Using GIS

for Visualizing Historical Data

from Building Management System

Petr Glos

Masaryk University

Institute of Computer Science

GIS Department

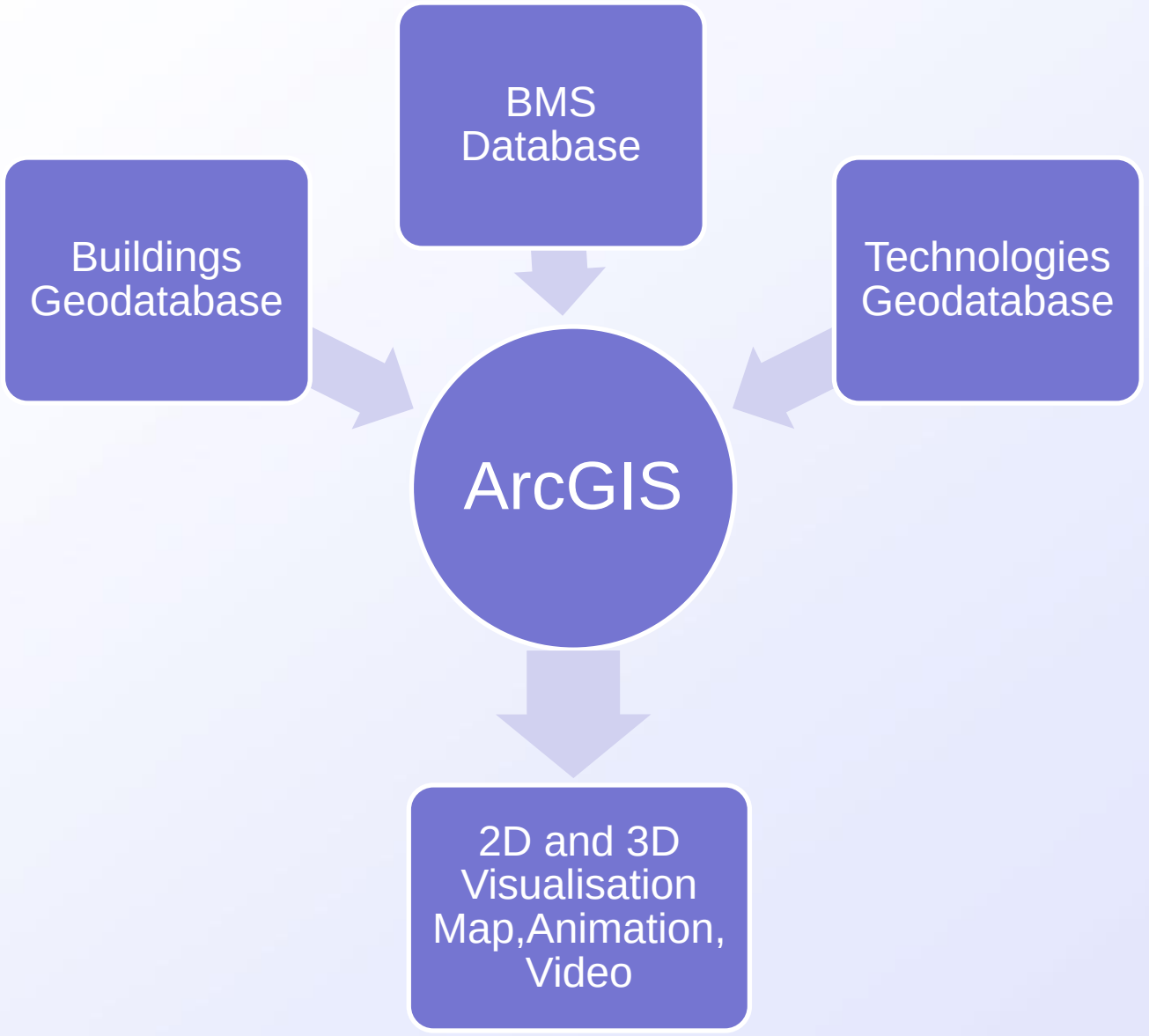
Botanická 68a, 602 00 Brno, Czech Republic

glos@ics.muni.cz

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

Outline

- GIS and ArcGIS
- Buildings
- Technologies
- BMS
- Historical Data from BMS
- 2D and 3D visualization
- Questions


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

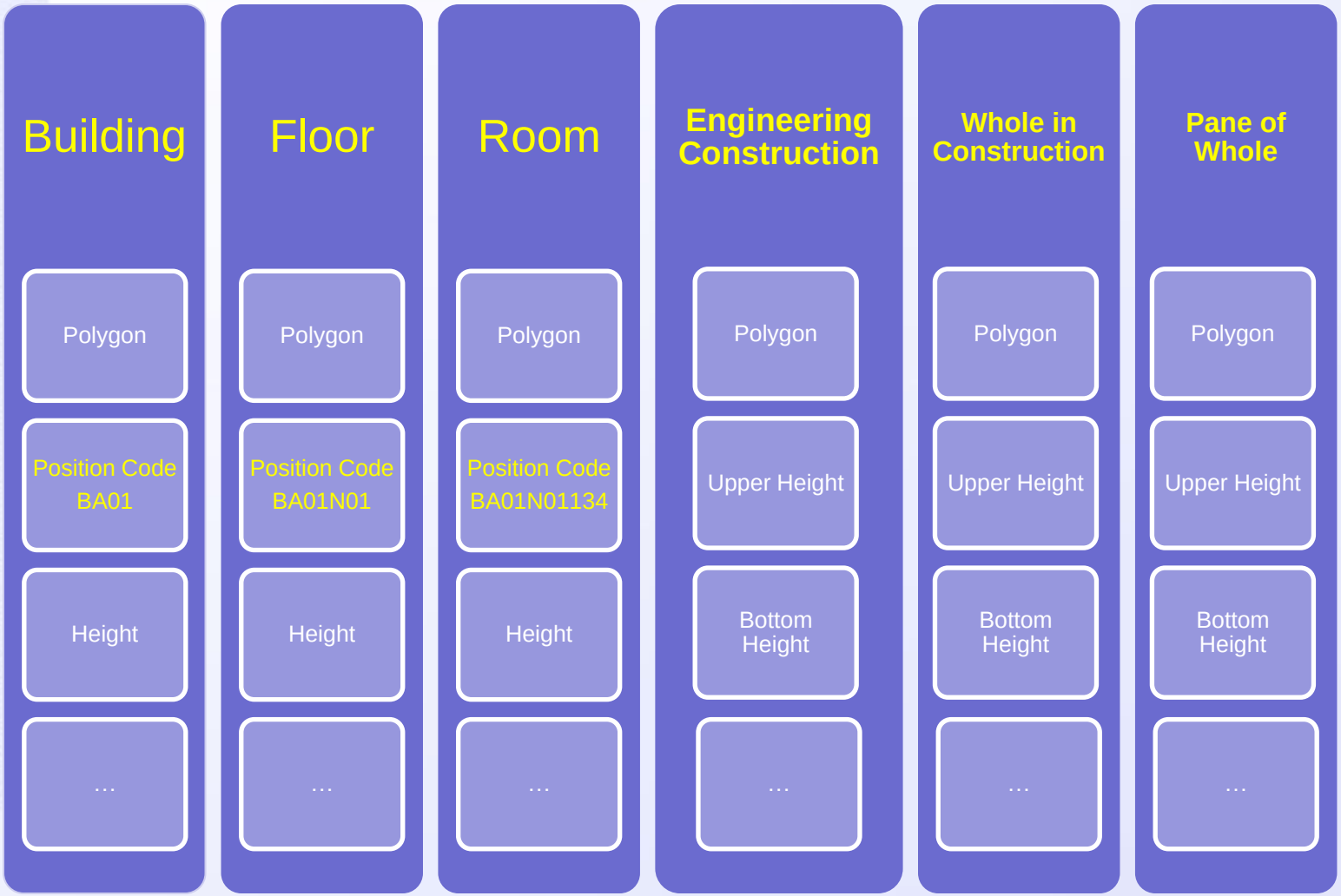
GIS
Geographic Information System

- GIS = G + IS
- G = Spatial context
  - Shape / What
  - Geometry
    - Point, Line, Polygon, 3D shape
  - Position / Where
  - Coordinates
    - WGS, S-JTSK,…
- GeoDatabase =Geo + Database
- Spatial relationships
- Topology rules
- Digital cartography
- Internet maps
- GPS
- …

ArcGIS

- Server
  - ArcGIS Server
    - Map Services
  - ArcSDE
    - GeoDatabase
- Desktop
  - ArcCatalog
    - Data management
    - Metadata management
  - **ArcMap**
    - **Data editing**
    - **Map authoring**
  - **ArcScene**
    - **3D visualization**
- Mobile
  - ArcPad
    - Mobile phone,
    - PDA

