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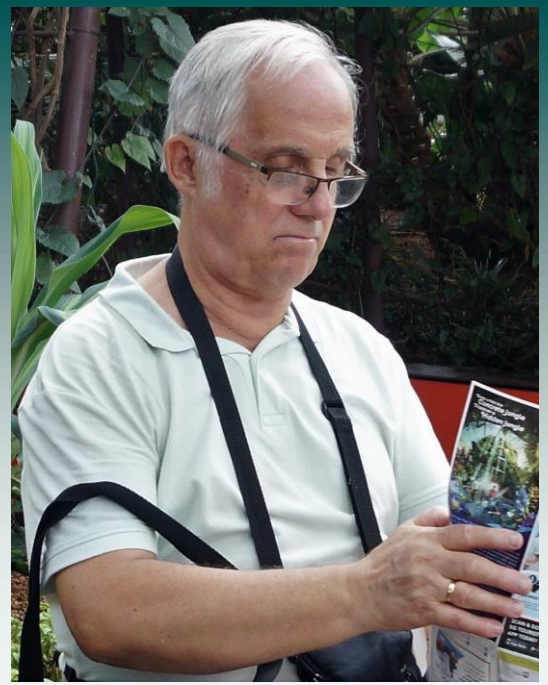
Model Centered Engineering in Wide Context



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Integrated autonomous multidisciplinary scenario in engineering

Autonomous functions with enhanced content and system level communication.

Widened scope of the relevant disciplinaries.

Execution of contextual model structure provides realistic behavior for an engineering achievement (EA).

An EA reconfigures itself for changed outside contexts.

Situation based control of virtual and physical execution of decided activities.

Conventional document-based engineering communication is over

New communication is done between representations which are configured and contextually communicated by engineers. Human communicates with autonomous representations.

Integrated research, development and operation activities

All EA related activities, from fundamental research to operation of physical units, need contextual integration.

Main categories of engineering achievements (EAs) are industrial and commercial products, integrated systems, experimental configurations, and prototypes.

Click DOI for the cited publications!

Complex Integrated Engineering Environment (CIEE)

CIEE uses contextual connections to send and receive controls in the context of its connected outside world.

L. Horváth, "Changed Communication in Engineering," 2020 IEEE 20th International Symposium on Computational Intelligence and Informatics, Budapest, Hungary, 2020, pp. 185-190, DOI: 10.1109/CINTI51262.2020.9305826.

Engineering Communication Model (ECM).

ECM provides organized aspect for communication at work of engineering environment.

Integrated engineering scenario

Component systems of a System of systems (SoS) are placed on levels of model system. These levels serve organized intellectual property (OIP), systems engineering (SE) based autonomous model system (AMS), and cooperating systems of cyber-physical system.

L. Horváth, "Model System for the Representation of Smart System of Systems in Engineering," 2020 IEEE 15th International Conference of System of Systems Engineering, Budapest, Hungary, 2020, pp. 603-608, DOI: 10.1109/SoSE50414.2020.9130485.

Requirements against modeling software platform (MSP) capabilities

An analysis to enhance representation of intelligent driving content (IDC) in a general engineering model system.

L. Horváth, ”Intelligent Content Driving of Engineering Model System in Modeling Platform,” in book Knowledge Innovation Through Intelligent Software Methodologies, Tools and Techniques, IOS press, 2020, pp. 102 - 113, DOI: 10.3233/FAIA200556.

New general model of the changed scenario of engineering

One of the most influencing recent change in engineering is included: the human influence can be achieved only in the system communication.

New style of human behavior and human communication

Human behavior is a source of human capability to contribute to a system which is autonomous. Human communication is motored by human behavior.

