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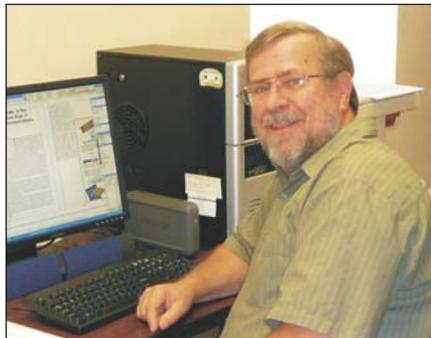


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# New Technologies Develop at Their Own Deliberate Speed

Gary Breed  
Editorial Director



The topic of this month's Technology Report—tunable technologies—was selected for coverage about 11 months ago when we worked out our 2010 Editorial Calendar. At about the same time, the most highly publicized technology, Barium-Strontium-Titanate (BST) ferroelectric dielectric capacitors, nearly disappeared from the news. As we

researched this month's report, I wondered if we would find out the reason for the silence. In part, we did.

First, companies were waiting for some patents to be awarded and were busy filing additional patents to establish their intellectual property rights. Next, production methods were being engineered and funding sought for production equipment and/or fabrication contractors. In a few cases, the startups were arranging production partnerships with larger companies (and setting up future acquisitions, too, I presume).

Key customers were being courted as well. For a new technology to become viable, it must have financial support. The only two sources I can think of are deep pockets of a parent company and venture capital investment. Especially for outside investors, it is essential to have a certain level of sales ensured by early design-ins with a few large OEMs.

As it turns out, our report is probably too soon, but we'll hear plenty about tunable technologies in the near future. Perhaps it is useful to provide a reminder of work on new technologies in that quiet time between the initial flurry of publicity and full production that delivers finished products.

In the past, there have been similar noticeable delays between invention and production. Silicon-Germanium (SiGe) semiconductor processes and Low Temperature Co-fired Ceramics (LTCC) come to mind, although they had continuing news coverage during the wait for practical development, since industry giants IBM and DuPont were the primary developers.

The typical process for a new technology that is launched by a new startup company doesn't have as much PR effort behind it. The inventors generate a large number of conference and journal papers at the beginning, receiving well-deserved publicity for their accomplishments. But

when they must return to the lab to focus on production matters and negotiate confidential agreements with vendors and customers, the flow of papers stops for a while.

For you engineers who are not involved in strategic planning, it is easy to forget about a new technology when there are few papers and little publicity. Hopefully, magazine columns like our Technology Report provide a reminder of progress as we examine a variety of topics throughout the year.

### **Books—Print or Digital?**

In late May, the *San Jose Mercury News* ran a story describing how Stanford University's new Engineering Library would be much smaller than the present one, with 85% of its books shipped to storage in Livermore, CA. National Public Radio recently did a report on that plan, generating consider-

able attention. Carnegie-Mellon and Duke Universities have announced similar plans.

Is this the beginning of the end for in-print books?

Of course it is—at least for wide distribution. I expect that some copies will be continue to be printed and stored for the future. After all, it is possible that today's digital storage technology could become obsolete and forgotten. Hard copies don't need to be converted from invisible bits and bytes.

The technology of recording society's knowledge has continually evolved—from oral memorization to chiseled stone; from crude scratching on fragile parchment to quality inks on acid-free paper. Digital books are the next step.

Besides, Stanford has already agreed to be part of Google's effort to digitize "every book on the planet." This effort needs to proceed

quickly, however. As students (and everyday people) use digital media instead of print, the most important texts must become available in digital form, properly indexed so they can be found when needed. One of my current frustrations with Internet searches is that well-known references on some topics simply don't show up in search engine results. That must change!

We see the digital trend ourselves because all of our past articles are achived online, readily accessible for download and easily indexed by search engines. Our web hosting company tells us that our site has the highest data traffic of any they host. Most of that traffic is from our online Archives.

Maybe some of those downloads are Stanford engineering students doing their homework...