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FSNOTAMS

COMMAND AND CONTROL

Courtesy ASRS *Callback* #244, Oct 99
NASA's Aviation Safety Reporting System

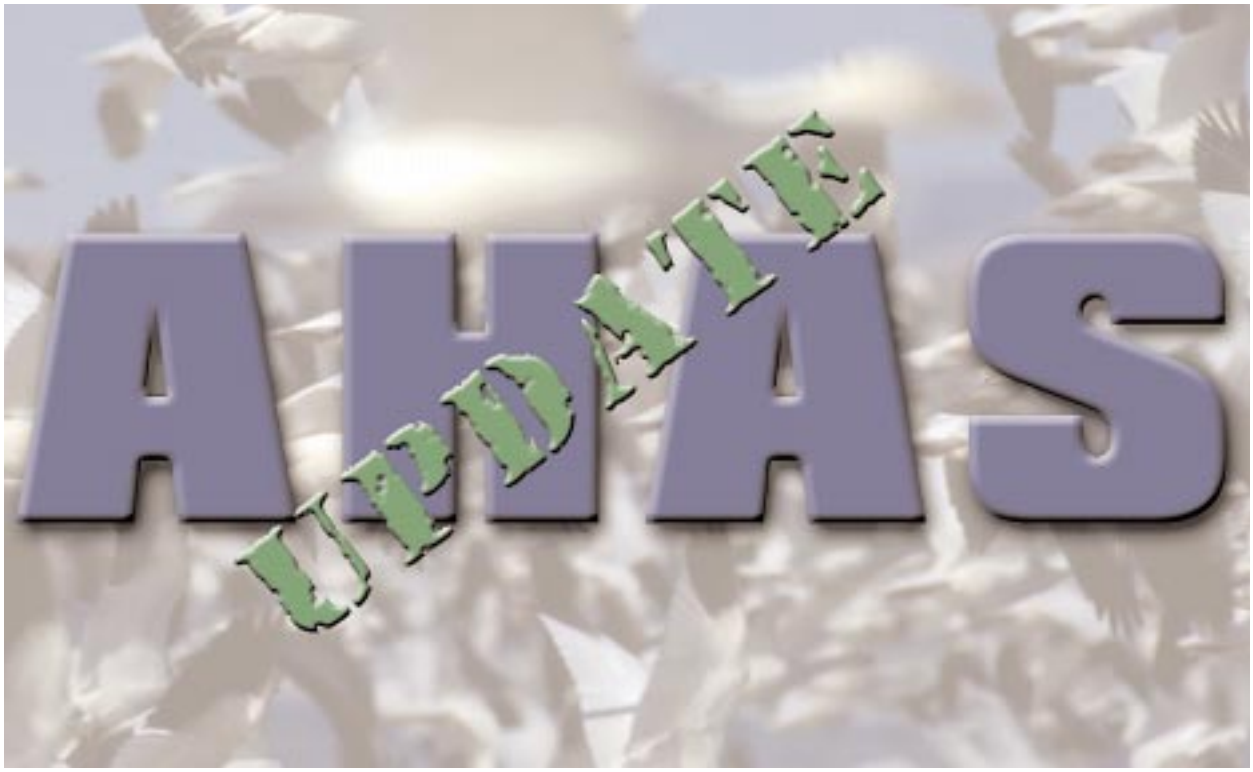
A delicate dilemma faced by instructors in operational training situations is deciding how far to let a student go. If an instructor is too conservative, the student may never learn the full range of skills needed. Too casual, and the student may be placed in situations beyond his or her ability to cope. An air carrier instructor explained to ASRS why being mentally prepared to take control from a student was not enough.

I have been a line check airman for my airline for twelve and one-half years. On this flight I was giving IOE (Initial Operating Experience) to a new hire with no previous jet experience. It was our first leg together, and his first leg since simulator training. We thoroughly briefed our visual approach to Runway 12, which is served by a VOR approach (no electronic glideslope). We discussed appropriate power settings for our flap 40 degree approach and landing. Approach was well flown from 1000 ft, at which point we were fully configured and on speed. Weather at the time was wind 090/8 kts, good visibility. We acquired the runway six miles out.

All indications were perfectly normal until 150 ft AGL, at which point our airspeed dropped 3-4 kts below target. I commanded "Add power." The First Officer added a small amount of power. I again commanded "Add power," at which point the First Officer added only a slight amount of power...(and) relaxed back pressure on the yoke, allowing the aircraft nose to drop. At this point I took control, adding a lot of power and attempting to flare the aircraft. Our full airplane (landing weight 137,500 pounds) hit hard on the main gear and bounced. I effected a recovery and continued the landing rollout. On arrival at gate, we inspected the aircraft and discovered that the tailskid was heavily damaged. An additional area of lower fuselage forward of the tailskid was also damaged.