Buildings


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

Pasport místností a budov - Microsoft Internet Explorer

Soubor Úpravy Zobrazit Oblíbené Nástroje Nápověda

Zpět Hledat Oblíbené

Adresa https://maps.muni.cz/Pasport/viewer.htm Přejít

Google Go Bookmarks Popups okay Check AutoLink AutoFill Send to

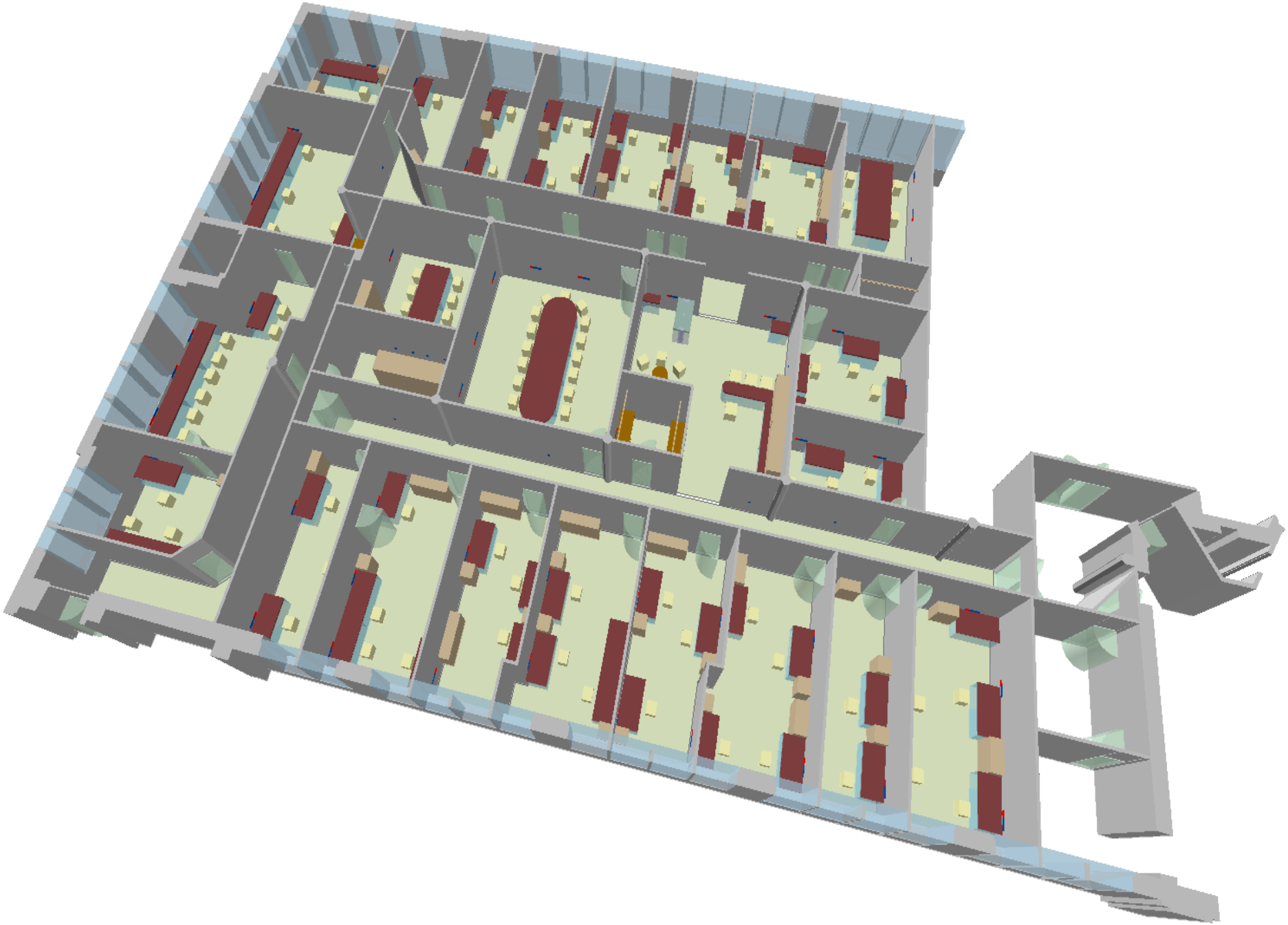
Pasport místností a budov

- 1. podzemní podlaží
- 1. nadzemní podlaží
- 2. nadzemní podlaží
- 3. nadzemní podlaží
- 4. nadzemní podlaží
- 5. nadzemní podlaží
- FSpS
- FSS
- IBA
- LF
- MJGM
- MU
- PedF
- PrávF
- PřF
- RMU
- SKM
- SPSSN
- UCT
- UKB
- ÚVT
- Vrstvy mapy
  - Orientační plán - vektorový
  - Stavební pasport
    - B-poznámka
    - Dveře
    - Kóta-Poznámka
    - Kóty
    - Okna
    - Orientační schodiště
    - Otevírání dveří
    - Půdorys areálu
    - Půdorys budovy
    - Půdorys budovy ISKN
    - Půdorys místnosti
    - Půdorys podlaží
    - P-poznámka
    - Stavební konstrukce
  - Technologický pasport
  - Orientační plán Brna
  - Ortofoto Brna
  - Parcely

Editovaná vrstva: P-poznámka Změnit popisek poznámky

Kliknutím v mapovém okně označte poznámku, u které chcete změnit popisek.

Editace




Žerotínovo náměstí
Brandlova
Image © 2007 DigitalGlobe
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23 m
©2007 Google

