Low Cost Road Condition Mapping for Sustainable Road Maintenance in Uganda

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Presentation Outline

• Background
• Method
• Concept
• Conclusion
Background

- Value for a good transportation network
- Combined road, air, rail & water
- Uganda and its problems
  - Land locked country
  - Rail ?:@?<>!??
  - Road maintenance :/@?<>!??
- Statistics

<table>
<thead>
<tr>
<th>Road Type</th>
<th>Length of Road (KM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
<td>20,800</td>
</tr>
<tr>
<td>District</td>
<td>17,500</td>
</tr>
<tr>
<td>Urban</td>
<td>4,300</td>
</tr>
<tr>
<td>Community Access</td>
<td>30,000</td>
</tr>
</tbody>
</table>

- Focus – Robust road condition documentation
The Method
The Gadgets

1. Contour GPS Camera

2. Microsoft Kinect™
Why the Contour GPS Camera

• No common standard to geotag video
• Popularity of video log data collection technologies.
• A variety of platforms for navigation and mapping sensors
Screenshot of a Contour GPS video by storyteller
Microsoft Kinect™

- Xbox 360 video game console
- Capability to sense depth
- 2010 version
- Asus Xtion PRO™ that has a higher frame rate (60 instead of 30 frames/sec)
- Infrared and RGB Cameras
- Storage
  - Depth maps- 16 bit or,
  - 24 bit point clouds
Mapping Roads in Jinja - Uganda
Depth map (screen dump) of a road pothole registered with the Kinect via software RGBDemo
The Concept

- Focus on method rather than tools (STI)
- Concept
  - GPS positioning + Video
  - Volume estimates thru 3D scanning
- No prior GIS Knowledge required
- GIS ready information obtained
- More objective estimation of measurements by experts.
- Time series studies to monitor potential degradation.
- Integration of these data in a dedicated GIS is necessary for road maintenance decision support.
Conclusions

1. Up-to-date & continuous accumulation of spatial video databases for routine & periodic maintenance decisions- based on road inventory and condition data.

2. Sustainable approach - utilizes low cost equipment that can be mounted on any vehicle and - operated without special training of the patrolling personnel.
Thank you for listening!

Questions?