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# TAMEcat Trainer 40 ARF

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There are many popular Basic Trainers available today that closely resemble full-size fighter aircraft. These remarkable airplanes look fast and deadly, but are actually very gentle, slow and easy to fly trainers. The availability and numbers of such fighter-trainers have been rapidly growing of late.

But, these “new” style trainers did not spring straight from the balsa tree. The fighter-trainer concept was actually developed back in the mid-1990’s. At that time, Jeff Troy (now Editor of AMA’s Park Pilot magazine) designed, and a company called Altech distributed, the very first RC fighter-trainer. It was called the TAMEcat 40.

The Altech TAMEcat 40 was far ahead of its time, but it was a wood kit that required several months to complete. Its construction, while elegant in that it used single parts to perform multiple functions, was somewhat elaborate and sometimes problematical for new RC fliers to build.

The World Models (TWM) has changed all that and eliminated the building problems by redesigning the TAMEcat 40’s construction into a very simple to build ARF airplane. Thanks to modern light plywood construction and computer design, the TAMEcat 40 ARF is much lighter than the old wood kit but has the identical airframe.

Photo 1

There is so much prefabrication here that this is one of the easiest to assemble ARF Trainers Sport Aviator has ever reviewed. The airplane is extremely light, features interlocking construction for proper tail alignment plus extra strength, has factory installed wing attachment and flies like

pushing a baby carriage. But push some extra fuel into a strong .46 engine and the baby carriage becomes an exciting performer; safely exciting but exciting nonetheless.

To top it off, this airplane looks really good on the ground or in the air. The Toughlon covering is complete with panel lines, hatch outlines and subdued markings. The color scheme is in “Ferris Grey” but TWM includes a full set of color decals if the pilot wants to brighten the airframe a bit. TWM even includes two pilot figures and a detachable bomb! This airplane looks like anything *other* than the Basic Trainer it actually is.

Photo 1A

Here is an example of TWM’s construction quality. Weight reducing cutouts are everywhere in this airplane. The plywood is of higher quality than is usually found in ARF aircraft. Quality materials and attention to details means that the TAMEcat 40 is both light, less than 5.5 pounds, and very rigid.

The factory installed wing mount system is also shown here. The bolts fasten to factory installed blind nuts. The clear plastic strip protects the wing’s trailing edge during bolt tightening.

**BUILDING**

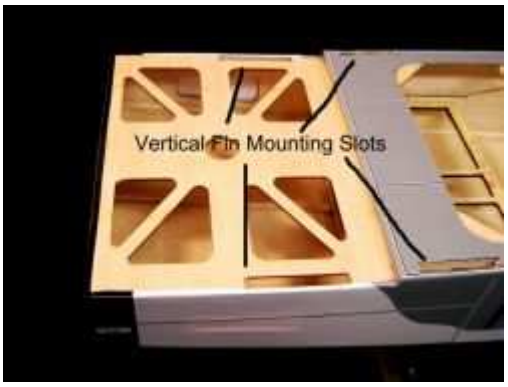


Photo 2 Photo 3

Not only is the TAMEcat 40 ARF built well, it is very easy to build. It is also about the easiest-to-build-*straight* Trainer ARF now available. TWM’s enormous prefabrication work transforms this ARF *almost* into an RTF airplane. The covering over the stabilizer’s large mounting area has been factory removed as it has on the vertical fins. The horizontal stabilizer’s covering has also been removed in the area that mounts onto the fuselage. There is no chance of accidentally cutting into the stabilizer during covering removal, a very common problem, since the covering has already been removed.

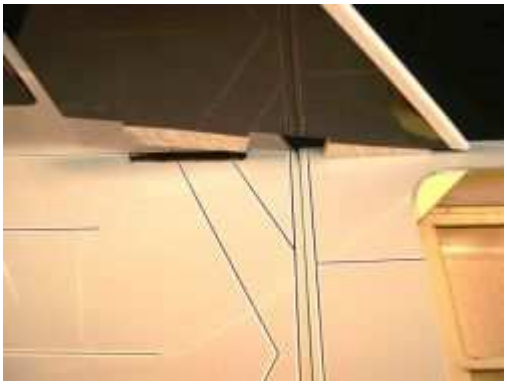

Photo 4

The vertical fins lock into the stabilizer to insure alignment and add strength while the very large gluing area insures that the stabilizer is parallel to the wing for best flight performance. All control rods are factory formed and fit perfectly. Every control surface has holes pre-drilled for the control horns and all are in the correct position.

