

# An Analysis of the HF Antennas at 10 MW

[10 Matthews Way, Harpswell ME]



**Larry Banks, W1DYJ**

First licensed: 1962 (KN1VFX)

W1DYJ since 1966 – Amateur Extra

10 Matthews Way Harpswell ME

33 Blueberry Hill Road Woburn MA

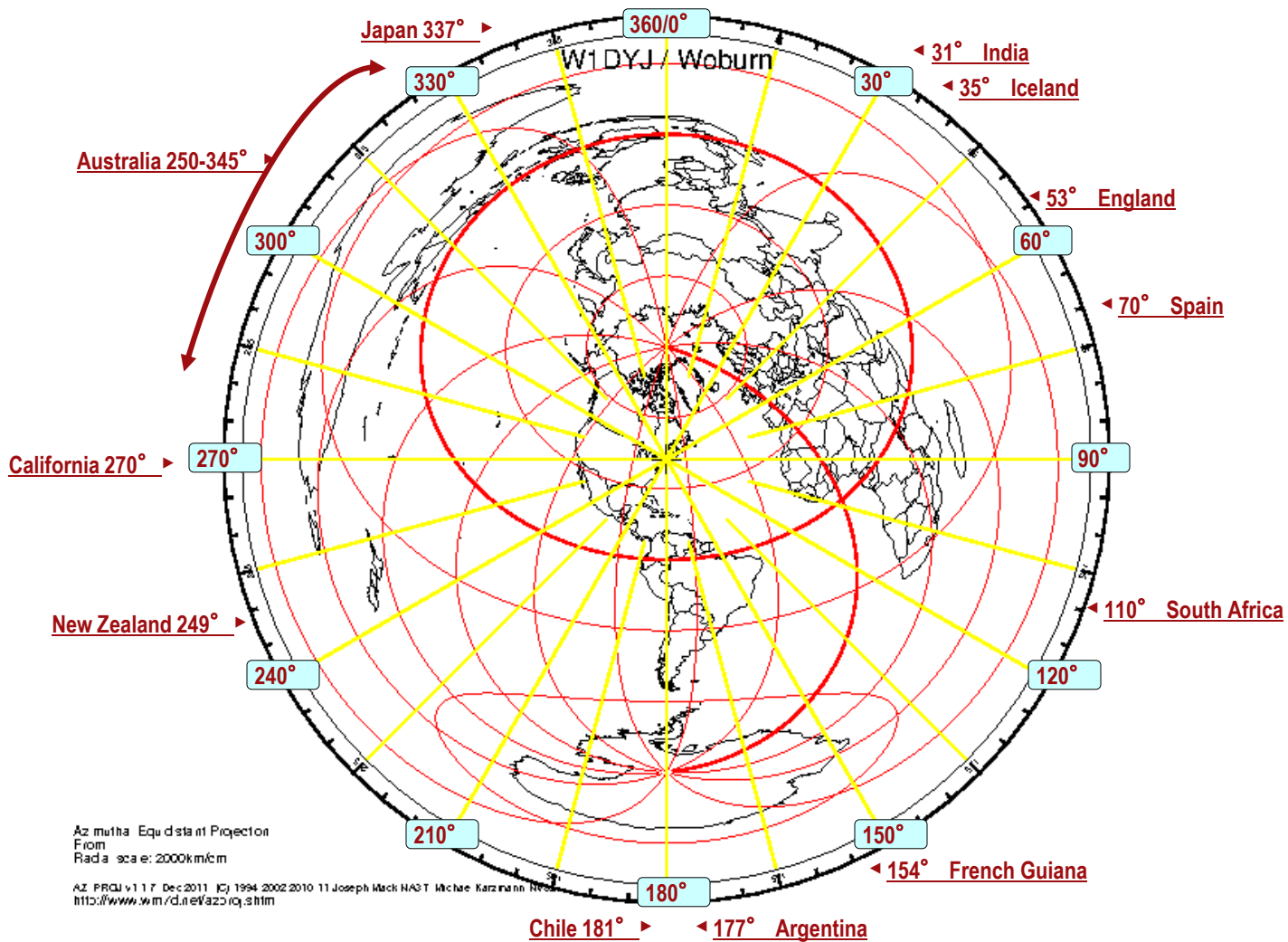
- Azimuth for Various Countries
- Terrain toward Various Countries
- The HF Antennas at 10 MW
- HFTA Response for Each Antenna
- Comparison of Antennas at Specific Azimuths



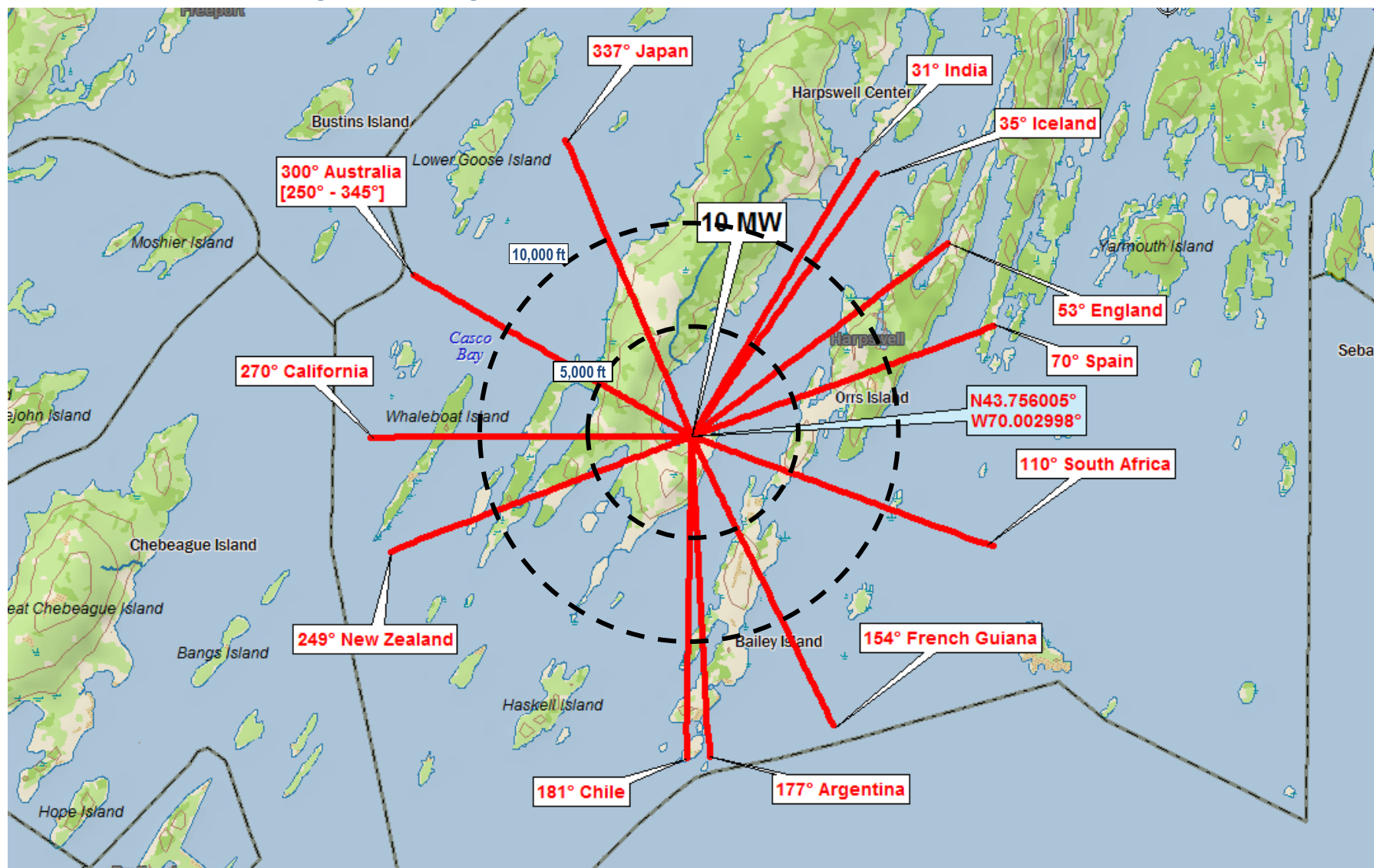
W1DYJ / Larry Banks [www.qsl.net/w1dyj](http://www.qsl.net/w1dyj) 7B-DXCC WAS VUCC WPX

