Using ArcGIS

for Visualizing Historical Data

from Building Management System

Petr Glos

Masaryk University

Institute of Computer Science

GIS Department

Botanická 68a, 602 00 Brno, Czech Republic

glos@ics.muni.cz

http://maps.muni.cz, http//:www.muni.cz, http://ics.muni.cz

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Agenda

- Introduction – Masaryk University Brno
- Buildings
- Technologies
- BMS
- Historical Data from BMS
- 2D and 3D visualization
- Questions

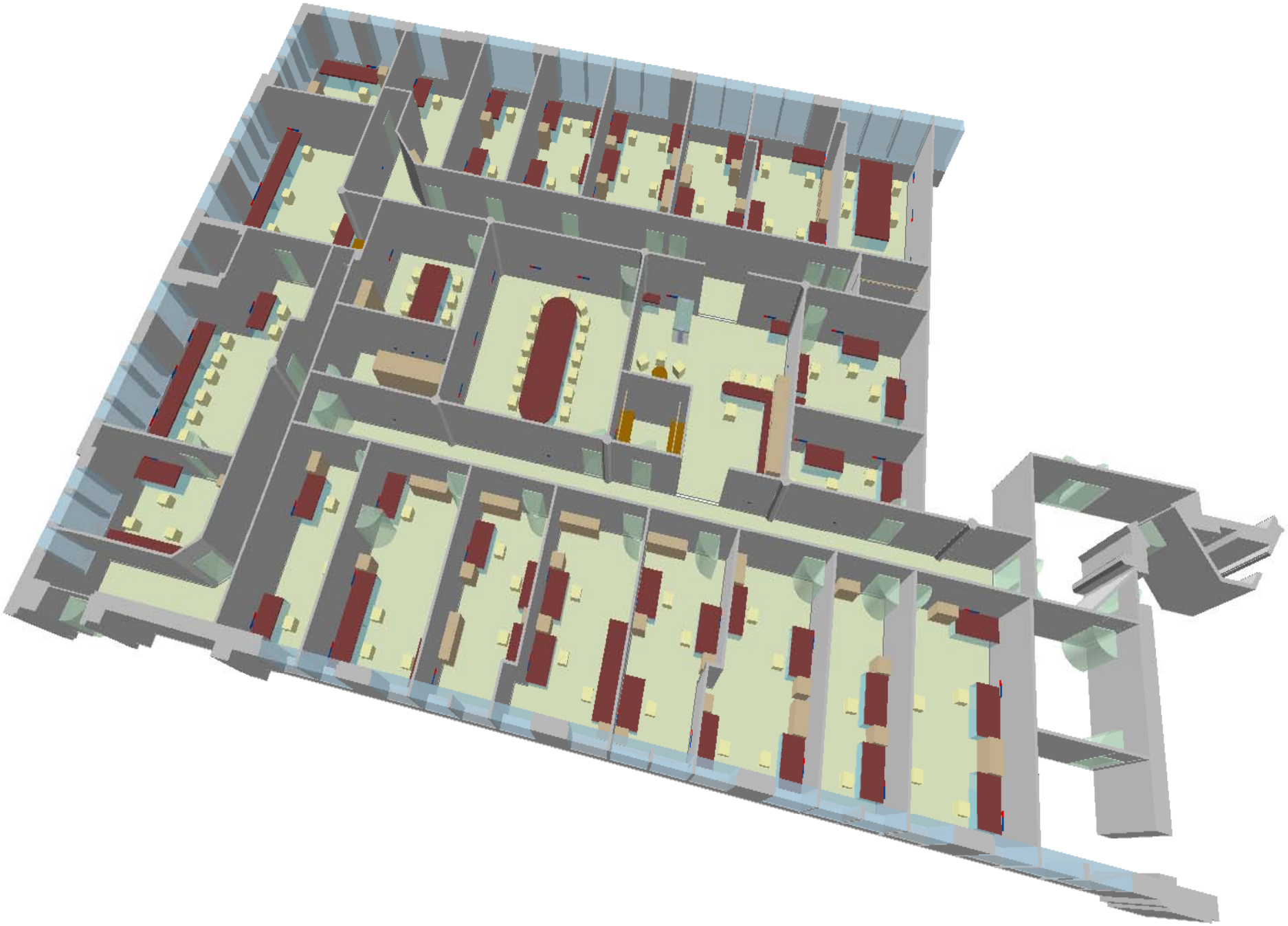
Masaryk University

- 2nd largest Czech University
- 90 years old
- 9 faculties
- Persons
  - > 35 000 students
  - > 4 500 employees
- Buildings and Rooms
  - > 200 buildings
  - > 17 000 rooms
  - > 335 000 m2


BMS
Database
Buildings
Geodatabase
Technologies
Geodatabase
ArcGIS
2D and 3D
Visualisation
Map,Animation,
Video

Buildings

Building	Floor	Room	Engineering Construction	Whole in Construction	Pane of Whole
Polygon	Polygon	Polygon	Polygon	Polygon	Polygon
Position Code BA01	Position Code BA01N01	Position Code BA01N01134	Upper Height	Upper Height	Upper Height
Height	Height	Height	Bottom Height	Bottom Height	Bottom Height
...	...	...	...	...	...



Technologies

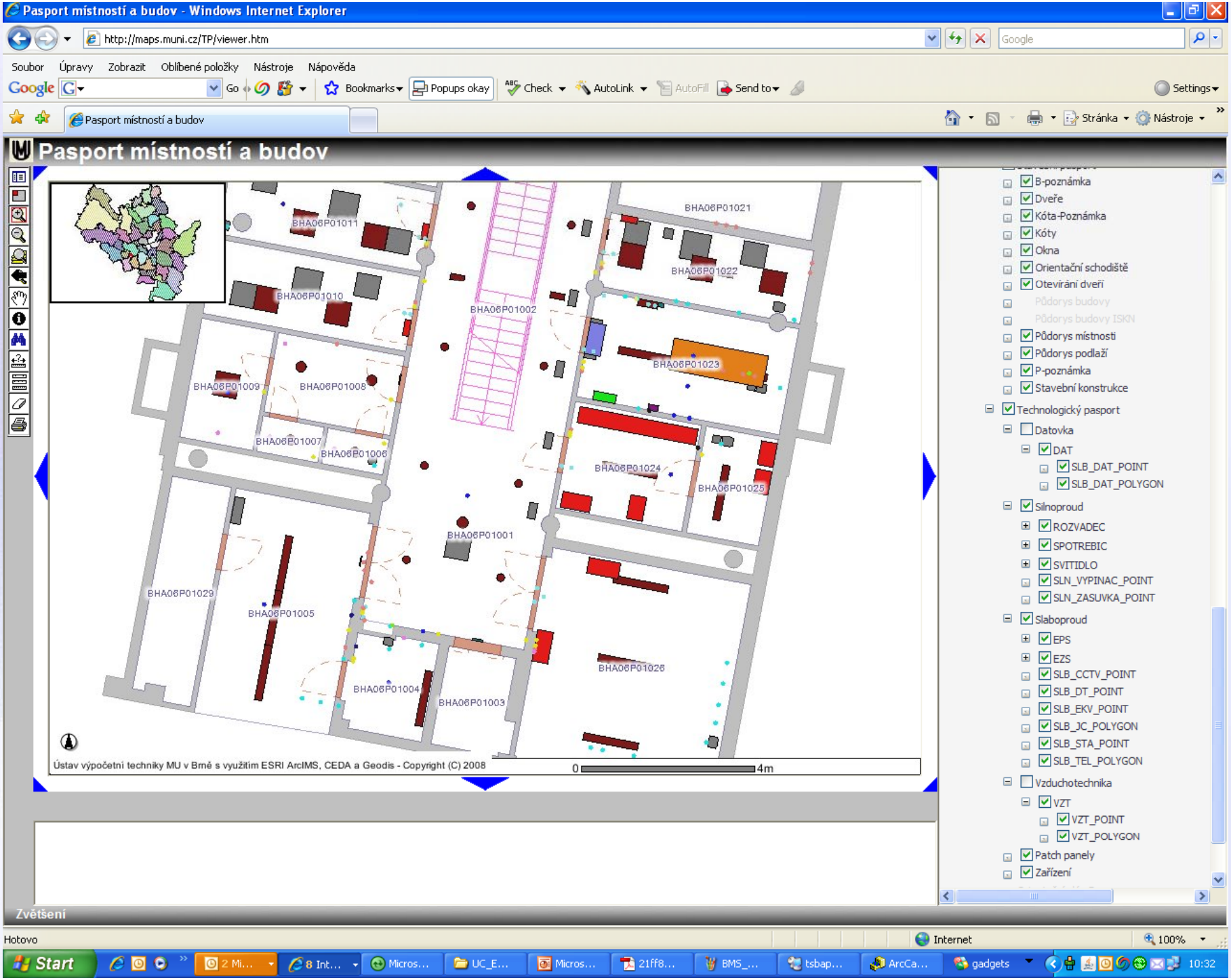
HVAC, Fire alarm system , Access control, Intrusion system,…

