

# *FOSTERING OPEN SCIENCE IN METEOROLOGICAL RESEARCH, OPERATIONS, AND EDUCATION*

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Department of Agronomy

# KEY POINTS

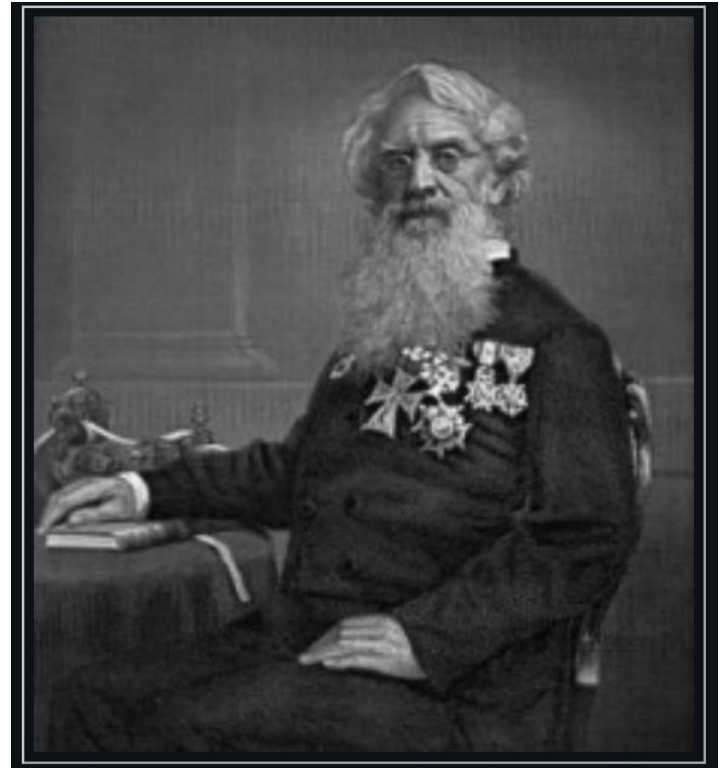
- Developing a culture of sharing data and models by building trust through collaborations
- Removing barriers by use of “honest brokers” in establishing public-private partnerships
- Addressing a trend toward privatizing data in areas of high societal importance
- Ensuring rapid access by graduate students and early career scientists to data and opportunities for early discovery and scientific leadership.



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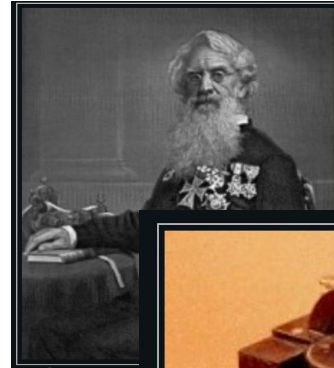
# CULTURE OF SHARING

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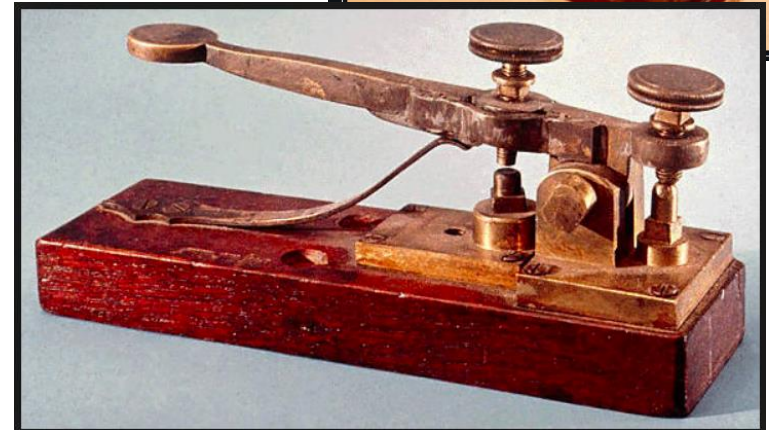
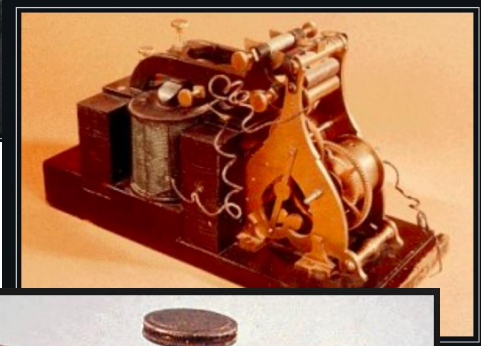
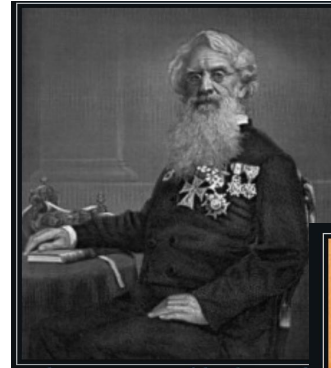
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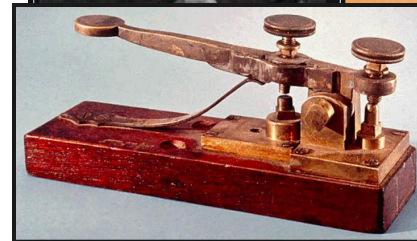
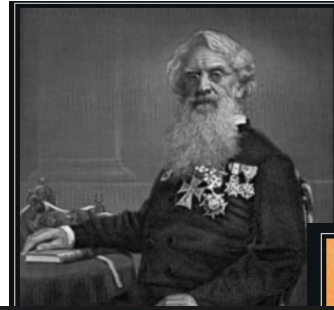
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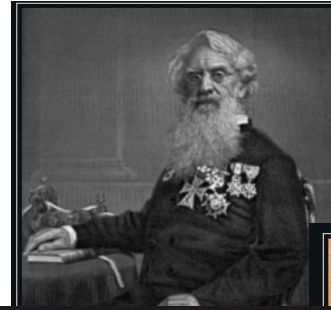
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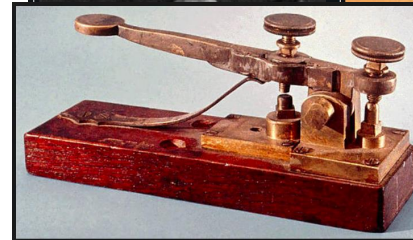
Constantino Brumidi. US Senate

