Enabling powerful custom AI-driven digital transformation in industries

Disruptive IoT platform and tools for smart management and control of Big Systems

What makes this new high level IoT platform **PharosN** unique is that it helps to make a custom Virtual Twin and run it as AI, Big Data and Blockchain -driven digital transformation engine linking physical world of real objects and virtual world of diverse automated systems, IoT, databases and mobile apps. The twin represents the processes taking place in the both worlds for its effective holistic, optimised management, monitoring and control in real time. It calculates each and every data stream necessary to monitor, calculates various custom indicators for each target process and all necessary totals for the whole Big System of Systems. Then automatically analyses the results and compares it with acceptable conditions or business plans for sustainable operation and immediately identifies non-compliances. The operators, management and other stakeholders can be promptly informed about every deviation from the plans and expected process outcomes. Ongoing holistic status and operational results as well as the relevant change trends are identified in real time supported by extensive analytics of problem causes to improve the overall performance, efficiency and sustainability. The examples of such application systems include but not limited Smart Enterprises, Smart Farms, Smart Connected Assets (buildings, campuses, etc), Ambient Assisted Living Monitoring systems for patients, caregivers and healthcare and many others.

The technology solution runs in cloud or at-premises linked to all data sources such as SCADA, other automated systems, IoT, sensors, smart meters, beacons, GPS devices, including those installed on moving vehicles (tractors, trucks, cars, vessels, drones, etc) and animals. It collects big data streams, stores it and transforms this information into a simple human-friendly holistic status of a complex system or its application subsystems "**How my Big System doing now**?" (e.g. production floor, line or cell, the whole enterprise, farm, building, transportation or other assets, stocks, sales, finance, suppliers, patients managed by caregivers, etc). Actual **sustainability status is available in real time** and can be analysed in any necessary detail for problem causes by various metrics for insight in specific systems or processes.

The management, operators and other employees obtain **Assisting Intelligence** for their work and roles. The virtual twin is the comprehensive unique model of a **big complex cyber-physical system of systems** representing its structure, technologies, assets, customers and human resources and processes. Unlike much traditional architecture, the **PharosN is an organic agile instrument to adapt to undergoing change**, incorporating various requirements of quality and relevant standards, dealing with complexity of modern and future oriented industrial environment and linkages to Smart Everything. Enterprise specialists can create and manage their complex applications by using own smart models and have it connected to diverse real world data sources, products and services. It fosters quick R&D, cost effective prototyping and new flexible business models having profound effects on speed of innovation, capacity to change, adapt, lead and keep growing revenue streams realized on scientifically solid solution for real world.

PharosN is novel key enabling technology for rapid prototyping of complex IoT solutions (such as Industry 4.0, eHealth 4.0, etc), and dealing with increasing complexity, big data, needs to adapt to accelerated industrial change, accommodate interlinking to smart everything, IoT and robotics. It fosters intelligent assistance for employees, new jobs, learning and experimenting, innovative business models integrating product life-cycle, customer services, and quality management.

The essence of the unique advanced technology: Compared to other solutions and methods available on the relevant markets, PharosN applications have the following unique features:

- **Simplicity of user interactions with the virtual twin** presenting processes in the physical and virtual worlds
- **Automatic analysis of very complex infrastructures in real time** identifying abnormal, problematic causes
- Introducing the "**Watchdog @ my mobile device**" for holistic monitoring diverse processes and events
- Identifying the **operational efficiency and sustainability for various assets**, its maintenance and control
- Significant **decrease of complexity of the target system operations, maintenance and relevant costs** with improved holistic transparency and intelligent sustainability management in real time
- **Unified high level approach to digital transformation architecture** based on system sciences (Fig. 1)

