

# X-cell

# News

The Official Newsletter For Miniature Aircraft

Volume 2003

SPECIAL EDITION

Issue Number 2

## Introducing the Fury Tempest 3D and FAI!



*The New Tempest 3D*



*The New Tempest FAI*

Ever since the very first Fury shipped over 2 years ago, Miniature Aircraft USA has been hard at work building the ultimate 3D and contest helicopters. Well, the development and testing is complete and the all new Tempest 3D and FAI are ready to go.

For years, XCell helicopters have led the industry in building tunable helicopters. The Tempest adds a new dimension to the term adjustable, as almost every aspect of these new kits can be adjusted to fit your particular flying style. They really do represent the new flagship models for

*(Continued on page 3)*

## EDITORIAL

### Greetings

At last, the new Fury Tempest models are ready to go. First shown at Toledo back in April, these things have been in development for some time and represent some of the finest model helicopters available in the world today. This issue is almost entirely devoted to taking a closer look at these models.

As this is being written, the US F3C team is in Japan about to go head to head with the best pilots in the rest of the world. Have to wait and see how that turns out, but good luck to the US Team!

Several pilots in this area have turbine model helicopters now. These are really very impressive in the way they act and sound. And they've gotten much easier and safer to operate. They do require a special license from AMA in order to be covered by the standard insurance policy. If these are flying at your AMA sanctioned club site, make sure the pilot has an AMA Turbine license, and the model being flown has been type certified by AMA. The AMA website lists all the turbine models that they have already certified.

Our local club, had a recent reminder as to just how important it is to keep safety in mind. One of our local flyers got hit in his calf with the rotor blade of a runaway helicopter that was stuck at full power. There was extensive damage to his leg which required emergency surgery to repair. He's very lucky, he's going to be just fine and is again flying his helicopter. Never forget that these things require your utmost attention and respect.

Its finally summertime just about everywhere in the US and its really hot here in Florida. Don't forget to bring water, sunscreen and if possible a tent or some other means for getting out of the sun. Staying hydrated is very important, and not having enough water can catch up with you before you know it.

Burn as much fuel as you can. It's the most important money you'll spend in this hobby!  
Carey

## X-CELL NEWS

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31713 Long Acres  
Sorrento, FL 32776  
(352) 383-3204

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***Florence Schoonard – President /Owner***

***Tim Schoonard – Vice President***

***Carey Shurley – Newsletter Editor***

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## The Tempest

*(Continued from page 1)*

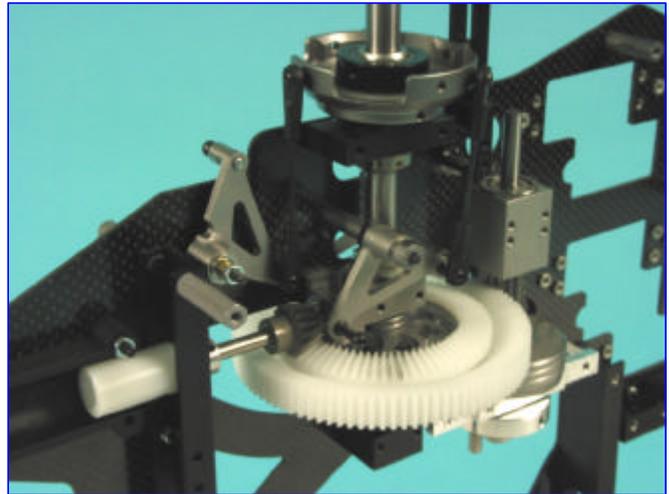
Miniature Aircraft. The Tempest 3D and FAI include the most up to date and well designed components of any model helicopter on the market today.

There are a number of features that are specific to each model and a number that are common about both. Lets get started by looking at what the two Tempest versions have in common.

