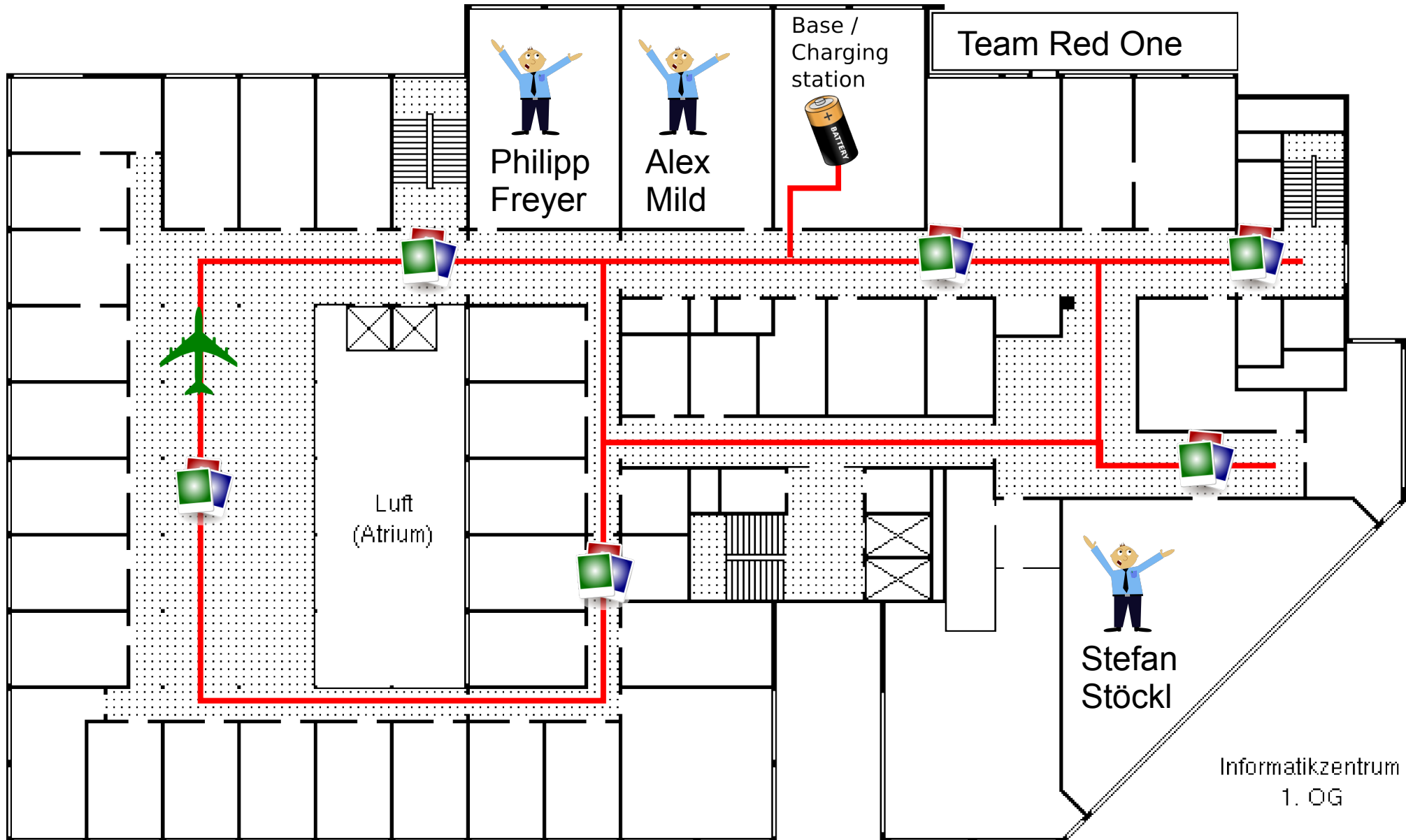


Autonomous flying drone for building surveillance



Topic motivation

- Use AR drone for building surveillance
- Addition to existing watchmen
- Fly a predefined path through a building
- Videostream of the drone's camera image to the guard-room
- Take pictures of points of interest for security archive
- Learns map of the route for case of occluded waypoints

Topics

- Detect and follow the line
 - Segment colored lines in the camera image
 - Align the drone relatively to the line
- Detect crossways
 - Simple: mark crossways with marker or different colored tape
 - More difficult: check for crossways without tape
- Make pictures of points of interest
 - Marker on the floor to tell the drone where to take a picture
- Optional: Fly back to base if battery level is low
 - Monitor battery level and calculate shortest way back to base if battery level is low

Approach

- Map creation
 - Save path points as graph
- Path finding for complete area coverage
 - Dijkstra or A* for shortest path to POI
 - Finding shortest path that covers is NP-hard (Travling Salesman problem) → Solution: Use some way, not necessarily the best way
- Position estimation
 - Use Kalman filter to estimate the position of waypoints
 - Use markers at crossways and POIs for position correction

Future work

- Fly to POI if an alarm goes off
- Create a 3D map for coverage of multiple floors
- Use Camera for 360° panorama images of POI
- Follow a guard in case of an alarm
- Mapping and pose estimation without markers and lines (SLAM, ...)