Supplementary Materials

A Geometrically Constrained AI Fusion Workflow for Reconstructing Vanished Landscapes from Archival Aerial Imagery

Dominik Brétt [1,*], Jan Pacina [1,2] and Jakub Vynikal [1]

Table S1. Processing parameters and software configurations used in the evaluated workflows.

Processing Step/Software	Parameter/Setting
Software Versions	Agisoft Metashape Professional (v. 2.1.0); GIMP (v. 3.0.4) Adobe Lightroom (v. 13.5); Topaz DeNoise AI (v. 3.7.2);
Unifying Images (GIMP)	Images were rotated using GIMP's Rotation tool and standardized to a uniform frame size of 12,210 × 11,782 pixels to ensure spatial consistency (matching the lowest effective resolution).
Radiometric Preprocessing (Light-room)	Automatic Exposure Matching/Brightness normalization (Adjustment Brush, until visually coherent)
AI Enhancement (Topaz DeNoise AI)	AI Model: Standard; Remove Noise: 40; Enhance Sharpness: 57 (Until visually coherent)
Image Alignment (Agisoft)	Accuracy: High; Key point limit: 80,000; Tie point limit: 8,000
Camera Calibration (Agisoft)	Focal Length (f): Fixed at 211.09 mm
Build DEM	Quality: Medium; Depth filtering: Aggressive, Interpolation: Enabled
Orthomosaic Generation	Blending mode: Mosaic; Surface: DEM; Enable hole filling: Yes

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