involved with it's operation. John also visited the Lotus Factory in Norwich, England to see the plant and view the Magnum Engine progress. It was a marvelous trip and we thank Malcolm Lawrence, Pres. of INAV and Managing Director of Aviation Composites, for such a memorable time in his wonderful country.

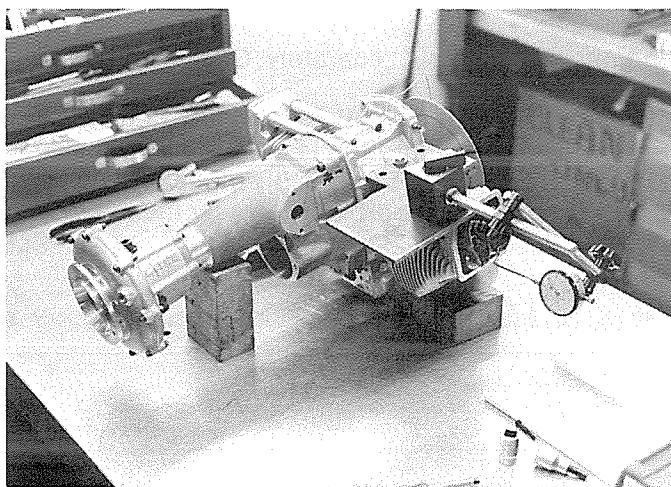
## Lotus Factory Visit

John, Malcolm, and Dave Gustafson of Communication Resources were given a complete tour of the Lotus Facilities by Martin Long, Commercial Director of Lotus Cars Limited. They saw everything from the engine assembly area, to the production line, to the test track.

Several models of Lotus cars going together were seen also, as well as automotive engine innovations. It was interesting to learn that Lotus is involved in consulting work with other manufacturers such as: Chrysler, Chevrolet, Ford and Toyota!



The Magnum Engine was of course their primary interest. They did see the progress being made on these aircraft engines which were designed by Lotus and have been under development for some time. The 4 cylinder engine seen here is running in a test cell with a wooden prop. All the wires and things you see coming out everywhere are sensing probes for it's various operation cycles.



Several more 2 cylinder and 4 cylinder engine were being assembled from production parts for further testing. This photo shows one of these 2 cylinder engines being put together.

All in all it was an enlightening tour. It was encouraging to see the Magnum test engines actually being assembled and running! Progress at Lotus seems to be in high gear. After cautious delays in production caused by a slumping untralight market, this is exciting to see. With the advent of INAV Ltd. in the USA, it is apparent Lotus is working hard towards engine production and deliveries in early 1986.

In this INAV INK, you will find a different format when you turn the page. I have left out the Sonera, Monera, and Moni builders columns but only for this issue. They will be back next month for the Nov./Dec. newsletter. Keep sending me your photos, notes, and thoughts all of you. This is still your newsletter! We do have much to share with you about Engines so I chose to devote several pages on both the Konig and the Magnum engines, I have also devoted a page to the General Builder's Workshop set for Jan. 18th, 1985.

# Engine

Monerai Konig Power Pod is HERE!! INAV is now accepting orders for a December delivery! Have a top-notch self-launching Monerai - order now! Cost is \$2450.00 complete.

Power Pod Kit includes:

- 3 cylinder Konig Engine
- Folding prop
- Exhaust System
- Molded fiberglass shroud
- All necessary hardware
- Welded fuel tank - 2 gallon
- Prewelded engine mounting posts

Performance to expect with your Konig Power Pod:

