

Review of Aeronautical Information Publication Data Validation Methods at the Aeronautical Information Center

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Article Info	ABSTRACT
Article History: Submitted: 8 August 2025 Revised: 16 August 2025 Accepted: 10 August 2026	Aeronautical Information Publication (AIP) data require reliable checks from source submission through publication. This qualitative case study compares ICAO Doc 8126 with two internal procedures (SOP.001 and SOP.007), reported workflow observations, and interviews with 14 cartography and publication personnel at an Aeronautical Information Center. SOP.001 calls early checks of raw data verification, whereas SOP.007 calls a later review of the compiled AIP product validation. Six informants perceived a discrepancy with ICAO guidance; eight considered their work consistent with the internal procedures. Thus, the principal finding is an unclear mapping of terminology and evidence between early source-data checks and final product review, rather than an absence of early checks. The study recommends that the procedures define each control point, acceptance criteria, responsible roles, and correction records. This mapping may improve traceability of AIP quality assurance; actual error rates and safety outcomes were not measured.
Keywords: <i>aeronautical information publication; data quality; validation; verification; ICAO Doc 8126.</i>	

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INTRODUCTION

Aeronautical Information Publication (AIP) provides information required for flight navigation and must be supported by reliable aeronautical data. The Aeronautical Information Services Manual, ICAO Doc 8126, describes quality requirements and checks across the aeronautical data chain [1]. A recent study in the Denpasar AIS region found that incomplete or incorrectly formatted source submissions obstructed AIP change requests [2], while another documented a discrepancy between AIP text and charts caused during document compilation [3]. These studies concern submission quality and product consistency, respectively; neither examines the terminology and placement of validation in the two Central AIS procedures assessed here. A study of aeronautical NOTAM requests in Denpasar identified the absence of a specific mechanism for verifying airspace location coordinates, illustrating why explicit intake criteria matter across AIS products [4].

At the Aeronautical Information Center, SOP.001 prescribes checks when raw data arrive, whereas SOP.007 uses the term validation for a check after drafting, bundling, and final quality control [5], [6]. The question is whether their control points and terms correspond clearly to Doc 8126, not whether all early checks are absent. The objective of this study is to compare the stages, methods, and terminology of AIP data checks in these SOPs with ICAO guidance and propose specific procedural improvements.

Data quality requirements should be identified when source data are received and retained throughout processing [1]. Early checks and subsequent product review have related but distinct purposes. In aeronautical data processing, the way verification and validation are defined can affect the evidence used to demonstrate data quality [7].

The Aeronautical Information Center uses internal SOPs to process AIP changes. SOP.001 names check of incoming raw data verification, whereas SOP.007 names a later review of the assembled publication validation [5], [6]. This study examines the relationship between those two control points and the quality assurance guidance in Doc 8126 [1].

A mismatch in procedural terminology can make it harder to identify which requirements have already been checked and which remain for final product review. The present comparison focuses on the documented sequence and acceptance evidence; it does not assume that a published data error or safety occurrence resulted from the terminology.

METHODS

A qualitative case study was used to compare the documented AIP workflow with accounts from personnel who perform it. The analysis covers ICAO Doc 8126, SOP.001, SOP.007, reported workflow observations, and interviews with 14 AIS personnel in cartography and publications [1], [5], [6]. The research question concerns the purpose, timing, and naming of data checks rather than a statistical estimate of errors.

The unit of analysis was the AIP data-check workflow at the Aeronautical Information Center. Fourteen informants were selected because they work with cartography or publications and are directly involved in the process. The study compared what the procedures prescribe with the stages described in the interviews and reported observations. The available manuscript does not specify fieldwork dates, interview duration, verbatim transcripts, or a formal coding protocol; these details and direct quotations cannot be reconstructed.

Primary data comprised reported observations, document-related evidence, and interviews with 14 personnel involved in AIP data processing. Interview statements were summarized by their view of procedural alignment: six reported a gap, while eight considered internal practice compliant.

