

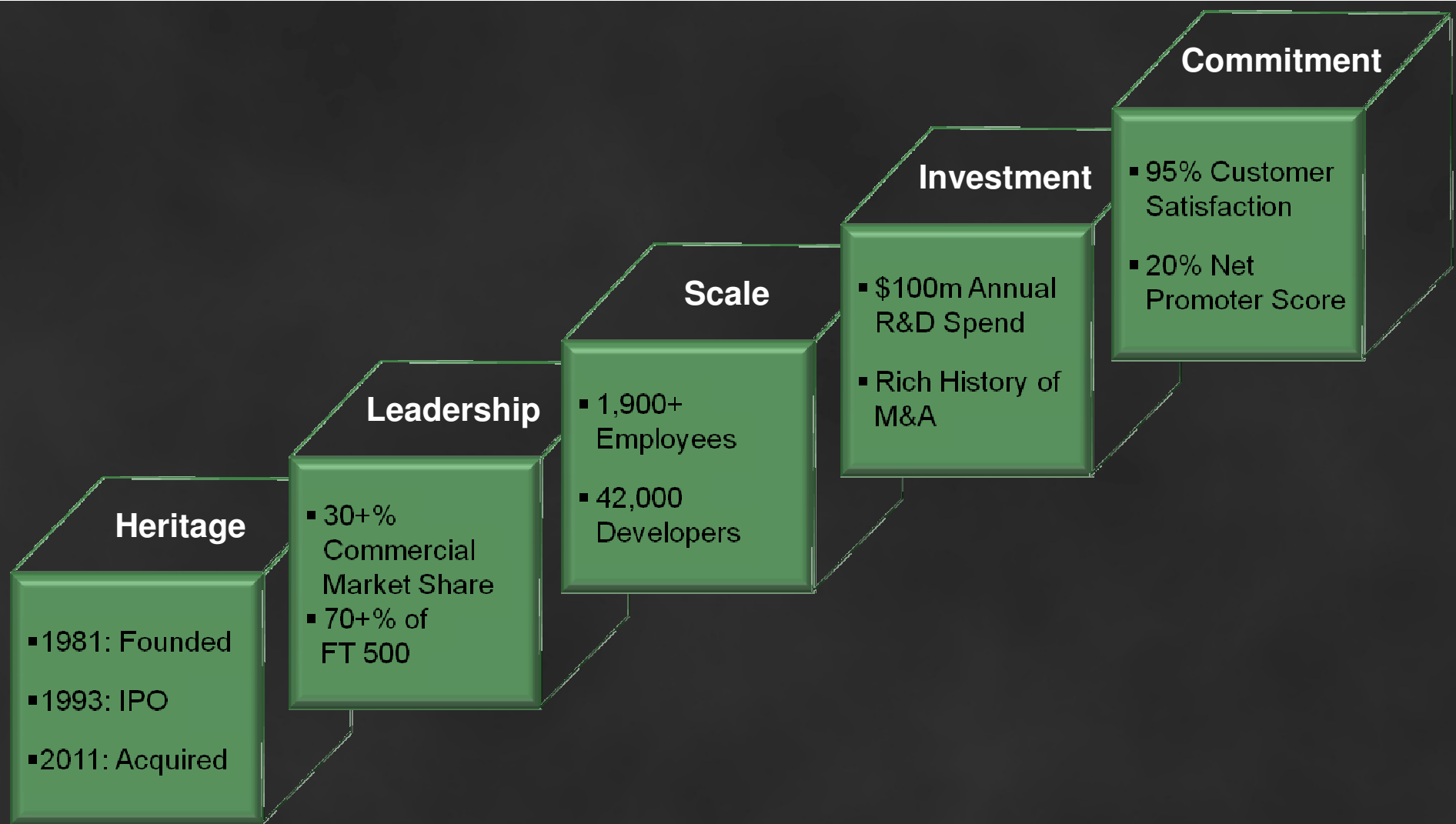
WIND RIVER



Wind River Success in Aerospace and Defense

Trade Show title

WIND RIVER



Aerospace and Defense Challenges

Commercial

- Dynamic requirements
- Reduced budgets
- Extended life cycles
- Industry consolidation

Technology

- Semiconductor influence
- Next-generation tooling
- Safety and security
- Platform consolidation

Aerospace and Defense Capabilities

Platform Solutions



- Flexibility and agility
- Rapid deployment
- Embedded virtualization

Security Solutions



- COTS Common Criteria
- Data and network
- Enterprise/system

Safety Solutions



- COTS DO-178C Level A
- DO-297 application reuse
- Full life-cycle support

Wind River Platform Solutions: Lower Total Cost of Ownership

Platform Flexibility and Agility

- Wind River Linux, VxWorks, legacy or enterprise OS
- Reliability and quality through Wind River Simics and Wind River Test Management
- Global education, mentoring, and services

Rapid Deployment

- Open architecture providing rapid application deployment
 - Android, Linux CGL 5.0 & LSB 4.5, POSIX, SCA 2.2.2
- Advanced interoperability through IPv6

Embedded Virtualization

- Wind River Hypervisor, optimizing the physical environment
 - No generic abstraction as in IT domains
- Consolidation and provision for security/safety

Boeing 787 Common Core Computer Runs VxWorks 653

- First flight, December 2009
- Certified to DO-178B Level A
- ARINC 653 for application portability
- 17 Boeing suppliers, dozens of teams
- DO-297 for multi-vendor integration/reuse
- Simics for hardware simulation and verification
- More than 100 different line replaceable units (LRUs) eliminated

VxWorks 653 now leads the industry, with more than 230 projects, used by more than 140 customers, in more than 50 aircraft.

