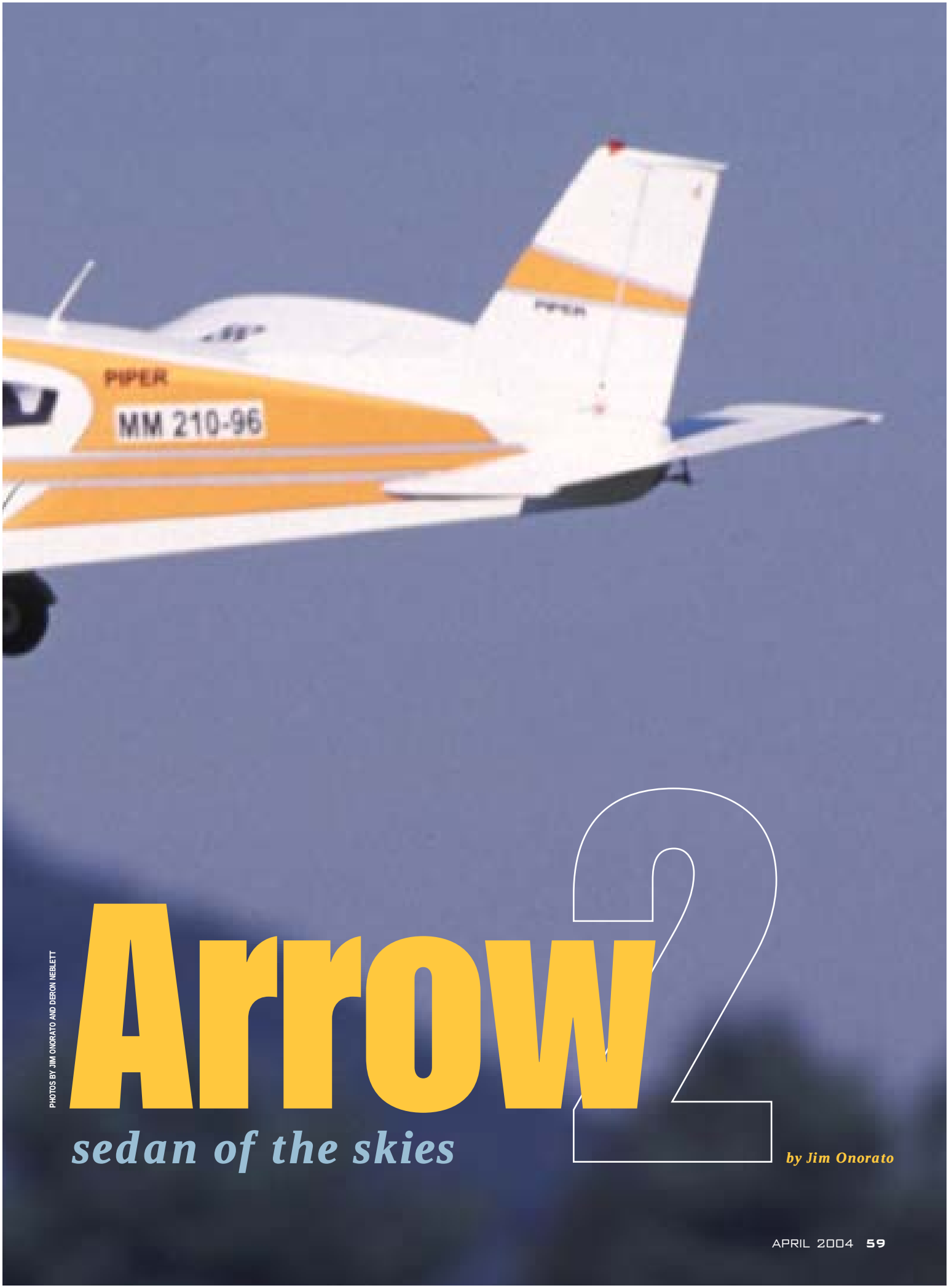
AVIOMODELLI Piper

Sport-scale

The Piper Arrow 2 is one of the most rugged, reliable and attractive full-scale trainers in the air today. It offers the perfect combination of quality and features to make it suitable for training, business, commercial and private use. Its superior quality and reliability have made it a staple craft in Piper's fleet for 30 years. Popular worldwide with flight instructors, the Arrow is also an aircraft that flight school graduates often purchase for themselves. Since I am neither a flight school graduate nor wealthy enough to afford the full-size version, I was happy to try Aviomodelli's kit of this classic six-seater.

