How ICEYE's Natural Catastrophe Solutions improve the resilience of the country and society

Jeffrey Apeldoorn

Head of Government Solutions Europe

16/04/2024

ICEYE

ICEYE - A New Space Leader

2018

World's First New Space SAR
Satellite Launched
34 satellites launched to date

650+

People with 65+ Nationalities.

Headquarters in Finland

4 SUBSIDIARIES:
POLAND, US, UK, SPAIN
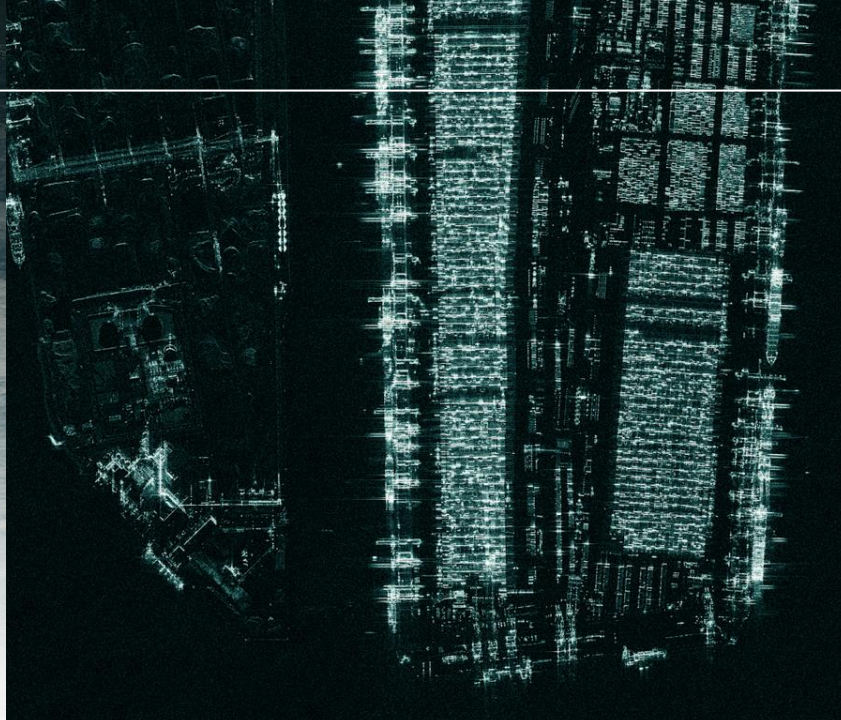
Global Leader

IN SAR MINIATURIZATION TECHNOLOGY &
NATURAL CATASTROPHE MONITORING
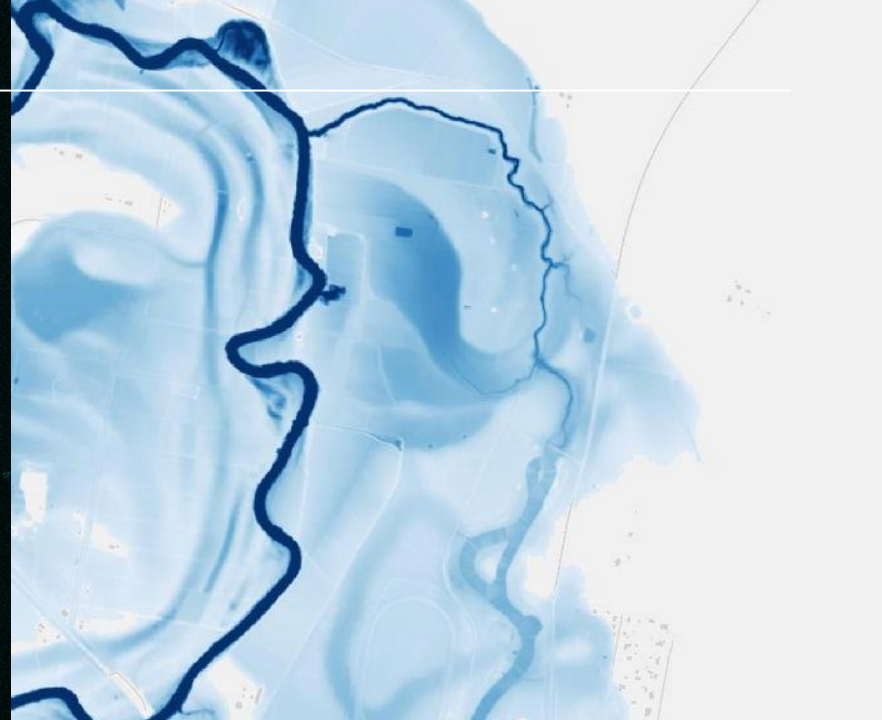
Existing portfolio of international customers

Satellite Missions

Reach space in months, not years. Own the world's only proven high-performance new space SAR satellites now.

Satellite Data

Gain unprecedented access to high-resolution SAR images of any location on Earth - day or night, regardless of weather conditions.

Solutions

Rely on ICEYE's globally consistent, high-resolution datasets for near real-time information to make critical decisions for natural disasters.

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Community Resilience

- **Prepare** for & recover from disasters

- **Mitigate** risks to critical infrastructure

- **Support** vulnerable population groups

- **Adapt** in an equitable & sustainable way

Social	Economic
Institutional	Environmental
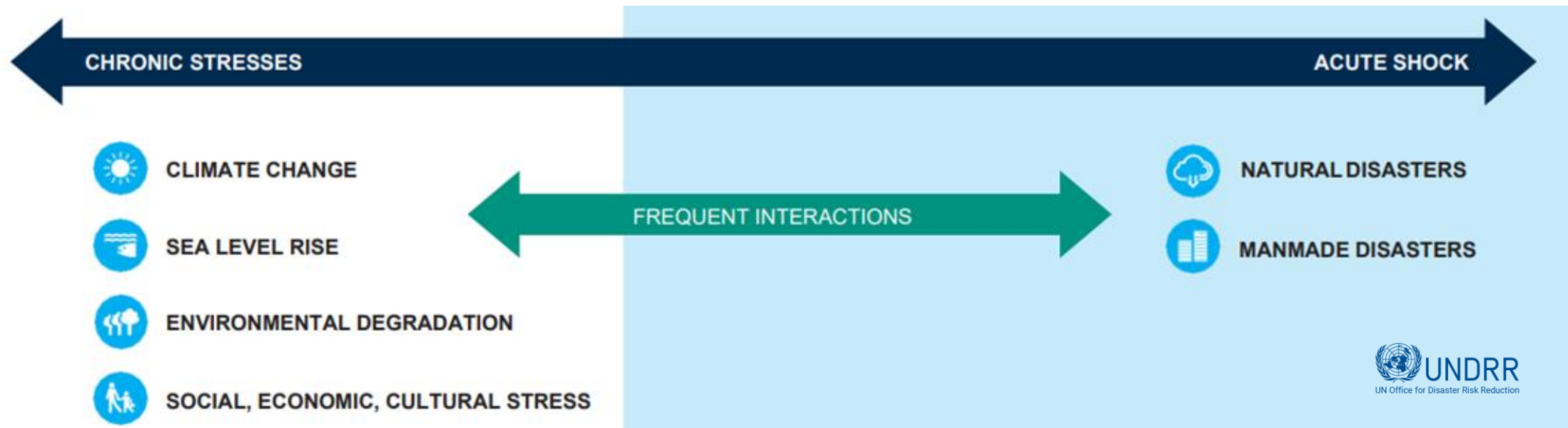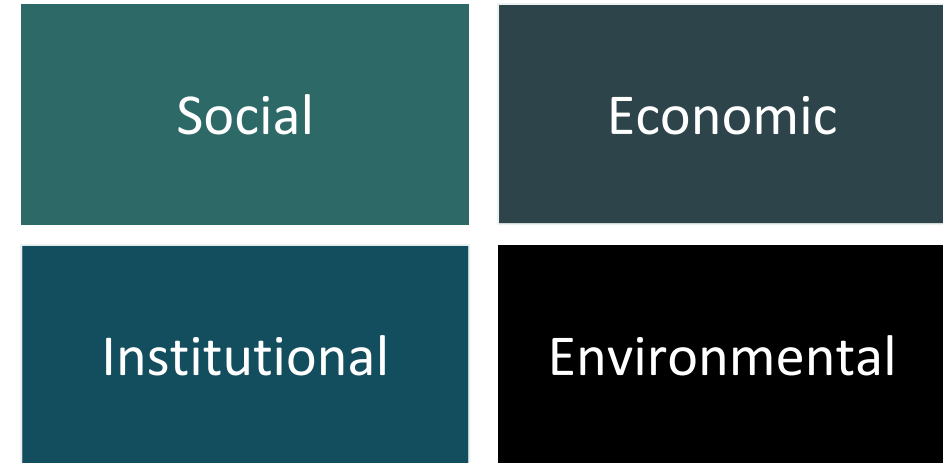
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How ICEYE Supports Resilience