Wind River COTS Security Solutions to Protect Against Cyber-Security Threats

COTS Common Criteria

- Wind River Linux Secure, EAL4+
- Wind River MILS Platform, EAL6+

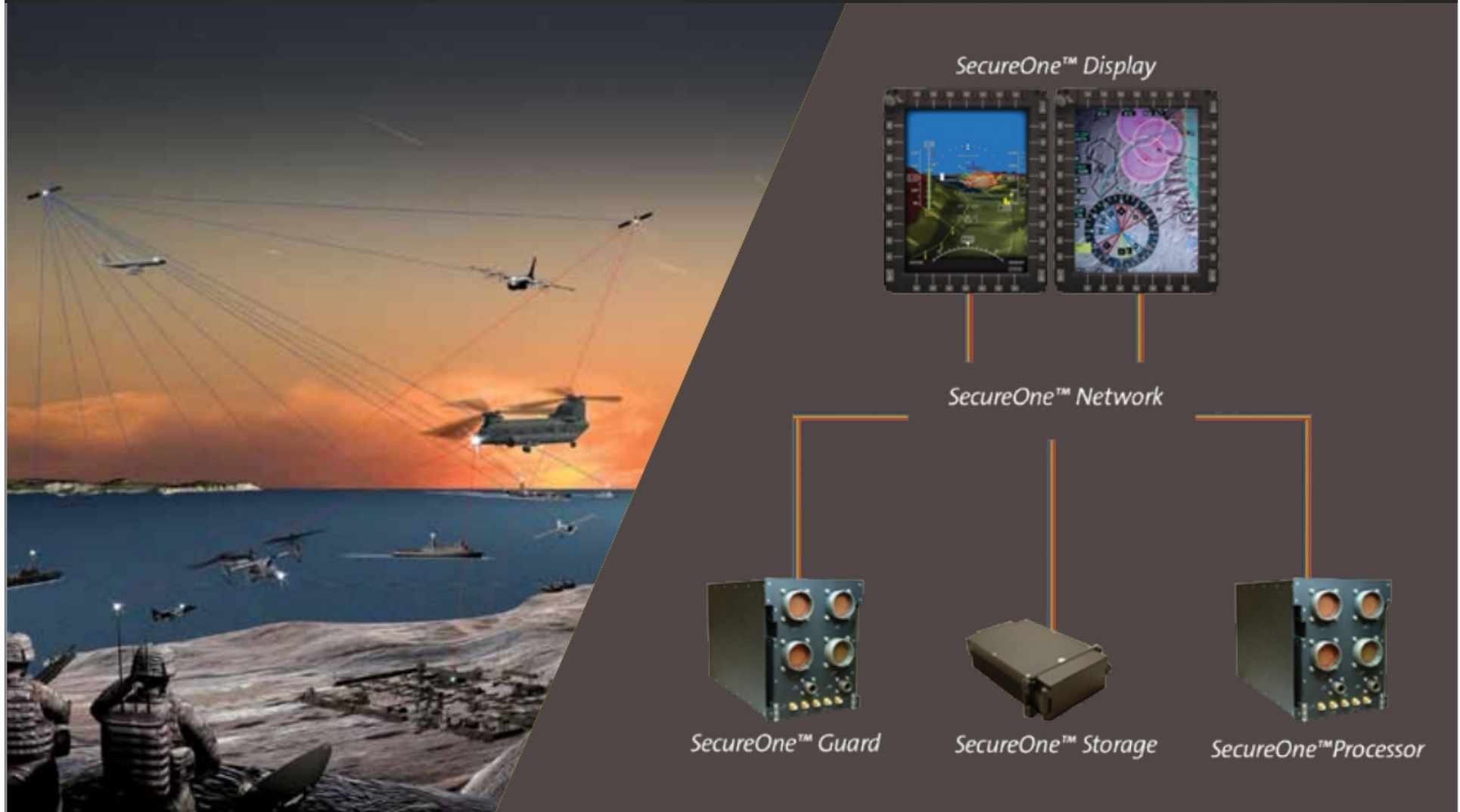
Data and Network

- Wind River Workbench for security analytics
- IPv6, including IPsec, IKE, SSH, SSL, TLS
- FIPS 140-2

Enterprise/System

- Integration through McAfee
- Security response team

Rockwell Collins SecureOne™ Cross Domain Technologies run VxWorks MILS



Wind River COTS Safety Solutions to Meet Government Regulations

COTS DO-178B/C

- VxWorks
 - Single applications to Level A
- VxWorks 653
 - Multiple applications to different levels
- Wind River Hypervisor
 - Multi-core and legacy applications

Application Reuse

- COTS certification artifacts on DVD
- DO-297 certification process, including tools qualification
 - Platform supplier, application supplier, systems integrator roles

Full Life-Cycle Support

- Wind River Simics: System-level simulation and validation
- Wind River Test Management: Quality control and validation
- Unit test: DO-178B-qualified Cantata++

Boeing KC-767A Tanker



Three Subsystems Platform Certified (RTOS and Hardware)

- VxWorks Cert (Federated)
 - Multipurpose control display unit
 - Hose deploy unit
- VxWorks 653 (IMA)
 - Flight management computer

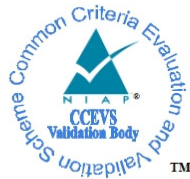
Wind River Solutions

- Lower the total cost of ownership (TCO) for embedded systems development.
- Protect advanced mission-critical systems from cyber-security threats.
- Deliver safety critical platforms to meet the requirements of RTCA DO-178C.

***1 billion products worldwide
rely on Wind River technology***

Wind River Linux Secure

National Information Assurance Partnership



Common Criteria Evaluation and Validation Scheme Validation Report

Wind River
Wind River Linux Secure 1.0

Report Number: CCEVS-VR-VID10430-2011

Dated: 2011-04-05

Version: 1.0

National Institute of Standards and Technology
Information Technology Laboratory
100 Bureau Drive
Gaithersburg, MD 20899

National Security Agency
Information Assurance Directorate
9800 Savage Road STE 6940
Fort George G. Meade, MD 20755-6940

http://www.commoncriteriaportal.org/files/epfiles/st_vid10430-vr.pdf

FIPS 140-2 Validation Certificate



The National Institute of Standards
and Technology of the United States
of America



Certificate No. 1475



The Communications Security
Establishment of the Government
of Canada

The National Institute of Standards and Technology, as the United States FIPS 140-2 Cryptographic Module Validation Authority, and the Communications Security Establishment, as the Canadian FIPS 140-2 Cryptographic Module Validation Authority, hereby validate the FIPS 140-2 testing results of the Cryptographic Module identified as:

Network Security Services (NSS) by Wind River Systems, Inc.
(When operated in FIPS mode)

In accordance with the Derived Test Requirements for FIPS 140-2, Security Requirements for Cryptographic Modules, FIPS 140-2 specifies the security requirements that are to be satisfied by a cryptographic module utilized within a security system protecting Sensitive Information (United States) or Protected Information (Canada) within computer and telecommunications systems (including voice systems).

Products which use the above identified cryptographic module may be labeled as complying with the requirements of FIPS 140-2 so long as the product, throughout its life cycle, continues to use the validated version of the cryptographic module as specified in this certificate. The validation report contains additional details concerning test results. No reliability test has been performed and no warranty of the products by both agencies is either expressed or implied.

