Mir Contact!

Space Chat Moves Kids' Goals Out of This World!

For the ten children selected to ask their question to Astronaut Andy Thomas, and for the 300-plus other children, the teachers, and the rest of the community listening, the excitement fever won't long be forgotten. On February 24, after about 4 years of planning and waiting, students at Prairie Hills Elementary School (PHE) finally had their chance to ask their questions directly to Thomas as he passed overhead aboard Mir, 260 miles above Earth. At exactly 9:07 am Mir rose above the horizon in the southwest sky, sped toward the NE horizon at 17,000 mph, then disappeared in 10 minutes. During that time, Thomas briefly described his role aboard Mir, then answered 6 of the 10 questions waiting for him before he was gone. Right afterward, two other experts, Maj Mike Caylor of the USAFA and Eric Joern, former astronaut trainer, answered the rest of the questions, then dozens more from the audience of 3rd, 4th and 5th graders.

(*Photo by NASA*)

Space Seed Sown

The project began early in 1994 while I was on a field trip with my daughter's then second grade class and teacher Debbie Thiem. I had been reading many SAREX articles and decided it was time to bring SAREX to Prairie Hills. Initially, I thought it would be a fairly small event with the station set up in a classroom. After filling out an application form and seeing what really is expected when a school gets involved, the project was much larger than one person could handle, and the PPRAA quickly became part of the picture. Then president Steve Westby WB7VHR agreed to have the PPRAA be the sponsor for this SAREX contact.

The application process spanned the summer of 1994, because school was out before we could get all the answers. NASA and the ARRL wanted to know how we were going to involve as many people as possible in the educational aspects and what kind of media coverage we were going to get. At that time, I hadn't talked to many people, and the contact was still very conceptual in nature. So, I identified a modest station, consisting of a beam and rotor, and a VHF mobile transceiver. Simple, but adequate; minimally acceptable. It wasn't until after Frank Bauer of AMSAT called me in 1997 that I realized the contact was about to come true, and began to seek out some "real" satellite radio equipment.

Planning and Ideas

When Frank called in February 97, he gave me many ideas to think about, ideas about equipment, antennas, people, projects, displays, teachers, etc. At the Feb PPRAA club meeting Jeannie George KBØQFY stood to announce a space fair at West Middle School. They were to have moon rocks, an astronaut suit on display, several simulators, and guest speaker Dr Ron Sega KC5ETH. I visited the school during that space fair, and found even more interesting things, such as a partially complete shuttle cockpit simulator. Their plans were to install a SAREX transceiver in that simulator. All of these ideas fed my thoughts about trying to schedule our Mir contact in conjunction with a math or science fair at PHE. Unfortunately, as only time would tell, scheduling to any degree of reliability was not possible.

Several of us did a quick site survey to check out places to install the antennas and set up equipment in the gym. The gym had a nice PA system and we could easily pipe the audio from the radio into the PA so all could hear. An antenna installed right above the gym's west door would make it easy to drop a few coax runs right into the gym. District 20's Ron Horne installed a steel pipe as our mast. Equipment donations began flowing in. Ed Means WØVO wasn't using his transceiver and rotor so it was pegged for the contact. All in all, I received loans of two Yaesu FT-726Rs, an az-el rotor, several power supplies and RF amplifiers, and a few antennas. Tom McDaniel offered his FT-736R, but was using it daily so he held it until needed.

(*Photo by NASA)*

Set-up, Tear-down, Set-up Again!

Quite soon after we had our equipment set up, equipment started failing on Mir. We all remember the fire, the collision, and the antenna problems. The life threatening situations on Mir put our contact in a holding pattern. Summer vacation came and went, and with it came the return of some of the equipment as owners prepared for the proposed launch of Phase IIID. Witih no word of a contact pending, school started up again with no antenna installed at PHE. Meanwhile, my daughter, originally in 2nd grade at PHE, was now attending Timberview Middle School and would likely not be a cast member for the contact.

By November, we again received word from AMSAT that the contacts would resume in December, so the call went out again for equipment and for help assembling the station. Despite darkness, below-freezing wind chills and plenty of frozen fingers and toes, a crew of hams were up on the roof of PHE installing and testing the rotor and antennas. The work crews put in time after normal work and school hours during the week, when we could access the roof. By the time we got word of a specific date/time, all equipment and cables were in place.

Final Countdown

On February 16, word came down that our date/time was Feb. 24 at 0907. Finally, after several years of waiting and dissappointing the students, we went full steam ahead - I felt that this time was for real. Now, all the plans we had discussed had to be put into action. Up until now, every time we discussed this contact we couldn't get commitments for any kind of support because we didn't have a specific date. Now, with our date only a week away, I was beginning to wonder whether things could happen in only a week. Fortunately, with the help of many people from the club and community, everything fell into place. Since we knew the date, time and frequencies, we programmed the two FT-736R's with the correct freqs, accounting for Doppler shift. When Mir approaches us, our RX freq must be higher than the Mir's TX freq, but our TX freq must be lower than Mir's RX freq, about 10 kHz difference at the horizons, and when Mir is overhead, with no relative radial velocity the TX & RX freqs are the same. We also prepared a cheat-sheet for rotor control, to make rotor control by two people easier. Dave NØUVR and Chris KBØMMV operated the rotor. With the Mir travelling from SW to NE, and the rotor having a stop at S, a little trick was used so we wouldn't lose Mir when it passed through due S. By elevating the antenna to 180 deg, the rotor pointed S, but the antenna pointed N, so we turned the rotor N, and the antenna pointed S. Now, by adding 180 to our azimuth display, the rotor would pass through N with no stop, pointing the ant through S with no problems.

We actually had three antennas for the contact. Originally we were told the contact would be on VHF, but it turned out to be on UHF. We had two circularly polarized Yagis (a KLM 2M-22C for VHF, and a KLM 435-18C for UHF), and for backup, a dual-band omni J-pole.

Tom NØNTX brought all his skills into play to make sure the radios were both working fine for the contact. Problem: since we were originally expecting the contact to be on VHF simplex, I didn't think twice when loaned a radio without a tone board. By the time we learned we'd be on UHF, I had forgotten about the missing tone board in one radio. On UHF, Mir requires a tone for access, so before we even got started we were down to one radio with no backup. The other 736, the amplifier and the power supplies all worked perfectly, though. And we were covered if we lost commercial power - the El Paso County Search and Rescue had their comm van there with the generator running just in case.

(Photo by Debbie Bernardo)

Media coverage was certainly important, but the media tends to put out their fires with short notice. The problem was us getting the word out to as many places as possible. Because of Ron NKØP's efforts, we did get coverage from three TV stations (two of them mentioned the PPRAA by name) and newspaper coverage by the Woodmen Edition, a neighborhood newspaper. And we wanted to make sure the local amateur community could participate, even if they couldn't be there. So we retransmitted the audio from the

FT-736 and the students to the PPFMA repeater so all could hear. We did numerous tests to make sure the VHF transmissions didn't interfere with the UHF contact.

At about 0830, the selected students were in the gym, some a little nervous, others relaxed, even as the news crews began to interview them. The kids were asked how they felt getting a chance to talk directly to an astronaut. Responses came like, "I've always wanted to talk to an astronaut!", or "I really want be an astronaut when I grow up!" Fifteen minutes later, the rest of the 3rd through 5th graders filed in, the noise level grew, and adrenalin flowed even more. Several hams were scattered around the gym and on stage recording this event on their camcorders.

At about 0850 I addressed the audience, briefly describing what they would see on the STSPLUS screen, and telling them what would happen in the next half hour. Then at about 0900 I just let everyone watch the screen. Will Marchant KC6ROL, our AMSAT mentor, called to make sure we were operating, had the correct freqs programmed in, were pointing the antennas correctly, and had the correct time. Some past contacts have failed because people didn't set their computer clock to the correct time! At about 0905, Jeff Ryan NØWPA began calling, "UØMIR, this is WAØVTU, over." Shortly after 0907, we got our reply. "Hello, this is Andy Thomas, and I'm an astronaut." My wife Dorothy KCØBSY later told me that kids and parents alike threw their arms in the air, but held their vocal expressions, as Andy's voice came loudly across the gym's PA speakers.