Secondary data comprised ICAO Doc 8126 and the two AirNav Indonesia procedures, SOP.001 and SOP.007 [1], [5], [6]. The comparison addressed source-data checks, product-level checks, their documented names, and the evidence or corrective action associated with each stage.

The procedures and interview summaries were read by workflow stage. Recurrent topics were organized as (i) checks at intake, (ii) final product control, and (iii) interpretation of verification and validation. The resulting themes were compared across the three evidence types to identify agreement and disagreement; such transparent theme development is consistent with current methodological guidance [8]. Figure 1 summarizes the research sequence.

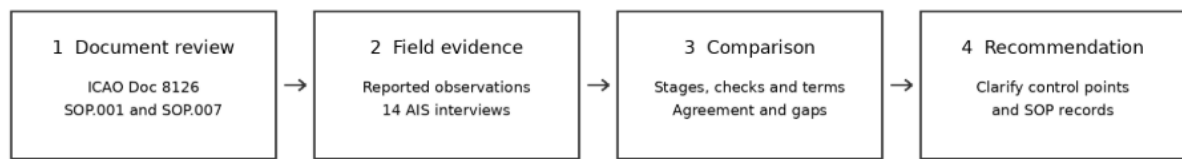


Figure 1. Research process from document review to procedural recommendations.

Table 1. Research participants and focus.

Aspect	Description
Informants	14 AIS personnel from the cartography and publications divisions who are involved in AIP data validation at the Aeronautical Information Center.
Research Subject	AIP data validation at the Aeronautical Information Center.

Triangulation here means comparing the accounts of personnel with the steps recorded in the SOPs and the reported workflow observations. When sources differed, the discrepancy was retained as a finding rather than resolved by majority opinion. The source materials do not provide individual quotations or a record of interview questions, so this article reports the aggregate interview result and avoids fabricated testimony.

The analysis proceeded from a description of the actual SOP steps to a comparison with Doc 8126 and then to recommendations for clarifying the two control points. Because the evidence concerns one center and two procedures, the findings are context-specific and do not measure AIP error rates or causal effects on flight safety.

RESULT AND DISCUSSION

This section reports the steps documented in SOP.001 and SOP.007, the views of 14 informants, and a comparison with ICAO Doc 8126 [1], [5], [6]. The observed difference is principally in the terms used and in how the two checking stages are specified.

SOP.001 governs receipt, registration, assignment, and checking of requests to change or add aeronautical information. Its final step checks incoming data before drafting [5]:

1. AIS personnel receive a publication request letter from the data source. The source provides information on data changes or additions via the ARSIPKU application, email, or other communication media. AIS personnel then confirm the request.
2. AIS personnel register the disposition from the Manager of Aeronautical Information and Cartography to follow up on the updates to FRM.29.
3. AIS personnel identify data additions or changes according to the responsibilities of the Central and Regional AIS.
4. Central AIS personnel notify Regional AIS if the requested data changes or additions fall under regional authority.
5. AIS personnel verify the raw data by checking the accuracy of the effective date, consistency of supporting documents, resolution accuracy, consistency of coordinates with the object's physical location, consistency with NOTAM, AIP, or AIC, and internal consistency of the submitted data [5].

SOP.007 governs review and publication of the prepared AIP and AIC products. Its seven documented steps can be summarized without removing the control points [6]:

1. AIS personnel receive AIP and AIC drafts sent by Regional AIS. They check the completeness of the email and record the publication process in FRM.45, Publication Monitoring at Central AIS.
2. AIS personnel bundle the AIP Amendment drafts.
3. AIS personnel perform a final quality control (QC) check on the bundled AIP Amendments, AIP Supplement drafts, and AIC drafts.
4. Drafts that pass final QC are validated. Inconsistencies are marked and returned to Regional AIS for follow-up.
5. AIS personnel correct the AIP draft based on inconsistencies found during final QC and validation, in accordance with SOP.004 on Drafting AIP and AIC Publications at Central AIS.

