DAY ONE PROJECT

Earth Observation for Sensible Climate Policy

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Summary

The United States lacks the basic information and digital infrastructure required to effectively respond to the emerging climate crisis. While the science and technology needed for sensible climate policy exists, efforts to leverage these technical resources are fragmented and undirected. Actors in the most important sectors of the U.S. economy are making long-term investment decisions based on inaccurate or outdated data as a result. In the past 10 years, for example, homes worth over $11.2 billion have been built in areas that are at risk from sea-level rise. Insurance companies have paid over $25 billion in claims resulting from the 2017 wildfires in California. Better information on environmental impacts of climate change will make it possible to mitigate losses from wildfires, droughts, floods, and extreme weather events. Therefore, the next Administration should invest in Earth observation to directly measure environmental change and greenhouse gas emissions.

The next Administration should also invest in modern data and information technology infrastructure to effectively and efficiently respond to climate change. Such digital infrastructure will make it easier to integrate climate science into decision making. These investments will not only strengthen the domestic economy, but will also reposition the United States as a global leader on one of the most pressing "moonshots" of our time—basic measurements of humanity's impact on our home planet.

Challenge and Opportunity

By 2050, the cost of anthropogenic climate change to the United States is projected to be equivalent to the cost of a mid-scale pandemic, year-over-year. Yet American homeowners, small businesses, and even large enterprises are making investments with expected dividends in 10-30 years as if the impacts of climate change are unknowable — they aren't. The technology exists to measure the causes and effects of climate change at a resolution and frequency commensurate with economic decision-making. The challenge is to effectively organize disparate federal efforts to collect and distribute information about how our home planet is changing, so that Americans and American companies can make smart, forward-thinking choices.

Environmental information, especially about climate change, is a public good and should be provisioned by the public sector. In addition, there are sweeping economies of scale associated with Earth observation — with high upfront costs of data collection and data infrastructure, but low marginal costs to extend coverage from one state to the next. As such, the Federal Government is a natural home to lead and coordinate Earth observation.

Bolstering the Federal Government's Earth observation will reposition the United States as a global leader on the most pressing "moonshots" of our time. Establishing capacity to collect basic information about the vital signs of our planet will be a clear diplomatic, scientific, and

economic win for a new Administration. This document outlines feasible, measured, and near-term activities in support of that goal.

Plan of Action

The next Administration should take immediate and bold actions to elevate Earth observation at the federal level. Specifically, the next Administration should

(1) **Deputize the next NASA Administrator to lead Earth observation for the Federal Government**, with decisive support for budget-neutral reallocation of resources toward Earth science. NASA has the mandate, public trust, technical resources, and science budget to take a leading role in monitoring climate change. Currently, only 7% of NASA's annual budget is dedicated to studying our home planet. The urgency of climate change requires that number to be much higher. The percentage of NASA's annual budget allocated to Earth science should be doubled within the first year of the next Administration. Moreover, structures to support climate science within the Federal Government are insufficient. NASA leadership will organize, elevate, and operationalize existing efforts. For example, reallocation and refocusing of resources could be used within the Small Business Innovation Research (SBIR) program to develop an ecosystem of firms capable of (i) collecting and processing climate data and (ii) creating decision-support tools to foster better understanding of climate change impacts and more effective adaptation responses.

(2) **Establish a Climate Corps to increase the pipeline of talent in climate-change mitigation and adaptation,** with a specific branch dedicated to leveraging Earth observation data. The Climate Corps should adopt a tiered approach that puts members to work at the local, state, and federal levels, tailoring information and services delivered accordingly. The federal branch of the Climate Corps could be modeled on and work with existing programs such as the Presidential Innovation Fellows. The state and local branches of the Climate Corps would link federal investment in climate data and science with on-the-ground needs. Localities on the front lines of climate change require tailored scientific and technical expertise to support evidence-based decision-making. We recommend recruiting graduates with science and technical degrees to branches of the Climate Corps focused on serving such localities nationwide. Much like the Peace Corps embeds members within communities abroad, this Climate Corps branch would embed members within front-line communities at home to facilitate two-way communication about local needs, relevant scientific findings and capabilities, and informed investments at all levels of government.

