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Changed Communication in Engineering

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Contributions in this paper were motivated by recent mayor advances in engineering modeling:

Model Centered Engineering (MCE) based integration of engineering research, development, manufacturing, operation, and recycling.

MCE requires communication through contextual chains in engineering model system (EMS).

Physical level model-based design engineering (DE) 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 in EMS (IEEE/1220 Standard)

EMS lifecycle integrates representations for systems, physical components, simulations, and processes for an engineering achievement and constitutes highly integrated model background of engineering activities.

EMS contextually supports cyber units of cyber physical biological systems (CPBSs) at situation-based control [2] and driving connections with physical units.

Recent related research in integrated autonomous engineering model systems at the Laboratory of Intelligent Engineering Systems (IESL), Óbuda University

Organized driving intellectual content (ODIC) structures were developed and published to drive conventional, RFLP structured, CPS and situation recognition capable EMS. ODIC organizes contextual connections to generate drives for relevant object parameters in the EMS.

Intelligent driving content (IDC) multilevel structure *Situation* level of which consists of structures for situations, circumstances, and consequences of situations.

Driving content model (DCM) is a variant of ODIC and includes *Actions* level to exchange actual content with CPS cyber units in parameters, procedures, and status to drive cyber units from DCM and to drive for DCM from cyber units.

This paper includes contributions to methodology of Model Centered Engineering (MCE)

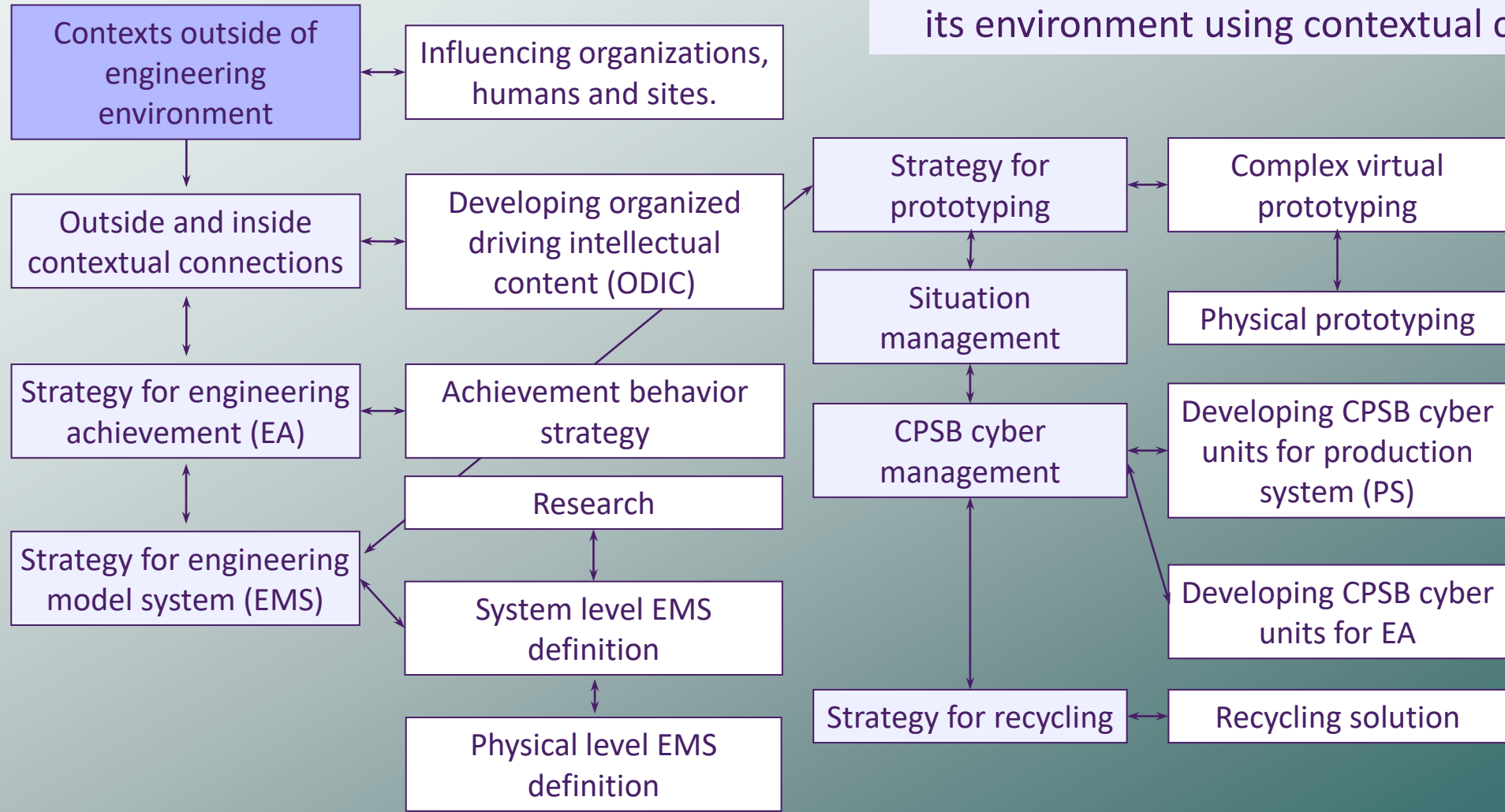
MCE places autonomous model in the center of engineering activities.

