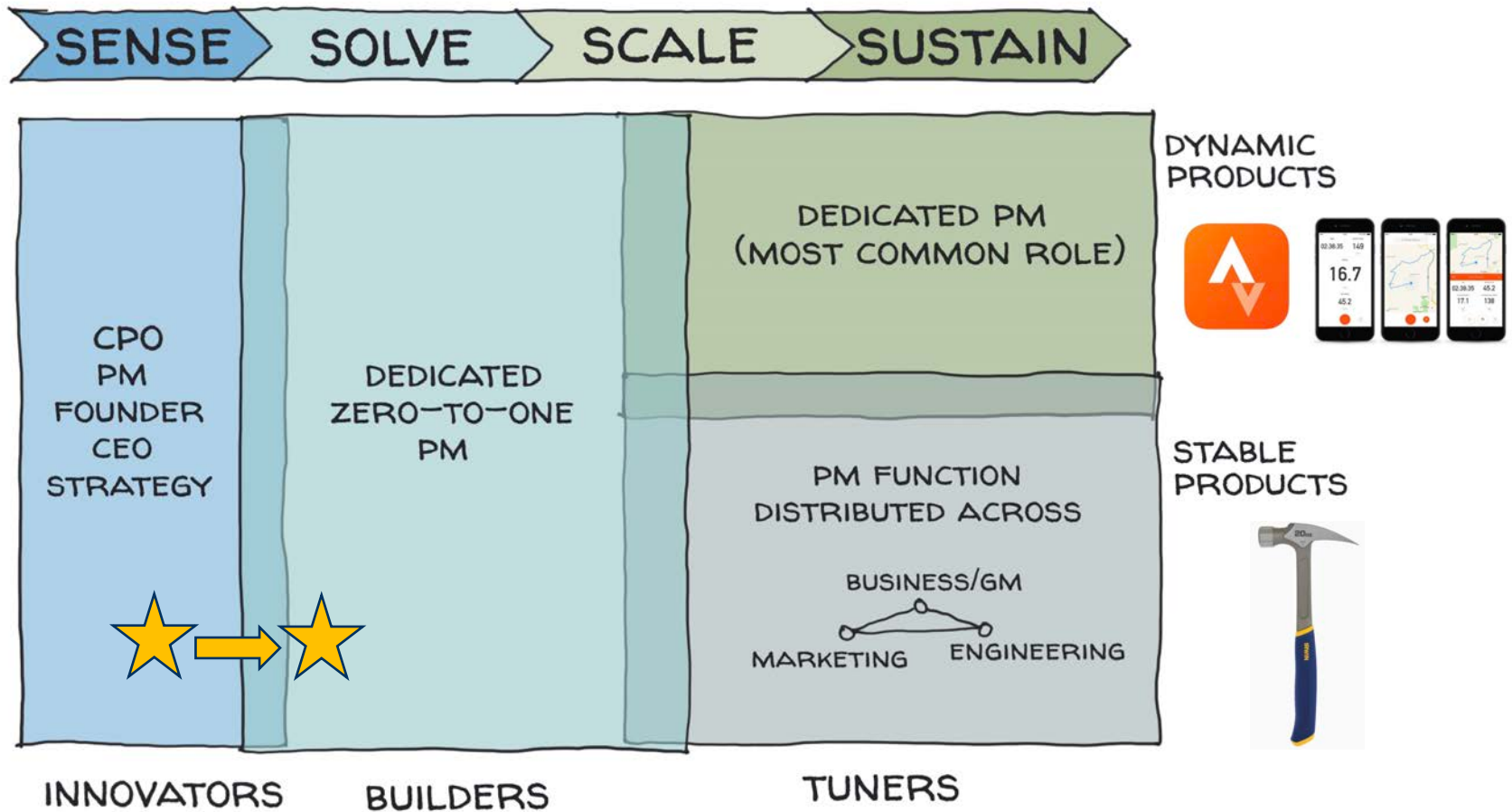