System

- Position Code
- Technology Code
- …

Device

- Polygon, Line, Point
- Position Code
- Technology Code
- Upper Height
- Bottom Height
- …


Pasport místností a budov - Windows Internet Explorer
http://maps.muni.cz/TP/viewer.htm
Soubor Úpravy Zobrazit Oblíbené položky Nástroje Nápověda
Pasport místností a budov
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BHA06P01003
BHA06P01026
Ústav výpočetní techniky MU v Brně s využitím ESRI ArcIMS, CEDA a Geodis - Copyright (C) 2008
0
4m
B-poznámka
Dveře
Kóta-Poznámka
Kóty
Okna
Orientační schodiště
Otevírání dveří
Půdorys budovy
Půdorys budovy ISKN
Půdorys místnosti
Půdorys podlaží
P-poznámka
Stavební konstrukce
Technologický pasport
Datovka
DAT
SLB_DAT_POINT
SLB_DAT_POLYGON
Silnoproud
ROZVADEC
SPOTREBIC
SVITIDLO
SLN_VYPINAC_POINT
SLN_ZASUVKA_POINT
Slaboproud
EPS
EZS
SLB_CCTV_POINT
SLB_DT_POINT
SLB_EKV_POINT
SLB_JC_POLYGON
SLB_STA_POINT
SLB_TEL_POLYGON
Vzduchotechnika
VZT
VZT_POINT
VZT_POLYGON
Patch panely
Zařízení
Zvětšení
Hotovo
Internet
100%
Start
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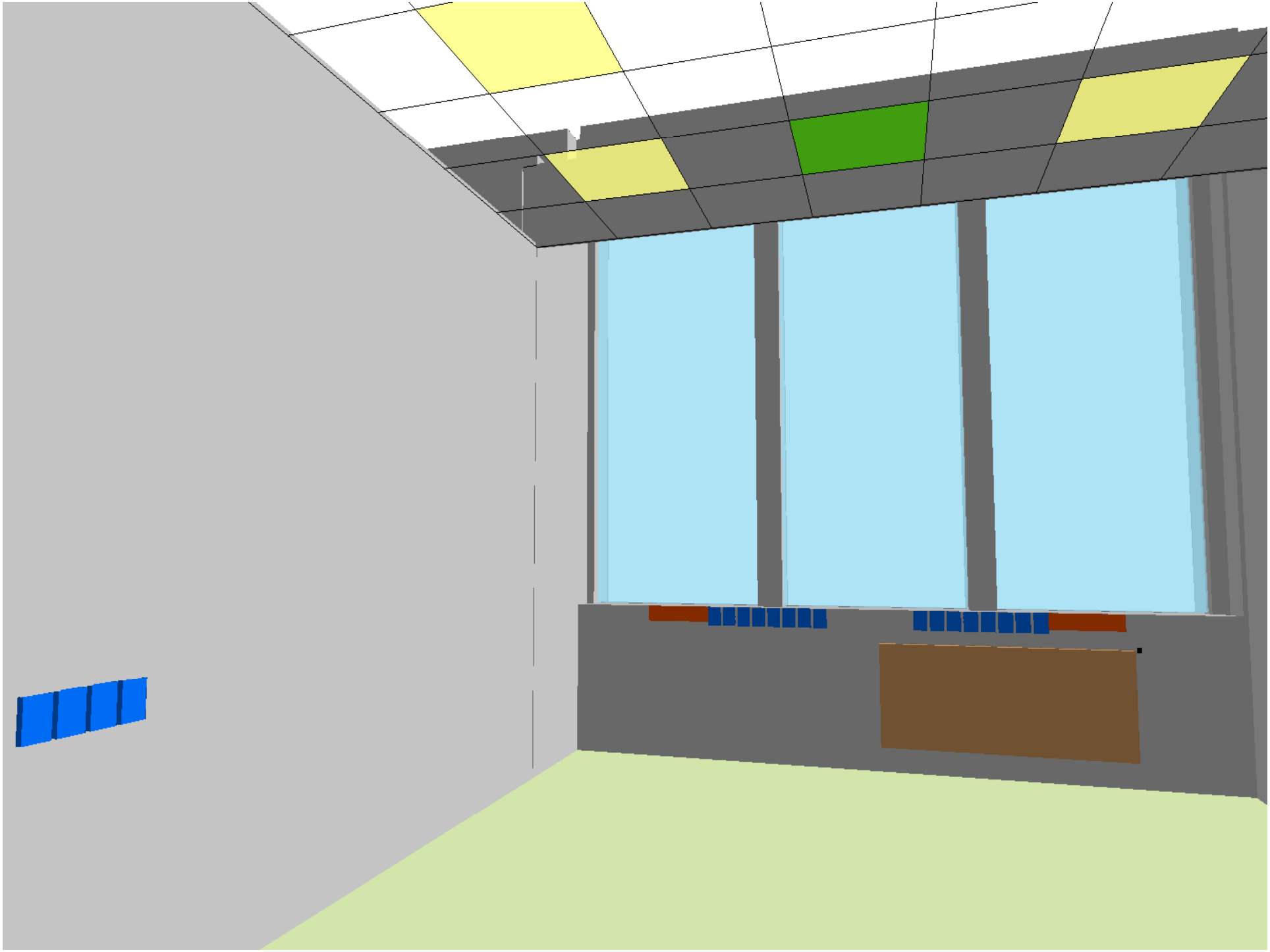
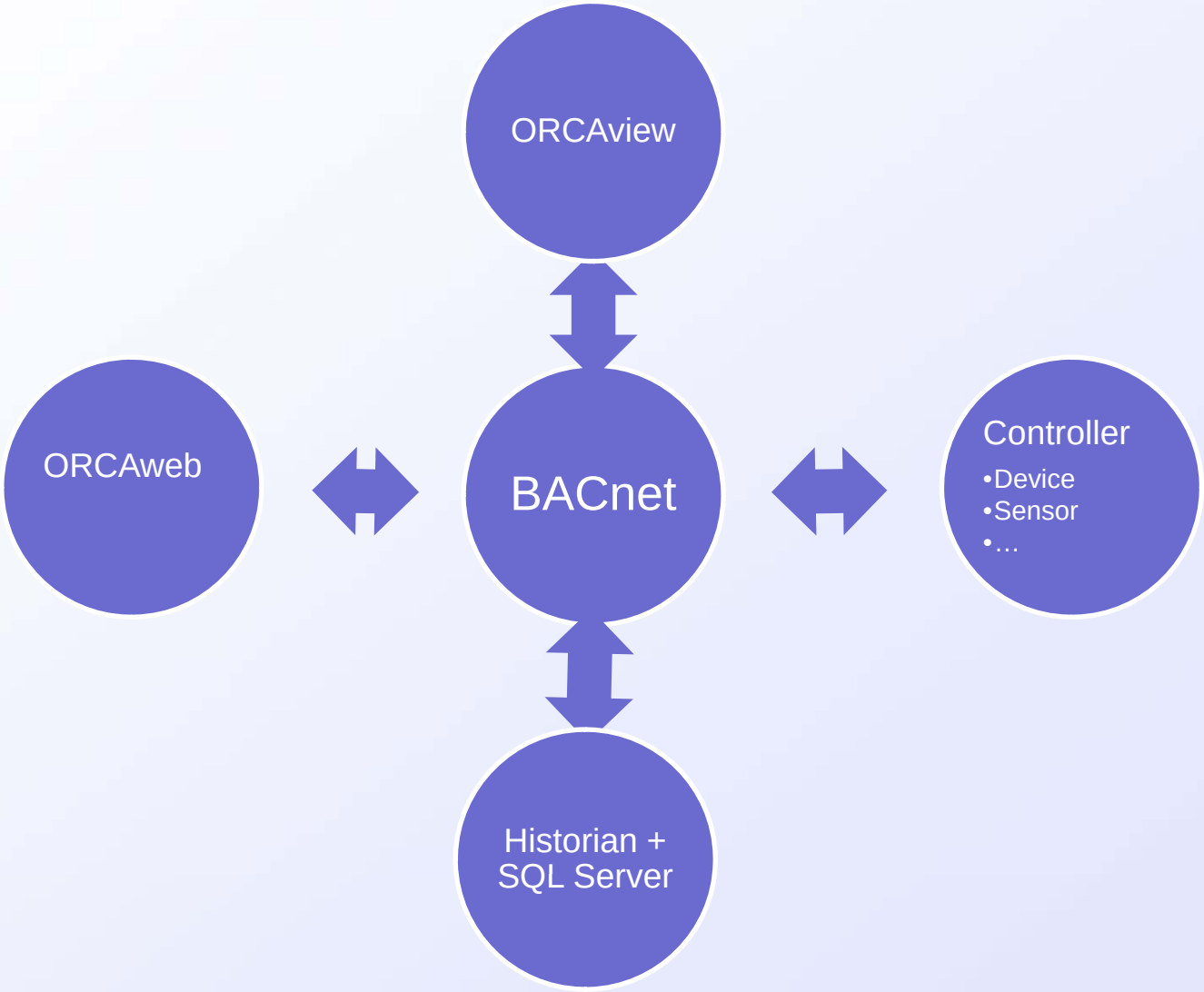
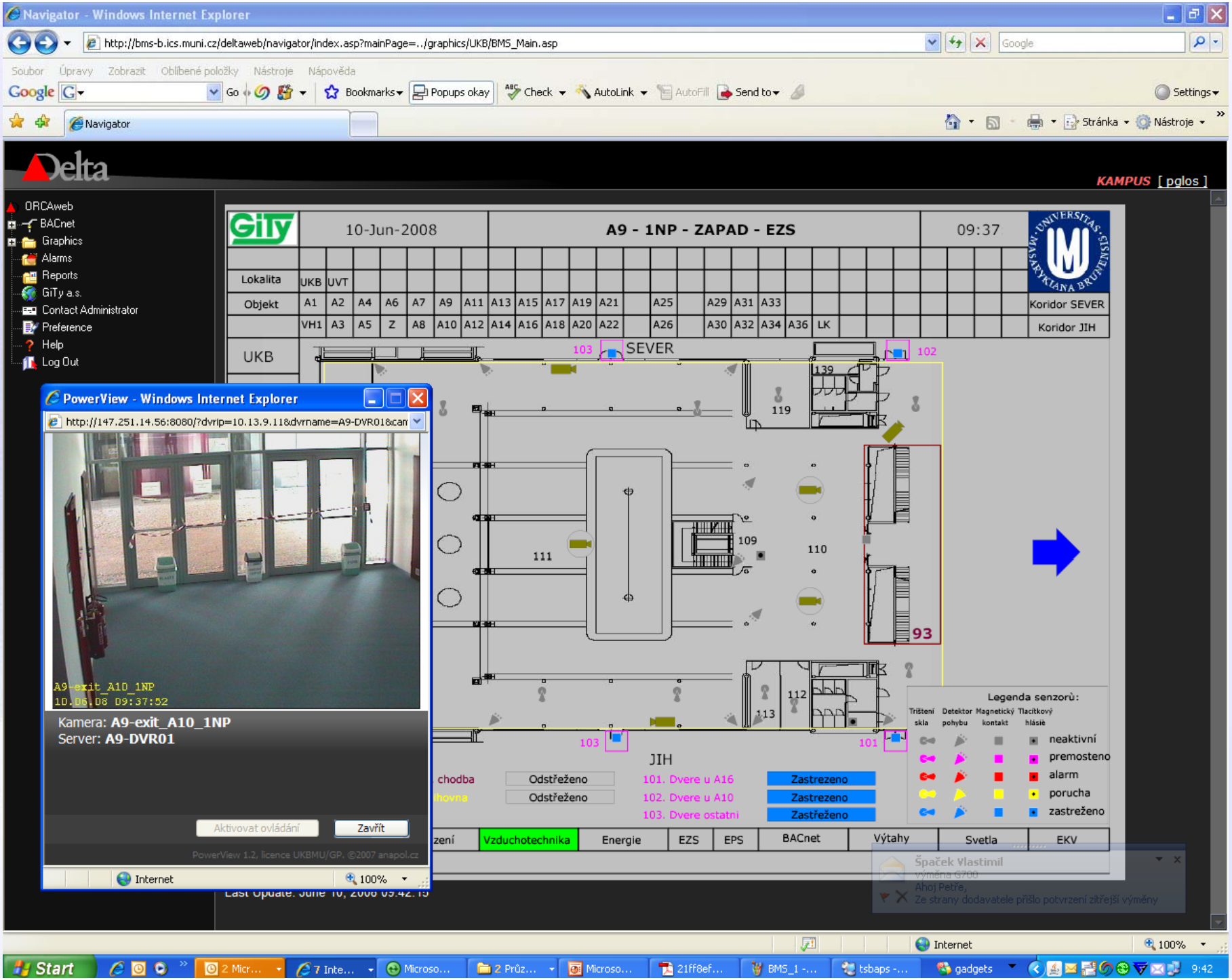


