NAVIONS

GENTLE GIANT

Big, rugged and forgiving, the Navion may fly on forever.

BY MARK M. LACAGNINA

It does not take much effort to become enamored with the Navion. The big airplane grows on you, slowly and inevitably, like an oak tree.

The Navion is imposing. On the ground, the airplane towers above its ramp-mates on gear that appears to have been designed for a carrier-based fighter. The resemblance to a military airplane is no fluke. The Navion was designed by the same people who unleashed the P-51 Mustang.

But it is only a passing resemblance. In the air, the Navion is a gentle giant—comfortable, stable and surprisingly docile. The airplane's good flying manners are a matter of choice, not chance. Edger Schmuedt, who headed the design team, said he wanted his airplane to be safe in the hands of a 50-hour private pilot.

Any pilot with experience in high-performance singles should have very little difficulty transitioning to a Navion. But get the name right, it's pronounced *nay-vee-on*.

Probably the biggest challenge in flying the airplane is climbing into the cockpit. On early models, the boarding step is in front of the left wing root. Scrambling up to the wing-walk is the first task. The next is to find a way to lower yourself over the canopy tracks without ruining the upholstery. Many Navions have been modified with a flap boarding step. It does keep people away from the propeller but does little to help them avoid playing mountain climber.

The cabin is about the size of a 1947 Plymouth. It is big and roomy. The pilot has a commanding view of the ramp. There are about seven feet between the asphalt and the top of the

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airplane's canopy. Visibility is good, despite a proliferation of window posts. The downward-sloping nose suggests that the Navion originally was intended to be a taildragger.

The Navion is not as fast or as fuel-efficient as airplanes with similar power ratings, such as the Beech Bonanza and the Piper Comanche. Navion owners do not seem to care. What is important to them is the downright ruggedness of their airplanes. The Navion's wing and fuselage skins are nearly twice as thick as those on other airplanes. Many components, including the landing gear, were designed to military specifications. Indeed, about 250 Navions saw military service as L-17s.

Some owners go so far as to claim that the Navion has not experienced an in-flight airframe failure. Unfortunately, this is not true. A special study conducted by the National Transportation Safety Board indicates that from 1972 through 1976, five Navions crashed after in-flight airframe failures. However, the study does not explain *why* these failures occurred. Any aircraft can be overstressed if it is flown beyond its design limitations. The rugged Navion is no exception.

What the airplane lacks in speed, it more than makes up for in takeoff and landing performance. Specifications published by the first two manufacturers, North American Aviation and Ryan Aeronautical Corporation, claim the Navion needs only about 1,500 feet to take off or land over a 50-foot obstacle under standard conditions. Owners say this may have exaggerated the airplane's short takeoff and landing capability—but not much. (For more on the Navion's past and possible future, see "The Past Through Tomorrow," p. 79.)

A would-be Navion owner would be wise to get a thorough check-out on the airplane's idiosyncracies by an experienced Navion pilot. The engine starter, for instance, is located on the firewall and is activated by foot. North American and Ryan Navions have variable-pitch propellers, which means the pilot must adjust the prop control whenever attitude or throttle position is changed.

The airplane is maneuvered on the ground with a steerable nosewheel and a hand brake. The ailerons and rudder

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are interconnected, and the pilot can make minor heading changes and shallow, coordinated turns by nudging either the yoke or a rudder pedal.

Each wing contains a 20-gallon, aluminum alloy fuel tank. The fuel is gravity-fed into a small accumulator tank beneath the cabin floor. A fuel shut-off lever is located on the right side of the instrument panel. Some Navions have an auxiliary, 20-gallon fuel tank beneath the rear seat or in the baggage compartment.

The landing gear and flaps are hydraulically actuated. The pilot activates the engine-driven hydraulic pump before takeoff and landing by pulling a control lever located below the throttle. Should the pump fail, the pilot can raise or lower the flaps and retract the landing gear by pumping a large handle located below the middle of the panel. A separate lever releases the landing gear uplocks, causing the gear to free-fall and to be forced by air loads into the down-and-locked position.

North American and Ryan built about 2,300 Navions. Various companies later produced about 200 canopyless Rangemasters. About 2,000 of these airplanes are still flying. Due to a plethora of modifications that have been developed for the airplanes, it would be hard to find two Navions that are exactly alike.

