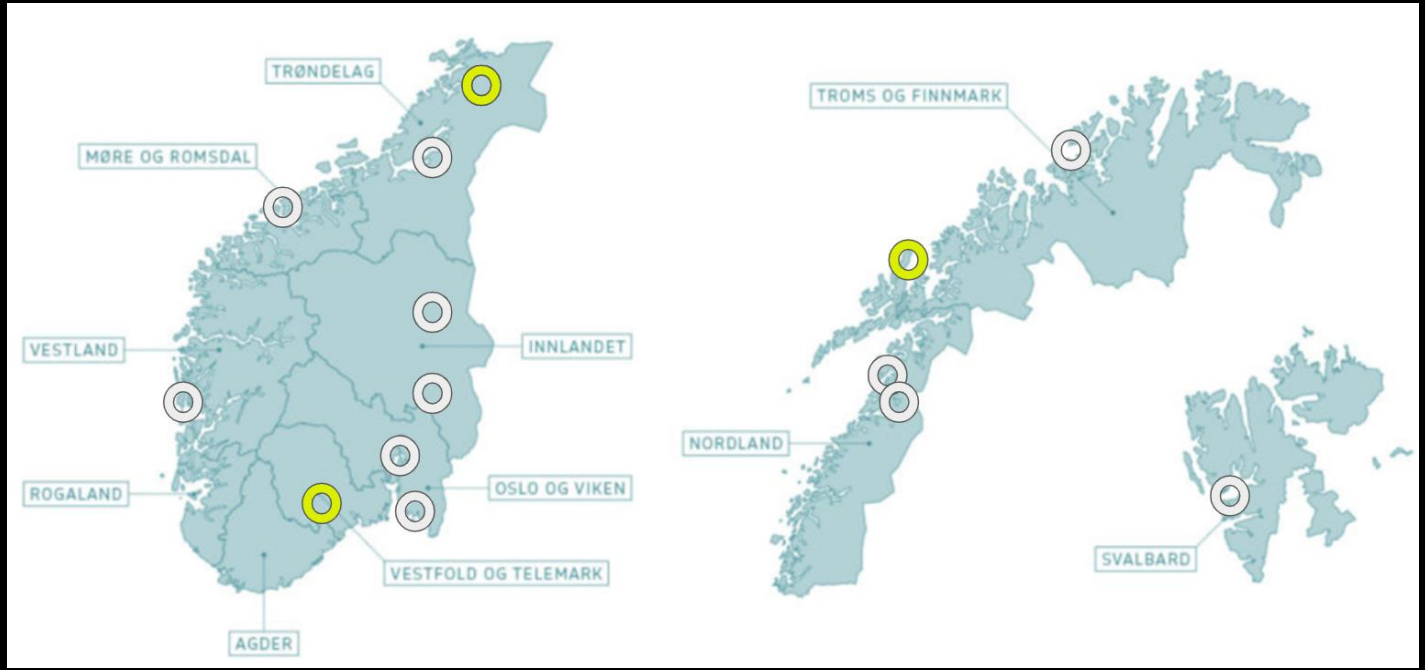
Situational awareness by drone

Before/after the quick clay landslide Gjerdrum, Norway

Nicholas C. Newhouse - CTO, Special Ops Pilot

TIEPOINT

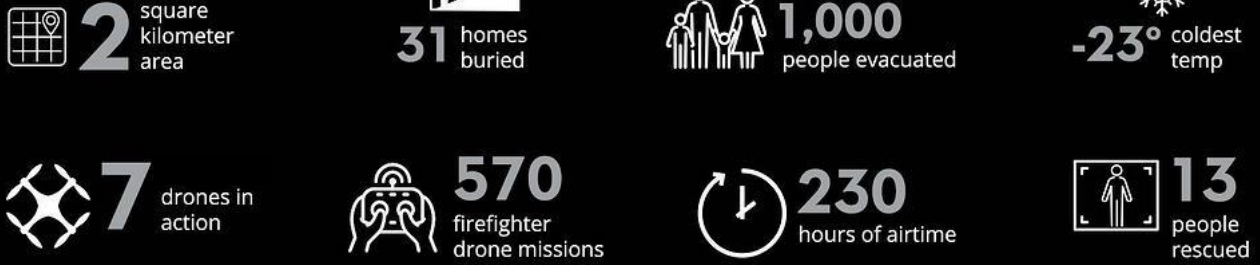
