North American AstroPhysical Observatory

NAAPO (North American AstroPhysical Observatory)

"Signals"
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The NAAPO Newsletter
(February 11, 1989)

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Meeting Notes

January 21, 1989

Those Present: **Barnhart, Dixon, Mitchell, Ayotte, Huck, van Horne, Connell, Joy, Herfel, Campanella, Phillips, Varda, Eberly, Untied, Irvin, Simon, Smith, Ferryman, R. Helwig, D. Helwig**

• **Barnhart** announced new volunteers: **Eberly, Untied, Irvin, Smith**

• The signal squirter has arrived from **Father Lonc** at St. Mary's University, Halifax, Nova Scotia.

• The Gould Recorder has been delivered, and is now in the focus room.

• Nine new power poles are ready and waiting for us to take them away. The **Helwigs** have organized a pole party for this weekend of January 28th.

• **Dixon** needs help with the modem problems in the software group. Volunteers are gladly welcome.

• **Ferryman** is currently working on the problems with the Kermit lockups.

• The cart motion project has taken high priority. We have gotten back in touch with Manchester College.

• **Ayotte** has announced a need for new photographs for future publication.

• Also, there is a need for a fund raising brochure, and volunteers to help with it.

• **Ayotte** and **Smith** have volunteered to do a wiring study.

• **Earl Phillips** has volunteered to head the RFI group.

• A financial report was given by **Connell**.

• A micro-group report was given by **Joy**. All is going well.

• Request was made for an 11/23 to be placed in the lab at Otterbein.

• Upper Arlington students will be coordinated by **Eberly**.

• **van Horne** has been made Director of Titles.

• The parking lot at the RO needs to be cleaned up, especially the weeds.

• **Huck** is sending a bi-directional phone amplifier information to **Barnhart**.

February 4, 1989

New Volunteers: **Ken Schafer, George Irvin, Lybrand Smyth-Mayes, Owen James, Tricia McCarthy**

Software Group: Rodney Ferryman has solved the disk pack back-up problem. He is also the Director of Systems Development.

RFI Group: Earl Phillips is now head of the RFI group. **Tom Irvin** has volunteered to help.

Micro Group: Robb Joy is continuing to work on the strip chart recorder for the PC. He is also working on digitizing the Ohio Survey using C. He welcomes anyone with a knowledge of C to help.

