



**BEA**  
Bureau d'Enquêtes et d'Analyses  
pour la sécurité de l'aviation civile

# Use of ECCAIRS at the BEA

Olivier FERRANTE

[www.bea.aero](http://www.bea.aero)

# A central tool for investigations

- Memory of accidents
- Statistics and safety indicators
- Safety analysis (for instance on similar accidents i.e. mid-air collisions, CFIT, runway incursions ...)
- Dissemination and exchange of safety data
- Facilitate to identify recurrent safety causal factors or patterns in accidents
- Support of structured analysis
- Connected to the Safety Recommendations Information System

- 1. A common database
- 2. ECCAIRS at BEA
- 3. Architecture and encoding occurrences
- 4. ECCAIRS tools
- 5. Future enhancement
- 6. Conclusion

# 1. A common database

- Extracts from Directive 2003/42/EC [now Regulation (EU) No 376/2014] :
- "Contribute to improvement of aviation safety by ensuring that relevant information on safety is **reported, collected, stored, protected** and **disseminated**"
- "**Accidents** and **serious incidents** shall also be stored in these databases."
- "A **mechanism** shall be put in place to collect, evaluate, process and store occurrences"

# 1. ECCAIRS system

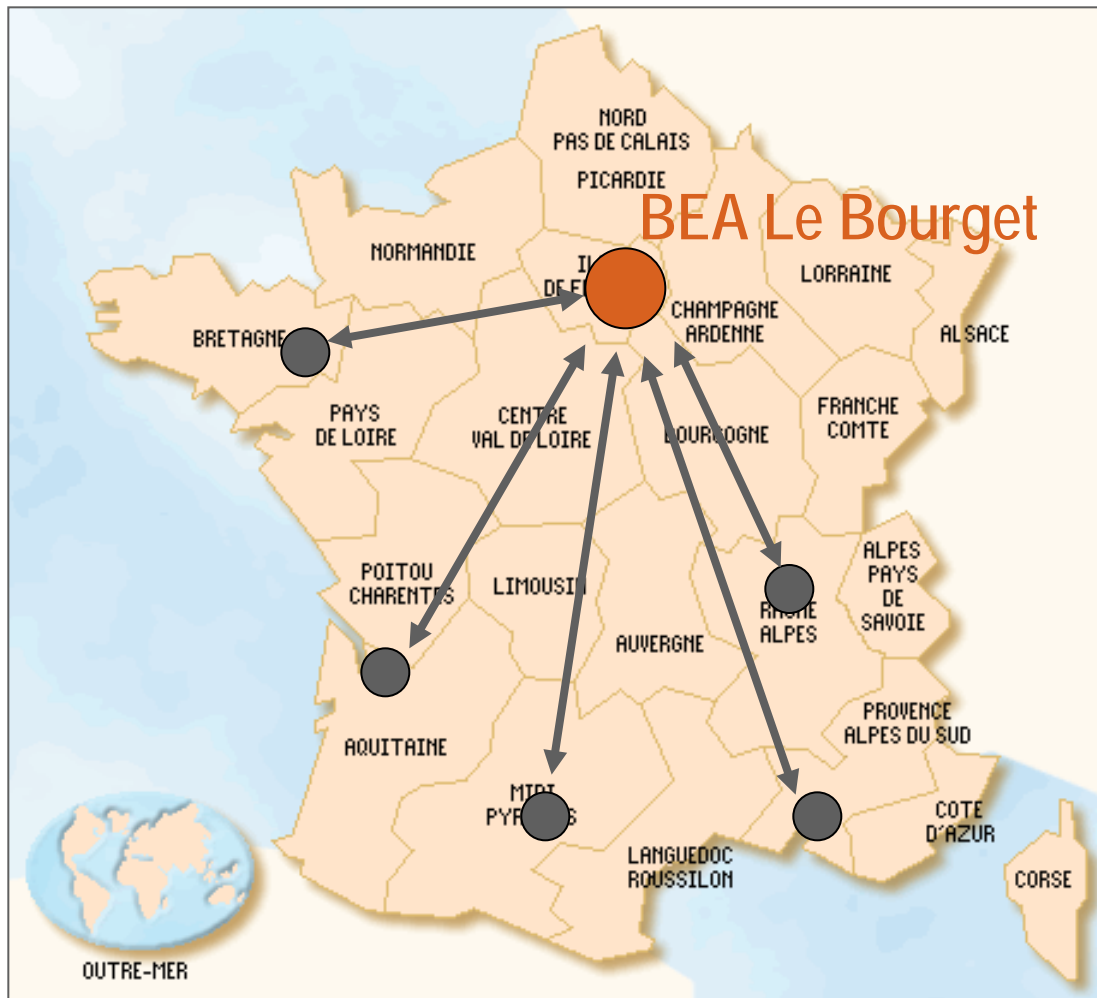
- European Co-ordination Centre for Accident and Incident Reporting Systems : Developed by the Joint Research Centre (JRC)

website : <http://eccairsportal.jrc.ec.europa.eu/>

- Operated by BEA since 2004
- A coordinated network of national databases
- Adopted by ICAO in 2004