Building Management System

- ORCAview
  - Desktop client
- ORCAweb
  - Web client
- Historian
  - Service for data collection
  - SQL Server
- BACnet
  - Standard for technology network
- Controllers
  - Technology operating
- Devices
- Sensors

Building Management System

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Delta
KAMPUS [pglos]
ORCAweb
BACnet
Graphics
Alarms
Reports
GiTy a.s.
Contact Administrator
Preference
Help
Log Out
GiTy
10-Jun-2008
A9 - 1NP - ZAPAD - EZS
09:37
Lokalita
Objekt
Koridor SEVER
Koridor JIH
UKB
SEVER
JIH
Legenda senzorů:
neaktivní
premosteno
alarm
porucha
zastreženo
Odstřeženo
Zastrezeno
101. Dvere u A16
102. Dvere u A10
103. Dvere ostatni
Vzduchotechnika
Energie
EZS
EPS
BACnet
Výtahy
Svetla
EKV
PowerView - Windows Internet Explorer
Kamera: A9-exit_A10_1NP
Server: A9-DVR01
Aktivovat ovládání
Zavřít
Internet
100%
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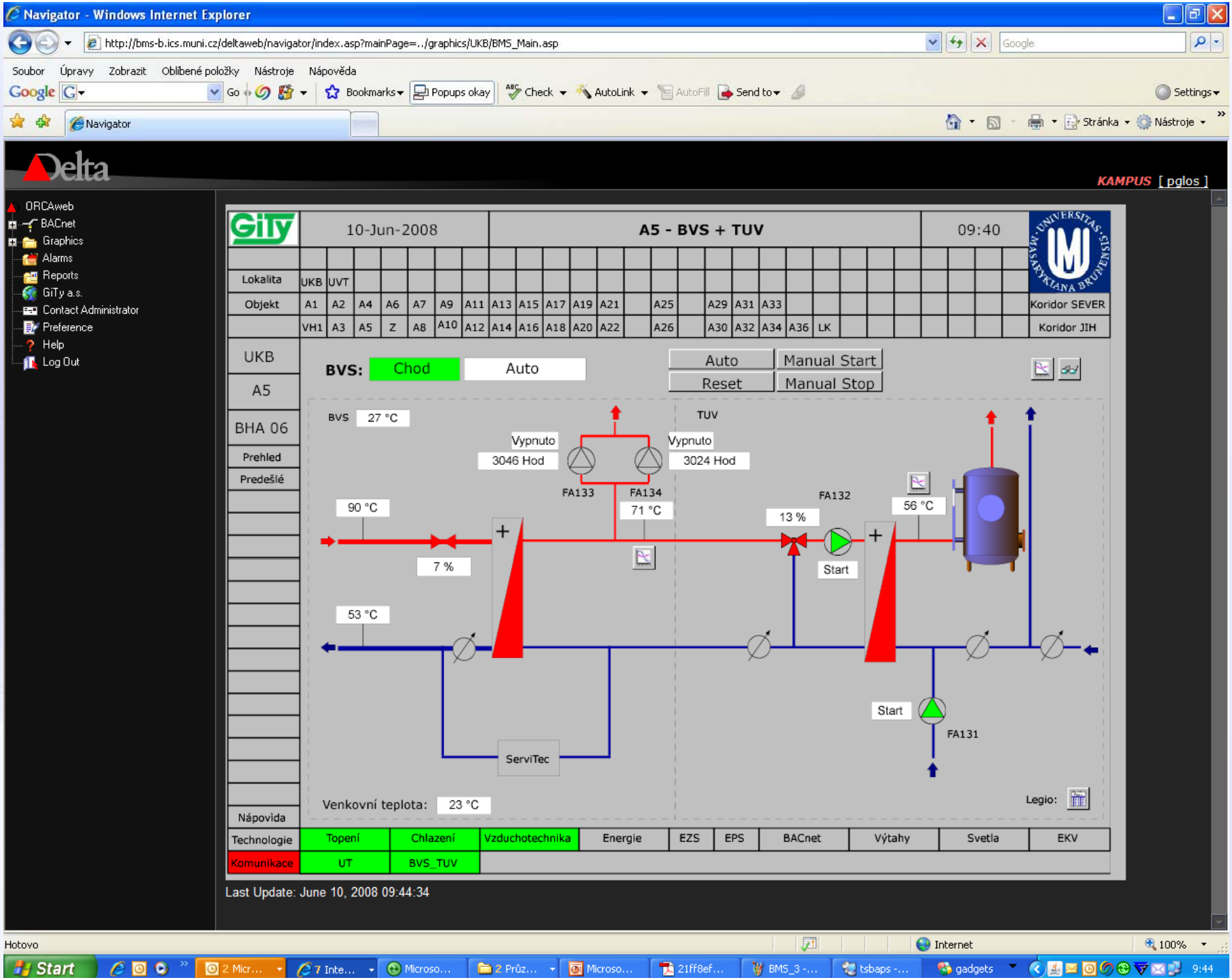
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Delta
KAMPUS [pglos]
ORCAweb
BACnet
Graphics
Alarms
Reports
GiTy a.s.
Contact Administrator
Preference
Help
Log Out
GiTy
10-Jun-2008