- Democratizing access to Earth Observation

- Helping leaders tackle imminent climate threats

- Informing decisions at every level of government

- Addressing largest driver of EU NatCat losses

- Fueling data-driven response & recovery

- Empowering communities to:
  - Protect vulnerable populations
  - Secure critical infrastructure
 - Mitigate damage & disruptions

Global Risks Report 2024

Top 10 risks

WORLD ECONOMIC FORUM

10 years

	Risk
1st	Extreme weather events
2nd	Critical change to Earth systems
3rd	Biodiversity loss and ecosystem collapse
4th	Natural resource shortages
5th	Misinformation and disinformation
6th	Adverse outcomes of AI technologies
7th	Involuntary migration
8th	Cyber insecurity
9th	Societal polarization
10th	Pollution

Improve Community Resilience with ICEYE

Please see the presented Floodings video on the following link:

https://www.iceye.com/solutions/government

FLOOD INSIGHTS:
DEPTH & EXTENT

SAR satellite imagery
Optical satellite imagery
Aerial imagery
Ground sourced images
River / tidal gauges
Watersheds
Digital elevation models
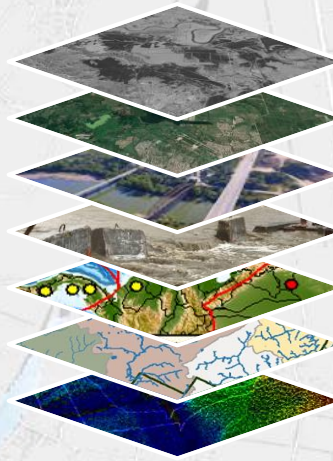
HIGH **3085**
MEDIUM **2132**
LOW **381**

Enabling portfolio-level impact analysis in near real-time

Providing the flood extent and depth at the individual structure level

Multi-sourced flood analysis using observational space-based, aerial-based, and ground-based data

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PROPRIETARY AND CONFIDENTIAL

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Event Overview - Ostrobothnia, FIN, April 15, 2024

- After a fairly snowy winter, rapid snowmelt caused by the warm spring conditions has brought several rivers to flood stage in Ostrobothnia in mid April. Particularly rivers that had ice jams have caused flooding that has covered large agricultural areas, cut off roads and impacted buildings. **Ylivieska, Alavieska and Kalajoki** have seen the worst impacts.
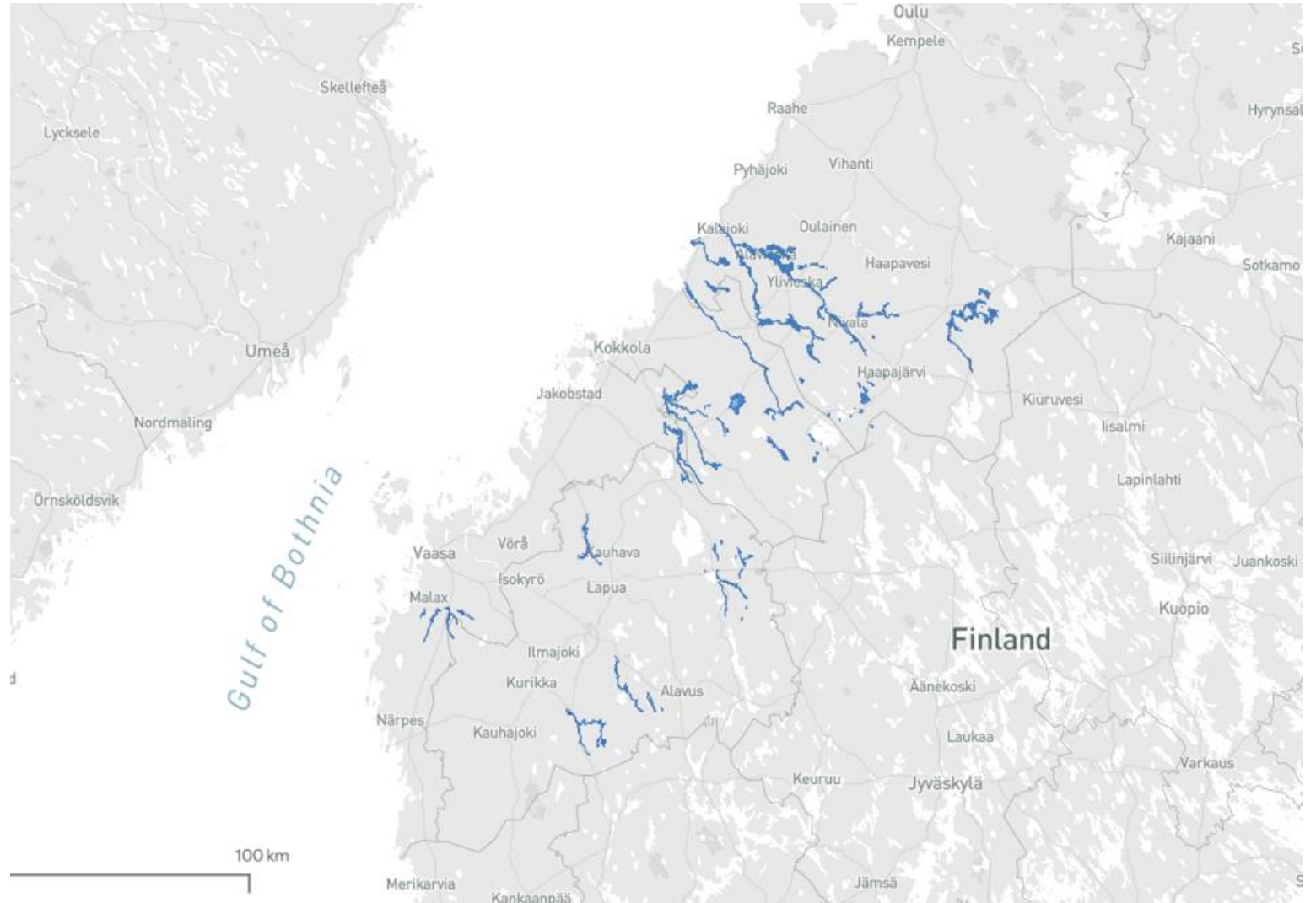
Initial list of impacted locations Ostrobothnia, FIN – April 15, 2024

