INTMINS OBSERVERS

Roster Update

The following is a roster of INTMINS observers including first-time observers. Team number assignments are permanent and will be used to refer to teams in the future. (Unless noted otherwise, all longitudes are West and latitudes are North.)

North American observers:

Team #	Observer	Location	Longitude/Latitude
1.	John Lamb, Jr. East Texas State University	Belton, TX	95° 53' 59" / 33° 14' 49"
2.	Stephen G. Davis	Fort Edwards, NY	73° 29' 30" / 43° 18' 00"
3.	Don Shockey	Oklahoma City, OK	97° 40' 5" / 35° 43' 30"
4.	Mike Aiello	Croton, NY	73° 46' 45" / 40°
5.	Jean-Claude Touzin	St. VitalQuebec	79° 10' / 48° 55'
6.	Bill Pine Chaffey High School	Ontario, CA	117° 41' / 34° 14'
7	Dean Knight Sonoma Valley High School	Sonoma, CA	122° 33' / 38° 21'
8	Mike Dormann	Seattle, WA	123.4°/47.2°
9	Robert Moloch Eastern Elementary School	Greentown, IN	85° 58' / 40° 28'
10	Bill Taylor INSPIRE	Washington, DC	38° 54' / 77° 2'
11	Mark Mueller Brown Deer High School	Brown Deer, WI	87° 56' / 43° 10'
12	Jon Wallace	Litchfield, CT	73° 15' / 41° 45'
13	Bill Combs	Crawfordsville, IN	86° 59' / 40° 4'
14	John Barry Seeger High School	West Lebanon, IN	87° 22' / 40° 18'
15	Robert Bennett	Las Cruces, NM	106° 44' / 32° 36'
16	Leonard Marraccini	Finleyville, PA	80° 00' / 40° 16'
17	Kent Gardner	Fullerton, CA	117° 48' 30" / 34° 12' 13"
18.	David Jones	Columbus, GA	77° 07' / 35° 00'
19.	Larry Kramer / Clifton Lasky	Fresno, CA	119° 49' / 37° 01'
20.	Barry S. Riehle Turpin High School	Cincinnati, OH	84° 15' / 39° 7'
21.	Phil Hartzell	Aurora, NE	98° 0' / 41° 0'
22.	Rick Campbell	Brighton, MI	83°50'2.7" / 42°16'43.7"
23.	Jim Ericson	Glacier, WA	121° 57.91' / 48° 53.57'
24.	Paul DeVoe Redlands High School	Redlands, CA	116° 52' / 34° 10'
25	Norm Anderson	Cedar Falls, IA	92° 15' / 42° 20'
26	Brian Page	Lawrenceville, GA	83° 45' / 34° 45'
27	Ron Janetzke	San Antonio, TX	98° 47' / 29° 35'
28	Thomas Earnest	San Angelo, TX	100° 25' / 31° 16'

European observers:

Team #	Observer	Location	Longitude/Latitude
E1	Flavio Gori	Florence, IT	11° 50' 18" E / 43° 50' 18" N
E2	Silvio Bernocco	Torino, IT	7° 12' E / 44° 54' N
E3	Fabio Courmoz	Aosta, IT	7.7° E / 45.7° N
E4	Joe Banks	London, UK	0° / 50° 52' N
E5	Renato Romero	Cumiana, IT	7° 24' E / 49° 57' N
E6	Marco Ibridi	Finale E., IT	11° 17' E / 44° 50' N
E7	Alessandro Arrighi	Firenze, IT	10° 57' 50" E / 43° 43' 21" N
E8	Zeljko Andreic Rudjer Boskovic Institute	Zagreb, Croatia	
E9.	Dr. Valery Korepanov Lviv Center of Institute of Space Research of NASU	Lviv, UKRAINE	24° E / 50° N
E10.	Sarah Dunkin University College London	London, England	0° 02' E / 51° 40' N

New Observers (11/97):

29 Janet Lowry — Houston, TX

Longitude: 95° W
Latitude: 29° N
San Luis Pass, 18 miles west of Galveston, 32 miles south of JSC
Receiver: INSPIRE RS-4
Recorder: Radio Shack CTR-69 (ALC and VOX - OFF)
Antenna: 6' whip
WWV:

30 Linden Lundback — Watrous, Saskatchewan, CANADA

Longitude: 105° 22' W
Latitude: 51° 41' N
North side of abandoned farm yard in snow covered stubble field
Receiver: INSPIRE RS-4
Recorder: Radio Shack CTR 94 with AGC
Antenna: 7 foot whip
WWV: Radio Shack DS-351

Leonid Meteor Shower - Observations and Data

By: Bill Pine
Ontario, CA

On November 17-18, 1998, the annual Leonid meteor shower was predicted to show a high level of activity - a level reached only about every 30 years. Unfortunately for those of us in the United States, the predicted time of maximum meteor activity was in the early afternoon of November 18. The strategy was to observe in the early morning the day before and after the predicted maximum in an attempt to see if there is a VLF signature for meteors. Since meteor observation depends on clear local weather, some observers were not able to see the meteors (this was the case in Southern California!). Many observers did see several meteors and the frequency of their appearance was indeed higher than on other nights. VLF radio recordings were made and the tapes submitted for analysis.

The analysis of the data consisted of making sound files for the times that corresponded to the sighting of bright meteors. As the data and logs were being examined, a serious problem soon presented itself. Some of the logs did not indicate the meteors with enough time accuracy. Ideally, the meteor should be logged to the second. Using the time marks on the data tapes, this would allow the perfect coordination of the visual and radio observations. The logs of some observers were not precies enough to allow interpretaton of the VLF signals to be coordinated with the presence of meteors. In any event, there was no signature VLF signal that could be attributed to meteor activity.

Zeljko Andreic of Croatia indicates that some students from his school were in Mongolia for the Leonid maximum and recorded the event using an RS4 receiver. He says they got some interesting results that they will be presenting and publishing this spring. Zeljko has promised to send reprints of the article when it comes out.

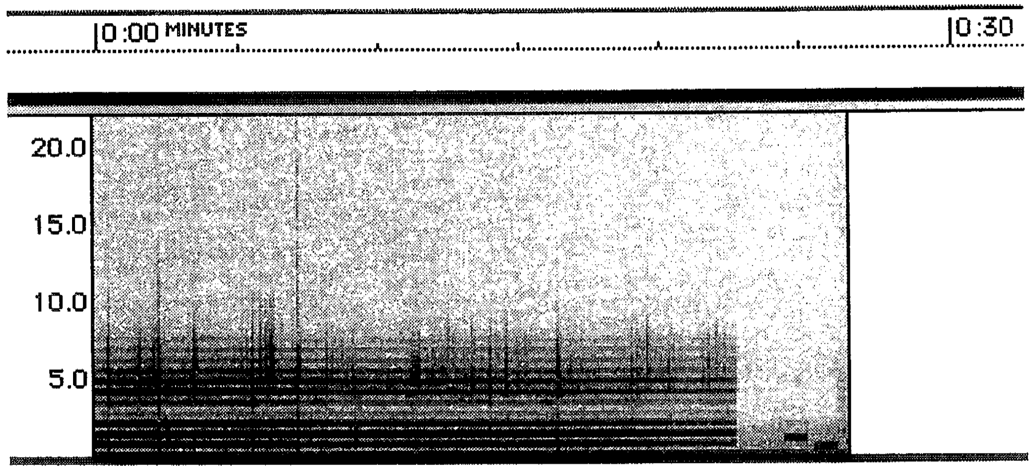
While the maximum was impressive in Mongolia this year, there may be even more meteors next year. As INSPIRE plans for Leonids/99, we will be emphasizing data logging procedures.

The following is a sampler of data recorded by INSPIRE observers last fall. The data analysis procedure was to make 2-minute files at the start of each 12-minute observing period and then to make closeup views corresponding to bright meteors logged.

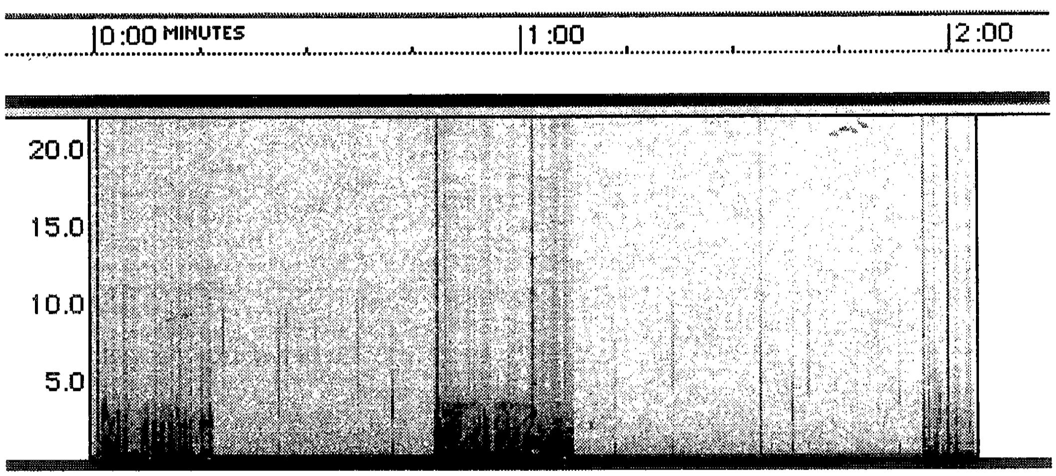
Teams submitting data included:

Team 13	William Combs	Crawfordsville, Indiana
Team 21	Phil Hartzell	Aurora, Nebraska
Team 25	Norm Anderson	Cedar Falls, Iowa
Team 30	Linden Lundback	Watrous, Sask, CANADA
Team E2	Silvio Bernocco	Torino, ITALY

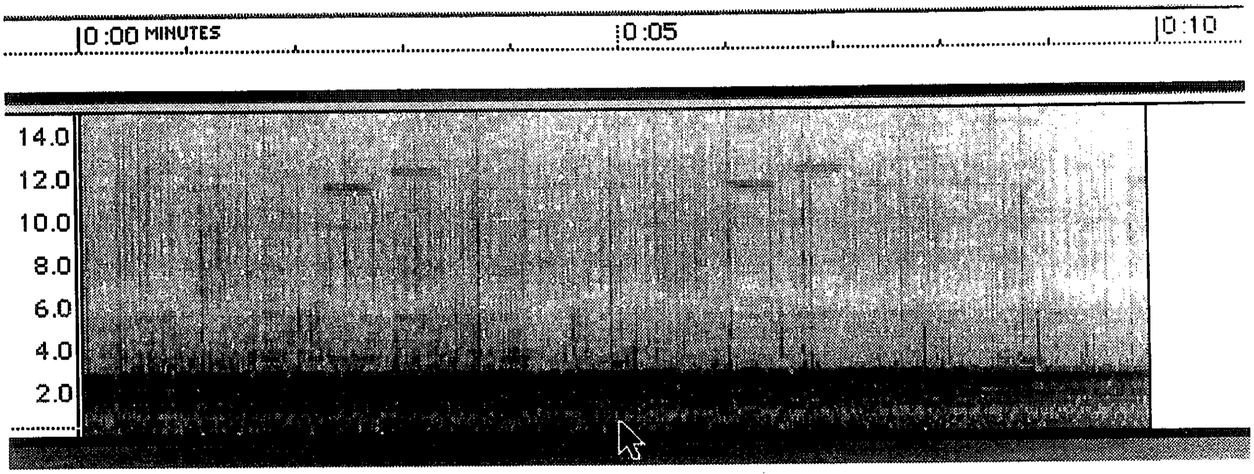
11/17/98



11/17 0900 UT Team 25 Norm Anderson, Cedar Falls, Iowa
Horizontal bars show the strong hum on Norm's tapes during these sessions. Unknown origin. File ends with 0906 UT WWV tone.

