2700-2900 MHz

1. Band Introduction

The band 2700-2900 MHz is used by Federal agencies for operating various types of radar systems that perform missions critical to safe and reliable air traffic control (ATC) and accurate weather monitoring in the United States. This includes airport surveillance radar (ASR) systems and meteorological radars. The ASR systems are operated by the Federal Aviation Administration (FAA) and the Department of Defense (DoD) to monitor national airspace for cooperative and non-cooperative targets in and around airports. The ASRs also can have some limited weather monitoring functions. A network of Next Generation Weather Radar (NEXRAD) systems are operated by the National Weather Service (NWS) in the band 2700-2900 MHz that provide quantitative and automated real-time information on storms, precipitation, hurricanes, and other important weather information (rainfall amounts and rates, wind velocity, wind direction, hail, snow) with higher spatial and temporal resolution than previous weather radar systems. The NEXRAD systems are operated throughout the United States by the NWS, the FAA and the DoD.

2. Allocations

2a. Allocation Table

The frequency allocation table shown below is extracted from the NTIA Manual of Regulations and Procedures for Federal Radio Frequency Management, Chapter 4 – Allocations, Allotments and Plans.

Table of Frequency Allocations

United States Table

Federal Table	Non-Federal Table	FCC Rule Part(s)
2700-2900 METEOROLOGICAL AIDS AERONAUTICAL RADIONAVIGATION 5.337 Radiolocation G2 5.423 US18 G15	2700-2900 5.423 US18	Aviation (87)

2b. Additional Allocation Table Information

5.337 The use of the bands 1 300-1 350 MHz, 2 700-2 900 MHz and 9 000-9 200 MHz by the aeronautical radionavigation service is restricted to ground-based radars and to associated airborne transponders which transmit only on frequencies in these bands and only when actuated by radars operating in the same band.

5.423 In the band 2 700-2 900 MHz, ground-based radars used for meteorological purposes are authorized to operate on a basis of equality with stations of the aeronautical radionavigation service.

G2 In the bands 216-217 MHz, 220-225 MHz, 420-450 MHz (except as provided by US217 and G129), 890-902 MHz, 928-942 MHz, 1300-1390 MHz, 2310-2390 MHz, 2417-2450 MHz, 2700-2900 MHz, 3300-3500 MHz (except as provided by footnote US108), 5650-5925 MHz, and 9000-9200 MHz, the Federal radiolocation service is limited to the military services.

G15 Use of the band 2700-2900 MHz by the military fixed and shipborne air defense radiolocation installations will be fully coordinated with the meteorological aids and aeronautical radionavigation services. The military air defense installations will be moved from the band 2700-2900 MHz at the earliest practicable date. Until such time as military air defense installations can be accommodated satisfactorily elsewhere in the spectrum, such operations will, insofar as practicable, be adjusted to meet the requirements of the aeronautical radionavigation service.

US18 In the bands 9-14 kHz, 90-110 kHz, 190-415 kHz, 510-535 kHz, and 2700-2900 MHz, navigation aids in the U.S. and its insular areas are normally operated by the Federal Government. However, authorizations may be made by the FCC for non-Federal operations in these bands subject to the conclusion of appropriate arrangements between the FCC and the Federal agencies concerned and upon special showing of need for service which the Federal Government is not yet prepared to render.

3. Federal Agency Use

3a. Federal Agency Frequency Assignments Table

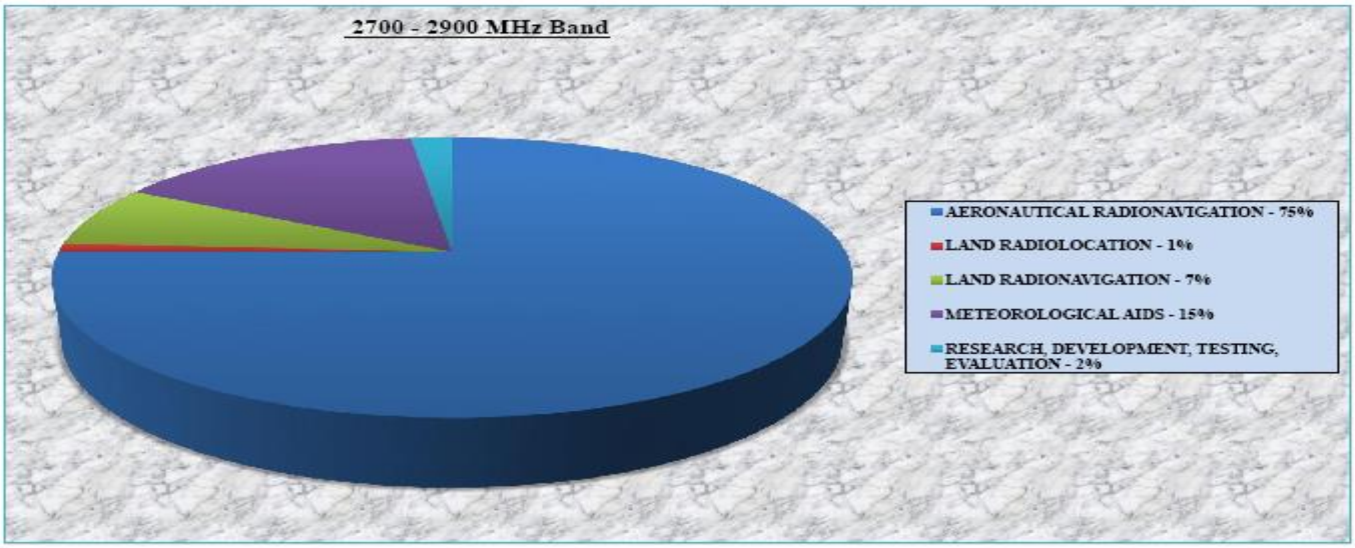
The following table identifies the frequency band, type(s) of allocation(s), types of application, and the number of frequency assignments by agency.

Federal Frequency Assignment Table

2700-2900 MHz Band						
FEDERAL EXCLUSIVE BAND						
	AERONAUTICAL RADIONAVIGATION METEOROLOGICAL AIDS RADIOLOCATION					
	TYPE OF APPLICATION					
AGENCY	AERONAUTICAL RADIONAVIGATION	LAND RADIOLOCATION	LAND RADIONAVIGATION	METEOROLOGICAL AIDS	RESEARCH DEVELOPMENT TESTING EVALUATION	TOTAL
AF	146	1	9	21	33	210
AR	187			2	1	190
DOC				126	1	127
FAA	482			23	10	515
MC	78			1		79
N	66				33	99
NASA	3					3
NSF				4		4
TOTAL	962	1	9	177	78	1227
The number of actual systems, or number of equipments, may exceed and sometimes far exceed, the number of frequency assignments in a band. Also, a frequency assignment may represent, a local, state, regional, or nationwide authorization. Therefore, care must be taken in evaluating bands strictly on the basis of assignment counts or percentages of assignments.						

3b. Percentage of Frequency Assignments Chart

The following chart displays the percentage of frequency assignments in the Government Master File (GMF) for the systems operating in the frequency band 2700-2900 MHz.



4. Frequency Band Analysis By Radio Service

4a. Aeronautical Radionavigation Service

The FAA and DoD operate ASR systems in the band 2700-2900 MHz. These systems detect and display the position of aircraft in the terminal area around commercial and military airports.[1] The ASR is a mainstay of air traffic management around major airports. The FAA operates ASR systems at over 250 airports for management and control of aircraft in terminal airspace. The DoD operates approximately 150 ASR systems. The ASR system measures the time required for a reflected signal that it transmits to return from an aircraft and the direction of the reflected signal. From this information, the ASR system can determine the distance of the aircraft from the antenna and the direction, of the aircraft relative to the

[1] The terminal area includes the runways, taxiways, the approach and departure routes and adjacent holding areas in the skies around the airport.

antenna. The ASR system has a range of 60 nautical miles and operates continuously.[2] The ASR systems operate in this region of the radio frequency spectrum because of the low external noise and the angular resolution necessary for medium-range aircraft detection can be attained using reasonably sized antennas.

The FAA and DoD have been using different variants of the ASR systems for over 50 years to monitor the national airspace around commercial and military airports. The FAA and DoD have continuously upgraded the ASR systems to improve reliability. The versions of the ASR systems currently operating in the band 2700-2900 MHz include the ASR-7, 8, 9, and ASR-11. The existing ASR systems are being replaced by the ASR-11 to improve reliability, provide additional weather data, reduce maintenance cost, improve performance, and provide digital data to new digital automation systems for presentation on air traffic controller displays. The ASR-11 will provide six-level weather monitoring capability that will result in significant improvement in situational awareness for both controllers and pilots. ASR-11 systems are already operational at some airports but are not fully deployed. ASR systems are operated by the DoD at military airports and airfields. The DoD systems are functionally the same as those used by the FAA, but are identified with a different nomenclature. The DoD also operates ASR systems that are functionally different than the systems operated by the FAA. Unlike the FAA ASR systems that operate at fixed locations, the military systems are transportable, but are only operated while stationary.

