Air Safety Week®

Celebrating 20 Years

Air Safety & Aviation Security Trends and Critical Analysis

Incorporating Airport Security Report

April 3, 2006
Washington, D.C.

Vol. 20 No. 14
www.aviationtoday.com

Efforts Renew to Understand Dangers of Mountain Flying

Aviation Safety

A research project in California's Sierra Nevada mountains is attempting a major leap forward in unraveling the mysteries surrounding one the biggest atmospheric hazards in modern aviation — a wind phenomenon known as a "mountain rotor."

Both rotors and a related phenomenon, mountain waves, regularly form on a mountain's lee side, or on the side opposite the direction from which strong winds typically blow. Just such a site is in Owens Valley, Calif., which is between the Sierra Nevada and the city of Fresno. There, from March 1 to April 30, a series of airborne and ground-based readings are being taken for the "terrain-induced rotor experiment" (T-REX), says the lead researcher, Vanda Grubišić, of the **Desert Research Institute** (DRI) based in Las Vegas and Reno, Nevada. Primary funding is coming from the **National Science Foundation** in Washington, D.C.

Around the world, there are 60 principle researchers and another 40 interns and technical staff who are starting to analyze the new data, Grubišić adds. For the scientific community, it's a chance to revisit these atmospheric phenomena whose existence have been known for a long time. But now, researchers are coming back to them with the latest technology and research methods, and the chance over the next three years to develop numerical models from the T-REX data.

"Despite numerous investigations during the last 70 years concerning lee waves, the structure and dynamics of rotors remains largely unknown," René Heise, a meteorologist in Germany with the **Mountain Wave Project** (MWP), tells *Air Safety Week*.

Mountain waves, which in form are something like the waves at a sea shore, result from oncoming air coming against a mountain's face that is then

(See Rotors on p. 6)

Raytheon, New York Officials Plan New Level of System Integration

Aviation Security

A planned perimeter security system for four airports in the New York area will help solve one of today's biggest aviation security gaps — the sharing of real-time information across airports.

Both the **Port Authority of New York and New Jersey** (PANYNJ) and the **Raytheon Company** [RTN], which is preparing to install its "Perimeter Intrusion Detection System" (PIDS) at New York's **John F. Kennedy Int'l Airport** (NYC) and **LaGuardia** (LGA), as well as in New Jersey at **Newark Liberty Int'l** and **Teeterboro** (TEB), say the new system will be the first of its kind in the nation. This is because it will integrate data from several types of sensors and funnel the data to the same control center.

Whether new security systems are about perimeters, access control, or something else new and wonderful, data often are not coordinated with other systems at the same airport, or with other airports or transportation hubs in the same region.

For the PANYNJ, PIDS is expected to alert security officials to suspicious goings-on that happen simultaneously or appear to be starting a trend across facilities. Also, if one operator goes off to the rest room or is having lunch, and his/her workstation is initially alarmed, there will be a time-out feature that forwards the alarm to a different workstation after a set time interval.

Then again, if it's a good idea to link four airports in the same metro area, it also makes sense someday

(See Raytheon on p. 2)

Raytheon *(Cont'd from p. 1)*

to link facilities regionally and nationally. But with the vagaries inherent in today's funding streams, it's not likely that neighboring airports would be able to coordinate their renovations in this way. This is probably an area where the **Transportation Security Administration** (TSA) would have to take the lead.

A TSA spokeswoman says that while the agency is interested in regional communications linkages, but is not yet testing such a system.

Another perimeter security system under construction for the **Houston Airport Authority** at two of its facilities, **George Bush Intercontinental** (IAH) and **William P. Hobby** (HOU), and being installed by **Honeywell International** [HON] *(Air Safety Week, Jan. 23, p. 1)*, appears to share some data-integration characteristics with Raytheon's New York project.

One big difference between the Houston and New York projects, however, seems to be the two systems' price tags, according to airport security consultant Bob Poole of the Reason Foundation. At $140 million, Raytheon's estimate for the Port Authority is significantly greater than the $3.5 million the Houston system is expected to cost.

"It may well be that the risk of a terrorist attack on New York airports is greater than that of an attack on the Houston airports," Poole says. "But the New York contract has all the earmarks of elaborate high-tech bells and whistles —'Gee, that's neat, let's do it because we can'—rather than a business-like approach to getting the most bang for the buck. Let's hope it does not become the model for perimeter protection."

In response, Raytheon spokesman Lynford Morton tells *Air Safety Week* that the Port Authority conducted an extensive bidding process with eight companies including Raytheon, using a number of criteria such as the firms' experience and pricing. In the end, the authority "concluded that Raytheon had the best value solution for their specific and unique needs."

