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DOCUMENT

Configuration Control Document for CP40ers who retrack CPP Data

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APPROVAL

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CHANGE LOG

Reason for change	Issue	Revision	Date
Update: Waveform Normalization Handling Azimuth PTR Width Redefined Vertical Speed Effect Handling	1	1	
Update: Along Track Antenna Beamwidth Update	1	2	

CHANGE RECORD

Issue 1	**Revision** 2		
Reason for change	**Date**	**Pages**	**Paragraph(s)**

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1 INTRODUCTION

The scope of this Technical Note is to propose to the CryoSat+ for Ocean Team (CP40) a table of parameter (Table 1) to which the team members should adhere in retracking the CPP data.
This shared approach will prevent the raising of unexplained discrepancies in comparing the different re-tracking methods during the project.
Further, the second objective is to shed light on the current processing configuration adopted by CPP Prototype (Table 2 and Table 3) for L1b and L2 stage and establish a shared processing configuration to be adopted by team members using the SAMOSA Model/Retracker Scheme over ocean (Table 4).

1.1 Shared CryoSat-2 Parameter Table for re-tracking CPP Data

Universal Constant		
	vacuum speed light	299792458
Earth Parameter		
	Ellipsoid Characteristics	semi major axis =6378136.3; flattening = 0.0033528131778969 Mean Earth Radius=6378137
Instrument Parameter		
	Ku band frequency	13.575Ghz
	Rx Bandwidth	320Mhz
	Rx Pulse Width	44.8 microsec
	Chirp Slope Sign	-1
	SAR Pulse repetition frequency	18181.818 Hz
	Number of pulses in a BURST	64
	Burst Repetition Interval	0.011693825 sec
	PTR 3db Width	2.801e-9 sec

Antenna Parameter		
	Antenna 3db aperture used to compute the Doppler model	2D elliptic sinc function: [1] teta3b_X=1,095 deg, teta3db_Y=1,22 deg
	Antenna Gain at Boresight	42.6 db

Table 1 : CryoSat+ Parameter Table

1.2 CPP L1b & L2 Processing Options

CPP Delay-Doppler (L1b) Processing Options		
	Doppler Weighting	NOT APPLIED
	ZERO PADDING	NOT APPLIED
	Stack Weighting	Only 212 Looks used in building the Multilooked SAR Echo (they are 106 on the left and 106 on the right of the stack center)
	Ground Cell Time Tag & Geo-location	SAR Echo focused at RDSAR measurement location
	Doppler Effect Compensation	Fully Compensated for Doppler Effect
	AGC and Gain Drift Compensation	APPLIED
	LPF Mask Compensation	APPLIED
	SAR Mode Transitories Handling	Transitories (i.e ≈2 seconds of data at beginning and at end of SAR acquisitions) are chopped off

Table 2: CPP L1b Processing Options

CPP Retracking Scheme (L2) Processing Options		
	RIR used to compute the Doppler model	sinc function
	AIR used to compute the Doppler model	sinc function
	Thermal Noise Handling	in input to the re-tracking scheme and measured from RDSAR echoes
	Mispointing Handling	Mispointing angles in input to the re-tracking scheme and measured from platform star trackers (and compensated for biases)

[1] X is along track direction, Y is the across track direction

	Multilooking Handling	Multilooked Echo Model built accumulating the same number of looks as accumulated at L1b stage to build the SAR Data waveform
	Input Waveform Sub-setting	first and last 12 waveform samples are dropped off
	Skewness Effect	NOT APPLIED
	Re-tracking Algorithm	CNES/CLS MLE3

Table 3: CPP L2 Processing Options

1.3 SAMOSA L2 Processing Options

SAMOSA Retracking Scheme (L2) Processing Options		
	RIR used to compute the Doppler model	Squared Gaussian Function α_p=**0.513 (TBD)**
	AIR used to compute the Doppler model	Squared Gaussian Function α_p=**0.380 (TBD)**
	Thermal Noise Handling	in input to the retracking scheme and read from CPP products
	Mispointing Handling	Mispointing angles in input to the retracking scheme and read from CPP products
	Multilooking Handling	Multilooked Echo Model built accumulating the same number of looks as accumulated at L1b stage to build the data waveform
	Waveform Normalization	Applied with a moving window size of 1 range bin (i.e. normalization by waveform absolute maximum)
	Input Waveform Sub-setting	NOT APPLIED
	SAMOSA Model Generation	SAMOSA v3
	Skewness Effect	NOT APPLIED
	Scattering Amplitude Decay Rate (nu)	set to zero
	Slope (Orbital and Surface) Effect	NOT APPLIED
	Re-tracking Algorithm	Bounded Levenberg–Marquardt Least Square Estimator (LEVMAR-LSE)

Table 4: SAMOSA L2 Processing Options