

13 March 2026

National Science Foundation

To whom it may concern,

Below please see my responses to the NCAR DCL entitled **NSF Intent to Restructure Critical Weather Infrastructure**.

1. NCAR Space weather activities:
 - a. Management and operations of space weather-related observational platforms, modeling and science as a stand-alone activity.
 - b. Management and operations of space weather-related observational platforms, modeling and science as combined with other NSF investments/facilities.

I am not an expert in this area, but this decision, and similar decisions, should be done with open dialogue. I also suggest coordination with the National Science Board, National Academies, and other expert panels consisting of public, private and stakeholder entities as appropriate in open deliberations.

2. NCAR weather modeling and atmospheric observing capabilities:
 - a. Management and operations of weather-related observational platforms, modeling and science as a stand-alone activity.
 - b. Management and operations of weather-related observational platforms, modeling and science as combined with other NSF investments/facilities.

The current discourse proposing the extraction of the “weather portfolio” from the National Center for Atmospheric Research (NCAR) or advocating for its management to be transferred to a single academic institution is a profoundly misguided solution to a manageable problem. This approach risks dismantling a “gold standard” of scientific collaboration, a unified national laboratory, that has taken over five decades to establish, perfect, and integrate. While healthy management reforms are an ongoing necessity, fragmenting this demonstrably successful, unified laboratory would inflict fundamental, long-lasting damage on the future trajectory of Earth System Science and, crucially, diminish the return on the American taxpayer’s investment.

1. The Indivisible Power of the Unified Laboratory: Weather as an Earth System Challenge

NCAR’s critical functions, comprised of divisions such as the Mesoscale and Microscale Meteorology Laboratory (MMM), the Earth Observing Laboratory (EOL), and the Research Applications Laboratory (RAL), do not operate or succeed in isolated silos. Their scientific superiority and technological output are a direct result of their deep, systemic integration within a single, unified national laboratory structure.

Moving past siloed science. The most significant advancement in environmental predictability over the past three decades is the profound realization that weather cannot be treated in scientific isolation. It is an inseparable, interacting component of the holistic Earth System, driven by complex processes spanning immense time and space scales, from the deep ocean to the upper atmosphere and into the global climate system. Siloing weather research apart from climate, solar, and fundamental atmospheric research would not only reverse this paradigm shift but

would structurally mandate a return to scientifically fragmented approaches, setting the national capability back by decades and creating artificial barriers to discovery.

Economies of Research Scale and Shared Infrastructure: The weather-focused laboratories benefit immensely from NCAR's broader, often climate-related and fundamental expertise, particularly within the Computational and Information Systems Laboratory (CISL). This unification creates powerful economies of scale, in scientific knowledge, computational resources (like supercomputing), specialized instrument development, and data management. Breaking these laboratories into smaller, disparate pieces immediately reduces these efficiencies, forces costly duplication of infrastructure at individual institutions, and fragments our national scientific capabilities, resulting in a less capable and more expensive overall system.

2. Neutrality and Equitable Governance

The University Corporation for Atmospheric Research (UCAR), which manages NCAR, is intentionally designed as a consortium comprising nearly all academic institutions with atmospheric science programs. This structure ensures maximal, equitable benefit to all member institutions, irrespective of their size, geographic location, or institutional ranking. *This neutrality is paramount.*

Maximizing Synergy by Avoiding Institutional Conflicts and Competition. Transferring these crucial national functions to a single university, or even a small, select consortia, would introduce immediate and serious conflicts of interest. It would irrevocably jeopardize the very governance and foundational principles that UCAR is mandated to uphold: namely, ensuring that NCAR does not compete with universities for basic research funding or favor one institution's research agenda, facility access, or talent pool over another.

The "Neutral Site" Advantage and Scientific Objectivity: Operating NCAR from a "neutral site" in Boulder, Colorado, fundamentally enhances its independence and reduces the risk of "group think" that often plagues institution-centric research. This neutrality ensures that faculty, postdoctoral researchers, students, and facility users from across the nation operate on an equal, competitive footing. No single university, regardless of its prestige, possesses the complete scientific breadth, managerial impartiality, or comprehensive facilities required to operate NCAR to its full extent in a fair and equitable manner for the entire community.

3. The "Multiplicative Effect" on Taxpayer Investment and Public Benefit

Replacing UCAR's management with a profit-driven entity, whether corporate or private, would fundamentally eliminate the "multiplicative effect" that UCAR provides on the nation's scientific mission and the taxpayer's investment.

Reinvestment for Science vs. Private Profit. As a non-profit university consortium, UCAR's operational efforts and indirect costs are not siphoned off as profit. Instead, this capital is systematically reinvested back into the laboratory, its facilities, education programs, and the broader scientific community, creating a self-sustaining cycle of innovation. Removing this mandated reinvestment model would drastically diminish the efficacy and output of the nation's science. It is highly improbable that taxpayers would realize the same exceptional rate of return or benefit under any for-profit or institution-specific management structure. The non-profit, community-governed structure maximizes public good.

4. Meeting the Grand Challenges: AI, Quantum, and Modern Facilities

The arrival of transformative technologies like Artificial Intelligence (AI), Machine Learning (ML), and future quantum computing requires an "all hands on deck," collaborative approach to fundamentally improve the speed, accuracy, and resolution of weather and climate forecasting. No single entity, whether a university or a private firm, possesses the resources, the requisite diversity of talent, or the necessary mandate to implement this paradigm shift alone. It demands the inclusive, democratic, multi-agency coordination that the current, unified NCAR structure is uniquely positioned to provide.

Democratizing Facilities Access is Key. While the existing model for managing expensive research facilities (such as research aircraft or specialized instruments) may be underfunded and, at times, seem fragmented, the strategic answer is a broader, sustained NSF-led funding strategy, not the dissolution of the facility-operating laboratories.

The existing process, though imperfect, works to democratize access to these expensive national resources for the broadest possible swath of university users, including those at smaller, less-resourced institutions. Future advances in predictability will largely be driven by increases in observational capabilities and thus is an important pillar along with modeling and computation in creating national resilience. As a matter of process, any proposed changes to the facility management model must be guided by an independent, expert study group of facility users and managers to create a strategic, consensus-driven plan that maximizes investment and accessibility across the entire academic community.

Final Recommendation: Reform, Do Not Fragment, and Invest for Excellence

If the nation truly intends to pursue a “moon shot” for weather and Earth System prediction, we should look to models of success like the European Centre for Medium-Range Weather Forecasts (ECMWF): a nimble, independent laboratory empowered by its member states, which collaborates closely with universities, government agencies, and the private sector but operates as a robust, centralized, standalone entity. Empowering the existing, unified NCAR through surgical and strategic management reforms, coupled with sustained investment, is a far more prudent, scientifically sound, and cost-effective path than attempting to silo its parts into multiple, less capable entities. Making NCAR more like ECMWF would constitute reform, not breakup and siloing.

Any decision of this magnitude, which impacts the national scientific infrastructure for decades, must be made through an open, transparent, and rigorous deliberation process. This deliberation must be coordinated with the National Science Board (NSB), the National Academies of Sciences, Engineering, and Medicine, and a diverse group of expert stakeholders drawn from across the public, private, and academic sectors. The integrity of Earth System Science depends on doing this right through the preservation of a unified, neutral, and reformed NCAR.

3. NCAR Mesa Lab (located in Boulder, Colorado):
 1. Ownership of the NSF NCAR Mesa Lab building for private use.
 2. Ownership of the NSF NCAR Mesa Lab building for public use.

The NCAR Mesa Laboratory is a world-class and architecturally iconic facility that acts as an attractor for earth system scientists to its location. It was donated to the National Science Foundation by the State of Colorado to host NCAR. If the NCAR Mesa Lab were to be repurposed, it would deal a blow to the scientific community. Any decision to repurpose the NCAR Mesa Lab should come with strong justification that strongly considers the scientific benefits of using the laboratory for NCAR research.

In addition to expressions of interest in the above, NSF is also requesting responses to the following questions:

1. Are there any areas in which NCAR activities or capabilities duplicate those of other government agencies, universities, or the private sector?

NCAR's is designed by UCAR to mitigate duplication and solve problems too big for single universities to approach. The government, universities, and private sector greatly benefit from NCAR's activities, as they compliment each other. Scientific duplication is not necessarily a bad thing. For example, the development of the MPAS model independent of the NOAA FV3 model led to innovation, that ultimately enabled both models to be better. MPAS is now the dynamic model core of NOAA. Both NCAR and NOAA's Hurricane Research Divisions have worked on aircraft operations in hurricanes. Each laboratories technology has benefitted from the other, including the dropsonde and airborne radar observations, critical to hurricane observations. NOAA has used NCAR's models to forecast hurricanes also. A blue ribbon panel with broad membership should identify synergies and priorities for emphasis of various components of weather research in the US.

2. Are there transformative prospects for observational platforms and the resulting data that are currently unexplored or underutilized?

Yes, and workshops and community input should be solicited by NCAR to explore those opportunities, not a DCL. In fact, during the week of 9 March 2026, NCAR EOL conducted a workshop on Radar Technology and its recommendations, which will be summarized, could be used to decide NSF priorities. Similar open workshops, prioritizing broad community input, should help determine these areas.

3. Are there other concepts for management and operations of NCAR activities that differ from the current model that NSF should consider?

Management of NCAR must be independent of conflict of interest and engaged with the broader community. This should be non-negotiable, and is the largest source of NCAR's success.

4. What should the performance objectives and metrics be for a restructured atmospheric research center?

Based upon my reasoning above, some potential metrics I would put forth:

- *Promote the progress of science, advance the national health, prosperity, welfare, and secure the national defense:* Weather and climate are inseparable in how they impact our nation, and an un-siloed, flexible, capable, and well-funded laboratory should be measured on its ability to address priorities of the NSF to advance novel science that benefits society.
- *Mitigation of Duplication:* A core objective would be to ensure that NCAR is complimenting existing activities activities do not duplicate those of other government agencies, universities, or the private sector, but rather solve problems too large for single institutions to handle.
- *Scientific Independence and Neutrality:* Metrics should evaluate the center's ability to remain independent and avoid "groupthink" or favoritism, maintaining its status as a neutral hub for the entire community.
- *Collaborative Impact:* Performance would be measured by the extent of collaboration with a broad range of universities and federal labs, as well as the successful cross-pollination of ideas across Earth System Science disciplines.
- *Equitable Access and Opportunity:* Objectives would include providing equal footing for faculty, students, and researchers from all institutions, regardless of their size, location, or ranking.
- *Efficient Use of Resources:* Metrics would likely track how well indirect costs are reinvested into the laboratory and the scientific community rather than being taken as profit.
- *Innovation in Earth System Science:* Success would be gauged by the center's ability to advance predictability and innovation by treating weather as an integrated part of the Earth System rather than in isolation.
- *Community Input:* A key performance indicator would be the center's success in soliciting and acting upon community input and workshops to explore transformative prospects for data and observational platforms.

Thank you for the opportunity to respond to these inquires to the community.

Sincerely,



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