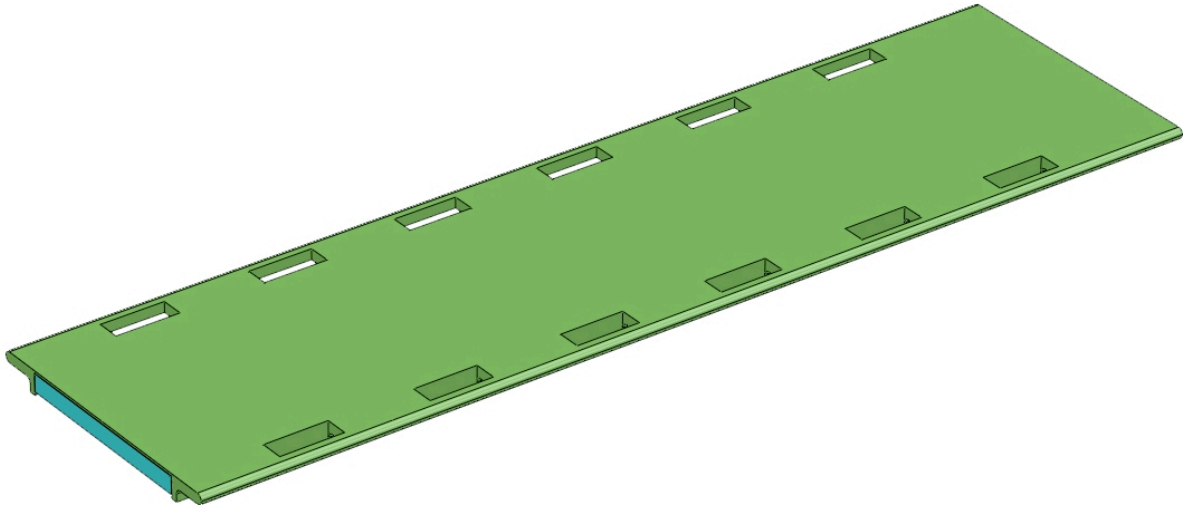
Variable Buoyancy Backboard



Blue B

Concept: What is a Backboard?

