

# The National Plan for Civil Earth Observations

National Research Council  
Committee on Earth Science and Applications from Space  
Washington DC  
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# Legislative Background

Sec. 702 of the NASA Authorization Act of 2010 instructs the OSTP Director to establish a mechanism to ensure greater coordination of civilian Earth observations, including the development of a strategic implementation plan that is updated at least every three years.



# Timeline

## 2011

- OSTP convened an interagency National Earth Observations Task Force (NEOTF)

## 2011-2012

- NEOTF conducted the first assessment of the Civilian Earth observations

## 2013

- OSTP released the National Strategy for Civil Earth Observations
- The U.S. Group on Earth Observations (USGEO) re-chartered as NSTC Subcommittee

## 2014

- OSTP released the National Plan for Civil Earth Observations



# Earth Observation Assessment

- Major input to the National Plan for Civil Earth Observations
  - NEOTF principals designated a working group to collaborate with appropriate subject matter experts (SMEs)
    - Over 300 Federal SMEs participated across 13 Societal Benefit Areas (SBAs)
- |  |  |
|--|--|
| <ul style="list-style-type: none"><li>• Agriculture &amp; Forestry</li><li>• Biodiversity</li><li>• Climate</li><li>• Disasters</li><li>• Ecosystems</li><li>• Energy &amp; Mineral Resources</li><li>• Human Health</li></ul> | <ul style="list-style-type: none"><li>• Ocean &amp; Coastal Resources and Ecosystems</li><li>• Space Weather</li><li>• Transportation</li><li>• Water Resources</li><li>• Weather</li><li>• Reference Measurements</li></ul> |
|--|--|



# Highlights from the National Plan for Civil Earth Observations



# National Plan Approach

- Defines a new framework for constructing a balanced portfolio of Earth observations and observing systems
- Employs a measurement-driven approach by setting aside the immediate questions of hardware, sensors, and systems in order to prioritize measurement needs
- Classifies Earth-observation activities according to two broad categories
  - Sustained Observations: Measurements generally taken for seven years or more
  - Experimental Observations: Measurements taken for a limited observing period generally for research or development purposes



# Sustained Observations

Divided into two purpose-driven subcategories:

- For public services: systematic measurements necessary to support products routinely generated for, and widely disseminated to, the general public
- For Earth system research: measurements supporting continuous data streams or generated data products that are needed for basic and applied research to advance human knowledge, to improve public services, and to support public and general education



# Sustained Observations for Public Services - Tiers

- Tier One: Measurement groups derived from systems identified in the EOA as having high impact on a majority of the Societal Benefit Areas
- Tier Two: Measurement groups derived from the remaining high impact systems identified in the Assessment
  - Many Tier Two systems contribute critically, or are essential, to key objectives in one or more societal benefit areas.
  - Some Tier Two systems are the only observing systems available for accomplishing a particular objective.





# National Plan Identified Priorities

1. Continuity of sustained observations for public services
2. Continuity of sustained observations for Earth system research
3. Continued investment in experimental observations
4. Planned improvements to sustained observation networks and surveys for all observation categories
5. Continuity of, and improvements to, a rigorous assessment and prioritization process



# National Plan Supporting Actions

- Coordinate and integrate observations
- Improve data access, management, and interoperability
- Increase efficiency and cost savings
- Improve observation density and sampling
- Maintain and support infrastructure
- Explore commercial solutions
- Maintain and strengthen international collaboration
- Engage in stakeholder-driven innovation



# Airborne, Terrestrial, and Marine Observations

- Vital to fulfilling Federal public-service obligations and research objectives across multiple SBAs
- Continuous, high-quality observations are critical for defining the current state and constant changes to the Earth system
- Observations from these platforms are required to accurately measure a number of Earth-system processes, including:
  - Weather
  - Biodiversity
  - Groundwater
  - Carbon sequestration
  - Subsurface ocean



# Airborne, Terrestrial, and Marine Observations (cont'd)

Examples of high-impact airborne, terrestrial, and marine platforms and programs identified in the EOA:

- Airborne Observations including: LiDAR, airborne meteorology, digital orthophotography, and radiosonde observations
- Terrestrial Observations including: ground-based weather radars, soil observations, and the stream gage networks
- Marine Observations including: high-frequency coastal radar network, oceanic buoys and coastal networks, and survey vessels
- Multi-platform Observations including: aquatic resource surveys, forest observations, and water-level observations



