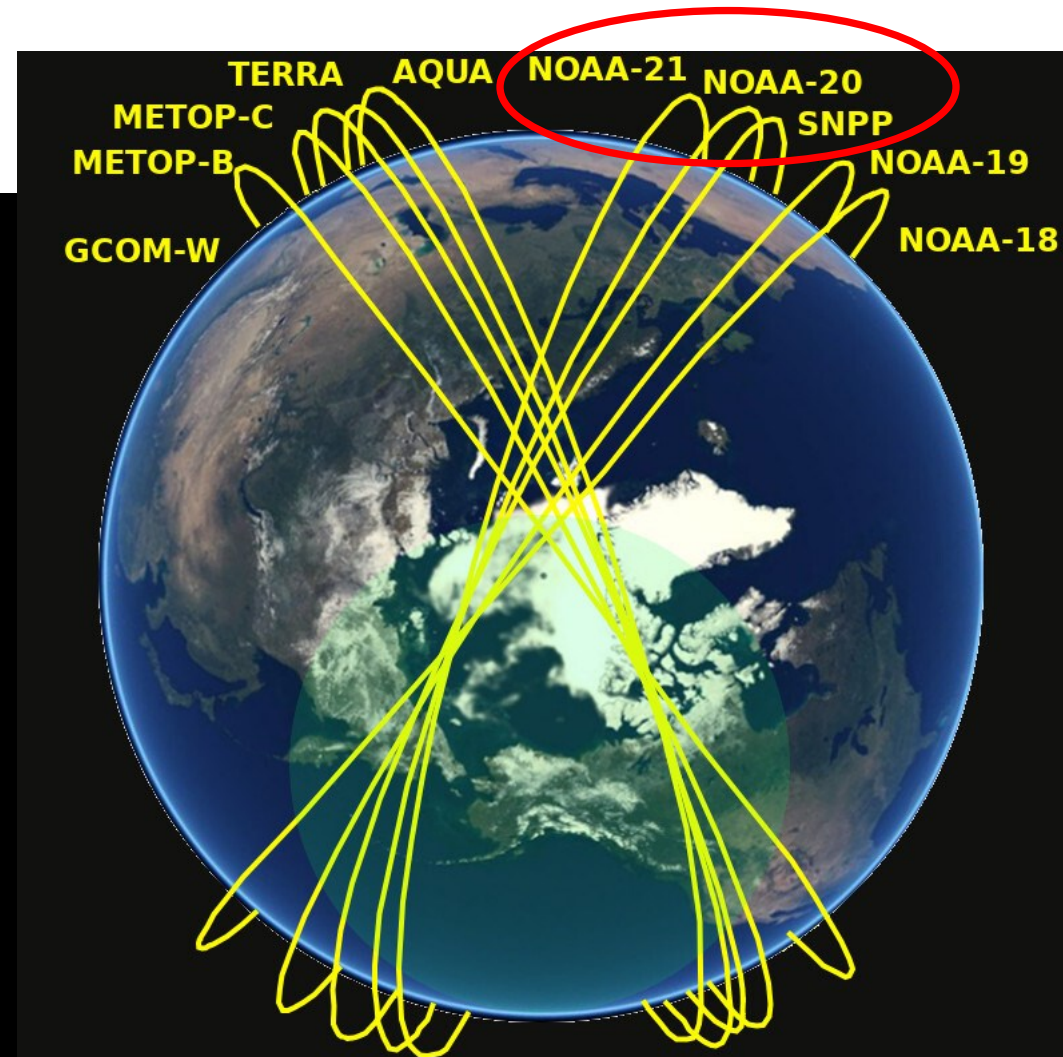