ASR systems are capable of tuning throughout the band 2700-2900 MHz and can employ either one or two operational frequencies. ASR systems use two operational frequencies to mitigate the effects of multipath, signal fading and other propagation effects to enhance aircraft detection and tracking capabilities. In addition to the operational frequency each ASR system typically has a reserve frequency.[3] The reserve frequency is only used if a problem occurs with the operational frequency. In order to resolve range ambiguities and improve correlation, the ASR systems transmit combinations of short and long pulses on different frequencies. Some of the ASR systems used by the DoD also employ frequency hopping techniques. Table 1 summarizes the emission bandwidth and frequency usage for the FAA and DoD ASR systems operating in the band 2700-2900 MHz.[4]

Table 1.

System Designator	Emission Bandwidth (MHz)	Frequency Usage
ASR-7 and AN/GPN-12	10	One operational frequency and one reserve frequency.

[2] The information collected by the ASR systems is displayed on a plan position indicator scope at the radar site and relayed to regional ATC centers.

[3] The reserve frequency is referred to as “hot stand-by”. The signal on a hot stand-by frequency is always active, but not transmitted, and has the ability to be transmitted within minutes if a problem occurs on the operational frequency.

[4] The bandwidth for a radar system is dependent on the pulse width, type of modulation, signal coding, and filtering that is being employed. Typically, the shorter the pulse width, the wider the bandwidth.

ASR-8 and AN/GPN-20	3.8	Two operational frequencies with a minimum separation of 60 MHz.
ASR-9 and AN/GPN-27	4	One operational frequency and one reserve frequency.
ASR-11 and AN/GPN-30	2.8 (Long Pulse Mode) 5.1 (Short Pulse Mode)	Two pairs of operational frequencies with a minimum separation of 30 MHz. A short pulse is transmitted on one frequency followed by a long pulse transmitted on a second frequency.
AN/TPN-31	3.2 (Short Pulse Mode) 1.6 (Long Pulse Mode)	Two pairs of operational frequencies with a minimum separation of 30 MHz. A short pulse is transmitted on one frequency followed by a long pulse transmitted on a second frequency.
AN/TPN-24	7.5	Two operational frequencies with a minimum separation of 80 MHz.
AN/TPN-73	2	Frequency hops across the entire band
AN/TPN-14K	3.5	One operational frequency.

If two or more ASR systems are used at an airport, they must be separated by at least 30 MHz.[5] As a general rule, other radar systems operating in the band 2700-2900 MHz are not permitted to be located within radio line-of-sight of an ASR system, unless there is a 10 MHz separation between their operating frequencies.

All of the existing versions of the ASR system generate high-power pulsed radio frequency signals, using tube-output devices.[6] The ASR systems all employ high gain directional gain antennas. The equivalent isotropically radiated power (EIRP) can be on the order of $1x10^9$ watts, or a Gigawatt for the ASR systems.[7] The ASR systems employ a low duty cycle pulsed waveform which allows compatible operation with other radar systems in the band using smaller frequency and distance separations.[8] The ASR-11 takes advantage of the latest advances in radar design employing solid-state technology to produce the required power level. Solid state output devices cannot generate as much peak power as tube output devices, so the ASR-11 uses a lower transmitter power but employs longer pulse widths than the

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5 Document No. RTCA/DO-237, *Aeronautical Spectrum Planning for 1997-2010* (January 1997).

6 Magnetrons and klystrons are examples of tube-type output devices used in radar systems.

7 The EIRP represents the actual level of the signal transmitted by the radar system and is the combination of the peak transmitter power and mainbeam antenna gain.

8 Duty cycle is a measure of the fraction of the time that a radar is transmitting in relation to the overall time between pulses. The maximum duty cycle occurs with the longest pulse width and the maximum number of pulses per second.

existing ASR systems.[9] In order to detect targets while using a lower-transmitter power, the ASR-11 must operate at a duty cycle approximately 100 times higher than that of the existing ASR systems. This means that the ASR-11 occupies the spectrum 100 times longer than the older ASR systems, which could increase the frequency and/or distance separation requirements necessary for compatible operation with other radar systems operating in the band.[10] The ASR systems only transmit for a small fraction of time, and they spend a majority of their time receiving the weak reflected signals from aircraft that are being monitored. Table 2 summarizes the transmitter power level, antenna gain, EIRP, and duty cycle for the FAA and DoD ASR systems operating in the band 2700-2900 MHz.

Table 2

System Designation	Peak Power (Watts)	Duty Cycle (Percent)	Mainbeam Antenna Gain (dBi)	EIRP (Watts)
ASR-7 and AN/GPN-12	425×10^3	0.06 (min) 0.1 (max)	34	1.1×10^9
ASR-8 and AN/GPN-20	1.4×10^6	0.07 (min) 0.1 (max)	33	2.5×10^9
ASR-9 and AN/GPN-27	1.4×10^6	0.13	33	2.5×10^9
ASR-11 and AN/GPN-30	25×10^3	0.1 (min) 9 (max)	34	63×10^6
AN/TPN-31	650	0.14 (min) 8 (max)	31	746×10^3
AN/TPN-24	450×10^3	0.12	33	857×10^6
AN/TPS-73	14.5×10^3	0.92 (min) 11 (max)	34	36×10^6
AN/MPN-14K	1×10^6	0.11	32	1.6×10^9
Kilowatt is 1×10^3 Watts Megawatt is 1×10^6 Watts Gigawatt is 1×10^9 Watts				

[9] Radar systems that employ solid-state technology generate lower levels of spurious and out-of-band emissions.

[10] Some radar systems use waveforms where the duty cycle can vary, which will enhance compatibility with other radars, eliminate possible tracking errors, and allows the radar to have selectable operating ranges.

A more detailed description of the technical characteristics of aeronautical radionavigation radar systems that operate in the band 2700-2900 MHz can be found in ITU-R Recommendation M.1464-1.[11]

ASR systems use a continually rotating antenna mounted on a tower to transmit pulsed radio frequency signals that are reflected from the surface of aircraft. The antennas are mounted on towers to provide an unobstructed view of the airspace they are monitoring. The antennas are slightly angled upward to remove the effects of local obstructions (e.g., ground clutter), that would otherwise degrade its performance. The ASR systems track aircraft at altitudes from ground level to approximately 60,000 feet. Each ASR system installation is unique but the typical antenna height is approximately 45 feet above ground level.

In addition to the operational ASR systems in the band 2700-2900 MHz, the FAA has frequency assignments for research and development purposes to examine hardware and software improvements for ASR systems. The FAA also develops and tests new ASR systems in the band before they are operationally deployed, such as is currently being done with the ASR-11. The research and development includes examining new waveforms and testing new signal processing techniques. The frequency assignments for these research and development efforts are limited to the FAA Technical Center in Atlantic City, NJ and the Aeronautical Center located in Oklahoma City, OK, The usage of the radar systems for research and development are carefully coordinated to ensure that they do not cause interference to operational radar systems.

4b. Meteorological Aids Service

The NWS, FAA and DoD operate radar systems in this band under the meteorological aids service. The NEXRAD is a joint program initiated by the FAA and DoD consisting of 159 operational sites within the contiguous United States with radars that provide weather monitoring capabilities. The NEXRAD collects data by transmitting a pulsed radio frequency signal that bounces off the raindrops and returns to the radar. The returned signal conveys three important properties: first, the time it takes for the signal to bounce off the raindrops and return determines the distance from the storm to the radar, and thus the location of the storm; second, the strength of the returned signal, also known as reflectivity, is proportional to the size and number of raindrops in the storm; and third, the frequency of the returned signal reveals whether the winds are moving toward or away from the radar, as well as the speed. The NEXRAD data is converted into visual images and used by the NWS forecasters, the FAA, and the military to provide weather information to the nation. In addition, selected visual images are made available on the internet and shown on television weather broadcasts. Local and national television meteorologists use NEXRAD data to keep their viewers informed of real-time weather conditions.[12] NEXRAD data is also used by

