



Australian Government

Department of Defence
Science and Technology



UNSW
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Integrity Capability of Standalone GPS in Cooperative Intelligent Transport Systems (CITS)

Elizabeth Smith

IGNSS Feb 7th – 9th 2018

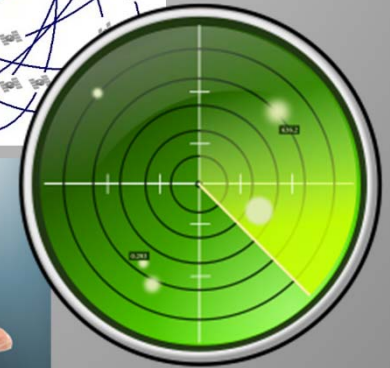
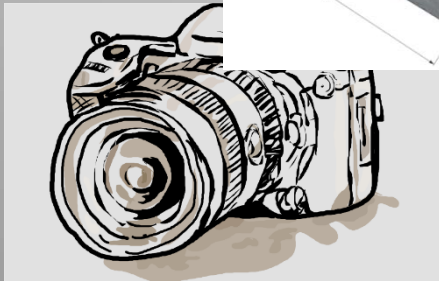
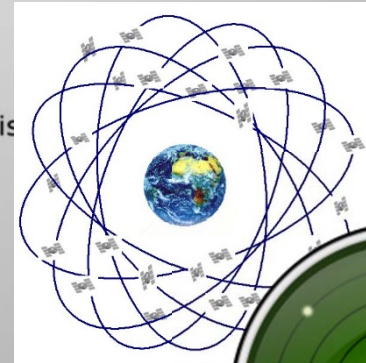
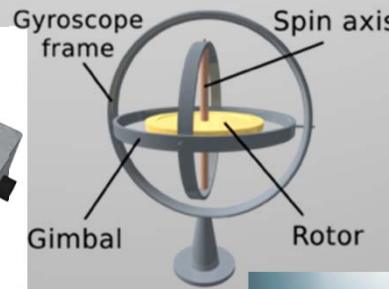
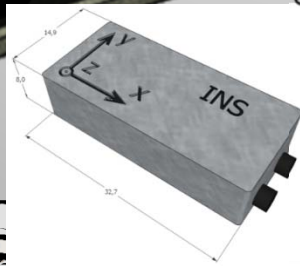
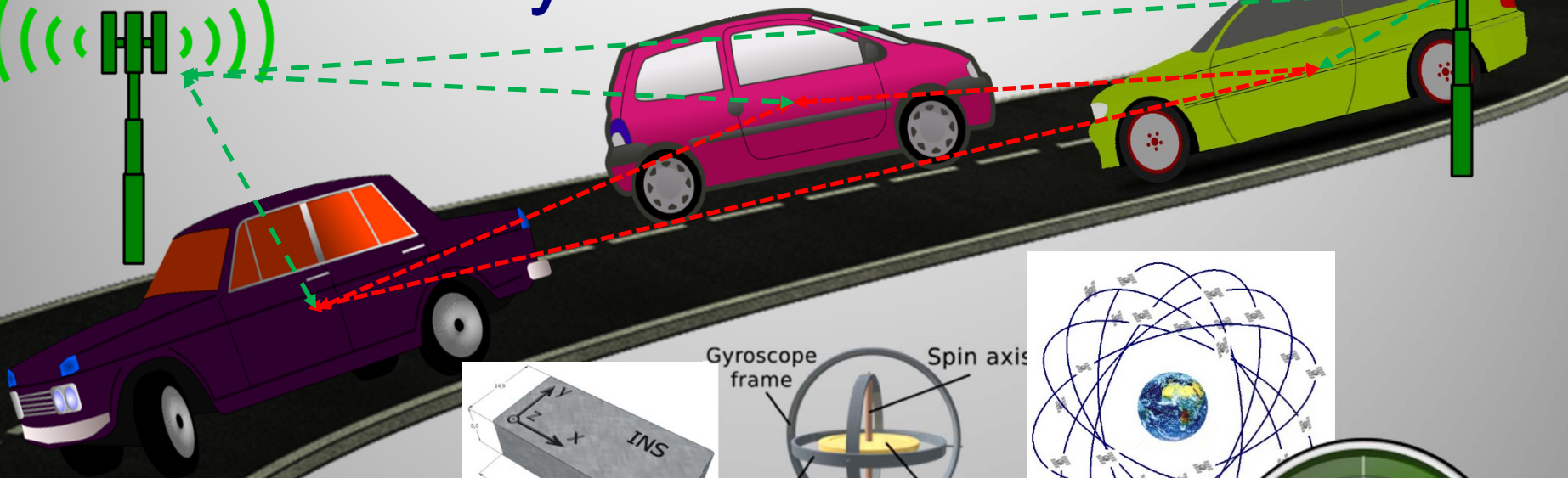
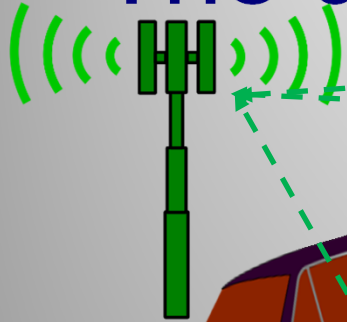
Never Stand Still