6. Once the bundle is declared valid, AIS personnel publish the AIP SUP, AIP AMDT, and AIC bundles on the iWISH INDONESIA website and record publication monitoring in FRM.45.
7. Personnel archive the drafts, corrections, source letters, and supporting documents [6].

Interviews with 14 cartography and publication personnel showed that participants understood the sequence established by the internal SOPs. Six considered its validation terminology or stage insufficiently aligned with ICAO Doc 8126; eight viewed the workflow as compliant with the internal procedures. These are perceptions of alignment, not independent measurements of process performance or data accuracy.

The differing views suggest that following a local SOP and demonstrating an explicit mapping to ICAO guidance are separate questions. The early raw-data checks described in SOP.001 must be considered together with the final review described in SOP.007 [1], [5], [6]. In a study of aeronautical publication coordination in Jakarta, periodic discussions between AIS personnel and data sources were recommended to address issues under their coordination agreement [9].

Table 2. Gap analysis of AIP data-check terminology and timing.

Aspect Analyzed	Current Condition	Expected Condition	Gap	Recommendation
Documented stages	SOP.001 checks incoming data before drafting; SOP.007 reviews the bundled draft after final QC [4], [5].	Doc 8126 describes data-quality checks across the data chain [1].	The purpose and evidence for early and late checks are not explicitly mapped between the two SOPs.	Define acceptance criteria and recorded evidence for each control point; retain final QC.

Table 2 shows why the gap should be stated precisely: the early checks exist, but their purpose, terminology, and link to the later product review are not made equally explicit in the two SOPs. This is a finding about documented controls; a full audit of individual AIP records would be required to determine how consistently each check is performed.

The document comparison in Table 3 focuses on the timing and method of checks described by Doc 8126 and by SOP.001 and SOP.007 [1], [4], [5]. It complements the interview finding by showing which local activity corresponds to each control point.

Table 3. Comparison of ICAO Doc 8126 with AirNav Indonesia procedures.

Doc 8126, <i>Aeronautical Information Service Manual</i>	Internal SOPs at the Aeronautical Information Center
Source-data quality is considered early in the data chain; metadata and plausibility checks support continued quality assurance [1].	SOP.001 includes early checks but names the activity verification; SOP.007 labels a later product review validation [4], [5].
Check source authorization and metadata, geographic plausibility, and consistency with related aeronautical data as applicable [1].	Several analogous intake checks appear in SOP.001; final QC and validation of the bundled product appear in SOP.007 [4], [5].

