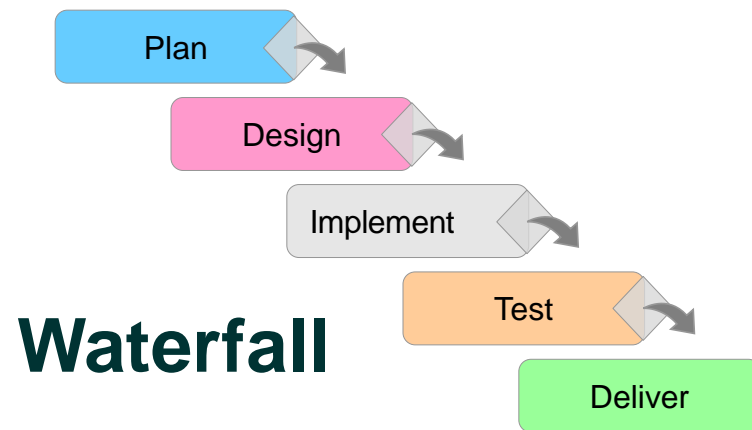
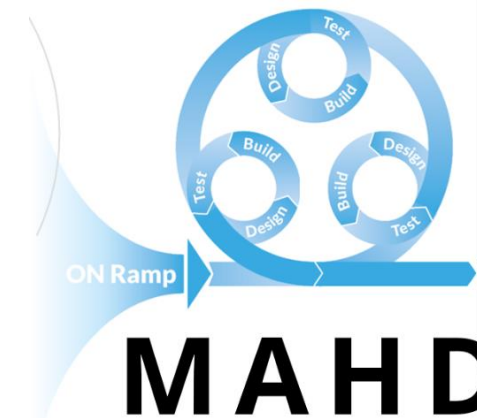


10 ADVANTAGES OF AGILE FOR HARDWARE OVER WATERFALL DEVELOPMENT



VS.

