



# SPORT ROCKETRY

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MARCH/APRIL 2007

AN INTERVIEW WITH VERN AND GLEDA ESTES

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# Poyéhali!<sup>1</sup>

## THE 16TH WORLD CHAMPIONSHIPS OF SPACE MODELS

Reported by John Langford,  
US Team Manager<sup>2</sup>

Photos by John Langford (JSL)  
or Russian Space Agency (RSA)  
unless otherwise noted.

- <sup>1</sup> "Poyéhali" was the word spoken by Yuri Gagarin, the first man in the space, as he lifted off. It translates roughly as "we're going" or "let's roll!".
- <sup>2</sup> With acknowledgments to Trip Barber, Steve Humphrey, Bob Parks, Ed Pearson, Jennifer Ash-Poole, and Grigoriy Vislobokov who read drafts and provided many helpful comments.

Imagine a stadium filled with 10,000 cheering fans, police escorts to block traffic and hold back a crush of autograph-seekers, and aerial demonstrations featuring balloons, kites, helicopters, and fireworks—all for a model rocket meet! Then imagine a secret rocket base in a desert, where the first human left the planet but only a few Westerners have ever been, reachable only by chartered aircraft with permission of the government, littered now with industrial wreckage and space shuttles left to rot in the dust, but which still routinely launches people and cargo into space. Imagine a colonial city ruled by Russians but populated by Kazaks with no grass but every public space filled with rockets or missiles or memorials to space and rocket heroes. Imagine an American

team member speaking Russian, translating for a Russian general and for the President of the FAI. Imagine a tent city built in the desert, complete with paved main street, food stands, beer stands, a cafeteria, souvenir shops, an infirmary, parking lots, viewing areas, awards areas, and 48 launch pads. Not to mention camels, scorpions, and dust, dust, dust. Imagine foreign rocketeers breaking down in tears of joy upon meeting the founder of Estes Industries.

I would have told you this was a complete fantasy n-e-v-e-r-g-o-i-n-g-t-o-h-a-p-p-e-n if I hadn't seen it myself, and didn't have reliable witnesses and thousands of photographs who say it did.

Oh yes, and there was also a heck of a rocket contest.



The US Team in Lenin Square of Baikonur town. L-R standing: Vern Estes, Keith Vinyard, Gleda Estes, Chris Kidwell, Bob Parks, James Duffy, Dean Franklin, Tony Reynolds, David Bellhorn, Dawnn Reynolds, Trip Barber, Chris Franklin, Ben Reynolds, Steve Humphrey, Jennifer Ash-Poole, George Reynolds, Grigoriy Vislobokov, Gib Reynolds, Dave Clark, Barbara Langford, Mark Petrovitch. Kneeling: Bill Parks, Katharine Humphrey, Esther Clark, Scott Vinyard, Bill Stine, John Langford, Fritz Langford, Kevin Johnson. Not pictured: Greg Stewart.

## Getting There

Thirty-one Americans assembled for the trip on Saturday, September 16, 2006. From California came Bob Parks and his son Bill. From Missouri came Keith Vinyard and his son Scott, plus Chris Franklin, accompanied by his father Dean. From Texas came the Reynolds family (Tony, Dawnn, Gib, Ben, and George), James Duffy, and David Bellhorn. From New Jersey, Steve Humphrey and daughter Katherine. Maryland was represented by Ed Pearson (FAI Juror), Jennifer Ash-Poole (official timer), Kevin Johnson, and Mark Petrovitch. From Virginia we had the Langfords (John, Barbara, and Fritz), Esther Clark and her father Dave, Trip Barber, Chris Kidwell, and Grigoriy Vislobokov. From Arizona we were joined by Bill Stine, from Colorado came Vern and Gleda Estes, and from Min-

nesota-enroute-to-Mississippi came Greg Stewart. We all met in Atlanta for a Delta non-stop flight to Moscow. We landed in Moscow on Sunday morning, collected our luggage, and headed for our hotel. We had anticipated delays and hassles getting our modeling equipment past TSA and out of the US, and with Russian customs getting into the country, but both went smoothly except that three bags were delayed one day in transit.

If only the same could be said for our rocket motors! Unable to carry motors with us and anticipating trouble, we had split our shipment into three parts, one coming from the US, one from Serbia, and one from the Czech Republic. Getting the American motors released from Russian customs was an ultimately Quixotic quest that consumed much of our attention for many days.



Restaurant Arbat, the US team's assigned eatery in town throughout the contest. Bill Stine, Chris Kidwell, Grigoriy Vislobokov, Trip Barber, Steve Humphrey, Katharine Humphrey. JSL photo.

The contest itself was held in Baikonur, which is a small Russian zone in the center of the independent nation of Kazakhstan. Baikonur is special because it is so historic



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Steve Humphrey and Chris Kidwell check in the US team motors for testing.  
RSA photo.

and so remote. It is where the first satellite, the first dog, the first man, and the first woman were all launched into orbit. As such, it has an almost mystical position in the pantheon of air and space sites. It was originally chosen by the Russians for being one of the southernmost places in the USSR and also one of the most remote, and so it remains today—only about 700 miles north of Afghanistan, in a part of Kazakhstan deemed too valuable to be granted independence and hence “leased” by the Russians for the next 50 years. When I asked my astronaut friend Jay Apt, who led a mission in space that docked at the Russian MIR space station, whether he had been ever to Baikonur, he replied “heck no—my flight surgeon went and he got hepatitis, so I never went.”

One thing about Baikonur is that you can't get there on your own—you must have permission from the Russian gov-

ernment. The entire participant group of the World Championships—some 355 people—assembled at Moscow's Domodedovo Airport on Tuesday morning for specially chartered flights to Baikonur. The US was joined on our TU-154M by the Russian, British, Spanish, German, Romanian, Swiss, and Austrian teams. Three rows ahead of me Dave Clark was holding the emergency exit release handle cover in place as we taxied out. Greg Stewart actually kept a piece of his seat that fell off and used it as part of his launcher throughout the contest.

The land below gradually changed from green to brown. Before long we were flying over desert—not sand dunes, but hard-packed dust with small scrubs. We descended over tracking stations and launch pads and landed safely. We knew then we weren't in Kansas anymore. The Baikonur airport is technically in Kazakhstan, so we

had to clear Kazak customs. The terminal was an unheated hut and we were the only plane in sight. The luggage was screened and x-rayed as we deplaned. A British woman fainted cold in the customs line. It was dark as we exited to a madhouse of everyone collecting checked luggage, which also had to be screened before you could take it. We met our official translator, who taught English at the local school, and a number of her students who had been brought along as helpers. We loaded onto buses and drove into town to our Hotel Tsentralnaya, a 1960s era structure on the town square overlooking a statue of Lenin. We collected the team for our first dinner, and walked en masse several blocks to the Restaurant Arbat, our assigned eatery for the next ten days.

