



# MASA Planet

Volume 5, Issue 3

July 2002

*Safety First!*

## Ignition!

*But only when you want it!*

**Ted Cochran**

Safety is often learned through the misfortunes of others. Here's another example, presented in hopes that we can learn from it.

### Premature launch

On February 27, 1993, an Orion sounding rocket was being prepped for a launch the following day in the European Space Range in Northern Sweden. The mission involved lofting a 100 kg instrument package to do ozone studies at an altitude of ~25 km.

The rocket was lying in a horizontal cradle undergoing final checkout, including an igniter continuity check.

The battery pack on the continuity checker included a holder that reduced battery voltage from 1.3 volts to almost nothing. Unbeknownst to the technical team, the battery pack had been removed to replace the battery, but the battery alone, without the voltage-limiting battery holder, was replaced into the tester.

*Safety, continued on page 2*

## SPACE STATION!

*3D movie to captivate rocketeers of all ages*

Now playing at the Science Museum of Minnesota is SPACE STATION. It's the story of the on-orbit assembly of the International Space Station, and a home movie from humanity's home-away-from-home. Viewers will blast off with the astronauts and cosmonauts from Florida's Kennedy Space Center



and Russia's Baikonur Cosmodrome to rendezvous with their new home in orbit 220 miles above Earth. They'll experience for themselves life in zero gravity aboard the new station—a permanent facility for the study of the effects of long-duration exposure to zero gravity, and the first step towards the global cooperative effort needed if we are to go to Mars some day.

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*Russ Durkee reviews SPACE STATION on page 2*

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Narrated by Tom Cruise, the film covers the construction of ISS from the first module through the completion of Phase 2, including two expedition crews and seven shuttle missions.

## ALSO IN THIS ISSUE

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*Safety, continued from page 1*

The continuity check resulted in the igniter firing, which in turn led to motor ignition. The rocket went out a wall, through another building, and into a hill beyond.

A launch technician, Bror Torneus, who unfortunately happened to be standing in the path of the rocket, was killed; two other technicians were injured, and the prep building was severely damaged.

## Lessons

Not just the launch, but the preparation of a rocket must be safe. Most of us have heard horror stories about flashbulbs, accidental ignition of motors (including at least one in a hotel room) and accidental ignition of black powder ejection charges. Nearly every large launch provides an opportunity to witness an LCO launching the wrong pad--which can be hazardous if the mislaunched pad is in the wrong bank, or is an RC RG. Last summer, some of us witnessed the accidental launching of an H-powered sustainer off of the booster during pad-side preparations at North Branch. A necessary risk? No.

How can we be sure something like this doesn't happen to us?

- As LCOs, we can double-check the status of pad select switches before pushing the launch button.
- We can design avionics bays to use high-quality SPDT switches to both shunt and disconnect pyros during preparation.
- We can make sure arming switches can be activated from outside of the airframe, and, just as importantly, can be de-activated again if necessary, without keys or special tools.
- We can ground test the first one or two of a new batch of igniters using the same equipment we'll use at a launch.
- We can thoroughly ground test a new launch control system before we use it with rockets.

There are lots of lessons for us in the story of the Orion, and Bror Torneus will likely rest easier if we learn them!

## Source

Casey, Steven. *Set Phasers on Stun and Other True Tales of Design, Technology, and Human Error*. Second Edition. Santa Barbara, Aegean Publishing Company, 1998.

## Film Review

# I wanna be an astronaut!

*A review of the 3-D Omni film SPACE STATION*

Russ Durkee, President Emeritus

★★★★★ (Five out of five stars)

Astronauts often wait ten or more years for a space flight. That's nothing: I have been waiting 33 years (and counting)! As a kid, I had every intention of becoming an astronaut. At the very least, I thought by the time I was in my thirties I would be living in a floating city and driving to work in my own flying car or at least a helicopter. Boy, am I disappointed.

