ENMO® hydro
ENVIRONMENTAL MONITORING

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developments in dynamic, continuous and automated water quality monitoring

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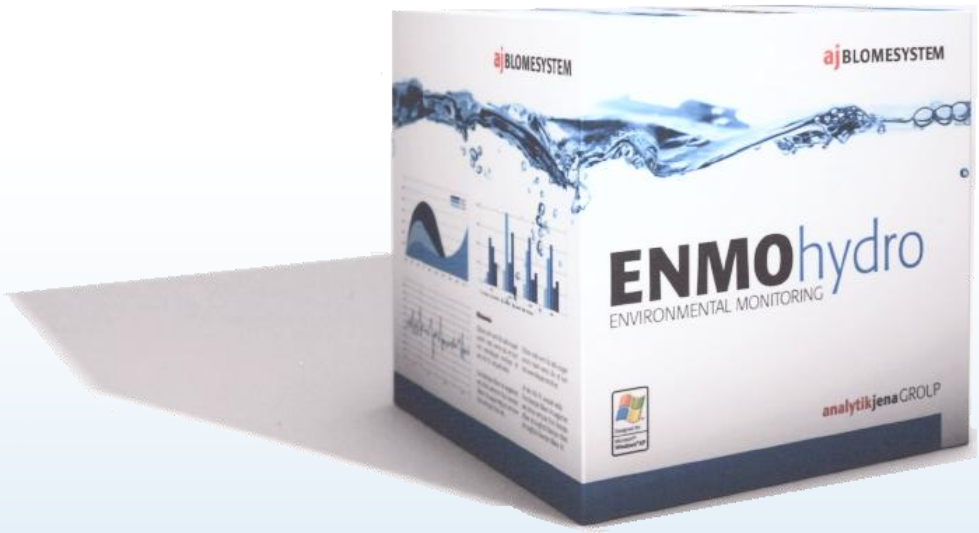
ENVIRONMENTAL MONITORING

content

- overview
  - ENMO®hydro
  - co-operation
- conception
  - software & hardware
  - features
- future



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ENMO®hydro

overview

conception

future

- efficient control of automated water quality measuring networks
- early detection of disasters and accidents,
  evaluation of hazard potential
- observation of short- and long-term changes in water quality
- innovative software environment
- a contribution to the compliance of the EU WFD

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co-operation

overview

conception

future

- result of a co-operation project
- start: 2009
- live: 2011
- Gateway Hamburg Portal:
  data is made accessible to the public

Institut für Hygiene und Umwelt
Hamburger Landesinstitut für Lebensmittelsicherheit, Gesundheitsschutz und Umweltuntersuchungen

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software & hardware

overview

conception

future

- software:
  - .NET application
  - multi-tier-system
  - web based
- 3 components:
  - ENMO Client
  - ENMO Server
  - ENMO Site

