SRDP CONSULTING INC.
Integrated Mapping, GIS & Engineering

SRDP Mapping & GIS Services for Development Projects

Joel F. Cruz
June 4, 2018

QAS INTERNATIONAL ISO 9001:2015 REGISTERED COMPANY

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SERVICES

- **Base Mapping**
  - Aerial Mapping (Drone/Manned Aircraft)
  - Satellite Image Mapping
  - Topographic/Hydrographic Surveys
- **Engineering Consulting**
  - Road Database Development
  - Bridge/Slope Protection Inspection
- **GIS Services**
  - GIS Consulting
  - GIS Database Development
  - GIS Applications (WebGIS)

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OUR REACH

Philippines, Indonesia, Vietnam, Sri Lanka, Cambodia, Timor-Leste, Japan, Nepal, Pakistan, Uganda, Tanzania, South Africa, Guam, Saipan

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Qualifications

1. ISO 9001-2015 QMS
2. Civil Aviation Authority of the Philippines Operator/Controllers
3. Professionals
   1. Geodetic Engineers, Civil Engineers,
   2. Geography, Foresters, Environmental Planners
   3. CADD & GIS Operators

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CIVIL AVIATION AUTHORITY OF THE PHILIPPINES
ROC#: 2015001
SRDP CONSULTING INC.
CAPT. ANTONIO G. BUENDIA, JR.


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CERTIFICATE OF

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AFFILIATES

Keypro

esri

AUTODESK.

UniADD

PHILIPPINE INSTITUTE OF CIVIL ENGINEERS

WALDOAIR
IMAGE THE WORLD

CECOPHIL
COUNCIL OF ENGINEERING CONSULTANTS OF THE PHILIPPINES

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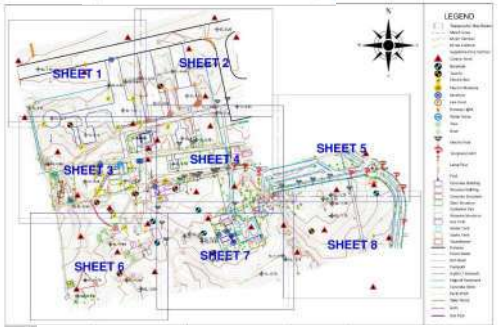
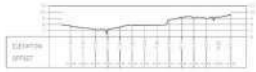
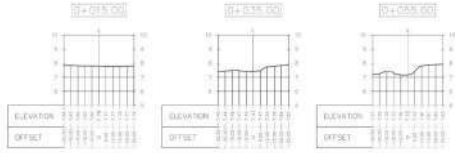
INFRASTRUCTURE
Airports

➢ **Topographic Survey for Preparatory Survey on the Project for Improvement of Presidente Nicolau Lobato International Airport in Democratic Republic of Timor Leste** (JICA, Timor Leste, 2018)







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SRDP PROJECTS

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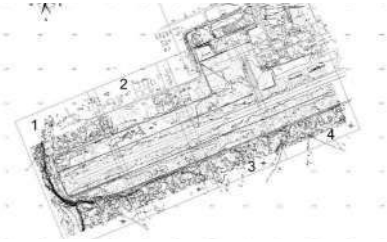
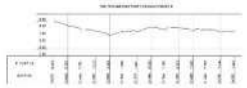
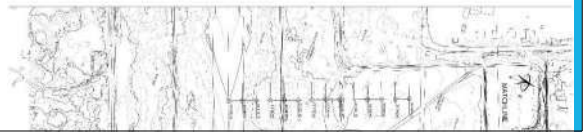
INFRASTRUCTURE
Airports

➢ **Topographic Survey for Preparatory Survey on the Project for Improvement of Honiara International Airport in Solomon Islands**
(JICA, Solomon Islands, 2018)







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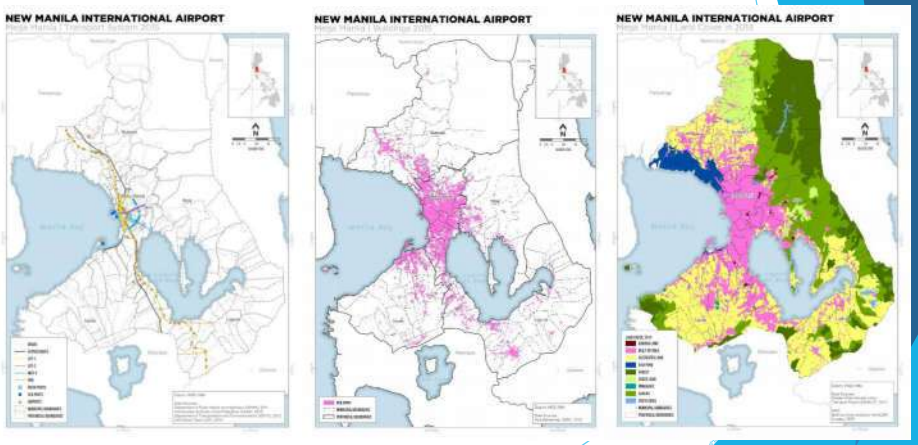
INFRASTRUCTURE
Airports