## 2. BEA and fields office

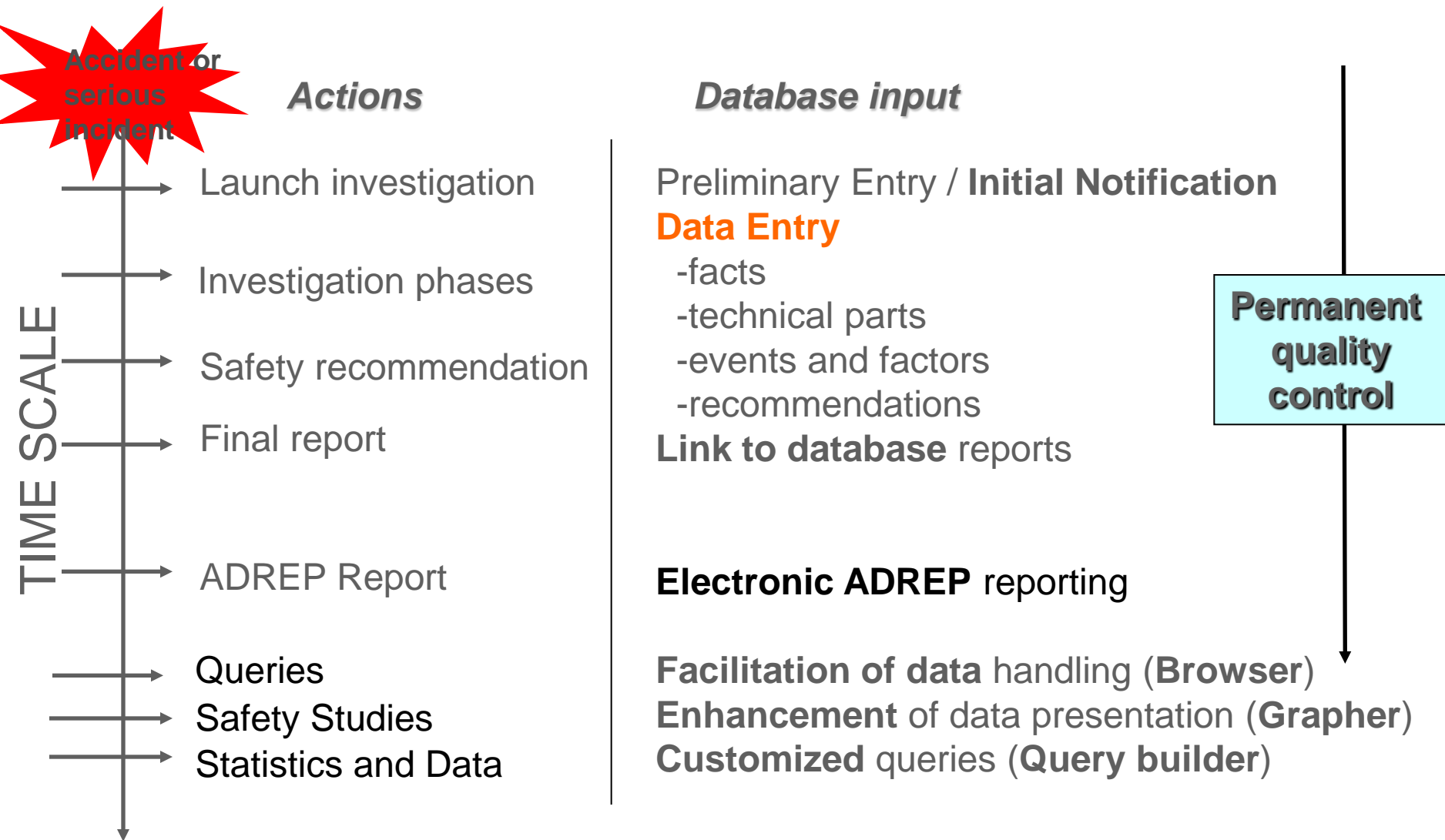
- ✓ 90 users of ECCAIRS
- ✓ Each department uses ECCAIRS
- ✓ 5 field offices
  - VPN connection



## 2. Activity at BEA

- More than 24 000 records in ECCAIRS
- About 600 records a year
- 150 reports published last year
- 1 meeting each morning
- Meeting to validate data
- Quality rules

## 2. ECCAIRS at BEA (central data source)





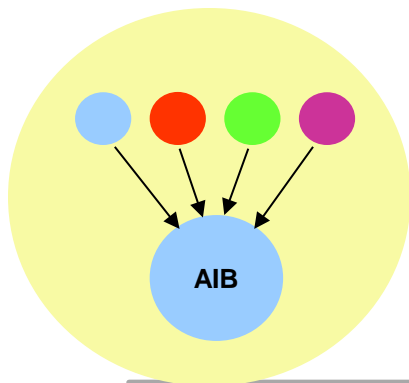
## 2. Official reportings

- ✓ Initial Notifications
- ✓ Preliminary reports
- ✓ Data reports



ECCAIRS file (E5F)

[adrep@icao.int](mailto:adrep@icao.int)



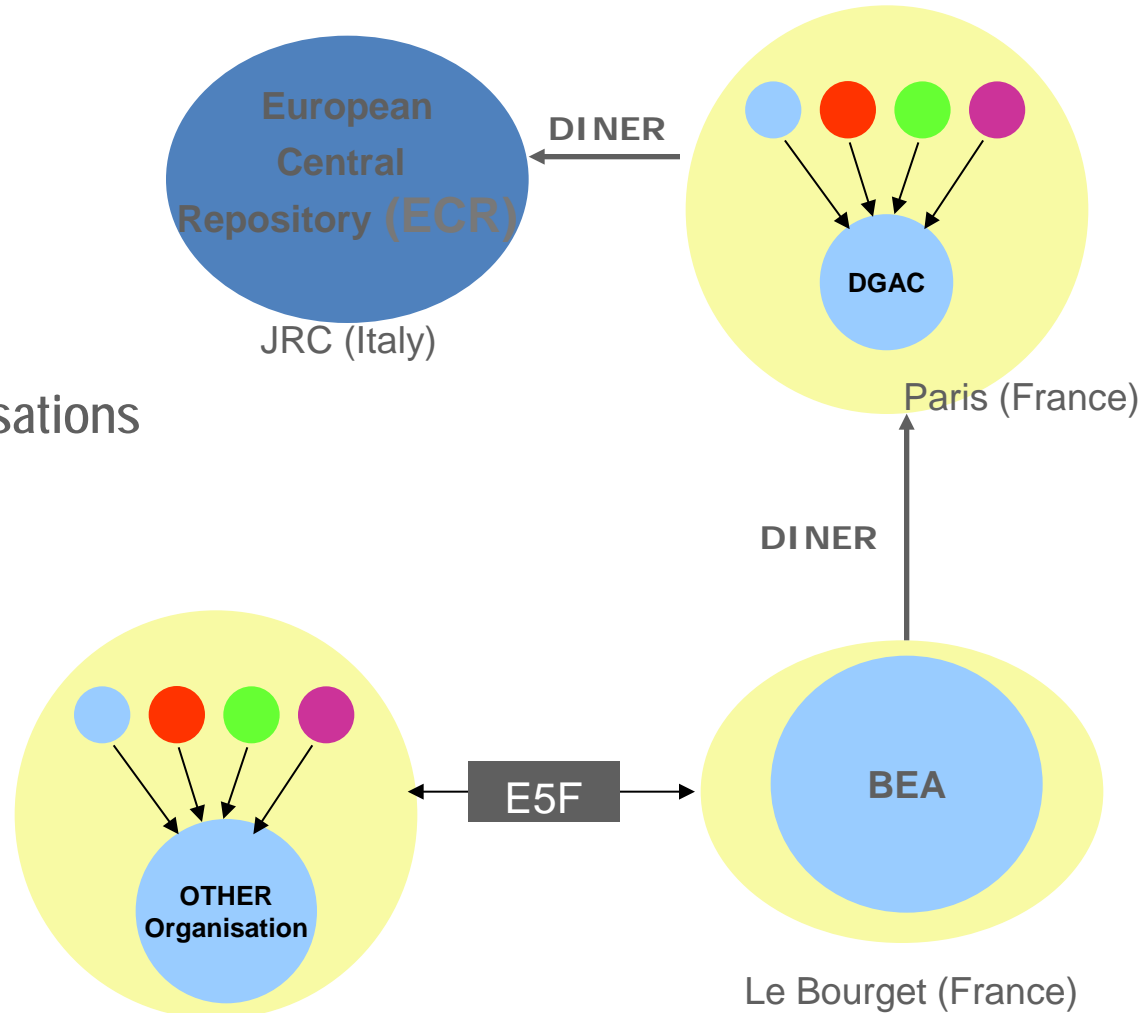
- Accidents MTOW > 2 250 kg
- Serious incidents MTOW > 5 700 kg

