

aquaAIRius

for an easier pool rescue



2.009 Blue Team

December 7, 2009

What is a backboard?



Introduction

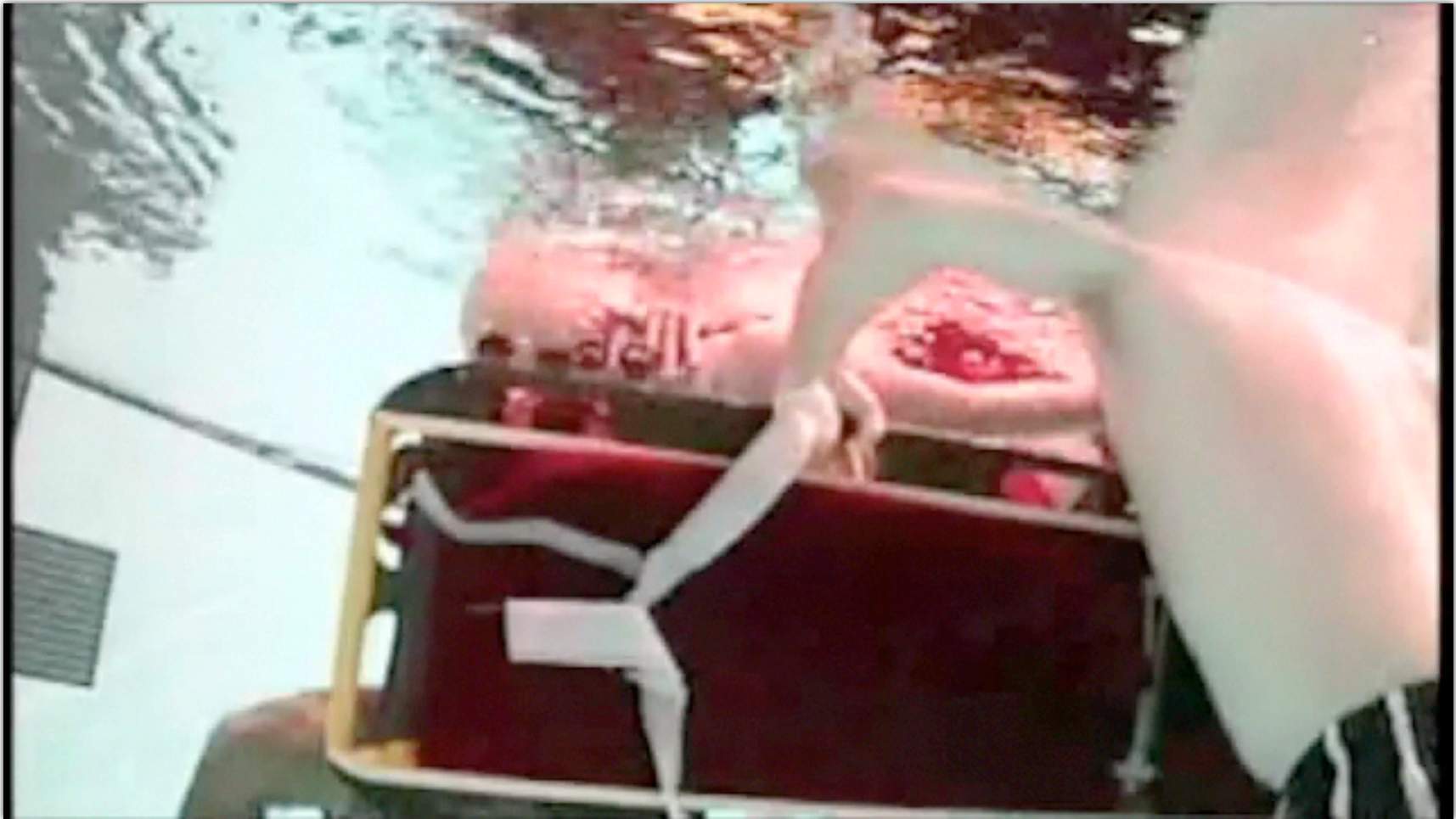
Demo

Need

Features

Business

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Introduction

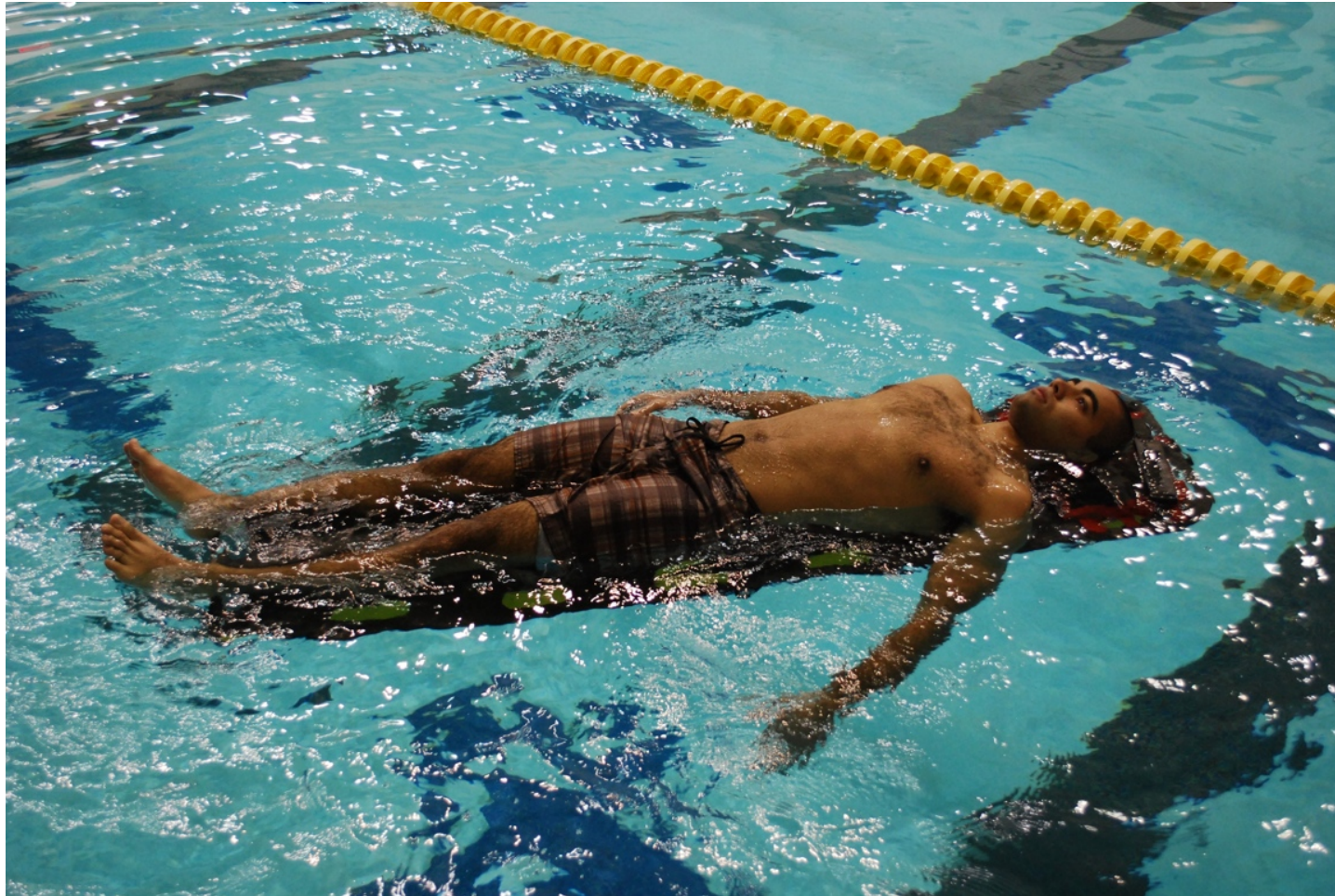
Demo

Need

Features

Business

