ApRES Field Tests

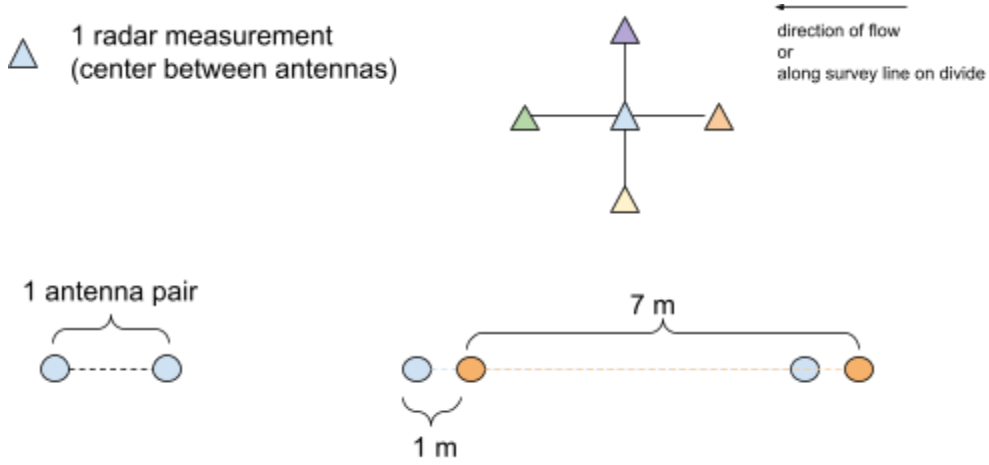
Execution Questions:

- What is our measurement of success here?
    - What are we comparing? Histograms?
- How will we standardize our data?
    - And format (file formats, file names)?

Things to test:

- Comprehensive description of different possibilities for apres measurements – how do these set ups affect measurements, if at all?
    - Schematics
    - Decision making matrix
    - What worked well/what could be improved?
    - 100 bursts at 7m separation at ideal attn/gain - with and without skidoo
        - 2 measurements
    - 100 bursts at 7m separation at ideal attn/gain - with and without sleds
        - 2 measurements
- Interference with any other measurements? (ie. GPS, other GPR?)
- Attenuation settings
    - What settings work in different glaciological settings? E.g. ablation zone vs. accumulation, high elevation, dry snow/firn vs coastal, wet snow/firn environment
    - 100 bursts at 7m separation (standardization)
        - Attenuation: 0, 10, 20, 30 dB
        - Gain: -14, -4, 6
        - 12 measurements, each 100 bursts → 1200 s (20 minutes run time)
- Other quantitative or qualitative information from sites
    - Basic site characteristics
        - lat/lon/elev
    - Weather
        - Avg annual surface temp
        - Surface temp at time of deployment
        - Qualitative wx report during deployment
            - Precipitation, prolonged warm period, etc.
        - IDs for nearby met stations
            - Links to databases or files if available
    - Ice characteristics
        - Avg annual ice temp (also: temperate, polar, polythermal?)
        - Ice temp at time of deployment
        - Avg annual accum rate
        - Avg ice flow
        - Any info about ice flow at time of deployment
        - Ice depth
        - Characteristics of basal boundary (ice shelf vs terrestrial, subglacial h20?)

        - Englacial characteristics (water in the system? Crevasses?)
        - Accumulation or ablation zone?
- Changing antenna separation - ideal setting for that location
    - 2m, 4m, 7m, 10m
    - 4 measurements, each 100 bursts? 400 s (~7 minutes run time)
- Cross polarized measurements - ideal setting for that location
    - Hh, vv, hv, vh
    - 4 measurements, each 100 bursts? 400 s (~7 minutes run time)
- Changing number of subbursts - 2000 chirps long?
    - 1 measurement at 2000 chirps → 2000 s (~34 minutes run time)
- ApRES while moving?
    - For folks with sled
    - 1 measurement, 1 km long
- How sensitive is ApRES to small displacements between survey and resurvey locations?
    - Same separation, attenuation settings
    - Along flow direction would be ideal – try to account for ice parcel movement
    - Five points?



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Questions of how to test:

- Phase-wrapping issues in locations where accumulation is really high
- Limitations of shallower environments
- Cores & shallow radar
- Best methods to locate survey/resurvey sites in high accumulation areas (Hunter/Eclipse/etc)

Questions for Keith:

- Feedback from other groups on what tests would be useful
- Involvement of other groups
- Why -14, -4, 6?

To do:

- Could this be a methodology paper?
- Google form for data collection
- Google form for what tests folks want to see

Study Sites:
Mount Hunter, AK (2022)
Juneau Icefield, AK (2022)
Summit Station, Greenland (2022)
Thwaites Glacier, Antarctica (2022)
Ilulissat, Greenland (2022)
Eclipse Icefield, Canada (2023)
George VI Ice Shelf, Antarctica (2023)