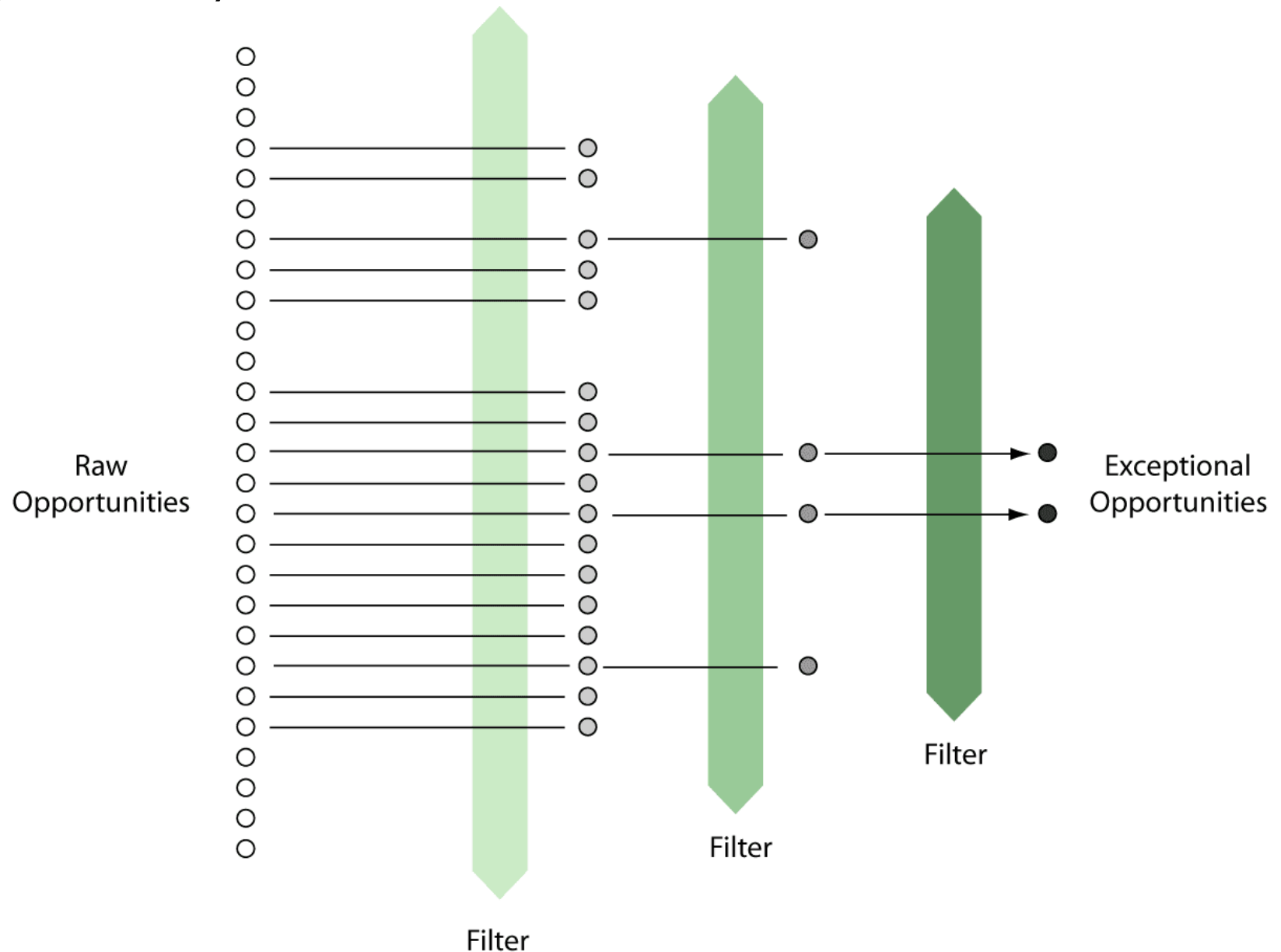


