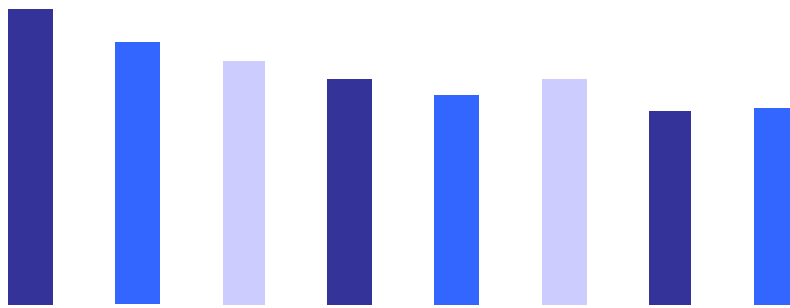




Statistical Summary Aviation Occurrences 2005



Foreword

This document provides users of Canadian aviation safety data with an annual summary of selected statistics on aviation occurrences. Information in this summary is also posted on the Transportation Safety Board of Canada (TSB) web site at www.tsb.gc.ca.

Users of these statistics are advised that, in a live database, the occurrence data are constantly being updated. Consequently, the statistics can change slightly over time. Further, as many occurrences are not formally investigated, information recorded on some occurrences may not have been verified. Therefore, caution should be used when using these statistics. The 2005 statistics presented here reflect the TSB database updated as of 30 March 2006.

To enhance awareness and increase the safety value of the material presented in the TSB *Statistical Summary, Aviation Occurrences 2005*, readers are encouraged to copy or reprint the data presented, in whole or in part, for further distribution (with acknowledgements of the source).

The TSB is an independent agency operating under its own Act of Parliament. Its sole aim is the advancement of transportation safety.

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Cat. No. TU1-3/2005
ISBN 0-662-49087-8

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AVIATION OCCURRENCES IN 2005

ACCIDENTS

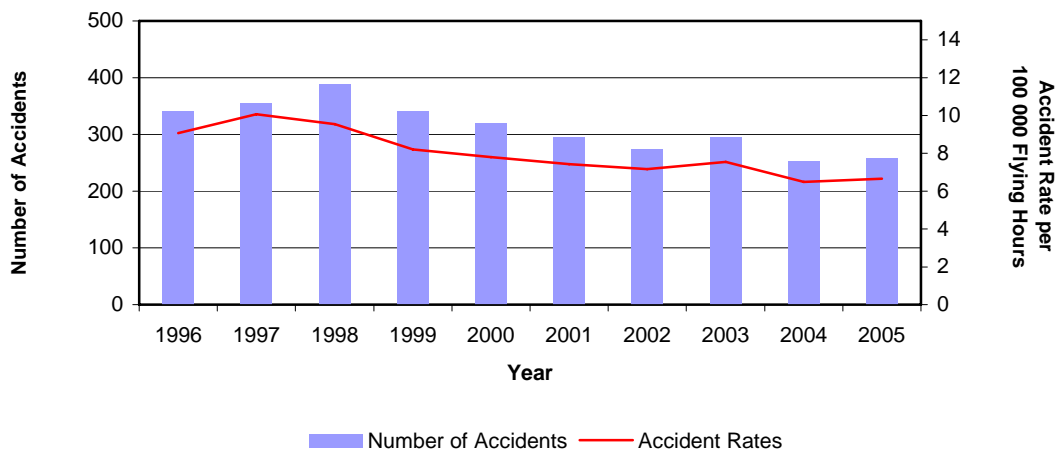
Overview of Accidents and Fatalities (Tables 1, 2, 3 and 8)

In 2005, a total of 306 aviation accidents were reported to the TSB. Of this number, which excludes ultralights, 258 involved Canadian-registered aircraft, an increase of 2% from 2004 (Figure 1).

As flying activity has been comparable to last year, the accident rate is estimated to have increased from 6.5 accidents per 100 000 flying hours in 2004 to 6.7 in 2005. Statistical analysis using linear regression indicates a significant downward trend ($p < .001$)¹ in accident rates over the past 10 years.

The 258 accidents involving Canadian-registered aircraft (excluding ultralights) included 205 aeroplanes² (58 of which were commercially operated) and 50 helicopters. The remaining 8 were either balloons, gliders or gyrocopters.

Figure 1 – Accidents and Accident Rates,³ 1996–2005



¹ It is agreed by convention that, for a result to be considered statistically significant, its probability must be lower than 1 in 20 (that is, $p < .05$).

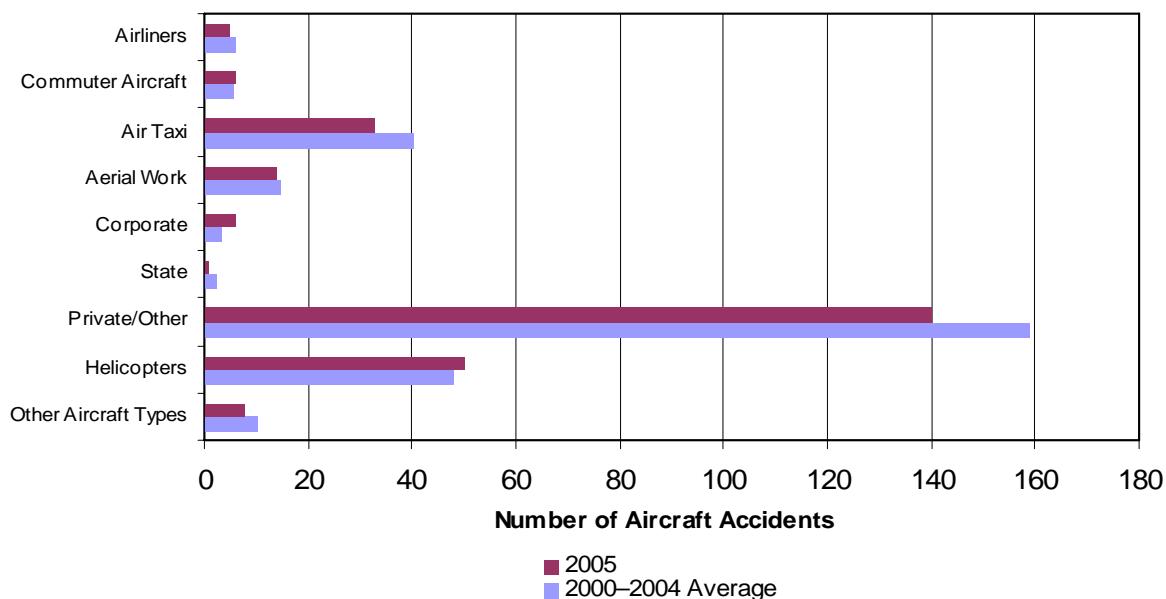
² As some occurrences involve more than one aircraft, users are cautioned to note differences between the number of occurrences and the number of aircraft involved in occurrences. All tables except Table 1 exclude ultralight aircraft; all tables except tables 1 and 4 also exclude balloons, gliders and gyrocopters.

