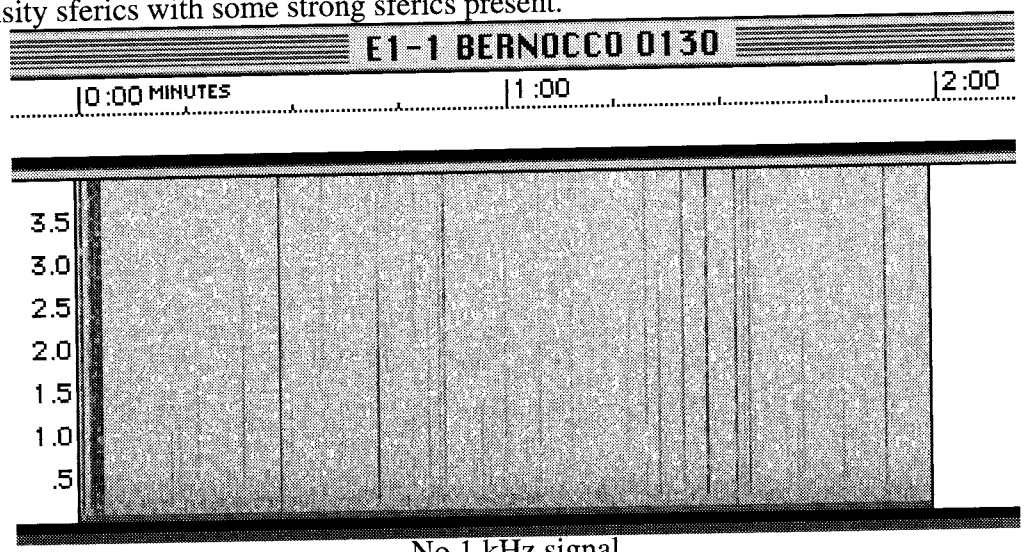
E1-1

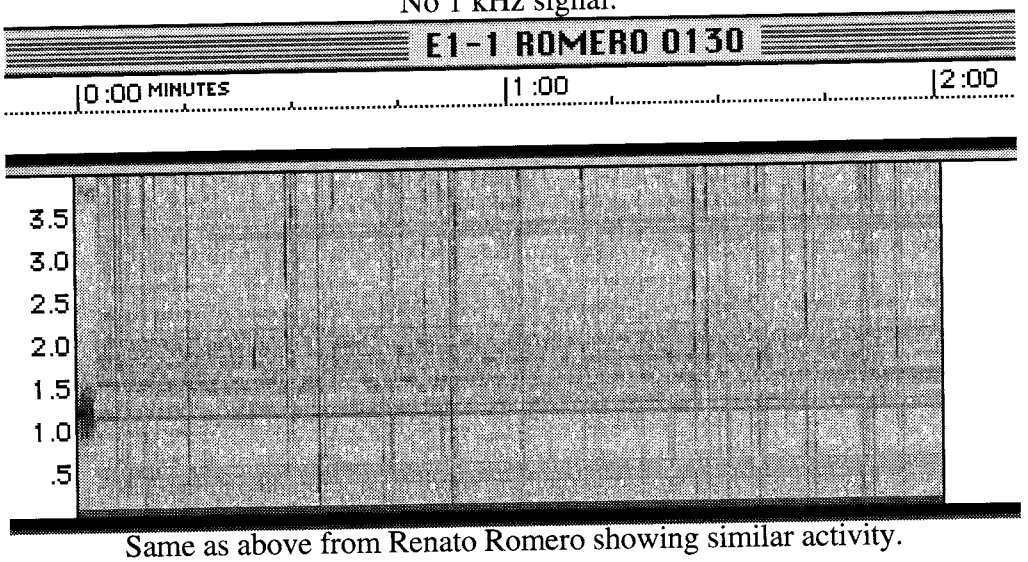
Silvio Bernocco, Vaccera, ITALY

Team E2

Low density sferics with some strong sferics present.

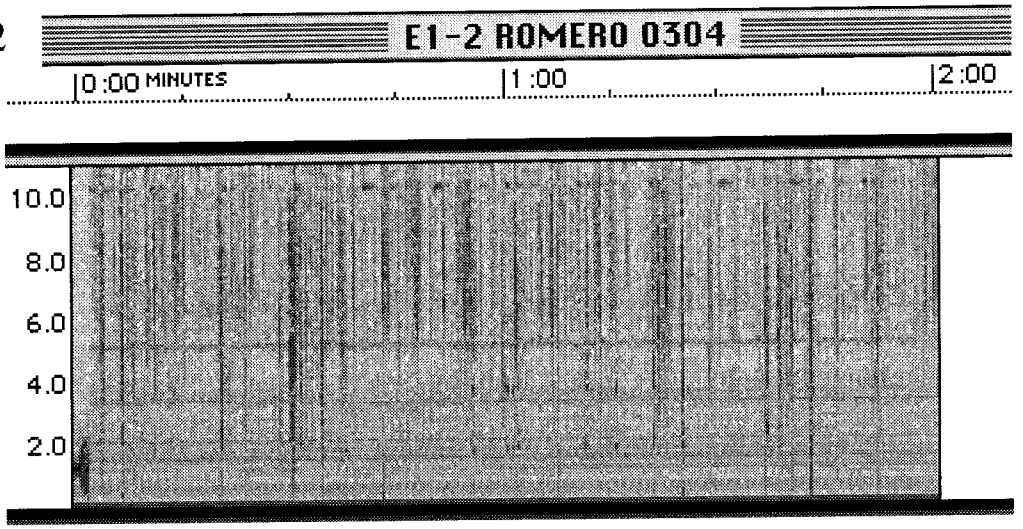


No 1 kHz signal.



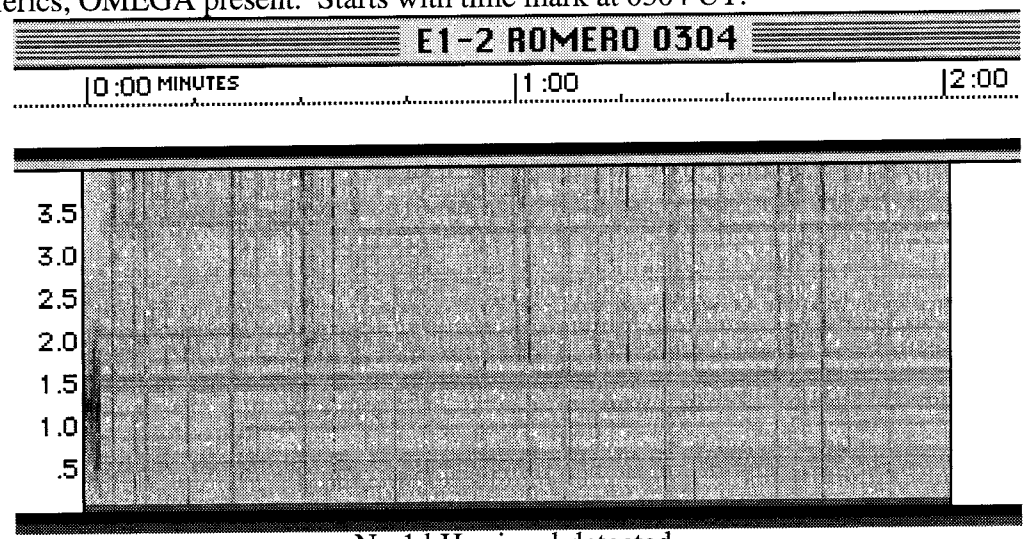
Same as above from Renato Romero showing similar activity.

E1-2

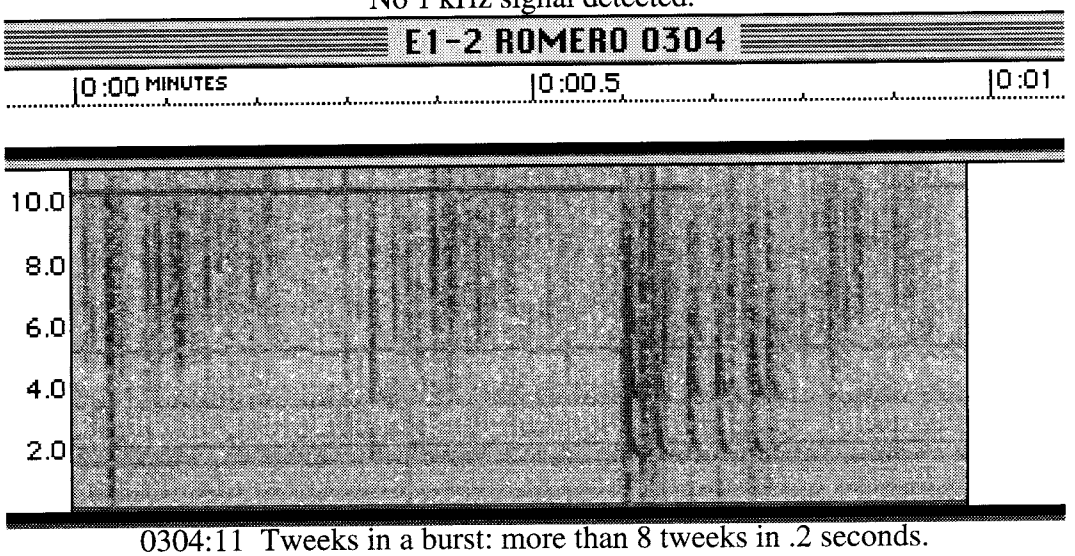


Renato Romero, Cumiana, ITALY Team E5

Dense sferics, OMEGA present. Starts with time mark at 0304 UT.

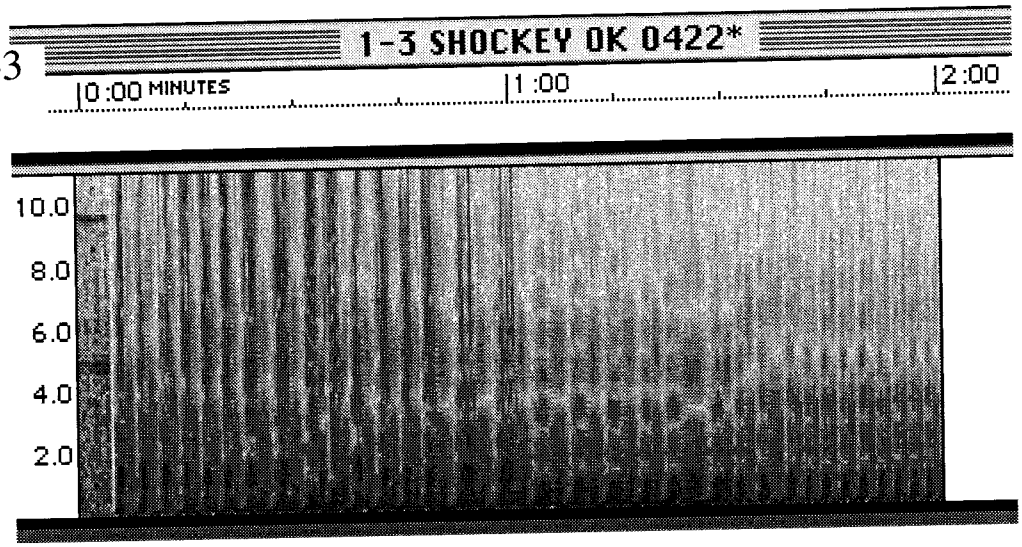


No 1 kHz signal detected.



