

## **Turbines, Radar and National Security**

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With the press buzzing around bankrupt California solar company, Solyndra, and the half billion in DOE-backed loans squandered, few noticed the scandal brewing around another company, LightSquared, and its new nationwide wireless communications network.

Last week, Air Force Gen. William Shelton testified before Congress that LightSquared's network would cause significant disruptions to the military's space-based navigation system. Shelton presented an honest assessment of the problems. The [scandal erupted](#) over pressure from the White House for Shelton to change his testimony so it was more favorable toward politically-connected LightSquared.

Shelton put the nation's interests first. But the military has not been honest about the adverse impact wind turbine technology is having on our national radar systems.

The fact is our air space has been made less safe by turbines and our national security compromised because of a reckless policy of siting wind towers within 50-miles of radar installations. Military radar experts in the field know the damage that's been done. But with the debate surrounding energy policy dominated by politics and money, the military has bowed to the pressure.

### **Radar interference and mitigation**

The military services and federal agencies have conducted numerous studies on the radar question, as have multiple international military and private interests. Not all studies agree on levels of severity and potential mitigations, but all agree that large scale industrial wind turbines have the potential to negatively affect military installations, radar, and navigation aids.

The problem is easy to explain, but difficult to resolve.

Since radar technology is designed to detect moving objects, spinning turbine blades create interference which degrades the signal. Wind towers carry a signal strength greater than a Boeing 747 so when the radar repeatedly sees the large return [it cannot detect actual aircraft in the same area](#).

Large expenditures of time and funds have been allocated in pursuit of technical mitigations but so far the results are controversial. According to Raytheon lead radar engineer, [Peter Drake](#), radar mitigation technology does not yet exist. "...These things [turbines] inside of 20 miles, look like a 747 on final approach," Drake said. The trick, he adds, "...is to somehow make them disappear, while still being able to see a real 747...we have not figured that out yet."

By 2008, nearly [40% of our long-range radar systems](#) were compromised by wind turbines. Today, more than twice the wind capacity is installed and the problem of radar interference persists.

Proper siting of turbines, while politically cumbersome, is the only tried and true form of mitigation. But this means denying wind developers access to land areas covered by radar.

### **Radar interference at Travis Air Force Base**

The problem of radar interference first cropped up in the U.S. in early 2007 near Travis Air Force base in California. Two wind proposals were before the Solano County Planning Commission that would erect over one-hundred new turbines in the area. The spinning blades resulted in smaller planes appearing to drop off the radar while others appeared when they weren't actually there.

Both Travis and the Solano County Airport Land Use Commission urged the planning commissioners to delay approving the projects citing air safety and the need for more time to study the effects the towers had on navigation.

[In his letter to the County](#), Colonel Steven Arquette, commander of the 60th Air Mobility Wing at Travis warned: "...we have evidence indicating the wind turbines will create significant interference with the base's radar and could lead to potentially serious flight safety hazards in terms of planes dropping off radar, flight tracks on radar different from actual tracks and 'false targets' -- planes the radar sees but aren't actually there."

The county heeded their concerns and agreed to the delay. Commissioner [John Moore was particularly firm](#) when he said "...If they can't fix it, it might never get done. Nothing happens unless the Air Force's problem gets fixed."

Travis held firm on its objections until a year later when enXco, one of the project proponents [gifted \\$1 million](#) to the base for technical mitigations.

Col. Arquette was told by his superiors to accept the money and withdraw his complaints despite the fact that the mitigation offered little more than a "detuning" of the radar signal to lessen the impact of the towers.

enXco's project was approved and built. But the radar problem was never resolved.

The Travis AFB Midair Collision Avoidance (MACA) pamphlet was updated this year with a warning that states:

"The wind farms southeast of Travis AFB interfere with the Travis ATC radar. In the area shown above ([click here to read the MACA](#) ) you cannot be seen on radar if you are not squawking! Please squawk. BE SEEN."

Squawking refers to turning the aircraft's transponder on to allow communication between the aircraft and the secondary radar system installed at air traffic control facilities.

