

flying
into the

Future

Above: BCA Technology theme leaders join Amy Buhrig, BCA Technology leader (center) in the 787 interior mockup at the new Customer Experience Center in Tukwila, Wash. Theme members, from left, are: Doug Ball, Performance Efficiency; Billy Glover, Market Drivers; Don Fudge, Production Efficiency; Mark Steele, Operational Efficiency; Tim Petersen, Systems Efficiency; and Cindy Ashley, Structural Efficiency.

Far right: Tim Petersen and Amy Buhrig discuss features of the new 787 Dreamliner interior.

BCA Technology, the breakthrough team at Commercial Airplanes, is not waiting for things to happen. It's drawing on the best technical talent to build a 10-year technology plan for Boeing.

BY KATHRINE BECK

Wings that can adapt to changing flight conditions . . . new hybrid composites . . . super-efficient jet engines.

Those are all breakthrough technologies, not yet ready for prime time, that could one day be an integral part of the Boeing commercial fleet.

At the forefront of this technical revolution is Boeing Commercial Airplane's Amy Buhrig.

She leads a BCA team whose main job is to think ahead – a decade ahead.

The Commercial Airplanes Technology organization is identifying technological breakthroughs that help it design and build future products and services. It's investing time to study and develop them now, so that the technologies will be mature when they are needed.

“That's what this job is all about – bringing the best of Boeing to serve our customers and shareholders. As we do that, we

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develop our future work force,” says Buhrig, who directs a team of engineers and technologists in Puget Sound. She is also the Commercial Airplanes technology leader for Phantom Works, Boeing’s advanced research and development unit, which develops common technologies for the Boeing business units.

“We work with BCA Marketing to direct investment to areas customers find valuable,” says Buhrig. “We also work with the product development teams in Airplane Programs and Commercial Aviation Services who define market driving products and services.”

The team integrates the resources of BCA Engineering; BCA Manufacturing, and Phantom Works to deliver new capabilities to BCA programs and customers.

Buhrig says her charter is to oversee those investments “from an integrated perspective, enabling synergy across programs and eliminating duplicative activities.” The goal is to increase the effectiveness of technology, process and tool investment.

The six technology themes

BCA Technology has six themes, with objectives that go beyond individual programs. Buhrig says that the 10-year time frame allows for integrated development that builds on previous results. Boeing intends to deliver technology, processes and tools ahead of the critical path; to develop capability that provides significant value; and to shape the technology investments of Boeing partners and suppliers.

The **Structural Efficiency** theme leader, Cynthia Ashley, says that the use of composites on the 787 program has radically advanced structures technology. “The next step is determining how to take advantage of these great new materials,” she notes. “We can go in an infinite number of directions.” As examples, she cites new hybrid parts made from various materials. Another area of interest is structural parts that do double duty. Strong and light composites, for example, also serve an acoustical function by dampening sound

Tim Petersen is the **Systems Efficiency** theme leader. His theme encompasses onboard systems such as avionics, flight controls, environmental controls, cabin systems, and electrical power generation and distribution. He’ll be looking for ways to make systems scalable, so they can be shrunk or expanded for different airplanes. He’s also investigating the use of more on-board electricity to power airplane systems for weight advantages and fuel efficiency.

Don Fudge leads the **Production Efficiency** theme. He says that the BCA Technology organization “provides an opportunity to develop a technology plan that’s in sync with our production strategy and lean vision.” His goal is to identify new technologies that reduce recurring manufacturing costs and improve flow. He’s reviewing about 130 ongoing Boeing R&D projects, and he’s calling upon the creative and intellectual power of Boeing Technical Fellows, the company’s top engineers and scientists.



Tim Petersen and Amy Buhrig check out the advanced lighting system, designed for maximum comfort, in the 787 cabin.

Bill Glover leads the **Market Drivers** theme. In 10 years, he says, longer flights will make passenger health and comfort in the cabin increasingly important. Crowded skies and changing regulatory requirements make environmental issues such as noise, emissions, fuel efficiency, and recycling prominent too. Glover is also looking at technology that will build safety into airplanes, with an emphasis on prevention. Another area is improved flight deck interface – information display – to improve safety and performance. This area will include human factors engineering that takes cultural differences into account.