**Harpswell Antenna Analysis**  
**June 2019**

# 10 MW: Great Circle Azimuth for Various Countries

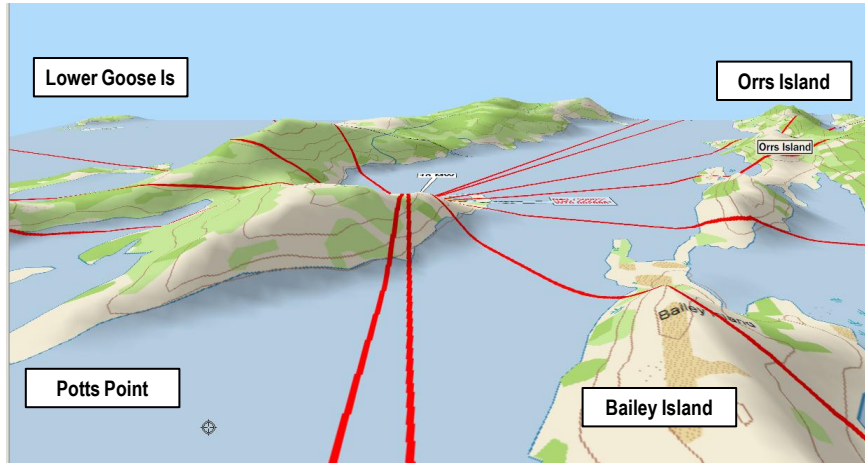


# 10 MW: Topo Map and Azimuth for Various Countries



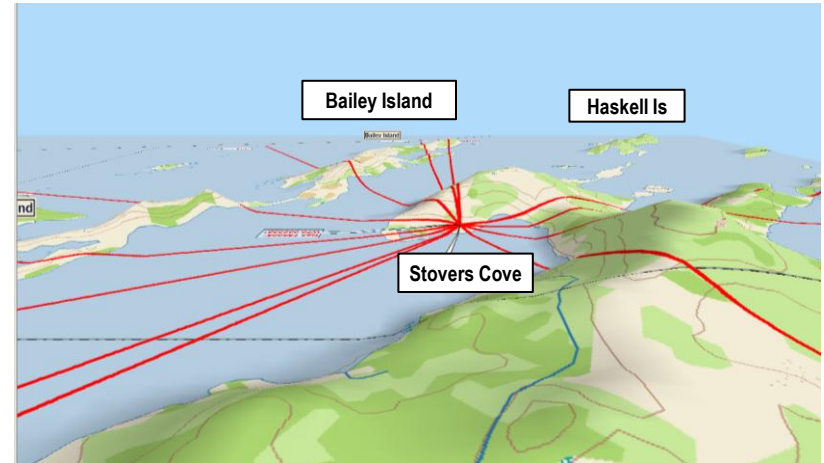
# 10 MW 3D Maps

## Looking North

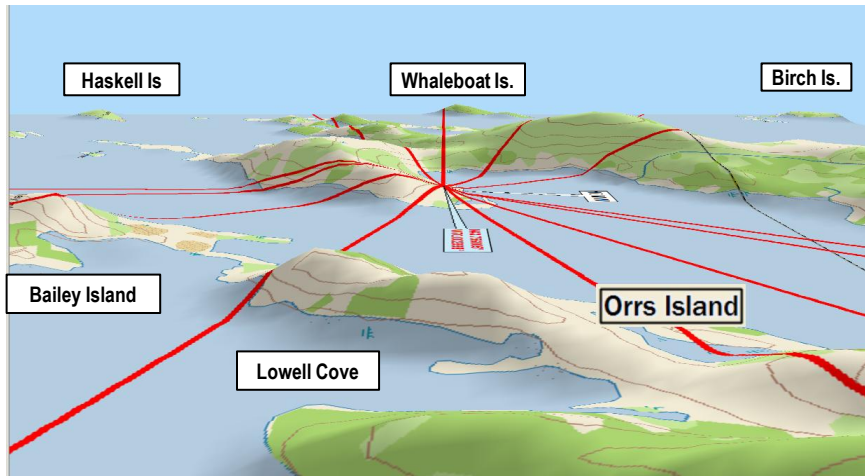


Note: Vertical dimensions are enhanced by a factor of 8

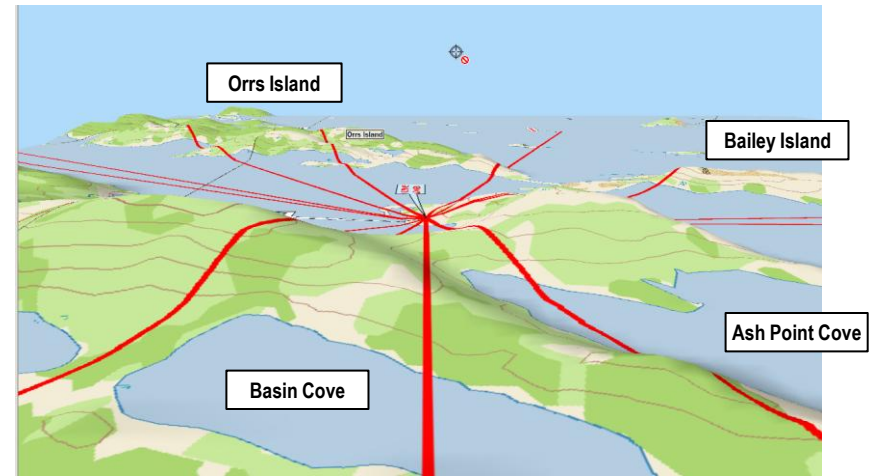
## Looking South



## Looking West



## Looking East



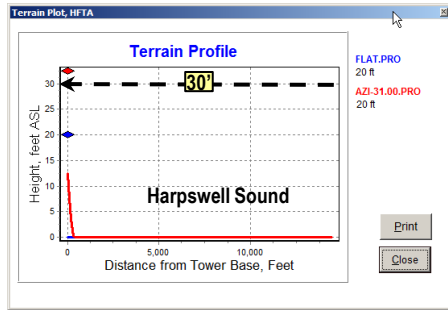
W1DYJ / Larry Banks [www.qsl.net/w1dyj](http://www.qsl.net/w1dyj) 7B-DXCC WAS VUCC WPX

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June 2019

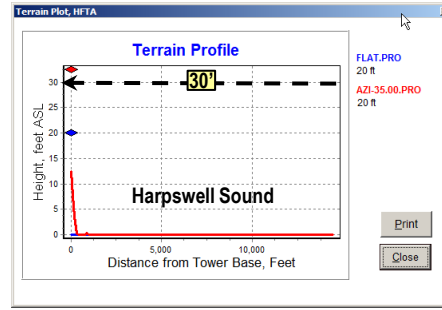


# 10 MW: Terrain toward Various Countries

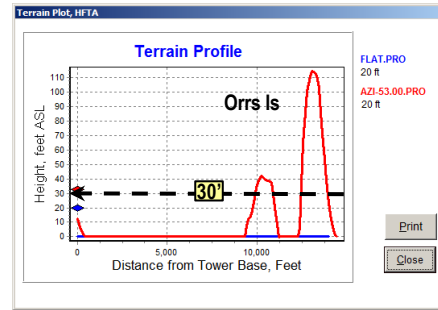
31° India



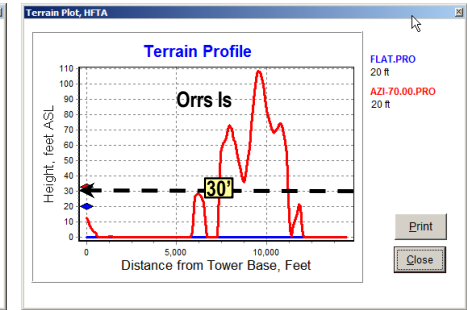
35° Iceland / EurRussia



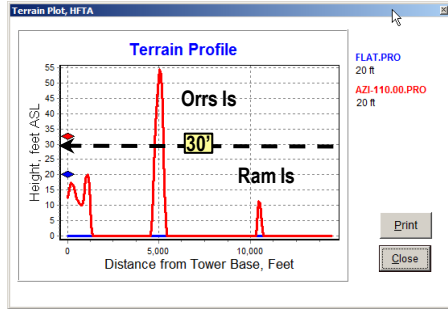
53° England



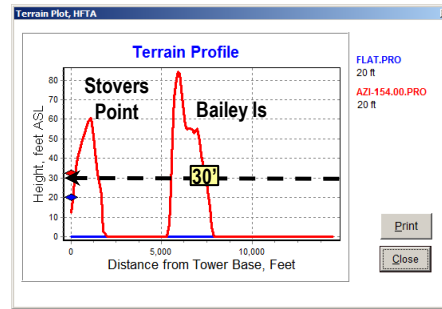
70° Spain



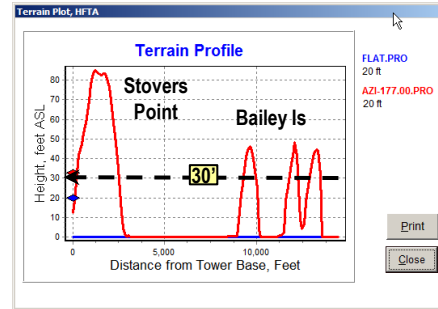
110° South Africa



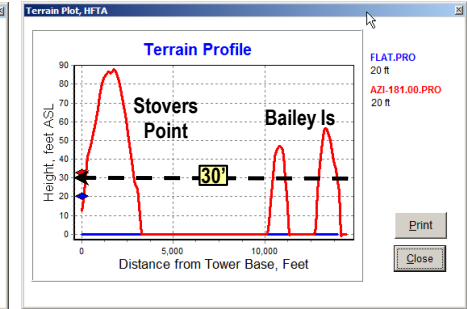
154° French Guiana



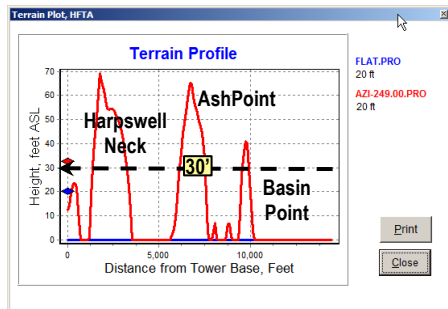
177° Argentina



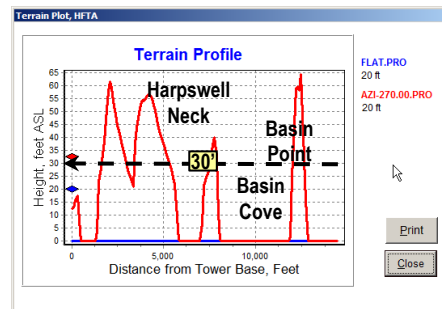
181° Chile



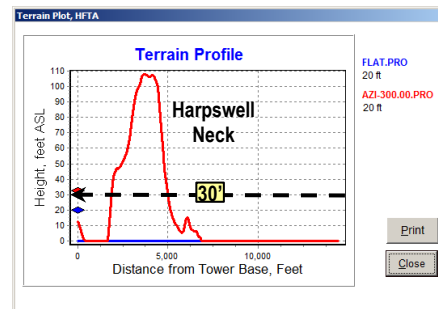
249° New Zealand



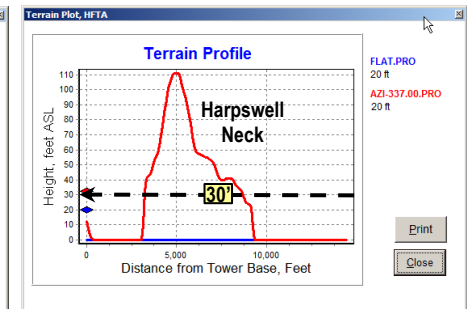
270° California



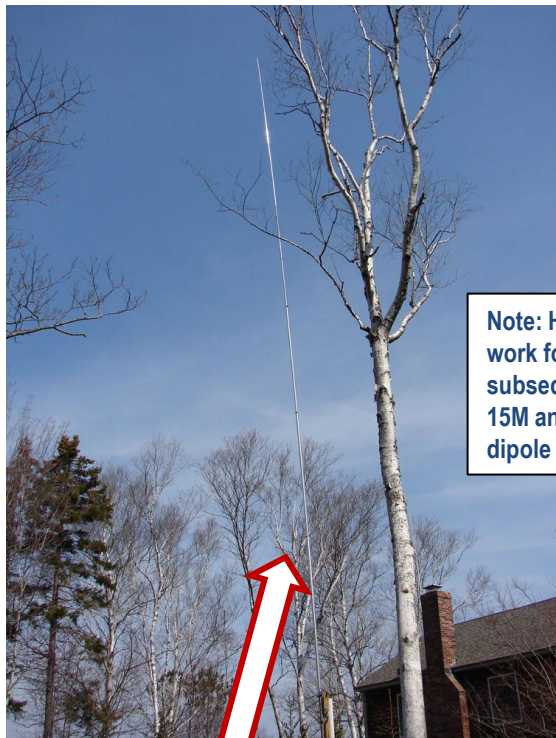
300° Australia



337° Japan



# The HF Antennas at 10 MW



Note: HFTA does not work for verticals. The subsequent analysis for 15M and 4M is based on a dipole at 8M.

