Creating Ocean Floor Image Topography Maps Using ROV Videos

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Objective

To create a seafloor image map from an underwater video
Aerial Image Mapping with Drone
Photogrammetry Software

✓ Image Overlap
✓ Identify Control Points

More overlap = more control points = better image & 3D products
Using this technology

Can we create a seafloor image?
Challenges

- Low Light
- Low Visibility
- GPS signal
- Dense

Using a video
Seafloor Video

Marine Applied Research & Exploration (MARE)

✓ ROV

✓ Existing seafloor videos

✓ Position and sensor data
Remotely Operated Vehicle (ROV)

ROV Beagle: 450 lbs
F/D/R, stereo, HD, SD camera
50ft+ boat needed
7-9 crew required

Fly 1 to 2 meters above bottom
Move slow and constant speed
Preparation

1. Finding ROV video sections for different ocean conditions
2. Create short video clips
3. Extract position data for each clip
ROV Video to Images

Photogrammetry software can be used to:
✓ Extract the frame images from the video
✓ Geocode
✓ Create one image

Capture frame images from video
✓ Every 1 second = enough overlap
✓ 1 second = 30 frames
I successfully created a good seafloor image from the ROV video
Seafloor Image from ROV Video
Location: Carmel Bay, CA
Depth: 35 ~ 37 meters
Condition: Good visibility
Lots of light

2D Image
100 meters long
1’30” video clip
Demo: Video & Image

ArcMap with Full Motion Video Tool
3D Products: DSM and 3D Image
Seafloor Animation
Created using ArcGIS Pro
Notes from the trials…

During the mapping survey, the ROV should…

✓ Never stop

Suggested Ocean Conditions and Video Display

✓ Lighter environment is better

✓ No kelp

✓ No “On Screen Display” in the view
✓ No laser dots in the view
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