Unmanned Operating Basis in Norway



TIEPOINT

Gjerdrum Quick Clay Landslide

GJERDUM NORWAY LANDSLIDE RESCUE OPERATION IN NUMBERS



TIEPOINT

Quick Clay Properties

Intact Quick Clay

Collapsed Clay Particles

Remolded Quick Clay

Remolded Quick Clay
Strengthened by Salt

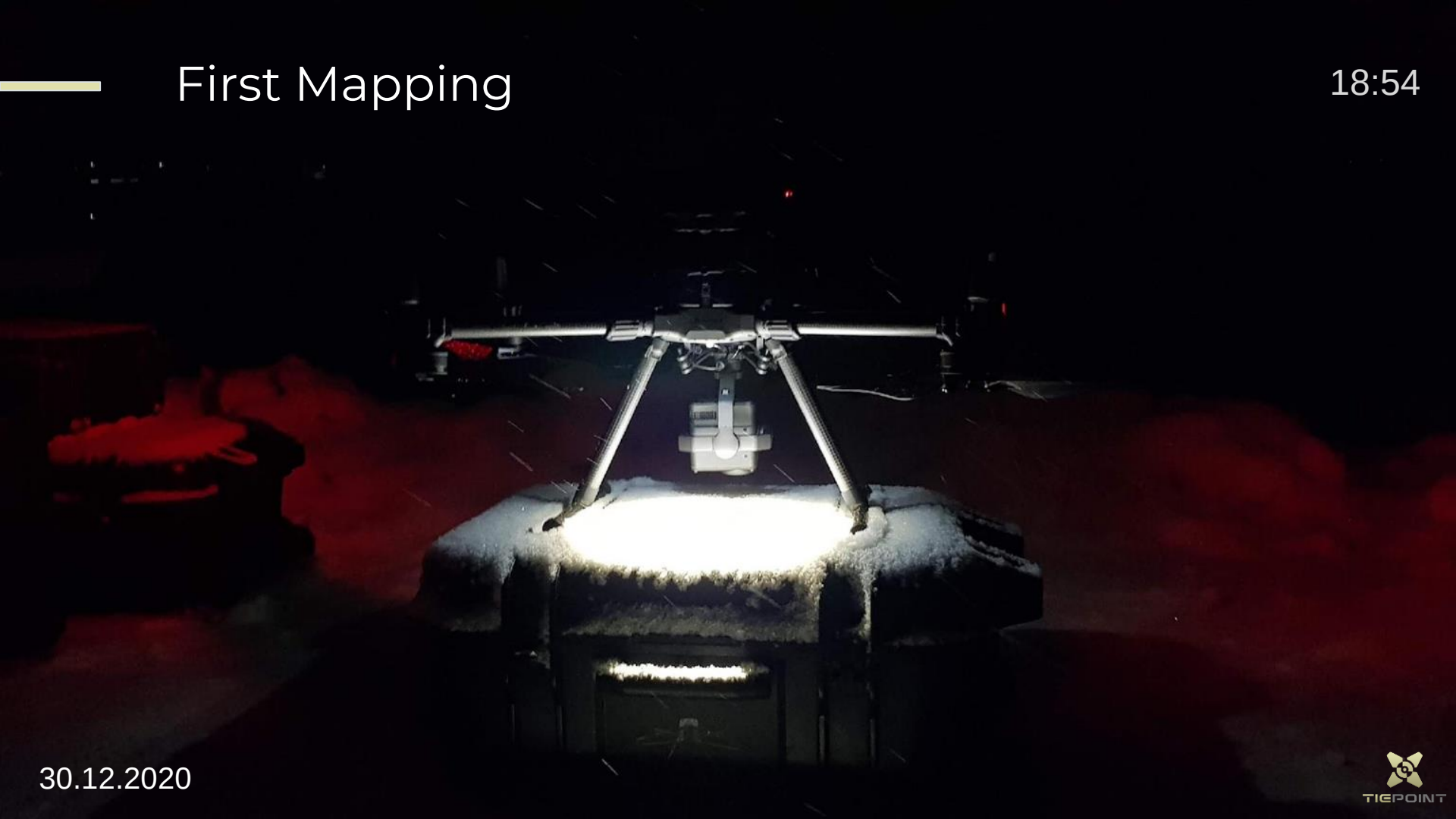
TIEPOINT

30.12.2020

TIEPOINT

First Mapping

18:54



30.12.2020

TIEPOINT

Tango1 Drone - Grid Flying

30.12.2020

