



**Alaska Department of
Transportation & Public Facilities**

Urban Camera Avalanche Detection System

Jack Stickel

4 June, 2014



Urban Avalanche Camera Detection System

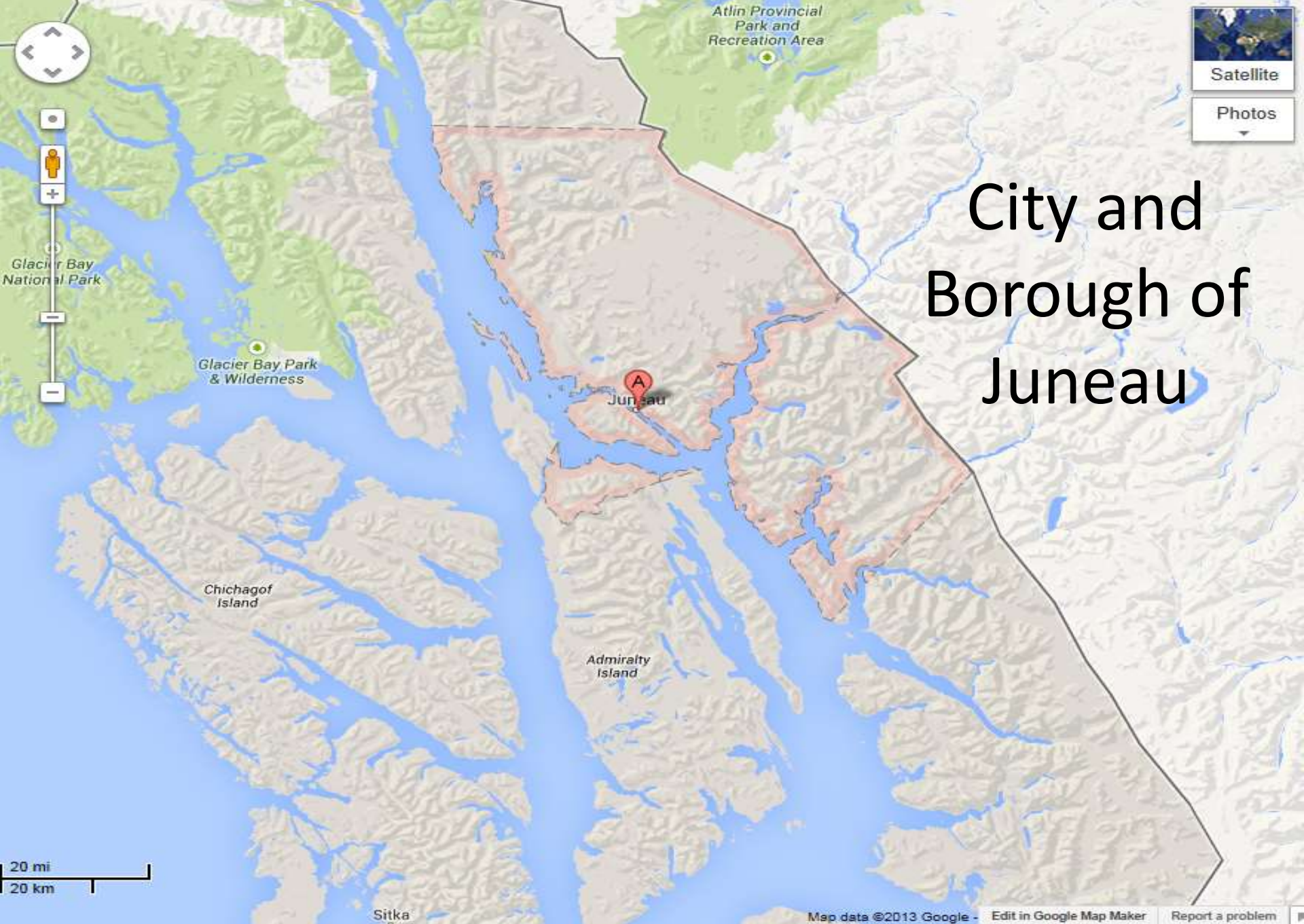


- Urban avalanche environment
- Motivation for system
- Environmental sensor station
- Sensors & cameras
- Operational concept
- Camera control center
- Additional research
- Power line diverters
- References



