Boundary Matters
Linking Earth and Sky

From FIFA to emergency management, HYSPLIT helps communities

It's been a busy year so far for the HYSPLIT team. A request came in from the WFO in Seattle, WA asking the HYSPLIT modeling team to create custom HSYPLIT forecasts to help prepare for the FIFA Club World Cup. The resulting automated forecasts provide one-hour average concentrations of hypothetical situations, refreshed every hour. These were posted online for easy access.

In February, HYSPLIT v9 was approved for implementation for the National Weather Service (NWS). This update is expected to be operational later this year. HYSPLIT v9 is purpose-built for the NWS and includes custom features not available on the public versions.

HYSPLIT model forecast of a hypothetical chlorine leak from a rail tanker close to Lumen Field stadium in Seattle, WA.

Clackamas fire fighters respond to hazardous chemical emergency. Credit: Clackamas Fire

The team also released a major update to the downloadable public version with HYSPLIT v5.4.0. It included new features and improvements such as upgraded graphics and diagram capabilities.

Weather Forecasting Offices all over the country have been using HYSPLIT for everything from training exercises to real emergency situations. On May 10th, there was an accident at a manufacturing facility in Oregon involving hydrogen gas, which is extremely flammable and harmful when inhaled.

The Holt Summit Fire Department Assistant Chief was thankful for the HYSPLIT plume model in their training exercise. He said they allowed for better evacuation plans; and it helped State and County Health take physical sample readings in the higher exposure areas.

Upgrading transmitters at 142 USCRN stations

ARL technicians have replaced Geostationary Operational Environmental Satellites (GOES) transmitters at 23 U.S. Climate Reference Network stations in the first half of 2025.

The new model transmitters are upgraded to no longer have to be programmed manually. This allows for easier replacements in the field if a unit fails and decreases the chance for human error during programming. They also make troubleshooting transmission problems much easier.

The old model transmitters are up to 20 years old and require programming prior to deployment at 142 USCRN stations across the country, including Alaska and Hawaii. This made installing replacements problematic if one failed while technicians were onsite in one of the remote locations where the stations are located.

All 142 stations must be upgraded before the deadline of May 31, 2026 to be in compliance with certification requirements. ARL expects to have this task completed before the deadline.

Spotlight on Winston Luke

Dr. Winston Luke was recognized on March 12th for his lifetime career achievements in advancing the scientific understanding of the behavior, transport and dispersion of mercury in the environment, which is critical to the health and lives of U.S. citizens. The Silver Sherman Award recognizes NOAA employees who perform work above their normal requirements to help fulfill NOAA's mission, achieve a milestone that contributes significantly or critically toward a particular program goal, or demonstrate leadership toward process improvement of a significant magnitude. Read more
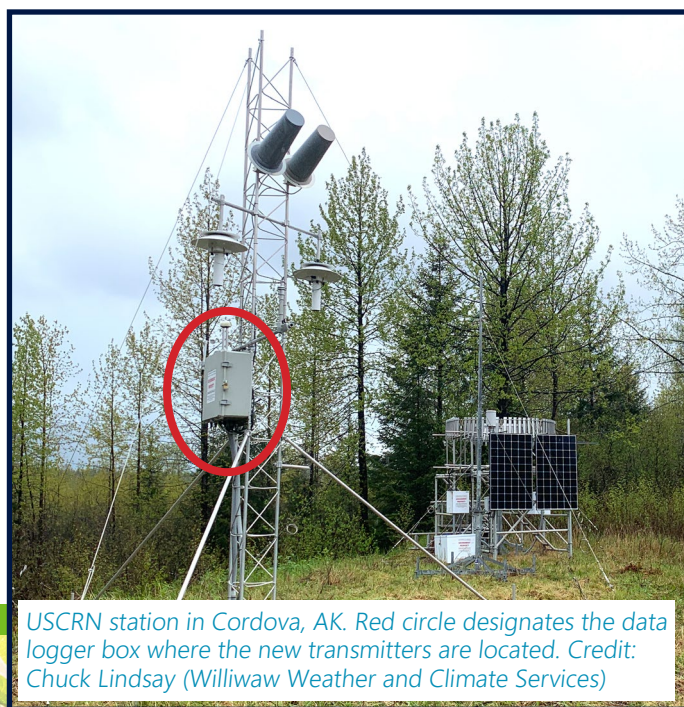
USCRN station in Cordova, AK. Red circle designates the data logger box where the new transmitters are located. Credit: Chuck Lindsay (Williwaw Weather and Climate Services)

