



Creating Careers in Aerospace

AIR WASHINGTON

IN 2010, UNEMPLOYMENT IN WASHINGTON STATE HIT a Great Recession high of 10.4 percent. Yet the Boeing Company was having trouble finding skilled workers to build its planes, including the revolutionary new 787 Dreamliner. Several of the state's community college presidents began looking for ways to address this economic disconnect. One of them, Joe Dunlap of Spokane Community College, found a possible solution in Washington, D.C., where the U.S. Department of Labor was preparing to distribute \$2 billion in grants for workforce education and retraining as part of President Barack Obama's economic stimulus program. Dunlap and like-minded executives at ten other colleges applied for a grant as a statewide consortium. They asked for the maximum single grant amount—\$20 million—and they got it. Four years after the program started, more than 4,700 students have graduated and moved into the booming aerospace workforce, changing the lives of many for the better. This book recounts how the unusual educational initiative was put together, and what it taught both educators and students.

Pieces of aircraft, engines, and mechanical systems are stored in the Spokane Community College Maintenance Building.



BY JIM KERSHNER AND THE HISTORYLINK STAFF

Air Washington Chronology

2008	The U.S. economy is mired in the Great Recession, with effects lasting for years.
2009	The Trade Adjustment Assistance and Community College and Career Training (TAACCCT) Grant Program is authorized by Congress as a part of the American Recovery and Reinvestment Act.
March 30, 2010	President Barack Obama signs the Health Care and Education Reconciliation Act, which includes an appropriation of \$2 billion over four years to fund the TAACCCT program.
January 20, 2011	The Department of Labor solicits applications for the first round of the TAACCCT grants.
Spring 2011	A consortium of eleven Washington colleges, calling itself Air Washington, works on a grant proposal.
April 21, 2011	Air Washington submits its application on deadline day.
September 26, 2011	Air Washington receives the maximum grant amount, \$20 million.
October 1, 2011	Air Washington officially springs to life in what is initially intended as a three-year program.
Late 2011 and early 2012	A number of Air Washington programs are up and running.
September 2012	Air Washington hits full speed at all eleven colleges.
January 2013	A midterm progress report indicates that Air Washington has already exceeded its goal of 2,615 trainees.
March 3, 2014	U.S. Secretary of Labor Thomas E. Perez visits Renton and praises Air Washington as a “springboard to the middle class.”
July 23, 2014	Spokane Community College’s Dave Cox testifies about Air Washington’s achievements before the U.S. House Subcommittee on Aviation.
September 30, 2014	The original grant is set to expire, but the Department of Labor extends Air Washington’s grant for one more year at no additional cost.
Mid-2015	The number of Air Washington trainees hits 4,722.
September 30, 2015	Air Washington’s projected final expiration date.

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Jim Kershner & The HistoryLink Staff

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Printed and bound in the United States

First printing: September 2015

A HistoryLink book

Published by Air Washington in association with
HistoryLink/HistoryLink.org



HistoryLink.org, the online encyclopedia of Washington State history

This workforce solution was funded (100%) by a grant awarded by the U.S. Department of Labor's Employment and Training Administration. The solution was created by the grantee and does not necessarily reflect the official position of the U.S. Department of Labor. The Department of Labor makes no guarantees, warranties, or assurances of any kind, express or implied, with respect to such information, including any information on linked sites and including, but not limited to, accuracy of the information or its completeness, timeliness, usefulness, adequacy, continued availability, or ownership. This solution is copyrighted by the institution that created it. Internal use by an organization and/or personal use by an individual for noncommercial purposes is permissible. All other uses require the prior authorization of the copyright owner.

ISBN: 0-9788302-7-X

LCCN: 2015950818

The paper used in this publication meets the minimum requirements of American National Standard for Information Sciences—Permanence of Paper for Printed Library Materials, ANSI Z39.48-1984.∞

TITLE PAGE: *A fuselage frames students in Spokane Community College's aircraft maintenance hangar.*

FACING PAGE: *Students in the Spokane Community College Advanced Machining and CNC Lab are framed by examples of some of the projects they must complete to earn their Machining Technology Degrees.*

FOLLOWING SPREAD: *A 787 Dreamliner bound for JetStar Airways in Australia moves along the assembly line at Boeing's Everett plant.*

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BOEING CAPACITY
EQUIP. NO. 60W 40 TON

BOEING CAPACITY
EQUIP. NO. 60C 40 TON

Jetstar
Head Office
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FOREWORD

By Jay Inslee

AEROSPACE IS ARGUABLY THE MOST POWERFUL SECTOR IN THE WASHINGTON STATE ECONOMY. THE ECONOMIC BENEFITS OF WASHINGTON'S AEROSPACE CLUSTER HAVE NATIONAL AND GLOBAL IMPORTANCE. EXPANDING THIS HIGH-PAYING INDUSTRY THROUGH NEW TRADE ALLIANCES, NEW INCENTIVES, AND A STRONG WORKFORCE HAS BEEN ONE OF MY HIGHEST PRIORITIES BOTH AS GOVERNOR AND, BEFORE THAT, AS A U.S. CONGRESSMAN.

Winning the final assembly of the Boeing 777X and its carbon-fiber wing for Washington was one of my primary goals. But my strategy also has strengthened the state's position for expansion in unmanned aircraft systems, space exploration, aviation biofuel development, and other emerging industry subsectors.

In addition to Boeing, Washington is home to more than 1,350 aerospace and related business establishments that design, manufacture, and service products ranging from tires to carbon fiber structures to inflight entertainment systems.

When I took office as governor, I launched Washington's first ever statewide Aerospace Industry Strategy to ensure that we, as a state, focused efforts on growing and diversifying Washington's aerospace cluster, cultivating a deep and talented aerospace workforce, fostering a culture of aerospace innovation and collaborating, and coordinating the vast stakeholder network to strengthen Washington's aerospace "support chain."

The federally funded Air Washington project has been an essential part of this effort because it expanded workforce training programs, created new training facilities, and established clear pathways for students to move into



the aerospace field. Former Governor Christine Gregoire, our federal Senators Patty Murray and Maria Cantwell, and many others worked together to bring this \$20 million grant to Washington.

In 2011, the leaders of eleven Washington community and technical colleges pledged to establish effective and nimble partnerships with our aerospace businesses and train more than 2,600 workers during the three-year Air Washington project. This program exceeded our expectations, training more than 4,700 aerospace workers, including 654 of our veterans, by the summer of 2015.

In 2012, the state Legislature further enhanced this effort, creating the Washington Aerospace and Advanced Materials Manufacturing Workforce Pipeline Advisory Committee to better connect the state's aerospace training programs with industry needs. Based upon recommendations from this valuable group, I supported funding one thousand additional enrollment spaces annually in high-demand aerospace training programs, expanding the staffing and resources at the Center of Excellence for Aerospace and Advanced Materials Manufacturing, and expanding the revolving loan fund program for short-term aerospace training.

Washington's economy relies upon the aerospace companies that provide direct employment for over 132,000 skilled workers. Our state has more than one-sixth of the aerospace workers in the nation. When the full economic



Jay Inslee



impacts of the aerospace industry in Washington were measured in 2014, they totaled over \$85.7 billion in economic activity statewide. It is essential that we work together to keep this economic engine running.

These companies forecast a growing need for additional skilled workers as many of their employees approach retirement and their business needs grow. Boeing leadership reports that 48 percent of its current workforce in Washington will be eligible to retire by 2020. This upcoming wave of retirements is one of the company's greatest challenges and will require the hiring of as many as 30,000 replacement workers in the years ahead—an exciting prospect for our state, but a daunting challenge.

I believe the Air Washington public-private partnership represented a significant step in addressing that need.

New composite manufacturing labs, instrumentation programs, and aircraft assembly and electronics programs were created or bolstered by the Air Washington grant.

While the Air Washington training program was available to all, there was a successful emphasis on recruiting veterans, women, and underserved populations for these well-paying educational opportunities. We believe the aerospace workforce benefits from these diverse employees joining it.

More skilled workers are needed in Washington and nationwide. Some 21,000 new skilled workers will be needed over the next decade in Washington, according to a report by the Washington Council on Aerospace. Nationwide employment forecasts show a need for over 30,000 new workers per year.

Boeing forecasts demand for more than 38,000 new commercial aircraft over the next 20 years, valued at more than \$5.6 trillion. In 2014, a full 95 percent of the company's record 723 aircraft deliveries were made in Washington and that dominant market share is expected to continue for the foreseeable future.

At the same time, the skills new workers need grow ever more complex. A growing use of composite materials, increasingly sophisticated electronics, and emerging technologies demand comprehensive statewide training and



apprenticeship programs to ensure that our workers are ready to meet the demand.

We face an ever-growing need for all of our students, at the youngest ages, to be educated in Science, Technology, Engineering and Mathematics (STEM) so that they can be successful in college and beyond. STEM jobs are the jobs of the present and the jobs of the future.

In 2014, Washington State's aerospace community was selected as one of twelve "manufacturing communities" in the nation under the U.S. Economic Development Administration's new Investing in Manufacturing Communities Partnership. This federal initiative will provide up to \$1.3 billion in economic development funds and assistance from eleven federal agencies to these designated manufacturing communities. This designation will allow the Washington aerospace industry to leverage public and private investments. The strategy includes further evaluation of the training programs in the state's community and technical college programs, further building on the success of Air Washington.

The increase in impending retirements, new emerging technologies, and a greater production demand have created challenges for building a skilled 21st century workforce and competing in a global economy. The current workforce is composed of tradespeople who offer valuable knowledge and skills acquired through years of experience. It is imperative that employers have an avenue to capture the knowledge of these retiring tradespeople and pass that knowledge on to the next generation.

Although the Air Washington grant is ending, I believe the industry partnerships and the specialized curriculum will continue long after the grant ends. The curriculum and equipment now are in place for these programs and we know the demand for future employees remains strong.

I applaud the strong partnerships and innovative minds that made Air Washington a successful federal investment in our state and our national economy.



CHAPTER 1

A Light Goes On

IN 2010, WASHINGTON STATE WAS MIRED IN THE GREAT RECESSION. State unemployment had reached a depressing high of 10.4 percent. Enrollment was booming in the state's community colleges—up as much as 46 percent—for unsettling reasons. People were out of work and were desperate to learn the skills for a job, any job. There was, however, a glimmer of hope. Washington's massive aerospace industry—the Boeing Company and at least six hundred smaller companies—was ready to start hiring. Boeing was gearing up production on the 787 in Everett, the



737 MAX in Renton, and a new U.S. Air Force tanker, and it needed men and women to build them. Still, there was a problem. Hundreds of thousands of unemployed workers wanted work, but few of them knew how to build airplanes.

That was one reason Spokane Community College President Joe Dunlap found himself in Washington, D.C., in 2010, seeking federal funding. He was hoping to move his college's aircraft-maintenance training program from its old hangars at Felts Field to a new multi-million-dollar facility that would be built at Spokane's Geiger Field. Washington Governor Christine Gregoire had already made it clear that she wanted the state's community colleges to step up their training programs for this crucial state industry. The governor had set up an aerospace training commission and allocated discretionary funds to pay for two aerospace training centers, one at Paine Field in Everett called the Washington Aerospace Training & Research Center, and one in Spokane, to be called the Inland Northwest Aerospace Training Center (INATC). Yet only \$175,000 was allocated to INATC, not nearly enough to build the new facility that Dunlap had in mind. He was trying to get the U.S. Department of Education to fund the remainder. However, the department told Dunlap it had no federal

Washington Governor Christine Gregoire had already made it clear that she wanted the state's community colleges to step up their training programs for this crucial state industry.

grants that would fit his needs. Officials mentioned to Dunlap that he might want to talk to the U.S. Department of Labor. The DOL was getting ready to offer grant money, lots of

it, as part of the Trade Adjustment Assistance Community College and Career Training initiative, also known by its ungainly acronym TAACCCT. This was a component of President Barack Obama's stimulus program, aimed at getting people back to work and pulling the U.S. out of the worst recession since the Great Depression. So, Dunlap went to the DOL and discovered that the department was indeed preparing to announce a program that would eventually grant nearly \$2 billion to community colleges for job training programs—and possibly for the kind of aerospace training programs that Governor Gregoire envisioned.

At about the same time, several other Washington community college presidents with a large stake in aerospace training were also discussing the TAACCCT grants. "We knew it



ABOVE: *David Beyer, president of Everett Community College, recognized early that a federal grant could be used for an aerospace training program spanning the entire state.*

FACING PAGE: *The Big Bend Community college instructional fleet, at Grant County International Airport in Moses Lake.*



Joe Dunlap, who has a particular passion for aerospace, was president of Spokane Community College during Air Washington's crucial grant proposal and program launch.

was coming along, and we began to brainstorm about things we could do,” said David Beyer, president of Everett Community College. “... This was a time when most state resources were being reduced significantly, so we were looking for other resources.” Bill Bonaudi, then president of Big Bend Community College in Moses Lake, had heard about the grant program while serving on the governor’s aerospace commission. “My role was always to point out that there were other [community college] programs that were successful, outside of those large metropolitan areas, that also needed the kind of support we thought we might be able to get through a Department of Labor grant,” he said. Other presidents, including John Walstrum of Clover Park Technical College in Tacoma, and officials with the Washington State Board for Community & Technical Colleges were also looking for ways to train the state’s unemployed workers in the kinds of skills needed by Boeing and the rest of the aerospace industry. They were seeking ways to teach unemployed loggers, food-service workers, and

“Once you get involved in aviation, it’s not just about flying,” said Dunlap. “I mean, there’s maintenance and management, and pretty soon, at least for me, I was just enthralled with all of it.”

janitors to become airplane mechanics, aircraft assemblers, avionics technicians, composites builders, and machinists. They began to explore whether a TAACCCT grant would be a good way to accomplish this.

Dunlap returned to Spokane, disappointed that he had been unable to find funds for his



Bill Bonaudi, former president of Big Bend Community College, was an early and staunch Air Washington proponent.

INATC training centers, and then further disappointed to learn that the upcoming Labor Department grants could not be used for construction. This meant he had to reluctantly abandon his INATC plan. However, an alternative was stirring. He and the other college presidents recognized that the TAACCCT grants might provide an unparalleled opportunity to join together and create an aerospace training program with a statewide impact. They began hashing out ideas together. “That’s where I think Spokane took the leadership role,” said Beyer. “They said, ‘Hey, we’re ready to partner with anybody; we want to bring together a big initiative.’ ... It just made tremendous sense to do a collective application process” for a grant.

This might have seemed like an unusual campaign for a Spokane community college to lead. The big Boeing plants were in Everett and Renton, almost 300 miles away. Yet Spokane, in common with other cities around the state, had dozens of smaller companies that supplied Boeing or made aerospace components. There also was a more personal reason that Dunlap

had taken this on as a project: “I was just enthralled with every aspect of aviation.”

Dunlap, from the little town of Chimacum, Washington, entered the army as young man, became a helicopter pilot and developed a passion for flying. After he left the army, he embarked on a career in technical training and academia, but he never lost his passion for aviation. In fact, it just kept growing.

“Once you get involved in aviation, it’s not just about flying,” said Dunlap. “I mean, there’s maintenance and management, and pretty soon, at least for me, I was just enthralled with all of it.”

He didn’t realize, when he left the military, that aerospace would continue to “consume a fair portion of my life.” As 2011 began, it was about to consume even more of it, in the form of a \$20 million program to be called Air Washington.

Dunlap, Beyer, Bonaudi, Walstrum, and other college presidents were visualizing a statewide program that would do everything that the TAACCCT initiative was designed to accomplish: It would retrain thousands of laid-off workers, cut into the unemployment rate, give unskilled workers a jump start on a middle-class career, and provide jobs for veterans. It would also accomplish another goal vital to Washington State: It would strengthen and support the historic and economically crucial Washington aerospace industry.

“The light went on,” said Dunlap.



CHAPTER 2

Busts and Booms

TO UNDERSTAND THE NEED FOR AIR WASHINGTON, IT HELPS TO understand the place of aerospace in Washington's history. Since World War II, no other industry has rivaled the importance of aerospace. In fact, flight has played an outsize role in the state's economy almost since the day in 1917 when William E. Boeing started the Boeing Airplane Co. The enterprise was an early contributor to the Seattle-area economy, and by the 1940s Boeing had become the single most important economic engine in the state, surpassing even the state's original industry, timber. When historians Robert E. Ficken and Charles P. LeWarne looked back on the state's first century in *Washington: A Centennial History*, they wrote, "Seattle and to a large extent, the state, became dependent on a single company. The slightest loss had serious repercussions for the

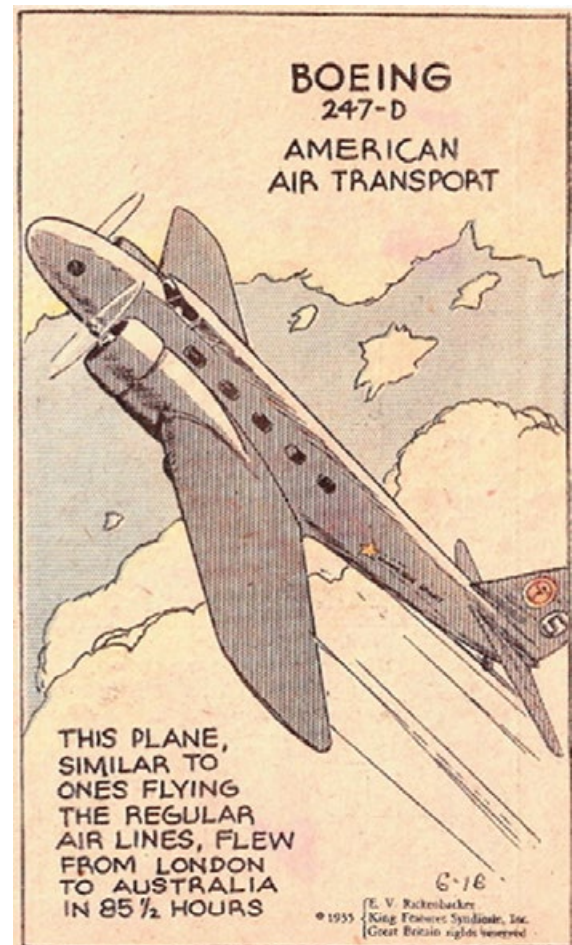


region and its people.” When Boeing thrived, so did Washington. When it slumped, most of Washington dived into what came to be called a Boeing Bust.

The origins of the state’s aerospace industry can be traced to 1915, when Bill Boeing, then a young timber magnate, persuaded a visiting floatplane pilot to give him a ride above Lake Washington. Boeing made it up into the sky and, in the words of historian Walt Crowley, never truly came down. He became fascinated with flight and soon learned to fly. He and his friend George Conrad Westervelt, a U.S. Navy officer and engineer, built a floatplane at the Lake Union boathouse where Boeing berthed his yacht. Boeing soon realized that with World War I raging and American involvement looming, the U.S. military would need plenty of airplanes. He hired some engineers and mechanics to design and build planes in a former shipyard building along the Duwamish River, in south Seattle, and it soon became legendary as Boeing’s “Red Barn.” Seattle seemed like a natural place to build airplanes. Light, strong spruce wood was abundant—and Boeing, a timber man, owned forests of it. Before long the U.S. Navy had commissioned about 100 aircraft. At the height of World War I, the Red Barn hummed with 337 workers. Then, in 1918, World War I ended and Washington’s fledgling aerospace industry suffered its first economic crash, one of many to come. Military orders disappeared and the Red Barn resorted to making furniture and speedboats. The payroll dropped to eighty. Then, just when it looked like the Boeing Airplane Company was doomed, it won a U.S. Army contract in 1919 to refurbish biplanes.

However, it was a newfangled concept, airmail, that truly saved the company. One of Bill Boeing’s test pilots, Eddie Hubbard,

convinced Boeing that airmail was the future, and he talked Boeing into accompanying him on a flight from Victoria, British Columbia, to Seattle with a bag of mail. This was the nation’s first international airmail flight. Hubbard was subsequently hired by the U.S. government to carry airmail back and forth from Seattle to Victoria, using a Boeing-built B-1 flying boat. Airmail routes soon were established around the country and Boeing was back in the airplane-building business, making mail planes for the government. In 1922, the company’s employment reached an all-time high of 549. By 1925, the government had started contracting with private firms to carry the mail. Sometimes, passengers would hitch rides on these mail planes for a fee—and the passenger airline industry was born. In 1926, Hubbard persuaded Boeing to bid on the Chicago–San Francisco mail route. The company won the contract and became a company that not only



RIGHT: A sketch of the then revolutionary Boeing 247-D airliner from a 1935 ad.

FACING PAGE: A 1928 Boeing 40C flies in formation with a Boeing 787 in 2010. Addison Pemberton of Spokane restored this historic Boeing mail plane.



built planes, but flew passengers on regularly scheduled routes. In 1927, it added a Seattle–Los Angeles route under the name Pacific Air Transport, soon to be called the Boeing Airplane & Transport Co. The company was now making so many planes that it outgrew its Duwamish plant and moved some of its production and some of its flights over to the Sand Point airfield on Lake Washington in Seattle. When King County transferred the Sand Point airfield to the U.S. Navy, Boeing threatened to move to Los Angeles. King County responded by building a new municipal airport, not far from the old Red Barn, intended largely for use by Boeing. In fact, the county named the airport Boeing Field. About twenty thousand people were on hand when Boeing Field was dedicated on July 26, 1928. An overwhelmed Bill Boeing declared, “This day is just about the happiest one of my life.”

That day was also, in many ways, a turning point for both the Boeing Company and the state’s economy. In 1928, Boeing’s payroll skyrocketed to 1,049, which made it Seattle’s largest manufacturing firm. Aviation was now one of the city’s biggest industries, almost entirely because of Boeing. By comparison, in 1929 all of Seattle’s shipbuilding firms together employed 1,395 people. Boeing reached a high of 1,491 that same year. The Great Depression

began late in 1929, but it hardly affected Boeing, which was rapidly introducing new planes, some for the airmail market, some for the growing passenger market, and some for the military, including pursuit planes and bombers. Bill Boeing was rapidly assembling an industrial conglomerate. In 1929, Boeing and Fred Rentschler, president of engine-maker Pratt & Whitney, combined to incorporate a new offshoot called United Aircraft and Transport, which would soon purchase a number of aviation companies, including Sikorsky, Northrop, and Stearman. In 1931, Boeing’s United Aircraft and Transport won the airmail contract for the entire northern tier of the United States. Meanwhile, this nascent airline enjoyed the decided advantage of building its own planes. In 1933, Boeing unveiled the groundbreaking Model 247, an all-metal monoplane that could speed ten passengers from coast to coast in the then-breathtaking time of twenty hours, including refueling stops. Boeing had made it possible, for the first time, to cross America in a day.

Bill Boeing wasn’t the only person in Washington to have discovered the thrill of flight. Across the state, Spokane hosted the National Air Derby and Air Races in 1927, and in 1929 Spokane aviators Nick Mamer and Art Walker made national news with the first nonstop transcontinental flight in their plane *Spokane Sun-God*. In 1931, Clyde Pangborn, a barnstorming pilot from Bridgeport, Washington, belly-landed onto a Wenatchee airfield to complete the first nonstop airplane flight from Japan to the U.S. In the early days, Spokane even had a fledgling aircraft industry. Two companies, the Northwest Aircraft Company and the Russell-Symmons Aviation Company, were building planes by 1920. Spokane’s industry did not take root like Seattle’s, but it began an aviation presence in Spokane that would eventually result in an Air National Guard base, a World War II airfield, and eventually Fairchild Air Force Base, which would become Spokane County’s largest employer. In fact, Washington would eventually be peppered with huge military air



A collection of bygone machining tools, circa 1960s, on display at Spokane Community College.



bases, including McChord Air Force Base near Tacoma, Larson Air Force Base in Moses Lake, the Ephrata Army Air Base, the Sand Point Naval Air Station in Seattle, the Pasco Naval Air Station, and Whidbey Island Naval Air Station.

Back at Boeing's plant on the Duwamish, the company was barreling forward in 1933, while the rest of the U.S. was mired in the worst year of the Great Depression. The company hit an all-time high payroll of 2,264 workers. Then came another bust, partly because of new competition, but mostly because of developments in Washington, D.C. The U.S. Congress accused Boeing of monopolistic practices and banned the awarding of new mail contracts to companies that also built aircraft. In 1934, the company was forced to dissolve United Aircraft and Transport, which was reincorporated as an independent company under a new name, United Airlines. The Boeing Airplane Company was reorganized, and a bitter William Boeing sold most of his shares, retired, and never again played a significant role in the company he founded. The next year, 1935, the company's payroll dwindled to 839.



ABOVE TOP: A Boeing B-17E, the famous Flying Fortress bomber of World War II.

BOTTOM: The Boeing 314 clipper, flown by Pan American World Airways, transported up to 74 passengers across the Pacific and Atlantic in all first-class luxury.



1915



1917



1963



2014

A chronology of major events in the history of Washington's aerospace industry

- 1915 William E. Boeing takes his first airplane ride above Lake Washington.
- 1917 The Boeing Airplane Co. begins making airplanes for the U.S. Navy.
- 1926 Boeing wins airmail route and begins taking passengers along on trips.
- 1928 Boeing Field dedicated; Bill Boeing calls it the happiest day of his life.
- 1929 Boeing teams up to create United Aircraft and Transport, later to become United Airlines.
- 1935 Boeing payroll dwindles to 839.
- 1941 Clover Park Technical College begins teaching aircraft maintenance; Pearl Harbor sparks plane-building boom.
- 1944 Boeing's Duwamish plant swarms with nearly fifty thousand workers, Seattle's population skyrockets.
- 1947 Boeing develops the Stratocruiser, a commercial airliner.
- 1950 Cold war renews demand for military planes.
- 1957 Boeing employment tops one hundred thousand for the first time.
- 1963 Boeing moves into aerospace field, builds Kent Space Center.
- 1967 Washington State Legislature passes Community College Act, creating the current statewide system of community colleges.
- 1968 South Seattle Community College initiates aircraft maintenance courses.
- 1971 The biggest Boeing Bust cripples the state's economy.
- 1975 Big Bend Community College completes move to former Larson Air Force Base and offers air training programs.
- 1978 Boeing rebounds and becomes the nation's largest single exporter.
- 1993 Boeing's debt rating is downgraded, due to new competition with Airbus.
- 1997 Boeing merges with McDonnell Douglas.
- 2001 Boeing moves headquarters from Seattle to Chicago.
- 2003 787 Dreamliner conceived, introducing new era of outsourced parts and composite construction.
- 2010 State aerospace employment begins to rebound; Washington's community colleges ponder aerospace training plans.
- 2011 Air Washington wins three-year, \$20 million U.S. Department of Labor grant.
- 2014 Air Washington is granted a fourth-year extension.
- 2015 Air Washington trains 4,722 students, far above its original goal of 2,615.

A pictorial tour of aerospace history: From the top, Bill Boeing and Eddie Hubbard; the Red Barn; Walter Hiltner and Richard D. White with a model of Boeing's Counter-Moon Space Probe; and training at Clover Park Technical College.



1997

The Boeing Plant on the Duwamish River; a Boeing 247 airliner; Stratocruiser delivers supplies to scientists in Antarctica; and Big Bend Community College's hangars at Grant County International Airport.

However, war rumblings from Europe soon revived Boeing's fortunes, along with those of the broader Puget Sound economy. Boeing received an order for dozens of bombers in 1936 and the company's payroll soared, reaching 2,956 in 1938 and nearly 6,000 by the end of 1939. With success came labor troubles. The Aero Mechanics' Union threatened to strike in 1940 and Boeing, in retaliation, threatened to move to Portland or San Francisco. This would have spelled economic trouble because the company was now firmly ingrained in the state's economy. In the end, Boeing accepted arbitration and the labor strife slowly eased, in part because the threat of a new war in Europe brought both sides together. Boeing would remain in Seattle.

The attack on Pearl Harbor in 1941 sparked an unprecedented explosion in Washington's aviation industry. The Duwamish River complex was covered with camouflage netting, so that hostile eyes could not see what was happening below: tens of thousands of workers feverishly building thousands of airplanes, including two of the most famous American aircraft of the war, the B-17 Flying Fortress and the B-29 Superfortress. Boeing was no longer merely a regional economic powerhouse; it "instantaneously became a major national business enterprise," according to historians Ficken and LeWarne. By 1944, nearly fifty thousand people worked for Boeing. The company had expanded along the Duwamish River and into the suburb of Renton, on the south side of Seattle. Boeing sales for 1944 exceeded \$600 million, a number unthinkable before the war. This was ten times the total sales for *all* of Seattle's industry in 1939. Seattle's population skyrocketed and many of those newcomers were working long hours and making good money at Boeing. The company's presence was now felt all across the state. For instance, aluminum, produced with cheap hydroelectric power in Spokane, Longview, and other cities, almost immediately became the state's second-biggest wartime industry. Much of that aluminum was bound for Boeing, where it was fashioned into wings and fuselages. Personal



income was tripling across the state, partly because of “the narcotic effects of war contracts,” as one Seattle newspaper put it. Meanwhile, the state’s community and technical colleges had begun offering aerospace training programs as early as 1941, when the school that evolved into Clover Park Technical College started training aircraft mechanics.

For Washington’s economy, “the postwar era began not ... aboard the battleship *Missouri*, but in the board room of the Boeing Company,” wrote Ficken and LeWarne. With peace in 1945, it appeared that the state’s aviation industry would crash again. The government immediately cancelled most of its B-29 contracts and the company’s board slashed the workforce to eleven thousand. This was perilously close to the critical mass “below which the company could not survive,” wrote Boeing historian Eugene E. Bauer. Boeing pulled out of this dive by converting one of its cargo planes to a commercial airliner, the Stratocruiser, and pursuing the growing commercial aviation industry. Then, as the 1950s began, the Cold War and the Korean conflict created a renewed demand for military aircraft. Boeing developed the B-47 and the groundbreaking B-52 Stratofortress. Over the

next decades, Boeing would build 744 of the massive B-52 jet bombers, more than sixty of which were still in use in 2015, sixty years after the plane first entered service. Then came the KC-135, an Air Force tanker built in Renton, and a series of commercial jetliners, including the hugely popular Boeing 707 and Boeing 727. Boeing had not merely survived the postwar era, it was thriving on an unprecedented scale. In 1957, employment topped 100,000 for the first time. Yet for the state’s economy, “Boeing’s own success proved a mixed blessing,” said Ficken and LeWarne. The workforce and the economy continued to careen up and down in sometimes sickening lurches, depending on the whims of the commercial airplane market and the stiff competition for military contracts.

