10 TIME TESTED TROUBLESHOOTING TIPS

BY DALE SMITH

As anyone reading this magazine can attest, troubleshooting avionics problems can sometimes lead you to the very brink of sanity. Simple boxes can have complex problems, and the most sophisticated systems can suffer from the simplest of malfunctions. And the more integrated the systems become, the more places our 'techno gremlins' have to hide and the more tricks you need to uncover them in a timely way.

To help you get the upper hand next time trouble strikes, *Avionics News* has polled some leading avionics shops including Duncan Aviation, Eastern Avionics, Elliott Aviation and Stevens Aviation, to assemble the following "Top 10 Troubleshooting Tips" list.

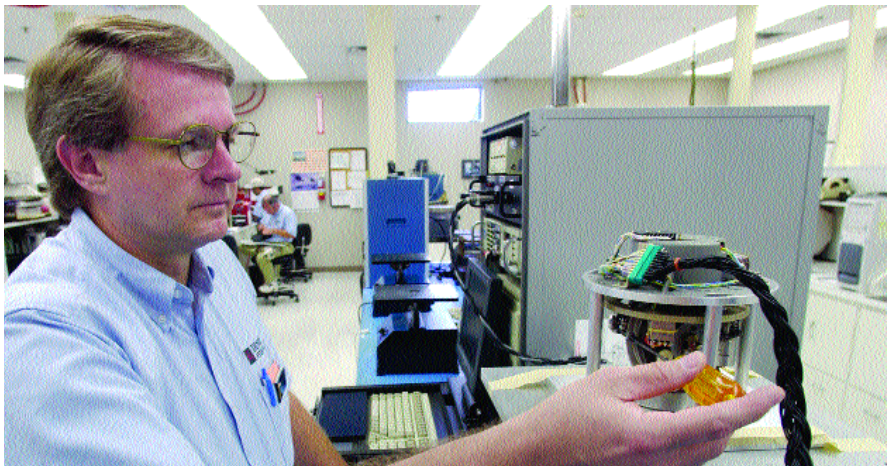
Take a few minutes to review them. Some may be basic, others insightful. But they all can help you save time next time you're called on to hunt-down a problem.

Tip #1: Talk to the flight crew.

Some of the best troubleshooting you can do is debriefing the pilots. You'll get an invaluable picture of what the fault is. What was the unit in question doing that it wasn't supposed to be doing? What wasn't it doing that it should have been doing? Could the problem have been caused by operator error? Never! The biggest challenge here is asking the right questions. And to help you do that, move on to Tip #2.

Tip #2: Take time to fully understand the system's installation.

Without a clear picture of what you're facing, you can't know what you don't know. Draw a stick diagram of the installation if you have to. Very often a problem with a cockpit unit will be caused by another unit or sensor back up the datastream. The more sophisticated the system is the greater chance you have of this happening.



Gyro Troubleshooting Tip: It is strongly recommended that power be removed for at least 20 minutes prior to gyro handling. Photo courtesy of Duncan Aviation.

Tip #3: Use your head before your hands.

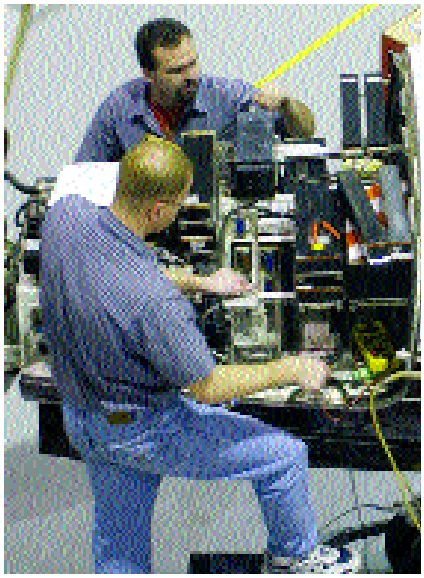
Approach every problem with a clear understanding of everything that can cause the malfunction. Spend a few minutes with the system diagram and the maintenance or operator's handbook if you need to. Begin your search with the part or component that is most likely to have caused the problem.

Tip #4: Is this thing on?

It may seem too simple but make sure the unit is getting power. And that means checking switch position. That's OK? Then check that it's getting the right voltage. Power drops and/or spikes can lead to a lot of intermittent problems. And that goes for bench tests too. Also, check those circuit breakers. You'd be amazed at how many hours technicians waste chasing a simple problem.

Tip #5: Only change one thing at a time.

When troubleshooting an integrated system, it's counterproductive to change more than one component at a time. You won't know which piece is



Checking for dirt, corrosion and grease is an important part of troubleshooting. Photo courtesy of Duncan Aviation.

the bad one. Start at the most logical point of failure and work your way out from there. Save the wholesale box swaps for instances when you don't have time to do it right.

Tip #6: Check antennas, wires and connectors.

If a pilot reports that ATC can't hear his transmissions or the transponder is erratic, an often-overlooked source for the problem is broken antennas, wires and connectors. Dirt, corrosion and grease can get into antennas and play havoc with reception. Also, make sure antenna wires are properly connected. And check belly-mounted antennas—they are frequently broken off when the aircraft is washed.

Tip #7: Is it making its connection during flight?

Another frequently overlooked problem is the box simply is not making good contact with its connectors. It happens a lot with panel-mounted radios. The rack is just a bit too far back in the panel and the unit's faceplate keeps the connector from becoming properly seated. It's often the cause of intermittent radio problems. Add a little turbulence and the connection jumps on and off.

Tip #8: Autopilot "Porpoising."

While the autopilot's altitude mode can have a bad day, an often-overlooked cause of an autopilot's relentless search for straight-and-level is due to the bridle cables not having the correct tension on them. Check the box, then grab your tensionometers and make sure the tension on those cables is as close to dead-on as you can get.

Tip #9: Troubleshoot your troubleshooting equipment.

Make sure all of your tools and test equipment are properly calibrated. If you do a test and the outcome just doesn't make any sense, maybe your test equipment is in need of repair. Take a step back and make sure the test was done properly and try the test again with another piece of equipment and compare the outcomes. Slow times around the hangar are good times to treat your equipment and tools to some well-deserved preventative maintenance.

Tip #10: The spin on gyro systems.

It is strongly recommended that power be removed for at least 20 minutes prior to gyro handling. This also means the aircraft should not be moved during that time. If you move the aircraft or remove the gyro prior to it being completely run down, it can cause severe damage to the gyro itself. ❑