

Table 1: Deep SOLO Prototype and Regional Pilot Deployments

Month/Year Array	Deployment Vessel	Number of Deep SOLOs	Batteries No. Packs and type	Serial Numbers	Recovered/ Shipped home/ Redeployed	Active
Deep SOLO						
Jan 2013	Bell Shimada	1	4E	6002 Prototype	1/1/1 (Sep 2013)	0
June 2014 SW Pac	Tangaroa	2	4E	6002-6003 Prototypes	2/2/0 (Sep 2015)	0
Jan 2016 SW Pac	Kaharoa	7	4E	6004-6007, 6009-6011	5/1/4 (Jun 2016)	5
Jun 2016 SW Pac	Kaharoa	3	4E	6008, 6014, 6015	2/0/2 (Aug 2018)	3
Aug 2016 SW Pac	Investigator	2	4E	6012-6013	0/0/0	2
Oct 2016 S Australian	Kaharoa	8	4E	6016-6020, 6022-6024	1/1/0 (Feb 2019)	7
Mar 2017 NW Atlantic	James Cook	6	4T (3 floats) 4E (3 floats)	6021, 6025- 6029	1/1/0 (Nov 2018)	5
Aug 2017 SW Pac	Palmer	3	4E	6030-6032	0/0/0	3
Oct 2017 SW Pac	Kaharoa	5	4T	6033-6037	0/0/0	5
Jan 2018 Aus Antarctic	Investigator	5	4T	6038-6042	0/0/0	5
Jul 2018 SW Pac	Kaharoa	10	5T	6043-6052	0/0/0	10
Jan 2019 SW Pac	Tangaroa	5	5T	6053-6055 6057-6058	1/1/0 (Feb 2019)	2
Dec 2019 – Jan 2020 SW Pac	Kaharoa	10	5T	6056, 6059- 6061, 6063- 6068		10
Total		67 deployed			13/7/7	57 active
Deep SOLO-MRV						
May-June 2018 NPac	K-Kanaloa, Kilo Moana	3	5T	12001- 12003	0/0/0	3
Jan-Feb 2019 Aus Antarctic	Kaiyo Maru	3	5T	12006- 12008	0/0/0	3
May 2019- Feb 2020	Thompson, Discovery, Petrel, Brown	30	5T	12004-5 12009-36	2/1/1	27
Total		36 deployed				33 active

Deep SOLO Issues Encountered

An impedance mismatch between float and CTD caused partial data losses (salinity truncations) and occasional “long vacations” in the 7 floats deployed in Jan 2016. 4 floats had new firmware installed at sea which overcame the problem. A 5th had a broken antenna during recovery and was returned to the laboratory. The remaining 2 were on “long vacation” during the recovery cruise and could not be recovered. The impedance problem was fixed in all subsequent deployments.

Battery life: Early Deep SOLOs carried 4 Electrochem battery packs and were capable of about 120 deep profiles. Addition of a 5th battery pack and conversion to Tadiran hybrid lithium cells increased battery capacity to > 200 cycles (to be determined). Increased battery life makes the float more economical and makes the array more sustainable.

Bottom drag: Original firmware did not ensure that floats would lift off the bottom to reach drift depth. It is hypothesized that 6055 and 6058 were snagged while on the bottom. In subsequent floats, firmware ensures that floats lift off the bottom for drift period.

CTD cable failure: 6053 and 6054 both had total data loss at mid-depth and below, due to CTD cable failure. 6053 was recovered by RV Tangaroa and returned to the lab. 6054 is active but shoaled. 12011 is inactive as a result of CTD cable failure.

CTD cable intermittent failure: 12004, 12005, 12010, 12012, 12015, and 12020 all have had intermittent CTD cable failures that have resulted in partial loss of data from some profiles or triggered emergency beacon mode. 12012 was recovered, recabled, and redeployed and has not had issues since. 12004 was recovered and is being brought back for repair. The rest of the floats are still active, and all are reporting full-depth profiles most of the time.

Rapidly drifting salinity: Two Deep SOLOs with rapidly drifting salinity (6008, 6015) were recovered. The CTDs were swapped out and shipped to SeaBird. The floats were immediately re-deployed. 12002 is also exhibiting a salty drift.

Of the 12 Deep SOLO floats deployed and no longer active, 7 were recovered and returned to the lab. 6004 failed from low batteries. 6055 and 6058 have failed (possibly bottom-snagged, as noted above). 12023 has failed from a valve issue, and 12010 failed from a CTD cable failure.