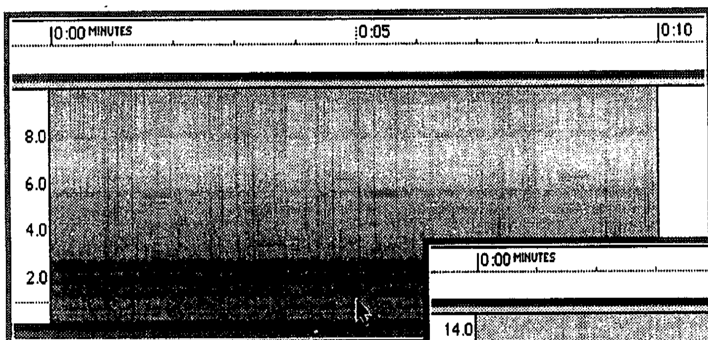


11/17 0900 UT Team 30 Linden Lundback, Watrous, Sask, CANADA
Quiet conditions. WWV time signals shown.

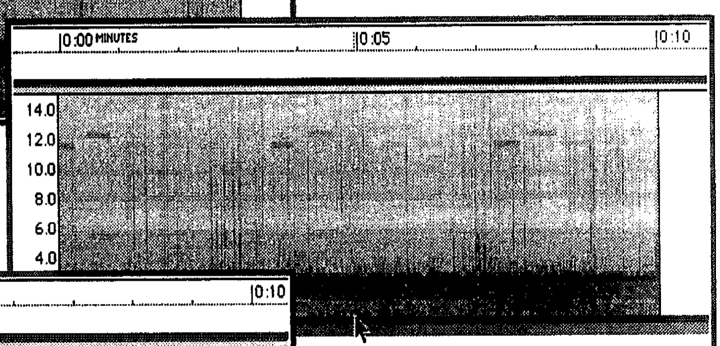


11/17 Team E2 Silvio Bernocco, Torino, ITALY
10-second file centered on "bolide" (fireball) logged at 043850 UT
Note the strong Alpha signal and pronounced hum bands below 3 kHz.
Alpha dashes are visible near 12 kHz; similar dashes at lower
frequencies are aliases of the strong Alpha signals.

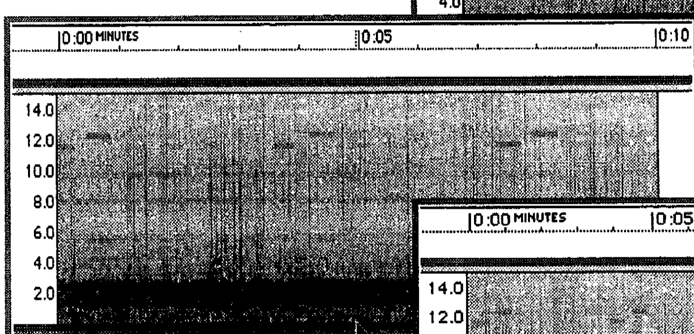
Other meteors logged:



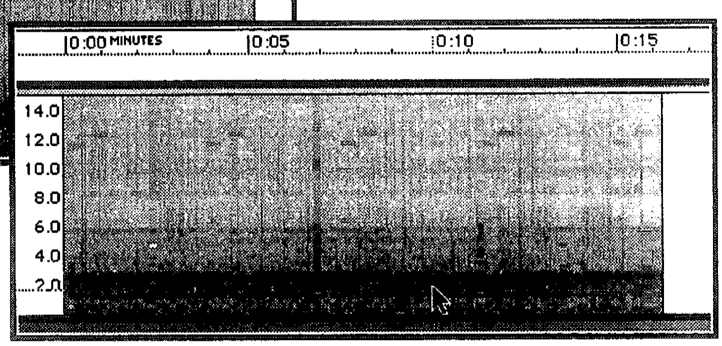
044528 UT



044628 UT

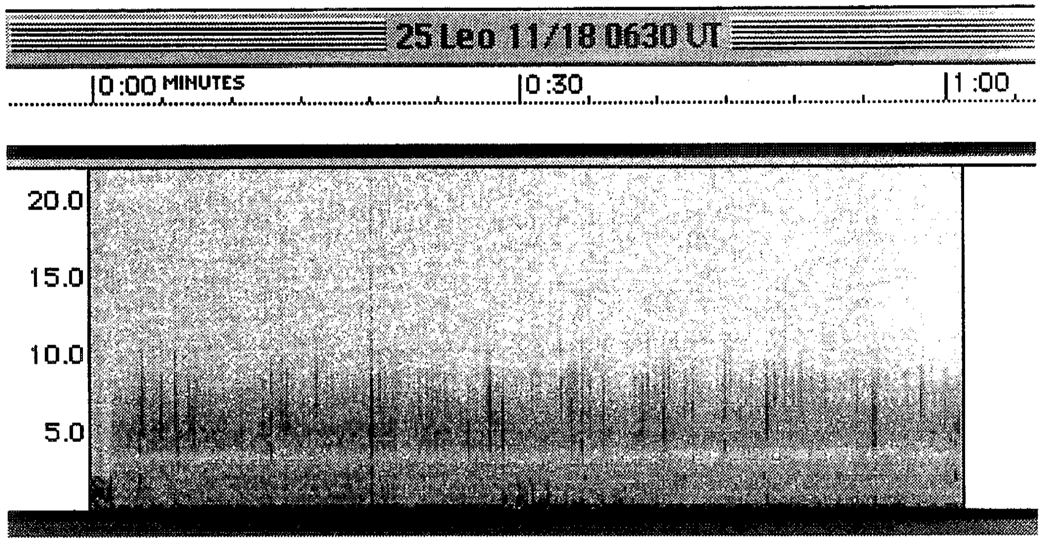


045015 UT

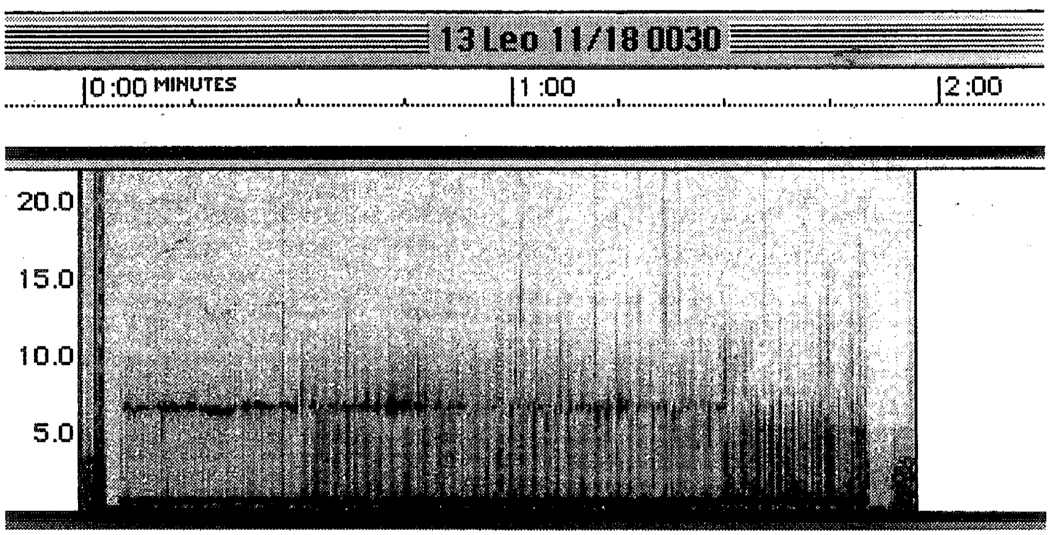


045037 UT

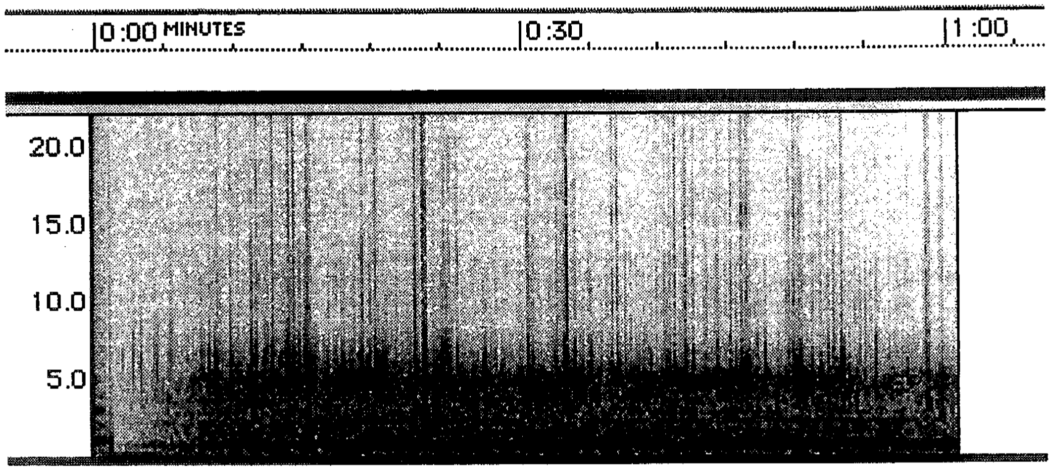
11/18/98



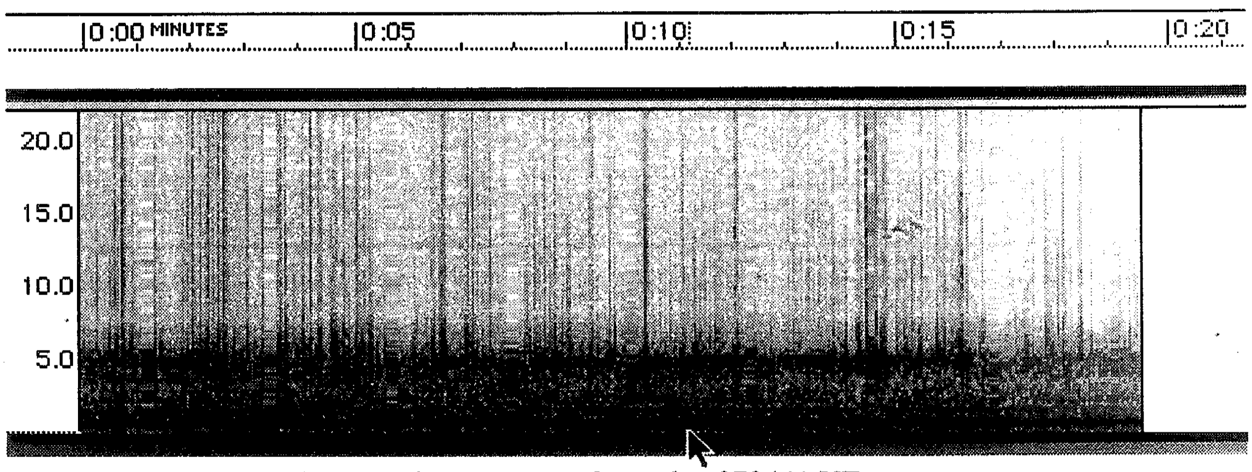
11/18 0630 UT Team 25 Norm Anderson, Cedar Falls, Iowa.
Note that the hum is gone!
Good sferics and tweeks in generally quiet conditions.



