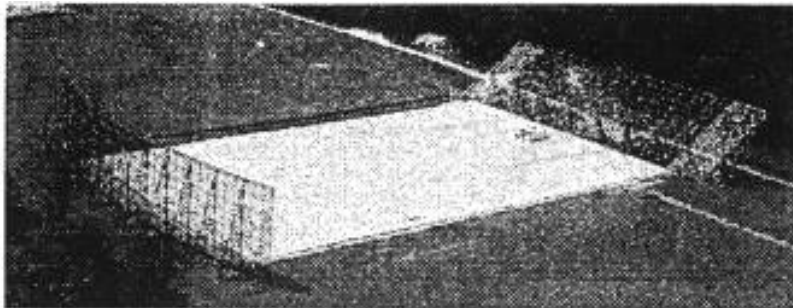




NAAPO (North American AstroPhysical Observatory)

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SIGNALS



Editor:

Earl W. Phillips, Jr.
7893 Thornfield Lane
Columbus, Ohio 43235
614-764-0476

NAAPO Coordinator:

Dr. Philip E. Barnhart
Dept. of Physics/Astronomy
Otterbein College
Westerville, Ohio 43081
614-823-1516 (NAAPO)
4655 Indian Ct.
Westerville, Ohio 43082
614-882-6711 (home)

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VOLUNTEER PROFILE

RO and NAAPO Bid Farewell to Steadfast, Loyal Volunteer

The Radio Observatory has lost a volunteer. With the death July 26 of Walt Mitchell we will miss the valued advice, counsel, volunteer assistance and committed support of a long time associate.

Walter E. Mitchell, Jr., native of Franklin MA served as a 2nd Lieutenant in the U. S. Army Infantry in W. W. II where he was wounded during the Battle of the Bulge. He graduated from Tufts University, the University of Virginia and obtained his PhD in Astronomy from the University of Michigan. In 1957 he joined the faculty of the Department of Astronomy at The Ohio State University where he served until his retirement in 1991.

His research activities extended over a broad range of interest anchored in solar atmospheric physics. He directed contract research in terrestrial atmospheric physics (stellar scintillation), stellar infrared irradiance and spectrographic instrumentation. He was a dedicated educator and popularizer of astronomical topics and concepts. He was a regular presenter and participant at meetings of the Great Lakes Planetarium Association.

It was my good fortune to work with Walter from my early days at OSU, first as a research associate and then as a PhD candidate under his direction and guidance. I developed a tremendous respect for him and found it virtually impossible to come up to his ideal for what a graduate student should be. He continually insisted that I keep the dissertation under 100 pages (certainly a self-defense move) and when my first draft came in at 176 pages he returned it with the suggestions of the other members of the committee and the request that the revised version be reduced below 100 pages. After all his most helpful suggestions and those of the other committee members were incorporated Walter was finally reduced to accepting my 244 page dissertation. I feel he has never forgiven me for that.

Walt was a regular contributor from the early days of NAAPO and helped on many occasions when work was needed or problems presented themselves. He brought talent and humor to the

working sessions and his warmth and friendship will be missed.

A lingering, progressive illness has kept him away from the week to week activity of the radio observatory projects, but he kept in touch and was always interested in the latest happenings at the RO. He tried to keep up with those activities he most enjoyed, his name was on the attendance list of the most recent Planetarium Association meeting in Pennsylvania. I fear he did not make that appointment. Walter was 70.

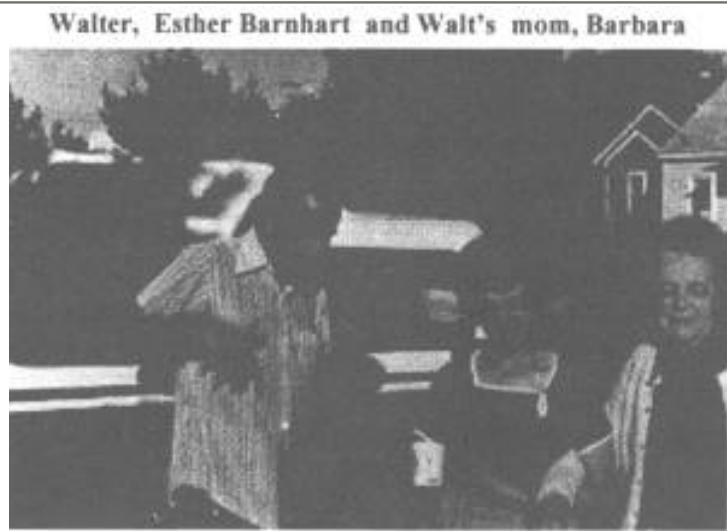
His friend and student.

