

COVER STORY

Does Wright Patterson Need a Boost?

By Lynn Wasnak

Wright-Patterson is the world's largest Air Force base. It boasts some of the finest research facilities anywhere. But could it contribute more to Ohio's economy?

It's the largest employer at a single site in Ohio, with more than 35,000 workers on 8,000-plus acres. Payroll exceeds \$2 million a day. It's the home of more than 100 different organizations beneath the umbrellas of the U.S. Air Force and the Department of Defense. Its offices are a major conduit for Ohio businesses seeking to learn the pathway to lucrative government contracts. Dayton's Wright-Patterson Air Force Base (WPAFB) is one of Ohio's most important assets. And yet the role it plays in the state economy is not well understood outside the surrounding Miami Valley.

That's not surprising. The base is dizzying in its complexity.

The host, or landlord, of WPAFB is the 2750th Air Base Wing, an affiliate of the base's largest tenant, the headquarters of the Air Force Logistics Command (AFLC). AFLC is the third largest of 13 major Air Force commands. AFLC headquarters manages the purchase, modification, repair, and distribution of U.S. Air Force airplanes and support equipment worldwide. It also oversees about 19 other functions at WPAFB, including the Wright-Patterson Contracting center, the Air Force Museum, the USAF Medical Center, an Air Force Contract LawCenter, Air Force Packaging Evaluation and the 661st Air Force Band!

WPAFB's other major tenant is the Aeronautical Systems Division (ASD), the largest product division of the Air Force Systems Command. Always looking to the future, the ASD creates and develops new aircraft and related equipment, such as the F-15 and F-16 fighter aircraft, and the Stealth (B-2) bomber. Although ASD's parent command is headquartered at Andrews Air Force Base, Maryland, ASD maintains the research arm of the Air Force at its Wright-Pat facilities. Here you'll find some of the finest research laboratories in the world for avionics, propulsion, flight dynamics, electronics technology, and materials. ASD also operates the 4950th Test Wing, several specially modified aircraft designed for test flights and research.

A sister unit of ASD is the Foreign Technology Division, which monitors and evaluates the aerospace capabilities of foreign powers.

WPAFB's research capability is also extended by the Harry G. Armstrong Aerospace Medical Research Laboratory, a unit of the Human Systems Division at Brooks Air Force Base, Texas.

Technical experts are trained at the Air Force Institute of Technology (WIT), a graduate school that ranks among the leading engineering and technical management schools in the country.

But this is far from a comprehensive list of WPAFB functions. It has weather planes, the Air Force Intelligence Service, an office of the Canadian Department of Defense Production, a Library of Congress film vault and motion picture lab, a bank, a travel office, representatives of the American Red Cross, and much, much more.

WPAFB is an unusual air base in that it employs more civilians (about 19,000) than military personnel (about 10,000). Contractors total about 6,000.

And where else in Ohio would you find a facility that employs a clothing designer, a locomotive engineer, an entomologist (to study insects), a roofer, a welder, and a sports specialist?

All this diversity means WPAFB has a huge impact on the state's economy. The figures available range from conservative estimates of \$3.2 billion prepared by the base itself, to the more inclusive \$15 billion figure prepared by the Dayton Chamber of Commerce.

You might compare WPAFB's impact with the \$9.2-billion direct impact on San Diego, attributed to its 19 Navy and Marine installations. But that figure does not include multipliers or secondary jobs.

WPAFB's influence far exceeds that of Los Alamos, the Department of Energy's large facility in New Mexico, which contributes just \$666.2 million in direct economic impact, or perhaps \$1 billion in total, on the local economy. New Mexico, however, has a special state-sponsored program to recognize and utilize its federal installations—a program that Ohio lacks.

And Florida is taking a very proactive role in developing commercial space applications, its spinoff from Kennedy Space Center and Cape Canaveral Air Force Station. Total contracts, purchases, and salaries for Kennedy Space Center for fiscal 1987 were \$702.7 million. Yet Florida has allocated staff, budget, and much publicity for its intention to create and promote the nation's first commercial space port, Space Fort, Florida.

Although defense work is primary at Wright-Pat, it seems clear that there are opportunities for many Ohio businesses and institutions that are not defense-oriented to service and support the broad range of base operations. Some relevant areas are computerization, construction, education, and services such as housing maintenance.

The AFLC lists capital assets exceeding \$125 billion and a yearly operating budget of about \$45 billion. It supports some 9,500 aircraft and 53,000 jet engines, and in 1987, it completed nearly 359,000 contracting actions, valued at a total of \$10.5 billion.

General Alfred G. Hansen, commander of the AFLC, is essentially the CEO of this vast operation. He manages 100,000 employees worldwide, and is responsible for the management of about 900,000 individual weapon systems components.

"There is no doubt that military spending is on a downward trend and ALFC will share in any reduction," Hansen says. "This is the fourth consecutive year of negative real growth in ALFC and it appears a flat defense budget may be all we can expect in the next few years.

"We are concerned about the impact budget constraints will put on Air Force readiness," he adds.

