THE UNIVERSITY OF TEXAS AT AUSTIN
RADIONAVIGATION LABORATORY

Receiver Certification for Hardening Against Spoofing

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The University of Texas at Austin

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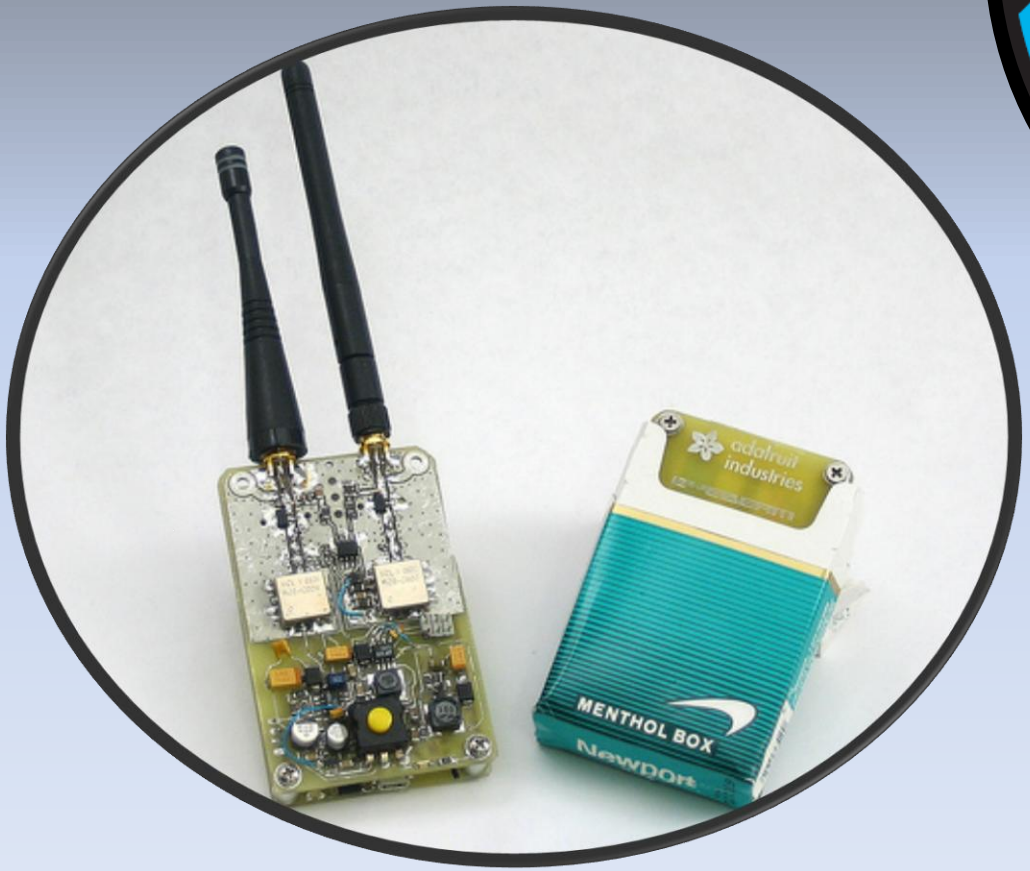
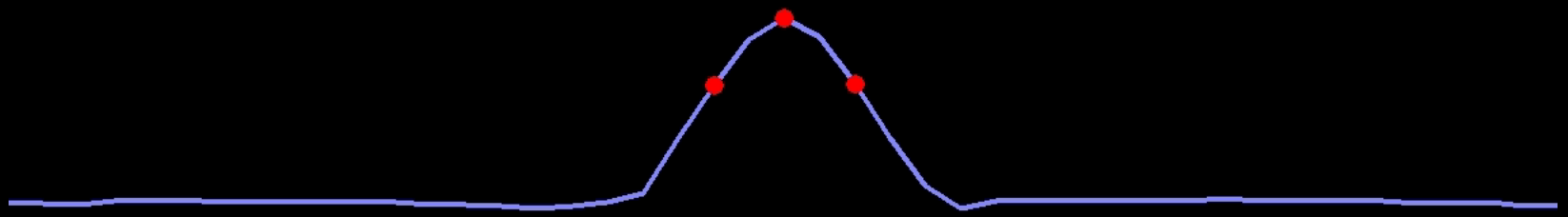
Acknowledgements