Faculty of Engineering

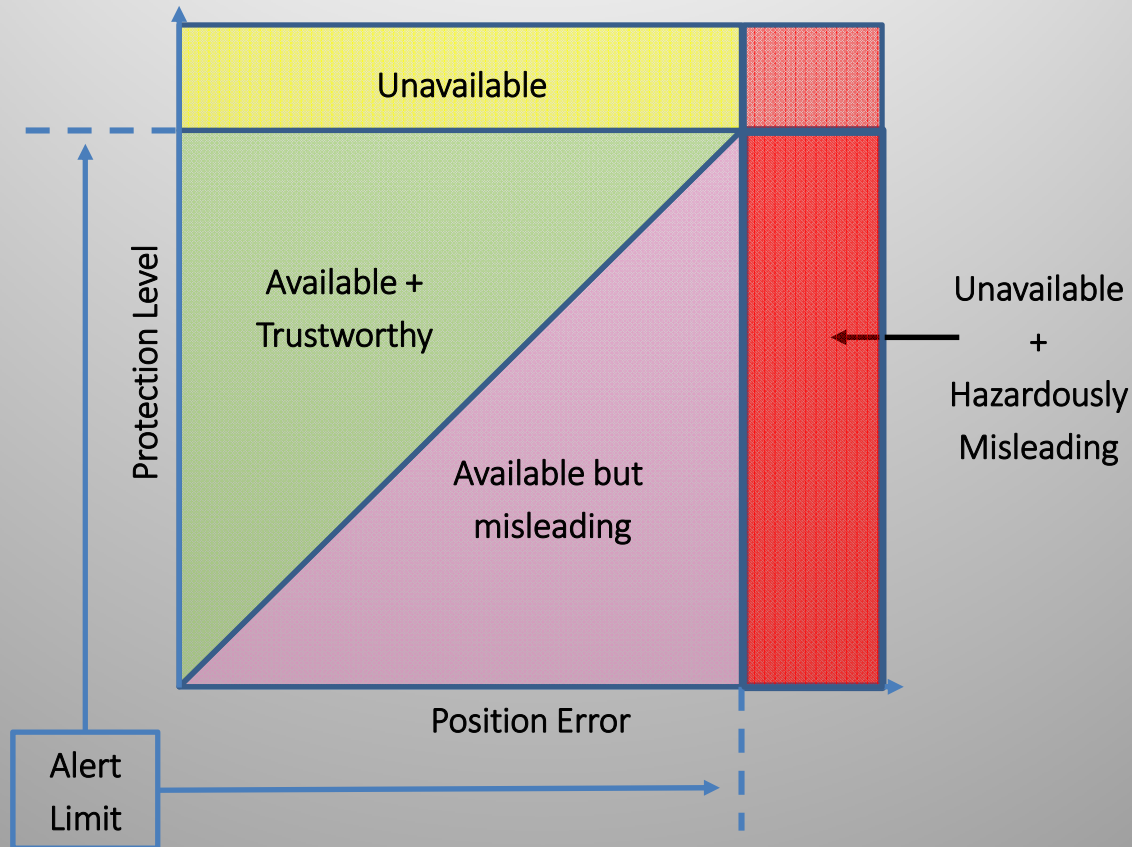
Australian Centre for Space Engineering Research (ACSER)



