
4DI



**How Our Unamped Omnis
Beat the Vivato™ Switches**

<http://www.4di.us/>

It's Mostly Ben's Fault.....

From: "Ben Serebin"

To: "Brian Walden", "Terry Schmidt"

Date: Sun, 13 Jul 2003 13:20:57 -0400

Subject: a little defcon contest...

Hey Guys,

Wireless distance contest... I think we could win a category of this. Brian, care to borrow 2 of the PR dishes?

-Ben



Which Categories To Enter?

Choose a maximum of two from these

- Stock/unmodified, with commercially made omnidirectional antenna
 - Stock/unmodified, with commercially made directional antenna
 - Homemade omnidirectional antenna
 - Homemade directional antenna
 - Enhanced power, (omni or directional) commercially made antenna
 - Enhanced power, (omni or directional) homemade antenna
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Categories picked

- Stock/unmodified, with commercially made omnidirectional antenna
 - Stock/unmodified, with commercially made directional antenna
-

What do we need?

- Hotel Room
 - Rental SUV
 - Base Access Point
 - 2 Omni Directional Antennas
 - 2 Directional Antennas
 - Remote Client
 - WiFi Cards
 - Pigtails and Cables
 - Tripods and masts
-

Equipment Decided Upon

Base

- Soekris with Senao Card
- 15 dBi Omni
- 24 dBi Parabolic

Remote

- Laptop with Senao Card
 - 12 dBi Omni
 - 24 dBi Parabolic
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So, How Far Can We Go?

