

First Astronaut From Nebraska

By Phillip D. Hartzell
Aurora, NE

Hello Fellow Listeners:

The last year or so have brought some changes in my day-to-day activities. This has limited my VLF experimentation, and as a result I have missed several of the scheduled recording sessions. I expanded my business on Dec 19 1999. I sold my existing shop and on that date made the move to a larger location. My business is custom auto upholstery. Previous to that event, I married Lorie Anderson on May 29 1999. Being married to Lorie is a great deal, but at that time I also became brother-in-law to Clayton Anderson, the first astronaut from the state of Nebraska.

Clay was born in Ashland, NE and spent all of his life growing up in this small community of about 2000 in population. He was a typical kid, lots of athletics and play. Clay was never really that interested in space, until his mom woke him, his brother Kirby and sister Lorie at 3 am to see one of the Apollo missions photograph the backside of the moon. Clay stated "That was kind of cool, Mom" and went back to sleep. That experience ate at him some, and he thought someday he might like to become an astronaut, but he would rather play basketball instead.

Clay graduated from Ashland High School and headed to Hastings College (in Nebraska) to study something and play ball. His heart for space was rekindled and he decided to study physics and engineering. He graduated from Hastings College in 1981 and quickly received a chance for an internship over the summer at NASA in Houston. As an intern he worked on data analysis systems with various flight and space simulators. His next step was to receive his masters degree in 1983 in aerospace engineering from Iowa State. (Yes, he is still a Nebraska Cornhusker!). He applied for the astronaut training at that point but they gave him other duties to attend to while at Houston. He vividly remembers his lowest point was the Challenger accident in 1986. He gets teary eyed when he recalls how stunned and shocked the people were on that tragic day.

Clay was finally accepted for training in June of 1998. He graduated with the 17th astronaut class, one of 31 men and women. The 17th class has chosen the penguins as their mascot, the reason being is that "penguins will never fly". Quite a sense of humor! At the present time Clay has been working on engineering and data involved with the new Space Station. He has spent several weeks in Nebraska speaking at various schools and organizations. Clay hopes to receive a mission on the shuttle very soon. If all goes as planned he will likely get some serious time on the Space Station in the next 5 to 8 years. His wife Sue has reservations about Clay being gone several months at a time, but she understands as she is a NASA employee herself, working as a liaison with the Russian Space Agency. Clay and Sue have one son Cole, who is five. They are expecting their second child in March. It has been a lot of fun to be married into the Anderson family. We all hope to see Clay in orbit very soon.

Happy Listening.

Phil

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THURSDAY, JULY 13, 2000
LINCOLN, NEBRASKA

Space odyssey starts in Ashland



Clayton Anderson, astronaut candidate

Age: 41

Hometown: Ashland

College: Physics degree, Hastings College; master's, aerospace engineering, Iowa State

Training, NASA roles: Began work at NASA in 1983 in mission planning, analysis division; has worked with Galileo, Magellan and Gamma Ray Observatory missions; now works with solar and other power systems for shuttle; selected to be astronaut candidate in 1998.

Goal: Mission Specialist 2 on space shuttle mission, possibly to space station or Mars.

Itinerary: Could fly in space shuttle in five to six years.

Logging INSPIRE Data

By Bill Pine
Chaffey High School
Ontario, CA

A feature of all scientific investigations is careful record keeping. A laboratory scientist may keep records in the form of a journal in which all equipment used is described, all procedures outlined, all data is recorded and computations and graphs are shown. For field study it may not be convenient to carry a large, bound volume, so data may be recorded on separate pages. This is the method used by INSPIRE. The Data Log Cover Sheet and INSPIRE Data forms have been modified over the years to accommodate the various data gathering activities and opportunities that INSPIRE has conducted. With the demise of MIR and INTMINS, these forms have been revised once again. The new forms appear as pages 47 and 48 of this *Journal*. The following is a brief explanation of how to use these forms.

The purpose of the Data Log Cover Sheet is to provide information about the INSPIRE team that does not change from session to session. Only one of these pages needs to be submitted with each set of data. In other words, if you record data for several sessions of the April Coordinated Observations, you only need one Cover Sheet for all of the data.

Data Log Cover Sheet		(copy as needed)
INSPIRE Observer Team _____		Team Number: _____
Equipment:	Receiver	_____
	Recorder	_____
	Antenna	_____
	WWV radio	_____

The Observer Team name is up to you. We use "Chaffey", you could use your school name or your own name or a name of your choice. Team Numbers will be assigned as data arrives and will be permanent for use on Coordinated Observations. Equipment descriptions include brand names and model numbers, when applicable.

Site description: _____		
Longitude: _____ ° _____ ' W	Latitude: _____ ° _____ ' N	
Personnel: _____		

Site Description is in words; Longitude and Latitude are included, if known. Personnel can be listed if the same people always participate. If personnel changes, a separate note can be included.

INSPIRE Data	(copy as needed)
INSPIRE Observer Team _____	Team Number: _____
Coordinated Observation Date: _____	Receiver _____
Tape Start Time (UT) _____	Tape Start Time (Local) _____
<div style="border-top: 1px dashed black; height: 10px; width: 100%;"></div>	

This part should be read into the recorder at the start of each session. The "Receiver" entry is for those teams using more than one receiver.

Local weather: _____		
Code: M - Mark (WWV or Voice) S - sferics T - tweak W - whistler A - Alpha C - chorus		
Sferic Density: D: _____ Scale of 1-5 (1 - Very Low, 3 - Medium, 5 - Very High)		
Time (UT)	Entry	Observer
_____	M-WWV M-V S T C W _____	D: _____

At each time mark (every 2 minutes) or more often, record the time and circle all of the relevant codes. If the time mark is from a WWV radio, circle "M-WWV", if the mark is by voice, circle "M-V". Circle all natural signals present: S T C W. Place a number in the "D: _____" location indicating your estimate of the sferic density. Use the space available to make other observations (use more than one line if needed). Indicate the observer's name, especially if the observers are changing. At the end of each session, say "End of Data" into the recorder, log this and you are done.

On the following pages are some examples of logging done by INTMINS observers using the previous versions of the forms. Notice the variety of methods and the variety of forms. All are examples of good data recording.

Team 15 Robert Bennett Las Cruces, NM

Robert has modified the cover sheet so that the only blanks are the items that might change from operation to operation. This streamlines the log preparation process.

DATA LOG COVER SHEET
OBSERVER: Robert Bennett
DATE: 28 Nov 99

OPERATIONS DETAILS

Type Operation: ISTOCKNIK mission 28-4

Tape Start Time: 2031 UTC

Local Time 1331 MT.

Operation Start Time: 2043 UTC

Local Time: 1343

Operation Stop Time: 2045 UTC

Local Time 1345

Tape Stop Time: 2056 UTC

Local Time 1356

EQUIPMENT

Receiver: RS-6

NOTE: The "RS6"
is a souped up RS4
modified by Bob

WWV Receiver: Yupiteru MVT 7100

Recorder: Marantz CP 430.

WWV Antenna: 3' whip

Antenna: 120 Ft Longwire
orientation 270° (West)

WWV Frequency: 15 MHz MHZ.

NOTE: A long wire
antenna increases the
sensitivity of the receiver.

Misc: RS-6 Settings: Ant on Longwire, HPF-in, Gain on max,
Recorder limiter ~~off~~ ^{out}, WWV on left channel. Note, in "whip" setting on
RS-6, too much horizon pick-up.

All settings are logged. Changes in settings
are noted in the Data Log.

SITE INFORMATION

Location: 32 deg, 34 min N LAT: 106 deg, 41 min W LON: Elevation: 4290 Feet

Site Description: Desert valley between two mountain ranges.

Temp: 68 F. R.H. 45 %.

Local Weather: warm dry winter day. No wind. Very nice
out in desert.

