

Boeing employees appear tiny as they look into the huge thermal vacuum chamber in Kent, Wash. The test facility played a key role in testing famous space vehicles in the race to the Moon, but its future usefulness is in question.



NICE

but how necessary?

A team created under the Development Process Excellence Initiative is touring the company to evaluate how well its lab and test facilities are being leveraged.

By **BILL SEIL**

A huge, cavernous thermal vacuum chamber in Kent, Wash. – two stories of glistening steel – was once an important part of the early space race. The manned lunar rover that bounced across the Moon’s landscape, and the lunar orbiter that took the first pictures of Earth from space, were both tested here. But the facility hasn’t been used since 2003.

In St. Louis, a massive multi-ton “iron bird” used to test the hydraulics of the A-12, the U.S. Navy’s canceled carrier aircraft, has been gathering dust, and taking up valuable real estate, for 15 years.

Now these once-priceless resources of aerospace history have become an expensive burden to Boeing. As a result, they are among a number of laboratory and test facilities being evaluated to determine whether they are still being well leveraged by the company. This enterprise-wide effort is being led by the Development Process Excellence Initiative with an aim to significantly reduce the cost of maintaining such unused or underused assets and to use those savings to invest in required new lab and test facilities, such as those being used in the 787 Dreamliner program.

The effort is modeled, in part, on a successful cost-reduction program carried out by Boeing Commercial Airplanes (BCA) since 2001. During the post-9/11 downturn in the airline industry, BCA consolidated its own laboratory and test facilities. Cost savings were realized by eliminating waste and duplication via lab and test asset reductions, while maintaining needed capabilities.

Leveraging strategic facilities

The Development Process Excellence Initiative is using lessons learned from the BCA experience to evaluate lab and test assets throughout the enterprise. Where appropriate, teams are disposing of redundant and unused equipment but leveraging



Bill Schane: The ultimate goal for Boeing is to reduce lab and test assets by \$100 million by 2009.

those lab and test facilities across the enterprise that are of critical strategic value. The polysonic wind tunnel in St. Louis is one example of a key test facility that will continue to be used for enterprise tests.

And Boeing is looking at the possibility of leveraging test facilities around the enterprise to conduct structural component tests for the P-8A Poseidon, a long-range intelligence, surveillance, and reconnaissance aircraft and next-generation derivative of the 737-800, for example. Such tests would normally be performed at Commercial Airplanes facilities in Puget Sound but those facilities are being used by the 787

Dreamliner program. Instead, the team is looking at test sites in Philadelphia, Huntington Beach, St. Louis and Integrated Defense System facilities in Puget Sound.

John Pricco, leader of the DPE Initiative, sees the lab and test component as an important part of the overall initiative.

“Development programs are significant users of our lab and test assets,” Pricco says. “New programs have requirements for a variety of equipment and tests to develop new technology, certify products and determine performance. The lab and test sub-initiative has a lot of potential to help these programs be more successful while using our assets more efficiently.”

Bill Schane, program manager of the Lab and Test Asset Team of the DPE initiative, says Integrated Defense Systems has the goal this year of achieving a net reduction in lab and test assets. At the same time, Commercial Airplanes is ramping up its lab and test capabilities to meet the needs of the 787 Dreamliner and other programs. The ultimate goal for the enterprise is to achieve a \$100 million net reduction in lab and test asset acquisition costs by 2009; acquiring important new assets while more than offsetting this through eliminating assets.

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Some test facilities have a bright future. Bob Hilker, manager of Aerodynamics Laboratories in St. Louis (left), and Bill Schane look at a wind tunnel test model of a fully loaded F-15. The model is used in the Polysonic Wind Tunnel in St. Louis, which will continue to be an important test facility for the enterprise.

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Schane, who also serves as director of Test and Evaluation for IDS, notes, “There’s an ebb and flow to our business. BCA is at the point where it needs new assets for its programs. Our challenge is to make sure the business units have the right assets, at the right place, at the right time, at the right cost.”

There’s always a temptation to hang on to things that you’re not using now but might need again some day. That makes sense in some cases, but Schane says it’s not a good strategy when dealing with costly business facilities and equipment. Regardless of whether an asset is fully depreciated, there are continuing costs. Even inactive facilities have tax, maintenance and utility costs. They take up space on company property and take up the time of employees.

If a facility or asset provides capabilities that will be needed in future programs, planners must make decisions: Will the existing property meet future needs? Can some of the assets be re-deployed elsewhere within the company where there is a current need? What types of facilities will eventually replace those that are

no longer needed?

The 787 Integration Test Vehicle (ITV) – the type of facility commonly referred to as an “iron bird” – was built on one-third the space previously occupied by the 777 iron bird. An “airplane” that never leaves the ground, the ITV is made up of actual components of the flight control and hydraulic systems as well as flight deck, avionics and maintenance systems; to ensure all the integrated parts of these systems work together seamlessly.

