New Claimed World and North American Distance Record (61.8km) for the 241GHz Amateur Radio Allocation

3-Dec-2003

I'd like to claim a new DX record for the 241GHz band. We had some rather dry WX here in Virginia and I just couldn't pass up trying to better our own DX record for the band. After shorting out a set of gel cell battery terminals while setting the gear up, I thought we'd never make the QSO! No fire, just a melted 1/4" plug on the cable end of the CW straight key.

The new claimed record is 61.8km and here are some specifics:
Date: Dec 3rd, 2003
Time: 01:48z
W2SZ/4 (WA1ZMS op) FM07fm 37-31-04N 79-30-40W
W4WWQ/4 EM97xe 37-10-49N 80-03-59W
Distance: 61.8km

The weather at the time of the QSO at the W2SZ/4 QTH was:
Temp: -6.1C
Dew Point: -17C
Relative Humidity: 40%
Station pressure: 876mb
These WX conditions result in a total atmospheric loss of 0.541dB per km.

The weather at the W4WWQ/4 QTH was not logged. But since his elevation was around 600 meters lower than mine, his dew point should have been slightly higher.

I elected to use the W2SZ/4 club callsign for this QSO since several people within the club have helped me with this 241GHz project.

73,
Brian, WA1ZMS/4 op for W2SZ/4

(Please see below for station details, pictures, and an audio file. -ed)

13-Nov-2003

(Please note that this record was set prior to the one announced above. It is here as the s details and other information are relevant. -ed)

New Claimed World and North American Distance Record (34.9km 241GHz Amateur Radio Allocation

Hi all-

The cold and dry WX was calling and we just had to try to break our own World DX recor on 241GHz. Here are the specifics of the new claimed **34.9km** record:

Detais of the QSO
Date: Nov 14th, 2003
Time: 01:57z
WA1ZMS/4 FM07fm 37-31-19.3N 79-30-14.4W
W4WWQ/4 FM07ji 37-21-14.1N 79-10-13.6W
Distance: 34.9km

The weather at the time of the QSO at the WA1ZMS/4 QTH:
Temp: -3.3C
Dew Point: -14.4C
Relative Humidity: 42%
Station pressure: 874mb
The WX conditions result in a total atmospheric loss of 0.673dB per km.

The weather at the time of the QSO at the W4WWQ/4 QTH:
Temp: 3.3C
Dew Point: -12.2C
Relative Humidity: 31%
Station pressure: 992mb
The WX conditions result in a total atmospheric loss of 0.820dB per km.

The WX conditions being different at each end of the QSO make for some interesting pre signal margin calculations. The actual measured signal margin on the WA1ZMS/4 end wa as 13dB. The wind was very strong at both locations and that made for some signal fadin

73,
Brian, WA1ZMS/4

241GHz Station

Station Details

Here are some details of the 241GHz station as it has been modified for the latest 34.9kr record.

TRANSMITTER:
The transmitter is based on a 40mW 80.666GHz Gunn oscillator driving a anti-parallel S GaAs diode X3 multiplier (the original design of the multiplier was by Virginia Diodes Inc)

resulting 241GHz output power is a measured -1dBm.

RECEIVER:
The receiver is based on a modification of the X3 TX multiplier. By adding a DC/IF return converts the multiplier into a harmonic mixer. Each station's TX frequencies are offset wh the use of a tunable RX IF of around 439MHz.

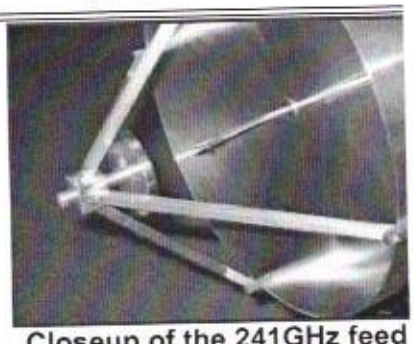
ANTENNAS:
New homebrew 30cm parabolic reflectors with Cassegrain feed system using true hyperl reflectors. The machining of the curved surfaces was done with help from a local machin feed is a W2IMU style dual-mode horn with a step transition from rectangular WR-3 wave Antenna gain is around 53dB (rough measurement).