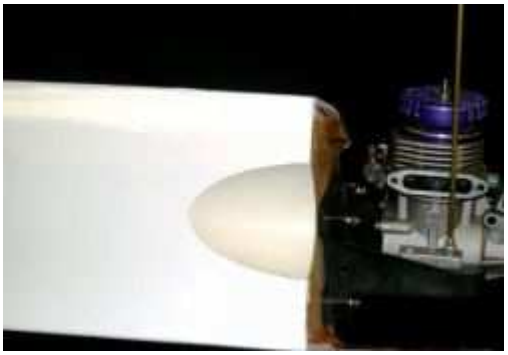

Photo 5 Photo 6

Installing and hooking up the tail feathers takes about 1 hour using 12-minute epoxy. Since the engine mounting holes are already built into the firewall and the mount is adjustable, that installation is also quick and easy. The builder still must drill the engine mounting holes in the mount. A great tool for this is the Great Planes “Dead Center” Engine Mount Hole Locator (GPMR8130). This is one of the best engine mounting tools I have yet used.

Note the small fuselage cutout in photo 6. This cutout is designed to allow the muffler to clear the fuselage. The section inside this cutout is made from fiberglass. Make sure the engine’s muffler chosen to power the TAMEcat 40 will fit inside this area. Modifying the fuselage nose area to clear the muffler is a difficult task not really suitable for beginners. The only alternative is to manufacture a muffler extension and that also is not a task for the new RC pilot.

Photo 7

Some engines such as the O.S. Max .40 - .55 series, have factory extensions available but many, like the Tower Hobbies .46 pictured, do not. But then again, the O.S. Max engines clear the fuselage without an extension (photo 7). Unfortunately, I didn't find out that the Tower Hobbies engine was not suitable for the TAMEcat 40 until after the cowling photos were taken. Fortunately, the O.S. Max .46 AX fit into the same mounting beam holes as the Tower Hobbies engine. Sometimes, I would rather be lucky, as in this case, than good.

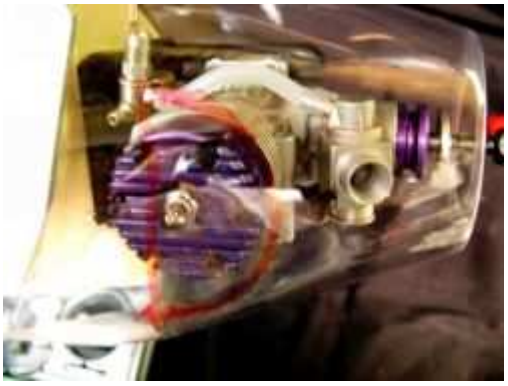

Photo 8 Photo 9

Fitting a cowling around all those engine projections is a daunting task for most new, and maybe for all, RC pilots. There are several methods, such as the card stock templates shown in photos 53 to 58 in the Sport aviator P-6E Hawk Review, to accomplish this task.

However, TWM makes this task much easier. The TAMEcat includes an extra, clear cowling that makes cutting and fitting the factory painted fiberglass cowling error proof. The cowling was originally cut to fit the Tower Hobbies engine (photo 8). The O.S. Max engine required only small modifications around the carburetor inlet as shown in photo 9. Simply fit the clear cowling over the engine, gradually cut out as required until the cowling fits onto the fuselage and the spinner back plate lines up with a 1/8 in. spacing. Then mark the needle valve, idle adjustment, muffler bolt holes and other fittings and cut them out.

Once cut to fit, the clear cowling slides *over* the factory painted cowling and the clearance holes are transferred. No mistakes. No ruined cowlings. This is truly a simple ARF to build.

My TAMEcat uses the OS Max .46 AX engine. This powerful and easily managed engine is a mainstay of our sport. But other engines, such as the Evolution or Super Tigre 40 series will work as long as their mufflers are not big, fixed-in-place, round cylinders such as the Tower Hobbies .46, which, as previously discussed, does not fit. Although having a round muffler, the Super Tigre engines allow the muffler to rotate and extend for fuselage clearance. Take your pick because the TAMEcat 40 flies well on most any ball-bearing equipped engine.

The TAMEcat 40 is a light, but large airplane. It will fly well on most any 40-size powerplant. But using a bushed 40 sport engine limits the TAMEcat's aerobatic capability. This is too good an airplane to put "on the wall" once the pilot advances past the solo point. Once soloed, the now more experienced pilot will want that aerobatic performance, so install a strong sport engine in the first place.

**THE WING**

Photo 10 Photo 11

The wooden wing spar is factory preassembled and fit well into the wing halves. One wing half has a small positioning dowel near the trailing edge to insure proper wing alignment. It just isn't possible to induce wing warping during assembly. Both aileron servo mounts are factory installed. TWM even marks the four underside wing openings with a red dot so the builder knows where to cut the covering. Of course, both servo mount areas include the string necessary to pull the servo leads out the middle of the wing.

If the ailerons are to be "Y" corded, then servo extension leads are not necessary. The "Y" cord does that job. However, two six-inch extensions are required if flaperons are to be used. The TAMEcat 40 does not *need* flaperons to be a good trainer but they are highly recommended as they expand the TAMEcat's performance envelope while also making the already very slow landings even easier to manage. While offering improved performance, remember that having flaperons does require a *5-channel* "buddy box".

The wing is mounted further back from the nose than it is on most standard Basic Trainers. The airplane has a gigantic flat-bottom wing with monumental amounts of lift that allow very slow airspeeds. The ailerons are also large. Combining all these factors means that the TAMEcat 40 has noticeable amounts of adverse yaw at very slow airspeeds as will be discussed later on. I mention it here as I strongly recommend using the flaperon system available in most computer transmitters so the pilot can adjust the aileron differential to eliminate any adverse yaw tendencies.

Photo 12 Photo 13

Whether using a single “Y” cord or computer flaperons, the aileron servos are mounted in the wing. All control surfaces are pre-hinged but still require final installation using thin CAA. For details about installing these hinges, read the Sport Aviator article, Installing Mylar Hinges in the Flight Tech Section.

Another nice assembly feature is that TWM has already marked the holes for all the control horns. This allows horn installation before attaching the control surface. Nothing can be easier than that. Once the horns and control surface are mounted, use the TWM prefabricated control rods to finalize the installation. All the supplied control rods fit just right; even those featuring complex bends to reach the twin rudders.

The wing mounting system is completely factory installed. The wing’s bolt holes are factory drilled so the builder need only cut the covering away from the small holes. The matching fuselage blind nuts are also factory installed. Once assembled, we tested the wing for proper alignment and found it exactly on target.

Photo 14

There is a clear plastic wing protector that rides the top of the wing’s trailing edge to protect it from bolt pressure. One bolt hole in the protector was not properly located but enlarging it by 1/8-inch toward wing center solved that problem in seconds.

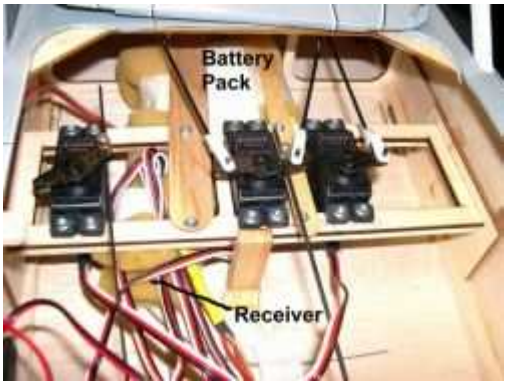


Photo 15 Photo 16

For proper balance, everything mounts far to the rear. A single cover the size of a freighter’s loading hatch hides the TAMEcat’s spacious “control room”. TWM provides pre-formed control rods for all functions, even for the complicated twin rudders. The pre-formed throttle and nose wheel steering rods extend forward inside TWM-provided plastic tubes that are precut to the exact size required (photo 16).

Photo 17

The nose gear bearing is factory installed. The nose wheel steering arm is provided and fit well. The fuel tank is on the large size, about 12 ounces, so training flights do not have to be short. The tank fits into a hole in the firewall and is held in place by a few rubber bands. The canopy covers this area.

TWM does so many tasks usually left to the builder in most ARF's, that detailed construction instructions are not really necessary here. Completely building the TAMEcat 40 took 6 hours. That included time for photographs.