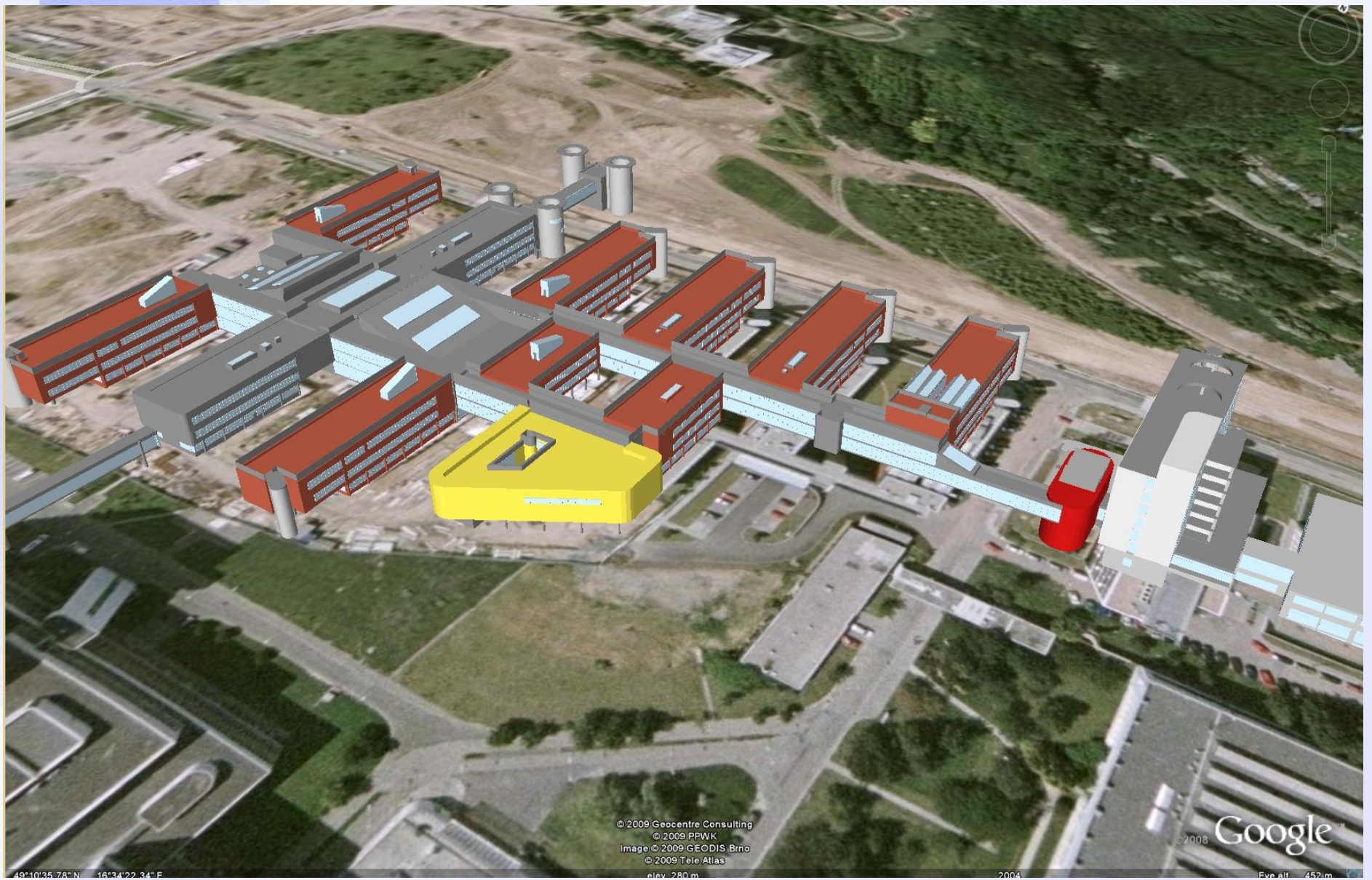
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Image © 2009 GEODIS Brno
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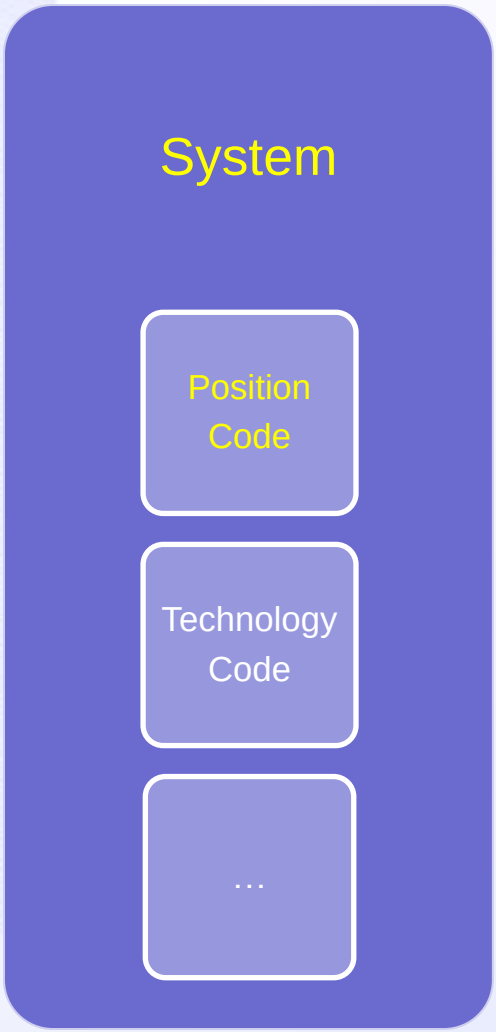
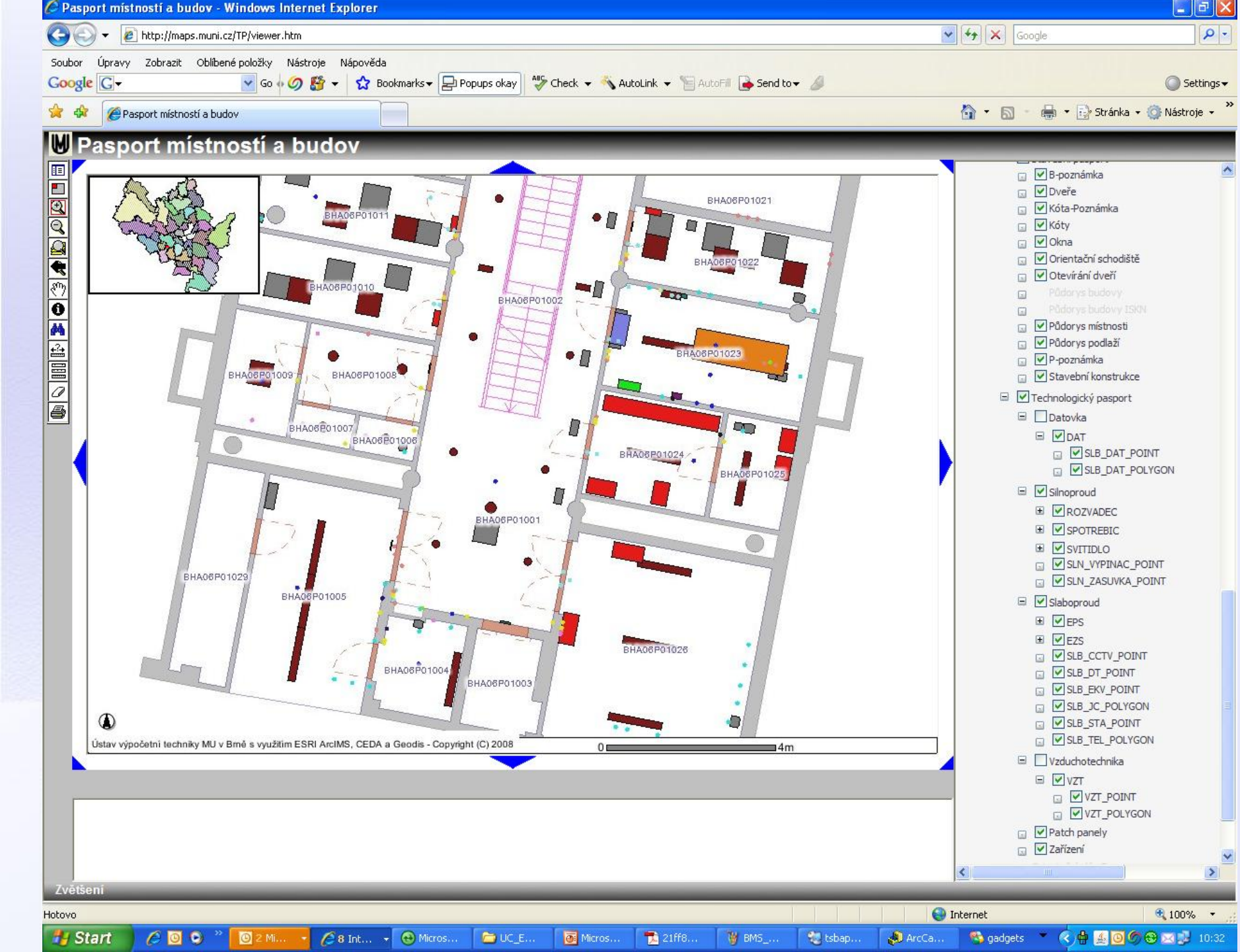
Technologies

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




Pasport místností a budov - Windows Internet Explorer
http://maps.muni.cz/TP/viewer.htm
Pasport místností a budov
BHA06P01011
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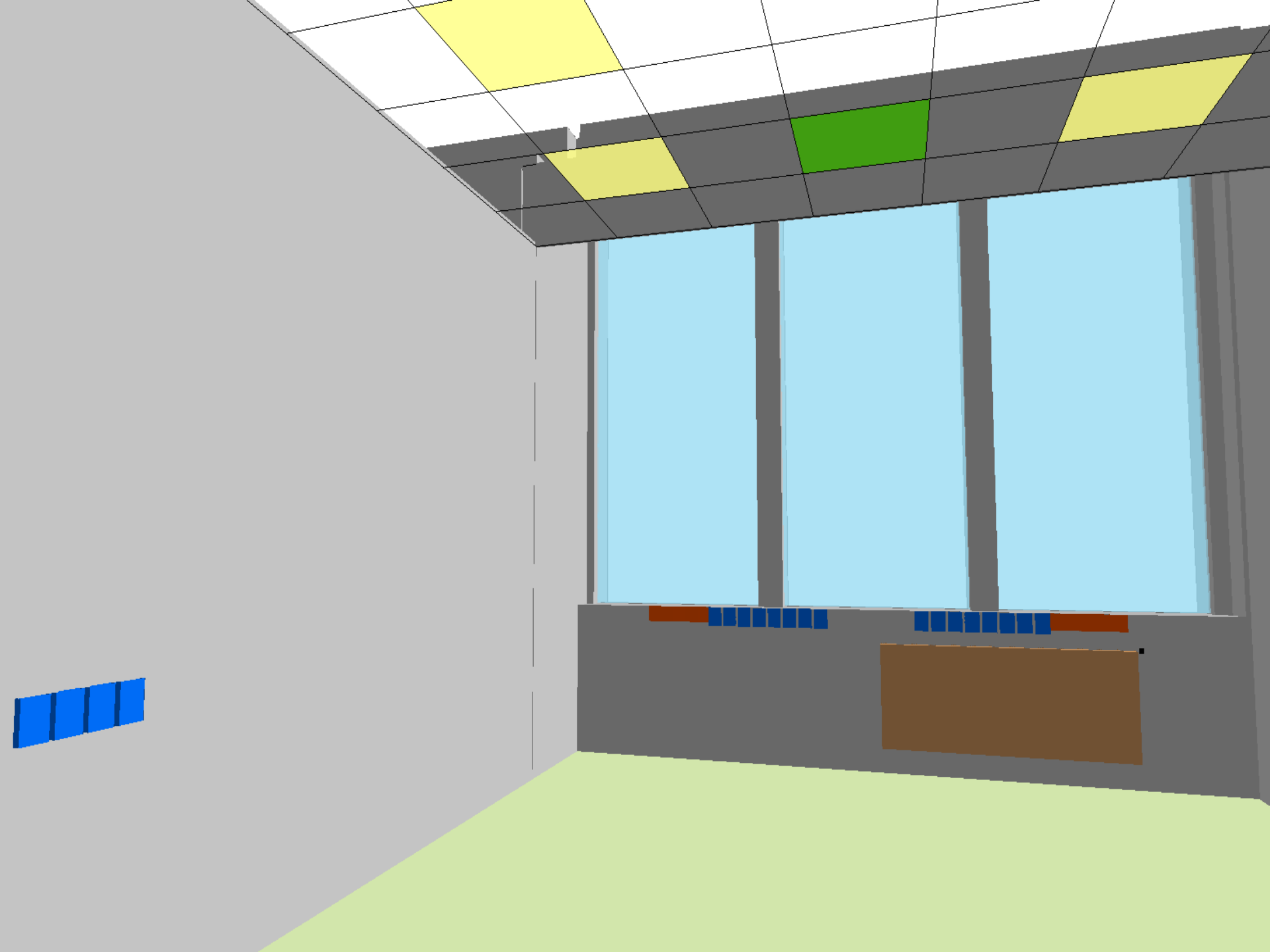
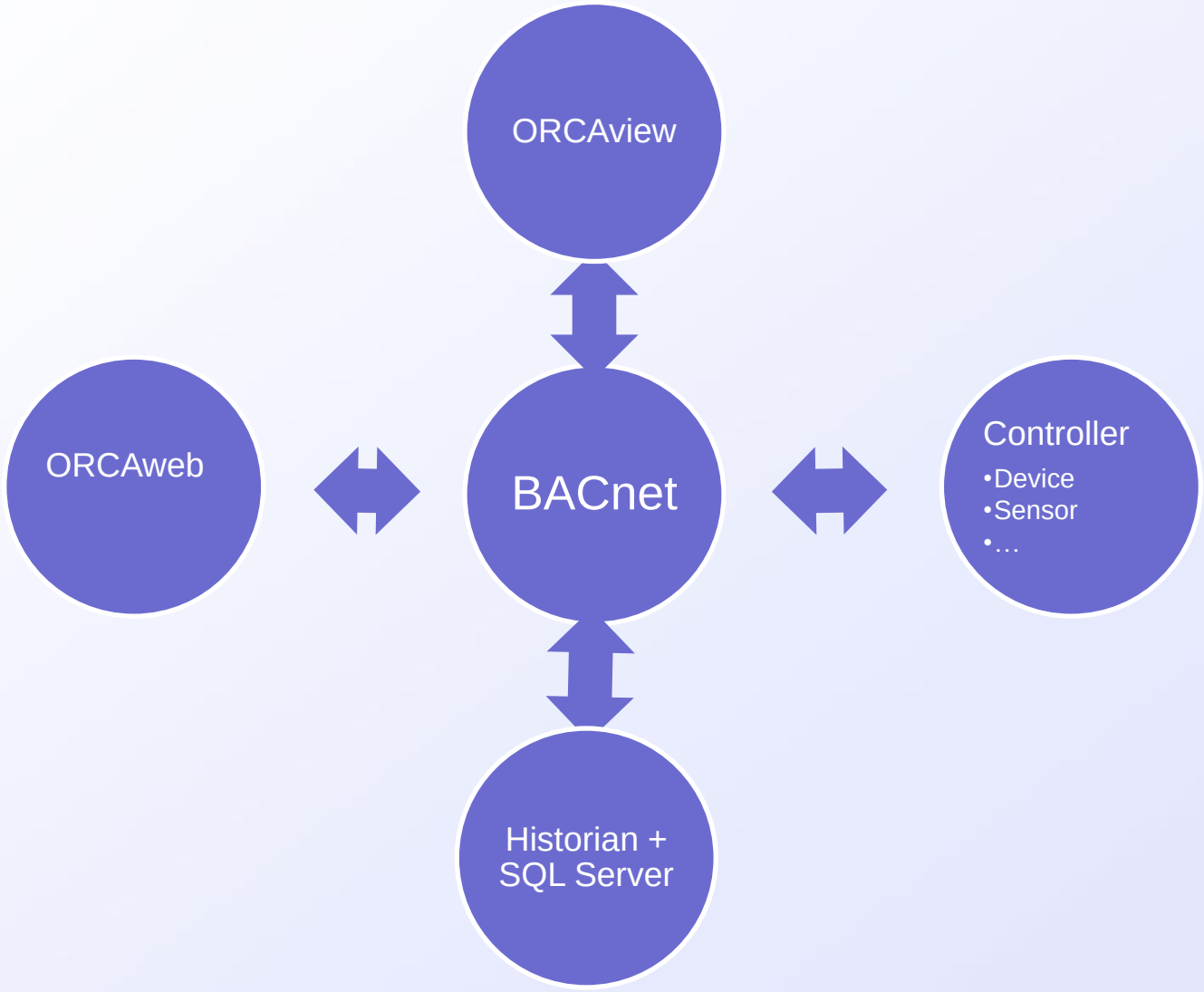
BHA06P01029
BHA06P01005
BHA06P01004
BHA06P01003
BHA06P01026
Ústav výpočetní techniky MU v Brně s využitím ESRI ArcIMS, CEDA a Geodis - Copyright (C) 2008
0
4m
B-poznámka
Dveře
Kóta-Poznámka
Kóty
Okna
Orientační schodiště
Otevírání dveří
Půdorys budovy
Půdorys budovy ISKN
Půdorys místnosti
Půdorys podlaží
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
10:32



