


ND SATCOM

SKYWAN IDU 7000/1070 COURSE OVERVIEW



Premium Satellite Communications
Systems & Solutions

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1 COURSE OVERVIEW: SKYWAN 7000/1070 SATELLITE NETWORKS (VSAT)

ND SatCom offers training in various areas such as installations, operations, maintenance and management of our products and solutions. Convenient **classroom & hands-on training** is available all year-round at our training center in Friedrichshafen. We also offer trainings on request at our regional branches or at customer premises.

ND SatCom training is the most efficient way to get a full comprehension of ND SatCom products and solutions.



The following training course catalogue is based on the current SKYWAN generation with IDU 7000 series and IDU 1070 series. Detailed descriptions of well-proven predefined courses about SKYWAN are available for review.



Beside the SKYWAN predefined courses various customized training packages are possible. Such courses will be defined according to customer specific needs and requirements. The flexible content can be a selection of existing course modules enriched by additional customer topics. For the arrangement of a customized package please contact our training experts. The professional training courses covering all relevant topics for SKYWAN satellite networks.

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Our hands-on training enables you to quickly install your VSAT stations, discover how to commissioning and operate your network and learn through ongoing monitoring and maintenance how network downtime can be minimized.

The following figure illustrates the standard course overview for SKYWAN satellite networks:

Tasks	Network Designer	Network Operator	Station Commissioner
Entry	Satellite communication fundamentals (VSAT) Course 8000 / 2 days		
			Installation basics (VSAT station) Entry level Course 8010 / 1 day
Basic / Specialist	Network design & engineering Basic level Course 8340 / 3 days	Network commissioning & operation Basic level Course 8240 / 5 days	Station commissioning Basic level Course 8140 / 1 day
Advanced / Expert	Network desing & engineering Advanced level Course 8350 / 2 days	Network commissioning & operation Advanced level Course 8250 / 4 days	Station commissioning, installation & maintenance Advanced level Course 8150 / 2 days
Optional		Configuration of SKYWAN FAD Basic level Course 8243 / 2 days	
	Expert Certification Network Designer 1 day	Expert Certification Network Operator 1 day	Expert Certification Station Commissioner 1 day

The following course descriptions will provide the necessary detailed information about available course modules.

1.1 Station Commissioning (8140)

Title	
8140 - SKYWAN IDU 7000/1070 Station Commissioning	
Level	Basic / Specialist
Objectives	<p>The participant will be able to:</p> <p>Prepare & commission a SKYWAN station to become a member of a SKYWAN network and perform tests at station level, i.e.:</p> <ul style="list-style-type: none"> • Install a SKYWAN indoor unit, • Setup a SKYWAN IDU with a predefined parameter set, • Run station specific functional tests, • Control relevant parameters for proper station operation.
Contents	<p>Description of SKYWAN solution:</p> <ul style="list-style-type: none"> • SKYWAN features, hardware & interfaces, • Configuration file & software images, • Interfacing of outdoor unit (RFT, LNB, cabling), • SKYWAN station setup wizard. <p>Installation check of outdoor equipment (ODU):</p> <ul style="list-style-type: none"> • Visual checks, • Check of antenna pointing. <p>Installation steps & Line-up procedure:</p> <ul style="list-style-type: none"> • Loading a predefined configuration, • Change essential configuration parameters, • Required information for proper Line-up, • Procedures (perform tests, final adjustments, cross-pol & power settings). <p>Initial station operation:</p> <ul style="list-style-type: none"> • Basic monitoring (i.e. via LuM and LED indications), • Essential adjustments, • General pitfalls, • Troubleshooting procedure (Identify & localize general failures).
Target Group	Station commissioner (installation staff)
Duration	1 day
Prerequisites	<p>The following prerequisites are mandatory for the participant:</p> <ul style="list-style-type: none"> • Good knowledge in 'satellite communication fundamentals (VSAT)', • Good knowledge in 'installation basics (VSAT)' (e.g. like course 8010) • General good English language skills.
Environment	SKYWAN IDU 7000/1070 hardware, PC or notebook with SKYWAN Line-up Manager software (LuM), antenna system with RFT & LNB.
Methods	Lecture, hands-on (partly outside classroom), demonstrations, practical exercises.

