

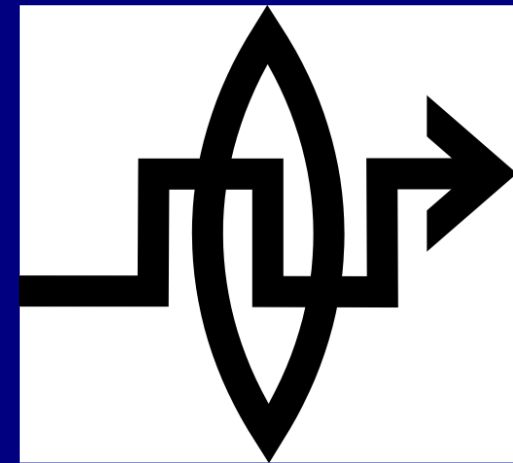
# RONJA



Optical Wireless Point To Point Ethernet  
Karel Kulhavy, Zurich

## *Technical data*

- 480,000 / 340,000 GHz – red, infrared
- 10Mbps full duplex
- BER  $10^{-9}$
- RTT < 1ms
- Range 1.4km



**RONJA  
PROJECT**

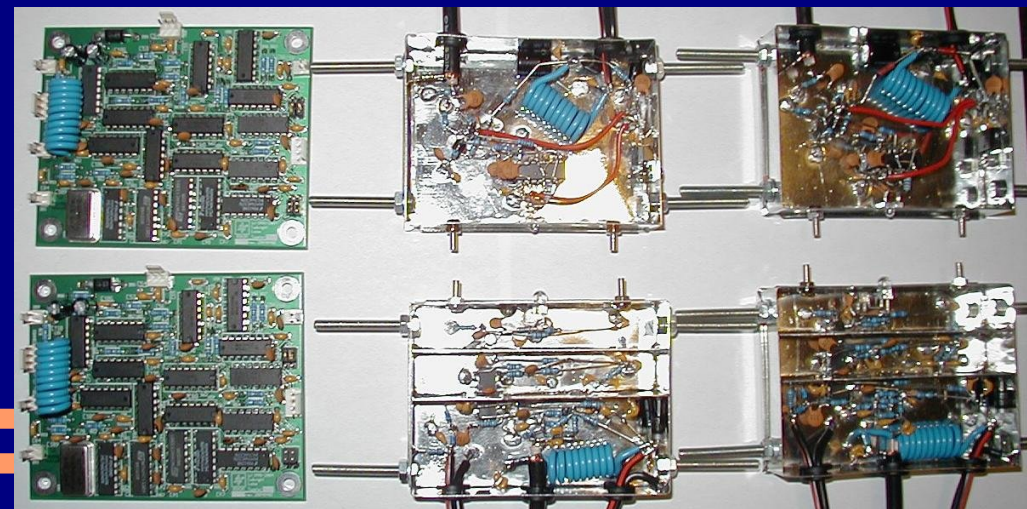
# Features

- Good chainability
- Realtime home cinema with Samba / 2 links
- No slowdown during 100% load
- Fails in dense fog
- Requires a solid mount



## *A link consists of...*

- 4 magnifying glasses
- 4 smoke pipes
- steel parts
- 426 electronic components
- ~\$300,- material
- ~70 hours building time



## *User friendly*

- DIY friendly parts and construction
- Ready made PCB files
- No understanding needed
- Online instructions under GFDL licence
- Should work on the first try



