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2004: A Nonpareil Year for Safety

"Series of 'good' years is largely a product of normal distribution rather than a new trend."
– Airclaims

The year just completed "was the safest ever for commercial transport," according to the annual assessment of **Airclaims**, a UK-based consultancy. Only 11 fatal accidents to passengers occurred worldwide, out of 27 fatal accidents overall (e.g., cargo) in which 439 passengers and crew were killed.

The toll includes Eastern as well as Western-built jets and turboprops. Airclaims' final count for 2003 was 13 fatal accidents and 693 passengers and crew killed *(see table, p. 3)*.

In the United States, aviation officials hailed 2004 as ending on a positive note the safest three-year period ever recorded for airline travel, with 34 deaths over that period. The worst single event was the Jan. 8, 2003, crash of an **Air Midwest** twin turboprop, in which all 21 aboard were killed *(see ASW, May 26, 2003, p. 1)*.

Ellen Engleman Conners, chairman of the **National Transportation Safety Board** (NTSB), declared 2004 "a great year for aviation safety" but cautioned that not all sectors are equally safe. She cited the more than 1,500 general aviation accidents occurring annually that are keeping NTSB investigators busy. In addition, the NTSB has continuing safety concerns about air cargo operations and, based on a spate of recent accidents, the hazard of ice contamination during takeoff *(see related p. 8 brief)*.

Airclaims' Dec. 31, 2004, Special Bulletin #346 puts the situation in context, offering guarded optimism for the future. To cite the bulletin's key points:

- "The series of 'safe years' starting in 2001 is unprecedented."
- "The number of passenger fatalities in 2004 [347] is more than 60% down on the 970 a year average for the 1990s. No other year has come close to such a good result. The closest in number was 1955, when 409 passenger fatalities were recorded."

(Cont'd on p. 2)

SPECIAL GRAPHIC REPORT –
PROFILES IN DISASTER

Despite Headway, CFIT Remains Persistent, Deadly Threat

More than 190 pilots and passengers were killed and nearly 30 aircraft were destroyed in 2004 by crashes involving controlled flight into terrain (CFIT). Most of the aircraft involved were not required or, if required, had not yet installed terrain awareness and avoidance warning systems (TAWS), according to a new study *(see table at p. 4)*.

The study was prepared by Don Bateman, chief flight safety systems engineer at **Honeywell** [NYSE: HON], one of the world's leading suppliers of TAWS equipment. To be sure, the company has a business interest in highlighting the persistence of the CFIT hazard, but the study findings reflect a deadly problem that has been of continuing concern for years *(see ASW, Aug. 30, 1999, p. 5)*.

Most of the accidents in the Honeywell study involved smaller aircraft, as nearly all large passenger-carrying aircraft have been equipped with TAWS (the **International Civil Aviation Organization** established a Jan. 1, 2003, deadline for installation on aircraft carrying 30 or more passengers). TAWS is the generic acronym for what also are known as enhanced ground proximity warning systems (EGPWS). Unlike the earlier and more limited GPWS, EGPWS features a "look ahead" function that provides earlier warning of dangerous terrain. Not only does the EGPWS technology warn pilots of rising terrain ahead, it warns

(Cont'd on p. 3)

✔ "The long term trend is to fewer fatal accidents, with the number expected each year roughly having halved from the 40 or 50 a year in the late 1940s/early 1950s down to around 25 a year in the 1980s and 1990s. However, in the two decades up to 2001, this improvement in the **number** of fatal accidents had 'stalled.' There was no improvement during the 20 year period from 1981 to 2000, rather there was a gradual trend towards increasing numbers of fatal accidents." (Emphasis in original)

✔ "Although the number of fatal accidents each year was not decreasing during the 1980s/1990s, the number of flights was increasing. Therefore, aviation was still continuing to get safer but … the frequency of accidents … forms the public's view of air safety."

✔ "These recent series of good results have come despite the difficult financial climate experienced by the airline industry."

✔ "It is probably unrealistic to expect this recent high rate of improvement to continue indefinitely and, unfortunately, 2005 may well produce a worse result."

✔ "Reluctantly, this series of 'good years' is largely a product of normal distribution rather than a new trend."

Nonetheless, *ASW* contributing editor John Sampson raises a number of factors on the still-evolving safety situation:

‣ Airframe manufacturers are providing more direct and pertinent online support for both maintenance and operations. This support can positively impact achievable safety levels.

‣ The circumstances of (and lessons learned from) accidents are filtering through more rapidly (and clearly) to a larger sampling of airline pilots worldwide. The Internet is playing a positive role for safety. *Bluecoat, PPRuNe, Airliners.net, usaviation.com* (and many others) are providing forums where accidents and incidents are being actively and intelligently discussed. This activity will have had an educational impact, particularly where the new technology is concerned. That became obvious soon after the mid-air collision over South Germany. Even the regulators read into the confusion levels and smartly began publishing official interim notes to ensure that all concerned were aware of facts that hadn't been widely disseminated *(see ASW, May 31, 2004, p. 1).* Pilot attitudes have also changed. The **Swissair** Flight 111 crash rapidly switched 100 percent of pilots away from any mindset of tolerance of smoke or fumes. Land ASAP (as soon as possible) has become a scrupulous compunction. Trouble-shooting while airborne? After the TV re-enactment of the **Alaska Airlines** Flight 261crash, forget it. Hard lessons are being remembered, reducing the likelihood of repeats.

