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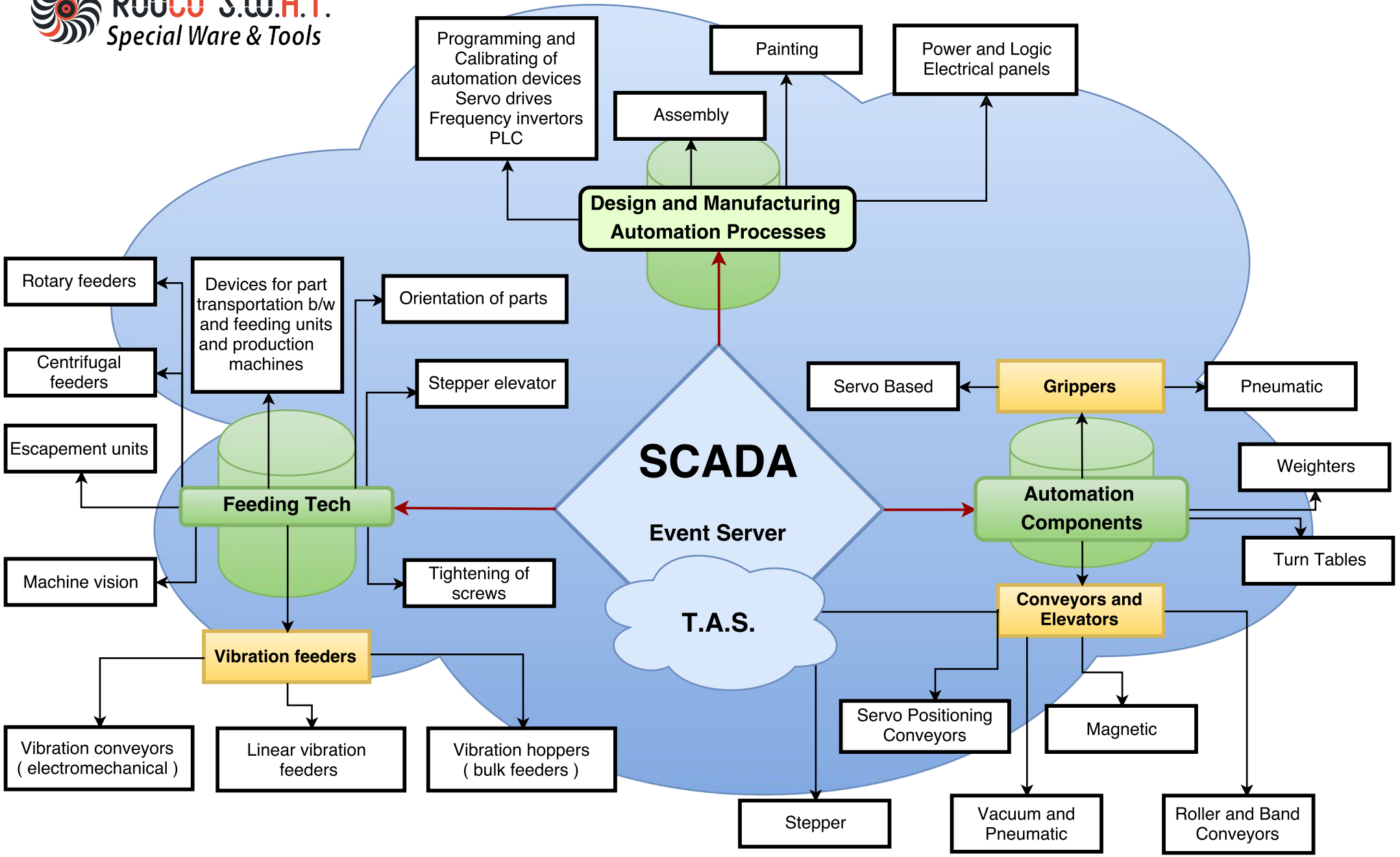
Telemechanical Automation Systems - T.A.S.

