

SatMaster Professional-Satellite Link Budget Training

Kigali (Rwanda)

17 - 21 November 2025

UK Training

PARTNER



SatMaster Professional-Satellite Link Budget Training

Code: GC28 From: 17 - 21 November 2025 City: Kigali (Rwanda) Fees: 4000 Pound

Introduction

Link budgets are the standard tool for designing and assessing satellite communications transmissions, considering radio-wave propagation, satellite performance, terminal equipment, radio frequency interference RFI, and other physical layer aspects of fixed and mobile satellite systems. The format and content of the link budget must be understood by many engineers and managers with design and operation responsibilities. SatMaster is a highly-recognized yet low-cost PC-based software tool offered through the web by Arrowe Technical Services of the UK.

This five-day course reviews the principles and use of the link budget along with hands-on training in SatMaster, the latest version, for one- and two-way transmission of digital television; two-way interactive services using very small aperture terminals VSATs; point-to-point transmission at a wide range of data rates; and interactive communications with mobile terminals. Services at UHF, L, S, C, X, Ku, and Ka bands to fixed and mobile terminals are considered. The course includes several computer workshop examples to enhance participants' confidence in using SatMaster and to improve their understanding of the link budgeting process. Participants should gain confidence in their ability to prepare link budgets and their facility with SatMaster. Examples from the class are employed as time allows. The course notes are provided.

Course Objectives

- Principles and main components.
- Detailed Link Design in Practice: Computer Workshop.
- Principles of Satellite Links and Applicability of SatMaster.
- Link Budget Calculation Considerations.
- Consideration of Interference and Workshop in Digital Link Budgets.
- Advanced Features in VSAT Systems.

Course Outlines

Day 1: Principles and main components

- Types of Transmission Systems.
- Satellite Systems.
- What is VSAT?
- Satellites Classification.
- Satellite Frequency Bands.
- VSAT Earth Station block diagram and characteristics.
- Satellite link Information flow.
- VSAT Earth Station.
- VSAT Network Component.



- VSAT Network Topology.
- VSAT Multiple Access Techniques.
- VSAT Important Terms.

Day 2-3: Principles of Satellite Link Budget Calculations:

Standard ground rules for satellite link budgets

- Frequency band selection.
- Satellite footprints: EIRP, G/T, PFD and SFD.
- Propagation considerations: the isotropic source, line of sight.
- Atmospheric effects: troposphere clear air and rain and ionosphere Faraday and scintillation.
- Rainfall regions.
- Losses and interference.
- Earth station: Antenna characteristics Antenna radiation pattern, Front-to-Back Ratio, HPBW, Gain, X-pol considerations.
- Earth station: HPA characteristics, intermodulation and sizing, uplink power control.
- Modulation systems.
- Forward error correction techniques and comparisons.
- Bandwidth and roll-off factor, Power Equivalent Bandwidth PEB.
- Availability.
- EbNo/EsNo, BER, spectral efficiency.
- Transmission equation and its relationship to the link budget.

Day 4: Link Budget Calculation Considerations:

Basic design considerations.

- Antenna, LNB, HPA, carrier operation.
- Link budget result and fine-tuning.

Important Satmaster Pro Calculators

- Satmaster data file types.
- Bandwidth Calculator.
- Sun outages.
- D: M:S to degrees conversion and vice versa.
- Noise figure to noise Temperature conversion and vice versa.
- Frequency to wavelength conversion and vice versa.
- Beamwidth calculator.

Detailed Link Design in Practice: Computer Workshop

- Uplink / downlink calculation.
- ASlup / ASIdown calculation.
- Rain model.
- Satellite.
- Carriers.

Day 5: Advanced Features in VSAT Systems:



- Simple and improved adaptive uplink power control.
- Adaptive coding and modulation,
- CNC / Bandwidth cancellation and link budget considerations.
- Layer 2 networking, traffic shaping, and quality of service.
- General discussion.



Blackbird Training Cities

Europe



Malaga (Spain)



Sarajevo (Bosnia and Herzegovina)



Oporto (Portugal)



Glasgow (Scotland)



Edinburgh (UK)



Oslo (Norway)



Annecy (France)



Bordeaux (France)



Copenhagen (Denmark)



Birmingham (UK)



Lyon (France)



Moscow (Russia)



Stockholm (Sweden)
(Netherlands)



Podgorica (Montenegro)



Batumi (Georgia)



London (UK)



Istanbul (Turkey)



Amsterdam



Düsseldorf (Germany)



Paris (France)



Barcelona (Spain)



Munich (Germany)



Geneva (Switzerland)



Prague (Czech)



Vienna (Austria)



Rome (Italy)



Brussels (Belgium)



Madrid (Spain)



Berlin (Germany)



Lisbon (Portugal)



Zurich (Switzerland)



Manchester (UK)



Milan (Italy)



Blackbird Training Cities

USA & Canada



Los Angeles (USA)



Orlando, Florida (USA)



Online



Phoenix, Arizona (USA)



Houston, Texas (USA)



Boston, MA (USA)



Washington (USA)



Miami, Florida (USA)



New York City (USA)



Seattle, Washington (USA)



Washington DC (USA)



In House



Jersey, New Jersey (USA)



Toronto (Canada)

Africa



Baku (Azerbaijan)
(Thailand)



Maldives (Maldives)



Doha (Qatar)



Manila (Philippines)



Bali (Indonesia)



Bangkok



Beijing (China)



Singapore (Singapore)



Sydney (Australia)



Tokyo (Japan)



Jeddah (KSA)



Riyadh (KSA)



Dubai (UAE)



Kuala Lumpur (Malaysia)



Kuwait City (Kuwait)



Pulau Ujong (Singapore)



Jakarta (Indonesia)



Amman (Jordan)



Beirut (Lebanon)

UK Training
PARTNER



Blackbird Training Cities

Asia



Kigali (Rwanda)



Cape Town (South Africa)



Accra (Ghana)



Lagos (Nigeria)



Marrakesh (Morocco)



Nairobi (Kenya)



Zanzibar (Tanzania)



Tangier (Morocco)



Cairo (Egypt)



Sharm El-Sheikh (Egypt)



Casablanca (Morocco)



Tunis (Tunisia)



Blackbird Training Clients



UK Training
PARTNER



Blackbird Training Categories

Management & Admin

Professional Skills
Finance, Accounting, Budgeting
Media & Public Relations
Project Management
Human Resources
Audit & Quality Assurance
Marketing, Sales, Customer Service
Secretary & Admin
Supply Chain & Logistics
Management & Leadership
Agile and Elevation

Technical Courses

Hospital Management
Public Sector
Special Workshops
Oil & Gas Engineering
Telecom Engineering
IT & IT Engineering
Health & Safety
Law and Contract Management
Customs & Safety
Aviation
C-Suite Training



BLACKBIRD
FOR TRAINING



International House 185 Tower Bridge
Road London SE1 2UF United Kingdom



+44 7401 1773 35
+44 7480 775526



Sales@blackbird-training.com



www.blackbird-training.com

UK Training

PARTNER

