Computer Controlled **Three Dimensions (3D) Physics System**

EFAC

EDIBON PATENT

3D. EDIBON Three Dimensions System

Teaching Technique used

② Control Interface Box

③ Data Acquisition Board

Computer Control Software of each application

Computer (not included in the supply)

⑤ Cables and Accessories

⑥ Manuals

① FUB. Base structure and Robot

Sensor allocation

Elements allocation

MORE THAN 100 PRACTICAL EXERCISES

④ Sets (sensor+elements+computer control software) required for each application:

Sensor + Elements + Computer Control Software for Electrical Fields application (✛)

Sensor + Elements + Computer Control Software for Magnetic Fields application (✛)

Sensor + Elements + Computer Control Software for Mechanics Study application (✛)

Sensor + Elements + Computer Control Software for Acoustics Study application (✛)

Sensor + Elements + Computer Control Software for Optics Study application (✛)

Sensor + Elements + Computer Control Software for Thermodynamics Study application (✛)

4.1 FCE. Set for **Electrical Fields** application
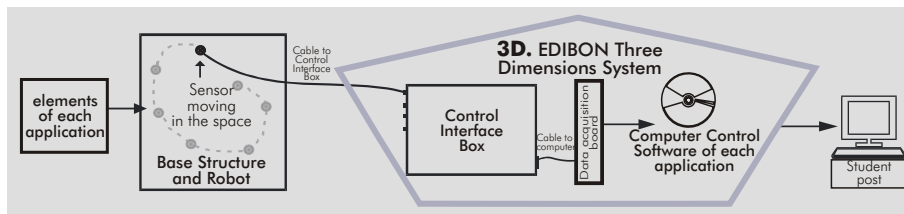
4.2 FCM. Set for **Magnetic Fields** application

4.3 FM. Set for **Mechanics** Study application

4.4 FAC. Set for **Acoustics** Study application

4.5 FOP. Set for **Optics** Study application

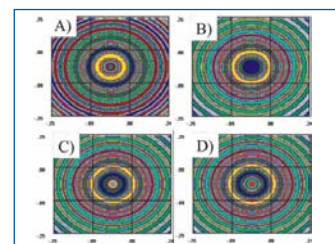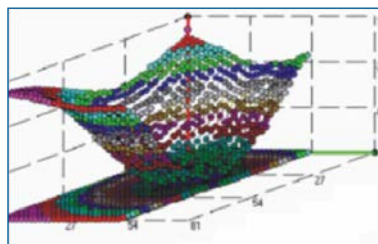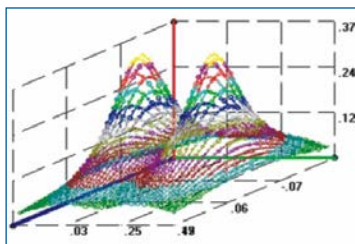4.6 FTT. Set for **Thermodynamics** Study application

OPEN CONTROL + REAL TIME CONTROL

elements of each application → Sensor moving in the space → Base Structure and Robot

Cable to Control Interface Box

3D. EDIBON Three Dimensions System

Control Interface Box → Cable to computer → Data acquisition board → Computer Control Software of each application → Student post

Some 3D Results

A) B) C) D)

Common items for all applications

① FUB. Base structure and Robot:

This unit is common for all applications type "F" and can work with one or several applications.

Anodized aluminium structure. Metallic elements in steel.

Cartesian robot, controlled by 3 motors.

Movement in the X, Y and Z axes.

Support for the different sensors.

Robot arm, computer controlled, with a sweeping area .

Electronic box for the motors multiplexing. This Electronic box is controlled by a PLC allocated into the Control Interface Box.

Wires.

FUB. Base structure
and Robot

② EFAC/CIB. Control Interface Box:

This unit is common for all applications type "F" and can work with one or several applications.

Control interface box with process diagram in the front panel and with the same distribution that the different elements located in the unit, for an easy understanding by the student.

All sensors, with its respective signals, are properly manipulated for -10 to +10V computer output.

Sensors connectors in the interface have different pines numbers (from 2 to 16), to avoid connection errors. Single cable between the control interface box and computer.

The unit control elements are permanently computer controlled, without need of changes or connections during the whole process test procedure.

Shield and filtered signals to avoid external interferences.

Conventional mechanical and electrical protection systems, and also, computer protection and in a simultaneous way.
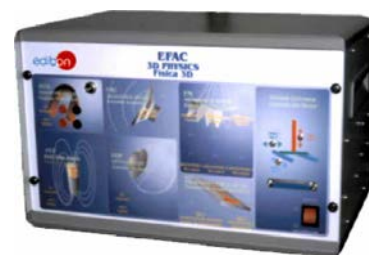
EFAC/CIB

③ DAB. Data Acquisition Board:

PCI Data acquisition board (National Instruments) to be placed in a computer slot.

Bus PCI.

Analog input:

Number of channels= 16 single-ended or 8 differential.

Resolution=16 bits, 1 in 65536.

Max. Sampling rate up to: 250 KS/s (Kilo samples per second).

Input range (V)=± 10V.

Data transfers=DMA, interrupts, programmed I/0.

Number of DMA channels=6.

Analog output:

Number of channels=2.

Resolution=16 bits, 1 in 65536.

Maximum output rate up to: 833 KS/s.

Output range(V)=±10 V.

Data transfers=DMA, interrupts, programmed I/0.

Digital Input/Output:

Number of channels=24 inputs/outputs.

D0 or DI Sample Clock frequency: 0 to 1 MHz.

Timing:

Counter/timers=2.

Resolution:

Counter/timers: 32 bits.

DAB

Applications

④ Sets required for each application:

We offer some Sets of components for doing the main exercises and practices, but THE UNIT IS OPEN to use many other elements that can be chosen by the teacher.

④.1 FCE. Set for **Electrical Fields application:**

This application can be done by using just the following:

-Common items for all applications:
   1) FUB. Base structure and Robot.
   2) EFAC/CIB. Control Interface Box.
   3) DAB. Data Acquisition Board.

-Set for this particular application, including these items:

a) Sensor:

Sensor of Electric Field. It is a probe capable of measuring the potential created by any distribution of loads. It consists on a conductor wire that measures the reference and the point where it is located.

b) Elements:

A nickel-plated conductor sphere with diameter of 100 mm.
Conductor coil sheets of 280 x 240 mm (2 units).
Conductor coil sheets of 100 x 280 mm (2 units).
A nickel-plated sphere with insulating rod.
Several conductor plates.
Tank.
Red conductor cable with banana crocodile.
Black conductor cable with banana crocodile.
Black cables (2 units) with bananas at the ends.
Red cables (2 units) with bananas at the ends.
The teacher can use any element that creates ELECTRICAL FIELDS, so the UNIT IS OPEN and can do MANY OTHER EXPERIMENTS.

c) Computer Control Software:

Computer Control+Data Acquisition+Data Management Software for Electrical Fields application.
Compatible with actual Windows operating systems. Graphic and intuitive simulation of the process in screen.
Compatible with the industry standards.
Registration and visualization of all process variables in an automatic and simultaneously way.
Flexible and open software, developed with actual windows graphic systems, acting simultaneously on all process parameters.
Management, processing, comparison and storage of data.
Sampling velocity up to 250,000 data per second.
Student calibration system for all sensors involved in the process.
It allows the registration of the alarms state and the graphic representation in real time. Comparative analysis of the obtained data, after the process and modification of the conditions during the process.
Open software, allowing to the teacher to modify texts, instructions. Teacher's and student's passwords to facilitate the teacher's control on the student, and allowing the access at different work levels.
This unit allows that the 30 students of the classroom can visualize simultaneously all results and manipulation of the unit, during the process, by using a projector.

Sensor
+
Elements
+
Computer Control Software for Electrical Fields application

FCE

④.2 FCM. Set for **Magnetic Fields application:**

This application can be done by using just the following:

-Common items for all applications:
   1) FUB. Base structure and Robot.
   2) EFAC/CIB. Control Interface Box.
   3) DAB. Data Acquisition Board.

-Set for this particular application, including these items:

a) Sensor:

Hall probe capable of measuring the intensity of the static and dynamic magnetic fields.

b) Elements:

Two magnets of AlNiCo.
100 gr. of iron powder.
Isolated conductor wires (l=200 mm, diam.=5 mm).
Red and black testing wires.
Working table.
Conductor spirals of different diameters.
Electromagnets and cooper wires.
The teacher can use any element that creates MAGNETIC FIELDS, so the UNIT IS OPEN and can do MANY OTHER EXPERIMENTS.

c) Computer Control Software:

Computer Control+Data Acquisition+Data Management Software for Magnetic Fields application.
Compatible with actual Windows operating systems. Graphic and intuitive simulation of the process in screen.
Compatible with the industry standards.
Registration and visualization of all process variables in an automatic and simultaneously way.
Flexible and open software, developed with actual windows graphic systems, acting simultaneously on all process parameters.
Management, processing, comparison and storage of data.
Sampling velocity up to 250,000 data per second.
Student calibration system for all sensors involved in the process.
It allows the registration of the alarms state and the graphic representation in real time. Comparative analysis of the obtained data, after the process and modification of the conditions during the process.
Open software, allowing to the teacher to modify texts, instructions. Teacher's and student's passwords to facilitate the teacher's control on the student, and allowing the access at different work levels.
This unit allows that the 30 students of the classroom can visualize simultaneously all results and manipulation of the unit, during the process, by using a projector.

Sensor
+
Elements
+
Computer Control Software for Magnetic Fields application

FCM

Applications (continuation)

4.3 FM. Set for **Mechanics Study application:**

This application can be done by using just the following:

- Common items for all applications:
  1) FUB. Base structure and Robot.
  2) EFAC/CIB. Control Interface Box.
  3) DAB. Data Acquisition Board.

- Set for this particular application, including these items:
  a) Sensor:

  3 Ultrasonic receivers of 40kHz.

  3 Ultrasonic emitters of 40kHz.

  b) Elements:

  Receiver supports.

  Bodies for studying the kinematics and dynamics as:

  Weights and Car model.

  The teacher can use any element suitable for MECHANICS study, so the UNIT IS OPEN and can do MANY OTHER EXPERIMENTS.

  c) Computer Control Software:

  Computer Control+Data Acquisition+Data Management Software for Mechanics Study application.