‣ Pilots are realizing more than ever that their job security depends upon a safe and profitable operation. Flight Data Monitoring (FDM, a.k.a. FOQA) has convinced pilots of the virtues of being skilled professionals – and de-rated the shortcut approach to getting the job done. There is nothing as praiseworthy as induced virtue. If it translates into fewer human error accidents through less risk-taking, then the era of the true professional will have arrived.

‣ The next limitation to overcome may be the man-machine interface. If pilots can feed deadly all up weight (AUW) data into a keyset, or set too low a power to get airborne, or allow an aircraft to suck them into thinking it

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was under autopilot control and take them on a hay-ride, that interface needs re-examination *(see ASW, Jan. 26, 2004, p. 6)*. The perennial question of "Who's driving the bus?" was always an unintended consequence of automation – but one needing more monitoring than it's getting.

‣ Safety awareness, and action, is improving globally. The old Soviet bloc states still have a way to go but they appear to be turning the corner. Korean Airlines has undergone a major safety overhaul and has been accident-free for five years. The Chinese appear to have a very rational and up-to-date thought process regarding "safety first." Their rapid grounding response to their CRJ200 accident would've been considered a heresy by the U.S. **Federal Aviation Administration** (FAA), but the Chinese doggedly allowed "better safe than sorry" to prevail. In Taiwan, the **Aviation Safety Council** (ASC) has established a high standard for accident postmortems, with a positive effect on airlines coming under its investigative eye.

Highlights of 2004 Losses
Western and Eastern-built aircraft

Year(s)	1990s average	2000	2001	2002	2003	2004P[1]
Fatal accidents [2]	40	35	30	35	25	27
Pax & crew fatalities	1,149	1,127	842	982	693	439
Hull & pax liability losses[3]	$1,535	$2,305	$1,810	$1,251	$1,042	$1,030

Notes:
[1] Preliminary for 2004. [2] Includes cargo, etc., of which fatal accidents to passengers (pax) is a subset.
[3] In millions of dollars. Includes "major partial" and "minor" losses. A "major partial" is defined as one where the cost of repair equals or exceeds 10% of the aircraft insured value, or $1 million. *Source: Airclaims*

‣ The hardware and human infrastructure impact safety. The FAA is looking down the barrel of en masse retirements of experienced air traffic controllers. Berms, light poles, other obstructions and inadequate runway overrun areas present latent hazards. If crews make a mistake it shouldn't have to be a lethal penalty awaiting them just off the bitumen at the far end.

‣ There are red flags up on turboprop icing, on-ground de-icing, bird strike potentials, pilot chronic fatigue, outsourced maintenance, non-precision approaches and the like, not to mention the band aids applied to the in-flight fire threat. Over the horizon looms the inbuilt conflict between aircraft climb/descent rates and TCAS Resolution Advisories under the new DRVSM 1,000 ft. vertical separation rules coming into force January 20 *(see ASW, Nov. 3, 2003, p. 1)*. The elastic band for ETOPS (extended range operations) keeps stretching and may one day fly back to hit in the eye *(see ASW, Jan. 13, 2003, p. 1)*. In summary, everything in the garden appears rosy, but behind and beneath each rose thorns lurk – and the potential for many pricks.

All in all, the Airclaims' caution about complacency seems justified. Three "good" years don't necessarily mean the future will continue on the same positive path as the past. As the saying goes, whenever one thinks a trend is going to continue forever, that's right about the point where it is most likely to reverse. ■

CFIT Accidents Persist *(Cont'd from p. 1)*

of threatening terrain off to the side, thereby providing additional protection during turns. It is estimated that EGPWS probably prevented about 45 deaths in 2004, although Bateman hastened to add, "EGPWS is not the panacea for all CFIT situations; the big variable remains the pilot's response."

The deadly toll involving smaller aircraft reinforces the recent call by Jim Hall, former chairman of the **National Transportation Safety Board** (NTSB), to install TAWS (EGPWS) on smaller aircraft *(see ASW, Jan. 3, p. 1)*. Indeed, in less than 90 days, by March 29, all turbine powered aircraft in U.S. registry carrying six or more passengers must have TAWS installed or face grounding. If this mandate date had been four years earlier, in March 2000, about 180 lives might have been saved, Bateman estimated. Moreover, the requirement does not cover aircraft of lesser capacity or piston-powered aircraft. By one estimate, turbine powered aircraft constitute barely 7 percent of the general aviation (GA) fleet.

In a five-day period last October three CFIT accidents occurred involving aircraft covered by the March 29 deadline but not yet equipped:

✓ Oct. 19, 2004 at Kirksville, Mo., 13 fatalities. Part 121, scheduled carrier (classic GPWS installed but no warning as aircraft was in the landing configuration; EGPWS purchased but not yet installed).

✓ Oct. 23, 2004, Brown Field, Calif., 5 fatalities. Part 135, on-demand carrier.

✓ Oct. 24, 2004, Blue Ridge, Va., 10 fatalities. Part 91, GA.