The extra prefabrication done by TWM saved at least several building hours, probably more. But even more importantly, the prefabrication insured that everything was straight and properly located. Even a complete novice will have no assembly difficulties. The few questionable areas are represented in the instruction manual's photographs and careful study eliminates the questions. But a little more text in the instructions would be a good thing for first-time builders.

Being very honest, this is the easiest to *correctly* build ARF trainer we have worked on so far. Also, being an ARF, not an RTF, means that the new pilot gets to pick a more advanced radio system, like the Futaba 7C used here, while also having a wider engine choice.

Photo 18

My TAMEcat 40 is equipped with the new Futaba 7C 2.4 GHz FASST radio system. Basically a T7CAP transmitter working on 2.4 GHz instead of 72 MHz, the T7C offers flaperon operation, a short latency period for faster servo response, 10-model memory and multiple mixing with fly-anywhere interference protection. The digital S3152 servos center perfectly while producing a whopping 69.4 oz-in of torque at 4.8 Volts. The FASST system's tighter feel, due to its short latency period combined with precise servo response, is very obvious when flying the TAMEcat.

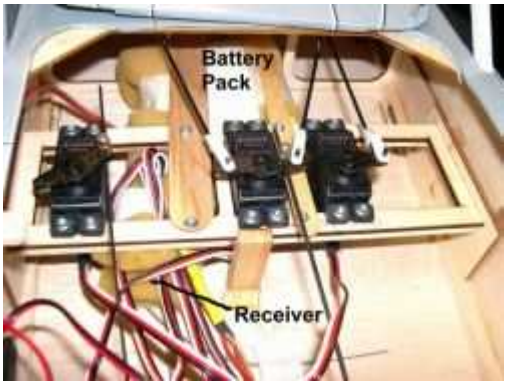


Photo 15

The TAMEcat balances 4 inches back from the wing's leading edge. This means *everything* goes in the back. As photo 15 shows (repeated here for clarity), even the throttle servo mounts in the rear while the battery pack mounts even further aft. The battery is supposed to mount under the servo rails along with the receiver. But that would mean adding tail weight so the pop-stick system shown was devised to eliminate the extra weight. Since this battery pack is larger than normal, a 5-cell, 1650 mAh Ni-MH, mounting it under the rails also would have meant no cushioning foam. A regular 4-cell 1100 mAh battery would fit, complete with foam.

Not every model pilot is aware that many 2.4 GHz radio systems require a 5-cell receiver battery for *total* safety even though they are usually supplied with a 4-cell pack. If any 2.4 GHz receiver ever sees less than 3.8 Volts for even a short period, it loses its "lock" with the transmitter and must recover it before again responding to the transmitter's inputs. Recovery time can vary from milliseconds to about two seconds. The latter can be a problem. A 4-cell pack with five flights already on it can drop below 3.8 Volts during a snap roll or spin when all five servos are in motion. Using a 5-cell pack prevents this. Manufacturers currently provide larger capacity 4-cell packs to help prevent this but a 5-cell pack is a very safe alternative. This is an opinion here, but one worth considering.

For complete details about the new 2.4 GHz radio systems, see the Sport Aviator article: 2.4 GHz for the Common Pilot.

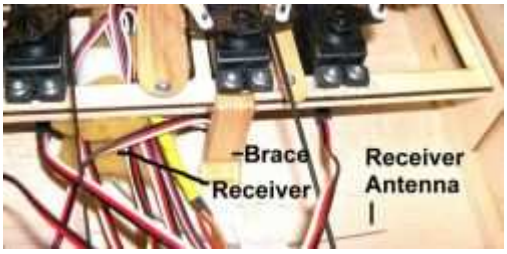


Photo 15A

The short center brace was installed only after rudder movement was increased far beyond factory settings for added aerobatic performance. The additional rudder movement caused some tray flexing that does NOT occur when factory rudder specs are followed.

Note the one receiver antenna taped at 90 degrees to the forward pointing one. This provides maximum reception area regardless of the airplane's orientation to the pilot.

All up, this TAMEcat 40 weighed 5.4 pounds. Considering that the O.S. Max .46 AX would be turning the APC 11 x 6 in. propeller at over 12,000 rpm, there was going to be some very impressive vertical performance flying this aircraft. Vertical and aerobatic abilities are important but the TAMEcat's performance as a *Basic Trainer* was its most important flight characteristic to evaluate.

