CornellEngineering
Electrical and Computer Engineering

Animal Movement Research Using Phase-based Trilateration (AMRUPT)

Authors: Justin Cray, Peidong Qi, Mei Yang Advisor(s): Joe Skovira, Julian Kapoor

Objective: Outdoor Localization of Small Animals

Font must be readable from 10' away. Increase size.

- Design a more accurate outdoor location tracking technology for the localization of small animals in the field of ecology More accurate than what? Be specific
- Used for the study of flight patterns, social interactions, or other biological attributes to most species.
- Designed system architecture is resilient in cluttered environment, i.e. unsusceptible to multipath interference, electromagnetic interference, and other environmental conditions.

Use "must be" rather than "is" to avoid confusion about whether we've achieved this result

Using Phase Interferometry for Localization

- Utilize Phase Interferometry for use in estimating the Angle of Arrival (AOA) of radio signals Why? What are advantages of phase?
- RF signals phase information is calculated on the RTL SDR

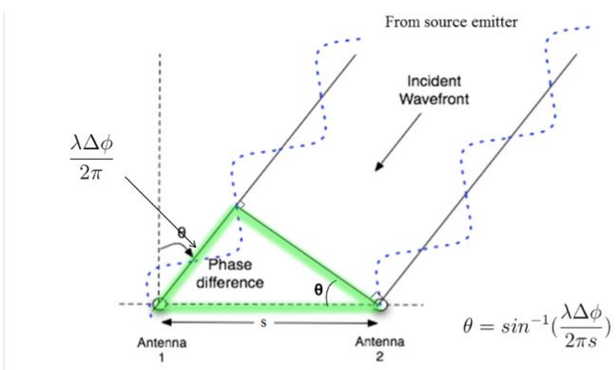
Why use SDRs? Why not in Hardware section?

- I & Q values are sent to a Raspberry Pi for angle of arrival calculation

Find a way to emphasize what's new / exciting about your work

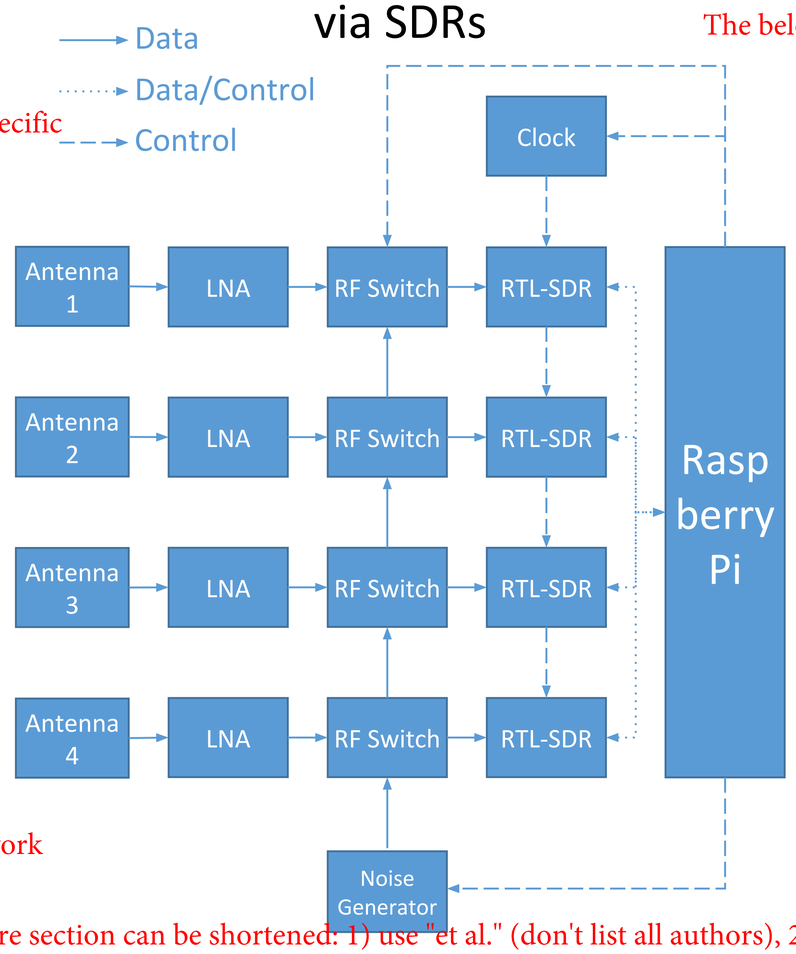
AOA Calculations

- Angle of arrival equation formed using the phase difference of a signal received at two antennas, the distance between antennas, and the wavelengths of the signal



