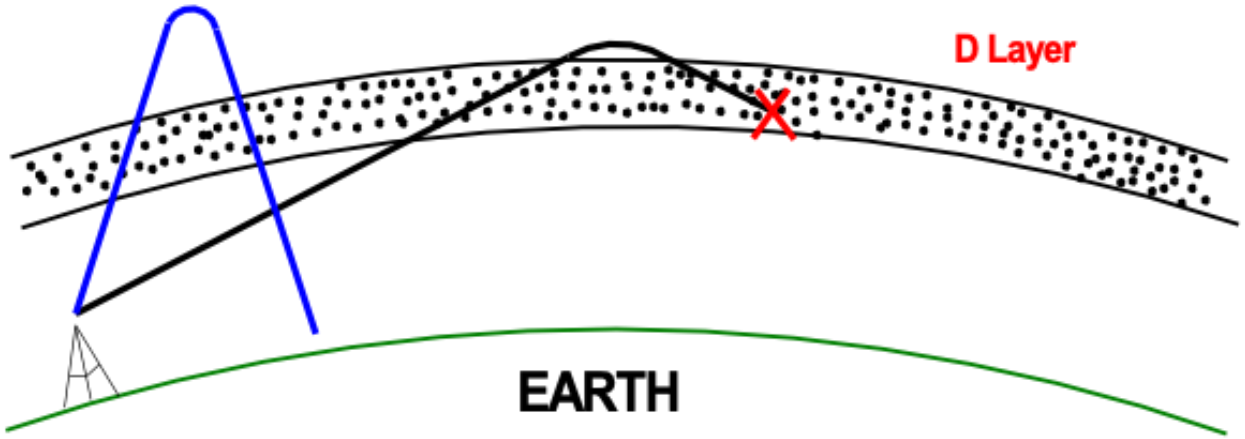
Mid Day 40 Meter NVIS Test

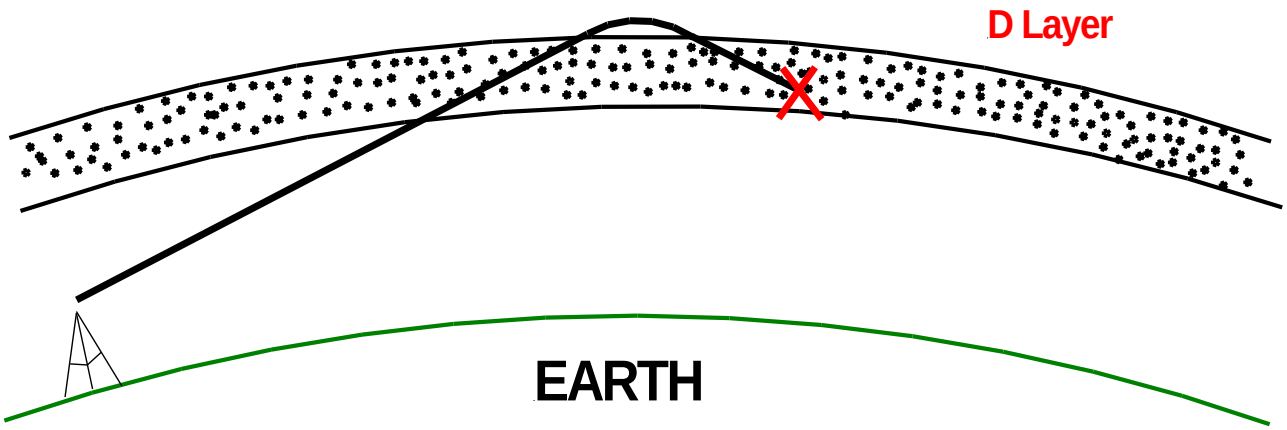


Ken Larson KJ6RZ

April 4, 2025

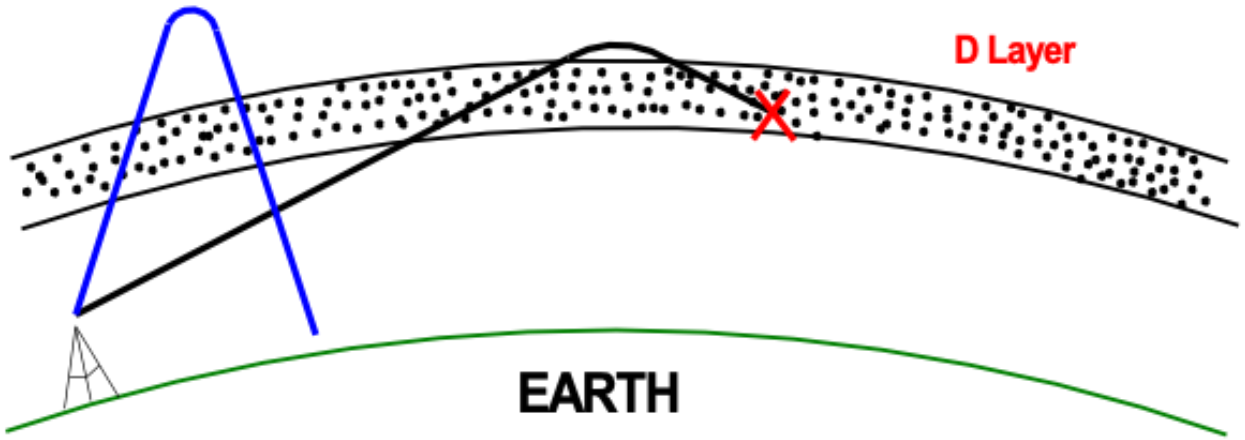
www.skywave-radio.org

40 Meter Daytime Propagation



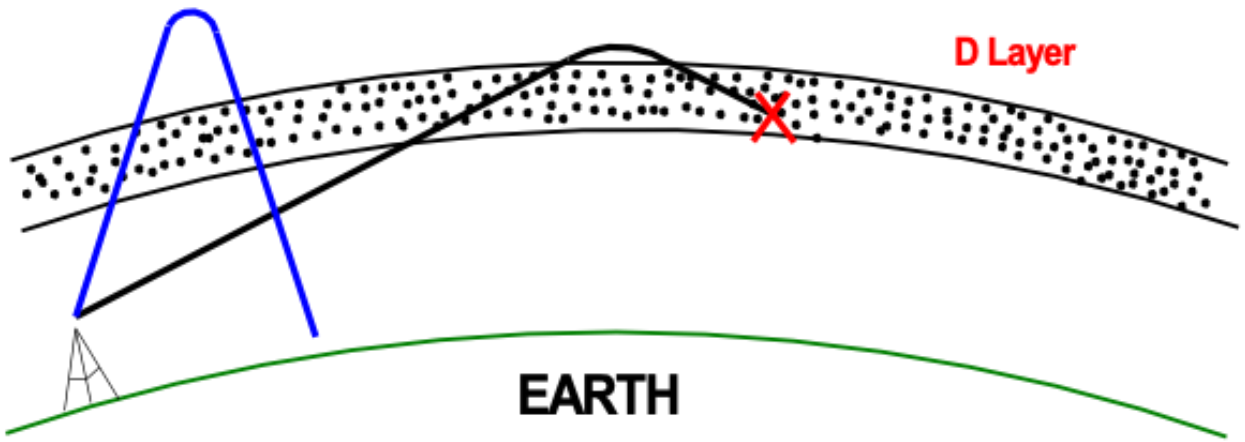
- It is generally accepted that
- The 40 meter band is dead during daylight hours during solar maximum
- This is due to 40 meter signals being absorbed in the ionosphere D-Layer

