

CALL FOR QUOTE

Design of Experimental Platform for Supervision and Monitoring applied to Energy Efficiency in Smart Buildings Based on Cyber-Physical Systems (CPS).

1. BACKGROUND GENERAL.

The habitat is (and will remain) one of the major stakes at least for the next thirty years, both in terms of the comfort needed by the occupants but also in terms of the energy bill during and after the construction. Significant researches have been carried out in public and industrial laboratories in order to develop new materials (intelligent, economical, etc.), as well as new methods for construction and management of buildings. These researches are relayed generally by various scientific books and publications, and notably by international conferences increasingly active in these fields, such as ICOME, ECOS, EVF, etc., (to mention only those organized in France).

This project involves the original use of a CPS (i.e., Cyber-Physical Systems) technology, that shall be applied in the factories of the future (FoF), as well as for agile monitoring and intelligent control of smart buildings. Therefore, an experimental platform for testing and demonstration (based on CPS) has to be developed for the purpose of this project. This platform actually represents a part of the project: **Creative Lab. "TRANSENE"**, developed by ECAM - EPMI, with the financial support of ANRU (National Agency for Urban Renewal) and ERDF (European Regional Development Fund). Our project is in fact a pioneer in this field.

2. GENERAL OBJECTIVES, ACTIVITIES AND EXPECTED RESULTS.

1.1. Research activities.

- Design and development (a realization) of a Cyber-Physical Platform (CPP) for supervision and monitoring of energy efficiency in smart buildings.
- Creation of the main modules and algorithms as well as their interactions in the form of a specific structure designed to combine intelligent modules and devices with capabilities for intelligent monitoring, supervision, control and decision-making in an undefined environment(s).
- Selection of appropriate algorithms and models for simulation and training of the individual modules (the structures), connecting intelligent devices and enabling smart monitoring, control and decision-making under uncertain conditions, as well as failure prevention based on specific symptoms appearing in energy modules and systems.
- Development of an operational physical environment (i.e., appropriate sensors, measuring equipment, intelligent modules for the optimization of algorithms applied in the structure of the PCS-based platform), and respectively – implemented for agile management and control of 4th generation energy systems.
- Creation of intelligent tools for activation and remote access to the various PCP-modules, as well as for management of the peripheral devices in collaboration with the partner

organizations. This will enable the reception and processing of data, generated by different sources as well as management of external remote devices.

1.2. *Creation of prototypes, application of methods and algorithms (already developed) and their integrations in the exploitation.*

- Creation of an autonomous software platform with a user-friendly interface based on the already developed algorithms, and with capacities for communication, training, monitoring and supervision of/via intelligent sensors and external devices.
- Implementation of the autonomous software platform (already created) in a real environment (i.e., with real operating conditions), for testing verification and optimization of the algorithms implemented, in order to integrate the obtained results in a "Cloud" Network Structure (CNS).
- Development and implementation of specific tools, necessary for maintenance and control of energy modules and systems, based on the principles of intelligent fault diagnosis.
- Development of solutions for preventive maintenance, combined with integrated methods for analysis and evaluation of failures and their degree of criticality (i.e., the so-called FMECA- technics), and providing respectively an effective exchange of information between the sources and the users of the CNS, (of course with the necessary degree of certainty).

3. *DATE OF ANNOUNCEMENT*

- 13th March 2017.

4. *DEADLINE FOR RECEIPT OF THE QUOTATIONS (THE OFFERS):*

- 30th April 2017.

5. *DEADLINE FOR SELECTION OF A QUOTATION (AN OFFER):*

- 15th May 2017.

6. *PROJECT START:*

- 1st June 2017.