Title of the Supported Area

Maintenance

Repair

Re-use

Adapt

S/T goals of the supported area

Methodologies and tools for the sustainable, predictive maintenance of production equipment (FoF.NMP.2012-2)

Innovative strategies for renovation and repair in manufacturing systems (FoF.NMP.2013-8)

Innovative re-use of modular equipment based on integrated factory design (FoF.NMP.2013-2)

Intelligent production machines and 'plug-and-produce' devices for system adaptivity (FoF.NMP.2012-3)

S/T goals of the supported area

	Production systems	Customer/Targets
iMAIN PROJECT	Machine-tools (Forming presses), all other highly loaded mechanical systems	OEM/Users
Power-OM	Machine-tools (milling)	OEM (Machine manufacturer, CNC)
EASE-R3	Machine-tools	OEM
T-REX	M-T, spindles, Robotics, Transport systems (Lift Trucks), batteries	OEM
SelSus	Manufacturing devices, assembly lines, fixtures	OEM (Maintenance) / Users (Operators)
ReBorn	Machinery, Robotics, in-line manufacturing (AM)	OEM/System integrators and component suppliers
whiteR	White rooms: Robots, effectors, transportation, dna fixturing systems	End users (component manufacturer for laser machines, Manufacturer of solar cells) / OEM
SUPREME	Paper industry	OEM/Users

Research and innovation

Expected impact of the supported area

- Increase availability of production systems & OEE.
- Energy consumption reduction (10%)
- Reduction of around 20% of renovation and repair costs
- At the end-of-life stage, contribution towards a 80-100% reuse of production system components in new life cycles
- Cost reduction of around 30% due to re-use of existing modular equipment when setting-up production systems for new product variants
- Renovation of outdated plants and structures. Safe production sites

Technical cross-cutting issues

	Failure prognosis	M2M, eMaintenance cloud, Remote services	Energy optimisation	Upgrade, Life extension, Modular design
iMAIN PROJECT	"Virtual sensor"; Fatigue hypotheses, failure accumulation (frames) CbM (bearings, guidings); production planning (PP)	Cloud data storage and load history; monitoring and prediction services; also mobiles; cloud is also open to third parties	Energy-based PP; zero defect presses	Frame life extension; bearing and guiding life extension
Power-OM	CbM (current consumption, CNC signals)	Reliability, Operation, Maintenance	Measure&Compare	Spindle life extension, reconditioning and design upgrade
EASE-R³	Selection the best maintenance strategy (renovation, repair or re-use)	Augmented Reality (AR) and Virtual Reality (VR) for maintenance	Minimisation of LCC	Life extension of machinery by Re-use and Re-configuration
T-REX	CbM (current, vibrations, temperature)	Equipments connected to the cloud, O&M, Re-novation	-	Life extension and Upgrade
SelSus	Distributed diagnostic and predictive repair and renovation models, embedded into smart devices	Synergetic relationship with operators and maintenance personnel based on pro-active communication	-	Yes, by extending the equipment capabilities to become smart devices
ReBorn	Condition monitoring, device self-description, optimization model	-	-	Upgrade of old, renewed and new factory layouts and production lines, modular re-use/re-tooling of equip+devices
white'R	Included in every P&P module integrated in the white'R island	Monitoring software for: -Robot reliability and accuracy -Module re-use over time -Maintenance -Quality of service of modules -Module lifecycle tracking	Device monitoring and maintanence Process and path	Re-use of modules while adapting their tasks and set points: Robot modules, End effectors
SUPREME	CbM (current consumption, vibration analysis, acoustic emission)	-	Measure& ecommend process parameter	Residual life prediction, life extension

Research and innovation

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Non-technical cross-cutting issues

	New business model	Standardization	Industrial dissemination targets	Academic dissemination targets
iMAIN PROJECT	Predictive Maintenance; virtual sensor-based monitoring; cloud services	OSA-CbM, OPC-UA	EMO, INTEC, MAINTENANCE VDW, WGP	CIRP, WGP, IJMTM, Euromaintenance, COMADEM
Power-OM	Maintenance, reconditining, replacemants	OSA-CbM, OPC-UA	EMO, IMTS CECIMO, ESRA, ESReDA, IFAC, EFNMS	Euromaintenance, PHM, COMADEM, eMaintenance
EASE-R³	-	RDSS (Repair Decision Support System), OSA-CbM, AR and VR	EMO, BIEMH, BIMU	IEEE Transactions on Emerging Topics in Computing, Euromaintenance
T-REX	Production system renting, pay per use. Maintenance full service.	CEN/CENELEC TC319 Mainte-nance (condition assesm, management, contracts)	EMO, BIEMH, BIMU, Maintain, Hannover Messe. CECIMO, EFNMS, ESREDA, IFAC	Euromaintenance, PHM, COMADEM, RESER, EUROMA
SelSus	Maintenance	Not decided on up to now	EMO, Automatica, Hannover Messe, Welding&Cutting	CIRP, RAMS, MIMAR, MARTS (Maintenance & Reliability), IEEE
ReBorn	Equipment servicing on upgrading for re-use, service through equipment knowledge	Component's interfaces	EMO, Motek, Automatica, PPMA, Production/Maintenance technicians /eng., plant. managers	IEEE, Flexible Automation& Intelligent Manufacturing, Emerging Technologies & Factory Automation
white'R	Business models supporting: Assembly, Disassembly and repair	Green labeling of white'R island. Standard product, process, equipment and communication syntax.	Photonics 21 Initiatives, SPS, Premiere Electronic Industry West Photonics, Robotica, Cleanzone	CIRP, IEEE, ICRA, CAPS, ECAI, ASME Journals and Conferences
SUPREME	Predictive maintenance with Condition Monitoring based dynamic maintenance manag. + energy optimization	ISO/TC 108/SC5 «Condition monitoring and diagnostics of machines»	ESRA, AFIM, VDI, VDMA OEM/Users (by e-learning modules)	Euromaintenance, COMADEM Use of e-learning modules in lectures

Synergies and benefits of clustering

What cluster activities have you undertaken in the last year?
• Create awareness in consortium by informing about clustered projects. • Coordination dissemination issues: Panel session in Euromaintenance 2014 (Maintenance in FoF) • Discussion on commonalities and plans for collaboration (T-REX, POWER-OM, SelSus, ReBORN, I-RAMP3, INTEFIX + Associated Projects): "Cooperate, Communicate and Connect to boost smart Components for tomorrows Industry" Co – FACTOR
How have cluster activities added value to your projects?
• Sharing the knowledge in the field can help to be more effective and efficient, go faster. • Project results can complement each other. • Interoperability issues should be considered, relevance of standardization. • A common communication/dissemination strategy gives more visibility as a group.
How can cluster activities help exploitation of results after the projects end?
• Faster industrial up-take • Community building and agreement on joint technology use, fostering standardization • Targeted end-user approach through community, combination of results can contribute for a higher impact • Opportunities for new collaborations

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iMAIN PROJECT	www.imain-project.eu	markus.wabner@iwu.fraunhofer.de
Power-OM	www.power-om.eu	aitor.alzaga@tekniker.es
EASE-R3	www.easer3.eu	p.pezzolla@fidia.it
T-REX	t-rex-fp7.eu	aitor.arnaiz@tekniker.es
SelSus	-	roland.wertz@ipa.fraunhofer.de
ReBorn	-	michael.peschl@hwh-karlsruhe.de
whiteR	whiterproject.eu	anna.valente@supsi.ch
SUPREME	www.supreme-fof.eu	sophie.sieg-zieba@cetim.fr

Thank you!