ALTEN TECHNOLOGY

FIVE COMMON ISSUES IN PRODUCT DEVELOPMENT AND HOW TO RESOLVE THEM

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Updated 09 February 2024

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ALTEN

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INTRODUCTION

Here are five issues you may have in product development and how to resolve them.

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Many symptoms can indicate that product development is off track. Missed project milestones, unclear project goals and team roles and responsibilities, frustration due to lack of progress, and interpersonal conflict all lead to chaos in the development process. This negative disruption has a cost—wasted budget due to redundant work and constant start–stop cycles, along with the decreased confidence of the client (internal or external) that they will get the optimal product for the investment.

The development team bears responsibility for some of these issues, as does the client guiding the effort. An experienced engineering services firm can help their client better define what they want by managing the project to eliminate schedule-extending scope creep, anticipating design iterations, and building in frequent communication touchpoints to ensure both parties are aligned.

Additionally, an engineering services partner accurately predicting risk, planning for design iteration, and budgeting for sufficient validation will keep the project moving forward without show-stopping disruption.

Here are five issues you may have in product development and how to resolve them.

1. MISSING MILESTONES

Project milestones help demonstrate that the project is proceeding to plan and will meet the timing requirements.

CHALLENGES

Even the most innovative, helpful products must be developed on a timeline that governs the flow of cash and allocation of resources and meets the client's expectation for when they can have the product. Project milestones help demonstrate that the project is proceeding to plan and will meet the timing requirements. These intermediate steps often track with stage-gate style phases, such as ideation and initial concept, product design and development, process design and development, validation, and launch. These milestones take place in series, so if the team exceeds the first milestone target, the remaining goals are behind schedule before they begin, leaving the project manager (PM) feeling powerless to stop the slide. Many factors cause the project to extend past a milestone; examples include the following:

- Inaccurate estimation of the time it takes to complete a task
- Poor communication among the development group, the client, or the suppliers
- Team members working in silos
- Lack of direction from the PM or client
- Third-party deliverables missing their deadlines

> "Improving communication between product development functions can help cross-check the project tasks.

SOLUTIONS

It is vital for the PM to make an honest assessment of the project direction. Step away from the head-down project execution and evaluate the signs, behaviors, and processes the team is using to develop the product. Though it is challenging to condense the remaining schedule to account for the slippage, proactive course correction can quickly right the ship. If one or more team members consistently underpredicts the amount of time needed for their tasks, the PM can show them a direct comparison of their time estimate to the actual delivery date. Taking this step may inspire the teammate to be more accountable for the overall timeline, knowing the team planned around an inaccurate time estimate.

Improving communication between product development functions can help cross-check the project tasks. The development team operates like a machine, with each team member working as a subprocess to make the system operate. The functional engineering disciplines transfer small, targeted deliverables to each other, and if done properly, the receiving function reviews and communicates issues back to the delivering function. Scrum meetings, which include sprint planning and reviews, demos, and standups, let all team members know

how their piece fits in the larger project puzzle. Cross-functional engineering reviews further define how the engineering disciplines should interact to execute the final project deliverables. For complex products, this approach brings issues to the surface early enough to rectify without catastrophic compromises to project scope or timing.