## 2. Data exchange

- ✓ **Coordination with DGAC**
  - Accidents, serious incidents
  - DINER application



- ✓ **Data exchange with other organisations**
  - Initial notifications
  - Final reports
  - ADREP reports

- ✓ **Data dissemination**
  - E5F files
  - Aggregated data



## 2. Relations with DGAC

- ✓ Data Coordination with DGAC is formalised in an advance arrangement
- ✓ ANNEX 2 contains ARRANGEMENTS FOR EXCHANGING SAFETY INFORMATION
- ✓ Note: This document was translated into English and is available for sharing

		Service contract BEA - DSAC	Rev. 5
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**Service contract between the Investigation and Analysis Bureau (BEA) and the Civil Aviation Safety Directorate (DSAC)**

3 May 2017

Director of the Civil Aviation Safety Directorate (DSAC) Patrick CIPRIANI: /signed/	Director of the Investigation and Analysis Bureau (BEA) Rémi JOUTY: /signed/
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The previous service contract, signed on 21 November 2014, is hereby repealed.

The contract applies as from the date of the last signature.

## 2. Data Transmitted to the DGAC

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- ✓ Preliminary Data on an occurrence subject to a French safety investigation or a foreign investigation notified to the BEA are uploaded on the BEA's website once a week and transmitted to the DGAC (DSAC)
  
- ✓ Criteria:
  - Organisation (in charge of the investigation): BEA
  - Local date (of the occurrence): As from 1 January 2005
  - Status of the case: Preliminary or Closed
  - Nature of the case: Investigation
  - Event category: Accident or serious incident or incident or

## 2. Data Transmitted to the DGAC

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### ✓ Criteria:

or

- |  |                              |
|--|------------------------------|
| • Organisation (in charge of the investigation): | BEA                          |
| • Local date (of the occurrence):                | As from 1 January 2005       |
| • Status of the case:                            | Preliminary or Closed        |
| • Nature of the case:                            | No investigation             |
| • Event category:                                | Accident or serious incident |

or

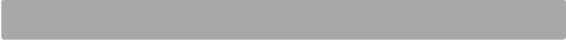
- |  |   |
|--|---|
| • Organisation (in charge of the investigation): | foreign investigation body                  |
| • Status of the case:                            | Closed                                      |
| • Nature of the case:                            | Investigation                               |
| • Occurrence category:                           | Accident or serious incident or<br>incident |

## 2. Data Transmitted to the DGAC

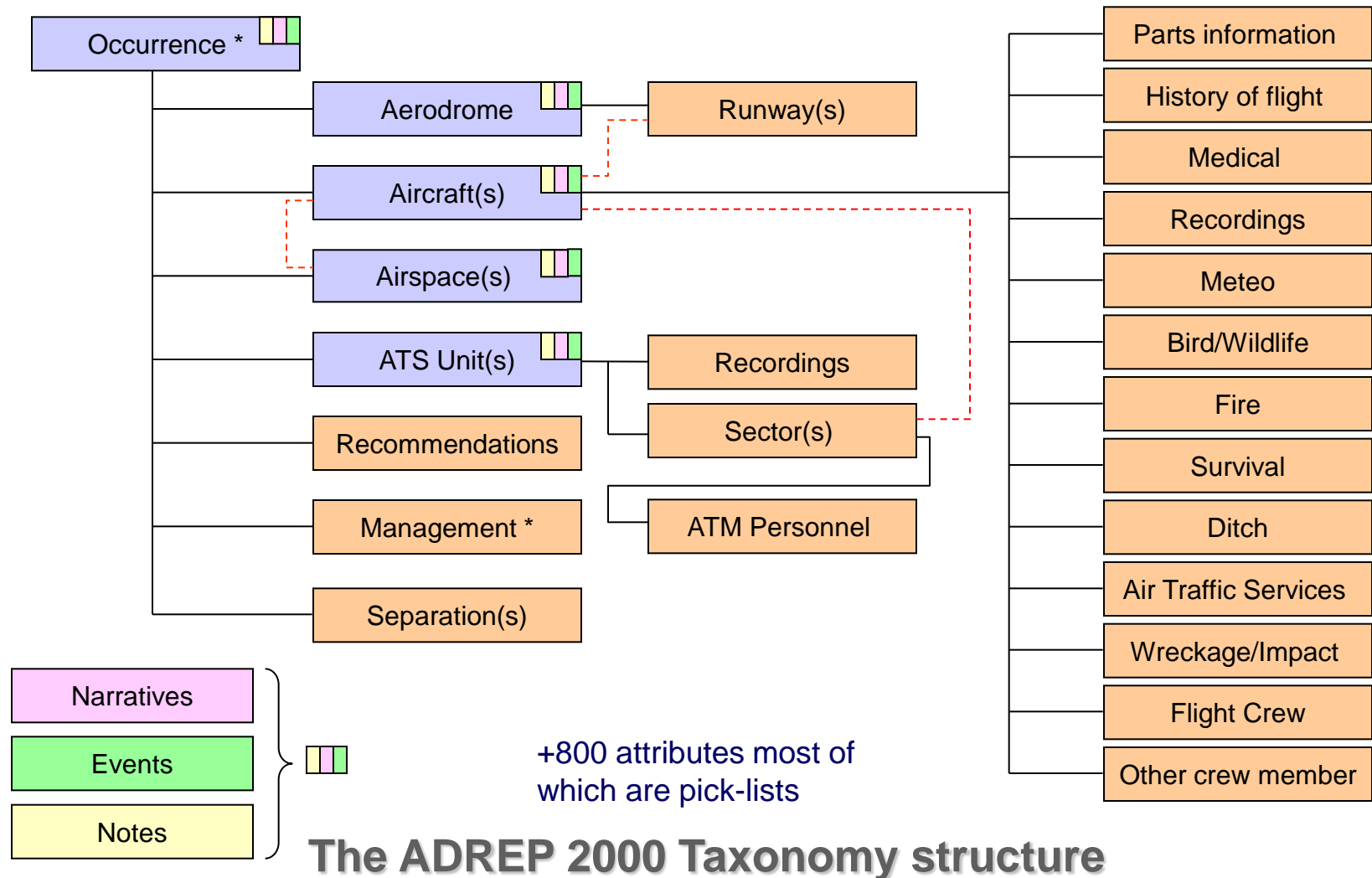
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### ✓ Fields transmitted

For all occurrences for which the BEA is in charge, all ECCAIRS fields are transmitted to the DGAC, with the exception of:

- database access, Id 382
  - date of access, Id 383
  - date of amendment, Id 422
  - case management, locked/unlocked since, Id 443
  - case management, locked/unlocked, Id 442
  - amendment of author identification, Id 421
  - amendment note, Id 423
  - note, Id 426
  - person in charge of case, Id 446
  - locked/unlocked status, Id 441
  - subject of the note, Id 608
  - type of access, Id 384
  - subject of report, Id 495
- 

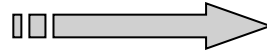
### 3. ECCAIRS architecture



### 3. ECCAIRS Dictionary

**A repository of information on the data stored in the system containing:**

ICAO  
ADREP 2000 taxonomy



Attributes

Structure, Definitions &  
Characteristics: valid values and data  
types

Attribute values

List and Definitions

**Access to the dictionary:**

- Via the dictionary browser
- Via the *browser* by putting the arrow over the attribute names or values



### 3. Access to definitions in the browser

Flight phase

En route

The occurrence took place when the aircraft was en route.