Bob also modified the Data Log sheet. An important change is to include the counter reading from the recorder. This makes it easy to find a specific location in the data.

mission 28-4
28 Nov 99

DATA COLLECTION FORM

TAPE RECORDER COUNTER	TIME UT	EVENT	SFERIC LEVEL	COMMENTS
0-11	-	Voice Announcement	-	1. 600 Hz present
13	2032	WWV	4-5	2. No Loran, or very low
28	-	Noise burst	-	Tweaker and Sferic
34	2033	WWV	-	Average recorder level -6 to -8 dB
37	-	Noise burst	-	Note recorder limiter = OFF
65-68	-	feed back, I moved	-	toward antenna with headset on
73	2035	WWV	-	-
99	-	strong static clash	-	Not sure of source.
125	2038	WWV	-	-
141	2039	WWV	-	-
172	2041	WWV	-	-
194	-	weak incoherent noise	-	-
202	2043	T-Time	-	T-Time ←
223	-	more incoherent noise	-	-
230	2045	WWV - mission End	-	End time ←
257	2047	WWV	-	-
282	2049	WWV	-	-
307	2051	WWV	-	-
317	-	strong incoherent noise	-	-
331	2053	WWV	-	-
332-337	-	Put RS Ant switch on "whip" and LPF-out	-	-
338	-	put LPF back in	-	-
354	2055	WWV	-	Loran now very strong
-	-	both Ant on whip and LPF out from here to End	-	Record limiter in
376	2057	WWV	6-7	This test shows very clearly
398	2059	WWV	-	that Loran is strong enough
419	2101	WWV	-	in my area to saturate RX
430	-	End of Recording Side A	-	when long wire Ant is used.
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-

Page 2 of 3

Team 21

Phil Hartzell

Aurora, NE

Phil uses the INSPIRE Cover Sheet.

Note the use of a loop antenna with the VLF2 receiver.

Data Log Cover Sheet

(copy as needed)

INSPIRE Observer Team

21- HARTZELL

Receiver VLF-2

Operation

24-8

Date

4-24-99

Tape Start Time (UT) 18:35

Operation details:

Tape start time: 18:35 UT 1:35 PM local

Operation start time: 18:35 UT 1:35 PM local

Operation type: INTENSIVE ISTOCHNIK

Operation stop time: 1900 UT 2:00 PM local

Tape stop time: 1900 UT 2:00 PM local

Equipment:

Receiver

VLF-2

WW V reception:

Recorder

CTR 69

Antenna

LOOP - 4 FT DIAMETER

WWV radio

SYNC WITH WWV

Site description:

HILL OVERLOOKING SMALL POND -

Longitude:

98° 0' W

Latitude:

41° 0' N

Local weather:

CLOUDY - NO DRIZZLE - WIND EAST 10 MPH 49°F

Personnel:

PHIL HARTZELL

Team Leader address:

Name

PHIL HARTZELL

Notice the informative details on the "Entry" line. Also notice the references to "car noises". The VLF2 picks up radio signals from the ignition system of passing cars. The loop antenna is especially sensitivity to ignition noise.

INSPIRE Data

(copy as needed)

INSPIRE Observer Team

21- HARTZEL

Receiver VLF-2

Operation

27-8

Date

4-24-99

Tape Start Time (UT) 18:35

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
M 1835	S - CAR NOISE AT 56 SEC S: 0 1 2 3 4 5	PAUL
1836	T- SFERICS W41 W48 S: 0 1 2 3 4 5	
M 1837	SFERICS- S: 0 1 2 3 4 5	
1838	BURST OF S AT 12 SEC S: 0 1 2 3 4 5	
1839	STRONG SAT 27 SEC S: 0 1 2 3 4 5	
1840	SFERIC AT 48 SEC - 35+50 S: 0 1 2 3 4 5	
1841	(CONSTANT STATIC MASKING S: 0 1 2 3 4 5 WHISTLERS??) S: 0 1 2 3 4 5	
M 1842	SAME S: 0 1 2 3 4 5	
18:43	CAR HUM FROM WEDDING S: 0 1 2 3 4 5	
18:44	ENGINE NOISE FADING S: 0 1 2 3 4 5 FIRST 10 SEC - S: 0 1 2 3 4 5	
18:45	NEARLY SOLID SFERICS S: 0 1 2 3 4 5	
1846	SAME S: 0 1 2 3 4 5	
(T) M 18:47	CAR NOISE AT 45 SEC S: 0 1 2 3 4 5	
18:48	STILL CAR NOISE S: 0 1 2 3 4 5	
18:49	CAR AT 20 SEC S: 0 1 2 3 4 5	

Team 18

David Jones

Columbus, GA

David uses the INSPIRE Cover Sheet.

Data Log Cover Sheet

INSPIRE Observer Team

18 JONES

Receiver RS4

Operation

18 - 9

Date

4 18 99

2104

Operation details:

Tape start time

2104

1704

On-air start time

2116

1716

Operation type

1STOCHNIK

Operation stop time

2118

1718

Tape stop time

2131

1731

Equipment:

Receiver

RS4

Recorder

RS CTR69

Antenna

VERTICAL

WWV radio

LOW FREQ WWVB VOICE HACKS

Site description:

OPEN FIELD

Longitude:

84.55 W

Latitude:

32 16

Local weather:

CLEAR DRY

Personnel:

Team Leader address:

Name

DAVID M JONES

1000 HUNTON AV

INSPIRE Data

INSPIRE Observer Team

Operation

Date

18 JONES

18-9

18 APR

Receiver RS4

2104

Code: S - sferics

012345

Time

En

21:04:00 CLANKING MAST AND WIRE

21:08:58

W

21:10:00 CLANK STOPS

21:10:29

W

21:12:04 INSECT

21:12:33 CLANK STARTS

21:12:52

W

21:12:55

W

21:14:15

W

21:15:05 RISING IGNITION OR ALTERNATOR

21:15:30

W

21:17:15

INSECT

21:17:54

INSECT

21:18:38

W

21:19:59

INSECT

21:20:30

W, also clanking

21:24:28

DOUBLE WHISTLE

21:27:12

W

21:27:50

W

21:30:36

W

21:35:28

END OF TAPE

Windy conditions led to the clanking noises.

The VLF2 picks up a signal from insects. Sounds just like a mosquito buzzing in your ear!

Whistlers logged to the nearest second.

Team 7

Dean Knight Sonoma Valley High School

Sonoma, CA

Dean fills out the Cover Sheets and his students do the logging. The Sonoma Valley High School Team sets up 3 RS-4 receivers using different antenna arrangements. Long wire antennas of various lengths are set up in specific orientations. Often there is a notable difference in signals received from a North-South antenna and an East-West antenna.

Data Log Cover Sheet

(reproduce as necessary)

INSPIRE Observer Team

Sonoma Valley HighReceiver RS-4

Operation

21-2

Date

Sat 11/20/99 PST Tape Start Time (UT) 0647

Operation details:

Tape start time: 11/20/99
0647 UT 10:47pm local PSTOperation start time: 0659 UT 10:59pm local PSTOperation type: IsotachnikOperation stop time: 0701 UT 11:01pm local PSTTape stop time: 0712 UT 11:12pm local PST

Equipment:

Receiver

RS-4

WWV reception:

The receivers are all RS-4s, but the recorders are different.

Recorder

#65 Ball & Blum Model 385-A Radio Shack DX-375

Antenna

longwire ~ 91 ft E-WReceiver

WWV radio

Radio Shack DX-375

Site description:

Orchard - Sonoma Developmental Center near south boundary of Jack London State ParkLongitude: 122° 32.96' WLatitude 38° 20.89' N

Local weather:

rain, drizzle

Personnel:

(see attached)

Lists of students operating each receiver are

Team Leader address:

Name

Dean Knight

INSPIRE Data

INSPIRE Observer Team

Operation

Date

Main Experiment

Date: Nov. 21, 1999

Period: 1 (copy as needed)

Receiver # 64

21-6
Sun 11/21/99 (PST) Tape Start Time (UT) 2307 (11/21/99)

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

PST 11/21/99	Time UT	Entry	Observer
3:07pm T-12	2307	Problem w/tape	S: 0 1 2 3 4 5
	2308		S: 0 1 2 3 4 5
3:09pm T-10	2309		S: 0 1 2 3 4 5
	2310		S: 0 1 2 3 4 5
	2311		S: 0 1 2 3 4 5
	2312	C	S: 0 1 2 3 4 5
	2313	C	S: 0 1 2 3 4 5
3:14pm T-5	2314	C	S: 0 1 2 3 4 5
	2315	C	S: 0 1 2 3 4 5
	2316	C	S: 0 1 2 3 4 5
	2317	C	S: 0 1 2 3 4 5
	2318	airplane C	S: 0 1 2 3 4 5
3:19pm T	2319	airplane C	S: 0 1 2 3 4 5
	2320	C	S: 0 1 2 3 4 5
	2321	C	S: 0 1 2 3 4 5
3:22pm T+3	2322	airplane C wind	S: 0 1 2 3 4 5
	2323	C	S: 0 1 2 3 4 5

Time marks
are logged.

Problems with
equipment are
logged to explain
missing data.

An entry is made
each minute
noting conditions
and especially
any changes.