Tango2 Drone - Manuell Flying

19:50

TIEPOINT

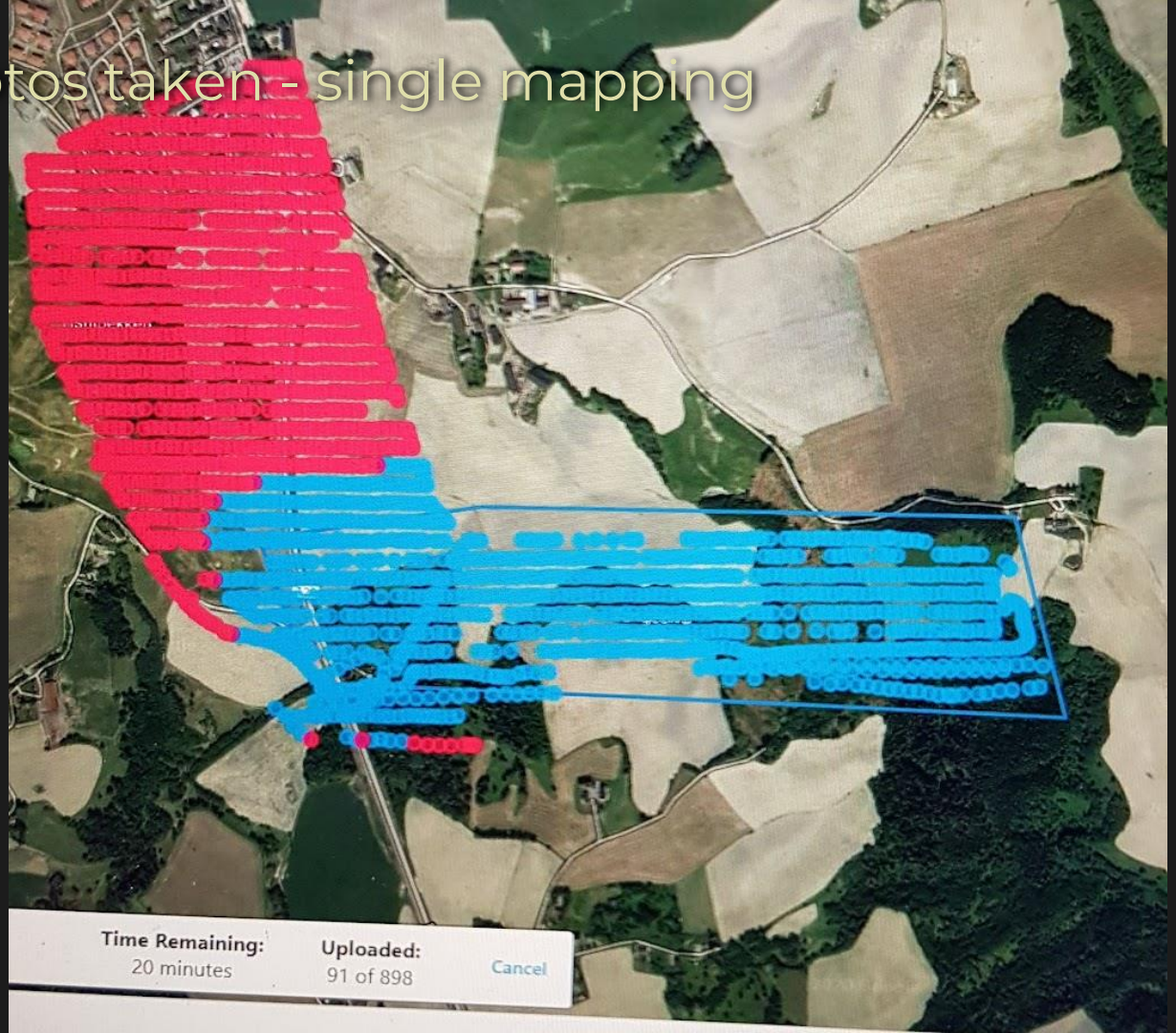
First Map - IR

21:45

30.12.2020

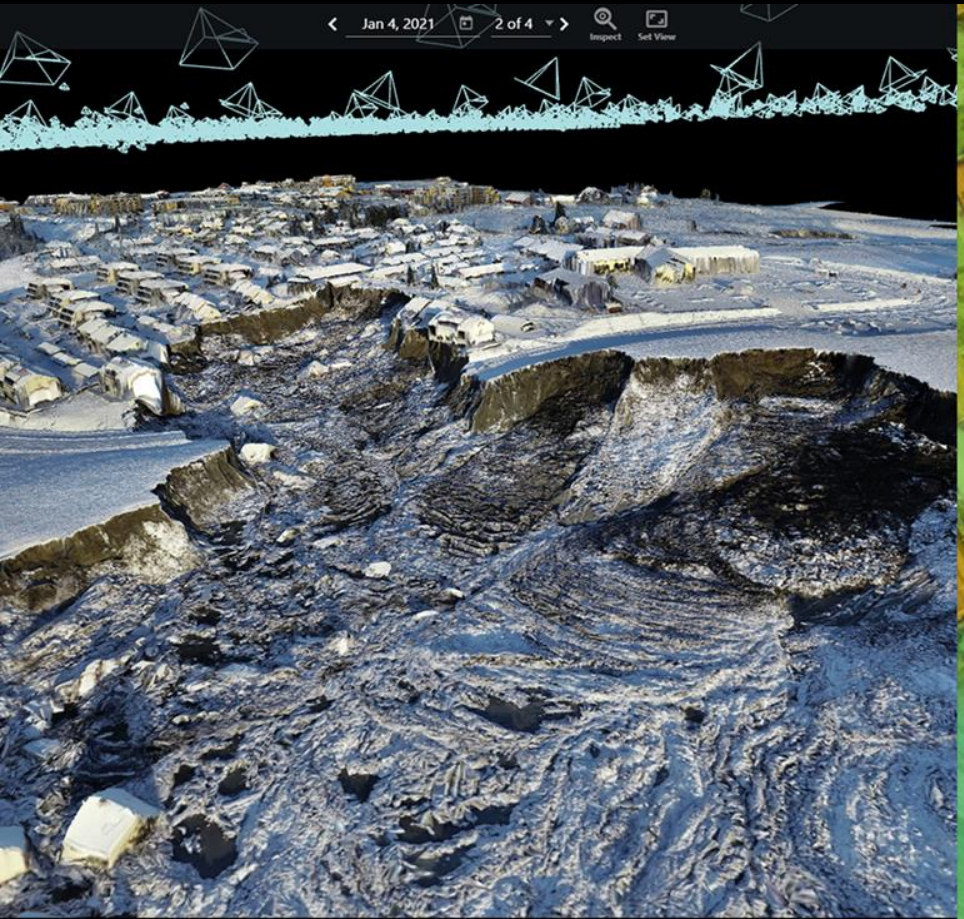
TIEPOINT

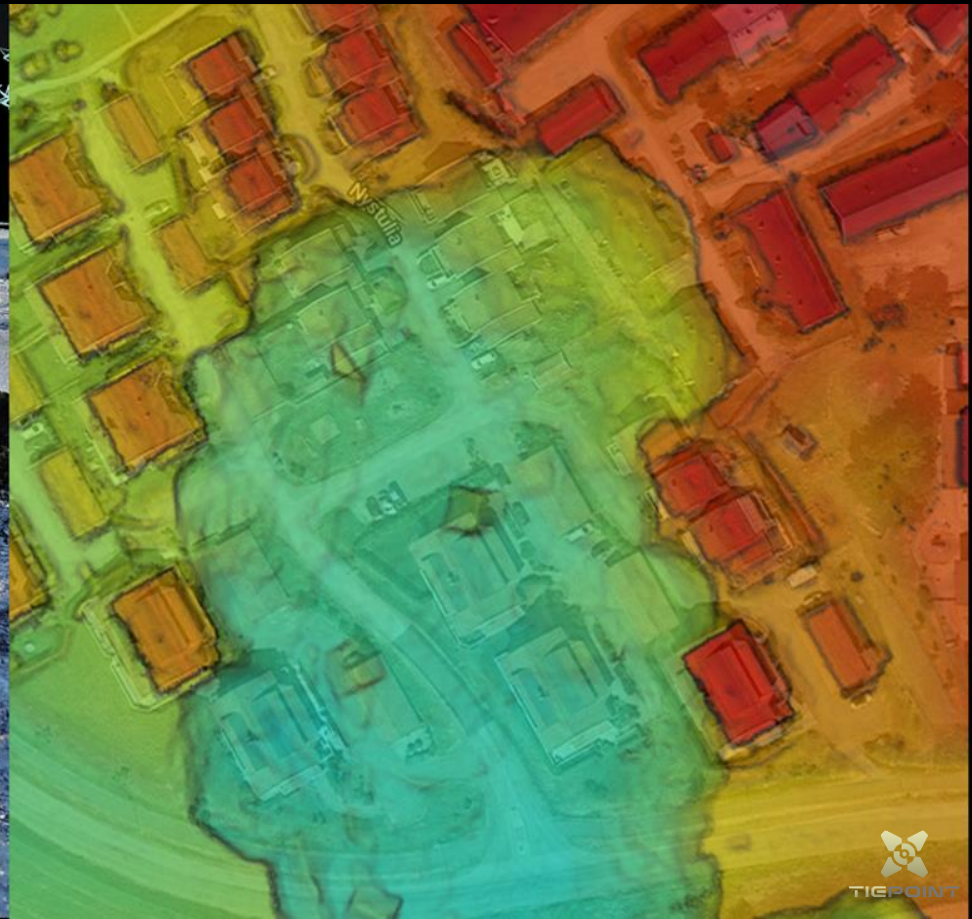
