RFID & WSN
Applications for u-City

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S23: WSS 2005

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Korea's Vision
for New Information Society

u-Korea Vision

- **World's first ubiquitous ICT based society**
- **20th in world's leading contury with 20,000$ GNP**

- **Inovative social system**
- **15th in world's leading contury with 25,000$ GNP**

- **Leading the ubiquitous ICT based society**
- **10th in world's leading contury with 30,000$ GNP**

u-Korea entry ('05~'07)

u-Korea development ('08~'12)

u-Korea realization ('13~)

IT 839 Strategy

8 Services

- **WiBro**
- **DMB**
- **Digital Home**
- **Tele-Car**
- **RFID Applications**
- **W-CDMA**
- **DTV**
- **VolP**

3 Infra

- **BcN**
- **USN(RFID, WSN)**
- **IPv6**

9 growth power

- **N-Mobile Com.**
- **Digital TV**
- **Home Networks**
- **IT SoC**
- **N-PC**
- **Imbeded S/W**
- **Digital Contents**
- **Telematics**
- **Intelligent Robots**
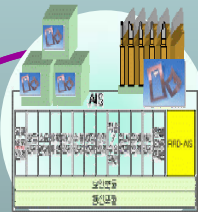
Source: MIC

USN (RFID/WSN) Test Bed Projects

Budget: 15 M$; Timeline: 2004-2006
Evolution form passive RFID to Active RFID & Wireless Sensors

government supply items management

Ammunition management

Trade logistics system

2004

Beef products tracking system

Incheon Airport baggage management

Bio-hazardous waste management
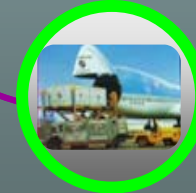
Gesung Industy Park logistics system

Korean Air Focrce F-15K Fighter parts management

2005

Korean beef cattle tracking system

National Modern Museum Service

Incheon Airport freight management system

Source: NCA

2 Ubiquitous ICT City

What is u-City?

u-City(ubiquitous computing city) is the "Korea's 21C ICT mediated City", in which advanced ICT infra and ubiquitous information services are intrageted into the city space providing high convience and quility for everyday city life, highly secured and well managed city environment, and creation of new business.

**Fostering the u-City project as korea's future ICT Strategy**

Ubiquitous information services based on advanced ICT infra create new city values

Considering the ICT infra and services at the initial stage of city development

Concentrating the full effort of allied industries, academics, government and civil experts for the development of u-City