**FLIGHT PERFORMANCE**

Photo 19 Photo 20

The TAMEcat 40 looks like anything but the Basic Trainer it actually is. The lines are very reminiscent of the Navy's F-14 Tomcat. TWM provides colored details but I only used a few to offset the overall grey color. The covering includes all those panel lines, grayed-out markings and access hatches.

Photo 21

The forward hatch is factory painted and fit well. TWM includes those two painted foam pilots. Also included are the two-sided adhesive foam pads that hold them in place. After numerous flights, neither pilot has yet to eject.

Photo 22

When viewed from ground level, the TAMEcat 40 ARF reveals its almost flat-bottom (actually more of a "Clark Y" airfoil) wing shape. But even so, this airplane still hides its Basic Trainer performance behind its jet fighter personality.

Photo 23

Looks are one thing, but flight performance is all-important for a Basic Trainer. If the airplane is not gentle, honest, responsive and forgiving of mistakes, it is not a suitable Basic Trainer no matter how exciting the appearance. So, the TAMEcat 40 and I went out to the flying to see just what it could do. Actually, we traveled together to the field several times and 35 flights later, I am happy to report that the TAMEcat 40 is a good Basic Trainer. But it is also much more than that.

Photo 24 Photo 25

After the range check, the TAMEcat taxied out to takeoff position. Holding full “up” elevator while taxiing on grass is a good idea.

Photo 26

The nose wheel is located further back from the propeller than is the case with most other Trainers. There is a very minor tipping tendency during sharp turns that holding elevator cures. But holding “up” elevator during taxi on grass is an important lesson on all airplanes that all student pilots need to know and the TAMEcat teaches it early in the training program.

Photo 27 Photo 28

Since the big, 831 sq. in. wing is loaded to only 15 oz. per sq. ft. (very light even for a Trainer) and the engine has enough power to pull down a barn, it was fairly obvious that this airplane was not going to stay earthbound for very long once that engine got some throttle.

In fact, the ground roll was very short at only about 50 feet. But the short ground time, while impressive, is not the real takeoff story. The real story is that the ground roll was straight without correction.

Photo 29

Even better, the climbout was also almost completely straight without requiring much right rudder correction. The TAMEcat's large, twin vertical fins and dual sub-fins combined with a generous fuselage side area reduce torque effects to practically zero. Just the slightest amount of right rudder was needed for a straight climbout and that only after the airplane had already gained about a 100 ft. in a straight, on its own, climb. Maybe this airplane is too easy to fly for a Trainer?

Photo 30

The best cruise (training) speed is around 38 mph. At this airspeed, the TAMEcat 40 is stable, predictable and very honest. It does lose a little altitude in a turn but less than most conventional Trainers; probably because of its very light wing loading. Another improvement over conventional Trainers is the TAMEcat's ability to resist "ballooning" while rolling out of a descending turn. The student will find constant altitude turns easier to learn on a TAMEcat.

However, the pilot *does* have to roll out of the turn as the airplane does not self-recover. Self-recovery was once important but now is generally considered a *poor* characteristic for a Trainer that will be flown with an instructor. Aircraft that want to roll wings-level in a turn require the pilot to hold aileron (or rudder) throughout the maneuver. When later transitioning to sport airplanes, this habit must then be unlearned.


Photo 31

TAMEcat slow flight and stalls border on the ridiculous. First, stalling this aircraft means airspeed must drop below 10 mph. Then, all that happens is the airplane remains nose up while sinking at around 500 ft. /min. The only way to get a stall break is to get the nose up about 70 degrees and suddenly apply full "up" elevator. If held in a deep stall after forcing the stall break, the airplane just resumes its usual nose-high attitude and slow, wings-level, descending flight.

But having such a low stall speed does have its price. Below about 15 mph, aileron response becomes extremely slow; to the point that adverse yaw causes the nose to turn in the *opposite direction.* We have experienced this same reaction in the few other conventional trainers that are able to fly at very slow airspeeds. However, adding about 20% differential using the Futaba 7C transmitter settings reduces adverse yaw to the point that this condition nearly disappears. Even so, a small amount of rudder is required to totally eliminate the adverse yaw tendency at extremely low airspeeds.