- **Information Collection Survey for the New Manila International Airport (NMIA)** (JICA, Philippines, 2015)



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INFRASTRUCTURE
Railways

- **Malolos-Clark Railway Project and North-South Railway Project – South Commuter** (Japan International Cooperation Agency (JICA) and Department of Transportation (DOTr), Philippines, 2018)

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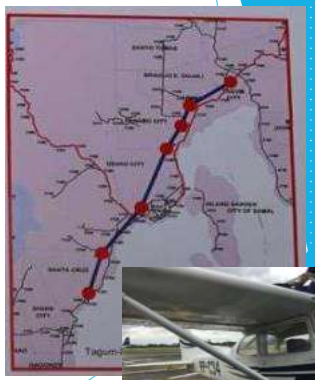
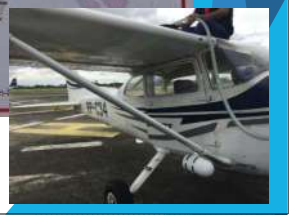
INFRASTRUCTURE
Railways

- **Aerial Survey for the Mindanao Railway Project (Tagum-Davao-Digos Segment)** (Asian Development Bank (ADB) and Department of Transportation (DOTr), Philippines, 2018)





Sources: http://conceptnewscentral.com/index.php/2018/02/28/mindanao-railway-project-moving/, http://meb-news.blogspot.com/2017/03/chinese-proposal-phase-1-of-mindanao.html

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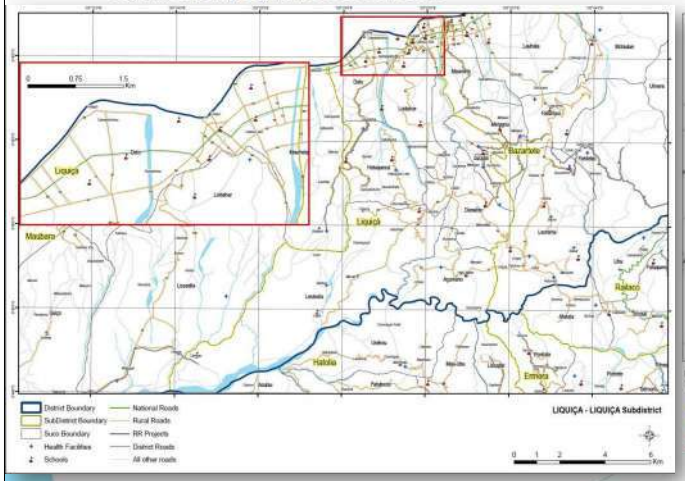
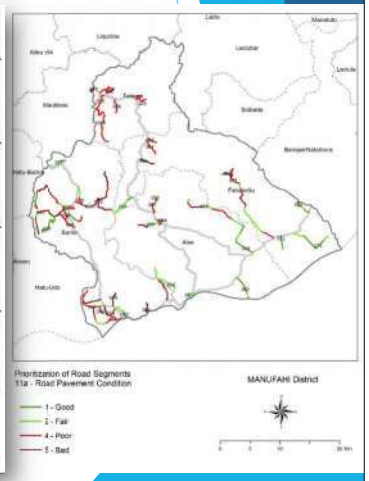
INFRASTRUCTURE
Roads

- **The Development of a Rural Roads Master Plan and Investment Strategy for Roads for Development Programme (R4D)** International Labor Organization (ILO), Timor Leste, 2015