  Compatible with actual Windows operating systems. Graphic and intuitive simulation of the process in screen. Compatible with the industry standards.

  Registration and visualization of all process variables in an automatic and simultaneously way.

  Flexible and open software, developed with actual windows graphic systems, acting simultaneously on all process parameters.

  Management, processing, comparison and storage of data.

  Sampling velocity up to 250,000 data per second.

  Student calibration system for all sensors involved in the process.

  It allows the registration of the alarms state and the graphic representation in real time. Comparative analysis of the obtained data, after the process and modification of the conditions during the process.

  Open software, allowing to the teacher to modify texts, instructions. Teacher's and student's passwords to facilitate the teacher's control on the student, and allowing the access at different work levels.

  This unit allows that the 30 students of the classroom can visualize simultaneously all results and manipulation of the unit, during the process, by using a projector.

Sensor
+

Elements
+

Computer Control Software for Mechanics Study application

FM

4.4 FAC. Set for **Acoustics Study application**:

This application can be done by using just the following:

- Common items for all applications:
  1) FUB. Base structure and Robot.
  2) EFAC/CIB. Control Interface Box.
  3) DAB. Data Acquisition Board.

- Set for this particular application, including these items:
  a) Sensor:

  An acoustic sensor (microphone) of high sensitivity.

  b) Elements:

  3 Acoustic sources (trumpets):

  Two of them are of low frequency 450Hz, 90dB and the third one of high frequency 4500Hz and 90dB, with supply of 12V. AC.

  Anacoic camera with walls covered with polyurethane of high intensity. It will allow you to isolate your experiments from external noises, allowing you to obtain the waves produced by the sound source supplied.

  Microphone of high sensitivity.

  Flat wall covered with high density polyurethane and orifice of 10 mm.

  Inclined wall and 45° with possibility of being recovered with foam of high density.

  Buzzer.

  The teacher can use any element suitable for ACOUSTICS study, so the UNIT IS OPEN and can do MANY OTHER EXPERIMENTS.

  c) Computer Control Software:

  Computer Control+Data Acquisition+Data Management Software for Acoustics Study application.

  Compatible with actual Windows operating systems. Graphic and intuitive simulation of the process in screen. Compatible with the industry standards.

  Registration and visualization of all process variables in an automatic and simultaneously way.

  Flexible and open software, developed with actual windows graphic systems, acting simultaneously on all process parameters.

  Management, processing, comparison and storage of data.

  Sampling velocity up to 250,000 data per second.

  Student calibration system for all sensors involved in the process.

  It allows the registration of the alarms state and the graphic representation in real time. Comparative analysis of the obtained data, after the process and modification of the conditions during the process.

  Open software, allowing to the teacher to modify texts, instructions. Teacher's and student's passwords to facilitate the teacher's control on the student, and allowing the access at different work levels.

  This unit allows that the 30 students of the classroom can visualize simultaneously all results and manipulation of the unit, during the process, by using a projector.

Sensor
+

Elements
+

Computer Control Software for Acoustics Study application

FAC

Applications (continuation)

4.5 FOP. Set for **Optics Study application:**

This application can be done by using just the following:

-Common items for all applications:

  1) FUB. Base structure and Robot.

  2) EFAC/CIB. Control Interface Box.

  3) DAB. Data Acquisition Board.

-Set for this particular application, including these items:

  a) Sensor:

    Optics study sensor consists of diode capable of measuring the light.

  b) Elements:

    Modulated laser diode:

      Nominal wavelength=670 nm.

      Maximum power output= 1 mW.

    2 Lens of crystal. One has x9 magnification and 31 mm of focus distance, and the other has x2 magnification.

    Line generator. The line generator is a combination system consisting of a lens to focus or collimate the beam from a laser diode and cylindrical lens, which generated the line. By rotating the front cell assembly, the beam can be focussed or collimated. A locking ring is used to secure the final position.

    Magnifier.

    Angle measurer.

    The teacher can use any element suitable for OPTICS study, so the UNIT IS OPEN and can do MANY OTHER EXPERIMENTS.

  c) Computer Control Software:

    Computer Control+Data Acquisition+Data Management Software for Optics Study application.

    Compatible with actual Windows operating systems. Graphic and intuitive simulation of the process in screen. Compatible with the industry standards.

    Registration and visualization of all process variables in an automatic and simultaneously way.

    Flexible and open software, developed with actual windows graphic systems, acting simultaneously on all process parameters.

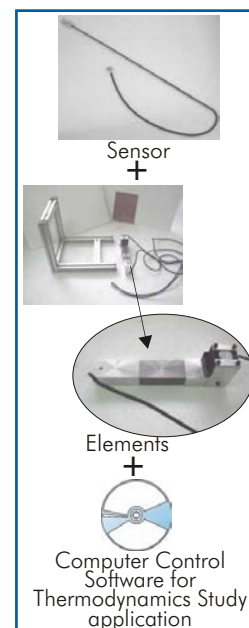   Management, processing, comparison and storage of data.

    Sampling velocity up to 250,000 data per second.

    Student calibration system for all sensors involved in the process.

    It allows the registration of the alarms state and the graphic representation in real time. Comparative analysis of the obtained data, after the process and modification of the conditions during the process.

    Open software, allowing to the teacher to modify texts, instructions. Teacher's and student's passwords to facilitate the teacher's control on the student, and allowing the access at different work levels.

    This unit allows that the 30 students of the classroom can visualize simultaneously all results and manipulation of the unit, during the process, by using a projector.

Sensor
+
Elements
+
Computer Control Software for Optics Study application

FOP

4.6 FTT. Set for **Thermodynamics Study application**:

This application can be done by using just the following:

-Common items for all applications:

  1) FUB. Base structure and Robot.

  2) EFAC/CIB. Control Interface Box.

  3) DAB. Data Acquisition Board.

-Set for this particular application, including these items:

  a) Sensor:

    Thermodynamics study sensor consists of a probe capable of measuring the temperature along the interchangeable elements or in the space (Aluminium, Cooper and Stainless Steel).

  b) Elements:

    Heater element: Electrical resistance of 50W.

    Heat sink: Blade metallic plus fan.

    The teacher can use any element suitable for THERMODYNAMICS study, so the UNIT IS OPEN and can do MANY OTHER EXPERIMENTS.

  c) Computer Control Software:

    Computer Control+Data Acquisition+Data Management Software for Thermodynamics Study application.

    Compatible with the industry standards.

    Registration and visualization of all process variables in an automatic and simultaneously way.

    Flexible and open software, developed with actual windows graphic systems, acting simultaneously on all process parameters.

    Management, processing, comparison and storage of data.

    Sampling velocity up to 250,000 data per second.

    Student calibration system for all sensors involved in the process.

    It allows the registration of the alarms state and the graphic representation in real time. Comparative analysis of the obtained data, after the process and modification of the conditions during the process.

    Open software, allowing to the teacher to modify texts, instructions. Teacher's and student's passwords to facilitate the teacher's control on the student, and allowing the access at different work levels.

    This unit allows that the 30 students of the classroom can visualize simultaneously all results and manipulation of the unit, during the process, by using a projector.

Sensor
+
Elements
+
Computer Control Software for Thermodynamics Study application
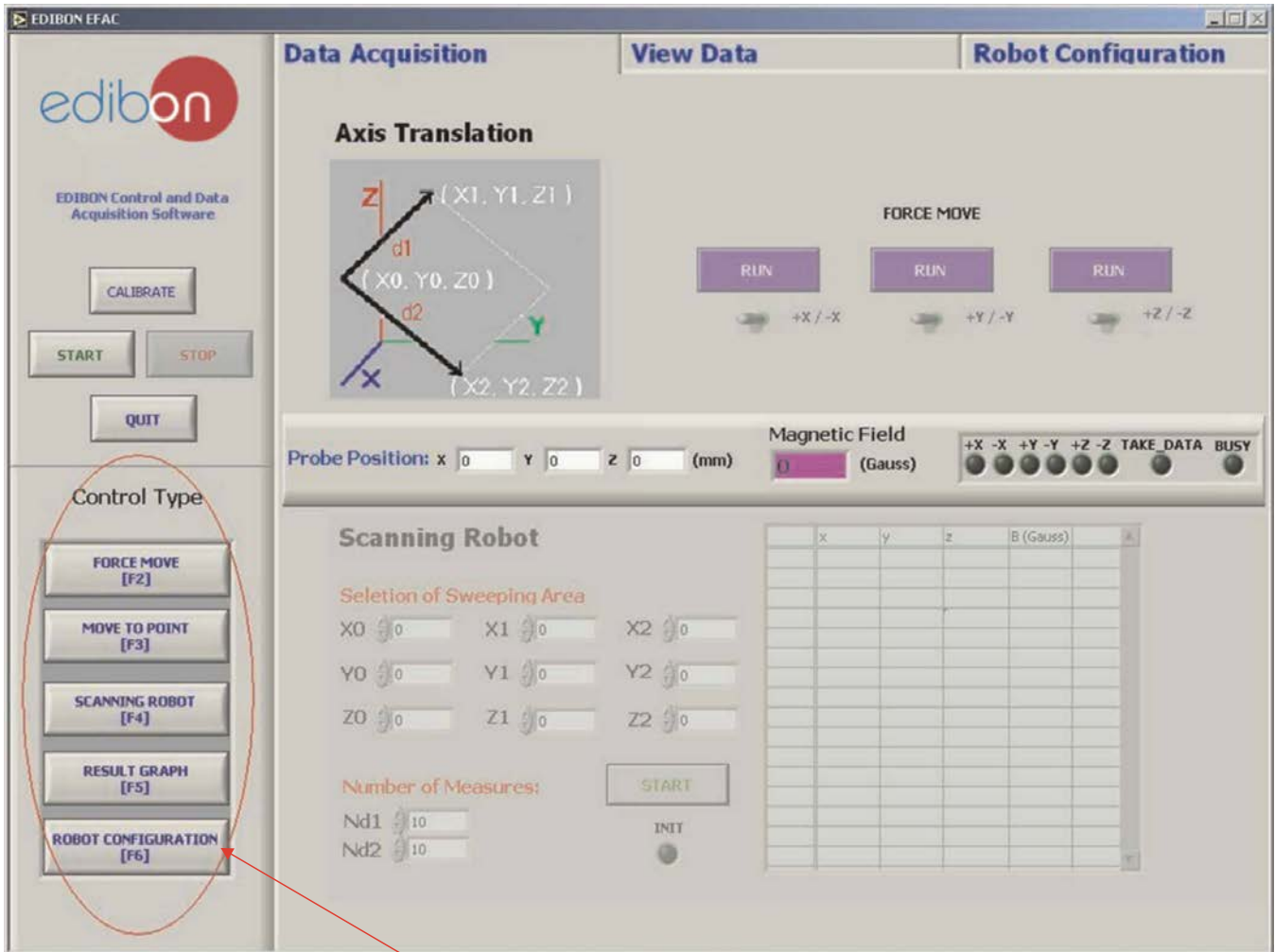
FTT