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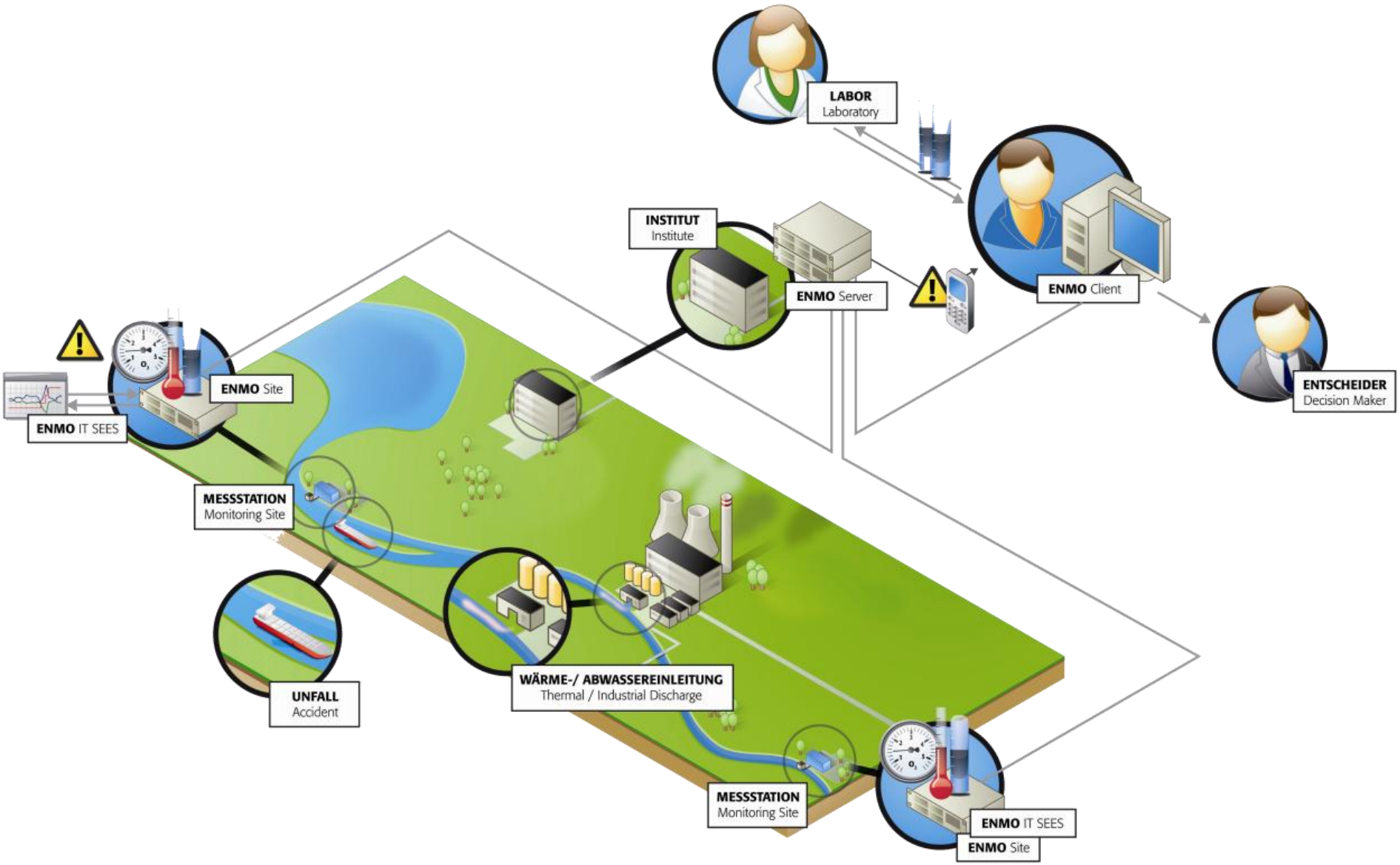
LABOR
Laboratory
INSTITUT
Institute
ENMO Server
ENMO Client
ENTSCHEIDER
Decision Maker
ENMO Site
ENMO IT SEES
MESSSTATION
Monitoring Site
UNFALL
Accident
WÄRME-/ ABWASSEREINLEITUNG
Thermal / Industrial Discharge
MESSSTATION
Monitoring Site
ENMO IT SEES
ENMO Site

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software & hardware

overview

conception

future

- ENMO Site
  - continuously collects data
  - connected to IT SEES plug-in
  - buffers data
  - transmits data to server
- ENMO Server
  - executes business logic (e.g. calculation of mean values)
  - collects data
  - evaluation of incoming data
  - performs actions such as sending SMS
- ENMO Client:
  - presentation, evaluation and validation of transmitted data
  - modern Windows GUI

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software & hardware

overview

conception

future

- as many measuring stations as needed can be connected
- various sensors combined in a sensornet
  - toximeters
  - temperature
  - oxygen level
  - pH – value …
- Matricon OPC Server standardizes all incoming data via MODBUS TCP

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features

overview

conception

future

- effectiveness/promptness
  - works with emission-oriented alarm thresholds
  - early detection of anomalies
  - notification system
  - numerous options for data evaluation, illustration and export
  - unlimited access to data
  - online data transfer in scalable intervals

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features

overview

conception

future

- quality
  - DIN ISO 17025
  - audit trail
  - version control
  - maintenance planning
  - logbook
  - defined access rights per user

- integration
  - easily integrates to existing systems (web services)
  - visualization of measured data via web browser

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features

overview

conception

future

- advantages
  - high information content of data: continuous measuring
  - up-to-date data: permanent data transmission
  - high quality data and reliability: remote monitoring
  - permanent availability of measured data
  - early detection of disasters, accidents, hazard potentials
  - reduction of personnel costs for measurements
  - reduction of costs of control in measuring stations
  - new tasks: e.g. device monitoring
  - monitoring and administration of devices / stations, data acquisition, data evaluation, data illustration, data export, quality control, notification and alarm system in **ONE** system

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features

overview

conception

future

- possible applications: monitoring networks
  - countries
  - federal states / provinces
  - municipalities
  - rivers
  - dams
  - lakes
  - groundwater
  - water supply companies
  - industrial enterprises
  - …