## 160M/80M/30M/20M/10M: Homebrew Fan Dipole: center @ ~10M

- W1DYJ design [also useful on 17M & 12M] (2/440 FM stick on top)
- Built and erected Summer 2016 as 80/30/20/10. Added 160 Sept 2017
- Fed with 50' RG8x → matched loss dB = 0.19 (160) / 0.28 (80) / 0.51 (30) / 0.62 (20M) / 0.93 (10M)
- 100 W at transmitter → W at antenna = 96 (160) / 94 (80) / 89 (30) / 87 (20) / 81 (10)



## 40M: Homebrew 1/4 lambda vertical with 4 raised radials @ ~3M

Also used on 15M

- W1DYJ design
- Built and erected April 2014
- Fed with 15' of RG8x + 105' of Bury-Flex → matched loss = 0.5 dB (40M) / 0.88 dB. (15M)
- 100 W at transmitter → 89 W at antenna (40M) / 82 W (15M)



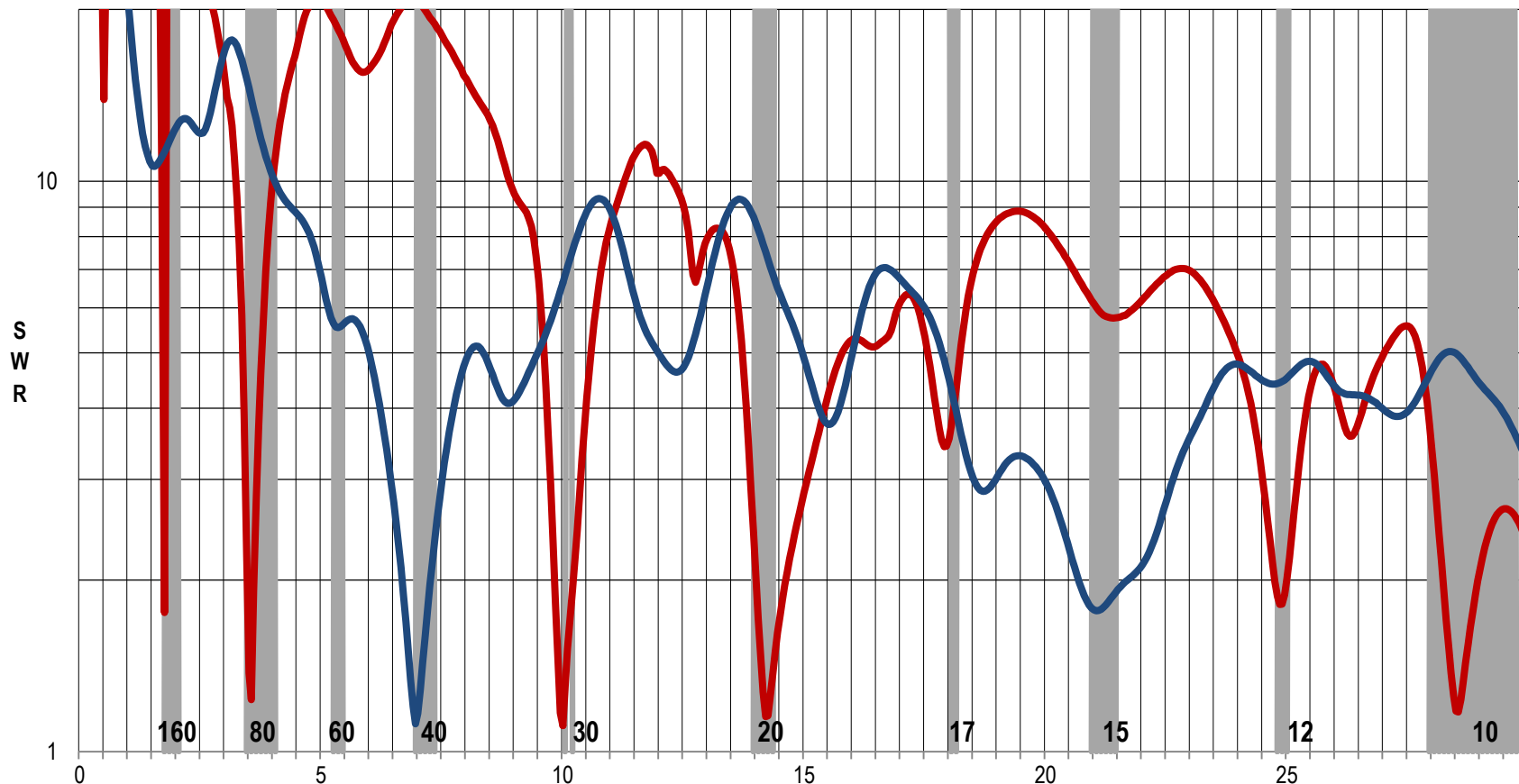
# The HF Antennas at 10 MW

Harpwell Antenna Sweep 0.1 MHz => 30MHz Oct 2017

— Ham Bands

— 160-80-30-20-10

— 40M Vertical



W1DYJ / Larry Banks [www.qsl.net/w1dyj](http://www.qsl.net/w1dyj) 7B-DXCC WAS VUCC WPX

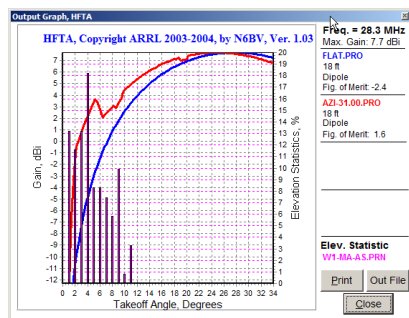
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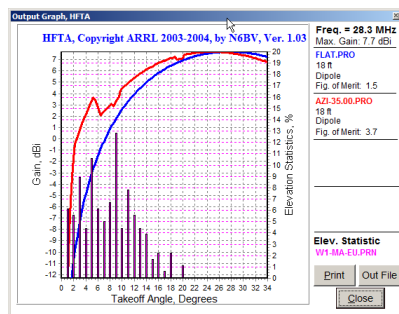
# 10M Dipole @ ~18': HFTA Response toward Various Countries

Note: The current fan dipole is a ~30'. The response will not be significantly different.

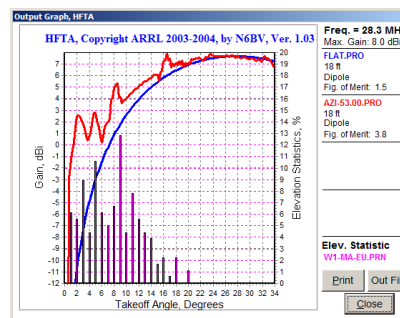
**31° India**



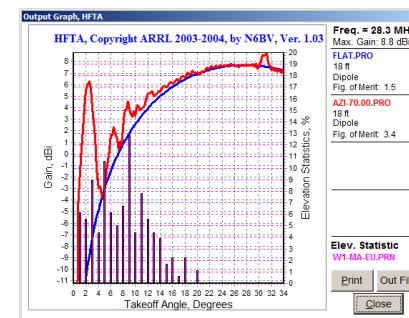
**35° Iceland / EurRussia**



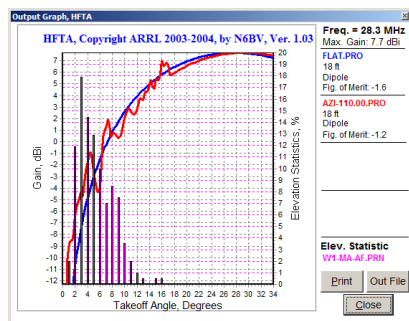
**53° England**



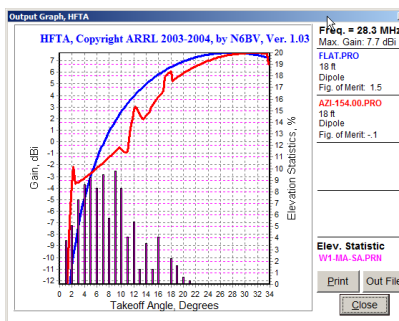
**70° Spain**



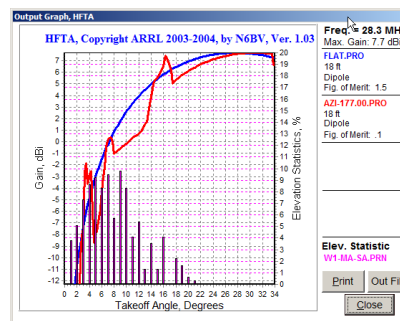
**110° South Africa**



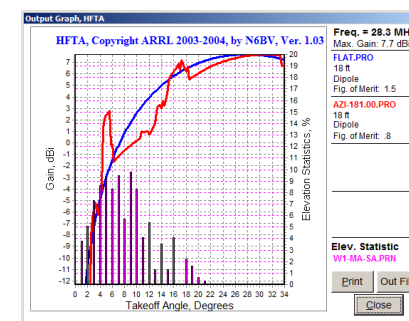
**154° French Guiana**



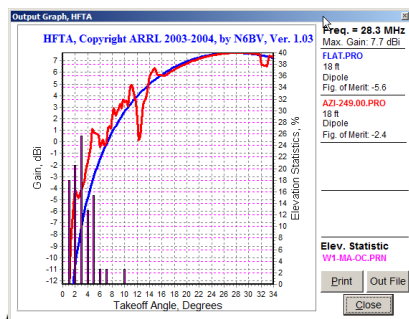
**177° Argentina**



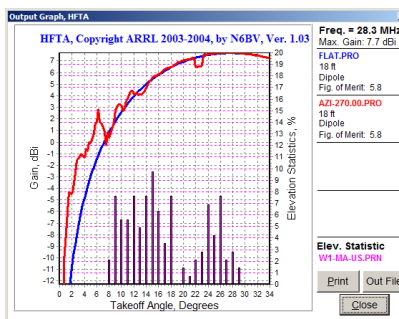
**181° Chile**



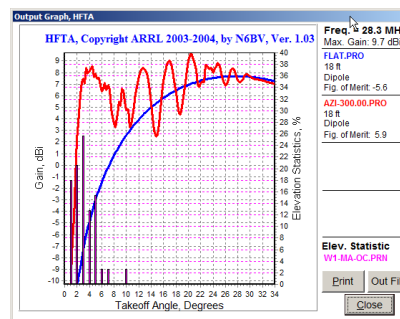
**249° New Zealand**



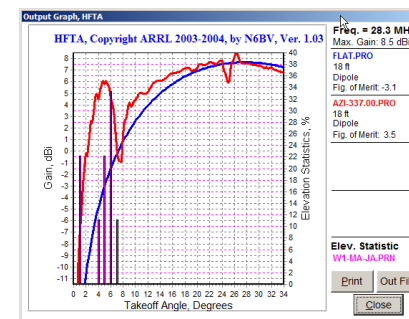
**270° California**



**300° Australia**



**337° Japan**



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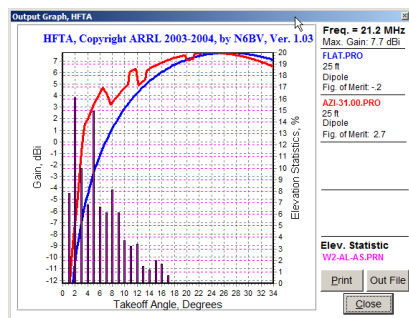
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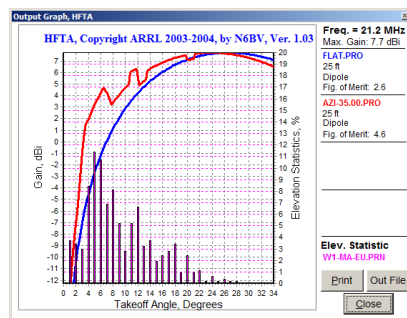
# 15M Vertical: HFTA Response toward Various Countries

Note: HFTA does not work for verticals. This analysis is based on a dipole at 8M.