³ Canadian-registered aircraft (excluding ultralights)

Of the 58 commercial aeroplanes (5 airliners, 6 commuter aircraft, 33 air taxi and 14 aerial work) involved in accidents in 2005 (Figure 2), 1 commuter aircraft, 6 air taxi aircraft and 2 aerial work aircraft were involved in fatal accidents. There were no fatal accidents involving airliners.

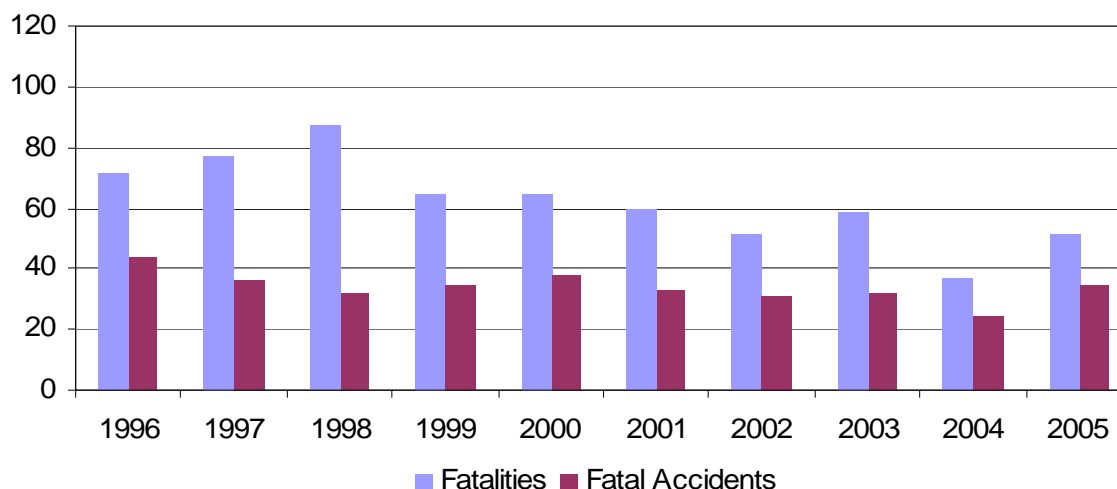
A total of 140 private aeroplanes were involved in accidents, 12% lower than the five-year average of 159. In 2005, 13 such accidents resulted in fatalities, down from 15 in 2004 and the five-year average of 17.

Figure 2—Canadian-Registered Aircraft Involved in Accidents by Aircraft Type, 2005



In 2005, Canadian-registered aircraft, excluding ultralights, were involved in 34 fatal accidents⁴ (Figure 3), 42% higher than last year's total of 24 and 6% higher than the 2000–2004 average of 32. The number of fatalities and serious injuries (51 and 37 respectively) decreased by 6% and 8% respectively from the five-year average (54 and 40 respectively). Passenger fatalities accounted for 36% of aeroplane fatalities in 2005, and crew member fatalities accounted for 64% (excluding fatalities from ultralight, glider, balloon or gyrocopter accidents).

Figure 3 – Fatalities and Fatal Accidents, 1996–2005



Aeroplanes operated by the state (that is, operated by federal or provincial governments) were involved in 1 accident in 2005 with no fatalities.

In 2005, there were 50 helicopter accidents, up slightly from the five-year average of 48. Of the 50 helicopter accidents, 10 were fatal, resulting in 15 fatalities. Over the past 10 years, the highest proportion of helicopter accidents occurred during air transport operations (28%) and training (13%).

In 2005, 30 ultralight aircraft and 18 foreign-registered aircraft were involved in accidents in Canada. Of the accidents involving ultralight aircraft, 5 resulted in 6 fatalities, which is slightly fewer than in previous years. Of the accidents involving foreign-registered aircraft, 6 resulted in 10 fatalities.

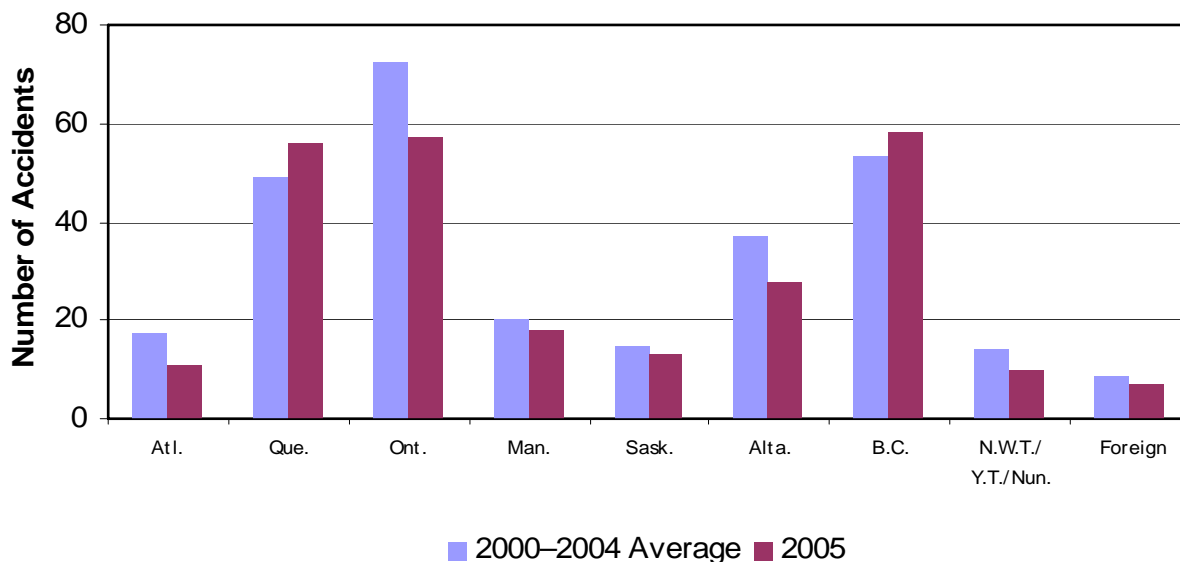
⁴

One of the 34 fatal accidents involved a glider and one involved a gyroplane.

