BY MARK RITTINGER ■ PHOTOS BY MARK RITTINGER

DOUGLAS A-26 INVADER

A Speed-400 size military twin that's easy to build and exciting to fly!

DESIGNED AS A LOW-LEVEL attack bomber, the Douglas A-26 Invader first flew in 1942. Powered by two Pratt and Whitney R-2800 radials, it carried a variety of weapons from .50-caliber machine guns and rockets to a cannon. During the end of WW II, the Invader earned a reputation as a hard-hitting, durable weapons platform. The Invader soldiered on through the Korean conflict, operating mostly in night attack roles, but by the early 1960s most had been retired or converted into fire bombers. When the Vietnam War broke out, the tried and battle-tested A-26 came out of retirement for a third tour of duty converted into counter-Invaders, designated B-26Ks, used mostly for counterinsurgency missions.

THE MODEL

I've always been impressed with the simplicity of the Invader's design. It has fine proportions for an RC model, especially an electric-powered one. The long, narrow and efficient wing has a tapered planform and the fuselage has a simple box cross-section making it quick and easy to build. Though brushless motor setups are very popular, I still like to use the cheap power available from ubiquitous Speed 400 type "can" motors.

The model presented here has been flown with two 7.2V Speed 400 motors, as well as two Scorpion brushless motors (innov8tivedesigns.com). The choice is up to you.