I will make a point in the future of discussing some of the basic differences between jets and turboprops regarding landing technique for students whose background does not include jet aircraft experience. While I was mentally prepared to take control (as I always am during a new student's IOE), the unexpected relaxation of back pressure worsened the situation too quickly for me to avoid the outcome.

The reporter added that the geometry of the involved aircraft is sufficiently different from previous models (longer and more vulnerable to tail strikes) as to mandate trainee landing and takeoff experience in the simulator. ✈



T. ADAM KELLY
ACC AHAS Project Manager

AHAS... evaluates in near-real-time, and forecasts for 24 hours ahead, the bird strike risk for 6,197 IR and VR low-level routes, ranges, military airfields and MOAs in the Eastern third of the US.

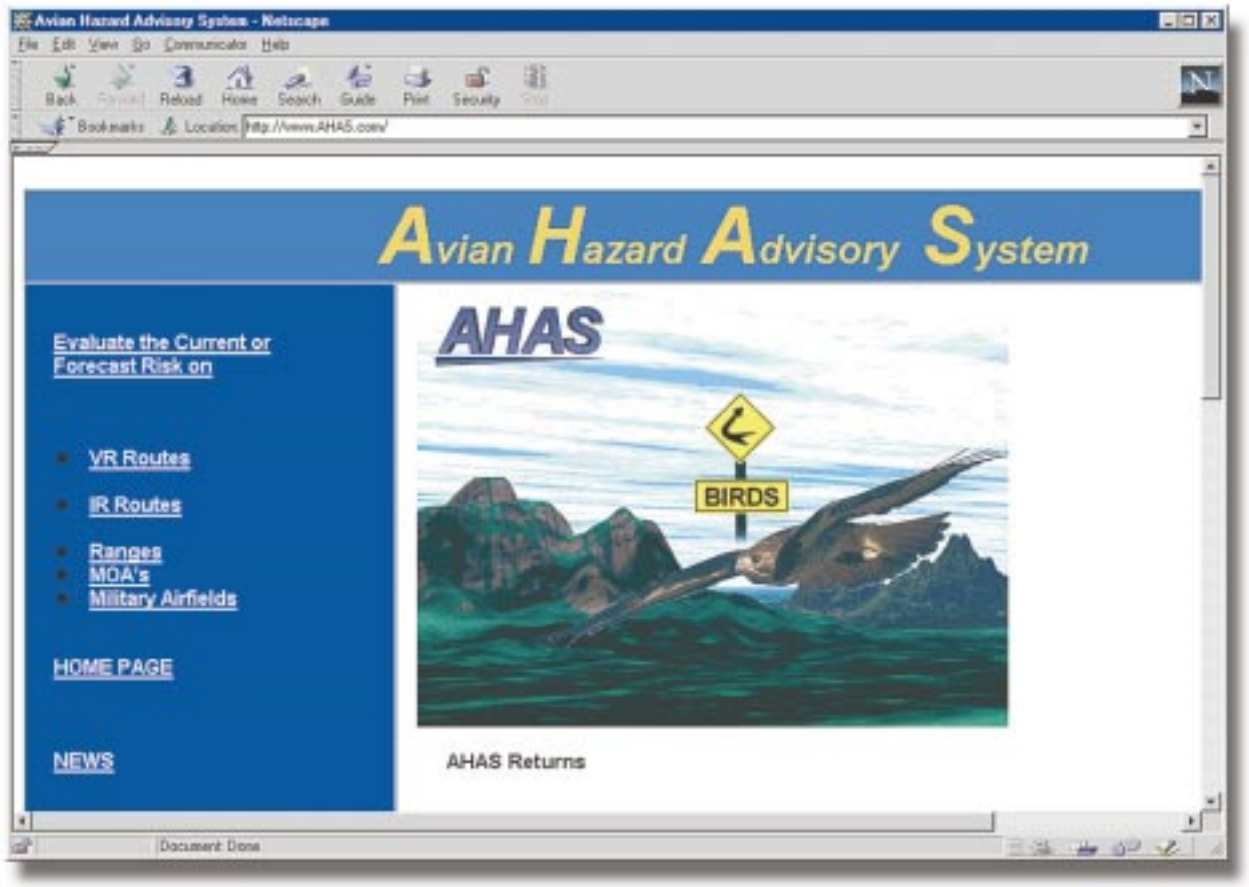
Last year, we reported how Air Combat Command had conducted a successful test of the Avian Hazard Advisory System (AHAS) in the fall of 1998 to monitor and predict potentially hazardous bird activity in selected regions of the US Atlantic Coast. (See *Flying Safety*, April 1999. Ed.) To the end user, not much appeared to happen with the AHAS during 1999. Our web page did not change much and no new data was posted. This was caused by problems with funding delays. Geo-Marine, Inc., kept one staff member developing the AHAS infrastructure and archiving data collected during the year.

