



NAAPO (North American AstroPhysical Observatory)

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VOLUNTEER VIEW

HANSON GETS TAPE PROJECT WELL IN HAND

(ed. note: I asked volunteer Tom Hanson, who is performing the punch card-to-mag. tape conversion program, to explain the program and it's ultimate use. His response, which will be run in Signals in 3 parts, the first this month, speaks as much to data storage in general, now and in the future, as to the specifics of this project.)

The following is in Tom's own words:

It's all Tom Van Horne's fault? He's the one who cast the Radobs/SETI lure into the moving stream of my life, over and over again until I finally bit. So I came to the Tuesday night meetings at Dreese hall, and waited for someone to talk about something I could do.

Finally someone mentioned a roomful of punchcard data in the room next to Dreese-805 (where meetings are held every Tuesday night at 6pm). It turns out that most of those cards are 20 year old outputs from work done at Big Ear, when no tape drive was available to preserve data.

The idea of getting involved with a room full of dusty punched cards must have tickled my funny bone. While breaking into data processing, 20 years or so ago, I spent several years in operations. Many thousands of blank and punched cards have passed through a variety of unit record and computer peripheral equipment under my watchful eye, and when I finally made the transition to fulltime programming, I thought I'd never see another punched card.

The process of preserving one of these boxes of ancient observatory data can be described in a few words. The box is carried to Baker Hall where one of the few card readers left in the United States is enshrined. The box is split into 6 groups of cards, and each group is read into the reader a minimum of 2 times, and the separate runs are compared to be sure no cards were omitted or no characters were converted into mystery glyphs. When all 6 batches compare perfectly, a pair of magnetic tapes are called up from the OSU tape library, and their contents restored to disk. If the 2 tapes compare perfectly, then we know that the cards previously stored are still safe.

The new batch of cards is given a header, which consists of 20 lines of blank text

surrounded by asterisks. The comment header is then updated with whatever cryptic notes have been scribbled onto the top or front of the box.

The header and data are then processed by a fortran program, which computes the sum of the values of each of the 80 columns in each input record, and records the sum in a 100 column output record.

The 100 column output records are then combined with the records previously restored from tape, and the entire group is written back out onto the 2 magnetic tapes.

The checksums written out with the data will become important when (not if), one of the magnetic tapes fails to restore properly.

At that future time, it will be possible to establish which of the 2 tape files is still good, by re-computing the checksums, and accepting the tape which passes the test. Of course, that will also be the time when we replace the magnetic tapes.

---con't next issue---

Notice

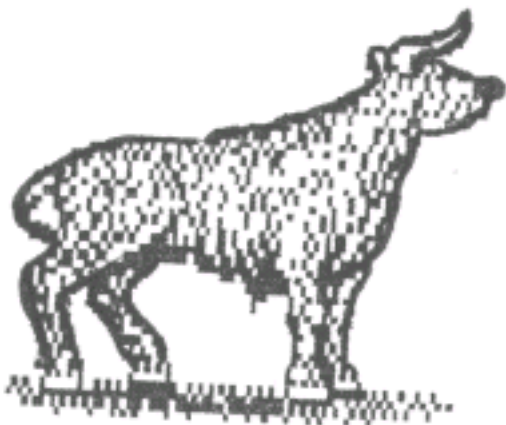
Please take note of the enclosed flyer announcing the impending symposium, fourth in the SCIENCE 2000 Series at Otterbein College.

This will prove to be a stimulating series with delightful, exciting personalities.

MARK YOUR CALENDARS

[Note. The text of the flyer is not included here because it was not available for reproduction.]

COORDINATOR'S CORNER



Fall term starts and panic sets in. At this sitting, we are two weeks into the term and I am just beginning to feel like there is a tunnel -- no light yet, but a tunnel.

Frustration abounds. The team shifts, jobs get done only fitfully, my time gets eaten alive, the budget stands at \$1900 and the request comes in to hold onto \$3000 - \$5000 to be sure we can paint the paraboloid next spring. I would smile, but my jowls are stiff.

It is great to see the large group of eager volunteers from Jones Middle School this fall. We will have a lot for them to do. As always we are glad to see Susan and Jim Snider keeping them excited and involved.

We expect an awesome year. It is my hope that more volunteers dig in and more ideas are pursued. Most of us have evolved patience. It is not always easy.

Meeting notes:

1 September 1990

--- EP ---

The meeting started at roughly 10 am. Those in attendance were: Bates, Barnhart, Phillips, Dixon, Pfister, Hurt, Mitchell, and Brown.

Barnhart reports that he has sent a letter to the manager of the golf course regarding the broken windows at the RO office building; he has received no answer thus far. There was some discussion regarding putting up a fence around the building to prevent this in the future. Dixon suggested speaking with Mr. Grogan, of Green Highlands, the development consortium in control of the grounds.