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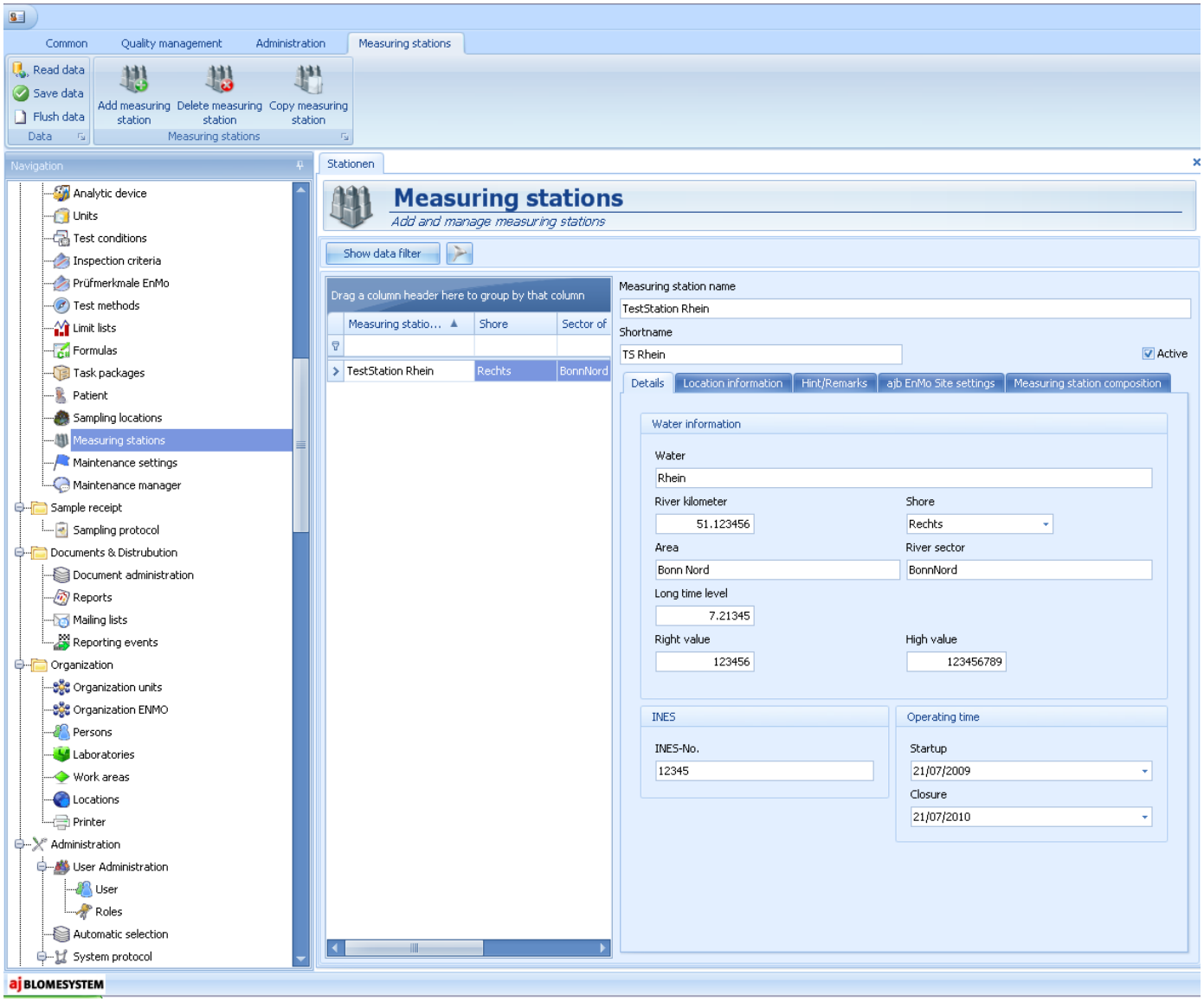
Common
Quality management
Administration
Measuring stations
Read data
Save data
Flush data
Data
Add measuring station
Delete measuring station
Copy measuring station
Measuring stations
Navigation
Analytic device
Units
Test conditions
Inspection criteria
Prüfmerkmale EnMo
Test methods
Limit lists
Formulas
Task packages
Patient
Sampling locations
Measuring stations
Maintenance settings
Maintenance manager
Sample receipt
Sampling protocol
Documents & Distrubution
Document administration
Reports
Mailing lists
Reporting events
Organization
Organization units
Organization ENMO
Persons
Laboratories
Work areas
Locations
Printer
Administration
User Administration
User
Roles
Automatic selection
System protocol
Stationen
Measuring stations
Add and manage measuring stations
Show data filter
Drag a column header here to group by that column
Measuring statio...
Shore
Sector of
TestStation Rhein
Rechts
BonnNord
Measuring station name
TestStation Rhein
Shortname
TS Rhein
Active
Details
Location information
Hint/Remarks
ajb EnMo Site settings
Measuring station composition
Water information
Water
Rhein
River kilometer
51.123456
Shore
Rechts
Area
Bonn Nord
River sector
BonnNord
