Example Application of Aviation Safety Information System (AVSiS)

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Preface

This example application has been prepared by AvSoft Limited in conjunction with the Global Aviation Information Network (GAIN) Working Group B (Analytical Methods and Tools) (WGB) as one of a number of such examples of the use of analytical methods and tools described in the "*Guide to Methods & Tools for Airline Flight Safety Analysis*". The intent of these example applications is to illustrate how various tools can be applied within an airline flight safety department, and provide additional information on the use and features of the tool and the value of such analysis. GAIN WG B hopes that these example applications will help increase the awareness of available methods and tools and assist the airlines as they consider which tools to incorporate into their flight safety analysis activities.

Each example application of an analytical method or tool is posted on the GAIN website (*www.GAINweb.org*). Readers are encouraged to check the website periodically for a current list of example applications, as further examples will be added as they become available.

AVSiS

1 Introduction

1.1 OVERVIEW OF THE APPLICATION

AVSiS has been in use with a number of the world's airlines for many years now, during this time it has continued to grow and develop as AvSoft respond to customers' requests and suggestions. AVSiS enables Flight Safety Officers to log all safety related incidents, manage investigations and subsequently monitor trends and recurring events.

When a safety related incident has taken place, the reporter (e.g. the Captain) files an Air Safety Report (ASR) detailing the incident, his actions, then any consequences such as unscheduled landing, injuries, delays etc. These reports are passed to the safety officer and the report details are then entered into AVSiS.

(Note: AVSiS 2, will soon enable electronic reporting.)

The report is inputted directly into AVSiS by the Flight Safety Office staff. There is no need to format or edit the data. Simply input all the facts into the system. Much of the data is stored in special fields, which makes sorting and viewing the data much easier later. For example there are boxes into which users can input the speed and altitude, while many of the selections are from drop-down lists to promote consistency. Users can also add free text descriptions of the event.

There are five special events which, if selected, provide additional data capture forms. These five events types are: Birdstike, TCAS/Airprox, Dangerous Goods, GPWS and Wake Turbulence.

This system is of greater benefit to airlines than simply filing the paper reports as it allows for easy review of past incidents, providing a log of all reported incidents which can be sorted, filtered and viewed in a number of ways. Reports and queries can be run to quickly analyze the data and spot trends or reoccurring events.

There are two levels of analysis: logging, categorizing and analyzing the single reported event and analysis of historical trends.

These analyses may be carried out in three ways: (a) Using the grid view, users may filter, sort and review events in a list (Figure 1, below shows the main AVSiS screen including the grid view). (b) Using the standard reports, events may be filtered and shown graphically or as text. (c) Using the AVSiS Query Builder the user can filter and display on any fields including attachments.

