Fimecc S-Step Program
Smart technologies for lifecycle performance

Arto Peltonen
Shar ehol der s
International partners

Read more about the international partners: www.fimecc.com/content/international-partners
Strategic research themes & cross-cutting themes
Strategic research themes & program coverage

Service Business
OPEN SYSTEMS & PROCESSES
- FutIS: Future industrial services (service business mindset, design & efficient production)
- S4Fleet: Service solutions for fleet management (joint with DIGILE)

User Experience
USABILITY & INDUSTRIAL DESIGN
- UXUS: User experience and usability in complex systems

Global Networks
SUPPLY & DEMAND CHAIN MANAGEMENT
- REBUS: From transactional business to relationships
- MANU: Future digital manufacturing technologies and systems

Intelligent Solutions
PRODUCTS & PROCESSES
- ELEMET: Energy & lifecycle efficient metal processes
- SIMP: Systems integrated metal processes
- Memscat: Catalyst & Ecosystem on Microsystems
- S-STEP: Smart technologies for lifecycle performance

Breakthrough Materials
MATERIALS & PROCESSING
- LIGHT: Product structures and material properties
- HYBRID S: Hybrid materials
- BSA: Future steels

Outstanding user experience
High performance service concepts
Efficient and flexible network structures
Leading solutions to pioneering customers
New materials that create new markets

On-going
Program under preparation
Programs launched in 2014

- **BSA – Breakthrough steel applications**
  - About 46,2M€, 2014-2018
  - Program manager Markku Heino, markku.heino@spinverse.com

- **Hybrids – New hybrid materials**
  - About 33,9M€, 2014-2018
  - Program manager Markku Heino, markku.heino@spinverse.com

- **REBUS – Towards relational business networks**
  - About 41,7M€, 2014-2018
  - Program manager Katri Valkokari, katri.valkokari@vtt.fi

- **SIMP – System integrated metal processes**
  - About 43,8M€, 2014-2018
  - Program manager Ingmar Baarman, ingmar.baarman@indalgo.com

- **S-STEP – Smart technologies for life-cycle performance**
  - About 25,6M€, 2014-2018
  - Program manager Arto Peltomaa, arto.peltomaa@fimecc.com
Growing Industrial Service Business

Emerging Industrial Internet

Technology solutions for profitable services
1. **Intelligent Machines**
   - Connect the world’s machines, facilities, fleets and networks with advanced sensors, controls and software applications

2. **Advanced Analytics**
   - Combines the power of physics-based analytics, predictive algorithms, automation and deep domain expertise

3. **People at Work**
   - Connecting people at work or on the move, any time to support more intelligent design, operations, maintenance and higher service quality and safety
How Smart, Connected Products Are Transforming Competition

by Michael E. Porter and James E. Heppelmann
THE NEW TECHNOLOGY STACK

Smart, connected products require companies to build and support an entirely new technology infrastructure. This “technology stack” is made up of multiple layers, including new product hardware, embedded software, connectivity, a product cloud consisting of software running on remote servers, a suite of security tools, a gateway for external information sources, and integration with enterprise business systems.

PRODUCT CLOUD
- **Smart Product Applications**
  - Software applications running on remote servers that manage the monitoring, control, optimization, and autonomous operation of product functions.
- **Rules/Analytics Engine**
  - The rules, business logic, and big data analytical capabilities that populate the algorithms involved in product operation and reveal new product insights.
- **Application Platform**
  - An application development and execution environment enabling the rapid creation of smart, connected business applications using data access, visualization, and run-time tools.
- **Product Data Database**
  - A big-data database system that enables aggregation, normalization, and management of real-time and historical product data.

CONNECTIVITY
- **Network Communication**
  - The protocols that enable communications between the product and the cloud.

PRODUCT
- **Product Software**
  - An embedded operating system, onboard software applications, an enhanced user interface, and product control components.
- **Product Hardware**
  - Embedded sensors, processors, and a connectivity port/antenna that supplement traditional mechanical and electrical components.

External Information Sources
- A gateway for information from external sources—such as weather, traffic, commodity and energy prices, social media, and geocoding—that informs product capabilities.

Integration with Business Systems
- Tools that integrate data from smart, connected products with core enterprise business systems such as ERP, CRM, and PLM.

Identity and Security
- Tools that manage user authentication and system access, as well as secure the product, connectivity, and product cloud layers.
DIGITAALINOSTURI

Dew point and temperature, energy consumption

Drum wear

Crane usage, loading

Brake, gear, motor condition

Structure

Environmental conditions

Rail shape, bending and misalignment, collisions

Wheel alignment and wear

Rope condition, side-pulling, sway

Hook track, hoist usage, hook rotation, loading
Wärtsilä engines currently assembled in Vaasa

<table>
<thead>
<tr>
<th>Wärtsilä</th>
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<tbody>
<tr>
<td>20</td>
<td>32DF</td>
<td>32</td>
<td>34SG</td>
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<thead>
<tr>
<th>Specification</th>
<th>20</th>
<th>32DF</th>
<th>32</th>
<th>34SG</th>
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<tr>
<td>Cylinder bore</td>
<td>200 mm</td>
<td>320 mm</td>
<td>320 mm</td>
<td>340 mm</td>
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<tr>
<td>Piston stroke</td>
<td>280 mm</td>
<td>350 mm</td>
<td>400 mm</td>
<td>400 mm</td>
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<tr>
<td>Speed</td>
<td>900–1000 rpm</td>
<td>720–750 rpm</td>
<td>720–750 rpm</td>
<td>720–750 rpm</td>
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<tr>
<td>Mean eff. pressure</td>
<td>18.7–28.0 bar</td>
<td>19.8–19.9 bar</td>
<td>23.3–22.9 bar</td>
<td>20.0–19.8 bar</td>
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<tr>
<td>Piston speed</td>
<td>8.4–9.33 m/s</td>
<td>8.4–8.75 m/s</td>
<td>9.6–10.0 m/s</td>
<td>9.6–10.0 m/s</td>
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<tr>
<td>Output</td>
<td>548–1800 kW</td>
<td>2010–6300 kW</td>
<td>2700–8280 kW</td>
<td>6960–9000 kW</td>
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<tr>
<td>Fuel specification</td>
<td>Fuel oil</td>
<td>Fuel oil, natural gas</td>
<td>Fuel oil</td>
<td>Natural gas</td>
</tr>
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Improving lifecycle efficiency

Preventing the unexpected
Reliable, continuous performance is essential. Planning operational reliability of installations through access to highest quality of technologies, services and competences ensures smooth operations and managing risk.

Environmental efficiency
Environmental legislation and energy efficiency are currently major concerns for our customers. Sustainable solution options enable a reduced environmental impact and improved operational efficiency.

Performance optimisation
Longer term strategies are aimed at improving business efficiency. Optimising performance of installations reduces operational expenses and improves uptime.
We boost strategic research together.

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