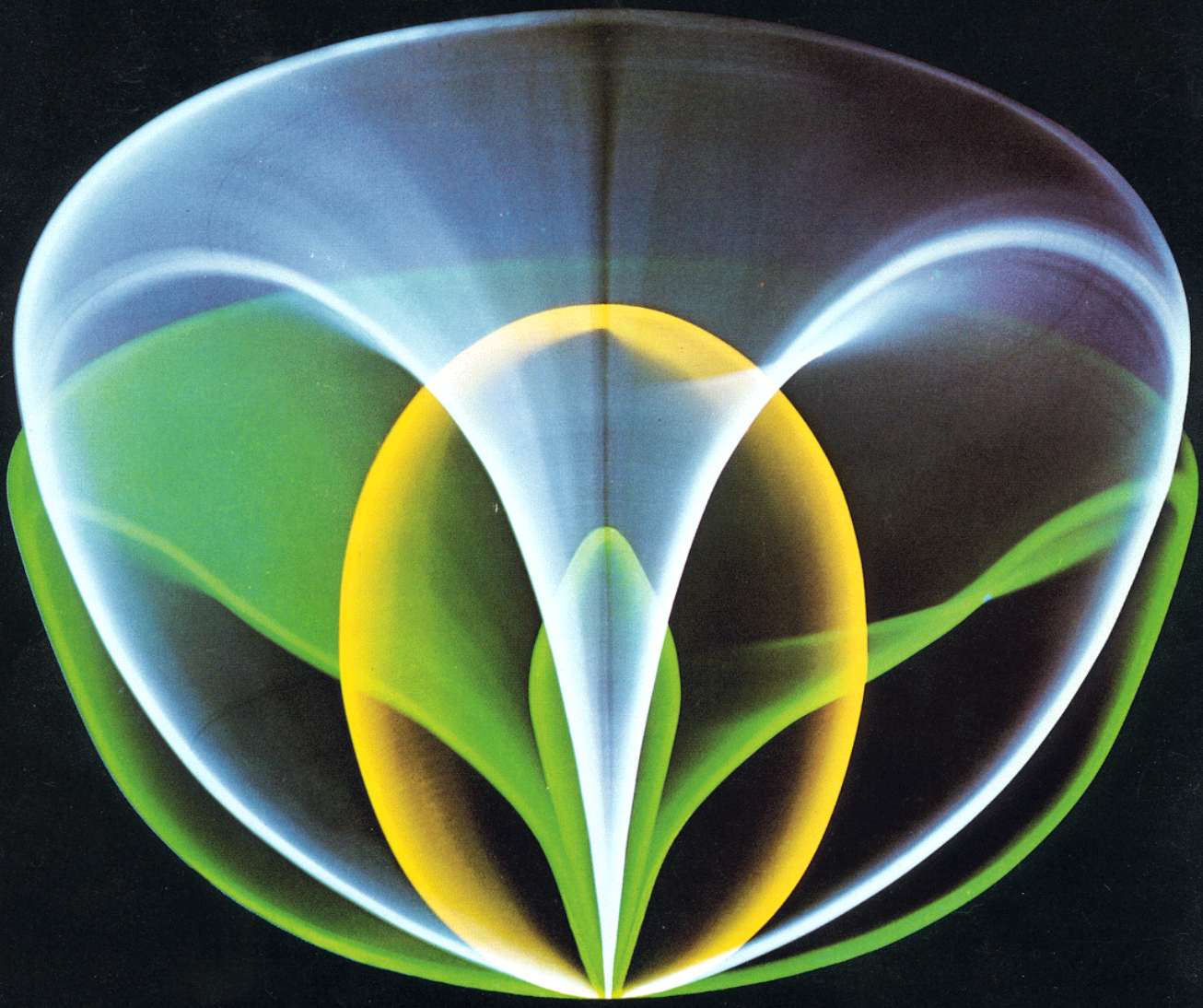
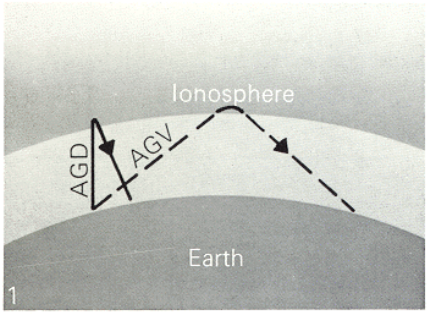
Zellweger
USTER