PM in Context



Innovation Tournament Process for Identifying Opportunities (e.g., OIDD614)



Triple Diamond Model of Design



- Beachhead market
- Persona
- Job to be done (JTBD)

Adapted from UK Design Council "Double Diamond" model.

<https://www.designcouncil.org.uk/news-opinion/what-framework-innovation-design-councils-evolved-double-diamond>
<https://medium.com/design-leadership-notebook/the-new-double-diamond-design-process-7c8f12d7945e>

Panel Supply

Plywood, panels, sheet goods, and other supplies for makers.



Contact:

Karl T. Ulrich

ktulrich@gmail.com

Customer Persona



Peter - Educational Laboratory Coordinator – UPenn Mechanical Engineering Department

- Laser cutters and Makerbot 3D printers
- Buy a single-size sheet 16" x 24" of two materials MDF and Acrylic
- Use \$xxk / year in materials (1-2 orders per month)
- Thicknesses 1/8 in or 1/4 in nominal
- Serve hundreds of Penn students – **who purchase their own non-standard materials**
- Buy from Tague (local lumber supply company) and Curbell Plastics (national plastics distributor)
- Prices are all over the map – purchasing not too professional (e.g., MDF prices very high, Acrylic quite low)

Beachhead Market

Indie and university maker labs and their maker customers



Land the lab with very good price and service on their stock material (usually MDF and Acrylic).

1

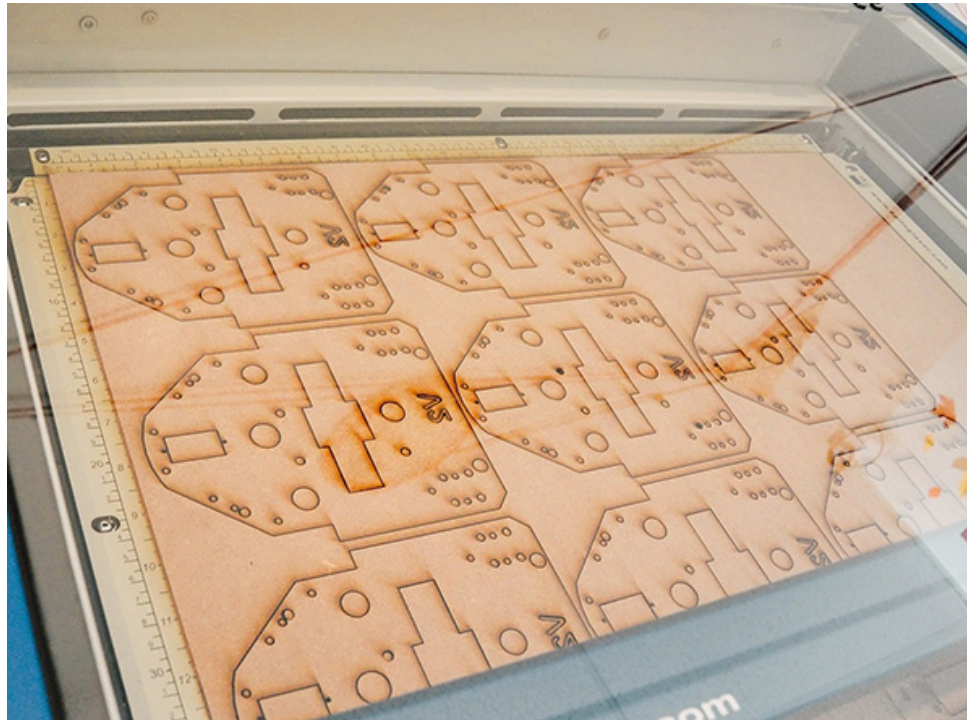


Be the lab's referral of choice for all their users who need other materials.

2

Mission Statement – Job to be Done

- Supply sheet goods to maker labs and individual makers.
- Key benefits / Value Proposition
 - Pre-cut to the size used in cutting machines
 - Single source for wood, plastics, metals, specialty materials
 - Easy to manage inventory – easy ordering, 1-2 day delivery, easy receiving
 - Attractive prices on high-volume materials (e.g., MDF and Acrylic)
 - Large selection of specialty materials, available in single pre-cut sheets (e.g., bamboo plywood, Kirei board, cork, silicone rubber)
 - Single source referral for individual makers, who are the end customers of maker labs (e.g. “no, we don’t stock bamboo, but just go to Panel Supply to get it.”)



