FAA Capstone Program, Phase II
Baseline Report
Southeast Alaska

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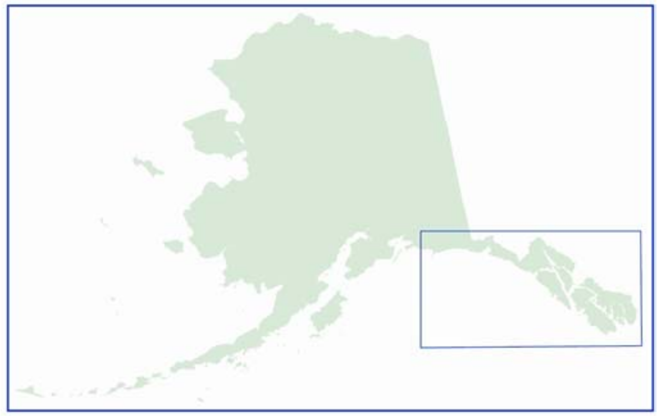
EXECUTIVE SUMMARY
FAA CAPSTONE PROGRAM, PHASE II
BASELINE REPORT • SOUTHEAST ALASKA

Why This Study?

This report describes air safety and aviation infrastructure in southeast Alaska as of December 31, 2002. It establishes a baseline to enable the University of Alaska Anchorage (UAA) to evaluate how the Capstone program affects aviation safety in the region. The Federal Aviation Administration (FAA) contracted with UAA's Institute of Social and Economic Research and Aviation Technology Division to do a variety of training and evaluation tasks related to the Capstone program.



That program is a joint effort of industry and the FAA to improve aviation safety and efficiency in selected regions of Alaska, through government-furnished avionics equipment and improvements in ground infrastructure. The name "Capstone" is derived from the way the program draws together concepts and recommendations in reports from the Radio Telecommunications Conference of America, the National Transportation Safety Board, the Mitre Corporation's Center for Advanced Aviation System Development, and representatives of the Alaskan aviation industry. The first phase of the program began in southwest Alaska in 1999. Phase II began in March 2003. The Phase II area–the Capstone Southeast Alaska region–includes all of southeast Alaska and extends west along the Gulf of Alaska to Cordova. This area includes all operators supervised by the Juneau Flight Standards District Office.

The Capstone program in southeast Alaska will install global positioning system/wide area augmentation system (GPS/WAAS) avionics and data link communications suites in certain commercial aircraft; deploy a ground infrastructure for weather observation, data link communications, surveillance, and Flight Information Services (FIS); and increase the number of airports served by instrument approaches. It will also expand the IFR infrastructure to make it more usable by reducing the minimum enroute altitudes on airways and adding special low altitude routes and approaches. The FAA expects these improvements will reduce the number of mid-air collisions, controlled-flight-into-terrain CFIT incidents, and weather-related accidents in southeast Alaska.

Who is Eligible for Capstone Avionics?

A total of 40 air carriers in southeast Alaska and Cordova conduct passenger and cargo operations under parts 133 and 135 of the Federal Aviation Regulations (FAR; 14CFR, Chapter 1). These carriers are eligible to receive Capstone avionics. These operators typically fly air taxi, commuter, and flightseeing operations with aircraft that carry nine or fewer passengers. A large share of FAR part 135 operations in the region is floatplanes flying under Visual Flight Rules (VFR) in the summer season. Part 133 operators use helicopters for various non-passenger activities such as helicopter logging. The majority of these carriers are very small, with most employing between one and three pilots. They fly to most airports in southeast Alaska, as well as to some places outside the area.

This baseline report concentrates on the aircraft that will be receiving the Capstone avionics, but general aviation aircraft also operate in southeast, as do military planes and private carriers regulated under other FAR parts. For a complete picture, we look at all aviation activity in the study area. Although we present data on safety incidents dating back 10 or more years, we emphasize the safety record from 1997 through 2002.

Area Description

In this study, we define the Capstone Southeast Alaska region as all of Alaska east of west longitude 145 degrees and south of north latitude 61 degrees. This is a remote coastal area, stretching from Cordova on eastern Prince William Sound to the southern tip of Prince of Wales Island. Only a few roads exist between villages, and there is no road connection to the state's metropolitan centers in Anchorage and Fairbanks. Residents rely on water travel in the summer and air travel year round. About 75,000 people live in 45 communities, but almost half live in the regional hub of Juneau, which is also the state capital.

The region has a marine environment, with extremely variable weather and frequent storm systems with low ceilings and fog. Precipitation—rain, snow, drizzle—is heavy and frequent. Many accidents in the area are weather- or visibility- related. Rapidly changing weather can be especially dangerous for flying. Pilots can depart in good weather and then see the weather turn bad before they reach their destinations.

Airport Facilities and Services

Southeast Alaska has 84 landing facilities—24 airports, 8 heliports, and 52 seaplane bases. Most of these facilities have single runways with minimal navigation, weather monitoring, or other services. Most (64 of the 84) are unattended, and of those attended, most are attended only during daylight hours. Ten have some form of instrument approach. Stand-alone GPS approaches are also proposed for airports in Juneau, Hoonah, and Haines. Only Juneau International Airport has a control tower, operated by the FAA. The FAA also operates flight service stations (FSS) in Juneau, Ketchikan, and Sitka.

Almost all the current weather observations in the region are from 16 automated weather stations throughout the area. Many destinations do not have weather reporting facilities. Operators depend on area forecasts and pilot reports. Some flight routes have long distances between weather stations; for example, the route from Yakutat to Sitka is 201 nautical miles between weather stations.

Air Traffic Operations

Available data on local air traffic in southeast Alaska is limited. The only publicly available source of such information is the FAA's Terminal Area Forecast (TAF) system, which uses data from airport operations to project future aviation system demands. But this data is of questionable reliability for airports that do not have control towers. Among southeast airports, only Juneau has a control tower—so accident and incident rates based on these data should be used with caution.

Commercial air traffic operations (take-offs and landings) in southeast Alaska totaled an estimated 240,000 in 2002—nearly 20 percent of commercial air traffic operations statewide. Keep in mind that the airport terminal observations do not include landings and take-offs at locations away from established airports and therefore underestimate total aviation traffic in the region.

Accidents and Accident Rates

Looking at numbers of accidents statewide and in the Capstone SE Alaska region from 1990 through 2002, we found:

- 233 accidents occurred in the region during that period, with 54 resulting in fatalities. The share of accidents with fatalities (23 percent) was more than twice as high as in the state as a whole (11 percent).
- Air taxi operations accounted for 24 percent of accidents and 41 percent of fatalities in the region.
- Commuter operations accounted for 4 percent of all accidents in the Capstone Southeast Alaska region, 2 percent of fatal accidents, and 3 percent of fatalities.
- Part 135 operators flying under Part 91 accounted for 16 percent of accidents, 16 percent of fatal accidents, and 13 percent of fatalities.

We also calculated accident rates statewide and for the southeast area for the period from 1998 through 2002 and found:

- Accident rates for part 135 operators in the Capstone Southeast Alaska region were lower than for the state as a whole—5.8 per 100,000 departures, compared with 9.9 statewide. But fatality rates were higher—3.7 per 100,000 departures in the region, compared with 3.2 statewide.
- Accident rates for general aviation were also lower in the Capstone Southeast Alaska region—10.3 per 100,000 departures, compared with 13.2 statewide. But again, fatality rates were higher—4.0 per 100,000 departures in southeast, compared with 1.5 statewide.

What Might Capstone Have Prevented?

Capstone avionics, training and data are intended to help pilots avoid CFIT accidents, collisions between aircraft, and some accidents where flight information is a factor. In examining causes of accidents during the baseline period, we found:

- Capstone could potentially have prevented about 23 percent of all accidents in the Capstone Southeast Alaska region from 1990 through 2002.
- But Capstone could potentially have prevented more than half the fatal accidents in the region during that period. Most of the fatal accidents were CFIT accidents, either in cruise flight or on approach or departure. Fatalities in floatplane accidents are often pilot or passenger drowning.

Operator and Pilot Surveys

To assess the effects of the Capstone program on air safety, we also need to control for other factors that might affect safety in the Capstone Southeast Alaska region. Among those are changes in the qualifications and experience of pilots during the study period; changes in company operations and policies; and other safety initiatives in the region. To assess how these factors might change, we collected baseline data from both air carriers operating in the region and their pilots.

These surveys were part of a larger effort to collect information about qualifications, practices, and attitudes of pilots and company management for aviation operators in Alaska. ISER developed and conducted most of these surveys as part of a contract with the National Institutes for Occupational Safety and Health (NIOSH). In surveying operators and pilots in the Capstone Southeast Alaska region we found:

- Improving pilots' training in decision-making and increased use of video cameras for weather information were the measures operators said were most important for improving aviation safety.
- Pilots agreed that better training in decision-making was one of the most important measures for improving aviation safety. Many also cited the importance of more locations in southeast with manned weather reporting stations.
- Improved pilot awareness of terrain and fewer mid-air collisions are the main benefits operators expect from the Capstone program in southeast Alaska.
- Operators most frequently cited distractions and less heads-up time as their most serious concern about pilots' using Capstone avionics. Several operators also believe pilots may hesitate to use the avionics for fear of the company or the FAA monitoring their flights.
- One quarter of the southeast pilots we interviewed said they have to make daily decisions about flying into unknown weather conditions. More than 60 percent said that at least weekly they fly into conditions that are different from what was forecast when they started their flights.

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1. Introduction

1.1. Purpose of Study

This report provides the Federal Aviation Administration (FAA) with information on air safety and aviation infrastructure in southeast Alaska as of December 31, 2002. The data will establish a baseline to enable the University of Alaska Anchorage (UAA) to conduct an independent evaluation of how the Capstone program affects aviation safety in the region. The FAA contracted with UAA's Institute of Social and Economic Research and Aviation Technology Division to do a variety of training and evaluation tasks related to the Capstone program. The program is a joint effort of industry and the FAA to improve aviation safety and efficiency in select regions of Alaska, through government-furnished avionics equipment and improvements in ground infrastructure.

The first phase of the program began in southwest Alaska in 1999. Phase II, in southeast Alaska, began in March 2003. The name "Capstone" is derived from the way the program draws together concepts and recommendations in reports from the RTCA (formerly Radio Telecommunications Conference of America), the National Transportation Safety Board, the Mitre Corporation's Center for Advanced Aviation System Development, and representatives of the Alaskan aviation industry.

The Capstone program in southeast Alaska will install global positioning system (GPS)/wide area augmentation system (WAAS) avionics and data link communications suites in certain commercial aircraft; deploy a ground infrastructure for weather observation, surveillance, and Flight Information Services (FIS); and increase the number of airports served by instrument approaches. It will also create a usable instrument flight rules (IFR) infrastructure by reducing the minimum enroute altitudes on most airways and adding special low altitude routes and approaches. The FAA expects these improvements will reduce the number of mid-air collisions, controlled-flight-into-terrain (CFIT) incidents, and weather-related accidents in southeast Alaska.

The program focuses on air carriers conducting passenger and cargo operations under parts 133 and 135 of Federal Aviation Regulations (FAR; 14 CFR, Chapter 1). Part 135 operators typically fly air taxi, commuter, and flightseeing operations; part 133 operators use helicopters for various non-passenger activities such as helicopter logging. Aircraft owned by these carriers will be eligible to receive Capstone avionics in southeast Alaska. A large share of FAR part 135 operations in southeast Alaska are by float planes flying under Visual Flight Rules (VFR) in the summer season.

To form a complete picture of aviation safety in southeast Alaska, this study includes information on the aviation safety record not only of Capstone-eligible aircraft, but also general aviation aircraft, military planes, and private carriers regulated under other FAR parts. We present data on safety incidents dating back 10 or more years, but we emphasize the safety record from 1997 through 2002. Two challenges confront our safety analysis.

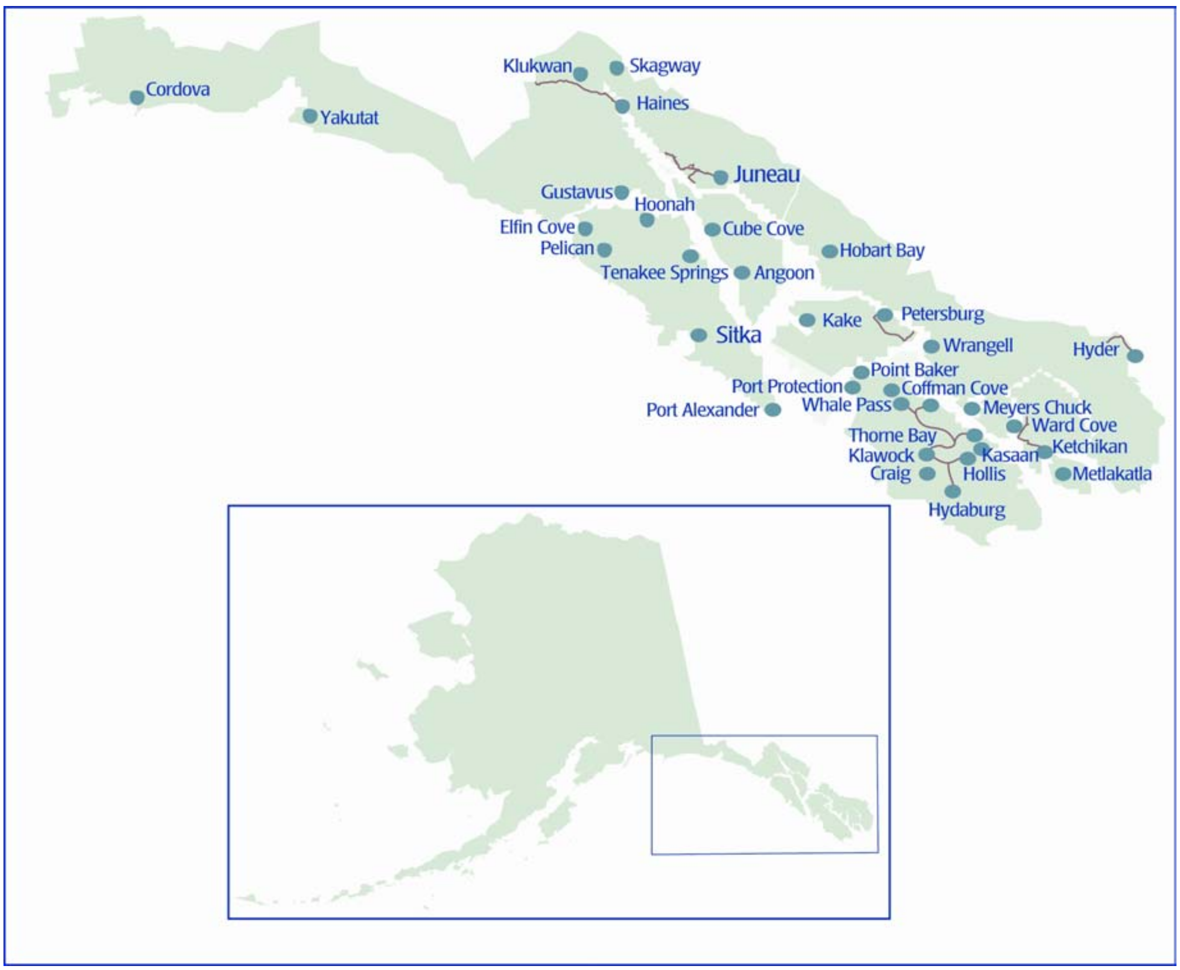
First, a significant regulatory change during this period confounds attempts to interpret aviation statistics. Second, data on air traffic in Alaska are limited and problematic. We briefly explain each of these issues. In early 1997, the FAA dramatically increased the scope of commercial aviation regulated under the more restrictive FAR part 121. Since March 20, 1997, all scheduled service using turbojet aircraft or aircraft with 10 or more passenger seats has fallen under part 121. The effect of this regulatory change on flight operations is not known. However, it is likely that many companies providing passenger service adjusted their fleets to avoid the cost of recertification under part 121. In addition, some service conducted under part 135 prior to 1997 is probably now under part 121, as the FAA presumably intended. This change makes it difficult to compare earlier data on incidents or operations to more recent data.

Second, the available data on flight operations is not highly accurate. The only source of publicly available data on air traffic that can provide regional and local information is the FAA's Terminal Area

Forecast (TAF)[1] system. That system uses data from airport operations to project future aviation system demands. The terminal operations data is of questionable reliability for airports without control towers to monitor traffic. In southeast, that includes all communities except Juneau. Consequently, accident and incident rates based on these data should be used with caution.

1.2. Description of the Capstone Southeast Alaska Region

The Capstone Southeast Alaska region (Capstone SE Alaska region) as defined in this study is all the area of Alaska south of north latitude 61 degrees and east of west longitude 146 degrees. This area includes Alaska's panhandle and extends westward from the north end of the panhandle along the Gulf of Alaska to Cordova, on the western edge of Prince William Sound. The area is remote, with only a few roads between villages and no road connection to the state's metropolitan centers. Residents rely on water travel in the summer and air travel year round. The 45 communities in the area have more than 75,000 residents, with almost half living in the regional hub of Juneau, which is also the state capital. Of the 44 other communities, 29 have fewer than 500 residents. The map below shows the major communities; Appendix B lists them all.



[1] The Terminal Area Forecast System (http://www.apo.data.faa.gov/faatafall.HTM), created by the FAA's Office of Aviation Policy and Plans, is the official forecast of aviation activity at FAA facilities. The forecasts are prepared to meet the budget and planning needs of the constituent units of the FAA and to provide information that can be used by state and local authorities, the aviation industry, and the public.

1.3. Air Operations in the Capstone Southeast Alaska Region

The Capstone SE Southeast Alaska region has 84 airport facilities—24 airports, 8 heliports, and 52 seaplane bases. Table 1-1 shows the 2002 traffic estimates (including commercial, private, and military) from the FAA's Office of Aviation Policy and Plans. Commercial air traffic operations (take-offs and landings) in the region totaled about 240,000 in 2002—nearly 20 percent of commercial air traffic operations statewide.

Table 1-1 also shows total general aviation traffic operations totaling 163,580, or about 12 percent of general aviation operations statewide. Keep in mind that the airport terminal observations do not include landings and take-offs at locations away from established airports and therefore underestimate total aviation traffic in the region—especially itinerant general aviation originating in urban areas such as Anchorage and Juneau. Again, these numbers and any safety incident rates estimated from them should be interpreted with care.

Table 1-1. Total Terminal Operations Activity 2002*

	SE Alaska Region	Alaska
FAR Part 121 Air Carriers	28,872	185,277
Air Taxis and Commuters	210,657	1,018,959
General Aviation-Local	70,425	552,546
General Aviation-Itinerant	93,155	769,869
Military	3,718	76,044
Total Operations	406,827	2,602,515

* Preliminary 2002 data

Source: FAA Office of Aviation Policy and Plans Terminal Area Forecast System (http://www.apo.data.faa.gov/faatafall.htm)

1.4. Review of Recent Studies

Seven recent studies are of particular interest and relevance to the Capstone project:

- Berman, M. et al. (2001). *Air Safety in Southwest Alaska: Capstone Baseline Safety Report*. Institute of Social and Economic Research, University of Alaska Anchorage.
- Institute of Social and Economic Research, University of Alaska Anchorage (2002). *Capstone Phase I Interim Safety Study 2000/2001*. Prepared in cooperation with the Aviation Technology Division, Community and Technical College, University of Alaska Anchorage and the MITRE Corporation.
- Kirkman, Worth W. (2002). *The Safety Impact of Capstone Phase 1, an Interim Assessment of 2000-2001*. MITRE Center for Advanced Aviation System Development, McLean, Virginia.
- National Transportation Safety Board (NTSB) (1995). *Aviation Safety in Alaska*
- FAA (1999). *Joint Interagency/Industry Study of Alaskan Passenger and Freight Pilots.*
- Garrett, L. C., G. A. Conway, J. C. Manwaring (1998). "Epidemiology of Work-Related Aviation Fatalities in Alaska, 1990-94" in *Aviation, Space and Environmental Medicine* Vol. 69, No. 12.
- Mitchell, M. T., American Airlines Training Corporation. (1982*). Final Report on Definition of Alaskan Aviation Training Requirements*.

Geographic Area. All seven studies of these cover a portion of Alaska or the state as a whole. They are relevant because the problems they describe are problems in southeast Alaska as well. Their characterization of commuter and air taxi operations in Alaska is also applicable to southeast Alaska.

Data Sources. The FAA, NTSB and Garrett studies used the NTSB/FAA accident and incident database. The FAA and NTSB studies also fielded surveys. The FAA surveyed pilots in 1998, and the NTSB surveyed pilots and operators in 1995. The NTSB study also included interviews with Alaska aviation personnel; information from public forums; and a 1994 survey of commercial pilots and operators conducted by the Ames Research Center of NASA. The Mitchell study is also survey-based. The study team interviewed air taxi operators and pilots. The Garrett study combined the NTSB database with statewide data on occupational deaths.

Brief Summary. The NTSB (1995) report examined commuter airline, air taxi, and general aviation accidents. The study focused on accidents during take-off and landing and accidents related to flying under visual flight rules (VFR) into instrument meteorological conditions (IMC). It identified VFR into IMC as the leading safety problem for commuter airlines and air taxis in Alaska. It also cited seven safety issues: (1) pressures on pilots and commercial operators to provide services in a difficult environment with inadequate infrastructure; (2) inadequate weather reporting; (3) inadequate airport inspections and airport condition reporting; (4) current regulations for pilot duty, flight, and rest time; (5) inadequacy of the current instrument flight rules system; (6) enhancements to the IFR system needed to reduce reliance on VFR and; (7) the needs of special aviation operations.

The FAA (1999) study has a narrower focus than the NTSB report. It examined controlled-flight-into-terrain (CFIT) accidents where VFR into IMC is listed as a causal factor. The aim of the FAA study was to identify differences between companies that had CFIT accidents and those that hadn’t. It found several statistically significant differences. Pilots who had not had CFIT accidents had more flying experience; perceived their company's safety program as better than those of companies that had CFIT accidents; and relied less on station agents for pre-flight weather decisions.

Garrett et al. (1998) also examined CFIT accidents as part of a larger study comparing fatality rates in aviation and other occupations. The authors analyzed differences among pilots based on levels of training and experience and found that commercial and transport pilots were significantly more likely to have IMC conditions at the crash site than were pilots holding private pilot's licenses.

Mitchell (1982) focused on air taxi operations and interviewed 177 air taxi pilots. The study was the basis for designing a training program suited to the conditions pilots in Alaska face. It identified decision-making skills and operational procedures that are necessary for operations in Alaska’s weather and environmental conditions. Based on the interviews, the study team found that lack of weather information and communication facilities; management policies; and insufficient decision-making skills combined with rapidly changing weather and difficult terrain to make flying in Alaska hazardous. A large share of pilots interviewed cited overloading; incomplete weather information; pressure to fly in marginal conditions; lack of training in mountain flying and off-airport take-offs and landings; pilots with alcohol problems; and violations of the 8-hour rule as being safety problems. Pilots also noted that profit motives drove many management decisions to fly in unsafe conditions.

Berman et al (2001) provided the Federal Aviation Administration (FAA) with information on air safety and aviation infrastructure in the Yukon-Kuskokwim Capstone program area as of January 1999, just before Phase I of the program began. The data established a baseline to enable the University of Alaska Anchorage to conduct an independent study assessing the safety effects of Capstone. The report focused on air carriers conducting passenger and cargo operations under parts 121 and 135, respectively, of the Federal Aviation Regulations (FAR; 14 CFR, Chapter 1), since aircraft owned by these companies serving the Bethel area were scheduled to receive Capstone avionics. However, general aviation aircraft also operate in the area, as do a limited number of military planes and private carriers not regulated under parts 121 and 135. Therefore the baseline report took into account the safety record of aviation overall in the study area. The report included safety incidents occurring in the previous 10 years, with emphasis on the safety record from 1995 through 1999.

The ISER Capstone Phase I Interim Safety Study 2000/2001 evaluated aviation safety changes in the Yukon-Kuskokwim Capstone area through the end of 2001. ISER first analyzed data for the period 1990-1999, before the Capstone program started. Researchers quantified the scarcity of navigation aids and weather information for pilots flying in the Yukon-Kuskokwim (Y-K) Delta. They then looked at accidents and found that if the new technology had been installed on all aircraft in the test region during the 1990s, it might have prevented about 1 in 7 of all accidents and nearly 1 in 2 fatal accidents, by mitigating all causes of the accidents; and helped pilots avoid more than half of all accidents and fatalities, by mitigating some but not all of the causes of the accidents.

Preliminary recommendations included continuing the Capstone program; marketing the program to operators and pilots; insuring adequate pilot training; expanding ground-based transceiver coverage; providing radar-like approach control services; and requiring more operator feedback.

Kirkman (2002) provided an interim assessment of Capstone in the Y-K Delta region, comparing accident rates in the delta before and after implementation of Capstone and reporting on implementation in the region. The author compared accidents by type and by Capstone equipped and non-equipped aircraft. Kirkman concluded that “the Capstone program made significant progress toward implementing safety and efficiency capabilities for commercial aviation for the Y-K Delta.” He noted that important steps like pilot training and surveillance infrastructure were not yet fully implemented in the region.

Relevance to the Capstone Project and its Evaluation. All seven of these studies are relevant for the Capstone evaluation. The FAA, NTSB and Garrett, et. al. are relevant because they provide detailed information about CFIT accidents. All three studies recommend using global positioning systems (GPS) to reduce accidents caused by flying under VFR into IMC; improving weather reporting services at VFR-only airports; and using GPS technology to expand the IFR route structure. The Mitchell study provides a detailed discussion of accident causes and factors that Capstone avionics don’t address. It helps us to understand cases where these avionics have little or no effect on safety. The MITRE report and baseline and interim reports from ISER provide illustrative and key evaluation of the existing status of aviation conditions in Alaska and the implementation of Capstone in the Yukon-Kuskokwim area.

Recommendations Relevant to the Safety Study Design. From the FAA study, we plan to use both the survey data and the research findings and recommendations. We will use the survey data to see if there are differences between pilots flying in southeast Alaska and in the rest of the state, and to identify factors in accidents that Capstone doesn’t address and that we need to control for. These factors include risk-taking behaviors; company operations; training; and safety policies and procedures. In our study design we are using findings and recommendations from the NTSB, Garret, and Mitchell studies. The Mitchell study also confirmed that pilots are somewhat reluctant to be interviewed, fearing punitive action. Our experience in southwest Alaska confirms this finding, although some pilots and operators have become more open and candid as the study progresses. Also, southwest Alaska pilots tended to initially be more optimistic about both benefits and potential problems of the Capstone program than they are after experience with the program; we expect to see this same pattern in southeast Alaska.