Zellweger Uster Short-Wave Broadband Transmitting Antennas



The Zellweger Antenna Systems AGD and AGV



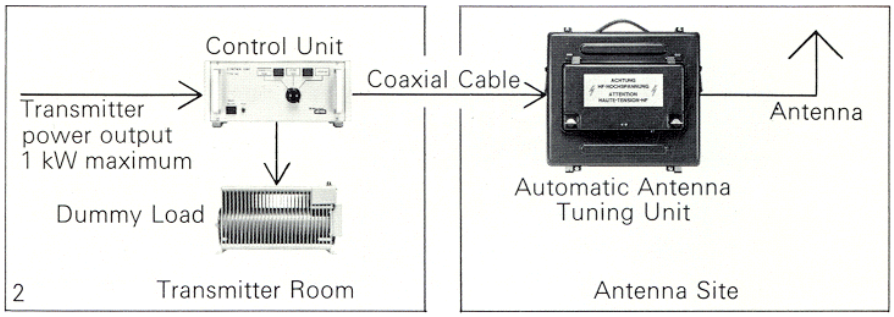
System AGD

The AGD transmitting antenna system has been designed to cover short distances by means of a dipole antenna with low mast height, thus producing mainly high-angle radiation. This AGD-system provides an excellent omnidirectional horizontal radiation pattern without skip zones up to 1500 kilometers, being especially useful in mountainous countries. Its pronounced high-angle vertical radiation is shown by the red lobes in the drawing below, whereas fig. 1 is indicating the resulting ionospheric reflection. The usable frequency range is from 1.8 through 14 MHz.

System AGV

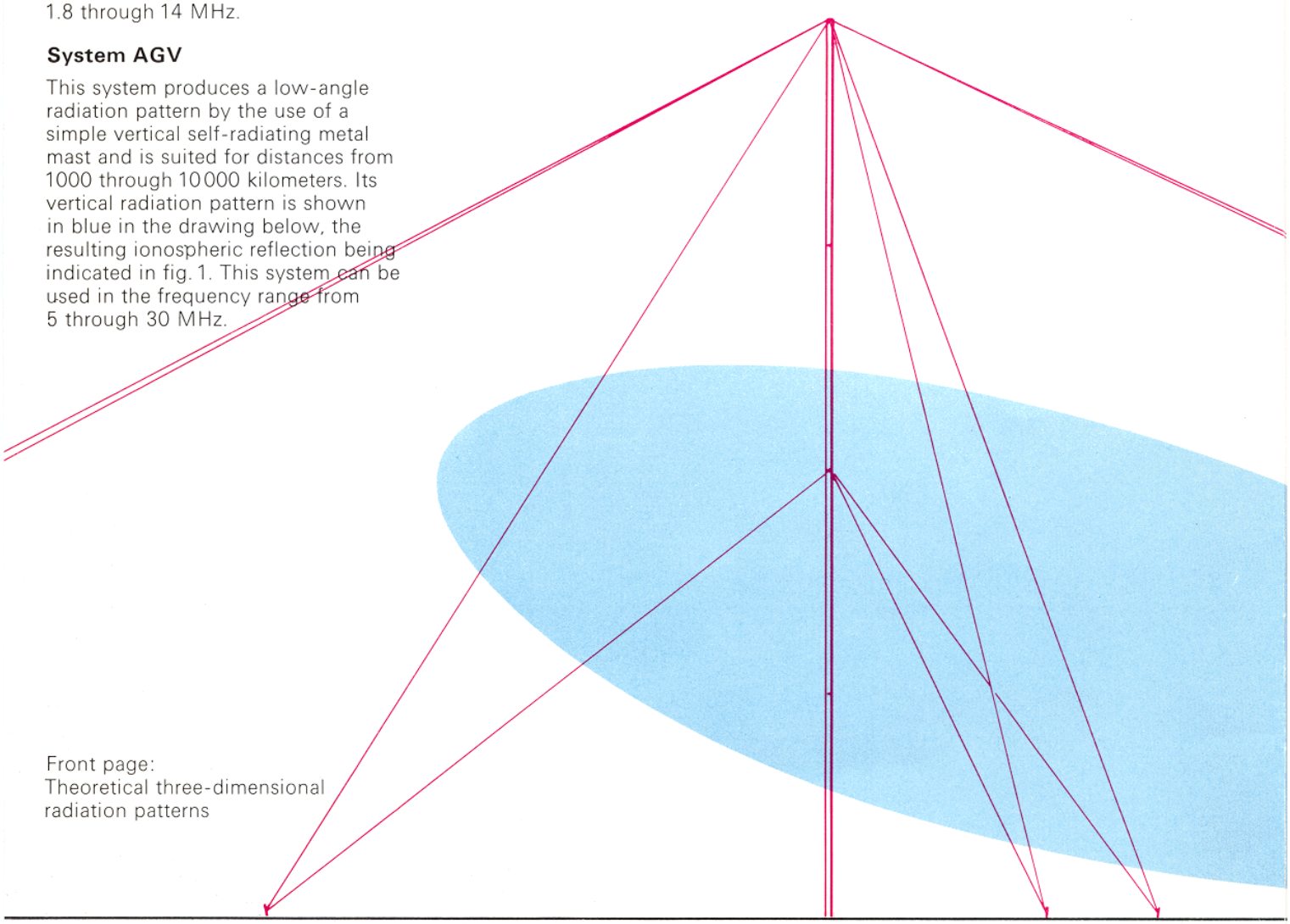
This system produces a low-angle radiation pattern by the use of a simple vertical self-radiating metal mast and is suited for distances from 1000 through 10000 kilometers. Its vertical radiation pattern is shown in blue in the drawing below, the resulting ionospheric reflection being indicated in fig. 1. This system can be used in the frequency range from 5 through 30 MHz.