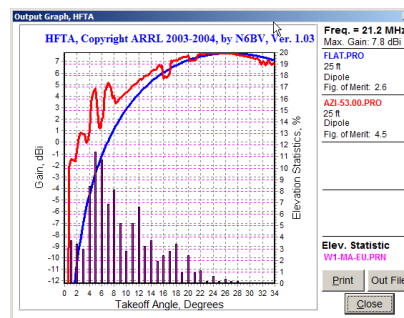
**31° India**



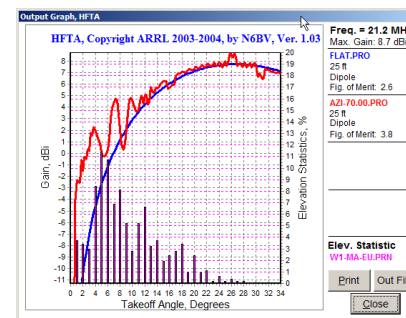
**35° Iceland / EurRussia**



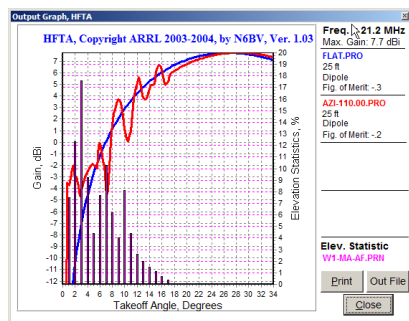
**53° England**



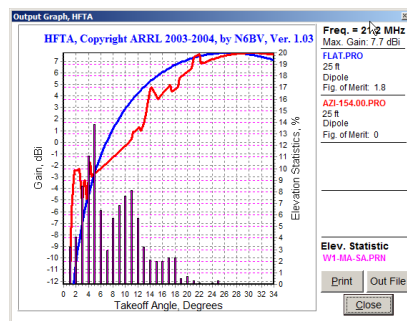
**70° Spain**



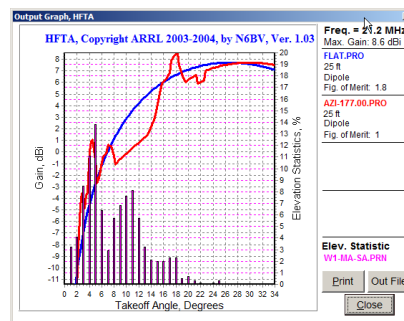
**110° South Africa**



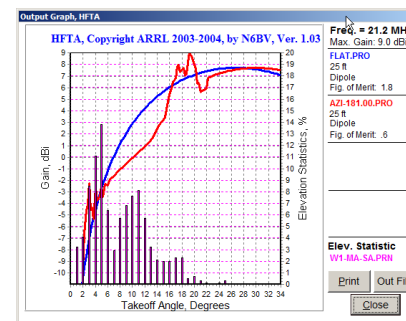
**154° French Guiana**



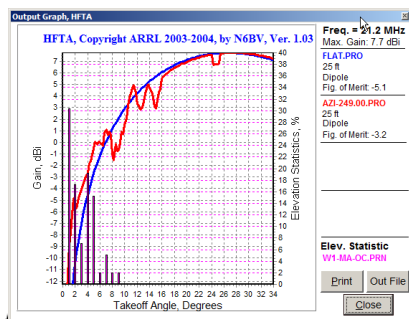
**177° Argentina**



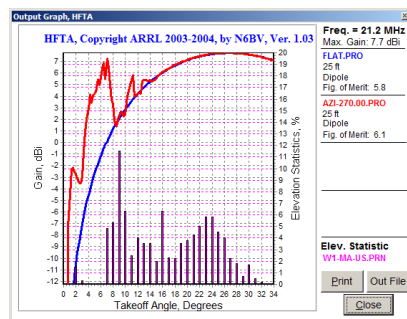
**181° Chile**



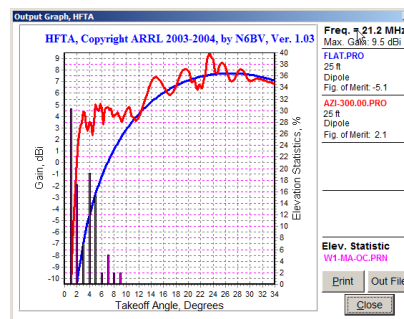
**249° New Zealand**



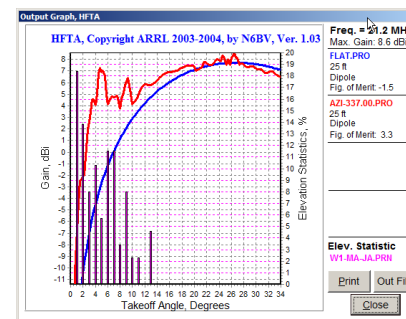
**270° California**



**300° Australia**



**337° Japan**



Note: HFTA does not work for verticals. This analysis is based on a dipole at 8M.



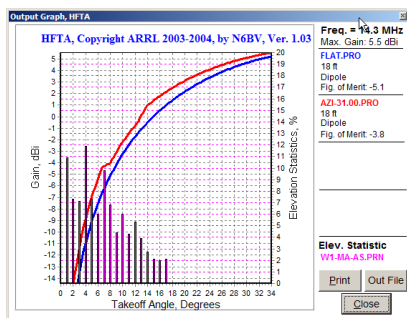
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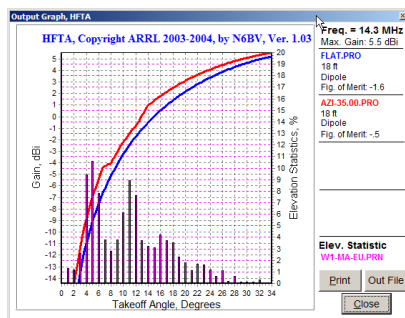
# 20M Dipole @ ~18': HFTA Response toward Various Countries

Note: The current fan dipole is a ~30'. The response will not be significantly different.

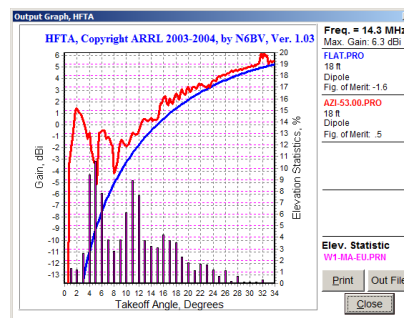
**31° India**



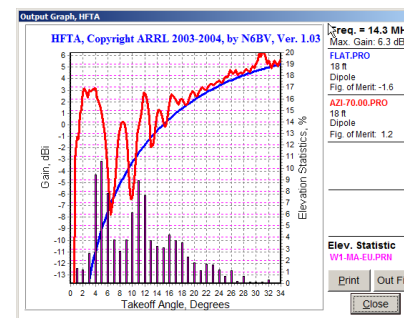
**35° Iceland / EurRussia**



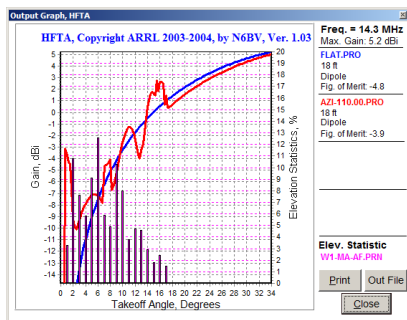
**53° England**



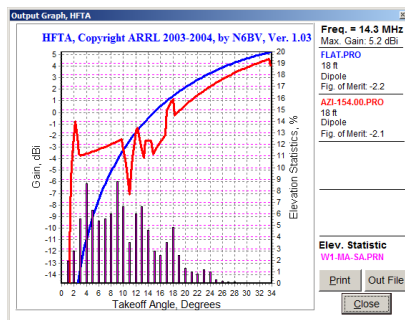
**70° Spain**



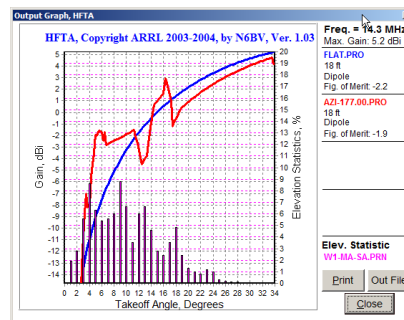
**110° South Africa**



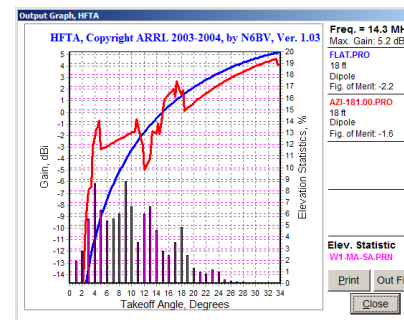
**154° French Guiana**



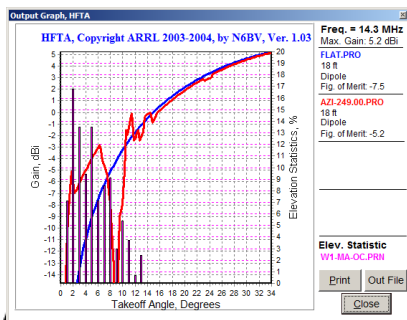
**177° Argentina**



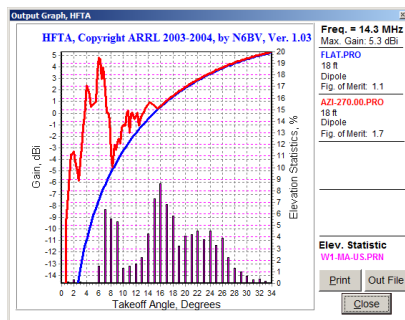
**181° Chile**



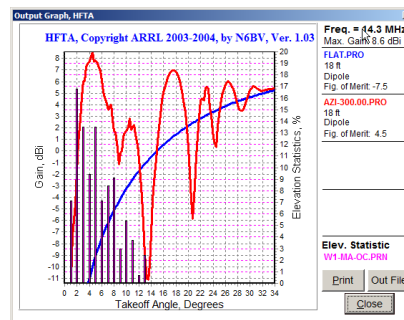
**249° New Zealand**



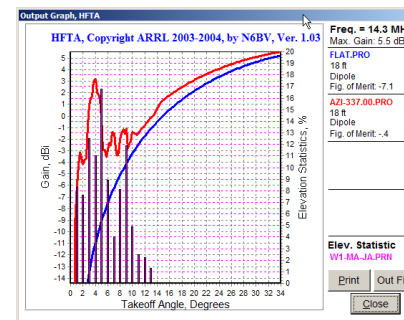
**270° California**



**300° Australia**



**337° Japan**



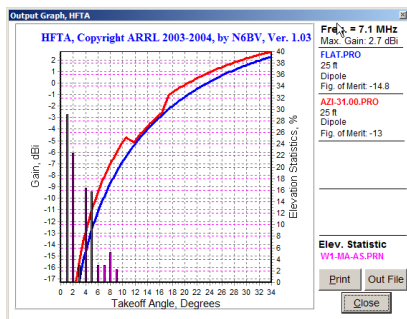
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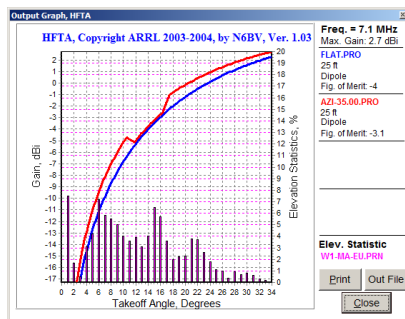
# 40M Vertical: HFTA Response toward Various Countries

Note: HFTA does not work for verticals. This analysis is based on a dipole at 8M.