5 Cables and Accessories.

6 Manuals:

This system is supplied with 8 manuals for each application: Required Services, Assembly and Installation, Interface and Control Software, Starting-up, Safety, Maintenance, Calibration & Practices Manuals.
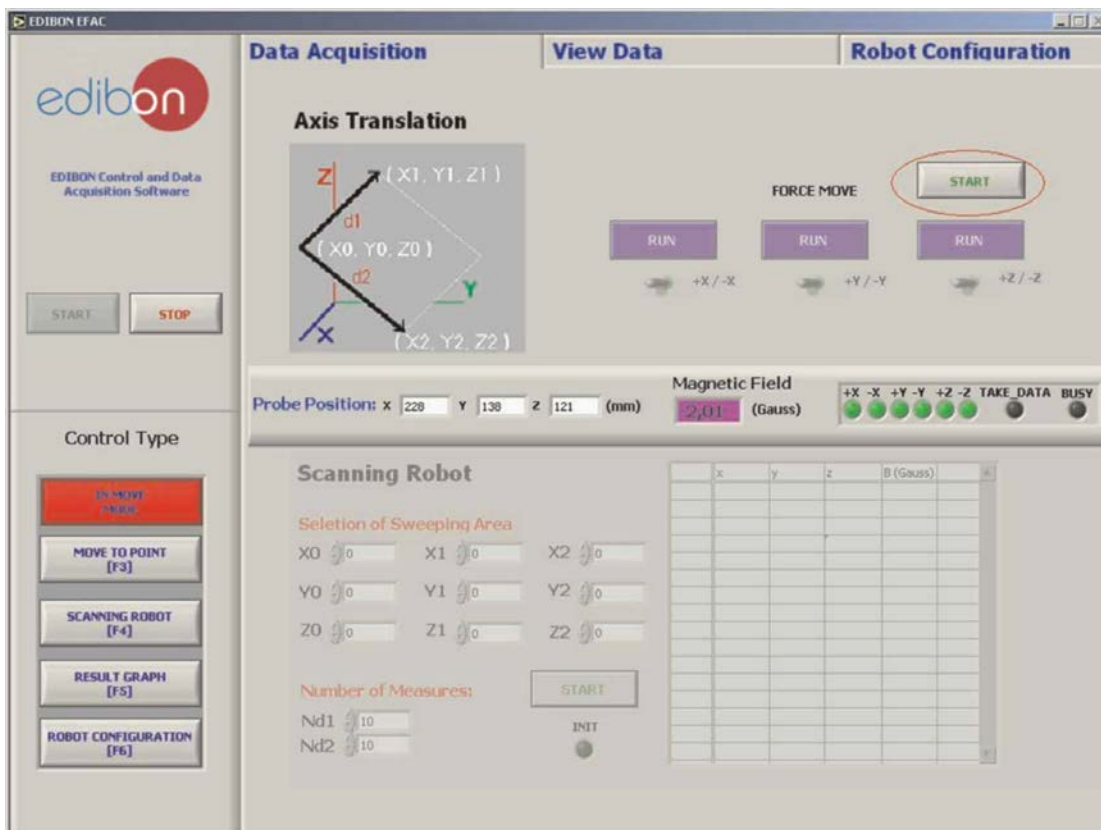
Software Main Screens

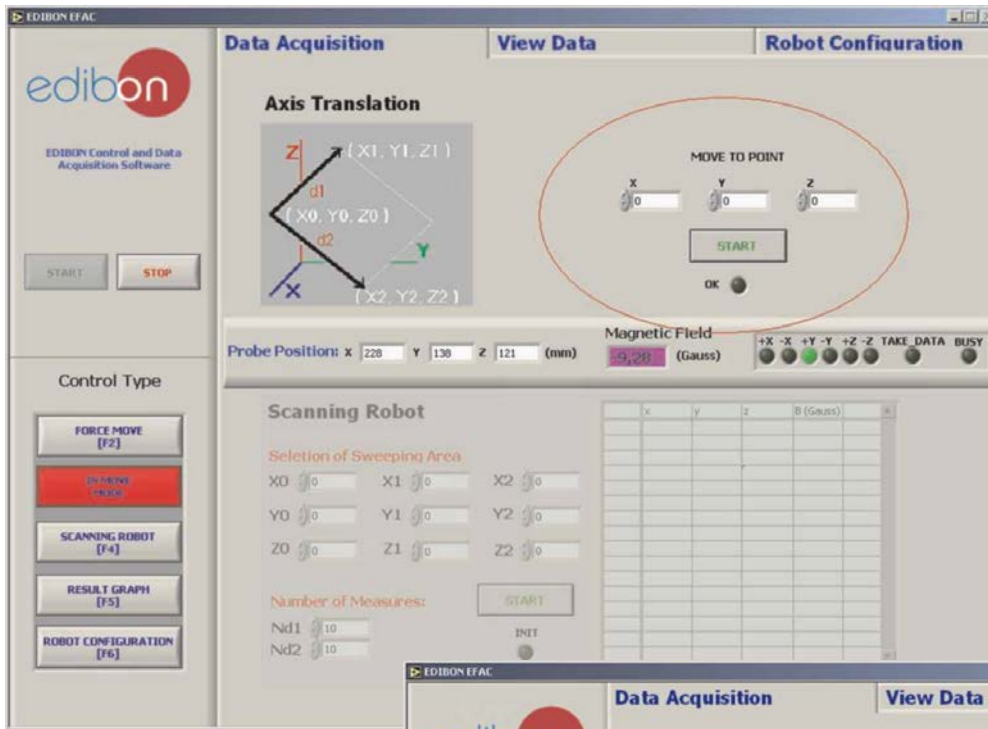Example: FCM. Magnetic Fields Application

Main screen

Control Type Menu.
It this menu we can see several selectionable parts, that are shown in the following screens:


Force Mode screen.
We click on " Start" to start the force movement of any axis.
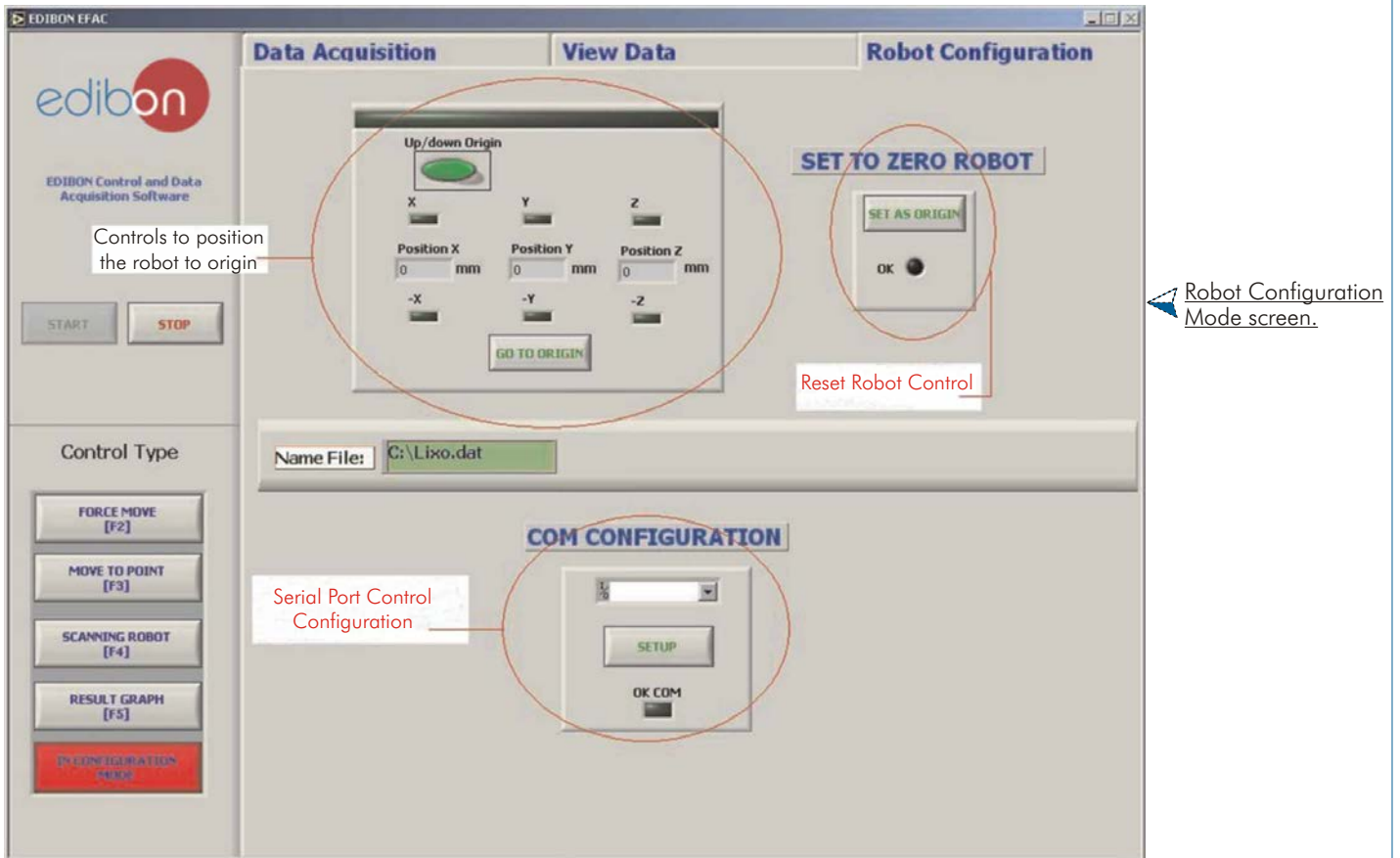We can activate each axis and indicate the movement direction of each axis respectively.

