Do we still need photo metadata in 2019?

3D Photogrammetry and Metadata

By Simon Brown

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Agenda

- Introduction
- What is Photogrammetry?
- Uses of Photogrammetry
- Metadata and 3D Workflow
- Photogrammetry, Metadata and the Future
- Summary

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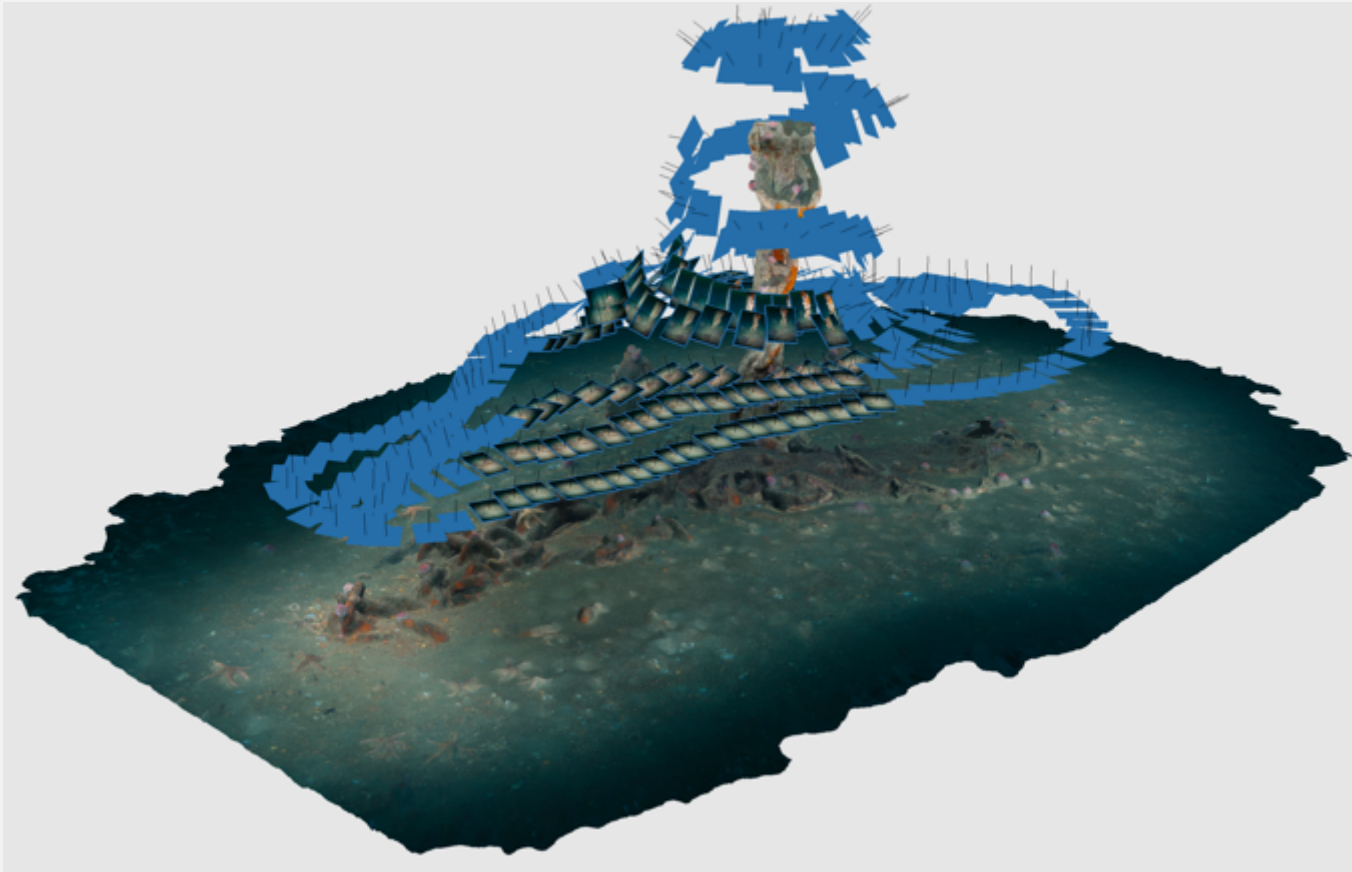deep3D
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Introduction - Simon Brown

- Key skills:
  - Underwater photographer
  - Commercial diver
  - Data management consultant
  - 3D designer & engineer
  - Author and researcher
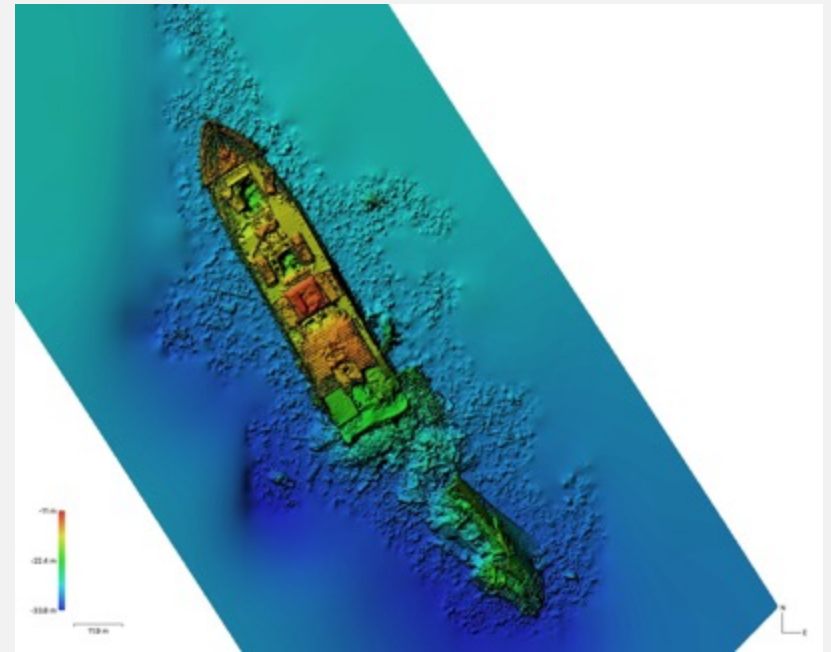
**Digital Elevation Model of the SS Thistlegorm**

What is Photogrammetry?

What is Photogrammetry?

- The art and science of creating a 3D shape from 2D photographs.

- Requires hundreds or thousands of high quality overlapping photographs.

- Requires bespoke software to interpret each image and identify common points.

- Processing time – even with dedicated hardware - can be measured in days even with cloud computing.