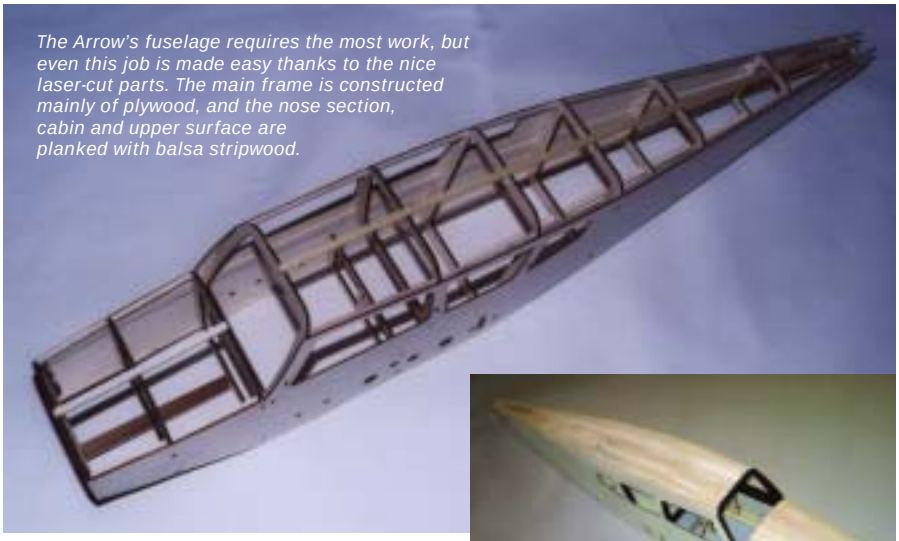


Arrow 2

sedan of the skies

by Jim Onorato

PHOTOS BY JIM ONORATO AND DERON NEBLETT



The Arrow's fuselage requires the most work, but even this job is made easy thanks to the nice laser-cut parts. The main frame is constructed mainly of plywood, and the nose section, cabin and upper surface are planked with balsa stripwood.

THE KIT

Though advertised as a 50-percent ARF, Aviomodelli's Piper Arrow 2 kit does require a fair amount of work. The Arrow is actually a balsa and ply kit with vinyl- (or resin-) covered, foam-core wings and tail feathers. That isn't a complaint or criticism, just a fact. The kit includes balsa and laser-cut ply parts for the fuselage, balsa stripwood, vinyl-covered foam wing panels and tail feathers, a fuel tank, a motor mount, a spinner, wheels, vacuum-formed windows and windshield, decals, plans and a very complete hardware package. There are also a number of ABS parts including the cowl, wingtips, stab tips, rudder fairing, servo boxes, instrument panel, antenna, taillight and seats. Instructions are provided in several languages right on the plan which and include a complete list of every part identified by number, name, material, size (in millimeters) and quantity. Although the plan is not full size, it does show every part by its identification number; which I found this very helpful. In addition, the parts are numbered consecutively in the order in which they are used—also very helpful.

CONSTRUCTION

The first thing I did before starting construction was identify and number every laser-cut part while they were still in the plywood sheets. I also numbered all the other wooden parts including the stripwood.

• **Fuselage.** I started construction with the fuselage, which is the part of the Arrow that requires the most effort. It is basically a plywood frame with the nose section, the cabin and the upper surface planked with balsa stripwood. All of the plywood parts are laser-cut and interlock to fit perfectly. This made it rather easy to keep things in proper alignment. Very small nails are provided for use in attaching the plywood parts, but I chose not to use

The vinyl-covered foam tailpieces arrive as shown here. Simply separate the rudder and elevator from the fin and stab and apply balsa to the exposed edges in preparation for hinging.