Photos taken - single mapping



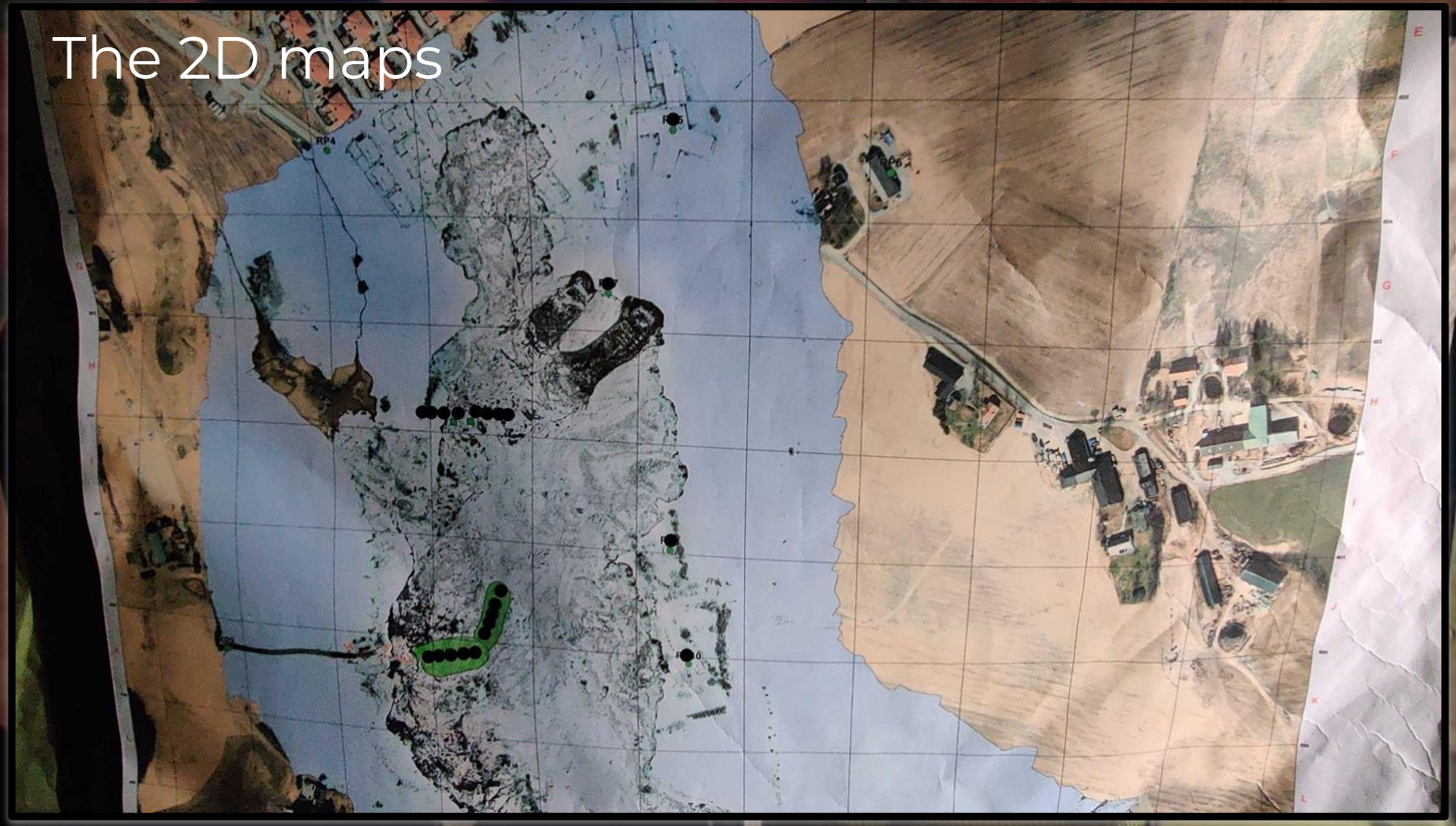
Comparing Mappings

3D Terrain model from drone orthophoto





The 2D maps



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Gjerdrum
05/01/2021, 00:00 EO...