Hansen says the AFLC is similar to the corporate world in that it is driven by "bottom line" issues. "But our bottom line isn't a profit margin. My bottom line in AFLC is giving our Air Force's combat units the strength and staying power they need to win. Doing it within budget is getting increasingly more difficult," he states.

To develop better efficiency, the AFLC is restructuring its approach. "We're shifting away from an item management philosophy and moving toward weapon system management. All components will be looked at in the context of their overall system. The highest priority weapon systems will get priority in funding, acquisition and distribution," Hansen explains.

Although some contracts are awarded through AFLC's WrightPatterson Contracting Center (WPCC), the majority of its budget is funneled to various Air Force Logistics Centers around the country, which then award contracts to firms for their particular needs. Only a small portion of AFLC's total budget is placed directly with Ohio firms. But many Ohio companies receive contracts from the outlying AFLC Logistics Centers. These dollars are rarely reflected in local contract statistics.

A bright spot for southwestern Ohio was the AFLC decision to modernize its computerized management systems. Hansen says the goal is to increase responsiveness in the field, improve the accuracy of decisions, and reduce costs.

The greatest potential for new jobs is in the computer arena, particularly in software development and engineering. "Our Logistics Management Systems modernization program has already provided a strong boost to the local economy," says Hansen, because contractors are required to locate a facility within 20 miles of the base.

Logistics system modernization contracts have totaled more than \$333 million since 1985. About 50 contractors are working on the AFLC's modernization program,

employing about 4,000, and generating about \$80 million annually in payrolls for the Miami Valley.

"We are recruiting an additional 400 people in software maintenance and support disciplines. There will be a continuing need for these technical skills as our systems near development completion," says Hansen.

Head of the computer modernization program is Brigadier General John F. Phillips, vice commander of the Logistics Management Systems Center. He explains that the program will cost about \$1.7 billion on completion in the 1990s, but it will save the Air Force about \$3 billion in the same period. It will replace all existing 1960s technology, moving into an on-line environment where a wide variety of computers can be accessed through a single terminal.

The strong focus on interconnecting computers is an area that private industry is also grappling with, and Phillips expects that many techniques developed for use in this military program will be adapted to the private sector.

When possible, the Air Force uses commercially available software. It is creating the modernization system in small, bite-size chunks so cost reductions begin as soon as a particular module is implemented. Already, 32 percent of the system is up and running.

Four core AFLC functions are being updated. They include the requirements system, which determines how many widgets are needed to support its aircraft; the acquisitions function, that will generate purchase requests, track contract status, and delivery dates; the stock, store, issue function which monitors inventory, condition, location, and quantity of spare parts; and the maintenance, modification and repair function. The latter system is being handled by MRP-II, a complex program that has been used with varying degrees of success in private industry.

"We'll take help wherever we can get it," says Phillips. He is especially interested in learning about new management technology tools that might be available, particularly those that use artificial intelligence. He's also interested in tools that help different kinds of computers to work together "seamlessly".

Yet to be awarded for the modernization project are multi-million dollar contracts for an Air Force Equipment Management System, and an Air Force Tech Order Management System. There are also a number of smaller, \$2-million to \$12-million contracts yet to be assigned. "Every time we award one of our major contracts, it generates several subcontractors," offering more opportunities for Ohio businesses to get involved, Phillips points out.

The AFLC will soon be putting its technical data into a form that can be accessed electronically. Phillips expects this to encourage more suppliers to compete for contracts. Its technical standards will be shared with private industry in this form. But small companies that don't have the computer equipment to access this information will

still be able to get printed copies of requirements, so they won't be squeezed out of the marketplace.

On the other side of the base is the Aeronautical Systems Division (ASD), a distinct entity, with a budget of about \$20 billion. Lieutenant General John M. Loh commands ASD, which employs most of the 10,000 engineers and scientists who work at WPAFB.

Major programs at ASD include the development of the advanced tactical fighter, or the next generation beyond the F-15s and F-16s; the B-2 or Stealth bomber; the C-17 airlifter, a very large cargo plane; and the National Aerospace Plane, or NASP, which will take off from a conventional runway and fly directly into space, without boosters that drop off.

ASD's research laboratories have been streamlined and reorganized recently. An electronic technology lab was added to study advanced electronic components, a major cost driver for the Air Force. Loh hopes to soften the impact of frequent budget cuts in science and technology by tying ASD's budget to the overall Air Force budget.

Loh is an enthusiastic promoter of the usefulness of technology

transfer to both the military and the private sector. Speaking to the Dayton Area Technology Network (a group that was formed to improve technology transfer), Loh cited many civilian products derived from military-funded research and development. These include:

*The personal computer, which once was part of an Air Force research program into microminiaturization and the integrated circuit chip in the 1950s.

* Digital watches, calculators, and timing and control circuitry for home appliances, autos, and computers, which all grew from 1960s Air Force research.

*Ceramic cookware that withstands temperature changes, derived from the ceramic material for ICBM nosecones.