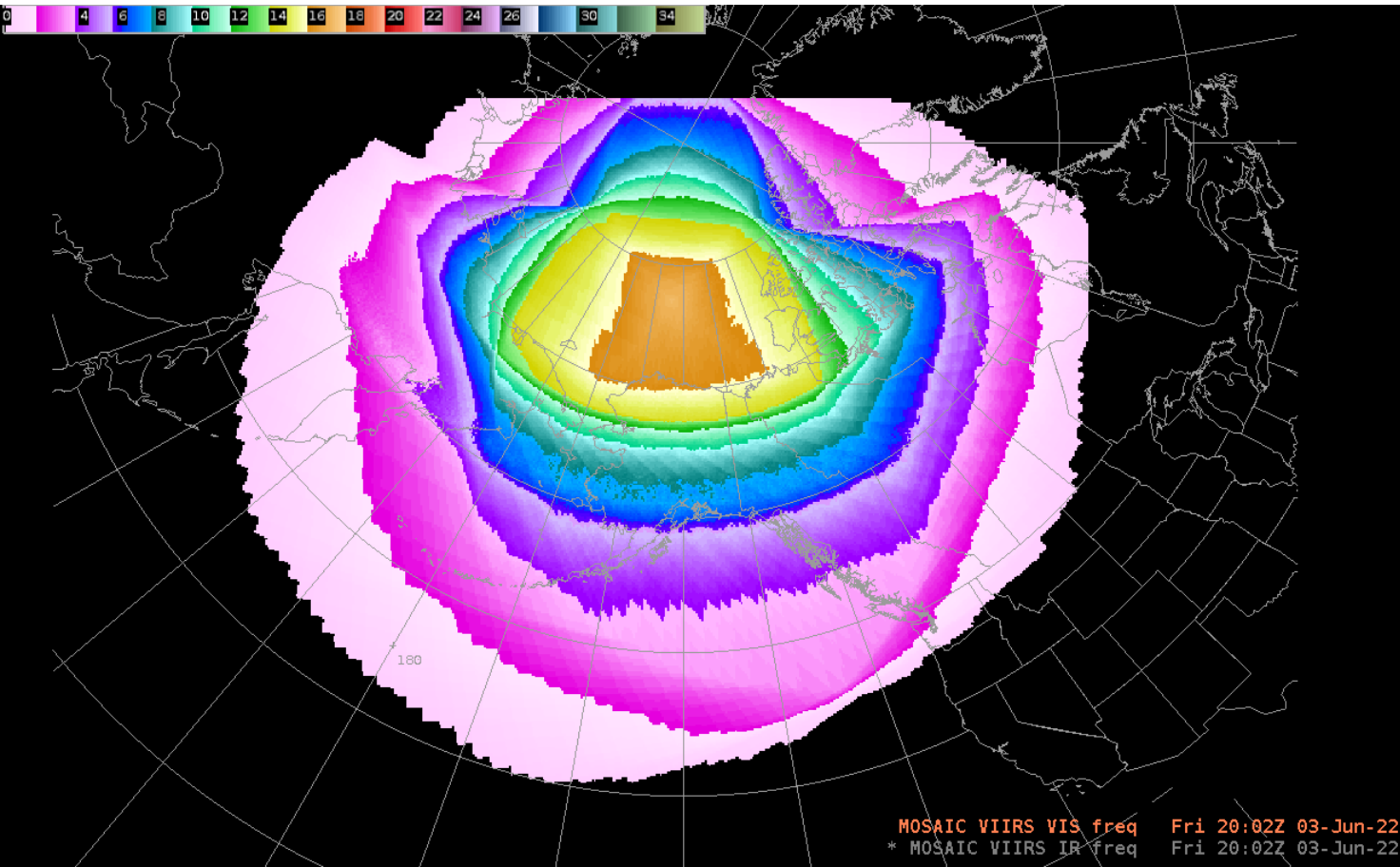