Most Impacted Cities	Minimum Number of Flooded Buildings	Average Depth (cm)	Analysis Status
Ylivieska	10-30	30-50	R1 Expected April 16
Alavieska	<10	30-50	R1 Expected April 16
Tynkä	<10	50-100	R1 Expected April 16
Kauhajoki	<10	30-50	R1 Expected April 16

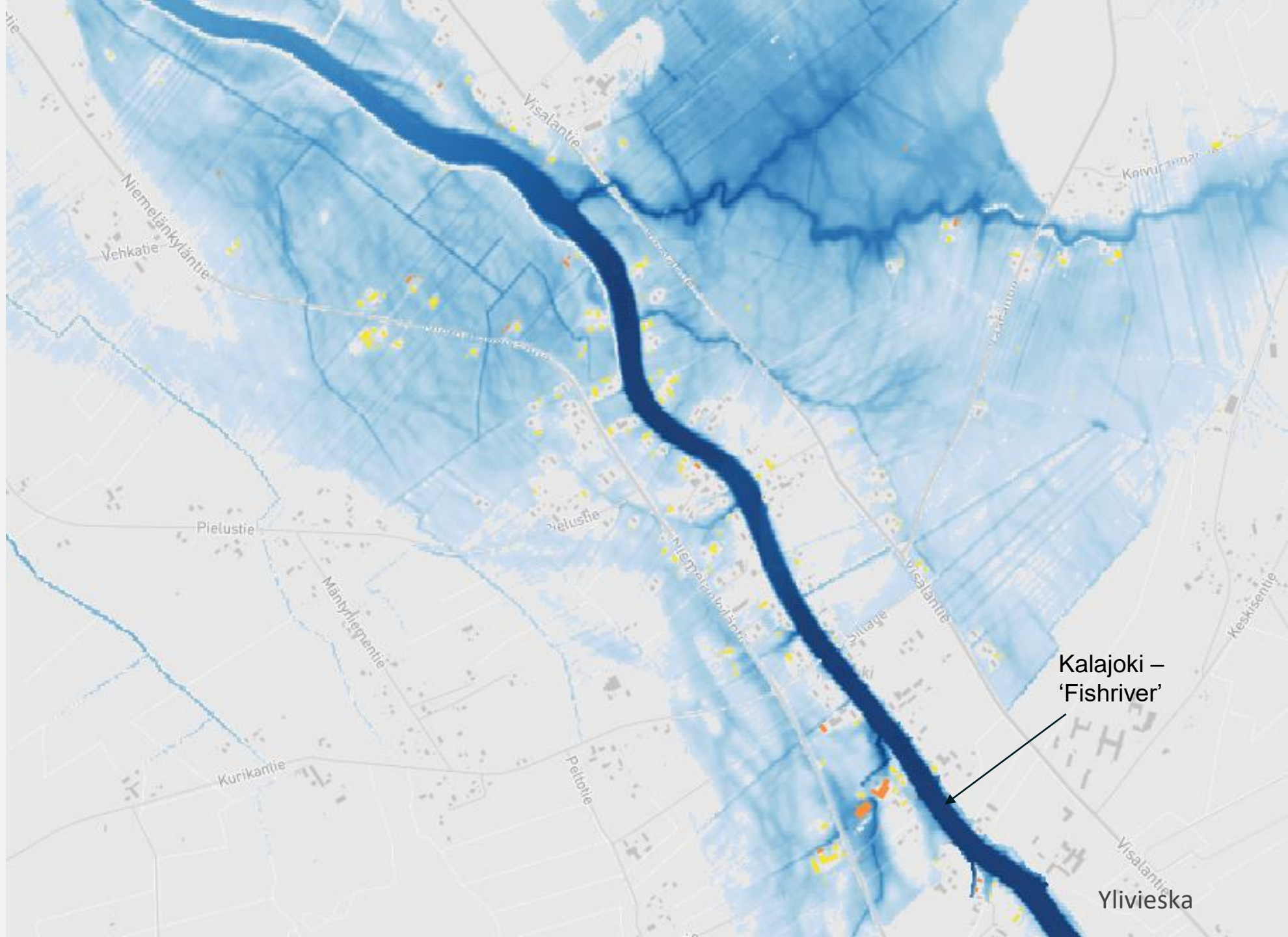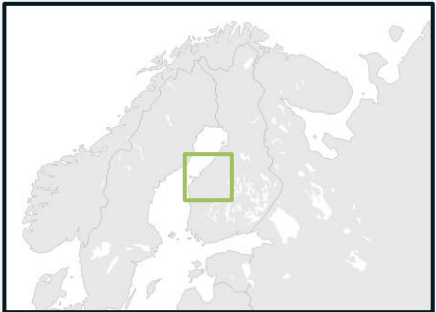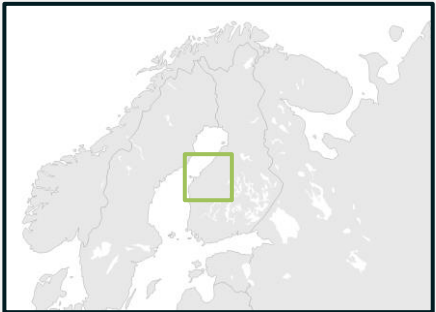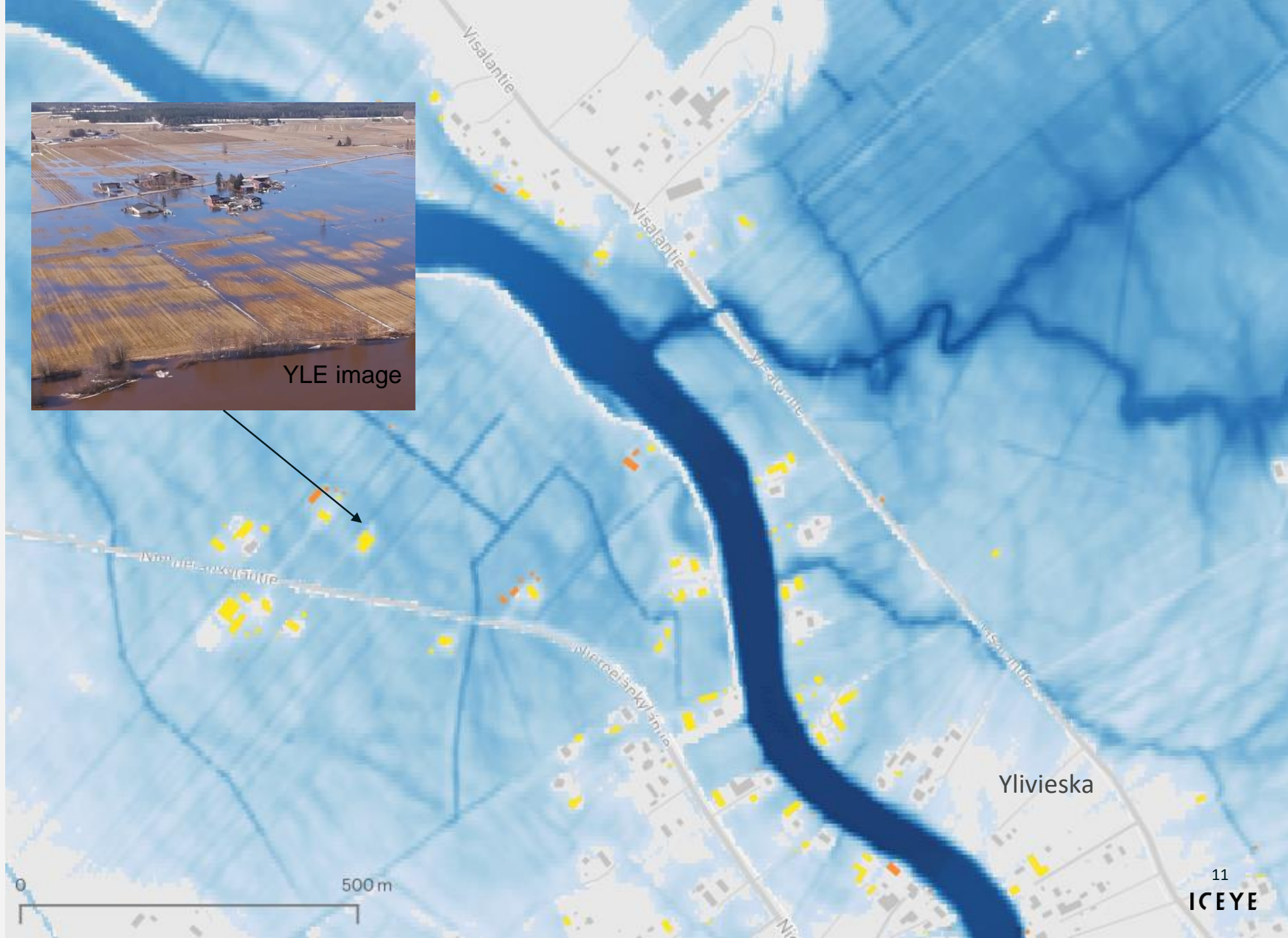# Event Overview - Ostrobothnia, FIN, April 15, 2024