The Journey

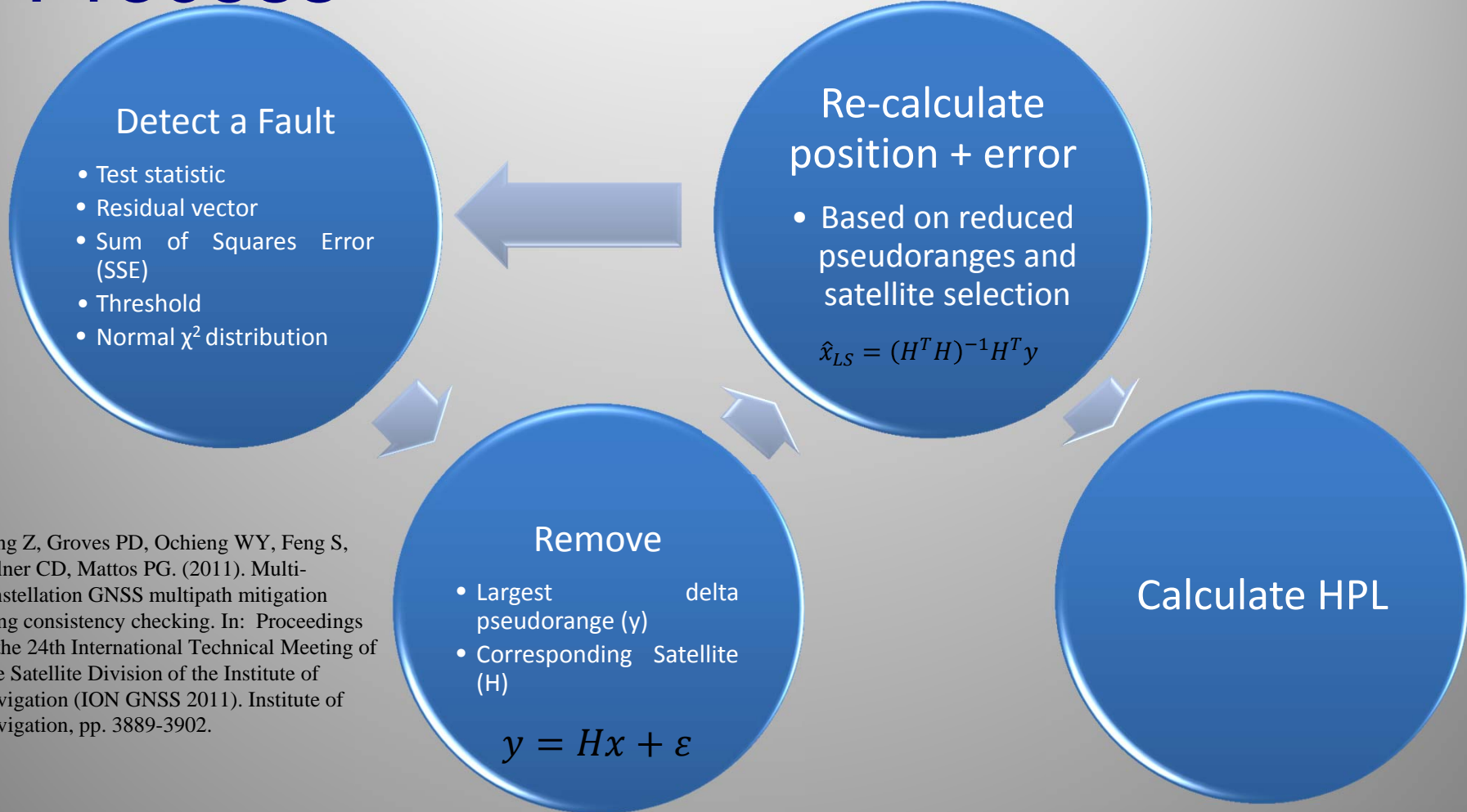


Stanford Integrity Diagram



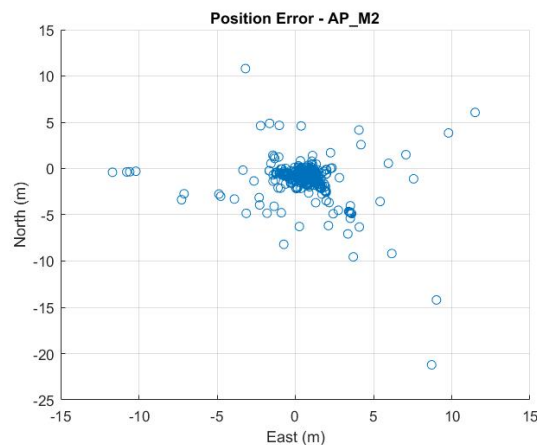
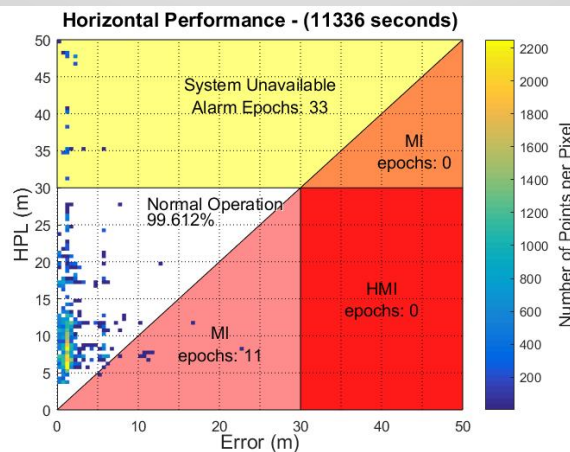
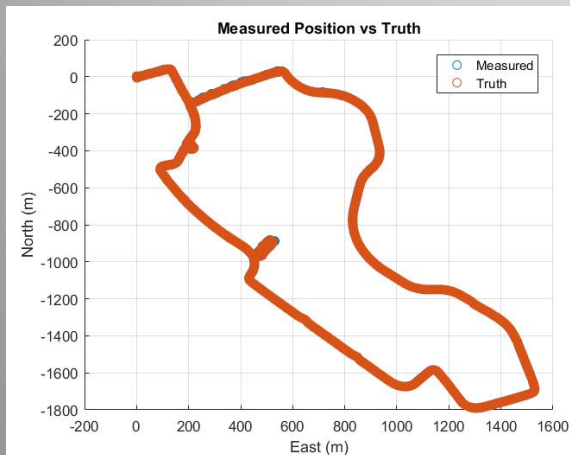
Based on: Tossaint, M., et al., *The Stanford-ESA Integrity Diagram: A New Tool for The User Domain SBAS Integrity Assessment*. Navigation, 2007. **54**(2): p. 153-162.

