LWA-SV Survey Marker Position

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On 26th October 2019, we did short runs with the transmitter on the northern survey marker at LWA, Sevilleta, New Mexico. The goal of this test was to emit from a well measured position while capturing time domain waveforms from all 256 antennas. This data could in theory be used to demonstrate phase coherence. The memo notes for the record the particulars of the test that day and the survey data we learned later. People involved besides the author include Danny Jacobs and Jayce Dowell.

Fig 1: Experimental setup for the phase experiment. The ECHO drone is placed above the survey marker.

For this experiment, the Valon transmitter was turned on for 30s for both bicone orientations(NS, EW). The response of all antennas was recorded for 30s in spec mode and 2 minutes on TBN.
I note a 'dips' on antennas 115,116 and 117. Also combs on antenna 163 which was closest to ECHO home position.

Ground Truth of LWA SV marker:

On October 30th, Jayce reports the marker location to be: X=0 m, Y=128.548 m, Z=6.177 m, relative to the "center" of the array.

On October 31st though,Jayce realized that the coordinates he gave us were not right. He remembered that the original survey of the station was done using a "sorta north, sorta east" coordinate system, where the axes are rotated by about 6.5 degrees off of north and east.
He later gave us backsight coordinates in the same frame as the rest of the array-
"X=14.626 m, Y=127.717 m, Z=6.174 m"

From lsl, the coordinates of the "center stake" of LWASV array are:
GEO_N +34.348358 # N Lat [deg]
GEO_E -106.885783 # E Lat [deg]
GEO_EL 1477.8 # [m] above MSL

Using **lwasv.getGeocentricLocation()** function, the above coordinates in ECEF are-
x,y, z = (-1531554.771732196, -5045440.98395596, 3579249.988606345)

Adding the X,Y,Z offsets given by Jayce and using **ecef2geo()**,
lat,lon,alt = 34.349047017723045, -106.88603403904489, 1376.8767108600587