Enhancements to the NWS Alaska Region Sea Ice Program

4th Symposium on the Impacts of an Ice-Diminishing Arctic on Naval and Maritime Operations

Tuesday 21 June 2011

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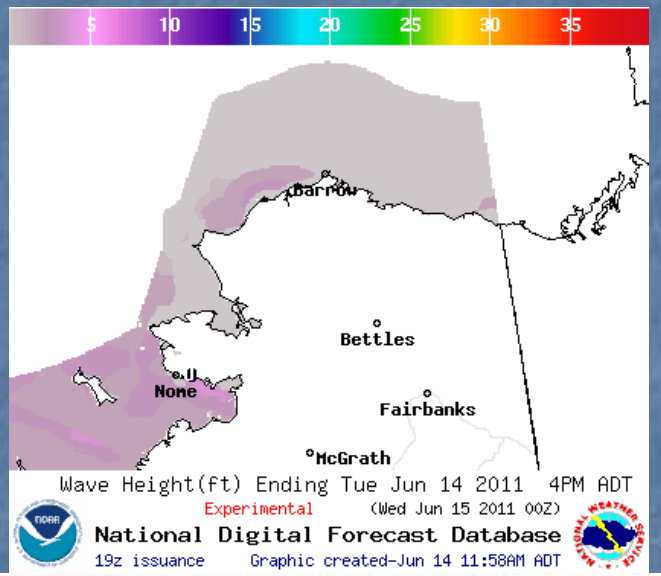
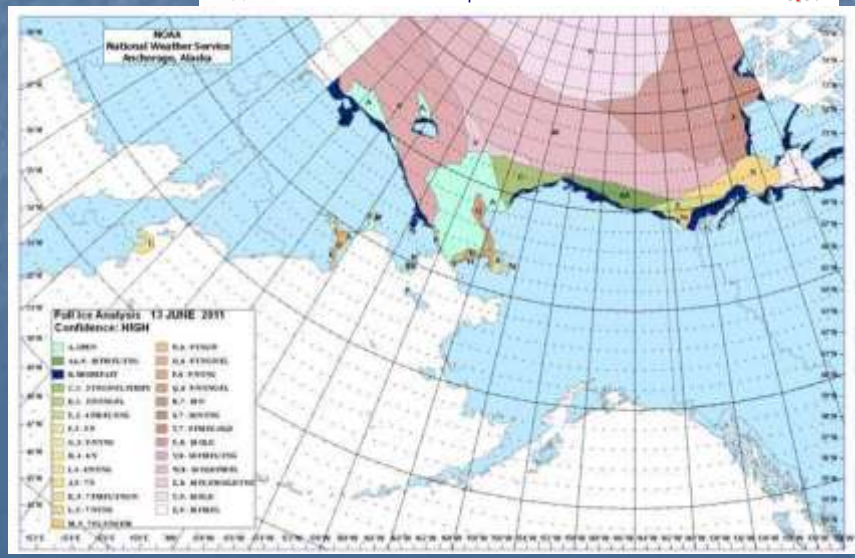
Alaska Sea Ice Program
Sea Ice Services

- **Sea ice analysis and outlook**
- **Impact Based Decision Support Services (IDSS)**
  - **Spot support for Search & Rescue (SAR)**
  - **Hazardous Material Release (HAZMAT)**
- **Direct contact with mariners for delivery of critical information and collection of volunteer observations**
- **Integrated in the marine forecast and warning services for the Bering, Chukchi and Beaufort Seas**