Raytheon is planning at least five types of sensors for the Port Authority's airports, including three kinds of cameras, ground-based radar and smart fencing, says Raytheon's Rich Dinka, who is a director for its airspace management and homeland security division.

Over at command and control, which PANYNJ says will be at a police facility separate from any of the four airports, Dinka explains that operators will be alarmed when a possible intrusion is detected and will then see different types of data coming in on two screens. On the left screen, there will be tabular data on the intruder's whereabouts and characteristics; while the right-hand screen will display video. The system also will alarm according to pre-defined operator rules and priorities, and will differentiate as to the type of alarm, such as from perimeter intrusions, worker access control alerts, loss of communications, low power, and system tampering.

Raytheon already has site surveys underway at all four airports, Dinka tells *Air Safety Week*. Construction will begin this summer, and individual airports will come on line in phases. By early 2008, there should be a fully operational, four-airport system.

Raytheon's partners in the PANYNJ project include **4D Security Solutions** (advanced sensors, among other things), **Intergraph** [INGR] (command and control and dispatch systems); **Mass Electric Construction Co.** (general and electrical contractor); **AMSEC (**communications and electrical system design); and **Goshow Architects** (command and control room design). ✈

>>Contacts: Lynford Morton, Raytheon, (703) 284-4446, lynford@raytheon.com; Marc La Vorgna, PANYNJ, (212) 435-7777; Bob Poole, (310) 391-2245, bobp@reason.org<<

Air Safety Week
ISSN 1044-727X

Access Intelligence

Editor-In-Chief: David Evans
devans@accessintel.com
Editor: Bob Grupé
bgrupe@accessintel.com
Managing Editor: Matt Aukofer
maukofer@accessintel.com
Contributing Editors: John Sampson, Dr. Alex Richman, M.D.

Director of Marketing:
Jennifer Green-Holmes
jgreenhomes@accessintel.com
AVP/Publisher: Jennifer Schwartz
SVP/Group Publisher: Heather Farley
VP/Info. Technology: Robert Paciorek
President CEO: Don Pazour

For Advertising Call Jennifer Green-Holmes: +1-301-354-1696
Send press releases to:
Bob Grupé, Editor
FAX: +1-301-762-4196, bgrupe@accessintel.com

For Now, Blacklisting Carriers Is Only the European Approach

While the **European Commission** (EC) has chosen to ban 92 foreign airlines because of their poor safety records *(Air Safety Week, March 27, p. 2)*, it's unlikely that such an airline-blacklist approach will be emulated anywhere else, anytime soon.

The **FAA**, for one, still believes that the best approach is to deal primarily with foreign-government entities that have equivalent roles to the FAA, and not with individual airlines, agency spokeswoman Alison Duquette tells *Air Safety Week*. Then too, the **International Civil Aviation Organization** (ICAO), which is an organ of the **United Nations**, has a similar focus to the FAA. ICAO also places speciaphasis on compliance with its own standards, which the FAA and other aviation authorities around the world incorporate into their regulatory efforts.

Both the FAA and ICAO give a similar reason for focusing on government entities, such as the civil aviation authorities. Most importantly, they're the ones that are usually legally responsible for ensuring aviation safety, encouraging airlines' compliance with national aviation laws, and making sure that standards are followed. Moreover, it makes the most sense to deal primarily with the government office that has enforcement authority, ICAO spokesman Denis Chagnon tells *Air Safety Week*.

But Chagnon would not say which focus — on foreign airlines or foreign governments — is better, explaining that it's really just a matter of taking different approaches to the same goal of improving aviation safety. Also, it was difficult for *Air Safety Week* to get spokespersons for the FAA and the EC to discuss the advantages of their approaches, or make comparisons between them.

For the EC, it seems to come down mostly to a matter of complying with regulation (EC) No 2111/2005, which apparently mandates the individual-airline approach. Then again, "there's no need to punish all airlines from the same country" if only one of them is particularly unsafe, EC spokesman Stephaan Rynk tells *Air Safety Week*.

Meanwhile, the FAA does not believe that creating lists of banned airlines is going to help much, preferring to remain engaged with the various foreign governments to help them improve their oversight, Duquette says. EC, meanwhile, takes the opposite tack. It believes that being on the blacklist will spur airlines to make improvements.

The FAA uses the ICAO standards to assess other nations' oversight capabilities and operating practices. Under its International Aviation Safety Assessment (IASA) Program, the agency maintains a public list of countries and designates them as either Category 1 or Category 2. Category 1 means they comply with ICAO standards, Category 2 simply means that they do not. The last time figures were updated in early 1998, it was noted that there were close to 600 foreign air carriers flying into the United States, overseen by 103 government bodies. By then, the FAA also had completed 87 foreign-government assessments. Asked whether these figures had been updated, Duquette says that will happen this summer.