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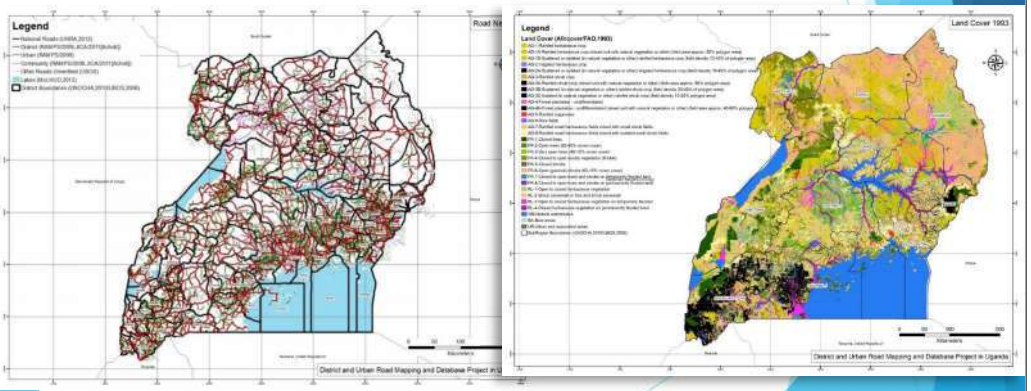
INFRASTRUCTURE
Roads

- **District and Urban Road Mapping and Database Project in the Republic of Uganda Phase 1 & 2** (Japan International Cooperation Agency (JICA) & Ministry of Works and Transport (MOWT), Uganda, 2012-2015)



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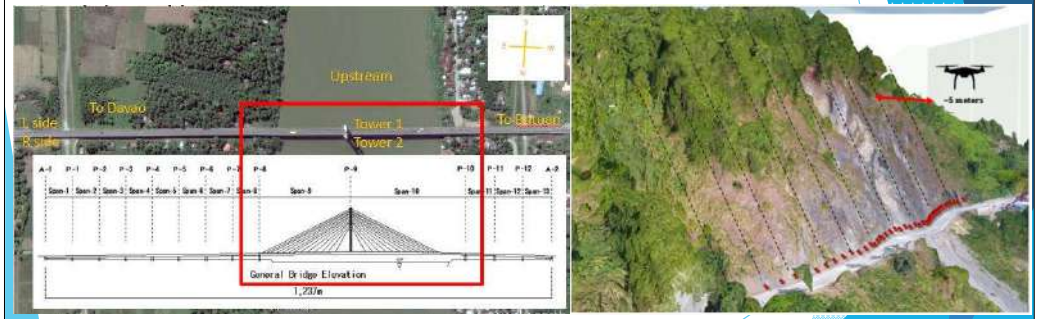
INFRASTRUCTURE
Bridge/Slope Protection Inspection

- **Condition Inspection of Two (2) Special Bridges and One (1) Road Slope Protection Work Using Drone Technology (Activity 2- Magapit Bridge)** (Japan International Cooperation Agency (JICA), Philippines, 2017)



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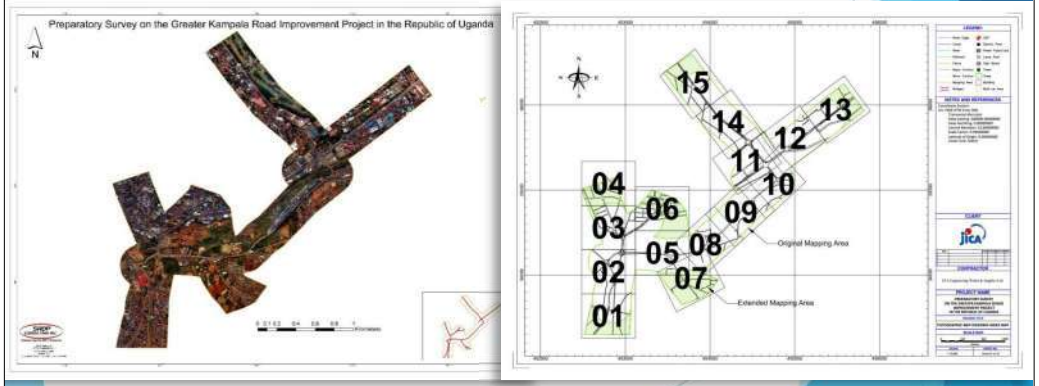
INFRASTRUCTURE
Roads

- **Aerial Survey for the Preparatory Survey on the Greater Kampala Roads Improvement Project** (Japan International Cooperation Agency (JICA), Uganda, 2013)