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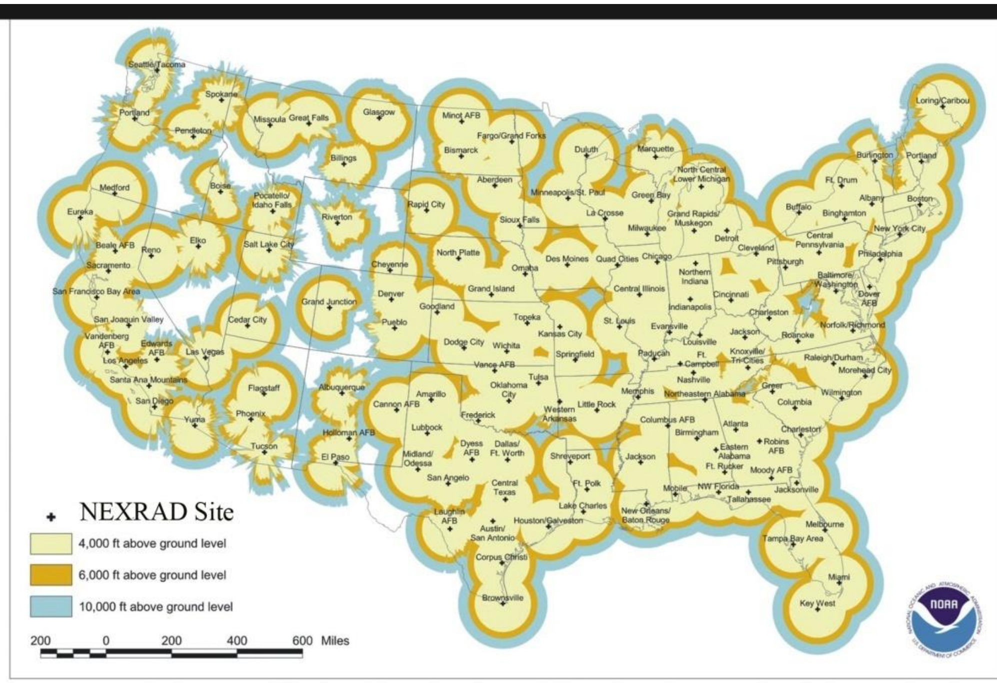
[11] ITU-R Recommendation M.1464-1, *Characteristics of radiolocation radars, and characteristics and protection criteria for sharing studies for aeronautical radionavigation and meteorological radars in the radiodetermination service operating in the band 2700 -2900 MHz* (2000-2003).

[12] Even if a television station has its own weather radar, they will often use regional NEXRAD data to provide a broader view of the weather approaching their area.

private companies and studied by university researchers to improve forecasts. Weather forecasters use the continuous, immediate weather information provided by NEXRAD to track storms and warn the public of dangerous weather conditions. NEXRAD allows forecasters to see all types of weather and provide advanced warning for thunderstorms, hail, tornadoes, hurricanes, wildfires, flash floods, snow, and freezing precipitation. The ability of NEXRAD to detect wind patterns in storms and predict real time rainfall amounts provides significant improvements over previous weather radar systems. The NEXRAD operates continuously, and provides severe weather coverage out to 125 statute miles and storm tracking out to 250 statute miles. A map showing the coverage of the NEXRAD network is provided in Figure 2a and Figure 2b.[13]



Doppler weather radar coverage of CONUS at 4,000, 6,000, and 10,000 feet above radar ground elevation from the nationwide network of WSR-88Ds (Next Generation Weather Radars). (Courtesy of SRI International)

Figure 2a. NEXRAD Coverage in the United States

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[13] A description of the NEXRAD coverage plots can be found at http://www.roc.noaa.gov/WSR88D/Maps.aspx.

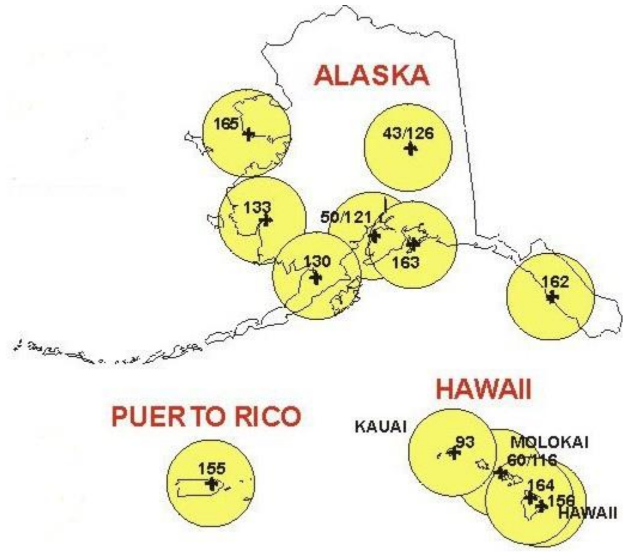

Figure 2b. NEXRAD Coverage in the United States

Other meteorological aids systems besides NEXRAD are operated in this band; but they are only used at test ranges in small numbers.

The NEXRAD can tune across the entire band 2700-2900 MHz. The occupied channel bandwidth of the NEXRAD is 5 MHz. A single frequency is used at each NEXRAD site location. Frequency re-use (i.e., co-channel operation) by pairs of NEXRAD radars is possible in situations where they are separated by at least 150 nautical miles (173 kilometers).

The peak power of the NEXRAD is 1 Megawatt ($1x10^6$ Watts) and it employs a directional antenna with a mainbeam gain of 45 dBi; resulting in a transmitted signal power level of 32 Gigawatts. The NEXRAD has a maximum duty cycle of 0.21 percent and a minimum duty cycle of 0.05 percent. Additional information related to ground-based weather radars can be found in ITU-R Recommendation M.1849.[14]

For a typical installation, the NEXRAD antenna is located on a tower approximately 90 feet above ground level so as to provide a clear view of the sky. The antenna is encapsulated by a radome to protect it from weather as it rotates 360 degrees. While it rotates, it also scans in the vertical direction through 20 degrees every five minutes. The antenna is slightly angled upward to remove clutter and other objects that could degrade performance. NEXRAD can be operated in three distinct modes. The first of these is the clear-air mode, in which eight full 360 degree azimuthal scans are completed every ten minutes, at elevation angles ranging from 0.5 to 4.5 degrees. The second is the precipitation-detection mode, in which 11 full azimuthal scans occur every six minutes at elevation angles between 0.5 to 19.5 degrees. The third is the severe-weather mode, in which 16 azimuthal scans are performed every five minutes at elevation angles between 0.5 and 19.5 degrees. A typical NEXRAD installation is shown in Figure 3. Each NEXRAD site is unique in terms of how the radar is located and arranged to reduce interference and clutter from the local terrain and other radar systems operating in the band.

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[14] ITU-R Recommendation M.1849, *Technical and Operational Aspects of Ground-based Meteorological Radars*.

Figure 3. Typical NEXRAD Installation

4c. Radiolocation Service

The DoD has frequency assignments in the band 2700-2900 MHz for radar systems operating under the radiolocation service. There are also frequency assignments for test range instrumentation radar systems operating in the radiolocation service at military facilities in Elgin, FL, Wallops Island, VA and Fort Huachuca, AZ. In addition to the operational radar systems in the band 2700-2900 MHz, the DoD has frequency assignments for research and development purposes to examine hardware and software improvements for military systems. The research and development includes examining new waveforms, testing new signal processing techniques, and other various aspects of radar design and development. The frequency assignments for these research and development radar systems are limited to military test ranges and training facilities throughout the United States. The usage of the radar systems for research and development are carefully coordinated to ensure that they do not cause harmful interference to operational radar systems.

4d. Frequency Coordination in the Band 2700-2900 MHz

In the band 2700-2900 MHz there are hundreds of high power radar systems operating across the country. In some cases near large population centers with airports, multiple radar systems must operate in close proximity. Compatible operation between different types of radar systems is accomplished through careful design of the radar receivers, frequency selection, and NTIA regulations. The radar receivers use various types of circuitry and signal processing to reduce or eliminate the effects of pulsed interference from other radars.[15] The careful assignment of frequencies for radars operating in this band is crucial to prevent interference to and from other radar systems. The NWS, FAA, and DoD carefully choose and coordinate the frequencies for each system that operates in this band. Radar systems that operate in the band 2700-2900 MHz must also comply with the NTIA Radar Spectrum Engineering Criteria (RSEC).[16] The RSEC regulates how much bandwidth radars are permitted to use, based on the parameters of the transmitted pulses and the amount of unwanted or spurious emissions they emit. The NTIA regulations place design criteria on radars operating in the band 2700 -2900 MHz that is stricter than criteria in other bands to facilitate compatibility and spectrum sharing.

4e. Spectrum Contours

The following spectrum contours for the radars operating in the aeronautical radionavigation, meteorological aids, and radiolocation, services have been computed for a generic receiver. The contours represent the locations where the power of the radar signal causes the receiver thermal noise power to increase by 1 dB.[17] These contours do not represent the coverage area of the radar itself; rather they represent the locations where the radar signal causes a receiver to exceed the interference threshold. Any receiver inside the contour plot would experience interference from the radar at power levels above the 1 dB threshold.

The following frequency assignment data elements from the GMF were used to compute the spectrum contours: frequency; radar emission bandwidth; radar peak transmitter power; radar transmitter latitude and longitude; and radar transmitter antenna height.