REFERENCE OSCILLATORS:
New homebrew direct synthesizers have replaced the former 5th over-tone VHF crystal c The direct synthesizers are fed by 10MHz reference OCXOs from Corning. CW keying is FSK'ing the 10MHz OCXOs. The close-in phase noise of multiplied 10MHz OCXO is mai better than even the best VHF crystal oscillator.

A close up of one of the 241GHz stations

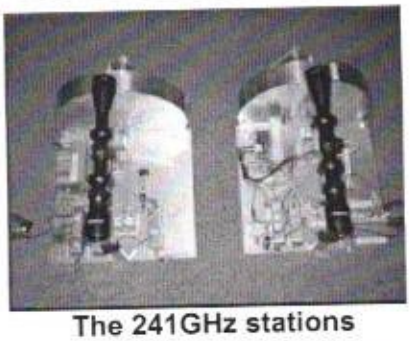
241GHz 30cm dish

The 241GHz dishes



Closeup of the 241GHz feed on the 30cm dish

One of the 241GHz stations during the 34km QSO



The 241GHz stations

241GHz QSO Pictures

W2SZ/4 set-up at rock out-cropping on Apple Orchard Mtn.

Apple Orchard Mtn. sign

View towards EM97xe the next morning...nice view.

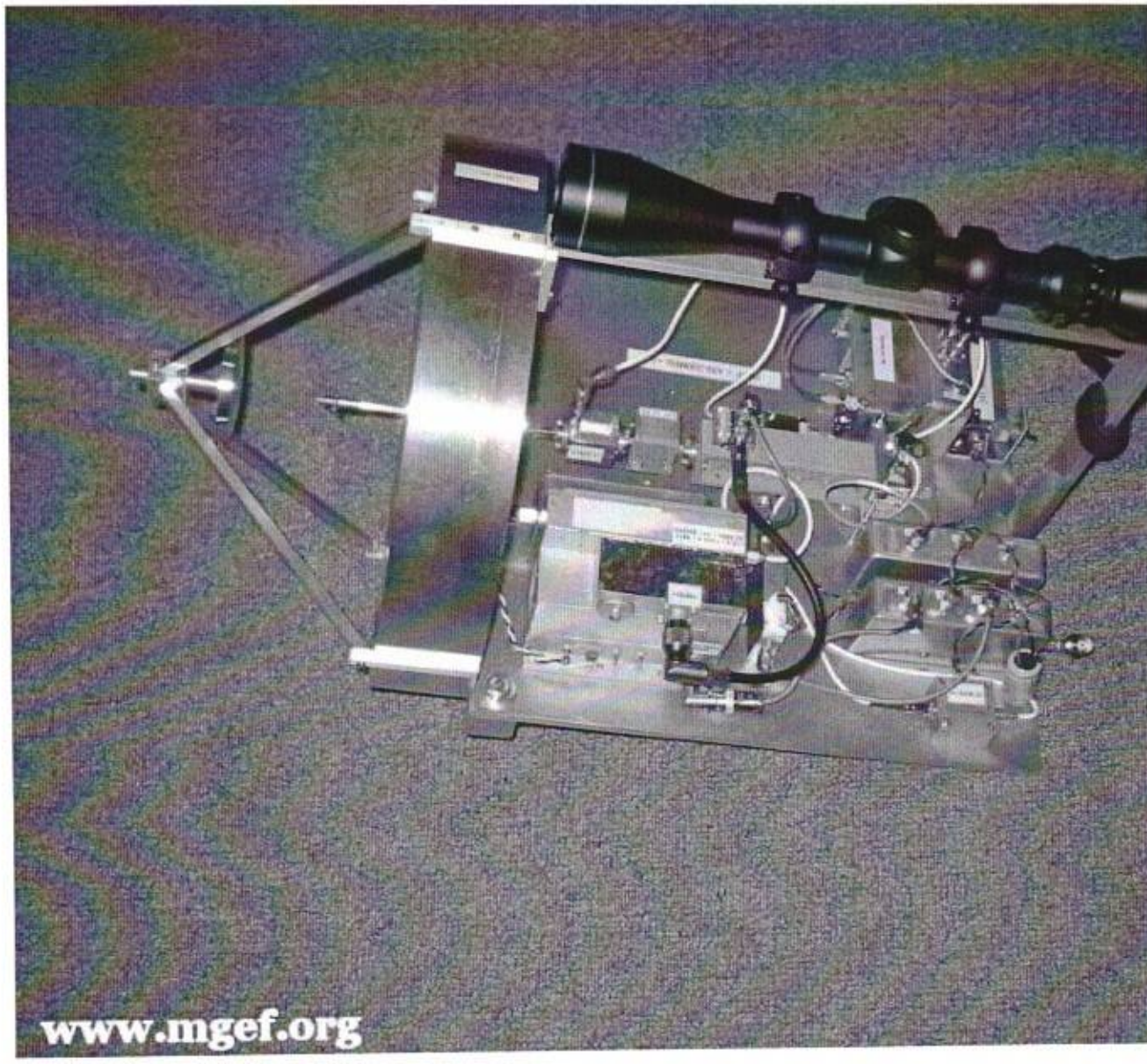
241GHz QSO Audio

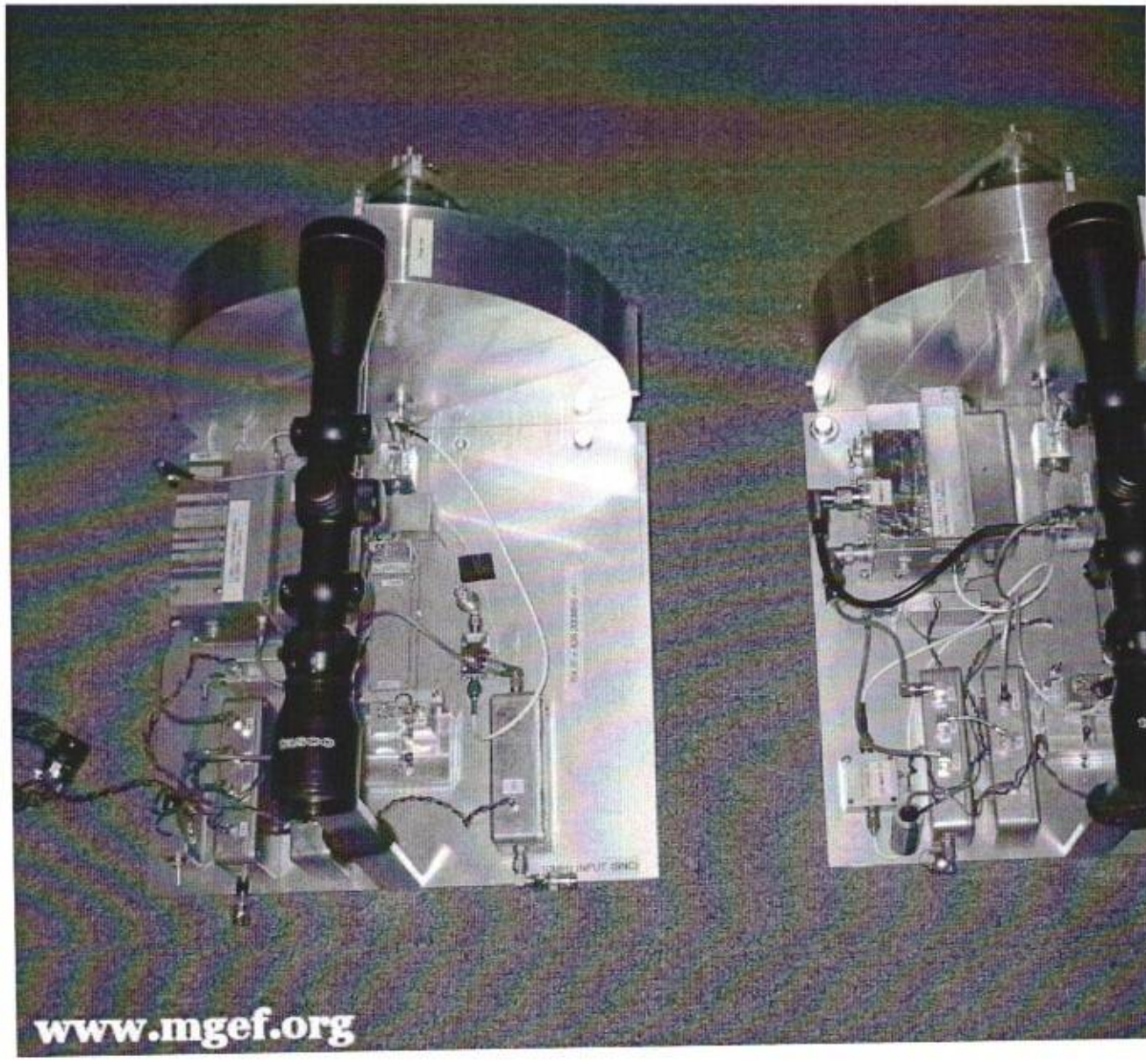
You can listen to a **an excerpt from the 61.8km 241GHz QSO** (44 sec, 948kB .WAV file