City and Borough of Juneau

Map data ©2013 Google - [Report a problem](#)



City and Borough of Juneau

Thane Road





Motivation – Thane Road Avalanche System



- Residential commuter corridor
- Connection to five hydropower facilities
 - Primary power to community
 - April 2008 major avalanche knocked out line for five months
- CBJ avalanche response plan
- DOT&PF emergency & mitigation operations

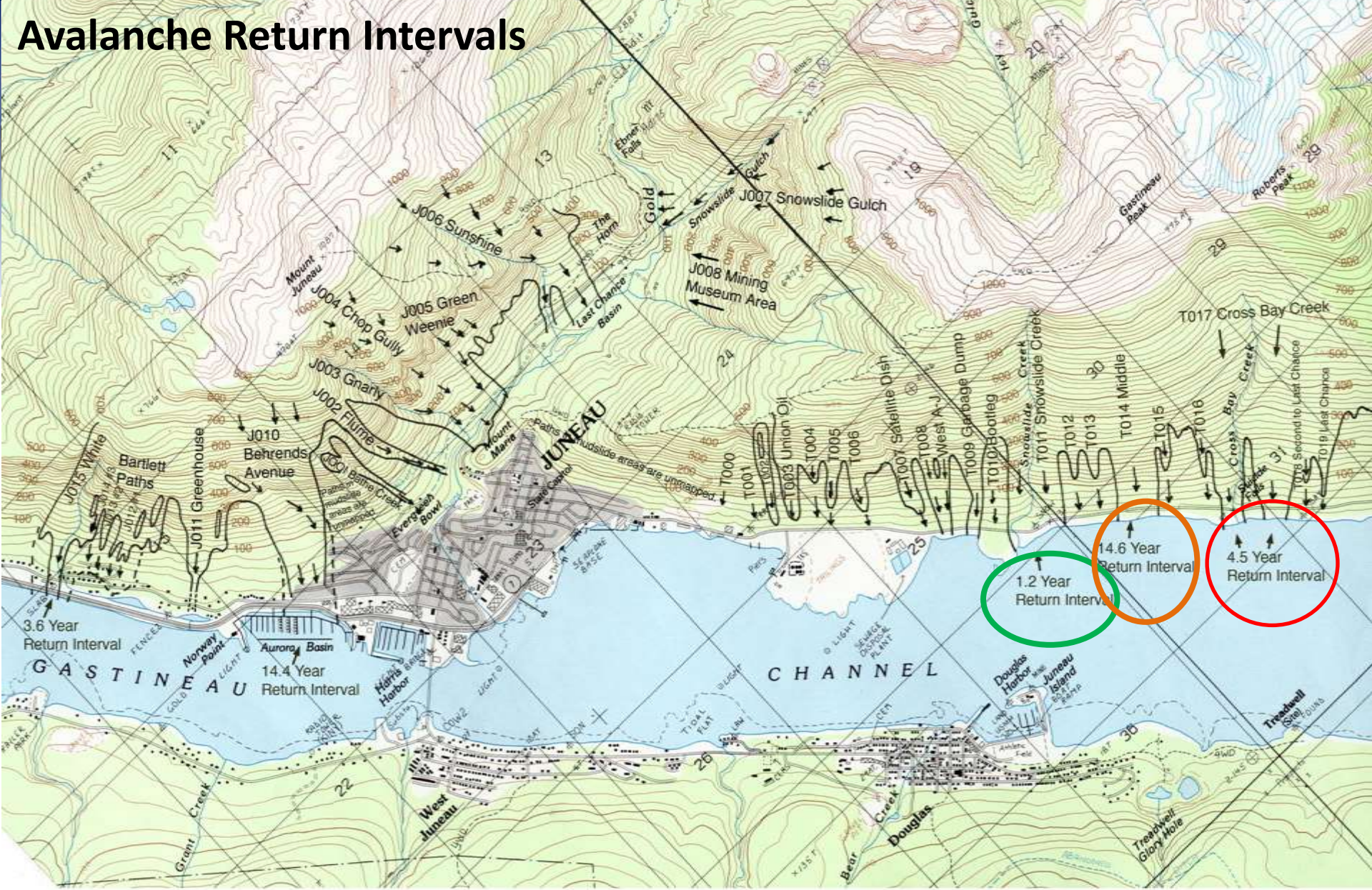


- Route Search
- Route Identify
- Google Streetview
- Town Search
- Advanced



Power line corridor to hydro projects
Map source - <http://www.gina.alaska.edu>

Avalanche Return Intervals



JUNEAU URBAN SNOW AVALANCHE PATHS

Avalanche Paths ©Bill Glude 2005 Southeast Alaska Avalanche Center
Base Maps USGS Juneau (B-2) SE & (B-1) SW Metric 1:25,000
Unlabeled Paths: J009 Other Gold Creek Paths
Unmapped Paths: Mudslide zones above Gastineau/South Franklin & the Highlands