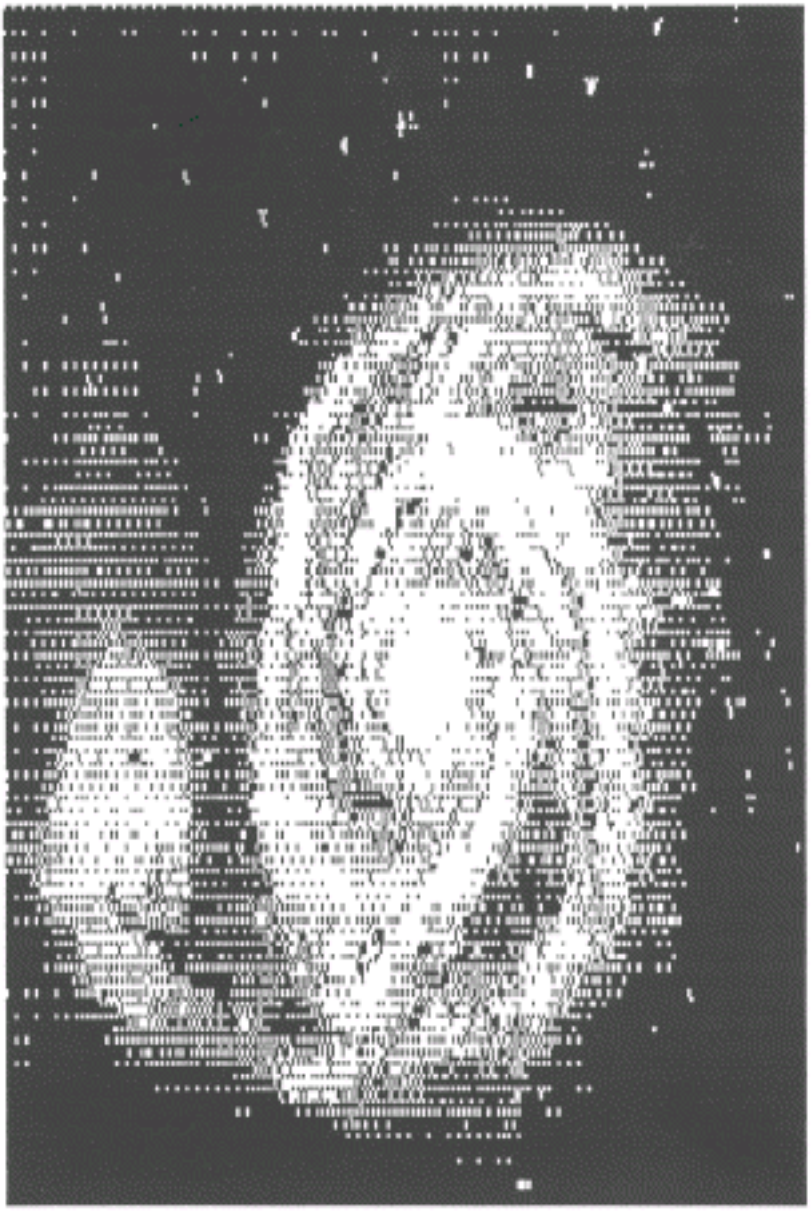
MISC: Owen James has offered his help in doing yard work at the RO.

Debbie Merriman and **Anna Stanley** from the Tan and Cardinal (the newspaper at Otterbein) are working on a story about NAAPO and attended the Feb. 4 working session.

The next working session is Feb. 18.

Coordinator's Corner

Phil Barnhart



Many times I have addressed my feelings concerning the operation and coordination a largely volunteer organization. The past six months have provided the manic highs and depressing lows that come inevitably with the non-organizable creature consisting of volunteers.

In September, I had the exhilarating privilege of a four day visit with **Fr. William Lonc** in his comfortable lair in the Physics Department at Saint Mary's University in Halifax, Nova Scotia. Just recently, the first fruits of that visit arrived in the form of a 1420 MHz Calibration Oscillator/Transmitter. We hope to soon reciprocate with data output to them from the Radio Observatory Project. Till then, many thanks to **Bill** and his "team" for the fine construction job they produced.

My work during the fall term sabbatical leave was directed toward organizing and implementation of a number of consortium interests. This was a very stressful time, largely because I was working alone, learning on my own, doing things I had relied upon others to do in the past. This was very depressing because everywhere I turned nothing seemed to be happening. The highlight of this period was certainly the opportunity to join again in a classroom setting with **John Kraus** in his course on Introductory Radio Astronomy. **John** has been a hero of mine even before I sat as a student in one of his first Radio Astronomy courses, team taught with **Geof Keller** back in the 1950's. I think I may have participated more this time.

The organizational drudgery, the development of rudimentary computer literacy, and several projects negotiated over many months suddenly fell in place in December and January. I have been on a glorious high with the number of people coming forth to volunteer and get things done. The infrastructure of the Headquarters office now seems nicely in place. We are now getting tasks under way, carried through and tied up WITHOUT interfering with my classroom obligations. It is a great feeling. Special thanks to volunteers **Aaron Connell, Robb Joy, Brenda Eberly, Dirk Herfel, and Tricia McCarthy**. Together we are getting things done.