Now, a much broader AHAS is in operation. It evaluates in near-real-time, and forecasts for 24 hours ahead, the birdstrike risk for 6,197 IR and VR low-level routes, ranges, military airfields and MOAs in the eastern third of the US. The data is being made available to pilots from two sources: directly from the AHAS web site (www.AHAS.com), and later in the year from the ACC natural resources web site(www.cevp.com/apps/bam/index.html).

Methods of Displaying Data

AHAS.com will continue to produce data in grid table form, while the ACC natural resources web site will generate the data as a graphic map display. Each method of displaying data has its advantages and disadvantages for showing areas of increased birdstrike risk to pilots. By making both formats available, users may access the data in the format that is most effective for their needs. If you want to look at the forecast birdstrike risk for the next 24 hours on a given low-level route, it's better to have the data in a table. In the table format, each hour is in one row and the risk for each segment of the route is in a column. A table can be printed for all frequently used routes and posted in the squadron mission planning room. While maps more effectively illustrate the spatial distribution of risk, printing 24 individual maps wouldn't be as useful. Tables are better than graphics for portraying risks over several time periods.

Seeing the current or forecast risk color-coded along a route overlaid on a flight planning map for a specified time is much more useful when considering the spatial aspects of mission planning, such as proximity of radio towers or other obstacles, and the general terrain. The ACC web site will



pull the information on risk from the on-line AHAS data base and then generate the map display.

AHAS and the BAM

The US Bird Avoidance Model (BAM) is the historical record of where and when birds are active. To the end-user, differences between the US BAM and AHAS are becoming increasingly transparent. If you access the AHAS web page to obtain the risk on a low-level route at any time period greater than 24 hours, you'll be looking at risk ratings from the US BAM.

AHAS is the *dynamic* data set of forecasts and near-real-time birdstrike request data. If you request the risk on a route within a 24 hour period from the web site, you'll be looking at AHAS forecast data. A request for the current birdstrike risk on a route will result in a risk evaluation based on near-real-time observations from the WSR 88-D Next-Generation Weather Radar (NEXRAD).

AHAS also uses US BAM data in interpreting radar returns from NEXRAD. The type of processing AHAS uses in processing NEXRAD radar returns can only separate weather from biological targets. US BAM data, which shows where and when large, hazardous birds are active, is used as a part of an expert system to evaluate the risk that the biological targets seen on the radar present to aircraft.

Much of the current funding for AHAS has been provided to collect data on the movement of birds in the lower 48 states to improve the existing US BAM. Radar data can be used to find new bird migration patterns. Man is constantly altering the landscape with development, changes in farm crops in response to market conditions and establishing new wetland areas and wildlife refuges. Monitoring bird activity in near-real-time provides a means to find these new "hot spot" areas and update the US BAM.