*Graphite composite golf clubs, fishing poles, skis, and tennis rackets, which originated from Air Force aircraft and engine materials research.

Loh pledges to make available to Ohio industry any and all technologies allowed by law, including lasers, materials, composites, and the next generation of integrated circuits and other microelectric devices.

But he urges business interests and area governments to stop squabbling among themselves or fearing competition, and instead band together to build on the hightech atmosphere generated by the base.

And he believes there's a big place for higher education to complete the equation.

"If government and industry are to successfully develop and mine the talent this area has to offer, we must look to academia to play a major role," says Loh. ASD-sponsored research in area universities and colleges amounts to about \$27 million annually.

Phil Bouchard, a retired general and former vice commander of ASD, is the director of the Center for Artificial Intelligence Application. The reasoning behind the establishment of this center, he explains, was the known shortage of trained experts in the Dayton area.

"ASD was managing a \$25-million research and development budget in artificial intelligence, with only six or eight bona fide experts on staff," he says. Looking five years to the future, ASD officers realized the budget would jump to \$50 million for A-1 research. And there was no available pool of experts near the base. "A-I expertise is so scarce, you can't buy it on a civil-service salary," Bouchard adds.

So ASD decided to create a local center for artificial intelligence that would boost the interest of area university students. An Air Force proposal went out, requiring that the winning contractor had to locate its resources within a 25-mile radius of Dayton. The goals of the center were two-fold: to apply artificial intelligence methods to Air Force problems, and to expand the local A-I talent base at the same time.

When local university presidents heard about the proposal, they banded together and bid on it as an entity. The four institutions were the University of Dayton, Wright State University, Sinclair College, and Central State University. They had previously established a corporation known as the Miami Valley Research Institute with the intention of joining forces to apply for contracts or grants.

The consortium approached Bouchard, and he agreed to help. "We submitted a proposal 45 days later," he explains. Just before the proposal was complete, Ohio State University requested to join the team, and was accepted.

Next, a prominent artificial intelligence company from California was included in the proposal.

The five-year, \$10-million contract was awarded in October, 1987. After an initial six months in training, the second six months was devoted to applying A-I to Air Force problems.

"We have to become self-sufficient before the five years is out," Bouchard states. The center is presently surveying local industry to find out what companies are interested in participating in its research effort. Any company is invited to inquire. There is also a possibility that the state of Ohio will provide matching funds, as it does to the Edison research centers.

As to what sort of tasks the center will undertake, Bouchard is blunt. "We've got to produce things in a hurry, so we can't tackle exotic problems. We have to tackle mundane problems with high value."

One item that may soon be developed as a prototype is the Artificial Intelligence Spreadsheet Checker. ASD requires independent cost analysis of the contractor's cost estimates for a new airplane. How do you estimate the cost of something that's never been built? ASD goes to the experts in different components, and asks what the next generation of engines or avionics will cost. Each entity puts its thoughts on a spreadsheet, and then all the spreadsheets are integrated onto a single spreadsheet.

Bouchard expects a prototype of this system to be created before the end of 1989. "And for sure, this has applications in the private sector. Spreadsheet checking is done every day," he says.

He thinks the A-I Center fits naturally in Dayton. "The heritage of this town is applied technology. We don't invent esoteric stuff. We take esoteric stuff, apply it, and solve engineering problems," says Bouchard. "This is a problem-solving town."

WPAFB offers boundless opportunities to Ohio's colleges and universities. Co-op or graduate students can work on the base and gain invaluable experience. And research dollars are funneled into many participating educational institutions, as well as businesses, to supplement the work of Air Force laboratories.

Dr. Paige Mulhollan, president of Wright State University, Fairborn, says being "neighbors" with the base across the street has been a distinct advantage to his operation. "We have a Master's Degree in Logistics Science in the College of Business, which was put into place specifically at the request of AFLC," he says. "We also have Ohio's only computer science and computer engineering Ph.D. program, which is clearly designed to serve a number of needs at the ASD."

The base also impacts Wright State through its research programs and equipment sharing.

Dr. George Noland, associate provost and director of the University of Dayton Research Institute, cites many ways WPAFB has improved UD's status. Air Force contracts with UD's Research Institute topped \$20 million in the last fiscal year. Noland estimates that total contracts since UD started working with Wright-Pat in 1949 could easily be in the \$250 million range.

"Probably the biggest part of our work is with the materials lab, but we have had contracts or grants with just about every organization on the base," Noland explains. "They are our customers for advanced education as well as advanced research, and they pay tuition. We're not a state institution. We're tuition-driven, and in research areas, we're dependent on external sponsorship. The Department of Defense says we're in the top ten of all universities receiving DOD research funds, and have been for years."

Of UD employees and students, probably 1,000 are involved in base projects some way. About 400 are full-time researchers. The remainder would include faculty who combine teaching and research, and students who work on projects and earn part of their tuition.

"We [at the Research Institute] worked with 250 different companies last year. We have 54 patents issued, and 40 licenses in effect. Probably most came out of research for Wright-Pat. In fact, two-thirds of our total volume is with Wright-Pat. And there have been a number of companies formed as a result of things we did with the Air Force."