Provide some reference to the fact that this is not a figure you made (ci.e.itation)

Architecture: Coherent Detection via SDRs



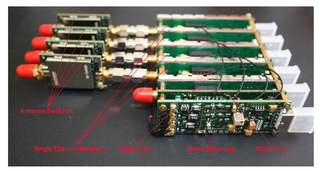
Hardware

The below text needs to be larger. Can sacrifice complete sentences to do this

- The base station setup needs Raspberry Pi 3 and RTL SDR cards with antenna to be able to receive signals from bird tags.
- RTL-SDR card is an inexpensive, open-source signal receiving device that can support direction finding
- Raspberry Pi 3 is an inexpensive, powerful and highly consumable device that can support system operation and allow us to run GRC software

Use different font for figure headings

- Raspberry Pi 3 RTL-SDR card



Software

- Execute GNU Radio Companion(GRC) on Raspberry Pi to run RTL-SDR card Advantages of GRC??
- Use GRC to process the received signal, then we can get the AOA base on the phase difference
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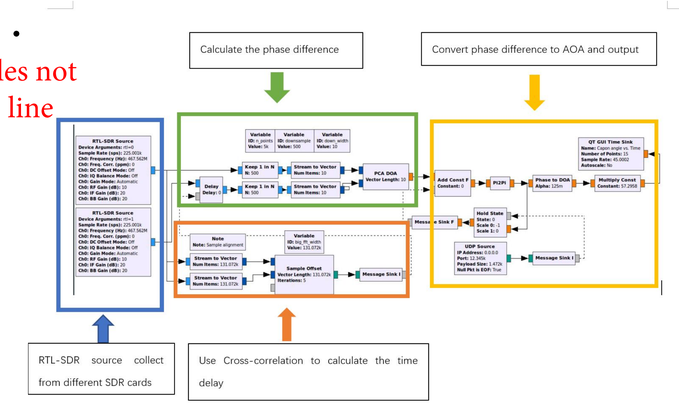

Make these functional explanations larger and easier to read. Can remove black borders, maybe change fontcolor to match box color, and definitely enlarge text.

Literature section can be shortened: 1) use "et al." (don't list all authors), 2) titles not necessary, 3) abbreviate journal names. You should be able to get it down to 1 line per reference. Bibliography should not dominate the poster.

Literature

[1] D. Guerin, S. Jackson, and J. Kelly, "Passive Direction Finding: A Phase Interferometry Direction Finding System for an Airborne Platform," Oct. 10, 2012. https://web.wpi.edu/Pubs/E-project/Available/E-project-101012-211424/unrestricted/DirectionFindingPaper.pdf.

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[3] "Sub-1 GHz and 2.4 GHz Antenna Kit for LaunchPad and SensorTag," May 3, 2016. http://www.ti.com/tool/CC-ANTENNA-DK2.

[4] Weiser, A. W., Orchan, Y., Nathan, R., Charter, M., Weiss, A. J., & Toledo, S. (2016). Characterizing the Accuracy of a Self-Synchronized Reverse-GPS Wildlife Localization System. 2016 15th ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN). doi:10.1109/ipsn.2016.7460662

[5] A. Smith, H. Balakrishnan, M. Goraczko, and N. Priyantha. Tracking moving devices with the Cricket location system. In Proceedings of MobiSys, pages 190–202, 2004.

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[9] Krüger, S W. "An Inexpensive Hyperbolic Positioning System for Tracking Wildlife Using off-the-Shelf Hardware." May 2017.

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[11] "Tejeez/rtl_coherent." *GitHub*, 6 July 2016, github.com/tejeez/rtl_coherent.

[12] https://www.rtl-sdr.com/about-rtl-sdr/

[13] https://osmocom.org/projects/sdr/wiki/rtl-sdr

[14] https://github.com/samwhiting/gnuradio-doa/blob/master/gr-doa/lib/phase2doa_ff_impl.cc

Acknowledgments

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