Visual SLAM in Urban Search and Rescue

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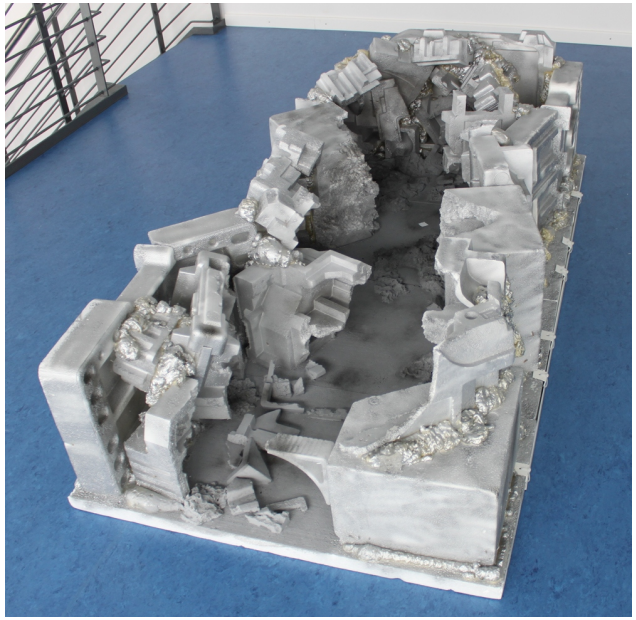
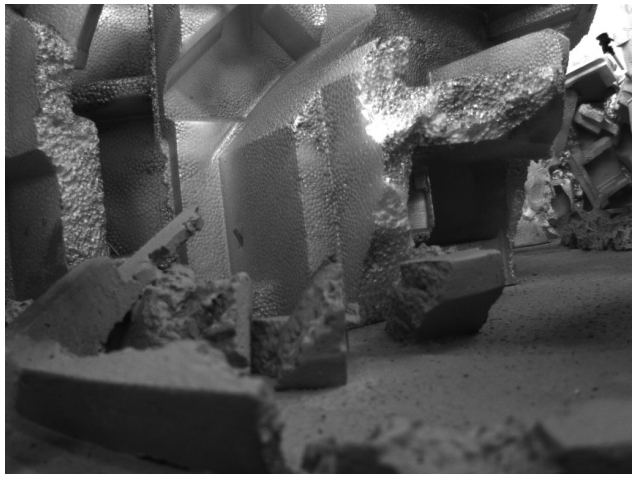
Urban Search and Rescue

- collapsed buildings, e.g., after earth quake
- risky for human rescue personnel to enter
- camera equipped, tele-operated robots are already in use
  - navigation difficult





Urban Search and Rescue

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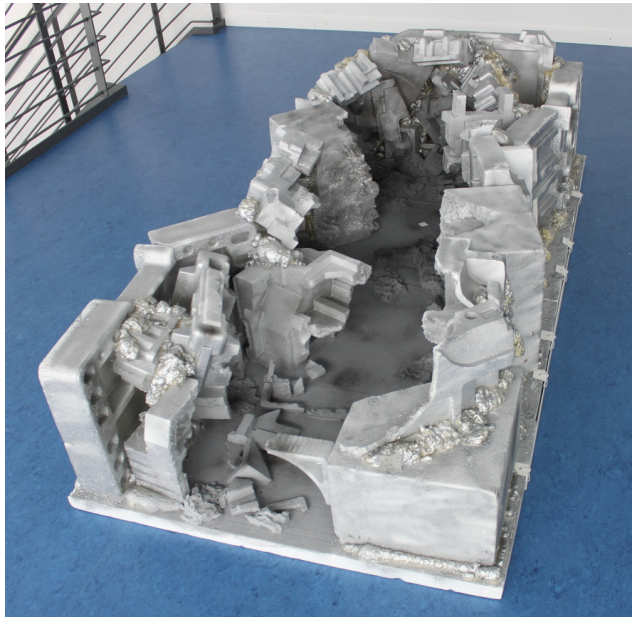
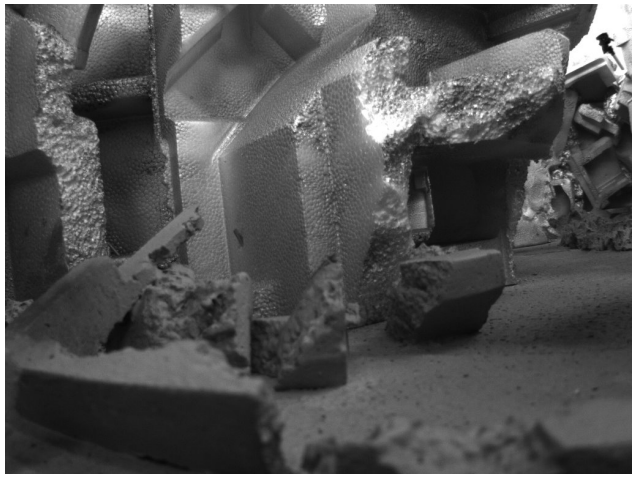
- idea:
  - provide a birds-eye view of the environment
  - in robotics terms: 3D volumetric map





Visual SLAM

- Stereo camera/IMU head moves through the environment
- Both, the camera trajectory and the environment map are initially unknown
  $\rightarrow$ Visual SLAM (Simultaneous Localization and Mapping)

Video

- And now a short video. . .

Current Research Problems

- Obviously, the resulting map is not dense, the entire ground plane is missing
- Dense mapping is currently done offline, do this in real time instead
- Possibly fuse dense stereo with depth/TOF camera images