

Group Rough Draft Sample

Team Name:

Team Members:

Topic: Should the federal government continue to launch and support weather satellites or should this be privatized?

Position: (CON) The federal government should not continue to launch and support weather satellites.

Roles:

In addition to supplying content to the assigned sections, each member is responsible for providing at least two sources and providing an MLA Annotated Reference.

Each member has been assigned the following sections.

- Member 1 - Introduction
- Member 2 - Sub Topic A: Cost and Efficiency
- Member 3 - Sub Topic B: Current Focus, Performance and Reliability of Government Vs Private Weather Service
- Member 4 - Sub Topic C: Economic and Social Benefits of Private System
- Member 5 - Conclusion

Introduction (Member 1)

Whether to privatize weather satellites or continue to let the federal government launch and support them has been an overarching debate for years. Past and present legislation has brought us through the Communications Satellite Act of 1962, the Land Remote-Sensing Commercialisation Act of 1984, the Launch Services Purchase Act of 1990, the National Weather Service and Related Agencies Authorization Act of 1999, and Weather Research and Forecasting Innovation Act of 2017. Despite this legislation over the years, our group calls for a bigger change in the way we launch and support our weather satellites. We establish our position as against the continuation of the federal government launching and supporting satellites, and thus in favor of privatization. We believe that privatization will bring more accurate, efficient and technologically advanced reports that have the potential to revolutionize other fields that rely on this data.

1.) Miglarese, Anne Hale and Crain, David J. "A Better Way To Weather the Satellite Gap" *Space News*, 16 December 2013

<https://spacenews.com/38720a-better-way-to-weather-the-satellite-gap/>

Accessed 21 September 2018.

- "Satellite data account for more than 90 percent of the data that go into weather forecast models, and data from satellites that orbit the planet from pole to pole are

particularly important. Multiple studies suggest that, left unmitigated, a gap in this data “would erode everyday weather forecasts and expose the nation to a 25% chance of missing extreme event forecasts that matter most,” according to the National Oceanic and Atmospheric Administration (NOAA).”

- “Our nation’s weather satellites are getting old, and the system for replacing them in a timely and cost-effective manner is broken.”

2.) US Government Accountability Office. “Mitigating Gaps in Weather Satellite Data” *GAO*, 2017 Report

https://www.gao.gov/highrisk/mitigating_gaps_in_weather_satellite_data/why_did_study

Accessed 22 September 2018

- “NOAA is responsible for the polar satellite program that crosses the equator in the afternoon and for the geostationary satellite program, while DOD is responsible for the polar satellite program that crosses the equator in the early morning orbit. However, these programs have troubled legacies of cost increases, missed milestones, technical problems, and management challenges that have reduced functionality and delayed launch dates. As a result, the continuity of weather satellite data is at risk.”
- “NOAA officials acknowledge that there is a risk of a gap in polar satellite data in the afternoon orbit, between the time that the current polar satellite is expected to reach the end of its life and the time when the next satellite is expected to be in orbit and operational. This gap could span up to a year or more, depending on how long the current satellite lasts and whether there are any delays in launching or operating the new one.^[2]”
- “According to NOAA program officials, a satellite data gap would result in less accurate and timely weather forecasts and warnings of extreme events—such as hurricanes, storm surges, and floods. Such degraded forecasts and warnings would endanger lives, property, and our nation’s critical infrastructures”

3.) Freedman, Andrew. “The Space Race is on for Climate, Weather Privatization” *Climate Central*, 13 July 2015

<http://www.climatecentral.org/news/the-space-race-is-on-for-climate-weather-privatization-16243>

Accessed 22 September 2018

- “private satellite firms present an opportunity to dramatically expand the data available to scientists, which could markedly boost forecast accuracy. More important, if this space race reaches the finish line, it could revolutionize fields that depend on environmental data, from climate adaptation to urban planning, farming, and even insurance claims processing.”
- “The government is not only behind schedule and overbudget on many of its upcoming weather and climate satellite programs, but it is also cutting back on what it funds, much to the dismay of scientists.”

4.) Throughout this debate, you will hear detailed arguments that highlight evidence as to why we believe privatization of weather satellites is essential. We will discuss how the private sector can produce and maintain satellites weather data more efficiently and effectively in order to ensure that our nation is as safe and informed as possible about weather conditions. You will hear about cost and efficiency, reliability of government vs private weather services, and economic and social benefits of the private weather system.