While the 777 iron bird could only run one test at a time, the 787 ITV has three complete ship sets of airplane flight controls electronics and can connect to all or portions of the flight controls actuators and hydraulic systems concurrently. Additionally each test system can test with simulated hydraulic and flight controls actuators. As with the 777 iron bird, the 787 ITV supports both software and hardware integration to validate airplane level functionality prior to ground and flight operational testing. The 777 Iron Bird was dismantled and surplused in 2002 to make room for the 787 ITV, 787 Power Lab and Environmental Control Systems Labs.

Some facilities, like wind tunnels, are difficult, time consuming, and expensive to build, so there is a clear need to evaluate a business case over a longer time horizon. Others have special strategic value. Schane notes that the company has a small high temperature test facility in St. Louis, the Arc Heater Facility, that was

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essential in the Space Shuttle’s return to flight.

Over the years, there have been a number of efforts to consolidate and trim costs from lab and test facilities. They have had mixed success. When Schane asked his IDS lab and test colleague Bob Calkins to help lead the Lab and Test Asset Team, Calkins agreed – under one condition. He asked to be assured that it would be a sustainable program, and that a similar all-out effort would not be needed later on.

Calkins says past cost-reduction programs have cut costs but haven’t established processes that ensures that efficiency is maintained. Some cost-cutting efforts have focused on floor space rather than the efficient use of assets. That has yielded only short-term results in many cases.

This program begins, says Calkins, by identifying things you clearly don’t need “It may be stuff that’s sitting around in cabinets and not being used,” he says. “If it is redeployable, let’s put it to use and avoid buying more. If it is very outdated or has high repair and maintenance costs and low use, we’re better off getting rid of it.”

A well-executed program

The Commercial Airplanes cost reductions after the September 11 terrorist attacks set a good example as a well-executed program, Calkins says. Next, similar changes must be made at IDS and Phantom Works, using clear goals and metrics. Emphasis will be given to “net acquisition cost,” retiring unneeded assets to offset the cost of new assets.

Calkins says IDS faces different, possibly greater challenges than BCA did during its recent cost reduction program. For example, Commercial Airplanes facilities are, for the most part, centrally located in the Puget Sound area of Washington. IDS assets



An unused legacy of the past. Bruce McIlroy, Test and Evaluations Operations manager in St. Louis, is pictured with the A-12 “iron bird,” a massive fixture used to test the hydraulics of the cancelled U.S. Navy aircraft and now no longer needed.

are based at various locations around the country. There are also a wider range of IDS programs, requiring a greater variety of lab and test equipment. And IDS, made up of several heritage companies, continues to reduce duplication resulting from the mergers.

The company has three large thermal vacuum chambers, two located in California at Huntington Beach and El Segundo and one in Washington at Kent. The size, cost, and utilization of these facilities indicate that these are a potential cost-reduction opportunity. A part of the team is performing a study to determine if the capability exceeds the needs of the company’s satellite programs. This is an example of the process for matching capability to business unit needs.

The team’s strategy involves both a business unit and regional focus. The IDS business unit is divided into four regions: Southern California; Puget Sound; Central (including St. Louis and Wichita) and East (which includes rotorcraft and launch vehicle sites, such as Philadelphia, Mesa, Houston and the Florida Space Coast).

“One advantage to doing things by regions is you don’t have to invent all of the ideas yourself,” Calkins says. “Sites or regions can set up teams to trade ideas, leveraging ideas from other regions.”

This effort will ultimately lead to the development and validation of unified company processes that manage lab and test assets, containing costs while meeting the needs of the business units. The transition won’t be easy, but reducing costs while maintaining quality and meeting schedules is a compelling reason to change.

The Lab and Test Asset Team leading the DPE sub-initiative has been meeting for approximately one year. It is made up of rep-

resentatives from each of the regions who attend group meetings and report on local progress and challenges. Each of the regions has its own team, which is specially structured to address local needs. Members include both technical specialists and other personnel, such as finance professionals. The team has made progress, eliminating more than \$140 million of IDS assets while adding \$108 million in new assets, without reducing capabilities required by the business unit.

Now that the enterprise team is organized and proceeding to execute its plan, Schane will begin focusing for a time on benchmarking other companies, including a number outside the aerospace industry. Organizations he has in mind include automakers, hospitals and a pharmaceuticals company. He primarily wants to know how each manages its asset base.

Boeing is very good at the logistics of moving equipment from place to place, and in the future testing will take place around the country, regardless where the product is being built. And while the Lab and Test Asset team is focusing on U.S.-based assets, global facilities must also be considered part of the mix.

“Lab and test personnel are dedicated professionals who take their responsibilities very seriously,” Schane says. “That’s why they are now being asked to take the additional step of working together with teammates across the enterprise to help establish the most efficient and effective lab and test capabilities possible. With us all working together, I’m confident we’ll succeed.” ■