I-CONIC Vision AB

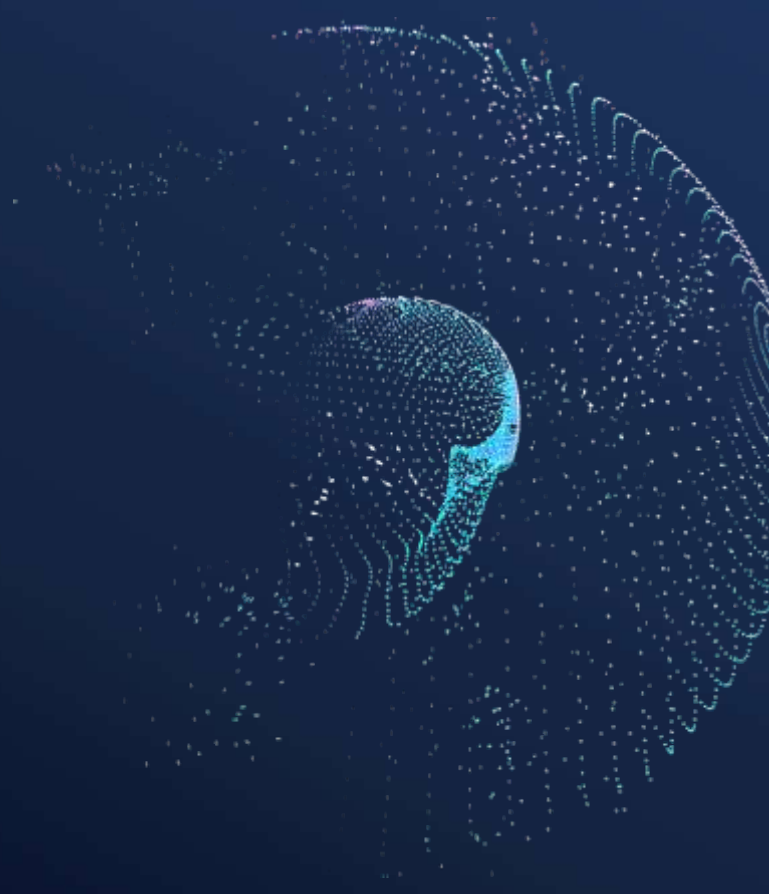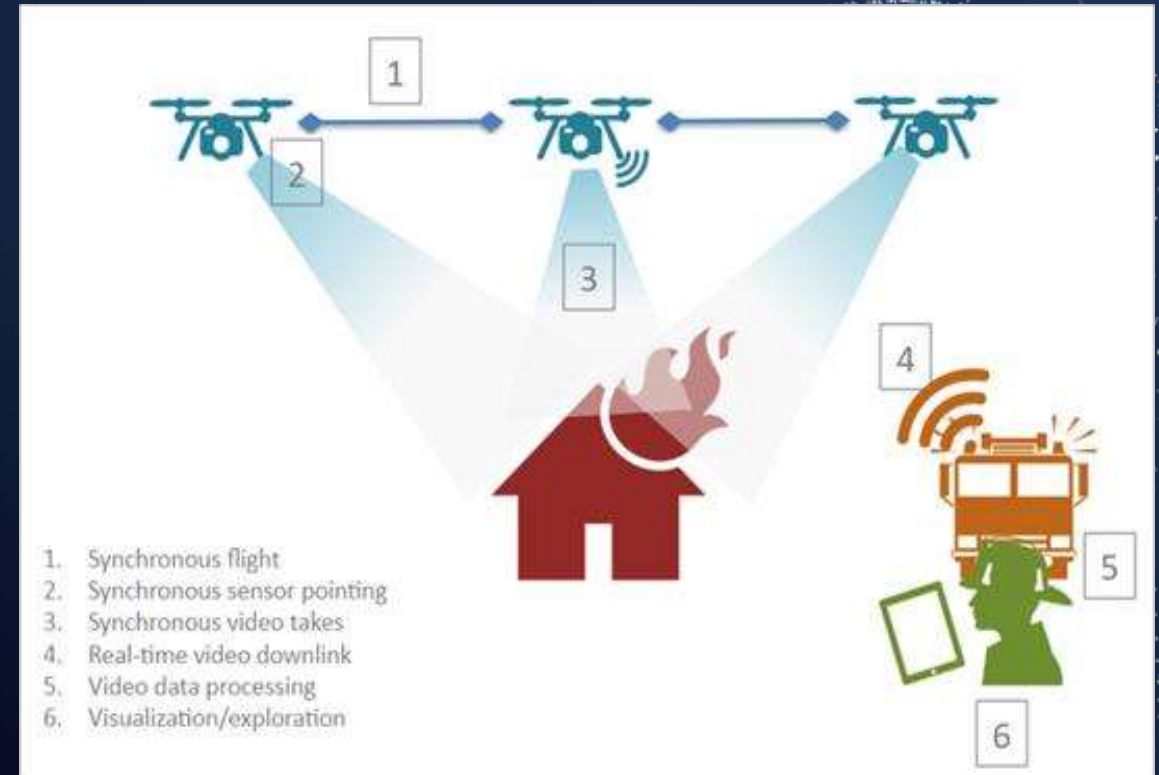# I-CONIC

Photogrammetric software for
Real-time, Real-world 3D

# Real-time, Real-world 3D

➢Real-time 3D or Real-world 3D is an 3D imaging technique, which provides the perception of depth similar to a real - world- object in within a virtual environment.