- **User friendly, simple realization** of customization requirements for operations, production, maintenance
- **Agility, adaptation to** change processes (structures, products, technologies, materials, standards, demand)
- **Effective options of linking to diverse processes, objects and systems in physical world** (mobiles, IoT, sensors, automated and control systems, SCADA, ERP, robotics, drones, autonomous vehicles etc)
- **AI driven monitoring of conditions, prediction and control of enterprise processes,** sustainability of production, operation, assets for end-to-end product life cycle and compliance to quality standards
- **Deep drill down analytics** supporting **transparency of ongoing processes, trends and events**
- **Rich options** for monitoring, analytics, benchmarking, data driven simulation of critical decisions
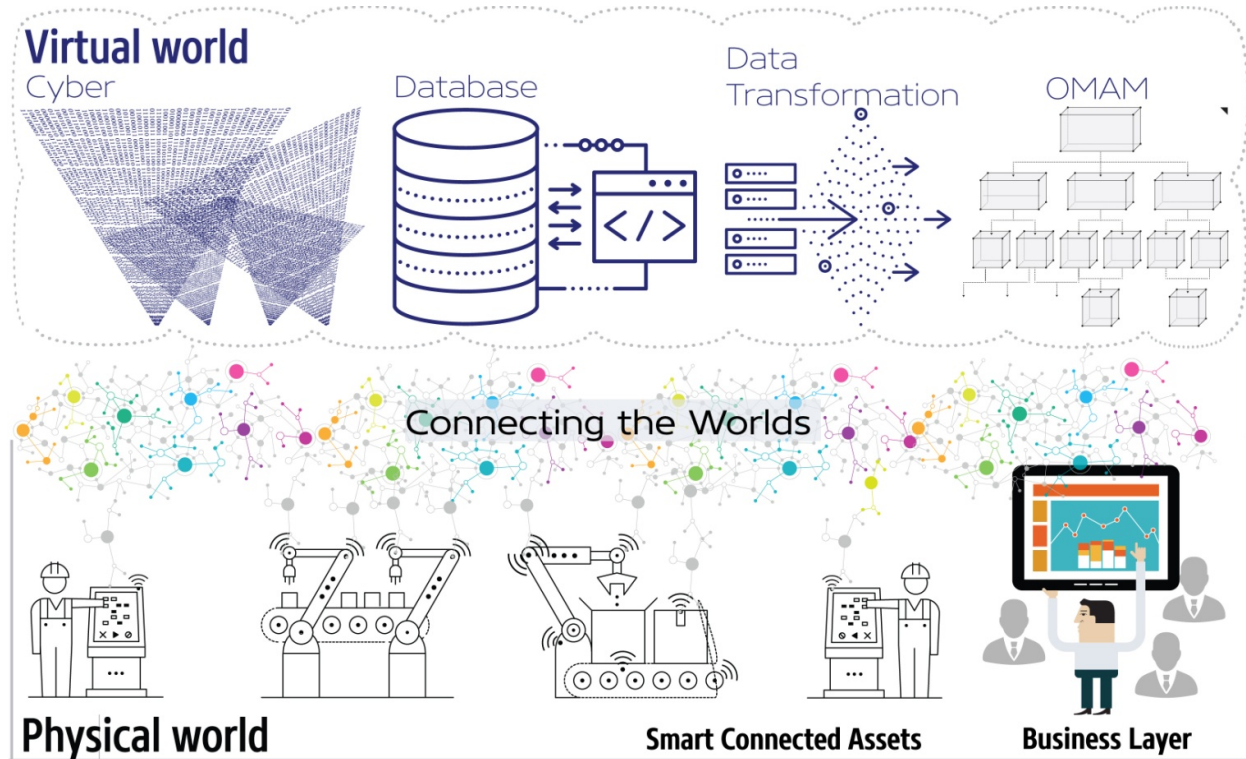

Fig. 1 Linking physical and virtual worlds with digital transformation twin Open Manufacturing Assets Model (OMAM)

The company offers
- Technology licensing and knowledge transfer
- Support in implementation of novel complex applications and prototyping, learning and educational use
- Consulting and support in implementation of Smart Monitoring and Control and Quality management projects
- Participation in consortiums for EU Horizon 2020 grant calls in different focus areas

The technology: PharosN is the backend software running the custom twin model (like OMAM) as large scale application linked with **multiple data sources and automated and information systems** via Internet using secure protocols (RESTful, CoAP, MQTT, OPC, etc). It is implemented in C++ and JavaScript using only **Open Source components** such as Linux, docker containers, postgresql, apache, QT5, poco, C++ and JavaScript libraries, OSM, Keras+CNTK, Interledger, compliant to international standards (OAuth2, SSL, HTTPS, ISO/IEC 18033-3) decreasing the implementation costs. The engines enabling transformation can run in cloud or at enterprise premises linked to the distributed processing micro-modules.

Legal: PharosN is available as a service for industrial and business customers. The **customer has own copyright for its locally developed virtual twin models** and can independently manage its running on own PharosN engine instance. The **data access and authorisation are administered by the customer** and can be supported under additional agreements.

The detailed information and online application demo Smart Enterprise Monitor are at http://pharosnavigator.com.

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Search keywords: Pharos Navigator®, PharosN, Ambient Assisted Living, eHealth, Smart Enterprise Monitor, IoT Integrator, Smart City Monitor, Smart Urbana, Smart Pedestrian Nets, UNIDO Pharos