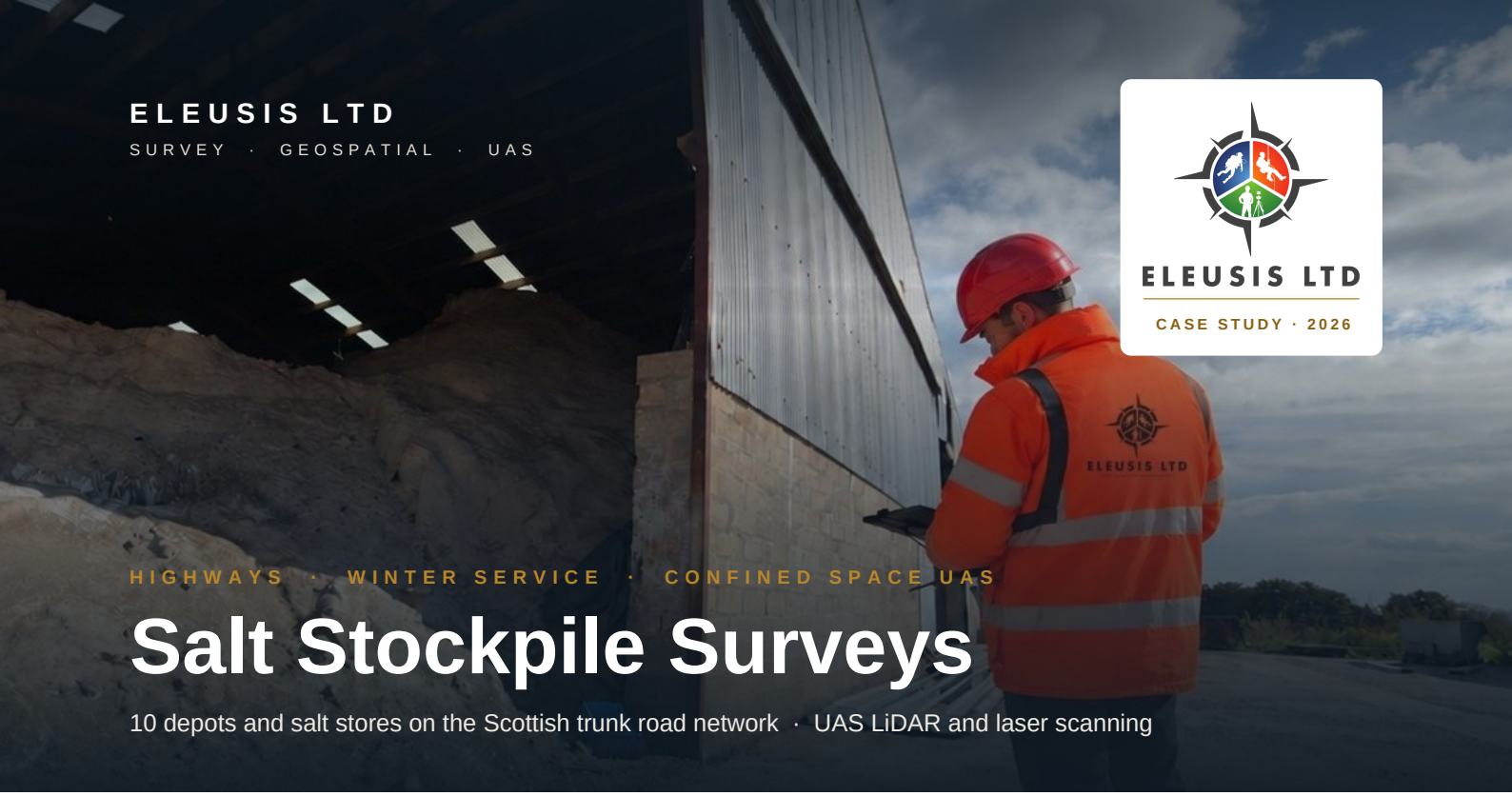


ELEUSIS LTD
CASE STUDY · 2026

HIGHWAYS · WINTER SERVICE · CONFINED SPACE UAS

Salt Stockpile Surveys

10 depots and salt stores on the Scottish trunk road network · UAS LiDAR and laser scanning

Ahead of winter, our Scottish highways client needed to know how much salt was held at ten depots and salt stores on the trunk road network, from Kinross to Nairn. Eleusis Ltd measured all eleven stockpiles in two days on site, without putting anyone near a face of salt, and issued a volume report for every site five days after the last flight.

THE BRIEF

On the client's network, knowing the salt position means periodic volumetric surveys of every barn and store. The previous method relied on ground-based scanning alone. To see the crest and back faces, the instrument had to go in close, putting a surveyor at the toe of a stockpile up to 11 m high.