Accidents by Selected Categories

Province (Table 4): In 2005, Quebec, Ontario and British Columbia accounted for two-thirds of Canadian-registered aircraft accidents, with 22% in each. Canadian-registered aircraft accidents were lower than the five-year average in all provinces and territories except Quebec and British Columbia, which showed a 15% and 9% increase, respectively. The Atlantic provinces, Ontario and Alberta showed a 37%, 21% and 24% decrease respectively (Figure 4).

Figure 4 – Canadian-Registered Aircraft Involved in Accidents by Province, 2005



Events and Phases (Tables 5 to 7): Accidents are frequently classified according to the first event (or abnormal condition) in the sequence of events that led to the occurrence. This classification serves to demonstrate the nature and distribution of safety-significant events, and how these events shift over time. However, the first event should not be construed to be the cause of the accident.

In 2005, the most common first event in aeroplane accidents was a take-off/landing event (17%). Power loss (16%), control loss (12%) and collision with terrain (10%) were the next most common first events. In helicopter accidents, collision with terrain (20%) and collision with object (12%) were the most common first events.

The statistics show that the first event leading to an accident varies substantially according to the flight phase of the aircraft involved. For aeroplanes, accidents during the landing phase account for about 36% of total accidents. The most common first events in such accidents were landing (such as nose over, tire blow-out, etc.) and control loss. Approximately 22% of aeroplane accidents occur during the take-off phase; in these accidents, power loss and control loss were the most common first events. The en-route phase accounted for about 15% of aeroplane accidents, with power loss being the most common first event in that flight phase.

The approach/landing phase accounted for 30% of helicopter accidents, with the most common first events being collision with object and control loss. The manoeuvring phase (17%) had power loss and collision with object as the most common first events. The en-route phase (16%) had power loss and collision with terrain as the most common first events. About 13% of helicopter accidents occurred in the hover/lift phase, with sling-related event and collision with terrain being common first events.

Operation Type (Table 8): In 2005, aeroplane accidents occurred mainly on recreational flights (56%), followed by air transport (18%) and training flights (8%). Helicopter accidents occurred mainly on air transport flights (38%) and on recreational flights (22%).

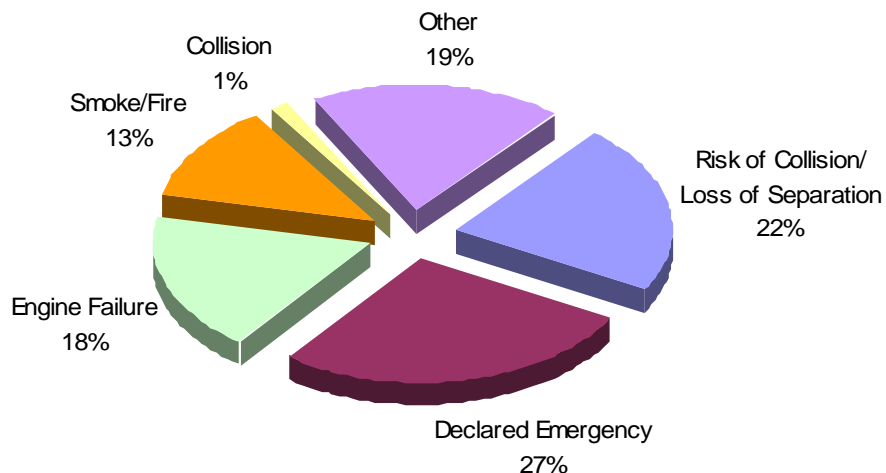
INCIDENTS

Overview of Incidents (Tables 1, 9 and 10)

Pursuant to TSB mandatory incident reporting requirements, 820 incidents were reported in 2005, 650 of which involved Canadian-registered aircraft.

In 2005, the most frequent incident types were declared emergency (27%), risk of collision or loss of separation (22%), and engine failure (18%), with the remainder being mostly smoke/fire incidents (Figure 5).

Figure 5—Reportable Incidents by Type, 2005



The first event in declared emergency on Canadian-registered aircraft usually involved component failures, the most common of which were landing gear, hydraulic system, and electrical system.

Over the past five years, the majority of risk of collision incidents involving Canadian-registered aircraft had air traffic services (ATS)-related or air proximity events⁵ as their first event.

⁵ Refer to the definitions in Appendix B for explanations for ATS-related and air proximity events.

APPENDIX A – AVIATION OCCURRENCE TABLES

Table 1
Aviation Occurrences and Casualties
1996–2005

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Canadian-Registered Aircraft¹										
Accidents	342	355	388	341	320	295	274	295	252	258
Aeroplanes Involved ²	273	294	318	286	258	243	210	242	206	205
Airliners	4	8	14	6	9	5	6	7	3	5
Commuter Aircraft	12	12	10	13	4	8	6	9	1	6
Air Taxi	91	110	108	70	45	37	41	35	43	33
Aerial Work	13	10	18	18	19	18	12	17	8	14
Corporate	6	9	11	6	5	4	2	2	4	6
State	2	2	2	2	1	3	4	3	2	1
Private/Other ³	145	143	155	171	175	168	139	169	145	140
Helicopters Involved	56	56	57	46	53	46	56	44	41	50
Other Aircraft Involved ⁴	13	10	17	15	12	9	10	12	9	8
Hours Flown (thousands) ⁵	3624	3476	3931	4046	3982	3885	3713	3790	3809	3832
Accident Rate (per 100 000 hours) ⁶	9.1	10.1	9.5	8.2	7.8	7.4	7.2	7.5	6.5	6.7
Fatal Accidents	44	36	32	34	38	33	31	32	24	34
Aeroplanes Involved ²	34	29	25	28	26	25	23	26	18	22
Airliners	1	0	0	1	1	0	0	0	0	0
Commuter Aircraft	1	0	1	2	1	1	0	0	0	1
Air Taxi	11	11	8	5	3	5	5	5	3	6
Aerial Work	0	0	0	1	2	1	1	3	0	2
Corporate	0	1	1	2	0	1	0	0	0	0
State	0	1	0	0	1	0	2	0	0	0
Private/Other ³	21	16	15	17	18	17	15	18	15	13
Helicopters Involved	7	8	6	4	11	6	6	3	4	10
Other Aircraft Involved ⁴	3	0	2	4	1	3	3	4	2	2
Fatalities	71	77	87	65	65	60	51	59	37	51
Serious Injuries	38	69	49	42	53	37	42	43	26	37
Canadian-Registered Ultralight Aircraft										
Accidents	30	55	37	35	38	35	36	46	36	30
Fatal Accidents	4	7	4	12	5	6	9	7	6	5
Fatalities	5	9	7	19	9	8	12	9	10	6
Serious Injuries	8	7	7	7	10	8	4	14	7	9
Foreign-Registered Aircraft										
Accidents	22	16	21	21	17	29	13	30	20	18
Fatal Accidents	4	5	5	5	6	8	1	6	3	6
Fatalities	13	11	236	8	16	10	2	8	10	10
Serious Injuries	2	5	3	0	2	5	0	3	2	14
All Aircraft: Reportable Incidents										
Risk of Collision/Loss of Separation	193	217	181	168	161	204	193	154	223	180
Declared Emergency	197	192	226	207	225	255	280	293	278	224
Engine Failure	174	144	170	155	161	175	160	132	143	147
Smoke/Fire	75	61	106	87	84	107	101	103	94	103
Collision	2	7	4	7	8	19	22	16	21	12
Other	64	64	84	75	86	93	109	136	150	154

