

# REP 105 { Coordinate Frames for mobile Platforms }

## \* Coordinate frames

### ① base-link

- rigidly attached to the mobile robot base.
- Can be attached to the base in any arbitrary position and orientation.

### ② Odom

- It is a world-fixed frame.
- The pose of a mobile platform in the odom frame can drift over time, without any bounds.
- This drift makes the odom frame useless as a long-term global reference.
- However, the pose of a robot in the odom frame is guaranteed to be continuous meaning that the pose of a mobile platform in odom frame always evolves in a smooth way, without discrete jumps.
  - The odom frame is useful as an accurate, short-term local reference.
- Typical odometry source:
  - { Wheel odometry, Visual odometry }
  - or IMU

### ③ map

- It is a world fixed frame.
- The pose of a mobile platform, relative to the map frame, should not significantly drift over time.
- It is not Continuous, meaning the pose of a mobile platform in the map frame can change in discrete jumps at any time.
- In a typical setup, a localization component constantly re-computes the robot pose in the map frame based on sensor observations, therefore eliminating drift, but causing discrete jumps when new sensor information arrives.
- The map frame is useful as a long-term global reference, but discrete jumps in position estimations makes it a poor reference frame for local sensing & acting.



⇒ This graph shows the minimal representation of this graph.

↳ The basic topology should stay the same, however it is fine to insert additional links in the graph which may provide additional functionality.