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SUMMARY

Founded Westslope Consulting, LLC in 2008. Provides radar consulting and technical services to developers of wind energy, commercial real estate including high-rises, event venue and stadium, transmission line, and solar energy projects and wind turbine manufacturers in the United States, Canada, and overseas including the Bahamas, India, and the United Kingdom.

Over 25 years of experience in the United States working with DoD, DHS, FAA, and NWS radar and automation systems and is considered a subject matter expert on the potential effects of wind turbines on air traffic control, air defense, border security, weather, over-the-horizon drug interdiction, and test range radar.

Works with developers at all stages of project development. In the early stages of project planning to identify potential radar concerns as well as other potential aviation and military operational concerns. In the late stages of development as projects move through the approval process at local and federal levels. This includes conducting radar studies, identifying impacts, outlining mitigation techniques and strategies, modeling, simulation, data analysis, optimization, and defining and testing software and/or hardware changes.

Represents clients a subject matter expert at Safety Risk Management Panels as the FAA reviews impacts to radar and air traffic operations and considers mitigation.

Engages with the DoD Siting Clearinghouse, DHS Long Range Program Office, FAA Obstruction Evaluation Group, National Telecommunications and Information Administration, WSR-88D Radar Operations Center, and national laboratories on behalf of clients and the wind industry.

Supports hearings and meetings at various levels of government.

Depending on project needs, teams with aviation, environmental, legal, and policy partners.

Working relationships with radar manufacturers in Canada, Denmark, the United States, and the United Kingdom, including those actively pursuing wind farm mitigation.

Technical expertise spans multiple navigation and surveillance systems including:

- ARSR-4
- ATCBI-5 and 6

- AN/FPN-63(V)
- AN/MPN-14K
- ASR-3, 8, 9, 10SS, 11, and 23SS
- CARSR
- CDT
- CVOR and DVOR
- ERAM
- DeTect Harrier and Merlin
- C Speed LightWave
- LSTAR
- MLAT
- Mode S
- MSSR
- ROTH
- Terma SCANTER
- STARS
- TDWR
- TDX-2000
- WSR-88D
- WSR-98A/E/R

EDUCATION

University of Leeds – Leeds, England

September 1991 to July 1994

Bachelor of Engineering with Honors in Electronic Engineering with a concentration in Microwave Engineering.

PROFESSIONAL EXPERIENCE

Westslope Consulting, LLC – Norman, OK

Founder, Owner, and Principal

May 2008 to present

- Supports the analysis of wind energy, commercial real estate including high-rises, event venue and stadium, transmission line, and solar energy projects to assess for radar effects.
- Provides mitigation studies and negotiates mitigation agreements with the DoD, DHS, FAA, and the NWS.
- Develops data analysis and modeling tools to assess for radar effects and identify possible mitigation solutions.

- Consults with AWEA regarding wind-radar policy, process, and technical issues including weather radar.
- Worked hand-in hand with the DHS to identify in-fill radar mitigation and draft agreements to resolve border security concerns.
- On behalf of wind developer, supported first exercise modeling the impacts of wind turbines on Relocatable Over-the-Horizon Radar.
- Provided expert witness testimony relating to impacts to Canadian weather radar.
- Served as a technical advisor for wind developer in negotiations of first Memorandum of Agreement with the DoD and Navy.
- Served as Radar Working Group lead under the first Cooperative Research and Development Agreement with United States Transportation Command and three wind developers successfully improving ASR-11 radar performance over approximately 600 wind turbines near Travis AFB. This work included implementing and validating a proprietary Westslope Consulting modeling method for predicting the impacts of wind energy projects, integrating two adjacent radar sites into STARS, several iterative optimization changes, third party evaluation of wind farm mitigation, and flight testing.
- Developed agenda for National Wind Coordinating Collaborative's State of the Art in Wind Siting Seminar and moderated radar solutions session.
- Served as the industry representative for the DHS radar and wind turbines interaction modeling tool.
- Provided support to the CanWEA Radar Working Group and served as an organizational committee member and moderator for the 2011 International Wind and Radar Forum in Ottawa, Canada.
- Supported the DoD, DOE, DHS, and FAA Interagency Field Test and Evaluation.

Regulus Group, LLC – Woodstock, VA

Partner, Senior Engineer and Consultant

September 2003 to May 2008

- On behalf of the FAA, supported DoD testing at King Mountain, Texas during the ARSR-4 wind turbine interference and mitigation study.
- At the request of Idaho National Laboratory, served as a technical advisor for the 2008 JASON Report JSR-08-125 Wind Farms and Radar.
- Supported INL at wind-radar intra-agency meetings to further understanding of radar impacts and existing and potential mitigation techniques.
- FAA lead assigned to working group to study potential impacts on ASR-11 and co-located MSSR and VOR from a proposed wind energy project near Ted Stevens International Airport. Identified potential impacts, outlined mitigation strategies, simulated and modeled potential impacts and mitigation techniques, analyzed data, and defined and tested software changes.

- Managed field engineering activities including maintenance and troubleshooting, system optimization and commissioning flight inspection for FAA ASR-11 Program Office.
- Developed ASR-11 Optimization Procedures and ASR-11 Optimization Training Course. Conducted training courses and on-the-job training for various government agencies and radar manufacturer.
- Led and participated in numerous detailed investigations into ASR-11 performance issues. Instrumental in defining, modeling, testing, analyzing, and implementing new algorithms and algorithm enhancements to the ASR-11 software to improve performance.
- Codeveloped Radar Toolbox, a FAA software radar analysis tool.
- Supported the assessment of radar concerns for the FAA regarding real estate development projects and wind projects.

Fesler Technical Services – Oklahoma City, OK

Principal Engineer

July 2002 to September 2003

Senior Engineer

May 2000 to July 2002

- Managed engineering activities including maintenance and troubleshooting, system optimization, commissioning flight inspection, and test and evaluation support to FAA ASR-11 Program Office.
- Assigned to National Airways System Engineering Division to provide systems engineering support. Provided coordination among FAA and DoD ASR-11 Program Offices.
- FAA POC for test and evaluation of ASR-11 weather channel. Worked with MIT/LL to complete Developmental Test and Evaluation.
- Participated in FAA's Pre-Operational Test and Evaluation and Operational Test and Evaluation at Stockton, California. Assessed radar performance to ensure operational suitability. Modeled algorithms to investigate potential software changes. Developed enhancements to improve system performance. Coauthored several data processing algorithm enhancements required by the FAA.

Management Assistance Corporation of America – Oklahoma City, OK

Electronic Engineer

May 1997 to May 2000

TVR Communications – Oklahoma City, OK

Electronic Engineer II

February 1997 to May 1997

Electronic Engineer I

February 1995 to February 1997

- Provided systems engineering support to the FAA's National Airways System Engineering Surveillance Division on the ARSR-4 program. Completed numerous ARSR-4 and co-located ATCBI-5 optimizations and flight inspections. Wrote and edited various sections of the ARSR-4 Optimization

Procedures. Provided on-the-job ARSR-4 and ATCBI-5 optimization and flight inspection training to DoD and FAA.

- Provided field support both onsite and via telephone including troubleshooting, installing electronic equipment modifications, site technical bulletins, software build updates and solving several radio frequency interference problems. Participated in numerous ARSR-4 restorations.
- Project lead for ARSR-4 Search Overload Project. The goal of this project was to prevent a search overload condition and improve weather channel performance. This project resulted in changes in the way the FAA and DoD optimized, and continues to optimize, the ARSR-4 and provided interim measures to lessen the effects of false search targets while anomalous propagation conditions existed.
- Project lead on the ARSR-4 Ducting Day Map Project. The goal of this project was to mitigate clutter, as a result of anomalous propagation, from declaring false weather reports. This project resulted in software changes to weather channel.
- Project lead for the ARSR-4 Television Radio Frequency Interference Project. The goal of this project was to eliminate interference from television broadcast stations. This project resulted in a hardware redesign.
- Participated in FEMA response to Typhoon Paka. Conducted damage assessment of the Guam ARSR-4. Helped restore the ASR-8 including radar optimization, troubleshooting, and commissioning flight inspection.

PUBLISHED WORKS/PRESENTATIONS

- *Radar Mitigation in the U.S.*, presented at the Canadian Wind Energy Association 2012 Conference and Exhibition, October 15, 2012.
- *Wind and Radar Introduction and Mitigation Overview*, presented at the International Wind and Radar Forum, Canadian Wind Energy Association, June 29, 2011.
- *Military, Radar, and Aviation Issues: Growing Concerns and Ways to Navigate Potential Problems*, presented at WINDPOWER 2010 Conference and Exhibition, American Wind Energy Association, May 24, 2010
- *Introduction to the Issues*, presented at the State of the Art in Wind Siting Seminar, NWCC, October 21, 2009.
- *Candidate Solutions*, presented at the State of the Art in Wind Siting Seminar, NWCC, October 21, 2009.
- *Overview of Mitigation Efforts at Wind Projects in the UK and US*, presented at the WINDPOWER 2009 Conference and Exhibition, American Wind Energy Association, May 7, 2009.
- *Long Range Radar Technical Discussion*, Competition for the Sky, FAA, September 29-October 2, 2008.
- *Issues, Wind Turbine Clutter, I/Q Data, Detection and Track Eligibility, and Modeling Tools*, Competition for the Sky, FAA, September 29-October 2, 2008.

- *Radar Issues: A Developer's Perspective*, presented at the WINDPOWER 2008 Conference and Exhibition, America Wind Energy Association, June 1-4, 2008.
- *Technology Update and Mitigation Options*, presented at the Wind Energy Project Siting Workshop, America Wind Energy Association, February 14-15, 2008.
- *Fire Island Wind/Radar*, presented at the WINDPOWER 2007 Conference and Exhibition, America Wind Energy Association, June 3-6, 2007.
- *Fire Island Wind Turbine Project*, 51st Annual Conference Proceedings, Air Traffic Control Association, October 2006.

HONORS/AWARDS

- *Thank you letter*, Brigadier General Steven J. Lepper, February 2010.
- *Thank you letter*, Congressman John Garamendi, CA-10, February 2010.
- *Award for Exemplary Performance*, FAA ASR-11 Program Office, August 2009.
- *Letter of Appreciation*, FAA ASR-11 Program Office, May 2008.
- *Letter of Appreciation*, FAA ASR-11 Program Office, June 2007.
- *ASR-11 Team Award*, FAA ASR-11 Program Office, November 2005.
- *Letter of Appreciation*, FAA ATB-400, September 2003.
- *Letter of Appreciation*, FAA ATB-400, May 2003.
- *Letter of Appreciation*, FAA ATB-400, November 2002.
- *Letter of Commendation*, Fesler Technical Services, August 2001.
- *Letter of Commendation*, FAA ARN-300, September 2000.
- *Letter of Appreciation*, FAA Golden Gate Systems Management Office, November 1998.
- *MACA Certificate of Appreciation for outstanding support in rebuilding the Guam Island radar systems destroyed in super typhoon Paka*, November 1998.
- *TVR Communications Incorporated Outstanding Performance Award*, June 1997.

PROFESSIONAL AFFILIATIONS

- IEEE, Member
- IET, Member

CITIZENSHIP

- United States