System Layout



Apart from the antenna each system consists of an automatic antenna tuning unit, a dummy load and a control unit (see fig. 2).
The same control unit can be used with the AGD and AGV system as well. It can be delivered, however, in two different models: a semi-automatic unit, type KG and a fully automatic unit, type KGA. The control unit contains all control elements.
The dummy load should have the full transmitter output power rating.

The type of automatic antenna tuning unit to be used depends on the system chosen, AGD or AGV. It is located at the antenna mast base. The 50 ohms coaxial cable, carrying the radio-frequency and servo-motor power, may have a length of several hundred meters. No additional cables are needed between transmitter and antenna tuning unit, the latter only requiring the transmitter operating frequency for tuning information.

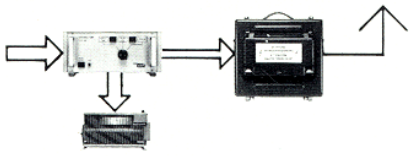


Front page:
Theoretical three-dimensional radiation patterns

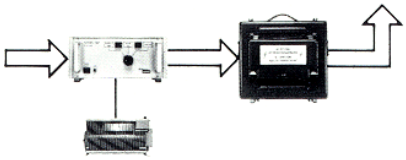
Ten salient Features

- Simple, land-saving broadband antenna which can be installed anywhere within minutes
- Rugged construction to meet military requirements
- Foolproof operation
- High tuning unit efficiency: better than 95%
- Exact matching: VSWR: typically better than 1.1:1, maximum 1.3:1
- Omnidirectional horizontal radiation pattern
- No additional control lines required
- Automatic antenna tuning without critical adjustment of transmitter output power, even full output power can be safely applied for tuning purposes
- Systems can be used with any transmitter of any make up to 1 kW output
- Wide variety of applications:
  – mobile, military and civil radio services
  – emergency and back-up communications
  – fixed stations having restricted available space or large distance between transmitter and antenna

How it all works



3



4

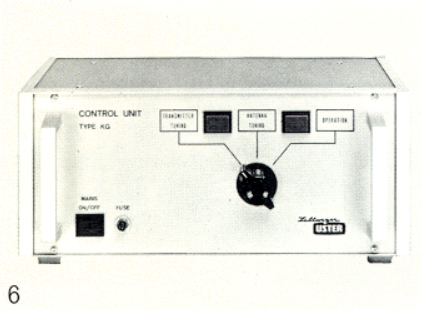
After switching on the equipment full transmitter output power is supplied to the control unit. This unit will then switch the main part of this power to the dummy load. A small amount of RF power will be carried to the automatic antenna tuning unit, enabling it to start the tuning process (fig. 3). After tuning has been completed, the control unit will switch the full transmitter output power to the antenna (fig. 4).