Dixon introduced Karen Pfister, who is volunteering to work on the KL transform

project. He also introduced Jim Hurt, who is a member of the local ham group. Jim will be taking some of the Foster grant to some of the hamfests in order to try to sell some of the extra stuff, with a 50/50 split of the profits.

Brown reports that he and Russ have been working on the receiver components. He has also built a breadboard to reduce the power output of the signal squirter.

Barnhart sent a letter to Bill Lonc, who built it, and has received no reply as yet.

The meeting broke up at roughly 10:45 am, with most going off to their respective tasks.

FUTURE MEETING DATES

OCTOBER 6

OCTOBER 20

NOVEMBER 3

NOVEMBER 17

DECEMBER 1

DECEMBER 15

All Saturday working sessions are at 10:00 AM in the conference room at the Radio Observatory. Everyone is welcome. Meetings last from 1/2 to 2 hours with tasks available after the meeting.

Mook; On the K-L Transform

A MODEL FOR INTERSTELLAR COMMUNICATION DEVELOPED

In response to a call in last month's Signals I have spent the last four weeks learning all I can about Karhunen-Loeve transforms and how this technique might be applied to the problem of interstellar communication.

Consulting with Bob Dixon, who is an expert on this matter, it was concluded that a complete as possible software model of an interstellar communication loop be designed. With this model we can not only test the KL transform as a detector, but also test all other aspects of interstellar communications.

FIVE SOFTWARE MODULES

The software model finally derived consists of five modules. Each module simulates an important, yet well defined aspect of interstellar communications. The five modules are:

RAND - This module simulates as closely as possible all sources of random fluctuations, including RFI. The output of this module is a data file consisting of an endless stream of random numbers suitably modified by known physical rules, i.e. Planck's curve for a thermal radiator, motions of the Earth about the Sun, etc. A random number generator will be used, but will not be the operating system random number generator since it is only capable of generating less than a million distinct numbers. As a result a portable random number generator, using floating point computations is under development.

SIGNAL - This is a simple program to produce sample signals which will be detected by a later model. This module is flexible enough to provide any waveform, or finite set of co-varying waveforms. With this module we can test the effectiveness of various encoding schemes. This takes Philip Morrison's idea of reverse encryption to a much higher level of sophistication. Again the output of this module is a sequence of numbers representing the chosen signal.

SUM - This module takes the output of the previous two modules and 'sums' them. What really happens is somewhat more sophisticated to reflect actual conditions under which a radio telescope operates. The outputs of the previous modules are amplitudes. This module squares these and convolves them (adds them vectorially) to produce a simulated received power. This module, as the others, has many whistles and bells. Here is where you can change the signal to noise ratio, detector sensitivity, and ultimately time domain stuff. The last is important in simulating a signal passing through a radio telescope's beam. Also, there are ways to simulate the strengths and shortcomings of a radio camera integration (yes there are weaknesses in radio cameras when viewed in the time domain). What we are trying to do here is provide a perfectly general module to simulate the effect of noise on a generally conceived detector. The output of this module, like all before, is a stream of numbers representing a signal 'buried' in realistic sky and receiver noise.

FILTER - This module inputs the data provided by the previous module. This is the module where we will be testing KL Transforms, Herault-Jutten Transforms, and any other far out idea Bob Dixon, or anyone else, may care to try out against our

well defined signal. The output of this module will be another list of numbers, suitably transformed, and hopefully reflecting something of the artificial signal introduced by SIGNAL.

DIFF - Is the fifth and final module in this quintet of programs. This is the most useful of programs because with it we can do something that can't be done with a real receiver, we can compare the output of the filtering program with the output of the signaling program to arrive at a measure of conformance with the actual signal. This will allow us to compare various filtering and signaling techniques by scoring them using various appropriate statistical methods. The initial method will use a simple difference and portable linear regression analysis. Later, if I get a chance to try some of my ideas about co-varying sources we may graduate to analysis of variance techniques suitable to multiple signals.

WHAT IS KARHUNEN-LOEVE, AND WHY SHOULD I CARE?

Karl Karhunen and Michel Loeve in the late 1940's developed a perfectly general technique for analyzing latent signals. This work is a part of latent analysis and is important in many sciences where you are trying to figure out what to measure as well as what the value is of the things you are measuring. The technique crops up in Artificial Intelligence, Self Organizing Systems, (software and hardware), Biology, Psychology, Sociology, Medical Research, Encryption and Decryption, and others.

The basic insight of K&L is that random values can be imagined as geometric quantities. You can then manipulate these values geometrically, and figure things out about them.

