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.
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 those lab and test facilities across the enterprise that are of critical strategic value. The supersonic 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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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 redeployed 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 control 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 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

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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
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 fa-
cilities indicate that these are a potential cost-reduction opportu-
nity. 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 busi-
ness 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 valida-
tion 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 per-
sonnel, 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 bench-
marking other companies, including a number outside the aero-
space 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.”

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.