

UAS Program External Review

Research

*Identify innovations, trends, capabilities that have
the potential to impact NOAA observing
requirements*

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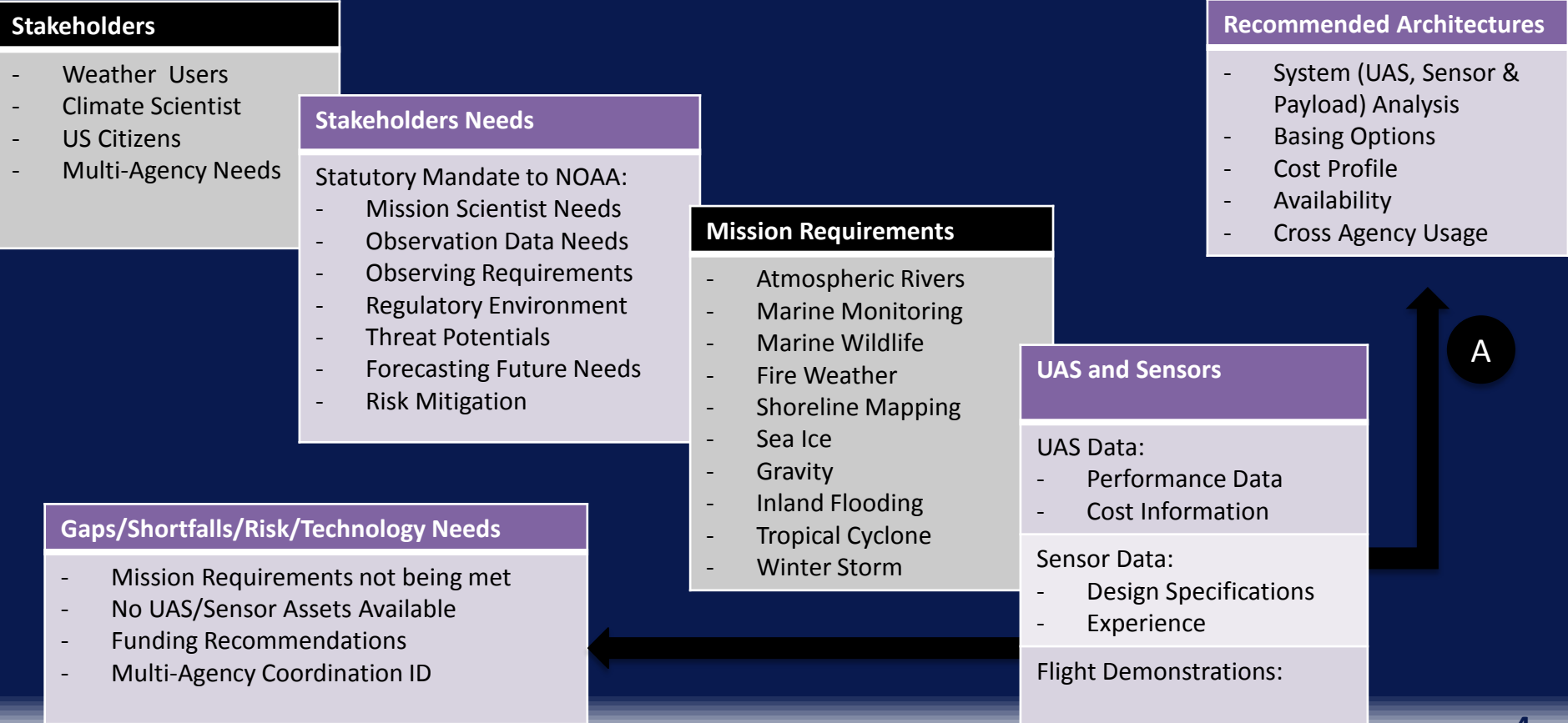
KEY STEPS FOR IDENTIFYING INNOVATIONS AND CAPABILITIES

Research to Advance NOAA's Mission

- Observations and Data
 - UASPO conducts research and collects data on the observing system for use in models and studies.
- Includes analyzing observations and developing insights based on those observations
- Using Analysis of Alternatives as a tool to select observing systems
- Maintaining quality control of data, and archive and access.

