

# NOAA Observing System Integrated Analysis (NOSIA) Applications



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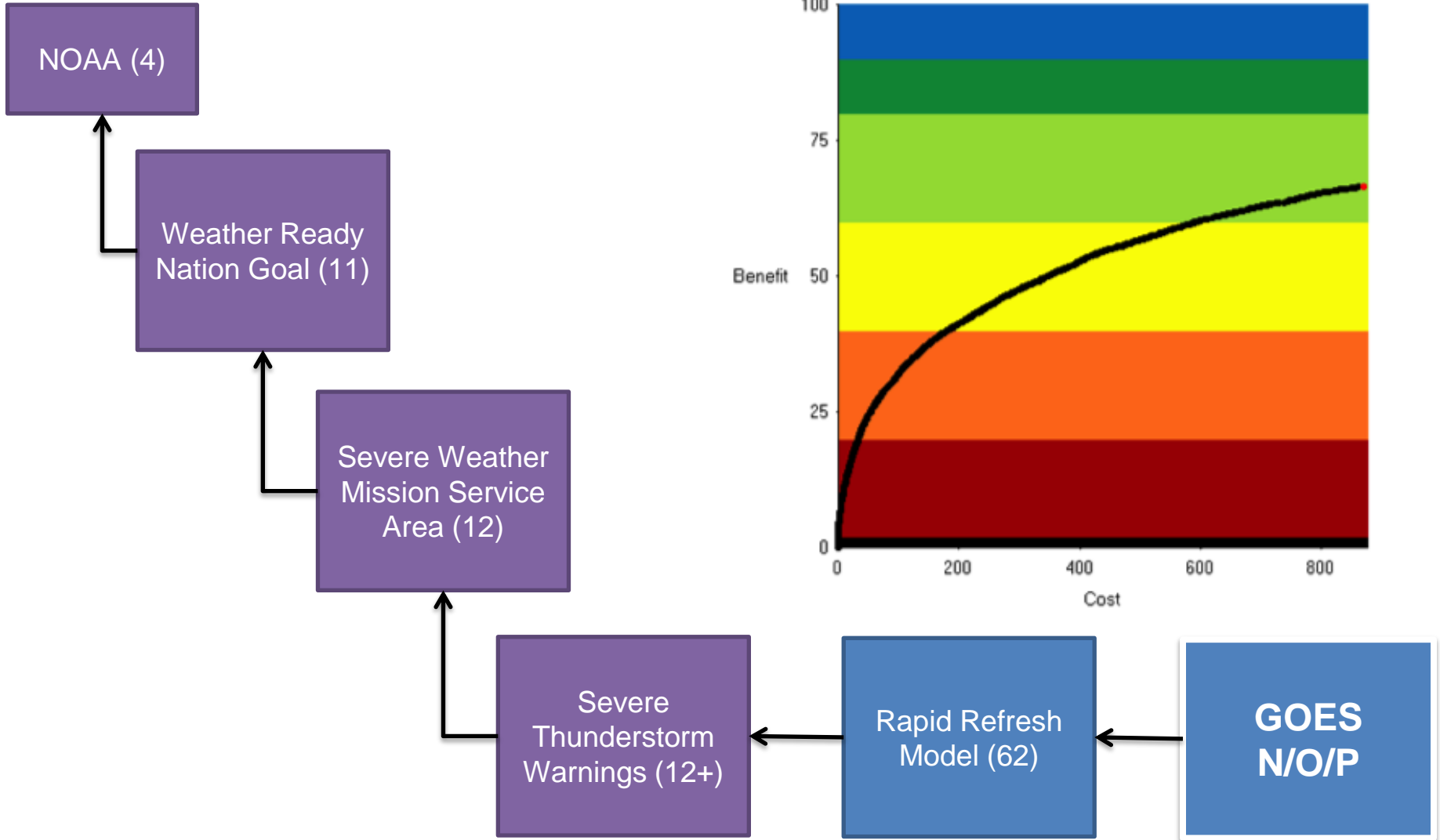
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