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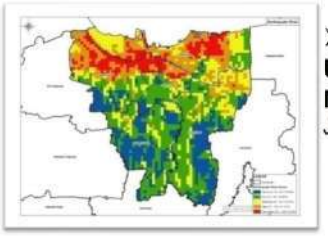
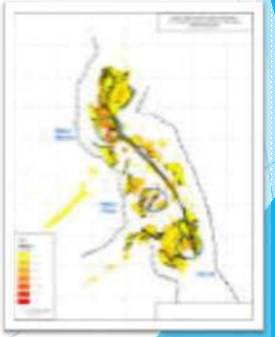
DISASTER MANAGEMENT



- **Pilot Study For Project Formation For Integrated Urban Disaster Management Project In Jakarta Metropolitan Area**
  Japan Bank for International Cooperation, Indonesia (2006)

- **Natural Disaster Risk Management in the Philippines Reducing Vulnerability**
  Pacific Consultants International (PCI) & World Bank, Philippines (2004)



DISASTER MANAGEMENT

➢**Metropolitan Manila Earthquake Impact Reduction Study (MMEIRS)**
MMDA, PHIVOLCS and Japan International Cooperation Agency (JICA), Philippines (2002)

➢**Master Plan Update for Flood Management in Metro Manila and Surrounding Areas**
The World Bank, Metro Manila and Surrounding Areas, Philippines (2011)

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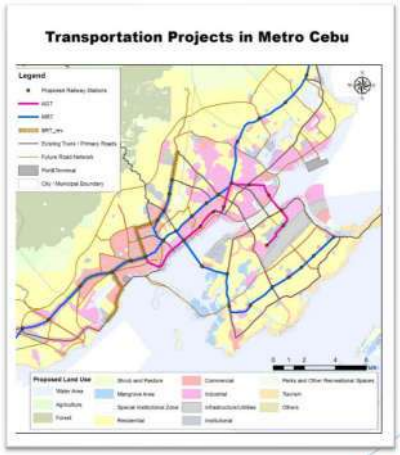
TRANSPORTATION

➢**Metro Cebu Utilities and Transportation Plan**
Japan International Cooperation Agency (JICA) and Provincial Capitol of Metro Cebu, Philippines (2017)

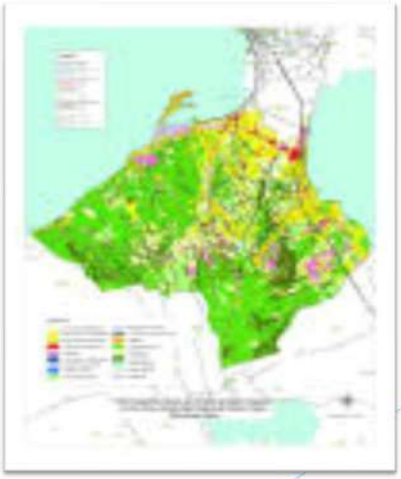


TRANSPORTATION

➢**The Metro Manila Subway Project: Property Survey and TOD-Household Interview Survey**
Japan International Cooperation Agency (JICA) and Department of Transportation (DOTr), Metro Manila, Philippines (2018)

TRANSPORTATION

➢**The Feasibility Study and Implementation Support on the CALA East-West National Road Project**
Japan International Cooperation Agency (JICA) and Department of Public Works and Highways (DPWH) , Philippines (2005)



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TRANSPORTATION

➢**The EDSA North Transit Study**
Department of Transportation and Communications (DOTC), Philippines (2006)

➢**The Feasibility Study and Implementation Support on the CALA East-West National Road Project**
Japan International Cooperation Agency (JICA) and Department of Public Works and Highways (DPWH) , Philippines (2005)

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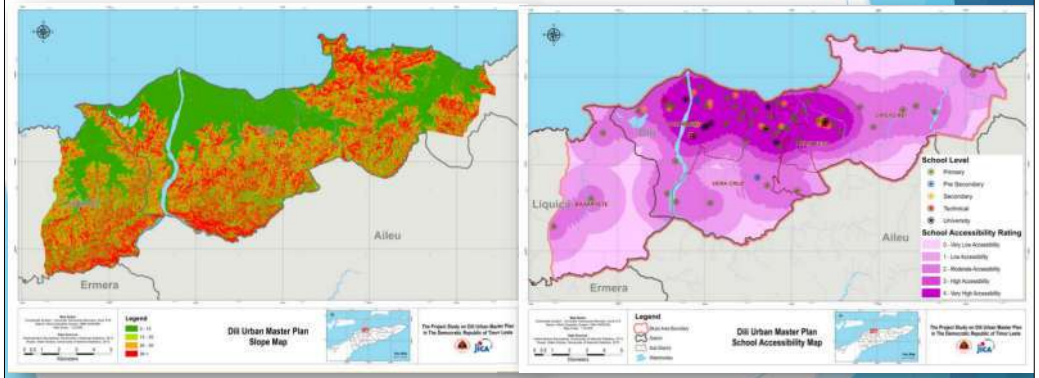
URBAN PLANNING