Market Segmentation

	Indie Maker Lab	Edu Labs	To-Order Production Firm	DIY / Hobbyist	Bespoke Designer/ Artist	Furniture/Fixture Fabricator	Sign Makers
End User	Hacker, Maker	Students, Research Staff	Designer, pro				
Application							
Benefits							
Lead Customers	NextFab Studios	UPENN FabLab	Neal's CNC				
Market Characteristics		Novice users	High customization, interactive engagement				
Partners/ Players							
Market Size							
Competition							
Platform							
Complementary Assets							
Assets Required							
Typical Panel Sizes			5'x10' bed				
Typical Materials			any non-ferrous				

Nate to finish

Market Size – Beachhead Market (Materials only, US)

- Bottom-up estimate – Total Addressable Market (TAM)
 - xxx universities each with x significant maker labs
 - xxx maker spaces in US with significant laser cutting
 - Annual materials spend per lab \$xxk
 - Each lab has xxx users ==> xx users @ \$xx/user
 - \$x million per year
- Top-down guess
 - Students -- laser/router/waterjet makers
 - 40k/yr mechanical engineering grads
 - 10k/yr architecture grads
 - 2k/yr industrial design grads
 - Educational systems producing 60k/yr at 3 yr period of engagement ==> 180k student population
 - Makers – swag 100k
 - Average use of materials: -- swag xx USD/yr
 - xxx individuals at xx USD/yr ==> \$xx mm/yr

Nate to finish

TAM ~ \$xx mm/yr
(small, but
underserved, easy
to access)

<https://makezine.com/2017/11/01/open-world-20-databases-help-find-local-maker-resources/>

Customer Acquisition

- Sales call in person to Maker Labs
- Mailing list within Maker Lab community
- Deliver very nice sample box with lots of branding – sample board for wall (tethered samples)
- Adwords for “laser cutter materials” etc. for individual maker acquisition
- Referrals from cutter manufacturers
- Lots of swag for lab managers



Images from laser-cutting service Ponoko

Benefit proposition (key customer needs)...