Process

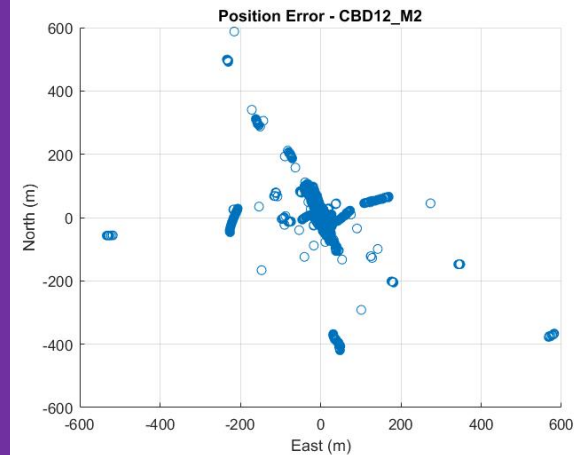
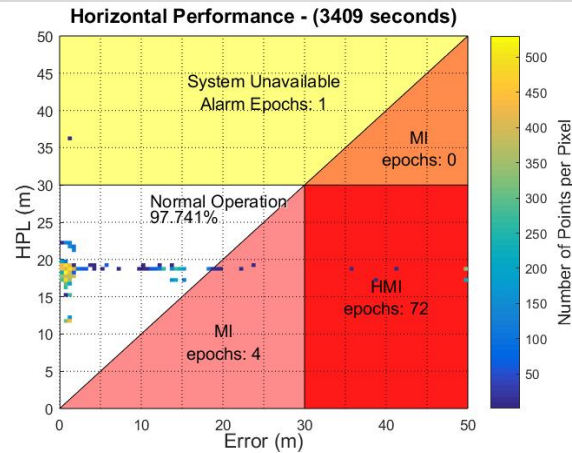
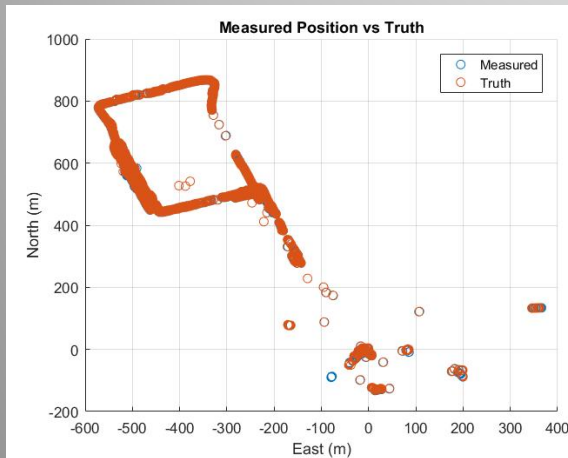


Jiang Z, Groves PD, Ochieng WY, Feng S, Milner CD, Mattos PG. (2011). Multi-constellation GNSS multipath mitigation using consistency checking. In: Proceedings of the 24th International Technical Meeting of The Satellite Division of the Institute of Navigation (ION GNSS 2011). Institute of Navigation, pp. 3889-3902.

