

Senate Commerce Committee Nominee Questionnaire, 116th Congress

Instructions for the nominees: The Senate Committee on Commerce, Science, and Transportation asks you to provide typed answers to each of the following questions. It is requested that the nominee type the question in full before each response. Do not leave any questions blank. Type "None" or "Not Applicable" if a question does not apply to the nominee. Return printed answers to Committee. Begin each section (i.e., "A", "B", etc.) on a new sheet of paper.

A. BIOGRAPHICAL INFORMATION AND QUALIFICATIONS

1. Name (Include any former names or nicknames used):

Neil Andrew Jacobs Jr.

2. Position to which nominated:

Under Secretary of Commerce for Oceans and Atmosphere

3. Date of Nomination:

January 6, 2020

4. Address (List current place of residence and office addresses):



Office:

1401 Constitution Ave NW
Washington, DC 20230

5. Date and Place of Birth:

December 12, 1973. Colorado Springs, CO.

6. Provide the name, position, and place of employment for your spouse (if married) and the names and ages of your children (including stepchildren and children by a previous marriage).

Jennifer Modliszewski, Ph.D. Duke Center for Genomic and Computational Biology, Duke University



7. List all college and graduate degrees. Provide year and school attended.

Ph.D. Atmospheric Science (Numerical modeling). 2005, North Carolina State University
M.S. Atmospheric Science (Air-sea interaction), 2000, North Carolina State University
B.S. Physics and Math, 1996, University of South Carolina

8. List all post-undergraduate employment, and highlight all management-level jobs held and any non-managerial jobs that relate to the position for which you are nominated.

2018-Present, Assistant Secretary of Commerce for Environmental Observation and Prediction, NOAA
2013-2018, Chief Atmospheric Scientist, Panasonic Avionics Corporation.
2004-13, Director of Research and Business Development, AirDat, LLC.

9. Attach a copy of your resume.
10. List any advisory, consultative, honorary, or other part-time service or positions with Federal, State, or local governments, other than those listed above, within the last ten years.

I have never had a position in Federal, State, or local government other than the one listed above.

11. List all positions held as an officer, director, trustee, partner, proprietor, agent, representative, or consultant of any corporation, company, firm, partnership, or other business, enterprise, educational, or other institution within the last ten years.

American Meteorological Society (AMS) Forecast Improvement Group (Chair 2015-2017)
Federal Aviation Administration (FAA) Continuous Lower Emissions, Energy, and Noise (CLEEN)
World Meteorological Organization Expert Team on Aircraft-Based Observing Systems (ET-ABO)

12. Please list each membership you have had during the past ten years or currently hold with any civic, social, charitable, educational, political, professional, fraternal, benevolent or religiously affiliated organization, private club, or other membership organization. (For this question, you do not have to list your religious affiliation or membership in a religious house of worship or institution.). Include dates of membership and any positions you have held with any organization. Please note whether any such club or organization restricts membership on the basis of sex, race, color, religion, national origin, age, or disability.

American Meteorological Society; Forecast Improvement Group (Chair 2015-2017; Lead, NWP 2012-14)
World Meteorological Organization; Expert Team on Aircraft-Based Observing Systems
American Geophysical Union
American Meteorological Society
Gamma Beta Phi, National Honor Society
Geological Society of America
National Forensics League
Phi Beta Kappa, Honor Society
Pi Mu Epsilon, National Math Honor Society
Sigma Pi Sigma, National Physics Honor Society (President: 1993-1996, USC Chapter)
Sigma Xi, Honor Society
Durham YMCA
Greensboro Velo Club (Pro Cycling Team)
Rotary International
Trout Unlimited
*None of these restrict membership on the basis of sex, race, color, religion, national origin, age, or handicap.

13. Have you ever been a candidate for and/or held a public office (elected, non-elected, or appointed)? If so, indicate whether any campaign has any outstanding debt, the amount, and whether you are personally liable for that debt.

No.

14. List all memberships and offices held with and services rendered to, whether compensated or not, any political party or election committee within the past ten years. If you have held a paid position or served in a formal or official advisory position (whether compensated or not) in a political campaign within the past ten years, identify the particulars of the campaign, including the candidate, year of the campaign, and your title and responsibilities.

None.

15. Itemize all political contributions to any individual, campaign organization, political party, political action committee, or similar entity of \$500 or more for the past ten years.

None.

16. List all scholarships, fellowships, honorary degrees, honorary society memberships, military medals, and any other special recognition for outstanding service or achievements.

Pi Mu Epsilon, National Math Honor Society

Sigma Pi Sigma, National Physics Honor Society (President: 1993-1996, USC Chapter)

Gamma Beta Phi, National Honor Society

National Forensics League Scholarship

Phi Beta Kappa, Honor Society

Sigma Xi, Honor Society

17. Please list each book, article, column, Internet blog posting, or other publication you have authored, individually or with others. Include a link to each publication when possible. Also list any speeches that you have given on topics relevant to the position for which you have been nominated. Do not attach copies of these publications unless otherwise instructed.

Invited lectures at government meteorological centers (prior to NOAA):

NCEP, Camp Springs, MD, *PWS global ensemble system*, 21 July 2016

UK Met Office, Exeter, UK, *PWS global model and data assimilation*, 13 July 2016

ECMWF, Reading, UK, *Assimilation of ABOs into a global modeling system*, 12 July 2016

UK Met Office, Exeter, UK, *Estimation of TAMDAR Error and Assimilation Experiments*, 27 Apr 2012

ECMWF, Reading, UK, *Utility of TAMDAR aircraft observations for NWP*, 26 Apr 2012

NCEP EMC, Camp Springs, MD, *Optimization of TAMDAR for NWP*, 23 Aug 2011

SMN, Mexico City, Mexico, *Operational forecasting with TAMDAR*, 23 Jun 2011

ECMWF, Reading, UK, *Unique aspects of aircraft data assimilation*, 10 Nov 2010

Publications:

Gao, F., Z. Liu, J. Ma, N. Jacobs, P. Childs, H. Wang, 2019: Variational Bias Correction of TAMDAR Temperature Observations in WRF Data Assimilation System, *Mon. Wea. Rev.*, 147, 1927-1945.

Gao, F., X.-Y. Huang, N. Jacobs, H. Wang, 2018: Assimilation of Wind Speed and Direction Observations: Results from real observation experiments. *Tellus A*, 67,1.

Zhang, X., H. Wang, X.-Y. Huang, F. Gao, and N. Jacobs, 2015: Using Adjoint-Based Forecast Sensitivity Method to Evaluate TAMDAR Data Impacts on Regional Forecasts, *Advances in Meteorology*, Vol. 2015, Article ID 427616, 13 pg. 2015.

Gao, F., P. P. Childs, X.-Y. Huang, N. A. Jacobs, and J. Z. Min, 2014: A Relocation-based Initialization Scheme to Improve Track-forecasting of Tropical Cyclones. *Adv. Atmos. Sci.*, 31(1), 27-36.

Jacobs, N., D. Mulally, A. Anderson, J. Braid, P. Childs, A. Huffman, E. Wilson, and F. Gao, 2015: Recent Advancements in the TAMDAR Sensor Network Expansion, (IOAS-AOLS), AMS, Phoenix, AZ.

