

VIRTUAL DESIGN REVIEW 1

Retractable Storage Rack for
Inert Atmosphere Glove Box

JACQUELINE MATTHEWS

MICHEAL RODINO

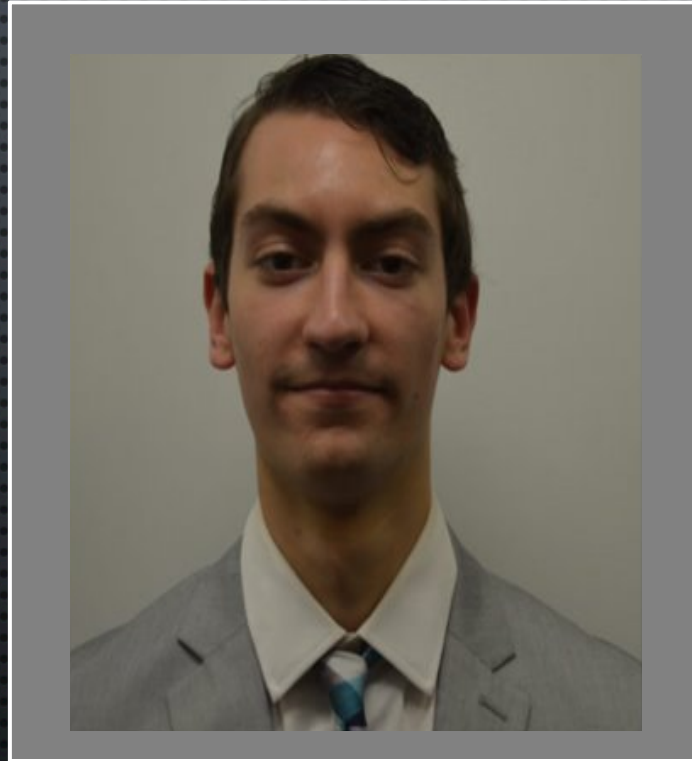
EVAN RYAN



TEAM 502 INTRODUCTIONS



Jacqueline Matthews
Lead Mechanical Engineer



Micheal Rodino
Manufacturing Engineer



Evan Ryan
Design Engineer



SPONSOR AND ADVISOR

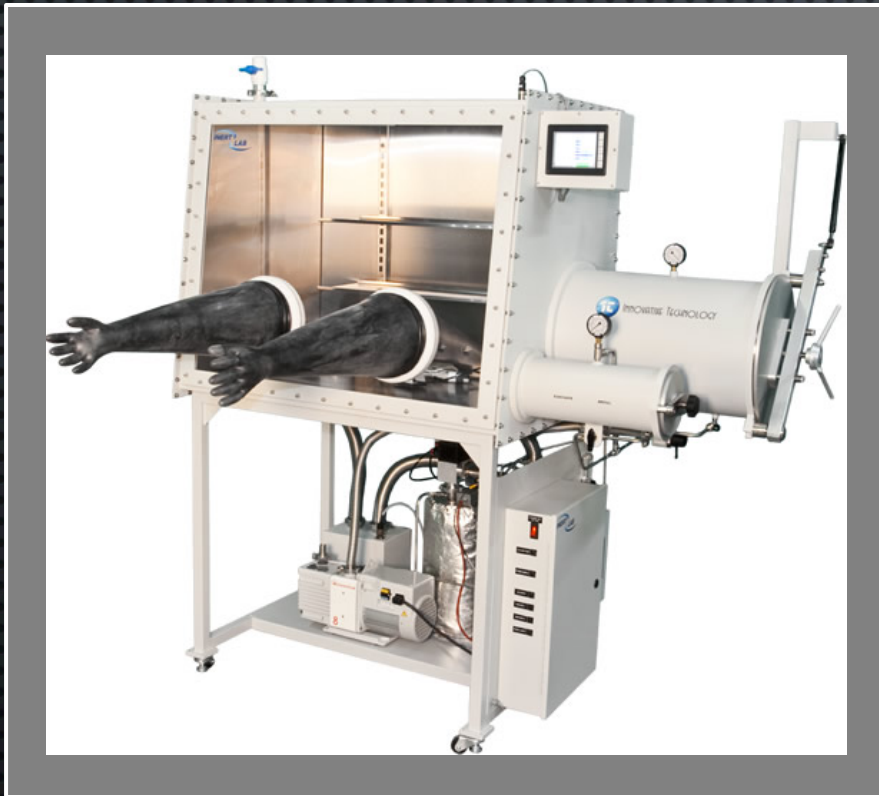


Sponsor: Bill Starch



Academic Advisor: Dr. Hellstrom

OBJECTIVE



THE OBJECTIVE OF THIS PROJECT IS TO CREATE FULLY FUNCTIONAL RETRACTABLE RACKS THAT WILL BE IMPLEMENTED INTO AN INERT ATMOSPHERE GLOVE BOX. THE RETRACTABLE RACKS WILL BE USED TO STORE MATERIALS, TOOLS, SCALES, ETC., INSIDE THE GLOVE BOX, CREATING AN ORGANIZED, UNCLUTTERED WORKING AREA FOR THE USER.

INERT ATMOSPHERE GLOVE BOX

- CONTROLLED ATMOSPHERE APPARATUS WHICH USES INERT GAS TO PROVIDE A STABLE AND STERILE WORK ENVIRONMENT.
- USER REACHES INTO BOX THROUGH GLOVES AND CONDUCTS EXPERIMENT/TEST.
- CAN MANIPULATE AIR PROPERTIES AND ALLOW FOR MORE ACCURATE TESTING.



PROJECT SCOPE



KEY GOALS AND ASSUMPTIONS

KEY GOALS

- RETRACTABLE STORAGE RACKS
- OPTIMIZE STORAGE SPACE
- UNRESTRICTED WORK AREA
- ABLE TO BE USED BY ONE USER
- EASILY REMOVABLE

ASSUMPTIONS

- OLD GLOVE BOX WILL BE PROVIDED FOR PROTOTYPING
- SIMILAR INTERIOR DESIGN IN ALL BOXES
- CAN BE MOUNTED USING SCREWS
- BUILT FOR INTERIOR OF GLOVE BOX

MARKETS AND STAKEHOLDERS

MARKETS

- APPLIED SUPERCONDUCTIVITY CENTER (ASC) AND ITS GRADUATE STUDENTS
- FAMU/FSU CHEMISTRY DEPARTMENT
- GLOVE BOX MANUFACTURERS

STAKEHOLDERS

- DR. SHAYNE McCONOMY
- DR. ERIC HELLSTROM
- BILL STARCH
- ASC



CUSTOMER NEEDS



Question

Customer
Response

Interpreted
Need

1. What materials can be used inside the glove box?

Cannot be materials that contain water or rust easily. Wood cannot be used.

The materials used for the storage racks can be aluminum or steel.



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2. How much weight should the racks be expected to hold?

The racks can hold tools or materials needed by the user

The storage solution can carry tools or materials.



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3. Where can the racks be implemented?

The bottom and the side where the antechamber is can't be used.

The racks can be mounted onto the back, top, and side panels.



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You can drill into
the top or sides of
the box, but not
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Can the glove box be penetrated?

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Does the design have to work for a single- or double-sided glove box?

Focus on creating a design for a single sided glovebox for now.

The racks are going to be implemented on single a sided glove box.



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Can the box be disassembled for installation?

Ask resources if the box can be decommissioned or have solution retrofitted.

Create an installation procedure if the box cannot be decommissioned.



