Getting the Last Stop Right: An Analysis of the Fort Campbell Personnel Processing Center

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Abstract: This project proposes to develop an improved system to process Soldiers at the Personnel Processing Center (PPC) located at Fort Campbell, Kentucky. This processing center is the final pre-deployment requirement prior to missions in support of the Global War on Terror. The PPC services the 101st Airborne Division and Fort Campbell’s tenant units and receives a high volume of Soldiers for processing. It is in the interest of Soldiers, their families, and senior leadership to process deploying troops accurately and rapidly. The current system, though functioning and meeting the Army’s needs, has inherent inefficiencies that limit its capacities and ability to maximize utilization.

1. Introduction

When they are getting ready to leave their family and friends and deploy to a combat zone, most soldiers will tell you that the last thing on their minds is showing up early. Unfortunately, that is usually what the Army requires of its soldiers to ensure that each soldier is prepared for deployment. In this case, “prepared for deployment” means that all their beneficiary and medical paperwork is properly completed among other requirements.

Recently, the leaders at Fort Campbell, Kentucky, Home of the 101st Air Assault Division, realized that the final pre-deployment processing was taking too long and decided to work to shorten the soldiers’ processing time at the deployment processing center and give them as much time as possible with their family and friends prior to getting on the plane. Taking care of these soldiers is critical to combat readiness and morale. This is something that the commanders and the organization take very seriously. So seriously that they not only built facilities specifically to accommodate these functions, but have commissioned studies, such as this one, to ensure they are operating effectively and efficiently. Effective operations mean that each soldier has completed all the steps prior to deployment which make that soldier combat ready. Efficient operations mean that soldiers are not asked to waste their precious time at a processing center as opposed to spending it with their families prior to deploying.

After a review of the background for the study, the paper discusses the analysis and the recommendations for improving the last stop for deploying soldiers at Fort Campbell which is known as the Personnel Processing Center (PPC).

2. Background

Fort Campbell is home to the Screaming Eagle 101st Airborne (Air Assault) Division among other tenant units and is located on the border between Tennessee and Kentucky. This location and the installation’s amazing facilities make it arguably the premier United States Army Power Projection Platform (PPP). Essentially, a PPP exists to allow the Army to push forward (or project) its combat power anywhere in the world. More specifically, it is “an Army installation that supports the mobilization, deployment, redeployment, and demobilization of soldiers and their equipment and supplies.” (Hughes, 2008)

Though the training of the military units is left to the commanders of the operational units, the management of the garrison functions is primarily left to the staff of the Installation Support Command (INSCOM) for Fort Campbell. INCSOM
was established to manage common installation functions and thereby allow the operational commanders to focus on their subordinate units. One of the primary functions of the INSCOM staff at Fort Campbell is the deployment and redeployment of soldiers and equipment to and from Fort Campbell – essentially they project Fort Campbell’s power throughout the world. (Dickens, 2008)

During the recent conflicts in Iraq and Afghanistan, the Fort Campbell Installation Operations Center (IOC) has coordinated the movement of hundreds of thousands of gross tons of vehicles and equipment as well as many thousand soldiers from this central location to the Middle East and elsewhere. The vehicles and equipment are primarily moved via rail from the massive rail yard on the southeast part of the main installation. These rail lines take the equipment to ports along the US East Coast for transloading onto ships which will deliver the equipment to ports in southern Iraq.

2.1 Personnel Processing

The processing of soldiers is in many ways more complicated than equipment processing. Whereas most tanks and helicopters are similar in their deployment needs, this is quite far from the situation for individual soldiers. Even disregarding a soldier’s combat-related training requirements, prior to deployment each soldier has their individual deployment needs and challenges. Additionally, soldiers are not as patient as equipment. They do not always stand in line until seen, they do not always complete a station prior to departing or they get too busy to complete their requirements prior to deploying.

To ensure the soldiers can fully function when they arrive in a combat theater, the Army has instituted a very detailed and complex pre-deployment processing system for all soldiers. This processing normally begins many months prior to the actual deployment to ensure all the steps can be accomplished. These steps include individual training requirements (first aid, location specific training, head trauma treatment, etc.), legal and personnel processing (powers of attorney, wills, next of kin information, etc.) and medical processing (shots, medical fitness, updating records, etc.)

A great deal of work has been done to make this pre-deployment personnel processing as efficient as possible. Fort Campbell established a Deployment Processing Center at a reclaimed World War II vintage field house at the center of the installation. Many soldiers who move through this facility complete all stations and finish their pre-deployment processing very quickly. When a soldier completes his or her personnel pre-deployment processing requirements, the managers at the processing center stamp their packets as complete.