u-City Service Image
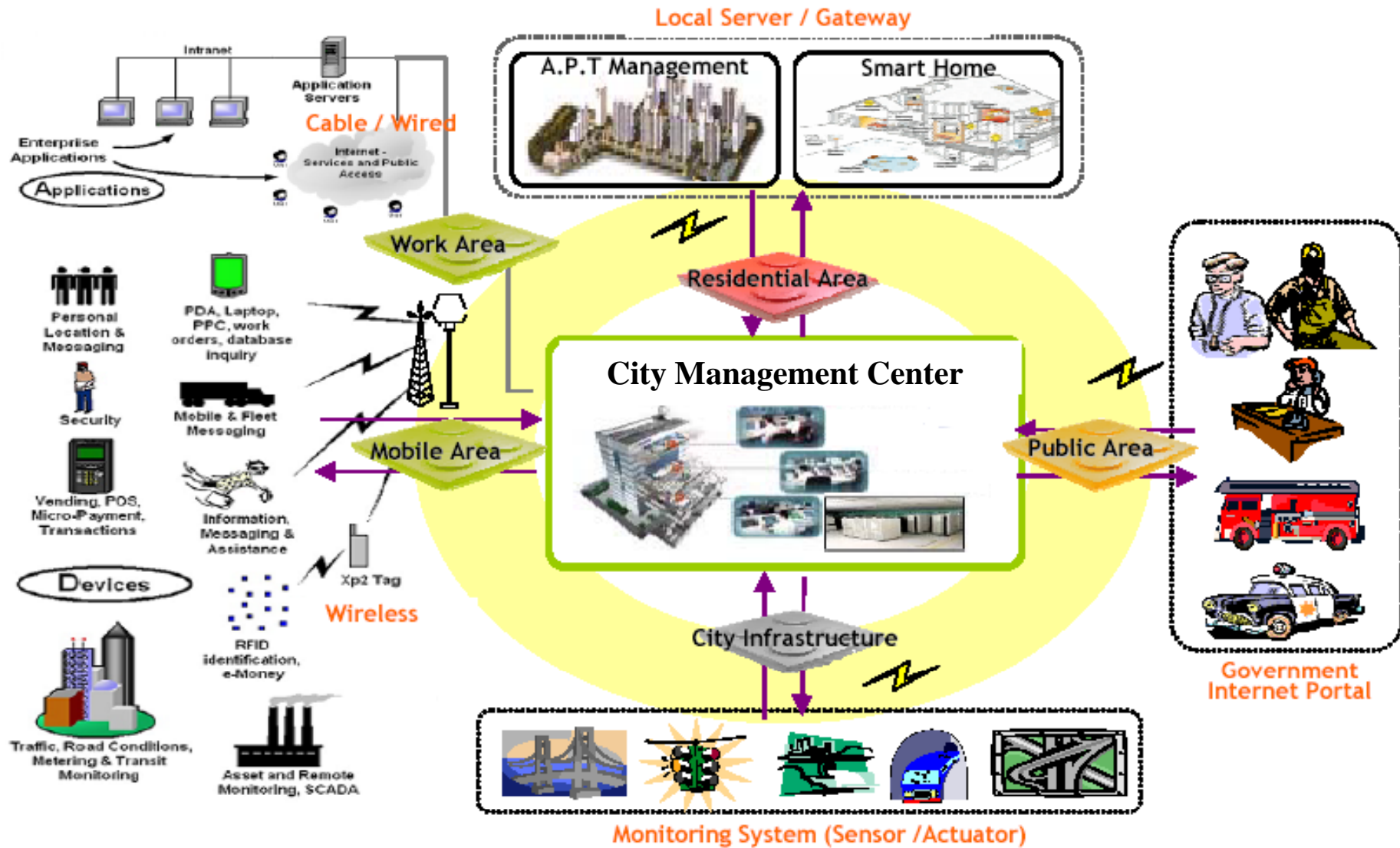
u-City Forum

u-City is for creating ICT converged construction industries and securing the growth phase of ICT industry by maximizing the synergy effect between the world top level ICT infrastructure and the most active city construction industry in Korea.

The u-City Forum is a non-profit organization fostering the u-City proliferation project as a Korea's future economic growth strategy.

The main goal of the u-City Forum is to concentrate the full effort of allied industry, government and civil experts for the development of u-City application service models and related technology.

The major members of the forum are high-tech heavyweights such as KT, SKT, Samsung, LG, government agencies including the NCA, MIC and Ministry of Construction and Transportation, and city developers such as the Korea Land Corp. and Korea Housing Corp.

3 u-City Projects

u-City under Development

Incheon Songdo u-City

- 209,000 sq km and total population of 200 K ubiquitous computing model town in the songdo district will be complete by 2014.

- total $1 B investment from the NSC + LG CNS

Source: NSC LLC

- RFID/WSN Industy Support Center
- Time line : 2005~2010
- Budget : 0.8B$(0.3B$ from the government)