*The occurrence took place during the phase of flight from the completion of initial climb at the departure aerodrome to the completion of controlled descent to the outer marker (IFR) or (VFR) to completion of the controlled descent to the VFR pattern or 1,500 feet [450 metres] above runway end elevation, whichever comes first.*

Pop-up window appears with text of definition

Data captured:

- **Description**: short term, must fit on paper / screens, may use abbreviations
- **Detailed description**: same information but with the possibility to use more space and more details
- **Explanation**: a detailed explanation of the term, if possible giving references to the documentation where the information/definition was obtained from

### 3. The browser user interface

The screenshot displays the ECAIRS 5 Browser interface. On the left, a tree of topics is visible, including 'United States - NTSB, BEA2017-0629', 'Reports', 'Narrative (French)', 'Note (Suivi de l'enquête)', 'Weather', 'Persons on board and medical int', 'History of flight', 'Aerodrome (KANP (ANP) [ANP]Ann', and 'Management'. The main area shows an 'Information window' for aircraft identification and description. The bottom section displays a 'List of occurrences' table.

Local date	Aircraft registration	Investigation scope	Responsible entity	Occurrence status	Occurrence moderator	Occurrence class	Injury level	Highest Damage	Head
10/11/2017	N207GT	Full (Annex 13) type investigation	United States - NTSB	Preliminary	ERL	Accident	None	Substantial	Dimin.
08/11/2017	HA-LWK	Full (Annex 13) type investigation	Bosnia and Herzegovina - AIB	Initial notification	JFR	Serious incident	None	Minor	Pompe
14/11/2017	578MY	Full (Annex 13) type investigation	France - BEA	Preliminary	INCO	Accident	Fatal	Destroyed	Perte
12/11/2017	RA-07210	Full (Annex 13) type investigation	Russian Federation - CAA	Preliminary	ERL	Serious incident	None	Minor	Atterr
13/10/2017	VT-3HE	No investigation	India	Initial notification	BEA	Serious incident	None	Unknown	Ouver
28/10/2017	CUA44H	Full (Annex 13) type investigation	Morocco - AIB	Preliminary	ERL	Serious incident	None	Unknown	Heurt
26/10/2017	XC-LHU	Full (Annex 13) type investigation	Mexico - CAA	Preliminary	ERL	Serious incident	None	Unknown	Collis
15/11/2017	F-GTLL	Full (Annex 13) type investigation	France - BEA	Preliminary	SEB	Accident	None	Substantial	Rétra
15/11/2017	F-GNIE	Full (Annex 13) type investigation	France - BEA	Preliminary	TOY	Serious incident	None	Minor	Collis
15/11/2017	9M-SSZ	Full (Annex 13) type investigation	Malaysia - AIB	Preliminary	ERL	Accident	None	Substantial	Atterr
13/11/2017	F-GOPE	Desk investigation				Incident	None	None	Décler
11/11/2017	JAS31H	No investigation				Serious incident	None	None	Risqu
16/11/2017	HL9170	Full (Annex 13) type investigation				Accident	Fatal	Destroyed	Collis
17/11/2017	988IJ	No investigation				Accident	None	Substantial	Perte
17/11/2017	EC-HQJ	Full (Annex 13) type investigation	France - BEA	Preliminary	DLR	Serious incident	Minor	None	Incap
12/11/2017	XA-VLK	Full (Annex 13) type investigation	Mexico - CAA	Preliminary	ZBS	Serious incident	None	Unknown	Blocag
17/11/2017	G-JAMM	Full (Annex 13) type investigation	United Kingdom - AAIB	Preliminary	GTS	Accident	Fatal	Destroyed	Collis
14/11/2017	LV-CSF	Full (Annex 13) type investigation	Mexico - CAA	Preliminary	ERL	Serious incident	None	None	Détec

- ✓ User-friendly tool
- ✓ Browser for reading, editing
- ✓ Check-list for an investigation

### 3. Enter Base Data



- Administrative & background data

- File Number

- State & Reporting Organisation

- Report Source & Report Status

- Time & Space

- Date and Time

- State of Occurrence

- Location (name or region)

- Severity levels

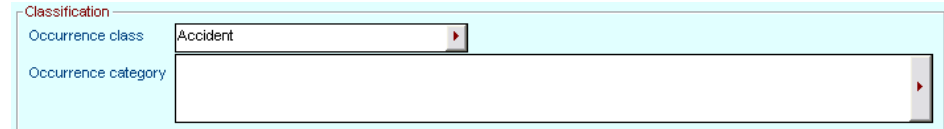
- Aircraft damage

- Injury level

### 3. Occurrence Classification

- **Occurrence class (Annex 13)**

- Accident, serious incident, incident



A screenshot of a software interface for selecting an occurrence class. It features a light blue header bar with the text 'Classification'. Below this, there are two labels: 'Occurrence class' and 'Occurrence category'. The 'Occurrence class' label is followed by a dropdown menu that currently displays 'Accident'. The 'Occurrence category' label is followed by a larger, empty dropdown menu.

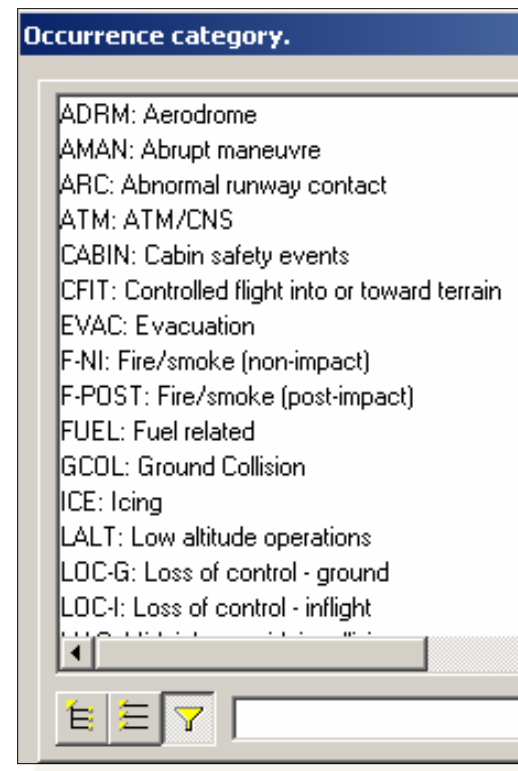
- **Occurrence category (CAST/ICAO)**

- List and definitions provided by the Common Taxonomy Team
- One or more possible

