

**Zeitschrift:** Technische Mitteilungen / Schweizerische Post-, Telefon- und Telegrafienbetriebe = Bulletin technique / Entreprise des postes, téléphones et télégraphes suisses = Bollettino tecnico / Azienda delle poste, dei telefoni e dei telegrafi svizzeri

**Herausgeber:** Schweizerische Post-, Telefon- und Telegrafienbetriebe

**Band:** 71 (1993)

**Heft:** 3

**Rubrik:** News Items

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**Download PDF:** 08.07.2025

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## Telephone

Both the *pilot networks with optical fibres in the subscriber network* (OFA) in *Les Planchettes NE* and *Sagno TI* were officially put into operation after a construction period of less than nine months. Approximately 100 households will be supplied with telephone and programme distribution services (radio and television) of the best quality via glass fibres in a passive optical network (FTTC/PON, Fibre to the Curb/Passive Optical Network).

Seven further *Natel C Base Stations* as well as two further *national highway tunnels* were put into operation for *Natel C*.

The *International Roaming for Natel D GSM* was commercially opened with eleven foreign operators.

## Teleinformatics

The *first series of SDH links* (synchronous digital hierarchy, 2.5 Gbit/s, that is  $16 \times 140$  Mbit/s) on glass fibres were put into operation as feeder lines in the Oberwallis broadband network. Television, radio and digital radio programmes are transmitted digitally from the receiving stations in *Feschel* and *Nendaz* to *Saas Fee* and *Zermatt*. The range will be completed with local programmes and fed into the broadband distribution networks of *Brig/Glis*, *Naters*, *Visp*, *Saas Fee* and *Zermatt*.

The first *ring in synchronous digital hierarchy (SDH)* set up in Switzerland is ready for operation: in Lausanne a synchronous ring was set up for the connection network with three 'Add-Drop' Multiplexers ADM1 in the Ecublens transmission equipment location, the University (UNIL) and the Federal Institute of Technology (EPFL). The multiplexers are connected with one another with glass fibres between university and institute even alternatively also via radio relay with the STM-1 bitrate of 155 Mbit/s. The ring will be controlled with a network management system from the Savoie transmission equipment location. From this pilot project, valuable information for an efficient network organization and the possibilities of an effective and modern network management with every operational consequence are expected. In addition, the transmission quality of

glass fibres and radio relay can be directly compared.

25 digital ( $17 \times 64$ , 56 kbit/s, resp.,  $3 \times 128$  kbit/s,  $2 \times 256$  kbit/s,  $2 \times 384$  kbit/s,  $1 \times 768$  kbit/s) and seven analogue lease-lines were put into operation via the *leaseline control centre* (LCC).

## Radio, Television and Radiocommunications

The following *permanent microwave radio links* were put into operation: in the long-distance network *Leuk-Sion* (2700 voice channels) for the bridging of bottlenecks in the cable network for the analogue traffic of the Leuk satellite earth station; *Vallorbe-La Sarraz* (140 Mbit/s) in the regional network; in the connection network *Lausanne University-EPF Lausanne* with a transmission capacity of 155 Mbit/s for testing the SDH (Synchronous Digital Hierarchy) radio relay technology in the connection network; *Hoher Kasten-Nendeln* for feeding the radio station ( $4 \times 2$  Mbit/s); and finally for the feeding of *Natel C* base stations *Niederhorn-Spiez*, *Niederhorn-Längenbühl*, *Schwarzenegg-Heimenschwand*, *Kleindietwil Centre-Kleindietwil Natel C*, *St. Chrischona-Rodersdorf* (all  $4 \times 2$  Mbit/s) and *Osterfingen-Schaffhausen Kohlfirst* (34 Mbit/s). Furthermore, the following *temporary* radio links were set up in January: *Solothurn-Tramelan*, with an active relay on the Chasseral (8 Mbit/s, 5 years); *Zürich Mühlebachstrasse-Zürich Wildbachstrasse* ( $4 \times 2$  Mbit/s, 1 year); in addition, a digital telephone radio link with 34 Mbit/s transmission capacity was put into operation between *Celerina* and *Lagalb* on the one hand as well as between *Lagalb* and *Poschivao* on the other hand.

31 *temporary microwave radio links* were set up and 16 put out of service in the year 1992. 78 links with transmission capacities of between 2 and 140 Mbit/s were in operation by the end of 1992. The connections serve as lease-lines, bridging measures during modifications and reconstruction of cable installations as well as for capacity increase in case of bottlenecks.

A further 15 *DAQS* (Data Acquisition and Quality Supervision) installations with modem connection were put into operation in 1992 for the quality supervision.

With these installations the parameters of all digital radio links in the long-distance and regional networks can be constantly monitored. At present, 44 stations are thus equipped, and additional stations will be furnished in 1993.

Two new voice circuits of the SCPC (Single Channel Per Carrier) type were put into operation with *Cuba* via the Leuk-1A satellite earth station and the Intelsat satellite 325.5° east.

Within the framework of the *regional language programme exchange in Wallis*, the following *FM broadcasting stations* were put into operation: *Gebidem* on the 90.8 MHz frequency for supplying Oberwallis and Vispental with the RSR-1 programme, *Ravovre* (89.6 MHz) and *Haute-Nendaz* (92.0 MHz) for supplying the Rhone valley from St-Maurice to Sion and from Sierre to Sion, respectively, with the DRS-1 programme. Additional stations will follow.

A *television radio link connection* was put into operation between the *Poschivao* and *Celerina* multipurpose stations as feeder for the RAI-1 programme in the Oberengadin. In addition, an identical installation was put into operation as feeder of the ARD programme in the Poschivao valley between the *Lagalb* and *Poschivao* multipurpose stations.

The following towns were made accessible with new *Citycall B* transmitters: *Ins*, *Les Diablerets*, *Porsel*, *Saas Fee*, *Simplan* and *Sisseln*.

## Miscellaneous

The *Telemed* Project of the European Race Research Programme was officially concluded in December in Berlin in the presence of EC representatives. In this project the application of the broadband video and data communication in the medical fields of radiology, cardiology and psychiatry was tested. Over 40 project partners from ten EC and EFTA countries, university hospitals, industry and telecommunications have taken part in this work since 1989. The *PTT with Megacom* and the *informatics department of the Geneva University Hospital* participated from Switzerland. Telemed is referred to as one of the most successful Race projects of all. The results of the whole project will be available and published by the middle of 1993.