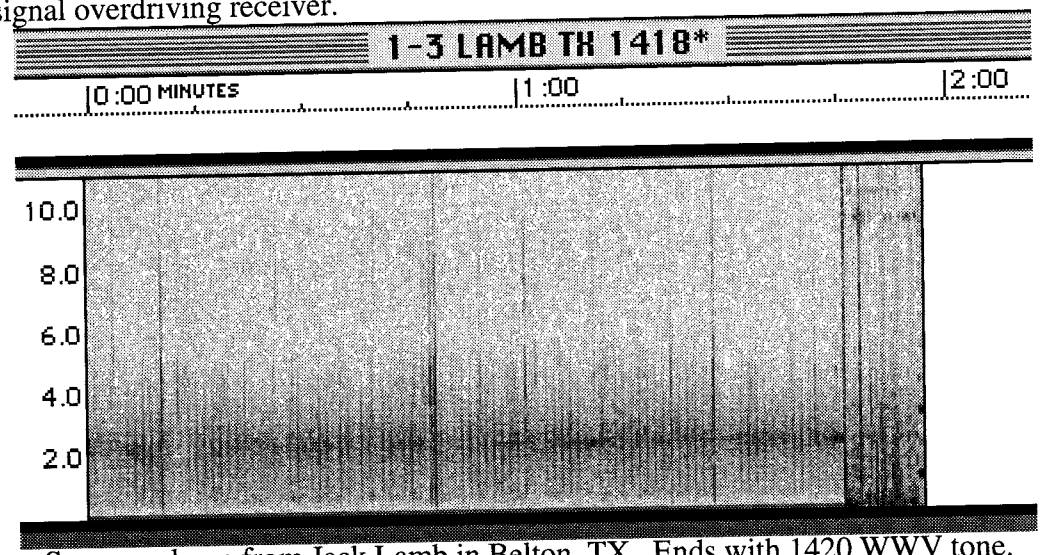
0304:11 Tweeks in a burst: more than 8 tweeks in .2 seconds.

1-3

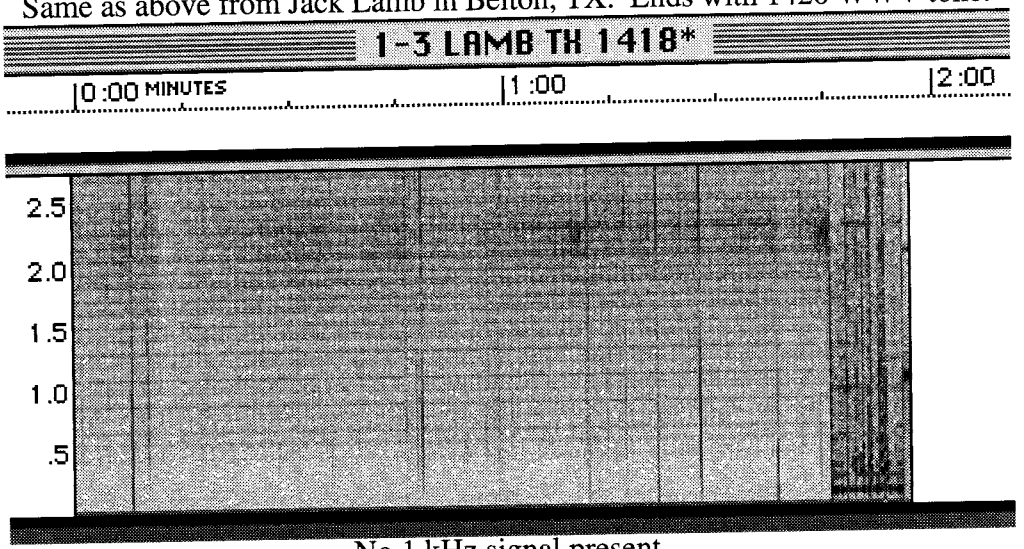


Don Shockey, Oklahoma City, OK
Strong signal overdriving receiver.

Team 3

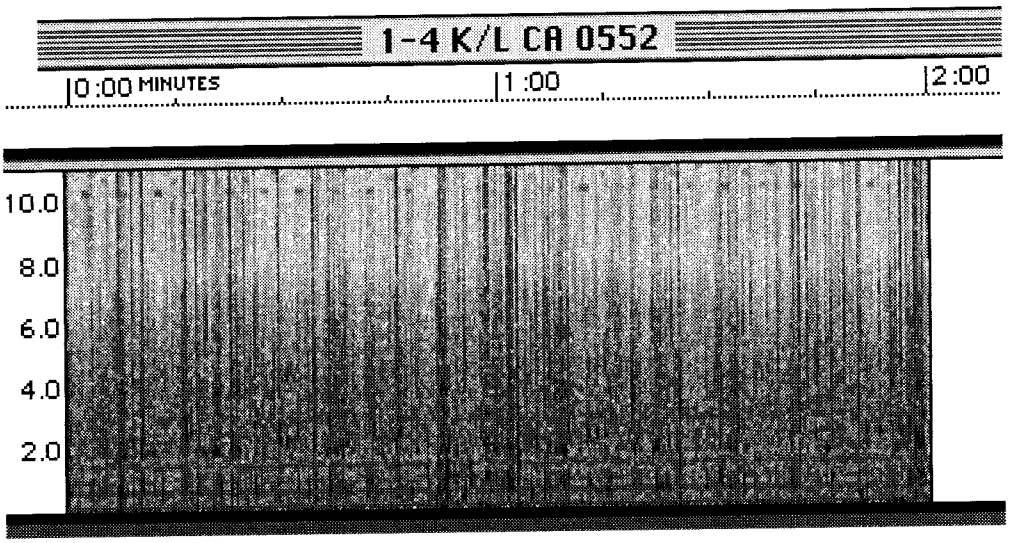


Same as above from Jack Lamb in Belton, TX. Ends with 1420 WWV tone.

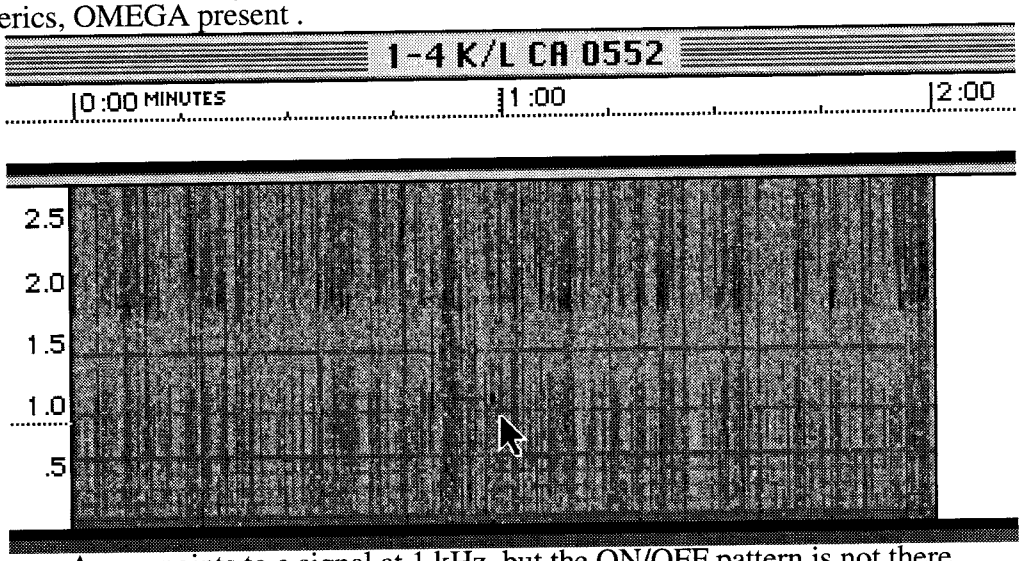


No 1 kHz signal present.

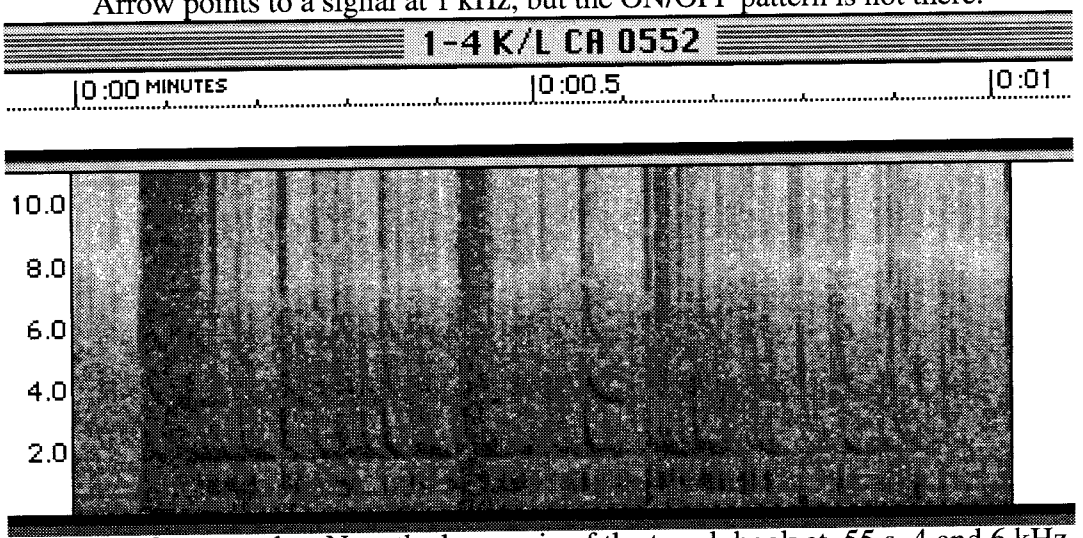
1-4



Larry Kramer/Clifton Lasky, Fresno, CA Team 19
Dense sferics, OMEGA present .

