

Swiss Section Visit to ComLab AG in Ittigen near Bern

Perhaps the most successful technologies are those which we use without even being aware that they are there, and this has quickly become the case with the systems required to operate Switzerland's two Base Tunnels. In fact, a group of 'Elderly Adventurers' encountered on a recent journey to Biasca were so busy discussing their 'angst' at soon being so far underground at such 'high speed' in the Gotthard, that they passed through the tunnel without realising it!

Similarly, and more significantly, the American Couple engrossed in planning their next three days in Milano on their Personal Digital Devices. They paid no regard to how, with two thousand metres of solid rock above them and the nearest daylight twenty-seven kilometres away, they could still reserve their seats for Verdi's Nabucco at the Teatro alla Scala! Suddenly proclaiming, "Oh, its dark outside, are we in a tunnel?" they gave no thanks to the engineers who provided the innovative Radio Transmission Technology now contributing to their holiday experience.

Not so the 17 Members and 2 Guests of the IRSE Swiss Section who met at ComLab's premises in Ittigen on the afternoon of 10 November '17. They came with the very purpose of discovering how such technology has been developed and so successfully implemented, not only in Switzerland's tunnels, but in many locations worldwide where 'normal' Radio Reception would otherwise have proved impossible.

ComLab CEO, Peter Härdi welcomed the group to the company's premises and gave a brief resumé of the company's history. Established in 1976 as a manufacturer of RF Filters the product portfolio was constantly developed such as to enable the company to commission its first Tunnel Radio Transmission System in a road tunnel in 1988. The increasing need for bespoke radio systems in railway applications led to the first Railway Tunnel Radio Project in 1998 and the creation of a 'Railway Department' within the company.

In the meantime, whilst ninety employees maintain product development and production in Ittigen, the company has a further 130 employees worldwide including a significant number in a subsidiary in Beijing. Despite starting in road tunnels there are now over six *thousand* kilometres of railway tunnel fitted with ComLab systems, compared with 'only' eight hundred kilometres of road tunnel. To compliment these tunnel systems, on-board repeater systems for trains soon followed, thus enabling visitors to Switzerland to be otherwise distracted, should they find the magnificence of the scenery presented through the train windows to be monotonous!

Of course, it was the operational needs of the railway, including the introduction of GSM-R as an enabler for ETCS Level 2, which drove the development of these systems and it is the requirements for these which still primarily drive the further development. Understandably it is the RAMS requirements which define the design solutions necessary for railway tunnels and Urs Amstutz, the manager of the current project for the radio installations in the Ceneri Tunnel¹ gave the group an insight into how the recently approved design for this was developed.

He also explained that an important aspect of such long-term projects as tunnels is to recognise at the beginning that the radio systems which will be put into operation at commissioning probably don't exist at the time of contract award! This is particularly the case with the Public Provider Systems for which new developments with ever higher capacity and bandwidth needs

¹ Members attending the 2018 IRSE Convention will be able to inspect these installations in the Ceneri Tunnel, for themselves.

are repeatedly being introduced. Another similar example he mentioned is the current development being undertaken to enable accurate GPS signals to be provided in long tunnels.

The realisation of good performance, especially in such high frequency applications, can only be achieved with sufficient care and attention to detail in the production and layout of the actual hardware as well as the provision of enclosures suitable for the harsh environment and restricted space found in tunnels. Restricted space, and restricted access times, must also be reflected in the Maintainability of such equipment. This was well demonstrated to the group during a tour of the manufacturing and testing facilities where the current activities were explained by those employees carrying out the work.

Here the group not only saw systems for railways but also radio frequency products for other specialised fields, including military applications, identification and positioning systems, directional radio and broadband transmission. Products for Selective Radio Frequency Suppression are also designed and manufactured by ComLab. These are for use in applications such as convoy protection and prison security and the challenges presented by the design and use of these “Jamming” systems were also explained.

After completion of the tour of the production and test facilities the group was invited back to the lecture room for the opportunity to discuss the technology and its application ‘one to one’ with the company’s Technicians and Engineers whilst partaking of an Aperitive Buffet which they had prepared for the group. The Swiss Section’s Chairman, Daniel Pixley gave a vote of thanks to ComLab for a most enjoyable, informative and interesting afternoon. In the discussion around the buffet, the future replacement of GSM-R, and the introduction of ‘4G’ and ‘5G’ were not the only topics to be heard as many of the members were interested in the purpose, use and legality of ‘Jamming’ systems!

In this case, quite an appropriate final discussion, as the increasingly exact application of the Requirements defined in the IRSE News Production Manual, will effectively ‘jam’ future contributions from this pen to this journal. Thank you to those readers who have tolerated previous similarly ‘non-compliant’ reports from the Swiss Section.



Members listen as Daniel Pixley (2nd from right), gives a vote of thanks to Peter Härdi (right) for an interesting visit and an appetising buffet.