### Wednesday, September 20

Our first order of business was to track down rocket motors. The Czech and Serbian shipments were located and in our hands by noon, but the American motors continued to be a problem with Customs in Moscow. We registered the team with the organizers, and turned in our engines for testing and impoundment. Twenty-two other teams showed up, over 350 participants in all. In the evening we turned in our Scale Models (with a flail over the size of the contestant numbers that had to be on each model) and Grigoriy and I attended a team managers meeting and dinner at a local Pizzeria—which served real pizza and became increasingly the favorite dining spot for the U.S. team as the time in Baikonur went on. Grigoriy is a native of Ukraine and a co-worker at Aurora Flight Sciences, who came along as our Assistant Team Manager. By the end of the day the pattern was already clear, as the contest organizers began using Grigoriy as their official translator and troubleshooter. This was to add to his workload throughout the week but also had a lot of collateral benefits for the US Team.

### Thursday September 21

Opening Ceremony—First Flights

We assembled in Lenin Square in downtown Baikonur at 9:00 am for the big opening ceremony. This took all morning, but was easily the most impressive event I have seen at a rocket meet. All 23 countries lined up behind standard bearers and marched the four blocks to the town soccer stadium. The stadium was filled with 10,000 people, which added a lot to the

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effect. We all marched in and circled the field before taking seats. Grigoriy was again drafted for the translation, and we had a series of introductions and speeches from the Mayor of Baikonur, the Russian general who runs the base, and the CIAM Committee chair Srdjan Pelagic from Serbia, who runs the FAI's international Spacemodeling programs. In what must be two other "firsts" for space modeling, the President of the FAI, Pierre Portmann, attended the ceremony and spoke, and the crew of the Soyuz spacecraft that had been launched from Baikonur two days before spoke to us from space as they passed overhead.

Through our entire time in Baikonur, we never went anywhere except in a bus with a policeman onboard and a police escort out front. "It was great!" expounded Trip Barber. "It's a lot more fun having those flashing lights ahead of you than coming up behind you." The town itself has about 65,000 residents living inside a fenced perimeter. Outside the fence and the checkpoints is the Kazak desert. The place we were was mostly flat, with a little terrain relief. It was dusty, almost lunar-like landscape. Camels roamed free. Bob Parks commented "this place makes the Mojave desert look like a rain forest!"

The field setup was something else—they took a turnoff from the main road along the old Silk Route (the railroad was not far away) and carved out an impressive model rocket complex. The launch pads were laid out in a semicircle—imagine two baseball diamonds together. The range safety officer and launch officials sat at the pitchers mounds—different officials for the senior range and the junior range—while the launch pads were spread out over two 90-degree arcs. Behind the launch officials was a paved area with tents set up for each team, and behind that was a concession area. There was a large bus parking area to one side, and a parking lot for spectators—amazingly, there were a lot of those. All around, the desert stretched to the horizon on every side, except for one cell phone tower and a satellite tracking station on the near horizon. On the far horizon you could see some of the large pad structures at the Baikonur Cosmodrome.

## Friday, September 22

S3A Parachute Duration and  
S6A Streamer Duration

The first real contest day—up at 5:00—breakfast at 6:00—bus leaves at 7:00—we were on the field before sun-



US Deputy Team Manager Gregory Vislobokov at the US Team tent on "main street" at the contest site. Behind him are Fritz Langford, Chris Franklin, Bill Parks, Katherine Humphrey, and Barbara Langford.

rise. The weather was perfect: clear, light winds, and temperatures in the 70s and 80s. In the morning Juniors flew streamer duration while seniors flew parachute duration—in the afternoon the events switched and the Juniors flew parachute while seniors flew streamer.

The FAI duration rules are very different than the NAR rules. Most obvious, is that the event is flown in three rounds, and in each round there is a maximum recorded time or "max." Each contestant has two models allowed, so at least one of the first two flights must be recovered. This

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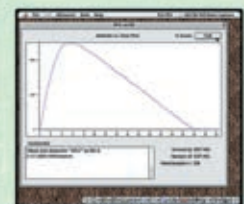
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Above: Mark Petrovitch, Chris Kidwell, and Kevin Johnson prep a US parachute duration model at the US pad.

JSL photo.

Right: A US Parachute Duration model descending over the "magnificent desolation."

Photo by James Duffy.

is similar to the NAR multiround events (which were based on the FAI rules at the time they were added to the Pink Book). However, the FAI rules also specify a minimum size for the models. All of the World Championship free flight duration events are now flown with A motors. But the models for A motors must be a minimum length of 500mm (19.7") and with a minimum diameter of 40mm (1.57") for at least half the total length. It turns out that the US kit that most closely meets the size requirements is the Estes Big Bertha! All of the competitive models have ultralight bodies made of fiberglass, plastic film, or tissue paper. A good body and nose cone might weigh 7 or 8 grams, which just happens to be about the weight of 500mm of BT-5 paper tube!

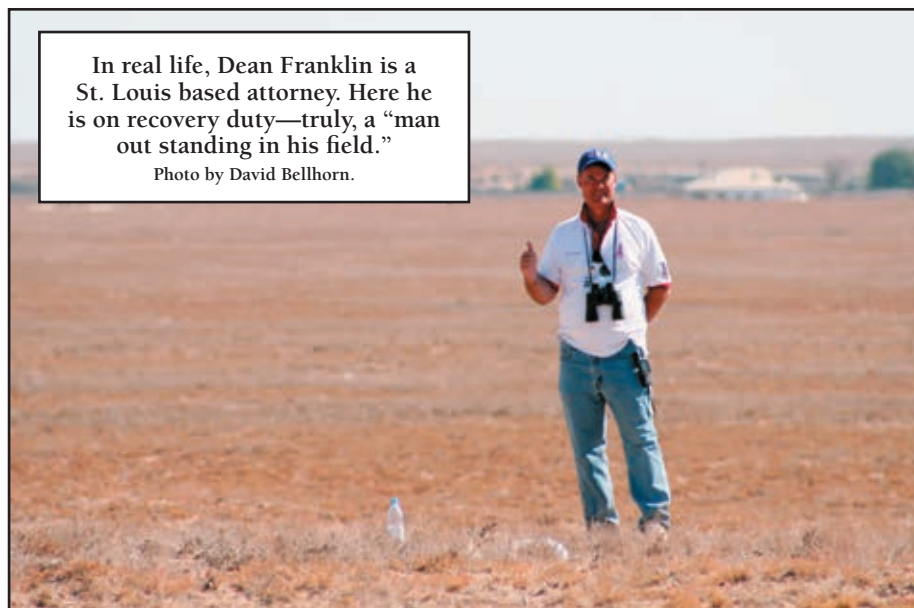
The competition at a modern World Championships is intense. In S6A the US Juniors finished 10th to the Russians (1st), Poles (2nd), and Ukrainians (3rd). Katherine was the top US finisher, with three qualified flights and 10th place. George was 38th, while Esther was 41st. For the US Seniors Kevin was 39th, Steve was 50th, and Trip was 56th, for a team finish of 17th. Poland, Russia, and Slovenia took top honors among the Seniors.

