



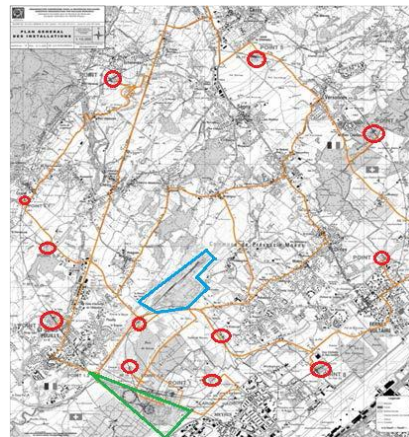
Mobile services at CERN

Frédéric Chapron

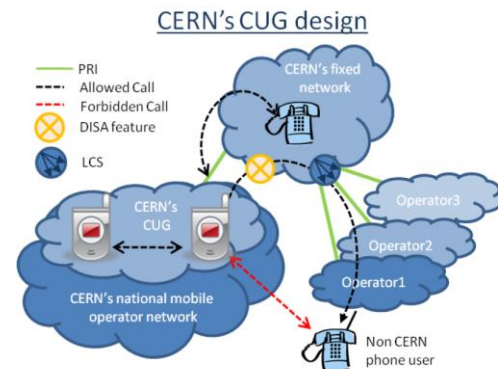


Early ages of mobile services at CERN

- 1991 birth of “GSM” technology !
- From 1994 to 2003 at CERN
 - GSM to replace of an old pager system
 - « Compte rendu d'une réunion informelle (3 février 1994) concernant la recherche de personnes (RP) et le téléphone cellulaire (GSM) »
 - Authors: F. Caspers, J-J. Gottraux, B. Reinseth, M. Ruette
 - Monopoly context with national telecom operators
 - Swisscom becomes the first CERN mobile provider
 - Deployment of mobile infrastructure at CERN
 - Full coverage of CERN surface sites
 - Some Swisscom transmitters located in France
 - Partial coverage of tunnels and experiments
 - Introduction of innovative services
 - Close user group
 - Email to SMS
 - CERN APN

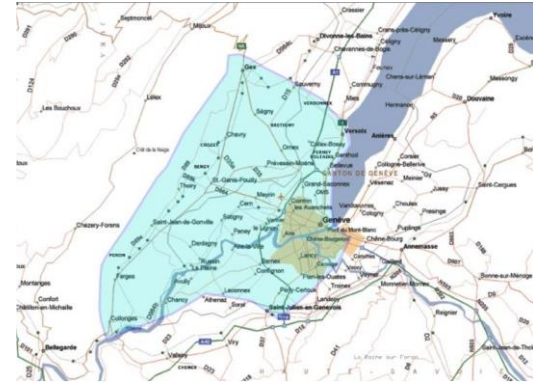


GSM transmitter locations



New actors on the market

- End of the 90s,
 - End of national telecom monopoly
 - New actors appears on the market
 - Sunrise and Orange Communications (Salt) for mobile services
 - Many telecom operators for fixed telephony services
- In 2002, CERN invitation to tender for mobile services
 - Sunrise won the contract !
 - Replacement of Swisscom infrastructure
 - Swisscom replaced by Sunrise in Pays de Gex!



CERN GSM network coverage



Louis Guerrero, chef du service télécommunications du CERN (à gauche)
Jean-Claude Som, directeur de Sunrise pour la Suisse romande
(photo de swissinfo.ch)

Sunrise period

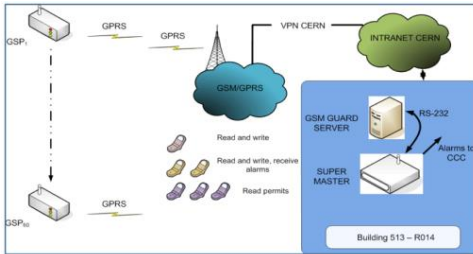
- From 2003 to 2015
 - Increase of mobile subscriptions (3000 to 7000)
 - Introduction new data services
 - GPRS, EDGE, UMTS 900 (2013), HSDPA, HSDPA+
 - Extension leaky feeder infrastructure to cover all tunnels and experiments
 - Suppression of 333 prefix for outgoing GSM calls (2007)
 - In-house development of leaky feeder monitoring system (2009)
 - 6 July 2015, a user makes a bill of 38.163,42 CHF in three days!



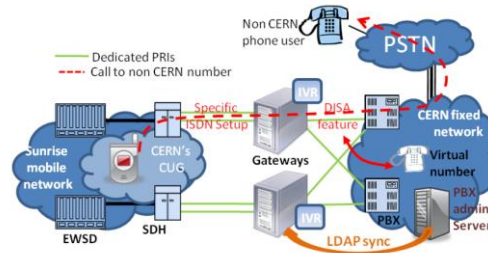
Luis Guerrero, Jean-Jacques Gottraux, Gillian Bezard-Brown, Frédéric Chapron from the CERN telecom team



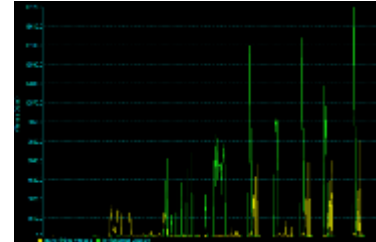
Rodrigo Sierra from the CERN telecom team
Gerald Tejedor from Sunrise
3G test in LHC



GSP monitoring project



333 prefix suppression



First 3G download in LHC (18 Mbit/s)

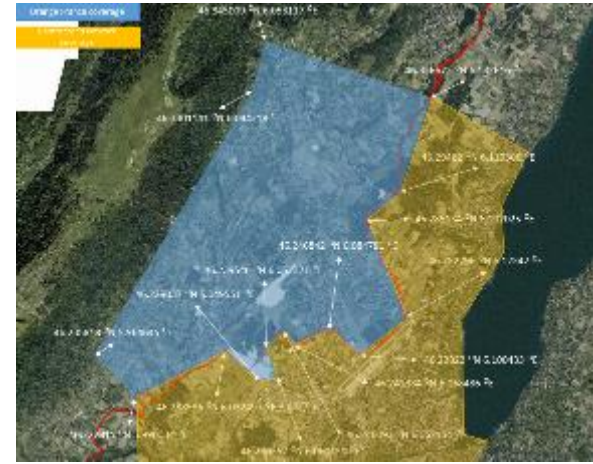
New mobile contract ...

... new surprises

- In 2015, Swisscom won the CERN mobile contract, but
 - A legal issue appeared for the Swiss transmitters installed in France
 - (Forced) collaboration with Orange
 - Technical problems
 - CERN subscription scheme not applicable
 - Communication cuts when moving from FR to CH networks
 - Many loss of calls around the border
 - Roaming costs

New Swisscom period

- From 2015 to now
 - (2015) Introduction of LTE services in underground
 - (2016) First solution to interconnect “Orange Local VLR region” (Haute-Savoie and Ain department)
 - Allow the management of specific CERN subscriptions but does solve other issues
 - (2018?) Development of E-PLMN solution
 - Eliminate (reduce) call loss at border area



Outdoor coverage on CERN sites
With Orange and Swisscom

Conclusion

- Challenging environments enable innovative solutions
- But don't forget to (re)assess the context of your project, even if it looks like a continuation of an on-going activity



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