(*Cont'd on p. 4)*

Fixed Wing CFIT Accidents 2004 Cargo, Medical Evacuation, turboprop, some piston					
Operation	Date & Place	Aircraft type	Circumstances	Deaths	TAWS Req'd
CFIT Accidents involving U.S. aircraft					
Cargo	Jan. 2 Koyukuk, Alaska	PA-31-350	Flew into frozen river on entering IMC	1	Not req'd
Cargo	Jan. 21 Big Pine, Calif.	PA-32R-300	En route, acft flew into mountainous terrain (fell asleep?)	1	Not req'd
Business	Jan. 31 Homestead, Fla.	Be-C90	Awaiting IFR flight plan approval into Miami; dusk	2	Yes, but?
Medevac positioning	Feb. 17 Dodge City, Kan.	Be-B90	Flew into terrain 5 NM NW	3	Yes, but?
Private	March 11 Napa, Calif.	MU-2B-40	Hit 3 NM short on approach at night	2	Yes, but?
Air taxi positioning	June 13 Lewisburg, W.Va.	Be-200	Flew into terrain 15 NM west of airport during approach; daytime; fog	2	Yes, but?
Private	July 13 St. Kitts Island	LJ-25	Hit short into perimeter fence; significant damage	0	Yes, but?
Cargo	Aug. 17 6 NM NE Neihart, Mont.	Be-99	Hit 175 ft. below "Big Baldy" mountain at night; VFR	2	Not req'd
Cargo	Sept. 23 Gwinner, N.D.	Ce-208	Hit short on GPS 34 approach	1	Not req'd
Scheduled	Oct. 19 Kirksville, Mo.	JS-32	During VOR/DME approach to Rwy 36 crashed short 1.3 NM in poor visibility	13 of 15	Yes, but no EGPWS
Medevac	Oct. 23 Brown Field, Calif.	LJ-35	Flew into mountain on departure at dawn	5	Yes, but?
Private	Oct. 24 Blue Ridge, Va.	Be-200	During missed approach in poor visibility struck Bull Mt.	10	Yes, but?
Cargo	Nov. 9 Boise, Idaho	SA226TC	Hit short into approach lights on ILS Rwy 10R at night in IMC	0	Not req'd
Air taxi positioning	Nov. 22 Houston, Texas	G-III	Hit obstacle 3¼ NM short during ILS Rwy 04 approach; positioning flight to pick up Pres. Bush Sr.	3	Yes, but acft awtg sale
Charter	Nov. 27 Bagram, Afghanistan	CASA-212	Hit mountain enroute	6	Yes, but?
Toll for U.S. aircraft:				54 dead, 15 hull losses	
CFIT accidents involving non-U.S. aircraft					
Scheduled	Jan. 22 Tashkent	Yak-40	Hit terrain/fence in fog after missing the runway	37	No
Regional	Jan. 28 Ghardaia, Algeria	Be-1900D	Flew into terrain at high bank angle on go-around	1 of 8	No
Positioning	Feb. 19 30 NM NNW of Hobart, Tasmania	AC-500	Hit terrain ridge enroute	1	No
Govt. VIP	Feb. 24 Mostar, Bosni-Herzegovina	Be-200	Flew into mtn during initial approach; possible icing in IMC	9	No
Medevac	Feb. 24 Cagliari, Sardinia	Ce-500	During initial approach, hit mtn at 20 NM in IMC	6	No
Scheduled	May 14 Manaus, Brazil	EMB-120	Flew into jungle on approach about 9 NM short at night	33	???
Cargo	DHC-6 Papua, New Guinea	DHC-6	Hit mtn 45 NM enroute from Port Moresby	2 of 3	No
Taxi/charter	Aug. 18 Goma, Zaire	Ce-208	Flew into 10,800 ft. mtn at 8,500 ft. level in IMC	3	No

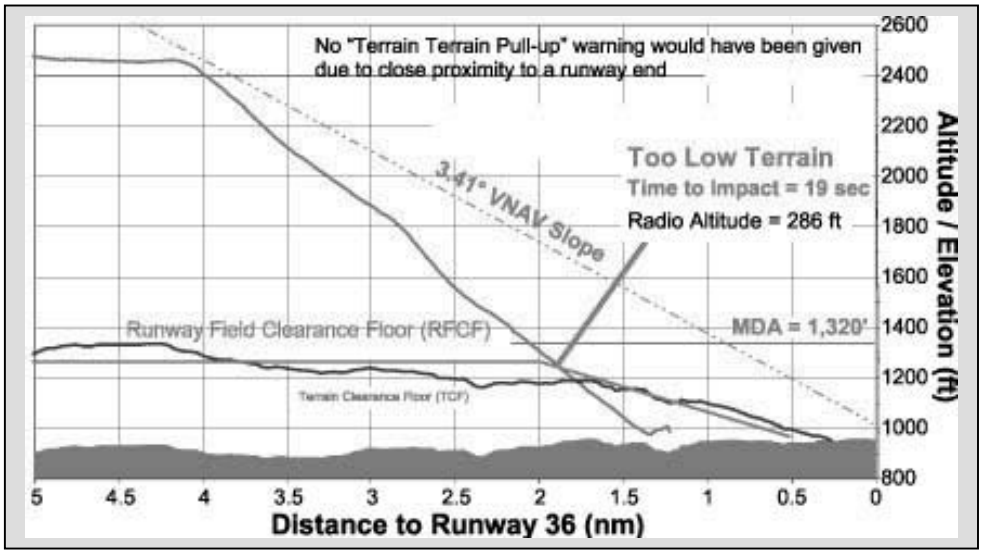
Regional (AF)	Aug 21 Mariara, Venezuela	C-23	Flew into mtn enroute 60 NM west of Caracas in IMC	25	No
Cargo	Sept. 9 Villahermosa, Mexico	CT-39a	Crash 1.5 NM short on approach	2	No
Cargo	Oct. 16 Coron, Philippines	BN-2A	Flew into Mt. Tagpaso on departure in heavy rain, poor visibility	2	No
Private	Oct. 22 Beinn Dearg, Scotland	Ce-406	During initial approach to Inverness, hit a mtn 13 NM short	1	No
Regional (AF)	Dec. 10 El Junquito, Venezuela	M28	During departure from Caracas, flew into mtn 20 NM out in IMC	16	No
Cargo	Dec. 11 Uberaba, Brazil	EMB-110	Crashed short on approach at night	2	No
Scheduled	Dec. 12 Guiyang, China	B737-700	Hit 30 ft. power pole on approach. EGPWS installed but not the critical obstacle database.	0 of 132	Yes
Toll for non-U.S. aircraft:				140 dead; 14 hull losses	
2004 CFIT toll worldwide:				194 dead; 29 hull losses	