Building Management System

- Integrated environment for building operation and management
  - BACnet
  - Open Standard
  - IT x Building Technologies
- ONLY ONE application for all buildings of University Campus Bohunice
- Desktop version for problem resolving
  - Anywhere on Technology Network
  - ORCAView – DELTA Controls
- Web version for building operation
  - 2 servers
  - Anywhere on Data Network
  - ORCAWeb – DELTA Controls
- Historical Data
  - 2 servers
  - Historian – DELTA Controls
  - MS SQL Server

Building Management System



Navigator - Windows Internet Explorer

http://bms-b.ics.muni.cz/deltaweb/navigator/index.asp?mainPage=../graphics/UKB/BMS_Main.asp

Soubor Úpravy Zobrazit Oblíbené položky Nástroje Nápověda

Navigator

Delta

KAMPUS [pglos]

- ORCAweb
- BACnet
- Graphics
- Alarms
- Reports
- GiTy a.s.
- Contact Administrator
- Preference
- Help
- Log Out

GiTy | 10-Jun-2008 | BMS UKB Masarykova Univerzita | 09:26

v.08.05.23

Lokalita	UKB	UVT																								
Objekt	A1	A2	A4	A6	A7	A9	A11	A13	A15	A17	A19	A21		A25		A29	A31	A33								Koridor SEVER
	VH1	A3	A5	Z	A8	A10	A12	A14	A16	A18	A20	A22		A26		A30	A32	A34	A36	LK						Koridor JIH

