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2010 WORLD SPACEMODELING CHAMPIONSHIPS

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WORLD SPACE MODELING CHAMPIONSHIPS 2010

by George Gassaway

The 2010 FAI World Space Modeling Championships (WSMC) was held August 21-28 near the town of Irig in the country of Serbia. This was the 18th WSMC held for Seniors and the 9th WSMC held for Juniors. This was the best-run WSMC that most have ever attended.

The U.S. Team consisted of 15 Senior fliers, and 14 Junior fliers. Several of the Junior fliers were sons or daughters of Senior team members. Managing the Senior team was John Langford. Bill Stine of Quest was the manager for the Junior team, with Ellis Langford as assistant manager. There were also many supporters and family members who made the trip. Mary Roberts of Estes Industries was one of the supporter group.

The flying field near the town of Irig was part of a very large agricultural area with miles and miles of farmland in a mostly flat valley. The flying field had been harvested, so the ground was plowed-up dirt. Areas to the North and West had hay, corn, and even a reservoir that came into play. There was more corn to the South and vineyards to the East.

Practice flying on Sunday gave many team members the opportunity to try out their models with the actual motors they would use for the contest. As is often the case some problems arose due to differences between the motors used for practice at home and the real motors used for the contest. For many of the low power events, very small and efficient motors are used, around 10mm in diameter. They are better than current 13mm motors available in the U.S. The U.S. team bought Czech "Delta" motors and Serbian "Ultra" motors to use in many of the events.

Some U.S.-made motors were also used, including the AeroTech D3 and E4 motors that were so critical for the S8 R/C R/G events. The motors were shipped by air freight to Vienna, Austria, and then transported from there by the Stenberg family who flew into Vienna and rented a car.

In FAI rocket competition, all of the flying is done in scheduled rounds, usually 90 minutes long. All three team members have to fly in that round's limited time window. For all of the duration events except S8E/P, the events are flown with "max" times, such as 180 seconds for S4A Boost Glide. The three flights are added together, and if there is a tie there is a fly-off. Only two models are allowed for the first three rounds, so one model has to be returned in order to be able to make a third flight. For the S1 Altitude and S5 Scale Altitude events, there are also three



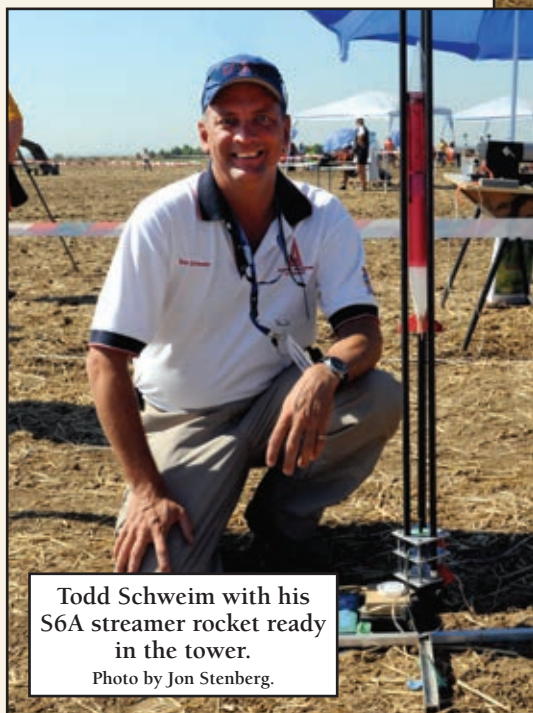
Alexandr Levikh's beautifully detailed Soyuz TM-12 model lifts off on an 8-motor cluster to win the Gold medal in the Senior division.

Photo by George Gassaway.

scheduled rounds, but the best single flight is what counts.

For many of the events there is a minimum body tube diameter of 40mm. The model has to be at least 40mm diameter for 50% or more of the model length, and there is a minimum model length of 500mm. The models use very lightweight construction. The tubes can be fabricated with masses (without fins) under 5 grams, and the nose cones (often vac-formed) weigh about a gram.

Model recovery duties are shared by everyone else on the team who is not needed at the launch area. The U.S. recovery crew is the best asset the team has, ev-



Todd Schweim with his S6A streamer rocket ready in the tower.
Photo by Jon Stenberg.



Chris Kidwell preparing to fly S6A Streamer Duration.
Photo by George Gassaway.



Kevin Kuczek slides an S6 model into the tower, with Steve Humphrey in the background.
Photo by George Gassaway.

ery time. Keith Vinyard, Trip Barber, and George Gassaway helped pick thermals for the Juniors and Seniors, but Keith did the lion's share for the week.

MONDAY S6A Streamer Duration

S6A has a max time of 180 seconds. The Seniors flew Streamer in the morning. The Senior team, as well as Paige Kuczek on the Junior team, used 1/2 mil streamers that used the "heat sink streamer press" method that Kevin Kuczek developed.

Chris Kidwell had flights of 102 seconds, 180 seconds (max), and 118 sec-

The U.S. S8D Juniors preparing for round one.

Photos by George Gassaway.



onds. Chris ended in 13th place among the 64 fliers, with a total of 400 seconds.

Todd Schweim's first flight used a piston and had the model's body collapse on boost (it had tested fine at home). For the rest of his flights he did not use a piston, which reduced the altitude but did keep the model from boosting too fast.

Todd's second flight ran into another common issue: a lot of fliers trying to fly at the same time into the same thermal. Trip

Barber detected a thermal and suggested "GO," Todd put up the paddle to fly, but so had other fliers. By the time the other models were flown and Todd's model was launched, the thermal had gone by. Todd's model boosted fine and deployed, but without the thermal it flew only 72 seconds.

For Todd's third flight, Trip Barber detected a thermal before anyone else put up a paddle, so Todd launched without having to wait. His model nailed the thermal, and got the 180-second max.

Kevin Kuczek had a good first flight of 127 seconds, but his second and third flights shredded on boost. Kevin's "composite paper" (1/2 oz fiberglass vacuum bagged flat to Japanese tissue) models were made the same as in 2002 when flown on B2 motors, yet did not hold up to the A1 motors this year.

The Senior Gold medal went to Stephanie Uhlig of Germany, with two maxes and a first flight of 96 seconds, for a total of 456 seconds. The Team Gold went to Serbia, Silver to Poland, and Bronze to



A U.S. Senior team S8 glider in flight.

My First Internats

by Caleb Boe NAR 83769 JR

The 2010 WSMC was my first experience at the Internats as well as my first trip overseas. I had read about past Internats in Sport Rocketry and hoped that someday I'd have the opportunity to participate on the U.S. team. That opportunity finally came when I met Todd Schweim at NARCON 2008. Since then, Todd and I have worked together to achieve our common goal of making the U.S. Internats team. After two years of preparation, Todd, my dad, and I were finally in Serbia.

I enjoyed every minute of the trip from the moment I left home. It was an incredible experience competing in my events as well as helping teammates compete in their events. I was impressed with how well the U.S. recovery team was organized; Ellis did a good job. I enjoyed being a part of it. It was great to spend a week with others who share a passion for model rocketry.

Meeting competitors from other countries was an enjoyable experience. I was amazed by how many people across the world participate in rocketry, and I marveled at the modeling skills of these foreign competitors. Many of their models were absolutely incredible.

Because we flew in a day early, we had the opportunity to spend some time touring Belgrade. Highlights included the Nikola Tesla Museum and enjoying the Belgrade cuisine. Thanks to Ryan Woebkenberg who arranged the transportation, some of the team members were able to tour Novi Sad, Serbia's second largest city. Seeing another part of the world and their culture was awesome.

Participating in the WSMC was an incredible adventure and one that I will always remember. It was an honor to represent the United States in the competition and be a part of a talented group of competitors. I'm looking forward to my next opportunity to be a part of the U.S. team.

Macedonia.

The Juniors flew S6 Streamer Duration in the afternoon. Paige Kuczek, 8-year-old daughter of Kevin Kuczek, flew very well. At home she had practiced prepping over 200 times. Learning from the problems the Seniors had that morning, Paige's models had extra foam plugs (usually used for ejection pistons) to make the model stiffer to hold up on boost. That worked, but did cost some altitude because of the extra weight. Paige had flights of 93, 180 (max), and 104 seconds, for a total of 377 seconds. She ended up in 6th place out of the 44 fliers.

