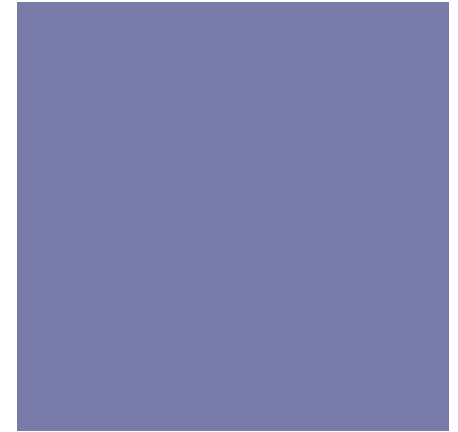
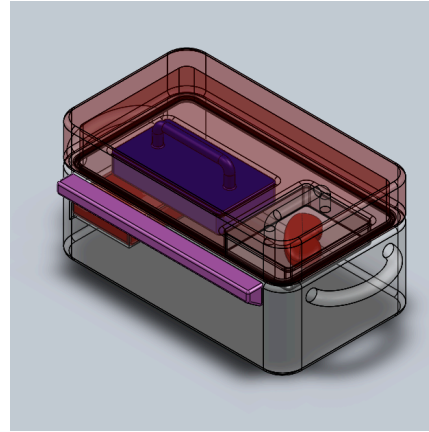


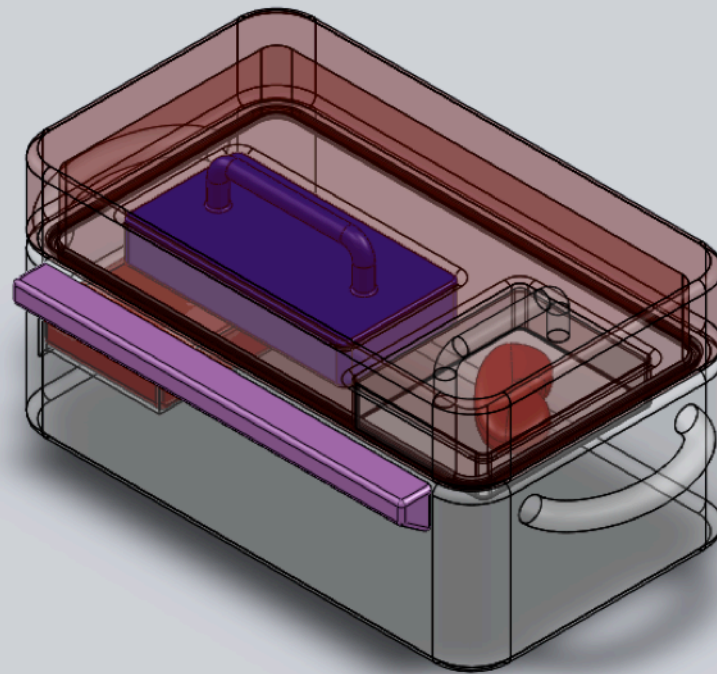
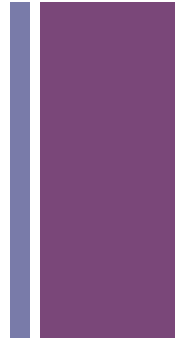


# Sketch Models

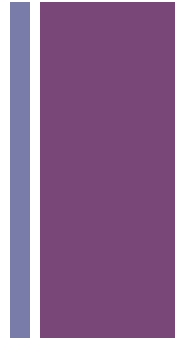


Team Purple A

# + Organ Vitality System

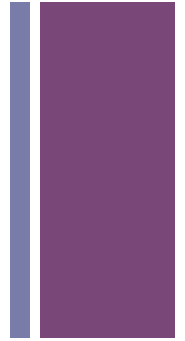


## + Defining the Problem



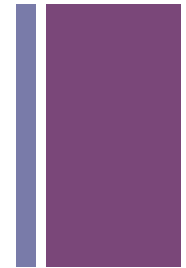
- Organs transported using styrofoam coolers and ice
  - 25% of hearts are damaged before transplant.
- LifePort Kidney Transporter
  - Uses ice as a cooling method
- Live Organ Care solution
  - Maintains normal organ function outside the body