➢I-CONIC studio provides solutions for Real-time 3D, based upon
two product lines: Instant 3D & Live 3D.

➢Digital 3D models from images have been established as a standard product with many applications. However, our environment is filled with events and movements from vehicles, people, animals, water, fire and smoke. At I-CONIC, we are developing software that generates 4D models, i.e. time- dependent 3D models. The models are generated in real-time to be used when an event, such as a fire fighting, takes place.
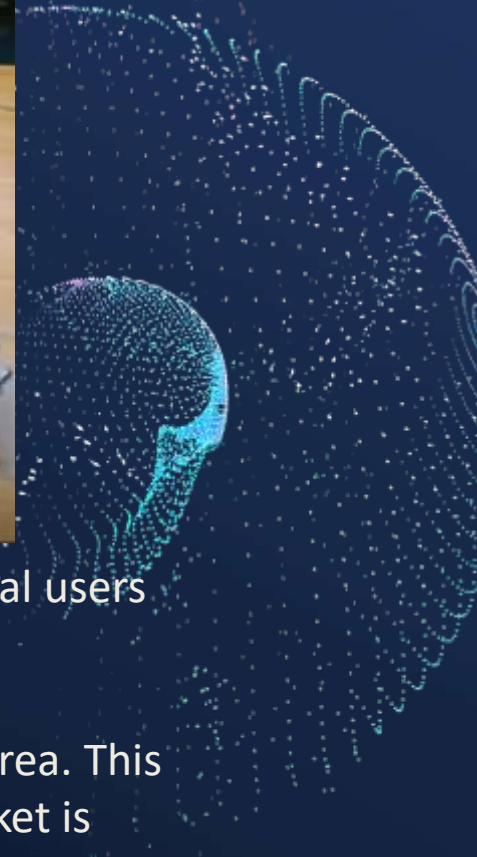


1. Synchronous flight
2. Synchronous sensor pointing
3. Synchronous video takes
4. Real-time video downlink
5. Video data processing
6. Visualization/exploration

**Live3D (models of events and moving objects)**

# Static 3D

# Dynamic 3D





➤*Instant3D*, produces static 3D models made from ONE moving camera. The market is traditional users of 3D in mapping, measurement and inspection, where the user need immediate, actionable information.

➤*Live3D,* produces 3D models from TWO or more cameras simultaneously covering the same area. This allows for moving or changing objects to be modelled as well as the static objects. The first market is Blue-light authorities (emergency services, police, etc). The next market is the Entertainment industry (sports TV, computer games, Metaverse, etc.).

# 3D – a Rapidly Growing Global Market

3D models are used in everything from mapping to computer games. But models of the real world today are typically:

- ➢ Static
- ➢ Takes time to manufacture
- ➢ Mostly from still images

I.CONIC is developing software enabling:

- ➢ Live models with moving objects
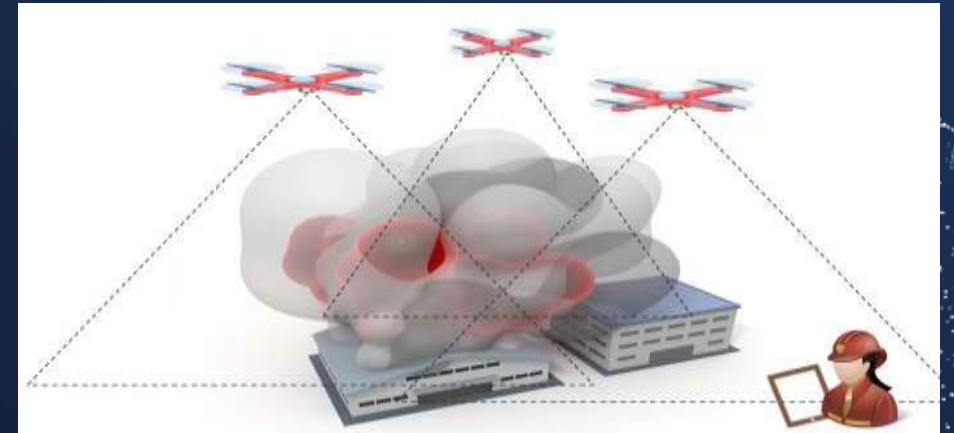- ➢ In real-time
- ➢ Also from video



Example of Live3D (simulated)

# Market Segments for 3D



Product step #1. Instant3D
Mapping, measurement, inspection



Product step #2. Live3D
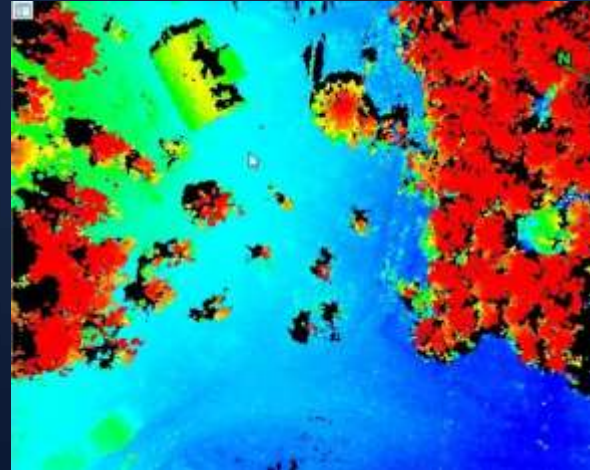Blue-light (Rescue, Police, defence)



