

## Satellite communication training courses from L.TEQ

### Who are L.TEQ?



L.TEQ was established in 1984 as Europe's independent supplier of professional satellite earth station equipment.

Initially L.TEQ provided just equipment but within two years had branched out into system design and integration of VSAT networks and Gateway earth stations.

Installation work by necessity led onto equipment training and this in turn led onto us complementing these courses with theoretical training.

To date we have provided equipment to around 60 countries and have undertaken training courses in almost 30 countries.

L.TEQ is ISO 9000 registered and also holds the prestigious Investors in people (IIP) award.



INVESTOR IN PEOPLE

## Why use L.TEQ for training?



For over 20 years, L.TEQ has been holding regular technical training courses at customer sites as well as our UK headquarters.

Our courses are listed with the UK Learn direct organization and course attendees have come from as far afield as the Middle East, America and South East Asia.

Although originally setup to provide product training, our wide range of available courses now cover all aspects of satellite communications for Engineers and Communication managers.

We regularly produce courses tailored to customers needs, whether these be "bridging" courses introducing new technologies or highly specific courses for customers with military or commercially sensitive applications.

Course tutors use modern multimedia presentations and each participant is provided with comprehensive course notes and a certificate of completion. Practical courses include a "hands on" session for testing and fault diagnosis.



Since L.TEQ specializes in supplying the world with the latest earth station technology, we ensure that all "hands on" courses use these products thus giving the participant experience that will last long after the course has finished.

With over 22 years experience in satellite communications and senior staff on satellite related international committees, L.TEQ is uniquely qualified and experienced to provide "state of the art" earth station training.

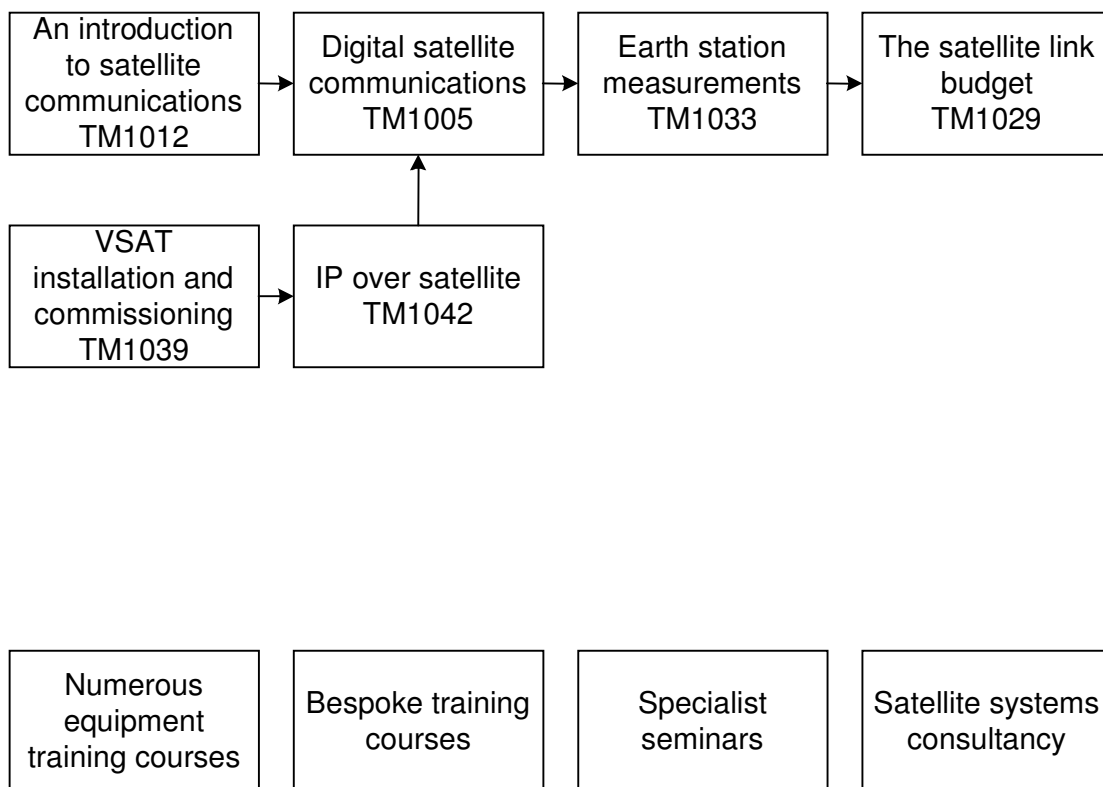
## What courses do we offer?

L.TEQ offers a complete range of training courses for professionals working in the satellite industry.

The courses range from a one day basic introductory course for new employees through to our two day advanced “digital satellite communications” course.

