NOS Workshop
Ames Research Center Pilot Project: ‘Tip’ and ‘Cue’ Architectures for The New Observing System

February 2020
Motivation: Oroville Dam

i.e. Why you want an accurate Quantitative Precipitation Estimates (QPEs)

Dam operators were required to discharge water based on charts contained in the *Oroville Dam Reservoir Regulation Manual (1970)*

Accurate, timely estimates -> better discharge predictions -> avoiding catastrophes
Static Resources

- Fixed scope
- Fixed Resources
- Cost amortized over many users
- Low Data Volumes over a large area
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- Resource constrained = must prioritize observations
- Coverage can respond to new events
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**Static Data Sources** Identify Events (tip) and Deploy (cue) **Dynamic Data Sources** with Targeted Observation Campaigns
The USGS NextGen Water Observing System (NGWOS) will integrate “improved bidirectional comms for sensors nodes” and “integrated mobile monitoring assets.”

Mapping river water depth by using a drone-mounted ground-penetrating radar system (white equipment). (Credit: John W. Lane, USGS)
Static vs. Dynamic Resources

Massive private/crowdsourced buildout of shared RF infrastructure called the Internet of Things
Open Questions in Research

Question:

How can we have enough advance warning to prepare/deploy dynamic observations?
When is an impending event going to occur?

How can we best supplement existing static resources to provide the most accurate estimates?
Where do the assets go?

Technologies

**Interfaces** to/from forecast tools & ”global data sources” (e.g. SSMIS IWV data products)

**Rapid prototyping** tools for testing new state estimation and tasking algorithms
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A broker provides the primary tasking interface between sensor networks with varying network topologies and capabilities, and other nodes in NOS-T. **Implements** standards/ontologies in order to provide sensor networks as a service.
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Rapid prototyping tools for testing new state estimation and tasking algorithms
Event-Driven Measurement Acquisition

Date Range
Satellite Imagery
SSMIS NOAA PSD
URL PNG
NCDC CDO JSON
Legacy Adapter
Broker
Custom Fusion Algorithm
Data Display
Expected Outputs (River Discharge, gridded climate data)

Data Type (e.g. IWV)
Feature ID Algorithm

AR Landfall Location

Date Range Lat/Lon Box
Sensor Data Type

Expected Outputs

Custom Fusion Algorithm

Date Range
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Open Questions

• What is the most effective way to integrate new techniques and data sources in a way that enables rapid prototyping?
• What kinds of time-sensitive, objective-oriented retasking can bring real science value to stakeholders?
Thank you!