

# Introduction to Hardware Product Development

## Initial Presentation

Professional and Technical Consultant's Assoc.

September 12, 2024

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## **Angotti Product Development**

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# Overview of this Presentation

- 1) Discuss the Complexity of New Product Development (NPD) of a Hardware Product
- 2) Give Examples of Project Planning, for a simple to a very complex product
- 3) Discuss Managing the project
- 4) Q and A

## Overview of this Discussion

- 1 ) Uses a Top Down Approach
- 2 ) Considers only brand new product development, not a rehash of an existing design, or one going directly into production
- 3 ) Start at either Feasibility or Demo Phase as the product target

# The Big Picture of Product Development



# Complexity of Hardware Development

- Assumes development of a new product from the very concept, and that also **assumes there is a perceived market** for the product
- Involves the interaction of many diversely skilled persons
  - a) Electronic Engineers – Circuit Design and Potentially FPGA (Field Programmable Gate Array) Designers
  - b) Programmers, including Firmware and PC plus Mobile Software Developers
  - c) Mechanical Engineers
  - d) Managers and Project Managers
- There are a number of project inter-dependencies, each with their own risks
- ***Communication between skilled persons is critical to success***

# Follow a Formal Planning Process

- This is a defined process that can be followed in whole or part. Often many critical process steps aren't followed, and lots are overlooked. This can create numerous problems later on.
- A New Product Development, (NPD) Project has several formal steps to completion
  - a) **Product Concept**
  - b) **Initial Documentation**, define Minimum Viable Product (MVP), or Minimum Viable Feasibility (MVFP) or Minimum viable Demo Product (MVDP)
  - c) **Documentation** of the Minimum of Specifications Required
    - These can include System Functional, Hardware, Firmware and Software High Level Specs. Often overlooked are the Initial Test and Final Test Specs
    - These are “living documents”
    - Updated as the project moves forward

# Formal Planning Process

## Example of very simple Analog design



(Simple Analog Design Plan)

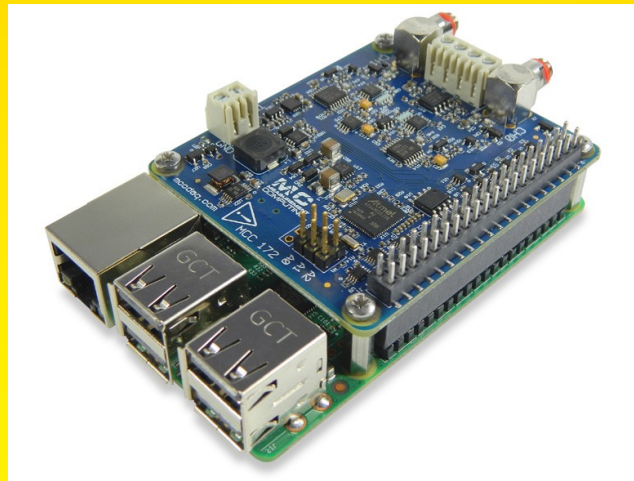




# Formal Planning Process (Cont'd)

Example of a more complex design mixed

Analog and MCU



(More Complex Design Plan)



# Formal Planning Process (Cont'd)

## Example of that adds PC or Smartphone interface



Highest Complexity Design Plan



# Additional Complexities, Teams

- 1 Co-location of teams (Best Approach)
- 2 Remote teams local or US
- 3 Remote teams disparate countries
  - Different Time Zones
  - Different Languages
  - Different Customs and Social Mores

## Other Formal Process (Cont'd)

### **Other Major Processes if planning to go beyond first implementation**

- a) Documentation Cleanup Phase
- b) Parallel Production Test Plan and Implementation
- c) Reliability Plan
- d) Other Formal Testing Plans

## Resources for Later Reference

Several Papers on Product Development and managing technical projects are available on my website at <https://angotti.com/resources/>

# Wrapup

- 1 Discussion of the challenges of developing a hardware based product going from a simple to a very complex one**
- 2 A straightforward process for developing a hardware product**
- 3 Some generalized example schedules for an NPD**
- 4 Some further resources that might be tapped to learn more**



# Q&A and Contact Info

## Questions regarding NPD

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