The above illustration depicts two extreme scenarios for communications and networking systems. One is underwater communications using acoustic signals. Although this is perhaps the most viable approach for building long-distance underwater communications networks, key technical challenges need to be addressed, such as the impact of long propagation delay and delay spreads, limited and highly nonuniform (spatially and temporally) transmission rates, and the dramatic impact of the environment on the communication channel. A team of APL researchers and external collaborators across multiple disciplinary research areas—including oceanography, physics, signal processing, communications, and networking—has been developing innovative techniques for a spectrally efficient, reliable, and covert underwater acoustic communications network. Some of their results can be found in papers by A. Rosenberg, A. Boyles, D. Chizik, and Q. Zhang in proceedings of the MILCOM 2009 and OCEANS 2009, 2010, and 2011 conferences. Another extreme scenario is that of interplanetary networking. Very long delays, predictable and unpredictable link outages of long durations, and the impact of space weather make this scenario a challenge for Internet protocols. A solution based on disruption-tolerant networking (DTN) can be found in the article “Enabling the Interplanetary Internet” by Krupiarz et al., beginning on page 122 of this issue.