Product steps #. Live3D
Entertainment (sports TV, games, movies, consumer)

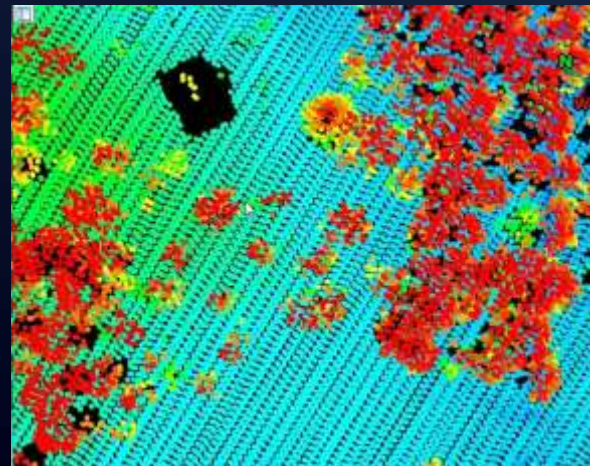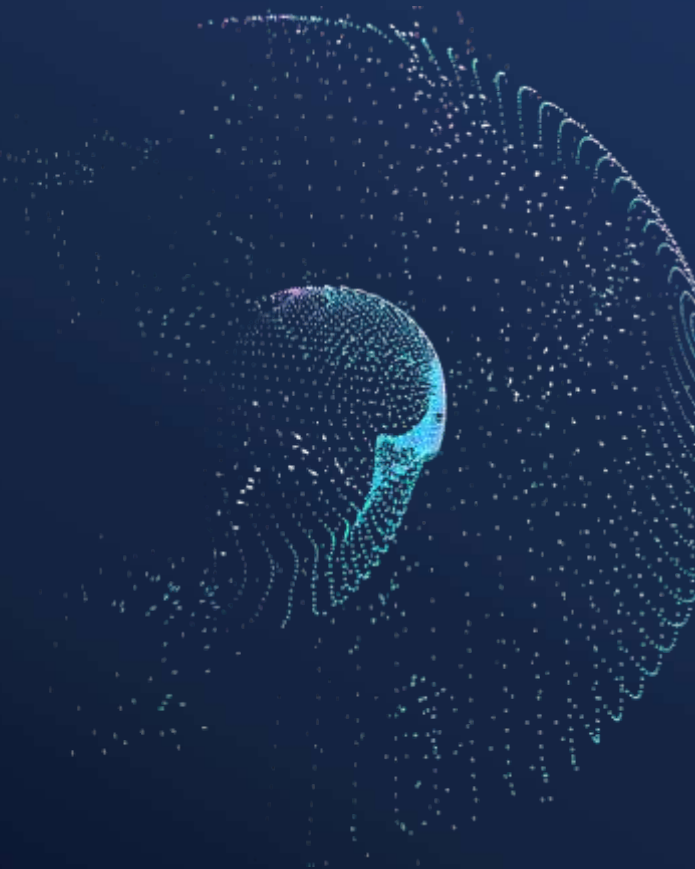# GNSS-free navigation using real-time 3D


Drone image


I-CONIC's real-time point cloud


Reference orthophoto


Reference point cloud (Lantmäteriet)

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# Real-Time Static 3D Technology

➢As much data as possible is collected, for example by digital video instead of still images. The term videogrammetry is used for measurements in video clips.

➢Results and products are expected to be available faster and faster, preferably in real-time.

➢New applications and products are expected and developed.

➢Based on these predictions, at I-CONIC we first take on the challenge to producing static 3D models in real-time from one 'normal' 2D video stream. We call it Instant3D.