➢ **Dili Urban Master Plan Project** Japan International Cooperation Agency (JICA), Timor Leste, 2015



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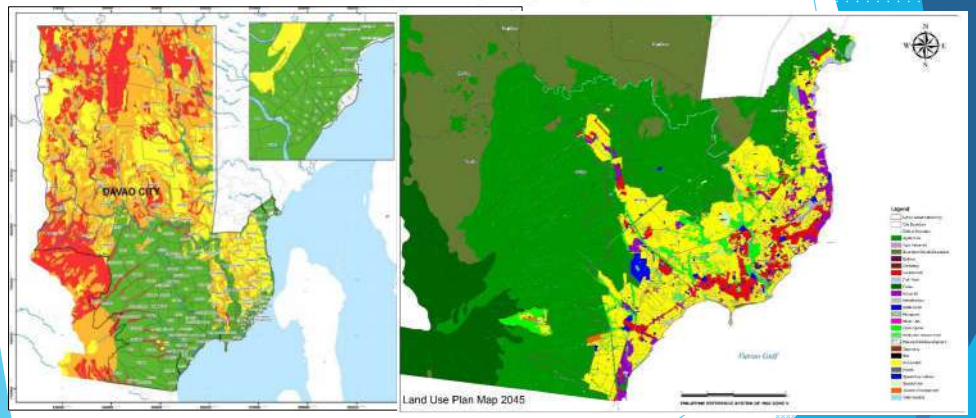
URBAN PLANNING

➢ **Davao City Infrastructure Development Plan and Capacity Building Project** Japan International Cooperation Agency (JICA), Philippines 2017



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URBAN PLANNING

➢**The Study on the Adjustment of the HCMC Master Plan up to 2025**
Urban Planning Institute, Ho Chi Minh City, Vietnam (2006)

➢**The Comprehensive Urban Development Programme in Hanoi Capital City**
Japan International Cooperation Agency (JICA), Vietnam (2005)

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URBAN PLANNING

➢**The Study on the North Triangle Central Business District in Quezon City**
The World Bank, Philippines (2006)

➢**Formulation of the Comprehensive Land Use Plan of Boracay Island**
Department of Tourism, Philippines (2008)

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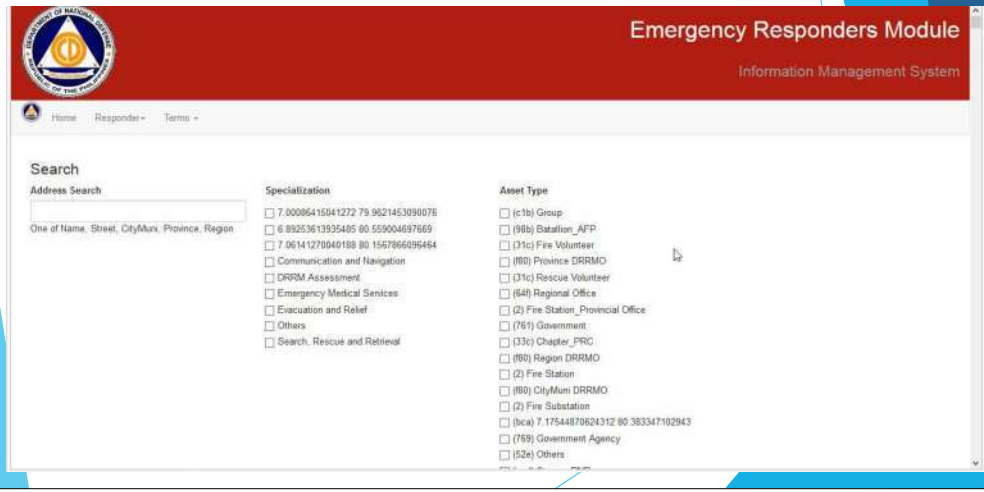
WEB APPLICATION

➢**INFORMATION MANAGEMENT SYSTEM FOR DISASTER MANAGEMGENT**
(OCD-JICA, 2014)
➢An online database that stores, collects and manages emergency responders (volunteers, evacuation centers, etc.) historical and current incidents (such as tropical cyclones, earthquake, etc) information of the Philippines.