- **ATM contribution**

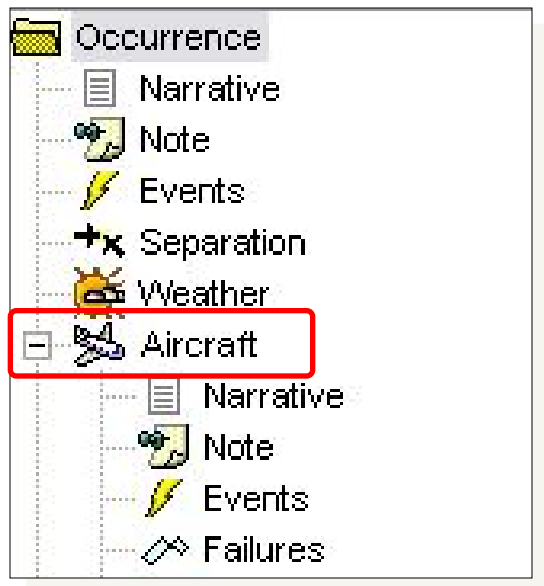
- Required for Eurocontrol reporting

- Events, phases of flight, descriptive factors, explanatory factors (will be described later)



A screenshot of a software interface titled 'Occurrence category.' in a blue header bar. Below the header is a list of occurrence categories, each with a three-letter code followed by a description: ADRM: Aerodrome, AMAN: Abrupt manoeuvre, ARC: Abnormal runway contact, ATM: ATM/CNS, CABIN: Cabin safety events, CFIT: Controlled flight into or toward terrain, EVAC: Evacuation, F-NI: Fire/smoke (non-impact), F-POST: Fire/smoke (post-impact), FUEL: Fuel related, GCOL: Ground Collision, ICE: Icing, LALT: Low altitude operations, LOC-G: Loss of control - ground, LOC-I: Loss of control - inflight. At the bottom of the list is a horizontal scrollbar. Below the list are three buttons: a magnifying glass icon, a list icon, and a funnel icon, followed by a text input field.

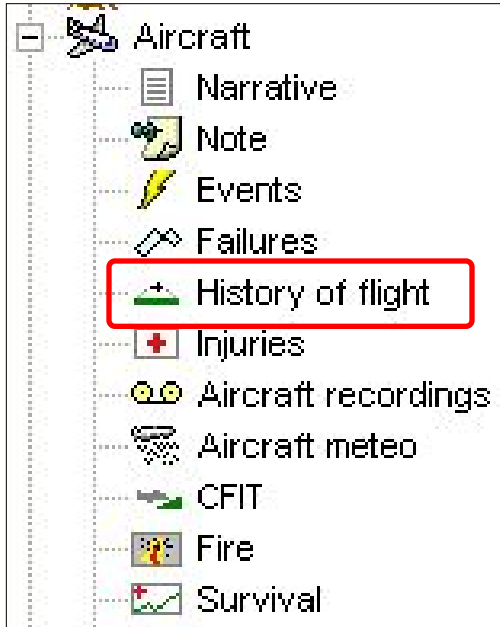
### 3. Add aircraft



- Registration
- Manufacturer / model
- Aircraft characteristics\*
  - Aircraft category
  - Number of engines
  - Propulsion type
  - Mass group
  - Landing gear type
- Type of operation
  - At least top level (Commercial, GA, Aerial work,...)
  - For operation type GA / Aerial work also enter Operator Type

Aircraft identification	
Manufacturer/model	<input type="text"/>
Year built	<input type="text"/>
Aircraft serial number	<input type="text"/>
State of registry	<input type="text"/>
Aircraft registration	<input type="text"/>
Call sign	<input type="text"/>
Flight number	<input type="text"/>

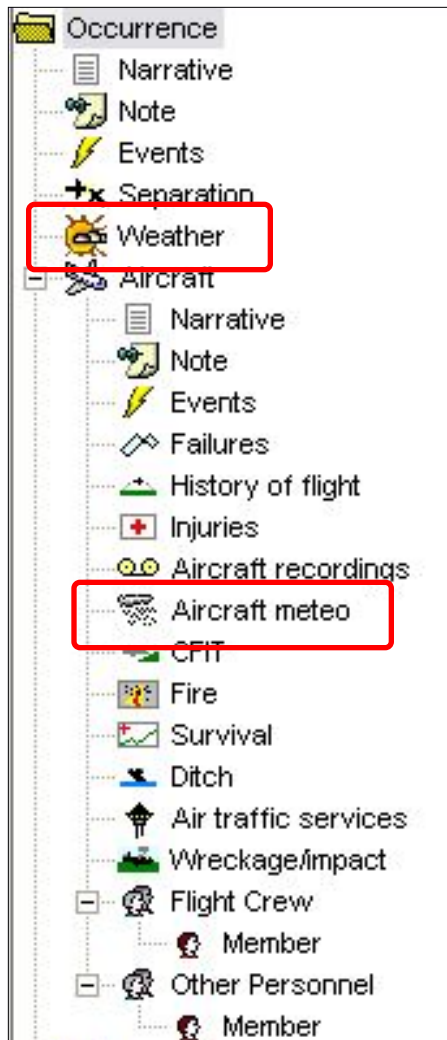
### 3. History of flight



- Itinerary
- Flight phase  
Use the one related to the event that defines the occurrence
- Occurrence on ground ?
- Approach / landing information
- Information on person at controls
- Information on flight plan

Itinerary			
Last departure point	<input type="text"/>	Flight phase	<input type="text"/>
Planned destination	<input type="text"/>	Duration of flight	<input type="text"/> Minute(s)
		Occ. on ground	<input type="text"/>

### 3. Weather



- Weather in general
  - Conditions for the area
  - Under the occurrence
- Aircraft meteo
  - Briefing
  - Winds
  - Visibility
  - Specific phenomena
    - icing, turbulence, wind shear, mountain wave

Turbulence	
Turbulence type	<input type="text"/>
Turbulence intensity	<input type="text"/>

### 3. Parts / component failures / engine / propeller



- When such failures can be established, record

Name of parts

Part numbers

- In any case, if available

Engine data (make/model, hours cycles)

Propeller data (make/model)