Continue…

Move to Point screen.
In this mode we can move the robot to a particular point, introducing the coordinate in the x, y, z controls.

Sweeping Mode screen.
We activate this mode selecting "Scanning Robot". In this mode, a plane sweeping, defined by 3 coordinates, will be executed.
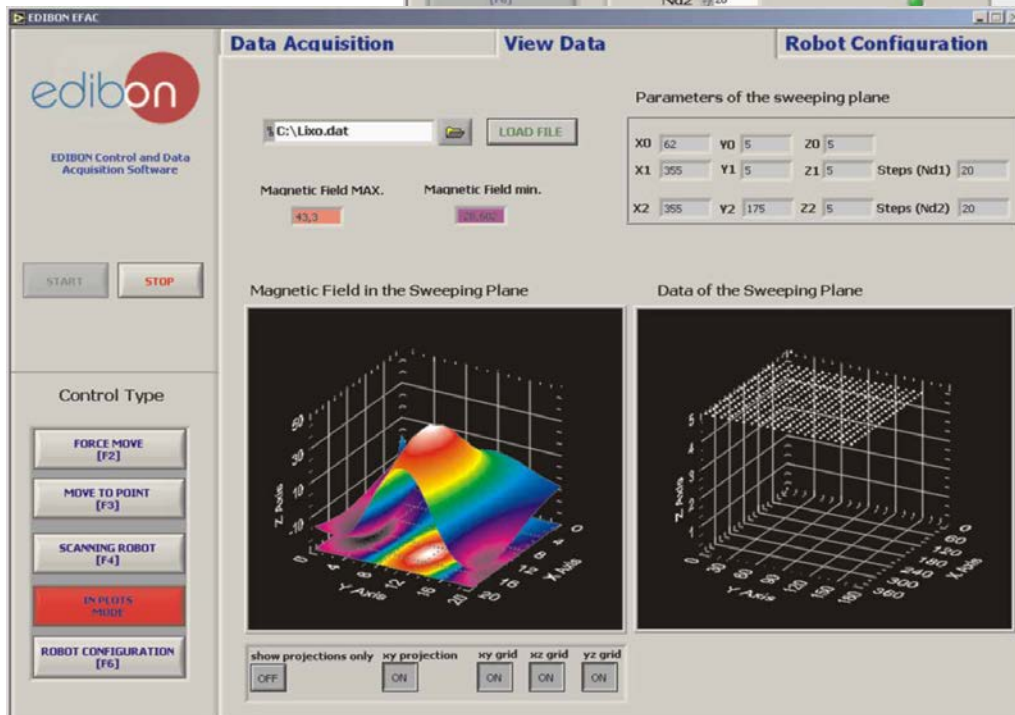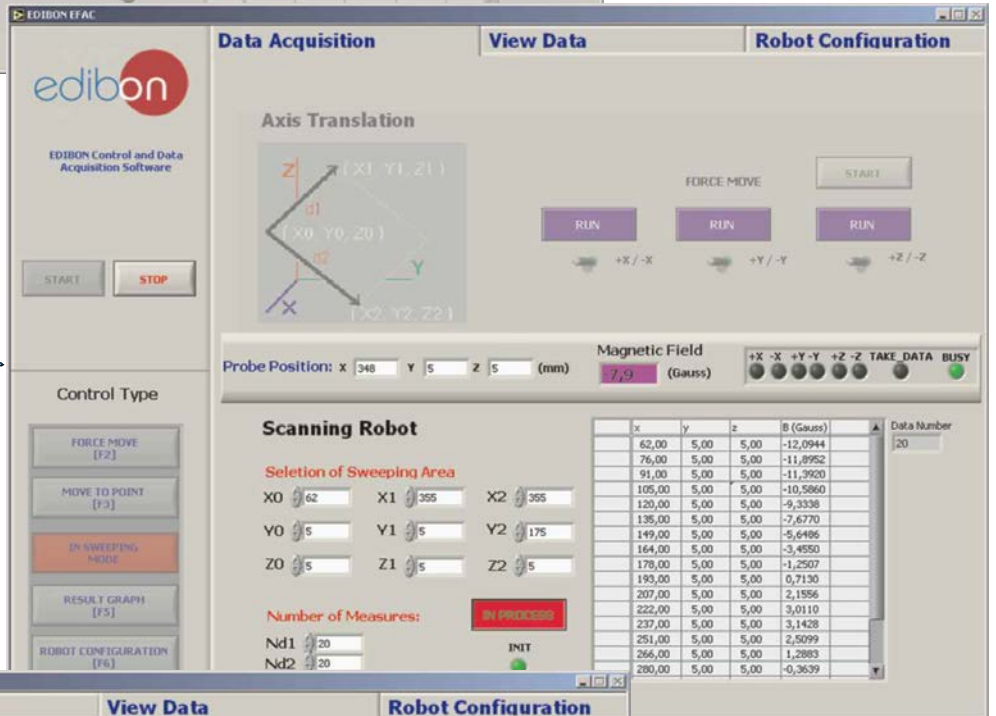
Result Graph screen.
In this mode we can see the graphic representation in 3D of obtained data.

Continue...

Software Main Screens (continuation)

Controls to position the robot to origin

Reset Robot Control

Serial Port Control Configuration

Robot Configuration Mode screen.

In several modes, we can see a indication bar in the middle of the screen. This bar has several indicators:
1) Actual robot position indicator, shown in millimeters.
2) Magnetic field indicator in actual robot position.
3) Led indicator for limit switch of the corresponding axis. Led indicator for data taking. (The robot indicates to the software when it has to take a right data). Led indicator for busy robot.

Indication bar

Indicators:
-Limit switch.
-Data taking.
-Busy robot.

Actual Robot position

Magnetic Field in Gauss in actual position
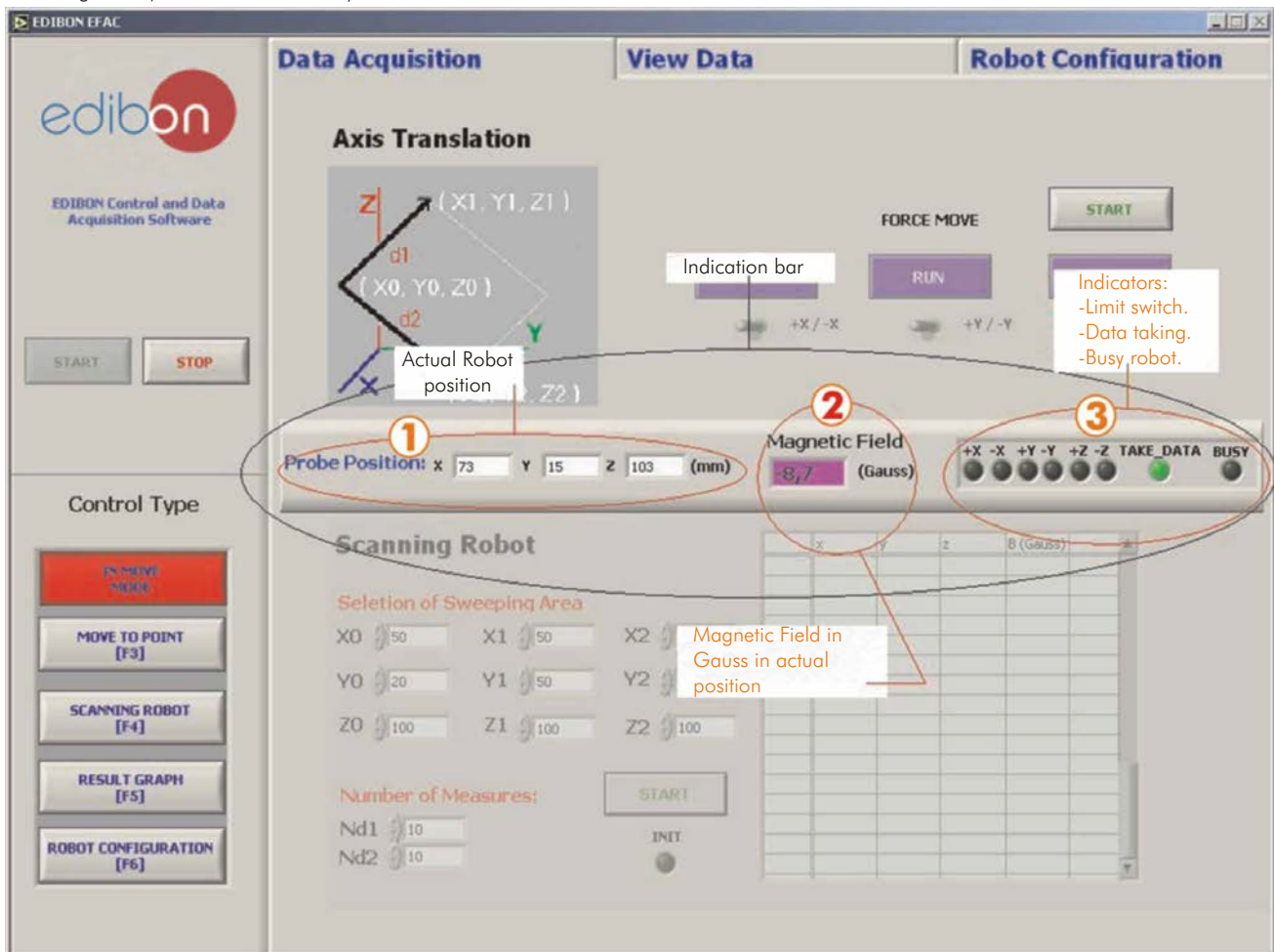
Continue...

Software Main Screens (continuation)
Calibration screens

This unit allows that the 30 students of the classroom can visualize simultaneously all results and manipulation of the unit, during the process, by using a projector.

