LHP 4000
ADVANCED TELECOMMUNICATIONS SYSTEMS

The LHP-4000 laboratory covers all areas theoretical and practical concerning Advanced Telecommunications Systems including **OSI Model** and **communication protocols** that are most widely used in data transmission systems and in modern networks.

The laboratory offers a set of a **digital telecom training system**, modular and versatile of any lab student number and one workshop lab kit for **structure cabling and local networks.**

The **PT CB41** is a complete set of workshop or field engineer equipment that offers training both practical and theoretical, to technician or network administrator in the sector of the **installation and maintenance of Datacom and Telecom** (telephone lines) **integrated structured cable installations.** Students are called to create via the structured cabling methods sub networks which then can be the platform for running the Icarus lab, thus providing an A to Z training in the filed of Networks and Telecommunications.

ICARUS, the **digital telecom training system**, is a set of networked Icarus Nodes. Icarus is a multimode node trainer lab simulating the architectures of Local Area Networks (**LAN**), wide area networks (**WAN**), wireless LAN and WAN - **Mobile networks**. The multimode trainer also includes training package for Voice-Over-IP (**VOIP**), Wireless LAN (**WLAN**) and Mobile Networks to the recently developed 5G mobile networks.

The laboratory equipment is accompanied by the appropriate software to run interactively with PC workstations, wherever this is applicable via the CAI didactic application. The Computer Assisted Instruction (**CAI**) **software** is organized in subjects corresponding to the simulations and the experimental exercises with scope:

- A series of aims for the specific experiment and the level of knowledge that must be obtained.
- Theoretical background relevant to the lesson as well as practical examples of use.
- Tests/Questions for the students and fault testing.

The Lab is accompanied by electronic manuals for theory and exercises.

Minimum configuration shall be a 3 Icarus node network, and 3 PCs, OS Windows 10.

PT CB41
Trainer for Data-com and Tele-com structured cabling installations

ICARUS
Digital Communications Laboratory

ICARUS DUO I2
Trainer for GPS & GSM/GPRS

ENS
Enterprise Network Solution

BASIC TELECOMMUNICATIONS

Didactic Topics
- Switches and LANs
- Routing
- UDP and its applications
- TCP/IP
- Multicasting
- HTTP, DHCP, NTP
- NAT, IP TABLES & FIREWALLS
- Wireless Net Architectures Bluetooth/Wi-Fi/ Wi MAX/ LTE
- Wireless: IEEE 802.11
- Broad Band Wireless WANS Wi-MAX, LTE (4 and 5 G), GSM
- Voice over IP (VoIP)
- Q o S
- Multi-Cell Wireless networks Wired backbone
- Wired-Wireless interconnection
- QoS planning /Multi-Cell Nets

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EDUCATIONAL SYSTEMS
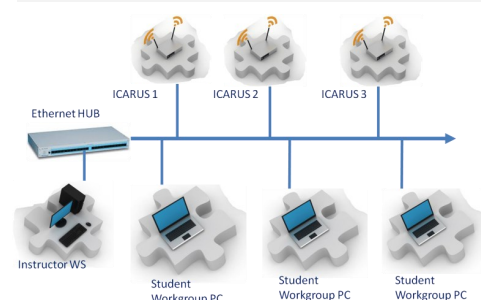
PT CB41 Workshop kit Structure cable Trainer
Trainer for Datacom and Telecom structured cabling installations

The PT CB41 is a complete set of workshop or field engineer equipment that offers training both practical and theoretical, to technician or network administrator in the sector of the **installation and maintenance of Datacom and Telecom** (telephone lines) **integrated structured cable installations**.

The provided training offers a theoretical overview on structured cabling and network devices, small PBX telephone systems and practical activities from passive component internetworking, sizing and techniques of a structured cabling plan, testing and maintenance of network plan for a small size office data and telephone network.

