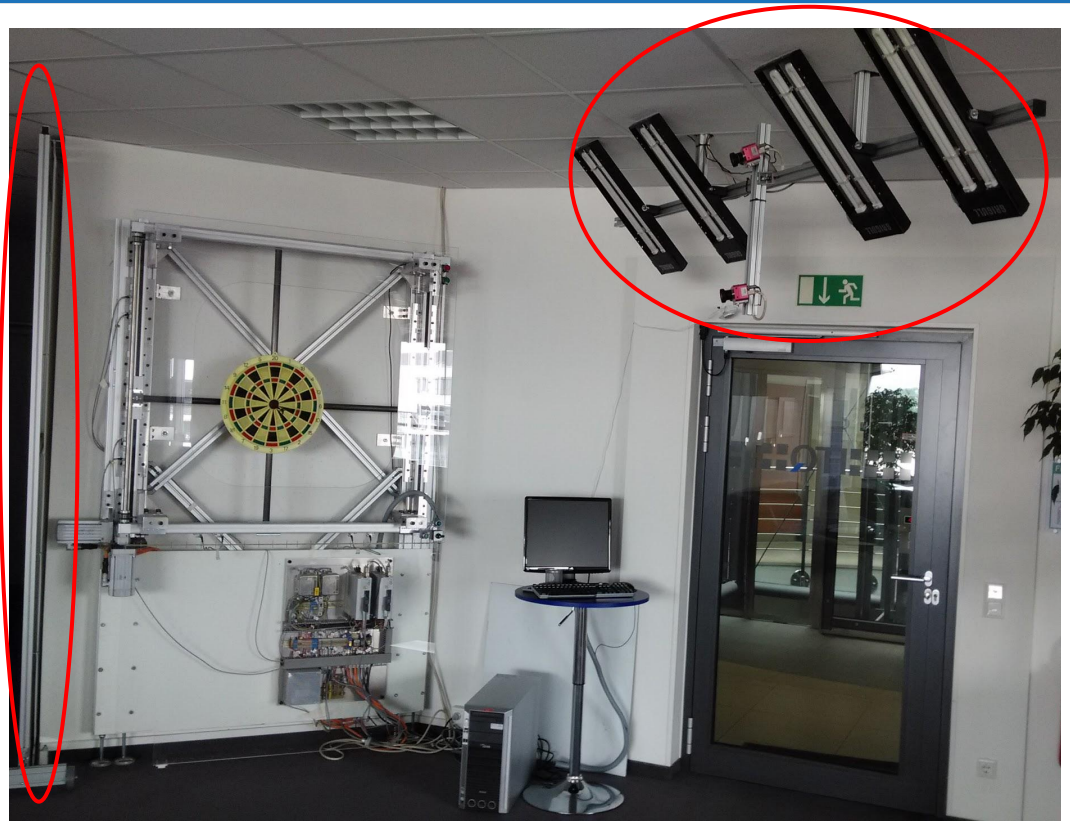
Bull’s Eye

Never miss a shot!