1 Ultralight aircraft excluded

2 As some accidents may involve multiple aircraft, the number of aircraft involved may differ from the total number of accidents.

3 Other: Contains, but is not limited to, organizations that rent aircraft (that is, flying schools, flying clubs, etc.)

4 Includes gliders, balloons and gyrocopters

5 Source: Transport Canada (2003, 2004 and 2005 hours flown are estimated)

6 Accident rate does not include "Other Aircraft Involved"

Figures are preliminary as of 30 March 2006.

Table 2**Canadian-Registered Aircraft¹ Involved in Accidents and Accident Rate by Operator Type
1996–2005**

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Accidents										
Aeroplanes Involved										
Airliners	4	8	14	6	9	5	6	7	3	5
Commuter Aircraft	12	12	10	13	4	8	6	9	1	6
Air Taxi	91	110	108	70	45	37	41	35	43	33
Aerial Work	13	10	18	18	19	18	12	17	8	14
State	2	2	2	2	1	3	4	3	2	1
Corporate/Private/Other ²	151	152	166	177	180	172	141	171	149	146
Helicopters Involved	56	56	57	46	53	46	56	44	41	50
Commuter/Air Taxi Helicopters ³ Involved				11	9	18	16	10	18	24
Total	329	350	375	332	311	289	266	286	247	255
Hours Flown (thousands)⁴										
Aeroplanes										
Airliners	1079	1070	1210	1247	1198	1168	1124	1148	1192	1196
Commuter Aircraft	299	294	329	344	337	322	311	318	316	326
Air Taxi	803	732	805	825	792	754	683	651	650	697
Aerial Work	137	141	173	197	219	242	262	313	332	271
State	146	142	174	196	220	240	258	307	285	295
Corporate/Private/Other ²	587	553	630	629	612	555	496	463	448	457
Helicopters	574	543	610	609	604	604	578	590	586	591
Total	3624	3476	3931	4046	3982	3885	3713	3790	3809	3832
Accident Rates (per 100 000 hours)										
Aeroplanes										
Airliners	0.4	0.7	1.2	0.5	0.8	0.4	0.5	0.6	0.3	0.4
Commuter Aircraft	4.0	4.1	3.0	3.8	1.2	2.5	1.9	2.8	0.3	1.8
Air Taxi	11.3	15.0	13.4	8.5	5.7	4.9	6.0	5.4	6.6	4.7
Aerial Work	9.5	7.1	10.4	9.2	8.7	7.4	4.6	5.4	2.4	5.2
State	1.4	1.4	1.1	1.0	0.5	1.2	1.5	1.0	0.7	0.3
Corporate/Private/Other ²	25.7	27.5	26.4	28.1	29.4	31.0	28.4	36.9	33.3	32.0
Helicopters	9.8	10.3	9.3	7.6	8.8	7.6	9.7	7.5	7.0	8.5
Total (all aircraft)	9.1	10.1	9.5	8.2	7.8	7.4	7.2	7.5	6.5	6.7
Itinerant Aircraft Movements (thousands)⁵										
Aeroplanes										
Airliners	1521	1447	1541	912	1364	1155	1218	1199	1230	1245
Commuter Aircraft	332	361	398	268	446	494	479	527	555	553
Air Taxi	428	497	603	407	616	654	560	550	508	520
Commuter/Air Taxi Helicopters ³	172	199	242	162	239	219	207	252	242	250
Total	2453	2504	2784	1749	2665	2522	2464	2528	2535	2568
Accident Rates (per 100 000 itinerant aircraft movements)										
Aeroplanes										
Airliners	0.3	0.6	0.9	0.7	0.7	0.4	0.5	0.6	0.2	0.4
Commuter Aircraft	3.6	3.3	2.5	4.9	0.9	1.6	1.3	1.7	0.2	1.1
Air Taxi	21.3	22.1	17.9	17.2	7.3	5.7	7.3	6.4	8.5	6.3
Commuter/Air Taxi Helicopters ³				6.8	3.8	8.2	7.7	4.0	7.4	9.6
Total (all aircraft)	4.4	5.2	4.7	5.7	2.5	2.7	2.8	2.4	2.6	2.6

1 Excludes ultralight aircraft, balloons, gliders and gyrocopters

2 Other: Contains, but is not limited to, organizations that rent aircraft (that is, flying schools, flying clubs, etc.)

3 Before 1999, helicopters involved in accidents were not consistently classified into commuter or air taxi operations.

4 Source: Transport Canada (2003, 2004 and 2005 hours flown are estimated)

5 Source: Transport Canada

Figures are preliminary as of 30 March 2006.

Table 3
Canadian-Registered Aircraft¹ Accident Casualties by Operator Type
1996–2005

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Fatalities: Crew										
Aeroplanes										
Airliners	1	0	0	2	2	0	0	0	0	0
Commuter Aircraft	2	0	2	2	2	2	0	0	0	2
Air Taxi	10	13	9	6	2	4	1	5	2	6
Aerial Work	0	0	0	1	3	1	1	4	0	2
Corporate	0	0	2	1	0	1	0	0	0	0
State	0	1	0	0	2	0	1	0	0	0
Private/Other ²	22	16	16	16	20	17	15	15	14	11
Helicopters	4	9	5	5	10	7	6	3	4	8
Total	39	39	34	33	41	32	24	27	20	29
Fatalities: Passengers										
Aeroplanes										
Airliners	0	0	0	0	0	0	0	0	0	0
Commuter Aircraft	0	0	9	0	0	0	0	0	0	0
Air Taxi	9	9	16	4	5	8	7	10	14	2
Aerial Work	0	0	0	0	1	1	0	0	0	3
Corporate	0	2	1	4	0	1	0	0	0	0
State	0	2	0	0	0	0	0	0	0	0
Private/Other ²	15	13	11	14	6	12	16	16	1	7
Helicopters	2	12	13	6	8	2	0	3	0	7
Total	26	38	50	28	20	24	23	29	15	19
Serious Injuries: Crew										
Aeroplanes										
Airliners	0	1	0	1	0	1	0	0	0	1
Commuter Aircraft	0	0	0	2	0	0	0	3	0	0
Air Taxi	6	9	6	5	4	4	3	1	2	1
Aerial Work	3	1	0	0	2	0	0	2	1	2
Corporate	0	2	0	2	0	0	0	0	0	0
State	0	0	0	0	0	0	0	0	0	0
Private/Other ²	11	7	13	13	15	11	12	14	7	14
Helicopters	6	5	5	4	2	3	7	6	3	7
Total	26	25	24	27	23	19	22	26	13	25
Serious Injuries: Passengers										
Aeroplanes										
Airliners	0	8	3	1	1	2	0	0	0	0
Commuter Aircraft	0	0	0	0	0	1	1	4	0	0
Air Taxi	2	17	2	3	8	4	9	2	2	0
Aerial Work	0	0	1	0	1	0	1	0	0	0
Corporate	0	1	0	0	0	0	0	0	0	0
State	0	0	0	0	0	0	0	0	0	0
Private/Other ²	4	4	5	9	13	4	4	6	4	7
Helicopters	5	7	7	1	4	3	1	1	3	1
Total	11	37	18	14	27	14	16	13	9	8

1 Excludes ultralight aircraft, balloons, gliders and gyrocopters

2 Other: Contains, but is not limited to, organizations that rent aircraft (that is, flying schools, flying clubs, etc.)

Figures are preliminary as of 30 March 2006.

Table 4
Accidents Involving Canadian-Registered Aircraft¹ by Province/Territory
1996–2005

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Accidents										
Newfoundland and Labrador	10	9	7	5	14	10	6	9	5	5
Prince Edward Island	2	1	0	0	1	1	0	1	0	1
Nova Scotia	5	4	7	4	9	3	7	1	3	0
New Brunswick	1	6	6	7	5	4	2	1	5	5
Quebec	39	60	42	46	55	48	42	55	44	56
Ontario	72	84	106	106	73	64	74	80	71	57
Manitoba	18	25	29	32	17	28	17	28	12	18
Saskatchewan	24	22	21	22	9	18	18	16	13	13
Alberta	56	46	62	52	39	36	46	34	29	28
British Columbia	83	72	70	40	68	58	41	54	46	58
Nunavut ²	0	0	0	0	4	2	1	0	2	2
Northwest Territories	13	9	13	14	11	12	4	5	7	5
Yukon	11	5	8	4	6	4	4	4	6	3
Outside Canada	8	12	17	9	9	7	12	7	9	7
Total	342	355	388	341	320	295	274	295	252	258
Fatal Accidents										
Newfoundland and Labrador	2	1	1	1	2	1	1	2	1	1
Prince Edward Island	1	0	0	0	0	0	0	0	0	0
Nova Scotia	0	0	2	0	3	0	2	0	1	0
New Brunswick	0	0	0	0	0	0	0	0	0	1
Quebec	6	7	9	5	5	6	6	5	4	9
Ontario	9	7	4	9	4	6	5	11	2	6
Manitoba	3	1	2	4	0	2	1	0	2	2
Saskatchewan	1	4	2	1	2	0	2	1	2	0
Alberta	3	2	4	5	3	2	2	3	2	2
British Columbia	12	11	5	8	10	11	9	8	6	12
Nunavut ²	0	0	0	0	3	1	0	0	1	0
Northwest Territories	4	0	0	1	1	3	0	0	1	0
Yukon	0	0	0	0	1	0	0	1	0	0
Outside Canada	3	3	3	0	4	1	3	1	2	1
Total	44	36	32	34	38	33	31	32	24	34
Fatalities										
Newfoundland and Labrador	5	2	1	1	3	3	2	3	1	2
Prince Edward Island	1	0	0	0	0	0	0	0	0	0
Nova Scotia	0	0	4	0	4	0	2	0	1	0
New Brunswick	0	0	0	0	0	0	0	0	0	1
Quebec	12	18	29	9	8	12	14	9	4	12
Ontario	12	8	9	14	5	8	6	27	14	10
Manitoba	4	4	5	7	0	4	1	0	2	2
Saskatchewan	1	9	5	1	2	0	2	1	2	0
Alberta	3	4	10	8	3	4	3	4	2	4
British Columbia	20	22	12	24	19	17	16	13	6	19
Nunavut ²	0	0	0	0	5	3	0	0	1	0
Northwest Territories	5	0	0	1	3	8	0	0	2	0
Yukon	0	0	0	0	2	0	0	1	0	0
Outside Canada	8	10	12	0	11	1	5	1	2	1
Total	71	77	87	65	65	60	51	59	37	51

1 Excludes ultralight aircraft

2 This territory was created on 01 April 1999.

Figures are preliminary as of 30 March 2006.

