**MATLAB SIMULINK®**
- Matlab R2018b
- ALMAbuild 2.2

Short description

ALMABuild is an open library based on MATLAB SIMULINK for the dynamic modelling of a building, To facilitate the creation of the model ALMABuild uses a series of Graphical User Interfaces (GUIs) by means of which all the properties of each building element and each thermal zone can be defined. GUIs facilitate the use of ALMABuild also for users without skills in the use of SIMULINK: the system is able to create automatically the SIMULINK model of the building simply starting from the input data. The import of the envelope geometry from SketchUp is supported. Compatibility with the CARNOT library and native integration with MATLAB Toolboxes.
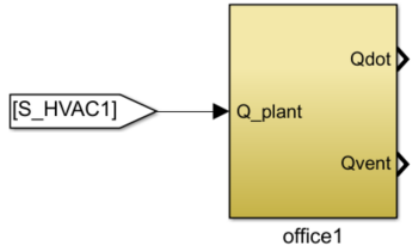
How to install it?

ALMAbuild is a SIMULINK library developed by the Applied Thermal Engineering team of DIN Unibo (gianluca.morini3@unibo.it, claudia.naldi2@unibo.it). The library is available as β-version on demand. A specific webpage will host the library for free download in the next future.
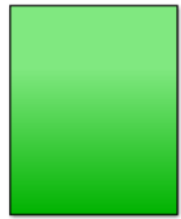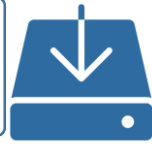
Climatic Data

Intersections
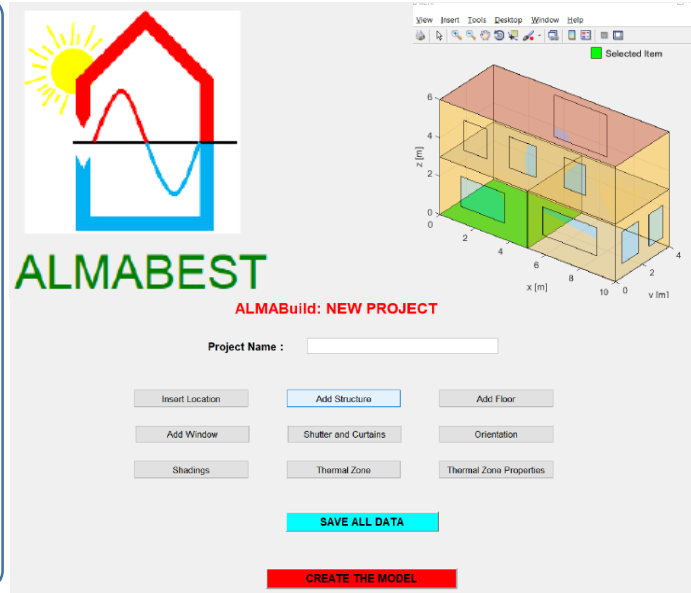
[S_HVAC1] → Q_plant → Qdot / Qvent

office1

How is the model structured?

ALMAbuild is a library of SIMULINK blocks able to model each aspect of the building physics. The library is organized with a top-down approach in a series of specific blocksets (i.e. weather data collection, thermal balance of the envelope elements and so on). Each blockset is divided in subsystems which contain elementary blocks able to model the single aspects of the building modelling. Envelope elements are modeled as equivalent RC networks. The dynamic values of the whole set of physical variables can be monitored runtime. ALMAbuild makes possible different analysis levels: in the "Whole Building level" two nodes are associated to each thermal zone (Convective and radiative) and in the "Single Zone level" 3D-distribution of operative, radiant and convective temperature can be obtained within a single thermal zone.

How to run and modify the model?

The building geometry can be directly imported by SketchUp. The designer is driven along the building model creation by a series of Graphical User Interfaces. The SIMULINK model is obtained automatically, once the complete set of input data is uploaded. The user can modify each block of the SIMULINK library and/or add new blocks with new functions, in agreement the open-source philosophy adopted in this project. The powerful set of toolboxes of MATLAB can be easily integrated with ALMAbuild within a unique working frame. As an example, MATLAB optimization tools can be coupled with the SIMULINK model in a native way by avoiding costly and complicated co-simulations with other software. Even the data post-processing can exploit the MATLAB features in terms of graphs, animations, statistical analysis. Occupant behavior can be modeled by means of an iterative procedure driven by MALAB.

ALMABEST

ALMABuild: NEW PROJECT

Project Name :

Insert Location	Add Structure	Add Floor
Add Window	Shutter and Curtains	Orientation
Shadings	Thermal Zone	Thermal Zone Properties

SAVE ALL DATA

CREATE THE MODEL

Strengths

- Use of Graphical User Interface;
- Full coherence with European Standards;
- Post-processing of results using MATLAB;
- Building imported from SketchUp
- 1*- and 2*-node models for the zone calculation;
- Simulation of the 3D spatial distribution of the convective and radiative temperature;
- Simulink model automatically created based on the input data;
- Integrated procedure for the evaluation of the user behaviour and for optimal-cost analysis;
- Analysis of indoor comfort indexes (mean and local)
- Simulink library compatible with CARNOT
- Open source SIMULINK library