antenna dBi matrix

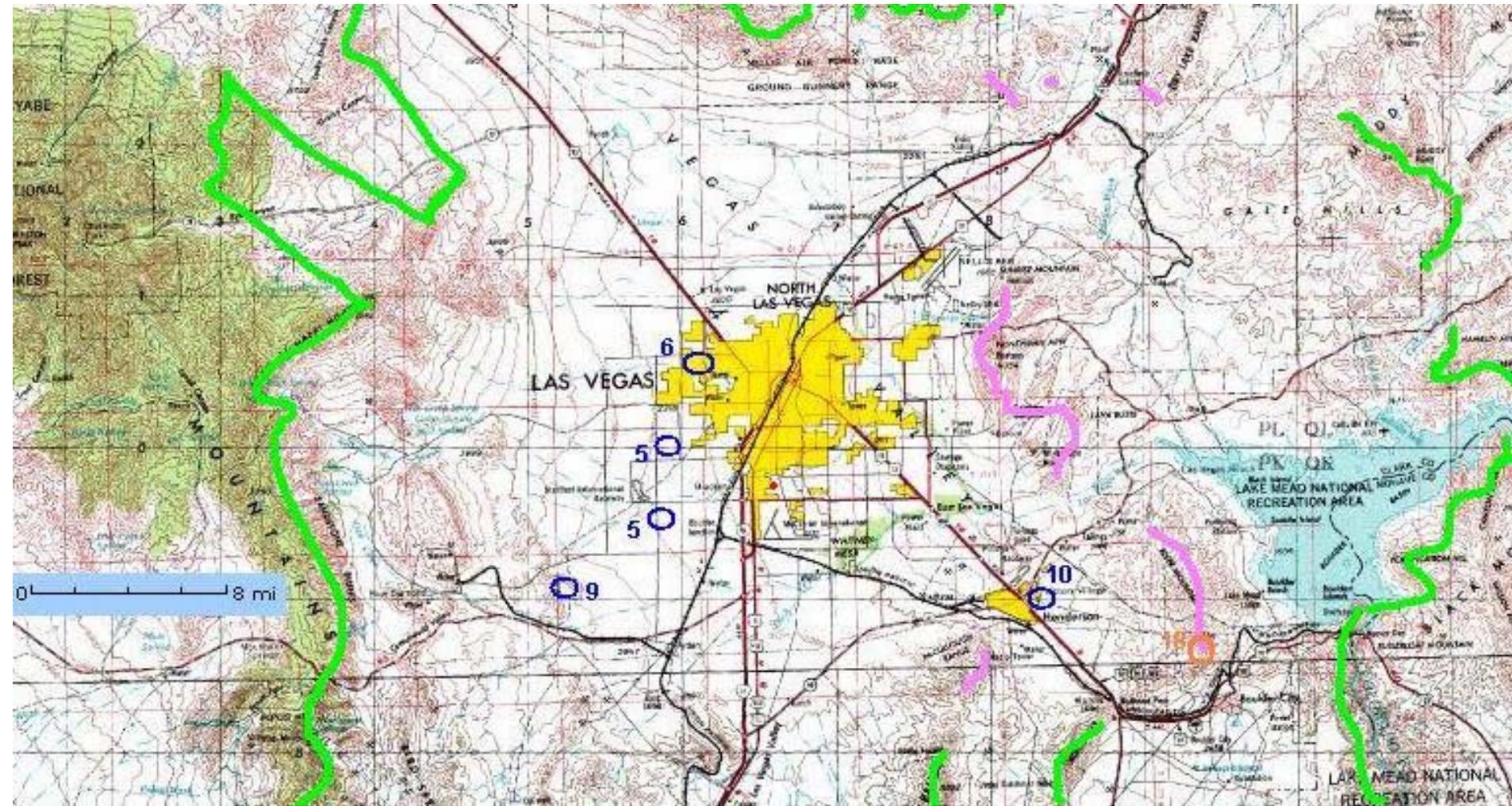
200mw tx power; -93dBm rx sensitivity

miles at fade margins of 30/20/12 dBs

	12	15	24
12	0.9/3/7.5		
15	1.25/4/11	1.75/6/15	
24	3.5/12/30	5.5/17/42	15/48/120



So, Where Is That?



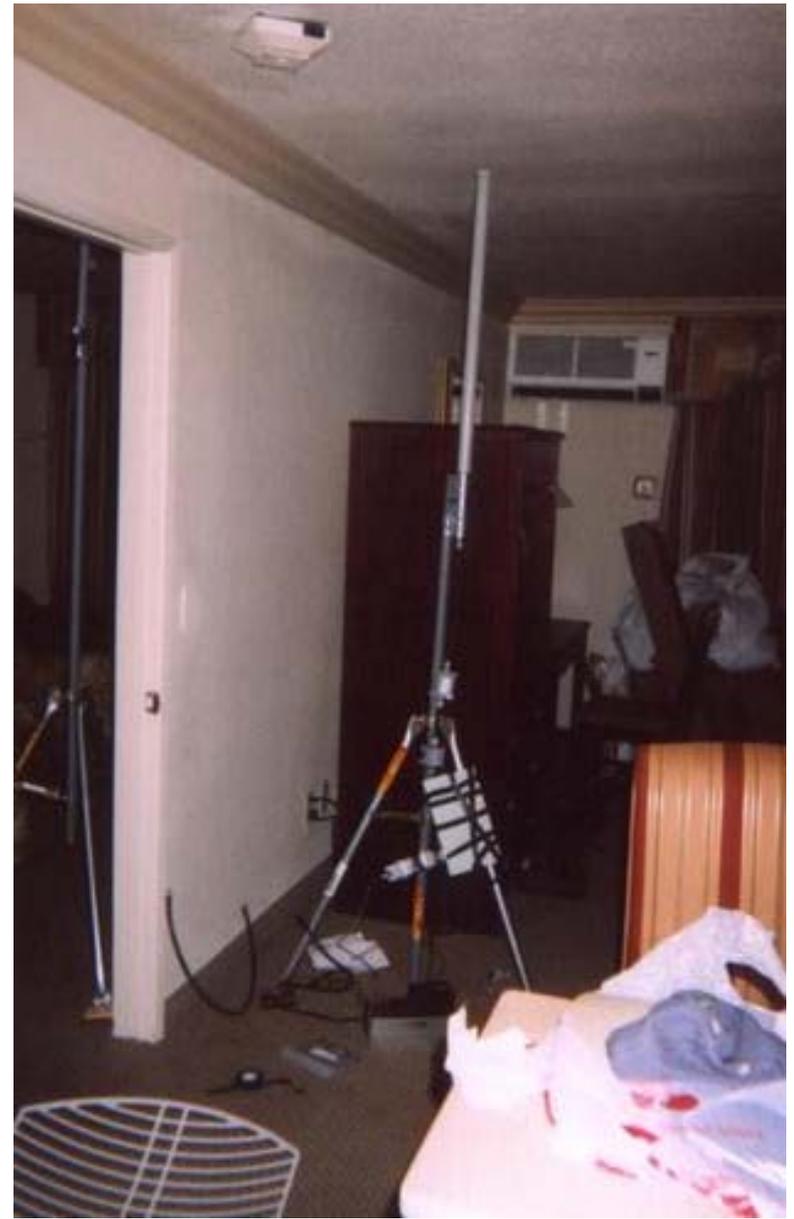
Hey, they changed the base location!

- Las Vegas Fire Marshal forbids access to the Alexis Park roof
 - New base is undisclosed until the start of the contest
 - Invalidates topo prep work
 - Base location is over 40 miles out of Las Vegas in the middle of the desert
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Just Testing

In the hotel

- Soekris AP
- 15dBi omni
- 500mW amp
- No internet
 - For all those at Defcon that associated



The View From Base Camp

The obvious horizon is 5 miles, mountains at about 40.