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Flooding In Ostrobothnia, Finland

15/04/2024

➔ **292 km²** total flood extent.

➔ **0.44 m** average inundation at building level

Total buildings affected:

- ■ **64 high** *(>1.51 m)*
- ■ **820 medium** *(0.46-1.5 m)*
- ■ **1663 low** *(0-0.45 m)*

Kalajoki – 'Fishriver'

Ylivieska

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YLE image

Ylivieska

500 m

ICEYE

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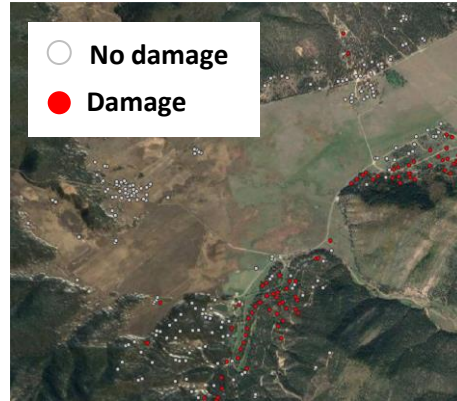
YLE image

Ylivieska

0   600 m
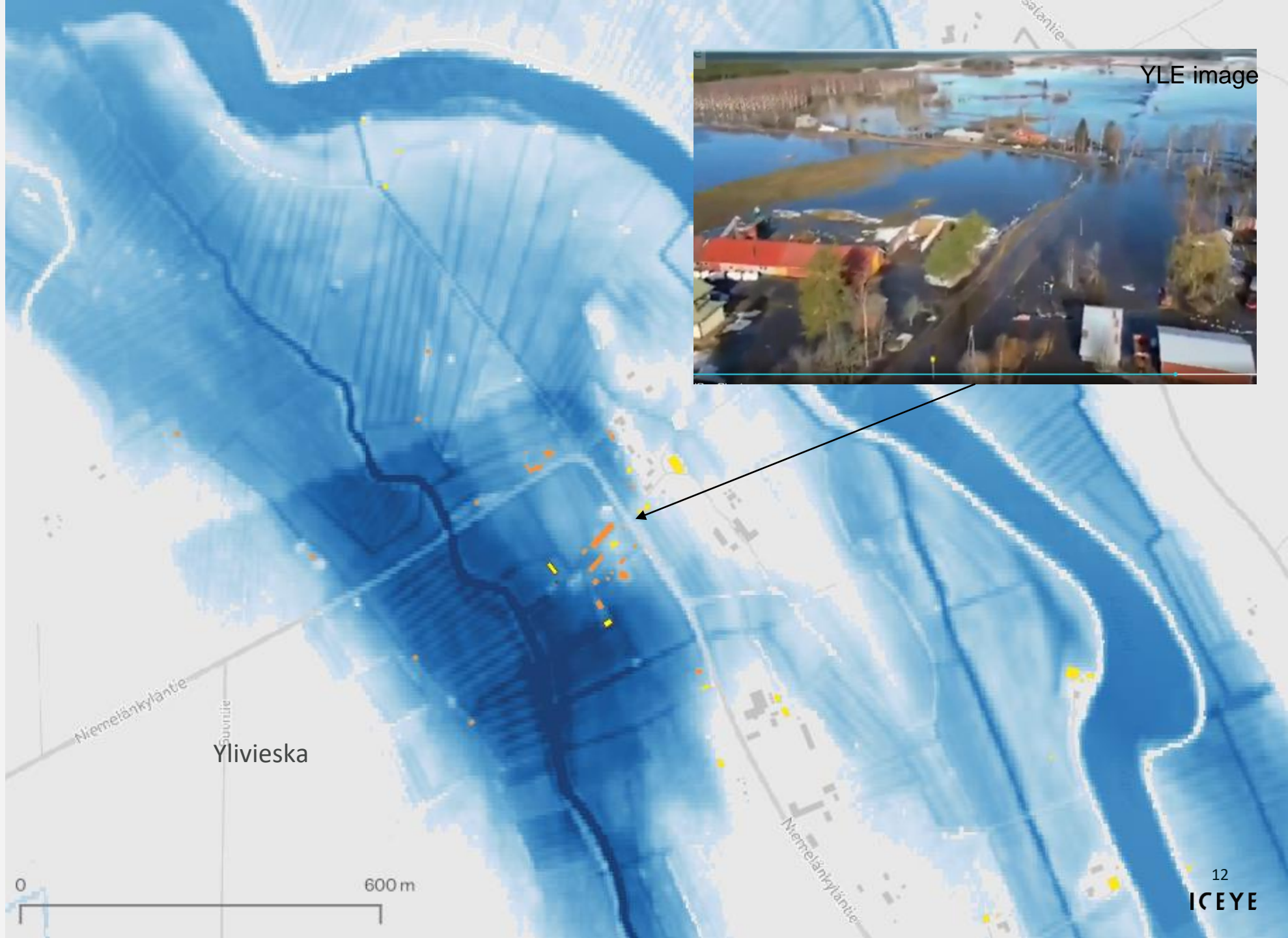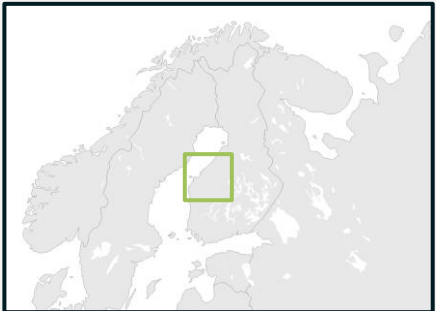
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ICEYE WILDFIRE PRODUCTS IN DEVELOPMENT THROUGH COSMOS

