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FROST & SULLIVAN BEST PRACTICES AWARD

AVIONICS SOFTWARE PLATFORM - GLOBAL

Technology Leadership 2019

WIND™

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2019

BEST PRACTICES AWARD

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Background and Company Performance

Industry Challenges

The avionics market is growing; with the increasing number of aircraft in production and air traffic growth, the need for software-based avionics functions has become critical. Avionics suppliers are looking for ways to leverage impactful tools to solve avionics technology issues, shifting from single core to multi-core architecture, as technology running on single core architectures is becoming obsolete. Research from Frost & Sullivan is showing a shift towards the Internet of Things (IoT), which also affects avionics suppliers; through sensorization, new platforms can record and deliver important sets of information that will lead to major changes in how modern aircraft are maintained and repaired.

The avionics industry seeks to satisfy the need for safety-critical software platforms that enable cost-effectiveness for technology suppliers and meet strict safety certifications. Such mandates include DO-178C (airborne systems and equipment certification software considerations; Federal Aviation Administration qualifications), and Avionic Application Software Interface (ARINC 653)—space and time partitioning in safety-critical avionics real-time operating systems. The need for safety platforms that can perform effectively and meet multiple certifications has proven a challenge for many avionics suppliers, thus affecting airlines as they adopt new architectures.

The development costs of adapting to multi-core avionics architectures are an issue; for customers to afford these types of platforms that protect and secure the operating systems, a set of software would need to adapt, enabling the future of connected avionics and devices globally to perform effectively.

Technology Leverage and Business Impact of Wind River®

Headquartered in Alameda, California in the United States, Wind River® is a global leader that provides a complete range of problem-solving software for IoT and the edge. The company's software continues to enhance and protect devices across multiple industries including aerospace and defense. Since 1981, Wind River has developed and pursued enhancements to its complete portfolio of software solutions addressing a quick transition to digitization by providing reliable solutions for operating system safety and security.

Gusts from Wind River's VxWorks Software Platform Continue Strong

The Wind River VxWorks® industry-leading real-time operating system (RTOS) product line provides an open systems architecture Integrated Modular Avionics (IMA) platform supporting ARINC 653, POSIX, and FACE, among a host of other industry and government recognized standards. VxWorks 653 is a virtualization-based IMA platform, which implements a virtualized version of VxWorks and features avionics RTOS safety certifications. It serves as the RTOS foundation for the recently released Wind River Helix™ Virtualization Platform. The company designed the platform around a multi-supplier, role-based supply chain that meets safety certification guidelines per DO-178C and RTCA DO-297 (integrated modular avionics development guidance and certification considerations)—allowing application suppliers to develop, test, and deliver software platform applications independently and asynchronously.[1] This offering is known as independent build, link, and load (IBLL)—allowing for a reduction of cost, risk, and stress that comes with a sudden change to an avionics control system. IBLL also makes it easier for multiple suppliers to work collectively.

The company's avionics software platform has more than 350 customers across more than 600 programs, involving over 100 civilian and military aircraft.[2] With Wind River's multi-core architecture, adaptive software platform, and focus on the avionics market, it is the company's leading integrated modular avionics platform, enabling workload (legacy and new applications) consolidation of safety-critical and general purpose applications by sharing a standard computer platform.[3]

As of 2018, Wind River continues to lead global revenue for the RTOS market with the help of its software design strategies, enabling infrastructure demands. More than half of the company's revenue share was generated from the RTOS and other commercial platforms.

Wind River's Excellent Support is a Breeze for Global Customers

A key feature that sets the company apart in regards to customer support is its offering of extensive professional services with a CMMI Level 3–rated Professional Services team. Through this support, Wind River helps with product assembly and supports coaching for writing code. The company offers detailed step-by-step installation and licensing for its products and platforms. Moreover, Wind River provides an extensive form of customer support to its clients. With an exceptional specialized team, the company offers live support in multiple time zones, allowing it to provide the fastest possible time-to-resolution and deliver design, integration, and optimization services. The platform has excellent reviews from customers such as Airbus, Collins Aerospace, Northrop Grumman, and AgustaWestland, showcasing the software's enablement and Wind River's capabilities

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[1] https://www.windriver.com/products/vxworks/certification-profiles/#vxworks_653
[2] https://www.windriver.com/products/vxworks/certification-profiles/#vxworks_653
[3] https://www.windriver.com/products/vxworks/certification-profiles/

in the aviation market. Furthermore, it supports GE's Common Core System avionics currently flying on the Boeing 787, among other aircraft, and is pioneering the path to multi-core 178-C DAL A safety-certification together with Collins Aerospace on an FAA program of record.

