

# Initial design of a telemetering - based air quality monitoring system for Konkuk University

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# Background : U-City

- U-City is Korea's vision or strategy for **future city** and **knowledge industry**, based on advanced ICT infrastructures
- In a “ubiquitous city”, various types of computer/sensors and information systems are built into houses, office buildings, streets; make them connected and **their services (residential, medical, business, governmental) available** in a **ubiquitous** and **integrated** way
- U-Services : **Anytime, Anywhere**

Healthcare,  
Medical care



Security



Fire alarm, Seismograph, Flood, Fall down  
(Penetration, Distortion, Temperature, Bright,  
Vibration,...)

Anti-disaster



Disaster monitoring  
Fire, Collapsed or Liquidized Soil  
(Temperature, Smoke, Foundation, ...)

u-City  
Infrastructure

Others Apps

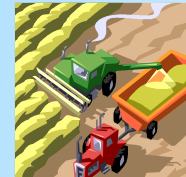
Weather, Water quality, Shopping



Air pollution, Vibration, Posionous Gas  
(SOx, NOx, Dust, Distortion, ....)



Physical distribution, Logistic, Quality  
(Temperature, Humidity, ...)



Management of growth,  
Position chase,  
Machine Condition  
(Position, Tempuature, Humidity ...)

Environmental Risk  
Management

Tracking

Agriculture

# **The u-EcoCity Project**

## **Major Goals**

**Design city models where ubiquitous technology makes urban life convenient, pleasant**

**Develop ubiquitous service and infrastructure technologies for the development of future city where urban facilities are intelligent and environment-friendly.**

**Construct testbeds in cities**

**Eventually create national brand for future city and new business opportunities**

# Konkuk University Complex : The testbed

- Components : Starcity(Residential & Commercial), Classic500 (Senior Housing), KU Hospital (KUH), KU Main Campus(KUMC)
- Starcity
  - Residential : 1310 Condos (58 floors max.)
  - Commercial : Multiplex theater, Supermarkets, Mall Area, Restaurants
- Classic500
  - Residential : 500 Senior Apartments
  - Under Construction
- KU Hospital
  - 870-bed, 83,000 m<sup>2</sup>, 13 flrs + 4 flrs (underground)
  - 31 units with 4 major specialized centers (Outpatient dept)
- KU Main Campus
  - 20,000 students(incl 2,000 grads), 589 full-time, and 864 part-time faculty. 12 grad schools and 16 colleges(86 depts and 33 research institutes)
  - about 1km<sup>2</sup> area (incl a lake)