The new Omni film *SPACE STATION* has got to be the next best thing to having your own shuttle and riding it into orbit to dock with the International Space Station. In typical Omni form, the story is fairly light on details, but I honestly did not care. The views were so outstanding that I sat there with my mouth agape for most of the flight— ah...er... I mean, movie.

The film follows the first and second crews as they assemble and become the first to inhabit the ISS. There are several very interesting close-up views of Space Shuttle launch, including some brief but rarely seen footage of the crew during the moments just after the SRBs ignite. One of the more memorable scenes shows a side view of the launch from the shuttle itself. Unfortunately this view only lasts a few seconds.

Russian Proton preparation and launches are especially interesting. The culture clash between the US and Russian space programs is abundantly clear in this film. Take a close look at the condition of the Russian infrastructure, especially the sidewalks, and buildings. You have to hand it to the Russians, though, they know how to give their astronauts a send off. Family and friends rub shoulders with the Cosmonauts right at the launch pad! Anyone know what the safe viewing distance from a Proton rocket is? That's ok... neither do the Russians. But lucky for us, an Omni crew was there to film it.

In addition, there are many minutes footage of astronauts working, playing with their food, and talking about their experiences flying in space. Besides the spectacular scenery, this film provides insight into the daily lives of the astronauts on the ISS. I especially

*Space Station, continued on page 6*

## MEETING SCHEDULE

**SATURDAY JULY 20**

**MASA Annual Summer Picnic!**

Location: [Elk River / Otsego](#)

Time: 3 pm - dusk (dinner 5 to 7:30 pm)

Sign up on the web page!

**TUESDAY, AUGUST 6**

Location: [Science Museum of Minnesota, St. Paul](#)

Time: 7pm to 8:30pm

Topic: Build MicroMaxx rockets!

**TUESDAY, SEPTEMBER 3**

Location: [Science Museum of Minnesota, St. Paul](#)

Time: 7pm to 8:30pm

Topic: Computer software for rocket design and flight simulation.

**TUESDAY, OCTOBER 1**

Location: [Science Museum of Minnesota, St. Paul](#)

Time: 7pm to 8:30pm

Topic: Build Junkyard rockets!

**TUESDAY, NOVEMBER 12**

**[ONE WEEK LATER THAN USUAL]**

Location: [Science Museum of Minnesota, St. Paul](#)

Time: 7pm to 8:30pm

Topic: 2003 MASA Officer Nominations

## LAUNCH SCHEDULE

**SATURDAY, JULY 27: FOURTH ANNUAL SCALE EVENT**

Location: [Blaine](#)

Time: 9 am - 3 pm

NARTREK: B Parachute Duration

Contest: B Parachute Duration

**AUGUST 4-9**

**NARAM 44**

McGregor, TX

**SATURDAY, AUGUST 24: MULTI-STAGING**

Location: [Blaine](#)

Time: 9 am - 3 pm

Fun Events: Fourth Annual Great UFO Drag Race,  
Comanche-3 Drag Race

NARTREK: Two stage flight

**SATURDAY, SEPTEMBER 28**

Location: [Blaine](#)

Time: 9 am - 3 pm

Fun Events: Alpha Drag Race

NARTREK: Finish up!

**SATURDAY, OCTOBER 26: CLUSTERS!**

Location: [Blaine](#)

Time: 10 am - 2 pm

Fun Events: SAM Drag Race

## President's Corner

# Home on the Range

Alan Estenson

After a great May launch, the summer flying season is finally in full swing, and a number of neat winter projects are making their first appearances on the field. I know that I've been busy trying to apply paint and decals to everything that I constructed over the past months. After a snowy winter and cool spring, everyone is ready to fly some rockets!

Rocket launching brings up a perennial topic of discussion—the need for volunteers to serve range duty at MASA launches. For summer launches, we typically need at least a dozen volunteers to serve shifts as Range Safety Officer (RSO) or Launch Control Officer (LCO). We're starting to realize that we really need a third person on duty to take some of the pressure off the RSO, but it's hard enough filling just two positions throughout the day. Recently, we've started discussing ways to encourage (require?) more MASA members to help out with range duty. As one MASA member put it, "We need to get more people doing it--it's always the same dozen or so people!" We haven't settled on any new strategies yet, but we're thinking about it.