A5 - BVS + TUV
09:40
Lokalita
Objekt
Koridor SEVER
Koridor JIH
UKB
A5
BHA 06
Prehled
Predešlé
Nápovida
BVS:
Chod
Auto
Auto
Manual Start
Reset
Manual Stop
BVS
27 °C
TUV
Vypnuto
3046 Hod
Vypnuto
3024 Hod
FA133
FA134
71 °C
FA132
90 °C
13 %
56 °C
7 %
Start
53 °C
Start
FA131
ServiTec
Venkovní teplota:
23 °C
Legio:
Technologie
Topení
Chlazení
Vzduchotechnika
Energie
EZS
EPS
BACnet
Výtahy
Svetla
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Komunikace
UT
BVS_TUV
Last Update: June 10, 2008 09:44:34
Hotovo
Internet
100%
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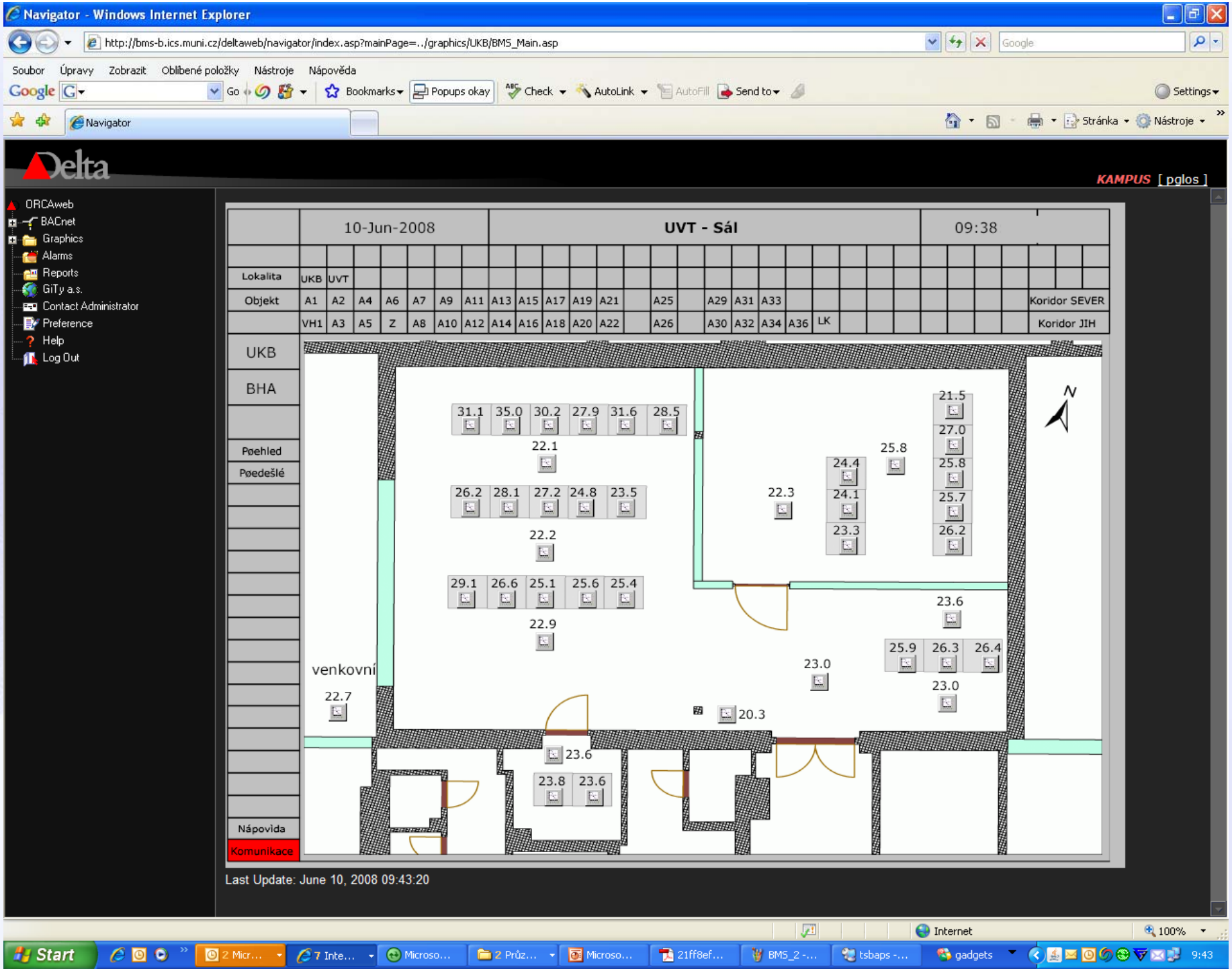
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Navigator
Delta
KAMPUS [pglos]
ORCAweb
BACnet
Graphics
Alarms
Reports
GiTy a.s.
Contact Administrator
Preference
Help
Log Out
10-Jun-2008
UVT - Sál
09:38
Lokalita
Objekt
UKB
BHA
Pøehled
Pøedešlé
Nápovida
Komunikace
Koridor SEVER
Koridor JIH
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Last Update: June 10, 2008 09:43:20
Internet
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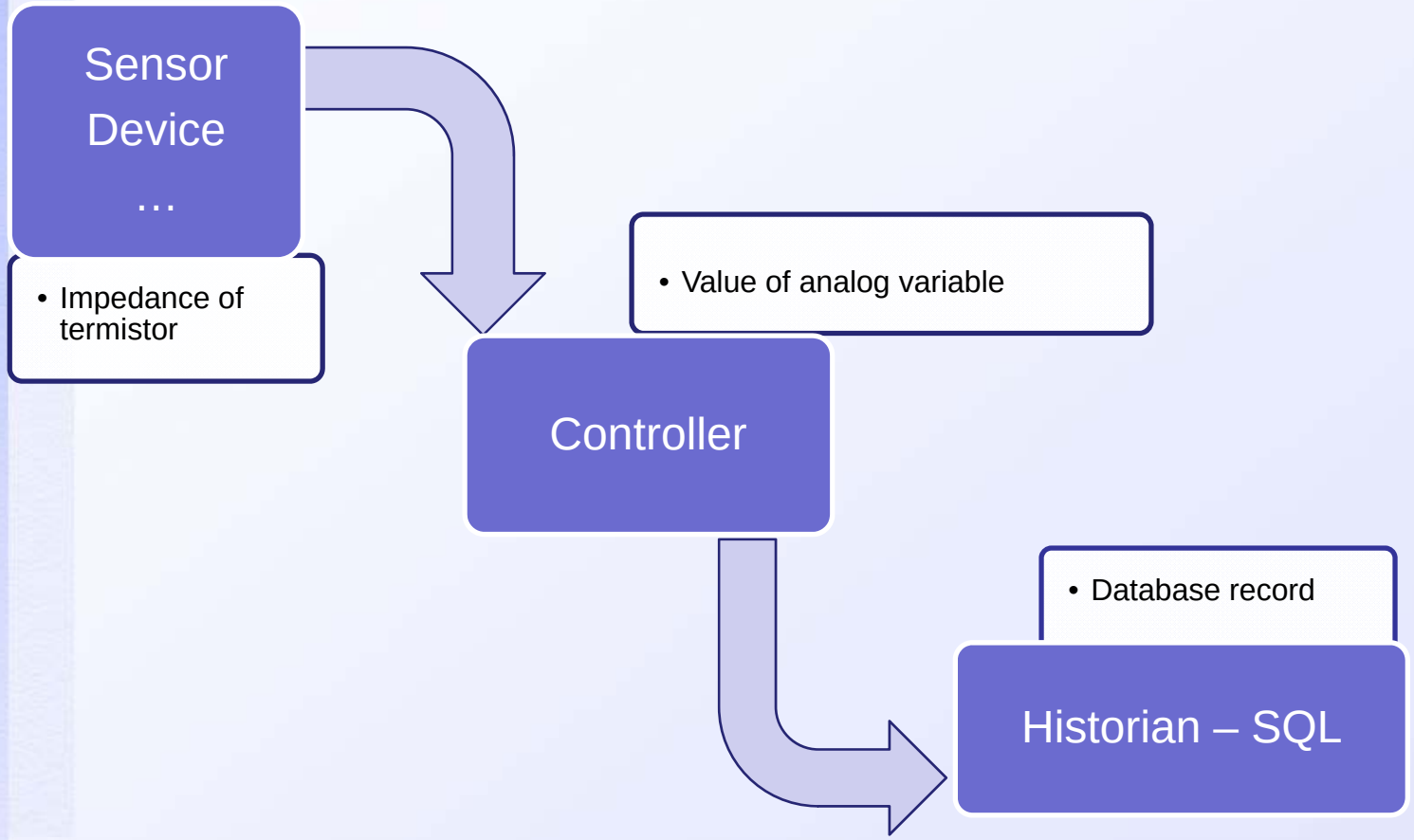
Collecting and Archiving Data from BMS