New model communication centered definition of the Complex Integrated Engineering Environment (CIEE).

New Engineering Communication Model (ECM).

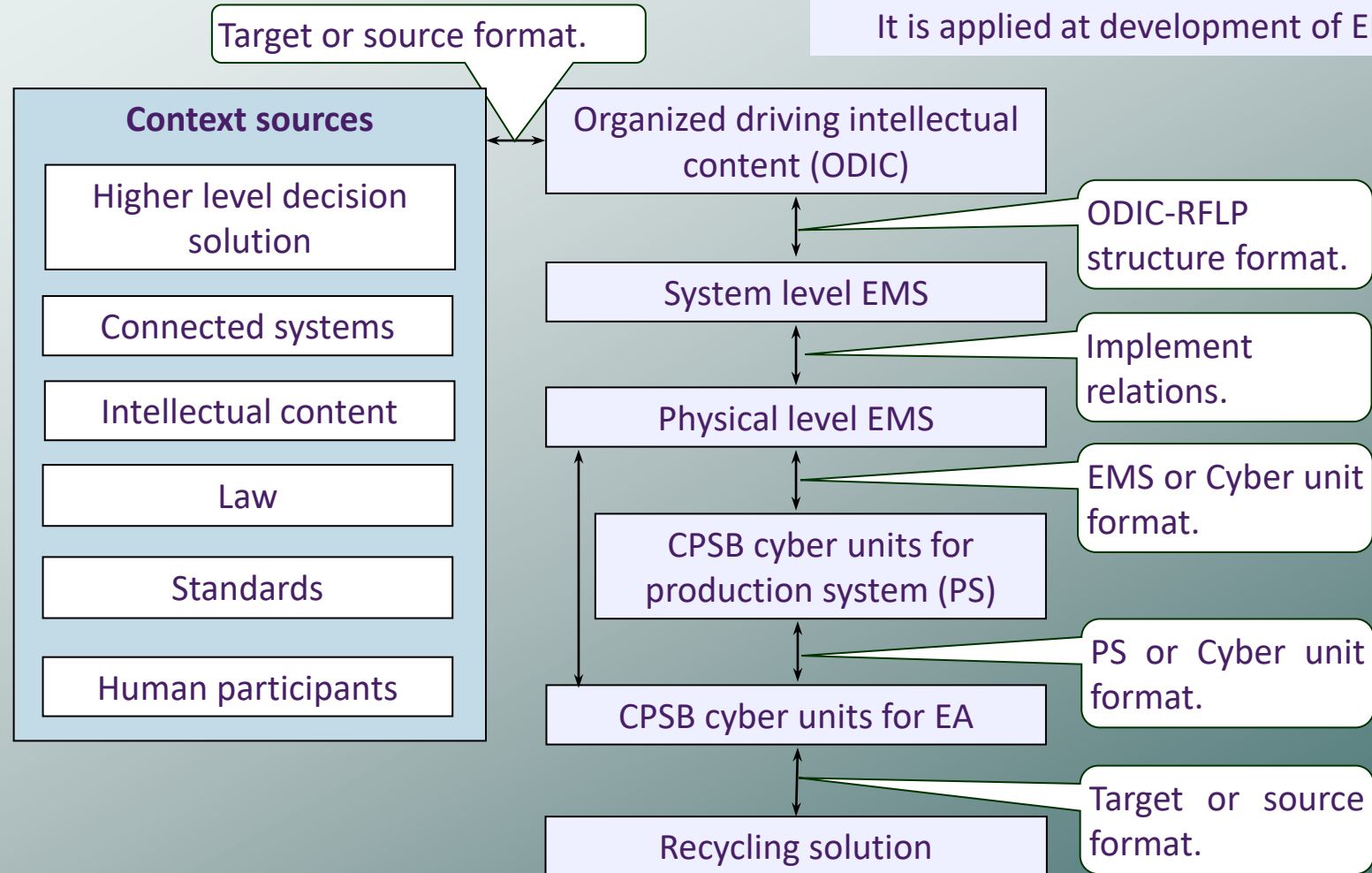
Level organized interventions at any communication item accommodation in ECM.

