Concepts for continuous quality monitoring and station remote control

NEXPRes

FESG

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Continuous quality monitoring

What does it mean?

(external) observer

- Status of telescopes?
- Is the telescope on source?
- How is the receiving quality?
- Environmental Information
  e.g.: temperature

Image from: http://www.thebollard.com/story_views/observer_8.20.06.html
Continuous quality monitoring and remote control

(external) observer

(act and react)

information

(act and react)

...
Continuous quality monitoring and remote control

Status before:

- No realtime access from correlators to read observation status (quality control through fringe checks/logfile monitoring etc.).
- No remote realtime error detection and reaction.
- No direct (read) access to fieldsystem parameters from remote.

- Extend the field system remote control software with
  - Authentication
  - Authorization
  - User and role management
- Provide a concept for station monitoring to support remote control.

WP5
Task3

3 years
The remote control principle
(local area network)
The remote control principle
(internet)
Software components

- **econtrol server**
  - based on idl2rpc.pl communication software generator
  - remote procedure calls via TCP/IP networks

- **econtrol client**
  - establish ssh-connection(s)

- **sshbroker**
  - graphical user interface

Wettzell Software Toolbox
Software components

- timecalc
- orbitcalc
- sshbroker
- socket communication
- serial communication
- crc32
- config file parser
- AES 256
- C/C++ - ansi compliant

...
e-RemoteCtrl features
e-RemoteCtrl-software

- **Status monitor**
- **Logging**
- **User input**
- **Connection information**
- **Mark 5 capacity**
- **System temperature**
- **Connection state**
e-RemoteCtrl-software
(logging and operator input)

- Permanent logfile filter
- Alarm sound (on/off)
- Filter logfiles by userdefined tokens
- Safe logfiles
- Operator Input
- Commandline history
e-RemoteCtrl-software
(mark5 capacity)

Pie-charts
Direct-labelprint
Label selection

new view
classic view
e-RemoteCtrl-software
(system temperature)

- select frequency
- scale
- plot over time
- classic view
Authentication and authorization

- This requires an authentication and authorization mechanism.

  confirm someone is authentic → give him a role

  Password + Username

- Each station manages dedicated access rights for every individual client.
- Configure fine grained access levels, e.g:
  - allow monitoring only
  - allow/deny changing source coordinates during session
  - ...


Role management

Name of role
- Observer
- Notifier
- Scheduler
- Agent
- Operator
- Superuser

User rights

Number of users
System monitoring

- **Collect data**
  from several sensors at the telescope and site
- **Visualize**
  the data with graphs and diagrams
- **Archive**
  the collected data
  
( **React**
 according to predefined rules )

→ Get a better knowledge about the system behavior during
  1. Session
  2. Post processing
<<include>>:
software module interface with functions of MCI stdinterface and MCI interface

* Database benchmarks are required
System monitoring

Safety-system display

Windsensor display

MCI Collaboration Group (Wettzell/Haystack)
Hierarchical design

e-RemoteCtrl (VLBI and SLR, ...)

e-RemoteCtrl (SLR)
e-SysMon
e-SysMon
e-SysMon

e-RemoteCtrl (VLBI) e-SysMon e-SysMon e-SysMon e-SysMon

e-SysMon e-SysMon e-SysMon e-SysMon
Hierarchical design for distributed systems
Take a look at our poster!
Development strategies: continuous integration

Metrics
wxgui: ~300 000 LOC
tools: 430 000 LOC
vlbi: 150 000 LOC
sysmon: ~117 000 LOC...

Take a look at our poster!
Development strategies: continuous integration

- Detect memory leaks, resource leaks, ...
- Compile with several compiler-versions
- Tests on function or module - level
- Generate a developer Information.
- Format the source code automatically
e-control-software homepage

http://econtrolsw.wettzell.de
Major Milestones (current status)

- **2010**: Preliminary work
- **2011**: Authentication & authorization, System monitoring, Integration into Fieldsystem
- **2012**: Role management
- **2013**: Test + experiments, Test + experiments, Test + experiments

Class on e-RemotCtrl – usage TOW/Haystack (May 2011)
Thank you!