Editors' Choice: Safety Enhancements

Continued focus on safety in helicopter operations will always be important. Our editors have searched for, and found, several products and services that can help improve your safety focus.

Cobham's HeliSAS:

Finally, an Autopilot for Small Helicopters

Most pilots will agree that an autopilot is a great, safety-enhancing device to have aboard an aircraft. But in the helicopter world, autopilots have been a luxury reserved for big-ticket ships, such as the Bell 412, Eurocopter EC155 and Sikorsky S76. But it appears that will change within the next few weeks as Cobham, the Mineral Wells, Texas-based avionics firm, closes in on FAA certification for HeliSAS, its two-axis autopilot system.

HeliSAS—an acronym for helicopter stabilization and augmentation system—is a two-axis system that controls the helicopter's pitch and roll attitude. Yaw and power inputs remain entirely with the pilot.

HeliSAS consists of four main components. Two of them are servos, which physically connect to the control tubes that link the cyclic to the pitch and roll sides of the swash plate. The third is the flight control computer, which serves as the electronic interface between the servos, the aircraft's avionics, and the fourth component—a slim control head mounted in the instrument panel.

As an autopilot, HeliSAS offers heading (HDG), navigation (NAV), back course (BC), altitude (ALT) and vertical speed (VRT) hold. When coupled to the Garmin GNS-530, SAS and NAV modes, along with one or the other vertical hold commands, directs the aircraft along published instrument approaches. Once again, power and yaw inputs are pilot-controlled.

In SAS mode, the system takes an "electronic picture," so to speak, of the cyclic's position, as sensed by the pitch and roll servo arms at the time of activation. HeliSAS then keeps the cyclic in that position until the SAS function is disengaged by on/off buttons on the control panel, or either one of the cyclic grips. It is so precise, it will even hold a fairly stable hover.

Should the pilot change the position of the cyclic slightly, HeliSAS assumes it is inadvertent, and returns the cyclic to its original orientation. But if the cyclic is moved to a greater degree, the SAS will assume that the pilot is executing an evasive maneuver and disengage, thus immediately restoring full control to the pilot.

A second benefit of the SAS is its ability to recover the aircraft from an unusual attitude. If the pilot should become disoriented, HeliSAS will gently return the aircraft to straight and level flight, power permitting.

HeliSAS requires physical attachment between the two servos and the tubes that connect the cyclic to the pitch and roll actuators. Engineers solved this requirement by mounting the 3.4-lb pitch and roll servos under the front seats, and attaching them to the cyclic control tubes with connecting rods. The HeliSAS computer then marries the system to the aircraft's avionics.

At 15 lbs total, HeliSAS does not create a significant weight and balance issue. In fact, it was designed with light helicopters, such as the Bell Jet Ranger and Robinson R44, in mind. And while a price for the unit has yet to be etched in stone, Cobham plans to keep acquisition costs well below $75,000, and installation time around 24 man-hours. FAA certification is expected near the end of 2010.

Cobham currently has HeliSAS installed aboard a Bell 206B Jet Ranger belonging to Edwards &Associates (E&A), the Piney Flats, Tenn.-based subsidiary of Bell Helicopter that specializes in custom helicopter completions. E&A, and its sister company Aeronautical Associates, are working with Cobham to ensure simplicity in installation and integration across a variety of airframes.

Jim Shirey, product line manager at Cobham, invited me to try HeliSAS at E&A's facility. He paired me up with E&A test pilot Mike Milhorn for a morning flight around eastern Tennessee. As advertised, our right hands rested in our laps as HeliSAS maintained the selected parameters, even when buffeted by light mountain winds and turbulence. Our only job was to set and guard our power and pedal positions. Hovering at 20 feet AGL without touching the cyclic was just plain magical.

For our ILS approach to runway 23 at Tri-Cities Regional Airport (TRI), Milhorn activated the SAS, NAV and ALT modes, which rolled the aircraft into a gentle left turn to capture the localizer. Upon intercepting the glide slope, the system switched from ALT to VRT mode, where Milhorn reduced our power, and let HeliSAS descend us on a book-perfect final approach all the way to decision height. From all appearances, HeliSAS looks like a nice aftermarket product for the light helicopter market. It isn't the four-axis autopilot found on the big, expensive ships, but Cobham has proven the technology, and feels confident that it will work on just about any helicopter on the market today. See a video of us flying the Cobham HeliSAS at www.rotorandwing.com —By Ernie Stephens, Editor-at-Large