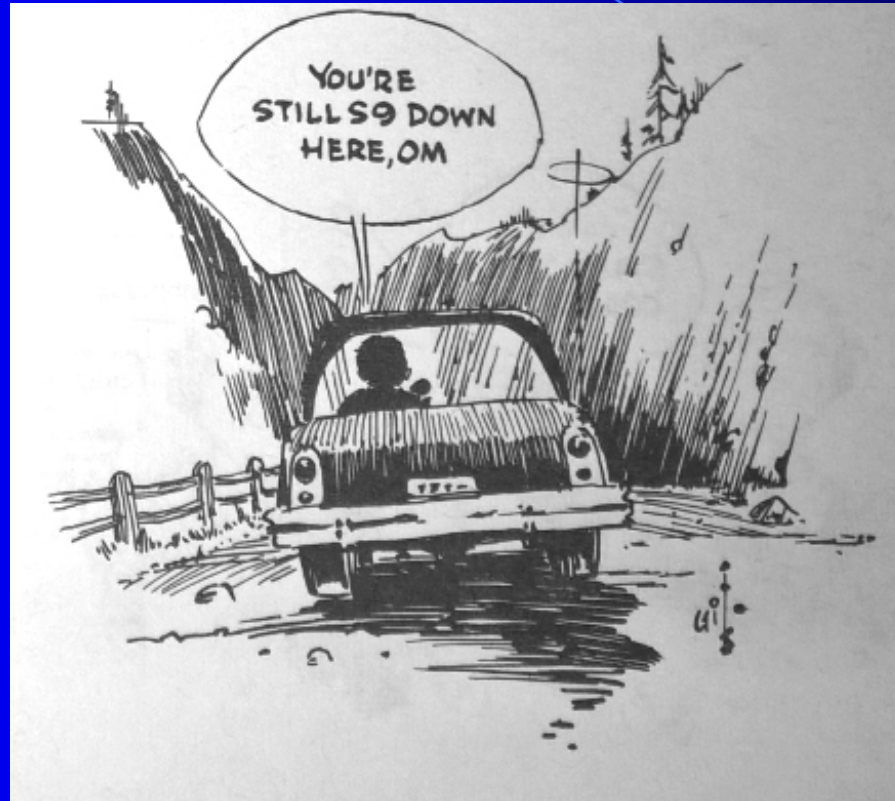


# Obstacle Gain: Reinventing the Wheel in 2018

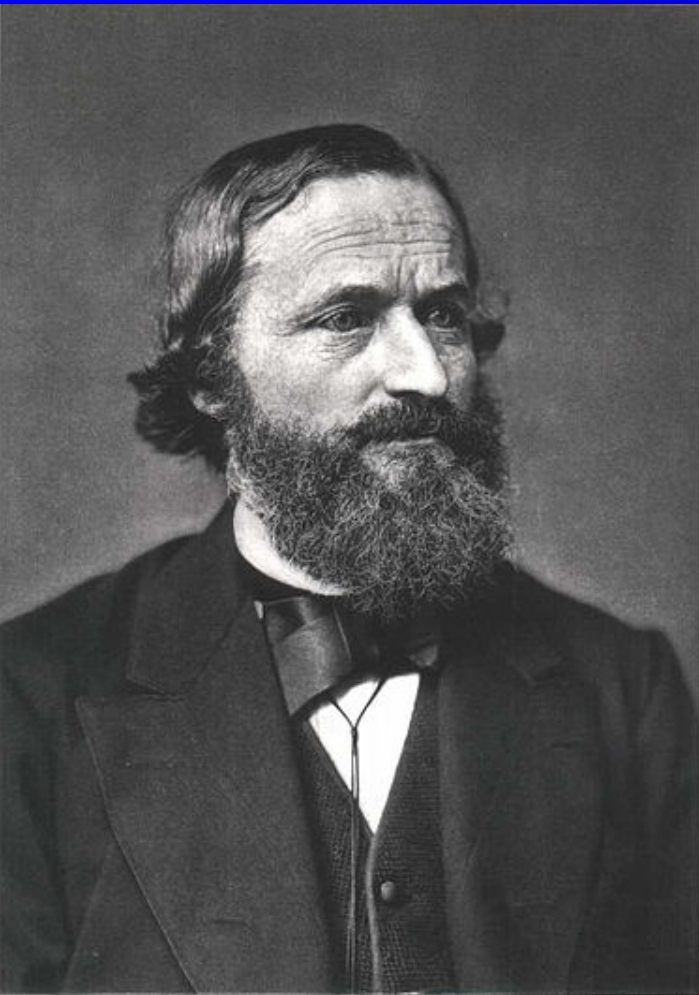


by  
Wayne Overbeck, N6NB  
[www.n6nb.com](http://www.n6nb.com)



The legendary cartoonist, Philip “Gil” Gildersleeve, W1CJD, penned our title cartoon for the *Radio Amateur’s VHF Manual* in the 1960s or perhaps earlier. This version appeared in the 11<sup>th</sup> edition, published 50 years ago in 1968.

However, terms like “obstacle gain” and “knife edge diffraction” appeared in professional and ham literature long before that time.



