Tips for Smoother, Successful Installations

BY DALE SMITH

If you're like most *Avionics News* readers, one of your favorite parts of the magazine is the "Before & After" section. In addition to giving you an opportunity to see what other shops are doing, it's a great source for ideas and inspiration for your next big installation project.

While these "Before & After" features have successful endings, no doubt there are plenty of other installations that would make great subjects for the magazine's annual "Avionics Horror Stories" feature in October. So, what's the difference between a featured success story and a nightmare installation? According to a few experts, there is no one answer.

While each aircraft, customer, shop and situation is different, there are some things you can do to help any installation — large or small —go as smoothly and as profitably as possible.

Banyan technicians Ross Collazo and Patrick Daniel in the process of wiring a Garmin GPS 500 in an Eurocopter ec135.

Emilio Flores, avionics bench technician for Banyan Air Service, troubleshoots a radar indicator.

The Customer is Always Right

Steve Ouellette, avionics chief inspector for Banyan Air Service, said the customer plays an important role from the very beginning.

"He tells you what (equipment) he wants and where he wants it to go, especially if it's a major modification," Ouellette said. "It's his airplane and he wants it laid out in a certain way."

Lamont Durante, director of avionics sales and programs for Premier Air Center/West Star Aviation, said shops must communicate with their customers.

"I can't stress the importance of good communication enough," Durante said. "What does the customer want? How does he want it interfaced? What functions does he want to have now and in the future?

"We like to start with either a phone call or a face-to-face meeting with the customer to outline the scope of the entire project. Then, we like to get that incorporated into a formal proposal that spells out all the details."

Durante said the size of the project should have no impact on the importance of this information-gathering session.

"Even if it's as simple as installing a phone system in the cabin — he may want three handsets in there. He needs to show us exactly where they need to go," Durante said. "A lot of times, it's like pulling teeth to get that kind of information from the customer."

That's especially true when the aircraft in question is located hundreds of miles away. To help minimize any surprises when the aircraft does arrive, part of the early planning process involves getting digital photos of the aircraft's exterior and interior, including the panel, cabin and avionics bay.

"We may expect there to be space

in the baggage compartment for something, and the aircraft shows up and we find that space is filled," Durante said. "Pictures are extremely helpful. The shop personnel can get a good look at where we can install certain instruments or indicators before the airplane arrives."

Once you have all the information about which equipment goes where, the next step is creating a design to show if it really will fit.

"What we basically do is use a panel-planner program to do the panel layout, and either show it to the owner or e-mail it to him for his approval," Ouellette said. "Once he signs off on it, we can begin work.

"This way, there are no questions and it saves arguments at the end."

Plan to Succeed

Once the customer has approved the basic layout drawings, Ouellette said those drawings then are shared with the other members of Banyan's team, including sales, engineering, inspectors and service managers.

"Now, we have a block diagram of what is going to happen, and engineering can use those to create wiring diagrams with CAD/CAM," Ouellette said. "We can get everyone on the same page."

Banyan technician Ross Collazo installs an Avidyne MHAS in a King Air B300.

This also is the time when other critical questions are answered, such as: Do you have the latest installation manuals?

"Before we begin any installation, we go online and get the latest data or verify that we already have it," said Bob Jacobson, president of Custom Avionics. "Most of it is downloadable, so it's pretty quick and easy to do."

Making sure you have the latest installation information can take some digging.

"You need to get detailed part numbers of the equipment you are going to be interfacing to," Durante said. "Are these radios up to the latest mods? Does the FMS need an additional mod? That's an 11th-hour gotcha."

Durante illustrated his point with this example from Premier Air Center: After trying at length to find out why a new multi-function display (MFD)

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10 Toolbox Tips for Smoother Installations

1. Communicate with the customer and clearly understand the expectations for the newly installed equipment.

2. Clearly communicate these expectations back to the shop floor. Ensure that everyone involved with the project understands the what, when, where and why of the installation.

3. Complete a thorough pre-installation check of the aircraft and its equipment. Report any discrepancies to the owner immediately and explain how they will affect the installation.

4. Check to make sure all the latest installation manuals are on hand. Don't rely on old information.

5. Make sure whatever currently installed equipment is going to be reused is kept track of, including wiring and connectors. Everything needs to be inspected and checked before it gets reinstalled.

6. Establish and follow an inspection and progress report program throughout the installation. Notify the customer immediately if any issues are encountered.

7. Make sure everything needed to complete the installation on time is on hand. Also, verify that new equipment is compatible with the existing part numbers.

8. After the installation is complete, repeat the same detailed systems check that was done prior to beginning the work.

9. When in doubt, ask other shops if they have encountered the same type of problem. There's a great deal of valuable information out there available for the asking.

10. Do a pre-delivery flight to find and fix any little "bugs" before the airplane is delivered back to the owner.

SMOOTHER INSTALLATIONS

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would not integrate with a popular Class B TAWS unit, it finally was determined the manufacturer had not supplied a particular software label the MFD needed to function.

"The OEM had said all along that it was the same software as their other products so that couldn't be the problem," Durante said. "Well, come to find out, it was."

Even with what they were told was "the latest" installation information in hand, Durante and his team still had a major system integration issue. The problem is, the installing shop still has to answer to the customer.