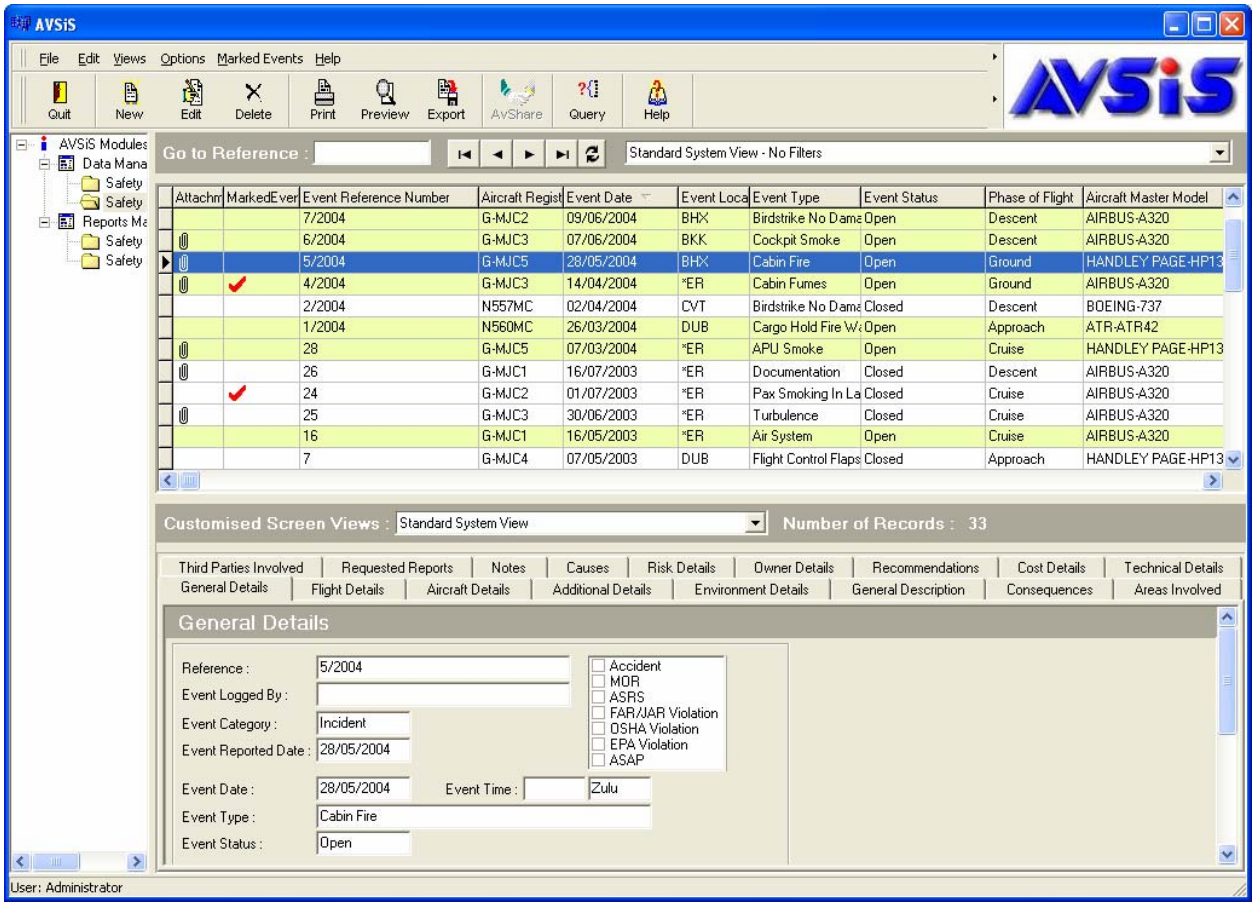


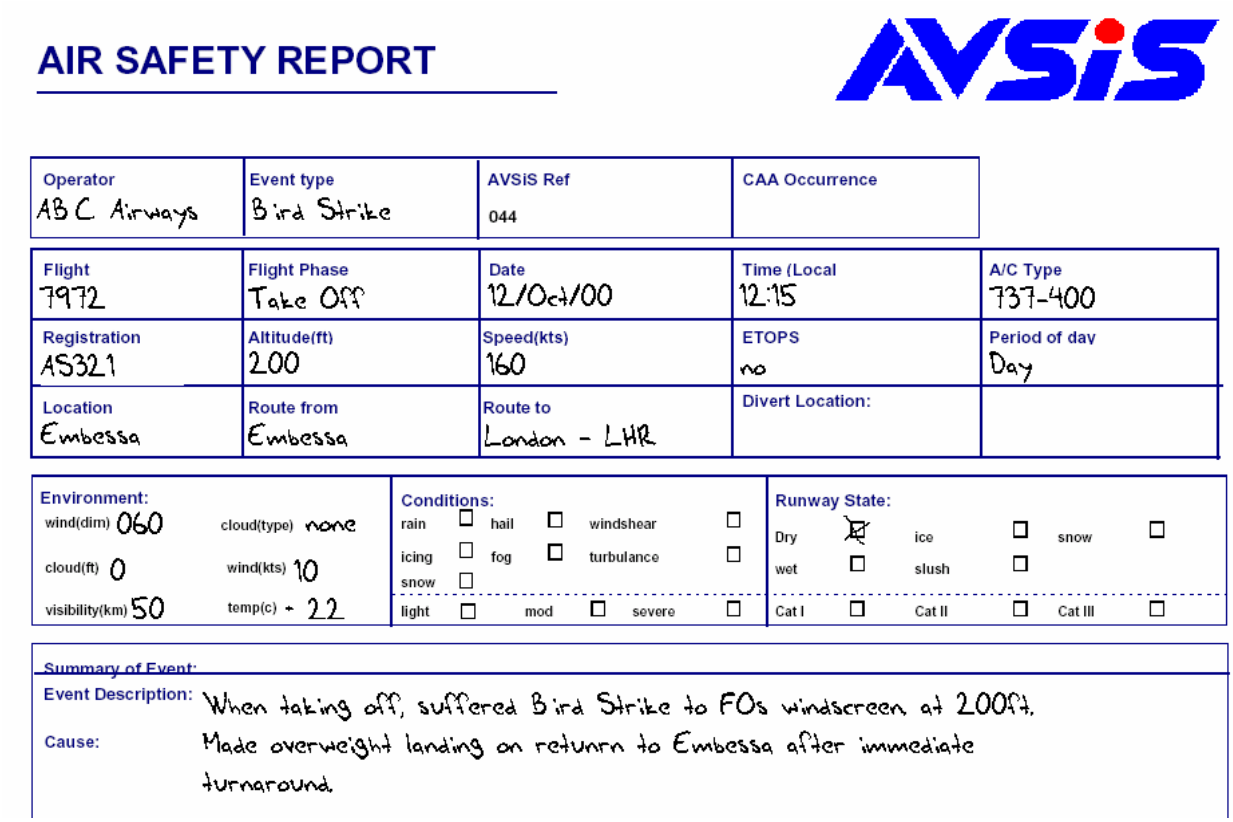
Figure 1 **AVSiS Main Screen (Grid View)**

1.2 INTRODUCTION TO THE EXAMPLE APPLICATION

This example illustrates the use of AVSiS through a typical event reported to the Flight Safety Officer, involving a bird strike at a foreign airport. In this example, the important things for the crew to note in the ASR would be the location of the event, time and date, weather conditions, speed, and altitude.

2 Input Data

Figure 2 shows part of the ASR for the example incident.



AIR SAFETY REPORT

AVSiS

Operator	Event type	AVSiS Ref	CAA Occurrence
ABC Airways	Bird Strike	044	

Flight	Flight Phase	Date	Time (Local	A/C Type
7972	Take Off	12/Oct/00	12:15	737-400
Registration	**Altitude(ft)**	**Speed(kts)**	**ETOPS**	**Period of day**
AS321	200	160	no	Day
Location	**Route from**	**Route to**	**Divert Location:**	
Embessa	Embessa	London - LHR		

Environment:
wind(dim) 060 cloud(type) none
cloud(ft) 0 wind(kts) 10
visibility(km) 50 temp(c) - 22

Conditions:
rain ☐ hail ☐ windshear ☐
icing ☐ fog ☐ turbulance ☐
snow ☐
light ☐ mod ☐ severe ☐

Runway State:
Dry ☒ ice ☐ snow ☐
wet ☐ slush ☐
Cat I ☐ Cat II ☐ Cat III ☐

Summary of Event:
Event Description: When taking off, suffered Bird Strike to FOs windscreen at 200ft.
Cause: Made overweight landing on return to Embessa after immediate turnaround.

