Record orders for new aircraft, engines and UAVs are about to enter commercial service. There are now on the books several new clean-sheet aircraft design programs including the Bombardier Learjet 85, Cessna Citation Columbus and several Embraer aircraft, all planning to be certified in the next few years. Along with the new aircraft are numerous STC programs and flightdeck technologies such as the Global Vision cockpit with Fusion-based displays announced by Bombardier. And we should not leave out the new VLJs, tiltrotor and new rotorcraft, SpaceShip 1, speech recognition processes and autonomous vehicle operations, all soon to be introduced for operation in commercial airspace. The success and timing of these programs hinges on the support and expertise of FAA. So what better way to celebrate FAA’s 50th anniversary than to be busier than anyone can recall.

From a buyer’s perspective, the purchase of a bizjet comes with an expectation of both a delivery date and performance as advertised. Getting that new bizjet into the buyer’s hands requires the successful demonstration by the aircraft manufacturer to FAA—a fact most buyers don’t consider or worry about. But the technical expertise of OEMs has to be mirrored within FAA, and the agency’s availability is critical to getting your bizjet on time. As technology changes, things like new software verification processes and new performance testing methods are continually being developed by FAA to keep pace with industry. This new high-tech capability within FAA has improved dramatically and most notably over the past 8 years. A once reluctant FAA has moved past rules and technology of the 1940s, and with a new base of professionals is now leading all kinds of development at home and internationally.

Advancing technologies at FAA

For many, FAA is an organization that mostly provides air traffic services, dotted with an occasional meeting with safety inspectors. But for bizjet manufacturers, the interaction with FAA starts soon after a new project begins. During the course of development, FAA’s efforts will include test pilots, engineers...
and other experts throughout the country, from Atlanta to Alaska. Counterparts of the industry in each major technical area of expertise are staffed within FAA. This government base of expertise also includes many versed in the law and regulations—a critical part of the agency’s ability to support bizjet advances.

Some of the major high-tech and aircraft certification groups need to be mentioned, beginning with the people who guide the agency in Washington DC. At the top is the current Acting FAA Administrator, Bobby Sturgell. A former US naval aviator and United Airlines pilot, Sturgell is unapologetic for pressing for industry collaboration with FAA. It was this spirit of collaboration and hard work that won the FAA/industry ADS-B team the Collier Trophy this year. Key to this proud moment in FAA’s history was people who understand the technology and fly airplanes.

The primary organization responsible for new aircraft technology and certification starts at the office of the Associate Administrator for Aviation Safety and is run by Nick Sabatini. A former city cop and police helicopter pilot who rose through the ranks of the FAA Flight Standards Service, Sabatini has been one of the agency’s key leaders of the current crop of FAA headquarters staff who have modernized FAA and the national airspace. This has been quite an effort, and as the industry has begun to change, headquarters people have supported and fostered new technology, such as efficient aircraft designs and revolutionary cockpits, through new rulemaking efforts and policy updates. Also within this part of FAA are the Aircraft Certification Service, Flight Standards Service and Rulemaking. These offices stretch from Washington DC across the country, with key facilities in Atlanta GA, Boston MA, Long Beach CA, Seattle WA and Wichita KS, to support the certification and operational approval of new aircraft and technology.

The Aircraft Certification Service, headed by John Hickey, has overall responsibility for certification, and is supported across the country at the Transport Directorate in Seattle and the Small Aircraft Directorate in Wichita. These groups define the safety criteria for aircraft and systems, test methods and verify the manufacturers’ claim of safety and performance from an engineering and pilot standpoint. Many new technology approvals have come from larger aircraft or Transport Directorate programs, but in fact certification of SVS, GPS/WAAS and ADS-B was squared into operations by the Small Aircraft Directorate.

Another key organization in Washington that supports both technical and operational procedures is Flight Technology and Procedures.
Division AFS 400, headed by John McGraw and his assistant, Acting Asst Division Mgr Les Smith. This group includes specialists in flight operations, low visibility and new technology such as navigation systems, and enhanced flight vision systems and synthetic vision systems (EFVS and SVS, respectively). FAA even has offices responsible for spaceflight operations and groups tasked with certification of unmanned aircraft systems (UASs), which are now beginning to roam the skies in support of law enforcement, forest service and firefighting.

The process of development and test work with manufacturers of new aircraft and technology typically begins with a meeting convened with FAA. The meetings can be with local FAA for minor modifications to an individual aircraft, or include a team of experts in flight test and aircraft certification from around the country. EFVS certification, for example, included almost every major group in FAA. The agency brought in test pilots from Atlanta, Long Beach and Washington DC, human factors and displays experts, even specialists in aircraft icing for the enhanced vision sensor window. After the system was certified, simulators were evaluated and approved, training programs and course syllabus approved, and even the simulator model was tested and certified.

