

## SALCA Data Summary for TLSIIG Brisbane 2013

**Instrument** System specifications of the Salford Advanced Laser Canopy Analyser (SALCA) are given in Table 1. The instrument has a fixed resolution in zenith at 1.05mrad, but variable in azimuth to 1.05mrad, 2.1mrad, and 4.2mrad. Due to output power strength of the 1545nm laser, a combination of neutral density filters is sometimes used whilst scanning: 0 (no filter), 0.4nd, 0.6nd, and 1nd.

Centre wavelengths	1545.4 nm and 1063.4 nm
Pulse length	3 ns (1545 nm) and 1 ns (1063 nm)
Pulse rate	5 kHz
Beam width at sensor	3.6 mm (1545 nm) and 2.4 mm (1063 nm)
Beam divergence	0.56 mrad
Laser output energy	5 $\mu$ J (1545 nm) and 0.5 $\mu$ J (1063 nm)
Detector field of view	2.67 mrad
Sampling rate	1GHz
Range resolution	15 cm
Maximum range	105 m
Angular sampling step	1.05mrad
Angular displacement between wavelengths	6 $\mu$ rad

Table 1: SALCA system specifications

**File name structure** SiteName\_Filter\_AzimuthResolution\_ followed by a sequential number generated by the instrument. Each file is described in an accompanying spreadsheet which defines the specific parameters used for each scan along with relevant field notes.

**Field sampling scheme** Data was collected using SALCA in 4 plots: Karawatha Forest Park (KARA001, KARA002, KARA005), and D’Aguilar National Forest Park (GOLD0101). Each plot contained 5 primary scanning positions (centre, north, south, east, west) with the plot centre scan position taking the highest priority. Due to timing constraints in the field, 4 out of 5 positions were completed in KARA001, KARA005, and GOLD0101, and only the centre position in KARA002. Numerous reflectors were positioned within line of sight of each scan position, with a double reflector representing North.

Previous measurements with SALCA have shown a drop-off in intensity over time, possibly due to the heating of the instrument. In order to investigate this further a portable multi-target calibration panel was used in most scans. This consisted of a 6-grey target panel that was moved around as the scan progressed so that it was imaged at the same range (10m) multiple times within each scan (Figure 1). Some scans also had a panel in a fixed position to appear at the beginning and end of the scan.

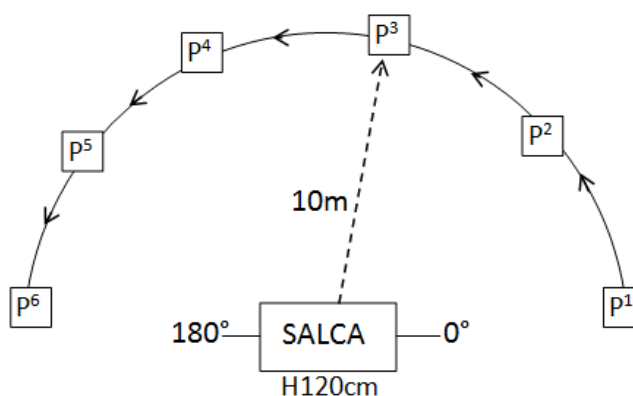
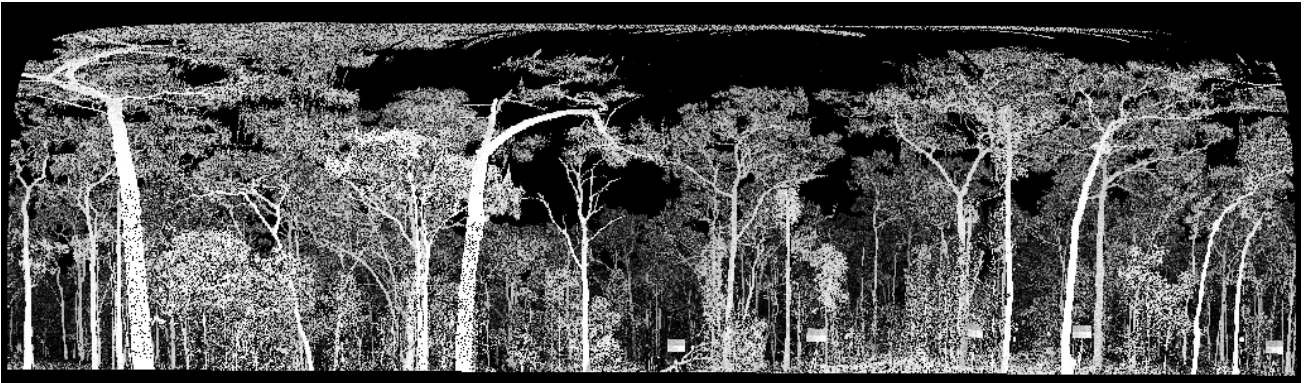