Wildfire Monitoring App
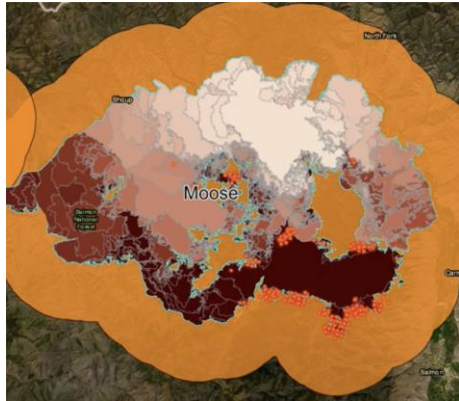
⤏ Situational awareness
  ⤏ Internal & external communication
  ⤏ Event underwriting
⤏ Web Application displaying all active wildfire events in the US

Building Damage Assessment


No damage

● Damage

⤏ Sizing event loss / Customer communication / Resource allocation / / Claims prioritization & payments
⤏ Detects the number and location of impacted buildings
⤏ Binary classification of

Wildfire Progression Maps

July 24 - 25 2022
July 25 - 26 2022
July 26 - 27 2022
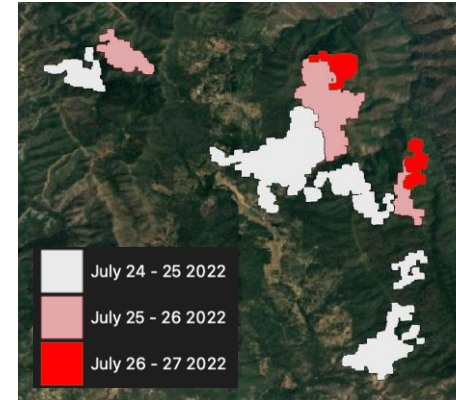
⤏ External Communication/Resource allocation
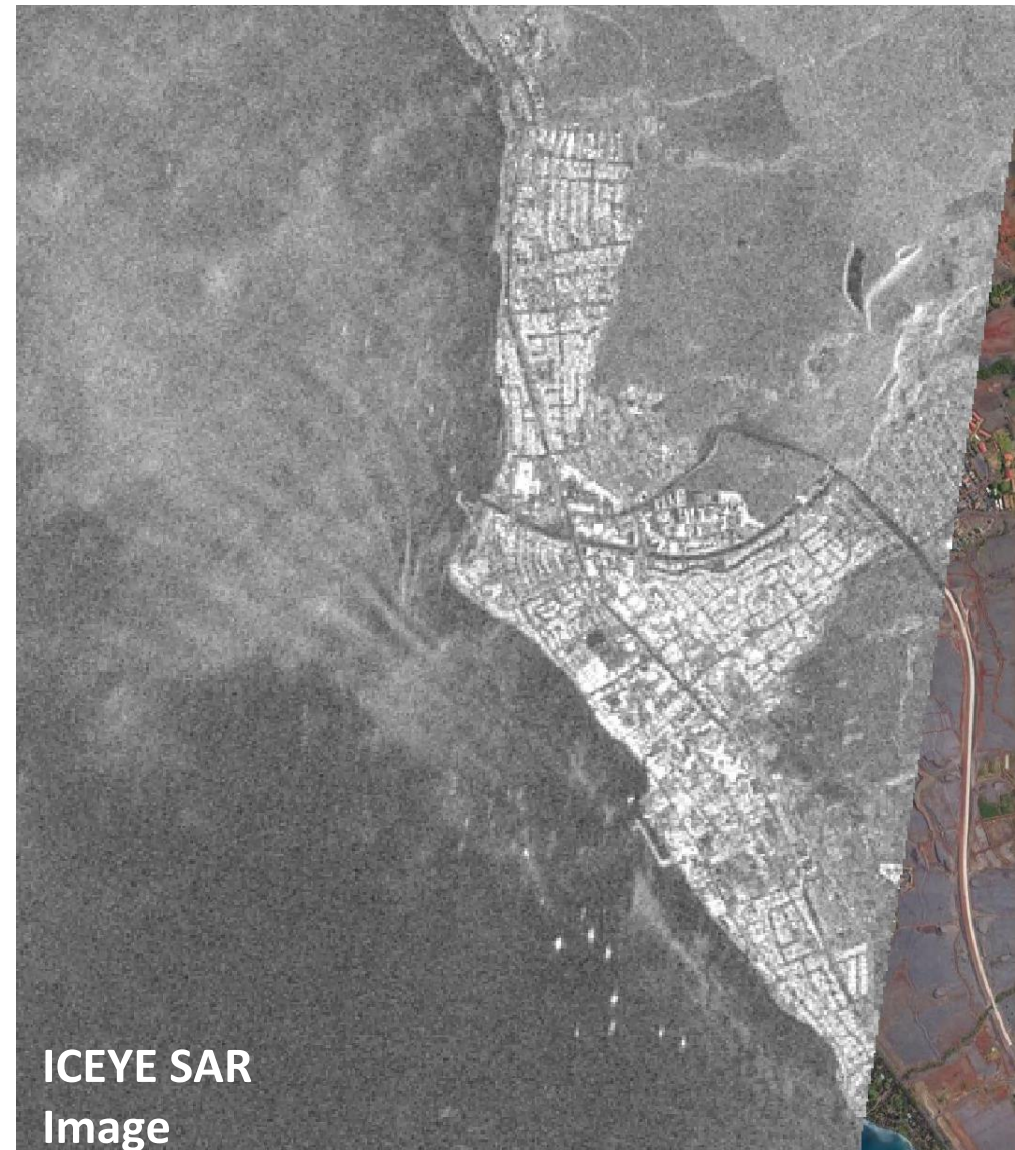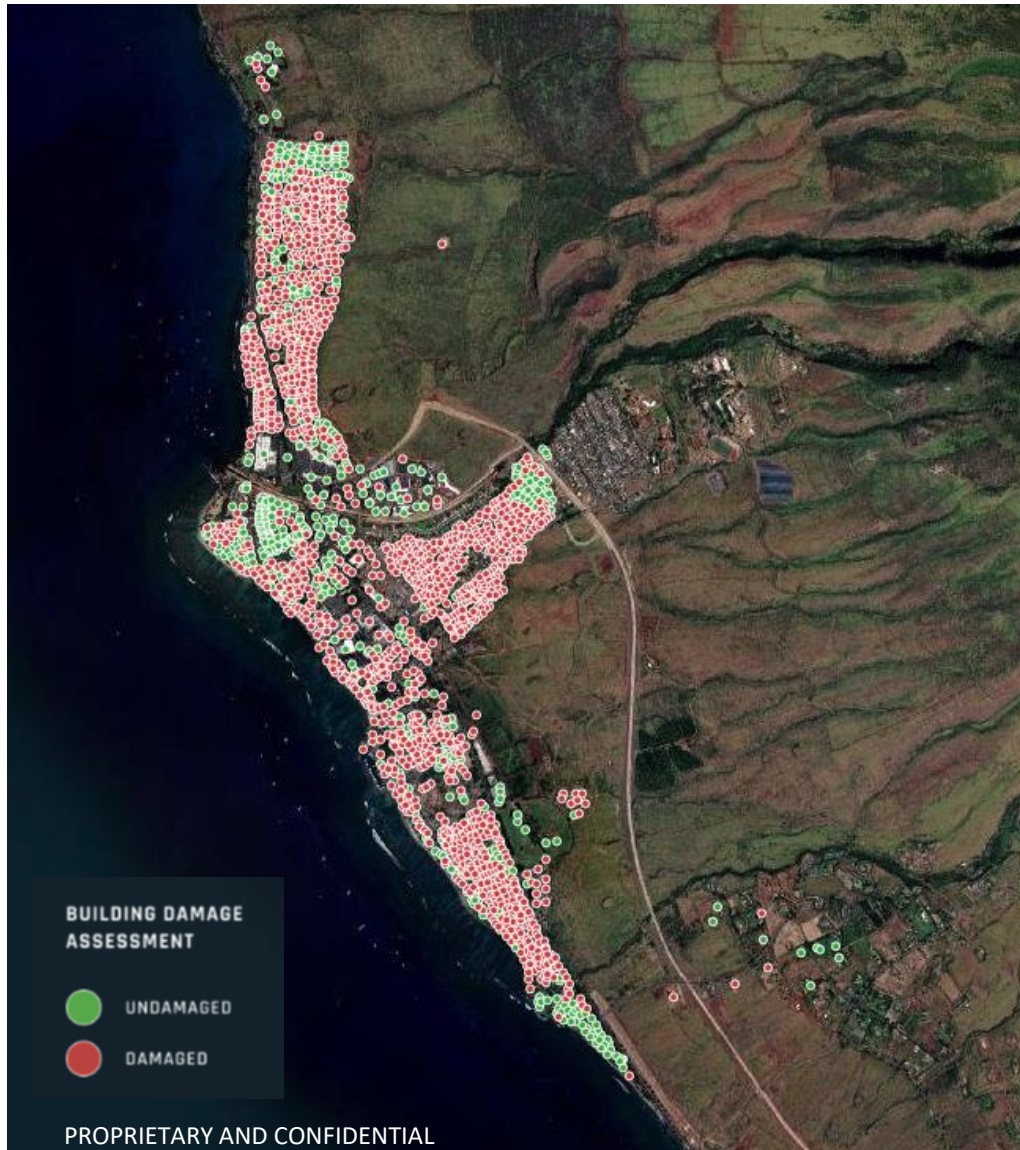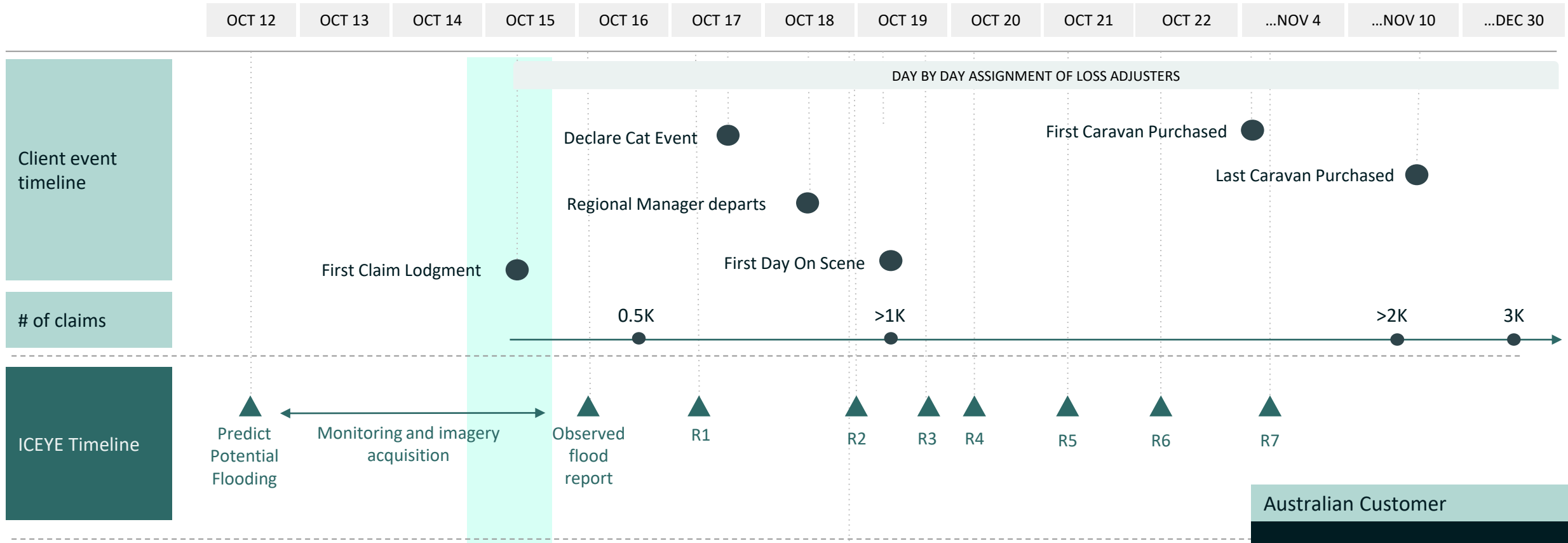⤏ Detects burned areas and delivers an outputs on a daily basis

Wildfire Footprint
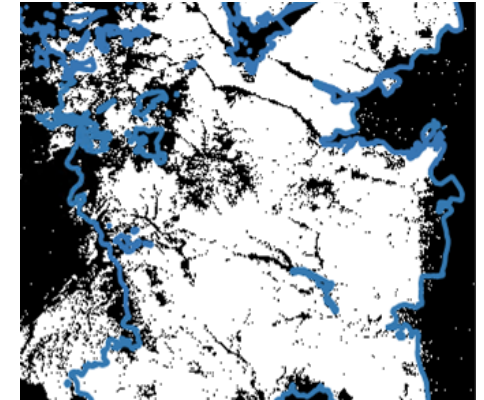
⤏ Underwriting and pricing
⤏ Historic burned areas incorporated into underwriting and pricing models, including risk assessment

