William Gerstenmaier Video Interview

Critical Conversations

When you have an operational program and you're asking crews to be in harm's way, to be flying on a shuttle or flying in on Orion capsule or aboard Space Station for an extended period or on a journey to Mars, I think there needs to be some informal communication between even the senior managers and those individuals that really have their life on the line for these activities and they need to feel that there's somebody that's listening to them. Again, you can't short-circuit the system because there's a whole process of who they report to and how they bring ideas forward and issues and concerns, but they also need to know that there's somebody listening and a way you can do that in a sensitive manner that you don't rile up the whole system. You know you see it in typical management organizations. Sometimes, the mid-level managers, they don't want to bring any problems up to their boss so they get problems from the lower-level folks and they kind of stop the mid-level and then the senior manager doesn't really hear anything. He's kind of shielded from all this noise and then one day he does an all hands, or goes down to the field and finds out what's going on and it's a totally different world than what he had perceived from the folks that were directly reporting to him. It's also problematic if that communication is so strong between the lower-level and the higher level manager that now you're bypassing all the good that comes out of that middle-level management. So you need some informal system where you can get some of that direct feedback from the crews from the folks that are doing the actual activities, but you don't let that over gain you. You then, when you get something that's interesting or doesn't quite make sense, you figure out a way. You ask the mid-level or you ask the managers that are directly responsible for that activity an obtuse way that they would then go ask the crew and then they would discover this isn't exactly right and then they would go off and do the right thing on their own. So I think there needs to be a mechanism where you're getting that feedback and you're understanding what's going on. So it's important to, I think, talk to the folks that you're really asking to go do the work and I found that, again, throughout my career, even technicians, I would go down to Florida, or I would go out to Downey, or to Palmdale, and hang out with the technicians for a while and see how things are going. Some companies they do a process where they have their technicians that are building hardware and then you have the engineers that are actually building the paper that the technicians work and then every two or three years they actually have the engineers come out of their

offices, go sit on the floor and see how the techs are actually assembling hardware, and that's often an eye opener because they'll tell the techs that these bolts go in, you put them in this order, you torque them in this region and you find out when the bolts sticking out you can't actually get back to that bolt with the wrench anyway in the back. So the techs have figured out a way to short the system and still do what they think is the right thing , but it may not be what the engineer really wanted and so then to have that engineer to actually come down and see how the techs are actually dealing with the physical hardware and how they're actually implementing his instructions. Does it really matter to the design performance? Or does it not matter? And it's important to get that kind of feedback and check back and forth. So I think there needs to be a mechanism, either informal or periodically you get a chance to see how the implementer is actually doing what you've asked them to go do and make sure it's being done in a way that you really want it to be done. So this is kind of an art of check and balance and it's something that occurs slowly over time. We talk about it in the technician cases. Tribal knowledge. One tech has learned how to go do it and he passes it off to the next tech and pretty soon they're not even following the procedures or paper anymore. They're off doing their own thing and then all of a sudden an umbilical doesn't come undone or something doesn't work appropriately. Then you go back and you look. Here, the technicians were not following the paper. Well, it turned out they couldn't really follow the paper because it was too difficult to go do the way it was written. So, again, I've learned that many times throughout my career. You could try your best. I'll never forget we had these valves on the system that we flew on the shuttle as a payload and the wires were shorting out against the case and we couldn't figure out why because the procedure called to have the case essentially filled with epoxy. They had to take a syringe with five milliliters of epoxy and inject it in the top of this valve so these wires would be totally encased in epoxy and there would be no way this wire could ever rub against the case and short it out. So there's no way this could be happening and so we would look at all the build paper and the way the procedures were written it said put the syringe in, inject five milliliters of epoxy in, then show the syringe to the QC technician who would verify the syringe was empty and he'd put the check mark on it and stamp the procedure. So here's all these procedures stamped and we started cutting open valves and there's like no epoxy in these things. So what it turned out was they couldn't get the epoxy in. It just physically would not go in. So they would try to put it in as much they could, then they would take this syringe, push a plunger down, dump it in the

wastebasket, show it to the QC, he would verify the epoxy was all out of the syringe, stamp it off, check and go. So they didn't really know what they were trying to do. They just thought the crazy engineers were asking them to put 5CCs or 5 milliliters of epoxy into this cylinder that just wouldn't hold that much so then they figured out a way to beat the system. So, no matter how well we try to defend ourselves with procedures and processes, there's a time to really go out and talk to the technician and find out what's really going on.