Wildland Fire Map Services from Near Real-Time Satellite Imagery

Owen Larson, Jen Delamere, Jay Cable, Carl Dierking, Jingqui Mao, Brian Buechler, Grace Veenstra, Benjamin Stream

Polar Orbiting Satellites

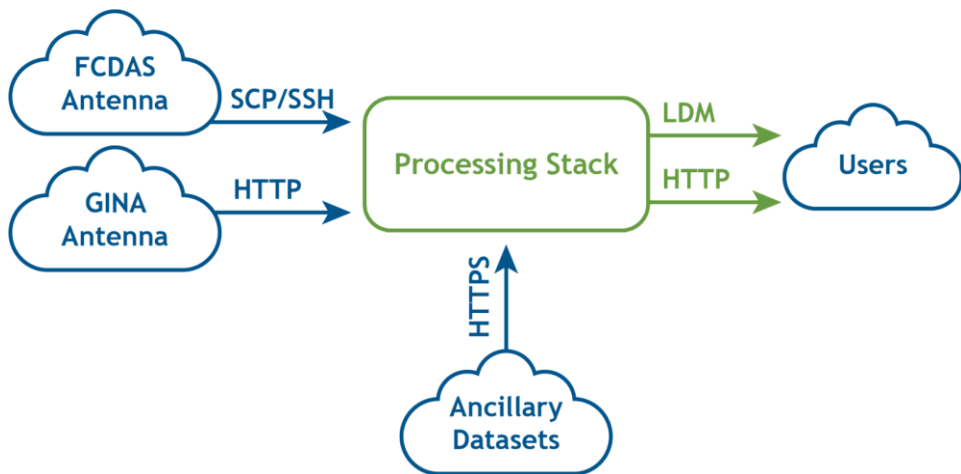
Up to 27 daily VIIRS passes over northern Alaska
Limited applications in Alaska for geostationary satellites



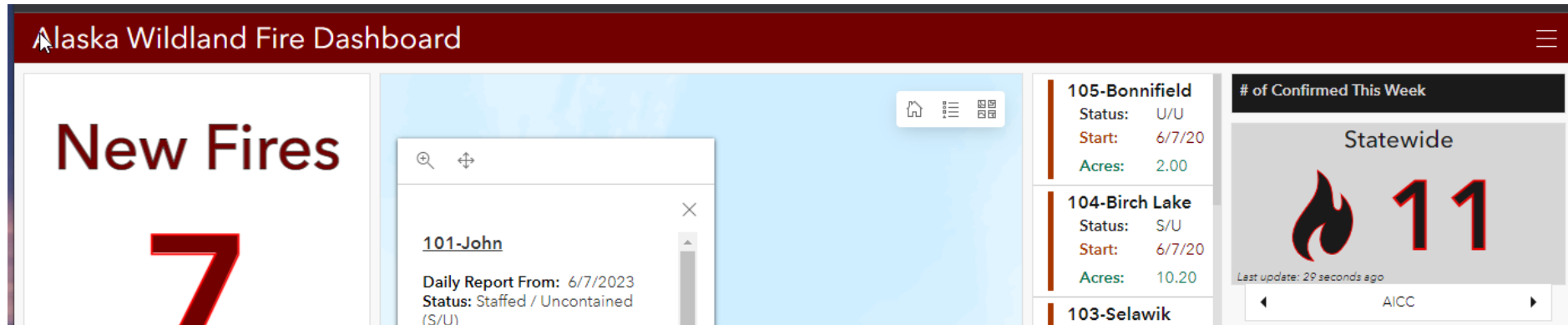
GINA Operations

Near real-time processing stacks in Alaska delivering products within minutes of an overpass.

AWS used for processing AFS Products



Alaska Fire Service Decision Support Systems

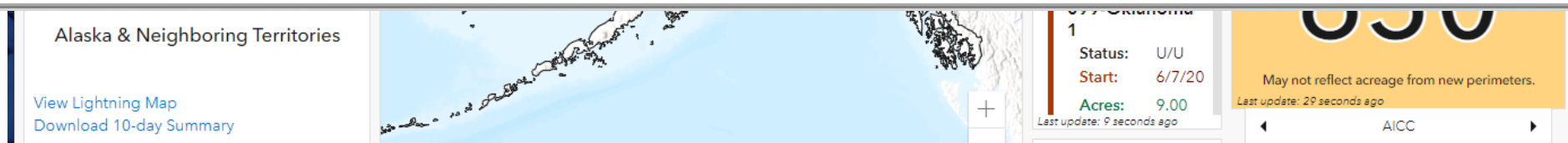


Daily Report From: 06/07

200.0 Acreage On 06/07

P9EP Lat: **67 03.1233** Status: **S/U** Acres: **200.0** Option: **Modified**
331101 Lon: **151 48.0717** Personnel: **12** Start Date: **06/07** Area: **TAD**
PDP9EP Owner: **State** Unit: **AKDNS-AK Dept. Natural Resources**
101 Name: **John** Cause: **Lightning**

