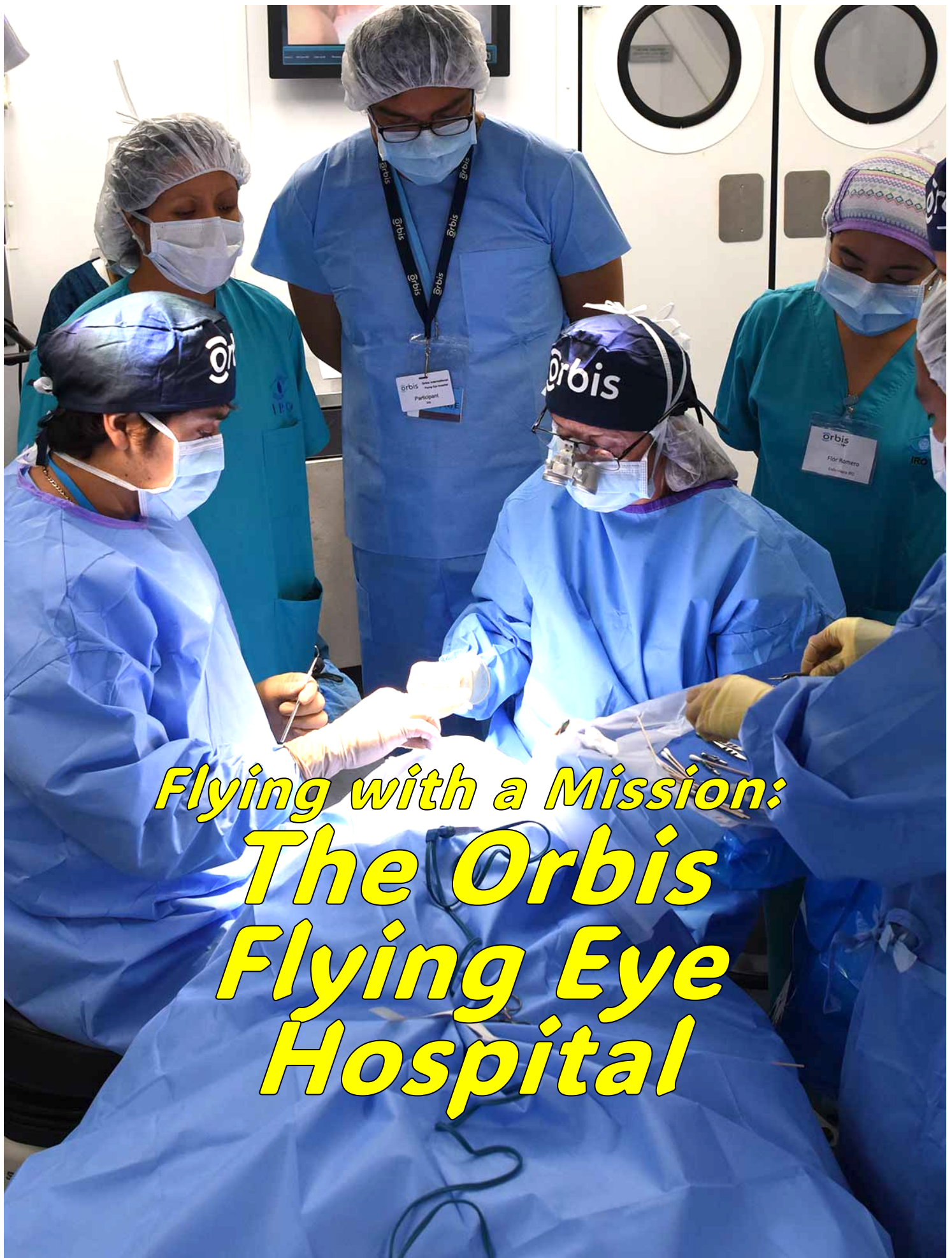




***Flying with a Mission:
The Orbis
Flying Eye
Hospital***

Flying with a Mission: the Orbis Flying Eye Hospital

By Mike Jones

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Boeing Plaza at Oshkosh is where the Big Boys park their “really” airplanes. If it has wings and goes really fast, really high, really far or some other “really”, you’ll find it perched there, sizzling under the fiery July sun. Last summer, before the show officially opened, I wandered the plaza to preview the displays before the crowds arrived. An aging but dignified KC-135 tanker from the Air Force loomed over a prim Airbus A-400 airlifter. There was a Lockheed C-130, an F-16 and an A-10; later in the week a brand-new Boeing 747-8 freighter in UPS livery would offer shade to hundreds of beet-red visitors. All very amazing and yet ho-hum — it’s Oshkosh, for heaven’s sake. Astounding is the norm.

Then I noticed a stunningly shiny blue and white jumbo jet neatly tucked in the corner. The cabin doors were open and a precipitous set of airstairs beckoned me skyward. No velvet rope or snarly security guard blocked the way. Why not? I asked myself. I nervously climbed the wobbly structure only to be greeted by a petite lady with captain bars on her epaulets. Great, I thought to myself, 30 minutes into Oshkosh and I’m already gonna get kicked out.

But I was completely wrong (which is my normal condition, my wife advises me). The pilot in the doorway was Captain Cyndhi Berwyn, one of the elite team of flyers that call that airplane home. Her story, and the tale of the Orbis Flying Eye Hospital itself, was the highlight of my visit to Oshkosh.

The Orbis Mission

Globally, more than 338 million people are affected by vision loss, 77% of which is avoidable. This becomes a huge economic burden and enormous personal tragedy. The mission of Orbis is three-fold: to bring first-world eye care to people who don't have access, to educate and equip their doctors and caregivers, and to deliver a sustainable, positive economic impact on those individuals, their families and their communities. In short, Orbis is a global organization delivering the three "E"s – equality, education, and economics — to eye care.



The Orbis flying eye hospital is a giant MD-10 cargo hauler made in 1973 that has been modified to carry a completely self-sufficient operating room, patient care facilities and medical training systems. It travels the world delivering eye care where it is needed most. Photo by Paul McKelvey.

The logic is undeniable. Better medical training delivers better medical care. Better medical outcomes enable people to live and work which, in turn, allows people to live healthier, happier lives. For example, a child who stayed

home to care for blind grandparents might go to school and earn a job, which would improve the lives of everyone in the family.

The Orbis project stems back to the late 1960s when Dr. David Paton, an eye doctor at John Hopkins, recognized those far-reaching consequences of the poor eye care in developing nations. While the medical need was clear, structural problems within low-income countries such as tuition costs, visas, corruption, travel fares and lack of accommodations prevented medical professionals from receiving the training they needed.

Dr. Paton broke the log-jam with a stunningly simple bit of reverse-thinking: instead of bringing people to the hospital, bring the hospital to the people. It took a decade of fund-raising, but the first Flying Eye Hospital mission launched to Panama in 1982 using a [Douglas DC-8](#) donated by [United Airlines](#). That plane visited 24 countries in its

first two years. Subsequently, a DC-10 was purchased by three anonymous donors and mostly flown by United Airlines crews until United phased out their fleet of DC-10 jets. At that point, FedEx began supporting Orbis.

Today, Orbis flies a massive DC-10-30 upgraded to the all-glass MD-10 configuration which was donated by FedEx. All of the surgical facilities were built inside freight containers which were inserted directly into the plane. Since those containers were separate from the airframe Orbis did not need FAA “STC”-type certificates for the modifications. That plane has, in its first five years, been to 95 countries, conducted 250,000 medical training events,

**Orbis means
“Of the Eye” in
Latin, but in
Greek it means
“around the
world.”**

performed 19 million diagnostic screenings, and delivered half-million surgeries, 20% of which were on children.