Wright-Pat: Ohio's Ticket to Leadership?

If Wright Patterson Air Force Base is so large, so dynamic, so full of research knowledge and opportunities, what is the State of Ohio doing to maximize its potential for business development?

The answer appears to be, not much. At least not yet.

"The fact is, the State of Ohio has *never* had a policy recognizing Wright-Pat as a resource, or made any organized effort to see what its needs are, and how it could be advanced," says State Senator Charles F. (Chuck) Horn, R-Kettering.

Horn recently won reelection for his second term in the heavily-Democratic sixth district, which includes the base. His campaign centered on the present impact of WPAFB and its future promise. A self-styled "private sector person. Not a government person," Horn has a background in engineering and law, and only recently ended a 20-year affiliation with a small high-tech firm in Dayton. He has served with many R&D-oriented groups, including ten years with the Federal Labs Consortium, an organization of about 330 federal laboratories that encourages the transfer of technology from its research facilities to the private sector. Horn admits that the Ohio Technology Transfer Organization (OTTO) and the state-sponsored Edison Materials Technology and Engineering Center (EMTEC) have established some interface with WPAFB. But he claims that these are isolated relationships which do not replace the need for a top down state-wide policy that directly interacts with the base and its facilities.

Though Dayton's Chamber of Commerce and business leaders continually lobby the U.S. Congress on behalf of WPAFB programs, the state government has not paid much attention to the "gold mine" that WPAFB could be for economic development here, hesays.

Other states are much more active than Ohio in recognizing the potential of their federal installations. Horn cites New Mexico, which has incorporated the enhancement of its Los Alamos Laboratories and its sole Air Force base into its five year economic development plan. New Mexico created the post of Governor's Science Advisor to serve as an ambassador to its base-a liaison who reports directly to the governor.

"Here we are, sitting on one of the biggest sources of research and development in the whole country, and there's never been a state policy to acknowledge this. There are no liaison efforts being made," says Horn.

Until recently, many state government officials were not well informed about the importance of WPAFB and its activities. Despite this indifference, Horn helped "horse through" a \$70(3,(100 appropriation to assist a consortium of universities in the Miami Valley in its successful effort to secure the Air Force's \$10-million grant for an artificial intelligence initiative.

However, the effort later sparked the Ohio Board of Regents to add artificial intelligence research to its budget.

And last May, the Dayton Area Chamber of Commerce, WPAFB, and the city of Dayton gave members of the Ohio General Assembly a two-day eye-opening informational tour of the base and its opportunities. It was the first ever such group tour.

Horn hopes to establish a task force that works with the base to open its procurement system more to small business in a realistic way.

He also wants to fund a government initiative that will analyze Ohio's incentive programs to find out precisely how much new jobs cost the taxpayer,

While the present economic impact of WPAFB is important, its R&D effort could be Ohio's ticket to world leadership, Horn says, if the resources are properly tapped. "We should be forcing an investment into this area. We need a plan to market WPAFB all across the state, to our businesses and universities. We have the opportunity to contribute to lower costs and higher duality in the defense effort. And by utilizing research and technology for private sector needs, we'll create greater efficiencies in our commercial sector, solve problems, and create a lot of new products," Horn maintains.

He encourages business people from all Ohio cities to contact him about his Wright-Pat awareness campaign. "This is a state issue, not a southwestern Ohio issue. It's potentially nearly as important to Cleveland as it is to Dayton. It's an exciting possibility."

Spin-offs and move-ins

The Ohio-based businesses and facilities that have been nurtured by WPAFB are far too numerous to list individually. Dayton Area Chamber of Commerce President Thomas Heine points out that "Ten years ago, we had fewer than 100 companies involved in the Aerospace business, and they employed fewer than 4,000 people. Today, we have over 300 high-tech companies employing over 18,000 people." Many of these firms service the base or have hired skilled technicians and scientists who 'graduated' from the base to private industry.

"We have more scientists and engineers here per capita than any other place in the Midwest," Heine continues. "At least 60,000 people in this community work for WrightPatterson, either directly or indirectly through contractors or suppliers. That's 15 percent of all the jobs in Dayton, not counting the spin-off benefit in service industries."

• SRL Inc.

One advanced technology firm that was not a transplant is SRL (formerly Systems Research Laboratory), which became a division of Arvin/Calspan in 1987. Ken Langhout, senior vice president and general manager, started his career as a lieutenant

at WPAFB more than 30 years ago. He says SRL is one of a half-dozen companies who began contracting with the base in the mid-1950s. "We began before the term 'high-tech' even existed. There were three companies within a few miles of each other, starting at the same time. We're the largest of that group to survive."

SRL is primarily a service company. Its original business was instrumentation and computer services and support. "In the 1950s, the tech people at Wright Field were a bit suspicious of the capability that existed in the Dayton area. They were going to Boston, Los Angeles, and San Francisco for contract assistance. But over the years they gained confidence that the capability existed here, and it grew," says Langhout.