Fire observed via satellite remote sensing. Civilian later reported smoke near Bettles. Upon arrival, the fire was reported to be approximately 40 acres, 70 percent active with creeping and running fire behavior and flame lengths of 1 to 4 feet. Fire was burning in a mix of spruce and tundra with sparse hardwoods. Twelve Smokejumpers were deployed and later requested two firebosses and an air attack platform. Fire was wind and terrain driven spreading to 200 acres. With the help of the air tankers and significant precipitation, the fire was knocked down dramatically. Firefighters continued fire suppression efforts through the operational period.



<https://www.arcgis.com/apps/dashboards/a23a625f4d18412ea13cffeefcbe7f5e>

6/2/2022

Hog Butte Fire

ArcGIS REST S

[Home](#) > [service](#)

[JSON](#) | [SOAP](#) | [WMS](#)

afs/VIIRS

View In: [Arc](#)

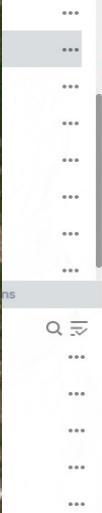
View Footprin

Service Descr

Supplemental
Radiometer S



Alaska Interagency
Coordination Center



(links)



VIIRS Imagery Collection

<https://arcg.is/1vGKmW>

Alaska Wildland Fire Information Map Series

Wildland Fires | Lightning | Reporting and Admin.

AK Wildland Fire Information

GINA

Go to Location or Fire

SEWARD PENINSULA

Norton Sound

VIIRS Fire Color RGB
Image via NOAA-21
Captured at:
2023/8/26 21:55 UTC
2023/8/26 13:55 AKDT

Available Information

Fire and Lightning

- VIIRS Imagery Collection (GINA)
- GINA_VIIRS_FireColor
- GINA_VIIRS_i04_ShortwaveIR
- GINA_VIIRS_FireTemperature
- GINA_VIIRS_TrueColor
- 12_hours_of_VIIRS_TrueColor
- 12to24_hours_of_VIIRS_TrueColor
- npp.20231017.0052_true_color_gm
- noaa21.20231017.0021_true_color_gm
- noaa20.20231016.2358_true_color_gm
- npp.20231016.2307_true_color_gm
- noaa20.20231016.2215_true_color_gm
- npp.20231016.2127_true_color_gm
- noaa20.20231016.2036_true_color_gm
- 24to48_hours_of_VIIRS_TrueColor

Boundaries, Jurisdictions, and IA Options

Other Information

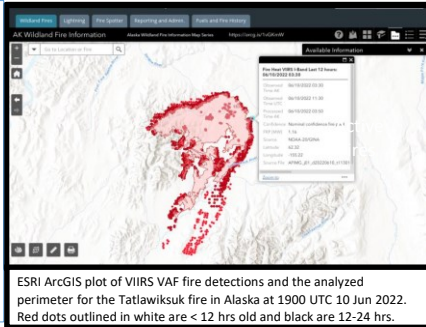
Training Materials

<https://gina.alaska.edu/training-resources/>



Why is VIIRS Active Fires Important?

The VAF algorithm provides critical information on significant thermal anomalies across the globe in high detail. It is within software that can be used as a background monitoring utility, continually examining satellite data for potential fires or heat points. VAF output includes fire location, confidence value, and intensity information such as Fire Radiative Power (FRP) which can assist fire response decisions such as the allocation of resources for mitigation efforts. Product information can be used as the basis of an alert system for new fires, or as a monitoring tool for evaluating the distribution, intensity, and evolution of existing fires.



