

High Priority Staffing Decision

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Abstract

Lockheed Martin is the prime contractor for a large U.S. Government agency program which, among other activities, provides a team of Systems Integrators (SIs) to support multiple software development and deployment projects. A key SI recently left the highest priority project, and Lockheed Martin has been unsuccessful in hiring a replacement for this person. With each passing week, the inability to fill this position adds to the risk of successfully completing this project, as well as increases the attention received from the customer. This paper explores the process and tool used to determine a course of action to fill the vacant position, based on four alternatives.

Background

Larry Feidelseit is an employee of Lockheed Martin who manages a team of System Integrators for the government program. The SIs are employed by Lockheed Martin and various companies that have partnered with Lockheed Martin for this program. In mid-August, one of the senior SIs for the highest priority project (subsequently referred to as HP) that Larry's team currently supports left the program. After six weeks of attempting to hire a new SI to fill the vacancy, neither Lockheed Martin nor the partners have been able to identify a suitable replacement. Each week, the inability to staff this position has received more attention from the government HP Project Lead and from the senior government customer, responsible for all of the projects that Larry's team supports.

With this increased scrutiny, it became apparent that other alternatives needed be considered for staffing this position. One of these alternatives was to transfer an SI supporting one of the other projects (which are all lower in priority) to HP. After evaluating the qualifications and availability of the SIs, a single SI (we'll call him Tom) rose to the top of the list.

Unfortunately, primarily for personal reasons, Tom is reluctant to leave his current position on a lower priority project (subsequently referred to as LP). Since he has a young child at home and is enrolled in a post-graduate program, his ability to travel is limited. Earlier in the summer, Larry approached Tom with a similar opportunity, and he bluntly responded that he was content in his current position and was not interested in the new opportunity. Larry recently talked with Tom about this current opportunity to join the HP team. Tom responded similarly (and even more bluntly), "Thanks, but no thanks." This left Larry with the difficult decision of forcing Tom to transfer to HP or investigate other alternatives.

Decision Model and Process

Larry and Daniel Ng used the principles of the Analytic Hierarchy Process (AHP) to determine a solution to the problem. After determining the goal for the decision model, a decomposition of the problem was performed. Daniel and Larry decomposed the problem using a bottom-up approach, first listing the alternatives, then documenting the pros and cons of each alternative, and finally using the pros and cons to derive the objectives and sub-objectives for the decision.

Once this decomposition was complete, Daniel and Larry performed a series of judgments (or pairwise comparisons) to determine the relative preference or importance between two elements with respect to its parent element in the hierarchy. These comparisons led to the derivation of local priorities among the elements with the same parent. The local priorities were then synthesized across the model to derive global priorities for the alternatives, leading to a recommended decision.

The remainder of this paper provides the detail related to the decision model developed to solve the high priority staffing decision.

Goal

The goal of this decision is to determine the best alternative for staffing the high priority project.

Alternatives

Table 1 details the four alternatives and related advantages (pros) and disadvantages (cons) that were developed and entered into the model:

Alternative	Pros	Cons
Move reluctant employee to high priority project	<ul style="list-style-type: none"> • High Priority project will be fully staffed • No change in budget (cannot afford to hire another SI) • Customer will be happy that high priority project is fully staffed • Senior customer believes that low priority project is overstaffed 	<ul style="list-style-type: none"> • Reluctant employee will be dissatisfied with move • Reluctant employee has travel constraints
Continue to search for external hire for high priority project	<ul style="list-style-type: none"> • Larry will not have to confront reluctant employee • Reluctant employee will continue to be satisfied 	<ul style="list-style-type: none"> • Will require hiring another SI, overrunning budget • High priority project will not be fully staffed • Senior customer will remain unhappy with our ability to staff • Senior customer will continue to believe that lower priority project is overstaffed

Alternative	Pros	Cons
Look for another employee to move to high priority project	<ul style="list-style-type: none"> • No change in budget (cannot afford to hire another SI) • Larry will not have to confront reluctant employee 	<ul style="list-style-type: none"> • High priority project will still not be fully staffed • Senior customer will remain unhappy with our ability to staff • Senior customer will continue to believe that lower priority project is overstaffed
Eliminate open position on high priority project	<ul style="list-style-type: none"> • Reluctant employee will continue to be satisfied • Overall staffing of SI will not go over budget • Larry will not have to confront reluctant employee 	<ul style="list-style-type: none"> • High priority project will still not be fully staffed • Senior customer will still consider lower priority project is overstaffed • The customer will not be happy with our staffing on high priority project

Table 1: Alternatives, Pros and Cons

Larry was given a challenge to reduce his team by ~10% at the beginning of the government's fiscal year (October 1, 2005). He was able to meet this goal through natural attrition of his staff. However, based on a smaller budget but larger scope of work for the SIs, the senior customer has been scrutinizing Larry's entire team to identify areas which she believes are overstaffed, in the belief that resources may be moved from these areas to higher priority activities.