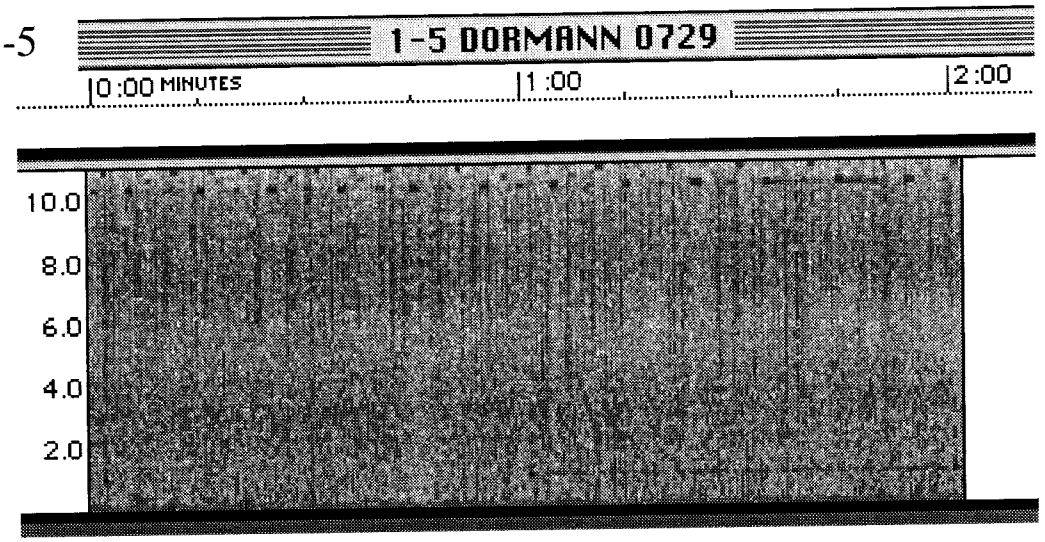


Arrow points to a signal at 1 kHz, but the ON/OFF pattern is not there.



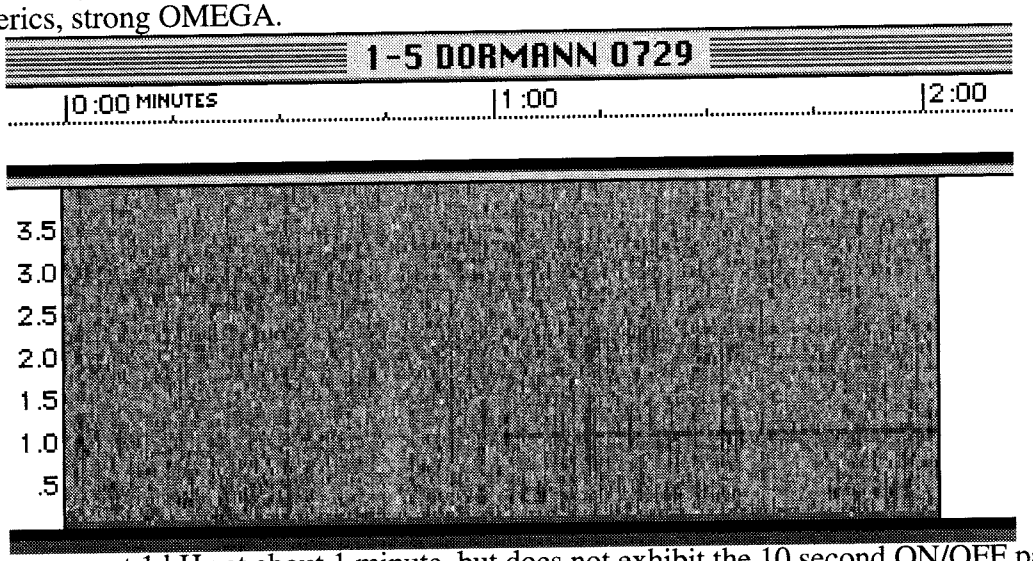
0552:10 Many tweeks. Note the harmonic of the tweek hook at .55 s, 4 and 6 kHz.

1-5

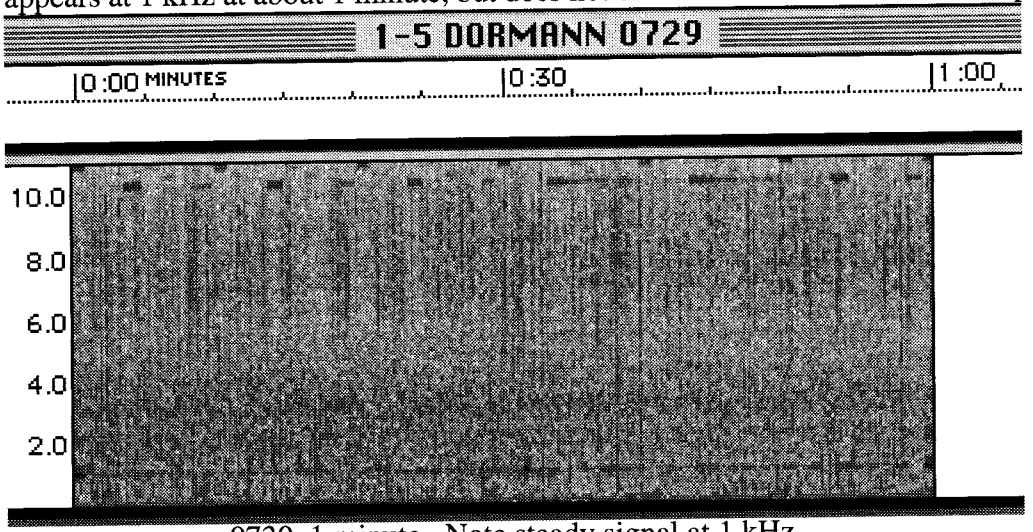


Mike Dormann, Seattle, WA
Dense sferics, strong OMEGA.

Team 8

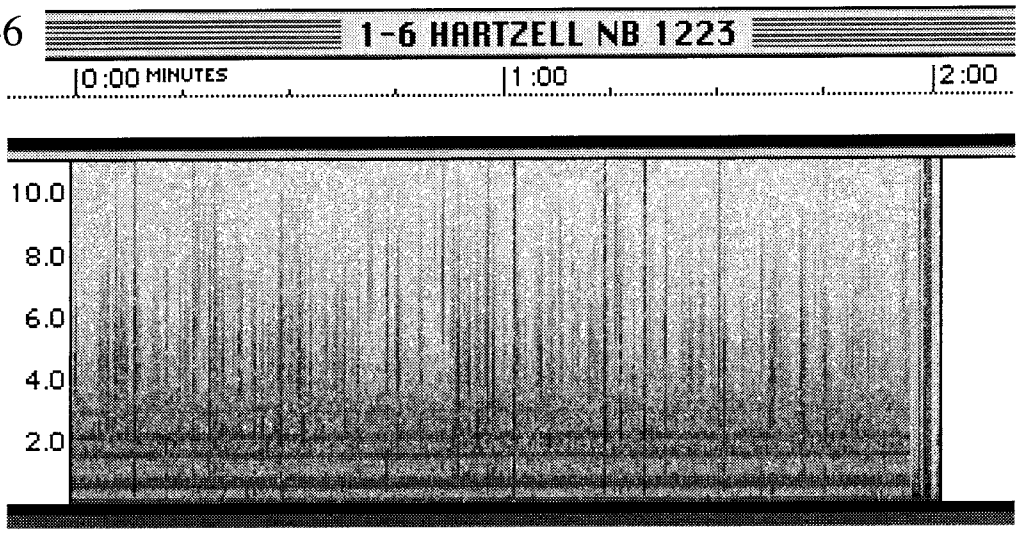


Signal appears at 1 kHz at about 1 minute, but does not exhibit the 10 second ON/OFF pattern.

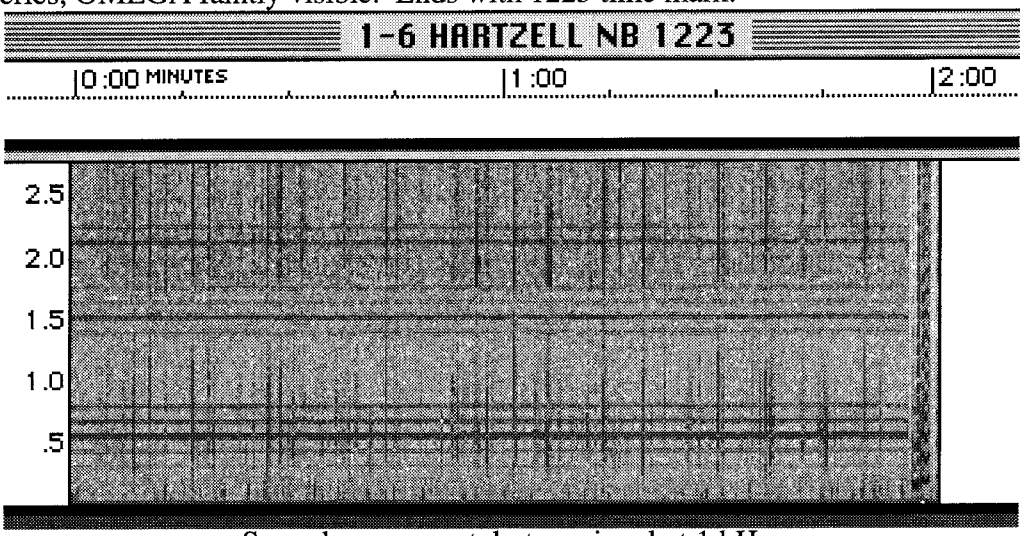


0730, 1 minute. Note steady signal at 1 kHz.

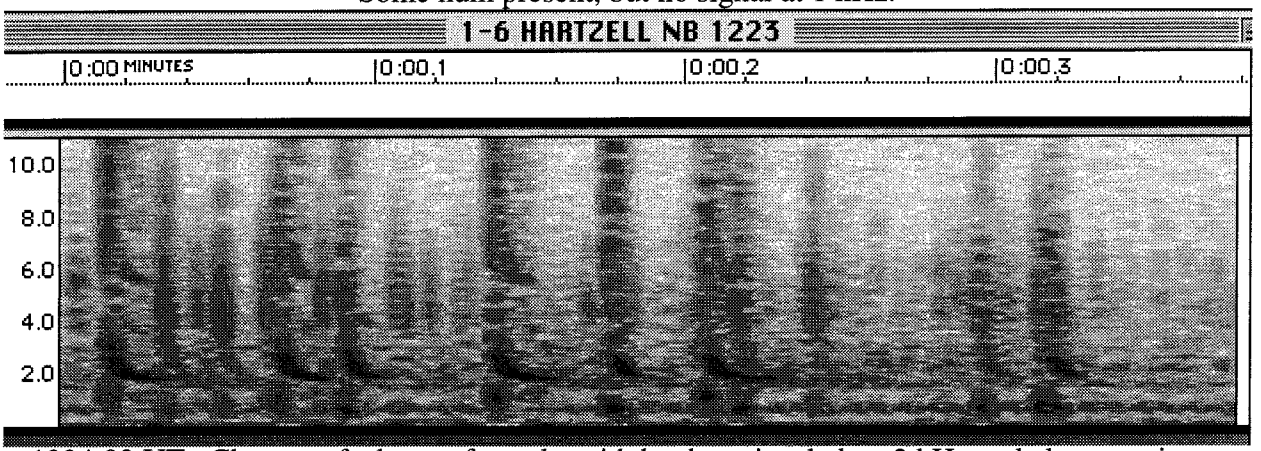
1-6



Phil Hartzell, Aurora, NE Team 21
Dense sferics, OMEGA faintly visible. Ends with 1225 time mark.



Some hum present, but no signal at 1 kHz.



1224:03 UT Closeup of a burst of tweeks with hooks at just below 2 kHz and also prominent hooks at the second harmonic just below 6 kHz.

This completes the data analysis report for the November 1996 INTMINS Operation.

