

TIADPE

Relative positioning by dead reckoning

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Outline

Positioning

Dead reckoning

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Positioning

Fundamental in

- ▶ Location based services and mobile robotics

Different methods

1. Absolute positioning:
With reference to beacons
2. Relative positioning:
Continuous offset relative to initial absolute position
3. Hybrid positioning:
Combination of absolute and relative positioning

Outline

Positioning

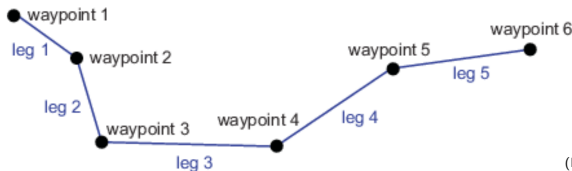
Dead reckoning

Dead reckoning purposes

- ▶ Deducing net movement from a past absolute position (fix)
- ▶ Used for determining position **between** fixes and for and for **forecasting** future positions
- ▶ Hence, dead reckoning is an **interpolation** and **extrapolation** technique
- ▶ From a fix a DR track can be plotted, i.e. a plot of the **intended** positions of the object forward in time
- ▶ DR points are typically computed for every change in:
1) course or 2) speed or 3) at every hour (or other threshold)

Dead reckoning fundamentals

- ▶ Deducing often based on fix, fix-time, waypoints, and speeds
- ▶ Fix: An absolute position
- ▶ Fix-time: The time when at the fix
- ▶ Waypoint: Point through which a track passes
- ▶ Leg: Straight line path between consecutive waypoints
- ▶ Speed: The speed on a leg



(Mathworks, 2014 [1])

Dead reckoning example 1

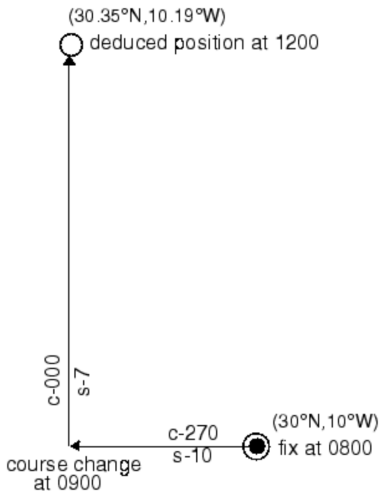


Figure : West for 1 hour at 10 knots. North for three hours at 7 knots

(Mathworks, 2014 [1])

Dead reckoning example 2

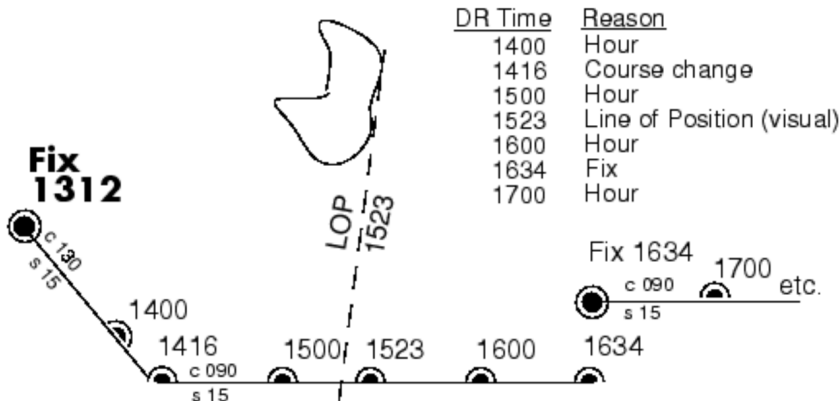


Figure : DR point does not match perfectly with LOP at 15:23

(Mathworks, 2014 [1])

References I

- [1] Mathworks (2014). Mapping toolbox: Navigation. R2014b documentation.