Some typical results
(in two and three dimensions)
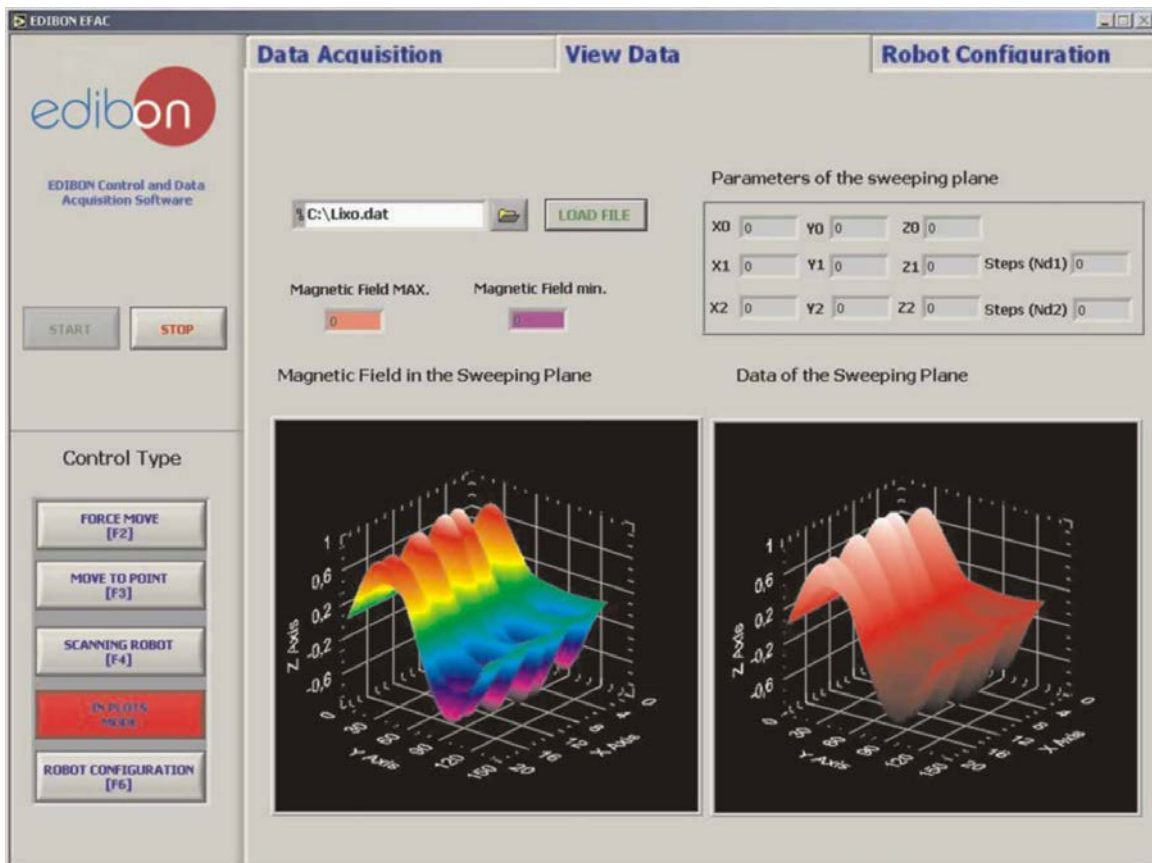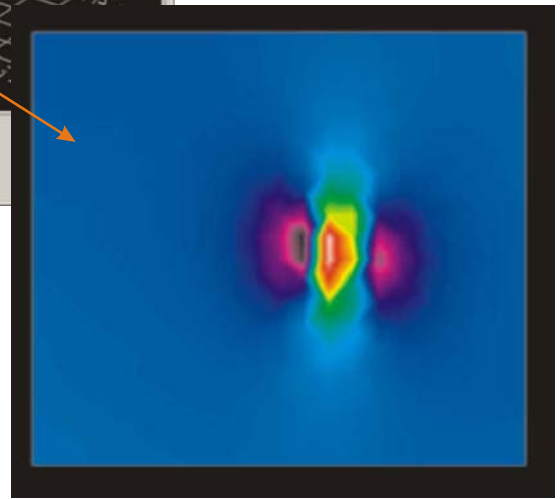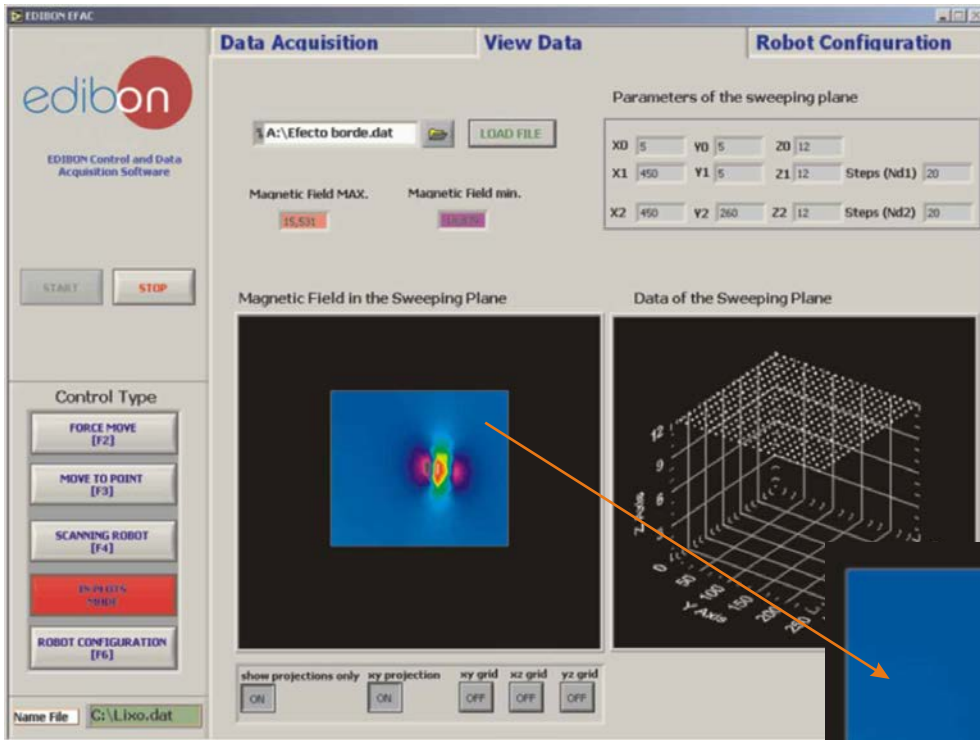<u>Magnetic Fields</u>