NOTE: The following is a copy of the letter sent to observers who contributed data for the Fall 1996 INTMINS Operations.

Dear INTMINS Observer,

Thank you for your contribution to the Fall 1996 INTMINS observations. Enclosed you will find your returned data tapes and a copy of the spectrographs of your data. The following is a description of the data analysis process and the resulting spectrographs.

1. Data is received by analyst (Pine). A sequential number is assigned indicating the operation and the order in which data is received. For example, 11/96-5 would be the fifth set of data received for the fall operations. Data is analyzed in the order received. The only exception to this is the spring operations: data from school teams is analyzed and returned first so the results can be known by students before the end of school.

2. Data tapes are listened to and a two-minute sound file made of the ISTOCHNIK operating period. The actual time of operation of ISTOCHNIK may be different than that scheduled in the operation plan due to changes in the orbit of MIR. The sound file is assigned a file name consisting of the operation number followed by the name of the chief observer followed by the starting time of the sound file. While the file is being monitored, an analysis log is kept which consists of the following:

11/96-9 Dean Knight Team 7

Sonoma Valley High School

Recorder Count	Watch Reading	UT Time		Pitch	S
012	0:00	1320	M - WWV S, T, OMEGA	+1.5	4
060	1:01	1321	M - voice	+2	

At the top left, the sequential data number information is entered. The next lines are for team identification information. At the upper right, the permanent team number is recorded. The information in the log consists of:

Recorder Count: the counter reading on the Marantz recorder used for analysis. (Different recorders use different types of counters, so this number may not be the same on your recorder.)

Watch Reading: I run a stopwatch to check tape speed against time marks on the tape.

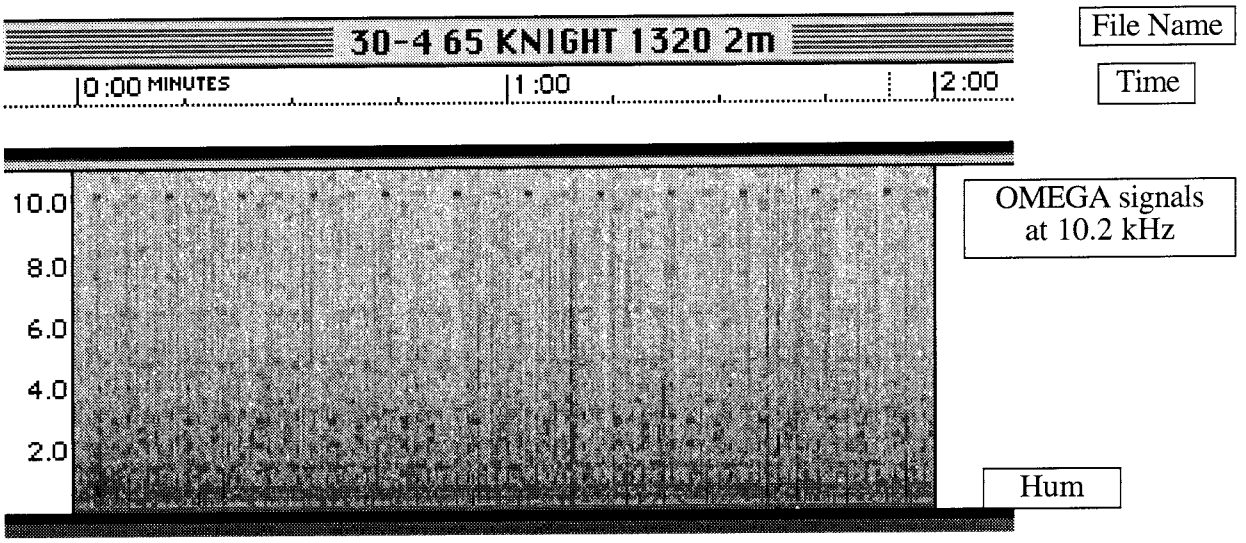
UT Time: As indicated on the time marks and data log.

(blank line): For logging events and information from the tape.

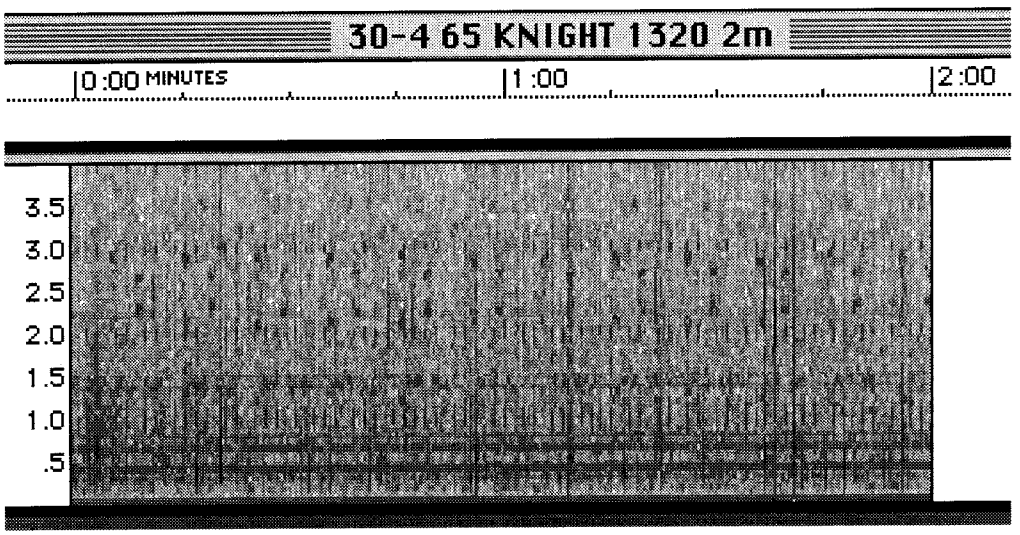
Pitch: The Marantz has a "pitch" adjustment which is used to find the proper tape speed to keep the time marks in synch. A "+" indicates that the tape was sped up on the Marantz (the most common situation). A "-" indicates the tape was slowed on the Marantz to stay in synch.

S: The sferic density level on a scale from 0-5. ("0" is perfectly quiet; "5" is a steady roar of sferics. From 2-4 is common.)

3. An image is captured of the entire 2 minute file using a frequency range of 0-11025 Hertz (0-11 kHz). An image is made of the same time interval using a 0-4 kilohertz range. This is the image that may reveal the presence of the ISTOCHNIK signal. The fundamental frequency of the electromagnetic signal matches the frequency of modulation of ISTOCHNIK, but there is some theoretical evidence that the third harmonic (3 kHz) may be most prominent. A 0-4 kHz range includes this harmonic. (Note: some data in this set of operations was analyzed using a frequency bound of less than 3 kHz.)

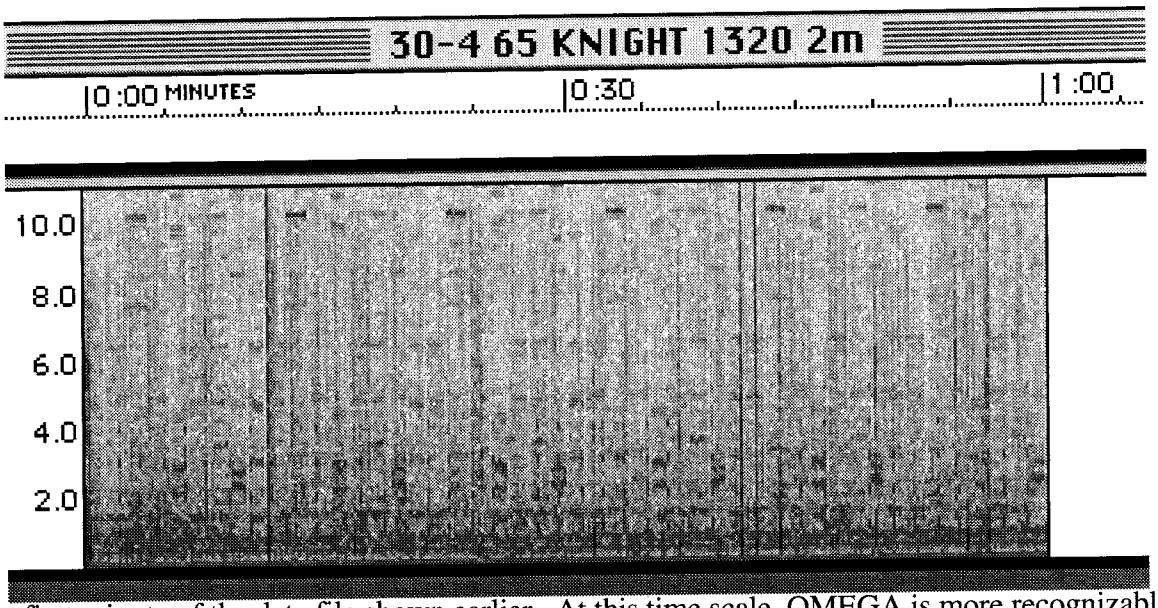


Sample data file image. This data was taken by Dean Knight's students in Sonoma Valley, CA. The file is of data taken with one of the three receivers that Dean's students set up (identified as #65). The start time for ISTOCHNIK operation is 1320 UT for operation 30-4 on November 30. Visible at the top is a series of dashes from a couple of OMEGA stations just above 10 kHz. Also visible at lower frequencies are some similar dashes called aliasing, which is an artifact of the sampling process in the digitizer and indicates a very strong OMEGA signal. Horizontal bands at low frequency represent 60 Hz hum and its harmonics. This site is very quiet.



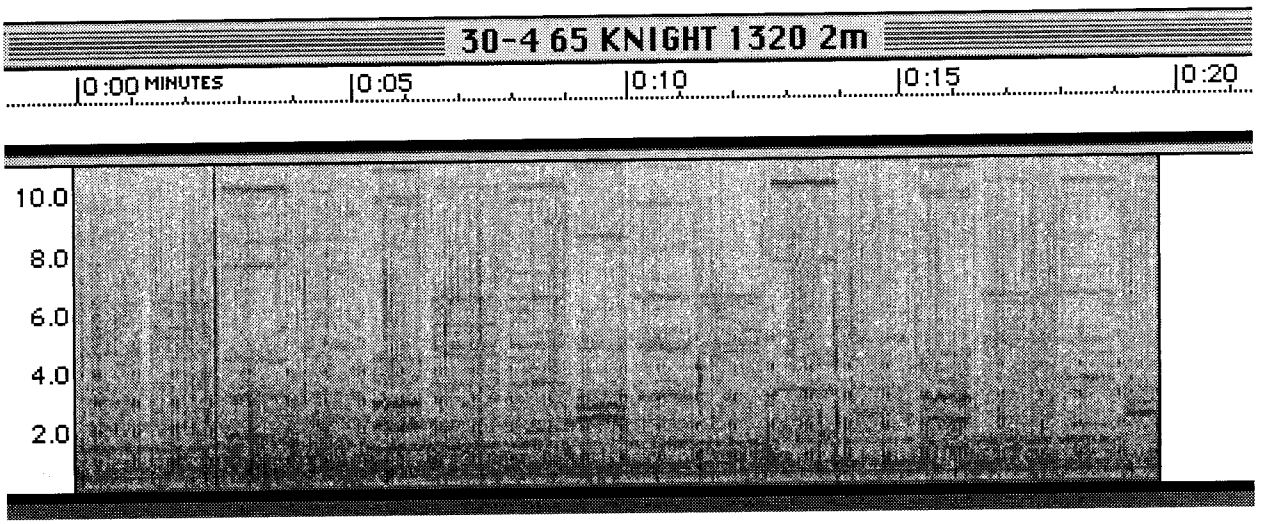
The above file using a 0-4 kHz frequency range. The ISTOCHNIK signal should appear as a series of dashes 10 seconds long indicating electron gun operation separated by 10 seconds of no signal. No signal is apparent at 1 kHz, 2 kHz or 3 kHz.