In parachute duration, S3A, Chris and



In real life, Dean Franklin is a St. Louis based attorney. Here he is on recovery duty—truly, a "man out standing in his field."

Photo by David Bellhorn.



Katherine each had one successful 300 second max. Chris was the top US Junior finishing 13th, Katherine was 39th, and Ben was 45th. The Ukrainian Junior team took gold with a perfect score—a max on every one of their 9 flights! In the Senior flying, Mark and Steve each had two maxes, good enough for 17th and 18th place, while Kevin finished 57th. Fifteen senior fliers had perfect scores in the regular flying—three flights each of 300 seconds. Five fliers survived the first flyoff round, where the max was raised to 420 seconds. In the final flyoff round, the top two finishers each had times of over 1955 seconds—more than half an hour—before Michael Zitan of Slovakia finally claimed the Gold.

While there was no such thing as a model lost in a tree on this range, recovery was still a major challenge. The US team used Garmin GPS-equipped "Rhino" radios that plotted the location of each radio on a map. This helped keep track of everyone. Fritz and Tony were on deep recovery—at one point over 2.5 miles from the launch site chasing models. Dave Clark and Dean Franklin had made the trip as "team supporters" and they spent countless hours downrange tracking, chasing, and returning models. By the end of the week, Fritz's GPS odometer showed he had run and walked over 56 miles on the field!

The buses returned to the hotel after dark—we went straight to the restaurant for dinner at 9:00 pm—planned evening events were cancelled due to lateness and we collapsed into bed. This was repeated each evening of the flying. In many ways a World Championships is a team endurance contest as well as a flying contest.



## Saturday September 23

### S4A Boost-Glide and S8 Radio-controlled Rocket Glider

In contrast to many events where US model-building technology lags behind that of the European competition, in S8 radio controlled glider the US has traditionally been a leader. Guppy Youngren won the first US Space Modeling Gold medal ever back in 1978 when the US team introduced RC gliders to the World Championships, and the US team for 2006 had worked long and hard with custom airfoils, vacuum-bagged foam and glass wings with graphite spars, special composite motors, custom launchers, and hundred of practice flights. Unfortunately, our special Aero-Tech motors were in the shipment from the USA that never made it to the contest. The team scrambled to get whatever motors were available, and came up with enough to fly the events, but with very few extra motors to practice with, a severe penalty, since the motors were quite different than what the team had flown before.

The Juniors went first in the morning. Each contestant was allowed to check in two models, and then radios were impounded for frequency control. Fritz was the first US Junior off the pad and one of the first Juniors at the meet to fly. His model accelerated upwards and arched over on its back—too far, and Fritz lost control and did a giant spiraling loop, which the judges disqualified for non-vertical flight. Bill Parks flew next, with a nice boost, and narrowly missed a max. Scottie didn't miss, posting a solid max on his



Fritz Langford's  
RC rocket glider lifts off.



first flight. In the second round Fritz qualified with 237 seconds, but Bill's model spiraled in after less than two minutes while Scottie missed his max with 331 seconds. Bill's problem was determined to be radio interference, which led to the scene of Russian police officers roving the field with megaphones searching for the offending transmitter (later determined to be an out-of-tune transmitter splashing onto adjacent frequencies). Bill was allowed a re-flight and achieved 234 seconds. In the third round both Scottie and Bill qualified but did not max. Fritz was again disqualified for boosting outside the allowable 30° cone around straight up, but was allowed a re-flight when the judges declared the error due to another radio glitch. Fritz did not squander the gift, flying last off the pad

Above: Greg Stewart coaches Ben Reynolds in the US prep tent on how to make an igniter. Igniters were in short supply, since most of them were in the motor box that never arrived.

Photo by Vern Estes.

US Junior team coach Greg Stewart helps spot thermals for S8 pilot Scott Vinyard. Junior team manager Bill Stine watches.

JSL photo.





## Reflections on S8D

by Fritz Langford

It's dry and dusty on the plains of Kazakhstan. Underneath the clear blue sky and the bright desert sun, my radio controlled rocket glider screams out of the tower and arcs over onto its back. Though I keep it under control while the rocket engine is still burning, the rules dictate that any rocket that comes within 60 degrees of horizontal must be disqualified. As I hear the Range Safety Officer announce the disqualification, I can feel my heart sink and I know that my chances at a medal disappeared less than 5 seconds after the event started.

As the sun set, I watched the Chinese win another gold medal and I reflected on my performance that day. After the disappointment of my first flight, the pressure to do well on my remaining flights disappeared, and I was able to pull off a good second flight and a perfect third. Unfortunately, at the world championships, all three flights have to be perfect, as the scores are added together to determine the winner. The contest is flown in rounds, with each contestant getting one flight in each 100-minute round. Though my second and third flights were decent and excellent, respectively, that first disqualified flight was an absolute disaster.

As the round opened, I was worried, feeling the pressure of the world championships, but I was confident that my 150 practice flights over the past year had properly prepared me for this day. I had charged all the batteries for both my radio transmitter and receiver, and I thought that despite a few snags in the plan, I was ready. Though the US team had ordered special engines designed specifically for this event, and had painstakingly shipped them from California to Russia, they had been held up in Moscow customs and we were unable to use them in the actual contest. Fortunately, I had ordered backup engines so that I would be able to fly the contest, but I had been unable to obtain any of these engines to practice with at home, so I was flying the contest on an engine I had never seen before. This meant that on my first flight, I was unprepared for what the rocket would do, and as a consequence, I broke the allowed angle of ascent, and was disqualified. Looking back, there is very little I would have done differently, and it turned out to be the things I couldn't control that got me. I didn't win a medal that day, but I gave it my all, and I'm still glad I tried. Competing in the world championships at all is a privilege that few people have. Though it would have been nice to win a medal, there is no shame in losing to the best in the World. Indeed, you must play with them to become one.

and the last flight in the event. He got an excellent boost, but was headed for another three-minute flight. With about 50 feet of altitude remaining, Bob Parks and Greg Stewart guided him into a weak thermal forming over the pad, and Fritz worked it well. He climbed back up to probably 200 feet and achieved a max (six minutes). It was a great note to end the day on.