- University of Texas Radionavigation Lab graduate students **Jahshan Bhatti, Kyle Wesson, and Daniel Shepard**

GPS Jammers



GPS Spoofer



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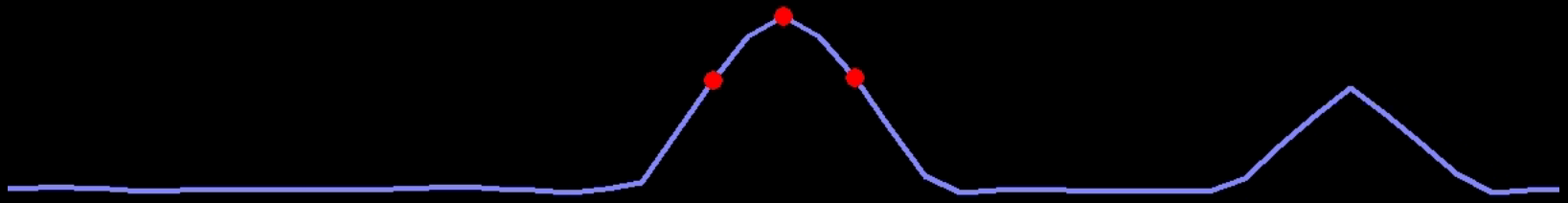

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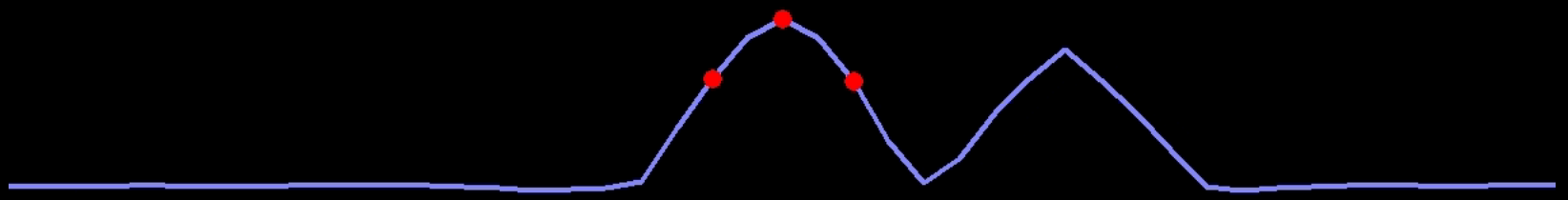

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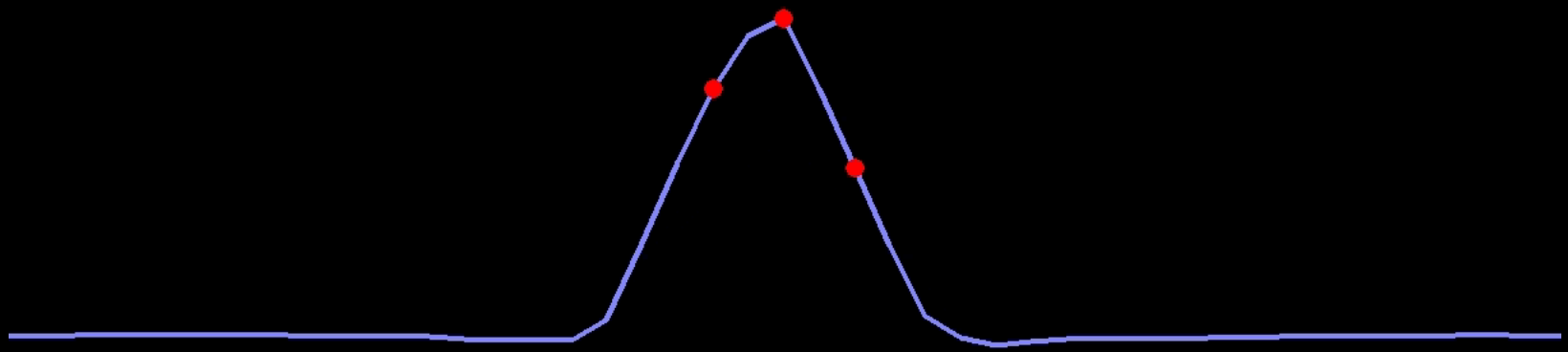