4. The file is then cropped to include either the first or second minute and an image captured using 0-11 kHz and 0-4 kHz. This completes the basic set of images for each data tape.

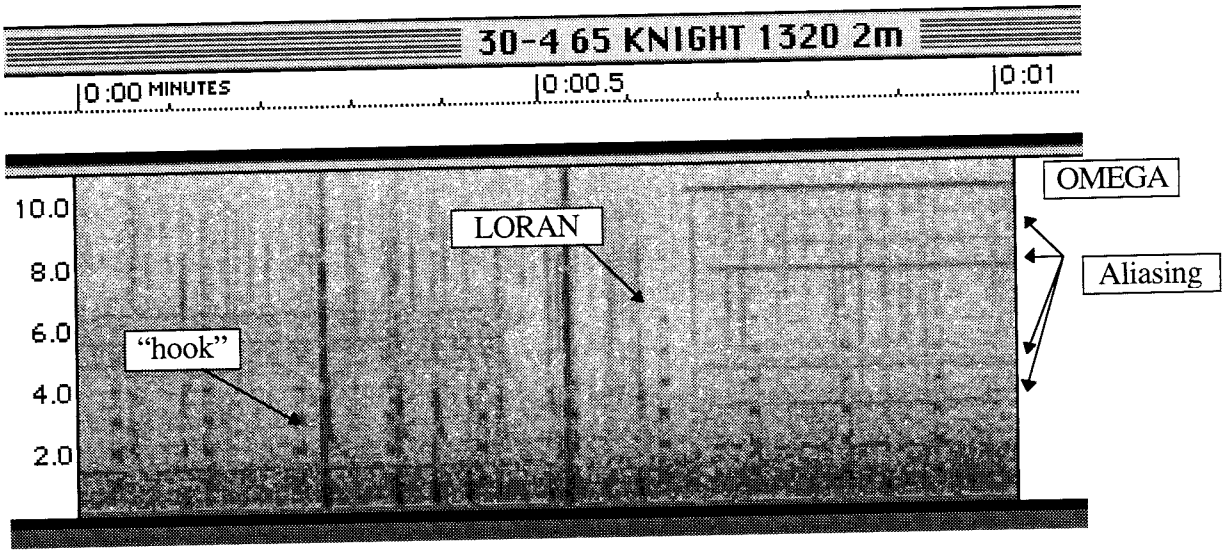


The first minute of the data file shown earlier. At this time scale, OMEGA is more recognizable. Note that the file name does not change even though the time interval has been cropped. You have to look at the time bar to see the length of the spectrograph in the image.

5. Any interesting parts of the data file are then investigated and images taken. Also any items of interest noted in the log of the observer are also investigated and images taken. Examples of items noted by observers include whistlers, tweeks and "strange sounds".



A 20 second sample starting at 1320 showing details of OMEGA. Three stations are visible: a strong dash at about 3 seconds, a weak dash at about 7 seconds and a slightly stronger dash at about 8-9 seconds. Dashes which appear at frequencies below 10.2 kHz are the result of aliasing.



Finally an image starting at 1320:02 UT showing a strong tweek between .2 and .3 seconds. Tweeks can be identified by the "hook" at around 2 kHz. LORAN signals, a navigational aid, sound like a clacking noise and show up on the spectrograph as a vertical series of dots occurring periodically.

6. A Word file is then made containing all of the images from each observer including explanatory captions. This file is used for creating the articles in the *Journal.*

7. Last, the data tapes are returned accompanied by a printed copy of the Word image file and the analysis log sheets.

To save postage, the data logs are not returned. It is suggested that you make copies of your data logs before submitting your data for analysis.

Thank you for your continued participation in INTMINS and for your support of INSPIRE.

By the way, if you are wondering if the signal from ISTOCHNIK has been detected, the answer is "Not yet!". I plan to keep looking and I hope you do, too.

Thanks again,

Bill Pine

Chaffey High School
1245 N. Euclid Avenue
Ontario, CA 91762

email: pine@nssdca.gsfc.nasa.gov
pinebill@aol.com
pine@chs.chaffey.k12.ca.us

Notes From the Field

Communications from INTMINS Participants

Edited by Bill Pine
Chaffey High School
Ontario, CA

Data submissions are often accompanied by notes and messages from INTMINS participants describing various aspects of their experiences as observers. As an ongoing feature, some of these communications will be summarized in *The INSPIRE Journal.* The following summaries are in the approximate order in which the data was received by INSPIRE.

Team 3 Don Shockey Oklahoma City, OK

Probably this recording session should have been skipped. Bad roads slowed travel such that it wasn't possible to get anywhere near the site until almost T-time. So, it seems best to make the best of it, regardless of the nearby phone line or power line.

Out of the experience, it became clear that, in a pinch, a ground isn't necessary. Placing the antenna rack and pole atop my Jeep will do the trick just fine and the receiver pumps enough signal to reach a recorder inside the Jeep. Second, wrapping the receiver in tape will permit operating just short of under water. Third, WWV reception when there is a line of weather near or between the receiver and Ft. Collins, Colorado, (the location of WWV - ed.) is unreliable enough that a separate antenna system will be necessary. Good weather is no problem. Also, it will be necessary to find a site that can be reached on all-weather roads. Two miles of 4-wheel drive is something I probably should not have tried, but did anyway. The log tells the tale and it is enclosed. Regardless, I look forward to the spring sessions. It's always an adventure.

Thanks for the contribution, Don.

Team 1 Jack Lamb Belton, TX

Jack has been a faithful contributor to INSPIRE since 1992. He was assisted in his data gathering by his grandson, Matt Haley.

Jack writes:

I would like a nice description of exactly what we are doing or trying to do with our recordings. People ask me what I am doing with that weird looking radio and I am having trouble explaining exactly what we are about. As I understand it, we are trying to establish a way to communicate with space craft using low frequency radio. I do not know why w are trying to do that. Can you help educate me in this area? I might be able to drum up some interest at the University of Mary Hardin-Baylor where I am now teaching if I knew more about the project and how to get them excited about it.

Well, Jack, here is my attempt to explain my understanding of what we are doing. First off, the goal is not to improve communication with space craft. Current communication using various radio frequencies (none of them VLF) works just fine as you thought. The real tie in is with whistlers. Since whistlers are a product of the way the magnetic field of the earth (the magnetosphere) interacts with radio waves, improving our understanding of this interaction may

increase our knowledge about the magnetosphere. Since whistlers are generated by lightning, which is random and of unknown (but large) power, it is hard to do controlled experiments with them. The electron gun on MIR (ISTOCHNIK) is essentially a manmade lightning generator of know power and controllable operation. If we can detect the electromagnetic waves generated by the electron gun as it is turned off and on 1000 times per second (1 kilohertz) we can them examine the effect of the magnetosphere on where the signal goes and how it is processed.

The bottom line is we are endeavoring to add to the scientific knowledge about the magnetosphere. What is important to me is that this is an area where the answers to many questions are not known (and some of the questions are not known yet, either!). It is rare for high school students and interested amateurs to be able to contribute to science at this level. Testimony to the validity of the efforts made by INSPIRE are our grant support from NASA and our agreement with the Russian Space Agency (IKI). Hope this helps and thanks for your long-time support.

Team 18 David Jones Columbus, GA

Thursday morning I left Columbus, Georgia with all the gear packed in the diesel's trunk. How long the trip, I didn't know. Airline distance to the Croatan National Forest is 450 miles. The forest is more a prairie marsh than a forest. The Indians referred to it as "pocosin" for swamp-on-a-hill. I had recorded INSPIRE there in the spring of 1992.

At the waterfowl impoundment the nearest power line is three and one-fifth miles. I had seen the forest from an airplane at night; a huge black hole among thousands of scattered lights. The INTMINS map showed the midpoint of operation 23-1 roughly there. I remembered an aluminum culvert in a dike between two impoundments. That could be the earth ground. The acid water and
ancient submerged trees suggested conductive soil. The few standing trees were acres apart, stunted and misshapen pines. While near the coast, it was far enough away to avoid the likely manmade interference concentrated there.

I crossed middle Georgia to near Savannah then followed the coastal highway towards Jacksonville, North Carolina. At Savannah the car began to lose power and not shift automatically unless I raised my foot. I could only go about fifty, but the sun was down and fifty is reasonable going northeast up the coast.

The wind swerved the car and heavy rain fell occasionally. I began to wonder if I would ever get to the waterfowl impoundment. I did get to Jacksonville and argued with the motel operator about jacked-up prices. I paid them anyway. Friday morning I started the car easy enough but had to drive very slowly to avoid stalling out. I bought a set of fuel filters but didn't touch anything except to blow backwards through the fuel tank line. It seemed ok. Obsessed with recording, barely getting there was good enough for me. When the car would only go thirty-five, I began to wonder it my decisions were right. In a few miles I came to the dirt road to the waterfowl impoundment. The owner had put up a formidable gate and a no-trespassing sign. I checked the security of the lock anyway and started driving around searching for another way in. A rough-looking deer hunter on foot said I would have to detour thirty miles back through Maysville. The diesel kept running, if slowly.

The wildlife people had moved the next gate so that I couldn't approach the waterfowl impoundment by car. I got out the forest service map. There was another gate a few miles away. That's where I finally stopped. The cold front had passed and the winds chilled me. It was still many hours till one A.M. and I checked out the equipment and found some hum. It wasn't overwhelming. That indicated I had a sensitive setup. The previous night's storm made mucho sferics although the storm was far out in the Atlantic by now. I wonder if the astronauts would look out and see the lightning show. The loran-C was strong but surprisingly it would decrease later after sundown. On the RS-4 I selected whip instead of long-wire, no filter and gain max. After sundown the wind died and the sferics became tweaks. Not checked carefully, the coax from the WWV receiver to the RS-4 didn't work. You will be able to hear me pick up the recorder to place the mike near the radio speaker. The clanking sound on the initial announcement is the antenna wires striking the mast when the wind was strong. In the cold air I used an old trick to increase the conductivity around the three copper-clad ground rods. There are a few tower lights on the horizon. The clouds are so thin that the full moon looks veiled. The clouds are not high because the city of New Bern and the base at Cherry Point glow on their bottoms. The clouds are racing towards the southeast. No frogs or crickets chirp, but the ducks splash and one duck seems to be laughing at me. His down would be useful. A raccoon came by as if I were no threat at all.