(3) **Create a collaborative public-private partnership for climate data and science,** much like the BRAIN Initiative brings together public and private entities to advance understanding of brain function. The partnership should be overseen by a civilian science board and

should aim to allocate $5 billion over five years in applied research grants to universities and small businesses. These grants would spur development of innovative technologies to monitor Earth systems in response to community and industry needs. Supported by committed involvement from the Department of Defense (e.g., DARPA, IARPA), part of the partnership's mandate should be to reinstate the MEDEA program (or follow-on incarnation) to make military data assets available to civilian researchers and data scientists.

Conclusion

There are moral and economic imperatives for the United States to take swift action, supported by consistent and credible data, on climate change. Global investment in Earth observation is insufficient to adequately respond to climate change. The United States can leverage its comparative advantage in scientific diplomacy and domestic talent to fill this information gap. By doing so, our nation can lead the world to the next great human achievement—a stable and productive climate.

Frequently Asked Questions

Why focus on remotely sensed sources of data?

Earth observations from space are robust, resilient, and appropriately balanced. Satellite-based sensors offer low-cost, credible, and globally comparable information about planetary change. Combined with in-situ observations, remotely sensed data make it possible for us to map and model the intricacy of Earth systems, including important interactions among the atmosphere, land, ice, and oceans on time scales of minutes to decades. Accurately characterizing these Earth-system interactions is key to understanding how the Earth environment functions today, how it supports life, how conditions might change in the future, and how humans influence such change.

Why hasn't this been done before?

NASA has led Earth science programs throughout its 60-year history, but its predominant focus has been human spaceflight. Recently, reduced satellite-launch costs, expanded satellite capabilities, and better sensor technology have combined to dramatically increase the potential of remotely sensed Earth observations. These developments—combined with improvements in climate modeling, data storage, and data accessibility—have created a renaissance in Earth systems science that could assist in prediction of, mitigation of, and adaptation to climate change. NASA and the Federal Government are well positioned to leverage these new developments and position the United States as a leader on Earth observation and climate action. Strong federal commitment to Earth observation, including through avenues like advanced market commitments, will also catalyze a vibrant private-sector response to climate change and Earth monitoring.

What are the political risks of expanding Earth observations at the federal level?

Political risks depend on the source of funding. If additional funding is allocated by Congress to support expanded Earth observation, then political risks track with the ongoing political debate about climate change. While the NASA Space Act specifies study of the Earth and atmosphere as part of NASA's charter, some radical members of Congress have discussed eliminating NASA's Earth Science program. The risk is significant if climate deniers become a stronger cohort in Congress.

If additional funding for Earth sciences comes at the expense of existing programs, criticism and thereby political risk will originate from stakeholders of the affected programs. Moving resources from existing programs will be decried both from within the Agency and the lawmakers whose districts are impacted. This risk may be mitigated by the fact that 90% of the American public views climate change as an immediate priority: perhaps a greater priority than outer planet exploration or human spaceflight, especially now that the U.S. private sector is more involved in Earth observation and that climate impacts are becoming more apparent. Political risks of

resource reallocation could also be mitigated by placing budget numbers in context. Earth Science has an annual budget of approximately $1.7 billion—a far cry from other NASA science missions (approximately $4 billion) or human spaceflight (approximately $8 billion). A strong leader could point out that NASA has already put multiple people on the moon. The agency's next great "moonshot" should be to save our home planet from climate change.

Why is the BRAIN Initiative a compelling model for a public-private partnership around Earth observations?

The BRAIN Initiative offers a compelling, science-based approach to public-private partnerships that involve the defense sector. The U.S. military has a long history of gathering Earth data for intelligence purposes. These longitudinal data help climate scientists identify important baselines, which are especially important when geoengineering is part of the solution set. Further, the defense sector is materially concerned with climate change due to national-security concerns. Recent reporting suggests that the U.S. military is more involved in climate adaptation than any other organization on the planet, and the resource-allocation and data-collection capabilities of the military and intelligence communities are unmatched. The existential threat that climate changes poses to our domestic economy and safety requires much closer collaboration among the military, private sector, and public-sector scientists.

If other countries are investing in climate data, why should the United States allocate its own resources?

The United States has lost moral ground and technological edge over the past several years. Our nation must take bold, globally beneficial action to restore its reputation as an effective, substantive, and respected leader. Climate change is one of the greatest challenges facing humanity today and the U.S. has been a major contributor to the problem. Only scientific data and climate modeling can effectively determine sensible climate policy—and the United States has the resources, technical capacity, and domestic talent to carry out large-scale data and modeling initiatives that few other countries can match.

About the Authors

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