Description: "W2SZ/4 DE W4WWQ W4WWQ W4WWQ QTH EM97xe"

For more pictures and information you can also look at the pages for the prior **1.1km** rec **11.4km record.**

Page last updated: 10-Dec-2003 by K2JJB


www.mgef.org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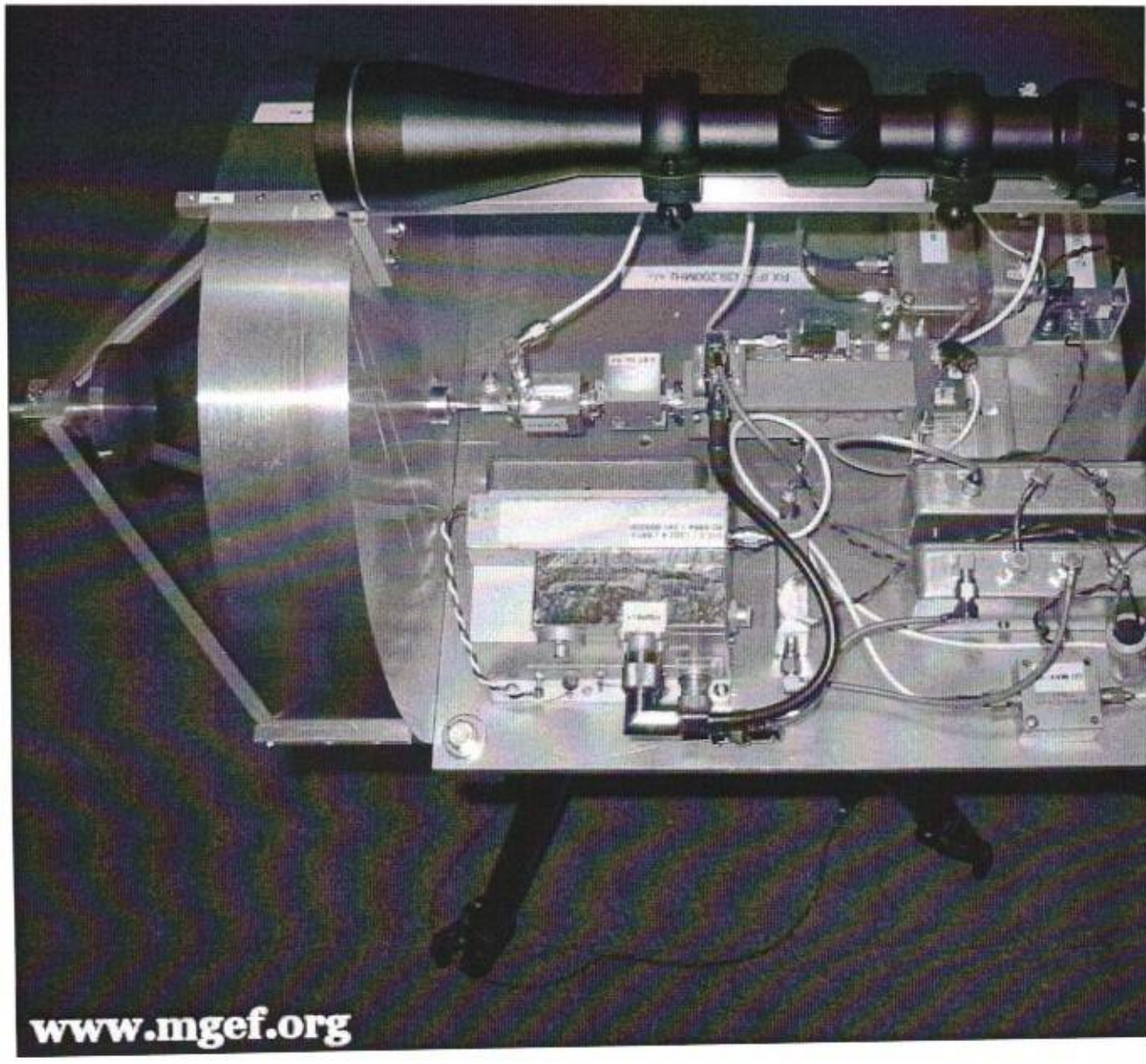
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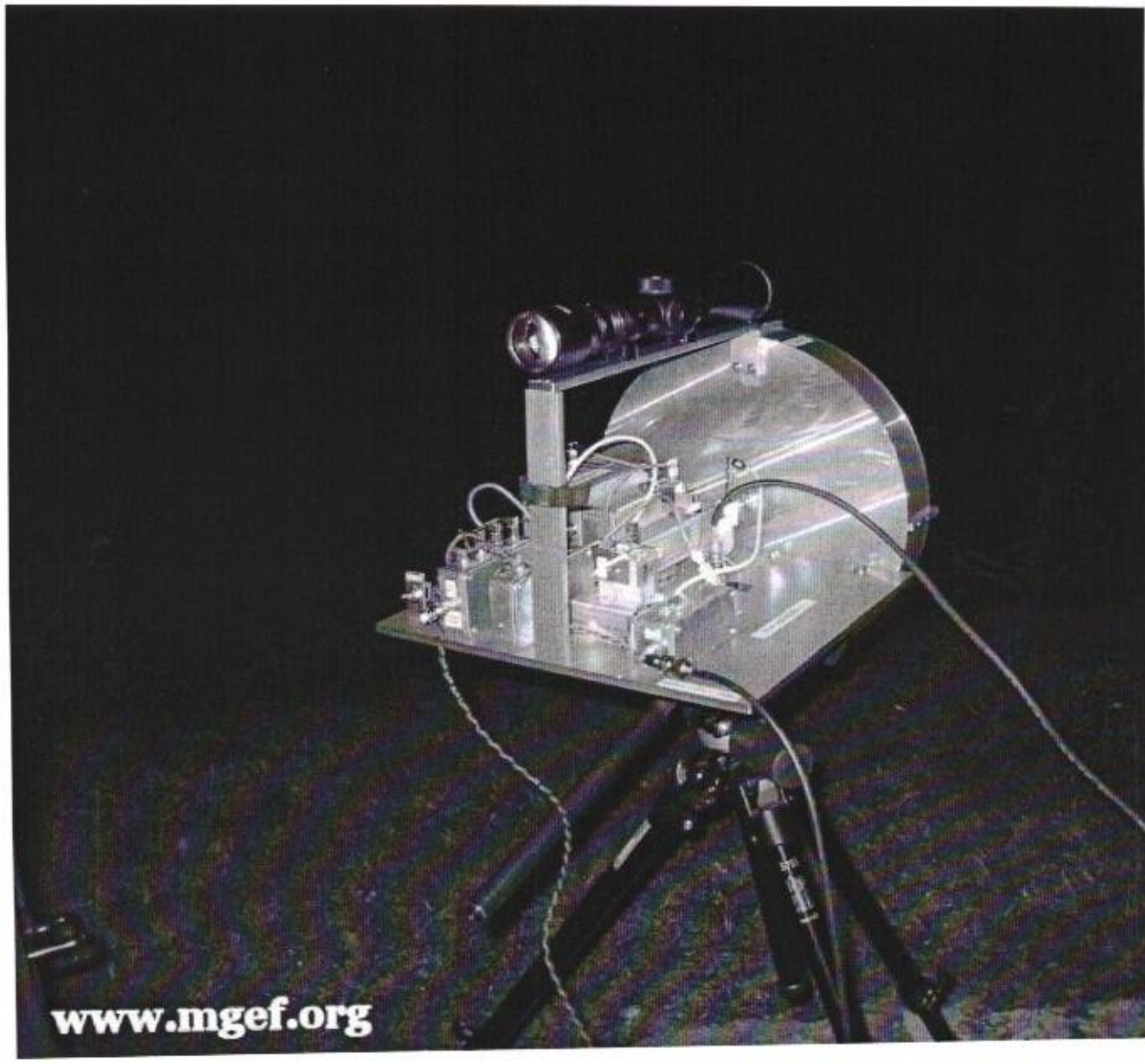
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