**The SARA 2006 Annual Conference- An Anecdotal Debriefing**
by John C. Mannone

Every year, members of the Society of Amateur Radio Astronomers (SARA), and other enthusiasts from all over the world, converge on the National Radio Astronomy Observatory (NRAO) in Green bank, WV. We are fortunate to have a world-class observatory host our conferences. This year, SARA celebrated its 25th anniversary as a premier group in amateur radio astronomy (there are other worthy organizations around the world). One of SARA's goals is to increase its international presence by coordinating with radio enthusiasts around the world.

Over 60 registered arrived, some with family. They came by car (personal and rental), by plane (commercial and private), by rental van (cozy and with *contraband*, if you count box wine), and in my case, by tow truck (impersonal and not very private). Thank God for AAA. After the regional clubs finished fighting whose responsibility I fell under, my 317,000-mile Honda completed its last 40 miles to the site by flatbed escort—consequence of a failed tensioner and a chewed-up, gummy-burnt timing belt. Fortunately, the repairs could be made only 23 miles away and the car was ready before the conference was over. At first I wondered if I was going to be stuck in the 'sticks'. I think the mechanic has fewer teeth than the spent timing belt, but Bill sure did a good job, and knew how to smile. Not all stories have happy endings. I'm glad my Honda hummed home— without any strange tunes!

Of course, one can easily imagine the befuddled looks as I disembarked the strange ship of floorboard planks. After several trips to the dorm-like room, I was ready for my first meal. Well, I guess we could call it that. Though the cooks are truly some of the most friendly, sweet ladies you would want to meet, their cuisine makes fast food taste like gourmet cooking. (Except to this guy from Kansas who thought it was great). Nevertheless, the atmosphere is charged with chatter about radio astronomy, which has a positive 'alka-seltzer effect'. Seriously, I prefer to think of the meal plan as free food and the proceeds go to the privilege of being at such a distinguished site.

Two full days of lectures can leave some exhausted, but all of us are motivated with plans for new projects. The wide range of topics is displayed on the SARA website, together with our group photo. You can find me standing left of center near the front in the red shirt (color coordinated with bloodshot eyes). I think people enjoyed my talk on the impact of extreme solar events on the solar wind and on our magnetosphere, especially when I got out of the way so the crowd could see the slides. The "Halloween Storms" of 2003 were like a series of severe thunderstorms, but instead of water raising *hail*, coronal mass ejections pelted our magnetic field. Of course, this gave rise to some of my radio poetry by the same name. If you visit my web site, there are links under the "Announcements" to the SARA 2006 Conference Powerpoint, which contains my poem, *Halloween Storm*. You will want to study the extreme ultraviolet SOHO image of the sun from excited helium ions (304 nm). In TN, we would describe the false color of this image as "Vol Orange," but one should note that the sun is shaped more like a pumpkin than a football.

All the talks were great, but one was superlative. It's not often that seasoned radio astronomers get upstaged by a bright 11-year old whose presentation was nothing short of radio-stellar. Not only could Shanni Prutchi spell "Hydrogen Line Radio Astronomy", but also she clearly understood it. It was for her elementary school science project. What a refreshing breath, especially when compared with some of us "old farts." We had a great keynote speaker this year, the eminent Dr. Steve Ellingson addressed low frequency radio astronomy, but I move that we try to get Shanni for next year. By the way, the Board voted to award her an honorary membership for her contribution.

And she was not alone. Sgt. Tyler Moore, a Civil Air Patrol cadet and recent high school graduate, is another talented young-blood ready to transfuse vitality into a growing SARA organization. His impressive experiment sounds like an exercise in Greek- alpha, beta, and gamma. These designate geographical placement of three radio telescopes for scoping out the sun. Tyler is one of seven who is part of the Tamke-Allan Observatory (TAO) contingency represented at the conference. In fact, this group is worth a digression.