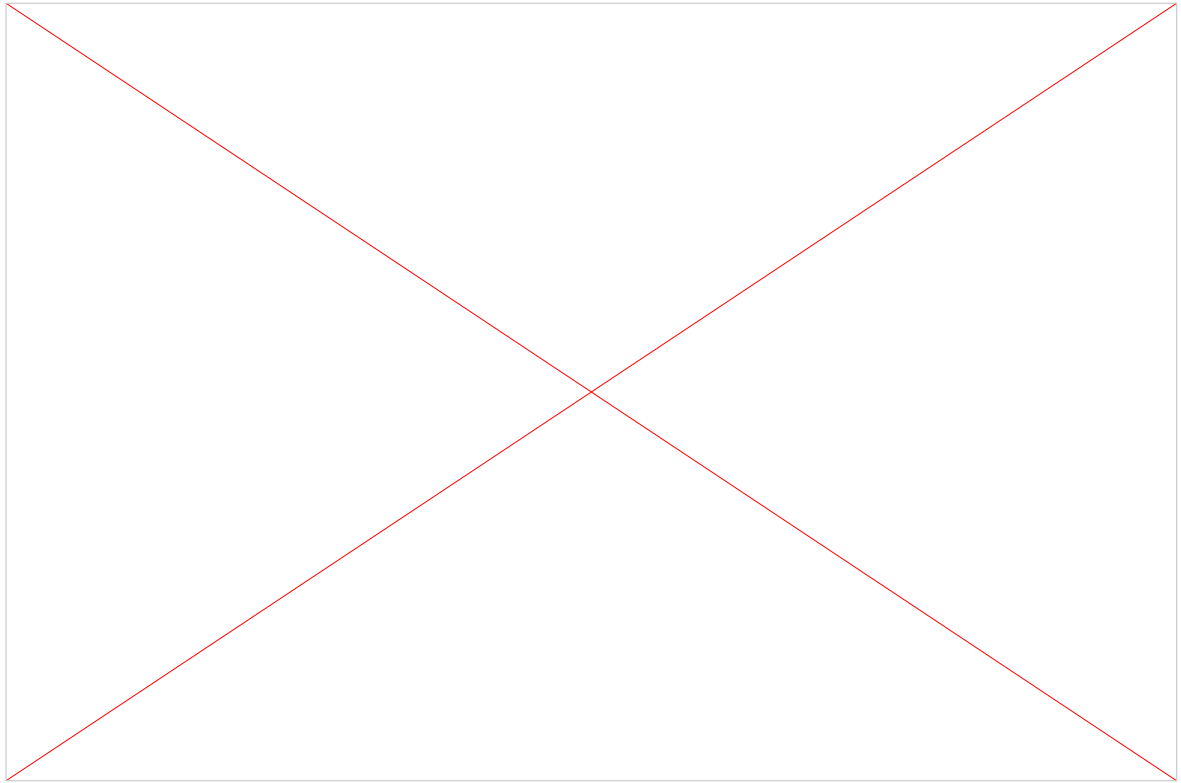
The old model: big and sensitive

White wall to remove background noise

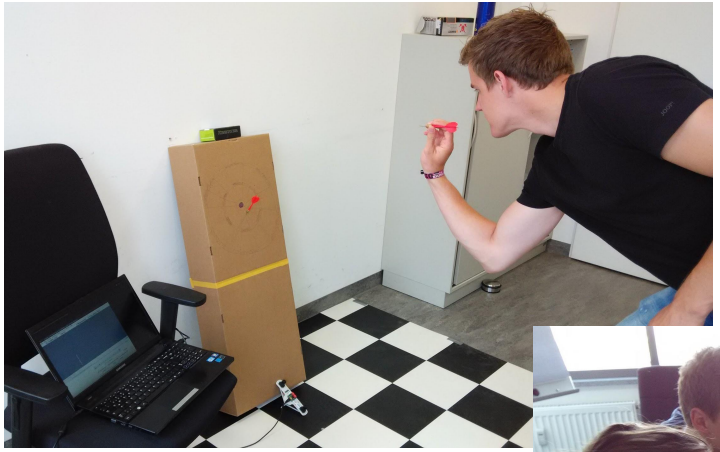


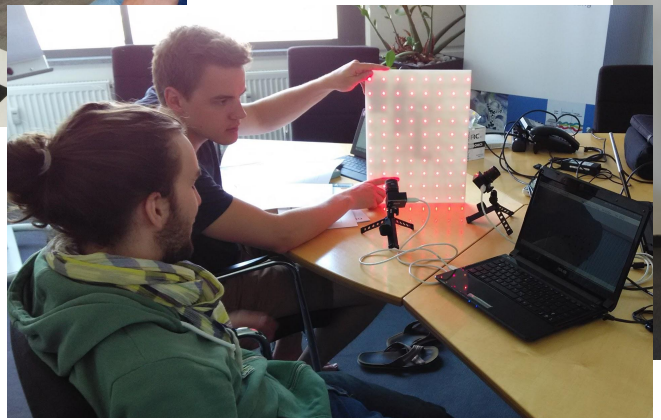