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2. Aviation Accidents and Incidents in the Capstone Southeast Alaska Region

2.1. Summary

Section 2 reviews accidents statewide and in the Capstone SE Alaska region from 1990 through 2002. It discusses total accidents and fatal accidents by type of carrier; estimates accident rates for the state and region; and identifies accidents that Capstone avionics could potentially have prevented, had they been in place.

Between 1990 and 2002, accidents and incidents in the Capstone SE Alaska region made up about 11 percent of the statewide total (241 of 2,151). Within that region, FAR part 135 operators accounted for 42 percent of accidents (97 of 233). Most accidents involving part 135 operators were on non-scheduled flights (54 of 97). Accident rates from 1990 through 2002 were lower in the region than in state as a whole, but fatality rates were higher.

The Capstone program could potentially have prevented 22 percent of accidents in the Capstone SE Alaska region from 1990 through 2002, had the program been in place. The potential effects of the Capstone program are strongest for fatal accidents. More than half of all fatal accidents in the region during this period were potentially preventable by Capstone avionics, training, and data.

2.2. Accidents in Alaska and the Capstone Southeast Alaska Region

Data covering accidents and incidents come from NTSB Aviation Accident and Incident database. We got access to the data using the NTSB Website http://www.ntsb.gov/ntsb/query.asp. Accident and incident data in this report cover the period from January 1, 1990 through December 31, 2002. We used latitude and longitude information to create a subset of data covering southeast Alaska. We categorized accidents by Federal Aviation Regulations (FAR) part number,[2] scheduled and non-scheduled service for the Capstone SE Alaska region and the entire state.

Table 2-1 summarizes data for the state and region for 1990 through 2002. It breaks out the total accidents and incidents, accidents, fatal accidents and fatalities by type of operation for the Capstone SE Alaska region and Alaska as a whole.

The NTSB data include all the accidents but only a subset of the incidents—generally those that were downgraded from accidents—that are reported to the FAA. Of the 60 incidents statewide in this period, eight were in the Capstone SE Alaska region. The table shows that from 1990 through 2002:

- 233 accidents occurred in the Capstone SE Alaska region, with 54 resulting in fatalities. The share of accidents with fatalities (23 percent) was more than twice as high in the region than in the state as a whole (11 percent).
- Air taxis accounted for 24 percent of accidents and 41 percent of fatalities in the region.
- Commuters accounted for 4 percent of accidents in the region (10 out of 233), 2 percent of fatal accidents (1 out of 54) and 3 percent of fatalities (4 out of 126).
- Part 135 operators flying as Part 91 accounted for 14 percent of accidents (33 out of 233), 13 percent of fatal accidents (7 out of 54), and 11 percent of fatalities (14 out of 126).

[2] We used information on type of flight, owner and operators to identify part 135 operators flying as part 91.

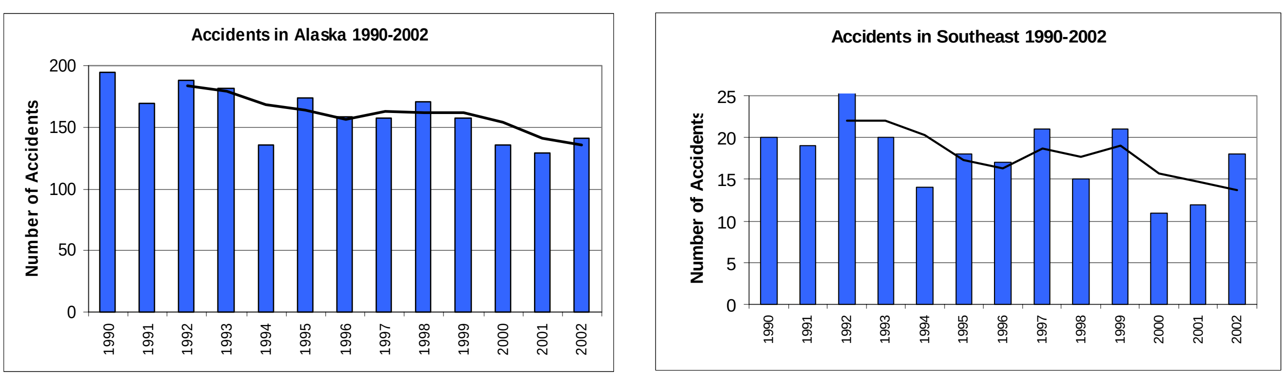
Table 2.1. Accidents, Incidents and Fatalities Reported to the FAA, 1990-2002

		Accidents & Incidents		*Accidents*		*Accidents w/ Fatalities*		*Fatalities*	
		Southeast	*Alaska*	*Southeast*	*Alaska*	*Southeast*	*Alaska*	*Southeast*	*Alaska*
Air Carriers Operating Under FAR Part Number 121									
	Non Scheduled	2	15	2	12	0	1	0	4
	Scheduled	4	26	2	12	0	0	0	0
Air Carriers Operating Under FAR Part Number 135									
	Non Scheduled	57	355	54	343	17	51	52	136
	Scheduled	10	110	10	99	1	17	4	59
	135 Operating as Part 91	33	250	33	242	7	23	14	43
Air Carriers Operating Under FAR Part 91									
	FAR Part 91	117	1290	115	1280	24	127	45	234
	FAR Part 91 - Public	5	71	5	70	0	4	0	6
Other									
	FAR Part 125	0	5	0	5	0	1	0	2
	FAR Part 129	0	8	0	7	0	1	0	2
	FAR Part 133	13	20	12	20	5	6	11	12
	FAR Part 137	0	1	0	1	0	1	0	0
Total		241	2151	233	2091	54	232	126	498

Source: NTSB (2003) Accident and Incident Database. Data cover 1/1/90 through 12/31/2002.

Figure 2-1 shows that the number of accidents in Alaska has been declining since 1990. Three-year moving averages have dropped from 183 in 1990-1992 to 135 from 2000-2002. The trend in southeast Alaska is less clear, but appears to be declining as well, moving from an average of 22 per year from 1990-1992 to 14 per year from 2000-2002. Total accidents in the Capstone SE Alaska region during this period ranged from 11 to 27 annually.

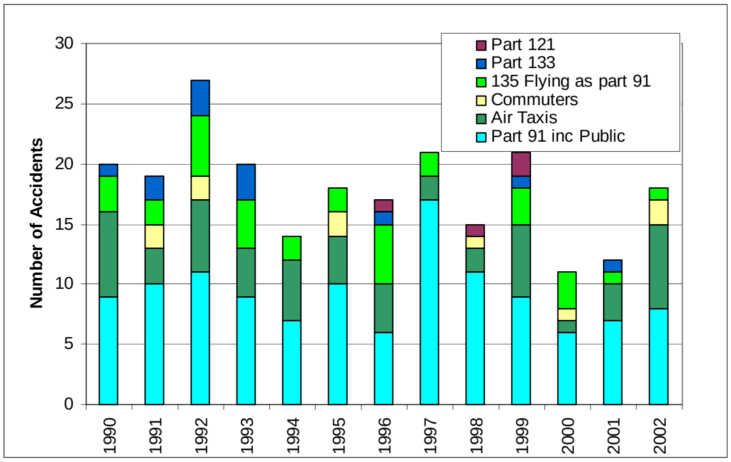
Figure 2-1: Accidents in Alaska and Southeast, 1990-2002



Source NTSB (1990-2002) Accident and Incident Databases

Figure 2-2 shows accidents in the Capstone SE Alaska region from 1990 through 2002 by FAR part number. Accidents involving part 135 operations are commuters, air taxis, and part 135 flying as 91. Of all accidents, air taxis and 135 flying as part 91 made up the largest share.

Figure 2-2. Accidents in the Capstone SE Alaska Region by FAR part number.



Source NTSB (2003) Accident and Incident Database

2.3. Accident Rates

To construct accident rates we need data for both the numerator—the number of accidents—and the denominator—the amount of flying, which is often measured in departures, hours flown, or enplanements. We have excellent data on accidents, and all our rate calculations use the same accident data. The accident and fatality counts for Alaska and the Capstone SE Alaska region come from the NTSB accident and incident database. Accident and fatality counts for the U.S. come from FAA (1999) *Accidents, Fatalities and Rates, Preliminary Statistics*. As discussed above, we will look at incident rates in more depth later in the study. Data on departures, hours flown, or enplanements in southeast Alaska are all limited. We carefully reviewed the available data sets with staff from FAA, BTS, NTSB, and NIOSH.

- U.S. Bureau of Transportation Statistics (BTS) data include departures and flight hours. However, these data are available only at the company and state level and not for regions within the state. Also, they show only the commuter departures and hours of part 135 air carriers and do not include unscheduled flights.
- The national General Aviation and Air Taxi Survey provides an estimate of total Alaska flight hours for unscheduled air taxi and general aviation operations, as well as scheduled commuter service. However, the data are reported at the state level, and it is not currently possible to extract numbers for southeast Alaska.
- The APO Terminal Forecast Survey Summary Report from the FAA's Aviation Policy and Plans Office uses historical data on traffic counts from FAA Form 5010, the Airport Master Record. This is the only systematic data available for the Capstone SE Alaska region. For airports with control towers, airport managers report the number of aircraft cleared for takeoff or landing. For airports without towers, which include many southeast Alaska airports, airport managers estimate the annual traffic counts. We have made rough estimates of annual departures by dividing the traffic counts by two. This method assumes that each departure results in a traffic count at both the departing and the arriving airport. It undercounts unscheduled air taxi and general aviation departures, since it would not count departures from off-airport locations.

Table 2-2 shows accident and fatality rates for air taxis, commuters, and FAR part 135 flying as part 91 and for general aviation from 1998 through 2002. The accident and fatality counts come from the NTSB database. Departure data come from the APO Terminal Area Forecast.

During that period, accident rates for part 135 operators in the Capstone SE Alaska region were lower than for the state—5.8 per 100,000 departures, compared with 9.9 statewide. But fatality rates were slightly higher—3.7 per 100,000 departures in southeast and 3.2 statewide. General aviation accident rates were also lower in the Capstone SE Alaska region—10.3 per 100,000 departures, compared with 13.2 statewide. Fatality rates were higher—4.0 per 100,000 departures compared with 1.5 statewide.
.

Table 2-2. Estimated Accident and Fatality Rates per 100,000 Departures: Air Taxis, Commuters and General Aviation for Alaska and Southeast Alaska, 1998-2002

	Annual Average, 1998 to 2002					
	Departures [2]		Accidents [1]		Fatalities [1]	
	Southeast	Alaska	Southeast	Alaska	Southeast	Alaska
Air Taxis, Commuters, and Part 135 as 91[a]	107,525	504,600	6.2	50.0	4.0	16.2
General Aviation [b,c]	79,951	694,830	8.2	91.8	3.2	10.6
			Rate per 100,000 Departures			
			Accidents		Fatalities	
			Southeast	Alaska	Southeast	Alaska
Air Taxis, Commuters, and Part 135 as 91[a]			5.8	9.9	3.7	3.2
General Aviation [b,c]			10.3	13.2	4.0	1.5

Sources:

1. NTSB (2003) Accident and Incident Database

2. FAA (2003) APO Terminal Area Forecast Summary Report

Notes:

a. Departure data for Air Taxis and commuters do not count at private airports or off-airport sites. We assume that FAR part 135 air carriers operating under part 91 are counted in air taxi and commuter departures.

b. General Aviation is from APO Terminal Area Forecast reports. We assume this is FAR part 91

c. FAR public accidents and fatalities are counted in General Aviation

2.4. Accidents Potentially Preventable by Capstone Equipment

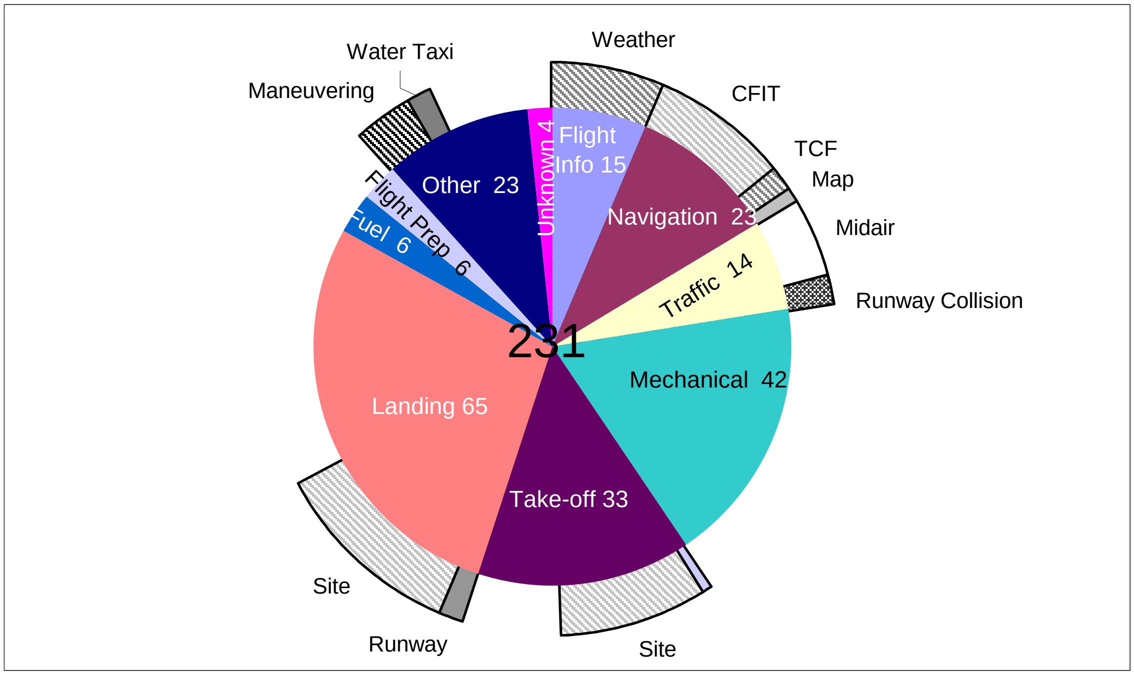
The Capstone program includes safety enhancements that may be able to prevent accidents from a wide variety of causes. The avionics, training, and data provided by the Capstone system are more likely to help pilots avoid some types of accidents than others. We looked at accident narratives and causal information in the NTSB dataset for each accident in the Capstone SE Alaska region and determined whether having Capstone avionics and training could have helped prevent the accident.

Figure 2-3 divides 231 accidents in the region from 1990 through 2002 into ten basic cause categories.[3.] The inner pie shows all accidents divided into the ten major categories. The extensions show more details of causes within the major categories. Remember that a large share of FAR part 135 operations in southeast Alaska are by float planes flying under Visual Flight Rules (VFR) in the summer.

Capstone avionics, training and data can help pilots avoid CFIT accidents, collisions between aircraft, and some accidents where flight information is a factor. From 1990 to 2002 in the Capstone SE Alaska region, about 23 percent—52 of the total 231 accidents—might have been prevented if the Capstone program had been in place.

[3] Table 2.1 reports 233 accidents in Southeast from 1990 to 2002. Two of the accidents do not have narratives in the database so these figures cover 231 accidents. Appendix A contains text summaries and coding of accidents in Southeast.

Figure 2-3: Accidents in Southeast by Cause, 1990 - 2002



Nine Basic Cause Categories	**Detailed Cause Categories**

Nine Basic Cause Categories

1. **Mechanical:** Engine failure, inoperable control surfaces, failed landing gear or floats, propeller or shaft failure.
2. **Navigation:** Controlled Flight into Terrain (CFIT) while en route is often associated with reduced visibility and small navigational errors. Some CFIT accidents are due to pilots being off-course.
3. **Traffic:** Usually mid-air collisions. Also includes ground or water accidents from last-moment avoidance of other aircraft and from jet blast on airport surface.
4. **Flight Information**: Usually accidents that result from inadequate weather information and are often caused by icing and sometimes poor visibility but rarely convective weather. (Surface winds contributing to take-off or landing accidents have been included under take-off or landing rather than here.)
5. **Fuel:** Accidents caused by running out of fuel.
6. **Flight Prep:** Accidents caused by a variety of poor flight preparation measures, including failure to insure that cargo is tied down and within the aircraft's weight and balance limits and failure to check if fuel has been contaminated by water.
7. **Takeoff:** Accidents during take-off, including pilots' failure to maintain control in wind, improper airspeed, waterway debris, hazards at remote lakes, rivers without markings or moorings, poor runway conditions and obstacles at off-runway sites.
8. **Landing:** Accidents during landing, including pilots' failure to maintain control in wind, improper airspeed, waterway debris, hazards at remote lakes, rivers without markings or moorings, poor runway conditions and obstacles at off-runway sites.
9. **Other:** Includes colliding with watercraft or ground vehicles, hitting birds and pilots under the influence of alcohol or drugs.
10. **Unknown:** Missing aircraft, cause not determined.

Detailed Cause Categories

__**Capstone Relevant Causes**__

1. **Weather**: Accidents where the availability of weather information was a factor.
2. **CFIT:** Controlled Flight into Terrain (or Water) accidents
3. **TCF:** CFIT accidents that occur on approach or departure.
4. **Map:** Accidents where the pilot did not know aircraft's location
5. **Midair:** Midair Collisions between aircraft.
6. **Runway**: Collisions between aircraft on the ground or water.

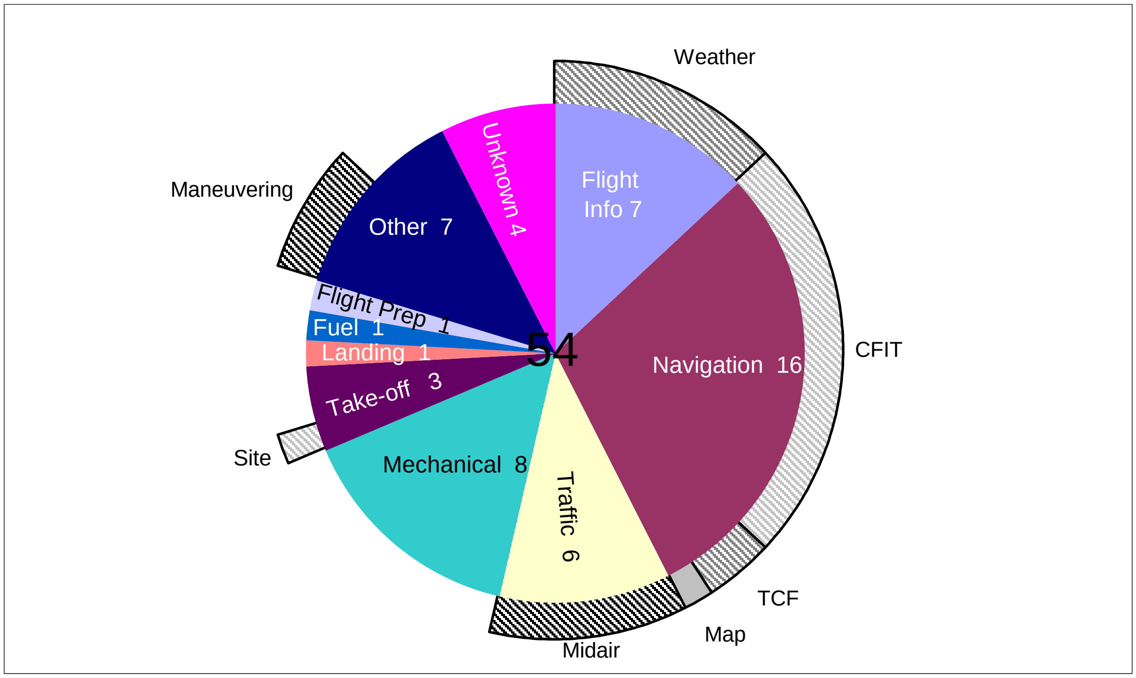
Other Causes

7. **Runway:** Accidents on take-off or landing related to runway or waterway conditions such as potholes, submerged obstacles the runway
8. **Site:** unusual hazards of water or off-runway sites
9. **Water taxi**: collisions with objects (not a/c) while taxiing on the ocean, rivers or lakes.
10. **Maneuvering**: Typically, stalling the aircraft while maneuvering

Source: NTSB (2003) Accident and Incident Database

Figure 2-4 shows the causes of the 54 fatal accidents in the Capstone SE Alaska region from 1990 through 2002. Capstone could potentially have prevented a much larger share of fatal accidents than of total accidents. More than half of the 54 fatal accidents in the region had causes that Capstone avionics, training, and data address. Most fatal accidents were CFIT accidents, either in cruise flight or on approach or departure. Fatalities in float plane accidents are often pilot or passenger drowning.

Figure 2-4: Fatal Accidents in Southeast, by Cause, 1990-2002



Source: NTSB (2003) Accident and Incident Database

3. Commercial Operations

Information in this section is from several FAA sources and U.S. Bureau of Transportation Statistics.[4] The scope of operations—and in some cases the operators themselves—in the Capstone SE Alaska region change over time. Data on air operations within the region are limited. Departure and enplanement data collected by the U.S. Bureau of Transportation Statistics (BTS) record only scheduled passenger and cargo flights. The only systematic regional data available during the baseline period (1997-2001, with preliminary data for 2002) come from the Terminal Forecast Survey Summary Report, produced by the FAA's Aviation Policy and Plans Office (APO). The APO compiles historical traffic counts from FAA Form 5010, the airport master record.

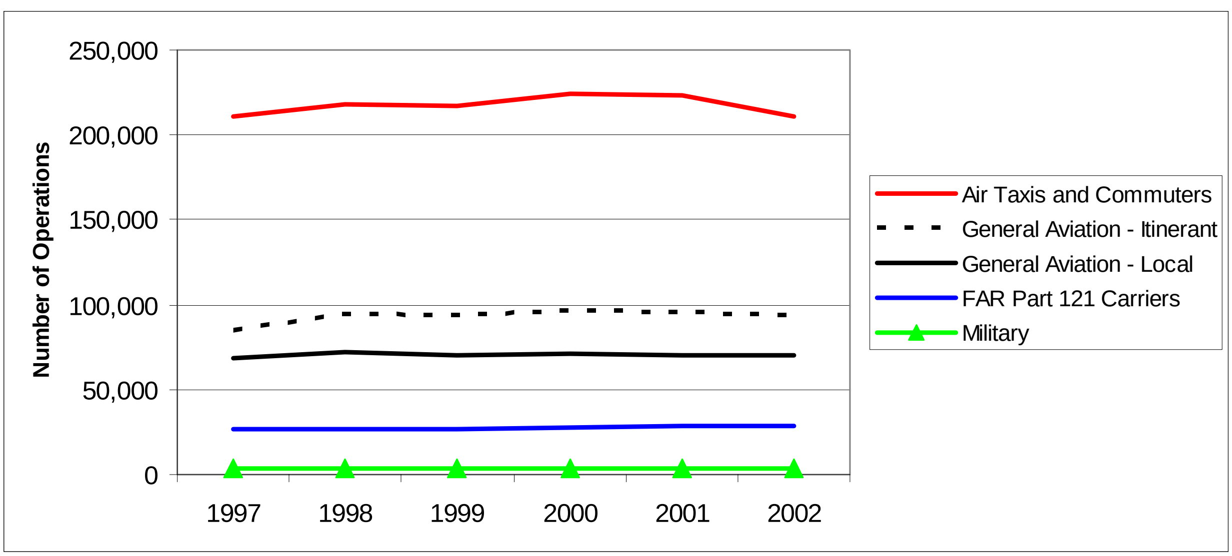
In Juneau, the air traffic controllers report the number of aircraft cleared for take-off or landing. At all other airports in the region, airport managers provide estimates of annual traffic counts. We estimated annual departures by dividing the traffic counts by two. As a result, this method undercounts operations to and from off-airport locations.

In addition, operations data from 1990 to 1996 had fluctuations that could not be attributed to any credible reason. It is difficult to ascertain why the earlier data had these fluctuations, except that many airports without towers did not begin reporting estimates until 1996. Because the data from 1990 to 1996 is likely an inaccurate representation of operations, we have limited our analysis to operations data from 1997 to 2001, with preliminary data for 2002.

3.1. Terminal Operations

Terminal operations information for the Capstone SE Alaska region is from the FAA Office of Aviation Policy and Plans Terminal Area Forecast System. There was little variation in the number of terminal operations reported in the region from 1997 to 2002. Air taxis and commuters comprised more than half (54 percent) of the total regional operations during that period (Figure 3-1).

Figure 3-1: Capstone Southeast Alaska Region Terminal Operations 1997-2002

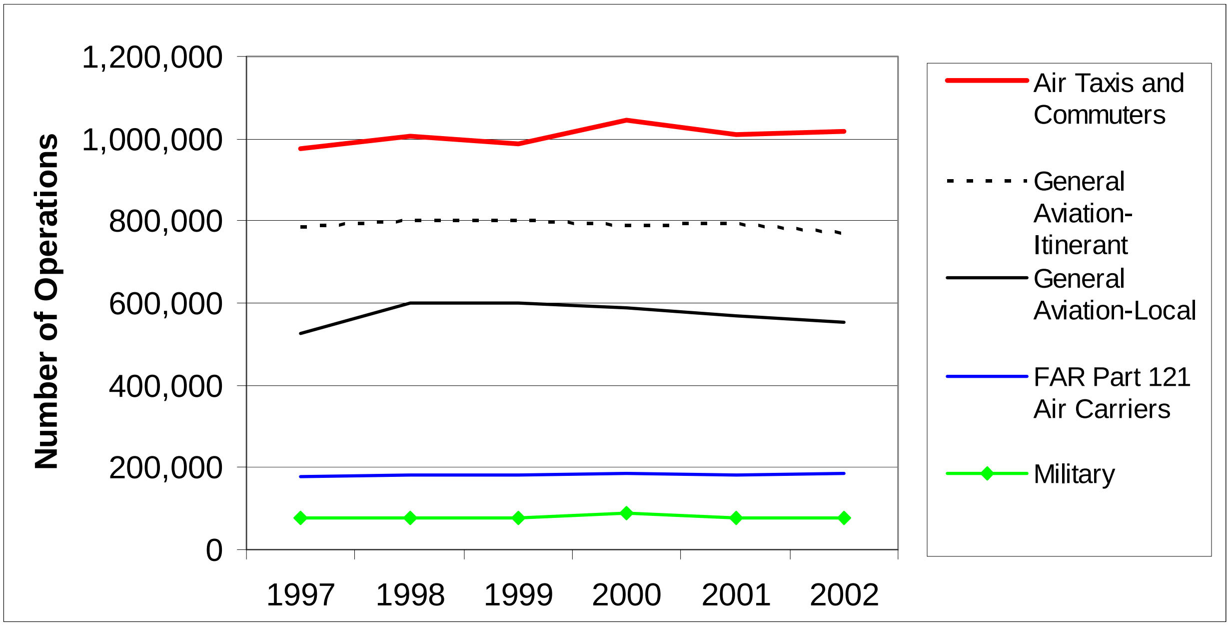


Source: FAA Office of Aviation Policy and Plans Terminal Area Forecast System

[4] The Vital Information System (VIS), June 2001; Capstone web site, http://www.alaska.faa.gov/capstone/status.htm Office of Aviation Policy and Plans Terminal Area Forecast System site, http://www.apo.data.faa.gov/faatafall.htm.