Team 32

Shawn Korgan

Gilcrest, CO

Shawn uses a home built receiver. He often observes in the Rocky Mountains at an altitude of over 10,000 feet.

Tape Seven

Data Log Cover Sheet

(copy as needed)

INSPIRE Observer Team Not currently assigned Receiver LMC6001Operation Whistlers/C.L.S. 15:00-15:12Date 4-25-99 Tape Start Time (UT) 14:45

Operation details: Tape start time: 14:45 UT 8:45 AM local (MDT)
 Operation start time: 15:00 UT 9:00 AM local (MDT)
 Operation type: Whistlers/Coordinated listening session
 Operation stop time: 15:12 UT 9:12 AM local (MDT)
 Tape stop time: 15:15 UT 9:15 AM local (MDT)

Equipment: Receiver LMC6001 Homemade e-field WWV reception:
 Recorder Sharp RT-22 Good in
 Antenna 8-9 Ft mounted on car Colorado!
 WWV radio PRO-60

Site description: Open country, near paved road and gas well, one mile from power linesLongitude: 104° 67' W Latitude: 40° 22' NLocal weather: Light to medium snow, very cold,Personnel: Shawn Korgan

Team Leader address: Name

SHAWN KORGAN

INSPIRE Data

(copy as needed)

INSPIRE Observer Team

Not currently assignedReceiver Lmc6001

Operation

Whistlers/CLS 15:00-15:12

Date

4-25-99Tape Start Time (UT) 14:45

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
<u>14:45:00</u>	<u>W</u>	S: 0 1 2 <u>3</u> 4 5	
<u>14:46:43</u>	<u>W</u>	S: 0 1 <u>23</u> 4 5	
<u>14:47:21</u>	<u>W</u>	S: 0 1 <u>23</u> 4 5	
<u>14:48:00</u>	<u>W</u>	S: 0 1 2 <u>3</u> 4 5	
<u>14:49:00</u>	<u>W</u> (long)	S: 0 1 <u>23</u> 4 5	
<u>14:49:17</u>	<u>W</u> (several)	S: 0 1 <u>23</u> 4 5	
<u>14:49:29</u>	<u>W</u> (long)	S: 0 1 <u>23</u> 4 5	
<u>14:50:47</u>	<u>W</u>	S: 0 1 2 <u>3</u> 4 5	
<u>14:51:15</u>	<u>W</u>	S: 0 1 2 <u>3</u> 4 5	
<u>14:51:18</u>	<u>W</u>	S: 0 1 2 <u>3</u> 4 5	
<u>14:51:25</u>	<u>W</u>	S: 0 1 2 <u>3</u> 4 5	
<u>14:52:08</u>	<u>W</u>	S: 0 1 2 <u>3</u> 4 5	
<u>14:52:18</u>	<u>W</u> (long)	S: 0 1 2 <u>3</u> 4 5	
<u>14:52:42</u>	<u>W</u>	S: 0 1 2 <u>3</u> 4 5	
<u>14:52:56</u>	<u>W</u> (long)(several)	S: 0 1 2 <u>3</u> 4 5	
<u>14:53:01</u>	<u>W</u>	S: 0 1 2 <u>3</u> 4 5	
<u>14:53:46</u>	<u>W</u>	S: 0 1 2 <u>3</u> 4 5	

This was a session rich in whistlers - and that is what got logged!

Team 30 Linden Lundback and Brian Cowan

Watrous, Saskatchewan, CANADA

Linden and Brian have a very quiet site. Note the long (13 feet) vertical whip antenna, which gives them excellent sensitivity.

Data Log Cover Sheet Tape #12

(copy as needed)

INSPIRE Observer Team #30 Lundback/Cowan

Receiver RS-4

Operation Ariel/Istochnik 25-6 T-time 1427 UTC
0827 CST

Date _____

Tape Start Time (UT) 1417

Operation details: Tape start time: 1417 UT 0817 local CST

Operation start time: 1415 UT 0815 local

Operation type: Ariel/Istochnik 25-6

Operation stop time: 1440 UT 0840 local

Tape stop time: 1440 UT 0840 local

Equipment: Receiver RS-4 receiver level 5.5 WWV reception: _____

Recorder CTR-69 recording level 7

Antenna 13 ft. vertical whip

WWV radio Sony ICF-SW40 10.0 mhz

Site description: Road approach 8 miles SW of below co-ordinates

Longitude: 105° 22' W

Latitude: 51° 41' N

Local weather: 10 knot SE wind, Temp +6°C, Clear sky

Personnel: Linden Lundback Brian Cowan

Team Leader address: Name

Linden Lundback

Linden and Brian use a sheet of lined paper for a data log and record detailed observations in columns using the shorthand codes for the natural signals.

Team #30 Linden Lundback/Brian Cowan RS-4 receiver April 25, 1999
Ariel/Istochnik 25-6 T-time 14 27 UTC Tape #12.
T-start 1417 UTC

S-spherics T-tweak W-whistler WW-weak whistler M-mark H-high tone
n-riser tone K-whooper tones KE-whooper & echo t-pronounced emission

General reception: A hum, background hiss, whooper chorus (1435), rising tone chorus, spheric chorus.

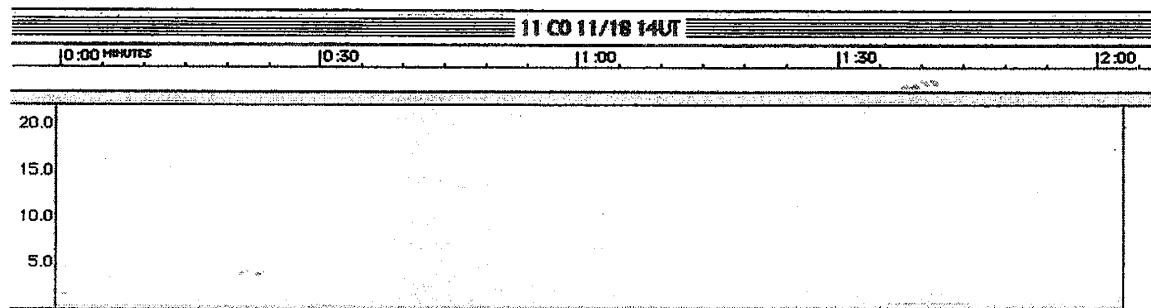
14:15:00 } not on	14:27:35-S	14:33:33-H
14:17:00 } tape	40-S	39-H
14:17:00-M	28:39-S	42-H
10-S	29:36-H	52-WH
19-S	30:00-M	34-42-R
39-K	03-R	35-00-M
52-S	04-H chorus starts	22-K chorus starts
18	09-R	28-H
19	39-R	57-H
20:13-S	55-R & H	36:39-H
24-S	31:01-H	48-R
45-H	23-H	37:03-S
48-S	25-H	10-H
50-H	38-H	45-S
21:33-H	43-H	58-H
38-H	57-R	38:22-H
46-H	32:05-RH	39-H
22:00-M	10-RH	50-S
28-S	24-RH	39:21-H
23:35-S	36-RH	40-S
56-WW	39-RH	50-S
24:18-S	44-H	40:00-M
39-S	52-H	
25:02-S	57-H	
54-S	33:01-H	
26:03-S	06-H	
27:00-M	15-H	
08-S	22-H	

Observers:	Team 11	Mark Mueller, Brown Deer High School	(CDT)
		Brown Deer, WI	
	Team 15	Robert Bennett, Las Cruces, NM	(MDT)
	Team 21	Phil Hartzell, Aurora, NE	(CDT)
	Team 32	Shawn Korgan, Gilcrest, CO	(MDT)
	Team 6	Bill Pine, Chaffey High School, Ontario, CA	(PDT)

For analysis purposes, a spectrogram was made of the first two minutes of each 12-minute hourly session. Additional spectrograms were made of any items of interest and of any segments requested by the observer. Time marks were placed on the tape every two minutes and a complete log was made of each session.

11/18/00 1400 UT

The only observer to submit data for the Saturday sessions was Mark Mueller of Brown Deer High School, Brown Deer, WI (Team 11). Mark found the conditions very quiet. Almost nothing shows up on the spectrograms, although the sferics are faintly heard on the tape.