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WEB APPLICATION

➢**THE PROJECT FOR MONITORING OF THE WATER QUALITY OF MAJOR WATER BODIES IN DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA**
➢An online database that collects, stores and manage Environmental Protection Licenses (EPL) and Pollution Source Inventory (PSI) of Polluting Industries of Sri Lanka and exports annual data summary such as graphs, charts and maps for public and private use.

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WEB APPLICATION

➢**ANGELES CITY WEB GIS**
(Pampanga, Philippines, 2015)
➢ Web GIS application for visualizing the data gathered from UAV mapping and Building Survey using desktop / mobile applications.

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Technology Presentation

Aerial Mapping by Drone/Manned Aircraft

- Drone / Manned Aircraft Typical Requirements
  - Military/Civil Air Regulations (Philippines)
    - Clearance to take aerial photo (Military)
    - Operator Certificate (Company/drone)
    - Controller (Person/drone)
    - Equipment (drone)


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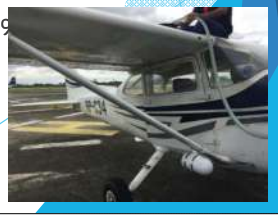
Technology Presentation

Manned Aircraft Aerial Photography

- GPS-guided and manned
- Less weather-dependent operation, (3,000-9,000 feet above ground)
- Covers a large area in shorter time
- Advantageous over urban area and high wind situations like mountain areas
- Equipment is small and can be carried as baggage in any commercial airline worldwide high
- Camera can be installed on smaller and more aircraft such as Cessna 172, Cessna 150 or helicopters
- Resolution (10 to 30 cm per pixel)
- High accuracy mapping (20 to 60 cm in X,Y and 30 to 9 in Z)
- Quick delivery time (1 week ~ 1 month)



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Technology Presentation

Drone Aerial Photography

- GPS-guided and autonomous flying
- Less weather-dependent operation, (1,000-2,000 feet above ground)
- Promotes ease of operation, requiring only one or two men to acquire data on field.
- Good to go and relatively easy to deploy
- Equipment is small and can be carried as baggage in any commercial airline worldwide high
- Resolution (3 to 20 cm per pixel)
- High accuracy mapping (6 to 40 cm in X,Y and 30 to 60cm in Z)
- Quick delivery time (1 week ~ 1 month)

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Technology Presentation

Aerial Mapping by Drone/Manned Aircraft

- WorkFlow

1. Mission Planning

2. Ground Control Survey

3. Aerial Photography

4. Image Processing

5. Production of Mapping Outputs

Technology Presentation

Aerial Mapping by Drone/Manned Aircraft

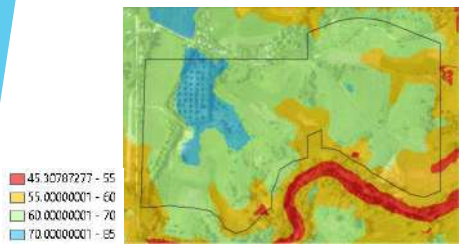
- Drone Vs Manned Aircraft
  - Considerations
    - Size of Mapping Area
      - < 15 sqkm - Drone : Faster, Cheaper
      - > 15 sqkm - Manned A/C : Faster, Cheaper
    - Location / Accessibility
      - Urban, High wind - Manned A/C has advantage
      - Small area, open - Drone has advantage

Technology Presentation

Calculate Volumes Cut/Fill by Drone/Manned Aircraft

September 2017

Orthophoto



Digital Terrain Model

Topographic Map

Technology Presentation

Aerial Mapping by Drone/Manned Aircraft

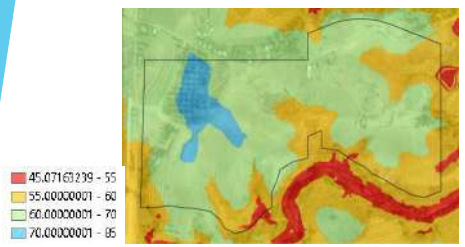
- Outputs
  - Orthophoto,PointCloud,DSM/DTM, Topo (Global Mapper SW - Analysis)
  - 3D Model (TerraExplorer Pro SW - Visualization/Analysis)