Long time level
7.21345
Right value
123456
High value
123456789
INES
INES-No.
12345
Operating time
Startup
21/07/2009
Closure
21/07/2010
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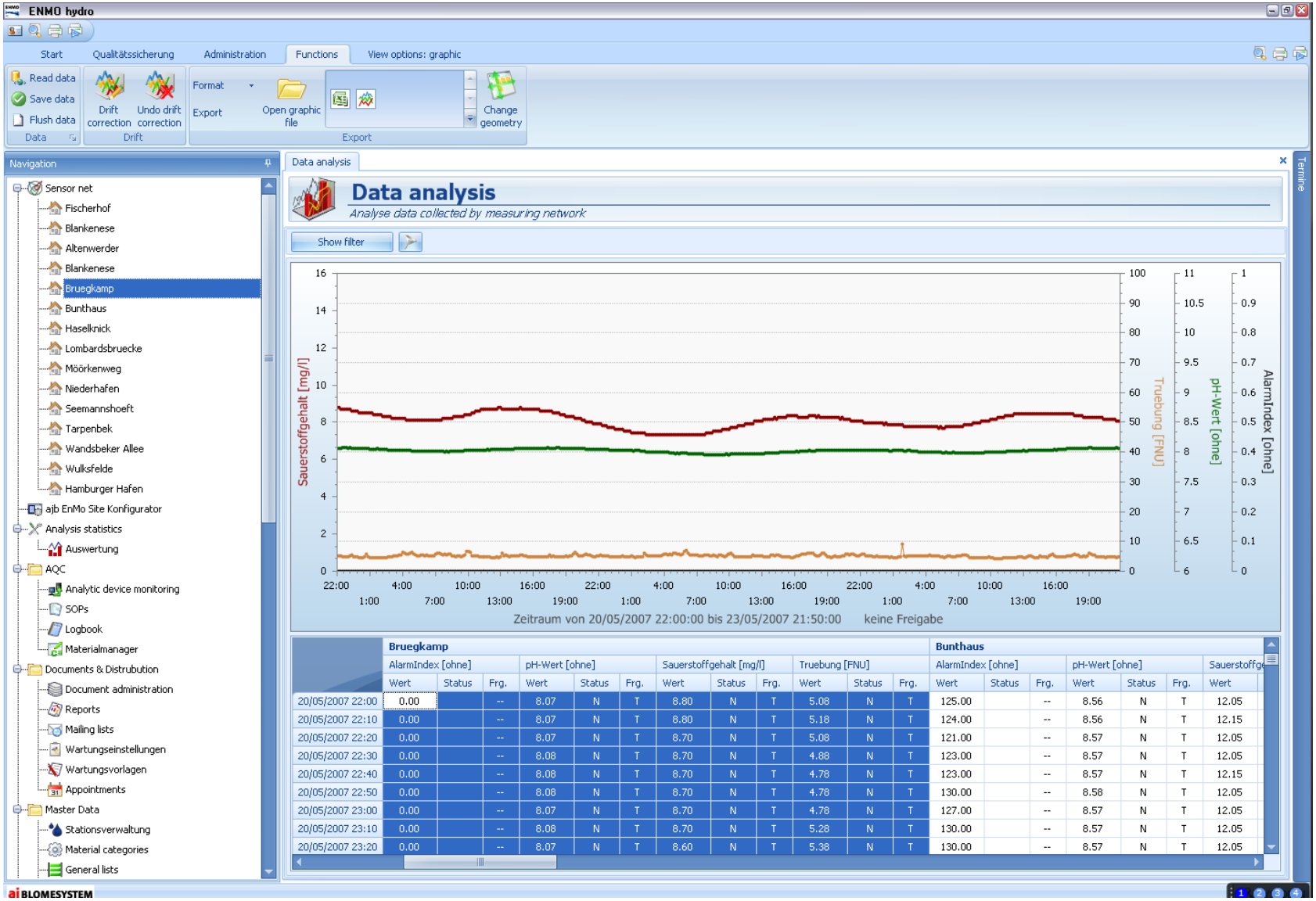
ENMO hydro
Start
Qualitätssicherung
Administration
Functions
View options: graphic
Read data
Save data
Flush data
Data
Drift correction
Undo drift correction
Drift
Format
Export
Open graphic file
Change geometry
Export
Navigation
Sensor net
Fischerhof
Blankenese
Altenwerder
Blankenese
Bruegkamp
Bunthaus
Haselknick
Lombardsbruecke
Möörkenweg
Niederhafen
Seemannshoeft
Tarpenbek
Wandsbeker Allee
Wulksfelde
Hamburger Hafen
ajb EnMo Site Konfigurator
Analysis statistics
Auswertung
AQC
Analytic device monitoring
SOPs
Logbook
Materialmanager
Documents & Distrubution
Document administration
Reports
Mailing lists
Wartungseinstellungen
Wartungsvorlagen
Appointments
Master Data
Stationsverwaltung
Material categories
General lists
Data analysis
Data analysis
Analyse data collected by measuring network
Show filter
Sauerstoffgehalt [mg/l]
Truebung [FNU]
pH-Wert [ohne]
AlarmIndex [ohne]
Zeitraum von 20/05/2007 22:00:00 bis 23/05/2007 21:50:00
keine Freigabe
Bruegkamp
Bunthaus
AlarmIndex [ohne]
pH-Wert [ohne]
Sauerstoffgehalt [mg/l]
Truebung [FNU]