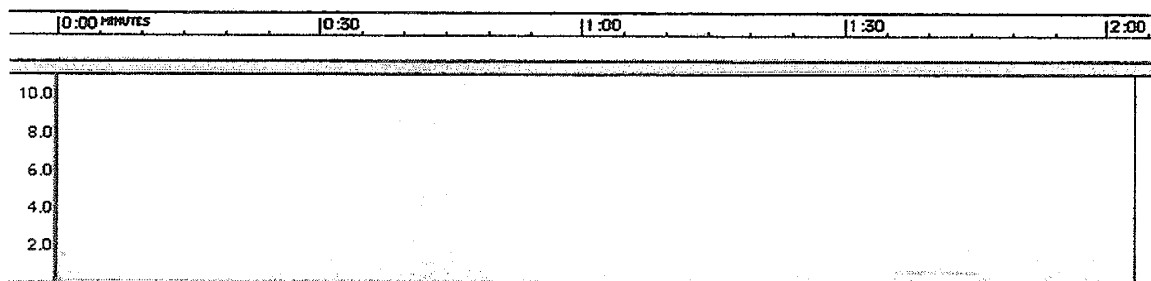


Team 11. Mark Mueller, Brown Deer, WI.

The first 2 minutes are shown starting at 1400 UT.

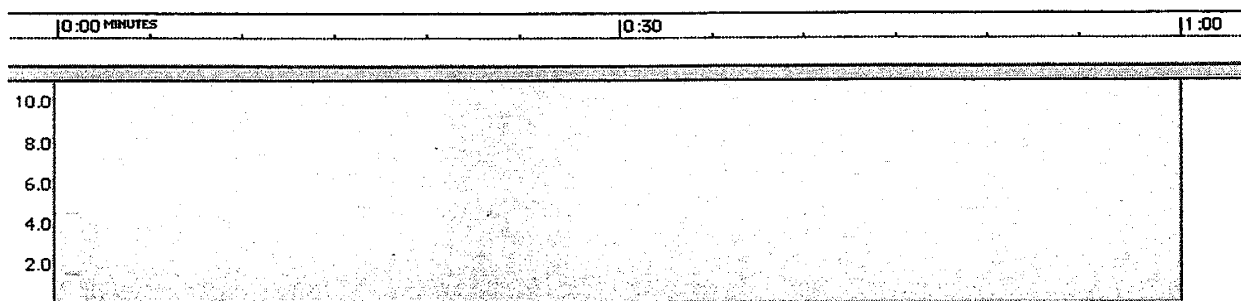
Quiet conditions, but sferics are present.

This spectrogram shows the full frequency range allowed by the software 0-22 kHz).

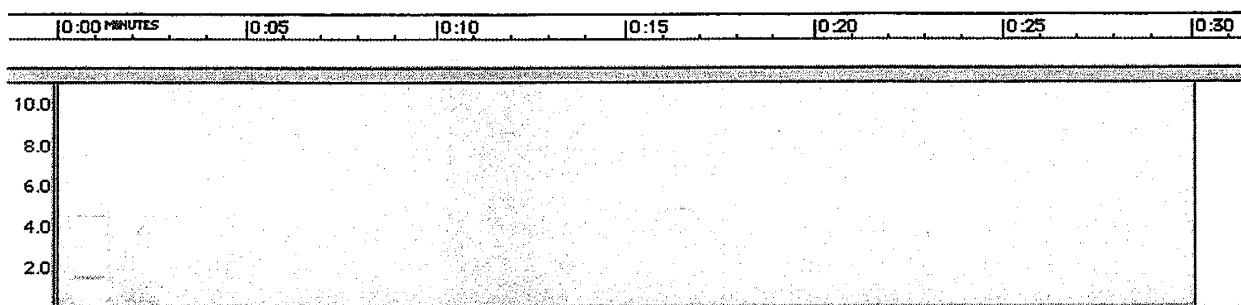


The same time period as the first spectrogram with the frequency range reduced to 0-11 kHz.

This frequency range coincides closely with the design parameters of the VLF2 receiver (0-10 kHz.)



The first minute. A WWV tone appears at the start of the spectrogram.

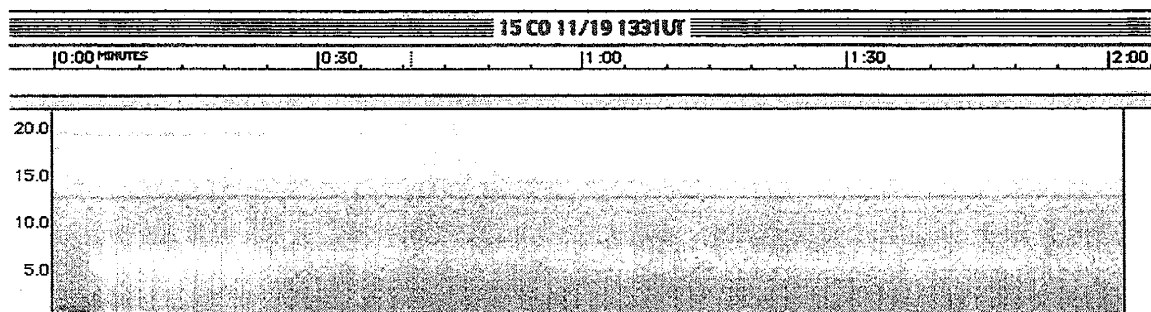


The first 30 seconds.

11/19/00 1300 UT

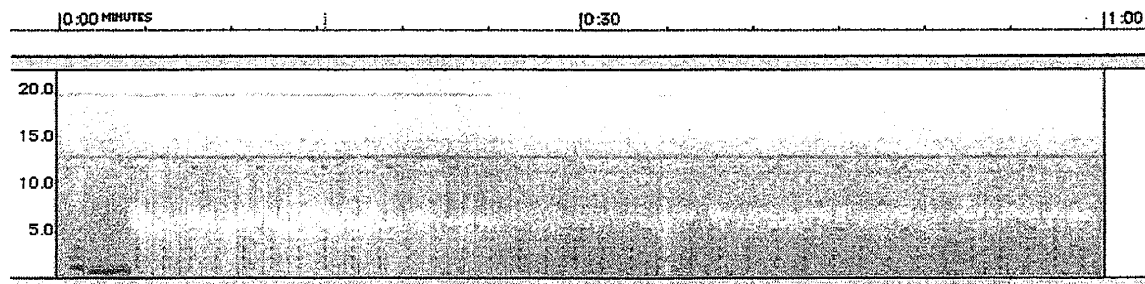
This data actually starts at 1331 UT. Robert Bennett intended to record at 6 AM MST, but as he reports:

We received heavy rains on Monday and Tuesday and I thought that the roads would be dry by Sunday, but not the case. This time wet roads slowed me down a lot. I have to drive along a minimally maintained gravel range road for 15 miles and then along a dirt trail for another four miles to get to my preferred monitoring site. The gravel road was still wet and slippery so I had to drive a lot slower than I usually do. The dirt road was a disaster. I had difficulty getting over the trail even though I was driving a four-wheel drive vehicle.

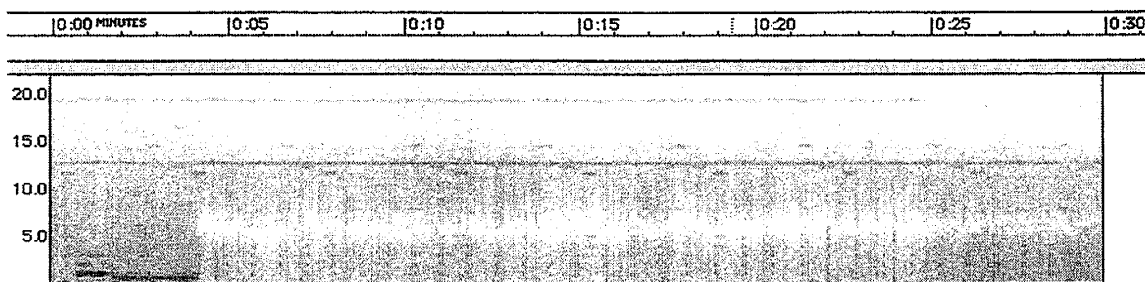


Team 15. Robert Bennett, Las Cruces, NM.

