Mahta Moghaddam

Antennas for Autonomy

If you consider the direct translation of the Latin word *autonomy*, it would be self-law—and, therefore, an autonomous system would translate to something like a self-ruling system. I don't know about you, but if I wanted to apply this literal definition to the expression "autonomous system," it would be contradictory to what we have in mind when we refer to, e.g., self-driving cars, robot-based manufacturing systems, sensor webs, and unmanned aerial vehicle swarms.

These systems are far from being self-ruling. Indeed, they must be highly aware of their surroundings and must continuously collaborate with other systems for their proper operation! We define strict rules for how they act and react. They take input and provide output to other nearby systems, and they do so mostly by wave- or field-based communications. While we search for a better name to describe these systems, the technology will press forward to make their communication capabilities faster, more reliable, and more efficient. We take on the lion's share of that role when we design advanced antennas that are ever smaller and push the performance boundaries.

HOW DO YOU DESIGN *YOUR* ANTENNA?

There are many antenna design tools to address the aforementioned applications and others that I surely haven't mentioned. Many more tools are being continuously developed to push the envelope of progress. In this issue of *IEEE Antennas and Propagation Magazine* (*APM*), we have an excellent selection of feature articles focused on antenna design, including both surveys and descriptions of some of the latest methods. The techniques presented are especially suited for efficient, rapid, and reconfigurable designs for autonomous systems or systems operating based on signals of opportunity.

The article by Michel et al. provides an overview of antenna designs for ultrahigh frequency (UHF) near-field (NF) radio-frequency identification (RFID) readers, whereas Ding et al. focus on a multiobjective optimization method for a versatile UHF NF RFID with fragment-type topology. Fallahpour and Zoughi review antenna miniaturization methods using both topology- and material-based approaches. Deb et al. use fuzzy rule-based cost functions with dynamic weights to compare the performance of ten differential evolution and hybrid antenna design algorithms for microstrip antenna and array design problems. Olokede and Ain present an enhanced feeding strategy for increasing gain and reducing the size of an isosceles patch array antenna that could be highly desirable for various communications and autonomy applications. Xu et al. propose an indented antenna array for reducing mismatch and minimizing reflections into the receiver systems for systems that use simultaneous transmit and receive front ends. Finally, the article by Nagel delves into a different but related topic, namely, a fundamental analysis of eddy-current generation in metals due to a time-varying magnetic field.

EDITORIAL BOARD UPDATES

I am honored and delighted to have been renewed for a second three-year term as the editor-in-chief of *APM*. I am grateful for your support and, with your help, will continue to strive for the highest-quality, creative, and state-of-the-art content.

After a long and illustrious tenure with *APM*, Prof. David Davidson is stepping down from editing the "EM Programmer's Notebook" column after this issue. David started as the associate editor (AE) of the column in 1999, managing to solicit and handle the reviews of numerous outstanding articles, being always thorough and timely. It has been a true privilege for me to work with David, and I wish him the very best in his ongoing endeavors and busy schedule (especially as he crosses a couple of oceans to move to Australia). I am also delighted to welcome Dr. Matthys Botha as the new AE of the "EM Programmer's Notebook" column and look forward to working with him.

As always, please feel free to send me your comments and feedback. I hope your new year is off to a great start!

Digital Object Identifier 10.1109/MAP.2017.2786163
Date of publication: 12 February 2018