



## NAAPO (North American AstroPhysical Observatory)

"NAAPO News"  
Volume 2 Number 1  
(September 23, 1986)

NAAPO Coordinator - Philip E. Barnhart,  
Department of Physics/Astronomy  
Editorial Intern - Michele Davis, Otterbein  
College, Westerville, Ohio 43081

### CALL FROM HAY RIVER

Just before press time a call from Bob Stephens in Hay River, Northwest Territories, (our most northerly NAAPO outpost) came in. Bob had a couple items he remembered from the shop/storage area at the radobs that he wanted to claim before we threw them to the scrap dealer. In the conversation that followed (it was, after all, his nickel) he filled me in on the status of the SETI program in the land of Nanook.

On the up side, he travels to Vancouver, B. C. to film a portion of a planetarium program to be presented over the winter months to audiences in the Expo area. He is sharing billing with Frank Drake.

He also reports he is now fully steerable from +30 to +46 North Declination. For an instrument that consists of SOLIDLY mounted parabolic reflectors this is quite an accomplishment. He is using a selsyn motor to control the vertical position of the prime focus feeds. The report is that there is NO electrical interference from the drive motors

while conducting a declination change with the receivers ON. This will allow him to map the entire 16 degree swath in about 6 weeks, spending two days per half power beam width in declination. He has added two microcomputers to his system, one a Z80 based machine to do his on-line acquisition and processing work and an Atari 520ST which he intends to use off-line for reducing his sky survey data.

Bob reports that he is getting about a 1 jansky sensitivity over a 10 MHz bandwidth at 1420 MHz. He expects this to increase to 100 millijansky after completion of a new pair of low noise amplifiers.

On the down side - - Bob describes the most grim sort of financial bind with the lease holders breathing down his neck. He is not just working on a shoestring. He is emulating Charlie Chaplin and eating his shoestrings. And we think we have troubles.

He does promise to get information to us about his operation for dissemination to the friends of NAAPO. He also promises a copy of his H I spectrum that had to await copier paper. We are waiting with baited breath.

### **WANT A MIRROR?**

Do you have need of a 60-inch Pyrex mirror? One is available for you for the asking. The only requirement for possession is the willingness to haul it away. It is Pyrex and weighs in at about 3000 lbs.

Any ideas? It is presently located on the Skip Lewis farm, southeast of Zanesville, Ohio.

**SUBMIT LETTERS, COMMENTS OR QUESTIONS TO:**

**DR. PHILIP E. BARNHART, NAAPO COORDINATOR**

Dept. of Physics/Astronomy

Otterbein College

Westerville, Ohio 43081

(614) 898 1516

## **WORKING SESSION Sept 20, 1986 at Big Ear**

In attendance: Huck, Abel, Davis, Barnhart, Dixon, Monk, Kraus; Guests - Lubbers. Gall, Tilden, (all of Creighton Univ.), Neff (Otterbein Col).

Reports were received from the following areas:

**Dreese/OSU** -- Work is proceeding both on hardware and software projects necessary to get the 11/23 on line. It looks as if the hardware will be the major hold-up in the process. A proposal to reduce the acquisition cost for components was explored later in the meeting. The ability to take the 50-channel receiver to Dreese will speed the conversion somewhat as the testing and calibration can be done all at once before transport of the system to the RADOBS. The 11/40 has now been removed by Aero Engineering. We can now proceed with the installation of the 11/23 into the vacated cabinets.

**RADOBS/Delaware** -- In the absence of Mikesell we had to patch together the status of the on-site work. Progress is slow on the fence. The need for cash is acute in order to pursue certain of the fencing jobs. We still await the POA from Foster to finish the transfer of title on the Honda. There is need to begin the cart drive project again. A "cut/break" occurred in the trolley line lead-in from the cart position indicator. The wire seems to have been smashed and then cut. This is an unusual kind of break and may indicate a strange intruder (vandal?).

The strip-chart recorder is still "gushing" ink. Request was made that Barnhart contact 'magic fingers' Mitchell to see if he would examine the system to render a fix according to the Mount Wilson protocol for gushing recorder ink pens.

Barnhart, Huck and Bolinger attached the instrument housing to the tail end of the receiver horns earlier in the week. The device (weighing roughly 1.7 bolingers) is presently hanging only by its sides. Bracing and caulking are yet to be completed. It is the view of those hanging it that a gusty wind might damage the horn assembly should we not brace the housing soon.