# Drone Videogrammetry



Frame #
Frame
Frame #
Frame #4
Frame #5
Frame #24
Frame #25
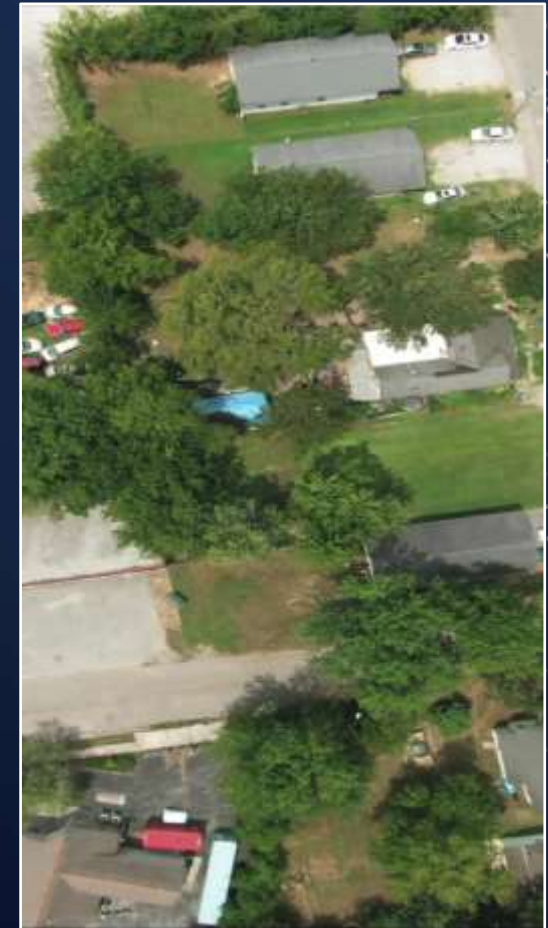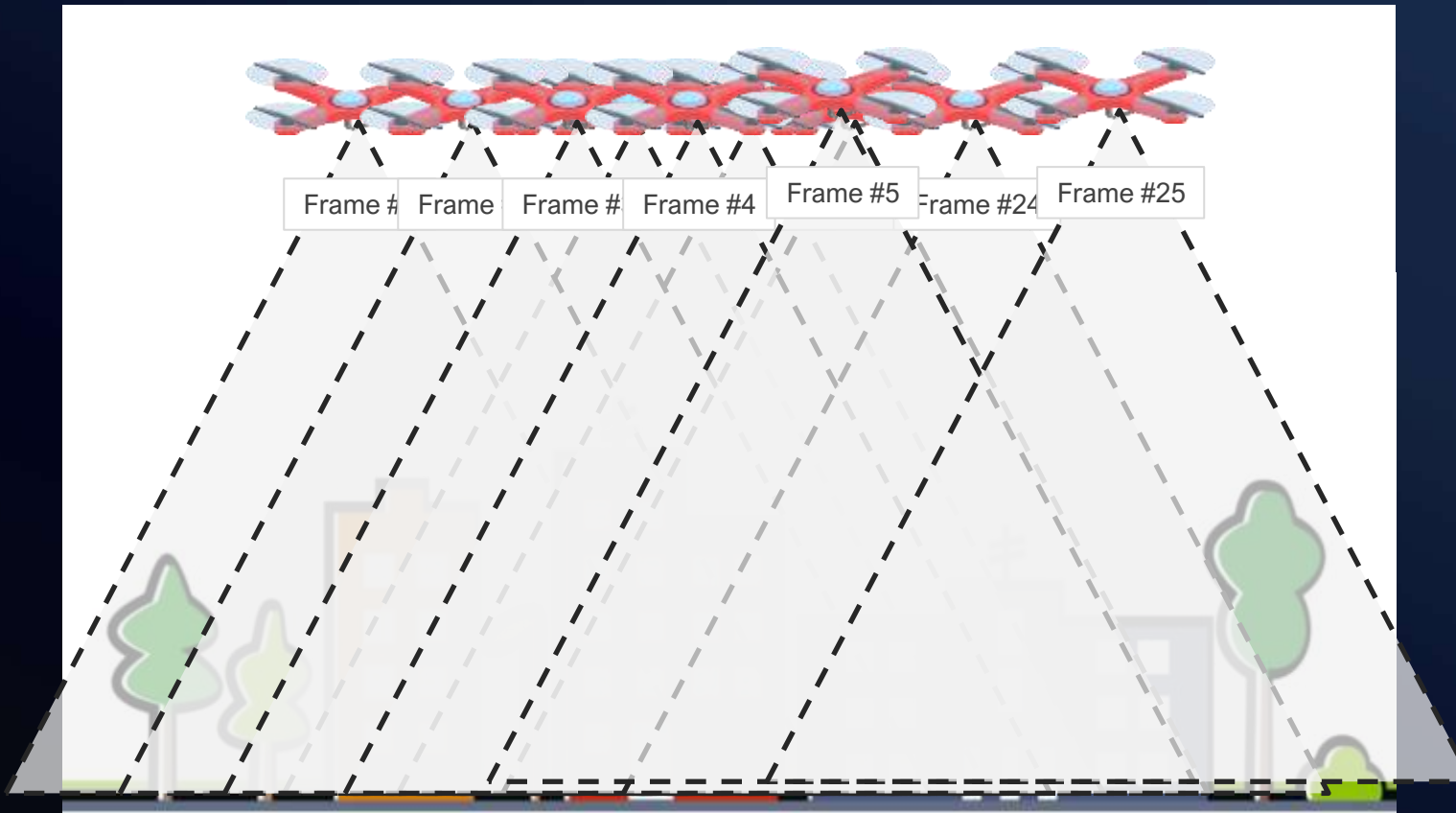
# Live3D Technology

➤Challenges are increasing by using multiple and synchronized video streams (e.g. from a swarm of drones) and thereby creating  Live3D  where also moving object are modeled.
➤Live or Dynamic 3D model is produced from two or more drones instead of  one.
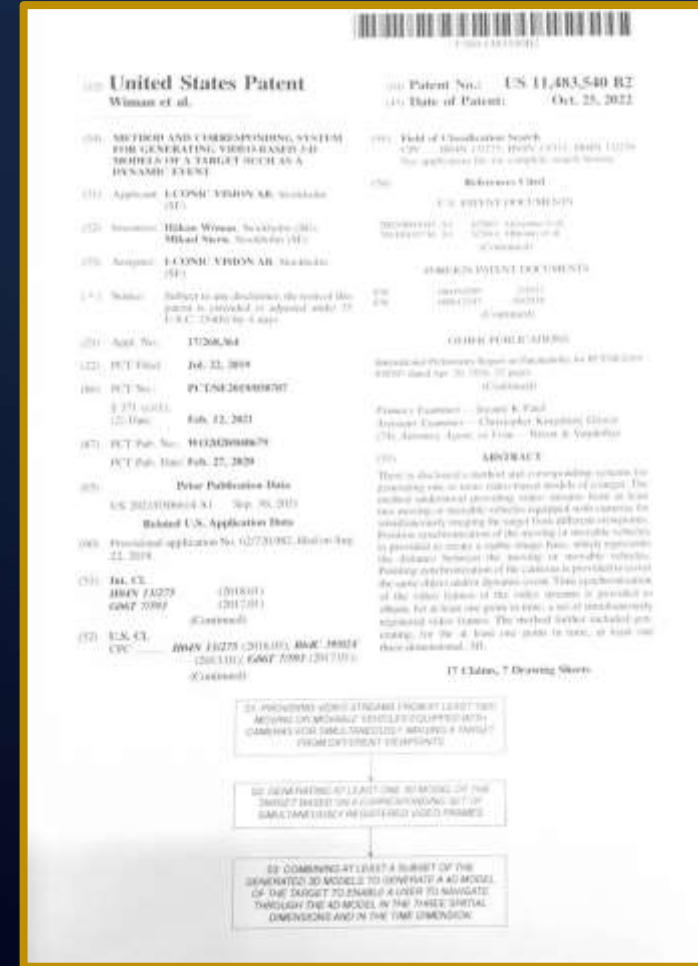
# Two or more drones instead of one