SPECIFICATIONS

MODEL: Piper Arrow 2

MANUFACTURER: Aviomodelli

DISTRIBUTOR: Internet-RC

TYPE: sport-scale kit

WINGSPAN: 83 in.

WING AREA: 1,160 sq. in.

WEIGHT: 13 lb., 15 oz.

WING LOADING: 27.7 oz./sq. ft.

LENGTH: 60 in.

ENGINE REQ'D: .61 to .91 2-stroke or .91 to 1.20 4-stroke

ENGINE USED: O.S. .91 FX 2-stroke

RADIO REQ'D: 5-channel w/6 servos (elevator, rudder, throttle, flaps and 2 aileron)

RADIO: Futaba 7-channel transmitter and receiver w/5 FMA 301 servos and 1 FMA 355 servo (elevator)

PROPELLER USED: APC 15x8

FUEL: Wildcat 15%

PRICE: $249.99

FEATURES: laser-cut balsa and ply fuselage pieces; vinyl-covered, foam-core wings and tail feathers; kit includes a fuel tank, motor mount, spinner, wheels, vacuum-formed windows and windshield, decals, plans, a very complete hardware package and a number of ABS parts including the cowl, wingtips, stab tips, rudder fairing, servo boxes, instrument panel, antenna, taillight and seats.

COMMENTS: the Aviomodelli Piper Arrow 2 is an attractive, well-made airplane intended for intermediate builders and fliers. It offers enough of a challenge to satisfy most kit builders but also provides pre-sheeted foam-core wings and tail feathers to reduce building time.

HITS

- Excellent laser-cut parts fit.
- Good parts identification.
- Stable, scale-like flight performance.

MISSES

- Construction plans not full size.

FLIGHT PERFORMANCE

The instructions don't specify the proper throws for the control surfaces, so you're pretty much on your own here. For the initial flights, I set the throws as follows: 1/2 inch for ailerons, 5/8 inch for elevator and 1 inch for rudder.

TAKEOFF AND LANDING

After performing a routine preflight check and making sure that all the control surfaces were moving in the right direction, I fired up the O.S. .91 engine and taxied out to the center of the runway. Thanks to the steerable nose gear and widely spaced main gear, the Arrow handles well on the ground, with no tendency to tip. After getting the feel for how the Arrow handled on the ground, I pointed the nose into the wind and slowly advanced the throttle. The Arrow tracks straight ahead without rudder input and quickly accelerates to flying speed. When flying speed is reached, I apply slight up-elevator; the plane rotates and starts a very realistic, scale-like climb. After it makes the first turn and levels off, the Piper Arrow requires no trim adjustments to maintain straight and level flight.

Landings are also scale-like; the Arrow stays steady as a rock at low speed. I lower the flaps on the base leg and turn onto approach at 1/2 throttle. Once lined up on approach, I use the elevator to slow things down and the throttle to control the altitude. As the plane crosses the threshold of the runway, I chop the engine to idle and just let the Arrow descend until it's about a foot off the runway. I then apply enough up-elevator to get the plane to flare so that the main wheels touch down just before the nose wheel. With the controls at neutral, the Arrow continues its rollout until I steer it slowly back to the pit area for another enjoyable flight.

LOW-SPEED PERFORMANCE

The Arrow flies smooth and predictably at slow speed. To test the stall, I took the Arrow to a safe altitude and reduced the power while adding more and more up-elevator until it eventually stalled. When it does, the stall is gentle and straight ahead. In fact, the plane begins to porpoise as it flies through stall after stall and each

time nearly comes to a standstill. When you see a plane with such gentle stall characteristics, you know it's going to be easy to land.

HIGH-SPEED PERFORMANCE

This is a bit misleading; the Arrow doesn't really attain "high" speed even at full throttle. Rather, it moves along at what I would call a brisk, scale-like speed. I didn't experience any bad tendencies at full throttle. The Arrow tracks very well and pretty much goes where you point it.