Cross over connection
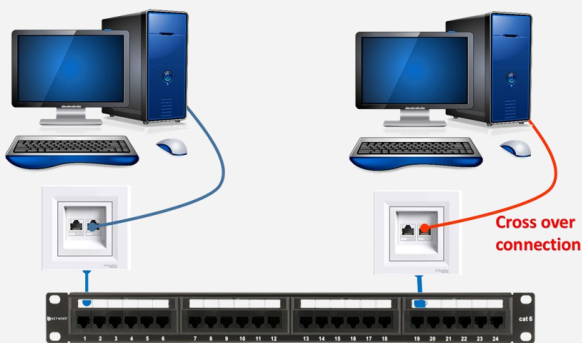
Theory and Practice combined give a good comprehensive knowledge and hands-on skills to the students in **all phases of a structured cabling project,** from design phase to testing phase of a Data/telecom networks and also allows to the instructor to **create different tasks** for the students with higher complexity, even allowing each trainer to **interconnect to a subnet complex**.

TRAINER BENCH

The bench top panel can be installed on any working bench. On its front, it includes 6 flush-mounted junction boxes for UTP plug installation, a 25-port patch panel, a 16-port network switch and a cable plastic routing channel on the bottom which internally has access through an opening to the back side of the panel. The back side is all routed with plastic channels where students must route all data cables. Each trainer can be interconnected to another trainer in order to create subnets amongst them. Each trainer can connect up to18 Data lines and 6 Phone lines.
Panel thickness 15/10 mm; laminated MDF.
All junction boxes are interconnected by plastic cable tracers.
When trainers are interconnected to the Icarus nodes the whole lab becomes a **compete network active laboratory** and can be fully managed.

Dimensions: H:76cm x W:60cm

Toolkit includes
- IDC Punch Tool
- Various Slotted Screwdrivers
- Cable Tester
- Data Cable Stripper
- RJ45 Crimp Tool
- Structured cabling Consumables*
- A Self-Healing Cutting Mat
- 16 port switch

* The trainer includes some initial cabling consumables as: 100 meters of UTP cable, 50x RJ 45 connectors, 10x RJ11 connectors, 4x quad RJ45 plugs and 4x dual RJ45 RJ11 plugs all with face plates.

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ICARUS Trainer
Digital Communications Laboratory

ICARUS laboratory offers to the Communication Technicians and Engineers an **advanced training** in the area of all **State-of-the-Art technology in Digital Telecommunications.**
It is the most complete, compact and modern laboratory solution offered in the market in the sector of Digital Telecommunications. ICARUS platform consists of three basic modules, fully integrated. All modern networks and equipment used in digital communications, from **Fast** to **Giga bit Ethernet** routers, bridges, switches and wireless LAN to Mobile Network **GSM, 3G, 4G and 5G** can be configured and **operated by a single ICARUS node.** Multiple interconnected nodes can implement any LAN, WAN or Mobile Antenna WAN (GSM, 3G, 4G and now 5G) and create any typical digital telecom network test-bed for students to perform experiments.

ICARUS MULTIMODE DIGITAL TELECOM NODE

A multimode telecom node **remotely programmable, configurable** and **manageable** by the user. An ICARUS node offers the following user **configurable modes:**
- LAN Router, Switch, Bridge
- Wireless LAN Router
- Wireless WAN - 2,8 Ghz
- Wireless WAN -5.0 Ghz

All modern type Networks and Equipment used in Digital Telecom from 10/100/Gbit Ethernet router, switch bridge and wireless LAN to Mobile network antennas can be configured/operated by a single ICARUS node.


ICARUS NETWORK CONTROL & MONITOR SW

All the below are the possible user programmable mode configurations of interconnecting 2 ICARUS Nodes.
Multimode connections are also provided with simultaneous configuration modes of interconnection on the ICARUS nodes:
1. Point to Point communication Mode
2. Multi-Node communication Mode
3. Basic Laboratory Configuration
4. Network Control & Monitor SW

Wireless WAN 2.8.Ghz
Wireless WAN 5.0.Ghz
Wireless LAN
10/100 & Gbit Ethernet LAN
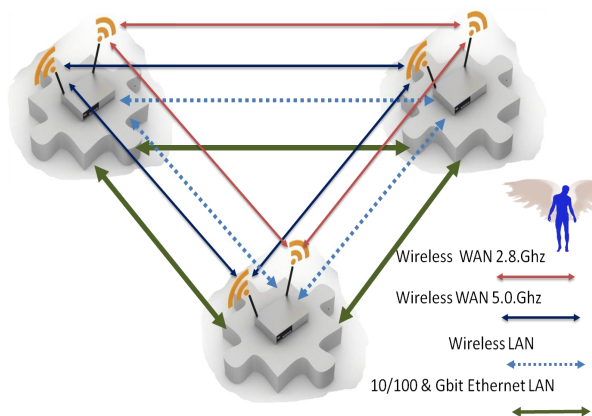
TECHNICAL SPECIFICATIONS

CPU	Intel® Core™ i7-8700 / 8M Cache at 3.20 GHz
ETHERNET IF	2 x Gbit Ethernet Interfaces
WIRELESS IF - A	AC 802.11 - 2,4 Ghz and 5 Ghz
MEMORY	8 GB
USB	4 USB II ports
Power Supply	300Watt . 220V
Remote power	CMCI –Chassis Management Card IF -Optional
HDD	Solid state 250 GB

ICARUS EDUCATIONAL SOFTWARE APPLICATION
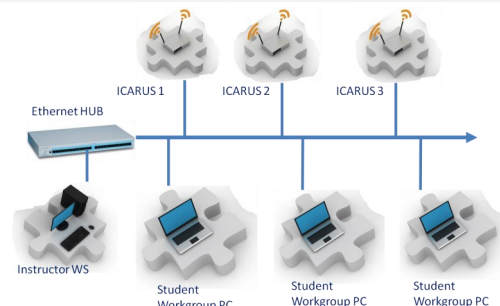
ICARUS EDS is a **CAI** – Computer Assisted Instruction - system, where the student using the PC performs all his activities and classroom interactions. IDEA is offered in two different levels, 1 & 2.
IDEA - Integrated Digital Educational Application - is an integral part of the Laboratory, familiarizes and trains students on the widely used network architectures, protocols and mechanisms.
In **EDS**, emphasis is given to **practical issues** related to the implementation of networking systems, dealing with network operation and management challenges. The students will have the opportunity to learn about **Network Architecture** by conducting experiments in a Real Telecommunication Test bed platform, the ICARUS node. Through this hands-on approach, students get familiar with the **networking protocols** that are used on the related networking equipment (bridge, switch, router, WAN, LAN, Wi-Fi, 3G, 4G. 5G Wireless technologies etc.) and the functionality of the different **network layers** (Ethernet, IP, TCP/UDP) including structured cabling hands on training.

KONDLE VENTURES Ltd.
EDUCATIONAL SYSTEMS

ICARUS DUO I2 Trainer
Trainer for GPS & GSM/GPRS

GPRS
GENERAL
PACKET
RADIO
SERVICE

GSM

GPS

INTRODUCTION

I2 is a Dual purpose microcontroller training system for vocational training on GPS/Satellite communication as well as the commands for the control and communication of GSM devices.
The system integrates a GPS and a GSM/GPRS module along with their respective antennas and the required peripherals to be fully operational.
The unit is connected to a PC computer with a USB cable. It is powered up either by a AC/ DC adaptor (9V, 2A) or when used outside the classroom by a battery pack of 9V/2 A provided with the set.
The system is accompanied by Kondle's ARD:icon software that provides command coding for the control and functioning of the GSM and GPS modules as well as step by step lab experiments on the subject.
The application commands control the functioning of the trainer and all data sent or received from the corresponding communicating unit are recorded,
The software commands can control the GPS and GSM/GPRS operation and communication data for evaluation and analysis.
The software provides an on line help menu guide for the GPS functioning and the AT command functions in a didactic format and experimental procedure.

FEATURES

Icarus Duo trainer operates as a normal mobile phone with all communication features of a commercially operated GSM/GPRS mobile with GPS features and Internet connectivity.
Additionally is an open didactic platform offering to the students the low level code programming of the device using the AT commands and other functions available for programming the internal trainer microcontroller which is ATMEGA328P-PU. Ard:icon provides many experiments in I./O microprocessor controls.
The trainer base is a compact, easily accessible plastic case enclosure. It can be easily carried outdoors for testing. It allows the SIM card insertion for the GSM / GPRS module from the top of the trainer case.

