2012 National Earth Observations Task Force Portfolio Assessment

Briefing to CENRS Subcommittee for Disaster Reduction (SDR)

March 1, 2012

David Helms, Pam Taylor

NOAA

Overview

- Purpose / Background
- NEO Portfolio Assessment Approach
- Expected Outcomes/Deliverables
- Timelines
- Methodology / NOAA Pilot Study
- SDR Involvement
- Progress to Date
- Next Steps

Purpose / Background

- OSTP established the NEO Task Force in Feb 2011
  - Develop a National Earth Observation Strategy
  - Assess and prioritize the nation's portfolio of Earth observing systems and networks following a common methodology
  - End goal: 10-year Implementation Plan to inform OMB; triennial updates

- Disasters is one of multiple service areas identified as part of the assessment
- Help is needed from the SDR to identify subject matter experts to participate across the full range of disasters

Background

- NEO Task Force Assessment Working Group (AWG) formed in November, 2011
  - **Conduct and deliver the first National Assessment**
  - Co-chairs:
    - Peter Colohan, OSTP
    - John Crowe, USGS
    - David Halpern, NASA
    - Pamela Taylor, NOAA
  - Member agencies: USDA, NOAA, NIST, DOE, NSF, Smithsonian Institution, USAID, OFCM , USGS
  - Societal Benefit Area (SBA) Teams being formed to lead the assessment for each SBA