Most of the airplanes built by North American and Ryan rolled off the assembly lines with 185-hp engines. Ryan also built about 320 Navions with 260-hp engines. Many of these have been converted with engines ranging in horsepower from 225 to 285. There also is a turbosupercharged, 260-hp engine conversion.

When owners began to hang bigger engines on their airplanes in the early 1950s, they ran into a problem. The Navion originally was designed to

Navion roominess and size are clear in the 1948 Ryan A of Dr. Gary Elder, AOPA 429510; the sliding canopy is original equipment, but Elder has added an avionics-oriented panel.

cruise at about 105 knots. Faster cruise speeds required pilots to use an inordinate amount of nosedown trim to keep their airplanes straight and level. To correct the problem, the angle of incidence of the horizontal stabilizer was increased by three degrees. The modification is called the Palo Alto tail, and most Navions now have it. (The Rangemaster never had this problem, the angle of incidence of the wing was changed before production.)

Originally, the Navion's windows were held in place by rubber moldings, which were unsightly and contributed to parasitic drag. They have been replaced on most airplanes with flush windows or with bubble canopies that have one-piece windshields and side windows.

Brittain and Fletcher wing-tip fuel tanks have been installed on a large number of Navions. The auxiliary tanks add either 40 or 68 gallons to the airplane's fuel supply.

Other modifications include retractable boarding steps, wing fairings, downdraft engine-cooling systems, toe brakes and wheel-well doors.

And, of course, there are the twins. Riley Aircraft was the first company to develop and certify a multi-engine conversion of the Navion. A Riley twin has either 150- or 160-hp Lycoming engines. Later, Texas Engineering and Manufacturing Company (Temco) began installing 165-hp Lycomings on the Navion's wings. Today, about 125 Riley-Temco twins are flying. In addition, Cameron Iron Works converted about 25 Navions into twins with 240- or 260-hp engines.

Navion owners are quick to dismiss any suggestion that the airplane is a maintenance nightmare. They contend that it costs no more to maintain a Navion than any other vintage high-performance single. The trick is to find a mechanic who knows the airplane, so that you do not end up paying for on-the-job training. Many owners do their own work under the supervision of authorized inspectors.

So far, the Navion has accumulated a total of 81 airworthiness directives. Nineteen directives have targeted propellers and prop-governing systems. The first propeller-related AD was issued in 1947 and required the diameter of Hartzell props to be reduced from 86 inches to 84 inches. Work mandated by other propeller ADs ranges from adding a friction lock on the control lever to inspecting the propeller blades for nicks and cracks.

Major airworthiness directives include: AD 47-21-9, which required modification of the hydraulic system; AD 52-26-1, inspection of stabilizer-to-fuselage attachments every 100 hours until the spar web gussets are replaced; AD 56-3-3, inspection of wing-spar fittings for cracks; AD 64-4-5, inspection for loose rivets in the outboard wing panels; AD 68-20-6, inspection for cracks and corrosion in the rudder horn during each annual inspection; and AD 77-13-22, inspections every 100 hours for cracks in the crankcase of Continental IO-520-B engines until the crankcase is replaced.

At this writing, the last airworthiness directive issued on the Navion was AD 82-13-1, requiring replacement of certain Bendix magnetos.

Anyone considering the purchase of a Navion should check the airplane's logbooks carefully to ensure compliance with all applicable ADs.

One of the best things going for any Navion owner or enthusiast is the American Navion Society. The Navion society was formed in 1960 by S. Dan Brodie, AOPA 169734, president of Multitech International Corporation, and is one of the largest and probably the most helpful organization of its type.

Every new member receives a "Navion Data" binder. It contains a comprehensive collection of service bulletins, operating tips, specifications, supplemental type certificates and airworthiness directives.

The society also publishes a monthly newsletter that usually contains a wealth of tips on operation and maintenance. The society also has a large inventory of spare parts that can be purchased by its members. If the society does not have a part in stock, it will tell you who does.

Social events include regular regional fly-ins and an annual national convention. This year's convention was held in Horseshoe Bend, Arkansas from June 27 through July 3. The event attracted nearly 90 Navions from all parts of the country.

More information can be obtained by contacting the American Navion Society, Post Office Box 1175, Municipal Airport, Banning, California 92220; 714/849-2213.