# + Organ Preserver Benefits

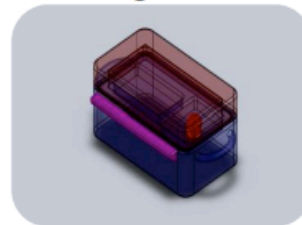


- Machine perfusion
  - Fluid circulates around organ
  - Organs should function soon after transplant
  - Reduces hospital stays by nearly 50%
- More organs become eligible for transplant
- Will work for all transplantable organs

# + Benchmarking Analysis



Cooler



OrganVS



LifePort



Organ Care System

## Features

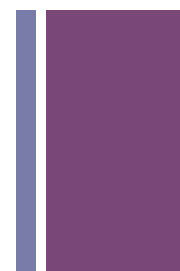
Features	Cooler	OrganVS	LifePort	Organ Care System
Organ preservation time	6 hours (hearts) <sup>i</sup>	> 24 hours (design goal for kidneys)	24-48 hours (kidneys) <sup>iii</sup>	12 to 15 hours (heart) <sup>i</sup>
Preservation method	Passive	Cool fluid refrigeration	Cold organ perfusion	Warm blood perfusion
Operating principle	Ice	Controlled refrigeration	Ice	Warm blood perfusion
Temperature control	None	Included	Only with ice present	Included
Transportable organs:				
Kidneys	Yes	Yes	Yes (only kidneys)	No
Livers	Yes	Yes	No	No
Hearts	Yes	Yes	No	Yes (only hearts)
Others	Yes	Yes	No	No
US approval	Yes	Not applied for	Yes	No (CE approved for Europe)
Battery life	None required	24 hr	24 hr	Not listed
Portability	Yes, w/ ice supply	Yes	Yes <sup>ii</sup>	Yes
Loaded weight	~15 kg	Not known	20 kg	Not listed
Air Transport Capable	Yes	Yes	Yes	Not listed, assuming yes
Retail Cost	\$5-\$8 for Styrofoam cooler <sup>iii</sup>	~\$5000 (goal)	\$18,000 <sup>iv</sup> /unit	Not listed, assuming >\$20,000

<sup>i</sup> Source: Daily Mail UK

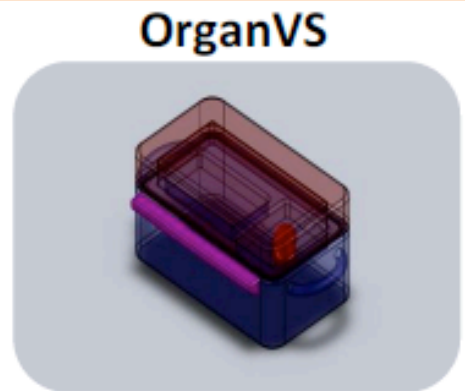
<sup>ii</sup> Source: AFCNewsSource.org

<sup>iii</sup> Source: Google search

<sup>iv</sup> Source: BusinessWeek



Cooler



OrganVS



LifePort



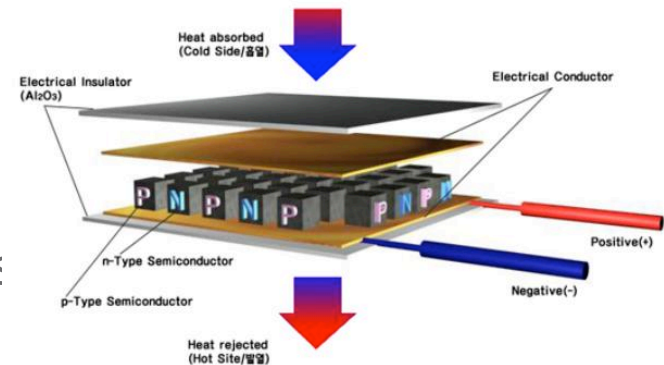
Organ Care System

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<sup>ii</sup> Source: AFCNewsSource.org  
<sup>iii</sup> Source: Google search  
<sup>iv</sup> Source: BusinessWeek

# + Sketch Model Lessons

- Vibrations can damage organs
  - Excludes rolling briefcase design
  - Excludes mechanical refrigeration
- Thermoelectric chip produces large amounts of heat
  - Peltier device
- Limiting factor is battery life
  - Cost and weight
  - Sketch model required 2 power supplies



# + Organ Preserver Sketch Model