This certificate includes details on the scope of conformance and validation authority signatures on the reverse.

This is a Certification Mark of NIST, which does not imply product endorsement by NIST, the U.S. or Canadian Governments.

FIPS 140-2 provides four increasing, qualitative levels of security: Level 1, Level 2, Level 3, and Level 4. These levels are intended to cover the wide range and potential applications and environments in which cryptographic modules may be employed. The security requirements cover eleven areas related to the secure design and implementation of a cryptographic module. The scope of conformance achieved by the cryptographic modules as tested in the product identified as:

Network Security Services (NSS) by Wind River Systems, Inc.
(Software Version: 3.12.4; Software)

and tested by the Cryptographic Module Testing accredited laboratory:
is as follows:

atsec information security corporation, NVLAP Lab Code 20058-0
CRYPTIK Version 8.0

Cryptographic Module Specification:	Level 1	Cryptographic Module Ports and Interfaces:	Level 1
Roles, Services, and Authentication:	Level 2	Finite State Model:	Level 1
Physical Security: (Multi-Chip Standalone)	Level N/A	Cryptographic Key Management:	Level 1
EMI/EMC:	Level 1	Self-Tests:	Level 1
Design Assurance:	Level 1	Mitigation of Other Attacks:	Level 1
Operational Environment:	Level 1	tested in the following configuration(s):	Wind River Linux Secure 1.0 (single-user mode)

The following FIPS approved Cryptographic Algorithms are used: Triple-DES (Cert. #949); AES (Cert. #1374); DSA (Cert. #450); ECDSA (Cert. #174); SHA (Cert. #1256); RSA (Cert. #973); DRBG (Cert. #449); HMAC (Cert. #807).
The cryptographic module also contains the following non-FIPS approved algorithms: MD5; MD2; RC2; RC4; DES; SEED; CAMELLIA; Diffie-Hellman (key agreement; key establishment methodology provides between 80 bits and 112 bits of encryption strength); ECDH (key agreement; key establishment methodology provides between 80 bits and 256 bits of encryption strength); RSA (key wrapping; key establishment methodology provides between 80 bits and 192 bits of encryption strength).

Overall Level Achieved: 1

Signed on behalf of the Government of the United States

Signed on behalf of the Government of Canada

Signature: *William S. Brown*

Signature: *Carol J. ...*

Dated: *December 28, 2010*

Dated: *December 21, 2010*

Chief, Computer Security Division
National Institute of Standards and Technology

Director, Industry Program Group
Communications Security Establishment Canada

Completed Safety Certification Projects

<i>Customer</i>	<i>Program</i>	<i>Standard</i>	<i>Product</i>	<i>Level</i>	<i>Agency</i>
BARCO	CDMS-3000 (MOSArt)	DO-178B	VxWorks 653	Level A	EASA
BARCO	Ilyushin 96	DO-178B	VxWorks 653	Level C	NIIAO
Boeing/GE	787 Common Core System	DO-178B	VxWorks 653	Level A	FAA
Boeing/GE	KC-767 AFMC	DO-178B	VxWorks 653	Level B	FAA
Boeing/GE	KC-767 Hose Deploy	DO-178B	VxWorks	Level B	FAA
Boeing/GE	KC-767 MCDU	DO-178B	VxWorks	Level B	FAA
Cobham FR	A330 905E Wing Pod	DO-178B	VxWorks	Level A	INTA
EADS Eurocopter	EC 225 LP	DO-178B	VxWorks	Level A	EASA
EADS CASA	A330 MRTT ARBS	DO-178B	VxWorks 653	Level A	INTA
EADS CASA	A330 MRTT MIC	DO-178B	VxWorks	Level B	INTA
EMEA Supplier	Radar System	Def Stan 00-56	VxWorks	SIL 3	UK MoD
EMEA Supplier	Pipeline Valve Control	IEC 61508	VxWorks	SIL 3	TÜV
EMEA Supplier	Ships modular safety system	IEC 61508	VxWorks	SIL 2	TÜV
EMEA Supplier	UAV	Def Stan 00-56	VxWorks	SIL 3	UK MoD
LogicaCMG	EGNOS	DO-178B	VxWorks	Level B	ESA
LogicaCMG	Fire Control BISA	IEC 61508	VxWorks	SIL 2	UK MoD
Raytheon	WAAS	DO-178B	VxWorks	Level B	FAA

TJ2018-002
Issue 58, 22 January 2011

Page 1 of 25

European Aviation Safety Agency

EASA
TYPE-CERTIFICATE
DATA SHEET

SA 330 J
AS 332 C
AS 332 L
AS 332 C1
AS 332 L1
AS 332 L2
EC 225 LP

Type Certificate Holder: Eurocopter

Alouette International Manutention – Remorque
17171 Montargis (Aisne)
France

Manufacturer: Eurocopter

Alouette International Manutention – Remorque
17171 Montargis (Aisne)
France

Issue 7: 12 January 2011

[illegible]

Software Acceptance/Summary for VoIPsofts 053 Platform 2.2.1	
APPRAISALS Independent technical reviewer and Software Quality Assurance personnel have reviewed this document.	
Document Title	Software Acceptance/Summary for VoIPsofts 053 Platform 2.2.1
Document Version:	V053_053_2_2_040_v_1
Technical Review:	Reviewed by: <u>John Smith</u> <u>Reviewed by:</u> <u>John Smith</u> <u>Reviewed by:</u> <u>John Smith</u>
Technical Review:	Reviewed by: <u>John Smith</u> <u>Reviewed by:</u> <u>John Smith</u> <u>Reviewed by:</u> <u>John Smith</u>
Software Quality Assurance:	Reviewed by: <u>John Smith</u> <u>Reviewed by:</u> <u>John Smith</u> <u>Reviewed by:</u> <u>John Smith</u>
Project Management:	Reviewed by: <u>John Smith</u> <u>Reviewed by:</u> <u>John Smith</u> <u>Reviewed by:</u> <u>John Smith</u>

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Word-Rite Proprietary

Page 1



European Aviation Safety Agency

**EUROPEAN TECHNICAL STANDARD ORDER
(ETSO) AUTHORIZATION**

EASA 21.01.162

This European Technical Standard Order (ETSO) Authorization is issued by EASA, acting in accordance with the provisions of Regulation (EU) No 1825/2003, in order to ensure the Member States and of the European States which are signatories to the Convention of 1968 (Annex 8) of that Convention, that the products which are certified according to the Technical Specifications for the following:

BARCO N.V.
Product: 4000 Series PS
4000 Series
Kingman

in accordance with Commission Decision No 1762/2003/EC, Part 21, Section A, Subpart C of Regulation (EU) No 1825/2003.

for

CSH-200 / Control Display and Management System Display Unit
Part 21, ETSO-ED-200-001, Issue 01, CSN 01-200-001 (CSA)

ETSO-ED-200-001-001, Issue 01, CSN 01-200-001 (CSA)

Remarks:
 The following design description has been developed in ETSO 21.01 and is
 incorporated in CSN section 2.1.1

Conditions
 The above ETSO Authorization holder is authorized to identify, in Article with this ETSO and with any additional conditions with its conditions, within the scope of this authorization, the following conditions in accordance with the provisions of the Annex of the Convention of 1968 (Annex 8) of that Convention, that the products which are certified according to the Technical Specifications for the following:

This authorization does not remove said conditions or restrict


European Aviation Safety Agency
Date of issue: November 13, 2009

[illegible]

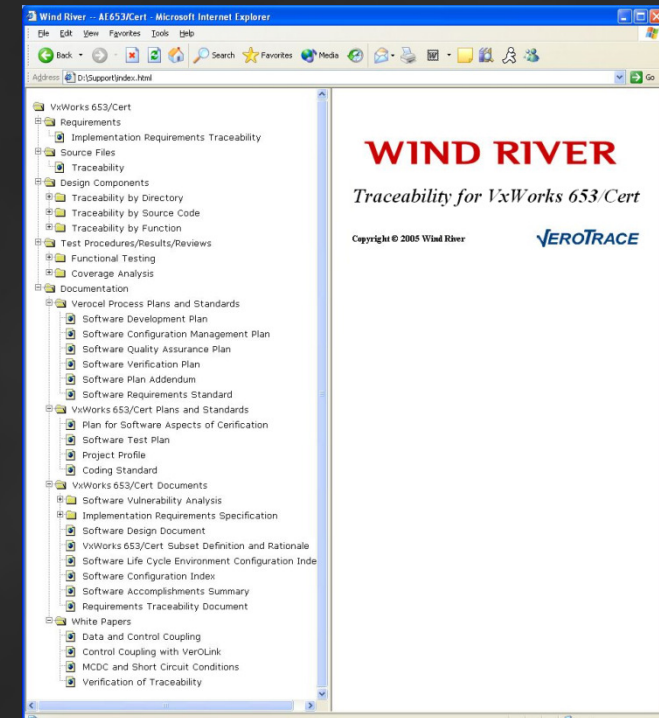
Ongoing Safety Certification Projects

<u>Customer</u>	<u>Program</u>	<u>Standard</u>	<u>Product</u>	<u>Level</u>
Assystem	A400M Power System	DO-178B	VxWorks	Level A
Boeing/GE	C-130 AMP FMS, Comm, others	DO-178B	VxWorks 653	Level A
Boeing/GE	P-8A MMA Flight Computer	DO-178B	VxWorks 653	Level A
Bombardier	HM410 Train Information System	IEC 61508	VxWorks	SIL 2
Cobham FR	A400M 908E Wing Pod	DO-178B	VxWorks	Level A
EADS CASA	A400M MIC	DO-178B	VxWorks	Level C
EMEA Supplier	A400M System	DO-178B	VxWorks 653	Level C
EMEA Supplier	A400M System	DO-178B	VxWorks 653	Level D
Indra Sistemas	A400M IFF System	DO-178B	VxWorks	Level B
Japan Supplier	Industrial System	IEC 61508	VxWorks	SIL 3
Rockwell Collins	C-130 Tactical MFD	DO-178B	VxWorks 653	Level A

Plus many more confidential projects

*Wind River safety solutions are
used by over **150** customers
on over **230** projects
working on over **50** aircraft*

Sealed DVD with
certification artifacts
supplied as part of
the product
certification
data package





The **broadest** and **deepest** hardware ecosystem in the industry





The **broadest** and **deepest** software ecosystem in the industry



LiMo Foundation

open handset alliance





Aerospace and Defense

- Air Traffic Control
- Avionics
- Command & Control
- Electronic Warfare
- ISR
- Satellites
- Simulation and Training
- Sensors
- Software Defined Radio
- Space Launch Vehicles
- Space Probe
- Test Equipment
- Unmanned Vehicles
- Weapons Control



Aerospace and Defense

Applied Signal
Aselsan
BAE Systems
Boeing
Dassault Aviation
EADS
Elbit Group
Eurocopter
Finmeccanica

General Dynamics
General Electric
Harris
Honeywell
IAI
ITT
L-3 Communications
Lockheed Martin
NASA

NEC
Northrop Grumman
Raytheon
Rockwell Collins
Saab
Terma
Thales
United Technologies
US Navy

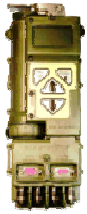


Aerospace and Defense

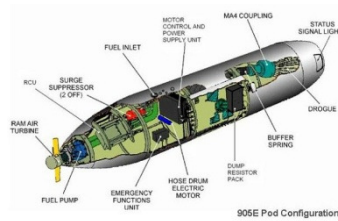
Abrams	Aegis	A400M	ARES	Airbus A3xx
Bowman	Astute	A330 MRTT	Columbus	Airbus A350
Bradley	DDG-1000	V-22	Falcon 9	Airbus A380
Challenger	Halifax	KC-767	FTB1	Boeing 7x7
FCS	Harpoon	C-130	ISS	Boeing 747-8
GIG	KDX-I	Typhoon	Mars Rovers	Boeing 787
HIMARS	Phalanx	F-35	NASA ST8	EC 225
JTRS	Tomahawk	Global Hawk	Odyssey	EGNOS
MLRS	Type 45	nEUROn	Pathfinder	Ilyushin Il-9
Patriot	U212	UCAS-D	PROBA	WAAS