Installation: a Matter of Minutes

5

The highly mobile AGD system can be set up within 20 minutes by two persons. The light-weight 12 meter mast consists of 4 fiberglass parts and is guyed by means of 3 nylon ropes. Despite this light-weight construction the antenna will easily withstand high wind velocities up to 150 km/h. An area of only 14×60 meters will be needed to set up the AGD antenna, a significant feature which can easily become predominant, considering land cost for broad-band antennas without tuning unit for frequencies as low as 1.8 MHz. The AGD antenna system has been designed for easy transportation, see picture below technical specifications.

Operation: semi-automatic or automatic



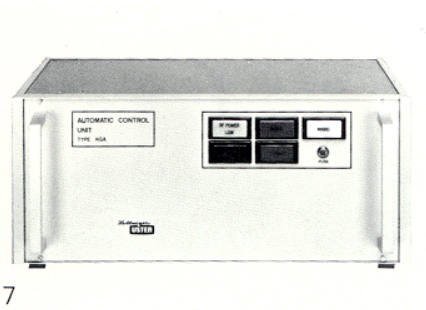
6

Operation and supervision of the antenna system will be controlled by means of the control unit. Depending upon the type of control unit being used, operation is very easy or is not necessary at all.

Semi-automatic Control Unit Type KG (see fig. 6)

Manual operation has been restricted to the operation of a three position sequence switch. A lighted arrow indicates the next position to be switched on:

- Set switch to 'TRANSMITTER TUNING'. Thus the dummy load is connected to the transmitter. Tune transmitter to full output power. As soon as there is enough RF-power for correct antenna tuning, the arrow between 'TRANSMITTER TUNING' and 'ANTENNA TUNING' will light up, pointing to 'ANTENNA TUNING'.
- Now the switch can be set to position 'ANTENNA TUNING' Thereby the automatic antenna tuning process will be started. As soon as tuning has been completed, another arrow will light up and point to 'OPERATION'.
- Then the switch can be put to 'OPERATION', thus the full transmitter power output will be switched to the antenna.



7

Automatic Control Unit Type KGA (see fig. 7)

This type of control unit has no switches at all. Therefore, it can also be used with remote controlled transmitters. The automatic control unit starts the antenna tuning process automatically as soon as a VSWR of 1.5:1 is exceeded. A coloured panel display shows the actual situation:

TUNING = tuning process running

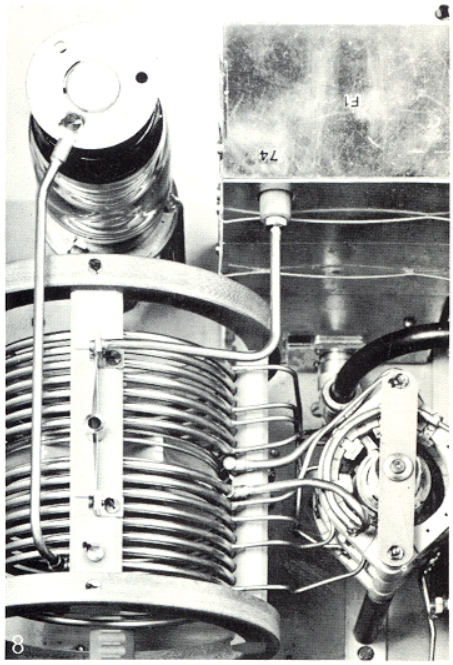
READY = antenna tuning completed

RF-POWER LOW = RF power too low for exact tuning

ANTENNA CABLE INTERRUPTED = cable between control unit and antenna tuning unit being interrupted

Remote indication of 'TUNING' can be applied.