# Space-Based Observations

- Weather forecasting
- Environmental monitoring
- Disaster-risk reduction
- Water-resources assessment
- Climate-change research

*Provide critical information on atmospheric, oceanic, and terrestrial phenomena at local, regional, continental, and global scales*



# Experimental Observations

- Airborne, Terrestrial, and Marine
  - Federal agencies conduct experimental airborne, terrestrial, and marine observations to advance human knowledge through basic and applied research, to explore technical innovation, and to improve public services.
- Satellite
  - NASA, in collaboration with other agencies, conducts experimental observations of the Earth from space to advance human knowledge of the Earth as an integrated system.



# National Plan Implementation Guidance

- Budget and program-planning activities of relevant Federal agencies, and interagency processes where appropriate
- Agencies to determine implementation schedules, progress review, and funding profiles in consultation with the Executive Office of the President
- The USGEO Subcommittee will serve as primary forum for related interagency collaboration on Earth observation, data management, and international activities
- USGEO will also facilitate triennial Earth observation assessments



# Data Management Efforts and the Big Earth Data Initiative

- The National Plan includes improving data access, management, and interoperability as a supporting action to advance and maximize the benefits derived from Earth observation
- To accelerate the implementation of the Plan's data management objectives, the FY 2014 and FY 2015 budgets funded the Big Earth Data Initiative (BEDI) to improve discoverability, accessibility, & usability of the high value Earth observation data collected, managed and used across the Federal Government
- The USGEO Data Management Working Group (DMWG) coordinates BEDI across the Federal agencies and provides guidance for USGEO agencies in achieving the BEDI goals and implementation





*Thank You!*



# Backup Slides



# 2012 EOA Results: Tier One

Table 1: Tier 1 High-Impact Observation Systems (Ranked Order)

Observation System (Ranked Order)	Agency	Ag&Frst	BioDiv	Climate	Disasters	Ecosys	Energy	HumanHlth	Ocn&Cstl	Space Wx	Trans	WaterRes	Wx	RefMeas
1. Global Positioning System (GPS) satellites	DOD/USAF													
2. Next Generation Weather Radar (NEXRAD)	DOC/NOAA								*					
3. Landsat satellite	DOI/USGS, NASA										*			
4. Geostationary Operational Environmental Satellite System (GOES-NOP)	DOC/NOAA			*		*								
5. National Agriculture Imagery Program (NAIP)	USDA/FSA													
6. Airborne LIDAR	DOC/NOAA, DOD/USACE, DOI/USGS, NSF													
7. Forest Inventory and Analysis (FIA)	USDA/USFS							*						

Impact: \*



# 2012 EOA Results: Tier One

Observation System (Ranked Order)	Agency	Ag&Frst	BioDiv	Climate	Disasters	Ecosys	Energy	HumanHlth	Ocn&Cstl	Space Wx	Trans	WaterRes	Wx	RefMeas
8. Aircraft Meteorological Observations (e.g., MDCRS, AMDAR)	DOC/NOAA, Non-USG													
9. National Water Level Observation Network (NWLON)	DOC/NOAA											*		
10. Terra satellite	NASA										*			*
11. MetOp - Polar Orbiting Operational Meteorology (satellite, EUMETSAT) <sup>a</sup>	Non-USG					*				*				
12. Radiosonde Observations by National Weather Service (RAOBS)	DOC/NOAA					*			*					
13. USGS Stream Gage Network	DOI/USGS						*							
14. Suomi National Polar-orbiting Partnership (S-NPP) <u>satellite</u> <sup>b</sup>	NASA, NOAA													
15. Jason satellite	DOC/NOAA, NASA	*	*											

Impact:      \*      Moderate      High      Very High      Highest



# 2012 EOA Results: Tier Two

Table 2: Tier 2 High-Impact Observation Systems (Alphabetical Order)

Observation System (Alphabetical Order)	Agency	Ag&Frst	BioDiv	Climate	Disasters	Ecosys	Energy	HumanHlth	Ocn&Cstl	Space Wx	Trans	WaterRes	Wx	RefMeas
Advanced Composition Explorer (ACE) satellite	NASA													
Advanced National Seismic System (ANSS)	DOI/USGS													
Aerial Observers - Aerial Detection Surveys (ADS)	DOC/NOAA, USDA/USFS													
Agricultural Attaché Reports	USDA/FAS													
Agricultural Economic Data	USDA													
Airborne Geophysical Measurements	DOI/USGS, EPA													
Airborne High-Resolution Optical Imagery	DOC/NOAA, DOD, NASA, USDA													
Airborne Hyperspectral Imagery	NASA				*									