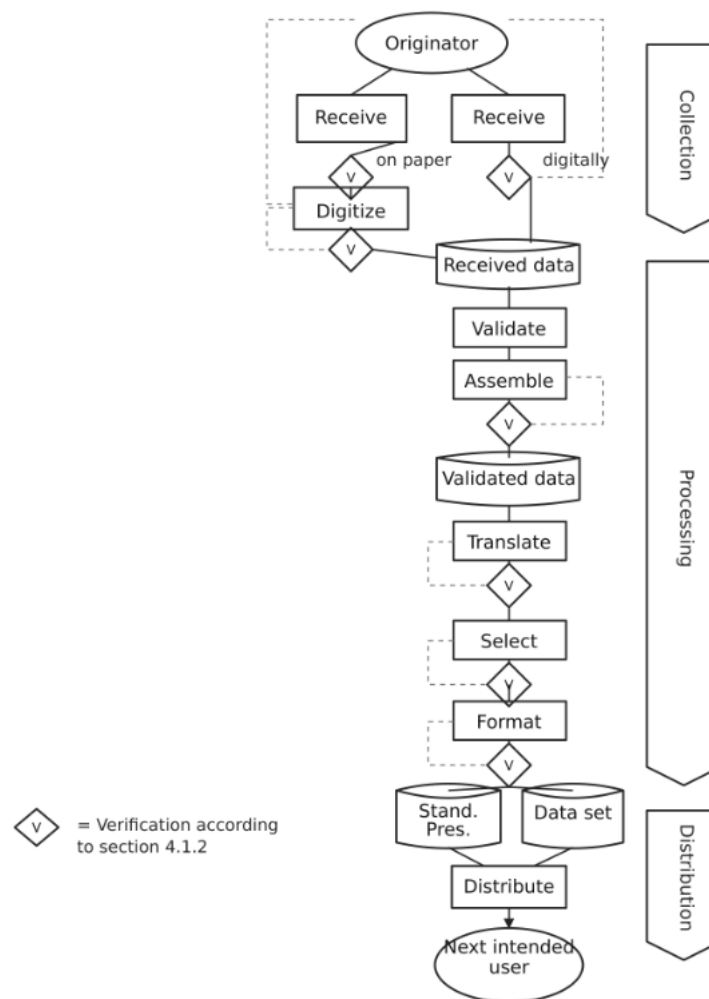


Figure 2. ICAO aeronautical data quality workflow (source: ICAO Doc 8126 [1]).

Figure 2 places quality checks early in the data chain, before integration into a publication product. The relevant question for this study is whether the local intake checks and later release controls have defined acceptance criteria and an auditable handoff [1].

The following examples from Doc 8126 illustrate the evidence that may be needed at intake: metadata and authorization of the source; plausibility of geographic values and relationships; and consistency where data are shared with neighboring states [1].

Validation Methods Based on Doc 8126

Validation based on metadata. The metadata review establishes whether the submitting source is authorized, supporting material is clear, and the supplied data satisfy the applicable quality requirements [1]. Operational questions include whether the data come from an authorized source, whether metadata and supporting documents are complete and understandable, and whether applicable requirements for accuracy, resolution, integrity, and format have been met.

Data plausibility checks. A plausibility check compares a submitted value with other geographic or aeronautical information to detect an inconsistency before it propagates through the workflow [1]. For example, geographical coordinates may be visualized in a geographic information system and compared with topographic maps, orthophotos, or satellite maps. Declared distances and bearings may be recalculated from coordinates and checked against related runway or route data. Obstacle data may also be compared with three-dimensional terrain information.

Validation with data from neighboring countries. Where aeronautical information appears in the products or services of more than one country, such as airspace boundaries, routes, or border points,

responsible AIS personnel need a mechanism for checking consistency. If a change could affect cross-border data, the AIS of the neighboring country should be notified [1].