Alaska Sea Ice Program Customers

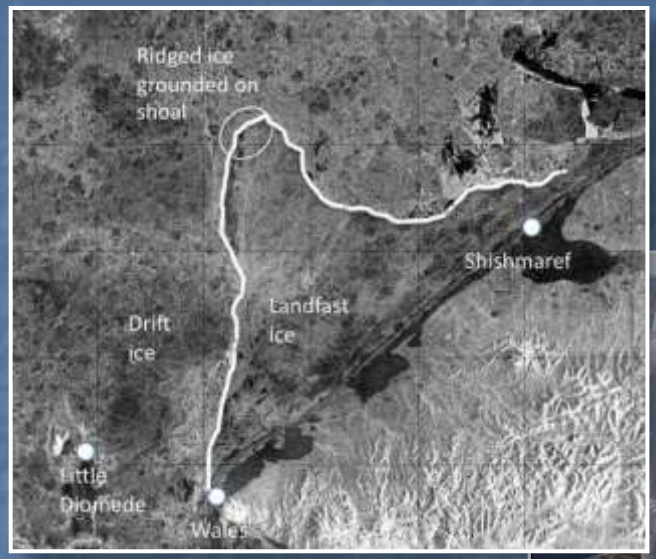
- Government
  - Department of Homeland Security (DHS)-US Coast Guard (USCG)
  - Local and Borough Governments
  - State of Alaska – DHS and Emergency Management (DHSH&EM), Department of Natural Resources (DNR), and Department of Transportation (DOT)
  - Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE)
- Industry
  - Fishing Fleets (Bottom fishing, Trawlers, Crabbers)
  - Oil and Gas
  - Mining and Mineral Extraction
  - Marine Transportation and Shipping
  - Native Corporations
  - Tourism
- Research
  - University of Alaska – Fairbanks (UAF)
  - NOAA Office of Oceanic and Atmospheric Research (OAR)

Alaska Sea Ice Program Today

- **Focused on the Tactical** – Day 1 to Seasonal
- **Graphics and Text** year round
  - Sea ice analysis
  - Sea surface temperature analysis
  - Sea Ice Advisory
  - Five day sea ice forecast
- **Seasonal Outlook** based on "Yeargroup"

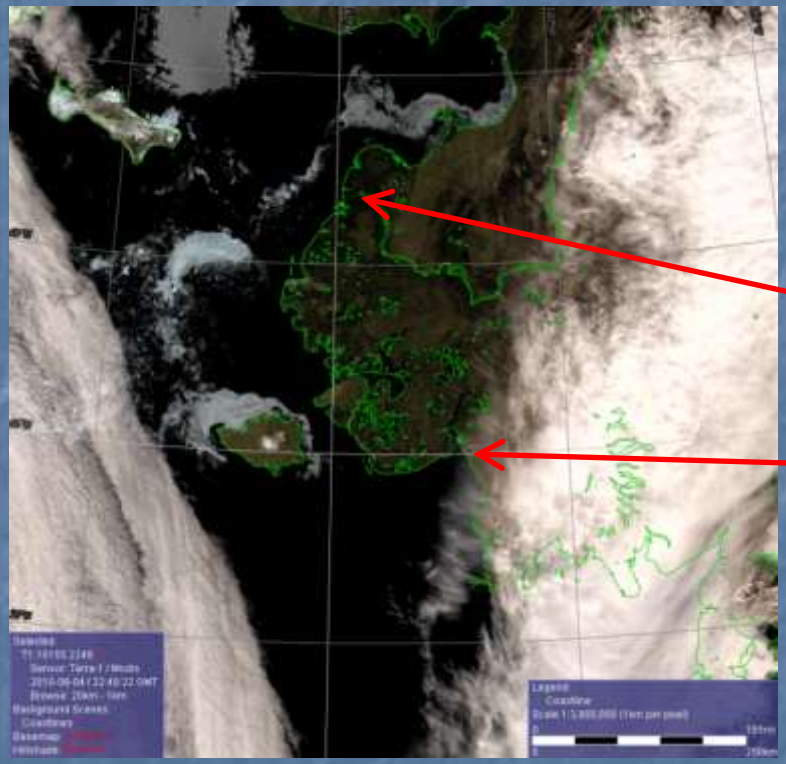
- **Integrated into marine weather forecasts** across Alaska Region forecast offices
- **IDSS Example:** Sea Ice for Walrus Outlook (SIWO)

