

Whatever it takes

Boeing's Airplane-On-Ground Operations teammates go anywhere, do just about anything to get customers' airplanes back in the sky

By DAN IVANIS

When the phone rang last Christmas Eve, Mike Carpenter had a pretty good idea what was in store. There was a damaged Boeing airplane somewhere in the world, and soon he would be traveling to wherever it was to assess the damage and put a team together to get it back in the air.

As a manager in Boeing's Airplane-On-Ground (AOG) Operations, Carpenter's phone rings year-round with such calls. AOG workers will tell you that airplanes don't get holidays off, and the mechanics who put them back together rarely do either. AOG teams spend days, weeks, even months at locations around the world, working 12-hour shifts, seven days a week. Because of the nature of the work, teammates often travel on short notice and stay until the job is done.

Yet the work they perform is essential to Boeing's role in supporting the operations of its airline customers—which rely on Boeing airplanes to transport passengers and cargo. And that's why Carpenter knew a trip was imminent—even if it was Christmas Eve.

"I don't think I've ever missed a Christmas at home, but I've missed nearly every Thanksgiving since I joined AOG in 1996," said Carpenter, who spent nine years as an AOG mechanic before becoming a manager. "It is just part of the job—one of the tradeoffs."

OFF TO FRANCE

Normally, Carpenter would be on a plane the day of the call, or the next day at the latest. But his flight to the incident site—Charles de Gaulle Airport, outside Paris—wasn't until Dec. 26 due to delays in obtaining necessary airport security passes. Joining him on the flight were three AOG specialists—members of a survey team who would help assess the damage and begin putting together estimates, lists and plans to fix the airplane as quickly and efficiently as possible.

AOG Operations, which is part of Commercial Aviation Services within Commercial Airplanes, specializes in returning customers' Boeing 7-series or MD-series airplanes to revenue service, wherever they happen to be. AOG Operations centers are located in Everett, Wash. (specializing in twin-aisle 7-series airplanes), Renton, Wash. (single-aisle 7-series) and Long Beach, Calif. (MD-series). The sites regularly loan employees back and forth, depending on needs and availability.

When Carpenter, who is based in Everett, and his team arrived in Paris, they got a first-hand look at the damage. A 767-300 was inadvertently backed into a blast fence by a tow tug operator. The airplane sustained heavy damage to the rear section where the vertical tail fin and horizontal stabilizer are joined to the fuselage. Three skins and numer-



Boeing AOG Operations mechanics rejoin the 48 Section to the 46 Section on the damaged 767-300.

RICK TURNBAUGH/BOEING

ous fuselage stringers and frames needed to be removed and replaced. In addition, the pressure dome, a circular structure nearly 20 feet (6 meters) in diameter located at the aft end of the passenger cabin, had been punctured. The dome, a key component in the pressurization of the cabin, would have to be replaced.

‘HOT BUNKING’ AVOIDED

Along with assessing the damage to the airplane, the survey team also evaluates logistics, including what facilities are available for performing repairs and the proximity of accommodations for the AOG team. For this particular job the logistics were pretty straightforward: Hangar space was available and Paris offers a wealth of hotels and restaurants. The biggest hurdle was transporting the new pressure dome to the repair site, due to its size. That required hiring a Russian-built Antonov An-124 cargo plane, which could not land at Charles de Gaulle Airport because of noise restrictions. The plane landed at a different airport and its cargo was trucked to the repair site.

“That was a logistics challenge for our planning group, but relatively tame compared to some of the things we go through,” Carpenter said. Depending on the location and facilities available at the site of a disabled airplane, AOG teams often have to set up makeshift “hangars” or tents to perform their work. Although most AOG jobs have relatively easy access to hotels and restaurants, AOG teams tell stories about sleeping in tents or “hot bunking” in former jail cells at an airport where a plane was being repaired. (Hot bunking is where workers on different shifts use the same bed.)

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—Sam Norwood, Airplane-On-Ground electrician

Logistics are an essential part of the equation when AOG managers such as Carpenter put together repair estimates for the customer. AOG service is a competitive business and customers consider quality, cost and time when deciding who to hire to get their airplane back in the air.

“We have to be very efficient,” Carpenter said. “Customers know we will provide them with quality and get the job done on time, but if someone else charges a fraction of the price less, they’ll certainly get the customer’s attention.”