I hear from many members that they're willing to serve, but they're apprehensive about that very first duty shift. Here's my three-step program: 1. Start out with LCO duty. The job is a bit easier than RSO, and more people feel comfortable with it. 2. "Shadow" and observe an experienced LCO during their duty shift. Learn the procedures and ask questions. 3. Sign up for a shift of your own, but ask an experienced LCO to "watch your back" for a while.

As far as RSO duty, it isn't that much harder than LCO duty, but it does seem to make rocketeers nervous. They are typically afraid that they don't have enough experience to serve as RSO; however, I would say that being RSO is a wonderful way to broaden your rocket experience. You aren't expected to know *everything!* Occasionally as RSO, I'll be faced with a rocket that is outside my personal experience. The solution? I simply call over another club member to consult with me and offer a second opinion.

If you missed the training session earlier this year or if you're unclear about the duties of the RSO and LCO, I encourage you to download and read the MASA RSO & LCO checklists. You can find them on the "Tech" page on the club web site.

Hot jets!

Alan Estenson, MASA President

# Cherub

A 5/8 scale "Mini Brute" version of the Estes Fat Boy

Design MH-05 by Alan Estenson, NAR 69539 SR

## Specifications

Length: 197 mm (7.75 in)  
 Diameter: 41 mm (1.63 inches)  
 Weight: 34 g (1.2 oz)  
 Recommended motors:  
 Best: A10-3T: 91 m (300 ft)  
 OK: A3-4T 91 m (301 ft)  
 Marginal: 1/2A3-2T: 39 m (128 ft)

## Parts list

- A. One (1) bt-60 body tube, 127 mm (5 in.) long
- B. One (1) "Big Bertha type" plastic nose cone (from Estes NC-60A pack)
- C. One (1) bt-5 motor mount tube, 44 mm (1.75 in.) long
- D. One (1) eb-5 engine block
- E. Two (2) cr-5/60 flat centering rings
- F. One (1) 1/8 in. launch lug, 38 mm (1.5 in.) long
- G. One (1) shock cord – 406 mm (16 in.) of 1/8 in. elastic or Kevlar
- H. 3/32 inch balsa sheet for fins
- I. One (1) parachute – 12 inch diameter
- J. One (1) snap swivel for parachute (optional)

## Notes

Kitbashing the new Estes Baby Bertha kit will provide you with the nose cone, body tube, launch lug and parachute. You may have to cut your own 5 to 60 centering rings as they are not easy to find.

Place bottom of launch lug 2.25 inches up from bottom end of body tube.

Cut three fins from 3/32 inch balsa sheet. Make sure wood grain is parallel to leading edge. Check the dimensions of your fin pattern to make sure it printed correctly: root 2 in., tip 1.2 in., height 1.5 in.

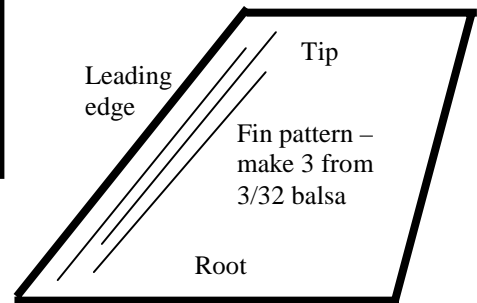
Center of Pressure is approximately 2.25 inches forward from the bottom end of the body tube. Simulations show a small stability margin, but all test flights have been stable. However, you should be very careful to avoid adding unnecessary weight.

Friction fit the motor and secure it with masking tape. Pack the parachute loosely; due to the low altitudes, it doesn't have much time to open.