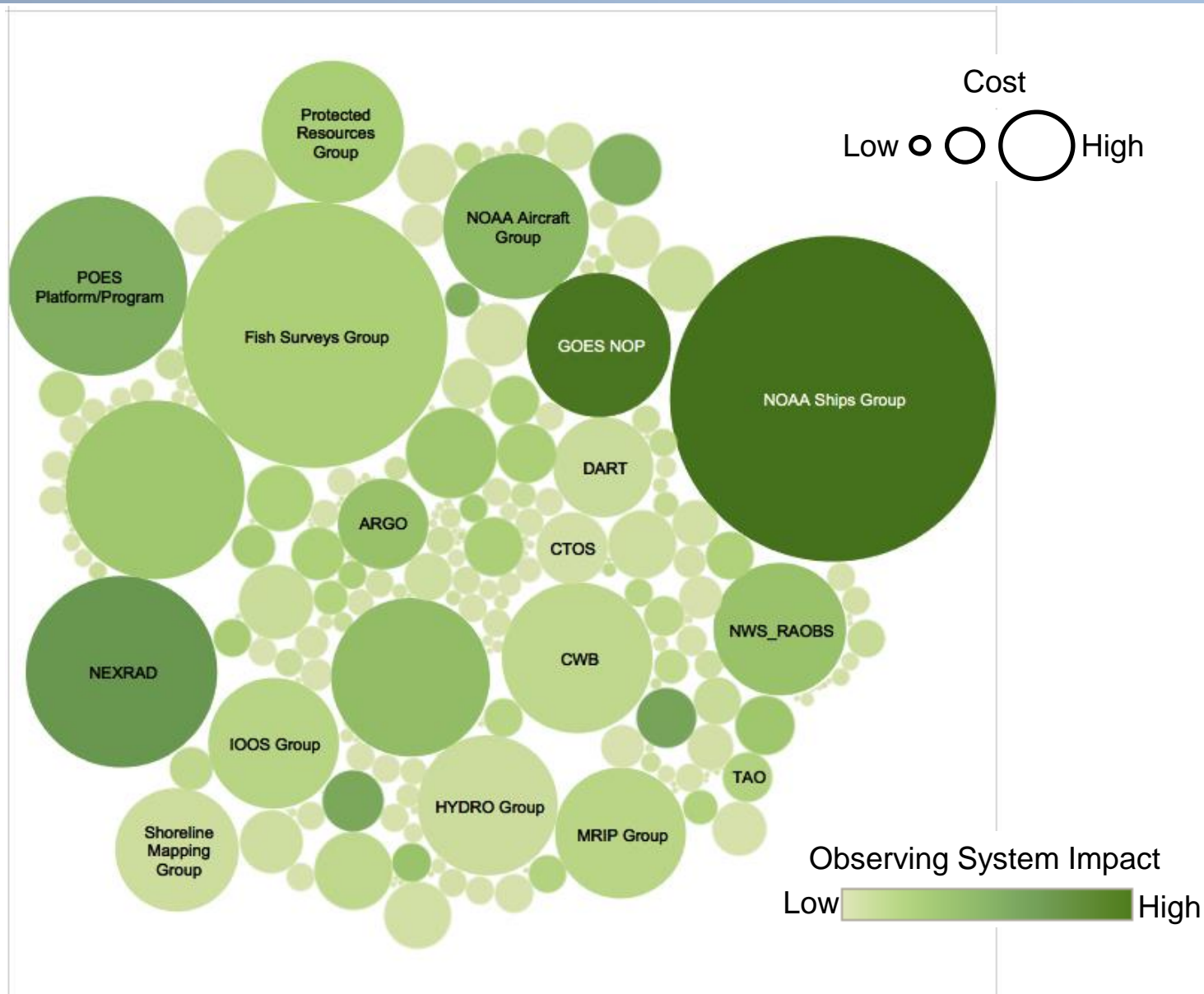
**Objective:** To leverage the PALMA™ analysis of NOSIA-II data to support NOAA's core mission and business practices. Three areas of discussion for today's presentation:

1. Value Tree Data Mining
2. Prioritization of Satellite-Observed Environmental Parameters
3. NOAA Observing System Architecture

# Top of Connection Path



# NOSIA Cost vs. Impact Bubbleview



# GOES Impact Ranking

Very High
High
Moderate
Low
Supplemental

Rank	Data Source	Cost Category	Impact Category	Score (65.92)
1	NOAA Ships	Very High	Very High	3.96
2	<b>GOES NOP</b>	High	Very High	3.80
3	NEXRAD	High	Very High	2.61
4	METOP	Moderate	Very High	2.22
5	NWLON	Moderate	Very High	2.11
6	POES	High	Very High	1.96
7	JASON	Moderate	Very High	1.90
8	UNOLS	Moderate	Very High	1.84
9	NOAA Aircraft	High	Very High	1.62
10	Commercial Fisheries Dependent Data Surveys	High	Very High	1.51

Climate Adaptation and Mitigation			Healthy Oceans		Resilient Coastal Communities and Economies		Weather Ready Nation	
Rank	Data Source	Score (68.96)	Data Source	Score (51.54)	Data Source	Score (69.40)	Data Source	Score (73.87)
1	JASON	5.61	NOAA Ships	6.67	NOAA Ships	5.31	<b>GOES NOP</b>	12.8
2	Polar Operational Environmental Satellites	4.49	Commercial Fisheries Dependent Data Surveys	5.41	National Water Level Observation Network	5.24	NEXRAD	8.07
3	MetOp	4.13	University-National Oceanographic Laboratory System	4.92	NERR SWMP	3.75	METOP	3.65
4	NOAA Ships	3.77	Science Field Collections	4.82	Grav-D Geoid Modeling	3.12	NWS Radiosondes	3.5
5	ARGO	3.74	National Observer Program	3.97	Coral Reef Ecosystem Integrated Observing System	2.8	ASOS/AWOS	3.43
6	Drifting Buoy Network	2.12	Habitat Surveys	3.65	NOAA Aircraft	2.51	POES	2.41
7	Tropical Atmosphere Ocean Buoys	2.01	Fish Surveys	3.24	Global Positioning System	2.07	National Water Level Observation Network	1.41
8	NWS Cooperative Observer Program	2.01	Protected Resources	3.17	System Wide Monitoring	1.98	Mesonets	1.38
9	DMSP	1.98	Animal Borne Sensors	2.61	Global Sea Level Observing System	1.83	Lightning Data Buy	1.32
10	<b>GOES NOP</b>	1.68	Great Lakes Environmental Research Laboratory	2.37	State & Local Water Quality Monitoring	1.74	Suomi NPP	1.14