Table 5
Canadian-Registered Aircraft¹ Involved in Accidents by First Event and Phase of Flight
1996–2005

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Aeroplanes Involved in Accidents by First Event										
Control Loss	31	33	35	30	41	37	23	27	30	24
Power Loss	44	46	55	41	37	37	28	36	20	32
Collision with Object	39	32	40	36	24	21	16	25	16	19
Collision with Terrain	21	18	18	22	30	17	16	25	19	20
Collision with Moving Aircraft	0	3	3	9	3	3	2	1	3	1
Operations-Related Event	14	13	10	12	5	6	6	5	4	10
Component System Malfunction	13	16	15	18	15	13	14	7	16	10
Landing Gear Collapsed/Retracted	15	18	18	15	8	7	10	9	10	3
Runway Overrun	5	5	5	4	2	1	1	1	2	4
Take-off/Landing Event	48	45	59	53	46	47	45	55	39	34
Wheels-up Landing	4	13	6	9	4	5	9	5	6	5
Component System-Related Event	4	16	13	4	10	9	7	13	3	7
Weather-Related Event	12	12	10	7	15	12	12	9	16	12
Aircraft Damage	8	7	10	1	5	4	3	4	2	4
Other/Unknown	15	17	21	25	13	24	18	20	20	20
Total	273	294	318	286	258	243	210	242	206	205
Helicopters Involved in Accidents by First Event										
Control Loss	3	6	10	3	3	5	6	3	3	5
Power Loss	5	9	6	12	9	5	9	11	3	5
Collision with Object	7	6	12	8	14	8	5	3	3	6
Collision with Terrain	3	5	3	6	5	4	9	5	7	10
Collision with Moving Aircraft	0	0	0	0	0	1	0	0	0	0
Operations-Related Event	6	1	0	5	1	2	0	2	6	1
Sling-Related Event	5	2	2	2	2	2	4	2	2	0
Dynamic System Malfunction	2	3	1	0	2	2	2	1	1	1
Dynamic Rollover	0	1	2	0	3	1	3	1	3	4
Autorotative Landing	3	6	1	2	2	3	4	4	0	1
Weather-Related Event	2	0	1	1	3	4	2	1	2	2
Aircraft Damage	11	5	6	3	2	3	1	3	4	5
Other/Unknown	9	12	13	4	7	6	11	8	7	10
Total	56	56	57	46	53	46	56	44	41	50
Aeroplanes Involved in Accidents by Phase of Flight										
Standing/Taxiing	19	22	26	17	21	18	22	23	16	19
Take-off	57	64	72	72	59	52	50	47	49	46
En Route	44	43	52	38	39	34	30	40	20	30
Manoeuvring	19	14	22	21	17	15	11	11	8	14
Approach	27	39	28	30	24	36	18	21	23	24
Landing	104	109	112	105	91	87	72	93	83	69
Post-Impact	0	0	0	1	0	0	0	1	1	0
Unknown	3	3	6	2	7	1	7	6	6	3
Total	273	294	318	286	258	243	210	242	206	205
Helicopters Involved in Accidents by Phase of Flight										
Standing	7	4	1	4	2	3	2	1	6	5
Take-off	5	9	3	4	9	5	9	5	6	9
En Route	7	14	9	6	8	10	7	6	6	7
Hover/Lift	13	6	13	10	4	5	3	4	4	4
Manoeuvring	11	9	13	8	14	2	9	9	7	5
Approach/Landing	13	14	17	12	13	19	21	18	11	15
Unknown	0	0	1	2	3	2	5	1	1	5
Total	56	56	57	46	53	46	56	44	41	50

¹ Excludes ultralight aircraft, balloons, gliders and gyrocopters

Figures are preliminary as of 30 March 2006.

Table 6
Canadian-Registered Aircraft¹ Involved in Accidents
First Event vs. Phase of Flight
1996–2005

	Phase of Flight							Total
	Standing/ Taxiing	Take-off	En Route	Manoeuvring	Approach	Landing	Other/ Unknown	
Aeroplanes Involved in Accidents by First Event								
Control Loss	11	108	15	26	17	130	4	311
Power Loss	0	113	161	38	61	1	2	376
Collision with Object	60	60	22	28	41	55	2	268
Collision with Terrain	4	57	36	25	29	40	15	206
Collision with Moving Aircraft	9	7	2	5	4	1	0	28
Operations-Related Event	7	30	17	4	10	15	2	85
Component System Malfunction	11	28	16	2	32	47	1	137
Landing Gear Collapsed/Retracted	16	11	0	0	0	86	0	113
Runway Overrun	1	3	0	0	0	25	1	30
Take-off/Landing Event	5	77	3	1	19	366	0	471
Wheels-up Landing	0	0	0	0	1	65	0	66
Component System-Related Event	4	20	23	4	10	24	1	86
Weather-Related Event	7	25	38	6	26	14	1	117
Aircraft Damage	31	4	1	1	0	9	2	48
Other/Unknown	37	25	36	12	20	47	16	193
Total	203	568	370	152	270	925	47	2535

		Phase of Flight						Total
		Standing	Take-off	En Route	Hover/Lift	Manoeuvring	Approach/ Landing	
Helicopters Involved in Accidents by First Event								
Control Loss	4	5	1	6	9	20	2	47
Power Loss	0	9	20	10	17	17	1	74
Collision with Object	4	12	3	11	15	26	1	72
Collision with Terrain	4	9	13	5	11	12	3	57
Collision with Moving Aircraft	0	0	1	0	0	0	0	1
Operations-Related Event	2	6	2	3	3	8	0	24
Sling-Related Event	0	4	1	11	5	2	0	23
Dynamic System Malfunction	0	2	5	4	3	1	0	15
Dynamic Rollover	1	8	0	0	1	7	1	18
Autorotative Landing	0	0	1	1	4	19	1	26
Weather-Related Event	0	1	9	2	0	6	0	18
Aircraft Damage	11	1	2	8	2	16	3	43
Other/Unknown	9	7	22	5	17	19	8	87
Total	35	64	80	66	87	153	20	505

¹ Excludes ultralight aircraft, balloons, gliders and gyrocopters

Figures are preliminary as of 30 March 2006.