As in 2004, the Chinese dominated the Junior event, with seven maxes out of nine flights. They easily took Gold. Poland was second with three maxes, and Latvia was third. The US finished 6th. Scott was our top finisher with 6th place, Bill was 17th, and Fritz was 20th.

Each day we had a box lunch on field. Every contestant got a meal ticket, and was expected to go to the lunch tent to collect a foam box with some form of salad, meat, and potatoes, plus a plastic bag with juice, plastic cutlery, an apple, a Snickers bar, and a liter bottle of water. If your team did not pick up the requisite number of lunches the organizers came and tracked you down and made you take them—even if you were only carrying them to a garbage can.

The US Team had two tents, which served as our base of operation and were constantly mobbed by onlookers and young autograph seekers. Dawnn Reynolds and Barbara Langford took turns supervising the action, making sure that only team members got inside, and keeping track of the team's equipment, schedule, and possessions.

The Russians had a fantastic infrastructure and organization assembled for this contest but the execution sometimes fell a bit short in the face of language challenges. Nowhere was this more obvious than in S8E/P. This is a complex event, where the seniors use 40N-s engines and must fly exactly six minutes and then land precisely on the centerline of a runway. Each contestant must fly three rounds, and each round was split into four groups of eight fliers apiece. The groups had three minutes to prepare their models, then 14 minutes to fly the flight. Within this 14 minute window, the contestant had to run to the transmitter impound station, pick up their radio transmitter, return to the pad, turn on the radio gear, launch the model and fly the six-minute flight, land on the runway, and return the transmitter to the impound. If the return was late the entry was disqualified. The transmitter station was 98 paces to the furthest pad, which happened to be assigned to the United States. This meant that the US team of Bob Parks,



Greg Stewart, and Keith Vinyard had the unanticipated challenge of running a 100-yard dash at the beginning and the end of their flights! Greg Stewart missed the return cutoff by about ten seconds, and despite having the best flight score of the group, was disqualified. But it turned out that seven of the eight entries in the round were disqualified for one reason or another (some very legitimate) so I was able to get the team managers from US, Britain, China, and Switzerland to appeal together. The common thread was communications misunderstandings before the first group was flown in this very complex event, and



**Vern and Gleda Estes with most of the US Junior team: Gib Reynolds, Bill Parks, George Reynolds, Chris Franklin, Scott Vinyard, Ben Reynolds, and Esther Clark.**

JSL photo.

we managed to convince the Contest Jury to move to the classic end of a good negotiation—they were able to reject all the protests but still give us all the result we wanted, which was a re-flight of the entire round. This whole process led to delays, and as the sun set we were only halfway through the event, flying the third group of the second round. The game was called on account of darkness, to resume at a time to be determined.

Greg Stewart was returning to the Internats after an absence of more than 25 years. In 1980, he had won Gold in A engine Free Flight Rocket Glider the first time that event was flown. In Baikonur this September Saturday, he was really amazing—in the morning he was the Junior team manager, getting eight qualified flights in nine tries, working through RF interference and two reflights. Then in the afternoon he flew three rounds of S8, achieving high scores throughout. Through the whole thing he kept a positive disposition. He was an incredible role model for the whole team.

But he was not unique. Another star was Bill Stine. Bill alternated with Greg as the Junior Team manager. Bill has a great touch with the more junior Juniors. Our team ranged in age from 10 to 17, which is a huge spread in maturity and ability. The S8 team was at the upper end of the age spread, and they all took disappointment hard. You could see it in their faces and actions as each took their turn—Fritz



**Gleda and Vern Estes with Makoto Yamada, the Japan Team Manager, at Yuri Gagarin's launch pad.**

JSL photo.







The US team in front of a BURAN Shuttle at Baikonur. L-R: Vern Estes, James Duffy, Gleda Estes, Dean Franklin, Gib Reynolds, George Reynolds, Chris Franklin, Scott Vinyard, Katherine Humphrey, Esther Clark, David Bellhorn, Dawnn Reynolds, Barbara Langford, Trip Barber, Bill Stine, Grigoriy Vislobokov, Jennifer Ash-Poole, Dave Clark, Fritz Langford, Greg Stewart, Kevin Johnson, Keith Vinyard, John Langford, Mark Petrovitch, Bob Parks, Steve Humphrey, and Bill Parks. Not shown: Tony Reynolds, Ben Reynolds.

tween 1969 and 1972, and the Energia rocket and Buran Space Shuttle, which flew once during the 1980s. Since the demise of the Soviet Union, Baikonur has been home mostly to the Soyuz rocket, which has been the main way of reaching the MIR space station and the International Space Station when the Shuttle has not been flying. Only a few days before we arrived, a Soyuz launched on something close to its 2000th flight (over 125 of them manned), carrying two Americans and one Russian to the Space Station. One of the three was a commercial passenger, an Iranian-American woman who bought a ticket from the Russians to visit the International Space Station. Almost no one from the west has visited Baikonur, and we had heard a wide range of accounts about what to expect.

Our fleet of buses left the town about 1:00 in the afternoon and drove north into the desert for almost an hour. There are reportedly about 15 launch pads, of which we visited only two. We went first to a payload processing facility for Soyuz spacecraft and Progress resupply vehicles, which was mostly empty since a mission had just flown the day before we arrived. Then we toured an assembly building for Soyuz rockets, which was much more in-

teresting. Parts for two or three complete Soyuz rockets lay in assembly-line fashion in this building. Then we went around to the other end of this huge building, where the Energia and Buran had been housed. This was a complete contrast—the roof had collapsed years ago (with a shuttle inside) and has never been repaired or even cleaned up. We walked around two huge transporters, similar to the crawlers at Kennedy Space Center, which had hauled

the Energia rockets to the pads and erected them for launch.

From there we went over to one of the Shuttles, sitting outside and covered with dust. This was a non-flight article (the fit-check mockup), but we all posed for pictures around it. Apparently there were to have been six Soviet shuttles, although only one was completed and flown in space.

From there we drove to the pad where the first man in space, Yuri Gagarin, was launched in 1961. Gagarin has near-sainthood status in the space community, and certainly here at Baikonur. After a long visit at the pad, we went to visit a museum, which included the tiny cottage where Gagarin slept the night before his launch. The Museum featured a model of the US Saturn 5 rocket, which was built from the Estes kit! We enjoyed taking pictures of Vern Estes posing in front of the display.