A reference bandwidth of 1 MHz was used in the development of the spectrum contours.

The received signal level was computed using the following equation:

$$10 \text{ Log } (P_{Peak}) + G_T + G_R - L_T - L_P + OTR = N_{Thermal} + 1 \text{ dB} \qquad (1)$$

Where:

P_{Peak} is the radar peak transmitter power from the GMF, in Watts;
G_T is the radar sidelobe antenna gain in the direction of a ground-based receiver, in dBi;
G_R is the gain of a ground-based receive antenna in the direction of the radar transmitter, in dBi;
L_T is the insertion loss in the radar transmitter, in dB;
$N_{Thermal}$ is the receiver thermal noise, in dBW;

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15 These techniques are not effective in mitigating the effects of interference from continuous signals such as those generated by communication systems as discussed in NTIA Report TR-06-444, *Effects of RF Interference on Radar Receivers* (September 2006) available at www.its.bldrdoc.gov/publications.

16 National Telecommunications and Information Administration, Manual of Regulations and Procedures for Federal Radio Frequency Management Chapter 5. The radars operating in the 2700-2900 MHz band must comply with RSEC Category D.

17 A 1 dB increase in receiver noise is equivalent to an interference-to-noise (I/N) ratio of -6 dB, which is a commonly accepted value for a first level interference threshold used in EMC analyses.

OTR is the on-tune rejection (dB); and
L_P is the propagation loss between the radar transmitter and a ground-based receiver, in dB.

The OTR is used to account for the rejection provided by a receiver as a result of a mismatch of the receiver bandwidth relative to the bandwidth of a co-tuned transmitter. The OTR is computed using the following equation:

$$OTR = 10 \text{ Log } (RXBW/TXBW) \quad \text{for } TXBW > RXBW \qquad (2a)$$

$$OTR = 0 \quad \text{for } TXBW \leq RXBW \qquad (2b)$$

Where:
TXBW is the radar emission bandwidth from the GMF, in MHz; and
RXBW is the receiver bandwidth, in MHz.

The RXBW used in computing the spectrum contours is 1 MHz.

A typical value of insertion loss in a radar transmitter is 2 dB.

The thermal noise is computed using the following equation:

$$N_{Thermal} = 10 \text{ Log } [k\ T\ RXBW] \qquad (3)$$

Where:
k is Boltzmann's constant, 1.38×10^{-23} in, Watts/K/Hz
T is the ambient noise temperature, 290 K; and
RXBW is the receiver bandwidth, in Hz

The thermal noise for a 1 MHz bandwidth receiver is:
$$N_{Thermal} = 10 \text{ Log } [(1.38 \times 10^{-23})\ (290)\ (1 \times 10^{6})] = -144 \text{ dBW}$$

The antenna gain of the ground-based receiver in the direction of the radar station transmitter is 0 dBi.

Making the substitutions for G_R, L_T, and $N_{Thermal}$ in Equation 1 and solving for L_P results in:
$$L_P = 10 \text{ Log } (P_{Peak}) + G_T + OTR + 141 \qquad (4)$$

The radar sidelobe antenna gain in the direction of a ground-based receiver used for computing the spectrum contours is 10 dBi.

Making the appropriate substitutions into Equation 4 results in the required propagation loss used to compute the spectrum contours:

$$L_P = 10 \text{ Log } (P_{Peak}) + OTR + 151 \qquad (5)$$

The Irregular Terrain Model (ITM) in the point-to-point mode will be used to compute the propagation loss for the spectrum contours.[18] The statistical and environmental parameters used with the terrain profile in calculating propagation loss are shown in Table 3.

Table 3.

Parameter	Value
Refractivity	301 N-units
Conductivity	0.005 S/M
Permittivity	15
Humidity	10
Reliability	50 percent
Confidence	50 percent
Radio Climate	Continental Temperate
Receive Antenna Polarization	Vertical
Receive Antenna Height	3 meters
Topographic Database	United States Geological Survey 3 Second Data

The radar transmitter latitude and longitude was used as the center point for the spectrum contour. The ITM terrain dependent propagation loss satisfying the required propagation loss values was used to determine the spectrum contour.

The spectrum contours for the radar systems operating in the band 2700-2900 MHz are shown in Figures 4 through 13 in 20 MHz band segments.

[18] The propagation loss for the spectrum contours are computed using the Irregular Terrain Model in the point-to-point mode and three second U.S. Geological Survey topographic data. A detailed description of the Irregular Terrain Model is available at http://flattop.its.bldrdoc.gov/itm.html.

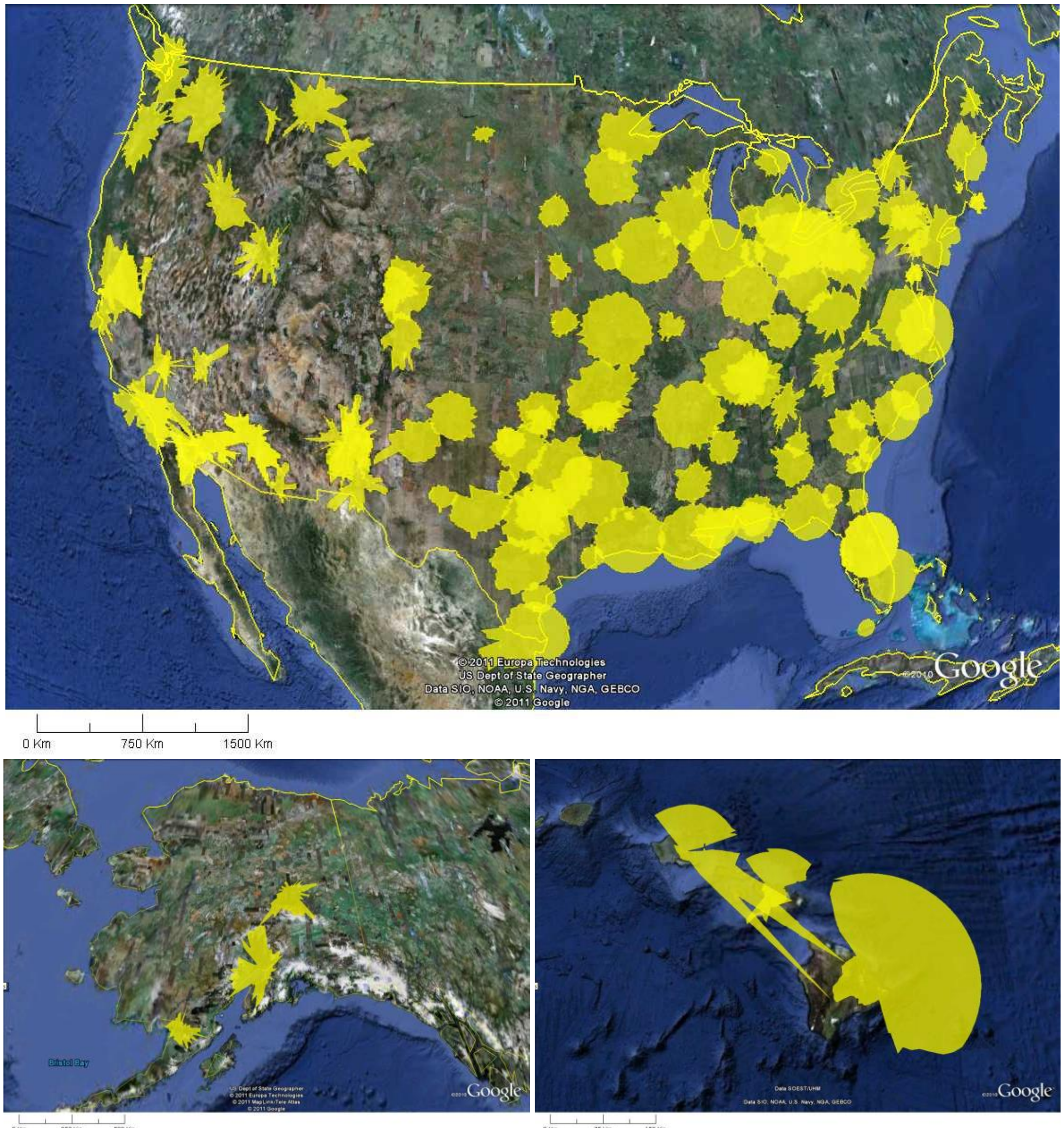

Figure 4. 2700 – 2720 MHz Band Segment

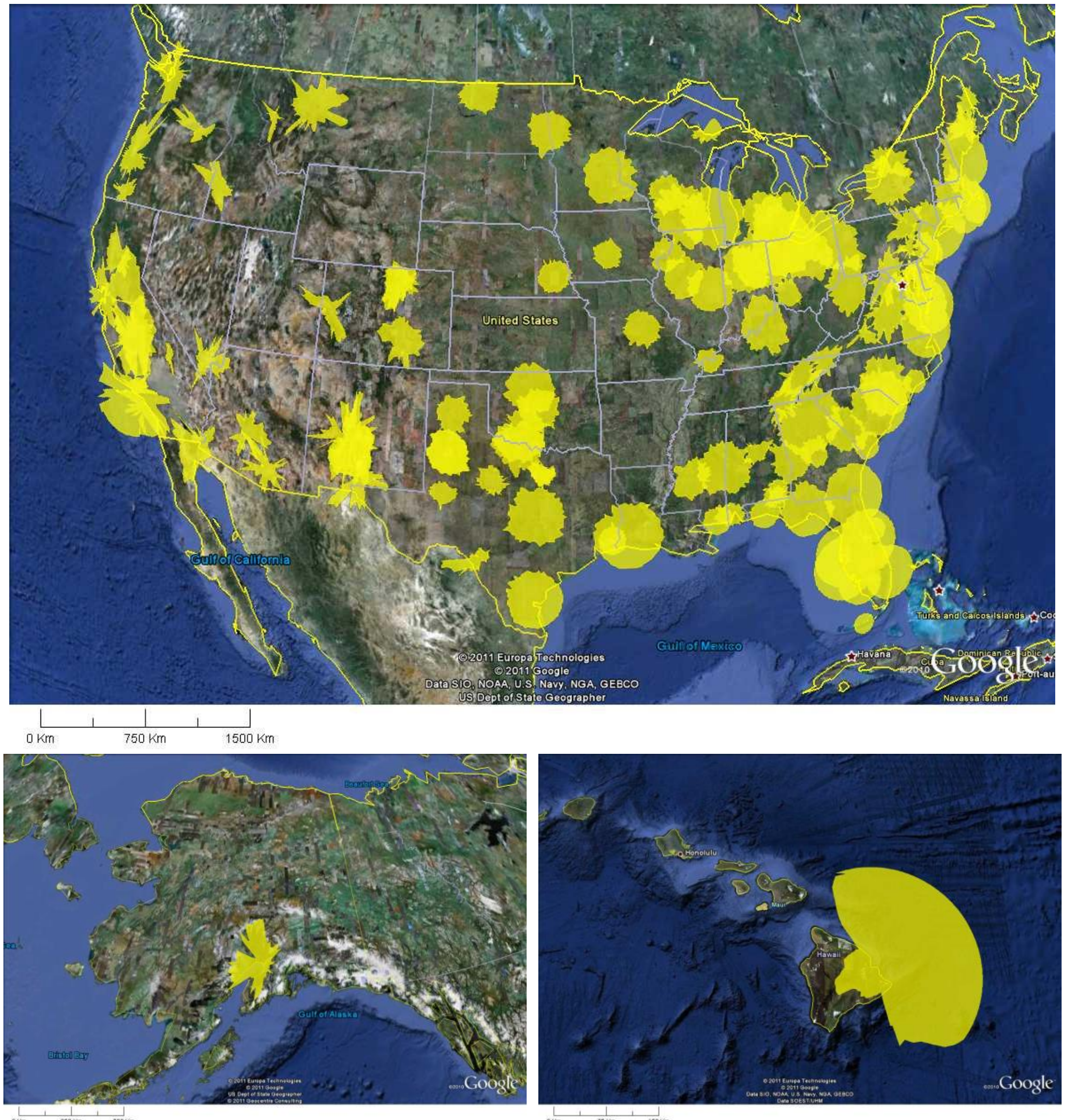

Figure 5. 2720 – 2740 MHz Band Segment

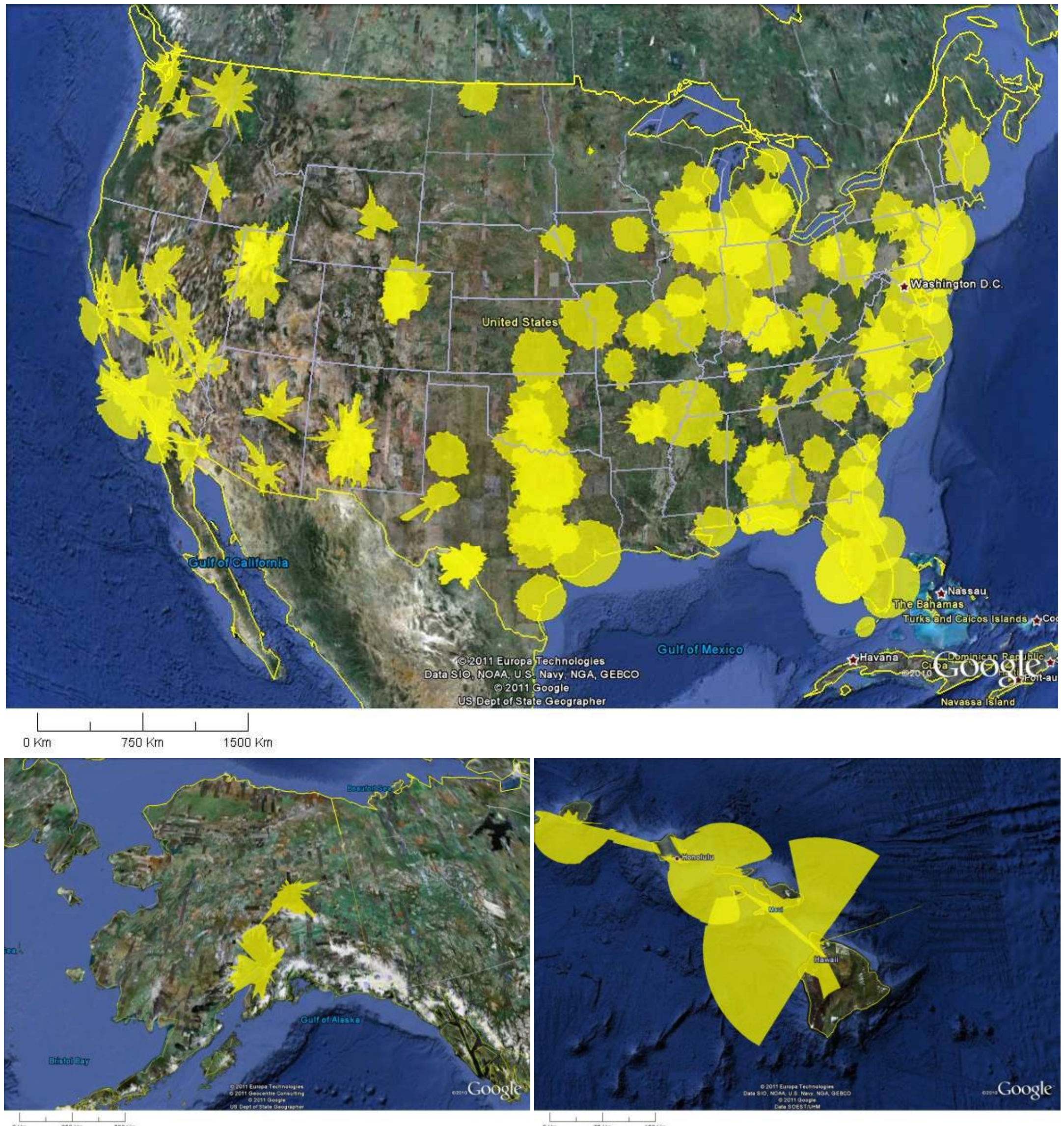

Figure 6. 2740 – 2760 MHz Band Segment

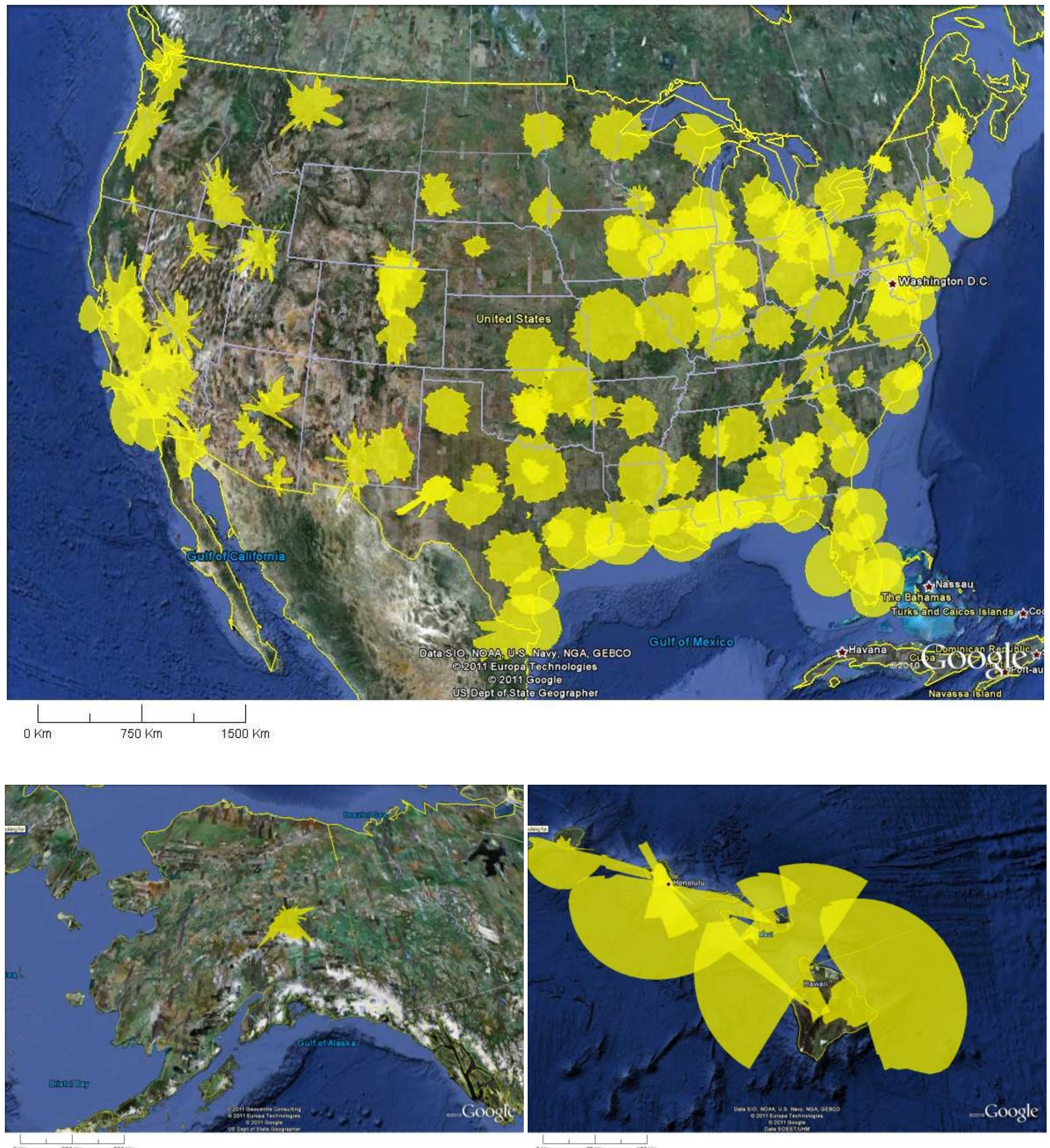

Figure 7. 2760 – 2780 MHz Band Segment

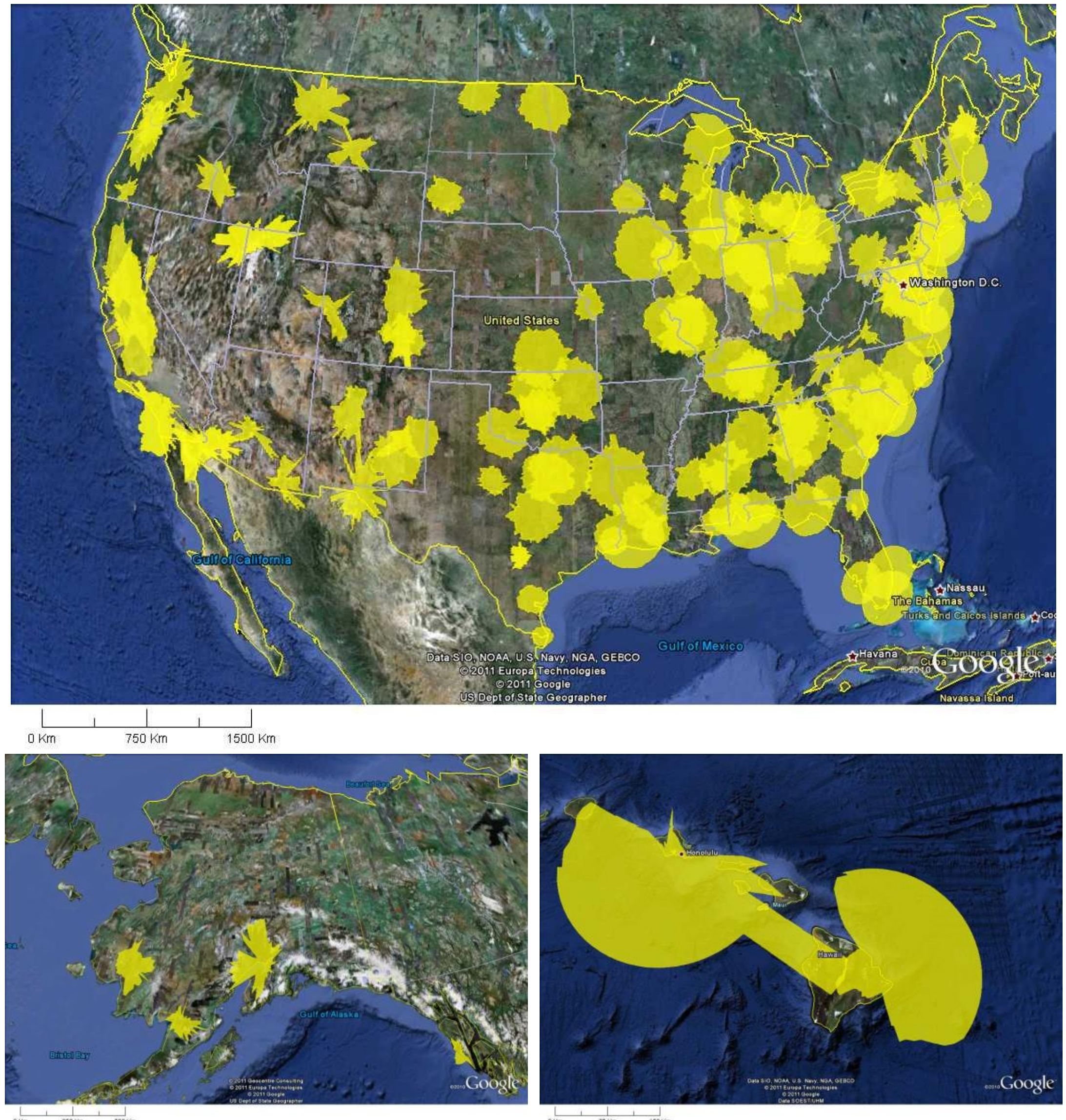

Figure 8. 2780 – 2800 MHz Band Segment

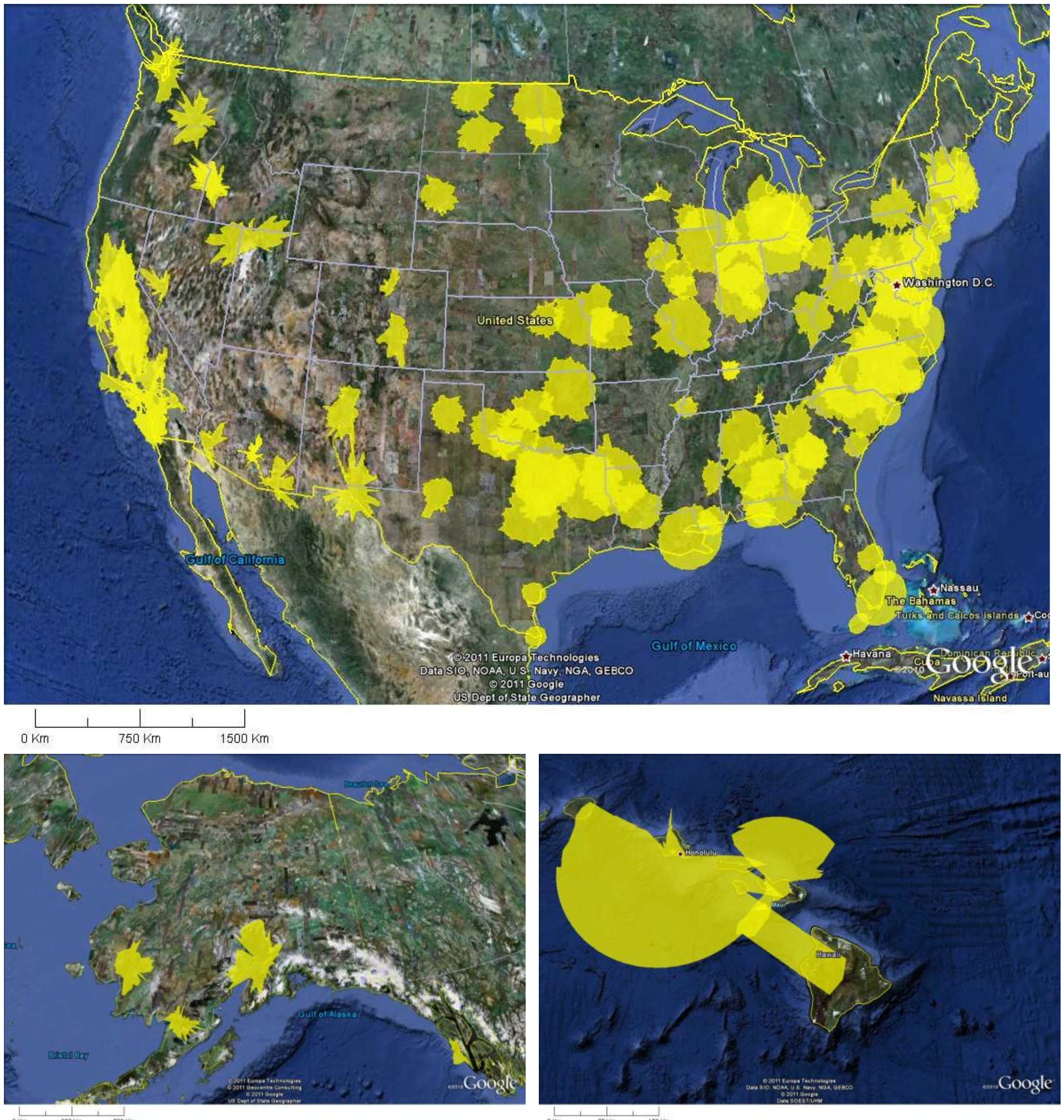

Figure 9. 2800 – 2820 MHz Band Segment

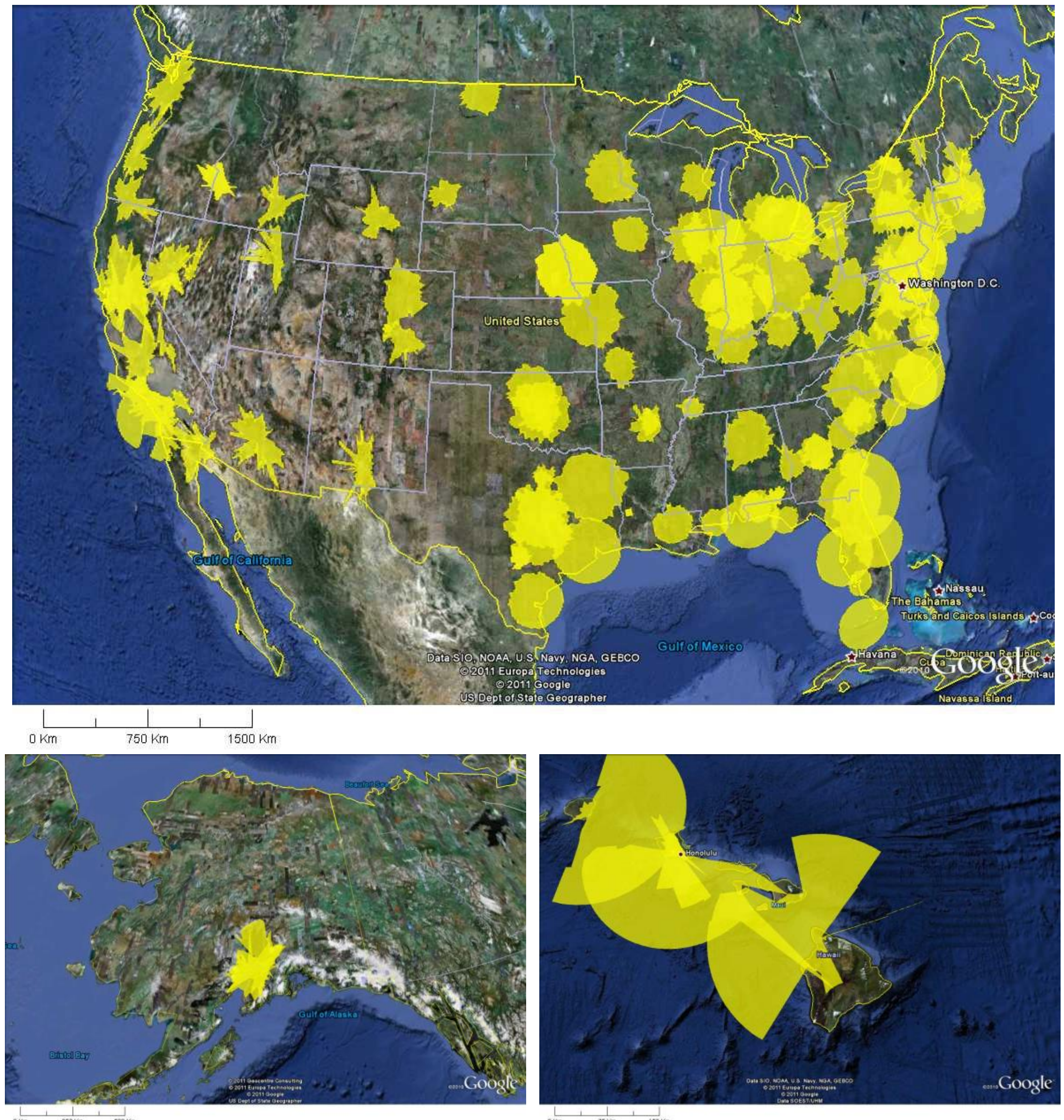

Figure 10. 2820 – 2840 MHz Band Segment

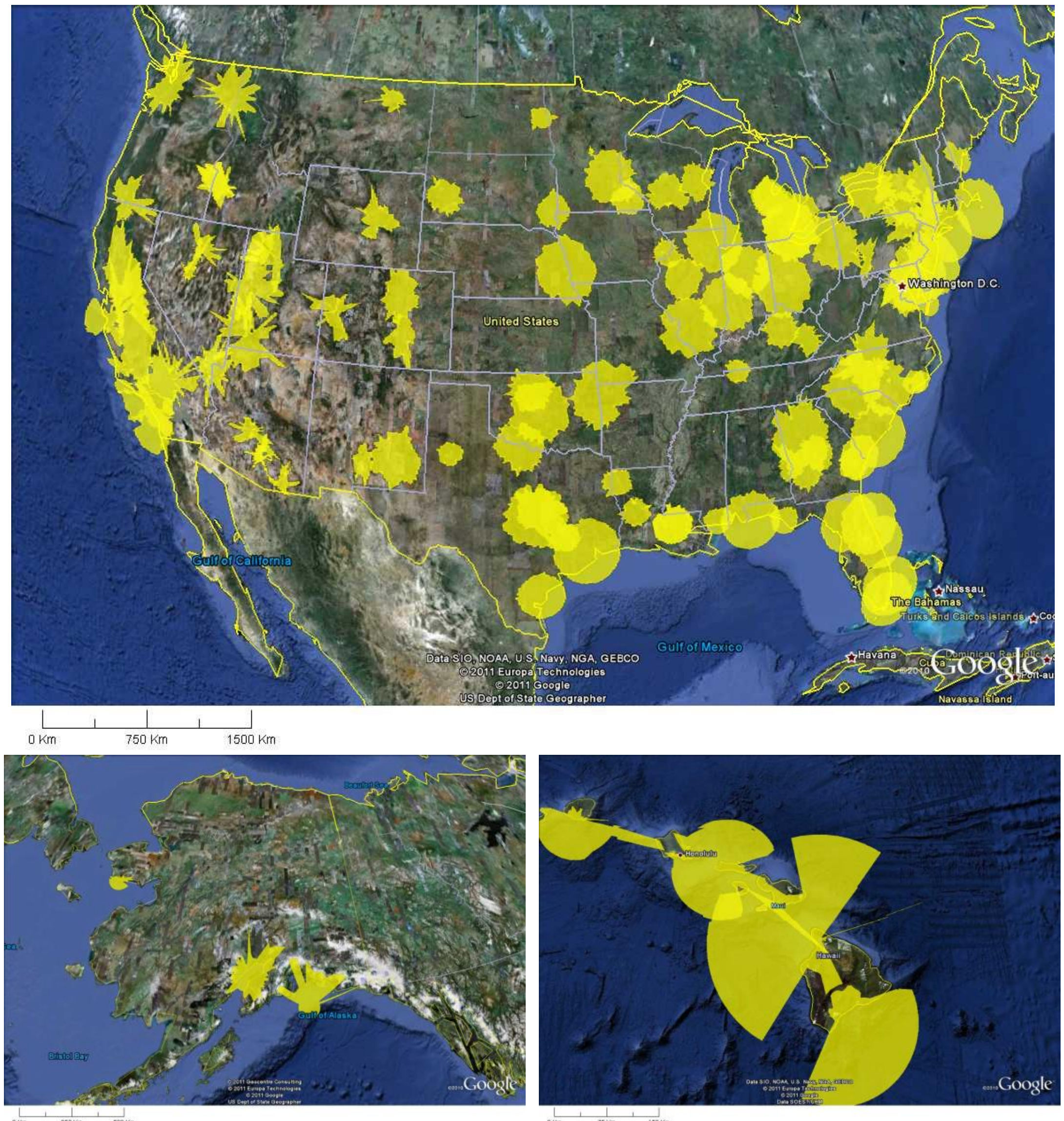

Figure 11. 2840 – 2860 MHz Band Segment

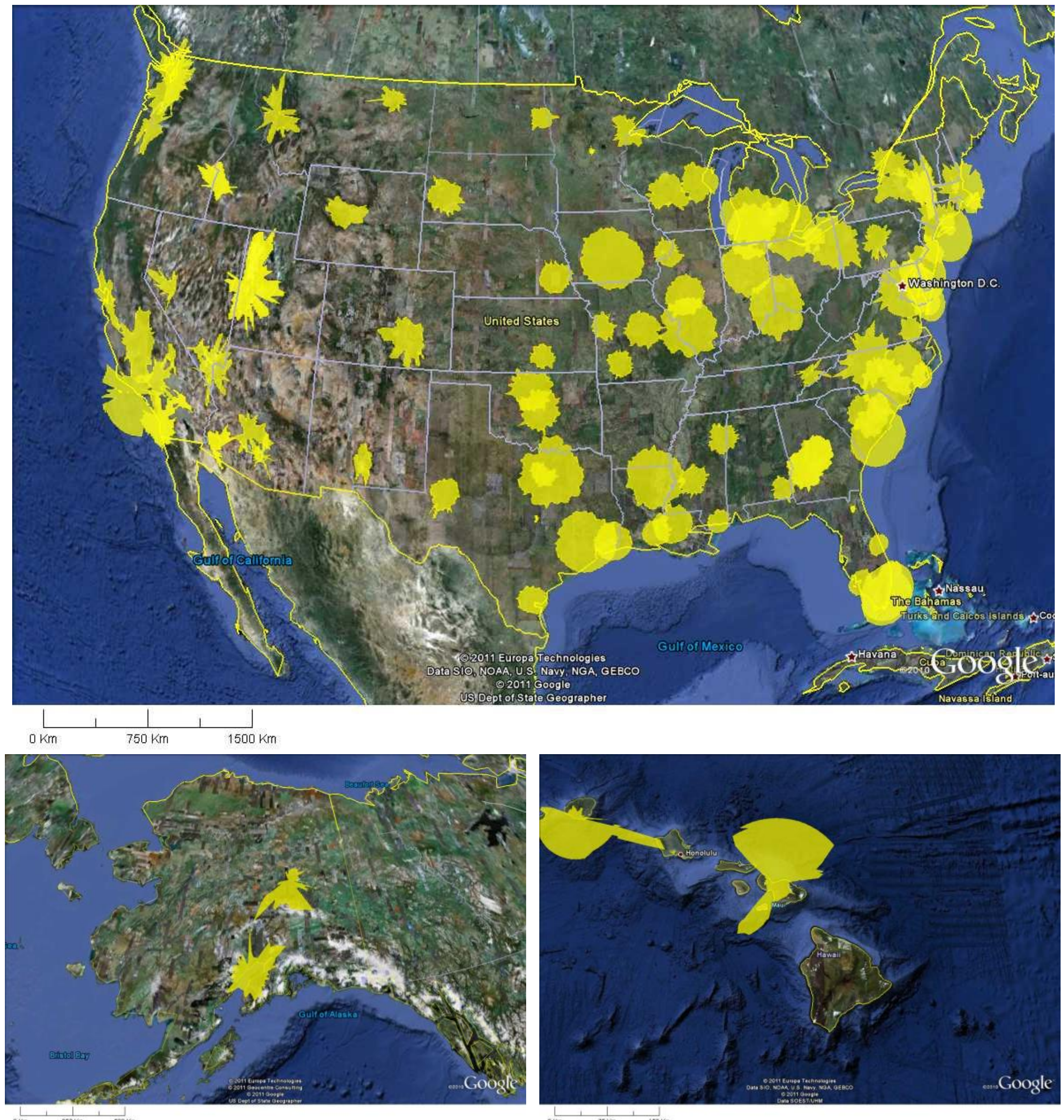

Figure 12. 2860 – 2880 MHz Band Segment