So did SRL. When Langhout joined the company in 1957, it had 25 people. Today it employs about 1,250. Fifty-percent of its business is directly with WPAFB.

"Our work supports research and development, tests, and evaluation. We have our largest collaboration with the Aerospace Medical Research Laboratory," Langhout explains. "That's a particularly interesting and exciting area, because it relates to what human beings can do, and how they perform when working with large, complex systems."

SRL also produces non-destructive testing systems, special avionics systems, defense electronics, and more.

SRL works with the base both as a prime contractor and as a subcontractor in tandem with other primes. Langhout suggests that companies wanting to work with the base should take the initiative in seeking out the informal network of the defense industry. "It's not a closed, insidious network. It's relatively open for people who want to tune in. But they have to take the initiative," Langhout says.

First steps might include becoming familiar with Commerce Business Daily, which publishes advance notice of government contracts. Frequently, this is followed by a bidder's briefing, where interested parties have an opportunity to meet each other, as well as become informed on specifics of the pending contract.

• **BDM Corp.**

A contractor that enlarged its Ohio presence due to the award of an AFLC computer contract is BDM International Inc., headquartered in McLean, Virginia. Thomas Gernon, senior vice president and manager of the company's Dayton Technology Center, says, "We intend to be here a long time."

BDM first came to Dayton 14 years ago, and grew gradually for several years. In 1985 it consolidated at a new facility in the Miami Valley Research Park. Today it employs 200 people, as well as 50 subcontractors. The majority of its work is in advanced software development for government contracts that support WPAFB.

Gernon says its Software Productivity Enhancement Center (SPEC) has been very successful in deliver

ing high quality, highly productive software development. This is a capability that will readily transfer to the private sector, he states.

Rather than automate coding, as many software tools do, SPEC automates the design phase. "We did a quality analysis of the programming process and found that most of the expense and quality problems occur in the design phase. If you make an error in coding, it's easy to find and cheap to fix. If you make an error in design, it's difficult if not impossible to find, and so expensive to fix that often it never gets fixed," says Gernon. BDM's major contract with AFLC runs through 1994, but it is also discussing work with a number of new customers.

Gernon's suggestion for Ohio is to increase its support of educational facilities. "The quality of employees at Wright-Pat is directly driven by graduates in central and southwest Ohio, especially in science and engineering. Anything the state can do to improve that is going to be a direct benefit to Wright-Pat," he says.

***The Boeing Co.**

Boeing's presence in Dayton started over 30 years ago. Its 10-person staff started small and stayed small. But Boeing managers John Ralph and Jerry Jones have an important job to do. "Boeing Aerospace is such a major business partner with the Air Force that we have three men dedicated to that under Jerry's guidance," says Ralph. "The rest of us deal predominately with Boeing's military airplanes."

Like hundreds of representatives manning offices near the base, the Boeing group sees its primary job as one of interfacing between people at WPAFB and Boeing's other facilities around the country. Everyone in this office is a graduate engineer. "Some [out of town contractors] want their people trained in marketing, but others want engineers facing engineers," says Ralph. "We go to the base quite a bit. Four or five trips a day."

"Our major challenge is to keep the channels of communication open and maintain the understanding," Jones adds. "This has to be developed with a face to face, give and take dialogue. Not letters or phone calls."

The managers agree that Boeing is always looking for qualified subcontractors. "First we have to become aware that they are available," says Ralph. There are special requirements for quality assurance. If the company hasn't been qualified by the military, Boeing maybe interested in qualifying them, by sending out its own inspectors and setting up a system.

***C.J.Laser Corp.**

If there had never been Air Force contracts in Dayton, C.J. Laser would probably not exist-even though it doesn't do the majority of its work for the government today. Cem Gokay, C.J. Laser's founder and president, came to the University of Dayton's Research Institute in the early 1980s as a research physicist. "The contract I was working on was for an Air Force lab in New Mexico, but UD obtained that contract by way of its past experience at Wright-Pat," Gokay explains.

He started his own business in the proverbial garage while he was still employed full-time at UD. In 1984 he chose to leave his job to devote full efforts to his new company.

Within six months, he moved from the garage into a facility with the help of former associates in UD's research team.

"I can't ignore the impact of Wright-Pat on my company. It gave me the basics to hold a job, and knowledge to spend in other areas. But my abilities were priced higher than the normal commodities you buy on the street. Everything I made was high-tech, and the only people I know that pay the bills for those high-tech devices is the government."

As a subcontractor, he helped Zenith Corp. win a major contract to develop secure computer systems. Many of his components are still operating at WPAFB.

Although he works on the leading edge of laser technology, Gokay has not filed for patents. "The minute I get a patent, I'm advertising to everybody. Since I don't have the leverage of a major company, I can't sue people who steal patents." Instead he creates advanced products, markets them quickly, prices them "extremely correct" (translation: high), and sells a lot of them. Then he goes on to make a better unit, and repeats the process.

