RCU Review: Precision Aerobatics Katana MD

Contributed by: Clarence Boudville |

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Introduction

Being already well into my second PA Katana Mini and still enjoying every minute of it, the news of a larger sibling recently launched was certainly met with great excitement. What little that I could manage to glean from PA's website was that the larger PA Katana MD was not merely a scaled up copy of its little sibling in verbatim but a totally re-engineered machine that incorporates many design features that were once exclusive to only giant scale aircraft. I was only a mouse click away from owning one and as you may guessed, I clicked the proverbial *?Add To Cart*? button before the webpage could even fully load itself on screen and to be ?extra? cautious had that delivered directly to a hobby shop owned by a dear friend of mine to stage Phase 2 of my pre-planned covert operations, that is: *Stealthy sneaking parcel into the house without tipping **THE** Home Minister off*. There, it's done and I have now is to wait for its delivery but because the backorder it created due to the overwhelming response it got from eager enthusiasts all over the world and I am right at the back of this long queue.

Specifications

watch this and more videos

Katana MD video by
Clarence Boudville

Additional videos:

Katana MD video #2
by Radio Rookie

A few more videos contributed by
Daniel Dominguez
(aerofundan)
can be seen here:

Having FUN with the MD

Noon demos at SEFF 2007

Specifications:

Wingspan: 46" - 1170 mm
Length: 44.9" - 1140 mm
Wing area: 500sq.in
Wing loading: 9.77oz/sqft (approx)
Weight: 34oz - 965g (approx)
Type of Construction: PA FiberFusion?: Laser Cut Balsa, ply and carbon fiber
Type of Aircraft: Advanced Freestyle / IMAC (CG Selectable)
Skill Level: Intermediate to Expert Freestyle/IMAC

Setup:

Power plant: PA Thrust 30, 930KV outrunner (Front mounted)
Battery: PA 3S LiPo 2200mAh 20C and JAS 3S LiPo 2300mAh 20C
Connectors: Original Ultra Dean plugs
Servos: Hitec HS65BB
ESC: Castle Creations Phoenix 35A programmable brushless ESC
Receiver: JR 610M with Deans 2 piece Micro Antenna
Radio gear: JR PCM 9X
Prop: APC 13X6.6E
Four color schemes available:

Katana MD First Flights

Testing Snap rolls and
Knife edge loops

Assembly

The Katana MD

Contents of the box comes very nicely packed!

PA Thrust 30 motor, Cool Beyond The Look!

If there was ever a Guinness book of record for unpacking parcels, I probably broke it that morning! Oh man, even the box design itself looks fantastic. I could just see the look of the other guys when the box was open revealing the airframe. Wow, the yellow scheme embellished with the black CF texture looks simply superb and I can honestly say that the photographs in the website did not do justice to it. It looks a heck of a lot better in the flesh. I could just see the look on my friend's face as we ogled through the airframe, part by part and he remarked how he wished that his previous high quality giant scales were finished like that.

The first thing after unpacking the airframe out of the protective plastic bag that caught my eye was the canopy. It was smooth and appeared to have no seams where the canopy met the upper deck of the fuselage. Upon removing the canopy, held in place by 4 strong magnets, I was delighted to see that the canopy was essentially molded from a single piece of clear plastic and painted over to exactly match the yellow covering and henceforth explain the smooth seamless look. Very nice indeed!

Peering into the fuselage revealed the brilliance in the use of carbon fiber reinforcements, logically placed in strategic locations to provide added rigidity without sacrificing weight. It had carbon fiber rods embedded in the wood stringers running the entire length of the fuselage along with carbon fiber cross braces that felt very stiff when I attempted to twist it and that meant very precise handling in the air.

I was astonished to note the carbon fiber trays for the battery, rudder servo as well. To the side of the fuselage, there is a pair of wing tube supports where the carbon fiber wing tube intersects the fuselage to provide a solid, flex free structure again prompting precise handling. The laser cut balsa-ply structural panels were so well designed and I was pleased to note that the designers have taken the extra steps to minimize excess weight. I thought to myself that the attention to detail in weight management was brilliant on the designer's part and I certainly appreciated the pre-installed Velcro strap on the Receiver tray which is especially tricky to install considering the confines of a built-up fuselage. The tray itself is adequately sized to accommodate most compact sized receivers.

Incredible FiberFusion? construction

CF Battery Tray plenty of space for batteries up to 11.1V 2200 mah

Leaving the fuselage aside, the wings were put under scrutiny and I was amazed at what I saw already attached to the wings. The ailerons are already pre-installed and a complete departure from the run of the mill CA hinges that most are pretty familiar with. These ailerons were specially built into a tunnel without the need to manually seal the hinge gaps, reminiscent of a full scale aircraft. The pre-built ailerons had massive 3D throws and travel on both were silky smooth.