For those who wish to undertake an intensive training program, we run a structured five day course which covers most aspects of satellite communications from the basic introductory course through digital satellite communications through to the satellite link budget.

The following is a complete list of our courses at the time of printing. If you do not see the course that you require, please contact us for a bespoke course tailored to your precise requirements.



## **TM1012**

### **An introduction to satellite communications**

In our modern world, we take satellite communications for granted, often using the technology without even realizing it.

This is a two part introductory course in basic satellite communications.

The morning session is aimed at people with a basic electronics background and covers the basic principles, applications and limitations of satellite communications.

The afternoon session is aimed at communication technicians and provides an in depth continuation of topics introduced in the morning.

#### **Objectives and Content**

##### **Morning session**

- \* Satellite coverage
- \* Satellites, earth stations and VSAT's
- \* Applications
- \* Leasing capacity and licensing issues

##### **Afternoon Session**

- \* Space segment
- \* Network topology
- \* Ground segment
- \* Antenna
- \* Applications
- \* Maintenance
- \* Earth station signal level budget

#### **Who Should Attend**

- \* Sales support staff
- \* Communications Managers
- \* IT Managers
- \* Internet providers

#### **Duration**

1 Day

#### **Location**

- \* L.TEQ HQ (UK) (lunches are provided)
- \* Customer site

#### **Course size**

Up to 10 attendees

## **TM1005**

### **Digital Satellite Communications**



Virtually all satellite services are now digital, whether they be carrying telephony, video or internet traffic. Whilst the principle of transmission is the same for terrestrial or analogue traffic routes, the upgrade to digital satellite communications involves many inter-related technologies (Datacoms, RF, Microwave etc.)

The course is aimed at communication engineers and technicians, who wish to add digital satellite communications to their capabilities.

This is our most popular course, having been presented internationally on many occasions and now being run on an almost monthly basis at our UK headquarters.

#### **Objectives and Content**

- \* Understanding data communication interfaces, clocking and multiplexing
- \* Understanding Digital satellite modems (forward error correction, scrambling, modulation etc.)
- \* Understanding requirements of SHF conversion equipment (phase noise, stability, group delay etc).
- \* Understanding basic differences between transmission modes (FDMA, TDMA, SCPC, MCPC etc.)
- \* Understanding testing of Digital satellite circuits

#### **Who Should Attend**

- \* Broadcast engineers and technicians retraining from analogue to digital expertise
- \* Telecommunications or data communications engineers and technicians retraining for satellite communications
- \* Earth station engineers and technicians

#### **Duration**

2 Days

#### **Location**

- \* L.TEQ HQ (UK) (lunches are provided)
- \* Customer site

#### **Course size**

Because this course has a "hands on" session, we limit attendance to 5 participants.

## **TM1033**

### **Earth station measurements**

Since deregulation of the telecommunications market, the number “newcomers” to the satellite industry has meant a shortage of suitably trained technicians and engineers.

This course encompasses both a “classroom” and a “hands on” approach to providing the candidate with the necessary skills to commission and “fault find” a modern digital satellite earth station.

#### **Objectives and Content**

- \* Designing for ease of maintenance
- \* Antenna alignment
- \* Antenna G/T and cross polarisation measurement
- \* System amplitude measurement
- \* Group delay equalisation
- \* Phase noise measurement
- \* Transmit carrier spectral mask
- \* Spurious measurement
- \* Transmit EIRP measurement
- \* Transmit frequency measurement
- \* Bit Error Rate measurement
- \* Alarms
- \* Monitor and control
- \* Clocking arrangements
- \* Drop and Insert measurements
- \* Jitter measurements
- \* Fault finding

#### **Who Should Attend**

- \* Broadcast technicians retraining from analogue to digital expertise
- \* Telecommunications or data communications technicians retraining for satellite communications
- \* Earth station technicians
- \* VSAT installers

#### **Duration**

1 Day

#### **Location**

- \* L.TEQ HQ (UK) (lunches are provided)
- \* Customer site

#### **Course size**

Because this course has a "hands on" session, we limit attendance to 5 participants

## **TM1029**

### **The satellite link budget**

A satellite link relies heavily on the parameters not only of the satellite, but also on the earth station's technical specification and its geographical location. Accurate calculation of the link budget is necessary if the earth station is not to be undersized or indeed oversized for a particular application. Contractual service agreements often include bit error rate performance requirements over the period of a year, a system that works well in summer may fail to meet such requirements during heavy winter rains. Link budgeting must take into account such variations in parameters.

This course was first held in 1998 and has been updated to reflect modern trends in satellite communications.