A Note On Buoyancy



Introduction

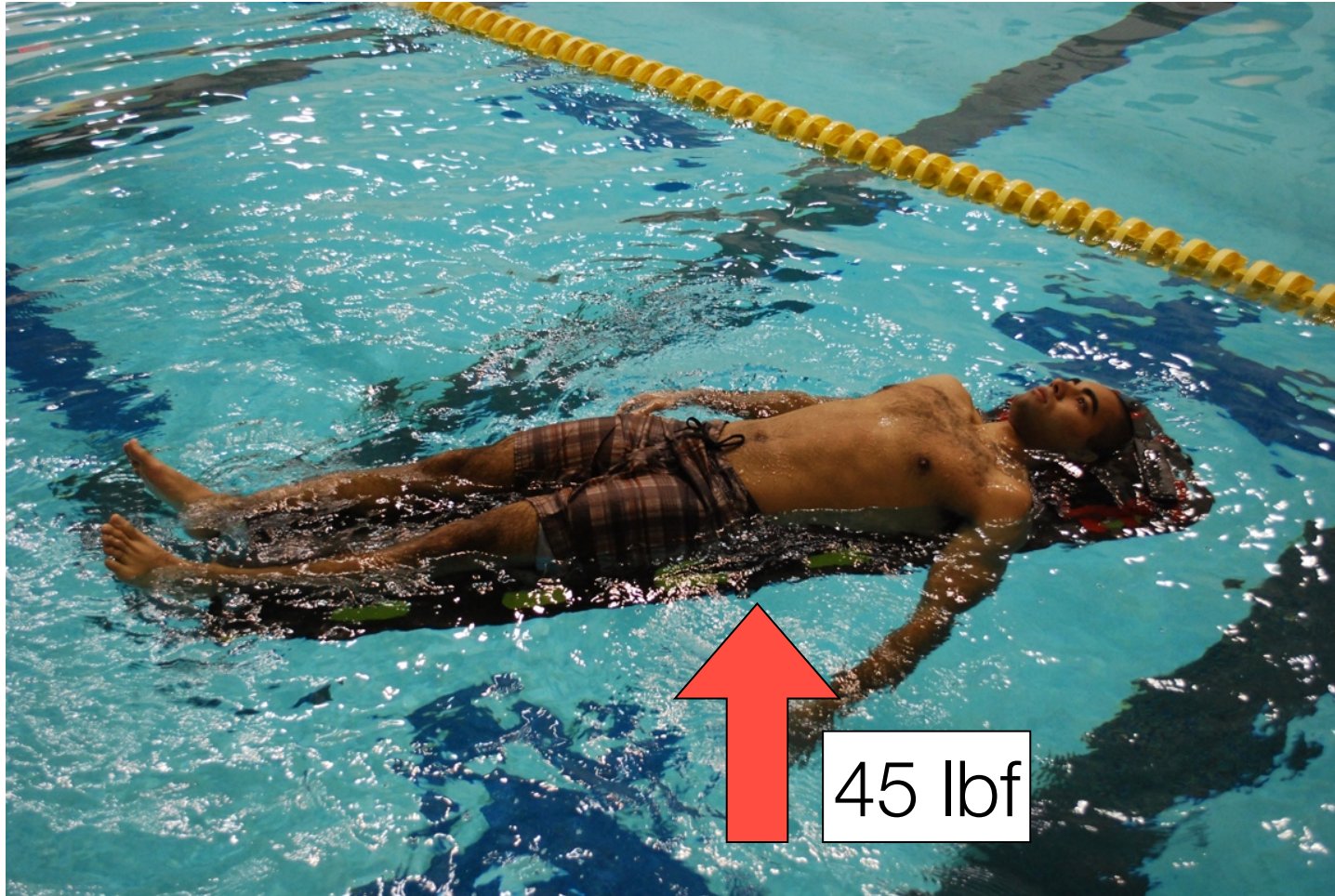
Demo

Need

Features

Business

A Note On Buoyancy



Introduction

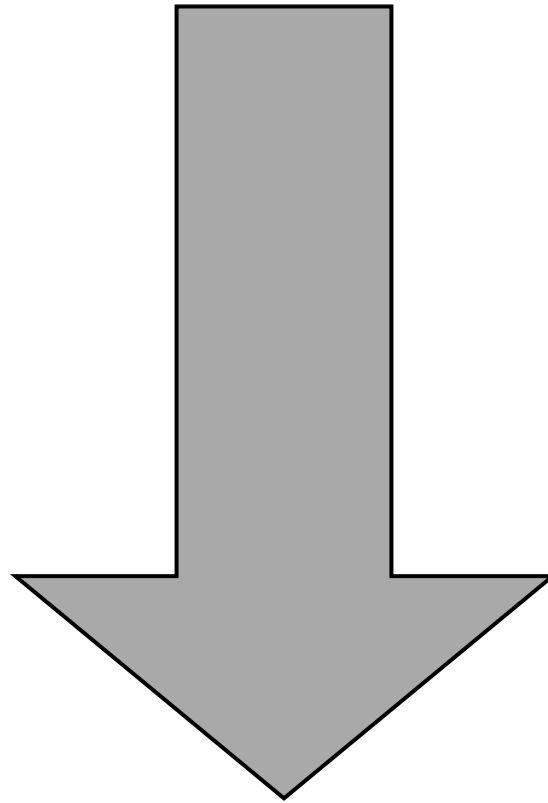
Demo

Need

Features

Business

Demonstration



Introduction

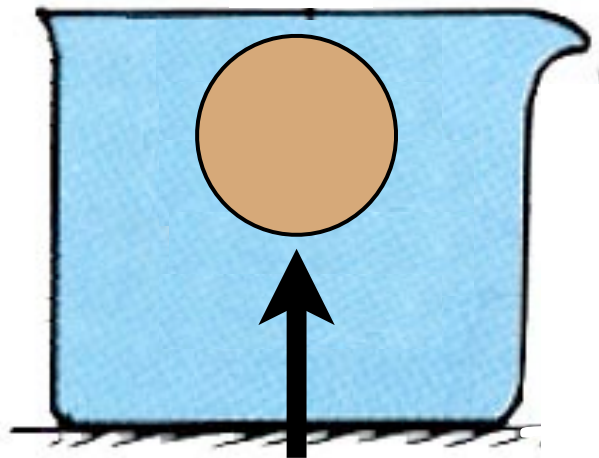
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Need