Katherine Humphrey had three solid flights of 87, 78, and 122 seconds, coming in at 18th place.

Esther Clark had a problem with her first flight, for a DQ. Her second flight was 78 seconds and third flight 82 seconds.

The Junior winner was Jakub Fijalkowski of Poland. With two maxes and 116 seconds, for a total of 476 seconds. For Teams, Gold went to Poland, Silver to Slovenia, and Bronze to Ukraine.

S8 R/C Rocket Glide

The Juniors flew S8D R/C R/G in the morning while the Senior's were flying S6. The max time for the S8D event is 6 minutes (360 seconds), quite a challenge for D power.

The Junior S8D team of Matthew Berk, Craig Vinyard, and Alyssa Stenberg were probably the most practiced and prepared group of fliers on the U.S. Team. At the 2008 WSMC, a launch countdown mistake cost the Junior team a Bronze medal and cost Matthew Berk a Silver medal when he flew for a max but his flight was DQ'd. So Matthew and Craig, who were on the 2008 team, had a mission. So did three-time NAR A-Division Champion Alyssa Stenberg. She had only been flying R/C for two years. She learned quickly, and got up to speed to not only fly the boosts very well, but to also fly in thermals. Matthew, Craig, and Alyssa were able to practice together a few times in the U.S., such as near Washington D.C. and at the Great Lakes Cup in June. In Serbia on practice day, they spent more time practicing than anyone else on the U.S. Team. There were some rough moments, with models damaged on landing, a near fly-away, and a near crash, but they got all of those problems behind them before contest day.

They all flew the same design, the Raven-10 designed by Bob Parks. It was optimized to boost on 18mm D3 motors made by AeroTech. Keith Vinyard made wing kits for most of the models, and Matthew made pod and tail kits for all of the models.



Alyssa Stenberg and Matthew Berk return after a successful max flight by Alyssa.

Photo by George Gassaway.

For the morning of the event, the wind was already blowing more than it had on practice day. Ryan Woebkenberg of the Senior S8E/P team was the coach for the Juniors, and he did a great job with them. He had helped to coach them on practice day as well as on contest day. Matthew Berk was first up. He had a good boost and settled into a good glide. The wind speed was almost as fast as the glide speed, so Matthew had to point his bird into the wind. It became apparent after a while that his model would not max. There might have been some lift crosswind and upwind, but if he had flown to that spot of possible lift, he might have gotten way too low to catch it and lost more time; it was a tough call. His model landed at 293 seconds. Alyssa's first flight had a very good

boost. Her model ended in a different part of the sky than Matthew's had. She flew her model straight into the wind, and the part of the sky she was in had some weak upwind ridge lift to keep her model up well enough for it to max easily. Craig Vinyard had a good boost, and his glider ended up much as Matthew's had, for a time of 293 seconds. At the end of round one, the U.S. Junior Team was in first at 946 seconds, China second at 886 seconds, and the Czech Republic third at 865 seconds.

For round two, the wind had increased beyond the glide speed of most of the models. So, even flying straight into the wind, most of the models were drifting downwind, backwards. A pilot could add some down elevator trim to go faster into the wind, but that would cost dura-

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The victorious Junior S8D team members, Matthew Berk, Alyssa Stenberg, and Craig Vinyard, pose with Junior Team Manager Bill Stine.

Photo by George Gassaway.

tion overall. Matthew Berk caught the bottom of a thermal and was doing well, but then as the model drifted downwind, it got over a down slope at the edge of the field. Topography like that produces mechanical sink (the opposite of slope lift). Matthew's flight flew for 333 seconds. Alyssa's second flight ran into a similar situation but it was in a better thermal and higher up before it got caught in the sink behind the hill, so she was able to get another max. Her model ended up landing about a half mile away, but it was easily recovered. Craig Vinyard's flight got off well, but it rolled a bit and an elevator correction made it veer enough to be DQ'd for the boost.

At the end of round two, the U.S. Juniors were hanging in there at 2nd place, 76 seconds behind the Czech team. The Chinese team fell to 5th.

In round three, Matthew was able to get a max. Craig had a good boost, but his model fell into the dreaded mechanical sink behind the hill for 267 seconds, a good solid flight for those conditions. It was educational, as the last part of his flight was done "free flight," letting his model circle and drift downwind rather than piloting it into the wind.

Going into round three, Alyssa was one of four fliers to have two maxes, so she was in the running to win a medal. And the U.S. Junior team also was in the hunt to get some sort of medal if she did well. This was quite a lot of pressure for a 10 year old who had been flying R/C for only two years, competing at her first World Championships. She had joined the team to try to help the team get a medal by being the "third flier" on the team, given Matthew's and Craig's experience levels and ages. But Alyssa was ready, prepared, and had all the skills necessary to do well. The breaks had gone her way that day, and not quite so much for Matthew and Craig individually.

The end of Craig's last flight had pointed the way to a good strategy. Circle the model into the thermal as is usually done in lower winds, and let it drift. But this could exact a price.

The strategic equation was simple: medal or model? If Alyssa flew her model into a thermal, then adjusted the trim for it to circle free flight by itself until it maxed, then it was very likely to be able to max, to bring home some sort of team medal and maybe an individual medal. But by doing that, it was very likely she would lose that model. In practicing weeks before, Alyssa had been reluctant to let her models get very far away because she had lost one before. Well, it made sense not to risk losing a model in practice flying. But she was coached that there might come a time at the WSMC when she'd have to let her model fly a lot farther away than she liked, maybe even losing it. So, at the WSMC, round three, with everything on the line for the team and individually, that is what Alyssa chose: to go for the medal(s) and risk losing the model.

Her boost was great, and after being sure it was in lift, she adjusted the trim to make the model circle in the thermal and let it go. The model circled on and on as it drifted downwind, ultimately getting the max! Indeed it flew so far away that by the time it maxed, it was only visible in binoculars, and it was too far out for the R/C system to control it. It was last seen about 3.5 miles away still circling, and was never found. But that didn't put a damper over the fact that Alyssa had maxed out, and she was one of only two fliers to have three maxes, so she was assured of at least a Silver medal. Also, not long after, the results came in that the U.S. Juniors had won the team Gold medal! In a case of "oh-so-close," Matthew Berk ended up in 4th place, just 3 seconds behind the Bronze medal winner Jan Chmelikova.

The team Silver medal went to the Czech Republic. The Chinese Team had a very strong third round, second only to the U.S. in round three, so they moved up to take the Bronze medal.

Hearing the Star-Spangled Banner

By Alyssa Stenberg NAR 87476

My week at the World Championships was the best week of my life. When I made the S8D R/C Rocket Glider team last year, I was happy but I knew I had a big responsibility. And I knew I had so much to learn! The team came in 4th place in 2008 and I wanted to make sure that I didn't hurt the team's chances to win a medal in Serbia. I practiced on the computer nearly every day and traveled all over the country to practice. At times I felt like someone else should have taken the spot because I was making a lot of mistakes—this is a hard event! But I was so lucky that I made many of those mistakes because I needed those lessons at the Championships.

When the time came for me to fly my first round I was so nervous my knees were shaking! I felt so much pressure... I really didn't want to let the team down! I also really wanted make all of the Senior members that coached me proud. Plus, I knew a lot of people expected the 10-year-old girl to fail and I wanted to prove them wrong. I never felt so focused in my life; everything I had learned was in my head at that moment.

I couldn't believe it when my first round was a max! When I flew my second max the pressure was even greater for the third round! When it was all over I was so happy that I had helped the team win a Gold medal! I will never forget hearing the U.S. national anthem that night being played for the rest of my life.

Very late in the afternoon, after S8E/P had ended, there was a flyoff for the Gold medal between Alyssa and Russian Junior flier Alexey Lutiy. There was little to no thermal activity by then, and the winds had dropped, so it was shaping up to be quite a battle in the air. Unfortunately, the result was decided on the ground and not in the air. Alyssa's model had a misfire, and flyoffs only allow one launch "attempt," so her model did not fly. When Alexey's model took off and was qualified, he won the Gold. He flew it out, for 422 seconds, just over 7 minutes. The U.S. Team could only wonder what might have been; that time would have been challenging to beat, but it was possible. Alyssa took the disappointment incredibly well—after all she did have a Silver medal! Members of the Russian team applauded her for her accomplishment, and she shook hands with Alexey after he landed his model.