Boeing’s solution was to diversify. As the 1960s began, space had become a key part of President John F. Kennedy’s New Frontier. Boeing had already entered the missile business in the 1950s with its BOMARC supersonic antiaircraft rockets. Then in 1961 it won a contract to build Saturn rocket boosters. In 1963 the company acquired 320 acres of farmland in Kent and built the Kent Space Center, which would become the sprawling headquarters for Boeing’s many space-related projects, including

The Boeing 727, designed for short to medium trips to smaller cities with shorter runways, was a big hit with airlines as commercial jet aviation expanded in the 1960s.





the Lunar Roving Vehicle that eight years later would ramble over the surface of the moon. Washington's aviation industry had evolved into an aerospace industry.

By 1966 the company was taking a hard look at its primary market, the airliner, and determined that jumbo jets were the future. The company acquired Paine Field, an old wartime military base in Everett, and built what remains to this day the largest building by volume in the world. It was the assembly plant for the company's new jumbo jet, the Boeing 747, and the workforce soon exceeded twenty thousand at Everett alone. The first 747 rolled out of the giant building in 1969. By 2014, Boeing had built fifteen hundred 747s and counting. The 747 also marked a turning point in the way the company built its planes, with enormous implications for Washington's economy. Only the wings and the forward body sections, including the flight deck, were actually manufactured in the Boeing plant. More than 65 percent of the 747 was subcontracted to other companies. Tellingly, the Everett plant was called an assembly plant, not a factory. To a significant degree, the 747 was being built in widely scattered workshops and factories all over the world and then assembled in Everett. This trend would accelerate over the next few decades. A running joke in Seattle, according to author John Newhouse, went like this: "A Boeing airplane is forty-five thousand pieces flying in close formation."

Airplanes had become so complex that it made sense to farm out some parts to specialists. Some of these suppliers were clustered in the Puget Sound area and were founded by former Boeing employees who had struck out on their own. Others were scattered around the state and utilized the aerospace knowledge of retired Air Force personnel from the state's many air bases. Also, many of these suppliers were overseas. Still, assembling and integrating all of these pieces in Everett and Renton remained a massive job. As the 747 project got rolling in 1968, employment at Boeing peaked at nearly 142,400, and many thousands more were working for Boeing's suppliers.

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Then came the biggest Boeing downturn of all, the one for which the term Boeing Bust was coined. As the 1970s dawned, the airliner market was saturated and the country was slipping into recession. Boeing laid off more than 25,000 workers in 1969 and another 41,000 in 1970. Then in 1971 came devastating news. The U.S. Senate cut funding for Boeing's sleek new Supersonic Transport, known as the SST, and the company cut nearly 20,000 more jobs. The workforce hit a low of 56,300. This Boeing Bust had put 86,000 workers on the street in three years. "Seattle and the Puget Sound region—where most of the people were employed—became a disaster area; and statewide, Washington unemployment hit 14 percent, highest in the nation," wrote historian Eugene E. Bauer. "Someone placed a huge sign adjacent to Interstate 5, with the grim admonition, 'Will the last person leaving Seattle turn out the lights.'"

The company—and the state's aerospace industry—engineered a remarkable comeback over the next decade. Boeing landed several lucrative military contracts, including the Airborne Early Warning and Control System (a radar plane known as AWACS), built in Renton, and air-launched cruise missiles, made at the Kent Space Center. The company also made a crucial strategic pivot: It decided to target "overseas commercial sales as its top priority," said Bauer. By 1972, the company was selling to airline customers in Romania, Egypt, Iraq, Sudan, and, of special significance for the future, China. Japan for decades has been one of Boeing's largest customers, and operated a pilot-training center at the former Larson Air Force Base in Moses Lake, Washington,

Ron Humphrey, 61, Clover Park Graduate



Ron Humphrey

RON HUMPHREY had been a metal finisher at a dental lab in Olympia for 15 years until he was laid off in 2012. Try as he might, he couldn't find a new job in his field, so he started thinking of changing careers. He turned to WorkSource, Washington state's career and employment center.

"A counselor suggested I grab one of the flyers and it was about composite technician classes at Clover Park," said Humphrey. "I didn't think I could hack it, because there was so much math involved and I'm not very good at math, so I put it off." But the idea stuck with him and he eventually decided to enroll. "I took a leap of faith of believing in myself and went for it," he said.

Humphrey was 60 years old when he started the program. "I felt like I was the old guy in the club," he remembered. "Most of the students in there are young, and a lot of them are fresh out of the military. But there were a few old guys in there. I'm a veteran, so I could relate to the veterans in the class."

And the work was challenging, he says. "A side of me that I knew was there came out," he recalls. "I just got in there and got my hands dirty doing the math and doing all the hard classes—trigonometry, geometry. I was pretty proud of myself for getting through the process and coming out the other side."

When Humphrey graduated, he found work with Hexcel Corporation in Kent, a maker of aerospace composites. But he really wanted to work at Boeing and a Clover Park advisor was helping him toward that goal. Eventually, he was called for an interview. "I was excited, because it's tough to get into Boeing," he remembers. "I kept my fingers crossed and about a month later they called me in for further interviews. A week or two later they sent me an offer."

Humphrey now works as a composite fabricator at Boeing, helping to make structural frames for the 787 and the 777 airliners. "I'm in the training phase now," he said.

As for Air Washington and his work at Clover Park, Humphrey said, "It was a game changer for me."



for more than forty years. By 1978 more than half of Boeing's commercial airliner orders were foreign. Boeing had by then become "the country's largest single exporter and earner of foreign capital," according to Newhouse, and it would remain near the top. However, the trauma of the 1971 Boeing Bust had hurt nearly everybody in the state, not only Boeing workers. It was seared into the collective psyche. Washington's policy makers and business leaders put a great deal of effort into diversifying the state's economy. This effort reached fruition in the 1990s with the rise of Microsoft, Amazon, and the high-tech industry. This helped to alleviate the "mixed" portion of the "mixed blessing" that was Boeing. The "blessing" part was still obvious. By 1980, Boeing's employment had rebounded back to more than 100,000.

The company still towered over its aerospace competitors, but by the late 1980s that began to change. An upstart European company called Airbus was beginning to cut into the market, partly because it was able to build airplanes more cheaply than Boeing. The reasons for this became a subject of fierce international debate in the mid-1990s. In some American circles—and especially in Boeing's home state—Airbus was considered to have an unfair advantage over Boeing because a consortium of European governments subsidized it. In fact, Airbus had been conceived because the governments of Britain, France, Spain, and Germany were worried that they would lose their national aircraft corporations altogether to the Americans, i.e. Boeing. But how could Boeing be expected to compete with a company whose losses could be covered by government money? The word "socialism" was bandied about. Europeans, on the other hand, were appalled at "Boeing's habit of laying off thousands of highly trained mechanics in slack periods," according to Newhouse. In fact, in 1992 Boeing announced another layoff of twenty-eight thousand people. This debate came to a head when President Bill Clinton visited Seattle that year and said that many of the layoffs wouldn't have happened without

the \$26 billion that European governments had plowed into Airbus. "The Europeans are going to have to quit subsidizing Airbus," said Clinton. "I am not going to roll over and play dead." Seattle's economy, noted Clinton, was the most export-dependent in the U.S. and a model for a nation increasingly concerned about growing overseas trade gaps. An international agreement did, in fact, partially limit Airbus subsidies, but it didn't appear to help Boeing. In 1993, Moody's downgraded Boeing's debt rating for the first time in company history. The subsidies debate would drag on toward stalemate.

Once again, the state's aerospace industry lurched up and down. In 1997, Boeing merged with one of its chief competitors in the defense field, McDonnell Douglas, as part of an attempt to further diversify and shield the company from the vagaries of the passenger-plane market. This didn't entirely succeed. A sharp downturn in air passenger traffic occurred in the year following the September 11, 2001,

The company still towered over its aerospace competitors, but by the late 1980s that began to change.

terrorist attacks, which also resulted in fewer airplane orders. In the years following the attacks, Boeing laid off nearly thirty thousand people and the company's Washington workforce dropped to around fifty-four thousand. This happened while the state was still reeling from a shocking announcement in May 2001: Boeing was moving its corporate headquarters to Chicago. Could this spell the beginning of the end for aerospace in Washington? The Boeing president fueled the paranoia by saying, "We don't want to be off in a corner of America." The executives packed up and left, creating an upper tier far removed from the nuts and bolts of the business. Yet the headquarters of the Boeing Commercial Airplanes unit of the company remained in Seattle, and



An All Nippon Airways 787 lands in Tokyo. ANA was the launch customer for the revolutionary composite-based airliner.

the airplanes were still being churned out in Everett and Renton. No matter where the corporate suites were, the airplanes still had to be assembled in a state with a trained workforce that knew how to build them.

By 2004, the workforce was once again at low ebb—about a hundred thousand Boeing jobs had vanished in the Puget Sound area since the 9/11 terrorist attacks, for total employment of just above fifty-two thousand in Washington—and spirits were even lower. Aerospace seemed to be in a slow decline and high tech seemed to be soaring. “By then, Boeing was widely seen as peripheral, an ex-spouse who is still hanging around the neighborhood,” wrote Newhouse. Then, once again, Boeing bounced back. Another new and innovative airplane, the midsize Boeing 787 Dreamliner, was conceived in 2003 and began production in Everett and—ominously for Washington State—at a new plant in South Carolina. The 787’s launch was delayed until 2011, but by then it was already what the company called the “fastest-selling wide-body airplane in history.” Boeing was once again outselling Airbus. The 787 reflected the company’s new way of making airplanes. More of its manufacturing than ever was outsourced

to suppliers. Many of these were huge overseas companies, such as Japan’s Mitsubishi, Fuji, and Kawasaki. Hundreds of others were spread all over the Puget Sound region and the rest of Washington. The 787 was especially innovative in its use of composites—carbon-fiber reinforced plastic—to replace aluminum. About half of the plane’s primary structure, including the fuselage and wing, were made of composite materials. Partly because of this, a composites industry—a labor-intensive manufacturing process—sprang up in Washington.

In early 2011, while the state’s community college presidents were pondering an aerospace-training consortium, several developments signaled a new aerospace boom in Washington. In February, after a long and controversial competition with Airbus, Boeing won a U.S. Air Force contract to build a new long-range aerial refueling tanker, the KC-46, based on the Boeing 767. An estimated 179 of these would begin production in Everett. In addition, Boeing announced a new version of the 737, its bestselling model, to be called the 737 MAX. All the while, the current 737 versions, including the 737-900, were still hot sellers. Within a year, the 737 in all versions became the first commercial jet to surpass the 10,000



mark in sales. Soon, the Renton plant would be producing 737s at the remarkable rate of forty-two per month. Total Boeing employment was at around 165,000, of which about 77,000 were in Washington. The outlook for the next few years looked equally strong. The number of aircraft ordered by customers was heading above eight hundred for the year, compared with fewer than three hundred just two years earlier. Most significantly, Boeing's Washington employment numbers were climbing every month in 2011, toward 80,000 and beyond.

This was a serious workforce challenge, made more difficult by the demographics of the existing Boeing workforce. "We had a situation in which at least 50 percent of our workforce was eligible for retirement within a decade," said Michael Greenwood, who was a Boeing senior manager for workforce development at the time. "... We knew we had to be really proactive going forward, making sure that, as those folks retired or left, there was enough capability ... to backfill those positions. So we were a bit alarmed about how that was going to be addressed." Compounding the problem was another alarming statistic: "There weren't enough young people, or even displaced workers, that were thinking about aerospace as a viable career," he said.

Dixie L. Simmons, who was the state workforce director for the Washington State Board for Community & Technical Colleges at the time, said that the situation had reached a critical juncture. "The economic downturn that began in 2008 squeezed state resources for worker training, and nobody had any money," said Simmons. "Yet, here was Boeing saying, 'We cannot find people to hire.' And Boeing just reflects the whole supply chain." Meanwhile, the number of skilled manufacturing workers trained by the community colleges had plunged. Simmons said there's a "kind of craziness" that takes place in the state's workforce development system. If people don't get jobs in a certain field, it falls off the demand list. If it falls off the demand list, the colleges downsize or close their programs. "We had the lowest production of machinists in ten



Dixie Simmons, who evaluated—and later worked for—Air Washington.

or twelve years," said Simmons. Then, all of a sudden, a big gap develops. Companies need machinists and can't find them.

Boeing wasn't the only company facing this challenge. The state had spawned a huge network of smaller companies that were suppliers to Boeing and the larger aerospace industry. Some of these were composites companies, such as Janicki Industries Inc. in Sedro-Woolley and Hexcel Corporation in Kent. Some were electronics and engineering companies, such as Absolute Aviation Services in Spokane. Some had started as Boeing-owned companies and had been sold along the way, such as Triumph Composite Systems in Spokane. The nonprofit trade organization, the Pacific Northwest Aerospace Alliance, represented more than five hundred companies. Greenwood estimated the total number of suppliers at between thirteen hundred and fifteen hundred companies. And when Boeing starts hiring, said Simmons, "they suck people out of their own supply chain, and then they [Boeing] can't get parts." So both Boeing and its suppliers were hungry for a skilled workforce. Everyone was ramping up for what was shaping up to be a surge in aerospace orders—if not a downright Boeing Boom.



CHAPTER 3

An Elephant for Christmas

BY EARLY 2011, SEVERAL OF WASHINGTON'S AEROSPACE-ORIENTED community colleges had reached a consensus about the best approach to winning a Department of Labor TAACCCT grant. For the biggest impact, they should apply as a statewide consortium. They also concluded that Spokane Community College would be the best choice to lead that consortium. "It's a lot of work, administratively, to manage that grant," said Everett's David Beyer. "At first, we thought, 'Why not us?' We had that discussion internally. And then we thought, 'No, they have some ideas, and they're willing to do it.'"

"The fact that we are not on the Interstate 5 corridor was a good thing for this project," said Christine Johnson, chancellor of the Community Colleges of Spokane, the parent organization of Spokane Community College. It meant the college was not a "direct competitor" with the state's



large Puget Sound aerospace colleges; it was a neutral player. “It wasn’t an ego thing with any of the other schools, about who was going to get looked upon as the driving force,” said Beyer. SCC also had an extra level of administrative support through the Community Colleges of Spokane district organization.

So when Joe Dunlap gathered his staff together in Spokane in early 2011, he did not ask them, “*Should* we apply?” Instead, recalled Christy Doyle, who was the director of workforce education at SCC, “I received a directive: You *will* write this grant. You will herd these cats.”

“He said, in no uncertain terms, we *are* applying for this grant,” recalled Dave Cox, the dean of instruction for the technical division of Spokane Community College. Other colleges were ready to pitch in. In Everett, Beyer offered the services of his grant-writing office. “I said, ‘Yes, we’re in, and we’ll put forward the resources into writing the grant.’”

In Spokane, Doyle, Cox, and Carol Weigand, who would later become Air Washington’s director, all recognized immediately that going after this grant in cooperation with other colleges was an uncommonly good idea. It was an opportunity to do aerospace training on an extra-large scale. Dunlap, Beyer, Bonaudi, and Walstrum were already putting together what would eventually become an eleven-college consortium. The plan was to apply for the largest grant available and spread the training all across Washington. Dunlap said it was the only way to “serve the state in the manner that Governor Gregoire had envisioned.” However, the potential of this grant was far larger than the state’s relatively

modest program. This federal money would be sufficient to fund four statewide goals:

- > Hire new aerospace faculty.
- > Expand class capacity and increase the number of students earning certificates and degrees.
- > Buy new training equipment (including airplanes and parts of airplanes).
- > Help graduates find jobs.

The entire idea fit quite comfortably into the goals of the Department of Labor’s TAACCCT program, which were explained in its official solicitation for grant applications.

“In an increasingly competitive world economy, America’s economic strength depends upon the education and skills of its workers,” the application form said. “In the coming years, jobs requiring at least an associate’s degree are projected to grow twice as fast as those requiring no college experience. The nation needs workers with the education and skills to succeed in growing, high-wage occupations, and community colleges serve as significant and rapidly growing contributors to

RIGHT: *Students listen and take notes as instructor John Mensonides lectures during an advanced composites class at Clover Park Technical College Aviation Center in Puyallup, Washington.*

FACING PAGE: *Jon Whitehouse works on airframe components in Spokane Community College’s aircraft maintenance hangar.*





the nation's higher education system, enrolling more than 11.8 million students. ..."

Furthermore, the Department of Labor said, with a four-year, \$2 billion congressional appropriation, the TAACCCT grant program "provides eligible institutions of higher education with funds to expand and improve their ability to deliver education and career training programs that can be completed in two years or less, and that result in skills, degrees, and credentials that prepare program participants for employment in high-wage, high-skill occupations."

The U.S. needed more workers in highly skilled occupations, and the community

It would require getting all the colleges to agree on an overall concept, submit their plans, and write their budgets—all in time to meet the grant deadline, which was April 21, 2011, less than three months away.

colleges were going to train them. The Labor Department's call for grant applications also encouraged the building of consortia "to take a broad view across an entire community, region, state or industry sector." This was exactly what Washington's colleges had decided to do. Yet creating a multi-college consortium was, in practice, a real challenge. Washington's community colleges had joined together on projects before, but never on this scale. It would require getting all the colleges to agree on an overall concept, submit their plans, and write their budgets—all in time to meet the grant deadline, which was April 21, 2011, less than three months away. It also would require coordinating with a number of other agencies that had roles in this project, including the Center

of Excellence for Aerospace and Advanced Materials Manufacturing, a statewide organization based at Everett Community College that served as a liaison between the state's aerospace industry and the community colleges, and the Aerospace Joint Apprenticeship Committee, a statewide labor and industry group dedicated to creating apprenticeships in the field. Finally, it would require close coordination with Boeing and dozens of other aerospace companies. The people writing the grant had to know what skills the industry needed the most, where it needed them, and how fast it needed them.

"I must say, Joe was the guy who was working with thirty-four colleges in the state to determine who wanted to opt into this very new—and a little scary to a lot of people, I'm sure—and very big project that would last for three or four years," said Cox. The challenges did appear, at times, to be akin to "herding cats," which soon became a favorite metaphor. However, the people working on the grant realized that creating a consortium was well worth the effort. "The whole was larger than the sum of its parts," said Carol Weigand.

One of the first things that they did was call Mary Kay Bredeson, the executive director of the Center of Excellence for Aerospace and Advanced Materials Manufacturing and ask for her expertise. The Center for Excellence had already brought together a team of community and technical colleges for an existing initiative, called the Aerospace Curriculum Alignment Team, or ACAT. This team had worked for years to stay current on which skills the quickly changing aerospace industry needed. Just as important, Bredeson already had experience in bringing together institutions with an interest in aerospace. "They called and said, 'Mary Kay, based on the work you've done with ACAT, we would really like you to help us coordinate bringing the colleges together based on these cluster [curriculum] areas. And oh, by the way, can we use your grant writer?' And I said, 'Absolutely!'" said Bredeson.

The Air Washington proposal fit perfectly with her organization's goals, which had always been, in her words, "to be the one-stop shop



for industry to connect with the colleges.” The Center of Excellence had many industry connections that the Spokane team would need as they put together the grant. Bredeson would go on to lead an executive advisory board, with a number of industry partners, to help guide the proposal and the subsequent grant. Sharon Buck, Everett Community College’s dean of business and workforce education, also went to work on developing the grant.

As it turned out, the Air Washington proposal came at a particularly propitious time for the Boeing Company. For about forty years, Boeing had dealt with hiring booms by

organizing its own periodic preemployment training programs, held at local community colleges but run by Boeing, not the colleges. It was effective, training many thousands of workers, but it was also expensive and did not systematically build a long-term work force. In 2009, Boeing abandoned that program and was looking for a more sustainable solution. Michael Greenwood, a Boeing senior manager for workforce development in Seattle, argued for a longer-term relationship with the community and technical colleges. He had formed a committee called the Aerospace Academic Alignment Team, or Triple-A in Boeing



Carol Weigand, standing on the bank of the Spokane River, served as Air Washington’s director for most of the four-year project.



Spokane Community College instructor Raymond Thomas explaining engine dynamics.

parlance, to study the colleges, their programs and their capacities. When he first heard about the Air Washington proposal, it sounded exactly like the kind of program he was seeking.

“It was a really big shot in the arm to what we were trying to do with sustainability within the college system,” said Greenwood. “... This was going to create capacity within the community colleges in Washington and ... give them the funding, the visibility, and the attention to step up and really support aerospace.” Consequently, Boeing’s support of Air Washington was never in doubt. Nor was Governor Gregoire’s support. The loss of a Boeing 787 assembly line to South Carolina a few years earlier had been the “real wake-up call” that this is a competitive industry, said Alex Pietsch, director of the state’s Office of Aerospace. Air Washington fit right in with Gregoire’s plans, “and in a bigger, broader, and deeper way, with more money and more institutions,” said Pietsch.

Doyle, Cox, Weigand, and Jackie Bopp, the grant writer from the Center of Excellence, began a few months of feverish work. They immediately consulted with a group that went by the aptly aeronautical-sounding nickname

of the Fighting 147s. This wasn’t a team of fighter pilots, however; it was made up of faculty from the five community colleges around the state that had already established aircraft-maintenance technician programs: Big Bend Community College in Moses Lake, Clover Park Technical College near Tacoma, Everett Community College, South Seattle College, and Spokane Community College. The Fighting 147s named themselves after Federal Aviation Regulation Part 147, which covers maintenance. In 2010, these five colleges came together to develop aircraft-maintenance programs in conjunction with the Aerospace Joint Apprenticeship Committee. This was a complex process, involving certification under Federal Aviation Administration rules.

“Now, if you have ever worked with faculty or with the FAA, you would say this is an impossible task,” said Dunlap. “But they got together, had some conversations, and eventually arrived at the idea that they needed to put in place a common curriculum. And so, they went about doing that, and it took about a year.”

The Fighting 147s became another role model for how a multi-college consortium would work. As Spokane Community College



started putting together its plan, the five colleges of the Fighting 147s became the first solid core for the new consortium. They already had aircraft-maintenance programs and would be able to expand them greatly if the \$20 million grant was approved. All five Fighting 147 colleges became enthusiastic partners in the new consortium.

After the grant writers consulted with the aerospace companies, it also became clear that the industry had a crucial need for workers who knew how to make and repair composites. Carbon fiber and other composite materials were becoming the next generation of airplane parts. Parts that were once made of sheet metal were now made of composite panels, and composite manufacturing and repair required highly specialized training. Clover Park Technical College was already leading the way

This eleven-college consortium was now set, and took on a catchy brand name: Air Washington, encompassing maintenance, manufacturing, avionics and more.

in composites training, and several colleges that were interested in starting or expanding composite programs joined the consortium: Olympic College, Peninsula College, and Skagit Valley College. The consortium added two other colleges with substantial aerospace programs—North Seattle College and Renton Technical College—along with Wenatchee Valley College, which wanted to train students in avionics. This eleven-college consortium was now set, and took on a catchy brand name: Air Washington, encompassing maintenance, manufacturing, avionics, and more. The grant writing began in earnest.

“We had to move very fast,” said Cox. “We had no choice. We had to make some hard

calls.” Among those were which instruction areas to focus on and what skills were in demand. Some of those areas were obvious. Aircraft maintenance was clearly one of the core curricula. It was also clear that composites had to be part of the mix. In the end, the consortium identified five main clusters of instruction:

- > Aircraft maintenance, also known as airframe and powerplant maintenance.
- > Composites manufacturing and repair.
- > Electronics and avionics.
- > Advanced manufacturing and precision machining.
- > Aircraft assembly, which was in especially high demand at Renton Technical College, near the Boeing 737 assembly plant.

In addition, the colleges would offer pre-employment training—what might be called “Working in Aerospace 101”—for new students in all of those clusters. And so they started fleshing out the grant application. Another of the hard calls involved how to divide up the \$20 million among the eleven colleges. Each had to specify what instruction it would provide and how much it would cost. This was difficult, because in some ways everybody was flying blind. “At that point, you’re kind of using a bit of a crystal ball,” said Weigand. “Because you don’t know, really, what you don’t know. So you make educated guesses. This is where we think the need will be, and this is what we’ll train in, and this is why. And these are the programs that can be short-term programs, and these are the ones we can adjust or create. You have to figure—with accreditation and all of those moving parts and pieces we have to deal with in education—what can we do in the time frame we have been given?” The time frame was short, because the grants were for only three years.

The Department of Labor wanted a “three-legged stool” of support for each grant proposal, and the first leg was local industry. “We had to have a strong industry partner, and we had that, with Boeing and all of its suppliers,” said Weigand. It appealed to Boeing partly because it was *not* just about Boeing jobs. It was



about the state's entire aerospace "ecosystem," as Greenwood put it. "If we wanted to only build the capability and capacity of our own Boeing-badge workforce, it would be extraordinarily short-sighted," said Greenwood. The company's suppliers were nearly as crucial to building Boeing airplanes as the workers on the assembly floor. Greenwood said the suppliers' ability to find qualified workers had a "direct and immediate impact" on the company's ability, every single day, to have "one or two 737s leave the Renton field for the customer."

The second leg of support would be the Workforce Development Councils. These are regional state councils, federally funded under the Workforce Investment Act, that support workforce training and education. The people in these councils were experts in helping get people into jobs.

The third leg was education. "So that was your three-legged stool," said Weigand. "The industry partners were all for it. They were very happy. The Workforce Development Councils? No problem. And education? That was us."

With this solid foundation, the colleges dove into the "long, grueling process" of fine-tuning the application. For instance, every grant proposal needed to address four areas, identified in the Department of Labor's solicitation for grant applications:

- > Accelerate progress for low-skilled and other workers.
- > Improve retention and achievement rates to reduce time to program completion.
- > Build programs that meet industry needs, including developing career pathways.
- > Strengthen online and technology-enabled learning.

Secretary of Labor Thomas E. Perez, second from left, visited the Boeing 737 assembly plant in Renton in 2014 and called Air Washington a "springboard to the middle class."





Crucially, they also pledged to “hire qualified candidates who complete the grant-funded educational programs.”

So the grant writers detailed a plan for getting low-skilled workers—people with no manufacturing experience, no aerospace skills, and, in some cases, weak English skills—into the program. Also, the grant writers had to show that the program could turn laid-off workers in fading industries—and industries lost to overseas competition—into productive workers in thriving modern industries.

“Kimberly-Clark in Everett was a perfect example,” said Weigand. “They offshored all of their jobs to Asia and the plant closed down. There were a bunch of people out of work, a great workforce. Let’s plug them into the community college. They knew how to make paper and we needed them to make airplanes.”

As for “reduce time to completion,” some of the proposed programs—especially composites—satisfied that requirement nicely. “Composites were short-term programs, so that was perfect,” said Weigand. “Go two quarters and you can get up to speed on how to work with composite materials.” The aircraft-assembly program was also designed to speed trainees into the workforce. After a twelve-week course, a trainee could be ready for the Boeing assembly floor.

“Meeting industry needs” was one of the consortium’s strongest selling points. It could say with confidence that Boeing was looking at a workforce crunch in both Renton, because of the 737 projects, and in Everett, because of the 787 projects and the recently awarded contract to build Air Force tankers. Boeing had an aging workforce, many of whom might retire as soon as the economy started to come around. Boeing needed to have people ready to fill those gaps. The grant writers also were looking beyond Boeing, to its hundreds of suppliers, as well as

the companies that served other areas of the aerospace and composites industries.

The consortium submitted a letter of commitment with its application in which various aerospace businesses pledged to help in important ways. The companies promised to identify skills and competencies they needed, to “serve as subject matter experts and provide support for curriculum development,” and to provide “train the trainer” workshops for instructors. Crucially, they also pledged to “hire qualified candidates who complete the grant-funded educational programs.” The letter was signed by Greenwood from the Boeing Company, and representatives from, among others, Profile Composites North America; the Pacific Northwest Defense Coalition; Angeles Composites Technologies; Janicki Industries; and the Inland Northwest Aerospace Consortium and the Pacific Northwest Aerospace Alliance, which between them represented more than five hundred companies.

This same letter also addressed the second support leg, the Workforce Development Councils. The councils pledged to, among other things, “assist in identifying suitable candidates for training,” and “assist in connecting qualified workers with aerospace employers.” It was signed by representatives of Workforce Development Councils in nearly all the regions served by Air Washington. The Air Washington grant writers were also able to directly address one of the key objectives of the Labor Department grants—to help workers or industries that had been negatively impacted by foreign trade. It noted that Boeing had petitioned in 2008 for support under the Trade Adjustment Act after some of the 787 Dreamliner production had been outsourced overseas, “in part a consequence of reciprocal trade agreements with China.” Many other aerospace companies had been affected by the North American Free Trade Agreement.

The proposal also specified the actual number of participants that Air Washington planned to train in aerospace jobs—2,615. This would become Air Washington’s magic number over the next few years, the number that, more



than any other, would mark the divide between success and failure.

The grant application's section on Targeted Industries and Populations was especially persuasive. It noted that the recent award of the U.S. Air Force tanker contract to Boeing would "bring eleven thousand jobs to Snohomish County alone, mostly in the occupations of aircraft assembly, machinists, and other technician-level positions." In addition, it cited figures that projected increased demand for aircraft mechanics and composites repair technicians. Then it identified the problem the state's education system faced: Due to budget limitations, the current programs in Washington's community and technical colleges were "insufficient to adequately meet the industry's workforce demands."

"The results are aerospace-related programs running at capacity, waiting lists, and limited-schedule offerings that interfere with timely completion of certification and degree programs," said the Air Washington grant application, underscoring the need for more robust programs. Students who were wait-listed might have to wait anywhere between an academic quarter and a year to enter the program, and more than three hundred students were on such lists.