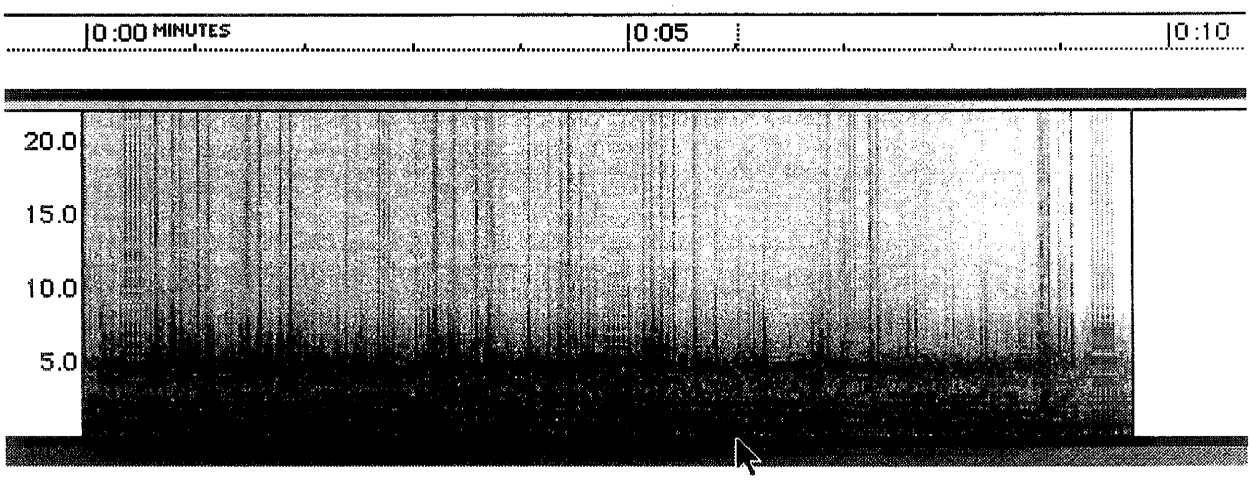
11/18 0530 UT Team 13 William Combs, Crawfordsville, Indiana
There was a persisten but intermittent buzz on the tape and it shows at about 6 kHz.
Strong sferics and tweeks were very evident throughout.



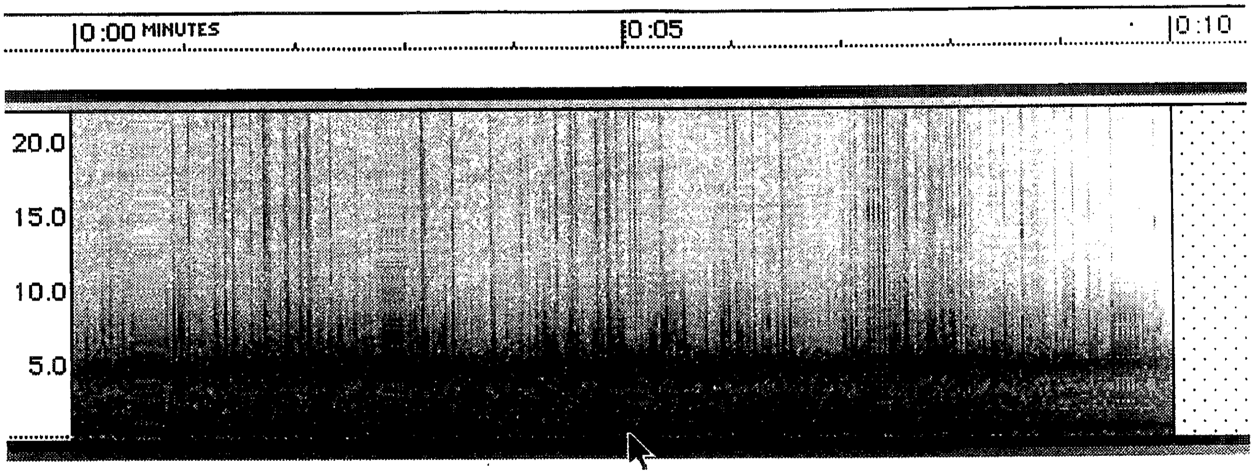
11/18 0704 UT Team 30 Linden Lundback, Watrous, Sask, CANADA
Generally noisy conditions with good natural VLF reception. Meteor logged at 070441 UT



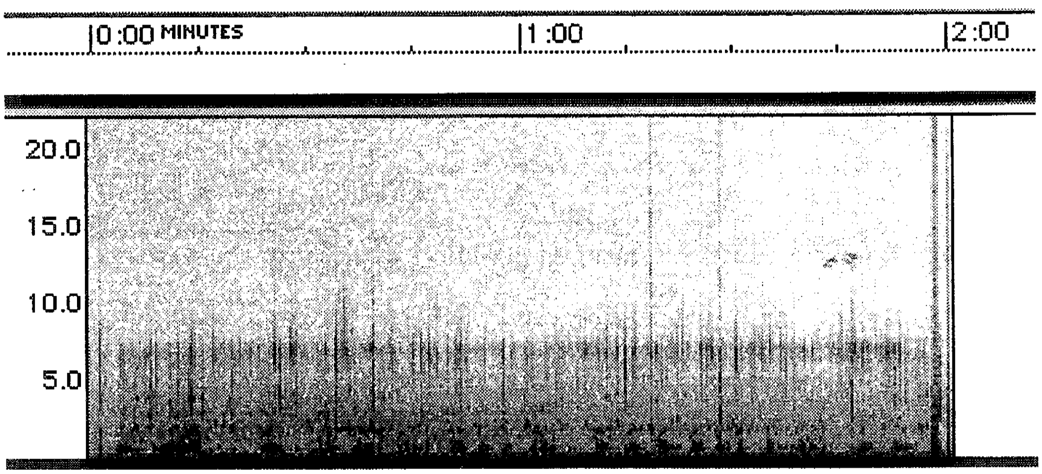
Arrow points to meteor logged at 070441 UT.



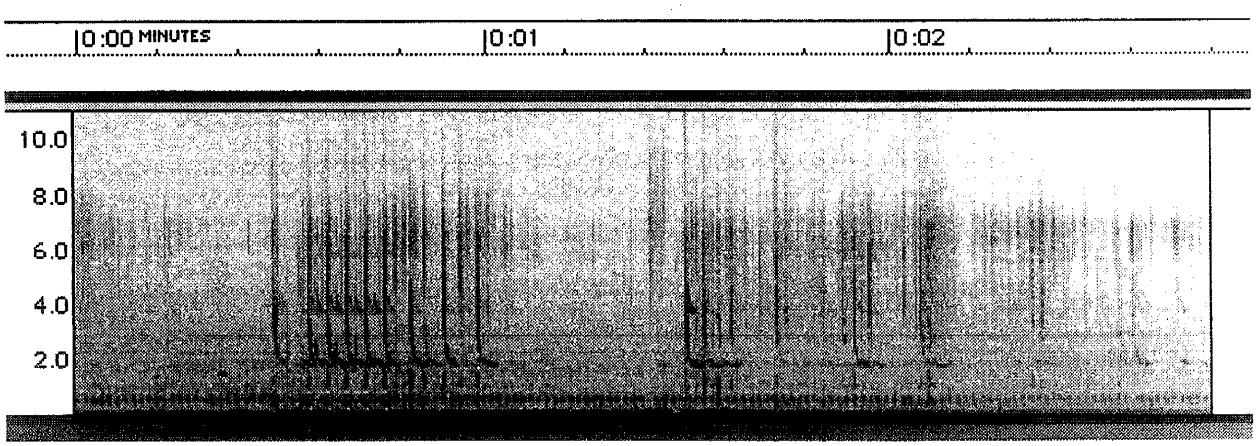
Meteor logged at 073111 UT.



Meteor logged at 073330 UT



11/18 0530 UT Team 21 Phil Hartzell, Aurora, Nebraska



Closeup of tweek burst at about the 7 second point above.
Note the "hook at about 2 kHz and the harmonice at about 4 kHz.

INTMINS - November/98 Data Analysis Report

by Bill Pine
Chaffey High School
Ontario, CA

The November/98 INTMINS observations marked the eighth session in an ongoing series of operations, conducted with the cooperation and assistance of the Russian Space Agency (IKI) and ENERGIA, the Russian space engineering organization. INTMINS is an attempt to detect manmade VLF radio waves emitted by instruments on the MIR Space Station.

INTMINS Status Report

Orbital corrections that occurred after the November/98 INTMINS schedule was distributed required a slight modification in the operation schedule. All operations on the first weekend were moved 2 mintues earlier than the scheduled time; all operations on the second weekend were moved 6 minutes earlier than the scheduled time. This resulted in a ground track for all operations that was essentially unchanged from the operations schedule maps. Since these modifications were well within the recording window used in the data taking procedure, there was no need to notify observers of this change. Notification was sent via email to those observers for whom email addresses were on file. The time analyzed on the tapes was, of course, changed to reflect the changed operation of the modulated electron gun, ISTOCHNIK.

The bottom line of the analysis remains unchanged: the VLF signal from the pulsed electron beam was not detected on the ground. This is not an unsurprising result since theoretical calculations of the signal of the power of ISTOCHNIK when propagated to the ground place the signal strength at just about the same as the background of natural VLF. We will continue with INTMINS as long as the Russian Space Agency (IKI) and MIR are able to provide observing opportunities for us. It is beginning to look like (even to an optomist!) the beam strength of ISTOCHNIK is inadequate to propagate a VLF signal to the ground that can be detected by our receivers. In the future, perhaps on the International Space Station, maybe a more powerful electon gun will be available for us to use in this ongoing investigation.

Data Analysis Procedure

The data analysis procedure used consisted of the following:

1. A sound file was created of the 2-minute period of ISTOCHNIK operation.

2. A spectrogram image was made of this file using a frequency range of 0-22.05 kilohertz so that the 12-15 kilohertz range could be examined for the presence of Russian Alpha navigation signals. The 1 kilohertz region of the spectrogram was examined for the 10 seconds on, 10 seconds off signal from ISTOCHNIK.

