



# From the Editor's Desk

## ***Scientific and Technical Periodicals and the Needs They Satisfy***

■ Madhu S. Gupta

As in most technological disciplines, microwave engineering literature is voluminous, taking a variety of forms with complex interrelationships and fuzzy boundaries that render global statements about its totality difficult. One way to understand the myriad roles of this multifaceted literature at different levels is to subdivide it into a number of categories:

- 1) *primary literature*—technical reports, patents, and research papers in journals that present newly created knowledge for consideration by the technical community
- 2) *secondary literature*—review articles, professional books, and handbooks that synthesize the bits and pieces of validated knowledge scattered among primary sources into a cohesive form
- 3) *tertiary literature*—bibliographies, literature surveys, and directories, which may not themselves contain the knowledge, but offer directions on where or how to find it
- 4) *instructional literature*—instruction manuals, learning modules, text-

books and workbooks used for educational and training purposes, which might include introductory and background materials and need not necessarily be close to the cutting edge of the discipline

- 5) *trade literature*—trade news, market surveys, application-specific information, data sheets, and evaluations, pertinent to a particular technology, trade, or product
- 6) *commercial literature*—product releases, application notes, and such that are distinguished by their goal of advocacy rather than dispassionate presentation
- 7) *organizational literature*—newsletters from professional groups, societies, and corporations that are usually of local and often transient interest.

Periodicals (both printed and electronic) attempt to position themselves in one or more of the above categories and deliberately exclude others; for example, *IEEE Microwave Magazine* strives to serve as a source of secondary and organizational literature but painstakingly avoids the roles of primary or commercial literature. To evaluate a periodical's success, we must consider both how well it meet the goals it has established for itself, as well as how well those goals serve the needs of the two constituencies that any periodical

serves—the readers and the authors. Alas, the needs of the two groups diverge significantly.

A reader might rely on the periodical literature for many purposes:

- a) for reference information needed in technical work (e.g., design equations, parameter values, relationships between variables, or its trend) that may be located in the primary literature, or possibly more conveniently through the secondary literature, depending on whether the work is at the cutting edge of technology
- b) for assurance about the reliability of some technical information, backed by the credibility and reputation of the periodical, the peer review process it uses, vigilance of its other readers, and other features of the scientific process that makes the periodicals self-correcting over time
- c) for tutorials and reviews to keep up with the changes—both evolutionary and breakthrough—in one's own field
- d) for readings outside one's principal area of expertise, so as to broaden one's background, understand applications and implications of related technologies, and develop some perspective of the field.

The needs are significantly different for the community of authors, who

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might look to periodicals to serve the following roles.