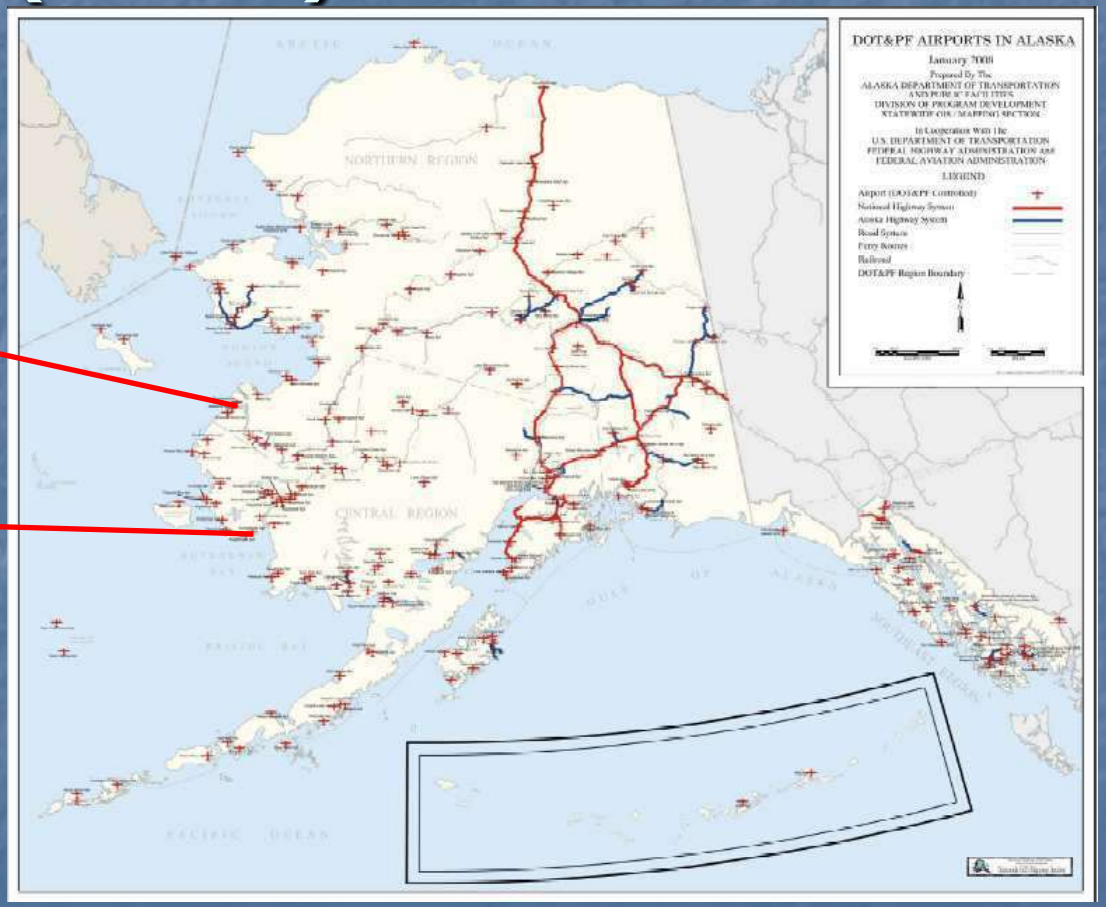
Sea Ice for Walrus Outlook (IDSS)



- Enhance communication with villages and provide for hunter safety
- Additional sea ice observations
- Understand climate change impacts
- Better understand weather information needs and dissemination limitations
- Development of Decision Support Impact Catalog

Resupply to the Alaska Interior (IDSS)



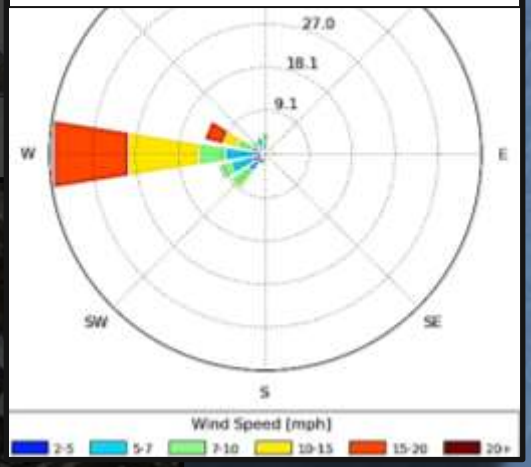


Supply Chain Management - Fuel and food for rural Alaska

Sea Ice Damage Kotzebue May 2011

May 27, 2011 - Shorefast locked in place

May 28 – Jun 2, 2011
Windrose Kotzebue, AK



May 31, 2011 - Melting ice on the move from wind & tides

Ice Breakup in Kotzebue can turn damaging when winds combined with high tide push ice onshore

