Remote Control and Monitoring of VLBI Experiments by Smartphones

Cristian Herrera, Hayo Hase, Octavio Zapata, Felipe Pedreros
Transportable Integrated Geodetic Observatory - TIGO
Agenda

- Introduction – Motivation
- Existing remote control Software
- Jmonan Features
- General and application scheme
- Screenshots
- ToDo
- Conclusion
Motivation

- Lack of operators in TIGO.
- Lack of use of mobile technology for VLBI.

The idea:
Use a smartphone for monitoring and controlling of VLBI experiments.
Existing rc-software for PC (1)

- FS Remote. (Alexander Neidhardt, Martin Ettl (FESG))
Existing rc-software for PC (2)

- Monan and Pymonan (TIGO)
Smartphones programming

- Native development
  - JAVA
  - C and C++
  - Only work on the plataform

- Web development for smartphones (JMonan)
  - Javascript
  - PHP
  - Multiplataform. (Browser)
Features of new development

Jmonan

- Client-Server architecture based on TCP/IP
- Interface optimized for smartphone screen
- Multi-platform
- Uses FieldSystem and station shared memory
- Highlights errors and warnings
- Watchdog server
- Needs only a smartphone with browser (HTML-Javascript)
Features of Jmonan

- Visualized actual status of:
  - Radio telescope (mode, position, velocity, brakes)
  - Receiver (cryo params, box temperature, voltages)
  - Schedule (session, source)
  - Recorder (recording on/off, scan name, capacity)
- Input of commands to the FS (remote control!)
- Displays the log entries
- HTTP Security (login)
- Webcam Interface (visual control)
General Scheme

FieldSystem PC

Firewall

Web Server

Smartphone

Jmonan Server
FS Shared Memory
Station-Specific

Security (2)

Apache
PHP
Security (1)

HTML
Javascript
Browser

Cristian Herrera Ruztort
Universidad de Concepción - CHILE
Network optimized

- 3 seconds update (customizable)
- Not load the entire page and values.
- Average 2KB each update.
Server Side

- Running on the FieldSystem PC
- Design separation on three services
  - Monan (Monitoring Antenna)
  - Oprin (Operator Input)
  - Log (Log Entries)
- Written in C
- Watchdog
WebServer Side

- Apache Webserver
- HTML
- Javascript
  - Ajax
  - Jquery framework
- PHP
Screenshot Antenna Status

Antenna Status Parameters

Schedule Status Parameters
Screenshot Receiver Status

Receiver Status Parameters

System Temperatures
Screenshot Recording Status

Mk5 Status Parameters
Screenshot Operator Input - Log

Operator Input

Log

Entries

2011.299.19:22:46.03/fmout_gps/5.14130E-7
2011.299.19:23:04.31;mk5=protect=off
2011.299.19:23:04.31?ERROR m5 -900 Incomplete
2011.299.19:23:04.32?ERROR m5 -904 MARK5 return code 4: error encountered (during attempt to
Screenshot Webcam image

Webcam Interface
To Do

- Packaged versions
  - Android (Most smartphones)
  - IOs (Iphone)
  - Symbian (Nokia)
- Autocomplete (Operator input)
- Command History
- Standard for other stations
Conclusion

- Is a new software for smartphones and enables remote control and monitoring of VLBI radiotelescopes.
- Is a useful tool for understaffed VLBI stations.
- Was developed and tested successfully at TIGO during 2011.
- Software code is available under GNU public license via personal contact: cherrera@tigo.cl.
Interested?
cherrera@tigo.cl

The End