While this method works satisfactorily, Gokay is presently seeking teaming arrangements with organizations that would have adequate leverage to back the patents. "They take the glory and the royalties," he says. "We earn our money through manufacturing, sale and service."

Recently, he says, he took a product others had been unsuccessful with for ten years, and made a successful version in nine months. His products don't come cheap.

"People buy our equipment because they want to be better than the other guy," Gokay concludes.

***Krug International Corp.**

Another former researcher at UD's Research Institute is Maurice F. Krug, chairman and CEO of Krug International Corp. He started his own aerospace research company (Technology Inc.) in 1959. It went public in 1965, and a year later recorded revenues of \$3.1 million in its aerospace business.

Since then, Krug's company became increasingly more diversified, and the name was changed to reflect its broader scope. It now has twelve subsidiaries/ divisions with locations in the U.S., Canada, and the United Kingdom. In 1988, Krug revenues totaled \$143 million from three business segments: aerospace, industrial, and commercial/consumer.

"Our association with WPAFB continues to provide the company with valuable opportunities and contacts," says Krug. "Our entire Aerospace Group, with operations in Dayton, San Antonio, and Houston, has certainly been enriched by our WPAFB affiliations." In 1988, about \$32.5 million in revenues was generated from military/NASA contracts, half of which was related to WPAFB. The company is currently working on 8 contracts with the ASD laboratories.

However, Krug's other products, which range from "Dempster" solid waste removal equipment to housewares, garden products, and marine equipment, are rarely relevant to the federal government.

*** The Maxima Corp.**

Maxima, a minority-owned integrated information management company, recently dedicated new offices in Dayton to house its 45 employees. Dayton Division vice president Bill Dwyer says Maxima is presently working on ASD's F-15 program, and the AFLC's stock control and distribution program, as well as its Depot Maintenance Management Information System (DMMIS). It is also working for the private sector.

The company started in defense work by applying for the set-aside programs designated for disadvantaged small businesses. Because the company's chairman and CEO, Joshua I. Smith, is a native Ohioan and graduate of Central State University, some of those early contracts came out of WPAFB.

As Maxima grew, it "graduated" from the set-aside programs, and now competes with other small business companies for its share of contracts in software development and engineering support.

Dwyer praises the set-aside program, and encourages the owners of small, disadvantaged and minority-owned businesses to take the time to learn how to participate. "The Maxima Corp., headquartered in Rockville, Maryland, now has over 1,400 employees at 46 sites in the U.S. The set-aside programs gave us a chance to grow," he says.

***The Grumman Corp.**

When The Grumman Corp. won a 12-year, \$84-million contract from AFLC, it promptly leased a 60,000-square-foot facility in Dayton and expanded its workforce. Currently, 60 Grumman people and 40 subcontractors are working on the Depot Maintenance Management Information System (DMMIS), says program vice president Ron Bury.

"We buy commercial software from some of the companies. Cincom Systems Inc., Cincinnati, is a major subcontractor, supplying database software." Most of the people at Grumman's Dayton location were hired locally. "Wright State is doing an excellent job in providing training. Entry-level people are here. But the experienced people are hard to get," he states.

What does it take to be seriously considered as a subcontractor? According to Bury, "They've got to have specifics. Some people don't

do their homework. They introduce themselves and say they have certain skills. But with a little more homework, they could say, "I understand the program requires such-and-such, and I can support that."

Bury was "deluged" by potential subcontractors shortly after the contract was awarded. "It was like answering fan mail." But now the flow has slowed to a trickle. "I still get calls from people representing job shop houses and software houses. I encourage that to continue," he says.

*** General Electric Aircraft Engines-Evendale**

WPAFB's largest contractor in Ohio is GE-Evendale, noted manufacturer of jet engines. It supplies ASD with a wide variety of propulsion systems, from the F-101 engine to that powering the B-1 bomber. Its defense contracts typically crowd the \$2 billion mark, year after year.

And once again, the military research is converted to commercial applications. Dwight Weber, GE spokesman, says "Virtually every engine we have in this plant for commercial aviation was a derivative of a military engine. We can say we're selling \$4-billion worth of commercial engines worldwide. But without that military base to start with, we wouldn't have that.

"[The Air Force] helps establish technology leads in hundreds and hundreds of companies. They work on advanced systems that later show up in the civilian market. Defense spending is a lot more than people think."

It's important for all Ohio to recognize the value of its resource in WPAFB. Because of its proximity, the Dayton Chamber of Commerce naturally takes the lead in supporting the base and its programs.

"We're probably the most active Chamber in the country in this area," says president Tom Heine. "In 1988, we spent about 60 days staff time in Washington, D.C., lobbying in behalf of WPAFB. Ron Wine, our vice president, is assigned to that responsibility."

The Chamber also participates in the Miami Valley Military Affairs Association, a consortium of about 15 Chambers in the Greater Dayton area. This group encourages a

social interchange with the base officials and enlistees, and entertains visiting dignitaries.

It also sponsors the Military Affairs Committee, which includes top representatives of the aerospace industry as well as other top business leaders. "The committee deals with policy and decides what efforts we should take to improve our relationship with the base," says Heine.