Features

Business

A Note On Buoyancy



Buoyancy Force = Weight

Introduction

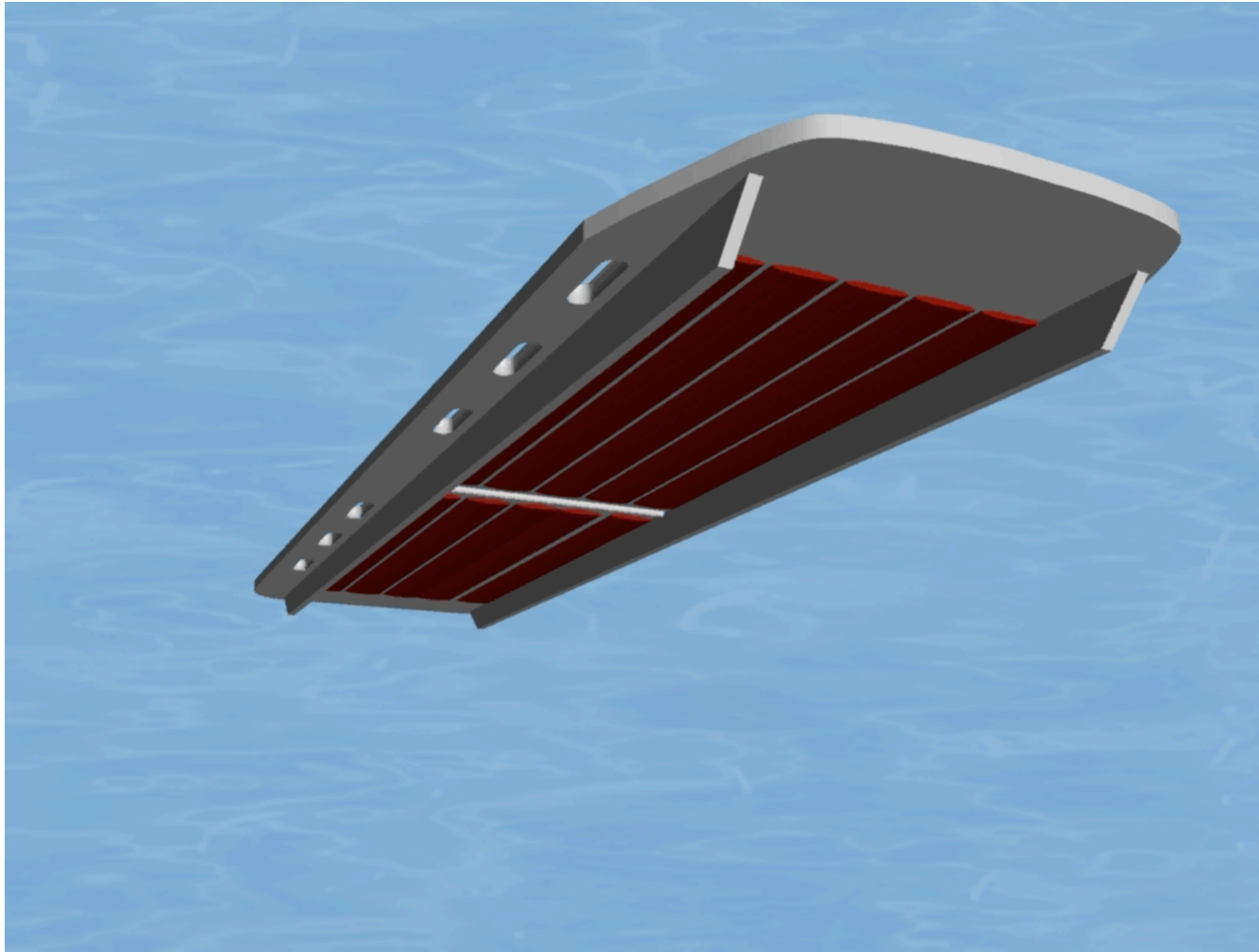
Demo

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Features

Business

Adjustable Buoyancy



Introduction

Demo

Need

Features

Business

A Niche and Novel Problem

Introduction

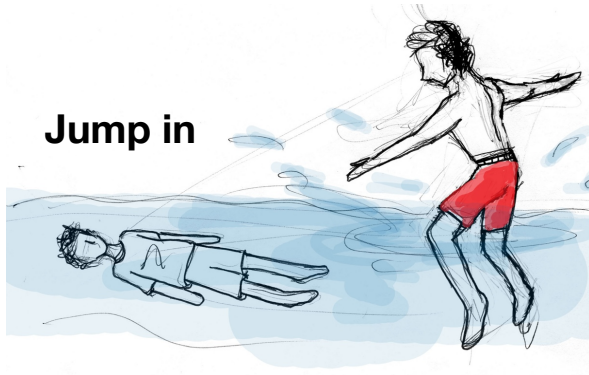
Demo

Need

Features

Business

A Niche and Novel Problem



Introduction

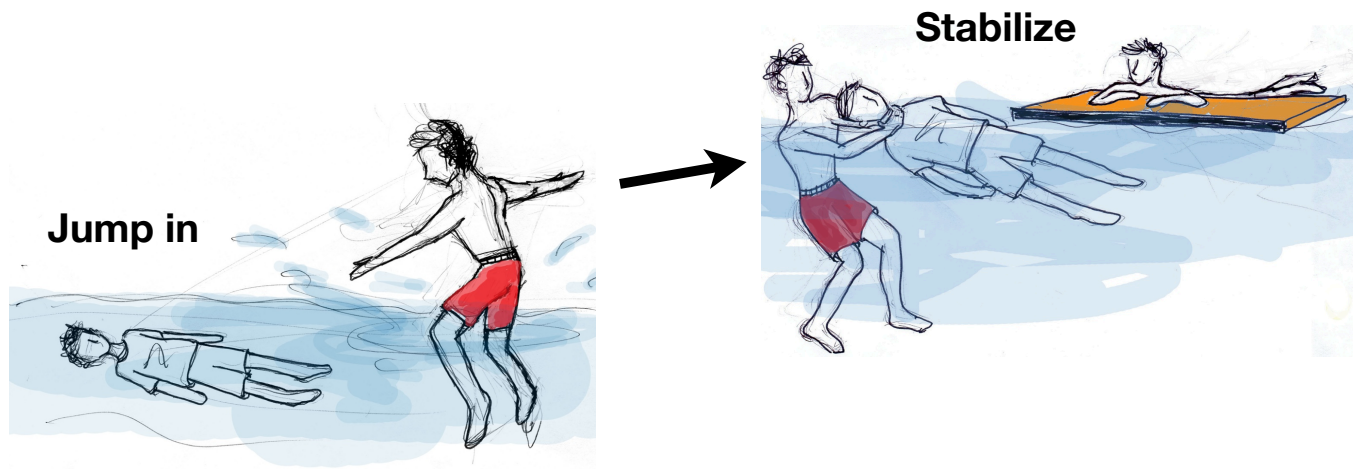
Demo

Need

Features

Business

A Niche and Novel Problem



Introduction

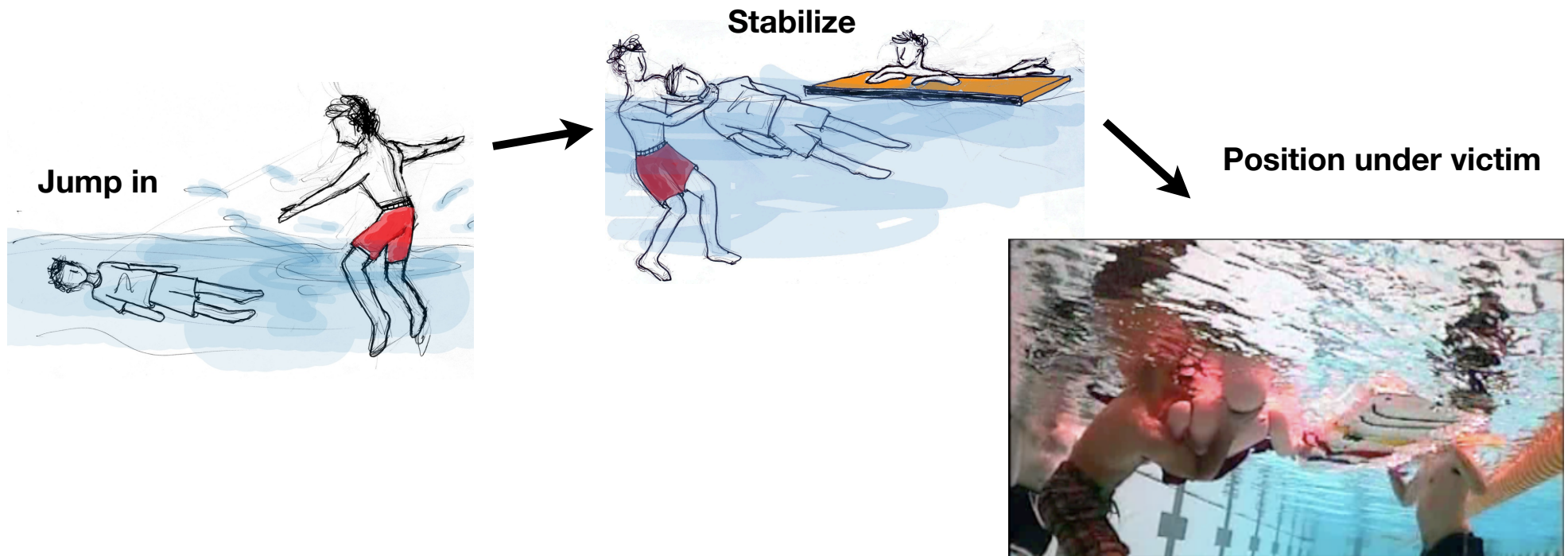
Demo

Need

Features

Business

A Niche and Novel Problem



Introduction

Demo

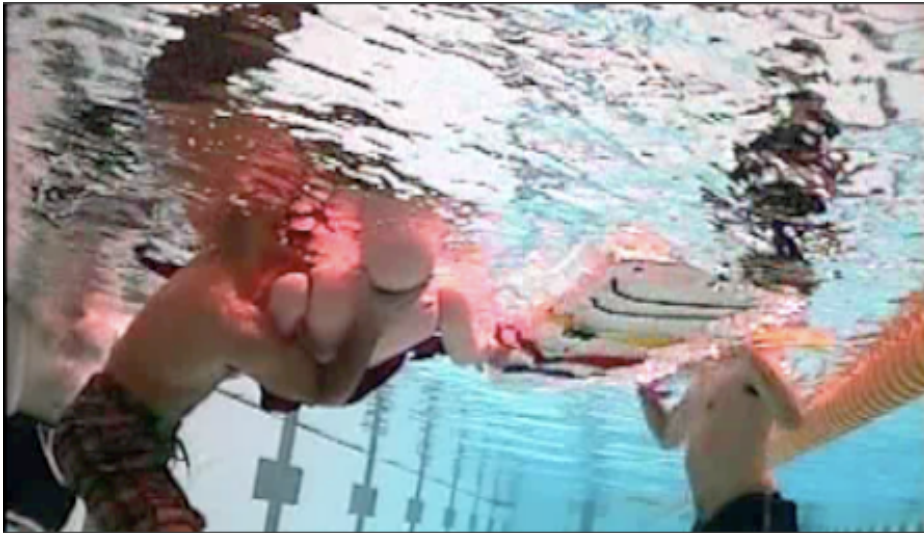
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Features

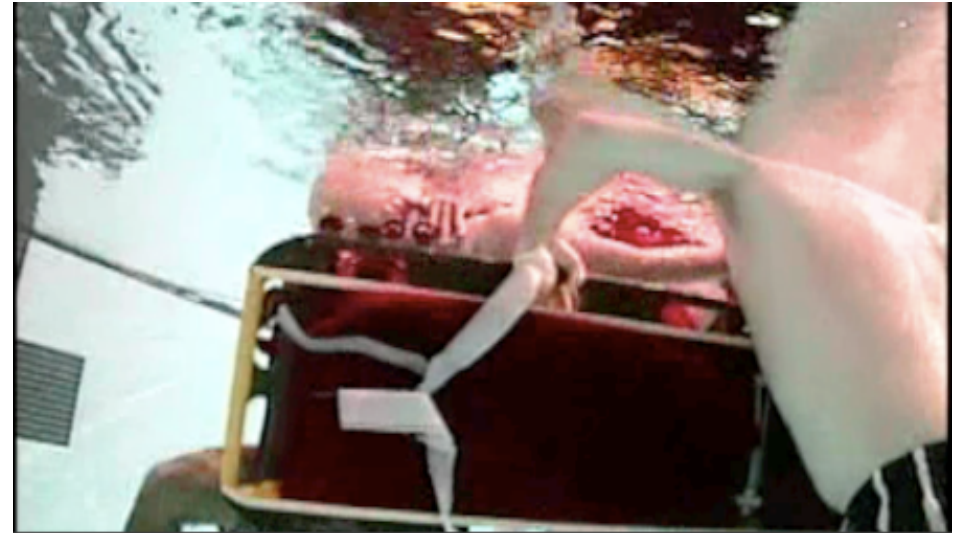
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A Niche and Novel Problem