Fractal Information and Control Flowchart



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IoT/Big Data/Smart Manufacturing with

T.A.S. - TELEMECHANICAL AUTOMATION SYSTEMS

A distributed automation object is made of large numbers of technologically connected sub-objects, positioned on large distances from one another and from the control center. The volume and the dynamics of the technological information describing these objects vary in wide margins. Typically for such objects the information available in the separate sub-objects is insufficient for taking controlling decision.

Therefore the information from each sub-object has to be placed in a single place, then analyzed and to construct governing actions for the individual sub-objects on the basis of the analysis.

Supervisory Control and Data Acquisition (SCADA) of dispersed automation sub-objects implies transfers of data from the individual sub-objects to one or more control centers - Central Monitoring Station (CMS) - “informational tract”, and transfers of control actions and data requests from the CMS to the objects - “command tract”. In this case the two-way transfer of data is achieved in tele-mechanical approach; hence the SCADA of the dispersed automation objects is achieved by T.A.S.

The current transmission and distribution grids that acquire the needed level of “intelligence”, with the help of relevant automation systems, so they can automatically balance themselves are known as “Smart Grids”. The grid balancing implies that the control and the adjustment is done in Real Time (RT) mode, for both power generation and consumption with the sole purpose to stabilize the network fluctuations by keeping permanent conformity between the dynamics of the information tract, power generation and load. These are the new features. Their implementation allows the realization of “Smart Grids”, namely:

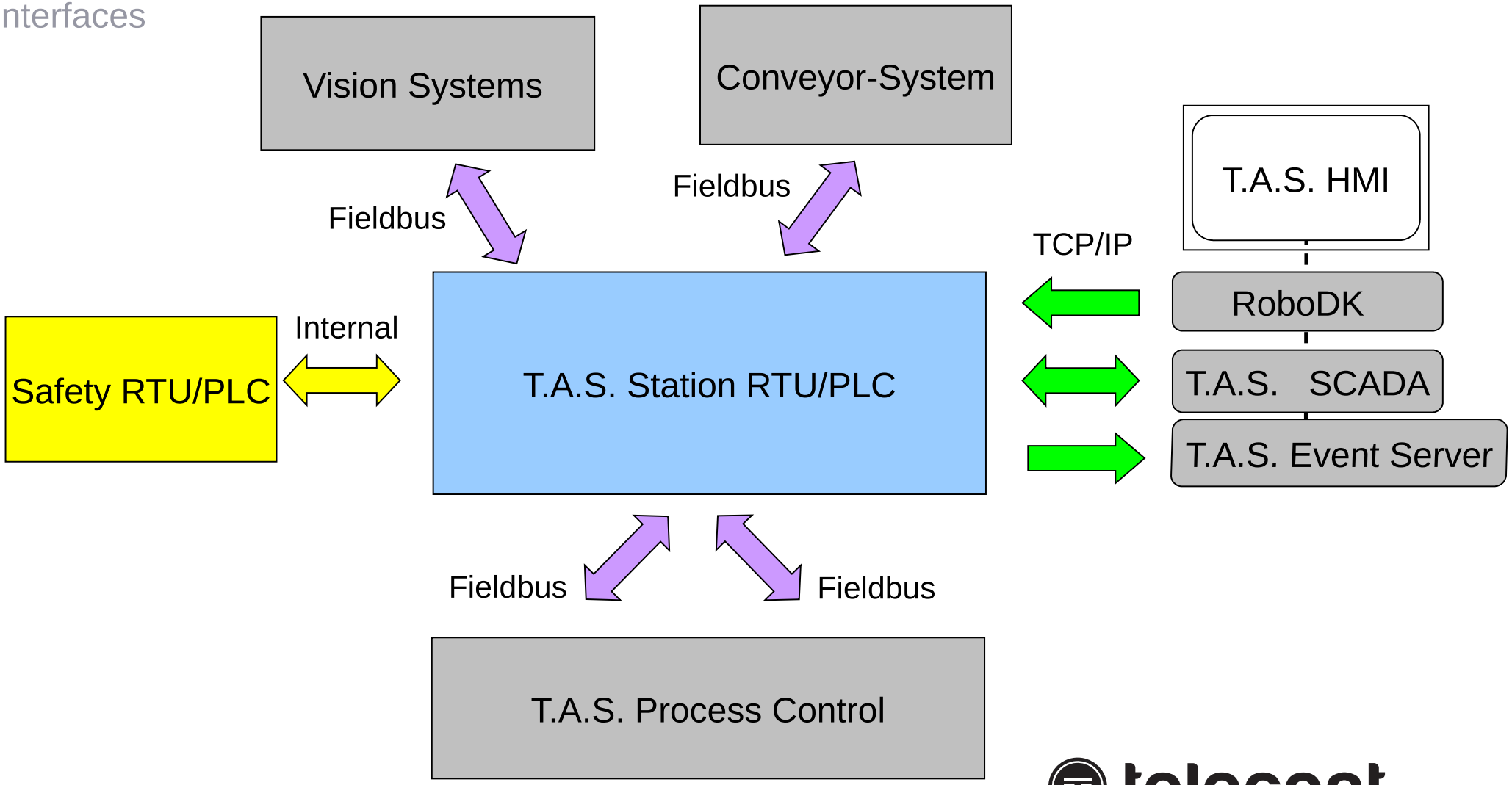
- Network topology mapping;
- Flow control evaluation;
- Network state assessment following a spontaneous event occurrence in the objects;
- Object simulations;
- Network behavior forecast;
- Initiation of the required controlling decisions.