However

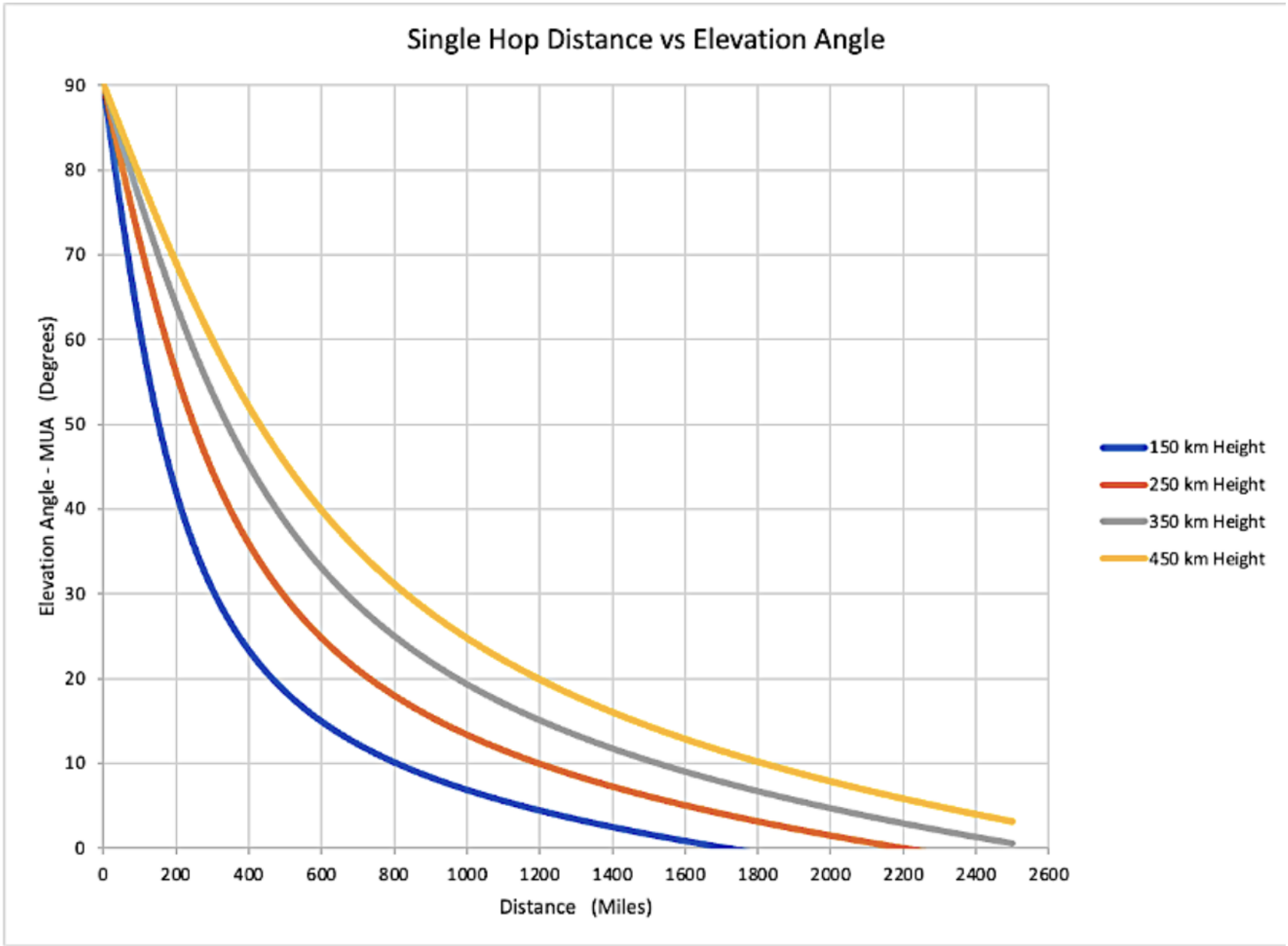


- Excellent 40 meter NVIS (Near Vertical Incident Skywave) propagation occurs
  - Throughout the day
  - In particular during mid day when the D-Layer absorption is greatest

The Reason For Excellent 40m Daytime NVIS



- The elevation angle for NVIS is generally considered to be greater than 60^{o}
- At this high elevation angle (blue trace) NVIS signals pass through the D-Layer quickly incurring little absorption
- The hop distance for an elevation angle of 60^{o} is around 200 miles (see next slide)
- Signals spend a relatively long period of time passing through the D-Layer for hops of 500 miles or longer (black trace) often resulting in complete D-Layer absorption