“The plane is so impressive, so capable. It’s as modern as tomorrow, and with 52,000 pounds of thrust per engine it’s got pretty good power,” Berwyn told me as she showed me

Above: Cyndhi Berwyn is an experienced military and commercial pilot with more than 22,000 hours in her logbook. When she comes to retirement, she will no longer be able to fly for FedEx but can continue in the left seat of the Orbis MD-10 because it flies under Part 91 general aviation flight rules. Photo by Nick Wood. Below, right: Before joining FedEx, Capt. Berwyn was one of the first women flyers in the U.S. Air Force. She flew as an instructor and then was an aircraft commander on the KC-10 Extender aerial refueling fleet. Below, left: Growing up in Hawaii, Berwyn first learned to fly sailplanes because of its affordability and the ideal conditions for soaring found above the islands. When conditions were right she would fly for eight hours at a time, with neither radios, GPS, or a lavatory. She arranged with the school that she would only return to base when the flight school positioned the tow-truck at a certain spot on the field, signaling they needed the plane back.



around. “I love the way the DC-10 flies. It’s kinda like driving your grandparents’ Eldorado. It’s not nimble but it’s smooth, very capable, and very strong.”

Orbis keeps the plane in “fantastic” condition. On a trip, it’s accompanied by former mechanics from FedEx who know the airplane intimately. The mechanics, flight crews and medical volunteers take pride in caring for the plane and, at the end of each day, the entire interior is mopped down, the walls are washed, and everything is vacuumed.

Pacific Flying

Berwyn grew up in Hawaii but aviation was not her first fascination. That changed with an orientation flight in 1972 after she joined the Civil Air Patrol. “It bit me like drugs or something. I became addicted to it,” she laughed. She quickly earned her sailplane license because it was the fastest and least expensive path to the sky.

“My Part 121 plane is a Boeing 777, but my general aviation airplane is the Orbis MD-10.”

— Capt. Cyndhi Berwyn

Hawaii has the best sailplane flying anywhere, Berwyn told me. “With the wind blowing against the mountains, you can get up in the morning and literally fly all day,” she said. She quickly progressed through her commercial, flight instructor, single-engine, multi-engine and

instrument tickets. “I paid my way through college, teaching flying for \$5 an hour.”

For her single-engine-land solo cross-country, Berwyn flew from Honolulu to Kawai, crossing a hundred nautical miles of icy Pacific Ocean. About 40 miles off-shore the VOR radio signals fade away and students dead-reckon over

waters 15,000 feet deep. During her senior year in college, her big break came when the Air Force allowed women to serve as pilots. She applied for pilot training and, with her proven expertise, was quickly accepted. As one of the first female pilots in the Air Force, she served as an undergraduate instructor, an instructor-instructor and then migrated to KC-10 tankers.

After 26 years in the Air Force and Reserves, her logbook lists 22,500 hours total time. At FedEx, she's flown everything in the fleet: the Boeing 727, DC-10, MD-11, and Airbus jets. Her current job is shepherding a FedEx B-777 around the globe.

"I'm rusty on the little airplanes, but I stay current on the MD-11 because of my Orbis connection," she said. Preparing for retirement, she's in the process of buying a Glasair Super IIRG for visiting her kids. "It's a fast airplane, easily 200 knots, and will make a 12-hour drive a three-hour flight."

The Flying Hospital

Jumping to the left seat of the Orbis Eye Hospital is not an option for the average G.A. pilot. Most of the 17 Orbis pilots are FedEx flyers, either actively flying or retired. The Chief Pilot is Gary Dyson who first met Berwyn in their initial classes at FedEx. Dyson has been involved with Orbis for 20 years. He, like the others, volunteers his vacation time for Orbis missions.

"The other pilots? We're all good friends. We've known each other for a really long time," Berwyn said. "Probably half the group are retired now. Gary's trying to find younger people to bring in, to replace the old ones who will eventually time-out."

Berwyn can't say enough nice things about FedEx, and their support for Orbis is extraordinarily generous. Every Orbis pilot has access to the FedEx MD-10 simulator which enables the retired guys keep up their currency in both

seats. Access to the FedEx training system allows Orbis to have crews acquire and perfect their Initial operating experience.

The rest of the Orbis team includes three full-time mechanics and about 400 volunteer “faculty” including doctors, nurses, lab techs, anesthesiologists, biomedical engineers. (Unlike some charities, the actual paid staff at Orbis is only about 15 people.)



Dr. Nguyen Tuan Thanh Hao has served as a Retina Specialist at the Danang (Vietnam) Eye Hospital for 16 years. Dr. Hao trained with Orbis Flying Eye Hospital and lectures on medical techniques in Vietnamese when the clinicians come to the airplane. Photo by Geoff Oliver Bugbee.

“Our Orbis instructors and the local doctors actually mentor each other,” Berwyn explained to me. “Our doctors have the latest skills, but those local doctors see exotic, really rare and far-worse cases than doctors would see in the western world. They work back and forth, solving the problems

together; teaching each other. It’s not just a bunch of Americans ‘coming to save the world’ — it’s the global community working together to make the world a better place.”

Additionally — and unexpectedly for this author — they don’t do all of their medical work on the airplane. First, it would be very poor form to conduct thousands of surgeries but leave those patients without proper follow-up care. Secondly, an important part of the process is teaching in the local hospitals and demonstrating the procedures there with the equipment they have. “Our doctors operate with them, helping local doctors achieve proficiency,” Berwyn said.

Teaching is slow. A surgery that might take five minutes in a U.S. hospital might take an hour and a half on the airplane because the clinicians are explaining and teaching as well as healing.

“Our team has learned a lot about teaching on the airplane, the levels of learning,” Berwyn explained. “We’re teaching how to perform these delicate procedures, so there’s a lot of discussion and give-and-take. Why are you cutting at this angle? Why are you using that tool?” When possible, Orbis also funds follow-up shipments of medical technologies to local facilities, such as lasers, cataract surgical tools, and the devices needed for retina operations.

COVID didn’t really stop the Orbis program because in 2003 Orbis had begun the deployment of an on-line surgical learning program. With modern high-speed internet access, the Cybersight telemedicine system is “able to reach even more people than when we meet them in person,” Berwyn told me. “With Cybersight we can educate clinicians anywhere.” In 2020 alone, Cybersight trained 26,000 eye health professionals from 192 countries, and their video library was viewed 2.3 million times.

Orbis on the Road

When Orbis deploys to a third-world location, it’s termed “a program.” Most programs last two to four weeks and there usually will be eight programs each year. Each program begins with an advance ground team. That team examines the available facilities including the airport, the



The operating room and all the other medical facilities on the Orbis airplane are built into massive cargo containers which were inserted into the airplane during its five year transformation from an DC-10 to an MD-10. Here, volunteer faculty-surgeon Dr. Andrea Molinari demonstrates a procedure to visiting doctors when the plane was in Trujillo, Peru in 2016. Photo by Geoff Oliver Bugbee.

hospitals, housing and local training needs. “Most of the places we’ve been before; and we’re going into big cities, with commercial airports. If commercial jets can get in and out, we can too.”

The MD-10 doesn’t fly very much, maybe 100 hours a year, and it rarely comes to the U.S. Preferred inter-program destinations are airports with free parking and long runways. The Orbis plane doesn’t even have an official home-base.

Unexpectedly, the Orbis pilots do most of their own flight planning. “We do our own weight and balance, we look at Google Earth, we use Foreflight. We look at the airfield to see if the concrete is adequately stressed for the weight of the plane. Can I do a 180° turn?” she explained. Orbis has a professional company to put together a “flight package” for each mission, but it’s a package made to their specifications, the routes they prefer, the weather, and so on.