Data - Open Sky - Albert Park

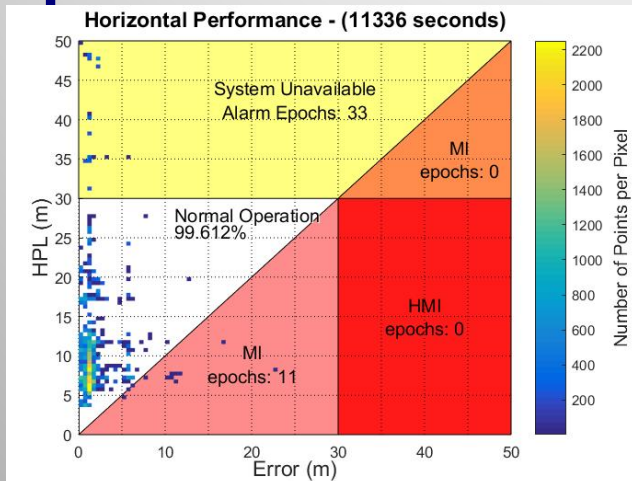


Data - Dense Urban – Melbourne CBD

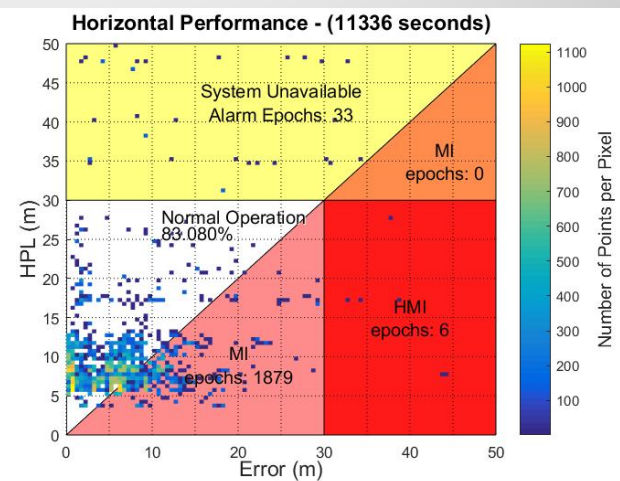


Multipath in RAIM

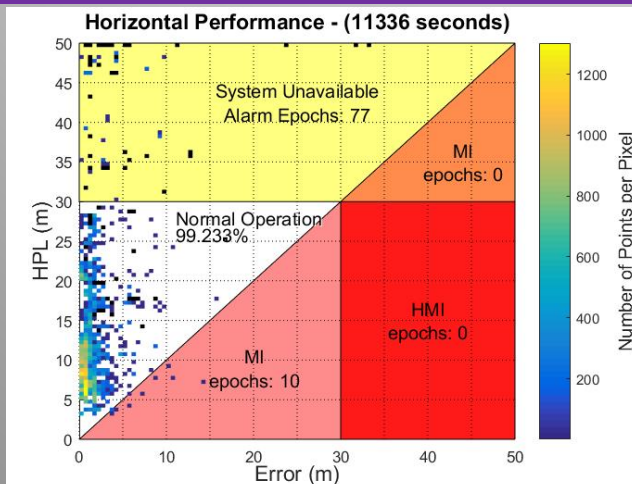
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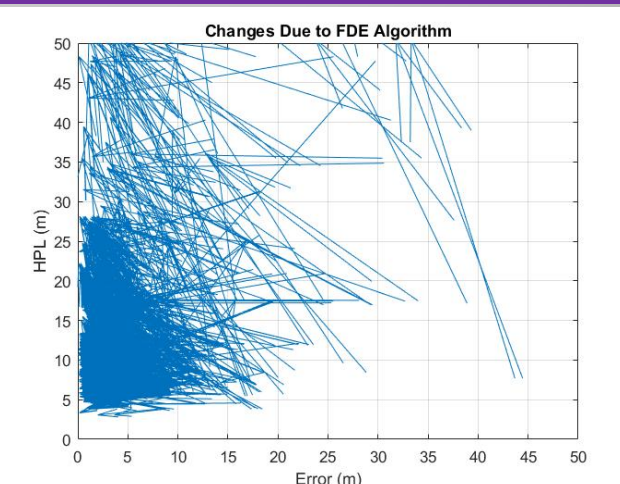
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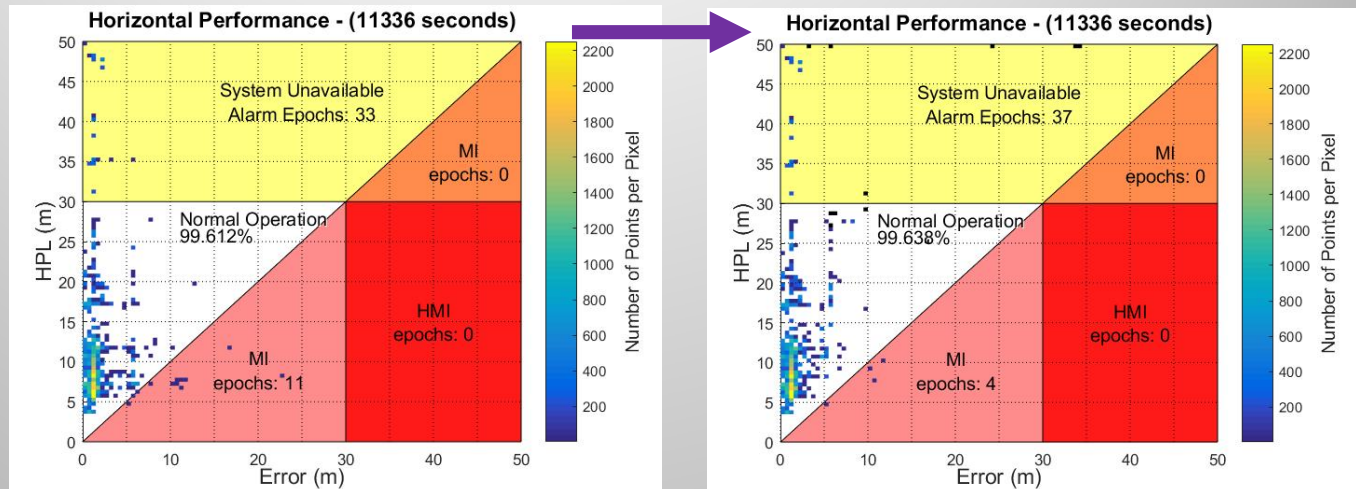