## Common Features

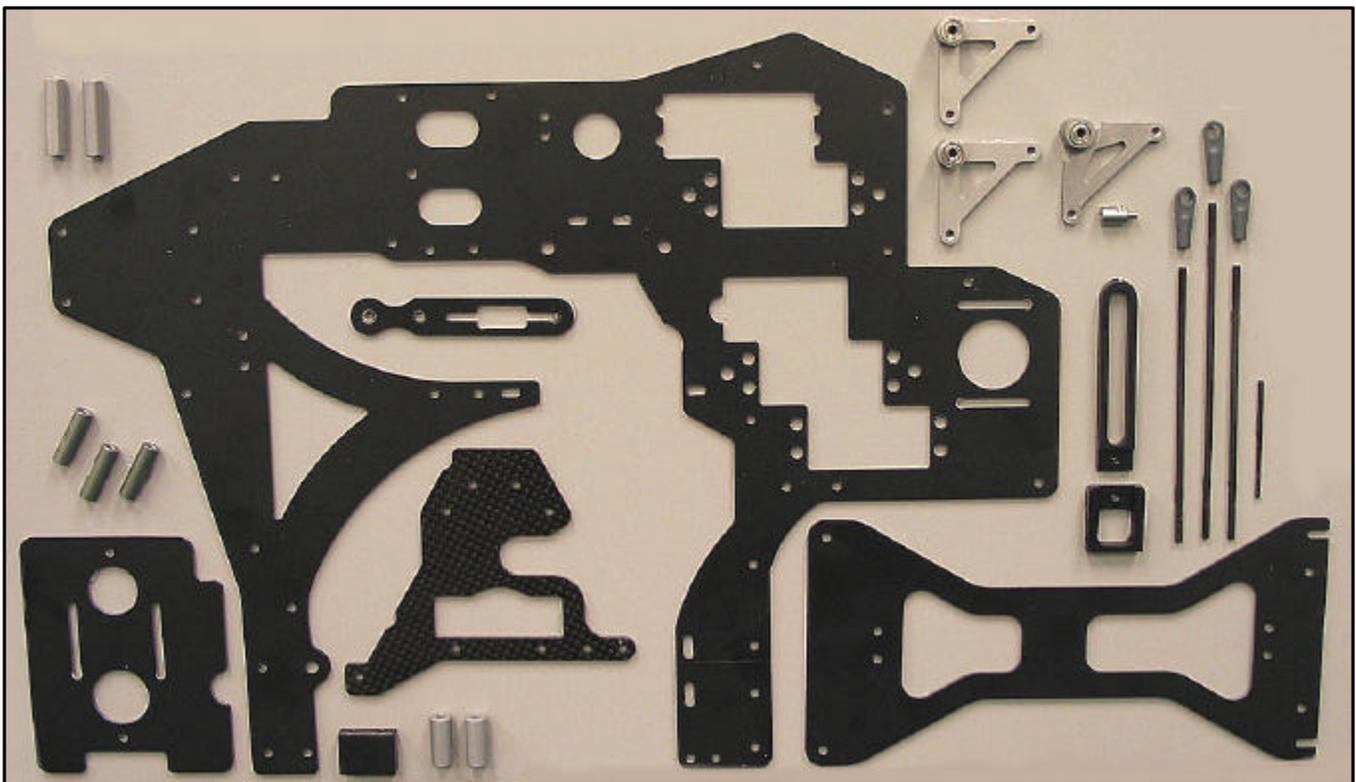
Starting in the middle, there's a new design frame. Cut from the finest quality materials, the configuration has been improved, so that the entire drive train can be assembled on one frame half. This not only simplifies initial assembly, but also makes it easier to do mainte-

nance or replace parts if the need should arise. The servo placement has also been



*Left frame assembly for the Tempest FAI* improved so that their positions result in a sleeker look. It also allows for mounting the

*(Continued on page 5)*



*The Chassis Layout for the Tempest 3D and FAI model*

## Team Pilot Intro: Matt Chapman



Miniature Aircraft USA would like to welcome its newest Team Member, Matt Chapman. If you've been to a full size air show lately, you've probably seen Matt perform in his Cap 232. It's a very special airplane, one of only six in the world. Matt throws it around like a model. His shows are unbelievable and filled with 3D maneuvers in an airplane. If you have a chance to attend one of his shows, you won't be disappointed.

What you may not know, is that Matt enjoys flying model helicopters and performing 3D routines with them as well. He's now flying an XCell Fury Extreme.

Check our website, we'll soon have more information about Matt and his connection with Miniature Aircraft!!!

## Latest Products

### Part # 0867-14 New Extreme Duty 33" tube drive



Big block engines, longer t/r blades, high gain gyros, ultra fast t/r servos, and aggressive flying styles, place an all time high load on t/r drive systems. In response, we've improved our tube drive systems to handle these requirements.

- New Tube Material - 40% thicker/ 15% larger diameter
- New Mandrel design - 25% more adhesive area than previous design
- Threaded tube sleeve is now integral part of u-joint
- Single bearing centered on tube
- Designed for the extreme duty t/r installation
- Standard Equipment on the Tempest models



*(Continued on page 9)*

**New Tempest Models** (Continued from page 3)

rudder servo on either the left or right side. Also, the clutch/ pinion mounting cutouts have been changed so the additional frame spacers previously used for the clutch blocks are no longer necessary. The frame design has also been adjusted to accommodate an even larger array of gear ratios.

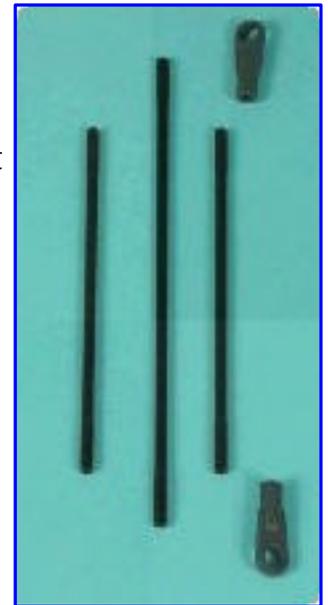
Speaking of gear ratios, a very wide array of ratios is available for this chassis. The ratios that are supported are 7.25:1, 7.50:1, 7.66:1, 7.75:1, 7.91:1, 8.18:1, 8.36:1, 8.45:1, 9.0:1, 9.3:1 and 9.5:1.

With all these options, engine sizes from .50 all the way through a .91 can be used, of course using the proper blade sizes.

There's a new frame support block at the rear of the frame that connects the t/r boom supports, the rear frame, and the lower frame support plate together and the front frame support

block has now been slotted to accommodate larger motors crankcases without any interference.

The mainshaft uses the 4 bearing setup pioneered in the Fury Extreme and the one-piece t/r shaft/lower main bearing support better accommodates using optional front t/r pinion gear ratios. The starter shaft/clutch support block retains the proven 4 bearing design, but the clutch/driver support block has been redesigned so that it is now a structural part of the frame and includes a new 22mm sealed bearing to ensure maximum support for the clutch assembly.



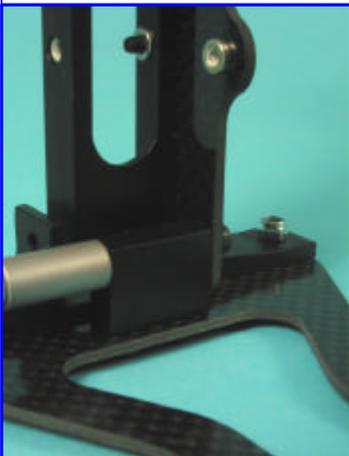
2.6mm control rods



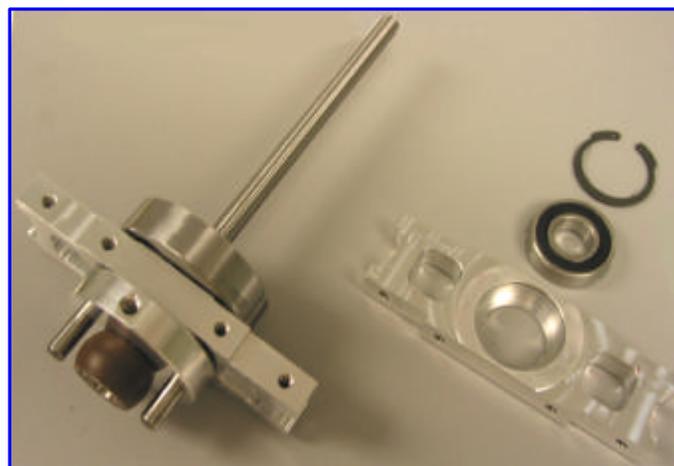
CNC Anti-Rotation Guide

The swashplate control system has been improved in several ways. The new servo configuration along with redesigned CNC aluminum bellcranks allows straighter control rods to the lower bellcranks. These rods are now a massive 2.6mm to eliminate the possibility of any control flex under heavy maneuver loading. The rods between the bellcranks and the swashplate are now all the same length. This eliminates almost all of the control interaction

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Tail Boom Support Mount

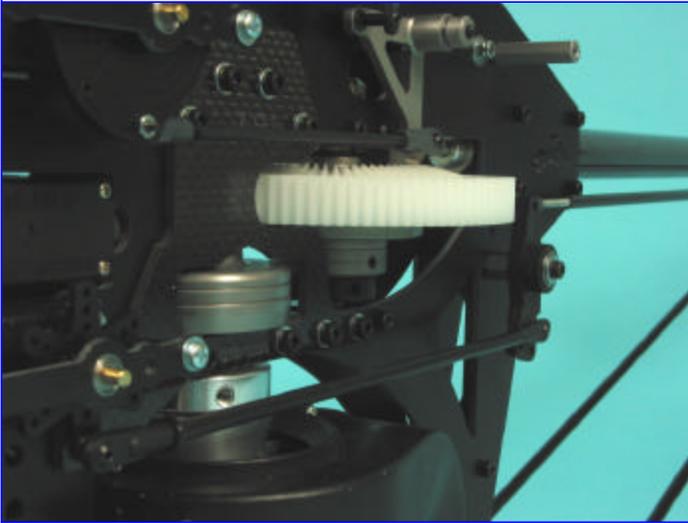


New Clutch Driver with 22mm support bearing

**New Tempest Models** (Continued from page 5)

typical of CCPM systems. Finally, the anti-rotation bracket is now a CNC machined part to ensure perfect swashplate timing throughout the collective pitch range.

The front t/r control system has been changed so that it now supports two ratios, including



*Tempest 3D Front T/R Control System*

1:1. These have been matched to the ratios available on the rear t/r bellcrank to ensure top performance of today's precision gyro systems. Depending on which model you want, the tail rotor will be on the left or right hand side, but using optional parts, the t/r control system can be mounted on either the left or right frame in support of a left or right hand tail rotor.

Moving back along the tail boom, the tempest kits include as standard equipment the 33" ultra stiff tail boom. Inside is a new larger t/r drive tube, with larger drive joint man-



*Comparing new (top) and old t/r drive joint*

drels. Created in response to the requirements of the big block motors, longer tail rotor blades, more powerful gyros, and the stress that more radial 3D maneuvers place on the tail rotor, this drive tube has a 15% larger diameter and is made of material that is 40% thicker. The new end pieces allow for 25% more area for adhesive. It's plenty



tough! At the back, you'll find a proven aluminum t/r gearbox and the heavy-duty t/r hub. This setup has been proven over thousands of flights to withstand the most violent t/r maneuvers and keep going. The horizontal and vertical fins are ventilated C/F for maximum



(Continued on page 7)

## Miniature Aircraft USA at Toledo 2003

Photos By David Harkey



*So much cool stuff to see*

Miniature Aircraft had a large booth set up this year, to preview all the new goodies! Plenty of expertise was available to answer questions or help with problems, as many of our team members were on hand to help. Shown above are Team Pilots Gordie Meade and Mike Swift, and of course Tim Schoonard. Below are some of the many gearing options available not only for the Tempest, but for the entire Fury line.



*So many gear ratios to choose from.....*

### The Tempest

*(Continued from page 6)*

durability (the designs are different for each model type).

Moving forward, finds the new Tempest canopy. Similar in outline to previous canopies, the fuel line bulge on the left side is gone, and has been replaced



*One of the new CNC canopy retainers*

with stylish recesses on each side. Still made of durable gel coat fiberglass, the mounting system has been redesigned to allow a full 4 point capture system. The rear mounts no longer mount to the tail boom clamp bolts, but have dedicated mount points. (the standard Fury canopy can be used by simply changing the location of the rear mount studs on the Tempest). In addition, standard equipment includes the new one-piece knurled CNC

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***“Simply the finest model helicopter on the market today!”***

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aluminum canopy bolts. These incorporate the bolt, shoulder and cap all in one, making these easier to install with less parts. The kit ships with full decals to make your Tempest as snazzy looking as you want!

Last but certainly not least lets look at the new Tempest rotor head and control systems. The swashplate is the latest design, with slot-

*(Continued on page 8)*

## The Tempest

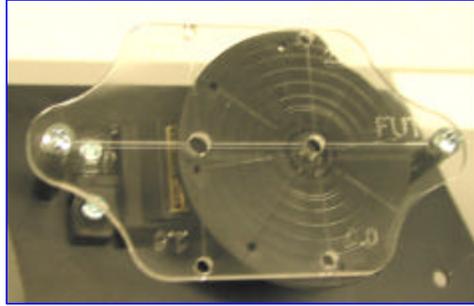
(Continued from page 7)

ted openings to allow easy access to remove/adjust the upper control rods. The washout block is the same metal block as the Extreme. At the center of the head is the new Tempest upper and lower head blocks. Designed to provide more consistent axle damping, the upper head block allows 35mm wider damper spacing than the standard XCell head. This allows the rotor head to

*Common Rotor Head Blocks*

hover better, track better through maneuvers, and to perform better than any rotor head we've ever produced. Using a single axle design, which floats in fully adjustable dampers, the head now includes CNC aluminum blade grips, with new design metal blade arms and stronger 5mm blade bolts. The flybar seesaw is also a new design, and works with new stainless steel flybar control arms which provide 3 different flybar control ratios. The head is topped off with an integral metal head button.