Moving on to the horizontal tail feathers, the massive elevator spots a single piece counter balanced elevator with a carbon fiber stiffener pre-installed at the joiner to for added stiffness to resist the most aggressive vertical pull up without roll coupling which I usually dish out. Highly essential if precision flying is desired as well as eliminating the unpredictable and alarming roll over during an emergency pull up and the impending smashing date with Miss Ground! Which I have indeed grown to be pretty close of late!

Next came the visual inspection of what's bundled in the hardware package. It contained carbon fiber horns, pre-installed Kevlar pull-pull cables, carbon fiber rudder servo horns, pushrods and a multitude of essential metal fasteners of various sizes. What caught my attention was the unusual looking plywood plate that turned out at the end of the day to be a deflection gauge. Wow! This is the first time I have ever seen a defection gauge bundled with a model of this size.

The pre-painted fiberglass cowl color matched to the fuselage was indeed a work of art. Test fitting the cowl to the fuselage revealed that the black lateral stripe was in precise alignment with the carbon fiber scheme black stripes running the length of the fuselage, something that I have only seen on a top dollar all composite models.

Fiberglass cowl

Pre-hinged Ailerons! Not even a gap to seal!

Aileron CF leading edges, strong and light!

The Build

Considering that so much of the work has already been done at the factory, the build has been pretty much a walk in the park and with a well written and intuitive pictorial installation manual; it should be a fairly easy task for most average modelers with prior experience of building at a few balsa ARFs. In most instances much easier especially when it comes to the ailerons, canopy, motor mount and cowl that are already pre-built at the factory. PA have certainly gone the extra mile to take so much of the laborious building out of the KMD and this has made it a fun and easy task.

The landing gear and horizontal and vertical surfaces are simple to install, as elementary as *ARF 101*. I have opted not to install the optional CF wheel pants until after the KMD has undergone its check ride

Motor mount and CF rod in place

Removable wings with CF tube

Huge Tail surfaces for excellent 3D performance!

The mount itself is quite an innovative departure from the average ARF's I have seen and built in the past. Built considerably stronger, it spots three carbon pins that will prevent any chances of the motor mount ripping out and a pre-drilled carbon front plate securely mating in a tongue and grove fashion on all four sides of the frame. It will take a lot to ever rip a motor out and I thought to myself, that PA does not do anything without a reason and if their motor mount is this strongly built, they must surely know something I didn't at the time about the power of their motor. And I will surely find out soon enough!

Next on the build agenda were the CF rods for the ailerons which are pretty simple to install. I used a timesaving technique that involves first, snipping about 5mm off the supplied heat shrink tube that will be used to temporarily hold the metal Z-bend and CF rod in place. This allows easy alignment and adjustments to be made prior to tacking with CA.

Wrapping the string prior to wetting with CA assembly

Tacking down with a bit of CA prior to wrapping

Done! a neat, Strong CF push rod

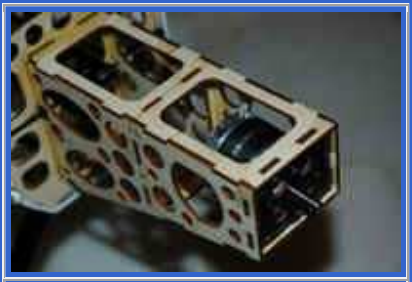
Installation of the shiny, cool looking, PA Thrust 30 power plant came next. The PA Thrust 30 is simply a work of art befitting the PA Katana MD itself and reminded me of high quality custom made helicopter upgrade parts, (the kind that has that ***special*** ability to transform your wallet into CF, the moment you step into a hobby shop). Gleaned from PA website, the PA Thrust 30 is said to be a

revolutionary new motor specifically engineered incorporating their RotorKool technology for exceptional cooling and efficient running along with an ability to turn a prop one size larger than most motor in its class and hence the plan to fly the PA Katana MD with an APC 13X6.5E for the test flight. The motor mount had all the mounting and ventilation holes pre-drilled and mounting the motor was only a matter of securing 4 bolts. No messy drilling and thrust line adjustments whatsoever. With the supplied air scoops installed, the PA Thrust 30 will be running much cooler and last longer than most motors currently available.

The installation of the Rudder servo and Kevlar Pull-Pull went without a hitch. A CF extended rudder horn was also included in the box and gave more than adequate throws and in fact adequate for all control surfaces. The installation of the electronics and the cowl followed and the PA Katana MD was ready for the final phase of the build, the Radio setup.

