

Step-by-Step MAHD

Modified Agile for Hardware Development

The Smart Coffee Maker Project

Part 4 of a 9-part series to walk through an agile development project from concept to launch

Step 4: Building the Backlog



By Dorian Simpson and Gary Hinkle

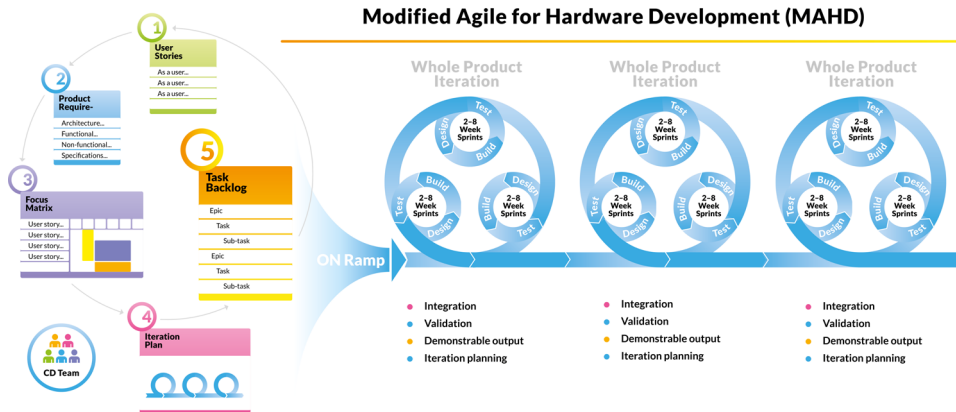
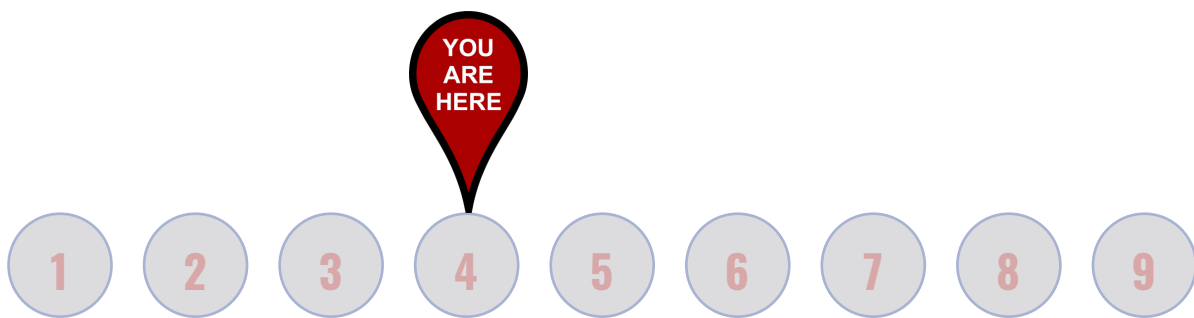
A Quick Intro to MAHD

Agile methods have proven superior over traditional product development processes to quickly adapt to customer needs, reduce waste and accelerate development. However, the application of agile requires significant changes to support the needs of hardware products. This led to the development of the Modified Agile for Hardware Development (MAHD) Framework – an open-source initiative to embrace the principles of agile while recognizing hardware’s unique needs.

THE COFFEE MAKER PROJECT: STEP-BY-STEP AGILE IN NINE STEPS

To help practitioners visualize the MAHD Framework, we have developed a series of nine articles to explain how agile methods and tools can be used for physical products, who should be involved, the deliverables for each step and tips for how to overcome challenges. We hope you'll join us on this journey as JavaBrew uses the MAHD Framework to develop an innovative new coffee maker.

INTRO TO MAHD



The MAHD Framework: Similar to Agile for Software, but with Important Differences

Learn More

To learn more about the MAHD Framework, download related ebooks and whitepapers, or sign up for e-learning opportunities, visit www.agileforhardware.org.

Step 4: Developing the Initial Project Backlog

THE SITUATION

In the previous step, Jordan, the Agile Project Manager (APM), led the team to develop their Iteration Plan, which describes project milestones, their prototype plan, timing of key deliverables, and early focus areas. The team also identified risks, questions to be answered, and opportunities to engage with customers. This was an important step of the MAHD On-ramp which gave them a well-planned outline for the entire project, including a critical draft of the overall schedule and clear objectives for the first iteration.

From previous steps, the team had a major concern about the overall schedule that Iteration Planning helped resolve... at least for now. They still have a lot of questions about the value of voice control, how much effort to put into the mobile app, how all the interfaces will work together and especially how to ensure customers will actually love the product. These are all important questions and concerns that will need to be addressed throughout the agile project.

In step four, the team is now ready to develop their backlog — the prioritized list of work items that need to be done. Since the team is still engaged in On-ramp planning (and haven't even started their first sprint), they will take a high level approach to capture large work items, knowing that each will be broken down further into more detailed tasks during sprint planning. User stories, requirements, product attributes, tasks, risks, resources and the progress toward completing the iteration successfully will all be reassessed by the team with each sprint.