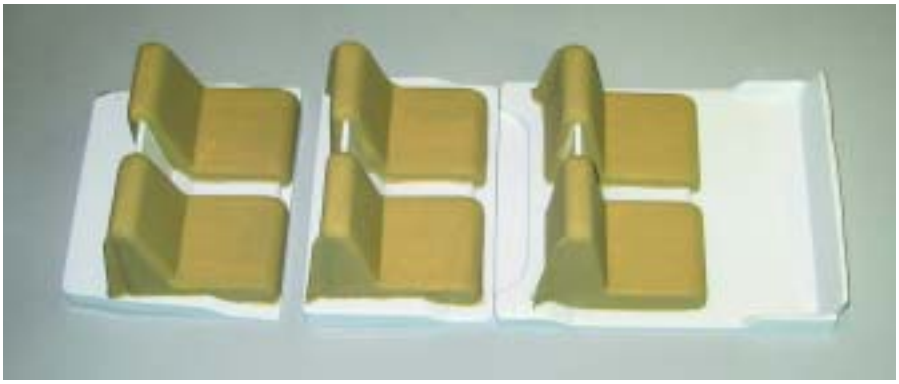
AEROBATICS

I doubt that anyone would build a Piper Arrow for its aerobatic capabilities. After all, it's a scale model and is most at home flying like one. However, having said that, I must admit that I wanted to see what it could do and had a lot of fun trying some mild maneuvers. I found that the Arrow is capable of loops, axial rolls (with coordinated rudder and elevator input), stall turns and inverted flight, but I couldn't get it to snap or spin (most likely because it's so hard to stall!). With a little more weight in the tail, it may be possible to coax the Arrow into a spin, but why mess with a good thing?

them as I was afraid they would split the plywood. I used 5-minute epoxy on the plywood parts and aliphatic glue, which is easy to sand for the planking. A large hatch on the bottom of the fuse provides access to the radio equipment, which, when installed, is completely hidden under the seats.

• **Tail feathers.** The tail feathers came next. Since these are vinyl-covered foam-cores, all that was required here was to separate the elevator and rudder from the stab and fin and to apply balsa to the exposed leading and trailing edges and thin plywood to the ends. The ABS stab tips were attached with medium CA. I inserted the wing tube into the fuse to make sure that the stab was aligned properly then I glued the stab and fin to the fuse with 30-minute epoxy. I didn't hinge the rudder and elevator until after the plane was covered.

• **Wings.** The Arrow uses plug-in wing panels, which and I completed those next. I numbered the flaps and ailerons before I cut them from the wing panels so they wouldn't get mixed up. Then, I covered all



Above: the included ABS plastic seats are a nice touch. They really contribute to the Arrow's scale appeal. Below: as with the tailpieces, the plug-in wing panels are vinyl-covered with foam-cores.