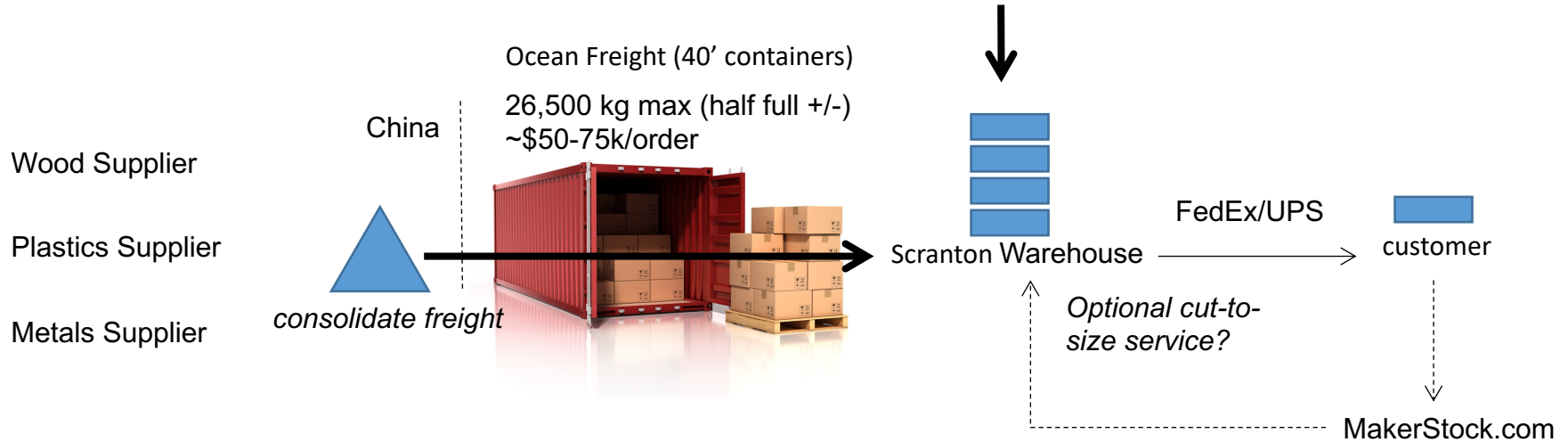
Panel Supply

- Materials pre-cut for your machines (e.g., 18 x 24, 18 x 32) and ready to ship. Orders received before 2pm ship same day.
- We stock your materials so you don't have to waste valuable space in your shop.
- Attractive pricing so your budget goes farther.
- One-stop shopping for your community to buy single sheets of other materials you allow on your machines (e.g., acetal, polycarbonate, baltic birch, and more).

Order at panelsupply.com or call Steve at 383-478-4566

Solution Concept

US Suppliers (2-5 day lead time)
to Deal with Forecast Error



- Some large panels for cut-to-size use in Scranton
- Most product pre-cut and packaged in ready-to-ship cartons (e.g., 12 18x24x1/4 Acrylic panels)



Phase 2

Laser cutting service
(cut entire panels from customer file)

MVP

- 10 materials
- 2-4 thicknesses per material
- 1-4 sheet sizes per material
- Order one full-weight 40' container from China to start (~\$50,000)
- Scranton facility
 - Source pre-cut panels in cartons from China
 - Panel saw + radial arm saw to cut low-volume sizes from full sheets
 - Use local suppliers if necessary to address forecast error in panel sizes and materials
- Shopify eCommerce site
- Laser cut samples



“Validated Opportunity”

Formulated Opportunity Dec 2018 – Jan 2019

Formed entity April 2019

➔ Build and launch the minimum viable product (MVP)



Plywood, panels, sheet goods, and other supplies for makers.



Contact: xx(xx@makerstock.com)

Beachhead Market

University maker labs and their users.



Land the lab with very good price and service on their stock material (usually MDF and Acrylic).

1



Be the lab's referral of choice for all their users who need other materials.

2

Job to be done:

Provide a single-source for pre-cut materials for use by labs and their (student) users.

Sources of Sustainable Advantage

1

Brand



2

Customer relationships with key EDU maker labs

- Requires:
 - Outside sales, direct relationships with labs
 - Maker culture
 - Community engagement

3

Scale

- Big enough to buy from original manufacturers (e.g., \$100k orders)
- Requires:
 - 200+ lab accounts


