

astrolabe analytics

accelerating battery innovation

Robert Massee, CEO
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Seattle, WA

Mission

To accelerate battery innovation



Electric Cars



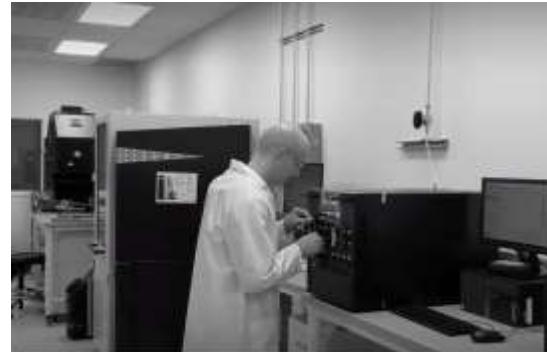
Grid storage



Electric Planes

First-order Problem

**+25% of battery R&D time lost to
tedious data chores**



Management Team



Robert Massé, CEO

PhD Candidate,
Materials Science



Brian Goodall, CPO

Software developer,
battery expert



Dan Ulery, VP Software

Experienced software
developer



Nick Webb, CIO

Experienced IT
business executive

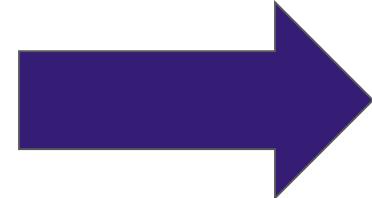


Prototype Solution

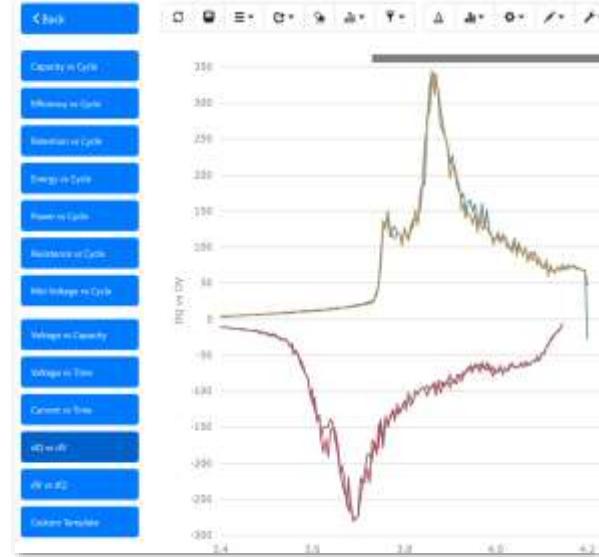
Status Quo battery testing data management

Cell_Index	Date_Time	Current(A)	Voltage(V)	Temp(°C)	Energy(W)	Charge_Cap_Capacity_of_Charge_%
1	87900.39418	07/04/2012 10:55:13	0.000000000	1.999999999	0.000000000	0.000000000
2	129711.2977	07/05/2012 06:00:00	0.000000000	1.999999999	0.000123417	0.000000000
3	144137.5818	07/05/2012 04:02:20	0.000000000	1.999999999	0.000123452	0.000000000
4	159460.5718	07/05/2012 11:22:20	0.000000000	1.999999999	0.000123492	0.000000000
5	166704.5984	07/05/2012 03:05:40	0.000000000	1.999999999	0.000123537	0.000000000
6	171955.7597	07/05/2012 21:18:00	0.000000000	1.999999999	0.000123581	0.000000000
7	181176.4483	07/05/2012 23:55:47	0.000000000	1.999999999	0.000123625	0.000000000
8	191004.7080	07/05/2012 07:51:40	0.000000000	1.999999999	0.000123669	0.000000000
9	201054.4475	07/05/2012 03:04:40	0.000000000	1.999999999	0.000123713	0.000000000
10	211084.8959	07/05/2012 04:05:40	0.000000000	1.999999999	0.000123747	0.000000000
11	222099.9683	07/05/2012 07:44:00	0.000000000	1.999999999	0.000123781	0.000000000
12	231232.3113	07/05/2012 23:24:20	0.000000000	1.999999999	0.000123815	0.000000000
13	246633.0857	07/06/2012 11:47:40	0.000000000	1.999999999	0.000123859	0.000000000
14	260041.2891	07/06/2012 03:10:40	0.000000000	1.999999999	0.000123903	0.000000000
15	284006.6714	07/06/2012 21:11:40	0.000000000	1.999999999	0.000123947	0.000000000
16	294488.9873	07/06/2012 23:12:40	0.000000000	1.999999999	0.000123991	0.000000000
17	305880.9675	07/06/2012 06:10:20	0.000000000	1.999999999	0.000124035	0.000000000
18	310174.1852	07/06/2012 21:48:40	0.000000000	1.999999999	0.000124069	0.000000000
19	330400.2554	07/06/2012 16:57:40	0.000000000	1.999999999	0.000124113	0.000000000
20	368855.5453	07/06/2012 00:09:40	0.000000000	1.999999999	0.000124147	0.000000000
21	376972.2881	07/06/2012 23:11:40	0.000000000	1.999999999	0.000124181	0.000000000
22	374887.7494	07/06/2012 22:22:40	0.000000000	1.999999999	0.000124215	0.000000000
23	378033.0884	07/06/2012 22:23:40	0.000000000	1.999999999	0.000124249	0.000000000
24	379041.8455	07/06/2012 23:11:30	0.000000000	1.999999999	0.000124283	0.000000000
25	379311.5792	07/07/2012 00:10:40	0.000000000	1.999999999	0.000124307	0.000000000
26	384992.7345	07/07/2012 00:07:00	0.000000000	1.999999999	0.000124341	0.000000000
27	393440.6891	07/07/2012 00:31:37	0.000000000	1.999999999	0.000124375	0.000000000
28	398725.5548	07/07/2012 00:30:47	0.000000000	1.999999999	0.000124409	0.000000000
29	395464.0842	07/07/2012 01:26:41	0.000000000	1.999999999	0.000124443	0.000000000
30	398801.11978	07/07/2012 04:56:10	0.000000000	1.999999999	0.000124477	0.000000000
31	408160.4393	07/07/2012 01:18:01	0.000000000	1.999999999	0.000124511	0.000000000
32	408862.7792	07/07/2012 03:00:40	0.000000000	1.999999999	0.000124545	0.000000000
33	409327.6668	07/07/2012 03:00:40	0.000000000	1.999999999	0.000124579	0.000000000
34	396571.1143	07/07/2012 00:56:51	0.000000000	1.999999999	0.000124613	0.000000000
35	398981.7297	07/07/2012 02:55:20	0.000000000	1.999999999	0.000124647	0.000000000
36	252265.5723	07/07/2012 02:57:34	0.000000000	1.999999999	0.000124681	0.000000000
37	252300.3265	07/07/2012 03:02:29	0.000000000	1.999999999	0.000124715	0.000000000

amazon catalyst



Astrolabe Analytics battery testing data management



Phase 1 – Workflow Tools

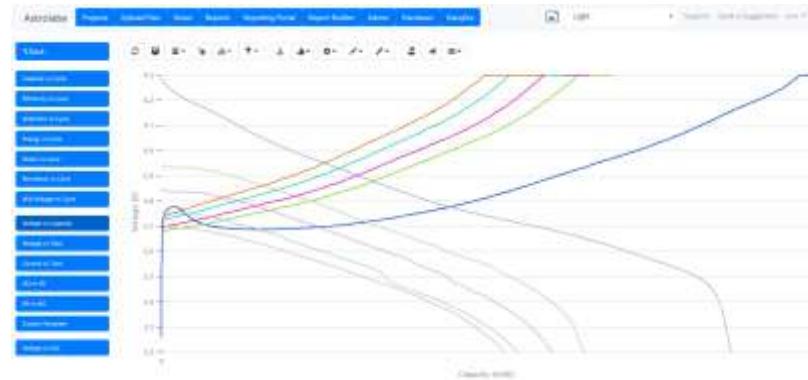
Routine Analysis

Automated data cleaning, conversion, and export

Metadata management and queries

Differential capacity

Automated processing of HPPC, Rate Performance Tests



Interoperability

Supported:
Arbin
Maccor
Neware
Landt
BioLogic

Under Development:
Admiral Instruments



Flexibility

Cloud

Easiest for
continuous updates
and deployments

Lower Total Cost of
Ownership

On-Premise

More complicated...

But in our wheelhouse if
required for data security



www.redwireservices.com

Phase 2 – Advanced Analytics

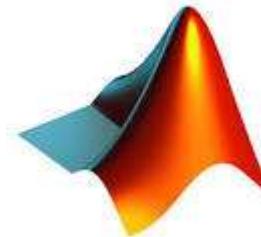
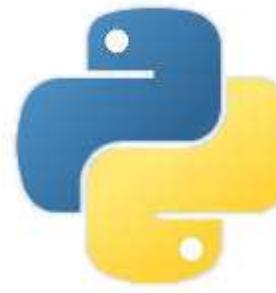
Coming Soon!

Custom Scripting

Python API

EIS

Integration with other
processing data streams



Early Win



1st Customer

Seattle, WA | Subsidiy of BASF
Carbon materials for energy
storage applications

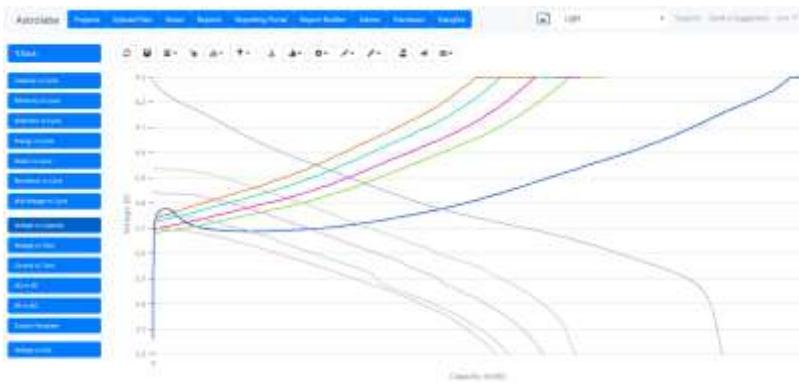
2-3x testing throughput

**Automated ETL w/
internal database**

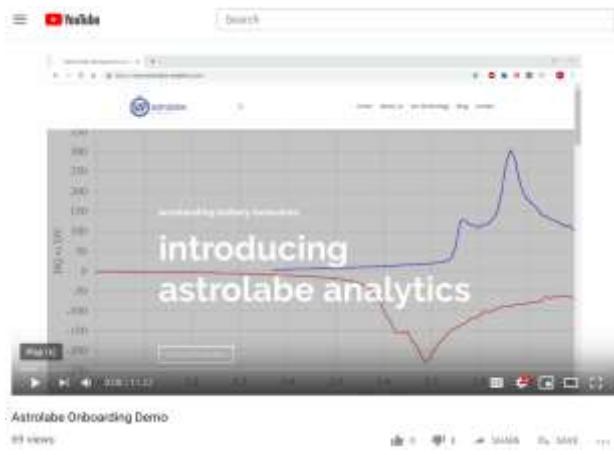
**Automating HPPC, DCA,
other Pb-acid testing**



Demo Available Now

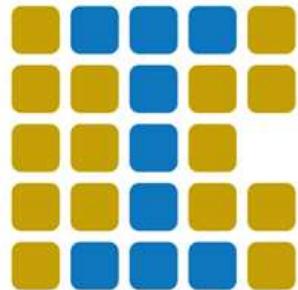


Free Trial at
<https://app.astrolabe-analytics.com>



10-min Tutorial Youtube “astrolabe onboarding”

2nd Date?



CORPS
NSF Innovation Corps

March 31 – May 17, 2019



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