Dr. David Fields, my friend and associate, should be commended for his very proactive efforts in promoting an atmosphere conducive to down-to-earth research for many students, ham operators, and even theoreticians like me who are handicapped with hands dumber than a box of rocks. This modest Tennessee observatory is sometimes more like a United Nations (without the quibbling). Our entourage (all contributors to the SARA lectures), on this trip alone, is distinguished by Dr. Carmen Pantoja, a research radio astronomer at Arecibo National Radio Astronomy Observatory (site of world's largest radio telescope, period!) and is on the faculty of University of Puerto Rico, Ms. Wanda Diaz, a graduate student doing cutting-edge research on sonifcation to bring radio astronomy to the visually impaired, also at the University of Puerto Rico, Dr. Stan Kurtz with the Centro de Radio Astronomia, UNAM located near Mexico City, my friend, Robert Kennedy, fairly new to radio astronomy, but a successful entrepreneur in engineering and president of Orion, an Oak Ridge based science and astronomy club, Tyler and myself, a Professor of Physics, who torments students, hopefully, with a case of infectious enthusiasm. There are more who are active in radio astronomy, but couldn't make it this trip. However, because of TAO's strong commitment to educational outreach, look for new talent, from both students and teachers, in the near future. (Check out their website).

In fact, educational outreach is one of SARA's missions and the Officers and the Board convened for our business meeting Monday night. We did well this year; the hour-long meeting only lasted two and a half hours. SARA will provide grants to qualified students from 5$^{th}$ grade through college to do work on radio astronomy projects.

I also serve on the steering committee for another outreach effort to increase public awareness and educate them on what NRAO is doing (remember, it's our tax dollars). The NRAO Navigators will accomplish this with the help of an Itty Bitty Telescope (IBT). Its fine design by fellow Board member and friend, Kerry Smith, is reminiscent of

the Green Bank Telescope (GBT). However, it is more portable than the world's largest, fully steer-able radio telescope and weighs 17 or 18 pounds instead of 17 million pounds. The frequency of operation may be a *bit* different, but the 12 GHz dish with off-center feed demonstrates the principles of radio astronomy. Based on the public's reactions thus far, one might say it shares another feature with the GBT— a huge wow-factor!

One of the highlights of the conference is a tour of the GBT. The erector-set like appearance is unusual for a radio telescope, especially with its off-center feed. The long part of its parabolic section exceeds 110 meters in length. Finite element modeling is used to warp the surface to the required smoothness so that 6 mm wavelength radio astronomy can be done. There is an effort to achieve 3 mm wave capability (100 GHz). (Radio astronomers often speak of microwave and far infrared as part of the radio spectrum; of course, this is different from what chemists are taught). I won't try to do it injustice with an abbreviated description, so I recommend you visit the NRAO website to learn more about this engineering marvel. Its contributions to radio astronomy have already been impressive.

Another treat is the use of the 40-ft diameter dish equipped with a 1420 MHz receiver. You might recognize that this is the infamous spin flip hyperfine transition in neutral hydrogen (the most ubiquitous substance in the universe). It is also affectionately known as the 21-cm line. (Ham radio operators usually talk in terms of wavelength, as with a 2-meter antenna. But, radio astronomers often mix terminology between frequency and wavelength, presumably to confuse the beginner. So, 2 meters corresponds to 150 MHz, except to Hams, where it's 144 to 148. Did I say something about confusing the beginner? No, not really, there is something called the 2-meter Ham band where we round off to 2-- close enough for government work.). Our members/visitors get to operate this meridian transient instrument in both continuum and spectroscopy modes. This year under the able direction of one of our leaders (Tom Crowley), several of us looked at the Doppler shifts of rotating hydrogenic regions, like the galactic center. Unfortunately, Murphy's Law kicks in. We have our meetings typically in June with many of the strong radio sources caught napping while we're up.

Nevertheless, an evening's discussion in the celebrated Drake Lounge, tempered with a little wine or whatever, is one way to wait for the arrival of the quasars, supernova remnants, Supermassive black holes, etc., through the southern celestial longitudes. Then some brave the dark without much sleep, others retire early, yet some remain nestled in the nostalgia of the lounge, getting acquainted with new friends and reaffirming old ones.

By now I hope you all realize that my humorous complaints are with good intention and are punctuated with many more joyous moments. This is truly a remarkable place. It's only been a couple of days since I have been back home in TN and already I am experiencing withdrawal symptoms and separation anxiety. The only sure stop gap measure I can apply, until I return next year, is to ride the radio airwaves— bronco-bustin' titillations, studying scintillations, blowing plasma bubbles, and anything with flare.

Respectfully submitted
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Web sites:
SARA, http://radio-astronomy.org/
NRAO Green Bank, http://www.gb.nrao.edu/
TAO, http://www.roanestate.edu/obs
Adventures in Astronomy, http://home.earthlink.net/~jcmannone/