3. A one-minute portion of the file was cropped, enlarged and an image made using a 0-11.025 kilohertz frequency range. Again the 1 kilohertz region of the spectrograph was examined.

4. Finally, a 30-second portion was cropped, enlarged and an image made. A final examination of the 1 kilohertz region was made.

5. Additional sound files and spectrogram images were made of items of interest noted in the logs.

INTMINS-November/98 Operations Summary

(NOTE: All times are UT on the date indicated.)

European Passes

Pass	ISTOCHNIK Start Time	Path during ISTOCHNIK Firing	Number of Observers Recording Data
E21-5	2036	Central Italy	4
E21-6	2216	Russia, south of Moscow	2
E27-1	1723	Central Italy	1
E27-2	1903	Russia, south of Moscow	1
E27-3	2032	England	1
E28-5	1753	Croatia	2
E28-6	1931	Russia, south of Moscow	1
E28-7	2100	England	1

North American Passes

Pass	ISTOCHNIK Start Time	Path during ISTOCHNIK Firing	Number of Observers Recording Data
21-1	0107	East of NC, VA, DC, MD	1
21-2	0241	IL, IN, MI	1
21-3	0410	Central CA	4
21-4	0533	WA, ID	2
22-1	0130	SE of TX, LA	2
22-2	0302	So. CA, AZ	3
22-3	0439	OR, ID	2
27-4	2324	TX	2
28-1	0057	So. CA	1
28-2	0241	Quebec	2
28-3	0551	MN, IA, IL, IN	1
28-4	0721	WA, OR	0
28-8	2222	DC, MD, DE NJ, NY	1
28-9	2351	NM	3
29-1	0125	No. CA	2
29-2	0309	Quebec	2
29-3	0443	MN, WI, MI	1
29-4	0621	MS, AL, FL	2

Summary of European Passes Recorded

Team/Pass	E21-5	E21-6	E27-1	E27-2	E27-3	E28-5	E28-6	E28-7
E1	x					x		
E2	x					x		
E5	x	x	x	x			x	x
E6	x	x			x			

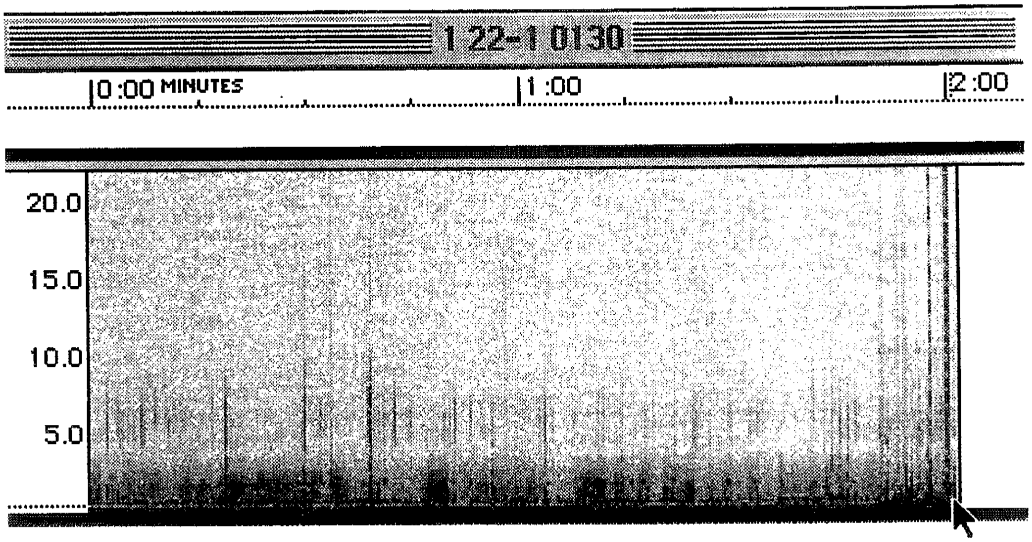
Summary of North American Passes Recorded

Pass	11/21				11/22			11/27	11/28						11/29			
	1	2	3	4	1	2	3	4	1	2	3	4	8	9	1	2	3	4
Team																		
1	x					x		x						x				
4													x					
5										x						x		
6			x			x			x									
7			x				x								x			
15			x	x	x	x	x							x	x	x	x	x
18																		x
25		x									x							
28					x			x						x				
30			x	x						x								

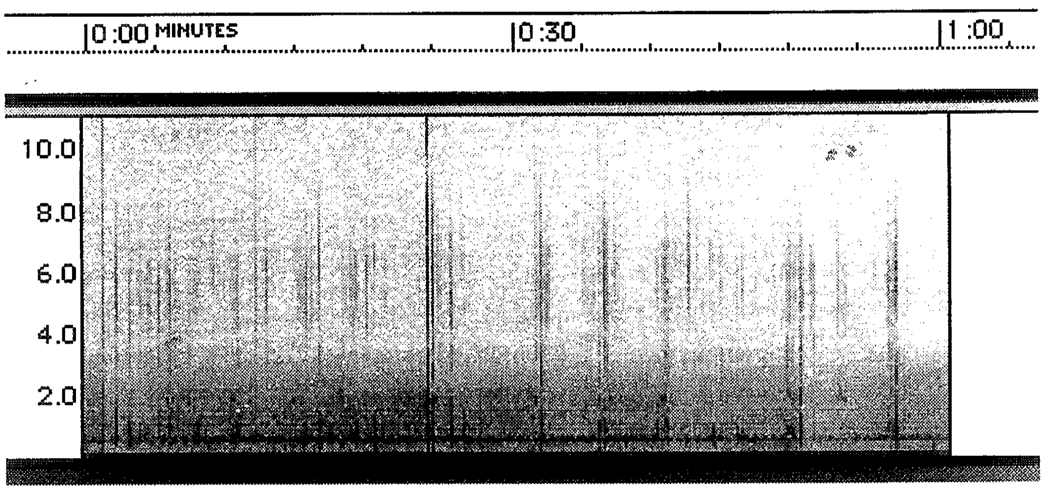
INTMINS Data

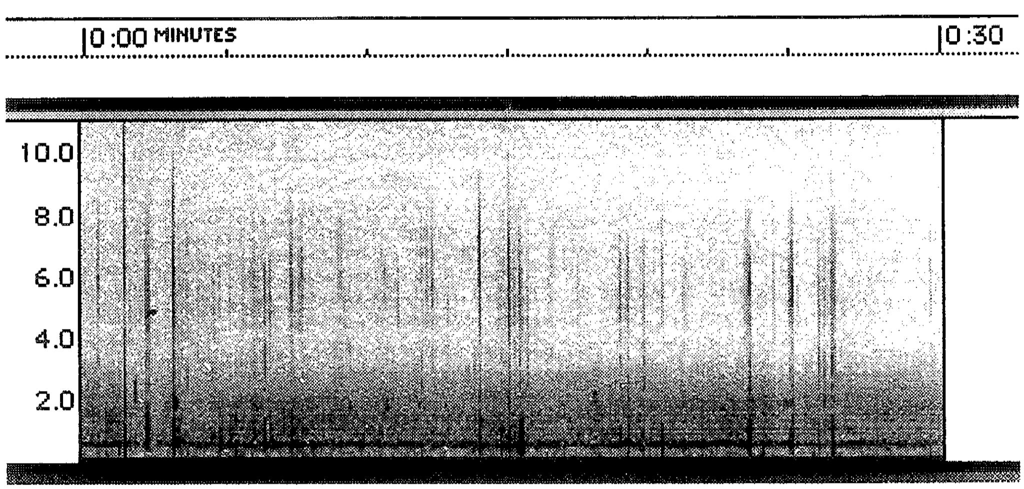
The following spectrograms are taken from data tapes submitted by INSPIRE observers. The first view shown will be that of the entire two-minute interval analyzed. At the top of the image is the sound filename which consists of the Team Number, operation number, and the start time of the operation. Subsequent views will be of portions of the first. Use the time scale at the top to determine the length of the view. Use the frequency scale on the left to determine the frequency range used for that view. Unless otherwise noted, the start time of the cropped view is the same as the start time of the operation.

21-1

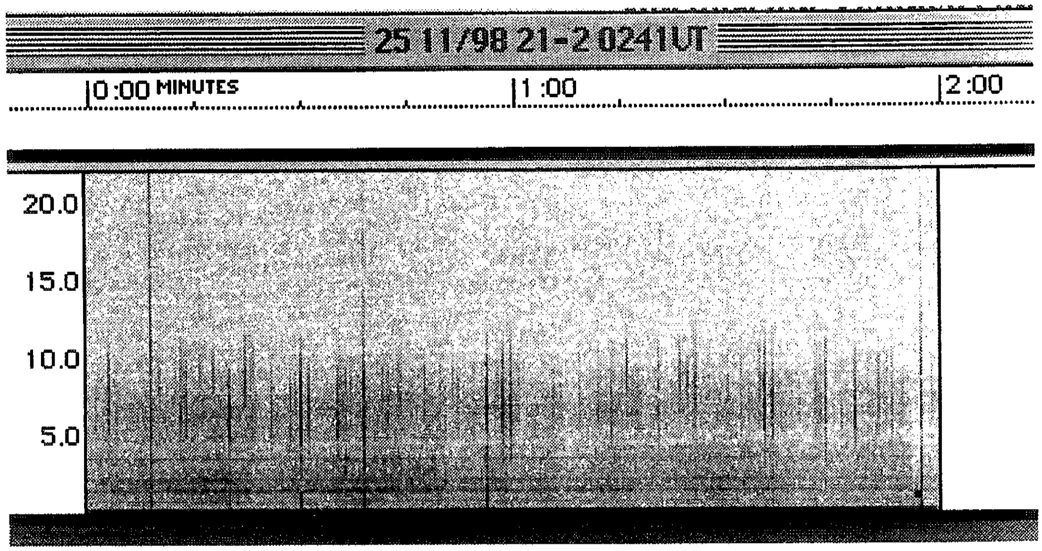


Team 1 Jack Lamb, Belton, Texas. Very low hum level with good sferics. Arrow: 0132 UT