Impact: \*





# 2012 EOA Results: Tier Two

Observation System (Alphabetical Order)	Agency	Ag&Frst	BioDiv	Climate	Disasters	Ecosys	Energy	HumanHlth	Ocn&Cstl	Space Wx	Trans	WaterRes	Wx	RefMeas
Airborne Interferometric Synthetic Aperture Radar (InSAR)	Non-USG						*							
Airborne Radar - U.S. Coast Guard	DHS/USCG													
Airport Surveillance Radar (ASR)	DOT/FAA													
American Academy of Allergy Asthma & Immunology National Allergy Bureau (AAAAI-NAB) pollen counts	Non-USG													
AmeriFlux Network	DOE													
Aqua satellite	NASA										*			
Argo Oceanographic Profilers	DOC/NOAA		*		*							*		
Atmospheric Integrated Research Monitoring Network (AIRMoN)	DOC/NOAA													

Impact:      \*                        

Contributes      Moderate      High      Very High      Highest

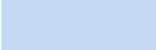





# 2012 EOA Results: Tier Two

Observation System (Alphabetical Order)	Agency	Ag&Frst	BioDiv	Climate	Disasters	Ecosys	Energy	HumanHlth	Ocn&Cstl	Space Wx	Trans	WaterRes	Wx	RefMeas
Aura satellite	NASA						*							
Automated Surface Observing System (ASOS)	DOC/NOAA, DOT/FAA		*	*		*								
Automated Weather Observing System (AWOS)	DOT/FAA		*	*		*								
Autonomous Underwater Vehicles (AUVs) - temperature, salinity, and currents measurements	DOC/NOAA						*							
Breeding Bird Surveys (BBS)	DOI/FWS													
BLM Rapid Eco-regional Assessments (REA) & other federal/state agency/NGO Landscape Assessments (RA)	DOI/BLM													
Centers for Disease Control and Prevention (CDC) Surveillance	HHS/CDC				*									
Chartered Survey Vessels for Benthic Habitat observations	DOC/NOAA						*	*						

Impact:

Contributes      Moderate      High      Very High      Highest

\*         



# 2012 EOA Results: Tier Two

Observation System (Alphabetical Order)	Agency	Ag&Frst	BioDiv	Climate	Disasters	Ecosys	Energy	HumanHlth	Ocn&Cstl	Space Wx	Trans	WaterRes	Wx	RefMeas
Chartered Vessels for Fish Surveys	DOC/NOAA													
Clean Air Status and Trends Network (CASTNET)	EPA													
Coastal Buoys (National Data Buoy Center Buoys, IOOS)	DOC/NOAA						*					*		
Commercial Fishery Catch Monitoring	DOC/NOAA													
Commercial High-Resolution Satellite Imagery	Non-USG													
Commercial Radar Satellites (e.g., RadarSat, TerraSAR-X)	Non-USG													
Deep-ocean Assessment and Reporting of Tsunamis (DART) Buoys	DOC/NOAA													
Defense Meteorological Satellite Program (DMSP)	DOD/USAF													

Impact: \*

Contributes   Moderate   High   Very High   Highest





# 2012 EOA Results: Tier Two

Observation System (Alphabetical Order)	Agency	Ag&Frst	BioDiv	Climate	Disasters	Ecosys	Energy	HumanHlth	Ocn&Cstl	Space Wx	Trans	WaterRes	Wx	RefMeas
Direct Reports from Farmers (Crop Reports, FSA Form 578)	USDA/FSA													
Disaster Incident Reports	EPA, DHS/FEMA													
Disaster Monitoring Constellation (DMC) satellites (foreign)	Non-USG					*								
DOE Atmospheric Radiation Measurement (ARM) Climate Research Facility	DOE							*						
Drifting Buoy Network	DOC/NOAA		*				*	*				*		
Earth Observing Satellite - 1 (EO-1)	NASA													
EPA Emissions Source Testing/ Measurement Programs (EST/M)	EPA													
EPA Water Quality Samples	EPA				*									