I am expecting ISTOCHNIK two minutes early at midnight-fifty-six eastern. I wonder if the spacecraft will cross the moon. No use watching for it. Already I am thinking of taking down the antenna and getting warm. The ionosphere will be thin by one-A.M. so when I listen to 1O MHz WWV to check the indexes, it has faded out. In a panic, I check the equipment, then find WWV again at 2.5 MHz. A Jolly Green Giant helicopter whops by. The thin clouds disappear and frost forms on the car roof. A pickup parks about a mile away and the ceiling light goes on then off. Why would anyone be out here on a cold night? Please keep your ignition switched off. A diesel locomotive blows for a grade crossing signal in the direction of Cherry Point. Finally the T time arrives.

I hurriedly take down the antenna and pull out the ground rods. I can't stop long even though I would like to go to bed. The car may not restart. Just a few miles shy of Wilmington it stops itself. Now I change the filter since I have nothing to lose by breaking the pump prime. It restarts.

Coming back to Columbus the air is warm and the sun shining.

David

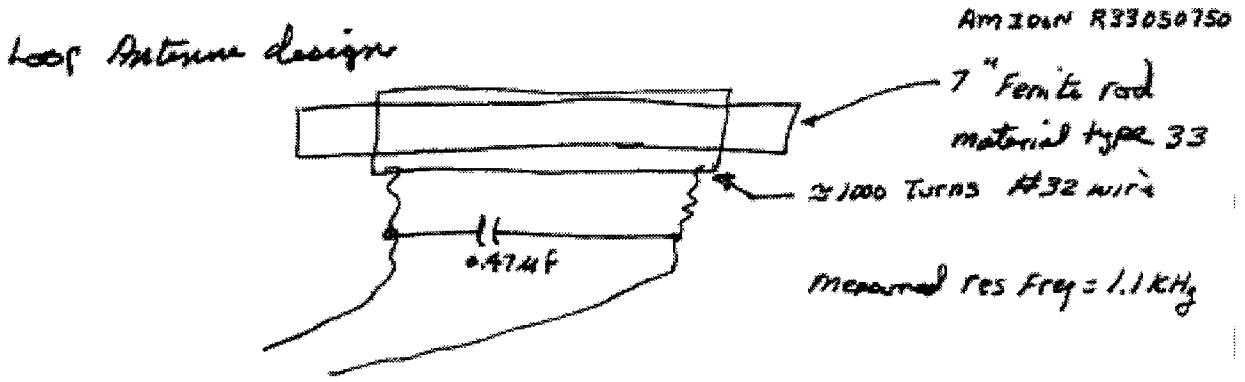
David's account of his observations closer to home for Operation 30-1 was less eventful. His observation site then was on a remote part of Fort Benning, GA. Other than the need to identify himself to military police, everything was routine. Good work, David!

Team 15 Robert Bennett Las Cruces, NM

Yesterday during recording of mission 23-3, I noticed the level of activity with the 6' whip antenna to be much less than I expected based on prior recordings. I rigged a 300' long wire to try to increase sensitivity. The long wire ran approximately east-west. The west end was 10' above ground and the east end was 4' above ground. I used fence posts to mount a short pipe to support the antenna. The level of activity with the 300' long wire was much more than without it. However, I got better performance in April 96 at about the same time of day with just a 100' long wire.

The first part of the tape for 30-3 is with a loop antenna on a modified RS4. After the first part, I changed to the vertical 6' whip antenna. Observations on the loop antenna:

1. The loop eliminates just about all of the sferics. I only hear noise background and an occasional strong tweek.
2. Next time I will try connecting a longwire to the loop. That way the loop basically becomes a band pass filter centered on 1.0 kHz.



Let us know how this works out. I know I have not investigated all of the antenna possibilities - mostly because a telescoping whip antenna is so easy to use!

Team 19 Clifton Lasky / Larry Kramer Fresno, CA

We saw MIR during the 30-4 pass. It was very bright as it passed by the stars eta and delta (Algorab) in the constellation Corvus.

Another matter we should clear up is our site location. As you may have noticed, the latitude and longitude we gave is not in Fresno, it's in Madera. The Wide Awake Ranch is private property and the owner has been nice enough to let us observe there as long as we didn't hurt his cows (he didn't really understand what all the equipment was for). It's the only spot we could find that was 3 or 4 miles from power lines, within an hour's drive.

The owner doesn't understand, and what must the cows be thinking ...

Team 5 Jean-Claude Touzin St. Vital, Quebec, CANADA

I recorded pass 23-2, 24-3, 30-1 and 30-2. Note however that pass 30-1 and 30-2 are maybe unusable because while I rewound the tape it broke. I repaired it and sent it to you without trying it because I was afraid I would break it again. I do not remember having broken a tape before. Well, that's life!

Pass 29-3 was rather cold here. I do not think that I heard ISTOCHNIK despite the fact that I saw MIR almost right above me while I was recording 29-3.

I did raise the gain of my receiver quite a lot. I now want to install variable filtering for low and high pass so that I can adjust myself to changing conditions. This is less of a problem for me since I have oriented my loop for lowest hum and I am far from the AC line.

I also raised my bridge a good one and a half feet to prevent flooding in the springtime. But I noticed that the beavers were busy working at their dam downstream. Well ...

The repaired tape worked fine. I admire Jean-Claude's ability to deal with adverse weather conditions and uncooperative wildlife.

Team 20 Barry Riehle Cincinnati, OH
Turpin High School

Barry was assisted in his data gathering by Melissa Eng, Nikki Nime and Debra Sawyer.

Team 7 Dean Knight Sonoma, CA
Sonoma Valley High School

This year was a bit more unusual. The 30-3 and 30-4 passes were part of an overnight campout since one pass was so late and the other so early. The kids loved it. Many had tents, but some of us wanted to watch the stars, so we put up with the morning frost all around us. The 1-4 pass was late (sort of) and only those souls willing to hike and set up the equipment in the rain and darkness made the trip. We hoped the moisture did not get to the electronics - too much of a hope for 2 of our 3 receivers. At least the really hard rain did not occur until we were hiking back tom our cars.

(Last year we hiked as long as 1 hour to get away from power lines. Sometimes this was at night across creeks for some passes. This year we found an electrically "quiet" area that could be reached by driving a couple of miles back into the hills of Glen Ellen and then only hiking in about 10 minutes over level terrain - big improvement!)

On one of the passes we actually saw the MIR Station at the tail end of the operation (30-4). It appeared about 2 minutes later than expected (5:21 AM) directly overhead. It had just emerged from the earth's shadow. Pretty exciting!

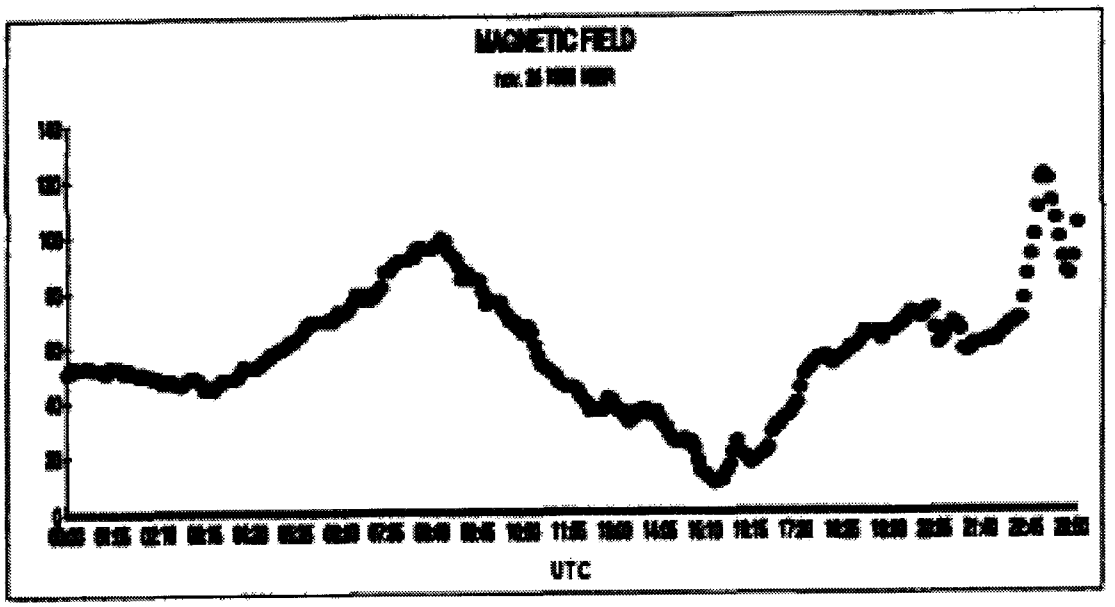
The operating time for ISTOCHNIK was adjusted from a start time of 1319 UT (5:19 AM PST) to 1320 UT. When it appeared high in the sky the operation had been underway for a minute (instead

of 2 minutes) and it continued as it passed over you. The time on the tapes that was analyzed was from 1320-1322 UT.

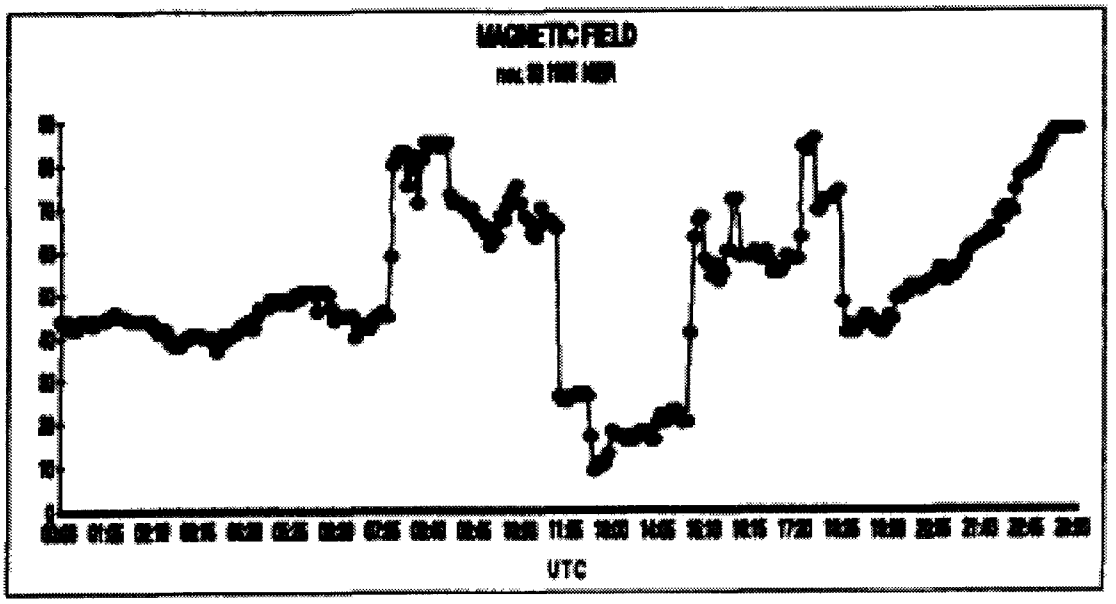
Bret Allen (3)
Whitney Baker (5)
Evan Baldinger (2)
Jenna Barkley (4)
Jimmy Barrot (3)
Alex Benward (3)
Megan Boden (3)
Kelly Bonbright (1)
Betsy Bradbury (2)
Kaitlin Burn (2)
Bryan Carlson (3)
Sabrena Carrington (4)
Meghan Coleman (1)
Stephen Coleman (2)
Juan Cruz (2)
Ryan Daffurn (4)
Chris Daley (1)
Joe Doherty (2)
Brad Duncan (2)
Stephanie Du Pont (1)
Brianna Egnew (2)
Alex Evaschuk (2)
Tony Faley (4)
Ellen Fitspatrick (2)
Lauren Flaherty (2)
Mark Gamelin (4)
Abe Gardner (3)
Rebekah Gonzalez (4)
Loren Graves (1)
Beth Gullikson (2)
Jenna Halthouse (1)
Peggy Henry (1)
Valerie Henry (1)
Amanda Higi (3)
Megan Klenow (2)
Jenni Knight (2)
Kaitlin Layher (2)
Camille Lucia (1)
Danielle Marshall (1)
Tom McKeever (2)
Katy McNulty (2)
Michelle Mendel (4)
Katherine Merritt (2)
Mike Moore (4)
Katie O'Leary (1)
Nathan Prziborowski (3)
Lea Rosemurgy (2)
Matt Ryan (2)
Pat Ryan (2)
Jenny Scafidi (2)
Meg Sou (1)
Gloria Stovall (2)
Sarah Swint (2)
Camille Varin (2)
Skye Vendt-Pearce (2)
David Vetrone (2)
Travis White (4)
Carrene Wojciechowski (1)
Cassie Wojciechowski (1)
Yvonne Young (2)