Jacobs, N., F. Gao, P. Childs, X. Y. Huang, and H. Wang, 2015: Optimization of In-situ Aircraft Observations for Various Assimilation Techniques, (IOAS-AOLS), AMS, Phoenix, AZ.

Liu, Y., M. Xu, L. Pan, Y. Liu, N. Jacobs, and P. Childs, 2015: Implementation of a CONUS RTFDDA system with radar data assimilation for convection-resolvable analysis and prediction, (IOAS-AOLS), AMS, Phoenix, AZ.

- Jacobs, N. A.**, D. J. Mulally, and A. K. Anderson, 2014: Correction of Flux Valve–Based Heading for Improvement of Aircraft Wind Observations. *J. Atmos. Oceanic Technol.*, **31**, 1733–1747.
- Jacobs, N. A.**, and J. E. Rex, 2013: Benefits and Utility of Tropospheric Airborne Meteorological Data Reporting, *Air Traffic Control Quarterly*, January, First Quarter, 2013.
- Huang, X.-Y., F. Gao, **N. A. Jacobs**, and H. Wang, 2013: Assimilation of wind speed and direction observations: a new formulation and results from idealized experiments. *Tellus A*, **65**, 19936.
- Wyszogrodzki, A. A., Y. Liu, **N. A. Jacobs**, P. Childs, Y. Zhang, G. Roux, and T. T. Warner, 2013: Analysis of the surface temperature and wind forecast bias of the NCAR-AirDat operational CONUS 4km RTFDFA forecasting system, *Meteorol. Atmos. Phys.*, **121**, 3-4.
- Jacobs, N. A.**, P. Childs, M. Croke, A. Huffman, J. Nelson, J. T. Braid, Y. L. Liu, and X. Y. Huang, 2013: An update on the TAMDAR global network expansion. Special Symposium on Advancing Weather and Climate Forecasts: Innovative Techniques and Applications, Austin, TX.
- Nelson, J., J. T. Braid, A. K. Anderson, **N. A. Jacobs**, P. Childs, M. Croke, and A. Huffman, 2013: Alaska TAMDAR and the RTFDFA WRF QC System, ARAM, AMS, Austin, TX.
- Huffman, A., P. Childs, M. Croke, **N. A. Jacobs**, and Y. L. Liu, 2013: Verification of the NCAR-AirDat operational RT-FDDA-WRF for the 2011 and 2012 spring convective seasons, IOAS, AMS, Austin, TX.
- Gao, F., **N. A. Jacobs**, X. Y. Huang, and P. Childs, 2013: Direct assimilation of wind speed and direction for the WRF model, Special Symposium on Advancing Weather and Climate Forecasts: Innovative Techniques and Applications, AMS, Austin, TX.
- Richardson, H., **N. A. Jacobs**, P. Childs, P. Marinello, and X. Y. Huang, 2013: UAS observations and their impact on NWP during TUFT, ARAM, AMS, Austin, TX.
- Gao, F., P. Childs, X. Y. Huang, and **N. A. Jacobs**, 2013: A new method for vortex relocation within balanced flow field, NWP, Austin, TX.
- Gao, F., X. Zhang, **N. Jacobs**, X.-Y. Huang, Xin Zhang, P. Childs, 2012. Estimation of TAMDAR Observational Error and Assimilation Experiments. *Wea. Forecasting*, **27**, 4, 856-877.
- Gao, F., X.-Y. Huang, **N. Jacobs**, 2012: The Assimilation of Wind Speed and Direction Based on WRFDA 3D-Var System. New Orleans, LA.
- Zhang, Xiaoyan, X.-Y. Huang, T. Auligne, Xin Zhang, F. Gao, **N. Jacobs**, P. Childs, 2012. Evaluation of TAMDAR Data Impact on Forecast Error with WRFDA-FSO System, AMS, New Orleans, LA.
- Gao, F., Xiaoyan Zhang, X.-Y. Huang, Xin Zhang, **N. Jacobs**, P. Childs, 2011: Preliminary Results of Directly Assimilating Wind Speed and Direction Based on WRFDA 3D-Var System. 12th WRF Users' Workshop, Boulder, Colorado, 20-24 June 2011.
- Zhang, Y. Y. Liu, **N. A. Jacobs**, P. Childs, T. Nipen, T. T. Warner, L. D. Monache, G. Roux, A. Wyszogrodzki, W. Y. Y. Cheng, W. Yu. and R.- S. Sheu, 2012: Evaluation of the impact of assimilating the TAMDAR data on WRF-based RTFDFA simulations and the RTFDFA performance on predicting warm-season precipitation over the CONUS, *Wea. Forecasting*, under revision.
- Liu, Y., T. Warner, S. Swerdlin, T. Betancourt, J. Knier, B. Mahoney, J. Pace, D. Rostkier-Edelstein, **N. A. Jacobs**, P. Childs, and K. Parks, 2011: NCAR ensemble RTFDFA: real-time operational forecasting applications and new data assimilation developments. 24th Conference on Weather and Forecasting (WAF-NWP), AMS, Seattle, WA.

- Huffman, A., N. A. Jacobs, M. Croke, P. Childs, X. Y. Huang, and Y. Liu, 2011: Verification and Sensitivity of the NCAR-AirDat Operational Forecasting Systems to TAMDAR Observations. 15th Symposium (IOAS-AOLS), AMS, Seattle, WA.
- Jacobs, N. A., F. Gao, P. Childs, X. Zhang, X. Y. Huang, X. Zhang, M. Croke, and Y. Liu, 2011: Optimization of In-situ Aircraft Observations for Various Assimilation Techniques. 15th Symposium (IOAS-AOLS). AMS, Seattle, WA.
- Jacobs, N. A., M. Croke, P. Childs, Y. Liu, X. Y. Huang, and R. DeJong, 2011: The Utility of TAMDAR in the NextGen-Oriented CLEEN Program. Second Aviation, Range and Aerospace Meteorology Special Symposium on Weather-Air Traffic Management Integration (ARAM), AMS, Seattle, WA.
- Croke, M., N. A. Jacobs, D. J. Mulally, A. K. Anderson, J. T. Braid, P. Childs, A. Huffman, Y. Liu, and X. Y. Huang, 2011: Recent Advancements in the TAMDAR Sensor Network Expansion. 15th Symposium on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans and Land Surface (IOAS-AOLS), AMS, Seattle, WA.
- Jacobs, N. A., P. Childs, M. Croke, Y. Liu, and X. Y. Huang, 2010: An Update on the TAMDAR Sensor Network Deployment, (IOAS-AOLS), AMS, Atlanta, GA.
- Jacobs, N. A., M. Croke, P. Childs, and Y. Liu, 2010: The Potential Utility of TAMDAR Data in Air Quality Forecasting, (IOAS), Atlanta, GA.
- Childs, P., N. A. Jacobs, M. Croke, Y. Liu, W. Wu, G. Roux, and M. Ge, 2010: An Introduction to the NCAR-AirDat Operational TAMDAR- Enhanced RTFDAA-WRF, (IOAS-AOLS), AMS, Atlanta, GA.
- Croke, M., N. A. Jacobs, P. Childs, Y. Liu, Y. Liu, and R. S. Sheu, 2010: Preliminary Verification of the NCAR-AirDat Operational RTFDAA- WRF System, (IOAS-AOLS), AMS, Atlanta, GA.
- Croke, M., N. Jacobs, P. Childs, and Y. Liu, 2009: The Utility of TAMDAR on Short-Range Forecasts over Alaska, (IOAS), AMS, Phoenix, AZ.
- Jacobs, N., P. Childs, M. Croke, Y. Liu, and X. Y. Huang, 2009: The Optimization Between TAMDAR Data Assimilation Methods and Model Configuration in WRF-ARW, (IOAS-AOLS), AMS, Phoenix, AZ.
- Childs, P., N. Jacobs, M. Croke, Y. Liu, and X. Y. Huang, 2009: TAMDAR- Related Impacts on the AirDat Operational WRF-ARW as a Function of Data Assimilation Techniques, (IOAS-AOLS), AMS, Phoenix, AZ.
- Jacobs, N., P. Childs, M. Croke, and Y. Liu, 2008: The Effects of Horizontal Grid Spacing and Vertical Resolution on TAMDAR Data assimilation in Short-Range Mesoscale Forecasts, AMS Annual Meeting, 12th Symposium on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface (IOAS-AOLS).
- Childs, P., N. Jacobs, M. Croke, and Y. Liu, 2008: TAMDAR-Related Impacts on the AirDat Operational WRF-ARW, AMS Annual Meeting, 12th Symposium on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface (IOAS-AOLS).
- Croke, M., N. Jacobs, P. Childs, and Y. Liu, 2008: PenAir-Based TAMDAR-Related Impacts on Short-Range Mesoscale Forecasts over Alaska, AMS Annual Meeting, 12th Symposium on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface.
- Jacobs, N. A., S. Raman, G. M. Lackmann, and P. P. Childs, Jr, 2007: The influence of the Gulf Stream induced SST gradients on the US East Coast winter storm of 24-25 January 2000. *International Journal of Remote Sensing*, 29, 6145-6174.

Jacobs, N. A., 2007: Potential benefits of tropospheric airborne meteorological data reporting (TAMDAR). *Managing the Skies*, 5, 3, 20-23.

Liu, Y., T. Warner, S. Swerdlin, W. Yu, **N. Jacobs**, and M. Anderson, 2007: Assimilation data from diverse sources for mesoscale NWP: TAMDAR-data impact. *Geophysical Research Abstracts*, 9, EGU2007-A-03109.

Jacobs, N. A., Y. Liu. and C.-M. Druse, 2007: The effects of vertical resolution on the optimization of TAMDAR data in short-range mesoscale forecasts, AMS Annual Meeting, 11th Symposium on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface (IOAS-AOLS) 9.3.

Druse, C.-M., and **N. A. Jacobs**, 2007: Evaluating the benefits of TAMDAR data in aviation forecasting, AMS Annual Meeting, 11th Symposium on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface (IOAS-AOLS) 9.5.

Liu, Y., **N. A. Jacobs**, W. Yu, T. T. Warner, S. P. Swerdlin, and M. Anderson, 2007: An OSSE study of TAMDAR data impact on mesoscale data assimilation and prediction, AMS Annual Meeting, 11th Symposium on (IOAS-AOLS) 5.20.

Jacobs, N. A., 2006: The effects of lower-tropospheric data resolution on short-range mesoscale model forecasts of surface temperatures during the summer season, Doc. and Tech. Note AirDat, LLC, 53 pp.

Jacobs, N. A., and Y. Liu, 2006: A comprehensive quantitative precipitation forecast statistical verification study, Doc. and Tech. Note AirDat, LLC, 25 pp.

Jacobs, N. A., Y. Liu, and C.-M. Druse, 2006: Evaluation of temporal and spatial distribution of TAMDAR data in short-range mesoscale forecasts, AMS Annual Meeting, 10th Symp. IOAS-AOLS.

Jacobs, N. A., S. Raman, and G. M. Lackmann, 2006: Sensitivity of East Coast winter storms to sea surface temperature gradients, AMS Annual Meeting, 14th Conf. Sea-Atmos.

Jacobs, N. A., G. M. Lackmann and S. Raman 2005: The combined effects of Gulf Stream-induced baroclinicity and upper-level vorticity on U.S. East Coast extratropical cyclogenesis. *Mon. Wea. Rev.*, 133, 2494–2501.

Jacobs, N. A., 2004: Porting MM5 to OS X: A guide to mesoscale modeling on a G5, *Mac OSX Hints*, 15, 97.

Jacobs, N., 2004: The Role of the Gulf Stream on Extratropical Cyclogenesis, Ph.D. Dissertation, Department of Marine, Earth, and Atmospheric Science, North Carolina State University, Raleigh, NC. 307pp.

Jacobs, N. A., S. Raman, G. M. Lackmann, and P. P. Childs, Jr, 2004: Role of the Gulf Stream on extratropical cyclogenesis, AMS Annual Meeting, 20th Conf. WAF/NWP pp. 318-322.

Raman, S., **N. Jacobs**, and M. Simpson, 2003: Numerical simulation of land-air-sea interactions during the northeasterly monsoon over Indian Ocean. INDOEX conf. Bangalore, India.

Jacobs, N. A., 2001: Latent and sensible heat fluxes over the Gulf Stream region during OMP. AGU, Boston, MA. Preprint pp 412-417.

Jacobs, N., 2000: Physical Oceanographic Processes and Air-Sea Interactions of extratropical cyclogenesis during the Oceans Margins Program, Thesis, Department of Marine, Earth, and Atmospheric Science, North Carolina State University, Raleigh, NC. 178pp.

Jacobs, N., C. Petrusak, V. Connors, D. DeMaster, T. Hopkins, 1998: Earth System Science: Integration of Computer Modeling and Laboratory Studies. 25 conf GSA/ESSE, pp. 127-131.

Jacobs, N., V. Connors, T. Hopkins, D. DeMaster, B. Sweet, 1998: The Evolution of Earth System Science at North Carolina State University. 25 conf GSA/ESSE, pp. 417-421.

Jacobs, N., 1997: Modeling e-folding time decay of super-cooled semiconductor clocks, Thesis, Department of Physics, University of South Carolina, Columbia, SC. 234pp.

18. List digital platforms (including social media and other digital content sites) on which you currently or have formerly operated an account, regardless of whether or not the account was held in your name or an alias. Include the name of an “alias” or “handle” you have used on each of the named platforms. Indicate whether the account is active, deleted, or dormant. Include a link to each account if possible.

I do not have any social media presence; I’m not even on LinkedIn. I have a general aversion to sharing personal information on social media. I do have a Zwift account. It’s an online application that is bluetoothed to my indoor cycling trainer, which allows me to race other people online. The account is active, and my handle is N. Jacobs. zwift.com

19. Please identify each instance in which you have testified orally or in writing before Congress in a governmental or non-governmental capacity and specify the date and subject matter of each testimony.

Hearing: A Task of EPIC Proportions: Reclaiming U.S. Leadership in Weather Modeling and Prediction (20 November 2019). House of Representatives, Committee on Science, Space, and Technology, Subcommittee on Environment: numerical weather prediction, community weather modeling

Hearing: The Future of Forecasting: Building a Stronger U.S. Weather Enterprise (16 May 2019). House of Representatives, Committee on Science, Space, and Technology, Subcommittee on the Environment: U.S. weather modeling, and effective collaboration among the weather enterprise

Hearing: A Review of the NOAA Fiscal Year 2020 Budget Request (30 April 2019). House of Representatives, Committee on Science, Space, and Technology, Subcommittee on the Environment: NOAA FY 2020 Budget Request

Hearing: Review of the FY2020 Budget Request for the U.S. Department of Commerce (2 April 2019). United States Senate, Committee on Appropriations, Subcommittee on Commerce, Justice, Science and Related Agencies: FY 2020 Budget Request for the Department of Commerce

Hearing: The National Oceanic and Atmospheric Administration’s Budget Request for Fiscal Year 2020 (27 March 2019). House of Representatives, Committee on Appropriations, Subcommittee on Commerce, Justice, Science, and Related Agencies: NOAA FY 2020 Budget Request

Hearing: Leading the Way: Examining Advances in Environmental Technology (21 June 2017). House of Representatives, Committee on Science, Space, and Technology, Subcommittee on Environment: Tropospheric airborne meteorological data reporting, conventional weather observations, and their impact in numerical models.

Hearing: Private Sector Weather Forecasting: Assessing Products and Technologies (8 June 2016). House of Representatives. Committee on Science, Space, and Technology. Subcommittee on Environment: The advancing capabilities of numerical weather prediction in the weather enterprise. Public-private-academic partnerships, which for sustainable business models.

20. Given the current mission, major programs, and major operational objectives of the department/agency to which you have been nominated, what in your background or employment

experience do you believe affirmatively qualifies you for appointment to the position for which you have been nominated, and why do you wish to serve in that position?

I have gained significant experience and understanding of NOAA's operations over the last three years as Assistant Secretary of Commerce for Environmental Observation and Prediction. As far as managing a large organization like NOAA, I've been performing the duties of Under Secretary of Commerce of Oceans and Atmospheres for the past year, including multiple budget cycles and spend plans. Because of the unique situation of being nominated for the position I have already been performing, I have a very detailed understanding of what is involved in managing NOAA.

At Panasonic, I lead a group of private-sector scientists and software engineers that developed a global weather model that has skill on par/and better than the European Centre for Medium-Range Weather Forecasts (ECMWF) that produces the "Euro" model. This was accomplished on a meager budget that industry analysts claimed was impossible to even get the program off the ground. Our U.S.-based team at Panasonic Weather Solutions (PWS), mostly in North Carolina, proved the critics wrong. I have extensive experience with public-private-academic partnerships for weather model and observing system development. As a founding member of the PWS predecessor company AirDat, I directed the private side of the National Weather Service's very first atmospheric observational data acquisition as a subscription service. This is a great example of a successful public-private partnership that is still in existence today. I have past experience in satellite data and imagery from GOES to Radio Occultation (GPSRO), and understand the advantages of commercial weather data to augment our current data. This includes processing, quality control, and assimilating into forecast models. Having worked alongside NOAA and NWS employees and scientists as a scientific collaborator, I have earned their trust and respect. Additionally, I have great working relationships with key World Meteorological Organization member countries and their respective National Meteorological Service Directors. I previously served as the Chair of the Forecast Improvement Group (FIG) for the American Meteorological Society. FIG members are NOAA, university, and private sector atmospheric scientists and meteorologists, who share the common interest of improving weather forecasting, modeling and prediction for the United States.

In late 2017, President Trump nominated me to the position of Assistance Secretary for Environmental Observation and Prediction. In February 2018, I was confirmed by the Senate with bipartisan support under Unanimous Consent. Over the last two years at NOAA, I have led the agency's effort to support the scientific community through focused improvements to its external engagement strategy. This culminated in the Earth Prediction Innovation Center, which will bring together the scientific expertise from federal partners, world-class researchers, and the private sector. I also understand that to be successful, NOAA must embrace new partnerships. In 2019, NOAA entered into new contracts under its Big Data Project, allowing the public greater access to NOAA data, which in turn will support our mission to protect life and property. My experience as Assistant Secretary has given me the tools to be successful as the NOAA Administrator, and I look forward to continuing to support our hard-working scientists and the mission of the agency.

Lastly, I want to serve my country. Growing up, I wanted to follow my father's career by serving in the US Air Force as a fighter pilot, but a medical condition prevented me from flying jets. When this opportunity presented itself, I thought that working for NOAA is another way to serve my country. The best way I can do that is by using my skills and expertise to return NOAA's National Weather Service to the world's most advanced weather forecasting and modeling agency.

21. What do you believe are your responsibilities, if confirmed, to ensure that the department/agency has proper management and accounting controls, and what experience do you have in managing a large organization?

My responsibility, as the NOAA Administrator, will be to work closely with NOAA line offices, and provide leadership to better manage the agency's assets in their service to the American people. As duly confirmed by the Senate, and as political appointees, we have an obligation to comply with the direction and oversight provided by Congress to manage our agency to the best of our abilities and within the letter

of the law. Over the last three years, I've gained significant experience and understanding of NOAA's operations. As far as managing a large organization like NOAA, I've been in the acting role of NOAA Administrator for the past year, including multiple budget cycles and spend plans. Because of the unique situation of being nominated for the position I have already been performing, I have a very detailed understanding of what is involved in managing NOAA.

Panasonic Avionics Corporation, a division of Panasonic North America, provides avionics, engineering services, meteorological data and other technical services to numerous leading air carriers operating in dozens of countries and National Meteorological Service agencies across the world. As their Chief Atmospheric Scientist, the team I managed had business relationships across the world that handled complex transactions and weather-related industry challenges. Being an executive for a large entity requires the proper balancing and management of multiple agendas and budgets, working with many teams with different and sometimes opposing strategies, and always working closely with corporate counsel when their expert guidance would be required. The private sector works towards the bottom line; in government, the bottom line is serving the American people.

22. What do you believe to be the top three challenges facing the department/agency, and why?

1) Weather Forecasting and Modeling -- Return NOAA NWS to the world's leader in global weather forecast modeling capability. The United States led the world in weather forecasting and modeling for decades, but has not kept pace with overseas competition, and is struggling to maintain the status of third most accurate global weather model among National Meteorological Services. As a matter of national pride, we will restore American technical superiority for this vital service for the country and our military serving around the world. As part of this effort, implementing a community-based earth-system modeling program is crucial. This will require adoption of cloud-based computational resources. While this is technically simple, it will require a significant culture shift in the workforce. Over the last two years, I've seen a drastic change in the agency with a growing proactive effort to migrate to the cloud, but change management will always be a challenge.

2) Increase Observational and Predictive Resource Capabilities -- For example, in Hurricane Harvey, NWS did a great job, but data gaps still exist. One area for improvement is to increase our knowledge to better manage QPE, which stands for Quantitative Precipitation Estimation. It is a method of approximating the amount of precipitation that has fallen at a location or across a region, and is critical for everything ranging from water resource management to flash flood prediction. QPE maps are compiled using several different data sources including radar estimates, manual and automatic field observations, and satellite data. Scientists at NWS-NCEP and OAR would agree that this process must be improved. We also need to examine where costs savings might be realized within existing budgets, and to discuss with Congress tradeoffs that can improve operational efficiencies thereby enabling NOAA to better serve the American people.

3) Reduce Seafood Supply Deficit - The U.S. has an estimated \$15 billion trade imbalance in seafood, much of it due to the importation of aquaculture seafood and lack of domestic aquaculture production. The U.S. imported roughly \$21 billion in seafood— nearly half of which is produced via aquaculture and 30 percent is shrimp (farmed and wild-caught). To achieve changes to the deficit, NOAA should consider increasing wild-caught production, increasing aquaculture, and reducing imports from nations with weak environmental protections.

4) Asset management - NOAA maintains hundreds of facilities across the nation, operates some of the largest observing networks in the world, and flies some of the most cutting-edge satellites in space. Over time, these assets will need to be replenished and recapitalized to continue providing Americans with the level of service they have come to rely on. These assets will continue to require careful planning, management, and oversight to ensure NOAA continues to meet its mission.

B. POTENTIAL CONFLICTS OF INTEREST

1. Describe all financial arrangements, deferred compensation agreements, and other continuing dealings with business associates, clients, or customers. Please include information related to retirement accounts.

I have no financial arrangements, deferred compensation agreements, or other continuing dealings with business associates, clients, or customers. I do have an IRA and 401k.

2. Do you have any commitments or agreements, formal or informal, to maintain employment, affiliation, or practice with any business, association or other organization during your appointment? If so, please explain.

No.

3. Indicate any investments, obligations, liabilities, or other relationships which could involve potential conflicts of interest in the position to which you have been nominated. Explain how you will resolve each potential conflict of interest.

In connection with the nomination process, I have consulted with the Office of Government Ethics and Department of Commerce agency ethics officials to identify any potential conflicts of interest. Any potential conflicts of interest will be resolved in accordance with the terms of my ethics agreement. I understand that my ethics agreement has been provided to the Committee. I am not aware of any potential conflict of interest other than those that are the subject of my ethics agreement.

4. Describe any business relationship, dealing, or financial transaction which you have had during the last ten years, whether for yourself, on behalf of a client, or acting as an agent, that could in any way constitute or result in a possible conflict of interest in the position to which you have been nominated. Explain how you will resolve each potential conflict of interest.

None.

5. Identify any other potential conflicts of interest, and explain how you will resolve each potential conflict of interest.

Any potential conflicts of interest will be resolved in accordance with the terms of my ethics agreement. I understand that my ethics agreement has been provided to the Committee.

6. Describe any activity during the past ten years, including the names of clients represented, in which you have been engaged for the purpose of directly or indirectly influencing the passage, defeat, or modification of any legislation or affecting the administration and execution of law or public policy.

Six years ago, Panasonic Avionics Corporation contracted with a DC-based lobbyist to represent their interest in the successful passage of HR 2413, 1561 and finally 353, The Weather Research and Forecast Innovation Act of 2017. Congress passed HR 353 and President Trump signed the bill in April creating Public Law 115-25.

C. LEGAL MATTERS

1. Have you ever been disciplined or cited for a breach of ethics, professional misconduct, or retaliation by, or been the subject of a complaint to, any court, administrative agency, the Office of Special Counsel, professional association, disciplinary committee, or other professional group? If yes:
 - a. Provide the name of agency, association, committee, or group;
 - b. Provide the date the citation, disciplinary action, complaint, or personnel action was issued or initiated;
 - c. Describe the citation, disciplinary action, complaint, or personnel action;
 - d. Provide the results of the citation, disciplinary action, complaint, or personnel action.

No.

2. Have you ever been investigated, arrested, charged, or held by any Federal, State, or other law enforcement authority of any Federal, State, county, or municipal entity, other than for a minor traffic offense? If so, please explain.

No.

3. Have you or any business or nonprofit of which you are or were an officer ever been involved as a party in an administrative agency proceeding, criminal proceeding, or civil litigation? If so, please explain.

No.

4. Have you ever been convicted (including pleas of guilty or *nolo contendere*) of any criminal violation other than a minor traffic offense? If so, please explain.

No.

5. Have you ever been accused, formally or informally, of sexual harassment or discrimination on the basis of sex, race, religion, or any other basis? If so, please explain.

No.

6. Please advise the Committee of any additional information, favorable or unfavorable, which you feel should be disclosed in connection with your nomination.

None.

D. RELATIONSHIP WITH COMMITTEE

1. Will you ensure that your department/agency complies with deadlines for information set by congressional committees, and that your department/agency endeavors to timely comply with requests for information from individual Members of Congress, including requests from members in the minority?

Yes.

2. Will you ensure that your department/agency does whatever it can to protect congressional witnesses and whistle blowers from reprisal for their testimony and disclosures?

Yes.

3. Will you cooperate in providing the Committee with requested witnesses, including technical experts and career employees, with firsthand knowledge of matters of interest to the Committee?

Yes.

4. Are you willing to appear and testify before any duly constituted committee of the Congress on such occasions as you may be reasonably requested to do so?

Yes.



(Nominee is to include this signed affidavit along with answers to the above questions.)

F. AFFIDAVIT

Neil Jacobs being duly sworn, hereby states that he/she has read and signed the foregoing Statement on Biographical and Financial Information and that the information provided therein is, to the best of his/her knowledge, current, accurate, and complete.

Signature of Nominee

Subscribed and sworn before me this 22nd day of January, 2020.

Notary Public



NEIL ANDREW JACOBS JR.
CURRICULUM VITAE

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
1401 Constitution Ave. NW
Washington, DC 20230



AREAS OF EXPERTISE:

Mesoscale and microscale dynamics, numerical weather prediction, variational and ensemble-based data assimilation methods, atmospheric transport, and mesoscale modeling. Mid-latitude convective systems, fronts, and small-scale convection-induced flows such as the sea breeze and urban heat island circulations. Surface flux relations and boundary layer dynamics as a function of enhanced thermal gradient grid resolution. Regional climate fluctuations as a result of western boundary current variability. Forecasting of tropical and extratropical long period ocean swell generation. Satellite, aircraft and UAS-based observing systems, weather-related flight route optimization, avionics, and aviation forecasting. Environmental economic policy, public-private partnerships, and business innovation and strategy.

EDUCATION:

Ph.D. in Atmospheric Science (Numerical Weather Prediction), May 2005, North Carolina State University
Thesis: The Role of Marine Thermal Gradient Structure on Gulf Stream-Related Extratropical Cyclogenesis. (Thesis Advisors: **Dr. Sethu Raman** and **Dr. Gary M. Lackmann**; Committee Members: Dr. Ping-Tung Shaw, Kermit K. Keeter, and Dr. Kiran Alapaty).
M.S. in Air-Sea Interaction, May 2000, North Carolina State University
Thesis: Physical Oceanographic Processes and Air-Sea Interactions Associated with Extratropical Cyclogenesis During the Ocean Margins Program. (Thesis Advisor: **Dr. Leonard J. Pietrafesa**; Committee: Dr. Lian Xie, Dr. Sethu Raman, and Dr. John M. Morrison).
B.S. in Physics, May 1996, University of South Carolina*
B.S. in Mathematics, May 1996, University of South Carolina
Minor in Economics, Cognate in Computer Science, Cognate in Marine Science
Graduated magna cum laude

EMPLOYMENT:

2018-present, Assistant Secretary of Commerce for Environmental Observation and Prediction performing the duties of Under Secretary of Commerce for Oceans and Atmosphere, NOAA (11,400 FTEs).
2013-18, Chief Atmospheric Scientist, Panasonic Avionics Corporation (5000 employees). Oversee the development and deployment of weather-related data and products. Oversee the development of global forecast products and advanced high-resolution data assimilation to enable better decision-making by industry, commercial aviation, and international and domestic governmental agencies.
2004-13, Director of Research and Business Development, AirDat, LLC (80 employees). Analysis of the impact of TAMDAR data on numerical models such as GFS, WRF, RUC, and RT-FDDA. Development of methods to optimize real-time 4D-Var data assimilation. Oversee the development of new TAMDAR-based products and high-resolution forecasts.
1998, Co-Developer, Computer modules for NASA's Earth System Science Program (ESSE), NASA Goddard.
1997, Programmer and GOES Satellite imagery processor, Langley, VA.
1995-97, Baikal Research Group, modeling the physical properties of Lake Baikal, Russia.
1995-97, Physical Limnology of Winyah Bay: Analysis and modeling of waves, salinity, temperature, and current. U. of South Carolina.
1993-97, Programmer, Oak Ridge National Lab, Nuclear Physics Branch, TN. Joint with College of Charleston and U. of South Carolina.

RESEARCH EXPERIENCE:

2005-2018, (Panasonic/AirDat/NCAR/NASA/NOAA-GSD, UKMO): Global model development (FV3-GFS). Analysis of the impact of TAMDAR data on numerical models such as WRF, RAP, RT-FDDA, GFS, UK Met Unified, ECMWF. Development of methods to optimize 4D-Var and EnKF assimilation. Development and testing of advanced flight optimization algorithms for safety and fuel efficiency.
2000-06, (State Climate Office (SCO) of North Carolina/NWS-RDU): Research involved atmospheric modeling (WRF) of surface temperature grid resolution to account for frontogenesis and sensible heat fluxes into the atmosphere over the southeast US and coastal waters.
1997-2003, Research Scientist, SCONC, Physical oceanography, mesoscale air-sea interaction and near-shore modeling (MM5/WRF).

COMPUTER SKILLS:

Programming Languages: Fortran, C, C++, C#, Perl, R, Python, Java, ksh, and IDL.
Computing Environments: HPC, Linux, UNIX, IBM-AIX, Mac, MPI, Slurm, Windows, Open/FreeBSD, Darwin.
Software / Models including: GFS, GSI, MPAS, FV3, WRFDA, WW3, POM, HYCOM, GrADS, NCL, IDV, ArcGIS, MATLAB, ecFlow.

COURSES TAUGHT:

2007-09, (NCSU): Atmospheric Thermodynamics (MEA 312)
2005-07, (Meredith): Meteorology (GEO 942)
2002-04, (Meredith): Earth Science and Lab (GEO 200, 240L)
2003-04, (Meredith): Introduction to GIS (GEO 943)
2000-01, (NCSU): Meteorology I, II (MEA 213, 214)
1998-99, (NCSU): Oceanography and Lab (MEA 200, 210L)
1997-99, (NCSU): Earth System Science (MEA 100)
1993-97, (USC): Calculus and non-calculus-based physics (PHYS 101, 102, 211, 212)
1993-97, (USC): Calculus and non-calculus-based physics labs (PHYS 101L-212L)

PROFESSIONAL ORGANIZATIONS:

American Geophysical Union
American Meteorological Society
Gamma Beta Phi, National Honor Society
Geological Society of America
National Forensics League
Phi Beta Kappa, Honor Society
Pi Mu Epsilon, National Math Honor Society
Sigma Pi Sigma, National Physics Honor Society (President: 1993-1996, USC Chapter)
Sigma Xi

COMMITTEES:

American Meteorological Society (AMS) Forecast Improvement Group (Chair 2015-2018; Lead, Modeling 2012-14)
Federal Aviation Administration (FAA) Continuous Lower Emissions, Energy, and Noise (CLEEN)
World Meteorological Organization (WMO) Expert Team on Aircraft-Based Observing Systems (ET-ABO)

INVITED CENTER LECTURES (prior to NOAA):

NCEP, Camp Springs, MD (hosts: Drs. Vijay Tallapragada and Bill Lapenta), *PWS global ensemble system*, 21 July 2016
UK Met Office, Exeter, UK (host: Dr. Dale Barker), *PWS global model and data assimilation*, 13 July 2016
ECMWF, Reading, UK (host: Dr. Anna Ghelli), *Assimilation of ABOs into a global modeling system*, 12 July 2016
UK Met Office, Exeter, UK (host: Dr. Dale Barker), *Estimation of TAMDAR Error and Assimilation Experiments*, 27 Apr 2012
ECMWF, Reading, UK (host: Dr. Erik Andersson), *Utility of TAMDAR aircraft observations for NWP*, 26 Apr 2012
NCEP EMC, Camp Springs, MD (host: Dr. Stephen Lord), *Optimization of TAMDAR for NWP*, 23 Aug 2011
SMN, Mexico City, Mexico (host: Dr. Felipe Adrian Vazquez), *Operational forecasting with TAMDAR*, 23 Jun 2011
ECMWF, Reading, UK (hosts: Drs. Erland Källén and Erik Andersson), *Unique aspects of aircraft data assimilation*, 10 Nov 2010

CONGRESSIONAL TESTIMONY:

Hearing: A Task of EPIC Proportions: Reclaiming U.S. Leadership in Weather Modeling and Prediction (20 November 2019)
House of Representatives, Committee on Science, Space, and Technology, Subcommittee on Environment

Hearing: The Future of Forecasting: Building a Stronger U.S. Weather Enterprise (16 May 2019)
House of Representatives, Committee on Science, Space, and Technology, Subcommittee on the Environment

Hearing: A Review of the NOAA Fiscal Year 2020 Budget Request (30 April 2019)
House of Representatives, Committee on Science, Space, and Technology, Subcommittee on the Environment

Hearing: Review of the FY2020 Budget Request for the U.S. Department of Commerce (2 April 2019)
United States Senate, Committee on Appropriations, Subcommittee on Commerce, Justice, Science and Related Agencies

Hearing: The National Oceanic and Atmospheric Administration's Budget Request for Fiscal Year 2020 (27 March 2019)
House of Representatives, Committee on Appropriations, Subcommittee on Commerce, Justice, Science, and Related Agencies

Hearing: Understanding the Changing Climate System and the Role of Climate Research (26 February 2019)
House of Representatives, Committee on Appropriations, Subcommittee on Commerce, Justice, Science, and Related Agencies

Hearing: Surveying the Space Weather Landscape (26 April 2018)
House of Representatives, Committee on Science, Space, and Technology, Subcommittee on Space

Hearing: Leading the Way: Examining Advances in Environmental Technology (21 June 2017)
House of Representatives, Committee on Science, Space, and Technology, Subcommittee on Environment

Hearing: Private Sector Weather Forecasting: Assessing Products and Technologies (8 June 2016)
House of Representatives, Committee on Science, Space, and Technology, Subcommittee on Environment

Many additional statements co-prepared and reviewed for Hearing witnesses

SELECT PUBLICATIONS:

Gao, F., Z. Liu, J. Ma, **N. Jacobs**, P. Childs, H. Wang, 2019: Variational Bias Correction of TAMDAR Temperature Observations in WRF Data Assimilation System, *Mon. Wea. Rev.*, **147**, 1927-1945.

Gao, F., X.-Y. Huang, **N. Jacobs**, H. Wang, 2018: Assimilation of Wind Speed and Direction Observations: Results from real observation experiments. *Tellus A*, **67**,1.

Zhang, X., H. Wang, X.-Y. Huang, F. Gao, and **N. Jacobs**, 2015: Using Adjoint-Based Forecast Sensitivity Method to Evaluate TAMDAR Data Impacts on Regional Forecasts, *Advances in Meteorology*, Vol. 2015, Article ID 427616, 13 pg, 2015.

Gao, F., P. P. Childs, X.-Y. Huang, **N. A. Jacobs**, and J. Z. Min, 2014: A Relocation-based Initialization Scheme to Improve Track-forecasting of Tropical Cyclones. *Adv. Atmos. Sci.*, **31**(1), 27-36.

Jacobs, N., D. Mulally, A. Anderson, J. Braid, P. Childs, A. Huffman, E. Wilson, and F. Gao, 2015: Recent Advancements in the TAMDAR Sensor Network Expansion, (IOAS-AOLS), AMS, Phoenix, AZ.

Jacobs, N., F. Gao, P. Childs, X. Y. Huang, and H. Wang, 2015: Optimization of In-situ Aircraft Observations for Various Assimilation Techniques, (IOAS-AOLS), AMS, Phoenix, AZ.

Liu, Y., M. Xu, L. Pan, Y. Liu, **N. Jacobs**, and P. Childs, 2015: Implementation of a CONUS RTFDDA system with radar data assimilation for convection-resolvable analysis and prediction, (IOAS-AOLS), AMS, Phoenix, AZ.

Jacobs, N. A., D. J. Mulally, and A. K. Anderson, 2014: Correction of Flux Valve–Based Heading for Improvement of Aircraft Wind Observations. *J. Atmos. Oceanic Technol.*, **31**, 1733–1747.

Jacobs, N. A., and J. E. Rex, 2013: Benefits and Utility of Tropospheric Airborne Meteorological Data Reporting, *Air Traffic Control Quarterly*, January, First Quarter, 2013.

Huang, X.-Y., F. Gao, **N. A. Jacobs**, and H. Wang, 2013: Assimilation of wind speed and direction observations: a new formulation and results from idealized experiments. *Tellus A*, **65**, 19936.

Wyszogrodzki, A. A., Y. Liu, **N. A. Jacobs**, P. Childs, Y. Zhang, G. Roux, and T. T. Warner, 2013: Analysis of the surface temperature and wind forecast bias of the NCAR-AirDat operational CONUS 4km RTFDDA forecasting system, *Meteorol. Atmos. Phys.*, **121**, 3-4.

Jacobs, N. A., P. Childs, M. Croke, A. Huffman, J. Nelson, J. T. Braid, Y. L. Liu, and X. Y. Huang, 2013: An update on the TAMDAR global network expansion, Special Symposium on Advancing Weather and Climate Forecasts: Innovative Techniques and Applications, Austin, TX.

Nelson, J., J. T. Braid, A. K. Anderson, **N. A. Jacobs**, P. Childs, M. Croke, and A. Huffman, 2013: Alaska TAMDAR and the RTFDDA WRF QC System, ARAM, AMS, Austin, TX.

Huffman, A., P. Childs, M. Croke, **N. A. Jacobs**, and Y. L. Liu, 2013: Verification of the NCAR-AirDat operational RT-FDDA-WRF for the 2011 and 2012 spring convective seasons, IOAS, AMS, Austin, TX.

Gao, F., **N. A. Jacobs**, X. Y. Huang, and P. Childs, 2013: Direct assimilation of wind speed and direction for the WRF model, Special Symposium on Advancing Weather and Climate Forecasts: Innovative Techniques and Applications, AMS, Austin, TX.

Richardson, H., **N. A. Jacobs**, P. Childs, P. Marinello, and X. Y. Huang, 2013: UAS observations and their impact on NWP during TUFT, ARAM, AMS, Austin, TX.

Gao, F., P. Childs, X. Y. Huang, and **N. A. Jacobs**, 2013: A new method for vortex relocation within balanced flow field, NWP, Austin, TX.

Gao, F., X. Zhang, **N. Jacobs**, X.-Y. Huang, Xin Zhang, P. Childs, 2012. Estimation of TAMDAR Observational Error and Assimilation Experiments. *Wea. Forecasting*, **27**, 4, 856-877.

Gao, F., X.-Y. Huang, **N. Jacobs**, 2012: The Assimilation of Wind Speed and Direction Based on WRFDA 3D-Var System, New Orleans, LA.

Zhang, Xiaoyan, X.-Y. Huang, T. Auligne, Xin Zhang, F. Gao, **N. Jacobs**, P. Childs. 2012. Evaluation of TAMDAR Data Impact on Forecast Error with WRFDA-FSO System, AMS, New Orleans, LA.

Gao, F., Xiaoyan Zhang, X.-Y. Huang, Xin Zhang, **N. Jacobs**, P. Childs, 2011: Preliminary Results of Directly Assimilating Wind Speed and Direction Based on WRFDA 3D-Var System. 12th WRF Users' Workshop, Boulder, Colorado, 20-24 June 2011.

Zhang, Y. Y. Liu, **N. A. Jacobs**, P. Childs, T. Nipen, T. T. Warner, L. D. Monache, G. Roux, A. Wyszogrodzki, W. Y. Y. Cheng, W. Yu, and R.-S. Sheu, 2012: Evaluation of the impact of assimilating the TAMDAR data on WRF-based RTFDDA simulations and the RTFDDA performance on predicting warm-season precipitation over the CONUS, *Wea. Forecasting*, under revision.

Liu, Y., T. Warner, S. Swerdlin, T. Betancourt, J. Knivel, B. Mahoney, J. Pace, D. Rostkier-Edelstein, **N. A. Jacobs**, P. Childs, and K. Parks, 2011: NCAR ensemble RTFDDA: real-time operational forecasting applications and new data assimilation developments. 24th Conference on Weather and Forecasting (WAF-NWP), AMS, Seattle, WA.

Huffman, A., **N. A. Jacobs**, M. Croke, P. Childs, X. Y. Huang, and Y. Liu, 2011: Verification and Sensitivity of the NCAR-AirDat Operational Forecasting Systems to TAMDAR Observations. 15th Symposium (IOAS-AOLS), AMS, Seattle, WA.

Jacobs, N. A., F. Gao, P. Childs, X. Zhang, X. Y. Huang, X. Zhang, M. Croke, and Y. Liu, 2011: Optimization of In-situ Aircraft Observations for Various Assimilation Techniques. 15th Symposium (IOAS-AOLS), AMS, Seattle, WA.

Jacobs, N. A., M. Croke, P. Childs, Y. Liu, X. Y. Huang, and R. DeJong, 2011: The Utility of TAMDAR in the NextGen-Oriented CLEEN Program. Second Aviation, Range and Aerospace Meteorology Special Symposium on Weather-Air Traffic Management Integration (ARAM), AMS, Seattle, WA.

Croke, M., **N. A. Jacobs**, D. J. Mulally, A. K. Anderson, J. T. Braid, P. Childs, A. Huffman, Y. Liu, and X. Y. Huang, 2011: Recent Advancements in the TAMDAR Sensor Network Expansion. 15th Symposium on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans and Land Surface (IOAS-AOLS), AMS, Seattle, WA.

Jacobs, N. A., P. Childs, M. Croke, Y. Liu, and X. Y. Huang, 2010: An Update on the TAMDAR Sensor Network Deployment, (IOAS-AOLS), AMS, Atlanta, GA.

Jacobs, N. A., M. Croke, P. Childs, and Y. Liu, 2010: The Potential Utility of TAMDAR Data in Air Quality Forecasting, (IOAS), Atlanta, GA.

Childs, P., **N. A. Jacobs**, M. Croke, Y. Liu, W. Wu, G. Roux, and M. Ge, 2010: An Introduction to the NCAR-AirDat Operational TAMDAR-Enhanced RTFDDA-WRF, (IOAS-AOLS), AMS, Atlanta, GA.

Croke, M., **N. A. Jacobs**, P. Childs, Y. Liu, Y. Liu, and R. S. Sheu, 2010: Preliminary Verification of the NCAR-AirDat Operational RTFDDA-WRF System, (IOAS-AOLS), AMS, Atlanta, GA.

Croke, M., **N. Jacobs**, P. Childs, and Y. Liu, 2009: The Utility of TAMDAR on Short-Range Forecasts over Alaska, (IOAS), AMS, Phoenix, AZ.

Jacobs, N., P. Childs, M. Croke, Y. Liu, and X. Y. Huang, 2009: The Optimization Between TAMDAR Data Assimilation Methods and Model Configuration in WRF-ARW, (IOAS-AOLS), AMS, Phoenix, AZ.

Childs, P., **N. Jacobs**, M. Croke, Y. Liu, and X. Y. Huang, 2009: TAMDAR- Related Impacts on the AirDat Operational WRF-ARW as a Function of Data Assimilation Techniques, (IOAS-AOLS), AMS, Phoenix, AZ.

Jacobs, N., P. Childs, M. Croke, and Y. Liu, 2008: The Effects of Horizontal Grid Spacing and Vertical Resolution on TAMDAR Data assimilation in Short-Range Mesoscale Forecasts, AMS Annual Meeting, 12th Symposium on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface (IOAS-AOLS).

Childs, P., **N. Jacobs**, M. Croke, and Y. Liu, 2008: TAMDAR-Related Impacts on the AirDat Operational WRF-ARW, AMS Annual Meeting, 12th Symposium on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface (IOAS-AOLS).

Croke, M., **N. Jacobs**, P. Childs, and Y. Liu, 2008: PenAir-Based TAMDAR-Related Impacts on Short-Range Mesoscale Forecasts over Alaska, AMS Annual Meeting, 12th Symposium on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface.

Jacobs, N. A., S. Raman, G. M. Lackmann, and P. P. Childs, Jr, 2007: The influence of the Gulf Stream induced SST gradients on the US East Coast winter storm of 24-25 January 2000. *International Journal of Remote Sensing*, **29**, 6145-6174.

Jacobs, N. A., 2007: Potential benefits of tropospheric airborne meteorological data reporting (TAMDAR). *Managing the Skies*, **5**, 3, 20-23.

Liu, Y., T. Warner, S. Swerdlin, W. Yu, **N. Jacobs**, and M. Anderson, 2007: Assimilation data from diverse sources for mesoscale NWP: TAMDAR-data impact. *Geophysical Research Abstracts*, **9**, EGU2007-A-03109.

Jacobs, N. A., Y. Liu, and C.-M. Druse, 2007: The effects of vertical resolution on the optimization of TAMDAR data in short-range mesoscale forecasts, AMS Annual Meeting, 11th Symposium on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface (IOAS-AOLS) 9.3.

Druse, C.-M., and **N. A. Jacobs**, 2007: Evaluating the benefits of TAMDAR data in aviation forecasting, AMS Annual Meeting, 11th Symposium on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface (IOAS-AOLS) 9.5.

Liu, Y., **N. A. Jacobs**, W. Yu, T. T. Warner, S. P. Swerdlin, and M. Anderson, 2007: An OSSE study of TAMDAR data impact on mesoscale data assimilation and prediction, AMS Annual Meeting, 11th Symposium on (IOAS-AOLS) 5.20.

Jacobs, N. A., 2006: The effects of lower-tropospheric data resolution on short-range mesoscale model forecasts of surface temperatures during the summer season, Doc. and Tech. Note AirDat, LLC, 53 pp.

Jacobs, N. A., and Y. Liu, 2006: A comprehensive quantitative precipitation forecast statistical verification study, Doc. and Tech. AirDat 25 pp.

Jacobs, N. A., Y. Liu, and C.-M. Druse, 2006: Evaluation of temporal and spatial distribution of TAMDAR data in short-range mesoscale forecasts, AMS Annual Meeting, 10th Symp. IOAS-AOLS.

Jacobs, N. A., S. Raman, and G. M. Lackmann, 2006: Sensitivity of East Coast winter storms to sea surface temperature gradients, AMS Annual Meeting, 14th Conf. Sea-Atmos.

Jacobs, N. A., G. M. Lackmann and S. Raman 2005: The combined effects of Gulf Stream–induced baroclinicity and upper-level vorticity on U.S. East Coast extratropical cyclogenesis. *Mon. Wea. Rev.*, **133**, 2494–2501.

Jacobs, N. A., 2004: Porting MM5 to OS X: A guide to mesoscale modeling on a G5, *Mac OSX Hints*, **15**, 97.

Jacobs, N., 2004: The Role of the Gulf Stream on Extratropical Cyclogenesis, Ph.D. Dissertation, Department of Marine, Earth, and Atmospheric Science, North Carolina State University, Raleigh, NC. 307pp.

Jacobs, N. A., S. Raman, G. M. Lackmann, and P. P. Childs, Jr, 2004: Role of the Gulf Stream on extratropical cyclogenesis, AMS Annual Meeting, 20th Conf. WAF/NWP pp. 318-322.

Raman, S., **N. Jacobs**, and M. Simpson, 2003: Numerical simulation of land-air-sea interactions during the northeasterly monsoon over Indian Ocean. INDOEX conf. Bangalore, India.

Jacobs, N. A., 2001: Latent and sensible heat fluxes over the Gulf Stream region during OMP. AGU, Boston, MA. Preprint pp 412-417.

Jacobs, N., 2000: Physical Oceanographic Processes and Air-Sea Interactions of extratropical cyclogenesis during the Oceans Margins Program, Thesis, Department of Marine, Earth, and Atmospheric Science, North Carolina State University, Raleigh, NC. 178pp.

Jacobs, N., C. Petrusak, V. Connors, D. DeMaster, T. Hopkins, 1998: Earth System Science: Integration of Computer Modeling and Laboratory Studies. 25 conf GSA/ESSE, pp. 127-131.

Jacobs, N., V. Connors, T. Hopkins, D. DeMaster, B. Sweet, 1998: The Evolution of Earth System Science at North Carolina State University. 25 conf GSA/ESSE, pp. 417-421.

Jacobs, N., 1997: Modeling e-folding time decay of super-cooled semiconductor clocks, Thesis, Department of Physics, University of South Carolina, Columbia, SC. 234pp.

* Recipient of USC undergraduate debate scholarship (1992-96); 3 National Championships 1996-2017, Collegiate policy (cx) debate programs (coaching, brief-writing, strategy), Baylor, Stanford, Dartmouth, and USC.

Commercial Driver License NC: Class B (GVWR 26,001lbs or more)

REFERENCES available upon request