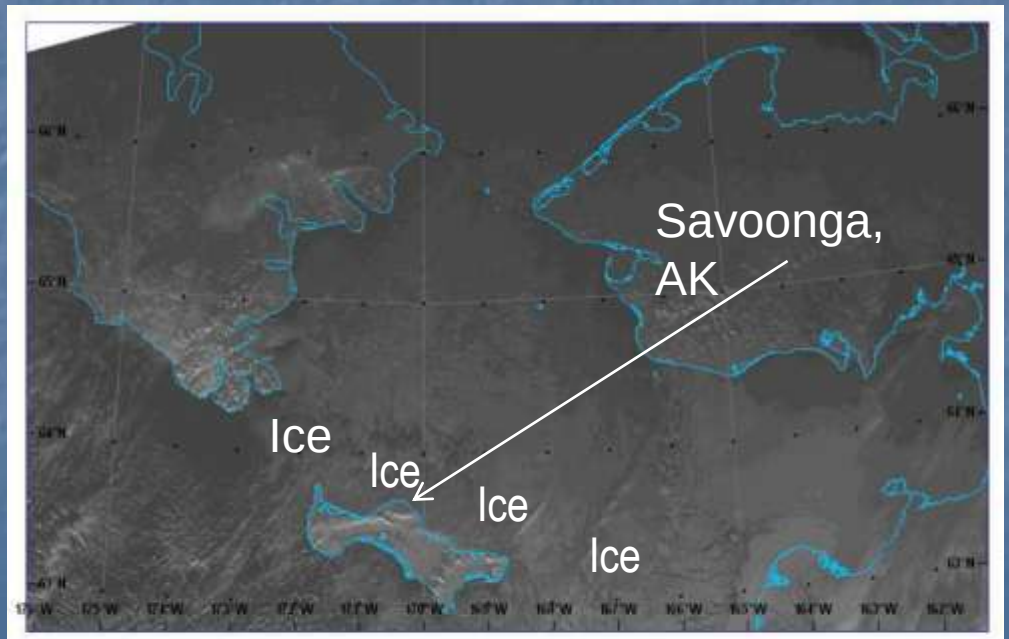
Damage can occur with normal tides and west or northwest winds of 10 to 20 mph.

Similar threats across the Arctic

May 30, 2011 - Sea ice damages structures in Kotzebue, AK

Power Outage Savoonga, AK
Dec 26 2010 to Jan 3, 2011

- Intermittent power outage for 6 days
- Temperatures ranging from 5F to -10F with 30-50 mph winds
- Nearly ¾ of residents lost power
- 25-30 homes experienced bursting pipes and flooding
- At least 20% of the 700 village residents sought refuge in the school (on generator)
- Weather hindered the ability to send in food, plumbing supplies, and repairmen



MODIS AQUA 29 DECEMBER 2010 0005Z

"The **extreme cold caused the salt spray to freeze on electrical equipment**. Initial outages were caused by line slap from iced-up conductors, but later problems were caused by electrical arcing through conductive salt. We are concluding that the **lack of sea ice was a major contributor to this situation**."