EC, which is the executive body for the **European Union**, publicly announced its blacklist on March 22. It consists not only of 92 newly banned airlines, mostly from developing countries and disproportionately in Africa, as well as three additional carriers that face "operational restrictions." These restrictions mostly likely mean that carriers can operate certain aircraft types into Europe, but not others.

There's also five countries on the list, all in Africa—the Democratic Republic of the Congo (DRC), Equatorial Guinea, Liberia, Sierra Leone, and Swaziland. Their inclusion means that none of their airlines can operate into Europe.

The FAA's IASA list (last updated on Jan. 13) includes DRC and Swaziland as one of about 20 countries rated in Category 2. The other three nations on EC's blacklist are not on the currently available FAA list, which could be because their assessments have yet to be completed or made public.

Furthermore, a majority of the FAA's Category 2 countries are also noted as not providing air services to the United States at the time of their assessments. FAA's Duquette says that airlines within those countries may want to begin such services, but problems with safety oversight remain.

It's also noteworthy that, despite the EC's airline focus, the commission also says that it will continue its technical assistance for "third world civil aviation authorities," particularly in cases where there's a will, but less of a way because financial resources are lacking. Over the last five years, the commission says it's spent €80 million (about $97 million U.S.) on such efforts.

Airlines get on EC's blacklist based on checks of their craft conducted in European airports, for using poorly maintained or obsolete aircraft, failure to rectify problems identified during inspections, as well as the apparent ineffectiveness of their governments' regulatory bodies. Development of the European Union-wide list also follows the example set by certain nations—

(See Blacklist on p. 6)

Significant Regulatory Activity

Passenger seats: Notice of proposed rulemaking (NPRM) – **Sicma Aero Seat** passenger seat assemblies.

March 17, 2006 FR Doc. E6-3908 Docket No. FAA-2006-24036

This proposed airworthiness directive (AD) would modify the aft track fittings on these passenger seat assemblies by installing new tab locks, and then torquing the aft track fitting locking bolts. There have been reports of loose and unlocked aft track fittings. FAA wants to prevent detachment of passenger seat assemblies during emergency conditions.

There are 239,209 of these assemblies on 1,016 airplanes of U.S. registry; the total cost to U.S. operators would be $563,880. The manufacturer also has indicated it might provide the parts at no cost to the operators.

Comments are due May 16.

>>Contacts: Sicma Aero Seat, (33) 54 03 39 39; fax: (33) 54 03 15 16; Jeffrey Lee, FAA, (781) 238-7161<<

Thrust reversers: Final rule – **General Electric Co.** model CF6-80C2D1F turbofan engines.

March 21, 2006 FR Doc. 06-2648 Docket No. FAA-2005-22055

This AD modifies the latching system of the fan reverser. There have been 13 reports of released thrust reverser hardware. FAA wants to prevent release of the thrust reverser cascade on landing, which could result in runway debris and a possible hazard to other aircraft.

This will affect 138 U.S. airplanes; costs will be $6,644 per engine.

The effective date is April 25.

>>Contacts: Middle River Aircraft Systems, (410) 682-0094; James Lawrence, FAA, (781) 238-7176<<

Fuel tank inerting: NPRM, extension of comment period – Reduction of fuel tank flammability in transport category airplanes.

March 21, 2006 FR Doc. E6-4025 Docket No. FAA-2005-22997

For an NPRM originally published on Nov. 23, 2005 *(Air Safety Week, Dec. 5, pp. 8-9)*, this action extends the comment period from March 23 to May 8. The extension is a result of requests from a number of entities to allow public comment on new information that has recently been placed in the public docket.

The NPRM proposes requiring operators and manufacturers of transport category airplanes to reduce fuel-tank explosions through promising technologies that make fuel tanks effectively inert, by preventing electrical and other systems from igniting flammable vapors. Moreover, the new rules would not be technology specific, but would establish a set of performance-based requirements. This would allow manufacturers and operators to weigh their options from among a range of commercially feasible methods.

Direct repair costs are estimated at about $1.7 billion and benefits, in terms of lives and aircraft saved, at about $2.6 billion.

In a separate *Federal Register* notice on March 21 (FR Doc. E6-4023), the comment period for a related proposed advisory circular Proposed Advisory Circular (25.981-2A) also is extended to May 8.

>>Contact: Michael E. Dostert, FAA, (425) 227-2132, e-mail: mike.dostert@faa.gov<<

Engines: Final rule – **Lycoming** AEIO-360, IO-360, O-360, LIO-360, and LO-360 series reciprocating engines.

