



Key features:

- **Higher laboratory performance since several students can work simultaneously.**
- **Several users can operate various units at the same time.**
- **Possibility of dividing the classroom into workgroups.**
- **Several experiments can be performed at the same time.**
- **Collaborative experiments performance.**
- **There are different user levels (manager, basic, intermediate and advanced) with different permissions.**
- **The manager has the absolute control of the system.**
- **The manager/teacher can supervise from his/her computer the operations every user is performing in any unit of the laboratory.**
- **User and manager are connected at all times.**
- **Real time display and control of the whole system from an Interactive whiteboard (touchscreen).**
- **CENTRALIZED AND SECURE SYSTEM**, it can be totally controlled from the central computer (manager).
- **The "ESN" System is MODULAR, OPEN and EXPANDIBLE.**
- **A vision system for real time monitoring of experiments is supplied.**
- **Visualization of the changes in a unit from any computer of the laboratory.**
- **All units can work simultaneously.**
- **The system is made up of as many units as required.**
- **The required infrastructure, both hardware and software is provided.**



ISO 9001: Quality Management (for Design, Manufacturing, Commercialization and After-sales service)



European Union Certificate (total safety)



Certificates ISO 14001 and ECO-Management and Audit Scheme (environmental management)



"Worlddidac Quality Charter" and Platinum Member of Worlddidac

## INTRODUCTION

- SCADA:

A SCADA application (Supervisory Control and Data Acquisition) is the one that acquires real signals or data from EDIBON technical units and control and supervise them.

Any SCADA system includes hardware and software components. The hardware collects and stores data in a computer with SCADA software installed. The computer processes the data and displays them in real time.

- NET:

A local area network (LAN) consists of a group of computers and associated devices that share information and are connected to a server, being the connection either wired or wireless.

With this type of network, any computer has remote access to any other computer of the network.

## GENERAL DESCRIPTION

The EDIBON Scada-Net Systems, "ESN", consists on the integration of EDIBON computer controlled units into the SCADA system in a local network.

The main feature of this system is the remote control of any EDIBON unit belonging to it from any control station included in the local network. In addition, any of these units can be visualized from any workstation.

Consequently, the efficiency of a laboratory with the "ESN" system is higher than the efficiency of a conventional laboratory. This increase is due to the fact that several users can work simultaneously with the same unit and, as a result, waiting times between experiments are reduced. Therefore, the number of users will not be limited to the number of units in the laboratory, as in conventional laboratories.