It was nearly dark when the medal ceremonies were held. It was great to see Alyssa being awarded her Silver medal. She may be the youngest person to earn a Space Modeling FAI medal. Shortly afterwards, the Team medals were handed out. Matthew and Craig, along with Alyssa, were able to get some vindication from the heartbreak of S8D in 2008, getting Team Gold medals. Finally we got to hear the Star Spangled Banner being played during the flag raising part of the ceremony.

The Seniors flew S8E/P R/C R/G in the



Ryan Woebkenberg with his Raven-11A S8 model. Note the big flaps extended down.

Photo by Todd Schweim.

afternoon. The event has a target time of 6 minutes, and a spot landing score of up to 100 points. Every second over or under 6 minutes is deducted. The landing uses "Spot Landing" scoring, where landing inside of a

1-meter radius is 100 points, with 10 points deducted for each meter away from the spot. Competitors in S8E/P fly in assigned "flight groups," each of which had 7 or 8 fliers. This WSMC had five flight groups per round, in tightly scheduled flight windows. The raw flight scores totals within each group are "normalized" (highest raw score set to 1000 and the rest adjusted in proportion).

The U.S. Seniors used an E4 motor manufactured by AeroTech, a modified version of the E6 motor. Returning the favor from S8D, when Ryan was coaching the Junior Team, Matthew Berk acted as coach/spotter for the Senior S8E/P team.

Ryan Woebkenberg flew a modified Raven-11A. Using a Raven-11A wing designed by Bob Parks, but with some differences. It used three channels—elevator, rudder, and two big flaps driven by one servo. Twice, Ryan's model suffered tail damage on landing, and he repaired the model to fly well each time. Ryan ended up in 12th place of the 39 fliers, with the following flight scores:

Round 1: 370 seconds, 70 point landing, flight group score = 921 points

Round 2: 351 seconds, 80 point landing, flight group score = 936 points

Round 3: 360 seconds, 30 point landing, flight group score = 851 points

Internats at Last!

by Ryan Woebkenberg NAR 49363 SR

I could write a book about all the fun and positive experiences I had at the 2010 WSMC, but for me the best part was getting to share a hobby I have participated in my entire life with my daughter Katie at a World Championship level. More than just a week and a half's experience, for us the WSMC was a 12-month adventure. Shortly after we both qualified for the team we started preparing. Katie is really young so I had to develop procedures she could follow for building and prepping the models. The models took many extra steps and entire extra days to build due to the adhesives I felt comfortable allowing her to use, and her still developing dexterity. We spent many sessions practicing all the skills necessary to prep the models: pistoning, recovery system packing, staging, altimeter assembly and installation, motor securing, and igniter installation. Sometimes we would practice just one skill like rolling streamers and other times we would do partial flight profile practicing.

There were two World Cups held in the USA in the 12 months leading up to the WSMC and we attended and competed in both learning valuable lessons each time. The net result of all the preparation was a 20 step prep process that I devised that Katie would have to execute with only the assistance of Katie Steele in Serbia. Katie Steele was a great mentor for my daughter Katie. Mentoring happens frequently on the U.S. team because more experienced modelers assist and teach less experienced ones. Although neither of the Woebkenberg Spacemodelers won anything in Serbia, I really feel we took away something even more valuable: we flew our flights to the best of our abilities and put up very competitive scores.

2010 World Championship Snippets

by Matt Steele NAR 22961 SR and Robyn Steele NAR 46809 SR

Srdan Pelagić (President of the FAI Jury and the FAI Space Modeling Committee) walked past the U.S. tent and remarked, "I can see that, for the U.S. team, the World Championships is a family affair." This was quite true, as the Reynolds, Wokenberg, Kuczek, Steele, Vinyard, Krystal, and Moses families all had multiple members on the Junior and Senior teams. In addition, family support was clear amongst the rest of the members traveling with the team, with Patricia Berk, Robyn Steele, Amy Wokenberg, Sally Vinyard, Don Boe, David Clark, Steve Humphrey, Dan Moses, Maria Lavrinc, and Jon, Caroline, and Zackary Stenberg all making the trip.

One of the highlights of the meet was lunch on the field. The Serbs had established a rangehead complete with an air-conditioned data center and a tent complex that included a "restaurant." The U.S. team did not opt for the standard box lunches, instead choosing to use the field facilities. The sandwich line featured huge hamburgers or chicken sandwiches, with fresh homemade buns "as big as your head!" They were so big that Mary Roberts and Robyn Steele had to split one each day. Toppings included the standard ketchup, mustard, onions, and tomatoes, as well as shredded cabbage and sliced cucumbers. The sandwiches were made to order, so you had to get in line early, but the results were worth the wait. The ice cream sold on the field was also very welcome; a favorite was "Bla Bla" (vanilla ice cream with strawberries). There was also beer served on the field, in marked contrast to U.S. rocket ranges.

Pins were a popular giveaway item. Robyn Steele went over to the food tent on the last day and gave all the ladies who had made the big sandwiches and gave them U.S. flag pins as a "thank you" for their hard work. They were so excited over these pins they made and brought chocolate filled crepes, drizzled with honey, over to the U.S. team as a thank you and asked us to please come back to Serbia. They were wonderful!

The large number of female competitors on the U.S. Junior team (nine) was considerably more than any other team. The fact was not lost on the other Junior teams, with one Polish boy confiding that the U.S. girls were "hot."

Matt and Robyn Steele had the opportunity to travel to Belgrade (in what was then Yugoslavia) for the 1987 World Championships. The 2010 meet seemed to be a lot more fun; the addition of the Junior teams seemed to have kept the competition on a much friendlier basis; although the U.S. Junior girls were a little taken aback by the number of shirtless men in Speedos wandering around!

Serbia itself had changed little since 1987, still being a basic agricultural society, though the presence of cell phones and the Internet was everywhere (Matt Steele caught up on emails from work on his Blackberry while sitting near a corn field on deep recovery for S3A). While we rode a very modern bus on the highway from Belgrade en route to the field, we also saw families on horse drawn wagons leaving the farm fields on the way home for dinner. One of the wagons even sported a "Mercedes Benz" sign, nailed to the back of the wagon!

There was a lot of camaraderie on the field. Chris Kidwell's first S6A streamer flight ended up on the other side of a fast stream that divided the field. Attempting to cross it, one of the Serbian Junior team members showed Matt Steele where to cross, and even he even held his shoes. Of course, that was the one day that Matt wore shorts, and the model had drifted right into a massive briar patch! Ouch! But, Matt got the model back.

As Americans, we felt rich in Serbia—products there were about 20% cheaper than in the U.S. A Big Mac meal at McDonald's in Belgrade only cost \$4. Coke, Coke Zero, Pepsi, and Pepsi Light all evaporated from the shelves of the little shop next to the resort. Katie and Cassidy Steele raved about "Jabouka Juice," Serbian unsweetened apple juice. Bottled water was by far the most popular drink, but you had to be careful to get the "stille" water and not the carbonated stuff. Coffee, in the traditional American form, was not served at breakfast, causing many team members to resort to instant coffee or visit a local restaurant near the hotel to get their fix.

The banquet was a fun time, with a great band that played late into the night. Trading between teams was a popular activity. Top traders on the U.S. team were Esther Clark, who got a Russian and a Japanese team jacket, and George Reynolds, Emma Krystal, and Cassidy Steele, who each got a Japanese jacket.