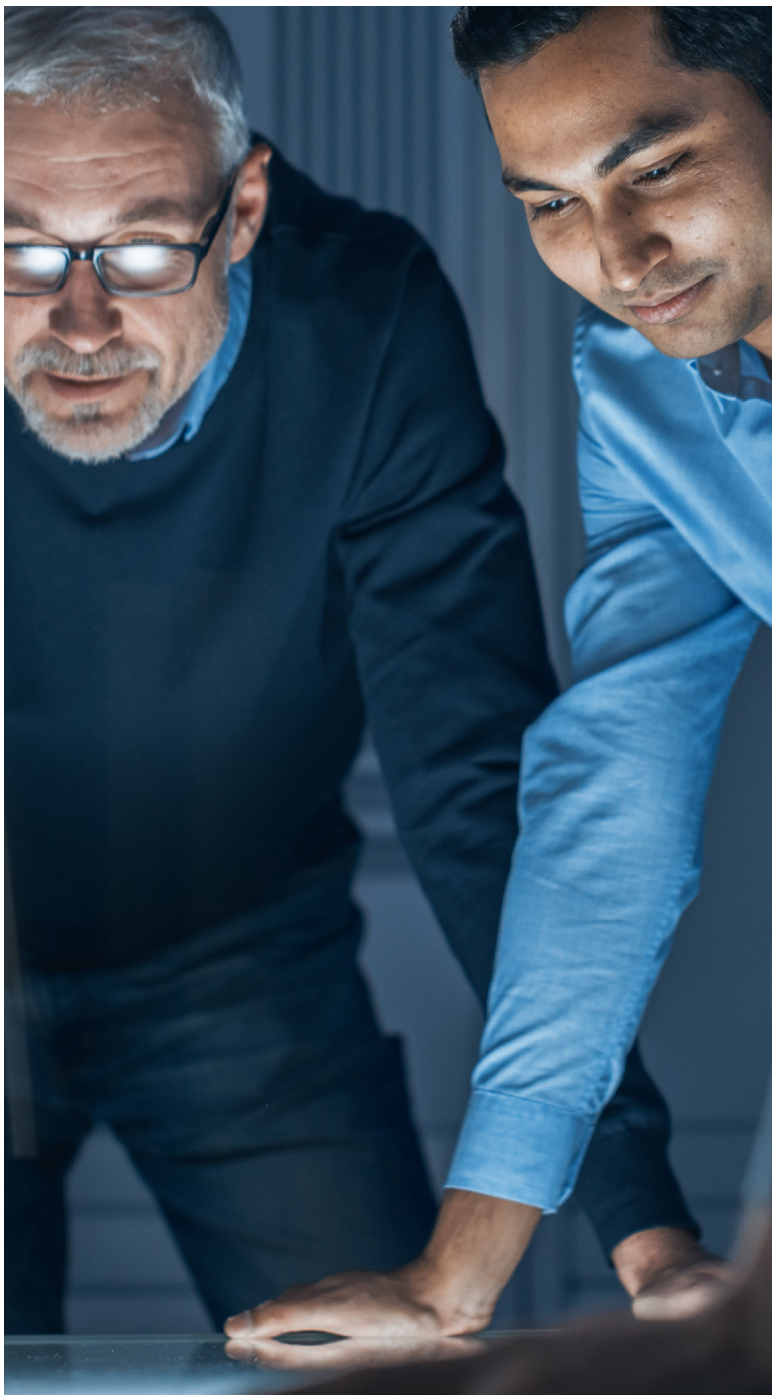
Removing noncritical items from the timeline can help pull downstream milestones closer to the project timing. Engaging stakeholders in feedback after prioritizing mission-critical tasks, while also objectively deciding what not to do, will pay itself back in the long-term plan. This solution also provides an opportunity for the client to think through their strategy to make sure it is still what they want, and it gives them a chance to reset direction if needed.

Because the original team did not meet the planned milestone dates, hiring additional, high-quality workers can alleviate stress by pulling noncritical tasks in parallel. Team growth can take the form of full-time workers or engineering services firms that specialize in areas beneficial to the project. Outsourcing tasks to additional team members reduces the overall lead time by removing them from the series orientation present at the beginning of the project.

Another way to pull up deliverable dates following a missed milestone is by engaging the stakeholders. This step is a natural opportunity to clarify requirements that might have confused the team, leading to delays caused by their need for clarification. Ensuring the team is working on the desired problem sets the team up for success and avoids time-draining loops back to a prior project phase. Increased engagement with project sponsors reminds them that they are integral to the success of the development team. The stakeholders also might have resources or leverageable experience to help alleviate time pressure by solving problems quickly.

ACTION STEP

Step back and look at how things are going and make a plan to correct the problem. Understanding *why* the team missed the milestone is the key to defining the right corrective measure.



2. SCOPE CREEP

Project milestones help demonstrate that the project is proceeding to plan and will meet the timing requirements.

CHALLENGES

Even well-run projects can encounter new requirements along the developmental path. These can be stakeholder-driven (e.g., adding functionality or marketability to the original product or team) or PM-driven (e.g., continual engineering loops) to improve a performance metric or a product feature to enhance the final deliverable. This process is called "gold plating"—that is, adding features or functionality, which were not part of the original scope, for a better solution. High-performing teams often fall into this trap upon completion of the concept or the design phases.

