

# **Successful Mechanical Product Development in Today's World**

**by**

**Mark Brinkerhoff**

**1/7/21**





**FusionDesign**<sup>TM</sup>  
Accelerating Concepts to Creation

# Fusion Design

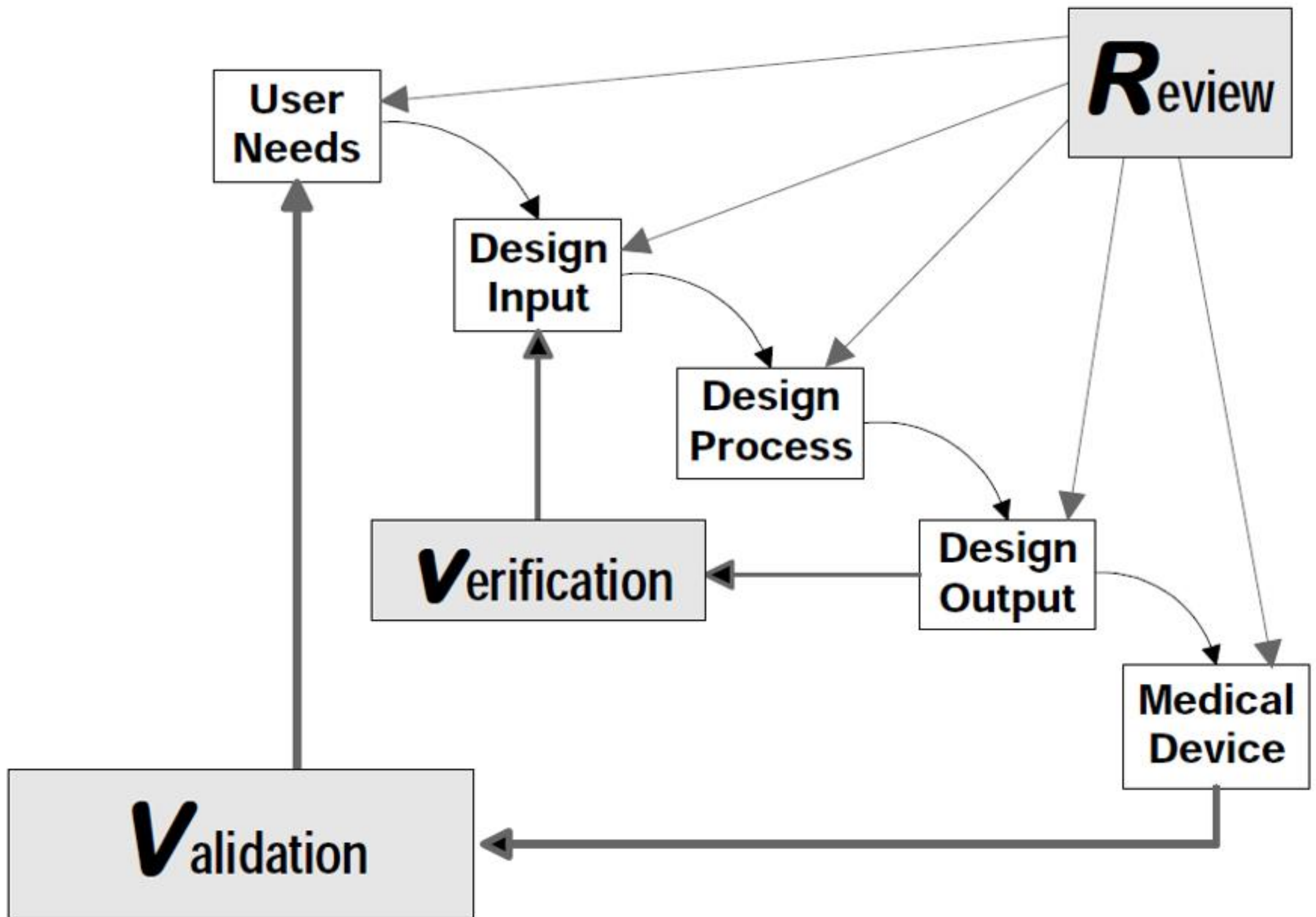
- Custom Product and Equipment Design
- Established: 1990
- Projects: 50-100 year
- Staff: 20
- Facilities:
  - 6,000 square foot office
  - Machine Shop
  - Design Studio
  - Modeling Shop/Lab



# Fusion Design

- **President:** Mark Brinkerhoff P.E.
- **Clients:** Entrepreneurial start-ups to Fortune 100 companies.
- **Projects:** Small plastic enclosures to large commercial equipment
- **Industries Served:**
  - Consumer
  - Medical/Biotech
  - Electronics
  - Commercial
  - Equipment





Waterfall Diagram for Design Control (from FDA "Design Control Guidance for Medical Device Manufacturers")