I had invited Vern to come with us almost a year ago, and to my great surprise, he and his wife Gleda accepted. Vern and Gleda were the oldest members of the delegation, and they quickly achieved “rock star” status at the contest. The most memorable of many encounters came during the Baikonur tour, when the Japanese team

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manager boarded our bus and presented a book as a team gift. He talked about how he once met the legendary Vernon Estes, who, although he did not recognize it, was sitting only a few feet away. I introduced Vern but it didn't sink in at first. Then he read Vern's name badge and his eyes began to get wide and he began to stammer, then to laugh, and then to cry, unable to believe this was Vernon Estes in person. Vern was

calm throughout this encounter. This scene was repeated, though usually on a more modest scale, many times throughout the contest as word spread that Estes was part of the US delegation.

We returned to town late in the evening, all feeling the tour had been worth the entire trip. Steve Humphrey summed it up: "The satellite prep area, the Soyuz assembly area, and the Soyuz launch pad

reminded me of a well-oiled steam locomotive; yeah, it's dated, but it works great. Heck, the Soyuz has got to be, by far, the most successful man-rated vehicle on Earth. Baikonur is also not just a place to launch Soyuz, as the Proton is also a successful and active launch vehicle."

## Monday, September 25

### S1 altitude

Monday was to have been given over to a single event, S1 altitude, flown by the Seniors in the morning with 5 N-s and the Juniors in the afternoon with 2.5 N-s. But the unfinished rounds of RC Glider from Saturday meant that much of the day would be given over to finishing that event.

The S1 event has the same dimension limits as the duration events, so everyone uses two-stage designs with a large booster and small upper stage. These require complex separated staging techniques and recovery systems on the boosters; our designs simply were not competitive. Trip, Tony, and Keith were the senior team, while Chris, Katherine, and Fritz were the Junior team. The senior team finished 11th out of 15, with Russia in first. Trip had the



Esther Clark assists Fritz Langford in loading his S1 altitude entry onto a piston.

JSL photo.

## Home on the Range

by Esther Clark

World championships can be grueling with a schedule that typically starts before dawn and ends after dark. Yet this event in Kazakhstan was special because of the way it was intertwined with the population of the entire town of Baikonur. When we arrived at the small military airport, we were greeted by three local high school girls who were assigned to serve as translators and all-around helpers. As it turned out, they proved to be critical since we needed so many items like water and food between meals. But more importantly, they were our eyes and ears into this foreign world. Through them we could experience what it was like to live in Baikonur, because they were eager to share and discuss things with us. (Actually, they were thrilled to be able to practice the English they had learned from textbooks.)

The experience went even deeper. On the contest range, busloads of kids my age appeared daily and eagerly sought to learn about "Americans." Then, after flying all day, we would play soccer on a field that stretched to the horizon. I seemed to find new friends every day from the town and from other teams. The "tent city" in the desert began to feel like home with a predictable routine: cool mornings of rocket preparation, hot afternoons of flying rockets and pad support, sleepy lunches of eating freshly cooked local food (rice, vegetables, and lamb), and cool nights of socializing again with my new friends.

I didn't realize the depth of these new relationships until we were walking the four blocks home from the closing ceremony. Surrounded by thousands of people, I was approached by numerous boys and girls who grabbed my arm or called my name from a distance to say a quick goodbye, and then disappeared back into the crowd. It was then that I realized how many friends I had made and how much I would miss them.



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best flight, at 452 meters, to the winner's 612. Tony had 349 m for 31st, while Keith failed to qualify. Among the Juniors, Fritz was 7th with a 295 m flight (to the winner's 325 m) while Katherine was 24th with 203 m and Chris was 27th with 173 m. The US Juniors finished 6th, while the Serbians took Gold. Katherine's first flight was a heartbreaker, as it was her best flight but was disqualified when the first stage separated into two pieces, each with its own recovery streamer. This was not prohibited by the rules, and we successfully got the disqualification overturned. But since the judges stop recording anything when a DQ is called, there was no altitude data—so the best Katherine could do was fly again.

The completion of S8 was a different matter. Greg was still in strong medal contention—but events seemed to be conspiring to hold him back. At mid-morning a paper was distributed to each team announcing the event would resume at 3:30 pm. Thus we were astounded when at 3:05 the meet officials announced that the round would begin in 5 minutes. They had made a schedule-change announcement during lunch (in Russian only) and posted a written schedule update on the results

board, so protests over the language issue did no good. Although Keith Vinyard flew he missed the time enough to remove him from medal contention—and while running to return his transmitter, Keith fell and broke two ribs.

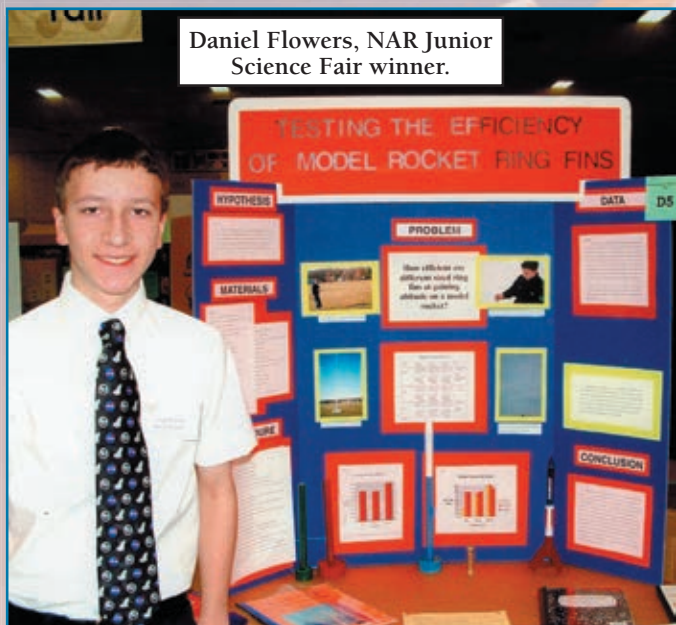
Keeping track of everything going on at the pad was the duty of the pad manager—a role generally filled by the Junior team manager at the junior pads but by Chris Kidwell at the senior pads. Chris is a NARHAMS member who came along to support the team, and he ended up being the traffic cop who kept everything moving smoothly at the senior pad. The sequence and protocol for getting approval to launch was complex and constantly changing, and the contestants had enough to worry about with their models and the round deadlines. Chris made their lives a lot easier! Another US volunteer was Jennifer Ash-Poole, who was the official US timer. She spent the entire week working as part of an international team of judges and timers, rotating between different nations each round.