*Plus...*

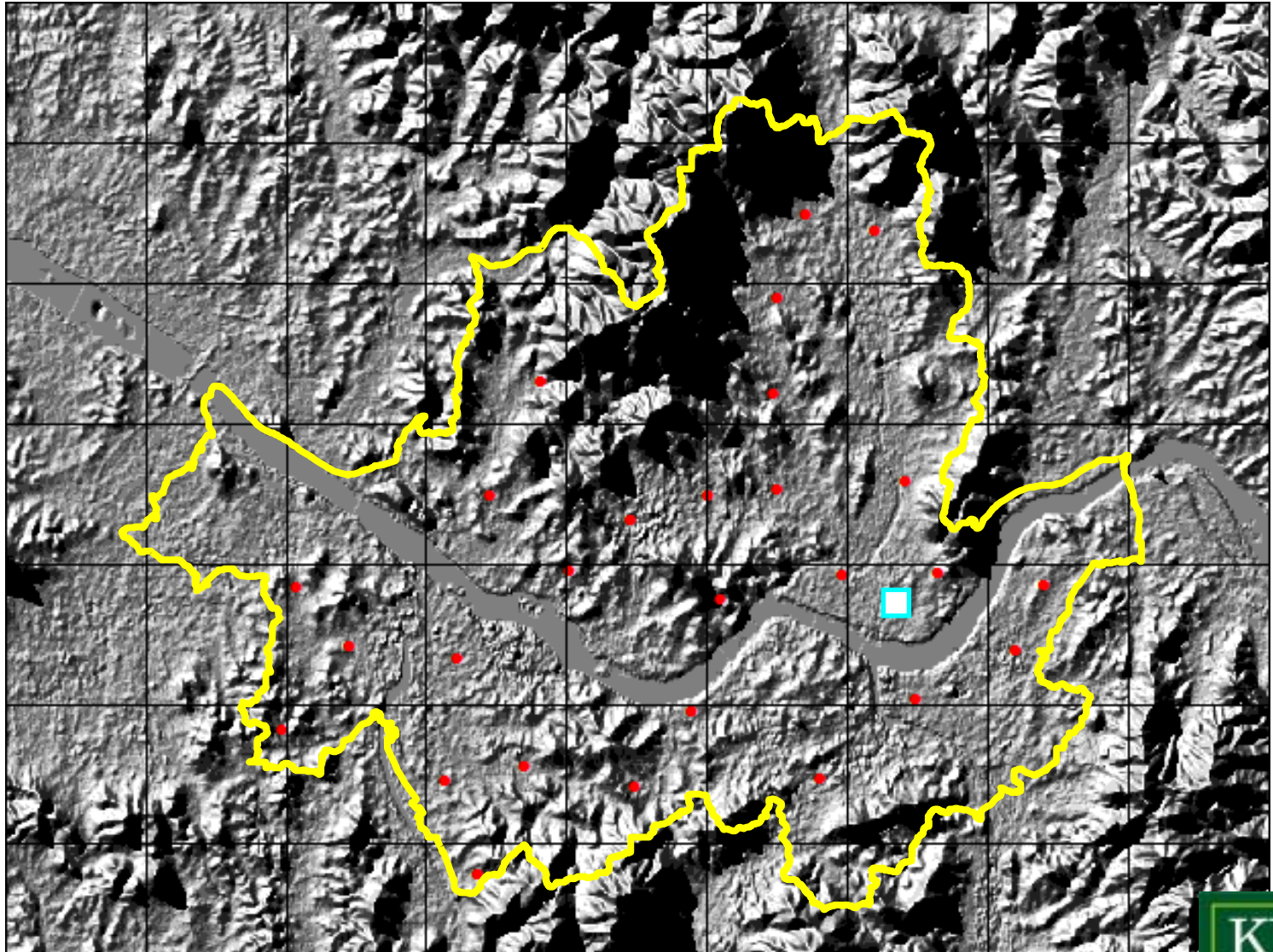
*Heavy Traffic, High Pop Density  
One management system!*

# Konkuk University Complex : The testbed





# Air Quality Monitoring Network in Seoul



(Seoul, Korea)





# Traffic Monitoring by Webcam



Car : Volume by Type  
-> Emissions (MOBILE mode)  
People : Volume

# Weather Monitoring by AWS



- : Weather Station (AWS)  
->Elevated Meteorology (60<sup>th</sup> FL)
- ⊕: Weather Station (AWS)  
->Surface Meteorology



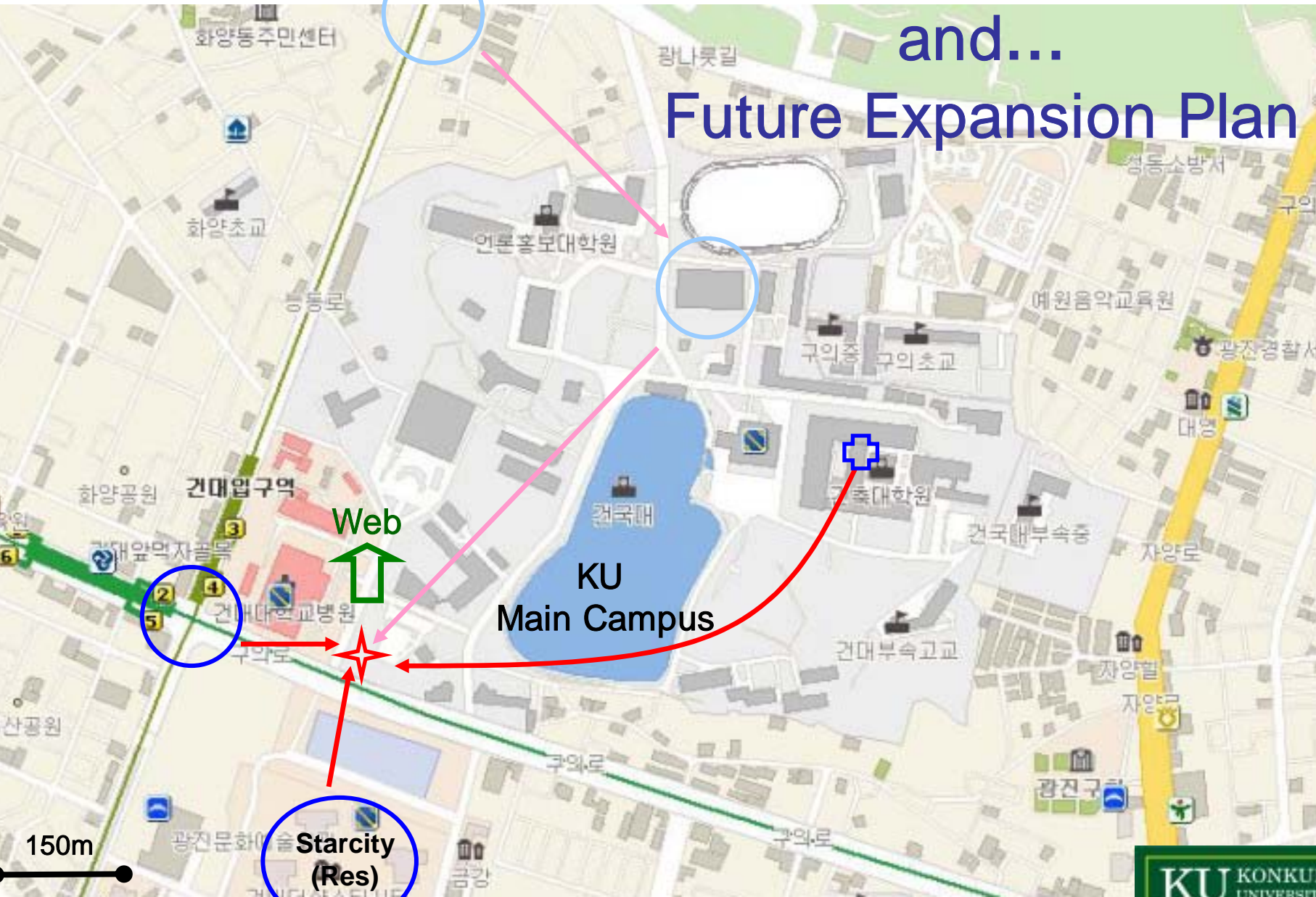
# Air Quality Monitoring (NO<sub>x</sub>, PM<sub>10</sub>)