- Subject must be static/immobile.

- Output includes 3D model, ortho photo and DEM.

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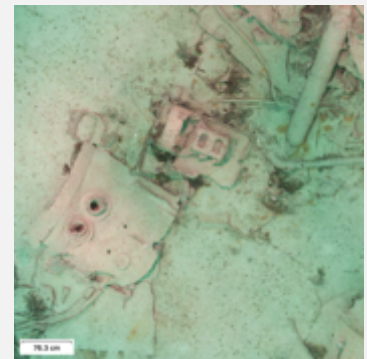# What is Photogrammetry?

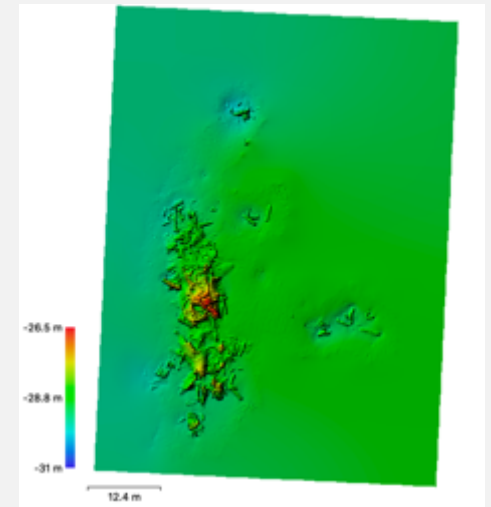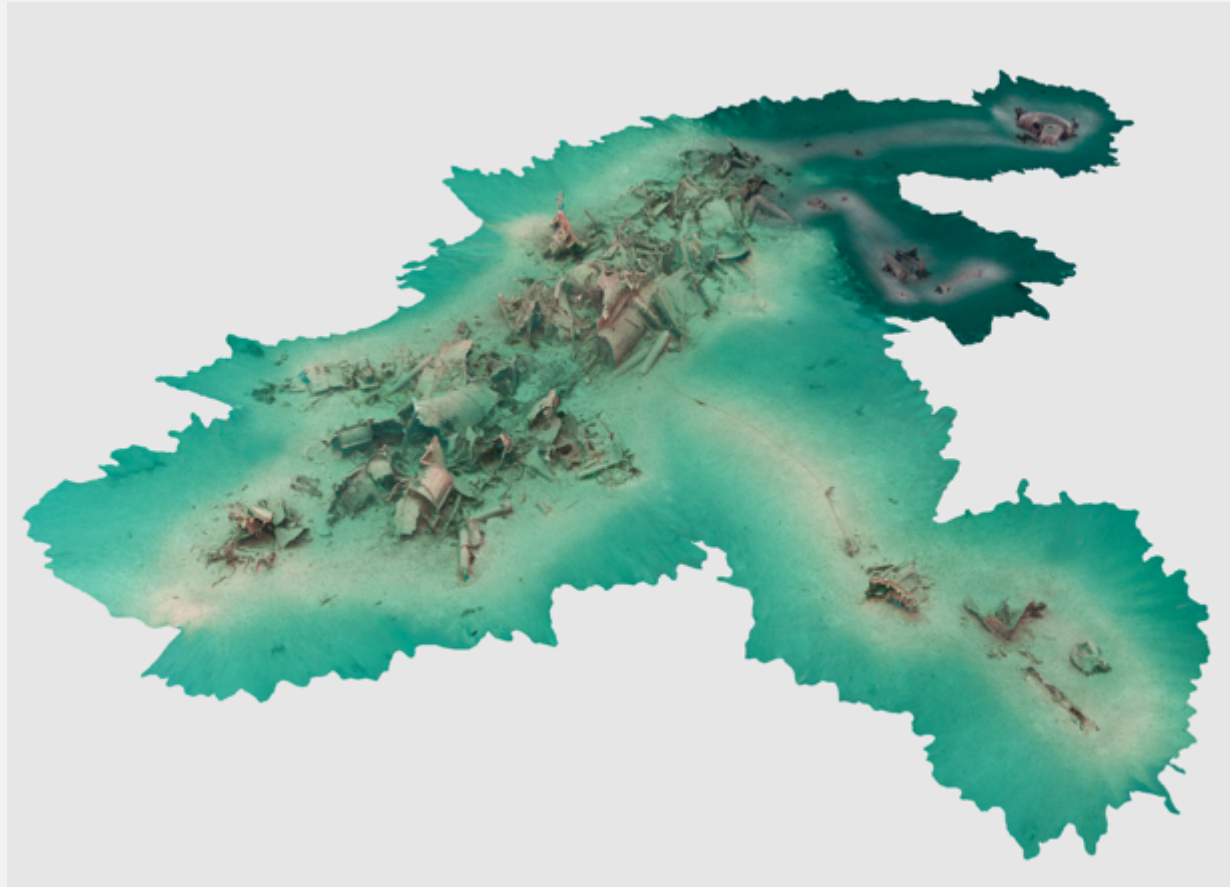Live Demo
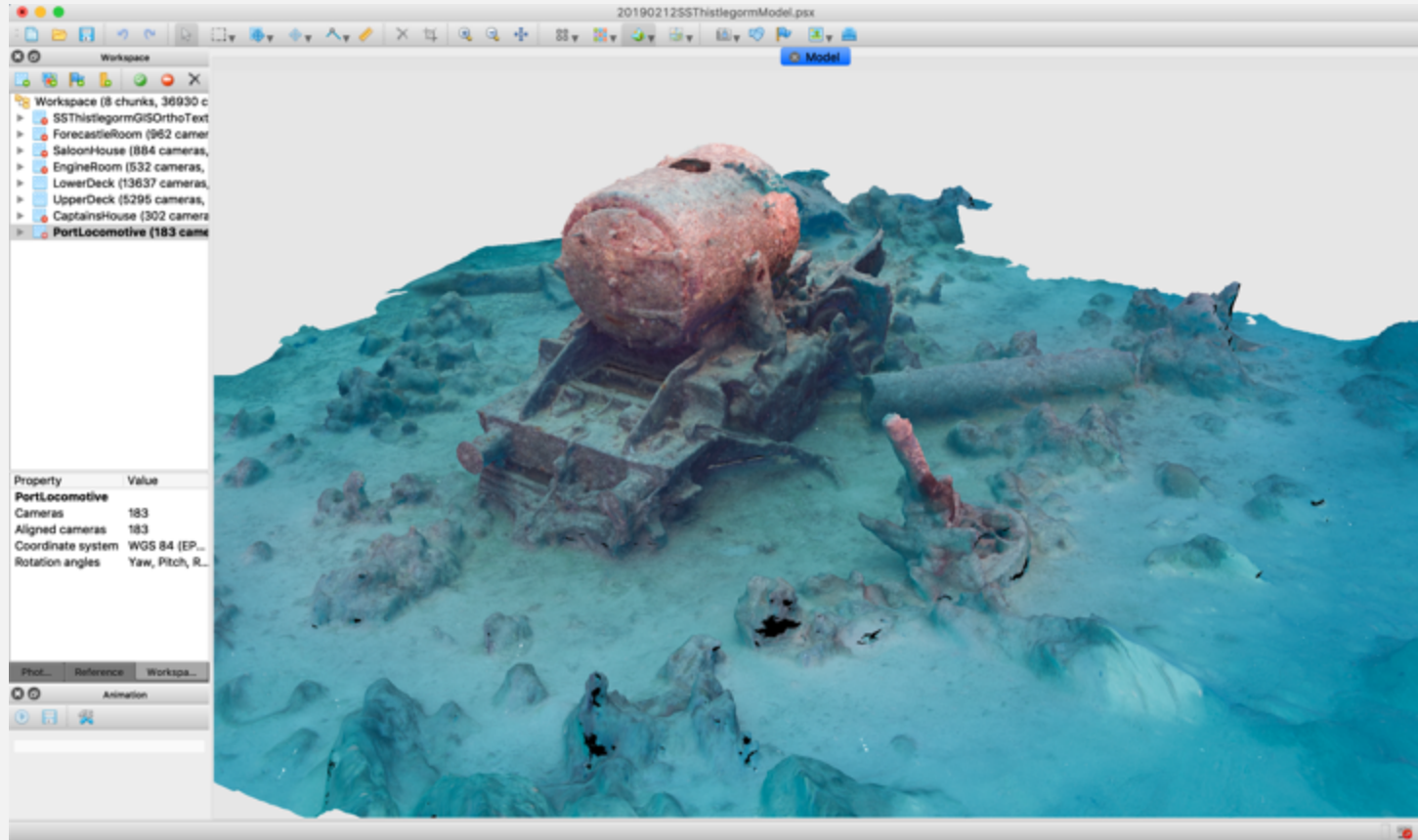
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What is Photogrammetry?
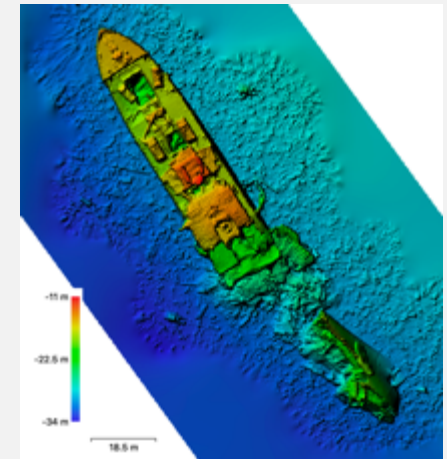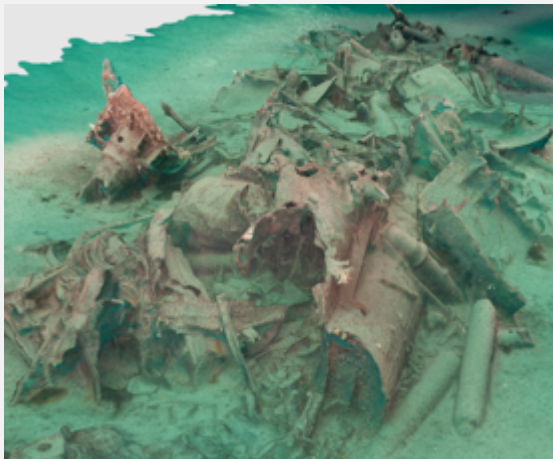
Automating the capture of thousands of images