# Business before the Pandemic

- Relationship connectivity to prospects
- Phone introduction
- NDA
- Onsite visit / needs assessment
- Gather data and sample parts in person
- Consider development path / tasks
- Ask clarifying questions
- Propose approach / budget
- Purchase order placed
- Team assignments (PM, Engineer / Designers / Technicians)
- Weekly strategic meetings plus ad hock meetings
- Scheduling / budget management
- Design / Prototype
- Milestone meetings in person
- Deliverables in person



# Fusion Design Shifting Gears



**COVID-19 Prepared**



# Business after the Pandemic

- Relationship connectivity to prospects
- Phone / Video Conference introduction
- NDA
- Needs assessment
- Gather data and sample parts
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- Deliverables





# Customer Shifts (Old, New, Gone)

- Long term continued
  - Closed buildings
  - Working from home
  - Heavy confusion/poor communication
- Divisions / companies disappeared
  - Physical presence gone
  - Food service gone
  - Distributed system with poor connectivity
- Companies at War with Covid
  - Extremely high volume testing (centralized)
  - Regional testing for fast turn around
  - PPE
  - Automation
  - Semiconductor Processing Equipment



# Where is everybody?

- Office Team

- Shop Team
- Management
- HR
- Accounting

- Remote Team

- Engineers
- Designers
- Customers
- Vendors



# Communication Tools

- In the office

- Common Wifi network
- Video Hardware
  - BEAM
  - Smart Phones
  - Tablets
  - PCs
  - Webcams / Video Scopes
- Software
  - SolidWorks Edrawings
  - TEAMs
  - Zoom
  - Blue Jeans
  - Whatsapp
  - Google

- Everywhere else

- Wifi / 4G
- Video Hardware
  - Smart Phones
  - Tablets
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  - Webcams
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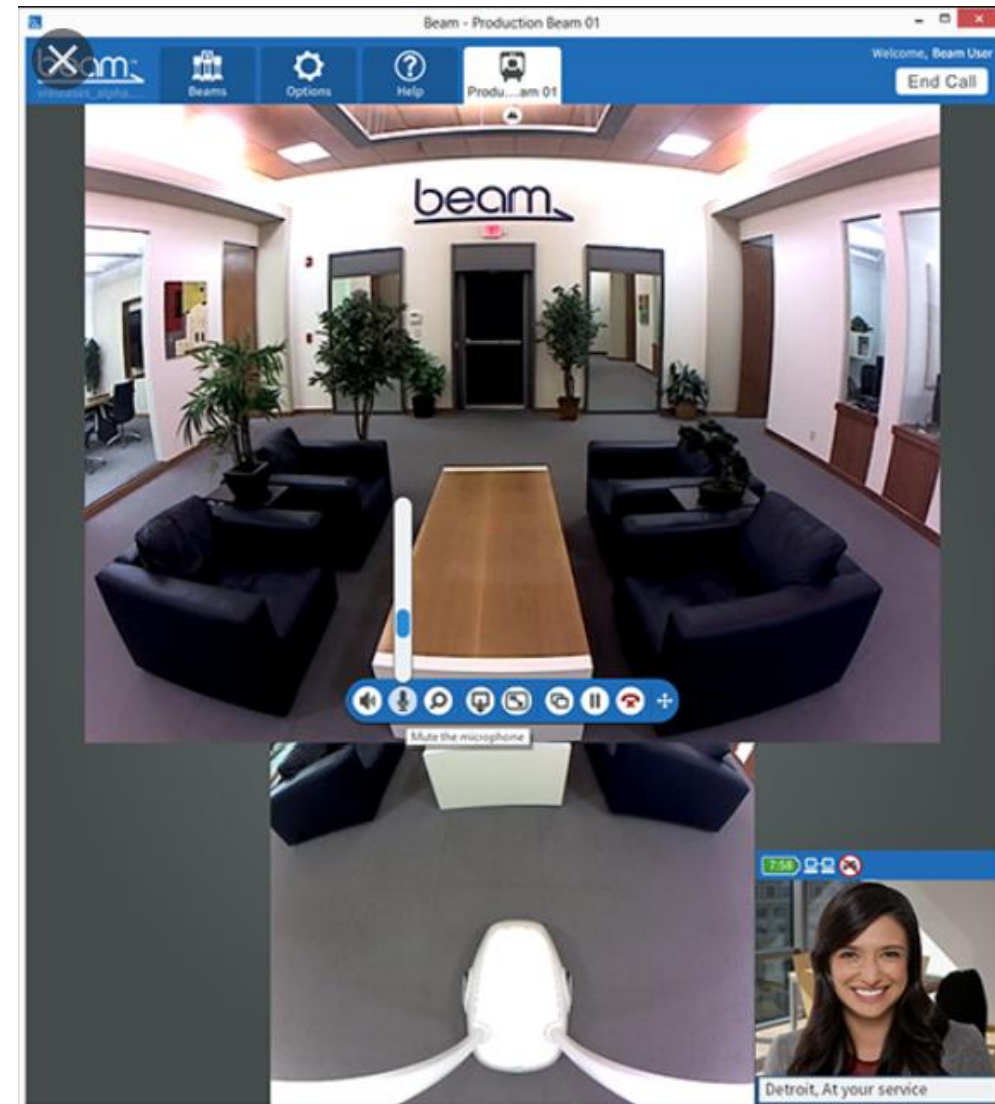