The KL transform treats random values as indices of a vector. Random values are independent of each other, so they appear orthogonal (right angles) to any non-random sequence of values. In practice what you're doing is getting a lot of numbers, crunching them through a set of well thought out formulae, and seeing if the result of the crunching is zero. (Note that the cosine of 90 degrees is zero). Any non-zero result heralds a non-random signal.

Herault-Jutten Transform is similar, but here once you get all your numbers into a geometric representation you map the vectors to another space where random values must be symmetric about the origin. So any non-symmetric (by translation or shape)

object must be non-random. This is great at figuring out the meaning of things that look random by their very nature.

Mook - Sept. 1990

RADOBS NOTES

Where-in we glean occasional comments circulating on the Radio Observatory E-Mail Bulletin Board---

28 Aug 90 17:05:45 GMT

Bob_Dixon@osu.edu

More CNN Fallout

As a result of the recent CNN coverage of our activities, I have been invited to give a major address on SETI at the annual National Congress on Aviation and Space Education, next April. This Congress is sponsored by FAA, NASA, and CAP as a means of educating primary and secondary school teachers about aerospace. About 1200 teachers will attend from across the country; the conference is in New Orleans.

Bob

27 Aug 90 12:35:53 GMT

Bob_Dixon@osu.edu

Progress on projects

Ever since the latest issue of Signals came out, I've had lots of people lining up to work on the various critical projects. Here is what we have so far:

RFI system — Dave Backus will take this over and make it work.

Rolled edges on reflectors — Tom O'Connor stopped by my house to say he will build and install the rolled edges, probably at no cost. He will do all the fabrication and welding, and thinks he can get donations for the materials. We must come up with the detailed design. We should start with the vertical edges of the parabola, where the diffraction is worst. Now we need someone to work with ESL and see if the horn edge design can be used as is, or whether something different is needed.

Tom is coming to our meeting Sept. 15. He also wants to buy some of our stainless steel hardware then.

KL Transform — Bill Mook and Karen Pfister are interested in this, and we will work jointly on it. I made further progress myself this weekend, and talked with Bill about it.

Argus Radio Camera — Steve Brown has continued his work and written an excellent progress report. More about that later.

Surplus sale — The local ham DX group has agreed to sell our surplus stuff at various hamfests, in return for 50% of the take. Dick Bennet is handling this and is supposed to call me to make arrangements. I think Findlay is next weekend, so he better move soon. I can give them access to what is at Delaware. Phil, can you give them access to what is still at Otterbein? We need suggestions for how to help set prices on this stuff, and how to keep records of what is taken, sold, etc.

Bob

Received:

from osumail.ircc.ohio-state.edu

by hpuxa.ircc.ohio-state.edu

with SMTP

(15.11/15.6) id AA13504; Tue, 28 Aug 90 12:04:17 edt

Return-Path:

<MIKE@aovax.naic.edu>

Received from fuzz-e-mail by pheml.ircc.ohio-state.edu;

Tue, 28 Aug 90 12:04: EDT

Received: from UPR1.UPR.CUN.EDU (UPR1.UPR.CLU.EDU)

by pheml.ircc.ohio-state.edu;

Tue, 28 Aug 90 12:04 EDT

Received: from aovax.naic.edu

by UPR1.UPR.CUN.EDU; Tue, 28 Aug 90 12:00 AST

From: "Mike Davis (MDavis@NAIC.EDU)"

<MIKE@aovax.naic.edu>

Subject: Synthesizers

Dear Bob,

Jill Tarter forwarded your sad message about the HP5105A synthesizer giving up the ghost. She asked if we had any kicking around in a back room somewhere that he could part with. What she is not aware of is the fact that we have even OLDER versions--HP5100A and B, with 5110A frequency standards, still in daily use. We still use these because they can switch frequencies much more quickly than the modern ones, which is an important consideration for radar work.

A few years ago we became concerned about using obsolete equipment in such a critical spot, and were able to buy some spares from a company called "Lectronics". I might be able to find the address, if you are interested. I would be carried out of here and roasted on a spit, however, if I were to let any of the ones we currently own leave the site!

Good hunting -- Mike

Is there Intelligence in Congress? Part II *by EARL PHILLIPS*

In the last issue of Signals, I promised to publish a list of the congress responsible for the SETI funding cut-off, as well as parts of the Congressional Record that attempts to explain the reasons for it. Following are excerpts from the record. As you'll recall, congress cited "proof" of ETI as the main reason for the funding cut. Here's what your congress had to say officially:

Mr. Machtley stated on record "Frankly, I would like to see a special terrestrial intelligence program in our schools and colleges in this country. We do not have to go into outer space to find minds and intelligence that need to be developed. In every state, in every city in this country there is intelligence, there are minds to be developed. Ask any parent who is trying to pay a tuition bill for their kids to go to college today."

Isn't it rather presumptuous to assume that, if we find ETI, we need to "develop" their minds, as Mr. Machtley seems to feel?