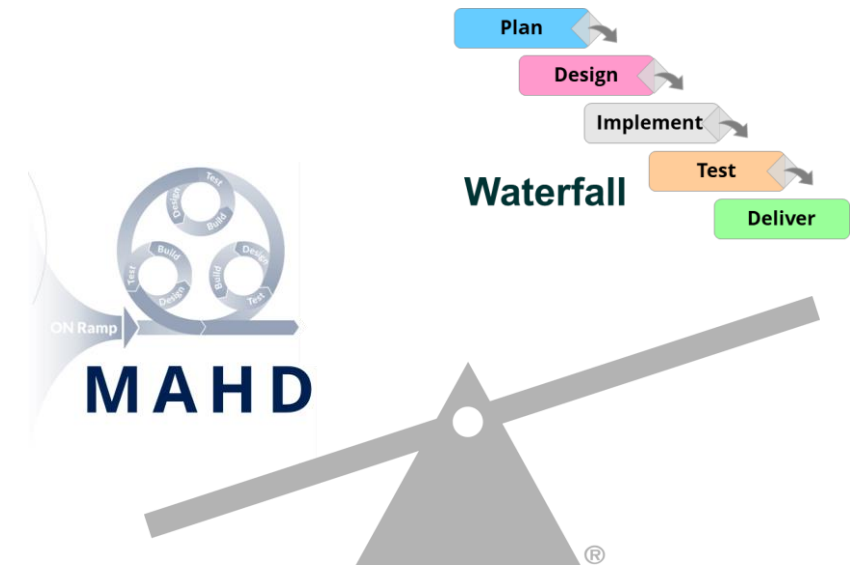


Introduction

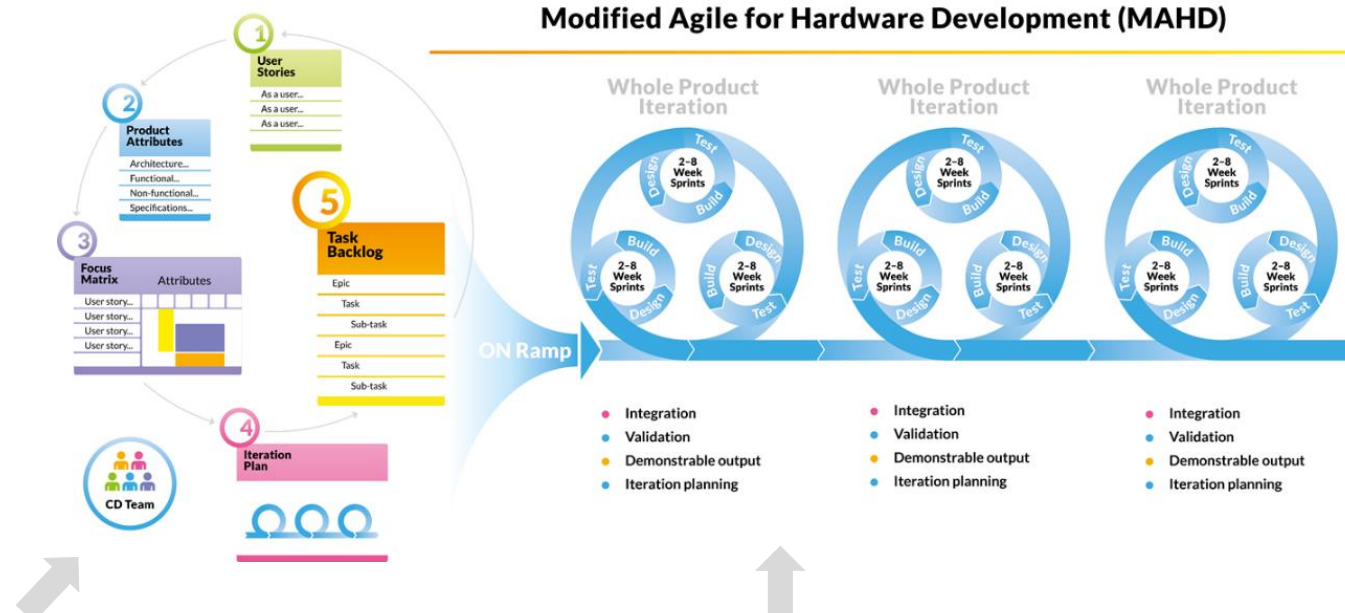
After executing over 125 product development (PD) projects (yes, we counted), training 1000's of PD professionals, and consulting with dozens of companies who are using the spectrum of PD processes, we learned a few things...

- 1) Waterfall (e.g., phase-gate/stage-gate) PD systems just don't meet today's real-world needs for speed and adapting to change. They are often slow, contentious, rooted in wishful thinking and frustrating.
- 2) Agile fixes many of waterfall's problems, but when agile methods are applied to hardware products there are gaps.
- 3) With some minor modifications, Agile can successfully be applied to hardware and ***provide real and almost immediate benefits.***

Below we share the top 10 advantages that agile methods and the Modified Agile for Hardware Development (MAHD) Framework have over typical waterfall methods.



What's MAHD? Agile, but Modified for Hardware



Project Initiation: MAHD On-ramp

- Focus on Mktg/R&D collaboration
- 2 days to 3 weeks
- Whole project considerations

Cross-discipline Iterations

- Rapid prototyping
- Customer engagement
- Adapt to changes

Production Readiness

- Design freeze
- Market validation
- Quality assurance

To learn more about the MAHD Framework, visit: www.agileforhardware.org

So... Imagine...

Your company is planning to develop a new “smart” energy-efficient home electric standby generator. You have some basic goals:

1. It is innovative!
2. It is ready for sale in 18 months
3. It is profitable (at least 40% GM)
4. It can wholesale for <\$2500 USD
5. It sells well (target 20,000 units/year)

Which Approach do You Think Will Lead to Success?

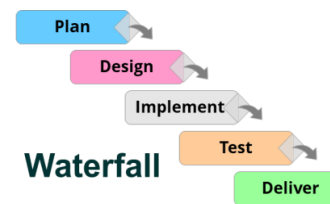


(For visualization of the concept only. At this point, you have no idea what the final product will look like!)

MAHD Advantage #1

Much Faster and Focused Project Kickoffs

The MAHD On-ramp provides a more complete view of the project in a fraction of the time without the reliance on a magic crystal ball. The learning process starts immediately.



- Detailed business case
- Complete product requirements
- Lengthy R&D scope negotiation



3-6 Months



- Light business case
- User stories / Preliminary attributes
- Mktg/R&D collaborative kickoff

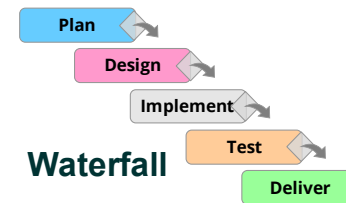


2-3 Weeks

MAHD Advantage #2

Massively Enhanced Cross-functional Collaboration

The MAHD Framework starts with activities designed for intelligent discussion of critical project elements – risk, innovation, schedule, targets, resources – and continues to drive collaboration using a consistent and collaborative development cadence.