# Dynamic 3D

- Creates 3D models of also moving or changing objects

- A complete and live model of the target area

- In real-time

- Can be visualised on for example a computer screen or using VR glasses

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# US patent on key elements f o r Dynamic 3D

# Disruptive applications for Dynamic 3D



Drone swarm covering a disaster area for Dynamic 3D modelling.



Small drone swarm scouting unknown terrain ahead of helicopter advance.



Artistic depiction of a swarm of simple drones launched from a cargo aircraft (US Navy)



Battlefield management in urban area using Dynamic 3D from a drone swarm.

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**Landslide Impacted Area:** See and  measure, support to immediate analysis



**Wild Forest Fire:** See and measure,  support to immediate analysis
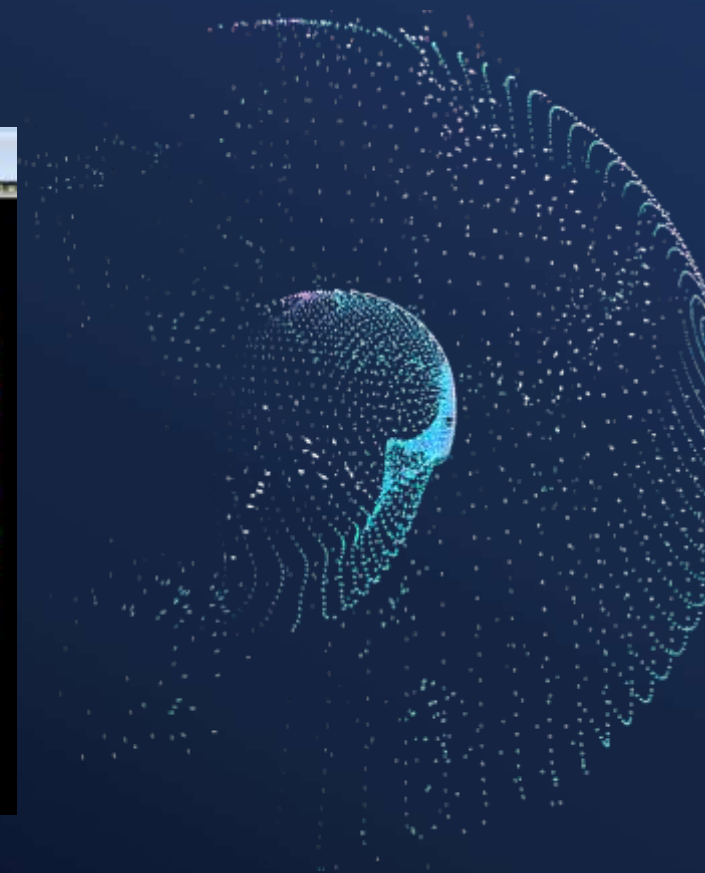


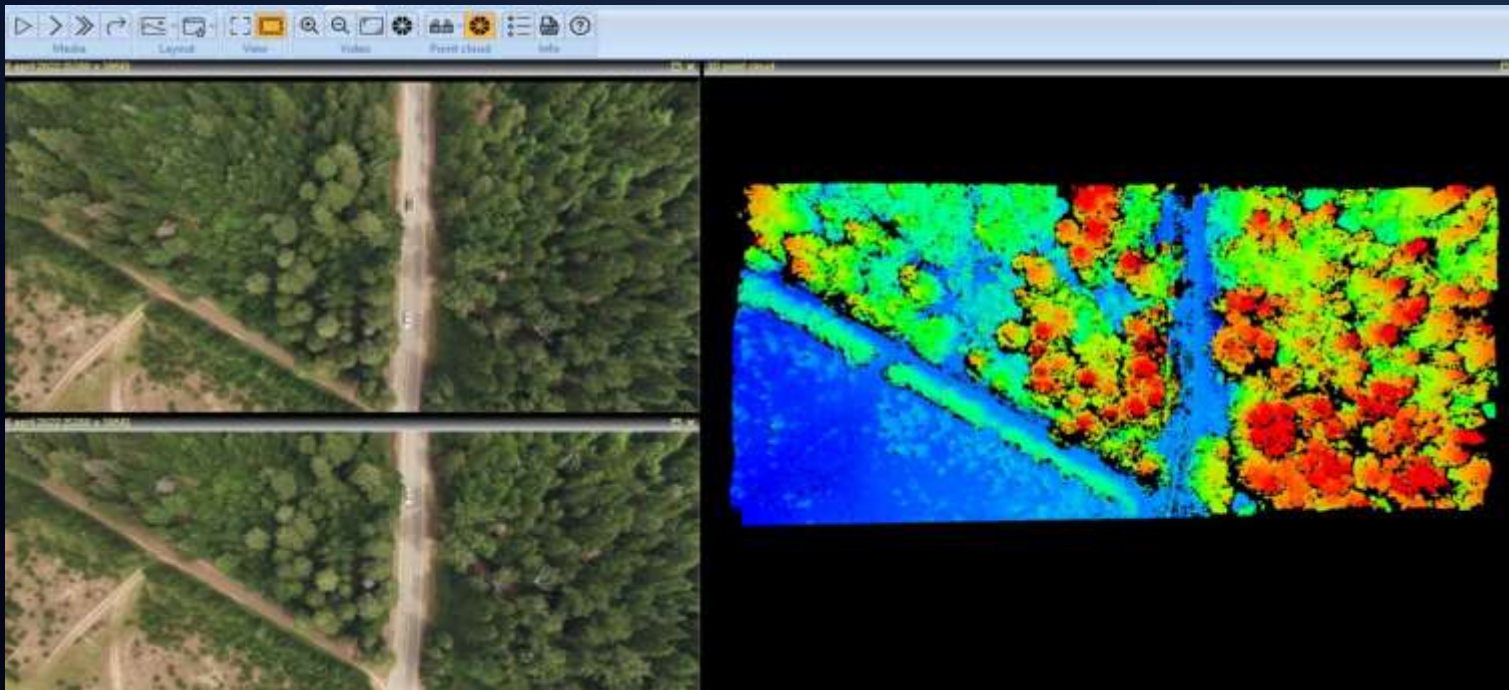**Inspection & Measuring**



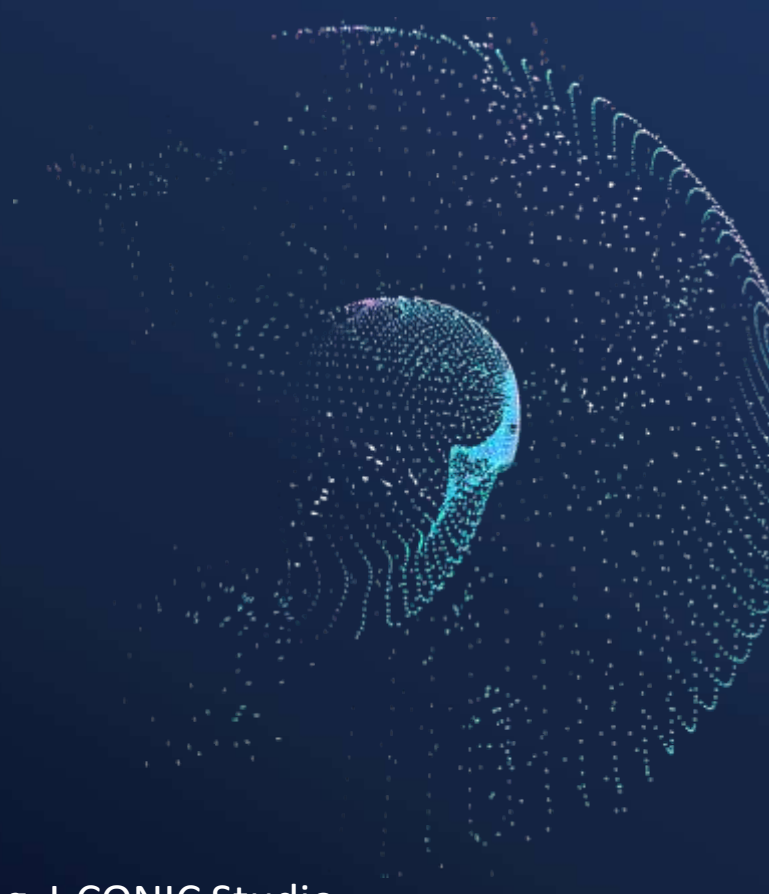**Volumetric Analysis**

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# I-CONIC Vision – Real-time 3D