UKB

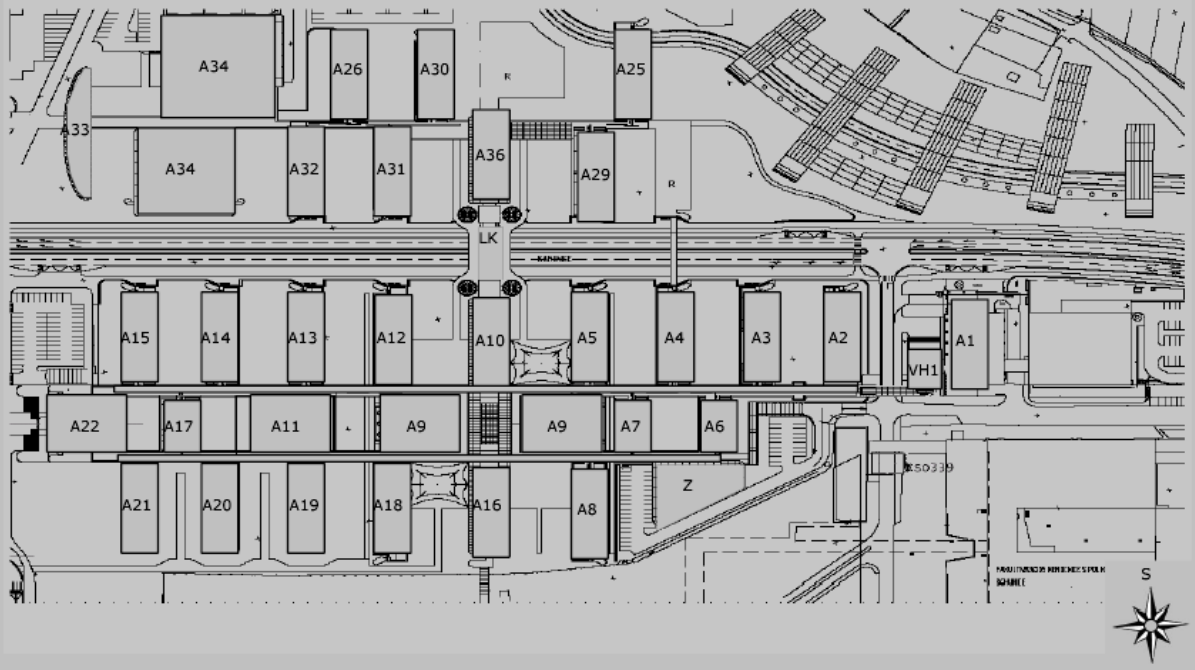
BHA

Pøehled

Pøedešlé

Nápovìda

Komunikace



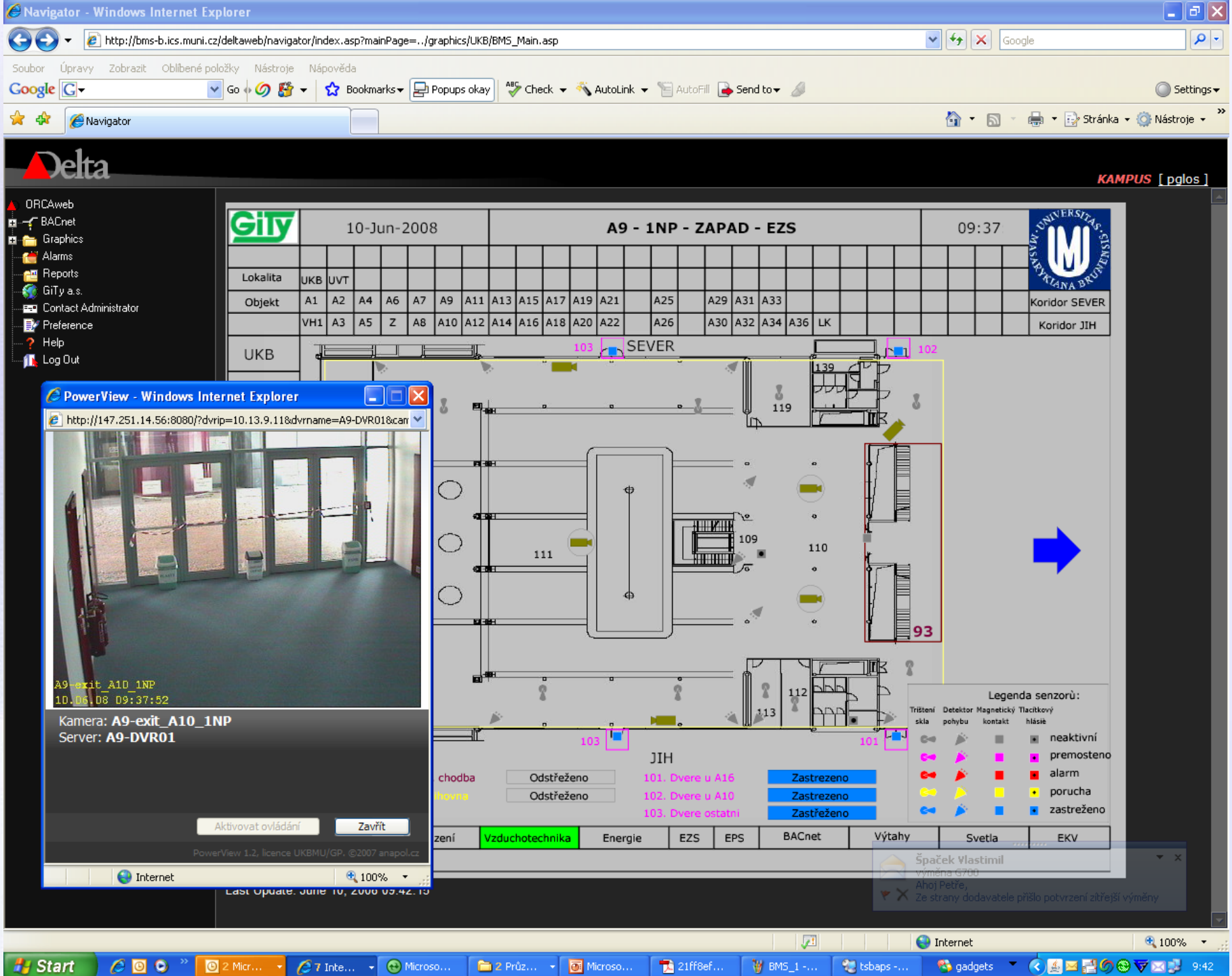
Venkovní teplota: ?? °C

UOCHV	Diesel	Tech. EPS	Osvetleni	MOV	Tlacitka	Napajeni	Vytahy

Last Update: June 10, 2008 09:30:37

Internet 100%

Start | 2 Micro... | 6 Inter... | Microsoft... | UC_ESRI... | Microsoft... | 21ff8ef2... | BAPS_1 -... | tsbaps - ... | gadgets | 9:30


Navigator - Windows Internet Explorer
http://bms-b.ics.muni.cz/deltaweb/navigator/index.asp?mainPage=../graphics/UKB/BMS_Main.asp
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
103
102
101
139
119
111
109
110
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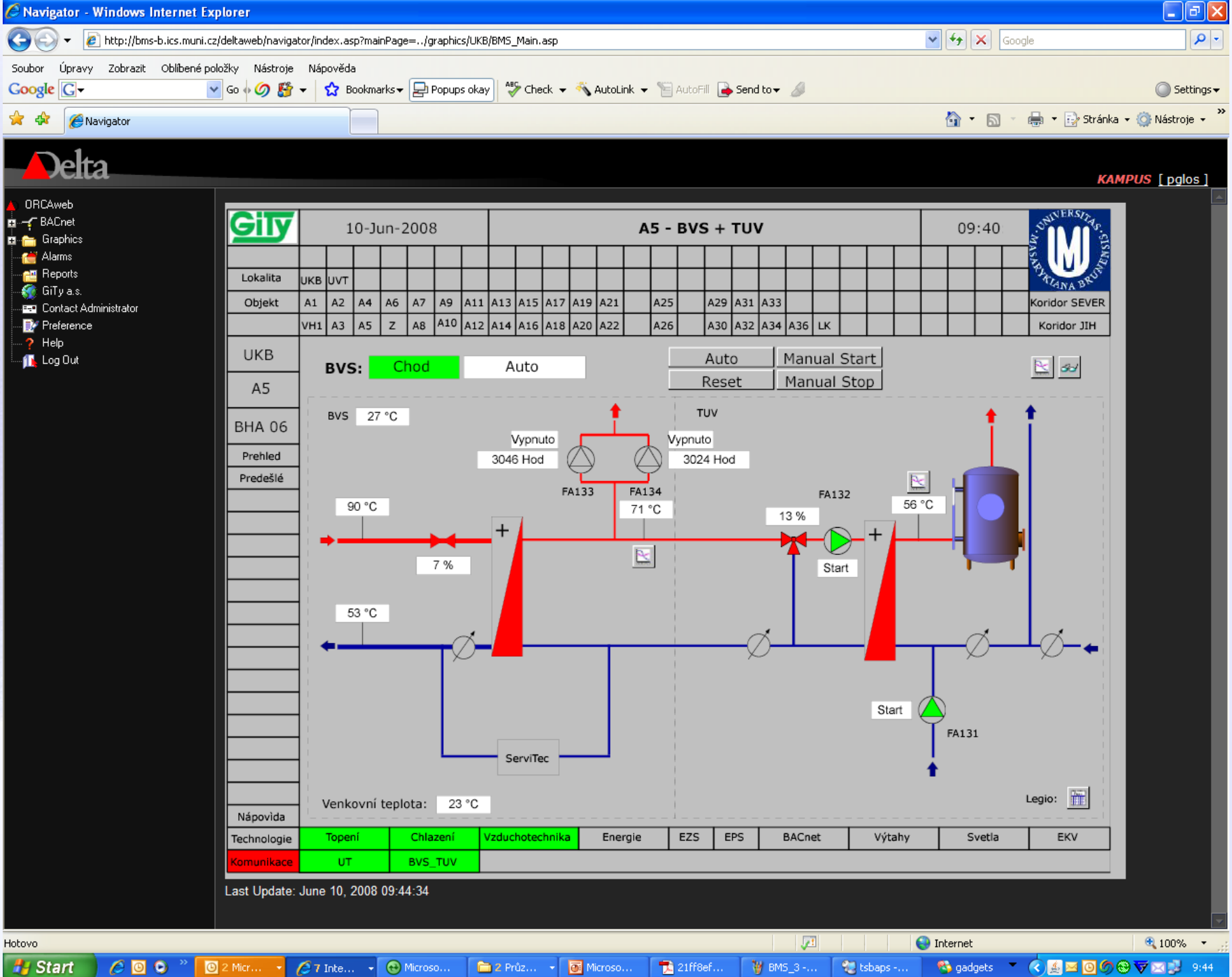
113
93
PowerView - Windows Internet Explorer
http://147.251.14.56:8080/?dvrip=10.13.9.11&dvrname=A9-DVR01&cam
A9-exit_A10_1NP
10.06.08 09:37:52
Kamera: A9-exit_A10_1NP
Server: A9-DVR01
Aktivovat ovládání
Zavřít
PowerView 1.2, licence UKBMU/GP, ©2007 anapol.cz
Legenda senzorů:
Tříštění skla
Detektor pohybu
Magnetický kontakt
Tlačítkový hlásič
neaktivní
premosteno
alarm
porucha
zastřeženo
chodba
Odstřeženo
101. Dvere u A16
Zastrezeno
Odstřeženo
102. Dvere u A10
Zastrezeno
103. Dvere ostatni
Zastřeženo
Vzduchotechnika
Energie
EZS
EPS
BACnet
Výtahy
Svetla
EKV
Špaček Vlastimil
Výměna G700
Ahoj Petře,
Ze strany dodavatele přišlo potvrzení zítřejší výměny
Internet
100%
Start
9:42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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
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
FA132
90 °C
71 °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
EKV
Komunikace
UT
BVS_TUV
Last Update: June 10, 2008 09:44:34
Hotovo
Internet
100%
Start
9:44

Navigator - Windows Internet Explorer

http://bms-b.ics.muni.cz/deltaweb/navigator/index.asp?mainPage=../graphics/UKB/BMS_Main.asp

Soubor Úpravy Zobrazit Oblíbené položky Nástroje Nápověda

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	10-Jun-2008							UVT - Sál																09:38						
Lokalita	UKB	UVT																												
Objekt	A1	A2	A4	A6	A7	A9	A11	A13	A15	A17	A19	A21		A25		A29	A31	A33												Koridor SEVER
	VH1	A3	A5	Z	A8	A10	A12	A14	A16	A18	A20	A22		A26		A30	A32	A34	A36	LK										Koridor JIH