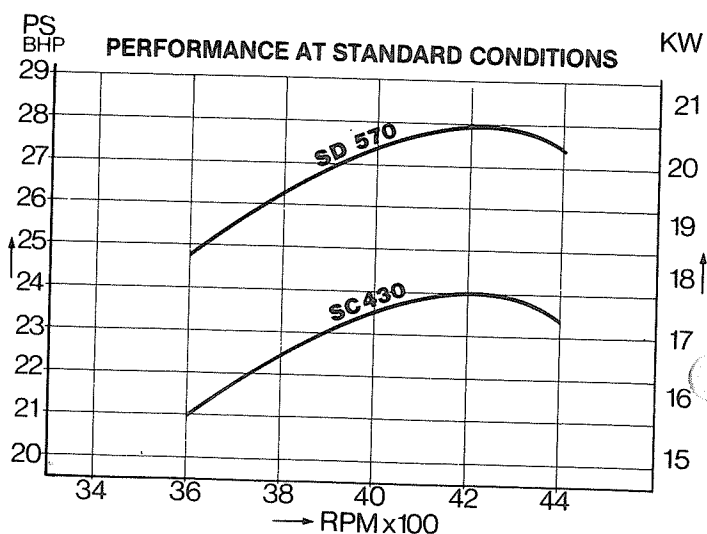
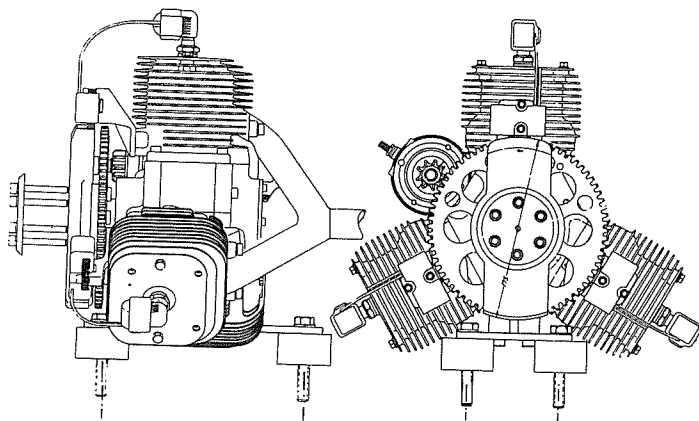
- 500 ft. per min. climb
- 300-400 ft. take off roll
- 26/1 - L/D with standard wing
- Less than 3 ft. per second sink rate
- Cruise at 65-70 mph.
- Endurance of 1 hr. at max. power

Engines are available separately. Call for a price.

The following information is taken from the Konig Engine brochure. Look it over! This excellent 2 cycle radial engine configuration is extremely light weight, smooth running, and produces maximum horsepower at a low 4200 rpm. Altho considerably higher priced than other 2 cycle engines of similiar horsepower, its advantages far outweigh the price differential over the more common "snow mobile" type engines.

## SPECIFICATIONS

<b>Type</b>	<b>3-cylinder</b>
Model:	SC 430
Bore:	66 mm
Stroke:	42 mm
Displacement:	430 cc
Carburetor:	22 mm concentric bowl
Brake HP/RPM:	24/4000-4200
Cylinder:	Aluminum, Nikasil plated
Connecting rod, bearings:	Needle, both ends
Main bearings:	3 ball bearings
Magneto ignition:	3 independent CDI systems
Lubrication:	Oil in Gasoline 1:33 (3%)
Starter:	12 Volt Electric starter
Reduction:	Powergrip belt, ratio 1,75:1
Weight with exhaust collector, Electric starter, Engine Mounts, carburetor, Fuel Pump:	16 kg
Fuel consumption:	approx. 0,5 liter per HP/hour



## THE DESIGN

The König 3 — and 4 — cylinder radial aircooled engines are designed just for one purpose: To motorize Ultralight Airplanes.

Unlike most other motors which power Ultralights, König radials have big piston displacement and operate at full throttle in the low range between 3600 and 4400 Rpm, which is the reason for their quietness and reliability. Their 3 or 4 cylinders fire alternatively resulting in extraordinary smoothness of torque. The radial positioning of the Nikasil plated Mahle cylinders allows superb air-cooling without the need for energy wasting cooling fans, regardless of whether the motors are installed as tractors or pushers.

The pointless magneto ignition consists of three or four independently working capacitor discharge modules and transformers, which keep the motors running even if two systems fail.

For easy instant starting all König radials are equipped with 0,4 HP electric starter motors. A 12 V, 14 Ah motorcycle battery is required, having sufficient capacity for more than 50 starts without recharging.

All cylinders breathe their fuel-air charge through a single concentric bowl carburetor, eliminating difficult synchronisation and adjustment work. Intake cycles overlap, providing a steady and quiet intake flow. The power boosting patented rotary intake valve, turning with crankshaft speed, distributes fuel-air mixture equally to all cylinders, resulting in high power and low fuel consumption. Each cylinder has its own separate crankcase chamber, interdivided by the crankshaft's sealing discs.

The one-piece chrome-nickelsteel crankshafts are case-hardened and precision ground all over. There are three main ball bearings on the crankshaft, which also bear the load of a tractor or pusher propeller. The drop forged hardened and ground connecting rods have split big ends, and needle bearings in both ends.

The Mahle pistons are forged aluminum for ultimate strenght and lightness.

All motors are equipped with factory tuned, complete exhaust silencer systems for best fuel economy and power.

As the motors develop high power at low RPM because of their relatively high piston displacement, propellers up to 1,10 m diameter can be driven directly from the crankshaft, ensuring good efficiency.

For highest thrust combined with lowest possible propeller noise, the König radials are available with a Dented Belt reduction system, suitable for big propellers, up to 1,35 m diameter.

The Dented Belt drive is ideally suitable for the smooth torque of alternativ firing multi-cylinder engines. It does not slip and does not heat up. Unlike V-belts, Dented Belts need very little tension. This results in a low bearing load. The absence of slippage eliminates power consuming friction and wear.

## PROPELLERS FOR DIRECT DRIVE

For direct crankshaft drive, fixed pitch laminated hardwood propellers of highest quality are available. These propellers have 1,07 m diameter and 0,46 m pitch.

They are suitable for König 3 — and 4 — cylinder radials without reduction, fitted to Ultralight planes with max. speed up to 85 km/h.

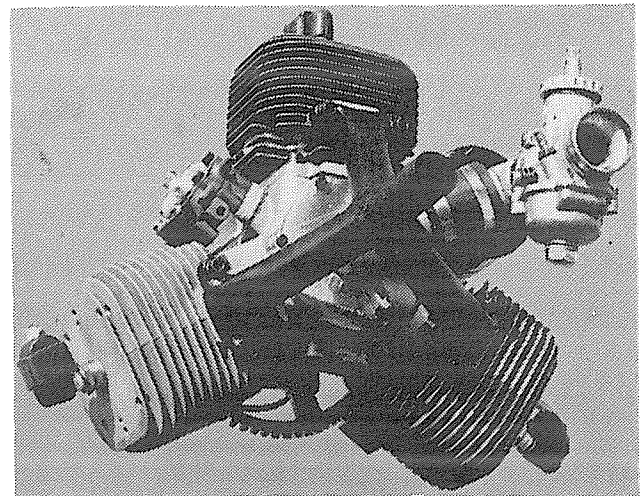
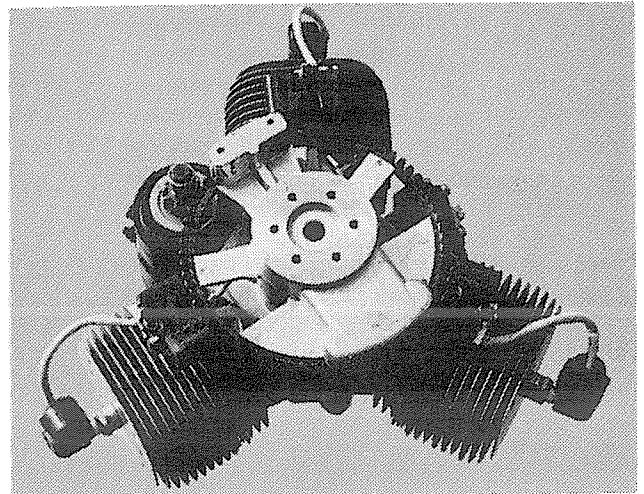
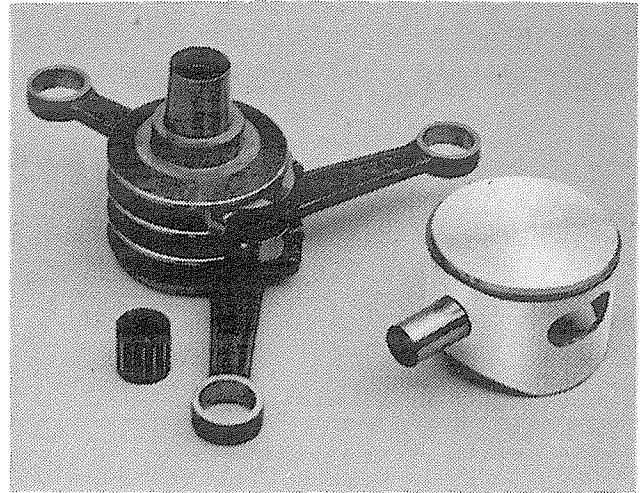
For special applications, direct driven, pitch adjustable 2 — and 3 — blade propellers can be delivered.