RFID/WSN Fab
- RFID/WSN Chip

Packing Lab
- RFID Tegs
- WSN Prototype

Test Lab
Certification Tests

Engineering Lab
- technical support
- R&D facility

Global retail DC

Park

Business Center

Hospital

School

IT Biz cluster

Techno-park

BT cluster

new port
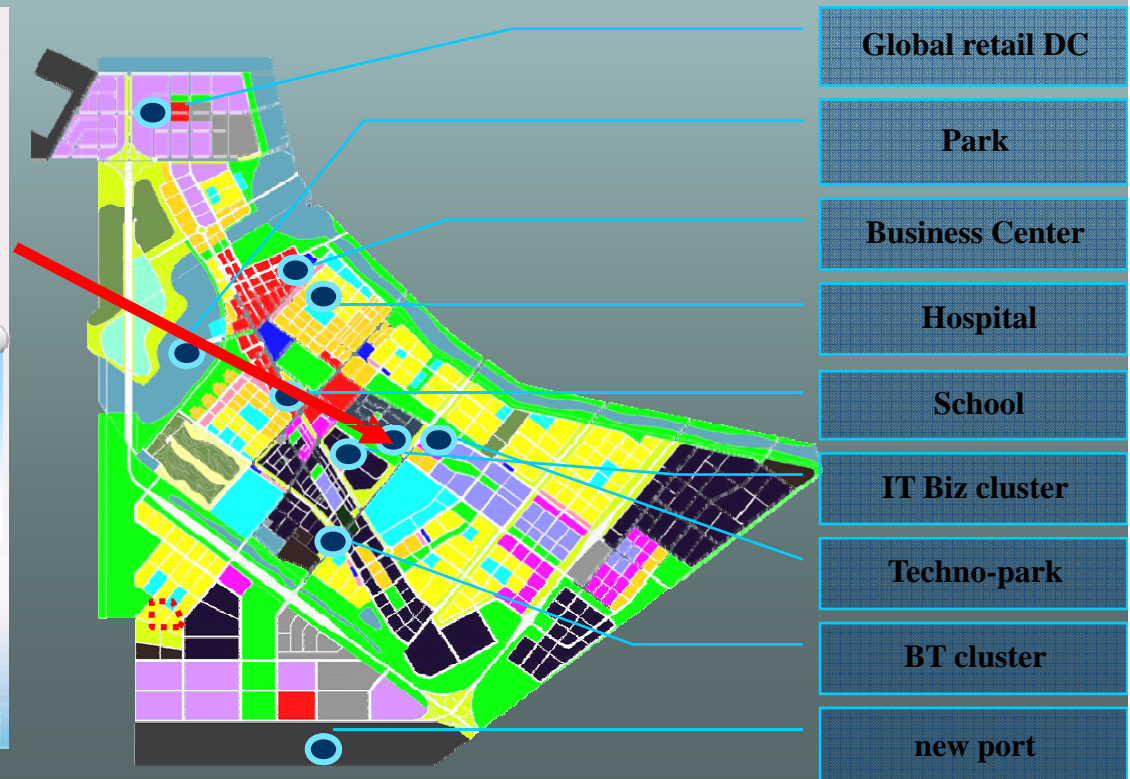
Busan u-City

Budget: 1 B$; Timeline: 2005-2010

u-Traffics(ITS)