Moving Tom, the reluctant employee, to HP is the quickest way to solve the staffing issue. Additionally, assuming that the LP vacant position is not backfilled, this will also satisfy the senior customer, who believes that LP is overstaffed, and as a zero-sum game, this will not add to current budget issues. However, given Tom's reluctance to make the move, there is the possibility that the quality of his work could suffer and even that he would decide to leave the program. This is something to be monitored, and it was considered in the model.

Continuing to search for an external hire for HP entails Lockheed Martin or one of the partner companies hiring an SI who is not already working on the program. This alternative would allow Tom, a productive team member, to remain on his current project, where he is very comfortable and performing well. However, hiring an additional SI to staff HP will cause a budget overrun. It should be noted that although the position on HP has been vacant for several weeks, the contract is structured such that unused budget may not be rolled over for future use. Essentially, for any given period, it is use it or lose it. Additionally, it will probably take at least

several more weeks to identify and bring on a qualified candidate, and it will certainly not satisfy Larry's customers, who wish to both staff HP quickly and reduce the size of LP's staff.

Looking for another employee to move to HP offers the same budgetary benefit as moving Tom to the project, since this would mean transferring an existing SI from a lower priority project without backfilling the vacancy. It would also offer the benefit of allowing Tom to remain on his current project, although there is no guarantee that any other suitable candidate would be less reluctant to move. This option has the disadvantages that it would take longer to identify another candidate and finalize the move than using Tom, as well as that LP will continue to be staffed at a higher level than the senior customer would like.

Eliminating the position on the high priority project has the advantages that Larry will not overrun his budget and that Tom will remain in his current position. However, with this alternative, for the foreseeable future, HP would not be fully staffed, and Larry's customers would not be satisfied, as the highest priority project would be understaffed, while a lower priority project remains overstaffed.

Objectives

Figure 1 displays the hierarchy of goal, objectives and sub-objectives for the model. As stated previously, the objectives and sub-objectives were derived from the pros and cons documented for each alternative. The list of pros and cons were analyzed, grouped and restated as objectives and sub-objectives to be achieved. For example, the con *Senior customer will remain unhappy with our ability to staff* was turned into the sub-objective *Improve senior customer's satisfaction w/ overall SI staffing*.