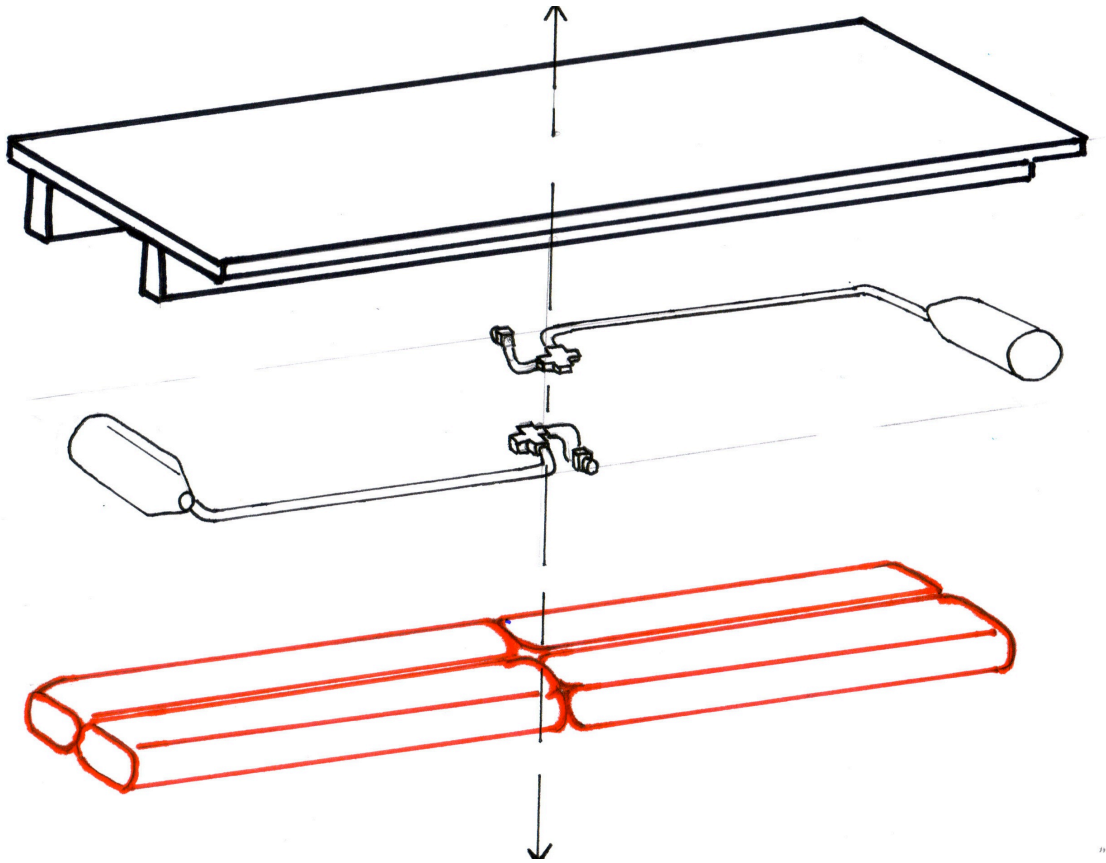
Concept: Variable Buoyancy

- Standard Backboard

- Our Backboard

Concept: Critical Components

- Components:
  - Rigid board
  - Pneumatic system and controls
  - Inflatable bladder(s)



Contract: Primary Needs

Product Description: Variable buoyancy backboard for spinal injury water rescue

Intended Customers: Certified Pool Operators and lifeguard training organizations

Market: Water safety and rescue

Customer Need	Product Attributes	Units	Engineering Specifications
Is easily maneuvered by a lifeguard.	Mass on dry land	kg	Less than 7.5.
Can support victims of varying density.	Maximum buoyancy	N	At least 200.
Is easily positioned under victim during rescue.	Minimum buoyancy	N	Between 22 and 90.
Has intuitive and ergonomic controls.	Time for inexperienced user to activate	seconds	Less than 10.
Inflates quickly.	Inflation time	seconds	Less than 10.
Is quickly reset between usages.	Reset time	minutes	Less than 10.
Allows for x-ray of victim.	X-ray transparent	binary	Yes.

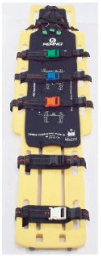
Contract: Cost

- Preliminary

Cost Estimate:

Item	Cost
Custom Bladder System	$200
CO_2 tank, valves, connectors, etc	$150
Top plate, runners, fasteners	$70
Labor	$50
PROFIT	$130
TOTAL	**$600**

- Benchmark comparison

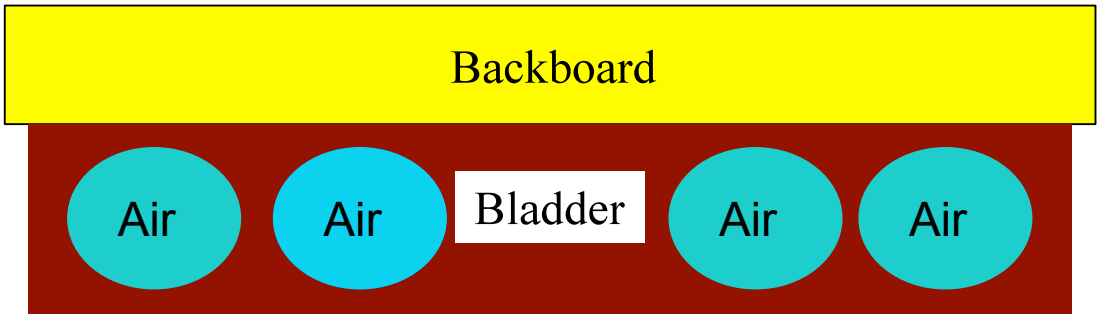
	 **Pro-Lite Spine Board**	 **Aquaboard**	 **SKED Rapid Deployment**	 **Flotation Assist Device**	 **Our Product**
Cost	$250	$600	$1,164	$300 (add-on)	Goal: $600

Risks

- Which bladder configurations are stable?
- Can we safely transfer CO_2 from a cartridge into a bladder with the push of a button?
- What barriers to market entry exist?