2D | Timeline | Cloud | Mesh

LAYERS | FILES | MEASURE

Ground Control Points

Photos (1,903)

Elevation Data

Orthomosaic

Leguan bridge

Road of styrofoam mats

20 m
100 ft

Maxar, Microsoft | Esri, HERE, Garmin, iPC

Lat 6

Precision - georeferencing of the maps

Ground Control Points

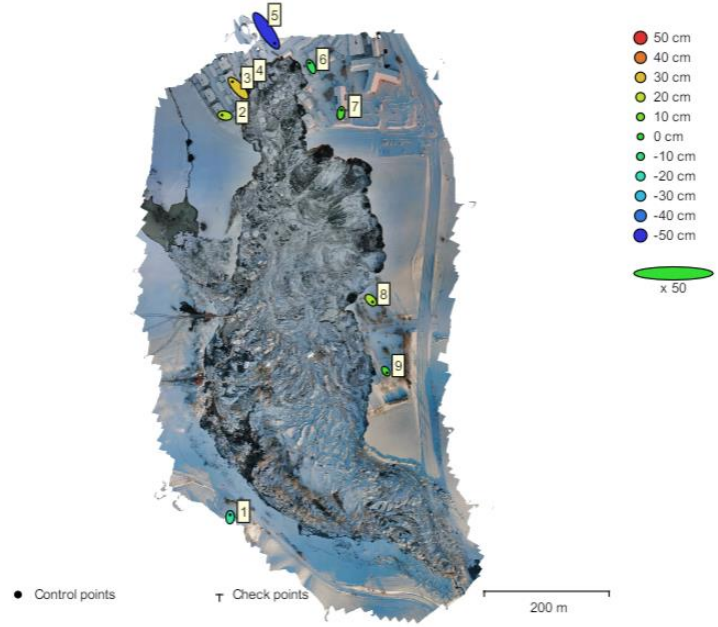


Fig. 4. GCP locations and error estimates.
Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.
Estimated GCP locations are marked with a dot or crossing.

Count	X error (cm)	Y error (cm)	Z error (cm)	XY error (cm)	Total (cm)
9	24.0234	32.6051	21.5376	40.4996	45.8703

What have we learned?

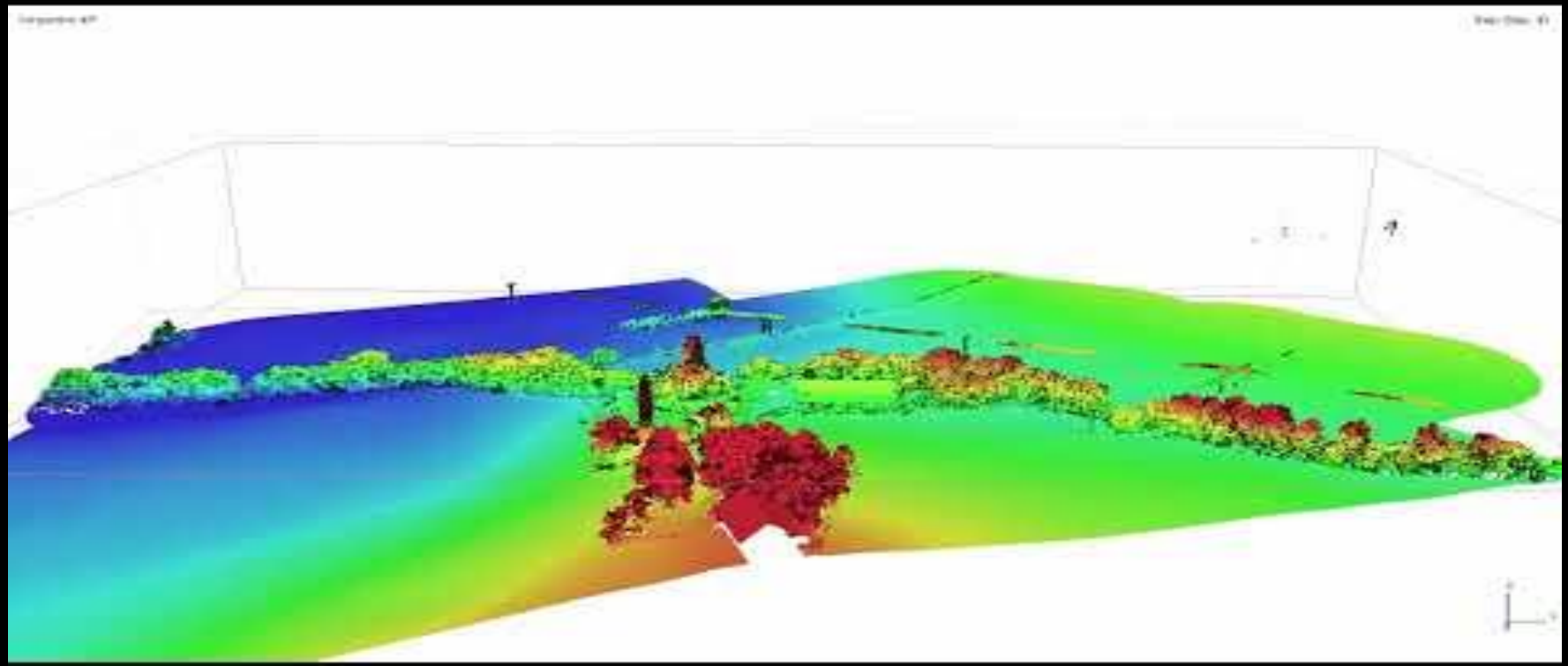
What have we learned?