Some soldiers do not complete their processing during their first run through the center. This might be due to mission requirements that take them away from the facility in the middle of their initial processing. This can also be attributed to soldiers who are required to make appointments to compete stations outside of the Deployment Processing Center. Many of these outside appointments include dentist visits and doctor visits beyond the scope and feasible reality of the services this deployment center can logistically provide. Soldiers may also miss steps along the way and have to return to the center prior to receiving the final stamp of completion. Unfortunately, some soldiers do not return and receive this final stamp prior to the actual day of deployment. The day of deployment comes nonetheless and all deploying soldiers move to the final deployment site, the Personnel Processing Center.

2.2 Personnel Processing Center Operations

Located near the airfield at Fort Campbell is a large building known as the PPC or the Personnel Processing Center. The PPC was designed to receive large groups of soldiers arriving from their unit headquarters and segregate them by plane load. The plane load, also known as a “Chalk” will remain in the holding areas to ensure accountability prior to the group loading the planes for deployment to locations throughout the world. As shown in figure 1, below, it consists of four large holding areas (listed A-D), a lobby and a dining facility to feed the soldiers as they wait for their transportation. This center also receives soldiers as they return from their deployments, though upon arrival the soldiers do not spend as much time in the center prior to returning to their unit headquarters and their families.
As more and more units deployed from Fort Campbell through the PPC, a significant problem was identified. Many soldiers had not completed their deployment processing prior to arriving at the facility. Because they had to deploy with their units, there was no time to return the non-deployment ready soldiers to the Deployment Processing Center for completion of the steps. To address this problem, the Installation Staff initiated a final processing center in the lobby of the PPC.

The first station in this center is arrival processing of soldiers to develop the flight manifests. All soldiers are processed at this station. Each soldier’s file is then reviewed to determine remaining station processing. Soldiers with a final processing stamp return to their designated holding area. Soldiers without a stamp (meaning incomplete processing) move to the other stations. These follow-on stations are legal, administrative and medical. Upon completing these stations, the soldier moves to the final station, which is medical processing or MEDPROS. This is a system developed to capture the medical readiness of each soldier. The layout of this center is shown in figure 2, below.
A final requirement for each deploying group of soldiers is receiving a departure briefing from the Commanding General (a two-star general) or his designated representative. This representative could be one of the two Deputy Commanding Generals (one-star general), the Division Chief of Staff (a Colonel), or the Command Sergeant Major (the senior enlisted soldier in the Division). This briefing is designed to be the final step for the group of soldiers prior to leaving the facility to the airfield.

2.3 Problems at the PPC

Though this system is extremely effective – every soldier is properly processed through the system and verified as ready to deploy – it has proven to be very inefficient. Processing of the soldiers is very slow. To ensure the groups of soldiers fully process, large groups are asked to arrive at the PPC four to six hours prior to their scheduled flight time.

Additionally, the queues of soldiers become extremely long as shown by figure 3, below. Soldiers wind around the lobby of the facility and spread down the hallways. These long lines result in a loss of good will with the soldiers. The inefficiencies create the impression that this is a poor process developed by leaders not interested in their time – time they could be with their families. To make matters worse, these are the last hours the soldiers will spend on US soil prior to departing to defend their country and often these hours are wasted in line.

When senior individuals arrive to give their presentation, they are met with a large number of disgruntled soldiers waiting for hours to do processing, many of whom have already completed the required processing! Often, as a result of the long lines, these senior officials direct that more personnel be brought in to man the stations. This causes serious problems in manning for the installation staff as they have difficulty in scheduling personnel to serve the stations.

Finally, to accommodate the schedule of the senior officials, the Commanding General’s briefing is scheduled at a fixed time based on the projected processing times of the soldiers. When the lines are especially long, not all soldiers can process through the system in time to be ready to listen to the Commanding General’s presentation prior to deploying. Inevitably some soldiers are pulled out of line to listen to the general officer’s presentation and upon completion have to begin the queuing process all over again. The leadership at Fort Campbell recognized the need for improving this process.
3. Study Approach and Initial Analysis

The Systems Decision Process (SDP) was developed in the Department of Systems Engineering by their faculty. The process was formally introduced in the seminal book on the topic, *Decision Making in Systems Engineering and Management* (Parnell, et al, 2008). This process, shown in figure 4, below, consists of four phases: Problem Definition, Solution Design, Decision Making and Implementation.