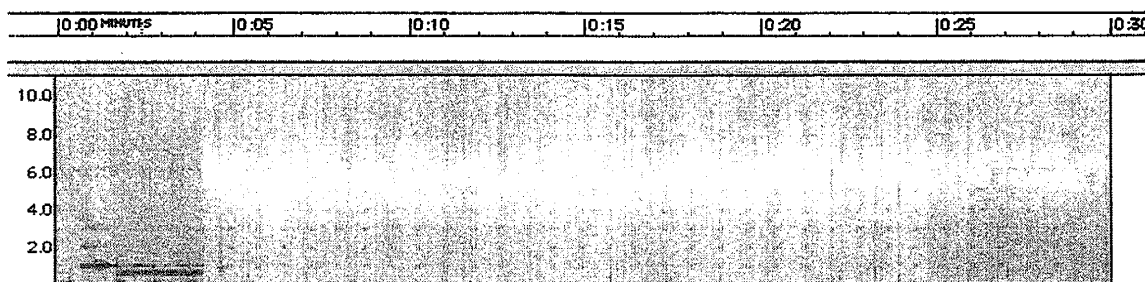
Robert's receiver is very sensitive. Visible on the 0-22 kHz spectrogram are several manmade signals above the 11 kHz frequency level.



First minute.

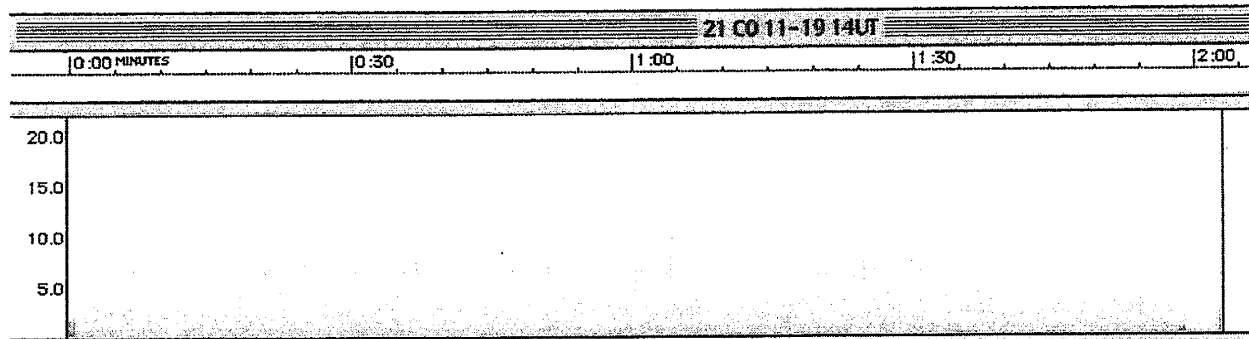


First 30 seconds. WWV signals and voice appears at and below 1 kHz for the first few seconds. The horizontal traces at about 13 kHz and just below 20 kHz are carrier signals for some VLF communication stations. The dashes that appear between 12 and 15 kHz are from the Russian Alpha navigation system, which is similar in operation to the now defunct OMEGA system.

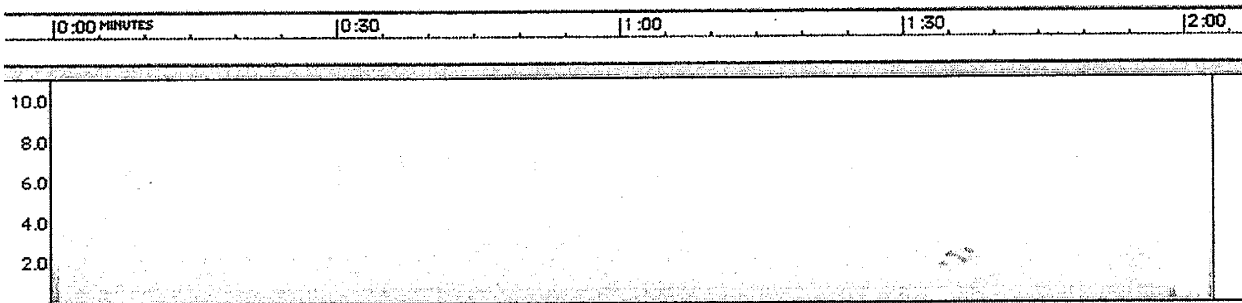


First 30 seconds using a 0-11 kHz frequency range. The sets of vertical dots are from a LORAN navigation station. This signal sounds like a “clacking” noise on the tape.

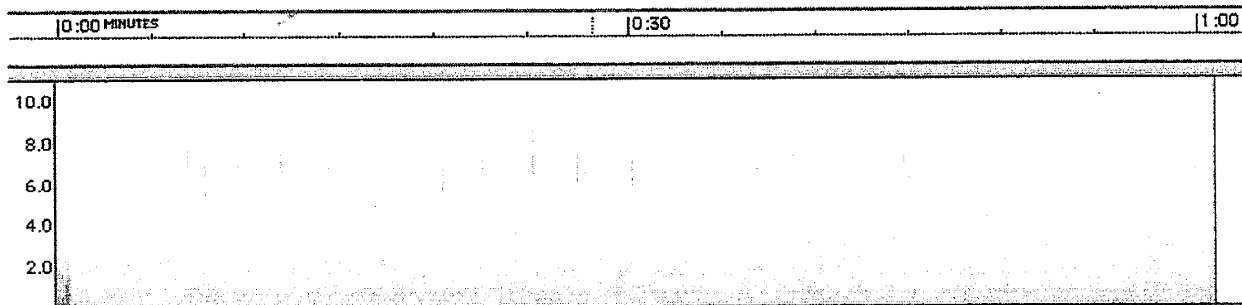
11/19/00 1400 UT



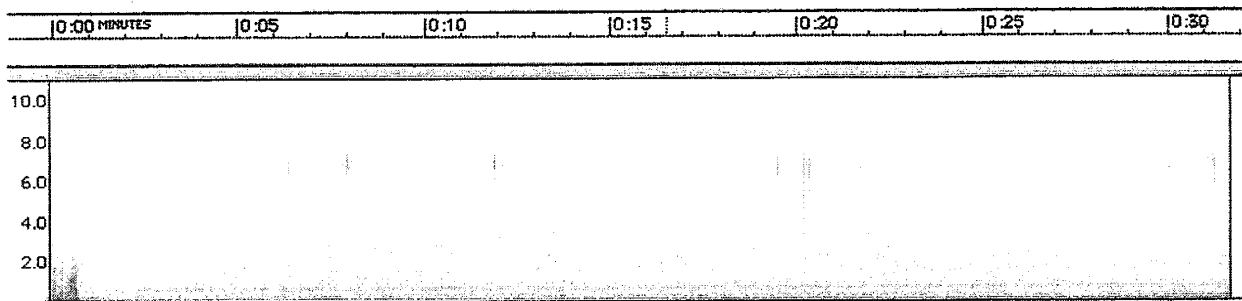
Team 21 Phil Hartzell, Aurora, NE. Quiet conditions, but the sferics are clearly heard and seen.
The arrow points to the voice "Mark" at 1400 UT.



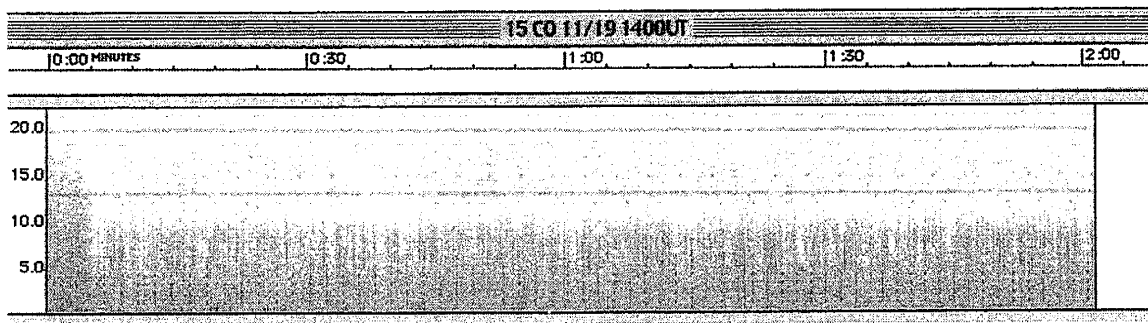
Team 21 data, 0-11 kHz frequency range.



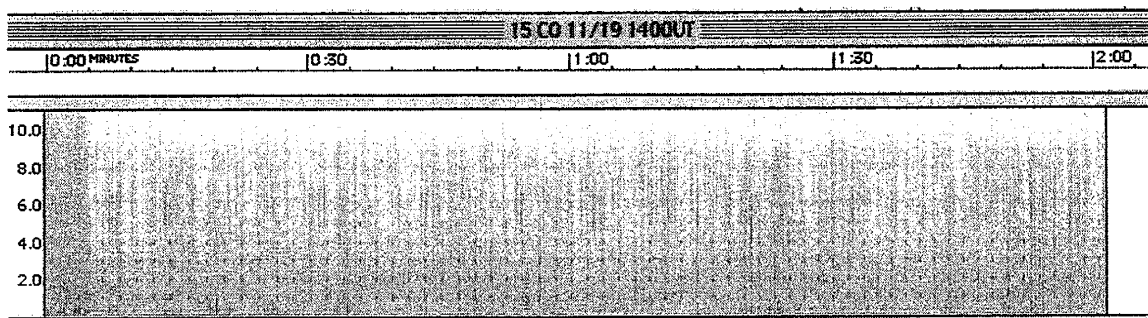
First minute.