Mr. Conte stated on record "We shouldn't be spending precious dollars to look for little green men with misshapen heads."

Now there's an intelligent thought for ya!

Mr. Conte goes on to state that "of course, there are space aliens."

A Mr. Hefner states that "it has just been on the AP wire, they have located some extraterrestrial beams, and they're wearing striped coats."

Mr. Conte comes back to say "of course there are flying saucers and advanced civilizations in outer space. But we don't need to spend 6 million dollars this year to find evidence of these rascally creatures. We only need 75 cents to buy a tabloid at the local supermarket. Conclusive evidence of these crafty critters can be found at checkout counters from coast to coast. This article, Exhibit 1, from the Weekly World News, for example, describes how UFO's were poised to land at Chicago's Soldier Field during half-time at last year's Bears-Eagles game. They were scared off, though, by gridlock traffic of blimps, helicopters, and airplanes over the stadium." At this point, Mr. Conte submitted for official record this "proof" of ETI as part of the congressional record.

And it goes on and on. We have copies of 4 pages of the congressional record that continues on in this vein. There is talk of psychic communication on a regular basis with UFO crew members. There are pictures of Noah's Ark being brought to Earth for Noah, because he didn't have time to build it himself before the floods. Then there's the one about space aliens wiping out the Earth's frog population, cause they eat them and use them for research. So that's what happened to the frogs!

All of this is part of the official congressional record, and the reasons why the SETI funding was cut from the NASA budget. The real sad part is, these people actually believe this garbage! Why are we allowing these people to run this country? These people should be institutionalized, not running the country! If this situation is maddening to you, here is the list of those responsible. Write, call or visit them, and let them know how you feel!

House Appropriations Subcommittee

Bob Traxler

Louis Stokes

Lindy Boggs

Allan Mollohan
Jim Chapman
Chester Atkins
Bill Green
Lawrence Coughlin
Jerry Lewis

U.S. HOUSE OF REPRESENTATIVES
RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, D.C. 20515

Senate Appropriations Subcommittee

Barbara Mikulski
Bob Kerry
J.Bennett Johnston
Frank Lautenberg
Don Nickles
Alfonse D'Amato
Charles Grassley

UNITED STATES SENATE
HART SENATE OFFICE BUILDING
WASHINGTON, DC 20510

Patrick Leahy
Phil Gramm
Wyche Fowler, Jr

UNITED STATES SENATE
RUSSELL SENATE OFFICE BUILDING
WASHINGTON, D.C. 20510

Leaders of the Full Appropriations Committee

James L. Whitten
U.S. House Of Representatives
2314 Rayburn Office House Building
Washington, D.C. 20510

Silvio O. Conte
U.S. House Of Representatives
2300 Rayburn House Office Building
Washington, D.C. 20510

Robert C. Byrd
United States Senate
5128 U.S. Capitol
Washington, D.C. 20510

Mark O. Hatfield
United States Senate
711 Hart Senate Office Building
Washington, D.C. 20510

Meeting Notes:

18 August 1994

--- EP ---

The meeting began at roughly 10 am. Those in attendance were Barnhart, Phillips, Huck, Hanson, Childers, Brown, Dixon, Bates, Backus, Mitchell, Janis, Goodall, and Bill Garber.

Barnhart reports that 2 golf balls have gone through 2 panes of glass in the west meeting room. He has decided to hold those, and any golf balls rounded up around the RO office building hostage until the golf course personnel agree to repair the affected windows. Barnhart also reports that all the bags of paper trash have been hauled away.



Childers reports that he has written up a report on the movement and tracking abilities he has installed on the feed horn cart. He will now aim for a pre-print for publication. Childers also reports that he has been talking with Dr. Kraus re: Suitcase SETI. He may consider beginning work on it, though it was generally agreed that it has rather limited use here.

Dixon reports that he has sent a message to Jill Tarter regarding the death of our local oscillator. She has agreed to forward the note to the NRAO and Earl Jackson. The hope is that one or the other may be able to come up with a replacement. Dixon also has a copy of the CNN tape, anyone interested in a copy may contact him or Barnhart.

Brown reports that he has sold 2 batteries. There is a possibility that we will allow the local Ham radio group to take much of our excess inventory to the various hamfests, etc for sale, with a 50/50 split of the profits.

Hanson reports that he is continuing with the card-to-mag-tape project, and welcomes anyone interested in volunteering to help out. Hanson also reports that the PDP 11/44 project has continued. The tape drive is now functional. Further testing will follow, and volunteers are also requested to assist with this project.

Janis reports that the Development Fund is now in the red, with no foreseeable way out. A donation has historically been this fund's saviour, though none are predicted for this year.

The meeting broke at approximately 11:30 am, with most going off to their respective tasks.

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Designed by Jerry Ehman

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