Maui Fire, Lahaina, Hawaii (August 2023)

- Over **1554 destroyed** buildings detected
- **74% of the total number of buildings** in this area

BUILDING DAMAGE
ASSESSMENT

🟢 UNDAMAGED

🔴 DAMAGED

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ICEYE SAR
Image

Speeding up resource planning and increasing effectiveness of allocation

OCT 12	OCT 13	OCT 14	OCT 15	OCT 16	OCT 17	OCT 18	OCT 19	OCT 20	OCT 21	OCT 22	...NOV 4	...NOV 10	...DEC 30

DAY BY DAY ASSIGNMENT OF LOSS ADJUSTERS

Client event timeline

Declare Cat Event

First Caravan Purchased

Last Caravan Purchased

Regional Manager departs

First Day On Scene

First Claim Lodgment

# of claims

0.5K   >1K   >2K   3K

ICEYE Timeline

Predict Potential Flooding

Monitoring and imagery acquisition

Observed flood report

R1   R2   R3   R4   R5   R6   R7

FLOOD PEAK

Insurance Council of Australia (ICA) declares Cat Event

Australian Customer

Impact:
→ Claims handling costs
→ Customer Experience
→ Sustainability

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ICEYE's Disaster Management from Space

ICEYE's vision is to deliver a comprehensive suite of insight solutions related to a wide range of natural catastrophe events that enable government agencies and insurance industry customers to achieve substantially better outcomes for their stakeholders. An important part of this work will be done through COSMOS.

Before
Near–term forecast for proactive response

During
Near real-time reporting to optimise response

After
High resolution historical event analysis to support recovery and future planning

Insurance Industry

→ Rapid Situational Awareness
→ Sizing Losses

→ Communication
→ Resource Allocation
→ Claims Triage

→ Remote Assessment
→ Risk Management
→ Parametric / ILS

Government Agencies

→ Rapid Situational Awareness & Response
→ Faster delivery of disaster relief

→ Financial Resilience (Parametric / ILS)
→ Improved Risk Management
→ Better Recovery Outcomes

NATCAT Perils

Flood   **Wildfire**   **Wind/ Hurricane**   **Tsunami**   **Earthquake**   **Volcanic Eruption**   **Infrastructure Monitoring**   **Deforestation**   **Oil Pipeline leaks**

LIVE AND R&D   R&D

Crisis Observations and Management from Space (COSMOS)

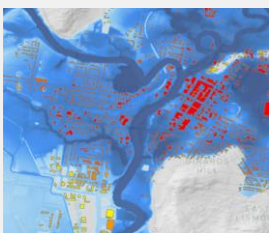Part of ESA's Civil Security from Space (CSS) program

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Disaster Management Solutions (DMS)

A complete set of applied solutions to provide accurate and fast insights to support decision making during management of **natural catastrophes**
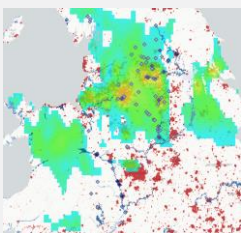
Building on Beta and advanced-Beta products to increase efficiency, consistency and capacity to allow:

- **Rapid** situational awareness
- **Reliable** event capture
- Real-time monitoring based on **observed** data
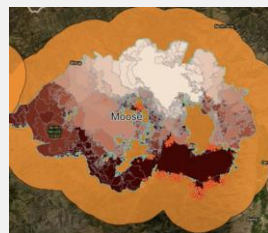- **Quantifiable** impacts on people and infrastructure

Flood Insights (Extend & Depth)	Flood Early Warning	Wildfire Insights

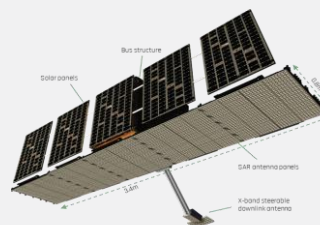- Performed in Finland

Spaceborne and other platforms

A service based on Gen-4 Satellites and other systems. Feeding DMS with frequent high-resolution SAR data acquisitions.

- **Generation-4 Satellite:**
  - Development of direct downlink antenna
  - Allowing for agile imaging mode and simultaneous acquisition and downlink (Near real-time)

ICEYE Generation-4 Satellite

Performed in Spain, Finland & Poland

ICEYE is bringing **Disaster Management Solutions** to the market by working in collaboration with subsidiaries in EU and ESA Member States **(Finland, Poland and Spain)** and dissemination/outreach partners to provide access to data **where it's most needed**.

ICEYE

Improving life on Earth by becoming
the global source of truth

For further information:

Jeffrey Apeldoorn

Head of Government Solutions Europe

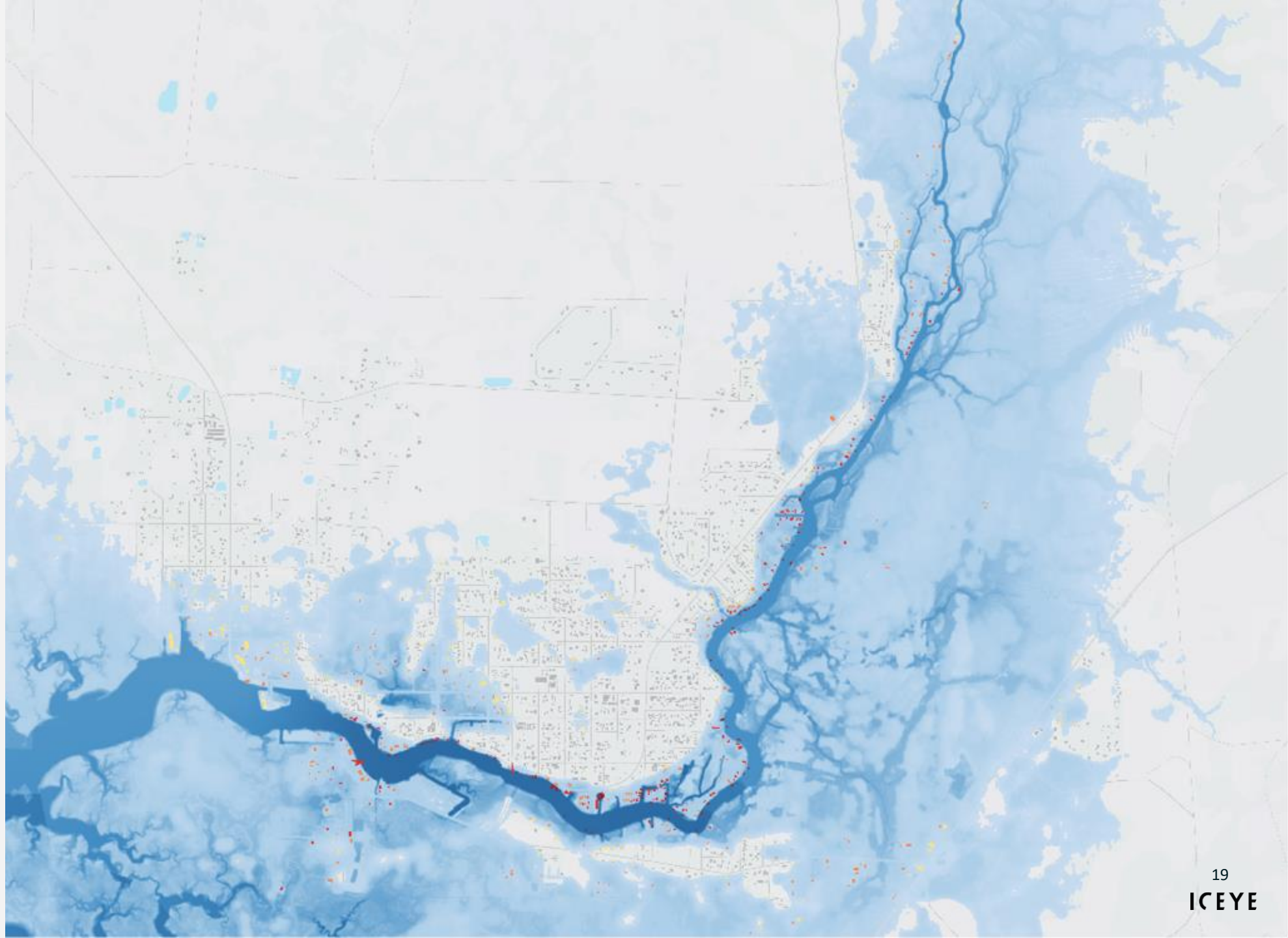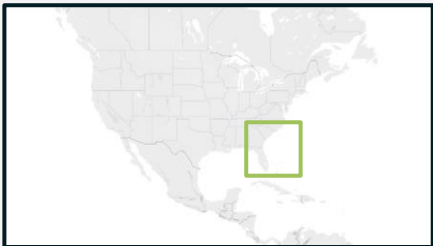Paris, France | +358 401580687 | jeffrey.apeldoorn@iceye.com