## PROPELLERS FOR REDUCTION

These propellers have 2 — or 3 — pitch adjustable 1,3 m diameter laminated hardwood blades. The blades are held in aluminum clamping hubs, which can be bolted directly to the driven belt pulley. The blades have marks for simple and accurate pitch adjustment. These propellers are adjustable for slow or fast flying speeds and represent the most modern and sophisticated design in ultralight propellers.

## Standard Equipment:

Exhaust System with Silencer · Motor Driven Fuel Pump · Hand Pump  
Electric Starter · Starter Cable · Rubber Engine Mounts · Throttle Cable  
Fuel Lines · Carburetor · Stop Cable with Switch · Instructions



**Small in Weight, Great in  
Thrust and Quietness**

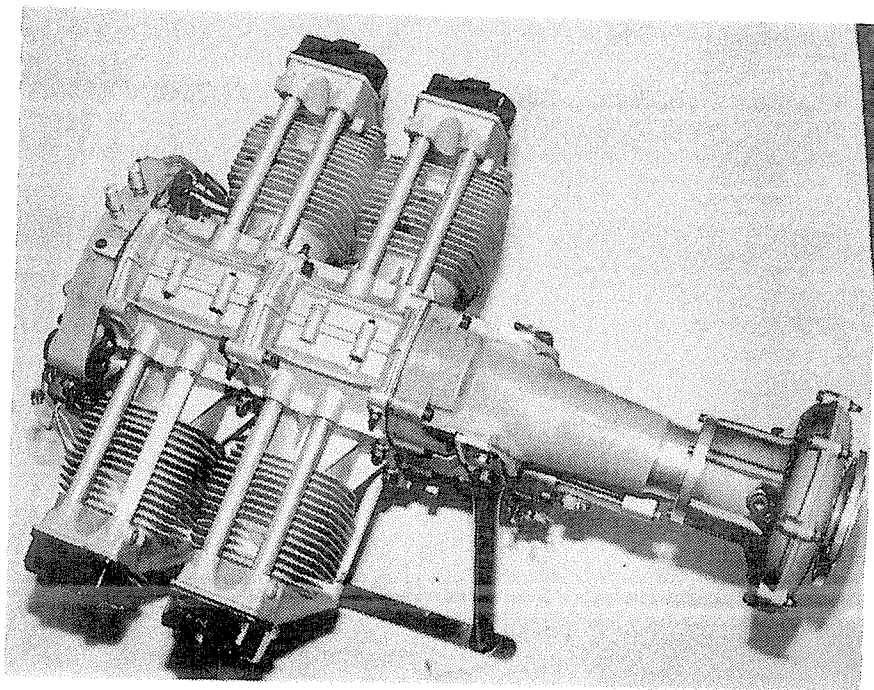
**König**

**Ultralight Aero-Engines**

# Introducing the Magnum 4-50 and 2-25!!

The need for a low-cost, lightweight, and reliable aircraft engine for the new generation of efficient, recreational aircraft has been answered!

Designed and developed by Lotus of England, these engines are "purpose built" for the new wave of light aircraft. The two and four cylinder, four stroke, configurations offer versatility to meet a wide range of application requirements. Their modular construction, horizontally opposed cylinders, and displacement assures ample breathing and cooling for low fuel consumption and excellent durability. The built in 2:1 reduction, with anti-vibration dampener, allows larger diameter propellers for maximum drive efficiency. The Magnum Engines will become the standard of performance for the future of the light aircraft industry!



## Technical Data

### Configuration

An aluminum alloy, horizontally opposed, four stroke engine with the propeller drive taken from the camshaft.

### Lubrication

Pump distribution from a wet sump.

### Cooling

Air

### Aspiration

Normal, carburetted

### Propeller Shaft Rotation

Counter-clockwise when viewed from the front.

### Drive Ratio

2:1 reduction with built in anti-vibration dampener.

### Valve Mechanism

Overhead valves, two per cylinder, operated by rockers and pushrods from the central camshaft.

### Fuel & Metering System

Automotive fuel through a single fixed choke Dellorto Carburetor. Provision is made for a mechanical fuel pump.

### Induction System

Manifold thru the crankcase for anti-icing.

### Ignition System

Single spark plug using capacitive discharge magneto system. (Provision has been provided in the cylinder head for a dual spark plug and ignition system.)

### Electrical System

Alternator 12 volt 12 amp with regulator

### Starter System

Electric, geared with sprag clutch engagement

### Time between Major Overhaul

500 hours

### Service Interval

50 hours

### Standard Engine includes:

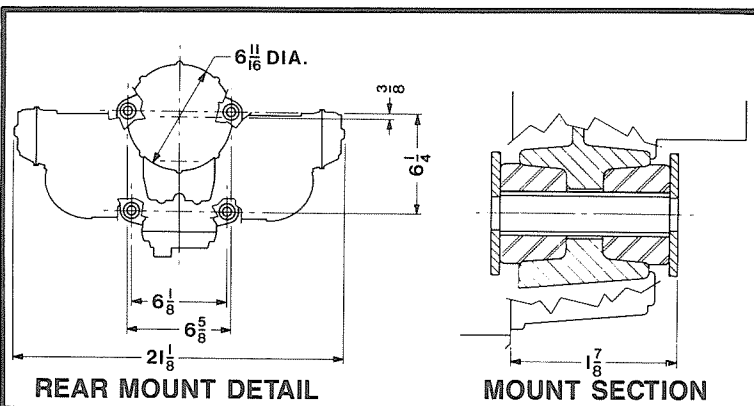
Intake manifold, ignition system, internal reduction drive, extended output shaft with vibration dampener, electric starter, alternator.

### Optional Equipment:

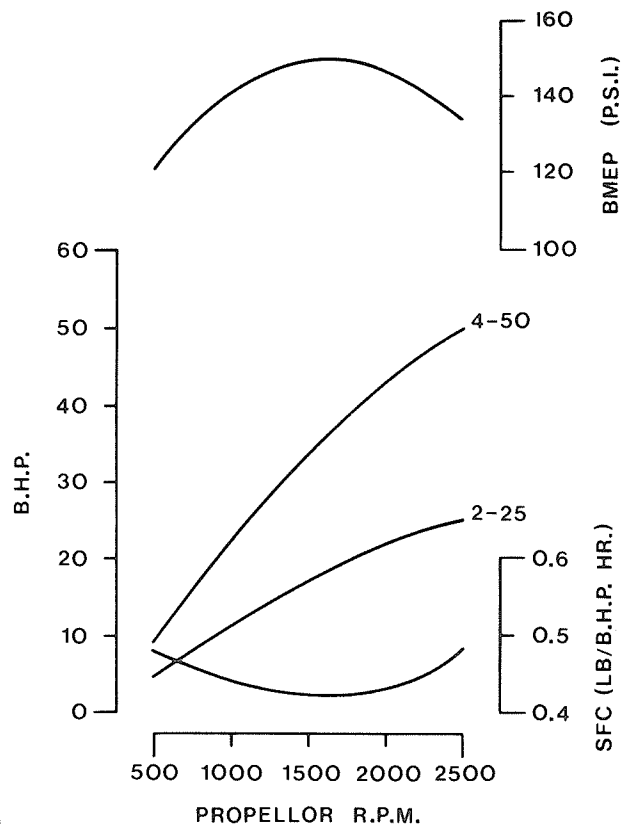
Exhaust/muffler system, dual ignition system

# specifications

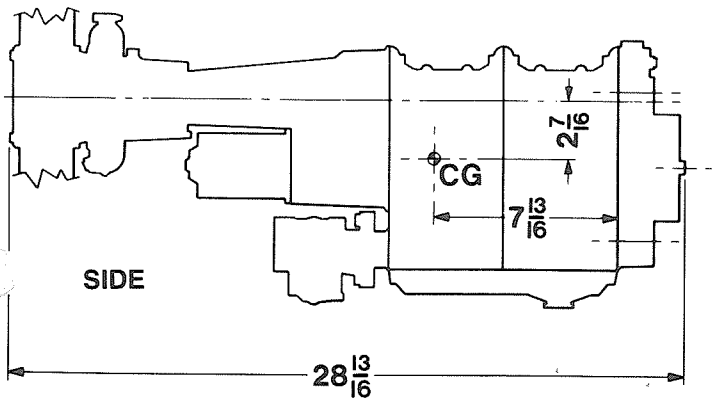
	4-50	2-25
Number of Cylinders	2	2
Cycle	4	4
Bore	72.0 mm	72.0 mm
Stroke	59.0 mm	59.0 mm
Displacement	960 cc	480 cc
Weight	42.7 kg. / 94 lbs.	30.1 kg. / 66 lbs.
Power at 2500 rpm (output at shaft speed)	50 bhp	25 bhp
Fuel Consumption ( @ 75% )	2.6 gal. / hr.	1.3 gal. / hr.



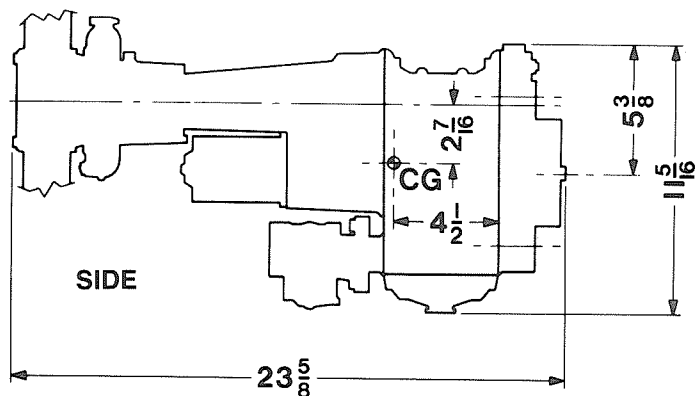
## MAGNUM PERFORMANCE



4-50  
TOP



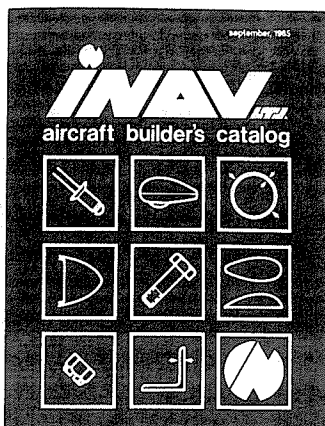
2-25  
TOP





## New Brochures Ready

At last our INAV Ltd. info pack is ready! It includes a color mini-brochure, an Aircraft Kit booklet, and an Aircraft Builder's Catalog. Cost for the complete pack is \$8.00 US, \$10.00 foreign. The Builder's Catalog is available separately for those only wanting this supply catalog of tubing, hardware, etc. Cost is \$3.00. A new mini-brochure on the Magnum Engines is just about ready. It is at the printer's now and will be included in the info pack soon. If you would like a copy of this info just let us know.



## New Hardware Digest

We have recently stocked a new book called the AirMart Hardware Digest by T. Creations of Broomfield, CO. It is a complete handbook of all aviation hardware including specs and part numbers. An excellent resource for your workshop. 125 pages. Sells for \$4.95.

## General Homebuilt Aircraft Workshop

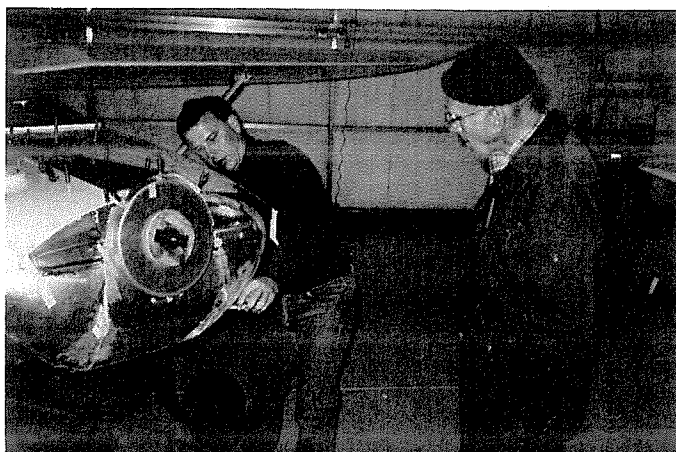
INAV is holding its first workshop on Saturday, January 18, 1986! This will be an all day workshop with lunch provided at the shop. The emphasis of this workshop will be on tools and skills needed to build one of our designs: Sonerai, Monerai, or Moni. But anyone interested in homebuilding skills could benefit. The day will include: demonstrations and slide presentations; discussions on metal working techniques, fiberglass repair, plastics, dope and fabric, welding, engines; question and answer times. Are you building one of our airplanes? Have a friend who wants to find out what homebuilding is all about? Come to the workshop and bring them along!! Fee is \$25.00 per person, \$35.00 family rate (spouse or child) this includes your lunch. We have a list of motels, restaurants, places of interest, shopping areas, things to do in Oshkosh which we will send upon request. Do try to register ahead of time so we have an accurate count for lunch. Call or send in the form here and plan on a profitable, educational day!!

## Special Projects

There are some "special projects" happening around the shop these days. One has been a non-aircraft defense related job we were asked to bid on because someone knew of INAV's experience in design and metal work thru his interest in EAA and air-

planes. We were awarded the contract and have had the shop in a flurry since the Fly-In on this "tight deadline" project. INAV and Aviation Composites are able to do design consulting, prototyping, and manufacturing in many areas. Expertise in metal working, plastics, welding, composite structures, design, and problem solving are available. A brochure about INAV and its consulting capabilities will be ready soon. If your company has special "problem projects", we may be of help!

Another special project is working with Steve Wittman on the cowling for his newest airplane. Steve calls it the "BIG O & O". He is building this 230 h.p. tailwind to fly back and forth between Oshkosh and Ocala, FL - his winter home. Wanting to leave soon . . . before the snow flies . . . this is his priority project! How could anyone resist taking photos of such an historic event as Steve and John working together elbow to elbow? Here they are in these photos working diligently one evening in our hangar showroom at INAV. Think they are also enjoying every minute of it!!

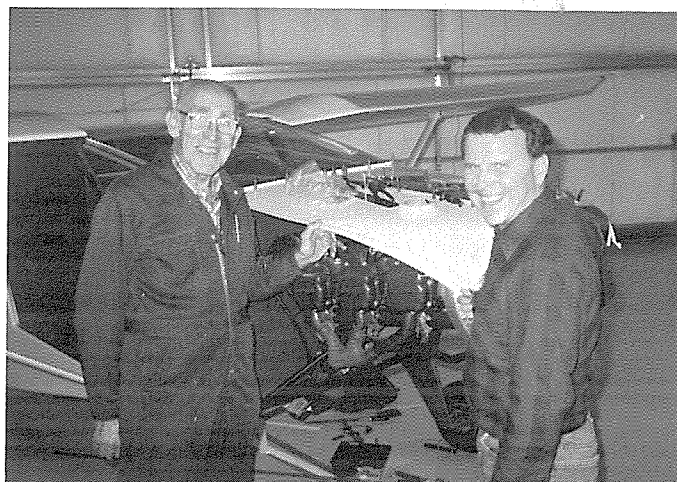
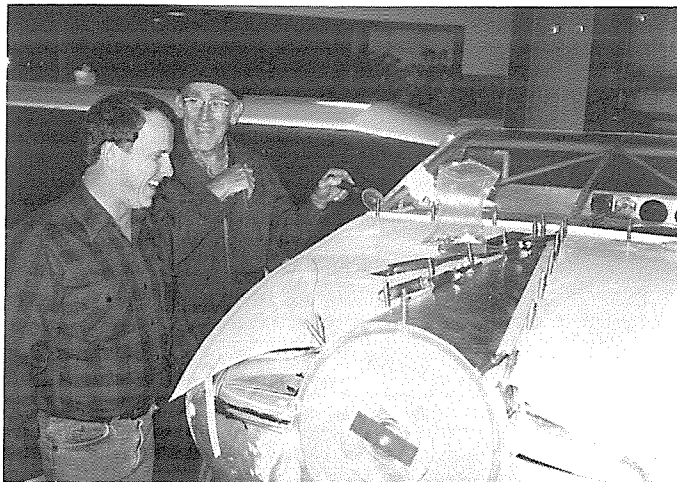


What a wonderful Aviation Great and friend. We have gotten to know both Dorothy and Steve and they are wonderful people. They have so many terrific stories to tell it always makes you wish you could take out a notepad and write it all down. Definitely one of the pluses of moving to Oshkosh was getting to know the Wittmans!!

Cherrio!!!

That's all for this month from Betti.  
(as my English friends would say)

*Betty Monnett*



## INAV Homebuilt Aircraft Workshop

**Date:** Saturday, January 18, 1986  
**Location:** INAV, Ltd.  
 895 W. 20th Avenue  
 Oshkosh, WI 54901  
**Time:** 9:00 a.m. - 3:30 p.m. (Registration begins at 8:00 a.m.)  
**Fee:** \$25.00 per person, special family rate \$35.00 (spouse, child)  
 Includes coffee and rolls, and lunch

Please register in advance by phone or mail. Check, Visa or Mastercard accepted. If you are planning on purchasing parts and supplies, please place your order by Friday, January 17, 1986. INAV is located on Wittman Field and you are welcome to fly in and taxi up to the building.

