Documentation: Photogrammetry with UAV: example measurement.

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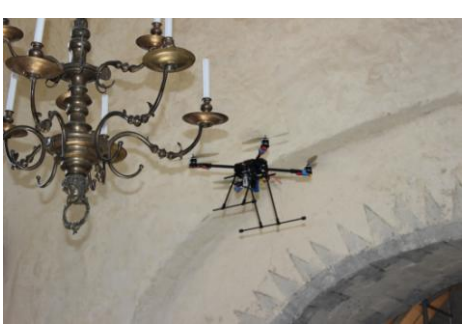
Sustainable Management of Historic Rural Churches

The Baltic Sea Region Network for Indoor Climate in Churches meeting on 12 september 2013. Visby Gotland Sweden

Using UAV (Unmanned aerial vehicle)

- An aerial camera platform is beneficial if parts of building to be documented are
- hidden (inner yards etc)
- Not accessible from ground (roof of building)
- *UAV makes documentation of a building quicker and easier*
- *Process could be automated eliminating thus human errors*
- *Combined photos from ground and UAV*



Flying stuff , part 1

- Electric multicopter built specially for this project
- Y6-configuration
- M2M distance 106 cm
- Gyro-stabilized camera platform
- Camera: mainly Canon EOS 600
- Smaller multicoper with a Pentax camera, not stabilized

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Flying stuff, part 2

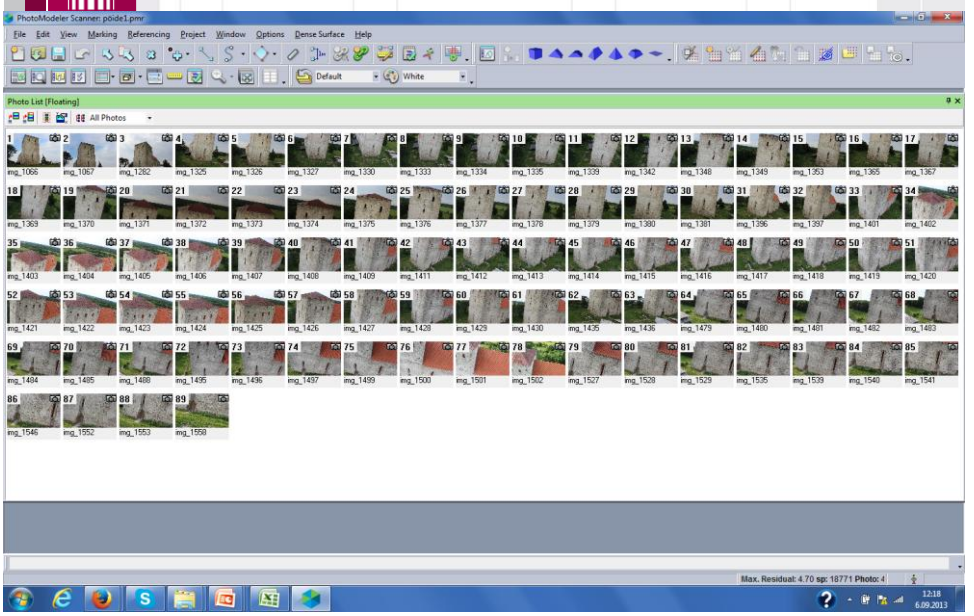
- Self-built smaller (56cm) multicopter for shooting indoors
- Is easily manoverable in tight rooms
- Consumes less power
- Not equipped with a stabilized camera platform
- We used a light-weight „Pentax" camera

- View to Pöide church from our Y6 copter

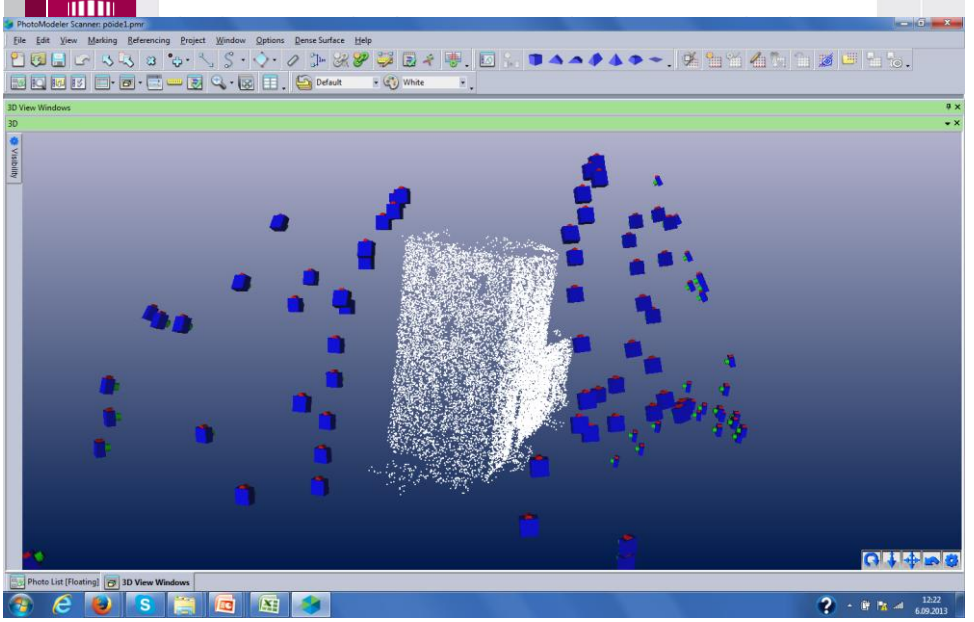
Problems encountered and other observations for outside shooting

