VLASS Search Pipeline Implementation Concept

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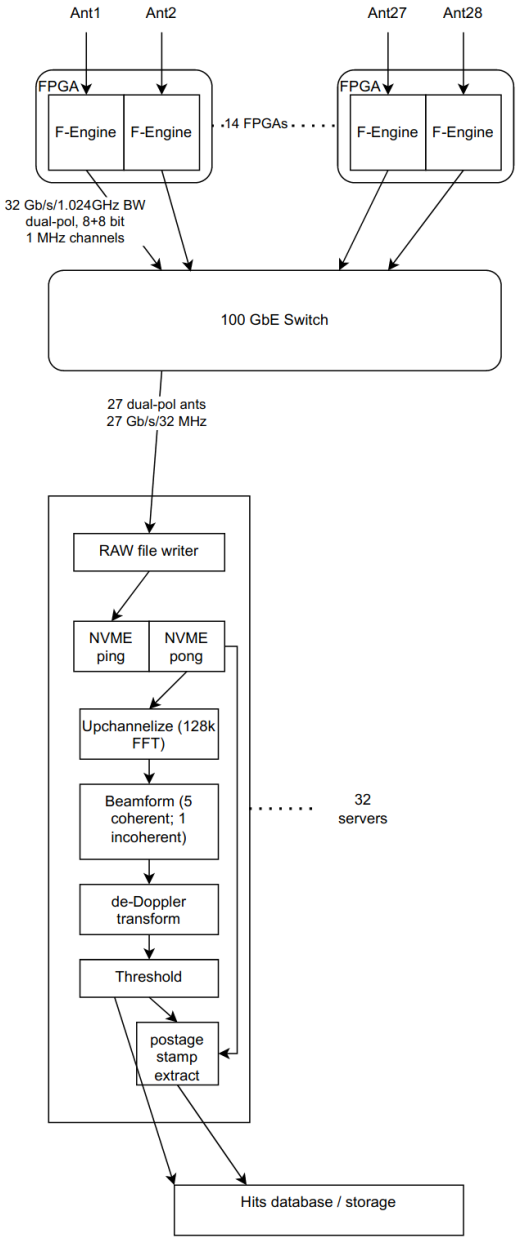
Search Architecture



Search Parameters

Parameter	Symbol	Requirement	Desired	Notes
Number antennas		27		
Input bandwidth		1 GHz	2 GHz	VLASS basebands are 2-3 and 3-4 GHz. Best continuous 1 GHz range from the RFI perspective is ~2.5-3.5 GHz.
Input coarse channel bandwidth		1 MHz		
Input polarizations		2		
Beamformer Frequency Resolution		10 Hz	Tunable (powers of 2) 1kHz - 0.1Hz	<1Hz requires consideration of time smearing
Beamformer Time resolution		0.1 seconds	1ms - 10 seconds	Always time-bandwidth product of 1
Number of beams		5 + incoherent	31 + incoherent	coherent is priority
Number of Beamformer output polarizations		1		Stokes I only
Observation time per source		5 seconds	<= 10 seconds	Set by VLASS scan rate and primary beam cutoff point
Doppler Search Range		+/-50Hz/s		

Doppler Search peak finding bandwidths		native	Native - 1 kHz	Bandwidths may be spread logarithmically (e.g. can use DIT algorithms)
Hit filtering		Frequency mask		Implement “ignore list” of frequency ranges
Hit output rate		100 / 5 second observation	1000?	Req. based on 1 PB per year.
“Postage Stamp” time duration		5 seconds	<= 10 seconds	Complete observation time for source
“Postage Stamp” bandwidth		+/- 100 Hz	+/- 500 Hz around hit	+/- 2 drift rate windows
Hit storage capacity		1 PB		1PB/year