Gustav Kirchhoff (1824-1887), a German physicist, described the diffraction (bending) of light waves passing over a cone or cylinder, among other principles that have earned him a place in physics and electrical engineering textbooks for more than a century.



## *Your Location May Be Better Than You Think!*

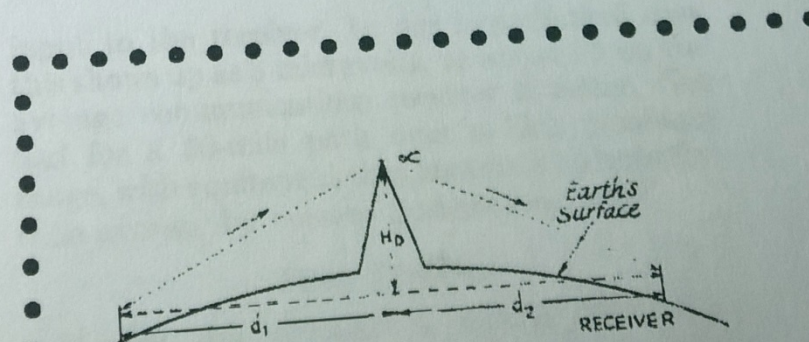
**H**AVE you been passing up 50 Mc. and higher bands because your location isn't on the highest hill for miles around? Probably you are not interested in breaking records; you merely would like to be able to have solid QSOs within an area of, say, a 100-mile radius. Even if you live in a valley surrounded by high mountains, the v.h.f. potential of your home site may be much more attractive than you ever thought it to be.

While not guaranteeing complete coverage in all directions, a relatively new technique offers a strong possibility that those of us who are surrounded by hills, mountains or even tall buildings may have *better* locations for v.h.f. work than fellows who are in the wide-open spaces! A propagation phenomenon known as obstacle gain has been the subject of thorough investigation in recent years, and the terrain characteristics required for utilizing it are now well understood.

This article will discuss the theory involved, briefly, since it is not at all complex, and show how to recognize paths that provide obstacle gain. Methods not requiring knowledge of higher mathematics will be presented for estimating the expected field strength at the receiving terminals with reasonable accuracy.