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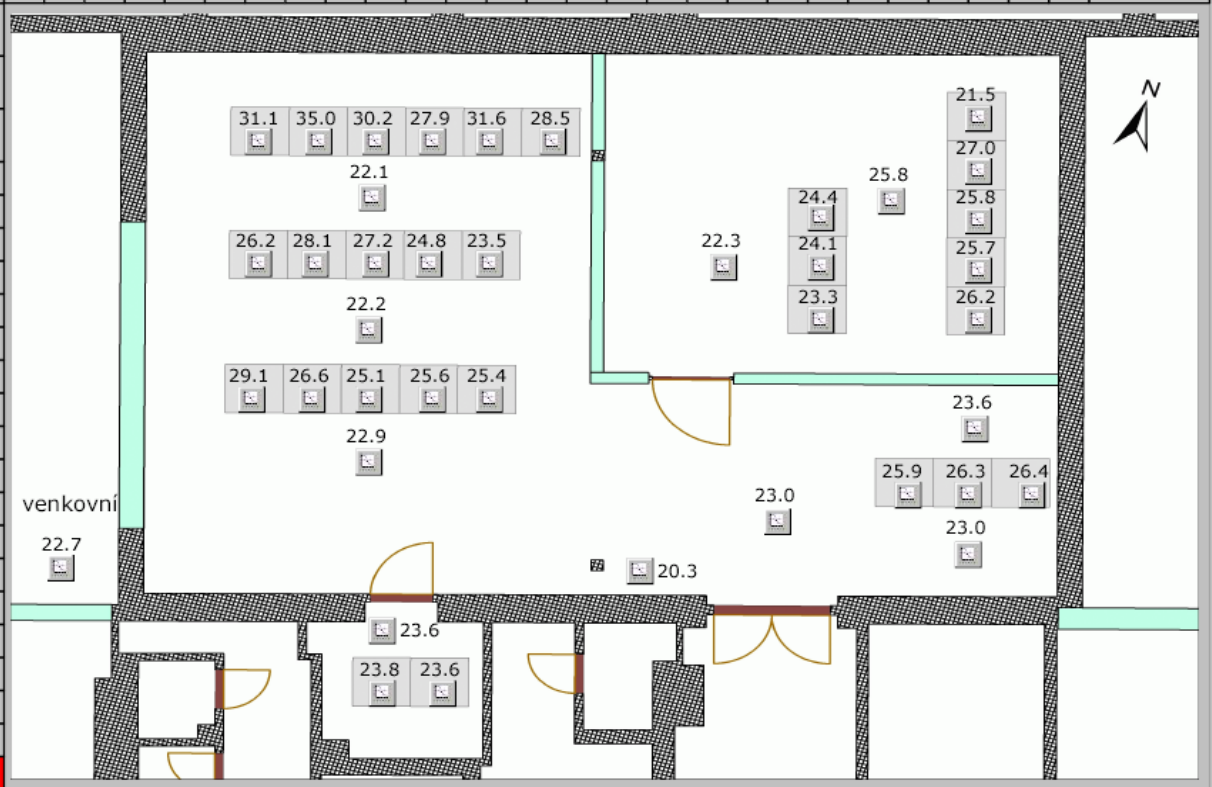
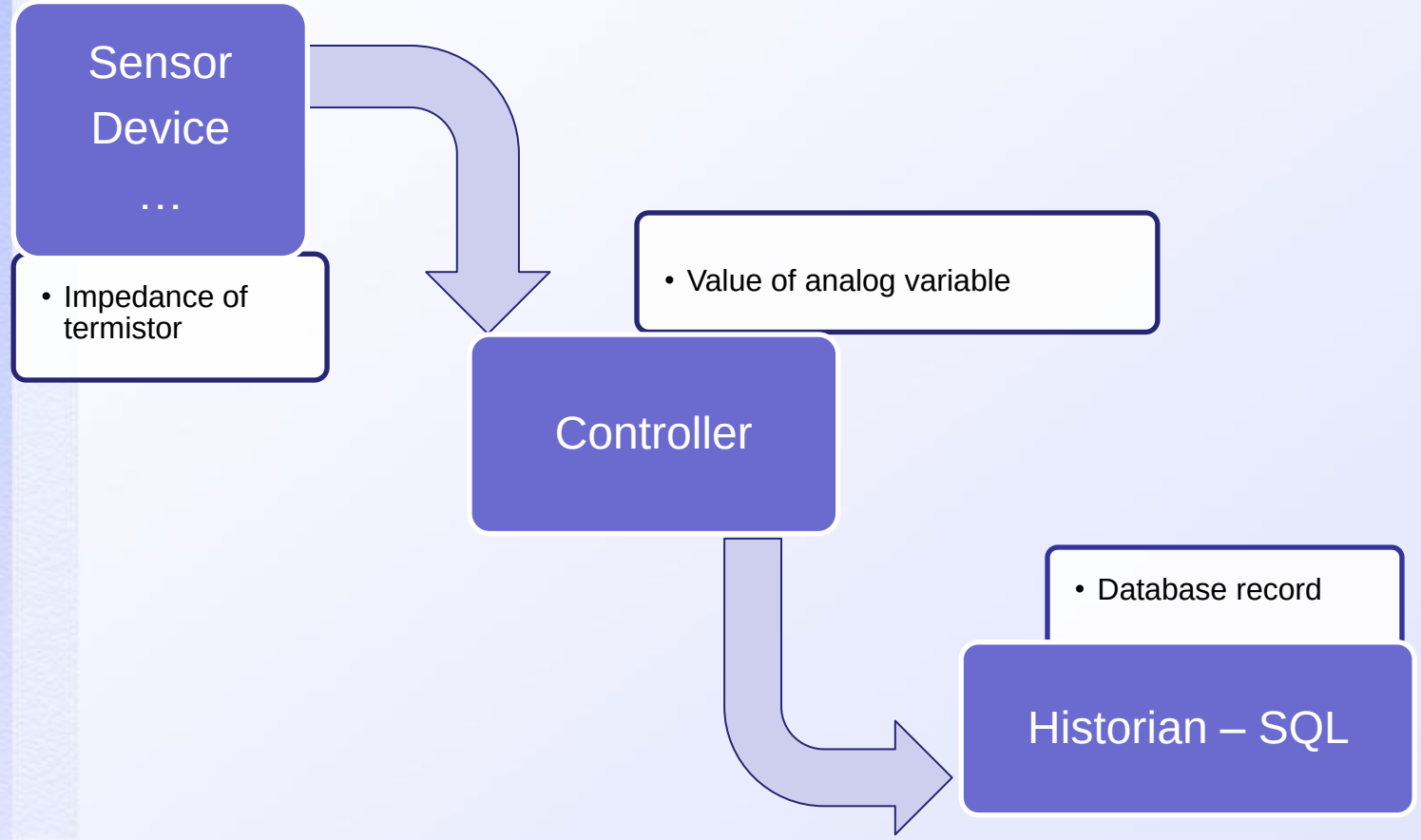