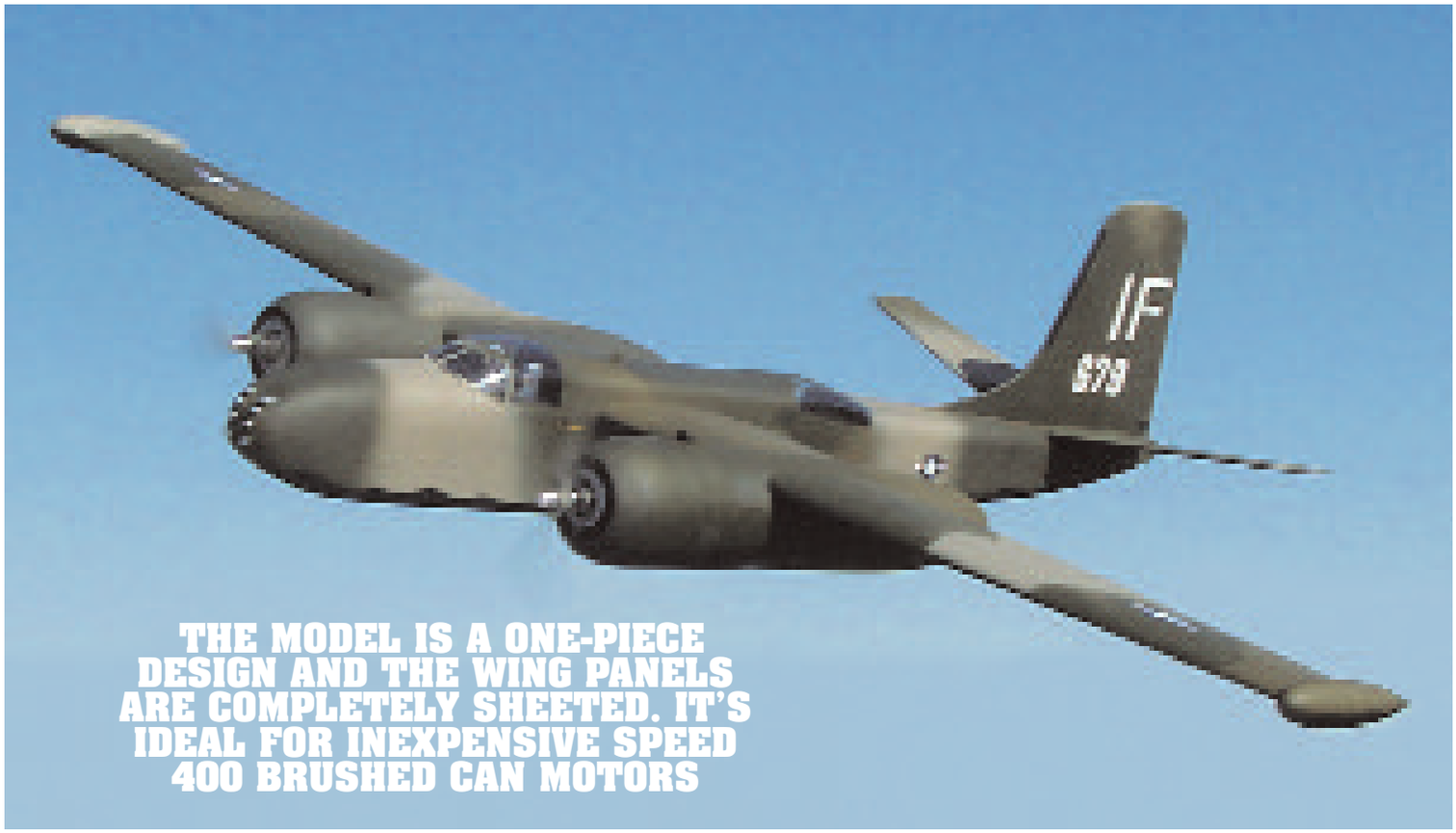
SPECIFICATIONS

WINGSPAN 42 in.
WING AREA 200 sq. in.
WING LOADING 18.5 oz./sq. ft.
LENGTH 30 ¾ in.
WEIGHT 25.5 oz.
MOTORS two direct-drive 7.2V Speed 400 brushed
ESC JETI 35 brushed with BEC (wired parallel)
PROPS 5x5 APC electric
RADIO REQ'D 3-channel (throttle, aileron, elevator)

The author Mark Rittinger poses with his new A-26 Invader all dressed up in Vietnam camo paint.

CONSTRUCTION

I began my project by ordering all my supplies from Prop-Shop.com. I was able to get my wood, motors, ESC, wiring, battery, props and adapters, and other hardware all in short order. Begin with the fuselage. You will need to decide if you are going to build a "glass nose" or a "solid nose" version before cutting the fuselage sides to shape. Laminate the formers from cross-grained 1/16-inch balsa. F2 and F3 are identical. Trace the fuselage sides onto 1/16-inch balsa sheet. Cut two identical sides. Install the triangle stock on the bottom corners from nose to



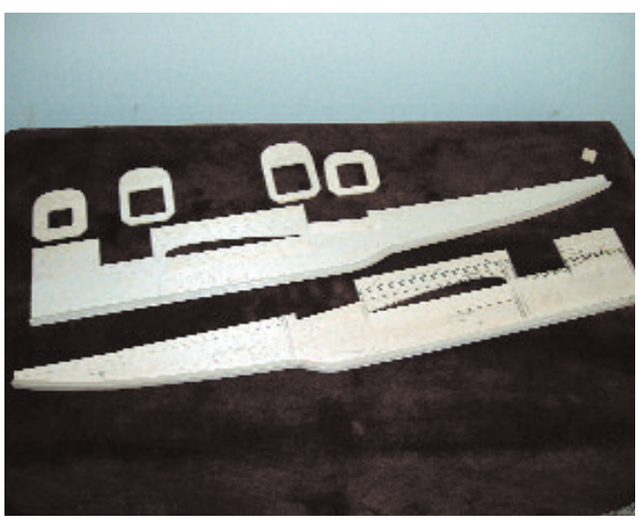
THE MODEL IS A ONE-PIECE DESIGN AND THE WING PANELS ARE COMPLETELY SHEETED. IT'S IDEAL FOR INEXPENSIVE SPEED 400 BRUSHED CAN MOTORS

tail and on top from the aft end of the cockpit to the tail. Add the 1/16-inch doublers below the rear canopy between F3 and F4. Since F1 through F4 are the same width, they can all be added to one side now, using a square to ensure proper alignment. Line up the opposite fuselage side and glue it to the formers. Lay the fuselage on its side, weigh it down in the wing saddle area, and prop the tail up 7/8 inch on one side at F5 (or to measure 1 1/4 inch to the center of F5 from the board). Glue F5 in place and remove the fuselage from the board. Add the instrument panel and the nose joiner piece. Wet the sides and glue the nose sheeting together. Install the 1/16-inch doubler under the wing saddle. Add the triangle stock above the wing then carefully sand the bevel on the outer edges so that the sides can angle inward. Glue the sides to the triangle stock above the wing. Sheet the fuselage top and bottom where noted with cross-grain balsa sheet. Add the cockpit floor and rear cockpit sheeting, as well as the lengthwise sheeting above the wing.

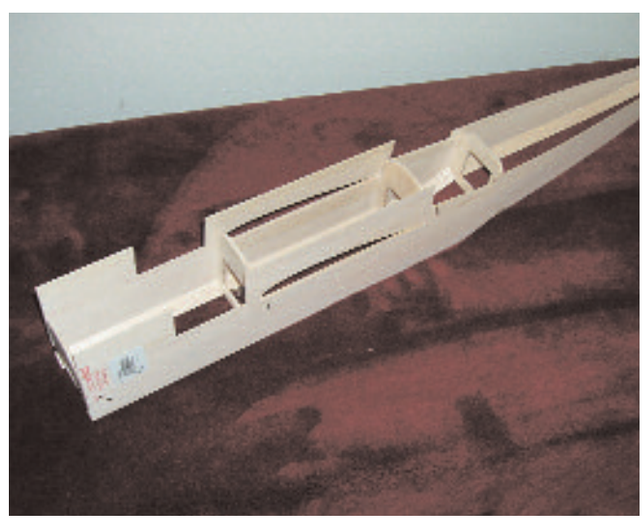
If you build the solid-nose version, add the nose block now. For the glass-nose variant, you will need to tack a block in place and carve the mold. Round the edges, and the fuselage is nearly complete. Carefully cut the bottom hatch free of the fuselage. I used an alignment tab in the front and small rare-earth magnets in the rear to hold the hatch in place. Now, simply add the tail block, bevel the stabilizer attachment area and the fuselage is pretty much done.

TAIL SURFACES

The Invader has a unique dihedral stabilizer that requires a bit of attention to install properly. Cut out all the pieces and assemble the stabilizer. Block up one tip 3 inches and join the halves. Reinforce the center joint with a strip of fiberglass tape and epoxy resin. Make the two elevator torque



The fuselage parts are easy to make and the design is very simple. Large triangular balsa stock fills in the corners for easy rounding later in the process.



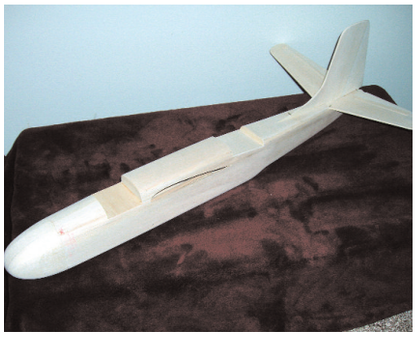
Here you see the fuselage sides glued in place around the formers. This basic box structure is easy to build straight.

rods from 1/16-inch music wire inserted into aluminum tubing before bending the ends to shape. The ends of the torque rods should hang inside the fuselage. Glue the torque rod tubes to the stab, and assemble the pushrod using 1/4-inch-square balsa sticks and wire pushrod ends. Cut the vertical fin to shape, then set it aside until covering.

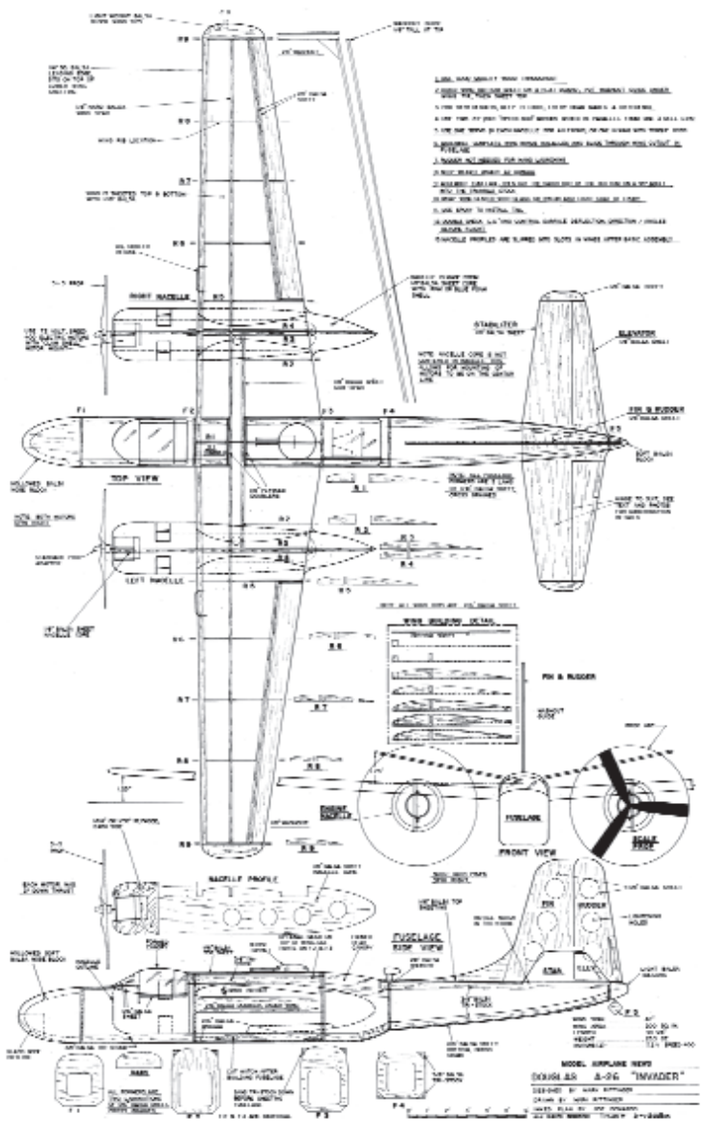
WING ASSEMBLY

The wing is quite simple to build. Build the wing in halves, and join them after sheeting.

Cut out all of the ribs and the bottom wing skins from 1/16-inch balsa sheet. The wing outline is the bottom sheeting's outline. Glue the 1/4-inch-square leading edge on top of the bottom sheeting. Measure the height of the root rib and tip rib, then cut the spar from hard 1/8-inch balsa sheet to match. Now you can glue the spars on the bottom sheet. Add the aileron framing and spars as well. Make them taller than needed to allow for sanding. Add the ribs but omit R1 in the center. Note that R3 and R4 are 1/8 inch apart to allow the nacelle profile to fit in place. Mark the slot where the nacelle will go and the corners of the ailerons by sticking pins through the sheeting. Cut the openings for the motor wires in the bottom sheet then, once all parts are installed, sand the leading edge to match the contour of the airfoil. Taper the trailing edge to a sharp point. Prop up the wingtip 1 1/4 inches and glue the center R1 in place square to the building board.



The completed fusleage structure with tail surfaces attached awaits the wing assembly.

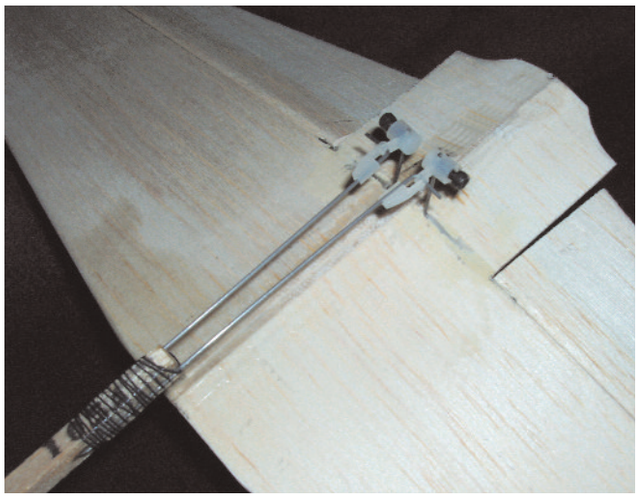


Make the washout guide from 1/8 balsa (as shown on the plans) and place under the wing's trailing edge. Pin the assembly to the board and glue the top sheeting in place. The top sheeting should be 1/2 inch larger than needed all around. Sand the leading and trailing edges to shape and add your wingtips (unless you are making tip tanks from Estes model rocket parts as I did; estes-rockets.com). Repeat the procedure for the opposite wing panel then cut wing joiners from 1/8-inch plywood and join the panels together with 1 1/4-inch dihedral under each tip. Wrap the center with glass cloth tape and epoxy resin.

