

# DIDA RESEARCH WEEK



UNIVERSITÀ  
DEGLI STUDI  
FIRENZE



## LABIMED Test Cell



An outdoor laboratory to assess energy performances of innovative building components

### Coordinators

Prof. Marco Sala  
Prof. Paola Gallo

### Venue

Engineering School  
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Florence

### Research group

PhD, Ing. Alessandra Donato  
PhD, Ing. Giuseppina Alcamo  
Arch. Alfredo Di Zenzo  
PhD, Arch. Villalta Begazo Milagros

### Partnership

UNIFI | Interuniversity Centre ABITA, Department of Architecture DIDA  
UNIFI | Department of Industrial Engineering DIF  
Regione Toscana  
Scuola Superiore Sant'Anna di Pisa  
Brand Management  
Ciabatti Legnami  
Davini Prefabbricati  
Azienda I+  
Manifattura Maiano Mannelli  
Palagio Engineering Progenia  
Targetti  
Lucense LUCCA  
Solava  
Consorzio Etruria  
Unibloc

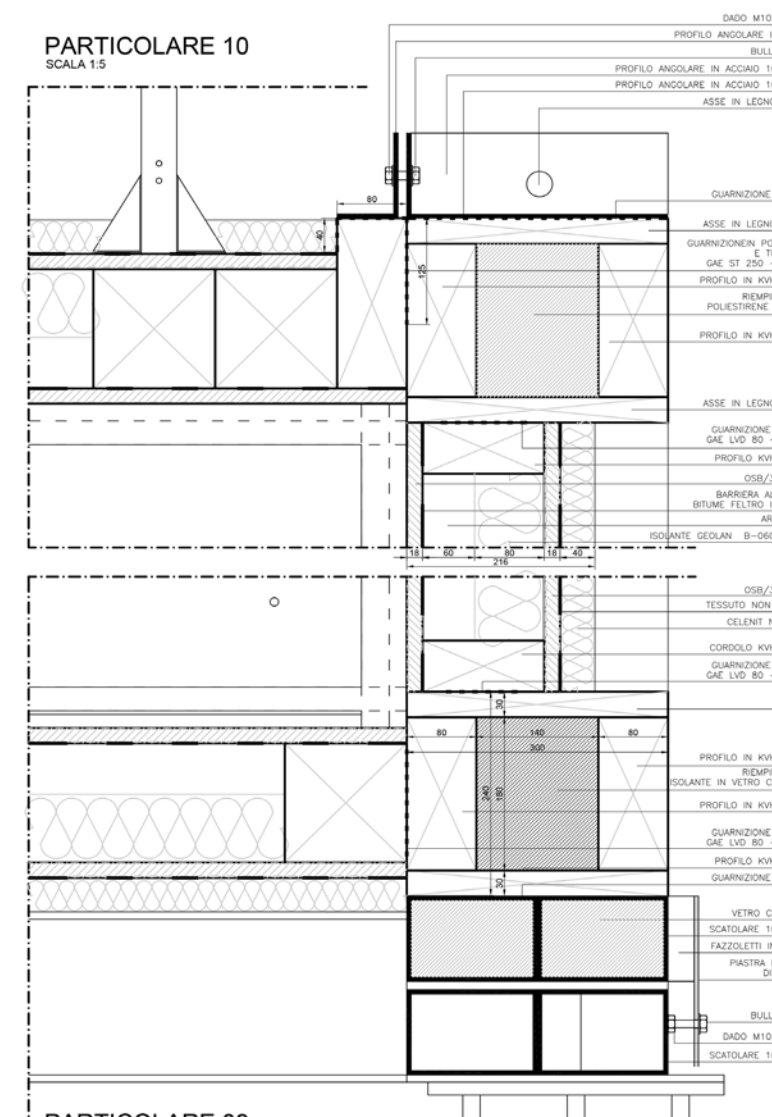
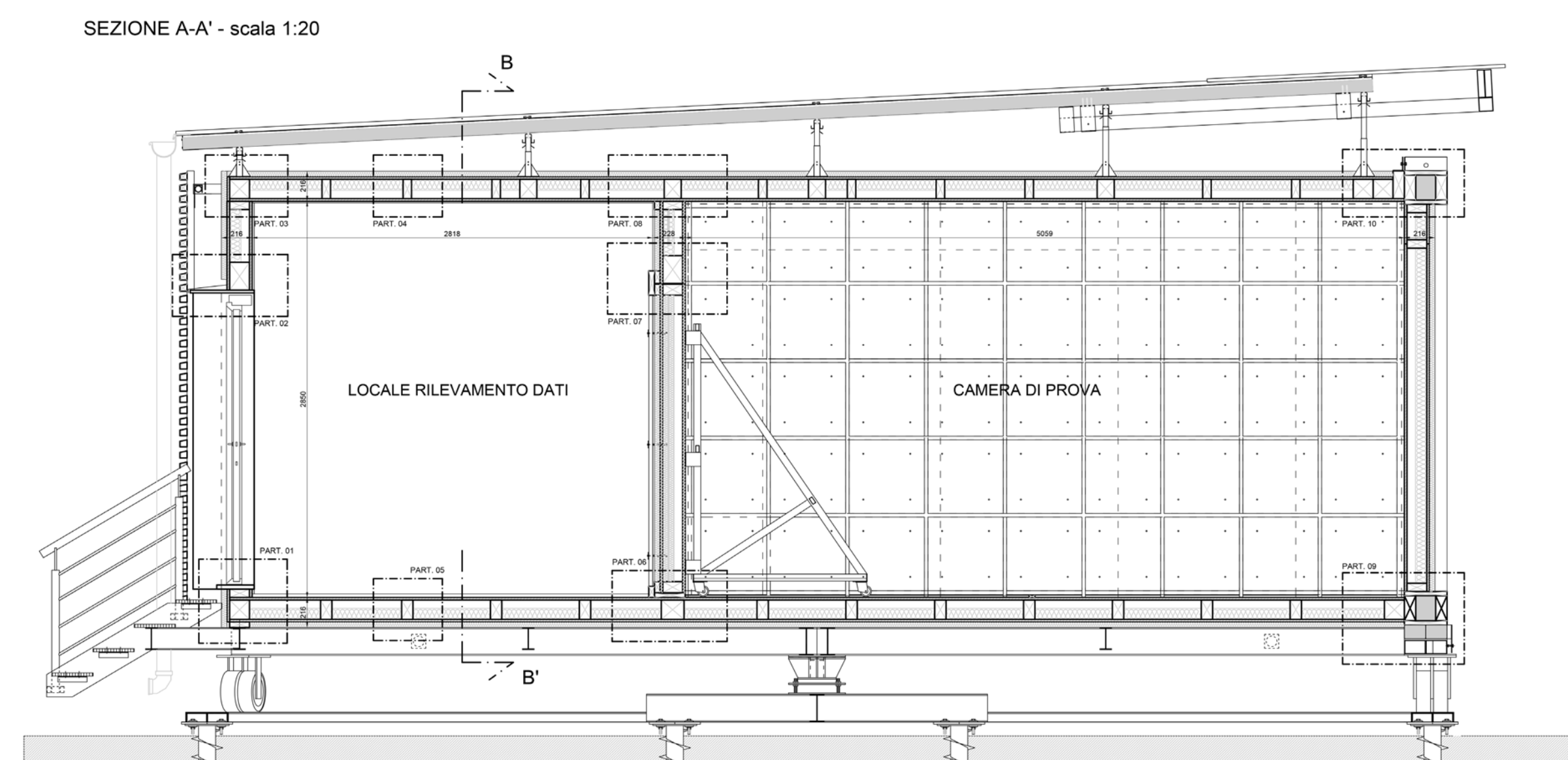
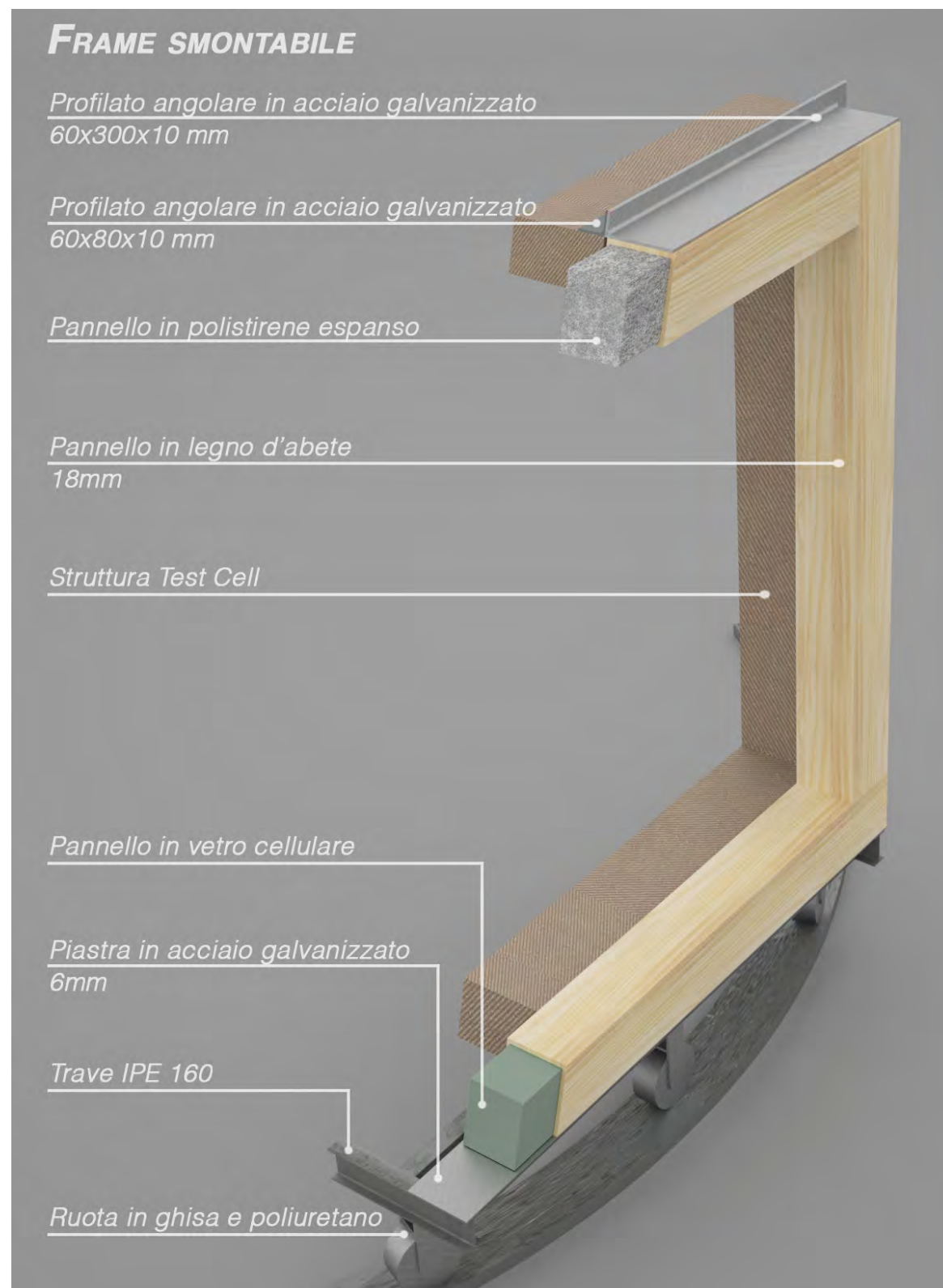
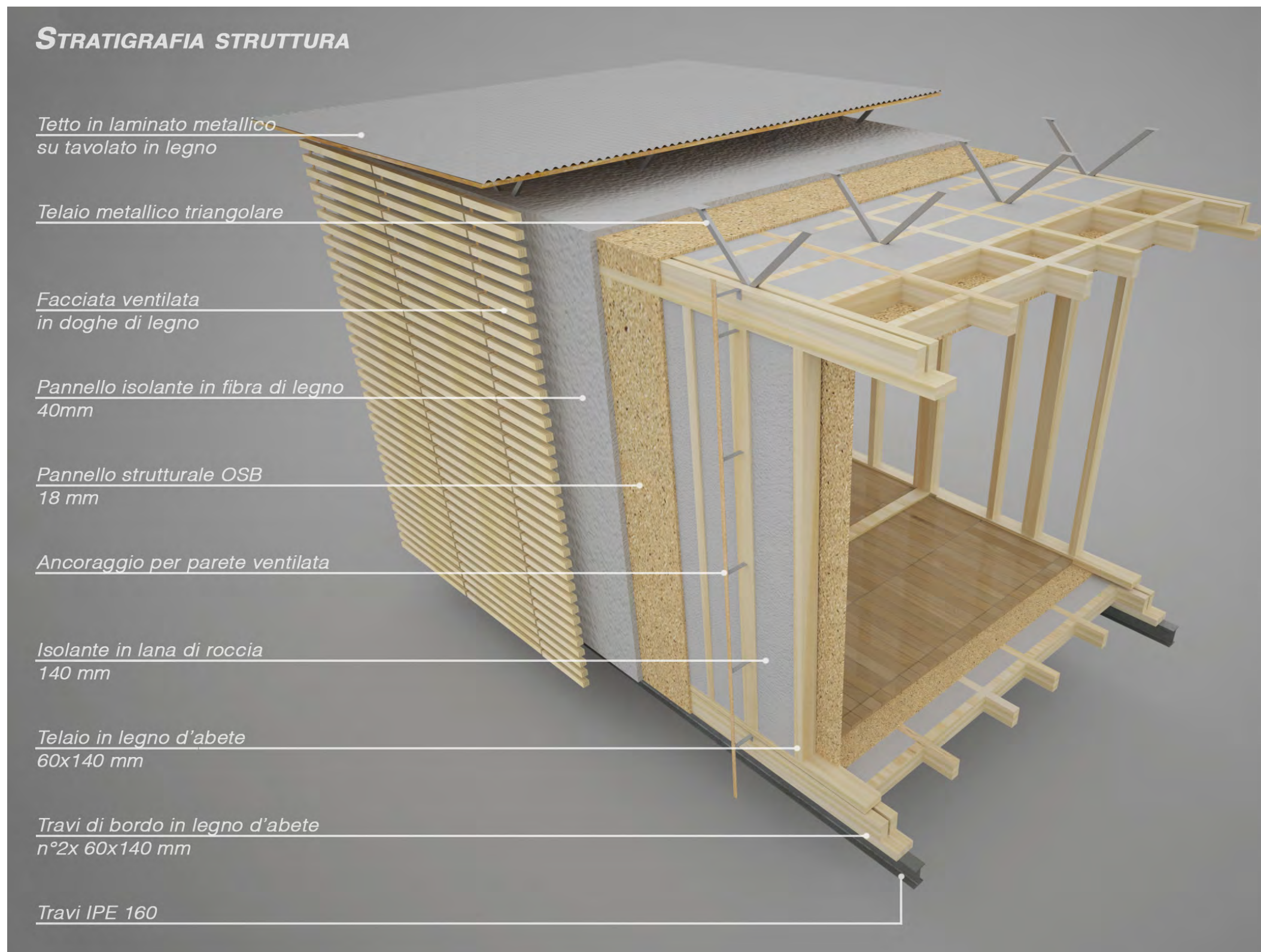
### Founding by