When the first three rounds were done, the top 5 contestants advanced to a final flyoff round. Unfortunately, our best score,

Greg's, was just shy of what was needed for the flyoff. We did win a Bronze medal in the team standings, which turned out to be our only medal of the entire contest. Greg ended up 13th, Bob 15th, and Keith 19th, for a combined score of 6477, good enough for Bronze behind the Slovaks (8319 points) who won Gold and the Russians (7249 points) who took Silver.



## NAR JUNIOR MEMBER SCIENCE FAIR CONTEST



Daniel Flowers, NAR Junior Science Fair winner.

### CONTEST RULES:

1. The contest is open to NAR Junior members.
2. Any science fair project involving model rocketry or high power rocketry is eligible to enter. The project can be a study of some aspect of rocketry, or it can be a project that utilizes rockets as a testing or data collection tool. Projects entered in a previous year's contest are not eligible for entry in this year's contest.
3. Submissions should include photocopies and/or photographs of your science fair report and display graphics. Include whatever material you feel will help the judges to better evaluate your project. You may also submit files on 3.5" diskette, Zip disk, or CD-ROM. A photograph of your self by your science fair display or conducting your rocketry project would be appreciated, but is not required.
4. Entries will be judged on Research Value and Originality, Scientific Thought and Engineering Goals, Organization and Thoroughness, Effort, and Clarity.
5. Membership renewals won in the contest are not transferable to other persons.
6. All Junior members who enter the contest will be listed in *Sport Rocketry* magazine.
7. You retain any copyright and commercial rights to your projects. You grant the NAR the right to publish your project in any of its publications. The entry materials become the property of the NAR and cannot be returned.
8. Deadline for entry (by postmark) is June 30, 2007. (We will run the contest again next year, so start thinking ahead!)
9. Send submissions to: Thomas Beach, Science Fair Contest, 432 Pruitt Avenue, Los Alamos, NM 87544. Be sure to include your name, NAR number, address, phone number, and email address (if applicable).

**NAR Junior members:** Have you done a science fair project that involves model rocketry? If so, you can enter your project into the NAR Junior Member Science Fair Contest. Up to six winners will receive free NAR membership renewals including First Class delivery of *Sport Rocketry* magazine! If you don't have a science fair project involving model rocketry, start thinking ahead to next year, because the NAR will run this same contest next year.

## Tuesday, September 26

### S5 Scale Altitude and S9 Helicopter Duration

Tuesday was a much-anticipated day for the US team, as we were the defending medal champions in the senior division of Scale Altitude and as it marked the third outing for the unusually-shaped "Space Grant I" Scale Altitude models in the Junior class. The seniors were to fly in the morning, giving the Juniors time to be ready for the afternoon.

As in many other FAI events, the Scale Altitude models must meet minimum size requirements at launch, and this leads to a search for multistage prototypes that have large fat boosters with very small upper stages. The Junior S5b models must be 500mm (19.7") long and at least 40mm (1.58") diameter for at least 20% of that length. For the Senior S5C models, the dimensions are 650mm and 50mm respectively. The long booster lengths also mean that there is a large separation between the first stage and second stage motors, so second stage ignition is challenging. The first stage must also fully deploy a recovery device.

Defending S5C Gold medalist Tony Reynolds, defending Silver medalist James Duffy, and rookie David Bellhorn flew three Bumper-WACs, which had dominated in 2004. At Baikonur, they did well in the static scores but fell victim to the missing U.S. engines still stuck in Customs. David and James both attempted flights using available foreign engines. These engines were quite a bit different than the US motors they had practiced with, which resulted in disqualified flights. The event was dominated by Taurus-Tomahawks. The highest altitude with the 10 N-s impulse limit was 446 m, and the Gold-medal score was 1023 points. The Czechs were first, the Slovaks second, and the Romanians third.

All three of our S5B Junior team members—Fritz, Gib Reynolds, and Ben Reynolds—had identical models and all had scored

Right: James Duffy, David Bellhorn, and Tony Reynolds load one of the US S5 Scale Altitude entries onto the US pad.

Below: Racing to beat the clock, Gib Reynolds and Fritz Langford prepare to launch a Space Grant I.

JSL photos.



Dawnn Reynolds and George Reynolds recover brother Gib's S5A entry, the Space Grant I.

RSA photo.



within a few points of each other in the static judging. Even though the Space Grant Is are simple models, they are complicated to prepare for flight, and in 2004 we only got four of the possible nine flights launched. The round opened at 2:30 with winds of about 3 m/s. Fritz flew first, suffering a bad tip-off but getting a qualified flight with a closed track at about 228 meters. Gib's flight tipped off even worse, staging straight down into the ground, while Ben had a nice boost but still a tip-off and an overly long delay...but our best flight of the round at 270 m.

Spirits were high moving into the second round. The winds were dropping and all three members had models to fly. Ben flew first, with an almost-perfect boost and a nice tracking cloud. Unfortunately, his streamer did not unfurl, and the model tumbled gently...right into the range head. This resulted in a disqualification under FAI rules. We did hear his score—417 meters, which as it turned out would have given him the silver medal (note this was only a few meters below the winning senior score, and the seniors had twice the total impulse!). In the second round Fritz had a great flight, straight up, and a nice red cloud. The streamer was clearly visible. We were elated but the judges watched... and watched... and watched... and then announced a DQ due to streamer separation. This was clearly a 500+ m flight and a likely gold medal. Gib had to rebuild his model and he flew in the second round, but also was DQed due to a lack of a streamer.

For the third round we were in the classic situation of not having an upper stage for Fritz (unlike most other events, in S5 you get only one model with which to attempt three flights). We put the whole team out on recovery and paced out search patterns across the desert. Mean-





while, Ben had a great, straight-up flight that was declared to be a track lost. This meant he could re-fly, which he did at the last minute. The round was due to close at 7:00 pm, and with 30 minutes to go, still no recovery on Fritz's upper stage. At 6:40 pm Dawnn Reynolds found the upper stage. This led to another classic run-back-to-the-pad and frantically re-prep scheme. Fritz was on the pad with a couple of minutes to spare—launched and boosted nicely to staging—and then the second stage ignition failed. It turned out that he had grabbed a Serbian-made Ultra motor instead of a Czech-made Delta, and Ultras are extremely difficult to ignite since they have essentially no core. Our record for the week was 12 Space Grant flights—of which 10 successfully staged and two failed, and both failures had Ultras as upper stages. The failure to gain a medal was a bitter disappointment for the team, since all three Juniors had been so close to a medal, but everyone took solace in the impressive teamwork demonstrated by launching 10 complex flights in the launch window.

The team medals went to the Ukrainians, Russians, and Slovaks. The top altitude was 332 meters.