## Obstacle Gain Techniques for 50 Mc. and Higher

BY JULIAN H. CRAIG,\* W6LWY

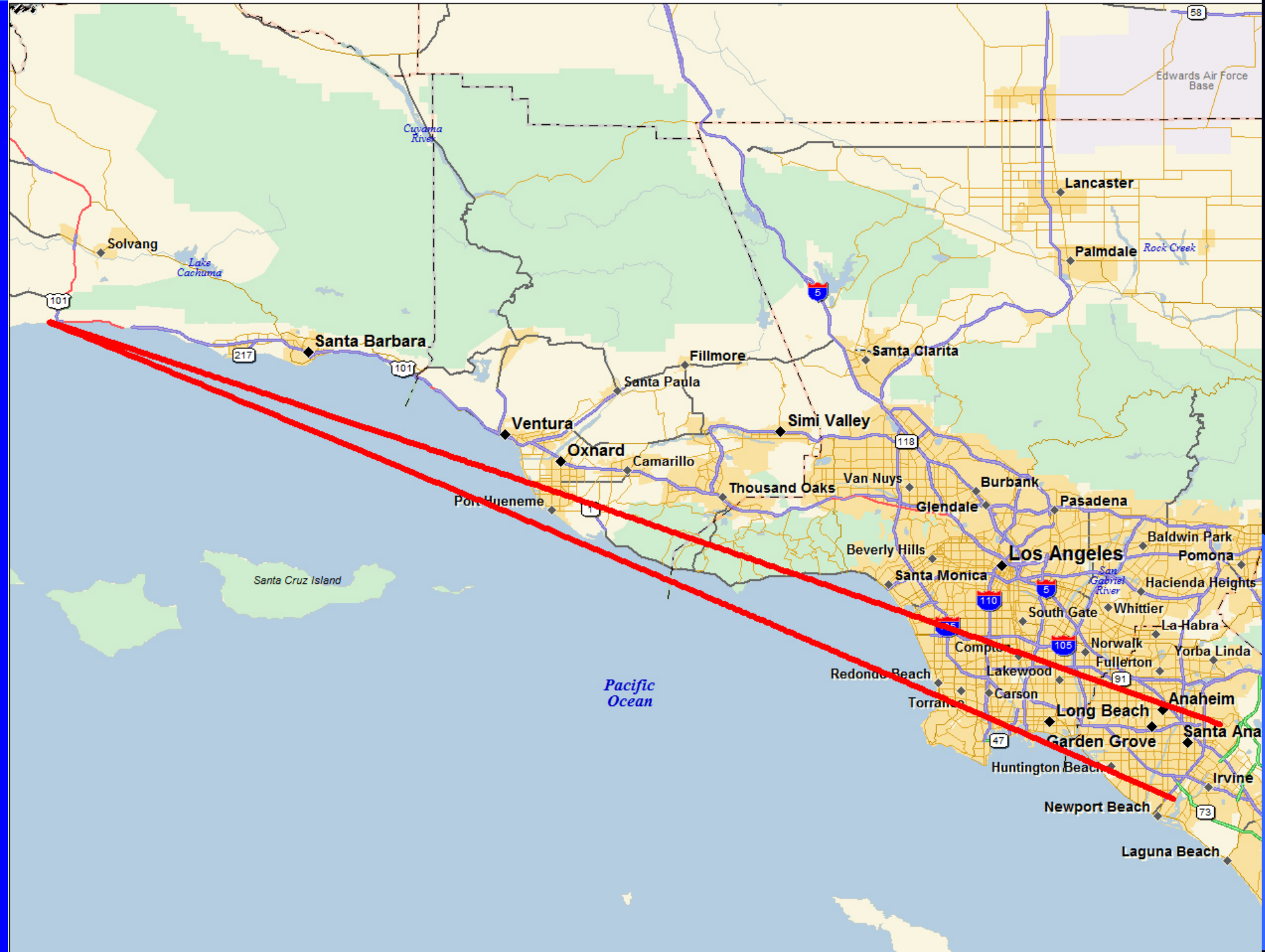


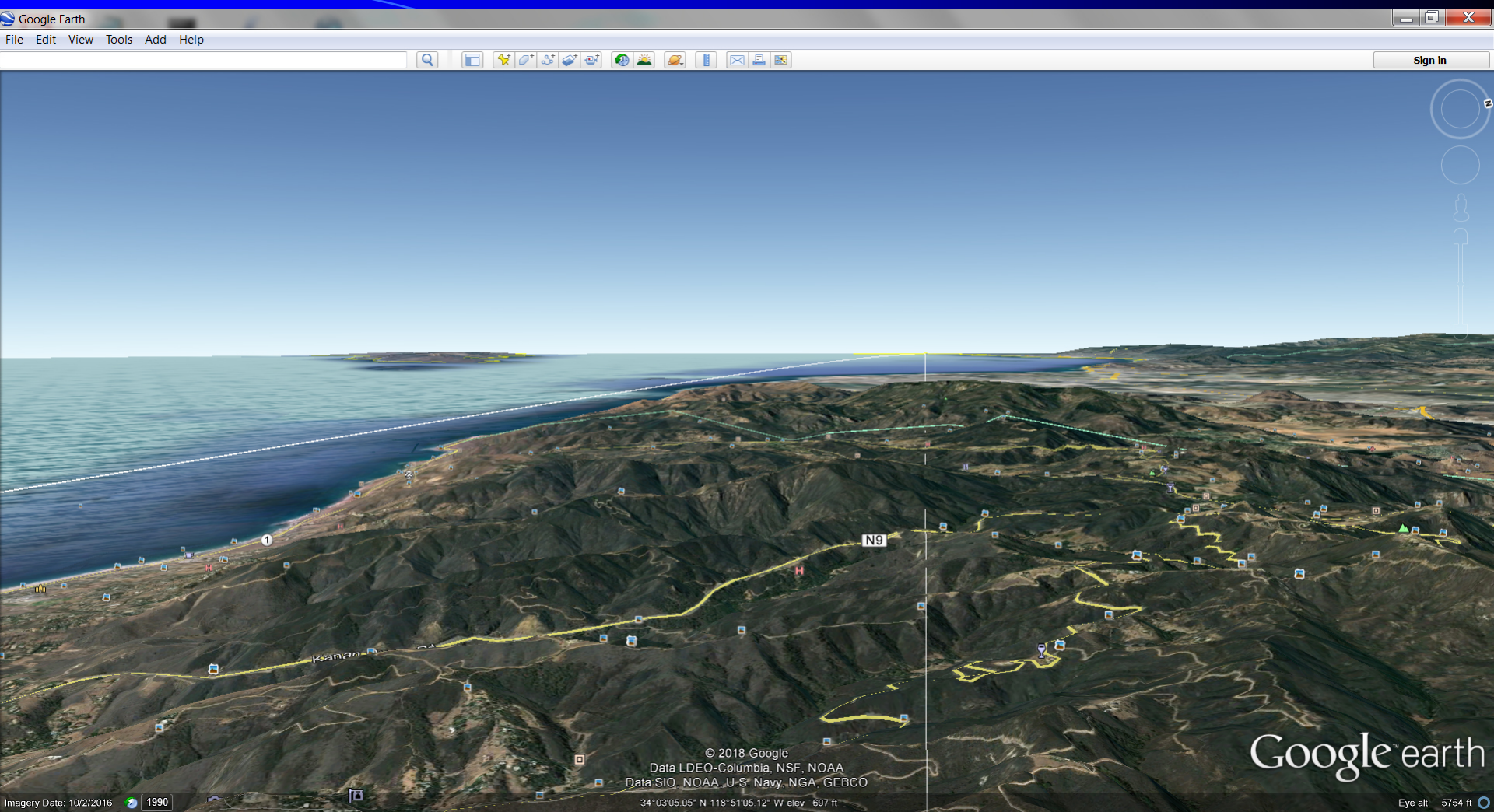
60 years ago in QST...