Even though the MD-10 is a long-legged airplane, this particular plane is very heavy. In addition to the surgical suites, the plane carries its medical supplies, HVAC systems, a water purification system and electrical generators, all powered by Jet-A. “We’re limited to about 100,000 pounds of gas, so a six-hour flight is our max, maybe seven, depending upon winds and alternates,” Berwyn notes. “Plus, an MD-10 requires a pretty long runway, always over 8,000 feet and preferably 10,000. Just like in smaller planes, density altitude sometimes is a real challenge.”

Orbis program operations generally run from 8a.m. to 5p.m.; the mechanics start a little earlier to get the plane opened up. Once the plane is parked, Berwyn and many of the other pilots stay a few days to help with the medical program. “I can’t do anything that requires brains, but I can sweep floors, walk people through lines, help with the patient screenings, and hold hands. I like doing that,” she told me.

On the personal side, the volunteers usually stay in fairly nice hotels; not the Ritz but good enough. As for food, they enjoy the local restaurants and some volunteers take cooking lessons in their off-duty hours. “It’s fun to taste the cuisine of the different parts of the world, and if you’re open-minded you can learn a lot.”

The plane has a large passenger compartment used as a lecture hall but it can ferry volunteers to the program city. “Going into Bangladesh we had a good load of people and nurses on board, but sometimes it’s just the flight crew,” Berwyn said. “The mechanics fly with the airplane all the time.”

Orbis buys airline tickets for the flight crews, but they’re usually sharply discounted economy fares. “That’s not the way I’m used to flying,” Berwyn said with a smile, “so I usually buy my own ticket to get to the plane.”

Third-world flying can be a challenge. All of the destinations into which Orbis would take the plane have air traffic control services, but the quality varies. Enroute ATC services are rare, so the pilots broadcast their position and altitude in the blind.

Weather forecasts are problematic but TCAS

always works. Politics can be troublesome because some countries aren’t friends with their neighbors. As such, planes are not allowed to transit their airspace enroute to the next destination. This happens more often than you might expect: “Not just in Africa,” Berwyn cautioned me, “but in the Middle



On the Orbis 2017 program to Bangladesh, Dr. Roberto Pineda performed cataract replacement surgery on Ms. Hazera Khatun, aged 65, and literally dozens of other people who would otherwise have no access to modern eye care. Photo by Geoff Oliver Bugbee.

East, Ukraine and Russia, Iran and Iraq, any of the ‘Stans, there are lots of places where you have to be careful.”

Orbis and COVID

Since COVID paused the Orbis programs, the team has spent the past two years working in the USA, building awareness, out-reach and education.

“We’ve participated in the Pacific Air Show in California, and at Oshkosh, and other places,” Berwyn told me. This is important because, “Orbis needs the support of America to do what we do. Bringing the plane to airshows and getting the word out has been very good.”

The organization has street-cred, too, with thirty years of operations and millions of positive medical outcomes to its name. The generosity and productivity of the Orbis team is simply astounding, and the organization has an “integrity score” of 93.9% from Charity Navigator, the popular watchdog site that tracks the efficacy of non-for-profit organizations.

Wrapping up our conversation, Berwyn hit my “flying with a mission” nerve. “I want to make a difference in my life. With Orbis I’m flying with a purpose,” she said. “Find something that’s important to you! As a pilot, how many ways can you donate your talents?”

Berwyn became involved in a project with a global impact. Her mission is saving eyes and helping kids find a future. Like Berwyn, we all have a choice. The question is not what can we do, but what will we do?

About the Author

Mike Jones is a 4,000 hour commercial-rated pilot who has more than 50 aircraft types in his logbook. His pride and joy is a Cessna T210, which has carried him to every corner of the U.S. and Canada for more than twenty years. He's always accessible at PilotMike2012@gmail.com.