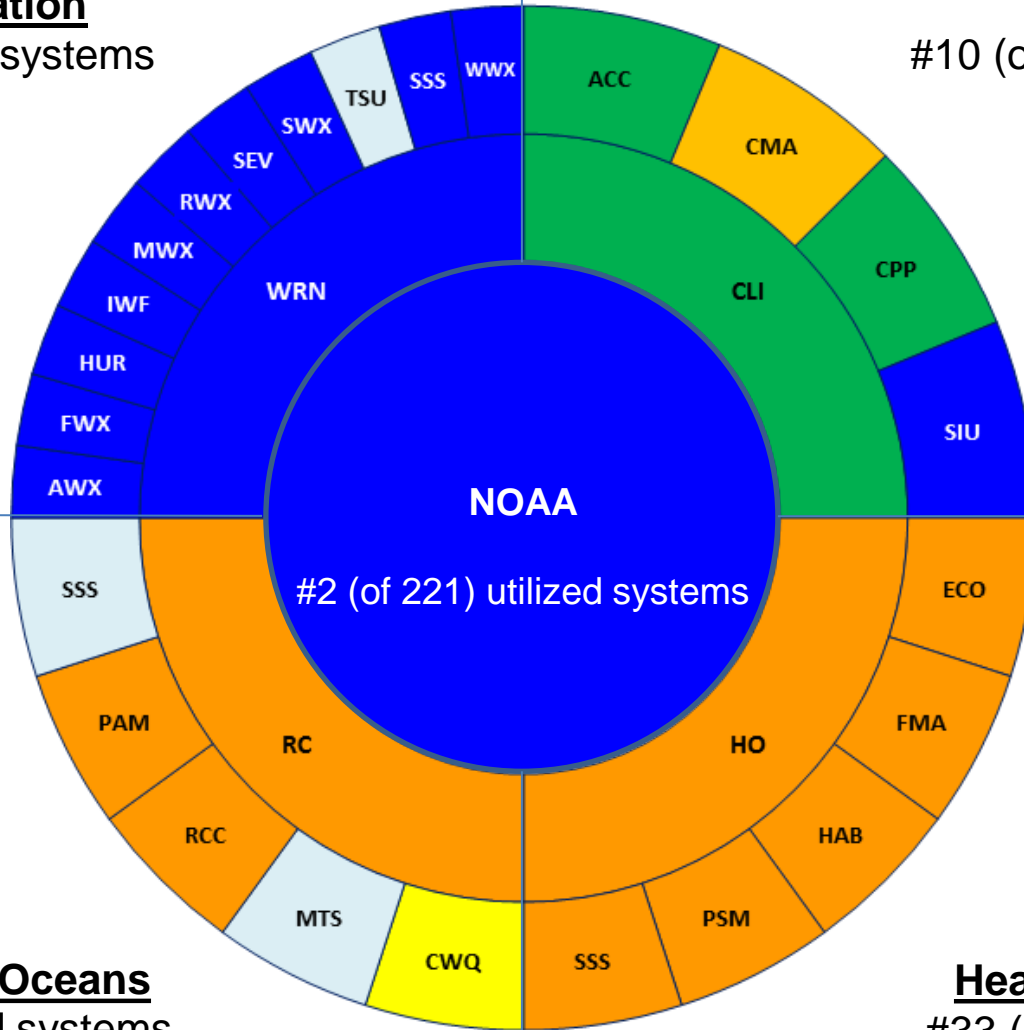
# GOES-NOP HEAT MAP

## Weather Ready Nation

#1 (of 148) utilized systems

## Climate

#10 (of 158) utilized systems



## Resilient Coasts - Oceans

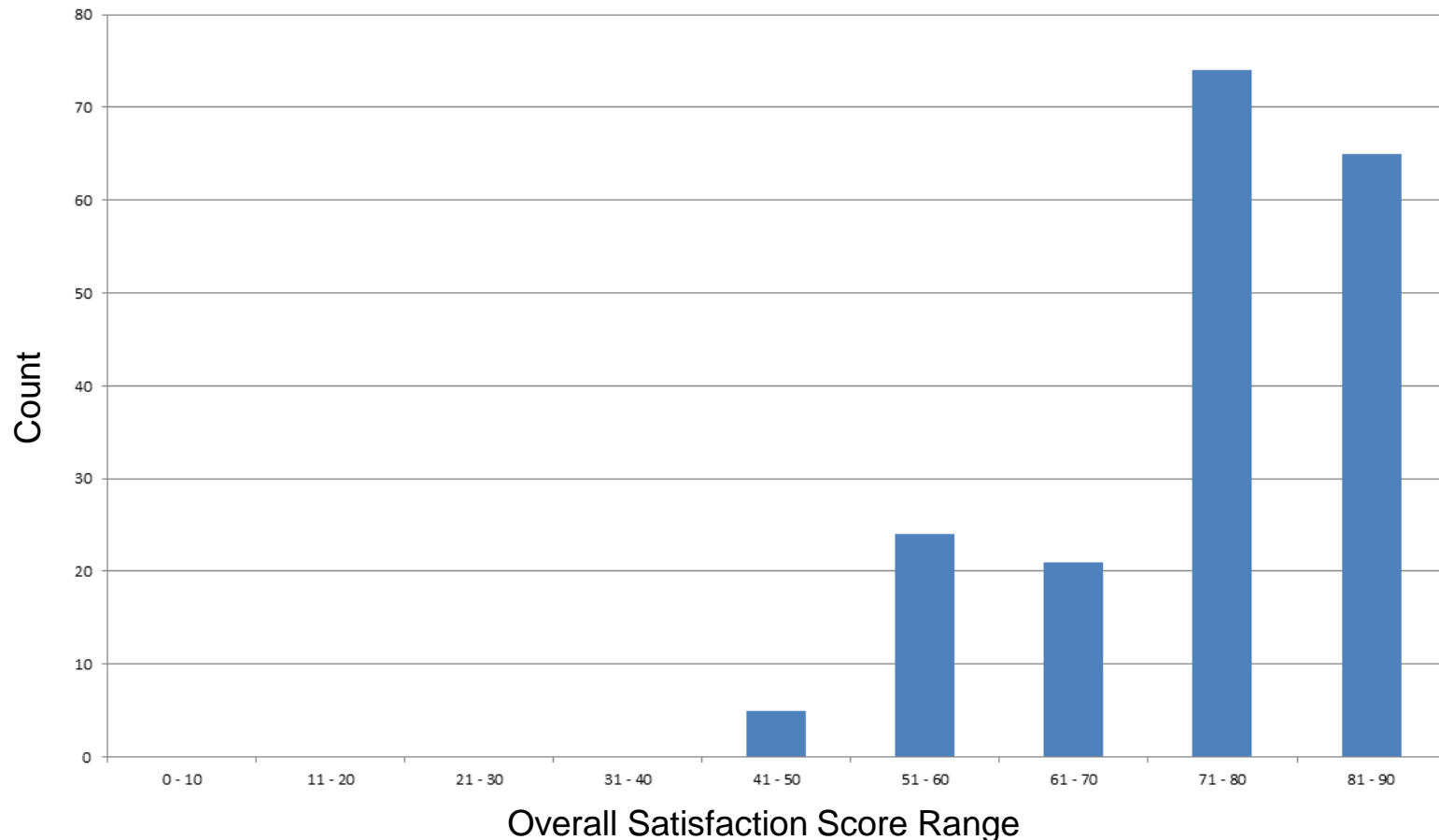
#44 (of 130) utilized systems

## Healthy Ocean - Fisheries

#33 (of 110) utilized systems

## *Summary of Subject Matter Expert Comments:*

- Need more GOES data via AWIPS
- GOES-NOP good but expect improvements from GOES-R



# GOES HEAT MAP

	GOES Satellite Series		
	# systems ≥ 0.1% impact	rank	Impact Category
<b>NOAA</b>	129	2	<b>Very High</b>
Climate Adaptation and Mitigation	97	10	High
Assessments of Climate changes and its impacts	73	12	High
Climate Mitigation and Adaptation strategies	74	17	Low
Climate Prediction and Projections	68	13	High
Climate Science and Improved Understanding	88	11	Very High
Healthy Oceans	74	33	Low
Ecosystems Monitoring, Assessment and Forecast	74	26	Low
Fisheries Monitoring, Assessment and Forecast	40	30	Low
Habitat Monitoring and Assessment	51	24	Low
Protected Species Monitoring and Assessments	51	31	Low
Healthy Ocean Science, Services, and Stewardship Advances	70	25	Low
Resilient Coastal Communities and Economies	78	44	Low
Coastal Water Quality	57	22	Moderate
Marine Transportation	31	N/A	
Resilience to Coastal Hazards and Climate Change	63	20	Low
Planning and Management	51	32	Low
Resilient Coasts Science, Services, and Stewardship Advances	34	27	Supplemental
Weather Ready Nation	93	1	Very High
Aviation Weather and Volcanic Ash	55	1	Very High
Fire Weather	55	2	Very High
Hurricane/ Tropical Storms	62	1	Very High
Hydrology and Water Resources (Integrated Water Forecasting)	59	2	Very High