Figure 3-2 shows terminal operations for the entire state of Alaska from 1997 through 2002. Overall and within each category, the number of operations remained relatively constant. Air taxis and commuters represented the largest share (38 percent) of operations statewide.

Figure 3-2: Alaska Terminal Operations 1997-2002



Source: FAA Office of Aviation Policy and Plans Terminal Area Forecast System

3.2. Air Carriers and Commercial Operators

Table 3-1 lists the 40 FAR part 135 operators flying in Capstone's SE Alaska region as of January 2003. Several of these also operate under part 133. These carriers account for most commercial flights in southeast Alaska. Ten operators have their main office presence in Juneau, nine in Ketchikan, five in Cordova, three in Petersburg and Sitka, and ten in smaller communities. These companies employ about 242 pilots, with the largest share (41 percent) employed in Ketchikan, followed by Juneau with approximately 33 percent. These operators fly to most airports in the region, as well as some places outside the area.

Table 3-1: Part 133 and 135 Air Carriers Supervised by the Juneau Regional FAA Office

Air Operator Name	Community
Air Excursions LLC	Gustavus
Yakutat Coastal Airlines	Yakutat
Air Sitka Inc	Sitka
Alaska Coastal Airlines Inc	Juneau
Alaska Juneau Aeronautics Inc	Juneau
Alaska Seaplanes Service LLC	Juneau
Alaska Wilderness Outfitting	Cordova
Les Hartley	Yakutat
Carlin Air (Jeff Carlin)	Ketchikan
Coastal Helicopters Inc	Juneau
Cordova Air Service	Cordova
Misty Fjords Air and Outfitting (David P. Doyon)	Ketchikan
Earth Center Adventures Inc	Haines
Family Air Tours LLC	Ketchikan
Fishing & Flying	Cordova
Harris Aircraft Services Inc	Sitka
L.A.B. Flying Service Inc	Juneau
Tinqmasoon (Edwin Harley Laity)	Sitka
Alaska Fly 'N Fish Charters (Harold J. Laughlin)	Juneau
Island Wings Air Service (Michelle Masden)	Ketchikan
Prince Of Wales Air Taxi (Ronald Nickolas Merfeld)	Craig
North Star Helicopters (North Star Trekking, LLC)	Juneau
Pacific Airways, Inc	Ketchikan
Pacific Wings Inc	Petersburg
Promech Inc	Ketchikan
Nordic Air (Douglas D. Reimer)	Petersburg
Fjord Flying Service (Charles David Schroth)	Gustavus
Scott Air	Craig
Silver Bay Logging Inc	Juneau
Silverado Air Taxi	Cordova
Skagway Air Service Inc	Skagway
Southeast Aviation	Ketchikan
Sunrise Aviation	Wrangell
Tal Air	Juneau
Temsco Helicopters Inc	Ketchikan
Taquan Air (Venture Travel LLC)	Ketchikan
Ward Air Inc	Juneau
Wilderness Helicopters	Cordova
Ronald Ward	Juneau
Kupreanof Flying Service (John N. Williams)	Petersburg

Source: Leonard Kirk, Capstone Program Manager, University of Alaska Anchorage, 2003

3.3. Employees

The majority of the southeast Alaska operators are very small. Table 3-2 groups the 40 companies by the number of pilots they employ. Most (26) are small, employing between one and three pilots. The other 14 companies are about equally divided between those that employ between 4 and 10 pilots and those that employ 11 or more.

Table 3-2. Companies in Capstone SE Alaska Region by Number of Pilots and Location

	Community			
# of Pilots	Juneau	Ketchikan	Other	Total
1-3	3	5	18	26
4-10	4	2	2	8
11 or more	3	2	1	6
Total	10	9	21	40

Source: Leonard Kirk, Capstone Program Manager, University of Alaska Anchorage, 2003

Table 3-3 lists all employees, not just pilots, of the 40 operators in the Capstone SE Alaska region. Keep in mind that some of the operators fly outside as well as within southeast Alaska. The table shows all employees, by job title, (taken from the VIS) of these companies, not just those employees involved in southeast Alaska operations. Over half of the companies have five or fewer employees and over a third are one-person operations. The two largest firms, however, each employ more than 100 persons, including not only pilots but also dispatchers, maintenance personnel, and others.

Table 3-3. Selected Employee Totals by Type, Southeast Operators, June 2001

Type of Employee	Number
Pilot In Command Captains	230
Other Pilots	12
Check Airmen	28
Dispatchers	4
Inspectors	26
Designated Inspectors	25
NonCertificated Mechanics	9
Certificated Mechanics	108
Total Number of Employees	635

Source: FAA Vital Information System, 6/1/2001

3.4. Aircraft as of June 2001

As of June 2001, companies supervised by the Juneau flight standards district office (FSDO) operated 231 aircraft under FAR part 135. Those are shown by type in Table 3-4. Among the aircraft operating under part 135 in 2001, all 51 helicopters and about 7 percent (12) of the 180 fixed wing aircraft had turbine engines. In addition to the aircraft shown in Table 3-4, there were 93 helicopters certified for operations under FAR part 133 (rotor wing external load) and part 137 (agricultural aircraft). Most of these support logging operations, and many of them are also certified to operate under part 135, and so are included in the 51 helicopters in Table 3-4.

Table 3-4. Number of Part-135 Certified Aircraft in the Capstone SE Alaska Region by Type , Make and Model, June 2001

	Number of Aircraft by Type					
Make & Model	Single Engine Land	Single Engine Sea	Multi Engine Land	Multi Engine Sea	Helicopter	Total Aircraft
AS-350					31	31
BE-18				1		1
BE-36	1					1
BHT 206					5	5
BHT 212					2	2
BN 2			2			2
Cessna 172	1					1
Cessna 180	2	3				5
Cessna 185	11	13				24
Cessna 206	25	7				32
Cessna 207	3					3
Cessna 208	4	3				7
CHAMP	1					1
DeHavilland Beaver	5	38				43
DH 3	1	10				11
DH 6				2		2
ECD-EC-135					1	1
FH-1100					1	1
Helio 250	1					1
HU-369					11	11
Piper PA 12	1					1
Piper PA 18	3	2				5
Piper PA 28	8					8
Piper PA 31			4			4
Piper PA 32	26					26
Piper PA 34			2			2
Grand Total	93	76	8	3	51	231

Source: FAA Vital Information System, 6/1/2001

Table 3-5 shows the passenger capacity of these 231 aircraft–689 passengers. Four aircraft are cargo only; passenger aircraft capacities range from one to 19 passengers each.

Table 3-5. Aggregate Passenger Capacity of Part-135 Certified Aircraft in the Capstone SE Alaska Region by Type , Make and Model, June 2001

	Aircraft Type					
Make & Model	Single Engine Land	Single Engine Sea	Multi Engine Land	Multi Engine Sea	Helicopter	Total Aircraft
AS-350	51					51
BE-18			7			7
BE-36				5		5
BHT 206	8					8
BHT 212	14					14
BN 2		9				9
Cessna 172				3		3
Cessna 180				6	12	18
Cessna 185				47	48	95
Cessna 206				89	49	138
Cessna 207				5		5
Cessna 208				27	27	54
CHAMP				1		1
DeHavilland Beaver				28	76	104
DH 3				10	39	49
DH 6			19			19
ECD-EC-135	6					6
FH-1100	3					3
Helio 250				5		5
HU-369	4					4
Piper PA 12				2		2
Piper PA 18				3	3	6
Piper PA 28				12		12
Piper PA 31		27				27
Piper PA 32				34		34
Piper PA 34		10				10
Total	86	46	26	277	254	689

Source: FAA Vital Information System, 6/1/2001

Most of these part 135 aircraft are VFR-only–199 of 233–and over 40 percent of the fixed-wing fleet is certified for VFR daytime operations only. The 34 IFR-certified aircraft represent only four companies.

Table 3-6. Capstone SE Alaska Region Part 135 Aircraft by Type of Operations

Count	Fixed Wing	Helicopter	Total
VFR DAY	80	0	80
VFR (Day & Night)	72	47	119
IFR	30	4	34
Total	182	51	233
Percent	Fixed Wing	Helicopter	Total
VFR DAY	44%	0%	34%
VFR (Day & Night)	40%	92%	51%
IFR	16%	8%	15%
Total	100%	100%	100%

Source: FAA Vital Information System, 6/1/2001

3.5. Avionics

The information on avionics in aircraft used by Capstone SE Alaska region operators in 2001 is taken from the VIS (June 1, 2001), photos of cockpit configurations, owner-operator interviews and data from the FAA's FSDO employees who oversee the operation certificates.

The avionics in these aircraft vary widely, from the minimum required for night VFR to full IFR panels with redundant systems. For example, one aircraft certified for day and night VFR operations is equipped with a single Nav/Com 360 channel radio with VOR receiver. Another twin-turbine aircraft has a much more sophisticated avionics suite and is certified for IFR operations as well as operations in known and forecast icing. Its avionics include dual 720 channel communications radio, dual VOR receivers with ILS and LOC capability, dual DME receivers, dual ADF receivers, dual GPS navigators, transponder, radar altimeter, and weather radar.

The aircraft listed in this baseline study as VFR aircraft generally have radio packages using navigation equipment that is not certified for IFR operations. In most cases the equipment is the original delivered with the aircraft and is therefore at least 20 years old. Operators also install radios that do not meet any FAR requirements and are only for company convenience. These are typically CB radios or marine radios used to talk to station agents in the villages.

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4. Capstone Southeast Alaska Region Aviation Facilities

4.1. Airport Facilities

There are 84 landing facilities in the Capstone SE Alaska region (Table 4-1): 24 airports, 52 seaplane bases, and 8 heliports. Appendix B gives a full list. Most of the facilities–71, or 85 percent—are available for public use. The State of Alaska owns about half (41 of 84) of the facilities. Table 4-2 below shows that five publicly owned heliports and two publicly owned airports are not available for public use; ten privately owned seaplane bases are available for public use.

Table 4-1. Landing Facilities, Capstone SE Alaska Region by Ownership and Type

	Public or Private Use?		
Type of Facility	Private	Public	Total
Airport	3	21	24
Heliport	8		8
Seaplane	2	50	52
Total	13	71	84

Source: FAA Forms 5010, compiled by GCR, Associates as the FAA 5010 database, http://www.gcr1.com

Table 4-2. Landing Facility Use by Ownership, Capstone SE Alaska Region

	Privately Owned	Publicly Owned	Total
Airports			
Private Use	1	2	3
Public Use	0	21	21
Total	1	23	24
Heliport			
Private Use	3	5	8
Public Use	0	0	0
Total	3	5	8
Seaplane Base			
Private Use	2	0	2
Public Use	10	40	50
Total	12	40	52

Source: FAA Forms 5010, compiled by GCR, Associates as the FAA 5010 database, http://www.gcr1.com

Most of these facilities have single runways with minimal navigation, weather monitoring, or other services. Only Juneau International Airport has a control tower. The majority of these facilities (64 of the 84) are unattended, and about half of those attended are during daylight hours only. Only 14 facilities have lighting–13 of the 24 airports, no heliports and one seaplane base (Table 4-3). Fuel is available at 21 facilities–ten airports, ten seaplane bases and one heliport–and repairs at 16 facilities (Table 4-4).

Table 4-3. Lighting, Capstone SE Alaska Region Landing Facilities

Lighting	Airport	Heliport	Seaplane Base	Total
24 Hour	0	0	0	0
Dusk-Dawn	7		1	8
Radio Controlled/Request	6			6
None	11	8	51	70
Total	24	8	52	84

Table 4-4. Services Available, Capstone SE Alaska Region Landing Facilities

	Fuel	
	Yes	No
Fuel Available?	21	63

	Repairs		
	Major or Minor	Minor Only	None
Airframe Repairs	8	8	68
Powerplant Repairs	8	8	68

Source: FAA Forms 5010, compiled by GCR, Associates as the FAA 5010 database, http://www.gcr1.com

4.2. Runway Characteristics

Airports in the Capstone SE Alaska region have 32 runways (28 land runways and 4 water runways), and seaplane bases have 55 water runways and one wooden helicopter pad. Half of the airport runways are paved, one-quarter are gravel, and the remainder are turf or water (Table 4-5).

Table 4-5. Runways in Capstone SE Alaska Region Landing Facilities by Runway Material and Facility Type

	Facility Type			
Surface Type	Airport	Heliport	Seaplane Base	Total
Asphalt	15	1	0	16
Concrete	1	1	0	2
Gravel	8	1	0	9
Turf	4	0	0	4
Water	4	0	55	59
Wood	0	5	1	6
Total	32	8	56	96

Source: FAA Forms 5010, compiled by GCR, Associates as the FAA 5010 database, http://www.gcr1.com

Airport runway lengths range from 1,100 feet (East Alsek River) to 8,456 feet (Juneau International); more than half are less than 150 feet wide (Tables 4-6 and 4-7). Water runway lengths range from 1,000 feet (Excursion Inlet) to 10,600 feet (Bell Island Hot Springs); nearly a third are less than 1,000 feet wide (Tables 4-8 and 4-9).

Table 4-6. Length of Land Runways, Capstone SE Alaska Region Airports

Length	Number of Runways	Percent of Runways
1,000' - 1,999'	8	29%
2,000' - 2,999'	2	7%
3,000' - 3,999'	3	11%
4,000' - 4,999'	2	7%
5,000' - 5,999'	3	11%
6,000' - 6,999'	5	18%
7,000' - 7,999'	4	14%
8,000' - 8,999'	1	4%
Total	28	100%

Source: FAA Forms 5010, compiled by GCR, Associates as the FAA 5010 database, http://www.gcr1.com

Table 4-7. Width of Land Runways, Capstone SE Alaska Region Airports

Width	Number of Runways	Percent of Runways
<25'	3	11%
25' - 49'	3	11%
50' - 74'	4	14%
75' - 99'	3	11%
100' - 124'	4	14%
125' - 149'	0	0%
150' - 174'	11	39%
Total	28	100%

Source: FAA Forms 5010, compiled by GCR, Associates as the FAA 5010 database, http://www.gcr1.com

Table 4-8. Length of Water Runways, Capstone SE Alaska Region Landing Facilities

Length	Number of Runways	Percent of Runways
1,000' - 1,999'	1	2%
2,000' - 2,999'	2	3%
3,000' - 3,999'	4	7%
4,000' - 4,999'	6	10%
5,000' - 5,999'	10	17%
6,000' - 6,999'	3	5%
7,000' - 7,999'	2	3%
8,000' - 8,999'	1	2%
9,000' - 9,999'	5	8%
10,000' - 10,999'	25	42%
Total	59	100%

Source: FAA Forms 5010, compiled by GCR, Associates as the FAA 5010 database, http://www.gcr1.com

Table 4-9. Width of Water Runways, Capstone SE Alaska Region Landing Facilities

Width	Number	Percent of Runways
150' - 499'	10	17%
500' - 999'	8	14%
1,000' - 1,999'	18	31%
2,000' - 2,999'	14	24%
3,000' - 3,999'	2	3%
4,000' - 4,999'	3	5%
5,000' - 6,999'	3	5%
>7,000'	1	2%
Total	59	100%

Source: FAA Forms 5010, compiled by GCR, Associates as the FAA 5010 database, http://www.gcr1.com

4.3. Instrument Approaches

Ten of the Capstone SE Alaska region airports had some form of instrument approach in 2002 (Table 4-10). Stand-alone GPS approaches are proposed for the Juneau, Haines, and Hoonah airports.

Table 4-10. Instrument Approaches to Public Use Airports in the Capstone SE Alaska Region

Airport Name	Runway # (or Circling)	ILS/DME	VOR/DME	LOC/DME	NDB/DME	LDA/DME	ILS	GPS	VOR	NDB	MLS	LOC	LDA
Cordova	27	YES											
Gustavus	29		YES					YES					
	Circling									YES			
Juneau	8									YES			YES
Kake	10				YES			YES					
Ketchikan	11	YES											
	Circling				YES			YES					
Klawock	2				YES			YES					
Petersburg	Circling					YES		YES					
Sitka	11					YES		YES					
	Circling				YES			YES	YES	YES			
Wrangell	Circling					YES		YES					
Yakutat	2		YES					YES					
	11		YES				YES	YES		YES			
	29		YES	YES				YES	YES				

Source: Index of Terminal Charts and Minimums and Dennis Stoner, FAA Anchorage Flight Procedures Office 271-5220

4.4. FAA Facilities

The FAA operates a tower in Juneau and flight service stations (FSS) in Juneau, Ketchikan, and Sitka. The Juneau tower operates from 0600 to 2300 hours (local) from May through September, and 0700 through 2100 hours (local) from October through April. The Juneau and Ketchikan flight service stations operate 24 hours a day, 7 days a week; the Sitka FSS is open from 0600 to 2145 (local), 7 days a week. These facilities provide services to pilots, including weather briefings and traffic control (Juneau tower) or traffic management (the flight service stations).

4.5. Communications Facilities

Communications for pilots flying in the Capstone SE Alaska region are provided by FAA facilities (FSS and towers) and by remote communications outlets (RCOs), remote tower relays (RTRs), and remote communications air to ground facilities (RCAGs) (Table 4-11). The FAA's *Pilot/Controller Glossary* describes these facilities as follows:

Remote Communications Outlet (RCO): An unmanned communications facility remotely controlled by air traffic personnel. RCOs serve FSSs.

Remote Transmitter /Receivers (RTRs): serve terminal ATC facilities. An RCO or RTR may be UHF or VHF and will extend the communication range of the air traffic facility. There are several classes of RCOs and RTRs. The class is determined by the number of transmitters or receivers.

Classes A through G are used primarily for air/ground purposes. RCO and RTR class O facilities are nonprotected outlets subject to undetected and prolonged outages. These facilities were established for the express purpose of providing ground-to-ground communications between air traffic control specialists and pilots located at a satellite airport for delivering en route clearances, issuing departure authorizations, and acknowledging instrument flight rules cancellations or departure/landing times. As a secondary function, they may be used for advisory purposes whenever the aircraft is below the coverage of the primary air/ground frequency.

Remote Communications Air/Ground Facility (RCAG): An unmanned VHF/UHF transmitter/receiver facility used to expand ARTCC air/ground communications coverage and to facilitate direct contact between pilots and controllers. RCAG facilities are sometimes not equipped with emergency frequencies 121.5 MHz and 243.0 MHz.

Table 4-11. Communication Facilities in the Capstone SE Alaska Region

Remote Communication Air Ground (RCAG) Locations	
Annette	Lena Point
Biorka Island	Level Island
Gustavus	Yakutat
Remote Communications Outlet (RCO) Locations	
Angoon	Kake
Annette	Ketchikan
Biorka Island	Klawock
Cape Spencer	Lena Point
Cape Yakataga	Level Island
Duncan Canal	Mt Eyak
Gustavus	Petersburg
Haines	Ratz Mountain
High Mountain	Robert Barron
Hoonah	Skagway
Johnstone Point	Sitka
Juneau	Wrangell
	Yakutat
Remote Transmitter/Receiver (RTR) Locations	
Juneau	Lena Point

Source: FAA Alaska Region, Airway Facilities Office

4.6. Weather Reporting Facilities

Weather data are limited both by the number of reporting stations and by the quality of data they report. The quality of data from any of these sources depends on the type of reporting station. In the Capstone SE Alaska region, there are a number of different station types but most airports have no reporting stations. Weather-reporting stations in the region include:

- *Automated sites:*

  Automated Surface Observation System (ASOS)

  Automated Weather Observation System (AWOS).

  Both types of automated sites report visibility but do not report what phenomena might be obscuring it. For example, one half-mile visibility could result from snow or fog or some other weather condition that we would be unable to determine.
- *A-Paid stations* are remote, non-aviation weather facilities reporting to the NWS for forecasting. These stations gather supplemental weather data at remote locations like lodges to assist the NWS in developing forecast models. A-Paid sites may be of interest to aviators if they are in mountain passes and report visibility. They may be limited by time, either time of day or seasonality.
- *FAA Contract Weather Observation Station (FCWOS),* a station paid by the FAA to provide weather observations; may be limited by time, either time of day or seasonality. .
- *Limited Aviation Weather Reporting Stations (LAWRS),* these provide ceiling and visibility information and may be limited by time, either time of day or seasonality.
- *Weather Service Office (WSO),* manned; provides area forecasts and terminal forecasts.

Table 4-12 lists the number of each type of weather reporting stations; because some locations have multiple types of weather station, the 24 stations are in only 18 locations. Table 4-13 lists the weather facilities by location.

Table 4-12. Weather Facilities by Type, Capstone SE Alaska Region

Type of Facility	Number
ASOS	10
AWOS	7
A-Paid	4
FCWOS	2
LAWRS	1
WSO	1
Total Unduplicated Locations	18

Note: Weather facilities are counted in each reporting type category that is applicable; the same facility may be listed in more than one type category

Source: NWS at http://www.alaska.net/~nwsar/station-identifiers.html, July 5, 2001

Almost all the current weather observations for pilots in the region are from 16 automated weather stations. As table 4-13 shows, there is some level of staffing at 7 of the 18 locations (the four A-paid, two FCWOS, the LAWRS and the WSO), but 24-hour automated observations at those locations provide most of the weather information pilots receive.

Table 4-13. Weather Facilities by Location, Capstone SE Alaska Region

Location	Station Identifier	Type of Reporting	Operated By
Annette	PANT	ASOS	NWS
Elfin Cove	PAEL	Apaid	NWS
Cordova	PACV	ASOS	FAA
Gustavus	PAGS	AWOS/Apaid	FAA
Haines	PAHN	ASOS	NWS
Hoonah	PAOH	AWOS/Apaid	FAA
Hydaburg	PAHY	AWOS	FAA
Juneau	PAJN	ASOS/FCWOS/LAWRS	FAA
Kake	PAFE	AWOS	FAA
Ketchikan	PAKT	ASOS	FAA
Klawock	PAKW	ASOS	NWS
Metlakatla	PAMM	AWOS	FAA
Petersburg	PAPG	AWOS	FAA
Port Alexander	PAAP	Apaid	NWS
Sitka	PASI	ASOS	FAA
Skagway	PAGY	ASOS	NWS
Wrangell	PAWG	AWOS/FCWOS	FAA
Yakutat	PAYA	ASOS/WSO	NWS

Source: NWS at http://www.alaska.net/~nwsar/station-identifiers.html, July 5, 2001

In addition to weather reporting stations, pilots can now access "Weather Cams" over the internet. These cameras provide pilots with internet access a real-time look in several directions from the camera location, and in some cases a loop showing hourly weather images over the preceding several hours. Cameras may be off-line, or pilots may not have adequate internet access to use them. However, pilots and operators have generally been very positive about weather cameras, and they add significantly to the current weather data available to pilots before they take off. There are nine weather camera locations in the Capstone SE Alaska region (Table 4-14).

Table 4-14. Weather Cameras by Location, Capstone SE Alaska Region

Location	Camera Directions			
Cape Yakataga	East	Northwest		
Gustavus	East	West		
Haines	West	North	Southeast	
Johnstone Point	West	North	East	South
Lena Point	Southeast	West	North	
Level Island	Southeast	Northeast	Northwest	
Pederson Hill	North	East	South	West
Sisters	East	Southeast	West	
Sitka	Northwest	South		

Source: FAA, http://akweathercams.faa.gov/wxcams/map.php

4.7. Navigation Facilities in the Capstone Southeast Alaska Region

Table 4-15 summarizes navigation facilities available to aviators in the Capstone SE Alaska region.

Table 4-15. Navigation Facilities in the Capstone SE Alaska Region

Name	Ident	Kind	Range	Lat	Long
Clam Cove	CMJ	NDB	Terminal	55N	131W
Coghlan Island	CGL	NDB	Low Level	58N	134W
Elephant	EEF	NDB	Low Level	58N	135W
Fredericks Point	FPN	NDB	Low Level	56N	132W
Glacier River	GCR	NDB		60N	144W
Gustavus	GAV	NDB	High and Low Level	58N	135W
Haines	HNS	NDB	Low Level	59N	135W
Mendenhall	MND	NDB	Low Level	58N	134W
Mount Edgecumbe	IME	NDB	Low Level	57N	135W
Nichols	ICK	NDB	High and Low Level	55N	131W
Ocean Cape	OCC	NDB	High and Low Level	59N	139W
Sitka	SIT	NDB	High and Low Level	56N	135W
Sumner Strait	SQM	NDB	Low Level	56N	133W
Yakataga	CYT	NDB		60N	141W
Kake	AFE	NDB-DME	Low Level	56N	133W
Klawock	AKW	NDB-DME	Terminal	55N	133W
Level Island	LVD	VOR-DME	High and Low Level	56N	133W
Annette Island	ANN	VORTAC	High and Low Level	55N	131W
Biorka Island	BKA	VORTAC	High and Low Level	56N	135W
Johnstone Point	JOH	VORTAC	High and Low Level	60N	146W
Sisters Island	SSR	VORTAC	High and Low Level	58N	135W
Yakutat	YAK	VORTAC	High and Low Level	59N	139W

Source: Falling Rain Genomics at http://www.fallingrain.com/air/cache/geo/USAK/nav.html 5 July 01

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5. Safety programs

5.1. FAA Requirements

Air carrier safety programs vary from extensive systems of procedures and training requirements to one-page statements of safety goals. Requirements for safety programs vary according to which federal aviation regulations (FARs) govern the flights a carrier operates. In general, carriers that operate under part 135 have wide latitude about how they structure and operate their safety programs. There are no requirements under part 135 for a director of safety or a formal safety program.

