

# Satellite loss actually shows what you've accomplished



When Panamsat's Galaxy-4 satellite spun out of control on May 19, it knocked out about 90% of the pager service in the United States, as well as some radio and TV feeds. The event also provided plenty of raw material

for the legion of TV, radio, and newspaper commentators and pundits. "Isn't it scary," or "isn't it terrible," they said, "that we have become so dependent on ad-vanced communications?"

But I looked at the event in another way. Isn't it astonishing, I thought, that engineers and scientists have accomplished so much in just a short span of about 25

years? We've implemented large and small physical and virtual links and networks, nearly all of them with a high degree of reliability, availability, and flexibility. We've outfitted a large part of the world with various types

of communications systems, and, although outages do occur, built-in redundancies, fault-tolerant design, and error-recovery procedures localize most failures without affecting high-level performance.

Given the complexity of these communications systems, I'm impressed that they work at all. I'm even more impressed that they usually work very well, especially when I stop to think about the less glamorous system components. Cell-phone handsets get most of the attention, but a cellular system couldn't work without base stations, linkages between base stations and network controllers, system-management algorithms and software, and countless other factors.

And don't forget the less visible—but still vital—vendors who provide the tools that let us write code, design

parts, and fabricate and test components and subsystems. From the lowest level line driver or amplifier, to sophisticated CPUs and MACs and protocols, to ultrapure materials, it takes a lot of intertwined pieces to make a communications system work.

I was recently reminded how far communications has come in such a short time while watching reruns of one of my favorite TV shows—*The Rockford Files*. What really struck me about the show—which was broadcast from 1974 to 1980—was that in nearly every episode, detective Rockford is looking for a pay phone to make a call, standing by a pay phone waiting for a call, or pacing at police headquarters watching a technician operate a slow, cumbersome fax machine. Rockford

was an on-the-go detective who spent most of his time in his car, but, ironically, he is unreachable there. Today, this scenario is a nonissue: If your business or personal life demands it, you can have a tiny phone that goes with you anywhere; you can even have fully mobile fax

and data service. Rockford's communications problem is history.

You can't ignore failures, but you also shouldn't dwell on them or become too discouraged by them. A communications system is a relatively new phenomenon, based on a highly organized, yet flexible and dynamic, interplay of components, circuits, systems, and software. These pieces range from basic interfaces to sophisticated processors, from multilayer protocols to multilayer pc boards. We should not be shocked by an aberration in a system that is far more complex than most people imagined just a few years ago.

Don't feel bad about that satellite failure. Let the failure highlight, by contrast, the reality of how fast, how far, and how well we've come along.

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