SPECIFICATIONS
A. GSM /GPRS Module
This is a complete Quad-band GSM/GPRS chip based module in a SMT type and designed with a very powerful single-chip processor integrating

AMR926EJ-S core, allowing integration in small dimensions.
Featuring an industry-standard interface, the module delivers GSM/GPRS 850/900/1800/1900MHz performance for voice, SMS, Data, and Fax in a compact and versatile system also with low power consumption.
The module comes with an active GSM /GPRS antenna, microphone and headset interface, all mounted on the top surface of the trainer.
The module is programmable using Standard AT commands for the GSM/GPRS functions.
It allows each unit to make voice calls, send SMS or make connections to the Internet network by providing the appropriate commands.
The module provides internal control and filtering for the quality of the communication signals.
GSM/GPRS module supports ETSI protocols: TCP/IP, 3GPP TS 27.007,3GPP TS 27.005, FAX class 1.
It supports PPP transmission protocol.

B. GPS Module
The GPS module is based on the NEO 6 u-blox GPS chip. The GPS module follows the standards of NMEA 0183 protocol for signals and data. It provides accurate location coordinate data for the trainer's outdoor location (latitude and longitude).
The GPS data can be transferred via GPRS to a GIS map application service .ie. Google maps etc.
Meanwhile, the I2 -GPS module also provides data with very accurate time since it includes an RTC timer.
The provided application can control the GPS reception Baud rate and refresh time.

PERIPHERALS AND AUXILIARIES.

I2 trainer is provided with all necessary equipment to be fully operational with:
1.   USB connections ,dual
2.   Microphone and head set
3.   Power-on switch
4.   Power Led
5.   GPS Antenna
6.   GSM/GPRS Antenna
7.   Battery pack
8.   Software - SB Ard:icon V.1.18
9.   USB Cables 2 pcs

Base Dimensions: L 27cm, W 16cm, H 7cm
Weight: 300gr

ACADEMUS EDUCATIONAL LABORATORIES

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EDUCATIONAL SYSTEMS

ENS
Enterprise Network Solution

ENS

ENS - Enterprise Network Management

The ENS application for enterprise network management provides simple, complete endpoint management: power management, software updates, application installs, configuration and remote assistance. Maintenance is just a few clicks, saving time you can spend on strategic tasks that grow the enterprise as a university or any other educational institute. The application runs on Linux.

Network Management Facilities - ENS

Monitoring. All the information about the network terminals and their configuration is at your fingertips. With the structured tree interface, doing maintenance is easy.

Automatic discovery of network devices. ENS carries out an automatic search of all terminal devices present in the network, both through broadcast and through IP range. In such a way, ENS browses devices in a local LAN and in complex WAN geographical networks.

Organization in groups and automatic assignment of new devices. The system allows the positioning, even automatic, of devices within specific groups, organized either upon their IP ranges or their physical disposition.

Simplified search and filter functions. The devices can be easily sorted, filtered and searched using one or more device properties or by user.

Power management. The system supports the remote power on and off on those Thin Clients equipped with a Wake On LAN support. With a simple click, users can easily power on and off remote devices on the network (even groups at scheduled tasks).

Configuration management which allows the user to receive the configuration of a remote device, for modifying it, saving it and then restoring it or using it as a template to distribute the same configuration on other devices. Distribution of updates and configurations. The update operations can be centrally performed on both single devices or groups of devices, in multiple and scheduled mode.

Activity scheduler which allows to plan single, multiple or group operations towards remote devices.

Execution of activity on device's power. The scheduling of actions can be easily combined with events such as turning the endpoint on or off, for greater granularity in the application of policies.

Available application software to connect any PC Windows OS10 to the ENS network management system.

Reset, cloning and **recovery** which allows you to easily restore network devices and offers an extremely simple workflow for cloning and restoring Windows Embedded devices.

Third-party software distribution which makes possible to distribute and install applications in devices.

Repository of configuration templates and firmware for the maintenance of configuration templates and firmware updates.

Integrated remote support system, a remote assistance service to the managed devices. Launches a shadowing session of the device where the help desk operator can operate, both to act on the workstation's setup, or to assist the user on enterprise applications.

Scheduled automatic distribution to endpoints using personalized configurations. It's easy to create and configure workstations for any user or department according to their needs and the type of endpoint.

Management of activities on the device by groups and by multiple selection. Execution of remote operations for device groups. The user using a multiple selection can directly and easily switch on or update an entire group of devices.

Profile Manager to provide devices with different configuration profiles, based on policies defined by group or individual device. Automatic assignment of the configuration profile to the user, group or device (roaming profile).

Classifier to automatically apply configuration profiles, to perform configuration actions or inventory actions, also transversely to groups of devices.

Secure authentication. Allows to protect devices from unauthorized access, defining users and groups that could access devices in the network from users database, or an Active Directory database, making the personal connection available to each user independently from the devices used.

ACADEMUS EDUCATIONAL LABORATORIES

ENS
Enterprise Network Solution

Network / thin-Client Stations

PRODUCT	WORKSTATION - All in one
D 9054	

SPECIFICATIONS	
CPU	Intel Celeron J1900 Quad Core 2Ghz Soc
Graphics	Intel HD Gen7 - All-in one Monitor
Monitor	21,5 incl LCD monitor -1920 x1080
RAM	2GB
FLASH	8GB
USB ports	4 USB ports (3 x USB 2.0, 1 x USB 3.0)
Ethernet Port	100/100/1000 Ethernet
Wifi	Build in
Audio	Mic in/Audio out , Build in speaker
Mouse	Optical - included
Power	External power supply
Mounting kit	LCD VESA mounting kit
O.S.	Linux / Thin-OX
Keyboard	105 key - Standard USB keyboard

Network / Gateways
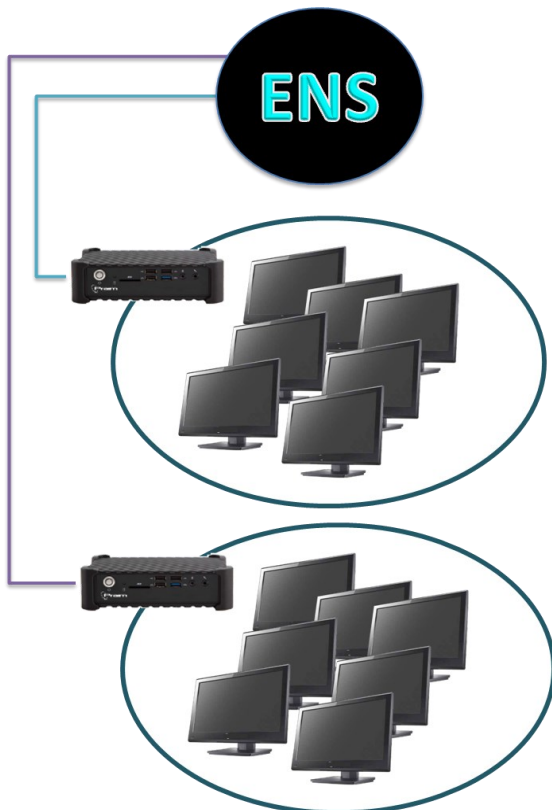
PRODUCT	Gateway router
G1A-WFB	

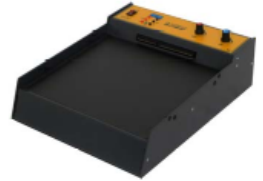| SPECIFICATIONS	
CPU	Intel Atom Quad Core 2Ghz
Net IF	2 x Gigabit Ethernet
RAM	4 GB
FLASH	128GB SSD
Bluetooth	Yes
WiFi	802.11ac
Antenna	External - dual
Management	Remote
Repository	Yes
WOL	Build in
Auto config.	Ye
HA network	Yes
Speed	Dual network
Mounting	Rack DIN Kit

DIGITAL COMMUNICATIONS & NETWORKS

BASIC TELECOMMUNICATIONS

ANALOGUE AND DIGITAL TELECOMMUNICATION TRAINER

COM Base
BASE FRAME WITH POWER SUPPLY AND INTERFACE TO PC

The Base Frame provides the operational characteristics of the basic digital technologies used in biomedical equipment as transducers, amplifiers, filters and data monitoring and conversion. The base frame is supplied with Interface EISA 31+18 - USB HID managed by microcontroller C8051 Control of 12 relays interfaced on the BUS output and managed by software, 12 NO and 6 NC relays. The system faults can be inserted by micro switches; It is provided with the appropriate interfaces for connection to power supply and PC. The PC application software allows the study of the topics with hyper text navigation (HTML screens). All test connections and test points are provided with 2mm terminals. It is supplied with a theory and practical exercise handbook.