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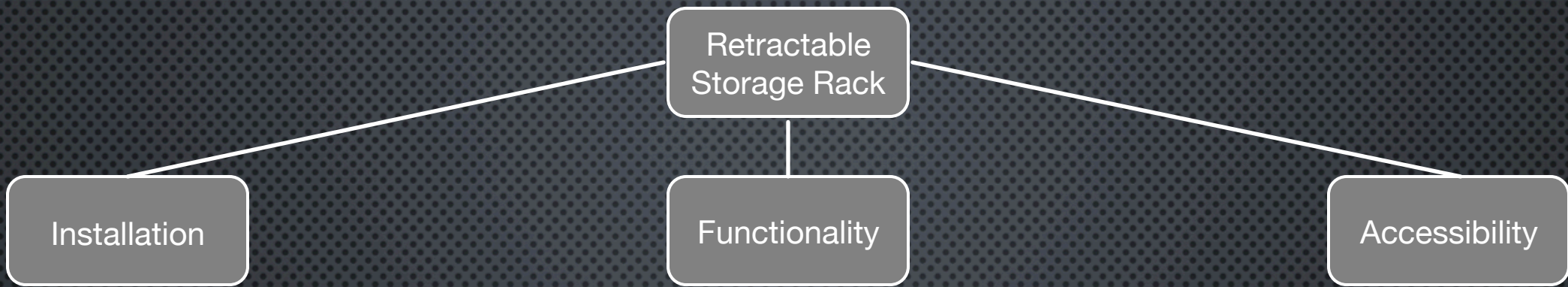