Traditional backboard



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Introduction

Demo

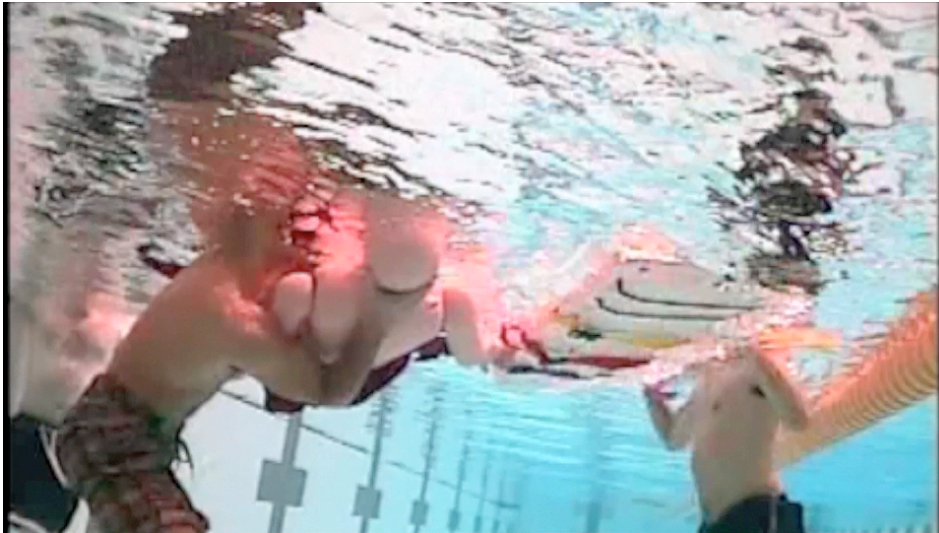
Need

Features

Business

A Niche and Novel Problem

Traditional backboard



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Introduction

Demo

Need

Features

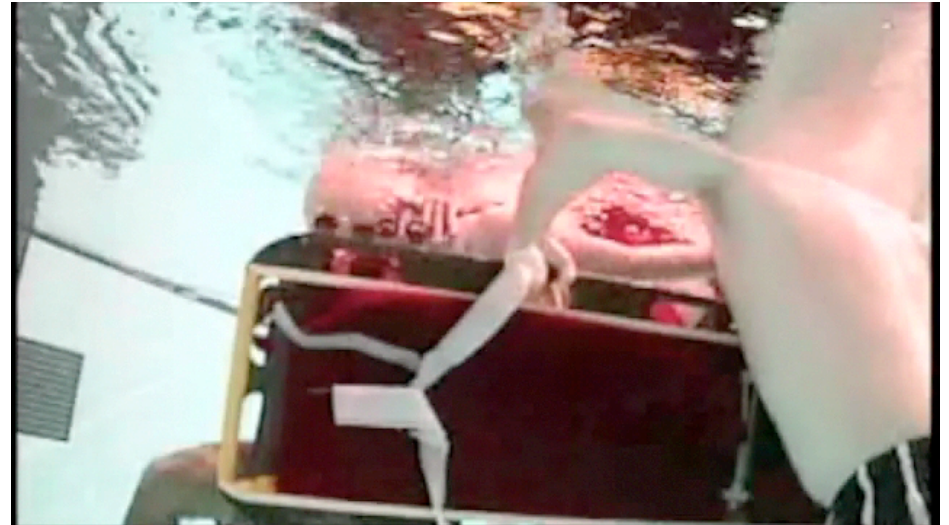
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A Niche and Novel Problem

Traditional backboard



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Introduction

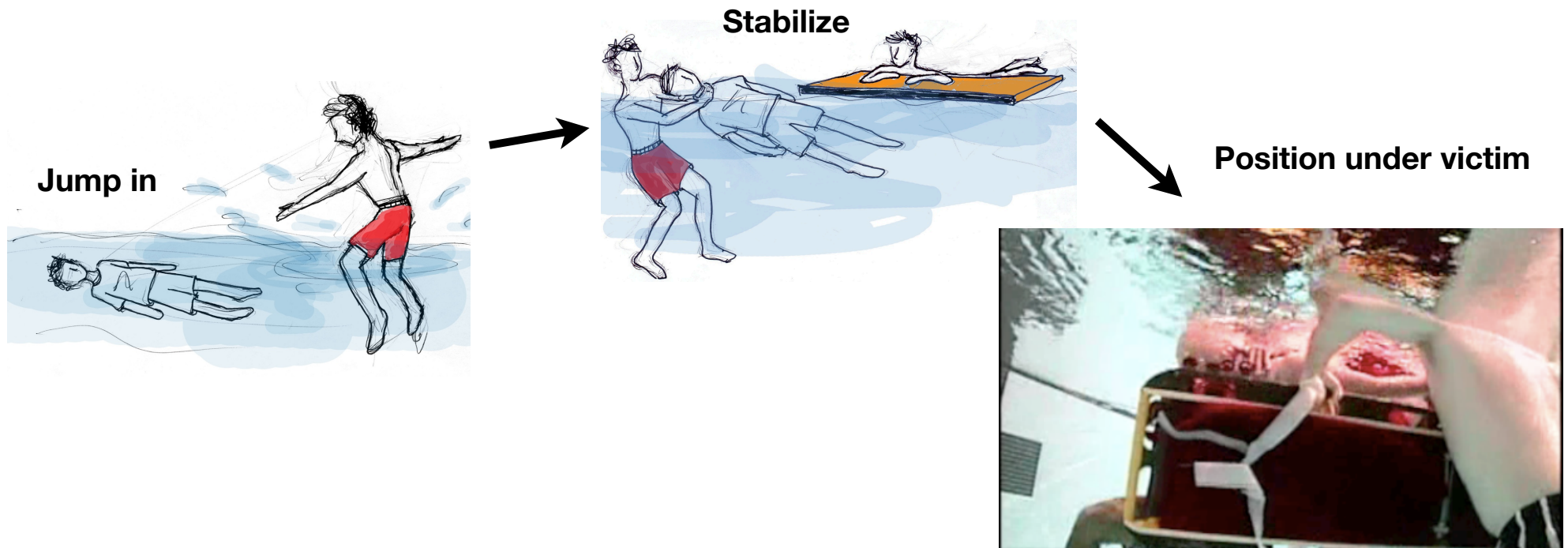
Demo

Need

Features

Business

A Niche and Novel Problem



Introduction

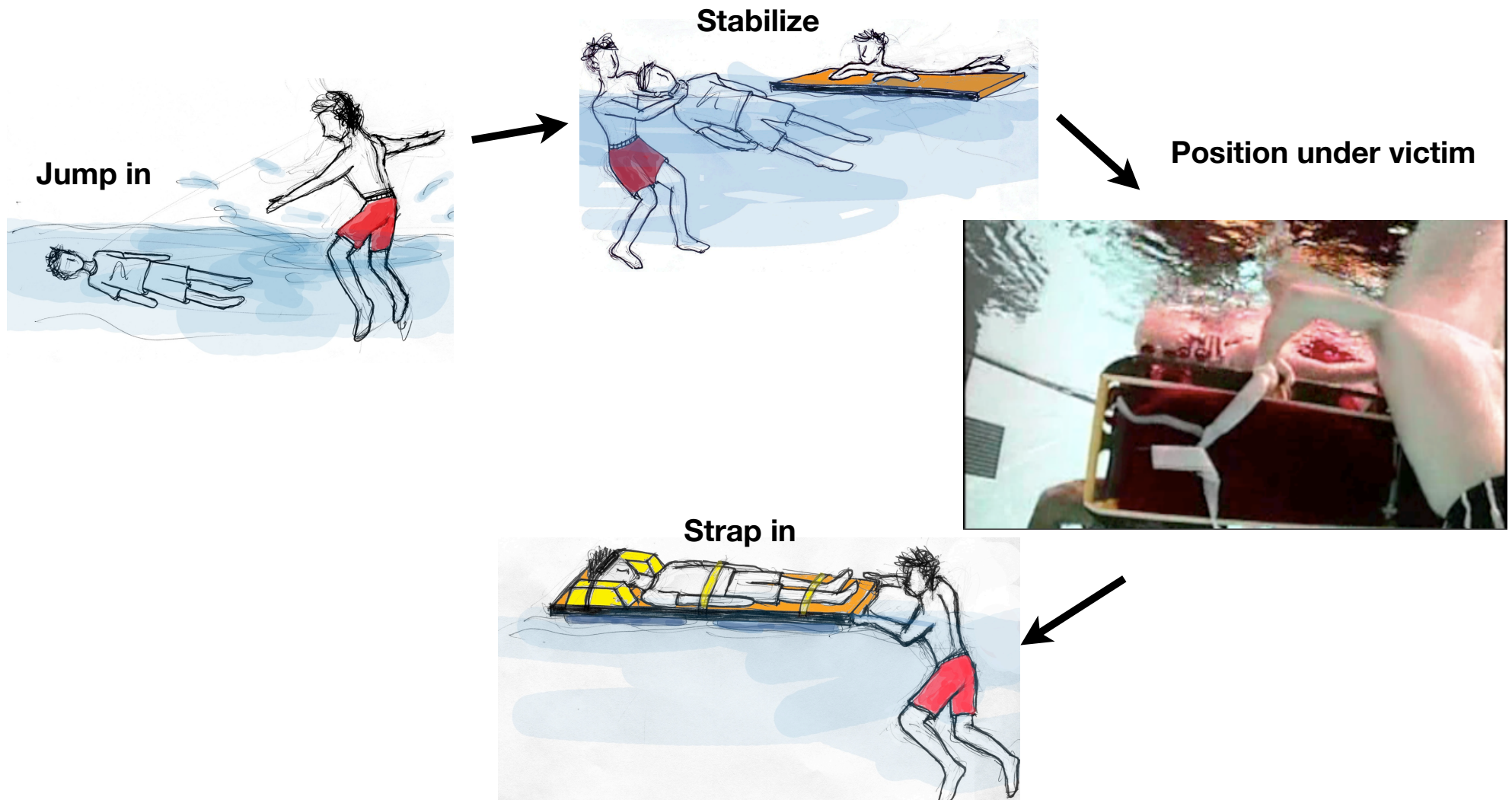
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Need