# Two paths: Orange County, CA to Gaviota Beach (CM94)

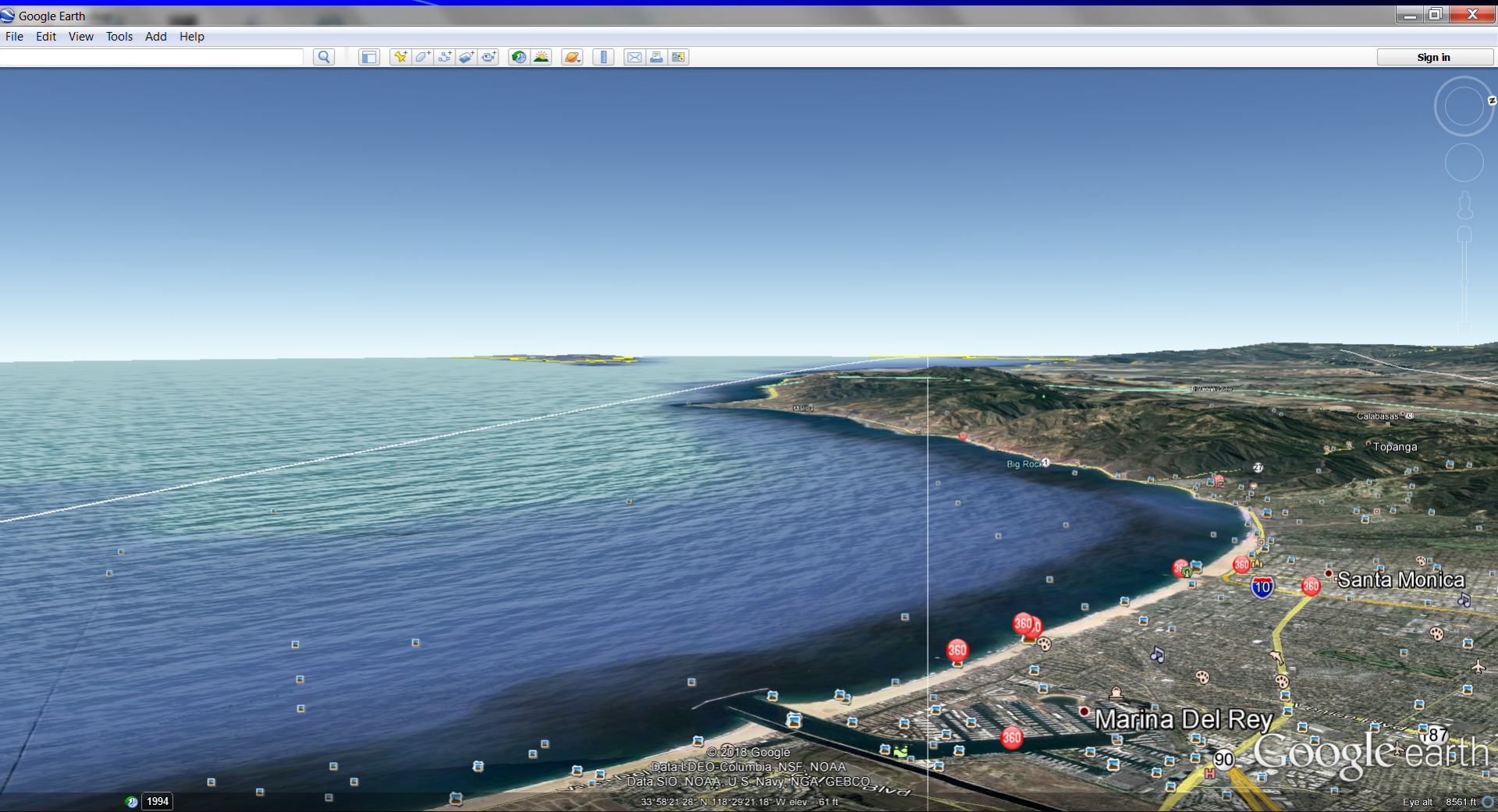
- About 150 miles total distance
- W6IT (Newport Beach) to CM94 is all over water or low-lying land (low-angle tropo)
- N6NB (Panorama Heights) to CM94 is over 2,800' mountain ridge line (“obstacle gain”)





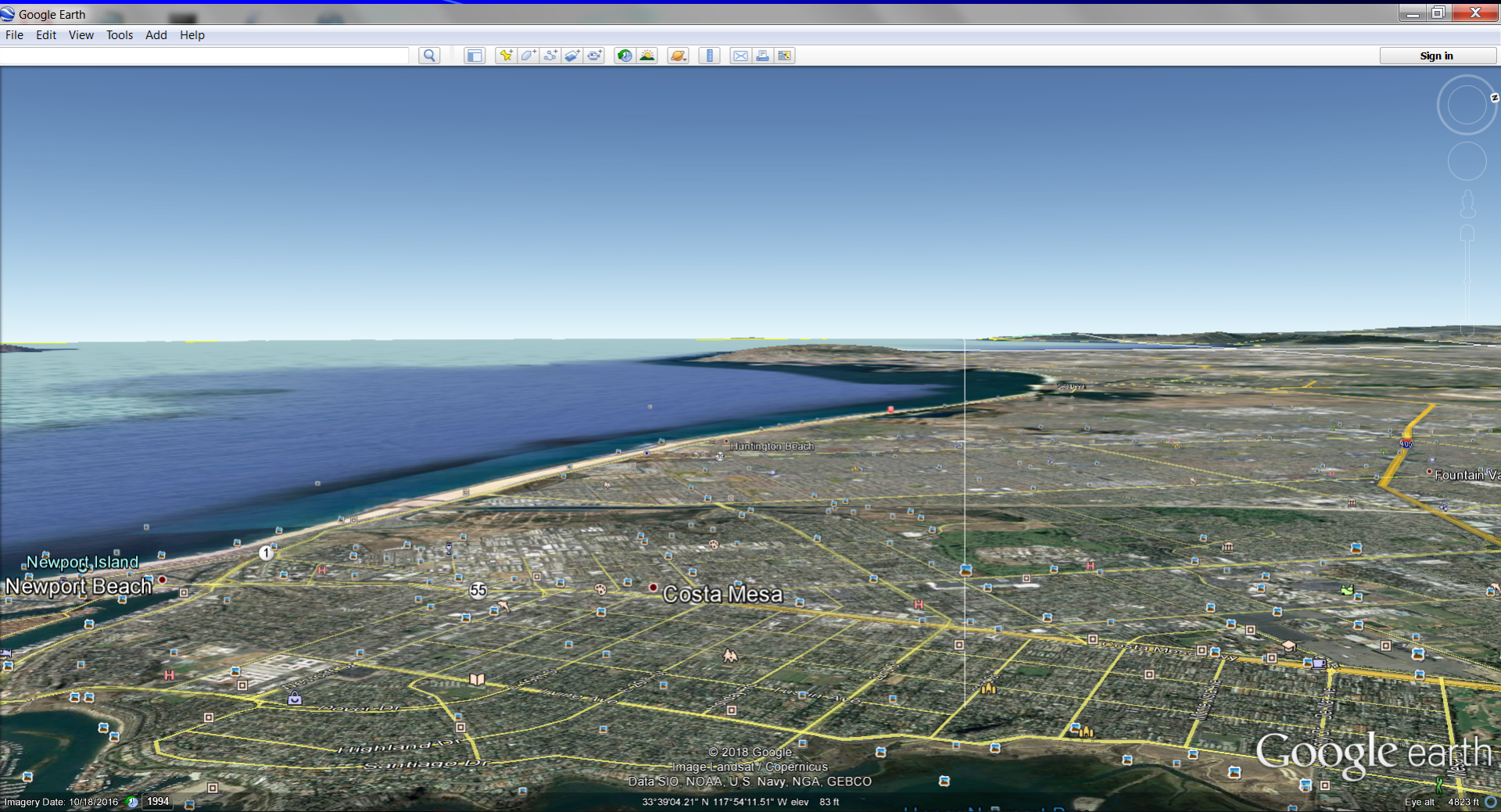
W6IT path (left, over water) and N6NB path (over 2,800' mountain ridge)





Two paths as viewed from Marina Del Rey





W6IT path, Newport Beach to Gaviota Beach



# Panorama Heights as seen by a drone







Panorama Heights antennas





Telephoto on a clear day: arrow shows 2,800' mountain ridge 75 miles away from Panorama Heights. In foreground: "Big A" at Anaheim Stadium (left) and "Matterhorn" at Disneyland.

# W6IT's antennas



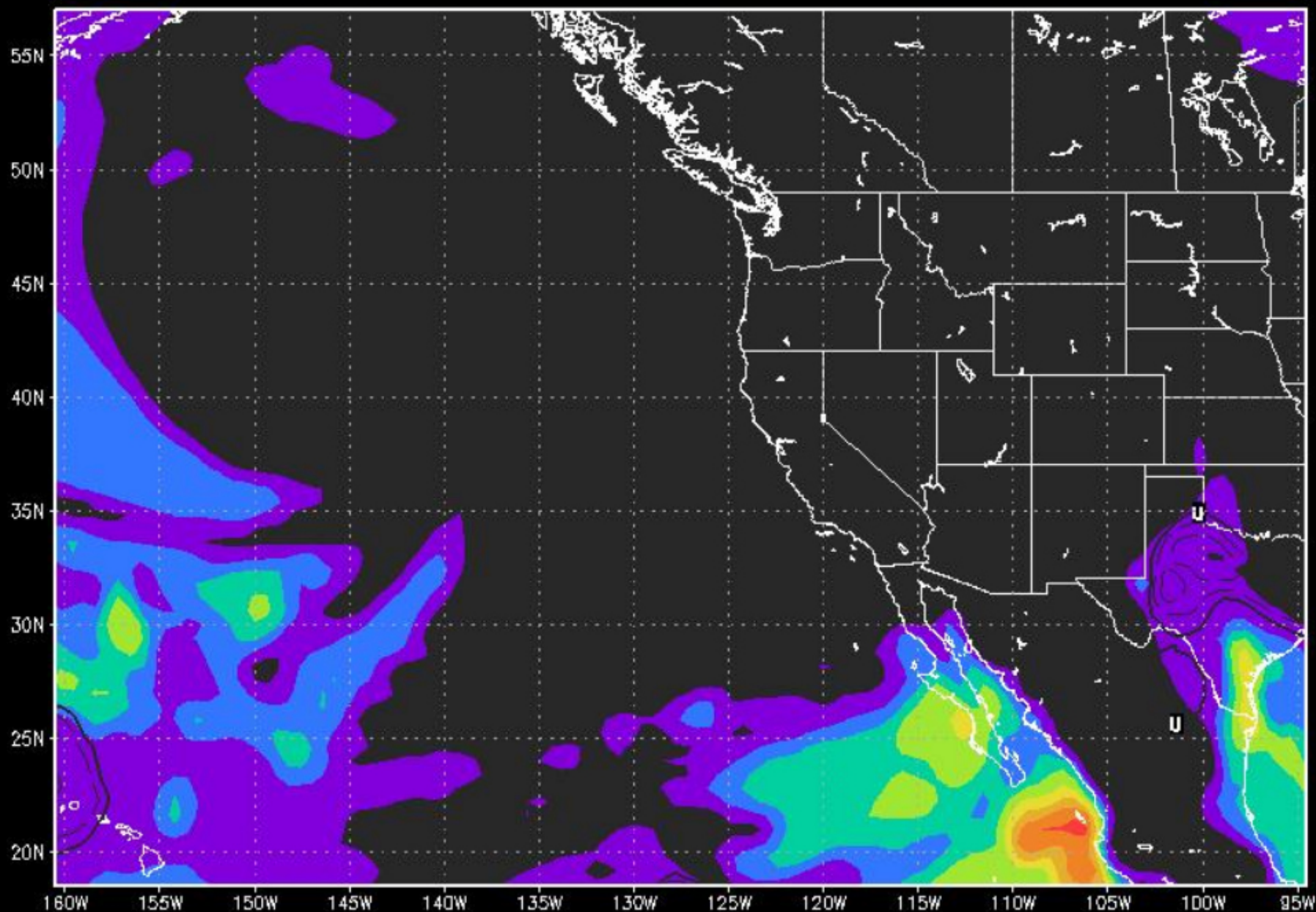




N6NB/R in Gaviota Beach, CM94VL

# Hepburn Tropo Index Valid 1200 UTC Sun Mar 4 Wrn No America

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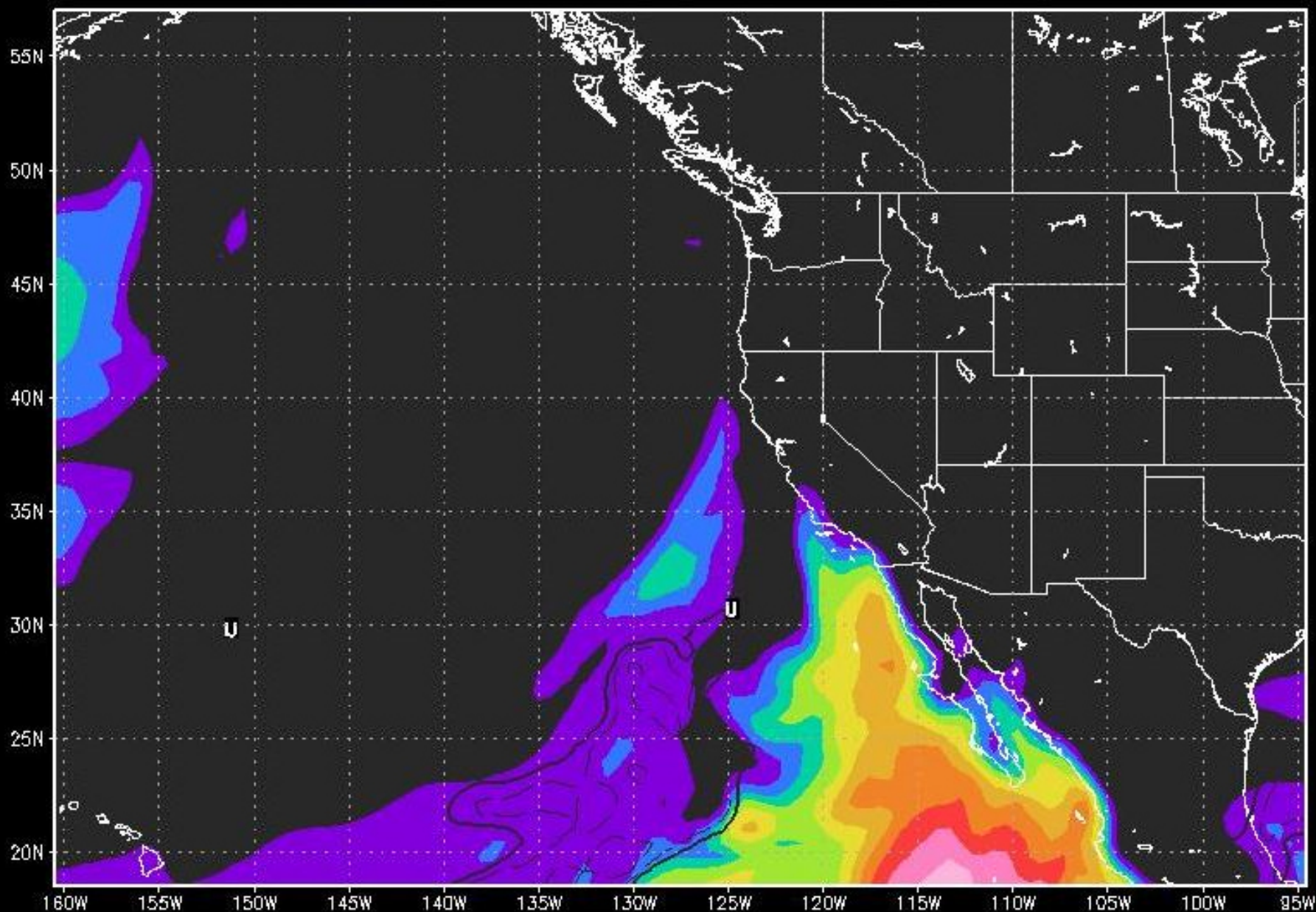