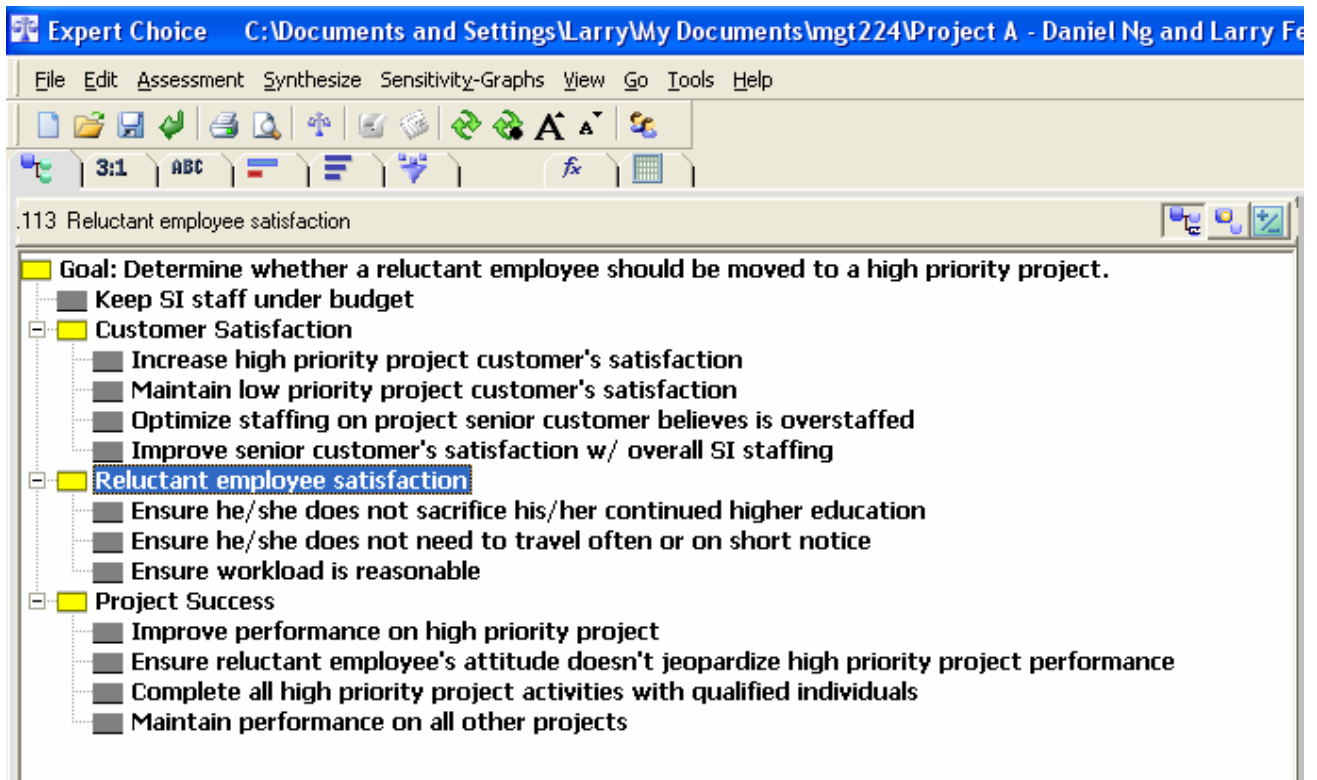


Figure 1: Goal, Objectives and Sub-objectives

Judgments (Pairwise Comparisons)

Figures 2 – 4 depict an example of each level of pairwise comparison that was performed in the model (alternatives, then sub-objectives, then objectives). The relative preference of two alternatives was determined with respect to each sub-objective, the relative importance of two sub-objectives was determined with respect to their related objective, and the relative importance of two objectives was determined with respect to the goal. As mentioned above, these comparisons led to the derivation of local priorities among elements with the same parent.

Verbal comparisons (see the sliding scale on the right side of each figure) were used for all of the judgments.