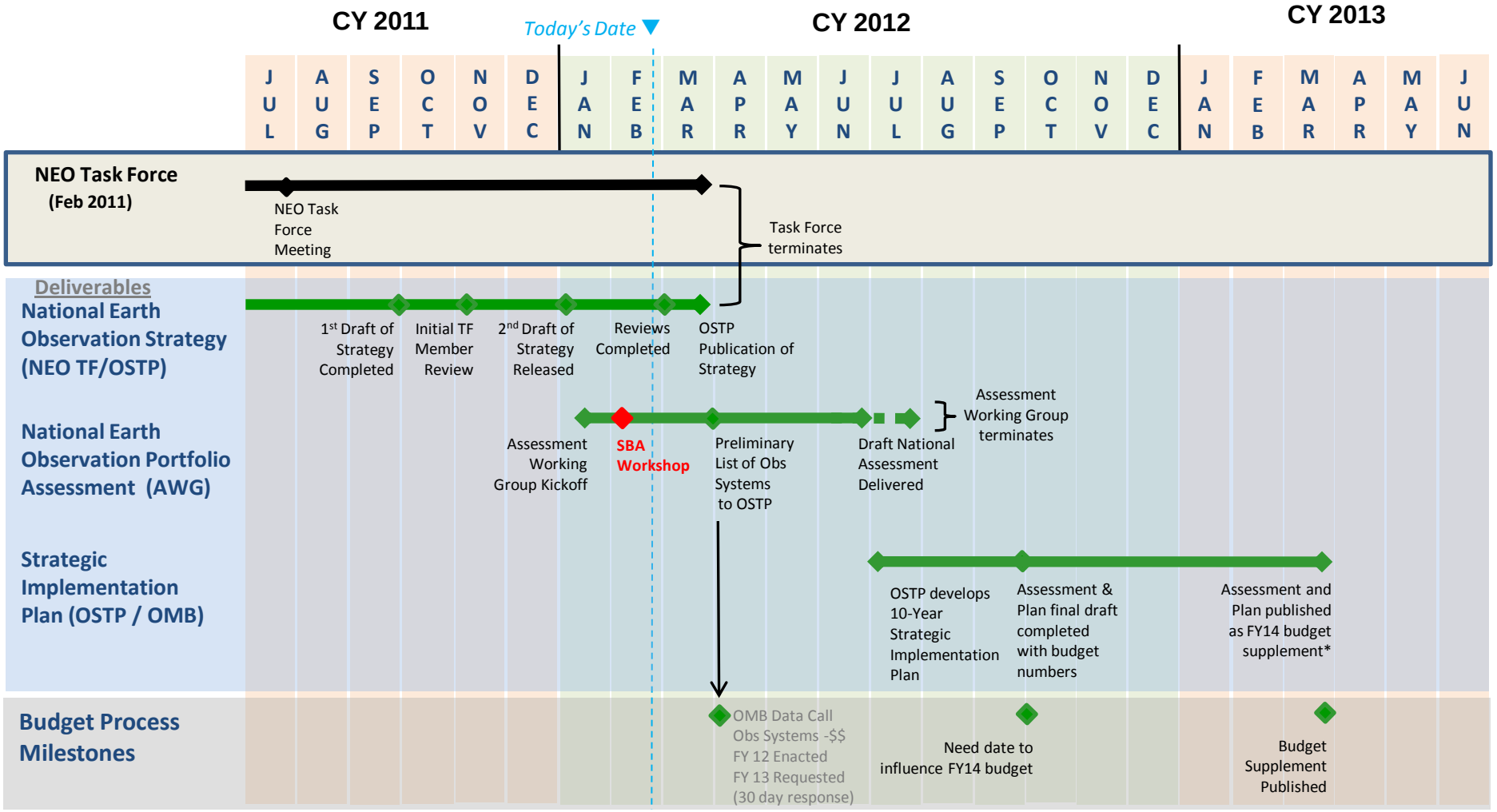
SBA Leads /Agencies

SBA	Team Lead
Agriculture & Forestry	Ken Brewer (USDA FS), Dan Good (USDA NRCS)
Biodiversity	Bruce Jones (USGS DRI)
Climate	Pat Jellison (NASA / USGCRP)
Disasters	**David Helms (NOAA), Lind Gee (USGS)**
Ecosystems (Terrestrial & Freshwater)	Roger Sayre (USGS)
Energy & Earth Resources	Gerald Geernaert (DOE)
Human Health	Lorrie Backer (CDC)
Ocean & Coastal Resources	Mike Ford (NOAA)
Space Weather	Mike Bonadonna (OFCM)
Transportation	Paul Pisano (DOT)
Water Resources	Bill Kustas (USDA ARS)
Weather	Margaret McCalla (OFCM)
Reference Measurements	Knute Berstis (NOAA)

Assessment Approach

- SBA assessments will occur broadly in two phases
  - Phase 1 (~Feb-Mar 12) – Focus will be on assessing the current portfolio of systems that provide observations
    - Result will be a baseline assessment of the current observing system portfolio by SBA
  - Phase 2 (~Apr 12) – Starting with current portfolio identified in Phase 1, SBA teams will examine data gaps, alternatives, new technologies, and research needed to maximize societal benefits over the 10-year planning period
    - Result will be a recommended 10-year portfolio

NEO Task Force and AWG Timelines

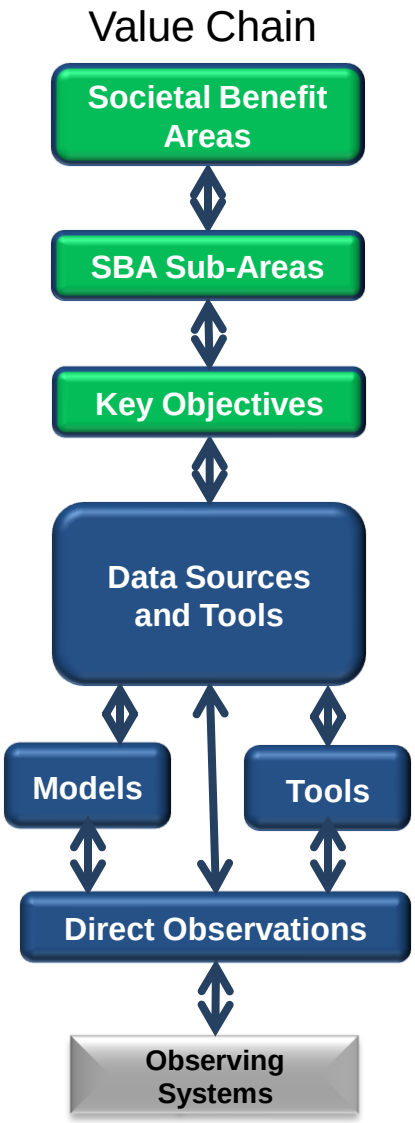


* Full Academy Review and Stakeholder Forums to follow

Applying Proven Technique

- NEO assessment approach drawn from NOAA's Observing System Integrated Analysis (NOSIA) Pilot Study
  - In 2010 NOAA senior leaders directed a study to identify an optimum observing system portfolio for upper air observations via a pilot study (included 44 different obs systems); Study period Jun - Dec 2011
  - Approach selected based on maturity/breadth of previous application by other industry and Federal agencies
  - NOAA Observing System Council endorsed the results of the study and the methodology and recommended for application NOAA-wide
  - NEO Task Force AWG decided to apply similar technique, benefiting from this recent NOAA experience
  - Key elements include
    - A "value tree" which traces the linkages between Earth observations and societal benefit
    - An impact-based, swing-weighting approach to assess relative performance and criticality of inputs at each level of the value chain