20-25% aileron differential is a good starting point for initial training. As the student gains slow-flight ability, most instructors will gradually eliminate the differential and teach using the rudder instead. The TAMEcat's twin rudders appear smallish but are very effective in maintaining level, coordinated slow flight. This airplane is a good tool to teach rudder use. Its long nose makes adverse yaw very easy to spot while quickly revealing how well the student's rudder corrections are working.

Photo 32 Photo 33

Landing approaches work best at conventional Trainer airspeeds, around 25 mph. Touchdowns are in the 20 mph range. Despite its F-14-looking wide fuselage, this airplane is very slippery in the air. It will gain airspeed if the nose is allowed to drop on approach. With that giant wing, the airplane then floats into the next county before touching down. This is where flaperons really help. Set at 14 degrees (25% Futaba setting), they help keep the approach airspeed constant and the touchdown point easier to manage. We tried several flaperon settings but found 14 degrees to be ideal.

Photo 34 Photo 35

Once past the Trainer stage, pushing this airplane is just plain fun. Loops are larger than 100 ft. Climb is quick. Rolls are steady but more than three in a row means extra elevator input as the airspeed slows and the Clark “Y” airfoil starts to hinder inverted flight.

This is not a fast airplane but its great vertical performance compensates for the lower maneuver entry airspeeds. Inverted performance, including reverse outside loops, is very good. Stall turns require lots of opposite aileron during the turn since, like all Trainers, the TAMEcat does have substantial roll coupling. Also, Stall Turns require good energy management. That means throw the rudders over in the turn direction *before* the airplane reaches the full vertical stopping point. Knife edge flight is marginal for an aerobatic airplane but far better than most conventional Trainers by a wide margin.

The TAMEcat 40 ARF’s big wing allows the flaperons to be coupled to the elevators CL stunt style and the Futaba 7C has the perfect setting built into the transmitter. Using coupled flaps makes for 15 ft. diameter square loops and a slightly more stable inverted flight.

This airplane will rival any Advanced Trainer’s aerobatic performance. Yet it is an airplane that will keep the pilot out of trouble or help escape it should a bad situation arise. It is ironic that a fighter-trainer designed more than a decade ago will, like its more modern counterparts, take a

new pilot from first flight, through solo and then on in to basic aerobatics using the same airframe, radio and powerplant.

In summary, this is an exceptionally easy to correctly assemble airplane that uses extensive prefabrication and goes together very fast. As a Basic Trainer, it is up there with the very good ones. Its aerobatic performance envelope is far wider than most Advanced Trainers. Its “F-14” looks make it attractive to a wide range of potential new pilots. Its very low price and high quality construction make it hard for a new pilot to resist the TAMEcat 40 ARF.

A Low Price? How about $110 for an exceptionally complete, high-quality ARF kit of one of the most advanced Basic Trainers available today. For more information about this exceptional airplane, go to:
http://www.masportaviator.com/activedit/../redirect.asp?website=ArticleLink_Airborne_Tamecat

Photo 36

On a personal note, this was the first TWM kit I have ever had an opportunity to build. I have flown several other TWM kits (Known as “OPA’s” – Other People’s Airplanes) such as the Extra 300 120S, the P-40 Warhawk and the Tai Ji 60. I enjoyed their flight performances but really never knew much about how they built.

After building the TAMEcat 40 ARF, and its little brother the TAMEcat EP, I need to say that I was very much impressed with the large amount of prefabrication, the quality of construction (everything fit exceedingly well), the fast build time and what an exceptional value their airplanes really are. These two TWM airplanes are not going to be the last TWM kits I will be building. I intend to order their F-82 Twin Mustang for my own sport use. So far, I like the TWM products.

The TAMEcat EP will appear shortly in Sport Aviator. While its big brother is a Basic Trainer, the EP version is more a “third” sport airplane. It is much faster than the glow airplane, more elevator sensitive and will stall and spin. But it is a joy to fly, tracks well and is a rugged little fun flyer with great looks.

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**Specifications:**
Wingspan: 69 inches
Wing Area: 831 square inches
Length: 50 inches
Weight: 5.4 lb.
Engine: OS Max 46 AX
RC: 4-channel or more
with 5 servos

**ARF Features**
Interlocking tail construction
Painted fiberglass cowl
Complete with panel lines, hatch outlines
More prefabrication than most ARF's
Includes all hardware & two pilot figures
Extra clear cowl makes cowl fitting easy
Includes colorful decal set