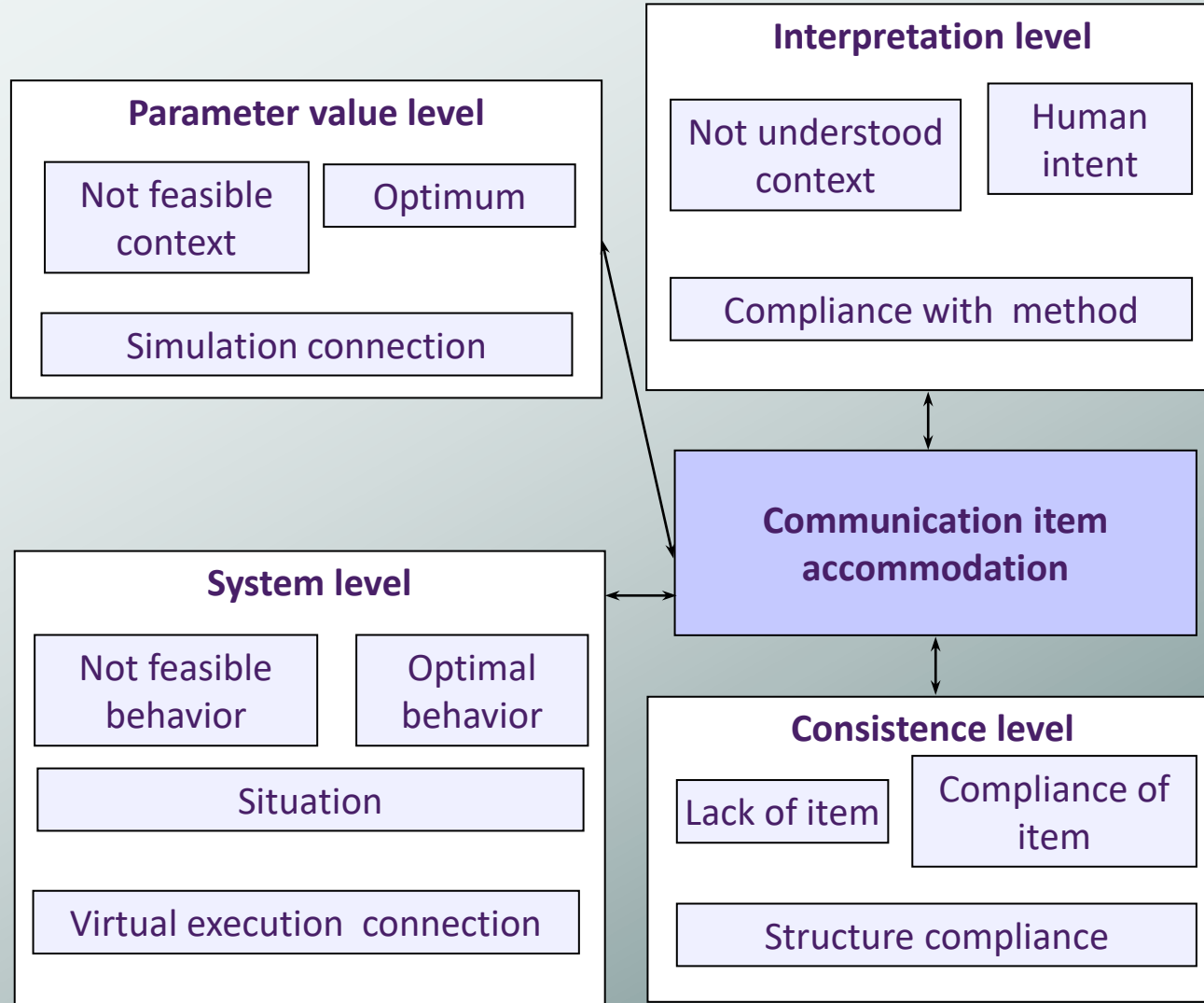
CIEE is controlled by its environment and controls its environment using contextual connections.