Features

Business

A Niche and Novel Problem



Introduction

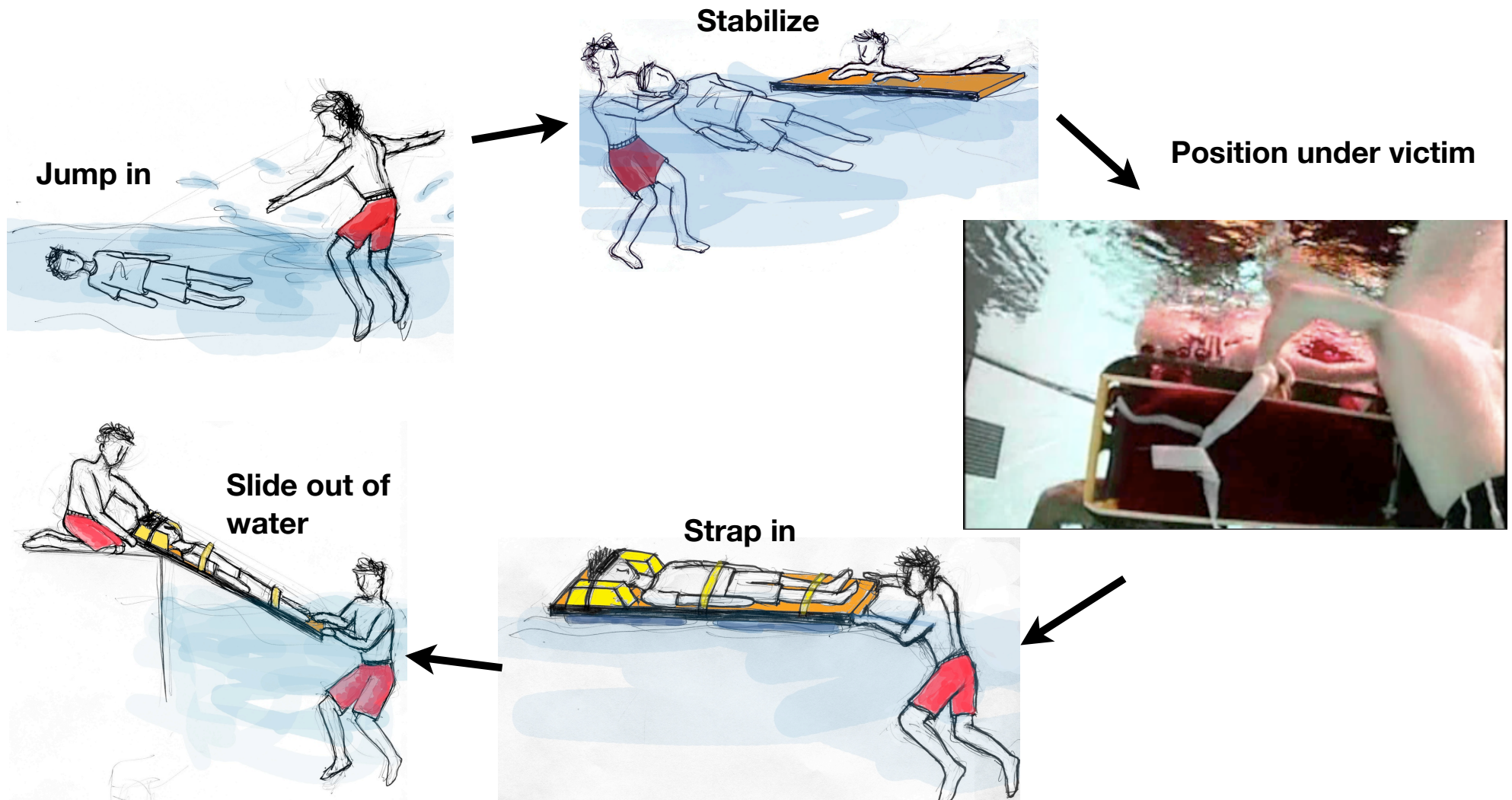
Demo

Need

Features

Business

A Niche and Novel Problem



Introduction

Demo

Need

Features

Business

Board

Composite materials

Introduction

Demo

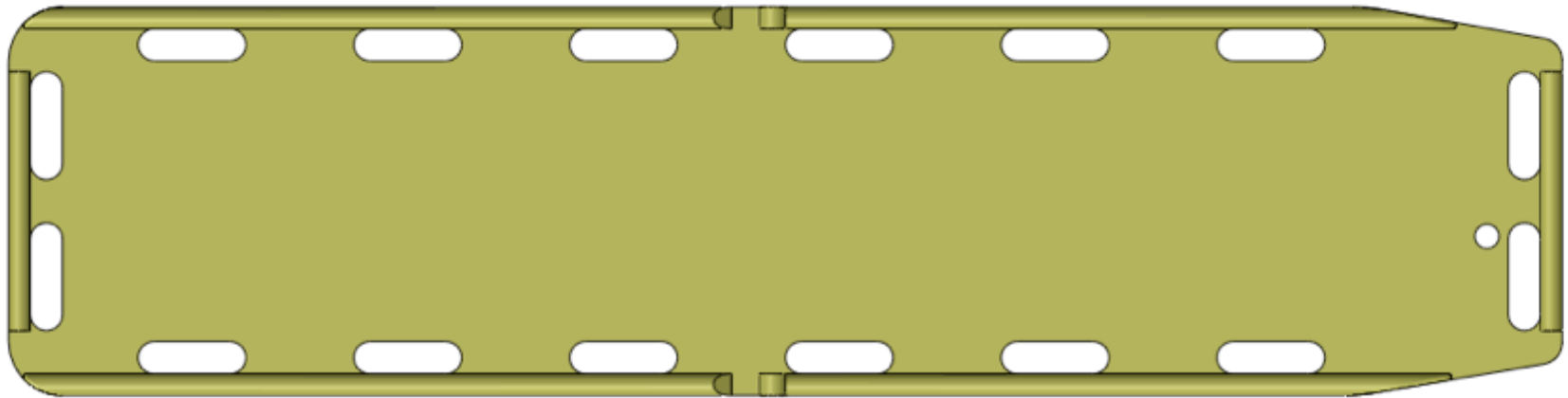
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Features