Salt is not a stable material. Loading shovels undercut the working face, the surface crusts as it takes on moisture, and a face that looks sound can slump without warning. The client paused that method on safety grounds and asked whether a drone could do the job instead.

OUR APPROACH

Photogrammetry keeps people back, but a salt barn is dim and dusty, and a stockpile gives image matching very little to lock onto. We proposed a caged, collision-tolerant confined-space drone carrying LiDAR, which maps as it flies and needs no satellite positioning inside the building.

Each barn was scanned from ground level, well clear of the salt, capturing floor, walls, retaining walls, dividing bays and roof. The drone then flew a planned orbit of each stockpile to capture the crest and back faces, and both datasets were tied together on the fixed structure of the building.

The depots stayed live throughout, and the programme was compressed to meet a fixed reporting deadline at the start of the winter season.

PROJECT AT A GLANCE

ASSETS
Ten salt barns and stores on the trunk road network between Kinross and Nairn

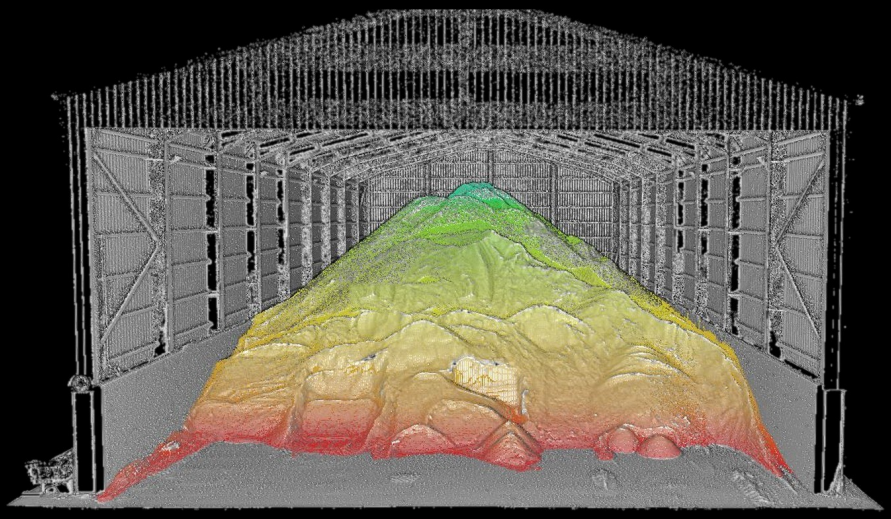
CLIENT
Scottish trunk road maintenance contractor

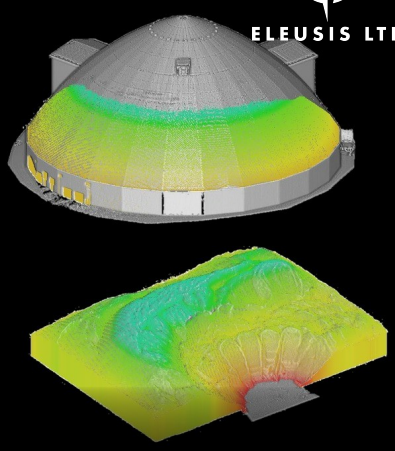
YEAR
2026

SERVICES
Confined-space UAS LiDAR · Terrestrial laser scanning · Volumetric analysis

DELIVERABLES
Volume report for every site · Point cloud views of each stockpile in its barn

SURVEY LEAD
Led by specialist UAS and geospatial engineering team





STOCKPILES CUT AND COLOURED BY HEIGHT

DELIVERY

Every site received a volume report giving location and depot type, volume, base area, maximum stockpile height and approximate weight, with views of the stockpile as a cut surface, inside its barn and in front elevation.

Because the barn is captured as well as the salt, the figures come with context: how full each store is and where the retaining and dividing walls sit. Where two stockpiles share a building, as at Rothienorman, each is reported on its own.

OUTCOME

Ten sites were surveyed in two days and reported in five, measuring 31,424 m^3 of salt in total, around 44,000 t at an assumed bulk density of 1.4 t/m^3.

The barn scan is a one-off. It becomes a fixed baseline for each site, so repeat surveys need only a two-person team and a short planned flight, and a change in the numbers is a change in the salt, not in the method.

EFFICIENCY

This approach removed the need for anyone to stand on, or at the toe of, a stockpile at any of the ten sites.

10
DEPOTS AND SALT STORES

31,424 m^3
SALT MEASURED

2 days
ON SITE



SCANNING THE BARN FROM CLEAR OF THE SALT



CAPTURING THE CREST AND BACK FACES



FLOWN FROM OUTSIDE THE BARN