Sub Topic A: Cost and Efficiency (Member 2)

Pro: The government can produce and maintain satellites weather data more efficiently than the private sector.

Con: The private sector can produce and maintain satellites weather data more efficiently than the government.

- Government missions struggle to gain sufficient funding
 - Missions, such as the COSMIC-2, under the NOAA struggle to receive funding from the government
 - Budget asked for \$16.2 million, senate only approved of \$8.1 million, while the house approved of \$16.2 million only if the NOAA thoroughly reviewed potential commercialized sources of data
- Private satellites create benefits that government satellites can not provide
 - Commercialized satellites can provide data that can be purchased, which can
 - lead to best pricing for data
 - generate revenues through tax-paying jobs and data sales
- Private satellites can help advance the data
 - Government currently struggles to compete with data provided by satellites owned by other nations worldwide
 - Current major weather satellite programs (NPOESS and GOES-R) have struggled in their development since the 90's
- Commercialized programs (i.e. GeoOptics) have been sufficiently funded through capital markets
 - This can reverse the trend set by NOAA programs that fail to meet worldwide standards set by satellites owned by other countries
- Launch Services for satellites GOES-S and GOES-R costed \$446 million

Sub Topic B: Current Focus, Performance and Reliability of Government Vs Private Weather Service (Member 3)

Pro: Demonstrate how Government program is excelling. Demonstrate shortcomings of private technology.

Con: Demonstrate where private solutions are excelling and where Government weather data is lacking or the program is inefficient.

- Governmental Inefficiencies:
 - NPOESS and GOES-R: delays, cost overruns, scope reductions (Cirac-Claveras)
 - NPOESS canceled in 2010 w/ no launches (Cirac-Claveras, Gemma. "Weather Satellites: Public, Private and Data Sharing. the Case of Radio Occultation Data.")
 - 8.6 Billion over budget
 - NASA and NOAA unable to fill data gaps caused by equipment end of life and launch of new mission (Migliarese, Anne Hale and Crain, David J. "A Better Way To Weather the Satellite Gap")
 - Lack of commercial entities due to NOAA's lack of commitment or signaling that they would purchase commercially produced data.
- Role of GNSS-RO data in private sector
 - Constellation Observing System for Meteorology, Ionosphere and Climate (COSMIC) 2006 (Cirac-Claveras)
 - Reduced 24h forecasting errors by 10%
 - Traditional models failed to predict Ernesto in 2006, but addition of COSMIC Data created a model that matched observation.
 - Recent developments are sending a clear signal that NASA must take actionable steps in supporting GNSS-RO commercial data
 - NOAA's Space Commercial Policy of January 2016
 - \$695,000 allocated to GeoOptics
 - \$370,000 allocated to Spire Global Inc.
 - Spire enters market
 - "it advocates for an open market for data within the weather industry, where NOAA is just a client amongst many others." (Cirac-Claveras, Gemma. "Weather Satellites: Public, Private and Data Sharing. the Case of Radio Occultation Data.")
 - Weather Research and Innovation Act of 2017 further pushes NOAA in procurement of commercial data
- GNSS-RO data can be obtained using low cost craft and minimum instrumentation
 - By abandoning the traditional system of aggregate 'large and expensive government "catch-all" systems', a larger array of sensors could be deployed

separately at a lower cost and with a larger sampling size. (Migliarese, Anne Hale. "The Benefits of Public-private Partnership in Weather and Environmental Data Collection")

- There is no definitive way to measure innovations due to the lack of private entities in the weather industries, but it stands to reason that it would benefit from the many innovations experienced in other realms of satellite imagery and observations.
 - Draw parallel between other industries benefiting from private satellite programs
 - NSA - history of supporting commercial companies to improve, augment and innovate surveillance and reconnaissance. ("Declassified Documents Trace U.S. Policy Shifts on Use of Commercial Satellite Imagery from 1970s to Today." *National Security Archive*)
 - USDA - By evaluating satellite images of corn fields, Descartes Labs correctly predicted a shortage in domestic corn production. (Shaw, Carrie. "Satellite Companies Moving Markets")

Sub Topic C: Economic and Social Benefits of Private System (Member 4)

Pro: Costs of the private system on the public.