✧ : AQ Monitoring Station  
->Surface Air Quality

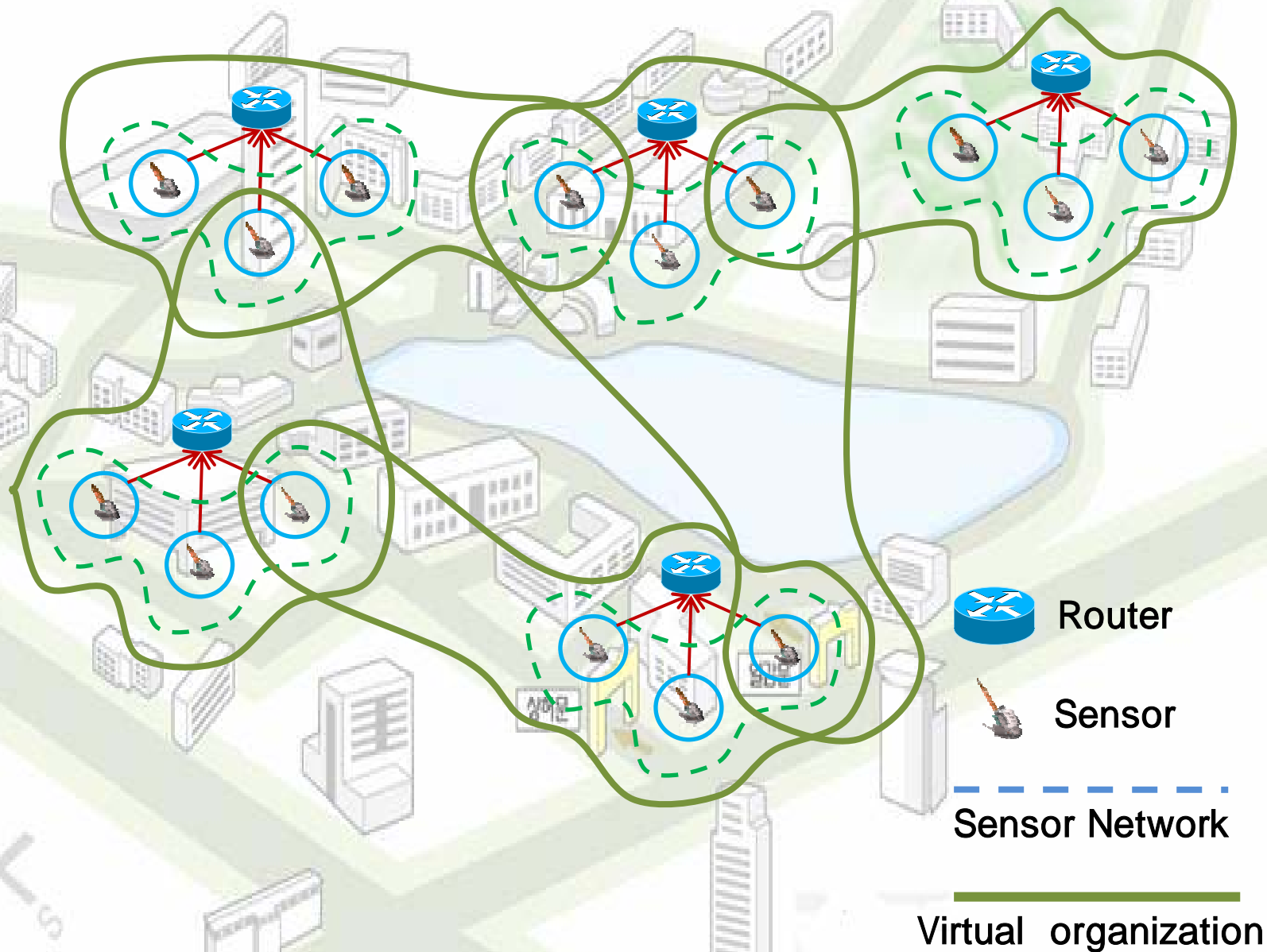
○ : AQ Monitoring Station  
->Elevated Meteorology