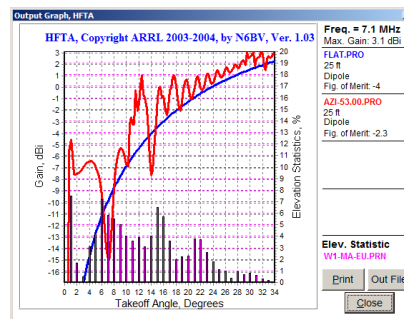
**31° India**



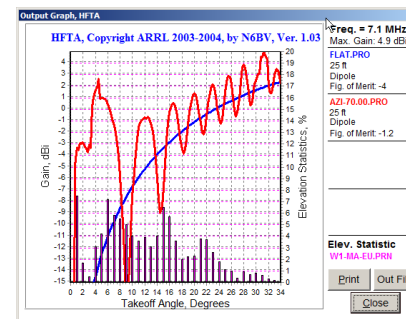
**35° Iceland / EurRussia**



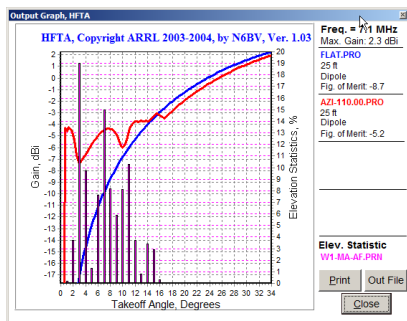
**53° England**



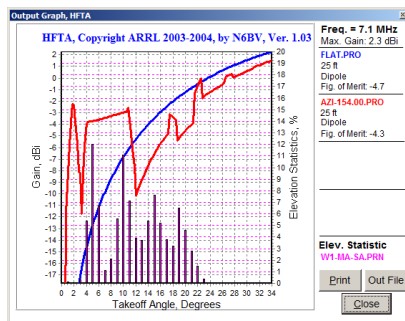
**70° Spain**



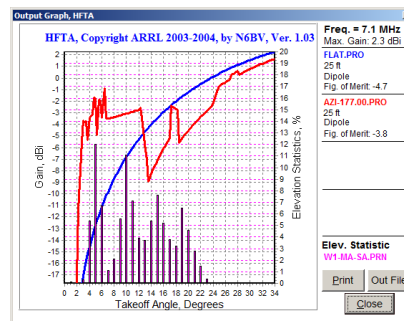
**110° South Africa**



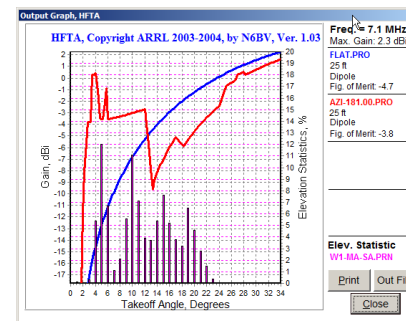
**154° French Guiana**



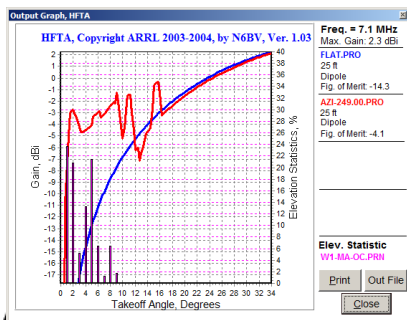
**177° Argentina**



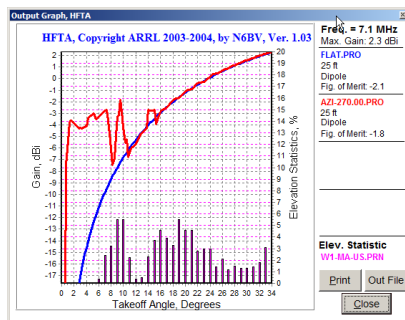
**181° Chile**



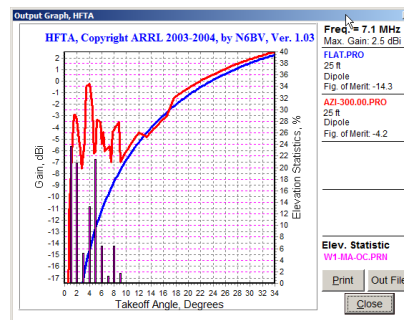
**249° New Zealand**



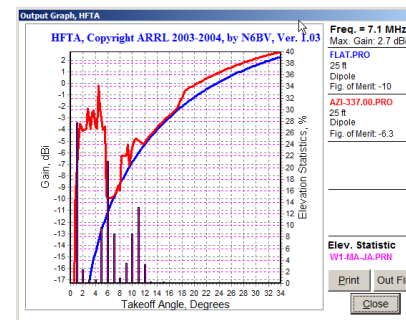
**270° California**



**300° Australia**



**337° Japan**



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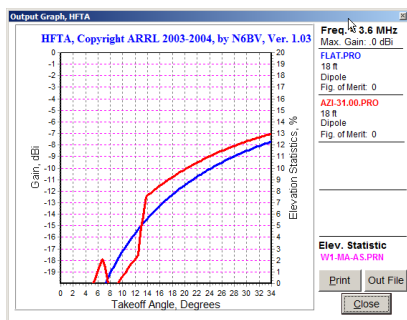
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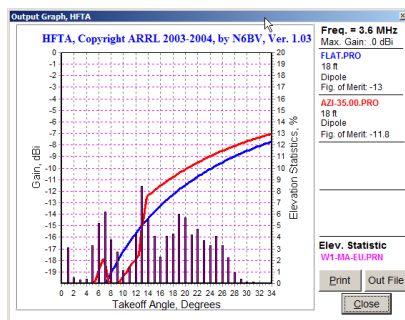
# 80M Dipole @ ~18': HFTA Response toward Various Countries

Note: The current fan dipole is a ~30'. The response will not be significantly different.