Phil Barnhart

Photos



Walter swimming at Goose Rocks Beach, Kennebunkport
Maine, 1984



Walter, Esther Barnhart and Walt's mom, Barbara

COORDINATOR'S CORNER

By: Phil Barnhart

We've had it again. Someone is more interested in the Flag of Earth than they are the activities of the staff of the observatory. For the second time in three years we have suffered the pilfering of a nearly new Flag of Earth. The flags are not mounted on a standard flag pole with ropes and pulleys, so it is no simple task to get the flag down.

Since the flag flies continuously it is fastened to the top of an aluminum antenna pole with quasi-permanent clips. This time the flag AND the aluminum pole were taken.

Volunteers Paul George and Bob Tournoux pulled together a 20 foot section of antenna pole donated by Bob Dixon and a 4 x 6 foot Flag of Earth just purchased with NAAPO funds and erected a higher flying flag than what we had before. They then bolted the aluminum pole to the steel pole that remained following the big caper. My only fear is the new lever arm will cause

premature failure of the aluminum pole at its bottom during a strong wind. All volunteers keep your eyes open for a fallen flag. They are easier to steal than [?] flying flags.

A bit of general information is in order. As many of you know, I have retired from my position as Professor of Physics and Astronomy at Otterbein College. I still frequent the campus on an irregular basis and still use the Otterbein good offices to continue the operation of NAAPO. Some have found I am not as quick to respond to mail sent to Otterbein as I used to be. Some mail is even being misdirected within the college delivery system. I am therefore suggesting that if you wish quick response to communications involving me the chances are better if you send them to my home address. This address will be published regularly in SIGNALS along with the College address. Be advised that my wife and I are subject to sudden fits of travel and may not get our home mail for a few weeks. I will try to anticipate such absences and announce them so you will not be disappointed when I do not reply immediately.

We are off to Northern Michigan till the middle (or after) of August. This will cut us out of the Dixon Wingding. Ouch!

Philip E. Barnhart; 4655 Indian Court; Westerville OH 43082-8817; (614) 882-6711

Chief Observer's Report

August 19, 1996

Russ Childers

rchilder@postbox.acs.ohio-state.edu

The survey continues. The current declination is -17 degrees, zero minutes. This means that the survey, which started at +62 degrees, 20 minutes, and which will cover 100 degrees, is 79 percent complete.

To facilitate off-line analysis of SETI data, we have been making CDs of LOBES (LOW-Budget ETI Search) data. Ken Ayotte, our reliable CD-maker, has been out of school for the summer, preventing him from making CDs. Thanks to NAAPO, sufficient ZIP disks were purchased to store three CD's-worth of LOBES data. Since about one month's-worth of data can fit on a CD, we have spanned the entirety of Ken's summer vacation. Let's hope that Ken can find time, early in this his Senior year, to punch out some CDs.

On a 'related' note, Ken's dad, John Ayotte, reports that his place of business will soon have a CD writer. I look forward to having a whole team of Ayottes working for us on this important task!

Bill Brown has resumed his SERENDIP observations. Since LOBES and SERENDIP cannot observe simultaneously, it is necessary to shut down LOBES for SERENDIP to run. This is a small sacrifice to make, because SERENDIP is looking for much narrower signals than LOBES

could ever hope to observe. Current SETI theoreticians postulate that civilizations would most likely use ultra-narrowband signals as radio beacons, since these would be obviously artificial in origin and would be easy to transmit. SERENDIP is designed to detect signals as narrow as 0.6 Hertz. No natural sources can make radio waves do this. LOBES, on the other hand, detects sources only as narrow as 10,000 Hertz. With both of these systems running, we are covering a much larger search space than most other SETI surveys.

