Innovative engineering, technical teaching and research equipment

The advanced Teaching Technology using SCADA SYSTEM, developed by EDIBON
1. Introduction to EDIBON. What do we do and why are we good at it?
   • 1.1 About EDIBON.
   • 1.2 Our international references.
   • 1.3 Technical education problems and solutions.
   • 1.4 Teaching technology evolution.
   • 1.5 How EDIBON Advanced Technical Teaching Equipment can reduce the processing time of technical education project cycle?

2. The SCADA System applied to Technical Teaching Equipment.
   • 2.1 Sector of application for the SCADA System.
   • 2.2 Development of modern TEACHING TECHNIQUES, as a consequence of modern and advanced technology used, by EDIBON.
   • 2.3 Alignment of EDIBON Technical Equipment with the new procurement regulation of Multilateral and Bilateral financing Banks. Example: ESN, ECL, etc.

3. Examples of the SCADA Teaching System and its expansions.
   • 3.1 UCP Process Control Unit.
   • 3.2 Expansion I: SCADA + PLC Control (Real Industrial System).
   • 3.3 Expansion II: SCADA NET System (ESN).
   • 3.4 Expansion III. EDIBON Cloud Learning (ECL).
   • 3.5 Other SCADA Expansions available: ICAI, FSS, etc.

4. Financing.
   • 4.1 Financing conditions.
1. Introduction to EDIBON. What do we do and why are we good at it?

1.1 About EDIBON

WHO WE ARE
EDIBON INTERNATIONAL, S.A. is a designer and manufacturer of Technical Teaching Equipment in the field of Engineering, with the most Advanced Technology and optimized instructive techniques. Training tomorrow's engineers since 1978.

WHAT ARE WE GOOD AT
Designing and supplying of fully integrated engineering laboratories for technical teaching and research -industry oriented-, providing a complete solution to the specific needs of the customer.

MINISTRIES WE ARE WORKING WITH
- Ministry of Higher Education (MOHE)
- Ministry of Education (MOE)
- Ministry of Labour (MOL)
- Ministry of Defense (MOD)
- Ministry of Health (MOH)
- Ministry of Oil and Gas (MOOG)
- Ministry of Energy (MOEN)
- Ministry of Agriculture (MOA)
- Other Ministries with Technical Schools

FACT SHEET
- Sales target for 2020: 50 M €
- Operating worldwide: 98% of international activity.
- Strong annual expansion.
- Headquarters: Madrid (Spain).
- Facilities: 30,000 m² & 15 M € investment.
- Staff: 120 team members & 95% technical profile.
- Turn key projects abroad:
  * 20 M € Executed in 8 countries.
  * 42 M € signed in 4 countries.
  * 600 M € under analysis for potential bidding.

INTERNATIONAL FINANCIAL INSTITUTIONS WE WORK WITH
- ADB
- The World Bank
- IDB
- UNDP
- UNICEF
- UNIDO
- UNOPS
- KOICA
- BILATERAL
- JICA
- KOICA
- AECID
- GIZ

OUR MAIN ACTIVITIES
- Units Design
  100% own design and know-how
- Manufacturing
  Fully in-house production
- Industrial training requirements
- Laboratories design
- Complete training solutions
- Installation & Training
  Complete setup up. Effective and advanced teaching techniques
- After Sales Service
  Guaranteed technical support

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1. Introduction to EDIBON. What do we do and why are we good at it?

1.2 Our international references.

Relevant KEY NOTE:

• Our customers are in developed, transition and developing countries.
• Regularly, EDIBON has been contract awarded with all Multilateral and Bilateral organizations.
• We comply with all globally recognized quality standards and provide long term warranties.

Some countries already using EDIBON Technology:

- Afghanistan
- Albania
- Algeria
- Angola
- Argentina
- Australia
- Austria
- Armenia
- Azerbaijan
- Bahrain
- Bangladesh
- Barbados
- Belarus
- Belgium
- Belize
- Bhutan
- Bolivia
- Botswana
- Brazil
- Brunei
- Bulgaria
- Burkina Faso
- Cambodia
- Cameroon
- Canada
- Chile
- China
- Colombia
- Costa Rica
- Croatia
- Cyprus
- Dominica
- Dominican Rep.
- Ecuador
- Egypt
- El Salvador
- Estonia
- Ethiopia
- Finland
- France
- Georgia
- Germany
- Ghana
- Greece
- Guatemala
- Guinea Ec.
- India
- Indonesia
- Lebanon
- Libya
- Italy
- Irak
- Ireland
- Ivory Coast
- Jordan
- Kazakhstan
- Kuwait
- Kyrgyzstan
- Latvia
- Lithuania
- Malaysia
- Mauricio
- Mauritania
- Mexico
- Mongolia
- Morocco
- Mozambique
- Myanmar
- Netherlands
- New Zealand
- Nicaragua
- Nigeria
- Oman
- Pakistan
- Palestine
- Panama
- Paraguay
- Peru
- Philippines
- Poland
- Portugal
- Qatar
- Romania
- Russia
- Saudi Arabia
- San Cristobal & N
- Serbia
- Singapore
- Slovakia
- South Africa
- South Korea
- Spain
- Sri Lanka
- Sudan
- Suriname
- Switzerland
- Syria
- Tajikistan
- Taiwan
- Thailand
- Trinidad & Tobago
- Tunisia
- Turkey
- Turkmenistan
- UAE
- Uganda
- Ukraine
- UK
- Uruguay
- USA
- Uzbekistan
- Venezuela
- Vietnam
- Yemen
- Zambia
1. Introduction to EDIBON. What do we do and why are we good at it?

1.3 Technical education problems and solutions.

**PROBLEMS**

MULTILATERAL PROCUREMENT REGULATIONS INCLUDE MORE AND MORE THE PRINCIPLE OF: QUALITY, TECHNOLOGY AND VALUE FOR MONEY IN CONTRACT DESIGN.

EDIBON COMPLIES WITH THESE THREE PRINCIPLES AND CONSIDERS THAT THE SOLUTION, FOR AN ADEQUATE TECHNICAL EDUCATION DEMANDED BY THE INDUSTRY TODAY, REQUIRES SCADA TEACHING UNITS AND THE SCADA EXPANSIONS (SCADA+PLC, ESN, ECL, etc).

<table>
<thead>
<tr>
<th>MAIN CONSTRAINTS DETECTED BY EDIBON ON TODAY’S HIGHER, TECHNICAL AND VOCATIONAL EDUCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Larger GAP:</strong></td>
</tr>
<tr>
<td><strong>Training of PROFESSIONALS:</strong></td>
</tr>
<tr>
<td><strong>Teaching Technology SHORTAGE:</strong></td>
</tr>
<tr>
<td><strong>VALUE FOR MONEY:</strong></td>
</tr>
<tr>
<td><strong>Technology:</strong></td>
</tr>
<tr>
<td><strong>Training STANDARDS:</strong></td>
</tr>
<tr>
<td><strong>SEPARATE labs and classroom:</strong></td>
</tr>
<tr>
<td><strong>LONG TERMS focus:</strong></td>
</tr>
</tbody>
</table>
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1.3 Technical education problems and solutions.

### SOLUTIONS

#### Solutions provided by EDIBON to these MAJOR CONSTRAINS in terms of Quality, Value-for-Money & Cost Reduction

<table>
<thead>
<tr>
<th>Solutions provided within TECHNICAL SPECIFICATIONS:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TEACHING units:</strong> Provided Technical Teaching units in all technical areas.</td>
</tr>
<tr>
<td><strong>SCADA system:</strong> Has become a reference in the international market as the most appropriate solution.</td>
</tr>
<tr>
<td><strong>TOR definition:</strong> EDIBON has become an expert in providing consultancy services on TOR (Terms of Reference) definitions according to solutions required and availability in the market</td>
</tr>
<tr>
<td><strong>ONE Teacher:</strong> Able to teach technical theory and practice in a classroom-Laboratory and controlling level of understanding of students in real time.</td>
</tr>
<tr>
<td><strong>30 Students:</strong> Working simultaneously with one or several units under the supervision of a single teacher.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Solutions provided in terms of SCALABILITY:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Equipment ADAPTABILITY:</strong> Independent equipment units can be integrated to complete laboratory system. Teaching Equipment similar to the industry's, including the control system. Essential for students understanding.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Increased OUTPUTS with additional key services:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Collaterals:</strong> Project and Complete Laboratories supplied by EDIBON, advanced and modern own technology.</td>
</tr>
<tr>
<td>Turn Key Projects (TKP) with our soft financing options</td>
</tr>
<tr>
<td>Technical Distance Learning (ECL),</td>
</tr>
<tr>
<td>Custom Made Units and Pilot Plants. Courses with advanced Teaching Unit + University Teachers + EDIBON Engineers, etc.</td>
</tr>
</tbody>
</table>

| **Services:** Laboratory adaptation. Units installation and comissioning. Training by EDIBON's engineers.. After sales service, including remote control. Sustainability. Warranties… and much more. |
1. Introduction to EDIBON. What do we do and why are we good at it?