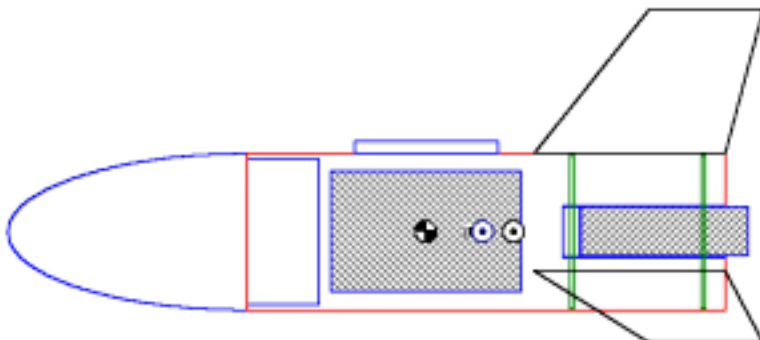


Alan Estenson

All sides of this square should be 1 inch long



Alan Estenson





# A BAR Is Born

David Fergus

A memorable flight for me was the launch of my old Estes Goblin left over from when I was a lad in 1969.



Alan Estenson

Estes used to give out free rockets for every 5 or so bucks you spent, and this was one of those. I had built it, painted it, decaled it and prepped a motor but never flown it. It sat in my basement in Colorado for twenty five years gathering dust and surviving my Mom's purges of other old memorable toys such as Tinker Toys, Strombecker slot cars, hot wheels, Lincoln Logs, GI-Joe, and others, including an unbuilt Interceptor. Anyway, she forced it on me 5 years ago to finish cleaning out the basement, so now that I had it, I needed a launcher for



Alan Estenson

it, so I bought a starter set at Toys-R-U's, and thus was the start of another BAR. I flew it on a D12-3 at Blaine and it zoomed almost out of sight, recovered on its original paper streamer and rubber band shock cord with virtually no damage except a little charring of the back edge of the fins from reflection off the launch pad. (I now use a clothes pin higher off the pad because of that.) And Kerry Hodges showed up with a clone of this venerable old rocket thus validating my affection for it.

[Editor's note: The photos show Kerry Hodges' 2X Goblin. R.I.P.]

# The Pioneer's Present

Alan Estenson

It was Friday, August 4, 2000. Ted, Seth, Glen and I were at NARAM 42 near Cañon City, Colorado. It was hot, dry, dusty, windy, the last day of NARAM, and it was my birthday. Determined to make at least one flight that day, I loaded an E30-7 into my scratch-built triple ring-tail rocket, "Razzle Dazzle," and walked down to the sport range. It went off with nary a hitch. My notes read "good flight, very fast." I do recall that the paint gained a few new scuffmarks from being dragged along the hard Colorado ground after landing.

However, this rocket hadn't yet seen the highlight of its day. For Vern Estes was helping out around the sport range that morning, and he kindly autographed my rocket. He seemed somewhat amused by the custom Estenson decal on it (inspired by the oval Estes logo). It was a fine way to wrap up my first NARAM trip and it was a nice birthday present. I haven't flown that rocket since. Perhaps when I get to another NARAM someday....



# Foxtrot by Bill Amend



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*Space Station, continued from page 2*

enjoyed this aspect of the film. Again, I found the background details most interesting. I see cables and hoses draped through air locks...hmm. What exactly *did* we learn from MIR? On a space walk, the astronauts use a million dollar, one of a kind, stainless steel screwdriver, but inside, a \$150 Makita cordless drill does the job.

In my book, space travel and astronauts are about as cool as it gets. No question, this movie will inspire our future astronauts and make envious old rocketeers out of the rest of us. The Omni format was made for films like this. Go see it. Bring your family and friends and enjoy the flight.

**When: June 14<sup>th</sup> – October 16, 2002**

**Where: Science Museum of Minnesota, St. Paul**

**For more information:**

<http://www.smm.org/visitorinfo/nowshowing/SpaceStation.html>

<http://www.imax.com/spacestation/>

## Minnesota Missiles

# AQM-37: MSP Gate Guard

**Ted Cochran**

This exhibit is inside the gate to the Naval Reserve station at the Minneapolis-St. Paul Airport (28th Street exit off of the Crosstown). It's a Beech (now Raytheon) AQM-37 target drone — perhaps a practice round. Our intrepid photographer was able to get this spy photo at sunset one evening, and, on a different occasion, to get an up close look at it, but he has not been allowed to photograph it from within the fence line (at least not yet).