Camera system with special lightning

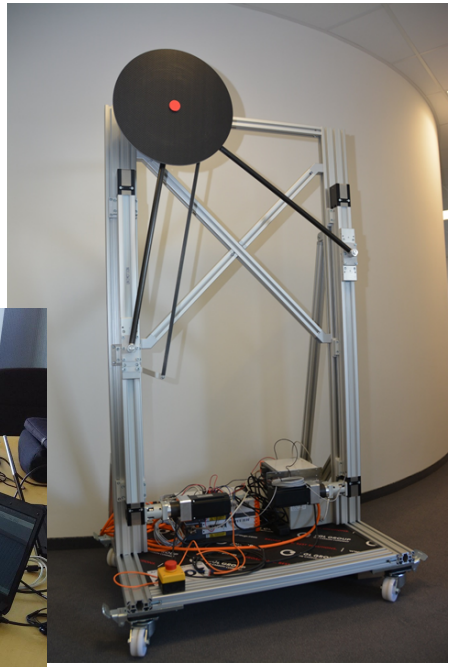
Final Demo



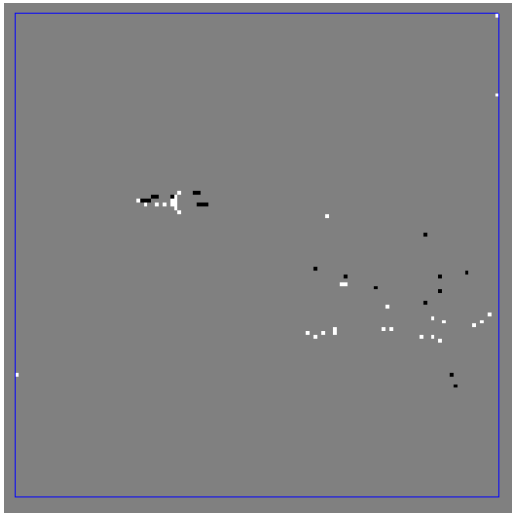
Sample recordings with two eDVS/DVS128



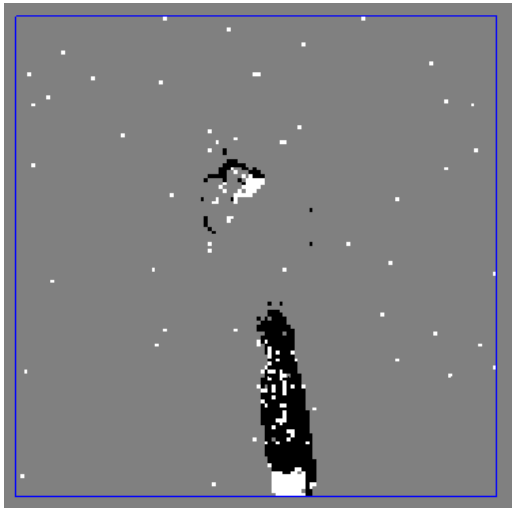