ECM serves as organized aspect for the communication structure in a CIEE.

It is applied at development of EMS and cyber units of CPBSs.

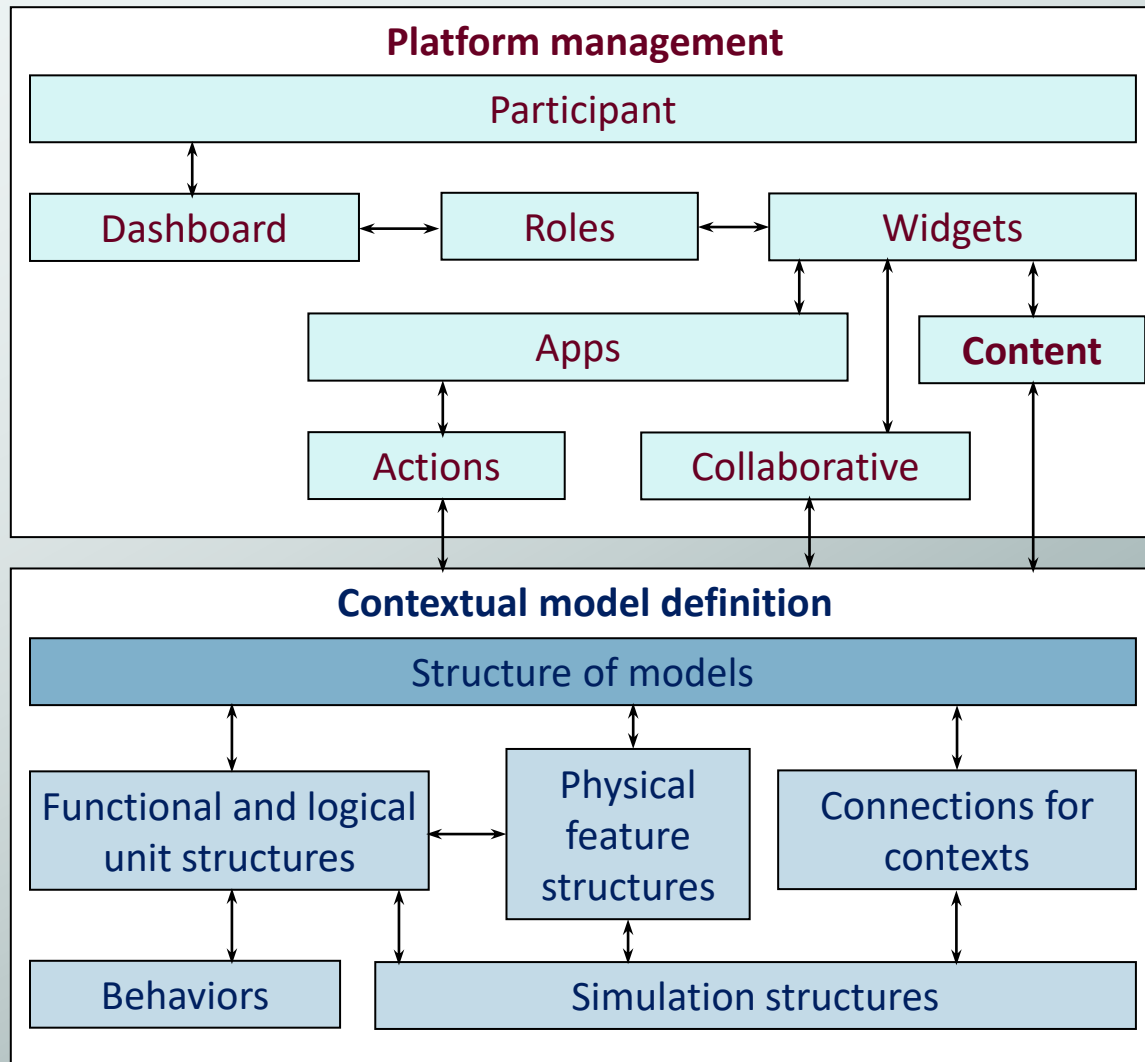




Multilevel structure is provided for interventions may occur at accommodation of communication item in CIEE.

Implementation of ECM context in communication within a CIEE must include protocol for accommodation of any communication item as context for relevant parameters of relevant objects.

In case of any abnormality experienced by autonomous procedure or human on duty, interventions should be place in action in accordance with the protocol in force.



Implementation requires system level modeling eligible and research and development capable engineering modeling platform.

The proposed CIEE, ECM, and intervention concepts and methodologies in this paper can be utilized at development of EMS and CPBS.

Dassault Systèmes S. A. 3DEXPERIENCE on the Cloud platform is under establishment at the Laboratory of Intelligent Engineering Systems (IESL), Óbuda University.

This platform also will provide laboratory background for PhD research at the Doctoral School of applied Informatics and Applied Mathematics (DSAIAM).

Full cloud services will be provided by own platform in the cloud which is operated by the Dassult Systèmes S. A.