VIIRS Active Fire algorithm and specifications

Algorithm	Wavelengths Used	Resolution	Coverage Frequency	Latency
The VIIRS Active Fire algorithm uses a combination of fixed and contextual tests to detect active fires and thermal anomalies both day and night. Detection criteria are based on 3.74 μm shortwave IR data refined with 11.5 μm longwave data. Three reflectance bands filter for high solar radiation during the day. Criteria is also refined by cloud and water classification schemes.	3.74 μm (I4 band)	375 m	Varies with latitude from 2 VIIRS satellites (SNPP and NOAA-20). Alaska interior: 10-14 passes/day CONUS: 3-4 passes/day	Less than 30 min from Direct Broadcast sources
	11.5 μm (I5 band)	375 m		
	0.64 μm (I01 band)	375 m		
	0.86 μm (I02 band)	375 m		
	1.61 μm (I03 band)	375 m		
	4.05 μm (M13 band)	750 m		

Impact on Operations

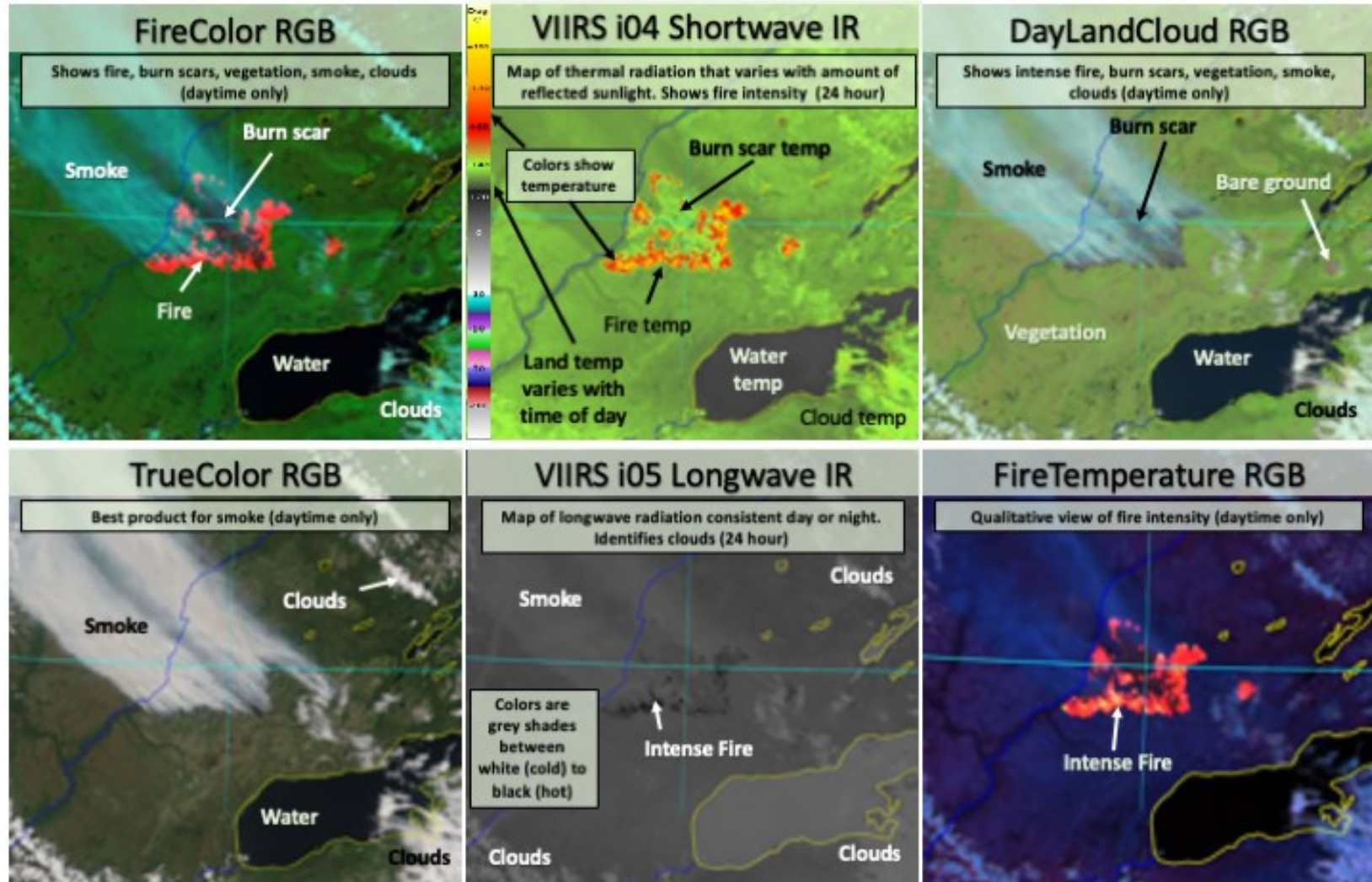
24-Hour Fire Detection: automated monitoring to identify and locate fire point sources day or night.
Remote Coverage: satellite observations detect fires where no other observations are available.
Frequent Coverage over High Latitudes: Polar satellites pass more often over Alaska & Canada.
High Spatial-Resolution: 375 meters.
Fire Radiative Power (FRP): Higher values equate to higher fire intensity and/or larger fires.
Additional features: identifies industrial burns, gas flares and volcano eruptions.
Persistent Anomalies: identifies common sources of non-wildfire heat sources, such as solar farms, volcanos, etc.