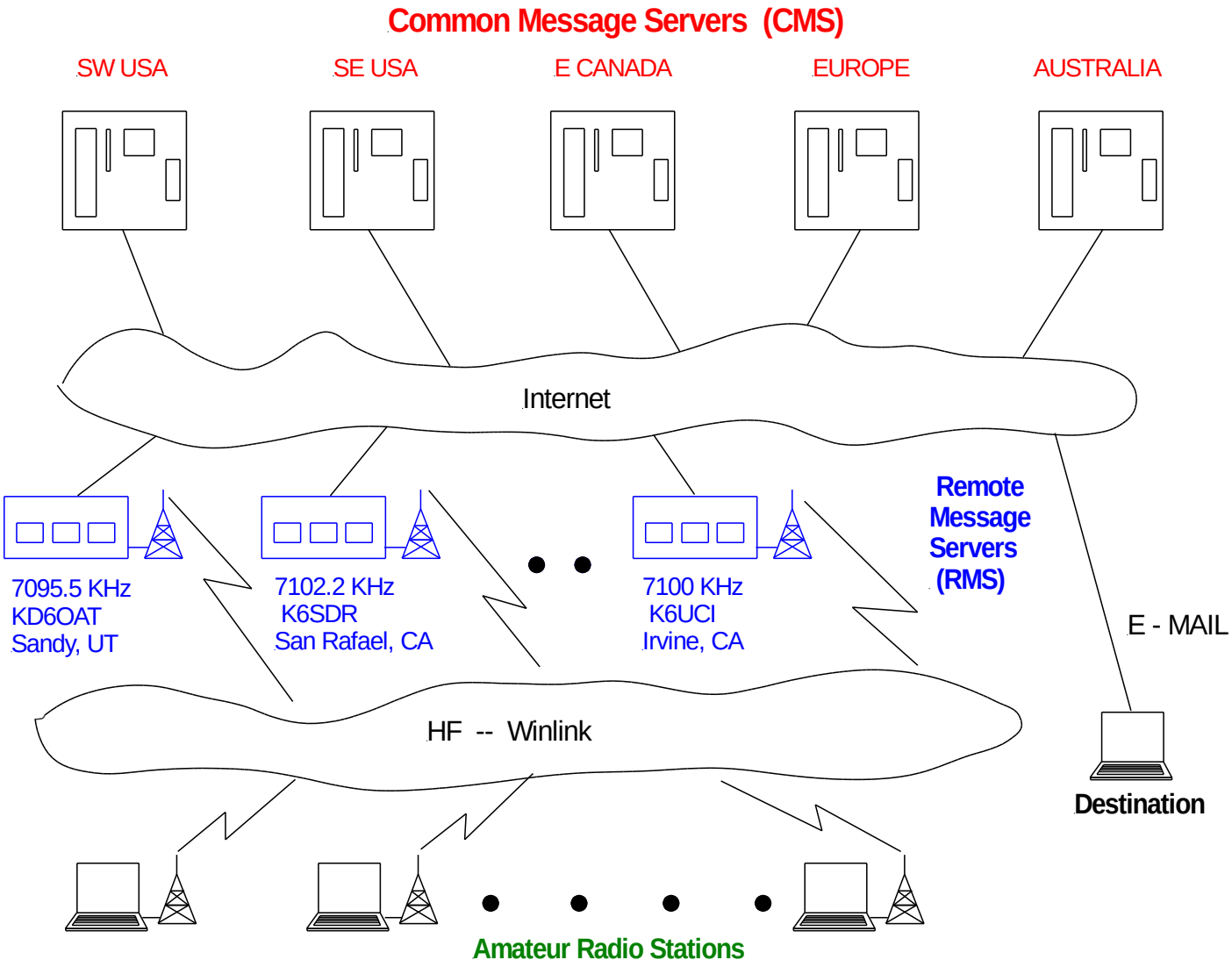

Single Hop Distance vs Elevation Angle
Elevation Angle - MUA (Degrees)
90
80
70
60
50
40
30
20
10
0
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
Distance (Miles)
150 km Height
250 km Height
350 km Height
450 km Height