Weigand later said that in some subject areas, such as the airframe and powerplant maintenance program, there were nearly as many students on waiting lists as in the programs. "That doesn't make sense," she said later. "They can't wait a year to get into class." Nor could employers afford to wait a year for qualified workers. The solution was to add classes and expand capacity, which became one of Air Washington's main goals.

The Department of Labor also wanted the applicant colleges to detail their work and project-management plans. Essentially, they sought evidence that the colleges had a well-thought-out plan to reach their objectives. This concern was addressed in numerous ways. For instance, Air Washington's application addressed the issue of accelerating progress for low-skilled workers by detailing its

pre-employment program, which would serve as an "on-ramp" for low-skilled workers seeking a career in aerospace. If a student lacked basic math skills, for example, the pre-employment program would offer math instruction, with a particular emphasis on the math skills needed in aerospace jobs. The program also would offer classes in aerospace vocabulary for students who weren't familiar with the language of aerospace—or, in some cases, with technical English.

The grant application also included a lengthy, and crucial, section on "measurement of progress and outcomes" to meet the DOL's requirement that successful applicants be "committed to using data to continuously evaluate the effectiveness of their strategies." Colleges would have to rigorously track their students—how they did in classes and what kinds of jobs they ended up with. Essentially, they had to be prepared to prove that their students were learning what they were supposed to learn and that they were getting the kinds of jobs the program intended. The Air Washington grant application vowed to compile quarterly reports, evaluate them, and then "make recommendations to expedite program implementation, improve program effectiveness and/or efficiency, and identify best practices." This would, in the years to come, prove to be one of the more challenging, yet valuable, tasks of Air Washington's administrators.

Finally, the grant writers had to detail how the \$20 million would be spent, and how it would be divided among the eleven consortium colleges. To do that, each college decided which of the five areas of instruction they wanted to offer. The budget narrative broke down the resulting cost estimates as follows:

- > Spokane Community College, \$5.3 million (which included consortium management costs).
- > Big Bend Community College, \$634,179.
- > Clover Park Technical College, \$1 million.
- > Everett Community College, \$3 million.
- > North Seattle College, \$1 million.
- > Olympic College, \$1.9 million.
- > Peninsula College, \$627,417.



Crystal Rose Hudelson, far right, with her teammates at the Aerospace Maintenance Competition in 2014, from left, Sarah McKenna, Melissa Wang, Jennifer Leshar and Agnes Choung.

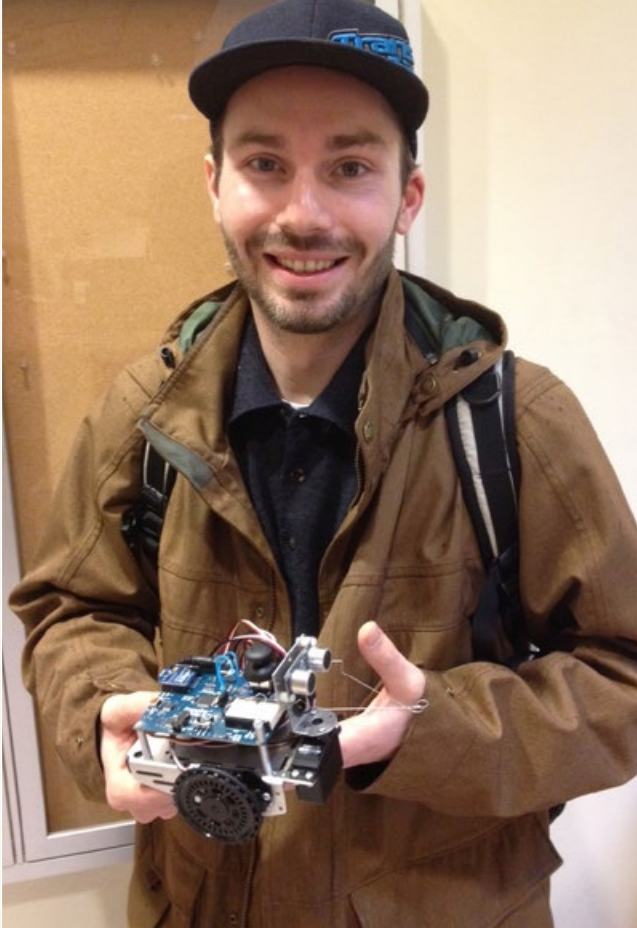
Crystal Rose Hudelson, 29, South Seattle College student

When CRYSTAL ROSE HUDELSON arrived at South Seattle College in 2012, she was one of seven or eight women out of about two hundred students in the aircraft maintenance program. She immediately organized a school chapter of the Association for Women in Aviation Maintenance. "Our main mission statement was to assist minorities and women in the field and also involve ourselves in service learning projects," said Crystal.

For one of those service learning projects, she and four other women students formed a team to compete in the international Aerospace Maintenance Competition, to be held that year in Las Vegas, and she persuaded the college to support the team. When they arrived in Las Vegas they discovered there were no other all-woman teams—in fact, they discovered they were the first all-woman team ever. Team member Sarah McKenna actually won in one of the individual categories. "She knocked it out of the ballpark, which was really fantastic," said Hudelson. The team didn't place, but the entire experience "made our skills better as mechanics when we go out to the field."

Hudelson has since graduated and landed a job as a maintenance technician for Alaska Airlines at Seattle-Tacoma International Airport. She loves the job and particularly "enjoys the mechanics and the ingenuity of aviation." She is particularly proud that the club she started is still going strong at South Seattle College, and she happily noted that, when the Aerospace Maintenance Competition was held the following year in Miami, a number of other women were competing. "Sometimes, you have to make a statement, like, 'Hey, don't forget about us over here!'"

Michael Nicodemus “Nic” Reisert, 32, North Seattle College student



Nic Reisert with avionics equipment at North Seattle College.

NIC REISERT jokes that he should have known aviation would be his calling since he was raised in Warsaw, Indiana, next to an airport that served as his comforting nightlight. Instead he decided to become a lawyer. He received his B.A. degree in anthropology and criminal justice from Indiana University Bloomington in 2006. He then moved to Boston to study law and worked as a paralegal. A friend’s wedding brought him to Seattle and he liked the city and stayed, making a living at several law firms. The economic hard times of the 2008 recession led to three job layoffs for him in five years. That, plus a growing awareness that he no longer wanted to be a lawyer, led Reisert to consider a new direction.

Finding information about the Air Washington program on the Internet, Reisert enrolled in electronics technology classes at North Seattle College in September of 2014 and knew he had found his calling; the work was creative and challenging and he could work with his

hands. Unlike his university experience, his class size was small and each student received individualized instruction and attention. He was inspired by his teachers, particularly Tim Fiegenbaum, Doug Jenkins and Frank Jump, all highly knowledgeable men who had had long careers in electronics and avionics. Reisert established an ongoing friendship with his teachers.

While a student at NSC, Reisert entered an eight-week student development internship with Boeing in maintenance of fabrication and other process equipment. He was amazed at the thorough safety testing that is given each piece of aviation equipment. Reisert has applied for a position as a calibration specialist with Boeing and is awaiting the outcome. If he does not get the job, he will look for similar work with another aerospace company. He also is a staff member for Mary’s Place, working at their Bianca’s Place shelter, one of the only Seattle homeless shelters that accepts single fathers with children.



- > Renton Technical College, \$1.9 million.
- > Skagit Valley College, \$306,827.
- > South Seattle College, \$1.3 million.
- > Wenatchee Valley College, \$651,369.

In addition, the narrative included several million more dollars for subcontractors, including the Aerospace Joint Apprenticeship Committee and the various Workforce Development Councils.

This part of the grant-writing process was still being refined right up to the April 21, 2011, deadline. “On the last day, it had to be submitted by 5 p.m., I think,” said Doyle. “I had five people in my office, double-checking my numbers, making sure everything was all correct.” And then, with what must have been an audible intake of breath, they pushed “send” on the application form and sent it winging through the ether.

Then, disconcertingly, “No word, no word, no word, nothing,” said Weigand. The Air Washington team was in limbo all spring, all summer, and into the approach of fall. They were nervous, no doubt about it. These grants were competitive. They knew that no single state would, for instance, get more than one grant of the maximum size. They also knew that the Department of Labor might cut the size of the grant, and award only part of it. Yet they had plenty of reason to be optimistic. “I had a good feeling about it, because, yes, even though it had been crazy and a flurry of activity, the collaboration and the sense of community we had created was really powerful,” said Doyle. “My only hesitancy was that we were asking for a lot of money. I mean, \$20 million is a lot of money!”

The very nature of the Air Washington proposal contributed to Dunlap’s optimism. His team believed they had submitted a proposal that would be good in just about every way: good for the unemployment rate, good for the aerospace industry, good for the community colleges and, most important, good for all those students looking for a skill and a career that might change their lives. “I don’t know how confident we were, but we knew we had something very, very special,” said Dunlap. “And

that was because of the amount of partners that were involved and the good it would do for the state. We knew it was very powerful. Now, we still had our fingers crossed. We were hoping.”

Cox, meanwhile, tried to stay philosophical. “I was like, if it happens, it happens,” he said later. “If it doesn’t happen, fine. However, I could tell that if it did happen, it would wind

“My only hesitancy was that we were asking for a lot of money. I mean, \$20 million is a lot of money!”

up with me, and I did make a couple of tentative plans for what we would do” if they got the grant. It was now September 2011, five months since filing the application. The grants were supposed to begin at the start of the federal fiscal year, on October 1, 2011. Still there was no word. Then, on September 26, Christy Doyle’s phone rang. “It was the Department of Labor, and they said, ‘I wanted you to know that you received the grant . . . for the whole amount. I said, ‘Are you kidding me?’ They said, ‘No, I am not kidding you.’” Nearly four years later, Doyle would say, “I’m still shaking!”

She immediately notified the entire team. “We didn’t have a formal celebration, but I think we had our own little happy dance,” said Dunlap. The dance couldn’t last long, however. They all knew that Air Washington would spring to life in exactly five days, on October 1. “It was more like, ‘Wow. Now what do we do?’” said Weigand. “It was kind of like asking for an elephant for Christmas and getting one.”



CHAPTER 4

From Zero to 100 mph

BOEING'S MICHAEL GREENWOOD REMEMBERS EXACTLY WHERE HE was on September 26, 2011, when he heard the news about the Air Washington grant award—in a dentist's chair getting a root canal. Suddenly his phone started ringing. And ringing. On the other end were top Boeing executives from company headquarters in Chicago. They had not necessarily been aware of the Air Washington grant before. But now it had become national news. "They were thrilled," said Greenwood. "This was at a time when skills gaps and deficiencies and lack of labor were just national topics. Here was a grant that was going to support the aerospace industry in Washington and it was getting all kinds of national attention. They [Boeing executives] were saying, 'This is the greatest thing we've ever seen in terms of skills training.' People were on the bandwagon. Which was good, because now this work we had been doing with the colleges was getting some much-needed attention."



The \$20 million Air Washington grant was among \$500 million in grants announced that day. There were thirty-two grants in all, and Air Washington was one of the few that received the maximum amount. The grants were aimed at a variety of job categories, including the health professions, high-tech, and the “green industry,” although many, like Air Washington, were aimed at manufacturing. The grant announcement was made by a trio of prominent names: U.S. Secretary of Labor Hilda L. Solis, Undersecretary of Education Martha Kanter, and Jill Biden, wife of Vice President Joe Biden and a community college professor herself. The Department of Labor called this “the first in a \$2 billion, four-year investment” designed to increase opportunities for the unemployed, “in combination with President Obama’s American Jobs Act.”

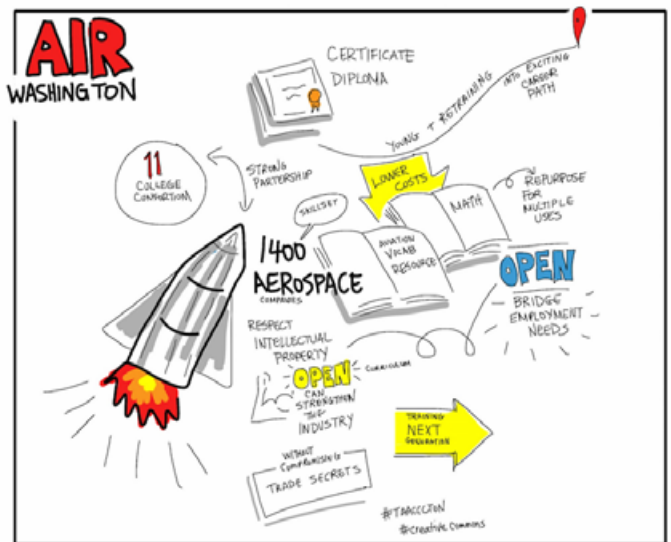
“Making it possible for unemployed Americans to return to work is a top priority of President Obama,” Secretary Solis said in announcing the grant. “This initiative is about providing access to training that leads to real jobs.” Jill Biden said that it was another “clear demonstration of the Obama–Biden administration’s commitment to our community colleges and their vital role in fueling the American economy.” The grant announcement also addressed one of the larger aims of the program: “The initiative complements President Obama’s broader agenda for every American to have at least one year of postsecondary education and will help to reach his goal for America to have the highest proportion of college graduates in the world by 2020. Every state will receive at least \$2.5 million for community college career-training programs through this initiative.”

Clearly, Air Washington was part of something bigger than itself. Still, the concerns of the Air Washington team at that moment were focused not on the national implications, but on its own daunting timeline. Air Washington was supposed to launch on October 1, five days away. “We had less than a week’s notice,” said Spokane’s Dave Cox. “And it didn’t surprise me a lot. But my preplanning in my head was

that we must establish one critical position, to be Information Central.” That position was the senior secretary for the program at SCC, and it needed to be staffed immediately, as the calls and e-mails began rolling in.

Cheryl Churchill was chosen for the job and had the distinction of being the first Air Washington hire. Churchill had the right skills, having served for many years as an executive assistant with the Community Colleges of Spokane and, for nearly two decades before that, as an administrative assistant at Washington State University. Cox prevailed upon the human resources department to rush the paperwork through, “to the point that less than five days into October, we had Cheryl sitting in the seat, doing the job, which was exactly what we needed.” All of the participating colleges needed information as quickly as possible. “We were getting bombarded from all different directions ...,” he said. “We had elected officials and the state board [of community colleges] wondering what the heck we were going to do with \$20 million.”

When Spokane Community College President Joe Dunlap spoke during the official Air Washington launch announcement at



ABOVE: A cartoon developed by the U.S. Department of Labor to accompany an achievement award to Air Washington.

FACING PAGE: A Boeing E-3 Sentry—a modified 707 better known as AWACS—was designed as an airborne radar warning system for the Air Force.



South Seattle College in mid-October, hints of both gratitude and exhilaration were evident. “Two and half years ago, Governor Gregoire ... called upon higher education to focus on the aerospace industry because not enough was being done to attract, train, educate, and retain the aerospace industry and its workers in Washington State,” Dunlap told the crowd. He went on to say that a consortium “affectionately known as Air Washington” had won the \$20 million grant under the Trade Adjustment Act and would “significantly increase capacity to train aerospace workers.” He closed by thanking Governor Gregoire, Representative (and later, governor) Jay Inslee, and Senators Patty Murray and Maria Cantwell “for their leadership, assistance, and support of this grant proposal.”

Back in Spokane, Cox and his team were working feverishly. “Don’t forget the situation that the country was in at the time,” said Cox. “And so one of the solid messages I got from everyone I communicated with, at all levels of the Department of Labor, was, ‘Get people back to work. Get ’em back to work, Dave.’”

During his planning, Cox had identified one key priority: “Herd the cats and get a meeting together very quickly.” The result was “what I called an Initial Calibration Meeting. We did that about fifteen days into the grant.” Against his better judgment, “because of all of the hype, angst, and anxiety that was going on with this grant, and how big a deal it was for the state of Washington,” Cox allowed participating colleges to bring more people than normal to the meeting. The meeting room was packed nearly shoulder to shoulder. All chairs were taken and people were standing with their backs to all four walls, taking notes and shifting uncomfortably on their feet.

Despite some discomfort, the two-day meeting accomplished what the Air Washington team needed. All of the colleges in the consortium returned home with clear priorities. They were to dive in right away on hiring faculty, expanding capacity, developing new curriculum, and enrolling new students. Spokane Community College had

the additional task of getting the program’s administrators hired and organized. “I’ve got to tell you, I was really blessed in that particular situation, more by luck than by anything else ... because we had Carol Weigand sitting there,” said Cox. Weigand had been working on the earlier INATC program that Dunlap had in mind when he first went to Washington, D.C. She had also helped write the Air Washington grant. Within a couple of months, Weigand was named the Air Washington director, a position she would hold for most of the program’s existence.

Weigand’s challenge was to get students into Air Washington classes as soon as possible in order to get graduates out into the aerospace workforce. She quickly realized that there were two categories of Air Washington classes, with different time schedules. First, there were the new classes that had to be started from scratch, such as many of the composites programs as well as the aircraft-assembly program in Renton. It would take time, maybe most of a year, to get faculty hired and curriculum developed. Second, there were a number of other courses that already existed among the eleven colleges and simply needed to be expanded, including the aircraft maintenance courses of the Fighting 147s. They could quickly expand those courses and immediately cut into the student waiting lists. South Seattle College, for example, was able to almost immediately double its existing aircraft maintenance program. Spokane’s aircraft maintenance program went from three groups of students, or cohorts, to four. “That required no curriculum change at all,” said Cox. In those kinds of programs, “we were able to start recruiting and training almost immediately and started placing them in jobs,” said Weigand. However, the new programs required a lot more preparation. “The colleges were telling us that they had to have longer lead times on this, because they were going through a brand new program with tenured faculty,” said Cox. A number of time-consuming steps were required, and one of those was creating course curricula. Cox had hired Rod Taylor, then the associate dean of technical education



at Spokane Community College, as the Air Washington point man on curriculum. One of the early key decisions was, in Cox's words, that the curriculum "did not have to look the same at each place." Each program had to meet the needs of local employers.

"We wanted a bit of diversity based on the community they were serving, not some kind of cookie-cutter approach," said Cox. "For instance, in our composites program, we talked about options in how long to make it. My input was, we would make it to fit our need, which is a small need here in Spokane. Which is a very different need than, let's say, Renton Tech, which is a huge need. ... We used a couple of different models in different places. One of those was Individual Certificate Programs, which keeps the size of the class very small and integrates an on-the-job or internship component into it." Weigand called this approach "building a framework, with a lot of flexibility within the framework." They also had to comply with one other curriculum requirement spelled out in the grant. Curriculum had to be open-source—that is, available to be used by other institutions—and had to provide significant online or technology-based learning opportunities.

While people were working hard on curriculum, Weigand and others at all eleven colleges were tackling one of the biggest challenges: recruiting new faculty for all of these new and expanded offerings. "Everyone was able to find faculty, but it wasn't always easy," said Weigand. "When the industry is going gangbusters, [skilled instructors] are not clamoring to go work for the community colleges for a third of what they can make out in industry."

Composites faculty turned out to be a particular challenge because "they were making good money in the industry. It's a new, emerging technical skill, and there aren't a lot of people out there with the ability to teach it," said Weigand. Still, the colleges were able to get the faculty they needed. "We were lucky because we have military, we have Fairchild Air Force Base," Weigand said. "We could tap into their expertise. People were retiring from the



Daniel Hughes, aerospace grants coordinator at Clover Park Technical College, in the hangar at the college's Aviation Center.

base [who] have the skills to teach at community college." The colleges sometimes advertised for faculty, but generally they found out about good prospects from the teachers already in the program.

Sometimes, the "timing just worked out," said Cox. "Within days, we were able to hire a faculty member in winter quarter to increase our capacity (in the aircraft maintenance program) in the second quarter of the grant," said Cox. "... We simply had to get the faculty clicked in, and then the waiting list would go down by cohort size per faculty member."

Some colleges had to recruit not only faculty, but students. "It was kind of like, 'We can build it. But will they come?'" said Weigand. That was not a problem in the programs with waiting lists. Yet for the many of the new courses that Air Washington was quickly



“They were bringing the students to the programs, helping them stay in the program with funding, and then helping them get jobs on the back end. So they were a real integral piece to this puzzle,”

introducing, it was a real concern. How could students sign up for programs that they didn't know existed? That's where the state's Work Force Development Councils made one of their many crucial contributions. “They brought students to the classrooms,” said Weigand. “They were out pounding the pavement saying, ‘There are aerospace degrees, aerospace jobs. You need to get retrained and get in the class. Get retrained and we'll get you a job.’”

These Air Washington “navigators”—advisors whose responsibility was to help students complete the program, get a job, and sometimes help them keep it—were making the program work in a variety of ways. “They were bringing the students to the programs, helping them stay in the program with funding, and then helping them get jobs on the back end. So they were a real integral piece to this puzzle,” Weigand said.

Air Washington's first navigator, Mary Stanton, who would hold that job in Spokane throughout the grant, compared her job to that of a “concierge” or a “triage nurse.” Her clients were both students and employers. “If they come in and say, ‘What do you do?’ I respond, ‘What do you need?’”

The navigator concept was one of the true inspirations in the Air Washington grant. It had been used successfully since 2000 by the Workforce Development Council of Seattle–King County and other state councils, yet rarely to the extent that Air Washington used it, and never before for the aerospace industry. “We were well-versed in how, sometimes, you

need a ‘glue’ person to make sure that there is coordination happening between all of the local players,” said Marlena Sessions, chief executive officer of the Workforce Development Council of Seattle–King County. “... It was very important to us and for the folks who wrote the grant to put the navigator model into the grant. I think that was the hallmark of the piece.” Mark Mattke, chief executive officer of the Spokane Area Workforce Development Council, said that Stanton and the other navigators created the crucial link that connected all three branches of Air Washington: the students, the colleges, and the employers. “She has a foot in each of those three worlds and helps to bridge that gap ... across three different systems,” said Mattke.

The navigator's job was not only to connect students with jobs, but also to improve student retention. All too often, community college students need assistance just to stay in school. Many have families and bills to pay. “A lot of things happen to students: Your child care falls through, your car breaks down, so you don't go to school that day,” said Mattke. “And pretty soon it's a week. And pretty soon you're out of the program. Whereas, the navigator can help you work through some of those things.” Cox later called navigators “the tough-love moms to the students that need it.”

The navigators helped with a variety of other issues, too, including lessons in English as a second language and food stamps. “If they are worried about food in their belly, they are not going to make it to class,” said Stanton. Sometimes, Stanton helped students who couldn't supply even their own paper and pencils. The navigators also assisted the many students who needed help finding tuition grants or loans. This could be a baffling process, particularly for students who were the first people in their families to go to college. “Anybody who's financially unable to go to college, *can* go to college,” said Weigand. “The resources are out there to support anyone.” Yet the process is daunting, and the navigators knew how to cut through the tangle of forms.

The navigators also served as a conduit for jobs, as a free service to both the employers and



the students. Stanton said she had “navigated” well over three hundred students in the first two and a half years of the grant. At the same time, she was serving what she called “probably my biggest customer,” industry, and providing employers with skilled labor. Sometimes, employers came to her with job descriptions and openings and Stanton connected them with qualified students. Other times, it happened in serendipitous ways. Once, Stanton brought in a speaker representing a Spokane fabrication company that builds seatbacks and overhead bins for airplanes. The company representative told the students about the kinds of skills her company needed. As it turned out, that wasn’t all she did. “When all was said and done, she ended up hiring one [student] ... out of the classroom ... and he is now working for her,” said Stanton. Finally, the navigators’ work didn’t necessarily end when the students landed a job. Sometimes, they continued to provide advice and assistance. “They *keep* them hired,” said Rob Watt, Renton Technical College’s Air Washington grant manager. “That’s a big piece.” Navigators stayed in touch with graduates in the workforce through phone calls and e-mails and offered advice on how to maneuver through the working world.

The \$20 million grant also bought something a lot more tangible than capacity, curriculum, and “navigation” assistance. It bought equipment, which was crucial—and very expensive—for this kind of technical-education training. As Weigand put it, “to learn how to fix an airplane, you have to *have* an airplane.” Usually it has to be an airplane that is at least airworthy enough to fly to the training site. The grant enabled some colleges to buy planes students could learn to repair, along with the expensive high-tech machine tools and avionics equipment the students were required to master. The composites programs had their own complicated equipment needs. Many of the colleges now had several hundred thousand dollars each to purchase this kind of equipment.

Meanwhile, Air Washington had to make sure it complied with a number of specific

grant requirements. For instance, the program had to make sure that veterans would be well represented. Patrick O’Halloran was named the veterans transition coordinator at the Spokane headquarters, and his job was to go out and find veterans who might be interested in aerospace. It was very difficult for a surprising reason, said Weigand: “Veterans are hard to find.” More specifically, it was hard to find veterans with an interest and background in aerospace who were unemployed. Other veterans had skills far beyond what the Air Washington programs were teaching. It was hard to figure out how to bring them into the program. “It’s very vertical, their training,” said Weigand. “An airframe and powerplant mechanic in the military works on jet engines, all day, every day, and doesn’t touch the rest of the plane. And Boeing needs someone who can move around and work on the whole plane.” They overcame these kinds of challenges by “literally going to every outpost and every event, veterans’ organization, and Guard meeting in the state” and telling them about the Air Washington programs. “I manned many a table

Jill Biden, wife of Vice President Joe Biden, visited South Seattle College on July 9, 2012, and met Christopher Benjamin and many other Air Washington students and staff. Biden said the common thread was that “the students who have come through these programs really love their jobs.”





Air Washington made the news when KXLY-TV reporter Jeff Humphrey, left, interviewed Dave Cox, center and Patrick O'Halloran, right, about veteran training.

at many an event that was veteran-themed,” said O’Halloran, himself an Air Force veteran.

O’Halloran learned that there was not one particular way to serve veterans. “It’s so specific to the person,” he said. “Generally, they had three ‘wants.’” Some knew they had sufficient skills and wanted to go work right away. Some wanted just enough retraining to get a good aerospace job. And some wanted to go to college and get a degree before going out into the work force. “So you’re meeting all kinds, and they could have been infantry men, or they could have already worked in aircraft maintenance,” said O’Halloran. “So you’re trying to find the right path for them.” William Noland, O’Halloran’s successor as veteran transitions coordinator, spread an even wider net. Noland’s efforts “made a big difference in our veteran numbers,” said Simmons. Eventually, all of their hard work paid off. At Clover Park Technical College in Pierce County near Joint Base Lewis–McChord, “They did entire cohorts of veterans and found placement for them,” said O’Halloran.

Another specific requirement of the grant was that it had to be used to address the needs of low-skilled workers. This broad category encompassed a wide swath of the unemployed. Some people knew how to operate forklifts, but didn’t know how to read an aerospace blueprint. Sometimes the skills they lacked were among the most basic, such as the ability to speak the language of aerospace. Many of these people “are great at manufacturing and have a great work ethic,” said Weigand. But they weren’t going to be hired unless they could understand basic aerospace vocabulary. Consequently, Air Washington’s pre-employment program, a course of basic skills for those just getting into the aerospace job market, included lessons in vocabulary. The program also included basic lessons in how to hold any kind of serious job. “Pre-employment was very stringent, very different from normal college,” said Weigand. “We treated it like a typical workday. So you needed to be here at 7:30 in the morning and stay until 3:30 in the afternoon and you had to be dressed for



work.” The results, according to Weigand, were heartening. “The industry partners told us that those [graduates of that class] were their most valuable employees,” said Weigand. “Pre-employment got them up to speed on the industry, the work ethic, and whether or not they were the right fit.”

While all this hiring, expansion, recruiting, and curriculum development was going on, the Air Washington administrators were, metaphorically at least, going to school as well. Learning to master the grant’s complicated reporting and compliance requirements was a challenge. In some cases, they had to make changes to their operations immediately. One good example, said Cox, came when they realized that the Aerospace Joint Apprenticeship Committee could not, technically, be part of the consortium. “The grant was only available to community colleges,” said Cox. “So, even though our grant had been approved, it had to be immediately modified to take off AJAC and replace it with a subcontract, for deliverables that they still could do as a subcontractor.”

Then they had to parcel out some of the other deliverables—specific tasks or outcomes originally stipulated for AJAC—to the five Fighting 147 aircraft maintenance colleges. In addition, the Air Washington administrators had to design and implement a complex “data capturing” program to keep track of all of their students and what they were doing. “There were all these stipulations to track students

“It was working because the navigators were really out, talking to industry and connecting ... Students were leaving their technical training and going straight to work.”

beyond completion to employment, [in order] to measure success,” said Weigand. All eleven colleges had grant managers, and arguably one of their most crucial jobs—and probably the most time-consuming—was data capturing. Rob Reneau, the overall project’s full-time data-compliance manager, was in charge of making the crucial progress reports to the Department of Labor. Reneau had to design the entire data-capturing process from scratch when he arrived in the grant’s second quarter. “What did we promise? And how were we going to measure that?” said Reneau. “None of that had been really defined until I came on board. So I started collecting a fairly large database.” For each student, Reneau was tracking seventy different metrics. This included information on demographics, retention, degrees, certificates, jobs, and salaries. “And we found that even that wasn’t enough, because the state wanted more information,” said Reneau. As time went on, Reneau’s data proved so reliable and so useful that the Department of Labor invited him to present at DOL conferences and workshops to explain how to develop a complex database to track project outcomes and student achievements.

At the same time, the Air Washington managers were trying to get a grip on all the other complexities of federal grant management. “We were watching webinar after webinar after webinar, and talking back and forth and learning stuff,” Cox said, “and literally after about every third webinar ... we’d walk out with ‘Ah-ha!’ or ‘Oh, my gosh!’ or ‘Holy cat!’ —and probably some more serious words!” They overcame this steep learning curve “by just kind of staying diligent, and quite frankly, hard on ourselves through the middle part of the project, to get caught up on the stuff that we didn’t do in the first quarter or two,” said Cox. By September 2012, the eleven colleges had built capacity, added new curriculum, and were churning out graduates. And those graduates were getting jobs at aerospace companies all over the state, including Boeing, which was snapping them up for its Renton and Everett plants. Most of Weigand’s



apprehensions had long vanished. “We kind of knew right away that it was working,” she said. “It was working because the navigators were really out, talking to industry and connecting ... Students were leaving their technical training and going straight to work.”