Wert
Status
Frg.
20/05/2007 22:00 0.00 -- 8.07 N T 8.80 N T 5.08 N T 125.00 -- 8.56 N T 12.05
20/05/2007 22:10 0.00 -- 8.07 N T 8.80 N T 5.18 N T 124.00 -- 8.56 N T 12.15
20/05/2007 22:20 0.00 -- 8.07 N T 8.70 N T 5.08 N T 121.00 -- 8.57 N T 12.05
20/05/2007 22:30 0.00 -- 8.08 N T 8.70 N T 4.88 N T 123.00 -- 8.57 N T 12.05
20/05/2007 22:40 0.00 -- 8.08 N T 8.70 N T 4.78 N T 123.00 -- 8.57 N T 12.15
20/05/2007 22:50 0.00 -- 8.08 N T 8.70 N T 4.78 N T 130.00 -- 8.58 N T 12.05
20/05/2007 23:00 0.00 -- 8.07 N T 8.70 N T 4.78 N T 127.00 -- 8.57 N T 12.05
20/05/2007 23:10 0.00 -- 8.08 N T 8.70 N T 5.28 N T 130.00 -- 8.57 N T 12.05
20/05/2007 23:20 0.00 -- 8.07 N T 8.60 N T 5.38 N T 130.00 -- 8.57 N T 12.05
Termine
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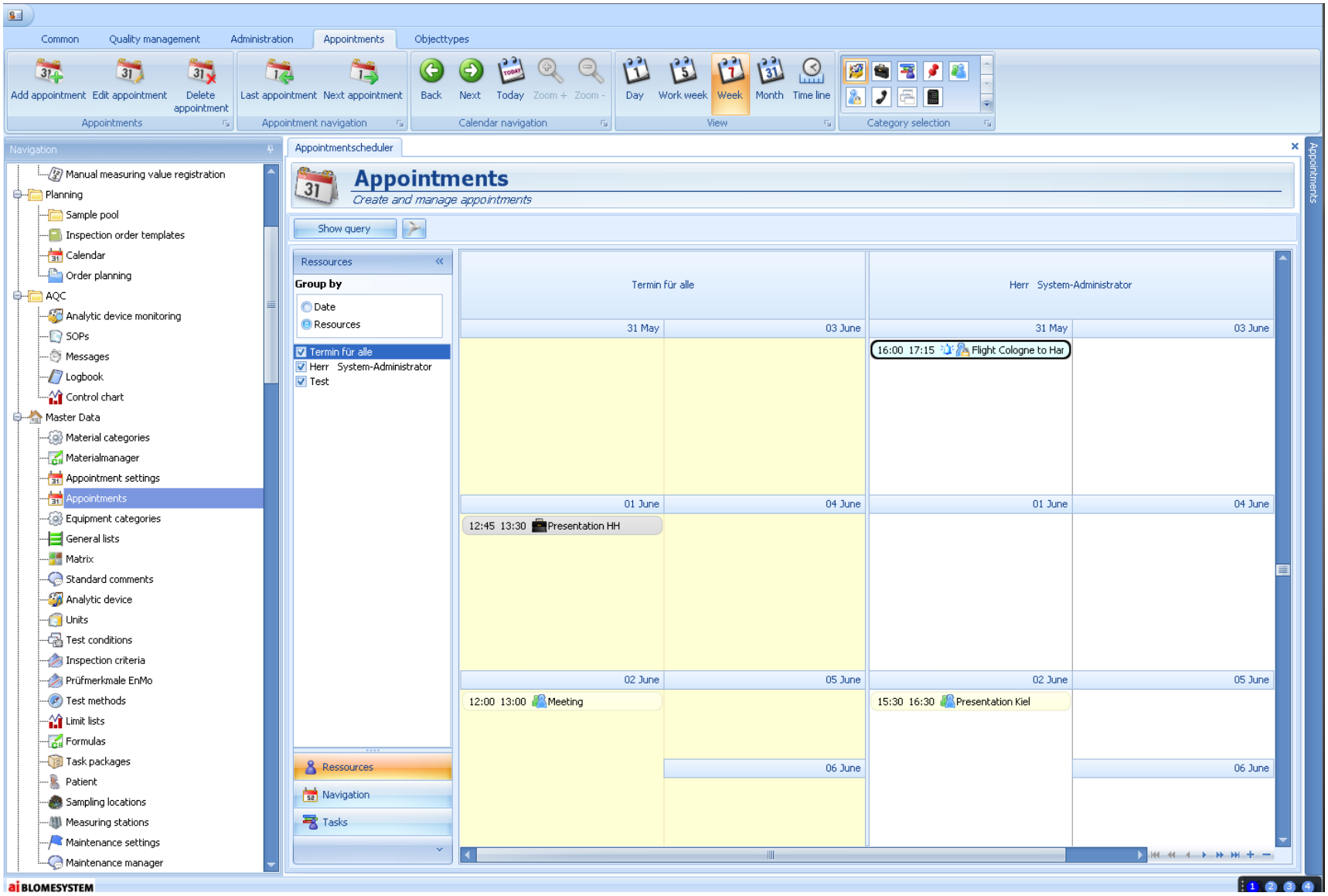
Common
Quality management
Administration
Appointments
Objecttypes
Add appointment
Edit appointment
Delete appointment
Appointments
Last appointment
Next appointment
Appointment navigation
Back
Next
Today
Zoom +
Zoom -
Calendar navigation
Day
Work week
Week
Month
Time line
View
Category selection
Navigation
Manual measuring value registration
Planning
Sample pool
Inspection order templates
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Order planning