Figure 2 **Air Safety Report**

This data entered into AVSiS using a series of input forms. The screen shot below, see figure 3, shows the general details page of the input form. As you can see, there are fields for most details, including Event Date, Event Type and Location amongst others. By inputting this data into these specific fields it enables easier sorting, filtering and analysis of the data during later stages.

The use of pop-ups and standard, internationally recognized lists, such as IATA/ICAO location identifiers, helps to promote consistency and virtually eliminates issues caused by conflicting spelling/wordings of similar events by different users.

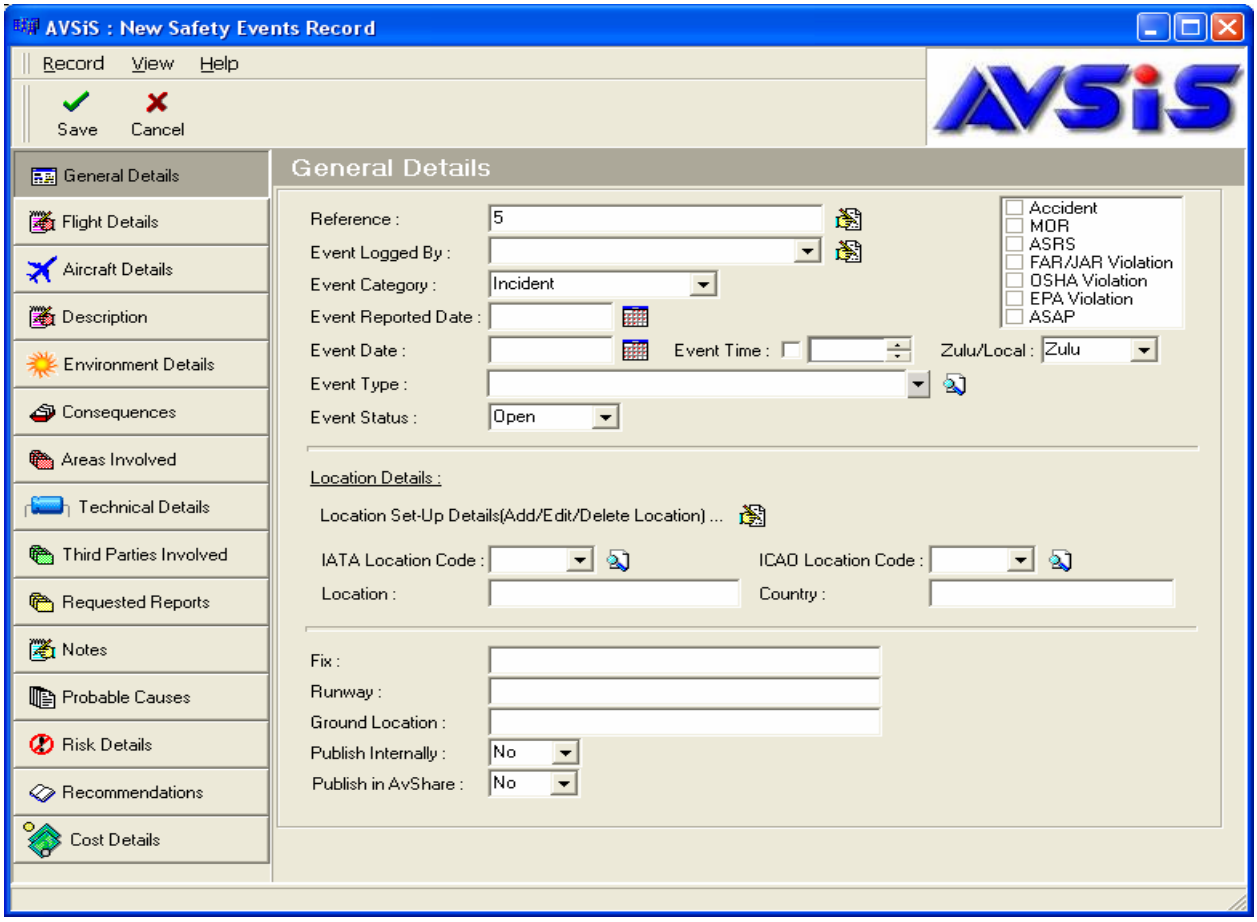


Figure 3

3 Tool Output and Application of the Results of Analysis

The first way of viewing and analysing the data is by the grid view, as shown below in figure 4. There are 4 standard views provided with the system, however the software has been designed from the outset to allow users to create and customise their own views, showing only the fields and records they are interested in.