Findings

- Which bladder configurations are stable?
- Shifting distribution of air causes instability



Findings

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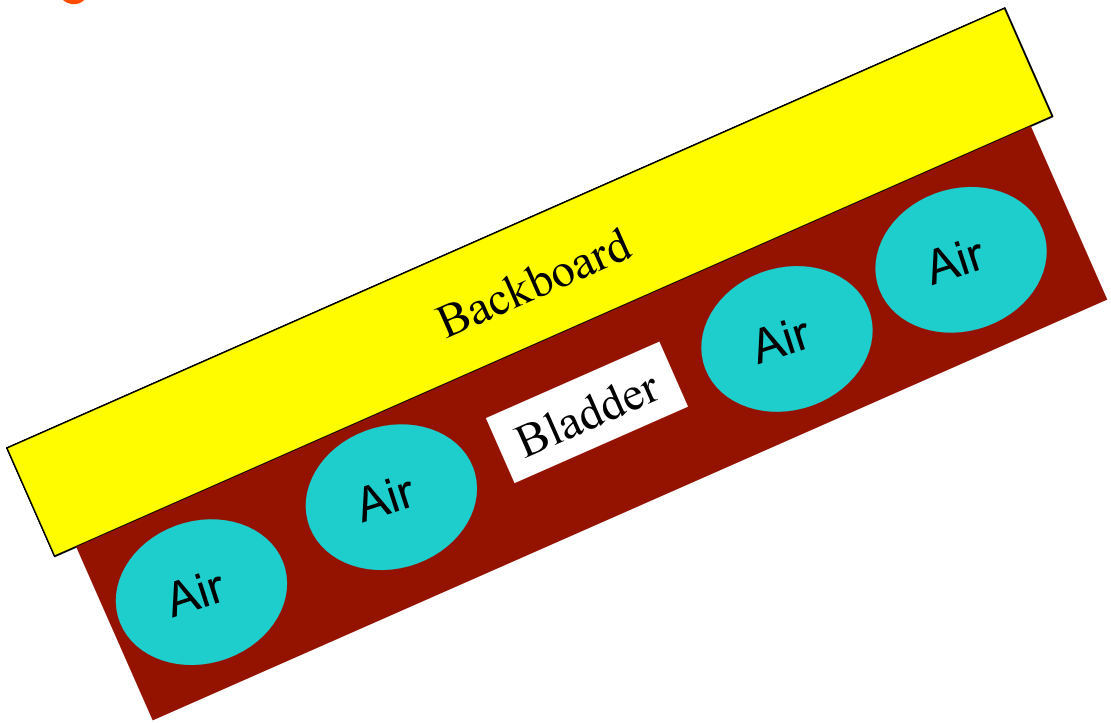
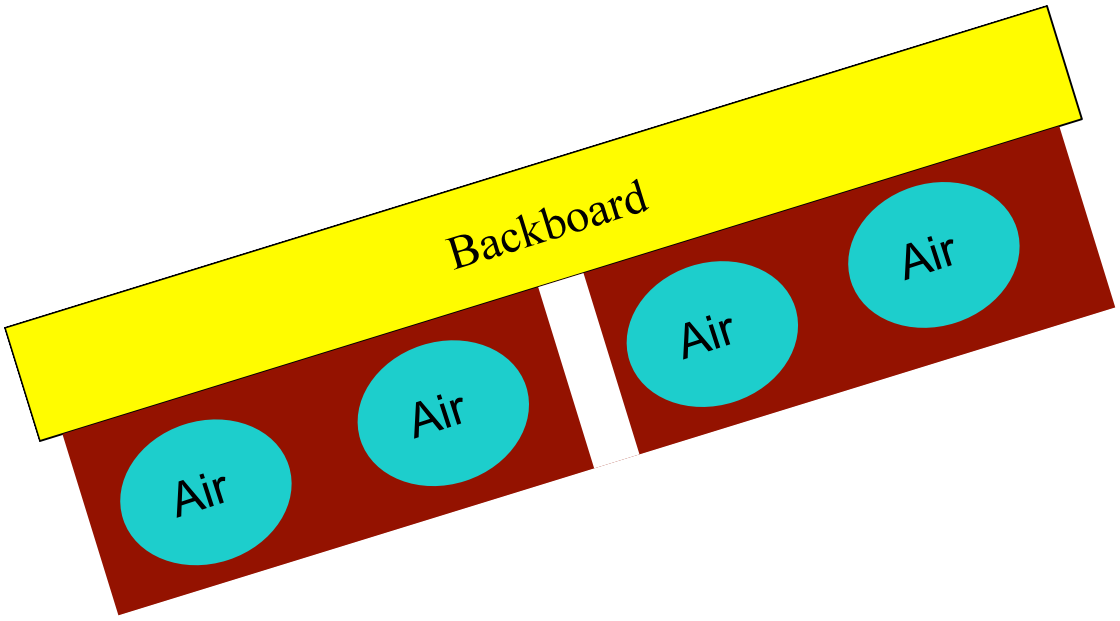