Technology Presentation

Calculate Volumes Cut/Fill by Drone/Manned Aircraft

March 2018

Orthophoto

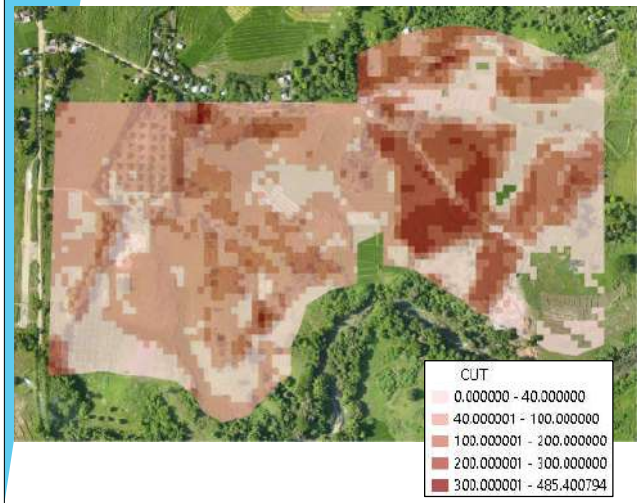


Digital Terrain Model

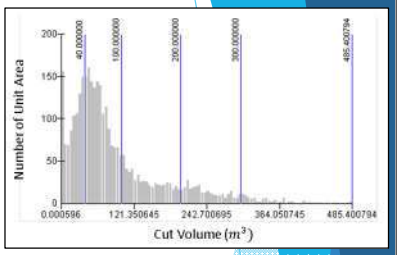
Topographic Map

Technology Presentation

Calculate Volumes Cut/Fill by Drone/Manned Aircraft



Areas of Cut
10m x 10m grids



Maximum Cut ≈ 485 m^3

Total Cut ≈ 286,474 m^3

Mean Cut ≈ 89 m^3

Technology Presentation

Calculate Volumes Cut/Fill by Drone/Manned Aircraft

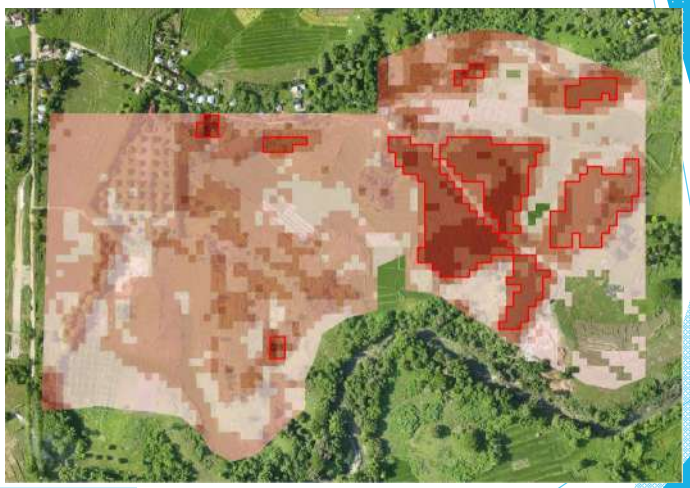
September 2017

March 2018

Areas of Significant Cut
10m x 10m grids

Technology Presentation

Calculate Volumes Cut/Fill by Drone/Manned Aircraft



Areas of Significant Cut
10m x 10m grids

Technology Presentation

Calculate Volumes Cut/Fill by Drone/Manned Aircraft

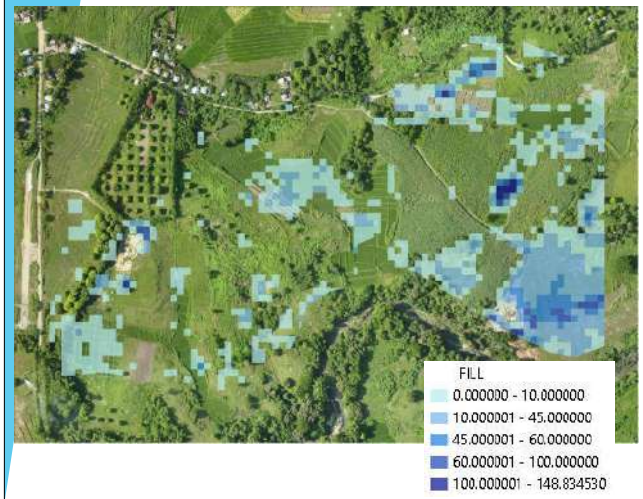
September 2017

March 2018

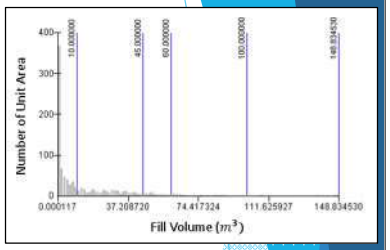
Areas of Significant Cut
10m x 10m grids