March 23, 2006 FR Doc. 06-2759 Docket No. Docket No. FAA-2005-23269

This AD requires replacing certain crankshafts. This results from a crankshaft failure in a Lycoming LO-360-A1H6 reciprocating engine.

There are 282 engines in affected U.S. aircraft; repair costs would be $15,300 per airplane.

The effective date is April 27.

>>Contacts: Lycoming, (570) 323-6181; Norm Perenson, FAA, (516) 228-7337<<

Landing gear: Supplemental NPRM, reopening of comment period – **Airbus** model A300 B2 and A300 B4 series airplanes; A300 B4-600, B4-600R, and F4-600R series; and model C4-605R variant F airplanes (collectively called A300-600 series).

March 27, 2006 FR Doc. E6-4402 Docket No. FAA-2004-19002

The original NPRM would have superseded an existing AD that requires repetitive inspections to detect cracks in gear rib 5 of the main landing gear (MLG) attachment fittings at the lower flange, and repair. That AD also requires modification of gear rib 5, which constitutes terminating action for the repetitive inspections. The original NPRM proposed reducing the compliance times for all inspections, and require doing the inspections in accordance with new revisions of the service bulletins. That proposal resulted from new service information issued by the manufacturer and mandated by the French airworthiness authority. This new action revises the original NPRM by proposing new repetitive inspections of certain areas of the attachment fittings that were repaired in accordance with both the existing AD and the original NPRM. This supplemental NPRM is necessary to prevent fatigue cracking of the MLG attachment fittings, which could result in reduced structural integrity of the airplane.

There are 164 affected U.S. airplanes; total costs of repairs and inspections to U.S. aircraft would be more than $2.5 million.

Comments are due April 12.

>>Contact: Tim Backman, FAA, (425) 227-2797<<

Flaps: Supplemental NPRM, reopening of comment period – Airbus model A300 B2 and A300 B4 series airplanes; and model A300 B4-600, B4-600R, and F4-600R series, and model C4-605R variant F airplanes (collectively called A300-600 series).

March 27, 2006 FR Doc. E6-4406 Docket No. FAA-2004-19566

An earlier supplemental NPRM would have required repetitive inspections for cracking in the web of nose rib 7 of the inner flap on the wings, and performing related investigative/corrective actions. This new action revises that first supplemental NPRM by requiring eventual replacement of nose rib 7 with a new, improved rib, which would terminate the proposed inspections. This action also removes from the applicability airplanes on which the improved nose rib 7 was installed during production. FAA wants to prevent cracking in the web of nose rib 7, which could result in rupture of the attachment fitting between the inner flap and flap track 2, and consequent reduced structural integrity of the flap.

For the 143 U.S. airplanes, rib replacements on inspections would total about $1.7 million.

>>Contact: Airbus, 1 Rond Point Maurice Bellonte, 31707 Blagnac Cedex, France; Thomas Stafford, FAA, (425) 227-1622<<

Novel design features — design roll maneuver and escape system: Notices of proposed special conditions – Airbus model A380-800.

March 29, 2006 FR Doc. E6-4509 Docket No. NM340
March 29, 2006 FR Doc. E6- 4511 Docket No. NM342

This airplane will have novel or unusual design features, such as its full-length double deck, when compared to the state of technology envisioned in the airworthiness standards for transport category airplanes. For these design features, the applicable airworthiness regulations do not contain adequate or appropriate safety standards regarding extendable length escape slides. These two notices propose special conditions regarding the airplane's design roll maneuver and its extendable length escape system to establish a level of safety equivalent to existing airworthiness standards. Additional special conditions will be issued for other novel features of the Airbus A380-800.

Comments must be received on or before May 15, 2006.

>>Contact: Holly Thorson, FAA, (425) 227-1357<<

Engines: Final rule – **Boeing** model 737-600, -700, -700C, -800, and -900 series airplanes.

March 30, 2006 FR Doc. 06-2958 Docket No. FAA-2005-20110

This AD requires repetitive general visual inspections for dirt, debris, and drain blockage and cleaning of the aft fairing cavities of the engine struts; and modification of the aft fairings, which terminates the repetitive general visual inspections. A report indicates that water accumulated in these cavities. FAA wants to prevent drain blockage by debris that, when combined with leaking, flammable fluid lines passing through the engine strut aft fairing, could allow flammable fluids to build up in the cavity of the aft fairing, and consequently could be ignited by the engine exhaust nozzle located below the engine strut, resulting in an explosion or uncontrolled fire.