Table 7
Canadian-Registered Aeroplanes¹ Involved in Accidents
First Event vs. Aeroplane Type
1996–2005

	Aeroplane Type						
	Airliner	Commuter	Air Taxi	Aerial Work	Corporate	State	Private/Other
Aeroplanes Involved in Accidents by First Event							
Control Loss	2	8	60	11	7	0	223
Power Loss	5	0	79	38	8	1	245
Collision with Object	12	13	59	30	7	6	141
Collision with Terrain	3	6	67	10	4	2	114
Collision with Moving Aircraft	0	0	6	2	1	1	18
Operations-Related Event	1	3	18	7	1	0	55
Component System Malfunction	5	9	43	6	5	3	66
Landing Gear Collapsed/Retracted	5	8	31	2	1	1	65
Runway Overrun	1	1	10	0	0	0	18
Take-off/Landing Event	13	14	115	18	9	4	298
Wheels-up Landing	1	2	22	2	3	1	35
Component System-Related Event	4	2	13	4	3	0	60
Weather-Related Event	1	7	34	6	1	0	68
Aircraft Damage	7	3	9	1	1	1	26
Other/Unknown	7	5	47	10	4	2	118
Total	67	81	613	147	55	22	1550
Aeroplanes Involved in Fatal Accidents by First Event							
Control Loss	0	1	9	1	0	0	24
Power Loss	1	0	4	1	1	0	22
Collision with Object	0	0	4	2	0	1	17
Collision with Terrain	2	3	28	4	2	2	52
Collision with Moving Aircraft	0	0	1	0	1	1	7
Operations-Related Event	0	1	0	0	0	0	4
Component System Malfunction	0	1	1	0	0	0	3
Landing Gear Collapsed/Retracted	0	0	0	0	0	0	0
Runway Overrun	0	0	0	0	0	0	0
Take-off/Landing Event	0	1	1	1	0	0	1
Wheels-up Landing	0	0	0	0	0	0	0
Component System-Related Event	0	0	0	0	0	0	2
Weather-Related Event	0	0	4	0	0	0	7
Aircraft Damage	0	0	0	0	0	0	2
Other/Unknown	0	0	10	1	1	0	24
Total	3	7	62	10	5	4	165

¹ Excludes ultralight aircraft, balloons, gliders and gyrocopters
Figures are preliminary as of 30 March 2006.

Table 8**Canadian-Registered Aircraft¹ Involved in Accidents by Operation Type
1996–2005**

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Aeroplanes Involved in Accidents										
Training	31	42	49	43	45	46	20	34	25	16
Pleasure/Travel	130	138	130	130	116	108	102	122	118	115
Business	9	9	15	10	9	10	6	8	5	6
Test/Demonstration/Ferry	15	9	14	9	5	7	7	5	7	5
Aerial Application	17	11	17	9	12	13	6	13	3	6
Fire Fighting/Fire Management	0	2	3	2	3	2	2	2	3	2
Survey/Inspection	3	4	3	2	0	2	5	2	1	7
Air Ambulance	1	3	3	3	0	3	2	1	2	1
Air Transport	50	62	67	67	53	43	49	42	37	36
Sightseeing	1	4	1	0	5	1	1	4	0	2
Other/Unknown	16	10	16	11	10	8	10	9	5	9
Total	273	294	318	286	258	243	210	242	206	205
Aeroplanes Involved in Fatal Accidents										
Training	0	2	5	2	2	2	1	3	4	0
Pleasure/Travel	16	16	11	14	12	10	11	15	10	12
Business	1	2	2	3	3	4	0	0	0	0
Test/Demonstration/Ferry	5	1	2	1	1	2	3	0	0	1
Aerial Application	0	0	0	1	2	0	0	1	0	0
Fire Fighting/Fire Management	0	1	0	0	0	1	0	1	0	0
Survey/Inspection	1	1	0	1	0	0	2	0	0	2
Air Ambulance	0	0	0	0	0	1	0	0	0	0
Air Transport	6	6	4	5	4	4	5	4	3	7
Sightseeing	1	0	0	0	1	0	1	0	0	0
Other/Unknown	4	0	1	1	1	1	0	2	1	0
Total	34	29	25	28	26	25	23	26	18	22
Helicopters Involved in Accidents										
Training	4	9	5	6	11	11	9	6	4	3
Pleasure/Travel	1	6	0	0	3	4	2	1	5	11
Business	1	2	5	1	1	4	6	1	0	1
Test/Demonstration/Ferry	4	4	0	3	4	1	5	0	2	0
Aerial Application	2	0	1	1	2	1	1	2	1	2
Fire Fighting/Fire Management	5	2	10	7	2	2	6	6	4	1
Survey/Inspection	7	5	7	4	4	0	3	8	2	1
Air Ambulance	0	0	1	0	0	1	0	0	0	1
Air Transport	17	15	14	10	11	12	14	11	16	19
Sightseeing	1	0	0	1	0	0	0	0	0	0
Other/Unknown	14	13	14	13	15	10	10	9	7	11
Total	56	56	57	46	53	46	56	44	41	50
Helicopters Involved in Fatal Accidents										
Training	0	0	0	0	2	1	0	0	0	0
Pleasure/Travel	0	0	0	0	1	2	0	0	1	5
Business	0	0	3	0	0	0	1	0	0	1
Test/Demonstration/Ferry	2	1	0	0	1	1	2	0	0	0
Aerial Application	0	0	0	0	0	0	0	0	0	0
Fire Fighting/Fire Management	0	1	0	0	0	0	0	1	0	0
Survey/Inspection	1	1	0	0	1	0	0	1	1	0
Air Ambulance	0	0	0	0	0	0	0	0	0	0
Air Transport	3	3	2	1	1	1	0	0	2	3
Sightseeing	0	0	0	1	0	0	0	0	0	0
Other/Unknown	1	2	1	2	5	1	3	1	0	1
Total	7	8	6	4	11	6	6	3	4	10

¹ Excludes ultralight aircraft, balloons, gliders and gyrocopters
 Figures are preliminary as of 30 March 2006.

Table 9**Incidents Involving Canadian-Registered Aircraft¹ by Incident Type
1996–2005**

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Incidents										
Risk of Collision/Loss of Separation	156	185	149	142	130	168	168	123	182	150
Declared Emergency	165	157	183	173	174	208	231	229	204	152
Engine Failure	133	115	133	121	129	157	134	104	118	116
Smoke/Fire	68	46	86	71	71	92	83	82	81	85
Collision	1	7	3	7	8	17	19	16	21	8
Control Difficulties	19	13	28	18	25	28	28	41	41	41
Crew Unable to Perform Duties	8	13	8	17	15	13	37	48	50	67
Dangerous Goods-Related	7	4	3	3	2	6	0	2	0	1
Depressurization	12	12	19	6	4	15	18	17	7	12
Fuel Shortage	0	2	6	7	1	2	1	6	10	5
Failure to Remain in Landing Area	8	9	8	10	13	4	6	3	10	10
Incorrect Fuel	0	0	0	0	0	0	1	0	2	1
Slung Load Released	1	2	1	5	6	8	3	4	5	1
Transmission or Gearbox Failure	2	1	1	3	2	2	2	1	2	1
Total²	580	566	628	583	580	720	731	676	733	650

1 Excludes ultralight aircraft, balloons, gliders and gyrocopters

2 Incidents involving Canadian-registered aircraft only; Table 1 includes those involving foreign aircraft

Figures are preliminary as of 30 March 2006.