Once a year, the Chamber sponsors a military fly-in to Washington. Up to 50 leaders of the Dayton business community spend up to two days making very pointed comments to congressmen. Much of this effort is intended to defend the base against piecemeal loss of jobs.

"There will always be fluctuations at the base, but I believe we should monitor them," says Heine. "I don't want some congressman from Nevada deciding he ought to have 5,000 jobs out of Wright-Patterson."

He stresses that all Ohio businesses should pay attention to the quantity and quality of WPAFB's impact on our state. "In 1987, Akron had \$329 million in contracts; Cincinnati had \$4 billion. Cleveland had \$79 million. The list goes on and on. This is the research and development center of the Air Force. I think every congressional leader in the state of Ohio should support this base," Heine concludes.

The AFLC's General Hansen adds his perspective, that "People should never think that Wright-Patterson operates in a vacuum. This base employs about 35,000 highly trained and educated people... The Air Force isn't some invisible entity; the Air Force is these people. Community concerns are our concerns, and, correspondingly, we hope that communities empathize with our challenges."

Working With Wright-Pat

No one ever said it's easy to do business with the federal government. First you need to learn who buys what. Then you must prove that your company is qualified to do a particular task. If you pass those paperwork hurdles and are awarded a contract, there are more complex rules to be followed and reports to be filed.

But despite what you may have heard, the government encourages new suppliers. And Uncle Sam pays his bills. Once you've actually experienced the process of dealing with the government, it gets easier.

Literally thousands of contracts are awarded through organizations at Wright Patterson Air Force Base, ranging from under \$25,000 to many hundred millions of dollars.

If you're interested in exploring the wonderful world of Air Force contracts, there are some specialists waiting at WPAFB, ready to help you master the process.

George (Bud) Laudenslayer, chief of the small business office at Aeronautical Systems Division (ASD) says that every federal department has its own designated small business specialist. "We're here to assist all contractors on how to do business with the government, ASD in particular."

In 1988, the ASD alone awarded over \$13 billion in contracts, with about \$275 million of that going to small businesses.

His office does not administer contracts. But he is the "open door" to the base, helping to steer contractors to the person who may be interested in their capabilities. Each acquisition by ASD of over \$5,000 requires the procurement team to coordinate with this office and the on-site Small Business Administration office, as well.

"We check to see if we have an adequate number of qualified small businesses, or additional sources to add to a source list," he says.

The criteria for a small business follows SBA guidelines. For example, engineering services companies with less than \$13.5 million gross annual sales averaged over three years would qualify. In research and development, any company with 500 or fewer employees can enter small business programs. And for aircraft parts, a company with up to 1,000 employees is still considered a "small business."

But Laudenslayer hastens to explain that very small companies, with fewer than 15 employees, are not excluded from contracts.

Company representatives who call on the base do not need to bring a lot of extensive documentation to the first meeting. "It's an exchange of information. We tell them what we buy and how we buy it. They tell us what they produce. We keep a file of generic brochures on a company that we look at from time to time. And each organization has a bidder's mailing list. Depending on the type of commodity involved, there's a different procedure for getting on the list. We explain that in detail," he adds.

Not everything used at the base is contracted for at the site. Laudenslayer's general rule of thumb is; If it's an item in common use by all federal departments, it would be purchased in large quantities by the Government Supply Agency (GSA). If it's an item used only by the Department of Defense, for all three services to use, it's bought by the Defense Logistics Agency. If it's an item peculiar to the Air Force only, then each installation buys it.

Everyone who walks in won't get a contract, and for some who do, it may be a two-or three-year wait. Others may receive a contract far more quickly.

The AFLC has a repetitive-type buy, because it deals in repair parts. It maintains thousands of contractors on rotating lists. But in ASD, where the number of qualified contractors for a particular item rarely exceeds 25, the technical person in charge of a

particular program selects 10 companies from the source list, who are matched by computer and notified that there is an active requirement pending.

All major prime contractors also have a person in their companies for subcontracting purposes. Sometimes it is less burdensome to work through a prime contractor for the first few government jobs, relying on its administrative assistance for paperwork.

At AFLC, Bob Kennedy, associate director for small business, manages the minority and small business programs. Unlike the ASD office, which has a staff of eight, Kennedy's is a one-man operation. "We don't do any buying in the headquarters," he explains. "Most of the activity is done at the five Air Logistics Centers around the country, the Wright Patterson Contracting Center, and at Newark, Ohio."

It's Kennedy's job to be sure there is appropriate participation of small and minority business in AFLC's acquisition programs. AFLC awards about \$10 billion a year in contracts. All but about \$600 million is spent by the outlying Air Logistics Centers. The rest is spent locally.

"One of the hardest things for a firm wanting to enter the government marketplace is to find out who buys what," says Kennedy. Although prime contractors often subcontract jobs, Kennedy would prefer to see those jobs broken out from the contract and awarded directly to small businesses, to avoid paying the prime contractor's overhead.