While the Scale Altitude flying was going on, S9A Helicopter Duration was also being flown. This event had originally been scheduled for Wednesday, but at the last minute the contest organizers decided to move it up a day. This had the unfortunate effect of knocking out Bob Parks, who was still working on wringing the bugs out of an extraordinarily advanced model, but with the extension of S8 into Monday he couldn't be ready to fly S9 on Tuesday. The two-man senior team of Trip and Mark still put in a credible showing, each achieving three qualified flights and maxing once. Trip's max was last seen by our "deep recovery" crew 29 minutes later and over two miles downrange, still headed off into the desert at several hundred feet! Trip was 18th, Mark was 20th, and the US was 11th. The top three senior finishers all had perfect scores (three maxes apiece) and 12 contestants had two maxes.

The US Junior Team in S9 was Bill Parks, Scott Vinyard, and George Reynolds. Bill had one max but each suffered one disqualification, leading to 26th, 34th, and 40th place finishes. The US team placed 12th overall while the Ukrainians took the Gold.

## Wednesday, September 27 S7 Scale

This day was the normal morning routine—up at 5:00, breakfast at the Arbat at 6:00, bus to the field at 7:00—but since we had no Junior flights in the morning we were free to roam, observe, and photograph.

Scale was the usual demolition derby—at the end of the first Senior round, there was only one qualified flight. Many were obvious DQs even in the U.S., but others fell victim to the FAI-rules standard that no part, however small, of a Scale model can fall out of the sky without its own recovery system. It made for an intense second round, of course, and at the end of the day Russian Alexander Levykh won with a perfect Soyuz flight. His model was tops in static judging, and it flew with all the bells and whistles—all four strap-ons lit motors then dropped away and deployed parachutes, two more stages fired, and more parachutes than I could count filled the sky. It was a real crowd-pleaser.

There were no US Junior entries in Scale this time. The Senior team was represented by Tony's Nike-Asp, James's Lit-

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The 2006 Texas, er, U.S. Scale team: James Duffy, Tony Reynolds, and David Bellhorn.

Photo courtesy David Bellhorn.

tle Joe I, and David's Saturn 1B. All three lacked the right motors due to the missing U.S. motor shipment. Tony Reynolds was the only US senior to try to fly—he made a good go of it, even though his flight was a DQ when the entire rear end of the model blew off from the ejection charge of the unfamiliar motor he tried to use.

The medals in the Junior division went to Russia, Poland, and Romania. In the Seniors they went to Russia, Slovakia, and Poland.

There was also an exciting fly off in S9

between the Italians' "ace" FAI flier Antonio Mazzaracchio and a Pole. Antonio picked the air and launched first, with the Pole piggybacking. The air was good and the flights were over 10 minutes, but the Pole fell out of the thermal first and Antonio won.

At the end of the day they gave out all the team awards, which led to a very protracted ceremony that continued past dark. Award ceremonies at any World Championships are Olympic-style, with the winners standing on award stands of various

heights, having gold, silver, or bronze medals draped over their necks by the FAI officials, and then listening to the national anthem of the gold medalist's country while the flags of the three medalists' countries are slowly raised on flagpoles. The US S8 team collected a Bronze, and we got to see the Stars and Stripes fly over Russia once



The first round of Scale had only one successful flight. Here, a Kazak model explodes.

Photo by David Bellhorn.

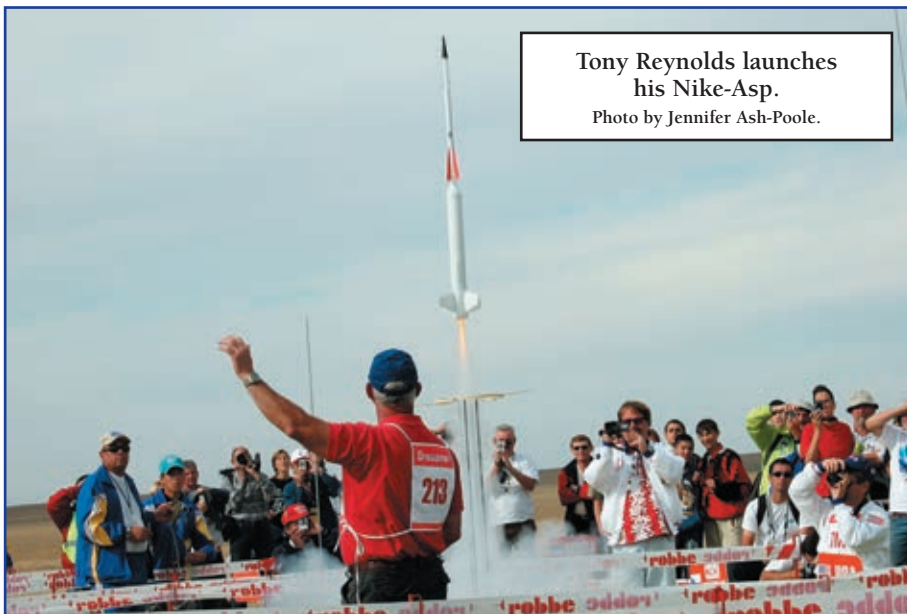
as a result. Ed Pearson, who had been the US team manager for many previous world championships, was "promoted" this year to the prestigious position of being one of the three international Contest Jury members. Although he traveled with the team, once we arrived in Russia Ed was sequestered with the other international officials. It was a thrill for all of us to have him help present the medals.

## Thursday, September 28

The CIAM meeting, the Closing Ceremony, and the Awards Banquet

Thursday was luxurious as we got to sleep late (8:00 am!). The day was given over to the CIAM subcommittee meeting, with a "lessons learned" session on this meet and an introduction to the plans for the next contest, which will be held in Spain in August of 2008.

The meeting was held in the "Cosmonaut Hotel" where all cosmonauts stay before their launch. Among the traditions are that each person about to be launched



Tony Reynolds launches his Nike-Asp.

Photo by Jennifer Ash-Poole.





Alexander Levykh's gold medal scale Soyuz flight.



The Ariane IV was a popular prototype in both Junior and Senior divisions.



One of three identical Czech Ariane IVs.



Vasil Pavluk and Peter Matuska of Slovakia prep a beautiful Saturn 1B.



The Uzbekistani Junior team modeled the Russian Cyclone.



The US S8E Rocket Glider team accepts its Bronze medal. L-R are John Langford, team manager, Grigoriy Vislobokov, accepting for Greg Stewart, Keith Vinyard, and Bob Parks.



US Jury Member Ed Pearson.  
RSA photos.