The state of the Air Washington program in January 2013—about halfway through the three-year grant—was documented in the *Air Washington Mid-Term Progress Report*, written by peer reviewer Dixie Simmons, who was an expert in workforce program development and curriculum. Simmons, from Tacoma, was hired through a contract with the State Board of Community and Technical Colleges, which was commonly called upon to perform this kind of outside evaluation. Simmons went through each of the major goals and strategies of Air Washington and explained how they were being tackled:

> **Expanding opportunities for low-skilled workers:** The pre-employment training courses were dealing directly with this issue. The courses were being refined, expanded, and improved.

> **Developing better student assessment and placement procedures:** Air Washington had hired an “assessment and prior learning coordinator” to help get students into the right courses. The report noted that student assessment and placement was particularly difficult because of the unique technical nature of the courses and the “local-employer focus.”

> **Improving student recruitment, support, and career opportunities:** This was being vigorously pursued through local Workforce Development Councils, the navigators, and transition coordinators.

> **Improving aerospace instruction:** Air Washington was hiring qualified instructors from industry, sending teachers to an “instructor boot camp,” and making it easy for instructors to share their areas of expertise with other teachers.

> **Aligning the curricula to meet industry needs:** Teachers were meeting with “industry subject-matter experts.” Competencies had been “reviewed, sometimes aligned, and refurbished.” Boeing’s Greenwood and a team

of industry experts had visited each college machining program and given advice. Other Boeing experts analyzed the composites programs and offered direction on program requirements and outcomes.

> **Increasing the number of qualified aerospace workers:** “Class capacity and student completions have increased dramatically since 2010 and progress has been made in many of the activities identified in the grant,” said the midterm report. “New programs have begun, new faculty and new teaching assignments have been made, facilities have been renovated, and new equipment installed.”

Then Simmons looked at each of the members of the consortium and the role they played in the first half of the grant period. Here’s a synopsis of her findings:

Big Bend Community College, Moses Lake: Its Air Washington goal was to train 126 students in aircraft maintenance. Big Bend is located on the former Larson Air Force Base and was already one of the Fighting 147s. “Classes, including expanded capacity classes, were filled this fall,” said the report, and the college was well on the way to meeting its goals.

Clover Park Technical College, Tacoma: Its goal was to train “250 students in aircraft mechanics, manufacturing, composites, and pre-employment.” It was the first in the state to launch a composites program. It was also one of the Fighting 147s and had increased capacity in its aircraft-maintenance program. It had an ambitious goal to train forty-five veterans, because of its proximity to Joint Base Lewis–McChord, although so far it was finding that to be a challenge.

Everett Community College: Its “ambitious goal is to serve 610 students in electronics, composites, advanced manufacturing,

FACING PAGE: *Brian Moen, left, and Chris Chalmers start at the very beginning of the Spokane Community College Airframe and Powerplant program by learning to rivet.*





A case displays historical aeronautical memorabilia in the entry of Clover Park Technical College.

pre-employment, and aircraft mechanics.” It started a new composites program and a new pre-employment program, and expanded capacity in its other programs. Its location near Boeing’s Everett plant was helping it to meet those goals.

North Seattle College: Its goal was to train 113 students in avionics and electronics. It had expanded capacity, introduced a pre-employment program, and had a navigator working with students.

Olympic College, Bremerton: It intended to train 374 students in electronics and avionics, composites, advanced manufacturing and precision machining, and pre-employment. It was the consortium’s lead institution for avionics–electronics. Its previous program had suffered from “weak” enrollment, but that had changed. Through Air Washington, it “hired a new faculty member straight from industry, purchased new lab materials, updated the curriculum, and developed task simulations.” Now the program enrollment had increased, the machining

program was revamped, and a new composites program inaugurated. The college estimated it would “have no trouble in reaching the overall student goal.”

Peninsula College in Port Angeles: It planned to train 45 students in composites and pre-employment. It had developed a composites curriculum based on that of Clover Park. A number of employers in the area needed composites workers and the college was “well on track to meet their goals.”

Renton Technical College: Located near the Boeing plant, this college was the only one with an aircraft-assembly program. It was training students to go directly to work on the 737 assembly floor, as well as in many suppliers’ plants. It was also training skilled machinists and had expanded that program. “Renton’s precision machining labs are humming with students and capacity has doubled since the inception of Air Washington,” the midterm report said. One college goal was to create the curriculum for the new aircraft-assembly



program—which it had already accomplished. It was also on track to exceed its goal of 571 trainees.

Skagit Valley College: Its goal was to train 200 students in pre-employment, advanced manufacturing, and composites. It had “established a new composites lab ... and doubled the capacity of the composites program.” It was also developing a cutting-edge “open” composites curriculum that could be made available online.

South Seattle College: Its goal was to produce 176 trainees in the aircraft-maintenance program. It was one of the original Fighting 147 aircraft maintenance colleges, and Air Washington allowed it to increase its capacity by 75 students. Because it had a number of international students, it was also the lead institution to develop the “aviation vocabulary integrated basic skills” courses for Air Washington’s pre-employment programs.

Spokane Community College: In addition to its role as the lead Air Washington institution, it had a goal of producing 225 trainees in most of the Air Washington disciplines: avionics–electronics, composites, pre-employment, precision machining, and aircraft maintenance. It was one of the original Fighting 147s, and it was able to expand capacity in its aircraft-maintenance program by hiring an additional full-time instructor and adding a summer session. It inaugurated a composites program and added new precision-machining curriculum and equipment.

Wenatchee Valley College: Its goal was to produce forty trainees in avionics–electronics and in pre-employment training. It updated its electronics curriculum and built a mobile lab so that first-year classes could be offered in Omak, more than one hundred miles distant. It was well on the way to meeting its goals.

The noncollege partners: The Aerospace Joint Apprenticeship Committee was working hard on a number of complex goals involving certification by the Federal Aviation Administration

and the European Aviation Air Safety Agency, and other curriculum issues. Also, the Center of Excellence for Aerospace and Advanced Materials Manufacturing was leading the development of the pre-employment curriculum and providing web resources and pilot-program testing.

Simmons concluded that, “in spite of an initial slow start,” the “eleven Air Washington colleges are well advanced toward meeting their major Air Washington goals.” However, Simmons listed three “challenges to success” as Air Washington entered its second and third years:

> Aerospace is a cyclical industry and no one could predict with certainty whether Boeing and its suppliers would continue hiring. Prospects still looked good, though. “Boeing stated in 2011–12 that they are beginning the largest hiring phase of their history and hired thirteen thousand in Washington that year,” noted Simmons. She also noted, however, that “things can change.”

> Air Washington’s goals for serving veterans were ambitious, perhaps too ambitious. “There is great competition for veterans ... with many employers and other grant projects focusing on hiring veterans,” wrote Simmons.

> Finally, “the Air Washington grant itself has conflicting goals,” Simmons wrote. On one hand, it had a goal of “creating programs with multiple employable exit points.” That meant that students had the freedom to take one or two courses, get a certificate, and leave and get a job. Yet it also had a goal of helping students graduate with two-year college degrees. With unemployed people eager for work, the latter goal was hard to reconcile.

Yet there was little question that “the Air Washington project, as a whole, is going well,” said Simmons. This conclusion was supported by an appendix to the midterm report that specified that 2,730 people had received training as of December 2012—already surpassing the project’s overall goal. Also, 795 had graduated, and more than a thousand had received

Craig Seybold, 52, lead instructor for electronics, Olympic College

CRAIG SEYBOLD grew up in Pennsylvania and spent twenty-six years in the U.S. Coast Guard, working on electronics, including weapons systems, radar systems, and computer systems. He also taught electronics to other military personnel.



Craig Seybold

After he retired from the Coast Guard, he went to work for the Stanford Research Institute (SRI International) where he was a development engineer and program-development manager—“mostly quantum physics and stuff like that,” he said.

When Seybold retired from the institute after several years, he decided to return to his twin passions: electronics and teaching. So he took a job as an electronics instructor at Olympic College in Bremerton, and had a lead role in developing the avionics-electronics curriculum for Air Washington.

“I had always enjoyed teaching,” said Seybold. “Teaching electronics, specifically, because electronics, more than anything else, has a tendency to frustrate people. It’s a complex concept. There are a lot of epiphanies for the student, where they get that ‘Ah ha!’ moment. There’s a lot of joy for an instructor being able to see people actually get those ‘Ah ha!’ moments, and start to see the world a little differently.”

Seybold said he deliberately chose to work at a community college rather than a university. “Simply because community colleges are much more focused on the local

community and the impact that we have here,” he said. There was a special satisfaction in “being able to pull people from one socioeconomic bracket (to another) and to improve their lives and their family’s lives.”

“I can’t think of something better that you can do with your time than help people do that,” said Seybold.



various skill certificates. The total number of credits earned was about sixty-eight thousand.

Simmons' opinion was apparently shared by the Department of Labor. In May 2013, the department aired a webcast aimed at organizations that were thinking of applying for a third round of grants. Air Washington was held up as one of the first-round success stories and was singled out as an example of a "strong employer partnership." The webcast included interviews with Dave Cox, Carol Weigand, and Boeing's Michael Greenwood. Greenwood told viewers that Air Washington had demonstrated "the real tangible steps that (communities) can take to build the aerospace industry." By this time, Dunlap had left Spokane Community College in 2012 to become the president of North Idaho College, and Cox had become the voice of the program. In 2014, Cox was invited to testify before the U.S. House of Representatives subcommittee on aviation. The theme of Cox's testimony was how and why Air Washington had been such a success. Rep. Rick Larsen from Washington, the ranking Democrat on the committee, thanked Cox and remarked, "In Washington State, we have made investments in the people that will keep our manufacturing base strong."

In fact, Air Washington was going so well that its administrators were already beginning to think that stopping it at the three-year mark—September 30, 2014—would be a mistake. Simmons' midterm report touched on the reasons for this. The grant had been awarded just days before the project was scheduled to begin. Weigand called it a "slow start out of the gate." Cox used a different metaphor to explain the problem. "We had basically described to the Department of Labor a project that would go from zero to one hundred miles per hour in one day," said Cox. No big project could accelerate that fast. "Colleges needed time to get key staff in place, find and hire qualified faculty, put new programs into course schedules, order supplies and equipment, expand machine shops and composite laboratories, and the thousands of other details required for putting technical education programs in place," wrote Simmons.

“We had basically described to the Department of Labor a project that would go from zero to one hundred miles per hour in one day”

“Necessary delay occurred when contracts were required for Workforce Development Councils to be funded for career navigators, and equipment could not be ordered until DOL reapproved those purchases in budget modifications.”

An excellent remedy existed, however. In late 2013, Air Washington applied to the Department of Labor for a fourth-year extension, at no additional cost. “So what happened was, we had built the best practice, we expanded capacity, our industry partners were happy, people were getting jobs, everything was working,” said Weigand. Also, the Washington State Legislature had come through in 2013 with a funding package aimed at keeping the Boeing 777 project in the state, and it included money for aerospace training. Some of that funding was aimed at maintaining “the highest-value, highest-performing programs” of Air Washington, said Alex Pietsch, head of the governor's aerospace office. The amount was \$8 million to train one thousand students per year, every year, as long as there is a demonstrated need. Furthermore, Air Washington still had not spent all of its \$20 million.

“So, we still had funding available, we were doing good work, the capacity expansion was there, and the state legislature had backfilled with support for this,” said Weigand. “... The federal government wanted to leverage that. They said, yes, keep going.” The Department of Labor granted the one-year, no-cost extension. Air Washington would stay aloft until September 30, 2015.



CHAPTER 5

What the Students Learned

ON MARCH 3, 2014, SECRETARY OF LABOR THOMAS E. PEREZ VISITED the Boeing Company's 737 assembly plant in Renton and said that Air Washington was doing exactly what the federal government intended. "Americans are using programs like this one as a springboard to the middle class—a better, more secure living for their families," he told reporters. "For those workers, and for their employers, that's what this work is all about—opportunity." He said that "Washington is, in many



respects, a model for the nation.” Beyer, who met with Perez that day, later said that “we established a lot of credibility with the Department of Labor.”

What, exactly, were all those students learning to help them make that leap into the middle class? A closer look at the five main disciplines taught through the Air Washington grant provides some insight.

Advanced Manufacturing–Precision Machining

The whirl of \$1 million worth of drills, mills, and lathes fills the big room labeled “Machining” at Spokane Community College’s Technical Education Center. As metal shavings fly, Air Washington students intently guide precision tools as they learn the skills necessary to become “entry-level machinists and go out and get jobs,” as instructor Jeremy Slack puts it. They were among the thirty-five students in the two-year machining course at SCC, one of the six colleges among the eleven Air Washington colleges that offer advanced manufacturing programs. The other colleges are Olympic College in Bremerton, Everett Community College, Renton Technical College, Skagit Valley College, and Clover Park Technical College in Tacoma. Spokane Community College’s program is generally representative of what the other colleges offer. It’s a two-year program, resulting in an Associate in Applied Science degree.

During the first year, students study conventional machining. The tools include mills,

lathes, grinders, drill presses, band saws, and hand tools—“all of the tools to make precision parts,” said Slack. Just because these machines are labeled “conventional” doesn’t mean they’re old-fashioned. Computer screens are mounted on many of the machines, and students must learn to manipulate an array of other controls in order to fabricate a precision part. During the second year, they learn to operate even more complex machines: CNCs, short for computer numerical control machines. “The machine is controlled by a computer,” said Slack. “The placement of the part, within the machine envelope, is being controlled by servos and control boards.” The students also learn the computer-programming skills necessary to operate them.

The students typically show up at 7:30 a.m. every weekday and remain there until 2:30 or 3 p.m. They usually spend the first hour in a classroom. “There’s a lot of theory behind both conventional and CNC machining,” said Slack. “...And then, of course, the programming is another class, in and of itself. That is done



RIGHT: *Metal filings decorate an observation window as a CNC machine cuts a block of metal.*

FACING PAGE: *André Selders countersinks rivets during class in Renton Technical College’s aircraft assembly program.*

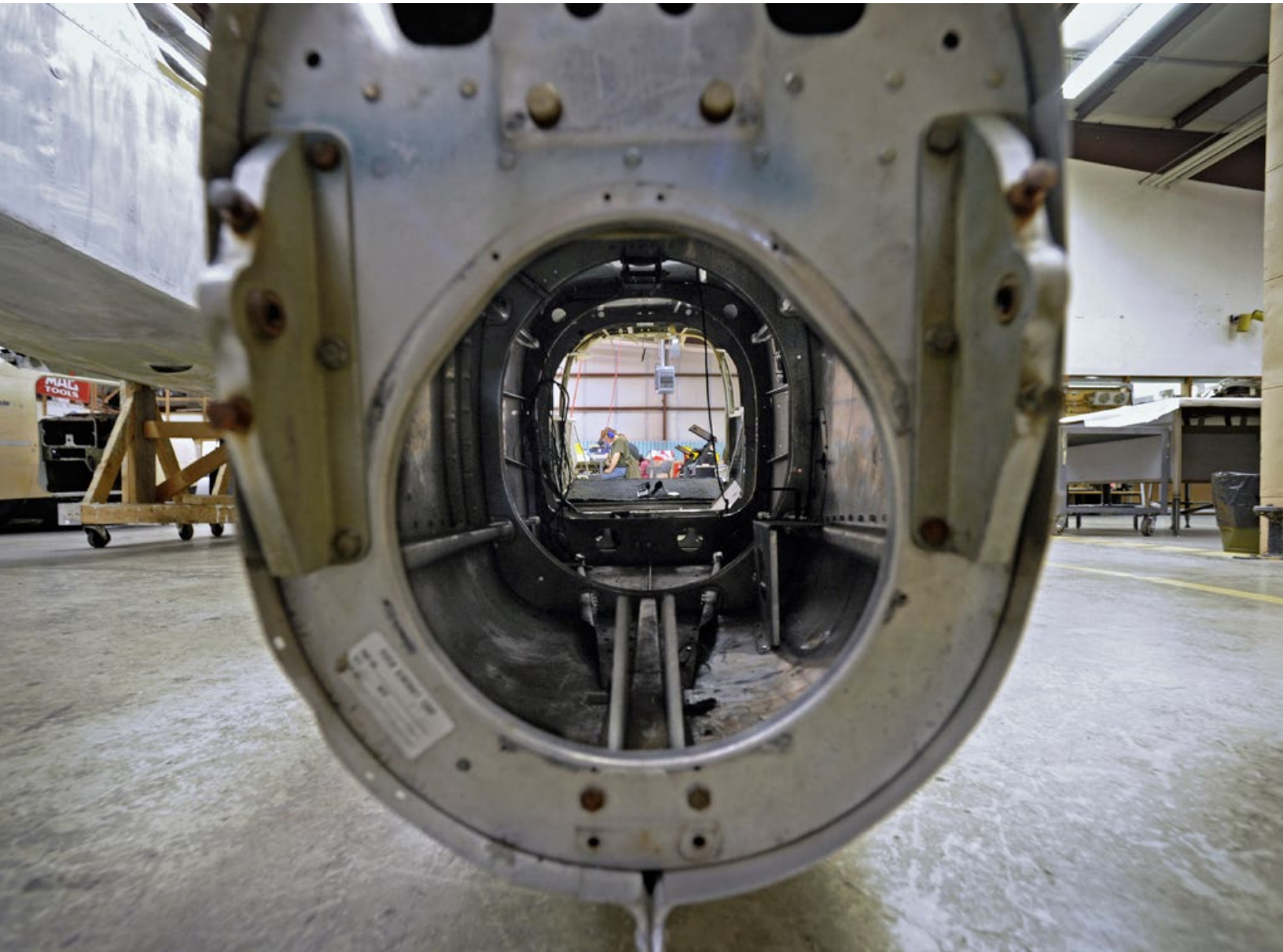


on a PC.” During their two-year training, the students also take classes in advanced math, technical writing, leadership, and the other skills necessary for their chosen profession. Yet about 75 percent of the time, the students are “hands-on, in the shop, making stuff,” said Slack. An advisory board of local industry people gives the instructors guidance on what techniques students will need to know once they get out in industry. “So we take these concepts and incorporate them into a project.” The students head out to the machines, fashion a part out of metal, and are graded on its precision and workmanship.

By the time they graduate, they are qualified to be machinists at any of the hundreds of machine shops throughout the state. Many

of those companies make aerospace parts. “A lot of parts are made on CNC machines that go directly onto the airplane,” said Slack. “Landing gear is a big one.” One of SCC’s machining graduates landed a job at Multifab Inc., a Spokane company that makes molds for airplane window shades, stowage bins, cover plates, and dozens of other items found on planes. Machinists with this kind of training are also in high demand in many other industries beyond aerospace. “With the wages we are seeing in today’s economy, these guys are in a perfect spot right now to go out and get jobs, a career, and provide for their families,” said Slack. “You know, we hear a lot from the high-schoolers: They’re told, ‘You need to get a four-year degree.’ ... Well, in this, you can get

A fuselage frames students in Spokane Community College’s aircraft maintenance hangar.





a well-paying job that supports you and your family and have fun doing it.” And it costs a lot less than a four-year degree.

The Air Washington grant bolstered SCC’s machining program in several ways. The machine shop got some new equipment, of vital importance in a program where the tools of the trade cost from \$30,000 to \$100,000 each. They were also able to revive a four-quarter night program for students with day jobs. “It had been run in the past but was shut down through lack of funding,” said Slack. “Then Air Washington came along, and it was revived.”

Aircraft Assembly

Renton Technical College, situated practically within sight of Boeing’s 737 plant in Renton, is the only Air Washington college to offer aircraft assembly training. This twelve-week program trains students in, literally, the nuts and bolts of putting an airplane together. Many of the students wind up working at Boeing.

As the sole provider for the Air Washington partners, Renton Tech was naturally the lead institution in developing Air Washington’s aircraft-assembly curriculum. The program is divided into an eight-week core program and a four-week lab program. The core part of the program is—somewhat surprisingly—taken entirely in the student’s home. It is administered exclusively online and involves learning basic aerospace manufacturing concepts such as reading a blueprint and workplace safety. It poses questions as fundamental as “What does this wrench do?” and “What instrument is this?” This core program also introduces the main principles of assembly. At the end of eight weeks, trainees earn a manufacturing core assembly certificate.

Then, for the final four weeks, the students come on campus to Renton Tech’s aircraft-assembly lab, created with Air Washington funds. There, students work with sheet metal and drills and rivets and learn the essential assembly skills. “It’s a lot of drilling, reaming, and fastener installation,” said Rob Watt, Renton Technical College’s Air Washington grant manager. “Some carbon-fiber reinforcement. A lot

of countersinking. Riveting—a lot of riveting. A lot of putting Part A into Part B into Part C.”

At the end of the twelve weeks, graduates earn a manufacturing assembly-mechanic certificate. This is, essentially, all they might need to get hired by Boeing or by one of the many aerospace suppliers in the Interstate 5 corridor. “The students are ready to go right to the assembly line,” said Watt. Many do. Watt said with the 737 MAX program gearing up in 2015, the demand for assemblers will remain high, which means the demand for the class has become correspondingly high. The tuition cost is forty-eight hundred dollars, but that hasn’t deterred applicants. Renton Tech has been easily filling every class of fifteen trainees per month. By spring 2015, a two-month waiting list had developed.

Aircraft Maintenance

Students swarm over huge pieces of airplanes—wings, fuselages, cockpits, and engines—at South Seattle College’s enormous hangars. “People walk by and see those planes, and, say, ‘Oh my gosh!’” said Ellen Gordon, Air Washington grant manager at South Seattle College. Over in Moses Lake, at Big Bend Community College’s hangar, about sixty students work on an even bigger chunk of aircraft—an entire Boeing 727. The same thing is happening at hangars at Clover Park Technical College, Everett Community College, and Spokane Community College. All of these students are logging their required nineteen hundred hours of instruction toward their airframe and powerplant maintenance certificates, and toward qualifying to take FAA certification exams. This is one of the most popular of the Air Washington disciplines, and it is offered at the Fighting 147s colleges, the five that named themselves after federal regulation that specifies the requirements to be certified and operate as an FAA-recognized aviation maintenance technician school.

All five colleges had aircraft maintenance programs before Air Washington, and all were able to expand their programs because of the grant. The programs are not identical, but



they all adhere to the same strict regulations. “This program is absolutely governed by FAA standards,” said Katé Lyons-Holestine, SCC’s aerospace director and Carol Weigand’s successor as the overall Air Washington director. For instance, a routine class roll call is not even remotely sufficient for the aircraft-maintenance program. When the students arrive early in the morning, they must clock in, as if they were going to work. Then they have to clock out for lunch breaks and clock back in. This is how they document that they have, in fact, received the 1,900 hours of training mandated by the FAA. Their hours break down like this: 400 hours of general curriculum, 750 hours of airframe curriculum, and 750 hours of powerplant curriculum. Powerplant includes the engines,

“Over in Moses Lake, at Big Bend Community College’s hangar, about sixty students work on an even bigger chunk of aircraft—an entire Boeing 727.”

propellers, and related fuel systems that make an aircraft go. Airframe means wings, fuselages, cabins, and just about everything else that isn’t part of the powerplant.

The course is typically two years, with the first year covering many of the basics of aircraft maintenance, from riveting to painting. The second year delves more deeply into many of the more sophisticated and complex systems, including the engines and electronics. The list of subjects students are tested on is daunting, including aircraft finishes, sheet metal, welding, landing-gear systems, cabin atmosphere control systems, instrument systems, warning systems, reciprocating engines, turbine engines, fire-protection systems, induction and engine-airflow systems, and engine exhaust.

A lesson might involve, for example, an airplane engine. The instructors will dismantle

it and “break” it in some unexpected way, said Lyons-Holestine. Then the students will troubleshoot what’s wrong, put it all back together, and make it work again.

Students’ knowledge must be broad and deep. Here’s what one typical lesson in the airframe program requires: “Inspect, check, service, troubleshoot, and repair electronic flight-instrument systems and both mechanical and electrical heading, speed, altitude, temperature, pressure, and position-indicating systems to include the use of built-in test equipment.” Big Bend Community College is the only college that offers a substantially different aircraft-mechanic program. It is a competency-based program, which allows students to learn the curriculum at their own speed, while still adhering to the nineteen-hundred-hour FAA standards. However, the other colleges have differences of emphasis. Gordon said that the South Seattle College program, with its location near Seattle’s big airports, emphasizes commercial-aircraft work. Other might spend more time on helicopters, for instance.

These programs attract a relatively high percentage of veterans, many of whom have worked for years in aircraft maintenance and who can, in some cases, shorten the training time by demonstrating their proficiency at some required skills. Yet the program also attracts many people who simply like fixing things—and who especially like fixing things that can fly. “I like working on airplanes—it’s a cool job” said Qihua Mai, a former student in South Seattle College’s program.

Composites

Students taking the Air Washington composites curriculum will quickly learn that the broad definition of composites “is two or more dissimilar materials which when combined are stronger than the individual materials.” However, in aerospace manufacturing, the term composites more specifically refers to the fiber-reinforced plastic panels that are increasingly used in place of sheet metal. These are called advanced composites, and working with these materials requires a specialized



Big Bend Community College aircraft maintenance students gather on the wing of the college's Boeing 727, which was donated to the program by FedEx.

knowledge that is in increasingly high demand. The goal for students in Skagit Valley College's introductory course, called "Composites Construction and Repair, is to master "the basic practices and methods of working with different resin systems, and reinforcements, and methods of construction and repair."

Students learn the basic composites vocabulary and safety guidelines. Then they learn about the many different resins, additives, and gels that can be used for various composites. They learn laminating techniques,

fiber reinforcement, and esoteric practices such as "sacrificial releases." They also learn how to calculate the complex issue of "reinforcement weights and resin consumption." Then they move into the equally crucial area of composite repairs, which are far more complicated than, for instance, pounding out a dent on a piece of sheet metal. In general, repairing composites requires "replicating the method of construction," meaning that it requires many of the same complex steps that it took to make the piece in the first place. In addition, a knowledge



A Clover Park Technical College student works on a composites lesson.

of “nondestructive testing”—testing a piece for flaws and damage without destroying it—is also required.

From that introduction, students delve more deeply into all aspects of making and repairing the kinds of composites they’ll find in the aerospace industry. Skagit Valley College offers two options: A two-quarter composite-repair technician certificate program, and a three-quarter advanced composites-manufacturing technician certificate program. Three of the five Fighting 147s also launched or expanded their composites programs: Clover Park Technical College, Everett Community College, and Spokane Community College. They already had an interest—and some expertise, particularly at Clover Park—in composites, since a composites component was part of the existing aircraft-maintenance program. Those colleges trained and placed students immediately. The other two

Fighting 147s, South Seattle College and Big Bend Community College, joined with the composites programs at Peninsula College and Olympic College to foster state-wide faculty training opportunities and curriculum adoption.

The composites programs are closely aligned to facilitate students moving from one college to another, but they are not identical and vary depending on the needs of local industry. For instance, Skagit Valley’s program, based at its Anacortes campus, is associated with the Center of Excellence for Marine Manufacturing & Technology because composites are important in boats and shipbuilding. Spokane Community College’s composites program actually expanded to an unusual branch campus, Airway Heights Correctional Center, where the dean of corrections instituted an aerospace composites certificate program for prisoners. Classes were held right on the



prison grounds, so that prisoners could learn the basics of a valuable job skill.

Avionics–Electronics

Craig Seybold, lead instructor for electronics at Olympic College, knows better than most that the days of “pulling a joystick, which moves a wire, which moves an aileron” are gone. Today, virtually every part of an airplane is computer-controlled, sensor-controlled, or otherwise wired together. That means that building virtually every part of an airplane requires technicians who specialize in avionics, the aviation arm of electronics. Electronics, avionics, or both are offered in four Air Washington institutions—North Seattle College, Wenatchee Valley College, Spokane Community College, and at Olympic College, which is Air Washington’s lead college for electronics.

Seybold and the staff at Olympic completely rewrote the curriculum after the Air Washington grant was awarded. They “modularized it”—broke it into five-to-ten-minute chunks—and made it available for online learners. They also made it available to the other colleges. “Part of our responsibility as the lead college was to share it as we developed it and get input from the other schools and find consensus,” said Seybold. “And, once we were done, to publish it and make it available for everybody.”

Avionics–electronics is generally offered as a two-year course. The first year includes most of the basics of electronics: direct current, alternating current, solid-state (analog) electronics, and digital electronics, including programmable logic chips, processors, and “how to program at the assembler level.” Although modern electronics are increasingly digitized, it’s important that students learn both. For instance, an altimeter—which measures a plane’s altitude—incorporates both solid-state analog components and digital components. “Certain things cannot be done in a digital format, so it’s always going to be a marriage between the two,” said Seybold.

Some students choose to seek jobs at the one-year mark. At that point, “they are

what I call teachable—an employer can hire them at an entry level and then teach them the specifics that they need for a particular job,” said Seybold. Yet most students continue into the second year of the program, which aims to deepen and broaden their knowledge and give them “a much more modern and direct application to what they will see in the field,” said Seybold. The second year is not necessarily identical at the five colleges. “There are different things that you can emphasize,”

Some students choose to seek jobs at the one-year mark. At that point, “they are what I call teachable—an employer can hire them at an entry level and then teach them the specifics that they need for a particular job”

said Seybold. “We emphasize the industrial electronics that people see in industry. Whereas another school might be more interested in electro-mechanical, if their students are going to see more robotics.” The colleges keep in touch with their local industries to see what skills are needed.

At Olympic College, about “a third of our students get hired before they finish their second year,” said Seybold. Many finish the program online, while working. Nearly every industry needs electronics technicians, so the students get jobs in an array of companies, yet Seybold said “a good percentage end up in aerospace. I would say that more than half of my students—and up to three-quarters—are either associated with the Department of Defense [including the Puget Sound Naval Shipyard or Naval Base Kitsap], Boeing, or direct contractors for those,” he said.

Tracy Buchanan, 48, North Seattle College Student



Tracy Buchanan graduated from the avionics-electronics program at North Seattle College.