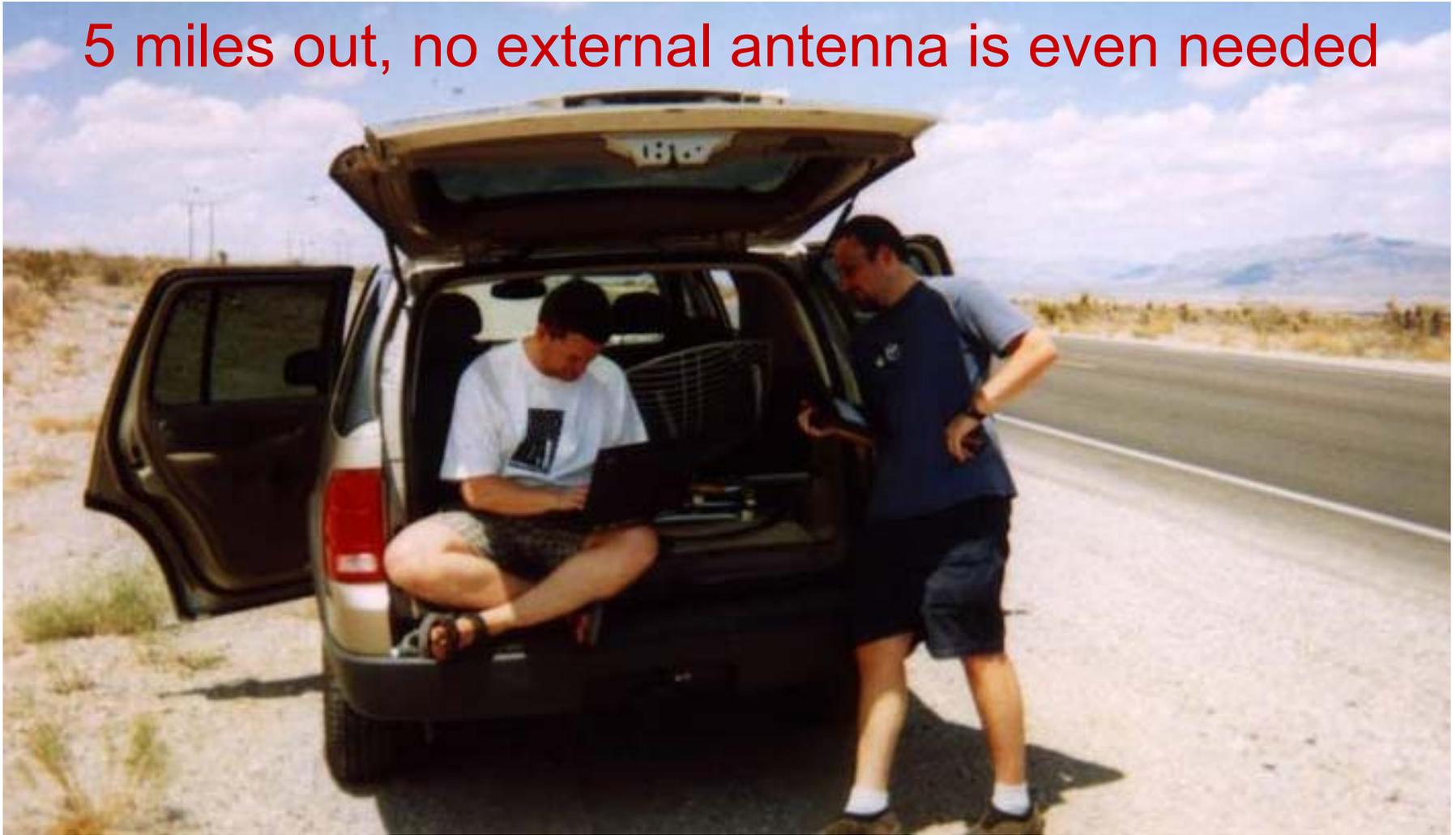
Completed Base Camp

- Soekris
- 15dBi omni
- 24 dBi para (unused)
- 12V 3Ah battery



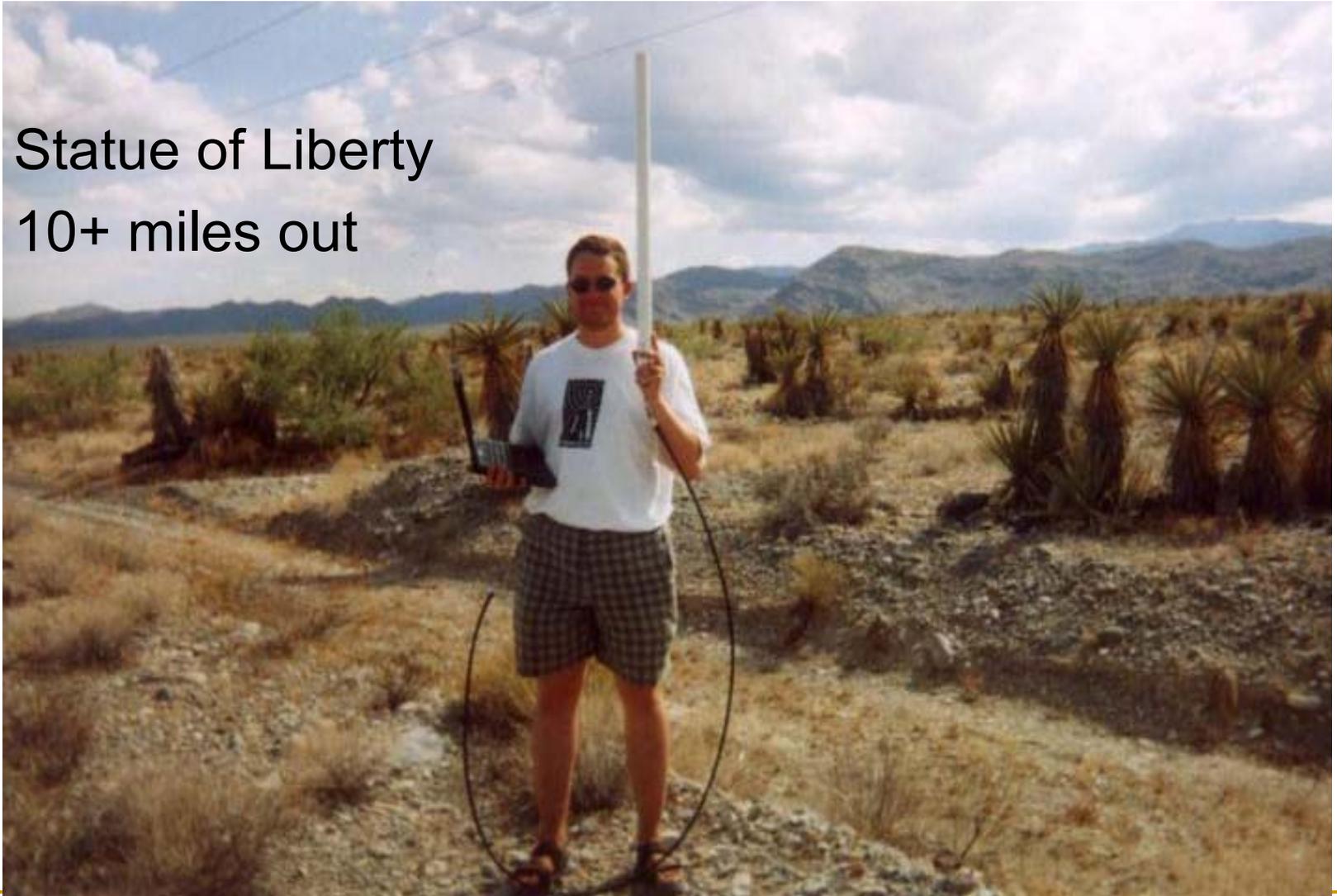
First Try

5 miles out, no external antenna is even needed



2nd Spot

Statue of Liberty
10+ miles out



2nd Spot (again)

Same 10+ miles



Distance notes

All using the base camp omni

- 5 miles: built in card in the IBM T23 connected without external antenna
 - 10 miles: connection solid with external omni (as well as parabolic, used for both entries)
 - 25 miles: could not find a signal, no line of sight
 - 35 miles: found the signal of the huge horn of another competitor, but could not find our signal
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Back at Base Camp

Verifying
bidirectional
communication



Notes on the Other Competitors

- Vivato™ switches needed a support frame
 - Lots of power, they ran down their car battery
 - Frame was large and immobile
 - Directionals are hard to align without tripods
 - Especially when you have to send a message
 - Distance winner had enormous horn antenna, 10 people, 3 cars, ham radios, high power amps
 - Our prep work paid off (won both categories)
 - But no fanfare
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Next Time.....

- Align the feed horn with the right polarity
 - Fill up as close as possible to base camp
 - ❑ SUV moving at max speed while using max A/C consumes gas at an amazing max rate
 - Use of 2 meter handhelds
 - ❑ FRS radios just suck
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Parabolics Make Great Bottle Openers