T.A.S. presents a systematic approach which allows the construction of “Smart Grids” and the growing, expanding and extending the functions of similar systems...

Turn-Key > Remote Terminal Unit (RTU)/(PLC) Solutions

OVERVIEW

Interfaces



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№	Description	Option I RTU	Option II PLC
1	Hardware suitability		
1.1	Temperature conditions	Yes	Yes
1.2	Mechanical conditions – vibrations etc.	Yes	Yes
1.3	Electromagnetic shielding	Yes	Yes
1.4	Excess voltage protection	Yes	Yes
1.5	Oscillations suppression equipment	Yes	No
1.6	Input/output circuit control equipment	Yes	No
1.7	Hardware devices for command control	Yes	No
2	Software suitability		
2.1	Availability and capability for operation under RTOS	Yes	No
2.2	Real-Time Database (RTDB) availability	Yes	No
2.3	"parallel" processing of the software system	Yes	No
2.4	"event-driven" architecture of the software system	Yes	No
3	Communication		
3.1	Protocol support:		
3.1.1	IEC 61850	Yes	Yes
3.1.2	IEC 60870-5-101/104	Yes	Yes
3.1.3	IEC 60870-5-103	Yes	Yes
3.1.4	IEC 60870-5-102 and IEC 61107	Yes	Yes
3.1.5	Modbus	Yes	Yes
3.1.6	Other protocols	Yes	Yes
3.2	Data consistency		
3.2.1	Data recovery after reconnection, individually for each end every Client	Yes	No
3.2.2	Notification of malfunctioning or disconnected devices	Yes	No
3.3	Multi-client operation availability		
3.3.1	Autonomous and parallel operation with each and every Client	Yes	Partly
3.3.2	By different protocols for every Client	Yes	Yes
3.3.3	With different composition and volume of data for each Client	Yes	Partly

№	Description	Option I RTU	Option II PLC
4.	Capability for working in Real-time		
4.1	Ensuring the required response time (dynamics) of the object. 1 millisecond for energy facilities.		
4.1.1	Independent of the volume of the data	Yes	No
4.1.2	Independent of the type and the depth of the processing action	Yes	No
4.1.3	Process dynamics independence – number of events per time unit	Yes	No
4.2	Ability to manage facilities in the energy sector		
4.2.1	Small-sized objects	Yes	Yes
4.2.2	Medium-sized objects	Yes	Partly
4.2.3	Large-sized objects	Yes	No
5.	Adaptability to a variety of IED produced by different manufacturers		
5.1	Software controllability - access to the source code of the product	Yes	No
5.2	Adaptability by alternating configuration parameters	Yes	Yes
5.3	Adaptability by source code adjustment	Yes	No

Comparative table: Suitability of individual system solutions for use in Real Time. Control and Management.

The functionality of a PLC is expended due to the use of a RTU-based solution.

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