Table 10

Canadian-Registered Aircraft¹ Involved in Incidents
Selected Incident Types vs. First Event
2001–2005

Incident Type	First Event	
Risk of Collision/ Loss of Separation	Air Proximity	346
1269 Aircraft Involved	ATS-Related Event	726
	Altitude-Related Event	38
	Runway Incursion	69
	Other	90
Declared Emergency	Landing Gear Failure	178
1024 Aircraft Involved	Hydraulic Failure	138
	Electrical Failure	41
	Other Component Failure	359
	Other	308
Engine Failure	Power Loss – First Engine	268
629 Aircraft Involved	Component Failure	308
	Other	53
Smoke/Fire	Fire/Explosion	308
423 Aircraft Involved	Component Failure	103
	Other	12
Control Difficulties	Component Failure	75
180 Aircraft Involved	Weather-Related Event	48
	Other	57

1 Excludes ultralight aircraft, balloons, gliders and gyrocopters

Figures are preliminary as of 30 March 2006.

APPENDIX B – DEFINITIONS

The following definitions apply to aviation occurrences that are required to be reported pursuant to the *Canadian Transportation Accident Investigation and Safety Board Act* and the associated regulations.

Aviation Occurrence

- a) Any accident or incident associated with the operation of an aircraft; and
- b) Any situation or condition that the Board has reasonable grounds to believe could, if left unattended, induce an accident or incident described in a) above.

Reportable Aviation Accident

An accident resulting directly from the operation of an aircraft where

- a) a person sustains a serious injury or is killed as a result of
 - i) being on board the aircraft;
 - ii) coming into contact with any part of the aircraft or its contents; or
 - iii) being directly exposed to the jet blast or rotor downwash of the aircraft;
- b) the aircraft sustains damage that adversely affects the structural strength, performance or flight characteristics of the aircraft and that requires major repair or replacement of any affected component part; or
- c) the aircraft is missing or inaccessible.

Reportable Aviation Incident

An incident resulting directly from the operation of an aeroplane having a maximum certificated take-off weight (MCTOW) greater than 5700 kg, or from the operation of a rotorcraft having a MCTOW greater than 2250 kg, where

- a) an engine fails or is shut down as a precautionary measure;
- b) a transmission gearbox malfunction occurs;
- c) smoke or fire occurs;
- d) difficulties in controlling the aircraft are encountered owing to any aircraft system malfunction, weather phenomena, wake turbulence, uncontrolled vibrations or operations outside the flight envelope;
- e) the aircraft fails to remain within the intended landing or take-off area, lands with all or part of the landing gear retracted, or drags a wing tip, an engine pod, or any other part of the aircraft;
- f) any crew member whose duties are directly related to the safe operation of the aircraft is unable to perform the crew member's duties as a result of physical incapacitation that poses a threat to the safety of any person, property, or the environment;
- g) depressurization occurs that necessitates an emergency descent;
- h) a fuel shortage occurs that necessitates a diversion or requires approach and landing priority at the destination of the aircraft;

- i) the aircraft is refuelled with the incorrect type of fuel or contaminated fuel;
- j) a collision, risk of collision, or loss of separation occurs;
- k) a crew member declares an emergency or indicates any degree of emergency that requires priority handling by an air traffic control unit or the standing by of emergency response services;
- l) a slung load is released unintentionally or as a precautionary or emergency measure from the aircraft; or
- m) any dangerous goods are released in or from the aircraft.

Serious Injury

An injury that is sustained by a person in an accident and that

- a) requires hospitalization for more than 48 hours, commencing within seven days of the date the injury was received; or
- b) results in a fracture of any bone (except simple fractures of fingers, toes or nose); or
- c) involves lacerations that cause severe haemorrhage or nerve, muscle or tendon damage; or
- d) involves injury to any internal organ; or
- e) involves second- or third-degree burns, or any burns affecting more than 5% of the body surface; or
- f) involves verified exposure to infectious substances or injurious radiation.

ATS-Related Event

Any event related to the provision of air traffic control services including, but not limited to, failure or inability to provide service, emergency handling, or loss of in-flight separation.

Air Proximity Event

A situation in which, in the opinion of a pilot or air traffic services personnel, the distance between aircraft as well as their positions and speed have been such that the safety of the aircraft involved may have been compromised.

Commercial Operators

Commercial operators include carriers that offer a “for-hire” service to transport people or goods, or to undertake specific tasks such as aerial photography, flight training, or crop spraying.

Airliner

An aeroplane used by a Canadian air operator in an air transport service or in aerial work involving sightseeing operations, that has a MCTOW of more than 8618 kg (19 000 pounds) or for which a Canadian type certificate has been issued authorizing the transport of 20 or more passengers.

Commuter Aircraft

An aeroplane used by a Canadian air operator, in an air transport service or in aerial work involving sightseeing operations, of any of the following aircraft:

- a) a multi-engined aircraft that has a MCTOW of 8618 kg (19 000 pounds) or less and a seating configuration, excluding pilot seats, of 10 to 19 inclusive;
- b) a turbo-jet-powered aeroplane that has a maximum zero fuel weight of 22 680 kg (50 000 pounds) or less and for which a Canadian type certificate has been issued authorizing the transport of not more than 19 passengers.

Aerial Work Aircraft

A commercially operated aeroplane or helicopter used in aerial work involving

- a) the carriage on board of persons other than flight crew members;
- b) the carriage of helicopter external loads;
- c) the towing of objects; or
- d) the dispersal of products.

Air Taxi Aircraft

A commercially operated aircraft used in an air transport service or in aerial work involving sightseeing operations, in which the aircraft is:

- a) a single-engined aircraft;
- b) a multi-engined aircraft, other than a turbo-jet-powered aeroplane, that has a MCTOW of 8618 kg (19 000 pounds) or less and a seating configuration, excluding pilot seats, of nine or less; or
- c) any aircraft that is authorized by the Minister of Transport to be operated under Part VII, Subpart 3, Division 1 of the *Canadian Aviation Regulations* (CARs).

State Operators

State operators include the federal and provincial governments.

Corporate Operators

Corporate operators include companies flying for business reasons.

Private Operators

Private operators include individuals flying for pleasure. Included are flights on which it is not possible to transport people or cargo on a “for-hire” basis.