Sound Technology throughout

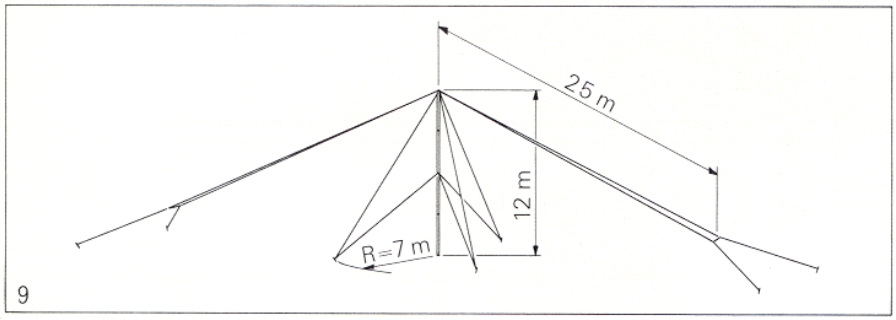


8

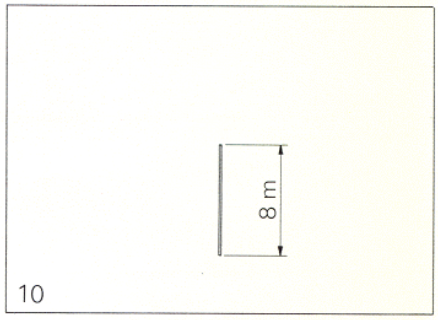
These antenna systems have been developed to meet stringent specifications and are used successfully in military, commercial and diplomatic communication networks. The automatic antenna tuning unit can be exposed to extreme weather conditions, the allowable environmental temperature ranges from –30 °C through +50 °C. High-quality components are being used within the weather-proof housing, such as vacuum capacitors and gold-plated copper tubing for the coils in the RF-power compartment, to guarantee long and trouble-free operation (see fig. 8). A mini-processor, controlling the automatic tuning procedure, is made up of high-reliability integrated circuits. Modular construction enables simple replacement, should repair become necessary. Maintenance-free servo-operation is assured by the use of brushless stepper motors.

03.4.3E/5.74/2000 Printed in Switzerland Fotos: U. Gantner Uerikon/Stäfa

Technical Specifications



9



10

System AGD

Antenna

Fan-dipole 2×25 meters (see fig. 9)

Mast:	height 12 meters, consisting of 4 fiberglass elements of 3 meters each
Radiation pattern	
– vertical:	high-angle radiation
– horizontal:	omni-directional

Automatic Antenna Tuning Unit AGD

Frequency range:	1.8–14 MHz
Maximum continuous power input:	1000 watts
Efficiency:	better than 95%
Input impedance:	50 ohms (type C connector)
VSWR:	typically better than 1.1:1 maximum 1.3:1
Operating temperature range:	–30 °C to +50 °C
Weight:	19 kg
Dimensions:	415×390×315 mm

Control Unit Type KG and KGA

Power supply:	220 V/115 V, maximum 0.3 Amps
Weight:	– type KG 5 kg – type KGA 15 kg
Dimensions	
– type KG:	329×149×184 mm
– type KGA:	435×190×244 mm suitable for 19" rack or table-top use
Coaxial connectors:	type C

1 kW Dummy Load

Weight:	11 kg
Dimensions:	216×151×420 mm
Optional for mobile applications:	reels containing 33 meters of coaxial cable type RG-217/U can be supplied

System AGV

Antenna

Self-radiating mast of 8 meters length

Radiation pattern	
– vertical:	low-angle radiation
– horizontal:	omni-directional