Limitations

Obscuration: clouds, smoke, and terrain may obscure or lower fire intensity values.
Missed Detections: fires too small or smoldering in duff.
False Alarms (day): reflected solar radiation from hot or bright surfaces that are not persistent anomalies. Missed cloud classifications.
False Alarms (night): reflected solar energy from cloud tops near the terminator. Hot smoke plumes.
Temporal Frequency: polar orbiting satellites have less frequent coverage over CONUS than geostationary satellites.

Contributors: ¹C. Dierking, ¹J. Delamere, ¹J. Cable, and ²J. Torres

¹GINA, ²CIRA

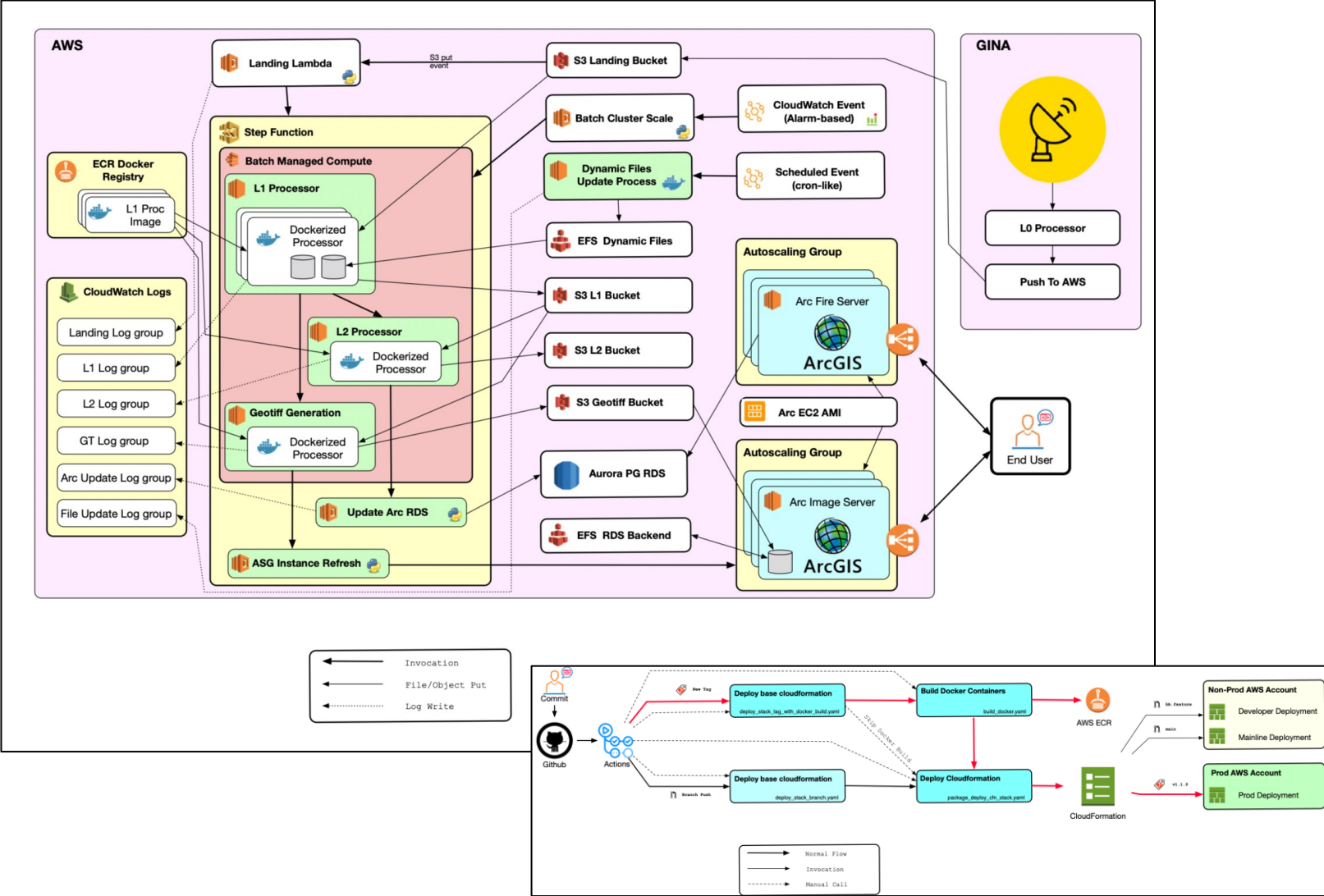


Fire Detections in AWS

Increased uptime, lower latency

Allows additional resources during times of high demand

Built for flexibility and future updates

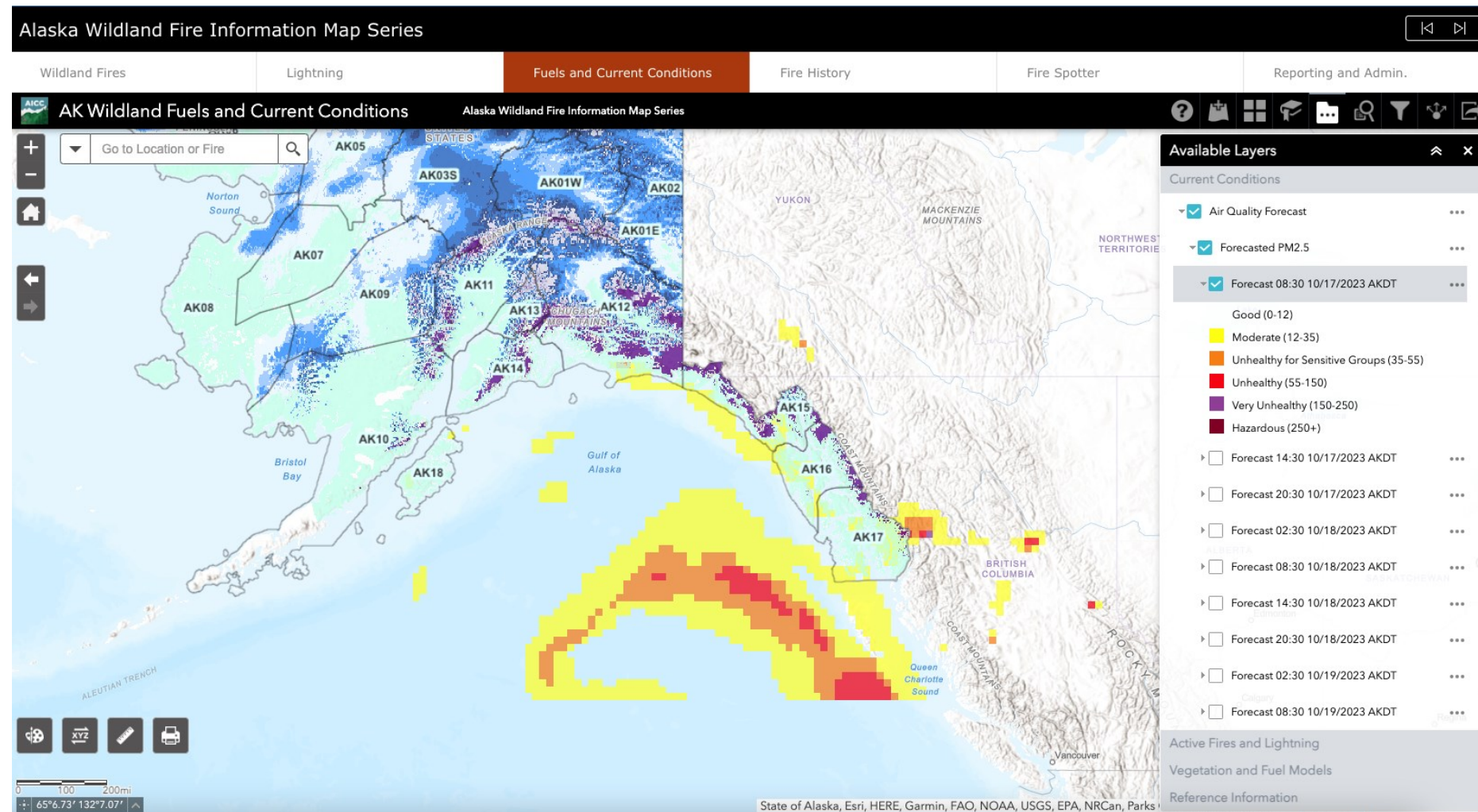


Air Quality Forecast Collaboration with Mao Lab

HAQAST Project: Air quality and health impacts of boreal fires: decision support and applied research supported by NASA satellite products