www.edibon.com
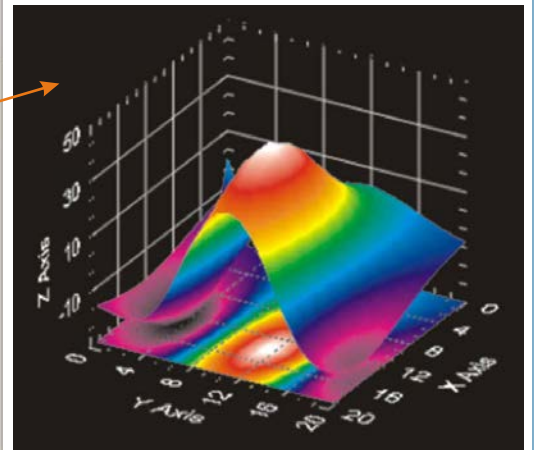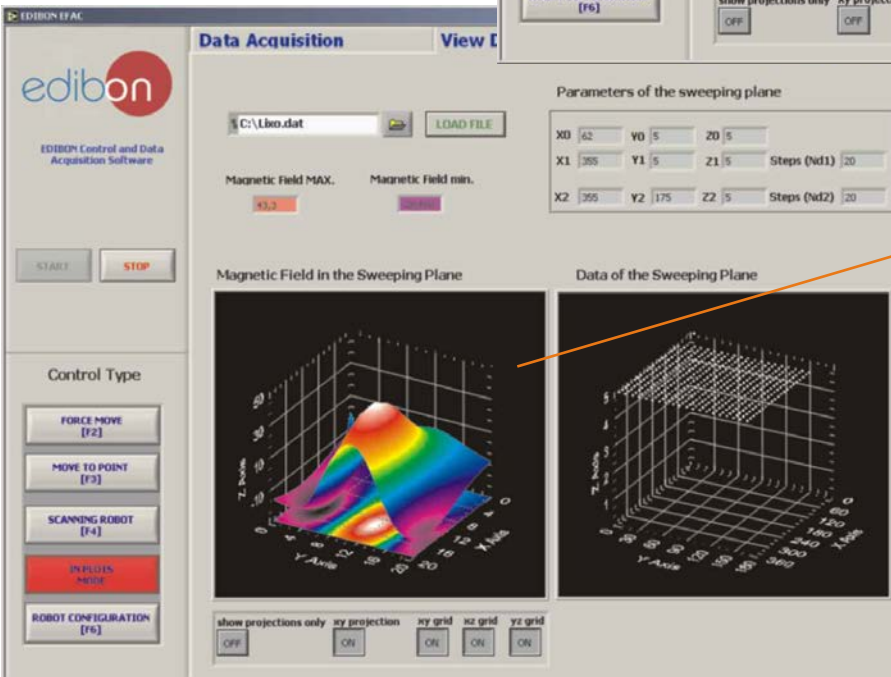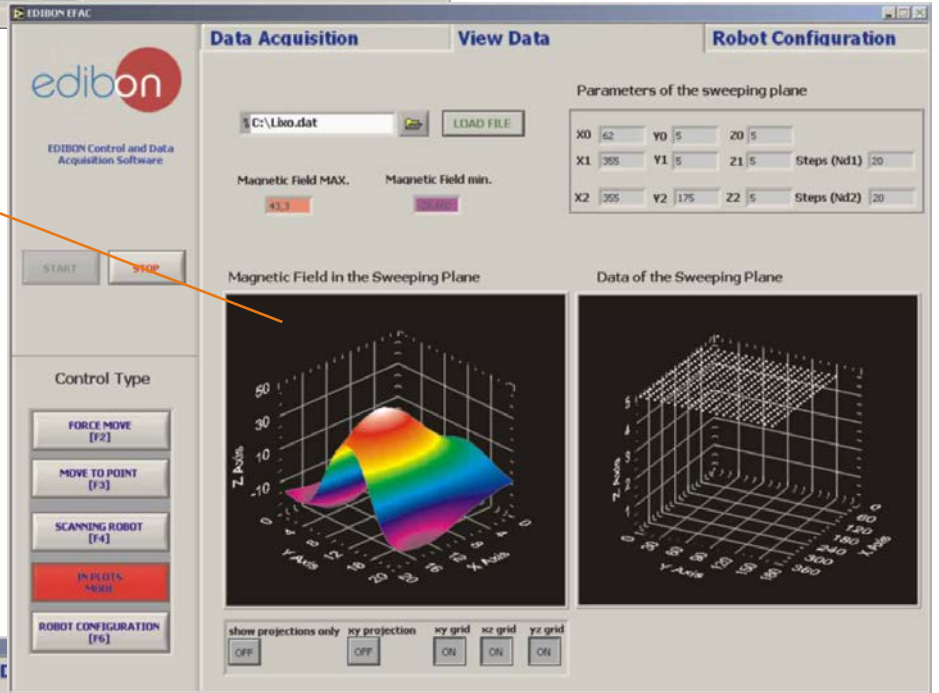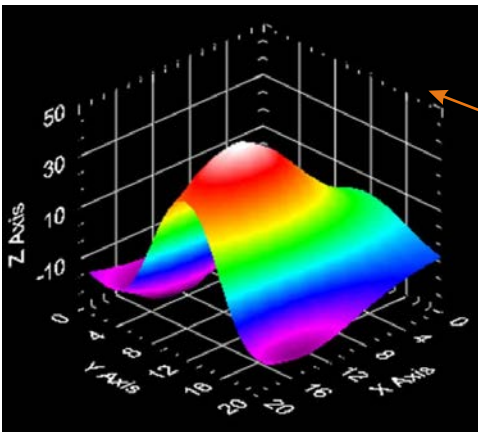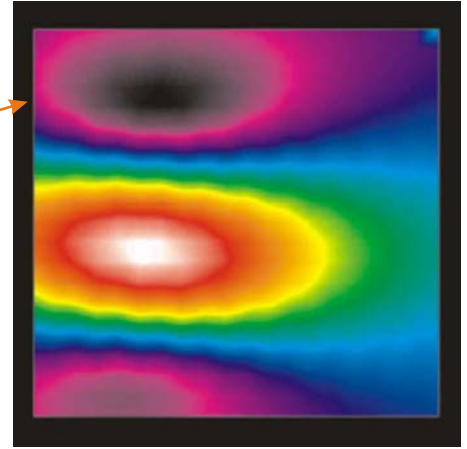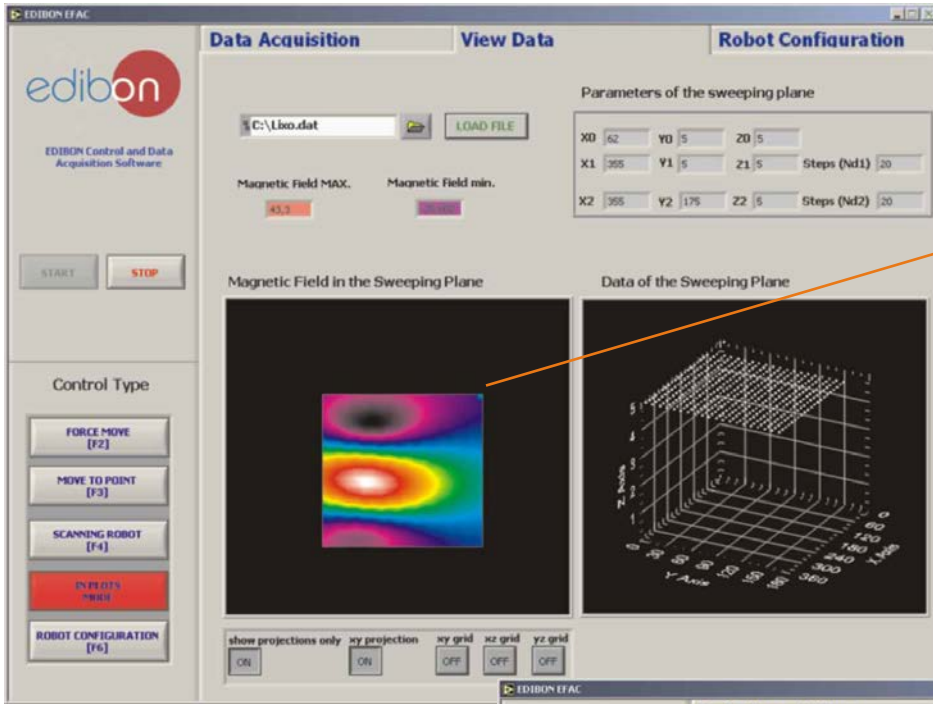
Some typical results
(in two and three dimensions)
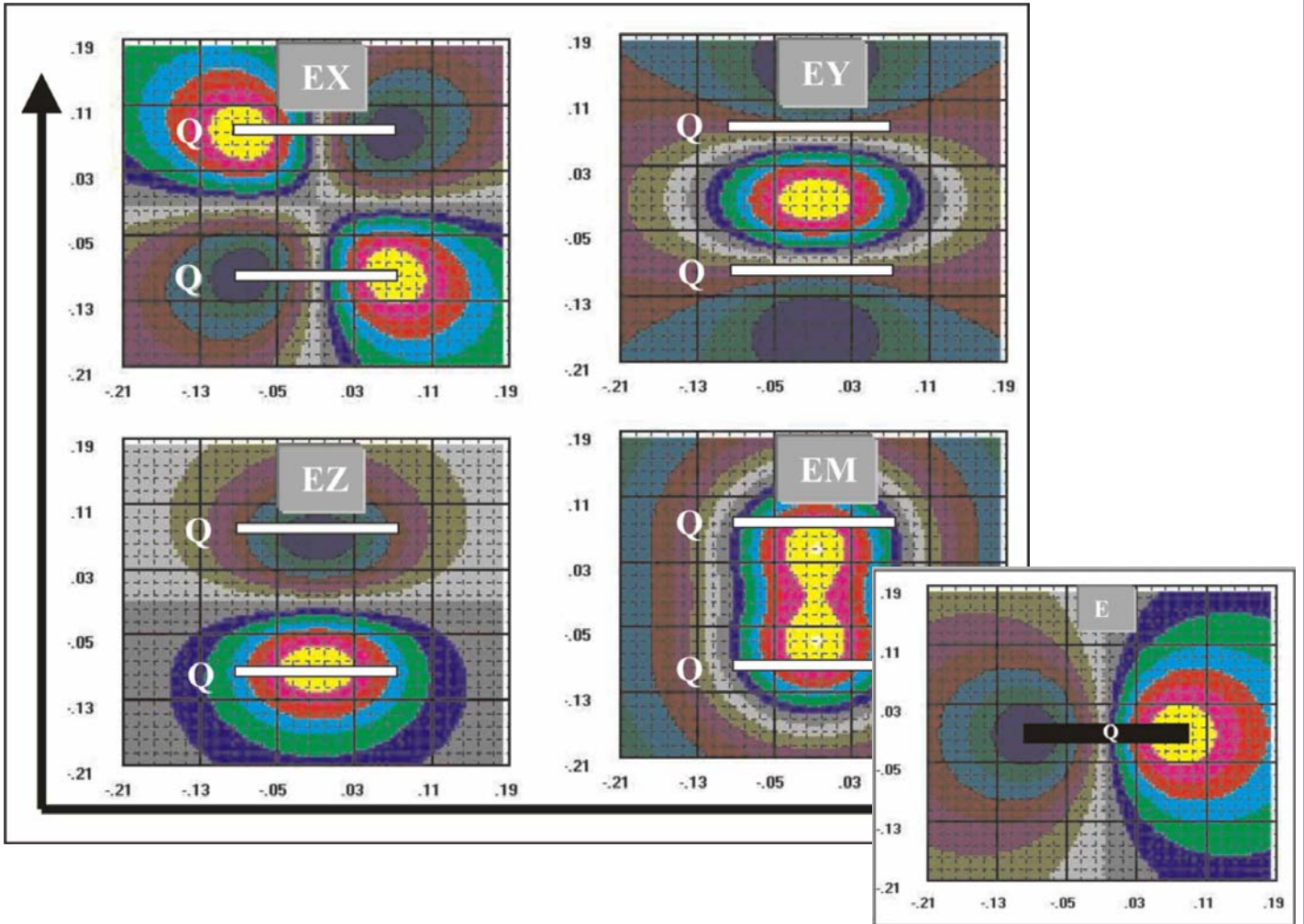
<u>Magnetic Fields</u> (continuation)
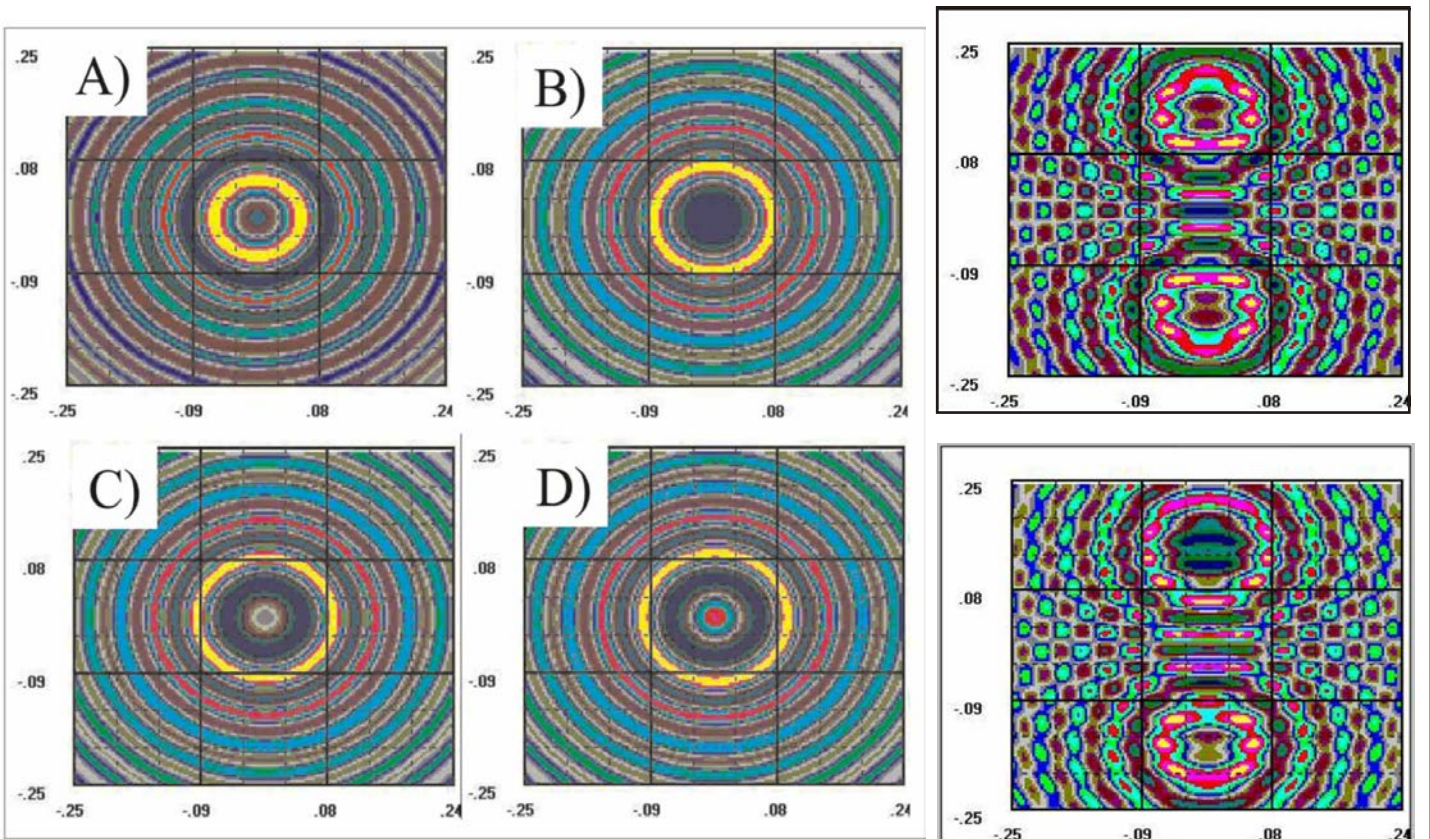
Some typical results
(in two and three dimensions)

