SKA Eng Mtg, Penticton

Thoughts on Clock Offset Scheme RT Approach

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Outline

- **What is it?**
- **Why do it?**
- **Investigation approach**

What is it?

Sample data at each antenna at a "slightly" different sample rate, f_{ant}.

- **Not clock dithering.**
- **Antenna digitizer sees a sample clock as usual, it is just that its frequency is slightly different (few hundred kHz/few MHz less) than the "spec'd" clock rate.**
- **Phase of f_{ant} is predictable on every f_{common} clock cycle.**
- **Before correlation, the f_{ant} sampled signal is digitally re-sample to f_{common} before channelization and correlation.**
- **Some band edge bandwidth is lost…usually throw-away anyway.**

Why do it?

- **Self-interference in the sample signal that is a function of f_{ant} is "imprinted" in the signal.**
- **This includes birdies from interleaved samplers.**
- **Aliased signals whose frequencies are a function of f_{ant} are also present.**
- **After re-sampling to f_{common} these signals don't correlate and correlation is prop $1/(2\pi T f_{diff})$**

Investigation Approach

- **Benefit analysis—first cut has been done, hence this investigation. Need to formalize and peer review.**
- **Negative effects analysis...data/science quality.**
- **Signal processing modelling—Thushara Gunaratne CSP Memo 12 completed. Need to peer review.**
- **SKA1 MID timing system analysis – SaDT/SAT, DISH, CSP. First discussion this meeting.**
- **DISH and CSP preliminary design investigation…is it feasible?**
- **Write report; TT sign-off.**
- **Anything missing?**

Questions?

Thank-you