

SKYbrary

# SIREN

Safety Intelligence & Retrieval Engine  
for Aviation Knowledge

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*Transforming how aviation safety knowledge is accessed,  
analysed, and operationalised.*

**Aviation safety knowledge is vast, fragmented and hard to access quickly.**

SKYbrary contains thousands of accident records, safety articles, airport data, aircraft specifications, and operator profiles — but navigating all of it takes time and expertise.

**Hours**

spent cross-referencing accident records manually

**Expertise**

required to navigate complex safety data

**Risk**

of missing critical patterns and trends

## WHAT IS SIREN?

**SIREN is an aviation safety intelligence system built on top of the entire SKYbrary knowledge base.**

*Ask any safety question in plain English — SIREN instantly retrieves, cross-references, and synthesises relevant knowledge.*

### Ask

Type questions in plain language  
— no forms, no keywords, no  
training required.

### Retrieve

SIREN searches across 6  
knowledge domains  
simultaneously and ranks the  
most relevant information.

### Answer

Receive a structured, sourced  
response with full traceability to  
the original SKYbrary records.

*Not a generic chatbot — a domain-specific safety intelligence layer grounded exclusively in verified SKYbrary content.*

### Speed

*Seconds — vs. hours of manual research*

Complex cross-collection safety queries — accident records, operator history, aircraft type, contributing factors — resolved in a single interaction.

### Decision Support

*Evidence-based — answers at every level*

Every response is grounded in verified SKYbrary content. No speculation, no hallucination. Directors, investigators and analysts all receive traceable, sourced answers.

### Trend Intelligence

*Pattern detection — across the full accident database*

SIREN can surface statistical trends by aircraft type, route geography, contributing factor, or operator — enabling proactive safety oversight.

### Institutional Memory

*Decades — of aviation safety knowledge — instantly accessible*

Historical accident data and safety knowledge that previously required expert navigation is now accessible to any authorised user, immediately.

## WHAT CAN YOU ASK SIREN?

Three modes of intelligence — all through plain English questions:

### KNOW

#### Knowledge & Explanation

"What is Loss of Control – Inflight?"

"Explain CFIT and typical contributing factors"

"What are the ICAO standards for runway incursion prevention?"

SIREN explains safety concepts, procedures, and terminology drawing on the full SKYbrary knowledge library.

### INVESTIGATE

#### Case Research

"Show CFIT accidents involving turboprops in IMC"

"What happened in the Überlingen mid-air collision?"

"Find accidents where ATC was a contributing factor"

SIREN retrieves and cross-references accident case studies, linking incident records with relevant safety knowledge.

### ANALYSE

#### Statistical Trends

"Which aircraft types have the most runway excursions?"

"Show accident frequency by contributing factor over the last decade"

"What regions have the highest incidence of LOC-I events?"

SIREN aggregates and interprets trends across the full accident database — by aircraft, geography, operator, or cause.

## DATA COVERAGE

SIREN has unified access to the full SKYbrary knowledge ecosystem:

### Accident & Incident Records

Full accident case studies — causes, consequences, contributing factors, and safety lessons

### Safety Knowledge Articles

SKYbrary's curated library of safety concepts, procedures, and regulatory guidance

### Airport Profiles

ICAO/IATA data, runway layouts, geographic context, and safety-relevant characteristics

### Aircraft Type Data

Specifications, performance envelopes, and type-specific safety records

### Airline Operator Profiles

Operator histories, ICAO/callsign lookup, and cross-referenced incident data

### Reference Publications

Bookshelf of aviation safety publications, manuals, and authoritative guidance documents

**SIREN is engineered for safety-critical environments — not a consumer chatbot.**

### ✓ **No Hallucination**

Every answer is derived exclusively from retrieved SKYbrary records. SIREN never generates content from general AI knowledge or speculation.

### ✓ **Domain Boundary Enforcement**

A three-layer filtering system prevents off-topic queries from entering the system, ensuring SIREN stays within its aviation safety mandate.

### ✓ **Full Source Traceability**

Every response displays the exact source documents used, including retrieval scores and curated-link indicators. Directors can verify any answer.

### ✓ **Complete Audit Trail**

Every query, routing decision, and response is logged with user identity and timestamp — fully auditable and archivable for compliance purposes.

### LIVE — Fully Operational

- All 6 knowledge collections indexed and searchable
- Natural language query with plain English input
- Accident investigation with cross-referenced safety knowledge
- Statistical trend analysis over accident database
- Airport, aircraft, and operator profile lookups
- Safety publications (Bookshelf) retrieval
- Real-time streaming responses
- Complete query audit logging

### NEXT — Performance & Depth

- Response time optimisation (parallel query execution)
- Expanded ground-truth evaluation framework
- Multi-hop reasoning for complex investigative queries

### Quality Benchmarks

- Faithfulness (answer accuracy): 94.7%
- Answer relevancy: 96.0%
- Functional test pass rate: 99% (7980 / 8000 tests)

F R O M

Static knowledge repository

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T O

**Interactive safety  
intelligence layer**

*SIREN represents a controlled, governed evolution in how aviation safety knowledge is accessed — transforming decades of institutional knowledge into an immediately actionable intelligence resource for every level of the organisation.*