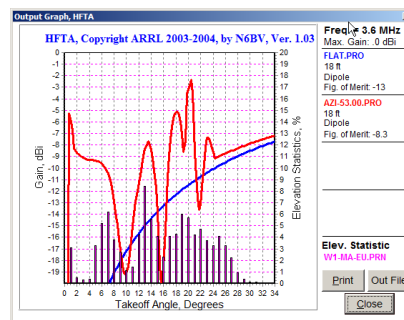
**31° India**



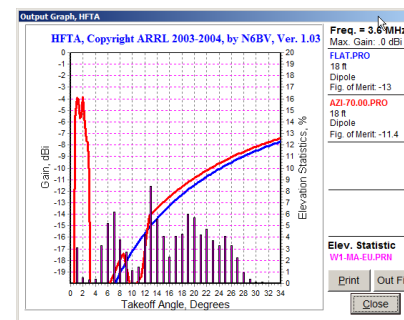
**35° Iceland / EurRussia**



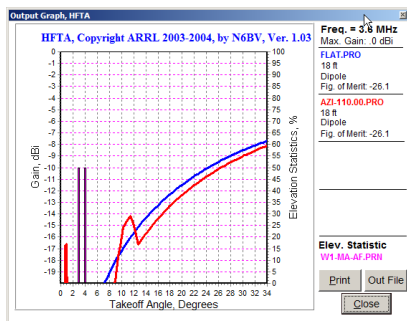
**53° England**



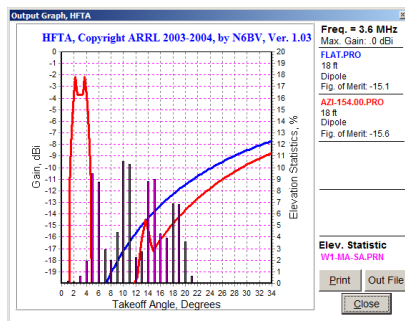
**70° Spain**



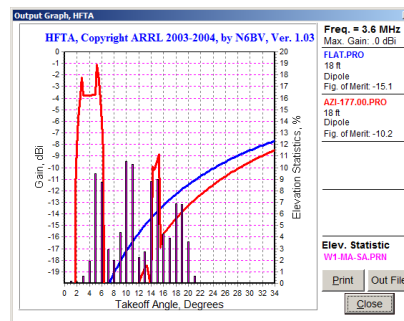
**110° South Africa**



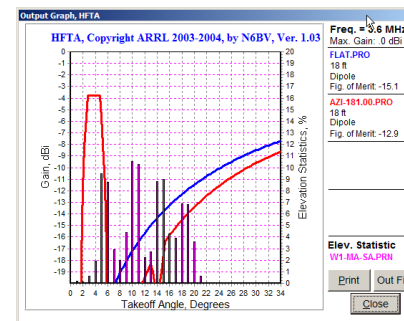
**154° French Guiana**



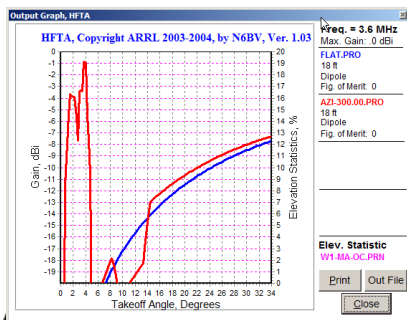
**177° Argentina**



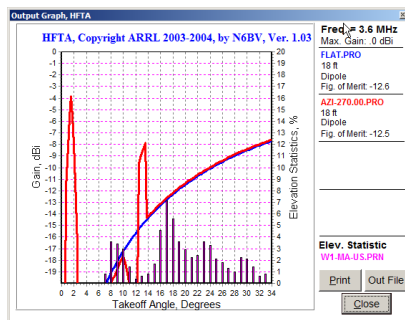
**181° Chile**



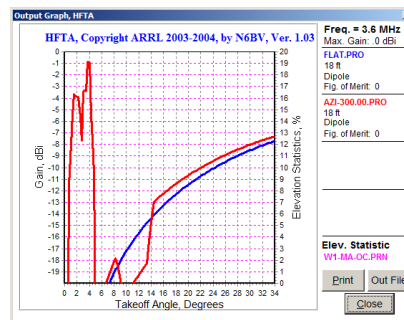
**249° New Zealand**



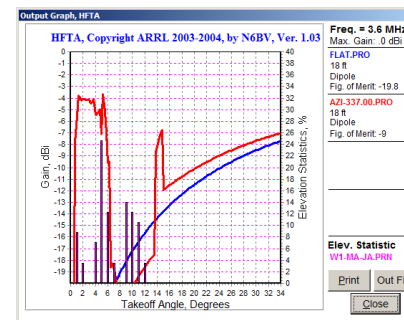
**270° California**



**300° Australia**



**337° Japan**



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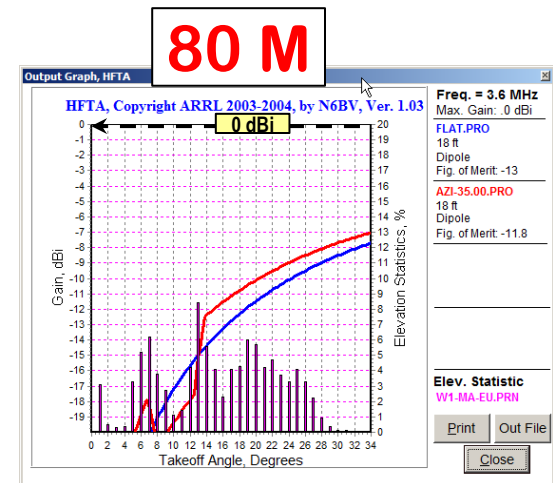
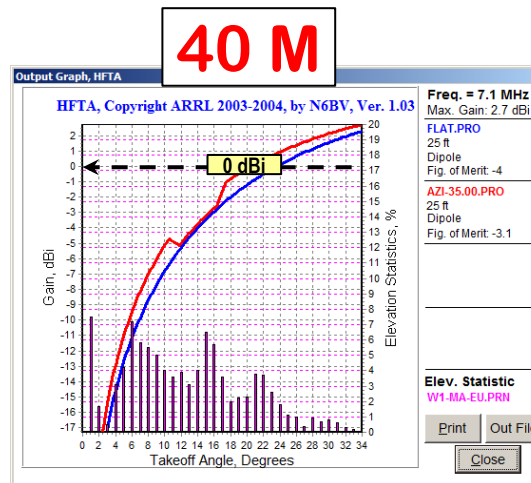
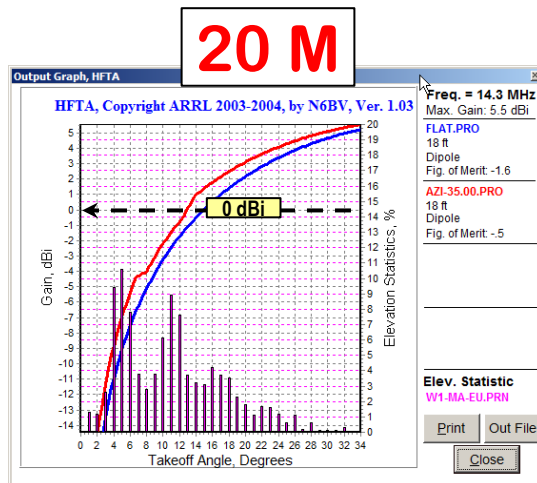
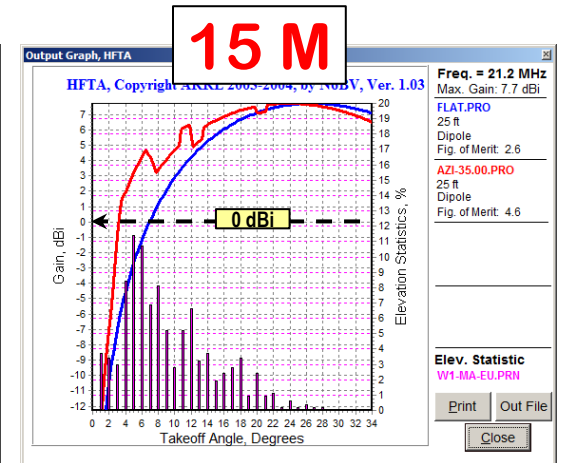
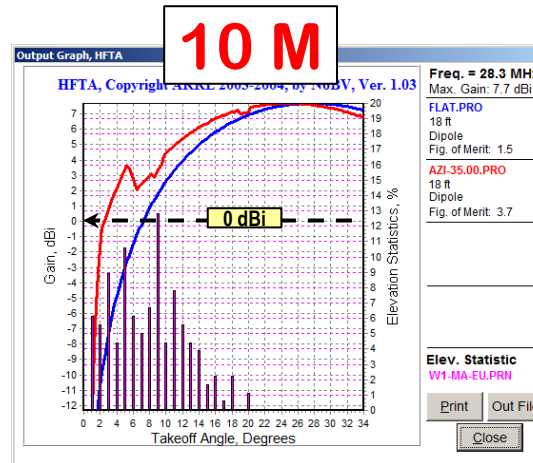
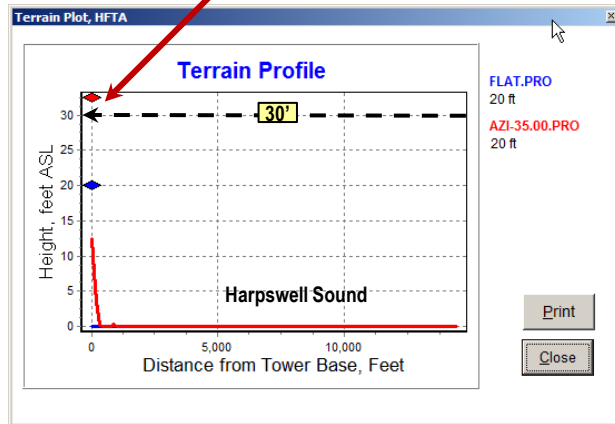
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# Comparison of Antennas at Specific Azimuths

## 35° Iceland / European Russia

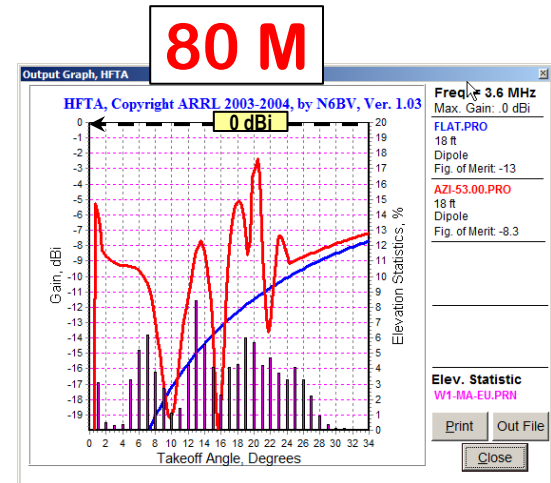
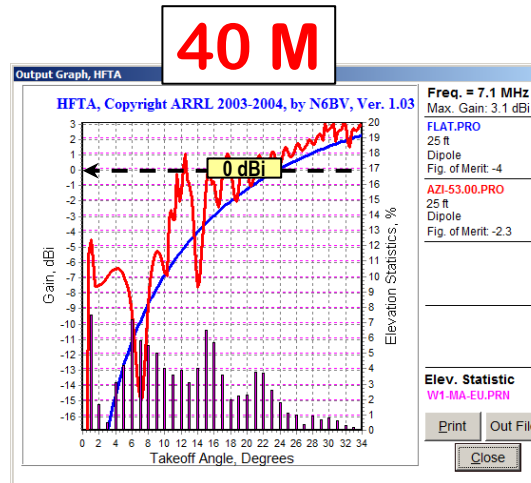
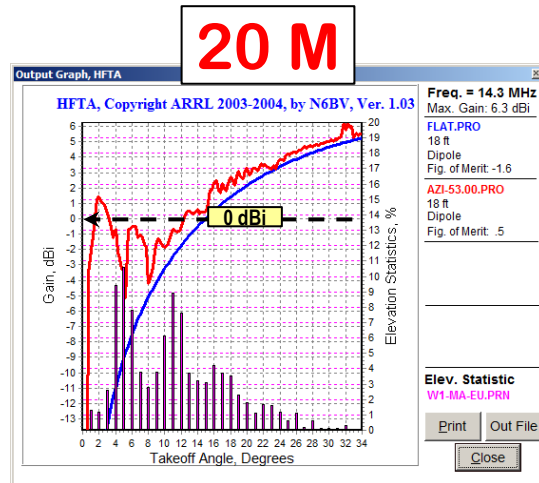
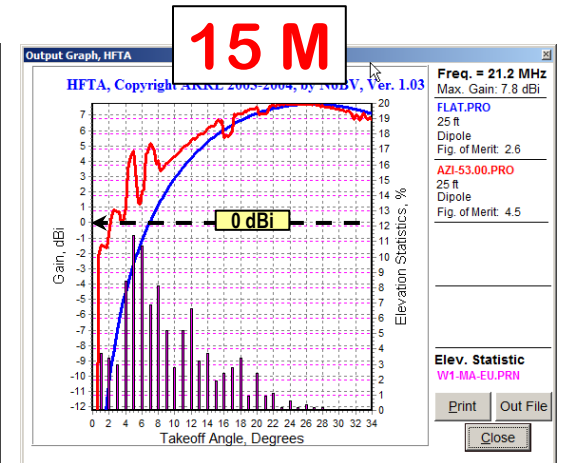
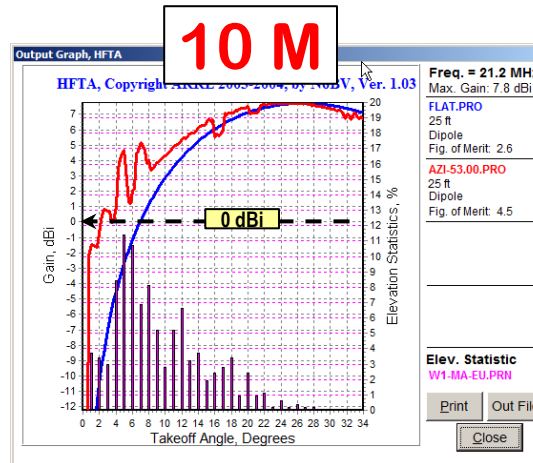
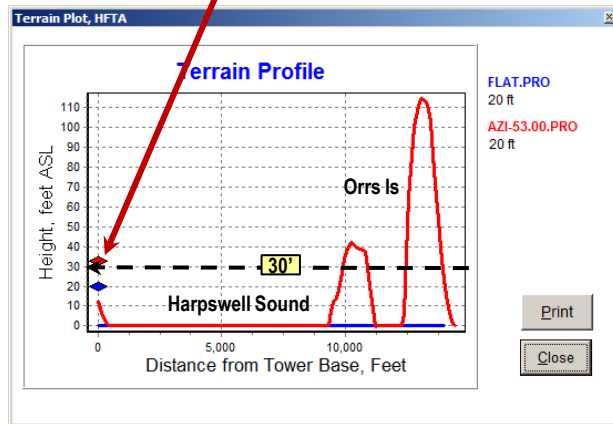
Note: Antennas are IN FRONT OF HILL