Once the team has a well-established backlog, after a few sprints the team will reach a steady cadence that will keep the agile process moving smoothly toward completing iteration plan milestones and the overall project.

It's Tuesday morning and the team has gathered in their project room ready for action.

AGILE ACTIVITIES

When the team meets, Jordan explains the goal for the meeting — to identify and clarify the work items to be placed into the backlog, organize them and appropriately prioritize each item.

Looking at their product attributes, project plan outline, Iteration Plan and risks from the previous on-ramp steps two and three, the team describes the major project elements that need to be done in simple, concise terms and adds these work items to their backlog. Initially they use Excel to quickly capture and organize the backlog but agree they will use Jira, an agile management tool, to capture the backlog, manage sprints and track progress (more on this in Step 5.) When the team is satisfied that work items are captured, they add a prioritization of 1 to 3 (1 being high) for each item. Jordan will transfer the backlog to Jira before planning their first sprint and diving into task details.

At this point, the team also had to consider how to quickly get feedback on the preliminary concepts. They knew they needed access to customers, but how? Linda, the product manager, agreed to develop a customer engagement plan as part of the first sprint.

STEP 4: OUTCOMES

The exhibit on the following page shows the initial high-level backlog in a simple spreadsheet format. Prioritizing the major tasks was not easy! There was great debate on whether it was important to focus on things like cost estimates early when they had no idea what the product would be or if they should think about mobile phone app as a priority 1 item or wait until they had the functionality further defined, etc. etc.

To make these decisions, it was critical that they used the Iteration Plan from the previous step to guide prioritization. They agreed that they had to get the concept right first! This meant early iterations (and sprints) must focus on the overall physical design, but they couldn't ignore the app or voice control since it would be critical to the overall customer experience. Many items would need to be considered in parallel.

Exhibit 1: Project Backlog

Jordan led the team to organize work items based on their effort in the previous steps. The team realizes this is high-level at this point and each cross-functional team will be responsible for breaking down large work items, such as "Define Product Architecture" into tasks that can be accomplished in two-week sprints.

NEXT STEP

The team will meet again in two days to plan the first sprint. They will begin by estimating the priority 1 tasks. Every work item in the backlog must eventually be estimated in terms of effort, with only the near-term work estimated with granularity and accuracy. The estimate for the entire project will become more accurate when the backlog no longer changes significantly.

Exhibit 1: Project Backlog

Identifying the work items to be refined into sprint tasks

Priority	Task Description
Mechanical Design	
1	Create conceptual drawings
1	Define product architecture
1	Develop initial production cost estimates
1	Decide about grinding mechanism
2	Innovative filter design
2	Determine color options
2	Determine carafe and housing materials
2	Determine water reservoir size
3	Prototype tooling
3	Production tooling
Interface, Electronics, Smart Features, Software	
1	Define interfaces - voice, physical and app
1	Research voice controlled interface
1	Learn about need for physical interface - Decide
1	App for coffee maker control - iOS/Android
2	Physical interface electronics
Other Elements	
1	Develop prototype brochure for feedback
1	Determine first release MVP
1	Get full resource commitments
1	Get customer input about voice control
1	Customer engagement plan
1	Define roles and responsibilities
2	Change management plan
2	Patents filing
2	Compliance testing
2	Refine initial production cost estimates
2	External resource plan
2	Capital expense approval
2	Verification and validation plan
2	Wireframe 3D video
3	Retail package design
3	User documentation and disclaimers
3	Communication plan
3	QA Plan
3	Release/launch plan

EXHIBIT 1

To Be Continued...

GET THE SERIES

To see the previous steps and receive each new step of this project as it is published, visit www.AgileForHardware.org. Each step will be available for download and sent directly to your email.

ABOUT THE AUTHORS

The MAHD framework is an open-source process, available for all to use, build on and improve. We look forward to hearing from you and your experiences with agile, waterfall and other processes. The MAHD framework was developed by Gary Hinkle and Dorian Simpson to address the needs of hardware development.

To learn more, get involved, or just join our community for discussion, visit:

www.AgileforHardware.org

About Gary Hinkle

Electronics, mechanical and software engineering are all part of Gary Hinkle's background, working in design, management and executive leadership of communication, industrial, telemetry, audio, avionics, computers, test & measurement, among other industries. Today, he's principal consultant at Auxilium, a company he founded to help engineering-oriented businesses increase productivity.

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About Dorian Simpson

Dorian Simpson is an innovation and product development consultant, trainer, speaker and author of *The Savvy Corporate Innovator*. Companies he's worked with include ABB, Tyco, Owens Corning, Technicolor, FEI, VTech and Freightliner. Before consulting, Dorian held positions at Motorola and AT&T in product management, sales, marketing, business development, and engineering.

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