# Communication Tools

- In the office



- Everywhere else



# Fabrication Tools

- In the office

- Machine
- Sheetmetal forming
- Hand
- 3D printers
- Large Plotters

- Everywhere else

- Hand tools





# Rapid Sourcing

- Through Rapid Mail
  - Components
  - Mock ups
  - Prototypes
  - Short Run Production
- Through the Store next door
  - Mock up components
  - Hardware
  - Hand tools



**amazon**

**McMASTER-CARR®**



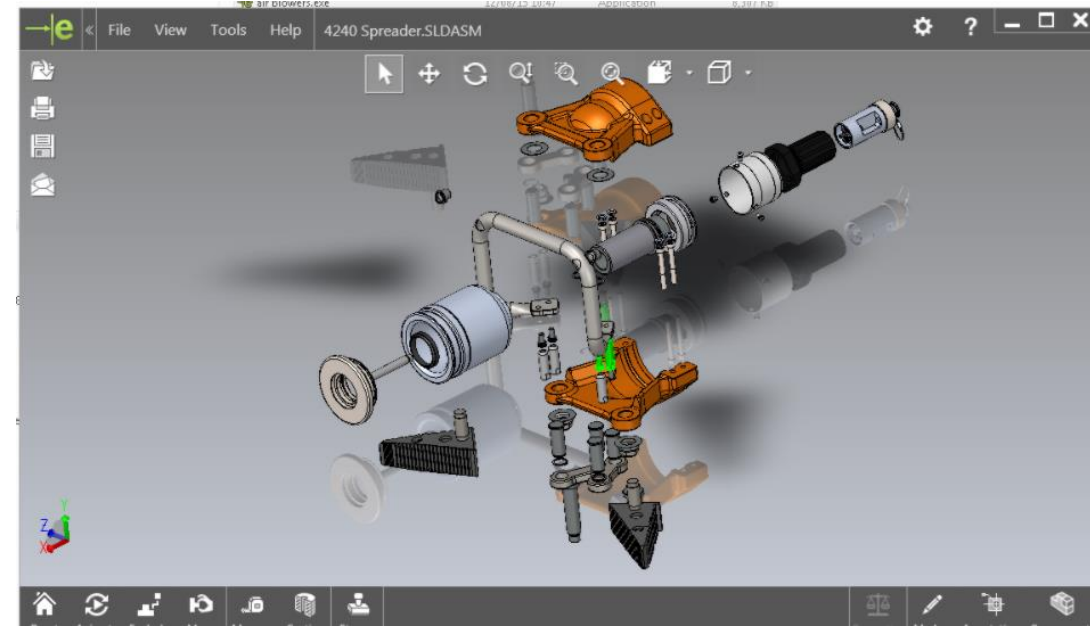
# Communication Rhythms

- 10 to 15 active projects continuously
- Weekly Strategic Meetings
- Ad hock working Meetings
- Video Calls daily
- BEAM Visits
- Walking meetings (treadmill and outdoors)
- Rapid Status
- Whatsapp concepting
- Cloud based data sharing



# Typical Project Deliverables

- Edrawings
- Videos
- CAD models
- CAD Drawings
- 3D prints
- Machined Parts
- Sheetmetal
- Assemblies
- Posters
- Proof of Concepts
- Working prototypes
- Short run production





# Top 5 Development Process Challenges

## 1. Lack of True Market Research

Minimum Viable Product – Why? How? Paradigms?

## 2. Incomplete project plan

Recognize the big picture

## 3. Incomplete / inconsistent communication

Management, engineering disciplines, fabricators, Ops, Regulation, others.

## 4. Creeping Elegance (Feature Creep)

More features = better products??

## 5. Remote Manufacturing

Global



# What Trends are Next?

## Megatrends

- Component Prices Dropping
- Automation is easier than ever
- Labor Rates Increasing
- Medical Costs Rising
- Aging Population
- Crowding fears

## Effects

- Tighter Integration with hardware, software and the cloud
- Collaborative Automation Systems
  - Food preparation, autonomous driving
  - General Labor reduction
- Products will address multiple industries
  - Medical and fitness / wellness
- Products will grow from more disciplines
  - Art, Ergonomics, Science and Manufacturing
- Winners will thrive in the transition space



# What's Biz Tech is next?

- VR / AR (maybe)
- Telepresence
  - Robots
  - Automatic doors
  - Dumb waiters
- TEAMS 2
- Online interactive sketching
- 5G connecting everything seamlessly
- Gamification
- Visual Search AI
- Move while working (quiet treadmills)
- HUGE productivity boost



***Contact Info:***

***Mark Brinkerhoff, PE***

***President***

***Fusion Design Inc.***

***m\_brinkerhoff@fusiondesigninc.com***

