EE 570: Location and Navigation Introduction to Navigation

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Overview	Dead Reckoning		Navigation Concept	S	Sensors	
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 The process of determining a vehicle's "course" by geometry, astronomy, radio signal, or other means.
Often described by Position, Velocity, and Attitude (PVA)

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 Often described by Position, Velocity, and Attitude (PVA)
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 - Position fixing: Directly measuring location
 - Dead Reckoning: measures changes in position and/or attitude
 - $\bullet\,$ need to initialized and then "integrate" the $\Delta 's$
 - Inertial sensors measure the $\Delta ^{\prime }s$ without requiring an external reference

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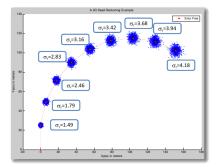


- At each epoch we measure Δx and Δy with noise ($\sigma = 1m$)
- Then add to the prior location

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PVA needed in terms of local datum

DARPA grand challenge



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PVA needed in terms of local datum

DARPA grand challenge



SOCOM Robot (EE NMT project)



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Earth Centered Earth Fixed Coordinate System



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Earth Centered Inertial Coordinate System



	Dead R	eckoning Navigation			
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- There exists a wide variety of information sources (i.e., sensors)
 - Inertial, Doppler, GPS, radar, compass, camera, odometry, barometric, ...

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• There exists a wide variety of information sources (i.e., sensors)

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- I How should I describe my location?
 - Position, velocity, and attitude?
 - attitude can be a bit tricky!!

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• There exists a wide variety of information sources (i.e., sensors)

- Inertial, Doppler, GPS, radar, compass, camera, odometry, barometric, ...
- How should I describe my location?
 - Position, velocity, and attitude?
 - attitude can be a bit tricky!!
- When answering the question "where am I?" the wrt must be very clearly defined!!
 - Lead in to the notion of coordinate systems

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