AQC
Analytic device monitoring
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Material categories
Materialmanager
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Appointments
Equipment categories
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Matrix
Standard comments
Analytic device
Units
Test conditions
Inspection criteria
Prüfmerkmale EnMo
Test methods
Limit lists
Formulas
Task packages
Patient
Sampling locations
Measuring stations
Maintenance settings
Maintenance manager
Appointmentscheduler
Appointments
Create and manage appointments
Show query
Ressources
Group by
Date
Resources
Termin für alle
Herr System-Administrator
Test
Ressources
Navigation
Tasks
Termin für alle
Herr System-Administrator
31 May
03 June
16:00 17:15 Flight Cologne to Har
01 June
04 June
12:45 13:30 Presentation HH
02 June
05 June
12:00 13:00 Meeting
15:30 16:30 Presentation Kiel
06 June
Appointments
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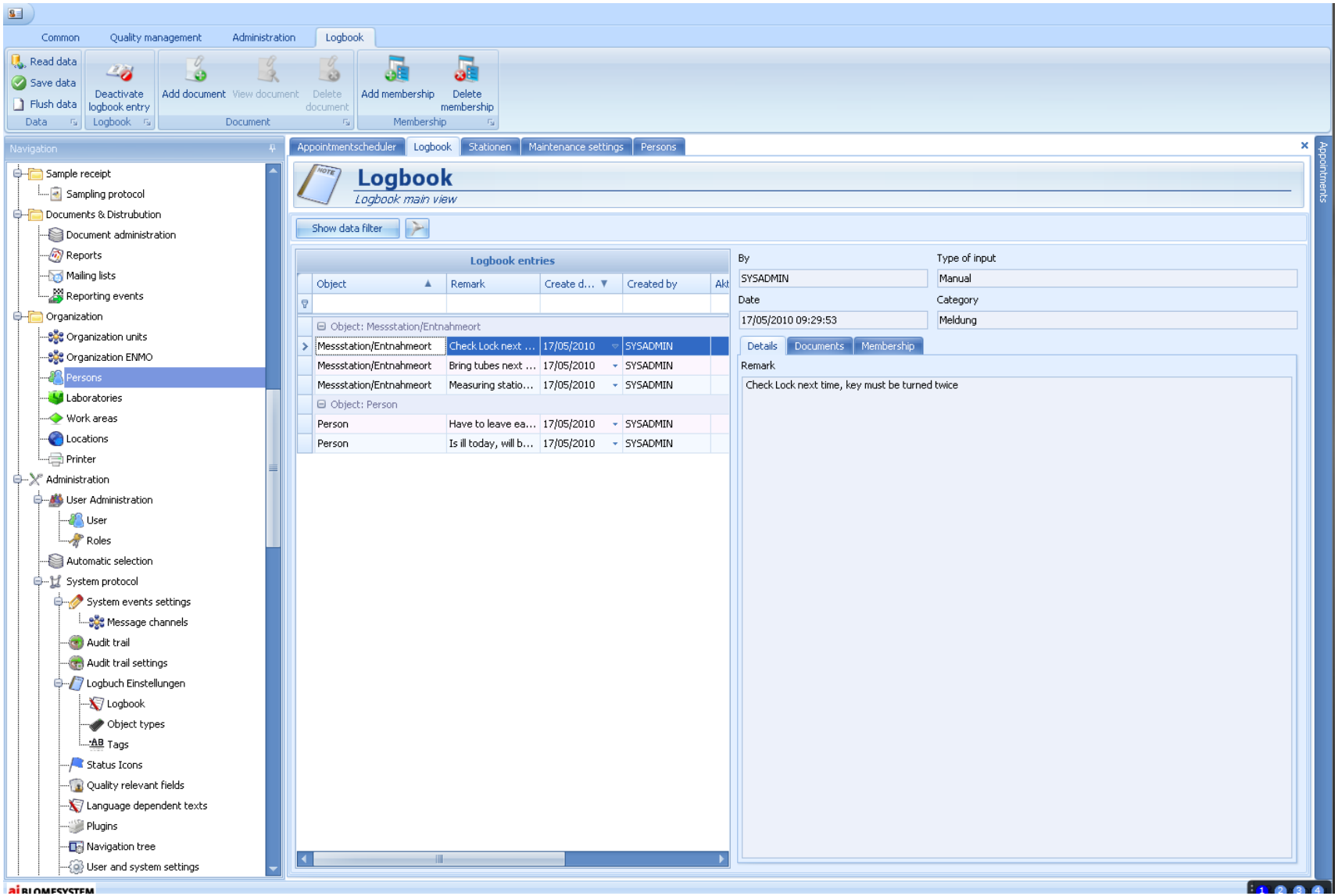
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Logbook
Read data
Save data
Flush data
Data
Deactivate logbook entry
Logbook
Add document
View document
Delete document
Document
Add membership
Delete membership
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Sampling protocol
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Reports
Mailing lists
Reporting events
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Organization units
Organization ENMO
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Laboratories
Work areas
Locations
Printer
Administration
User Administration
User
Roles
Automatic selection
System protocol
System events settings
Message channels
Audit trail
Audit trail settings
Logbuch Einstellungen
Logbook
Object types
Tags
Status Icons
Quality relevant fields
Language dependent texts
Plugins
Navigation tree
User and system settings
Appointmentscheduler
Logbook
Stationen
Maintenance settings
Persons
Logbook
Logbook main view
Show data filter
Logbook entries
Object
Remark
Create d...
Created by
Object: Messstation/Entnahmeort
Messstation/Entnahmeort
Check Lock next ...
17/05/2010
SYSADMIN
Messstation/Entnahmeort
Bring tubes next ...
17/05/2010
SYSADMIN
Messstation/Entnahmeort
Measuring statio...
17/05/2010
SYSADMIN
Object: Person
Person
Have to leave ea...
17/05/2010
SYSADMIN
Person
Is ill today, will b...
17/05/2010
SYSADMIN
By
SYSADMIN
Type of input
Manual
Date
17/05/2010 09:29:53
Category
Meldung
Details
Documents
Membership
Remark
Check Lock next time, key must be turned twice
Appointments