Top left image: new and old GOES transmitters. Credit: Brent French (NOAA/ORAU)
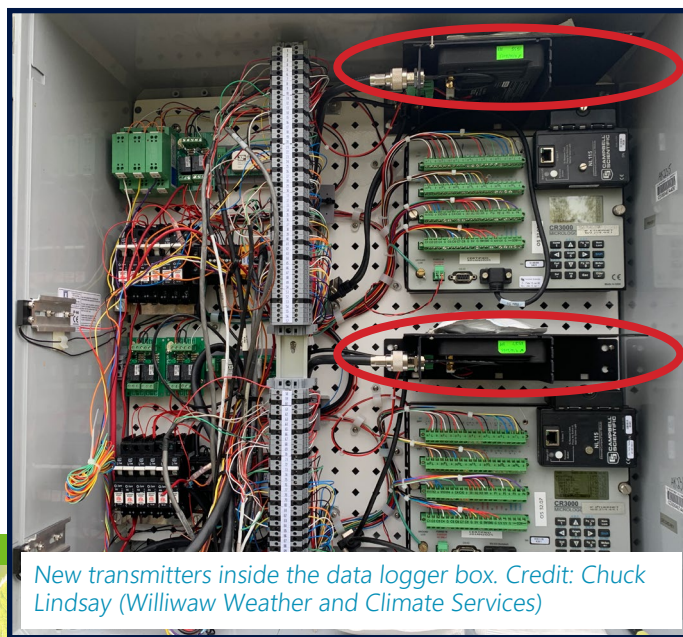
New transmitters inside the data logger box. Credit: Chuck Lindsay (Williwaw Weather and Climate Services)

Designing and building mobile towers for fire weather applications

For part of NOAA's fire weather work, ARL collaborated with NOAA's Physical Sciences Laboratory, Global Monitoring Laboratory, and Global Sciences Laboratory to design and build two mobile, rapid-deploy 33 foot towers. These towers host a suite of instruments to make measurements on location and can be transported and quickly set up in conditions conducive to wildfire.

ARL's mobile tower design team at the Atmospheric Turbulence and Diffusion Division included Mark Heuer, Mike Rutherford, Evan Bentley, Zack Henderson, Dave Senn, Dominick Christensen and Randy White. Together solved the problems of designing towers that could be: broken down to fit in trailers; are light enough for one or two people to carry the pieces; be assembled within two hours by two experienced field techs; carry 40 lbs of equipment at the top; and not move at all in wind conditions up to 80 mph. Look for more information about this work in the next few weeks.

ATDD Director John Kochendorfer (left side in photo on left) and Physical Scientist Temple Lee (right side in left photo) test out set up of the rapid-deploy tower using instructions developed for easy set up by any experienced field scientist. Credit: Erica Massengill (NOAA/ORAU)

Meet our 2025 Summer Interns:

ARL is excited to once again interns for the 2025 summer. This year's cohort are mentored by Dr. Praveena Krishnan at ATDD in Oak Ridge, TN; and Dr. Tianfeng Chai, Dr. Xinrong Ren and Phillip Stratton at the Atmospheric Modeling and Sciences Division in College Park, MD.

(L to R) Sasha Renton and Ilan Stein aboard the NOAA twin otter. Credit: Xinrong Ren (NOAA)

Quinn Adamy

Fun Fact: "I'm a huge Lord of the Rings fan! I've read all the books and have watched the extended editions more times than I can count."

Quinn is a graduate student who will finish her degree at the end of this year with a BA and MA in Remote Sensing and Geospatial Sciences at Boston University. She is hoping to pursue a career in remote sensing at NOAA or NASA. Quinn is most interested in working on satellite missions that help monitor Earth's systems and inform how we respond to environmental changes.

ARL scientist Praveena Krishnan has taken the role of mentoring Quinn while she works with Landsat land surface temperature and the UrbanNet project to study urban heat in Washington D.C. She is creating heatmaps and datasets that give a bigger picture of the urban heat island in D.C. Her work is also helping her grow as a communicator and collaborator which are key skills for any future mission team member.

pollution, she's now focused on air pollution. Ultimately, she wants to combine research, policy work and community education to support governments and local organizations in finding solutions that make a lasting difference.

This internship showed her that combining different expertise leads to better problem solving and a broader perspective. Suzan learned new ways to apply modeling techniques and gave her a better understanding of atmospheric dynamics. It also gave her valuable experience in being patient and adaptable with technical issues.

Suzan joined ARL through NOAA Experiential Research and Training Opportunities (NERTO), we had the pleasure of working with her from April to the end of June.

Fun Fact: "A doctor once told me I have the sensitivity of a mosquito. I'm a walking weather and pollution detector! No fancy gadgets are needed, my body's got it covered. Temperature rises or drops? I start sweating or sneezing. Pollution spikes? My skin reacts before the air quality index even updates. Air pressure shifts? Headaches hit like a weather alert."

Jaden Lau

Jaden is a rising senior at Cornell, double majoring in Atmospheric Sciences and Environment and Sustainability. He would like to pursue a career at NOAA in atmospheric sciences, specifically operational weather forecasting in field campaigns or research in land-atmosphere interactions or precipitation. Jaden is fascinated by the weather and its complexity and is passionate about problem solving and improving the lives of others.

Suzan Aranda

Suzan is finishing her Ph.D. in Environmental Science and Engineering from the University of Texas at El Paso. She believes the environment is deeply connected to our health, communities and future. After studying soil and water

Ilan Stein

Fun Fact:
"As a boy scout, I camped over 130 nights."

Ilan is a Mechanical Engineering major, who will be starting his junior year at the University of Maryland this fall. He is interested in a career in hands-on engineering environments,

This summer, he is deploying instruments and collecting trace gas and analyzing data in support of the AiRMAPS field campaign. This will give him the opportunity to apply his classroom learning and experience the work involved in field campaigns. Jaden is excited for the chance to build skills in analyzing and processing data in support of a research goal.
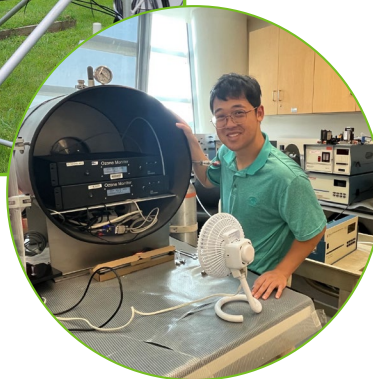
Fun Fact: "I speak four languages. English, Spanish, Portuguese and French."

such as control systems or instrumentation. Both his parents studied STEM fields, which sparked his interest in engineering.

This summer he is primarily calibrating meteorological instruments for the AiRMAPS field campaign and processing and displaying the resulting data in figures and plots. Ilan expects this internship to be extremely helpful in developing his skills with scientific instruments and data analysis with MATLAB.

Sasha Renton

Fun Fact: "I love heavy metal music and play a seven-string electric guitar."

A rising senior at Colorado College, Sasha is majoring in environmental chemistry with a minor in music. She is working on the NOAA Twin Otter to collect emission data during the AiRMAPS campaign and looking into previous years' data related to ozone and its precursors in the Baltimore-Washington area.

Sasha is excited to work in the field and be a part of data acquisition and processing. She is looking forward to gaining experience in data processing and enjoying learning new programs like MatLab.

Quinn Adamy at an ATDD test site in Oak Ridge, TN. Credit: Praveen Krishnan (NOAA)

*Jaden Lau in ARL's ASMD lab in College Park, MD. Credit: Xinrong Ren (NOAA)*

ATDD building gets long overdue repairs

ARL's Atmospheric Turbulence and Dispersion Division (ATDD) is a historic NOAA asset dating back to 1943. Over the years, maintenance has been deferred, various safety issues have cropped up, and then a fire sprinkler line break in 2023 that led to extensive water damage.

ARL Management and Program Analyst Barbara Shifflett has been hard at work ensuring those deferred maintenance, repairs and safety issues were addressed.

In addition to fixing the water damaged parts of the auditorium and offices, ATDD was granted approval for a new fire suppression system, drop ceilings and lights installed in the main building and the wind tunnel. Approval was also given to infill alongside the wind tunnel, which replaces shipping containers for storage. The 25 year old siding was also in dire need of replacing, so the outside of the building got new siding and paint.

Thank you Barbara for ensuring everything was completed so well!
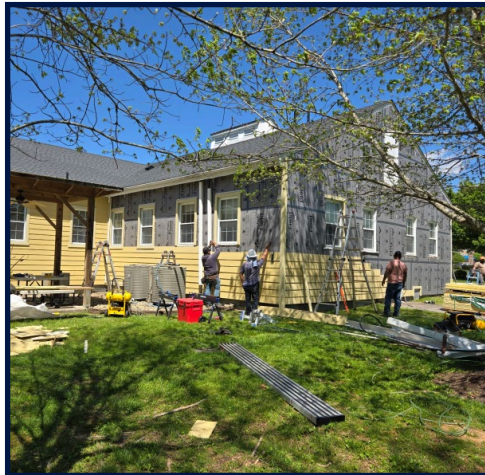
Repairs in progress, (top left to right) auditorium, side of building, hallway, and a before picture of the front of the building (bottom left). Images courtesy of ATDD

After completion (clockwise from top left) auditorium, hallway, front of building. Credit: Gabrielle Land (NOAA)

About NOAA's Air Resources Laboratory

The Air Resources Laboratory's (ARL) mission is to improve the ability of the Nation to protect human and ecosystem health and to support a vibrant economy through advanced atmospheric sciences and technologies.

ARL conducts research on the lowest part of the atmosphere, the boundary layer, where we live and breathe. World-class research contributes to accurate regional and global predictions of weather, air quality and climate variability. ARL also generates actionable information and highly localized forecasts to respond efficiently to a variety of emergencies.

Contact the Air Resources Laboratory:
www.arl.noaa.gov | arl.webmaster@noaa.gov