Sample applications

Command and Control Systems



**BAE SYSTEMS J-CAD
ChemSentry**



**Cobham Air Refuelling &
Auxiliary Mission Equipment
900E air refuelling pods**



**BAE SYSTEMS SCC500™
Series Infrared Camera**



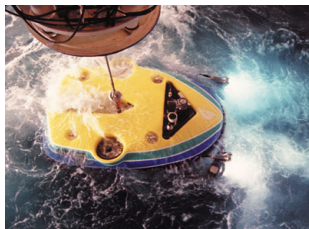
**Grand Telescopio
Canarias (GTC)**



AIRBUS A330 MRTT



**European Southern
Observatory Very Large
Telescope**



**Monterey Bay Aquarium
Research Institute Tiburon
Remote Operated Vehicle**



**University of Tokyo
Intelligent AUV**



**NASA Genesis
Space Probe**

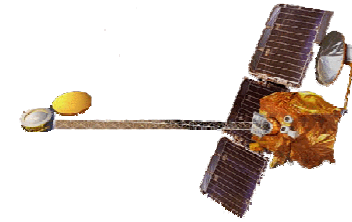
Communications Systems



**NASA Mars Pathfinder
Planetary Lander**



**Airbus A400M MIDS
Interface Computer**



**NASA Mars Odyssey
Planetary Orbiter**



**ESA PROBA Earth
Satellite**



**Thales JTRS Enhanced
MBITR**



**Kongsberg Defense & Aerospace
Common Tactical Computer (CTC)**



Raytheon RSTA-MEP



SELEX Communications Software Defined Radios

Flight Computers and Displays



**Northrop Grumman
X-47B N-UCAS**



**NASA X-38 Space Station
Autonomous Emergency
Vehicle**



**nEUROn
UCAV**



**CIRA FTB-1 Unmanned
Space Vehicle**



**Boeing 787 Dreamliner:
Common Core Computer**



Boeing P-8A MMA



**NASA Mars PHOENIX
Lander**



BOEING C-130 AMP



F-22 Raptor

Flight Computers and Displays



BARCO MOSart Display System



**Norwegian Special
Mission UNIFIS 3000
Flight Inspection System**



**BAE SYSTEMS: Tornado
Advanced Radar/Map Display
Information System (TARDIS)**



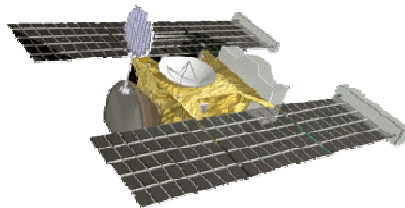
**EUROCOPTER Super
Puma EC 225**



**Elbit Systems Joint
Helmet Mounted Cueing
System (JHMCS)**



HKP14 Helicopter



**NASA Stardust
Cometary Probe**



**Honeywell Global
Star 2100 FMS**



Airbus A400M

Fire and Launch Control



**NASA Space Shuttle
Check-out and Launch
Control**



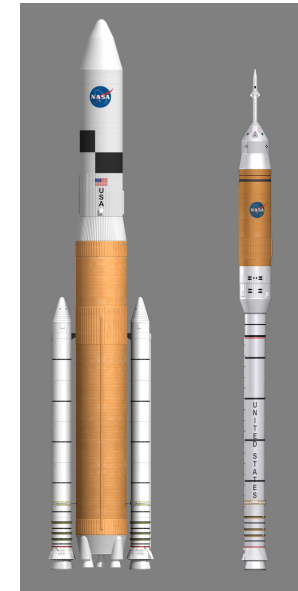
**SPACE-X Falcon 9
Launch Vehicle**



**Raytheon Javelin
Anti-Tank Missile**



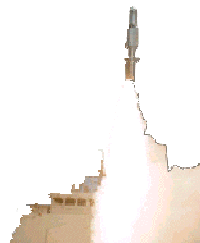
Multiple Launch Rocket System



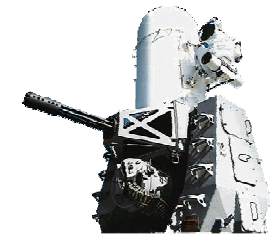
**NASA ARES I and
ARES V Launch Control**



Trident Missile Fire Control



**Raytheon Standard SM-2
Ship To Air Missile**



**Raytheon Phalanx
Close In Weapon System**

Guidance and Navigation



**Raytheon Tomahawk
Ship Launched Cruise Missile**



**Raytheon Wide Area
Augmentation System (WAAS)**



**Raytheon AMRAAM Phase 3
Air To Air Missile**



BOEING KC-767 Tanker



**NASA Deep Impact
Comet Probe**



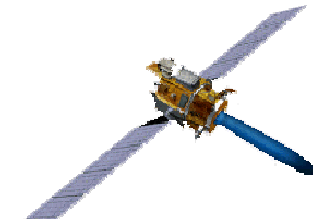
Boeing P-8A MMA



**Boeing AGM-84 Harpoon
Ship To Ship Missile**



**HBOI Ocean
Voyager AUV**



**NASA Deep Space 1
Space Probe**

Sensors and Electronic Warfare



Airbus A400M IFF



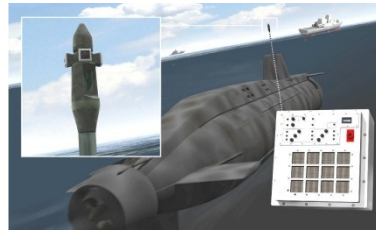
**Lockheed Martin AN/APR-48A
Electronic Support Measures**



Aegis SPY-1 Radar



**TERMA
Advanced Threat
Display**



**Thales Astute Submarine
Optronics Mast**



**Thales Active Phased
Array Radar APAR**



**NASA UAV Synthetic
Aperture Radar**



**Tornado: Radar Warning
Receiver**



E-2C Hawkeye

Success Stories

WIND RIVER

TERMA selected Wind River VxWorks Advanced Threat Display (ATD)