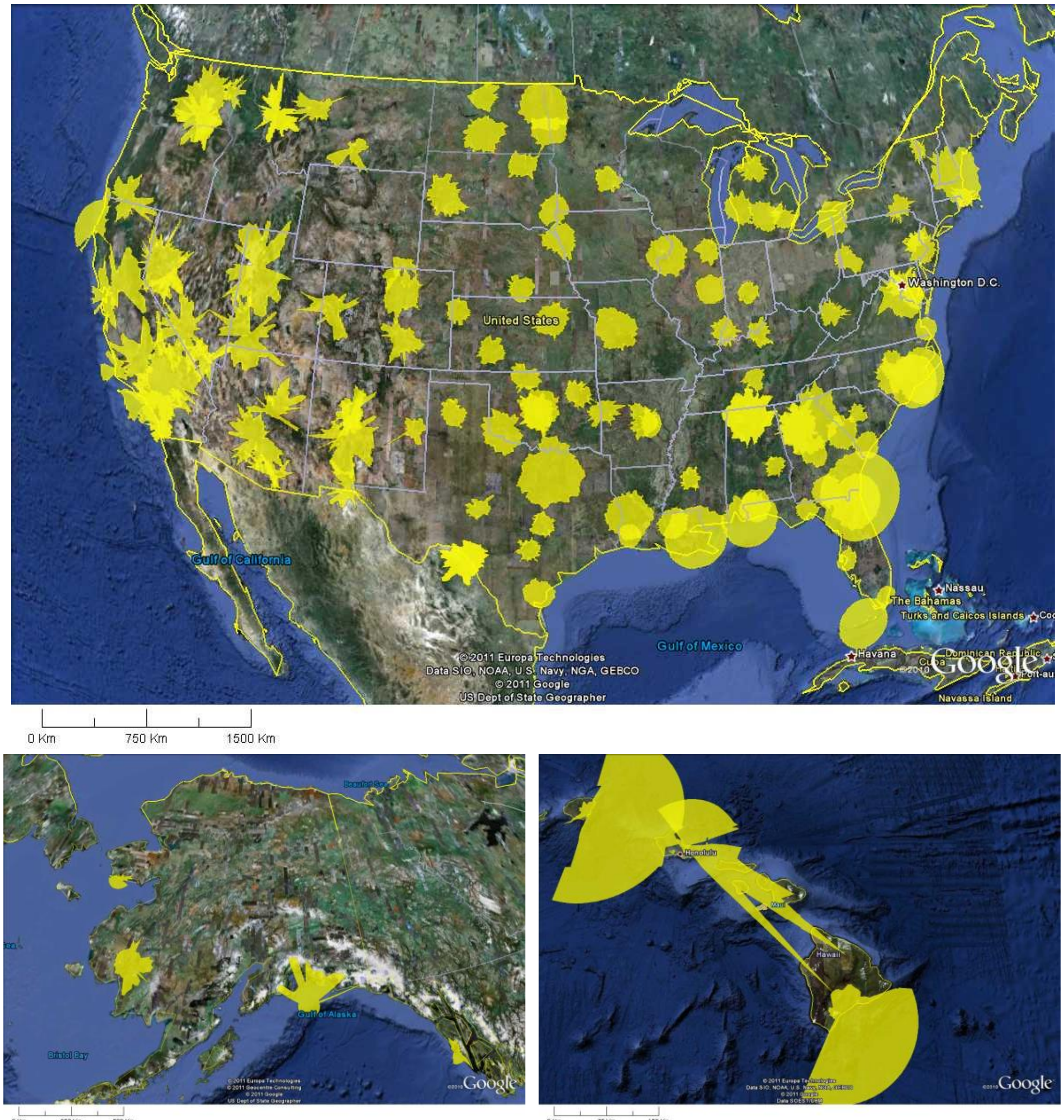

Figure 13. 2880 – 2900 MHz Band Segment

5. Planned Use

There are not any viable or feasible technologies that can replace the radar systems operating in the band 2700-2900 MHz, which would meet the safety-of-life and other requirements for air traffic control, weather surveillance, and national security-related missions.

The FAA and DoD use of the ASR systems in the band 2700-2900 MHz will remain the same for the foreseeable future.

The existing NEXRAD systems in the band 2700-2900 MHz will continue to operate for the foreseeable future. There are no new NEXRAD installations planned at this time.

Access to this band for tactical radar systems is critical to national defense and will continue for the foreseeable future.