UAS Management Approach

- ▶ Recognized NOAA's need for process to support analysis of UAS as an observing system solution
 - ▶ Need to capture vendor data from the numerous vendor sources and suppliers
 - ▶ Need to support NOAA's decision with regard to UAS implementation as an observing platform and complement alternates (satellite, manned craft, airplane, ships, human observation, etc.)



Analysis of Alternatives Developed by UAS Program

- LALE Ghost Net Detection Missions
- LALE Marine Sanctuary Monitoring
- Vertical Take Off/Landing Small Unmanned Aircraft Systems (UAS) for Marine Monitoring
- UAS Capabilities for Arctic Shipboard Operations
- UAS for Tropical Cyclone Boundary Layer Observations
- LALE Sea Ice Monitoring Missions
- LALE Combined Tropical Cyclone Boundary Layer (TCBL) And Atmospheric Rivers Low Level (ARLL) Missions
- HALE
- LASE VTOL for Sanctuaries

**EXAMPLES OF OBSERVING
STRATEGY RESEARCH WHICH HAVE
NOT PROGRESSED TO A
DEVELOPMENT KEY DECISION
POINT**

Research - Identifying High Impact Weather Monitoring Capabilities

OAR / UAS FY16 RFP Project - *Research UAS Capabilities for Three Dimensional Profiling of the Severe Weather Environment (Dr. Steven Koch, National Severe Storms Laboratory)*

OAR / Partnership - *The Role of UAS for Boundary Layer Measurements – (Dr. Bruce Baker, Air Resources Laboratory)*

Research - Identifying High Impact Marine Monitoring Capabilities

NOS /UAS FY16 RFP - *Evaluating Effectiveness of UAS Sensors and Platforms for Multi-purpose Mapping of Marshes and Beaches in the NERRS Sentinel Site Network – (Dr. Kirk Waters and Nina Garfield)*

NMFS / UAS FY16 RFP - *Quantifying Restoration of Juvenile Salmon Habitat with an Unmanned Aerial Vehicle System – (Dr. Curtis Roegner)*

NOS-NMFS / Funded Partnership - *Demonstrating UAS Capabilities in the Rim of the Pacific Exercise – (Todd Jacobs / NOS and Dr. Charles Littnan / NMFS)*