NEO Portfolio Value Chain Elements



NEO Task Force Assessment Value Chain

- The value chain is a linked collection of activities that begins with an Earth observation, adds value to it to ultimately achieve a key objective or deliver a product or service, which in turn contributes to a societal benefit
- SBA Sub-Areas provide a natural breakdown of the SBA into topical/application areas that encompass the major functions within the SBA
- Key Objectives represent the most important things to be accomplished within the Sub-Area
  - Accomplishment of the objective must rely at least in part on Earth observations
- Data Sources and Tools include direct observations, model output, intermediate products, and tools that require Earth observations to achieve the Key Objectives

  ****REQUIRES SME INPUT
- Observing Systems

Disaster SBA: Sub-Areas and Key Objectives

Sub-Area	Air		Land		Water	
Key Objective	Severe Thunderstorm	Winter Storms	Wildfires	Volcano-Land	Floods-Fresh	Techno-Water
	Volcano-Ash	Hurricanes	Landslides	Earthquakes	Coastal Inundation - Storm Surge	Erosion-Bathymetry Change (Nav)
	Techno-Air	Heat Waves	Techno-Land		Coastal Inundation-Tsunami	
		Solar/ Magnetic Storms				

SDR Involvement - Phases

- SDR assessments will occur broadly in two phases
  - Phase 1 (current through March 15)
    - Identify Program Leads (March 8)
    - Identify Program Subject Matter Experts (SMEs) (March 15th)
    - Schedule SME interviews to collect observing system impact data (March 15 through April 12)
  - Phase 2 (~Apr 12) – Starting with current portfolio identified in Phase 1, SBA teams will examine data gaps, alternatives, new technologies, and research needed to maximize societal benefits over the 10-year planning period
    - Result will be a recommended 10-year portfolio

SDR Progress to Date

- SDR Email to Member sent February 17, 2012
- Data collection:
  - Co-Chair Identified: Lind Gee/USGS
  - USGS proceeding well (Lind Gee)
  - NOAA started (Nell Codner), but needs to expand rapidly
  - Limited responses from other Agencies
- Concern we will not capture full spectrum of observing systems supporting disaster responses

SDR Next Steps

- Re-send SDR request for support ???
- Contract Program Managers directly
- Focus on major program areas
- Use disaster response plans as starting point
- Other ?

- Outcome will be used to inform budgetary process…


Rockford
Crystal Lake
Elgin
Aurora
Des Moines
Iowa City
South Bend
Fort Wayne

Questions?

Backup Slides

SDR Involvement: Disaster Key Objectives

SBA	Sub-Area	Key Objective (KO)	Derivative KO	Description	Monitor	Predict /Assess Risk/ Warn	Mitigate/ Recovery /Post Event Assessment	Understand	Educate
Disasters	Air	Heat Waves	Wildfires, Landslides, Transportation SBA (rail, surface, pipeline), Air Quality-Human Health, Energy	Prolonged period (3+ days) of (warm season) very high surface temperatures which cause widespread human suffering					
Disasters	Air	Hurricanes (Typhoons)	Techno-Water, Techno-Land, Techno-Air, Floods-Coast, Floods-Fresh, Landslides, Solid-Earth Change	A tropical cyclone which is capable of generating a combination of large waves, high winds, and heavy rainfall, often resulting in significant impacts to infrastructure, public safety, and eco-systems					
Disasters	Air	Severe Thunderstorms	Transportation SBA (aviation), Human Health	An intense thunderstorm capable of producing a combination of Tornados, Strong Winds, Lightning, Hail, Flash Floods					
Disasters	Air	Technological-Air	Transportation SBA (aviation), Air Quality-Human Health	Release of Nuclear, Chemical, Biological gas which is carried by prevailing wind to down-stream locations					
Disasters	Air	Volcanic Eruptions-Ash	Floods-Fresh, Air Quality-Human Health, Transportation SBA (aviation)	Suspended Ash Cloud containing substantial volcanic ash which can cause aircraft engine failure (abrasion), impact human and eco-system health, and change river flow					
Disasters	Air	Winter Storms	Floods-Coast, Floods-Fresh, Solid-Earth Change, Transportation SBA (aviation, surface, rail), Energy	A winter storm a impacting a large geographical area with a climatically large amount of snow, ice, and/or freezing rain, often accompanied with very cold surface temperatures and strong winds.					
Disasters	Air	Solar/Magnetic Storms	Energy (power distribution), Communications (terrestrial and satellite), Transportation SBA (aviation-polar, navigation-gps)	Major solar/magnetic storms degrades satellite and terrestrial communications, decreases GPS navigation accuracy, increases radiation exposure to aircraft transiting polar regions and manned spacecraft, disrupts power distribution at mid and high latitudes.					
Disasters	Land	Earthquakes	Techno-Water, Techno-Land, Techno-Air, Floods-Tsunami, Wildfires, Landslides, Solid-Earth Change, Transportation SBA (all), Energy	A large magnitude Earth Quake which results in significant damage to infrastructure and substantial movement in Earth surface					