Former relevant own publications in the topic of this presentation

L. Horváth, I. J. Rudas, “Information Content Driven Model for Virtual Engineering Space,” in Acta Polytechnica Hungarica, Vol. 15, No. 2, pp. 7-32 (2018), DOI: [10.12700/APH.15.1.2018.2.1](https://doi.org/10.12700/APH.15.1.2018.2.1).

L. Horváth, “[Intelligent Content in System Level Model of Industrial Cyber Physical System](#),” in Proc of the 44th Annual Conference of the IEEE Industrial Electronics Society, Washington D.C., USA, 2018, pp. 2914-2919, DOI: [10.1109/IECON.2018.8591403](https://doi.org/10.1109/IECON.2018.8591403).

L. Horváth, “Intellectual Content Driving for Model of Industrial Cyber Physical System,” in Proc. of the 2019 IEEE International Conference on Systems, Man and Cybernetics (SMC), Bari, Italy, 2019, pp. 1394-1399, DOI: [10.1109/SMC.2019.8914518](https://doi.org/10.1109/SMC.2019.8914518).

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](https://doi.org/10.3233/FAIA200556).

Conclusions

Wide spreading of Model Centered Engineering (MCE).

Integrated communication in Complex Integrated Engineering Environment (CIEE).

Engineering Communication Model (ECM) as extended to CIEE.

Check of communication items and prepare interventions are key issues.

Analysis and content of communication must be appropriate for entering a new era of automation.