Source: Honeywell

In short, airplanes fitted with EGPWS are less vulnerable to CFIT. For pilots not thinking far enough ahead to be ready for a missed approach (i.e., they get behind the aircraft), as may have been the case in the Oct. 24 crash, EGPWS can be their "second chance." Light poles, tall towers with guy wires and such in the vicinity of airports, particularly GA airports, can pose a real hazard to the unwary. These man-made hazards are incorporated into the terrain database by which EGPWS compares the airplane's position in space to the ground. "Bargain basement" versions of EGPWS are now available for GA aircraft and can go a long ways toward blunting the "one strike and you're out" penalty so characteristic of CFIT accidents.

Below, profiles of descents to disaster involving a number of recent CFIT crashes. It is evident from these portrayals that hundreds of lives might have been saved by mandatory and more urgent deployment of EGPWS technology. There is a way yet to go in CFIT interruptus.

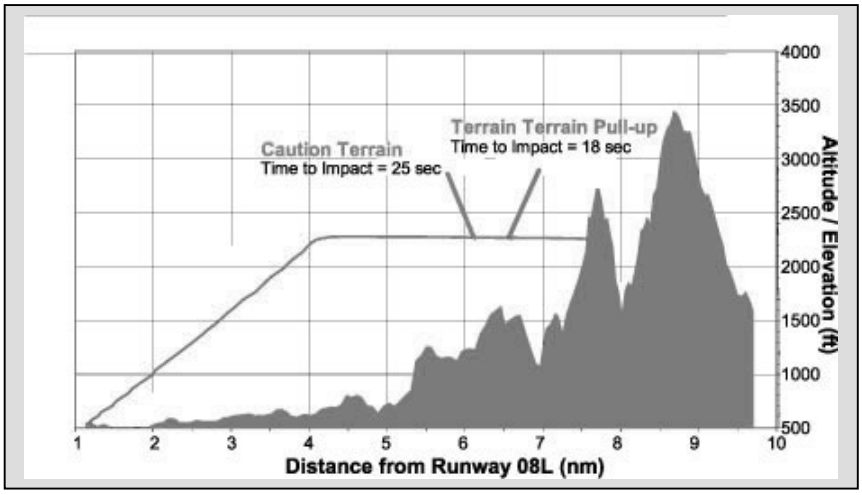
Profile 1: Oct. 19, 2004, Kirksville, Mo. Jetstream 32; 12 killed, 2 survivors



Classic GPWS was installed but no warning was given as the aircraft was in the landing configuration. EGPWS had been purchased and was awaiting installation; if installed, it would have provided 19 seconds warning. *All profiles courtesy Honeywell, with slight modifications by ASW*

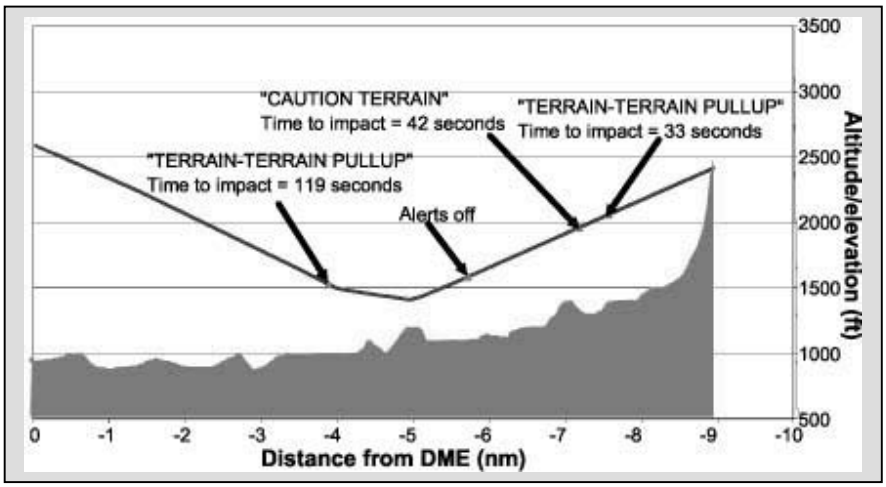
(Cont'd on p. 6)

Profile 2: Oct. 23, 2004, Brown Field, Calif., Learjet 35A; 5 killed



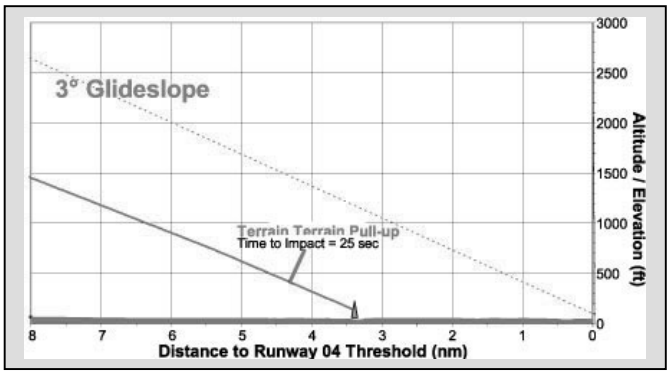
Probable flight path into Otay Mountain. Had EGPWS been installed, it would have provided nearly half a minute warning.