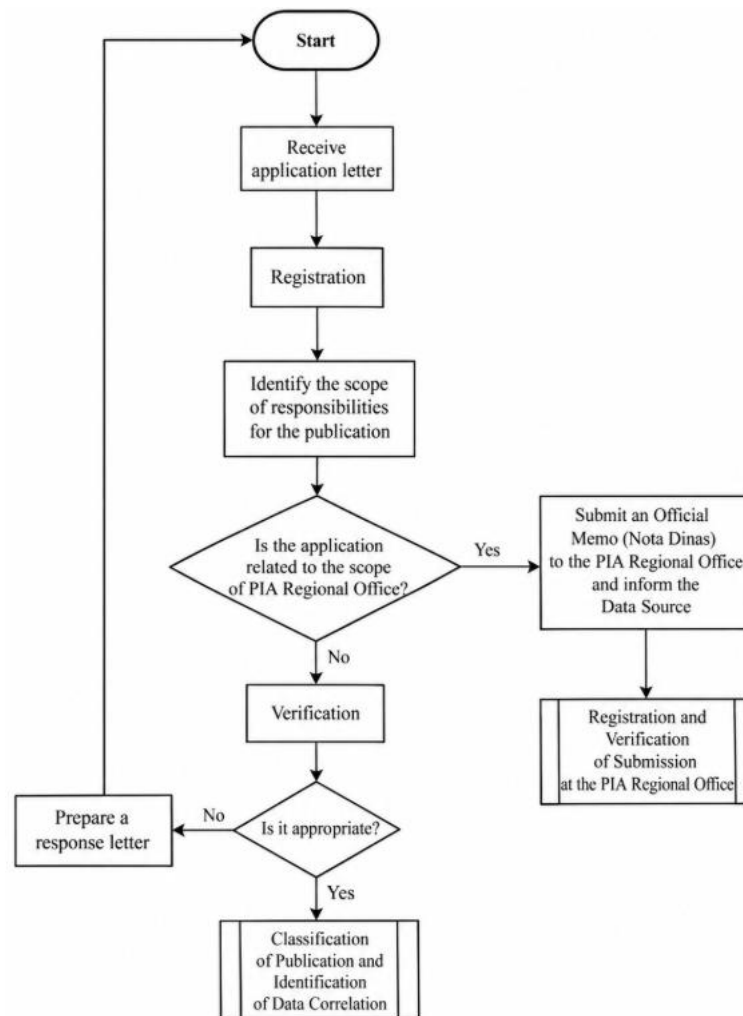


Figure 3. Registration and verification of incoming aeronautical data. Source: SOP.001 [5].

Figure 3 shows that submitted raw data are checked before drafting. Some of these checks resemble the source and plausibility checks described by ICAO, although the SOP calls the local activity *verification* [1], [5]. Thus, it would be inaccurate to say that the Center performs no early checks.

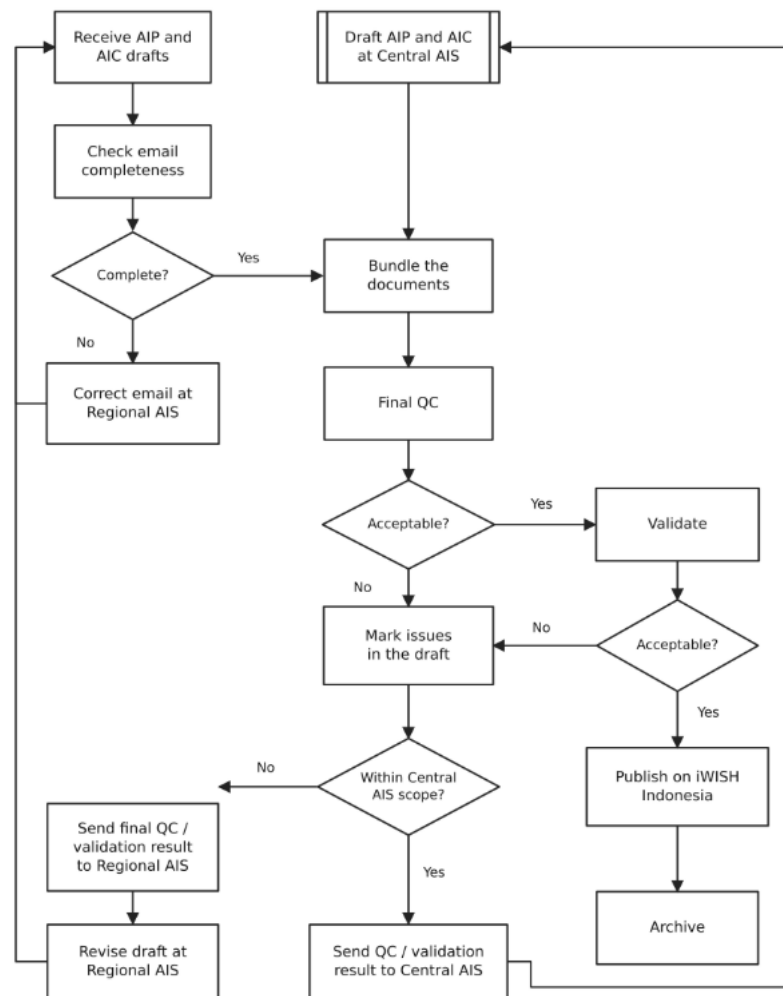


Figure 4. Validation and publication of AIP and AIC products. Source: SOP.007 [6].