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- which led to real time weather maps and a culture of sharing that now includes complex data sets and numerical models for advancing the use of science for the public good.



<http://morsetelegraph.weebly.com>



<https://www.thinglink.com/scene/615668189820354560>



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# BUILDING COLLABORATION – LEGACY EXAMPLE

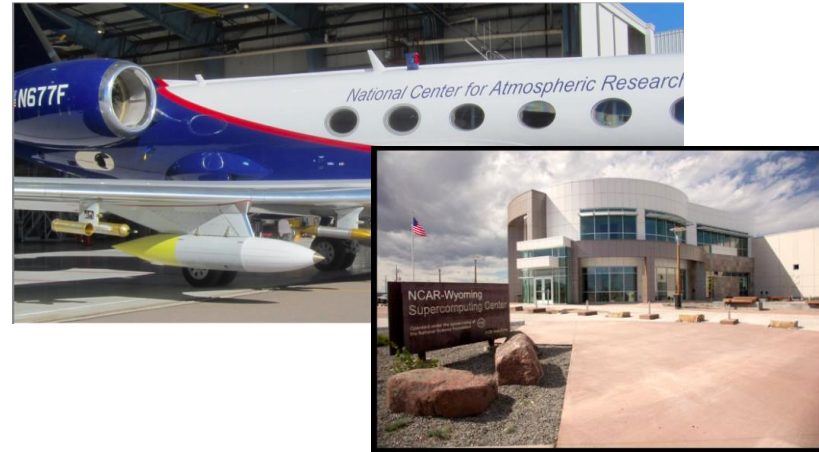
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HIAPER Gulfstream GV

National Center for Atmospheric Research

HIAPER



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<https://www.aviationcv.com/aviation-blog/2017/10-facts-about-planes-and-flying5114>



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# CULTURE OF SHARING – DISTURBING TRENDS

- Long-term, complex, multi-disciplinary and expensive field observations having high innovation and potential economic value are not being fully supported by public funds.
- As a consequence, consortia are forming to acquire and market data to a narrow set of clients at rates that recover costs of expensive data collection.
- Restricting access to data of high potential economic value to those who have resources to pay can lead to undesirable societal consequences.



USDA



USDA



# EXAMPLE OF THE NEED FOR OPEN SCIENCE

- By mid-century one year out of ten is projected to have a five-day heatwave that is 13°F warmer than the end of the 20<sup>th</sup> century in the food-producing Midwest.
- Key long-term plant, microbial, soil, and micrometeorological *field information* is lacking for understanding basic plant processes such as vegetative and reproductive failure “points” and nutritional quality of food grains grown in *climatically changing field conditions*.
- This creates high uncertainty in our ability to design a sustainable system for producing a sufficient and nutritious global food supply for the changing climate of the 21<sup>st</sup> Century.



<http://asi.ucdavis.edu/programs/rr/education-and-outreach/photos/cornfield.jpg/view>



<https://3c1703fe8d.site.internapcdn.net/newman/gfx/news/hires/2016/couldglobalw.jpg>

# OPEN SCIENCE AND EARLY CAREER SCIENTISTS

- Restrictions on open science can disproportionately impact graduate students and early career scientists who experience barriers to opportunities for early discovery and exercising scientific leadership.
- Graduate students have new and advanced analytical tools that may lead to unique insights.
- Restrictions in publishing results from data generated under highly restrictive confidential agreements reduce productivity.
- High costs of publishing may artificially limit early career productivity.



<http://cropwatch.unl.edu/2017/growers-statewide-share-farm-research-results>



<https://www.igb.illinois.edu/article/team-calls-integrated-midwest-field-research-network>



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