RTK with NavIC

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Brief about RTK

- **Concept**: Differencing of observables from two receivers receiving signals from the same set of satellites.
- Using more precise Carrier phase information.
- The satellite clock error is eliminated while differencing between the same set of satellites.
- The Receiver clock error is eliminated while differencing between base satellite and other satellites.
Receiver development

- Carrier Phase Observables accuracy of < 3 mm (1-σ)
- Kalman filter-based algorithm to estimate the float ambiguities.
- LAMBDA (least-squares ambiguity decorrelation adjustment by Teunissen) for integer ambiguity.
- 7 channel NavIC + 12 channel GPS.
- With the combination of NavIC and GPS, the number of satellites available is increased, which improves the positioning precision and availability for RTK.
- Applications: CORS, RTK, PPP.
RTK Solution with 400m baseline (NavIC Live)

- Baseline: 400 m
- 3D-RMS: 1.74 cm
- CEP: 5.9 mm
RTK Solution with 400m baseline (NavIC + GPS Live)

- **Baseline**: 400 m
- **3D-RMS**: 1.37 cm
- **CEP**: 3.1 mm
• We have Tested the Receivers both with simulator and with live signals.
• We have achieved < 2cm horizontal error and <3 cm 3d error.

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<tr>
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<th>Simulator</th>
<th>Live Signal</th>
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<tbody>
<tr>
<td>Baseline</td>
<td>0 m</td>
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<tr>
<td>3D-RMS</td>
<td>1.4 mm</td>
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<tr>
<td>CEP</td>
<td>0.4 mm</td>
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Future Roadmap

- Multipath- mitigation.
- Continuous communication between base and rover.
- Tuning of Kalman filter parameters for Dynamic scenario.
- Establishment of optimal threshold for correct ambiguity resolution.
- Extending the RTK for longer baselines using dual frequency NavIC signals.
- Implementation of Network- RTK.
- Extending the concept to PPP.
Thank You