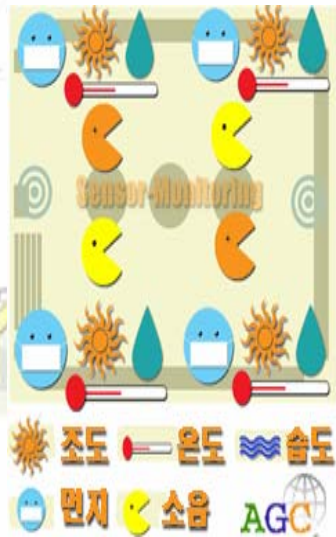
# Future Expansion Plan



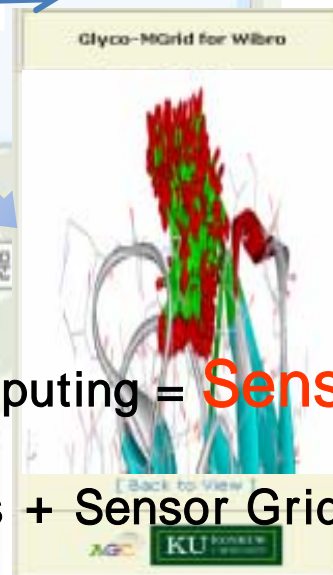
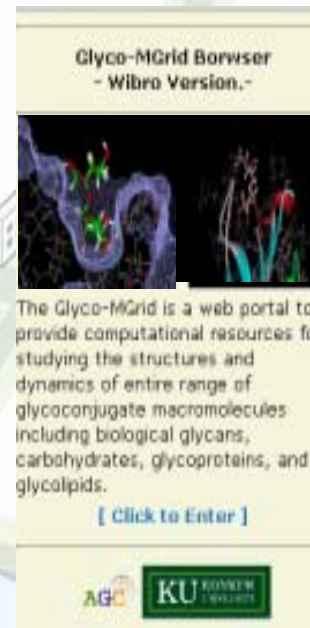
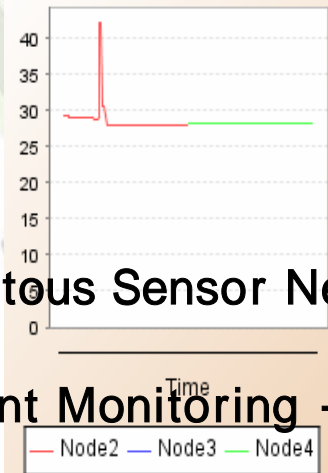


# Environmental Sensor Grids for u-Campus





Humidity Data Analysis



Ubiquitous Sensor Networks + Grid Computing = **Sensor Grid**

Environment Monitoring + Real time Analysis + Sensor Grid Technologies

# Future Plan

- Set up Webcam, AWS and AQ monitoring stations
- Initial test-run for new stations and set up links to other stations
- Finish QA and transfer data to DATF webpage and Wibro Network
- Add more stations (Funding?)
- Air Quality Modeling?

Thanks!