Bando Regione Toscana Por Fers 2007 - 2013

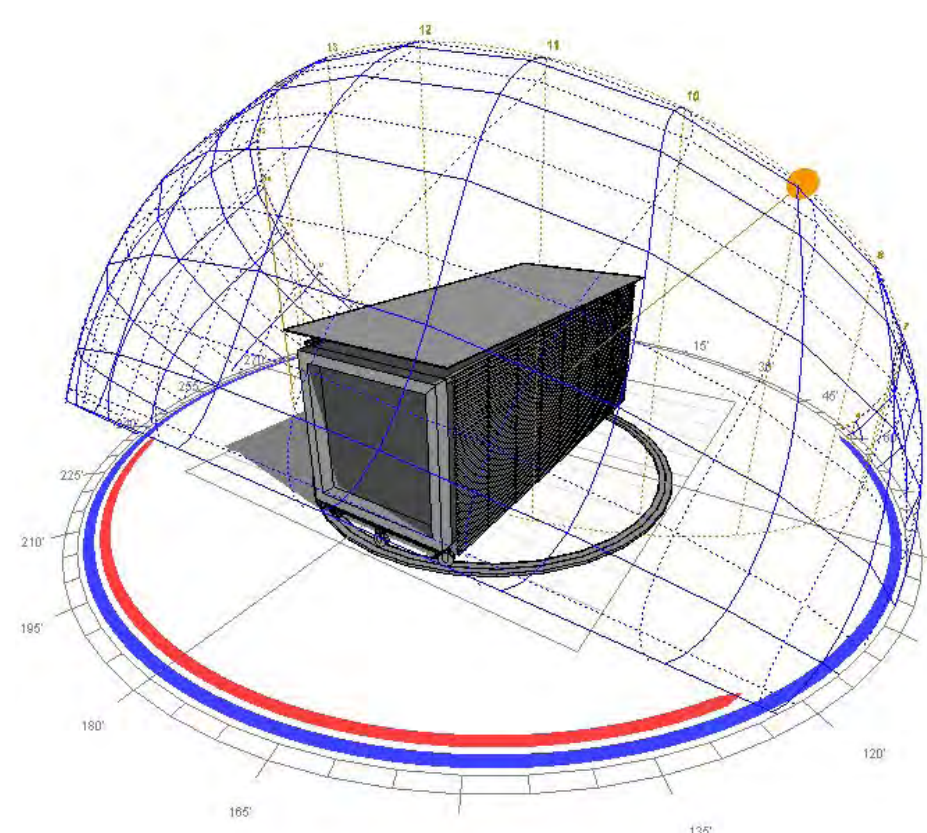
### Keywords

Energy Efficiency, Outdoor test, Test facilities, Dynamic measurements, Smart Building Envelope

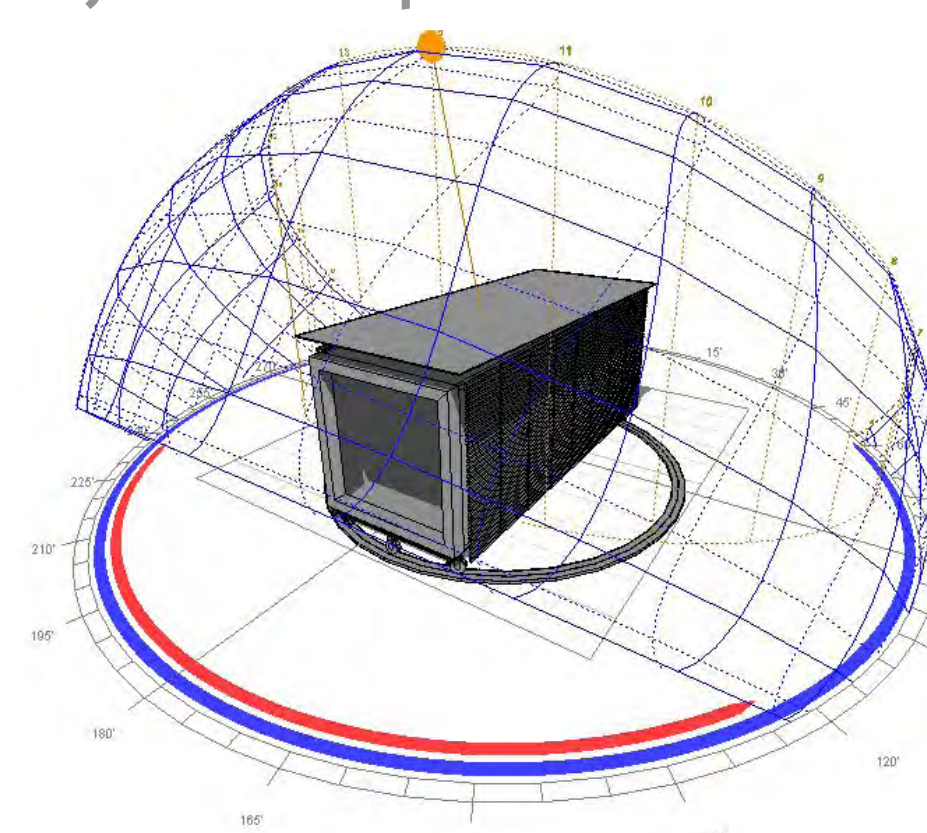
The proposal of a TEST CELL for the Mediterranean climate has been part of a research project Abitare Mediterraneo, funded by the Tuscany Region as part of the POR CREO Fers 2007-2013 and developed by the Department of Architecture of University of Florence, jointly with 12 local building sector's companies. Main project objective is to develop a technological innovation and architectural quality system in which test real application in the construction field, increasing energy saving and promoting a close collaboration between manufacturing companies, builders and research centres. As a significant result of this research, Test Cell LABIMED was realized in order to investigate the overall energetic and thermo-physical performances of opaque and transparent façade systems testing full scale products by means of dynamic measurements in real climatic conditions. The project of Test Cell LABIMED moved on from the outcomes of the research activities carried out during PASSYS and PASSLINK projects. They focused on the development of agreed quality procedures for full scale test and dynamic data analysis investigating the energy quality and thermo-physical properties of passive solar building components as the thermal transmittance U, the solar factor g-value and the dynamic behaviour. Test Cell LABIMED has been designed likewise the other PASSLINK Test cells, but some improvements were achieved to overcome some critical aspects such as overheating, thermal bridges effects, problems due to infiltrations and heat conductive parts. The advantages offered by using test cells compared to other methods depend on the possibility to test full scale façade systems by means of well-controlled realistic room sized environment equipped with advanced measuring instrumentations providing a high quality of output data coming out from the dynamic monitoring test. Reliable data sets can be largely used for data analysis and to validate the most common building energy simulation tools.