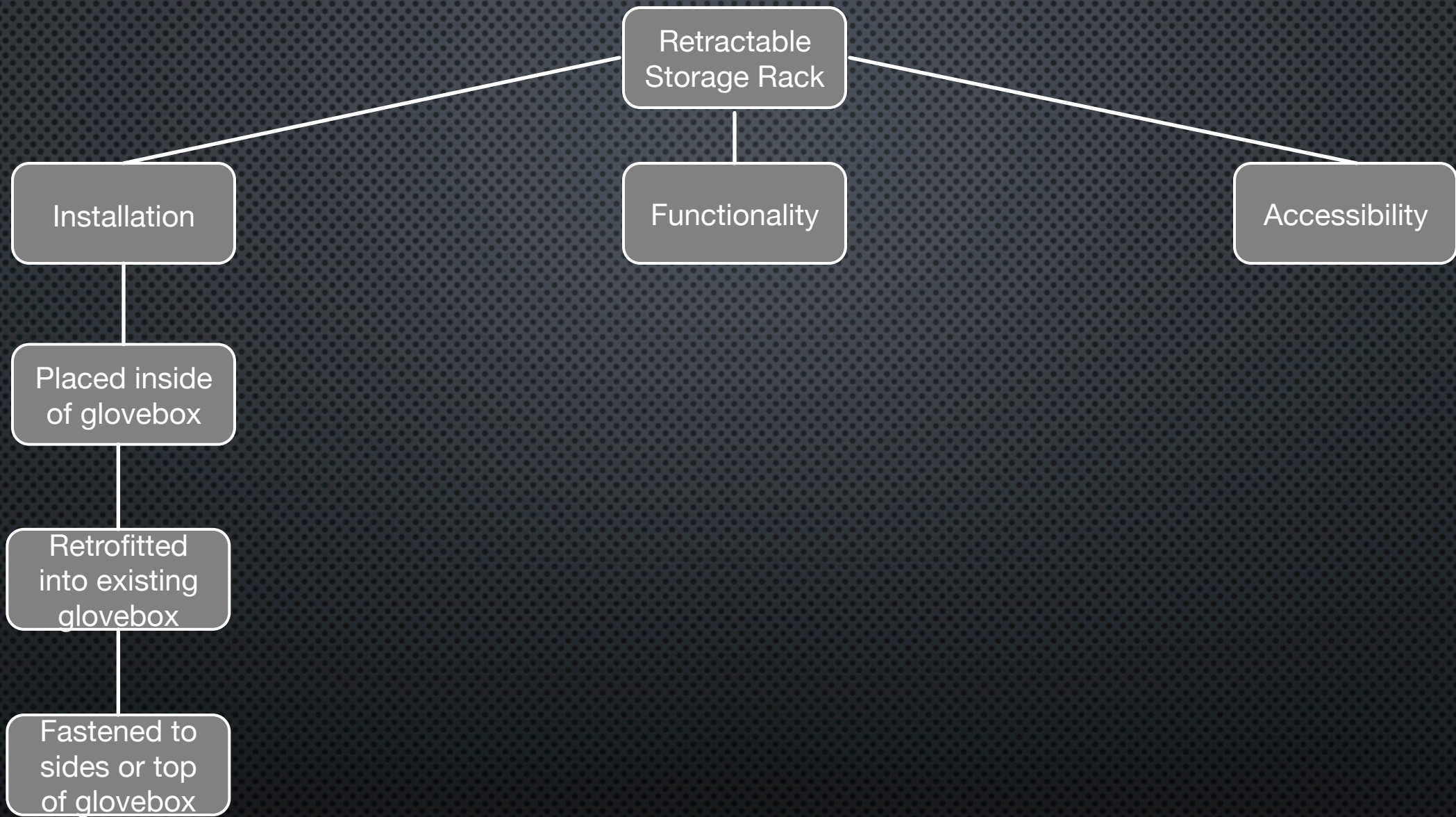
FUNCTIONAL DECOMPOSITION

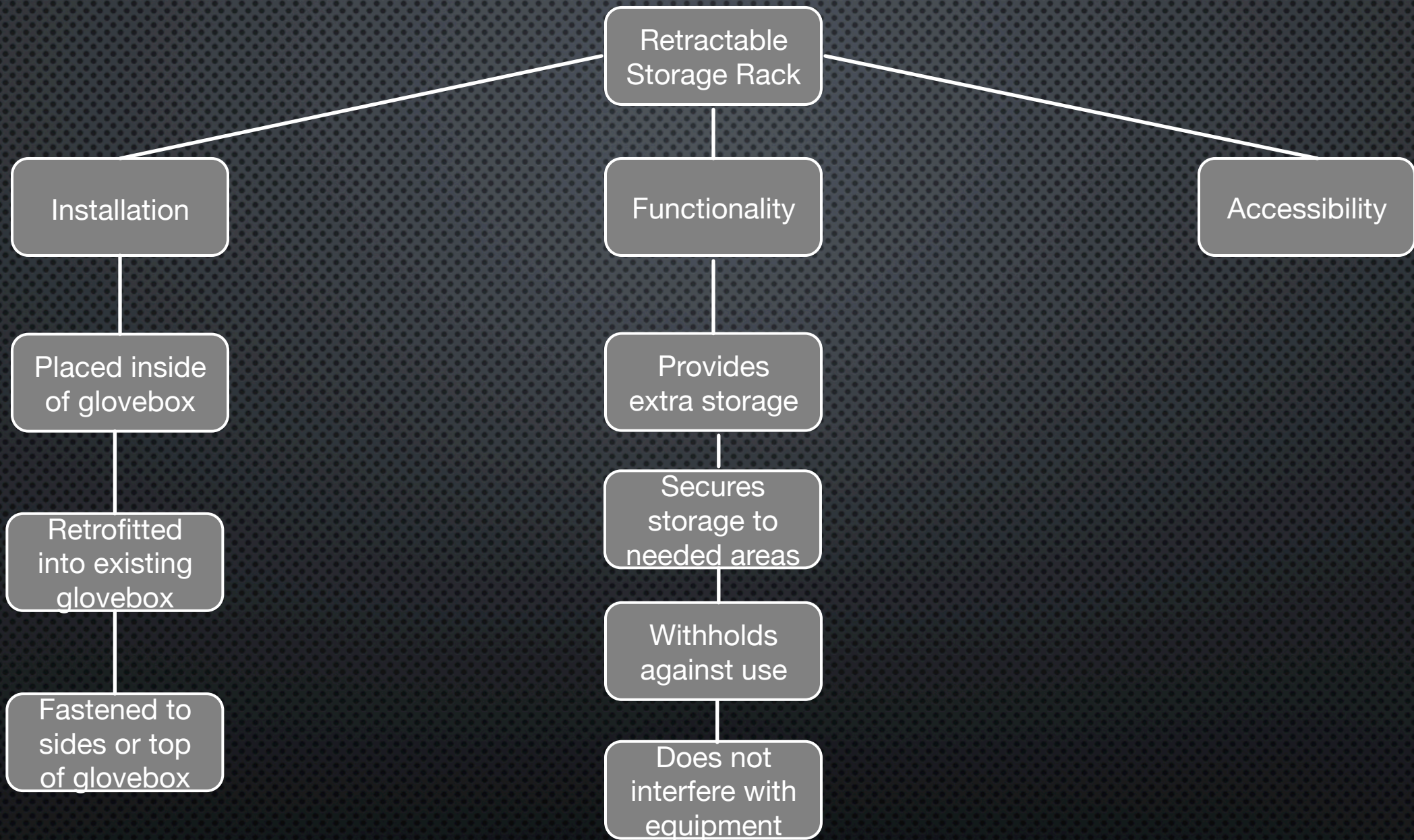