- Mapping is becoming a part of emergency response
- Initiative to fly manned and unmanned aircraft together
- Integration of UAV mapping within Norwegian 110 centres (112 centres)
- Creating an Incident Commander for Drones and ATC

Speed vs results - Single Shot

TIEPOINT

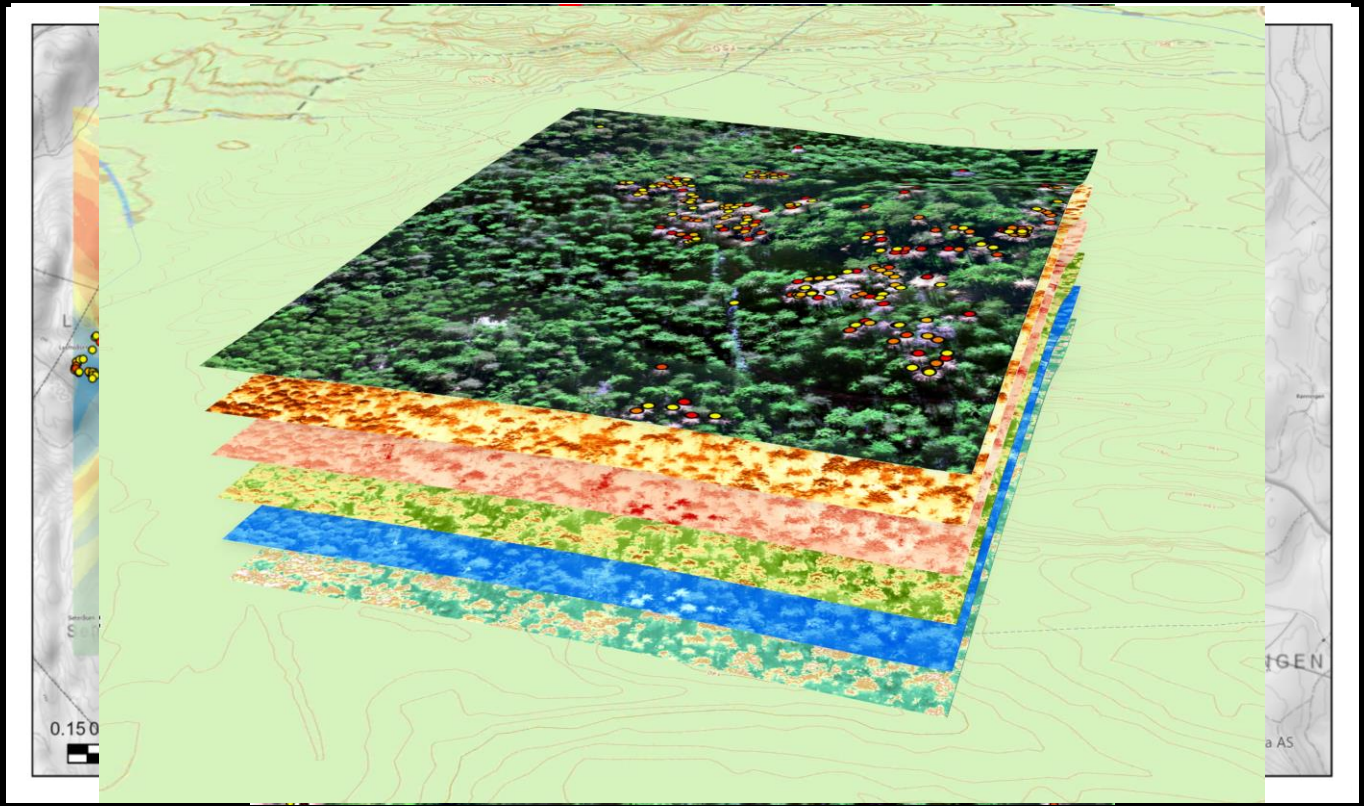