Team E6 Marco Ibridi — Finale E., ITALY

Marco has sent along some graphs of the magnetic field measurements on November 24 and 30.



Gear : Magnetometer KLIRCA5 home-brew software DAR I4IBR
sensor : FGM-3 Flux-Gate (Data-acquisition)
Speake & Co.Ltd. U.K.



It is interesting to note that the variation has approximately the same high and low points at corresponding times of day, but the variation is very different on the two days. Thanks, Marco.

Team 9 Robert Moloch Greentown, IN
Eastern Elementary School

Did note a strange ascending tome which seemed to fade out at approximately 1308 UTC, or 21 minutes 05 seconds into the tape recording. You might check this out and let us know what you think it was. This was the best pass (24-4) for us today or on previous INTMINS Projects due to the fact that MIR was almost directly overhead.

I think the signal you refer to was from the ignition system of a car.

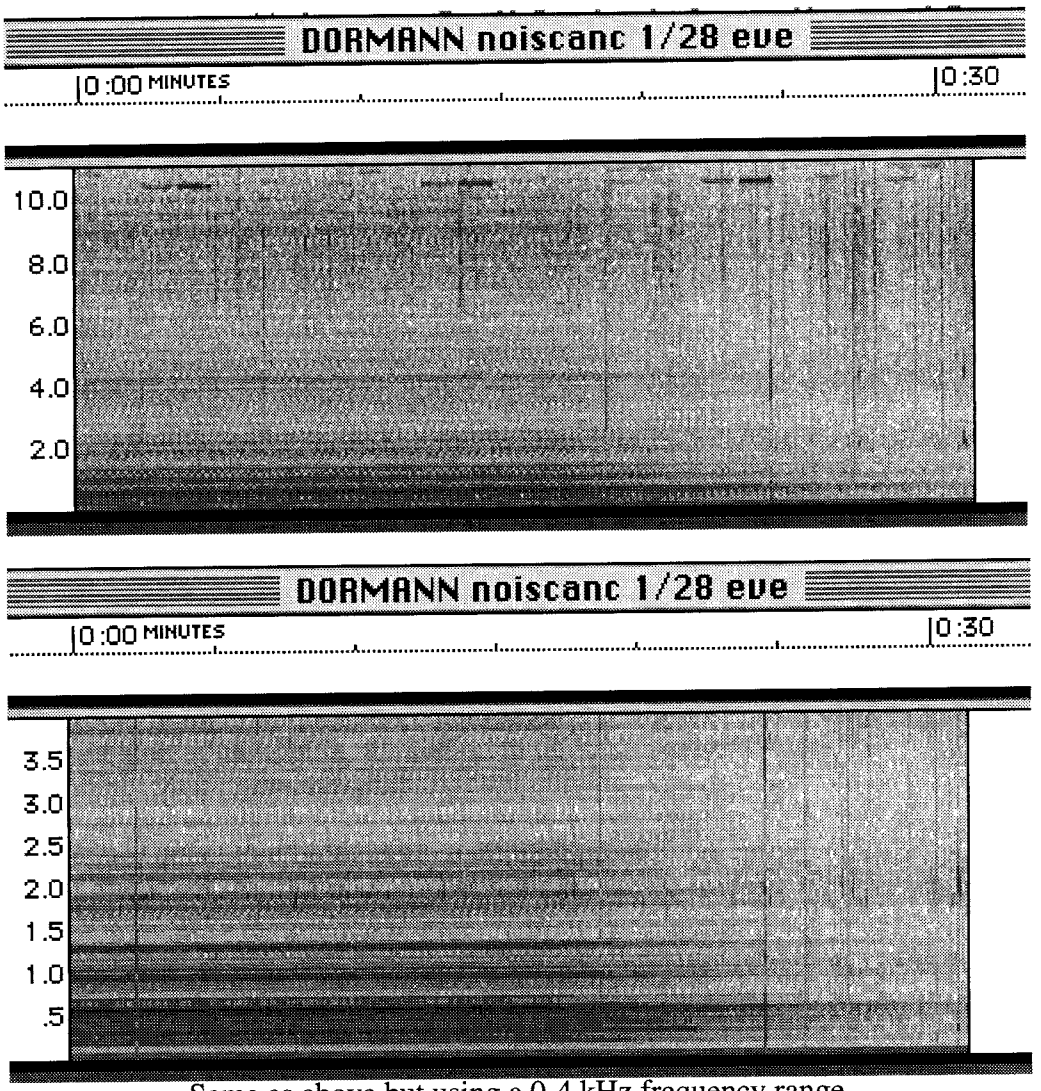
Adults on the Eastern Elementary Team included Robert Moloch N9SGQ, Radio Club Sponsor, Roger Grady K9OPO and Charles Sponaugle N9LYY. Student participants included Brooke Harden (for both pass 24-5 and 24-5), Jon Cranor (24-4), Josh Custer (24-5), Sarah Carpenter (24-5) and Jamison Haussman (24-5)

Team 8 Mike Dormann Seattle, WA

Mike has sent several pages of output using Excel to analyze INTMINS data. He also sent a tape demonstrating the performance of a noise canceler he has designed. The noise canceler responds to periodic (manmade) signals by generating the opposite wave form of the periodic signal. The result is a cancellation of the periodic waveform only. This is very different from a filter which would attenuate all signals in a certain frequency range. The noise canceler eliminates the hum only leaving the other signals intact.

The following spectrogram shows the operation of the noise canceler. Look at the horizontal bands which represent AC hum and its harmonics. About 15 seconds into the segment the noise canceler is turned on. It takes about 5 seconds to identify the periodic hum and generate the component necessary to cancel it. By 25 seconds into the segment, most of the hum lines have disappeared. When listening to the tape, the effect is striking. The natural (and nonperiodic)

emissions seem to rise out of the background as the hum diminishes. Notice that the OMEGA signals remain intact since they are not of sufficient duration (around 1 second for each dash) to cause the noise canceler to generate the canceling waveform.



Same as above but using a 0-4 kHz frequency range.

Team E9 Dr. Valery Korepanov Lviv, UKRAINE
Lviv Center of Institute of Space Research of NASU

The investigators who participated in data recording were Ihor Docenko, Fyodor Doudkin and Andrey Marusenkov.

Team 17 Kent Gardner Fullerton, CA

Kent sent a copy of a videotape of a program about the Shoemaker-Levy Comet impacts with Jupiter and the Galileo Jupiter mission. He writes,

... It has a short segment on the Spacecraft Galileo flying past earth listening to lightning-caused whistlers. You can hear whistlers on the sound track. Whether they came from Galileo exactly or were substituted from earth-bound observations, I don't know. This brings up a question: What equipment does Galileo have that receives these frequencies and what purpose did it serve in its work?

When the collisions occurred I tried to record any changes in radio signals coming from Jupiter, but was unsuccessful in coming up with any data that was meaningful.

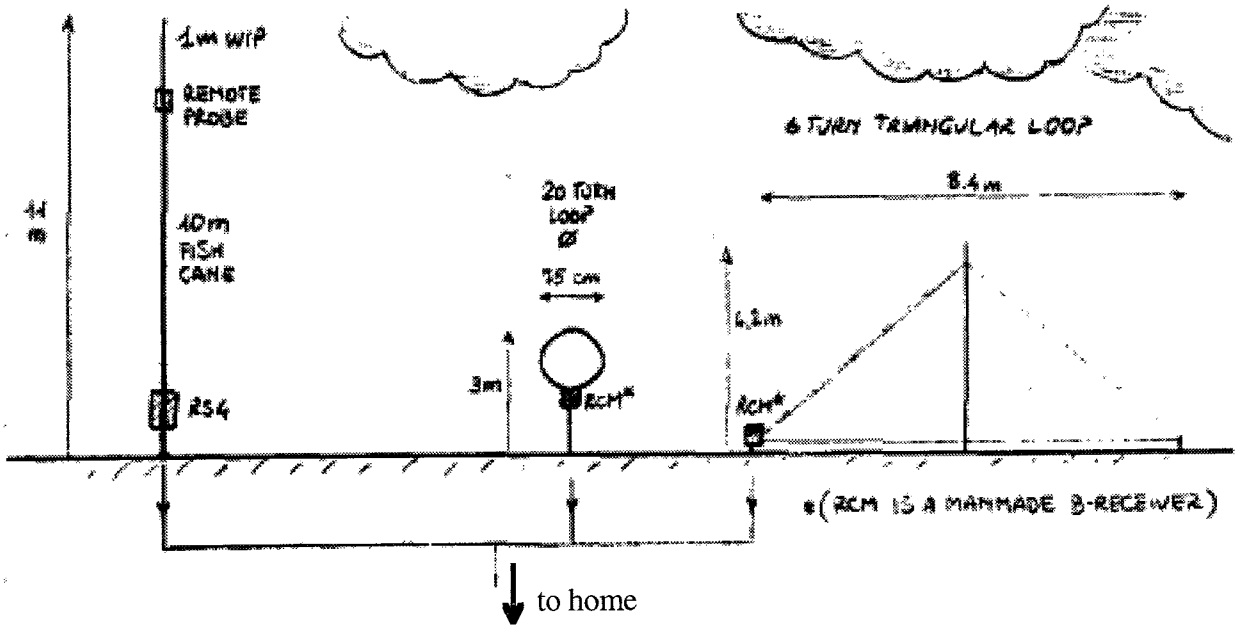
The following excerpt is from the JPL Web page on the Galileo mission:
(URL: http://www2.jpl.nasa.gov/files/fsheets/galileo.txt