Snow Slide Gulch

Middle Pass

Cross Bay

Thane Road Avalanche Zones

Thane Road Avalanche Zones



© 2010 Europa Technologies

Image © 2010 DigitalGlobe
© 2010 Google

© 2009 Google

Imagery Date: Jun 18, 2005

58°16'53.19" N 134°22'07.42" W elev 0 ft

Eye alt 13680 ft





























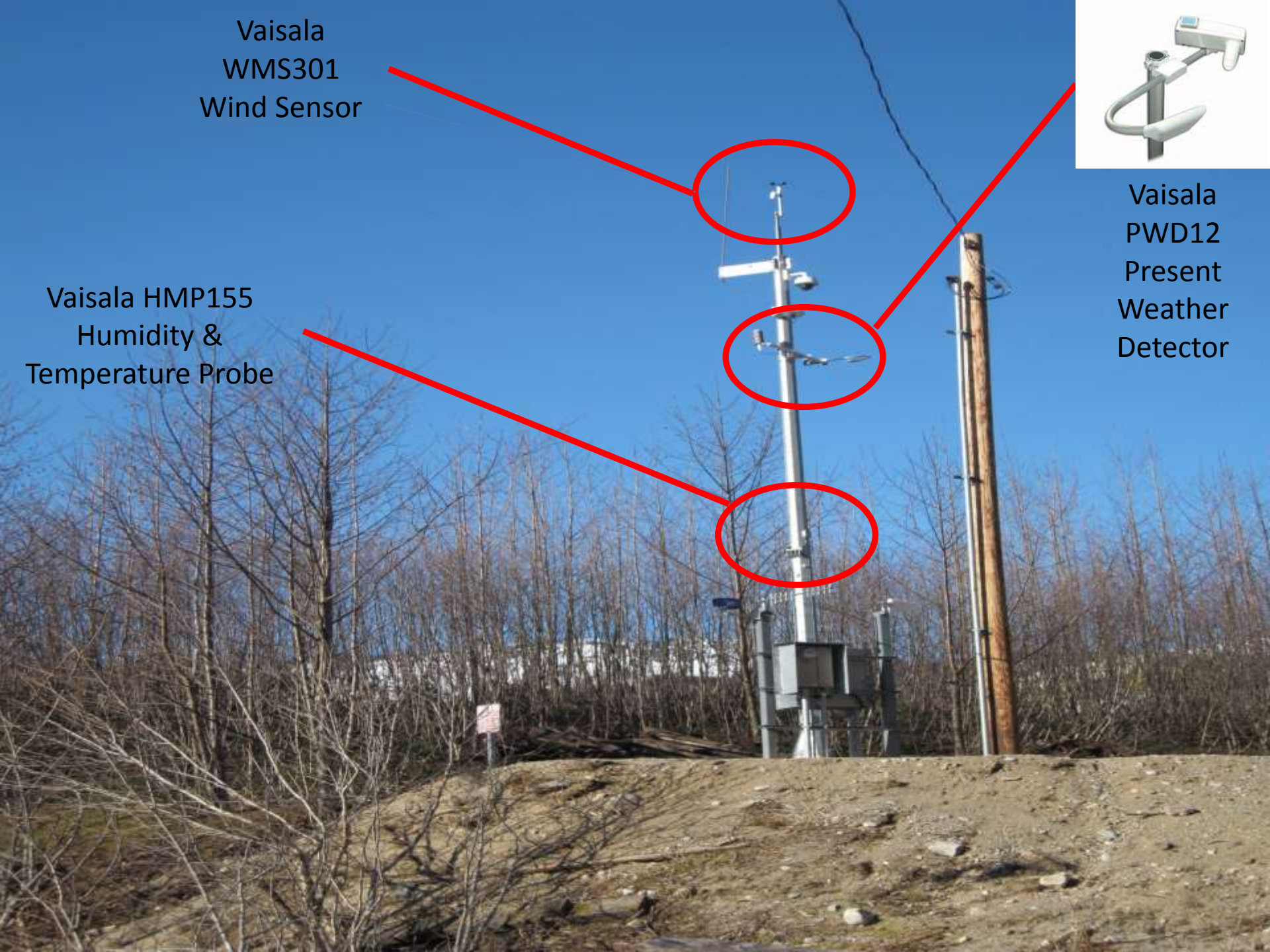


Vaisala
WMS301
Wind Sensor



Vaisala
PWD12
Present
Weather
Detector

Vaisala HMP155
Humidity &
Temperature Probe



Mobotix D15
Dual Dome
Network
Camera



Axis 6032-E
Dome Network
Camera

Cantronix
CSI-IR100m30
Illuminator





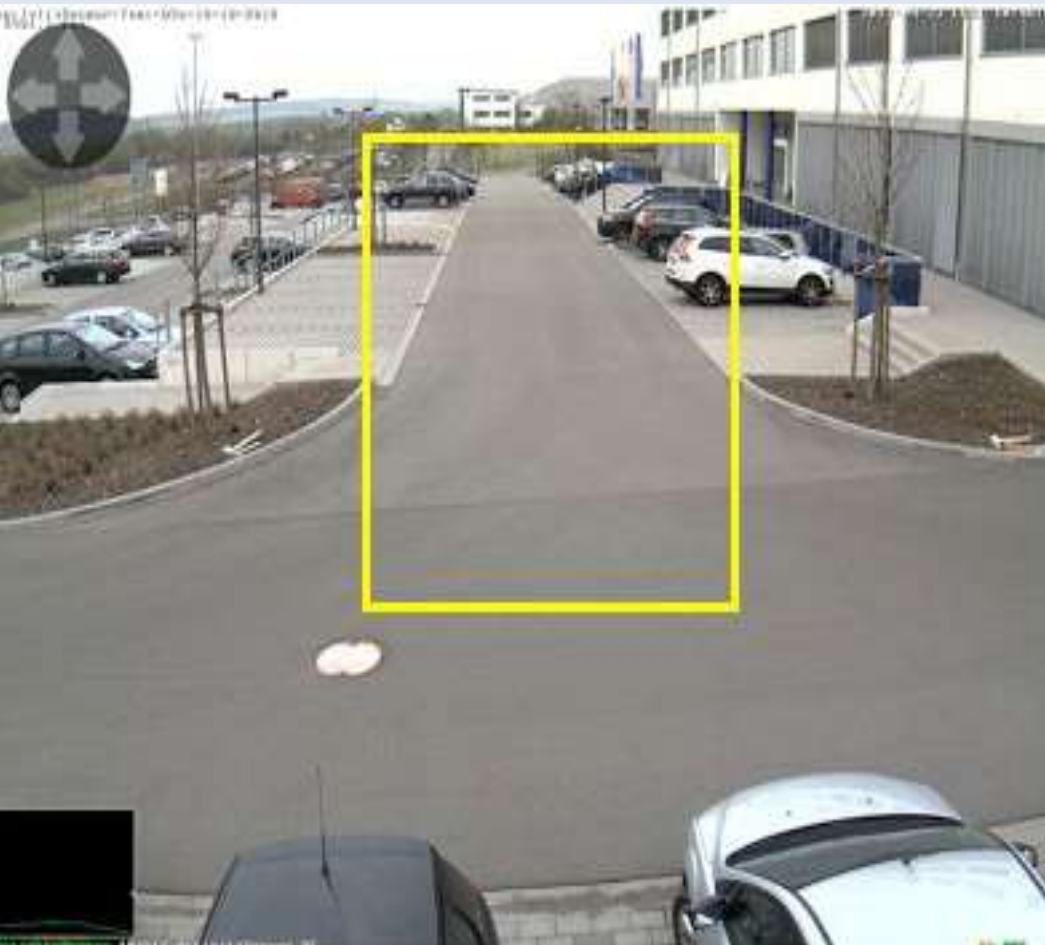
Mobotix MX-D15Di Day/Night



- 5 megapixel
- Day/night lens
- 1280 x 960 pixels
- MxActivity – integrated motion analysis