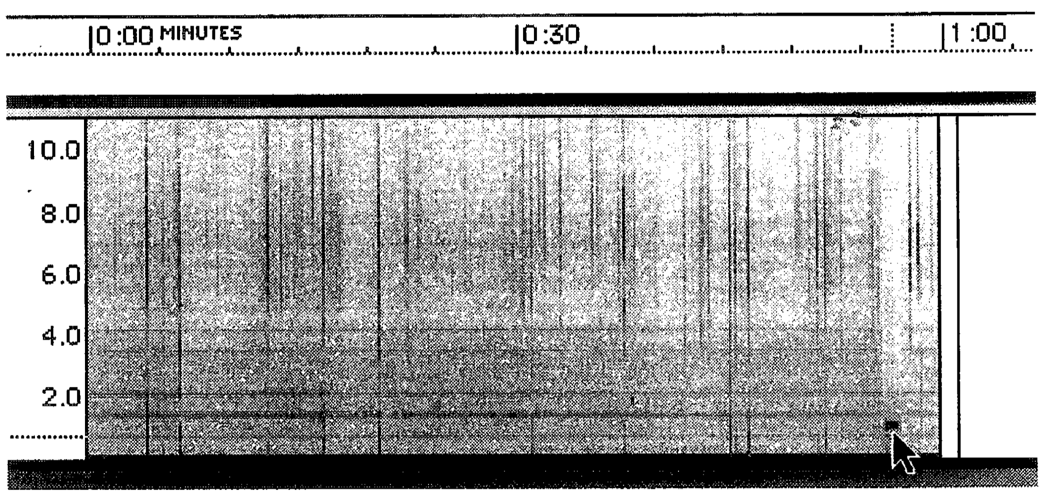




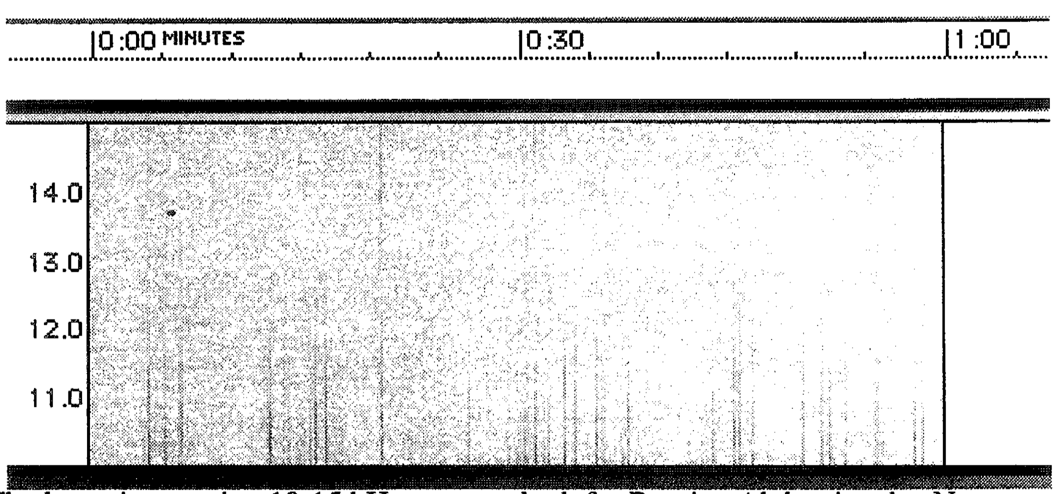
21-2



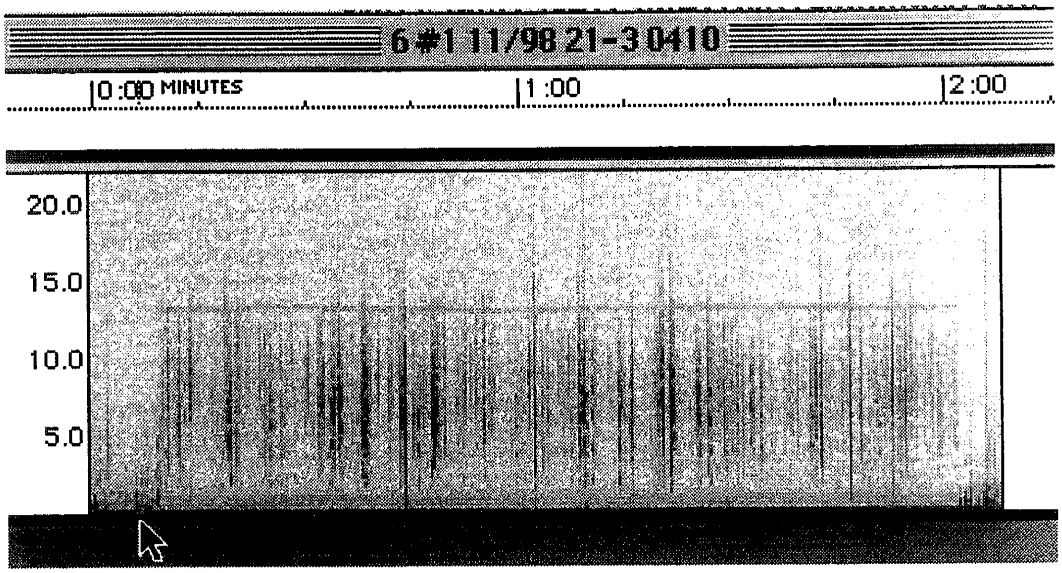
Team 25 Norm Anderson, Cedar Falls, Iowa. Some hum present, but sferics stand out against this low level background. Medium density sferics and tweeks.



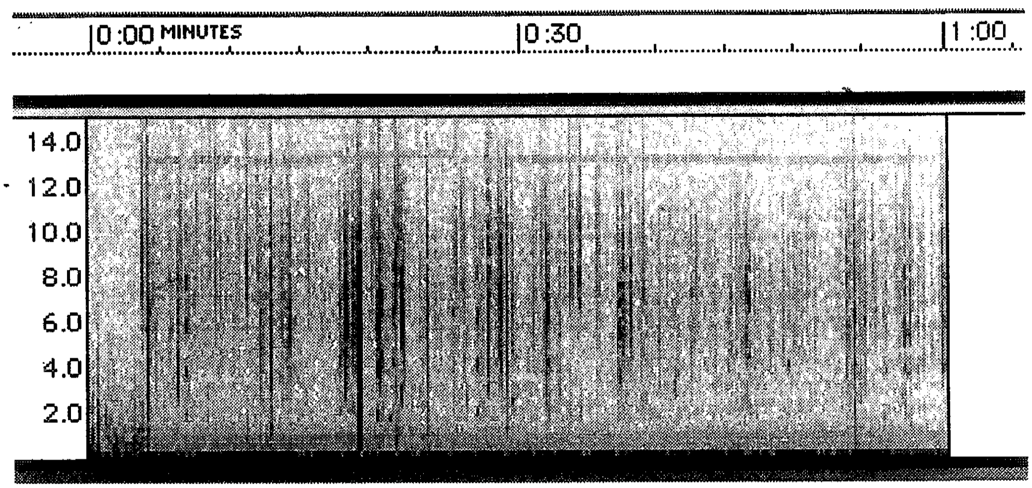
Last minute from above. Arrow points to WWV tone at 0243 UT.

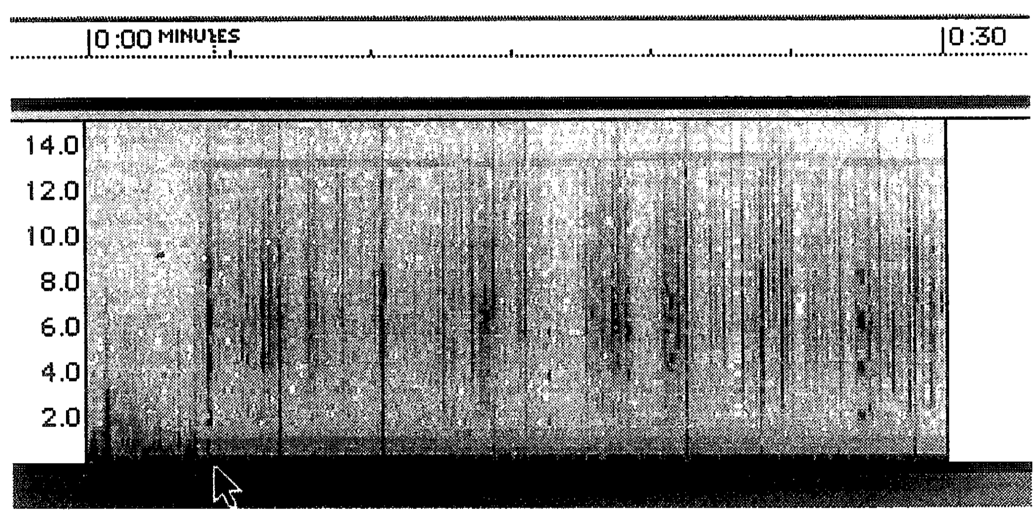


The last minute using 10-15 kHz range to look for Russian Alpha signals. None seen.



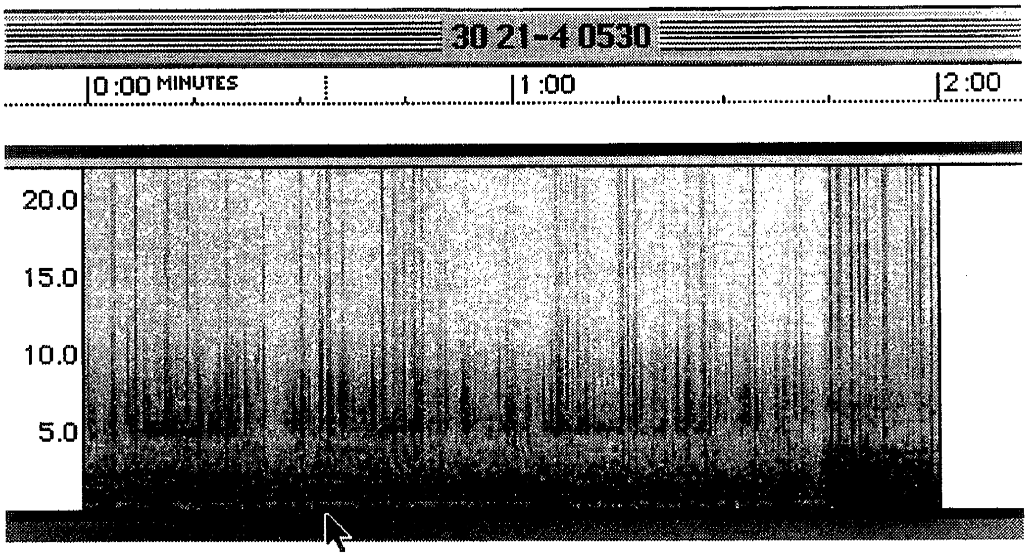
Team 6. Bill Pine, Chaffey High School, Ontario, California. Arrow points to 0410 "mark". Dense sferics and tweeks.



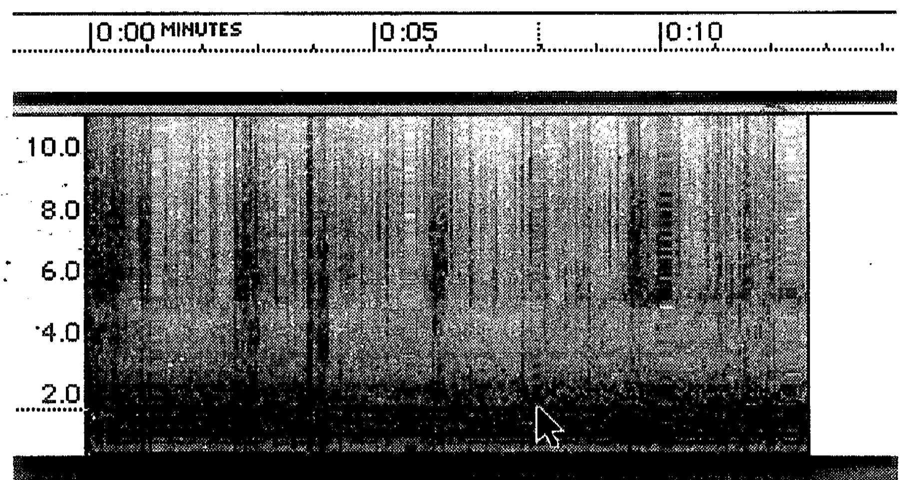


The arrow points to a strong tweek with a "hook" at about 2 kHz and several harmonics present.