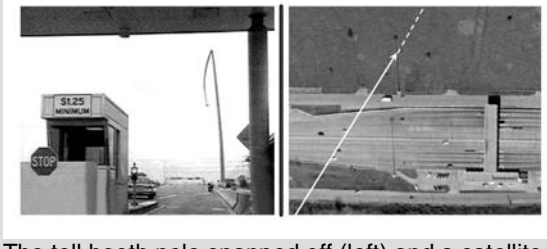
Profile 3: Oct. 24, 2004, Martinsville, Va., Beech 200; 10 killed



Probable flight path profile to impact on Bull Mountain. No GPWS or EGPWS installed. EGPWS would have provided multiple warnings.

Profile 4: Nov. 22, 2004, Houston's Hobby Airport, Texas, G-III; three killed

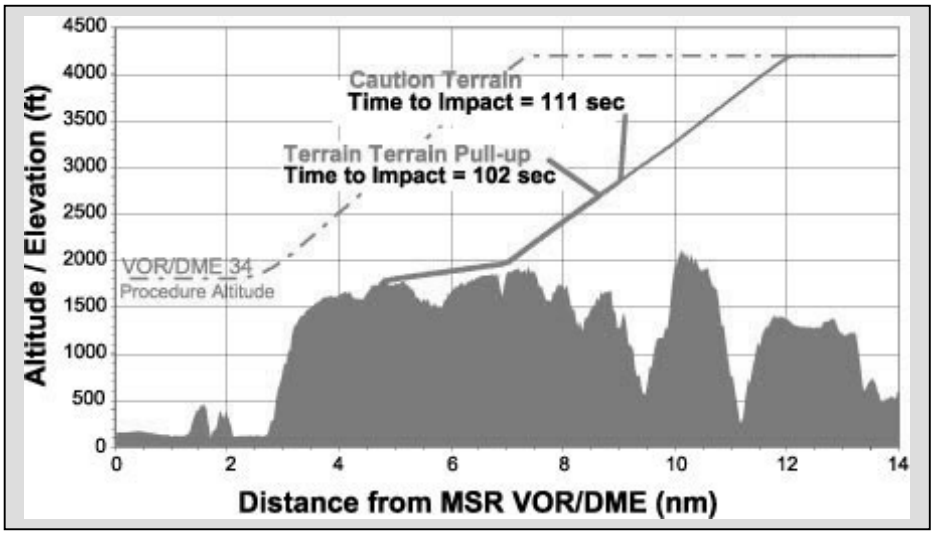




The toll booth pole snapped off (left) and a satellite view (right) of tollbooth and pole, showing likely flight path.

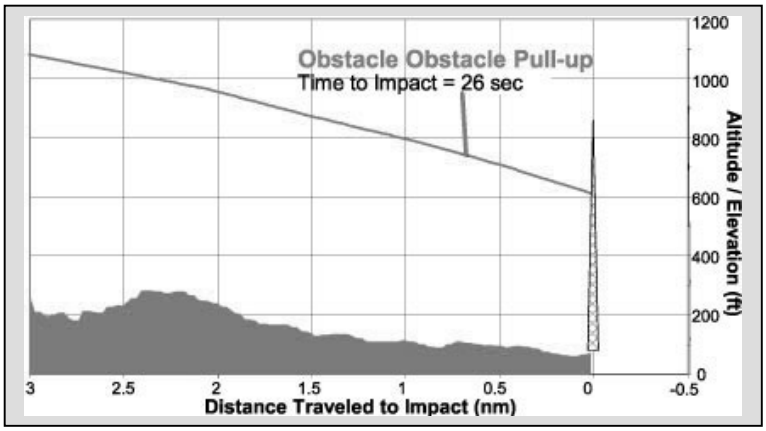
Assumed flight path and predicted EGPWS warning. The accident aircraft was fitted with GPWS but not EGPWS. If EGPWS had been installed, it would have given a 25 second warning before impact independent of the GPWS glideslope signal. The 125 ft. light poles were not in the FAA obstacle database.

Profile 5: Feb. 26, 2004, Mostar, Bosnia-Herzegovina, Beech 200; 9 killed, including Macedonia's president



Crew lost beacon signal but decided to try to land anyway. No EGPWS installed but an alert would have sounded nearly two minutes before impact.

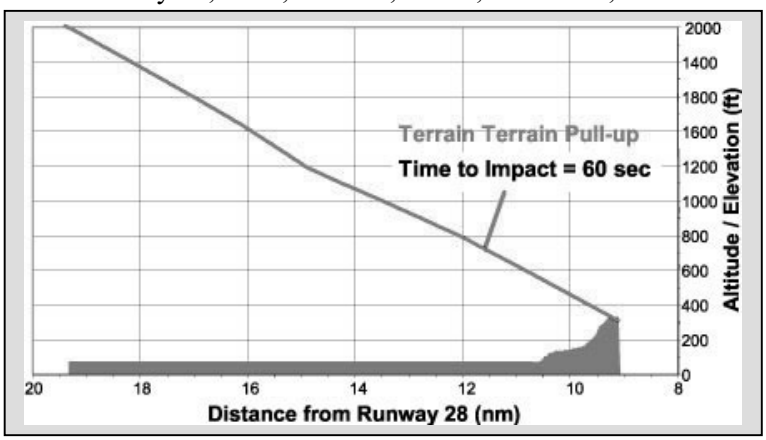
Profile 6: Dec. 19, 2004, Fullerton, Calif., Cessna 182; 2 killed



Final moments to impact. The KFI radio tower was painted red and white but was not fitted with strobe lights.

