Editorial:
Complexity in Our Everyday World

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It is a contemporary truism that our world has become a complicated place. Part of this situation is the web of complex technologies on which we depend. We are especially reminded of this fact when complex systems fail—something can happen at almost any scale.


The April 20th explosion on the Deepwater Horizon oil drilling platform in the Gulf of Mexico is a recent sad example. The platform, owned by Transocean Ltd, was under contract to British Petroleum. Now submerged at the bottom of the Gulf, the rig continues to discharge an estimated 12,000 and 19,000 barrels of oil per day.

Human failings at many levels assisted in creating this tragedy—in communication, organization, imagination—and the sheer complexity of pumping oil from more than a mile below the ocean surface magnifies these failings. Water pressure is about 16.5 million Pascals or 2400 PSI one mile down—so more than a ton of weight per square inch. The difficulties of working at these pressures are large since any significant pressure difference (between inside with circuitry and outside with ocean water) will crush equipment. Using wires and hose lines to communicate with robotic devices, and servo-mechanical motors, are very hard work.

So, the technology is challenging but our society's need for oil means that we drill even in deep water. The complexity of the bargain we make in doing this is shown by the environmental catastrophes that arise when failures occur. We fool ourselves into thinking that we are prepared to manage the complexity that we step into when we turn the corner into failure.

Of course failure happens at smaller scales, at the everyday level, too. How many of us have had a computer failure of some sort in the last year? Hard disk failures, security "updates", network problems… The complexity of software and hardware makes failure hard to predict or troubleshoot. I was reminded of this recently when my office laptop lost wireless access on short notice following a regularly scheduled software update. It took the computer techs two weeks to locate the bug in their own automated system. Two weeks for a supposedly routine action—complexity is getting the better of us.
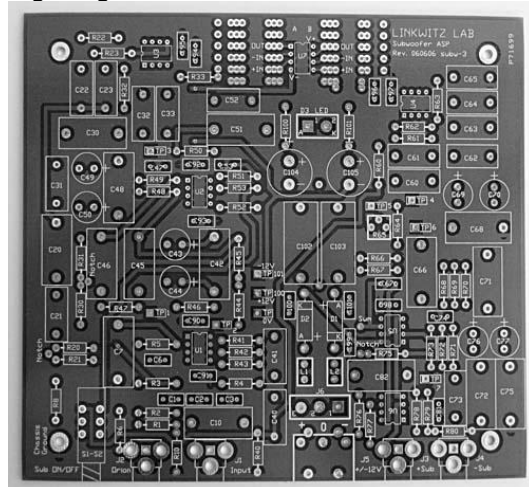
Technology has raised the stakes. People who can analyze, predict, and troubleshoot have always been prized. It will be even more so in the future. Students and graduates: be advised.