Image by Mike Postons

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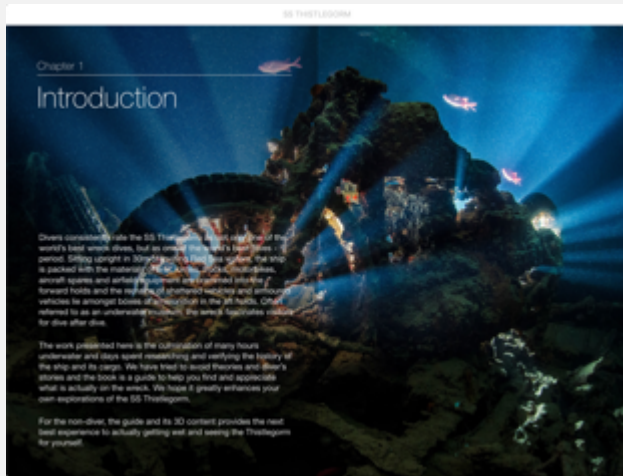
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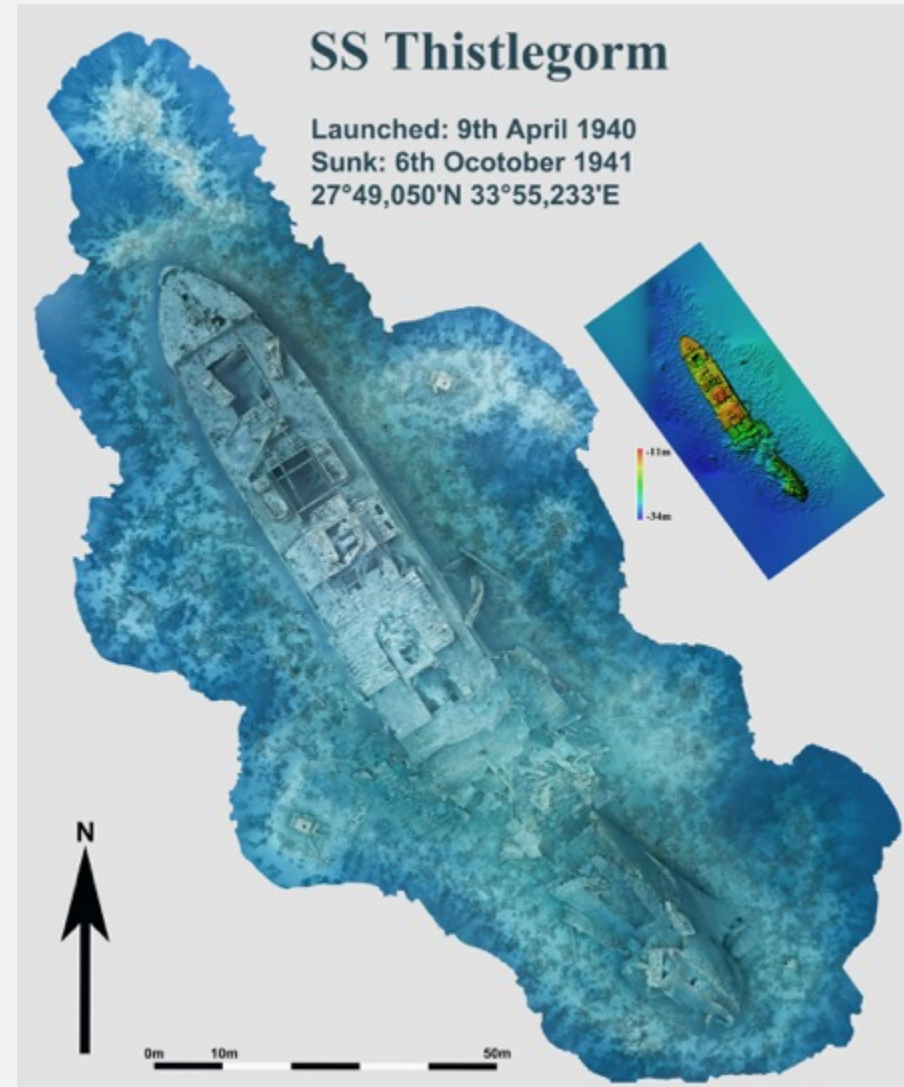# Uses of Photogrammetry

