

## Software *components* enable SDRs

### Q & A with Francis Bordeleau, CEO, Zeligsoft



#### EDITOR'S FOREWORD

*I first met Francis at last year's Software Defined Radio Forum. At an evening event sponsored by Zeligsoft, Francis was kind enough to give me time out of his schedule while a room full of people waited for him. Zeligsoft is at the forefront of the growing SDR movement, and the company is positioning itself as a COTS provider of tools and services. Perhaps more so than our other participants in this year's executive roundtable, Zeligsoft is a newer entrant to the mil market and offers an interesting, software-centric view of COTS.* – Chris Ciufu

**MIL EMBEDDED:** *What do you think constitutes a COTS company?*

**BORDELEAU:** A COTS company sells something that is ready to use and that is not customized. A COTS vendor invests its own dollars in R&D and sells their product at fair market value in a competitive market and customers do not pay NRE. Customers of COTS vendors benefit from competitive price points when adoption takes place. They also benefit from more comprehensive testing and product evolution that results from multiple customers having the same product.

To sum it up, COTS is about getting something less expensively, quicker, and with higher quality.

**MIL EMBEDDED:** *How has COTS changed during the past 10 years?*

**BORDELEAU:** Initially COTS adoption moved fast and then as the technology changed and as programs changed, it slowed down a bit. In the case of the JTRS [Joint Tactical Radio System, the military's key SDR program], primes got into ground-up development themselves, so the COTS waters are a bit murky.

The process has changed. Customers used to have to pay a lot for companies to integrate the COTS pieces. There is less and less in-house development. When needing to make a buy vs. build decision, they like to buy. Now the COTS vendors are doing integration as a value-add to their customers.

**MIL EMBEDDED:** *What are some of the advantages and disadvantages of COTS?*

**BORDELEAU:** Reuse of expertise is a key advantage. People with expertise can sell, people with need can buy. The military has much less of a burden to train human resources. The vendors

### COTS: The good, the bad, and the ugly?

**The good:** With COTS we can build more complex systems – more features, more functionality.

**The bad:** It has not been a free ride. COTS has a cost. That includes: always integrating, keeping the whole system together as the pieces evolve, and dependencies on providers.

**The ugly:** Nothing ugly to report. – Francis Bordeleau

invest and develop their specialization, which the military benefits from.

As a downside, there is considerable in-tegration involved in a COTS solution, and the military no longer controls the life cycle of product.

**MIL EMBEDDED:** *How are open standards affecting the military?*

**BORDELEAU:** What will ensure COTS success is standardization; users have to accept a standard interface so that there can be multiple sources.

**MIL EMBEDDED:** *What is it going to take for component-based S/W development to take off?*

**BORDELEAU:** Just like the IT world, we think the marketplace is poised to buy *components* for S/W security, encryption, filters, and so on.

For this to take off, the community needs standardization of APIs; in fact, a standardization of a whole chain of APIs. In order for it

to take off, the industry also needs to tackle testing associated with COTS. The black-box aspect of components makes it difficult to test for undesired behaviors and robustness.

The JTRS standard – the SCA – is allowing vendors to market middleware such as Object Request Brokers [ORBs] and SCA Core Frameworks for use with component-based S/W systems. Real-time operating system vendors are also packaging specifically for SCA applications.

The Unified Modeling Language [UML] was accepted as a standard in the object-oriented programming world and opened the market for tools and technologies to be used off-the-shelf. If the COTS community can agree on specific interfaces, like the SCA, component-based S/W development will take off.

**MIL EMBEDDED:** *What about managing over a long-life military program?*

**BORDELEAU:** The number one problem is keeping the technology robust, tested, and documented as the versions of the different pieces are changing. Version control is a challenge for a COTS solution. Upgrades to components need to be retested and validated against original specs. There is also a question of when to use the new version of a component.

**MIL EMBEDDED:** *Will COTS S/W go through the same evolution as COTS H/W has?*

**BORDELEAU:** S/W components can have the same impact that COTS H/W components had. How many companies are building an SDR downconverter or an antenna controller, or an ABS system in the automobile world? The software world will mature just like the H/W world. The S/W world will get there. It isn't harder, but it will follow. For it to be successful, it needs to be domain-specific (like the JTRS SCA that is under the OMG umbrella). Feature-based specifications are needed. COTS software vendors need to build components for reuse. The mindset of reuse is key. COTS customers must design their systems with components that have been developed with the specific use/context in mind.

COTS will render product faster, higher quality, and cheaper. This is very much needed with the complexity of software systems today; just take a look at the complexities in the commercial world pertaining to home entertainment, video CODECs, and DRM [Digital Rights Management]. The embedded world follows the IT world by 10 years. The IT world is all COTS.

**MIL EMBEDDED:** *What kinds of systems don't or won't use COTS? Why?*

**BORDELEAU:** With COTS, everything is about granularity. If you are leading the edge from a technical perspective, you need to go to less granularity.

Highly secure systems won't use COTS; it's too leading-edge. But leading-edge will change; as it becomes mainstream, it will move to COTS.

**MIL EMBEDDED:** *Speaking of open standards, can the Eclipse Platform become the standard for software development tools integration?*

**BORDELEAU:** Yes it can. The tools vendors, however, must be willing to change how they do things and adopt the Eclipse Platform.

**MIL EMBEDDED:** *Do you think the military will ever move backwards, away from COTS? Why?*

**BORDELEAU:** We don't think it will ever move back down. Innovative technologies come from specialization. There is too much to lose.

*Francis Bordeleau is CEO of Zeligsoft. He has more than 13 years of experience managing, researching, teaching, and defining in the domain of Model Driven Development (MDD), software engineering, component-based technologies, and Software-Defined Radio systems. He has worked, consulted, and collaborated with numerous companies, including IBM, Rational Software, Mercury Computer Systems, and Nortel. Francis holds a B.Sc. Mathematics from the University of Montreal, a B.Sc.A. Computer Science from Université du Québec à Hull, and a Master of Computer Science and a Ph.D. in Electrical Engineering from Carleton University.*

Zeligsoft ([www.zeligsoft.com](http://www.zeligsoft.com)) is a leading provider of market-specific embedded software development tools that enable the development of component-based systems. Leading aerospace and defense companies use Zeligsoft tools to build Software-Defined Radios that conform to the Software Communications Architecture [SCA].