- Mobotix Control Center – video management to review and download video stored at each camera



Mobotix MxActivity Motion Analysis



- Select area
- Select sensitivity thresholds
- Alerts:
 - Email – with image
 - Text
 - Phone
- Still fine tuning for false alarms due to large trucks



Snowslide Gulch North

www.TECPRD.com
Thane-Site1Can059

2014-05-04 UTC 14:30:01
U.com
e1Can059

2014-05-04 UTC 10:50:02



021750 UC AS

(EM) FR00 REC DV

AS

(EM) FR00 REC N1



Snowslide Gulch South

www.TECPRD.com
Thane-Site2Cam060



000857 UC AS SB_Arm_Record_UC

(EM) FR00 REC DY



SB_Arm_Record_UC

(EM) FR00 REC NI



Middle Pass

www.TECPRD.com
Thane-Site3Cam061

2014-05-04 UTC 14:30:02



008877 AS UC SB Arm Record UC

(EM) FR00 REC DY Arm Record UC

2014-05-04 UTC 09:20:03



(EM) FR00 REC NI

Navigator

▲ LAYOUTS

- Thane Site 1
- Thane Site 2
- Thane Site 3
- Thane Site 4

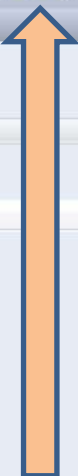
▲ VIDEO SOURCES

Name	Address
Cameras	
Clips	
Storage Devices	

▲ EVENT SEARCHES & MxANALYTICS

Search

▲ LOCAL ARCHIVE



Camera replay
for viewing
footage



Player

Navigation controls: Previous, Stop, Play/Pause, Next, Full Screen, and other playback buttons.

☐ Sync

5/7/14 10:04:01

5/7/14 10:04:01

PTZ Controls

Softbuttons

Mobotix D-15
Control Center

Navigator

LAYOUTS

- Thane Site 1
- Thane Site 2
- Thane Site 3
- Thane Site 4

VIDEO SOURCES

Name	Address
Cameras	
Clips	
Storage Devices	

EVENT SEARCHES & MxANALYTICS

Search

LOCAL ARCHIVE



Desired date & time

Player

Navigation controls: Previous, Play/Pause, Next, Stop, Full Screen, etc.