Con: The private sector will better serve the public interests. Identify social and economic benefits.

- Augment government programs. (Migliarese, Anne Hale. "Sense of Urgency Needed to Steady U.S. Weather Forecasting.")
 - Affordable consistent supply of data.
 - Accurate forecasts.
 - Earlier warnings.
 - Lower costs.
- Bridge production delays.
 - Quicker innovation in sensor and satellite development.
 - Improvement of weather forecast timelines and economic stability.
 - Agriculture benefits. (Walker, Jon. "AI for Weather Forecasting - In Retail, Agriculture, Disaster Prediction.")
 - 90% of crop losses are due to weather events.
 - 25% of weather related crop losses could be prevented using better weather predictive modeling.
 - Transportation (Walker, Jon. "AI for Weather Forecasting - In Retail, Agriculture, Disaster Prediction.")
 - IBM freight industry loses 8.7 billion dollars a year due to weather related delays.

- IBM uses Panasonic's weather forecasting to improve their commercial craft climb profile, reducing fuel consumption by 10% during ascent.
- Disaster relief. (Walker, Jon. "AI for Weather Forecasting - In Retail, Agriculture, Disaster Prediction.")
 - Improved accuracing for forecasting will save lives and speed up rebuilding efforts.
 - IBM is already delivering damage predictions that are 70-80% accurate 72 hours before a storm is predicted.
 - Accuracy of these predictions is helping cut back the \$20 billion to \$70 billion weather related outages cost.
- Benefits to taxpayers. (Miglarese, Anne Hale. "The Benefits of Public-private Partnership in Weather and Environmental Data Collection")
 - Financial risk associated with satellite development and launch is transferred from the government to the private sector.

Conclusion (Member 5)

Data gaps: <https://spacenews.com/38720a-better-way-to-weather-the-satellite-gap/>

The evolution and improvement of weather satellites over the years has played a massive role in the success of weather forecasting. A major part of this can be traced back to privatization, and private firms across the world are now able to put out data with satellites that the government struggles to compete with. It has been proven that commercialized programs can and have been adequately funded through capital markets, while missions under NOAA struggle to receive funding from the government. Private providers such as Panasonic, GeoOptics, and PlanetIQ all offer cost effective alternatives to the government run weather models. Our group favors privatization over the federal government launching and supporting satellites, and believes that this method will only bring more effective, precise, and advanced data to the field of weather forecasting.

https://www.washingtonpost.com/news/capital-weather-gang/wp/2016/09/16/noaa-awards-first-ever-satellite-data-contracts-to-private-industry/?utm_term=.d94aa1bc6cfa

- NOAA awards private industry satellite data contracts
 - Providers- GeoOptics and Spire Global awarded \$695,000 and \$370,000 respectively by NOAA to furnish satellite data
 - Provides incentive to private providers to launch satellites and

- Cost effective; NOAA satellites need billions of dollars to develop while GeoOptics and Spire satellites are worth in the range of hundreds of thousands

Samenow, Jason. "NOAA Awards First-Ever Satellite Data Contracts to Private Industry." *The Washington Post*, WP Company, 16 Sept. 2016, www.washingtonpost.com/news/capital-weather-gang/wp/2016/09/16/noaa-awards-first-ever-satellite-data-contracts-to-private-industry/.

MLA Annotated Bibliography

Cirac-Claveras, Gemma. "Weather Satellites: Public, Private and Data Sharing. the Case of Radio Occultation Data." *Space Policy*, 2018, <https://www.sciencedirect.com/science/article/pii/S0265964618300390>
Accessed 20 September 2018.

This article examines the impact of the 2017 Weather Research and Forecasting Innovation Act that requires NOAA to investigate the viability of commercial satellites as supplement or replacement to NOAA technology. By observing the commercial data collected by the Global Navigation Satellite System, the article identifies and investigates the many players involved in this process. It explores the arguments and conflicts between Government, Scientific Community, Forecasters, NOAA and the private sector by tracing how the data is obtained and shared. The article traces the history of governmental acts, the current involvement of private companies and the arguments for and against privatization.

"Commercial Weather Data Pilot (CWDP)." *Office of Space Commercialization, National Oceanic and Atmospheric Administration*, 2018, <https://www.space.commerce.gov/business-with-noaa/commercial-weather-data-pilot-cwdp/> Accessed 19 September 2018.