SDR Involvement
Disaster Key Objectives

SBA	Sub-Area	Key Objective (KO)	Derivative KO	Description	Monitor	Predict /Assess Risk/ Warn	Mitigate/ Recovery /Post Event Assessment	Understand	Educate
Disasters	Land	Landslides	Floods-Tsunami, Transportation SBA (rail, surface, pipeline)	A landslide is a significant ground movement, such as rockfalls, deep failure of slopes and shallow debris flows, which can occur in offshore, coastal and onshore environments.					
Disasters	Land	Technological-Land	Technological-Water	Chemical, Oil spills on land					
Disasters	Land	Volcanic Eruptions-Land	Volcanic Eruptions-Ash, Floods-Fresh, Landslides, Wildfires	Lava, Lahars, Glacier Melts					
Disasters	Land	Wildfires	Air Quality-Human Health, Landslides, Transportation SBA (surface), Floods-Fresh	Large, uncontrolled, wildfires which burn homes, damage infrastructure and natural resources, put at risk firefighters and public, impact local economies					
Disasters	Water	Coastal Inundation - Storm Surge	Transportation SBA (surface, barge, rail)	Water level rising above the mean high tide level caused by a combination of storm surge, waves, astronomic tides, and fresh water in-flow					
Disasters	Water	Coastal Inundation-Tsunami	Techno-Water, Techno-Land, Techno-Air, Solid-Earth Change, Health, Transportation SBA (surface, barge, rail, pipelines), Water Quality-Human and Ecosystem Health	A large amplitude rapidly-moving ocean wave caused by movement of the ocean floor					
Disasters	Water	Erosion - Bathymetry Change (Nav)	Transportation SBA (barge, surface, rail)	Significant Erosion/Deposition, Movement of sand bars and sediments, changes to shipping lanes, damage to levees and Navigation Aids requiring inspections and revalidation of geo-spatial information					
Disasters	Water	Floods-Fresh	Floods-Coast, Landslides, Transportation SBA (barge), Energy (hydro), Water Quality-Human Health	River Flooding is the raise in fresh water level above flood stage which over-tops levees, floods farm land and cities, disrupts barge traffic, and increases river pollution					
Disasters	Water	Technological-Water	Water Quality-Human Health, Ecosystem Health	Release of Nuclear, Chemical/Oil, Biological, or Nuclear liquids into the ocean which are carried by ocean current to down-stream locations impacting public safety, economy, and health of ecosystems					

Disasters

- Societal benefits accrue from ability to monitor, predict, mitigate, respond to, assess the risk of, and provide early warning of events
- NSTC Subcommittee on Disaster Reduction identified four key characteristics of disaster-resilient communities: (1) relevant hazards are recognized and understood; (2) communities at risk know when a hazard event is imminent; (3) individuals at risk are safe from hazards in their homes and places of work; and (4) communities experience minimum disruption to life and economy after a hazard event has passed

- Sub-Areas:
  - Earthquakes
  - Floods
  - Landslides
  - Tropical Cyclones
  - Other Severe Weather (e.g., tornadoes, severe thunderstorms/hail, winter storms, heat waves
  - Volcanic Eruptions
  - Wildfires
  - Oil/Chemical Spills
  - Space Weather

"Observing System" – Working Definition

Working Definition for Earth Observing System
Feb 7, 2012

Observing System :
A collection of one or more sensing elements that directly or indirectly collects observations of the Earth, measures environmental parameters, or surveys biological or other Earth resources (land surface, biosphere, solid Earth, atmosphere, and oceans). Sensing elements may be deployed as individual sensors or as constellations of sensors and may include instrumentation and or human elements. Platforms may be space based, air-borne, or in-situ. Observing systems produce and record measures and observations and may require sensor models to process raw observations to a form in which they are exploitable.

For the purposes of the NEO assessment, Earth observing systems will be addressed at the program level. Further, consideration of Earth observation systems with primary dependency on human Earth observation sensing elements will be limited to those programs which regularly and systematically collect observations and measures to produce periodically required data that are vital to an agency's mission.