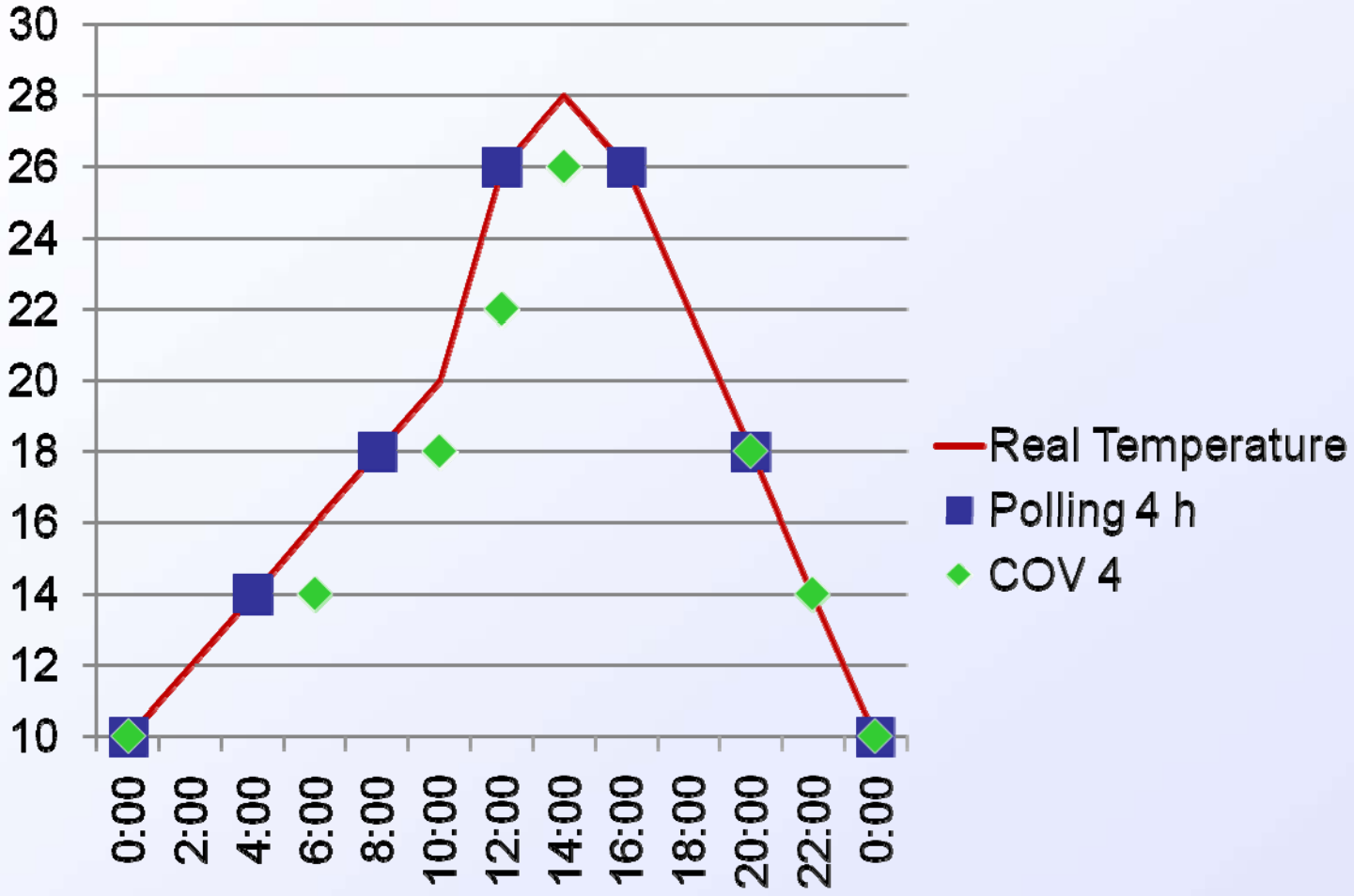


Trendlog

object for collecting and archiving data from BMS

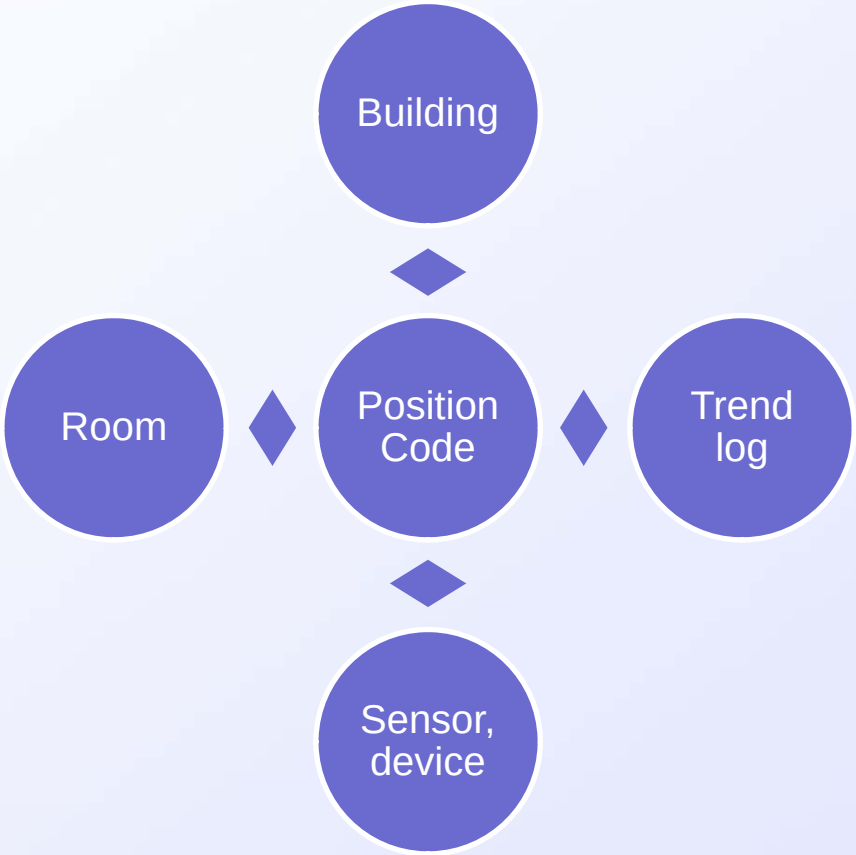
- Attributes
  - Position code,
  - Technology code
  - Time
  - Value
- Polling – Time Interval
  - 1 h = 1 value each our is registered
- Change of Value
  - 2 °C = next value is registered if temperature changes for 2 °C from previous stored value
- Controllers have buffers for data of trendlogs.
- Historian store data to SQL Server database.

Historical Data from BMS



Visualization

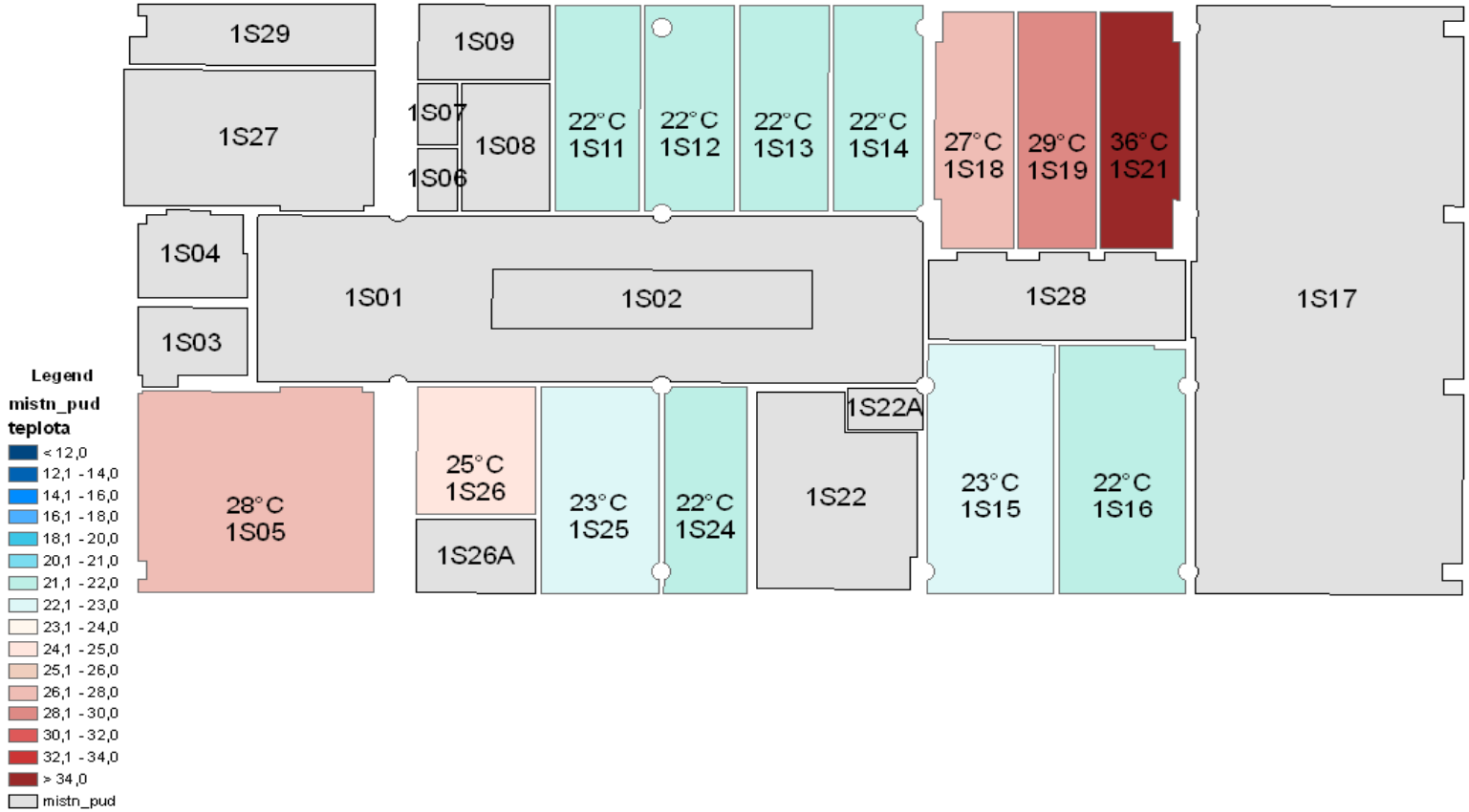
- Position Code – key item for data integration



Visualization

- ArcMap
- ArcScene
- 2D and 3D Thematic Map
  - Values for given instant of time
  - Average, minimum, maximum values … for time period
- 2D and 3 D Animation
  - Values for given time period
  - Video
- Examples
  - Room temperatures
  - Electric energy consumption