Findings

- Which bladder configurations are stable?

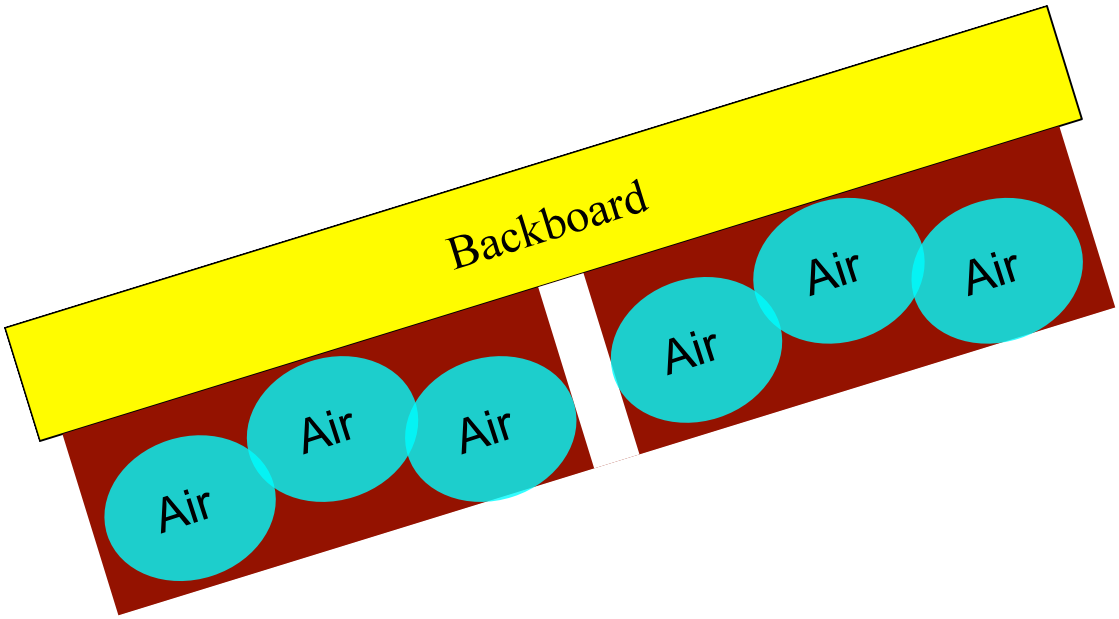
- Adding multiple bladders prevents air shifting within bladder



Findings

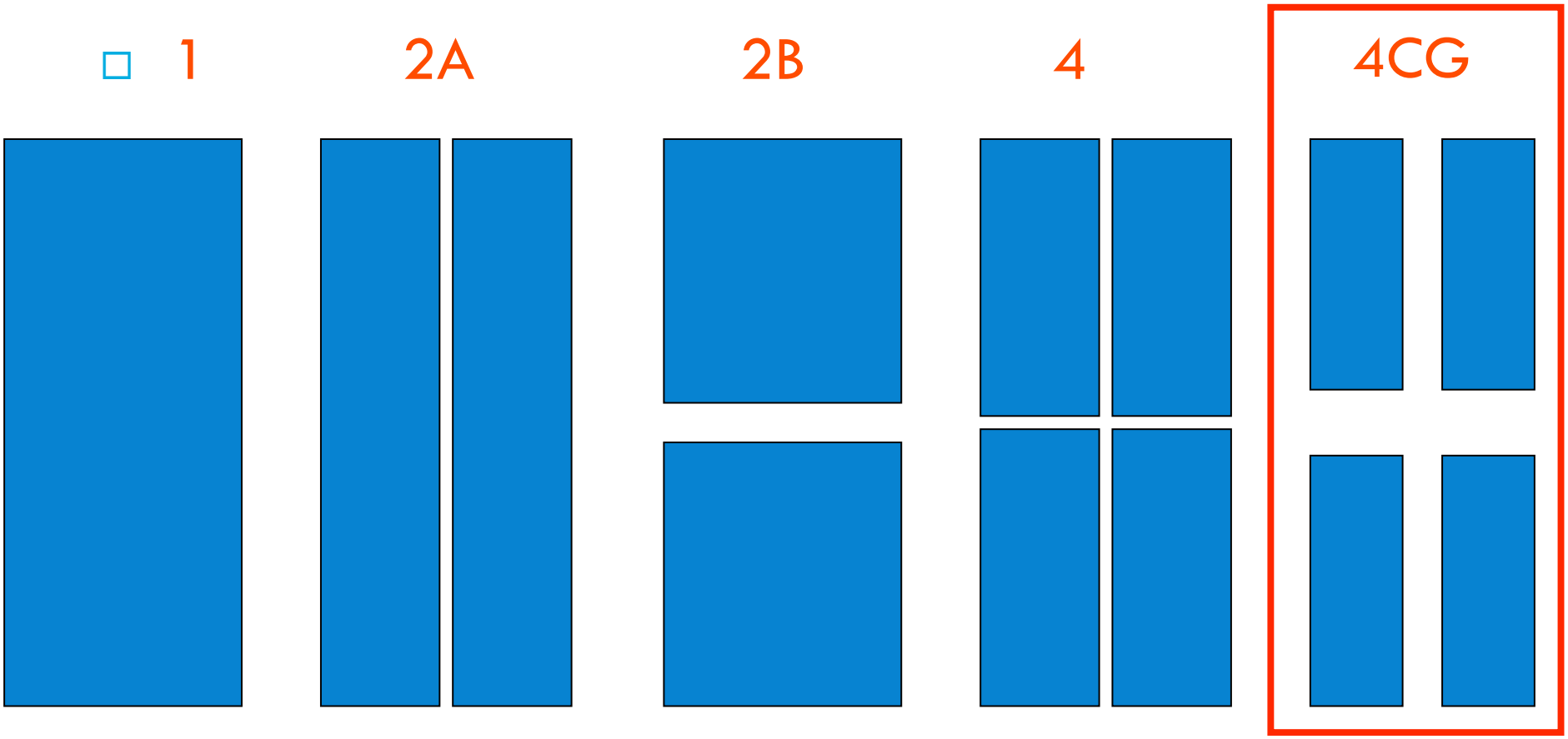
- Which bladder configurations are stable?

- If the bladders are filled quickly, air shifting will not occur



Findings

- Which bladder configurations are stable?
- Bladder Configurations:
- 1 2A 2B 4 4CG



Findings

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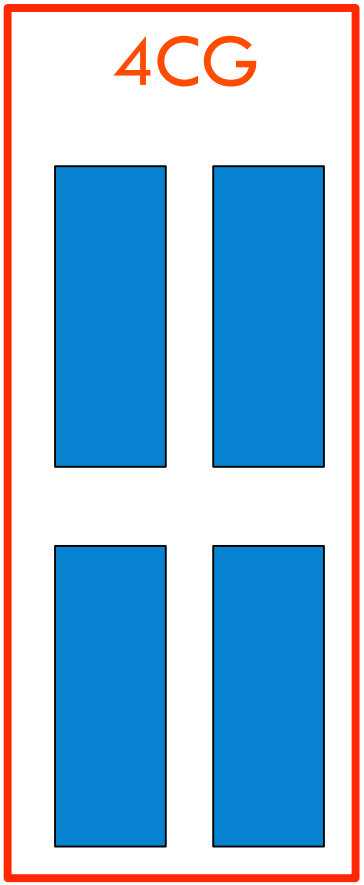

Findings

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- Disposable CO_2: Slow inflation

- Reusable CO_2: Regulator valve

Findings

- What barriers to market entry exist?
- FDA
  - Establishment Registration: $2000/yr
  - Premarket Notification: 510(k) form
- Market
  - Total Market: 10,000 backboards/yr
- Lifeguard Organizations

Thank You

For more information, please visit Blue B in the Pappalardo Lab!