George Gassaway flew a Stingray-Flap model as he had for the 2002 and 2008 WSMCs. The design used rudder and elevator (on a V-tail), plus a large flap in the center section for glide path control. George ended up in 9th place, with the following flight scores:

Round 1: 378 seconds, 0 point landing,
flight group score = 859 points

Round 2: 360 seconds, 40 point landing,
flight group score = 1000 points

Round 3: 350 seconds, 50 point landing,
flight group score = 869 points

Kevin Kuczek flew his own design named Pushit 3. It used six servos for elevator, rudder, inboard flaps, and outboard ailerons. The four servos in the wing drove the flaps and ailerons so that the model could go into "crow" configuration for glide path control during landing. Kevin had a problem during the contest rounds as his bolt-on wing was unable to snug down for the correct incidence angle, making control tricky at times, affecting his third flight the most. Kevin's scores were:

Round 1: 354 seconds, 30 point landing,
flight group score = 838 points

Round 2: 353 seconds, 30 point landing,
flight group score = 841 points

Round 3: 295 seconds, 0 point landing,
flight group score = 644 points

Individually, Peter Matusko of Slovakia was the winner (repeating his win in 2008), his countryman Stefan Turza took the Silver, and Zhaonian Zang of China the Bronze medal.

The U.S. Seniors had been aiming for a team medal, but the scores were not enough, as the U.S. Team ended in 5th place out of 14 countries. The Gold went to China, Silver to Slovakia, and Bronze to Poland.

TUESDAY S1 Altitude

This was the first WSMC to make use of onboard altimeters rather than optical tracking. The altimeter used for all S1 Altitude and S5 Scale Altitude flights was the "Adrel" altimeter from Poland, weighing 2.2 grams with battery, and small enough to fit inside a 10mm tube. The Contest officials provided the altimeters from a random draw after payment of a 50 Euro deposit, which was refunded after the altimeter was returned. When flown, contestants had only 20 minutes to return the altimeter or the flight result would not count. Each altimeter has a unique serial number to assure the altimeter that was handed out is

the same one that was returned.

For Altitude events, the competitors get around the 40mm minimum body diameter by using two-staged models. However, the rules require upper stages of the S1 Altitude models to be at least 18mm in diameter for at least 75% of the upper stage length. This makes for some very unusual looking two-staged models.

The Juniors flew S1A Altitude in the morning. Katie Woebkenberg, 6-year-old daughter of Ryan Woebkenberg, had a great first flight to 232.7 meters. Her flight was second place at the end of round one and out of first by only one meter. Unfortunately later flights pushed Katie's score to end into 5th place. Her model's first stage was made up of a single wrap of 3/4 oz. fiberglass cloth and Japanese tissue. The upper stage was made from old 18mm Blackshaft tubing, .015" Fiberglass fins, and a Pratt Hobbies Nose Cone.

Emma Kristal had some problems with her first flight, but got things together for the next two flights. Her best flight was 260 meters, ending 13th out of the 29 fliers.

George Reynolds's first two flights failed to stage. His third flight did stage,

Katie Woebkenberg checking in her model along with George Reynolds and Katie Steele.

Photo by Ryan Woebkenberg.



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but the first stage was disqualified for its streamer not deploying. It was a shame, as that flight was in excess of 400 meters, which would have won Gold medals both for George and for the Team.

The winning flight was 341.6 meters by Denis Gaganov of Russia. Vitaliy Batalov of Russia took the Silver, and Milan Petkovic of Serbia the Bronze medal. The Team Gold went to Romania with a total of 901 points, Serbia took the Silver medal, and the Czech Republic got the Bronze. The U.S. Junior team took 6th out of 10 teams.

The Seniors flew S1B Attitude in the afternoon. They used Delta A3-0 boosters and A1-7 upper-stage motors.

Trip Barber's model used a fiberglass body lower stage with an upper taper of 8 degrees to the top stage. It used flash-tube staging. The top stage was a well-finished paper tube/balsa nose model with nose ejection. The first flight was perfect, Trip's best of the day, but the altimeter failed to get any reading. Trip had two other flights that did get a reading, but none flew as well as that first one. Trip's best was 557 meters, for 12th place out of the 44 fliers.

Chris Flanigan's model flew well on its first flight, but the upper stage was not seen coming down, and was not found until much later. When he flew his round-two flight, the wind had increased, and the model weathercocked a lot during the boost. Again the second stage was not seen as it came down. Later, both models happened to be found, but it was well past the 20-minute time limit to return the altimeter (and too late to prep to fly round three before it ended). The altimeters read 528 meters for round one and about 450 meters for round two.

Steve Kristal's models were the same design as his daughter Emma's, made of Vellum paper. Steve's first flight started off well but the upper stage went unstable. The second flight got hung up at launch with its piston and tower, and then while still in the tower the upper stage ignited—with no liftoff guidance the upper stage went unstable and flipped around the pad area. Flight three flew successfully, but the payload section with the altimeter separated and was never found.

The winning flight was by Joze Cuden of Slovenia at 698 meters. Silver went to Miha Cuden of Slovenia, and Bronze to Pavel Krasnov of Russia. The winning team was Slovenia with a total of 1983 points. Russia won Silver, and Serbia won Bronze.



Emma Kristal with her S1 Altitude model.

Photo by Steve Kristal.

S9A Helicopter

S9A Helicopter Duration had a max time of 180 seconds. The Seniors flew in the morning. Rod Shafer flew a model whose blades folded in half chord-wise. It boosted and deployed well, though tumbled for a few seconds before orienting upright and spinning up to speed. It hit a thermal and flew for 159 seconds. His second and third flights flew OK but missed the lift for 83 and 81 seconds. Rod ended up 34th place.

Todd Schweim's model was a non-flop

design with twisted blades. His first flight broke the upper main carbon spar on top that the rubber bands attach to, so it did not deploy properly and was DQ'd. Apparently the mix of A2 engines and piston launch was too much acceleration. Todd's remaining flights were without the piston, getting 143 seconds and, due to a thermal, a max on the final flight.

Keith Vinyard used a non-flop design with twisted blades, much like Todd's. The first flight was boosting very nicely then suddenly veered off course due to some structural issue. It deployed OK but was DQ'd for "non-vertical boost." With the team score already buried by the time he flew again, Keith chose to make his last two flights short ones so he could use those flights to diagnose the problem from flight one and make sure he got the model back for evaluation.

There were five fliers who each had three maxes, making the flyoff round late in the day. Antonio Mazzaracchio of Italy won the flyoff, with a flight of 233 seconds, using a flop-rotor design. Silver went to Slawomir Lasocha, and Bronze to Leszek Malmyga, both from Poland.

The top country was Russia, with a total of 1463 points (an average of 152.5 seconds per flight). It was very close as Silver went to Belarus at 1459 points and Bronze went to Poland at 1457 points.

The Junior Team flew S9A Helicopter

Looking Forward, and Looking Back

by John Langford NAR 13672 SR

The rebirth of U.S. participation in International Space Modeling since the NAR and AMA reached an accord in 2006 has been nothing short of remarkable. In 2004 in Poland, there were two U.S. Seniors, seven Juniors, and a total delegation of 14. On the 2010 trip to Serbia, we took 45 people: 16 Seniors, 14 Juniors, and a host of supporters. The goal of this article, and the many different viewpoints it shares, is to give a sense of the inclusionary aspect that the NAR has tried so hard to stress. To any modeler reading this, and especially to the young men and women just getting started in competition, or thinking about it, I hope you will join us. The 2012 World Championships will be held in the Slovak Republic in a beautiful resort area in the eastern portion of the country. U.S. Team selection flyoffs will be held the weekend before NARAM-53, on July 23-24, 2011, in Cincinnati, Ohio. Let's make this the biggest U.S. delegation ever!

I would be remiss not to pause for a moment to remember Col. Howard R. Kuhn, who died just before the 2010 Serbian contest and who was buried at Arlington National Cemetery with full military honors. Attending Howard's funeral were several dozen members of a generation of rocketeers he helped to shape. I met Howard when I was in high school and he was running Competition Model Rockets. Howard led the 1974 and 1978 teams on adventures to Czechoslovakia and Bulgaria, and he was the Contest Director for the 1980 World Championships at Lakehurst. Howard went on to become the Chair of the CIAM Subcommittee on Space Models, a position he handed off to Srdjan Pelagic in 1996. Srdjan gave a fitting tribute to Howard at the opening ceremonies in Serbia. Howard made a great difference in my life, and I will always be grateful.

Duration in the afternoon.

Magda Moses flew a model like Keith Vinyard's. Her first flight flew well into a thermal, maxed, and was returned. Unfortunately her second and third flights missed the lift, and only flew for 72 and 114 seconds. Magda ended up in 13th place out of the 43 fliers.