### **Objectives and Content**

- \* Basic link
- \* Bit Error Rate Ratio and Forward Error Correction
- \* Modulation schemes
- \* Calculation of the G/T of an antenna system
- \* Calculating fade margins
- \* Transponder Selection
- \* Beam Advantage
- \* Interference
- \* Downlink Power
- \* Uplink Pattern Advantage
- \* Uplink Power at satellite
- \* Uplink path losses
- \* Uplink EIRP
- \* Hardware losses
- \* HPA requirements
- \* Example link budgets
- \* Use of Intelsat LST®
- \* Use of Satmaster Pro®

### **Who Should Attend**

- \* Earth station managers
- \* Satellite circuit engineers

### **Duration**

1Day

### **Location**

- \* L.TEQ HQ (UK) (lunches are provided)
- \* Customer site

### **Course size**

In order to keep the course interactive between tutor and students, we limit attendance to 5 participants.

## **TM1039**

### **VSAT design, installation and commissioning**



LTEQ have been instrumental in rolling out 10 to 30 piece VSAT networks on numerous occasions for multinational corporates, whose communication is totally dependant upon the quality of the VSAT network. LTEQ finely tune the size of VSAT to maximize return on investment, and avoid over or under specifying the power of the equipment.

This course is based upon our experience, highlighting many of the unwritten "pit-falls" which are not in any technical manual. Attendees will gain the 18 years of LTEQ knowledge, condensed into one day, and can look forward to constructing their first VSAT installation and commission, with confidence.

#### **Objectives and Content**

- \* System design
- \* Network topology
- \* Applications and technologies
- \* Monitor and control
- \* Antenna types
- \* Site Survey
- \* EMC and lightning protection
- \* Power supplies
- \* Installation procedure
- \* Antenna alignment
- \* Earth station signal level budget
- \* Configuring, testing and commissioning
- \* Documentation
- \* Maintenance

#### **Who Should Attend**

- \* VSAT installation technicians and engineers
- \* Earth station technicians
- \* Communications Managers
- \* IT Managers
- \* Internet providers

#### **Duration**

1 Day

#### **Location**

- \* L.TEQ HQ (UK) (lunches are provided)
- \* Customer site

#### **Course size**

Because this course has a "hands on" session, we limit attendance to 5 participants.

## **TM1042**

### **IP over satellite**

With the advances of satellite delivery, and the increase in VoIP and data communications over the Satellite systems in both Uni-cast, Multicast and broadcast methods has meant a huge leap in the use of this technology to interconnect offices over vast distances.

#### **Objectives and Content**

- \* Network connectivity
- \* Basic switching
- \* TCP/IP implementation
- \* Hardware topologies
- \* Routing basics
- \* VoIP basics
- \* Firewalls
- \* Internet Café Requirements
- \* Latency and the reduction of latency

#### **Who Should Attend**

- \* Network Technicians
- \* Communications Managers
- \* IT Managers
- \* Internet providers

#### **Duration**

1 Day

#### **Location**

- \* L.TEQ HQ (UK) (lunches are provided)
- \* Customer site

#### **Course size**

Because of the amount of theory, we limit attendance to 5 participants.

## **But don't just take our word for it!**

Here are few testimonies from previous course attendees:

“I work as an engineer at a earth station in Kazakhstan. We use L-TEQ IDR modems and switch. From the very beginning your training manual TM1005 (Digital Satellite Communications) is my handbook.

But after 8 years of use it looks pretty worn out. May I have a new copy of this book?”

R.T. (Kazakhstan)

“Thanks! What you don' t learn at the Digital Satellite Communications Courseisn' t worthwhile knowing.

To use the wordings of the course it' s the most composite and powerful course I have participated in for years. Here are some of the superlatives I have in mind about the course: Clear cut and no nonsense, captivating, powerful, fiercely memorable, and intensive learning.

You should consider recording the course on a video/DVD, and developing it as an interactive, Internet, and remote training course.”

L.U. (Denmark)

“I am glad to have met a lecturer who has taught me such valuable information which I have been looking for my whole career. The handout which I carried back home was another valuable item which I could not have left out as it is priceless to me”

I.F (Maldives)

“The participants were engaged in such a manner that healthy strain was exhibited by all throughout the course. The tutor has the ability to communicate and transfer his knowledge very effectively.

Needless to say, the course was considered a huge success by all participants and we shall not hesitate to engage L.TEQ for further course presentations when the opportunity arises.”

C.F (South Africa)

I have received very positive feedback from the guys who did the course. We will definitely be looking to arrange some more training from yourselves, either a repeat of this course or one of the others to compliment this course.

S.H (UK)

## **Course fees**

Course fees are available from our sales department

If the course is staged in Frimley, then lunches are provided.

Course fees include a complete set of notes in a training folder and a certificate of completion.

Payment must be received at least one month before commencement of the course or L.TEQ reserve the right to cancel the course.

Payment is accepted in Pounds sterling, US Dollars or Euros.

## **Contact details**

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