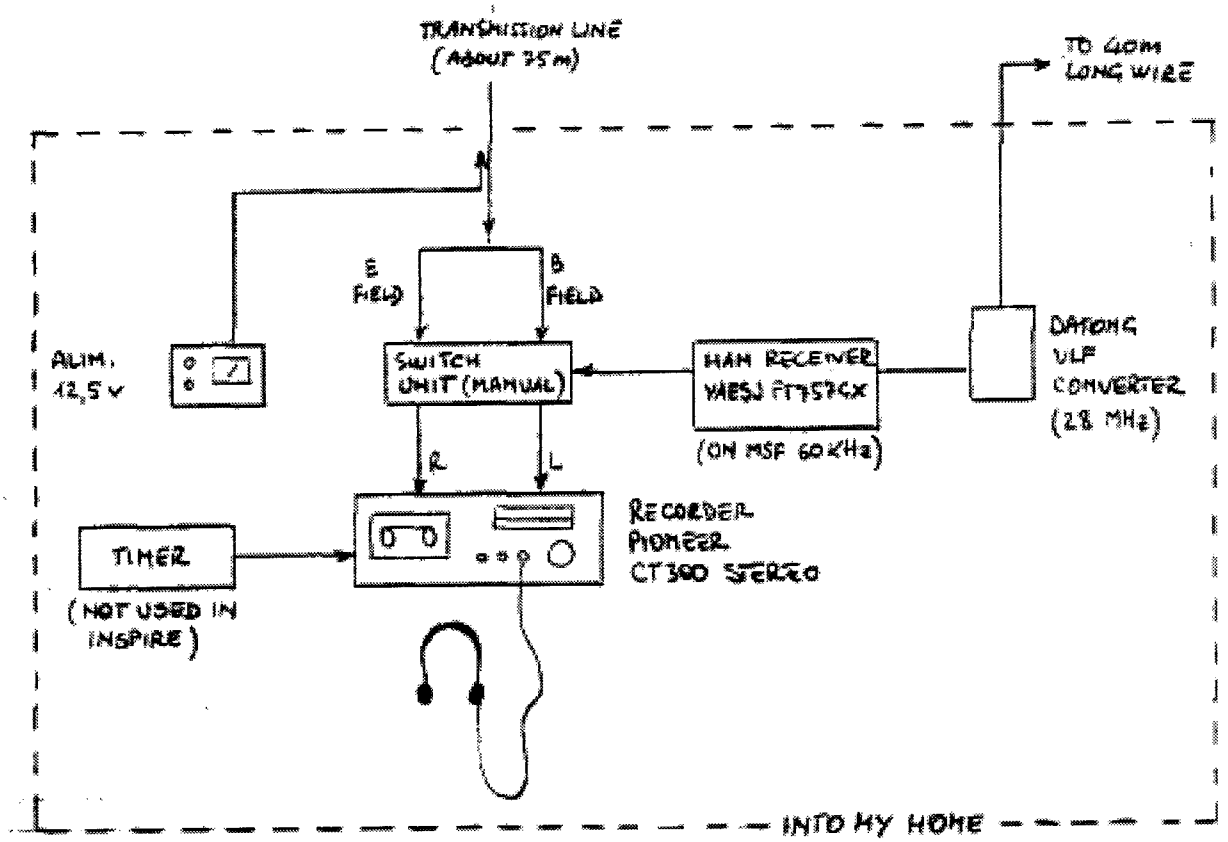
> Probe instruments include an atmospheric structure group of sensors measuring temperature, pressure and deceleration; a neutral mass spectrometer and a helium-abundance detector supporting atmospheric composition studies; a nephelometer for cloud location and cloud-particle observations; a net-flux radiometer measuring the difference, upward versus downward, in radiant energy flux at each altitude; and a lightning/radio-emission instrument with an energetic-particle detector, measuring light and radio emissions associated with lightning and energetic particles in Jupiter's radiation belts (so that this instrument begins measuring some hours before the probe reaches atmosphere).
> (Underlining added. - ed.)

Whistlers have been detected on Jupiter by the Voyager probes in the early 1980's. The reason for carrying this type instrument is basically the same as the reason we are conducting our investigations: to try to improve our understanding of the planetary magnetic fields and how they process electromagnetic signals. Thanks for the videotape, Kent.

Team E5 Renato Romero Cumiana, ITALY

Renato sent a diagram of his observing station. The setup consists of an antenna array outdoors connected by a 75 meter cable to his home.





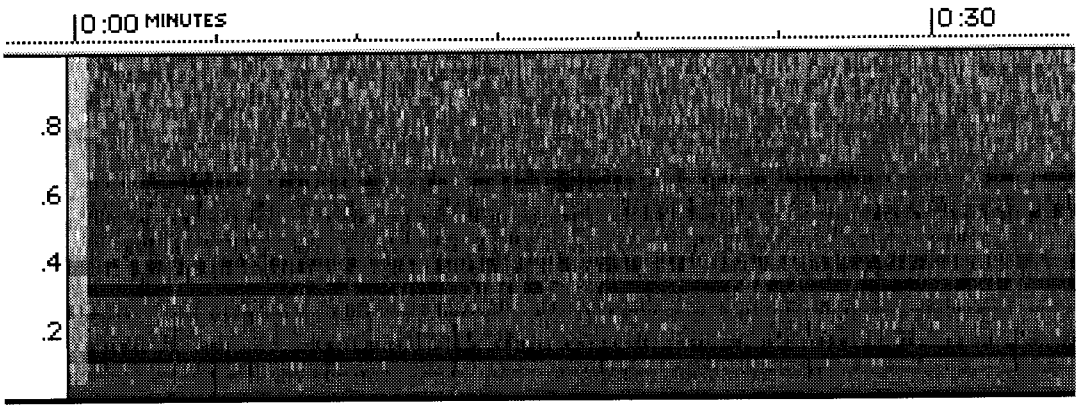
This is quite a setup, Renato. It's no surprise that you produce such good data!

Team 2 Stephen G. Davis Fort Edward, NY

Steve sent an additional tape and asked:

Here is a special request. There is an extra segment recorded after the INTMINS data of some local environmental noise pollution which has been disturbing the neighborhood for some time. Would you supply some spectrographs of the data? The noise is a steady high pitch coming from the stack of Environmental Soil Management, Inc., of New York which burns contaminated oil dirt. There is a large fan exhausting the gases, and it sound like somebody blowing across the top of a Coke bottle.

Here is a spectrogram of the signal recorded by Steve:



This spectrogram just shows the frequency range up to 1 kHz, which is where the noise seems to be found. Large fan motors would certainly put our a pretty strong electromagnetic signal with frequencies related to the rate of revolution of the fan motor.

Team 6 Bill Pine Ontario, CA
Chaffey High School

We used the November INTMINS operations to field test the new VLF2 receiver. The receiver worked well and we had good success with all observations (including the usual equipment related problems). We recorded passes 24-6, 30-3, 30-4 and 1-4. Chaffey students making data recordings included:

Jill Anthony
Victoria Avalos (2 trips)
Blake Hunter
Shazia Khan
Brad Olsan
Eugene Tarigan
Monika Witecka

For the early morning pass on the Saturday of Thanksgiving weekend (30-4) there was not a lot of interest from my students, so I did not plan a trip from school. If I go straight up to the mountains from home, it takes about an hour less time total for the trip, which was fine with me. Since it was Thanksgiving, all three of my daughters were home. Katie (24) was home from the San Francisco Bay Area where she works as Assistant Director of Development at a private school; Mandy (20) was home for the weekend from University of California Riverside; and Sarah (17) still lives at home. In addition, Mandy's boyfriend, Dennis Cox, was staying with us for the weekend. I invited all of them and they all accepted. At 4:30 AM we were up and on the road.

Only two out of three receivers could be coaxed to life, but the tapes were started on time. Just before MIR was due to appear, we looked to the northwest to see who would be the first to spot it. At that very moment we saw the brightest meteor I have ever seen. It was like a bright magnesium flare that traveled from about 50 degrees altitude to about 20 degrees in the northwest sky. It was so bright that the light seemed to persist in the sky for some seconds. It is also the first time that everyone present saw the meteor. It is far more common for someone to say "Look at that!" and for everyone else to say "What?"

About the time our eyes adjusted back to the dark, MIR popped out of the shadow right on schedule and passed nearly straight overhead. It was visible for about 7 minutes and finally faded from view in the low eastern sky. It was nice to note that MIR was following the revised schedule that we had projected when modifying the operation times.

After the tapes were completed, we packed up amid a growing dawn and headed down the hill. Thirty minutes later everyone under 30 was back asleep and I was contentedly reading the paper in a very quiet house.

Data Log Cover Sheet (copy as needed)

INSPIRE Observer Team _____ Receiver _____

Operation _____

Date _____ Tape Start Time (UT) _____

****

Operation details: Tape start time: _____ UT _____ local

Operation start time: _____ UT _____ local

Operation type: _____

Operation stop time: _____ UT _____ local

Tape stop time: _____ UT _____ local

Equipment: Receiver _____ WW V reception:

Recorder _____ _____

Antenna _____ _____

WWV radio _____ _____

Site description: _____

Longitude: ____° ____ ' W Latitude: ____° ____ ' N

Local weather: _____

Personnel: _____ _____ _____

_____ _____ _____

Team Leader address: Name _____

Street _____

_____

City, State, Zip, Country _____

INSPIRE Data (copy as needed)

INSPIRE Observer Team _____ Receiver _____

Operation _____

Date _____ Tape Start Time (UT) _____

****

Code: S - sferics 0 1 2 3 4 5 M - Mark T - tweek W - whistler O - OMEGA C - chorus
L M H

Time	Entry	Observer
_____	_____ S: 0 1 2 3 4 5	_____
_____	_____ S: 0 1 2 3 4 5	_____
_____	_____ S: 0 1 2 3 4 5	_____
_____	_____ S: 0 1 2 3 4 5	_____
_____	_____ S: 0 1 2 3 4 5	_____
_____	_____ S: 0 1 2 3 4 5	_____
_____	_____ S: 0 1 2 3 4 5	_____
_____	_____ S: 0 1 2 3 4 5	_____
_____	_____ S: 0 1 2 3 4 5	_____
_____	_____ S: 0 1 2 3 4 5	_____
_____	_____ S: 0 1 2 3 4 5	_____
_____	_____ S: 0 1 2 3 4 5	_____
_____	_____ S: 0 1 2 3 4 5	_____
_____	_____ S: 0 1 2 3 4 5	_____
_____	_____ S: 0 1 2 3 4 5	_____
_____	_____ S: 0 1 2 3 4 5	_____
_____	_____ S: 0 1 2 3 4 5	_____
_____	_____ S: 0 1 2 3 4 5	_____