Speed vs results LiDAR



Manned and unmanned aircraft

Manned and unmanned aircraft

Forest fires and Ai

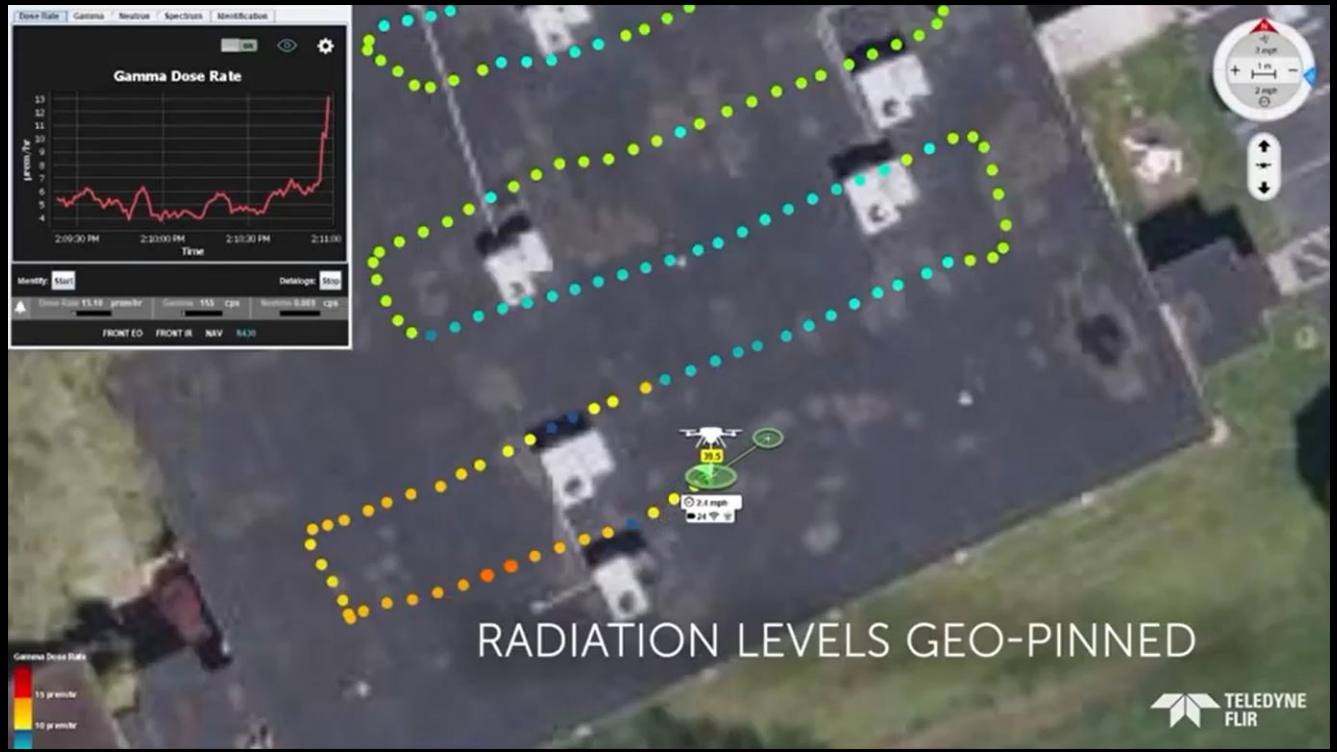


Ai at sea

Use of Ai

Integrations – CBRNE Units and drone

CBRNE - Mapping



A find in the rubble

Andøya Space

TIEPOINT

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