Research - Identifying High Impact Polar Monitoring Capabilities

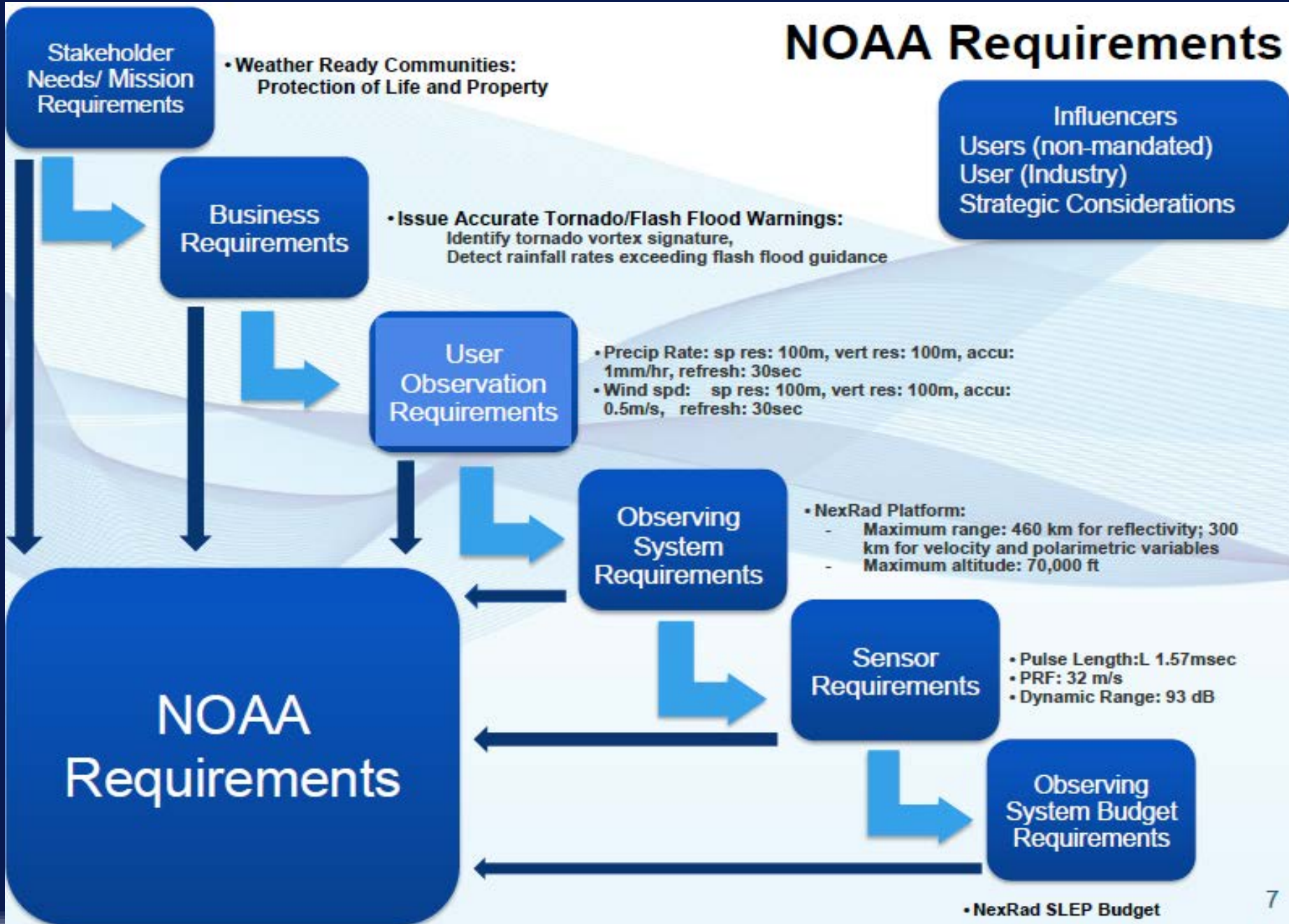
NMFS – Funded Partnership - *Manned vs. Unmanned Aerial Surveys of Cetaceans in the Arctic: Operations and Preliminary Results – Dr. Robyn Angliss*

OAR – UAS FY16 RFP Project - *UAS Capabilities for Future Shipboard Operations – Dr. Patricia Quinn, Pacific Marine Environmental Laboratory*

NASA – Funded Partnership - *Researching UAS capabilities during the Marginal Ice Zone Experiment (Partnership) – Dr. Thomas Wagner, Cryosphere Program Manager*

- BACK UP

NOAA Requirements



Stakeholder Needs/ Mission Requirements

• Weather Ready Communities:
Protection of Life and Property

Business Requirements

• Issue Accurate Tornado/Flash Flood Warnings:
Identify tornado vortex signature,
Detect rainfall rates exceeding flash flood guidance

User Observation Requirements

• Precip Rate: sp res: 100m, vert res: 100m, accu: 1mm/hr, refresh: 30sec
• Wind spd: sp res: 100m, vert res: 100m, accu: 0.5m/s, refresh: 30sec

Observing System Requirements

• NexRad Platform:
- Maximum range: 460 km for reflectivity; 300 km for velocity and polarimetric variables
- Maximum altitude: 70,000 ft

Sensor Requirements

• Pulse Length: L 1.57msec
• PRF: 32 m/s
• Dynamic Range: 93 dB

Observing System Budget Requirements

• NexRad SLEP Budget

NOAA Requirements

Architecture Analysis