Business

Board

Composite materials



Introduction

Demo

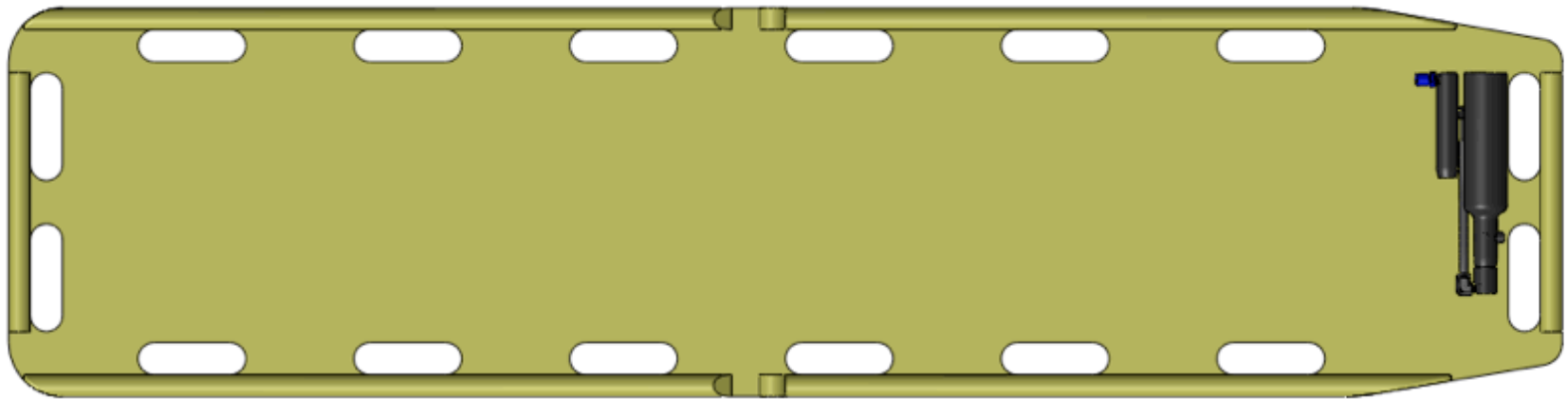
Need

Features

Business

Board + Air System

Compressed air tank



Introduction

Demo

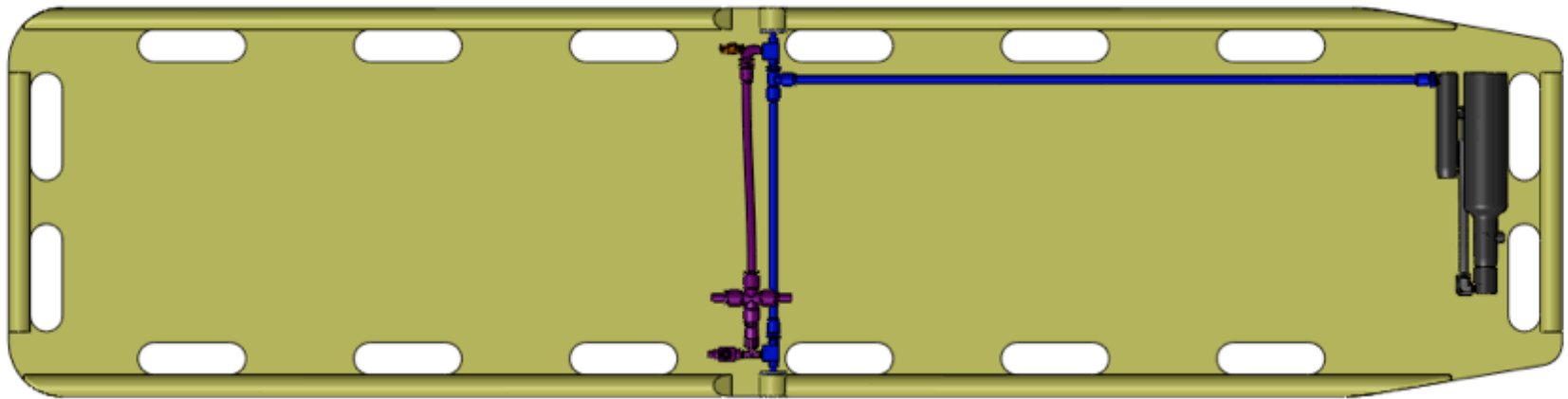
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Board + Air System

Controls



Introduction

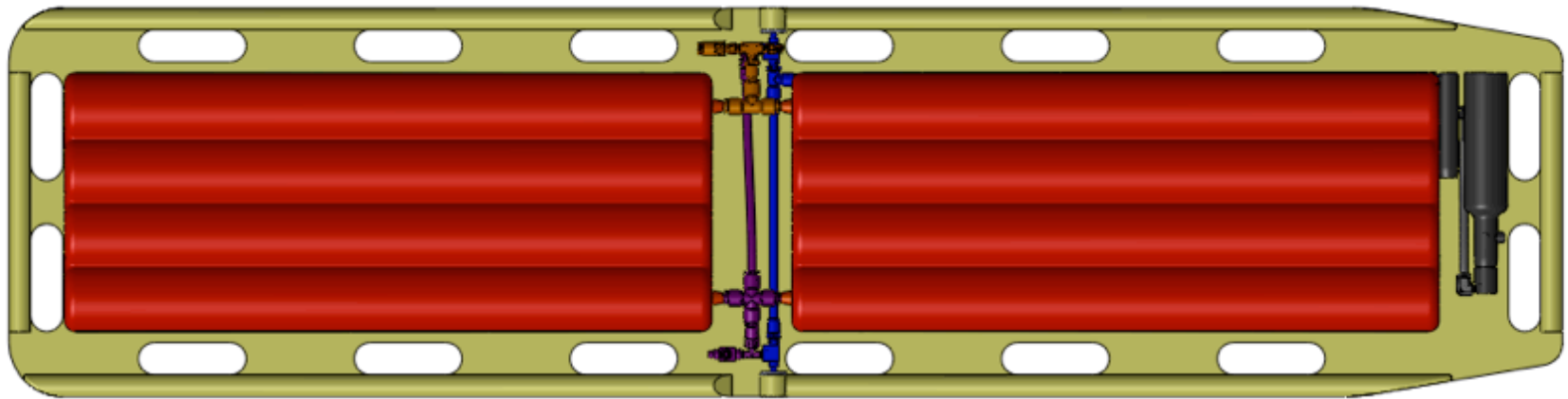
Demo

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Board + Air System + Bladders



Introduction

Demo

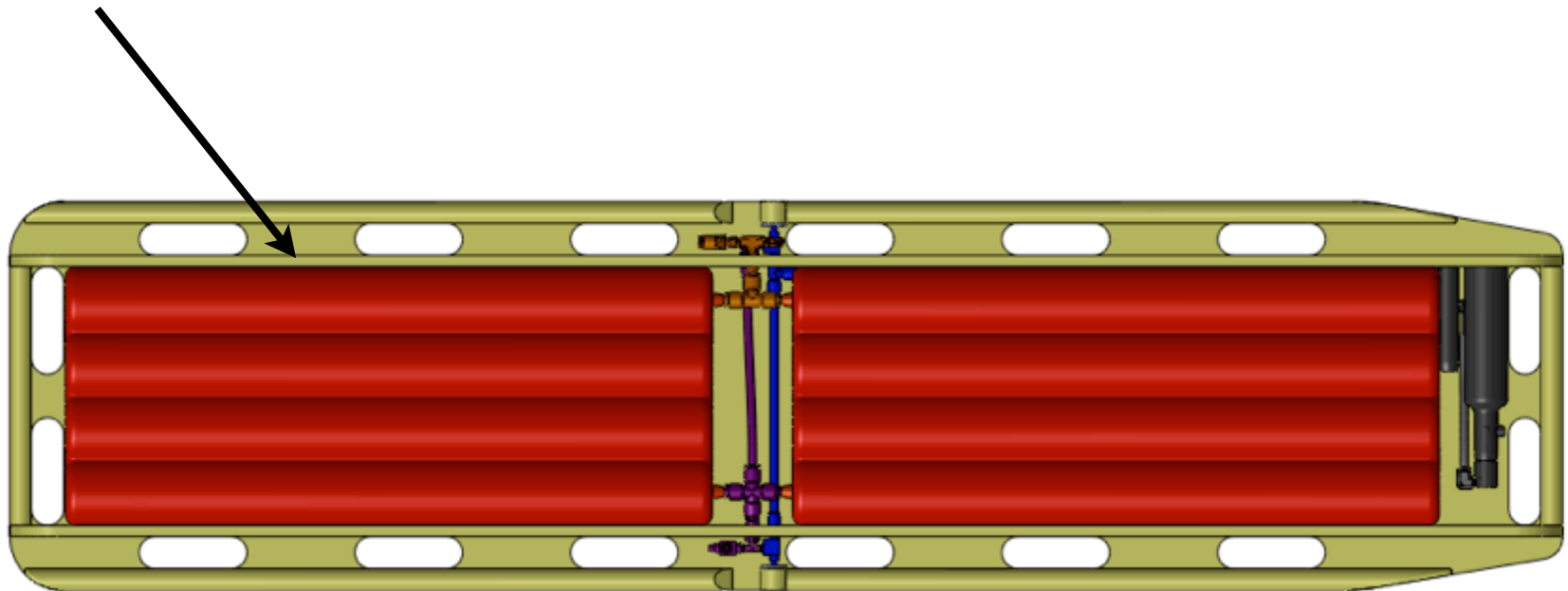
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Board + Air System + Bladders