The RFI (Radio Frequency Interference) survey has recently come back to life. Michael Brooks, a past Big Ear volunteer and current OSU graduate student, is conducting RFI data collection as part of his thesis work. Mike runs the data collection while SERENDIP observes, because LOBES uses the same communication receiver that the RFI system uses. Eventually, the RFI system will run full-time, allowing LOBES to use the receiver when it needs to record a (potential) message from ET.

This RFI survey is important to conduct. We need a catalog of interfering signals so we can reject them from LOBES and SERENDIP 'hits'. We might even be able to reject interference up front, during the time of observation, eliminating wasting time on tracking a signal known to be local interference. Mike hopes to have a modified RFI system running full-time by the end of the summer.

Summer brings hazards to changing the declination, just as does winter. During the cold months, ice forms on the flat reflector, locking up switches needed for moving the reflector. Ladders get icy and hazardous for climbing when I need to free these switches. Summertime, however, heralds the coming of dive-bombing wasps. These creatures of nature thrive in the hut used to house the flat reflector-moving controls. Every week, when I change the declination setting, I can expect a new brood of nervous wasps, circling inside the hut. Every week, I spray the inside of the hut with insect killer, and the wasps get the heck out of there! However, sometimes they discover the source of the offending spray, and come at me with a vengeance. An observer would be amused to see me from afar, running and spinning, spray can in hand, away from these tiny, unseen attackers. It is truly Nature's revenge on the unnatural activities brewing at the OSU Radio Observatory.

Saturday 6/1/96 Meeting Report

By: Tom Hanson

A very official looking US Government vehicle was parked by the Perkins Observatory entrance to the Radio Observatory drive, when attendees arrived for this meeting. Many of us had attended the new movie "The Arrival" on the previous Thursday evening, so it was disconcerting to see a group of military officers in full combat attire, walking about the grounds.

It turned out this was a group of Signal Corps officers who had contacted Dr. John Kraus some time ago, about visiting the Observatory. They had been advised to visit when the weather would

be agreeable, but no specific date had been set.

In addition to the military officers, there were several other guests in attendance. A list of attendees should include: Greg Charvat, a student who is a candidate for possible summer intern activity at the Observatory. Rita Charvat, chauffeur for Greg, Bob Tournoux, Frank Amore, Jody McKean, Dr. Dixon, Dr. Barnhart, Don James, Russ Childers, Jerry Ehman, Dan Fleisch. Military officers: Brian Matthews, Theodore Trueman, Jarrett Jumper, Chuck McConkey, James J. L. Kurash, Robert Shea, Myron J. Baughman, Steve Brown.

Dr. Dixon's opening monolog included: Introductions of our guests and Observatory personnel. Marilyn McConnell-Goelz had loaned a mystery novel featuring a radio astronomer to Dr. Dixon, and he had finished the book. There was a discussion of the movie "The Arrival". Garrison Keeler is coming to Columbus. A member of the planning staff contacted Dr. Dixon, and they had a total of three conversations. Dr. Dixon was asked to provide humorous stories. There were a number of topics under the "Argus" heading. Prominent among these was a letter from Nathan (Chip) Cohen, PhD. There was a letter from the Myers Machinery Movers company, offering to move Big Ear, but the prospects for funding for such a move appear slim at best.

Dan Fleisch was asked to write a sidebar on antenna measurement for the "Journal of Electronic Defense". He took this opportunity to mention Argus in his correspondence with the editor. Jerry Ehman brought a copy of the June 1996 issue of "Popular Mechanics", in which Big Ear is mentioned, along with a photograph. The article was reported to be well written and informative.

Russ Childers reported that the telescope is receiving from minus 12 degrees 20 minutes. The current survey is 75% complete. Russ also brought up a possible problem with equipment in the focus room. He noticed that the level of air conditioning seems to be having an effect, and he had to raise the temperature to compensate. Later on, Russ and Steve Brown discussed the problem, which may have to do with improper operation of an oven designed to hold a crystal at a fixed temperature. Russ has observed a known point source, which confirms that equipment is continuing to function properly.