ACTION STEP

Communicate to stakeholders how the requested change will affect the project. Sharing a project-specification freeze date or a drop-dead date for changes can help inform the client when the team can no longer meet the timeline with further modifications.

SOLUTIONS

Developing products naturally leads to changes, especially if the frequency of touchpoints with project stakeholders is high. Midstream changes can be highly disruptive, and they inflate timelines as the team adapts to include them in the product. Denoting new items in the product or in the system requirements document aids in the tracking effort and helps the team defend delays in the project if the schedule starts to slide. To that end, the development group must have a system to manage changes, knowing that expansions in scope usually come at a cost—budget, time, and quality. The team must also be up front and honest about the cost of changes with their clients, or they risk expectations becoming misaligned.

It is also essential to watch for gold plating. Adding redundancy in the quality checks against the requirements document can provide an objective assessment of the new feature and a chance for the team to add a layer of accountability to confirm whether the deliverable should include the added item. An example of this is for quality, systems, and product management to review completed features via sprint demonstrations to stakeholders.

3. STAFFING ISSUES

The easiest way to mitigate disruptions with staffing is to create a comprehensive onboarding process for all project roles.

CHALLENGES

A product development team may not have the exact breadth of skills it needs to execute a project, or the project time plan may not allow sufficient time to complete an activity. A new product may combine electrical engineering with mechanical engineering or specialized IT, and the allocated team may lack one or more of these areas of expertise. For example, the timeline may not accurately account for the required time to mesh a finite-element model for structural analysis.

Another issue could be that a colleague is pulled from the project team or leaves the firm altogether. When developing a new product, there is usually no redundancy in staffing. So, when the team lacks a critical skill or experiences personnel changes, the project timeline can suffer because of the lag in getting a new resource up to speed. Similarly, team members could be shared between multiple projects, which disrupts their focus and penalizes each project's timeline.

Finally, a leadership team that lacks accountability can significantly affect a project in a negative way. As the leaders set direction for project scope and approve gate passage, a lack of accountability reduces visibility to risks during the project. It can also lead to an incomplete picture of the amount of work the project requires.

> "If the team finds it underbudgeted time for an activity, outsourcing significant portions of the design is an effective way to make up time on the project schedule.

SOLUTIONS

The easiest way to mitigate disruptions with staffing is to create a comprehensive onboarding process for all project roles. Though this is sometimes complicated because of the variable nature of the developed products, the process for getting a new team member oriented and adding value can be similar for most roles in the group. One way to expedite onboarding is to cross-train team members, at least in part, to other functions. If team members collaborate on most aspects of the project, they will be familiar with the tasks their colleagues need to perform. A tool that encourages collaboration is the standup, a multidisciplinary team meeting that keeps team members informed of each other's activities by fostering a conversational atmosphere.

Another process to avoid disruptions is to employ comprehensive documentation for the current state of work so that an incoming team member can easily pick up the baton for an outgoing team member. This step retains critical project knowledge while accelerating onboarding.

If the team finds it underbudgeted time for an activity, outsourcing significant portions of the design is an effective way to make up time on the project schedule. A specialized engineering services partner can add the particular skills the team needs and then turn off like a faucet to maximize budget efficiency. Although meshing a finite element analysis model is an excellent example of a specialized skill suitable for outsourcing, bringing in an expert third-party contractor to design the product for structural integrity gives the external partner the freedom to work within its experience to devise the best overall product solution.

This area is where the human side of product development shows up the most. Engineering is collaborative, with communication, conflict management, and clear definitions of roles and responsibilities paramount in achieving efficient success. Functional managers should proactively track and allocate team members' time to avoid excessive (and disruptive) time sharing between projects. Team members want to succeed, but when challenges arise, it is important for a development staff to have processes and tools in place to help them navigate unplanned issues and to know where to go for support, clarification, or help.

ACTION STEP

Cross-train team members across departments on project tasks to minimize disruption of staffing turnover. Document current-state project information, define specializations dictated by the project at the outset, and look into options to outsource if it makes sense. Adding fractional engineering disciplines increases the expertise of the project team, leading to better output.

4. PROJECT MANAGEMENT ISSUES

Project managers often lack the visibility and tools to measure or predict progress against the schedule accurately.