Wind River acknowledges feedback through security assessments, architectural studies, and customer surveys to understand customers' satisfaction with the performance of its software and operating systems. Customer feedback is then evaluated and implemented into the company's product roadmap where applicable or possible to adapt to customers' needs.

The company offers licensing agreements under two distinct models: perpetual paid upfront licensing and a subscription-based licensing. Subscription based licensing allows for companies to have budget flexibility for projects.

Wind River continues its stamina in the market by remaining a global entity in regards to its technology enhancements; bracing systems for potential hackers and countering malicious cyber attacks. In 2018 in the aerospace and defense sector, 30% of Wind River's business was in North America, and 70% consisted of Europe and its other global customers. In hindsight, Wind River made overall positive strides within the European market alone. In recent years, the development and operating structures of the business aviation sector declined (4% to 5%)—resulting in fewer airplanes produced and, in turn, less aircraft needed effective solutions. However, Wind River succeeded through these challenges via its product leadership and performance. The company forecasts substantial growth in the aerospace and defense market, leveraging its software platform with a new avionics infrastructure as it stabilizes its dependence on the European aviation market.

Wind River has an extensive portfolio to differentiate it from competitors. Aside from the VxWorks RTOS product line, the company offers Wind River Linux and other commercial-grade open source technologies for general purpose functions. Wind River Helix Virtualization Platform is for consolidating multiple federated systems with both safety-critical and general purpose applications onto a single compute platform. For system simulation enabling unmodified target software to run on a virtual platform the same way it does on physical hardware, the company offers Wind River Simics®. And the company's Titanium product line is for virtualization at the network edge. By having an extensive portfolio, Wind River proves its leading and significant value for multiple industries in the market. Maintaining its customer base and gaining new customers with the company's rich functionality and high performing solutions, Wind River's VxWorks platform guarantees lower costs and shortened production cycles with its software and product offerings. Wind River utilizes its software platform solutions and extensive product line to build strong partnerships with large companies seeking to evolve software platform capabilities for internal avionics architecture expansion.

Conclusion

Wind River has made a name for itself by providing industry-leading operating system safety and security with its VxWorks platform for avionics. The platform complies with Avionic Application Software Interface, provides capabilities for cost reduction, time-to-certification and upgrades support, and functionality for multi-core avionics operations. It is capable of functioning with any workload and continues to enable next-generation avionics. Wind River's software platforms are industry proven and reliable, enhancing the technological advancement of the Internet of Things (IoT) into modern avionics.

With its strong overall performance for an industry-leading safe and secure software platform for all essential technology, Wind River earns Frost & Sullivan's 2019 Global Technology Leadership Award in the avionics software platform market.

Significance of Technology Leadership

Technology-rich companies with strong commercialization strategies benefit from the increased demand for high-quality, technologically-innovative products. Those products help shape the brand, leading to a strong, differentiated market position.

Understanding Technology Leadership

Technology Leadership recognizes companies that lead the development and successful introduction of high-tech solutions to customers' most pressing needs, altering the industry or business landscape in the process. These companies shape the future of technology and its uses. Ultimately, success is measured by the degree to which a technology is leveraged and the impact that technology has on growing the business.

Key Benchmarking Criteria

For the Technology Leadership Award, Frost & Sullivan analysts independently evaluated two key factors—Technology Leverage and Business Impact—according to the criteria identified below.

Technology Leverage

Criterion 1: Commitment to Innovation

Requirement: Conscious, ongoing development of an organization's culture that supports the pursuit of groundbreaking ideas through the leverage of technology.

Criterion 2: Commitment to Creativity

Requirement: Employees rewarded for pushing the limits of form and function by integrating the latest technologies to enhance products.

Criterion 3: Technology Incubation

Requirement: A structured process with adequate investment to incubate new technologies developed internally or through strategic partnerships.

Criterion 4: Commercialization Success

Requirement: A proven track record of commercializing new technologies by enabling new products and/or through licensing strategies.

Criterion 5: Application Diversity

Requirement: The development of technologies that serve multiple products, multiple applications, and multiple user environments.

Business Impact

Criterion 1: Financial Performance

Requirement: Overall financial performance is strong in terms of revenue, revenue growth, operating margin, and other key financial metrics.

Criterion 2: Customer Acquisition

Requirement: Overall technology strength enables acquisition of new customers, even as it enhances retention of current customers.

Criterion 3: Operational Efficiency

Requirement: Staff is able to perform assigned tasks productively, quickly, and to a high quality standard.

Criterion 4: Growth Potential

Requirements: Technology focus strengthens brand, reinforces customer loyalty, and enhances growth potential.

Criterion 5: Human Capital

Requirement: Company culture is characterized by a strong commitment to customer impact through technology leverage, which enhances employee morale and retention.

Best Practices Recognition: 10 Steps to Researching, Identifying, and Recognizing Best Practices

Frost & Sullivan Awards follow a 10-step process to evaluate Award candidates and assess its fit with select best practice criteria. The reputation and integrity of the Awards are based on close adherence to this process.

STEP	OBJECTIVE	KEY ACTIVITIES	OUTPUT
1 **Monitor, target, and screen**	Identify Award recipient candidates from around the globe	• Conduct in-depth industry research • Identify emerging sectors • Scan multiple geographies	Pipeline of candidates who potentially meet all best-practice criteria
2 **Perform 360-degree research**	Perform comprehensive, 360-degree research on all candidates in the pipeline	• Interview thought leaders and industry practitioners • Assess candidates' fit with best-practice criteria • Rank all candidates	Matrix positioning of all candidates' performance relative to one another
3 **Invite thought leadership in best practices**	Perform in-depth examination of all candidates	• Confirm best-practice criteria • Examine eligibility of all candidates • Identify any information gaps	Detailed profiles of all ranked candidates
4 **Initiate research director review**	Conduct an unbiased evaluation of all candidate profiles	• Brainstorm ranking options • Invite multiple perspectives on candidates' performance • Update candidate profiles	Final prioritization of all eligible candidates and companion best-practice positioning paper
5 **Assemble panel of industry experts**	Present findings to an expert panel of industry thought leaders	• Share findings • Strengthen cases for candidate eligibility • Prioritize candidates	Refined list of prioritized Award candidates
6 **Conduct global industry review**	Build consensus on Award candidates' eligibility	• Hold global team meeting to review all candidates • Pressure-test fit with criteria • Confirm inclusion of all eligible candidates	Final list of eligible Award candidates, representing success stories worldwide
7 **Perform quality check**	Develop official Award consideration materials	• Perform final performance benchmarking activities • Write nominations • Perform quality review	High-quality, accurate, and creative presentation of nominees' successes
8 **Reconnect with panel of industry experts**	Finalize the selection of the best-practice Award recipient	• Review analysis with panel • Build consensus • Select recipient	Decision on which company performs best against all best-practice criteria
9 **Communicate recognition**	Inform Award recipient of Award recognition	• Present Award to the CEO • Inspire the organization for continued success • Celebrate the recipient's performance	Announcement of Award and plan for how recipient can use the Award to enhance the brand
10 **Take strategic action**	Upon licensing, company is able to share Award news with stakeholders and customers	• Coordinate media outreach • Design a marketing plan • Assess Award's role in future strategic planning	Widespread awareness of recipient's Award status among investors, media personnel, and employees

The Intersection between 360-Degree Research and Best Practices Awards

Research Methodology

Frost & Sullivan's 360-degree research methodology represents the analytical rigor of our research process. It offers a 360-degree-view of industry challenges, trends, and issues by integrating all 7 of Frost & Sullivan's research methodologies. Too often companies make important growth decisions based on a narrow understanding of its environment, leading to errors of both omission and commission. Successful growth strategies are founded on a thorough understanding of market, technical, economic, financial, customer, best practices, and demographic analyses. The integration of these research disciplines into the 360-degree research methodology provides an evaluation platform for benchmarking industry players and for identifying those performing at best-in-class levels.

360-DEGREE RESEARCH: SEEING ORDER IN THE CHAOS

About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, enables clients to accelerate growth and achieve best-in-class positions in growth, innovation and leadership. The company's Growth Partnership Service provides the CEO and the CEO's Growth Team with disciplined research and best practice models to drive the generation, evaluation and implementation of powerful growth strategies. Frost & Sullivan leverages more than 50 years of experience in partnering with Global 1000 companies, emerging businesses, and the investment community from 45 offices on six continents. To join our Growth Partnership, please visit http://www.frost.com.