Research led by Dr. Jingqui Mao at UAF

NASA GEOS-FP model



<https://arcg.is/1vGKmW>

Additional Fire Product Visualizations

The screenshot displays the homepage of the Geographic Information Network of Alaska (GINA). The header includes the UAF logo and the text "Geographic Information Network of Alaska (GINA) Geophysical Institute". A navigation menu contains "ANTENNA STATUS", "REAL-TIME DATA", "TRAINING RESOURCES", "PROJECTS", "NEWS", and "ABOUT". A search icon is also present.

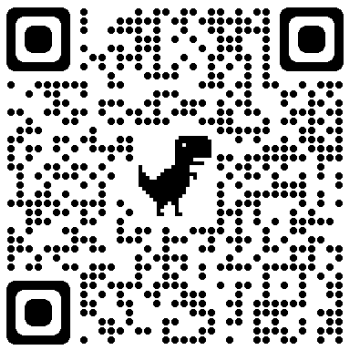
The main content area features a map of Alaska titled "5/18/2023" showing fire heat points. A text box to the right of the map reads:

Fire Point Mapping in Alaska:

This video shows a timelapse of the fire heat points detected by GINA over the course of the 2023 Alaska Fire Season from May 15, 2023 to September 5, 2023. Recent fire points are displayed as bright red and fade to brown after a few days. Fire points frequently appearing in the same location indicate an actively burning wildfire. This product doesn't detect points that are under cloud cover or thick smoke. This product is used by the Alaska Fire Service for detecting active fires on the Alaska Wildland Fire Information Map.

Below the main map, there are three smaller images: a social media post for "UAF GINA 212 followers" with "Follow Page" and "Share" buttons; a photograph of a large wildfire; and a satellite-style map with a color-coded overlay.

At the bottom of the page, a cookie consent banner states: "We use cookies to ensure that we give you the best experience on our website. If you continue to use this site we will assume that you are happy with it." with "Accept" and "Privacy policy" buttons.



GINA Product Data & Training

satellite@gina.alaska.edu

TWITTER
@uafgina

What's Next

- NOAA-21 Fire Heat Points in AWS system
- Improved Image Service Delivery
- NOAA/NESDIS Satellite Products for Wildland Fire

Applications

<https://uaf-accap.org/event/wildfire-satellite-applications/>