PA Thrust 30 at the Office!

CF Landing Gear LIGHT & STRONG



Super Clean Construction

Giant Scale Features: Pull-Pull Rudder Controls checked off

Avionics in place and checked off

Flight Report

Radio Setup

Here is where I usually deviate from the manual as a matter of preference. The JR PCM9X was set for triple rates, the first two being the recommended high-low conservative rates but I deviated from the recommended +70% expo on the high rates and retained at 30% and the third, my personal preference (zero expo) on high rates linked on single three position

Pictures

flight mode switch for convenience and ?***fumble-free?.*** The bundled deflection gauge was a certainly a welcome sight and since it was there, I decided to go with the recommended throws but opted not to use the expo recommended.

The Initial Setup Rates

Control Surface	Rate 1 (Low)	Rate 2 (High)	Rate 3
Aileron	Dual Rate 50% Expo 30% Throw 20deg	Dual Rate 100% Expo 30% Throw 45 deg	Dual Rate 100% Expo 0% Throw 45 deg
Elevator	Dual Rate 50% Expo 30% Throw 20deg	Dual Rate 100% Expo 30% Throw 45 deg	Dual Rate 100% Expo 0% Throw 45 deg
Rudder	Dual Rate 50% Expo 30% Throw full travel	Dual Rate 100% Expo 30% Throw full travel	Dual Rate 100% Expo 0% Throw full travel
Mixing		None	
Airframe CG		103mm (3D/ Freestyle)	

The Check Ride

Saturday arrived and the agonizing wait was over for the check ride, with only a very gentle breeze blowing, it was perfect flying weather for stationary torque rolls and hovers. It just does not get any better than this. Prior to the flight, as usual, I had all intentions to conduct a structured method in flight testing beginning with a conservative rolling take off, level flight to trim and proceed with basic aerobatic maneuvers, the basic stuff you would read in most reviews. With the sweet sound of the Castle Creations Phoenix 35 ESC arming, I did a quick customary routine preflight check. The usual stuff; ailerons; check, rudder; check, elevator; check, German techno trance music blasting at full volume;

Sibling Rivalry: Sizing up the Katana Brothers

Nice view from behind

Rock solid inverted harriers, hovers & tail touches

Torque Rollin'

?.NOT?yaadaa, yaadaa, yaadaa?. I noticed that the low rates appeared a bit too conservative for my liking, especially on the maiden flight where I may need the extra authority to fight for control, juts in case things gets out of hand and proceeded select Rate 3. It was now time to advance the throttle.

The rolling takeoff was short and the PA Katana MD was quick to get into the air and went straight into a set of beautiful slow high-alpha harrier rolls round the field. I leveled her and pulled up vertical to check the power of the PA Thrust 30. Wow, the motor just purred quietly and climbed vertically without hesitation. The Thrust 30 with the 13X6.5E provides ample power with a ?Giant scale like? feel to it. A quick blender and immediately into an inverted elevator and harrier and popping to a hover and torque roll. The entire set of routine was flawless and smooth. I was completely amazed at how easy she handles and that reminded me of the ?Easy-to-fly? Giant scale airplanes in the Aerofly Pro Deluxe simulator I have grown so accustomed to over the past year or so. The feel was fantastic, agile, solid, responsive and yet floaty, forgiving and stable. A rare brilliant combination of excellent aerodynamic attributes and a clear testament to the genius behind PA's engineering design.

Resisting the dire urge to just breakout and have fun, I continued on with the flight assessment. Next was the fast Knife Edge and she executes it perfectly. With only a little rudder input, the Knife edge is perfectly straight with absolutely no coupling or tucks and finished off with a Knife edge snap, popping up and back down as if on rails and continuing on the Knife edge without any hint of snaps. She is certainly excellent in the Knife Edge department too.

Flying the upright harrier was effortless and the PA Katana MD also excels in this department being able to parachute all the way down to a harrier spot landing. In fact the harrier landings were so good that I never had the chance to execute a normal landing for the remaining 21 test flights done for this review. That maiden flight lasted 9 incredible minutes, the time I initially set on my PCM 9X timer to be on the conservative side of things.

Sunday is Funday

Since all six check rides on Saturday pretty much

Ample control authority
for low 3D

Very stable upright harriers & harrier landings

Sorry Mr. Ant!
Was that too low for you?