CHALLENGES

A PM often lacks the visibility and tools to measure or predict progress against the schedule accurately. Many commercially available instruments or homegrown tracking methods specify pace in terms of percent complete of the overall project, but they do not include context into that number. The Pareto principle (80/20 rule) limits the effectiveness of this approach because, for example, the last 20 percent of the project often takes as much time as the first 80 percent. This effect leads to a situation in which a milestone is approaching, but the team has no reasonable shot at hitting it.

ACTION STEP

Share a unified vision. The PM is responsible for delivering the product on time and at budget. Help the PM track progress by using visual tracking; defining specific, measurable targets; and ensuring the team is working toward creating a functional product.

SOLUTIONS

The PM must measure progress by more than a single percentage. Learning that the project is "60 percent complete" means nothing to the team lead. Define work in terms of specific tasks, steps, and phases, so that the PM knows which actions are complete and what work remains. Agile is an effective project management style that facilitates this effort. Employing Scrums creates opportunities for the team to complete a task, check it, and measure progress based on specific tasks finished.

Another way to help the PM track progress is to have measurable definitions for "completed" project steps. An example of measurable completion could be to design a fluid manifold that provides flow distribution to the inlet of a part within 5 percent by mass across the face area. If the distribution is within 5 percent, it is complete. Consistently referencing and following the design specification helps ensure that once the feature meets the target, the engineering effort is complete. The point is a core value of the Agile Manifesto, which states that the focus should be on a functional product instead of comprehensive documentation.

Visual task boards can help the PM instantly see a snapshot of progress, ideally defined by measurable outputs. In addition to aiding the development group to visualize how the project is progressing, it adds a layer of accountability to each team member because everyone can see the completed tasks.

5. RESOURCE CONSTRAINTS

Resource issues are typically easy to solve but require planning. Setting up access to critical test equipment or end-use assemblies should be done well in advance.

CHALLENGES

The team needs the proper resources to complete its mission. Constraints on tools, systems, or prototypes compromise its ability to deliver on time.

Examples of resource constraints include the following:

- Access to specialized equipment, such as a temperature or humidity chamber that requires scheduled testing times
- An insufficient number of prototypes fabricated, leading to the need to schedule for when the team members can access them
- Material that requires particular disposal procedures (including strong chemicals or reagents) that can lengthen timelines
- End assemblies to which the developed product will integrate; limits to the numbers of these end assemblies can create unexpected packaging or interfacing issues
- Poor quality of product components from suppliers that require rewiring or new suppliers

ACTION STEP

Budget sufficient time for shared or limited resources. Use analysis and external facilities when possible and practical and define secondary sources for critical components to limit supply chain disruption.

SOLUTIONS

Resource issues are typically easy to solve but require planning. Setting up access to critical test equipment or end-use assemblies should be done well in advance. This equipment usage schedule is another mechanism to build the timeline around and mitigate scope creep. If the team misses its test window for a piece of equipment, the implications could be catastrophic for the project timing.

Considering the benefit of numerical analysis versus testing may alleviate prototype quantity constraints. Employing university resources is a convenient arrangement because the team gets access to labs, analysis tools, and low-cost temporary employment to conduct the work. Additionally, determining a suitable substitute can further relieve the team's prototype needs.

Fabricating a nonfunctional part of the same size, mass, and base materials as the product could serve the needs of packaging development or could be used in the validation testing of features that do not examine primary function.

Use of approved vendors de-risks the supply chain aspect of component ordering. Ensuring a primary and secondary supplier is in place for all externally sourced parts or tests helps preserve quality without compromising the project timeline.

CONCLUSION

Many of the reasons a product development project gets off track can be solved by outsourcing to an engineering services partner. When considering this option, ask the questions below.

Applying the solutions and action steps to the challenges listed throughout this paper will get your product development effort back on track.

PROJECT MANAGEMENT

Consider the following:

Can a portion of the deliverable be defined (without violating NDAs or IP) and given to an outside firm? Outsourcing allows your internal team to focus on core competency items. ALTEN Technology is well-suited to support many of the remaining project management and product development tasks by supplying on-site engineering staff to add instant bandwidth to the team.

Are there skills that your team is lacking? The cleanest option to avoid disrupting the project timing is to outsource those items to a capable partner. It saves cost and time in the long term and preserves product quality.