Case Data-1
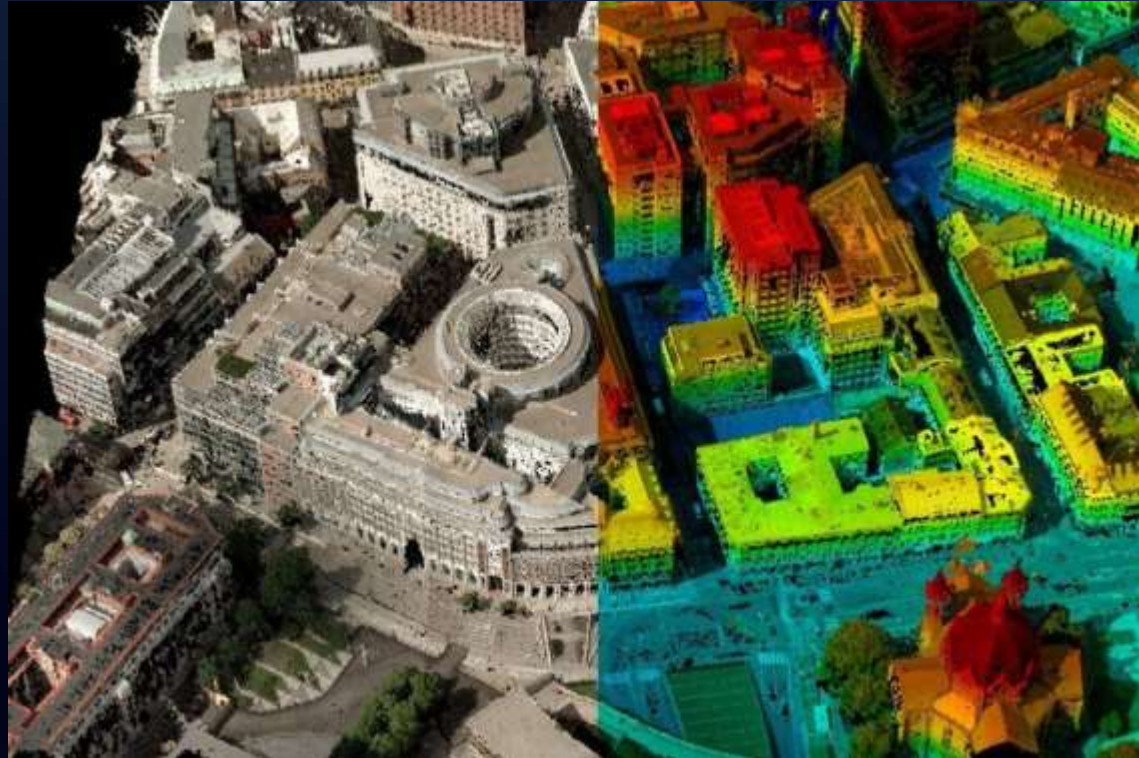


I-CONIC's photogrammetry software creates 3D models and orthophotos in real-time from video and images.

# I-CONIC Vision – Real-time 3D
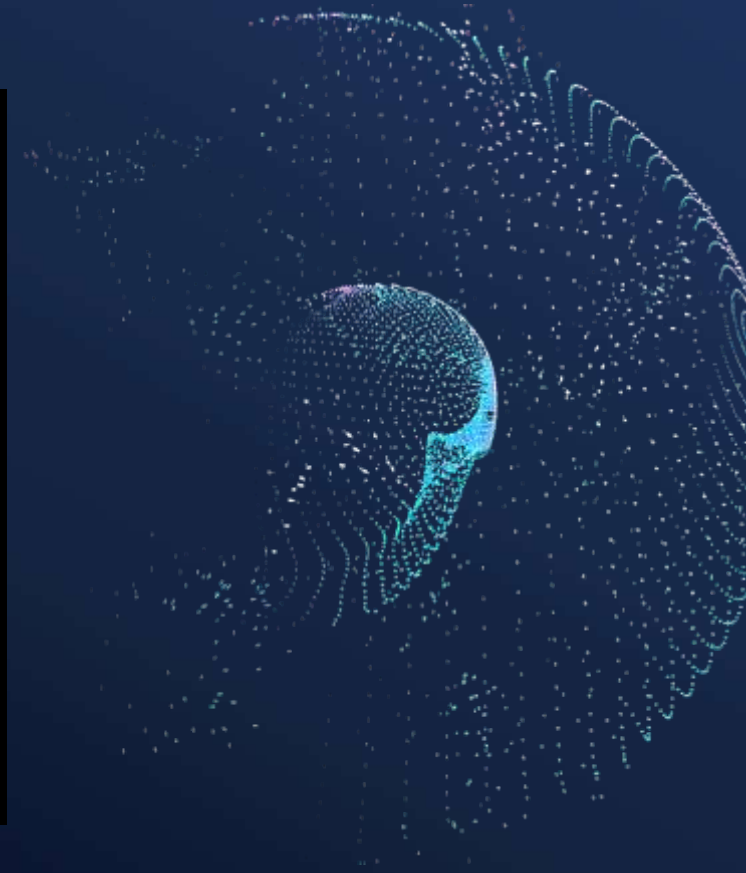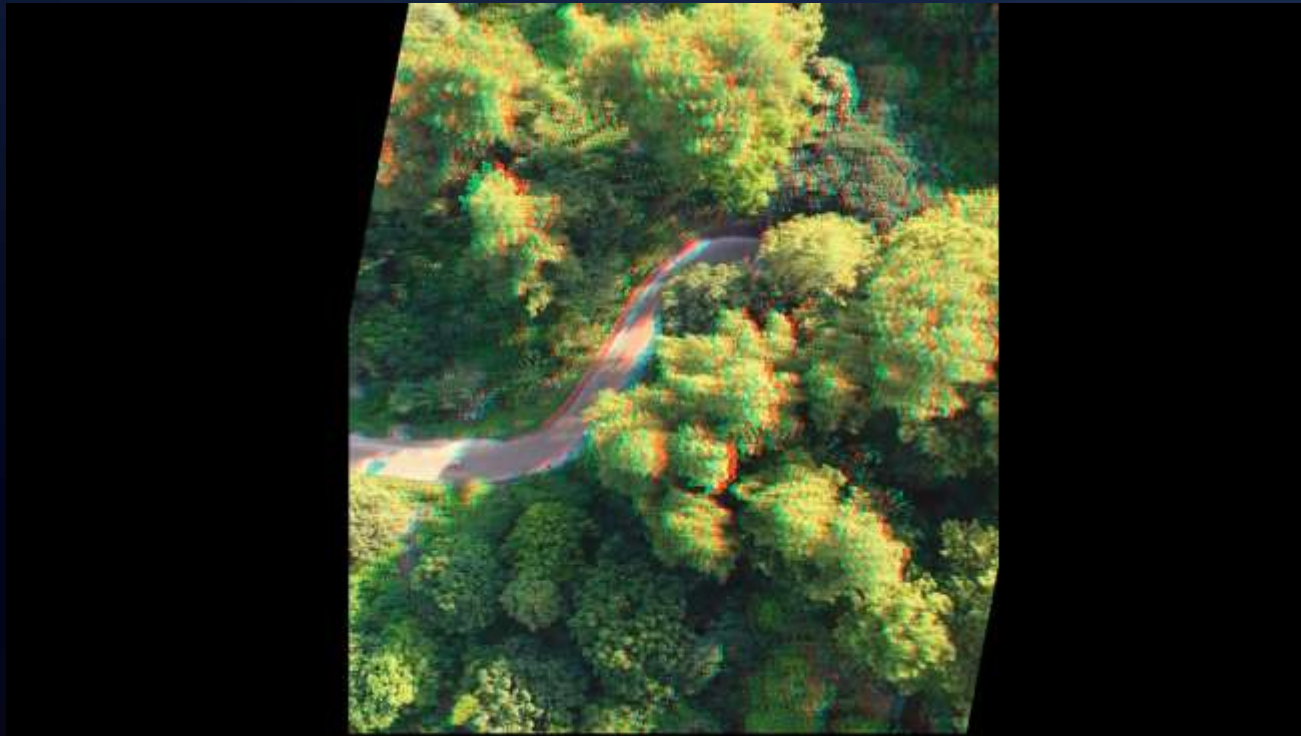
## Case Data-2