Project List

(contact person in parenthesis)

TASK	GROUP	ASSIGNED PERSONNEL	STATUS
FORTRAN programming	Software	**(Dixon), Ferryman, Vardag**	operating
Mechanical Evaluation	Mechanical	**(Huck)**	needs volunteers
Chart Folding	Observers	**(Van Horne)**	needs volunteers
PC to Focus Room	Micro Group	**(Bamhart)**	needs volunteers
Newsletter writing	Publications	**(Ayotte)**	needs material submitted
Cart Monitoring and motion	Mechanical - Electronics	**(Berry)**	Manchester needs support from RO
Data Transfer and analysis	Software	**(Morrison)**	St. Vincent needs support from RO
Signal Calibrator	Electronics	**(Bamhart), Lonc** St. Mary's	Mark I complete

Weed and Varmint control	Site Team	**(Van Horne)** (**Snider**' class?)	needs volunteers
Cement and block repair	Site Team	**(Van Horne)**	needs volunteers
Wiring Survey & repairs		**(Ayotte), Smith**	getting underway
PC Chart Recorder	Micro	**(Barnhart), Joy**	in process

We request that contact persons and group leaders (RFI, Mechanical, Electronics, etc. submit tasks and status information for updating this list. All jobs needing attention should be included. Descriptions of the kind of skills or facilities should be included. All others who see a task that you or someone else might accomplish, please send it along. There are a large number of things that can be included (should be included). Public relations, fund raising, community service, research programs, site development and off site opportunities are fair game.

By getting the tasks before us and the needs to carry them out we hope to stimulate more volunteer involvement and generation of ideas.

Volunteer needed to:
1. program FORTRAN
2. make 11/40 card reader work (open)
3. coordinate grounds keeping at RO

Eberly and Barnhart Contact Upper Arlington Jones Group

Dirk Herfel

Friday afternoon **Brenda Eberly** and **Phil Barnhart** went to Jones Middle School to address one of the eighth grade teams on the subject of ETI and Big Ear opportunities. **Brenda** is taking on the coordination of that group and getting some activities planned to bring them into the operation of the Radio Telescope Project. An audience of about 100 has now been made aware of the consortium and their potential for contributing to it.

Mention of **Mark Abel** and how he volunteered out of that same school at that same age brought ooh's and ahh's from the audience. **Barnhart's** slides seemed to put them to sleep because they sat very still while the pictures were on the screen.

Brenda is coordinating a program of meeting and events to present available tasks and possible contributions to the program for the Jones team. A concentrated brainstorming session will be planned for the near future to let them discover what they have to offer to the effort. A number of interesting ideas were tossed about during the afternoon and it looks like many productive things can be done by this group.

One of the first things **Barnhart** wants to get done is to have a modem and terminal installed so direct communication through electronic mail can be instituted. This would be both for the students and **Susan Snider**, coordinator of her eighth grade class.

Third Pole Party Great Success

Dirk Herfel

Clear weather, moderate traffic and an enthusiastic team of pole-pickers made the Jan. 28 pole party work smoothly. Ten more poles for the noise shield project found their way to the Radio Telescope site. Many thanks to **van Horne, Huck, Varda, Helwig-D and Helwig-R, Ferryman, Phillips, and Jurgens**. Special appreciation to **Judy Dixon** for allowing us to rest our muddy feet on her living room rug.

Bob Dixon and **Phil Barnhart** waved flags effectively enough to prevent traffic from running over any of the volunteers.

Radobs Notes

Wed 11 Jan 89 20:01:46-EST
Angelo Campanella
Mikesell Flat-Move Notes follow-up.

Comments by others, recently prompt the following in my thinking.

Having operating various apparatuses, aircraft, autos, etc etc for many years, I suggest the following:

a- Though the various schemes of **Mikesell** appear as fixes, worthy of more elegant solutions, I strongly recommend that you all attempt to try his way first, even if it's just only once. For instance, the intercom to listen to various machinery; one needs positive feedback that heavy equipment is following commands, else disaster. The only Hi-Tech solution I can think of for now is a live person with a walkie-talkie (2 meter hams please note and volunteer). It would be nice if motion indicators were there, but they aren't; and besides look at the trouble with the brake lights not always working...

b- If the oil type is not known, then find the name of the pump manufacturer along with pump serial number. Find a vendor of that pump type & call and ask. Then there is always the possibility that the pump in question has a manual stored in **Gene's** old records.

