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AstroPhysical Observatory

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"Signals"
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The NAAPO Newsletter
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Projects

(ed. note: Due to circumstances beyond our control, this issue of Signals will contain information previous to the last issue. I hope this doesn't throw you too far off!)

There are a number of projects that are available which require the attention of someone who really wants to get more involved with the RO. If you would like to get involved in any of these projects, please contact Dr. Dixon or Steve Brown, or the person named after the task for the information.

SETI Zoom
50 channel receiver repair? Cart motion on dedicated PC (Russ Childers).
Software: Search, Examin, Sensor
ARGUS (Steve Brown)
RFI System
Antenna repair and installation. ICOM receiver repair? reflector?
Software problems? Move to a dedicated computer. Compilation and automation of database of RFI sources and on-line access by SETI Zoom system. Directional RFI?
Upgrade Studies and Upgrades
Flat automation (Chuck Klein). Feed horns (ESL).
Bob Stephens to OSURO (if necessary)
Remodeling of office building (contractor/OSU?). Hiring Stephens as contractor (Steve Janis). Installation of Stephens' He-cooled pre-amp and 10M ch. spectrum analyzer (Bob Stephens).
K-L Transform (Dixon, Klein, Schumacher, Janis).
RFI-proofing of telescope
Paint horn blinders. Design of parabola rolled edges. Rolled edge material acquisition. Rolled edge fabrication (Tom O'Conner). Rolled edges for the flat side shields (using telephone poles?).
Electrical rewiring of focus room (Brown, Childers with Romanoff). Painting of telescope (contractor?). Ground plane repair?
Chart Recorder
Get a new one? Repair existing one? Modify Gould for efficient utilization of paper? PC emulation of chart recorder?
Various Tasks
Pest control. Filling key groundhog holes. Weed control in summer. Disposal,

utilization, sale of Foster inventory. Repair and synchronize focus room clocks. Straighten out focus room wiring. Cross referencing, compilation and documentation of software.

We have a few jobs which require more immediate attention. If you can help with any of the following please contact Dr. Barnhart or Earl Phillips.

Transport bottled water. Maintain soda suply and fund Assistant to Russ. Drive ICOM w/a PC. Clock resetting.

COORDINATOR'S CORNER

I am discovering some of the reasons volunteer coordinators become frustrated. Being a volunteeer myself I find how quickly time gets gobbled up by the demands of a busy class schedule, bureaucratic horseplay, personal commitments and just plain fatigue. It has been a pleasure the past few months (that you have not seen a copy of SIGNALS) to visit, contact and generally regenerate some acquaintances lost over the years of grindstone minding. I have chosen to send a few personal notes instead of relying upon my contribution to SIGNALS to carry messages. Skip Lewis is working on a neat method of recording seismic events and I felt I would rather devote the few minutes to that task than writing a Corner for Coordinators. The rest of you suffer a bit for that. I enjoyed myself. Earlier in the year I visited with the Vatican Observatory personnel in Tucson. This came about because Bill Lonc from St. Mary's University in Halifax was there on sabbatical leave and generously sought to increase my awareness and knowledge of the "other telescope" destined for Mt. Graham. All of this is to apologize for the long delay in getting the newsletter out of the out basket. We are working to turn the turn-around time to shorter intervals in the future. Just pardon my indulgence of my own desires for a short period of time.

1/19/91 Meeting Notes

The meeting began at roughly 10:07am. Those in attendance were: Schumacher, Brown, Langford, Barnhart, Phillips, Dixon, Lowery, Jurgens, Hanson, Janis, Bolinger, and Campanella.

Barnhart has returned from Philadelphia, seemingly none the worse for the experience. He reports that he has received some bites on the inventory list from companies he's sent copies to. The highest bid is around $1100. I was suggested that we go for a second round of bids, perhaps adding more to the list. It was decided that we will still be bringing some of the items to the Dayton Hamfest. Barnhart also reports that Dr. Kingsley has been given a date to meet with NASA officlals to give his paper on Optical SETI.

Dixon reports that Dr. Kraus wants to experiment on looking for pulsars in the 100 to 500 MHz range using the scope.

Brown reports that he and Russ and Chuck Klein have been on site working on things, as well as taking measurements. He pointed out that the A/C is down again, so he, Ang, and Bolinger will attempt to repair it after the meeting.

The meeting broke at roughly 11:40am, with most going off to their respective tasks.

2 Feb Meeting Notes

The meeting began at roughly 10:04am. Those in attendance were Brown, Phillips, Dixon, Barnhart, Hanson, Mitchell, Childers, and Campanella.

Barnhart reports that Bob Bates may know of someone to take the 11/23 at Otterbein. Barnhart stated that if Bob's friend does not, a work crew must be formed for 2/9 to remove it. He also reports that he will attempt to paint the horn cart today. Also he and Hanson will make a run to Jones to attempt to get them online next week.

Dixon reports that he and Janis Are making out an annual budget request for the RO. He has also cancelled the post office box we had for the RO, since most mail gets delivered to either the observatory or OSU now.