Naming

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	
1		Bought It	NBU	In Use	Available	For Sale	NBU friends	Score	Length	L-1to5	K Like	spelling ambig	Evokes 1st	Serv	Easy to Say	Flex to Other	Flex to Services	Flex to Products	Notes			
2	makermill					can't find	5	4.63	9	4	5	5	3	5	5	5	5					
3	makercraft					3595	3	4.50	10	3.5	4.5	5	3	5	5	5	5					
4	makerways					3795		4.38	9	4	4	5	3	4	5	5	5					
5	makerguys					588		4.25	9	4	4	5	3	4	5	5	5	4				
6	makerman					899		4.25	8	4	4	5	3	5	4	5	5	4				
7	makeroo					2195		4.19	7	4.75	3.75	4	2	4	5	5	5					
8	makersupply					offer		4.13	11	3	4	4	5	4	5	4	5	4				
9	makera					1895	3	4.13	6	5	4	4	2	3	5	5	5	5				
10	makercenter					offer		4.09	11	3	4.25	4.5	3	4	5	5	5	4				
11	makerstock					4495	4	4.00	10	3.5	4.5	4	5	4	5	5	3	3				
12	makertopia					3750		4.00	10	3.5	3.5	4	3	4	5	5	5	4				
13	topfab					2288		4.31	6	5	3	5	3	4.5	5	5	5	4				
14	panelworld					TBD		3.97	10	3.5	2.5	5	5	3.75	3	5	5	4				
15	panelworks		1			10000		4.06	10	3.5	2	5	5	5	3	5	5	4	counter offer made, 3000 reservation price			
16	fabmatix	1						4.00	8	5	2	3	2	5	5	5	5	5	5	fabmatics.com in use by a factory automation company		
17	makerhaus					2875		3.84	9	4	3	2	3	3.75	5	5	5	5	5	makerhouse.com in use -- probably too close		
18	panelmill	1	1		1			3.84	9	4	2	5	4	3.75	3	5	5	4				
19	panelzone					sedo make offer		3.84	9	4	2	5	4	3.75	3	5	5	4				
20	makersoutlet					2495		3.81	12	2.5	3	3	4	4	5	4	5					
21	makersdirect					3295		3.81	12	2.5	3	3	4	4	5	4	5					
22	sheetsmith					2095		3.78	10	3.5	2	5	4	3.75	3	5	5	4				
23	panelcentral		1			2995		3.78	12	2.5	2	5	5	3.75	3	5	5	4				
24	panelplex		1			875		3.75	9	4	2	5	4	4	3	4	4	4				
25	fabmat					2595		3.72	6	5	3	4	3	3.75	5	3	3	3				
26	makersystems					2695		3.69	12	2.5	3.5	4	3	3.5	4	5	5	4				
27	paneldepot		1			4995		3.69	10	3.5	2	5	5	5	3	3	3	3				
28	flatworks					offer		3.69	9	4	2	5	3	3.5	3	5	5	4				
29	panelmart					TBD		3.63	9	4	2	5	5	4	3	3	3	3				
30	panelyard	1			1			3.56	9	4	2	5	4	3.5	3	4	4	3				
31	makertaste				1			3.56	10	3.5	3	5	2	4	4	3	4	4				
32	sheetsupply					2888		3.50	11	3	2	5	5	5	3	3	3	2				
33	panelsmith					lost bid		3.50	10	3.5	2	5										
34	panelpad	1			1			3.38	8	4	2	5	3	4	3	3	3	3				
35	panelsupply		1			1888		3.34	11	3	2	5	5	3.75	3	2	3	3				
36	panelmedia					2795		3.31	10	3.5	2	5	3	4	3	3	3	3				

142 available names considered
 18 registered (~\$7 each via dynadot.com)
 10 tested with small sample (N ~ 15)

Name Testing


MakerStock



plywood, panels, and
supplies for makers.

makerstock.com


MakerCraft



plywood, panels, and
supplies for makers.

makercraft.com


MakerWays



plywood, panels, and
supplies for makers.

makerways.com


Makertopia



plywood, panels, and
supplies for makers.

makertopia.com


Makera



plywood, panels, and
supplies for makers.

makera.com


PanelSupply



plywood, panels, and
supplies for makers.

panelsupply.com


SheetStock



plywood, panels, and
supplies for makers.

sheetstock.com


PanelMill



plywood, panels, and
supplies for makers.

panelmill.com


PanelWorks



plywood, panels, and
supplies for makers.

panelworks.com

Makeroo



plywood, panels, and
supplies for makers.

makeroo.com

highly specific
highly flexible

Identity



MAKER STOCK

MAKER STOCK





Graphics done in 4 iterations over 2 weeks for about \$300 via Upwork (Lisbon-based freelancer).
"Design Brief" (e.g., spec) for designer is [here](#).



MAKERSTOCK
the right materials, at the right size, at the right time

www.makerstock.com

See our full range of specialty materials.

YOUR ONE STOP SHOP FOR MATERIALS

- Wide Variety of Materials ■
 - No Minimums ■
 - Expedited Delivery ■
 - Easy Online Ordering ■
 - Laser Cutter Safe ■

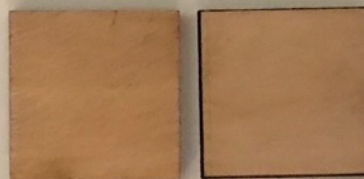
MDF



CHIPBOARD



BIRCH PLYWOOD



BALTIC BIRCH PLYWOOD



ACRYLIC



MAKERSTOCK
the right materials, at the right size, at the right time

YOUR ONE
STOP SHOP
FOR MATERIALS

makerstock.com

Customer Acquisition

- Dedicated salesforce focused on Maker Labs.
- In-person sales calls, building relationship with lab manager.
- Mailing list within Maker Lab community.
- Deliver very nice sample box with lots of branding – sample board for wall (tethered samples).
- Adwords for “laser cutter materials” etc. for individual maker acquisition.
- Referrals from cutter manufacturers.
- Lots of swag for lab managers.