In this case, the survey team returned to its Everett office on Dec. 30 and started putting together the estimate and plan—which included a team of 36 people staying on site for up to 20 days. Both were accepted quickly by the customer. While planners and mechanics developed packing lists of tools and parts, Carpenter started lining up his team.

“Because of the nature of the work, AOG mechanics have a multitude of skills,” Carpenter said. “Still, you always need a solid core of experience for the specific job you are going to, and you also have to take into consideration the other repairs going on.”

Depending on availability of parts and other logistics issues, AOG jobs can begin the same day the customer signs the contract, a week later or even months later. The 767 worker got under way in mid-February.

“I’ve had jobs where I came into work in the morning and was asked to fly out that afternoon,” said Bernie Dalién, a Renton-based AOG mechanic who was loaned out to help in Paris. “Other times you might know a week or two in advance.”

CAMARADERIE ON THE ROAD

Once the AOG teams arrive at the scene of the repair, they split into two shifts—12 hours on, 12 hours off, seven days a week. There is a 30-minute crossover at the end of each shift for information sharing and handing-off work.

“There is camaraderie with these guys when you are on the road,” said Fred Chadwick, an Everett-based AOG mechanic who recently accepted a management position with the 787 program. “It is definitely a band of brothers. You miss the family and the family functions, but you are with your extended family in another way.”

Although the travel to exotic locations seems alluring, AOG mechanics get very little opportunity for sightseeing.

“I’ve been doing this for 18 years and I’ve probably made 100 trips. I’ve probably had 30 days off during those trips,” said Craig Oppedal, an AOG manager. “Sometimes you get to see the sights, but you better do it in a hurry.”

Tom Niemi, an Everett-based AOG mechanic for the past 11 years, has had his wife join him on a couple assignments. “We got to ride around the pyramids in Egypt on camels, and that is something we never would have done if not for this job,” he said. “Days off are rare, though. Mostly it is just work.”

Although the reasons for joining and sticking with AOG work are as varied as the people who do the job, several main themes are apparent: the variety of work, variety of locations and the teamwork that gets the job done.

“There’s nothing else like fixing a broken airplane, giving it back to the customer and watching it fly away,” said Sam Norwood, an Everett-based AOG electrician. “We can fix just about anything.”



In France, the major hurdle in fixing the 767 involved removing the vertical tail fin and pulling the aft section of the plane away from the rest of the fuselage so the damaged pressure dome could be removed and the new one installed. Then, of course, everything had to be put back together.

"I'd been through that operation on 777s twice before," Dalien said. "Everything has to be very precise. Everything is measured, re-measured and measured again. Planes are built to stay together, not come apart. We are there to fix things, and not make them worse. When you start adjusting loads by pulling things apart, if things aren't supported properly they can break or bend."

The measurements were right on. Repairs proceeded on schedule and the airplane was handed over to the customer and returned to revenue service according to Carpenter's original estimate.

"For this group, it was just another day 'at the office,'" Norwood said. "We do our job very well—we do it right the first time, and we're proud when we leave. That's just the way it is."

Most AOG members don't get to see the airplane they've worked on fly away. As work winds down they are sent home, where they support factory or flight line operations, or move on to the next AOG assignment.

AOG managers such as Carpenter stay with the airplane until the end, making sure the customer is completely satisfied. Then they return to their base where they document lessons learned and other issues that may help the next remote repair be performed more efficiently—and, of course, to wait for their phone to ring again. ■