"Unfortunately, the customer doesn't see that as being a brand 'H' or brand 'U' issue. They see it as being a Premier Air Center issue," Durante said.

Premier Air Center/ West Star Aviation gives this Falcon 50 the four-tube EFI-890R installation, including Vision-1, Class A TAWS, dual UNS-1E FMS, P-880 radar, Collins AH-3000 AHRS, dual Universal radio control units, and dual Baker M-1035 audio panels.

Know What Works Before You Begin Working

Having the airplane in your hangar allows you to discover exactly what equipment there is and how it may or may not function with the new boxes you are installing.

A thorough analysis at this point can help avoid problems down the road. Not only does it allow you to see if there are any interface issues, it also let's you know if the resident units are working properly.

"Before we start any installation, we do a complete check of all the systems on the airplane," Jacobson said. "Find out what works and what doesn't. If there's a pre-existing condition or problem, you need to let the customer know about it now."

Ouellette said Banyan technicians bring all of their test equipment out to an airplane to do a full systems check, including a pitot-static system leak check.

"Any existing malfunctions or questionable operation of the equipment is brought to the immediate attention of the owner — that way, there's no finger-pointing at the end," he said.

Ouellette said a complete systems check not only gives the shop a good knowledge base before beginning an installation, it also generates additional income. The owner may not realize a unit is not functioning properly, and now is the best time to fix any additional problems.

"The Internet has really made our job a lot easier," Ouellette said. "We can take a picture and e-mail it to the owner. We can show them exactly what we found instead of trying to explain it on the phone."

Do You Have All the Parts?

Along with knowing the equipment in the panel will work well with the new boxes you are installing, it is also critical to know the availability of the new avionics the customer wants. There's nothing worse than getting a customer's airplane all torn down only to find out the necessary boxes aren't available.

"We were scheduled to install a new unit in a customer's airplane, and the day before the airplane was to arrive, the boxes still weren't shipping from the factory," Jacobson said. "We had two weeks blocked out for this installation and we were out of commission if the unit didn't show up.

"They finally started shipping the Friday before the airplane was to fly in from Hilton Head," he said. "I called our rep and he was able to pull one out of his pocket and send it to us. We just got lucky on that one."

Jacobson said what Custom Avionics does now, especially when the unit

in question is a brand-new offering, is to have at least the installation kit in hand. This way, the shop can install the rest of the equipment in the panel and, if worse comes to worse, make an appointment for the customer to come back to have the final box installed at a later date.

"Communicating with both the customer and manufacturer is key," Jacobson said. "But don't assume that just because the OEM says it is going to ship, that it will. The FAA can always step in and say it's not approved. They're not working on your schedule."

Aside from inevitable delivery delays, there are other issues involved with being an "early adopter" of new technology.

"If you are the first with anything, you have to be ready for the unknown," Durante said. "No matter how hard you try, there are just a lot of things that can't be emulated on the test bench — and a lot of them are going to turn around and bite you."

Under Promise; Over Deliver

Another way to minimize heartburn with any installation is to overestimate the time it will take to do the work. Every customer wants it done yesterday, but if you take an honest approach in creating expectations, you can help yourself and your customer in the long run.

"If we think it will take three days, we say five days," Jacobson said. "If you say three, the very best you can do is to hit your target, and you have a lot of chances to miss it.

"If you say five, then you have two days padding. The best you can do is finish early, and a customer is always more impressed with that than they are with on-time."

That kind of thinking can be a real paradigm shift for many companies — nobody wants to tell a customer his airplane is going to be down for very long, especially if it's a relatively simple installation. But that's how bad things can happen to good shops.

"Every installation is custom," Ouellette said. "You could have two Citation 550s with consecutive serial numbers come in and you're putting the exact same system in both of them. You aren't going to have the same problems — somebody did something different to each of those airplanes somewhere along the line."

Another way to avoid potential delivery problems is to end the same way you began: by doing another thorough systems check to find out if you "messed" anything up during the installation. This check also should include a detailed test flight.

"We always test fly the airplane when we are finished to find any squawks that may occur," Jacobson said. "We don't want the customer flying off and finding them later on. They will just have to spend more time and fuel coming back to have them fixed.

"A ramp check doesn't do it very well because you can't find a lot of problems on the ground. You have to be in the air," he said. "We want to fix it so the customer flies off happy and says good things about us."

It's a Learning Experience

Now that the customer has flown off into the sunset, you can close the book on the project — right? Wrong. The experts stress the value of doing a detailed post-installation wrap-up meeting and collecting all the data from the project. What went right? What went wrong? What should you do differently next time?

"We want to capture all that stuff for the next proposal we do for a similar installation," Durante said. "It's also key to get that information back to engineering. If we have issues — maybe a connector was pinned out incorrectly on the prints or something — we can correct that for next time."

Durante said he and the staff at Premier Air Center try to make what they learn available to other shops.

"Being a small industry like this, we have a lot of friends in the other shops out there and we're always talking to them. There's no point in keeping this stuff a secret," he said. "If there's an issue we run into and somebody else has gone through a similar install, we invite anybody to call any time and we'll certainly tell them about it.

"It helps the shops and it helps the customers."

And, in the long run, it helps ensure each installation has a smoother outcome. ❑