Airport

City Hall

u-Convention
Center

BEXCO

auto cluster

Busan
Port

u-Port

u-Logistics

•Yard

•active
•RFID

•Asset
info

•logistics
•company

•Asset
tracking

•Asset
tracking

•custom

•control
•center

•freight

•Custom
•hosue

•Airport
•agency

•Busan
•city

•Work order

•scheduling

•WiFi

•/CDMA
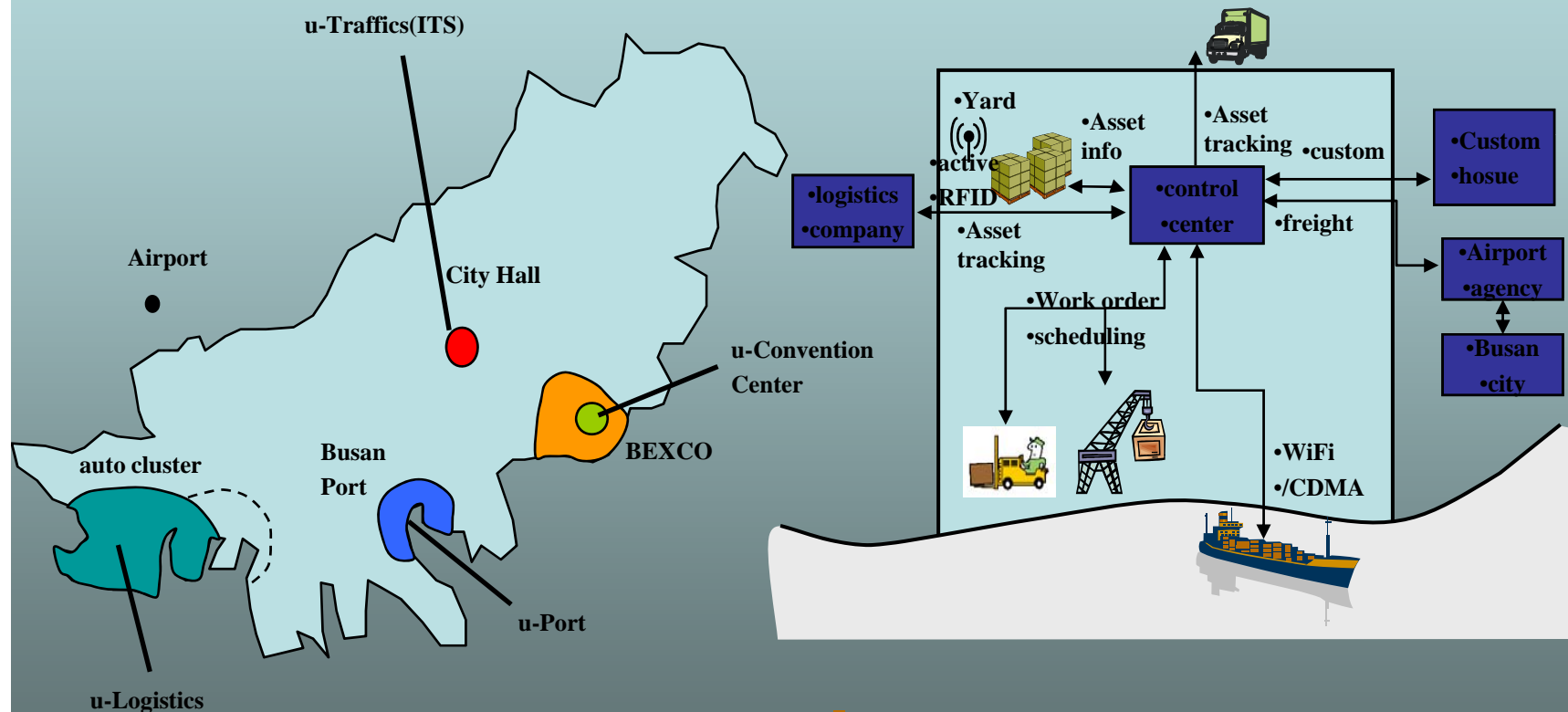
4 u-City Applications & New Business Opportunities

u-City Applications

- parking management
- elderly care
- street management
- tour guide
- cleaning
- disaster monitoring