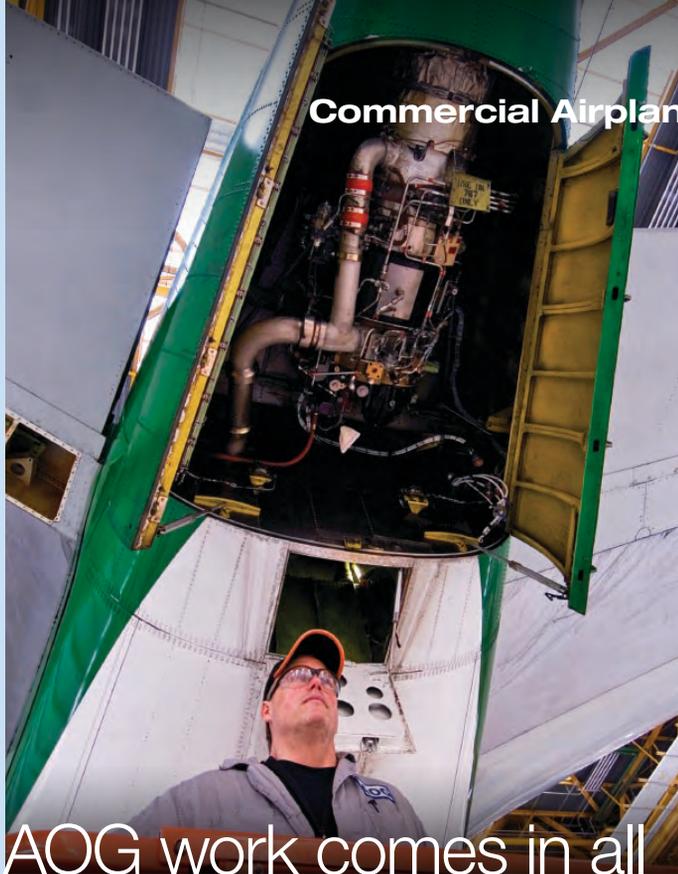
daniel.j.ivanis@boeing.com

AOG on TV

The remote Airplane-On-Ground repair referred to in this article was chronicled by a video team from the U.S. cable TV network National Geographic Channel. That report will air as a segment on the network's series "World's Toughest Fixes." The episode is scheduled to make its debut Sept. 28 at 9 p.m. Eastern Time. Check local listings and <http://channel.nationalgeographic.com> for show times and repeat airings.



First-shift AOG employees get a special message from their second-shift colleagues before loading the new pressure dome on the airplane. RICK TURNBAUGH/BOEING



AOG work comes in all shapes and sizes

There's no prescription for Airplane-On-Ground jobs. They can last anywhere from a few hours to several months. They can take place halfway around the world or on the other side of the factory. Airplane damage can be near-catastrophic or relatively minor.

AOG teammates are prepared for anything.

"That is one of the great things about this job: It is always different," said Fred Chadwick, a 14-year AOG mechanic in Everett, Wash., who recently accepted a management position with the 787 program. "One day I might be helping route clamp wires and the next day I might help do a bunch of sealing. The versatility and diversity are the great parts of this job."

Sometimes customers turn to Boeing AOG Operations for expertise alone.

"A lot of our jobs are technical assistance only," said Mike Carpenter, an Everett, Wash.-based AOG manager. "We'll send a team of people to show the customer how to do something. Their people do the work and we act as teachers and consultants."

Boeing's most famous AOG assignment took place in New Delhi in 1988. Unofficially referred to as "Mission Impossible," a 747 airplane aborted takeoff and ran off the end of the runway, plowing through 1,000 yards (914 meters) of thick mud before finally coming to a stop. As much as 70 percent of the airplane needed repair or replacement, and 127 mechanics, planners, engineers, and quality inspectors were dispatched to New Delhi. Another 2,000 team members supported the three-month effort from Everett, Wash.

A 10-minute video about the job, titled "Mission Impossible," inspired Craig Oppedal to join AOG. "There were a lot of people working together and it was dirty work," said Oppedal, an AOG manager. "I've always been interested in other cultures, so I figured I would fit in well."

The video is available to Boeing employees through Boeing Library and Learning Center Services by visiting <http://catalog.web.boeing.com> on the Boeing intranet.

—Dan Iwanis



Absent in body, but not spirit

Airplane-On-Ground team members often spend days, weeks, even months away from their families, sometimes with little or no notice. It's a part of their jobs they deal with in different ways.

Bernie Dalien, a Renton, Wash.-based AOG mechanic, said modern technology has been a big help in staying connected with his family. "With my laptop, a webcam and the Internet, I can talk to my family face-to-face. That has made a tremendous difference," he said. "If there are issues at home and I need to talk to one of my kids and be Dad, I can do it now and it means a little more when you can see one another."

"Several years ago someone gave me advice that has served me well," said Sam Norwood, an Everett, Wash.-based AOG electrician. "When I get back to my family I have to remember that I am the stranger. They have been functioning without me and I have to integrate myself back into their lives—not the other way around."

—Dan Iwanis

PHOTOS: (Left) AOG electrician Craig Oppedal reconnects the wiring to the auxiliary power unit and prepares for functional test. **(Right)** AOG jobs can require teammates to put in an enormous amount of work seven days a week. Here, mechanics grab a much-needed nap during lunch break in the midst of their 12-hour shift.

RICK TURNBAUGH/BOEING