Ken Ayotte has made another set of CDs of current survey data. There was a discussion of the need for a CD writer for the summer, when Ken will not have access to the school equipment. The most attractive possibility would be for Ken to be given access to the Ohio State University CD writer, first used by Raul Ordonez when he made the Card Project CD.

Don James has returned from volunteer duty with the Red Cross. This time his service was in Arkansas, where a severe tornado caused significant damage. Don inquired about whether the truck should be given attention, and it was decided to wait until the truck is actually needed. Russ commented that a woodchuck appears to have made a home in or under the truck, and that there is a pool of what may be anti-freeze under the truck. Don's inquiry led to an extended discussion of the impending end of Big Ear. Russ Childers made an impassioned plea for an attempt to extend

the life of the facility beyond the last day of 1997. Dr. Dixon reported that the Interstate 73 proposal has withered, under change of management, and he does not anticipate any further efforts to try to force this route into being. However, he warned that citizens must be ever vigilant! Steve Brown took part in a discussion of a suggestion that the Observatory set a goal of publishing results of the current survey in a refereed journal, before the end of 1997. Steve estimates the lag between submission and publication as up to a year, so that if the 1997 deadline is to be met, then material should be submitted by the end of the current year.

After the meeting, Jody McKean expressed an interest in helping with several current needs. Bob Tournoux and Frank Amore were in attendance because they are interested in using the Observatory Grounds for a Radio Amateur event, on the last weekend in June. Russ Childers volunteered to assist with access to the facility.

Saturday 6/15/96 Meeting Report

By: Tom Hanson

There was a nice turnout for today's meeting. The mood was even more upbeat than usual, and there was a good deal of hearty laughter. The Open House brownies made several circuits of the table, and there may even be a few left for next meeting.

Mike Brooks announced that he and his wife have a new baby girl.

Attending were: Dr. Barnhart, Steve Brown, Dr. Dixon, Ang Campanella, Don James, Cindy Brooman, Earl Phillips, Mike Brooks, Jerry Ehman, Jody McKean, John Ayotte, Ken Ayotte and Mark Sundstrom.

Guests from the ABB Amateur Radio Club included Paul George and Bob Tournoux. This report begins at 10:20, after Dr. Dixon's opening monolog.

Don James reported that the clutch is fixed on the crane. Don introduced the topic of preparing for Big Ear's transition at the end of 1997, and inquired once again about the merit of repairing the truck. He confirmed that an animal has taken up residence in the truck, as previously reported by Russ Childers. Steve Brown asserted we should wait to see if the truck would be needed, but Don pointed out that NAAPO has invested in a battery and radiator repairs.

In the absence of Russ Childers (who arrived after the meeting was over), we did not get to hear Russ' impassioned plea for keeping Big Ear going past the deadline of 12/31/97. Cindy Brooman said she would be sending a file for Signals to Earl Phillips that day.

Earl Phillips announced discovery of a superior satellite tracking program, and he passed around examples of its output. The new program shows when satellites are in the earth's shadow, which is a valuable feature not included in the program which Earl used to predict MIR passages until

now. The program is shareware for Intel architecture, according to Earl.

Mike Brooks contacted Russ Childers and Bill Brown about the RFI project he has undertaken.

Jerry Ehman passed to Jody McKean, who reminded us she is a new member and she is interested in going to work. This prompted Dr. Barnhart to deliver a copy of the Radobs mailing list to Jody. In addition, Steve Brown promised to send a copy of Steve Janis' membership list, which still resides on Magnus.

Dr. Dixon then introduced Jody to Mark Sundstrom, as a physicist, astronomer, and Mac owner. John Ayotte reminded us the Ayottes are Mac owners, and Bob Tournoux then announced he too is a Mac owner. The Mac community within Radobs is small but spirited!

Ken Ayotte is continuing to scan the galactic plane with his award winning radio telescope. He brought up the topic of non-availability of the CDROM writer he has been using at school, and a number of ideas were suggested. The most attractive option appears to be use of the CDROM writer at Ohio State, but several other options are under investigation.

Mark Sundstrom has returned from extensive travels. He has been preparing current survey data for presentation on a Web site. Although Mark said he had no specific web site in mind at the moment, there was a discussion of possible web sites, including BigEar.Org. Dr. Barnhart agreed to contact Dr. Kraus regarding use of the Big Ear name for this purpose. Cindy Brooman tentatively indicated she might be willing to host such a site. It was agreed that a new site such as BIGEAR.ORG would not interfere with other sites such as Dr. Klein's site at OSU, but instead would complement such sites by point to them.

Dr. Barnhart announced that NAAPO is able to fund Dr. Dixon's forthcoming trip to the Netherlands.

Greg Charvat will begin an internship with Dan Fleisch's company on June 23rd. Dr. Barnhart will provide accomodation for Greg at Otterbein, in return for a committment of some of Greg's time to benefit the Observatory. The transition from Magnus to Homenet is proceeding at the Barnhart household. It would not be accurate to say the transition is challenge free.

Ang Campanella agreed to work on the Pert Chart for Argus, in response to Dr. Dixon's recent list posting about a minimal starting Argus concept. The ABB Radio Amateur club will be holding a field day at the Observatory site on the weekend of June 22nd and 23rd. As a reminder, the ABB company is a descendent of a company started by George Foster, who generously supported the Observatory.

Saturday, 7/6/96 Meeting Report

By: Tom Hanson

There was a nice turnout for today's meeting. Jody McKean, Mike Brooks, Russ Childers, Dr. Barnhart, Ang Campanella, Earl Phillips, Cindy Brooman, Bill Brown, Jerry Ehman, and Steve Brown were present. In addition, we were joined by a native of Alaska, John Henry, who informed us he hails from the Bering Straits.

In the absence of Dr. Dixon, we dove right into the reports. Cindy Brooman passed around an article discussing Microsoft modifications of Java to facilitate its use with Windows 95.

Bill Brown has been taking data with Serendip. In response to an question, he said that his thesis will discuss use of pattern recognition to pull data from noise. Bill is able to use the Big Ear systems from Thursday, when he activates Serendip, until Russ Childers arrives on the weekend.

There was a discussion of the conflicting requirements of Serendip with respect to LOBES. Lobes requires a frequency of 80 Hertz for switching between the two feedhorns, while Serendip requires a switch every 1.2 seconds.

Bill confirmed that the Local Oscillator power supply had been repaired.

Jerry Ehman once again affirmed his endorsement of the movie "Independence Day".

Jody McKean informed us she can be reached via CompuServe, at 72164,3264. Jody's complete email address is 72164.3264@compuserve.com.

At this point in the meeting, a discussion point led to the announcement that Dr. Walt Mitchell has taken residence at a managed care facility in Columbus. Dr. Mitchell has attended astronomical conferences recently, and is reported to be getting along reasonably well.

Russ Childers opened his report with the news that his turtles are still swimming around without much evidence of egg laying, and that one of the males has shown Olympic prowess at escaping his aquarium by climbing on the top of his roommates. The telescope is taking signals from declination minus 14 degrees, 40 minutes. Russ is still waiting for a resolution of the CDROM creation problem, as of July 6th. However, recent messages since then offer hope a solution may be found before the next meeting. Russ has Zip disks ready for dumping to CDROM. Russ also asked us to keep in mind "Point Zero", which he said is a term to remember.

Mike Brooks has been studying Fortran code relating to RFI data. He is working on a C program to analyze Serendip data. Steve Brown's name came up at this point, with respect to assistance with a power supply for GASFET amplifiers. Steve was not present. His arrival later on was

preceded by the activation of the air conditioning system. Mike's report led to a discussion of issues of using data from the Serendip system in conjunction with the RFI system. Mike offered a possible payoff for his current project, by allowing Serendip and Lobes to run simultaneously, by eliminating the need to switch between the feed horns.

A possible web site for 'BigEar' must await communication between Dr. Kraus and Dr. Barnhart.

Dr. Barnhart reviewed funding issues relating to NAAPO, in response to a question about an article which appeared in a recent "Signals". Not all information about the business of the Observatory is reported in Signals, so it is possible for an individual reader to obtain an inaccurate impression.