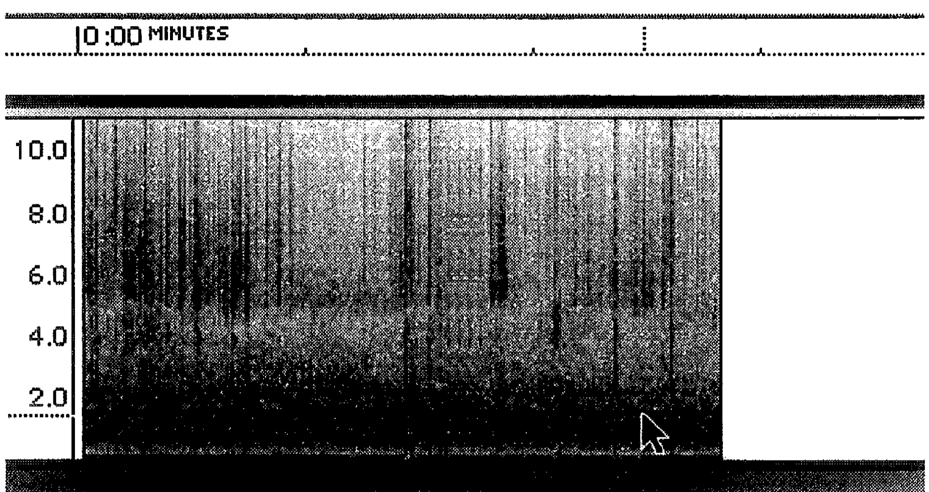
21-4



Team 30. Linden Lundback, Watrous, Saskatchewan, CANADA. Arrow points to whistler logged at 0530:35 UT.

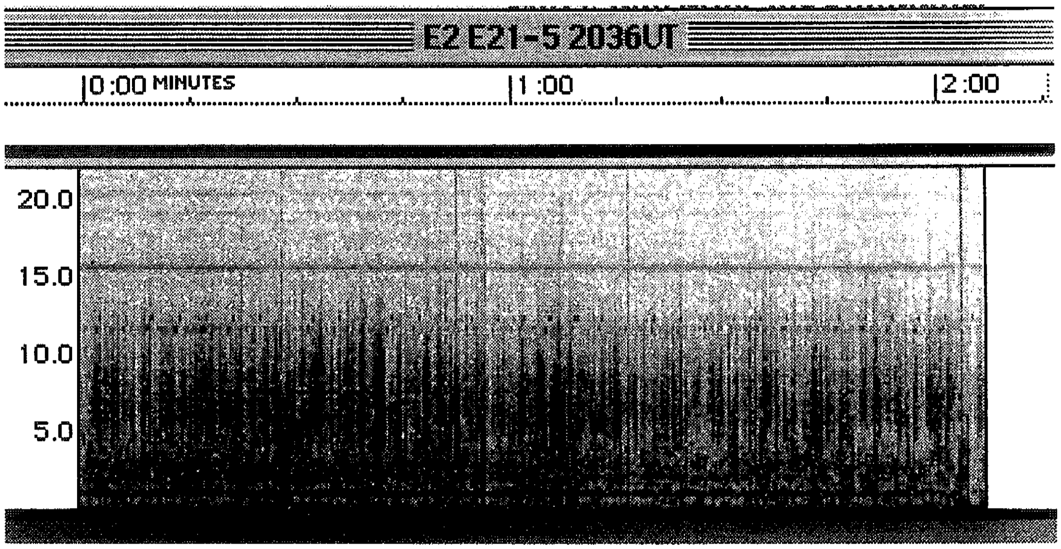


Arrow points to whistler.

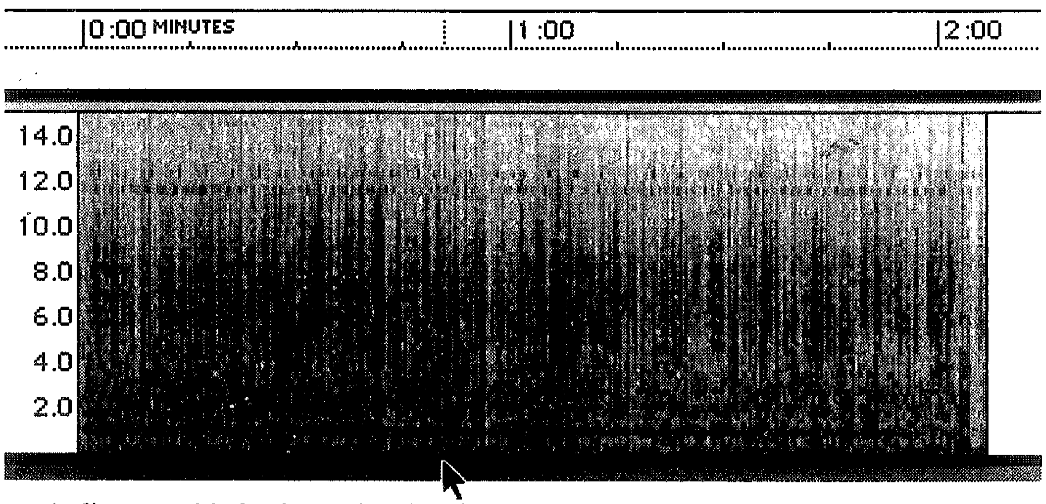


Arrow points to whistler. Not as obvious in this extreme closeup.

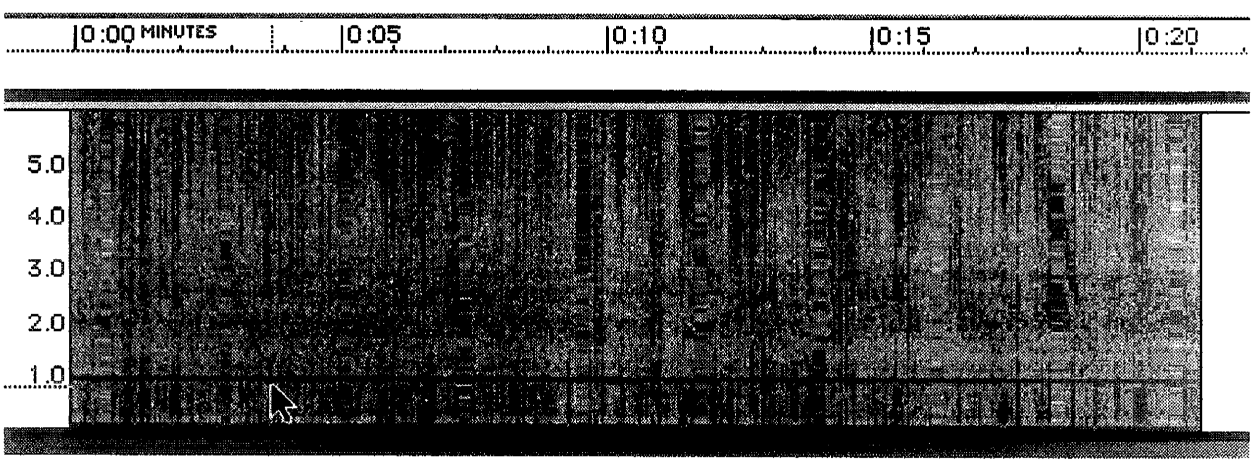
E21-5



Team E2. Silvio, Bernocco, Torino, ITALY.

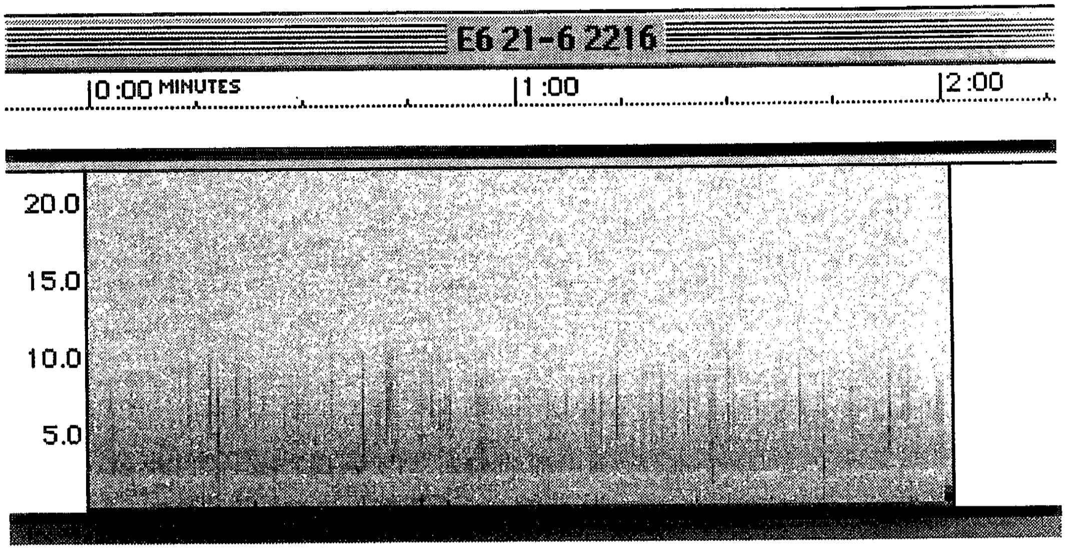


Arrow indicates whistler logged at 2036:45 UT. Note strong Alpha at and above 12 kHz.