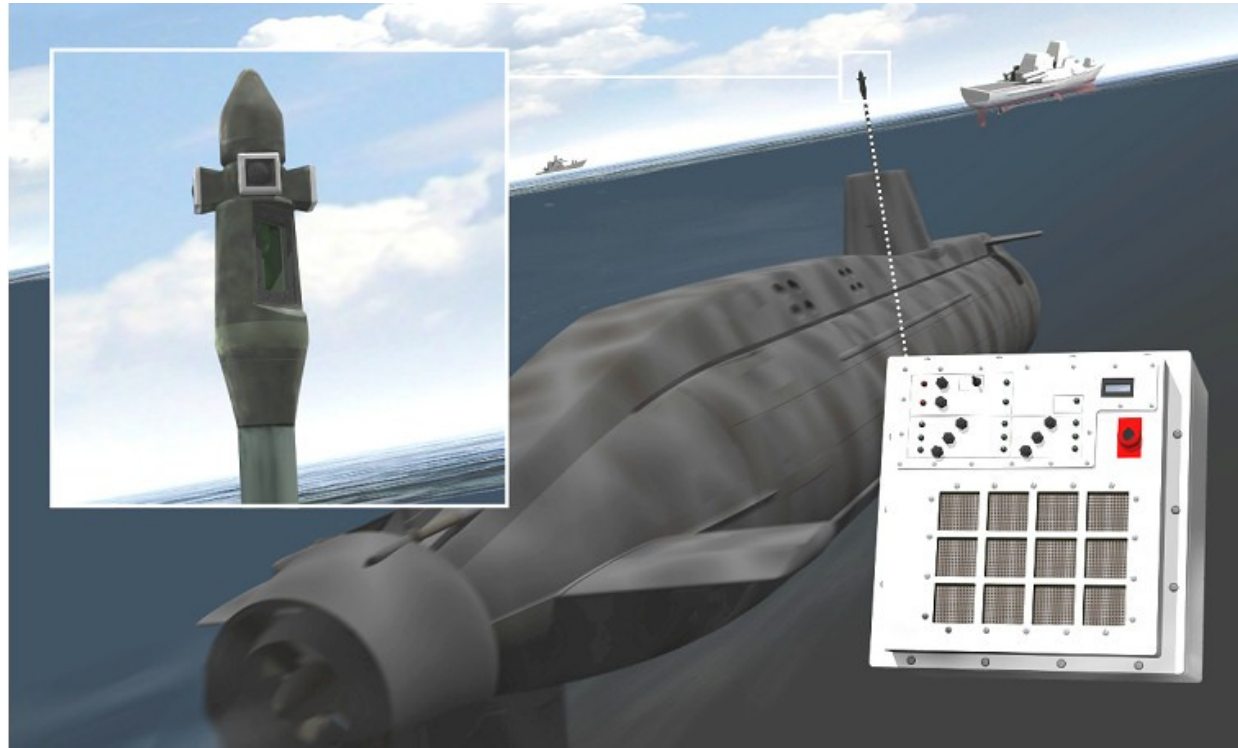
“We needed a robust, real-time software solution for the ATD,” said **Jørgen Jakobsen, manager of Terma Airborne Systems**. “A pilot typically has no more than a few seconds to respond to incoming threats. Every second counts when it comes to threat detection. Selecting VxWorks, an industry-accepted RTOS, was the only decision that made sense for Terma. When an airforce realizes that their aircraft lack sufficient protection for upcoming deployments in the battlefield, they demand urgent implementation from Terma. We, in turn, must rely on urgent and agile suppliers. Wind River’s local support and professional services offering was both powerful and proven.”

BAE SYSTEMS selected Wind River VxWorks for the Operating System in the JCAD ChemSentry



"BAE SYSTEMS chose Wind River technology in the design of our JCAD ChemSentry because of the environment it operates in," said **Ronda Foster, BAE SYSTEMS Vice President and General Manager**. "We need strong off-the-shelf solutions that don't fail under pressure. Using proven technology, we are able to concentrate on implementing the features that make JCAD ChemSentry such a powerful tool without worrying about the robustness of the underlying technology."

Thales selected Wind River VxWorks for mission-critical applications on the Astute Class Submarine

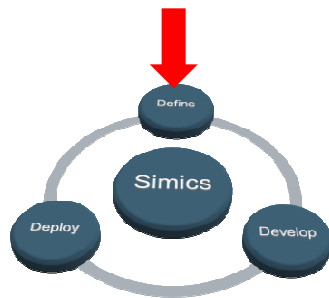
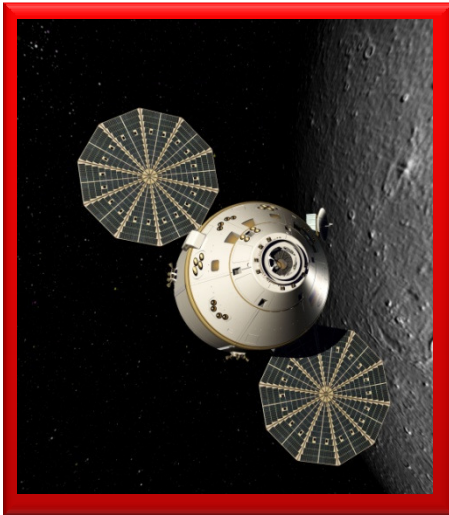


“Obviously a system like the Optronics Mast must be robust and highly reliable at all levels. Without it, the submarine is blind. VxWorks was chosen because it provides a high-performance, reliable environment.”

David Cookman, Systems Engineer, Thales Optronics

Honeywell selected Wind River Simics for the ORION Program

Honeywell/Orion
(Space Shuttle Replacement)