Pilot called base leg of his approach and was about a mile from the airport when he struck the 760 ft. tall tower. EGPWS would have provided 26 seconds warning.

Profile 7: May 14, 2004, Manaus, Brazil, EMB-120; 33 killed



Accident occurred in dark weather during poor visibility, heavy rain and gusting winds. EGPWS would have provided a full minute's warning.■

BRIEFS

• **Advocacy for action.** "It appears that some pilots believe that if they cannot see ice or frost on the wing from a distance, or maybe through a cockpit or cabin window, it must not be there, of if it is there and they cannot see it under those circumstances, then the accumulation must be too minute to be of any consequence," declares an Alert to Pilots issued Dec. 29, 2004, by the **National Transportation Safety Board** (NTSB).

The four-page advisory marks a significant development in NTSB activity. It is the first time the safety board has gone directly to the operating community with safety-related information. The alert reflects growing NTSB impatience with the **Federal Aviation Administration**'s (FAA) slow pace of needed safety improvements. At a breakfast meeting with reporters last week, NTSB Chairman Ellen Engleman Conners said, "The FAA was not listening. You'll see more advocacy from the board."

Engleman Conners alluded to NTSB frustration, catalyzed by three recent accidents in icing conditions while FAA-directed research, studies and whatnot continue at a stately pace in the decade since the icing-related ATR-72 crash at Roselawn, Ill. *(see ASW, Nov. 8, 2004, p. 1)*. Needed action on airframe icing has been on the NTSB's "Most Wanted" list of safety improvements since 1997, and the NTSB characterized the response as "unacceptable" just 19 days before the Nov. 28, 2004, crash on takeoff of a Challenger 601 at Montrose, Calif. *(see ASW, Dec. 6, 2004, p. 1)*. On Dec. 15, 2004, the NTSB recommended that the FAA require pilots of Cessna 208 series airplanes to conduct both visual and tactile inspections of their airplanes for any ice contamination prior to takeoff *(see ASW, Jan. 3, p. 8)*.

Two weeks later, the board issued its pilot alert.

"While the FAA is being prudent in its studies, we'd like pilots to be prudent in their decision-making," Engleman Conners said. Hence, the unprecedented alert. It marks a dramatic shift in the NTSB's approach to time-sensitive safety issues. Following the Nov. 12, 2001, crash of **American Airlines** [AMR] Flight 587, the NTSB urged the FAA to caution pilots about excessive use of the rudder and to avoid rudder reversals, which were suspected to have led to tailfin separation in that accident *(see ASW, Feb. 18, 2002, p. 1)*. In response, the FAA and manufacturers published a wealth of advisory material urging pilots to be prudent in their use of the rudder.

In this case, the NTSB has sidestepped the FAA, going directly to the pilot community. The alert warns pilots that ice contamination on the upper surface compromises the wing's lift-generating function:

‣ "Research results have shown that fine particles of frost or ice, the size of a grain of table salt and distributed as sparsely as one per square centimeter over an airplane wing's upper surface can destroy enough lift to prevent that aircraft from taking off."

‣ "It is also possible that many pilots believe ... They can simply 'power through' any performance degradation that might result from almost imperceptible amounts of upper wing surface ice accumulation. However, engine power will not prevent a stall and loss of control at lift off, where the highest angles of attack are normally achieved."

‣ "Further, small patches of almost imperceptible ice or frost can result in localized, asymmetrical stalls on the wing, which can result in roll control problems during lift off."

‣ "It may be difficult for a pilot to see ice on the upper wing surface from the ground or through the cockpit or other windows. Further, frost, snow, and rime ice can be very difficult to detect on a white upper wing surface and clear ice can be difficult to detect on an upper wing surface of any color. However, it is critically important to ensure, by any means necessary, that the upper wing surface is clear of contamination before takeoff [by] visual and tactile inspections."

To all of these precautionary procedures, a plug for thermal de-icing with lasers bears mention once again *(see ASW, Nov. 10, 2003, p. 7)*. When one:

✓ Considers the cost of de-icing with fluids (on top of which one can stack all the environmental concerns for getting rid of "spent" de-icing fluid and the fumes in the cockpit plus APU problems resulting from de-icing fluid getting where it's not supposed to go), and

✓ Hears about these pilots taking a chance, and

✓ Looks at the hold-over rules (for starting the process all over again), plus

✓ Recalls all the accidents caused by failure to de-ice, and

✓ Notes all the ground accidents caused by de-icing rigs striking aircraft, then …

Thermal laser de-icing on the ground (and thermal laser anti-icing airborne) might prove to be a real blessing and a big boon to safety. ■

• **The "L" word.** Saying she was reluctant to use the term "lobbying," **National Transportation Safety Board** (NTSB) Chairman Ellen Engleman Conners nonetheless said her agency was "lobbied from all sides" during the course of the investigation into the Nov. 12, 2001, fatal crash of **American Airlines** [AMR] Flight 587. She cited in particular American Airlines and **Airbus**, manufacturer of the A300-600 involved in the crash.

The airline and the manufacturer were among the designated parties that traditionally play a role in such investigations. In this case, the stakes were high, with American's pilot training under a microscope and Airbus' rudder system design under scrutiny. The liability implications were enormous, and both parties aggressively argued their respective positions *(see ASW, March 29, 2004, p. 1)*.