Impact:      \*      Moderate      High      Very High      Highest



# 2012 EOA Results: Tier Two

Observation System (Alphabetical Order)	Agency	Ag&Frst	BioDiv	Climate	Disasters	Ecosys	Energy	HumanHlth	Ocn&Cstl	Space Wx	Trans	WaterRes	Wx	RefMeas
Farm Operator Surveys	USDA/NASS					*								
Farm Service Agency Reporting	USDA					*								
Fish and Wildlife Service Inventory and Monitoring (I&M) Program	DOI/FWS													
Fisheries Observers on Commercial Vessels	DOC/NOAA													
Global Avian Influenza Surveillance	HHS/CDC													
Global Biodiversity Information Facility Network (GBIF)	DOI/USGS	*												
Global Change Observation Mission - Water (GCOM-W) Advanced Microwave Scanning Radiometer 2 (AMSR2)	Non-USG													
Global Climate Observing System (GCOS) Upper Air Network (GUAN)	Non-USG					*					*			

Impact:      \*      **Contributes**      **Moderate**      **High**      **Very High**      **Highest**



# 2012 EOA Results: Tier Two

Observation System (Alphabetical Order)	Agency	Ag&Frst	BioDiv	Climate	Disasters	Ecosys	Energy	HumanHlth	Ocn&Cstl	Space Wx	Trans	WaterRes	Wx	RefMeas
Global Lake Ecological Observatory Network (GLEON)	NSF													
Global Navigation Satellite System Meteorology (GNSS-Met)	DOC/NOAA			*				*			*	*		
Global Ocean Observing System (GOOS) Tropical Moorings (TAO/RAMA/PIRATA)	DOC/NOAA		*		*									
Global Sea Level Observing System (GLOSS) (international)	Non-USG										*			
Global Seismographic Network (GSN)	DOI/USGS, NSF													*
Gravity Field and Steady-State Ocean Circulation Explorer (GOCE)	Non-USG										*	*		
Gravity for the Redefinition of the American Vertical Datum (GRAV-D)	DOC/NOAA											*		
Gravity Recovery and Climate Experiment (GRACE) satellite	NASA												*	
<div> <div>Contributes</div> <div>Moderate</div> <div>High</div> <div>Very High</div> <div>Highest</div> </div> <div> Impact: * </div>														



# 2012 EOA Results: Tier Two

Observation System (Alphabetical Order)	Agency	Ag&Frst	BioDiv	Climate	Disasters	Ecosys	Energy	HumanHlth	Ocn&Cstl	Space Wx	Trans	WaterRes	Wx	RefMeas
High Frequency (HF) Coastal Radars	DOC/NOAA						*						*	
International Doppler Radar	Non-USG													
International Global Navigation Satellite Systems (GNSS)	Non-USG				*						*			
International Magnetometers	Non-USG													
Jet Propulsion Lab MODIS/ASTER airborne simulator (JPL MASTER)	NASA													
Lightning Data Buy	DOC/NOAA											*		
Long-Term Ecological & Agroecosystem Research Networks & International LTER (LTER/LTAR/ILTER)	NSF, USDA						*							
Low Level Windshear Alert System (LLWAS)	DOT/FAA													

Impact:      \*      **Contributes**      **Moderate**      **High**      **Very High**      **Highest**



# 2012 EOA Results: Tier Two

Observation System (Alphabetical Order)	Agency	Ag&Frst	BioDiv	Climate	Disasters	Ecosys	Energy	HumanHlth	Ocn&Cstl	Space Wx	Trans	WaterRes	Wx	RefMeas
Meteosat satellite (EUMETSAT)	Non-USG		*	*				*	*					
Micro-Pulse LIDAR Network (MPLNET)	NASA						*							
Multifunctional Transport Satellite (MTSAT) Imager for Weather and Aviation Control (Japan)	Non-USG			*			*	*			*			
National Air Toxics and Trends Stations (NATTS)	EPA													
National Animal Health Surveillance System (NAHSS)	USDA/APHIS													
National Aquatic Resource Surveys (NARS)	EPA													
National Ballast Information Network	DHS/USCG													
National Cooperative Soil Survey	USDA/NRCS													
<div> <div>Contributes</div> <div>Moderate</div> <div>High</div> <div>Very High</div> <div>Highest</div> </div> <div> <div>Impact:</div> <div>*</div> <div></div> <div></div> <div></div> <div></div> </div>														