Finally, each kit includes a new tool for setting the ball link location on the collective/cyclic servos. It makes it much easier to get the servo hole set at exactly zero degrees and to get the elevator servo arm set at exactly 2.5 degrees, which is a requirement of the new control system. This template simply bolts in place of the servo bridge. You then drill the hole in the cor-



*New Servo Alignment Guide*

rect position, install the ball link and then and re-install the bridge. Its that simple.

That pretty much covers all the features that are common to both models. As you would expect, there are features specific to each type of model that ensure that they are the best in each category. So now we'll look at each model more carefully.

## Tempest 3D



The Fury Basic, Expert and Extreme have set the industry standard for 3D flying. Just go to any fun fly in the US (or just about any where) and you'll see just how popular these models are. We've taken all the experience gained from building these and combined it with feedback from some of the countries best 3D pilots like Jason Krause and Todd Bennett. The result is the ultimate 3D helicopter, the Tempest 3D!

First, lets look at some of the features unique to this model that make it simply the finest 3D model helicopter on the market today.

The most important feature, is the new rotor head

(Continued on page 9)

**Part # 120-99  
New CNC Aluminum Canopy Retainers**



- Standard equipment on the Fury Tempest Models
- Knurled for easy installation and slotted for easy removal
- Cupped design seats perfectly on canopy grommet
- One piece design eliminates washer and sleeve
- Sold in pairs
- Works with XCell SE and Pro2K models as well

**Part # 120-91  
New Fury CNC Anti-Rotation Guide**

- Standard equipment on the Fury Tempest Models
- CNC Precision construction - can't flex
- Simple two piece assembly
- Fits all Fury models



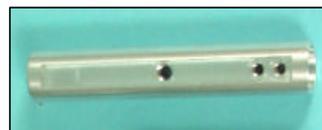
and control system. Based on the common Tempest center head blocks and main rotor blade holders, there are a number of aspects that have been designed specifically for 3D applications. A 3D specific design blade arm



*The Tempest 3D Rotor Head*

ensures perfectly centered bell mixers, so there is no unwanted delta interaction. The bell mixers themselves are a new design CNC aluminum fully ball bearing unit that allows for 4 different bell/hiller ratios.

The flybar seesaw is also a new design, that allows for two different hiller mixes to better tune the stability of the models. Combined with various available flybar lengths, are our proven lightweight 3D flybar paddles. All together, there are eight different bell/hiller mixes available to fine tune the Tempest 3D



*The Tempest 3D Flybar Carrier*

to just the right feel that you want.

The bell mixer control rods are larger 2.6mm rods, very tough and no flexing here! Finally, the washout mixers are the proven design from the Extreme and have full ball bearings.

(Continued on page 10)

## The Tempest

*(Continued from page 9)*

All of the frame components are cut from high quality black G10. This is the same material used in the Fury Expert and Extreme and has proven to be very durable.

The Tempest 3D can support many different gear ratios. Standard ratios are 7.91:1, 8.18:1, 8.36:1 and 8.45:1, which are typical for an .80/.91 sized motor in a 3D application.

The new style Tempest canopy is packaged with a set of 3 color decals that are unique to the 3D model. At the rear of the model you'll find a set of composite fins, that are cut out for lightweight but remain strong.

The tail rotor is the proven Extreme design and remains as a left hand version. Due to



*Tempest 3D Tail Rotor - Standard Left Hand Shown*

the new frame design however, using optional parts it can be converted to a right hand tail rotor if that's what works better for you.

The CNC aluminum t/r hub, extreme duty tail rotor hub and new extreme duty tube drive assembly can stand up to the most radical maneuvers you can throw at it and come back for more.



*Tempest 3D T/R Pitch Control System*

Combined with the common Tempest features, these unique features complete the Tempest 3D!!

## Tempest FAI



For years, XCell models have set the standard for precision competition machines. There's been an XCell model competing in every F3C championship that's ever been held and Cliff Hiatt won the 1995 World Championship with an XCell Pro2. The Pro1,

*(Continued on page 11)*

## The Tempest

(Continued from page 10)

Pro2, and Pro2K represented an evolution of our flagship competition model. Now comes the Fury Tempest FAI.

The centerpiece of the Tempest FAI is the new FAI rotor head. With the basic design done by World Champion Cliff Hiatt, you'd expect this rotor head to fly better than any other contest head on the market, and it delivers!!! This is the most stable and true flying rotor head we've ever produced. You have to fly it to believe how good this really works!

New design blade arms, provide that the head can easily be changed in just a few minutes to support either correcting or non-correcting delta using included parts. There is a new FAI design flybar seesaw which includes new



*The Tempest FAI Rotor Head*

bell/hiller mixers that support 4 all new hiller ratios. These can be adjusted to suit your particular flying style but can offer incredible stability!

New stainless steel flybar control arms support 3 different flybar ratios. And speaking of flybars, the Tempest FAI sports new larger Pro3 flybar paddles with 10% more control surface, and can support any weight between 38 and 55 Gms. The weight can also be changed at any

time as the paddles are easily disassembled and reassembled. Stronger 5mm blade bolts are now standard equipment and the head is topped off with an integral metal head button for smooth spool down.



*Pro3 Flybar paddles - Standard on Tempest FAI*

Every contest pilot likes to set up their model to feel just the way they want, and with all this flexibility, the Tempest FAI will allow as much customization as you want!

The frame design is the same as the Tempest 3D, however the Tempest FAI frame is cut from the finest quality carbon fiber. It also allows for mounting the rudder servo on the

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*“The Tempest adds a new dimension to the term adjustable, as almost every aspect of these new kits can be adjusted to fit your particular flying style”*

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right side to support the right hand tail rotor, which is standard equipment (more on that later).

The Tempest FAI can support many different gear ratios. Standard ratios are 7.66:1, 7.75:1, and 7.91:1, which are typical for an .80/.91 sized motor in a contest application. Using optional parts, the Tempest chassis can also accommodate any of the available ratios.

The boom support ends are CNC aluminum

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## The Tempest

(Continued from page 11)

and connect to the new rear frame support block to make a very sturdy tail boom. In most cases you'll be able to improve your gyro gain by several percent due to the stiffer assembly.

The front t/r control system has been changed to support the standard right-handed tail rotor, although with the Tempest FAI, the t/r control system can be mounted on either the left or right frame in support of a left or right hand tail rotor using standard included parts.

At the back, you'll find an all new tail rotor control system, aluminum t/r gearbox, heavy-duty t/r hub and new design CNC t/r blade holders. A new reversible machined control arm, provides ultimate precision yet with a very simple to assemble and maintain design.

The new Tempest FAI tail rotor represents the first XCell model to have a right hand tail rotor design. This new design results in a more crisp

tail rotor response in hovering and pirouetting maneuvers and better tracking in both horizontal and vertical rolling maneuvers. The horizontal and vertical fins are made of lightweight C/F with a new slotted design.

The new style Tempest canopy is packaged with a set of 3 color decals that are unique to the FAI model.

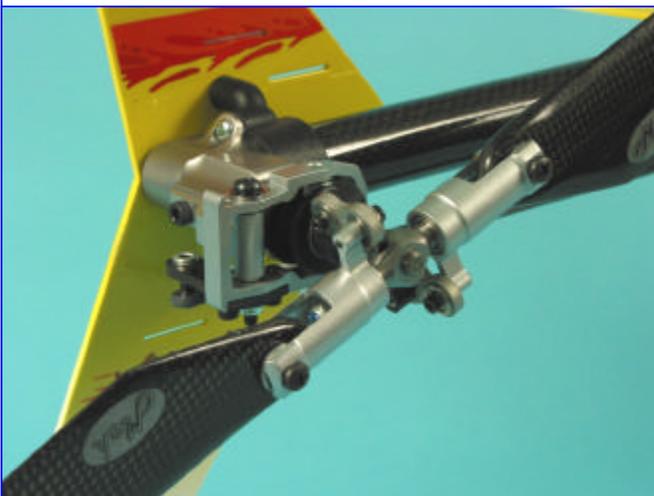
And that covers the new Tempest FAI! It's simply the finest contest model helicopter on the market today. If you're ready to be in the winners' circle the Tempest FAI is the helicopter for you!



control system, aluminum t/r gearbox, heavy-duty t/r hub and new design CNC t/r blade holders. A new reversible machined control

arm, provides ultimate precision yet with a very simple to assemble and maintain design.

The new Tempest FAI tail rotor represents the first XCell model to have a right hand tail rotor design. This new design results in a more crisp



They're Here!



**See Your Dealer To  
Reserve One for You!**