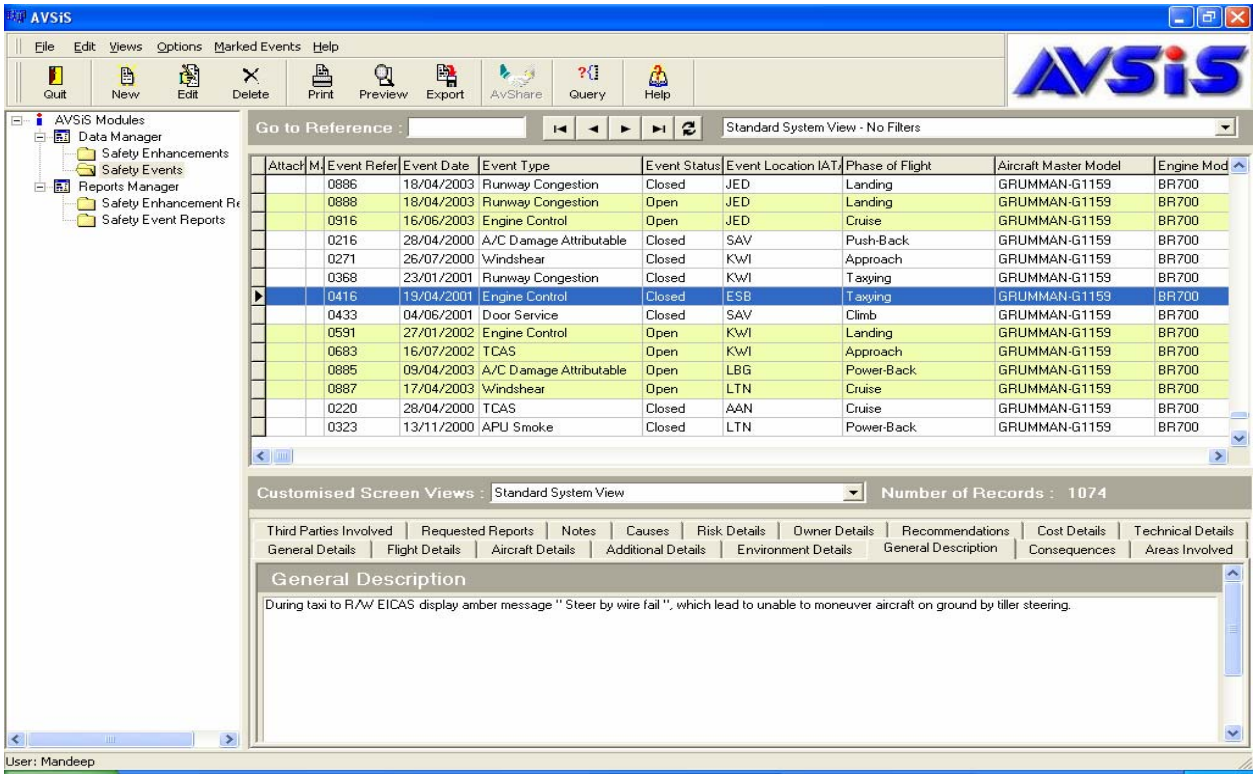


Figure 4

Figure 5 shows the screen to define the grid views. Here you can clearly see the four standard system views, together with two customized views created by the user 'Mandeep.' One of which clearly tells us it contains the standard fields (as in figure 4) yet is filtered to only show Bird Strike events. This view type is 'Local' which means it is only available to 'Mandeep' when he is logged into the system.

The second customized view, again shows the standard fields yet this time is filtered to only show events which have been classified as high risk within the system. This view is 'Public' which means it is available to all users.

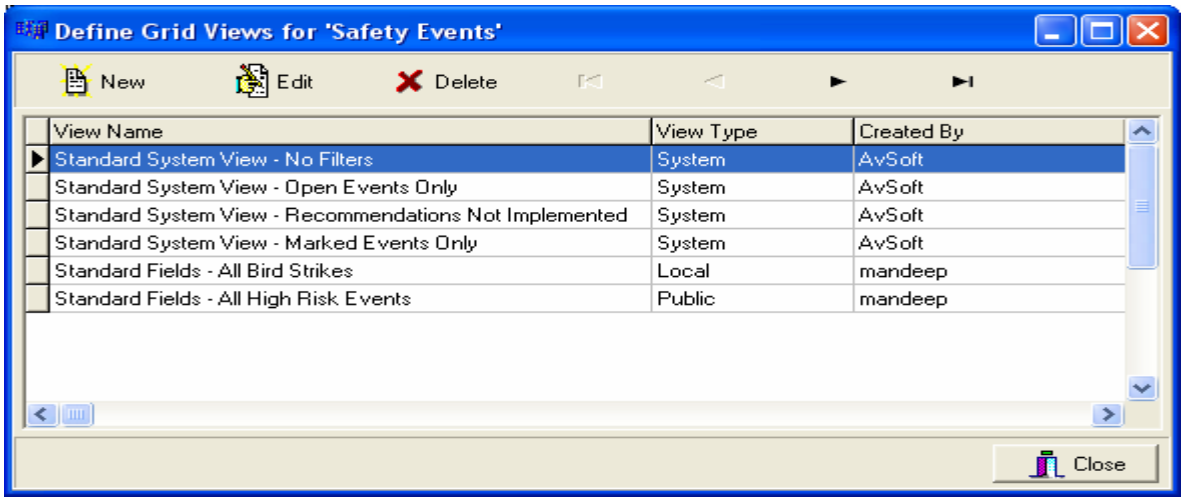
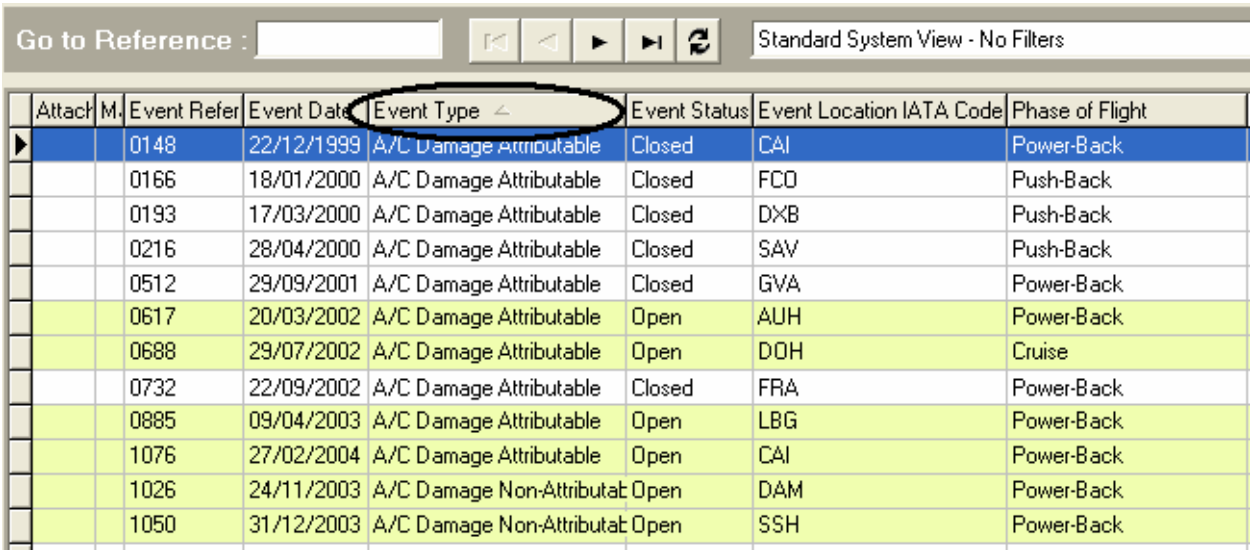