Automatic Antenna Tuning Unit

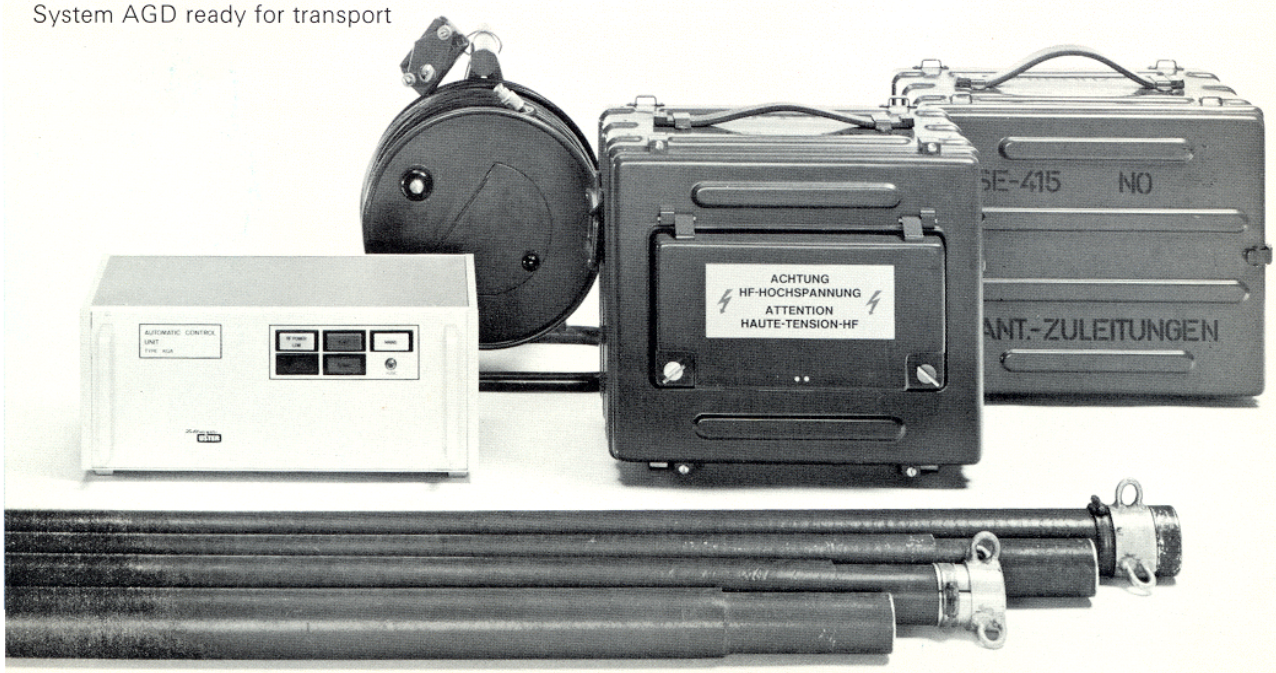
Frequency range:	5–30 MHz

Control Unit

Same types applicable as with the AGD system.

All other AGV-data are equal to the AGD-specifications.

System AGD ready for transport



The Zellweger Uster Group

Head office in Uster, Switzerland
Mobile 1 kW ssb-stations made by Zellweger Uster Ltd.

Zellweger Uster Ltd. is an international enterprise and maintains sales and service organizations all over the world. The head office is in Uster, Switzerland. All our organizations in Switzerland employ approximately 3000 people. In 1975 we shall celebrate the hundredth anniversary of our company.

Product Program

Zellweger Uster has a very diversified product program:

Radio equipment

We design and manufacture radio equipment since 1936. Our speciality besides wideband transmitting antennas are short-wave single sideband communication systems for voice and/or data transmission for various applications such as:

- mobile military and commercial communications
- radio communications over large distances, e.g. for diplomatic services

Non-radio products

Ripple control equipment for power distribution networks.

Electronic equipment for traffic requirements, e.g. speed radar.

Electronic instruments and installations for the textile industry, in particular testing and analyzing instruments for quality control, installations for yarn clearing, automatic monitoring and control installations for production control and data processing.

Machinery to increase productivity in the weaving mill, in particular semi- and fully-automatic machines for drawing-in warps and warp tying machines. Semi- and fully-automatic mechanical testing instruments for rationalizing quality control procedures in the textile industry.

Apparatus and installations for line operated communication and information systems.

Peripheral computer instruments, distributing electronics, telephone charge analyzers.

Electro-chemical laboratory equipment, apparatus for industrial electrochemical measurement and systems for chemical process control, e.g. textile wet treatment, metal surface treatment, waste water treatment, control systems for the food industry.

For your closest representative with regard to ZELLWEGER USTER radio equipment please write to:

Zellweger Uster Ltd.
Telinform Division
CH-8610 Uster/Switzerland

Phone 01/87 67 11
Telex 53587

03.4.3E/5.74/2000 Printed in Switzerland Fotos: U. Gantner Uerikon/Stäfa