The strategy of requiring areas to be transponder-only airspace could work but relies on pilots complying with the warning. Recreational pilots may not remember to comply or their aircraft

might not be adequately equipped. But worse, drug runners and -- in this post-9/11 world -- terrorists, might prefer not to be seen and intentionally keep their transponders off to stay invisible. *The first thing the 9/11 hijackers did after seizing control of our passenger planes was to turn off the transponders.*

Remarkably, participants at the radar forum at AWEA's Annual Conference last May touted the Travis solution as the gold standard for addressing turbine interference. You be the judge.

### **Shepherds Flat wind farm and long-range radar**

The radar problem at Travis involves airport surveillance radar. This type of radar is used by air traffic control and has a range of about 60 miles. Long range radar monitors in-route air traffic control used for homeland defense and NORAD. The mile distance for long range radar is 250 miles.

The Air Force maintains a long-range radar facility in Fossil, Oregon that's responsible for monitoring the U.S. border along the Pacific northwest. It covers the territory north, over the Canadian border, and south into areas in California. If you goggle "fossil oregon radar" the search returns titles that include:

1. [Pentagon objections hold up Oregon wind farm](#)
2. [Fears of radar interference threaten oregon wind farm, but solutions exist](#)
3. [Pentagon drops objections to Oregon wind farm](#)

A year ago this radar facility was the source of significant controversy when the Pentagon objected to the proposed \$2 billion Shepherds Flat<sup>1</sup> wind energy facility. The project's 338 General Electric turbines totaling 845 megawatts were to be built in the line of sight of Fossil's radar sweep .

The situation at Fossil was nearly identical to that of Travis.

Oregon Senators Ron Wyden and Jeff Merkley [expressed outrage over the Pentagon's objections](#) and set out to pressure the military into silence. They joined nine other senators in writing to Defense Secretary Robert Gates requesting a resolution of the conflict and insisting the DOD failed to search hard enough for practical solutions.

In order to get his way, Sen. Wyden (D-OR), [lobbied for](#) an \$8 million earmark in the 2011 appropriations to cover the cost for technical mitigations akin to what was implemented at Travis.

Bottom line: The public was on the hook to fund the project and responsible for degrading our radar.

## Outcome TBD

Windaction.org interviewed long-range radar specialists familiar with the mitigation proposed for the Fossil radar site. The technology under study ("Scan Step") involves installing a digital processor that, with software, will work to lessen the effect of turbine clutter. The process results in targets becoming invisible. In fact, aircraft the size of the space shuttle could fly through the radar sweep area undetected. Further, the fix is not universal and may be site specific.

The processor underwent its first suite of tests at the Fossil radar installation last spring. Word back was that it failed all tests. None of the FAA or DOD engineers we've spoken to believe Scan Step technology will work in the way people have been led to believe. No one doubts there will be a loss in radar resolution. Critical questions still pending are:

- 1) What level of radar reduction will be deemed acceptable?
- 2) Who will decide the level of reduction that will be permitted?
- 3) and Will the public be informed as to the extent Shepherds Flat has compromised our national security?

When Windaction.org asked a staff member of the Senate Armed Services committee what happens if Step Scan doesn't work, his response was an abrupt: "It has to".

*Indeed! Shepherds Flat is slated to go into service next year.*

There is no question that wind energy development has placed our national air safety at risk. The cases at Travis AFB and Fossil, OR should raise red flags. But unlike LightSquared, the military is comfortable whitewashing the issue before Congress. The public may find it difficult to believe our national security and air safety have been compromised in an effort to promote 'green' energy, but that's exactly what's happening.

<sup>1</sup> *The Shepherds Flat wind facility was the [subject of the White House memo](#) that complained the project received \$1.2 billion in governmental subsidies covered 65% of the cost and risk for the project while its equity sponsors incurred only about 11% and an estimated return on equity of 30% -- a hefty return for a project where the American public is absorbing the bulk of the risk.*