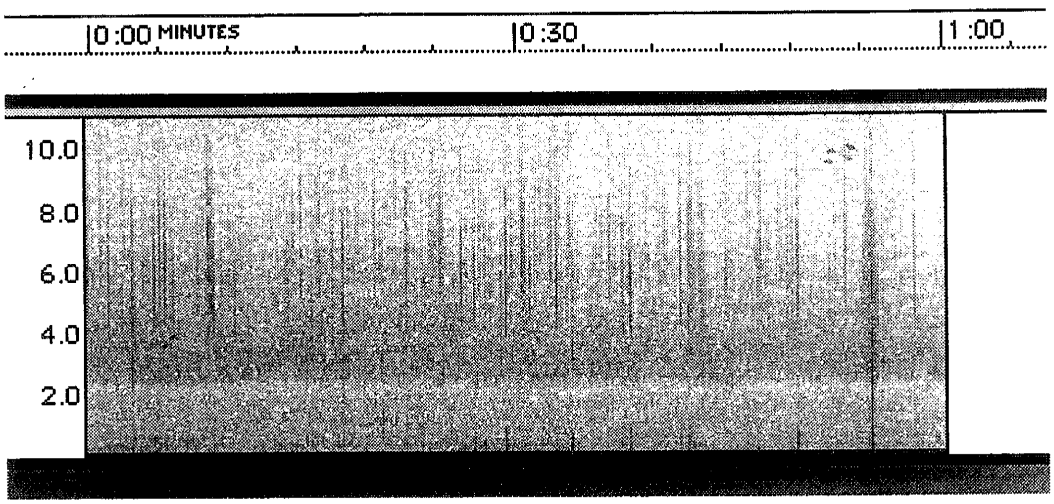


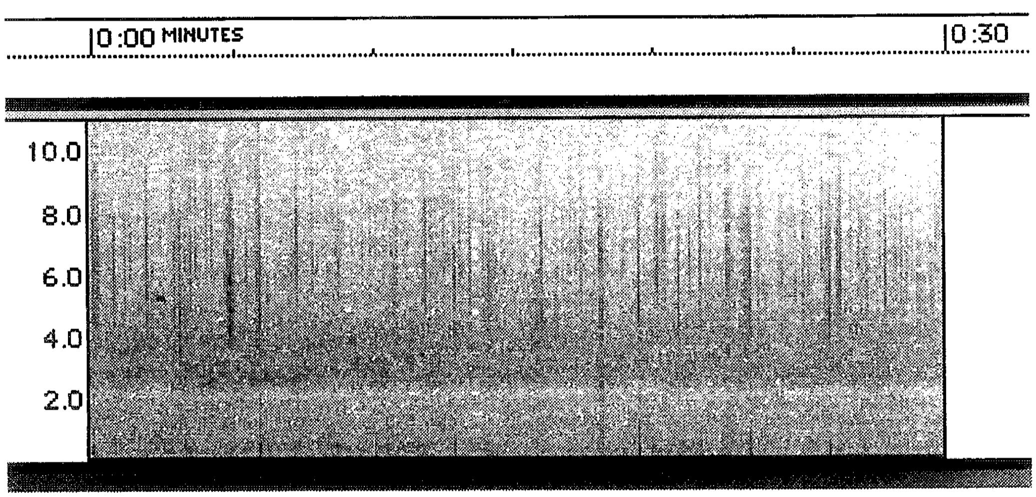
Arrow indicates weak whistler; strong whistler is visible at :18 seconds.

E21-6

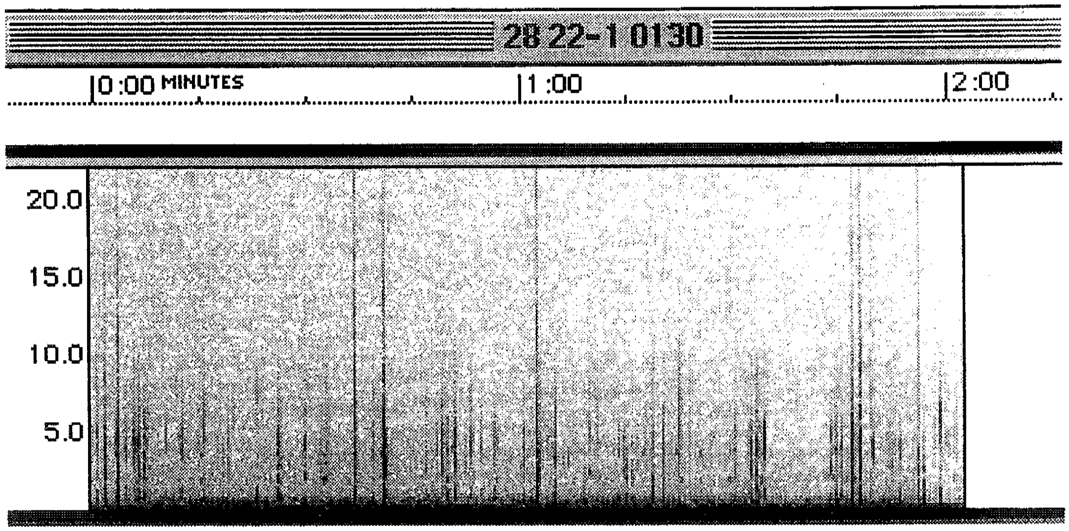


Team E6. Marco Ibridi, Finale E., ITALY.

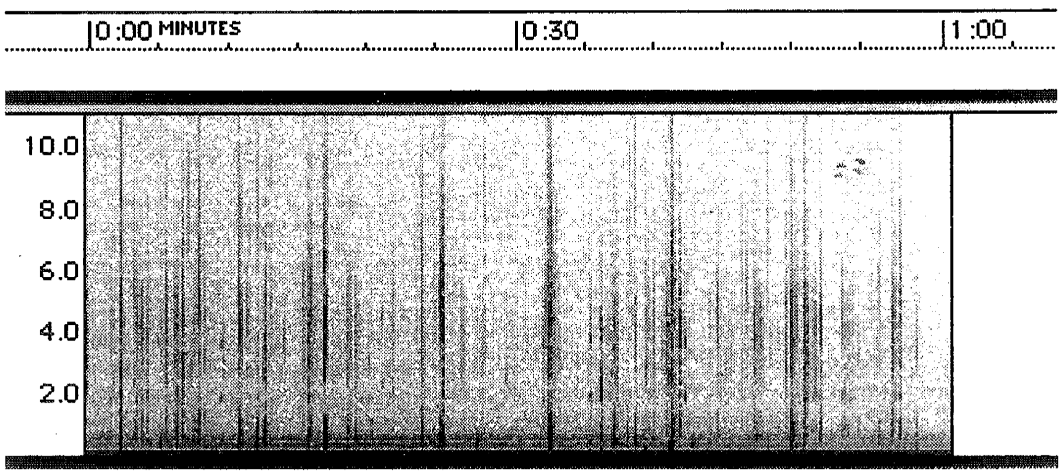


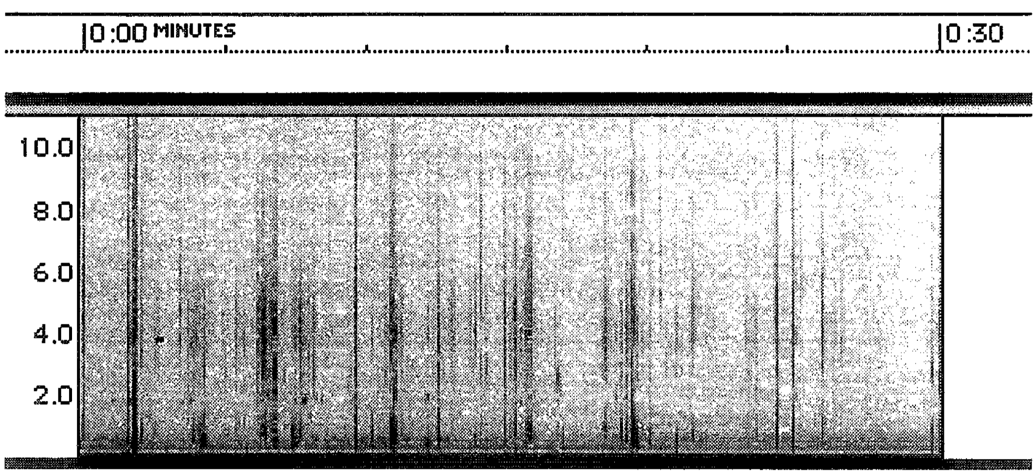


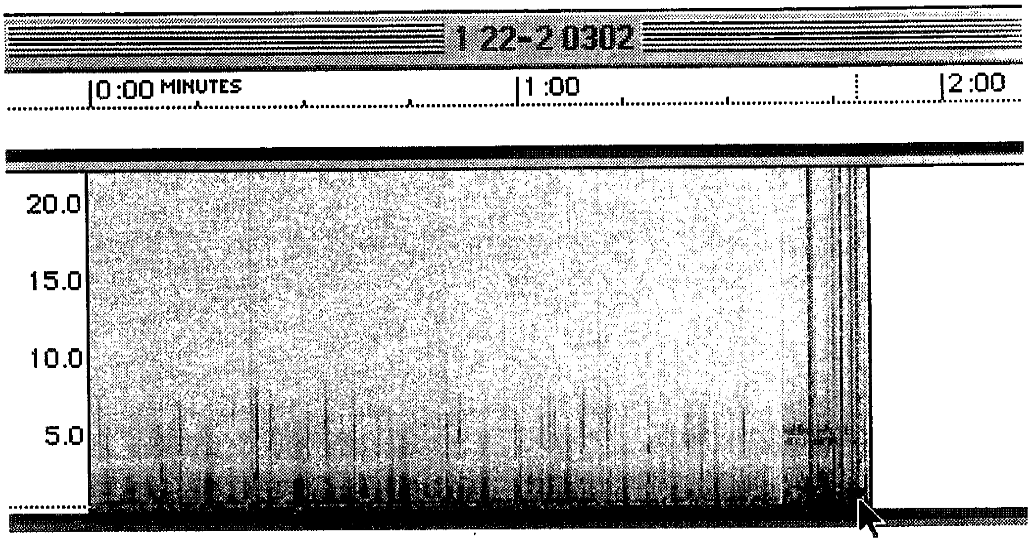
22-1



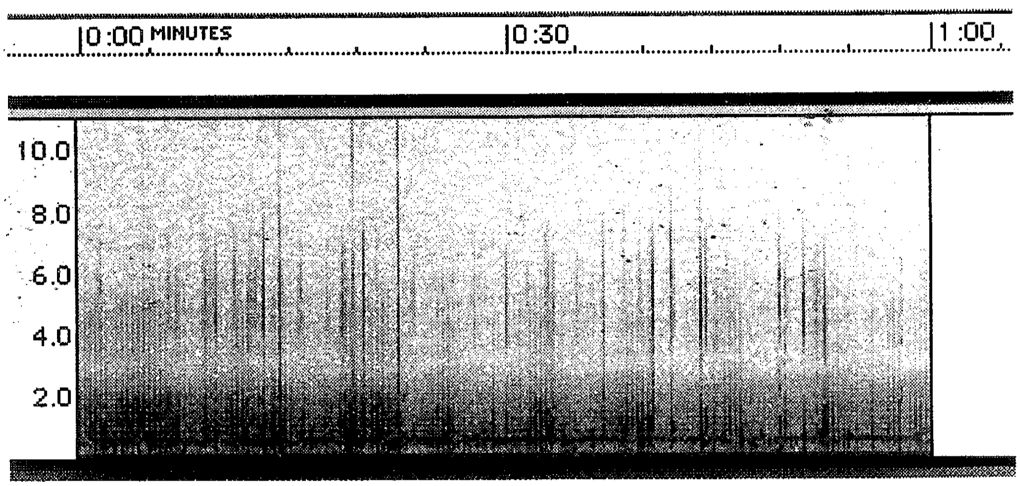
Team 28. Thomas Earnest, San Angelo, Texas.

