Energy Storage Systems in Large Scale Vehicles

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Large Model Testing since the 70's

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LSV-1 KOKANEE Underway

LARGE SCALE VEHICLE
LSV
KOKANEE

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LSV-2 CUTTHROAT Underway

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Acoustic Research Detachment
Lake Pend Oreille - Bayview, ID

Characteristics:

Quiet

Deep

Isothermal

Low Current

Acoustic Range

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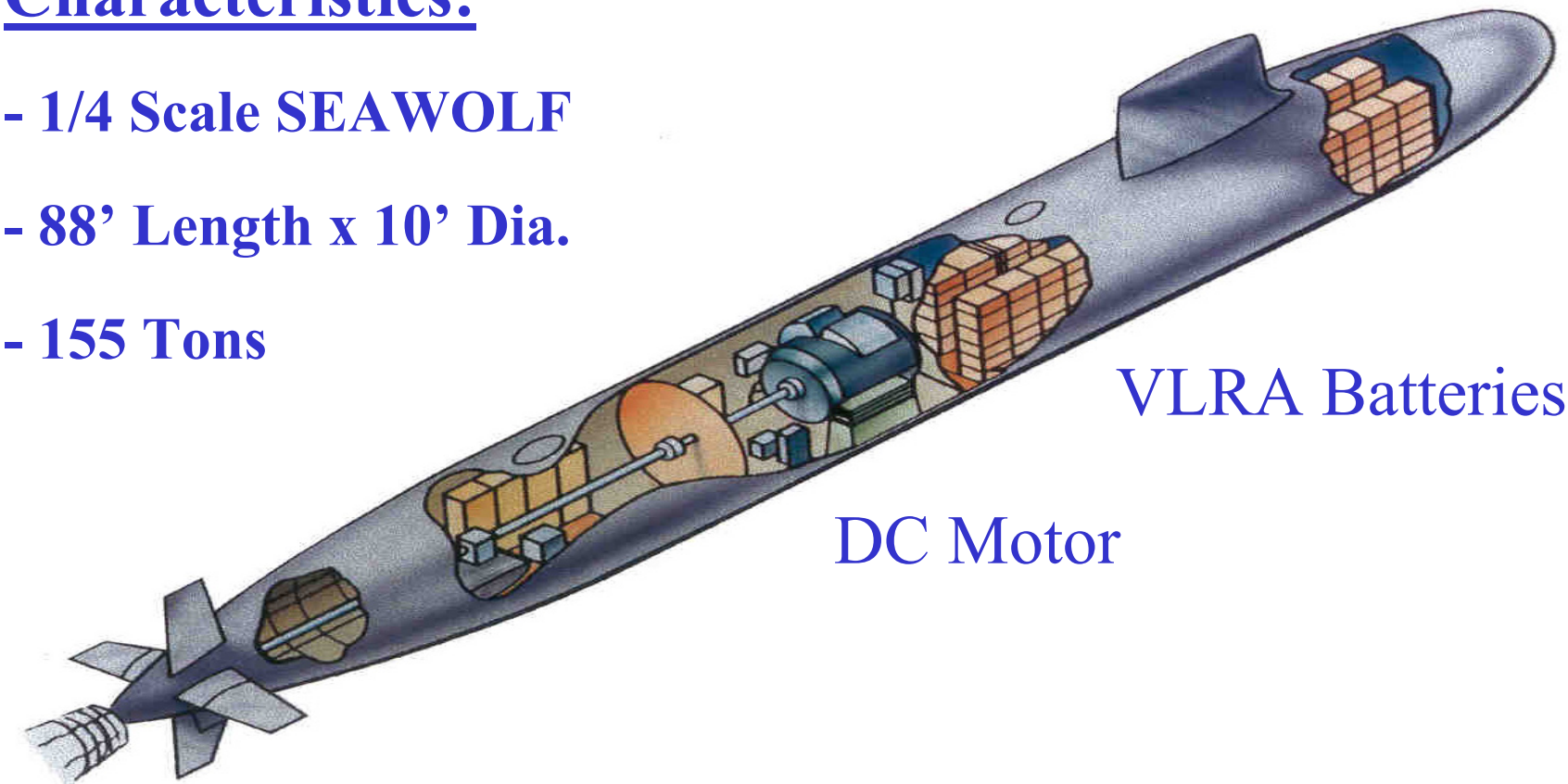
LSV-1 KOKANEE

Characteristics:

- 1/4 Scale SEAWOLF
- 88’ Length x 10’ Dia.
- 155 Tons



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Synchrolift Platform

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Tow out to the Range

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Release and Dive

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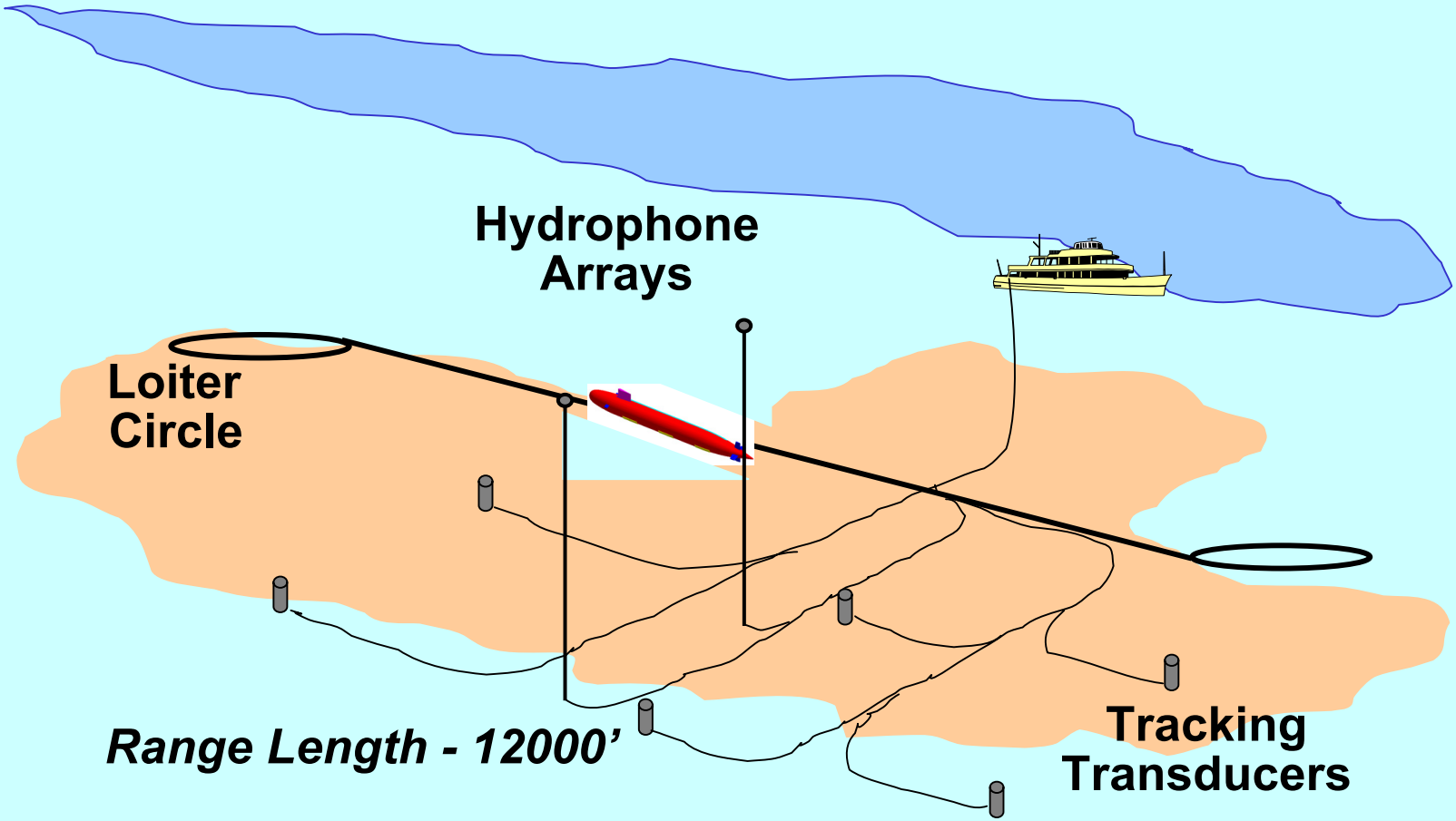
Instrumented Acoustic Range



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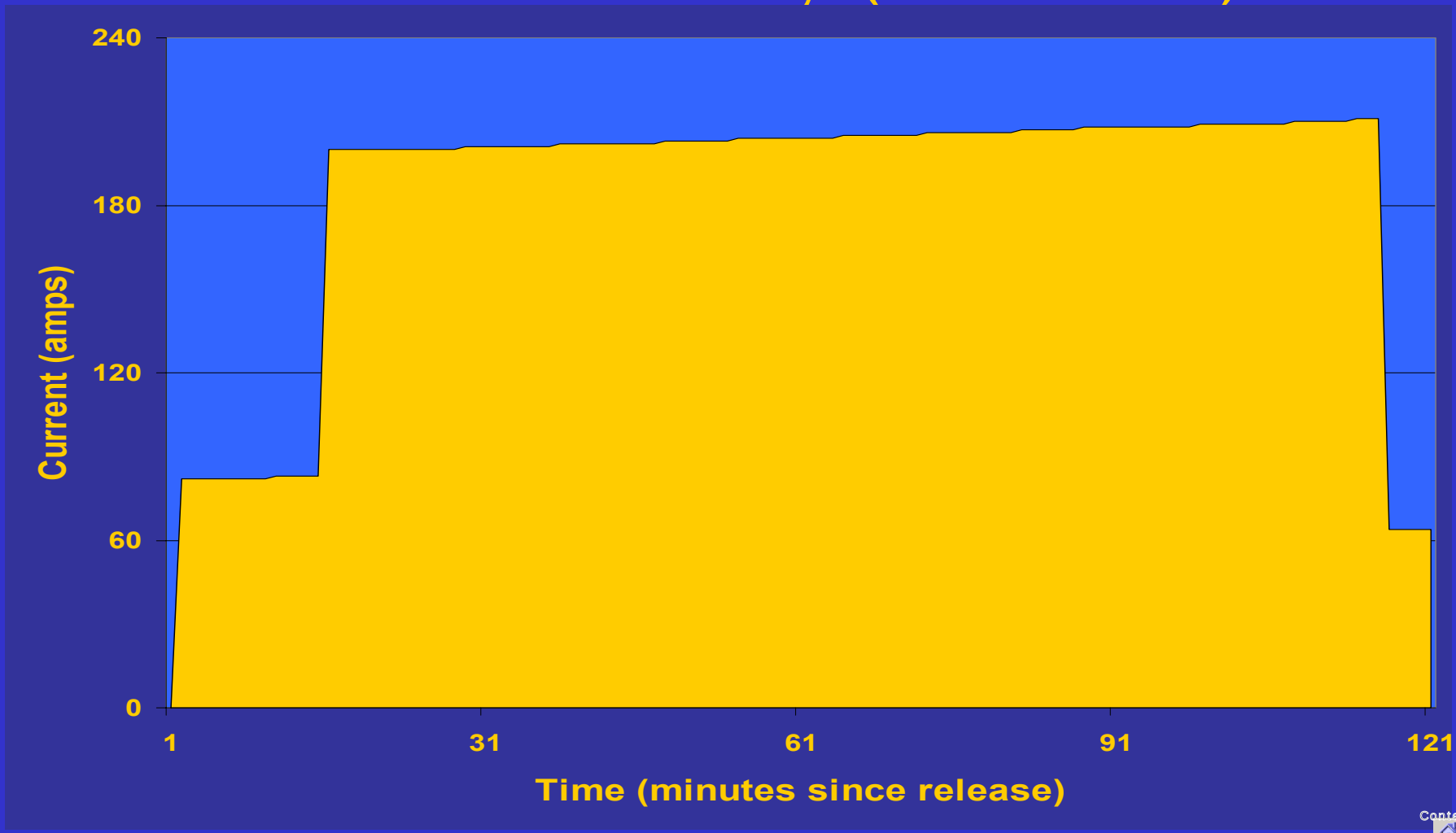
LSV-1 Instrumentation Battery (28 VDC)



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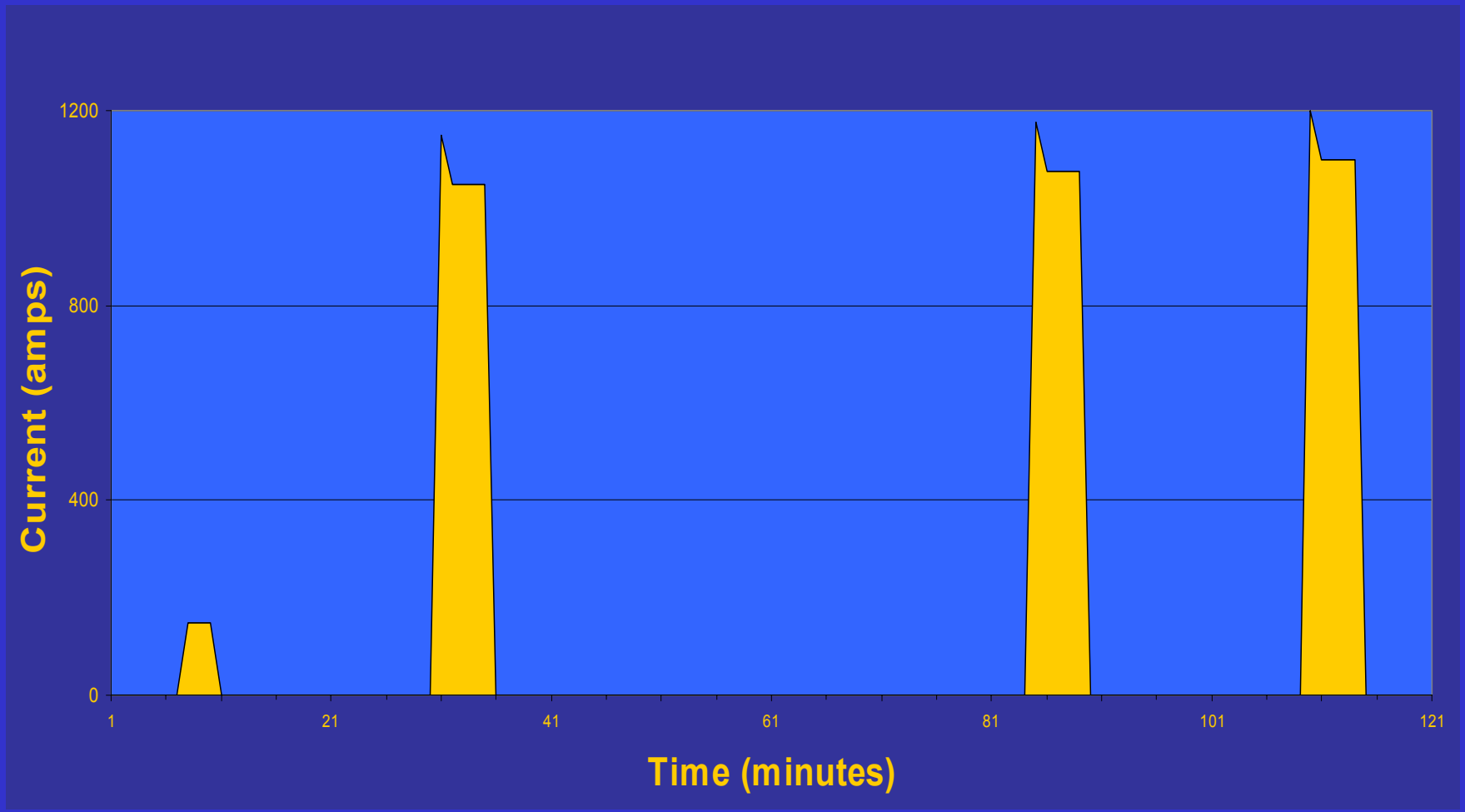
Typical Motor Discharge



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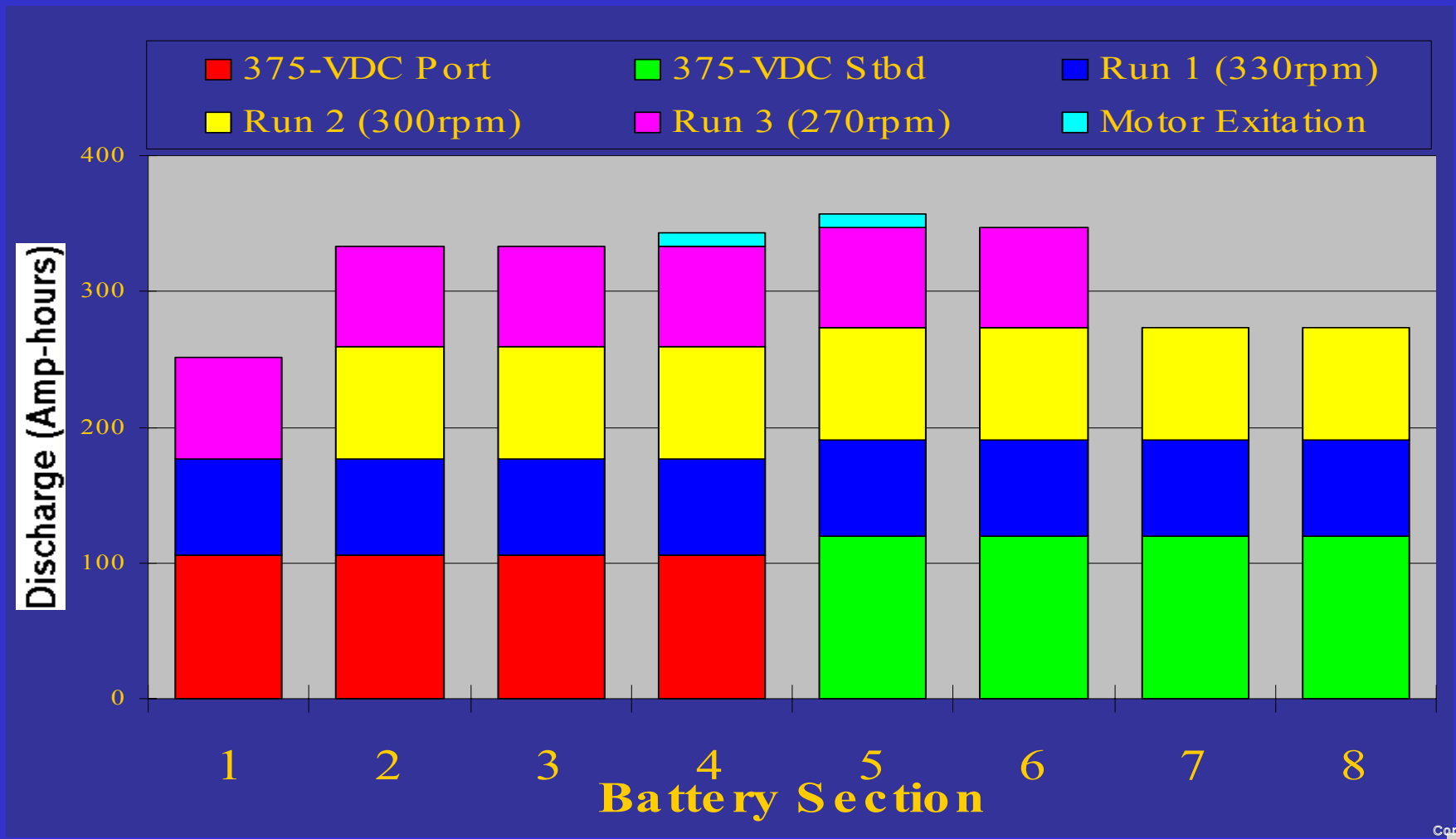
Discharge Distribution



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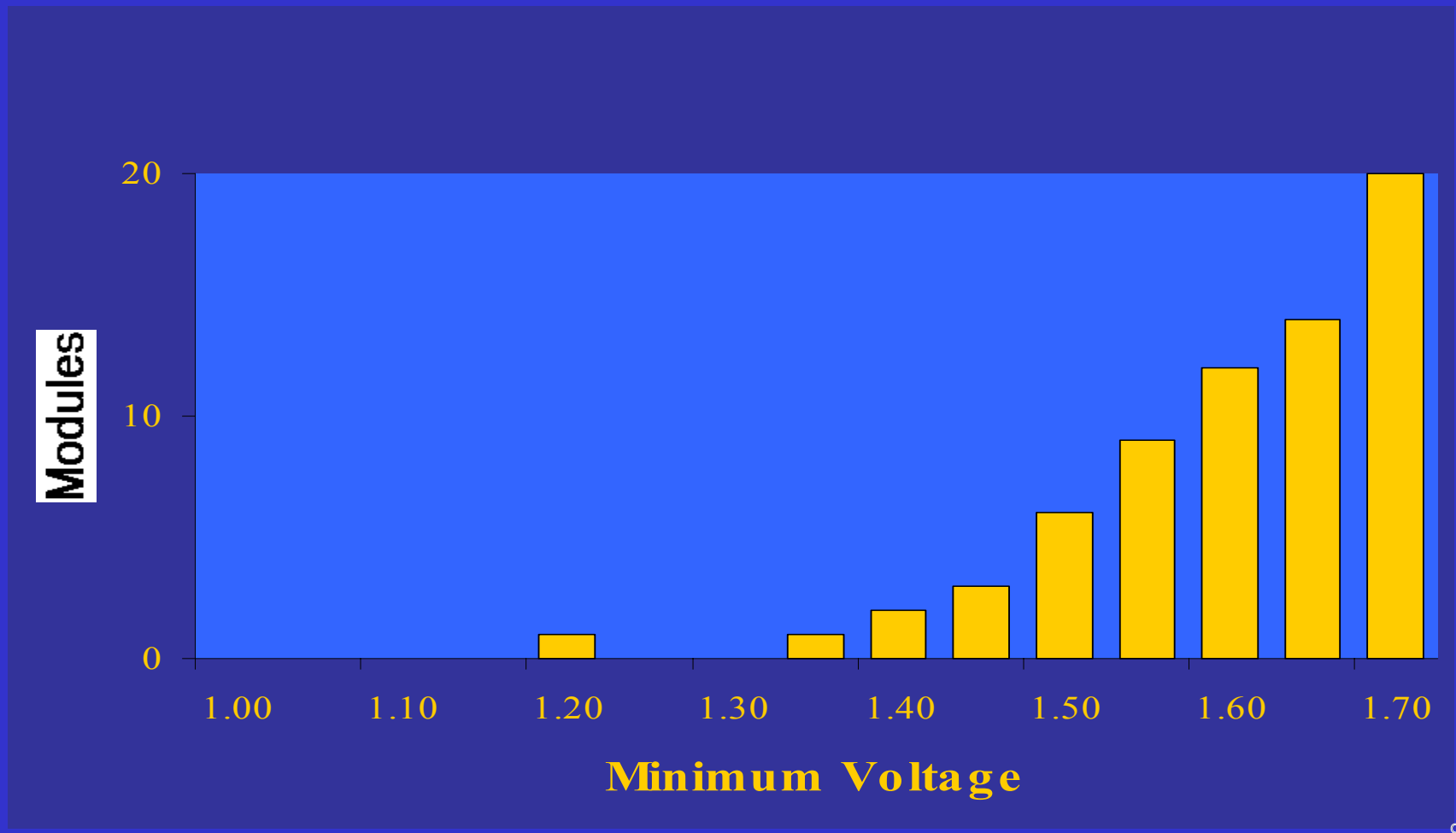
Typical Low Module Distribution



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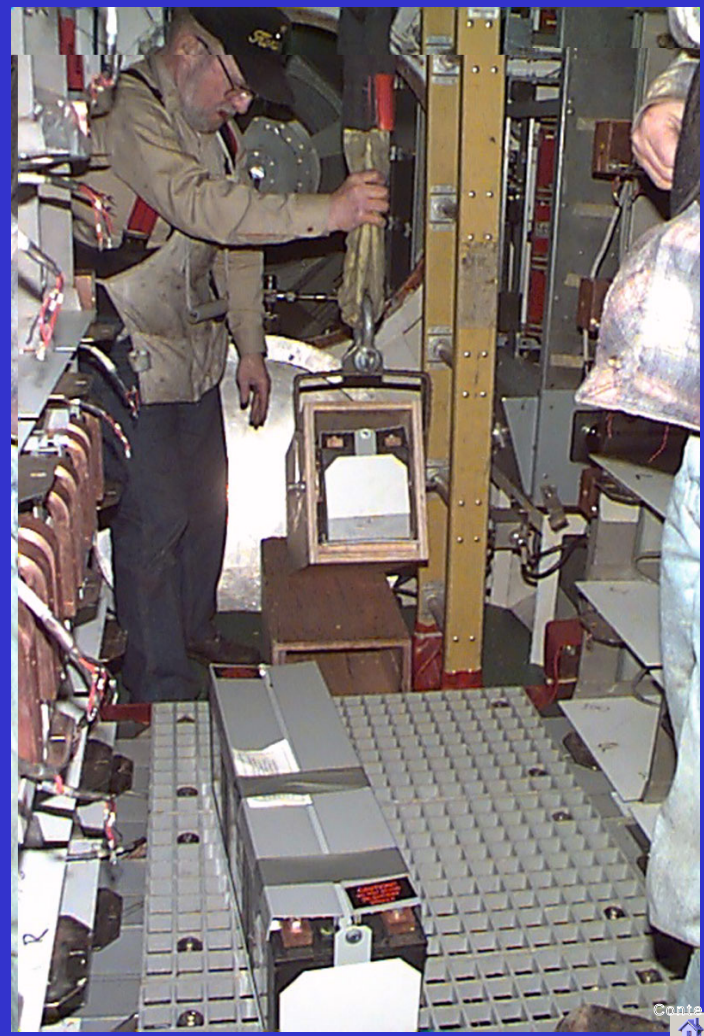
Low Voltage Module

- Low module(s) identified post-run
- Replacement module installed
- Removed module split into cells; good cells reconstituted



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Re-building Modules

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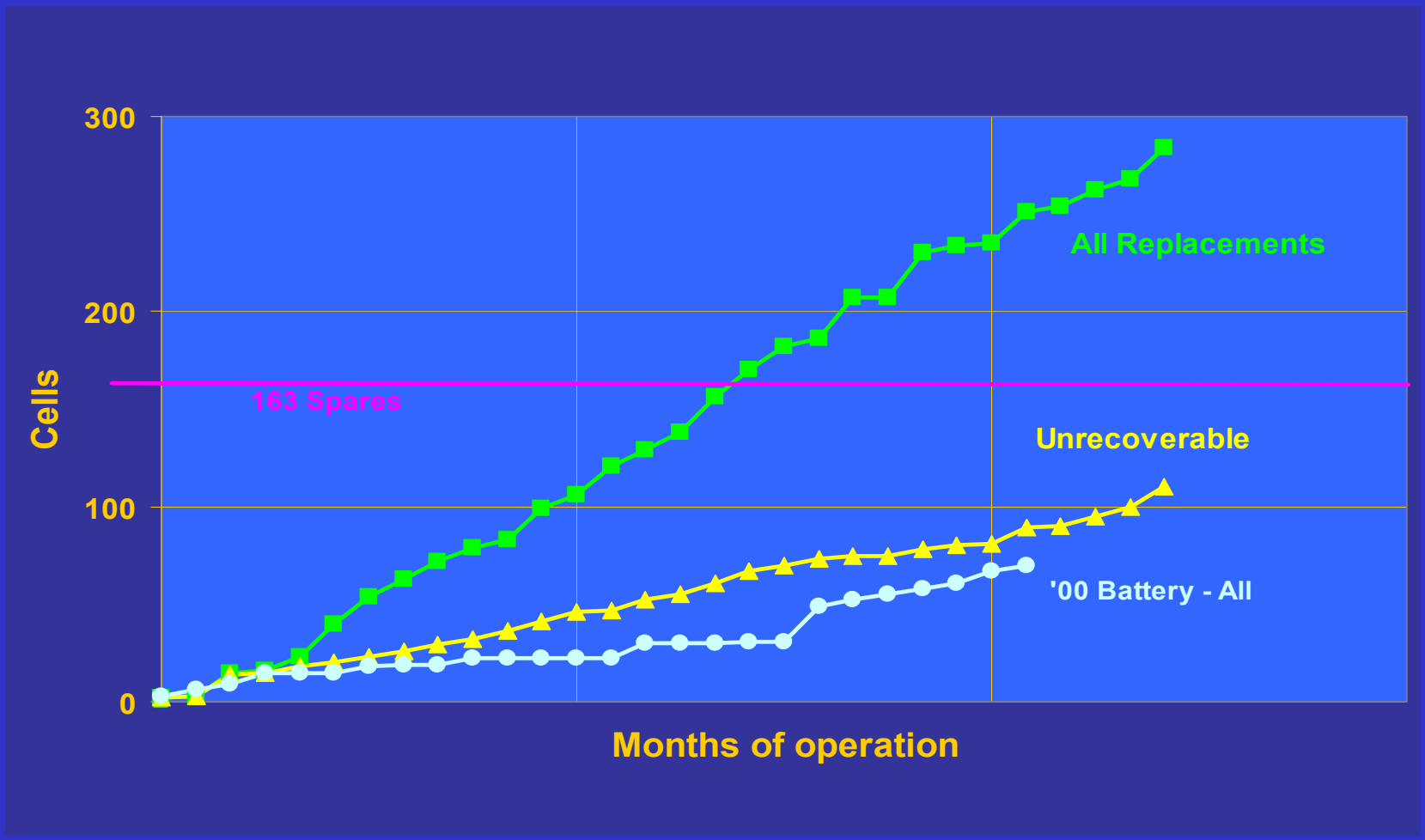
Fewer Replacements = Less Labor……



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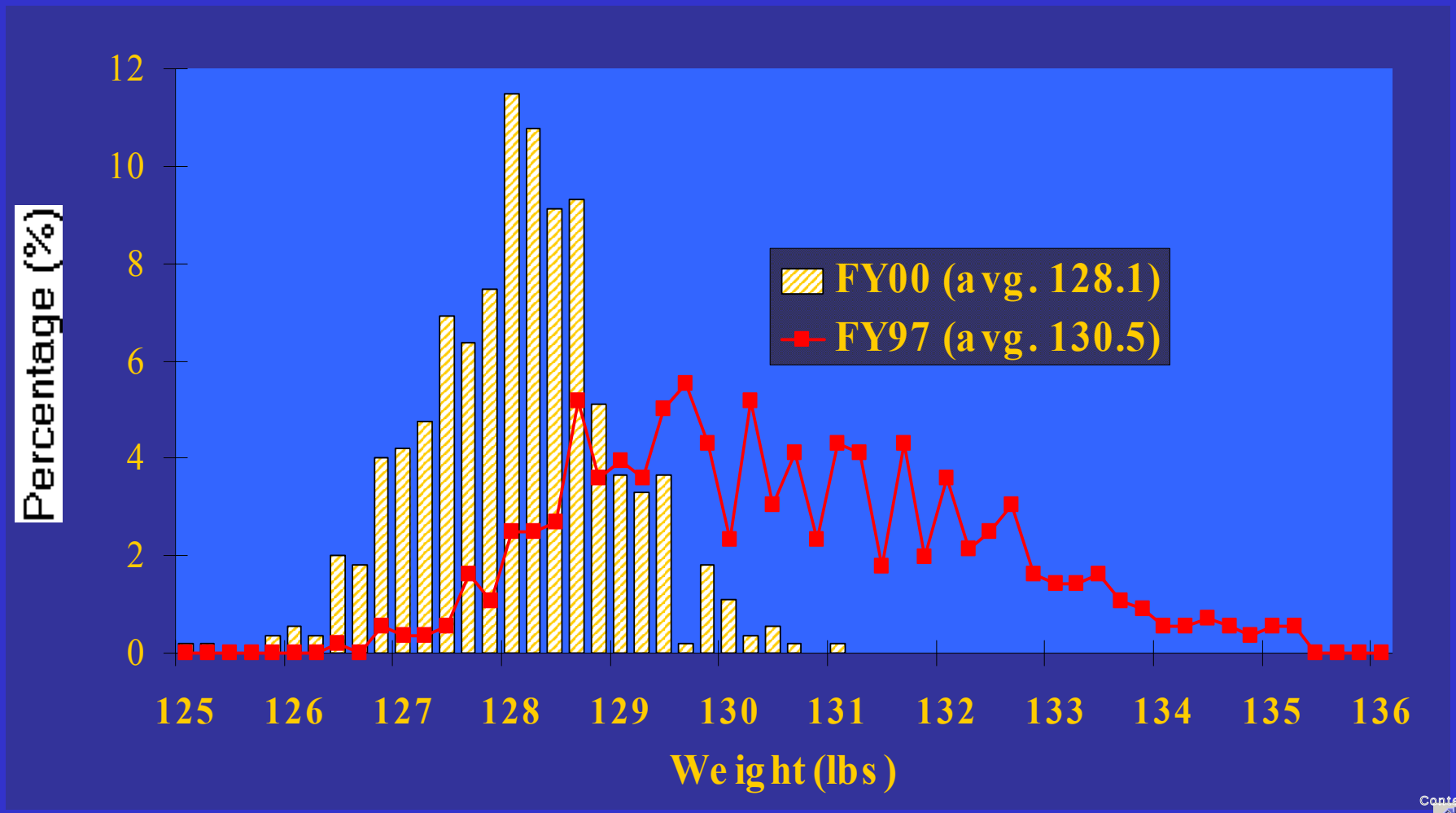
…Due to Manufacturing Quality Improvements



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Whole Battery Change-out

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New Cells in the Tray

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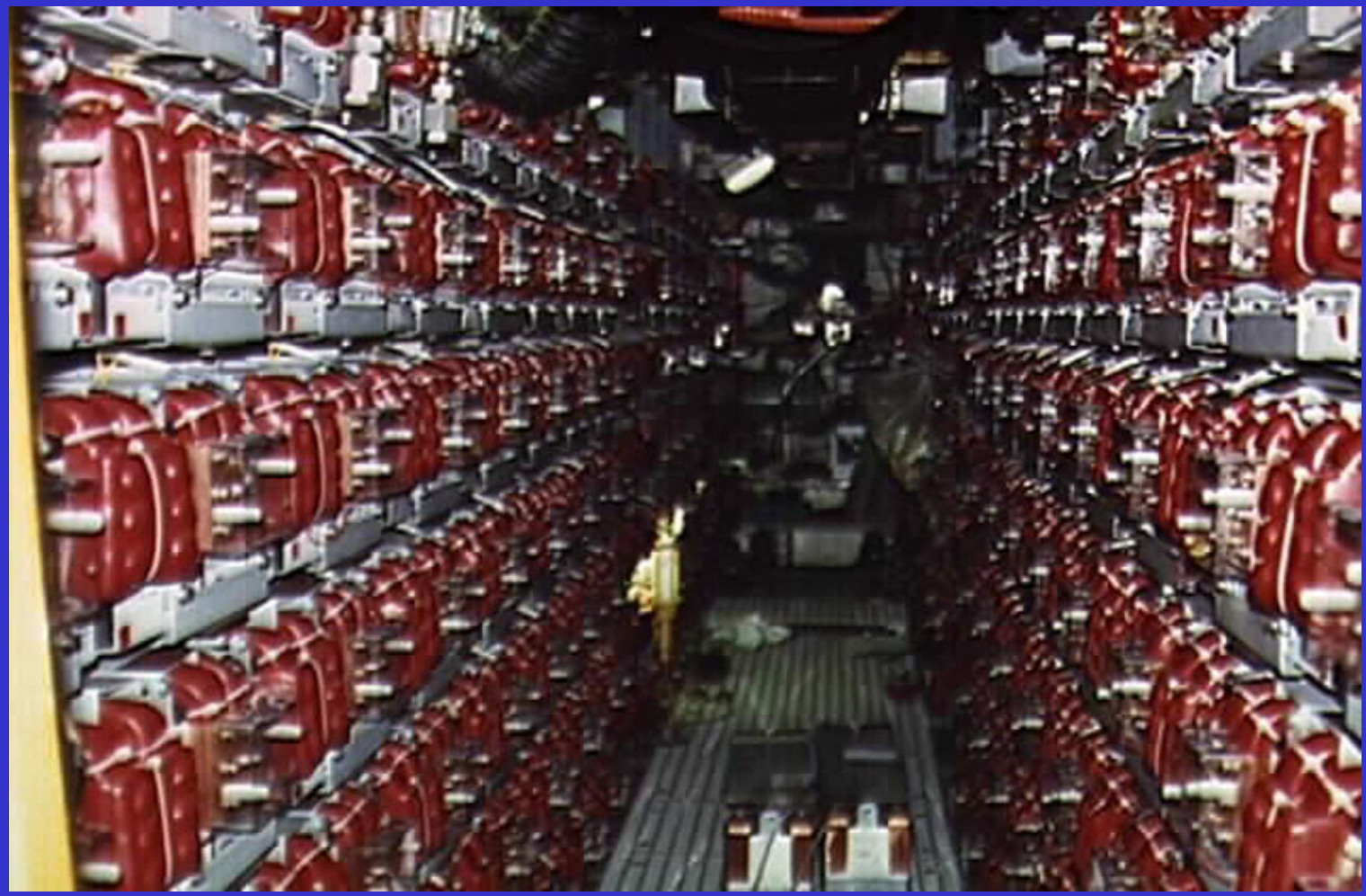
Almost done



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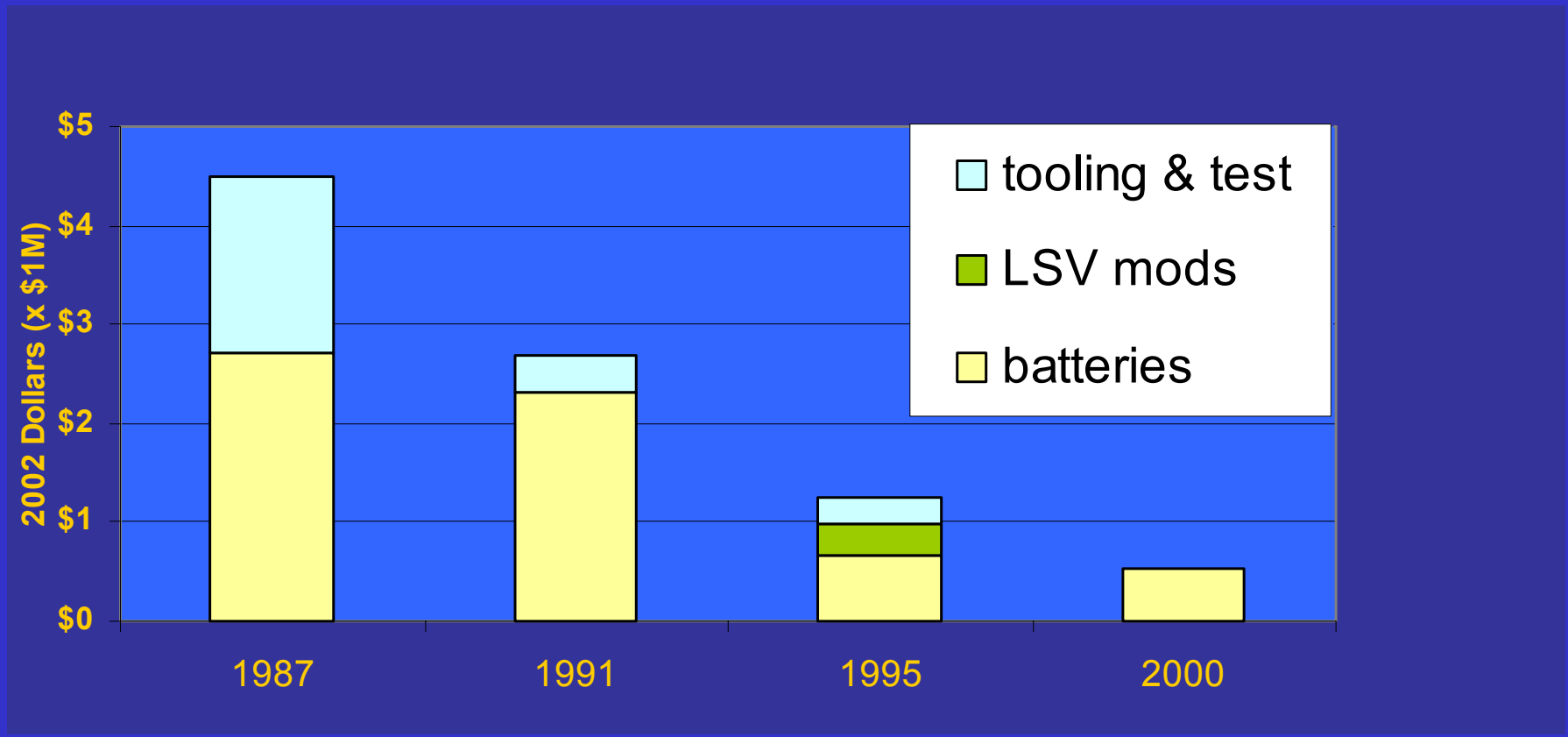
LSV1 Battery Costs



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LSV2, Arriving

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LSV2 Launch

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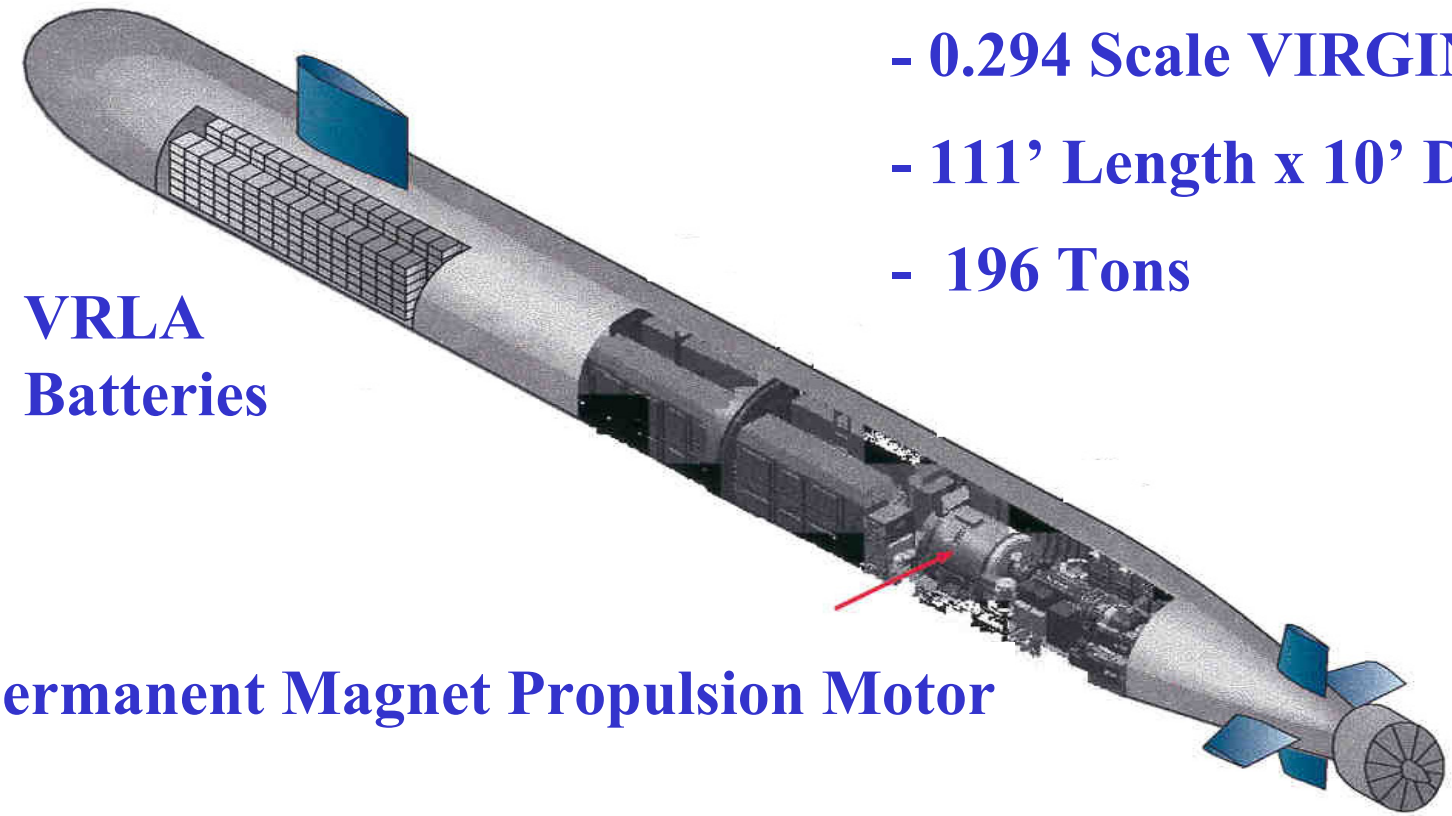
LSV-2 CUTTHROAT

Characteristics:

- 0.294 Scale VIRGINIA
- 111’ Length x 10’ Dia.
- 196 Tons



VRLA Batteries

Permanent Magnet Propulsion Motor

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The Future

The Issues:

- higher capacity
- reliability
- lower cost
- decreased #'s of cells

- Weight and recharge times are not problems

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