1.2 Advanced Station Commissioning, Installation & Maintenance (8150)

Title	8150 – SKYWAN IDU 7000/1070 Station Commissioning, Installation & Maintenance
Level	Advanced / Expert
Objectives	<p>The participant will be able to: Commission a SKYWAN station to become a member of a SKYWAN network and perform tests at station level, i.e.:</p> <ul style="list-style-type: none"> • Install a SKYWAN indoor unit, • Setup a SKYWAN IDU with a predefined parameter set, • Run station specific functional tests, • Control relevant parameters for proper station operation, • Perform basic maintenance tasks. <p>This course is the mandatory prerequisite for the participation in the additional certification course 'Expert SKYWAN IDU 7000/1070 Station Commissioner'.</p>
Contents	<p>Work on various installation example cases:</p> <ul style="list-style-type: none"> • Focus on frequent pitfalls and most critical installation steps. <p>Station commissioning and operation:</p> <ul style="list-style-type: none"> • Run standard site acceptance test (SAT) procedure, • Run advanced trouble shooting procedures, • Interaction with the SKYWAN Network Operator. • Advanced monitoring. <p>Station maintenance:</p> <ul style="list-style-type: none"> • Perform basic / preventive maintenance tasks, • Failure localization, • Exchange of station components (IDU, IDU-boards, LNB, RFT).
Target Group	Station commissioner (installation staff)
Duration	2 days(if certification is required 1 additional day for certification)
Prerequisites	<p>The following prerequisites are mandatory for the participant:</p> <ul style="list-style-type: none"> • ND SatCom course 8140, • General good English language skills.
Environment	SKYWAN IDU 7000/1070 hardware, PC or notebook, antenna system with RFT & LNB.
Methods	Lecture, hands-on (partly outside classroom), demonstrations, practical exercises.

1.3 Network Commissioning & Operation (8240)

Title	8240 - SKYWAN IDU 7000/1070 Network Commissioning & Operation
Level	Basic / Specialist
Objectives	<p>The participant will be able to:</p> <p>Plan and configure an entire SKYWAN network ready for network operation based on a predefined design, i.e.:</p> <ul style="list-style-type: none"> • Set initial network & station parameter configuration, • Configure network management relevant parameters, • Monitor & control relevant parameters for proper network operation, • Maintain the required grade of service within the network.
Contents	<p>Description of SKYWAN solution:</p> <ul style="list-style-type: none"> • SKYWAN IDU features, • SKYWAN NMS features. <p>SKYWAN NMS installation:</p> <p>Initial parameter configuration:</p> <ul style="list-style-type: none"> • Network Configurator (Configuration groups & profiles concept; network planning, profile activation & configuration upload), • Satellite link (Configuration of station; network & master/ backup-master), • Network management parameter (Access control for node- & network management). <p>Monitor & control relevant parameters:</p> <ul style="list-style-type: none"> • Monitoring TDMA parameters (LED indications; essential parameters; monitoring screens), • Reconfiguration cases (Fully meshed to star; new frequencies; add 2nd demodulator), • Basic Pitfalls & Troubleshooting. <p>Configure user traffic:</p> <ul style="list-style-type: none"> • IP-feature overview (OSPF, RoHC, load-balancing, IP multicast, TCP-A) and IP-router configuration, • FR-feature overview and basic port configuration. <p>SKYWAN NMS network tasks:</p> <ul style="list-style-type: none"> • Network adjustments, • MIB statistics, • Useful graphs, • Network trouble-shooting procedures.
Target Group	Network Operator
Duration	5 days
Prerequisites	<p>The following prerequisites are mandatory for the participant:</p> <ul style="list-style-type: none"> • Good knowledge in TCP/IP basics, • Good knowledge in 'satellite communication fundamentals (VSAT)', • General good English language skills.
Environment	SKYWAN IDU 7000/1070 hardware, PC or notebook with SKYWAN NMS software, inter-cabling of some SKYWAN stations for a small network.
Methods	Lecture, hands-on with NMS tools, demonstrations, practical exercises.