Uses of Photogrammetry

- Cultural heritage – interpretation and persistent record.

- Law enforcement – gathering evidence.

- Media – digital reconstruction.

- Gaming – photorealistic content.

- Mapping – positioning and measurement.

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Uses of Photogrammetry

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Metadata and 3D Workflow

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Metadata and 3D Workflow

EXIF data is mandatory for accurate photogrammetry

Required by 3D software to understand physical characteristics:

– Lens type

– Pixel size

– Sensor size

– Lens focal length

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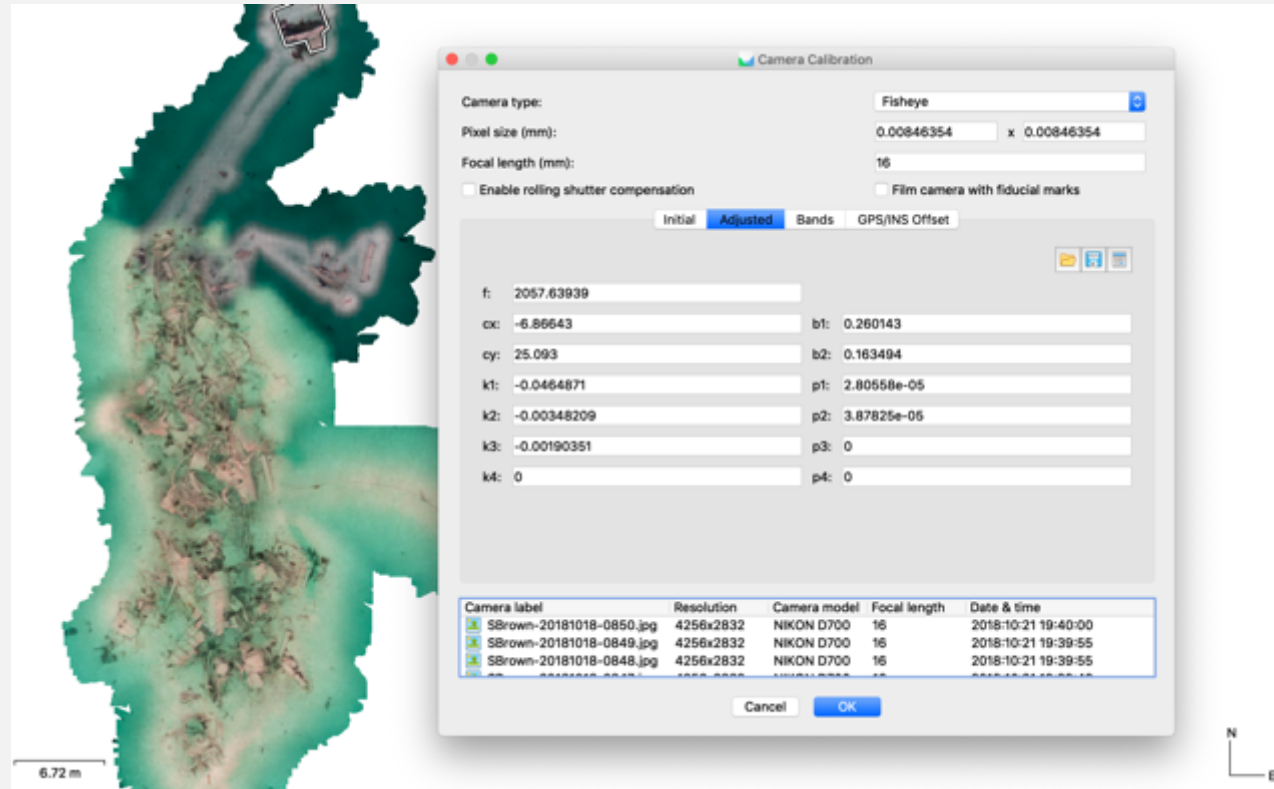
Metadata and 3D Workflow

IPTC schema used for digital asset management (DAM)

Typically:

- Sublocation
- City
- Province
- Country
- IP rights
- Creator

EXIF:
- Creation date
- GPS – lat, long & altitude/depth
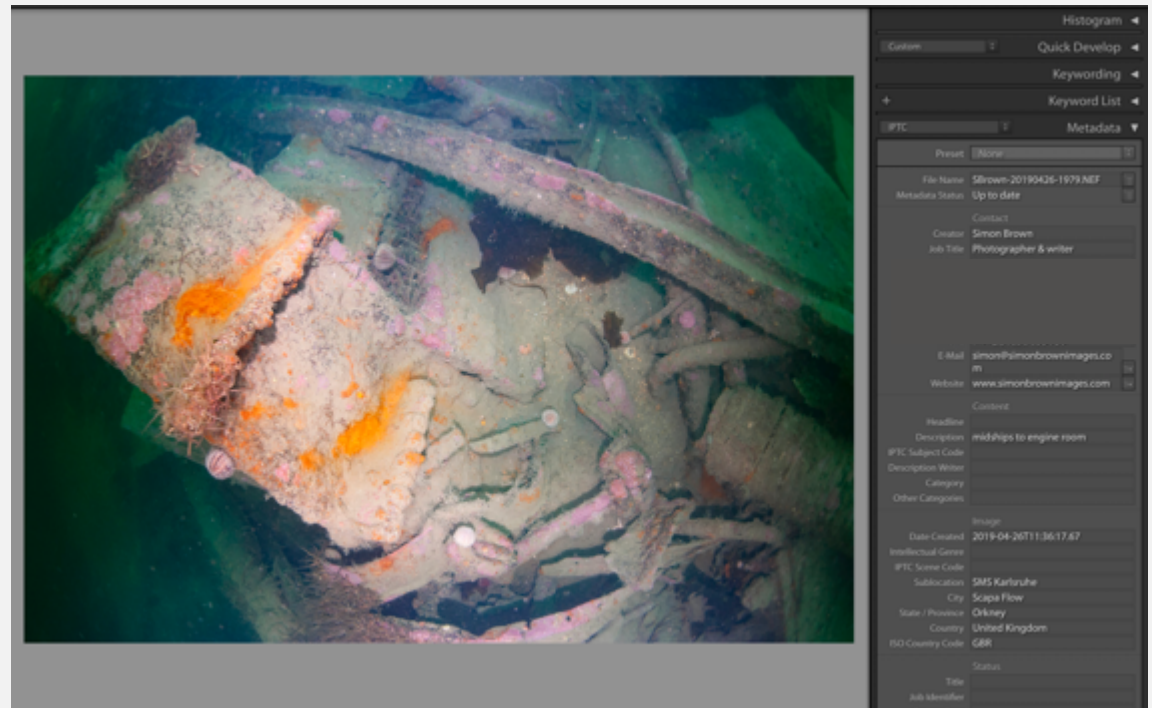

For more than one 3D project, projects with multiple contributors, or projects conducted over longer period of time, IPTC entry becomes <u>mandatory</u>.

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Metadata and 3D Workflow

Keywords used to describe specifics on large/complex subjects
Builders plans, common naming conventions, zones, subject or area.
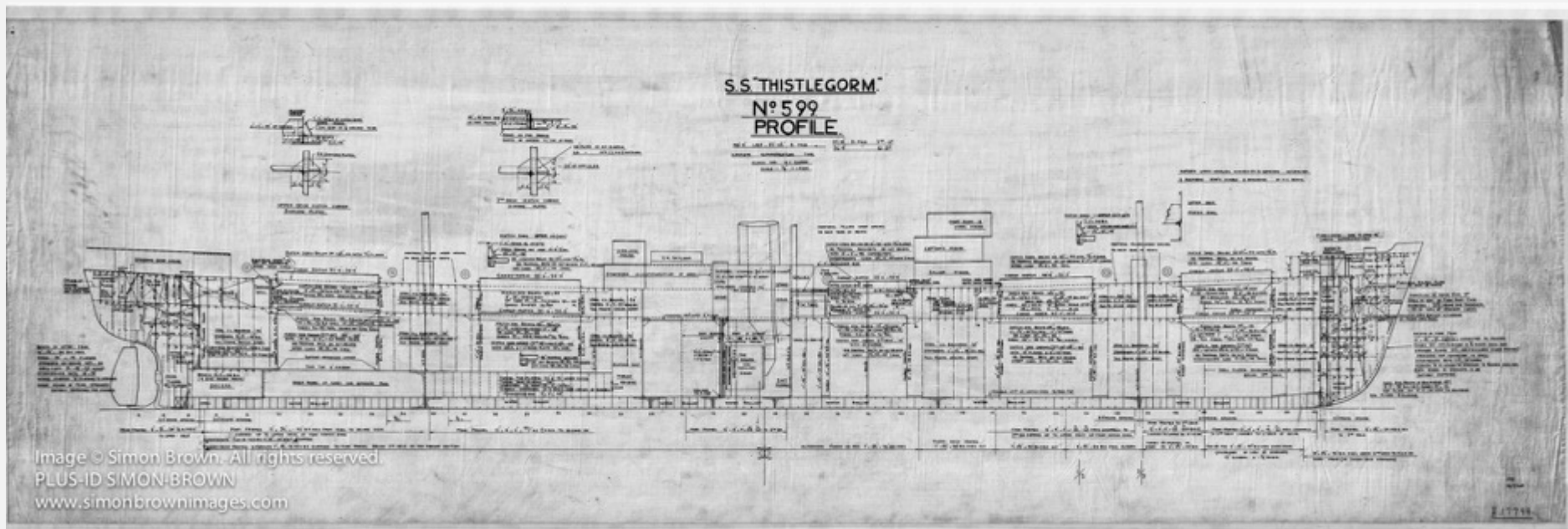
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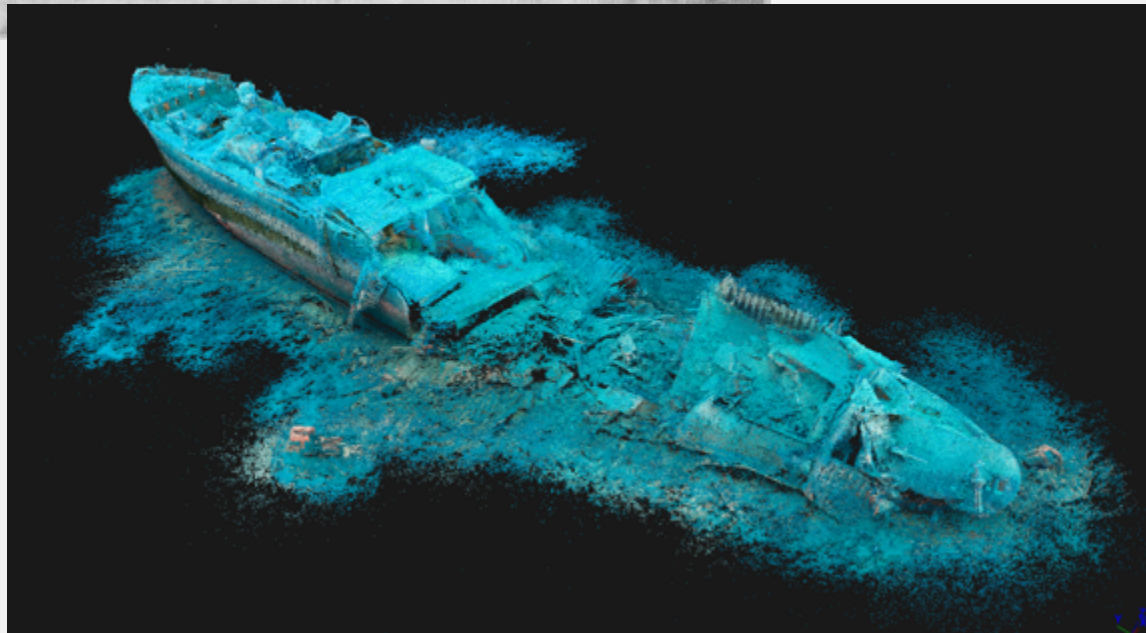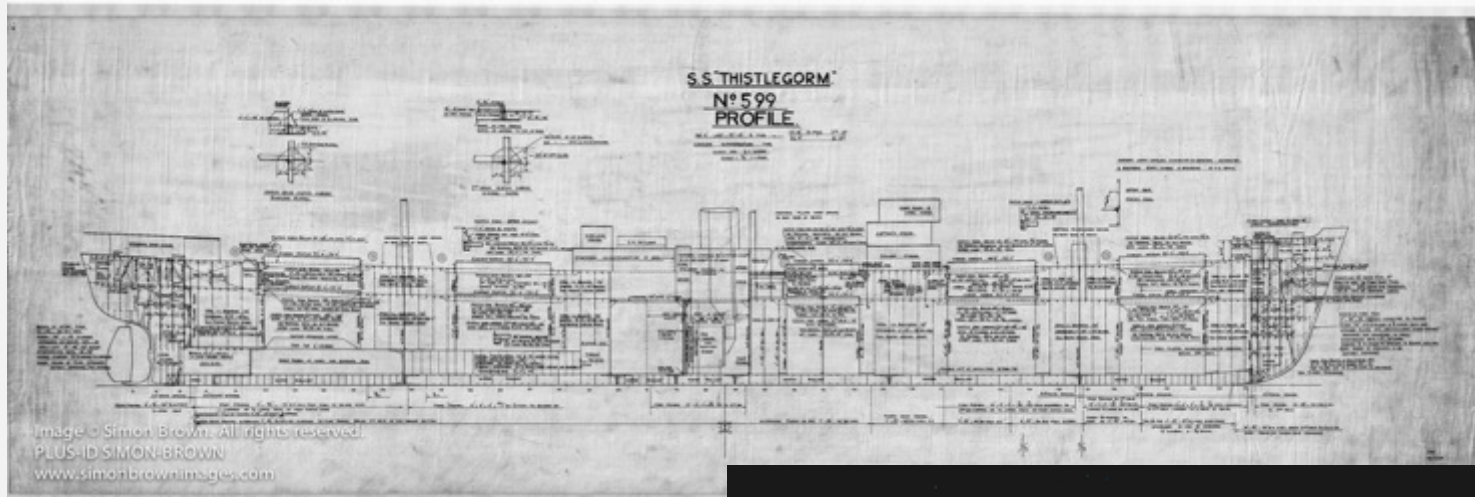
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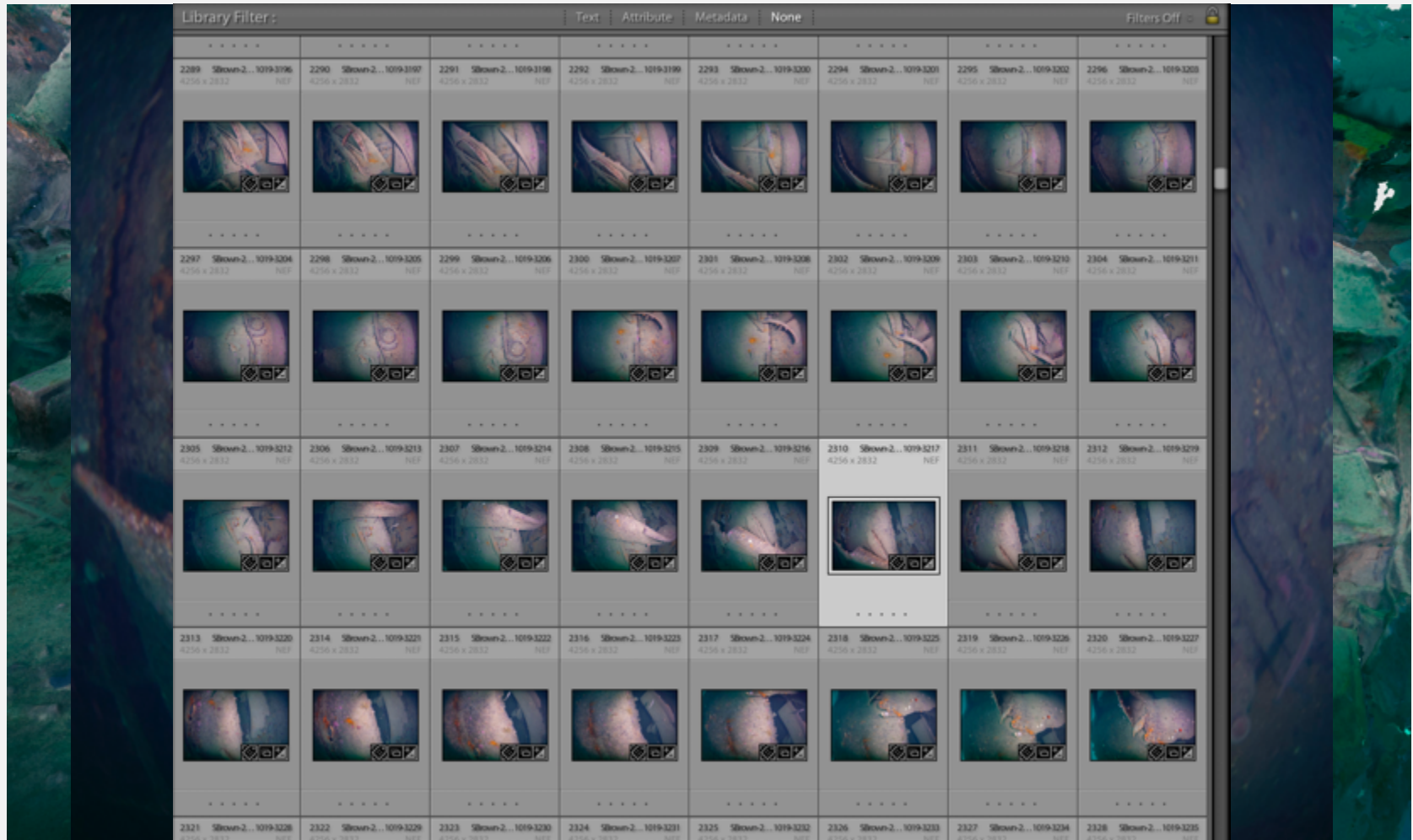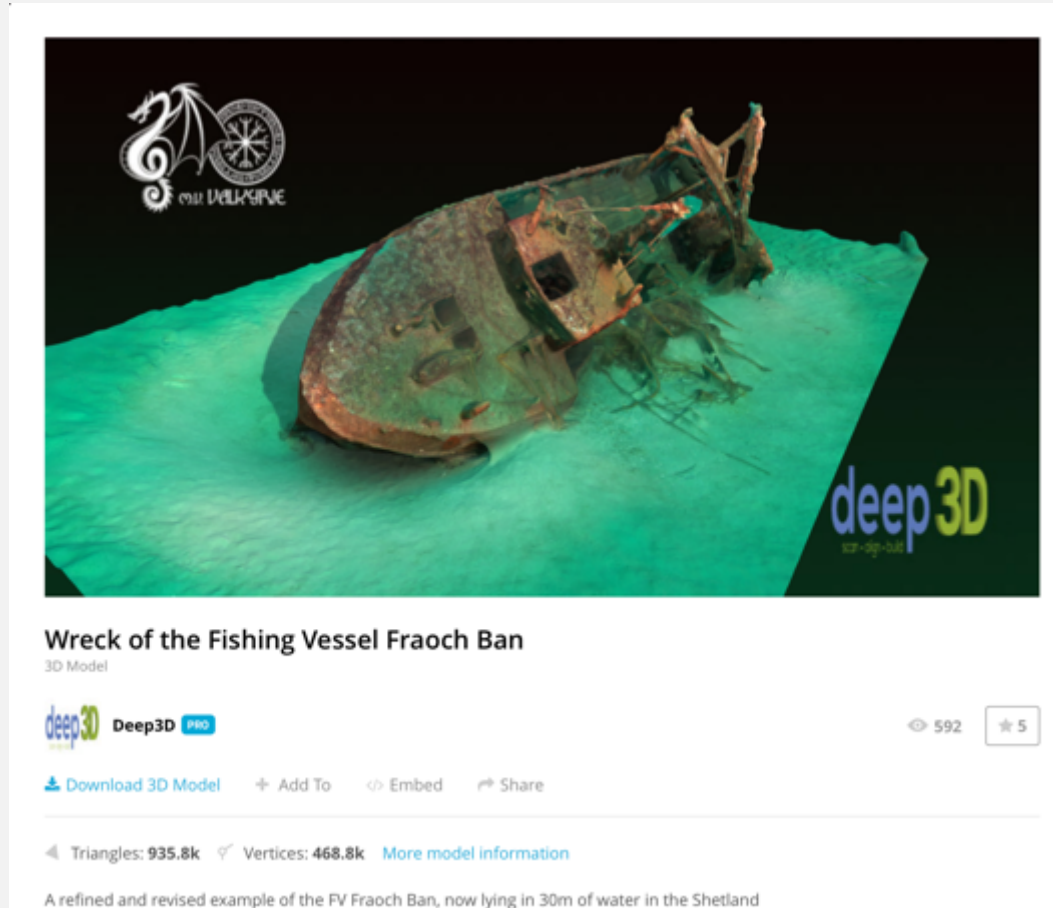# Metadata and 3D Workflow