AST Trainer
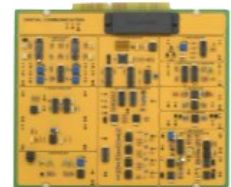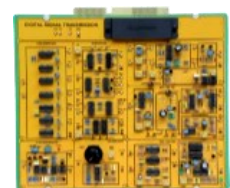#### ANALOGUE SIGNAL TRANSMISSION

The design and construction of electronic circuits to solve practical problems is an essential technique in the fields of electronic engineering and computer engineering.
With this board the students can study the operating principles of the most common techniques of analog modulation (AM, DSB, SSB, FM and PM) with the aid also of the signal generators and auxiliary circuits as VCO and PLL.

DTM Trainer
DIGITAL MODULATION-DEMODULATION

The design and construction of electronic circuits to solve practical problems is an essential technique in the fields of electronic engineering and computer engineering.
With this board the students can study the operating principle of the digital communications using the most common techniques such as PCM modulation, PAM modulation, PFM modulation, PWM and PPM modulations and finally the DM modulation with the aid also of a signal of noise, of analog filters and output amplifiers.

DST Trainer
DIGITAL SIGNAL TRANSMISSION

The design and construction of electronic circuits to solve practical problems is an essential technique in the fields of electronic engineering and computer engineering.
With this board the students can study the operating principle of the transmission of digital signals using the most common modulations such as ASK, FSK and PSK with the aid of encoders/decoders NRZ, RZ, Manchester, Bi-phase and Duo-binary.

ANALOGUE AND DIGITAL TELECOMMUNICATION TRAINER

The DIGITAL SIGNAL TRANSMISSION needs the CAUX - AUXILIARY BOARD
- Clock and carrier generator, obtained by a single quartz source at 2.4576 Mc/s with a selectable clock frequency of 2400, 4800, 9600, 19200 or 38400 cycles / sec;
- Pseudo-random data generator that generates two random sequences of 1 and 0 of different length, 15 bits and 255 bits;
- Bit Error Rate (BER) meter;
- Digital delay equalizer;
- Artificial noise generator, that generates a quasi-white spectrum signal in the band 2 - 40 kHz;
- Jitter meter.

TRANSMISSION LINE TRAINER

COM Base
## BASE FRAME WITH POWER SUPPLY AND INTERFACE TO PC

The Base Frame provides the operational characteristics of the basic digital technologies used in biomedical equipment as transducers, amplifiers, filters and data monitoring and conversion. The base frame is supplied with Interface EISA 31+18 - USB HID managed by microcontroller C8051 Control of 12 relays interfaced on the BUS output and managed by software, 12 NO and 6 NC relays. The system faults can be inserted by micro switches; It is provided with the appropriate interfaces for connection to power supply and PC. The PC application software allows the study of the topics with hyper text navigation (HTML screens). All test connections and test points are provided with 2mm terminals. It is supplied with a theory and practical exercise handbook.

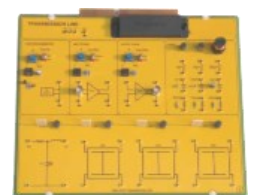## FST Trainer
FIBRE OPTICS

The design and construction of electronic circuits to solve practical problems is an essential technique in the fields of electronic engineering and computer engineering. With this board the students can study the operating principle of the communications through the use of the optical fiber analyzing the distortion characteristics and the quality of the transmitted signals.
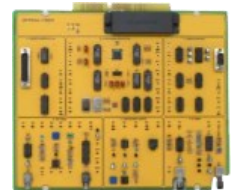
TSL Trainer
TRANSMISSION LINE

The design and construction of electronic circuits to solve practical problems is an essential technique in the fields of electronic engineering and computer engineering. With this board the students can study the characteristics of a transmission line by analyzing the main parameters as the impedance of the line and the losses on the same.

ANT Trainer
ANTENNAS TRAINER

Designed to introduce the student to the comprehension of the antennas operation mode. The trainer is provided with an extensive educational handbook with theoretical and experimental content which covers the following areas:
- Lecher line
- Polarization
- The elementary dipole
- The folded dipole
- The Yagi antenna
- The ground plane antenna
- The matching stub
- Testing and recording of the irradiation features of transmitting antennas
- Testing and recording of the directivity, selectivity and gain features of receiving antennas
- Drawing of polar diagrams
- Antennas as fitted loads of transmission lines