

# The Multiplex Twinstar II and the Easy Glider AeroTow

## Too Much Fun with Foam



▲ The Multiplex Twin Star II and Easy Glider are not just chunks of foam—they are well-designed airframes. Paired together, they make for inexpensive aero-tow fun.

Think of how silly the three of us dads felt as we watched our boys flying their Multiplex Easy Gliders. The kids were alternating hand-launches and performing spot landing approaches with their models, while three top-of-the-line molded contest thermal duration (TD) ships sat in protective bags in the back of the truck. More than \$6000.00 worth of high-end molded sailplanes sat unused as the Easy Gliders went out for yet another flight.

The boys kept at it, launching again and again, returning to the pits multiple times to recharge the radio batteries. As the late afternoon turned to evening, the boys were still flying. It finally became so dark that flying was no longer possible, and we had to use the headlights from our



▲ The Poly Quest 3S, 4000-mAh Li-Poly battery fits perfectly in the nose of the TS2. No additional nose weight is needed to achieve the proper center of gravity (CG).



Don't let the towline drag in the grass for too long! The TS2 shoots another approach.



◀ As you can see, the brushless motors and ESCs fit neatly inside the engine nacelles with very little modification.



The Easy Glider is a very nice-flying aileron glider.

▼ I use about 120 ft of light braided twine for the towline. We keep it wrapped up so the line won't tangle between trips to the field.



cars as we loaded up the rest of the gear to head for home. I thought to myself, "Man, they sure are having fun out there." I began to wonder if perhaps I might be missing something.

The next day, I took the Easy Glider out for a few flights at the park, and was blown away. This thing flies great! I was shocked that about \$70 worth of foam could perform so well, but I guess the Multiplex designers know what they are doing.

I raced home and jumped on the Internet to see what other pilots thought about the Easy Glider. The reports were consistent. Everyone loves the Easy Glider. Simplicity, low cost, crash resistance, and good flight performance have given the Easy Glider a well-deserved positive reputation. It's everything a weekend sport pilot could ask for.

As I read about the Easy Glider, I learned there was also a new Twin Star out: the Twin Star II (TS2). It is made from the same durable material as the Easy Glider, and is based on the proven and popular original Twin Star (TS), three of which I have owned in the past. The TS2 incorporates a long list of improvements over the original TS, and was recently reviewed in *Quiet Flyer* magazine.

Being an aero-tow enthusiast, the first thing that came to my mind was, "Hey! I should set up an aero-tow system for the TS2 and the Easy Glider." I did some more online research on the TS2, and

found many threads about the TS2 in various online groups. The topic of using the TS2 as a tug came up a few times, but was quickly shot down by the "experts" who frequent the forums. All I needed to read was "The TS2 will never be able to tow an Easy Glider. It just won't work." Well, that did it for me—it was time to convert a TS2 into a tug.

After a few evenings messing around with E-Calc, I came up with a power setup that looked good. At least, the math said it would work. So I ordered up the TS2, plus the rest of the gear, and planned my build for the following week.

## Gear and Modifications

The Easy Glider needs no real modifications beyond a simple tow release, which we will cover later. The TS2, on the other hand, does require some modification. The power system must be upgraded, and a simple modification to the rear wing bolt is required in order to provide a positive location for the tow line. Here is a list of the equipment I selected to power my TS2 aero-tow tug:

- Two E-flite™ Park 370 (1320-kv) brushless outrunner motors
- Two Castle Creations Thunderbird 18 electronic speed controllers (ESCs)
- Two APC 8x4 electric props
- One 3S Lithium Polymer (Li-Poly) battery capable of delivering about 25 amps of continuous current (I selected a 20C Poly Quest 4000-mAh battery)
- A custom wiring harness with a

## Setup

### Radio Gear:

- JR pulse-coded modulation (PCM) synthesized transmitters and receivers
- Hitec RCD servos used throughout both models
- 4-cell, 2700-mAh NiMH receiver battery in the Easy Glider

**Motors:** E-flite™ Park 370 (1360-KV)

**Battery:** Poly Quest 3S, 4000-mAh

**Propellers:** APC 8x4 E

**Controllers:** Two Castle Creations Thunderbird 18-amp ESCs, wired in parallel and using one BEC

**Current Draw:** ≈26 amps total RPM at Full Throttle: ≈10K

**Throws and CG:**

Per plan on both models

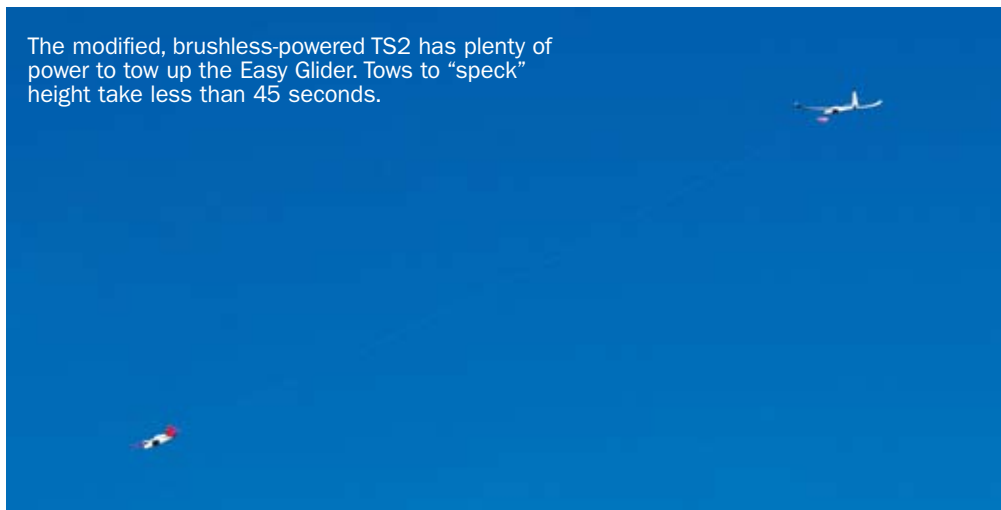
- ▼ The towline is connected to the TS2 underneath a large wooden washer and looped around a stainless steel wing bolt.



- ▼ A simple hand-launch is all that's required to get the models flying.



The modified, brushless-powered TS2 has plenty of power to tow up the Easy Glider. Tows to "speck" height take less than 45 seconds.



Deans Ultra connector  
 • Custom carbon fiber landing gear (optional).

## Installing the Motors

The E-Flight Park 370 outrunner motors were selected for their overall quality, affordability, and ease of installation. These motors are almost a perfect drop in replacement for the stock Speed-400 motors. Only minor sanding to the stock plastic motor mount is required. Once installed, the motors fit inside the engine nacelles perfectly.

Because this power system uses larger propellers and puts out much more power than the stock system, it's important that the motors be securely mounted and the propellers balanced before the motors are

spun up. If any radical vibration occurs, the motors could loosen in the stock plastic motor mounts, and could tear the foam out of the nacelles or break the cyanoacrylate (CA) glue joints holding the motor mounts in place. My system hasn't ever had a problem, but I was careful to test everything on the bench, one step at a time, as I was installing the gear, to ensure that everything would work smoothly at the field. Make sure you balance the propellers!

The ESCs are mounted close to the motors, and are held into the nacelles with Velcro® so that they have a smooth stream of cooling air at all times. They are recessed out of view for a cleaner look. I trimmed the wires down so there wouldn't be any excess wiring packed

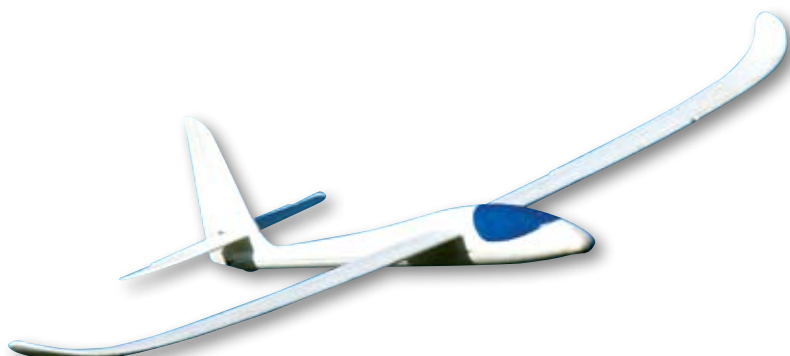
inside the nacelles.

## Wiring

Creating the wiring harness took the most work. A parallel Y-harness connects the Li-Poly flight battery to the ESCs. Another Y-harness connects both ESC's receiver leads to the throttle port on the receiver. It's important to disable the battery eliminator circuit (BEC) on one of the ESCs by disconnecting the red wire of the receiver lead. This way, only one ESC is providing BEC power to the receiver. Many people wonder, "Why not use just one ESC with enough of an amp rating to run both motors?" I'm not exactly clear on how or why, but the motors won't always start if you run only one ESC.

## Towline Release

The towline is simple light, braided twine. I use 120 ft of line. Simply securing this line directly to the TS2's stock plastic wing bolt worked fine for a while. However, after having the towline saw the plastic bolt almost in half, the rear wing bolt on the TS2 was upgraded to stainless steel, with a large 3/32 plywood washer underneath the head to keep it from pulling through the wing. The towline loops around the bolt and under the washer.





At the point of release, the TS2 slows down and the Easy Glider slips off the line.



The TS2 returns to the runway for another tow.

If you've got a spare channel on your radio, a conventional servo-driven tow release system in the TS2 wouldn't be a bad idea. I've stuck with my simple setup, but there have been times when I've wished I could "cut the glider loose" in an emergency and couldn't. I always managed to save it, but I have lots of experience towing larger models, which is probably why I've gotten away with it. If this is your first attempt at towing, having this option would be a good thing.

We tested two different tow-release systems at the glider end of the tow line. Both have worked well. The Version A tow release couldn't be simpler: Velcro! How crazy is that? I didn't think it would work, but it does, and it works great. Simply bond a thumbnail-sized piece of Velcro (the loop, or soft, side) to the bottom of the Easy Glider a couple inches aft of the nose, and tie a similar-sized piece (the hook, or prickly, side) to the end of the tow line. Don't be tempted to use a larger piece of Velcro or you may be using various impromptu recovery methods in a series of fruitless attempts to separate the models.

At the release point, the tug pilot throttles back, and the glider pilot simply "pulls up." As the glider pitches up quickly, the Velcro tears free. The

simplicity of this system means that all your friends at the field can have a go at aero-towing with the simple addition of Velcro to the bottoms of the noses on their Easy Gliders.

The Version B tow-release system consists of a split ring tied to the end of the tow line, and a simple hook taped to the bottom of the fuselage on the glider. With this system, the TS2 pilot slows down at the top of the tow, and the Easy Glider just flies off the hook. It's just like the release from a hi-start. There is some danger with this system, however, in that the tug must slow down far enough for the glider to over take the slack in the line and fly off the hook. Just image trying to come off the hi-start line if it were being towed!

I don't really have a huge preference for either, but we are currently using the hook-type (Version B) system. Whatever system you choose, make sure to add some highly visible "flag" at the end of the line near the nose of the glider. That way, when at release height, both pilots can easily see when the models have safely separated.

### Flying

The first thing to know about both of these models is just how well they fly. You might be thinking, "They're just

### References

#### Horizon Hobby, Inc.

4105 Fieldstone Road  
Champaign, IL 61822  
Web Site: horizonhobby.com  
Phone: 217-352-1913  
Fax: 217-355-1552

#### PolyQuest purchased from:

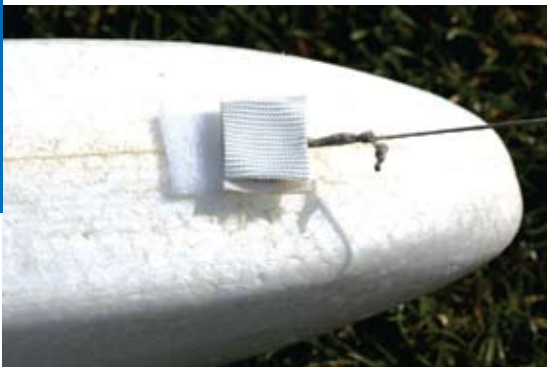
#### Northeast Sailplane Products (NSP)

948 Hercules Drive, Suite 12  
Colchester, VT USA 05446  
Web Site: nesail.com  
Phone: 802-655-7700

#### Castle Creations

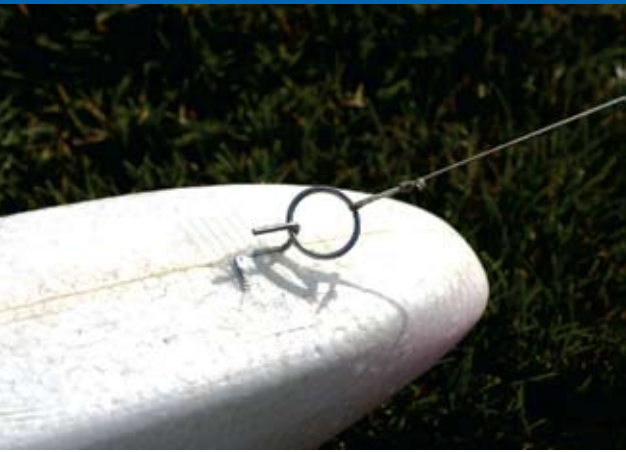
235 S. Kansas Avenue  
Olathe, KS 66061  
Web Site: castlecreations.com  
Phone: 913-390-6939  
Fax: 913-390-6164

▼ The Velcro tow release system on the Easy Glider couldn't be simpler.



another chunk of foam disguised as a model." On the contrary—both of these models are well designed and have very good flying qualities that are on par with any popular traditional remote-control (RC) aircraft in their respective classes.

