Introducing GIS to Peruvian University Students: “Mapping Peru with Drones”

Clubes de Ciencias - Peru

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Clubes de Ciencia *

- Located in México, Peru, Columbia, Paraguay, Bolivia, & Brazil
- Clubes de Ciencia – Peru (2017)
  - hosted 12 Science Clubs in Lima, Peru
  - neuroscience, programming, electrical engineering, etc.
- “Mapping Peru with Drones”
  - 2 Professors (Luis Carrión-UTEP) ; 1 Peruvian Grad Assistant (Roger Manay)
  - 25 Peruvian University & High School students
    - Different majors (biology, civil, mechanical, and environmental engineering, computer science, etc.)
  - Taught in English and Spanish

* [http://www.clubesdeciencia.org/](http://www.clubesdeciencia.org/)
Objectives

• Introduce students to applications of GIS
• Familiarize students with data collection techniques
• GIS data availability
• Use GIS to analyze human impacts to the environment
• Stimulate interest to learn more about GIS
Future Applications

Risk mitigation for natural disasters and minimizing poverty

Detecting illegal mining and deforestation

Agricultural monitoring
Hardware and Software

Garmin GPS

DJI - Phantom 4 & Mavik

ArcGIS

Drone2Map for ArcGIS

AUTODESK RECAP 360°
Science Camp Schedule

• Data Collection and Processing (Drone & GPS)
  • Drone Safety and imagery collection
  • GPS data collection
  • Field Trip
  • Processing imagery

• Introduction to GIS analysis
  • Spatial Analysis
  • Finding spatial data

• Creating a Story Map

• Group Presentation
Preparing to collect data

• Drone Safety and Image Collection
• GPS data collection
  • Learning to use a GPS (Garmin)
  • Accuracy
  • Coordinate systems
• Ground Control
Field trip

Establishing Ground Control

Field Notebook
Coordinate System
UTM zone 18S
WGS 84

Flight Plan
Introduction to Drone2map

• Esri Training Resources (Create 3D data from 2D Imagery)

• Taught students to:
  • Create new project
  • Understand importance of and define coordinate system
  • Upload imagery
  • Process Imagery Processing options
    • point cloud, mesh, orthomosaic, DSM, scene layer, etc.
    • In field Rapid vs full scale processing
      • Point cloud density (low to high)
  • Publish scene layer to ArcGIS online
Introduction to GIS – Estimating Tornado Damage

Students used the ‘buffer’ tool in ArcMap to determine which buildings were potentially damaged along a tornado path.
Introduction to GIS (Peruvian Census)
“Stimulate Interest to learn more about GIS”

¿Cuántas veces nos hemos preguntado qué podríamos utilizar para prevenir tragedias por desastres naturales o provocadas por el ser humano?

How many times have we ask ourselves what we could use to prevent natural disasters / human tragedies?
“Siempre hay que soñar, pensar en descansar es empezar a morir”
“You always have to dream, to think of resting means to start dying.”

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