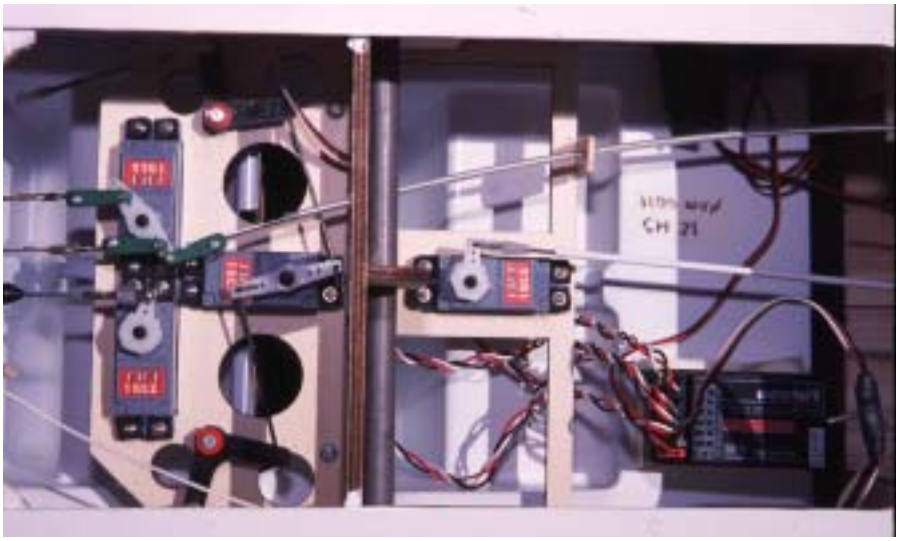
the exposed edges with balsa and/or plywood as I had done with the tail feathers. Pinned hinges are used for the ailerons, but the flaps utilize use torque rods that are connected to a servo in the fuse. These were not attached until after the plane had been covered. Two ABS servo boxes provided for the aileron servos were cemented into the cutouts in the wing panels, and the servos were attached to the box covers. I thought this was a very clever way of installing servos in a foam-core wing. The wing stiffeners, into which the metal wing tube fits, were made up by laminating five laser-cut plywood parts provided then glued into the wing with 30-minute epoxy. The stiffeners also hold the main landing gear that I attached after the plane was covered. I attached the ABS wingtips with medium CA and epoxied the root ribs and the anti-rotation pins to the root ends of the wing panels. Once the wings are slid onto the metal wing tube, they are held in place by two spring retainers attached to hook eyes in the wing. These were screwed into dowels that were then epoxied into the root ends of the wing panels. The final step was adding the tapered sections to the leading edges of the panels.

The finished product looks great in the air and on the ground.

• **Details.** Next, I painted the inside of the cabin with flat black acrylic paint and glued in the vacuum-formed windows from the inside. The ABS seats come in three sections. I painted the seats tan and the floor black and then installed the seats in the fuse. This was a little tricky because the seats fit very snugly, and the only access is through the bottom hatch. I didn't install a pilot figure but made the windshield removable in case I decided to add one later.

I painted the cowl with white LustreKote and covered the entire model with white Ultracote; then I applied the self-stick decals provided in the kit. I had to fit the large decal for the upper part of the fuse around slight compound bends, so it was necessary to cut a few slits at the top of the decal to make it fit properly.

• **Engine installation.** The firewall is predrilled for the motor mount, nose-wheel brackets and fuel-tank stopper that protrudes through the firewall. The tank is



Above: two trays built inside the fuselage hold all the radio equipment; one tray holds the rudder, elevator and flap servos, and the other holds the throttle servo. Left: Stiffeners in the wing secure both the metal tube and the main landing gear.

mounted on the right side of the fuselage; which this places it right behind the engine cylinder. I think it would have been better if it were mounted on the left side so the fuel lines could be routed more easily. The two-piece, adjustable motor mount is made of a composite material with a steel bolt embedded in it. The bolt goes through the firewall and is secured with a nut. I side-mounted an O.S .91 FX 2-stroke engine with a Pitts-style Slimline muffler on the motor mount and, after making the necessary cutouts, attached the cowl with four screws. I used a 15x8 2-blade APC prop with a Tru-Turn aluminum spinner.

• **Radio installation.** Last, I attached the control surfaces and installed the radio equipment. Four servos were mounted on two trays inside the fuselage. One tray holds the rudder, elevator and flap servos, and the other holds the throttle servo. I used an FMA 355 servo for the elevator and FMA 301 servos for the rest of the controls. The rudder uses a pull-pull cable system, and the elevator uses a solid pushrod. The flaps are controlled by a single servo that operates two bellcranks with linkages to the flap control horns that extend into the fuse when the wing panels are attached. To compensate for misalignment, I used ball links rather than clevises to attach the linkages to the flap control horns.

CONCLUSION

I enjoyed building and flying the Piper Arrow II and gladly recommend it for intermediate builders and flyers. The kit has several unique features that make it interesting to build. The finished product looks great in the air and on the ground. This is one you can be proud of.

APC Props; *distributed by Landing Products (530) 661-0399; apcprop.com.*

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