1.4 Teaching equipment technology evolution.

1. Traditional Manual Units / Software Simulation
   - Not recommended nowadays as modern teaching technologies are available.
   - OLD OPTION.
   - NOT RECOMMENDED

2. Units With Data Acquisition
   - Few companies in the world offer Data Acquisition as additional value to manual units.
   - SAVES TIME BUT IT IS NOT A PROPER SOLUTION

3. EDIBON Units + SCADA System
   - EDIBON is a pioneer company that offers SCADA for thousands of Teaching Units since 30 years ago.
   - SCADA IS THE SOLUTION

4. EDIBON Industrial Units (SCADA+PLC’s)
   - This is the only Real Industrial Teaching Systems.
   - EDIBON PATENT

5. Multipost EDIBON SCADA-NET (ESN)
   - This system allows up to 30 students to use different units in the laboratory working simultaneously under the supervision of a single teacher
   - PLC: Programmable Logic Controller with EDIBON own custom made Software for any unit
   - EDIBON PATENT

6. Multipost EDIBON Cloud Learning (ECL)
   - EDIBON Teaching Unit with SCADA in one location and students/teachers in a different location
   - Internet
   - SCADA
   - PLC
   - Students/Teachers
   - Internet

EDIBON: Innovative engineering, technical teaching and research equipment.
1. Introduction to EDIBON. What do we do and why are we good at it?

1.5 How EDIBON advance Technical Teaching Equipment can reduce the processing time of technical education project cycle?

<table>
<thead>
<tr>
<th>Step</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country and Donor agreements</td>
<td>Takes 1-5 years</td>
</tr>
<tr>
<td>General Agreement</td>
<td>Takes approx. 1 year</td>
</tr>
<tr>
<td>Country consultancy</td>
<td>Takes 1-3 years</td>
</tr>
<tr>
<td>End user technical requirements decisions</td>
<td>Takes 1-3 years</td>
</tr>
<tr>
<td>Country tender preparation</td>
<td>*Some months</td>
</tr>
<tr>
<td>Tender award from tender opening date</td>
<td>*Some months</td>
</tr>
<tr>
<td>Execution</td>
<td>1 to 2 years</td>
</tr>
</tbody>
</table>

**TOO LONG TOTAL PROJECT CYCLE: 5-12 YEARS**

*How EDIBON can help the end customer for reducing processing time?*

- By analysing the existing laboratories (size, conditions, installations, needs, etc.).
- By analysing the curricula and industry requirements.
- By recommending to use classroom and laboratory at the same place, for reducing costs and improving the teaching efficiency.
- By updating the laboratories in accordance with the future laboratory units requirements.
- By recommending to the end customers not only the proper Teaching units, but also the proper Teaching Technology.
- By supplying “complete packages” with installation, training and sustainability.
- By giving special and high level courses for training teachers.
- By guarantee sustainability.
- By supplying ALL SOFTWARE PACKAGES IN “ANY LANGUAGE”.
- By providing long term warranties.

... “SO EDIBON STAFF CAN COLLABORATE AND REDUCE DRASTICALLY THIS PROCESSING TIME”
2. The SCADA System applied to Technical Teaching Equipment.

2.1 Sector of application for the SCADA system

EDIBON’s equipment integrity, scalability and adaptability: 4,000 Technical Teaching Units + 5,000 different configurations.

- 10. Physics
- 20. Electronics
- 30. Communications
- 40. Electricity
- 50. Energy
- 60. Mechatronics & Compumechatronics
- 70. Mechanics
- 80. Fluid Mechanics
- 90. Thermodynamics & Thermotechnics
- 100. Process Control
- 110. Chemical Engineering
- 120. Food & Water Technologies
- 130. Environment
- 140. Biomedical Engineering

**SCADA CONTROL SYSTEM** as used in the industry today

**INCONVENIENCE**
Teachers may need training for SCADA CONTROL SYSTEMS. EDIBON can train them.

**UNITS AVAILABILITY**
Most of the units in stock.
Innovative engineering, technical teaching and research equipment

2. The SCADA System applied to Technical Teaching Equipment
2.2 Development of modern TEACHING TECHNIQUES, as a consequence of advanced technology used, by EDIBON

SCADA: Supervisory Control And Data Acquisition
PLC: Programmable Logic Controller Software custom made for any unit.

