AGU26 / ABSTRACT 2089569 / SESSION EP43F

From Arctic UAS Reconnaissance to Planetary Rotorcraft Science:

Linking Aerial Observations with Ground Measurements

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EXPLORE THE FIELD EVIDENCE
arctic.space4all.space
Pre-release companion website

PRE-RELEASE / UNDER REVIEW — Imagery, reconstruction and interpretations await validation

1 Question & setting

How can Arctic UAS reconnaissance guide ground observations, and what can that workflow contribute to planetary rotorcraft science?

Flashline Mars Arctic Research Station (FMARS), Devon Island, Canadian Arctic. The project science plan describes geological mapping and environmental and biological studies around Haughton impact crater [1].

FIGURE 1 / FMARS FIELD SETTING



FMARS habitat and surrounding terrain.

10 July 2026, image 0056.

Original UAS photograph by Rhett Woods.

Context view, not a georeferenced map.

The round FMARS habitat identifies the station. HMP is a separate neighboring facility. Image dates follow camera metadata; timezone is unconfirmed.

Proposed integration method

1. Preserve the original footage and flight metadata. Record filenames, dates, camera and aircraft details.

2. Trace each processed version to the source. Document software, settings and geometric or visual changes.

3. Match aerial features to ground sites by location and time. Retain coordinate and timing uncertainty.

4. Compare observations only where spatial support, units and calibration permit.

Reported acquisition settings [2]

Altitude: 300 ft above takeoff at habitat
Estimated GSD: ~2.5 cm/px near habitat; ~3–3.5 cm/px in lower gully
Overlap: 75% front / 65% side
Speed: 8–10 m/s; wide RGB camera
Distance trigger: interval not supplied

2 Aerial evidence

FIGURE 2A / ORIGINAL UAS PHOTOGRAPH



Original JPG, 4000 × 3000 px

10 July 2026, 11:36:05
Camera metadata: M3T

Terrain and snow patches visible. Location and scale pending verification.

Image 0233 [3]
Drone imagery: Rhett Woods

FIGURE 2B / SNOW-LINED CHANNEL DETAIL

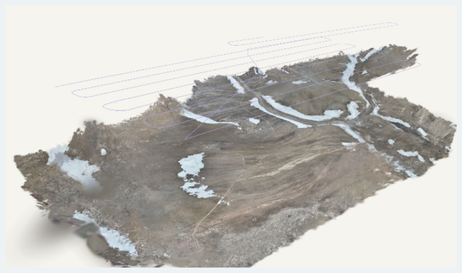


Snow margins and branching surface traces are visible.

Image 0040, 10 July 2026.
UAS imagery: Rhett Woods.

Flow direction, activity and erosion rates require ground evidence.

FIGURE 2C / SUPPLIED RECONSTRUCTION VIEW



Terrain and snow-lined channels visible.

Purple overlay meaning, creator, software and scale to confirm.

Supplied screenshot, unmodified.

Figure 2C provides reconstruction context. Confirm its source and match terrain before comparing it with 2A. Document processing and low-confidence geometry before making measurements.

Image observations

Original photographs resolve the habitat, tracks, snow patches and channel margins. The supplied reconstruction provides a wider oblique terrain view. These visual observations support selecting candidate ground targets; coordinates and field measurements are needed to test interpretations.

VALIDATION PENDING
Rhett's GSD estimates describe image sampling. They do not establish reconstruction accuracy.

3 Ground & planetary context

FIGURE 3 / GROUND VIDEO: REVIEW FRAME



User-identified gossan locality

Filmed by Trevor Jahn, July 2025.

Frame at 34.08 s. Original decoded lens projection; reframe pending.

Coordinates and aerial correspondence unconfirmed.

The 2025 ground video and 2026 aerial photographs represent separate campaigns. Establish site correspondence before comparing them. Mineral identification and measurements require supporting field records.

Analysis & uncertainty

The correspondence raises a possible mismatch between the reconstructed habitat and its known appearance [2]. Treat this as a validation question until matched views and reference geometry establish the discrepancy.

Compare source photos, camera coverage, mesh and textures. Document low-confidence or inferred geometry.

Planetary relevance

A planetary reconnaissance workflow can use aerial context to select surface targets, then test interpretations with local observations and instruments.

Mars and Titan provide mission contexts for this workflow. The Arctic example does not establish equivalent environmental conditions or transfer measurement accuracy between worlds.

Current conclusions

Aerial and ground imagery provide complementary views at different scales.

This review identifies candidate features and a traceable comparison workflow. It does not yet establish a georeferenced aerial–ground match, reconstruction accuracy or quantitative environmental results.

Acknowledgments: Rhett Woods, UAS imagery; Tash Coelho, reconstruction and regional mapping; Trevor Jahn, July 2025 ground video; Adrian [surname to confirm], historical-point geolocation.

[1] FMARS 2025 Project Description, "Science Plan 2024" (background context). [2] Supplied project correspondence and capture-date confirmation.
[3] Original UAS JPGs: DJI_20260710112129_0056_V, DJI_20260710113605_0233_V, DJI_20260710112011_0040_V.
[4] Trevor Jahn, July 2025 ground video, frame 34.08 s. [5] User-supplied reconstruction screenshot; processing provenance unconfirmed.