UASs challenge process

A new item in commercial aviation is the UAS. Although at present mostly being put into service for surveillance and border patrol, many local municipalities, the US Forest Service and other groups are being attracted to UASs. This is because their payload flexibility and tool-like functionality can come without the fuss of big runways and even larger fuel and operating costs. For the uninitiated, the size of these machines can range from tiny to full scale. Some of these craft weigh only 40lbs. The Forest Service has been able to task large UASs from the USAF for support fires that tend to rage in California and parts west.

The elaborate infrared systems on the UASs can see through smoke as if it were not even there, giving firefighters real-time information needed to abate the fire. But these machines have to fly in commercial airspace, and so are regulated by the only civil agency task with safety approval and oversight—FAA.

Certification of UASs is being tailored within the framework of FAR 91, the basis of all general aviation operations. Airframe and system approvals are following the certification process for small and transport aircraft known as Parts 23 and 25. By removing the pilot, there is a new challenge in defining safety criteria on these vehicles. For example, see-and-avoid in manned air-
craft requires that a pilot maneuver to avoid traffic, and hitting something normally results in all of the blame put on the pilot. Passing and right-of-way rules, a learned task at the early stage of training, has not yet been demonstrated to FAA’s satisfaction. Attended UASs that are remotely but human-controlled are argued to be as good as a manned platform. High-definition cameras and other sensors no doubt will exceed the standard pilot “Mark 1” eyeball. But that superbionic function is only good as long as the datalink between the attending pilot and UAS many miles away is working. Certification of systems and finding common points for UAS avionics and operations are a new regulatory challenge for FAA. What many OEMs and operators may have overlooked is that FAA is also required to maintain an operations and maintenance oversight and inspection force for these new flying machines. Fifty years of service has prepared FAA for aircraft certification—5 years of experience with UASs is just the beginning of a new era for FAA, and offers many new opportunities to engineers and others.

Budget woes and deliveries

Today’s corporate aircraft are the most advanced in the world. And the prize of winning a spot on the flightdecks of these aircraft is cherished and heavily competitive—certification of new aircraft and systems is moving at a pace not seen by FAA for decades. FAA’s efforts to keep up now include practically every group the agency has. International collaboration is also high on FAA’s agenda.

But a concern in the commercial aerospace industry has been the possibility that the FAA Aircraft Certification Service would downsize its organization through attrition of engineering staff and reduce the level of services it provides. Staffing is an ongoing challenge to FAA, and the tidal wave of new programs has put pressure on the agency not felt in a long time. The demand by the aerospace industry, where time is real money, is the need for FAA to support all programs without unwarranted delays.

The General Aviation Manufacturers Association (GAMA), representing more than 60 of the world’s leading manufacturers of GA aircraft, engines, avionics and related equipment, began campaigning on this point in 2004. GAMA pointed out that for the US alone the consequences of a weakly-staffed FAA would not only drag out programs but weaken the country’s aerospace industries—a crucial element of the national economy. The US Congress seemed to hear the call. The agency’s budget seems to be getting better these days with increases starting in 2006 that may extend through the 2009 timeframe, and will help in hiring more engineers and specialist. But FAA is also competing for the same talent pool as industry, and shortages are occurring in both government and manufacturers.

Agency of the future

Most of the new technology push is coming from corporate and general aviation. The numbers of new aircraft with EFVS, HUDs and SVS are moving into double digits, and the innovations of navigation systems, datalink, EFBs and inflight entertainment is remarkable. Collaboration of US industry and FAA is the root of the success of the positive US trade balance in aerospace.

The health of FAA’s budget and the attraction of new people to government service who know aviation are critical to the success of corporate aviation. A struggling FAA budget and engineering shortage could mean we all have to get in line and wait for that one critical resource we do not control—FAA’s schedule. To keep pace with new aircraft deliveries and get them on time, FAA will need to expand its expertise in software systems, flight controls, flight test and test pilot staff. Expertise in the foibles of UASs is also a new line of business for FAA, and staffing will be critical.

I personally am not a big-government guy, but in this case FAA has proven its value. In fact, over the past few years, FAA has been an essential part of the success story for aviation in the US, often ignored or missed by the buyer. Stuff gets done, and the FAA folks who show up and peer into the future with the rest of us know what they are doing. By contrast, in Europe, for example, almost 8 years after FAA certified EFVS, there is still no operational approval. In the US, the short-term future will see the certification of several new UASs, and new cockpit technologies such as EFVS and SVS fusion. And numerous new aircraft of every size and shape will be approved for service.

So at FAA you will see many civil servants come to work early and stay late because they enjoy it. These FAA folks seem to have a skip in their step, anxious to get to the next piece of technology, hoping no one notices that it’s supposed to be work. And this is a good thing, or else our bizjet business of innovation would soon go the way of the pyramids.