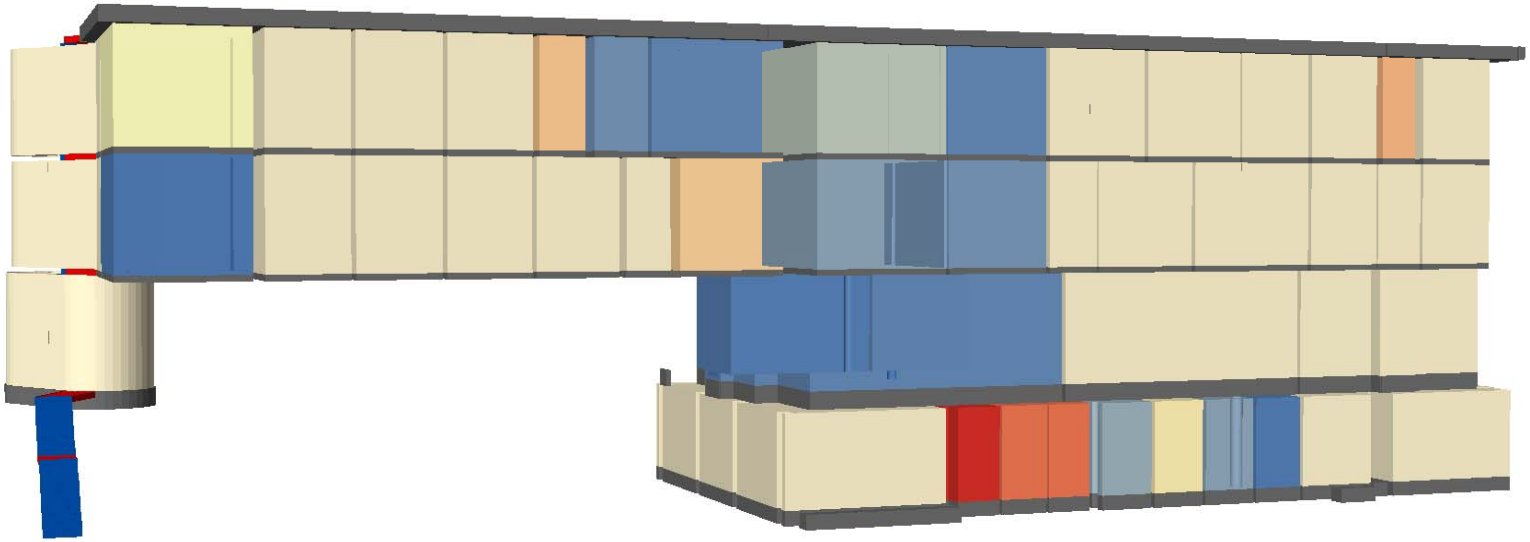
2D Thematic Maps
Room Temperatures



2D Thematic Maps

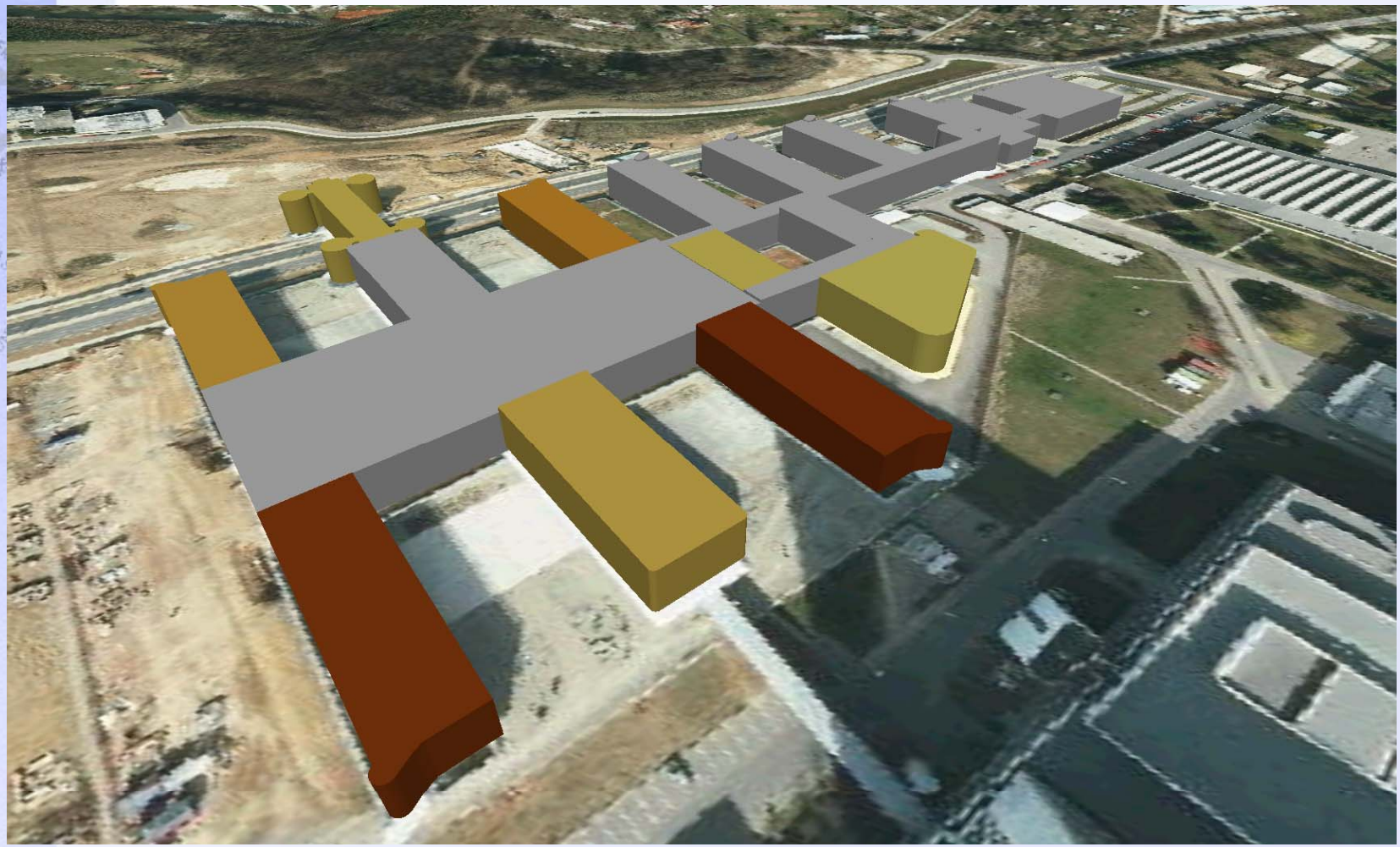
Electric Energy Year Consumption

3D Thematic Maps
Room Temperatures



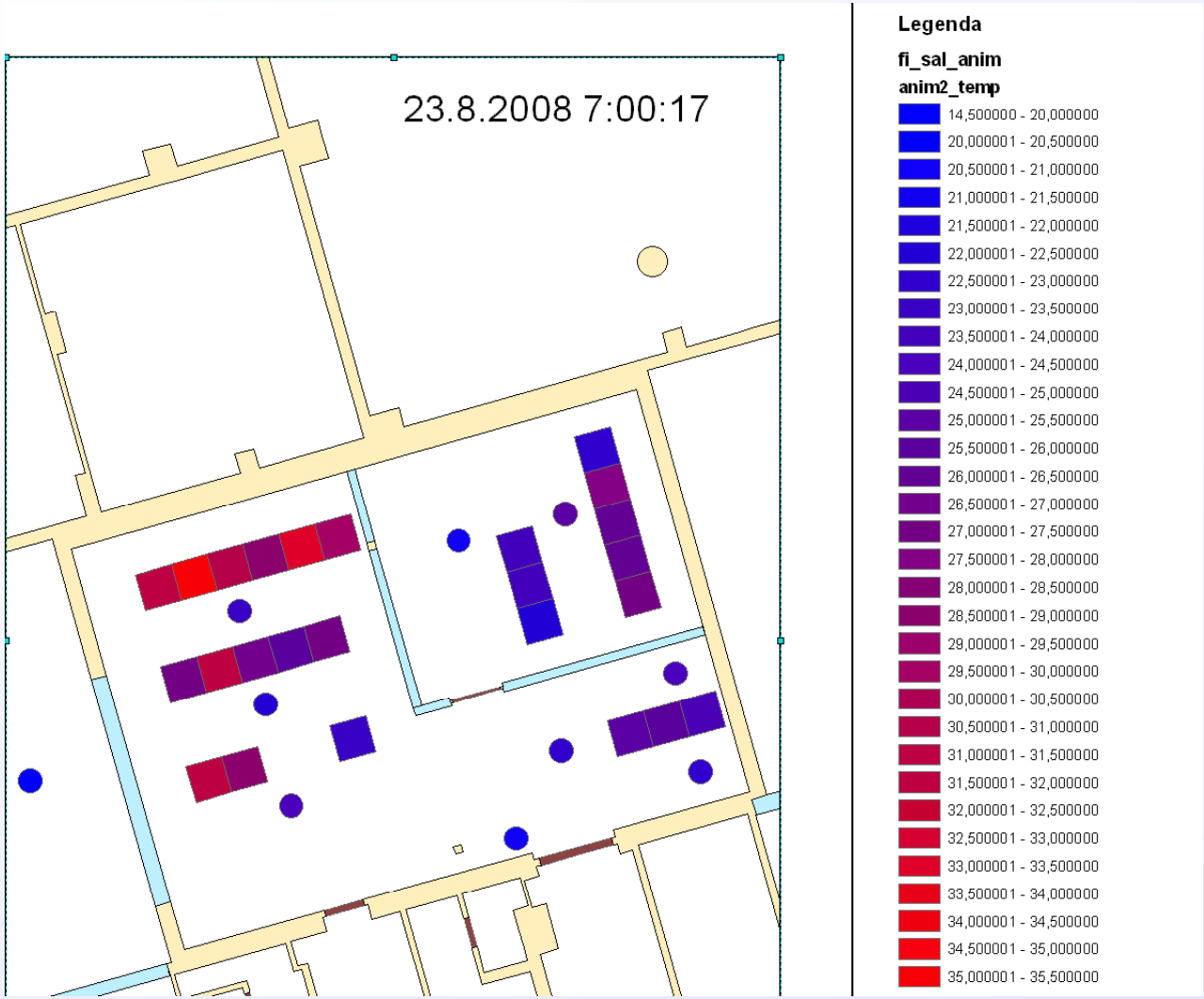
3D Thematic Maps

Electric Energy Consumption



2D Animation

Computer Room Temperatures



3D Animation
Room Temperatures