Figure 4 shows the later SOP.007 workflow: the prepared AIP and AIC drafts are received, checked for completeness, bundled, and subjected to final QC, then validated before publication; discrepancies are returned for correction [6]. This later control should remain explicit when early source-data checks are clarified. Research on NOTAM production in the Jakarta AIS region has likewise emphasized an independent quality control function to reduce recurrent nonconformities. Its findings support the value of a distinct final review, although the product studied was NOTAM [10].

Together, SOP.001 and SOP.007 cover receipt of raw data and review of the compiled product [5], [6]. A useful revision would map each local activity to its purpose and evidence requirement under Doc 8126 [1].

The process includes source documentation, drafting, bundling into an amendment, quality control, final QC, correction, publication, and archiving [5], [6]. The distinction to document is between accepting incoming data for processing and approving the consistency of the assembled publication.

Doc 8126 describes checks that help preserve data quality across the chain, including early consideration of metadata and plausibility [1]. SOP.001 already includes a number of early checks, but the SOP titles and workflow labels do not clearly distinguish those checks from the later “validation” after final QC in SOP.007 [5], [6]. This interpretation is more specific than treating the late stage as the only data quality control.

The consequence is a possible gap in traceability: without an explicit record of what was accepted at intake, the reviewer of a bundled draft may have to reconstruct the evidence behind a submitted

coordinate or effective date. A recent Indonesian study found inconsistent pavement-strength entries between AIP text and charts during compilation [3]. That case illustrates the need for product-level consistency review, but it does not demonstrate that the same error occurred at the Center studied here. A separate study of NOTAM submissions in Medan found that an incorrect coordinate sequence required correction and resubmission by the data source. This example concerns NOTAM rather than AIP, but illustrates the value of checking format at intake [11].

A practical SOP revision would distinguish (a) source-data checks for authority, metadata, plausibility, accuracy, and supporting documents; and (b) final review of the compiled AIP amendment, supplement, or circular. For each stage, the responsible role, acceptance criteria, correction route, and retained record should be identified [1], [5], [6]. The early and late controls are complementary.

The internal label “verification” may encompass checks comparable to early plausibility assessment, while the SOP.007 label “validation” applies to a later product review [1], [5], [6]. This distinction should be resolved in SOP definitions and evidence records rather than attributed to staff error.

The interviews support a need for shared terminology and training, while the SOP comparison identifies where clearer records could help. The evidence does not demonstrate individual personnel error or a measured effect on flight safety. Rezo *et al.* likewise show that validation and verification arrangements in aeronautical data processing need careful definition, though their study concerns a software solution rather than this AIS procedure [7].

Personnel reported that parts of the drafting workflow were being digitized. Whether this change reduces processing time or improves validation cannot be determined from the available interviews. A future evaluation should compare record completeness, corrections, and publication discrepancies after any revised SOP is implemented. A study of AIS facilities in Denpasar examined the infrastructure used to deliver aeronautical information services, providing context for evaluating whether digitization supports the documented workflow [12].

In summary, SOP.001 and SOP.007 provide controls at different points in the AIP workflow, but the terminology and evidence connecting those points should be clarified. The proposed mapping retains source-data checks and final QC while making both stages auditable [1], [5], [6].

CONCLUSION AND RECOMMENDATIONS

The comparison identifies a mismatch in how early and late AIP data checks are named and documented. SOP.001 checks source data before drafting, whereas SOP.007 labels the review following bundling and final QC validation [5], [6]. Six of 14 informants perceived a discrepancy with ICAO guidance and eight considered current practice consistent with internal SOPs. The study contributes a procedure-level mapping to support revised SOP definitions and a traceable data quality record. It is limited to one center, the two available procedures, observations as reported, and an aggregate interview summary; it cannot establish the frequency of AIP errors or a causal safety effect. Future work should pilot the revised SOPs and compare completeness of intake records, correction cycles, and discrepancies in published products.

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