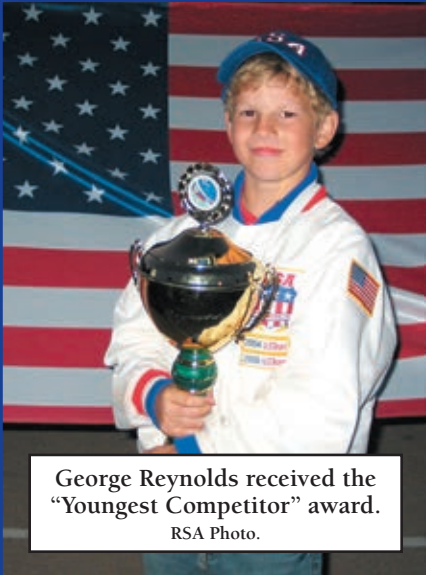
Opening ceremonies.

RSA photo



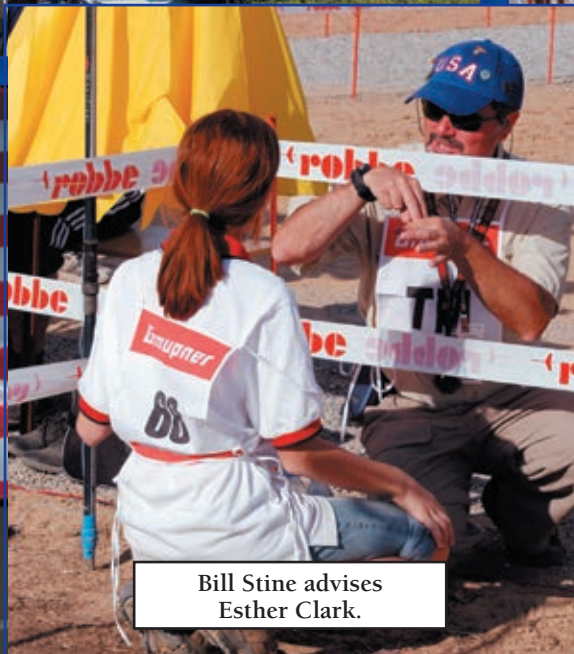
Trip Barber prepares to launch his streamer duration model.

JSL photos.



George Reynolds received the "Youngest Competitor" award.

RSA Photo.



Bill Stine advises Esther Clark.



US Team Manager John Langford before the medal ceremony. Kazak native costumes are in red, Russian in blue.

Photo by Grigoriy Vislobokov.

Greg Stewart poses by Gagarin's launch pad.





signs the door of their room, and they plant a tree after they return. Very few westerners—probably less than 200—have ever visited the grove of these trees. Like most things about Baikonur, it turned out to have two angles. On the one hand, it was neat to see a tree that Gagarin himself planted over 40 years ago and to see the continuity. On the other hand, even the Gagarin tree is not much to look at—really a large shrub—and many of the other trees have died. Some have been replanted, others they have not yet gotten around to. The symbolism seemed in keeping with the whole place.

The Closing Ceremony got under way in the early evening. As in the opening, the 10,000-seat stadium was full. The teams marched in behind flag-bearers, awards were given for team performance, and a ground show complemented by overhead fireworks closed out the ceremony. The overall meet champions received another set of awards (overall first place went to, you guessed it, the Russians). A special award was given to George Reynolds for being the youngest competitor at the meet.

The final evening banquet is usually a highlight of each World Championships, but this one was the only real disappointment of this Championships. It was held at the Baikonur city hall, but no single space there was big enough for the huge crowd so the competitors were split into three rooms—one for Juniors, one for Seniors, and one for team managers. Much of the community feeling customary to these banquets was lost by this split, and people wrapped up really early. However, Vern and Gleda did receive a presentation of a beautiful set of Kazak robes for their role in creating the hobby, and for being the oldest participants in the meet.

## Friday, September 29

### Starting the trip home

To go home we reversed the process of arrival: clear Kazak customs, take the charter flight to Moscow, stay overnight in Moscow, exit Russia again, and fly Delta to Atlanta and connect to our respective homes. We were scheduled to take the first flight out on Friday, but we ended up getting bumped in favor of other contestants who had earlier flights to connect with out of Moscow. We passed the day by taking a tour far out in the desert to an archeological site and religious shrine, a key spot where one of the founders of modern Kazakh civilization had lived along the Silk

Road, well beyond where our launch site had been. We finally left the hotel about 5:00 pm and took off from the Baikonur airport at about 9:30 pm.

The flight back on the TU-154 was an experience, with many Eastern European contestants in high spirits drinking and singing. The US team transferred to a hotel in Moscow for about three hours of sleep before catching our flight back to the US on Saturday morning, two weeks after we had arrived in Russia.

Outside as I write this it is a rainy and grey Thanksgiving Day in Washington,

D.C. I am deeply grateful for having had the chance to share this adventure with the rest of the American team. There are many memories that will stay with each of us forever. One of my most enduring is standing alone on the range as the sun set and darkness settled across the desert, the music of Dire Straits ringing from my iPod:

*There's so many different worlds  
So many different suns  
And we have just one world  
But we live in different ones*

At the end of the day, the overwhelming feeling I left with is a sense of commu-

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nity. Community first with the US team, which bonded together in the face of every travel and flying challenge and supported each other in every respect. It was especially gratifying to watch our Juniors as they faced challenges and setbacks and kept going. Sometimes it felt like you could literally see their character being forged before your eyes. But also a broader sense of community, among our competitors and our hosts. This is not an easy time for America in the world. We did not know how we would be received. Virtually without exception, we were greeted with warmth and enthusiasm.

The next WSMC is in Spain in 2008. The site is Liepada, about 100 miles north of Barcelona. The hotels and food will certainly be much better, the duration of the event will be less, and access to the event will be easier. The Spanish will be hard pressed, however, to match the logistics or infrastructure of Baikonur, or its history. They plan to hold the 2008 WSMC in late August, so not as many Junior team members of all nations will have to miss school to attend.

The NAR and the AMA have agreed that the NAR is now fully and completely

responsible for organizing future U.S. international Space Modeling teams, and the flyoffs for the 2008 team will be held by the NAR the weekend before NARAM-49 on the NARAM field.

FAI international competition is the Olympics of sport rocketry. The competition is intense, the modeling and flying skill levels are impressive, and winners of each event can call themselves "World Champions" and treasure their medals and memories for a lifetime. It is a team sport, and being part of the team that flies for the USA is an honor and privilege that is open to any NAR member with the dedication and skill to earn it.

While European and Chinese space-modelers have recently moved well ahead of US fliers in many respects in this level of competition, there is no reason why with the right practice and commitment US fliers cannot use our technological skills to return to the medal stand and hear our national anthem played again on a foreign flying field in future years. Come give FAI modeling a try and be part of America's official international rocketry team!

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