# Comparison of Antennas at Specific Azimuths

53° England

Note: Antennas are IN FRONT OF Hill



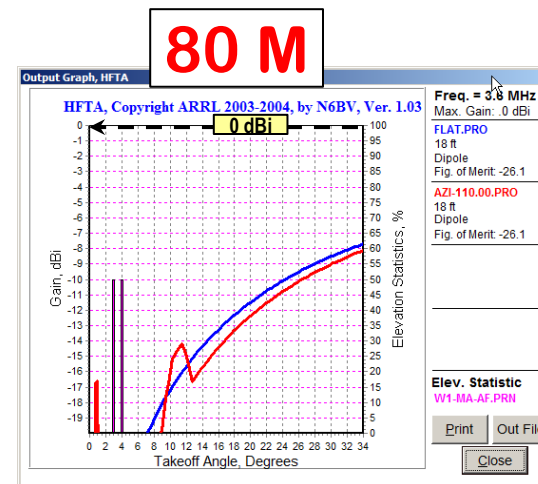
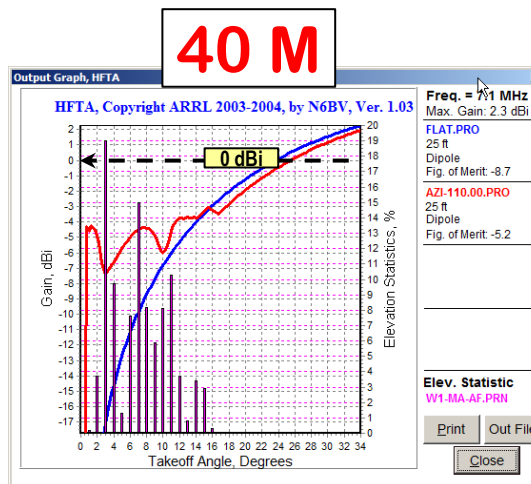
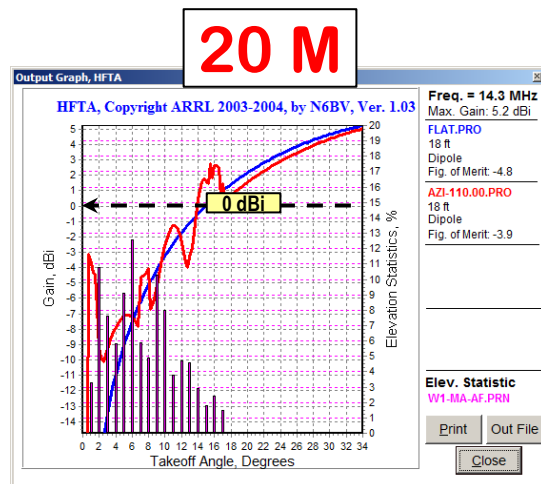
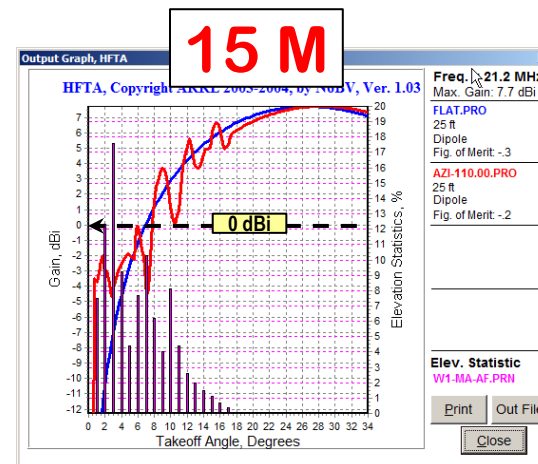
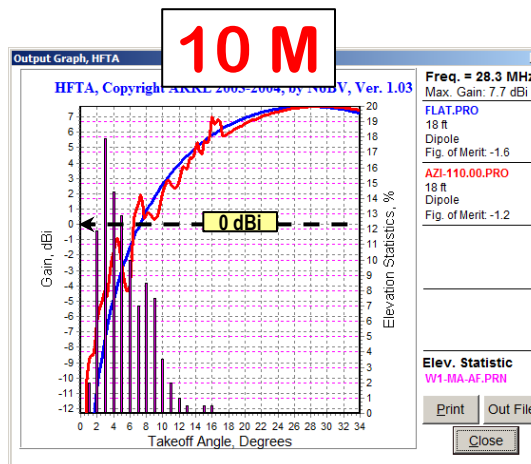
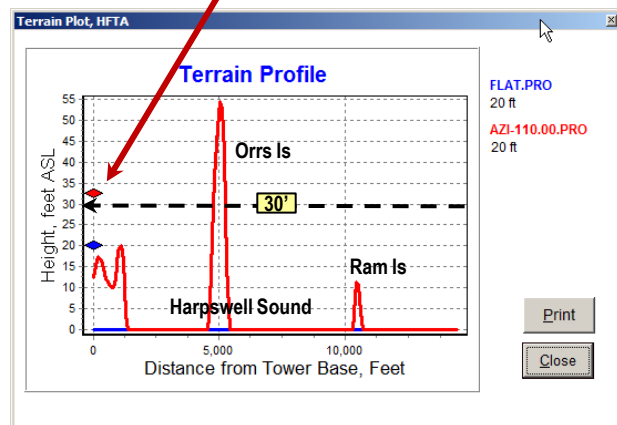
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# Comparison of Antennas at Specific Azimuths

110° South Africa

Note: Antennas are IN FRONT OF Hill



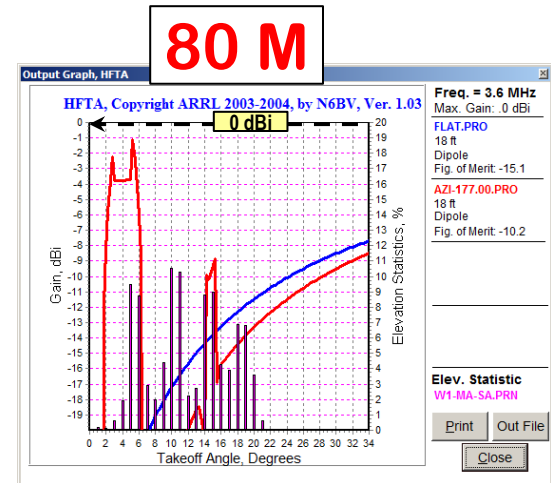
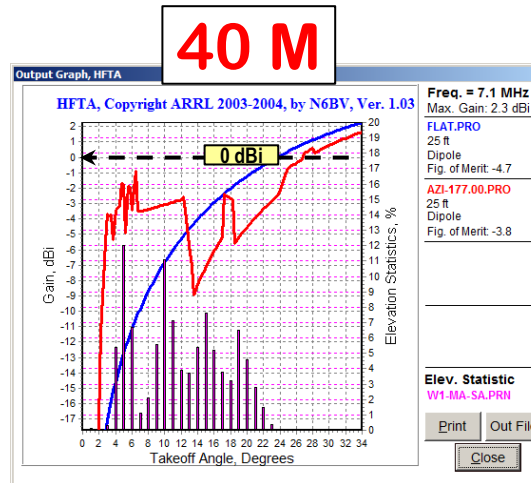
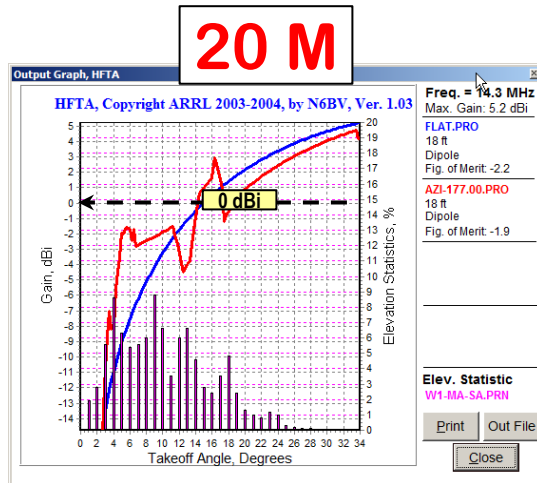
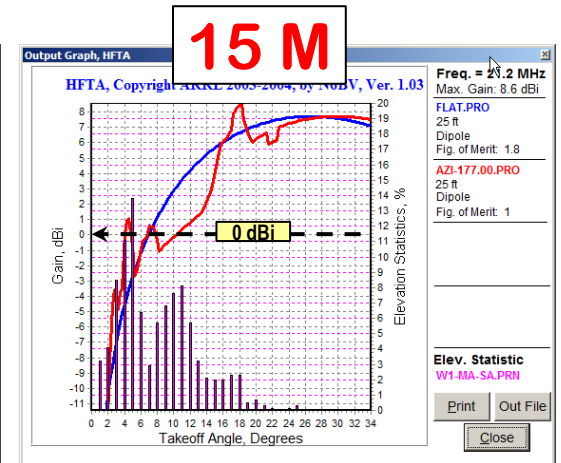
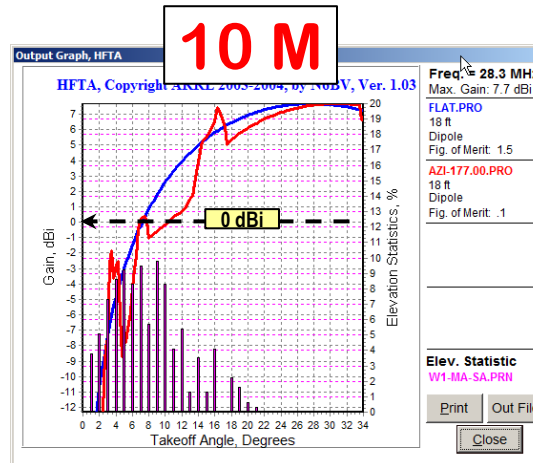
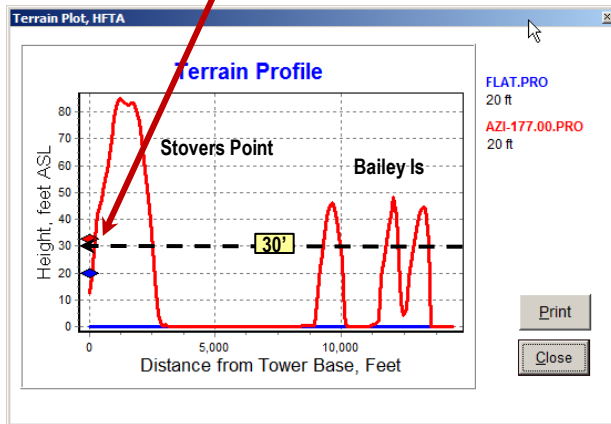
W1DYJ / Larry Banks www.qsl.net/w1dyj 7B-DXCC WAS VUCC WPX

