

External activity: Long-distance links

E. Pietrosemoli, C. Fonda and M. Zennaro
ULA Merida, Venezuela and ICTP Trieste, Italy

*** morning:**

*** ICTP (GGH) to Muggia**

*** GPS coordinates are on the website**

*** we meet in the Lab @ 9:00 sharp**

*** we take the bus at 9:15, no waiting!**

*** work in Muggia: 10:00 - 11:30**

*** estimated time back: 12:30**

*** afternoon:**

*** ICTP (AGH) to Grado**

*** GPS coordinates are on the website**

*** we meet in the Lab @ 14:00 sharp**

*** we take the bus at 14:15, no waiting!**

*** work in Grado: 15:30 - 17:30**

*** estimated time back: 19:00**

Tasks to do (1)

- * site survey in both locations:
 - * visual check for line-of-sight
 - * spectrum survey with the portable SA to identify the best channel to use
 - * survey for best location for the non-penetrating antenna mount
 - * survey for the solar panel installation

Tasks to do (2)

- * preparation of the radiolink:
 - * mounting of the antenna mast
 - * power supply (solar panel + inverter + batteries)
 - * survey for the solar panel installation
 - * cabling and testing of power supply

Tasks to do (3)

- * preparation of the radiolink:
 - * installation of the antenna on the mast
 - * preliminary antenna alignment with compass and GPS
 - * fine antenna alignment with Signal Generator and Spectrum Analyzer

Tasks to do (4)

- * installation of the radiolink:
 - * mounting of the radio station (and power amplifier if needed) on the mast
 - * RF cabling, ethernet cabling
 - * test of the link with portable computer

Tasks to do (5)

- * usage of the radiolink:
 - * file transfer (ftp) with throughput measurement
 - * audio and video conference (QoS testing)
 - * signal strength measurement with software and comparison with SA

Tasks to do (6)

- * additional tests:
 - * comparison of different antennas
 - * test with and without power amplifier
 - * sensitivity to antenna mis-alignment
 - * all measurements and readings should be recorded for further analysis

experiments - 1

- * ICTP - Muggia:
 - * 2.4 GHz 802.11 b/g
 - * 5.8 GHz 802.11 a
 - * 54 GHz proprietary protocol
 - * several types of antenna
 - * experimental test with USB wireless adapter and parabolic dish

experiments - 2

- * ICTP - Grado (26.5 km over the sea !!!):
 - * 24 GHz 802.11 b/g
 - * with/without power amplifier
 - * QoS for audio-video conference ???

equipment checklist

- * preparation of the equipment the day before
- * checking before departure in the morning!
- * coordinators are required to care of the items

radios

- * Metrix box "Mark II" with 2 radios:
 - * 802.11 a/b/g
 - * 802.11b High Power)
- * Alvarion "BreezeAccess" 5.4 GHz link
- * RTX handheld radios for voice communications

RF cables

- * pigtails for all radios and antennas (check!)
- * short and long coax cables
- * adapters for the measuring equipment
- * lightning arrestors (check gender!)
- * (grounding)

computer and networking

- * one or more laptops with signal strength measuring software, network utilities and audio/video conference applications
- * (software for AP configuration and monitoring, if needed)
- * ethernet cables, power supplies, webcam

radio stations

- * ICTP:

- * Signal generator and Spectrum Analyzer

- * Remote Site:

- * Portable Spectrum Analyzers
(Bantam + Rohde&Shwarz)

additional items

- * antenna mast
- * tools for mast installation (pliers, wrench, rope for fixing the mast in case of wind)
- * binoculars, compass, GPS, maps
- * paper and pen for taking notes! ;-)

Personal items

- * It may be cold, be properly dressed!
- * Hat and gloves are recommended.
- * Some walking is needed, use comfortable shoes (no high heels!)
- * No coffee break provided on field :-)