

Detailed Processing Model for the SAMOSA1 SAR ocean retracker

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WP4000 DPM

- Aim: to develop a Detailed Processing Model (DPM) for a SAR altimeter ocean retracker to be applied to S-3 STM SAR mode Level 1b waveforms over water
- Lead: NOC with support from Starlab
- Based on SAMOSA1 SAR retracker based on the SAR waveform model developed by Starlab



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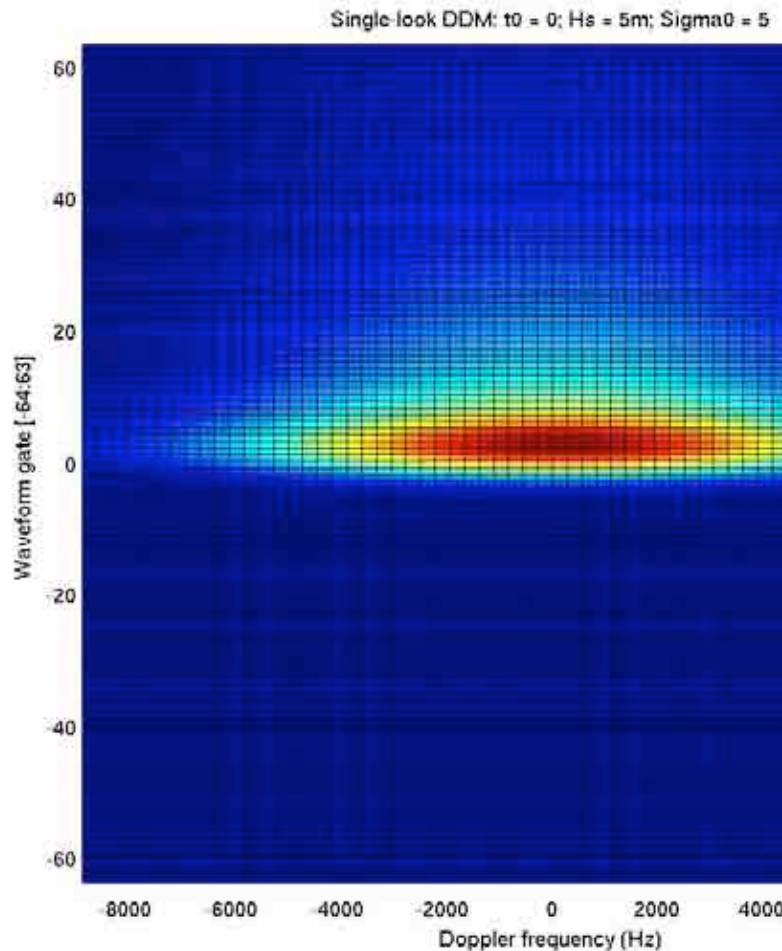
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SAMOS A1 SAR model

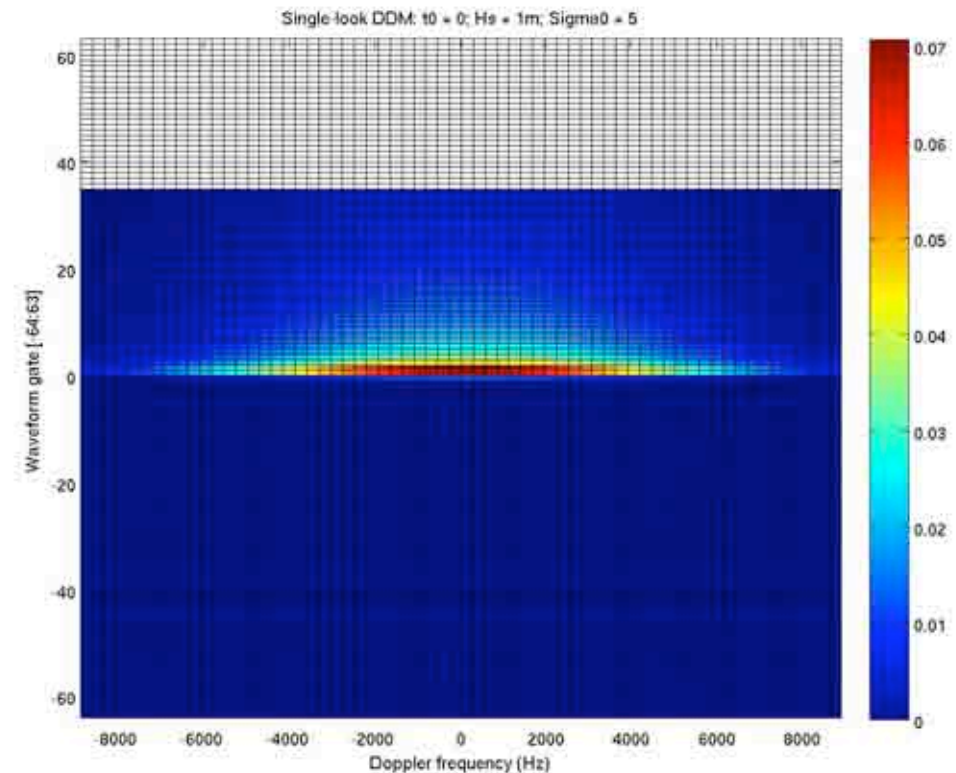
- Starlab developed an analytical formulation for single-look Delay-Doppler Maps (DDM)
- DDM depends on:
 - Epoch, τ_0
 - Significant Wave Height, H_s
 - Normalised Radar Cross Section at Nadir, $\sigma^0(0)$
 - Along-track mispointing, ξ
 - mean square slope, ν
- I_ν, K_ν modified Bessel functions of the first and second kind