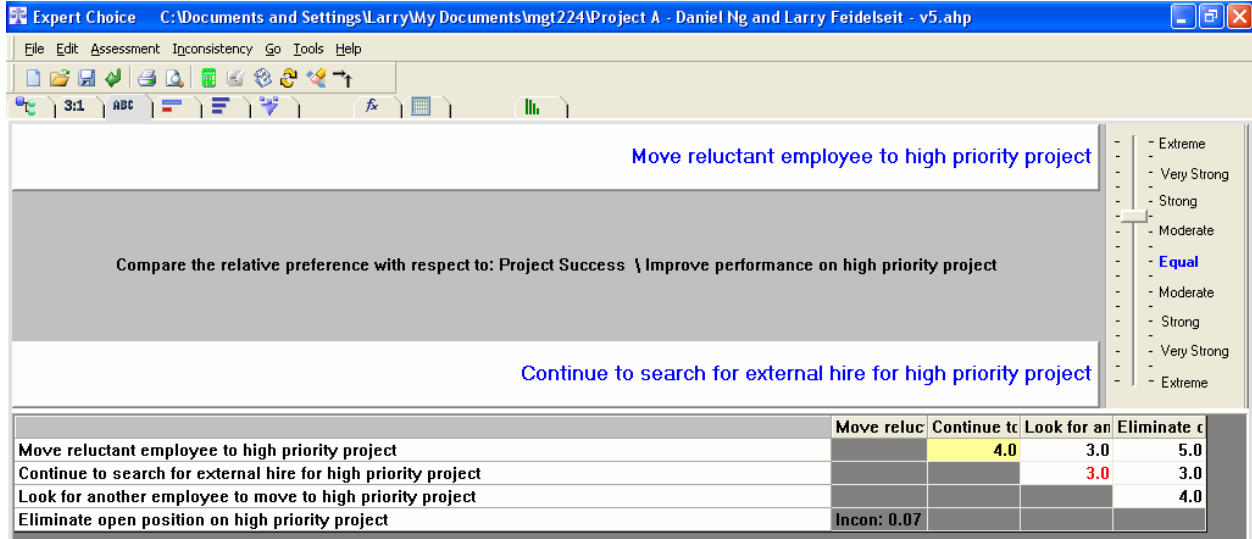


Figure 2: Alternatives with respect to a Sub-objective

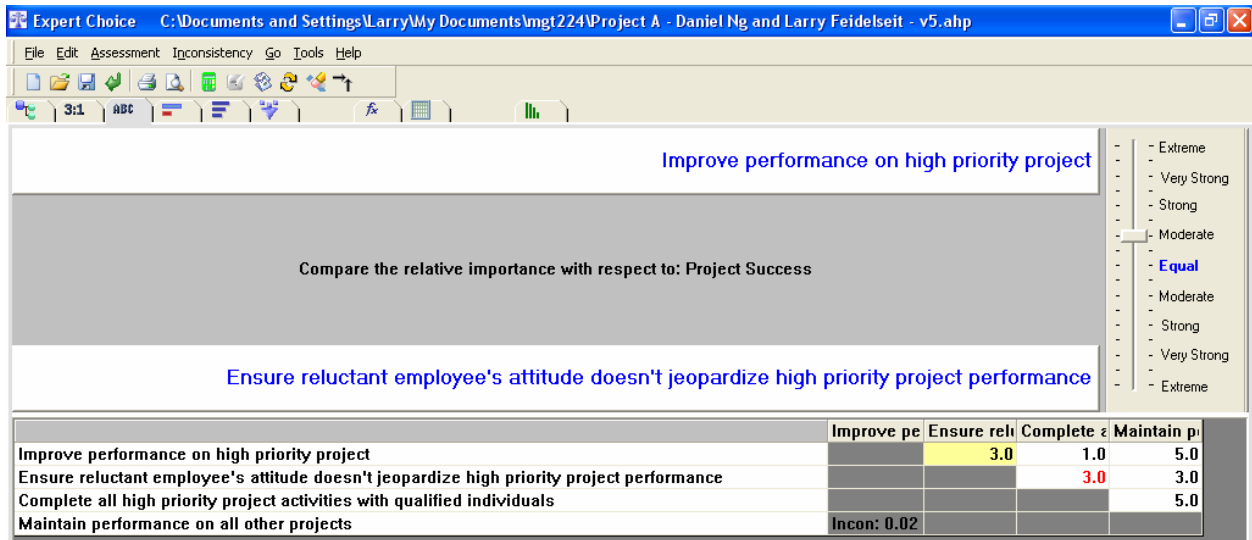


Figure 3: Sub-objectives with respect to their Objective

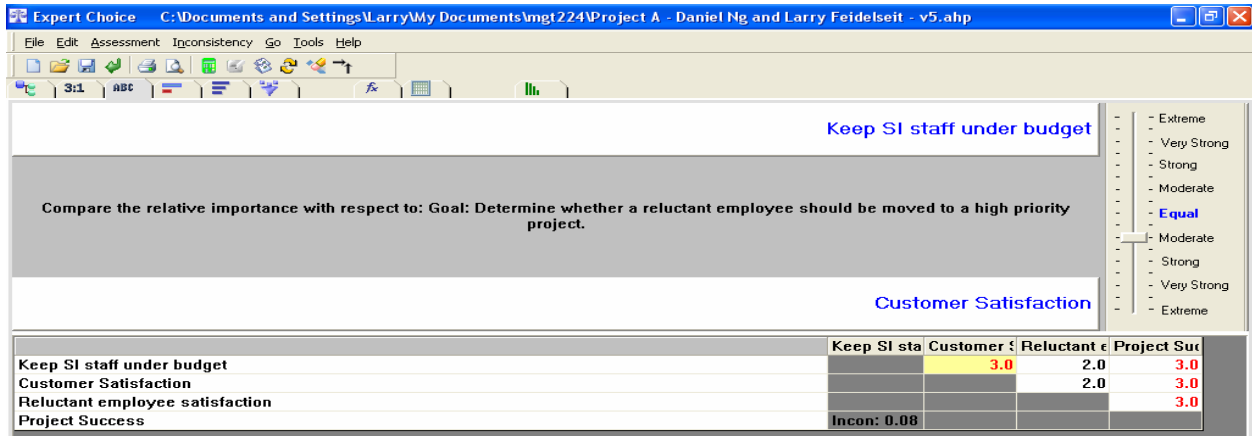


Figure 4: Objectives with respect to the Goal

The full array of judgments may be viewed within the Expert Choice model.

Priorities

Table 2 displays the local priorities derived from the pairwise comparisons for the model’s objectives and sub-objectives. These priorities are calculated based on the judgments made on the alternatives, sub-objectives and objectives. They are local because the priorities of each element’s children sum to 1.0. The alternative to local priorities is global priorities, where the priorities of an element’s children sum to the parent’s priority.

Type	Objective / Sub-Objective	Priority
Objective	Keep SI staff under budget	.147
Objective	Customer Satisfaction	.257
Sub-Objective	Increase high priority project customer's satisfaction	.460
Sub-Objective	Maintain low priority project customer's satisfaction	.067
Sub-Objective	Optimize staffing on project senior customer believes in overstaff	.149
Sub-Objective	Improve senior customer's satisfaction w/ overall SI staffing	.325
Objective	Reluctant employee satisfaction	.113
Sub-objective	Ensure he/she does not sacrifice his/her continued higher Education	.614
Sub-objective	Ensure he/she does not need to travel often or on short notice	.268
Sub-objective	Ensure workload is reasonable	.117
Objective	Project Success	.483
Sub-Objective	Improve performance on high priority project	.390
Sub-Objective	Ensure reluctant employee's attitude doesn't jeopardize high priority project performance	.152
Sub-Objective	Complete all high prior. project activities with qualified individuals	.390
Sub-Objective	Maintain performance on all other projects	0.68

Table 2: Objective, Sub-objectives and Local Priorities

Based on the pairwise comparisons, at the objective level, Project Success (.483) is highest priority, followed by Customer Satisfaction (.257), keeping the SI staff under budget (.147), and then satisfaction of the reluctant employee (.113).

From a manager's perspective, it seems somewhat out of place that employee satisfaction is lowest priority. This occurred, at least in part, because Larry believes that he has sufficient mitigation in place to ensure that this does not become a significant issue (this will be elaborated on in the summary). Additionally, this is reasonable since the good of the many (the program) should outweigh the good of the few (the reluctant employee).

Overall though, these priority values seem appropriate.

Results

Figure 5 depicts the synthesis results of the model, based on the pairwise comparisons.

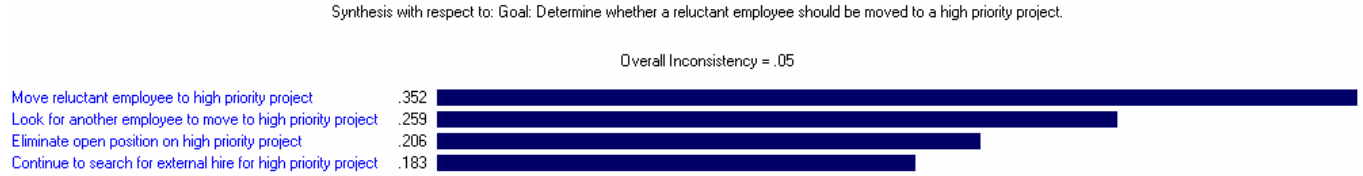


Figure 5: Synthesis Results

Based on the derived priorities, the model indicates that Larry should transfer Tom to HP, the high priority project. This result matched Larry's intuitive decision for the problem. The only result that was somewhat unexpected was that eliminating the open position on HP has a higher result than continuing to look for an external hire. This is due to the importance of not overrunning the SI budget by bringing in an external hire, as well as the importance of the senior customer's perception that the SI staffing is correct.

There is an overall inconsistency of 5%, well within recommended bounds. Consistency in the model is determined based on evaluating the transitive property of the pairwise comparisons (e.g., if $A > B$ and $B > C$, then it is inconsistent to say that $C > A$).

EC Model Performance

The performance sensitivity graph in Figure 6 reflects how the alternatives perform with respect to the objectives, as well as overall. This graph shows that the high values in the three highest priority objectives, Project success, Customer satisfaction and Keep SI staff under budget, led to the high value for the alternative Move reluctant employee to high priority project.

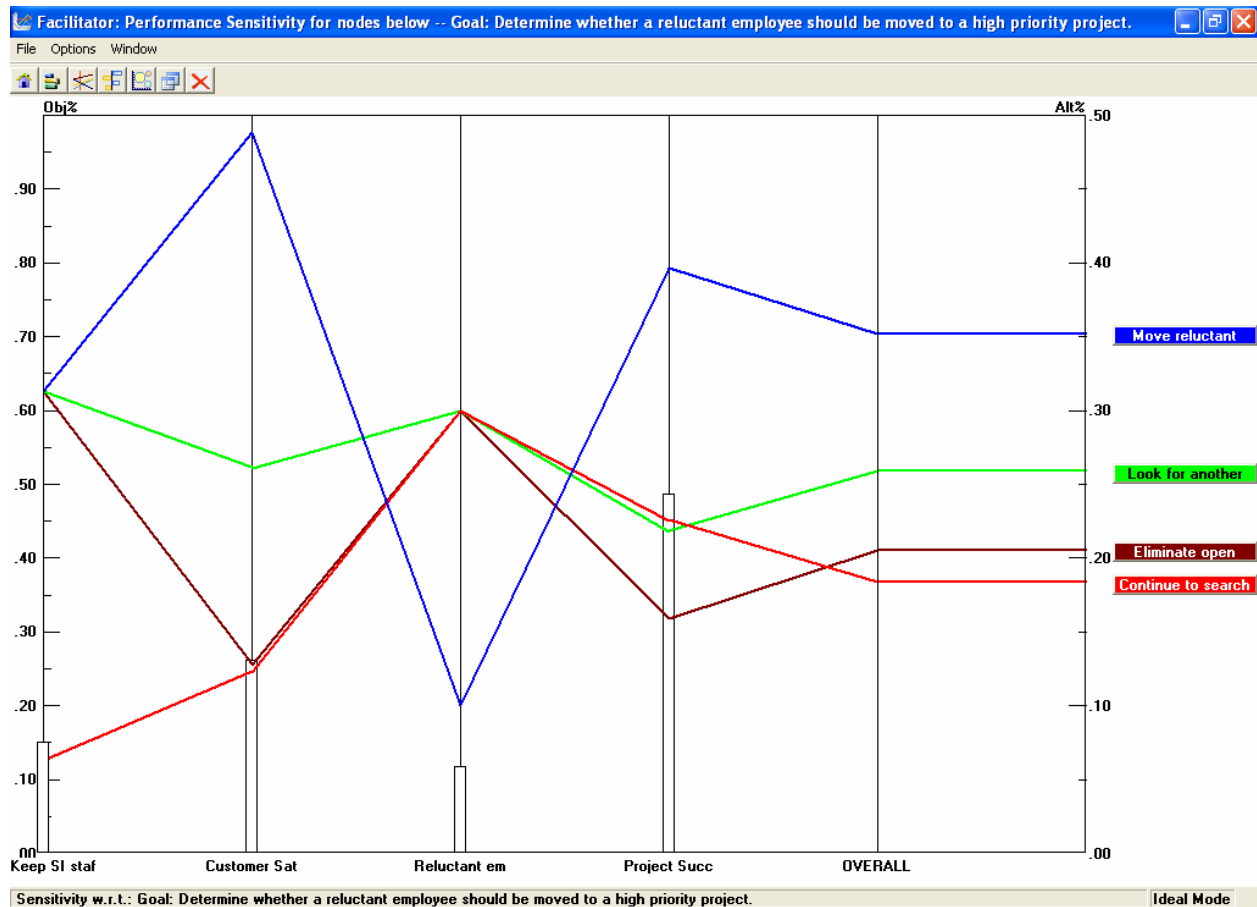


Figure 6: Performance Sensitivity graph

Summary

Once the model had been developed, and after discussion with his management and his project leads, Larry took the recommended solution and transferred Tom from the low priority project to the high priority project. Prior to finalizing this move, he spoke with Tom several times to fully understand his concerns that (as noted above) focused on travel restrictions. Larry calmed Tom's fears by making it clear to him that his schoolwork was also a priority to Larry, and he would ensure that it did not suffer because of his new responsibilities. Larry also spoke to the HP lead and confirmed that Tom's role should not impact his home life and schoolwork. Additionally, Larry made the commitment to Tom that if there came a time when Tom's schoolwork was going to have to be sacrificed, then a change would be made.

In the end, Tom seemed cautiously optimistic and agreed to transfer to the high priority project. Tom's character and work ethic bode well for the success of this move.