Alyssa Stenberg flew models based on George Gasaway's flop-rotor S9 design. Her first flight caught a thermal and maxed, flying away. Her second flight (second model) did not transition well for a while, and got 90 seconds. She added more dihedral before the next flight to fix that problem. The third flight operated fine but got into some poor air for a flight of only 79 seconds. Alyssa ended up in 16th place.

Caleb Boe used a flop-rotor design with twisted blades. His first and third flights were for 114 and 98 seconds, with no thermal either time. Caleb's second flight had deployment right after burnout and DQ'd. It is unsure if the motor ejection went off way early, or deceleration caused the rotor unit to slide out, or there was some other problem.

The winner was Frantisek Kontra of the Czech Republic, winning a three-person flyoff with a flight of 145 seconds. He won by one second, edging out Roman Taran of the Ukraine who took the Silver medal. Bein Li of China took the Bronze. The winning team, by a large margin, was the Ukrainian team, with 1424 points (an average of 158.2 seconds per flight). Silver went to the Czech Republic, and Bronze to Poland. The U.S. ended in 7th place out of 15 Junior teams



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Rod Schafer reads his S9 helicopter model while Keith Vinyard prepares to launch.
Photos by George Gassaway.



The U.S. Junior Team prepping to fly the S9 helicopter event.

WEDNESDAY

S5 Scale Altitude

The Juniors flew S5B (B power) Scale Altitude in the morning. Minimum diameter rules apply to Scale Altitude, requiring 40mm for at least 20% of the model length. There is no minimum diameter for any upper stage, except that no motors smaller than 10mm in diameter are certified for competition. Therefore, most scale prototypes chosen are two-staged models with about a 4:1 booster to upper stage diameter ratio, such as Nike-Cajuns, Taurus-Tomahawks, and Bumper Wacs.

The U.S. Junior team of Katie Steele, Cassidy Steele, and George Reynolds all flew the venerable "Space Grant 1" vehicle. Their models were at the bottom of the static points as expected, since the Space Grants favor altitude capabilities over scale qualities. Katie had 473 points, and Cassidy and George Reynolds were tied for last with 462 points.

The U.S. models used a 13mm Estes A3-0T (from a special batch made for the 1985 U.S. Team) in the lower stage, and a 10.5mm Delta A2-6 in the upper stage. Cassidy had a good first flight, only to have it DQ'd when the RSO could not see it to confirm that it landed safely (the streamer might have come off). She had a 355-meter



U.S. Juniors hook up a Space Grant 1 scale altitude model.

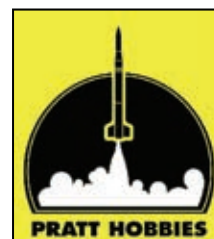
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Rocking Out with the World

by Emma Kristal, NAR 87433 JR

I knew I was going to Serbia to launch model rockets and I knew there would be lots of kids from other countries doing the same thing, but I didn't expect to meet and become friends with so many of them. The Chinese were assigned to the launch lane right next to us and even though I don't speak Chinese, and they didn't speak English, I still said "hi" to a couple of the girls on their team and they really seemed to get a kick out of it.

During the competition most of us were too busy launching or recovering to meet many of the other competitors. But the closing ceremony was just incredible for meeting other kids. There's a tradition that right after the awards everyone goes around and tries to trade for mementos. Even though you don't speak the same language everyone knows what everyone else is doing so there's tons of laughing and head shaking and it was a fantastic way to break the ice.

Then the music started and the American kids started dancing, the Japanese kids joined in, and then pretty soon the whole world of kids was rocking out. It seemed like one kid on each team spoke enough English to translate for everyone else so you could talk to pretty much whomever you wanted. It was amazing.

Even more amazing, though, is that a number of the kids I met at WSMC are on Facebook and we stay in touch through there. Edi from Croatia, Konrad from Poland, and Patrik from Serbia still send me notes. Even though we don't speak each other's languages we use Google Translate to communicate. It's really fun.

The rocket competition at WSMC was great and making such wonderful friends of my U.S. teammates was a definite highlight. But making so many friends from all over the world was something I never expected and has turned out to have been one of the best things about being on the team for me.

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flight, the third highest flight of the event. Katie Steele added some red tracking powder to her model to make the upper stage visible at ejection. Her model weathered a lot, flying to 376 meters. That was the highest flight of the S5B event, and with the combined scores she ended in 11th overall.

Cassidy's first flight had incurred some damage, which later caused her second flight to go badly for a DQ. George Reynolds had problems getting his upper stage motor to ignite on the first two flights. His third flight did stage, but it did not deploy a streamer in the first stage and was DQ'd. The staging and deployment issues were another case of things that worked well in practice at home with U.S.-made motors, but not necessarily so at the WSMC with different motors.

The winner was Alexandru Nica from Romania using a Bumper Wac. His model had been in second place in static, at 639 points, but won by a 28-point margin by moving past the eventual Silver medal

model (static score leading Bumper Wac by Vladislav Verstov of Russia) by flying to 366 meters. Harbour Volarevic of Serbia took the Bronze.

The Czech Juniors won the Gold, Poland Silver, and Romania Bronze. The U.S. S5B team ended up 8th. Had Cassidy's first flight been seen by the RSO and George Reynolds gotten his model to work, the U.S. team could potentially have won the Bronze or Silver medal.

The Seniors flew S5C (C power) Scale Altitude. The minimum diameter is 50mm. In 2004, Tony Reynolds and James Duffy flew to Gold and Silver medals with Bumper Wacs, and Tony and James competed again this year. The third U.S. team flier was Matt Steele, also flying a Bumper Wac. In static judging, the U.S. models were about in the middle of the pack. James had 625 points, Tony 619 points, and Matt 603 points. The leader in static was Evgenij Korobeinikov of Russia, with 668 points, flying a Bumper Wac.

For flying, the U.S. Bumper Wacs used

A Learning Experience

by Rod Schafer NAR 36564 SR

Not only was this my first time as a member of the U.S. Spacemodeling Team, but it also was my first chance to travel outside of the North American continent in my lifetime. Wow! What an learning experience. I loved every single minute of my travels.

It was an honor to compete for my country against 23 other countries from around the world. I experienced that the competition is quite different from NAR competition here in the states. One item that stands out is how everyone on the U.S. Team works as a "TEAM," very enjoyable to see this transpire. Here are some of the highlights of the WSMC for me:

On the first day of competition, hearing our country's national anthem over the PA system and watching Old Glory being hoisted up the center flag pole while standing on foreign soil for our Junior S8 Team. It just sent chills through out my body—a very special moment indeed!

Spending time on deep recovery with Matt Steele and shooting the breeze on many subjects from modeling, competition, families, life, etc.

On S3 day, tracking Chris Kidwell's model with Todd Schweim from the dam of the reservoir for an hour and half and watching it drop behind a mountain ridge, only to watch it rise up from the ridge a minute later and ride an elevator thermal to never be seen again! (We found out later in the day from the deep deep deep recovery crew with a GPS reading that they were 7 miles from the launch pads!)

Spending half a day with Steve Humphrey on that same dam of the reservoir shooting the breeze on recovery duty.

Listening on the radio while on recovery duty and hearing Dave Clark call out, "We have a U.S. model in the air!" It was our call signal on recovery to be on the lookout for the model.

Enjoying the huge baked rolls each morning for breakfast.

Spending time with Craig Vinyard (one of the Junior S8 Team Gold medalists) on deep recovery in the corn fields shooting the breeze while waiting for Junior S4 models.

Daily sunsets and the rising of the Moon before the medal ceremonies.

Making my first qualified flight in my first World Spacemodeling Championships in S9 as a rookie and feeling a sense of relief as the blades deployed and the model spun up to speed, and in that same moment just knowing that I want to come back in two years for more. Just Priceless!

a very nice tall tower that was made by Matt Steele. Most of the U.S. models flew with a Serbian Ultra B5-0 booster and B2-7 in the upper stage.

James Duffy, the prime motivator of the S5C team effort, was first to fly. His model took off well, but partially hung up during staging, only getting 238 meters. James spent round two working out the bugs and helping make sure his teammates got in flights. James DQ'd in round three.