Steve Brown arrived amidst cool air from the restored air conditioner, and he responded to questions about an Argus prototype. He maintained that an Argus prototype would get along quite nicely with only one general purpose computer, such as a Sun workstation, and that 12 bits of data from A2D chips would be adequate. Steve's arrival precipitated discussions about the design of an Argus prototype. Steve suggested goals for an Argus prototype of achieving 100 elements and 1 degree resolution. The prototype frequency range would be 400-600 MHz. The next meeting will be held July 20th, anniversary of the lunar landing by Apollo 11.

Saturday Meeting Notes for 7/20/96

By: Tom Hanson

A month has slipped by since these notes were taken. It is August 17th, members and friends of the Radio Observatory have gathered at Judy and Bob Dixon's home on Klondike Road, the sky is blue with occasional drifting clouds, and the temperature is a mild 84 degrees. We have just witnessed feeding of the large number of catfish who have enjoyed the quiet waters of the Dixon pond for a couple of years. The pond also contains some bass, and a variety of fish which feeds on weeds along the shore.

There was a full house in attendance for the meeting of July 20th. The 27th anniversary of the Apollo Moon landing was duly noted. Dr. Dixon, Dr. Barnhart, John and Ken Ayotte, Jody McKean, Bill Brown, Bob Tournoux, Paul George, Jerry Ehman, Mike Brooks, Earl Phillips, Cindy Brooman, Russ Childers and Steve Brown were present. In addition, we were joined by Greg, a summer intern. And we were joined by a guest, Jian Yi. Jian Yi has a BS in Astronomy.

October 12th is proposed for the next Big Ear Open House.

Dr. Barnhart will be away for the next two meetings. He will be exploring copper mines in the Upper Peninsula of Michigan.

Greg tested the GASFET amplifier which is intended for use in the noise detection system.

Jerry Ehman has been corresponding with Herb Johnson about the difference between Jerry's computation of the strength of the WOW signal, and that computed by Russ Childers. The temperature of the noise source plays a significant role in each computation. Russ used a value of 5, and Jerry used a value of 1.3. If 1.3 is used for Russ' computation, then his results would become very close to Jerry's. The next phase of this investigation will be to try to determine which noise temperature value should be used. It appears that both figures are found in documentation from the time of the WOW signal. In a later report, Russ found the figure "5 K" on a continuum record from the day WOW showed up.

Mike Brooks is working with Greg and with Steve Brown. He plans to run the original Fortran program to find out if it sees data.

Cindy Brooman has completed application for the BigEar.Org name on the World Wide Web. She has activated the name with a pointer to existing sites which contain Big Ear related information.

Russ Childers announced that the telescope is positioned at minus 15 degrees, 20 minutes.

Dr. Dixon met novelist Bob Ciaffone, who is writing a SETI story based on Big Ear. It appears the story will reflect the author's imaginative powers. We were reminded that Joe Mitchell is leaving. No one has stepped forward to take Joe's place, and this is a crisis for the Observatory. The 'Millennium Project' is an idea sponsored by William Shatner. The concept appears to be to solicit contributions from citizens, for the purpose of sending a message out from earth. Dr. Dixon sent email to a number of people about this idea, and received a variety of responses.

Dr. Dixon gave an interesting report on his recent trip to Capri to attend a BioAstronomy conference, and to present his evolving paper on Argus. His report will be covered in a separate message.

Steve Brown spent part of the previous weekend troubleshooting the RFI power system. Mike Brooks has renewed Steve's interest in this system. In addition, Steve has spent considerable time investigating beam forming as it might be done using the Serendip system. He performed a study based on 2000 elements in a linear array, and stated that 200 elements is a computational crossover point. Steve tested removing elements down to 10, which was the number of elements in the Mark 2 Argus (Bolinger). **[Actually, Jim Bolinger's array had 8 elements.]** Steve said that the FFT process strongly encourages spacing of antenna elements at 1/2 wavelength intervals. John Ayotte suggested planning for 1000 elements and starting with 100. Dr. Dixon suggested that Steve's analysis of the SERENDIP tool represents a possible argument for using a general purpose computer for flexibility. There was a discussion of the difference between a full Fourier Transform versus the Fast FT, which throws away some options for the sake of speed. The SERENDIP system is capable of performing a 4,000,000 point FFT, while a general purpose

computer might be capable of a 10,000 point FFT.