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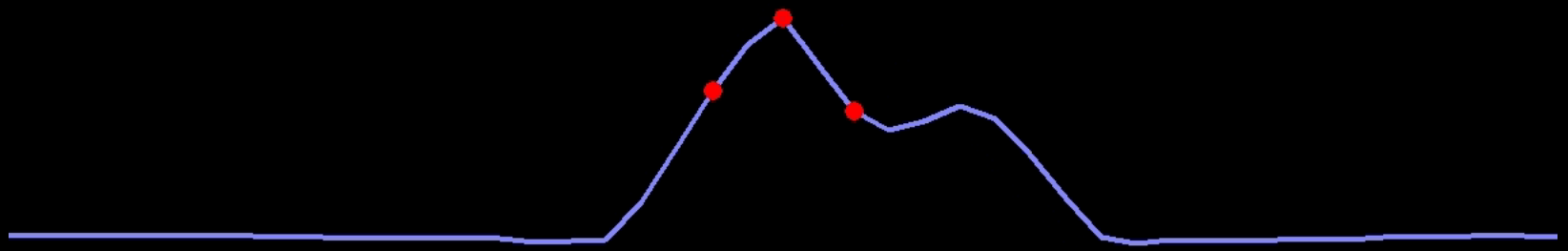

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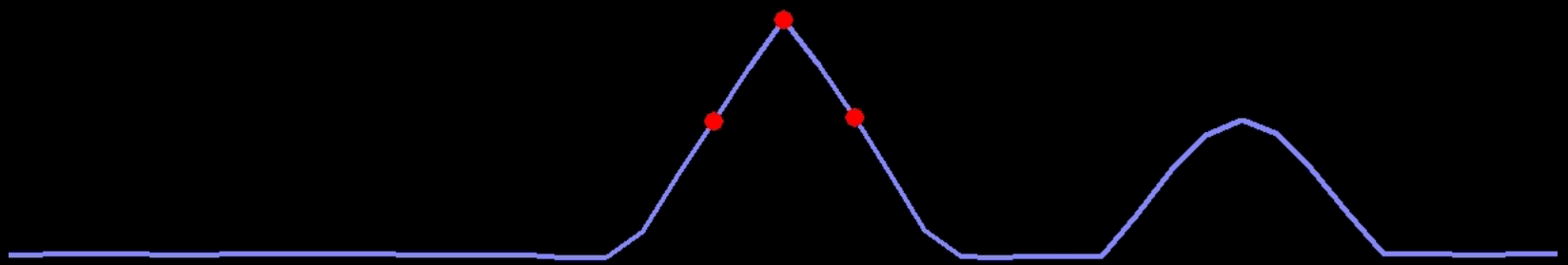


University of Texas Spoofing Testbed


RADIONAVIGATION LABORATORY

UAV Video

Recommendations to House Homeland Security Oversight Subcommittee (July 19, 2012)

- ***Require*** navigation systems for UAVs above 18 lbs to be certified **"spoof-resistant"**
- ***Require*** navigation and timing systems in critical infrastructure to be certified **"spoof-resistant"**

