



**Belcan**

— Engineering Better Outcomes

## INDUSTRY

Aerospace

## CLIENT OBJECTIVE

Conduct seamless switchover for aircraft software data loading from floppy disk software data loading to secure, online electronic vault.

## SOLUTION

Execute a multi-phased migration across nearly 80% of the entire manufacturing and distribution process.

## SERVICES

Systems engineering

Program leadership

# How Airborne software took flight at one of the world's largest Aerospace companies

For the customer, the challenge was epic. Execute a company-wide, seamless switchover from an obsolete technology to a modern one. Two major constraints prevailed; one, no disruption to manufacturing; and two, little to no disruption to customers. The customer's entire manufacturing process was at risk. They waged a valiant five-year effort. Then they called Belcan.

Airborne software manages critical onboard functions such as cockpit displays, radios, passenger lighting. The software must be managed and distributed per industry and FAA requirements. Software data loading is one of the many essential steps taken in maintaining the airworthiness of every airplane in the world.

Software on every airplane manufactured before the new 787 Dreamliner and 747-8 used floppy disks. And floppy disk loaders to load software. These physical media were distributed by hand or mailed to production facilities and customers all over the world.

Then came the 1990s, and floppy disks joined cassette tapes on the scrapheap of history.

# The customer would need to plot a new course, while also managing the risks associated with a major transition.

A plan emerged. Airborne software would truly become airborne; no more delivery by hand or mail.

It was a steep climb, and five years on, it had stalled out. The customer could show no measurable progress on making the switch. Several reasons explained why. As the program impacted more than a dozen areas of the organization, mixed signals emerged among parties. Who owns this project? Who benefits from it? Why are the changes urgent?

When the customer first began to push the software out to manufacturing and customers, they found a long chain of impact. Almost 80% of the entire manufacturing and distribution process would be affected. Stakeholders had tried to bake the entire initiative into one giant project. Beyond intramural discord, the scope was simply too large. Success would depend on consensus. Some stakeholders would have to give more than others. But how to get there?

## VOID THE MYTHOLOGY

Challenges around consensus and scope joined forces with a few well-entrenched mythologies. Myth one: you can't distribute software electronically until the aircraft has a hard drive. Myth two: customers must retain physical media on the airplane or risk running afoul of the FAA and other regulatory bodies. "There was some tribal knowledge we had to work with," said Parvathi Iyer, a Belcan senior project manager.

As they worked to build the true story, Belcan research revealed that myths one and two were just exactly that. Aircraft didn't need hard drives because laptops could function as secondary storage for data and software. And customers using electronic distribution would be well inside FAA regulations.

## WORKING SESSIONS, BUILDING TRUST AND CONSENSUS

When Belcan began work, they saw that most stakeholders knew their own turf. What they didn't know was how the entire program could come together outside of their purview. No one had a complete, integrated view of things. "This is something we always do," said Jon Winkvist, a Belcan senior systems engineer who worked on the project in the early stages. "We help people see over the fence, to see how the project impacts other areas."

Big picture thinking and consensus building is where Belcan makes its presence felt and its impact lasting and powerful.

"Our approach is we do whatever works for the customer," said Winqvist. "We share what we know with individual team members. With program managers and leadership. We ask hard questions. As we move ahead, we say what is really happening. What the path forward is. Good relationships and trust are incredibly important. That way people know what we've said is true and accurate and that we know what the right solution is."

### CREATE THE TRUE STORY

"To decipher and convey the true story, that was absolutely an important part of this," said Iyer. "We could speak to every person at the company, but if we didn't have a compelling story for them about how this would happen, what was in it for them, why it was a good idea, that it really could work, it wouldn't work." She added that when people came to know the true story, and that the changes would impact everyone, they became engaged and wanted to help.

As Belcan led working sessions, teams worked through the current process. What was the goal? What were the next steps? They developed several process and tool improvements. Belcan revisited the initial project requirements that were far too detailed, slimming them down to only what was necessary for success. Changes were made and steady progress followed.

**Iyer, working with her counterparts, suggested taking a different road to the destination.**

"We decided," she said, "to break up the initiative into phases. That way we could contain the scope and be more successful."

### EIGHTEEN MONTHS AFTER BELCAN CAME IN TO WORK WITH THE CUSTOMER, THE INITIATIVE WAS A SUCCESS.

What may have looked like a technology or a manufacturing process challenge was, in some key ways, more of a people and a process alignment issue. "The technical piece was decided very early on in the project," said Iyer. Getting the story out to everyone and bringing them along was the hard part.

Belcan would say they succeeded because they:

- Understood the issues
- Developed an integrated vision
- Created relationships and trust
- Built the true story and sold it
- Gained consensus and effectively managed people

Not long ago, a person at the company manufacturing would request software from the software library. Not so soon afterwards, the floppy disks were in the mail. Today, a person at a laptop searches a secure, online electronic vault. Software is downloaded to a laptop, which can connect to an aircraft, or to a piece of equipment in a factory anywhere in the world. Quality checks throughout the system ensure the right version is being loaded. The software has taken flight.