1.4 Advanced Network Commissioning & Operation (8250)

Title	8250 - SKYWAN IDU 7000/1070 Network Commissioning & Operation
Level	Advanced / Expert
Objectives	<p>The participant will be able to: Plan and configure an entire SKYWAN network ready for network operation based on a predefined design, i.e.:</p> <ul style="list-style-type: none"> • Set initial network & station parameter configuration, • Configure network management relevant parameters, • Monitor & control relevant parameters for proper network operation, • Maintain the required grade of service within the network, • Perform necessary FAT- and NAT-procedures. <p>This course is the mandatory prerequisite for the participation in the additional certification course 'Expert SKYWAN IDU 7000/1070 Network Operator'.</p>
Contents	<p>Parameter configuration for certain use cases:</p> <ul style="list-style-type: none"> • Network Configurator (Configuration groups & profiles concept; network planning, profile activation & configuration upload), • Satellite link (Configuration of station; network & master/ backup-master), • Network management parameter (Access control for node- & network management). <p>Acceptance tests:</p> <ul style="list-style-type: none"> • Run FAT procedure, • Run NAT procedure, • Troubleshooting approach. <p>Special configurations:</p> <ul style="list-style-type: none"> • Station & network redundancy, • Basic configuration of serial interfaces (i.e. for standard user FR-traffic). <p>Configure & optimize user IP-traffic:</p> <ul style="list-style-type: none"> • Quality-of-Service features for IP-traffic, • Advanced router configuration. <p>SKYWAN NMS advanced network tasks:</p> <ul style="list-style-type: none"> • Advanced network adjustments, • Additional useful graphs.
Target Group	Network Operator
Duration	4 days
Prerequisites	<p>The following prerequisites are mandatory for the participant:</p> <ul style="list-style-type: none"> • ND SatCom course 8240, • Good knowledge in TCP/IP basics, • General good English language skills.
Environment	SKYWAN IDU 7000/1070 hardware, PC or notebook with SKYWAN NMS software, inter-cabling of some SKYWAN stations for a small network.
Methods	Lecture, hands-on with NMS tools, demonstrations, practical exercises.

1.5 Network Design & Engineering (8340)

Title	8340 - SKYWAN IDU 7000/1070 Network Design & Engineering
Level	Basic / Specialist
Objectives	The participant will have general knowledge about: <ul style="list-style-type: none"> • Designing & engineering SKYWAN satellite networks, • Usage of the SKYWAN IDU 7000/1070 TDMA calculation tool.
Contents	<p>Description of SKYWAN solution & features:</p> <p>General carrier design:</p> <ul style="list-style-type: none"> • Traffic calculation (Networking features overview; calculation tool & procedure), • Carrier design (Essential satellite link layer features: Master/ Slave concept, channel coding & modulation, topologies and populations, reference burst modes, data transport; TDMA parameter optimization tool & procedure). <p>Outdoor unit design (incl. satellite selection):</p> <ul style="list-style-type: none"> • Essential satellite link features, • Choice of satellite / transponder, • Outdoor unit design process, • SKYWAN link budget tool & procedure. <p>Detailed indoor unit design:</p> <ul style="list-style-type: none"> • Detailed SKYWAN IDU data, • IP features: IP router, static routing, dynamic routing (OSPF), differentiated services, robust header compression (ROHC), TCP-Acceleration, IP multicast, load balancing, • FR features: port types, basic FR service, traffic shaping, congestion management, communication services, FR multicast), <p>Design finalization & cost optimization:</p> <ul style="list-style-type: none"> • Optimization of network design, • Operational costs versus hardware costs.
Target Group	Network Designer
Duration	3 days
Prerequisites	The following prerequisites are mandatory for the participant: <ul style="list-style-type: none"> • Good knowledge in 'satellite communication fundamentals (VSAT)', • General good English language skills.
Environment	PC or notebook with SKYWAN IDU 7000/1070 TDMA calculation tool and MS Excel and SKYWAN link budget tool.
Methods	Lecture, demonstrations & exercises, hands-on tool training.

1.6 Advanced Network Design & Engineering (8350)

Title	8350 - SKYWAN IDU 7000/1070 Network Design & Engineering
Level	Advanced / Expert
Objectives	<p>The participant will have good knowledge about:</p> <ul style="list-style-type: none"> • Designing & engineering SKYWAN satellite networks, • Usage of the SKYWAN IDU 7000/1070 TDMA calculation tool. <p>This course is the mandatory prerequisite for the participation in the additional certification course 'Expert SKYWAN IDU 7000/1070 Network Designer'.</p>
Contents	<p>Work on various engineering example cases:</p> <p>Carrier & outdoor unit design:</p> <ul style="list-style-type: none"> • Focus on frequent pitfalls and most critical design steps. • Approaches for design optimization, • Usage of DDD template & result documentation, • Interfacing with 'Network Commissioning'. <p>Advanced traffic analysis and QoS-requirements.</p>
Target Group	Network Designer
Duration	2 days
Prerequisites	<p>The following prerequisites are mandatory for the participant:</p> <ul style="list-style-type: none"> • Participation in ND SatCom course 8340, • General good English language skills.
Environment	PC or notebook with SKYWAN IDU 7000/1070 TDMA calculation tool and MS Excel and SKYWAN link budget tool.
Methods	Lecture, advanced exercises, hands-on tool training.