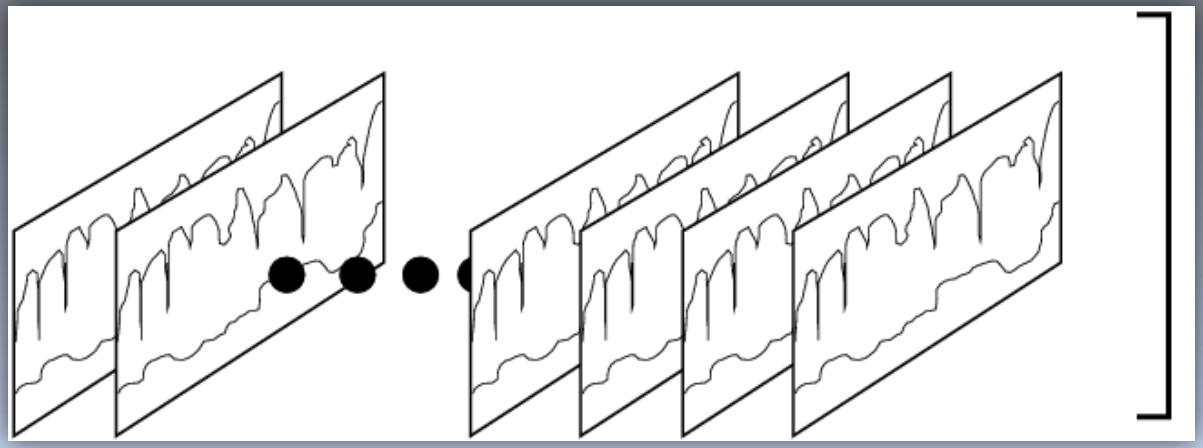
Spoof Resistance

A receiver is declared **spoof resistant** if, for each test in a spoofing test battery, the receiver