If you have longed for a military airplane with a peaceful temperament, check out the Navion. These airplanes were built for keeps and may fly on forever. □

"The Past Through Tomorrow" overleaf

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Riley Aircraft certificated the first Navion twins, with 150/160-hp Lycomings. Temco and Cameron Iron Works also do twin conversions now. About 125 are flying.

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Owned by Lee Woods, AOPA 45909, the Rangemaster G at left adds H-model mods such as a 285-hp engine and one-piece windshield to the turtledeck; it also has the fifth seat that marked the G model's arrival in 1961.

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next five years, the company developed and obtained certification for three Navion conversions. Each included 34-gallon wing-tip fuel tanks, a flap boarding step, flush-riveted wing leading edges and a new panel layout; the conversions differed in their powerplant installations.

Fifteen Navions were converted by Tusco into D models, with 240-hp Continental O-470-P engines. Three others became E models with the installation of 250-hp, fuel-injected Continental IO-470-Cs. Twelve Navions (including two of the three E models) were updated to F models with 260-hp Continental IO-470-H engines.

In the late 1950s, Tusco decided to design and build a new Navion. The project was directed by Leonard Childs, who had designed the Camair twin Navion conversion. Childs developed the Navion Rangemaster G. The Navion's familiar sliding canopy gave way to a turtledeck and a cabin door, and a fifth seat was added. The Rangemaster is equipped with the F model's 260-hp Continental and has a standard fuel capacity of 108 gallons.

Tusco renamed its Galveston facility the Navion Aircraft Company and began production of the Rangemaster in 1961. But only about 50 airplanes were built before the factory was decimated that year by Hurricane Carla.

With the aid of a $1.2 million disaster loan from the Small Business Administration, Tusco moved the Navion Aircraft Company from Galveston to Harlingen, Texas.

In 1962, the company introduced the Rangemaster G-1, which featured an increase in gross weight from 3,150 pounds to 3,315 pounds. The Harlingen factory built about 90 Rangemasters before Tusco went bankrupt in 1964 and the Navion Aircraft Company had to close its doors.

The next year, the assets of the company were acquired by members of the American Navion Society. They formed the Navion Aircraft Corporation and moved the production facilities from Harlingen to Seguin, Texas.

The corporation introduced the Rangemaster H, powered by a 285-hp Continental IO-520-B engine, in 1967 and built about 50 airplanes before going out of business in 1970.

The assets then were acquired by Neil Nelson, president of Janox Corporation in Columbus, Ohio. Janox planned to move the Navion factory from Seguin to Coshocton, Ohio. Some Navion owners claim these plans merely were a smoke screen and that the company never intended its Janox Division to be anything more than a tax write-off.

Ownership was transferred to Cedric Kotowicz in 1972. Kotowicz moved the production facility from Seguin to Wharton, Texas, and renamed it the Navion Rangemaster Aircraft Corporation. The company built about six Rangemasters before going bankrupt in 1976. The airplanes were H models with three-blade propellers, one-piece windshields and extensive flush riveting.

The assets of Navion Rangemaster Aircraft Corporation were sold at auction to James Thompson of Alexandria, Louisiana. Thompson was in partnership with a group of Korean businessmen who planned to resume production of the Navion in Korea.

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	Navion NA-4/A	Navion B	Rangemaster G
Price new	$6,100 to $8,000	$14,900	$22,000 to $26,000
Current market value	$7,000 to $20,000	$10,000 to $30,000	$15,000 to $40,000
Specifications			
Powerplant	Continental E-185 185 hp @ 2,300 rpm, 204 hp @ 2,600 rpm (takeoff)	Lycoming GO-435-C2 240 hp @ 3,000 rpm, 260 hp @ 3,400 rpm (takeoff)	Continental IO-470-H 260 hp @ 2,625 rpm
Recommended TBO	1,500 hr	1,200 hr	1,200 hr
Propeller	Koppers or Hartzell variable pitch, 2 blade	Koppers or Hartzell variable pitch, 2 blade	McCauley constant speed, 2 blade
Wingspan	33 ft 4.6 in	33 ft 4.6 in	34 ft 9 in
Length	27 ft 3 in	27 ft 3 in	27 ft 6 in
Height	8 ft 6.3 in	8 ft 6.3 in	8 ft 6 in
Wing area	184 sq ft	184 sq ft	184.4 sq ft
Wing loading	14.9 lb/sq ft	15.5 lb/sq ft	17.1 lb/sq ft
Power loading	14.9 lb/hp	11.9 lb/hp	12.1 lb/hp
Seats	4	4	5
Gross weight	2,750 lb	2,850 lb	3,150 lb
Empty weight	1,700 lb	1,950 lb	1,950 lb
Useful load	1,050 lb	900 lb	1,200 lb
Payload w/std fuel	810 lb	660 lb	552 lb
Fuel capacity, std	240 lb/40 gal	240 lb/40 gal	648 lb/108 gal
Fuel capacity, opt	360 lb/60 gal	360 lb/60 gal	—
Oil capacity	10 qt	12 qt	12 qt
Baggage capacity	160 lb	160 lb	180 lb
Performance			
Takeoff distance (ground roll)	670 ft	1,030 ft	785 ft
Takeoff distance (over 50-ft obst)	1,500 ft	1,400 ft	980 ft
Rate of climb (sea level)	750 fpm	1,110 fpm	1,250 fpm
Cruise speed/Range (fuel consumption) @ 70% power, 7,500 ft	128 kt/440 nm (61.8 pph/10.3 gph)	140 kt/400 nm (79.8 pph/13.3 gph)	145 kt/1,110 nm (82.8 pph/13.8 gph)
Service ceiling	15,600 ft	16,600 ft	20,500 ft
Landing distance (ground roll)	500 ft	980 ft	425 ft
Landing distance (over 50-ft obst)	1,300 ft	1,690 ft	980 ft
Limiting and Recommended Airspeeds			
Vx (Best angle of climb)	65 KIAS	65 KIAS	N/A
Vy (Best rate of climb)	83 KIAS	87 KIAS	91 KIAS
Vno (Max structural cruising)	139 KIAS	147 KIAS	147 KIAS
Vne (Never exceed)	165 KIAS	165 KIAS	172 KIAS
Vs1 (Stall clean)	65 KIAS	65 KIAS	65 KIAS
Vso (Stall in landing configuration)	52 KIAS	52 KIAS	52 KIAS
Vfe (Max flap extended)	87 KIAS	87 KIAS	94 KIAS
Vle (Max gear extended)	87 KIAS	87 KIAS	113 KIAS
Va (Design maneuvering)	108 KIAS	108 KIAS	117 KIAS

All specifications are based on manufacturers' calculations. All performance figures are based on standard day, standard atmosphere, at sea level and gross weight, unless otherwise noted. N/A, not available.

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These plans never progressed because of political turmoil in that country.

Approximately two years ago, the type and production certificates, as well as a large inventory of spare parts, were purchased by Charles G. Klingler, owner of an architectural and construction company in Redondo Beach, California.

Klingler sells spare parts to the American Navion Society for distribution, and he plans to apply for supplemental type certificates for two new conversions: the J and the K models.

The Rangemaster J will have a 350-hp Lycoming TIO-540-J2BD engine and an extended cabin to accommodate six seats. The airplane will have no wing-tip fuel tanks—internal wing tanks will hold either 94 gallons, standard, or 145 gallons, optional.

The Navion K also will have a 350-hp Lycoming and six seats; but this conversion will offer a bit of nostalgia: a sliding canopy.

Von Miller, Klingler's chief engineer, said prototypes of both airplanes are about 75-percent complete. Miller, who designed and is building the prototypes in Compton, California, knows his subject well. He was a Navion project engineer for North American in the late 1940s.

A third airplane is under construction in Miller's shop. This one is a Navion with a sliding canopy and two seats in tandem configuration. The airplane soon will be fitted with a Pratt & Whitney PT-6 turboprop engine and will serve as a prototype for a new military trainer.

Klingler currently is organizing Diamond Aero Enterprises, Incorporated, and plans to establish the company in Arkansas. He said the company initially will be involved in the production of spare parts for Navions. Conversion of existing airplanes into J and K models will begin as soon as the STCs are obtained.

Klingler also plans to add the Rangemaster J and the Navion K to existing type certificates. However, he expressed doubts as to whether his company eventually will produce new airplanes from scratch. "That decision, of course, is ahead of us," he said. "We are going to wait for the [economic] recession to go away before we attempt anything in the commercial market." —*MML*