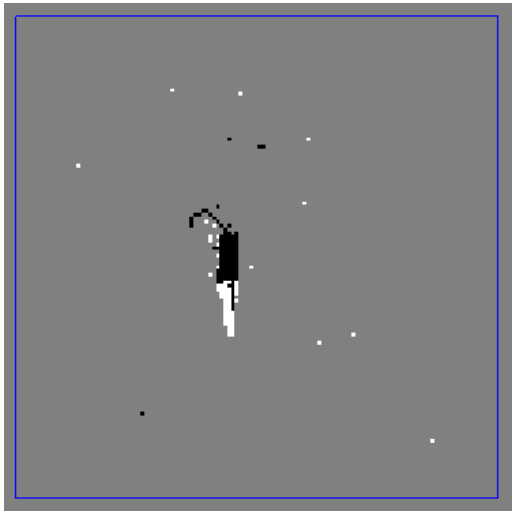
Rudimentary setup: test ideas



side perspective

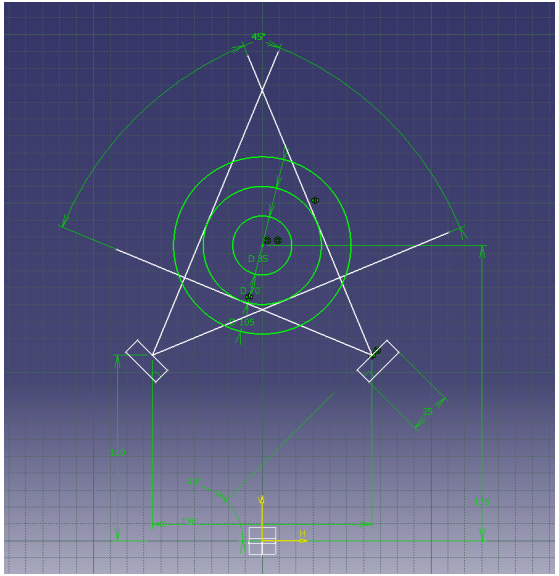


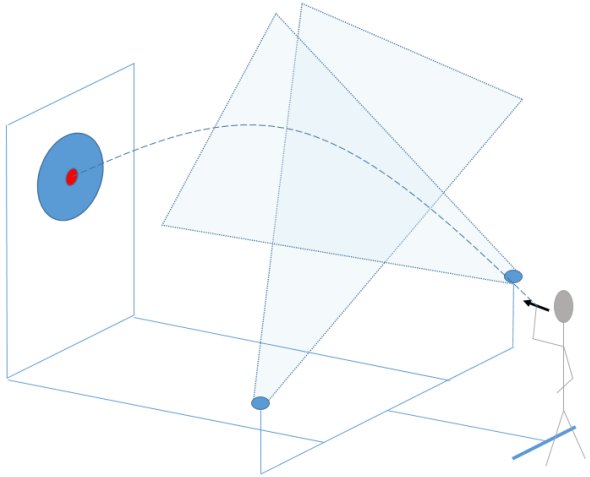
front perspective

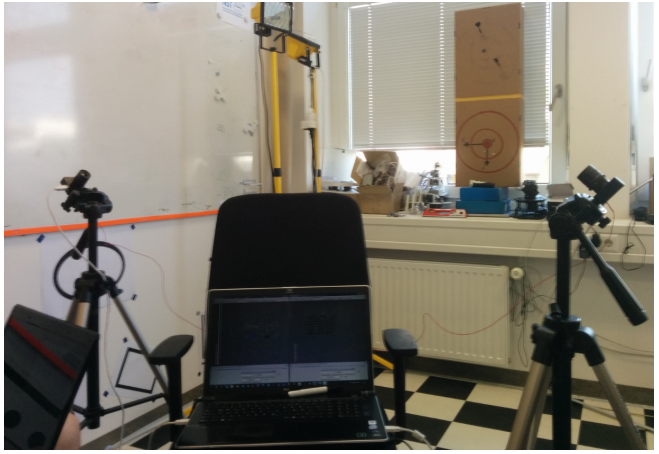