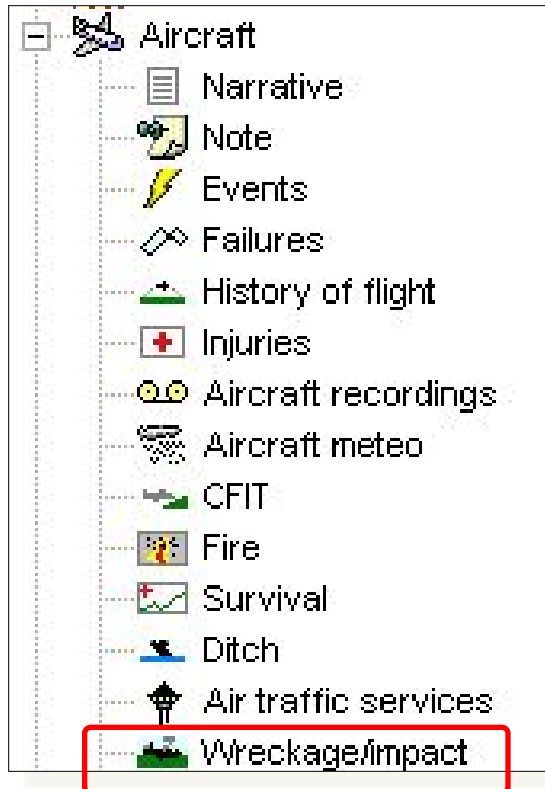
Engine information		
Engine model	Time since overhaul	Engine cycles

Propeller information	
Make, failed propeller	Model, failed propeller

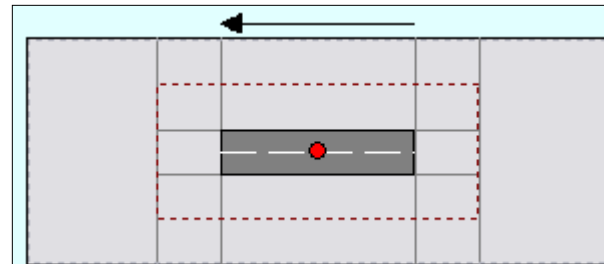


### 3. Wreckage and impact information



- Position of the wreckage  
In relation to the aerodrome
- Description of the terrain  
For example mountainous, water, etc.
- Details on the impact  
Speed  
Attitude  
Impact angle

**\* Position of aircraft or of wreckage**



### 3. Personnel information



#### ■ Information on

- Rest and duty time
- Experience
  - On type
  - All aircraft
- License/Ratings

#### ■ Both for Flight Crew and Other Personnel

Flight crew experience			
	Last 24 hours	Last 90 days	Total
This Aircraft type	<input type="text"/> Hour(s)	<input type="text"/> Hour(s)	<input type="text"/> Hour(s)
All types	<input type="text"/> Hour(s)	<input type="text"/> Hour(s)	<input type="text"/> Hour(s)

### 3. Injuries

#### ■ Injuries – persons on board

Injuries page under the aircraft

Severity of the injuries

Injuries by causes

Information on autopsies



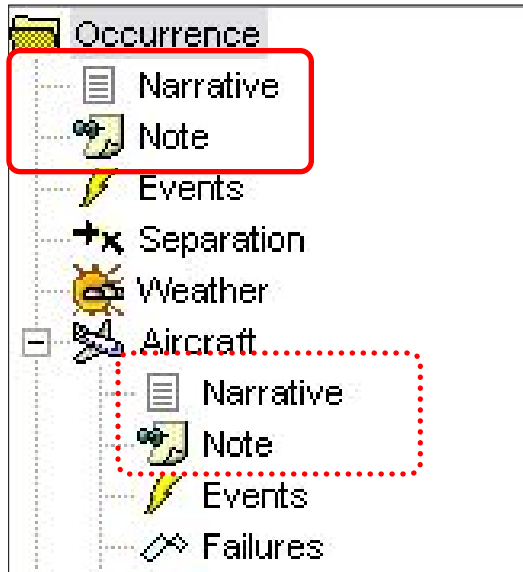
#### ■ Totals are on the front page (under occurrence)

To be used for injuries on ground

Total on aircraft is calculated from Injuries on aircraft

Injury totals						
	Fatal	Serious	Minor	None	Unknown	Total
Total on ground						
Total on aircraft						
Grand total						

### 3. Narratives and notes



- Narrative\*

Includes factual information, analysis and conclusions  
With indication of the language used

- Note

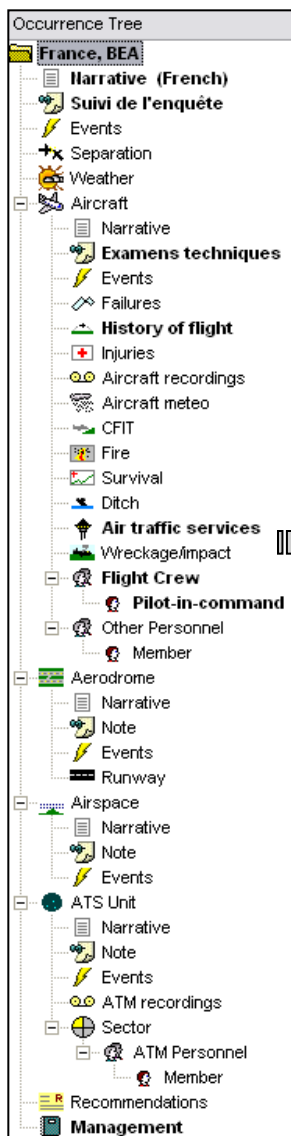
To be used for comments or complementary information (not to be placed in the narrative)  
With indication of the subject

- Narratives and notes are multiple instances

Different languages or subjects  
Located at different places in the occurrence tree

\* **Headline may be used also to enter a short description of the occurrence**

### 3. What kind of other information to collect?



**If the WEATHER was relevant, enter**

Details on meteorological conditions

**If there were INJURIES to persons**

Complete the injury details

**If the occurrence involved an AERODROME, enter**

Aerodrome data

**If the occurrence involved a RUNWAY, enter**

Runway data

**If the occurrence involved a RUNWAY EXCURSION, enter**

Runway data

Position where aircraft came to rest in relation to the runway used

**If the occurrence involved an AIRPROX or SEPARATION issues**

Provide basic data on all aircraft involved

Complete separation page with the details at hand (e.g. TCAS information)

**If the occurrence involved EVACUATIONS**

Provide evacuation details

**If the occurrence involved a FIRE / SMOKE ON BOARD an aircraft**

Provide information on aircraft fire warning and protection systems

**If the occurrence involved a FIRE ON or close to an AERODROME**

Provide information on aerodrome fire fighting efforts

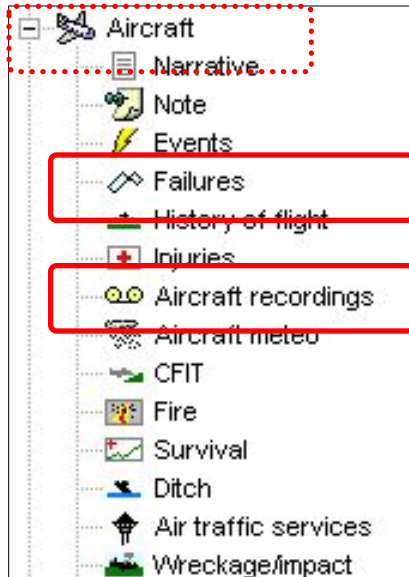
**If the occurrence involved an ATS UNIT, enter**