(a) detects the presence of spoofing; or

(b) is unaffected by the spoofing

Spoofing Test Battery

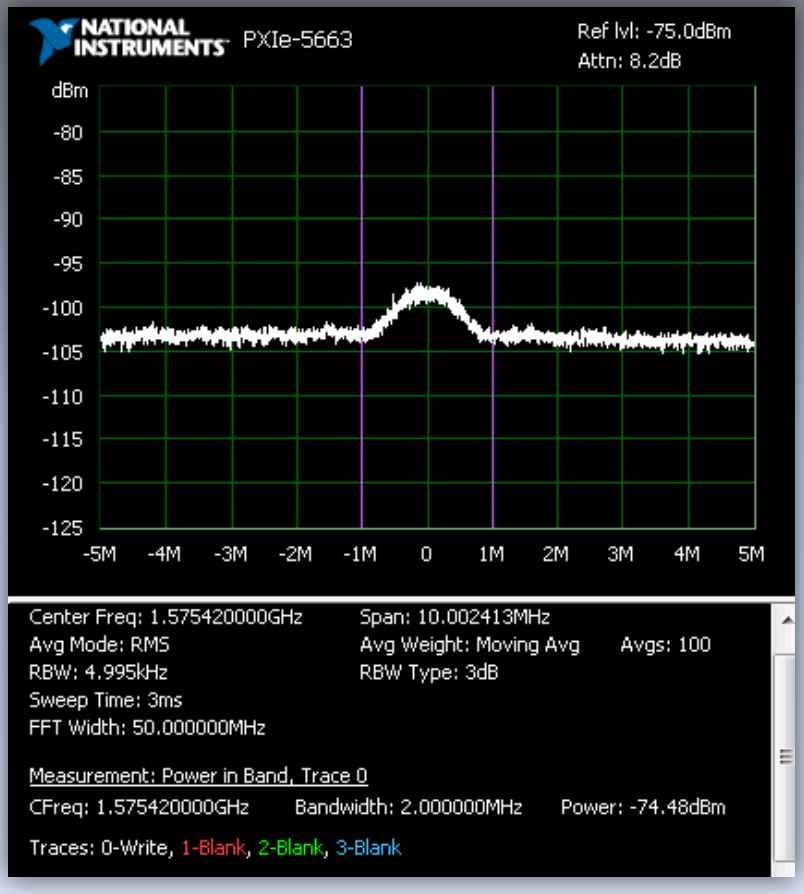


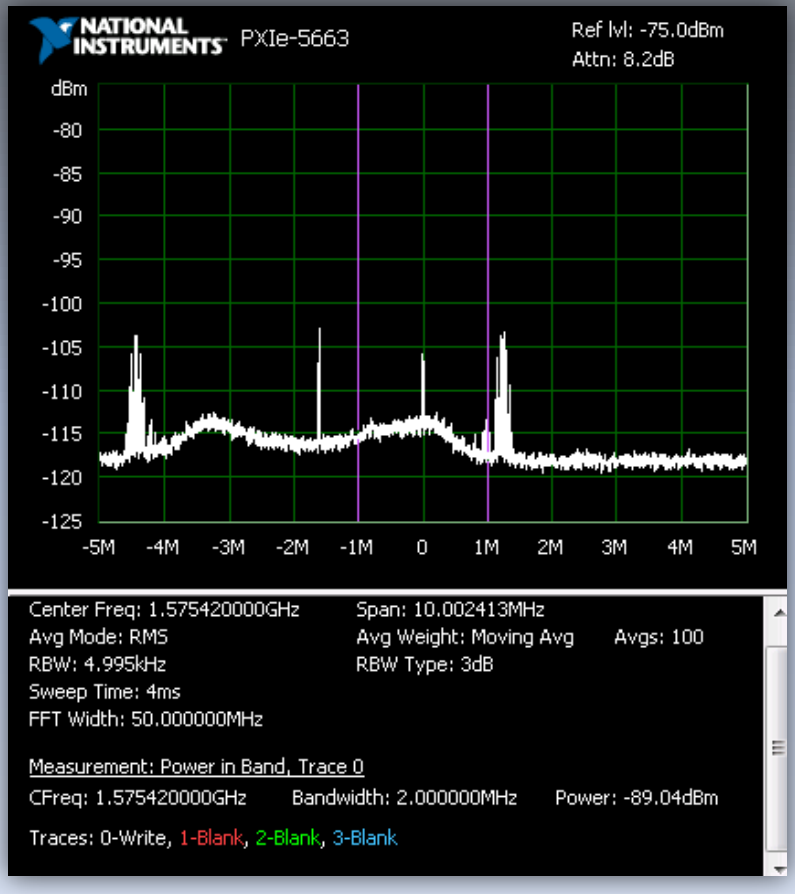
- High fidelity recordings of live spoofing attacks
  - 20-MHz bandwidth
  - 16-bit quantization
  - Each recording ~7 min. long; 40 GB
- Can be replayed into any GNSS receiver