Galileo Spacecraft Encounters Ganymede

PASADENA, June 27 (Reuter) - The spacecraft Galileo Thursday made a close encounter with the largest of Jupiter's moons, Ganymede, marking the beginning of a grand tour of the giant planet.

Galileo made its first fly-by of Ganymede, coming within 524 miles of the planet-sized hunk of ice and rock, at 2.29 a.m. EDT. Confirmation of the fly-by was received at the Jet Propulsion Laboratory (JPL) from the spacecraft at 3.04 a.m. EDT Thursday.

Pictures of Ganymede, which is bigger than the planet Mercury and three-quarters the size of Mars, are expected to be received back on Earth in a steady flow over the next few days, JPL spokesman Frank O'Donnell said Thursday.

Pictures of the Jovian moon will be released by JPL, which is run by the National Aeronautics and Space Administration (NASA), on July 10.

To celebrate the fly-by — the first of many over the course of the next two years — the Galileo team of scientists and their friends and families were treated to a party at JPL. Cheers went up from the 250 party goers as confirmation of the fly-by was received.

"It was an exciting moment for everyone. Some of these people have dedicated most of their careers to this project," O'Donnell said. Galileo was conceived in the early 1970s and given the go ahead by Congress in 1977.

With a diameter of 3,269 miles, Ganymede is the largest moon in the Universe and has many Earthlike geological features, such as craters, large valleys and mountains. Galileo's instruments started taking continuous measurements of the moon Sunday as the spacecraft approached Ganymede.

A probe from the two-and-a-half-ton spacecraft successfully entered the Jovian atmosphere on December 7 and transmitted data for about 45 minutes before burning up as planned in the planet's gaseous environment.

Galileo's epic trip through space has been likened to a journey to the beginning of time because Jupiter's atmosphere has changed less than that of any other planet in the solar system and the spacecraft is gleaning information that could help scientists learn how the solar system began.

Galileo will also have close encounters with two other of the planet's four largest 16 moons,

Callisto and Europa, during its two- year odyssey before its orbit fails and it plunges into the Jovian atmosphere and burns up.

Named after the Italian astronomer who discovered Jupiter's four largest moons in 1610, Galileo was launched from the space shuttle Atlantis on October 18, 1989, on a tour of the universe that took it close to Venus and brought it back to near Earth twice in slingshot maneuvers to give it the impetus to get to Jupiter, 389 million miles away. The project so far has cost \$1.5 billion.

GALILEO MISSION STATUS

June 25, 1996

NASA's Galileo spacecraft proceeded toward its first close flyby of Jupiter's big moon, Ganymede, scheduled to occur at 6:29 a.m. Universal Time on June 27, 1996 (11:29 p.m. on June 26 Pacific Daylight Time). One-way light time from the spacecraft to Earth at that time will be 35 minutes, so the spacecraft's signal showing that the closest approach has occurred will be received on Earth at 12:04 a.m. PDT June 27.

Initial observations of the Io plasma tours by the ultraviolet experiment are complete and the first remote observations of Io by the camera were done today. Tomorrow, Galileo's instruments will be looking at both Ganymede and Jupiter's Great Red Spot.

Yesterday afternoon, Galileo's energetic particle detector (EPD) was autonomously turned off by the spacecraft and placed in a "safe" mode. This is a standard safety feature built into the particle detector's operating software and is triggered if the instrument's own computer detects that any one of a number of readings are above or below pre-determined limits. The automatic turn-off allows EPD engineers to search for the cause of the anomaly and determine whether the instrument can safely be turned on. To avoid interfering with the Ganymede encounter sequence now being executed by the spacecraft, Galileo engineers have decided to leave the EPD instrument off until at least a day or two after the Ganymede flyby is completed. Meanwhile, engineering data being received from the spacecraft may point toward the problem that initiated the instrument's automatic shut-off. No other scientific instruments are affected and all of Galileo's other observations are proceeding as planned.