TRACY BUCHANAN was born in Spokane and raised there and in Auburn. After completing high school, she joined the U.S. Navy where she served as a torpedoman's mate (now called gunner's mate) for three years. Then she found work first as an assembler then as an electronics technician for a company where she worked for 21 years. During this time she married, had three children, and divorced. Following the recession, the company restructured and Buchanan was let go. While she was considered a valued employee, the job she had

been doing now required a bachelor's degree, which she did not have.

Buchanan received a good severance package that allowed for retraining and, loving electronics, she entered the aerospace program at North Seattle College working toward a two-year college degree as an electronics technician. Buchanan chose the college because it offered a strong program in avionics and electronics. Her entry into the program predated North Seattle's participation in Air Washington, but she said "the grant money significantly improved the lab environment by providing more precise and up-to-date equipment that allowed the students to utilize and understand equipment that they would likely encounter in the work field."

While there are fewer women than men in the aerospace profession, Buchanan noted that their number is growing and that, in her classes at North Seattle, there were usually three or four women students. In spring of 2015 Tracy Buchanan received her electronics tech degree, applied for four positions, and reported that she has received an offer to work at an excellent company.



Those who do go to work for Boeing might find themselves right in the thick of assembling airplanes. Again, Seybold took the altimeter as an example. “There might be a team of three to five technicians, and their job is to take a ‘built’ altimeter, which may come in several pieces,” said Seybold. “They climb into the aircraft and they have to install that, hook it all together, power it up, test it, and make sure it’s doing exactly what it’s supposed to be doing. If there’s a problem they have to isolate the problem and repair that. And that’s just one piece of gear out of hundreds on a modern aircraft.”

In addition to these five main disciplines, Air Washington also enrolled hundreds of new trainees in its “soft skills” classes of dressing appropriately, getting to work on time, and

other essential workplace skills. The programs also taught what might be called the firmer skills of aerospace vocabulary and math. Air Washington would later win kudos from the Department of Labor for its free, open Aviation Vocabulary Dictionary specifically designed for students studying English as a second language, and its free, open math-instruction resources textbook. Creating open, accessible online course materials was a priority of the Department of Labor, as it made it easier for students to earn affordable certificates for aerospace skills.



Students at Spokane Community College work on an avionics instructional “breadboard,” which mimics electrical systems in aircraft.



CHAPTER 6

Making Air Washington Fly—and Float

AIR WASHINGTON WAS A STATEWIDE BRAND, SPREAD FROM THE Olympic Peninsula on the west to just shy of the Idaho border on the east. The aerospace-rich Puget Sound region had six Air Washington colleges, yet there were also several options in the vast orchard-and-sagebrush sections of the state. Each college offered a slightly different Air Washington experience. Here's a closer look at each of the eleven colleges and their roles in the overall Air Washington program:



Big Bend Community College, Moses Lake

Big Bend Community College has had an aviation focus for most of its history, partly because of its strategic location on the site of the former Larson Air Force Base, which has one of the longest runways in the U.S. Thousands of pilots have trained on the huge runways, and Big Bend has always operated a large flight school.

Big Bend's sole Air Washington program is aircraft maintenance, an instruction course that was in existence long before the grant, as the college was one of the original five Fighting 147s aircraft-maintenance schools. Now, however, the college has been able to expand the program. "Thanks to Air Washington, we've been able to take, on average, between eighteen and twenty-three students [in each class]," said Clyde Rasmussen, the dean of professional and technical education. "It also helped us in recruiting—getting more students."

The college is small and isolated compared with the other Fighting 147s, so it gained a significant recruiting advantage by being part of the larger Air Washington group. "One of the strengths of the whole Air Washington thing was the fact that, of the '147' schools, the five schools used to work independently," said Rasmussen. "Now they work together and actually talk to one another. If somebody has an abundance of students ... they'll send them to the other schools."

"Most of my students don't come from Grant County," said Dan Moore, a Big Bend aircraft-maintenance instructor. "They come from all over the place—Puget Sound, the Tri-Cities, Wenatchee." In addition, Air Washington allowed Big Bend to hire a third instructor and an aircraft lab assistant. It also allowed Big Bend to send two instructors to a new training course, which enabled the college to add a composites unit in its existing aircraft-maintenance program. "And we got a whole new array

of equipment for composites," said Rasmussen. "We got 'computers on wheels,' and now all of our books and texts and reference manuals are on computers, so the instructors can take them to the work area." One other result of the Air Washington connection: "It has strengthened our connection with Boeing. We've had Boeing over here a number of times."

The Big Bend program differs in one important aspect from the other colleges' aircraft-maintenance programs. It is competency-based, meaning that students can learn at their own pace.

"It enables the faster students to advance more in what they're learning, and the slower students don't have to bail out," said Moore. "... They all meet the (FAA) nineteen-hundred-hour rule, but if they are really fast learners, they get to do more projects and gain more competencies."

The program's airport location comes with advantages. For instance, several years ago FedEx donated an entire Boeing 727 for the maintenance students to work on, one of two Boeing planes available for instruction. Also, the program operates out of a huge hangar, formerly part of the Air Force base. This location not only gives the college access to the airport, but also to several aerospace companies at the airport, "opening up internship opportunities," said Rasmussen.

Big Bend has been able to fill the program to its new expanded capacity—a considerable achievement in itself. As of mid-2015, it had enrolled 119 Air Washington trainees and was well on track to surpass its original goal of 126 trainees.

Clover Park Technical College

Clover Park Technical College has focused on supporting aviation industries since it launched original courses funded by the War Production Training program in 1941. The program was aimed at training civilians as auto mechanics, aircraft-service mechanics, shipfitters, welders, and blueprint readers. Today, the college has two campuses—a main campus in Lakewood, just south of Tacoma, and the South Hill



Numbered locations on map correspond to Air Washington colleges.

The colleges and their Air Washington programs

- Spokane Community College ① Advanced manufacturing, aircraft maintenance, composites, avionics–electronics.
- Big Bend Community College ② Aircraft maintenance.
- Wenatchee Valley College ③ Avionics–electronics.
- Skagit Valley College, Anacortes campus ④ Advanced manufacturing, composites.
- Everett Community College ⑤ Advanced manufacturing, aircraft maintenance, composites.
- North Seattle College ⑥ Avionics–electronics.
- South Seattle College ⑦ Aircraft maintenance.
- Renton Technical College ⑧ Advanced manufacturing, aircraft assembly.
- Clover Park Technical College ⑨ Advanced manufacturing, aircraft maintenance, composites.
- Olympic College ⑩ Advanced manufacturing, composites, avionics–electronics.
- Peninsula College ⑪ Composites.



Clover Park Technical College instructor Dean Conway, in front of the autoclave used for the composite classes.

Campus, just south of Puyallup, which offers the college's three Air Washington programs: composites, advanced manufacturing, and aircraft maintenance. Clover Park was one of the five Fighting 147s, and, not surprisingly, given the college's longstanding focus on aviation, Clover Park was one of the first to join the Air Washington project. Its original goal was to enroll 250 Air Washington trainees, and by mid-2015 it had enrolled 285.

Thanks to the Air Washington program, Clover Park has been able to purchase new equipment for its aviation-maintenance technician program and for its composites program. "And it has helped us expand the composites program," said Daniel Hughes, aerospace grant coordinator. "We have doubled capacity from eighteen students a quarter to forty-two students a quarter." According to Hughes, the major unexpected benefit of joining the Air Washington program has been the coordination of efforts with the other colleges. "It has helped us move away from the isolationist model that most colleges were using five to ten years ago," said Hughes.

The tendency to develop programs without sharing information with other colleges, he said, "stifles growth, innovation, and creativity." The Air Washington program, on the other hand, encourages colleges to coordinate their educational efforts. "I know that a certain college can't afford certain equipment, and we have that equipment, but we can't afford certain equipment they have," Hughes said. "We don't all have to use the same racetrack."

The payoffs at Clover Park have been expanded capacity for aerospace students, higher retention rates, and high rates of post-graduation placement of students in jobs. According to Hughes, the 85 to 90 percent retention rate in the aerospace program is far better than in other programs at Clover Park. He gives a lot of credit for that to the program's navigators, who help students both during the program and in finding employment. "I think [navigators are] something you're going to see adopted by colleges throughout the nation," said Hughes. And according to Les Sessoms, the college's Air Washington navigator, a majority of those students are finding work in aerospace after



graduation. He estimates that at least six out of ten students who have gone through the program are currently working in the industry. And those figures, says Sessoms, are particularly impressive in light of the college's student body. "We're talking nontraditional students from a variety of races and ethnicities, with different levels of English language command and of different ages," he said. "I would rate the Air Washington program pretty high. It was something that was sorely needed."

Everett Community College

Everett Community College has enrolled more trainees—950 and counting—than any other college in the Air Washington consortium. It is located in north Everett, in the heart of more than 175 Snohomish County aerospace companies. Prior to the Air Washington project, the college was one of the Fighting 147s, and it also already had classes in composites and advanced manufacturing. Under the direction of Sharon Buck, dean of business and workforce education, the college had a key role in the development of the Air Washington grant. Under the three-year leadership of the subsequent dean,

Sheila Dunn, the college was able to expand and improve all of those programs.

Annette Floyd has been the college's Air Washington director from the start, initiating, supporting, and managing all grant activities. Floyd was able to add many new classes in manufacturing-employment readiness, aerospace composites, advanced manufacturing, precision machining, aircraft maintenance, welding, and fabrication. Under the grant, the college increased enrollment in the composites program 143 percent and increased completion rates 14 percent, while the aviation-maintenance program completion rate increased 136 percent. Equipment was upgraded to industry standards and a strong navigation model was implemented to help students stay in school and find employment.

Everett Community College's 950 trainees easily exceeded its original goal of 610. The number includes 118 veterans, 82 women, and 15 students with disabilities. The vast majority of its students completed a certificate or degree. The college worked with internal and external partners to achieve the grant goals and build programs that meet industry needs to help

Everett Community College students, work on the precision machining equipment.





low-skilled workers progress and develop strong career paths. The grant provided training and enhanced support to many students severely affected by the economic downturn. The average age of students in the program is 33, with some students in their 50s. This was most students' first experience attending college and many had stories of struggles and failure with traditional education in high school. The Air Washington program provided a safe learning environment for building student confidence and providing practical skills needed for employment. Floyd said that the hardest challenge in the first year was getting the Air Washington message out to students, community partners, and prospective employers. Since that difficult beginning, employers now contact the college to hire students, and most have been placed in jobs, while others continue their studies.

Originally classes operated at Snohomish High School, a hangar at Paine Field, and the Sno-Isle Skills Center in Everett. Later, the college allocated \$4 million to bring the program under one roof at the Advanced Manufacturing Training and Education Center, a thirty-seven thousand square-foot college-owned facility near campus. The precision machining program has grown 200 percent since moving into the new facility. College officials say they are committed to sustaining and expanding the success of the Air Washington grant. The college will work with the Jobs for the Future program on a Gates Foundation grant aimed at enhancing the successful pre-employment program, to help align student skills with employer-determined competencies.

North Seattle College

North Seattle College is located in one of the largest centers for aerospace in the country. Situated near Northgate Mall and close to both Interstate 5 and Highway 99, the college is well positioned to provide workforce training to residents of both King and Snohomish counties. Before the Air Washington program, NSC's electronics programs focused on certificates and degrees in broadband cable, electronics

technology, electronics engineering, healthcare technology management, industrial power, IT-controlled electronics, and telecommunications. It has the most in-depth electronics program of any community or technical college in King County, offering degrees and certifications in avionics and electronics.

The Air Washington grant allowed the college to develop industry-aligned certificates for the avionics–electronics field and to extensively renovate its electronics labs. During the grant period, NSC developed courses in aviation electronics, fiber optics, robotics, and measurement science in its electronics department. The college also created two new certificates in aviation electronics and integrated aerospace-related courses into its previously existing electronics degrees and certificates. North Seattle's AAS degrees in Electronics Technology and Electronics Engineering Technology are approved by the Federal Aviation Administration's Technical Operations–Collegiate Training Initiative Program.

When students obtain their degrees in electronics technology and electronics engineering technology at NSC, they are eligible for internships with the FAA and for careers worldwide, and qualify to continue studies at the FAA Academy in Oklahoma City.

The college's original Air Washington goal was 113 trainees—a number it raced past. By mid-2015, it was up to 641 trainees. Due to the success of the Air Washington Program, NSC received funding in 2014 through the state to continue its expansion into aerospace.

During the grant period, NSC developed courses in aviation electronics, fiber optics, robotics, and measurement science in its electronics department.



Air Washington's focus has been on helping students not only to gain technical knowledge and skills but also to find employment. The college's Opportunity Center for Employment & Education, opened in 2011, is a multi-agency hub providing employment, training, educational, and public assistance services centrally located in one building at North Seattle College.

Olympic College

Olympic College, with campuses in Bremerton, Poulsbo, and Shelton, serves a region with extensive ties to the military and to industries that support naval and aerospace programs. In fact, the college's industrial electronics program is one of only two in the Pacific Northwest (the other is at North Seattle College) that are approved by the Federal Aviation Administration. In addition, the college has long had a machining program. Both Olympic programs, however, were recently threatened by budget cuts. "Our machining program had been struggling, our electronics program had been struggling," said Stephanie Thompson, Air Washington grant manager at Olympic College. "They were 'under review' and being looked at, given all the budget cuts, as something that could potentially be going away."

The Air Washington program changed everything, Thompson said. "When we got Air Washington, it allowed us to breathe new life into these programs," she said. "We were able to get new equipment, really work on updating curricula; we did building renovations, and new faculty from industry were hired." The Air Washington grant has also stimulated stronger connections between the college and employers in the region, says Thompson. And that, in turn, has led to an expansion in the college's recently launched composites program.

"We have expanded our composites curriculum from the original short-term certificate focused on fabrication and assembly, to a longer certificate, which includes training in nondestructive testing, inspection, and repair," said Thompson. "Also, due to the synergy we experienced with the technical design,

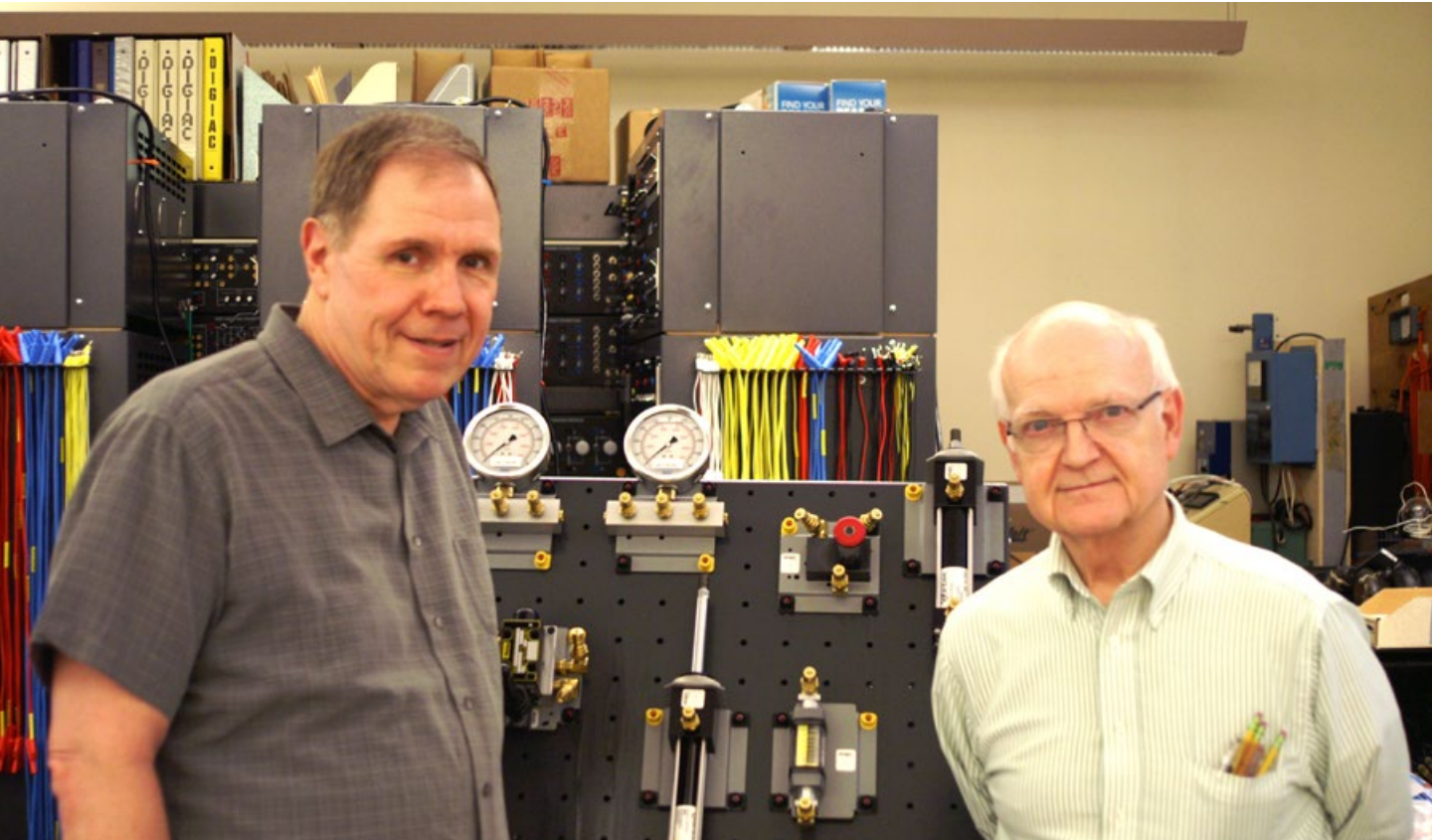
"Our training programs really focus on skill sets that could be applicable to multiple industries"

precision machining, and composites manufacturing programs, an Associate of Applied Science in Engineering Technology degree was developed and approved, incorporating training components from all three disciplines."

While aerospace is the target of the Air Washington program, Thompson said the impacts are being felt in a wide array of industries. "Our training programs really focus on skill sets that could be applicable to multiple industries," she noted. She said that Olympic graduates have been finding not just the Navy, Boeing, and aerospace contractors interested in hiring them, but also a growing number of other regional manufacturers, such as Trulife, a Poulsbo manufacturer of orthotics, prosthetics, and other health-related products.

Olympic's original Air Washington goal was to enroll 374 trainees. By mid-2015 it had enrolled 521. Avionics-electronics was the largest program, followed by advanced manufacturing and composites. The placement results have been impressive. "Since winter quarter (early 2015), we have had 189 completers," said Thompson. "Of these, 113 are employed. And this does not include folks who are still retained in school, or those who have dropped out and found work."

According to Thompson, the biggest challenge in implementing the Air Washington program has also been its major benefit: improved communication, both internally and among colleges. "We've got all these community colleges that have been traditionally focused on their own programs and hitting their own targets," Thompson explained. "You've got eleven colleges spread all over the place. How do you make that shift in thinking to, 'We're all in this together'?" Thompson acknowledges "there have been some growing pains," but the program has succeeded because of the efforts



ABOVE: North Seattle College electronics faculty members Chris Sanders, left, and Frank Jump.

RIGHT: North Seattle College faculty members: Standing, from left, Aaron Korngiebel, Alan Rowberg, Wayne Gilberts, John Vavrousek, Charles J. Eckard and Doug Jenkins. Seated, left to right, Dennis McMahon, Tim Fiegenbaum, Ted Rodriquez and Chris Walton.



BELOW: An Air Washington student at work.





of staff and faculty at all the participating colleges. Thompson has especially high praise for the Olympic faculty. “Our faculty has just been great,” she said. “When I send a student to them, I absolutely know they’re in the best hands.”

Peninsula College

Peninsula College’s main campus at Port Angeles is on the northern edge of the Olympic Peninsula in a region with a small, yet important, composites industry that produces parts for both planes and boats. So it was natural that Peninsula College would join Air Washington with composites as its sole program. Peninsula offers plenty of options for students, including five short-term certificates, two long-term certificates (including an advanced composite materials certificate), and two-year associate’s degrees in advanced manufacturing–composite technology. Maitland Peet, the college’s composite program coordinator, said the Air Washington grant allowed the program to expand capacity and “to upgrade our shop

dramatically and bring it into the twenty-first century.” Peninsula College’s original goal was to train 45 students. As of mid-2015, it had trained 164.

One of the most significant companies in the region is Angeles Composite Technologies Inc., which makes a variety of parts for Boeing and other aerospace companies. “They are a great industry partner,” said Peet. “We have worked really closely with them. A couple of their staff are on our advisory board and a number of our students are employed there.” In addition, Port Angeles has several shipyards, including Westport Yachts and Platypus Marine, and nearby Carlsborg has Mervin Manufacturing, a snowboard-surfboard-skateboard company, all of which need trained composites workers. One of Peninsula’s distinctions is its close partnership with the local high schools. The composites program is based at a local skills center, and includes both high school students and adults. Another of Peninsula’s distinctions is that students were able to take its composite courses tuition-free,



Elaine Tuisila works on her assignment during class in the Renton Technical College’s aerospace program.



ABOVE LEFT: *Rob Watt, Renton Technical College's Air Washington grant manager.*

RIGHT: *Governor Chris Gregoire visits Renton Technical College's advanced manufacturing program.*

meaning that the college was able to find various grants outside Air Washington to cover the cost of the courses.

Peninsula College soon hopes to be leading the way in a relatively new field: composites recycling. It has partnered with the Port of Port Angeles in designing a facility to recycle carbon-fiber waste. This includes recycling waste products from composite manufacturing as well as recycling worn-out composite pieces, such as jet fuselages. Peet credited Air Washington with positioning Peninsula College to be “potentially a major player” in what should become an increasingly important part of the industry. “It raised the profile of the college in composites in the region,” he said.

Renton Technical College

It makes complete geographic sense for Renton Technical College to be the lead institution—and sole provider—for the aircraft assembly program. The college is just down the road from the Boeing 737 plant in Renton. With Boeing’s assembly plant buzzing, Renton Tech’s assembly program has been in ever-growing demand, said Rob Watt, Renton Technical College’s Air Washington grant manager. Renton Tech also has an advanced manufacturing-precision machining program. The college’s

Air Washington program has blown right past its original goal of 571 trainees, and was up to 720 in spring 2015.

Before Air Washington, the aircraft assembly program did not exist at Renton Tech. Also, Boeing abandoned its own pre-employment training program in 2009. So if you wanted

Before Air Washington, the aircraft assembly program did not exist at Renton Tech.

to be an aircraft assembler for Boeing, said Watt, your only option was to “apply and hope they hired you.” After Air Washington funded the program, a job-seeker could sign up for the twelve-week program, earn the manufacturing-assembly mechanic certificate, and essentially be ready to go right to the assembly floor. The program was designed with extensive advice from Boeing about what the trainees would need to know. “We had some input as well, but they told us what they wanted and we put it together,” said Watt. The college built an on-campus lab—an assembly workshop—with funds from the Air Washington grant. Students



Jeremy Slack, right, works with one of his machining students.

Jeremy Slack, 27, machinist instructor, Spokane Community College

JEREMY SLACK grew up in Port Angeles in a family in the construction trades. He liked making things, but he also saw the stress that heavy construction work can place on a person's body. So he became interested in another form of making things. He wanted to be a machinist. "A machinist still gets to make stuff with their hands and produce something that society benefits from," he said. "It's just like building a house, but it's less wear and tear."

So, when he graduated from high school at age 18, he headed east and enrolled in Spokane Community College's machinist program. He got his Associate in Applied Science Degree and then landed a job at Multifab Inc., a Spokane company that makes airplane parts and many other fabricated parts. He worked there for six years, immersed in the fabrication industry. Then the Air Washington program started up and SCC expanded its machining program.

"This position became available," he said. "I always wanted to try my hand at teaching, so I applied. That was three years ago and I've been here ever since."

He loves working with his hands, yet he also loves the cerebral challenge of working with complex technological equipment, such as the Computerized Numerical Control (CNC) machines that every trainee must master before they graduate. The math in his field is quite advanced, and computer programming skills are critical.

Yet mostly, he loves working with students and teaching them a trade in which they can support their families, work with their hands, stimulate their brains, and "have fun doing it." He's proud to produce students who can master it all.

He said people sometimes stigmatize the trades by saying to bright students, "Don't be a welder, don't be a machinist."

"Well, that's not true," said Slack. "We want the best and brightest to come into our program."



do eight weeks of the program online and the final four weeks in the lab.

Boeing is the program's main employer, but by no means the only one. Renton Tech works with dozens of other aerospace companies in the Interstate 5 corridor, most of which have Boeing or military contracts. For instance, one of the college's other major industry partners is Primus International, which makes flight-control assemblies and has plants in Auburn, Woodinville, and Bothell. "We have created a pipeline of businesses that come to our programs, come to our classes and do mock interviews of our students," said Watt. As part of the program, Renton Tech also helps its students do their resumes and prepare for real interviews.

Renton Tech has made a concerted effort to get veterans into its advanced manufacturing programs, including designing two programs just for small classes of veterans. The first was oriented toward machining and the second toward preventive maintenance. All five veterans in the first program got jobs, said Watt,

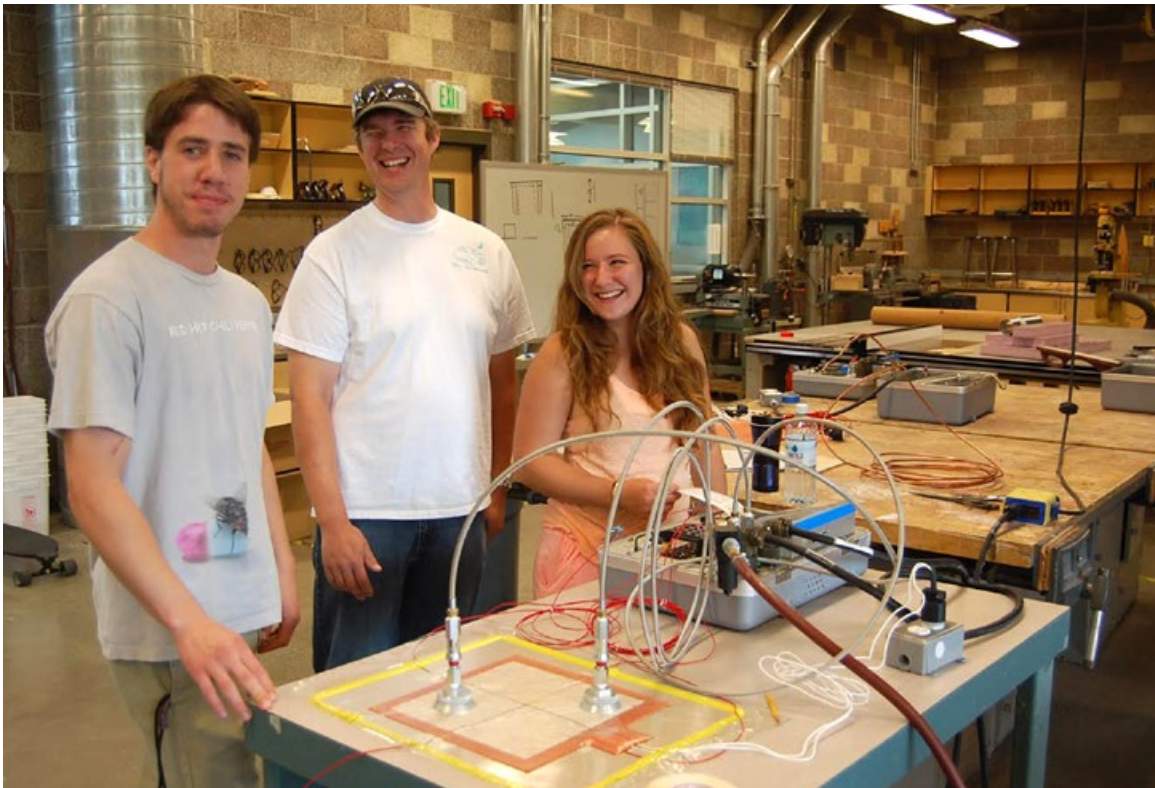
and three of the four in the second program were hired before they finished the course. A number of students who don't speak English enroll at Renton Tech each quarter, and with a little assistance usually do just fine. "For the most part, it's really pretty simple," said Watt. "If you can look at A, B, and C and put that together, then that's it. The thing about people from other countries is, they just get after it. It's all, 'Let's get it done.'"

Watt said he gets plenty of feedback from former students out in the workplace. "The e-mails I get, people coming in and saying, 'Hey, this really changed my life.' It feels good to give somebody an opportunity to have a true career. We've bonded, probably forever, with some of these folks. They come back and help us out, and give us feedback on what we're doing. It's just a really good deal."

Skagit Valley College, Anacortes campus

Skagit Valley College consists of several campuses in Skagit, Island, and San Juan counties in northwest Washington. The Air Washington

Students at Skagit Valley College, working with a hot bonder in the composites program.





program is based on the Anacortes campus. Because of the campus location on Fidalgo Island, the marine industry has played a large part in the college's Air Washington programs and recruiting. The Marine Technology Center already offered training in marine maintenance technology, but the introduction of the Air Washington program enabled the college to provide composites training for both marine and aerospace fields, which doubled the program. The college helped develop an innovative composites curriculum that could be accessed online.

"Many of the marine tech students will earn a composites certificate while working on their [degree]. This will give the students more options when looking for work. Many of the skills are the same for marine as for aerospace," says Wendy Bartholomew, grant coordinator for the college's Air Washington program. The college has tailored the advanced composites certificate to the different industries. Students can take either a marine safety tools and fastening course or a manufacturing precision-measurements tools class as one of the requirements.

The college also offers the advanced manufacturing program, which has "stackable" certificates. "Manufacturing is an ongoing demand with lots of flexibility as the industry advances and the employers' demands change," says Bartholomew, and Skagit Valley's unique certification programs have responded to the changing needs. A manufacturing fundamentals certificate is now offered as a direct result of Air Washington grants and can be acquired independently, providing an avenue into entry-level manufacturing positions. However, the program is designed so that students may stack more certifications onto the fundamentals core to increase employability and skills. The manufacturing foundations certificate also includes other specialty micro-certifications—composites, for example, or welding. By adding more credits and courses, students can eventually earn their manufacturing technology certificate or receive an Associate in Technical Arts degree.