Then, you could always try SAE#10 plain motor oil (a favorite of pumps).

Fri 13 Jan 89 00:33:12-EST
Ron Huck
RFI SURVEY

The hardware for the RFI survey is hooked up. The configuration is a little different from last time. Last time one of the horn LNAs was used so the system was down while the RFI survey was in progress. Now the spare LNA is mounted on the pipe with the discone antenna. The Amplica amp is not being used in the present configuration either because it is being used in the SETI system. What is now needed is for someone who knows how to use the software to get the program

running and let me know if the noise level looks good.

Mon 16 Jan 89 09:54:08-EST
Bob Dixon
11/23 computer progress

It is possible that some of the SETI program problems are caused by timing and slow response of the equipment. Therefore as a parallel effort to **Rodney's** efforts to find program bugs, I am contemplating writing a very stripped down version of the SETI program to look at just a few channels, but with more detail and the same timing as the big program. The timing can be made variable to look at the effects of speed.

For example, it is possible that the frequency synthesizer or yig filter are not stable by the time the computer thinks they are, making the data useless.

Tue 17 Jan 89 14:48:11-EST
Bob Dixon
New 11/23 status

Ron and **Steve** picked up the first installment of the 4 new 11/23 systems.

More will come later. They are not in racks, so the pieces are all separate.

Here is the config so far:
11/23 cpu, with a number of unknown cards.
2 RX02 floppy disks. High density. Very useful.
1 RL02 hard disk. This has twice the capacity of what we have at Delaware now, and if installed there could very useful. May also have a better disk controller than what we have now.
Various manuals, tapes, etc.
Rumors of an Ethernet card.
A 4 line serial card. Type unknown.

Tue 17 Jan 89 15:29:31-EST
Ron Huck
battery backup system

The battery backup system has been rebuilt and is operational. Before, if there was a short, the wires would have to melt apart because there were no fuses. Also, you had to add wires to one overloaded terminal strip while it was hot unless you wanted to go outside and pry the terminals off of the batteries. Now, there are 3 circuit breakers which can also be used as switches and there is a terminal strip for each voltage. If the batteries need to be disconnected there is a thumb screw on each terminal to quickly disconnect them. The sidereal clock, Heath clock, and sidereal voltage amp are currently connected to the battery backup system. Plus, I got a new bulb for the emergency light and wired it to the battery backup. Can you imagine what it would be like if you were in the focus room at night and there was a power failure at the RO without an emergency light? Better hope there is a full moon. Each battery now has its own battery charger.

Tue 17 Jan 89 17:06:55-EST
Steve Ellingson
my status

I have good news and bad news. First, I'm getting married this June. Also, I plan to graduate and publish a paper in the mean time. The bad news is that I will not be able to continue for my PhD as I hoped. This is because I am being ordered back to active duty in the Army. Although this means a real salary and a start in the work-a-day world, it clearly means I will not be able to participate actively in the RO for quite some time. The flurry of things to be done also have made it difficult for me to do anything useful in terms of the RO. Thus, I think I should start unloading the materials I have accumulated from my possession to those who will be able to use them in the future.

I have scores of documents, printouts, raw data, etc, that I would like to turn over. Most of it is related to the RFI survey, and I will need to explain some of it before I leave. Perhaps at a Tuesday meeting? I also need to turn over keys and anything else you can think of.

Although I will not be able to stay active with the group, I would very much like to stay on RADOBS until June. I can still help out with heavy-object-moving, etc. My van also continues to remain available.

Tue 17 Jan 89 20:49:57-EST

Bob Dixon
11/23 software progress

I made some progress with the 11/23 software.

Allowing Initlz to average more sweeps makes for better initial estimates of the baseline and sigma values, which reduces the number of spurious detections. But it takes forever since Initlz now uses virtual arrays because of its size.

I noticed that many spurious detections are always at the same frequencies, so I used the "reject" table for its intended purpose, and removed many more of the spurious signals.

I raised the detection threshold from 5 to 7 sigma, which of course also reduced the number of detections.

Other known but possibly related problems, for helpful volunteers to solve:

1. Suddenly the software switches seem to be ignored by Search.

2. The "selected" frequency chosen in Setup is lost by the time Search needs to know it. Why? This used to work. This is the selfrg() function.

I have also given some thought and planning to a new system for disk backups. This was previously done by **Marc Abel** and **Jim Bolinger** and now by nobody. This must be done periodically to reclaim vacant space on the disk to make it useable again, and to protect against data loss. Now that we have 4 disk drives it will be much easier than before, and amenable to semiautomatic operation using an indirect command file. If some software volunteer not engaged in the higher priority things would like to learn about command files and the operating system, this would be a good project, and badly needed. The we could do backups on a regular schedule and be much more efficient.

Tue 17 Jan 89 20:53:57-EST
Bob Dixon
Pole Thieves Pursued

I was called by the Electric Company chief of security. After some false rumors that

my complaint could not be found in the records of the Delaware county sheriff, they now know the names of the thieves and are after them. He said he would let me know what happens. I haven't decided how we should spend the 10 million dollar reward yet.

Wed 18 Jan 89 18:18:01-EST
Tom Van Horne
Earl Phillips call

Earl Phillips, a CAS volunteer who has been to a couple of our meetings gave me a call inspired by his receipt of Signals.

First off, he would like to get on our B board but has neither hardware nor access to any. I have told him that we may be able to set him up and he would like to explore this possibility with **Bob** at the Saturday meeting.

Second, he offers a suggestion regarding the RFI peaking at rush hour we have observed. He suggests this might be caused by police radars. He travels that road sometimes during our 'peak' period and uses a radar detector which he says is kept very busy.

Wed 18 Jan 89 18:18:57-EST
BOLINGER-J
Re. flat move instructions

Anyone who has ever done any repair or service work (and **Ron H.** and I certainly qualify for the position) is well aware of the fundamental axiom of the universe that says:

A WORKING SYSTEM SUPERSEDES ALL DOCUMENTATION

In view of this, I suggest that the video take precedence over the old (by the way, how old is it anyway?) written instructions, since it was made using a working (?) system.

Thu 19 Jan 89 15:57:45-EST
Steve Ellingson

RFI

I read **AC's** comments with interest. I would make the following points:

1. Police radar: Checking my handy-dandy Radio Shack catalog, I see that radar detectors detect in X and K bands. Anyone know off hand if either of these fall in the 1-2GHz band?

2. The RFI detection system we were running either detects a signal or does not. That is, all the "noise" in our data is actually errors due to high stepping rates (insufficient settling time), calibration error, etc. All these factors affect only the measured amplitude of the signal. When I set up the detection software, I was very careful about setting the detection threshold high enough to eliminate false detections due to spurious system noise, etc. Thus I feel all the signals we detected are real, RF airborne signals.

3. Auto ignition systems: I once worked out estimates of the strength of this type of RFI using spark emissions models and simple ground wave propagation principles (note that direct LOS does not exist). The minimum detectable power density of our system is about 10-to-the-minus-14 watts per sq. meter, and the estimates I did indicated spark emissions from US23 would be 50 to 70 db below that.

As **Bob** once mentioned, a good way to identify this kind of RFI is by checking band width — spark emissions should be ultra-broadband.

Fri 20 Jan 89 18:25:31-EST
Ron Huck
radar frequencies

The frequencies of police radar are:
X band 10.525 GHz
K band 24.150 GHz

Sat 21 Jan 89 23:36:57-EST
Angelo Campanella
Video/Flat-Move: early impressions.

Dear folks: Received the video cassette in the mail this afternoon after returning

from meeting. After my initial review, I have the following impressions (complete review & recommendations later).

1/ There is nothing you all encountered that is contrary to **Mikesell's** instructions I distributed a week or so ago.

2/ The sticking of the brake pads is predictable per their configuration; they are in a "quad set, east-west, up-down and they "pinch" when the sector attempts to move contrary to their respective offsets. This is intentional to give them ultra-safety against runaways.

3/ The relay "dancing" needed to get a decent move is an abomination and dangerous (reaching inside a hot box looking the other way, Ugh!). That action has to be remoted to accompany (be attached to) the winch push-button switch on its pig-tail.

More later. I'll copy and mail back the tape in a few days.

Wed 25 Jan 89 01:16:21-EST
Angelo Campanella
Flat-move video Observations.

**********OBSERVATIONS ON VIEWING THE VIDEOTAPE **********

Air pressure values on video tape agree with **Mikesell's** instructions. Leaks are a problem as well as muddauber wasps (summer).

Brake status lights: "lit" means brake is closed ("on"; "applied"; "stuck").

For each bay there are four INDEPENDENT brake shoes; East, West, Upper, Lower.

49 MHz walkie-talkies with boom mike are available.

If the air routed to the air actuator cylinders does not contain oil, said cylinders can be counted on to stick from time to time. Oil cup on brake air cylinder supply promotes lubrication (swept in by incoming air). The brakes are rigged to have a

"wedging" or "servo" action.

Thus, for a given bay, if the upper brake is set, the downward load of the dead weight of the bay locks them even tighter.

This effect surfaces when one attempts to release that upper brake by applying air pressure to it; the brake shoe fails to retract from the bay sector.

Only by relieving that wedging action — by running the winch upward in the case of the upper brakes — does that brake shoe then properly retract. The mirrored problem in lower brakes is apparently less severe; one can lower flat bay when lower brake is closed.

In the beginning there were only seven bays (now labeled #2 through #8). Bays #1 and #9 were added later.

We need to trouble-shoot the brake selector: The Jumper MUST be eliminated. Reset switch does not work. Separate west and east brake release actions are needed since automatic-alternating, originally supplied now only works on Bay #2. (The automatic feature must be revitalized!)

A typical bay-move involves the following brake actions:

Reset in "OFF" position. Operate upper air brake releases alternately. Listen by ear for each individual brake application.

Anomalies noted as the video tape move "progressed":

Bay 3: Had to wiggle switch to make it activate?

Scales for 7 to 9? Winch #3 did not work up or down. West arm actuator switch stuck.

Winch #4 Worked.

Bay #5 has three brakes always-on when external plug is plugged in. (hot-wired?); needed manual actuation of west upper brake. (Only one of the four is operable from the control room.)

Bay #6 east-close and west-close work reliably, but east-open and west-open are NOT reliable.

All Bay #8 controls work GOOD. WOW!!

Bay #9 lights are not consistent. Checked arm actuator, GOOD. Found trouble to be stuck actuator in control room panel?

***** Further AJC Comments***

1/ Brake wedging is generally unavoidable. You must plan to avoid it by interdicting actions of alternate switching.

One nuisance operation I noted was the repeated need to leave the declination sighting telescope to reach INSIDE a switch box to "dither" the East-West brake releases, be it upper or lower.

I recommend that the two alternating trigger switches at least be relocated to the box cover face alongside others. BETTER STILL, this trigger function, common to every move, must be remote to the winch trigger box.

Furthermore, it should have an automatic dither mode (much like automobile windshield intermittent operation)(is this the "automatic" mode formerly effected?), which when activated continuously triggers east and west shoes to allow bay movement at will by the operator who is at the same time busy sighting through the telescope to target and assure bay movements.

I invision this operation as a dithering relay (like the intermittent windshield wiper control on modern cars) to provide the needed freedom from brake wedging. This must be triggered from the same unit (or comprise a "go" switch attached to same). This should make flat bay moves a lot swifter.

3/ As I see it there is NO WAY that you are going to be able to move this flat without two persons.

I recommend for our volunteer group that a team of not less than THREE be on site

at any all times during flat movements.

Assignments are controller, sighter and recording person that doubles as safety/ gopher/trainee.

Two such teams ought to be formed so that movements can be made as needed as a permanent M.O.

Mon 30 Jan 89 08:38:43-EST
Bob Dixon
Pole Party Huge Success!

A great crowd turned out for the pole party, and the weather was great, so things moved along very quickly. A total of 8 poles were moved in 2 trips. There are 4 more left, which are too long for us to carry. I will check to see if it is OK to cut them off, and if so we can get the rest later. Does someone have a chain saw? Phil?

Those who participated were **Phillips, Vardag, Ferryman, Barnhart, Van Horne, Dixon, Helwig, Helwig, Huck and Jurgens**.

Phil and I flagged cars very officially using my official set of US Army Signal Flags, which I then left in Tom's car and hope that he will return them to me Tuesday, in case I need to do any more official flagging soon.

Avoid Applying Awkward Acronyms

The proliferation of lists of celestial objects based on different criteria and on data from different wavelength domains has produced a large variety of acronyms for identical objects. To keep the confusion to a minimum, the use of "The First Dictionary of the Nomenclature of Celestial Objects" is mandatory. See **Astron. Astrophys. Suppl.** Ser. 52, No. 4, 1983 and Ser. 64, 329, 1986. Examples and common problems, prepared by Dr. Helene R. Dickel, who chairs the IAU Commission 34 Working Group on Interstellar Medium Designations, are appearing in various issues of **IAU Today**.

Nomenclature "No No" No. 2: Don't Cloud The Literature by H.R. Dickel, Special to IAU Today

Never use "LMC" to refer to anything but the Large Magellanic Cloud. The IAU has adopted "LMC" as a "constellation" name. Don't use "LMC", for example, to abbreviate "Large Molecular Cloud."

Nomenclature "No No" No. 4: Get The Name Right Before The Star Explodes by H.R. Dickel, Special to IAU Today

Don't use "NS," "s ," "Sand," "Sk," and /or "SK" indiscriminately to refer to objects in the lists of stars in the Large and Small Magellanic Clouds by Nicholas Sanduleak. Those four acronyms actually stand for just two publications. Use "The First Dictionary of the Nomenclature of Celestial Objects" to determine which is which and what acronym to use.

Nomenclature "No No" No. 6: Radio Source Lists Cause Confusion by H.R. Dickel, Special to IAU Today

Don't omit the coding for epoch when you name and catalog celestial objects according to position. Consider this: two lists of 5-Ghz radio sources were published recently. In the first list, an object is called MG 0003+119. The second list includes two sources given MG 0003+1210 and MG 0006+1214, respectively. Can you tell which of these two corresponds to the object from the first list? Had the epoch-coding been included ("B" for "Besselian 1950" or "J" for "Julian 2000"), it would have been clear that MG B0003+119 and MG J0006+121 are probably one and the same.

Editor's Notes

With this issue, Signals is going to a monthly schedule. Our goal had always been to produce two issues a month, corresponding to the two working sessions. That goal was never reached with any consistency. I feel, however, that we can get out one per month (between the first and third Saturday working sessions), and possibly increase the content a bit.

I'll try to keep the calendar posted far enough ahead to inform everyone of upcoming events.

If you are working on one of the many tasks at the observatory, I'd like you to submit reports and information for publication in the newsletter at the first Saturday

of the month working session.

As always, if you have suggestions for the newsletter, or material you'd like to see published, just let me know.

Schedule of Working Sessions at Telescope Site

18 February
04 March
18 March
01 April
15 April
06 May
20 May
03 June
17 June
01 July
15 July
05 August
19 August
02 September
16 September
07 October
21 October

Plus regular meetings in 805 Dreese each Tuesday at 5:00

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