The EPD is one of several instruments on Galileo that measure Jupiter's magnetic fields and particles. Systematic measurements of the Jovian magnetic environment and particle population began on Sunday. The instruments will continuously send data back to Earth during Galileo's close passes of Jupiter, the moons and from other specially chosen locations within the planet's magnetic environment.

Today Galileo is 1.3 million kilometers (862,000 million miles) from Ganymede and 627 million kilometers (389 million miles) from Earth.. One-way communication time is about 35 minutes. Galileo is approaching Ganymede at a speed of 16 kilometers per second (30,900 miles per hour).

Random Thoughts

PEB

As the reality of the need to vacate our present site by the end of next year soaks in several things come to mind. Saving the present instrument is not uppermost in our thoughts. Though it is not an instrument without use it is unlikely anyone will be willing to move it to a new site. Cost of relocating an instrument of this magnitude will approach the original cost of the instrument.

Revitalization of the instrument in the manner of the Hooker 100-inch telescope at Mount Wilson, mothballed some years ago, by installing state of the art new technology detectors, has not to this time worked with Big Ear. The 100-inch instrument will be searching through the Los Angeles light polluted skies for evidence of non-stellar companions of nearby stars. This is a task not unrelated to Big Ear's search for evidence of advanced technologies beyond our solar system.

Clearly the more efficient approach to pursue in forced eviction is development of a feasible, step by step, project that can be developed in a new location and at the same time provide innovation and potential payback in future science and technology. Project ARGUS (not to be confused with the general skywatch effort proposed by the SETI League bearing the same title) fits this bill quite well. For the time being we are, as it were, one leg up on the competition. Jim Bolinger demonstrated the concept and feasibility nearly a decade ago. Steve Brown is carrying on the theoretical work and we are ready to start testing and constructing receiving elements and amplifiers for the new system.

A search is under way for a convenient site. We are hopeful that we can find a suitable location before the winter is over. We will also be seeking volunteers to provide moving gear and the trucking equipment necessary. Keep those ideas and acquaintences primed.

As we go to press, Hob Dixon is returning from Holland and France filled with enthusiasm and ideas. It appears the rest of the world is more easily excited about the prospects for Radio Astronomy and new technology than the research people at Ohio State. We look forward to the thorough debriefing Bob will undergo in the next few weeks.

Our joint summer intern, Greg Charvat, headed back to his home in Grosse Pointe, Michigan following eight weeks of shared effort with Dan Fleisch and the RO volunteers. Greg is a high school junior who, with a group of interested classmates, has constructed a radio telescope for use by the school. His interest in and ability with electronics attracted Dan to him last year. NAAPO helped Greg out with some housing and in return received help during the summer with amplifier testing and calibrating.

Greg says he is interested in returning next summer and is looking forward to some receiver/amplifier fabrication for the ARGUS Array. We look forward to having him aboard for some more fine collaboration. (Thanks, Dan, for sniffing him out.)

We have instituted a Web site using the name BIG EAR This is an attempt to preserve this name for future use and protect it from being picked up by other disinterested users for other purposes. We will begin to fill it with pleasant information indicating our intent to carry on the name to the next generation of radio telescopes carrying out the programs and activities inspired and encouraged by Dr. Kraus. The name will always be associated with the pioneering work carried out by John from the very early days as a new faculty member at Ohio State University.

Plan to visit the Web site just to say hello.

At our 7 September working session it was decided to postpone the next open house at the observatory till adequate publicity can be assured. We did not feel we were sufficiently prepared to put together an adequate open house for the month of October. We are a bit fearful of the colder weather of November so it is likely we will await the warmer time next spring.

Plans are beginning to take shape for a possible nostalgia auction to benefit the program of the observatory and help launch our new venture into radio astronomy by large array.

Please Note:

Our mailing list sometimes becomes ragged. We have had quite a few on the list move without informing us of their new address. Sometimes we do not receive the new address from the post office people when they return the mail. But, we do have to pay the return mail postage!

Please check your mailing label on the envelope and let us know of any changes needed. If you decide to leave town, try to let us know before we send an unforwardable copy of SIGNALS.

I would also welcome a volunteer to take over the mailing task for the Newsletter.

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Designed by Jerry Ehman

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