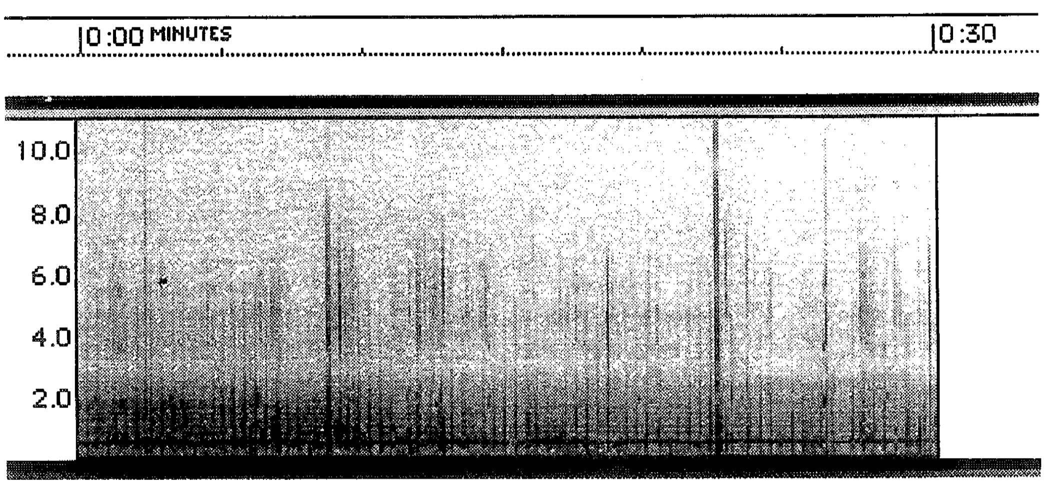




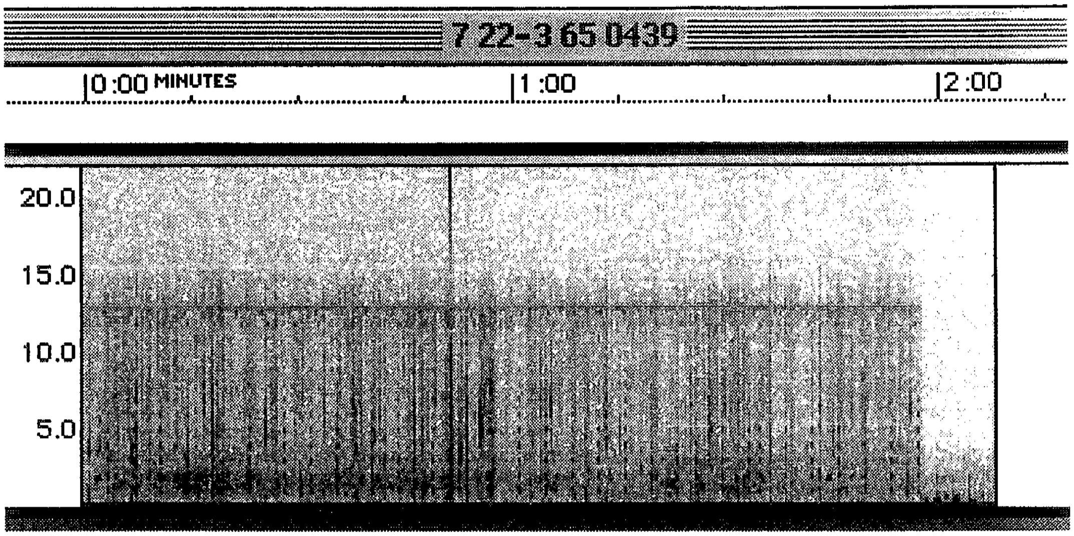


Team 1. Jack Lamb, Belton, Texas. Arrow points to 0304 WWV tone. Computer was started a little late resulting in a file less than 2 minutes long.

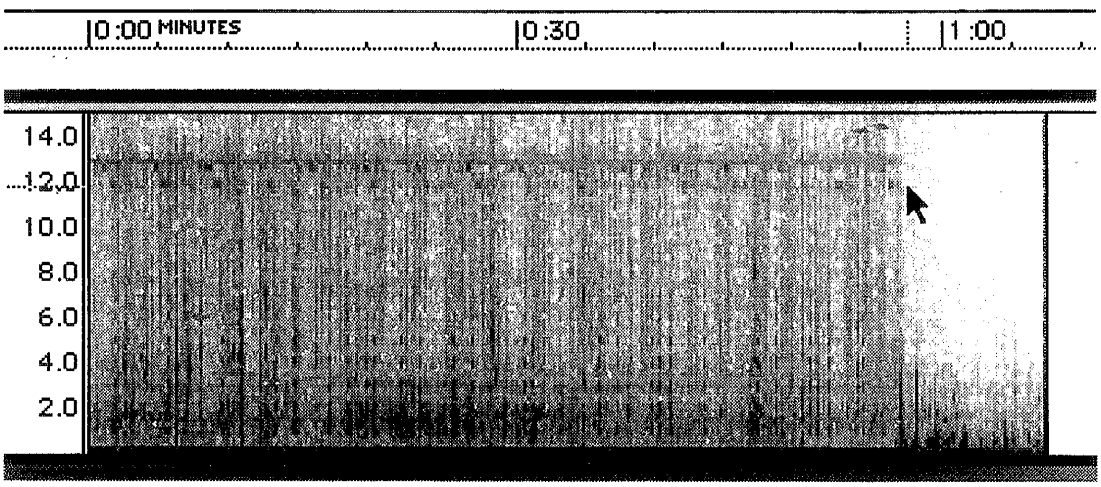




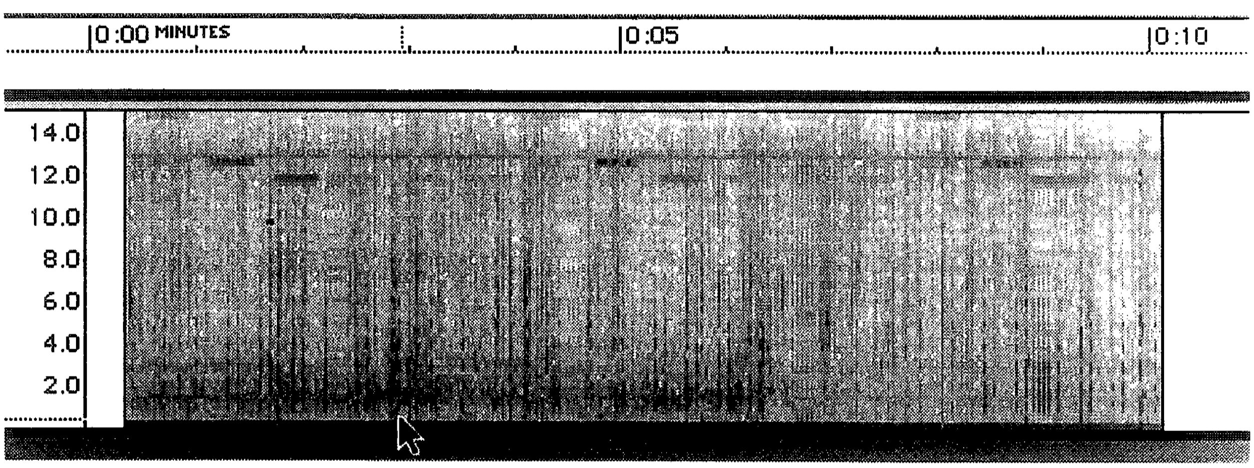
22-3



Team 7. Dean Knight, Sonoma Valley High School, Sonoma, California. Dense sferics. Alpha signals evident between 10 and 15 kHz.

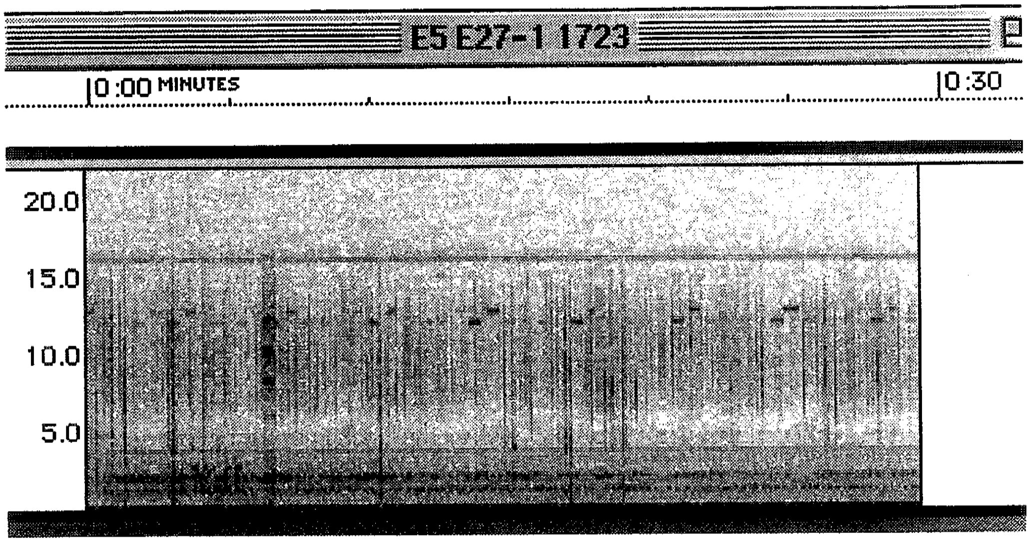


Arrow points to the region of dashes indicating the presence of Russian Alpha navigation signals.

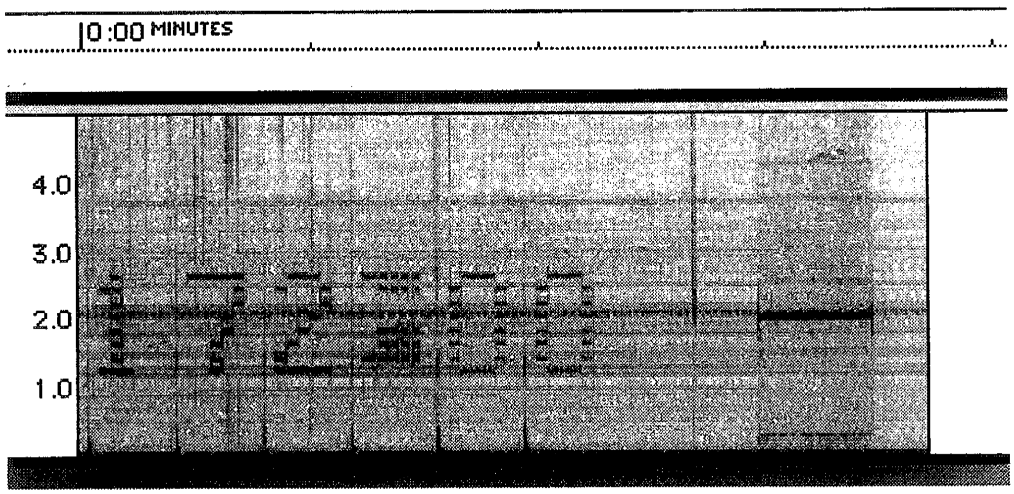


First 10 seconds showing the Alpha pattern. Arrow indicates a strong tweek.

E27-1



Team E5. Renato Romero, Cumiana, ITALY. First 30 seconds. Note the strong Alpha signal.



This is a closeup of the automoatic time stamp from Mike Aiello's software. This sounds on the tape like a musical ringing and appears on the spectrogram as seen above.