The **Performance Efficiency** theme is led by Doug Ball. New technological breakthroughs he’s examining include a novel wing concept with movable leading and trailing edges, which might improve aerodynamic performance by adapting to variations in flight conditions, just as a bird’s wing does. Also of interest are new tools that can optimize shape and structure at the same time, shortening the design cycle. In the propulsion arena, he is working with engine manufacturers. Ever-larger fan diameters are reducing noise and improving efficiency, and Boeing needs to be ready to integrate these new engines into future airplanes.

The **Operational Efficiency** theme leader is Mark Steele. He’s working with the 787 Program, Commercial Aviation Services and other programs to identify future needs, while looking for technologies that can improve airlines’ operational efficiency and profitability. One example is a tool with a 3-D graphic user interface for assessing airplane damage and recommending repairs. Another is the use of passive radio frequency identification tags for parts marking and tracking. Steele is also working to make digital maintenance data easier to access; he’s studying ways to relieve crowded airspace and busy airports.

Theme leaders name many sources for exciting new breakthroughs. Ideas come from private research labs, existing and potential supplier partners, industrial alliances, and academic institutions all over the world. Liaison with Phantom Works provides ideas from across Boeing. Technical Fellows play an integral role in evaluating internal plans and providing insight into industrywide capabilities. Bill Glover emphasizes the global nature of technology sourcing, citing as an example research work Boeing is doing on “green” materials for cabin interiors in partnership with a Chinese university.

Nan Bouchard, vice president of the Development Process Excellence initiative, stresses that the Commercial Airplanes Technology organization is a key part of the DPE initiative. “One of the initiative goals is to improve the yield of Boeing’s research and development investment,” she says. “The BCA Technology organization ensures that Commercial Airplane’s technology investment is cohesive and aligned with BCA’s business strategy.” ■

FLYING into the FUTURE



Amy Buhrig takes risks, makes opportunities.

Dream Job

Amy Buhrig seeks technical innovation that pays off in business success.

In the mid-1980s, Amy Buhrig took a Boeing class called Managing Personal Growth. One of the class exercises was to describe her dream job. “Now, 20 years later,” she says, “I have it!”

Her dream job was to search out the technology Boeing should invest in order to position itself for the future to become more competitive. Today, as director of Technology for Boeing Commercial Airplanes, Buhrig is responsible for identifying new technologies Boeing will use for future Commercial Airplanes products and services. It’s also her responsibility to make sure that research and development efforts are aligned with the economic realities of commercial aviation.

Her career got its first push when her high school guidance counselor, noting her aptitude for math and science, suggested she think about a career in computer technology.

She earned her bachelor’s degree in computing science from Texas A&M and started work at Boeing in Seattle without thinking of a long-term Boeing career. The recent grad thought she might want to go into sales for IBM some day. That never happened, but her interest foreshadowed a career marked by the desire to combine technological and business expertise.

Her first job at Boeing was in artificial intelligence, developing prototype software systems for the International Space Station.

Along the way, she got her master’s degree in business administration from the University of Washington. She says that working full time while pursuing a graduate degree was hard. “But I’ve always been interested in the big picture.”

M.B.A. in hand, she was assigned to making strategic assessments of the R&D portfolios of Boeing’s pre-merger aerospace competitors.

From 1993 through 2001, Buhrig was part of the team that created Sea Launch, the industry’s most innovative commercial satellite launch system.

She developed its market entry strategy, which involved getting launch customers on board before the system was built. Later, Buhrig became Sea Launch vice president of marketing and sales. Buhrig and her team successfully turned this unusual international venture into a significant player in the commercial space marketplace.

She was contemplating a career change when she boarded a plane to fly home from her last Sea Launch business trip. Her plane was on the tarmac in Copenhagen when the pilot announced that the flight was canceled because terrorists had attacked the World Trade Center in New York.

Commercial aviation changed drastically overnight. Buhrig accepted a position at Phantom Works, pursuing research and development contracts for the Mathematics and Computing Technology organization and leading a team to define the strategy for the Structural Technologies, Prototyping and Quality organization.

She came to BCA in August 2005 as director of Technology Strategy. Her experience at Phantom Works had convinced her that BCA and Phantom Works needed to work more closely together to optimize the company’s research and development investments.

Now she’s doing something about it. In her present job, she’s the official liaison between Phantom Works and BCA.

She’s had an eventful 20 years since she wrote that dream job description. Looking back, she says, “I’ve taken some risks, I’ve made some opportunities, I’ve worked with some tremendous colleagues, and I’ve been extremely fortunate.”