After the initiation of Capstone Phase I in southwest Alaska and prior to the initiation of Phase II in southeast Alaska, the Alaska Air Carriers Association began a safety initiative now funded as the Medallion Foundation. This program is designed to help air carriers improve their safety records by operating at a higher standard than is required. At the time of this report, five of the FAR 135 operators eligible to participate in Capstone in southeast Alaska are participants in the Medallion program and are building significant safety programs. The Medallion Program description is available at http://www.medallionfoundation.com.

5.2. Operator Safety Programs

All the air carrier certificates held by the Juneau Flight Standards District Office (FSDO) are either FAR 133 or 135 (Table 3-1). The FAA does not require directors of safety for air carriers operating under these regulations. Although they are not required to have directors of safety, the five southeast Alaska operators that are Medallion participants do have directors of safety and defined safety programs. None of the non-Medallion operators have defined safety programs. Discussions with operators made it clear they are unlikely to establish such programs unless required to do so under FAR 133 or 135.

None of the potential Capstone operators in southeast Alaska are required to use certificated aircraft dispatchers. Although some operators do use dispatchers, they are all defined in the operations manuals as flight followers or schedulers. Flight followers and schedulers are not directly responsible for any safety decisions. They provide flight following as part of their duties, which include aircraft and crew scheduling duties. Safety decisions, including Go/NoGo decisions, are the responsibility of the pilots, chief pilots, and directors of operations for these operators.

6. FAA Surveillance

The Federal Aviation Administration's Alaskan Region has one Flight Standards District Office in Juneau (designated FSDO-5) supervising air carriers in southeast Alaska and westward along the Gulf of Alaska as far as Cordova. The FSDO has air carrier safety inspectors for each operator in its area. Different inspectors cover operations, airworthiness, and avionics; they may be assigned only one air carrier or a number of air carriers, depending on the size and complexity of those carriers.

There is not a single focal point of aviation activity in the Capstone SE Alaska region. Operators fly-from numerous bases, including Ketchikan, Juneau, Sitka, Cordova, Yakutat, Wrangell, Petersburg and Anchorage. The inspectors from Juneau and Anchorage travel widely in the region to provide operator surveillance.

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7. Weather

7.1. Common Weather Hazards in the Capstone SE Alaska Region

Aviation weather hazards in the Capstone SE Alaska region include several conditions that create poor visibility and low ceilings. The FAA's Advisory Circular 00-6A on aviation weather defines the common weather hazards. Historical weather reports allow us to estimate how frequently these hazards occur and how often the weather conditions approach operational limits as defined in FARs. However, as we will discuss below, historical and current weather data are often not adequate for precise measurements of "how often" and "how much of the time."

Fog is a surface-based cloud of water droplets or ice crystals. It is the most frequent cause of surface visibility below 3 miles, and is one of the most common and persistent weather hazards in aviation (AC 00-6A pg. 126). Two types of fog occur frequently in southeast Alaska and along the Gulf Coast. *Advection fog* forms when moist air moves over colder ground or water. It is most common along coastal areas (AC 00-6A pg. 127). *Ice fog* occurs in cold weather when the temperature is below freezing (AC 00-6A pg. 128). Sunshine during the day can warm the fog and lift fog layers off the surface or evaporate them; however, fog tends to persist during the short hours of daylight during the winter.

Low stratus clouds may reduce ceilings below minimum safe levels. In many cases there is no line of distinction between such clouds and fog; one gradually merges into the other. Visibility may approach zero (AC 00-6A pg. 128). High winds over snow-covered terrain create *blowing snow* that can reduce visibility to near zero at ground level, even under clear weather conditions (AC 00-6A pg. 130).

Finally, *precipitation*—rain, snow, drizzle, freezing drizzle, and freezing rain—commonly presents ceiling and visibility problems.

7.2. Weather Variability

Capstone's Southeast Alaska region stretches from Cordova to the south tip of Prince of Wales Island, the most southern portion of Alaska. The area is a marine environment with extremely variable weather and frequent storm systems with low ceilings and fog. Many destinations in the area do not have weather reporting facilities. Operators depend on area forecasts and pilot reports to make Go/NoGo decisions. Some flight routes have long distances between weather stations; for example, the route from Yakutat to Sitka is 201 nautical miles between weather stations.

Table 7-1 shows examples of flight routes without enroute or destination weather reports. All these routes are entirely in coastal areas where advection fog is common due to moist air being moved onshore by normal cyclonic flow around lows and cooled by cold ground. This often results in destination weather with low ceilings and visibility. Aviators may fly longer than one hour—assuming a cruising speed of 110 nautical miles an hour for the typical single-engine aircraft used in southeast Alaska—on some routes without the benefit of weather reports.

Table 7-1. Typical Southeast Alaska Routes Without En Route and Destination Weather Reports

Route	Distance (nautical miles)
Juneau (JNU) to Elfin Cove (ELV)	80
Ketchikan (KTN) to Port Alice (16K)	80
Sitka (SIT) to Whale Pass (96Z)	100
Sitka (SIT) to Port Protection (19P)	75

Source: Leonard Kirk, UAA Capstone Office

7.3. Weather Data Summary

Analyzing weather is an important tool in comparing activities over the course of this study. Several organizations compile historical weather data:

1) The National Weather Service, in cooperation with the U.S. Army Corps of Engineers, and the Institute of Agricultural Sciences, University of Alaska
2) The Environmental Data Service and Air Weather Service of the U.S. Air Force
3) The Alaska Weather Almanac
4) NOAA records of historical weather (the Alaska Climate Data Center contains archives of NOAA weather observations for all locations in Alaska from 1992 to the present.)
5) The Western Regional Climate Center (WRCC) is one of six regional climate centers in the United States administered by NOAA's National Climatic Data Center. The WRCC performs several distinct functions, including maintaining historical climate databases for western states observation stations and responding to public inquiries for climate information.

For this analysis we obtained a consistent and complete set of weather data for the entire period from the Western Regional Climate Center. We received hourly ASOS reports, taken from NWS and FAA stations in the region. Table 7-2 shows weather reporting locations we used for our analysis and type of report each provides. Data came in the form of delimited text; we imported the data into SPSS, and then cleaned the data using a combination of syntax scripts and visual inspection. Cleaning the data included dropping corrected observations, assuring that values appeared in the respective fields, and picking out instances of repeated observations. We then matched in data from the U.S. Naval Observatory identifying civil twilight each day, allowing us to categorize observations by day and night.

Table 7-2. Weather Reporting Sites for Historical Analysis

Location	Weather Station Identifier	Type of Reporting
Juneau	PAJN	ASOS. FAA
Ketchikan	PAKT	ASOS. FAA
Sitka	PASI	ASOS. FAA
Yakutat	PAYA	ASOS. NWS

Source:
Western Regional Climate Center Desert Research Institute http://www.wrcc.dri.edu
U.S. Naval Observatory http://aa.usno.navy.mil/data/docs/RS_OneYear.html

We wanted to summarize the weather over a period of time, so we could later compare weather during the study period with weather during the baseline. We categorized each weather observation based on the classes described in Table 7-3, and generated tables and graphs by aggregating data by day and month, night and day, and community, and then by weather class.

Table 7-3 Weather Classes for Baseline Weather Analysis

Class 0	Ceiling less than 500' and visibility less than 1 mile
Class 1	Ceiling 500' or greater and visibility 1 mile or greater.
Class 2	Ceiling 500' or greater and visibility 2 miles or greater
Class 3	Ceiling 1000' or greater and visibility 3 miles or greater.
Class 4	Ceiling 2000' or greater and visibility 3 miles or greater.
Class 5	Ceiling 10,000' or greater and visibility 6 miles or greater.

Weather Observations

Figures 7-1 to 7-4 show the percentage of total observations within each weather class (zero to five) that occurred during the daytime. Looking across from 1998 to 2002, we can see that the weather is fairly consistent year to year in all locations. There was very little annual variance, with the exception of the years 1998 and 2001. The data suggest that during these two years there was a higher frequency of observations above Basic VFR conditions overall. The difference, however, does not suggest any extreme annual weather changes in the region as a whole.

Figure 7-1

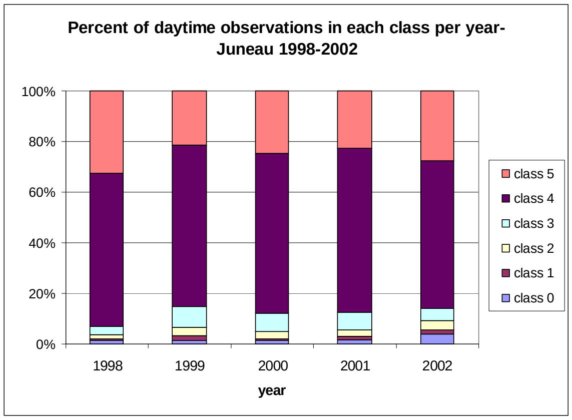


Figure 7-2

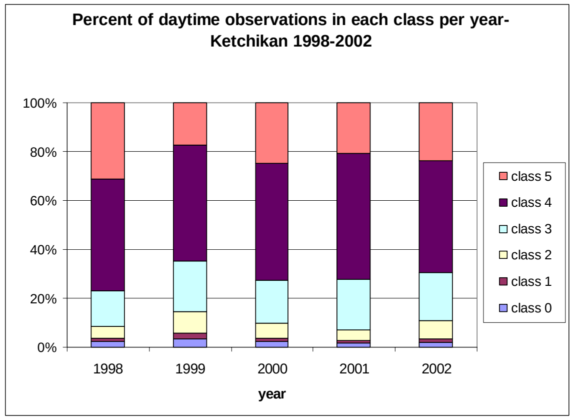


Figure 7-3

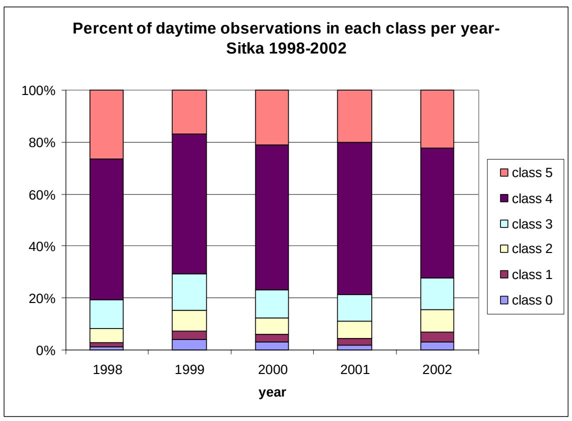
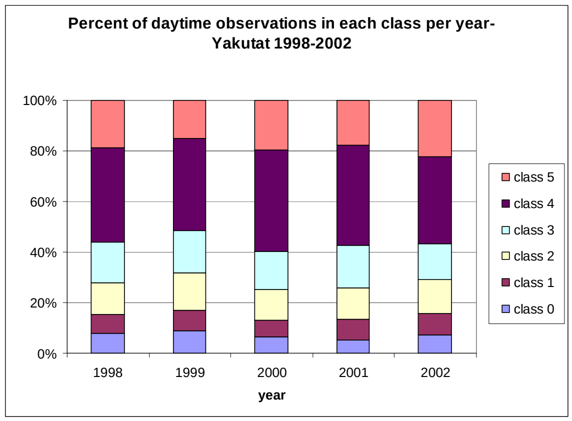


Figure 7-4



Source: *Western Regional Climate Center Desert Research Institute* *http://www.wrcc.dri.edu/*

U.S. Naval Observatory *http://aa.usno.navy.mil/data/docs/RS_OneYear.html*

Figures 7-5 to 7-12 graph the percentage of days and nights during which there was at least one observation when the weather was below basic Visual Flight Rules criteria (class 2 from table 7-3). We present the data by month (e.g., the average of the five January months, 1998 to 2002) to illustrate how typical weather varies by month. Note that there are more daytime observations during summer months and fewer during the winter. Figures 7-5 and 7-6 show Juneau day and night data, 7-7 and 7-8 show Ketchikan, 7-9 and 7-10 show Sitka, and 7-11 and 7-12 show Yakutat. This set of figures focuses on how often the weather is bad in each community.

Figure 7-5

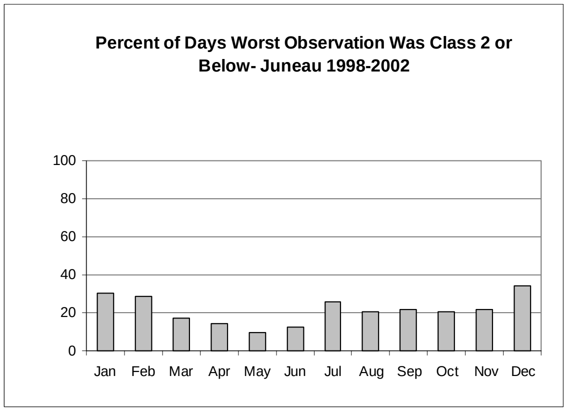


Figure 7-6

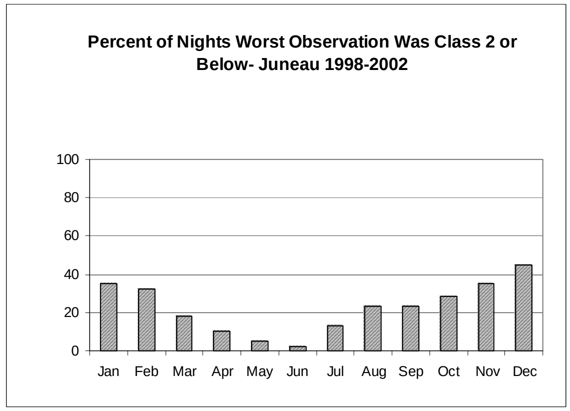


Figure 7-7

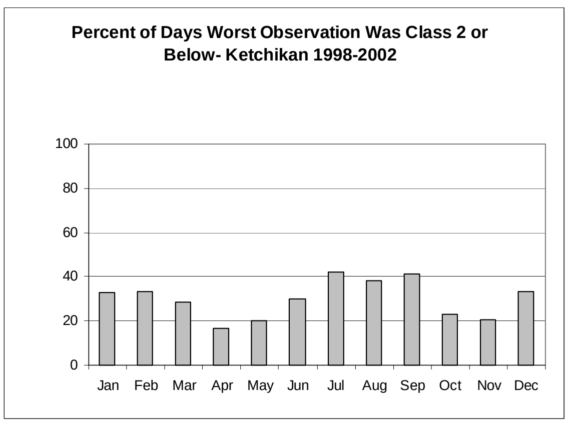
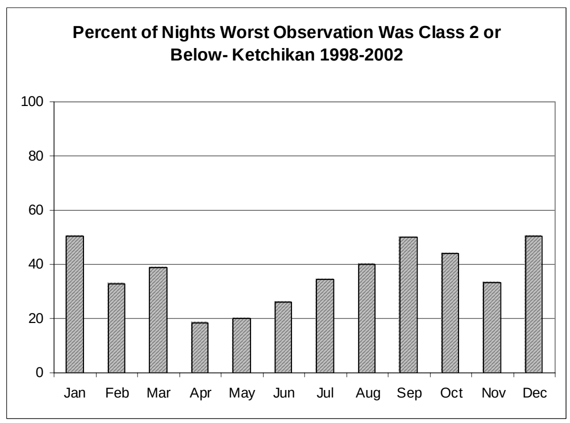


Figure 7-8



Source:
Western Regional Climate Center Desert Research Institute *http://www.wrcc.dri.edu/*

U.S. Naval Observatory
http://aa.usno.navy.mil/data/docs/RS_OneYear.html

Figure 7-9

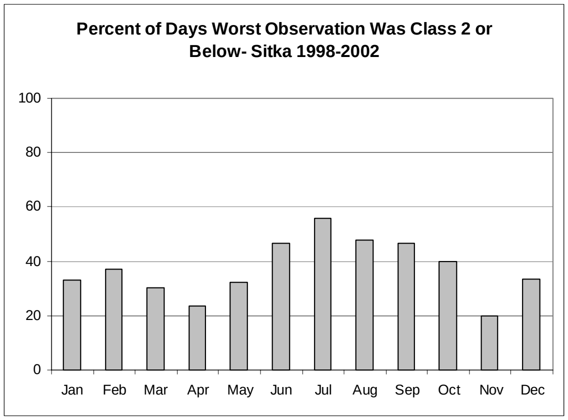


Figure 7-10

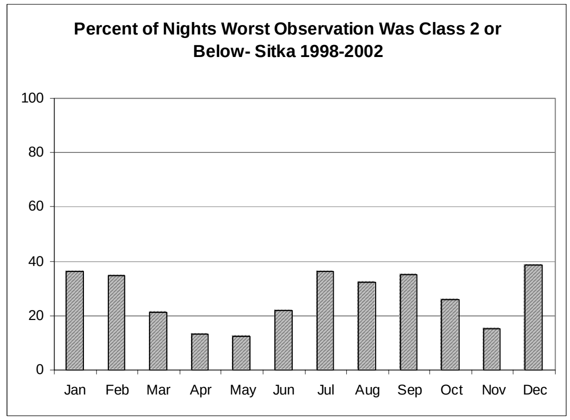


Figure 7-11

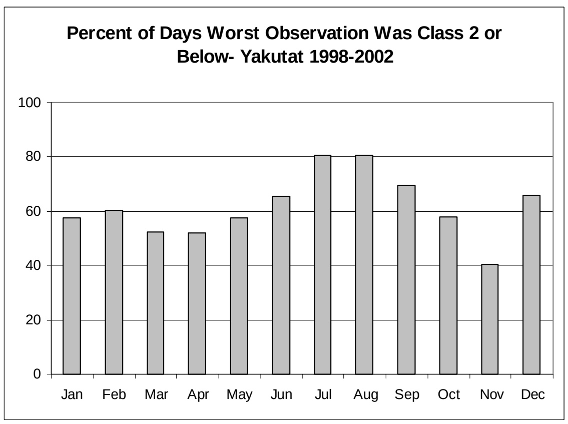
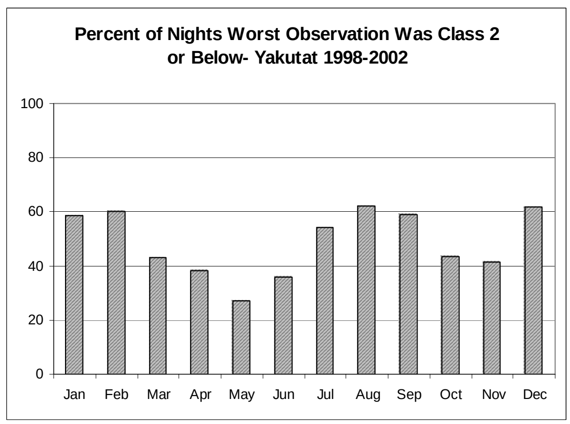


Figure 7-12



Source:
Western Regional Climate Center Desert Research Institute[*http://www.wrcc.dri.edu/*](http://www.wrcc.dri.edu/)

U.S. Naval Observatory
[*http://aa.usno.navy.mil/data/docs/RS_OneYear.html*](http://aa.usno.navy.mil/data/docs/RS_OneYear.html)

The next graphs, 7-13 to 7-20, parallel the previous set of graphs (7-5 through 7-12), but this time focusing on how often the weather is good. They show the percent of days during which the best observation was class 4 or better (Night VFR criteria or better). In most months, there was some time in every day when pilots could fly in VFR.

Figure 7-13

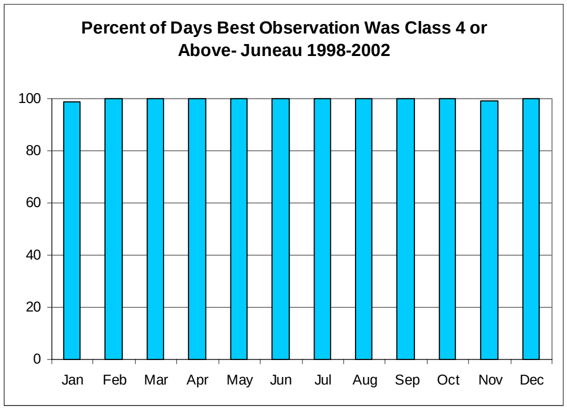


Figure 7-14

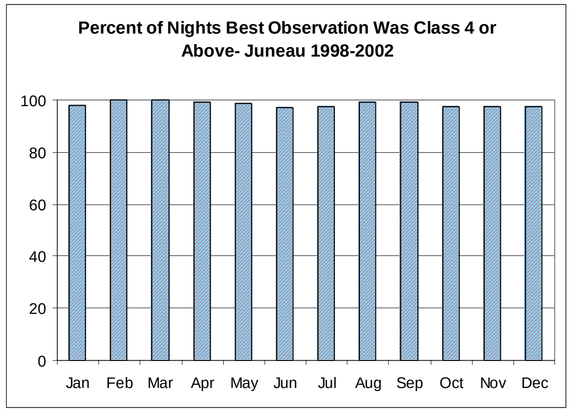


Figure 7-15

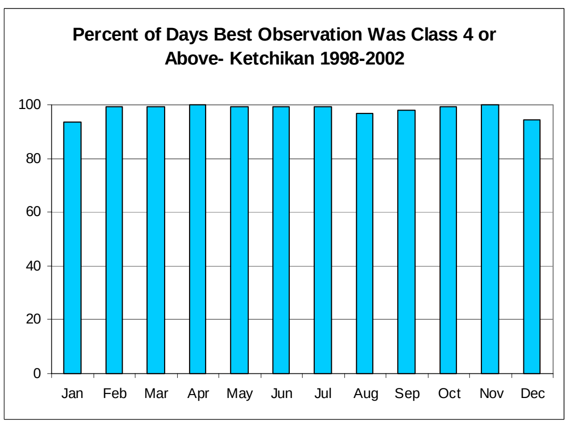
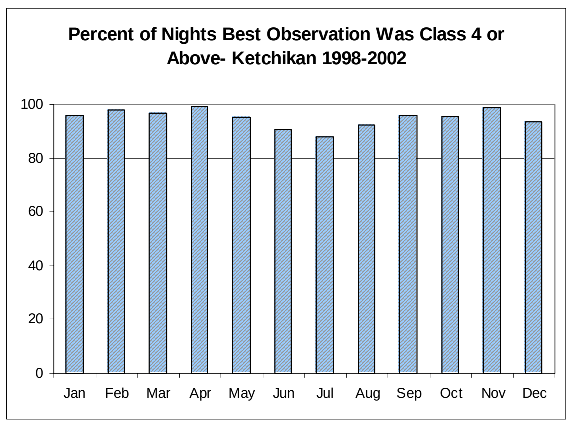


Figure 7-16



Source:
Western Regional Climate Center Desert Research Institute *http://www.wrcc.dri.edu/*

U.S. Naval Observatory
http://aa.usno.navy.mil/data/docs/RS_OneYear.html

Figure 7-17

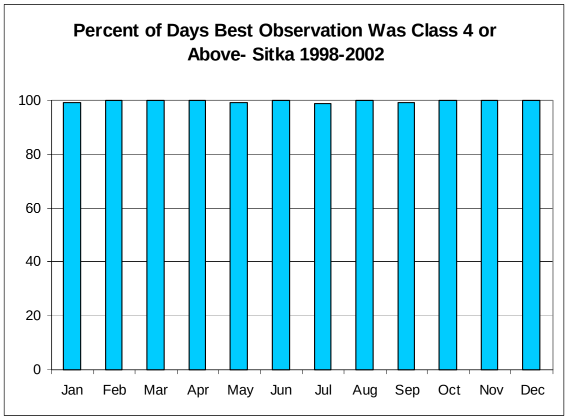


Figure 7-18

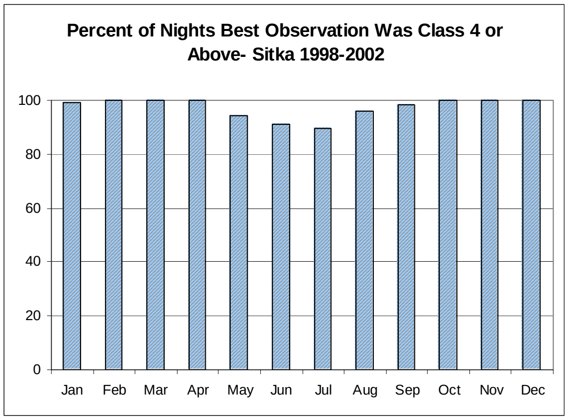


Figure 7-19

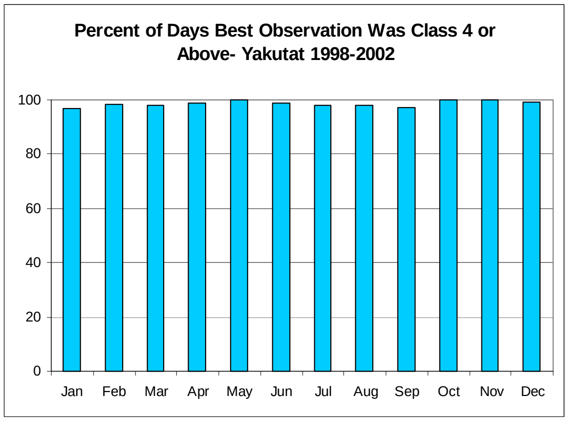
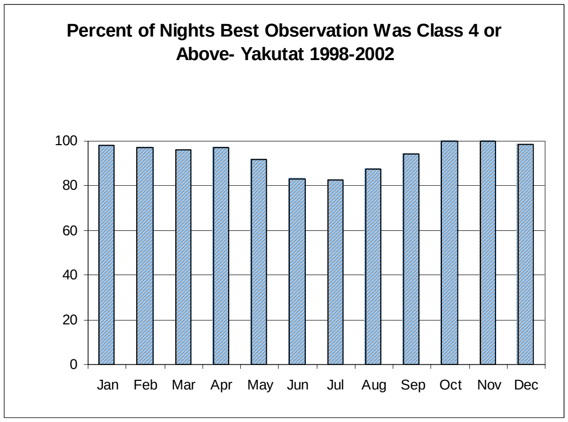


Figure 7-20



Source:
Western Regional Climate Center Desert Research Institute
http://www.wrcc.dri.edu/

U.S. Naval Observatory
http://aa.usno.navy.mil/data/docs/RS_OneYear.html

We have not analyzed how long those good weather periods lasted, and on some days the good weather was probably brief. For example, Juneau December weather observations show many low-classed (poor weather) and high-classed (good weather) observations. That means that pilots may take off in good weather but return in poor weather. Figures 7-21 to 7-28 show how many days each month showed this sort of variable weather. This occurrence is graphed out in figures 7-21 to 7-28 as the percentage of days with variable weather.

