

**Response to NSF “Letter to Colleagues”****Respondent: Robert Louis Grossman, PhD****Department of Atmospheric and Oceanic Sciences (Retired)****University of Colorado<sup>1</sup>**Credentials

With a BS in Electrical Engineering (Duke Univ.), graduate work in Meteorology and Oceanography (New York Univ.), and MS and Ph.D in Atmospheric Science (Colorado State Univ.), I am responding to this letter as a former Air Force Weather Officer (rank of Captain, forecasting for Strategic Air Command forward-based B47 Squadrons), NOAA research scientist (Environmental Research Laboratory/Wave Propagation Laboratory), NCAR Advanced Study Post-Doctoral Fellow and Staff Scientist, Visiting Fellow in the NOAA/Univ. of Colorado Cooperative Institute for Research in the Environmental Sciences (CIRES), sabbatical at Ames Research Center (Ecosystems and Space Science Divisions), and founding member of the Univ. of Colorado Department of Atmospheric and Oceanic Sciences. I was an NSF Principal Investigator on many grants (also a NOAA and NASA PI), now retired as University of Colorado Research Faculty. As an NCAR scientist I was seconded by United States to the United Nations/World Meteorological Organization as a consultant to the Government of India/India Meteorological Department spending almost four years managing a major international expedition to observe the summer monsoon that involved moving a European geosynchronous satellite from the Atlantic to the Indian Ocean, oceanographic vessels, aircraft and land-based observation systems from the Philippines to East Africa including China. I also helped with a similar effort to observe the winter monsoon. In that role I was the NSF representative for the USA component of the expedition (mainly NCAR, NOAA, and NASA aircraft) and had close relations with the US Embassy’s Scientific Officer and State Department personnel in New Delhi.

Furthermore, in the mid-90’s, I was recruited by NSF to be the NSF Program manager for Atmospheric Observational Facilities. I had the opportunity to fully review on-site NCAR facilities as well as other NSF Atmospheric facilities. Alas, NSF found that budget constraints did not allow them to follow through, and an amiable parting was found.

I am a retired airborne field research scientist with a varied and well-cited publication record.

I am an active American Meteorological Society Certified Consulting Meteorologist (#392, one of the earliest) for solely owned Atmospheric and Climate Research, registered with the State of Colorado, with wide legal experience.

I am a longtime member of the American Geophysical Union.

So, I am a full participant of the Weather Enterprise Noted below. *NCAR facilitated and nourished my career as it has for many of my colleagues.*

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<sup>1</sup> The opinions given in this response are mine alone and do not represent those of the University of Colorado.

### Executive Summary

**The Dear Colleague Letter states the intent to restructure NCAR but does not give a rationale for doing so. Thus, the rest of the request has no basis.**

Nevertheless, as retired atmospheric scientist looking back on a 60+ year career and concerned citizen, I will respond. Additionally, upon reading the request I found it poorly thought out. Was this the outcome of a committee formed at NSF for this purpose? If so, it was not stated so I can only assume that it was the consideration of one person. Whoever wrote this request appears to me to be grossly uninformed about the very active US Weather Enterprise, a collaboration of Federal, University, and Private atmospheric research and practice that has a long history.

NCAR is not just a research shop and certainly not just focused on climate research mentioned in news articles, it is an integral part of the booming US Weather Enterprise supporting STEM high school education, University education and research, private enterprise, and the highly regarded USA presence in the observation, research, and practice of the global meteorology and oceanography community. It has an art gallery.

NCAR is a Center. It was conceived as such by many very experienced scientists, government officials, and politicians of both political parties. The rationale was to provide a CenterPoint for atmospheric research and support for atmospheric research within the broader community of University, Federal and State governments, and private businesses. It also presents an example of US exceptionalism in atmospheric affairs to the international community. Furthermore, NCAR can take on risky research that others cannot. *That is a rationale for keeping NCAR rather than dismantling it*, the rationale of which was missing from the “intent” suggested in opening lines of the letter. The letter does not give a reason for dismantling and redistribution of the Center’s activities but states that it should be done and it is a citizen’s task to argue against or contribute to that position. I am against that position.

A Center is conceived for efficiency and cost effectiveness to achieve the mandate given to it by at the outset. At NCAR, *bringing together scientists of different persuasions but within a general envelope of “atmospheric science” is a recipe for synergy and the development of new ideas.* Synergy at NCAR, especially that inspired by cross-disciplinary discussions, was something I often discussed with Dr. Walter Roberts, the founder of NCAR, when I was an NCAR Post Doctoral Fellow and Staff Scientist in the mid-70’s and early 80’s. We called it “interface science”, the science undertaken at the interface of disciplines. He gave a seminar that NCAR promotes synergy.

As reported by the University Corporation for Atmospheric Research: “NCAR was first discussed and planned following a 1956 National Academy of Sciences committee recommendation to increase support for basic meteorology research. This led to the formation of the University Committee on Atmospheric Research (UCAR) in 1958, culminating in the establishment of NCAR by the NSF in 1960.” Thus, the letter seems to suggest upending a 66-year history by fiat, without

discussion among the atmospheric community and scientific community at large! That could be proposed but this letter is a poor and disruptive beginning.

#### Personal View

I feel this request was not carefully considered, it was ordered. In my opinion, a poorly informed middle-level bureaucrat, with little to no scientific experience, was given this onerous assignment. It is a bureaucratic response to a vindictive order by President Trump because, as reported, the Governor of Colorado, Jared Polis, refused his order to release Tina Peters, convicted and sentenced to prison in a court of Colorado law on a charge of election fraud regarding the 2020 Election. This conviction and imprisonment are a Constitutional right of the State of Colorado and based in centuries-old US practice of jurisprudence.

Whoever framed the questions and requests in this letter is uninformed with respect to the way atmospheric research has been successfully managed in the USA for many decades, six in my career, resulting in a robust Weather Enterprise collaboration among University research, Government research and practice, and private research and practice.

#### Recommendation

**My professionally considered opinion and conclusion: NCAR is a jewel in the crown of the United States Scientific Establishment! Leave NCAR alone and have a proper, independent scientific review, as has happened in the past, to critique NCAR's on-going operations and suggest improvements if needed.**

Detailed responses to the requests and questions in the letter follow.

## Request for Comments on Topics Listed in the Letter

### NCAR Space weather activities

As an atmospheric scientist I am unfamiliar with the details of NCAR's Space Weather Activities so have no comments on this section.

### NCAR weather modeling and atmospheric observing capabilities

Management and operations of weather-related observation platforms, modeling and science as a stand-alone activity.

Response:

The author combines three aspects of atmospheric research in a haphazard way and if they were separate entities. That is not true, these three aspects are intertwined and organic. There is no way to adequately separate them. My scientific focus was on observations but I had to be conversant with the scientific thinking (and contributed to it), how that thinking manifested in models (creating some of my own), and what observational platforms would be best used to investigate specific or general problems that either required investigation or were sparked by scholarly curiosity. In this context what does "stand-alone activity" mean?

**If, as suggested in the request above, each of these activities are separated bureaucratically, financially, and geographically, the result would be confusion, mismanagement, financial chaos, and a detriment to US atmospheric research.** The author poses no upside for a respondent's critique.

The author notes that there may be a need to: "concentrate on critical national needs such as seasonal weather prediction, severe storms,...". NCAR does that as well as supports Universities, and has collaborated with NOAA, DOE, USDA and DOD, Federal agencies also involved in those activities. The author needed to show that there was a lack of concentration at NCAR in those two activities. I have seen none.

What is meant by "weather-related"? In some cases, the observations taken, especially in the basic research environment, may have little to do with "weather", per se, but to the underlying physics of phenomena that may be weather related in some way. For instance, the observation of carbon dioxide fluxes from land to atmosphere by ground-based or airborne observatories in a particular NCAR/University study may be related to weather but may also be related to ecosystem variability and health which is not weather related other than weather is a factor in ecosystem science. As another example, observations of water vapor flux from a reservoir may be directly related to reservoir and water resource management, not weather. The author's lack of understanding of such basic issues is stunning!

Management and operations of weather-related observational platforms, modeling and science as combined with other NSF investments/facilities.

Response:

This is a repeat of the request above but now somehow combined with other NSF investments/facilities. No examples are given so it is almost impossible to comment on what is meant by this request. I've already stated that observational platforms, modeling, and science are "organically" intertwined. Now the author wants to somehow combine them with other NSF "investments/facilities" and asks for comments on *that* combination. What is meant by "other NSF investments" (grants, purchases of equipment, short-term hiring of scientists or managers, support of students, scientific societies, etc.)? "Investments" as a word covers lot of ground. No conflicts or enhancements are noted that would demand a need to consider combining any of the NCAR assets in personnel or equipment with other parts of NSF. I have experienced collaboration between the NSF section managing hydrology and that managing atmospheric science as the two are related scientifically and in practice. Is that what is meant? The two sections are independent, each a substantial "investment" supporting two distinct scientific communities that have substantial overlap. How that collaboration is executed may be a subject of critique, but none was made.

These are the major divisions at NSF:

Biological Sciences (BIO), Computer & Information Science & Engineering (CISE), Engineering (ENG), Geosciences (GEO), Mathematical & Physical Sciences (MPS), Social & Behavioral Sciences (SBE), and STEM Education (EDU).

I believe NCAR has some presence in all of them. What more is there to "combine"?

Here are the major facilities at NSF:

Astronomical observatories, Particle accelerators, Ocean vessels, Supercomputers, and Ecological monitoring networks,

From my vantage point NCAR has a direct interest in the last three. *Ocean vessels* can be used in air-sea interaction studies of which NCAR could be a collaborator. *Supercomputers* are part of the NCAR infrastructure. *Ecological networks* are often combined with atmospheric observations supplied by NCAR.

*Astronomical observatories* may need NCAR expertise as atmospheric phenomena can affect their observations. *Particle accelerators* could be used to provide information for instruments NCAR could be developing.

What more is there to combine? All that is needed are good bureaucratic and financial pathways for NCAR to help or collaborate with these facilities.

**NCAR Mesa Lab** (located in Boulder, Colorado):

- a. Ownership of the NSF NCAR Mesa Lab building for private use.
- b. Ownership of the NSF NCAR Mesa Lab building for public use.

Response:

I'm sure that the Mesa Lab could be repurposed. For instance, it could house a business or businesses in the Boulder/Westminster area (private use) or the homeless (public use). I'm a scientist, not a realtor. The land on which the building sits was purchased by the State of Colorado and donated to NSF ***with this condition:***

**" ...that it must be used for the scientific purposes of NCAR, which could restrict future sales or re-purposing of the land."**

So, how does the author see how NSF will obviate that condition? After dismantling an iconic State landmark, appeal to the State to drop that condition so NSF could sell it or use it for another purpose (see above)? Good Luck!

## Responses to questions posed in the Letter

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

Response:

Duplication in science is part of the scientific process, called “Replication of Results” (by an independent activity). I just used it in a basic research activity exploring a new observational concept. So, yes, NCAR could be involved in Replication that may look like “duplication”. This is no argument for dismantling but if there is a rare instance of duplication that does not involve Replication, a valid question. To quote President Trump, “this looks like a witch hunt.”

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

Response:

Huh? That is what scientists working at NCAR and collaborate with NCAR do all the time! They look for creative new ways to use current observation platforms and data. They also conceive new platforms, like drones, and instruments, like sonic anemometers, that provide data. As an NCAR and University scientist collaborating with NCAR, I’ve done it. Where’s the beef?

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

Response:

This is not an argument for dismantling NCAR. UCAR and NCAR management systems have been flexible over the lifetime of the institution as shown by NCAR’s stellar reputation nationally and internationally. This *is* an argument for an independent review of NCAR management. Something that has occurred in the past and I expect will continue. It is an on-going aspect of the principle of *adaptive management*. Another stunning example of the lack of basic management knowledge by the author.

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

Response:

Are you suggesting there are none at NCAR presently for comparison? The author expects those not familiar with the details of the current NSF management of UCAR and its management criteria for NCAR to comment on them as a future proposition. This is a poorly posed question. As such, I have no opinion and should not be expected to have one without knowing the present situation.

### Conclusion

The author's requests and questions do not convincingly frame the argument that NCAR needs to be restructured (see "lack of rationale" at the beginning of my responses) but expects even scientifically informed citizens with some NCAR experience to defend the "unseen". My responses have been detailed and I conclude that

***NCAR is a jewel in the crown of the United States Scientific Establishment. It should remain there. It should not be cast aside by those unworthy of estimating its worth.***