The liability issue involves apportionment. That is, once a total amount is determined, the apportionment of that amount between the airline, manufacturer, suppliers, etc., becomes the issue. The course of an ongoing investigation, and the direction in which it is likely headed regarding probable cause, can affect deliberations over apportionment, hence party activity to "shape" the investigation.

In the Flight 587 case, Engleman Conners likened the parties' efforts to "gerbil cage" activity, and the pet rodent's penchant to run on the exercise wheel.

"Once we have heard it once," she said, referring to the parties' particular position, "repetition without additional information does not support the message."

Engleman Conners said the parties' efforts to put the best face on their respective interpretations delayed completion of the investigation.

A similar case comes to mind involving an aircraft rudder system, the Sept. 8, 1994, fatal crash of **USAir** Flight 427 near Aliquippa, Penn. That crash involved a **Boeing** [BA] B737-300, and a similar debate between the parties as to whether pilot control inputs or an uncommanded rudder movement caused the crash. It took roughly four and a half-years for the NTSB to complete its investigation *(see ASW, March 29, 1999, p. 1)*.

In the case of Flight 587, the board completed its investigation in slightly less than three and a half years *(see ASW, Nov. 1, 2004, p. 1)*. In other words, in cases of comparable technical complexity and intense party activity (with the difference of a foreign manufacturer being involved in the latter instance), the Flight 587 investigation was completed in a year's less time than the Flight 427 case.

There is an obvious means of mitigating Engleman Conners' concern about lobbying. To cut down on the lobbying, speed up the investigation. Indeed, early in her tenure, Engleman Conners expressed exactly that desire – to complete major investigations (such as Flights 427 and 587) in two years. ■

• **An Indian Ocean tsunami warning system.** A warning system would have to be better than the carnage and loss of life typified in images of the gross aftermath *(see photo)*. The Indians had a warning from their air force base on the Car Nicobar Islands that would have given them about an hour's warning at least on the subcontinent (and Sri Lanka, too, if it had been passed on), but that opportunity was lost when the warning was blindly faxed to the wrong fax number.

The Grim Price of Surprise

The cheapest and most efficient Indian Ocean Littoral Tsunami Warning System would be a local warning siren system (30 min., 20 min., 10 min. and imminent distinctive aural alarms) activated by NOAA (**National Oceanic and Atmospheric Administration**) seismologists' warnings sent to all addressees via the AFTN (Aeronautical Fixed Telecommunications Network) with a FLASH prefix.

AFTN is a worldwide system, connected between international airports, air traffic control facilities and international airlines for the exchange of vital information.

Airlines dependent on the region's tourist trade have an interest, and their offices at popular destinations could assume responsibility for taking incoming NOAA warnings over the AFTN and for raising the alarm initially (so that airliners on the ground can be launched in the time available and local warning systems can be sounded (sirens, shore-side klaxon alarms, radio, television, etc.).

The cost of local warning systems hardware might even be shared between airlines, shipping lines, community and national governments.

The AFTN sends important messages quickly, beats a fax, telephone calling or HF radio system. Not all nations would want to buy expensive satellite transponder time and have it sit on standby for years on end. Build a viable warning system on what exists already. ■

ACCIDENTS AND INCIDENTS [1]