We define variable weather days as those on which the best weather observation met Basic VFR minimums of 1,000' ceiling, 3 miles visibility and the worst weather observation did not meet Day En Route VFR minimums of 500' ceiling, 2 miles visibility. These days represent higher danger because the weather changes markedly. On such days, pilots may be lured into flight during the good weather moments, but the weather may deteriorate before the flight is finished. Taking Juneau for example, the graph of variability (days with good and bad weather, 7-21) is nearly the same as the graph of below VFR days (7-5). With nearly every bad-weather day including some time with weather good enough for VFR flight, the scenario above can occur frequently. It is important to note these monthly and daily trends while trying to incorporate weather information and flight safety. Many accidents are weather or visibility related, so understanding the variance of weather as well as its typical trends can help explain this correlation.

Figure 7-21

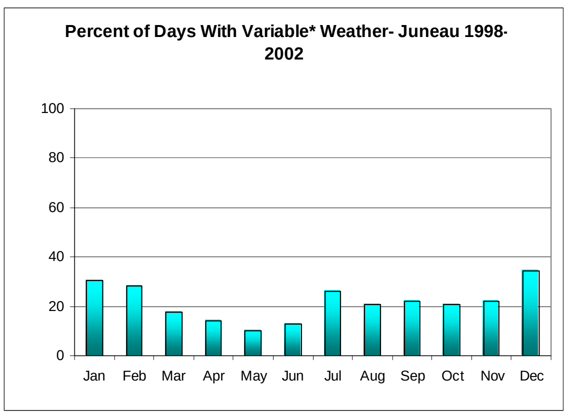


Figure 7-22

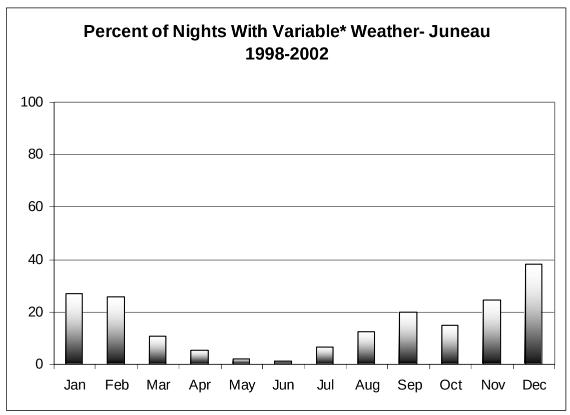


Figure 7-23

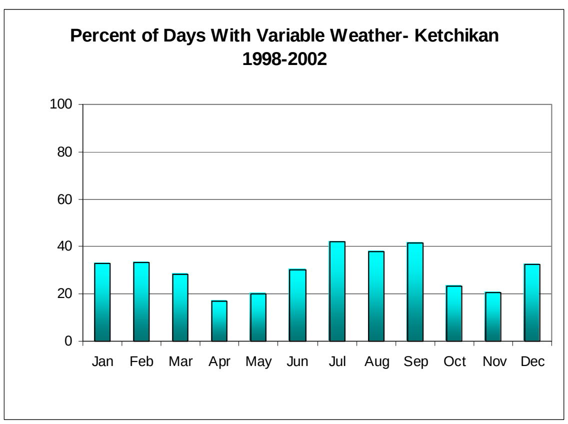
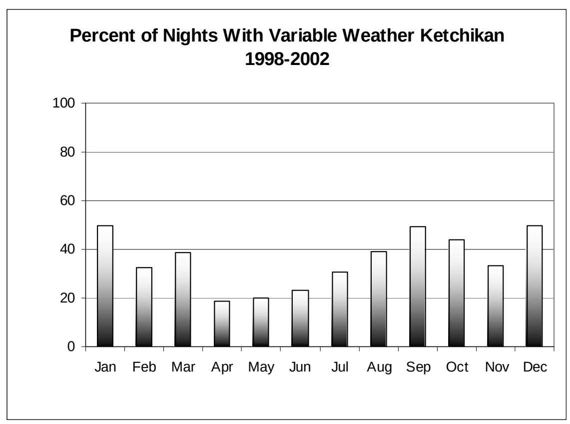


Figure 7-24



Source:
Western Regional Climate Center Desert Research Institute http://www.wrcc.dri.edu/

U.S. Naval Observatory
http://aa.usno.navy.mil/data/docs/RS_OneYear.html

Figure 7-25

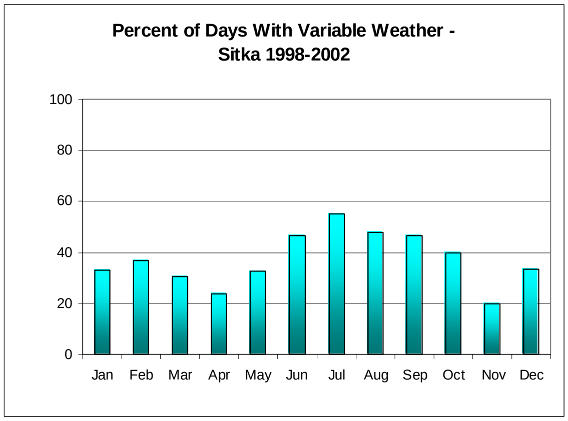


Figure 7-26

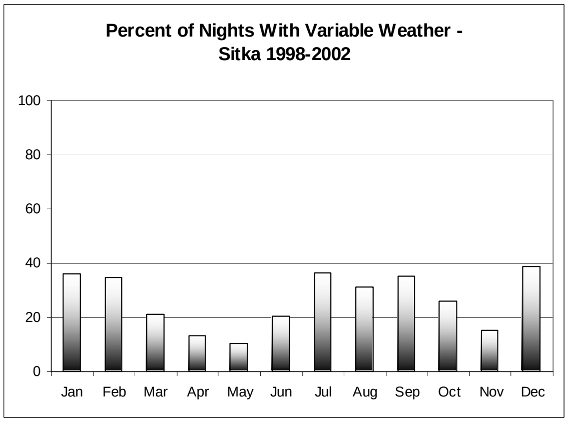


Figure 7-27

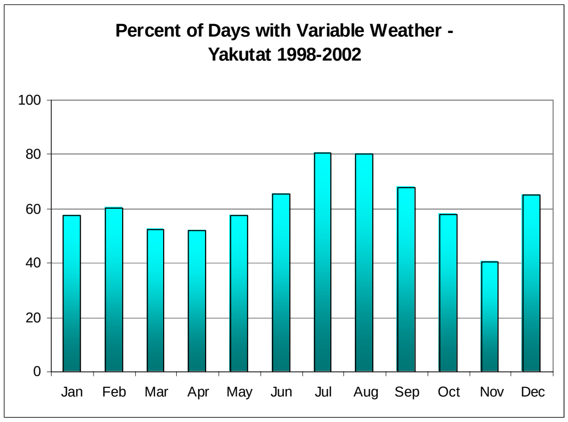
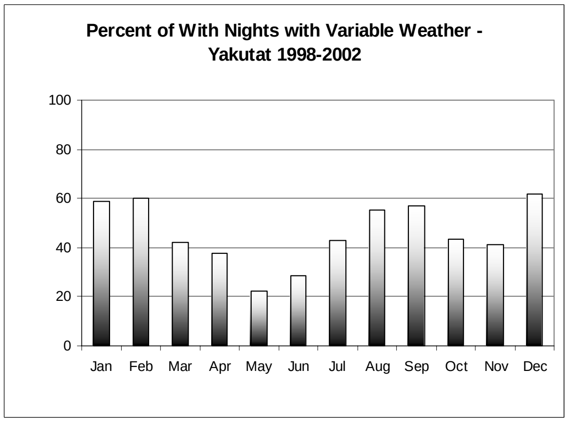


Figure 7-28



Source
Western Regional Climate Center Desert Research Institute
http://www.wrcc.dri.edu/

U.S. Naval Observatory
http://aa.usno.navy.mil/data/docs/RS_OneYear.html

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8. Baseline Surveys

8.1. Purpose

To assess the effects of the Capstone program on air safety in its southeast Alaska region, we need to control for other factors that might also affect safety in that area. Among those are changes in the qualifications and experience of Capstone area pilots during the study period; changes in company operations and policies; and other safety initiatives in the region. To assess how these factors might change, we collected baseline data from air carriers supervised by the Juneau FSDO and from their pilots.

These surveys were part of a larger effort to collect information about qualifications, practices, and attitudes of pilots and company management for aviation operators in Alaska. ISER developed and conducted most of these surveys as part of a contract with the National Institutes for Occupational Safety and Health (NIOSH) in the fall and winter of 2001/2002, and we conducted additional surveys in April 2003. Those surveys added three companies that had not been part of our initial sample and added Capstone attitude questions as well. Full details of our survey methodology, copies of the survey instruments, and frequency counts are included as appendixes.

8.2. Results

Operators

Our operator survey universe consisted of all the air carriers supervised by the FAA's Juneau Flight Standards District Office (FSDO) and pilots who worked for them. Our NIOSH sampling design called for attempting to interview all operators who employed three or more pilots, and interviewing a sample of operators with only one or two pilots. We obtained 20 operator interviews and 38 interviews with southeast pilots in 2001/2002, and added three more operators when we returned in April 2003. Table 8-1 shows the operators we interviewed.

Table 8-1. Companies Included in Southeast Baseline Interviews

Pacific Wing	Air Excursions
Family Air Tours LLC	AK Seaplanes Svc
Misty Fjords Air & Outfitting	AK Juneau Aeronautics
Prince of Wales Air Taxi	Venture Travel
Nordic Air	LAB Flying Svc
Sunrise Aviation	Skagway Air Service
Gulf Air Taxi	Coastal Helicopters
Southeast Aviation	Silver Bay Logging
Pacific Airways	Promech Inc
Island Wings Air Svc	Temsco Helicopters
Harris Aircraft Services	Sitka Air
North Star Helicopters	

Survey results covered a wide variety of topics. These operators ranged from employing only one pilot to as many as 27 pilots (while at their peak summer operations). Seasonality of pilot employment was evident; on average, the number of pilots employed across all 23 companies was 7.96 in the summer and only 3.24 in the winter. Reflecting the importance of air taxi and charter service to southeast aviation, companies flew, on average, more than twice as many unscheduled hours as scheduled: 2,248 unscheduled hours in 2000, compared with 1,006 scheduled hours that year. The importance of unscheduled service is further underscored by the fact that only about 30 percent of our respondents thought that on-time delivery of cargo, passengers, or mail was "very important" to the financial success of their company—about the same share as those who said such factors didn't apply to their companies.

Together, the companies we surveyed accounted for about 80 new pilot hires each year. They cited a variety of qualifications as important in hiring, including experience flying in southeast Alaska, pilot safety history, recommendations, flight evaluation, ability to handle stress and make good decisions, maturity, attitude, personality, and formal training.

We asked whether company management thought that each of 17 possible safety measures could be very effective, somewhat effective, or not effective at improving aviation safety in Alaska. We then asked them to pick the three most important. Table 8-2 shows the result of this ranking. Although pilot training for better decision making was the highest ranked single measure, four of the five weather-related measures ranked in the table—so weather information was clearly the greatest concern.

Table 8-2. Safety Measures Operators Ranked as One of the Two Most Important

Description	# of Respondents
Pilot training Improvements	
b. Pilot training improvements in decision-making	13
d. Pilot training improvements in regional hazards	2
Company Policies and procedures	
g. Pay based on salary rather than flight hours or flights	3
h. More flight time required of new pilots	4
i. Better checks of a pilot's flying history before hiring	2
Weather	
j. More locations with manned weather reporting	6
l. Increased accuracy of existing weather reporting	2
m. Increased and improved use of video cameras, such as mountain pass cameras	10
n. Improved passenger understanding of weather hazards	1
Operating Environment	
q. Financial incentives (e.g., lower insurance rates, preference in mail contracts) for flights or flight hours without accidents/incidents	2

Operator Opinions about Capstone

In April 2003, we asked 12 southeast operators, all of whom had some familiarity with Capstone's Phase II program, about their expectations for and beliefs about Capstone. We asked first about 11 potential benefits to aviation in southeast Alaska, asked what other benefits (if any) they expected to see, and which three benefits they though were the most important. Table 8-3 summarizes which benefits most operators expect to value the most.

Table 8-3. Top Potential Capstone Benefits Southeast Alaska Operators Expect, April 2003

Benefit	# of Responses
j. Improved terrain awareness for pilots	9
d. Fewer near mid-air collisions	5
k. Improved search and rescue capabilities	4
i. Time savings from direct flights	3
a. Fewer cancelled flights/instrument approaches	2
g. Improved SVFR procedures	2
h. Easier in-flight diversions or re-routes	1
Emergency support	1
e. More useful weather info	1
c. Safer flying in minimum legal VFR conditions	1

Unsurprisingly, the benefits Capstone was primarily designed to provide—terrain awareness and fewer mid-air collisions—are at the top of the list. Southeast operators also rated search and rescue highly, perhaps because of Capstone's successful use during a recent search in southwest Alaska. We did not ask about every aspect of potential benefits. Several operators cited as "other benefits" new minimum enroute altitudes for some southeast Alaska routes, although these did not make their "most important three" lists.

We asked about potential Capstone problems stemming from heavier cockpit workloads, less heads-up time, or congested point-to-point routes. Most of our respondents (10, 7, and 11 respectively) thought these would be at most minor problems. However, respondents cited as possible other problems overconfidence, using equipment to push the weather, and attempting to use the equipment to fly into instrument meteorological conditions while under visual flight rules. Several also cited concerns about their aircraft being grounded if Capstone equipment failed.

We asked why pilots might choose not to use Capstone equipment; most respondents (7) thought that the potential for the company to watch the aircraft was the only listed reason they agreed with; however, 7 also added that concern about the FAA watching aircraft was also a reason. Table 8-4 shows which of their concerns (both problems with the equipment and reasons not to use it) they considered among the three most serious.

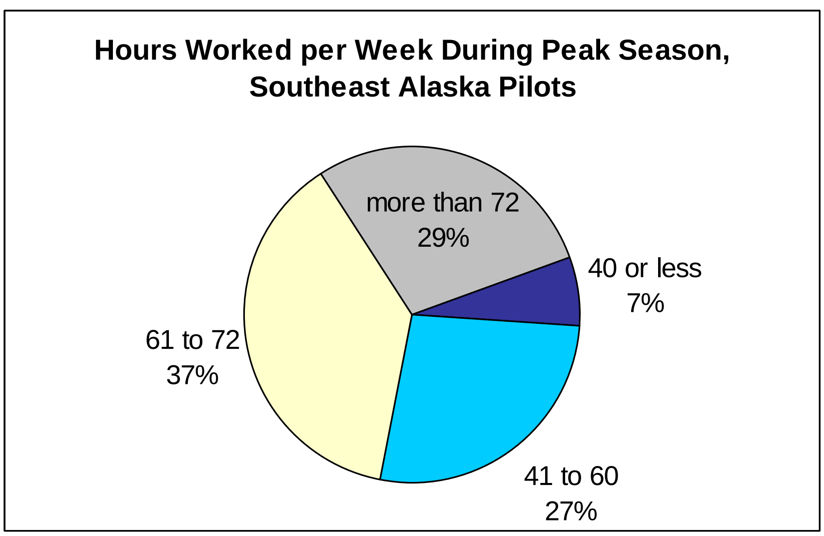
Table 8-4. Most Serious Operator Concerns about Capstone, April 2003	
Problem	**# of Responses**
Too distracting/Less heads-up time	5
Too difficult to use	1
Learning required to upgrade to IFR capability	1
Using equipment in lieu of training/over reliance on equip	2
Maintenance problems	1
Grounding a/c due to equipment problems	3
Don't want company/FAA watching	4
Overconfidence in marginal weather	2
Using equipment for bootleg IFR	1
Don't trust equipment	2
Initial lack of GBT's to receive information at home base	1

Pilot Characteristics

As with pilots throughout Alaska, pilots for our southeast operators have a wide range of experience. Their total flight time ranged from 1,500 to 26,000 hours and Alaska flight time from 300 to 26,000 hours. They averaged over 5,000 hours of flight experience. Not all were qualified and current to fly under instrument flight rules; almost 40 percent had never flown on instruments in Alaska.

As with many Alaska businesses, aviation is busy in the summer months. During peak season, pilots worked an average of 12 hours per day, at least 5 days per week. Figure 8-1 shows the distribution of their reported weekly work hours. Despite these long hours, fewer than one in seven of our pilots reported that fatigue made them wish they could decline a flight as often as once a month.

Figure 8-1



As in southwest Alaska, pilots in the southeast area are very concerned with the weather. We asked about how often they flew into unknown or changed weather conditions and about how accurate they found flight service station weather information. Over 90 percent reported that flight service station weather was accurate always or most of the time. However, as Table 8-5 shows, most also fly into unknown or changing weather on a regular basis. Over 80 percent do so at least monthly. All the pilots who responded told us that they had declined a flight for weather reasons while working for their current employer, and all reported that their employer supported their decisions.

Table 8-5. How Often Do Pilots Fly into Unknown or Changing Weather? (Percent of Respondent Pilots)

	How often do you have to decide whether to fly into unknown weather conditions that may deteriorate below VFR minimums?	How often do you fly into weather that is different from what was predicted when you started your flight?
Daily	24%	15%
Weekly	34%	46%
Monthly	24%	18%
Less than Monthly	16%	21%
Never	3%	0%

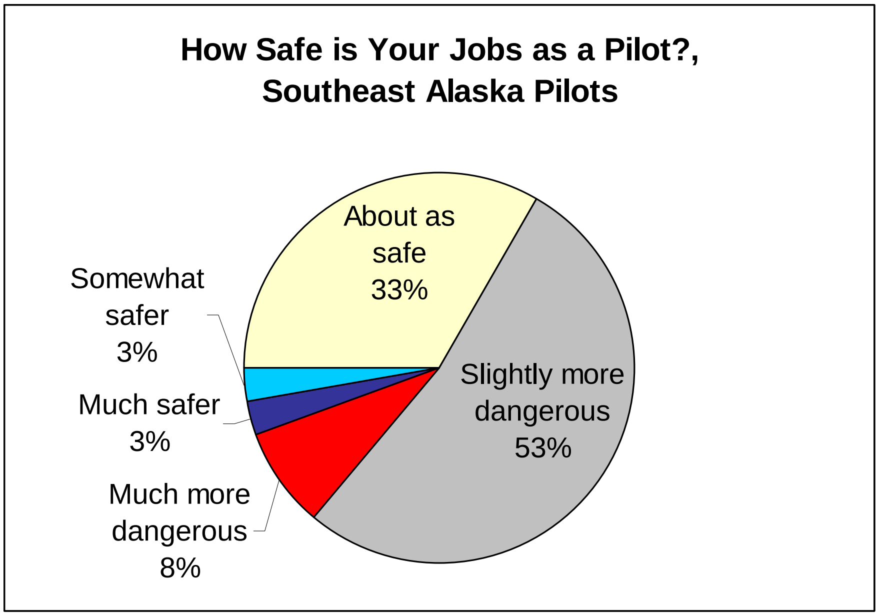
The importance of weather was again shown in pilot responses to the same 17 potential safety measures that we asked operators about. Pilots, like operators, chose more training in pilot decision making as the most important (Table 8-6). Again like operators, pilots said more weather reporting was the second most important measure (although operators chose AWOS stations and pilots chose manned weather reporting). And again, pilots chose four of the five listed weather measures as among the most important. However, pilots saw other types of pilot training (beyond decision making) as also important.

Table 8-6. Safety Measures Pilots Ranked as One of the Two Most Important

Description	# of Respondents
Pilot Training	
a. Pilot training improvements in meteorology	6
b. Pilot training improvements in decision-making	20
c. Pilot training improvements in white-out/flat-light conditions	3
d. Pilot training improvements in regional hazards	4
Company Policies	
f. Rewards from management for flights or flight hours	1
g. Pay based on salary rather than flight hours or flights	5
h. More flight time required of new pilots	5
Weather	
j. More locations with manned weather reporting	12
k. More locations with automated weather reporting	2
l. Increased accuracy of existing weather reporting	3
m. Increased and improved use of video cameras, such as mountain pass cameras	4
Operating Environment	
p. More time to deliver by-pass mail before it's switched to another operator	1
q. Financial incentives (e.g., lower insurance rates, preference in mail contracts) for flights or flight hours without accidents/incidents	9

Finally, pilots in southeast Alaska did not see their jobs as extraordinarily dangerous. As Figure 8-2 shows, fewer than 10 percent thought that piloting was safer than other jobs, but similarly few thought that it was much more dangerous. About one-third thought that piloting is about as safe as other jobs and the largest group—just over half—thought it was just slightly more dangerous than other jobs.

Figure 8-2.



Appendices

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Appendix A. Southeast Accidents, 1990-2001

The table below summarizes Southeast Alaska accidents from 1990 through 2001. Cause category explanations are listed below, with the abbreviations used in the table in parentheses.

- **Mechanical Failure:** Engine failure, inoperable control surfaces, failed landing gear, propeller or shaft failure.

- **Navigation (CFIT, TCF):** Usually Controlled Flight into Terrain (CFIT) while en route, most often associated with reduced visibility. In the YK Delta, CFIT also occurs in nominal VFR conditions when “flat light” on snow-covered ground prevents recognition of terrain. Terrain Clearance Floor (TCF) warnings are a Terrain Awareness and Warning System (TAWS) function planned for Capstone Phase 2 that addresses the 20%-30% of CFIT accidents on approach or departure. These are not directly addressed by Capstone Phase 1 avionics. Rarely, accidents are due to disorientation, which can be addressed by a GPS-map display.

- **Traffic:** Usually mid-air collisions or near mid-air collisions (NMACs) between aircraft. Also includes accidents from last-moment avoidance of other aircraft and from jet blast on airport surface.

- **Flight Information (Weather, Ice, IMC)**: Usually inadequate weather information, especially icing, but also visibility; rarely convective weather. (Surface winds contributing to take-off or landing accidents have been included under take-off or landing rather than here.) Occasionally, lack of information on changes in procedures or facility status.

- **Maneuvering**: Accidents while maneuvering during the cruise phase of flight.

- **Fuel**: Usually fuel exhaustion. Occasionally, failure to switch fuel tanks.

- **Flight Preparation:** Failure to ensure cargo is tied-down and within the aircraft’s weight and balance limits. Failure to check fuel for the presence of water, failure to remove ice or snow from the aircraft – often resulting in serious or fatal accidents.

- **Take-off** and **Landing:** Failure to maintain control (especially in wind), improper airspeed, or inadequate care near vehicles or obstacles. Accidents due to poor runway conditions, hazards at off-runway sites such as beaches and gravel bars, or from obstacles in water that are struck by float-planes.

- **Other (water taxi):** Includes a variety of unusual causes such as bird strikes, colliding with debris in lakes, rivers and oceans, collisions with ground vehicles and pilots under the influence of alcohol or drugs.

- **Unknown:** Undetermined causes, missing aircraft.