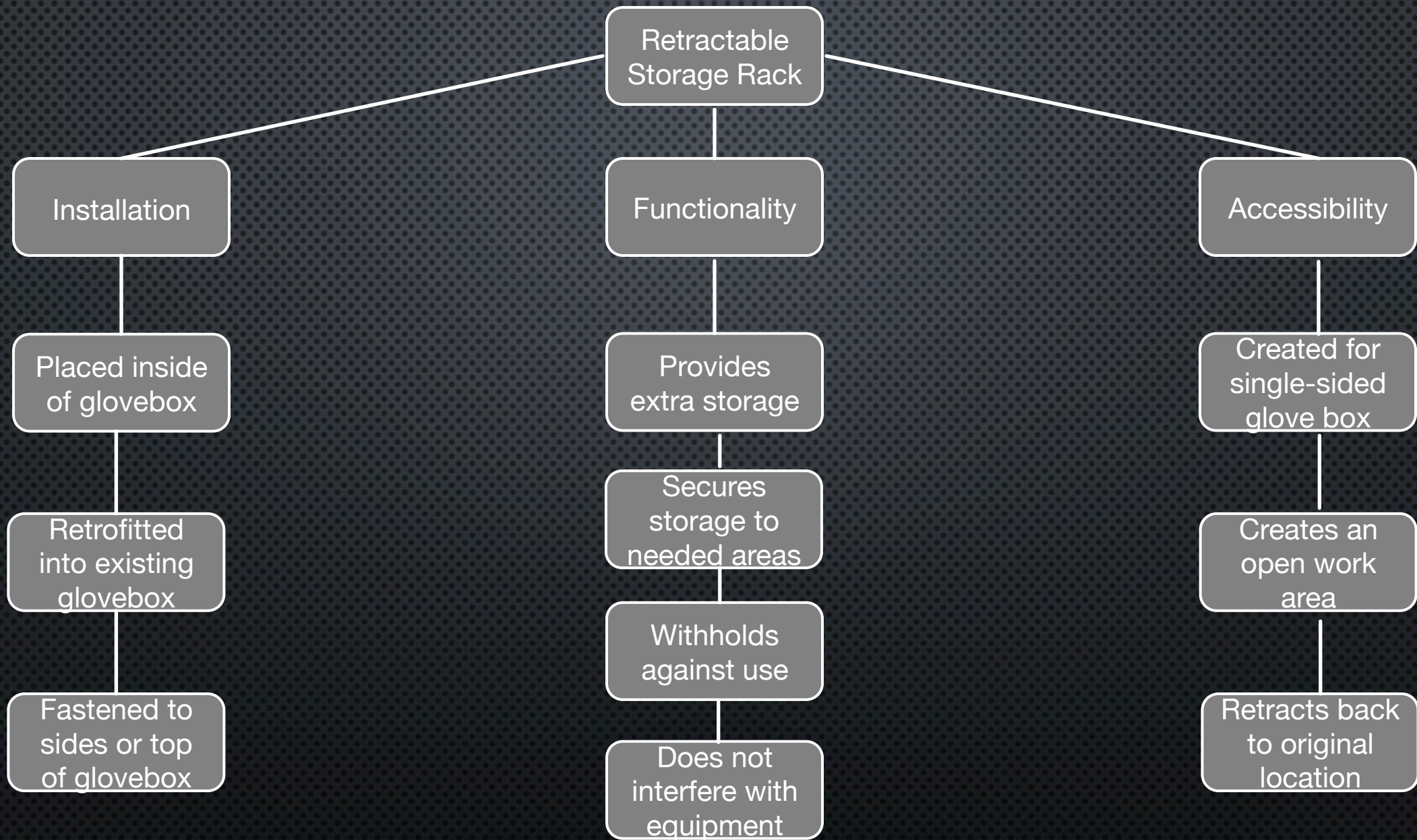
Retractable
Storage Rack











FUTURE WORK

- GENERATE CONCEPTS AND SELECT THE BEST DESIGN.
- CREATE A BILL OF MATERIALS.
- RISK ASSESSMENT.
- PROTOTYPING.