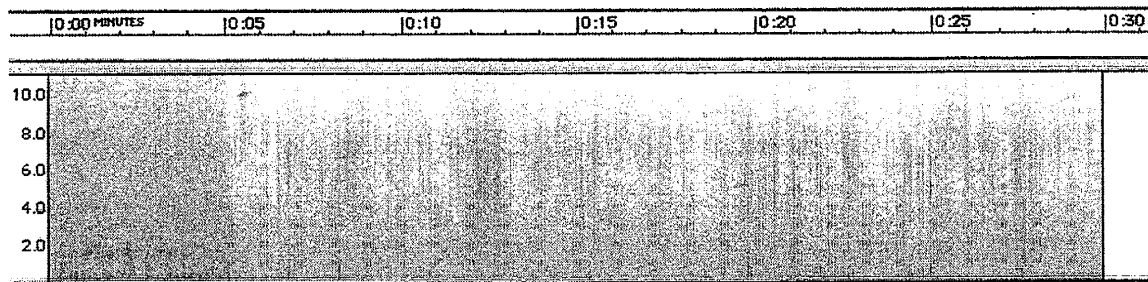
First 30 seconds. The spectrogram starts with a voiceprint of "Mark" at 1400 UT



Team 15. Robert Bennett, Las Cruces, NM.

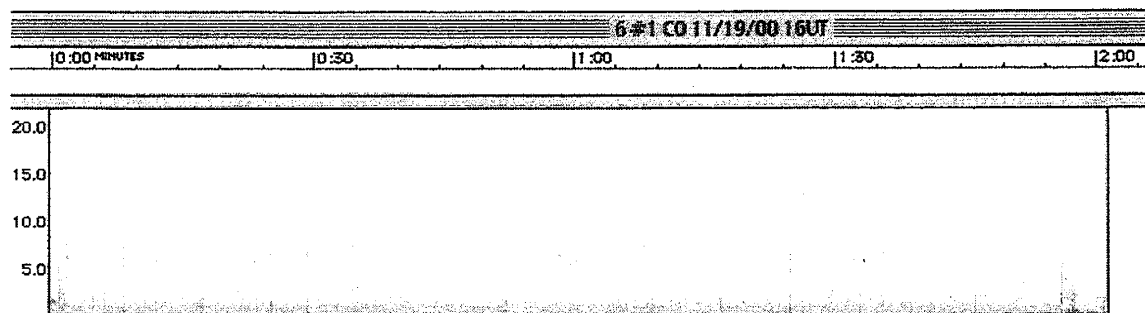


0-11 kHz.

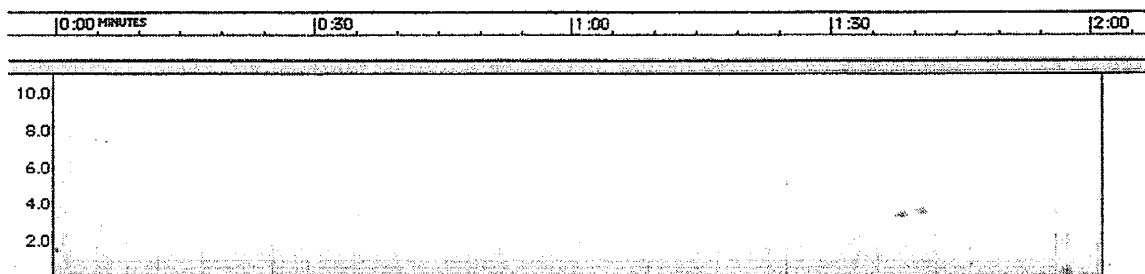


First 30 seconds. LORAN present.

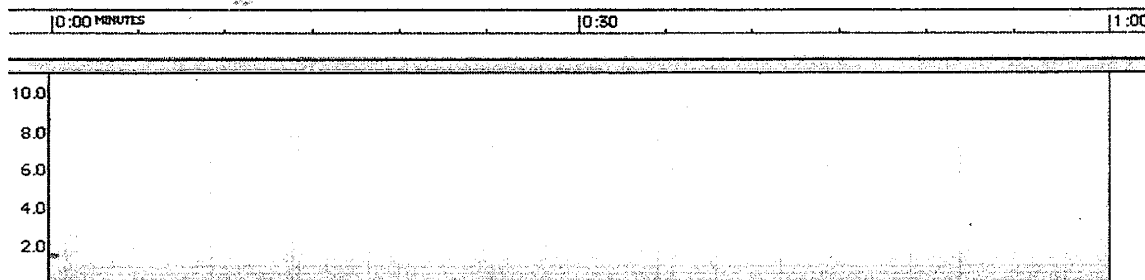
11/19/00 1500 UT



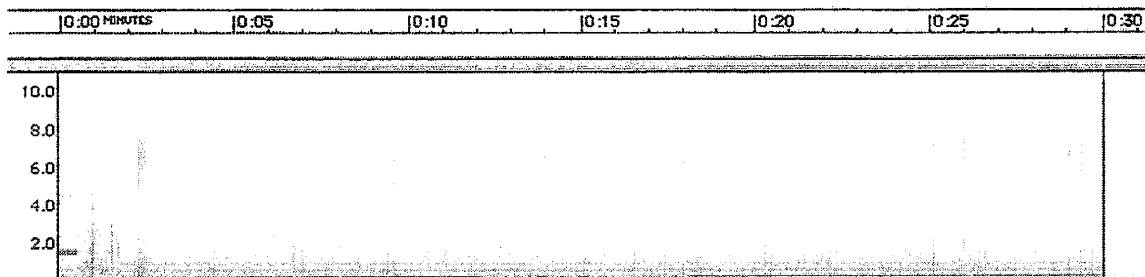
Team 6 Bill Pine, Chaffey High School, Ontario, CA
 This is Receiver #1, a 10-year old ACTIVE B-field receiver using a 1-meter square loop with 90 turns. Conditions were quiet, but the sferic density was estimated at 2.



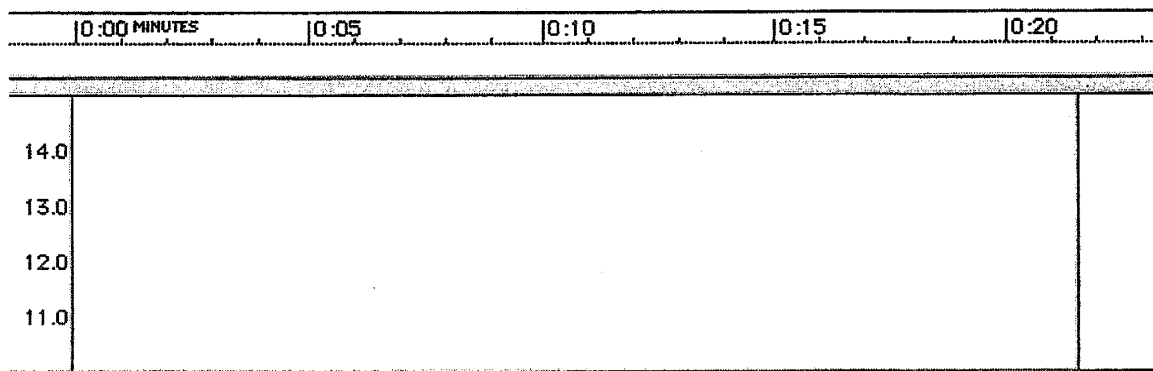
Full spectrogram using 0-11 kHz range.