NTSB Report Number	FAR part number	Date	Highest Injury Level	Cause	Does Capstone apply?
DEN90FA053	135 as 91	7-Feb-1990	Fatal	Weather	yes
SEA90LA053	135 as 91	18-Mar-1990	Serious	Other	no
ANC90LA049	091	31-Mar-1990	None	Other	no
ANC90LA059	091	15-Apr-1990	None	Take-off	no
SEA90LA078	091	16-May-1990	None	Landing	no
SEA90LA083	133	21-May-1990	Serious	Mechanical	no
SEA90LA088	135	29-May-1990	Minor	Other	no
SEA90LA089	135	29-May-1990	None	Other	no
ANC90LA090A	135	17-Jun-1990	None	Traffic	yes
ANC90LA090B	135	17-Jun-1990	None	Traffic	yes
SEA90LA114	091	28-Jun-1990	None	Landing	no
ANC90LA129	091	2-Aug-1990	None	Mechanical	no
ANC90LA141	091	11-Aug-1990	None	Landing	no
SEA90FA163	135	12-Aug-1990	Fatal	Other	no
ANC90LA147	135	17-Aug-1990	None	Mechanical	no
ANC90FA158	091	28-Aug-1990	Fatal	Navigation	yes
ANC90LA160	091	1-Sep-1990	None	Fuel	no
ANC91FA001	135	4-Oct-1990	Serious	Take-off	no
ANC91LA011	091	7-Nov-1990	Minor	Take-off	no
ANC91LA013	135 as 91	13-Nov-1990	None	Landing	no
ANC91LA021	135	18-Jan-1991	Serious	Navigation	yes
ANC91FA050A	091	9-Apr-1991	Fatal	Traffic	yes
ANC91FA050B	091	9-Apr-1991	Fatal	Traffic	yes
ANC91LA059	133	22-May-1991	Minor	Mechanical	no
ANC91LA088	091	2-Jul-1991	None	Take-off	no
ANC91LA106	135 as 91	24-Jul-1991	None	Mechanical	no
ANC91LA110	091	28-Jul-1991	None	Mechanical	no
ANC91LA112	091	29-Jul-1991	None	Flight Prep	no
ANC91LA119	135	10-Aug-1991	Serious	Other	no
SEA91FA207	135	14-Aug-1991	Fatal	Weather	yes
SEA91FA216	135	20-Aug-1991	Fatal	Weather	yes
ANC91LA159	091	26-Aug-1991	None	Landing	no
ANC91LA137	091	29-Aug-1991	None	Take-off	no
ANC91LA138	091	30-Aug-1991	None	Other	no
SEA92LA011	133	11-Oct-1991	Serious	Mechanical	no
ANC92LA009	091	13-Oct-1991	None	Take-off	no
ANC92FA005	091	15-Oct-1991	Minor	Mechanical	no
ANC92LA019	135 as 91	14-Dec-1991	Fatal	Other	no
ANC92LA023	135	25-Dec-1991	Minor	Weather	yes
ANC92LA032	135	4-Feb-1992	None	Mechanical	no
ANC92LA033	091	9-Feb-1992	Fatal	Other	no
ANC92LA037	135 as 91	17-Feb-1992	None	Landing	no
ANC92LA039	135 as 91	19-Feb-1992	Minor	Take-off	no
ANC92FA040	133	23-Feb-1992	Fatal	Mechanical	no
ANC92FA044	133	6-Mar-1992	Serious	Mechanical	no
ANC92LA047	091	15-Mar-1992	None	Landing	no
ANC92T#A04	PUBU	26-Mar-1992	None		
ANC92LA062	091	18-Apr-1992	None	Take-off	no
ANC92FAMS2	091	3-May-1992	Fatal	Unknown	no
ANC92LA079	135	25-May-1992	None	Weather	yes
ANC92LA082	091	29-May-1992	Minor	Landing	no
ANC92LA085	091	2-Jun-1992	Fatal	Take-off	no
ANC92LA090	135	10-Jun-1992	None	Landing	no
ANC92LA111	091	24-Jul-1992	None	Mechanical	no
ANC92LA115	135 as 91	29-Jul-1992	Fatal	Navigation	yes
ANC92LA119	135	6-Aug-1992	Serious	Navigation	yes

NTSB Report Number	FAR part number	Date	Highest Injury Level	Cause	Does Capstone apply?
ANC92LA120	135 as 91	6-Aug-1992	None	Take-off	no
ANC92LA121	091	8-Aug-1992	Minor	Other	no
ANC92LA151	135	29-Aug-1992	None	Landing	no
ANC92LA178	135	25-Sep-1992	Minor	Other	no
ANC92LA181	135	29-Sep-1992	None	Take-off	no
ANC93LA002	091	3-Oct-1992	None	Landing	no
ANC93FA012	135	6-Nov-1992	Fatal	Weather	yes
ANC93LA015	133	10-Nov-1992	None	Landing	no
ANC93LA022	091	23-Dec-1992	None	Other	no
ANC93LA023	135 as 91	24-Dec-1992	None	Flight Prep	no
ANC93LA030	135 as 91	4-Feb-1993	None	Take-off	no
ANC93FA033	133	19-Feb-1993	Fatal	Mechanical	no
ANC93LA043	135 as 91	12-Mar-1993	None	Take-off	no
ANC93FA056	133	2-May-1993	Fatal	Mechanical	no
ANC93FA061	133	8-May-1993	Minor	Mechanical	no
ANC93LA066	091	19-May-1993	None	Other	no
ANC93LA075	091	31-May-1993	None	Landing	no
ANC93LA077	135	2-Jun-1993	Minor	Mechanical	no
ANC93LA095	135 as 91	17-Jun-1993	None	Mechanical	no
ANC93T#A02		17-Jun-1993	None		
ANC93LA096	135	18-Jun-1993	Minor	Navigation	yes
ANC93LA101	091	23-Jun-1993	None	Mechanical	no
ANC93LA104	135 as 91	28-Jun-1993	None	Landing	no
ANC93LA118	091	15-Jul-1993	None	Landing	no
ANC93LA125	135	23-Jul-1993	None	Mechanical	no
ANC93LA130	091	30-Jul-1993	Fatal	Weather	yes
ANC93T#A03		2-Aug-1993	None		
ANC93LA184	135	17-Sep-1993	None	Take-off	no
ANC94LA012	091	5-Oct-1993	None	Mechanical	no
ANC94LA024	091	8-Dec-1993	None	Landing	no
ANC94LA042	135	26-Mar-1994	Minor	Landing	no
ANC94LA053	091	1-May-1994	None	Fuel	no
ANC94LA067	135	8-Jun-1994	None	Landing	no
ANC94FA070	135	22-Jun-1994	Fatal	Weather	yes
ANC94FA089	135	19-Jul-1994	None	Mechanical	no
ANC94LA091	091	21-Jul-1994	None	Fuel	no
ANC94LA098	091	5-Aug-1994	None	Mechanical	no
ANC94LA121	091	18-Aug-1994	None	Mechanical	no
ANC94LA139	091	18-Aug-1994	None	Landing	no
ANC94LA110	135 as 91	30-Aug-1994	None	Landing	no
SEA94FA245	135 as 91	22-Sep-1994	Fatal	Navigation	yes
ANC95LA012	135	20-Nov-1994	Fatal	Other	no
ANC95LA015	091	5-Dec-1994	Serious	Weather	yes
ANC95LA021	091	17-Dec-1994	None	Take-off	no
ANC95LA023	135	2-Jan-1995	None	Landing	no
ANC95LA034	135	10-Mar-1995	Serious	Weather	yes
ANC95LA051	135 as 91	30-Apr-1995	None	Landing	no
ANC95LA062	135	31-May-1995	None	Landing	no
ANC95LA072	091	9-Jun-1995	None	Landing	no
ANC95LA075	135 as 91	12-Jun-1995	Minor	Mechanical	no
ANC95LA081	135	24-Jun-1995	None	Landing	no
ANC95FA101	135	7-Jul-1995	Fatal	Navigation	yes
ANC95LA103	135	13-Jul-1995	None	Mechanical	no
ANC95LA119	091	29-Jul-1995	Fatal	Mechanical	no
ANC95LA130	091	4-Aug-1995	None	Flight Prep	no
ANC95LA134	091	8-Aug-1995	Serious	Take-off	no

NTSB Report Number	FAR part number	Date	Highest Injury Level	Cause	Does Capstone apply?
ANC95LA135	091	10-Aug-1995	None	Take-off	no
ANC95FA167	091	14-Sep-1995	Fatal	Navigation	yes
ANC95LA176	091	23-Sep-1995	None	Other	no
ANC96LA001	091	6-Oct-1995	Minor	Flight Prep	no
ANC96LA008	091	22-Oct-1995	None	Landing	no
ANC96LA014	091	12-Nov-1995	None	Navigation	yes
ANC96LA029	135 as 91	4-Mar-1996	Minor	Mechanical	no
ANC96TA075	PUBU	20-May-1996	None	Landing	no
ANC96FA079	091	24-May-1996	Fatal	Mechanical	no
ANC96TA087	PUBU	11-Jun-1996	None	Landing	no
ANC96LA088	135 as 91	14-Jun-1996	None	Mechanical	no
ANC96TA092	091	26-Jun-1996	None	Landing	no
ANC96LA097	135 as 91	7-Jul-1996	None	Landing	no
ANC96FA098	133	13-Jul-1996	Fatal	Mechanical	no
ANC96LA100	091	17-Jul-1996	None	Landing	no
ANC96FA101	135	19-Jul-1996	Fatal	Navigation	yes
ANC96FA139	135 as 91	31-Aug-1996	Fatal	Landing	no
ANC96FA137	135	1-Sep-1996	Serious	Weather	yes
ANC97FA001	135	13-Oct-1996	Fatal	Navigation	yes
ANC97LA004	091	18-Oct-1996	Serious	Flight Prep	no
ANC97LA005	135 as 91	29-Oct-1996	None	Mechanical	no
ANC97LA014	135	12-Dec-1996	Fatal	Take-off	no
ANC97LA015	121	22-Dec-1996	Serious	Weather	yes
ANC97LA020	091	13-Jan-1997	None	Landing	no
ANC97LA078	091	23-Feb-1997	None	Other	no
ANC97FA031	091	7-Mar-1997	Fatal	Flight Prep	no
ANC97LA038	091	26-Mar-1997	Minor	Navigation	yes
ANC97LA050	091	31-Mar-1997	None	Landing	no
ANC97FA051A	091	9-Apr-1997	Fatal	Traffic	yes
ANC97FA051B	091	9-Apr-1997	Fatal	Traffic	yes
ANC97LA058	091	16-Apr-1997	None	Landing	no
ANC97LA071	091	12-May-1997	None	Landing	no
ANC97LA082	091	18-May-1997	None	Landing	no
ANC97LA076	091	21-May-1997	Minor	Landing	no
ANC97LA086	135 as 91	19-Jun-1997	None	Landing	no
ANC97LA087	091	22-Jun-1997	None	Landing	no
ANC97LA105	091	22-Jun-1997	None	Landing	no
ANC97FA097	135	3-Jul-1997	Fatal	Mechanical	no
ANC97LA114	091	1-Aug-1997	None	Landing	no
ANC97LA141	091	2-Sep-1997	None	Mechanical	no
ANC97FA143	091	6-Sep-1997	Fatal	Mechanical	no
ANC97LA156	091	26-Sep-1997	None	Landing	no
ANC97FA159	135 as 91	29-Sep-1997	Fatal	Other	no
ANC98FA006	135	23-Oct-1997	Fatal	Navigation	yes
ANC98LA016	091	22-Jan-1998	None	Landing	no
ANC98LA037	091	12-Apr-1998	Minor	Landing	no
ANC98FA043	091	27-Apr-1998	Fatal	Navigation	yes
ANC98FA061A	135	30-May-1998	Fatal	Traffic	yes
ANC98FA061B	091	30-May-1998	Fatal	Traffic	yes
ANC98FA069	135	9-Jun-1998	None	Mechanical	no
ANC98LA071	091	12-Jun-1998	None	Take-off	no
ANC98LA084	091	23-Jun-1998	Minor	Landing	no
ANC98LA107	091	23-Jul-1998	Minor	Take-off	no
ANC98FA116	135	5-Aug-1998	Fatal	Fuel	no
ANC98LA122	121	14-Aug-1998	None	Landing	no
ANC98LA126	091	18-Aug-1998	None	Landing	no

NTSB Report Number	FAR part number	Date	Highest Injury Level	Cause	Does Capstone apply?
ANC98LA127	091	19-Aug-1998	None	Take-off	no
ANC98LA139	091	3-Sep-1998	Minor	Landing	no
ANC98FA168	091	29-Sep-1998	Fatal	Navigation	yes
ANC99LA049	091	22-Apr-1999		Landing	no
ANC99LA052	135	27-Apr-1999	Serious	Mechanical	no
ANC99FAMS1	091	2-May-1999	Fatal	Unknown	no
ANC99TA058	133	5-May-1999	Fatal	Other	no
ANC99FA073	135	9-Jun-1999	Fatal	Navigation	yes
ANC99LA072	135	9-Jun-1999	Minor	Take-off	no
ANC99LA089	091	3-Jul-1999	None	Landing	no
ANC99LA092	091	15-Jul-1999	Minor	Landing	no
ANC99LA100	135 as 91	30-Jul-1999	None	Fuel	no
ANC99LA102	091	1-Aug-1999	None	Landing	no
ANC99LA107A	121	7-Aug-1999	None	Traffic	yes
ANC99LA107B	121	7-Aug-1999	None	Traffic	yes
ANC99FA108	091	8-Aug-1999	Fatal	Navigation	yes
ANC99LA114	135 as 91	15-Aug-1999	None	Mechanical	no
ANC99LA136	091	1-Sep-1999	None	Take-off	no
ANC99FA139	135	10-Sep-1999	Serious	Navigation	yes
ANC99LA140	091	10-Sep-1999	None	Weather	yes
ANC99LA141	091	10-Sep-1999	None	Weather	yes
ANC00LA002	135	7-Oct-1999	None	Landing	no
ANC00LA014	135 as 91	21-Nov-1999	Serious	Take-off	no
ANC00LA020	135	23-Dec-1999	None	Take-off	no
ANC00LA055	135 as 91	5-May-2000	None	Landing	no
ANC00LA061	135	22-May-2000	None	Other	no
ANC00FA093	091	20-Jul-2000	Fatal	Take-off	no
ANC00LA094	091	25-Jul-2000	Minor	Landing	no
ANC00LA104	091	16-Aug-2000	None	Landing	no
ANC00LA105	135	16-Aug-2000	None	Mechanical	no
ANC00FA110	091	31-Aug-2000	Fatal	Other	no
ANC00LA113	091	5-Sep-2000	None	Landing	no
ANC00LA132	135 as 91	23-Sep-2000	None	Mechanical	no
ANC01LA013	091	28-Oct-2000	None	Fuel	no
ANC01FAMS1	135 as 91	27-Dec-2000	Fatal	Unknown	no
ANC01LA073	091	23-Jun-2001	None	Take-off	no
ANC01LA072	091	24-Jun-2001	None	Landing	no
ANC01LA086	091	15-Jul-2001	None	Take-off	no
ANC01LA090	135 as 91	26-Jul-2001	None	Take-off	no
ANC01WA091	135	26-Jul-2001	Fatal	Navigation	yes
ANC01FA093	135	30-Jul-2001	Fatal	Navigation	yes
ANC01LA096	135	30-Jul-2001	None	Take-off	no
ANC01LA109	133	11-Aug-2001	None	Other	no
ANC01LA112	091	11-Aug-2001	None	Landing	no
ANC01LA122	091	21-Aug-2001	None	Take-off	no
ANC01LA138	091	7-Sep-2001	Minor	Mechanical	no
ANC01LA139	091	9-Sep-2001	None	Landing	no
ANC02FA010	135	15-Jan-2002	Fatal	Weather	yes
ANC02FA028	091	10-Apr-2002	Fatal	Other	no
ANC02FA029	135	11-Apr-2002	None	Mechanical	no
ANC02LA030	091	14-Apr-2002	None	Landing	no
ANC02LA033	091	13-May-2002	None	Mechanical	no
ANC02LA053A	135	19-Jun-2002	None	Traffic	yes
ANC02LA053B	135	19-Jun-2002	None	Traffic	yes
ANC02LA069	135	25-Jun-2002	Minor	Landing	no
ANC02LA076	135	12-Jul-2002	None	Landing	no

NTSB Report Number	FAR part number	Date	Highest Injury Level	Cause	Does Capstone apply?
ANC02LA080	091	17-Jul-2002	None	Take-off	no
ANC02LA098A	135	19-Aug-2002	None	Traffic	yes
ANC02LA098B	135	19-Aug-2002	None	Traffic	yes
ANC02FA108	091	28-Aug-2002	Fatal	Navigation	yes
ANC02LA115	135	4-Sep-2002	None	Other	no
ANC02LA125	091	11-Sep-2002	None	Take-off	no
ANC03CA003	091	17-Oct-2002	Minor	Navigation	yes
ANC03LA022	091	13-Dec-2002	Fatal	Unknown	no

Appendix B. Southeast Alaska Airports and Community Population

Table B-1. Southeast Alaska Airports

Southeast Alaska Airports				
Name	Associated City	Type	Use	Owner
ALASCOM/COASTAL LENA POINT	JUNEAU	HELIPORT	PRIVATE	ALASCOM
ALSEK RIVER	YAKUTAT	AIRPORT	PUBLIC	USFS CHATHAM AREA
ANGOON	ANGOON	SEAPLANE BASE	PUBLIC	ST OF AK DOTPF/SE REGION
ANNETTE ISLAND	ANNETTE	AIRPORT	PRIVATE	METLAKATLA INDIAN COMM
BARTLETT COVE	BARTLETT COVE	SEAPLANE BASE	PUBLIC	U.S. GOVERNMENT
BELL ISLAND HOT SPRINGS	BELL ISLAND	SEAPLANE BASE	PRIVATE	DONALD PETERSON
CAPE DECISION C. G.	CAPE DECISION	HELIPORT	PRIVATE	U S GOVT
CAPE POLE	CAPE POLE	SEAPLANE BASE	PUBLIC	L.O.G. LOG CO.
CAPE SPENCER C.G.	CAPE SPENCER	HELIPORT	PRIVATE	U S GOVT
CHATHAM	CHATHAM	SEAPLANE BASE	PUBLIC	PUBLIC DOMAIN
COFFMAN COVE	COFFMAN COVE	SEAPLANE BASE	PUBLIC	STATE OF AK DOTPF-SE-REG
CORDOVA MUNI	CORDOVA	AIRPORT	PUBLIC	STATE OF ALASKA DOTPF N REG
MERLE K (MUDHOLE) SMITH	CORDOVA	AIRPORT	PUBLIC	STATE OF ALASKA DOTPF N REG
CRAIG	CRAIG	SEAPLANE BASE	PUBLIC	CITY OF CRAIG
CRAIG CG	CRAIG	HELIPORT	PRIVATE	U S COAST GUARD
DANGEROUS RIVER	YAKUTAT	AIRPORT	PUBLIC	USFS CHATHAM AREA
EAST ALSEK RIVER	YAKUTAT	AIRPORT	PUBLIC	NATL PARK SERVICE
ELDRED ROCK CG	ELDRED ROCK	HELIPORT	PRIVATE	U S GOVT
ELFIN COVE	ELFIN COVE	SEAPLANE BASE	PUBLIC	STATE OF AK DOTPF-CENTRAL RGN
ENTRANCE ISLAND	ENTRANCE ISLAND	SEAPLANE BASE	PUBLIC	STATE OF AK DOTPF-CENTRAL RGN
EXCURSION INLET	EXCURSION INLET	SEAPLANE BASE	PUBLIC	STATE OF AK DOTPF-SE-REG
FALSE ISLAND	FALSE ISLAND	SEAPLANE BASE	PUBLIC	ALASKA LOG & PULP CO
FIVE FINGER CG	FIVE FINGER	HELIPORT	PRIVATE	U S GOVT
FUNTER BAY	FUNTER BAY	SEAPLANE BASE	PUBLIC	STATE OF AK DOTPF-SE-REG
GUSTAVUS	GUSTAVUS	AIRPORT	PUBLIC	ST OF AK DOT SE REGION
HAINES	HAINES	AIRPORT	PUBLIC	ST OF AK DOTPF SE REG
		SEAPLANE BASE	PUBLIC	ST OF AK SE REG
HARLEQUIN LAKE	YAKUTAT	AIRPORT	PUBLIC	USFS CHATHAM AREA
HAWK INLET	HAWK INLET	SEAPLANE BASE	PRIVATE	GREEN CREEK MINING CO.
HOLLIS	HOLLIS	SEAPLANE BASE	PUBLIC	STATE OF AK DOTPF-SE-REG
HOONAH	HOONAH	AIRPORT	PUBLIC	STATE OF AK DOTPF SE RGN
		SEAPLANE BASE	PUBLIC	STATE OF AK DOTPF-SE-REG
HYDABURG	HYDABURG	SEAPLANE BASE	PUBLIC	STATE OF AK DOTPF-SE-REG
HYDER	HYDER	SEAPLANE BASE	PUBLIC	STATE OF AK DOTPF-CENTRAL RGN
ICY BAY	ICY BAY	AIRPORT	PRIVATE	STATE OF ALASKA
JUNEAU HARBOR	JUNEAU	SEAPLANE BASE	PUBLIC	PUBLIC DOMAIN
JUNEAU INTL	JUNEAU	AIRPORT	PUBLIC	CITY OF JUNEAU
KAKE	KAKE	AIRPORT	PUBLIC	STATE OF AK DOTPF SE REG
		SEAPLANE BASE	PUBLIC	STATE OF AK DOTPF-SE-REG
KASAAN	KASAAN	SEAPLANE BASE	PUBLIC	STATE OF AK DOTPF-SE-REG
KETCHIKAN /TEMSCO H/	KETCHIKAN	HELIPORT	PRIVATE	TEMSCO HELIC
KETCHIKAN HARBOR	KETCHIKAN	SEAPLANE BASE	PUBLIC	PUBLIC DOMAIN
KETCHIKAN INTL	KETCHIKAN	AIRPORT	PUBLIC	STATE OF AK DOTPF SE RGN
KLAWOCK	KLAWOCK	AIRPORT	PUBLIC	STATE OF AK DOTPF/SE REGION
		SEAPLANE BASE	PUBLIC	ST OF AK DOT, PF SE REG.
LLOYD R. ROUNDTREE SEAPLANE FACILITY	PETERSBURG	SEAPLANE BASE	PUBLIC	ST OF AK DOTPF SE REG
LORING	LORING	SEAPLANE BASE	PUBLIC	STATE OF AK DOTPF-SE-REG
METLAKATLA	METLAKATLA	SEAPLANE BASE	PUBLIC	STATE OF AK DOTPF-CENTRAL RGN
MEYERS CHUCK	MEYERS CHUCK	SEAPLANE BASE	PUBLIC	STATE OF AK DOTPF-SE-REG
MURPHYS PULLOUT	KETCHIKAN	SEAPLANE BASE	PUBLIC	KETCHIKAN GATEWAY BOROUGH
NICHIN COVE	TUXEKAN ISLAND	SEAPLANE BASE	PUBLIC	PANHANDLE LOGGING CO
NORTH DOUGLAS	JUNEAU	HELIPORT	PRIVATE	ERA AVIATION, INC.
NORTH WHALE	NORTH WHALE PASS	SEAPLANE BASE	PUBLIC	KETCHIKAN PULP CO
PELICAN	PELICAN	SEAPLANE BASE	PUBLIC	STATE OF AK DOTPF-SE-REG
PENINSULA POINT PULLOUT	KETCHIKAN	SEAPLANE BASE	PUBLIC	STATE OF AK DOTPF-SE-REG
PETERSBURG JAMES A JOHNSON	PETERSBURG	AIRPORT	PUBLIC	ST OF AK DOTPF SE REG
POINT BAKER	POINT BAKER	SEAPLANE BASE	PUBLIC	STATE OF AK DOTPF-SE RGN

Southeast Alaska Airports				
Name	Associated City	Type	Use	Owner
PORT ALEXANDER	PORT ALEXANDER	SEAPLANE BASE	PUBLIC	STATE OF AK DOTPF-SE-REG
PORT ALICE	PORT ALICE	SEAPLANE BASE	PUBLIC	ALASKA LOGGING & PULP
PORT PROTECTION	PORT PROTECTION	SEAPLANE BASE	PUBLIC	STATE OF AK DOTPF-SE-REG
PORT WALTER	PORT WALTER	SEAPLANE BASE	PUBLIC	USDI BU OF COMM FISH
SAGINAW	SAGINAW BAY	SEAPLANE BASE	PUBLIC	M HAMMER
SITKA	SITKA	SEAPLANE BASE	PUBLIC	CITY & BOROUGH OF SITKA
SITKA ROCKY GUTIERREZ	SITKA	AIRPORT	PUBLIC	STATE OF ALASKA DOTPF
SITUK	YAKUTAT	AIRPORT	PUBLIC	USFS CHATHAM AREA
SKAGWAY	SKAGWAY	AIRPORT	PUBLIC	ST OF AK DOTPF SE REG
		SEAPLANE BASE	PUBLIC	STATE OF AK DOTPF-SE-REG
SNETTISHAM	SNETTISHAM	AIRPORT	PRIVATE	ALASKA POWER ADMIN
STEAMBOAT BAY	STEAMBOAT BAY	SEAPLANE BASE	PUBLIC	NEW ENGLAND FISH CO.
TAKU HARBOR	TAKU HARBOR	SEAPLANE BASE	PUBLIC	PUBLIC DOMAIN
TAKU LODGE	TAKU LODGE	SEAPLANE BASE	PUBLIC	RON MAAS
TAMGAS HARBOR	ANNETTE	SEAPLANE BASE	PUBLIC	COUNCIL OF ANNETTE IS
TANIS MESA	YAKUTAT	AIRPORT	PUBLIC	USFS CHATHAM AREA
TENAKEE	TENAKEE SPRINGS	SEAPLANE BASE	PUBLIC	CITY OF TENAKEE
THORNE BAY	THORNE BAY	SEAPLANE BASE	PUBLIC	STATE OF AK DOTPF SE REGION
TOKEEN	TOKEEN	SEAPLANE BASE	PUBLIC	PUBLIC DOMAIN
WARM SPRING BAY	BARANOF	SEAPLANE BASE	PUBLIC	STATE OF AK DOTPF-SE-REG
WATERFALL	WATERFALL	SEAPLANE BASE	PUBLIC	WATERFALL CANNERY RESORT
WRANGELL	WRANGELL	AIRPORT	PUBLIC	ST OF AK DOT/SE REGION
		SEAPLANE BASE	PUBLIC	ST OF AK DOT/SE REGION
YAKATAGA	YAKATAGA	AIRPORT	PUBLIC	CHUGACH ALASKA CORP
YAKUTAT	YAKUTAT	AIRPORT	PUBLIC	ST OF AK DOT SE REG
		SEAPLANE BASE	PUBLIC	STATE OF AK DOTPF,SE REG
YES BAY LODGE	YES BAY	SEAPLANE BASE	PUBLIC	ART HACK

Table B-2. Community Population, 2000

Population by Community			
Community	**Population**	**Community**	**Population**
Haines Borough	**2392**	**Sitka City and Borough**	**8835**
Covenant Life	102	Sitka city and borough	8835
Excursion Inlet	10	**Skagway-Hoonah-Angoon Census Area**	**3436**
Haines city	1811	Angoon city	572
Lutak	39	Cube Cove	72
Mosquito Lake	221	Elfin Cove	32
Mud Bay	137	Game Creek	35
Remainder of Haines borough	72	Gustavus	429
Juneau City and Borough	**30711**	Hobart Bay	3
Juneau city and borough	30711	Hoonah city	860
Ketchikan Gateway Borough	14059	Pelican city	163
Ketchikan city	7922	Tenakee Springs city	104
Saxman city	431	Whitestone Logging Camp	116
Remainder of Ketchikan borough	5706	Klukwan	139
Prince of Wales-Outer Ketchikan Census Area	6157	Skagway city	862
Metlakatla	1375	Remainder of Hoonah-Angoon census subarea	49
Hyder	97	**Valdez-Cordova Census Area (Tract 2)**	2480
Meyers Chuck	21	Cordova city	2454
Coffman Cove city	199	**Wrangell-Petersburg Census Area**	6684
Craig	1725	Kake city	710
Edna Bay	49	Kupreanof city	23
Hollis	139	Petersburg city	3224
Hydaburg city	382	Port Alexander city	81
Kasaan city	39	Thoms Place	22
Klawock city	854	Wrangell city	2308
Naukati Bay	135	Remainder of Wrangell-Petersburg census area	316
Point Baker	35	**Yakutat City and Borough**	808
Port Protection	63	Yakutat	680
Thorne Bay city	557	Remainder of Yakutat borough	128
Whale Pass	58		
Remainder of Prince of Wales-Outer Ketchikan Census Area	429		

Sources: US Census 2000, Alaska Department of Labor and Workforce Development, Research and Analysis Section, Demographics Unit.

Appendix C. Pilot and Operator Surveys

Survey Summary Methodology
NIOSH Operator Questionnaire
Air Carrier Survey: Capstone questions
NIOSH Pilot Interview, Fall/Winter 2001/02

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C-1. Survey Research Methodology

Objective

We conducted surveys of both pilots and operators in Southeast Alaska. These surveys were part of a larger effort to collect information about qualifications, practices and attitudes of pilots and company management for aviation operators in Alaska. Based on survey responses, focus group results, and consultation with Alaskan aviation safety experts, the National Institutes of Occupational Safety and Health (NIOSH) will develop policy options designed to reduce aviation fatalities.