Over 4000 air-launched AQM-37 drones have been delivered since 1961, in more than a dozen varieties capable of over 300,000 feet at over Mach 4.5. The vehicle is rocket powered; the engine is a two-chamber liquid-fueled system with thrust ranging up to 860 pounds. Dry weight is 268 lbs; launch weight is up to 620 lbs.

## Snapshot



NASA

*Soyuz launch of ISS expedition 1. As Russ mentions in his movie review, the Russians don't much care about NFPA 1127!*



Ted Cochran

*AQM-37A at MSP. The sheet metal appears to be original, but most of the fittings and markings are gone. The flare tube has been cut away to make room for the cradle.*

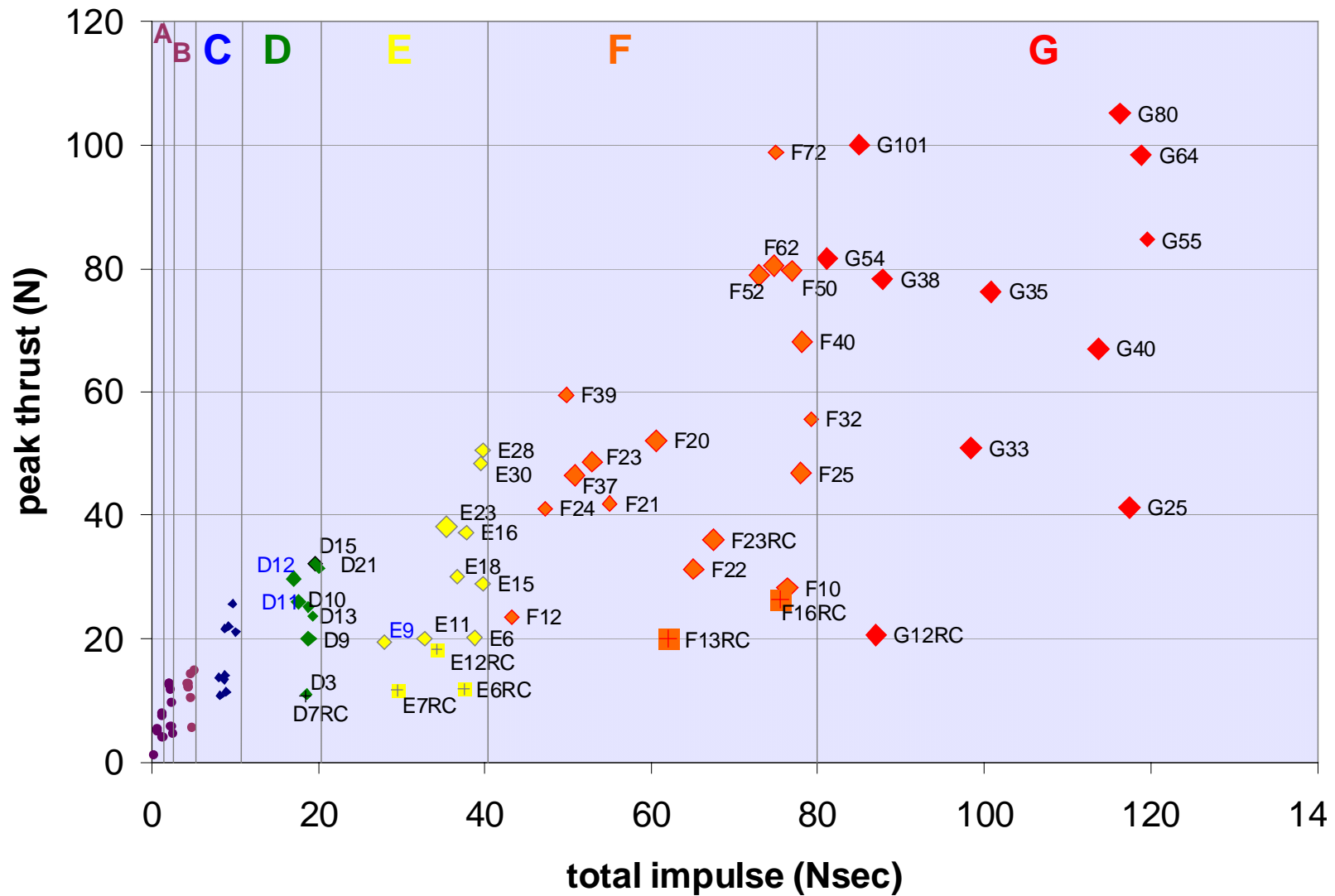
## Sod Farm Etiquette

When at the Blaine sod farm for MASA launches this summer, please remember that we are walking on the owner's livelihood!

- Enter the property on the east side (by the house) and leave the property on the west side (by the tree line). The owner has specifically asked that we do this. Yield to any workers or farm machinery on the road.
- Pick up all trash - especially expended motor casings.
- For safety and common courtesy, no smoking near or in the rocket prep areas. Do not drop cigarette butts in the grass!
- Park your cars only on established grass or on the dirt areas where sod has recently been cut. Walk on newly seeded or new growth areas gently, and as little as possible! Never drive or park on these fragile areas.

We're lucky to have this nice launch site, and we need to show the owner every courtesy. Just pretend that it's your own front lawn!

—Alan Estenson



After a recent discussion on E9s on the email list, I created this handy chart. It lists all motors under "G" impulse certified as of May, 2002 as a function of total impulse and peak thrust. The size of the dots is a function of motor diameter; and black powder motors are labeled in blue. Now you can see why an E9 is not a good replacement for the D12 for heavy models like the Honest John—it just doesn't have enough initial thrust. Try an E15, E18, or the new F21 instead!