**Otterbein/Consortium** -- Barnhart paid an unannounced visit to Teamguard offices this week. In spite of their obvious reticence to talk to a strange character about their systems it was determined that false alarms are an industry wide problem. We have very little that we can do. It is the consensus of those standing around the office at Teamguard that a gust of wind might very well shake the door enough to open the contact. It needs but 3/8 inch to send the alarm. We can test this under the system test mode without disturbing the operators

at the security office.

Otterbein College Department of Physics is making an indefinite loan to NAAPO of a Tektronix Model 5054 Graphics work station. If the system is in working condition, it should add considerable power to the focus room data gathering and processing capability. Anyone with experience on this equipment is welcome to provide input or advice about full utilization or operation of the equipment. It is the first hardware used at the RADOBS programmed in BASIC. Here is a chance to educate the radio astronomers in this microprocessor language standard.

The Consortium office is in the process of recruiting student interns for the office operations this year. We are breaking in a Newsletter Editor today. Michele Davis is attending her first working session this afternoon and will begin to function with this issue of the Newsletter. We are also looking for an editor for the Facilities Manual that we hope to get out in the next few months. In addition we are looking for an office manager intern and some data reduction interns.

A number of work projects are getting under way in which we would like to include consortium member institutions. The proposed methods of doing this will be outlined in the Newsletter.

An offer to provide construction aid has been made by SARA, the amateur radio astronomy group. We intend to pursue this offer as well.

Word was received this week from Dr. Brian Watson at St. Lawrence University in Canton, New York that they may be interested in joining NAAPO. We will be following up on this contact over the next few weeks.

Dixon reports that as a result of the embezzlement of the Overlay and Finding List funds by the Department of Electrical Engineering the NASA grant is suffering a definite crisis. Because of the freezing of these two accounts it has been necessary to pay current salaries out of the NASA grant. Since the NASA funds require a 45% overhead charge on salaries and wages, we get only 60% on our dollars and the money goes down in a hurry. Two proposals were presented for consideration. 1) Pay future salaries and wages from NAAPO to preserve NASA money for non-overhead expenditures such as equipment and parts. 2) Request the NASA renewal money to start in October instead of January. The second alternative will only postpone the inevitable exhaustion of this resource. Further consideration of this problem can not be carried very far into the future.

Barnhart reports that there are three seminar dates tentatively scheduled for the fall term for the purpose of carrying the NAAPO message to students in the consortium. Reports on these visits will be included in the Newsletter.

Kraus announced the sobering news that radio station WRFD is being evicted from its present transmitter site 4.5 miles south of Big Ear to make way for housing developments. Proposed relocation site is 1/2 (!) mile south of Big Ear. This is a potential noise source much too close to the radio observatory. We should make every effort to convince the interested parties that we have a scientific interest in locating such a 550 foot transmitting tower in a more remote site -- like Del Rio, Texas. (Coordinator's Note: At noon 22 Sept. I heard that a pilot friend of mine who navigates occassionally using WRFD was confused because the signal he was tracking seemed to be coming from a location some miles north of the traditional site. Perhaps they are site testing or have actually moved operations. We will keep monitoring.)

Bill Mook raised the question of an offer that Paul Horowitz made to him about dumping Suitcase SETI off on the RADOBS. It was agreed that Mook should call Horowitz and see what he can do with it in his lab.

Mook also informed us that the Cincinnati office of the EPA is getting rid of some computer equipment. He was invited to follow up on this lead.

Dixon will contact (again) EE on the issue of the embezzled money. There will probably be no satisfaction gained other than the realization on their part that they are crooks.

Meeting adjourned to the ground plane to attend to the 4 o'clock hand-off between the Molniya satellites.

## **COSMIC SEARCH ISSUES**

For a few years a fine journal was published out of the radio observatory. There are a number of copies of the journal on hand at Big Ear. I will entertain requests for a use for these issues. At least, each member institution liaison should have a complete set. It would be nice if a few libraries were to purchase a complete set to put some money back into the Observatory operating budget.

## **WHY MAIL THIS FIRST CLASS?**

In checking the requirements for bulk mail permits I find we can get away with a 60% postage break providing we can mail in bunches over 200 pieces. Our present mailing list runs about 60 so I we will have to grow a bit before taking advantage of bulk rates. If the Newsletter goes over 200 it is likely we will have to charge a subscription to keep it afloat, even with the reduced postage.

## **PARTS NEEDS PARTIALLY FILLED FROM STOCK**

When Paul Ave stopped by to try to get another terminal on line from Otterbein, I took him into the stock room to see if we could supply out of our excess some of the components he is needing to build the synchronous detector. We came up with about \$50 worth of components out of our surplus stock that we would never be able to use in years. This will materially help in keeping the construction cost down on the synchronous detector.

As a result of this move I decided to institute an exchange deal for anyone who is able to donate components for the construction projects. I will send from my stock (a limited variety now, but some choice components) comparable value of material to what you are able to provide for NAAPO.

**THIS SHOULD BE A WAY OF SPREADING THE WEALTH. I WILL BE HAPPY TO COORDINATE THE REDISTRIBUTION OF EXCESS STOCKS OF SUCH COMPONENTS.**

Send your lists of overstocked items and I will begin to level them out.

----- Phil Barnhart

## **DO YOU HAVE ACCESS TO SURPLUS GOODS?**

Academic institutions are not the only sources of useful materials for use by organizations like NAAPO. If you are affiliated with a business or industry that occasionally divests itself of materials or instruments no longer of use to them, please consider seriously the option of requesting your managers (or make the decision yourself) to donate (for tax write-off) such material to NAAPO. I will be happy to process any such gifts through Otterbein College. Keep us in mind!

**MACHINE SHOP WORK NEEDED ON 11/23 JOB**

Jim Bolinger has requested that we invite anyone having a machine shop available to bid on the opportunity to punch, drill and mill the front panels for the 11/23 interfaces and peripheral equipment. Your offers will be received in the same way that offers for components and labor are handled.

CALL OR WRITE MY OFFICE - -

Department of Physics/Astronomy  
 Otterbein College  
 Westerville, OHIO 43081  
 (614) 898 1516

**ALARM PROBLEMS ARE BEING CHECKED**

A large number of false alarms have been recorded at the radio observatory during the past month. Since each alarm transmitted to the security company involves a long distance toll charge we must pay it is vital that we track down the cause of these alarms.

A concerted effort is being made to isolate the cause of the alarms and produce a fix as quickly as possible. It may involve tightening the doors or moving the sensor to a less critical position.

**ATTENTION!!!!!!**

CHECK YOUR PARTS BINS NOW. WE CAN USE ANY COMPONENTS ON THE ATTACHED LISTS.

**OTTERBEIN SURPLUS**

Following is a list of electronic components we have here at the Otterbein Physics Department in embarrassing abundance. We will not be able to use most of this in the next several student (or faculty) generations. We should distribute this as effectively as possible.

Item	Value	Tol.	Number on hand
Resistor	10 ohm, 1/2 watt	10%	200
Resistor	69.8 ohm, 1/2 watt	1%	460
Resistor	187 ohm, 1/4 watt	1%	200
Resistor	200 ohm, 1/2 watt	5%	100

Resistor	330 ohm, 1/2 watt	10%	150
Resistor	576 ohm, 1/2 watt	1%	80
Resistor	1.5K ohm, 2 watt	5%	150
Resistor	2.5K ohm, 50 watt	3%	120
Resistor	2.61K ohm, 1/2 watt	1%	100
Resistor	5K ohm, 5 watt	1%	60
Resistor	5.6K ohm, 1/2 watt	5%	70
Resistor	6.8K ohm, 1/2 watt	1%	400
Resistor	9.1K ohm, 1/2 watt	1%	200
Resistor	11.3K ohm, 1/2 watt	1%	300
Resistor	150K ohm, 2 watt	10%	300
Resistor	200K ohm, wirewound	1%	50
Resistor	200K ohm, wirewound	5%	300
Resistor	274K ohm, 1/2 watt	1%	400
Resistor	1M ohm, 1/2 watt	10%	350
Resistor	1M ohm, 1/2 watt	1%	150
Capacitor	1 microfarad, 200 V		1300
Capacitor	10 microfarad, 16 V		1000
Capacitor	10 microfarad, 10 V		1200
Capacitor	200 microfarad, 16 V		800

At a cut rate \$0.10 each this list represents a surplus holding of over \$800 that is essentially unnecessary. Many of these components are in the \$0.50 to \$1.00 range if you were to buy them from a jobber. Let's spread the wealth.

**CHECK THE COMPONENT LIST FOR THE NAAPO PROJECTS AT BIG EAR RIGHT AWAY. LET'S GET THE SHOW ON THE ROAD!**

**ZELENCHUK COMPARISON NOW A SEARCH FOR Z>4**

It may just be semantics, but John Kraus recently called attention to the fact that what we are doing in the Zelenchuk Survey comparison is in fact searching for objects having a high probability of possessing red-shifts in the range above 4.0 ( $z > 4$ ). We will therefore refer to this search activity in the future as the Z-Four Project. It spells out very nicely the goal of this particular comparison.



### **DIXON APPEARS ON CABLE CHANNEL 3**

Otterbein College will feature Bob Dixon on its public affairs talk show on WOCC Public Access Channel 3 during the weeks following October 14. The topic will be "The Search for Extraterrestrial Intelligence."

He will record a 30 minute segment with the Otterbein College Relations Director Pat Kessler. The segment will be broadcast on the local Cable channel several times during succeeding weeks.

### **1001 WAYS -- -- to use a NAAPO student intern**

No. 676 Upon return from Big Ear most will be in stupor. Set two of them back to back on the library table to prop up that little row of newly acquired books.

No. 492 Pull their string and they will recite a history of Big Ear to a joint SPS/MPS meeting.

### **CONSTRUCTION PROJECT PARTS REQUIREMENTS**

The following lists are the parts needed to complete the phase detectors and the synthesizer interface. Please check your supply bins for any of these items you can spare. I will send you any of my surplus you request in return.

This may greatly reduce the cost of components for the hardware construction project. We want to get started on the assembly as soon as possible so do not delay too long. Set a student searching now!

#### Phase Detectors

<b>Quantity Needed</b>	<b>Item</b>	<b>Value</b>	<b>Comment</b>
8	Resistor	49.9K, 1%, 1/4 W	These could be 1/2 W
12	Resistor	499K, 1%, 1/4 W	These could be 1/2 W
8	Resistor	20K, 1%, 1/4 W	These could be 1/2 W
12	15 turn trimpot	50K	p c mount
12	Capacitor	0.5 micro F, +- 10%	non polarized
12	Capacitor	5 micro F, 50 V, +- 2%	not electrolytic - must be > 20 V
9	IC	LM324	quad op amp
1	card case to hold PC cards		

### Miscellaneous

<b>Quantity Needed</b>	<b>Item</b>
1	1 millimp vertical panel meter
1	Vector CCK3 card cage
13	3662AG plugcards
1000	Vector T44/C miniwrap pins
1	insertion tool for above pins
1	extender card
1	5.25 x 9 x 19 inch sheet aluminum panel back
5	rolls 30AGW wire wrap wire
26	extraction/insertion handles (Vector HA14) or ejector handles (Vector HA9)

### Synthesizer Interface

<b>Quantity Needed</b>	<b>Item</b>	<b>Comment</b>
31	Integrated Circuit	74LS11
11	Integrated Circuit	74LS38
20	Integrated Circuit	74LS244
31	Integrated Circuit	MC1489
11	Integrated Circuit	79L12
10	Integrated Circuit	78L05
11	Integrated Circuit	7805
10	Integrated Circuit	7445
1	Integrated Circuit	78L12
1	Integrated Circuit	74LS27
1	Integrated Circuit	74LS123
2	Integrated Circuit	74LS138
10	Integrated Circuit	74LS47
1	Integrated Circuit	78L10
100	Capacitor	0.1 micro F 50 V
2	Capacitor	0.01 micro F 50V

71	Capacitor	10 micro F 50 V* (*axial lead, max. diam. 0.45 inch)
20	IC socket	14 pin wire wrap
10	IC socket	14 pin wire wrap right angle
1	Potentiometer	10K ohm ten turn panel mount >1 inch dia.
11	Resistor Network	180 ohm, 7 section
10	Resistor Network	270 ohm, 7 section
11	Resistor Network	390 ohm, 7 section
10	Resistor Network	5.1K ohm, 7 section
10	Resistor Network	6.2K ohm, 7 section

### **WEEKEND INDOCTRINATION SESSION PROPOSED**

The suggestion just came over the electronic mail that anyone interested in engaging in the construction of the hardware mentioned elsewhere in the Newsletter might want to come to the RADOBS shop on a weekend soon to see how to do the job and to get an idea of how the task fits into the overall project at hand. We would be happy to set up such an appointment and give a tour of the facilities at Big Ear as well.

**THIS IS ANOTHER DANDY CHANCE FOR A FIELD TRIP!!!**

### **RECORDER INK EXPERT NEEDED**

We need the expert advice of anyone out there having insight and experience in making the ink distribution system on a strip chart recorder do what we want it to do rather than follow that corollary to Murphy's Law, "Recorder inking systems invariably get more ink on the operator than on the chart paper."

If you have information on how to prevent ink gushing in a capillary feed system (as on our Speedomax) call Jim Bolinger at (614) 422 6789 or Phil Barnhart at (614) 898 1516. We need your input.

## **WORK PROJECTS TO BECOME AVAILABLE**

THIS IS A CALL FOR ALL THOSE WHO HAVE THE FACILITY AND THE WARM BODIES TO VOLUNTEER TO HELP ASSEMBLE SOME OF THE COMPONENTS NECESSARY TO GET ON THE AIR WITH THE 11/23 AT BIG EAR.

As we near the time when it will be possible to set up the new computer in the focus room a number of tasks are piling up. The on-site staff, limited in numbers and short on time, have many things to do. If some tasks can be farmed out it will take much of the load off an overloaded staff. This makes a good short project for students interested in hardware building. If you are looking for good ways to offer credit for experience or just use up some of the available work-study funds this is a golden opportunity.

If your biweekly department meetings get dull this is a good way to liven them up.

Let me know (Otterbein Physics, Westerville, OHIO 43081, (614) 898 1516) of what you might be able to offer and (what sort of time scale you might be able to promise, (i. e., a ten hour soldering job in two weeks). I will get the crew at this end organized to try to meet the demand.

GIVE US ANY OTHER IDEAS AS TO HOW WE MIGHT FEED INTO AND OUT OF YOUR SITUATION. THERE ARE A NUMBER OF OPPORTUNITIES FOR PROGRAMMING THAT CAN BE DONE ON MICROS AT YOUR SITE.

## **CALL FOR ASSISTANCE in CONSTRUCTION**

Hardware assembly on the new synthesizer interface, phase detectors and 50-channel receivers is about to begin. As soon as we accumulate the necessary components assembly is ready to commence.

We are calling upon volunteers to assemble units to specifications. We will provide the circuit boards, components and instructions. After assembly, the completed boards can be sent back to us for testing. There is a test circuit for the phase detectors which can be sent with the components and returned with the completed units.

Anyone interested in this project should contact me as soon as possible. I will coordinate the operation as soon as we get the packages ready to go. (PEB; (614 898 1516)

## **[SCOLA SCORES AT BIG EAR](#)**

From 9:20 am till after 7:00 pm Lee Lubbers and Creighton University students Todd Gall and Mark Tilden tracked three Molniya satellites through two hand-offs. Their truck was parked on the east side of the Big Ear ground plane. Motion of the satellites carried them from very nearly overhead to about 12 degrees northeast and back again. The hand-offs occurred when the southbound spacecraft was about 5 degrees due north of the zenith.

The SCOLA MOLNIYA TRACKING SYSTEM automatically tracks and receives live Russian television and Moscow radio from the MOLNIYA satellite system. The demonstration was made using a 10-foot diameter satellite dish (because of the ease of transporting it over the highway on a 3/4 ton pick-up truck) with the microprocessor search and tracking control and the system to render the video transmitter and display devices compatible.

In addition to the obvious advantages of direct cultural and linguistic contact world-wide, the SCOLA project brings a number of technological advances and systems approaches to NAAPO that are of obvious value to our program. Lee Lubbers, a PhD professor of sculpture at Creighton, is mulling over and carrying an invitation to Creighton University to join NAAPO. We hope to hear in the near future if this very valuable mutual relationship might become official.

[\[Back to List of Issues in Volume 2\]](#) | [\[Back to List of Volumes\]](#) | [\[HOME\]](#)

[E-mail Webmaster](#)

Copyright © 2003 North American AstroPhysical Observatory

Designed by Jerry Ehman

Last modified: December 22, 2003