Timeline: 10/17/13 18:46:03 to 4/7/14 20:39:14

Selected time: 10/17/13 18:46:05

Export key for chosen date range

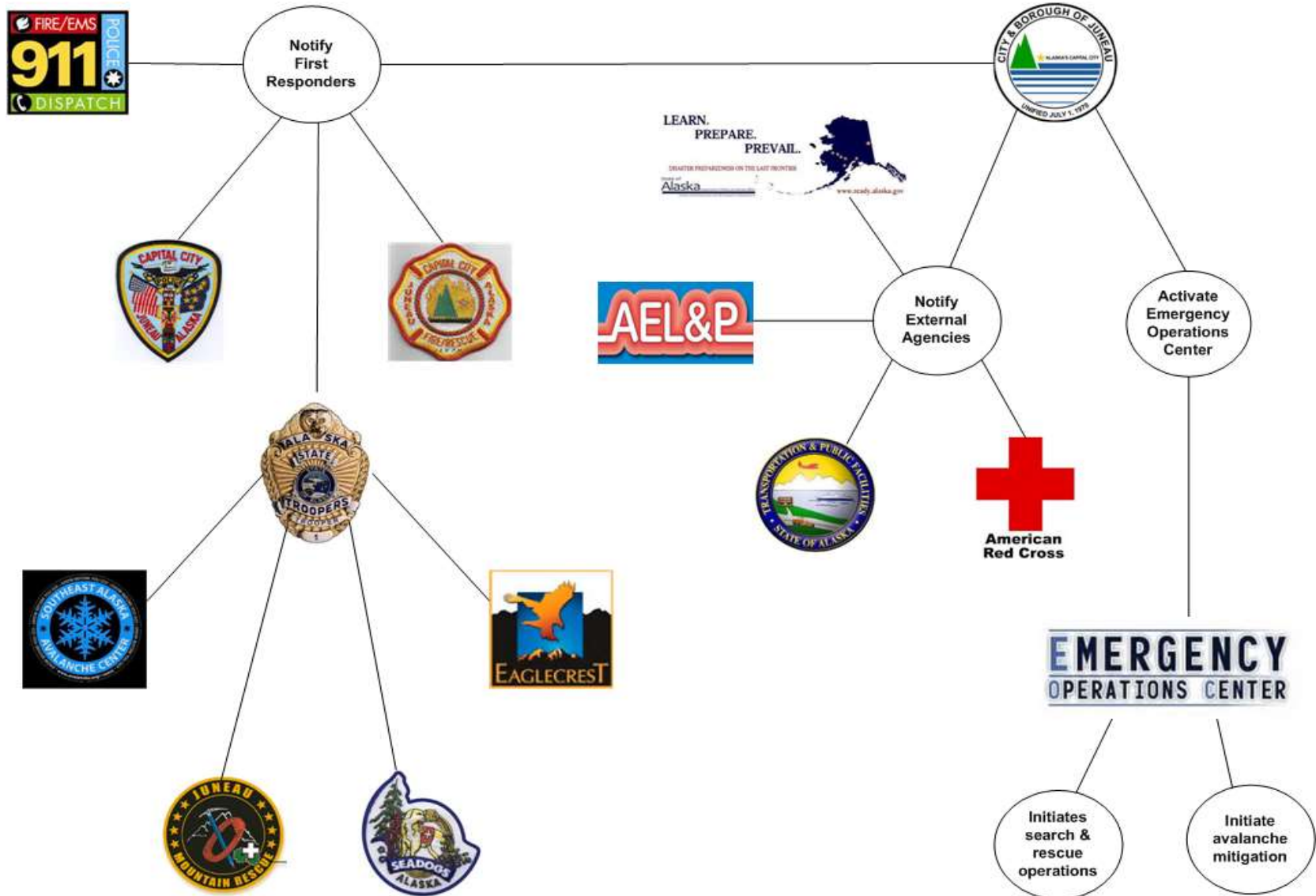
PTZ Controls

Softbuttons



Mobotix D-15
Control Center

Urban Avalanche Notification Use Case





Urban Avalanche Camera Operational Concept Use Case





National Center for Atmospheric Research



- Understand the snowfall liquid water equivalent (LWE), as measured by forward scattering present weather detector (Vaisala PWD-12)
- Assess the PWD-12 precipitation performance
- Compare the LWE and snowfall at base-elevation (approx 60') and mid-elevation (approx 1800')



Snettisham Power Line

- Relative Size – R5
- Destructive Size – D5



- 4.5 km power lines destroyed



Snettisham Tower Avalanche Diverter





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