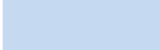





# 2012 EOA Results: Tier Two

Observation System (Alphabetical Order)	Agency	Ag&Frst	BioDiv	Climate	Disasters	Ecosys	Energy	HumanHlth	Ocn&Cstl	Space Wx	Trans	WaterRes	Wx	RefMeas
National Park Service Inventory and Monitoring (I&M)	DOI/NPS													
National Phenology Network (NPN)	DOI/NPS, DOI/USGS, NSF													
National Weather Service (NWS) Cooperative Observer Program (COOP)	DOC/NOAA													
National Weather Service Skywarn Spotters	DOC/NOAA										*		*	
NOAA and Chartered Aircraft for Protected Species Surveys	DOC/NOAA													
NOAA Global Monitoring Division Observatories	DOC/NOAA													
NOAA Profiler Network	DOC/NOAA		*	*								*		
NOAA Recreational Fish Surveys	DOC/NOAA													

Impact:

Contributes      Moderate      High      Very High      Highest

\*         



# 2012 EOA Results: Tier Two

Observation System (Alphabetical Order)	Agency	Ag&Frst	BioDiv	Climate	Disasters	Ecosys	Energy	HumanHlth	Ocn&Cstl	Space Wx	Trans	WaterRes	Wx	RefMeas
NOAA Ship and Chartered Ship for Coral Reef Field Surveys	DOC/NOAA													
NOAA Ships - Fish Surveys	DOC/NOAA													
NOAA Ships - Hydrographic Surveys	DOC/NOAA				*						*			
NOAA Ships - Protected Species Observations	DOC/NOAA													
Non-Federal Biological Surveys	Non-USG	*												
Ocean Reference Station Buoys	DOC/NOAA							*						
Physical Oceanographic Real-Time System (PORTS)	DOC/NOAA				*		*							
Pilot Reports (PIREPS)/Aircraft Reports (AIREPS)	DOT/FAA		*									*		

Impact:
   
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 Contributes
   
 Moderate
   
 High
   
 Very High
   
 Highest





# 2012 EOA Results: Tier Two

Observation System (Alphabetical Order)	Agency	Ag&Frst	BioDiv	Climate	Disasters	Ecosys	Energy	HumanHlth	Ocn&Cstl	Space Wx	Trans	WaterRes	Wx	RefMeas
Polar-orbiting Operational Environmental Satellite System (POES) <sup>a</sup>	DOC/NOAA		*											
Port Radars	DHS/USCG													
Portable Water Gages	DOC/NOAA, DOI/USGS													
Rain Gage Networks (state, local)	Non-USG				*						*			
Regional and State Mesonetworks	DOC/NOAA		*			*					*			
Road Weather Information Systems (RWIS)	DOT/FHWA													
Satellite Pour l'Observation de la Terre (SPOT) (France)	Non-USG				*			*						
Sentinel Animals (state and local)	Non-USG						*							

Impact: \* **Contributes** **Moderate** **High** **Very High** **Highest**

<sup>a</sup> Both MetOp satellites and POES system are part of the constellation required to meet the key objectives in relevant SBAs.





# 2012 EOA Results: Tier Two

Observation System (Alphabetical Order)	Agency	Ag&Frst	BioDiv	Climate	Disasters	Ecosys	Energy	HumanHlth	Ocn&Cstl	Space Wx	Trans	WaterRes	Wx	RefMeas
Shipboard Radars	DHS/USCG, DOC/NOAA, DOD/USN													
Ships of Opportunity Program (SOOP)	DOC/NOAA						*							
Small Boat Charters - Harmful Algal Bloom Water Sampling	DOC/NOAA													
Smithsonian Institution Global Earth Observatory (SIGEO)	SI													
SNOWpack TELelemetry (SNOTEL)	USDA/NRCS						*							
Soil Climate Analysis Network (SCAN)	USDA/NRCS						*							
Soil Moisture and Ocean Salinity Mission (SMOS) satellite (ESA)	Non-USG													
Solar and Heliospheric Observatory (SOHO) satellite	NASA													
<div> <div>Contributes</div> <div>Moderate</div> <div>High</div> <div>Very High</div> <div>Highest</div> </div> <div> <div>Impact:</div> <div>*</div> <div></div> <div></div> <div></div> <div></div> </div>														