MVP sample board

Direct-to-Maker (DTM) Business via makerstock.com (built with Shopify)



To Launch August 2019

Plastics



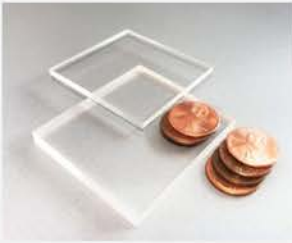
Sort by Best selling ▾



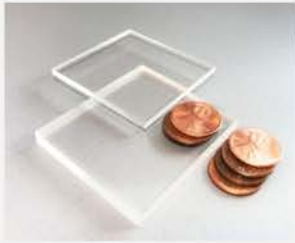
Acrylic (White)



Acrylic (Black)



Acrylic (Clear) Multi-Pack
(12 Pieces)



Acrylic (Clear)

MVP – Operations and Equipment

COWLEY
REAL ESTATE
AUCTIONS

[Login / New Bidder](#) [Current Auctions](#)

[← Back to Catalog](#)

Result: 2 of 3


Lot # : 101 - Rockwell/Delta rad





**“All start-ups die at least twice.
The question is whether or not they survive the second death.”**

(Many have said similar things. I was told this by a senior colleague, Dave Staelin, when I was an assistant professor at MIT in c1992.)

What happens when your entire customer base shuts down completely in a single month?

 Search



 Menu

ARTS, HUMANITIES, & SOCIAL SCIENCES

SPORTS

CAMPUS & COMMUNITY

EDUCATION, BUSINESS, & LAW

HEALTH SCIENCES

SCIENCE & TECHNOLOGY

Coronavirus and important changes to our operations for the remainder of the semester

March 11, 2020

The novel coronavirus, COVID-19, presents our world, country and University with a unique public health challenge that is all the more disquieting because of the uncertainties associated with its spread. We write today with the latest update on the additional steps we at Penn will take in dealing with this unprecedented challenge, guided by current data and expert advice. We will continue to communicate with you and update our plans as new data and evidence emerges. Our primary goals, as always, are carrying out our educational, research and clinical care missions while ensuring the health and safety of our students, faculty, staff and visitors.

To help us achieve these goals under demanding conditions, we are compelled to make major changes to the final weeks of the semester.



Sign in or Create an Account

Search all products...



CART

HOME BUY WOOD BUY ACRYLIC OTHER MATERIALS LASER CUTTING SERVICE MAKER LABS/WHOLESALE ▾ MORE ▾

Home > PET Plastic Film (Ideal for Protective F...



PET Plastic Film (Ideal for Protective Face Shields) - 20 x 25" - pack of 12

\$34⁹⁵

Quantity

- 1 +

ADD TO CART

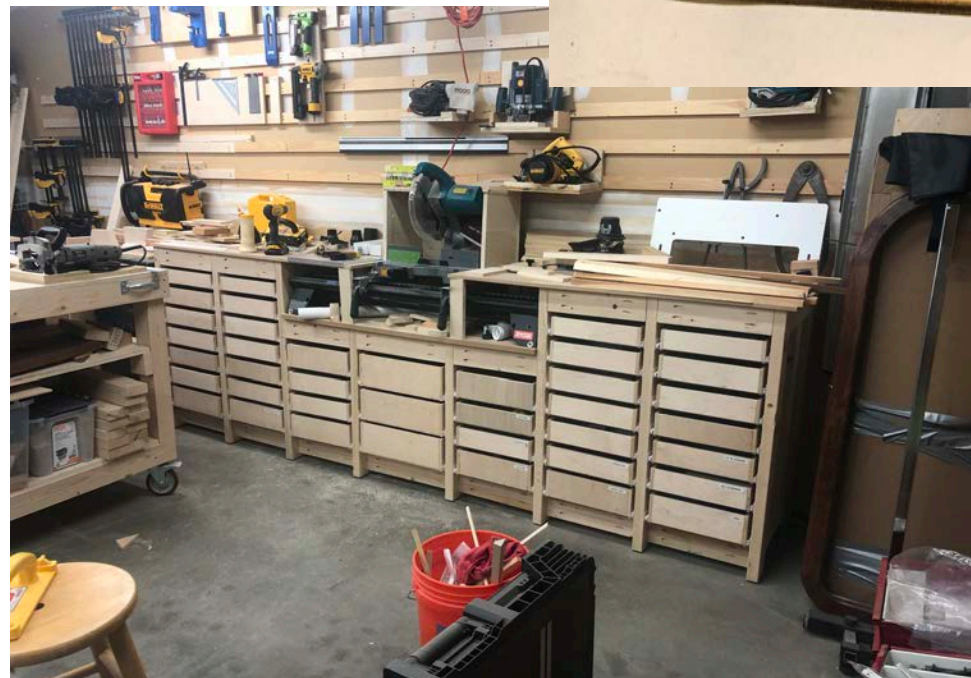
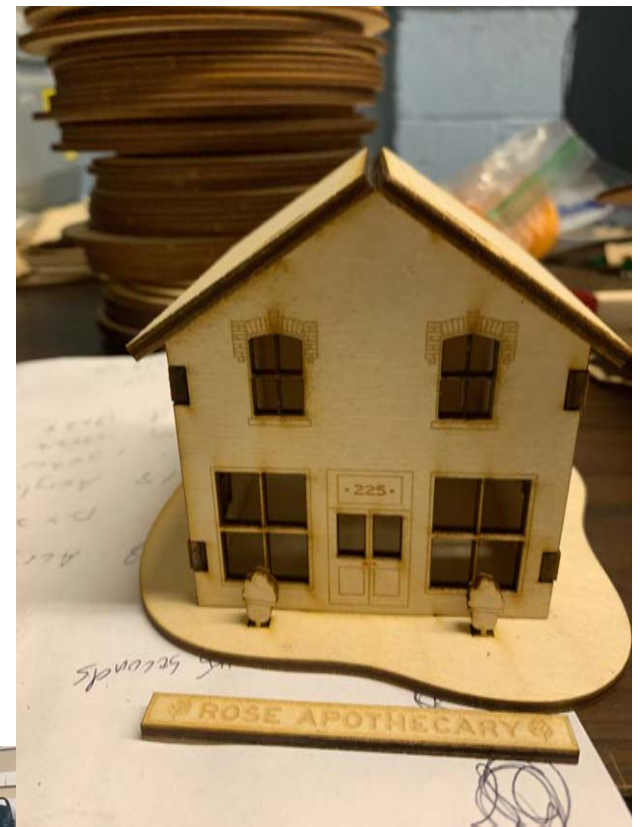
Polyethylene terephthalate or polyester (PET) is a crystal clear plastic film that is sturdy and versatile. PET film has higher tensile strength, excellent dimensional stability, low moisture absorption, and good retention of physical properties over a fairly wide temperature range. It also has superior UV resistance, excellent electrical properties, good optical clarity, high gloss, and good gas barrier. It is the ideal film for quality printing and lamination and a good choice for a high performance plastic films and sheets. It has a relative high melting point, which makes it suitable for applications that require sterilization at high temperatures.

DLS™ Face Shield Assembly and Care Instructions

Page last updated: Tuesday, 07-Apr-2020 21:52:30 UMT



Focus on “DTM” (Direct to Maker)





Fall 2020 – alive but burning 20-40k/month
"Ordinary challenge" -- can we acquire DTM customers?
But, then Death 2...HR Disasters

Death 2 (Fall 2020) – HR Disasters