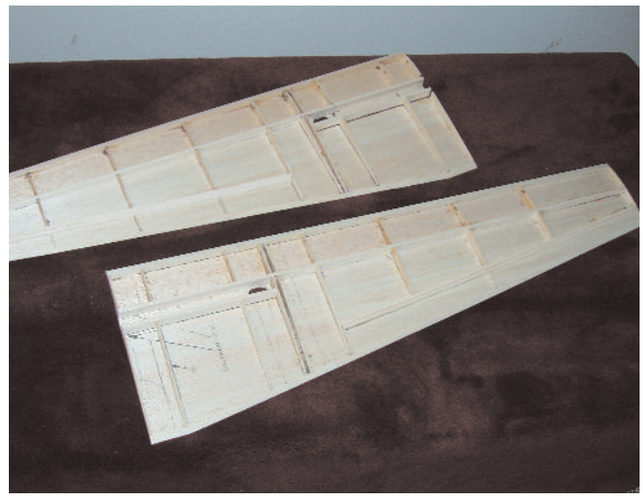
Cut open the slot for the nacelle profile on the bottom wing sheet only. Cut the ailerons free and bevel the aileron leading edges. Mark the torque rod location, and cut a slot for them in the bottom sheeting. Glue the rod tubes in place so the rod ends hang under the wing so you can hook up the aileron servo linkage. Make sure the rods can rotate forward into the wing so you can slide the wing into the finished fuselage. Slowly trim away balsa from the wing saddle cutouts until you have a good, tight wing fit.

ENGINE NACELLES

The nacelles are easy to build and install straight. Cut the nacelle profile from 1/8-inch balsa. Depending on the motor you are using, determine if you'll need a firewall or a clamshell motor mount. I used 1/64 ply doublers as shown on the plans and Estes BT55 rocket tubes to install my 7.2V Speed

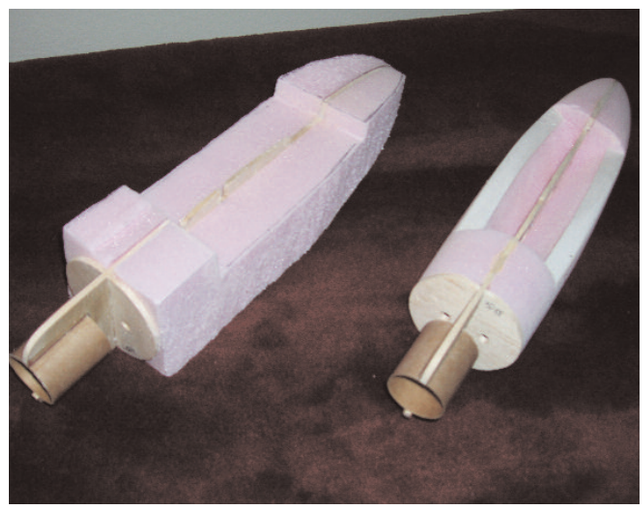


The elevator uses a two-pushrod wire arrangement because of the horizontal stabilizer's dihedral.



The wing panels are also simple in design and easy to build. All of the ribs and spars are added to the bottom sheeting and the panels are joined before the top sheeting is installed.

The engine nacelles are made of foam and are built around a central balsa profile. The profile is inserted into the wing through a thin slot cut into the wing's sheeting and then glued into place.



Here you can see the motor mounts the author made using sections of cardboard model rocket tubes.

400 motors. Use the plan's side view to rough cut your pink or blue foam to shape and tack glue the pieces to the sides of the nacelle profiles. Slowly sand and shape the foam to match the profile. Sand the nacelles into an octagon cross section then, keep sanding off the corners evenly until you have a smooth rounded shape. Start with 80-grit sandpaper and finish with 240-grit.

After the foam nacelles have been shaped, pop them off the profiles and hollow them out. Glue them back onto the profiles and finish sanding them smooth. Make sure they match and fit the slot in the wing panels. My model has balsa sheet engine cowls but you can easily make plugs to form plastic ones. Once satisfied that the nacelles look great, finish them with 1- or 1.5-ounce fiberglass cloth and finishing resin. Sand and prime them so you can paint.