NIOSH contracted with the Institute of Social and Economic Research (ISER) of the University of Alaska Anchorage to design and administer two statewide aviation safety surveys, one of air carrier managers and one of active commercial pilots. This document describes the methodology for the pilot survey, which addressed pilot demographics, flight hours (total, aircraft type, and instrument hours), Alaska flying experience, attitudes about safety, flying practices, and other salient risk factors.

Instrument Development

Focus Groups

We hypothesized that there were measurable differences in attitudes, policies and behaviors of pilots and operators that put some pilots and operators at greater risk of a crash than others. We further hypothesize that aspects of the economic and/or regulatory environment may be reinforcing those higher-risk characteristics. To investigate these hypotheses, NIOSH conducted focus group meetings between May and November of 2000 among pilots, operators, and villagers in five Alaska regions. Both NIOSH and ISER reviewed the findings of previous Alaska aviation studies. Findings from these two sources became the foundation of the research questions, and core of both the pilot and operator survey questionnaires.

Draft Questionnaires

Respondents were asked to reply to questions about flight practices, attitudes, and perceptions from their personal perspective. The questionnaires covered several areas:

1. Pilot demographics, certifications and flight experience
2. Flight experiences in their current employment relevant to the identified safety issues
3. Training provided by their current employer relevant to the identified safety issues
4. Operator policies and practices
5. Attitudes about those safety issues and about potential ways to address them
6. For operators who may be part of Capstone Phase II, questions about their attitudes about that equipment.

Pre-Test

The questionnaires were pre-tested on six pilots and six companies to filter out confusing questions and terms, confirm that perception and attitude questions worked, and to determine the time required to administer the survey. We also had to deal with sensitivity to questions about practices that are contrary to federal aviation regulations (FARs). In addition to an understandable reluctance to admit to breaking the law, some respondents also raised concerns that their survey responses to such questions would be used for enforcement purposes. For the same reasons, we chose not to ask pilots questions about their employers that might call for explanations of practices or procedures contrary to FARs.

Use of previously collected data

While prior studies examining crashes in commuter and air taxi services have provided useful leads on comparative information and examples of how to conduct this type of research, they do not provide the specific information needed for the reduction of deaths related to air crashes in Alaska. No existing information, such as that available from the NTSB or FAA accident data reporting systems, has been identified of the type required for these studies. Additionally, appropriate denominators and exposure estimates of commercial pilots are inaccurate and unreliable. Our review of the scientific and technical literature did not yield the number of commercial pilots per year or the number of pilot flight hours or flights per year in Alaska.

Sample Design

Both pilots and operators were the units of analysis in this study. The survey population for this study consists of

(1) air carrier companies supervised by the FAA's Juneau Flight Standards District Office (FSDO), as of November 2000, and updated in December, 2002, and

(2) pilots who flew for those companies:

Table F-1. Southeast Operators and Pilots Surveyed

	One or Two Pilots	Three or More Pilots	Total
Operator Sample, Nov. 2000	12	15	27
Responses from Nov 2000 Operators	6	14	20
Operator additions in December, 2002	3	0	3
Total Operator Responses	9	14	23
Total Pilot Responses	6	30	36

Survey Protocols

We generated the pilot sample from interviews with the air carrier operators. ISER interviewed operators from August 2001 through February 2002; we interviewed pilots from December 2001 through February 2002. As described above, the universe from which we drew the pilot sample was the pilots employed by operators that we interviewed. In the final section of the large operator/company questionnaire we requested a list of pilots employed by that carrier and their telephone numbers. If the operator provided the list, the interviewer verified that the number of pilots on the list was the same as the number reported in question 1 (pilots currently employed by the carrier). If the numbers were different, the interviewer resolved the inconsistency, either by correcting question 1 or correcting the pilot list, as appropriate. Once the numbers were the same, the interviewer chose a pilot sampling sheet with the same number of pilots as listed. The pilot sampling sheets (generated by an excel spreadsheet) randomly selected which pilots on a numbered list should be interviewed. We generated a new sampling sheet, with different random sample, for each company.

If the operator refused to provide pilot information after follow-up by an interviewer experienced in turning around refusals, we tried one of several options. We preferred option (1) or (2), but used option (3) when that was all the operator would agree to.

1. Work with the operator to obtain contact information only for pilots selected for interview. We would never see the full list of employees. The interviewer would direct the operator to choose names based on where they fell on list. For example, the interviewer, using a sampling sheet, would direct the operator to choose the 3rd, 5th and 8th pilots on the operator's list. The operator then provided us with names and contact phone numbers for the selected pilots.
2. Obtain a list of pilot names without contact information; draw the sample and mail the questionnaire to the company for delivery to the selected pilots.

3. Work with the operator (as above) so that the operator could select the random sample, but in addition, have the operator distribute the questionnaires to the selected pilots (rather than providing contact information to ISER).

In all cases when ISER mailed questionnaire to pilots we included a self addressed stamped envelope for the pilot to return the questionnaire to ISER. We also provided a form so that the pilot could mail us their telephone number, in which case we would call the pilot directly and conduct the survey over the telephone.

Initially we mailed surveys or called all selected pilots, and followed-up by telephone and fax as necessary. In most cases, we expected interviewers to complete surveys over the telephone. In cases where telephone contact was unsuccessful or where the pilots preferred face to face contact, interviewers arranged to complete the interview in person.

Our methodology incorporated the standard strategies used to obtain high survey response rates. We trained interviewers thoroughly so that they understood the goals of the research, the questionnaire, and the protocols for administering the questionnaire. We followed up by telephone (wherever possible) if we did not receive a response to an initial contact by mail. If necessary, we followed up with face-to-face contact where both telephone and mail contacts were unsuccessful. We did not assign the “unable to contact” disposition to a telephone number until we had made repeated calls on different days of the week and at different times of day. Likewise, we attempted face-to-face contacts on different days of the week and at different times of day. If potential respondents refused the survey, interviewers experienced at turning refusals around called them and attempted to change their minds. This rigorous telephone interview approach minimizes non-response bias at the outset by generating a non-biased sample, and then by ensuring a high response rate.

In addition, we followed up with face-to-face interviews in April, 2002 in order to add several of the operators that we missed in the initial NIOSH survey, and to ask Capstone attitude questions. We interviewed ten operators, three of whom had not been interviewed in the earlier NIOSH survey administration,

Interviewer Training

ISER hired and trained interviewers for telephone and face-to-face, interviews with respondents. The initial training was 16 hours and used the following outline:

Day 1

Research ethics - statement of professional ethics
Confidentiality
History of ISER
Purpose of survey
Background
Purposes and structure of Alaska Aviation Safety Survey
Selecting the respondent
General rules for interviewing
Thumbnail sketch
Style
Introductions
  Special interview circumstances
  Handling reluctant respondents
Some techniques to prevent or turn around a refusal:
Misinterpreted questions
Vague answers and answers that don't fit
Clarifying respondent's role using positive feedback
Disposition of interview and record keeping
Evaluation

Day 2

Practice interview
  Disposition of interviews, record keeping
  Paired interviewer practice
  Readiness check —1
  Practice interviews
  Readiness check —2
  Initial sample assignment

Interviewers are evaluated and approved by the field supervisor for readiness prior to their starting telephone interviews

Confidentiality

All respondents received voluntary participation and confidentiality information in a consent form. Participants who responded by mail or face-to-face were given a copy of the form to keep, and also signed a copy that was attached to the interview. If respondents returned a mail for fax survey without a signed consent form, we considered them to have given their implied consent. For telephone respondents, interviewers read the consent form and obtained the respondent’s verbal consent. The form included the following items:

1. The authority and purpose for data collection,
2. an explanation that participation was voluntary,
3. An explanation of the confidentiality of their responses, including assurances that

- responses would not be used in any enforcement actions ,

- although survey results would be available to the air carrier operator and pilot associations, federal agencies, and other interested parties, this would be in summary format only -- without any personal or corporate identifiers.
- the information provided is kept confidential. Responses are locked in a file cabinet with access limited to research staff on the project

Events Surrounding the NIOSH Survey

Respondents were expected to naturally refer to their own experience and prior flying experience in thinking about their responses. Three events occurred during the course of this survey, which are certain to have affected pilot's responses. On September 11 there were the tragic events at the World Trade Center and the shut-down of aviation nationwide. In response to the uncertainty in the aviation industry and concern among respondents we stopped interviewing for one week. On October 11, there was the worst commercial crash in Alaska since 1987 involving one of the largest regional operators in Alaska. On October 19, there was a helicopter crash in Anchorage involving another of the largest regional carriers. How and to what extent these events may have influenced pilots' responses is unknown, but a series of events of this magnitude are likely to have affected public attitudes, perceptions, and business practices.

Survey Dispositions and Response Rates

Table F-2 shows the response rates for Capstone operators and pilots. Every operator and pilot selected for the NIOSH sample was ultimately assigned a disposition code:

- Refusals
- Respondent Unavailable During the Study
- Completed Interview

The response rate is calculated as:

$$\frac{\text{Total \# of completed interviews}}{\text{Number in the original sample}}$$

For purposes of calculating the response rates, we did not include the 61 Capstone pilot modules obtained by Dr Daniels in Bethel and at Capstone training classes.

Table F-2. Response Rates for Southeast Operators and Pilots

	Sample	Completed Interviews	Response Rate*
Southeast Operators*	30	23	76%
Pilots Employed by Southeast Operators*	37	30	81%

*The true operator response rate is slightly lower; we did not draw an extended sample for our face-to-face interviews in April 2002, but simply added three new operators to the database.

Data Set

A data editor reviewed the completed survey forms for completeness and consistency; whenever possible, our interviewers called back respondents to resolve any problems we found. We reconfirmed our data entry programs to reject some types of incorrect data. We entered a sample of the surveys twice and compared the two entries to measure the accuracy of data entry. Once all the survey data was entered, we reviewed it and corrected for missing or unreasonable values.

Weighting

We initially calculated normalized weights for operators, using statewide data. We calculated an initial weight by dividing the number of operators in each stratum (large operators, small Southcentral, small North/Interior; small Southeast) by the number of respondents in that stratum. To normalize the weights, we multiplied each initial weight by a fraction computed as the sample size (153) divided by the sum of all the 153 operator weights.

We calculated two sets of weights for the pilot surveys. The first–*pilotwt* and *normalized pilotwt*–weighted sample pilots to represent all pilots flying for the operators whose pilots we interviewed. The second set–*totalwt* and *normalized totalwt*–adjusts the first set of weights to represent all pilots in our universe: pilots employed by air taxi and commuter air operators and public agencies flying in Alaska.

To weight to the operators represented in the survey, we calculated a separate weight for each company

$$\text{Pilotwt} = \frac{\text{Total pilots employed by company}}{\text{Total Pilot Interviews completed from company}}$$

This formula reflects the fact that the pilot's probability of selection was different for each company size. We then normalized this weight in the same way as described for the operator weights, so that the weighted total pilots equaled the number of pilot respondents (38):

To adjust the sample to represent all pilots in our universe, we needed to account for the operator's probability of selection, as well. We multiplied the (non-normalized) pilot weight by the (non-normalized) company weight, and again normalized those weights to represent the total number or pilot respondents.

$$\text{Totalwt} = \text{Pilotwt} * \text{Company Weight}$$

Use of normalized weights is appropriate to accurately calculate statistical significance and confidence intervals from the survey data. Since the pilot sample was stratified by company there is a unique weight for each of the 133 air operators represented in the sample. Consequently, the weights themselves are confidential.

We present the weighted operator and pilot survey responses. However, because the operators responding to the Capstone-specific questions were both purposive (operators that had expressed an interest in participating in the program) and non-random (other operators in the same communities, available when our interviewer was there) we present the answers to those Capstone questions unweighted.

The following pages show the instruments with frequencies (and ranges and means, as appropriate).

C-2. Survey Frequencies

Study No.

OPERATOR QUESTIONNAIRE
(CAPSTONE SE BASELINE,
NIOSH INTERVIEWS FALL 2001;
ADDED INTERVIEWS, MARCH 2003)

As part of expanding its Capstone Program into Southeast Alaska, the FAA had contracted with the University of Alaska to conduct a study of aviation safety in Southeast prior to the Capstone implementation. As part of that study, we are using surveys conducted for the National Institute of Occupational Safety and Health in their 2001-2002 study to improve aviation safety throughout Alaska. This questionnaire was designed for that study; we are asking operators who were not selected in the NIOSH sample to complete the questionnaire.

In addition, we are asking all operators to complete an excerpt from the Capstone Module of that survey, designed to study the first Capstone implementation, in the Yukon-Kuskokwim Delta area.

We want to know your thoughts and perceptions about aviation in Alaska as well as about your actual aviation practices. It will take about xx minutes to complete the questions.

Your answers will be kept confidential and will be used only in combination with those of others so that no company or individual can be identified. Do you have any questions before we begin?

CONTACT RECORD: Company________________________________

Date/Day of Week	Result Code	Result	Interviewer ID

START TIME: __________
INTERVIEWER ID: _______

I would like to begin by asking you a few questions about the operation of your air carrier business.

OP1. First, how many pilots do you, including yourself, currently employ? **5.17 (average includes operators asked at different seasons)**

OP2. How many pilots, including yourself, do you **typically** employ each season, during the summer? the autumn? the winter? and the spring?

7.96	Summer	**3.24**	Winter
4.09	Autumn	**4.43**	Spring

(range is 0 to 27 pilots)

OP3. How many pilots did your company hire in the year 2001? how many in 2000? in 1999?

3.55	2001 (total expected)
3.75	2000
3.37	1999

OP4. Including all locations and aircraft, can you tell me the total number of **scheduled** flight hours and departures flown by your company in the year 2000? And how many total **unscheduled** flight hours and departures did your company make?

Scheduled flight hours	Avg: 1,006	Sum: 21,120
Unscheduled flight hours	Avg: 2,248	Sum: 47,209

The next questions ask about your hiring and scheduling practices.

OP6. When hiring a pilot, which type of experience is most important to you? (READ THE FOLLOWING LIST AND RANK 1=MOST IMPORTANT, 2=SECOND, AND SO FORTH)

Number of responses that	Most Imp.	2nd	3rd	Least Imp	Not applicable
Flying in the area of Alaska where your company operates	**12**	**4**	**2**	**0**	**1**
Flying anywhere in Alaska	**1**	**2**	**9**	**6**	**1**
Total flying hours, anywhere	**0**	**3**	**4**	**11**	**1**
Flying in the type of aircraft your company uses	**5**	**9**	**3**	**1**	**1**

OP7. Is there some other pilot experience or qualification that is more important than any of the four I just mentioned?

4 No **15** Yes

OP7a. Will you please describe it? **Pilot safety history; recommendations; flight evaluation; ability to handle stress and make good decisions; maturity; attitude; personality; formal training**

OP8. How much of a problem is pilot fatigue in pilot scheduling? Is it a major problem, a minor problem, or not a problem?

0 A major problem
12 A minor problem
11 Not a problem

OP9. How do you pay your pilots? (USE CHOICES AS PROBE IF NECESSARY)

0 Hourly for all duty hours
0 Hourly for flight hours only
10 Salary
5 Combination of salary and flight hours
0 Combination of flight hours, duty hours, and salary
0 Flight completions
7 Other

OP9a. Please explain **Salary plus bonus; self-employed**

OP10. Do you pay your pilots overtime?

18 No ↓ **2** Yes →

OP10a. Under what conditions?
No responses

Now I would like to ask you some questions about Federal Aviation Regulations.

OP11. From your personal experience, are the FARs interpreted consistently by different inspectors at different times?

11 Yes ↓ **12** No →

OP11a. Interpretation of flight and duty time; interpretation of manuals; maintenance discrepancies; this was more of a problem in the past

OP12. Do you feel that some FARs interfere with getting the job done, without contributing to safety?

9 No ↓ **14** Yes →

OP12a. Which regulations are they and why do you feel that way?
Hazmat regulations too complex for small carriers; SVFR traffic in Ketchikan; arbitrary AD's; safer to fly in 300'/20 miles than in 500'/2 miles; items installed for a particular use can't be removed without removing all associated components(e.g., air conditioning; load manifests for each type of helicopter

Now I'd like to ask you about some of your company's policies and procedures.

OP13. Does your company require higher-than-FAA weather minimums for flying?

12 No ↓ **11** Yes →

OP13a. When did your company began this requirement?
Range: 1994 – 2000; "newer pilots

OP13b. Please describe your policy or send/fax a copy (786-7739)

Higher for flight-seeing; pilots have personal minimums; dispatch similar to part 121 operation

OP14. Does your company have one or more **<u>written</u>** programs for **pilot training** to help pilots deal with **whiteout conditions** (with **low visibility conditions, flat lighting conditions, recovery from inadvertent flight into IMC**?)

	Yes	No	If yes, when started
a. Whiteout conditions	**9**	**13**	**From 1989 to 2001**
b. Low visibility conditions	**10**	**12**	**From 1989 to 2001**
c. Flat lighting conditions	**7**	**15**	**From 1989 to 2001**
d. Recovery from inadvertent flight into IMC	**11**	**12**	**From 1989 to 2001**

Now I'm going to ask about pilot checking procedures for the same four conditions:

OP15. Does your company have one or more **written** programs for **pilot checking** to ensure pilot proficiency in **whiteout conditions** (in **low visibility conditions, flat lighting conditions, recovery from inadvertent flight into IMC**?)

	Yes	No	If yes, when started
a. Whiteout conditions	**12**	**10**	**From 1989 to 2001**
b. Low visibility conditions	**13**	**9**	**From 1989 to 1999**
c. Flat lighting conditions	**10**	**12**	**From 1989 to 1999**
d. Recovery from inadvertent flight into IMC	**16**	**7**	**From 1989 to 1999**

OP16. Who, inside or outside the company, has the authority to cancel a flight? (MARK ALL THAT APPLY)

23 Pilot ➔ **If pilot only, skip to Q.OP18**

18 Someone else in the company ➔ (WHAT IS THEIR POSITION? AND ARE THEY A PILOT?)

Chief Pilot; Director of Operations; Owner; Dispatcher; Base Manager; President; VP; Tour Operations manager

❍ Someone else outside the company ➔ (WHAT IS THEIR POSITION? AND ARE THEY A PILOT?)

Passengers, FAA

INTERVIEWER CHECKPOINT: IF A NON-PILOT EMPLOYEE MAKES DECISIONS ABOUT LAUNCHING FLIGHTS ASK TO OP17. IF A PILOT EMPLOYEE (PILOT OR CHIEF PILOT, ETC.) SKIP TO OP18

OP17. What initial and recurrent training does the company provide or require that person to have?

No responses.

OP18. Does your company have a written list of required conditions to launch a flight, for example, a risk assessment worksheet?

21 No ↓ **2** Yes →

OP18a. When did your company begin to use this list?
1 response: draft in spring 2002

OP18b. Please send/fax a copy of this list (786-7739).
Not provided

OP19. How many of your aircraft have auto pilots? Do you consider the auto pilot to be very helpful, somewhat helpful, or not at all helpful to flight safety in Alaska (NOT JUST TO YOUR COMPANY)? (CONTINUE WITH THE LIST OF REMAINING EQUIPMENT USING SAME QUESTION FORMAT)

	Sum of a/c	**# of companies**		
Type of equipment	Number of aircraft	Very Helpful	Somewhat Helpful	Not at all Helpful
a. Auto pilot	**7**	**1**	**1**	**4**
b. VOR	**45**	**2**	**4**	**8**
c. GPS – VFR	**77**	**12**	**7**	**1**
d. GPS – IFR	**22**	**3**	**1**	**2**
e. Loran	**5**	**0**	**1**	**6**
f. Mid-air collision avoidance system	**3**	**3**	**1**	**0**
g. Other Avionics: **ADF, NavComs, Capstone, Radar Altimeter**	**14**	**4**	**2**	**0**
h. Pilot shoulder harness	**127**	**20**	**2**	**0**
i. Rear Passenger shoulder harness	**39**	**5**	**4**	**1**
j. Pilot 5-point restraint harness	**18**	**2**	**2**	**1**
k. Other crash protection equipment **PFDs, survival equipment**	**3**	**2**	**0**	**0**

OP20. Now thinking about your company's financial success, how important is **on-time delivery of mail**? Is it very important, somewhat important, or not important? What about **on-time delivery of passengers?** How important is **on-time delivery of cargo?**

	Very Important	**Somewhat Important**	**Not Important**	**Doesn't Apply**
a. **On-time** delivery of mail	**6**	**4**	**1**	**10**
b. **On-time** delivery of passengers	**7**	**9**	**0**	**6**
c. **On-time** delivery of cargo	**7**	**7**	**2**	**6**

OP21. In the last 18 months, has there been a change in your company's insurance costs per seat?

16 Yes ↓ **4** No change→ **Skip to Question OP 22**

OP21a. Did the costs increase or decrease?

13 Increase: **from 2 to 300%; mean 91%**
3 Decrease **from 5 to 10 %; mean 8%**

OP21aa. By what percent did they increase or decrease?

OP21b. Why do you believe they changed?

Industry increase; accidents; Alaska market; 9/11; women take fewer risks

OP22. What survival equipment, beyond legally required items, is in your company aircraft?

Note that the US Forest Service minimums are required; cell phone; marine radio; survival suits

OP23. What training does your company provide to use the survival equipment in the aircraft?

Annual emergency training; familiarization; joint exercise with Coast Guard and Civil Air patrol; complete, including underwater egress training

OP24. Now, we are interested in your opinion about measures that might improve aviation safety throughout Alaska, not just in your company.

Can you tell me how effective each of the following measures could be in preventing aircraft crashes if it were widely applied in Alaska aviation?

Possible measures to use in preventing aircraft crashes	**Very Effective**	**Somewhat Effective**	**Not Effective**

Would pilot training improvements in meteorology be very effective, somewhat effective, or not effective in preventing aircraft crashes? (CONTINUE THE LIST OF REMAINING MEASURES USING SAME QUESTION FORMAT.)

Pilot training improvements in the following areas:			
a. Pilot training improvements in meteorology	**10**	**8**	**4**
b. Pilot training improvements in decision-making	**17**	**4**	**1**
c. Pilot training improvements in white-out/flat-light conditions	**11**	**9**	**2**
d. Pilot training improvements in regional hazards	**12**	**9**	**1**

Now think about company policy and procedures….
Would company policies that included written criteria for go/no go decisions be very effective, somewhat effective, or not effective in preventing aircraft crashes? (CONTINUE THE LIST OF REMAINING MEASURES USING SAME QUESTION FORMAT.)

Company policies and procedures			
e. Written criteria for go/no-go decisions	**5**	**12**	**5**
f. Rewards from management for flights or flight hours without accidents/incidents	**8**	**8**	**6**
g. Pay based on salary rather than flight hours or flights	**12**	**6**	**4**
h. More flight time required of new pilots	**9**	**6**	**7**
i. Better checks of a pilot's flying history before hiring	**9**	**7**	**6**

Now think about the weather….
Would more locations with manned weather reporting be very effective, somewhat effective, or not effective in preventing aircraft crashes? (CONTINUE THE LIST OF REMAINING MEASURES USING SAME QUESTION FORMAT.)

Weather			
j. More locations with manned weather reporting	**15**	**7**	**1**
k. More locations with automated weather reporting	**13**	**7**	**2**
l. Increased accuracy of existing weather reporting	**14**	**9**	**0**
m. Increased and improved use of video cameras, such as mountain pass cameras	**20**	**1**	**1**
n. Improved passenger understanding of weather hazards	**7**	**7**	**8**

Now think about the operating environments for companies like yours….
Would changes in how by-pass mail is given to operators be very effective, somewhat effective, or not effective in preventing aircraft crashes? (CONTINUE THE LIST OF REMAINING MEASURES USING SAME QUESTION FORMAT.)

Operating Environment			
o. Changes in how by-pass mail is given to operators	**2**	**6**	**2**
p. More time to deliver by-pass mail before it's switched to another operator	**3**	**6**	**1**
q. Financial incentives (e.g., lower insurance rates, preference in mail contracts) for flights or flight hours without accidents/incidents	**6**	**2**	**4**

OP25. Thinking of the seventeen (17) measures you just rated, if you had to choose only two as most useful, which would they be? (REPEAT MEASURES IF NECESSARY AND RECORD THE APPROPRIATE LETTER IN THE BOX.)

Safety Measure from OP 24	# of Respondents
b. Pilot training improvements in decision-making	13
m. Increased and improved use of video cameras, such as mountain pass cameras	10
j. More locations with manned weather reporting	6
h. More flight time required of new pilots	4
g. Pay based on salary rather than flight hours or flights	3
d. Pilot training improvements in regional hazards	2
q. Financial incentives (e.g., lower insurance rates, preference in mail contracts) for flights or flight hours without accidents/incidents	2
i. Better checks of a pilot's flying history before hiring	2
l. Increased accuracy of existing weather reporting	2
n. Improved passenger understanding of weather hazards	1

OP26. Are there any other measures that we didn't mention that might improve aviation safety in Alaska?

16 Yes 4 No

➔ What are they?

Better avionics (EGPWS and Capstone); Medallion Program participation; For pilots, more experience, better flight training; knowledge (especially local area), and knowledge of maintenance; AWOS weather reporting at non-airport locations; economic re-regulation.

P 27. What other about aviation safety in Alaska do you think we should know about?

Considering the variety of activities, the elements, number of operations, and the seasonal nature of the flight peaks suggests that Alaska aviation accidents are surprisingly low. The situational awareness of a moving map display would be the most useful tool in the airplane to reduce accidents.
Changes in attitude and education (e.g. risk management) should improve aviation safety, given several years.
Accidents usually happen here in August/Sept largely due to short season with long hours. Fatigue and 14-hr duty day over a season of 7-day weeks take its toll.
Good consistent maintenance
There is a need for thorough flight checkout of pilot applicants--more important than flight hours or history.
More IFR flight, twin-engine operation could improve flight safety if these were economically feasible.
(a) Too few career Alaska pilots; (b) VFR flying in Alaska requires more knowledge than IFR flying; (c) accidents correlate with the availability of qualified pilots; (d) the second season is more dangerous than for new pilots.