Matt Steele's first flight failed to stage. On the second flight, when the model left the piston, the very slight pull back when the piston tube released caused the rear deployment system of the V-2 to come apart, and by the time it staged, the Wac was pointing down. The Wac crashed into the plowed dirt, shattering into dozens of pieces. Many U.S. Team members helped look for the parts and the altimeter, but the altimeter was never found. Enough pieces of the Wac were found to almost literally "duct tape" it together enough for Matt to make a single staged C6 powered flight in round three. It was successful, but the altimeter apparently did not fly high enough to detect liftoff, so there was no altitude score.

Tony Reynolds spent a lot of time carefully prepping, and missed flying in the first round. His model flew in round two and flew very well, to 606 meters. For a while, he was in 2nd place. But when all of the flying was over, Tony's score was nudged down to a 4th place finish.

James Duffy readies his scale altitude Bumper Wac for launch.

Photo by George Gassaway.



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Rod Schafer and his Hummingbird S4 glider.
Photos by George Gassaway.

The Gold medal went to Evgneiy Korobeinikov of Russia; his Bumper Wac model flew to 684 meters for a total score of 1353 points. The Silver went to Lucian Sercaianu of Romania (1343 pts.), and Bronze to Florica Sercaianu of Romania (1307 pts.). The Team Gold went to Russia, Silver to Romania, and Bronze to the Czech Republic. The U.S. Team took 6th place. This was another one of those “might have been” events, especially since Tony came so close, ending in 4th place.

S4A Boost Glide

S4A Boost Glide duration had a max of 180 seconds. The Seniors flew S4A in the

morning. Rod Shafer and Kevin Johnson flew Hummingbird designs by Bob Parks. The Hummingbird wings are flapped, such that for boost the flaps are set to make the model roll, then for glide the flap is down slightly to produce a bit of undercamber. Both flew their models from a piston-tower. Unfortunately they both had problems with their flights. Rod’s first flight ejected the motor, leaving the pop-pod attached to the glider, causing it to spiral dive into the ground. For round two, undetected crash damage from round one led to the flaps not going to the correct position to glide properly. Rod was able to get a good third flight, but it did not get any lift, for a time of 104 seconds. Kevin had problems

with his model, causing his first and third flights to DQ, and he got 90 seconds on his second flight.

NAR President Trip Barber flew a conventional model similar in planform to a Hummingbird but with no moving parts. He used George Gassaway’s cast L-hooks for attaching the pop-pod, as did Rod Shafer. Trip launched his model off of a rod, with no piston and no tower. His model flew well every time. His first flight was



Trip Barber with his S4 boost glider.

timed for 142 seconds, though it was up longer than that (the timers lost sight even using binoculars). His last two flights both maxed. Had his first flight been timed to a max, he would have made it into a six-person flyoff. Instead, he ended up in 7th out of the 64 fliers. The U.S. Team ended in 16th place.

The winner was Gintara Jucevicius of Lithuania, who won the five-person flyoff by an easy margin. Silver went to Vladimir Menshikov of Russia, and Bronze to Miha Kozjek of Slovakia. The Team Gold went to Russia, Silver to Slovenia, and Bronze to Poland.

The Juniors flew S4A in the afternoon. Matthew Berk and Katherine Humphrey flew Hummingbird models. Katherine’s first flight was DQ’d for boost as it tipped off badly—possibly the piston popped off early. Her second and third flights went well, officially timed for 98 and 128 seconds, although the models were lost by the

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timers before landing. Matthew Berk had three good flights but they all suffered from the timers losing sight before landing. This was a combination of the wind at the time and the relatively small size of the gliders. Matthew's flights were for 64, 160, and 100 seconds (the last two may have maxed but went out of sight). Matthew ended in 14th out of 43 fliers.

Caleb Boe flew a folding flying wing design boosted inside of a 40mm model. His first two flights were for 122 and 93 seconds. The trim was a bit off on those flights, and other flying wing models often had similar problems. On the third flight, the glider ejected at a higher airspeed than normal, and the rubber band deploying the wing in the center V-hinge was unable to deploy the wing fully, for a DQ.

The winner was Alexey Lutiy of Russia (also the winner of S8D), Russian Vladislav Verstov for Silver, and Mitja Zgajner of Slovakia for Bronze. The Team Gold went to Russia, Silver to Serbia, and Bronze to Poland.

THURSDAY S3A Parachute Duration

S3A Parachute Duration had a max of 300 seconds. The Seniors flew S3 in the morning. Originally, Pat Butler was going to fly S3, but unfortunately he had to drop out. Chris Kidwell took his place with about one week's notice. Chris's first flight worked great, maxed, and thanks to the low winds landed only about 1000 feet



Bill Stine with the U.S. Junior S3 team:
John Moses, Emma Kristal, and Magda Moses.
Photo by John Langford.

away. Chris's second flight worked great too. Well, too great. There were some incredible thermals that day, and his model climbed up and up, to about 1500-2000 feet, and kept flying on and on, as did many other models. The U.S. recovery crew was hot on the chase, traveling for miles. About 45 minutes into the flight the model almost landed, but then it started going up again. Since Chris had gotten his first flight back, he was assured of having a model to fly round three with (being allowed two models for the first three rounds). But it was important to try to get Chris's model back anyway, so if he made the flyoffs he would have one extra model for the flyoff rounds (which usually goes to a second flyoff in S3A). Unfortunately it all became moot when his third flight (2nd model) failed to fully eject the chute out of

the tube, taking Chris out of the running.

Steve Kristal's first flight was for 161 seconds. For his second flight, it hit a thermal, maxed, and flew away. For his third flight, the chute did not deploy, and the model fell towards the ground. But at about 30 feet up, the chute deployed. It quickly started going up in a thermal, and was gone. Steve ended in 29th place of the 64 fliers.

John Hochheimer's models were powered by some custom "hot" 13mm A3-5 motors produced by Estes for the U.S. Team in the early 1990s. His first flight had the shock cord loop around the chute, preventing deployment. His second flight flew for 221 seconds, and his third flight maxed.

Twelve people all had three maxes and made the flyoffs. Of those, seven maxed

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to make the second and final flyoff round. The Gold medal winner was Antonio Mazaracchio of Italy. The Silver medal went to Pavel Krasnov of Russia, and the Bronze to Brandon Krcedinac of Serbia for the Bronze.

The Juniors flew S3 in the afternoon. Emma Kristal's first flight hit a huge thermal, maxing easily but also flying away. She had to use her second model for flight two, and if it flew away she would have no model to fly round three with. So, some ballast was added to the model, and it was launched into a weak thermal, in an attempt to try to max but not fly away. It flew for 260 seconds, 40 seconds short of the max. That left her with the model to fly for round three, but without a max she was out of the running for making the flyoffs. Her third round flight did max, and Emma ended up in 8th place.

John Moses used airframes sold by Venus Rocketry. He had two great flights, both of which maxed. But both also flew off in thermals. The U.S. recovery crew chased his model for miles, until it went over a mountain. So, John had no model to fly in round three.

Magda Moses developed her own light-weight airframe for S3. A nose fit problem



Chris Flanigan ready to launch his big N-1 Moon rocket.

Photo courtesy Chris Flanigan.

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made the first flight fly low, and combined with poor air it got only 40 seconds. Her second flight flew very well, getting a max. Her third flight had a bit of a twist in the shroud lines, which partially reefed the chute, for 85 seconds.

Five Juniors made the flyoffs, and four of them maxed to make it to the second flyoff round. The Gold medal winner was Dmitry Korsakov of Russia. Mitar Cpetkova of Serbia took the Silver, and Zeren Jin of China took the Bronze. The Team Gold went to Russia, Silver to Spain, and Bronze to Serbia. The U.S. Juniors ended in 6th place out of 15 teams.

S7 Scale

Unfortunately, this time there were no U.S. Junior entries in the Scale event. In static scoring, the top three Junior entries were all from Serbia, with Saturn IB models. All three flew successfully, and ended up in the same place after flying as they were in static scoring. Dejan Stancevic took the Gold medal, his model had 775 points in static and 191 flight points. Silver went to Miodrag Cipic, whose model had a static score of 770 points and the top flight score of 195 points, ending just one point behind the winning model. Milos Jo-

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vicic took the Bronze medal with a model that scored 763 in static and a simple flight score for 81 points. So, the Serbian Junior team easily won the Gold medal, with Poland taking the Silver, and Romania taking the Bronze.