# GOES Impact on Products (Impact at Sensor Level)

Line Office  
Product Priority



Priority 5
Priority 4
Priority 3
Priority 2
Priority 1
No Priority Assigned

GOES Extreme Ultraviolet Sensor	% Impact
Solar Synoptic Analysis	25
Solar Activity Forecast and Specification	20
Daily Solar Data	15
Geomagnetic Storm Forecast and Watch	3
Energetic Electron Forecast and Alert	2

GOES Magnetometer	% Impact
Satellite Environment Specification	26
Satellite Environment Assessments: Polar-Low Earth Orbit (LEO)	13
Solar Wind Specification and Geomagnetic Storm Warning	11
Satellite Environment-Surface Charging, Geostationary	8
Satellite Environment-Deep-dielectric Charging, Geostationary	7
Geomagnetic Specification and Storm Alert	5
Satellite Environment Assessments: Geostationary	3

GOES Imager	% Impact
Aerosol and Smoke Analysis	100
Aerosol Product	100
Volcanic Ash Guidance	99
Fog and Low Clouds Analysis	99
Land Surface Temperature from GOES	93
Significant Meteorological Information (SIGMET): Volcanic Ash	90
Fire and Smoke Detection Analysis	72
Significant Meteorological Information (SIGMET): Dust, Sand	68
Quantitative Precipitation Estimates (QPE), Satellite Derived	68
Tropical Cyclone Wind Position Analysis	64
Sea Ice Analysis: Chesapeake and Delaware Bay	56
Fire Hot Spot Detection	56
Global Fire Information Management System (GFIMS)	56
Tropical Weather Outlooks	50
Tropical Cyclone Analysis Package Update	48



# Prioritization of Satellite-Observed Environmental Parameters

- Satellite Task Force established by NOAA Science Advisory Board to advise on plans for future satellites (Satellite Task Force Final Report, December 2012).
- One of the Task Force Recommendations: Establish a prioritized list of space-based observational requirements across all of NOAA.
- NOSIA-II provides observing system impacts across all NOAA Mission Service Areas.
- These data, along with observed environmental parameters, allow mapping of these parameters to specific products via associated observing system.
  - Can then rank parameters according to impact and match with observational requirements

# Mapping Observed Environmental Parameters to NOSIA Impacts

Mission Service Area:

## Severe Thunderstorms, Tornadoes and Flash Floods


Key Surveyed Product	Severe Thunderstorm Warning and Severe Weather Statement	Tornado Warning	Excessive Heat Warning	Flash Flood Warning and Flash Flood Statement
MSA Impact	3.49	3.49	3.30	3.10
Priority	5	5	5	5



Results in Ranked Observing Parameters Within MSA

GCMD Variable	GCMD Term	NOSIA Observing System
Wind Profiles: Speed	Atmospheric Winds	GOES N/O/P (Imager)
Cloud Amount/Frequency: Profile	Clouds	GOES N/O/P (Imager)
Cloud Imagery	Clouds	GOES N/O/P (Imager)
Cloud Liquid Water/Ice	Clouds	GOES N/O/P (Imager)
Cloud Top Height	Clouds	GOES N/O/P (Imager)
Sea Surface Temperature	Ocean temperature	GOES N/O/P (Imager)
Precipitation Rate	Precipitation	GOES N/O/P (Imager)