Last Update: June 10, 2008 09:43:20

Internet 100%

Start 9:43

Collecting and Archiving Data from BMS

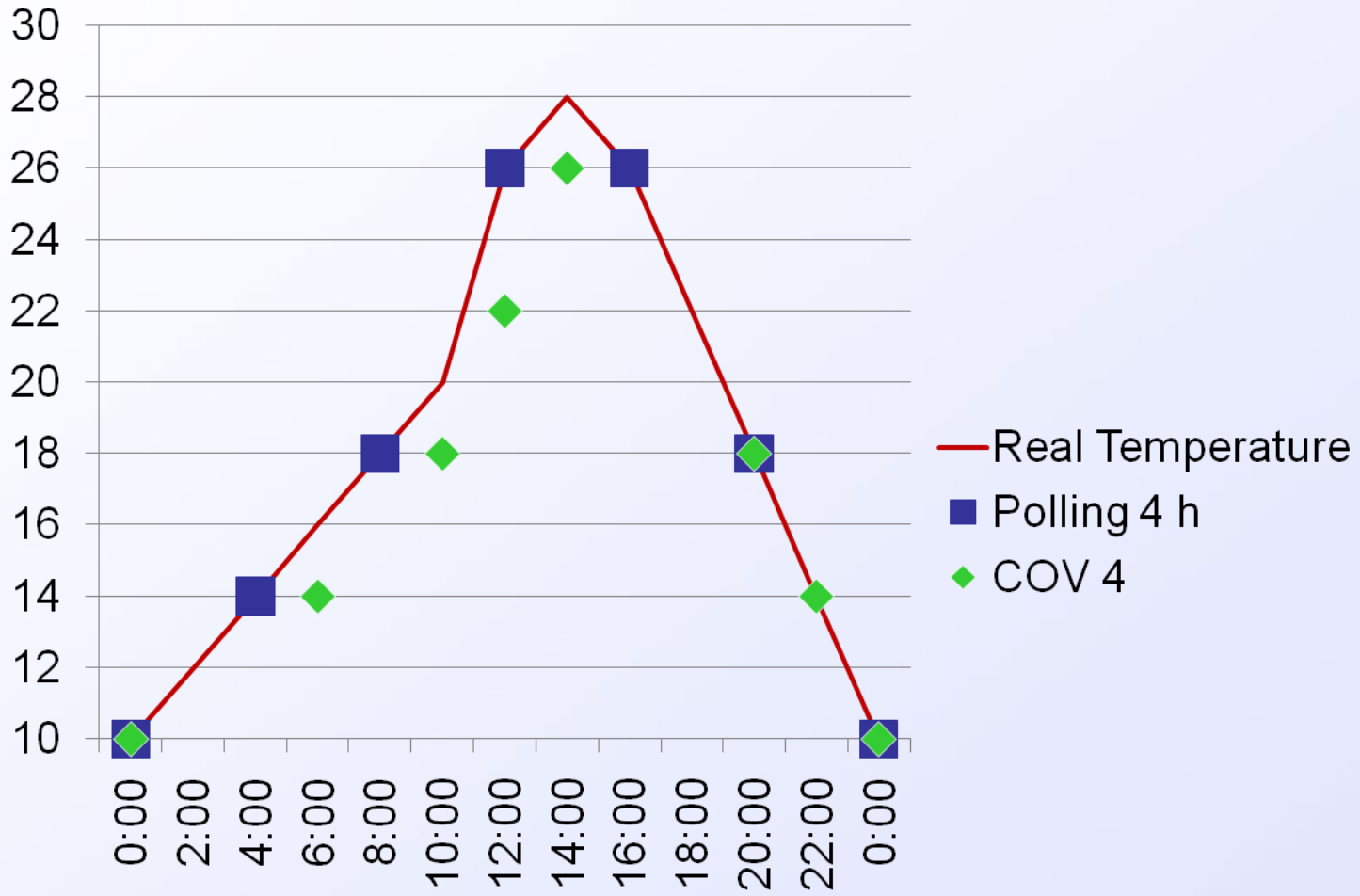


Trendlog

object for collecting and archiving data from BMS

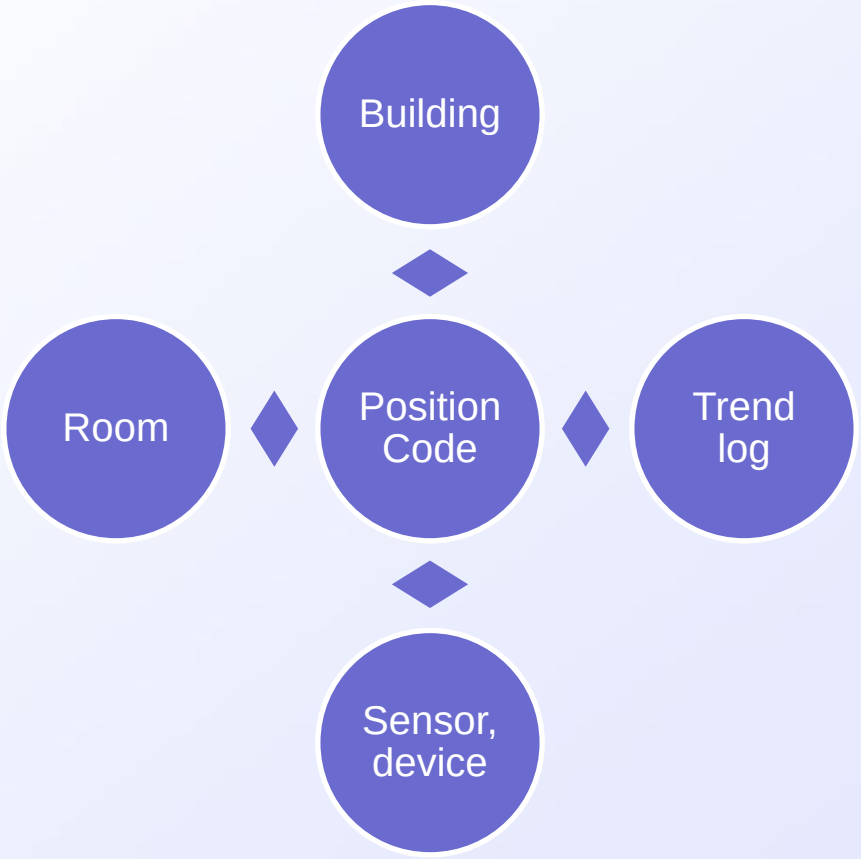
- Attributes
  - Position code,
  - Technology code
  - Time
  - Value
- Polling – Time Interval
  - 1 h = 1 value each our is registered
- Change of Value
  - 2 °C = next value is registered if temperature changes for 2 °C from previous stored value
- Controllers have buffers for data of trendlogs.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

Historical Data from BMS



Visualization

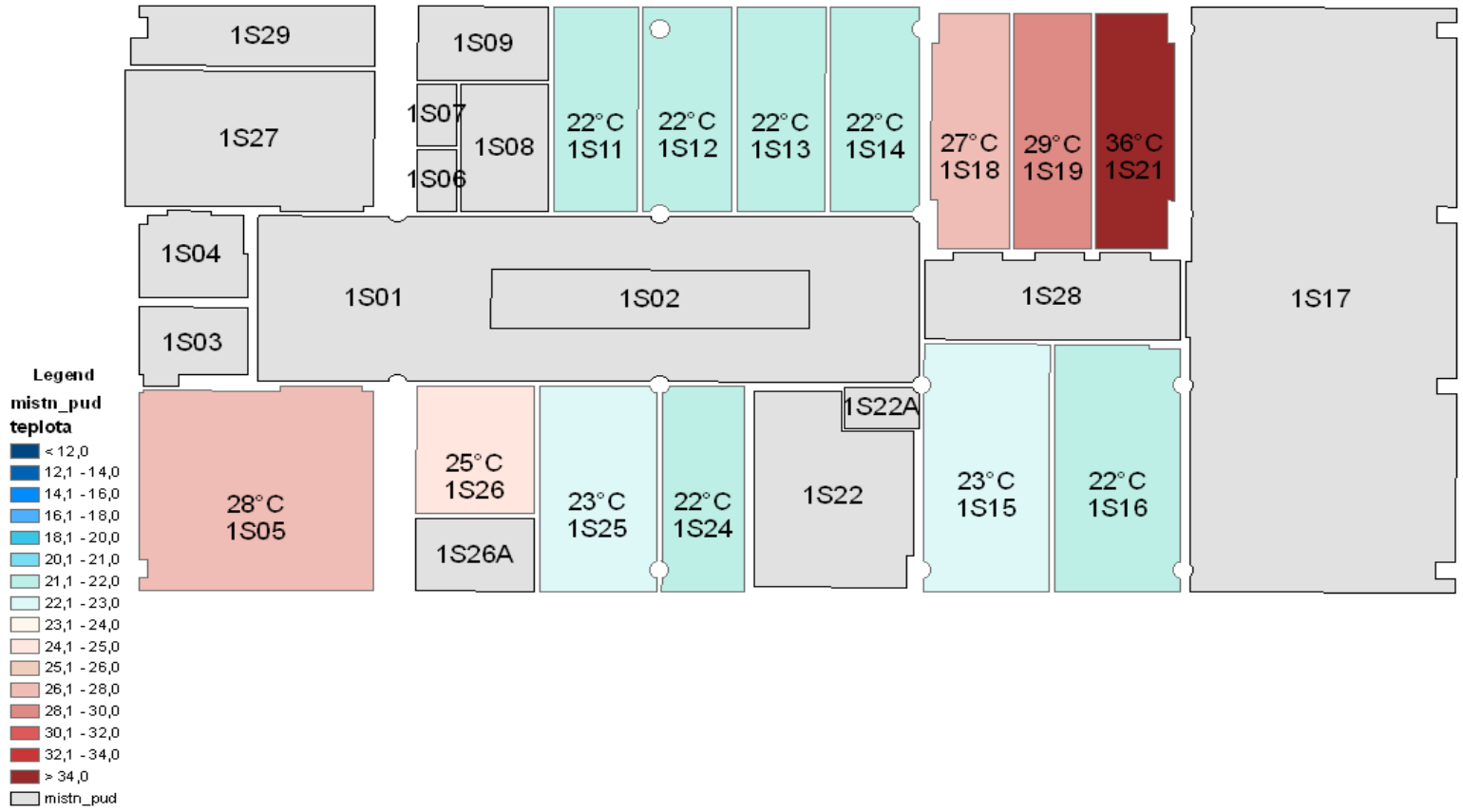
- Position Code – key item for data integration