Flooding In Southeast United States

September 2023

→ **3,644 km²** total flood extent.

→ **>0.2 m** average inundation at building level

Total buildings affected:

- **256 very high** *(>2.41m)*
- **957 high** *(>1.51-2.4m)*
- **3,671 medium** *(0.61-1.5m)*
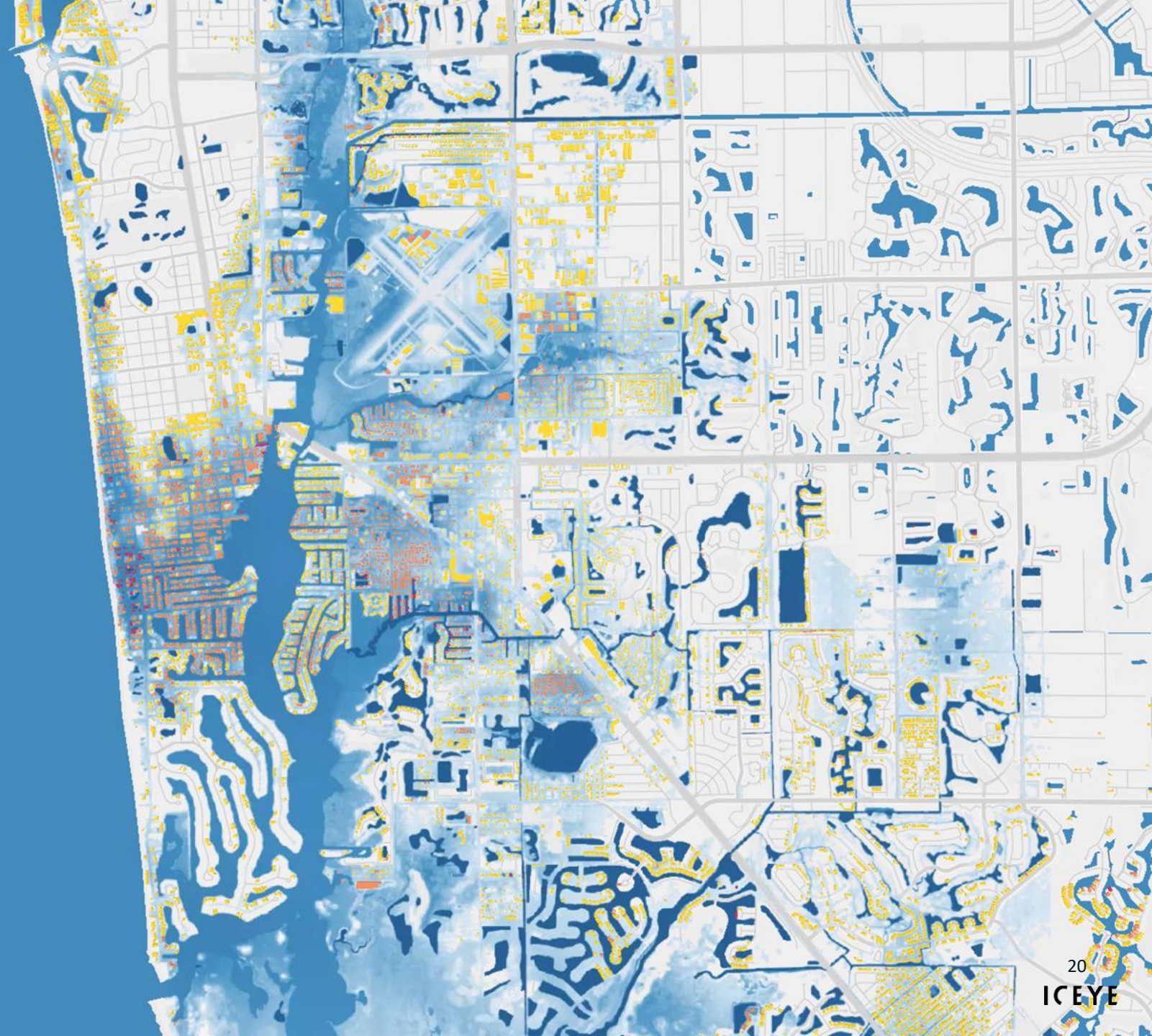- **62,302 low** *(<0.6m)*

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Flooding From Hurricane Ian in Florida, US

September 2022

➔ **6,499 km²** total flood extent.

➔ **0.40 m** average inundation at building level

Total buildings affected

- **2,231 very high** *(>2.41m)*
- **11,132 high** *(>1.51-2.4m)*
- **70,887 medium** *(0.61-1.5m)*
- **274,608 low** *(<0.6m)*

Flooding In Northern Territory, Australia

March 2023

Total buildings inundated
(Camden)

- **26 high** *(>1.51 m)*
- **24 medium** *(0.46-1.5 m)*
- **60 low** *(0-0.45 m)*

(St. Marys)

- **15 high** *(>1.51 m)*
- **224 medium** *(0.46-1.5 m)*
- **64 low** *(0-0.45 m)*

(Windsor)

- **48 high** *(>1.51 m)*
- **34 medium** *(0.46-1.5 m)*
- **66 low** *(0-0.45 m)*

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