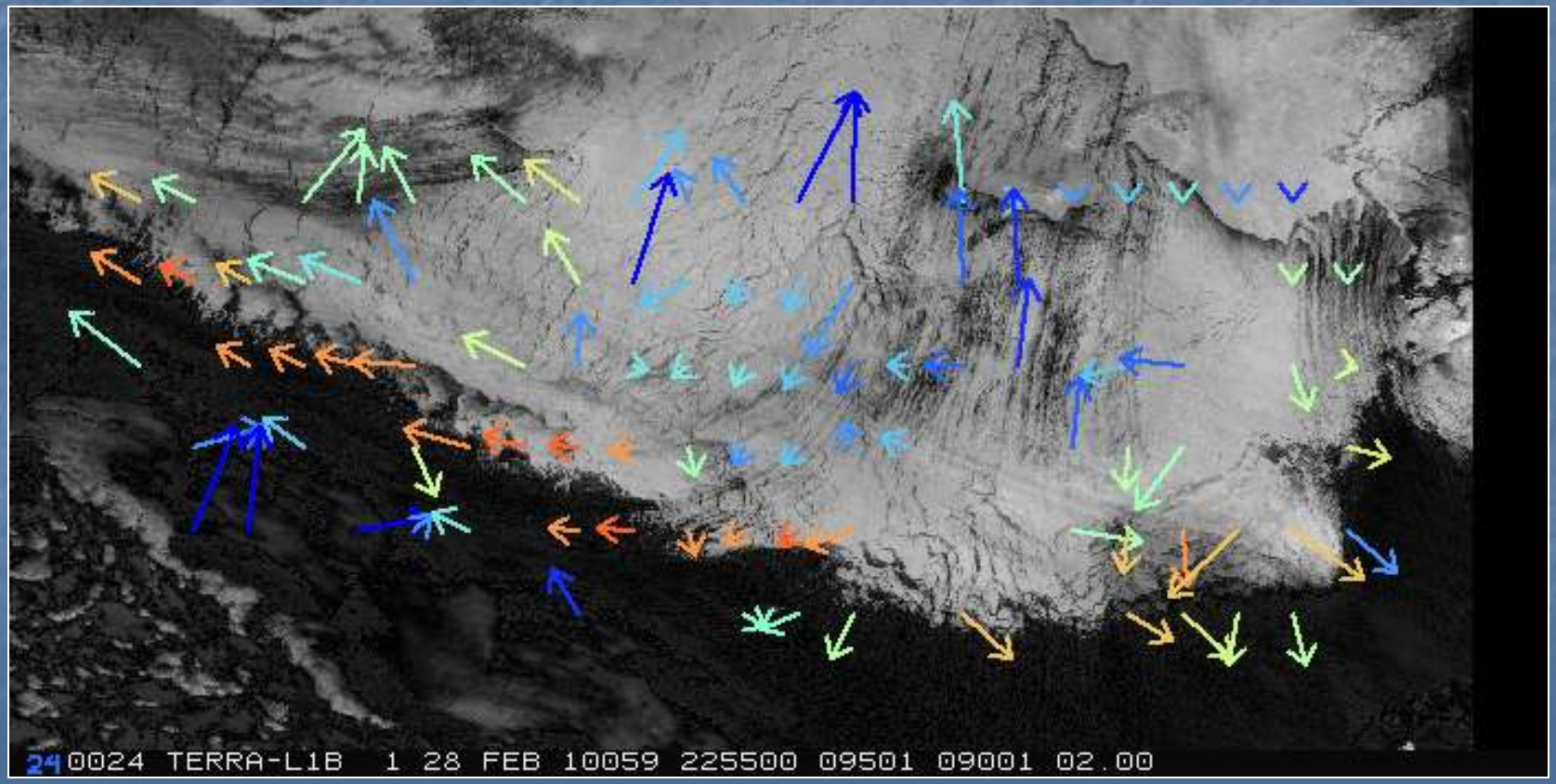
-Meera Kohler, Alaska Village Electric Cooperative

