



# 412<sup>th</sup> Test Wing



*War-Winning Capabilities ... On Time, On Cost*



**U.S. AIR FORCE**

## Evolution of a Risk of Adverse Impact to Military Operations and Readiness Areas (RAIMORA)

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# Overview



- Introduction
- Background
- HRAIZ Development
- Coordinated Effort
- What is a RAIMORA?
- R-2508/NTTR RAIMORA
- Conclusion



# Introduction



- Sustaining the military test environment is critical to the supporting the success of the warfighter.
  - Established in the 30s and 40s, these ranges were once considered remote and provided ample land and airspace with little risk to the sparse population
  - Military capabilities are constantly advancing
    - More resources required to validate
  - Challenge: Competing with commercialized renewable energy in/around the military ranges



# Background



- Experimental wind power development began to take shape in 80s and 90s within California
- By 2000, wind turbines had grown in size and number within the Tehachapi region
- Negative effects on airborne radar testing became substantial
- 2006 Kern Wind Resource was established
- 2008 Growth of Renewable Energy (RE) was promoted on a national level through incentives known as Production Tax Credits



# Background (Cont.)



- RE development viewed as being similar to the Gold Rush of yester-year
- Incentives brought RE costs down
  - Opened the potential for development in areas previously not considered viable
- DoD entities forced to apply a “fire fighting mentality” to address each proposed development at the installation level
- 2010 OSD established DoD Siting Clearinghouse



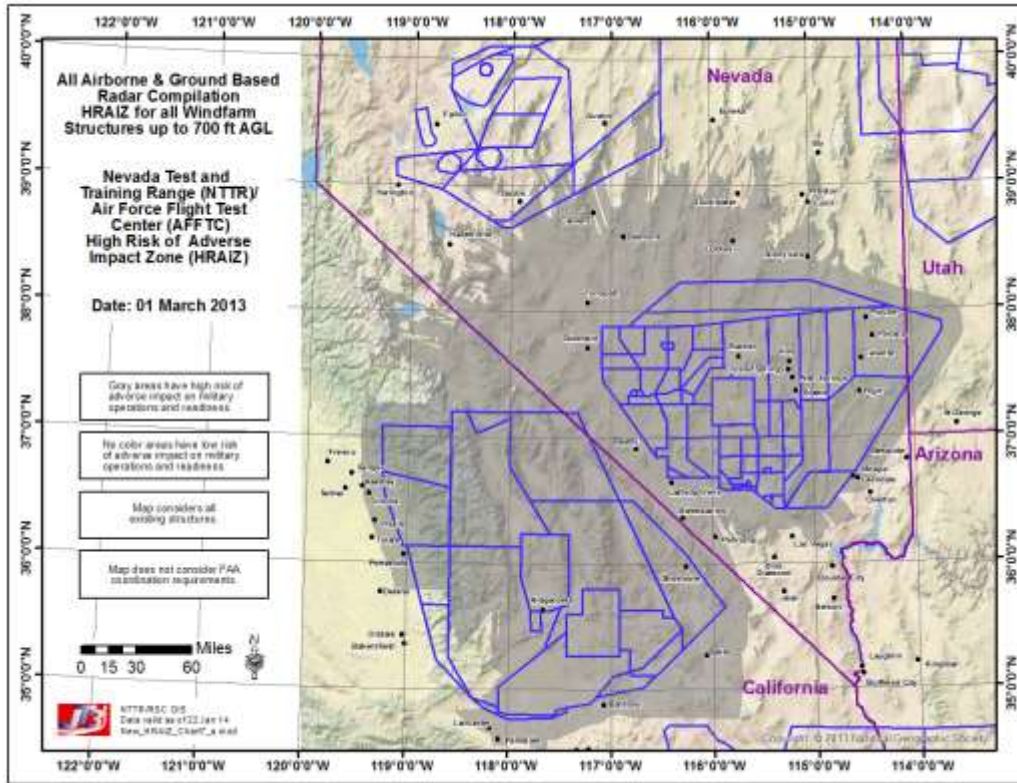
# Background (Concluded)



- 2011 CA Regional BLM office asked the question:
  - Can't you just give us a map of areas RE development will negatively impact military operations?
- Designing a map tuned into a tall task
  - Required a defensible science-based study
    - Weisz, J., Ungerman, R., (2012). AFFTC [Wind Turbine and Radar Interaction Program Test and Evaluation]
- NDAA 2011 Section 358 established criteria
  - Changed how the DoD could object to RE proposals
  - Determination of unacceptable risk
  - Developing a strategy



# R-2508/NTTR HRAIZ



- The High Risk of Adverse Impact Zone (HRAIZ) map depicts the Air Force area of interest for R-2508 and Nellis Test and Training Range (NTTR) operational areas.

<http://www.edwards.af.mil/library/factsheets/factsheet.asp?id=21609>

- Wind turbines built within the radio frequency line of sight of RDT&E systems can create significant adverse impacts to T&E activities depending on vertical height, electromagnetic sensitivity and distance from activities conducted on the range.



# Coordination



- Once the study was complete and validated by an independent source:
  - R-2508/NTTR HRAIZ map was created
  - Map vetted for approval by:
    - 412 TW, 99 ABW, USAF War Center
  - Signature endorsement:
    - Three Major Generals within the Test Enterprise
    - Secretary of the AF
- **End Result:** A Geographical Representation of High Risk Adverse Impact on Military Operations and Readiness approved as the AF position.





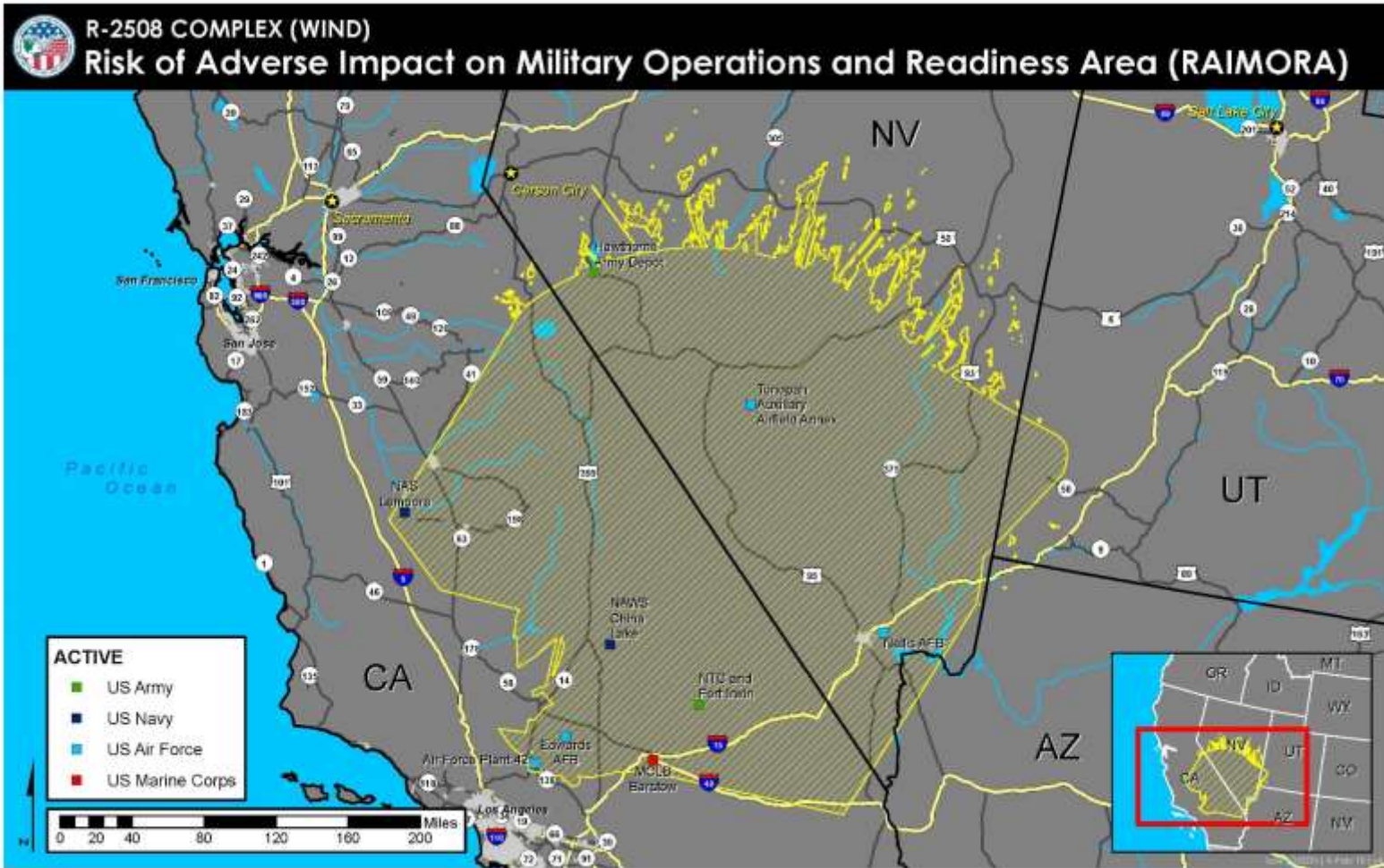
# What is a RAIMORA?



- A RAIMORA is an evolution from HRAIZ because Congress stipulated in the NDAA 2016 Sec. 314 that DoD does not need to rank zones into high, medium, or low, but simply identify risk or no-risk.
- RAIMORA information will be released to the public, land-use decision makers and developers in GIS format.
- OSD Siting Clearinghouse must approve the RAIMORA
- However, installations may share information (prior to approval) with local partners or government for collaborative purposes provided the maps are identified as “draft” or “pre-decisional.”



# R-2508/NTTR RAIMORA





# Conclusion



- **How are the wind industry and land owners to know where DoD has concern with wind development?**
  - Risk of Adverse Impact to Military Operations and Readiness Areas (RAIMORA)
- **Why was there a need to develop HRAIZ/RAIMORAs?**
  - Development proposals around military ranges
  - Ordered by Congress
- **What did it take to create the final product?**
  - Much more time, effort and resource than any one of us anticipated.