Figure 5

When in the grid view, you can change the sort order by simply clicking on the field heading as shown in figure 6, which has been sorted on Event Type alphabetically. This view can also be changed by clicking and dragging the fields to different positions.



Attach	M.	Event Refer	Event Date	Event Type	Event Status	Event Location IATA Code	Phase of Flight
		0148	22/12/1999	A/C Damage Attributable	Closed	CAI	Power-Back
		0166	18/01/2000	A/C Damage Attributable	Closed	FCO	Push-Back
		0193	17/03/2000	A/C Damage Attributable	Closed	DXB	Push-Back
		0216	28/04/2000	A/C Damage Attributable	Closed	SAV	Push-Back
		0512	29/09/2001	A/C Damage Attributable	Closed	GVA	Power-Back
		0617	20/03/2002	A/C Damage Attributable	Open	AUH	Power-Back
		0688	29/07/2002	A/C Damage Attributable	Open	DOH	Cruise
		0732	22/09/2002	A/C Damage Attributable	Closed	FRA	Power-Back
		0885	09/04/2003	A/C Damage Attributable	Open	LBG	Power-Back
		1076	27/02/2004	A/C Damage Attributable	Open	CAI	Power-Back
		1026	24/11/2003	A/C Damage Non-Attributat	Open	DAM	Power-Back
		1050	31/12/2003	A/C Damage Non-Attributat	Open	SSH	Power-Back

Figure 6

The second way of viewing the data is by the standard reports as shown in Figure 7. The option highlighted 'Incident By Event Type' produces a bar chart listing all the differing types of events that have been recorded, ranked by the number of occurrences of each, as shown in Figure 8.