Details on the ATS unit

Workload data only if workload issues are involved

Functioning of warning systems (e.g. STCA)

### 3. Example: Technical data



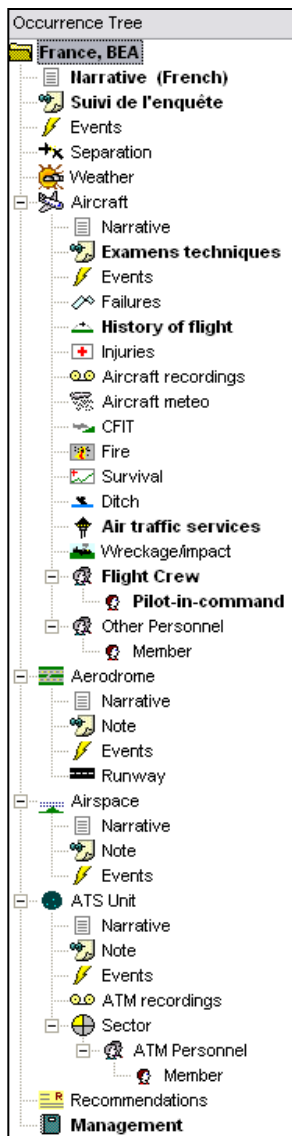
- Parts / components failures
  - Name of parts
  - Part numbers
  - More details is captured in the events section
- Recordings section
  - FDR/CVR
- In any case, if available
  - Engine data (make/model, hours cycles)
  - Propeller data (make/model)

Engine information		
Engine model	Time since overhaul	Engine cycles

Propeller information	
Make, failed propeller	Model, failed propeller

### 3. In Summary



- Depends on each occurrence  
Fire, CFIT, Separation, Runway excursion, Evacuation, ATS involved...
- Capture relevant information for future analysis and safety studies
- Align with the sections of the final report (Part 1)
- General rule  
Attributes left blank (no entry) indicate that the data was not entered.  
The information may or may not be available  
Attributes with contents "Unknown" indicate that the information requested was not available even though an effort may have been made to find it
- Finally, the topics tree represents the extent of the investigation if the 'Show all nodes' option is not checked

## Two data categories

### - Factual data

- Start with preliminary view
- Add information using more detailed views
- Topics tree can serve as a “check list”
- Sections of the final report
- Data entry procedure and guidelines for data collection

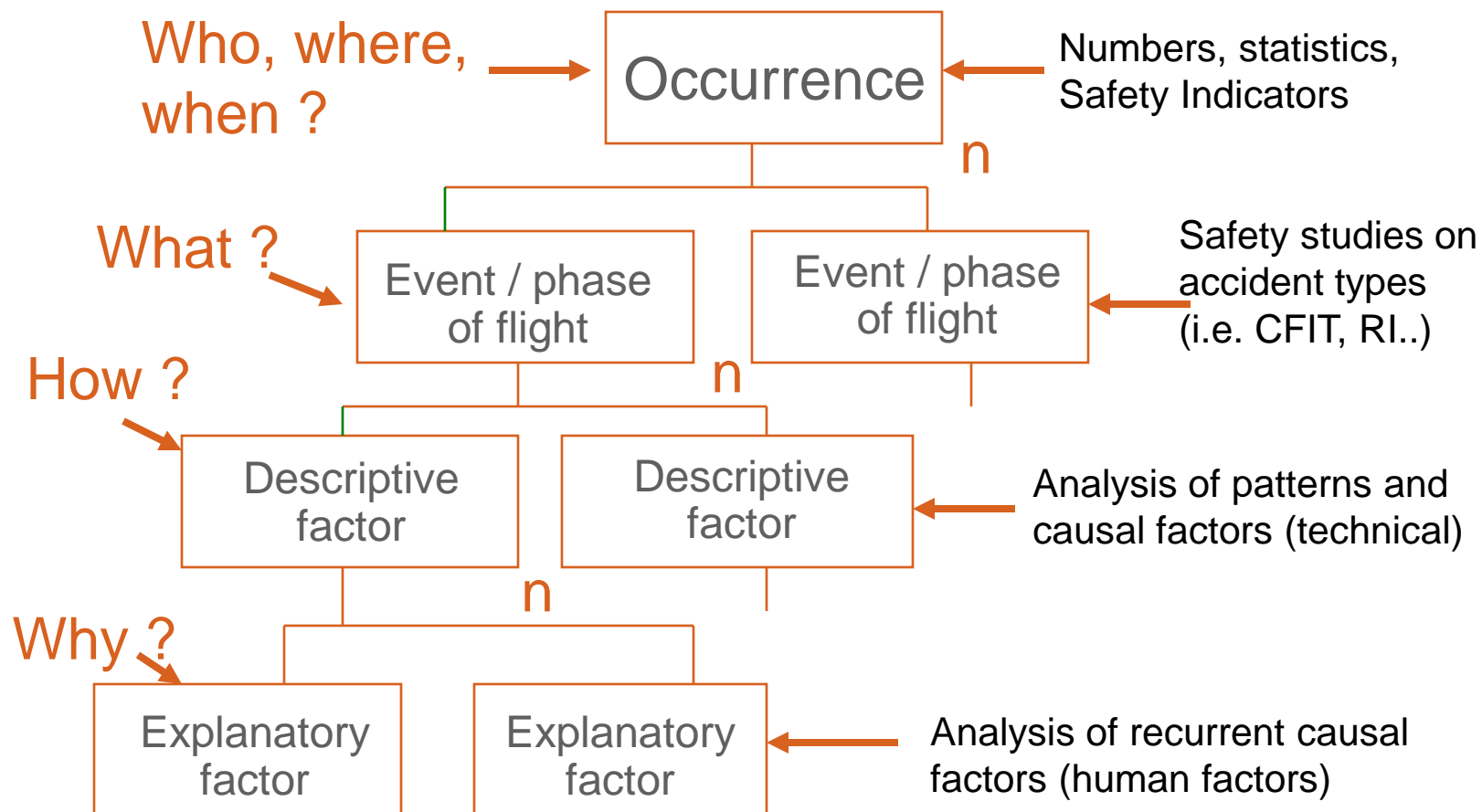
### – Analysed data

- Section events and factors
- Potential factors and safety issues
- Recommendations

➤ Proposed encoding approach



### 3. Coding structure



## 4. ECCAIRS tools

### ■ Reporting System

Repository manager

Taxnomy Browser

Browser

Exporter (DM)

Data Exchanger (DM)

Grapher

Manage views, users and theirs access

Access to the definitions of the taxonomy

Data entry and retrieval

Data extraction and reporting

Data Saving / Loading

Charting

### ■ Related tools

RefXAC / RefXAD

WebDAS

AWB

Dexter

Batchelor (DM)