Extraction of RGB Point cloud data from images and surface modelling using I-CONIC Studio

# I-CONIC Vision – Real-time 3D
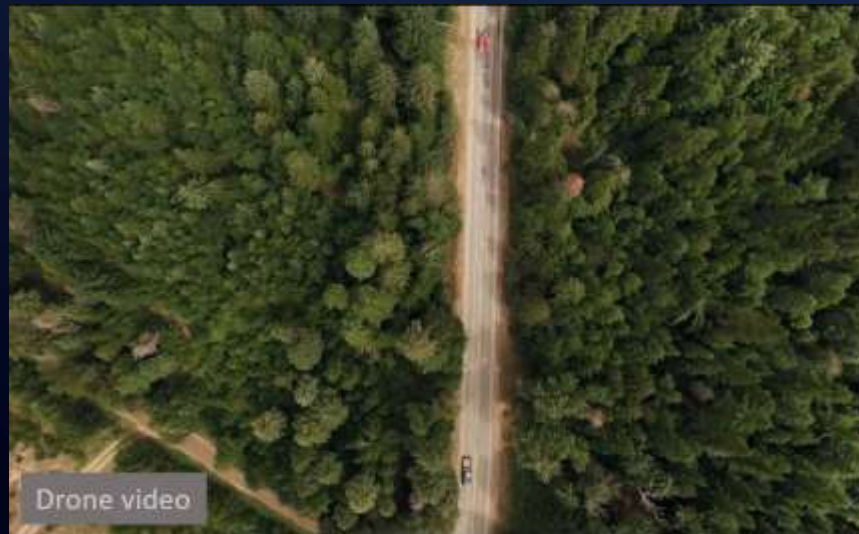
<u>Case Data-3</u>



An anaglyph 3D stereo video created by I-CONIC's Video Stereoscope. To obtain the 3D effect of this particular video you need a pair of red/cyan anaglyph glasses.
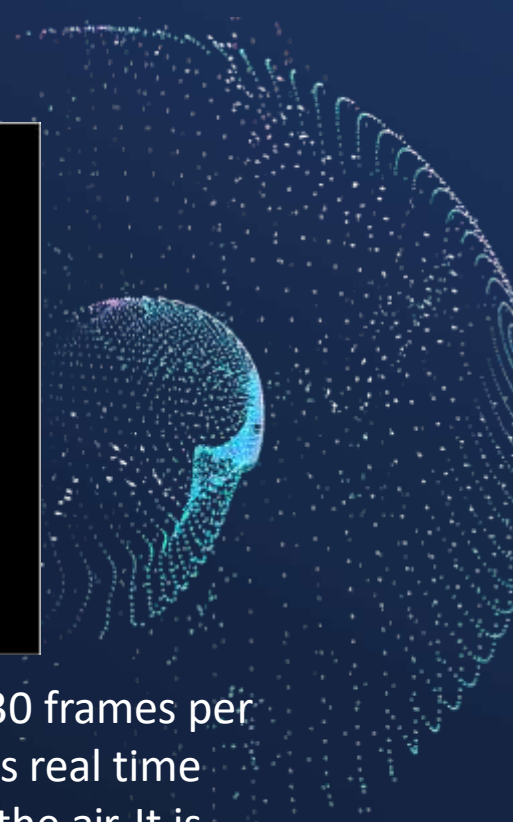
# I-CONIC Vision – Real-time 3D

Case Data-4



I-CONIC provides the solution of the future using real-time videogrammetry. Videos with 30 frames per second or more provide extreme amounts of image data, while processing on GPU enables real time processing. The 3D and 4D information can be generated while the flying vehicle is still in the air. It is photogrammetry on steroids. And real-time videogrammetry can be used for sports, entertainment, science and so much more than topographic maps.

# THANK YOU

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