Traffics

Everyday Life

Environment

Mobile RFID Services

Mobile RFID Forum: 67 Companies including Samsung Electonics & SKT

5 u-City Solutions for Real Time Environments

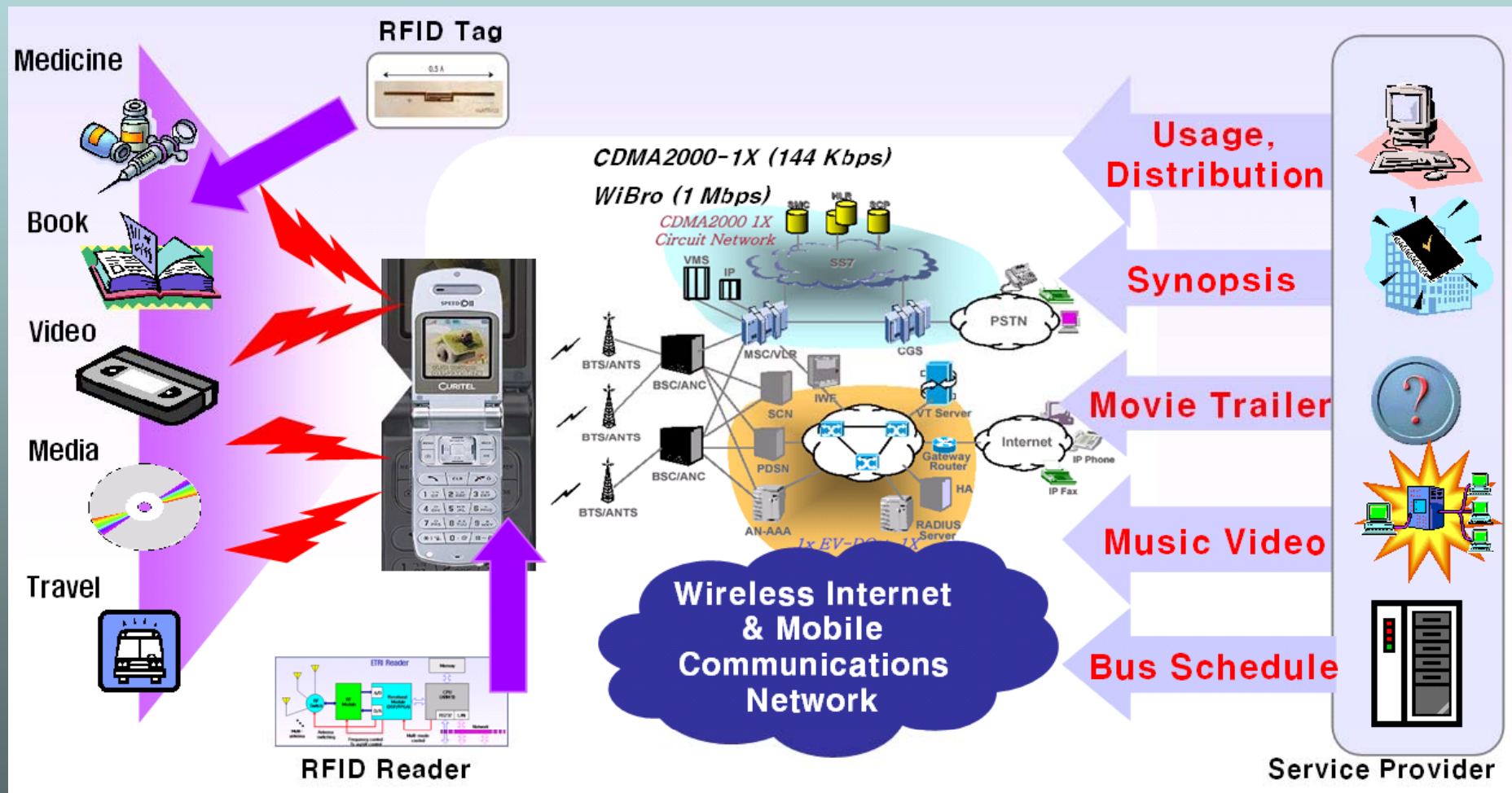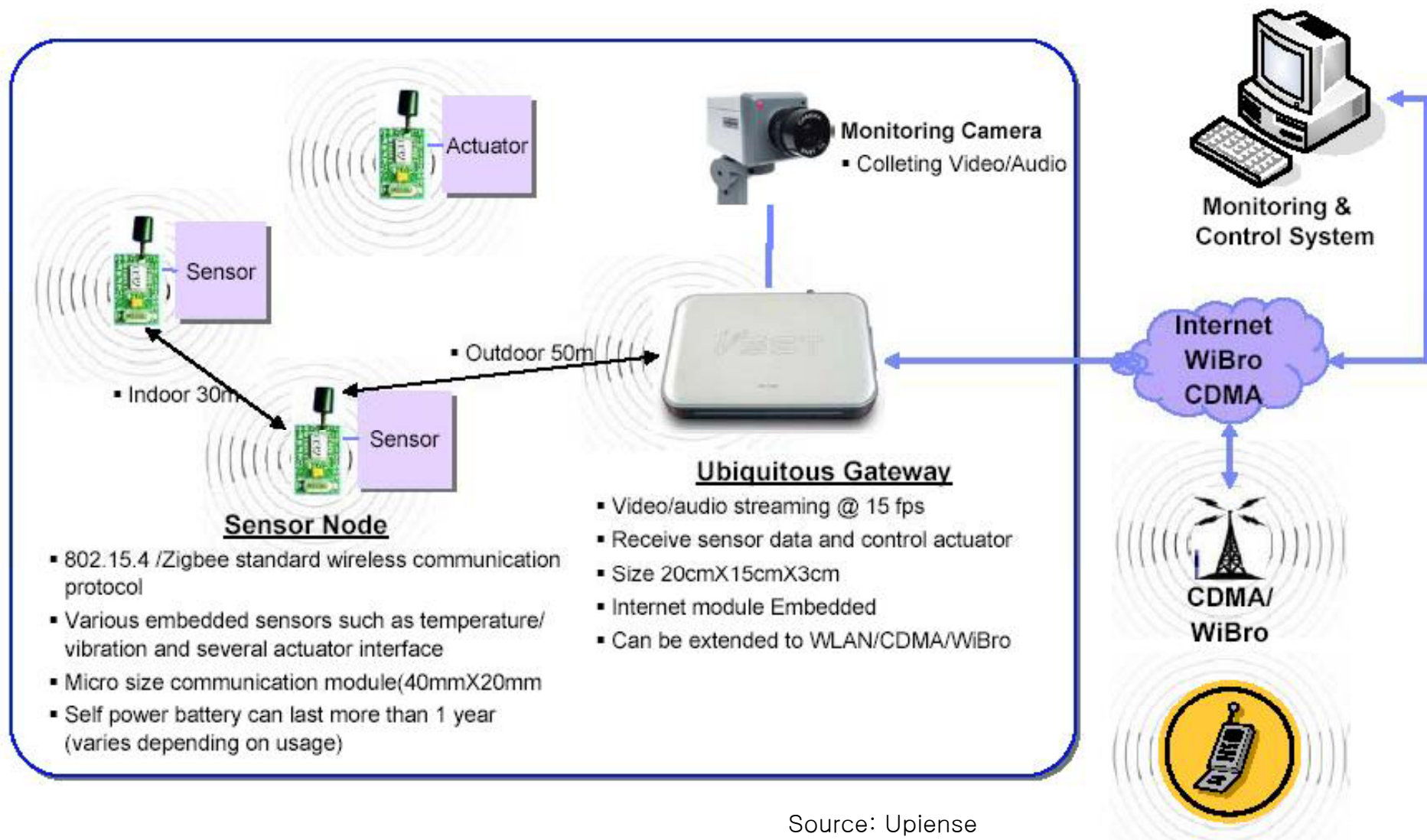# u-Gateway

Monitoring & Sensing using mobile devices ubiquitously

Actuator

Sensor

- Outdoor 50m
- Indoor 30m

Sensor

Monitoring Camera
- Colleting Video/Audio

Monitoring & Control System

Internet WiBro CDMA

CDMA/ WiBro

Sensor Node
- 802.15.4 /Zigbee standard wireless communication protocol
- Various embedded sensors such as temperature/ vibration and several actuator interface
- Micro size communication module(40mmX20mm
- Self power battery can last more than 1 year (varies depending on usage)

Ubiquitous Gateway
- Video/audio streaming @ 15 fps
- Receive sensor data and control actuator
- Size 20cmX15cmX3cm
- Internet module Embedded
- Can be extended to WLAN/CDMA/WiBro

Source: Upiense

System Architecture

User Handset	**Information Terminal**		
	Mobile Phone	**PDA**	**PC**

Back-end System	**Application**	
	Telemetry/ Telematics	**Monitoring & Control System**

Network	**Gateway, Switch, Router**			
	WIreless		**Wired**	
	CDMA/ WiBro	**Wireless LAN/ Zigbee**	**Modem/xDSL**	**Ethernet**

Device	**Input/Output & Communication Port**			
	Sensing/Actuating, Identification		**Streaming**	
	Embedded Sensor Active RFID	**Actuator**	**Video**	**Audio**

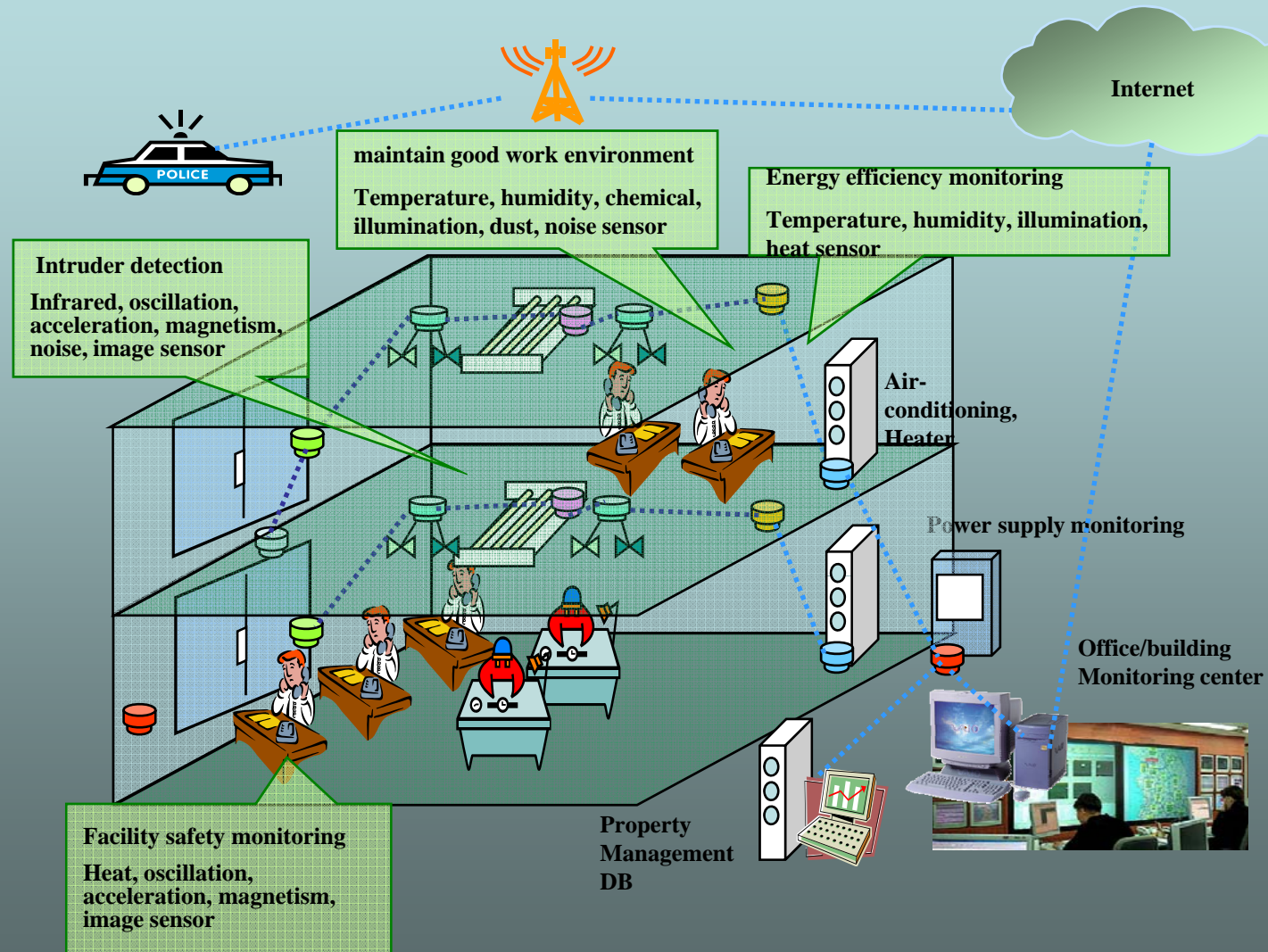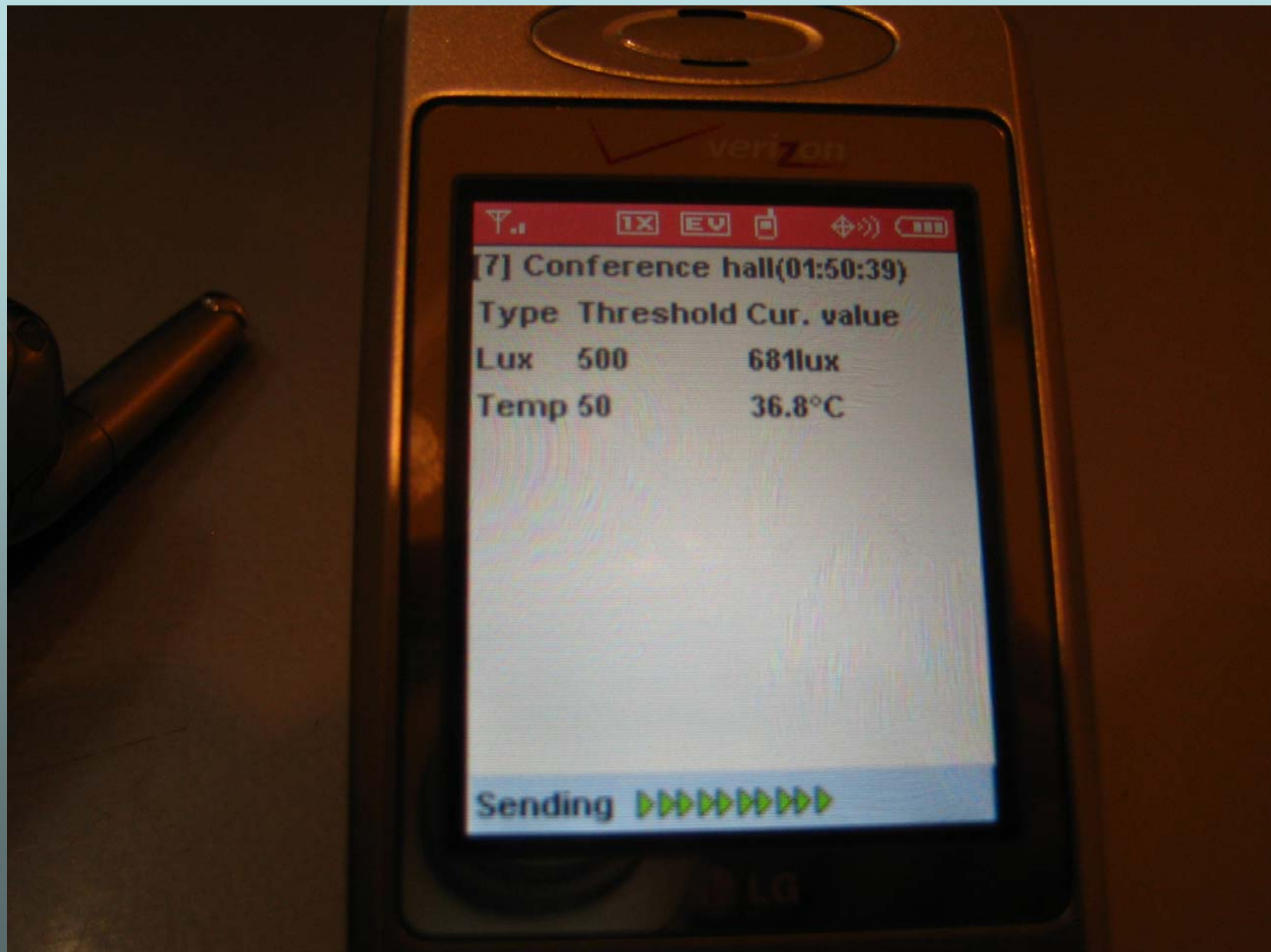**Multimedia video and various sensing data can be viewed and controlled from user handset with easily installable micro sensors and a handful size gateway.**