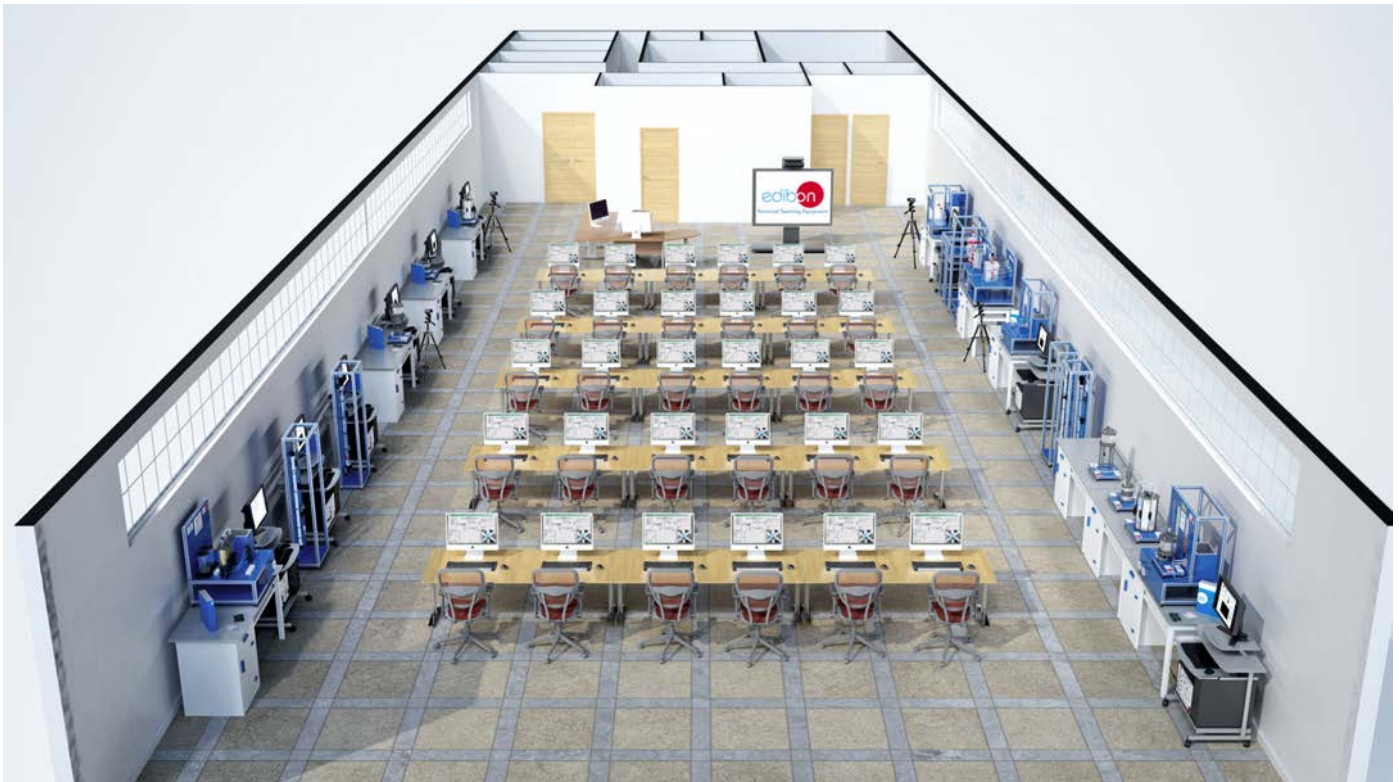
Since the central control computer is located between the units and the local network, the teacher can manage the access to the units and provide the users with the permissions required to control or view the units of the laboratory. The rest of users can visualize a specific unit in their computers while other person is controlling it from his/her post.

The communication between units and users is always managed by the teacher. The users will not be able to control any unit from their computers if the teacher does not provide the permissions required.

In this system, there are different configuration levels that allow the manager, usually a teacher, can grant certain access permissions to the users/students (basic, intermediate or advanced) depending on the needs of the laboratory practical exercise to be carried out.

The configuration of an EDIBON Scada-Net System is made up of 30 students post, a control post (teacher post) and as many EDIBON technical units as desired. All the devices included in the laboratory are connected through a local area network.

A typical EDIBON Scada-Net System shows the following layout:



This system may be configured with a single EDIBON technical teaching unit. This system is called MINI SCADA-NET.

The configuration of a laboratory with the EDIBON Mini Scada-Net System, "MINI ESN", consists of 30 student posts, a control post (teacher's post) and an EDIBON technical teaching unit. All the units/posts included in the laboratory are connected through a local area network.

## "ESN" SYSTEM CONTROL, MAIN ACTIONS

✓ **Case 1:** The teacher is controlling a unit and the students are visualizing the teacher's operation.



✓ **Case 2:** One student can control the unit provided that he has been granted permission by the teacher. This student controls a unit and the other students visualize the actions. However, the teacher can recover the control whenever he wants and disable the student's permissions.



## "MINI ESN" SYSTEM CONTROL, MAIN ACTIONS

✓ **Case 1:** The teacher controls the unit and the students visualize the teacher's operation.



✓ **Case 2:** One student controls the unit provided that he has been granted permission by the teacher. This student controls the unit and the other students visualize the actions. However, the teacher can recover the control whenever he/she desires and disable the student's permissions.







The EDIBON Scada-Net Systems, "ESN", and Mini Scada-Net, "MINI ESN", are made up of the following elements:

- EDIBON technical teaching units:

- Unitary process units (UPU). A single unit with "MINI ESN" configuration.
- Computer.
- SCADA Software.
- Data acquisition board.
- Electronic Interface.
- WebCam.

- Laboratory accessories:

- A teacher control post. A computer is included to manage access to the units and to give required permissions to the users to operate or view EDIBON teaching units.
- 30 Student's posts. Each post has its own computer to operate and view EDIBON teaching units.
- Interactive whiteboard: element required by the students to view how the teacher works with the units.
- Local network devices: switches and network cables.