Inspection and modification costs could be as high as $749 for each of the 549 affected U.S. airplanes.

Effective May 4, 2006.

>>Contacts: Boeing Commercial Airplanes, P.O. Box 3707, Seattle, WA 98124-2207; Doug Pegors, FAA, (425) 917-6504<<

Ailerons and elevators: Supplemental NPRM, reopening of comment period – **Gulfstream** model GV and GV-SP series airplanes.

March 30, 2006 FR Doc. E6-4621 Docket No. FAA-2005-22034

An earlier NPRM would have required a one-time inspection of the left and right aileron and elevator actuators to determine the part and serial numbers of each actuator, repetitive inspections of suspect actuators to detect broken damper shafts, and replacement of any actuator having a broken damper shaft. It also would have required operators to report broken shafts to the FAA, providing an optional terminating action for the repetitive inspection requirements of the proposed AD. This action revises the original NPRM by proposing to mandate the previously optional terminating action. Broken damper shafts could result in locking of an aileron or elevator actuator (hard-over condition), which would activate the hard-over protection system (HOPS), resulting in increased pilot workload and consequent reduced controllability of the airplane.

Costs for each of the 174 affected U.S. airplanes could reach more than $27,000.

Comments are due April 24.

>>Contact: Gulfstream Aerospace Corporation, Technical Publications Dept., P.O. Box 2206, Savannah, GA 31402-9980; Gerald Avella, FAA, (770) 703-6066<<

NTSB Action

What: March 24 recommendation.
Based on: During routine maintenance of an **Airbus** A300-600 operated by **Federal Express**, damage was detected in a particular rudder part, P/N A55471500 (premodification 8827).

Recommendations: 1) Require all Airbus A-300 operators to immediately comply with four Airbus All Operators Telexes (AOTs) dated March 2, 2006. Also, any disbonding to the rudder skins that occurs in the presence of hydraulic fluid contamination should be repaired or the rudder should be replaced as soon as possible, well before the 2,500 flights specified in the AOTs. (A-06-27). Classified as **Urgent**.

2) Establish a repetitive-inspection interval for Airbus premodification 8827 rudders until a terminating action is developed. The interval should be well below 2,500 flights. (A-06-28).

Background: The board also notes that this recent observation may be related to a more serious incident that occurred on March 6, 2005, involving an A300 operated by **Air Transat**. Most of the craft's rudder separated in flight, with only the bottom closing rib and the spar between the rib and the hydraulic actuators remaining.

Blacklist *(Cont'd from p. 3)*

such as Britain and Switzerland—that established their blacklists first. States with separate lists are encouraged to give them up to avoid confusion, but there apparently is nothing compelling them to.

Then again, member states are still expected to act independently if there's a need for quick action or one of them faces a unique set of circumstances.

EC also expects its blacklist to hamper the practice where foreign regulatory bodies simply issue certificates to "dubious" carriers. Prohibited airlines, however, can still sell tickets under their own name and code for European flights that are operated by other carriers. In such cases, he aircraft and flight crews must still be under the direct supervision of the other carriers than are deemed safe.

Furthermore, banned airlines will have certain "rights of defence" to express their points of view, submit new information, or state their case before the EC's **Aviation Safety Committee**. The list will be updated at least every three months, and more often if necessary.

Altogether, information from EC-sponsored investigations, or directly forwarded from the airlines, from member states, as well as from ICAO's investigations on nations' regulatory capabilities, will be used in revising the list.

For its part, the **Air Crash Victims Family Group** says it welcomes the EC's new blacklist, and feels strongly that such information should be coordinated among other entities like ICAO and the FAA to avoid confusion, group spokesperson Hans Ephraimson-Abt tells *Air Safety Week*.

More information on the FAA's IASA program is online at http://www.faa.gov/safety/programs_initiatives/oversight/iasa. ✈

>>Contacts: ICAO External Relations Office, Montréal, (514) 954-8219, acaohq@icao.org; European Aviation Safety Agency, +49 221 8999 000; Hans Ephraimson-Abt, Air Crash Victims Family Group, (201) 652-7050<<

Rotors *(Cont'd from p. 1)*

forced up and over the crest. On the other side, gravity suddenly pulls the air down and the waves form. Rotors develop right below the waves, and resemble a whirlwind or vortex tilted to the horizontal *(see illustration on opposite page)*.

But little is known so far about the "whys and hows" of rotor formation, Grubišić tells *Air Safety Week*. T-REX will be an important step in understanding these phenomena better, but much more research probably will remain to be done after the current project is over.