Example SAMOSA1 DDM



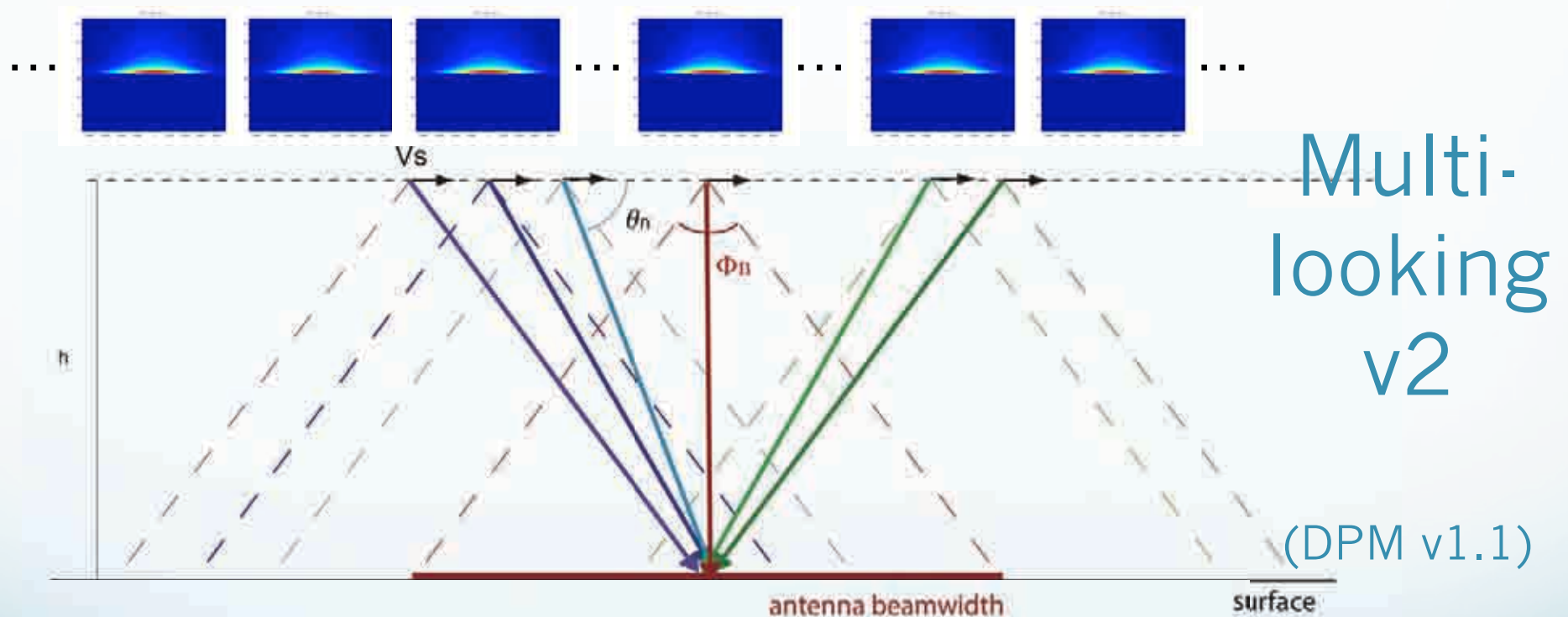
$$\tau_0 = 0, \xi = 0$$
$$H_s = 1\text{m}$$
$$\sigma^0(0) = 5 (\sim 7\text{dB})$$



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Multi-looking



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DPM Evolution & Status

Version	Issued	Reason for Change
• V1.0	30/09/09	First issue to S-3 team
• V1.1	21/01/10	New multi-looking method
• V1.2	29/03/10	Add numerical values for initial values, bounds, etc...
• V1.3	11/06/10	Remove numerical value of \square_P , remove NPM, normalise theo. waveforms, add EOP work with C++ levmar fitting
• V1.3.1	21/06/10	Minor edits & final delivery to S-3



Conclusions

- SAMOSA1 SAR ocean retracker was documented in the form of a Detailed Processing Model
- DPM was delivered to S-3 team in early July 2010
- Since then, we have further refined the SAMOSA model



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