“Unleash the unconventional: from game engine to co-simulation platforms for building performance analyses”
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Trend

19th century

20th century

21st century

Alber, Righter and Tittmann Architects
Early stages

Kohler N. and Moffatt S. 2003
We recognize the importance of a multidisciplinary, holistic and informed design.
We did an extensive research about the software in the market.
We identified a lack of suitable software for early design stages.
Towards the new application

**STEP 1** BUILDING GEOMETRY

- Rhinoceros

**STEP 2** SOLAR ANALYSIS

- C#
- Dynamo

**STEP 3** APP CREATION

- C#
- Unity

**STEP 4** RUN THE APP

- Unity

Workflow to build the APP
Game engines for building services design

the APP
Game engines for building services design
DYMOLA Systems Engineering
Multi-Engineering Modeling and Simulation based on Modelica and FMI
Co-simulation platforms for building performance analyses

PhD student Esther Borkowski
Co-simulation platforms for building performance analyses
Co-simulation platforms for building performance analyses

Why using them?

- **Decomposition of the design**, the design is decomposed into individual functional or logical components
- **Hierarchical modelling**, components may internally consist of other connected components
- **Component libraries**, ready-to-use equation-based model components from various application areas
Co-simulation platforms for building performance analyses
Control strategy

OPEN
HOR
30°
45°
60°
90°
Control strategy

Room model (EnergyPlus)

External Interface

Data exchange (FMI standard)

SolRad, CutOff, HorIll

yBlind, ySlat

Controller model (Dymola)

Set variables

Perform time step calculations

Get variables

EnergyPlus

FMI

DYMOLA Systems Engineering

Multi-Engineering Modeling and Simulation based on Modelica and FMI
DYMOLA environment

DYMOLA Systems Engineering
Multi-Engineering Modeling and Simulation based on Modelica and FMI
From measurements to actuator input
Results
Q&A?
Thank you!

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