Metadata and 3D Workflow

Non-descript images are of extreme value!

Knowing where they fit into a 5440 tonne ship 150m long that's in bits is priceless.

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Photogrammetry, Metadata and the Future

Wreck of the Fishing Vessel Fraoch Ban
3D Model

A refined and revised example of the FV Fraoch Ban, now lying in 30m of water in the Shetland
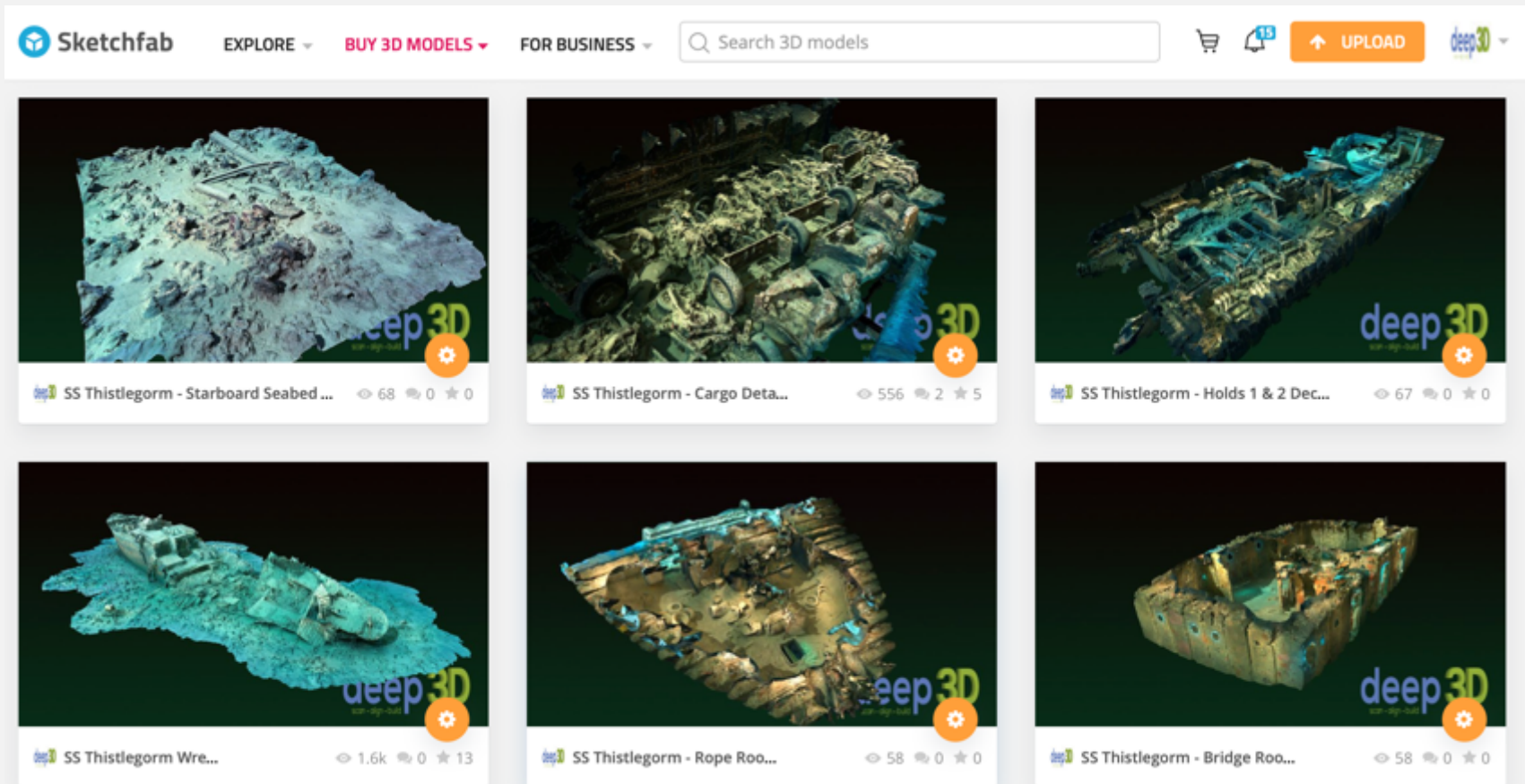
Photogrammetry, Metadata and the Future