ICAI: Interactive Computer Aided Instruction Software System
FSS: Faults Simulation System

REAL INDUSTRIAL TEACHING SYSTEM
REAL INDUSTRIAL AND COMPLETE TEACHING SYSTEM

ADDITIONAL TEACHING TECHNICS USED WITH INDIVIDUAL UNITS
2. The SCADA System applied to Technical Teaching Equipment

2.3 Alignment of EDIBON Technical Equipment with the new and future Procurement regulation of Multilateral and Bilateral financing BANKS.

**ESN main advantages:**
- 30 students can work simultaneously.
- Only one teacher controls and explains to ALL students at the same time.
- All units at the laboratory can be interconnected.
- Lower cost per student.
- The efficiency increases drastically.

**Local Net:**
- The ESN System allows all units and students’ computers, and teacher’s computers, to be interconnected.

**Note:**
- All EDIBON’s Computer Controlled Units that use “SCADA” can be integrated in any SCADA-NET (ESN) System.

**ESN costs analysis:**
- Unit cost = 1x
- System cost = 1x
- Total cost = 2x

30 Students
2 x Total cost= 15

**15 TIMES LOWER COST PER STUDENT**

**ESN Additional Advantages:**
- Laboratory and classroom AT THE SAME PLACE.
- 30 students working SIMULTANEOUSLY.
- Only one teacher teaching theory and practices AT THE SAME TIME.
- Higher Teaching Efficiency.
ECL Analysis:
- Master unit: EDIBON unit with SCADA in one place and/or city.
- Satellite unit: Up to 100 other centers in other places or cities students can use the pilot unit.
- Unit control IN REAL TIME.
- Visualization camera included.

Use option:
- Satellite places can use the master unit from:
  - Other laboratories.
  - Students homes.
  - Students mobile phones.

ECL Costs:
- Unit cost = 1x
- System cost = 1x
- Total cost = 2x

100 places
2 x Total cost = 50

Advantages:
- Lower maintenance costs.
- Teaching theory and practices at the same time.
- Many satellite centers can be connected with the unit in the Pilot Center.

ECL Customer references:
- System designed 8 years ago.
- Commercialization since July 2017.
- One order for Villalkor College (Madrid – Spain).
- Enquiries from Tamil Nadu (Chennai – India), Honduras, Kazakhstan, Nigeria, and on.
3. Examples of the SCADA Teaching System and its expansions.

3.1 UCP Process Control Unit.

UCP - Computer Controlled Process Control System (with electronic control valve), with SCADA and PID Control

Key Innovative Features:

• Advanced Real-Time SCADA and PID Control.
• Open Control + Multicontrol + Real-Time Control.
• Specialized EDIBON Control Software based on LabView.
• Calibration exercises.
• Projector and/or electronic whiteboard compatibility.
• Capable of doing applied research.
• Remote operation and control.
• Totally safe, utilizing 4 safety systems (Mechanical, Electrical, Electronic & Software).
• Designed and manufactured under several quality standards.

Teaching advantages:

• The student identifies and can see and compare, at the same time, the unitary process with Mathematic formula.
• Quick and clear understanding.
• Unitary process analysis in details.
• Apply research with zero additional cost.
• Approximately DOUBLE TRAINING possibilities compared with manual unit.

Cost:

• EDIBON SCADA with PID Control. SIMILAR PRICE than any other European manufacturers that DO NOT use SCADA.
3. Examples of the SCADA Teaching System and its expansions.

3.2 Expansion I: SCADA + PLC Control (Real Industrial System)

**PLC** – Programmable Logical Controller. Real Industrial System

**PLC Additional practices:**
- 1. Control of the unit process through the control interface box without the computer.
- 2. Visualization of all the sensors values used in the unit process.
- 3. Calibration of all sensors included in the unit process.
- 4. Hand on of all the actuators involved in the unit process.
- 5. Realization of different experiments, in automatic way, without having in front the unit. (This experiment can be decided previously).
- 6. Simulation of outside actions, in the cases hardware elements do not exist. (Example: test of complementary tanks, complementary industrial environment to the process to be studied, etc.).
- 7. PLC hardware general use and manipulation.
- 8. PLC process application for the unit.
- 9. PLC structure.
- 10. PLC inputs and outputs configuration.
- 11. PLC configuration possibilities.
- 12. PLC program languages.
- 13. PLC different programming standard languages.
- 14. New configuration and development of new process.
- 15. Hand on an established process.
- 16. To visualize and see the results and to make comparisons with the unit process.
- 17. Possibility of creating new process in relation with the unit.
- 18. PLC Programming exercises.
- 19. Own PLC applications in accordance with teacher and student requirements.

**Teaching advantages:**
- The student can work at SCADA mode and/or PLC mode.
- Many processes in Industry use SCADA + PLC.
- Quick and clear use of SCADA + PLC.
3. Examples of the SCADA Teaching System and its expansions.

3.3 Expansion II: EDIBON Scada-Net System (ESN).

Example: Scada-Net System (ESN)
Laboratory: Renewable Energies

Available SCADA-NET Systems with EDIBON units in the areas of:
- Physics.
- Electronics and Communications.
- Electricity.
- Energy.
- Renewable Energies.
- Fluid Mechanics.
- Thermodynamics.
- Process Control.
- Chemical Engineering.
- Food Technology.
- Environment.
- Biomedical.

ESN. References.

<table>
<thead>
<tr>
<th>Country</th>
<th>Systems working</th>
<th>Systems ordered</th>
<th>Systems quoted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pakistan</td>
<td>4</td>
<td>8</td>
<td>15</td>
</tr>
<tr>
<td>India</td>
<td>1</td>
<td>24</td>
<td>30</td>
</tr>
<tr>
<td>Peru</td>
<td>2</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>USA</td>
<td>1</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Nigeria</td>
<td>1</td>
<td>-</td>
<td>29</td>
</tr>
<tr>
<td>Oman</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Other 25 countries</td>
<td>-</td>
<td>-</td>
<td>300</td>
</tr>
<tr>
<td>Total:</td>
<td>10</td>
<td>32</td>
<td>379</td>
</tr>
</tbody>
</table>

15 TIMES LOWER COST PER STUDENT
3. Examples of the SCADA Teaching System and its expansions.

3.4 Expansion III: EDIBON Cloud Learning (ECL).

**Example:** Secondary Education
**End Customer:** Tamil Nadu Government (India)

**EDIBON Cloud Learning (ECL) for Secondary Education**

- **Master Unit Structure**

  - **M:** 42 Master Schools.
  - **S:** 100 Satellite Schools for any Master School.

**Complete System**

- **M:** 42 Master Schools.
- **S:** 100 Satellite Schools for any Master School.
- **Total:** 4,200 Satellite Schools.

**Comparative COSTS**

- **One school estimated to be equipped:** 50,000€
- **420 Master Schools × 50,000€/school = 2,100,000€**
- **Cost using ECL**
- **42 Master Schools × 100,000€/Master School = 4,200,000€**

**THE ECL COST IS 50 TO 100 TIMES LOWER**

**Example:** Higher, Technical and Vocational Educations
**End Customer:** Government of Kyrgyzstan

**EDIBON Cloud Learning (ECL) for Higher, Technical and Vocational Educations based on ESN System**

- **Master Unit Structure**

  - **M:** 3 Complete Master Laboratories.
  - **S:** “N” Satellite Training Centers in the country.

**Complete System**

- **M:** 3 Complete Master Laboratories.
- **S:** “N” Satellite Training Centers in the country.
- **Total:** “N” Schools.

**Comparative COSTS**

- **Complete Master Laboratory:** 50M€
- **3 Complete Master Laboratory:** 150M€
- **ECL System for all units:** 150M€

**The ECL + ESN cost AT LEAST 60 TO 100 TIMES LOWER depending the number of satellite schools.**
4. Financing,
4.1 Financing Conditions.

SOFT FINANCING AVAILABLE

INTEREST
Approx. 0.2 %

PAYMENT
Approx. 30 years

GRACE PERIOD
Approx. 10 years

Requirements:

- Projects agreement between End Customer and EDIBON.
- Priority letter from COUNTRY FINANCIAL INSTITUTION.

EDIBON LONG EXPERIENCE
THANK YOU!