Contextual integration of research, development and operation activities

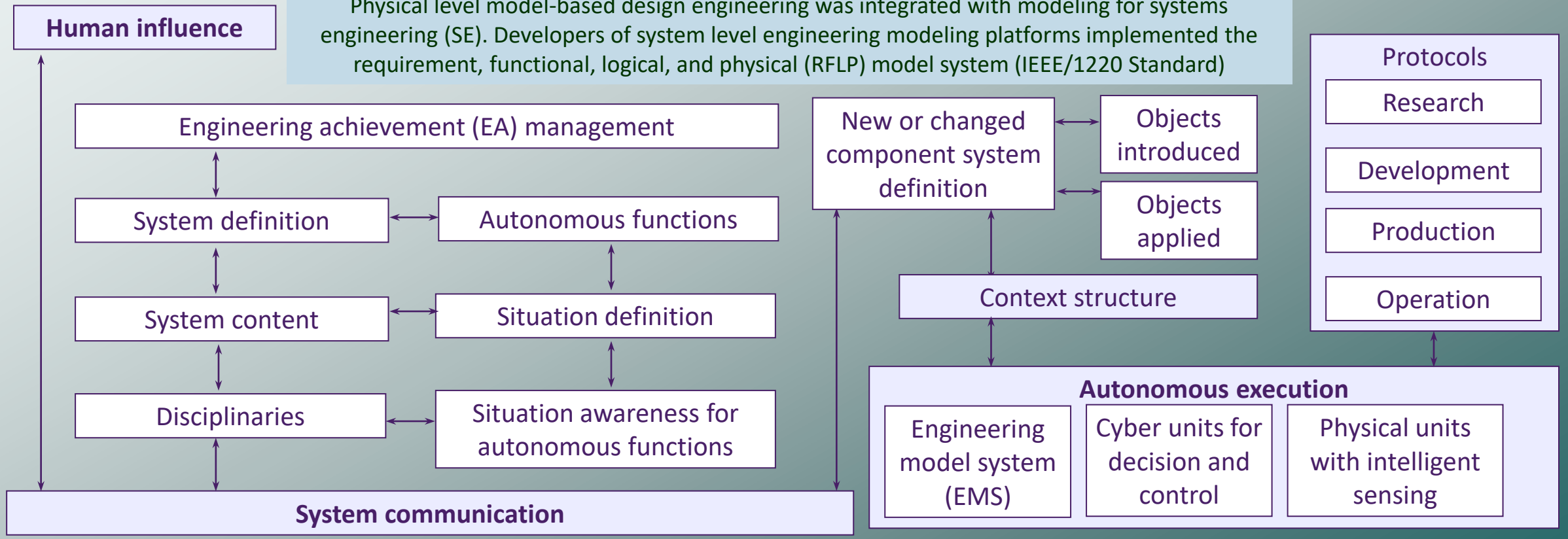
Model centered engineering continuous work is integrated in its all stages for innovation and life cycle of an EA .

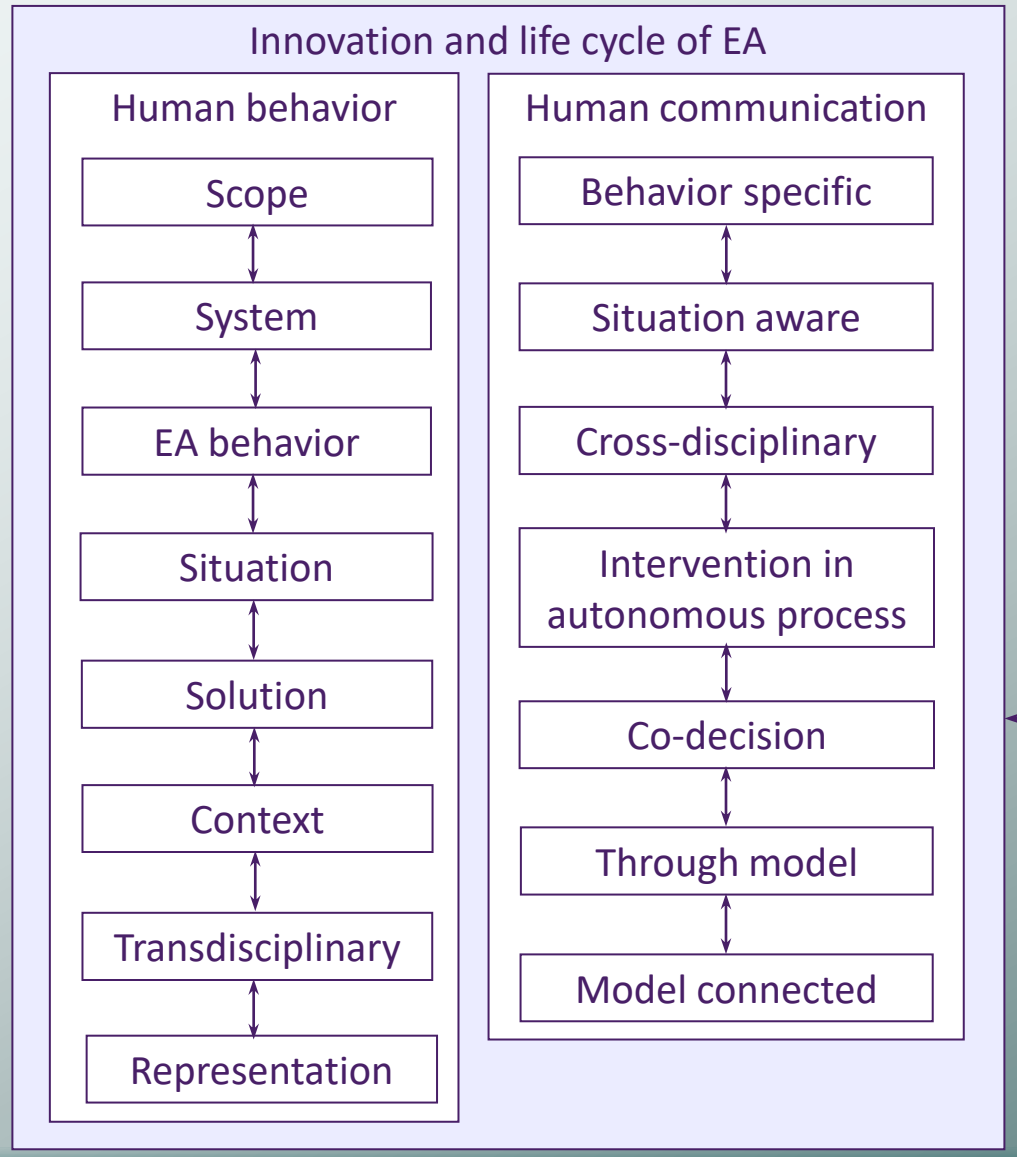
Details are included in the subsequent slides!

New general model of the changed scenario of engineering

Any contribution can be proposed only in the scope of affected systems. Any **influence** is evaluated that how it affects existing behaviors or what new behaviors will be resulted. This needs RFLP structured model of EA for **system definition** and complete behavior representations in all functional and logical level components in the RFLP structure.

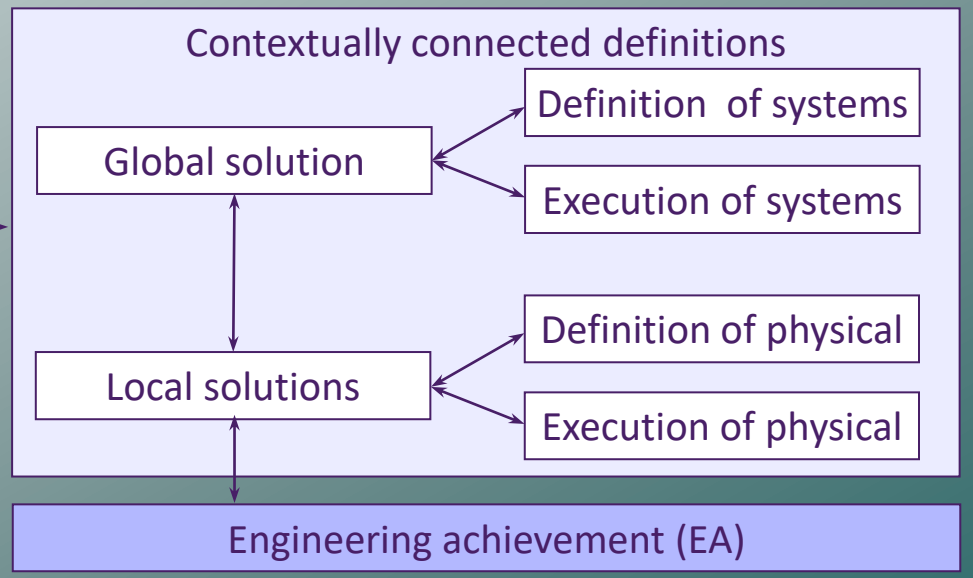
Physical level model-based design engineering was integrated with modeling for systems engineering (SE). Developers of system level engineering modeling platforms implemented the requirement, functional, logical, and physical (RFLP) model system (IEEE/1220 Standard)





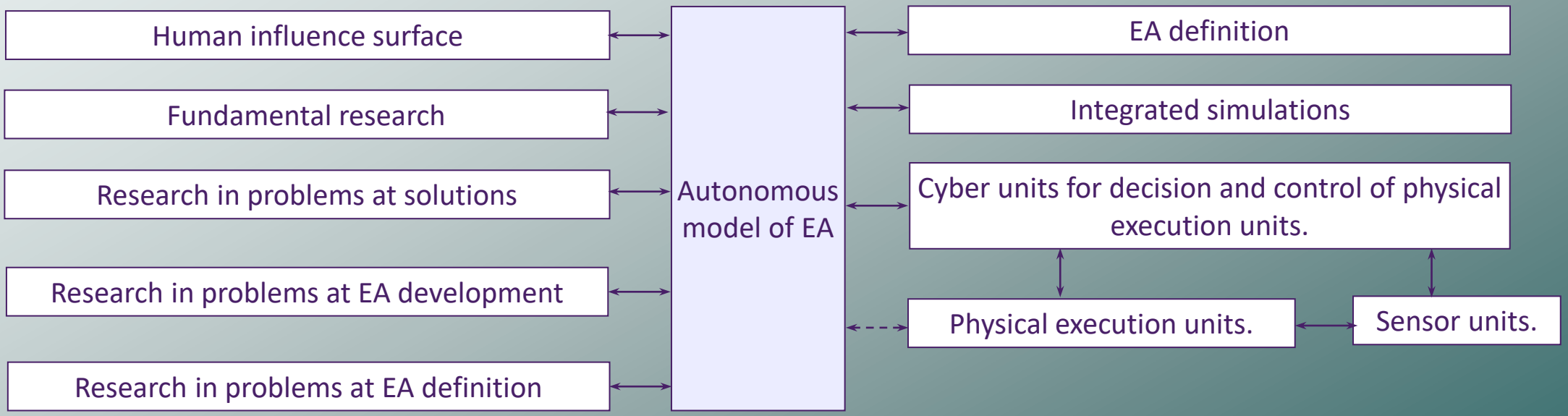
New style of human behavior and human communication

Activity specific human behavior and human communication issue sequences are proposed which are active during the integrated innovation and life cycle of EA. Any of the two issue sequences constitutes contextual chain.



Contextual integration of research, development, and operation activities

Activities below must be configured for the communication with fully integrated autonomous model of EA. Human influence surface must be available for any communication during the integrated innovation and life cycle of EA. This means continuous work in all the listed activities.



Modeling platform software capabilities

System level and research capable platform is required.

A main objective is realization solely model centered communication.

Flexibly configured cloud platform

Wide availability of advanced principles and methodologies in recent cyber physical biological systems must be included.

Virtual Research Laboratory

Is being estabished at the Doctoral School of applied Informatics and Applied Mathematics (DSAIAM), Óbuda University.

Conclusions

Paper is a contribution to engineering modeling for autonomous situation controlled EAs.

Engineering is analyzed and characterized for the demanded change in its style.

New general model of engineering, new style of engineering behavior and communication, and model centered style of integrated research, development, and operation are contributed.

Contributions are devoted to serve modeling related improvements in system level engineering for EAs.