The *MASA Planet* is the official newsletter of the Minnesota Amateur Spacemodeler Association, Section 576 of the National Association of Rocketry. It is published bimonthly as a service to its members.

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MASA's web site:

<http://www.mn-rocketry.net/masa/>

**MASA's 2002 OFFICERS:**

|                            |                      |
|----------------------------|----------------------|
| <b>President</b>           | <b>Alan Estenson</b> |
| <b>Vice President</b>      | <b>Ted Cochran</b>   |
| <b>Secretary/Treasurer</b> | <b>Dave Fergus</b>   |
| <b>President Emeritus</b>  | <b>Russ Durkee</b>   |
| <b>MASA Planet Editor</b>  | <b>Ted Cochran</b>   |

Submissions may be made to the editor at: [masa.planet@mn-rocketry.net](mailto:masa.planet@mn-rocketry.net). (Volunteer quickly, lest you be selected to summarize auction discussions on RMR.)

If your email address changes, please send notice of your change to [masa@mn-rocketry.net](mailto:masa@mn-rocketry.net). Include your name, old email address, and new address. We depend on email for communicating important information. When an email address starts "bouncing", we lose contact with you.

We also appreciate being notified about address and phone number changes!

## Welcome MASA Members New in 2002!

Stuart Lenz  
Dan DesLauriers  
David Leininger  
David Lynch  
David Oberlander  
Mike Erpelding  
Tom Lawell  
Albert Janssen, Jr.

Mark Poston  
Leland Cheng  
David Whitaker  
Darryl Thayer  
Tom Savard  
Leif Eischen  
David Erickson  
Tony Fernandez

## NARTREK Awards to Date

Ted Cochran Bronze, May  
Alan Estenson Bronze, May

Fourteen other members are going for Bronze!

Please let us know as you progress through the flights! 🚀

### *Parting shot*

Crash and burn:  
The end of the flight of George Gassaway's X1 that was shown here last issue. The model



Ted Cochran

stalled and crashed. The impact broke the motor mount, allowing the still-burning motor to move forward and set fire to the tail. DQ. 🚀

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