bottom perspective

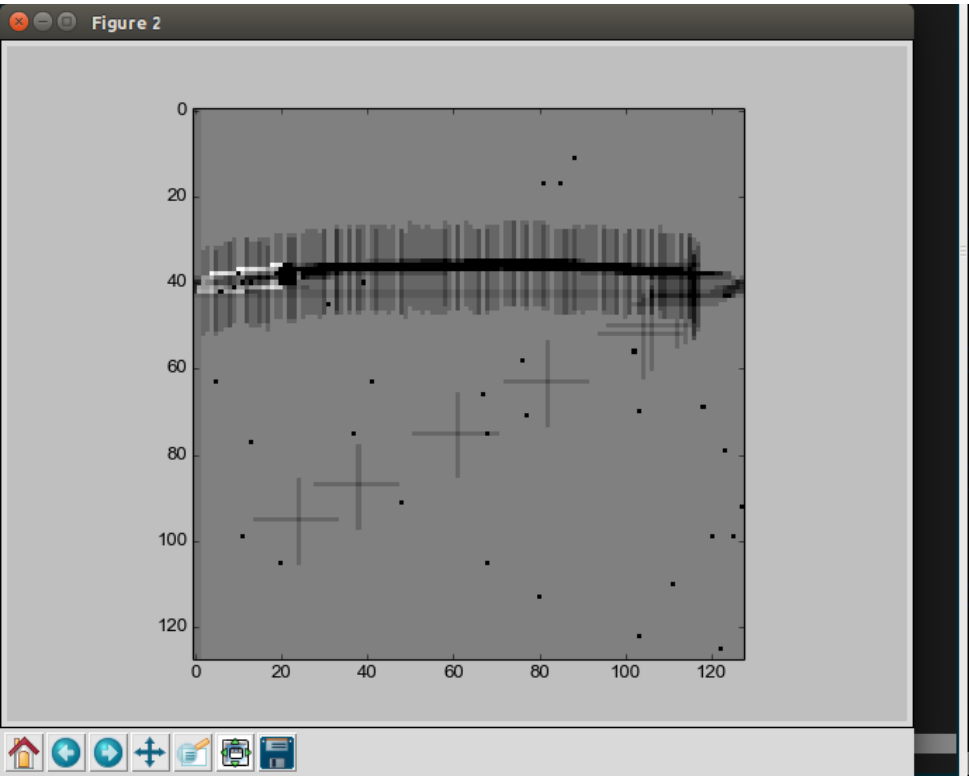
Final Setup

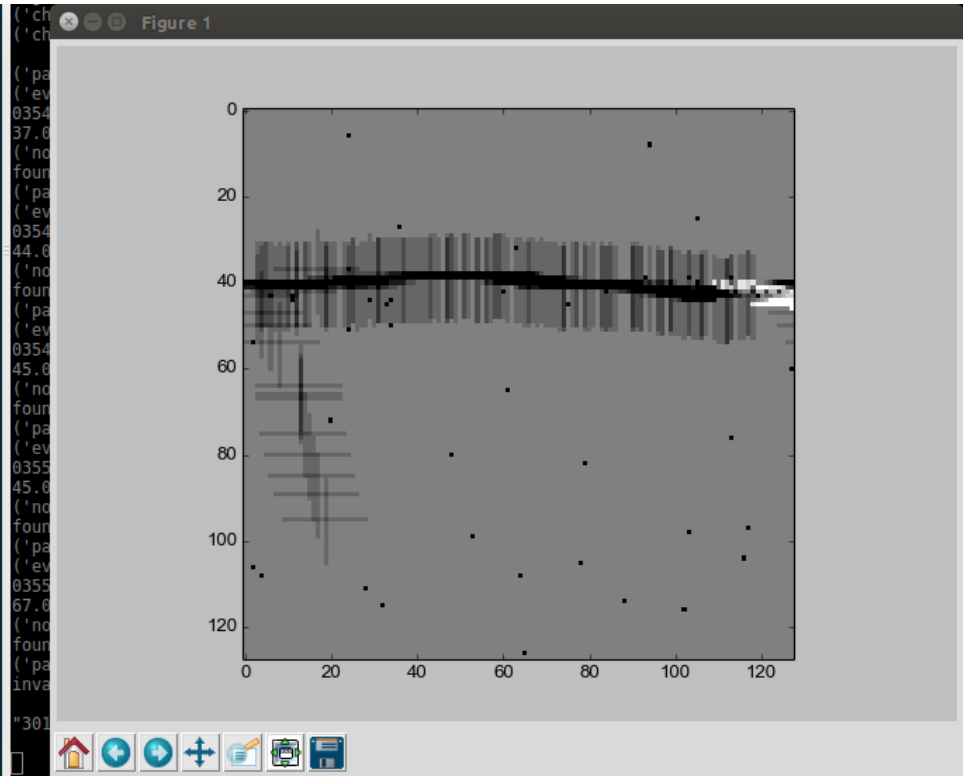






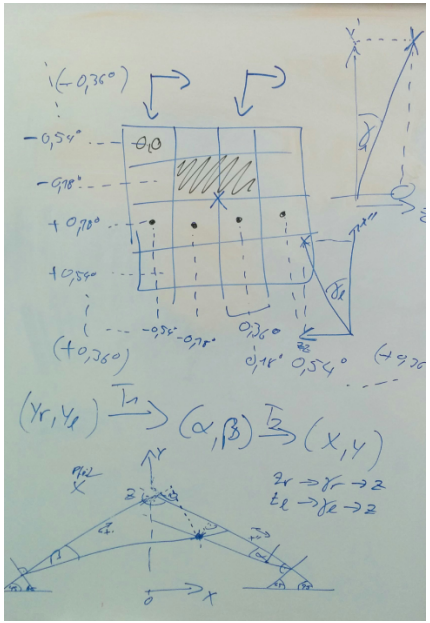
Triggering, Position Estimation & Matching