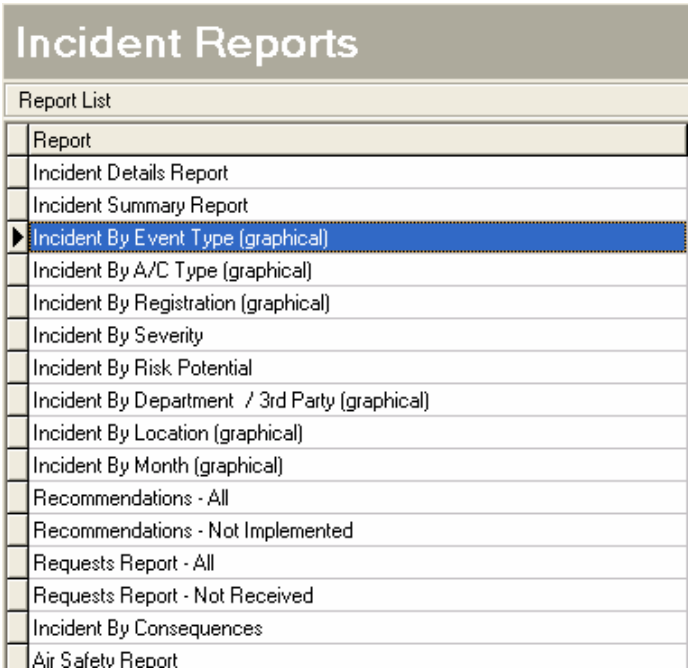


Figure 7

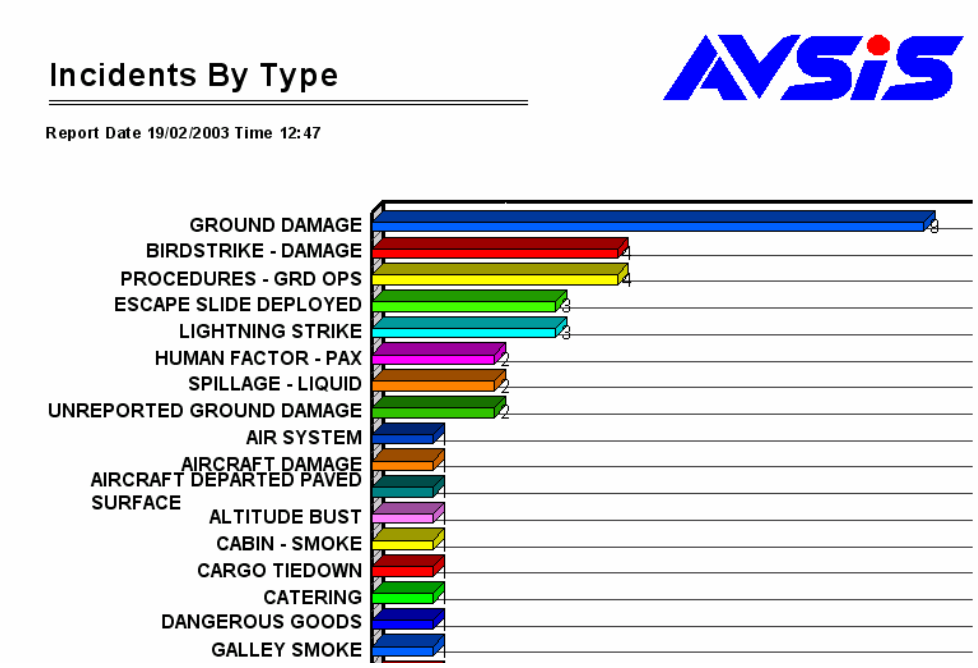
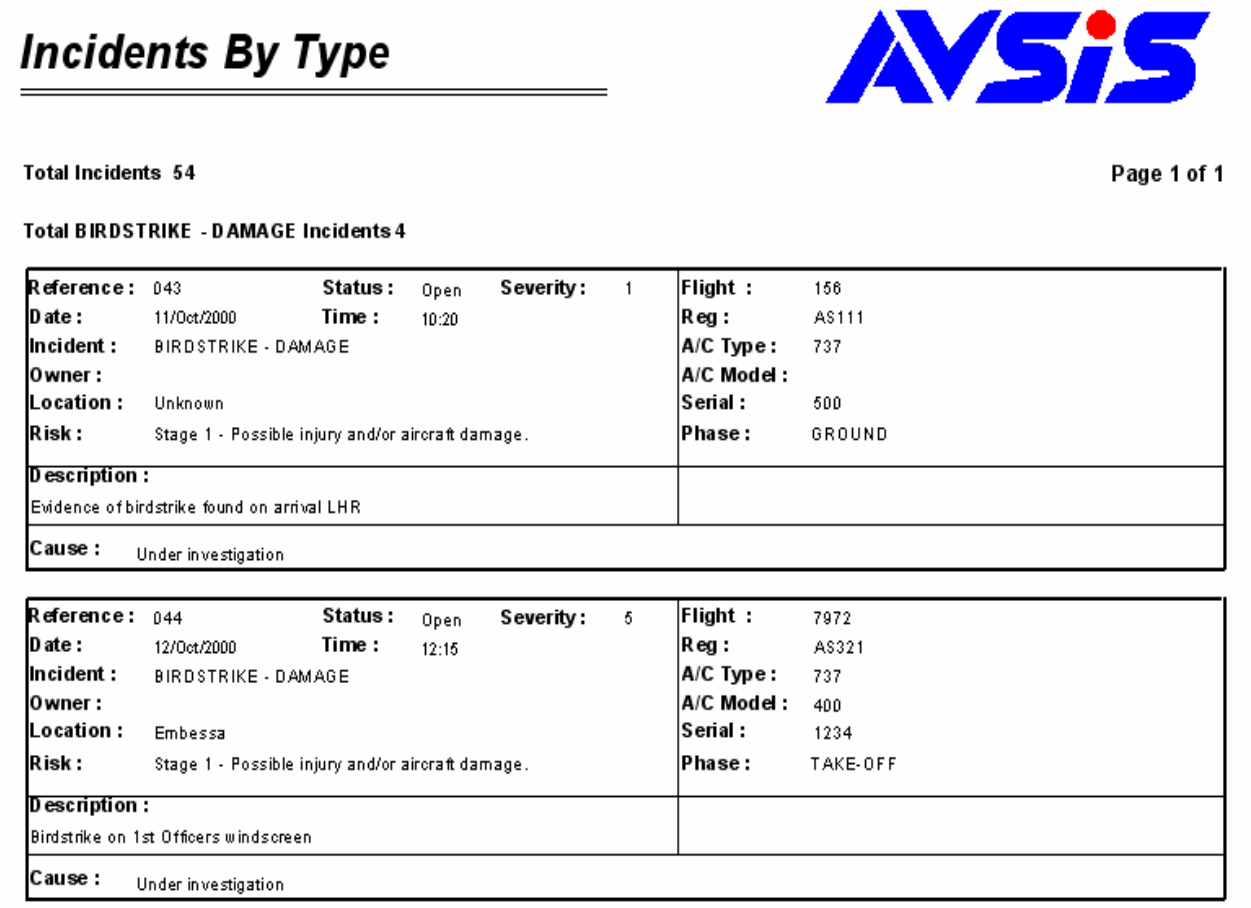


Figure 8

Other reports are available to view reports in more detail, as shown in Figure 9. It is then easy to review these and look for common threads between them, such as a high number of birdstrikes occur at one airport, or at a certain time of day.



Incidents By Type

Total Incidents 54 **Page 1 of 1**

Total BIRDSTRIKE - DAMAGE Incidents 4

Reference :	043	**Status :**	Open	**Severity :**	1	**Flight :**	156
Date :	11/Oct/2000	**Time :**	10:20			**Reg :**	AS111
Incident :	BIRDSTRIKE - DAMAGE					**A/C Type :**	737
Owner :						**A/C Model :**	
Location :	Unknown					**Serial :**	500
Risk :	Stage 1 - Possible injury and/or aircraft damage.					**Phase :**	GROUND
Description : Evidence of birdstrike found on arrival LHR							
Cause :	Under investigation						

Reference :	044	**Status :**	Open	**Severity :**	5	**Flight :**	7972
Date :	12/Oct/2000	**Time :**	12:15			**Reg :**	AS321
Incident :	BIRDSTRIKE - DAMAGE					**A/C Type :**	737
Owner :						**A/C Model :**	400
Location :	Embessa					**Serial :**	1234
Risk :	Stage 1 - Possible injury and/or aircraft damage.					**Phase :**	TAKE-OFF
Description : Birdstrike on 1st Officers windscreen							
Cause :	Under investigation						

Figure 9

Without a computerized system that the safety officer can easily view and manipulate, it would take a long time to go through the paper reports looking for similar events. The speed and simplicity of the system enables the FSO to spot trends quickly and focus on seeing that action is taken. Similarly, the FSO could filter viewing the ground damage events and see whether they mainly happen at one or two airfields.