2 OPTIONAL COURSE MODULES

For certain solutions e.g. with FAD voice multiplexers or flyaway antennas, dedicated / optional courses are available. Some examples you will find on the pages below:

2.1 Configuration of SKYWAN FAD (8243)

8243 – Configuration of SKYWAN FAD	
Title	8243 – Configuration of SKYWAN FAD
Level	Basic / Specialist
Objectives	<p>The participant will be able to: Configure a SKYWAN FAD for basic operation within the SKYWAN network, i.e.:</p> <ul style="list-style-type: none"> • Install a SKYWAN FAD unit, • Setup a SKYWAN FAD with a predefined parameter set, • Run specific functional tests of the unit and within a SKYWAN network.
Contents	<p>Description of SKYWAN FAD solution:</p> <ul style="list-style-type: none"> • Overview about FAD Series 9220 / 9230, • SKYWAN FAD features, • Hardware (interfaces, boards, functionalities, DSP SIMM), • WAN connection & PVC/R protocol, • Supported data protocols & voice codecs, • Configuration file & software images, • Interfacing with SKYWAN IDU. <p>Operator access & command line interface.</p> <p>Configuration section & relevant parameters.</p> <p>Basic pitfalls, test procedures and troubleshooting.</p>
Target Group	Network Operator or Application Configurator FAD
Duration	2 days
Prerequisites	<p>The following prerequisites are mandatory for the participant:</p> <ul style="list-style-type: none"> • Participation in ND SatCom course 8240, • Good knowledge in TCP/IP basics, • Good knowledge in 'satellite communication fundamentals (VSAT)', • General good English language skills.
Environment	SKYWAN IDU 7000 series hardware, SKYWAN FAD hardware, PC or notebook with SKYWAN NMS software, inter-cabling of some SKYWAN stations (with FAD) for a small network.
Methods	Lecture, demonstrations, practical hand-on exercises.

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2.2 Installation basics (8010)

8010 – Installation Basics (VSAT Station)	
Title	8010 – Installation Basics (VSAT Station)
Level	Entry / Beginners
Objectives	The participant will be able to: <ul style="list-style-type: none">• perform the proper installation of a VSAT station,• do the antenna pointing,• use the necessary equipment & tools.
Contents	The following topics are included: <ul style="list-style-type: none">• Antenna assembling & mounting,• Grounding & lightning protection,• Cabling & soldering (optional),• Mounting of ODU equipment,• Antenna pointing.
Target Group	Especially for persons new with installation tasks, who want to participate in the product specific courses (i.e. ND SatCom course for “station commissioning”).
Duration	1 day
Prerequisites	The following prerequisites are mandatory for the participant: <ul style="list-style-type: none">• Basic knowledge in ‘satellite communication fundamentals (VSAT)’,• General good English language skills.
Environment	Spectrum analyzer, antenna system with RFT & LNB.
Methods	Lecture, hands-on (partly outside classroom), demonstrations, practical exercises.

2.3 Satellite communication fundamentals (8000)

Title	8000 Satellite Communication Fundamentals (VSAT)
Level	Entry / Beginners
Objectives	The participant will get good knowledge about satellite communication fundamentals and will get the prerequisite knowledge to continue with our product specific courses.
Contents	<p>The following topics are included:</p> <ul style="list-style-type: none"> • History & benefits of satellite communication, • The satellite & the satellite link, • Units & definitions, • Multiplexing methods, • From voice to bits – digitization basics, • From bits to waves – modulation basics, • Basic VSAT ground station overview, • Antenna basics, • Transmit & receive components (demonstration waveguide), • Safety at work, • Spectrum analyzer basics, • Optional: Hands-on antenna pointing exercise.
Target Group	Anyone interested in satellite communication or persons new in satellite communication technology.
Duration	2 days
Prerequisites	<p>The following prerequisites are mandatory for the participant:</p> <ul style="list-style-type: none"> • General good English language skills.
Environment	Classroom
Methods	Lecture, discussion, demonstrations.

3 COURSE CERTIFICATE

The ND SatCom courses will provide a solid knowledge about the selected topic for the participant. The following knowledge levels within the available course sequence are introduced:

- Entry level (Beginners)
- Basic level (Silver - Specialist)
- Advanced level (Gold - Expert)

Customer will be able to go for:

- Participation in entry / basic / advanced level courses (without test),
- Participation in additional dedicated Expert certification courses.

ND SatCom provides currently the following standardized certification courses:

- Expert SKYWAN 7000 Network Designer,
- Expert SKYWAN 7000 Network Operator,
- Expert SKYWAN 7000 Station Commissioner.

By passing our certification courses a common and exchangeable base of proven knowledge and skills will be guaranteed.

All Expert certificates are valid for **2 years**. Prolongation requires a dedicated and timely re-certification.