- **Use-case:**

- Start software/system development before hardware design complete

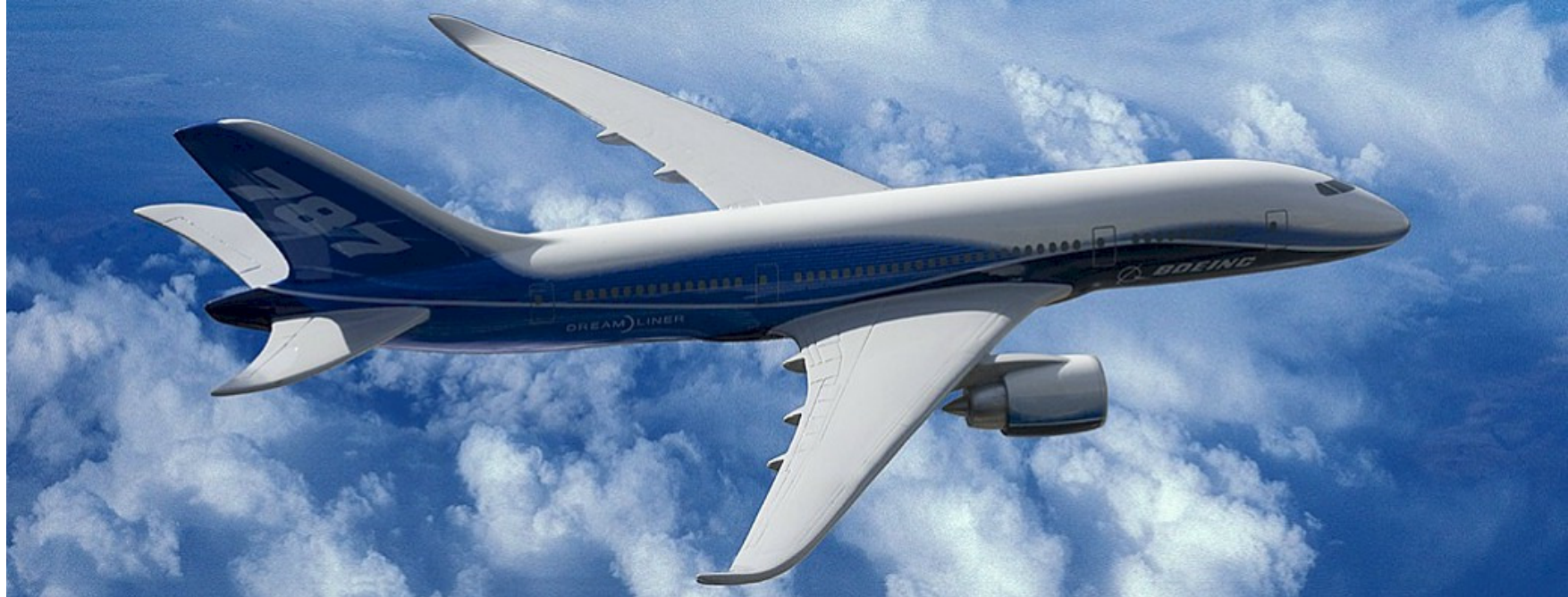
- **Problem:**

- Target hardware not selected; but very large software/system effort must begin right away & be able to evolve as HW design choices are made
- Need to equip multiple teams & companies with target hardware & have a means to quickly/easily/cheaply update new versions of it

- **Simics Solution:**

- Simics virtual model provided & will evolve as hardware decisions are made
- SW & Sys teams beginning work years before target HW is available

GE Aviation selected Wind River VxWorks 653 for the Common Core System on the Boeing 787 Dreamliner



"Working together on this groundbreaking program, we will enable Boeing to further reduce costs, size, and power consumption for the 7E7, while simultaneously providing the interoperability, flexibility and reliability needed to meet today's stringent security and safety requirements. "

said **Mike Grady** , vice president, Civil and Military Air Transport of Smiths Aerospace.

Kaiser Electronics selected Wind River VxWorks and Quantum-3D NVIDIA-Based embedded graphics subsystems in the F-22 Raptor MFD



Quantum3D will design an NVIDIA Mobile Workstation Graphics Processing Unit (GPU) based Embedded Graphics Subsystem (EGS) and provide associated systems software for incorporation in Kaiser Electronics' Multi-Function Display (MFD) designs for the F-22 Raptor now being developed for the USAF by Lockheed Martin and Boeing Corporation.

Quantum3D will also provide to Kaiser Electronics versions of the NVIDIA OpenGL® 1.2 graphics driver and diagnostic software for the Wind River VxWorks real-time operating system that is employed within the F-22 MFDs.

Lockheed Martin selected Spectrum Signal Processing SDR-3000 for waveform development in a Software Communications Architecture (SCA) environment

The SDR-3000 is a heterogeneous processing platform incorporating Xilinx® field programmable gate arrays, IBM and Freescale™ PowerPC® processors and Texas Instruments digital signal processors. It also includes Harris Corporation's SCA Core Framework, **Wind River's VxWorks real-time operating system**

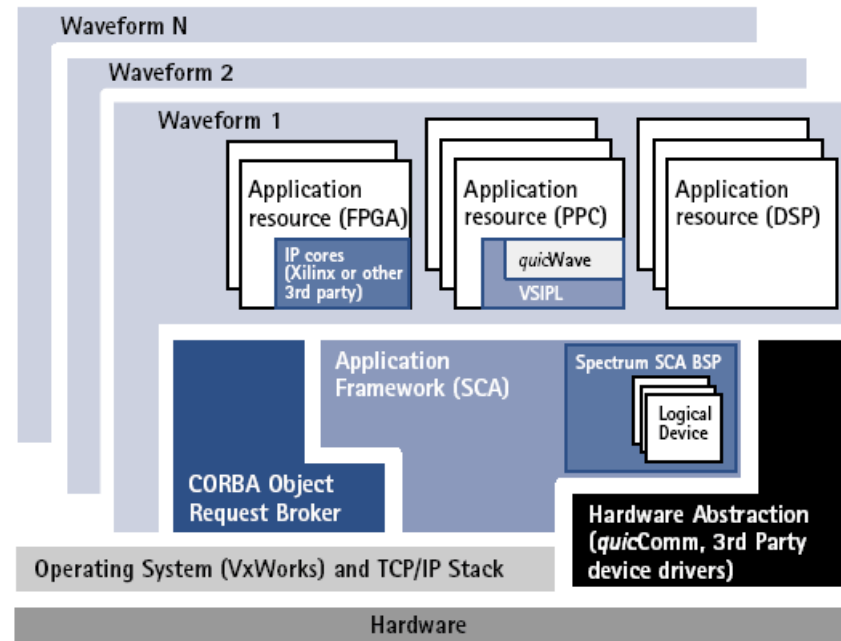


Figure 2. SDR-3000 Software Stack

"Lockheed chose Spectrum for its leadership position in commercial-off-the-shelf SCA-enabled reconfigurable processing solutions," said **Russ Johnson, Principle Research Scientist at Lockheed Martin Integrated Systems and Solutions**. "By selecting a Spectrum solution, I expect to advance my team's knowledge of the SCA and SCA-enabled waveform development and accelerate Lockheed's efforts under its next generation communications programs."

Thales selected Wind River VxWorks for the TMU Software in the Active Phased Array Radar (APAR)



The Tracking Management Unit (TMU) associated with a multi-function, four face, Active Phased Array Radar (APAR) for naval applications. The TMU is the APAR sub-system which performs all tracking functions by coordinating the use of the four, independent faces.

The TMU runs Wind River VxWorks on a battery of SPARC processors (eight in each of the main and standby unit), in a VME environment.

Spacebel selected Wind River VxWorks for the mission Computer on the ESA PROBA Satellite



Photo: ESA

Description:

Proba HRC image of the Pyramids of Giza in Egypt, acquired 20 March 2004. The three main pyramids seen consist of the Great Pyramid of Khufu, the Pyramid of Kafhre and the Pyramid of Menkaura. They stand on the border of Greater Cairo at the verge of the desert.

"We chose Wind River's VxWorks operating system for PROBA because of its robustness and proven reliability on space missions." said **Dominique Baudoux, Space Business Unit Program Manager for Spacebel**

BARCO selected Wind River VxWorks 653 for the MOSart Display System



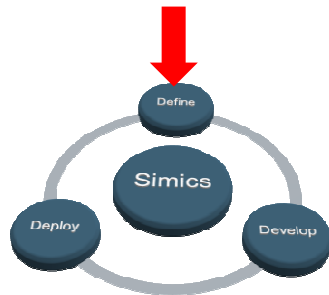
Jean-Christophe Monfret, Product Management Director at Barco, explains

“Military and civil aviation customers are demanding more advanced applications that become available faster, that are cheaper and that are better integrated into the same unit. This approach enables them to reduce weight and space, improve system availability, and comply with various levels of the DO-178B software safety standard.