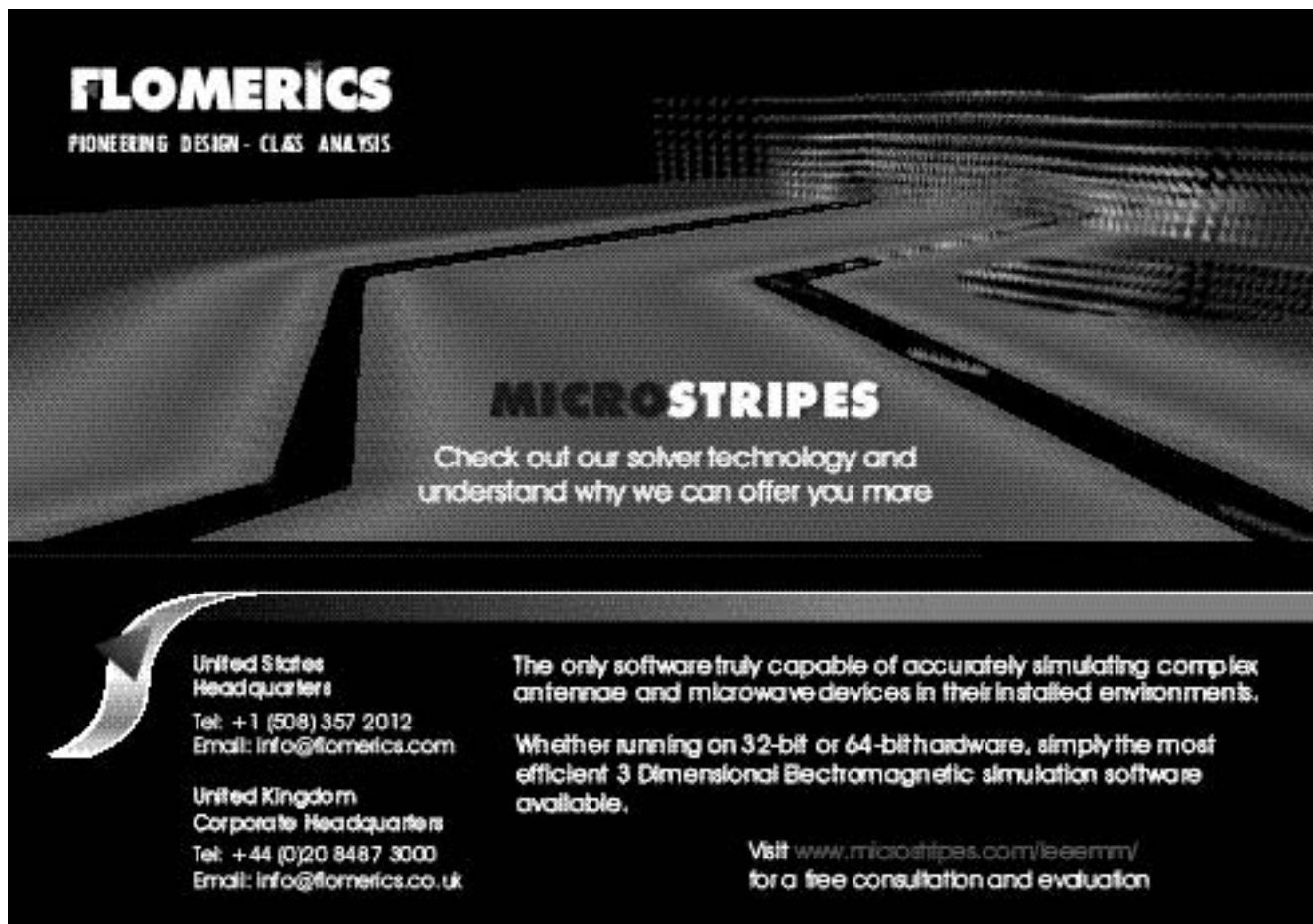
- a) *Evaluator*: a forum for presenting the work to peers for acceptance, validation, judgment of significance, and recognition; hence, the importance of the peer review process used by the periodicals.
- b) *Repository*: an archive of past work in the discipline useful for locating information, settling disputes of priority and precedence, and, perhaps most importantly, defining the prior art in the discipline (The latter is useful for answering a variety of questions: Where are the boundaries of knowledge that can be pushed? What work qualifies as "novel"? What can be claimed to be "well-known" in the discipline in order to prove that your opponent is ignorant? etc.).
- c) *Stock Market*: a collective enterprise that creates a market for converting a writing into a tangible, certified, and salable commodity. An article pub-

lished in a periodical is an acknowledged, valuable, and quantifiable item with many uses: to document accomplishments, to be counted as a deliverable to a research sponsor, to pay someone for their assistance by sharing authorship with them, to enhance the marketability of the author, etc. As a byproduct of this function, there is always interest in a more rapid publication process.

There is an interesting parallel between the above and the needs of a gold prospector who works to find gold nuggets and then needs an assay office, a deed, and a trading post to encash his find.

Accommodating the needs of both the users and the producers of a periodical's content requires tradeoffs when those needs are in mutual conflict. One example is the tradeoff between the speed of publication (usually accomplished by speedy reviewing) and careful authoritative peer reviewing (which is time-consuming). Another example

that occurs in setting the selectivity level of a periodical is the tradeoff between threshold of acceptability and credibility of published material. Still other problems arise in distinguishing between calisthenics and contributions. We understand that running on a treadmill in order to improve stamina is not the same as traveling to a destination, nor is lifting weights the same as performing work. Nevertheless, academic learning exercises frequently masquerade as contributions to the state of the art, possibly because the work has been justified to its sponsors on the grounds of being useful to technology, rather than useful primarily for training of new professionals in the discipline. Since the significance of a work cannot always be assessed in advance (although the lack of significance is frequently evident), the readers must be warned that the primary periodicals literature may be full of blind alleys and dead-ends. The benefit of hindsight is one of the strengths of secondary literature. 



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