The U.S. Seniors only had two entries. James Duffy flew a modified version of the type of Bumper Wac he flew for S5 Scale Altitude. Chris Flanigan entered a very large model of the Russian N-1 Moon rocket (the failed Russian alternative to the Saturn V). The model was 55" tall and 9.5" diameter at the base.

It had no fins, so it was made stable due to its conical shape and a lot of noseweight. In static scoring, the Bumper Wac scored 569 points, and the N-1 scored 546 points. Those scores were near the bottom, as the only models to score above 560 points were Arianes, Soyuzes, or Saturn IBs. The top model in static scoring was Russian modeler Alexandr Levikh's Soyuz TM-12. It was stunning in detail as his S7 models usually

are. His model was so good that his score of 831 points was well ahead of the second place static score of Serbia's Vladimir Cipicic's Saturn IB of 788. There was a logjam from 2nd thru 10th place as the 10th place score was 765 points, so flight scores could make for a lot of changes in places.

On flying day, James's Bumper Wac model was powered by a D12 and used electronic staging to ignite the Wac upper stage. His first flight was a DQ. His second flight started off well but just before burn-out it had a late cato of the first stage motor. The story took an even stranger turn when part of the model hit a thermal...and flew away! James ended up 20th of the 30 entries.

Chris Flanigan's N-1 may not have had a great static score, but it got a lot of attention from the crowd when it flew. It used a cluster of six C6-3 engines, ignited by Quest Q2G2 long lead igniters. All six engines lit perfectly, and the model climbed



Alexandr Levikh's Gold-medal Soyuz's booster separation sequence.
Photos by John Langford.

slowly and stably to about 150 feet. The chutes deployed and the N-1 landed safely, to the cheers of the crowd. The model got a flight score of 92 points and ended in 18th place.

Alexandr Levikh's Soyuz made a stunning flight. It was powered by a cluster of 8 motors, 4 in the main core and one in each of the 4 strap-ons. At about 150 feet, the strap-ons sepa-



rated and deployed their chutes. The main core flew onward still under power, then staged. His flight score of 218 points was not the highest flight score (top was 233)

The Value of Teamwork

by Chris Flanigan NAR 17540 SR

One of the great experiences of being a member of the U.S. Team is that the group works as a team. "All for one, and one for all."

An excellent example of teamwork occurred while preparing my N-1 scale model for flight. About half way through the flight preparation, the N-1 model unexpectedly disassembled (!) at the base of the Stage 2/3 interstage truss. It became apparent that I had assembled the tightly fitting parts together but had not bonded the interstage adapter to the top of Stage 2. Oops!

With the beginning of the S7 flight round rapidly approaching, several members of the team gathered for a quick and urgent bond assembly. There are 24 tubes in an N-1 truss, so good coordination was required. After mixing a generous batch of five-minute epoxy, James Duffy put epoxy into pin holes 1-12, John Hocheimer took care of pin holes 13-24, I put epoxy on the 24 pins of the interstage adapter, and Trip Barber called out cure times at 30 second intervals. The complete glue application and assembly was completed in just three minutes, well within the working time of the five minute epoxy. After waiting a few more minutes for the epoxy to set, the remaining steps in the flight preparation could proceed.

By the time the model flew, the epoxy was at good strength. The vehicle successfully held together during ascent and landing. This was a great demonstration of teamwork that quickly solved a potentially showstopping glitch and helped achieve a successful S7 flight for the U.S. Team.





Slovakian Junior Barбора Nemkova's Saturn IB scale model.

but enough to easily win by a margin of 62 points. Second went to Bedrech Pavka of the Czech Republic. His Ariane 44L had been in 10th place in static scoring, among a nine model static score logjam. His model's 222-point flight score moved him up to 2nd. Antoni Karch of Poland took 3rd with his Saturn IB. His model had been in 4th place, its flight score of 209 points moved him up to 3rd. The earlier 2nd and 3rd place models in static scoring fell out because of DQ'd flights. That is the price often paid for trying to do a lot of flight tricks—sometimes the clustering or staging does not go well.

The Senior Team Gold medal went to the Czech Republic, the Silver to Poland, and the Bronze to Russia.

Friday

At the banquet Friday night, Alexey Lutyi of Russia was named as the Junior Champion. Antonio Mazaracchio of Italy was named as Senior Champion. The Junior Champion Team was Poland, and Senior Champion Team was Russia. As things changed over to less formality, a lot of trading of pins, caps, shirts, and so forth was done between fliers. Mary Roberts of Estes Industries distributed Estes catalogs and Estes caps. There were going to be Estes kits given out to all fliers but those got held up in customs. Some looked at the Estes catalog, unable to believe that such kits ex-

ist. As the night continued and the band played on, a number of the U.S. Junior Team members started dancing together. Soon after, others joined in, including some of the Japanese Juniors. Fittingly, one of the last songs the band played was "The Final Countdown."

Wrap-up

The contest had started out great on the first day with the S8D Gold Team medal and Alyssa's Silver medal. We hoped to see more of that for the rest of the week, but flying at the WSMC level is tough and medals are not easy to come by. Still, there were some close opportunities in some of the events such as S1 and S5. Overall, the U.S. Seniors came in 4th place among the 22 countries com-

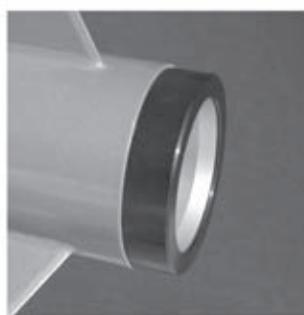


The overall champions: Polish Junior Team, Russian Senior Team, Antonio Mazaracchio of Italy (Senior Champion), and Alexey Lutyi of Russia (Junior Champion).

Photos by George Gassaway.

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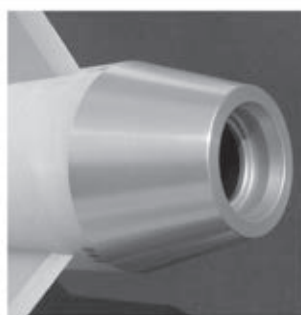
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peting. The U.S. Juniors came in 7th out of 15 countries fielding Junior teams.

Several of this year's Junior Team members flew the last WSMC they were eligible to fly for as Juniors, moving on to Senior age division. This will be particularly rough for the 2012 S8D team, as Alyssa Stenberg will be the only one from this year's S8D team to be eligible to fly as a Junior again. The U.S. Team does have a lot of strength for potential future S8D fliers due to the model design and the D3 motor, so hopefully there will be

some new Junior fliers to come in and take on the challenge of flying this event.

The next U.S. Team selection fly-offs will be held the weekend before NARAM-53. To find out more, please go to the NAR website, and join the NAR_FAI_Spacemodeling Yahooogroup at the two links below:

NAR website: <http://www.nar.org/internats/>
(<http://tinyurl.com/3x5r352>)
NAR_FAI_Spacemodeling group:
(<http://tinyurl.com/24lun4p>)

Chris Taylor ran a website called WSMClive.com, which George Gasaway and some other team members sent daily reports and photos to. To see it, please go to WSMClive.com

After the WSMC, James Duffy edited together a 2010 U.S. Team video which is posted on Vimeo. The video can be seen at <http://tinyurl.com/34m6zdb>.

The Serbian WSMC website with official results, photos, and more can be found at <http://tinyurl.com/36mcbup>.

Not Like Any NARAM I Ever Went To!

by Katie Steele NAR 80121 JR

The Internats was absolutely, positively, nothing like NARAM in any way whatsoever. Besides the fact that it was in a different country, there was a completely different air about it. Instead of intense individual competition, there was a level of camaraderie on the American team that rivaled no other. It wasn't one person's responsibility to do well, it was the whole team's. And because of this, I made friends I had never really had the chance to before. People like Craig and Katherine, whom I had met before at past NARAMs but never really got, or wanted, the opportunity to get to know, suddenly became the best friends anyone could ask for. All those hours out in the middle of Serbian cornfields chasing model rockets can really do a number.