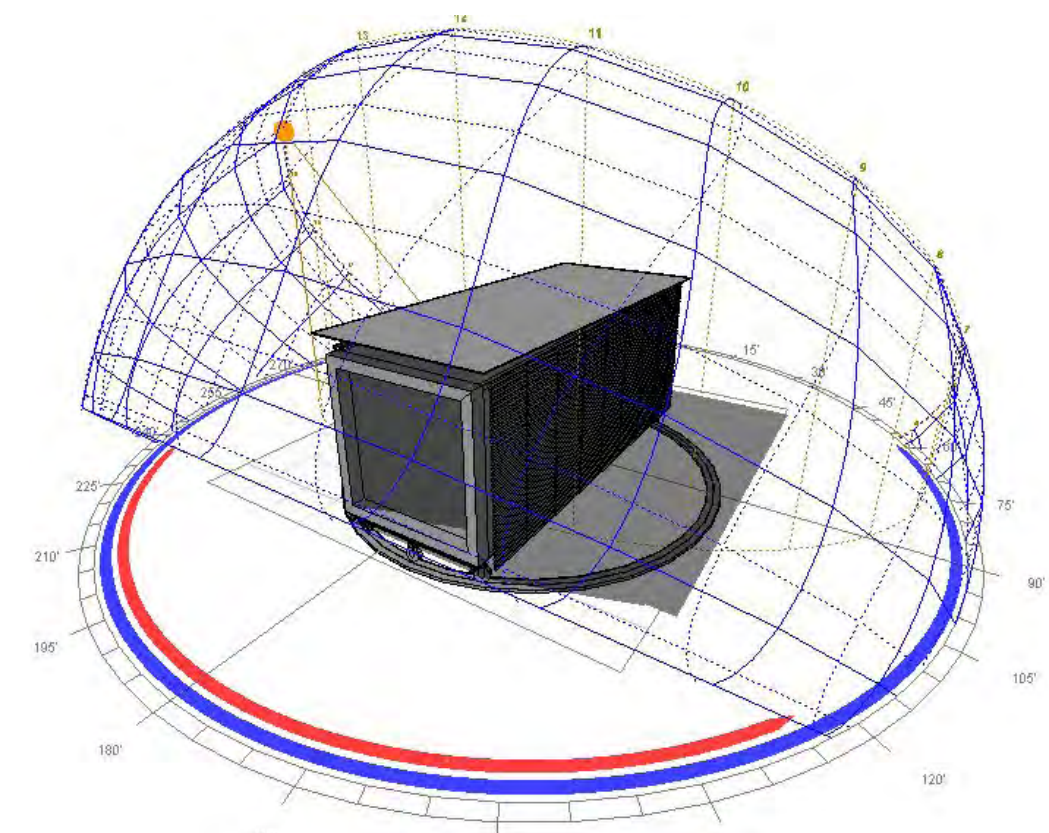
21 JUNE 9.00 am



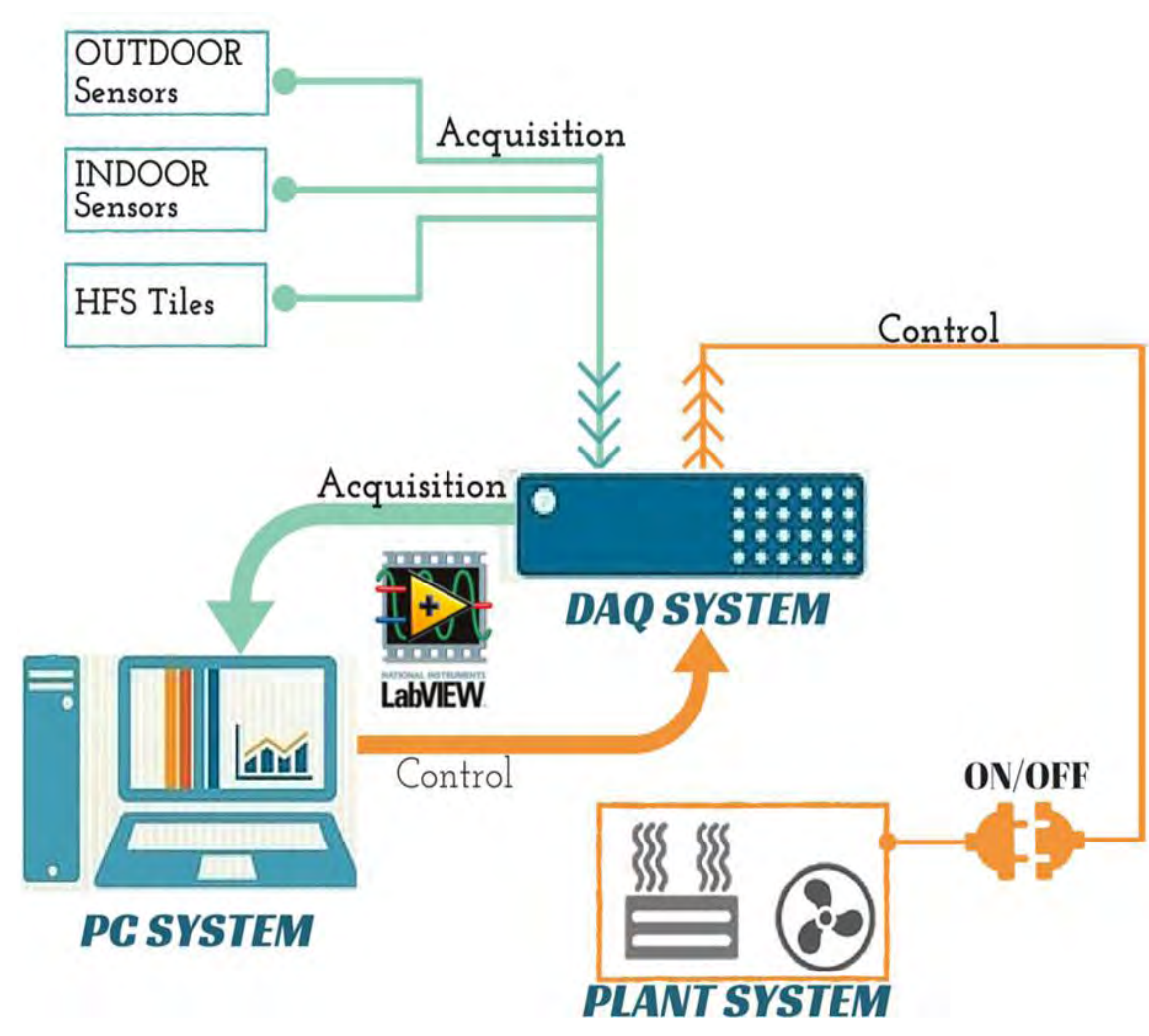
21 JUNE 12.00 pm



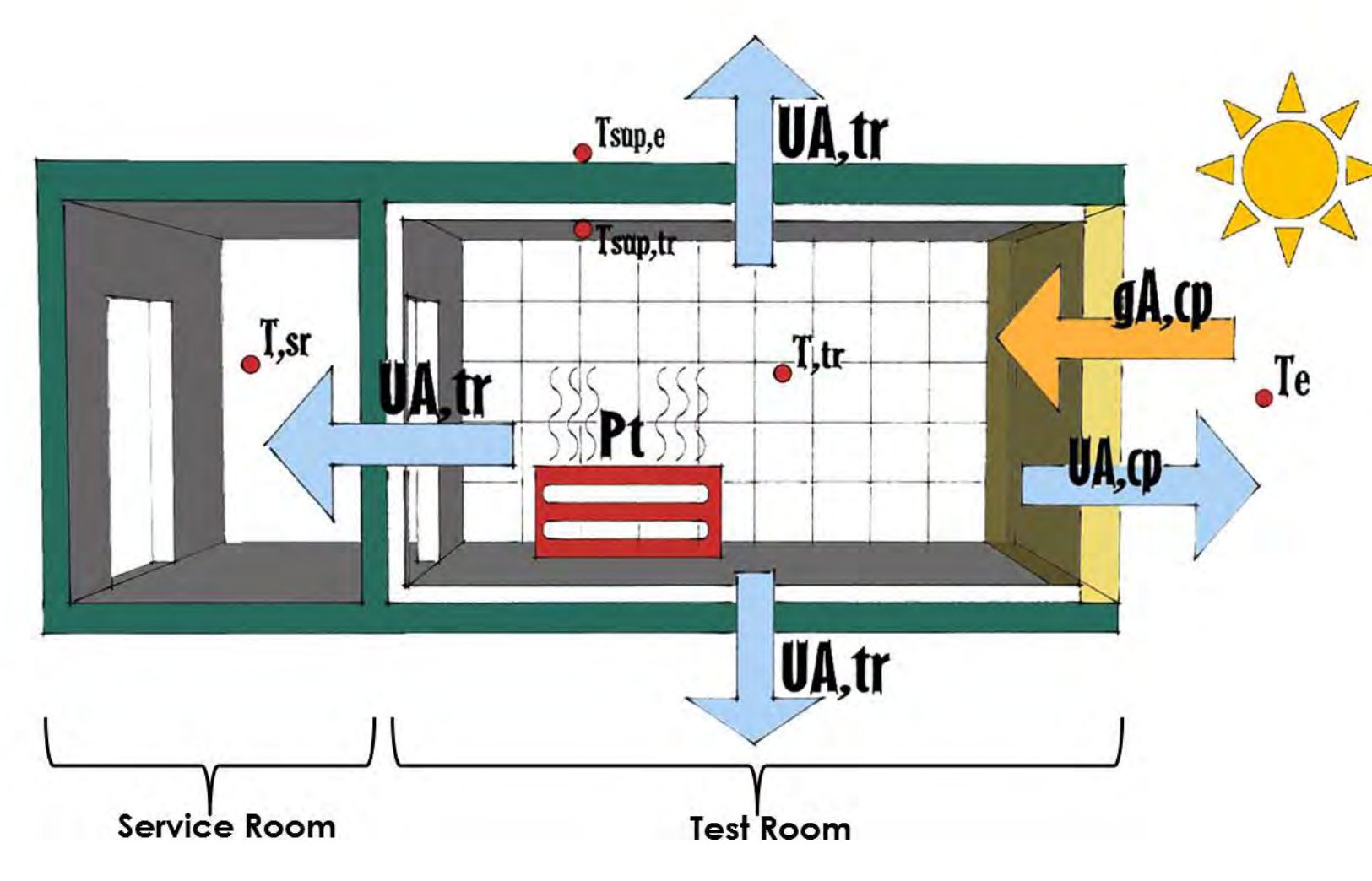
21 JUNE 15.00 pm



### DATA ACQUISITION SYSTEM



### PASLINK METHODOLOGY



### PUBLICATIONS

Alcamo G. 2012, *Sistemi per valutare e comparare in opera le prestazioni energetiche di componenti edilizi. Progetto di una Test Cell per il clima mediterraneo*, tesi di Dottorato Di Ricerca in Tecnologia XXIII Ciclo, Università degli Studi di Firenze

Alcamo G., De Lucia M. 2014, *A new test cell for the evaluation of thermo-physical performance of facades building components*, «International Journal of Sustainable Energy», vol. 33, no. 4, pp. 954-962

Gallo P. 2014, *Sustainable habitat: market trends and testing of innovation products*, 30th International PLEA Conference, Ahmedabad, 16-18 December, Cept University Press, vol. 4, pp. 23-25

Alcamo G., Donato A. 2015, *Test facilities for evaluation of building component energy performances - TEST CELL in Florence*, in S. Roels, L. Vandaele, etc. *Full scale test facilities for evaluation of energy and hygrothermal performances*, Gent, pp. 75-79

Donato A. 2016, *Analisi e monitoraggio a regime dinamico delle performance energetiche di componenti di involucro mediante outdoor test*, tesi di Dottorato Di Ricerca in Tecnologia XXVIII Ciclo, Università degli Studi di Firenze



19 - 23 FEBBRAIO

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