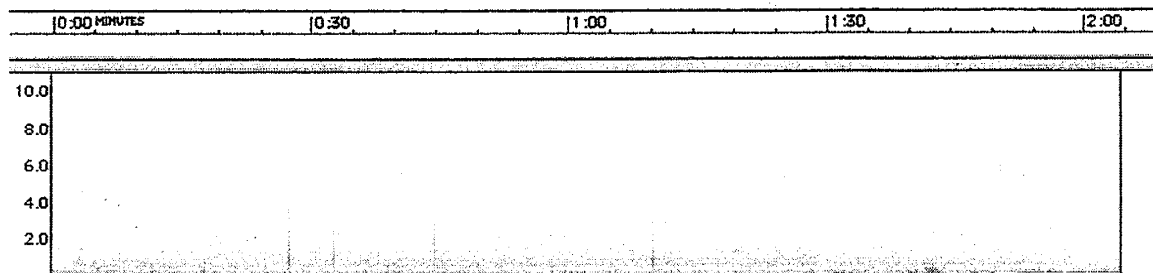
First minute, 0-11 kHz



First 30 seconds

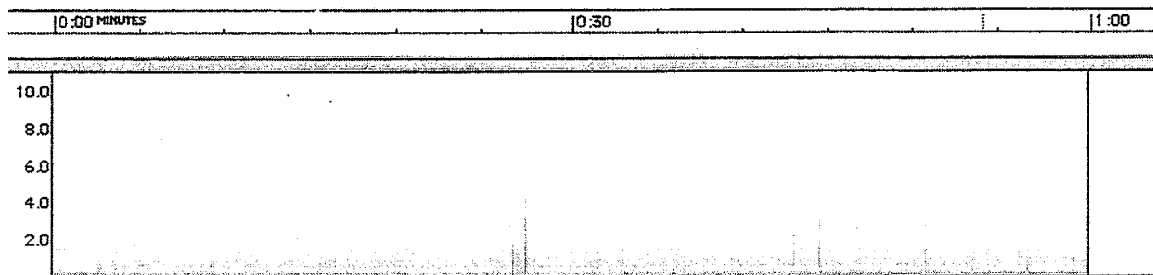


First 30 seconds; 10-15 kHz range showing faint Alpha traces.

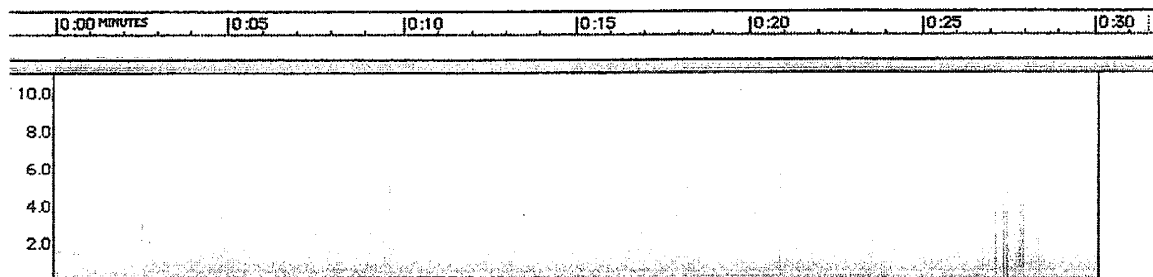


Team 6 Bill Pine, Chaffey High School, Ontario, CA Receiver #2
Data recorded by Sarah Pine, University of California, Riverside, CA

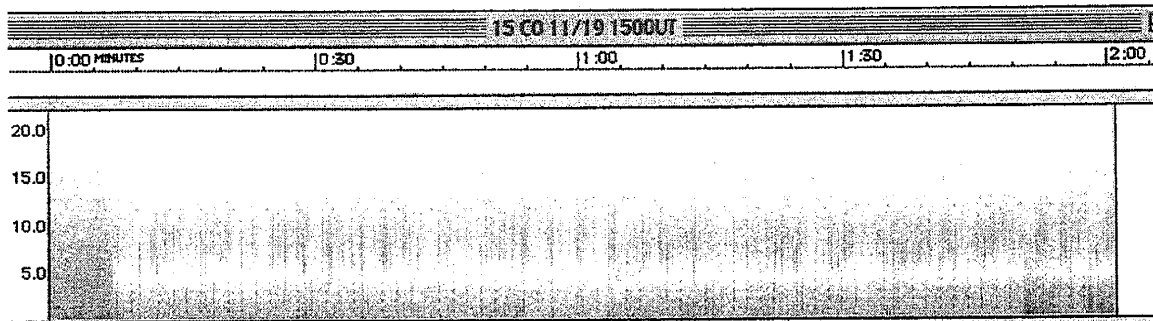
Receiver #2 is an INSPIRE RS4 receiver, the forerunner of the VLF2.



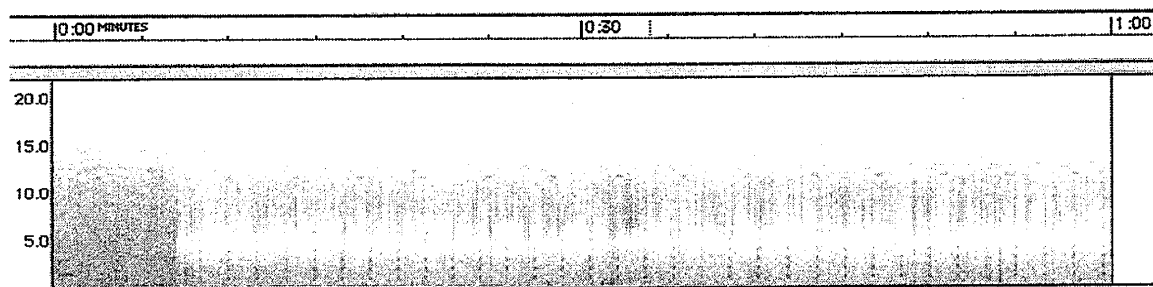
First minute.



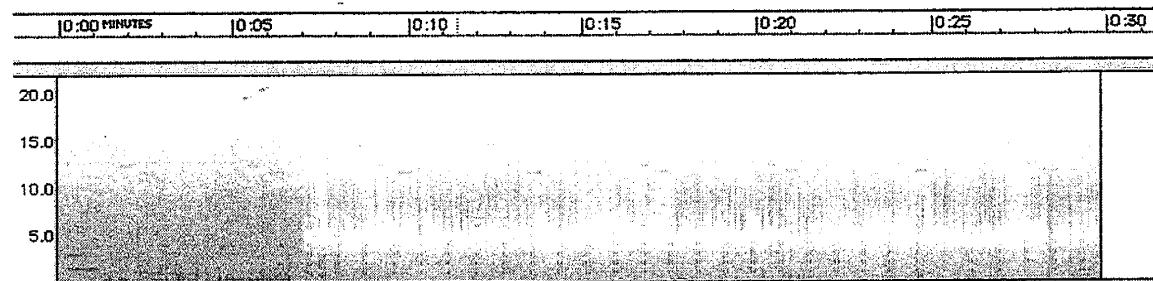
First 30 seconds.



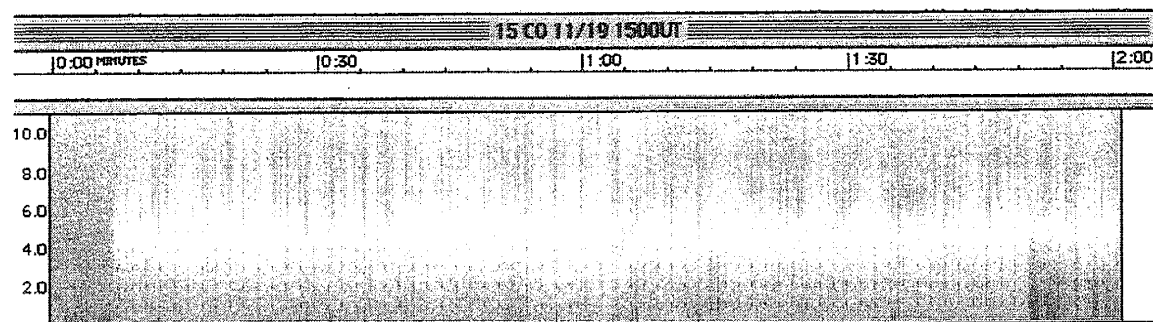
Team 15 Robert Bennett, Las Cruces, NM
 Note that the manmade signals above 12 kHz are less strong.



