

PRISMA 2020 checklists — main statement and abstract

Thermal and Multispectral UAV Remote Sensing in Archaeology (2013–July 2026) — Gabriele Ciccone

Item numbering and topic labels follow the official PRISMA 2020 checklists (Page et al., 2021, BMJ 372:n71), which should be downloaded in their authoritative form from prisma-statement.org and submitted alongside this mapping; item wording is abbreviated here.

Eleven items relating exclusively to effect estimation, meta-analysis and formal risk-of-bias grading are marked not applicable: the review is a descriptive bibliometric synthesis of a methodological literature, the included studies report heterogeneous and non-commensurable outcomes, and no pooled effect measure, heterogeneity statistic or certainty grading can be computed. This is a declared property of the design, not an omission. In particular, the four-field reporting-completeness appraisal presented in Table S1 is an appraisal of what each study reports about its own methods; it is not a risk-of-bias assessment and item 18 is marked not applicable accordingly.

All counts below refer to the corpus of 132 publications and to the two-track flow diagram of Figure 1.

Table A. PRISMA 2020 checklist (27 items).

Item	Topic	Checklist item (abbreviated)	Location in the manuscript
1	Title	Identify the report as a systematic review.	Title: “A Systematic Review”.
2	Abstract	Structured abstract per PRISMA for Abstracts.	Abstract; see Table B below.
3	Rationale	Rationale in the context of existing knowledge.	§1, paragraph 2.
4	Objectives	Explicit statement of objectives or questions.	§1, paragraph 3: RQ1–RQ6 plus three documentary axes, stated as part of the same synthesis.
5	Eligibility criteria	Inclusion and exclusion criteria; grouping for synthesis.	§3.4 and Table 3; grouping rules in §3.8.
6	Information sources	All sources; date each was last searched.	§3.2 and Table 1: four bibliographic databases plus the LLM-assisted track, all searched 27 July 2026. A second identification track, comprising the author’s reference library and citation searching of retrieved items, contributed 22 publications and is reported as a separate column of Figure 1 and in the Retrieval_provenance column of Table S1.
7	Search strategy	Full search strategies, including filters and limits.	§3.2 and Table 1; strings as executed, with Google Scholar ordering and export handling, in Supplementary File S1 §S1.5.
8	Selection process	Number of reviewers; independence; automation tools.	§3.5: single reviewer (GC), non-independent; two deterministic keyword rules only, no machine-learning classifier. The rules as implemented are given in File S1 §S1.1 and the stage at which every excluded record was removed is recorded in Table S2 (Screening_stage), with the assignment procedure in File S1 §S1.2.
9	Data collection process	Methods; number of reviewers; automation; author contact.	§3.6: single reviewer, predefined CSV form, no inference from figures or third-party sources, authors not contacted.

Item	Topic	Checklist item (abbreviated)	Location in the manuscript
10a	Data items: outcomes	All outcomes sought.	Not applicable — no effect outcome was predefined; the review maps methodological and bibliographic characteristics (§3.6).
10b	Data items: other variables	All other variables; assumptions about missing information.	§3.6; operational definitions of every coded category in File S1 §S1.3. Unavailable values are coded uniformly as “not reported” and are never imputed and never silently dropped from denominators.
11	Risk of bias	Methods used to assess risk of bias in included studies.	§3.7: no formal study-level risk-of-bias assessment was conducted; a four-field reporting-completeness appraisal was substituted and is explicitly distinguished from internal validity.
12	Effect measures	Effect measure used for each outcome.	Not applicable (§3.1).
13a	Synthesis: eligibility per synthesis	Processes for deciding eligibility for each synthesis.	§3.8: every record enters every synthesis for which its field could be established; reduced denominators stated in each caption.
13b	Synthesis: data preparation	Methods to prepare data for synthesis.	§3.8: normalisation of free-text fields into controlled categories; mapping rules in File S1 §S1.3 and, as executable code, in File S3.
13c	Synthesis: tabulation and display	Methods to tabulate or display results.	§3.8 and §4: seven figures, seven tables; software and versions given in §3.8.
13d	Synthesis: methods	Methods used to synthesise results.	§3.8: descriptive synthesis only; no meta-analysis.
13e	Synthesis: heterogeneity	Methods to explore causes of heterogeneity.	Not applicable. Stratified counts by period, sensor class and platform configuration serve an analogous descriptive purpose (§4).
13f	Synthesis: sensitivity analyses	Sensitivity analyses to assess robustness.	§3.8 and §4.2: the project-level series (n = 122) is a declared sensitivity comparison against the publication-level series (n = 132), presented in the lower panel of Figure 2.
14	Reporting bias assessment	Methods to assess risk of bias due to missing results.	Not applicable in the meta-analytic sense (§3.1). Retrieval bias is assessed directly in §3.3 and Table 2; the predominance of successful detections is discussed as a possible reporting bias in §5.5.
15	Certainty assessment	Methods to assess certainty in the body of evidence.	Not applicable (§3.1) — no GRADE-type framework exists for this evidence type.
16a	Study selection results	Search and selection results, ideally with a flow diagram.	§3.3, §3.5 and Figure 1, a PRISMA 2020 two-column flow diagram reporting the database, register and LLM track separately from the other-methods track, with screening, retrieval and eligibility as distinct stages.