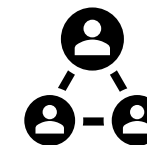
- Over the wall requirements
- Opinion-led tradeoff discussions



“Do this!”



- Common integration points
- Collaborative, real-time decisions
- Customer-driven discussions

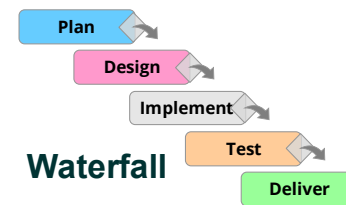


“Customers said...”

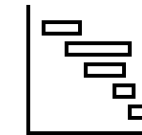
MAHD Advantage #3

Clear, Proven Development Progress

MAHD Iteration integration points prove a clear understanding of tangible project progress, leveraging opportunities to demonstrate prototype functionality with real customers early and often.



- Schedule-based progress
- End-of-project validation



“It’s Coming!”



- Demonstratable progress
- Prototype-driven feedback points

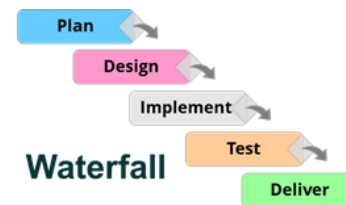


“Here’s what works!”

MAHD Advantage #4

A Healthy Sense of Urgency

By the nature of short-term sprints, procrastination is minimized. Each MAHD Iteration results in a commitment to deliver real work. It's like a manageable agile tradeshow every Iteration vs. a heroic waterfall end-of-project effort (that almost always fails).



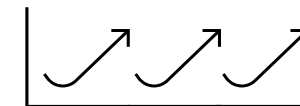
- Major work (& risk) pushed to end
- Resource needs detected too late



“We can’t do that.”



- Sense of urgency every sprint
- Resource needs identified early

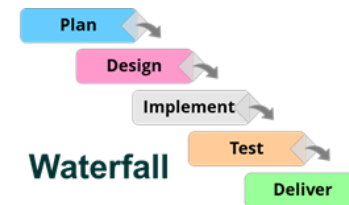


“We can do that!”

MAHD Advantage #5

Built-in Coaching and Mentoring

Individual AND team-based commitments to short duration sprints naturally identifies who needs help quickly. By pairing less-experienced team members with those having more seniority, both individuals are given professional development opportunities.



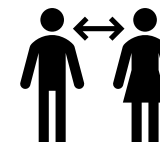
- Individuals rely on busy managers
- Months before problems surface



“That’s *your* job.”



- Peer support helps all succeed
- There is no place to hide

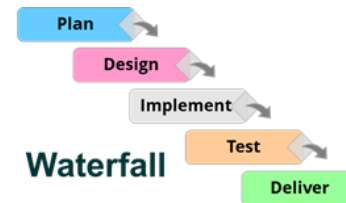


“Let’s figure this out.”

MAHD Advantage #6

Early Focus on Critical Areas of Risk & Innovation

At the core of the MAHD Framework is the early identification of areas where innovation will lead to market success, or risks will lead to failure (two highly related elements). This allows more focus to correct problems, add resources or find experts before it's too late.



- Critical decisions are pushed out
- Little data to drive “good enough”... so opinions prevail!



“We’ll see if there is time for that.”



- Risk/innovation tackled early through real investigation
- Risk decisions made w/real data

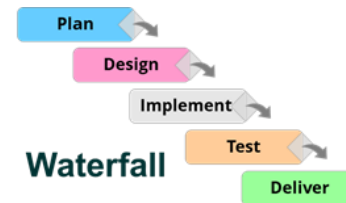


“How can we get this right?”

MAHD Advantage #7

More Intelligent (and Early) Trade-off Decisions

Through a consistent focus on demonstrable progress and learning through customer feedback loops, data is gathered early for faster and better resource/scope/schedule tradeoff decisions.



- Tradeoffs made in later stages
- Adding resources late rarely helps



“We’re Late, What Should We Cut?”