Mid Day 40m NVIS Test

Date:	3/29/25						
					SFI	160	
	Sun Rise	5:44	Sun Set	18:12	foF2	10-12 MHz	
					X-Ray	C2.2	
					Kp	1.33	
					Proton	nill	
					SSN	80	
Time	Frequency MHZ	Call	Distance Miles	Contact Duration (sec)	Power Watts	Antenna	Comments
1251	7.1021	W6BI	11	18	200	Yellow	Simi Valley, CA
1252	7.1065	KD6LLB	13	24			Oxnard, CA
1254	7.1015	NR6V	20	16			Northridge, CA
1256	7.1005	AJ7C	31	22			Culver City, CA
1257	7.1910	KK6DA	34	16			Los Angeles, CA
1259	7.1000	KN6BKT	48	16			San Gabriel, CA
1302	7.1060	N7OP	52	34			Lancaster, CA
1303	7.0835	KF6NYM	55	17			Santa Barbara, CA
1305	7.1000	K6UCI	73	16			Irvine, CA
1308	7.0997	N0CSM	213	23			Pahrump, NV
1311	7.1020	KO0OOO	252	16			North Las Vegas, NV
1315	7.1000	K9ONR	311	17			Walnut Creek, CA
1317	7.1015	KD7NHC	320	29			Wellington, NV (SE Carson City)
1319	7.1022	K6SDR	332	18			San Rafael, CA
1321	7.1020	KG6MDW	332	32			Fairfield, CA. (NE Berkeley)
1326	7.1020	W7DEM	345	26			Minden, NV (S Carson City)
1327	7.1050	W6LHR	349	17			Lincoln, CA. (NE Sacramento
1329	7.1065	N0DAJ	348	19			Wickenburg, AZ (NW Phoenix)
1332	7.1005	KL7RI	368	26			Reno, NV
1334	7.1000	KJ7GSK	386	31			Chandler, AZ (SE Phoenix)
1336	7.1020	N7DDT	433	65			Payson, AZ
1339	7.1020	W6FRI	542	79			Arcatra, CA
1344	7.0955	KD6OAT	585	NC			Sandy, UT
1350	7.1005	KF0OIC	651	93			Durango, CO

- 40m mid day NVIS test 12:51 thru 13:50 PDT March 29, 2025, Antenna: 40 meter inverted V with apex at 32 ft, VARA digital protocol used to connect to Winlink RMS stations (next slide)
- Contact duration is the time to connect to a RMS station, send a message, and disconnect
- For this test a contact consists of a Connect followed by a Disconnect since the message field is empty, i.e. it does not contain any text
- A contact test duration greater than 40 seconds is considered a very poor connection unsuitable for sending text messages
- NC = No Connection, the station could not be contacted

Winlink Network



Mid Day 40m NVIS Data

Date:	3/29/25						
					SFI	160	
	Sun Rise	5:44	Sun Set	18:12	foF2	10-12 MHz	
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1254	7.1015	NR6V	20	16			Northridge, CA
1256	7.1005	AJ7C	31	22			Culver City, CA
1257	7.1910	KK6DA	34	16			Los Angeles, CA
1259	7.1000	KN6BKT	48	16			San Gabriel, CA
1302	7.1060	N7OP	52	34			Lancaster, CA
1303	7.0835	KF6NYM	55	17			Santa Barbara, CA
1305	7.1000	K6UCI	73	16			Irvine, CA
1308	7.0997	N0CSM	213	23			Pahrump, NV
1311	7.1020	KO0OOO	252	16			North Las Vegas, NV
1315	7.1000	K9ONR	311	17			Walnut Creek, CA
1317	7.1015	KD7NHC	320	29			Wellington, NV (SE Carson City)
1319	7.1022	K6SDR	332	18			San Rafael, CA
1321	7.1020	KG6MDW	332	32			Fairfield, CA. (NE Berkeley)
1326	7.1020	W7DEM	345	26			Minden, NV (S Carson City)
1327	7.1050	W6LHR	349	17			Lincoln, CA. (NE Sacramento
1329	7.1065	N0DAJ	348	19			Wickenburg, AZ (NW Phoenix)
1332	7.1005	KL7RI	368	26			Reno, NV
1334	7.1000	KJ7GSK	386	31			Chandler, AZ (SE Phoenix)
1336	7.1020	N7DDT	433	65			Payson, AZ
1339	7.1020	W6FRI	542	79			Arcatra, CA
1344	7.0955	KD6OAT	585	NC			Sandy, UT
1350	7.1005	KF0OIC	651	93			Durango, CO

- Contacts very good throughout the 60º (200 miles) NVIS range, durations generally < 25 sec
- Contacts good out to a range of 386 miles, test durations < 34 seconds
- Contacts poor, unsuitable for message transfer, beyond 400 miles
- Serious D-Layer absorption beyond 400 miles

Mid Day 40m NVIS Oval

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1303	7.0835	KF6NYM	55	17			Santa Barbara, CA
1305	7.1000	K6UCI	73	16			Irvine, CA
1308	7.0997	N0CSM	213	23			Pahrump, NV
1311	7.1020	KO0OOO	252	16			North Las Vegas, NV
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1344	7.0955	KD6OAT	585	NC			Sandy, UT
1350	7.1005	KF0OIC	651	93			Durango, CO

- Useable NVIS oval out to 400 miles