Improving Forecasts and Monitoring

The AHAS was designed from the beginning to learn from its mistakes and steadily

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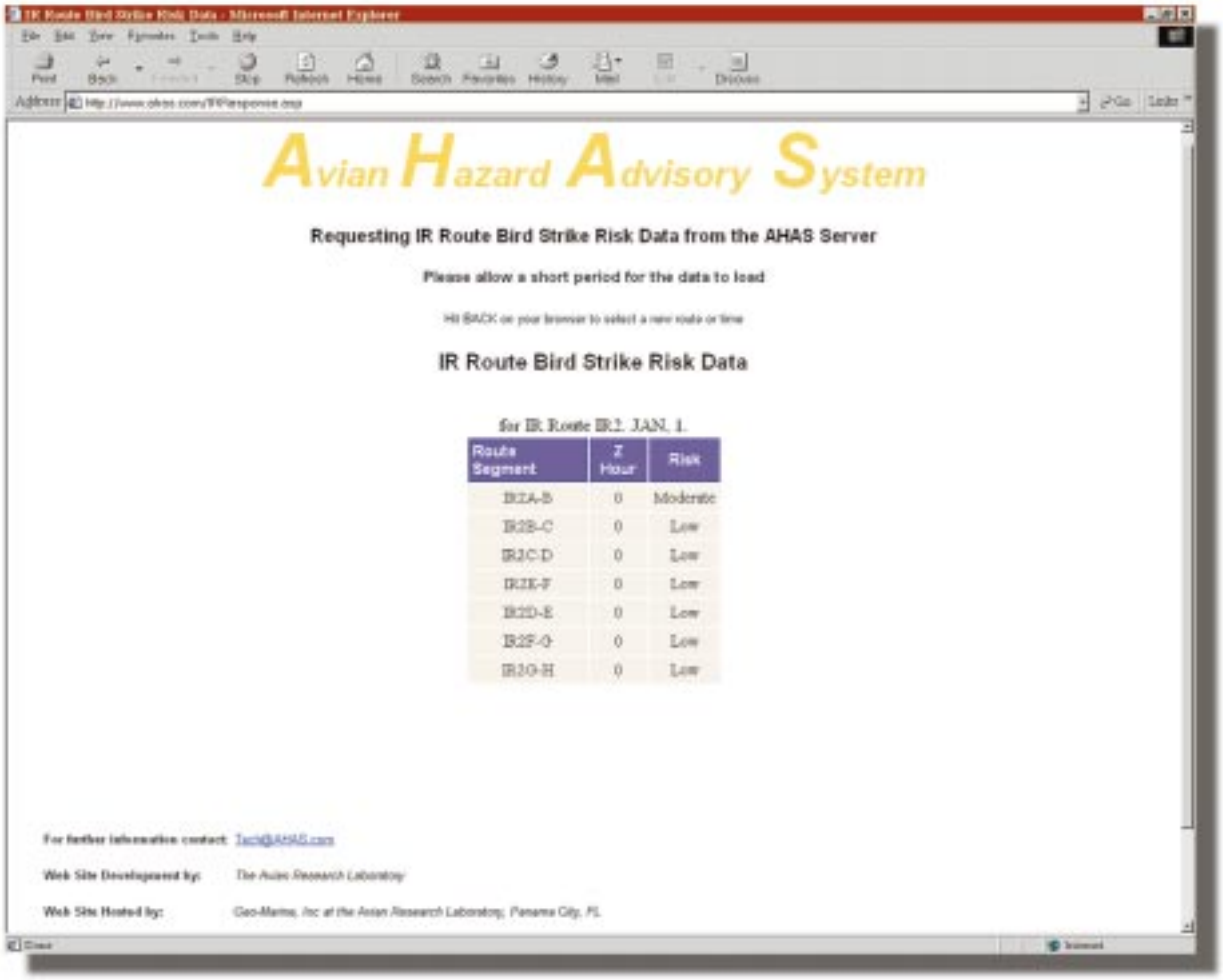