The third and final way of viewing the data is by the AVSiS Query Builder, as shown in figure 10. All the fields in the system are listed down the left hand side, under their groupings. By clicking on the three tabs at the top of the right hand side of the screen, you can customize the result to meet your exact requirements. Firstly it is used to select the fields you want in the final query i.e. the column headings you want in the final report, the filter you wish to apply i.e. to restrict the records. Rather than view the whole dataset you can filter to only show particular types of records, for example ‘Open Events’ only. Lastly you can specify the sort order of the report, i.e. you can set-up the report to be in Date order, or Event Reference Number order etc.

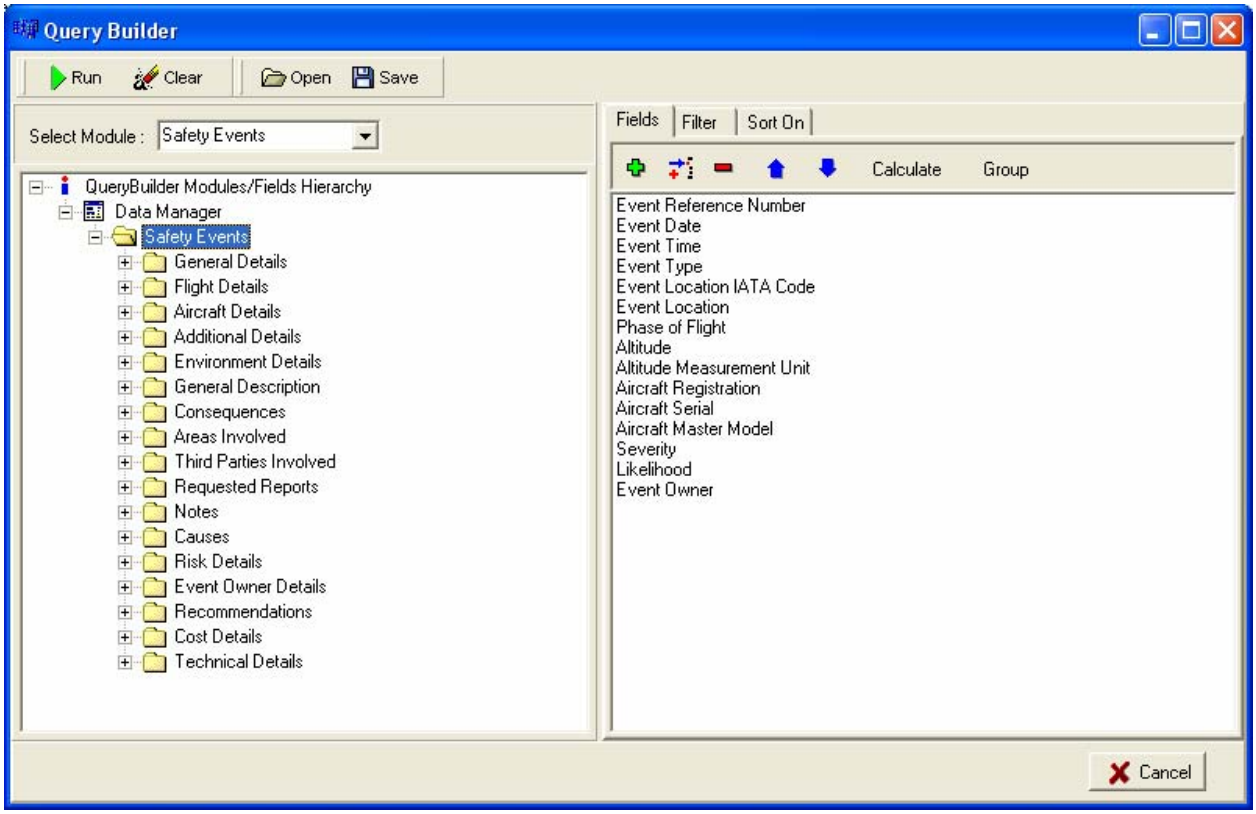
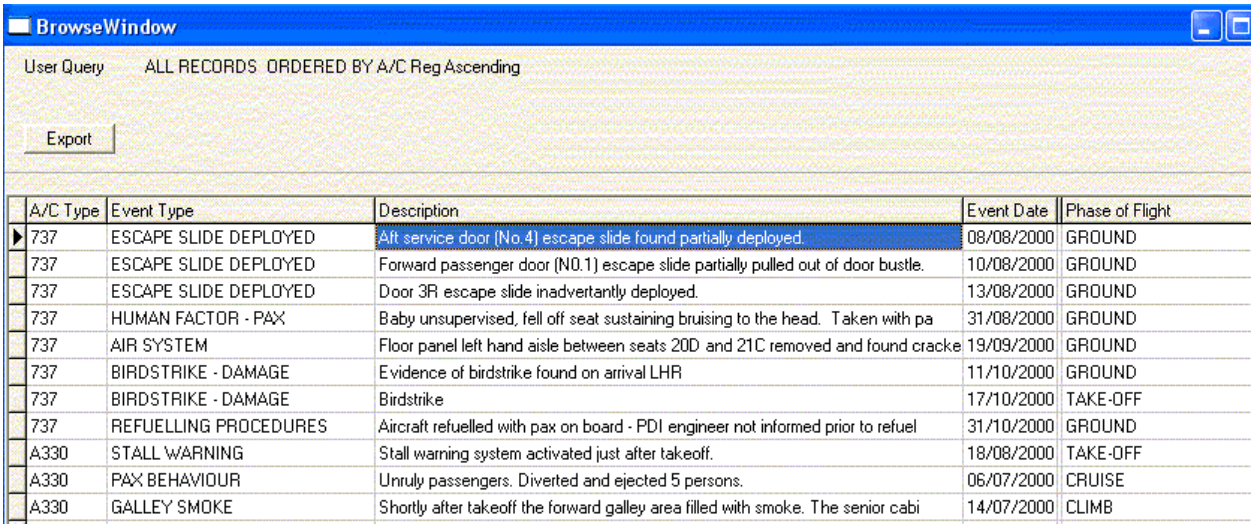


Figure 10 **AVSiS Query Builder**

Once the user has made the desired selections, clicking on 'RUN' causes the query to be processed and the results displayed, as shown in Figure 11.