- Tradeoffs assessed each iteration
- Early decisions driven by real data

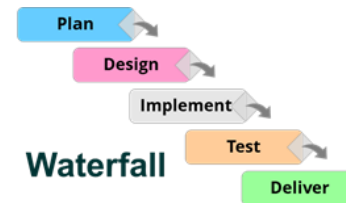


“How Should We Optimize?”

MAHD Advantage #8

Real Customer Engagement

Integral to the MAHD Framework is a customer engagement plan to test product concepts and partial functionality to gain real feedback that is cycled back into priorities each Iteration.



- Real testing AFTER project complete
- Too late to make significant changes
- Product often misses market target



“Did customers like the product?”



- Customer insight built into iterations
- Incremental testing to adapt fast

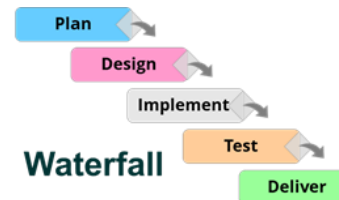


“How did the prototype demo go?”

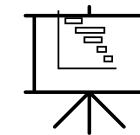
MAHD Advantage #9

Smarter Management Conversations

With Gantt charts and presentations, it's difficult for management to truly understand the status of a project. MAHD's Iteration plans, prototyping focus and demonstrable progress allows all stakeholders to actively engage throughout the whole project.



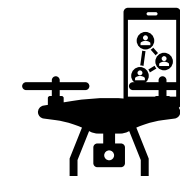
- Status limited to project updates
- Projects nearly complete before real information is uncovered



“80% done! Trust us.”



- Management sees early progress
- Redirection occurs at any Iteration

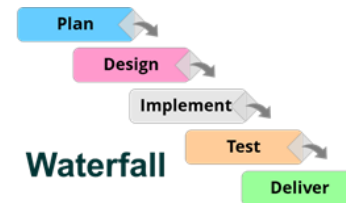


“Join our next demonstration!”

MAHD Advantage #10

A Happier Development Culture

Agile overall has been shown to provide a healthier, happier environment due to its inherent focus on peer engagement and support along with consistent doses of small wins.



- Long periods with little interaction
- Individuals can feel isolated



“Anyone out there?”



- Consistent interaction with peers
- Celebrates small milestones versus just the launch



“Let’s Celebrate!”

But What About???

You may have asked... What about...

- Massively saving development **time**?
- Dramatically reducing **resources**?
- Ensuring **perfect products** every time?

Aren't these the **real benefits** we seek?

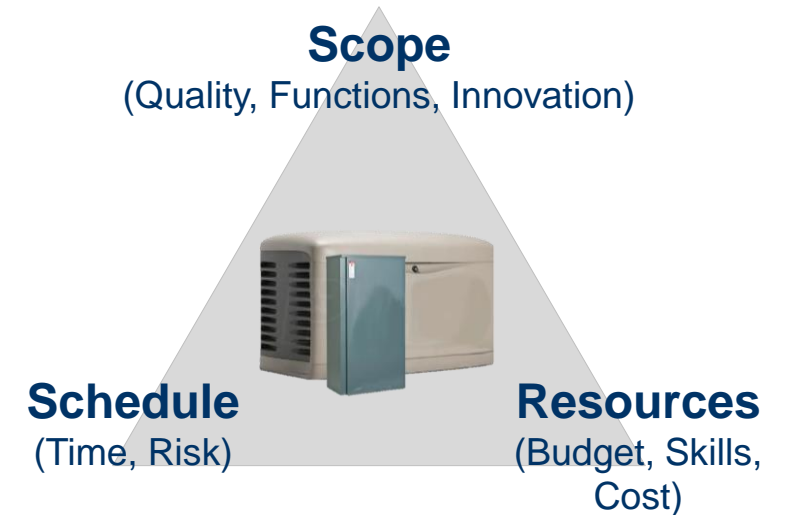
Yes! But Agile and the MAHD Framework are just **tools**.

How you apply them is up to you.

Every project has scope, resource and schedule limitations.

MAHD gives you the methods to optimize these tradeoffs

based on *your* development goals.



**What Are
Your Goals?**

The MAHD Team



Combined 40+ years in product development, management, consulting and training.

Gary and Dorian bring two unique perspectives to resolve Agile development challenges.

Gary Hinkle



- Agile Engineering
- Technical/Program Leadership
- Agile Project Management
- BSEE/Physics

Dorian Simpson



- Product Manager/Owner
- Market/Innovation Leadership
- Customer Insight
- BSEE, MBA



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