Andy briefly described some of his activities on Mir then one by one the kids began asking their questions: "What happens if you run out of oxygen?", "Does it feel different if you hurt yourself in space?", or "How does drinking feel different in space than on Earth?" Only six of ten students asked their questions before the signal began to fade. Then Mir passed below the horizon. Just before it was gone, though, all 300+ kids yelled a loud, "Goodbye Andy!" Don't know if he heard it or not, but if he did, what did it sound like? Nevertheless, the four years of preparing was over in ten minutes.

After the awe and excitement subsided, our two guest speakers picked up where Andy left off. Major Mike Caylor of the USAFA and former astronaut trainer Eric Joern answered several dozen more questions from kids and parents, and from the other 4 students that didn't get their questions answered by Andy Thomas. Finally at about 1000, the PHE faculty decided that the kids had to get back to other studies, so the gym eventually became empty. The leftover pamphlets were scattered about, but most of the 400 printed went to the kids, staff and parents attending. Originally started by Marilyn French, then completed by Dave Kurth and Chris Fox, the pamphlet described SAREX, Mir, the PPRAA, and offered a brief chronology of the contact. In about an hour, there was no trace of the excitement left in the gym, but kids will be talking about this for a long time.

Just a Memory

The antennas finally came down on March 12, leaving only the mast put up by District 20. The last thing to do was distribute the commemorative sweatshirts to the ten selected students. Early on, I recruited the help of Karen Garbee N1FED who has done graphics work in the past. She came up with the design and provided artwork for the sweatshirts. LinCom Corp (where I work) offered to pay for the shirts (as well as the pamphlet printing). Their nearly $600 donation helped make this a success. Sweatshirts were produced by Shirt Stop, the same place that makes our club jacket. The kids got their sweatshirts on March 17. If anyone wants their own commemorative shirt, let me know and we'll place an order. I'll bring in a sample to the next club meeting. The cost is about $16. There's also several video tapes that need to be edited into one tape so we can play it at an upcoming club meeting, and put a copy in the club archives, along with other memorabilia, like photos, the news article from the Woodmen Edition newspaper and e-mail.

As with any project of this magnitude, it's always a team effort, from participating in the contact, to installing the antenna, publicity, equipment loans, artwork, or just answering questions. Many hams from the PPRAA and other clubs helped, as did the PHE and D-20 staff, and even some of my neighbors and officemates. Here's my list of those helping (PLEASE let me know if I missed anyone so I can give credit where credit is due): AEØB, KØSU, KØTER, K2LCT, KA3HDO, KBØIAP, KBØLWJ, KBØMMV, KBØPPM, KBØREF, KBØRKW, KBØWFL, KCØBSY, KC5LXC, KC6ROL, KD6FLM. KFØWF, NØABC, NØEPF, NØIEM, NØIKF, NØMHQ, NØNTX, NØPRY, KBØQFY, NØQJS, NØUOD, NØUVR, NØWPA, NØZUQ, N1FED, N3EUA, N7LV, NKØP, WØVO, W6RML, WA1STO, WA3EIB, WBØIMH, WDØE, WDØFHG, WU3H, Tony Acosta, Steve Alsup, Nanette Anderson, Rose Carson, Maj Mike Caylor, Michael Chamberlin, Chris Clopton, Kathy Crawford, Sally Douglass, Peggy Healer, Paul Hedges, Ron Horne, Eric Joern, Roger Johnson, Sherri Kaderka, Dorothy Lindsey, William Lindsey, Cathie Padgett, Krista Roller, Henry Russell, Debbie Thiem, Jane Wisner and to AMSAT, ARRL, NASA, PPFMA, the students Jessica Alsup, Crissy Bernardo, Craig Bishop, Colin Clark, Kyle Joern, Cameron Lee, Erin Overstreet, Kaylan Plantt, Jessica Rodgers, Gregory Sugano, and astronaut Andy Thomas KD5CHF.

de N7LV