There are about 4,000 different laws that govern the contracting process, says Kennedy. "It adds to the confusion factor." But if a business person does some homework and research, builds a corporate library [one bookcase of reference documents] and becomes accustomed to the government contracting process, it's not that much different from contracting with some of the larger prime contractors. Items such as cost and pricing data, and equal opportunity compliances, are part of the process.

Wright-Patterson Contracting Center (WPCC) is the big buyer on the base. It supports base operations, and also has central contracting responsibilities for mechanized material handling systems, the Hospital Aseptic Maintenance Service, chaplain's supplies, books, periodicals, and classified programs. In 1988, WPCC spent about \$650 million, with over \$200 million going to small business. While ASD awarded about \$50 million to Ohio small businesses in buys under \$25,000, WPCC awarded over \$71 million to Ohio's small businesses.

A small business that repeatedly gets \$5,000 or \$10,000 in small purchase buys can do very well, says Kennedy. "These are less complex procurements."

If you need more help, contact the State of Ohio Office of Procurement Technical Assistance, Columbus. Also, U.S. Senator John Glenn holds Federal Procurement Conferences two or three times a year in various cities, as do the WPAFB small business offices.

There's still more help. Vickie Getter, logistics management specialist for ASD, is an advocate for the very small, disadvantaged contractor who qualifies for the 8a set-aside programs. She helps break out items from major programs, such as the F15 fighter plane or the C-17 cargo plane, which can be reassigned from the prime contractor to 8a firms. Because 8a contractors eventually "graduate" and become ineligible for these set-aside programs, new 8a contractors are sought to keep the pipeline full. "It takes quite a while to get a new contractor on board. Very often the new 8a companies do not have the administrative capability to deal with all our reports and contractual requirements. We suggest that the smaller 8a's subcontract to the established 8a's, and learn the ropes," says Getter.

Contractors in the disadvantaged category do not have to compete on price, although they must be technically competent. The contracts awarded are comparatively rather small, but at \$25,000 to \$1.5 million, they can be quite substantial for a small company.

Numbers, Numbers

How much does WPAFB contribute to the state economy? It all depends on how you measure it.

WPAFB officially comes up with a total of \$3.2 billion for fiscal year 1988. That includes payroll, Air Force museum tourism, contracts let through the Wright-Patterson Contracting Center, locally generated contracts for ASD and AFLC, as well as the many other organizations on the base. It also figures in educational impact aid given to school districts, and health care payments. The number is fleshed out by using a complex formula of multipliers to reflect secondary impact (banks, drycleaners, etc.).

But that figure pales beside the economic impact generated by Air Force activity in Ohio: some \$12.1 billion. What accounts for the difference? Well, much of the money AFLC spends is disbursed by its various Air Logistics Centers around the country. Many of these contracts go to Ohio companies. And many other Air Force commands headquartered outside the state buy from companies within the state. In many cases, these Ohio companies first made contact with the Air Force through the contracting agencies or small business offices at WPAFB. If you also add Air Force activities at the much smaller Newark

Air Force Base, plus all the Air National Guard facilities scattered around Ohio, and apply the everpresent multipliers, \$12.1 billion is the result.

But we're still not done, numbers fans. People in the Dayton area frequently refer to the economic impact of WPAFB as \$15 billion, or nearly 10 percent of Ohio's economy. *This* number appears to be generated by adding the total Air Force impact, plus the impact of the Defense Electronics Supply Center (DESC), which is a Department of Defense

installation, and the Dayton Veterans Administration Hospital. Together, these add up to roughly \$14 billion. And that's close to \$15 billion. What's a billion or so among friends.

Finally, if you're not confused enough, there is the problem of accounting for defense contracts. If a company is located outside Ohio, the AFLC or ASD may send the money to that firm's headquarters location, but the actual work may be done at a plant inside Ohio.

Some of these contract revenues are tracked back to the producing state, but not all. So the actual economic impact of Air Force (or Department of *Defense*) *contracts* in Ohio could easily surpass the \$12.1 billion (or \$15 billion) figure.

(FACTS FOR GRAPHICS)

OVERALL IMPACT ON OHIO ECONOMY: \$12 BILLION

HOME TO OVER 100 DEFENSE DEPT. ORGANIZATIONS AND MISSIONS

ANNUAL BUDGET: \$70 BILLION

**ANNUAL PAYROLL: \$852 MILLION
(OVER \$2.3MILLION A DAY)**

ESTIMATED 33,620 SECONDARY JOBS CREATED IN THE AREA

**PRIVATE SECTOR DEFENSE CONTRACTORS
IN AREA: 276**

CONTRACTS LET IN OHIO: \$5.4 BILLION

EMPLOYMENT ON BASE: 35,000 (MORE THAN ANY OTHER AFB: OHIO'S LARGEST SINGLE-SITE EMPLOYER)

CONTRACTS LET NATIONALLY: \$15.6 BILLION

VISITORS TO AIR FORCE MUSEUM: 1.5 MILLION ANNUALLY

Source: US Air Force Data: Dayton Chamber of Commerce. Ohio Business research.