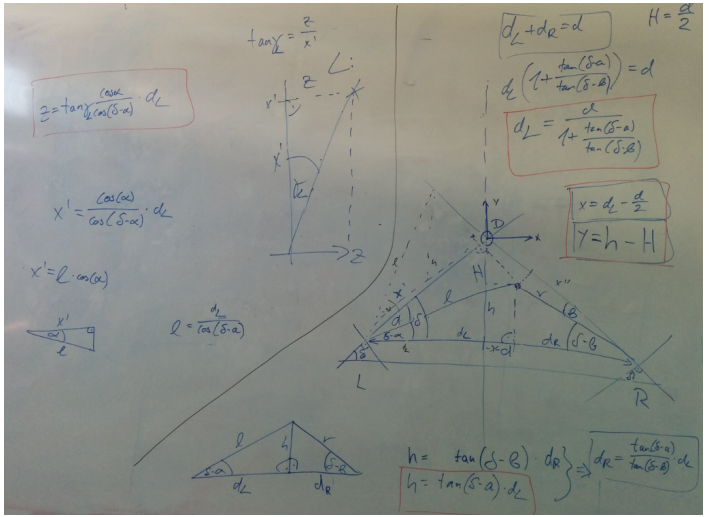




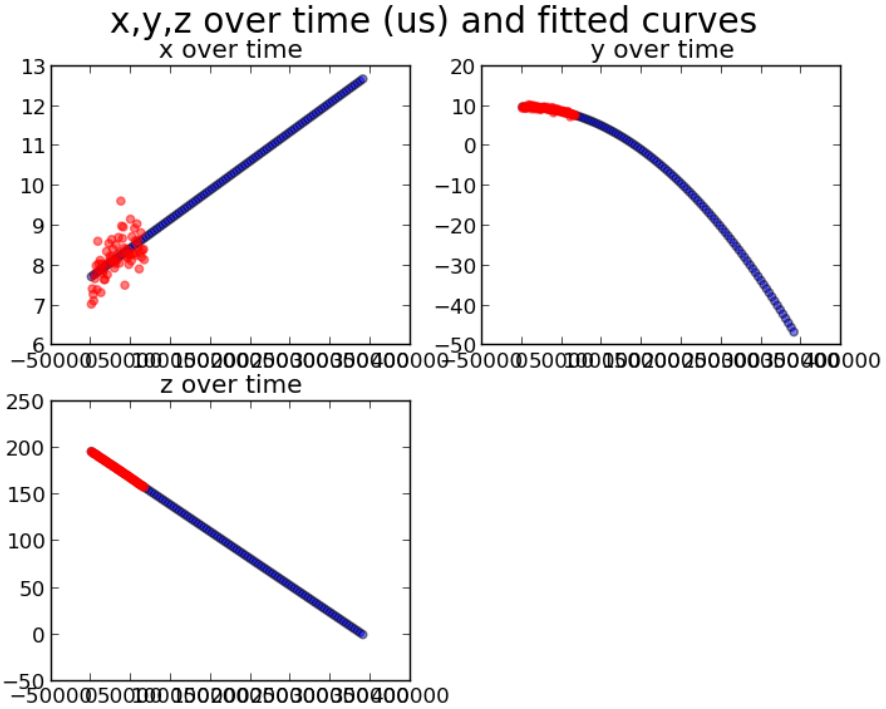
Calculate 3D Position

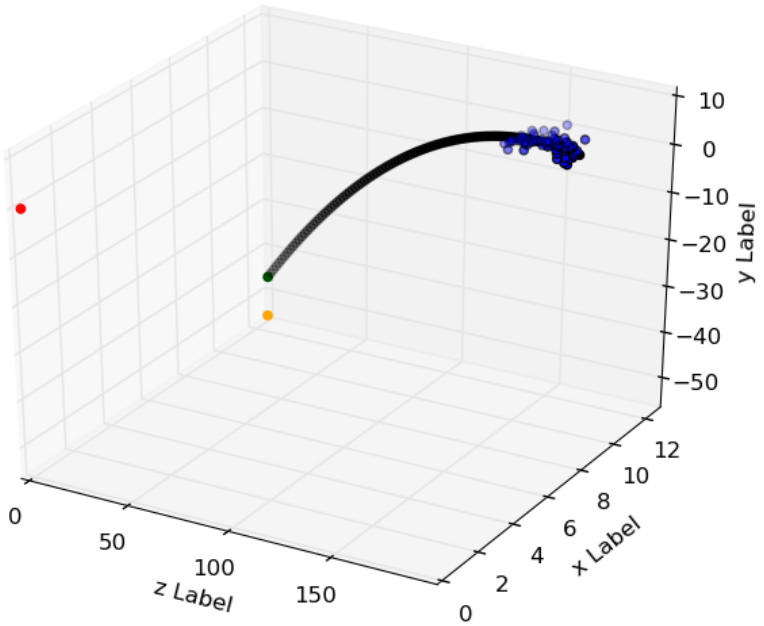
- use opening angle per pixel (1 px = 0,36°) and trigonometry
- accuracy: (5,14,12) mm





Estimate impact point





Conclusion

We are able to…

1. track the dart
2. calculate its 3D position each millisecond with an accuracy of (5,14,12) mm
3. predict the point of impact with a theoretical accuracy of (15,46) mm

During the process we experienced many more hurdles

- camera lenses and configurations

  (focus, angle, positioning, “blind” spots, lightning conditions, colour of dart → black, synchronisation)
- time for calculation
- difficult communication with the moving bullseye (CAN bus)
- calibration (→ precision)
- not enough time (!)

Outlook

Possible next steps:

- control the dartboard via our program
- calibrate the cameras by precise positioning
- build a system to attach the cameras to the dart rack