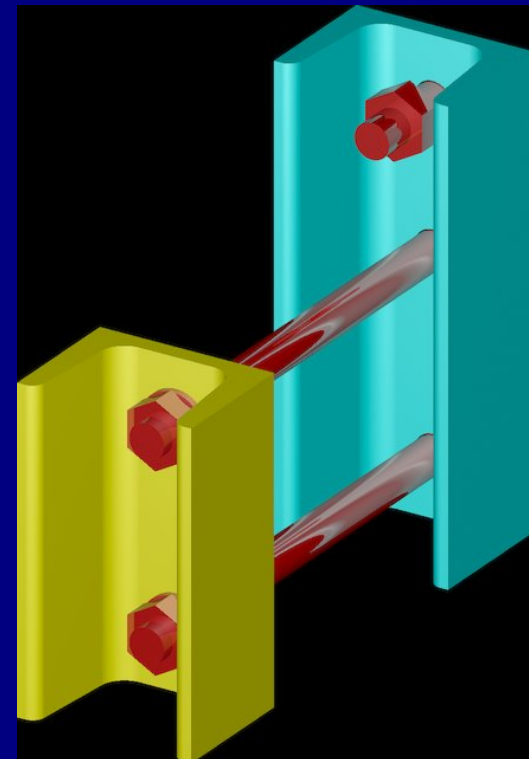
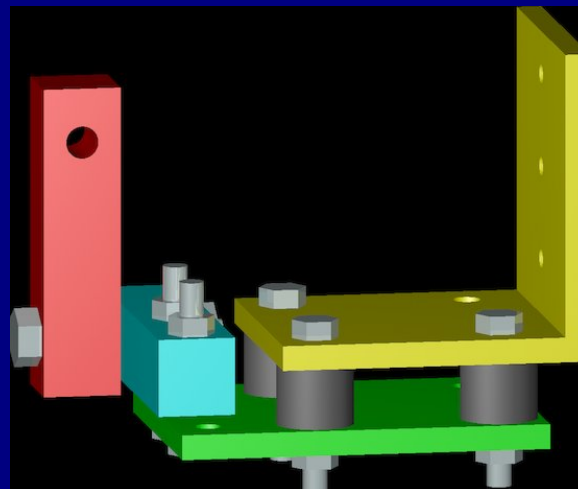
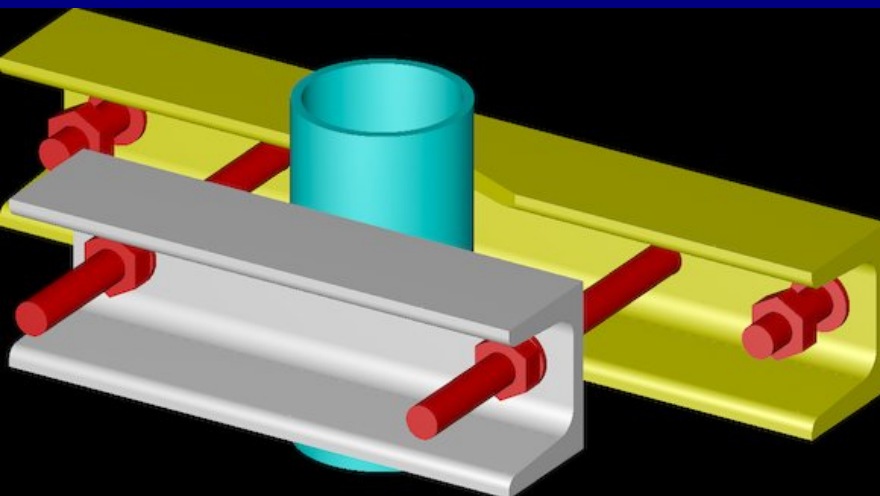
## *History etc.*

- Since 1998
- 115.2 kbps first, 10Mbps Christmas 2001
- 2x slashdotted
- 153 registered installations
- Slovak dormitory: 1000 students, 900m
- IEEE conference article
- NCSU experimental underwater link



# *Free Software*

- Qcad, BRL-CAD
- Gschem, Gerbv, Gnucap
- Gnuplot, GNU R
- Gimp, Sodipodi, Autotrace, ImageMagick
- GNU Make, Subversion, Rsync



# *Continuing Development*

- Bugfixes
- Releases of unreleased parts
- Increase range
- 100Mbps and 1Gbps would be nice





# *Thank You For Attention*

- Twibright Labs Ronja
- <http://ronja.twibright.com>