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PLEASE PRINT

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

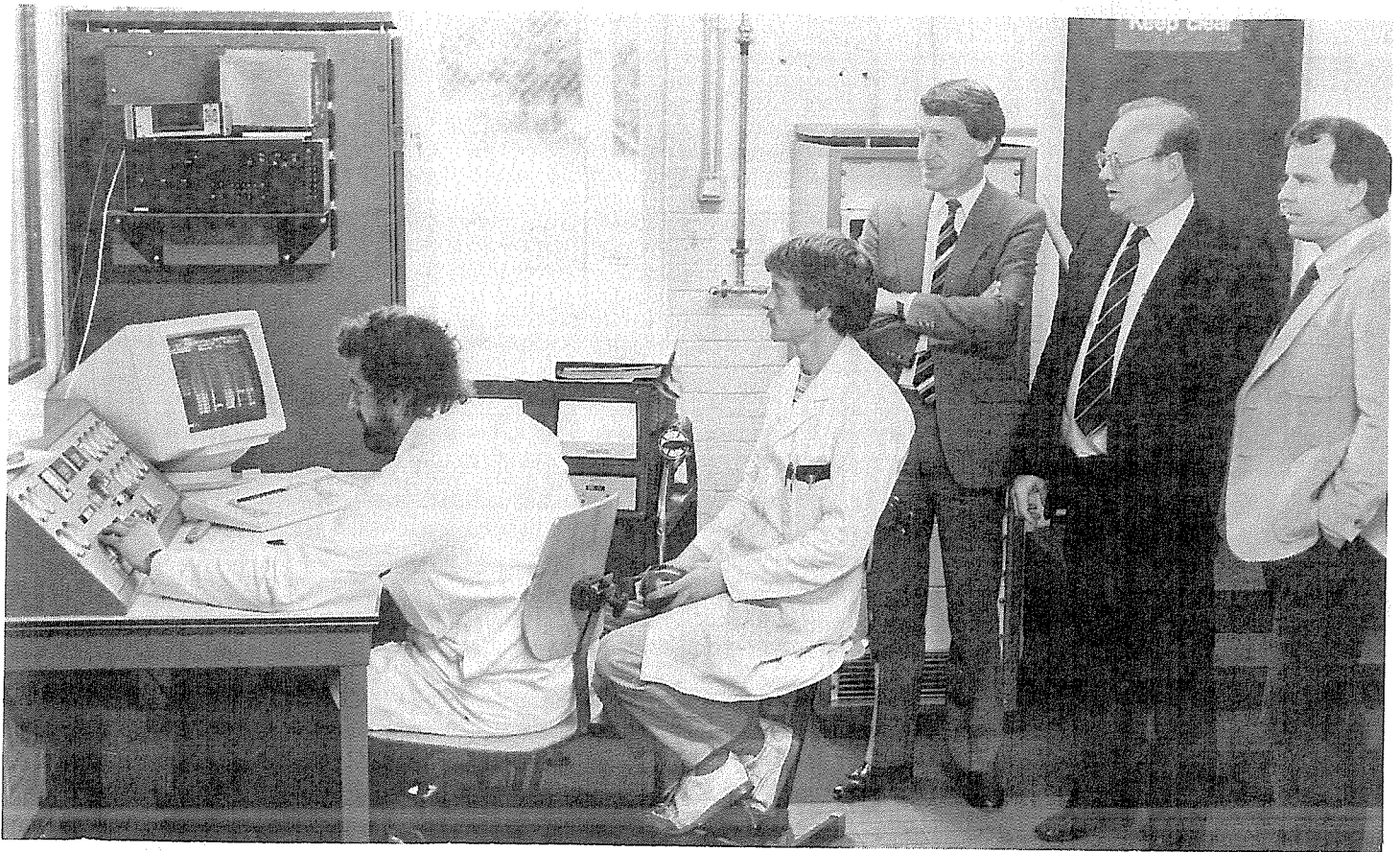
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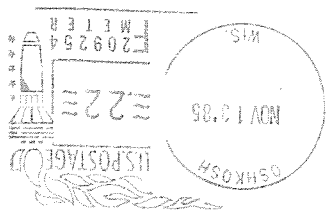
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\_\_\_\_\_ Check Enclosed MC/VISA# \_\_\_\_\_ Expires \_\_\_\_\_

Please send me info on motels, restaurants, etc. ☐



Martin Long showing Malcolm Lawrence & John Monnett technicians viewing a "Dyno test" on an engine at the Lotus Factory in Norwich, England.



**INDV**  
P.O. Box 2984  
Oshkosh, WI 54903