In aviation, mountain waves and rotors have long been recognized as significant dangers. The **Australian Transport Safety Bureau** cites a 1968 incident when a **BOAC Boeing** 707 was ripped apart by a mountain wave as the craft flew near Mt. Fuji in Japan. Also, in 1968, a **Fairchild** F-27B lost parts of its wings and empennage, and a **Douglas** DC-8 lost an engine and wingtip in 1992, in wave-related accidents.

Rotors, specifically, have been cited as contributors to accidents in commercial, military, and general aviation (GA), Grubišić says. Experienced pilots know about them and avoid them. But rotors and waves remain particularly dangerous to pilots who are unaware of them.

As the FAA has aptly put it, "Your first experience flying over mountainous terrain (particularly if most of your flight time has been over the flatlands of the Midwest) could be a *never-to-be forgotten nightmare* [italics in original] if proper planning is not done and if you are not aware of the potential hazards."

Besides the aviation dangers that rotors pose, Grubišić says "we're doing this because it's one of the unsolved problems in atmospheric research." The outstanding questions for her team includes not only why rotors form, or how they do, but also how they often get so strong. It seems, she adds, that rotors pick up their "intense rotation" from the "boundary layer" of air next to the earth's surface. But explaining exactly how this happens has been "one of the more puzzling questions," and has become one of the principle research aims.

Moreover, the numeric modeling of certain atmospheric conditions from T-REX could lead to better forecasting of rotors and waves. Indeed, another question occupying researchers' minds is just how predictable rotors will come to be.

Current attempts at numerical simulations are not the best because they use "idealized assumptions" of atmospheric conditions, MWP's Heise explains. Moreover, the lack of "sufficient empirical data" makes it difficult to develop certain parameters, a problem that T-REX's more precise measurements should ameliorate. This should lead to better forecasting of rotors and waves, and enhanced flight safety.

Steve Nelson, NSF's program director for physical and dynamic meteorology, agrees that there are a lot of unknowns with mountain rotors, adding that T-REX eventually could have significant implications for aviation safety. He draws an analogy between the

scientific inquiry into the dynamics of rotors and an older inquiry into two other troublesome atmospheric phenomena—downbursts and microbursts. Some years ago, the scientific knowledge base for these second two was similar to what exists today for rotors, he tells *Air Safety Week*. But a long stream of related research projects led to better radar and wind-detection systems at airports, greatly reducing the hazards. If a similar research stream gets going in the wake of T-REX, rotors someday may subject to far more accurate forecasting and become much easier for pilots to avoid.

The Sierra Nevada mountains are especially ideal for studying rotor and wave formation because they are "the tallest, steepest, quasi two-dimensional topographic barrier in the contiguous United States," according to the T-REX Web site (at http://www.joss.ucar.edu/trex). Thus, rotors and waves grow particularly large and strong there. Additionally, prior research shows that they are especially frequent in the Sierra Nevada in March and April.

There also are two aspects to T-REX's current phase of data collection, Grubišić explains. One involves the data being read by several ground-based stations. The second involves the readings coming from three aircraft. One is a **Beechcraft King Air** turboprop, owned and operated by the **University of Wyoming**. It can take readings from 500 ft. to 28,000 ft. above ground, and is flying for T-REX while based at Bishop, Calif. The craft is doing about 25-30 flights for the study. On the mountains' lee side, Bishop also is the T-REX operations center.

Above the range of the Beechcraft at altitudes reaching 35,000 ft. is a **British Aerospace** BAe 146. It's based in Fresno and is making about 10 flights for the study.

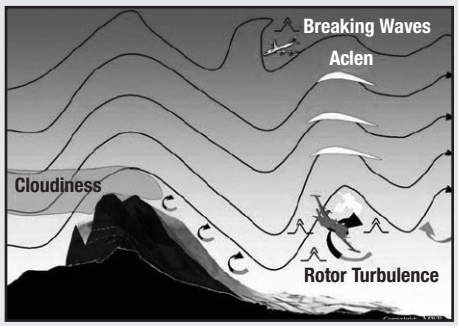
The third craft, which can take readings at up to 45,000 ft., is the new **Gulfstream** V HIAPER, which stands for "high-performance instrumented airborne platform for environmental research" *(see photo below)*. NSF developed and modified the craft specifically to enhance its environmental research needs in the coming years (and indeed, T-REX also is expected to yield data to help fight environmental pollution). The HIAPER is being operated and maintained for NSF by the **National Center for Atmospheric Research** (NCAR) in Boulder, Colo. The craft will make its dozen-or-so data-gathering flights from a base just south of Boulder in Jefferson County (which is part of metro Denver). T-REX also represents the craft's maiden use for scientific research.