Electric Fields

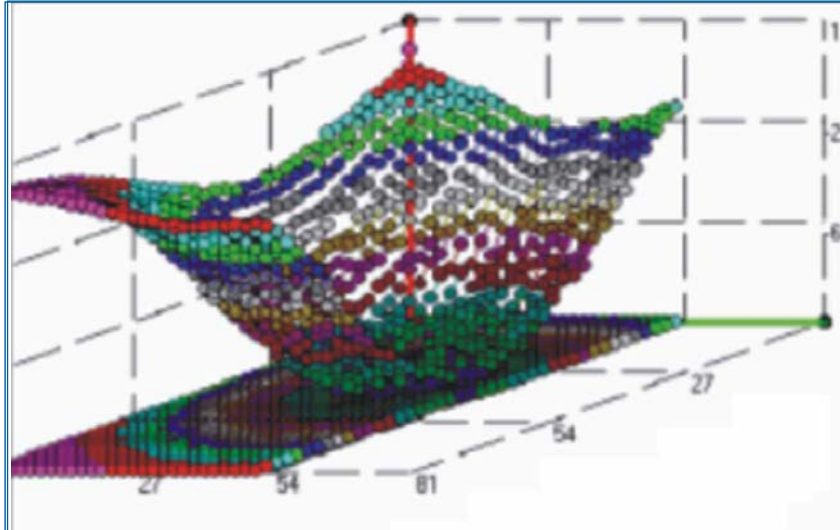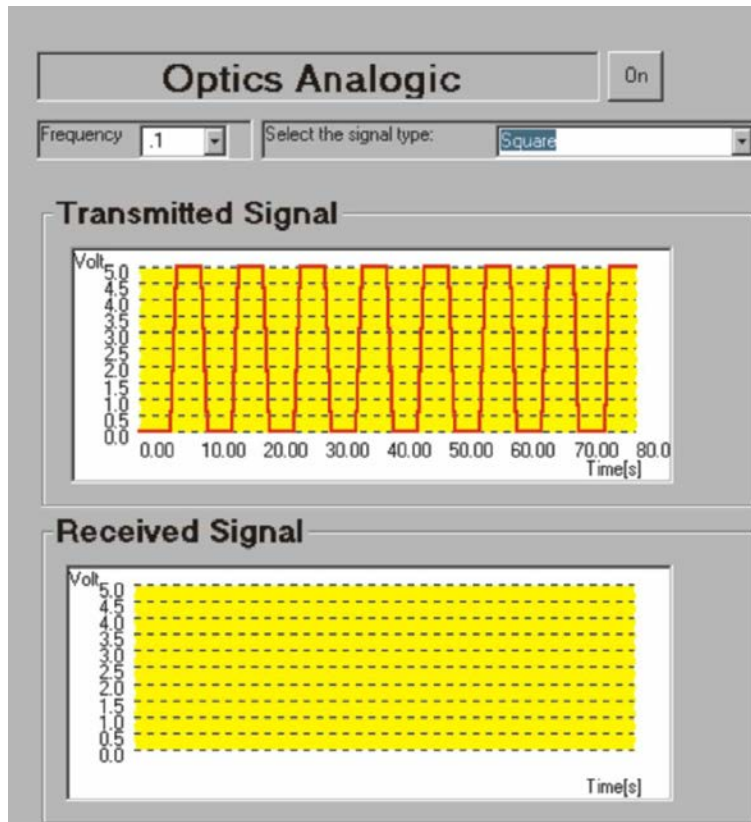Acoustics Study

Some typical results
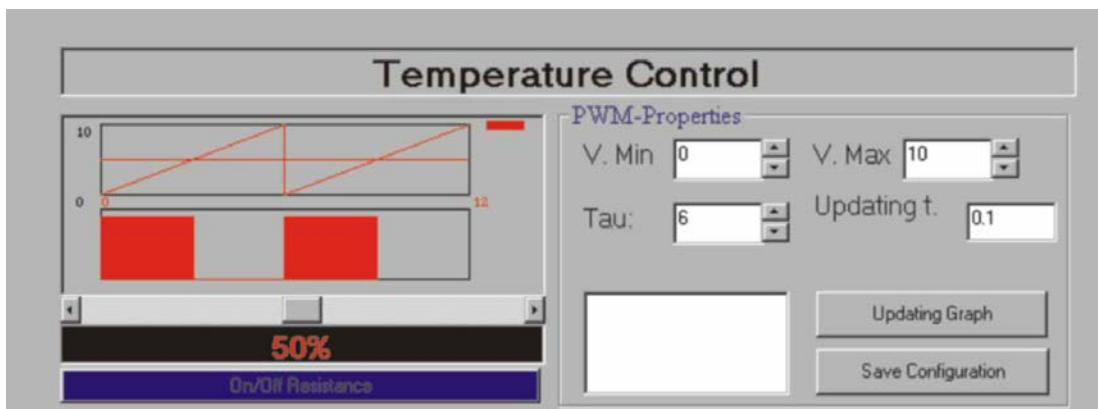(in two and three dimensions)

Mechanics Study

Optics Study

Thermodynamics Study

Practical Possibilities of the system:

Practices to be done with the **Electrical Fields application:**
Level 0:
1.- Programming and applications of a robot arm.
Level I:
2.- Visualization of the created fields lines by a punctual load.
3.- Spatial representation of the equipotential lines and the intensity of the electric field created by a punctual load.
4.- Visualization of the field lines generated by two punctual loads.
5.- Spatial representation of the equipotential curves created by two spherical loads.
6.- Study of the electric field created by a plane and a spherical conductor, both of them loaded. Principle of Superimposition (I).
7.- Spatial representation of the lines of field created by a conductor wire.
8.- Study of the superimposition of the fields created by two conductor wires.
9.- Visualization of the lines of field generated by two conductor planes according to the distance of separation. Study of the effect of Edge.
10.-Study of the confinement of loads in a plane-parallel condenser according to the distance.
11.-Calculation of the load contained by a plane-parallel condenser. Theorem of Gauss (I).
Level II:
All those of Level I.
12.-Experimental demonstration of the law of Gauss for a sphere and two plane conductors.
13.-Study of the load stored in a plane-parallel condenser according to the distance between the badges. Concept of capacity.
14.-Experimental study of the effect of edge.
15.-Experimental demonstration of the Theorem of Ampère.
16.-Spatial representation of the equipotential lines created by a cylinder and a plane conductor. Principle of Superimposition (II).
17.-Spatial study of the electric field created by a non-regular body. Effects of edges.
18.-Visualization and calculation of the intensity of the electric field generated by a plane-parallel condenser with a dielectric sphere inside. Dielectric (I).
Level III:
All those of level I and II.
19.-Shielding of the electric field by a conductor. Cells of Faraday.
20.-Spatial representation of the electric field and the equipotential lines generated when introducing a spherical conductor in a plane-parallel condenser. Principle of superimposition (III)
21.-Lines of electric field and equipotential surfaces generated by two spherical conductors equidistant to a plane conductor. Image effect.
22.-Equipotential lines and electric field generated by a quadrupole. Study of the energy of the system. Configuration of the minimum energy. Effects of polarization.
23.-Experimental calculation of the redistribution of load and potential energy of a series and parallel configuration of two plane-parallel condensers.
IMPORTANT: **The teacher can use his own elements, so these practical possibilities are NEARLY UNLIMITED.**

Practices to be done with the **Magnetic Fields application:**
Level 0:
24.-Programming and applications of a robot arm.
Level I:
25.-Visualization of the lines of magnetic field generated by a magnet.
26.-Line of the magnetic field.
27.-Three-dimensional representation of the magnetic field generated by a magnet.
28.-Magnetic field generated by two magnets. Spatial representation of the field lines and intensity.
29.-Three-dimension study of the generated magnetic field by a thin conductor wire. Experimental verification of the law of Biot-Savart.
30.-Sources of the magnetic field.
31.-Magnetic field generated by a spiral. Three-dimensional representation of the intensity and visualization of the field lines.
Level II:
All those of level I.
32.-Experimental demonstration of the existence of sources and drains. Gauss's theorem.
33.-Calculation of the current which floes by a conductor wire. Ampère's law (I).
34.-Magnetic field generated by two lines of parallel currents. Visualization of field lines and calculation of the magnetic intensity. Principle of superimposition (I).
35.-Helzmholtz coils. Three-dimensional study of the magnetic field.
36.-Magnetic field generated by two spires by which currents in the same direction and in opposite direction flow. Principle of superimposition (III).
37.-Magnetic field generated by a solenoid of N spires. Law of Ampère (II).
38.-Study of the magnetic field in function of the frequency of the current that circulates through the wire. Law of Biot-Savart (II).
Level III:
All those of level I and level II.
39.-Magnetic field generated by a real coil.
40.-Magnetic field in the material.
41.-Spatial representation of the magnetic field of a coil with a ferromagnetic nucleus.
42.-Determination of the magnetic sensitivity of a paramagnetic material.
43.-Effect of a diamagnetic nucleus in the magnetic field generated by a solenoid.
44.-Magnetic induction. Calculation of the e.m.f. induced in a solenoid.
45.-Experimental calculation of the coefficient of magnetic self-induction of a solenoid.
46.-Experimental calculation of the coefficient of induction of two solenoids.
IMPORTANT: **The teacher can use his own elements, so these practical possibilities are NEARLY UNLIMITED.**