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# Comparison of Antennas at Specific Azimuths

177° Argentina

Note: Antennas are BEHIND Hill

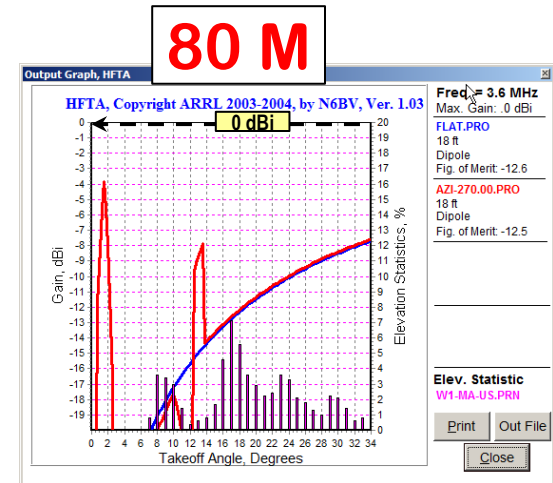
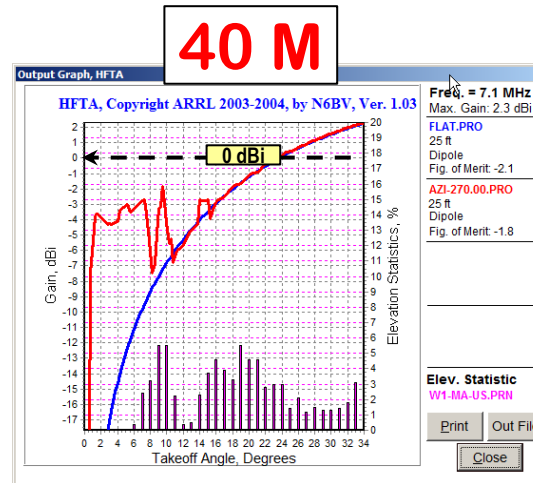
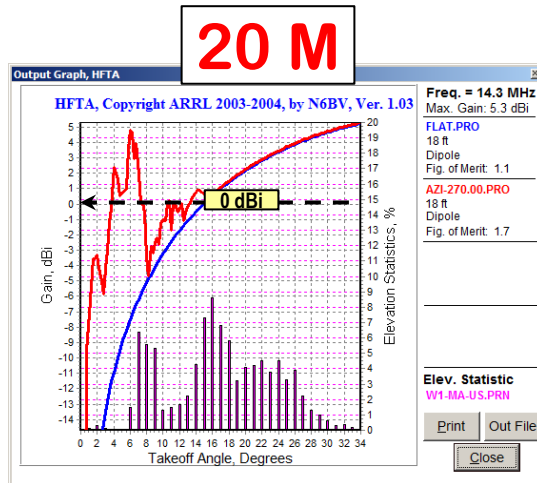
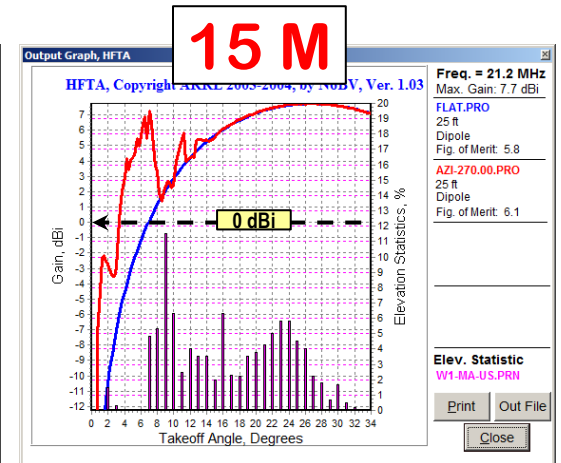
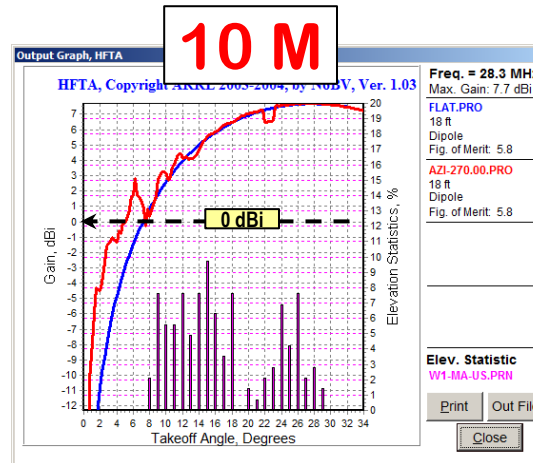
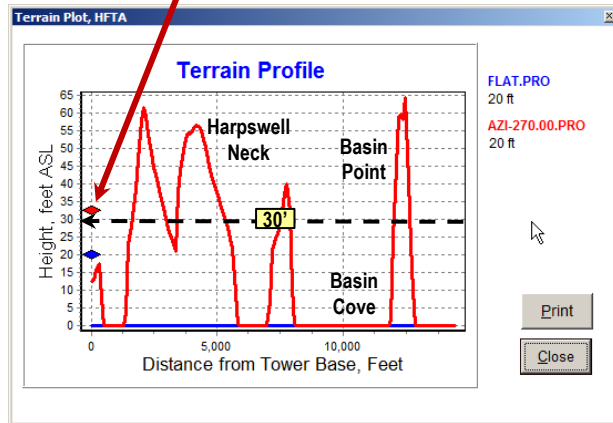




# Comparison of Antennas at Specific Azimuths

270° California

Note: Antennas are BEHIND Hill



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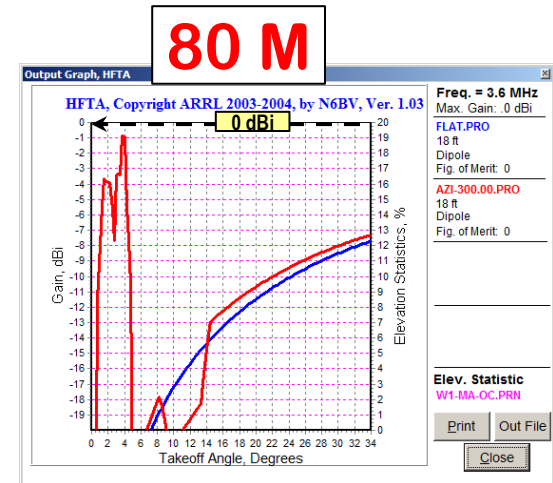
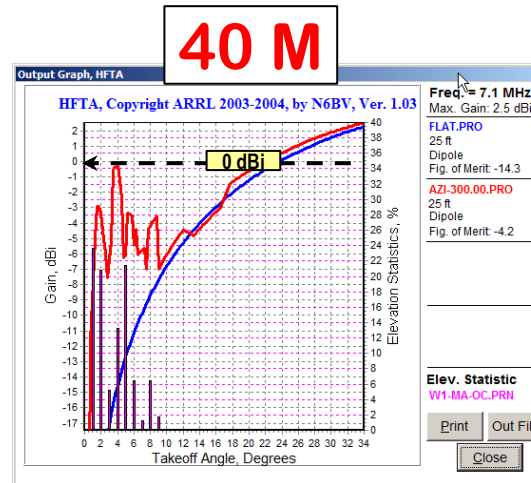
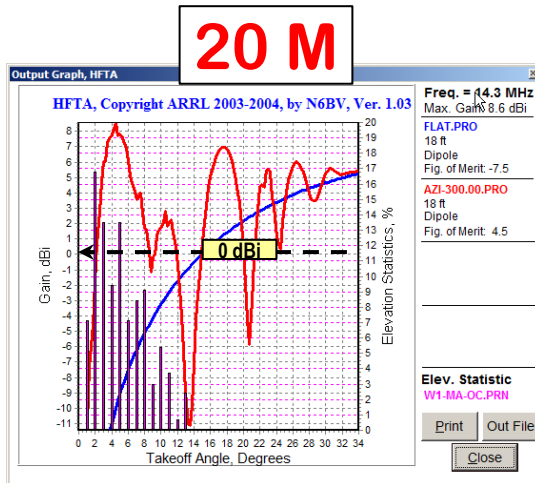
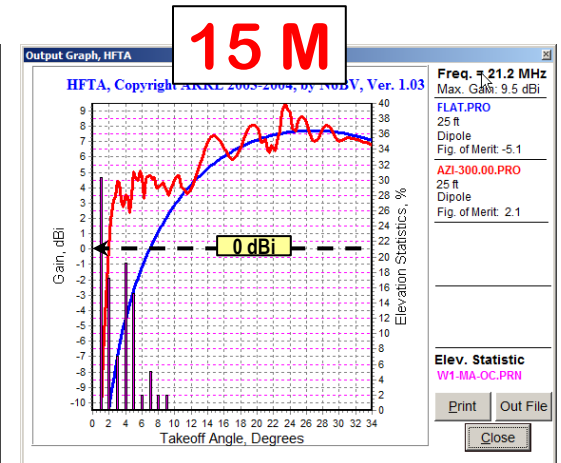
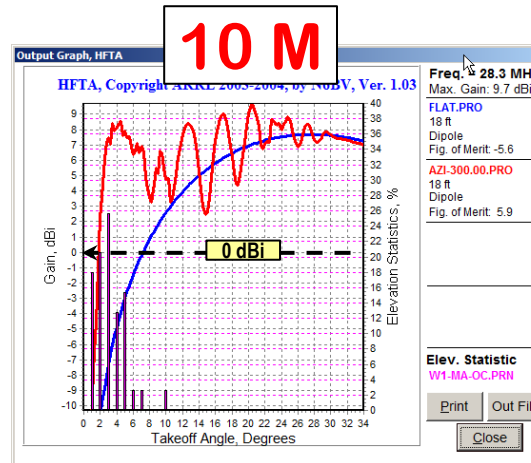
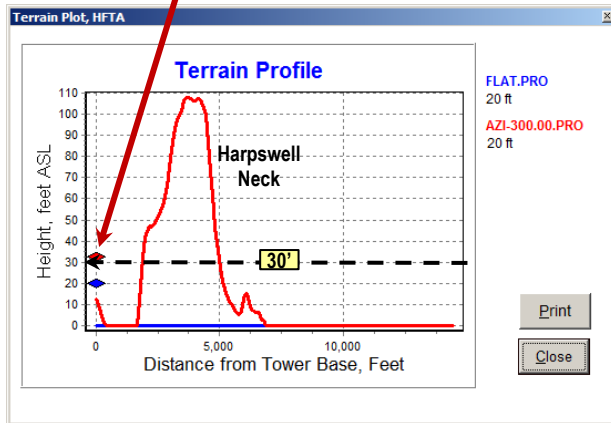
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# Comparison of Antennas at Specific Azimuths

300° Australia

Note: Antennas are BEHIND Hill



# Comparison of Antennas at Specific Azimuths

337° Japan

Note: Antennas are IN FRONT OF Hill