A/C Type	Event Type	Description	Event Date	Phase of Flight
737	ESCAPE SLIDE DEPLOYED	Aft service door (No.4) escape slide found partially deployed.	08/08/2000	GROUND
737	ESCAPE SLIDE DEPLOYED	Forward passenger door (NO.1) escape slide partially pulled out of door bustle.	10/08/2000	GROUND
737	ESCAPE SLIDE DEPLOYED	Door 3R escape slide inadvertantly deployed.	13/08/2000	GROUND
737	HUMAN FACTOR - PAX	Baby unsupervised, fell off seat sustaining bruising to the head. Taken with pa	31/08/2000	GROUND
737	AIR SYSTEM	Floor panel left hand aisle between seats 20D and 21C removed and found cracke	19/09/2000	GROUND
737	BIRDSTRIKE - DAMAGE	Evidence of birdstrike found on arrival LHR	11/10/2000	GROUND
737	BIRDSTRIKE - DAMAGE	Birdstrike	17/10/2000	TAKE-OFF
737	REFUELLING PROCEDURES	Aircraft refuelled with pax on board - PDI engineer not informed prior to refuel	31/10/2000	GROUND
A330	STALL WARNING	Stall warning system activated just after takeoff.	18/08/2000	TAKE-OFF
A330	PAX BEHAVIOUR	Unruly passengers. Diverted and ejected 5 persons.	06/07/2000	CRUISE
A330	GALLEY SMOKE	Shortly after takeoff the forward galley area filled with smoke. The senior cabi	14/07/2000	CLIMB

Figure 11

The data for the selected records shown on the screen can be exported to create graphs or charts in other programs. Queries can also be saved and rerun at regular intervals to help notice trends and recognize reoccurring events. Query Builder can also be used to create groupings on certain fields, when used in

conjunction with the 'COUNT' function, displays data at the summary level. For example, figures 12 and 13 show summary reports. Figure 12 shows a simple listing of event types together with how many times they've happened to this fictional airline. It clearly shows that weather, ATC, and Birdstrikes are the major issues that affect this airline. Figure 13 shows which aircraft types have the most occurrences.

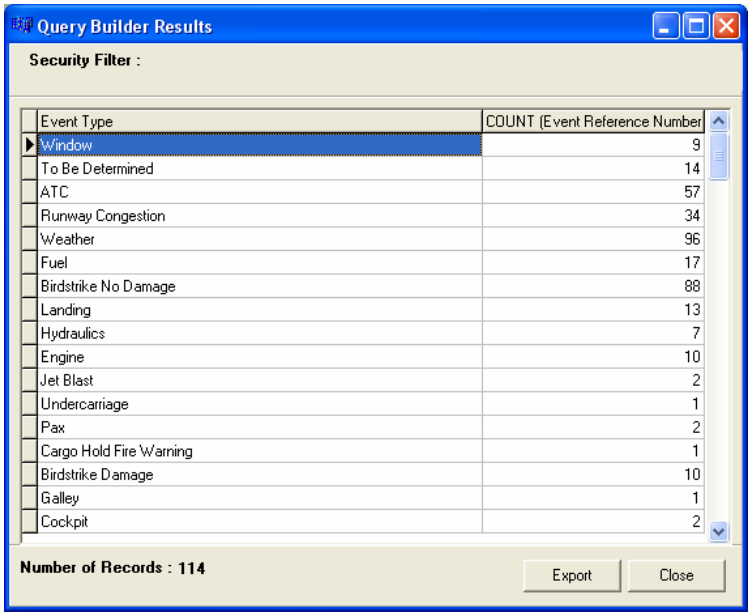


Figure 12 **Summary Report**

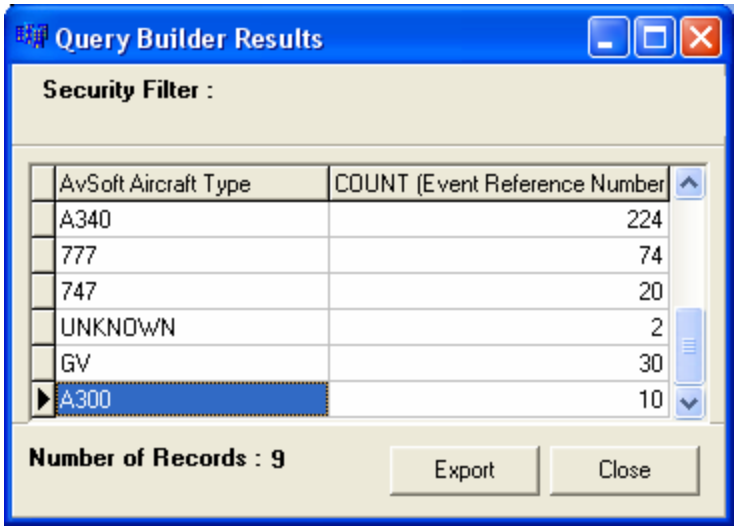


Figure 13 **Summary Report**