Practices to be done with the **Mechanics Study application:**
47.- Programming and applications of a robot arm.
Study in one dimension:
48.-Calibration of the receivers.
49.-Average velocity concept.
50.-Definition of instantaneously velocity.
51.-Acceleration concept.
Study in two and three dimensions:
52.-Velocity as a vector. Average velocity concept.
53.-Acceleration as a vector.
54.-Movement of the projectiles.
55.-Circular movement.
56.-Energetic conservation.
IMPORTANT: **The teacher can use his own elements, so these practical possibilities are NEARLY UNLIMITED.**

Practices to be done with the **Acoustics Study application:**
Level 0:
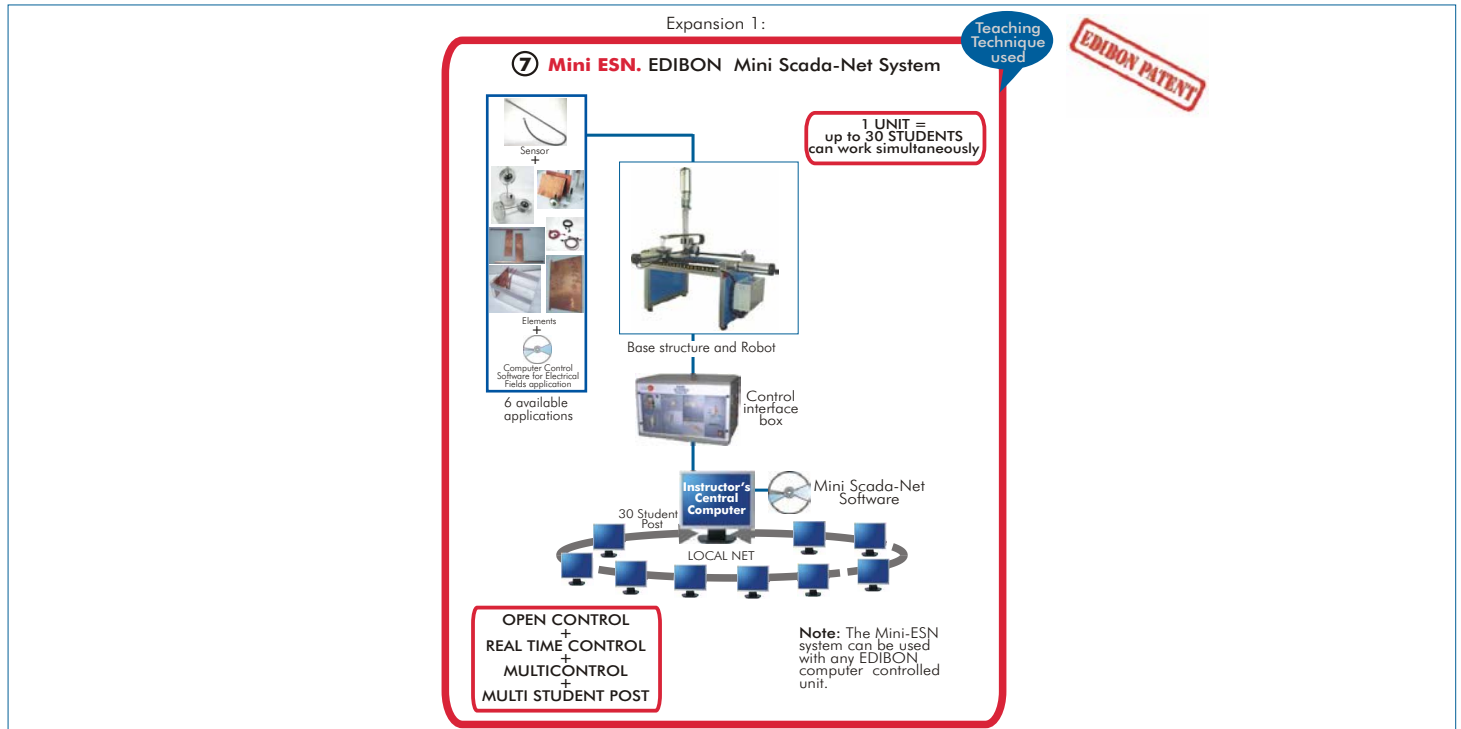57.- Programming and applications of a robot arm.
Level I:
58.-Temporal visualization of an acoustic wave.
59.-Experimental determination of the vibration frequency of a wave.
60.-Experimental calculation of the speed of an acoustic wave.
61.-Dependence of the propagation speed of a wave with the temperature.
62.-Three-dimensional study of an acoustic wave.
63.-Signal generated by two identical sources (Interference I).
64.-Acoustic attenuation produced by an obstacle.
65.-Generator of waves fronts (Diffraction II).
Level II:
All those of level I.
66.-Experimental determination of the power of an acoustic transmitter.
67.-Spatial representation of an acoustic attenuation.
68.-Space-time study of the signal generated by two acoustic sources (Interference II).
69.-Acoustic medium.
Level III:
All those of levels I and II.
70.-Effects in the acoustic shield of the wave frequency.
71.-Effects in the acoustic shield of the wave width.
72.-Reflection processes of an acoustic signal. Reflected energy.
73.-Concave and convex mirrors. Space-time representation.
74.-Refraction processes of an acoustic wave. Transmitted energy.
75.-Effects of the wavelength in the diffraction phenomenon (Diffraction III).
IMPORTANT: **The teacher can use his own elements, so these practical possibilities are NEARLY UNLIMITED.**

Practices to be done with the **Optics Study application:**
76.- Programming and applications of a robot arm.
77.- Calibration of the optics sensors.
78.- Reflection principles.
79.- Determination of the index of the refraction (n).
80.- Refraction principles.
81.- Determination of the reflection index for the methacrylate.
82.- Study of the dispersion.
83.- Calculation of the focal distance of a spherical mirror.
84.- Determination of the focal length in a magnifier (I).
85.- Determination of the focal length in a magnifier (II).
86.- Determination of the focal length for two lens.
87.- Determination of the aberration of a len.
88.- Interference.
IMPORTANT: **The teacher can use his own elements, so these practical possibilities are NEARLY UNLIMITED.**

Practices to be done with the **Thermodynamics Study application:**
89.- Programming and applications of a robot arm.
Laboratory practices in one dimension:
90.- Calibration of the temperature sensors.
91.- Conduction in one dimension.
92.- Determination of the thermal conductivity "k".
93.- Conduction through a compound bar.
94.- Determination of the thermal conductivity, k, of the stainless steel.
95.- Determination of the thermal contact resistance R_{tc}.
96.- Insulation effect.
Laboratory practices.
97.- Introduction.
98.- Temperature distribution on two-dimensional system.
99.- Determination of the thermal conductivity in two-dimensional system.
100.-Heat flow in a two-dimensional system.
IMPORTANT: **The teacher can use his own elements, so these practical possibilities are NEARLY UNLIMITED.**

Expansion 1:

⑦ **Mini ESN.** EDIBON Mini Scada-Net System

Teaching Technique used

EDIBON PATENT

1 UNIT = up to 30 STUDENTS can work simultaneously

Sensor +

Elements +

Computer Control Software for Electrical Fields application

6 available applications

Base structure and Robot

Control interface box

Instructor's Central Computer

Mini Scada-Net Software

30 Student Post

LOCAL NET

OPEN CONTROL
+
REAL TIME CONTROL
+
MULTICONTROL
+
MULTI STUDENT POST

Note: The Mini-ESN system can be used with any EDIBON computer controlled unit.

ORDER INFORMATION

Items supplied as standard

Minimum configuration for normal operation includes:

Common items for all applications:

① **FUB. Base Structure and Robot.** Common for all applications type " F " and can work with one or several applications.

② **EFAC/CIB.Control Interface Box.** Common for all applications type " F " and can work with one or several applications.

③ **DAB.Data Acquisition Board.** Common for all applications type "F".

Applications:

④ **Sets** (sensor+elements+computer control software) **required for each application:**
   ④₁ FCE. Set for **Electrical Fields** application, AND/OR
   ④₂ FCM. Set for **Magnetic Fields** application, AND / OR
   ④₃ FM. Set for **Mechanics** Study application, AND / OR
   ④₄ FAC. Set for **Acoustics** Study application, AND / OR
   ④₅ FOP. Set for **Optics** Study application, AND / OR
   ④₆ FTT. Set for **Thermodynamics** Study application.

⑤ Cables and Accessories.

⑥ Manuals.

Additional and optional items to the standard supply

Expansions

⑦ Mini ESN. EDIBON Mini Scada-Net System.

REQUIRED SERVICES

- Electrical supply: single phase,220V/50Hz or 110V/60 Hz.
- Computer (PC).

DIMENSIONS & WEIGHTS

Base Structure and Robot:
   -Dimensions: 1020 x 1250 x 890 mm. approx.
   -Weight: 80 Kg. approx.

Control Interface Box:
   -Dimensions: 490 x 330 x 310 mm. approx.
   -Weight: 10 Kg. approx.

Each set for the different applications:
   -Dimensions: 500 x 300 x 300 mm. approx.
   -Weight: 8 Kg. approx.

✱ Specifications subject to change without previous notice, due to the convenience of improvements of the product.

edibon
INTERNATIONAL

C/ Del Agua, 14. Polígono Industrial San José de Valderas.
28918 LEGANÉS. (Madrid). SPAIN.
Phone: 34-91-6199363   FAX: 34-91-6198647
E-mail: edibon@edibon.com   WEB site: **www.edibon.com**

REPRESENTATIVE: