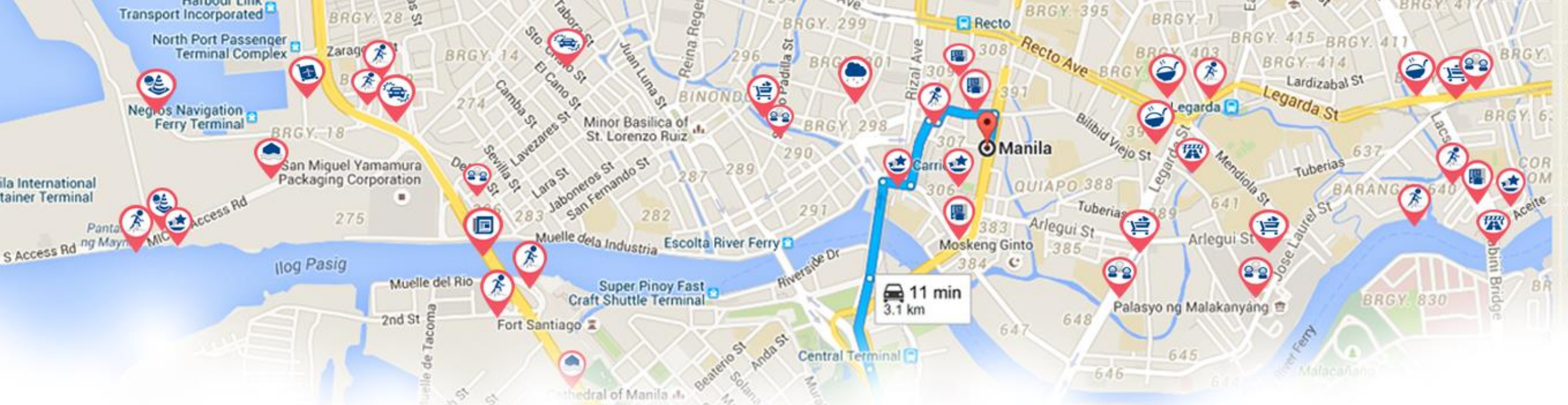


Geospatial Information and Civil Systems (GICS)

Presented by:

ALBEN ROME B. BAGABALDO
Senior Science Research Specialist
Mapúa Institute of Technology

MAPÚA INSTITUTE OF TECHNOLOGY
A YGC Member

Geospatial-Oriented Society?

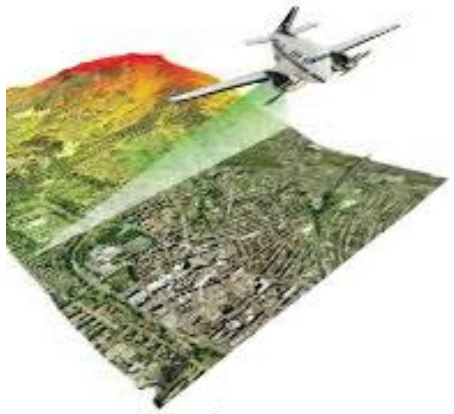
… is a vital tool in planning.
… provides insights from inter relationships between vast amounts of information

Geospatial information

+

Civil Systems

INFORMATION COMMUNICATION TECHNOLOGY



GPS

SMART CITIES

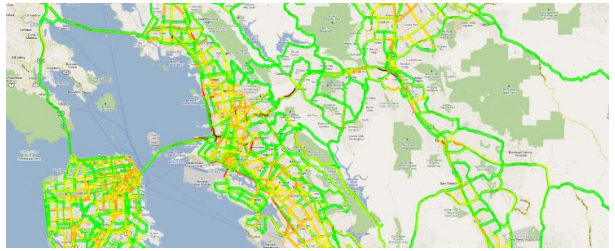
In the interest of the service and to ensure compliance of all concerned to the provisions of **"Section 105.2 – Earthquake Recording Instrumentation of the National Structural Code of the Philippines (NSCP) and Section 102 of the National Building Code of the Philippines, otherwise known as P.D. 1096"**, it is hereby directed that the **GUIDELINES AND IMPLEMENTING RULES ON EARTHQUAKE RECORDING INSTRUMENTATION FOR BUILDINGS** approved by DPWH as part of the

-DPWH NBCDO Memorandum (March 2015)

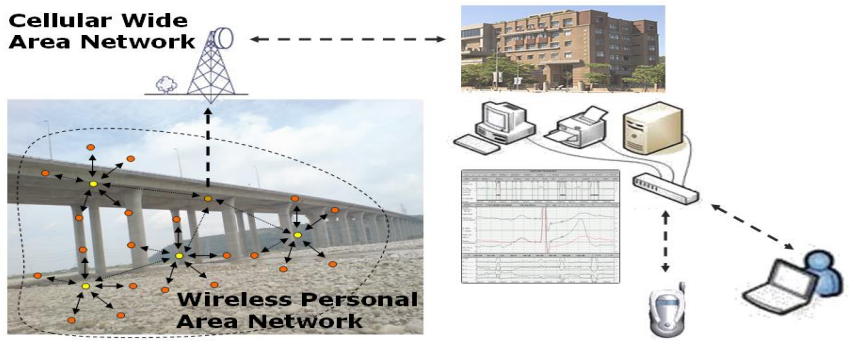
Floating Sensor Network project at UC Berkeley

Mobile Millennium

Snapshot of Mobile Millennium Traffic in San Francisco and the Bay Area



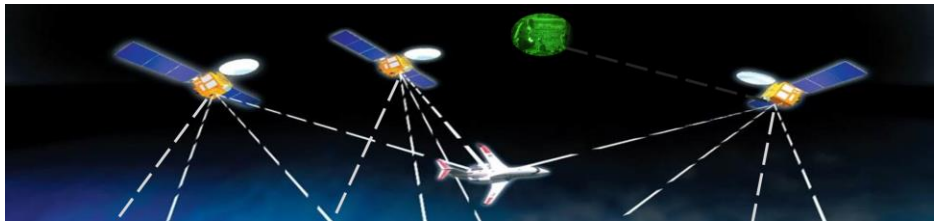
Structural Health Monitoring for Bridges and Buildings

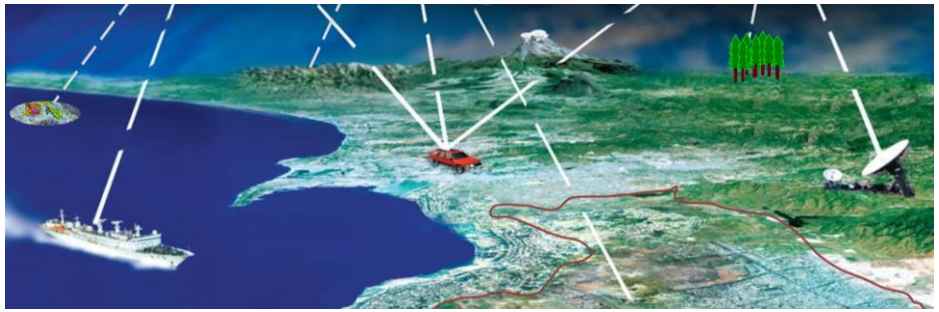


Geospatial Information Technologies

-geographic information systems (GIS), remote sensing, global positioning systems (GPS), spatial analysis techniques, and similar approaches to understand problems from a geographic perspective

-everything is located somewhere, understanding where and why things are located where they are is critical to unlocking so much about how our world works





Civil Systems

Bringing intelligence to work…

SOCIETY's "LIFENESS"

-design, analysis, and management of infrastructure supporting human activities

Samples

- Structural and System Reliability, Spatiotemporal Data Analytics, Behavioral Modeling, Sensors and Signal Interpretation Control and Information Management, Control and Optimization of Distributed Parameters Systems, Energy Systems and Control

Current Projects

CEGE

- **Mapúa Phil-Lidar 1** – Php 54M
- **SmartBridge Project** – Php 5M
- **Automated Real-time Monitoring System (ARMS) for Ambuklao, Binga, and San Roque Dams Project** – Php 7M
- **DRIVE Projects** *(multiple)* – Php 5M

TOTAL – Php 71M

EECE

- **Mapúa Phil-Lidar 2 – Php 40M**

Project Objectives (Smart Bridge)

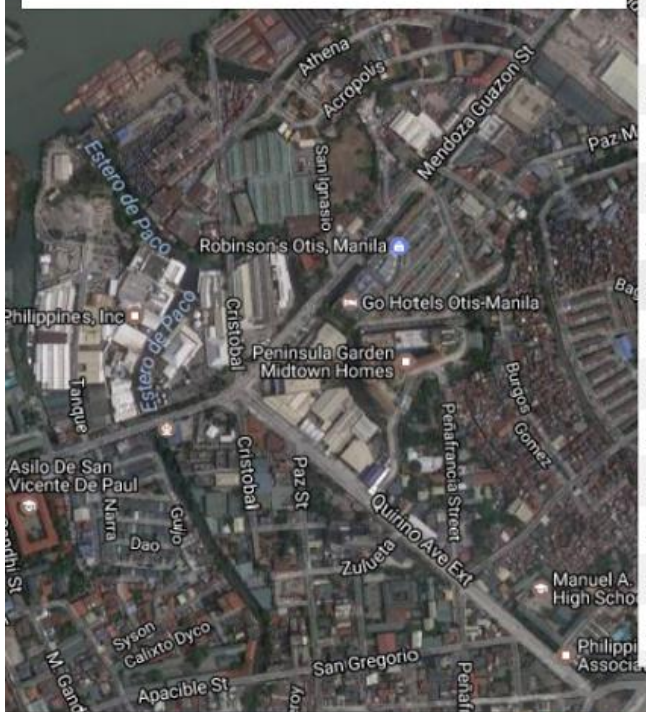
- To develop a weather and theft proof (Micro-Electro-Mechanical Sensors) MEMS based accelerometer device and wireless system that shall enable remote condition-monitor of bridges;
- To develop initial standard on the effective installation of MEMS based accelerometer devices for the remote Structural Health Monitoring of bridges; and
- To convert and process data from the wireless MEMS accelerometer devices and generate information that shall be useful for Structural Engineers and Maintenance Managers

epaluto.com/smartbridge/bridge/B02315LZ/sensor/1

Home Bridges About Us Login

Node: 1

41



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Map data ©2017 Google Imagery ©2017 , Aerometrex, CNES / Astrium, Cnes/Spot Image, DigitalGlobe 100 m

4:28 PM
2/16/2017

epaluto.com/smartbridge/bridge/B02315LZ

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Traffic Assesment

Heavy Traffic | Moderate Traffic | Light Traffic

NODES

1

Bridge Model

Criteria for Damage Type Manifestation

Level	Damage Classification	Damage Description	Repair Description	Socio-Economic Description
I	None	Bare Visible Cracking	No Repair	Fully Operational
II	Minor	Cracking	Possible Repair	Operational
III	Moderate	Open Crack	Minimum Repair	Life Safety
IV	Major	Very Wide Cracks	Repair	Near Collapse
V	Local Failure	Permanent Deformation	Replacement	Collapse

ZAMORA BRIDGE

Name: ZAMORA BRIDGE

Location: pandacan

ID: B02315LZ

Type: asd

Rating: Fair

Length asdasd

4:27 PM
2/16/2017

SAVE

(1) Pavement	GOOD	A
(2) Curb & Railing	GOOD	A
(3) Expansion Joint	GOOD	B
(4) Deck Slab	POOR	B
(5) Concrete Beam	FAIR	A
(6) Steel Beam	POOR	A
(7) Painting Condition	FAIR	B
(8) Shoe	GOOD	B
(9) Abutments	FAIR	C
(10) Piers	GOOD	B
(11) Slope Protection	GOOD	A

Existing Manpower (Full-time Researchers)

Researchers' Position	LiDAR 1	Smart Bridge	ARMS	LiDAR 2	TOTAL
Chief Science Research Specialist	1	0	0	0	1
Supervising Science Research Specialist	0	0	1	0	1
Senior Science Research Specialist	3	2	3	2	10
Research Associates	10	0	3	10	23
Science Research Specialists II	0	4	0	0	4
Project Assistants III	10	0	0	0	10
Computer Programmer III	2	0	0	0	2
Project Development Officer	0	0	0	1	1
Information Systems Analyst	0	0	0	1	1
TOTAL					53

Equipment & Software

LiDAR 1

Data Server	1
High-end Workstations	6
Laptop	4
Plotter Printer	1
Handheld GPS	10
Units Depth Gauge	4
Velocity Current Meter	4
LCD Projector	1
Color printer w/ Scanner	1
Laser Printer	1
Dual Frequency Survey-Grade GPS	2
High Spec-Video Camera	1
Desktop PC	2
Semi-rugged Field Laptop	4
Branded Desktop PCs	6

Php 4.3M

LASTools & ArcGIS **Php 2.4M**

LiDAR 2

Desktop Computer	4
High-end Workstations computers	6
Design Jet Printer	1
Macbook Computer	2
Data Server	1
DSLR Camera	2
Current Meter/Velocity Sensor	1
Mapping GPS	3
LCD Projector	1
Laptop Computer	2
Spectrometer	1
GNSS Echosounder	1
Forest Survey Equipment	1
Video Camera	2

Smart Bridge

Laptops	7
Branded Desktop PCs for Data Processing & Analysis	2

Php 600,000

ARMS

Branded Desktop Computers	2
Branded Laptops	6
LCD Projector	1

Php 440,000

Upcoming Project

- **CHED Philippine California Advanced Research Institutes (PCARI) Data Analytics for Research and Education (DARE) Project** – Php 30M

Dr. May Lim, Assoc. Prof., UP-NIP
Dr. Noriel Christopher Tiglao, Assoc. Prof., UP-NCPAG
Dr. Francis Aldrine Uy, Dean, SCEGE-Mapúa
Dr. Alexandre Bayen, Professor, UC Berkeley

Alexandre Bayen, Ph.D. [CV]

Liao-Cho Professor of Engineering

Department of Electrical Engineering and Computer Sciences
Department of Civil and Environmental Engineering, UC Berkeley

Director, Institute for Transportation Studies

Faculty Scientist, Mechanical Engineering, Lawrence Berkeley National Laboratory

Upcoming Projects

- **CHED PCARI Data Analytics for Research and Education (DARE) Project** – Php 30M
- **Automated Real-time Monitoring System for Angat Watershed (ARMS 2) Project** – Php 18M
- **Philippine Structural Integrity Management Systems (PhilSIMs) Project** – Php 20M

Total – P68M

Thank you!