Test Battery Details

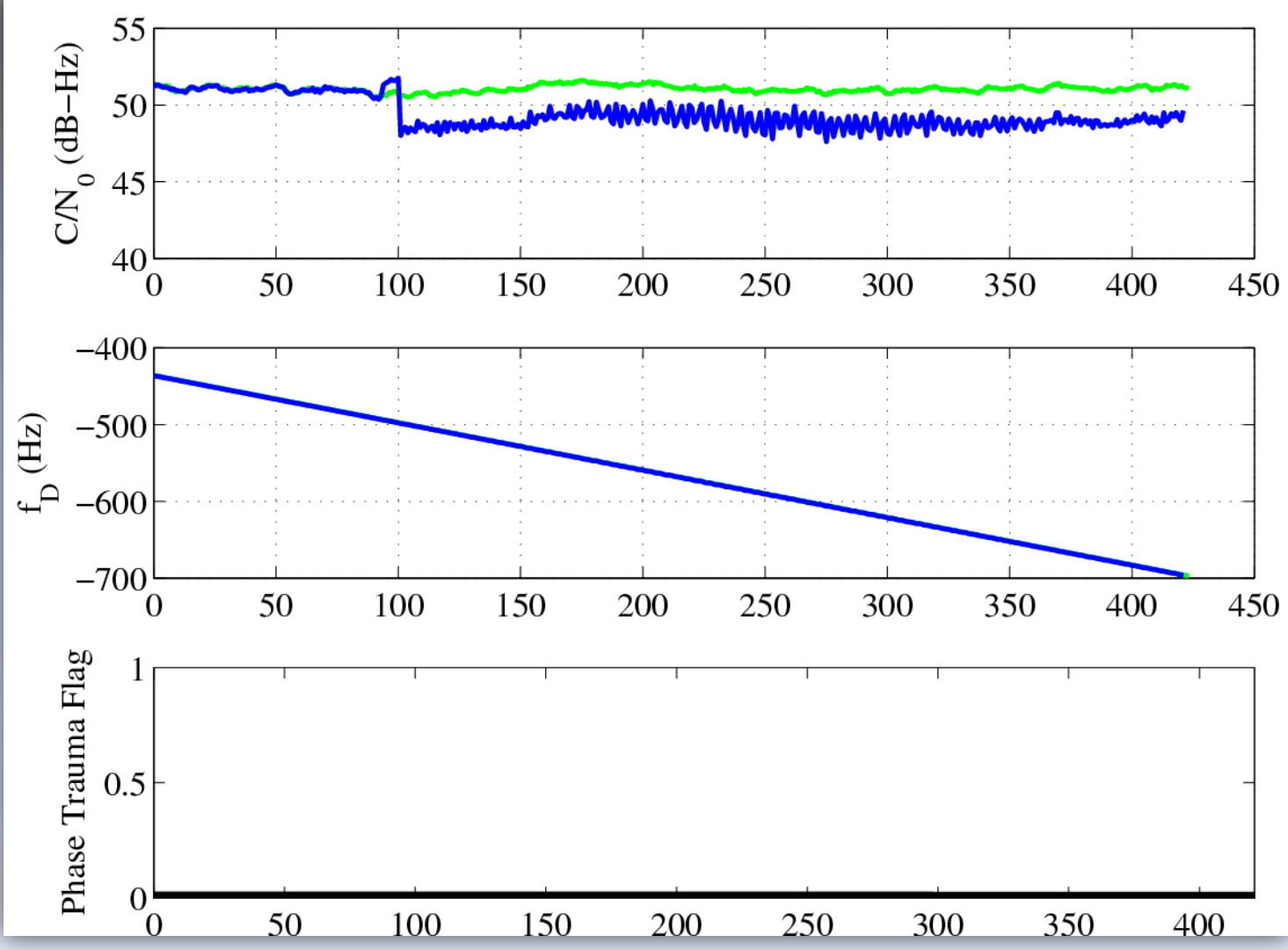
- The Dynamic Matched-Power Position Push
- The Dynamic Overpowered Time Push
- The Static Matched-Power Position Push
- The Static Matched-Power Time Push
- The Static Overpowered Time Push
- The Static Switch

The Static Switch (1/3)