By spring 2015, the college had surpassed its goal of 200 trainees, and was up to 229. Of these, 135 were in composites and 94 were in advanced manufacturing. Air Washington was established at Skagit Valley College in part to field and train some underrepresented populations. Because of the pre-employment program offered through Air Washington, fifteen more veterans were served in the aerospace program. With aerospace composites manufacturers Janicki Industries located in nearby Sedro-Woolley and Hexcel Composites in Burlington, the college has also been able to connect its composites program with industry.

Though Air Washington was designed to train for aerospace jobs, graduates are also finding work in the marine industry. "A lot of these students are cross-trained, so they have broader industry opportunities," Bartholomew points out. The Air Washington grant has been so well received and publicized that some manufacturers initially worried the program would end when the grant does in the fall of 2015. The college has reassured them that the training will continue to provide qualified and capable candidates, and so far, students have done a stellar job of finding work: Of those who have earned certificates and have been out of school for at least three months, 73 percent had jobs.

South Seattle College

South Seattle College is in the heart of Puget Sound's aerospace corridor and has had a significant aircraft-maintenance program since the institution's inception in 1968. In fact, the FAA-certified program began in the

The college's Boeing Field hangar gives students another advantage—among other things, it teaches them "how you move on an airport"



South Seattle College navigator Joanne Lee, center, flanked by students Jesus Rodiles, left, and Bob Nguyen, working as tech helpers with Alaska Airlines.

1930s at Edison Technical College in Seattle, migrated to the newly formed South Seattle Community College in 1968, and continues as a signature program of South Seattle College. It is one of the Fighting 147s colleges and its program operates from three hangars on the West Seattle campus and one at Boeing Field. South Seattle College's goal was to train 176 students in aircraft maintenance, and by mid-2015, it had trained 349, the most of any of Air Washington's aircraft-maintenance programs.

The reasons for its success go all the way back to the grant's award announcement in October 2011. "Kim Alexander, the school's dean of aeronautical technology, was hiring faculty as soon as it was approved," said Ellen

Gordon. "Her leadership allowed the school to get out of the blocks right away." Within a few months, South Seattle College had already added an entire cohort (class of students) and soon it had doubled the size of its already large aircraft-maintenance program, from four cohorts to eight. "When you have twice as many students, you need twice as many drill motors, and twice as many drill bits, for instance," said Gordon. "... We even had to buy whole new banks of lockers. It doubled the demand for every single piece of equipment. That would have been difficult for any program, but in aviation, everything is so expensive. ... That was a massive investment, and Air Washington supported that."



The college already had a close relationship with Boeing and with several airlines, in keeping with its location just a few miles north of Seattle–Tacoma International Airport. Air Washington’s funding of a navigator helped build on these relationships. New scholarships, mentorships, and internships were developed with Alaska–Horizon Airlines and Delta Airlines. For instance, students may take part-time jobs as mechanic’s helpers while they are still taking classes. “Upon graduation, students are converting those jobs to full-time employment, close to doubling their hourly wage,” said Gordon. Grant funding helped support the Association for Women in Aviation Maintenance club’s efforts at South Seattle College to field a team of women mechanic trainees to compete in a national skills competition—the first all-women team in the event’s history. The club obtained its own funding for

the completion but needed help with paperwork and equipment. The team’s efforts sparked industry interest and also increased support for the college’s program. In 2015, two of the club’s coed teams competed at the Aviation Maintenance Competition in Miami.

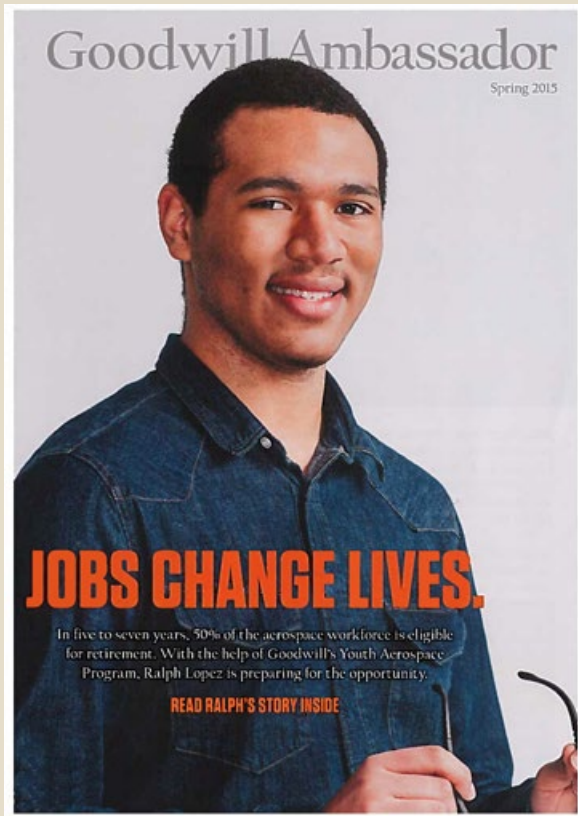
The college’s Boeing Field hangar gives students another advantage—among other things, it teaches them “how you move on an airport,” said Gordon. South Seattle’s program is unique in other ways as well. The college has one of the most diverse student bodies in the state. Many of the students, in Air Washington and otherwise, are first-generation immigrants. South Seattle developed an aviation glossary for a dictionary app that provides both FAA definitions and colloquial definitions, and also developed an online vocabulary course.

South Seattle College’s students get jobs at the nearby airports, of course, but not only

SCC student Britni Harrington studies in the first-year general aircraft maintenance class.



Ralph Lopez, 19, Everett Community College student



Ralph Lopez was featured on the cover of The Goodwill Ambassador magazine in 2015.

While a high school student, RALPH LOPEZ moved with his parents and brothers from the Bronx in New York City to the Pacific Northwest, where the family hoped to find better work opportunities. Lopez considered becoming an aerospace engineer, but the required college degree seemed out of his reach. He was prepared to settle for less until he learned about Goodwill's Youth Aerospace Program (YAP), a two-year program for at-risk students that begins in the summer following a student's junior year in high school. The program gave Lopez the chance he needed and he discovered the Advanced Manufacturing Training and Education Center at Everett Community College (AMTEC), which offered students two-year

degree and certification programs in advanced manufacturing.

Lopez enrolled in YAP as the Everett Community College was expanding its program as a result of the Air Washington grant. The college's aerospace course structure suited Lopez and he began working toward a two-year certificate in precision engineering. YAP focuses on first teaching students the soft skills they will need to succeed and introduces them to the working world of aerospace through onsite visits. Lopez liked the hands-on course instruction. He recalls his excitement in attending classes held first at a well-equipped hangar at Paine Field and then at the newly developed AMTEC building, which opened in October 2014. Lopez's story was featured in the spring 2015 issue of *The Goodwill Ambassador* and he was on track to receive his two-year certificate in 2015. After that, he plans to continue his studies to earn a four-year degree in engineering. Lopez feels that YAP and the Everett aerospace program—expanded through the Air Washington grant—have changed his life.



there. “Our students go to work in lots of different places and they are very mobile,” said Gordon. “They can go anywhere they want.” In fact, she said an FAA certificate is respected in other industries—“oil-well maintenance and anything that has engines,” for instance—because it indicates mastery in basic mechanics’ skills. Gordon said that the Air Washington grant allowed South Seattle College to prove that it could double capacity while, at the same time, improving the quality of the education. “Sometimes, we forget how amazing that is,” she said. “It wouldn’t have been possible without terrific students, faculty, and staff.”

Spokane Community College

As the lead institution of the Air Washington consortium, Spokane Community College’s campus in east Spokane is home to the five-person Air Washington administrative staff. SCC also was the only college in the consortium to initially offer classes in four of the five Air Washington disciplines: Advanced manufacturing–precision machining, aircraft maintenance, avionics–electronics, and composites. The only program it did not offer was aircraft assembly, which was offered only at Renton Technical College.

The college’s original goal was to produce 225 Air Washington trainees. It took only eighteen months to exceed that goal, according to Katé Lyons-Holestine, Air Washington director. As of mid-2015, it had trained 439 Air Washington students.

The college had an established aircraft-maintenance program before Air Washington. It was one of the original five Fighting 147s. Because of the Air Washington grant, SCC was able to expand its aircraft maintenance program at Spokane’s Felts Field by adding a summer session and one full-time instructor. It also had an existing advanced manufacturing–precision machining program, and was able to expand capacity and purchase new equipment through the Air Washington grant. It was also able to expand capacity in its avionics–electronics program. Katé Lyons-Holestine said that about fifteen to twenty-five

students take the avionics course every summer. It can be part of an Associate in Applied Science degree in avionics–electronics, or students in the aircraft-maintenance program can take it during the summer as a way to enhance that program.

Spokane Community College did not previously have a composites program, but was able to launch one because of the Air Washington grant. It produced 32 trainees. It also has a large aerospace pre-employment program, churning out well over 100 graduates, with many more still in the pipeline as of spring 2015. Spokane Community College is part of a larger organization called the Community Colleges of Spokane, which includes its sister school, Spokane Falls Community College. Of the two colleges, SCC has long been focused more toward vocational and technical training—which made Air Washington a natural fit in its overall mission.

Wenatchee Valley College

Wenatchee Valley College in central Washington is not in an aerospace-rich region. However, it does have several electronics companies that are part of the aerospace supply chain, as well as many other companies that need skilled electronics workers. Its only Air Washington program is electronics, and its initial, modest, goal was to train 40 students. As of mid-2015, it had trained 141 students.

The college already had an industrial electronics program, and when Air Washington came along, it was able to add aerospace curriculum to the existing program. It was also able to add instruction in job-seeking skills and interviewing skills. In fact, it was even able to add an entirely new, remote location in Omak, nearly 100 miles away. Riva Morgan, the

Its initial, modest, goal was to train 40 students. As of mid-2015, it had trained 141 students.



college's Air Washington grant manager, said that the grant allowed the college to hire an Omak instructor and then buy tools and laptop computers and a trailer to transport everything up to Omak, including, at one point, fifteen drafting tables. The Omak program began with fifteen students and eight of them finished with a one-year certificate.

Students in Wenatchee Valley College's industrial electronics program can complete either a one-year certificate or a two-year degree. Only the first year was offered at Omak, but four of the Omak graduates "decided they wanted the whole degree," said Morgan. So they commuted to Wenatchee, and Morgan said she arranged the class schedules so those students would only have to make the trip two days a week. All four graduated, along with a number of their peers who had taken their first year in Wenatchee. Many of them found jobs in local industries that rely on automation, such as food-processing and wood products. These companies, like the aerospace companies, need electronics technicians to keep their automation systems up and running. Morgan said other students hope to move to the Puget Sound area and work for Boeing.

All four of the Omak two-year graduates secured local jobs, said Morgan, which she found particularly gratifying. "That was our biggest success, getting those people graduated and employed," she said. "... The unemployment rate is higher there, maybe the highest in the state. And having those trained workers up there [in Omak] has made a lasting impact on our community. And the employers are thrilled up there."



Steve Garcia, developing his avionics–electronics skills in Wenatchee Valley College's Air Washington program.

During the no-cost program extension year, three more students started in Omak and then moved to Wenatchee to continue their studies: two to complete the one-year certificate, and one to continue on to degree completion in 2016 and transfer into a university engineering degree program.

PARTICIPANTS BY DISCIPLINE (as of early 2015)

Avionics–electronics	1,028
Aircraft maintenance	989
Advanced manufacturing–precision machining	881
Composites	649
Aircraft assembly	469



CHAPTER 7

Lives Were Changed

DEMOGRAPHIC DATA TELLS US A LITTLE ABOUT AIR WASHINGTON students. Their average age is 33, a little older than other community college students. About 10 percent are women. About 14 percent are veterans. About 20 percent are low-skilled workers, meaning they were initially deficient in English or math and had to improve to be college-ready. Many already had families or dependents to support. Between 1 and 2 percent had seen their jobs sent overseas. Many more began the program unemployed or underemployed, although exact percentages were hard to track down.



Many instructors had a keen grasp of the characteristics of students in their particular programs. “A hair under 40 percent of my students are veterans,” said Craig Seybold, who runs Olympic College’s avionics–electronics program in Bremerton. “Probably a third of my students are unemployed. And if they are employed, a lot of them are at minimum wage ... A lot of them have families. Their average age is about 28, and they’re really looking to change their circumstances.”

Dan Moore, an aircraft-maintenance instructor at Big Bend Community College, said he can divide his students roughly into three groups: kids just out of high school, people between 25 and 35 who have “been laid off two or three times” from previous jobs and are looking for new careers, and people 45 to 55 who are seeking one more career in a long chain of career changes. Moore’s favorite kind of student, at least for sheer enthusiasm? “Bring

me a 19-year-old farm kid, and I love them,” he said.

However, letting students tell their own stories is the best way to gain an understanding of students’ circumstances and career ambitions. Adam Stratton, 32, has one of the most unusual stories. He went from laid-off youth minister to precision machinist at Honeywell, the international aerospace, defense, and energy giant. Stratton seems as amazed as anybody by this turn of events. “I never thought somebody with schooling in pastoral theology would ever wind up in a machine shop,” said Stratton, with a laugh. “But really, I am so happy with where I’m at right now.”

Stratton’s circuitous journey began at the Moody Bible Institute in Spokane. He entered Moody right out of high school and studied pastoral theology for four years. He was hired as a youth pastor at a Spokane church and stayed there for six years. Then he took a job



ABOVE: Katé Lyons-Holestine was a key member of the administrative team and served as Air Washington’s director during its final year.

FACING PAGE: Adam Stratton made the unlikely journey from youth minister to precision machinist with the help of Spokane Community College’s Air Washington program.



with a church in Sutherlin, Oregon, as the director of youth ministries. It was a good job, but unfortunately Stratton's timing was bad. The year was 2008. The Great Recession kicked in, and even youth ministers found themselves battered by the economic downturn. Churches rely on discretionary giving, which took a tumble. The church's "budget was starting to get hit pretty good." Stratton and his wife found themselves with two kids and no job. "So we prayed about it and decided to move up to Spokane, with the intention of getting a job at a church," he said. However, he found that, just as in Sutherlin, "the youth ministries are the first ones to get cut back." Finding a church position in Spokane proved impossible.

Stratton kept his growing family afloat through his hobby, which was repairing and reconditioning antique firearms. He made some money, but it was sporadic. "We had no sort of fallback," he said. "At that point, we had three kids and were pregnant with our fourth." His hobby taught him that he enjoyed working with his hands and with metal. But he had no idea how to apply those skills to a career. His mother was also helping him to look for job possibilities, and she ended up talking to Mary Stanton, the Air Washington navigator, about the advanced manufacturing-precision machining program at Spokane Community College. "Once she got off the phone with Mary, she called me and said, 'Adam, you've got to get down there, and fill out the paperwork, because that seems like an awesome opportunity,'" he said.

Stratton called Stanton, who guided him through the application process and arranged an interview with the advanced-manufacturing instructors. He had to demonstrate some aptitude for the program and certain "soft skills" for employment, such as promptness, reliability, and an ability to communicate in the industry jargon. "That really worried me right there, because, while I am a people person, I'm nothing special," said Stratton. "So, in preparation for the meeting, I cut my beloved beard and made myself presentable and went to the interview and everything went super, super

well. And yeah, I got accepted." But he was "scared to death" about going back to school after so long a time, and machining school was about as far as you could get from Bible college. "So I went, and literally, the first day, I felt right at home," he said. "All of the instructors were just great." He credited Stanton and Air Washington director Katé Lyons-Holestine for giving him and his fellow students the push they needed to succeed. "Mary and Katé have been whip-crackers, but the students really needed that," said Stratton. "A lot [of us] hadn't been to school in a long time."

“We got into the nondestructive testing aspect of aerospace composites. ... It was a forty-hour course, and normally, it would have been about \$1,300 out of our pockets, but the school covered that.”

While waiting for one segment of the two-year machining program to begin, he also had time to take one of the college's aerospace composites testing certification courses. "It was just a blast," said Stratton. "We got into the nondestructive testing aspect of aerospace composites. ... It was a forty-hour course, and normally, it would have been about \$1,300 out of our pockets, but the school covered that. There were a number of us in the composites certification course who took advantage of that. I think all of us passed." Then he immersed himself in the two-year degree course in machining. Like many of the students in Air Washington, though, he couldn't afford to wait two years to get a job. He began looking for work during his first quarter and soon found a temporary job at Honeywell. The company has a plant in the Spokane Valley, and Stratton was



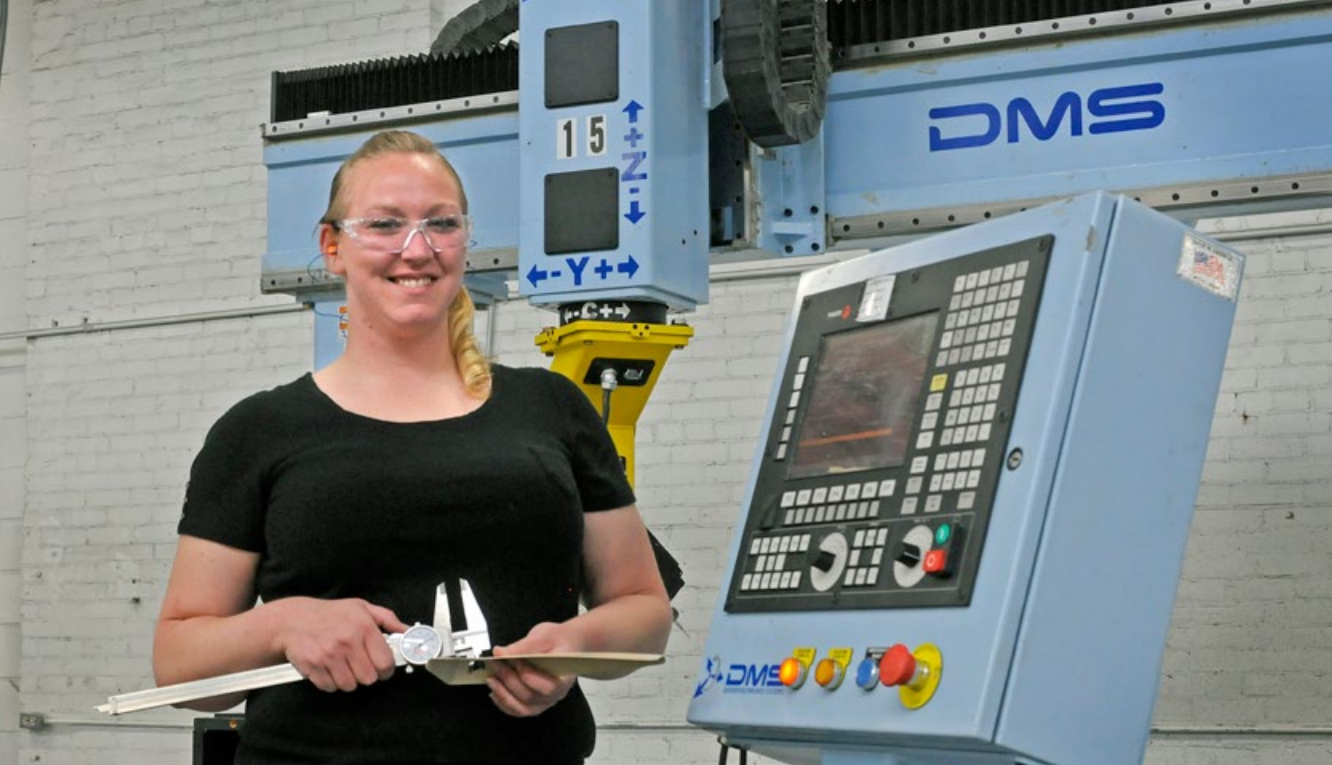
Mary Stanton was one of Air Washington's crucial "navigators," who guided students into the program, through the program and out into the working world.

hired as a quality-assurance technician because of his newly acquired skills. That job didn't last long, but while he was there, he got to know some of the people on the machinists' floor. He eventually was hired as a computer numerical control (CNC) machinist at Honeywell, even though he was still in his first quarter of the machinist degree program. "Tell you what, it was tough to do that and go through the CNC machinist program at the college, both at the same time," said Stratton. He had to be at school at 7:30 most mornings, and on some days he had to go to work straight from there. On weekends and other nonschool days, he worked at Honeywell from 5 a.m. to 5 p.m. "I did that for two years, and now I am in the beginning of my last quarter at the college," said Stratton, in spring 2015. "It's really been a ride."

But very much a worthwhile ride, in Stratton's mind. He said that, based on the feedback he has received at Honeywell, he's on track to get into a "supervisory position,

like a lead machinist position." He credits Air Washington with changing the course of his work life. "Without Air Washington being here and offering up the advanced manufacturing program, I honestly probably would have gone a different direction," said Stratton. "I probably would have gone in more of a behavioral sciences direction, because that's really what my background was." He believes he has found a career that will sustain him and his family for the long haul. "Ultimately," he said, "I'd like to stay at Honeywell and make a career out of this."

Baylee Ballard's work path has been perhaps more representative of Air Washington's students. She graduated from Rogers High School in Spokane in 2004, and a four-year college was not in her plans. She became a single mother, trying to support her daughter on her low-paying job as an in-home caregiver. "I would care for elderly and disabled people," said Ballard. "I would drive around town in my



own vehicle and sometimes transport them. It wasn't something that I was getting anywhere at. I started at \$9.50 an hour and after six years, I only made \$10.31 an hour."

She started looking for a career with better pay and a better future. Her aunt, as it turned out, had been an Air Washington student and she told Ballard how good the Spokane Community College program had been for her. "She said she learned a lot," said Ballard. "It was something different than what she knew before." She encouraged Ballard to call Air Washington navigator Mary Stanton. Ballard knew she liked working with her hands, but she had zero experience in manufacturing of any kind. That was part of the program's appeal. "I liked learning new things," she said. She hadn't realized that this kind of work "had been even an option for me." She interviewed for the advanced manufacturing-precision machining program and was accepted. She had that certificate in three months, then decided to also take composites. Stanton helped her get tuition grants and a loan, which Ballard said was the only thing that made her schooling possible. Three quarters later, Ballard had a certificate in composites, an industry she barely knew existed before she started the program.

Stanton, the navigator, told Ballard that a company called Multifab Inc., in the Spokane

Valley, had some openings and helped Ballard submit her resume. Ballard got an interview and was hired immediately as a CNC machine router. She had been out of school exactly one week. Among the items she makes for Multifab are plastic window shades for airplanes. "We have a department that molds it, and then we get it and program the machine to put the details in it," she said. She wasn't the only woman in her Air Washington classes, but she is the only woman in her department at Multifab. "It's not an issue at all," she said. "I've proven that I'm good enough." As of spring 2015, she had been at Multifab a year and half. Where does she hope to be in five years? "I'd like to have the job I'm doing," she said. "I would like to keep it as my career. ... I wouldn't have found it without Air Washington. I'd probably still be caregiving."

Sean Stoutimore's path was also common to many Air Washington students. His early job history consisted of stints in fast food—and even those didn't last. In 2012, he found himself "20 years old, jobless, and trying to find a place to live," he said, in a video interview recorded for Air Washington's website. He already had a family but no steady way of providing for them. He wasn't certain he liked school. "I didn't really know where I was going, or what I was going to do with my life," he said.



He heard about Air Washington and enrolled in Spokane Community College's program. He learned to read blueprints, operate a CNC machine, and make and repair composites. He also learned to operate a FARO machine—a high-tech 3D measuring machine. As part of the program, he had an on-the-job training stint at nearby Unitech Composites and Structures, which makes parts for Boeing and Airbus. The company, part of the larger AGC Aerospace and Defense group, uses FARO machines to measure parts to the exacting specifications required by its aerospace customers. Within six months, Unitech hired him.

"They were real excited to have someone who knew about the FARO and could operate it," he said. "I'm hoping to stay with Unitech and maybe become a field operator for the FARO." The job has allowed him and his family to have their own place to live and to become, in his words, "financially stable and OK."

"I went from working at a minimum-wage fast-food job to working in aerospace production," said Stoutimore. In fact, he has trained other people at Unitech in how to operate the FARO. This was not just a victory for Stoutimore, it was a victory for the people who run Air Washington. "That's why we get up in the morning," said Weigand, referring to Stoutimore.

Don Moore (not to be confused with Dan Moore, the Big Bend instructor) was a seasoned worker when he arrived at Air Washington's Renton Technical College program. He had already worked for thirty years as a carpenter. But construction took a dive during the recession. Like many in the building trades, he felt he needed to find something different. A friend of his, a flooring carpenter, went through Renton Tech's program and landed a job with Boeing in Everett, making airplanes. "I thought, if he could do it, I should be able to do it," said Moore, who subsequently graduated from Renton Tech's Air Washington program. "I've always been interested in aerospace—and I'm now doing it. I work for Hexcel Composites in Kent. ... We sell to Boeing as well as other people. The composites are the wave of the



ABOVE: A student at Clover Park Technical College.

FACING PAGE: Baylee Ballard went from low-paid caregiver to composites maker at Multifab Inc. in Spokane.

future. The 787, we'll be providing a lot of the parts for that as well."

He said he learned all the key skills of his new profession at Renton Tech, including how to work with titanium, aluminum, composite materials, and an array of fasteners he didn't know existed. "One of the things I enjoy about this job is everything is so exacting, and the tolerances are so tight," said Moore, in a video interview recorded for Air Washington in 2013. "It makes you proud to make parts that good, and I learned that here [at Renton Tech]. It's a fantastic job, there are excellent benefits. You know, like all industry, it has ups and downs. That's part of life. But right now, it's on a big upswing and it's time to get into it."

Joel Hobbs Jr. took an unusual path to Air Washington. He grew up in "the flight path of Boeing Field," but then attended Morehouse College in Atlanta, where he received a business administration degree. He tried to establish himself in business, but the economy was in decline and he slid into debt. "Looking for stability," he turned to aerospace. He enrolled in Renton Technical College's aerospace tool-mechanic program. "I received hands-on



experience from great instructors, and a lot of people in my class helped me, since most of them already worked at Boeing,” he said in an interview published in a newsletter for the Washington Aerospace Training Center. He received two job offers before graduation and accepted one at Honeywell, “where we’re building accelerometers used for guided missiles.”

Jon Whitehouse, 20, took what is probably the most common route into the aircraft-maintenance program at Spokane Community College. He needed a job, and during a visit to the offices of WorkSource, an arm of the area’s Workforce Development Council, he told them that he was interested in “something in industry.” They handed him information about Air Washington and asked him if that’s what he had in mind. As it turned out, it was perfect for Whitehouse. “I just love airplanes,” said Whitehouse “I’m into skydiving. And I want to be a pilot someday.” He’s in his second year in the aircraft maintenance program, and his goal over the next few years is simple: “Work for an airline.”

Keith Klettke, 18, was attending Medical Lake High School but wasn’t engaged in it. His mother heard about Air Washington and he decided to look into it “as an experiment to try something else.” He was able to get into

“But it was one of those things where I went into it, from day one, thinking, OK, I’m going to get enough training and enough education to get a decent job in a completely different field, and get away from retail altogether.”

the aircraft-maintenance program at Spokane Community College as part of a Running Start program for high school students. Now, he’s in his second year, and his ambition is to repair crop dusters or, if things work out right, go to Boeing.

Boeing is, for some Air Washington students, the ultimate goal. Scores have achieved it. An e-mail sent by one student, an immigrant from India, gives a hint of the exhilaration that students feel when they reach this goal: “I am so excited on this occasion when I got Boeing job offer. I have passed my background checking. I could not believe ... I have passed in first interview in USA. I have no experience in such things before. I am so thankful [to] both of you and my whole batch. ... I never forget this Great Experience With You.”

Sometimes, the Air Washington program just happened to line up perfectly with a student’s place in life and ambitions for the future. That was the experience of Levi Hay, 39, of Ephrata. He had been working for 13 years at a big-box store in Wenatchee, trying to support his wife and three kids. It was a steady job, but the pay was low. “It was not great employment,” said Hay. “We got by, but just barely. I look back now and wonder, ‘How *did* we get by?’”

So he and his wife were talking about looking for a new career with better pay and advancement. His wife saw an ad for Air Washington’s aerospace electronics technicians program at Wenatchee Valley College. “I went like, wow, I don’t know if we can afford it, but we should look into it.” With help from Riva Morgan, the Air Washington grant manager at the college, he was able to get financial aid and get into the program. As it turned out, he earned not just one, but two associate’s degrees, one in aerospace electronics and one in industrial electronics. It turned out to be a hectic two years. “I was still working twenty to

FACING PAGE: *Chris Chalmers works on metal fabrication skills in Spokane Community College’s aircraft maintenance program.*



Rickey Roberts, 50, self-employed, from Peninsula College

When RICKEY ROBERTS and his wife lost their retail store in the wake of the 2008 financial crisis, they had to start over. Roberts took advantage of his experience as a carpenter and electrician to get a job repairing RVs and yachts. After three years of six-days-a-week work, however, he was laid off.

“When I got laid off, I knew I wanted to go to school for something, but I didn’t know what,” he recalled.



Rickey Roberts

He turned to Peninsula College in Port Angeles, which was close to his Sequim home. He took a general manufacturing class over the summer and, after talking with the Air Washington grant coordinator and navigator, he decided to press on for an associate’s degree.

It had been quite a while since Roberts, 50, had been in school. And the coursework—heavy on physics, English, and math—was, he admits, daunting. “I panicked the first week,” he said. “I was ready to quit and run screaming.” Fortunately, his physics teacher talked him down, reassuring him that he’d be fine.

In fact, Roberts soon came to see his age as an edge. “It was an advantage that I was older,” he said. “I had a good work ethic. I spent sixty hours a week doing schoolwork. I didn’t do it halfway.”

Roberts also was proactive in working with the college to make the load—and his twenty-mile commute from Sequim—bearable. “I would drive in, take a morning class, and I got them to give me a room so I could sit and do homework and not have to face an hour and a half driving back and forth,” he said. “And then I would do my evening classes.”

Roberts found work even before he graduated. Since his unemployment benefits were running out, he started a small business doing small repairs and odd jobs. “When I graduated, that had built up so much, I never had to go get a job.”