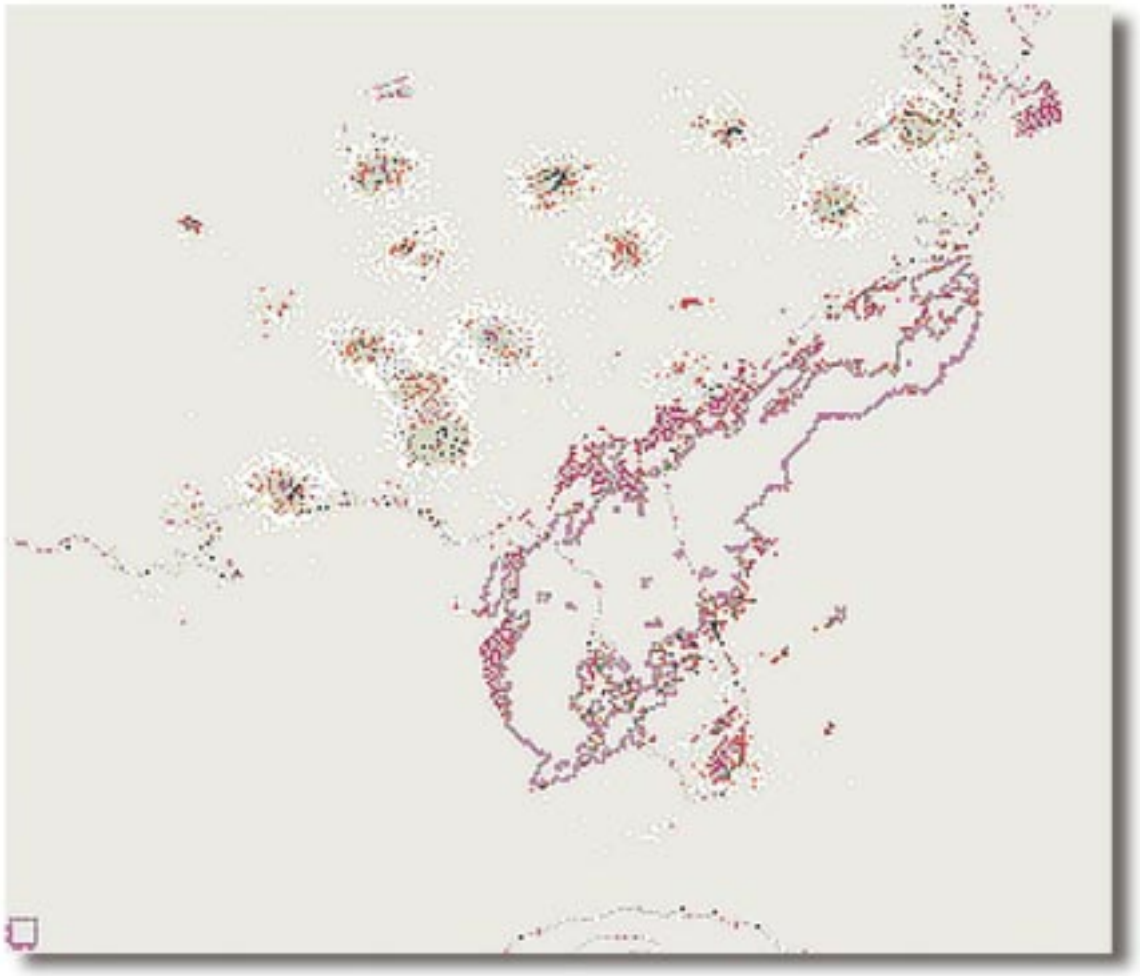
An archive of NEXRAD radar images has been collected in the past year, covering all types of radar targets.

improve itself by the use of sophisticated neural networks. When a bird migration occurs that wasn't predicted by the forecast system, the system can be retrained with the new set of weather conditions to learn how to predict this event. This is a much more powerful approach than using statistical models. Neural networks can, over time, find very subtle relationships between weather and bird behavior that are simply missed, or not considered significant, by other methods.

A similar approach is being used to improve the evaluation of radar data. An archive of NEXRAD radar images has been collected in the past year, covering all types of radar targets. They included large-scale weather fronts and small thunderstorms, bats, birds ranging in size from the smallest varieties to swans, ducks, and geese, and even to chaff discharged from military aircraft. In the coming months, neural networks will be trained to identify each of the identified target types. As the archive of target types grows, the neural networks will evolve, improving the quality of data used in both real-time monitoring and for the US BAM.

System Expansion

For pilots at bases outside the eastern third of the US, a progressive expansion from the East Coast is planned, and AHAS will be expanding to cover your areas in 2001. This progressive expansion has several advantages. Computers get consistently faster, doubling processor speed every 18 months. Therefore, we can do about a third more processing with each computer added to the system next year than we can now, for the same cost. It's also easier to fine-tune the system in small areas to achieve optimum performance than it is to try covering everywhere at once. The West Coast may be last to



receive AHAS coverage, but it will benefit greatly from the incremental improvements realized as the system is steadily expanded.

Fall 1999 Migration

During testing of the expanded AHAS system in the fall of 1999, before data was made available via the web, AHAS system operators noted that the fall migration, as in 1998, was going to be late. This information was sent out to aircrews via the USAF Bird/Wildlife Aircraft Strike Hazard (BASH) Team and HQ ACC Safety to ensure pilots didn't let down their guard before the worst of the fall migration was over for the year. When the weather finally turned cold in Canada, an advisory was issued five days in advance of a big movement of waterfowl across much of the lower 48 states. Fortunately, most of this hazardous bird migration occurred during the Thanksgiving holiday when low-level training was minimal.

AHAS continues to demonstrate that although we can't dodge all of the birds, we can stay away from the most intense bird activity, reduce bird strike risk and train more safely by just checking a web page before we fly! ✈

(About the author: Mr. Kelly has 18 years of experience in the BASH Program. He started his career as a falconer and bird control specialist with the USAF's 3rd Air Force BASH Program in the UK. After obtaining his master's degree with a thesis on Bird Avoidance Modeling, he moved to North Carolina and developed the Dare County BAM for HQ ACC. In 1999, he completed the Moody AFB BAM. He currently directs AHAS project development at the Avian Research Laboratory in Panama City, Florida.)

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