DATE/SITE	AIRCRAFT & REGN	CIRCUMSTANCES	DEATH & INJURY	PRELIMINARY ANALYSIS[2] Imagery at www.iasa.com.au/100105.htm
17 Dec. 0104L Chicago, Ill.	ERJ-135 of American Eagle	**Aero Snow Removal Van hit LE of rt wing of EGF226 as a/c entered taxiway**	Nil	Substantial damage (at entrance to taxiway Hotel Alley).
17 Dec. Colombo Sri Lanka	747 of Cathay Pacific CX749	**HK to Jo'burg flt diverted to Colombo with a seriously ill Japanese woman.**	1 fatal	36yo woman pronounced dead on arrival. Blood clot caused by DVT.
17 Dec. 0030L Des Moines, Iowa	Aero Commander 500 (Central Air)	**#1 eng failure and fire on descent to 4000ft. Fire lasted for about 60 seconds**	Nil	Omaha-Des Moines (catastrophic engine failure).
22 Dec. Central Java	Super Puma of Indon Air Force	**Helo crashed on or near Mount Dieng in Central Java in bad weather.**	13 fatal / 13 o/b	Follows an Indon Navy helo crash in weather 2 days prior killing 4 onboard.
22 Dec. 1807L Sunport, N.M.	737-800 of American	**AA 576 (LA to Chicago) flt diverted Albuquerque with a generator failure.**	Nil/143	Pax were on their way again early the next day.
26 Dec. Miami Intl Fla.	DC10-30 of Gemini AirCargo	**N605GC was struck in the right centre sail tail by a fuel truck whilst parked.**	Nil	Minor damage.
26 Dec. 2020L Washington Dulles	A300-600 of AA Flt 789	**JFK to Santa Domingo flt divtd due to intoxicated pax (plural) threats to crew**	Nil	Emerg declared, plane landed overweight, pax arrested & flt cont'd.
27 Dec. Key West NAS	757-212 of Delta Flt 299	**Bogota-Atlanta flight divtd in with a pax on the no fly/terrorist list.**	Nil	FBI grilled suspect for 2 hrs and then released him (mistaken ID) & the a/c.
29 Dec. 0940L Bradley Intl Ct.	EMB-145 of US Airways	**10mins out, returned Bradley A/P (Windsor Locks) - smoke in the cabin.**	Nil / 49 o/b	No further details.
29 Dec. 1638Z Ontario, Calif.	Beech 99 of AmeriFlight	**AMF5361 returned to Ontario Intl A/P with an engine fire.**	Nil	Fire was extinguished before landing.
30 Dec. 1022L Kathmandu, Nepal	A300 of Qatar Awys Flt QR352	**A7-ABX returned Tribhuvan A/P 37 mins after dept following engine fire.**	Nil / 203 pax +10	Eng failed noisily on t/off at 0945L and crew held off to dump gas.
01 Jan. 2200Z Madison, Wisc.	CL600-2B19 of Air Wisconsin	**AWI563 slid off the runway on landing in icy conditions (temp minus 1 deg C).**	Nil	Minor damage to N453AW.
01 Jan. 2317Z Bradford, Ill.	767 of AA Flt AAL79	**Encountered severe turbulence near Bradford and landed Dallas Ft Worth**	Some injuries	Flt originated London Gatwick UK
01 Jan. 0820L Oakland, Calif.	MD-80 of Alaskan AS397	**Ontario, Calif., to Seattle flight divtd to Oakland with a u/s fuel pump.**	Nil / 110 pax	No further details.
01 Jan. 1122CST Ainsworth, Neb.	Citation II of Jet Services LLC	**Landed off airport (1000ft short) in freezing precipitation, losing its gear.**	5 minor inj / 5 o/b	Substantial damage (a/c roadhauled to Reading A/P for repairs).
02 Jan. afternoon Munich, Germany	767-300 of Condor	**A/c dumped 17.5 tons of fuel on Switzerland before returning Munich.**	Nil	DE754 from Munich to Punta Cana (Dominican Rep) with an engine snag.
02 Jan. 0940L Chicago, Ill.	A320 of United Flt UA651	**Suffered an inflight stall of the port (#1) engine.**	Nil / 125 pax +5	No further details.
02 Jan. 1255L Dublin A/P Ireland	2x A330's of Aer Lingus	**Parked alongside, were blown together by a 73kt squall (EI-CRK & EI-DAA)**		A/c both out of service (EI133 to Boston and EI107 for JFK).
03 Jan. 1200L Albany, N.Y.	DC-9 of NWA	**Detroit - Albany flt landed with an unsafe nose-gear indication**	Nil	Gear pinned & a/c towed to gate. RH MLG door scraped r/way on landing.
03 Jan. 1220L Chennai, India	A310 of Air India Flt AI445	**Mumbai-bound flt landed back 30 mins after dept - with an engine snag.**	Nil / 139 pax + 12	No further details.
03 Jan. morning Khabarovsk Russia	747-100F of Kalitta Air	**T/off rejected after a tire burst at 130kts (then 10 other tires thermalled)**	Nil	Techstop enrt HK-Anchorage Alaska. Engine changes as debris was ingested
04 Jan. early morn Banda Aceh Sumatra Indonesia	737-200 of Tri-MG	**Relief aid charter a/c hit herd of water buffalo on ldg & port MLG collapsed.**		U.S. Navy crew made prompt temp repairs & cleared strip for aid flights.
04 Jan. 0930L Kittila, Lapland	TU154 of Air Yakutia	**A/c landed well short amidst the approach lights on this Finnish strip.**	Nil / 155 pax + 11	Severe damage to aft underside (hatches torn and flaps scraped).
04 Jan. 0945L Islamabad Pakistan	747-300 of PIA Flt PK786	**#4 pod-scrape on landing in very foggy weather.**	Nil / 376 pax +18	#4 engine damaged. Some discussion of auto-land having been faulty at start
04 Jan. 0234L Denver, Colo.	Beech 1900 of Lakes Air	**Baggage tug ran into pax-loaded a/c at gate A52, breaking the driver's leg..**	1 inj	Minor damage to a/c.
04 Jan. night Chicago, Ill.	A320 of United Airlines Flt 651	**Flt landed destination O'Hare after the #1 engine surged on descent.**	Nil / 125 pax +5	ex Newark, N.J.
04 Jan. 0002L Billings, Montana	Merlin 4 of Big Sky Airtaxi	**BSY 2573 diverted in after reporting a shattered windshield.**	Nil	Havre to Lewistown flight.
04 Jan. 0149L Jackson, Wyoming	A319 of NWA Flt NW1627	**A/c disabled and towed away after running off r/way 19 on landing.**	Nil	No report of damage.
05 Jan. 1332L Manokwari Papua	737-200 of Celebes Air	**Slid off far end by 20m after a landing at this East Papua A/P in heavy rain.**	Nil / 117 pax +7	Indonesian flight originated Makassar in South Sulawesi. Nil damage
05 Jan. Kuala Lumpur Mal	A330 of Malaysian	**Sabotage suspected after hyd fluid found spilt on pilots' instrument panel.**	Nil / 179 pax	4th incident since Oct 2003. A/c changed (to depart for Osaka Japan).
05 Jan. 1210L Warsaw, Poland	TU154 of Aeroflot	**Flt SU271 left Sheremetyevo 1020L & divtd Warsaw - disruptive female pax.**	Nil	Moscow to Geneva flight. Passenger cited for "inappropriate behavior."

[1] Air carrier accidents, or other incidents involving serious failures or fatal injuries.

[2] DISCLAIMER: These assessments are not intended to assert probable cause or liability, but rather are intended to provide insight pending publication of a final report of investigation. *Preliminary analysis by John Sampson - **International Aviation Safety Association.** (IASA)*