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Project Number RVO and/or ISPT(-TKI)	I40-20-05
Project Title + Acronym	EnergieReductie door conditieGestuurd Onderhoud, ERGO
Secretary (penvoerder)	ISPT
Name Project Leader	Simon Jagers
Researchers (name & title thesis)	Nikhil John, thesis to be published
Project start	October 1st, 2019
Project original end date	November 12th, 2023
Project final end date	November 12th, 2023

KPI	**Omschrijving**
1. Organisatie/ Penvoerder	ISPT
2. Projectnummer- of dossiernummer	I40-20-05
3. Projecttitel evt. acronym	EnergieReductie door conditieGestuurd Onderhoud, ERGO
4. TRL bij afsluiting, Hoofdcategorie	Industrieel onderzoek
5. TRL bij afsluiting, Detailcategorie	TRL7 (Energy optimization), TRL9 (Condition monitoring)
6. Projectsucces	Het project is afgerond conform de oorspronkelijk scope. Alle mijlpalen zijn behaald;
7. Vervolg	Marktintroductie
8. Aantal gerealiseerde peer-reviewed publicaties	1
9. Aantal verwachte peer-reviewed publicaties	1
10. Aantal gerealiseerde niet-peer-reviewed publicaties	8
11. Aantal aangevraagde patenten	0 – We kiezen bewust voor “trade secrets”, omdat de te patenteren onderdelen eenvoudig te omzeilen blijken. We houden deze strategie periodiek tegen het licht.
12. Aantal verleende licenties	0
13. Aantal prototypes	NVT
14. Aantal demonstrators	SAM4 Health + Energy Analytics zijn uitgerold op 100+ sites, en zijn doorontwikkeld tot product.
15. Aantal spin-offs/ spin-outs	0

KPI	Omschrijving
16. Aantal nieuwe of verbeterde producten/ processen/ diensten geïntroduceerd	SAM4 Health monitort de conditie van AC motoren en rotating equipment door hoogfrequente elektrische signalen te analyseren. Uniek is dat er geen sensoren op de asset in het veld worden geplaatst. Daarmee is SAM4 bij uitstek geschikt voor het monitoren van assets die opereren in extreme omstandigheden of moeilijk bereikbare plaatsen. SAM4 Energy Analytics stelt vast waar en hoe energie bespaard kan worden. Het stelt klanten in staat om 10 tot 25% energie te besparen, zonder in te leveren op prestaties.
17. Impact	Samotics' SAM4 is wereldwijd de meest verkochte ESA-based monitoringsoplossing. We bedienen inmiddels 100+ klanten in diverse sectoren. Gedurende de looptijd het ERGO-project zijn we gegroeid van 25 naar 110 personeelsleden. Marktleider ABB heeft een belang van 10% in ons bedrijf genomen, en we hebben contracten afgesloten met partijen als Siemens, Schneider Electric, en ATOS – die SAM4 hebben opgenomen in hun productportfolio.

Public Summary

Electric motors and rotating equipment — pumps, fans, compressors, conveyors — are the largest energy consumers globally, accounting for over 40% of electricity usage. Unfortunately, a significant portion, about one-third, is lost due to equipment malfunctions, improper asset selection, and inefficient operations. Electrical Signature Analysis (ESA) stands out as a scalable solution effectively targeting these inefficiencies.

In October 2019, the ERGO project embarked on the most extensive ESA field trial to date, examining its influence on these critical energy loss categories. ESA's innovative approach transforms electrical data into valuable insights about asset health and efficiency, with the added benefit of non-intrusive sensor placement for widespread application. As such, it is uniquely capable of having a meaningful impact on industrial downtime and energy waste – provided it offers accurate, actionable insights.

Outperforming expectations, Samotics' ESA-based monitoring system, SAM4, accurately identified 89% of equipment failures and showed the potential to reduce energy consumption by a remarkable 25,2% for non-optimized assets, demonstrating its pivotal role in energy efficiency.

Project overview

Samotics deployed SAM4 on 1,000 assets to determine its fault detection and energy-saving capabilities. Working with industry leaders Nobian, Vopak, Huntsman, and Vitens, Samotics enhanced asset health and performance. Validation by TPA Adviseurs and insights from Utrecht University's Copernicus Institute, along with ISPT's guidance, enriched the ERGO project, feeding into broader Industry 4.0 research and standards.

Key findings

SAM4 has established itself as an exceptionally reliable condition monitoring system.

- SAM4 detected 89% of faults in motors, transmissions, and loads, weeks to months before failure.
- It is uniquely capable of flagging operational circumstances that accelerate wear and tear, helping to extend the useful lifetime of equipment.

It also demonstrated its value in energy efficiency:

- Samotics' Energy Analytics-platform revealed that non-optimized assets could reduce energy usage by an average of 25,2%.
- The platform pinpoints which assets could be optimized, and how optimization could be achieved.

Looking ahead

The success of the ERGO project underscores the accuracy, scalability, and value of ESA technology in minimizing unexpected downtime and energy wastage in systems driven by AC motors. Future potential includes:

- Enhanced energy optimization through holistic analysis of production *systems*, not just individual assets.
- Scaling the technology by incorporating it into Variable Speed Drives, essentially developing "VFDs with PhDs".

Currently, plans for ERGO 2.0 are underway, focusing on maximizing value and impact through comprehensive system analysis and deeper integration of core technology into VFDs.