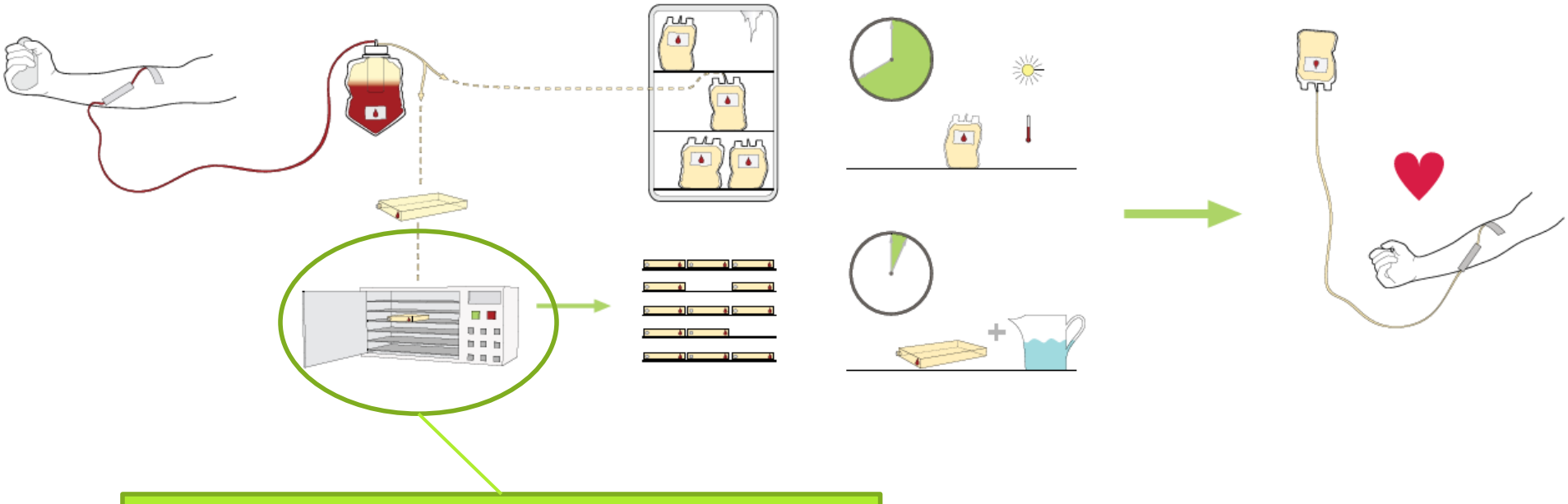
BLOOD PLASMA DEHYDRATOR

GREEN B

IMPROVING STORABILITY



Facilitate Sublimation:
Maintain low pressure
Remove water vapor
Provide enthalpy of sublimation energy

BLOOD ON THE BATTLEFIELD

- Expensive shipping Costs
- Fragility of supply chain
- Unreliable power source
- Mandatory cold transport

"Dried plasma is the most promising agent for damage control resuscitation … [and it] was identified as a top research priority."

–US Army Institute of Surgical Research**

**https://docs.google.com/viewer?a=v&pid=gmail&attid=0.1&thid=13a71513f6816cc8&mt=application/pdf&url=https://mail.google.com/mail/?ui%3D2%26ik%3D1c3172697f%26view%3Datt%26th%3D13a71513f6816cc8%26attid%3D0.1%26disp%3Dsafe%26realattid%3Df_h8f58wja0%26zw&sig=AHIEtbRm5e48G87NyC-Atpr-ec3q44TQJw

KEY RISKS

Sublimation rate?

$\dot{m} = 0.0145 \frac{kg}{m^2 s}$

Power for sublimation?

$P_{sub} = 36\ kW$

Sterile Environment?

Gore™ Lyoguard® Trays

Budget?	
Chamber + Condenser	$2500
Vacuum Pump	$2500
Controls + Heat Source + Sensors	$1000
Total	**$6000**

COULD WE FREEZE DRY PLASMA PROXY?

Vacuum Pump

Condenser with Dry Ice

Frozen Coconut Water

- Sketch model: need a condenser
- Pressure seals: Unable to freeze dry coconut water
- Reattempt: using Physics J-Lab pressure chamber

CUSTOMER CONTRACT

Customer Need	Product Attributes	Engineering Specifications
Transportable to remote locations	Weight	500 - 1000 lbs
Easily stored in a military hospital	Size	No larger than 4’ wide, 4’ deep, and 7’ tall
FDA approved or Surgeon General endorsed	Sterility or FDA Approval	yes/no
Powered by a single portable generator	Power Consumption	7 - 15 kW
Can efficiently freeze-dry blood plasma	Plasma produced per cycle	8 - 9 units (1 unit = 300 cm^3)