Source: Upiense

Smart Building Applications

Internet

maintain good work environment

Temperature, humidity, chemical, illumination, dust, noise sensor

Energy efficiency monitoring

Temperature, humidity, illumination, heat sensor

Intruder detection

Infrared, oscillation, acceleration, magnetism, noise, image sensor

Air-conditioning, Heater

Power supply monitoring

Office/building Monitoring center

Property Management DB

Facility safety monitoring

Heat, oscillation, acceleration, magnetism, image sensor

Source: Upiense

Demo

Source: Upiense

Thank You!

Profile

Dr. Geunho Lee is a senior research fellow at u-City Forum and a Professor at SCH Univ. in the field of pervasive computing and communications. He is also a co-founder and CEO of UPIENCE Inc., which is a start-up for u-City business development consulting and solutions.

After his Ph.D. from the Johns Hopkins University, he was in the field of ICT for 10 years working in several government organizations, small to large companies, and university research centers.

Recent his activities were for u-City (ubiquitous computing city) promotion in Korea by consulting government and industry for R&D, business strategy and industry policy. He is a well known speaker in major conferences related to Mobile Com., RFID, Wireless Sensors, and ubiquitous computing. He published more than 50 articles and several books including Korean translation of RFID Handbook, UMTS & Mobile Computing and Pervasive Computing Handbook.

He was a senior advisor at Samsung Techwin, CJ Systems, and KT, research fellow at Korea Electronic Payment Industry Association, visiting professor at Korea Polytech University, R&D director at Korea Wireless Networks Inc., research officer at Ministry of Information & Communication, and visiting scholar at Georgia Institute of Technology.

His career covers ICT regulation & industrial policy development, standardization, R&D, R&D planning, techno-business strategic planning, technology valuation, and business development.