Item	Topic	Checklist item (abbreviated)	Location in the manuscript
16b	Excluded studies	Cite studies that might appear eligible but were excluded, with reasons.	Supplementary Table S2: all 270 excluded records, each with its screening stage, the automated rule applied where relevant, a controlled-vocabulary exclusion reason and an explanatory note. Of these, 80 were removed by the automated rules, 26 on bibliographic metadata and 164 after full-text assessment. The reconciliation sheet of Table S2 reproduces the counts of Figure 1.
17	Study characteristics	Cite each included study and present its characteristics.	Supplementary Table S1: all 132 included publications with full citation, DOI or URL where available, and every extracted field.
18	Risk of bias in studies	Present assessments for each included study.	Not applicable — no formal study-level risk-of-bias assessment was conducted (§3.7). The four-field reporting-completeness appraisal reported per publication in Table S1 (columns RC1–RC4 and RC_score_0_4), and in aggregate in File S1 §S1.4, records what each study reports about its own methods and must not be read as an assessment of risk of bias or of study quality.
19	Results of individual studies	Summary statistics and effect estimates per study.	Not applicable — no effect estimates. Per-study characteristics in Table S1.
20a	Results of syntheses: characteristics	Characteristics and appraisal of contributing studies.	§4.1 and the denominator stated for each synthesis: 132 (temporal, sensor), 126 (geographic), 122 (platform), 106 (vegetation), 68 (timing), 30 (processing).
20b	Results of syntheses: statistical	Results of all statistical syntheses.	Not applicable — descriptive counts and proportions only (§4.2–4.9).
20c	Results of syntheses: heterogeneity	Results of investigations of heterogeneity.	Not applicable.
20d	Results of syntheses: sensitivity	Results of sensitivity analyses.	§4.2 and Figure 2, lower panel.
21	Reporting biases	Assessments of risk of bias due to missing results.	Not applicable in the meta-analytic sense; retrieval-bias results in §3.3, Table 2 and §5.2; reporting deficit within included studies in §4.8 and §5.5.
22	Certainty of evidence	Assessments of certainty.	Not applicable (§3.1).
23a	Discussion: interpretation	General interpretation in the context of other evidence.	§5.1–5.5, with comparison against the pre-2020 baseline of Adamopoulos & Rinaudo (2020).
23b	Discussion: limitations of evidence	Limitations of the evidence included.	§5.5 (reporting deficit) and §5.4 (concentration and absence of replication).

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23c	Discussion: limitations of process	Limitations of the review processes.	§3.9, recalled at the opening of §5.5; single-reviewer screening, partial recovery of non-English literature and the incomplete indexing of 2025–2026 are stated there.
23d	Discussion: implications	Implications for practice, policy and future research.	§5.4, §5.5 and §6; proposed minimum reporting standard in Table 7, reproduced in full in File S1 §S1.6.
24a	Registration	Registration information, or statement that the review was not registered.	§3.1: the review was not registered in PROSPERO or any other register.
24b	Protocol	Where the protocol can be accessed, or statement that none was prepared.	§3.1: no protocol was prepared or prospectively deposited. The methods reported in §3.2–3.8, together with File S1, document the procedures as implemented during the review.
24c	Amendments	Amendments to the registered or prepared protocol.	Not applicable — no registered or publicly available protocol existed, so no amendments to one occurred.
25	Support	Sources of support and role of funders.	Funding: no external funding was received.
26	Competing interests	Competing interests of review authors.	Conflicts of Interest, and §3.6. The corpus includes four publications by the review author; these were screened and extracted against the same predefined criteria as all other records and are identified by the Reviewer_authored column of Table S1.
27	Availability of data, code and materials	What is publicly available and where.	Data Availability Statement and Supplementary Materials: Table S1 (classified corpus), Table S2 (exclusion register with PRISMA reconciliation sheet), File S1 (search protocol, screening rules and codebook), File S2 (LLM-track outputs) and File S3 (analytical code and validation report).

Table B. PRISMA 2020 for Abstracts checklist (12 items).

Item	Topic	Checklist item (abbreviated)	Where addressed in the abstract
1	Title	Identify the report as a systematic review.	Title and first methodological sentence: “This systematic descriptive review, reported in accordance with PRISMA 2020...”.
2	Objectives	Objective or question the review addresses.	“...maps the published record of drone-based TIR and MS remote sensing in archaeology.”
3	Eligibility criteria	Inclusion and exclusion criteria.	“Eligible records were peer-reviewed archaeological studies deploying UAV-borne TIR and/or MS imaging; reviews, hyperspectral-only studies and grey literature were excluded.”

Item	Topic	Checklist item (abbreviated)	Where addressed in the abstract
4	Information sources	Sources searched and date last searched.	"Scopus, OpenAlex, Semantic Scholar and Google Scholar were searched on 27 July 2026...", plus the LLM-assisted track; a further 22 publications were identified through the author's reference library and citation searching.
5	Risk of bias	Methods used to assess risk of bias.	"No meta-analysis, formal risk-of-bias grading or certainty assessment was undertaken, because the reported outcomes are heterogeneous and non-commensurable."
6	Synthesis of results	Methods used to synthesise results.	"One reviewer screened all records and extracted predefined variables from the full texts; results were synthesised descriptively at publication and project level."
7	Included studies	Number and type of included studies and participants.	"One hundred and thirty-two publications, corresponding to 122 distinct research projects, were included."
8	Synthesis of results	Results, with measures of precision where applicable.	Temporal, sensor, geographic, platform, context, timing and processing results, reported as counts and percentages.
9	Limitations of evidence	Limitations of the evidence included.	"Only 23% of studies document their post-processing workflow and 48.5% report no acquisition timing at all."
10	Interpretation	General interpretation and important implications.	"A minimal metadata standard for TIR/MS drone surveys is proposed."
11	Funding	Primary source of funding.	"This research received no external funding."
12	Registration	Registration number and register name.	"The review was not registered."