ENMO® hydro
ENVIRONMENTAL MONITORING

future

overview

conception

future

- mobile application:
  - ENMO®mobile

- information:
  - GIS-connection

- environmental monitoring:
  - ENMO®air
  - …

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ENVIRONMENTAL MONITORING

Questions?

Thanks for your attention.

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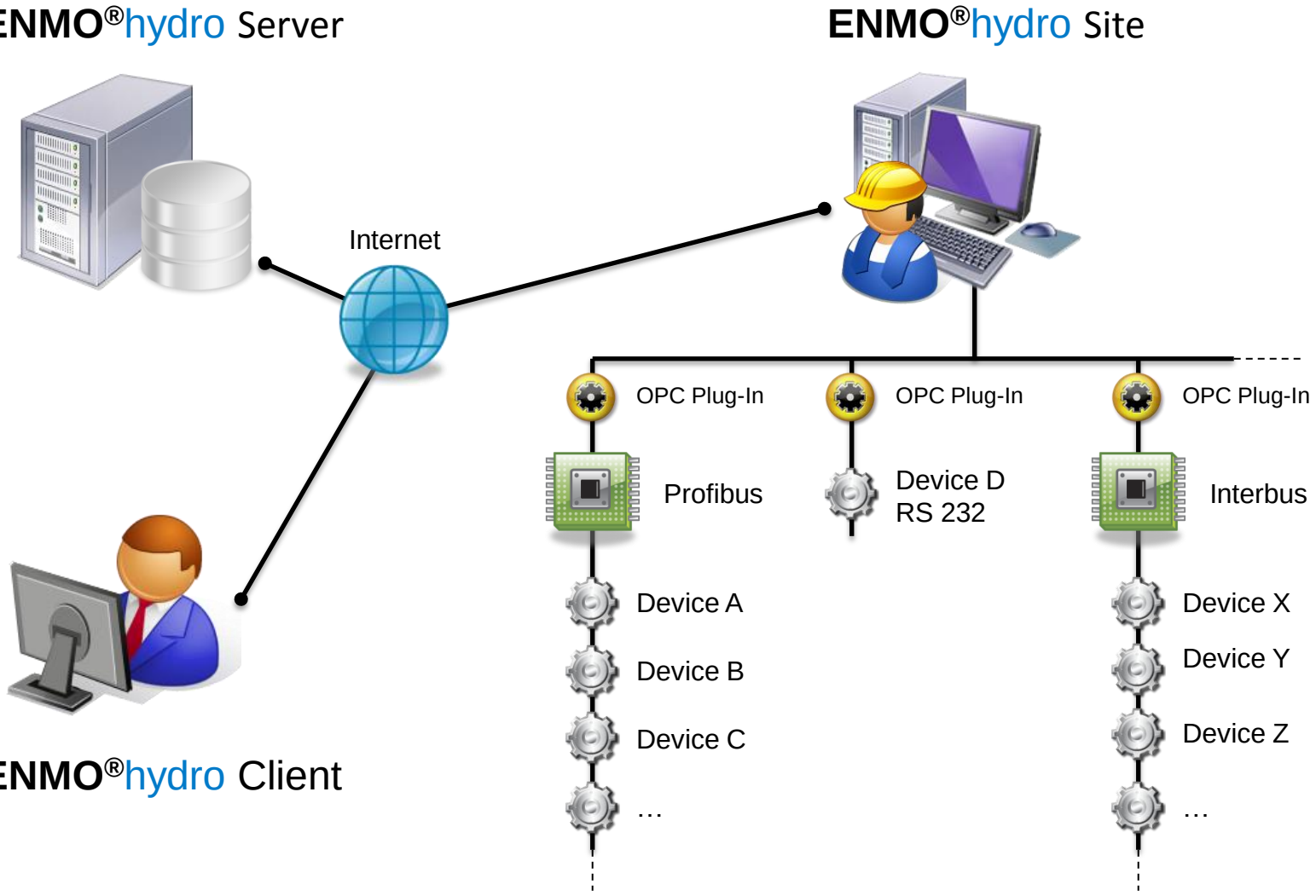
ADDITIONAL INFORMATION

schematic


ENMO®hydro Server
ENMO®hydro Site
Internet
OPC Plug-In
OPC Plug-In
OPC Plug-In
Profibus
Device D
RS 232
Interbus
Device A
Device B
Device C
…
Device X
Device Y
Device Z
…
ENMO®hydro Client