



TRANSFORMING ES DEPLOYMENTS WITH DATA SCIENCE

IDEA TYPE: Primarily Software with some ES Test Protocols

IDEA HISTORY: New

1st ESGC TRACK: Technology Development (AI/Data Science)

2ND ESGC TRACK: Investment, Commercialization & Scale-up

PROJECT SIZE: Medium/Large

SKILLS: Data science, battery science, testing science, system design/field deployments

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POTENTIAL IDEA SIZE	IDEA DEVELOPMENT FUNDING (6-12 months to complete)	POTENTIAL SCOPE TO COMPLETE (years to complete)	NUMBER OF NATIONAL LABS PARTICIPATING
S	\$50-100K	1-3	2+
M	\$100-200K	3-7	3+
L	<\$300K	7+	4+



ACCURATE ES LIFE INFORMATION = RAPID DEPLOYMENTS

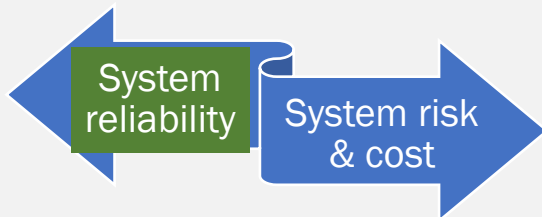
- **CHALLENGE:** insufficient & imprecise life/performance information creates risks which shackle every aspect of battery innovation cycle, especially those requiring large financial investments
- **TARGET AUDIENCE:** deployment ecosystem (developers, finance, final customers) & battery researchers
- **IMPACT:** providing more precise life information with quantifiable certainty catalyzes innovation & breaks today's design/invest/deploy conundrum
- **SIZE:** the scope is large due to the breadth of ES chemistries & the number of use-cases



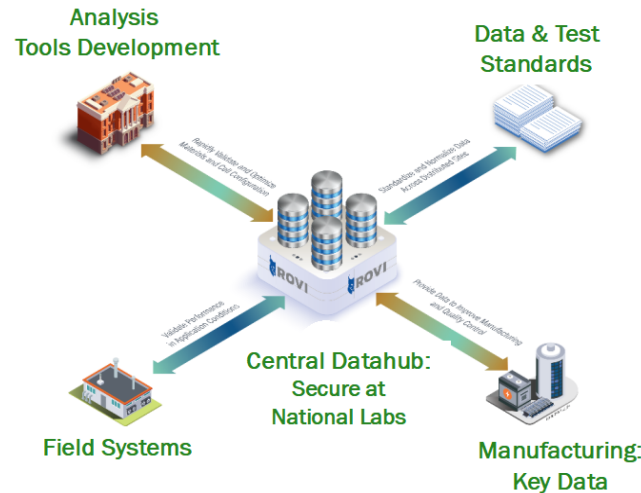


KEY ELEMENTS: (1) performance uncertainties quantified; (2) more efficient research & system designs ; (3) much data needed; (4) catalyzing investments, especially deployments

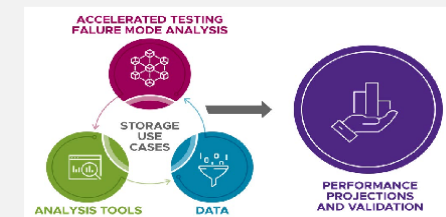
TODAY



- Lengthy cycle life evaluations
- Few cycle & use protocols evaluated
- Unknown ramifications of formulation changes
- **Unknown ramifications of BMS changes**
- Overbuild systems to ensure reliability & minimize risk
- Customer bears cost burden for overbuild
- Slow/expensive deployments - High Risk



FUTURE



- Cycle life evaluate in 2 days
- Cycle life available for any use protocol
- Impact of cell modifications rapidly assessed
- On-Site cell quality control in 1st week
- Systems designed to efficiently match needs
- Performance risks quantified in manner needed by investors & insurance.
- Field performance shared with secure national lab scientists - continuously updated
- Investment accelerate



Rapid Operational Validation Initiative PLAN:

- **KEY EXECUTION ISSUES:** data scarcity - devise data sharing incentives & BMS complexities in accessing cell info
- **KEY OUTCOMES:** fast analysis, accurate system designs, quantifiable certainty/low risk, more deployments
- **RESOURCES:** broad scientific, ecosystem participation, minimal project capital
- **PROPOSED BUDGET:** for Li-Ion & Flow Cells - \$7 million and 3 years