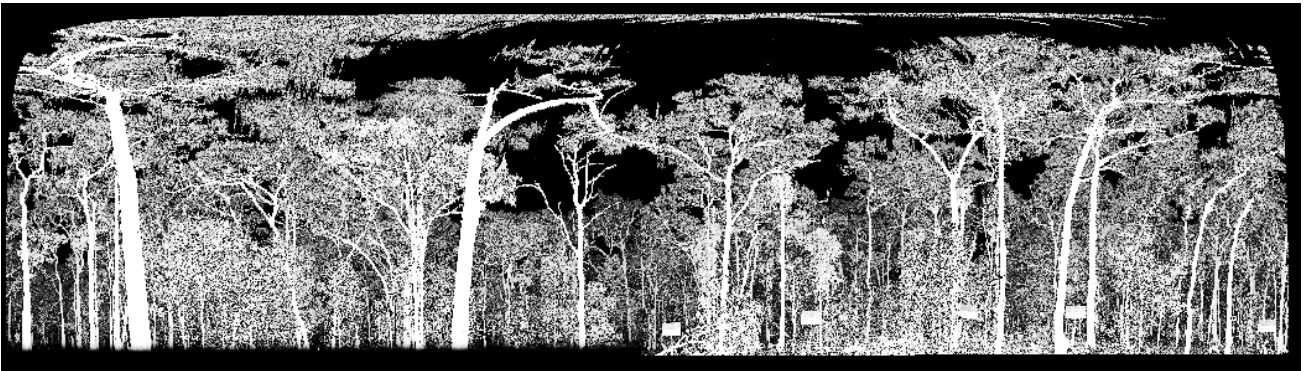
Figure 1: Setup for using calibration panels while scanning.

**Preview of site KARA005 centre position**

First return raw intensity: 1063nm (no filter)



First returns raw intensity: 1545nm (no filter)





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Kplot1c_04_2mrad_2894	7/30/13	4:02:17 AM	KARA001	C	0	180	0.4	105	366 remaining azimuth steps - started raining. Last 2 panels covered with waterproof sheets. Cancelled scan and switched off before scanning last panel (fixed)
Kplot1w_04_4mrad_2895	7/30/13	5:20:06 AM	KARA001	W	0	180	0.4	105	Stopped raining but ground and leaves very wet
Kplot1w_0_4mrad_2896	7/30/13	5:52:12 AM	KARA001	W	0	180	0	105	
Kplot1n_04_4mrad_2897	7/30/13	6:44:48 AM	KARA001	N	0	180	0.4	105	
Kplot1n_0_4mrad_2898	7/30/13	7:14:38 AM	KARA001	N	0	180	0	105	
Kplot5c_04_2mrad_2900	7/31/13	11:24:26 PM	KARA005	C	0	180	0.4	105	Last panel span round in wind whilst scanning
Kplot5c_04_4mrad_2901	7/31/13	12:44:29 AM	KARA005	C	0	180	0.4	105	Third panel span round in wind whilst scanning
Kplot5c_0_4mrad_2902	7/31/13	1:16:41 AM	KARA005	C	0	180	0	105	
Kplot5e_0_4mrad_2903	7/31/13	2:03:04 AM	KARA005	E	0	180	0	105	
Kplot5e_04_4mrad_2904	7/31/13	2:36:09 AM	KARA005	E	0	180	0.4	105	Some big gusts of wind
Kplot5n_04_4mrad_2905	7/31/13	3:43:56 AM	KARA005	N	0	180	0.4	105	Panels 2 and 3 very close together
Kplot5n_0_4mrad_2906	7/31/13	4:17:22 AM	KARA005	N	0	180	0	105	
Kplot5w_0_4mrad_2907	7/31/13	5:14:56 AM	KARA005	W	0	180	0	105	
kplot5w_04_4_2908	7/31/13	5:52:51 AM	KARA005	W	0	180	0.4	105	
Kplot5c_04_1mrad_2909	7/31/13	6:36:49 AM	KARA005	C	0	180	0.4	105	Cancelled half way through scan (time to go)
DA_c_04_1mrad_2914	8/1/13	1:19:17 AM	GOLD0101	C	0	180	0.4	105	
DA_c_0_4mrad_2915	8/1/13	3:16:10 AM	GOLD0101	C	0	180	0	105	
DA_w_0_4mrad_2916	8/1/13	4:06:33 AM	GOLD0101	W	0	180	0	105	
DA_w_04_4mrad_2917	8/1/13	4:37:38 AM	GOLD0101	W	0	180	0.4	105	
DA_s_04_4mrad_2918	8/1/13	5:39:42 AM	GOLD0101	S	0	180	0.4	105	
DA_s_0_4mrad_2919	8/1/13	6:11:04 AM	GOLD0101	S	0	180	0	105	
DA_e_04_4mrad_2920	8/1/13	7:03:36 AM	GOLD0101	E	0	180	0.4	105	Not in field notebook
DA_e_0_4mrad_2921	8/1/13	7:14:28 AM	GOLD0101	E	0	180	0	105	Not in field notebook
DA_e_0_1mrad_section_2923	8/1/13	7:17:41 AM	GOLD0101	E	29.82	46.78	0	105	Not in field notebook
DA_e_0_1mrad_targ_2925	8/1/13	7:29:42 AM	GOLD0101	E	91.98	95.98	0	105	Not in field notebook