D

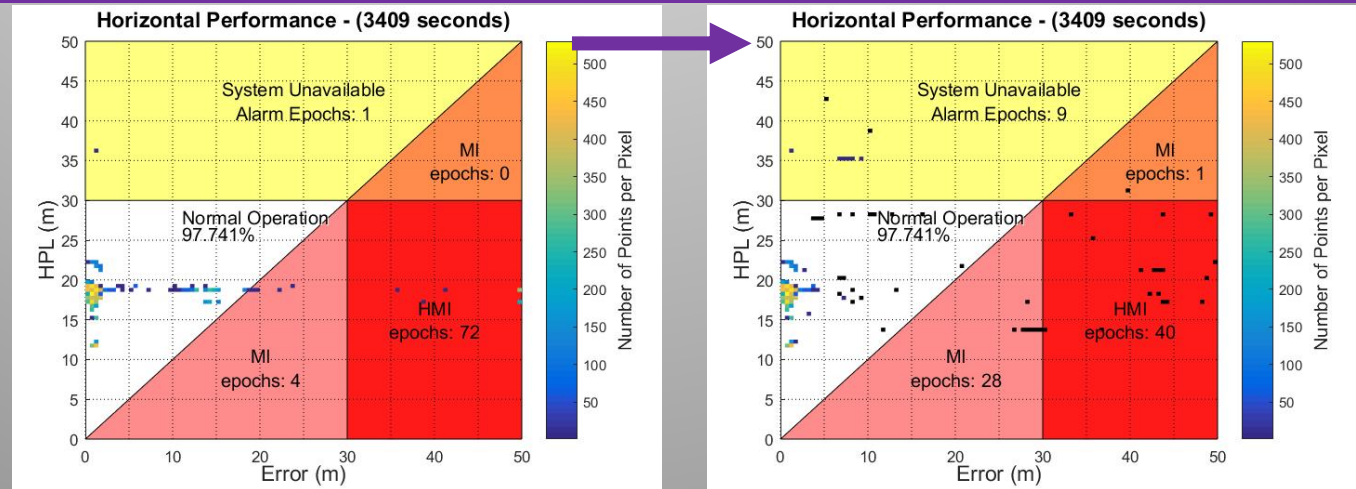


Fault Detection and Exclusion

**Albert
Park**



**Melbourne
CBD**



Conclusions

- We need more satellites! → GLONASS, Galileo, Beidou...
- We need more reliability! → More sensors
- GPS alone is not good enough! → RAIM does not consider multipath
- Next step → add in GLONASS → other sensors

Thank you ☺

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