PAINTING AND FINISHING

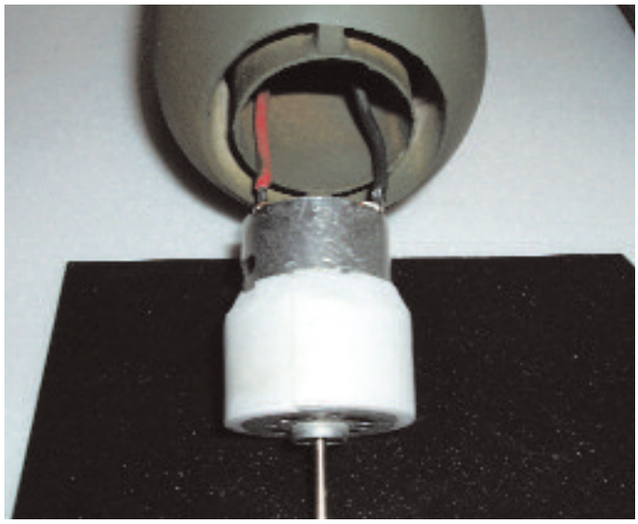
I covered the prototype before assembling the major parts. My covering of choice is thin Doculam laminating film, but any common covering film will do. You can also finish the wings and fuselage with resin and cloth. Just keep an eye on the weight; you only have about 200 square inches of wing area.

After finishing the model, hinge the control surfaces using your favorite method (I make my hinges from used floppy disk material). Assemble all the parts, install the canopies with white canopy glue, and then mask off the model for painting.

FINAL ASSEMBLY

Slide the wing into the saddle and epoxy it in place. Check the tail alignment and when everything lines up properly, slide the elevator pushrod into the fuselage and glue the stabilizer and fin in place. Run your twisted motor wires through the wing center and out the holes in the wing. Thread them through the nacelles, and glue the nacelles to the wing with epoxy. If you install brushless power, put the ESCs in the nacelles to free up fuselage space.

Use foam or balsa sheet to fill and shape the area on the wing above the nacelle. Install an aileron servo and linkage, and then the elevator servo. I used a Hitec HS-55 servo (hitecrcd.com) for elevator control held in place against the fuselage side with



Tape is wrapped around the Speed 400 motor for a snug fit into the mounting tube shown in the front of the engine cowl.

With the wing and engine nacelles installed, the A-26 really begins to look like a scale attack bomber. The engine cowls are simply made of wood and carved to shape and sanded smooth.

double-sided tape. I also used an HS-55 servo for aileron control. The brushed ESC for the Speed 400 motors goes in the nose section, and the Hitec Electron-6 receiver fits nicely at the trailing edge of the wing between the torque rods. Set the control surface throws and directions, and make sure there is no control system binding.

I used OD Green, Dark Green and Flat Black Testors Model Master paints along with Krylon Khaki for my Vietnam color scheme. Add your decals and markings and you are nearly finished.

Wire up the motors, check for proper rotation direction, and install them. I wrapped the motors with 3mm foam and lightly glued them into the rocket-tube mounts. Make sure there is a tight fit and the thrust lines are correct. My Invader performs very well with APC 5x5 props using Graupner prop adapters (apcprop.com; hobby-lobby.com). I used a Dualsky 11.1V 1300mAh 25C LiPo pack (2dogrc.com) held in place to the fuselage side with Velcro. The battery can handle 22 amps constantly. Final weight of my model was 25.5 ounces. After a thorough motor-on range check, it's time to fly!

There are several paint schemes available for the A-26 Invader. Take your pick.

IN THE AIR

Always perform a radio range check, with motors running, and run through the throttle range. Double check the controls for proper deflections, along with a last quick check of the CG. The Invader takes off from a simple hand launch quite easily. A couple steps and a toss into the breeze with the nose and wings level results in a mild climb. Once you get some air under the wings, get it trimmed out for straight and level flight.

The Invader will slow down nicely and is actually quite a floater. Cut power at altitude to get acquainted with the stall. It will stall to the left. Aerobatics are not really what an Invader is for, but it will loop, roll and fly inverted nicely. It does a nice Split-S, Immelmann turn and stall turns as well.

Setting up landing is where you're slow-speed flight and stall testing will help. Just line the Invader up into the wind, cut the power and bring it in smoothly. It might surprise you how well it glides in ground effect.

Built right, the A-26 Invader will provide a lot of enjoyment for a small expense. It's an exciting twin that will certainly shake things up at any flightline. If you have any questions, feel free to contact me at man@airage.com. Good luck and good flying!