- Teacher software:

- Management of the signals and data coming from any EDIBON unit in the laboratory.
- Management and organization of the students from the central post.
- Management of the users' passwords, as well as the access permissions they have in the system.
- Provides access to any laboratory unit and to its SCADA software.
- Users' assessment. The teacher can monitor the level of knowledge gained by the students.
- The manager can receive questions from the users.
- The manager can ask technical or theoretical questions related to any unit, such as to the unit itself, its operation, its results, etc.
- User's assessment, either in real time or during the complete process length, in order to assess the student's level of understanding.
- Chat available between manager and user at any time.
- The manager can send and receive results and files to the user, where necessary, and vice versa.
- Parts of a displayed picture can be highlighted for an in-depth analysis.
- Notes can be written on the interactive whiteboard in real time in order to help the students to assimilate the processes taking place in the units.
- Images can be frozen, as screenshots, at any given time for later analysis and/or further analysis of data displayed at that moment.
- Screenshots can be sent to other devices for the students to compare the experimental values obtained and the previously calculated theoretical values.
- Search of additional multimedia resources.

- Student software:

- View signals coming from the units, as well as manage actuators, controls, etc. of those units.
- Ask the manager questions about the unit the student will work with (configuration, results, etc.).
- View any unit under operation.
- Work with any unit and control it from his/her post.
- Send messages via chat to the manager.
- Sends files and questions to the manager, in real time.
- Duplication of external devices to share multimedia resources.

## EXERCISES AND PRACTICAL POSSIBILITIES TO BE DONE WITH THE "ESN" AND "MINI ESN" SYSTEMS

- 1.- Control any unit from any post located in the laboratory.
- 2.- Supervise different experiments about data acquisition and representation, from the units, in real time.
- 3.- Visualize any experiment from any laboratory post.
- 4.- Supervise as many experiments as desired, performed in different units at the same time.
- 5.- Generate reports with the results obtained with the units.
- 6.- Perform different experiments at the same time.
- 7.- Show to the laboratory members the appropriate manual or automatic operations to perform with each laboratory unit.
- 8.- Create more elaborate practical exercises using more than one unit from the laboratory.
- 9.- Suggest multidisciplinary experiments, in other words, mix in the same experiment units from different study fields.
- 10.-Modify any parameter of any unit included in the system from any workstation in the laboratory.
- 11.-Cause an abnormal functioning in a unit for the students to practice fault finding exercises.
- 12.-Assess the knowledge of a student or group of students about a particular unit (any unit included in the "ESN" system).
- 13.-Develop guided practical exercises for a better understanding of each unit.
- 14.-Individual training practical exercises.
- 15.-Group exams or practical exercises.
- 16.-Perform interactive exercises (using the chat between manager-users).
- 17.-Exchange of obtained results among the members of the "ESN" system.
- 18.-Any exercise directly related to the SCADA software of each unit.

*\*Some of the practical possibilities may be done only with the "ESN" complete system.*

## ALL AVAILABLE SCADA-NET AND MINI SCADA-NET SYSTEMS

The EDIBON Scada-Net Systems, "ESN", and Mini Scada-Net, "MINI ESN", can be provided with units belonging to the following areas:

1. <b>PHYSICS</b>
2. <b>ELECTRONICS</b>
3. <b>COMMUNICATIONS</b>
4. <b>ELECTRICITY</b>
5. <b>ENERGY</b>
6. <b>MECHATRONICS, AUTOMATION &amp; COMPUMECHATRONICS</b>
7. <b>MECHANICS</b>
8. <b>FLUID MECHANICS</b>
9. <b>THERMODYNAMICS &amp; THERMOTECHNICS</b>
10. <b>PROCESS CONTROL</b>
11. <b>CHEMICAL ENGINEERING</b>
12. <b>FOOD &amp; WATER TECHNOLOGIES</b>
13. <b>ENVIRONMENT</b>
14. <b>BIOMEDICAL ENGINEERING</b>

\* Specifications subject to change without previous notice, due to the convenience of improvement of the product.



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REPRESENTATIVE: