

## Bridging the Engineering/Project Management Gap

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*Hey, Engineers! Ever have trouble understanding how this Project Management stuff you hear so much about is actually useful?*

*Hey, Project Managers! Ever have trouble getting engineers to actually do the right things on your projects?*

*Well, here's a real life example from Motorola SPS demonstrating how engineering and Project Management professionals were able to bridge the gap that often separates the two groups. The results were outstanding: two critical design projects that will ultimately be used in Motorola's cellular phones were finished on time, meeting customer expectations. This compares to earlier projects that were often months late and didn't perform as expected.*

### Introduction

The work was done at Motorola's M•CORE Technology Center™ in Austin. MTC is part of the Advanced Systems & Platforms (ASP) organization within SPS, and creates embedded RISC microprocessor cores for use by both internal and external customers. Over the past eight years, MTC had grown from a small engineering 'skunk works' into a full-blown design center with over 200 on staff. Little formal project management was performed in the past, and projects were not schedule/task driven or metric focused. There was a lack of personal accountability, insufficient resource planning, and no clear daily focus on important milestones. As a result, projects were often late with little advance notice, drastically reducing the planning ability of management, and negatively impacting customers eager to capitalize on this new technology.

Despite these setbacks, this compelling core technology continued to be in high demand, and MTC was called upon to supply two critical cores in support of a newly formed partnership between the Wireless Systems Subscriber Group & Motorola CE. These two organizations were collaborating to realize 2<sup>nd</sup> and 3<sup>rd</sup> generation digital cellular platforms to be used across Motorola's broad range of cellular product offerings. The MTC microprocessor cores were defined as key deliverables for these platforms. In response, MTC senior management decided to implement formal project management at the project level. "We really had nothing to lose at that point," says Jim Thomas, MTC Vice-President and Director, "In the prior year, we were successful using project management to just select projects and balance resources, but it was not yet helping the design teams do a better, easier job. We needed real program management help integrated into the design teams."

The "help" was Doug Russell, a Principal Project Manager who from came to MTC from CGISS in Arizona, with 17 years of project management experience on a wide range of projects. Doug was teamed with Brian Branson, the team's Engineering Manager, with sixteen years of experience within SPS. Doug and Brian were asked to blend their unique experiences and talents into an approach that could deliver results, and one that the design & support teams would "buy into".

### Doug's Views upon entering the team

In the initial interview with Mike Strevell, MTC Program Controller, Doug learned that Mike and team had made significant headway at MTC in the areas of project prioritization and resource balancing, having been focused on these areas for the past several months. Mike also indicated that they were now ready for someone to bring project management techniques to the team level.

Doug says, "From previous experience I understood that as a new person coming into an organization I would have to adapt my approach to fit the team. I had three goals. First, to create a culture within the team that emphasized accountability, communication and focus. Second was to show the team the usefulness of tools such as earned value and a realistic schedule. Finally, I wanted to forge a solid bond with my Engineering counterpart Brian Branson. The forging of a joint viewpoint with Brian was probably the most valuable of the three. None of the things we were able to accomplish would have happened without that relationship."

### Brian's Views

Brian knew that the team needed help in Project Management. "I knew we had a great team," he says, "and they had really worked hard on the previous project, but even so, it was significantly late. We tried a few things, but the complexity of our designs was growing faster than our ability to manage them, and to tell you the truth, some of our prior attempts at project management seemed like they took more time than they were worth."

Brian's goal was to create useful schedules, and to execute these new projects with a different focus. "In the past we had always spent lots of time creating big gory schedules with all sorts of detail, but they weren't well understood, and they certainly weren't very useful. We'd take a week or two to plan the project, and then just a few weeks into it, we would get off track and wouldn't even know it."

Brian was eager for Mike to bring someone in from outside. "Bringing in Doug from an outside organization was critical. He arrived with no excess 'baggage' in terms of our on-going technical struggles, and was able to help us focus on schedules, resources, risks, and our critical customer commitments. Doug also emphasized from the start that he wanted to use project management to help us solve our problems, and not create any additional burden on already busy people." Brian quickly coined that thought into a simple one-liner: Program Management isn't extra work, it *is* the work!

### Early Views of Other Key Team Members/Customers

Other key team members shared many of Brian's concerns and were tired of working hard and not being successful.

Thomas Portlock, Team Leader for one of the critical sub-modules says, "In the past we weren't focused as a team. As I listened to what Brian and Doug were saying, I hoped two things would occur. First, that Project Management would bring us together as a team, and two, that it would provide a consistent set of expectations across the sub-teams."

John Arends, Project Leader for one of the two core projects, "I knew the management process of doing designs was broke."

Larry Muenster, Physical Design Manager, "I was tired of being crunched for time at the end of the projects because the front-end design teams continued to try to make their designs perfect. I was ready to try something new."

Says Bob Bolger, customer and Program Manager within WSSG, “What impressed me most in the beginning was the way they committed to what they were going to do and then they stayed with it. Never wavered, even under the pressure of management to further ‘pull in’ their schedules.”

John Silvey, Design Integration Leader for one of the two projects says, “The design groups had a tendency in the past to continue to ‘tweak’ their designs and not finish, paying little attention to the overall schedule. I thought to myself, ‘This time there’s going to be schedule accountability from the start’”.

### Rolling out the Approach

Doug was low-key in his initial approach to the team. “I went to a few of the team meetings for earlier on-going projects and was very quiet - observing really - trying to gauge the personality of the team, which I then shared privately with Brian. My comments were mostly geared around what I saw as too much status reporting and not enough focus on the schedule, risks, and deliverables. When Brian responded positively to my comments, I knew we had a chance at something really good.”

The two managers spent many hours over the next few weeks sequestered away in Doug’s office, pouring over their viewpoints and creating a mutual vision of how to implement change. “No one knew where I was, so we got a lot of planning done,” Brian adds.

The two decided that the proper way to create culture change was to start by holding a handful of meetings with the key team leaders. Doug says, “The idea was to peel the onion, showing the team clearly where we were headed, but one a piece at a time. In my MBA mind we were rolling out an ad campaign. And the team leaders were the consumers.”

“There were a lot of eyebrows raised and eyes rolling at the first meeting, but Doug and I were determined to be firm in our approach, and encouraging at the same time”, Brian says.

Adds Larry Muenster, “Some people were saying: ‘here we go again with the management stuff,’ but it was different this time.”

The first meeting with the team leaders was held in early September, 1999. There was so much material to cover, that several short meetings were scheduled to roll out the new plans and ideas. Brian adds, “At the first meeting we defined the new projects in terms of scope, discussed the new team culture of accountability, and handed out a few key assignments in technical areas where I felt we needed to do better.”

Doug adds, “Then two days later we told them the specifics of what we wanted. We told them that they needed to create schedules that *they* would own, and that the schedules would be so valuable that they would actually use them to drive the actions of the team. The looks I got when I said that almost made me think I’d made a mistake in leaving Phoenix.”

“Our underlying message was that *they* were accountable, just as we were, that fate was in their hands, and that they were empowered,” Brian concludes. “We knew the schedules were going to be hard to meet, but we also thought that if we could do a good job in creating them, we had a fighting chance of making it.”

Next, Brian and Doug started weekly meetings with the team leaders, and discussed the desired content and focus. They rolled out something they called a “one-pager” report, and asked each team leader to prepare and present this on behalf of their team. The report showed tasks that had been completed per the schedule, but more importantly, those that were not. If a task was not completed on time, a recovery plan was prepared by the team leader for review. The one-pager also included near-term milestones so the team leaders would be forced to look ahead. And then, perhaps most importantly, the one-pager included issues thought to be out of the leaders’ control, affecting their success. In short, the team leads were encouraged to bring up their problems in order to manage these exceptions and create recovery plans.

“The one-pager was our way of telling them that they were in charge of their destiny,” says Doug. “Solve the problems you can, tell us about those you can’t, and don’t complain that it’s not your fault when things

go wrong”. Brian adds, “We were trying to create a culture where it was OK to bring up issues, and ask for help in getting them resolved.”

In mid-October, Brian and Doug held a formal project kick-off meeting for the roughly 90 people who would be working on the two projects.

Brian says, “We described the critical nature of the customers’ requests, our design goals, and talked a lot about our need to make changes – personal accountability and properly managed execution. We brought them up to speed on our plans for focused weekly review, and our intent to manage the exceptions brought to the forefront by the entire team.”

Doug says, “The meeting took over an hour and they were pretty quiet the whole time. I was concerned that they weren’t getting it, but Brian sensed that they were listening and absorbing.”

Adds Jim Thomas, MTC Director, “I supported what was being said and I was pleased with how it went. I think the team understood.”

### Along the Way

The first project ‘tapeout’ (when final design files are delivered to customers) was scheduled for January 31<sup>st</sup>, and was then to be integrated with other complex sub-modules for a second tapeout on February 28<sup>th</sup>. These were treated as two separate projects since they were to be delivered to different customers, having different technical requirements, but both were critical deliverables, and shared a good number of MTC personnel.

Brian adds, “The key to success for the first three-fourths of the projects was keeping the teams focused on their critical tasks and schedules using Earned Value techniques introduced by Doug to get objective data on how we were performing.”

“Earned Value is something project managers are quite familiar with,” says Doug. “But it was new to most people here at MTC. I was concerned that people would ‘zone-out’ if I started talking Earned Value jargon such as ‘Budgeted Costs’ or ‘Work Performed’, so I tried to present it in a way that made it useful to Brian and the project leaders. I really focused my initial Earned Value efforts with John Arends, project leader for the first tapeout, as I knew it would provide a lot of credibility within the team if he found it useful.”

Says John, “It gave me the capability to make trade-offs between customer needs and a ‘flawless’ design.”

The team leaders were asked to create and maintain their schedules, so they would feel accountable for their performance. Adds Thomas Portlock, a key team leader, “There was definitely an air of accountability. We knew what we were expected to do.”

Doug and Brian worked hard through the execution phase of the project to solve whatever problems the teams needed help with, focusing on resource allocation and scope management, and sticking to the schedule as an underlying constant. These actions underscored to the team the importance of working together to knock down roadblocks that might have been considered unavoidable on past projects.

The two had to feel their way initially in taking on these roles. Brian adds, “Doug didn’t use his time and energy updating their schedules, but rather looking for risks and asking pointed questions from an orthogonal viewpoint. I focused on working the exceptions, and it was much less of a fire fight, as we had much better control of the chaos. It worked well.”

“As far as the schedules,” Doug adds, “my goal was to not be viewed as a scorekeeper. I had seen a previous project manager work really hard to keep a schedule updated, with minimal input and ownership from the team, but he had no time left to analyze what was going on or to make anything happen.”

### It Starts to Work

Several factors along the way made Brian and Doug feel that what they were doing was working.

The first was that several key team members related good feelings to the MTC management. Jim Thomas says, "I began to get 'hallway reports' from team leaders of a very positive change in the behaviors of everyone involved, toward each other and toward the project objectives."

The second factor was a sense Brian got from the team itself. "We worked hard to encourage them to bring up problems. On more than one occasion I remember us thanking them for uncovering an issue. When the team saw we were serious about helping them, they seemed to really start buying in."

From Doug's perspective another key point was how the team became more effective at using the data he was generating on a weekly basis. "I was amazed when John Arends started changing resource assignments and team focus based on the earned value analysis I was doing for him. Then, as we got to the last few weeks, he started performing scope reduction on non-essential tasks. It was great. I started thinking, 'we're going to make it.'"

### End-Game

As the projects neared the final few weeks, several key actions were taken to ensure success. First, Brian and Doug began brainstorming on how to focus all effort on completing the required tasks, and avoiding 'feature creep'. They created a simplified, single project schedule with the team, focusing on the tasks that remained, how they were critically linked, and what was required to complete them on schedule.

"We called this the 'end-game' schedule," Brian adds. "It occurred to me that we had actually changed the rules of the game, and I wondered how this would be perceived by the team, but Doug came up with a great baseball analogy for me. Doug pointed out that you don't coach a baseball team the same way in the seventh inning as you do in the first, so likewise on a project you have to change the tools and your approach as the project moves through different phases."

In order to stay focused on the 'end-game', short, daily 'stand-up' meetings were instituted for the last two weeks of the project, with increased communication being the main goal. "Towards the end it is absolutely key that people communicate back and forth on a lot of little details," adds Doug. "Bringing them together in a focused manner relieves a lot of stress because decisions are made and everyone hears them. It also gave Brian and myself the chance to minimize design 'tweaking.'" Brian adds, "We reviewed our daily progress to the end-game schedule, and generated simple daily action lists to stay on track."

The final key was the institution of a Change Control Board during this phase of the project. Doug says, "The team drove me especially crazy on the first project with last minute design changes. In fact, they almost caused us to miss the due date on the first project, although the team laughs at me for saying that."

"I had been thinking a long time about the right way to do a CCB," Brian says. "I didn't want to stop them from making critical improvements to the design, but I did want to make sure that these changes were done in a way that could be incorporated into the final design flow without affecting the schedule." Brian and Doug initiated a simple process of having potential changes brought to them for review - at any time - but not before the requesting party (1) clearly understood the value of the change to the customer, (2) documented how the change would impact the overall schedule, and (3) was prepared to present a compelling argument to the team. Decisions to use up 'management reserve' - consciously built into the final schedule - were orchestrated by Brian and Doug, with input from affected team members.

"The CCB idea worked really well," says Brian. "Once we rolled out this process, we ended up only needing about three of them, and the design stopped changing."

"I guess we gave them an official outlet and a framework by which to make changes," Doug adds.

## Results

Both projects met their schedules, to the great relief and satisfaction of all within MTC. “There was a round of applause for the team’s performance in front of my boss at the division staff meeting,” says Jim Thomas. “That was nice.”

Customers who six months before had thought MTC would not meet their schedule commitments were now very pleased. Bob Bolger, customer for one of the two MTC project deliveries says, “The way this project was managed is critical for future SPS success. As we move toward more complex integrated solutions utilizing design centers around the world, a key to success will be having each of the independent design centers like MTC do what they say they are going to do. These guys did it.”

A side benefit for MTC was that the planning and execution of future projects was not delayed. This is often forgotten when organizations slip schedules. “The same people are needed for the next critical project, right now,” adds John Eagan, an MTC engineering manager now planning a future project.

## Looking Back

“The team was successful,” Brian says, “because we all focused on the critical factors: project scope, resources, and time. But maybe even more crucial was the teams’ willingness to change in order to improve its effectiveness. To me, this was the sign of a maturing team.”

Doug adds, “Key also was a new sense of ownership the team had for their own success. They took control of their own schedules, and the commitment to the customer, too.”

Adds Thomas Portlock, “Based on our Project Management guidelines, I was better able to explain to my team what we were trying to achieve. This allowed us to consider more than just pure design issues.”

Brian and Doug agree that management support and commitment were also critical. “It was clear to everyone that our management was totally committed and supportive of what we were doing from the start,” says Brian. “Which made it a lot easier to drive change throughout the organization.”

John Silvey adds, “The greatest thing was the many fewer late nights and a lot less overtime and worry.”

John Arends says, “Project Management improved the groups’ communication, and helped us deal with our unknowns up-front, and then we managed the risks.”

“Finally, it was fun,” says Brian. Doug agrees, “Every project ought to feel like this.”

This was a win-win outcome for MTC, SPS, and Motorola. And that’s what it’s all about.