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

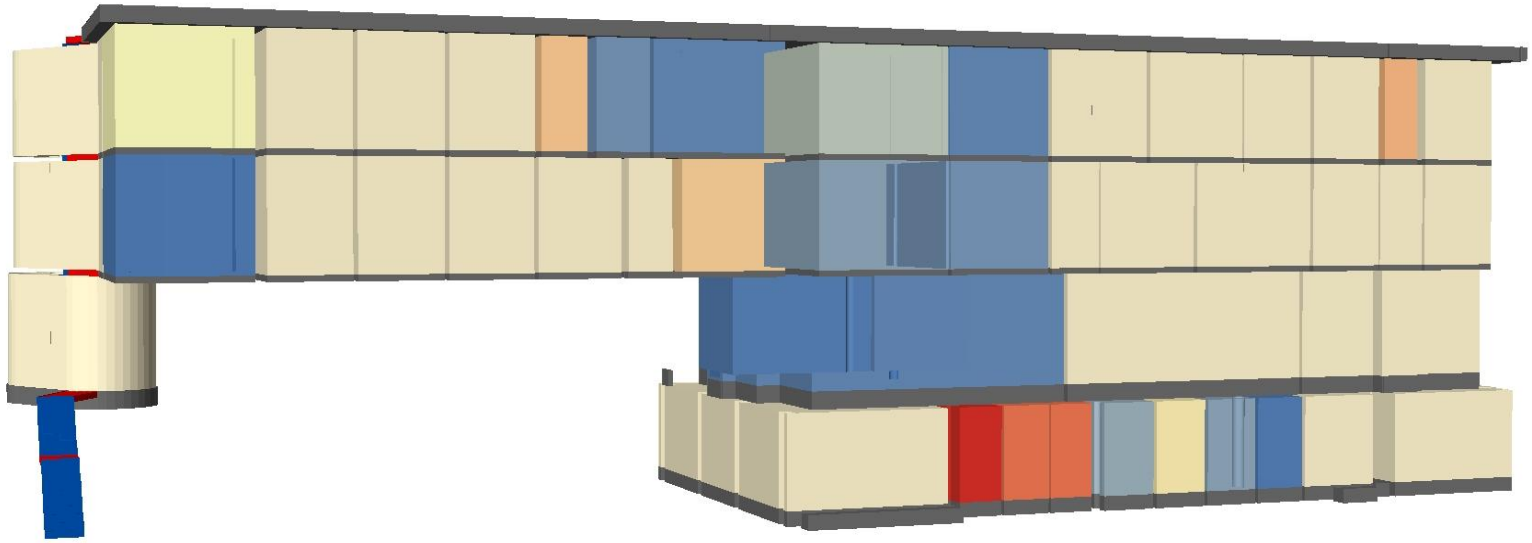
2D Thematic Maps
Room Temperatures



2D Thematic Maps

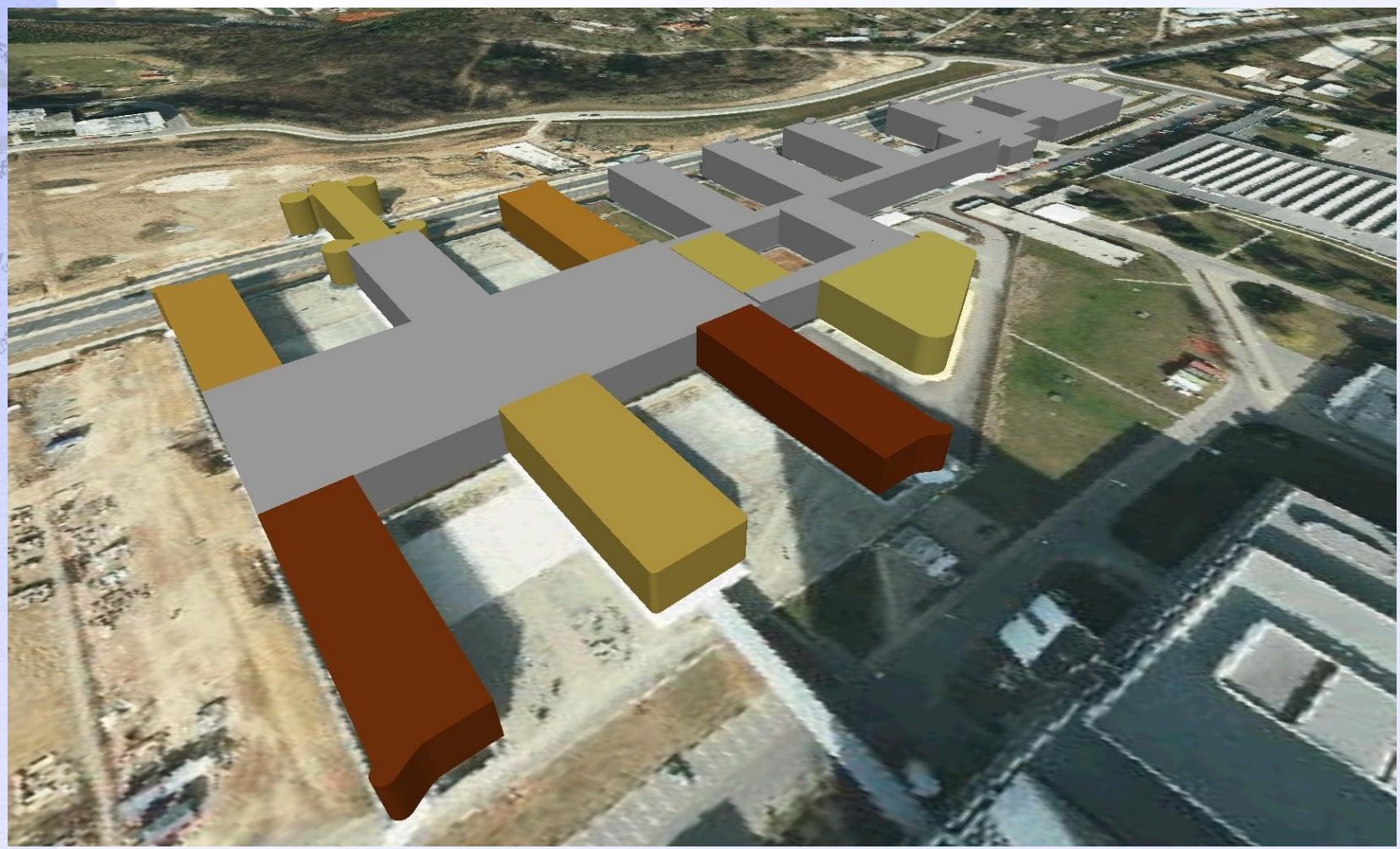
Electric Energy Year Consumption

3D Thematic Maps
Room Temperatures

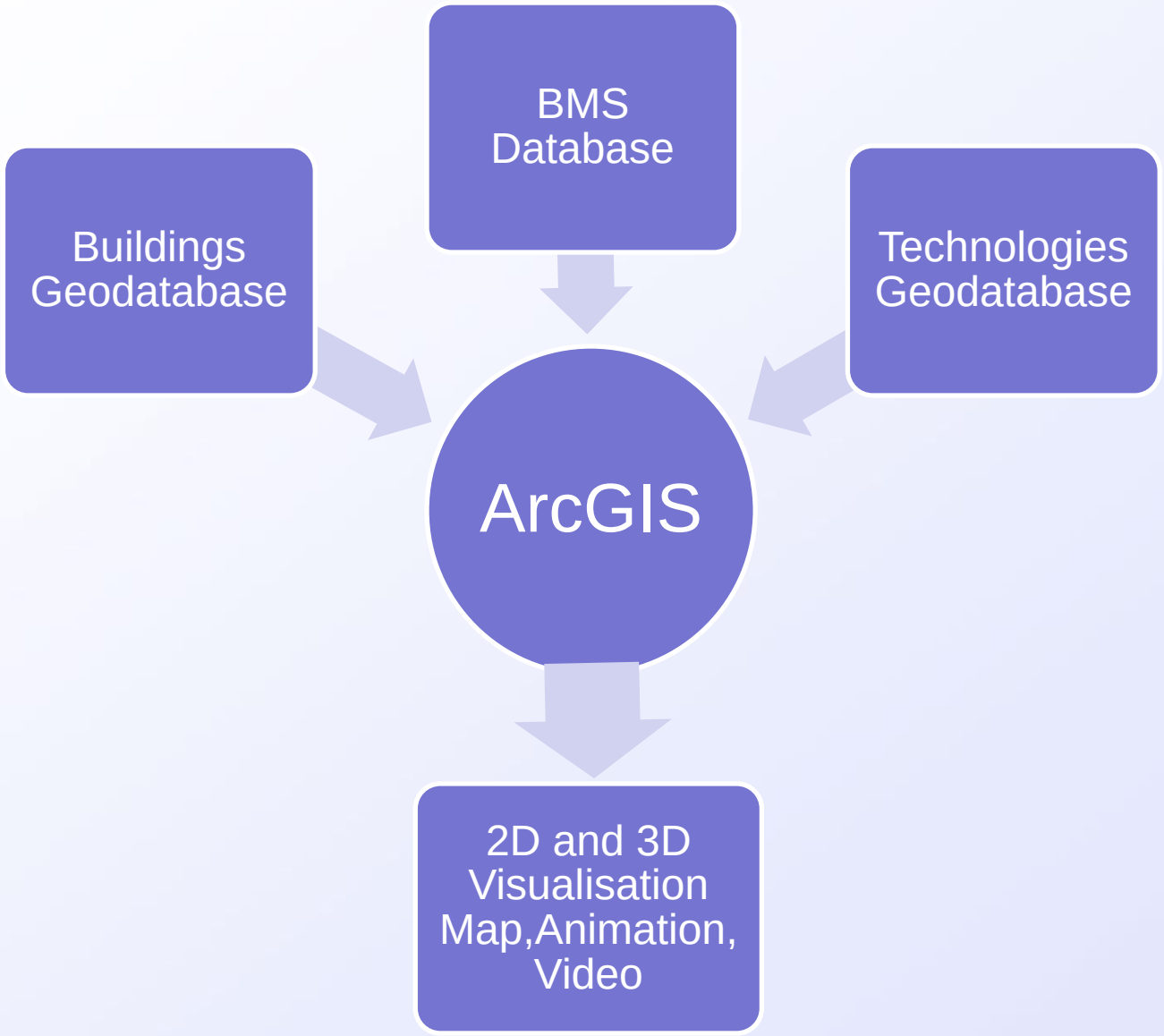


3D Thematic Maps

Electric Energy Consumption



Summary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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://maps.muni.cz