In fact, Roberts says, when he started the program, he wasn’t intent on working at Boeing or another aerospace giant. “I went there to gain knowledge,” he said. “I already had some skills, but I was broadening my skills.”

The skills he learned, particularly in working with composites, opened up new, better-paying opportunities. Roberts now works as an independent contractor primarily doing fiberglass repairs on RVs and boats. “I’ve been offered other jobs, but I’m making at least as much money now and I’m my own boss and control my own time,” he said.

He says he wouldn’t be in this position without the work he did in the Air Washington program at Peninsula College. “The whole process worked for me,” he said.



thirty hours a week,” said Hay. “And a couple of quarters, I had twenty-plus credits. Yeah, it was kind of rough. But it was one of those things where I went into it, from day one, thinking, OK, I’m going to get enough training and enough education to get a decent job in a

“It’s kind of a strange feeling, to not have the financial problems constantly looming over you. I don’t know how many people I have told, ‘Hey, find a way. Go back to school, get some kind of education. You can still do better. Don’t settle. Don’t wait as long as I did.’”

completely different field, and get away from retail altogether.”

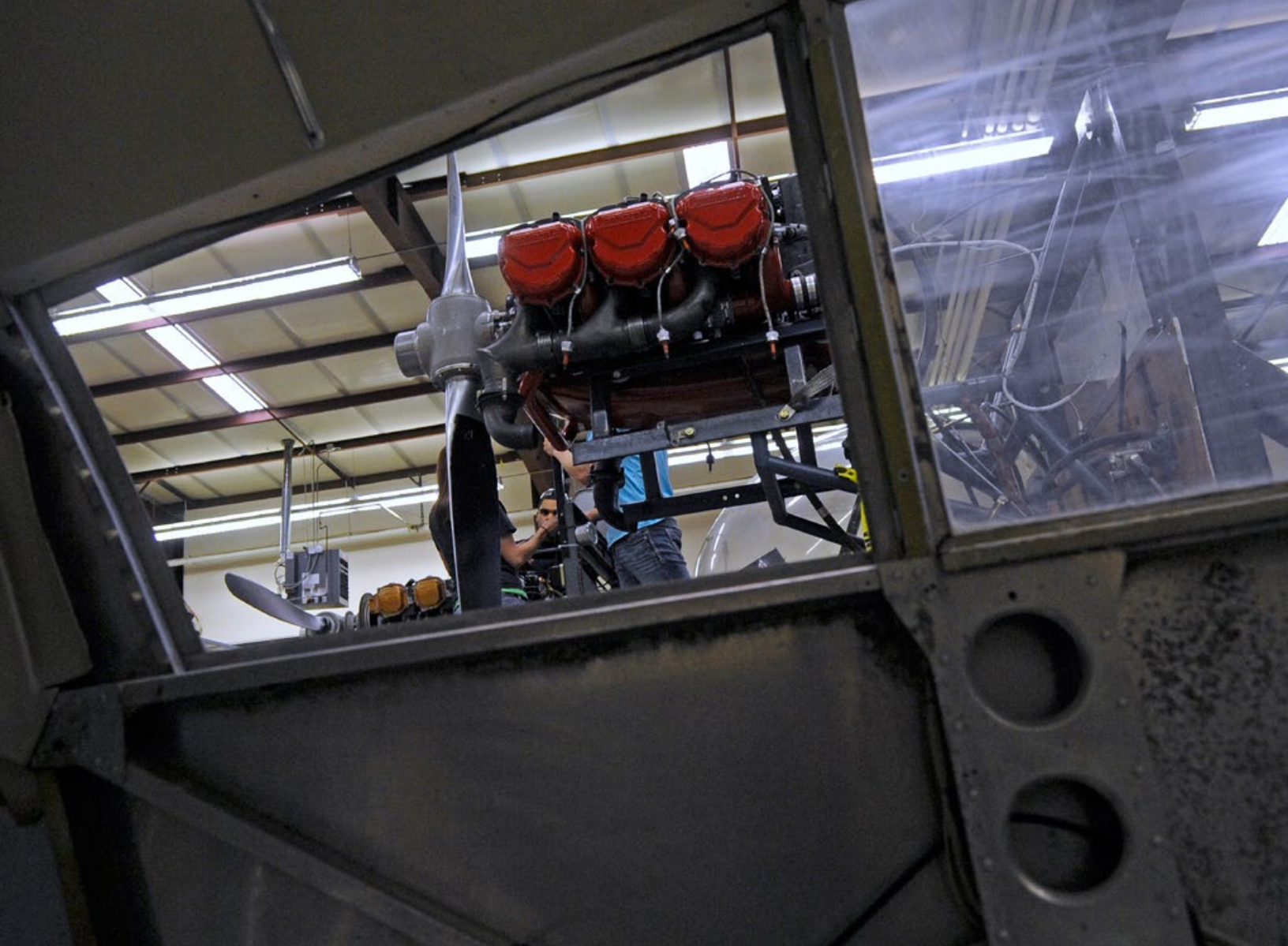
After graduation in 2014, he landed a job with Takata, an international manufacturing firm with a plant in Moses Lake. Takata makes automotive seat belts and airbags, as well as some aviation safety equipment. The company’s Moses Lake plant specializes in making airbag inflators, using a range of high-end automated machinery. Hay was hired as an assembly maintenance technician, using the skills he learned in the program. “It all goes back to the basics of how electricity works, how sensors function, how a pneumatic cylinder raises or lowers, how the valves work, how the industrial computers work, how they’re programmed to think ...” Without his training in all these subjects, he said, “there’s no way I would have been ready for the job.”

The job was exactly what he had hoped for when he took the plunge into Air Washington. “They [Takata] are actually a pretty dang good

company,” said Hay. “I make a really good living, and I work a ton of hours right now. I’ve already gotten one promotion. So I’ll probably stay at least two years. ... Sometimes, I say to my wife, could you ever believe we’d be here? And she says, ‘Nope. Things are good. I’m happy.’”

He illustrated the family’s change in fortune by describing his plans for the upcoming Mother’s Day. “Three years ago, before I thought about this program, it would have been, OK, let’s get the kids together and grab some paper and we’ll have them make a card,” said Hay. “There was no way I was going to be able to afford anything for my mom.” This Mother’s Day? “We’re going to Wenatchee and I’m going to take my mom and dad out to Mother’s Day dinner,” said Hay. “It’s kind of a strange feeling, to not have the financial problems constantly looming over you. I don’t know how many people I have told, ‘Hey, find a way. Go back to school, get some kind of education. You can still do better. Don’t settle. Don’t wait as long as I did.’”

Perhaps the most poignant student story is that of Mark Arno Casey. He was attending Skagit Valley College’s composites program and was described in the college’s newsletter as “a rising star.” His composites skills landed him a job with Janicki Industries Inc., in Sedro-Woolley, even while he was still attending classes at Skagit Valley College, and became a full-time employee, building aerospace composites. Then, on May 6, 2015, he died suddenly at age 23. His colleagues at Janicki and his friends and teachers at Skagit Valley College were devastated. They immediately stepped forward to create a scholarship in Casey’s honor. The Mark Arno Casey Endowed Scholarship now allows his memory to live on in the lives of the students who will benefit from the scholarship for many years to come.



CHAPTER 8

Beating the Numbers

THE TRUE TEST OF AIR WASHINGTON IS IN THE OUTCOME NUMBERS—students enrolled, programs completed, certificates and degrees awarded, and jobs landed. Air Washington’s most important initial goal was 2,615—the number of trainees that Air Washington promised in its original grant application. “By year two [2013–14], the data had settled itself out and I felt very confident that we were going to make it to 2,615, no problem,” said Dave Cox. “I was estimating at that time, 3,500.” As it turned out, in the words of Data Compliance Manager Rob Reneau, “we blew the participant numbers away.” It was clear by the third year that they would go far past 2,615. When Air Washington was granted its fourth-year extension, it established a new goal of 3,752 trainees.



The most recent actual tally, as of this book's mid-2015 publication date, was 4,722 trainees. The final number when the federal grant ended on September 30, 2015, was expected to be somewhat higher. These trainees were spread out over all of the program's five major disciplines, according to early 2015 numbers, with avionics–electronics having the most participants at 1,028, followed closely by aircraft maintenance at 989. Advanced manufacturing–precision machining had 881, composites had 649, aircraft assembly (offered only at Renton Tech) had 469, and the rest were in pre-employment and other programs.

That 4,722 was simply the number of students enrolled in Air Washington. It didn't answer another crucial question: How many of those trainees actually completed one or more of the certificate or degree programs? The numbers, as of mid-2015, showed about 2,501 completers, which did not include hundreds

more who were expected to complete in the next year or so. "I think you'll see that Air Washington students are, far and away, way up and beyond [the typical community college retention] rate," said Mattke. Marlena Sessions of the Workforce Development Council of Seattle–King County said that her organization tripled or quadrupled its retention goals. The latest overall numbers show a retention rate for Air Washington at more than 80 percent, compared with the average community college rates of 50 percent or below. Mattke and Sessions both credited the navigators with keeping the completion rate so high. Only 845 of the 4,722 total had actually left before completing the program, according to early 2015 numbers.

High completion results in a high number of certificates and degrees obtained. In Air Washington, certificates are divided into short certificates (credentials that can be obtained in less than a year), and long certificates (which

BELOW: *The original Air Washington lead office staff, from left, Katé Lyons-Holestine, Eric Moore, Patrick O'Halloran, Carol Weigand, Robert Reneau, Rod Taylor and Cheryl Churchill.*

FACING PAGE: *Students learn about every aspect of aircraft maintenance, from fuselages to props.*





require more than a year). In addition, students could get two-year associate's degrees, such as an Associate in Applied Science degree. In aerospace training, shorter certificates were preferred by most students. "Technical students tend to not want the [two-year] degrees," said Simmons. "What they want is to go take the FAA test and get a job right away. They don't really care whether they get an associate's degree, which would require a few more classes."

For those reasons, it soon became clear that Air Washington would have its most striking success rate in short certificates. The original goal was 481 short certificates obtained. When the grant was extended to a fourth year, it was already clear that a much higher goal was possible, so the goal was increased to 1,848 short certificates. As of mid-2015, the actual number of short certificates awarded was up to 3,997. Many students earned more than one.

As for long certificates, said Reneau, "it was close, but in the end we made it on that one, too." The original goal was 395, revised to a four-year goal of 488. The actual total, as of mid-2015, was 786 long certificates.

Two-year associate's degrees proved to be one of the most difficult goals. One of Air Washington's priorities was to get people to work as soon as possible, which clashed with its goal of producing students with two-year degrees. In addition, only a few classes, or cohorts, had time to move all the way through a two-year program during the four-year term of the grant. The original goal was for 448 two-year degrees, later revised downward to a four-year goal of 241. As of mid-2015, Air Washington had produced 356 two-year degrees.

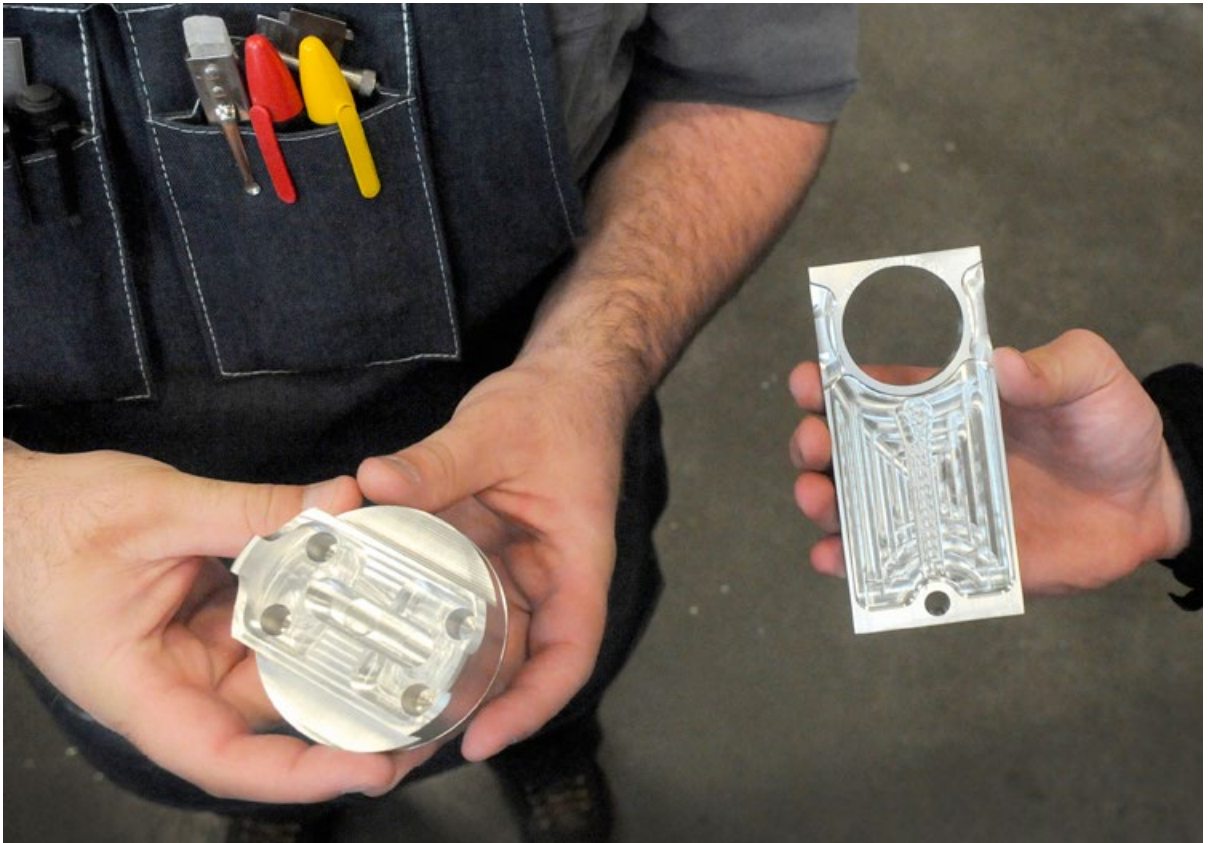
Air Washington's goal for veterans also proved challenging, not least because veterans had many other training options in the community college system. However, after a concerted and sustained effort, led by Clover Park Technical College, Olympic College, and Skagit Valley Community College, each of which had veterans making up more than a quarter of its students, Air Washington exceeded its goal of training six hundred veterans. As

of mid-2015, it had trained 654 documented veterans—plus about another hundred who identified themselves as veterans but whose standing the colleges had not yet verified. Overall, documented veterans made up about 14 percent of the Air Washington student body.

Since Air Washington was most importantly a jobs stimulus program, the single most vital question was this: How many of these students got jobs? These numbers were more difficult to compile, because it required locating students who had left the program and the campus. They had moved away and obtained new phone numbers and new e-mail addresses. Yet Reneau and the others tracking the data knew it was vital to get the most accurate numbers they could. The students filled out post-completion surveys that included their plans and their contact information. "We had very strict criteria that were universal throughout the schools," said Reneau. The colleges were required to track students not just once, but three times, after they left the program—at the three-, six-, and nine-month marks.

The original goal for the number of students employed after completion was 795, revised upward for the fourth year to 1,134. As of mid-2015, the number of Air Washington graduates employed was at 1,605, which translated into an employment rate that Air Washington calculated at between 72 percent and 81 percent. The calculation varied depending on whether, for instance, it included students who could not be found; foreign students who were not allowed to accept jobs because of visa restrictions; or students who said they were not seeking a job and were continuing on with college. Some within the program argued strongly that it defied logic to assume, for instance, that all students who could not be found must be unemployed. Yet by even the most rigorous calculation, the numbers exceeded Air Washington's original employment goal of 70 percent.

Not all former students were employed in the field for which they trained. "Sometimes, depending on the economy or the individual circumstances, they may find what we call a



Student Andrew Good of Spokane Community College demonstrates three stages of the precision machining process.



survival job, or a job that is temporary, or part-time, or not with the training,” said Sessions. That happens in any program—yet more rarely in Air Washington. Sessions said her Workforce Development Council of Seattle-King County excluded those survival jobs from its outcome totals. “When we looked at our outcomes at the end, we were very proud, because we actually did double the goal,” said Sessions. “We were shooting for 148 [jobs] for the grant, and we came up with 300. And each of those were training-related, in aerospace.” Mattke noted that some of the Air Washington jobs came about because state workforce funds paid for on-the-job training at the end of the student’s course. “So they would have an entree into the workforce at a subsidized rate, and the employer can ‘try before they buy,’” said Mattke. “(They) get a good look at the students and see if they’re going to fit their culture and have the right experience and right skills, and then hire them. We’ve done that time and time again.”



Les Sessions, Clover Park Technical College's Air Washington navigator.

The top employer, to no one’s surprise, was the Boeing Company. It had already hired 241 Air Washington graduates as of early 2015, with many more expected. Perhaps more of a surprise was how widely spread the other graduates were. At least fifty companies had hired three or more Air Washington graduates. The companies on the list read like a roll call of the aerospace supply chain, including Aerotek, Hexcel, Royell Manufacturing Inc., Angeles Composite Technologies, Inc., Aim Aerospace, Absolute Manufacturing, Aviation Technical Services, Primus, Triumph, Janicki, and Honeywell. A number of airlines were also represented, including Alaska-Horizon, Delta, and Empire Airlines. A few more exotic names also made the list, including Gulfstream Beijing. Overall, Boeing hired about 15 percent of Air Washington graduates. Simmons considered this a relatively strong number, given that Boeing sits at the apex of the aerospace industry job chain and most Air Washington graduates were entry-level candidates.

How well paying were these jobs? Air Washington compiled those numbers as well, not a simple task. However, Reneau and the other Air Washington data gatherers didn’t have to rely solely on what students reported. They were able to analyze salary numbers, in many cases with additional state employment data from the Washington State Board for Community & Technical Colleges, through a data-sharing agreement with the state’s Employment Security Division. The average six-month salary for graduates who landed jobs in their aerospace fields was \$17,102 or, extrapolated as an annual salary, \$34,204. This figure was slightly below the original Air Washington goal of \$17,260 for an average six-month salary.

This may have been a result of the way wages had evolved in the state’s aerospace industry. In March 2015, *The Seattle Times* published a story headlined “Low wages for aerospace workers.” While Boeing production workers were making good money, it was a different story for workers at other aerospace suppliers. The paper reported that one-third of all production workers at non-Boeing

Alan Lovaasen, 53, Olympic college student

When ALAN LOVAASEN was released from the Two Rivers Correctional Facility in 2012, he tried finding work as a forklift operator, the primary job he had performed in prison. No luck.

"I was having trouble finding work," says Lovaasen, a military veteran and former electronics technician. Then a counselor at the state's WorkSource veterans outreach program encouraged Lovaasen to go back to school. "We were looking at various options and manufacturing technologies just sounded interesting," said Lovaasen. "He helped me contact the Air Washington representative at Olympic College."

Lovaasen attended an open house at Olympic and became even more interested. "I liked the idea of learning a trade that would be more 'felon friendly' than a lot of jobs," he said, noting that because of his conviction he could no longer qualify for his previous job as an electronics technician at the Oregon state lottery.

"When we looked at the statistics, manufacturing technology had such a high placement rate, such high demand," he said. "And then there was the Air Washington grant money."

Lovaasen learned a broad array of skills in the Olympic College program, including manual machining, computer-numeric-control (CNC) machining, and programming. "It's a pretty intense program," he said. "As I got into it I found that I just really liked it."

Lovaasen graduated in August 2014 and in October, following a referral by the Air Washington navigator at Olympic College, he was hired by Armstrong Marine Inc. in Port Angeles. "I drove up on a Friday and was offered the job on the following Monday," Lovaasen said.

At Armstrong Marine, Lovaasen runs the CNC router table as well as performing some manual machining. "We cut mostly aluminum," he explained. "The average sheet is about 6 feet wide and 20 feet long and anywhere from an eighth of an inch thick to a quarter of an inch thick. The router table cuts the parts out that we use to fabricate the boat. My role as a programmer is to fit the most amount of parts on the sheet with the least amount of scrap."

Lovaasen says he's gathering experience that others he knows who graduated and went to work for large companies aren't getting. "I'm programming already. I'm gathering a wealth of experience that will allow me to write my own ticket," he said.

And Lovaasen adds that he's glad that he found his way to Armstrong Marine. "I love what I do," he said. "It's nice being a big cog in a small company, rather than a small cog in a big company. I'm starting to order material and I keep stock of inventory. No day is the same as the previous day. There's always something coming up, and I'm an integral part of getting the boats completed on time."

Lovaasen gives a lot of credit for his success to the team at Olympic College and the Air Washington project. "If it wasn't there I'd probably be working in a minimum-wage job somewhere and not being very happy," he said. "They believed in me before I believed in myself. They saw how hungry I was to learn and get back to using my brain again after six years of incarceration."



Alan Lovaasen



aerospace parts manufacturers were making between \$10 and \$15 per hour. Entry-level wages in that sector were even lower, between \$10 and \$12 per hour. This was at a time when Seattle was about to institute a \$15 per hour minimum wage. Meanwhile, the paper reported that 75 percent of Boeing's production workers were making more than \$20 per hour and 64 percent were making more than \$30 per hour.

Air Washington's salary numbers reflected that. Air Washington's Boeing hires were averaging \$49,189 per year, although this included some trainees who had worked at Boeing previously and had been rehired. Yet even the new Boeing hires were making an average of \$35,314, though most of them were hired at entry level. "At Boeing, it depends, but it's averaging between \$16 and \$18 an hour," said Rob Watt, whose Renton Tech aircraft-assembly program sent dozens of graduates to Boeing. Yet he said few of his trainees are complaining about that. For one thing, they were probably making \$10 an hour before—assuming they even had a job. For another, those Boeing hires were getting bonuses, in some cases, and plenty of overtime. "The thing is, they're all working forty-five to fifty hours a week ...," said Watt. "No one's working forty-hour weeks anymore (at Boeing). And that's time and a half, so they're all doing pretty well."

However, the average Air Washington salary at many of the other aerospace companies was somewhat lower, around \$30,000 per year, and in some cases in the mid to high \$20,000s. Differing wage rates around the state also influence aerospace pay, with urban areas usually paying better than rural areas. Carol Weigand, Air Washington's director until 2015, said it was true that not all aerospace jobs pay as well as those at Boeing. "Sometimes, the aerospace jobs are not much more than minimum wage at entry, but your ability to advance is better," she said. That's a key consideration for many of the trainees, such as Baylee Ballard, who felt stuck at around \$10 an hour as a caregiver.

Watt said the advancement opportunities are "amazing" at Boeing. "That's why everybody

wants to go there," said Watt. "After a year of service there, they put several thousand dollars behind you for professional development, and [that applies] each year you're there. So you could come through our assembly class and work for a year, and then come back and take the tooling class on Boeing's dime. You can go from making \$16 an hour, to \$25 or \$30." Watt encourages all his graduates to take advantage of those professional development opportunities. He advises his graduates to keep in mind that aircraft assembly workers are especially vulnerable to periodic layoffs, so they should learn advanced skills. "One of the things that Boeing told me was that the most valuable employee they have is the employee that is trying to be more valuable," said Watt. "They encouraged people to go and use that money and move around the company."

Air Washington graduates at other aerospace companies have a good chance of ending up working for Boeing as well.

**Average yearly salary
of an Air Washington
graduate employed in
aerospace: \$34,202**

**Average yearly salary
of an Air Washington
graduate employed at
Boeing: \$49,189**

"The reality is that when Boeing hires, they usually take people from the suppliers, and the suppliers backfill," said Weigand. "We don't recruit from the suppliers directly," said Boeing's Greenwood. "But let me give you an example. When there is an opening for assembly mechanics or electrical assemblers, or even technical salaried positions, when those openings occur at the Boeing Company, we are looking for the best and brightest talent. So in



many cases, a lot of the employees that worked for the supply base would apply for those jobs. And of course, the mission is to fill the jobs. So many, many, *many* Boeing employees that are on the payroll today came from the supply base.”

Percentage of women trainees in Air Washington: 10.6 percent

One lesson is abundantly clear from the state’s aerospace history: Another bust will arrive someday. In fact, a May 2015 headline in the *Puget Sound Business Journal* might have given some pause to students who are training for the industry: “Washington aerospace jobs to drop 8 percent by 2020.” The article was based on a report by the state’s Aerospace and Advanced Materials Manufacturing Workforce

Pipeline Advisory Committee, which predicted that total aerospace employment within the state would drop from 93,300 in 2015 to 87,000 by the year 2020. However, a closer reading revealed that the committee was not predicting a full-fledged bust, or anything near it. “Don’t expect massive layoffs,” or even a decline in the hiring rate, said the story. Most of the drop will come because of retirements in Boeing’s aging workforce over the next several years. Not all of those workers will be replaced, but most will be—by younger, trained workers.

AIR WASHINGTON’S GOALS AND OUTCOMES			
	Original Goal	Revised Four-year Goal	Actual Tally as of Mid-2015
Total participants trained by Air Washington	2615	3752	4722
Short certificates earned	481	1841	3997
Long certificates earned	395	488	786
Two year degrees earned	448	241	356
Trainees employed after completion	795	1134	1605



CHAPTER 9

A Skilled, Available Workforce

WHEN DAVE COX TESTIFIED IN 2014 BEFORE THE U.S. HOUSE SUB-committee on aviation, he told the lawmakers that Air Washington has “set a great example” not just for the state, but for the nation. “Our results are proof of that,” he told them. Air Washington had shown everyone “how to do one of these projects,” he said.

What, exactly, had Air Washington done right? Cox told the lawmakers that Air Washington’s success was due to five major factors:



- > The project addressed an urgent economic need specific to its state: Training a skilled aerospace workforce.
- > It included the aerospace industry as a partner from the beginning.
- > It complemented the state government's similar efforts, which would help sustain the program after the grant expired.
- > It was managed openly, transparently, and efficiently. Keeping track of solid, verifiable data was a priority.
- > The navigators were the "linchpins" making it possible for students to find the program, stay in the program, and obtain jobs in the industry.

As the project wound down in 2015, program managers and other observers identified several more key lessons learned, and expanded on Cox's original five:

The navigator role is crucial: Many of the people involved with Air Washington described the navigators as the most significant contributors to the program's success—in Carol Weigand's words, the "real integral piece of the puzzle." Every college had at least one navigator and it is no exaggeration to say that they made the program work at every step. Many of the successful graduates cited a specific navigator as the reason they found out about the program in the first place. Then they credited the navigator for helping them resolve sometimes perilous problems while in school. Finally, most credited the navigator with guiding them directly toward the jobs they got. "Having a person to go to for feedback and questions is a big help when faced with the challenge of getting into a new career field without much experience," said student Nic Reisert of North Seattle College, referring to navigator David Duché. The navigators weren't just crucial to the students; they were also crucial to the aerospace companies. When employers needed to find a trained worker, they turned to the navigators.

FACING PAGE: Dave Cox, dean of instruction for the technical division of Spokane Community College, was Air Washington's lead administrator and the voice of the program.

Air Washington did not invent the navigator concept. It had already been used in other programs. However, Mark Mattke of the Spokane Workforce Development Council said that Air Washington used navigators more extensively and more effectively than ever before. His organization benefited from that experience. "It has now become a key part of our business model," said Mattke. "We have actually institutionalized the navigator as a key function for our business-service deliveries." He said that he now has navigators dedicated to the region's five most important industrial sectors: manufacturing, health care, transportation–logistics, finance–insurance, and professional–scientific–technical services. "Air Washington allowed us to more fully fund that effort, and to test it, and to pilot it as a proven structure that makes sense," said Mattke. "... It needs to be sustained, because employers have come to view this as an intrinsic part of the system: They have someone, a navigator, who they can pick up the phone and call, and will know what their needs are." In Seattle, Sessions had already used navigators in previous projects, but she used the word "intensive" to describe Air Washington's application of the concept. "Frankly, without that intensity, I don't know if we could have continued to coordinate well with the three different colleges (in King County)," she said.

Make industry a full, contributing partner: The navigator concept wasn't the only crucial seed planted in the original grant application. The first two items on Cox's list were also there from the beginning, and they can be combined and summarized as follows: Pick an economically crucial industry and make sure it is treated as an equal partner. With Washington's aerospace history and the industry's oversized impact on the state's economy, it would have been difficult to conceive of a more important jobs program for the state. Then, from conception to execution, Boeing and dozens of other



companies influenced what skills the grads would learn. Michael Greenwood, who was for years Air Washington's crucial Boeing link, said this had repercussions felt in the very roots of the state's economy. "My experience tells me that when a company is considering expansion or an initial launch, they certainly look at the tax base and infrastructure with roads and highways and the accessibility to the suppliers," said Greenwood. "But make no mistake, being able to shine the light on a skilled, available workforce for industry is right up there with the most important decisions that have to be made. ... You've *got* to be able to promote the fact that you have a skilled workforce ready. Did Air Washington succeed in that? No question."

Eleven colleges are better than one: Size matters. This was a key concept that several of the state's college presidents recognized early in the process: Go big. Don't just conceive a program for one college. Conceive a program that will get the attention of an entire state. Ellen Gordon of South Seattle College said, "All the colleges worked together instead of competing for resources—there were real economies of scale." Simmons said it was the best grant project she had ever seen in her decades in the field, and one reason for that was its size. "It was actually enough to move the needle," she said. This sentiment was echoed by many others, including Greenwood. He said the sheer scope of the Air Washington project caught the attention of the industry. "Air Washington was a good place to plant the seed: Washington could become the aerospace training hub in the United States," said Greenwood. "And in some skills, maybe, even the world."