ACKNOWLEDGEMENTS

- BILL STARCH, CHONGIN PAK, AND ARLAND OHRT FOR DEMONSTRATING THE USE OF THE GLOVEBOX AND GIVING US A DECOMMISSIONED BOX FOR PROTOTYPING.
- DR. HELLSTROM FOR HIS HELPFUL EXPERTISE ON THE PROJECT.
- ASC FOR SPONSORING THE PROJECT AND ALLOWING US TO WORK ON IT.



REFERENCES

CLEARTECH. "INERT ATMOSPHERES GLOVE BOX." *CLEATECH.COM*, 2018, 30 SEPTEMBER 2019.

[HTTPS://WWW.CLEATECH.COM/INERT-ATMOSPHERE-GLOVE-BOX/](https://www.cleatech.com/inert-atmosphere-glove-box/)

INERTTECHNOLOGY, "GLOVEBOXES." *INERTTECHNOLOGY.COM* , 30 SEPTEMBER 2019

[HTTPS://WWW.INERTTECHNOLOGY.COM/GLOVEBOXES/](https://www.inerttechnology.com/gloveboxes/)

QUESTIONS



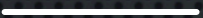
BACKUP SLIDES

SUPPORTING SLIDES TO THE CONTENT ABOVE.

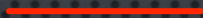




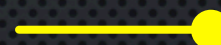
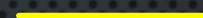
STANDARD SHAPES



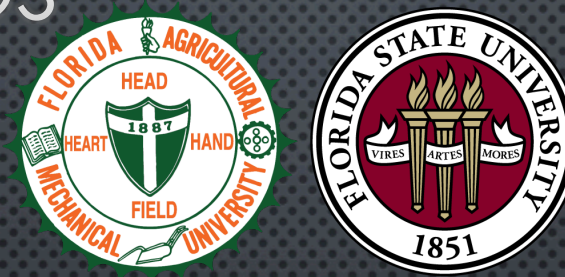
Text box 1



Outlined Text Box



APPROVED LOGOS






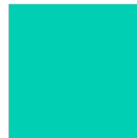





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COLOR PALETTE

 <p>PANTONE® 2299 C</p>	2299 C Color values: RGB 164 210 51 HEX/HTML #A4D233 CMYK 41 0 84 0	 <p>PANTONE® 1788 C</p>	1788 C Color values: RGB 238 39 55 HEX/HTML #EE2737 CMYK 0 88 82 0	 <p>COE Dk Gray</p>	75% Black Color values: RGB 64 64 64 HEX/HTML #404040 CMYK: 0 0 0 75
 <p>PANTONE® 2239 C</p>	2239 C Color values: RGB 0 207 180 HEX/HTML #00CFB4 CMYK 59 0 39 0	 <p>PANTONE® 647 C</p>	647 C Color values: RGB 35 97 146 HEX/HTML #236192 CMYK 96 54 5 27	 <p>COE Md Gray</p>	50% Black Color values: RGB 128 128 128 HEX/HTML #808080 CMYK: 0 0 0 50
 <p>PANTONE® 2199 C</p>	2199 C Color values: RGB 0 187 220 HEX/HTML #00BBDC CMYK 77 0 16 0	 <p>PANTONE® 7535 C</p>	7535 C Color values: RGB 183 176 156 HEX/HTML #B7B09C CMYK 10 11 23 19	 <p>COE Lt Gray</p>	25% Black Color values: RGB 191 191 191 HEX/HTML #bfbfbf CMYK: 0 0 0 25



APA TABLES

Category 1	Category 2	Category 3	Category 4	Category 5
Item 1				
Item 2				
Item 3				
Item 4				

Category 1	Category 2			Category 3	
	subcategory 1	subcategory 2		subcategory 1	subcategory 2
Item 1					
Item 2					
Item 3					
Item 4					