The SDP is deliberate, iterative methodology for analyzing a problem using a holistic systems viewpoint and applying a Value Focused Thinking (VFT) approach to determining the preferred recommended solution to the system problem. In the interest of brevity and as the discussion is not germane to the analysis in this paper, the intricacies of VFT is not detailed here though the interested reader is referred to many works on the subject beginning with the seminal publication on the topic titled Value Focused Thinking (Keeny1992 or Parnell, 2007 among others)
3.1 Problem Definition

To understand the system, many individuals were interviewed or consulted, including senior members of the INSCOM staff, individuals working at the Deployment Processing Center, soldiers going through the DPS and the PPC, commanders of units/chalks going through the PPC, and members of the Deployment Operations Center (DOC) who are responsible for the PPC. Unfortunately, the Senior Decision Maker was not available in the early stages of this study, the importance of which will be made evident later in this paper. Instead, the DOC staff provided us with his priorities based on their numerous briefings to the General.

Some of the significant desires in the development of the redesigned system were:
- Accountability of soldiers and soldiers maintaining “chalk integrity”. We have to develop the system to minimize groups of soldiers from intermingling and limited the ability for soldiers to leave after they arrive in the facility.
- Every soldier must be screened at the manifest station upon arrival for accountability and to assist in the development of the flight information.
- All soldiers have to be screened and the ones that do not have a final processing stamp must go through the processing stations.
- As many soldiers as possible in attendance for the Commanding General’s briefing.

The background research and stakeholder analysis resulted in the following redefined problem statement for the study:

Design a system which processes all soldiers through the PPC as efficiently as possible to care for the soldiers’ time and provides for consistent scheduling of personnel manning the stations.

Following the SDP, this problem statement is further decomposed into a value hierarchy. This is a breakdown of the functions and values in the system. The top-level objective drives the functions and objectives which we want to either maximize or minimize. The resulting value measures on the bottom tier are evaluated through our testing and evaluation process. The value hierarchy used in the initial stages of this study is in figure 5, below.

![Figure 5. Initial Value Hierarchy](image-url)

The final step of the Problem Definition phase is the development of the weights for each of the value measures which is accomplished through the use of a Swing Weight matrix. This tool helps develop relative weights and incorporate stakeholder values for each of the metrics based on two criteria: importance and variation. This allows the scaling of the importance of each measure with the level to which it varies between alternatives. Inclusion of the variation dramatizes the difference between the alternatives and improves the analysis. Each value measure is assigned a weight between 1 and 100.
depending on its categorization in the matrix. The absolute weights are then normalized making the total weights equal to one. The initial swing weight matrix is shown in figure 6, below.

### Table 1. Ideation Matrix

<table>
<thead>
<tr>
<th>GO Briefing</th>
<th>Queue Location</th>
<th>Queue Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>At the beginning</td>
<td>In the holding area</td>
<td>Co-mingled</td>
</tr>
<tr>
<td>Throughout the process</td>
<td>In the hallway</td>
<td>Separate</td>
</tr>
<tr>
<td>At the end</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 6. Swing Weight Matrix

This completes the Problem Definition phase of the SDP and so begins the Solution Design phase.

### 3.2 Solution Design

Solution design is a combination of free thinking and constrained analysis to explore the entire solution space for the system problem. To ensure the recommended solution does not make the overall system worse, the baseline (or existing) solution remains a viable option and is included in the follow-on analysis.

One boundary of the solution space is the time when the Commanding General’s briefing occurred. It could either be at the end (where it currently takes place), in the beginning when the soldiers arrive to the facility or anytime throughout the processing of the soldiers. Another boundary is the location of the soldiers in the queue. Currently, the soldiers queue in the hallways. Another option would be for the soldiers to queue in the holding areas and only move to the processing location when the stations are available.

One realization was that the processing rates for soldiers are extremely different depending on whether they have processed fully (received a stamp) or whether they have not. This suggested a standard industrial engineering technique demonstrated at toll booths: EZ Pass® lanes. Essentially, the soldiers could be screened earlier in the process and develop two separate processing points for soldiers with stamps from medical processing and for those without stamps.

Varying these boundary conditions led to an “ideation matrix” which is shown at table 1, below. This matrix allows the generation of unique alternatives by picking aspects of each boundary condition. For example, one alternative is the GO briefing at the beginning, the queue location is in the holding area and the queue consists of soldiers who have stamps and those who do not.
Using the ideation matrix resulted in 3x2x2 or 12 unique alternatives not including the baseline alternative, for a total of 13 alternatives. The DOC staff provided a significant constraint was that 100% of the soldiers had to receive the Commanding General’s briefing. Quick analysis and modeling determined that having the GO briefing at the end prevented this from happening so those alternatives were screened out. Additionally, initial models showed that the comingled queues were completely dominated by the separate queue alternatives and therefore were removed from further analysis.