HIAPER Craft On Maiden Assignment

The **National Science Foundation**'s (NSF) new HAIPER (high-performance instrumented airborne platform for environmental research) aircraft is taking high-altitude, precision atmospheric readings.

Source: NSF

Mountain waves and rotors



Waves form on the lee side of a mountain after the air blows over its crest and starts to sink. Rotors form beneath the waves, and appear to draw strength from the air layer just above the ground. But much about their formation and dynamics remains unknown. Both phenomena are significant hazards to all types of aircraft.

Source: Mountain Wave Project

The HIAPER is especially suited for its role in T-REX because it's the only craft that can reach such heights while deploying GPS Dropsonde technology and other instruments to measure certain meteorological parameters, says Jim Huning, program officer for NSF's Lower Atmospheric Observing Facilities. Dropsonde, which was developed at NCAR, drops a sensor below the craft that is equipped with a little parachute to get measurements of such factors as atmospheric pressure, horizontal wind, and moisture. Coupled with GPS, those readings can now be tied to very specific points in space and time.

"It gives a very accurate idea of what's going on," Huning tells *Air Safety Week*, and should help get more precise measures of rotor dynamics. The National Oceanic and Atmospheric Administration (NOAA) has found the technology very useful recently in hurricane research.

The mid-altitude BAe is also deploying the GPS Dropsonde sensors, while the low-altitude Beechcraft King Air is equipped with a special Dopplar radar sensor for studying clouds. Not only will its readings reveal where the clouds are, but the wind velocities within the clouds. ✈

>>Contacts: Vanda Grubišić, DRI, (775) 674-7031, grubisic@dri.edu; Steve Nelson, NSF, (703) 292-8521, Jim Huning, NSF, (703) 292-4703, jhuning@nsf.gov; René Heise, MWP, Rene.Heise@t-online<<

ACCIDENTS AND INCIDENTS [1]