The open architecture enabled by Wind River and its partner ecosystem allows us to meet these rigorous requirements and reduce our time to market. Certifying systems such as primary flight display, synthetic vision, enhanced vision and digital moving map for ARINC 653 requires a COTS approach to maintain a competitive edge. Wind River is a pioneer in COTS software and understands the high service-level demands of our environment. **That is why we have selected VxWorks 653 as the default core operating system for our MOSart solution for open displays.”**

A JSF Subcontractor selected Wind River Simics for the Joint Strike Fighter

JSF Subcontractor
(Joint Strike Fighter)



- **Use-case:**
 - Mitigate risks for HW technology changes
- **Problem:**
 - Need to modify system & hardware design; analyze impact of changes on actual software; begin software porting prior to HW
 - Need to analyze multi-core impact, optimize cache performance
- **Simics Solution:**
 - Use Simics virtual targets to evaluate the actual target software application when moving from 2 processors to 1 multi-core processor

Boeing selected Wind River Workbench as the Device Software Development Tool Suite for the U.S. Army's Future Combat System (FCS) Program



"The FCS program sought a common software development environment that was an extensible, standards-based platform, to address a broad range of needs for its software development projects," said **Paul Schoen, Director of Software for SoSCOE, FCS**. "Based on these and other defined criteria, the historical evidence of **Wind River Workbench's** Eclipse foundation promises a significant increase in productivity due to its flexibility, ease-of-use and scalability."

The University of Tokyo selected Wind River VxWorks for the Operating System on the Intelligent AUV



Wind River VxWorks runs the main computer which gathers and logs data from navigational and other sensors, and controls the total robot system in accordance with a mission plan, such as the motion and activity control of the robot including obstacle avoidance judgment, research payload control, watchdog and emergency control

NASA selected Wind River VxWorks for the DAWN Spacecraft



Image credit: William K. Hartmann Courtesy of UCLA



Image of MARS taken during fly past by DAWN

The command and data handling system (CDHS) is based on a RAD6000 board running VxWorks. The software is written in C. There are 8GB available on the board as storage for engineering and scientific data.

EUROCOPTER selected Wind River VxWorks Cert for the Flight Display System on the Super Puma EC 225 and Cougar EC 725



**DO-178B Level A
certified by EASA**

Copyright Eurocopter

"Wind River worked closely with the Eurocopter team throughout the development and certification process, providing tremendous value in optimizing the safety, security and reliability of Eurocopter's new flight display systems," said Marc Achache, System architecture department manager at Eurocopter's design office. "Wind River's technology and expertise is quickly making them an international standard for safety-critical systems. By choosing Wind River for this project, we had the complete foundation required to build and certify these mission critical systems on time."

Wind River VxWorks 653 has been selected for nEUROn Unmanned Combat Air Vehicle demonstrator



Andi Pabinger, Vice President of EMEA Sales for Wind River, reveals:

“European Systems integrators are choosing Wind River’s validated solutions, backed up by award-winning support to reduce risk and certification costs. This allows them to concentrate on added functionality and flexibility for world-class projects like the nEUROn. VxWorks 653 inherently supports supplier separation per DO-297, enabling the asynchronous systems integration of ARINC 653 platform providers and application software suppliers, reducing certification complexity.”

Northrop Grumman selected Spectrum Signal Processing SDR-3000 for waveform development in a Software Communications Architecture (SCA) environment

The SDR-3000 is a heterogeneous processing platform incorporating Xilinx® field programmable gate arrays, IBM and Freescale™ PowerPC® processors and Texas Instruments digital signal processors. It also includes Harris Corporation's SCA Core Framework, **Wind River's VxWorks real-time operating system**

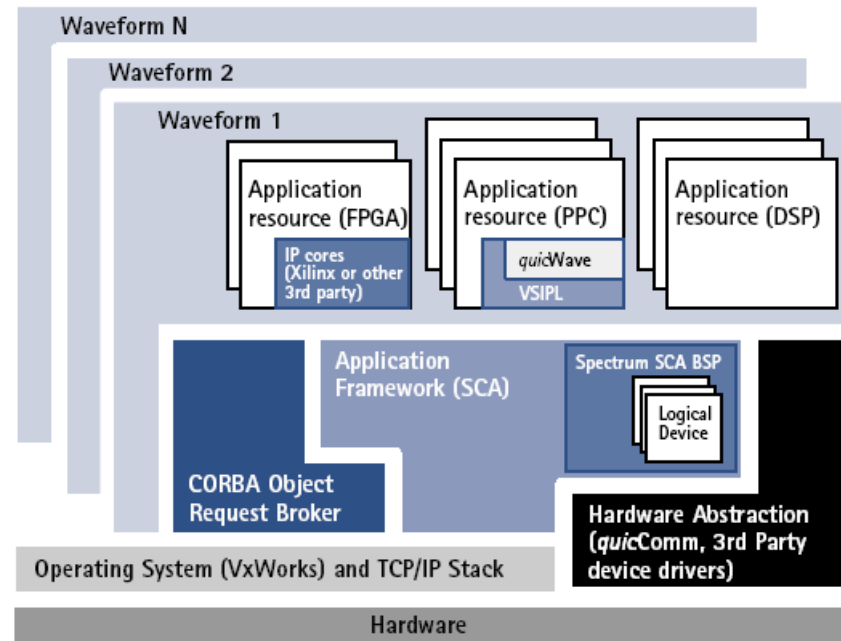


Figure 2. SDR-3000 Software Stack

"Spectrum's long-standing involvement with the Joint Tactical Radio Systems (JTRS) program as well as its extensive waveform porting experience will help Northrop grow its foundational capability with respect to the SCA and SCA-enabled waveforms, innovative wireless architectures and aerospace communications networks," said **Greg Shreve, Communications Research and Development Manager with Northrop Grumman's Mission Systems sector.**

HBOI selected Wind River VxWorks for the Control System on the Ocean Voyager AUV



The vehicle's operating system is Wind River VxWorks, a high performance real-time system.

The Ocean Voyager's Intelligent Control System (ICS) contains modules to deal with the various tasks constituting any mission. These include a mission planner, autopilot, navigator, seeker, dead reckoner, annotated mapper, emergency handler, health monitor, and obstacle avoider.

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