Bring in other agencies and let them do what they do best: Air Washington consisted of more than just the eleven colleges. It also included the Center of Excellence for Aerospace and Advanced Materials Manufacturing, which already knew how to connect community colleges with industry. It included the Aerospace Joint Apprenticeship Committee, which already knew how to connect new trainees with companies. It included the state's many Workforce

Development Councils, which already knew how to get unemployed people into jobs. It included the Washington Aerospace and Advanced Materials Manufacturing Workforce Pipeline Advisory Committee, which knew how to identify the skills the aerospace industry needed. Air Washington brought all of these together. "Oftentimes, you'll see partnerships thrown together ... create a sort of ad hoc organizational structure," said Workforce's Mattke. "But we have the infrastructure in place to make this successful." The key, he said, was giving each organization its proper role and allowing enough freedom to fulfill it. "All too often what happens is, you try and do it all," said Mattke. "You try to be the trainer, and the business liaison, and do the job placement. And that's not your core competency." Simmons said the Center of Excellence for Aerospace and Advanced Materials Manufacturing, housed near the heart of Boeing's manufacturing center at Paine Field in Everett, became a particularly important liaison between industry and the colleges. She recommended, in her 2014 Air Washington Progress Update, that any consortium attempting a similar program can improve efficiency and reduce costs by having this kind of partner.

Communication is crucial: A large consortium, of course, comes with large communications challenges, which is how the term "herding cats" gained currency. Cox, Weigand, and the other managers developed several strategies right away that they say made the communication much easier. "One very wise thing that Carol Weigand did ... was to facilitate a weekly conversation [among the colleges,]" said O'Halloran. "That brought in a sense of collaboration among the community colleges. Already, that felt new, felt good, and led to other benefits. We knew right there that we had a fresh feeling." Few colleges had ever been involved in a consortium of this scale, and Weigand, Cox, and the other grant managers sensed that a regular, routine conference call by phone would head off a lot of complications. "Everybody could dial in and get absolute openness on the financial management,"



Alaska Airlines' Kevin James, left, and David Wheeler, center, work with South Seattle College student Michael Cooke, right, as part of aviation maintenance team training at Alaska Airlines.

said Simmons. “Nothing was ever withheld. Everyone knew what the budget was, knew what everybody else had.”

During the grant proposal development phase, communication was also key to pulling the stakeholders together. “The biggest thing I learned from that was: communicate early and communicate often,” said Doyle. “Make sure people feel heard and valued, and if you can’t meet their need, you’re up-front with them about why.” It required, she said, “a lot of persistence and finesse.” Yet the rewards were worth it. This contains a “very deep lesson,” said Mattke. “Partnering is difficult and collaboration is challenging. There are different rules and restrictions. But at the core is the customer, which is the business community and the students that you serve. Keep your eye on who your customers are and what they need. It’s our job to make sure they get what they need.”

Communication was crucial at another level—what might be called the classroom level. Bill Bonaudi, who retired as president of Big Bend Community College in 2012, said

the grant allowed his aircraft maintenance instructors to visit other Air Washington colleges. “They saw some programs that really had some good ideas,” said Bonaudi. “And they were very open and willing to share.”

Give the partners flexibility within the framework: Air Washington, like one of Bill Boeing’s early spruce biplanes, had a strong framework, but not a rigid one. This allowed each college to tailor its programs to its own local needs. “They knew their programs best,” said Weigand. “So it wasn’t as scripted. I think this was one of our successes. Some projects get very detailed and scripted to the point where the colleges feel like their hands are tied. Part of this funding was about innovation and best practices and trying something new.” Simmons said this can be traced back to a particular characteristic of the state’s community and technical college system. The colleges are separately accredited and independent. Yet a structure exists to tie them all together, the State Board for Community & Technical Colleges. “The vocational deans from every



ABOVE: *Mary Kay Bredeson, the executive director of the Center of Excellence for Aerospace and Advanced Materials Manufacturing, a key Air Washington partner.*

FACING PAGE: *The Advanced Machining and CNC Lab on the campus of Spokane Community College is split into two sections. On the left are computerized milling machines and on the right is advanced machining equipment.*

college in the state meet quarterly,” she said. “They know each other, they have each other’s phone numbers, they work on committee projects together. I mean, we had a real advantage over some other states who don’t have a state system.” This sense of collaboration existed before Air Washington, but Simmons said this project “really pushed it to another level.”

Hire good people: This seems obvious, yet it can make the difference between success and failure. One outside—yet close—observer said she was convinced that hiring practices were critical to the entire project. “This \$20 million grant was probably won because of the quality of people that Spokane hired,” said Mary Kay Bredeson, from her Everett office. “I’m firmly convinced of that. They did an outstanding job from the get-go. And that was the leadership of Dave Cox and Carol Weigand and the whole team they had.” This, too, did not happen by accident. Doyle said she saw something special in Weigand’s people skills when she first hired her for an earlier project. Weigand was working at a cookware store, yet Doyle saw her potential for more challenging work. Weigand reached that potential in Air Washington, and as the grant was winding down in early 2015, Weigand moved on to a new, high-profile job as the director of program development and operations at the Spokane branch of the University of Washington School of Medicine.

Chancellor Christine Johnson of the Community Colleges of Spokane said that the quality of the deans, faculty, and administrators at the other eleven colleges also proved to be high. “We couldn’t have done it with just *some* of the colleges doing their part,” said Johnson. “It was, in fact, a huge team effort. ... Sometimes, we can think up a good idea, but it is not very well implemented. Here it was uniformly well-implemented in each of the participating colleges.”

Don’t assume that a project of this magnitude can spring instantly to life: Air Washington learned some lessons the hard way and this one was of the most important. “Some good hindsight for those who are going to follow us in these kinds of big projects—that



have a lot of moving parts—is that you have to plan a ramp-up time to the project,” said Cox. “We didn’t do it. What we basically described to the Department of Labor (in the application) was to go from zero miles per hour to 100 miles an hour in one day. And that caused us great challenges. ... Honestly, the first two quarters we were ramping up, when we should have been—by description in our Statement of Work—making numbers, producing graduates, getting people employed. It was a great lesson learned and I don’t want it to get lost.” It was a lesson that the Department of Labor evidently learned as well, since it later allowed the grants to run for four years instead of three.

Grant management itself is a key part of the project: A federal grant comes with many reporting requirements, oversight rules, “deliverables” obligations, and unbendable deadlines. Cox said they spent a lot of early time taking, in essence, a crash course in how to manage a federal grant. They even had to modify their project after their application had been accepted, to make certain they were in compliance with various Department of Labor requirements. Data management of all kinds, and keeping the Department of Labor up-to-date on progress and outcomes, was vital to the success of the project.

One of the biggest grant-management challenges came under the general heading of “budget modifications,” and it became a source of considerable stress, according to Ellen Gordon. For the first time, the community colleges, instead of the Workforce Development Councils, were taking the lead on a large Department of Labor grant. “Colleges scrambled to fulfill responsibilities normally taken on by experienced staff of Workforce Development Councils,” said Gordon. “Staff were hired, large contracts were negotiated, and new project managers took a deep dive into employment data collection and tracking and came to the realization that there was a substantial turn-around time for budget modifications. The normal ‘nimble response’ of the community colleges as subcontractors adjusting to on-the-ground circumstances was not possible.” The colleges had to adjust to this new reality.

Use the energy of the grant in creative ways: Dave Cox was particularly pleased with a strategy he employed early in the project to acquire a King Air turboprop for Spokane Community College’s aircraft maintenance program—without spending Air Washington grant funds. This King Air had originally been included in the grant proposal—for excellent reasons, said Cox. “(Our students) had been





working for decades on an old 1950s Air Force taxi jet,” said Cox. “It was more of a museum piece than anything else. . . . It was terrible and embarrassing to the program.”

Yet to keep the grant proposal under \$20 million, the writers reluctantly had to chop this and some other airplane purchases from the final budget. During the next few months, Cox thought hard about this problem and eventually came up with a creative plan. He figured out how much tuition the newly expanded aircraft maintenance program would generate for Spokane Community College, and realized that it would more than cover the cost of the King Air. So he went to Chancellor Johnson and explained his plan. The Community Colleges of Spokane would essentially loan the money to Spokane Community College for the King Air purchase. The college would then pay it back over the next three years from its increased tuition income. Johnson approved Cox’s innovative solution. “In another month, we’re shopping for a half-million-dollar aircraft,” said Cox.

“It was like borrowing from within the family,” said Johnson. “It was very evident that it would make a difference and . . . really have a lasting impact.” The risk turned out to be negligible, since more than enough students signed up over the next three years to produce the additional tuition. “My term for this is using the energy of the grant in a synergistic way to get a big thing done,” said Cox.

Be realistic about employment goals and income goals: It is all too tempting, when embarking on a program like this, to be overly optimistic about employment goals for students. Air Washington was realistic about its goals, and exceeded most of them. Even so, some Air Washington grant managers found it hard to accept the frustrating reality that 100 percent success is never possible. As one put it, “Not everyone turns out to be employable.”

As for income goals, Bonaudi noted that the very existence of a jobs-training program can sometimes put downward pressure on wages. “That’s the downside of a responsive community college system,” said Bonaudi.

“Businesses are interested in flooding the market with well-trained workers. That way you can keep wages down because there is competition for the job. . . . It’s a strain on the colleges, because you want to be responsive. You set these things up, and then, as you meet the most immediate demand, the demand slacks off a little bit, and you have this backlog of students.” He was not saying that this happened with Air Washington, but it is something to keep in mind in any program.

As Air Washington approached its final months in mid-2015, people both inside and outside the program began to think about its legacy. In March 2015 Air Washington was chosen as a “TAACCCT Standout,” an “exemplary workforce training program.” It was one of only nine projects—out of a total of 187 grant projects over four years—to be selected by participants in the Open Professional Education Network (OPEN) Showcase Fair at the TAACCCT-ON! Conference in late 2014. OPEN is a nonprofit organization, funded by the Bill and Melinda Gates Foundation, dedicated to helping grantees meet the TAACCCT requirements. The award cited Air Washington’s close working relationship with a vital national industry, its widespread benefit to the state, and its accessible, online curriculum.

However, to Carol Weigand, Air Washington’s legacy was simpler and more personal. “We changed students’ lives,” she said. Many instructors were convinced it changed their programs for the better as well. Dan Moore, an instructor at Big Bend Community College, said his funding was “basically zero” before Air Washington. Then Air Washington brought not only money, but also attention that his program had never seen before. “All of a sudden, we’re getting a lot of students,” said Moore. “And I can credit the fact that they are funding the school, funding this industry, and advertising the fact that there are a lot of opportunities.” Rob Watt of Renton Technical College provided a long-term perspective. “I’ll put it to you this way,” he said. “I started doing this navigation and placement and recruiting in



1996 in aerospace. And it has always been hard to get certain folks jobs in that industry. It's been hard to get minorities and women of color in the door there. Just women in general. And the barriers are down [now]. It's been nineteen years of looking at it, and now it's finally here, and I don't want it to end. I do think Air Washington is responsible for that."

Beyond the several thousand people trained, there's no single way to quantify the worth of Air Washington. Did it reduce the unemployment rate? It certainly played a part in getting many people back to work. It may have helped reduce government costs in other

“We changed students’ lives,” she said. Many instructors were convinced it changed their programs for the better, as well.

ways. “It’s putting people back to work who have been on food stamps,” said Stanton. In some cases, it catapulted people on the lower end of the economic scale into the middle class. Watt said that his new Boeing hires were making well into the \$40,000-a-year range, including overtime. It also supported an industry vital to the state’s economic well-being and to the nation’s balance of trade. “You know, there were a lot of people who felt these stimulus programs were just federal giveaways,” said Dunlap. “Taxpayer waste. But if you look at how these grants helped the recovery during the recession, I think it was really important. Let me give you an example. At this college, during the recession, our enrollment went up by 46 percent because people didn’t have jobs and were getting retrained. That was universal throughout the country. So these stimulus programs gave a place for those individuals to be trained, and then reenter the work force.” Dave Cox told the U.S. House subcommittee that

Air Washington’s success should, “if anything, give confidence to lawmakers like yourselves to positively consider these kinds of projects in the future, and balance that maybe against some that aren’t working so well.”

Bredeson, at the Center of Excellence for Aerospace and Advanced Materials Manufacturing, listed the multiple ways that she thought Air Washington succeeded. “We placed students in some great family-wage jobs, with the proper training,” she said. “It opened communications and trained the community colleges to work closer together. ... It provided professional development for our instructors. It provided offshoots—Composites Washington being one of them. We are now using the same formulas to develop mechatronics, or industrial machine maintenance. ... We’ll use the same prescriptive formulas that worked well for us with Air Washington. That was the best practice, and we’ll continue that.” Air Washington also brought the community colleges and Boeing together. “I think Boeing respects the community college system,” said Bredeson. This collaboration led to the formation of the Washington Aerospace and Advanced Materials Manufacturing Workforce Pipeline Advisory Committee, which brought industry, the colleges, and the state even closer together. This committee makes recommendations to the governor about how to sustain aerospace training. Bredeson believes that Air Washington also brought aerospace training something it never had before: buzz. “It brought it front and center,” she said. “We’ve gotten a lot of great press.”

Greenwood, who left Boeing during the grant period to take a workforce development job with another Washington behemoth, Amazon, was perhaps more enthusiastic than anyone about Air Washington’s results and legacy. He said his work with the Air Washington grant was, “in all my years, the most rewarding and most exciting work that I had ever been involved in ... I love this stuff.” His enthusiasm extended way beyond personal satisfaction—he believed that it made an impact on the state’s economic future. “This



Aircraft of all types make up the training regimen of Air Washington's aircraft maintenance program.

is a little bit of an editorial, but I would tell you that states that do not have the Boeing Company in their backyard, are *desperate* to have the Boeing Company in their backyard," said Greenwood. "Because they see the tangible financial incentives that are created from having a company and industry like that in their backyard. ... I could argue pretty wholeheartedly that it's the most important job base in the state. We have other great companies as well, including Amazon and Microsoft, and health care systems that I think are just as important, but manufacturing jobs are family wage jobs that really tie and hold down an economy. Not just in Washington but nationally. It's hard to quantify this, but having this kind of industry in your local area means you will always be first with new technologies and with infrastructures to support that sector of the economy. So there's a lot of byproduct that comes from having that work done in your local area, and quite frankly, it drives the value of the community in which you operate—housing values, school funding, and the list goes on. So those manufacturing

jobs are absolutely critical, and if you ever want benchmark proof of that, talk to state leaders who have been trying for decades to get those industries into their communities. They'll tell you how important that is."

Did Air Washington have an actual effect on Boeing's commitment to the state? "No doubt," said Greenwood. "No doubt, when you think about the highest levels of leadership within the company making those decisions, and you have a \$20 million grant that is specifically targeted to build the skills and talents of people that support the industry? No doubt it had an influence on the company and its decisions." Washington Governor Jay Inslee's administration was clearly grateful for what Air Washington accomplished. "It provided a huge infusion of resources to train folks up at a critical time for the industry here in Washington," said Pietsch, the governor's spokesman on this subject. "I think it demonstrated for us the need to continue to fund these programs at high levels. Obviously, we'd love to have the federal funding ongoing ... but it has also



Instructor John Mensonides makes a point during an advanced composites class at Clover Park Technical College Aviation Center.

prompted us to invest in the state level in these programs as well.”

The state’s \$8 million per year commitment includes funding for one thousand full-time-equivalent students each year in aerospace. In 2014, the State Board for Community & Technical Colleges convened a ten-member panel to review forty proposals from the state’s community and technical colleges to decide how to allocate that \$8 million. All eleven of the Air Washington colleges submitted proposals aimed toward sustaining at least parts of their programs; all eleven were awarded funds. So were ten other colleges. “So the work will continue,” said Kendra Hodgson, policy associate with the state board. “The foundation was already there.” Beyer said he believed that the momentum created by Air Washington led directly to the \$8 million legislative commitment. “I can see a lot of logical trails, or pathways, leading to where we are today,” said Beyer. “And Air Washington is the beginning of them.”

Air Washington’s federal grant will expire on September 30, 2015, but aerospace training

will not. “The governor understands that we have the largest and most robust aerospace workforce in the world,” said Pietsch. “He’s very proud of that fact and he is dedicated to making sure that we maintain that.”

Some people were concerned that aerospace training might hit some turbulence when the grant expires. “I don’t know if the college will allow me to keep my third instructor

The state’s \$8 million per year commitment includes funding for one thousand full-time-equivalent students each year in aerospace.

and my lab assistant,” said Moore at Big Bend Community College. Both of those positions were hired with Air Washington money. “If I lost my third instructor, I would not have a fall

Joe Kelley, 22, Clover Park grad working for Boeing

JOE KELLEY was a general manager at a pizza store in North Tacoma when he realized he wanted more. He decided to go back to school.

It wasn't easy. But since he was the one who made the schedules at work it was a little easier than it might have been. "Since I was the manager, I was able to make my own schedule and juggle my time," said Kelley. "I would work from opening the store at 8 a.m. to 2 p.m. or 3 p.m. at the latest. Often, I'd grab a quick bite to eat and go to school in the same clothes. I'd get out at 8 p.m. and I'd have to do homework. Then it would start all over again."

On occasion, Kelley says, he'd have to go back to work after school if someone got sick or quit. "Sometimes I'd be there until 1 in the morning," he said. "It was definitely a tough time, but it paid off in the end."

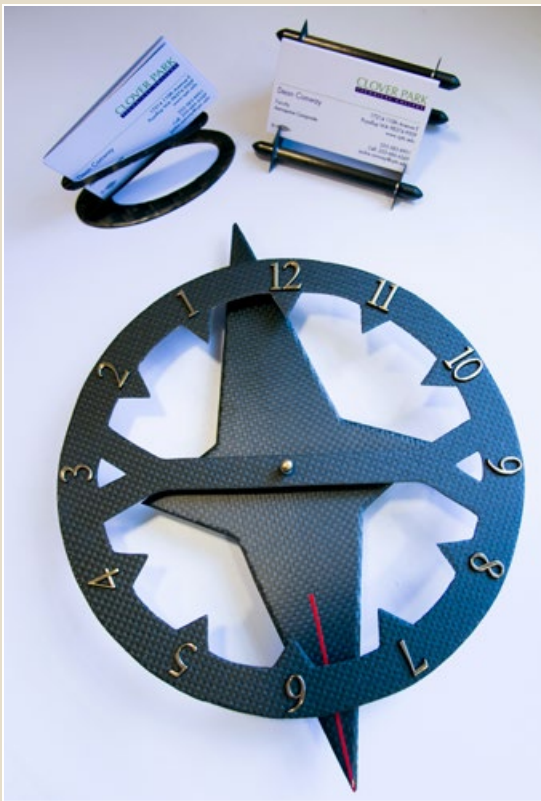
Kelley is now working in Boeing's Advanced Developmental Center as a composites applicator. "We develop products, stabilize the workflow issues, and then send them off to different vendors or send them off to another Boeing plant to start production," said Kelley. "We take all of the headaches and work through the processes so we can get the production going."

The path to his current job started with Kelley's decision to attend Clover Park Technical College, where he quickly learned about the Air Washington program. He took courses in blueprints, mathematics, materials, and aerodynamics. "The math went into things I didn't think I'd be able to do," said Kelley. "We were all trying to get to the next level and we all had the same goal in mind. We would all help each other out. Some people were stronger in some areas, while other people were stronger in other areas. It worked out."

Kelley says that the instructors and the Air Washington navigator were a big help.

"The navigator really opened my eyes," he said. "He knew aerospace as a whole and he said, 'OK, you can work at this company, or this company, or this company. You can even make parts for spaceships.'"

Kelley says that if it wasn't for the Air Washington program, "I wouldn't be here." He's doing his best to repay the favor by returning regularly to Clover Park to talk with students. "I remember sitting in the same seats and needing someone to tell me at the end there is going to be opportunity, or a better-paying job and benefits," he said.



Student projects in a composites class include a clock and two card holders.



enrollment. I might have to cut it [the program] in half.” Stanton was worried about what would happen with the students she was nurturing if they no longer had a navigator to help guide them through a complicated process. Dunlap was confident that all of the institutions would want to keep their programs going—if they could afford to. Others were convinced that their programs will keep on rolling precisely because of the momentum generated by Air Washington. Watt said that Air Washington produced full classrooms, plenty of tuition-paying students, updated equipment, and a lot of attention toward aerospace training, and it will not stop with the end of Air Washington. “If we get the full classrooms, and get the enrollment, then we should be OK,” he said. Gordon of South Seattle College echoed that, saying that as long as there is high demand, many of the courses should be able to continue. Bonaudi made the point succinctly: “If the program demand is there, the college will make the correct budgetary decisions.” Some colleges have found other funding to fill gaps, including a Gates Foundation grant for pre-employment at Everett Community College.

In 2014, Clover Park Technical College also won a \$2.5 million Department of Labor grant of its own for advanced-manufacturing training. Meanwhile, ten Washington colleges formed an alliance called Composites Washington to emulate Air Washington’s strength-in-numbers example. Johnson said the Air Washington experience has given the entire consortium the expertise and confidence to go after similar programs in other industries. “It really helped us to learn how to respond to industry needs fast,” she said. “I believe community colleges all across the country are very nimble and agile in getting the work done. That’s kind of our genius. But this really helped us fine-tune those skills.” Bonaudi said that “just about all of the health science programs in the community college system” now reflect the same approach. At Everett Community College, the momentum created by Air Washington helped the aerospace program to thrive, which led to the opening of its new \$4

“There are a lot of people working in the aerospace industry now who weren’t otherwise going to get that opportunity...”

million Advanced Manufacturing Training and Education Center, housing five aerospace programs. “We could not have done that without Air Washington and its training partners,” said Beyer.

In the end, college presidents Dunlap and Beyer were proud that everybody in the Air Washington consortium simply did their jobs—on an extra-large scale. “That’s what community college is about: Putting people to work,” said Dunlap. “I think it changed people’s lives, including the people who were involved in the grant. [They were] able to see beyond what they had traditionally done, and ... [were] able to think about new possibilities, and new relationships, and new techniques.”

“There are a lot of people working in the aerospace industry now who weren’t otherwise going to get that opportunity,” said Beyer. “So, yes, for thousands, it made a big impact.” He believed it also proved something intangible about the state. Before Air Washington, he said, there were questions about whether the state and the education community were willing or able to commit the resources necessary for aerospace training. It takes, in Beyer’s words, a certain amount of “moxie.” Does Washington have that kind of moxie? Air Washington, he said, proved that “yes, we do.”



Afterword

By Christine Johnson

WASHINGTON STATE HAS THE LARGEST CONCENTRATION OF AEROSPACE expertise in the nation, with more than twelve hundred aerospace-related firms employing more than ninety-four thousand workers. It is essential

that these companies have access to skilled machinists, programmers, aviation mechanics, assemblers, avionics technicians and composite fabricators.

Through the Air Washington grant, Washington State's community and technical colleges demonstrated our unique ability to quickly and comprehensively train this highly skilled workforce. Our community and technical colleges share a commitment to educating all people to improve their quality of life. The infusion of \$20 million made enhancing and expanding training programs for people of all skill levels possible and also strengthened partnerships with the aerospace industry cluster. The tasks set forth in the grant required teamwork, coordinated communication, and careful fiscal management involving a vast network of colleges, industry representatives, and government departments.

This expansion of aerospace training programs at the eleven consortium colleges was targeted to meet regionally specific workforce needs and will continue long after the federal grant ends. Strong and strategic partnerships have been formed with private sector employers, who will continue to be a resource for graduates and for program leadership dedicated to maintaining that industry relevance.



Christine Johnson



Administering a grant of this size, with so many colleges and private sector partners, required a complex balance of coordinated, frequent communication and candid feedback, so that lessons learned could be identified immediately, thus allowing adaptations to occur during the project. The value of administrative visibility, proactive problem-solving, and in-person meetings cannot be overstated.

Managing a \$20 million budget called for scrupulous attention and meticulous record-keeping. While each college managed individual budgets, the oversight of the entire budget was the responsibility of Spokane Community College as the lead agency. This responsibility was managed by the larger superstructure of the Community Colleges of Spokane District administration.

We can be sure that lives were changed, with more than 4,700 students trained and transitioned into the workforce, where they can enjoy new economic opportunities. These students, including more than 650 veterans, demonstrated Washington State's commitment to expanding the aerospace industry's footprint in all regions. This ripple effect across our population and economy is noteworthy.

As the Air Washington grant comes to a close, we can be certain its impacts will be long-lasting and its model will be applied to future initiatives in other industry sectors. Valuable lessons were learned by all of the colleges. And the consortium is poised to share this new knowledge and experience in managing a complex industry-specific partnership. We have established a template that future workforce training programs can utilize for other industries.

I look forward to future opportunities for our community and technical colleges to lead and support new partnership efforts, and I hope the Air Washington experience serves as a resource to others.

DR. CHRISTINE JOHNSON IS THE CHANCELLOR OF COMMUNITY COLLEGES OF SPOKANE.



A Note on Sources

Most of the information in this book came from thirty oral history interviews conducted by lead writer Jim Kershner in spring and summer 2015, with the following people: Joe Dunlap, Dave Cox, Carol Weigand, Christy Doyle, Patrick O'Halloran, Mary Kaye Bredeson, Katé Lyons-Holestine, Michael Greenwood, Mark Mattke, Mary Stanton, Rob Watt, Rob Reneau, Jeremy Slack, Dixie Simmons, Alex Pietsch, Clyde Rasmussen, Dan Moore, Ellen Gordon, Baylee Ballard, Adam Stratton, Riva Morgan, Levi Hay, Maitland Peet, Craig Seybold, Stephanie Thompson, Kendra Hodgson, David Beyer, Christine Johnson, Crystal Rose Hudelson, Bill Bonaudi and Marlena Sessions. We endeavored, as much as possible, to identify these sources within the text. HistoryLink writers Margaret Riddle, Patrick Marshall and Kate Kershner also conducted additional interviews with college administrators for the college profiles and also with the students in the student profiles throughout the book. A few student quotes came from videos produced by Air Washington and posted on the Air Washington website.

We had access to numerous documents at Air Washington's offices at Spokane Community College, including the original grant application. Most of the background information about the TAACCCT grants came from the U.S. Department of Labor's website. We also had access to two mid-program evaluations written by Dixie Simmons, on file at the Air Washington offices, which proved to be particularly valuable in tracing the course of the project. Air Washington also provided a trove of outcomes data, including the numbers cited in Chapter Seven and other places throughout the book. Due to our press date several weeks before the end of the Air Washington project, these outcome numbers should not be considered final; they were still evolving until the grant's official end on September 30, 2015. Any errors or misinterpretations of the data are the author's own, not Air Washington's.

In Chapter Two, about Washington's aerospace history, we found the HistoryLink.org essays by Walt Crowley on the early days of the Boeing Company to be invaluable. In addition, the following books provided useful information about Boeing and the state's aerospace industry: *Washington, A Centennial History*, by Robert E. Ficken and Charles P. LeWarne (Seattle and London: University of Washington Press, 1988); *Seattle In the 20th Century: Seattle 1921-1940, From Boom to Bust*, by Richard C. Berner (Seattle: Charles Press, 1992); *Boeing: The First Century*, by Eugene E. Bauer (Enumclaw, Washington: TABA Publishing Inc., 2000); *Boeing Vs. Airbus*, by John Newhouse (New York: Alfred A. Knopf, 2007); and *The Story of the Boeing Company, Updated Edition*, by Bill Yenne (Minneapolis: Zenith Press, 2010). The Boeing Company's website has a wealth of valuable information about employment numbers and airplane production, as well as historical synopses of many of its airplane models.



Acknowledgments

This book would not have been possible without the unfailing cooperation and assistance of Air Washington’s administrators, teachers, and students all across the state. We faced an exceptionally tight deadline—less than two months to write the bulk of the manuscript—which meant that even a few days’ delay in getting an interview might have proved damaging. Everyone connected with Air Washington generously made themselves available when we needed them and for as long as we needed them. We would particularly like to thank Carol Weigand, Dave Cox, David Beyer, Joe Dunlap, and Christy Doyle for patiently explaining the essential nature of the project and its origins. Katé Lyons-Holestine and Mysti Reneau were invaluable in providing data and information and helping to connect us with sources at all eleven Air Washington colleges. We would also like to thank Michael Greenwood, Alex Pietsch, and Mary Kaye Bredeson for providing crucial perspective from outside the project. Dixie Simmons proved to be an uncommonly knowledgeable and valuable source, combining both an insider’s and an outsider’s perspective. We would also like to thank Governor Jay Inslee for his Foreword and Chancellor Christine Johnson for her Afterword. Most of all, we would like to thank all of the Air Washington students—from Wenatchee to Renton to Port Angeles—who generously shared their stories. These stories lie at the heart of Air Washington—and of this book.



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Students take notes as instructor John Mensonides lectures. Photo © Natalie Fobes.

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Pieces of aircraft, engines, and mechanical systems are stored in the Spokane Community College Maintenance Building. Photo © Christopher Anderson.

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The shell of an airplane body frames students. Photo © Christopher Anderson.

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Students in the Advanced Machining and CNC Lab are framed by examples of some of the projects they have to complete. Photo © Christopher Anderson.

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A sketch of the then revolutionary Boeing 247-D. 1935 ad.

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About the author

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HistoryLink.org, the free online encyclopedia of Washington State history, was the nation's first community history encyclopedia designed expressly for the Internet. It is a program of History Ink, a 501(c)(3) nonprofit corporation dedicated to pursuing innovative approaches to historical research. History Ink has produced more than a dozen HistoryLink books on subjects related to the history of the Pacific Northwest.



MOST OF THE ELEVEN COLLEGES PARTICIPATING in the Air Washington consortium already had aerospace programs of their own, but winning a \$20 million federal grant allowed them to expand their programs, purchase new equipment, including airplanes, and hire more instructors. The colleges also cooperated to align their program offerings, making it easy for students to move from one college to another.

Besides additional faculty, the colleges took the innovative step of hiring “navigators” whose job was to help students get into the right classes, keep them in those classes when they had study or personal problems, and to help them get jobs when they finished. The result was a high graduation rate for Air Washington certificate programs. Many students say the program changed their chances in life, and Boeing and other aerospace companies have praised the program.

FRONT COVER: *The Air Washington aerospace education initiative undertaken by a consortium of eleven community and technical colleges spans the state from the wheat fields of the Palouse to the mountains of the Olympic Peninsula. In the inset, student Elaine Tuisila works on a class assignment at Clover Park Technical College.*

BACK COVER, TOP: *Brian Moen, left, and Chris Chalmers learn to rivet in Spokane Community College's Airframe and Powerplant program.*

BACK COVER, BELOW: *Inside one of instructor John Mensonides's classes at Clover Park Technical College.*



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