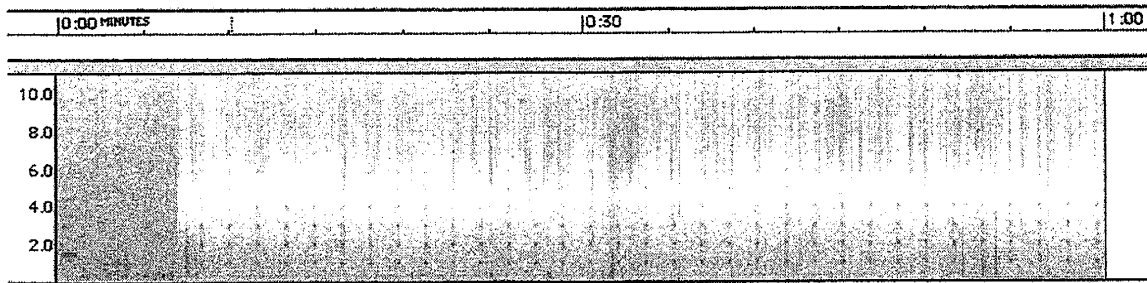
First minute.



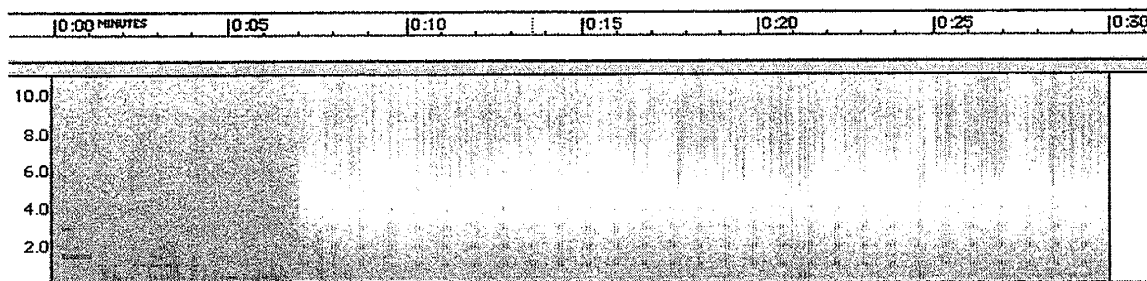
First 30 seconds. Alpha signals are visible, other carrier signals are not.



0-11 kHz.

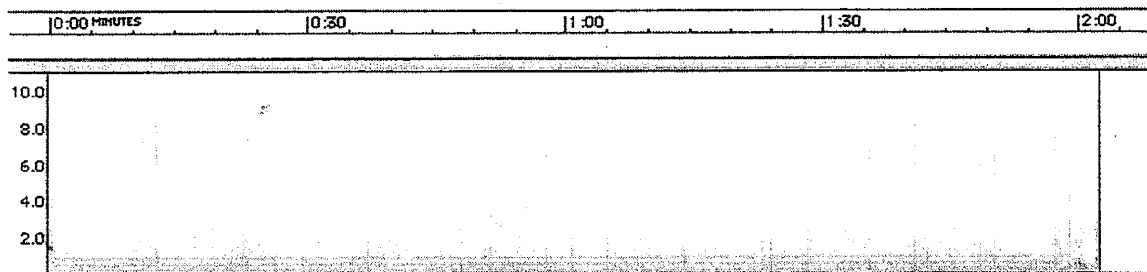


First minute. LORAN signal appears.

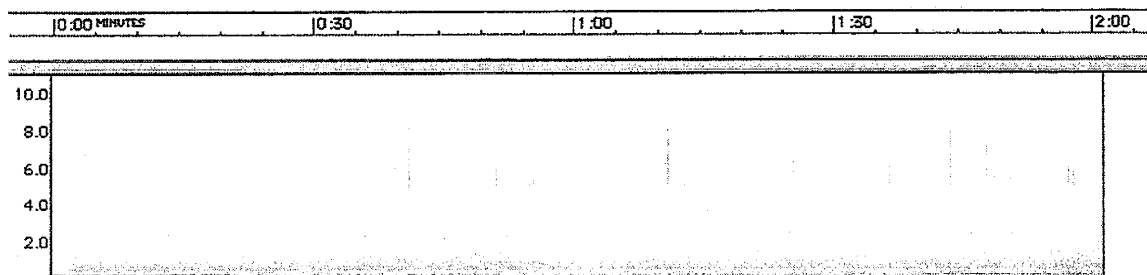


First 30 seconds. WWV tones and voiceprint are visible for the first 7 seconds.

11/19/2001 1600 UT

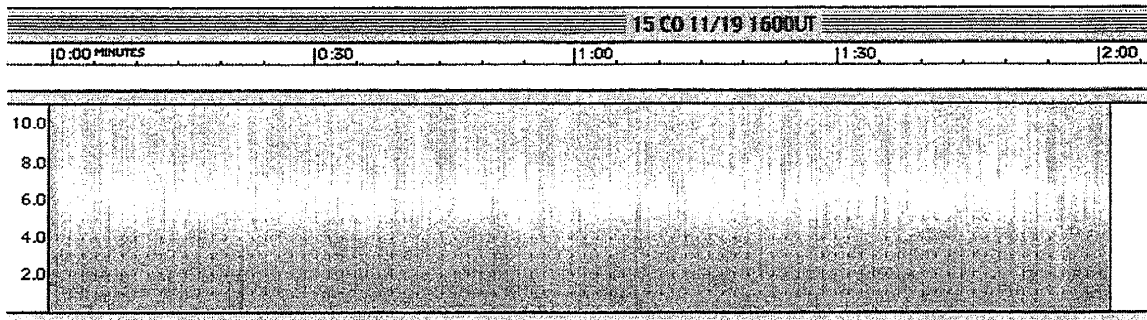


Receiver #1

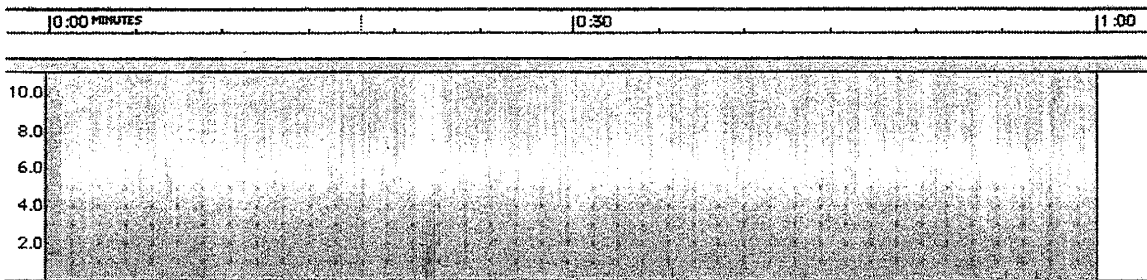


Receiver #2

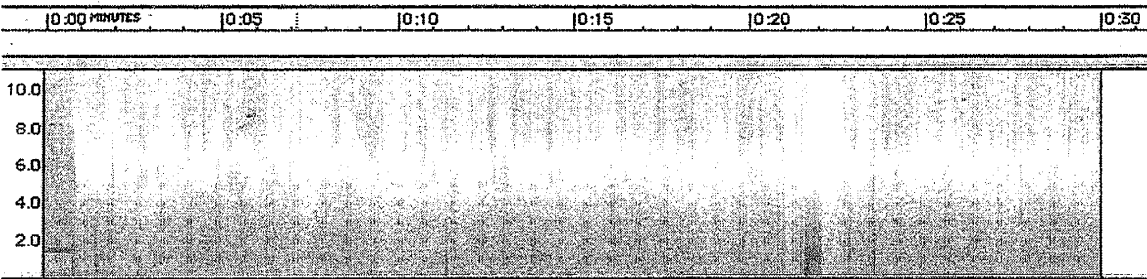
Team 6 Bill Pine, Chaffey High School, Ontario, CA
Sarah Pine, University of California, Riverside, CA



Team 15 Robert Bennett, Las Cruces, NM



First minute. LORAN signals appear.



First 30 seconds.

Data Log Cover Sheet

(copy as needed)

INSPIRE Observer Team _____

Team Number: _____

Equipment: Receiver _____

Recorder _____

Antenna _____

WWV radio _____

Site description: _____

Longitude: _____° _____' W

Latitude: _____° _____' N

Personnel: _____

Team Leader address: Name _____

Street _____

City, State, Zip, Country _____

email: _____

Local Time to UT Conversion Table

EST + 5 = UT

CST + 6 = UT

MST + 7 = UT

PST + 8 = UT

EDT + 4 = UT

CDT + 5 = UT

MDT + 6 = UT

PDT + 7 = UT

(copy as needed)

Team Number: _____

Receiver _____

Tape Start Time (Local) _____

Code: M - Mark (WWV or Voice) S - sferics T - twee W - whistler A - Alpha C - chorus
Sferic Density: D: ____ Scale of 1-5 (1 - Very Low, 3 - Medium, 5 - Very High)

[illegible]