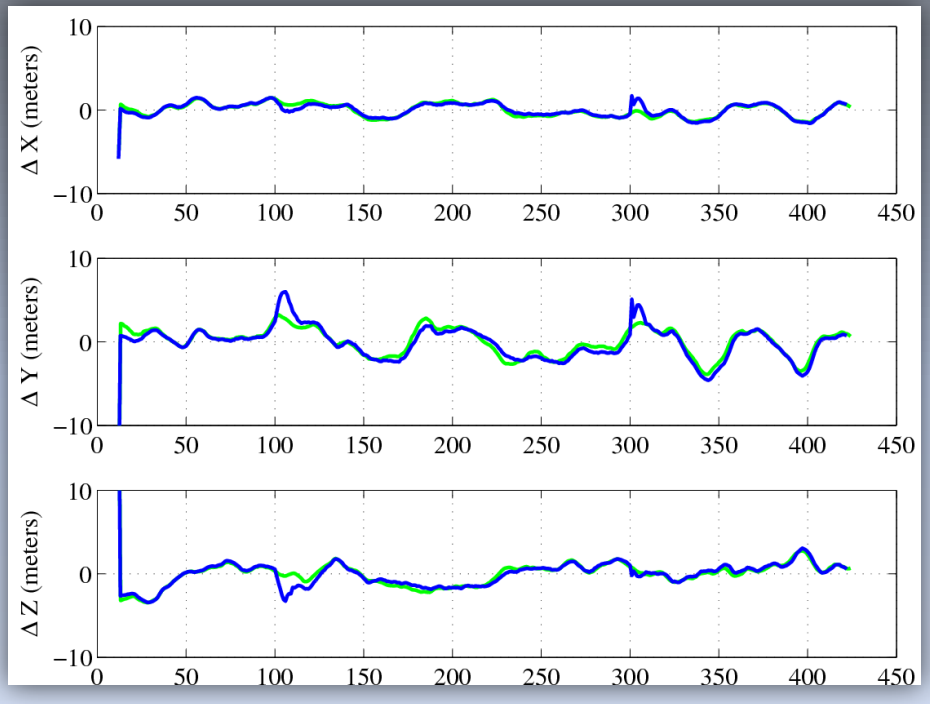




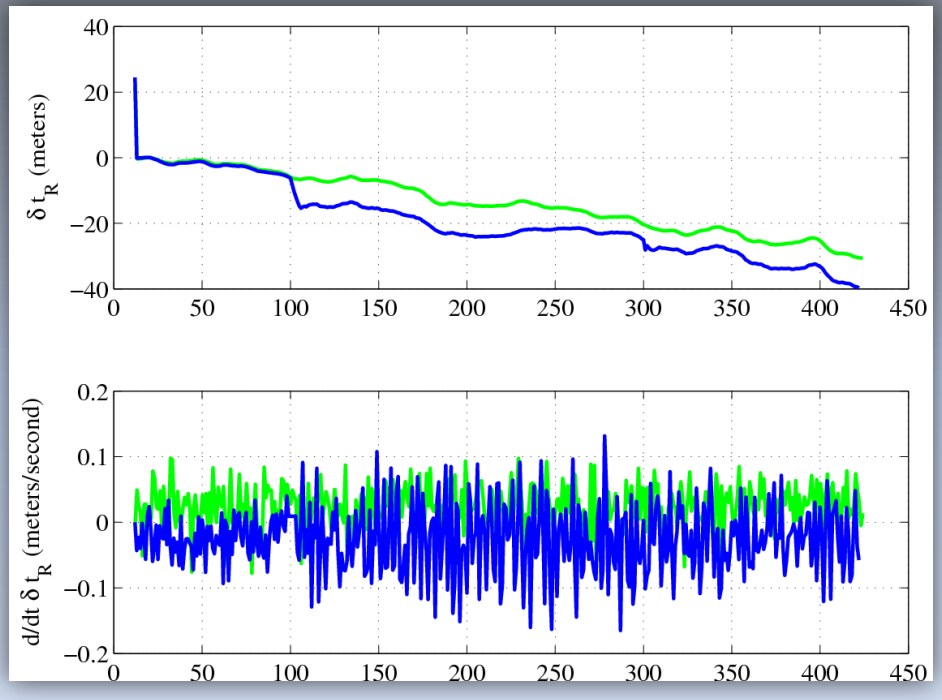
The Static Switch (2/3)



The Static Switch (3/3)