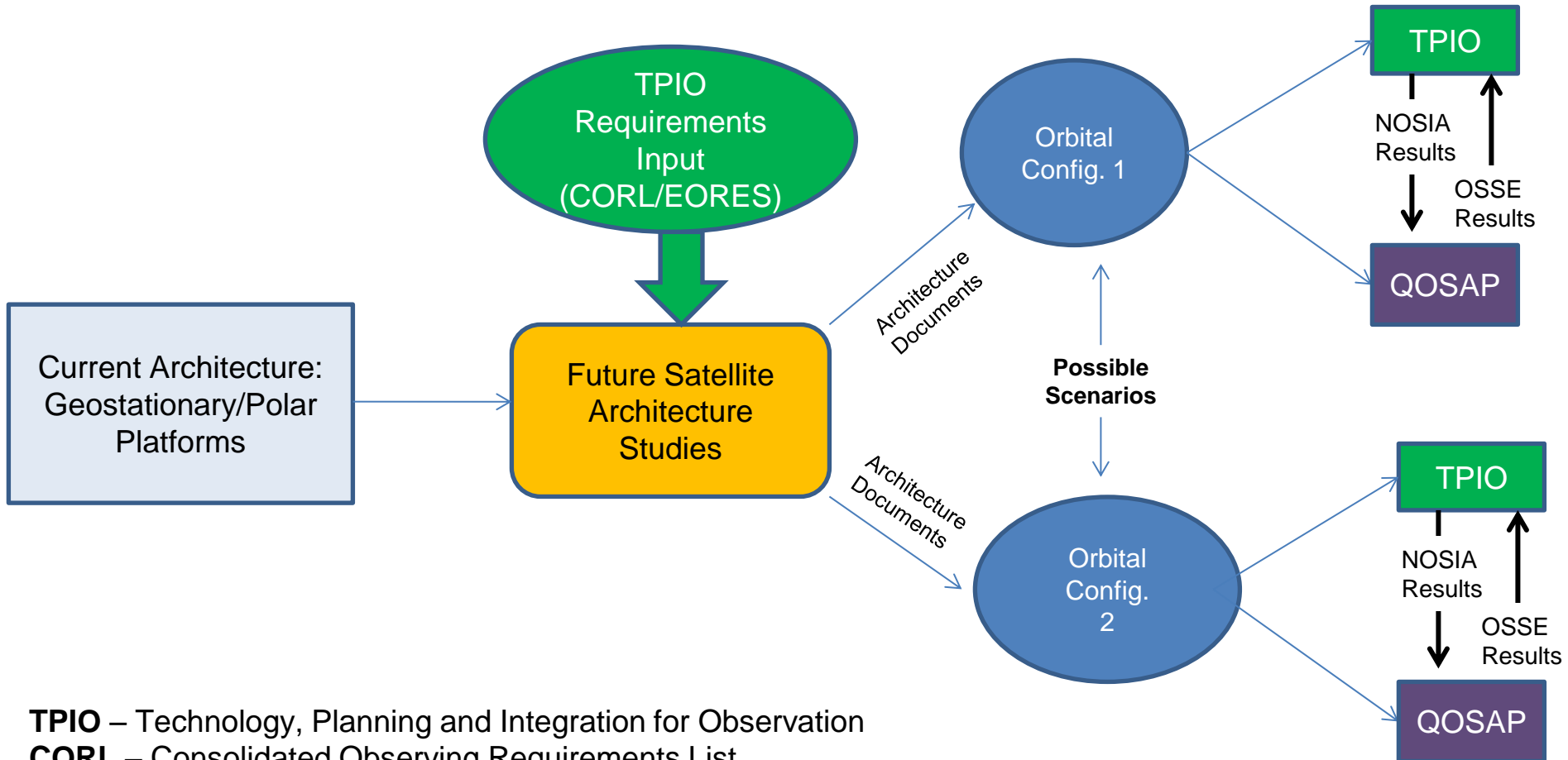
Impact Scores for each product



# Integrated Observing System Architecture Assessment Capability

- **Benefits of an Integrated Observing System Architecture Assessment Capability:**
  - Manage Risk
  - Enhance Characterization of Impacts to Products and Services
  - Improve Value Assessment
  - Strengthen Budget Justification
- **Benefits of the OSAAP Pilot:**
  - Demonstrates assessment capability
  - Addresses well defined business question
  - Builds enhanced capability for future architecture assessments (ships, in situ, radar, aircraft, mobile platforms)

# Process and Information Flow for Architecture Assessment Program



**TPIO** – Technology, Planning and Integration for Observation

**CORL** – Consolidated Observing Requirements List

**EORES** – Earth Observation Requirements Evaluation System

**MEO** – Medium Earth Orbit

**QOSAP** – Quantitative Observing System Assessment Program

**OSSE** – Observing System Simulation Experiment

Pre-decisional information, for NOAA

internal use only