Inverted parachute into a harrier

covered the ?serious by-the-book? maneuvers I had listed in preparation for this review, I pretty much left entire Sunday to venture around on the fun side of things and to see how far the Katana MD could be pushed or rather more appropriately as it turn out, how far Katana MD would push me instead. I was pushed pretty far and the PA Katana MD just keeps coming back for more. I have tried almost anything in the book to uncover any hidden bad habits and to my wits end I could not find any, even after 22 flights she is a well natured ?*Pussy Cat*? of an airplane, just sweet, extremely friendly and accommodating.

The maneuvers go lower and lower pretty quick and next to no time, she was already performing rudder scrapes, stationary harrier rolls in the wind, and rolling inches above the deck and I finally met up with ?Daddy Dumb-Thumbs? (*or was it the ground reaching up to grab my baby?*) on the last flight due to exhaustion and fatigue setting in after 17 intense sessions on a very hot day and I managed to clip the starboard wingtip on the ground and cartwheel, hitting the nose and landed poised on the gears. I was amazed after the stunt, no damage except a slight fracture on the outboard aileron rib (repairable) and immediately took off and flew the rest of the pack. This ?Pussy Cat? sure has nine lives, still have eight to go as I chucked silently at the thought of what just happened.

Katana MD video by Clarence Boudville

Additional videos:

Katana MD video #2

High Alpha Rolling Harriers

Awesome transparent covering on the bottom of the plane

Excellent hover performance

Whoops! it was the Ground's fault!

by Radio Rookie

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Katana MD First Flights


Testing Snap rolls and
Knife edge loops


Airframe inspection after Whoops!

Maneuvers Rating

Maneuvers	Rating	Grading Notes
Rolls	A+	Rolls are axial and instantly stops the moment the aileron stick is released. Excellent for four point rolls and hesitation rolls and very controlled for slow rolls.
Loops	A+	Entry and exit on the loops are clean and precise. The Thrust 30 provides ample power to perform big air loops with authority.
Hammerhead	A	Massive rudder provides more than adequate yaw authority at the apex.
Snap rolls	A	Excellent snap rolls. Crisp and precise and has the ability to immediacy snap into a stationary hover on demand.
Flat spin (Upright)	A	Nice slow and lazy flat spins with easy recovery without any hint of wing rock. Immediately transitions into a parachute, the moment the rudder and ailerons controls are released.
Flat spin (Inverted)	A	Effortless entry and recovery. Smooth transition into inverted parachute and harriers with no hint of wing drop.
Hovers	A+	Relatively easy to hold steady and controllable hovers with very little control input. Ample control surface and throws allows quick and responsive recovery. Stability makes it easy to practice belly in hovers in preparation to advance to controlled torque rolls.
Knife Edge	A++	Rudder only operation with absolutely no coupling. One of the easiest airplane to execute the Knife Edge. Executes beautiful knife edge snaps.
High Alpha Knife Edge	A+	Very easy to transition from hovering to slow and stable high alpha knife edge without worry of unpredictable rolls or snaps.
Harrier (Upright)	A+	Very stable and easy to execute. Holds stable high alpha attitude with ease and will easily execute

		harrier spot landings on demand with a short roll. Slow speed handling in high-alpha and VSTOL characteristics makes it possible to fly the KMD in confined and very rough airfields a distinct advantage over the giants.
Harrier (Inverted)	A++	Exceptionally stable on the inverted and safe to fly circuits without any hint of violent snaps. Massive elevator and thrust from the motor as well as the stable high AOA during the harrier makes it possible to hold precise altitude control to confidently execute rudder scrapes without the risk of snagging.

Summary

The PA Katana MD turned out to be a fantastic airplane, with all the great aerodynamic attributes others could only wish to attain. It's probably the only aircraft that I have flown so far that I can honestly say that I got fully comfortable with within seconds into the flight as opposed to most that require at least a couple of sessions while others on the extreme cases have actually taken as long as several weeks for me to fully acclimatize.

I have flown many similar airplanes in the past and nothing so far comes even close to the PA Katana MD and true to the KMD's slogan *?Redefine Your Limits?*, it certainly redefined mine, to well beyond my wildest expectations in just 22 short sessions. So, whatever your goals may be, whether it to be a budding intermediate level 3D pilot, an aspiring protégé, a professional free stylist or a giant scale IMAC contestant, I am truly convinced that the PA Katana MD will certainly be up to the challenge.

The PA Katana MD is simply light years ahead of the rest of the pack and I am certainly excited to see what else is coming out of PA's ?Skunkworks? next.

Available from PrecisionAerobatics.com and in the USA from Atlantahobby.com and through your local hobby shops.

Dealer Contact Information

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