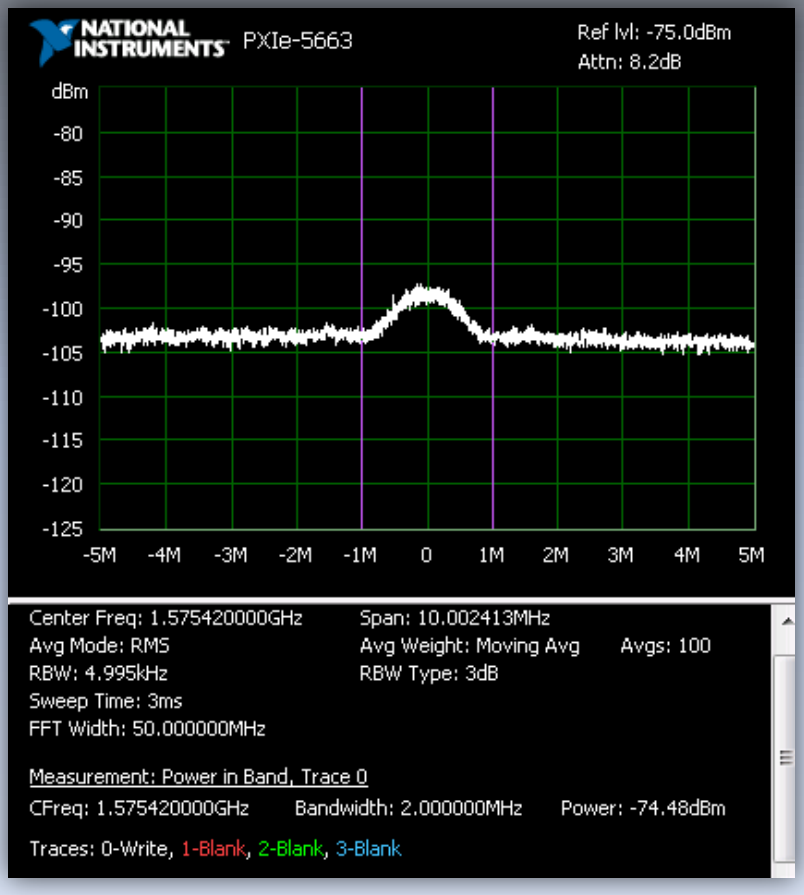


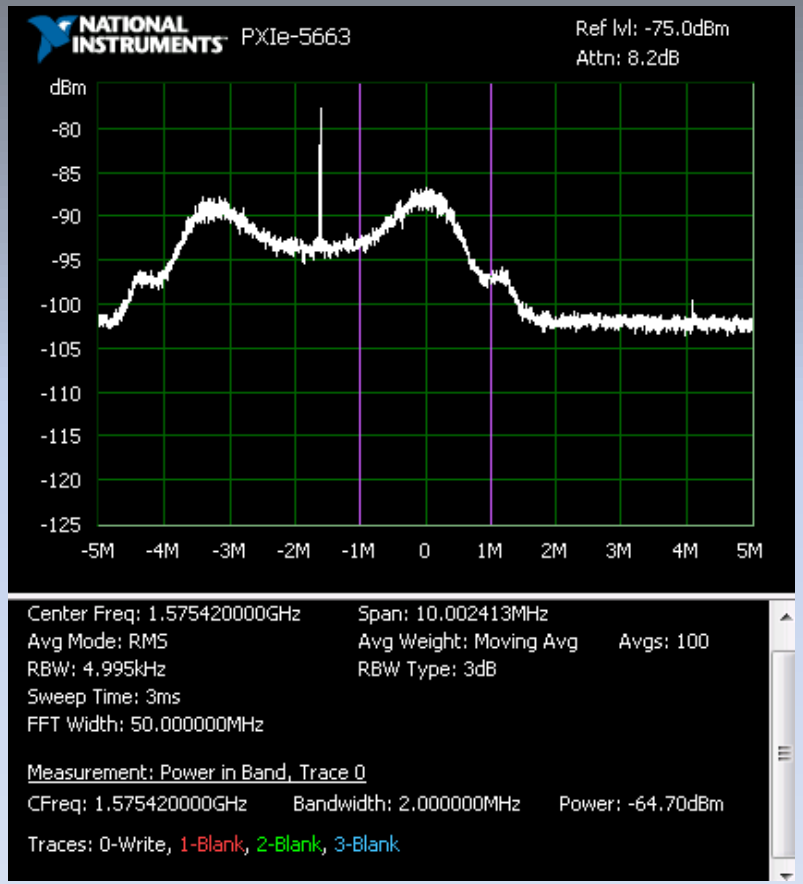
Receiver Position
Relative to Mean



Receiver Clock Offset
and Offset Rate

The Static Overpowered Time Push (1/3)





- The Dynamic Matched-Power Position Push
- The Dynamic Overpowered Time Push
- The Static Matched-Power Position Push
- The Static Matched-Power Time Push
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- The Static Switch

The University of Texas Radionavigation Lab and National Instruments
jointly offer the Spoofing Test Battery
for free download (after ION GNSS)
radionavlab.ae.utexas.edu