My favorite part was during the evenings, after the competition flying but before the awards ceremony, when the Juniors would just congregate and talk, or play "glider frisbee," or sometimes even games with other countries' Junior team members. Of course, who can forget when Artur came up to a bunch of the U.S. Junior girls—Matt Berk included—and informed them that the Polish team thought they were all "hot." Then there was "jabuka juice" which I can guarantee, *none* of us juniors could get enough of. If there's one food we'll miss from our Serbian adventure, it's jabuka juice. And another thing I loved was going recovering with Emma the first day, because we both were wearing shorts and went into the valley—we were so scratched up and sore afterwards!

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Trip Barber poses with the U.S. Junior team.
Photo by Jon Stenberg.



Senior Team Manager John Langford with Mary Roberts from Estes Industries.
Photo by George Gassaway.



Cassi, Matt, and Katie Steele at scale altitude turn-in.
Steele family photo.

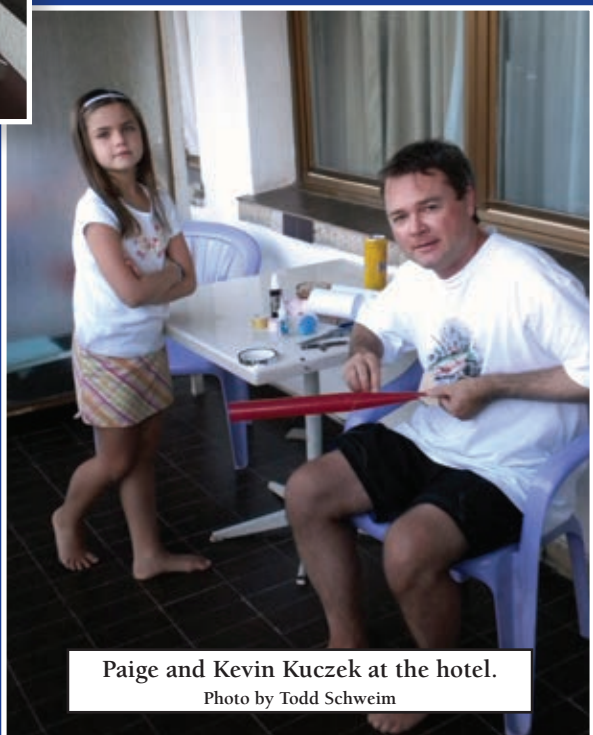


Scale turn-in. Most of the models seen here are for S5 Scale Altitude.
Photo by John Langford.

Todd Schweim and Caleb Boe working on their S9A copter models at the hotel.



James Duffy looks at the Bumper Wac of the eventual winner of Senior S5C, Evgneiy Korobeinikov.
Photo by Chris Flanigan.



Paige and Kevin Kuczek at the hotel.
Photo by Todd Schweim



The check-in line on Monday.
Photo by George Gassaway.

The U.S. Seniors (left-to-right): Keith Vinyard, Ryan Woebkenberg, John Langford (SR Team Manager), George Gassaway, Mary Roberts, Trip Barber, Chris Flanigan, Todd Schweim, Kevin Kuczek, Steve Kristal, Kevin Johnson, Tony Reynolds, John Hochheimer, Chris Kidwell, Rod Schafer, Matt Steele, and James Duffy.

Photo by Jon Stenberg.



The U.S. Juniors (left-to-right): Bill Stine (JR Team Manager), Katie Steele, Emma Kristal, Matthew Berk, Cassidy Steele, Craig Vinyard, Paige Kuczek, George Reynolds, Alyssa Stenberg, Caleb Boe, Katherine Humphrey, Zack Stenberg, Katie Woebkenberg, Emma Clark, Magda Moses, and John Moses.

Photo by Jon Stenberg.



Matthew Berk working on the fuselages of his S8D gliders.



Arianes and Saturn IBs in the scale turn-in room.

Photo by George Gassaway.



Photo by John Langford.



Close-up view of Alexandr Levikh's Soyuz.

Photo by George Gassaway.

Rhythm of the Energy

by Keith "Herby" Vinyard NAR 24568 SR

Thermals are fascinating, mysterious, and enchanting. I was blessed at the 18th WSMC to have the U.S. Team allow me to study them for several days, all day long. Watching the weather was anything but boring.

Each morning our arrival on the field was after sunrise and temperatures were in the upper 60s. Many competitors found warm comfort wearing their team jackets. Each morning was different from other times, but patterns were apparent. The winds would start off light to moderate and on all but one day there were clear skies. On the clear sky mornings the winds would make a rotational shift. The Sun had begun its daily delivery of energy and as the Earth would absorb it, the layers of air closest to the ground would see the first changes. The cold air aloft seemed to hold the energetic air near the surface and a clockwise rotational movement occurred, possibly enhanced by the terrain of the valley. S8 launch direction on practice day shifted around about 200 degrees. The S3 morning repeated this quite visibly as models were launched in continual succession, like numerous weather balloons into the gently lifting air that supported them for a max time, not rising much more than the original boost altitude.

As the Sun's energy grew stronger, the uneven absorption created larger temperature differences about the air near the ground. The movements of these concentrations of hot air became lively. Circular air movement was changing to the expected prevailing direction and the up and down cycling had begun that was also delivering energy higher into the air as to raise the ceiling that the cycles operated in. For the duration events other than S3 most competitors waited for this cycling of strong thermal energy late in the first round to give them the necessary lift needed to max, but then there was also sinking air to avoid.

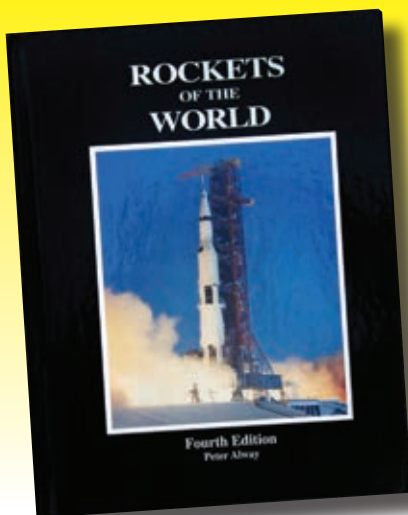
Later, the jackets disappeared, sunblock was applied, and everyone had made their first trip for water. The mid-morning thermal cycles formed and were spaced apart in fairly predictable time frames. This accumulation of energy near the Earth would be released skyward into large concentrated plumes as they would

track downwind. With every cycle of these energy-releasing towers that moved past the launch range, models were sent up in groups. Following this rhythm of the energy is the strategy of space modeling's duration events flown in rounds. The right timing of when to launch for getting maxes and for recovering models is the sport.

The cycles continued into the afternoon. As the temperatures rose into the upper 90s the energy intensified with each cycle. Violent churning air masses of differing temperatures tossed models about. Spinning columns of rising air connected the tall system from the ground up, several thousand feet high. Strong dust devils pulled range tents and umbrellas from the ground when not tied down. Grass, leaves, trash, and dust gave them an ominous tornado like appearance and the entire sky had taken on a hazy look. Moisture carried aloft condensed at the top of the systems in the cooler layers as dense cumulus clouds.

As the afternoon rounds ended, the Earth's rotation moved us further from the Sun, which made it appear lower and lower on the horizon. It took on a reddish glow as viewed through the dust that was brought aloft. The cycles continued but the energy was waning. High altitude cooler air had begun its descent and was compressing the layers beneath it as they cooled. Absorbed energy on the Earth's surface was now being re-radiated as gentle evening lift. With every passing minute the atmosphere was losing heat energy, as fast as it had gained it. The flyoffs for the top positions occurred in air conditions totally different from what was flown in all day. As the Sun set, team jackets came back out with the dropping temperatures, resilient energy still flowed, the wind still blew, and medals were presented. By the next dawn most of the previous day's energy had left, the dust and moisture had settled, and a new day began. Either clear and calm, like the day before or maybe windy, with moisture laden clouds bringing a front pushed by energy still in the atmosphere from differing weather that formed in another region. The experienced spacemodelers read the changes, adapted, and competed.

Now the closing ceremonies are over and all have gone home. The energy cycle on the Serbian plateaus continue, but for one brief week I had the opportunity to be amazed by its drama. Thank you, FAI and Team USA.



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