Childers reports that he has been working with the horn cart, observing objects and recording the observations on a chart recorder. He is currently attempting to reduce terrestrial noise in the system. He has also got the IBM up again, and is working with Jurgens on a "C" algorithm for it.

Brown reports that OSU reps were here and discovered that the thermostat in the focus room is not working, and the A/C leak has been repaired, and the system has been recharged. The EE department and us will split the repair bill. Dixon added that the discussion for further funding of the Columbus Project has been dropped from the agenda, and may not be picked up again. He states that there was an article in today's Dispatch stating that OSU is considering dropping any further support.

Phillips reports that we do indeed have a squirrel in residence in the RO office building. The critter made a kamikaze-like dive from the ceiling this morning when he opened the building, then scampered through a hole in the wall in the bathroom.

The meeting broke at roughly 11:04am, with most going off to their respective tasks.

16 Feb Meeting Notes

The meeting began at roughly 10:15am. Those in attendance were Huck, Brown, Janis, Campanella, Schumacher, Dixon, Phillips, and Murdock.

Dixon reports that Brown was on TV this week; a local news take on the RO was filmed, narrated by Brown. He states that he has been asked to submit a budget for the RO to OSU, for a permanent budget. We have not previously had a permanent budget, and this is seen as a positive movement. We will follow up on this request with Janis.

Brown reports that he will be meeting with Steve Kovatch from Romanoff Electric to get the donation started on the focus room rewiring.

Huch reports that the screen room at Battelle has been removed. He suggested that we contact them regarding the whereabouts. He will also do some clandestine snooping to see if he can find it himself. Huch states that he will also attempt to repair the chart recorder again, possibly next weekend.

Janis reports that he will be working with Dixon on the RO budget request for OSU.

Schumacher reports that he had been working on the K-L transform, and will continue to. He will be bringing periodic reports on his progress.

Campanella reports that he and PEB went to Jones school to attempt to get them online. A sign-on was not successful, possibly due to some parity errors in the Decwriter's ability to talk to the Magnus machine. A second attempt will be made by Murdock to hook up the VT-100 terminal to a modem and dial in that way. He will report on any progress.

The meeting broke at roughly 11am, with most going off to their respective tasks.

4 May Meeting Notes

The meeting started at roughly 10:10am. Those in attendance were Barnhart, Phillips, Brown, Dixon, Janis, Leeseberg, V.Horne, and Ferryman.

Dixon reports that he led a tour of the RO for Dr. Friedman of The Planetary Society. He also reports that he attended a meeting at MIT, where he talked with Carl Sagan about the possible implications of a negative result of SETI. There was also a discussion of NASA's approach to SETI. He also reports on a discussion on the construction of a "1000 year" clock. The idea is to build a clock that will operate entirely unattended for 1000 years. There are many problems to be worked out: mechanics, power, etc. Dixon reports that Paul Horowitz has an upgrade to his META project, called BETA, on the drawing board. It will scan billions, rather than millions, of channels simultaneously. He also got some information while at the Dayton Hamfest on a PC controlling an ICOM receiver, in just the way we'd like like it to. He observed that there are several things in various states of disrepair, and asked that they be attended to.

Brown reports that he is working on the Marksman chart recorder in an attempt to get it functional.

Janis reports that he has compiled a list of jobs requiring the attention of volunteers (see front page — i.e., see above).

Barnhart reports that he has received a letter from OSU's EE department regarding

our share of the focus room's A/C compressor replacement. The cost includes a 5 year extended warranty. Our share is about $500.00. This will strain our coffers, and we must find a way to replenish them.

Phillips reported that Jim Sheets, superintendent of Perkins Optical, is in the hospital with a colon blockage. The illness struck him last week.

The meeting broke at roughly 11:27am, with most going off to their respective tasks.

Poem by Tara Moore

(ed. note: The following is another poem by Tara Moore. This one is about the possible effect that the discovery of ETI may have on mankind. This one should have appeared before the last one, but didn't make it.)

A 'DIFFERENT' LIFE FORM
by Tara Moore

Since the dawn of time;
Man has been fascinated by what he doesn't understand;
So what would happen if he found different beings;
A new life form on his land;

Would he look at them in awe;
And welcome them with open arms;
Or would he stand there frozen in fear;
Being scared he would be harmed;

Would he try to avoid them;
And try to pretend they didn't exist;
Or would he be compassionate;
And appreciate what the life form is;

Would he accept them as being different;
Instead of thinking of them as strange;
Would he treat them as having feelings;

Or would he just study them at close range;

Would he try to learn from them;
And seek a knowledge that is new;
Or would he try to mold and change them;
And have them do as he would do;

Man has done this to himself;
People who are a little different he has feared;
But what would he do if the tables were turned;
And the different life forms thought HE was weird.

Excerpts from the E-mail bag:

From: Bob_Dixon@osu.edu
Subject: 11/23 progress
Date: Thu, 2 May 91 15:52:51 EDT

1. Rodney will come to the meeting Saturday, to show Steve B how to archive the files, back up the system, set the time, etc.

2. Rodney has his own copy of the a/d manuals (ours have been removed by persons unknown), which he copied from ours, which he will now donate back to us. Russ needs these.
--- Bob ---

From: Bob_Dixon@osu.edu
Subject: a/d manuals
Date: Fri, 3 May 91 10:46:21 EDT

Rodney brought me his manuals today. They are for the adv11-A, not the adv11-C. But still helpful. Rodney and I agree that the C manuals were borrowed by Ali Vardag some time ago. Steve J please hound Ali to the ends of the earth to get the manuals back!
--- Bob ---

From: James L. Bolinger ohio-state.edu
Subject: Argus element placement

Just returned from a short course on Digital Signal Processing at the AF Institute of Technology at Wright-Pat AFB. While they were discussing the windowing of sampled data for the FFT for the purpose of reducing the spectral 'smudging' into adjacent frequency bins, I had a revelation. The same windowing functions could be used to calculate the positions of the elements in an Argus array, and the result would be to minimize the sidelobes of the beam patterns. Actually I have seen this idea before, but never knew how to apply it. My method is easily explained: Take for example, an offset cosine function. Starting at the middle of the array (radius=0) calculate the value of the function. This is 1 so place an element at radius=0. Now go outwards some distance (radius) and calculate the function again. It will be something less than 1. Place additional elements inside the circle with radius x so that the DENSITY of elements inside the circle will be proportional to the value of the function (including the element placed at radius=0. Keep repeating this process with increasing radius (and cosine-decreassing density) till the array is as big across as you want. If the increments of radius are chosen properly the result will be a set of rings of elements. The end result is that more energy is collected from the center of the array and none from the edges; however the total diameter of the array will determine the angular size of the beams. This results in lower sidelobes with the tradeoff being a slightly wider beamwidth. The cosine function was mentioned as an example. There are actually other functions that could be used that would probably give better results.
--- JLB ---

From: Bob_Dixon@osu.edu
Subject: Re: Argus element placement

Argus will definitely use some illumination tapering method like that, but it could be done in several ways. Instead of physically tapering the element density, it could be done by downweighting the signals from the outer elements before combining them, by the same factors. Since the optimum tapering is a function of elevation

look angle, the computer will actually use a different algorithm for each elevation. If there are known interfering signals, the computer will also likely further adjust the tapering so as to keep nulls in those directions, separately for each beam.
--- Bob ---

From: Stuart A. Kingsley <skingsle@magnus.acs.ohio-state.edu>
Subject: OVER AND OUT

Tomorrow I am off to England. It will be all quiet on the Optical SETI front for the next two months, giving you plenty of time to digest ny recent uploads. Happy reading!
--- Stuart ---

From: James L. Bolinger <jbolinge@magnus.acs.ohio-state.edu>
Subject: Argus element tapering

Bob is right in that the elements could be weighted in software to achieve the tapering, but there is a fundamental assumption in doing this. And that is that the physical spacing of the elements is constant. This is undesirable because it can lead to grating lobes (to the uninitiated translate that as far-away sidelobes). To eliminate grating lobes you have to use uneven spacing. If you are going to use uneven spacing why not go ahead and use a spacing that also helps with the general sidelobe level.

Bob touched on another problem — that of the beams changing with look angle. This could be reduced by narrowing the array (in software) along the axis that is perpendicular to the azimuth with the amount of narrowing being proportional to the elevation angle. The result being that the array would be smallest when looking firectly at the zenith (broadside) and more elements would be added along the east west line (assuming you are looking along the meridian) as you approach the horizon. This could be combined with the weighting/spacing function, but I have not yet resolved how this would be done.

To clarify the cosine spacing function: The cosine curve would be scaled so that it

would equal zero at the maximum radius of the array and 1 at the center. It could be quantized so that the result would be a series of rings with increasing radius increments and possibly decreasing number of elements on each ring as the radius increases.
--- Jim ---

P.S. The differences in the beams with respect to look angle could be resolved in software by means of a deconvolution algorithm (similar to CLEAN) if the shapes of the beams were known.

From: Bob_Dixon@osu.edu

We got a nice note from one of our long-lost radobs people, Paul Ave. Here it is, for your info. --- Bob ---

Hello Bob,

I recently received a copy of the latest version of Signals. I'm glad to see that everyone is still working hard towards the pursuit of knowledge. I often reminisce of the times I worked at The O.S.U. RADOBS and I like to tell my colleagues at work about the things I learned there. I am very grateful of the opportunities you afforded me by allowing me to be a part of it all. O.S.U. RADOBS will always hold a special place in muy heart. I have been watching *"The Astronomers"*, and found it interesting that you said the overlays they used in some segments were created by the RADOBS. I knew that somewhere in that series that the RADOBS had to have played some part. I also found it interesting to see that the astronomers were using VCRs to collect their continuum data. I don't know if they were special in any way, but this was a suggestion Mark Selover and I had made some time back. I wonder if it still would be practical at the RADOBS. I also saw a mention from Herb Johnson from you about a new WWV clock.

Request from the Editor

If you have need of assistance in a job that you are doing for the observatory, or you have an update on a job that you are now working on, please let me know so I can post them here in Signals. I can be reached at my electronic address as ephillip.

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E-mail Webmaster

Designed by Jerry Ehman
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