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Observation System (Alphabetical Order)	Agency	Ag&Frst	BioDiv	Climate	Disasters	Ecosys	Energy	HumanHlth	Ocn&Cstl	Space Wx	Trans	WaterRes	Wx	RefMeas
Solar Dynamics Observatory (SDO) satellite	NASA													
Solar Electro-Optical Network (SEON)	DOD/USAF													
Solar Terrestrial Relations Observatory (STEREO) satellites	NASA													
Sound Velocimeter for hydrographic surveys	DOC/NOAA													
Spatially Enhanced Broadband Array Spectrograph System (SEBASS)	NASA													
State and Local Stream Gage Networks	DOI/USGS	*			*		*	*			*			*
State and Local Water Level Networks	DOI/USGS													
Terminal Doppler Weather Radar (TDWR)	DOT/FAA							*					*	
<div> <div>Contributes</div> <div>Moderate</div> <div>High</div> <div>Very High</div> <div>Highest</div> </div> <div> <div>Impact:</div> <div>*</div> <div></div> <div></div> <div></div> <div></div> </div>														



# 2012 EOA Results: Tier Two

Observation System (Alphabetical Order)	Agency	Ag&Frst	BioDiv	Climate	Disasters	Ecosys	Energy	HumanHlth	Ocn&Cstl	Space Wx	Trans	WaterRes	Wx	RefMeas
Toxics Release Inventory (TRI)	EPA													
Tropical Rainfall Measuring Mission (TRMM) satellite	NASA		*		*				*					
U.S. Army Corps of Engineers Hydrographic Surveys	DOD/USACE													
U.S. Census Data on Population and Roads	DOC/ Census													
Unmanned Aircraft Systems (UAS) - Surveys and Surveillance	DOC/NOAA, DOD, DOI/USGS				*				*					
US Gap Analysis Program (GAP) - assessing biodiversity conservation	DOI/USGS													
USGS Geomagnetic Observatories	DOI/USGS													*
USGS In Situ Water Quality Sensors	DOI/USGS	*	*		*						*			
<div> <div>Impact:</div> <div> <div>Contributes</div> <div>Moderate</div> <div>High</div> <div>Very High</div> <div>Highest</div> </div> <div> <div>*</div> <div></div> <div></div> <div></div> <div></div> </div> </div>														



# 2012 EOA Results: Tier Two

Observation System (Alphabetical Order)	Agency	Ag&Frst	BioDiv	Climate	Disasters	Ecosys	Energy	HumanHlth	Ocn&Cstl	Space Wx	Trans	WaterRes	Wx	RefMeas
USGS Inner Shelf Vessels for Benthic Habitat Observation	DOI/USGS													
USGS National Groundwater Stations	DOI/USGS				*		*	*						
USGS Water Quality Samples	DOI/USGS				*									
Very Long Baseline Interferometry (VLBI)	NSF													
Voluntary Observing Ships (VOS)	DOC/NOAA		*					*				*		
Water Resources Field Experiments	DOI/USGS													
WC-130 - U.S. Air Force - Hurricane Hunter aircraft	DOD/USAF		*						*		*	*		
WMO Global Observing System (GOS) - Surface	Non-USG				*	*					*			

Impact:      **Contributes**      **Moderate**      **High**      **Very High**      **Highest**

\*      [Light Blue Box]      [Dark Blue Box]      [Dark Blue Box]      [Dark Blue Box]



# 2012 EOA Results: Tier Two

Observation System (Alphabetical Order)	Agency	Ag&Frst	BioDiv	Climate	Disasters	Ecosys	Energy	HumanHlth	Ocn&Cstl	Space Wx	Trans	WaterRes	Wx	RefMeas
WMO Global Observing System (GOS) - Upper Air	Non-USG			*		*								
World Aviation Forecast System Internet File Services (WIFS)	DOT/FAA													

Impact:      \*      

**Note:** The EOA value chain began by identifying high-impact data sets and information products, and then observing systems that generate or contribute to those data sets and information products. As a result, the EOA captured the impact of certain non-USG sources of data, including from international, non-governmental, and commercial partners. Furthermore, the EOA results are derived from the findings of the SBA subject matter experts, and may not reflect all uses of well-known observing systems. In the table above, an asterisk indicates that the EOA scored this system as contributing to the SBA but not at a moderate or high level.