Over-water and over-mountain paths with little tropo enhancement on 50 MHz



# Hepburn Tropo Index Valid 0300 UTC Thu Mar 8 Wrn No America

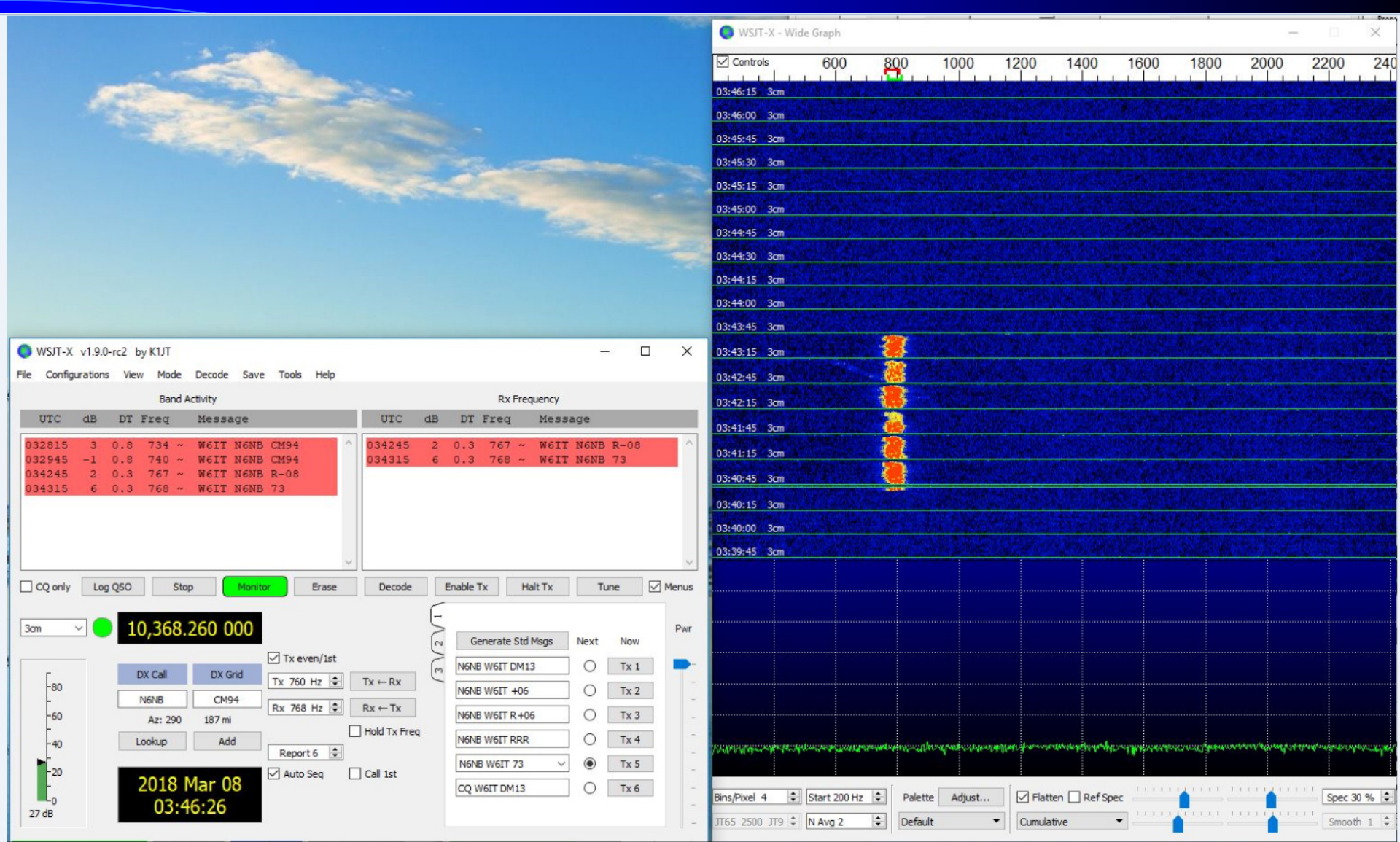
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Two paths on 222 MHz with tropo enhancement...



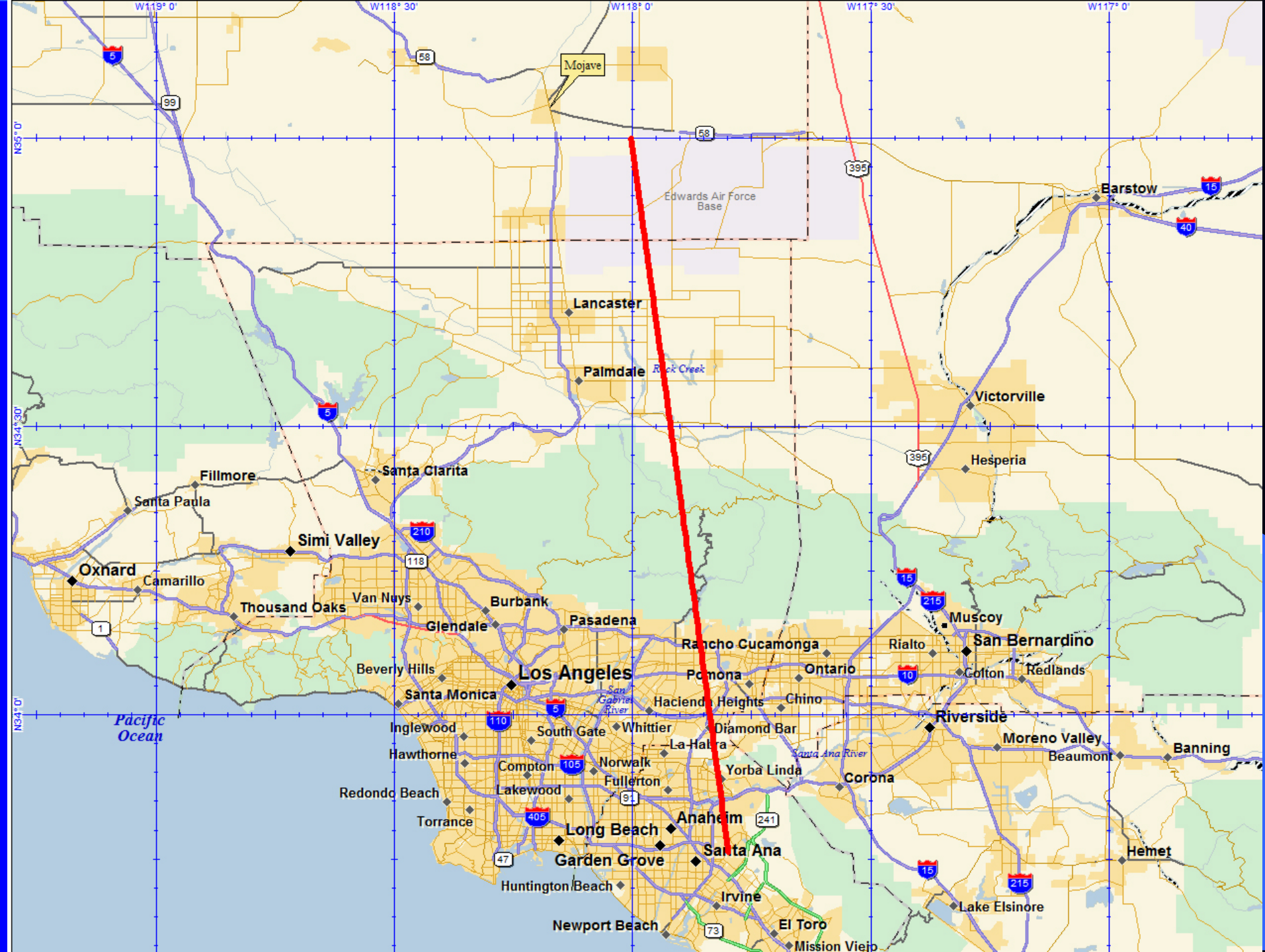


Newport Beach to Gaviota via FT8 on 10 GHz

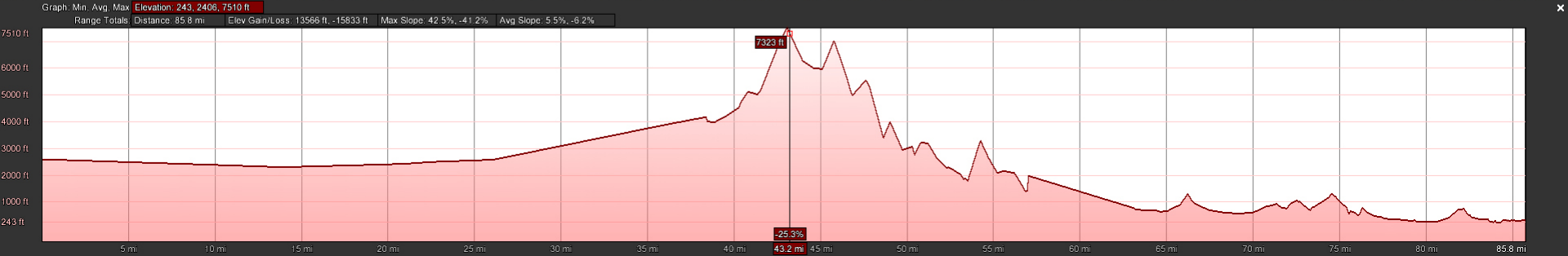


# Another obstacle gain path: Orange County to Antelope Valley

- About 90 miles total distance
- From near sea level over San Gabriel Mountains at 7,500' to high desert
- DM13 to DM04/DM14/DM05/DM15 grid corners near Mojave
- Path consistently worked by rovers up to 10 GHz over many years







## Path goes over 7,500' mountain ridge...





Yes, VHF/microwave signals  
do get over the San Gabriels!



# The N6NB website



[www.n6nb.com](http://www.n6nb.com)