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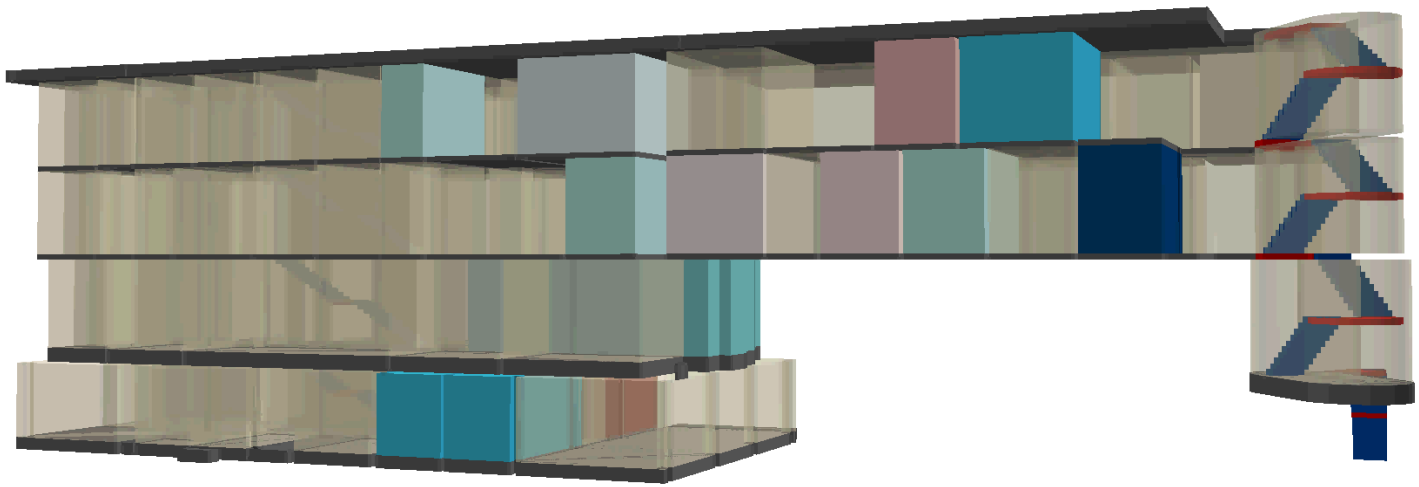
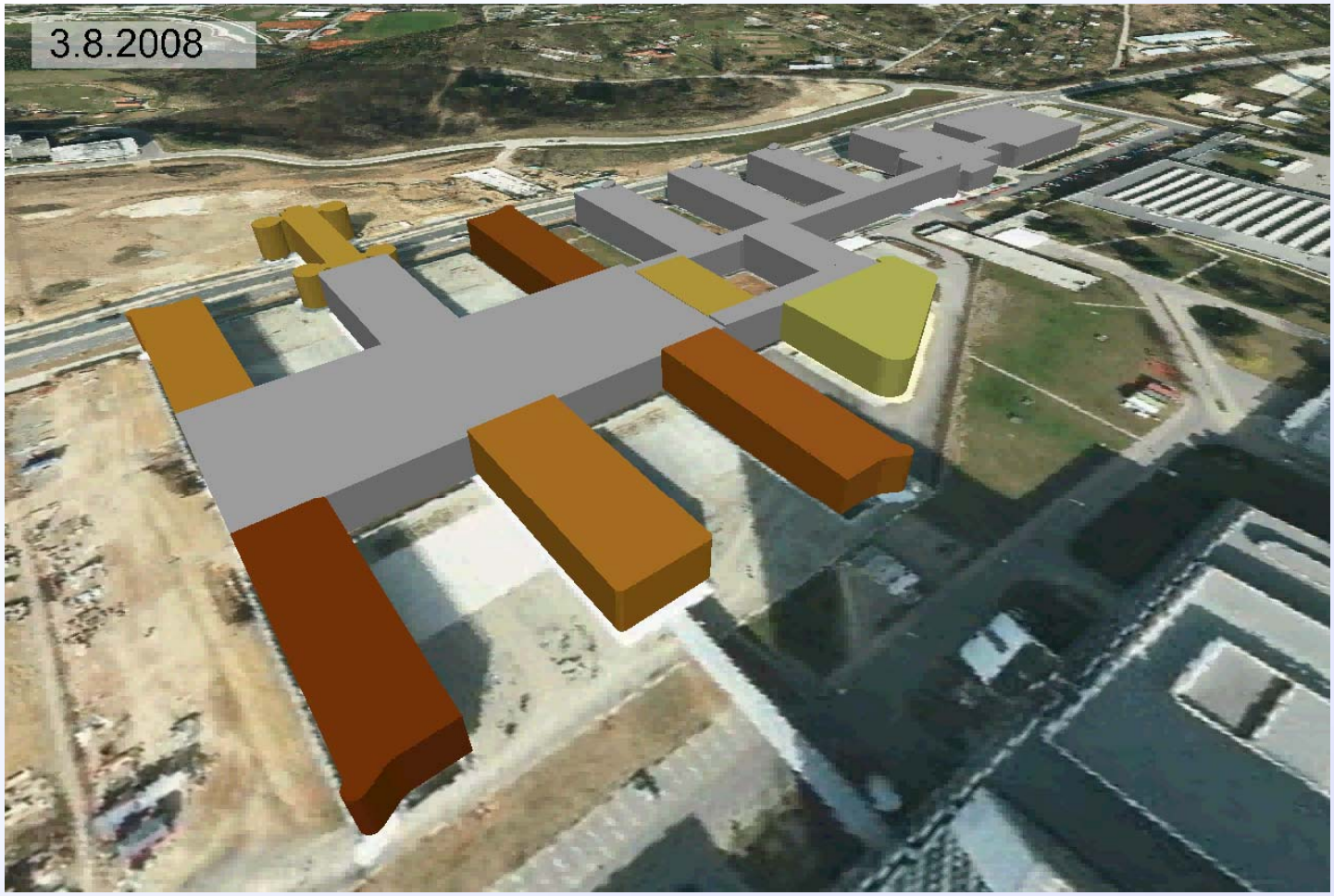


3D Animation

Electric Energy Consumption



Questions ?

Thank you for your attention.

Petr Glos
Institute of Computer Science
Masaryk University
Botanická 68 a, 602 00 Brno
glos@ics.muni.cz
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http://ics.muni.cz
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