Alaska Sea Ice Program Looking Forward

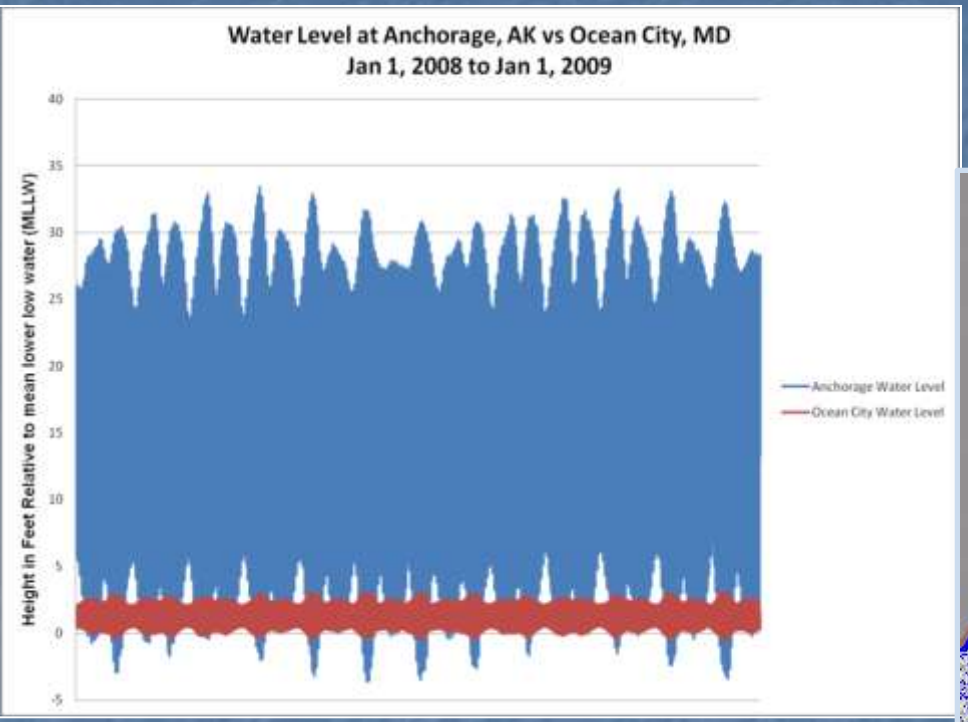
- Alaska customers have strongly indicated that the current services are insufficient
  - Greater frequency of products and services
  - Higher spatial resolution of products
  - Expanded forecast capabilities
- Additional Sea Ice Forecast Position at Anchorage
- NAIS and common IT platforms and software
- Enhanced partnerships and collaboration with private industry (e.g., Proposed Sea Ice Workshop)
- Arctic Testbed

Ice Motion/Vectors

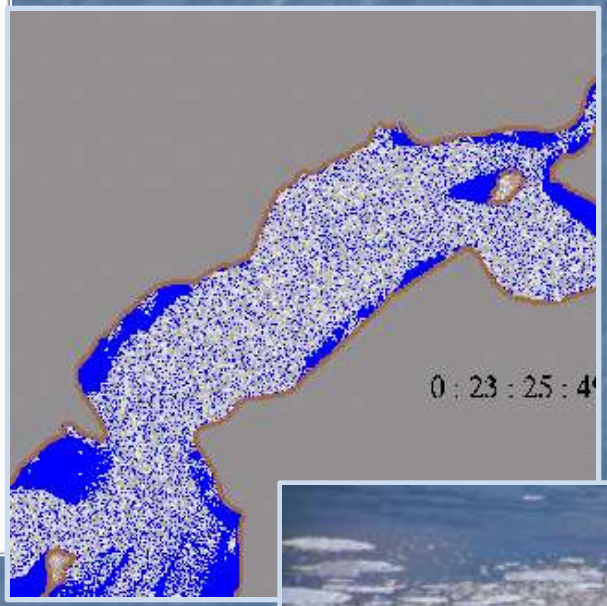
Partnership with NASA's Short-Term Prediction Research and Transition Center (SPoRT)



Sea Ice and Tides



Critical to Supply Chain Management
80% of Alaska's supplies ship through Cook Inlet



USACE modeling Cook Inlet ice and tides

- Sea ice "sloshes" with extreme tides
- USCG restricts ship traffic when ice velocity ≥ 4kt
- T/V Seabulk Pride grounding in 2006
  - Report indicates ice thickness is critical
  - Mooring at Nikiski dock could not withstand ice flow thickness of 4.7" or more

Alaska Sea Ice Program OAR-NWS AR Testbed

- Purpose:
  - Develop delivery mechanisms to communicate to external stakeholders the current and forecast state of sea ice coverage and weather impact from this phenomena including storm surge, arctic storms, sea ice extent and movement

- Goals
  - Explore application of ensemble of experimental scientific data relevant to decision makers
  - Explore data fusion techniques using the High Latitude GOES-R Proving Ground, polar orbiting satellites, external agency (NASA, international) remote sensing imaging
  - Explore data base mapping of the science requirements of decision makers
  - Explore data mining techniques used for alarm/alert/monitoring functions
  - Explore the use of cloud technology to create an integration platform