DATE/SITE	AIRCRAFT & REGN	CIRCUMSTANCES	DEATH & INJURY	PRELIMINARY ANALYSIS[2] Imagery at www.iasa.com.au/030406.htm
17 March Gatwick, UK	Learjet 40 Reg D-CNIK	**Crew member tripped on re-entering c'pit, hit rt throttle and a/c ran amok.**	1 inj	A/c hit parked vehicles and a pilot broke leg. See Osprey crunch 27 Mar.
19 March night Manchester, UK	767 of First Choice	**Fuel flooded hangar after booster pump change pulled on G-OOBK.**	Nil	Other a/c evacuated from hangar. A self-sealing valve failed to close.
21 March 1620L Chicago O'Hare	A319 of LH RJ of Delta Cnnct	**2 a/c cleared to take off together from intersecting runways 9L & 4L.**	Nil	Both a/c aborted and ended up 100 feet apart with smoking brakes.
21 March ~1705L Tokyo (Narita) Jap	Fokker 50 of All Nippon Awys	**A/c evac'd just prior to t/off as heavy smoke entered a/c fm rear cargo-bay.**	Nil / 47 o/b	Pax were offered alternative flight.
23 March 0907L Chicago O'Hare	737-300 of UA A320 of TED	**A320 cleared to taxi across 4L after 737 had commenced its takeoff roll.**	Nil / 156+111 pax	The two a/c missed by around 600 ft laterally. See O'Hare 21st & 26th Mar.
23 March 0739L Newark, N.J.	RJ-145 of Continental	**Emergency declared for smoke in cockpit during approach to Newark.**	Nil	Arriving from Buffalo, N.Y.
24 March ~1130L Cuenca, Ecuador	C208B of ATESA Reg HC-BXD	**Crashed into building less than 60 secs after t/off @ Mariscal Lamar a/p.**	5 dead / 14 o/b	Probable weight and balance issue. Headed to Macas (to the southeast).
24 March 0810L Abelema, Col.	Fokker100 of SAM Colombia	**Pilot misunderstanding of ATC led to very near mid-air with a Fokker 50.**	Nil / 57 +81 total	Fokker 50 of Avianca. Canadian F100 pilot failed to descend as cleared.
25 March 2020L Liverpool, UK	ATP of Emerald Awys	**Flt 3W424 arr from the Isle of Man declared emerg for smoke in cockpit**	Nil / 52 pax +4	A/c operating for Euromanx.
25 March ~0935L Detroit, Mich.	717 of Airtran Flt 872	**Pilot landed at Wayne County a/p after knocking heard from hold.**	Nil	Chicago Midway to Boston. Sound caused by loose cargo door seal.
26 March Manchester, UK	ATR42 of Aer Arann Flt 52M	**Suffered electrical failure and smoke in cockpit passing 500ft in climb.**	Nil / 62 total	Flt 52M (bound Galloway Ireland), returned to Manchester.
26 March 1220L Chicago O'Hare	A320 and a CRJ	**A/c simultaneously issued t/off clncs on 4L & 9L, then later told to abort.**	Nil	3rd runway incursion in six days at Chicago's O'Hare (5 in 2006).
26 March day Lihue, Kauai, Hi.	737 of Aloha Flt AAH215	**Flt AAH215 went off end of runway on landing & halted in overrun.**	Nil	Minor damage.
26 March 2010L Torp Int'l, Norway	A321-211 of MyTravel Scand	**On landing, a/c overran stopway by 150m, damaging localizer antenna.**	Nil	Reg OY-VKA used 2724m to stop. Finally finished yawed 90 degrees left.
27 March 0205Z Boeing Fld, Seattle	Beech 99 Reg N2880A	**Sparkling arrival after nose wheel seprted on roll-out following emerg.**	Nil	An Airpac operated a/c [Cn-109] Flt APC1031
27 March MCAS New River, N.C.	Osprey of MMTTS 204	**TiltRotor made inadvertent take-off followed by very hard landing.**	Nil	Substantial damage to RH wing and engine. (Asymmetrically blottled?)
27 March day Lagos, Nigeria	737 of Bellview Airlines	**Returned Lagos after bird was ingested into port engine on takeoff.**	1 pax inj	Lagos to Accra, Ghana.
27 March 0655L Manchester, UK	Fokker 50 of VLM	**Crew ordered an evacuation just prior to take-off due to an elec fire.**	Nil	Manchester to London City a/p. Fire was located in rear of aircraft.
28 March ~1700L Yucaipa, Calif.	C208B of Cessna Corp. N208WE	**A/c went down in a mountainous region 75 mls east of Los Angeles.**	3 dead / 3 o/b	Weather-related terrain accident (en route to Ontario a/p, Calif.).
28 March 1337GMT Yakutia, Siberia	MI-8 of Polar Aviation	**Crashed one km short of pad while landing at destination.**	5 dead / 7 inj / 12 o/b	Chokurdakh to Russkoye Ustye in Republic of Yakutia, West Siberia.
28 March RAF Leuchars Scotland	Beech 200 Super King Air & RAF Tornado F3	**Scottish ATC and a RAF Leeming Tornado crew shepherded a/c to safe landing at Leuchars, Scotland.**	Nil	King Air lost all electrics in cloud. Tornado joined up & escorted a/c via cloud-free route to safety.
28 March ~1745 Tehran, Iran	AN-12 of Phoenix Avia	**Broke up during forced landing in farmland 3 mls fm a/p after emerg.**	4 inj / 12 crew	EK-46741 was cargo flt from Payam Int'l Karaj, Iran to Sharjah, UAE
28 March ~1400L Newark a/p, N.J.	DC-10-30F of Fedex flt 1020	**On climb out, aft (#2) tail engine cowl separated and fell to the ground.**	Nil	No injuries on ground. New York (Newark) to Oakland, Calif.
28 Mar 1925L Tallinn a/p, Norw	737-505 of Estonian Awys	**ES-ABG received engine fault warning 12 mins after t/off & ret'd**	Nil	Tallinn to Oslo, Norway.
29 March 1447L BallyKelly, Ireland	A320 of Eirjet for Ryanair 9884	**Landed by mistake 6 miles short of Londonderry a/p at army airfield.**	Nil / 39 pax o/b	A/c pulled up just short of fence and rail track across disused runway.
29 March 2125L Sao Paulo, Brazil	A320 of TAM Flt JJ3012	**Radome collapsed & windscreen was broken in severe en route hailstorm.**	Nil	Curitiba to Congonhas, Sao Paulo. Flight depressurized after radome lost.
29 March 2125L Moscow	IL62 Libyan Govt Reg 5A-DKR	**Ran off side of runway on landing and broke into three pieces.**	2 inj / 6 crew o/b	Arriving Domodedovo a/p from Mitiga a/p, Tripoli, Libya, for heavy maint.
29 March ~0810L Newcastle, Austral.	Metro 23 of AeroPelican	**Flt 5010 returned Newcastle after takeoff with thick smoke in cabin.**	Nil / 18 pax	Oil contamination of air cycle unit. Newcastle to Sydney, Australia.
30 March 1140L Newark, N.J.	MD80 of AA Flt AAL321	**Lost #1 eng due to engine filter bypass light & diverted into Newark.**	Nil / 136 pax	LaGuardia to Chicago O'Hare.

[1] Air carrier accidents, or other incidents involving serious failures or fatal injuries, investigated by aviation safety agencies of various nations.

[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)*