Getting to Market Faster as a Hardware Startup

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Marcello Room 4501b Level 4
Startups are messy.

“Hardware Startups are hard, messy, slow and orders of magnitude more expensive than software startups” – B

MFG11293 seeks to influence hard commercialization pathways to be faster, less messy, cash savvy and fun!
Key learning objectives

NOVICE: At the end of this class, you will be able to check these boxes:

- Understand when to live & breathe the “inventor” lifestyle
- Understand when to live & breathe the “builder” live to work lifestyle
- Understand when to identify and close gaps within an “optimizer” role
- Understand when to transition to the “operator” work to live lifestyle
Key learning objectives

NINJA: At the end of this class, you will be able to check these boxes:

- Identify commercialization inflection points & risk cliffs
- Identify key transitions between being an inventor (idea person), builder (get stuff done), optimizer (local minima solver) & operator (shift work)
- Be informed about the latest world-class IP neutral prototyping facility
- Be informed on best practices for workflows & enabling platforms
Structure

1. Who is B?
2. Why are Commercialization Pathways Important?
3. Inflection Points
4. Transitions
5. The Full Stack
6. IP Neutral Facilities & Hardware
7. Workflows & Software Platforms
8. Thank You
1. Who is B?
1. Who is B?

Education

- Kauffman Global Scholar
- DOE:EEER:NGA Scholar
- Bachelor in Chemical Engineering
- Chemistry Minor
- Computer Science & Engineering Focus
- Masters of Finance
- Masters of Business & Energy Markets
- M.Sc. Geochemistry (6 CR)
- NCMA Phycology Studies at Bigelow
- John Zink Combustion School
- National Instruments Automation School
1. Who is B?

Experience

- Cleantech Prototyping Facility Startup
- Supercritical Fluids Laboratory Founder
- Engine R&D, Manufacturing & Metrology
- Oil & Gas Laboratory Commissioning
- Oil Movements Facilities & Optimization
- Refinery Blender & Process Engineer
- Real Time Controls & Device Prototyping
- Operations
- Logistics – Maritime, Pipelines & DOT
- Programming, Databases, IT Helpdesk
- Laborer at Fabrication Shop
1. Who is B?
2. Why are Commercialization Pathways Important?

Ingredients

a. People
b. Product
c. Market
d. Fit
2. Why are Commercialization Pathways Important?

a. People
- Inventors
- Builders
- Optimizers
- Operators
2. Why are Commercialization Pathways Important?

b. Product – Technology Readiness Level (TRL)

- Idea
- Proof of Concept
- Prototype (ex & in-situ)
- Pilot
- Demonstration
- Manufacturing
2. Why are Commercialization Pathways Important?

c. Market

- Maturity
- Size (Volume, Buy Cycle)
- Audience
- Decision Makers
- Revenue Streams
- Barriers to Entry
- Certifications
2. Why are Commercialization Pathways Important?

c. Fit

- Need vs. Want?
- Recurring Revenue?
- Single Cash Flow?
- Diverse Profit Centers?
- Lifestyle or Platform?
3. Inflection Points

Tread Carefully

a. Prototyping
b. Pre-Manufacturing
c. Certifications
d. Manufacturing
e. Growth
f. Optimize
g. Operate
h. Vertical or Horizontal?
4. Transitions

Your Mindset

a. Inventor
b. Builder (Live to Work)
c. Optimizer
d. Operator (Work to Live)
5. The Full Stack

Be Prepared = Hone Your Tools Before Embarking

a. Education
b. Experience
c. Team
d. Funding
e. Facilities & Equipment
f. Network
6. IP Neutral Prototyping Facilities & Hardware

Help You Keep Your Cash & Intellectual Property (IP) By:

a. Providing Shared Equipment & Functional Spaces

b. Providing Advice & Skilled Technicians

c. Funneling Collisions

d. Opportunities to Meet Real Mentors with Real Experience
6. IP Neutral Prototyping Facilities & Hardware

Collaborative Workspace / Prototyping Labs & Shops / Training Center

The La Kretz Innovation Campus

Los Angeles CA, USA
6. IP Neutral Prototyping Facilities & Hardware
6. IP Neutral Prototyping Facilities & Hardware

Site Plan

- Bioswale Filtration
- Greywater System
- Micro-Grid System
- 175 kw PV Array
6. IP Neutral Prototyping Facilities & Hardware
6. IP Neutral Prototyping Facilities & Hardware

- 7 Conference Rooms
- 1 Media Room (*planned*)
- 1 Large Board Room (~30 people)
- Event Space (~60 people)
- Kitchen & Break Room
- Signage (Digital & Physical)
- Dedicated Fiber Connection
6. IP Neutral Prototyping Facilities & Hardware

Seating Options

- Private Offices (2 Person, 4 Person, 6 Person)
- Open Office Pods (Multiple Size Ranges Available)
- Collaborative Workspace Open Seating (Hot Desk Model)
6. IP Neutral Prototyping Facilities & Hardware

- Fully mobile and reconfigurable desks
- Height adjustable desks in 2 desk offices
- Mobile media credenzas and marker boards
- Lockable mobile pedestals and storage cabinets
- 5 point adjustable ergonomic chairs
- Recycling centers
6. IP Neutral Prototyping Facilities & Hardware

Training

- 40 Person Classroom
- 32 Person Classroom
- 16 Person Classroom
- HD Video streaming and recording capability
- Multiple room configurations available
- Rapid modeling computer lab
6. IP Neutral Prototyping Facilities & Hardware

- Electronics Lab
- Wet Lab
- Core Lab
- Cell Lab
- 3D Print/Laser Shop
- Welding Shop & Tools
- Metrology Lab
- Precision Water Jet
- CNC Machining
- Safety Data System
- Digital Prototype Lab
- Print & Retail Shop
- Assembly Bay

Advanced Prototyping Labs & Shops

- CNC Machining Area (Room 408)
- Welding Room (Room 419)
- Print Shop (Room 408D)
- Water Jet Room & Manual Machining (Rooms 408B & 408)

Managed by LACI
6. IP Neutral Prototyping Facilities & Hardware

Electronics & Robotics Lab

- Oscilloscopes
- Controllers
- Data Acquisition
- Software: Labview
- Sensors
- Test Stands
- Components
- Breadboards
6. IP Neutral Prototyping Facilities & Hardware

Wet Lab

- Ultra Pure Water
- Lab Glassware Washer
- Centrifuges, Vortexers
- Micro Pipettes
- Chemical Fume Hood(s)
- Laminar Flow Hood(s)
- Culture Shakers
- Stereoscopes
6. IP Neutral Prototyping Facilities & Hardware

Core Lab

- Ultra Low Temp Freezer
- Autoclave(s)
- Centrifuge, Refrigerated
- Measuring Station
- Sterilizing Station
- High Temp Vacuum Oven
- Ice Maker
- Dispensers & Storage
6. IP Neutral Prototyping Facilities & Hardware

Cell Lab

- Clean Room
- Laminar Flow Hood
- Micro Pipettes
- Sterilizers
- CO2 Incubator
- Microcentrifuges
- Stereoscope(s)
6. IP Neutral Prototyping Facilities & Hardware

3D Print Shop

- Laser Cutter
- Stratsys Eden 3D Printer
- Stratsys Dimension 3D Printer
- 3D Part Cleaning Station
- Mini 3D Printer Arrays
- Supplies via Vending System
6. IP Neutral Prototyping Facilities & Hardware

Print & Retail Shop

- Large Format Printer
- Xerox Printers
- Vending Systems for Consumables
- CAD Station(s)
- Plug-in Play Laptop Station(s)
6. IP Neutral Prototyping Facilities & Hardware

Metrology Room

- Gage Arm
- HD Point Cloud Scanner
- Point Cloud Software
- Mobile Cart
- Calipers
- Measuring Taps
- Rulers
6. IP Neutral Prototyping Facilities & Hardware

Welding Room

- MIG Welder
- Belt Grinder
- Disc Grinder, 20”
- Grinder, 8”
- Grinder, 2”
- Buffer, 8”
- Polisher
- Welder Extraction Arm
6. IP Neutral Prototyping Facilities & Hardware

Precision Water Jet

- OMAX 55100 Water Jet
- Pump Cabinet
- Garnet Hopper
- Laminar Filter Wier
- Chiller
- Controller
- Human Machine Interface (HMI)
6. IP Neutral Prototyping Facilities & Hardware

CNC Shop & Bay 8

- CNC Mill
- CNC Lathe
- Drill Press
- Bandsaw
- Horizontal Bandsaw
- Cold Saw
- Sand Blaster
- Assembly Space
6. IP Neutral Prototyping Facilities & Hardware

Digital Prototyping Lab

- 3D Computer Aided Design
- Finite Element Analysis
- Computational Fluid Dynamics
- Process Simulations
- CAD to CAM Software
- CAD to 3D Printer Software
6. IP Neutral Prototyping Facilities & Hardware

Air & Vacuum

- Pressures 20+ psig
- Vacuum up to 28” Hg
- Simplex Systems
- Remote Monitoring
- Real-time hydraulics modeling & learning
- Alarm Management

Donated By:

[Image of equipment]
6. IP Neutral Prototyping Facilities & Hardware

**Persistent State & Situational Awareness System**

- Fire, Life & Safety
- SDS GHS Tracking
- IIoT
- Certification Management
- Health
- Training & Adherence
- Real-Time Monitoring
- Reporting & Data Analytics

*donated by:* Safety spot.com
7. Workflows & Software Platforms

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MFG11293: Getting to Market Faster as a Hardware Startup
Product Innovation Platform

The Future of Making Things

AGILE PRODUCT DEVELOPMENT

Collaborative

Flexible

Connected Services

The Customer Experience

PAAS: Product as a Service

Growth

Lifetime Value

Traditional Concept Design Produce Sell Operate & Retire

Autodesk University 2015
PRODUCT INNOVATION PLATFORM

INTERNET OF THINGS

USING SMART TECHNOLOGIES

PREDICTIVE FAILURE & OPTIMIZATION

MAKING INNOVATIONS

FUSION 360

DESIGN FOR CONNECTIVITY

AUTODESK UNIVERSITY 2015
8. Thank You

Brandon Iglesias
  - Chemical Engineer

Curtis Chan
  - Mechanical Engineer
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