



An Assessment of Selected Programs at the National
Institute of Standards and Technology Engineering
Laboratory
Fiscal Year 2020

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Panel on Review of the Engineering Laboratory

June 8, 2021

NIST Visiting Committee on Advanced Technology

Selected Programs Reviewed at NIST Engineering Laboratory

- Community Resilience Program (CRP)
- Structural Performance Under Multi-hazards (SPUMH) Program
- Earthquake Risk Reduction in Buildings and Infrastructure (ERR) Program
- Engineered Materials for Resilient Infrastructure Program
- Fire Research Programs
- Net-Zero Energy High-Performance Buildings Program
- Embedded Intelligence in Buildings (EIB) Program.

Key Conclusions

- EL Programs have contributed major advancements in measurement science, standards, and technology over the past decade; and
- Recent high-hazard events have heightened awareness of an urgent need for NIST EL's work.

2020 Extreme Events

- Pandemic: COVID-19

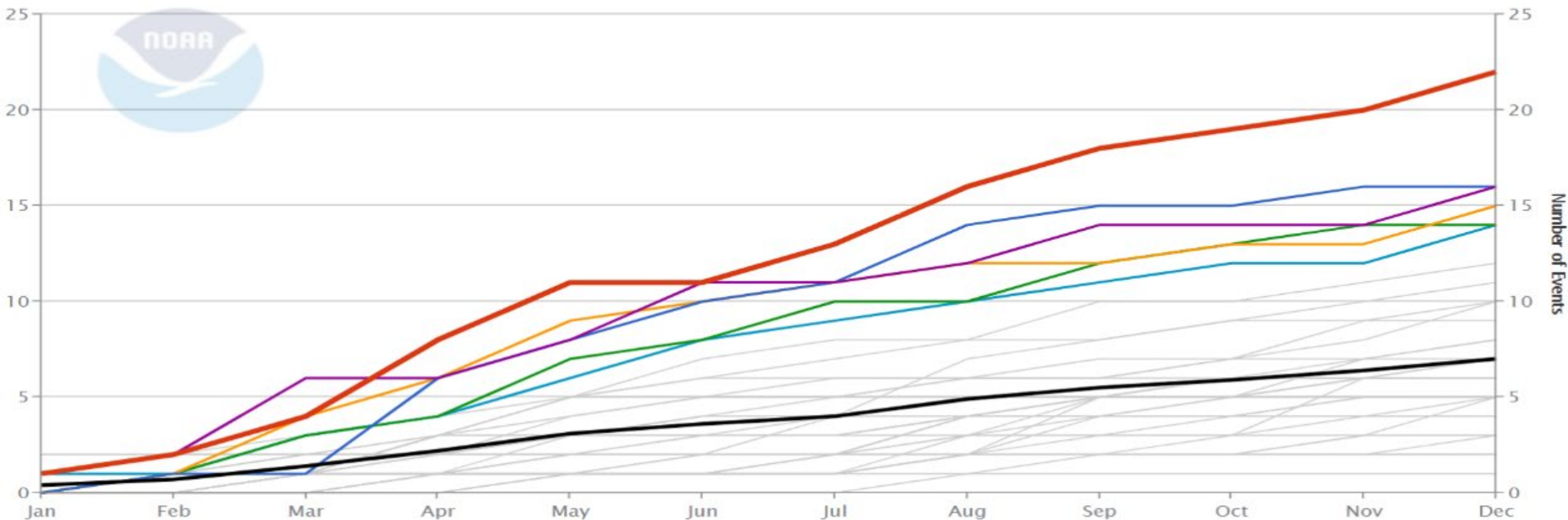
22 Billion-Dollar Weather and Climate Disasters:

- Western Wildfires
- Atlantic Basin Hurricanes
- Tornadoes and Derechos
- Flooding
- Drought and Heat Waves

2020 US Billion-dollar Weather and Climate Disasters

1980–2020 Year-to-Date United States Billion-Dollar Disaster Event Count (CPI-Adjusted)

2018 2019 2016 2011 2017 2020 Average



Source: <https://www.climate.gov/news-features/blogs/beyond-data/2020-us-billion-dollar-weather-and-climate-disasters-historical>

Common Themes Across EL

Increasing urgency for:

- Strategic planning for national and program priorities, human resources, facilities renewal;
- Multi-disciplinary collaboration and coordination across NIST and with other organizations; and
- Effective dissemination, implementation, and analysis of impacts.

Panel Major Conclusions and Recommendations

- Technical Merit: High research quality and adaptation to evolving needs.
 - Establish formal procedures to ensure interaction with practicing professionals and researchers at other institutions;
 - Develop long-term strategic research plan, developed with input from independent outside advisory panels.
 - Communicate to staff clear goals for the rate of annual publications of various types.
- Portfolio of Expertise: High quality and strong industry reputation.
 - Assess gaps in its expertise and add new competencies as needed, such as social scientists and medical scientists to the technical staff.

Panel Major Conclusions and Recommendations

- Adequacy of Resources: Adequate but stretched thin with emerging demands.
 - Develop succession planning to ensure areas of expertise are not lost within NIST.
 - Ensure adequate resources in the budget, human resources, facilities, and equipment resources for both continuity and growth.
 - Assure appropriate level of diversity of qualified researchers and managers adequate funding of facilities maintenance

Panel Major Conclusions and Recommendations

- Effectiveness of Dissemination: High value of outputs, but need strengthening
 - Develop Stakeholder Engagement and Dissemination Strategic Plan to report and interpret results and solicit diverse user input to improve effectiveness.
 - Provide a primary point of contact for outreach and dissemination to its diverse stakeholders
 - Develop an Enterprise evaluation system that would promote a holistic approach toward product development, implementation, and user feedback
 - Develop programs and tools that are user-driven, not developer-driven.
 - Increase development of partnerships with international organizations.

Examples of Potential NIST EL Collaboration

- Field studies for Community Resilience Program (CRP), Structural Performance Under Multi-hazards (SPUMH) Program, and Earthquake Risk Reduction (ERR) on earthquake, wind, and hurricane damage;
- Public health and social scientists in CRP and Fire Research Programs (FRP) on community response and safety; and
- Fire performance in buildings in FRP and Net-Zero Energy High-Performance Buildings Program.

Panel Members, Virtual Visit 9/29-10/1/2021

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Backup Slides

Examples of NIST EL 2020 Responsiveness

- COVID-19 Risk in Buildings: Net Zero Energy High Performance Buildings Program incorporated CONTAMX engine in the FaTIMA tool.
- Wildfire Assessment and Prediction: The Fire Risk Reduction in Communities Program developed and disseminated fire assessment and prediction models.