- Underwater GPS
  - Increase data capture efficiency, particularly in low visibility.
  - Automated embedding of latitude, longitude & depth into EXIF/IPTC fields.

- Autonomous Underwater Vehicles
  - Remove the diver from the environment.
  - Work at depth and duration beyond human capabilities.
  - Simultaneous Location Acquisition and Mapping (SLAM) with concurrent 3D processing.

- Adobe Lightroom to handle native size ortho photos
  - At 1mm to 1 pixel image size frequently exceeds 512 megapixels/65,000 pixel longest side.
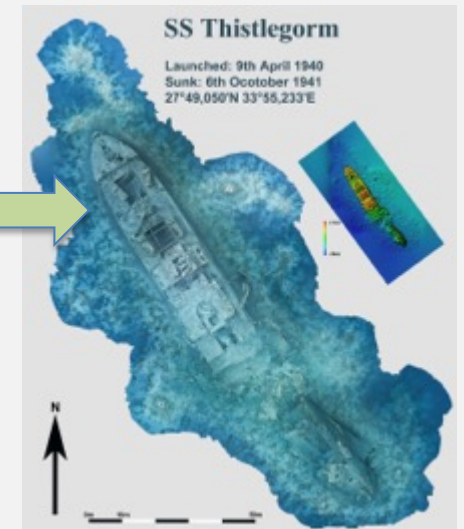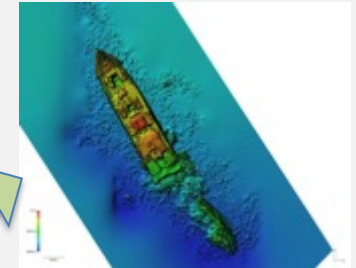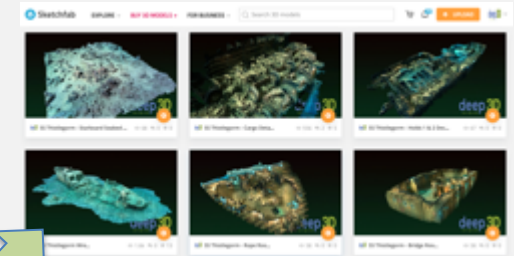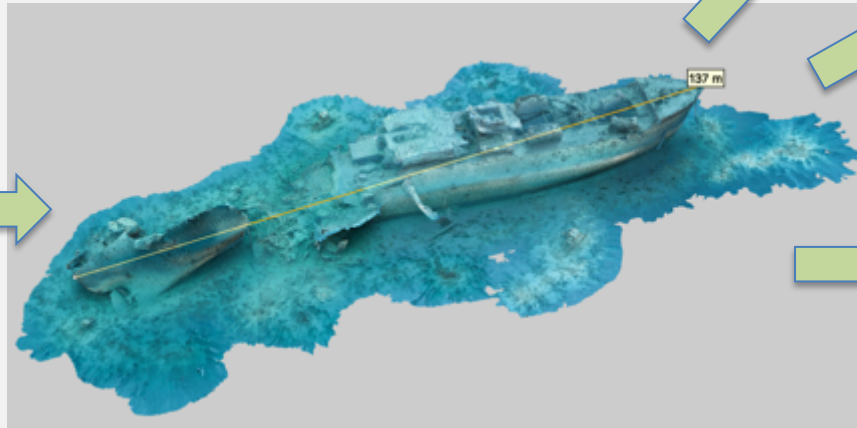
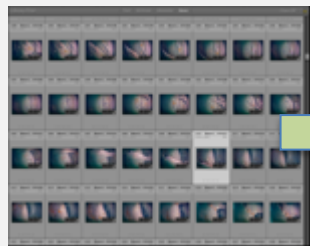deep3D
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Photogrammetry, Metadata and the Future

- 3D asset management
  - Apply the IPTC schema to 3D data.

Photogrammetry, Metadata and the Future

- Inalienable relationship between:
  - Source images
  - 3D assets
  - Digital Elevation Model
  - Ortho photo

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Photogrammetry, Metadata and the Future

- Personal project – Photogrammetry in the English Channel

- Cold War era – Sgt Paul Meyer and the stolen Hercules C-130 crash site

- Book/Film/Documentary using photogrammetry of crash site

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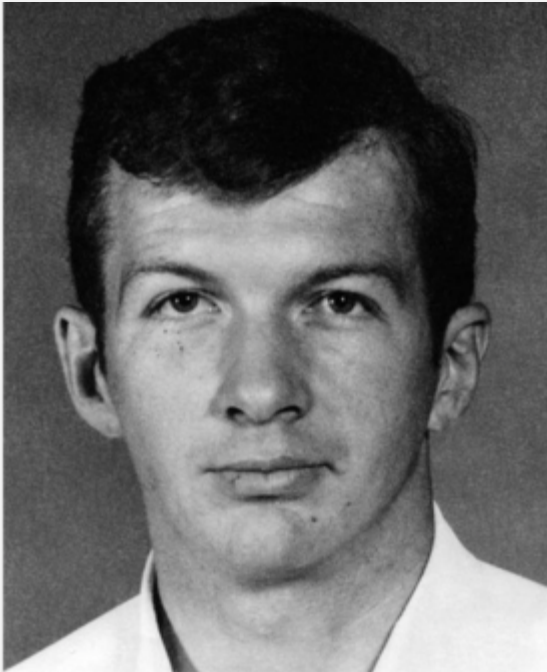
Do we still need photo metadata in 2019?

Metadata will become more valuable and relevant than at any time in the past.

Until AI can fully replicate human interpretation

By Simon Brown