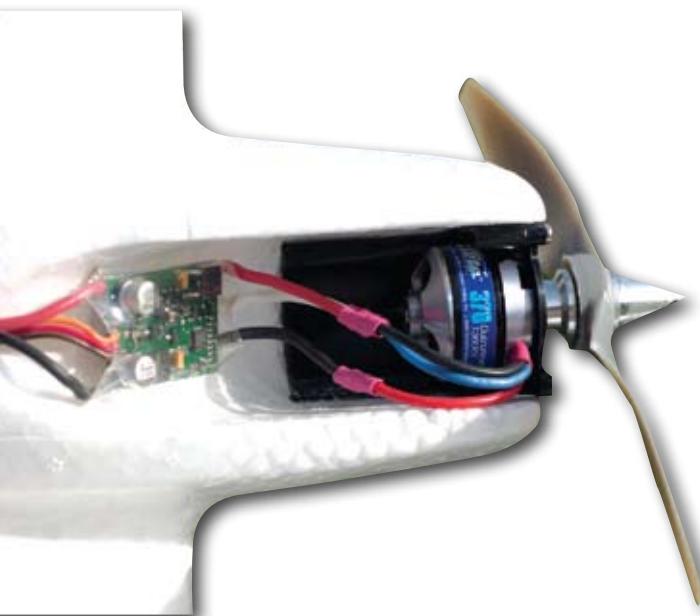
I'd consider the TS2 a solid aileron trainer with some aerobatic capability. It has excellent low-speed performance and a balanced control feel. It's a solid flyer that is comparable to more traditional built-up, kit-type model airplanes in



▲ The split-ring-over-hook release system works just like a hi-start. Just fly off the line.

the 0.20- to 0.40-size range. When not pulling duty as a tug, my TS2 spends lazy Sunday afternoons at the local power field doing some sport flying and shooting touch-and-go landings.

Similarly, the Easy Glider outperforms its foam heritage. That's one of the reasons the model has become so popular among student pilots and experienced pilots alike. I've recommended the Easy



Glider as an excellent choice for new pilots looking to step up from their first "Gentle Lady" type trainer. It's an aileron almost-ready-to-fly (ARF) glider that just happens to be made of sturdy, durable foam. The Easy Glider flies smoothly and thermals great!

I'm not going to dive into "how to aero-tow" in this article, but suffice it to say that if you have a clue about how to do it, this combo is the PERFECT choice to work out the bugs before you try towing with larger models. There are a ton of good sources of information on model

aero-towing. One I really like is Radio Carbon Art's Pro Aero Tow DVD. With it, you can learn all you need to know about how to aero-tow.

The takeoff is just as you'd expect with a larger model. When hand-launching, make sure you throw at or near the same time. Keep both models level as they gain speed. With landing gear installed, both models can be launched using rise-off-ground- (ROG-) style takeoffs. When taking off via ROG, keep the glider near the ground as the TS2 takes off. Once the models gain sufficient speed, start a smooth, shallow climb. The glider pilot should let the model be towed, just as if it were a skier behind a speed boat. Do not try to fly all the way up. Just keep the wings level, and stay in hi-tow position (that is, with the glider above the tug so that the tow line is not draped over the empennage).

Because the modified TS2 tug has plenty of power, it can make up for some piloting mistakes by a rookie glider pilot.

That said, don't let the glider get into a severe low tow position. If it does, the TS2 will quickly become uncontrollable. If your student tow-glider pilot starts to get low, keep on the power, level off, and let the glider get back into position.

If the tug and glider get in trouble, DO NOT PANIC. Throttle back the TS2, keep the wings level, and allow the glider to pull off the tow. If the models become entangled in the tow line, power off the TS2 and put the Easy Glider in a spin. It will slowly lower both models to the ground. We were forced to execute this method while refining the tow process for the TS2/Easy Glider combination. The tough Elapor® foam construction saved both aircraft.

After a successful climb out, both models will likely be about 1.5 to 2 times a normal winch launch height. The TS2 should slow down and let the line go slack, and then the Easy Glider pilot can release the line. The Easy Glider's Velcro nose release will simply tear away, or the line will slide off the hook (depending on your setup). With the efficient brushless motors and Li-Poly cells, we've consistently gotten 14 tows per charge.

## Wrap Up

Our TS2/Easy Glider aero-tow adventure has been a 100% complete success. These models have trained six new groups of aero-tow glider pilots in the few short weeks I've been flying them. Three of these pilots have now successfully towed with larger models having spans of up to 6 m and weighing 35 lb or more. The experience they gained at the controls of these well balanced foamies made for a quick, smooth transition to bigger models.

If you have an interest in getting into aero-tow, if you simply want a rugged, reliable, relaxing glider, or if you have a soft spot for a sporty, entry-level, electric twin, consider the Twin Star 2 and the Easy Glider. Both these models are excellent flyers. Paired up for aero towing—or not—they will give you hours of fun at a low cost. We haven't had this much fun at the field in a long time! **QF**



▲ Here is a close-up photo of the custom-bent hook for the nose of the Easy Glider. Simply push it into the foam and tape in place with high-strength tape.