Runners



Introduction

Demo

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Features

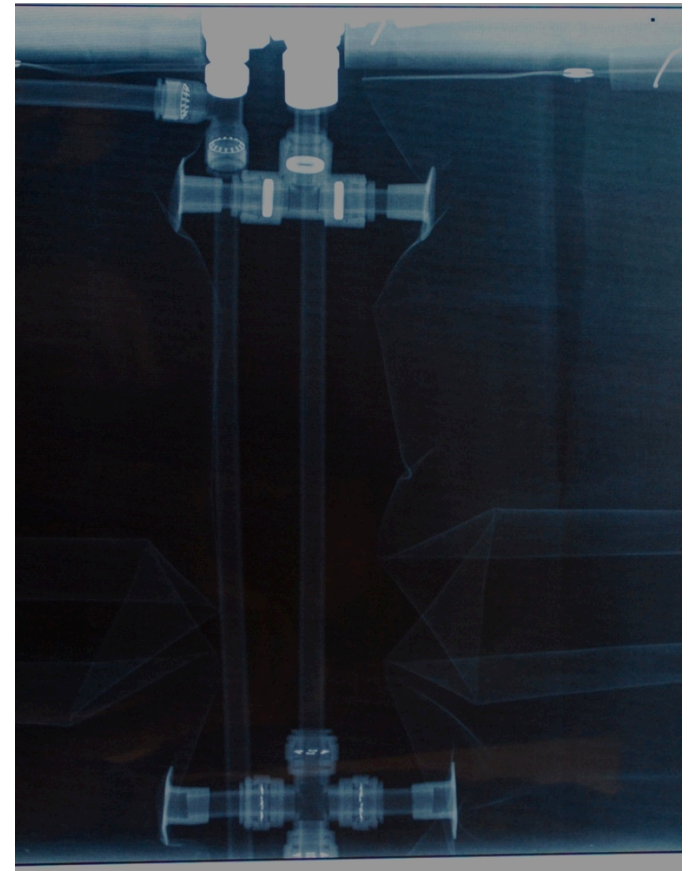
Business

Considerations




CAT (CT) scannable

Spine area is x-ray transparent




Corrosion resistance of materials



Product Comparison

			
Easy to position			
Floats heavy victims			

Product Comparison

			
Easy to position	✓		
Floats heavy victims	X		

Introduction




Demo

Need

Features

Business

Product Comparison

			
Easy to position	✓	X	
Floats heavy victims	X	✓	

Introduction




Demo

Need

Features

Business

Product Comparison

			
Easy to position	✓	X	✓
Floats heavy victims	X	✓	✓

Introduction

Demo

Need

Features

Business

Business Plan

Marketing strategy

Key risks

Financial outlook

Introduction

Demo

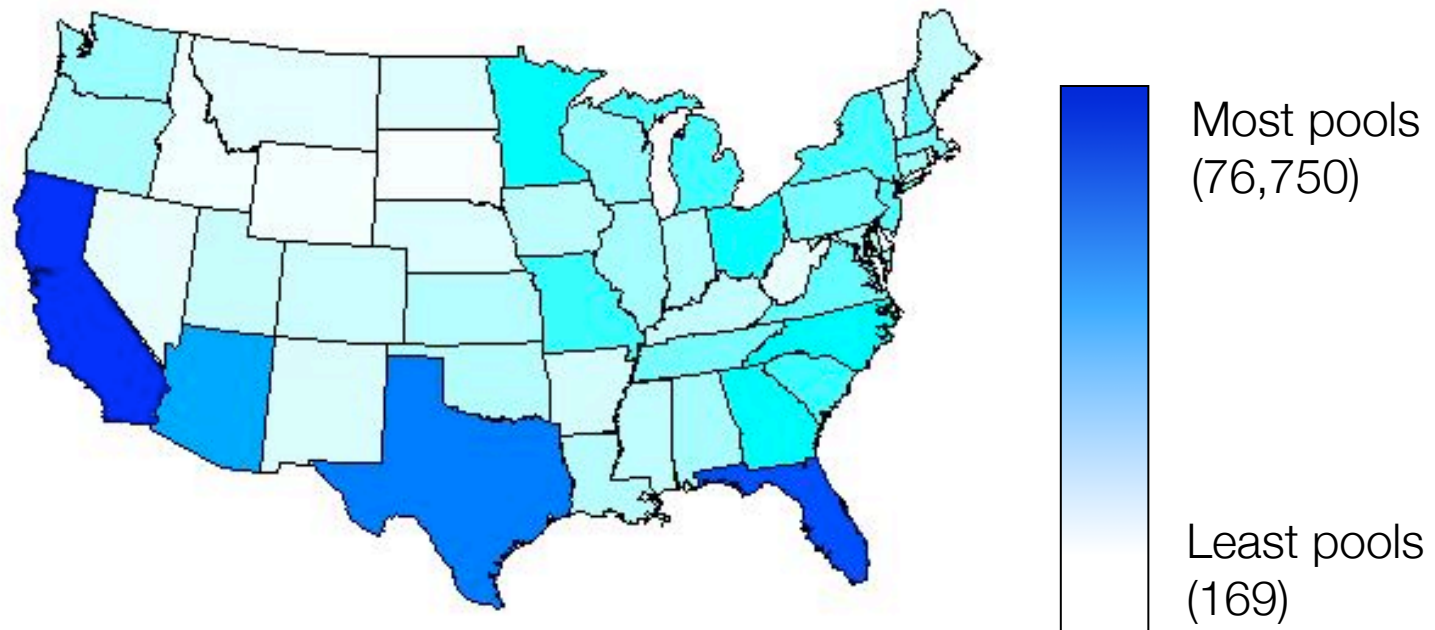
Need

Features

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Market Size

299,355 public/commercial pools in the US
Potential for 90,000 backboards/year



Number of pools per state

Introduction

Demo

Need

Features

Business

Key Risks

Market saturation

Barrier to entry

Pro-Lite: market leader

1989 model is still sold today

Strategy: Business to Business

Target: water rescue suppliers

Reduced expenses

Marketing/sales force

Inventory storage and distribution

Introduction

Demo

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Features

Business

Pricing

Cost of Manufacturing: \$250/board
Within two years: \$150/board

Wholesale price: \$319

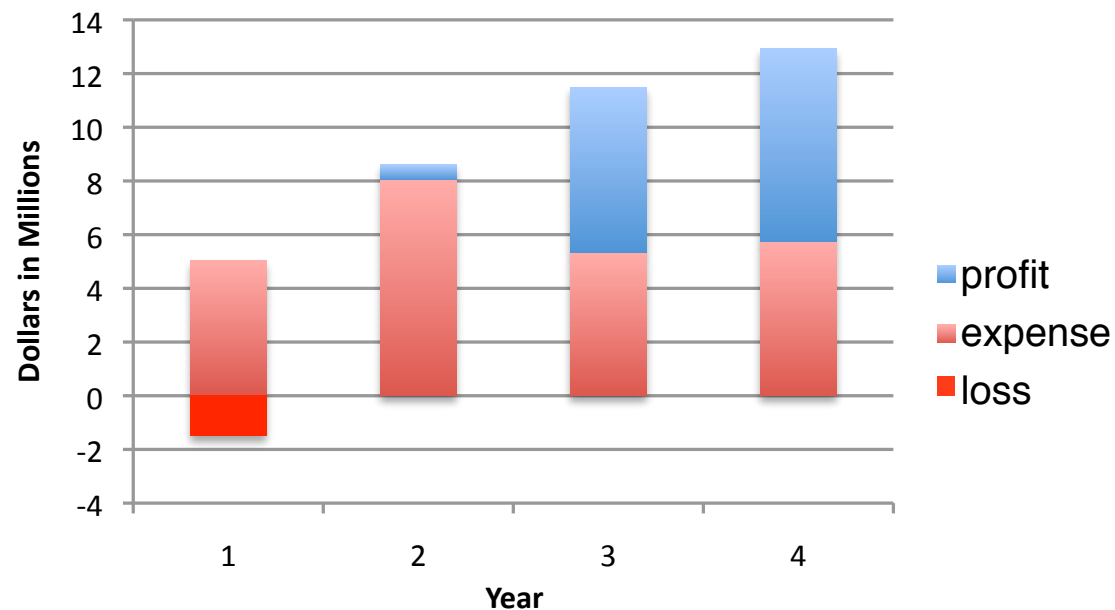
Price of popular boards: \$300-\$500

Financials

Initial investment: \$5 million

Return on Investment: 18.7%

Breakeven: Q1 of year 4



Introduction

Demo

Need

Features

Business

Acknowledgements

Thank you to:

2.009 Instructors and Staff

Pappalardo Staff

Jody Mello

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Sungmin Kim

Nick Powel

Mr. Sticky's Adhesives

Breton Industries

Pro-Lite Spineboards

Boston Paintball

Appendix: End of rescue

Pulling the board out of the water



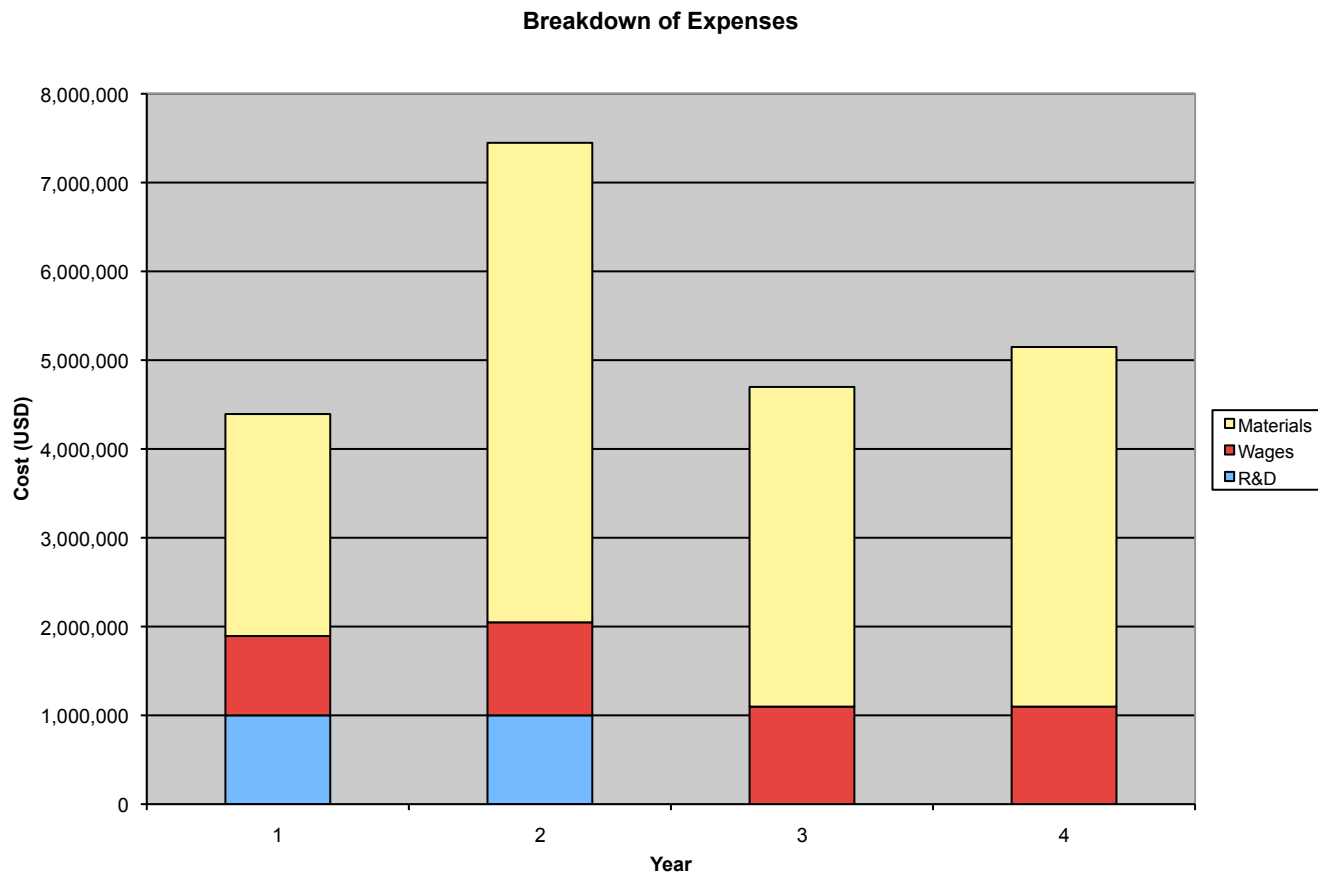
Appendix: Supporting Financials

Breakdown of material costs

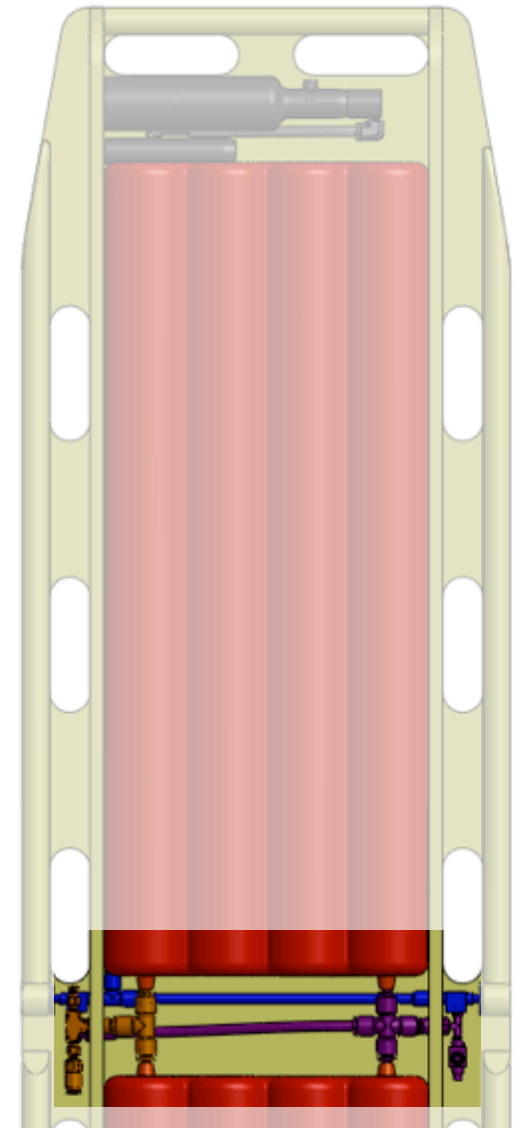
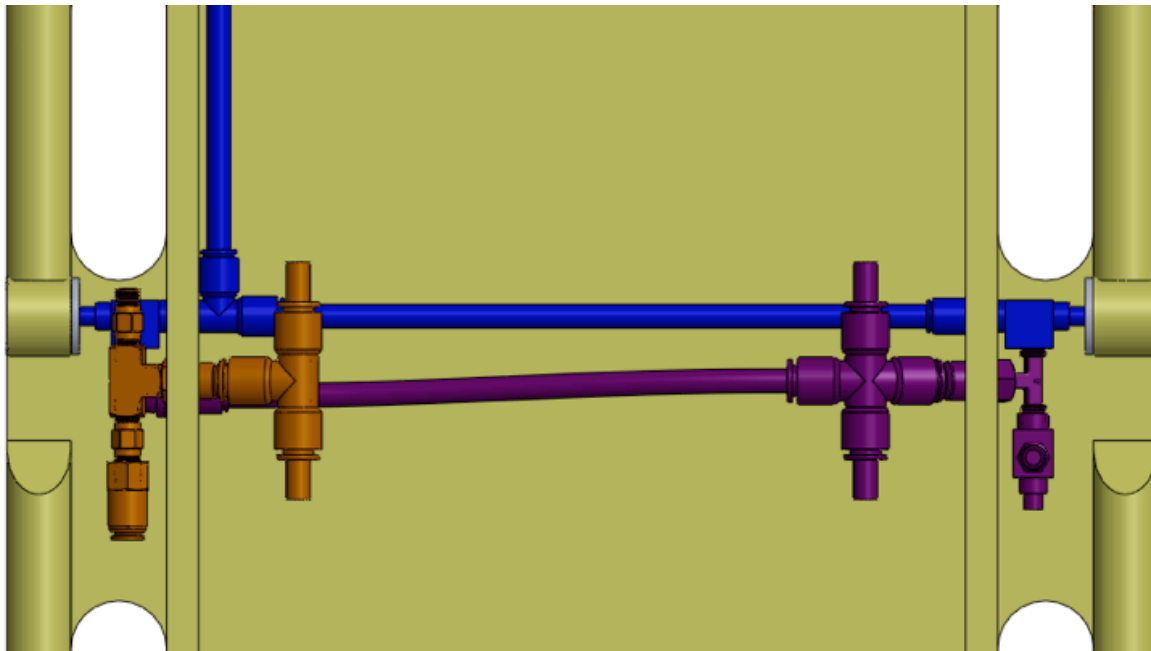
Components		# of Instances	Total
Board			
Carbon Fiber Sheet (.5mm)	\$412.50	1	\$412.50
Dragon Plate Carbon Fiber Veneer	\$468.75	1	\$468.75
Carbon Fiber Fabric (yard)	\$23.87	4	\$95.48
Epoxy Resin (1 quart)	\$25.65	0.5	\$12.83
Fast Hardener (.86 quarts)	\$26.43	0.5	\$13.22
HDPE Runners	\$39.31	0.25	\$9.83
Dowel Rod	\$2.24	3.5	\$7.84
Wooden Board (1/4")		1	
Board Total			\$43.71
Air System			
3/8" PVDF Tubing (1')	\$1.65	4	\$6.60
3/8" Ts	\$4.04	3	\$12.12
Push to Connect Adapters	\$2.92	6	\$17.52
Check Valve	\$8.97	2	\$17.94
Inflation Button	\$9.96	3	\$29.88
Metal Elbow	\$6.54	1	\$6.54
Piping T	\$1.58	1	\$1.58
Air Canister w/ Regulator			
CO2 Single Use Canister 16 g (pack of 2)	\$7.50	1	\$7.50
Air System Total			\$99.68
Bladders (set of 2)	\$35.00	1	\$35.00
Extras			
Head Immobilizer	\$0.00	1	\$0.00
Straps (set of 3)	\$0.00	1	\$0.00
Extras Total			\$0.00
(Minus Board)			
Total Price of Materials(w/o extras)			\$178.39

Appendix: Supporting Financials

Breakdown of expenses by year



Appendix: Air system close-up



Appendix: Materials Selection

Corrosion resistance of materials

		Chemicals Found in Pools					
		Calcium chloride dilute	Carbon dioxide (dry)	Chlorine water (saturated)	Hydrochloric acid dilute	DeChlor (sodium thiosulfate)	Calcium hypochlorite
Metals	Aluminum	U	E	G	U	G	U
	Brass	G	E	U	U	U	U
	Copper	G	G	U	-	U	U
	Nickel	E	G	U	G	E	-
	Steel	E	E	U	U	E	U
Nonmetals	ABS	R	R	R	R	R	-
	Carbon	R	R	R	R	R	R
	Epoxy	R	R	U	R	R	R
	Furan Resin	R	R	U	R	R	U
	Natural Rubber	R	R	R	R	R	U
	Neoprene	R	R	U	R	R	R
	Nylon 11	R	R	U	R	R	-
	Polyethylene	R	R	R	R	R	R
	Polypropylene	R	R	R	R	R	R
	Polystyrene	R	R	-	R	R	-
	PVC	R	R	R	R	R	R
	PVDF	R	R	R	R	R	R
	Silica	R	R	R	R	R	R
	Teflon	R	R	R	R	R	R
	Urethane	R	R	U	R	R	-

Metals: Resistance (in mil/yr of penetration)

E= less than or equal to 2

G= less than or equal to 20

S= less than or equal to 50

U= greater than or equal to 50

Nonmetals: Resistance

R= Resistant

U= Unsatisfactory