Registration / Loc. Indicator database

Web based access

Aggregation analysis and reporting

Data Entry Forms Designer

Execute jobs all at one time

### ■ Supporting tools

DINER

MEPHISTO / T-REX

Data Integration Network

Data conversion platform

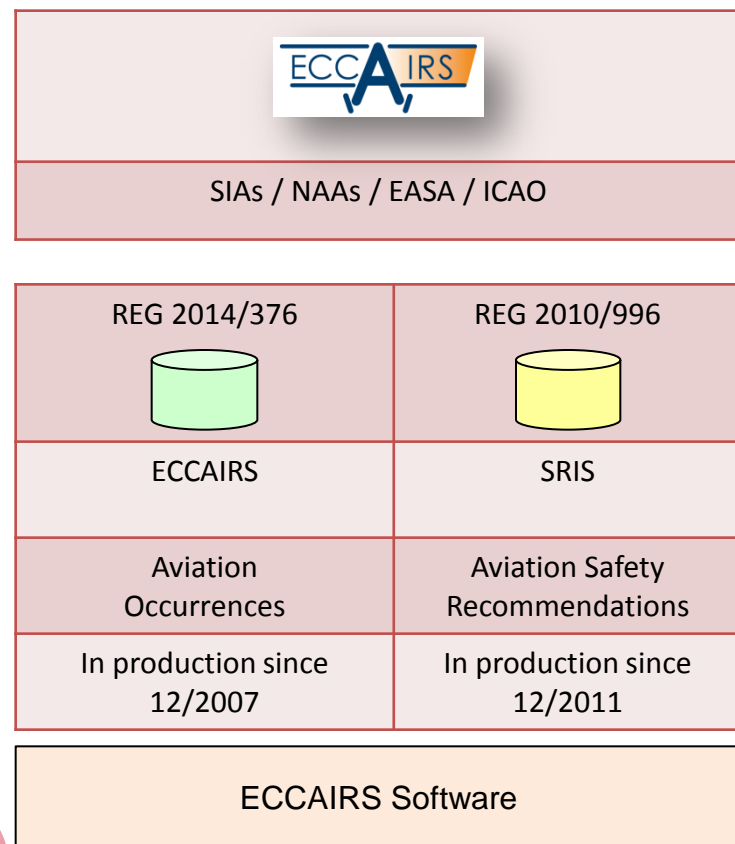
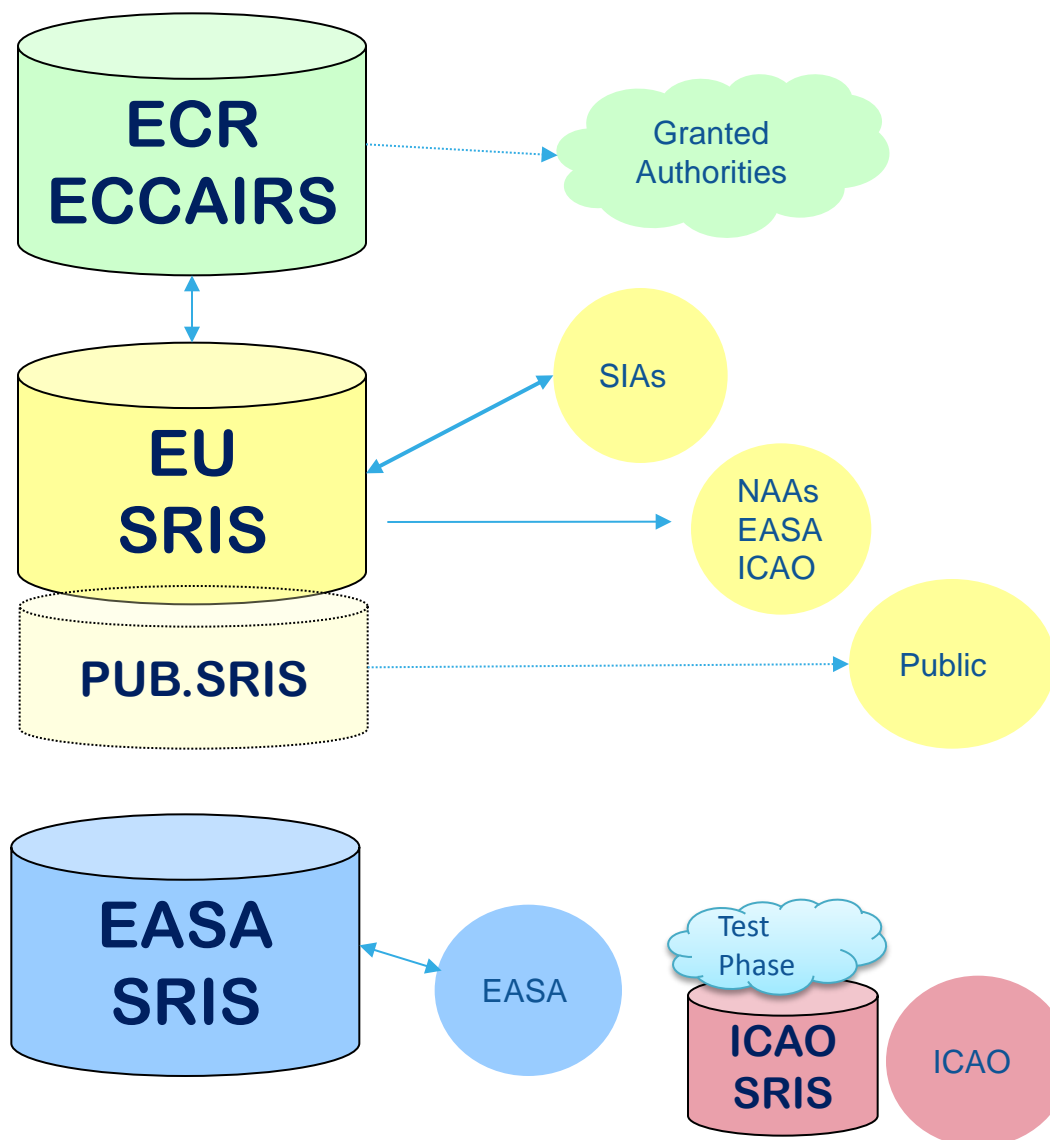
## 4. BEA internal developments

- ✓ **Customization**
  - ✓ Sections, views
  - ✓ Dictionaries
- ✓ **Data extraction**
  - ✓ Weekly reports (template)
  - ✓ Notification form (template)
  - ✓ Other templates
- ✓ **Add-ins**
  - ✓ State file number generation
  - ✓ Web Search Engine (AD, Registration, Aircraft/Engine taxonomies...)
  - ✓ Web map
- ✓ **Linking other systems** (Web services API)
  - ✓ BEA website
  - ✓ LISE

## 5. Future enhancements

- ✓ ECCAIRS 2.0
  - ✓ Central Database
  - ✓ Web-based
  - ✓ Focus on the Core functionalities
  - ✓ Open source technology
  - ✓ ...

# 6. Overview (Introduction to SRIS)





Thank you

[www.bea.aero](http://www.bea.aero)