This page describes the NOAA Commercial Space Policy, which requires NOAA to explore how commercial weather products can be integrated into NOAA models and observations. The page describes the NOAA's Commercial Weather Data Pilot (CWDP) and lists information on the requirements and findings of the pilot's three rounds. Information is given on the contract awards, budgets, plans and legislation.

"Declassified Documents Trace U.S. Policy Shifts on Use of Commercial Satellite Imagery from 1970s to Today." *National Security Archive*, 27 November 2012, <http://trumanfactor.com/2012/us-policy-shifts-on-use-of-commercial-satellite-imagery-11404.html>

Accessed 24 September 2018

This article examines the history of the relationship of the United States National Security interests and private commercial satellite entities. It traces the relationship using 39 documents obtained by the Freedom of Information Act requests. It traces the history of satellite imagery from its highly-classified beginning to a technology available simply via a simple web browser.

“First Private Weather Satellites.” *Science*, vol. 353, no. 6306, Sept. 2016, p. 1345. EBSCOhost, <http://web.b.ebscohost.com.proxy-um.researchport.umd.edu/ehost/pdfviewer/pdfviewer?vid=5&sid=1ee04c5a-bf87-4219-abe4-a0531a68eff9%40sessionmgr101>.

Accessed 24 September 2018.

This article describes the NOAA’s first action to support commercialized weather satellites. It explains the NOAA’s awarding of pilot contracts and small deals to GeoOPTics and Spire Global. It also states that the reason for reaching out to private weather satellites is due to cost overruns by the government funded programs.

Freedman, Andrew. “The Space Race is on for Climate, Weather Privatization.” *Climate Central*, 13 July 2015, <http://www.climatecentral.org/news/the-space-race-is-on-for-climate-weather-privatization-16243>

Accessed 22 September 2018

In this article, Freedman explores the opportunities that private weather satellite firms could bring. He also evaluates the relationship between the federal government and these private firms, including how that relationship will change in the future if weather satellites are privatized. Further, this article outlines the billions of taxpayer dollars that the government uses on satellites built by private companies, such as Lockheed Martin and Ball Aerospace. In relation, Freedman also touches on the satellite data gap due to the many difficulties the government has had with this for years. As a result, the government is behind schedule and over budget on many of their weather and climate satellite programs.

Migliarese, Anne Hale. “Sense of Urgency Needed to Steady U.S. Weather Forecasting.” *Washington Post*, 28 March 2014, <https://www.washingtonpost.com/news/capital-weather-gang/wp/2014/03/28/sense-of-urgency-needed-to-steady-u-s-weather-forecasting/>

Accessed 23 September 2018.

This article discusses the outperformance of the U.S. global weather model in comparison to other nations. U.S. model inaccuracy has led to a human and financial impact, and the weather forecasting for the U.S. is on track to become worse instead of better. Government funded satellite programs have created a gap in weather modeling due to the lack of funding. U.S. companies that are privately funded have been developing and launching their own weather satellites to provide the quality of data needed to reduce the gap that has been created. They are also doing so for much cheaper than government operated satellite programs.

Migliarese, Anne Hale. "The Benefits of Public-private Partnership in Weather and Environmental Data Collection" *PlanetIQ*, 2013, <http://planetiq.com/index.php/the-benefits-of-public-private-partnership-in-weather-and-environmental-data-collection>
Accessed 21 September 2018.

This article outlines the benefits to both government and consumers that could be achieved by a public-private partnership model for satellite data providers. It argues that in other fields, the government has supported and benefited from use of commercial satellite imagery products and the same could be done for weather data. By leveraging private capital and technology, the long term costs are dispersed and decreased while the project timeframe and launch effectiveness is improved. By abandoning the traditional system of aggregate 'large and expensive government "catch-all" systems', a larger array of sensors could be deployed separately at a lower cost and with a larger sampling size. It argues that the data supply from private providers would be less susceptible to data gaps, and by offloading the burden of data gathering from the government, funds could be focused on improving forecasting and models.

Migliarese, Anne Hale and Crain, David J. "A Better Way To Weather the Satellite Gap" *Space News*, 16 December 2013, <https://spacenews.com/38720a-better-way-to-weather-the-satellite-gap/>
Accessed 21 September 2018.