- It's hard to determine exact position of copter from distance
- Due to vibration (both movement and mechanical) some shots can be out of focus
- Props create huge sand storms – could even destroy lens mechanics
- Electric copter is very hungry for power: current consumption in normal hovering about 40A – gives about 8..10m of flight time

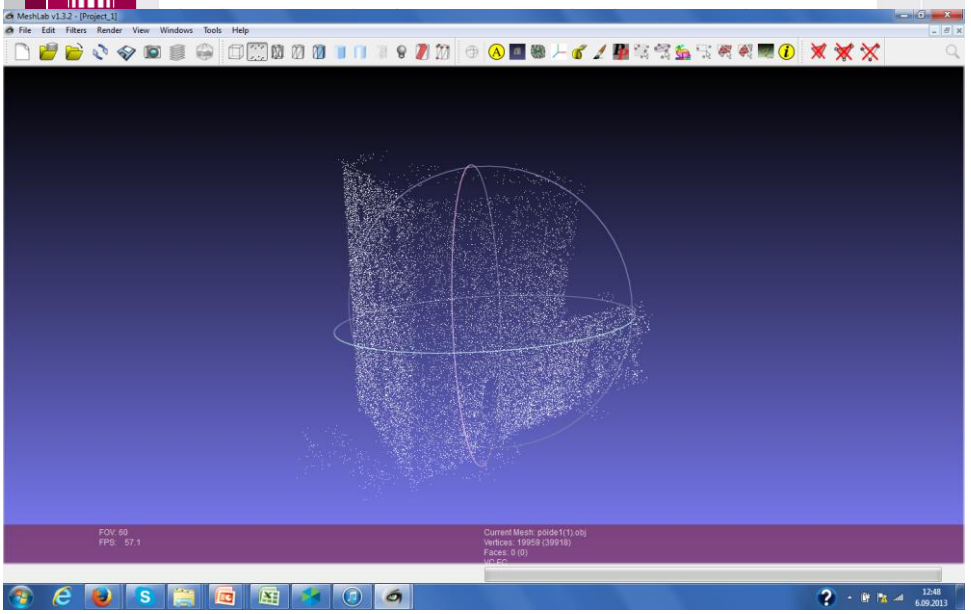
Oriented photos in the Photomodeler Scanner working window



Point cloud with camera station

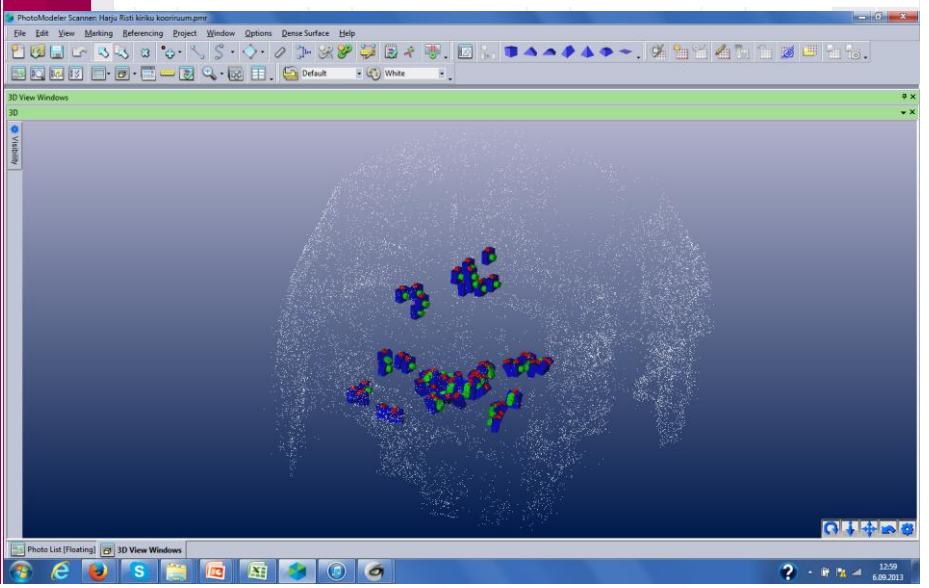


Point cloud in Meshlab window



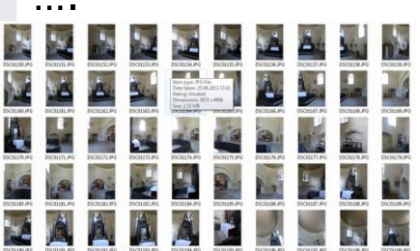
Y6 tricopter in choir ruum of Harju-Risti church

Point cloud of the Harju-Risti Church choir



On-line services for generating 3D models:

123D Catch
My3DScanner
….



Problems encountered shooting indoors

- Good lighting is essential !
- Slave flashes on tripod(s) is not enough - „umbrella" reflectors should be used
- Due to poor lighting camera can not focus properly even when using flashlights. Special LED-lights for copter and controller switching them **prior** to focusing is presently being built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