Air Carrier Survey: Capstone questions
Capstone Phase II Baseline Study
Southeast Alaska

The Alaskan Region's "Capstone Program" is an accelerated effort to improve aviation safety and efficiency through installation of government-furnished Global Positioning System (GPS)-based avionics and data link communications suites in commercial aircraft. Capstone was originally implemented in the Yukon-Kuskokwim Delta area of Alaska; the Phase II implementation area is Southeast Alaska.

The following questions are about how you expect the Capstone program to affect your operations in Southeast Alaska. You may not know the answers to some questions – that's fine. We are interested in finding out what Southeast Alaska air carriers know about the program, and what they expect it to do, as of March 2003, before it's been fully implemented.

Thanks you for answering!

CONTACT RECORD: Company________________________________			
Date/Day of Week	**Result Code**	**Result**	**Interviewer ID**

CO8. Listed below are some potential benefits from using Capstone equipment in Southeast Alaska. How helpful do you believe each of these will be to you?

	No Benefit	Very Small Benefit	Some Benefit	Signifi-cant Benefit	A Major Benefit	Don't Know
a. Fewer cancelled flights due to new instrument approaches at remote airports	**7**	**0**	**1**	**1**	**3**	**0**
b. Safer operations at remote airports due to new instrument approaches	**7**	**0**	**1**	**2**	**2**	**0**
c. Safer flying in minimum legal VFR conditions	**0**	**0**	**2**	**3**	**6**	**1**
d. Fewer near mid-air collisions	**0**	**0**	**4**	**2**	**6**	**0**
e. More useful weather information	**0**	**1**	**5**	**4**	**2**	**0**
f. Better knowledge of other aircraft and ground vehicle locations when taxiing	**5**	**3**	**1**	**2**	**1**	**0**
g. Improved SVFR procedures due to better pilot and controller knowledge of aircraft locations	**0**	**0**	**1**	**6**	**4**	**1**
h. Easier in-flight diversions or re-routes	**0**	**2**	**2**	**4**	**3**	**3**
i. Time savings from more direct flight routes	**2**	**2**	**1**	**2**	**5**	**0**
j. Improved terrain awareness for pilots	**0**	**0**	**0**	**2**	**10**	**0**
k. Improved search and rescue capabilities	**0**	**0**	**3**	**3**	**6**	**0**

CO9. Are there other benefits the Capstone program will provide?

Situational awareness; support in emergency such as inadvertent IMC; improved operations in marginal VFR; oversight by company dispatch; newer pilots will be lost less; reduced insurance rates; improved safety confidence; increased pilot comfort; more accurate and timely decisions; lower Minimum Enroute Altitudes (e.g. for medivac patients who need lower altitude; to avoid icing); improved passenger confidence.

Please rank the top three potential benefits to you from Capstone, and explain why:

Benefit	# of responses
Improved terrain awareness for pilots	9
Fewer near mid-air collisions	5
Improved search and rescue capabilities	4
Time savings from direct flights	3
Fewer cancelled flights/instrument approaches	2
Improved SVFR procedures	2
Easier in-flight diversions or re-routes	1
Emergency support	1
More useful weather info	1
Safer flying in minimum legal VFR conditions	1

CO10. Listed below are some potential problems with using Capstone equipment. How serious do you believe each of these will be?

	No Problem	Very Small Problem	Minor Problem	Significant Problem	Major Problem	Don't Know
a. Less heads-up time	**0**	**4**	**3**	**2**	**2**	**1**
b. Heavier workload in the cockpit	**2**	**3**	**5**	**1**	**0**	**1**
c. More aircraft flying in the same airspace because they are using GPS point-to-point routing	**1**	**7**	**3**	**1**	**0**	**0**

CO11. Are there other potential problems for you that Capstone may cause or add to?

Using equipment to push the weather; attempting to use it to fly into IFR; lack of redundancy if used for IFR; pilots may not talk to each other; attitude differences between older, experienced and younger, less experienced pilots; 75 percent of time flying over salt water; if used to fly very low would be dangerous; overconfidence; danger of over reliance on Capstone; maintenance difficulties in salt water environment; less experienced pilots using equipment to fly in unfamiliar terrain; minimum equipment lists (grounded if Capstone is not working); training costs for proficiency; maintenance costs after FAA program ends.

CO15. Which of the issues below do you think might cause pilots to choose not to use Capstone equipment?

	Yes	**No**	**Don't Know/ No Opinion**
a. Too distracting	**4**	**8**	
b. Too difficult to use	**4**	**8**	
c. Don't want company watching aircraft location at all times	**7**	**4**	
d. Don't trust equipment to provide reliable information	**2**	**10**	
e. Concerned that equipment might break	**1**	**11**	

CO16. Are other reasons you believe pilots might choose not to use Capstone equipment?

False traffic proximity warnings; need for or lack of training; concerns that aircraft might be grounded if equipment inoperable; don't want FAA watching for infractions (7 responses in this category)

Please Rank the three most serious problems you might encounter with Capstone, and explain why:

Problem	# of Responses
Too distracting/Less heads-up time	5
Too difficult to use	1
Learning required to upgrade to IFR capability	1
Using equipment in lieu of training/over reliance on equip	2
Maintenance problems	1
Grounding a/c due to equipment problems	3
Don't want company/FAA watching	4
Overconfidence in marginal weather	2
Using equipment for bootleg IFR	1
Don't trust equipment	2
Initial lack of GBT's to receive information at home base	1

CO14. How much do you expect Capstone equipment will help you to make go/no go flight decisions under the following conditions?

	Not at all	**A small amount**	**A great deal**	**Don't know**
a. Low ceilings	**6**	**1**	**4**	**1**
b. Low visibility	**7**	**1**	**4**	**0**
c. High winds	**12**	**0**	**0**	**0**
d. Icing potential	**11**	**1**	**0**	**0**

COfinal. What other concerns do you have about the Capstone program or about aviation safety in SE Alaska?

- Capstone can help new pilots in their learning of the areas and its unique characteristics, which is now a concern.
- Traffic avoidance with transient aircraft that are not Capstone equipped
- It’s not a level playing field with regard to federal excise taxes.
- Concerns about Special VFR regulations, especially in Ketchikan.
- The benefit will come if everyone has Capstone, not just a few.
- Remember we’re still a VFR environment; pilots could get lazy and spend too much time inside.
- Company and pilot attitudes towards safety is a concern, as is the weather.
- Capstone program appears to be designed for IFR operations; most operators in SE Alaska are not IFR certified.
- In heavily trafficked areas, the aircraft avoidance feature could be too distracting, in addition to the problem of not all aircraft being equipped.
- There are many open questions concerning design of Capstone avionics and operation in VFR helicopter operations.

Study No [ ]

NIOSH PILOT INTERVIEW, FALL/WINTER 2001/02
SOUTHEAST PILOT RESPONSES[1]

I would like to begin by asking you a few questions about your flying career and your background.

A1. Which pilot ratings and certificates do you hold?

36 Commercial
27 Instrument
17 ATP
10 Helicopter
13 Flight instructor
31 Single-engine land
18 Multi-engine land
24 Single-engine sea
10 Multi-engine sea
3 Others (please specify)
↓
CFII; glider tow (3)

A2. How many total hours have you flown in Alaska? how many in the last 12 months? Now can you tell us how many Alaska departures have you made in your total flight career? In he last 12 months? Finally, can you tell us how many total hours you have flown in all locations, including Alaska? how many in the last 12 months?

Mean Hours reported:

Flight Hours	**Alaska**	**All Locations, incl. Alaska**
Total Flight Career	5304	7212
Last 12 months	239	591

The next questions ask about your total flight career.

A3. How many instrument hours have you flown in Alaska? ➔ Mean: 119 hrs

A3a. Can you estimate your total number of instrument hours?
↓
Mean: 305 hrs

A4. How many hours have you flown for your current employer? ➔Mean: 2376 hrs

[1] Data are weighted and rounded to whole numbers; totals may be slightly different than 36 unweighted responses

A5. Thinking about the number of years you have flown in Alaska, how many have been seasonal?

➜ 1.2 **Years** range: 0 to 6 years

A5a. How many have been year-round? ➔ **7.8 Years** **dian 2.7 yrs; range, 0 to 36 years**

A6. Please estimate what percent of your paid flight hours in 2000 occurred in each season. (For example, 100% summer; or 25% spring, 50% summer, 25% autumn, etc.)

15 %	Spring	**20 %**	Autumn
54 %	Summer	**11 %**	Winter

A7. Over your entire career, how many different companies have you worked for as a pilot?

4 range: 1 to 12

A7a. Over how many years has that been? ➔ 13.8 yrs **range: 1 to 39**

A8. What is your gender?

2 Female
34 Male

A9a. How old are you?

39 yrs; range 20 to 66

A9. What is your race? (multiple responses allowed)

1 American Indian or Alaska Native
36 White
1 Latino

A10. What is the highest level of formal education you have completed? (PLEASE MARK ONLY ONE)

0	Attended high school; didn't graduate	2	Associate's degree
1	GED	12	Bachelor's degree
11	High school diploma	1	Master's degree
9	Attended college; no degree	0	Doctoral degree

A11. Now, based on your experience as a pilot, do you feel that some Federal Aviation Regulations interfere with getting the job done, without contributing to safety?

17 No 18 Yes

↓

A11a. Can you give me one or more examples?

135 - 100, no talking unless strait/level flight below 10,000 ft. Regs on flight + duty time are confusing so it doesn't help toward safety
Allowing a 14-hr duty day instead of something less, like 10-12- hr duty days. Far Part 135.
The duty time and time off max duty day of 14 hours with only 13 days off required in 90 days
Power struggle between pilots and FAA especially if pilots are more experienced. Anchorage FAA inspectors came to Juneau demanded main struts be pumped down 3 1/2 " from 7 ", it created tail dragging and prop damage
FAA does just what it wants to do and interprets all the regs the way they see fit, even if basic safety is at stake.
Flight duty time under 135 is in direct conflict with the ability to perform, some pilots can work 10hours straight and others can't handle 6 hours, part 67 covers physical condition and mental ability, leave it to part 67
Southeast AK seaplane operators used to be able to fly at lower altitudes with greater visibility, that has been eliminated, law requires you to be at 500 feet now, it was safer flying at lower altitudes
Weather minimums to a point, the letter of the law does interfere with safe flight operations, but I know there's got to be stipulations
Carrying weapons is a hot topic. Sept 11th would have been less of a tragedy if FAA had allowed cockpit crews to be armed
Processes involved in certifying particular maintenance procedures, we're trying to get approval for ski basket for the helicopter. We're being denied using it without scientific proof that we're not going to crash the aircraft, which costs millions of dollars
Seat removal legs, cloud clearance requirements
Seat removal and replacement re: small single engine aircraft

A12. Are there routes, locations, or conditions that should require higher than FAA minimum weather conditions for flying?

22 No 8 Yes

↓

A12a. What are they?

A13. During the peak season, what hours do you typically work each day, including periods of time you are not on duty?

Mean hours worked: 12; range from 8 to 14 per day

A14. During the peak season, how many **hours per day** are you typically **on duty**?

Duty hours per day: mean 12 hrs

A15. During the peak season, how many **days per week** do you typically work?

Days per week: mean 5.4 Range; 5 to 7

Calculated hours per week: mean 66 hours; range 30 to 98 hours per week

A16. During the peak season, how often would you have liked to decline a flight due to fatigue, but you flew anyway? (MARK ONLY ONE)

0	Daily	10	Less often than monthly
3	Weekly	19	Never
1	Monthly		

A17. How often do you have to decide whether to fly into unknown weather conditions that may deteriorate below VFR minimums? (MARK ONLY ONE)

7	Daily	5	Less often than monthly
12	Weekly	1	Never
8	Monthly		

A18. How often do you fly into weather that is different from what was predicted when you started your flight? (MARK ONLY ONE)

5	Daily	8	Less often than monthly
17	Weekly	0	Never
6	Monthly		

A19. How often do Flight Service Stations provide accurate, current weather conditions for where you fly? (MARK ONLYONE)

1	Always	0	Rarely
33	Most of the time	0	Never
2	Occasionally		

A20. While working for your current employer, have you declined a flight due to poor visibility or other weather-related reasons?

0 No (Skip to Question A 22) 30 Yes

A21. Did the company support your decision?

0 No 27 Yes 3 Missing

A22. Do you have standard procedures to follow if you unexpectedly fly into IMC?

7 No 29 Yes
↓

range of comments:

Execute a 180 degree turn and/or descend and maintain visual contact with land
Personal procedures, company procedures are not standard
Contact base
Return to VMC immediately
If bad weather fly close to shore so if we hit bad weather we can turn to land, do a 180 and drop down as low as we need
change altitude
Get out of it; change altitude; radio base.
We are taught slow the aircraft, 180 degree turn, transfer to instrument flight, return to VFR conditions. Training involves recognition and avoidance. I don't believe in inadvertent, you make a decision

A23. Has your employer provided you with training and/or check rides to help you deal with **white-out conditions**?

	Training & Check Rides	**Training**	**Check Rides**	**Neither**
a. White-out conditions	**10**	**8**	**2**	**12**
b. Low visibility conditions?	**13**	**12**	**2**	**4**
c. Flat light conditions?	**11**	**7**	**2**	**13**
d. Recovery from inadvertent flight into IMC?	**15**	**9**	**3**	**6**

A24. How confident are you that you can safely fly under VFR rules in **low visibility conditions?** Are you very confident, somewhat confident, or not confident?

	Very confident	**Somewhat confident**	**Not confident**
a. Low visibility	**33**	**3**	**0**
b. Flat-light conditions	**17**	**12**	**7**
c. White-out conditions	**16**	**8**	**12**

A25. What survival training have you received from your current employer?

None; initial ground school; basic survival training; annual training; dunk tank to learn escape methods (FAA sponsored); over water emergencies; care of passengers; communication with rescuers; fire extinguishing; water survival.

A26. From the list of resources I am going to read, which ones do you use when making the decision to launch a flight? (CHECK ALL THAT APPLY)

34	**Flight Service Station**	24	**National Weather Service**
32	**Station Manager or other company personnel at destination(s)**	30	**Dispatcher, flight follower, other company personnel at hub or headquarters**
33	**AWOS/ ASOS**	33	**Pilots who are in route or who have flown the route that day**
9	**Other (please specify)** **Community people that you know; internet; marine wx; video cameras**		

A27. If you refuse to launch a flight due to marginal weather, how likely is it that **your passengers will fly with a different company**? Is it not at all likely, somewhat likely, or very likely?

	Not at all likely	Somewhat likely	Very likely	Don't know	Not applicable
a. Your passengers will fly with a different company?	**18**	**10**	**7**	**0**	**2**
b. The Post Office will give bypass mail to another company?	**5**	**1**	**3**	**8**	**19**
c. Some other pilot will comment that they could have completed the flight?	**22**	**10**	**1**	**1**	**2**

A28. Compared to other jobs, how safe is your pilot job? Is it much safer than other jobs, slightly safer, as safe as other jobs, slightly more dangerous, or much more dangerous than other jobs?

1 Much safer than other jobs
1 Slightly safer than other jobs
11 As safe as other jobs
17 Slightly more dangerous than other jobs
3 Much more dangerous than other jobs

A29. Do you have any accidents or incidents on your record?

4 No
30 Yes

A30. Now I'm going to read some different types of avionics, and I would like you to tell me how helpful you think each is in preventing crashes? How helpful is the **auto pilot**? Is it very helpful, somewhat helpful, or not helpful? (MARK ONE ANSWER FOR EACH)

	Very Helpful	**Somewhat Helpful**	**Not Helpful**	**Don't know**
a. Auto pilot	**9**	**10**	**11**	**2**
b. VOR	**3**	**19**	**13**	**1**
c. GPS – VFR	**33**	**2**	**1**	**0**
d. GPS – IFR	**14**	**11**	**6**	**2**
e. Loran	**1**	**6**	**22**	**4**
f. Mid-air collision avoidance system	**16**	**4**	**9**	**4**
g. Other avionics **ADF, Transponder, Capstone, radar, radar altimeter, satellite phone, TCAS**	**17**	**3**		

A31. I would like to ask your opinion about measures that might improve aviation safety for all pilots in Alaska.

Can you tell me how effective **pilot training improvements in meteorology** could be in preventing aircraft crashes if widely applied in Alaska aviation? Would it be very effective, somewhat effective, or not effective?

Possible measures to use in preventing aircraft crashes	**Very Effective**	**Somewhat Effective**	**Not Effective**
Pilot training improvements in the following areas:			
a. Pilot training improvements in meteorology	**19**	**11**	**5**
b. Pilot training improvements in decision-making	**28**	**6**	**3**
c. Pilot training improvements in white-out/flat-light conditions	**19**	**15**	**2**
d. Pilot training improvements in regional hazards	**24**	**10**	**2**

Now I'm going to ask about company policy and procedures, would company policies that included **written criteria for go/no go decisions** be very effective, somewhat effective, or not effective in preventing aircraft crashes?

Possible measures to use in preventing aircraft crashes	Very Effective	Somewhat Effective	Not Effective
Company policies and procedures			
e. Written criteria for go/no-go decisions	10	17	9
f. Rewards from management for flights or flight hours without accidents/incidents	12	14	9
g. Pay based on salary rather than flight hours or flights	18	16	2
h. More flight time required of new pilots	17	13	6
i. Better checks of a pilot's flying history before hiring	8	21	8

Now thinking about the weather, would more locations with **manned** weather reporting be very effective, somewhat effective, or not effective in preventing aircraft crashes?

Weather			
j. More locations with manned weather reporting	25	9	2
k. More locations with automated weather reporting	20	13	4
l. Increased accuracy of existing weather reporting	21	14	1
m. Increased and improved use of video cameras, such as mountain pass cameras	24	8	4
n. Improved passenger understanding of weather hazards	6	14	17

I'll move on now to operating environments for companies like yours. Would changes in **how by-pass mail is given to operators** be very effective, somewhat effective, or not effective in preventing aircraft crashes?

Operating Environment			
o. Changes in how by-pass mail is given to operators	2	6	22
p. More time to deliver by-pass mail before it's switched to another operator	3	7	18
q. Financial incentives (e.g., lower insurance rates, preference in mail contracts) for flights or flight hours without accidents/incidents	10	17	8

A32. Thinking of those 17 measures you just rated, if you had to choose only two as most useful, which would they be?

Measures listed	Number of 'votes'
b. Pilot training improvements in decision-making	19
j. More locations with manned weather reporting	12
q. Financial incentives (e.g., lower insurance rates, preference in mail contracts) for flights or flight hours without accidents/incidents	8
a. Pilot training improvements in meteorology	5
g. Pay based on salary rather than flight hours or flights	5
h. More flight time required of new pilots	5
m. Increased and improved use of video cameras, such as mountain pass cameras	4
d. Pilot training improvements in regional hazards	3
l. Increased accuracy of existing weather reporting	3
c. Pilot training improvements in white-out/flat-light conditions	2
k. More locations with automated weather reporting	2
f. Rewards from management for flights or flight hours	1
p. More time to deliver by-pass mail before it's switched to another operator	1

A33. If there are other measures that you believe might improve aviation safety in Alaska, but which we didn't discuss in the previous question, can you tell me what they are?

Better equipment for IFR operations, i.e. radar services, better assistance to evaluate and tailor IFR approaches for 135/121 operations. In Southeast AK, support floatplane operations, approved VFR corridors to fly lower than 500 feet with 2 miles vis
Change the State aviations culture to one of quality air service with zero compromises instead of getting the job done. Ensure that FAA supports these operators and punishes the cowboys
AWOS/ASOS would be a great addition to your ability to disseminate weather very fast updates once/minute
Recurrent pilot training every six months instead of twelve for FAR 135 operators
More AWOS stations in villages; Putting automated wx observation units in certain areas and/or passes I think might enhance safety
We need more manned weather stations. 90% of accidents are weather-related.
High cost of insurance and mandatory FAA regulations cause 135's to push weather to make enough to pay for all this. I think high operations cost is the reason we have so many accidents in AK.
If Capstone is proving to be so great, why isn't it being considered for all of Alaska?
There are too many private pilots flying that don't know what they are doing.
More on-site human observers. AWOS/ASOS are inadequate. NWS computer modeling depends on accurate and plentiful observations. AWOS/ASOS are not dependable or accurate. We used to have plentiful observation stations in the 1960s and 70s, what happened?
More local flight service, the present system is far from what we use to have. Less of this automated junk and some personnel in the field doing the job
Need to lower altitude and increase visibility, safer system for our jobs
We would like to see Capstone expanded to our area, Yakutat.
Capstone project or some of the aspects of the Capstone project, terrain avoidance and aircraft traffic avoidance would benefit us
Periodic training through the year for new pilots to interact also with seasoned pilots.
FAA is too nosey and not consistent in dealing with aviation problems. They watch us so closely for the least thing and don't realize we are human beings just like them.
Need more AWOS stations in the smaller communities.
Most companies are great, but some companies put pressure on pilots to perform and that can lead to accidents. Also, reduce amount of paperwork that is required; that will take stress off a pilot. Also, how about an occasional "slap on the back" for good
We need to install more AWOS throughout Alaska.
We need more seasoned pilots who know how to fly and use common sense. Where are our older pilots?
More consistency in the FAA. Every inspector they have seems to have a different interpretation of the regulations. They need to focus on safety more and paperwork less
Smaller communities need to get traffic advisories directly rather than going through other larger communities flight services.
Pilots need to fly within their equipment and experience capabilities.
More manned weather stations would be helpful.

A34. Do you have any other comments you would like to add about aviation safety in Alaska?

Challenging task
Over the 24 years I've been doing this, been a lot of changes all good toward safety. I'm very encouraged to the extent that safety's taken in this state mostly d/t operators. Also FAA + pilots; nature of our business is turnover,
Don't really have any, there will always be pilots out there who will make bad decisions, it's hard to make rules and regulations that will stop them from making bad decisions
Aircraft accidents can never be totally eliminated. Both pilot decision making and aircraft will continue to breakdown. Fast moving weather will also catch pilots off-guard. But, through pilot training and improved weather information distribution, both
Less duty time for pilots.
Weather reporting has gone down since Flight Service Stations have been shut down.
A group came into Juneau to study aviation safety last year and found those carriers with the best safety records were the carriers who did annual (hands on) training with their pilots every year.
Sometimes people tend to fly at night VFR, with single engine. I'd like to see that eliminated.
The FAA isn't as strict with NEW pilot licensing as they should be. They don't do as thorough check rides as they should before issuing a pilot's license.
The more experience a pilot has in type of aircraft he flies and the more air time in location where he flies, the less likely he is to have an accident.
1. Why is it that in the continental U.S., lodges and guides are not allowed to haul clients for pay and yet in AK they are? Lodge and guide operations constitute a large portion of the aviation activity in AK, but are basically unregulated, why?
We work in a very tough environment, train us and tell us to do the best we can, don't implement more rules, they just confuse the issues at hand
The duty time requirement is too high, would prefer twelve hrs to current fourteen hrs per day. The company puts pressure on pilots to fly for recognizable financial reasons. This requires the pilot to remain level needed in decision making regarding pa
One of the most dangerous things I felt when I was fairly new at this game, if weather was questionable, they waited 10 minutes then sent an experienced guy out, this put pressure on new guys and is a big factor in safety
I think it's inherently pretty safe right now. Of course there are risks. I don't think more regulations will help other than inhibiting operations
State needs to consider some kind of subsidy for insurance for owner/operators. Getting out of hand. Makes for less flights for residents, insurance rates are prohibitive and I understand its o/t accidents.
IFR traffic can tie up approach zone to Yakutat, and we have to circle sometime for 20 min.
It's gotten a bad rap, small operators have been hit pretty hard by insurance companies because of bad press
If every air carrier trained like Temsco, there would be fewer accidents. They are very caring and helpful and are very strict about maintenance on their aircraft.
New pilots (inexperienced) need more time in the area they are flying in and the aircraft they are using. After a few trips, it's easy to get "cocky" and not pay attention. They think they've learned it all because they've flown the route a few times.
We need more public awareness; esp. with this new Capstone, and funding may come in to help the "little guy."
Some pilots that fly in bush areas sometimes get bad because there's no one really monitoring the flight. They take too many chances. I understand Capstone (company) can monitor these pilots. If so, we need Capstone in all areas.
Aeronautical Decision Program that FAA recommends needs to be mandatory. It is excellent for pilots of all experiences.
Weather is a big factor, and pilots shouldn't be pressured to fly if they don't feel comfortable.
Pilots and operators in AK spend too much time dealing with the FAA on issues that don't help safety
The RCO feeds most information to Sitka flight service rather than feeding it directly to Petersburg or any traffic advisories. Petersburg needs to be able to receive traffic advisories directly. We have to get our info directly

Thank you for your time. All of the information you have provided is confidential and cannot be used for enforcement purposes.

Appendix D. Acronyms

A & P	Airframe and Powerplant (aviation mechanic certification)
ADS-B	Automatic Dependent Surveillance – Broadcast
ASOS	Automated surface observing system
ATC	Air Traffic Control or Controller
AWOS	Automated weather observing system
CDTI	Cockpit Display of Traffic Information
CFIT	Controlled Flight Into Terrain
CTAF	Common Traffic Advisory Frequency
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FIS-B	Flight Information System – Broadcast
FSS	Flight Service Station
GBT	Ground-based Transceiver
GPS	Global Positioning System
IFR	Instrument Flight Rules
ISER	Institute of Social and Economic Research, U Alaska Anchorage
IMC	Instrument Meteorological Conditions
METAR	Meteorological Aviation Report
MFD	Multi-Function Display (of Capstone avionics)
NDB	Non Directional Beacon – a navigation aid
NEXRAD	Next Generation Radar
NIOSH	National Institutes of Occupational Safety and Health
NMAC	Near Mid Air Collision
NOTAM	Notices to Airmen
NTSB	National Transportation Safety Board
PIREP	Pilot Report
SVFR	Special Visual Flight Rules
TAF	Terminal Aerodrome Forecast
TAWS	Terrain Awareness and Warning System
TCF	Terrain Clearance Floor
TIS-B	Traffic Information System – Broadcast
UAA-ATD	University of Alaska Anchorage Aviation Technology Division
UAT	Universal Access Transceiver
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions
VOR	Variable Omni-directional Radio – a navigation aid
Wx	Weather

For detailed definitions of a wide variety of aviation terms, refer to the FAA's Pilot/Controller Glossary, available at
http://www.faa.gov/atpubs/PCG/