Technology Presentation

Calculate Volumes Cut/Fill by Drone/Manned Aircraft



Areas of Fill
10m x 10m grids



Maximum Fill ≈ 149 m^3

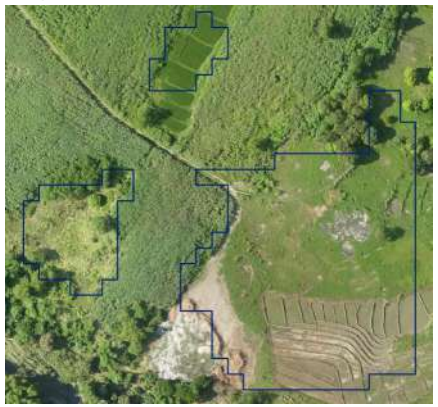
Total Fill ≈ 12,307 m^3

Mean Fill ≈ 13.3 m^3

Technology Presentation

Calculate Volumes Cut/Fill by Drone/Manned Aircraft

September 2017

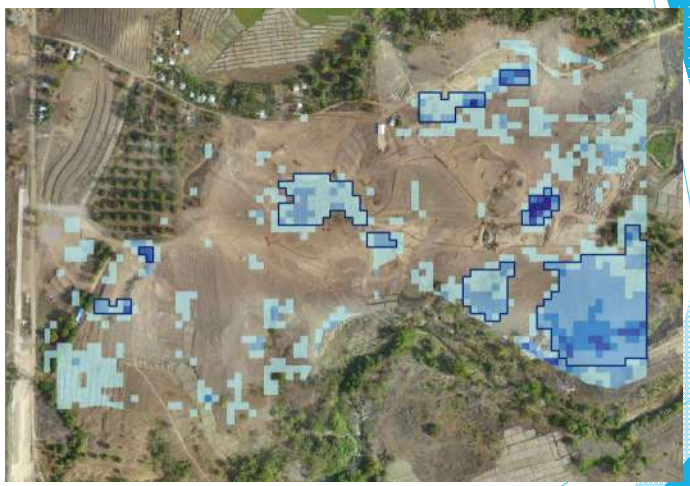


March 2018

Areas of Significant Fill
10m x 10m grids

Technology Presentation

Calculate Volumes Cut/Fill by Drone/Manned Aircraft



Areas of Significant Fill
10m x 10m grids

Technology Presentation

Calculate Volumes Cut/Fill by Drone/Manned Aircraft

September 2017

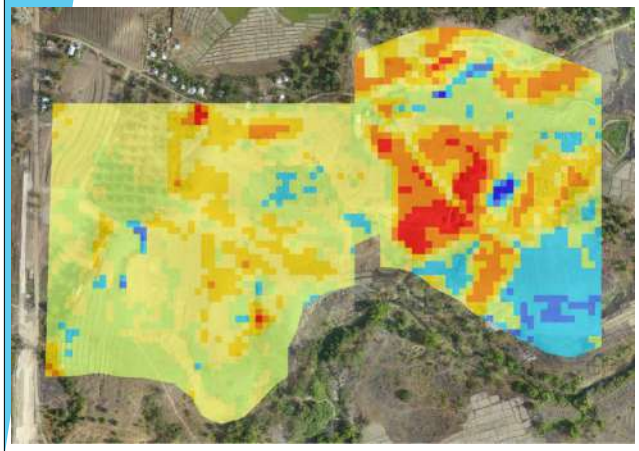
March 2018

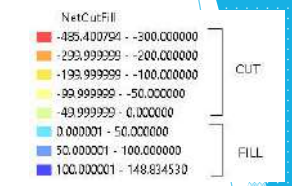
Areas of Significant Fill
10m x 10m grids

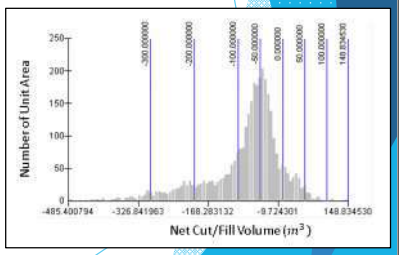
Technology Presentation

Calculate Volumes Cut/Fill by Drone/Manned Aircraft

Net Cut and Fill
10m x 10m grids







SRDP CONSULTING INC.
Integrated Mapping, GIS & Engineering

Thank you

ありがとうございます