This article describes the importance of satellite data in NOAA's current forecasting models and identifies the risk of data gaps due to satellite end of life and current mission delays. NASA and NOAA are unable to produce smaller and less expensive "gap-filler" satellites in a timely manner. Commercial satellite operators claim they are capable of a 6 month launch time. It argues that the commercial satellite economy would strengthen observation data, lower costs and provide an industry for employment.

"Mitigating Gaps in Weather Satellite Data", *US Government Accountability Office*, 2017, https://www.gao.gov/highrisk/mitigating_gaps_in_weather_satellite_data/why_did_study
Accessed 22 September 2018

This article describes the satellite systems that the US currently relies on for weather observations and forecasts, as well as who is responsible for these systems (NOAA and DOD). It acknowledges the difficulties the programs are having, such as cost increases, missed milestones, technical problems, and management challenges. These problems are leading to risk of gaps in weather satellite data. The article also highlights the repercussions of satellite data gaps, such as less accurate and timely weather forecasts. The article mentions the possibility of endangering lives and property as a result of the possibility of inaccurate or delayed warnings during extreme weather events.

Samenow, Jason. "NOAA Awards First-Ever Satellite Data Contracts to Private Industry." *The Washington Post*, WP Company, 16 September 2016, www.washingtonpost.com/news/capital-weather-gang/wp/2016/09/16/noaa-awards-first-ever-satellite-data-contracts-to-private-industry/
Accessed 23 September 2018.

This article identifies private companies that were awarded contracts by NOAA to join the government in obtaining weather data for the purpose of enhancing weather forecasts. The article explains that by awarding contracts to private providers such as GeoOptics and Spire Global, there is a further incentive for similar companies to launch satellites and use their data to improve the forecasting of weather. This article further delves into the aforementioned companies, referring to the impressive numbers and data put out by them, while also mentioning the lower cost and smaller size of the private satellites, unlike NOAA's. The significance of this article is that by rewarding these smaller, privately run companies, it creates a further incentive for them to launch satellites, which could very well revolutionize the world of weather forecasting.

Shaw, Carrie. "Satellite Companies Moving Markets" *Quandl*, 06 July 2016, <https://blog.quandl.com/alternative-data-satellite-companies>

Accessed 21 September 2018.

This article identifies several interesting ways people are deriving value from satellite data. There are two types of entities in the private satellite sector: Those who produce the technology and those who analyze the data. The article goes on to identify the companies occupying the spaces and offers a profile of the companies. The implication of the article shows that there is no shortage of private entities looking to enter the sector, and private equity is driving innovation and reducing cost.

PalanetIQ is focused on studying the atmosphere, weather, forecasting and climate modeling. They plan to launch 12 microsattellites, called Pyxis, in 2018. These satellites will use radio occultation, capable of penetrating clouds and storms.

Urthcast plans to launch 16 satellites by 202 that combines high definition video and radar to penetrate weather.

Shepherd, Marshall. "When It Comes To U.S. Weather Forecasting: Private, Public Or Both?" *Forbes*, 07 June 2016,

<https://www.forbes.com/sites/marshallshepherd/2016/06/07/when-it-comes-to-u-s-weather-forecasting-private-public-or-both/#4e1901a03a37>

Accessed 19 September 2018.

This article explores the relationship between private companies and the National Weather Service. It explores the claims made by several private companies that their technology and cost can outperform NOAA. The article explains the complex relationship between NOAA services and how private companies augment this data. The article explores the risk of fully privatizing the service. A notable quote from National Weather Service Deputy Director Laura Furgione: "If you solely rely on the private sector for the public safety service, you can't assume the company will always stay in business and if they go under, you have lost your source of service."

Walker, Jon. "AI for Weather Forecasting - In Retail, Agriculture, Disaster Prediction." *TechEmergence*, 08 October 2017, www.techemergence.com/ai-for-weather-forecasting/.

Accessed 21 September 2018.

This article discusses the impact that weather related forecasting has on businesses and governments. The smallest advancement in prediction technology would result in large strides agricultural benefits that are severely impacted by weather. Incorporating private funding to the development of satellites and other prediction technologies also would benefit transportation, disaster, and relief that are all impacted by weather forecasting.