This left a manageable number of alternatives or potential solutions to analyze in greater depth. Specifically, there were five unique potential solutions. These are listed in table 2, below.

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Baseline</td>
</tr>
<tr>
<td>2</td>
<td>GO briefing at the beginning, queues in the holding area and separate queues</td>
</tr>
<tr>
<td>3</td>
<td>GO briefing at the beginning, queues in the hallway and separate queues</td>
</tr>
<tr>
<td>4</td>
<td>GO briefing throughout, queues in the holding area and separate queues</td>
</tr>
<tr>
<td>5</td>
<td>GO briefing throughout, queues in the hallway and separate queues</td>
</tr>
</tbody>
</table>

Armed with these potential solutions and the value measures and weights developed in our previous phase, the study proceeded to the Decision Making phase of the SDP.

### 3.3 Decision Making

In this phase of the SDP requires detailed modeling of the potential solutions to assess and evaluate the value measures we developed in the Problem Definition phase. The list in table 3 below shows the value measure and their means of evaluation.

<table>
<thead>
<tr>
<th>Measure Description</th>
<th>Measured in</th>
<th>Evaluation Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of soldiers accounted for</td>
<td>Percent</td>
<td>Expert opinion</td>
</tr>
<tr>
<td>Time in service</td>
<td>Minutes</td>
<td>Simulation</td>
</tr>
<tr>
<td>Time in queue</td>
<td>Minutes</td>
<td>Simulation</td>
</tr>
<tr>
<td>Percentage of packets incorrectly filed</td>
<td>Percent</td>
<td>Expert opinion</td>
</tr>
<tr>
<td>Congestion in center</td>
<td>Visual scale (1-5)</td>
<td>Simulation/expert opinion</td>
</tr>
<tr>
<td>Dwell time (time waiting doing nothing)</td>
<td>Minutes</td>
<td>Simulation</td>
</tr>
<tr>
<td>Percentage of soldiers at GO briefing</td>
<td>Percent</td>
<td>Expert opinion</td>
</tr>
<tr>
<td>Percent utilization of employees</td>
<td>Percent</td>
<td>Simulation</td>
</tr>
</tbody>
</table>

The ProModel® discrete event simulation package was used to simulate each of the potential solutions. An example screen shot of the baseline solution is shown in figure 6, below. For each potential solution, soldier is represented as an entity in the simulation. Their attributes are whether they arrive with a processing completed stamp (blue) or not (yellow) and if they have completed processing at the PPC (green). This screen shot shows another unit has arrived and are in a different holding area waiting to begin processing though the PPC stations (red).
In this alternative, as a chalk of deploying soldiers arrive at the PPC they move to a designated holding area. If the processing stations are available, they begin to queue in the hallway for the PPC processing. If the stations are being utilized by another chalk, they remain in the holding area until the first unit clears the system. They then move to the stations for processing. At a designated time in the system, the “PPC cleared” soldiers move to Holding Area A (on the right) to receive the GO briefing. After the briefing, they return to their designated holding area until their plane arrives and they depart the system.

Of note in this alternative is the large number of soldiers crowding the hallways and the entryway for the PPC. This is the congestion that the DOC staff seeks to eliminate to the greatest extent possible. This congestion is nearly completely eliminated in Potential Solution 2 a screen shot of which is shown in figure 7, below. In this potential solution, the chalk arrives and moves directly to Holding Area A for the GO briefing and then moves to their designated holding area. Once in the holding area, the soldiers are screened for stamps (indicating that medical processing not required) and no stamps in their packets and are organized in queues in the holding areas. Notice in this screen shot the hallways are clear except for the soldiers moving between the PPC processing stations and the holding areas.
The below raw data matrix in table 3, below is the result of 100 replications for each potential solution.

Table 3. Raw data matrix for each original potential solution

<table>
<thead>
<tr>
<th>Candidate Solution</th>
<th>Percentage of Soldiers Accounted</th>
<th>Time in System (min)</th>
<th>Time In Queue (min)</th>
<th>Percentage correctly Filed (%)</th>
<th>Visual Scale (0-5)</th>
<th>Dwell Time (min)</th>
<th>GO Briefing Attendance (%)</th>
<th>Utilization of servers (%)</th>
<th>TOTAL VALUE V(x)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Baseline (do nothing)</td>
<td>70</td>
<td>422.56</td>
<td>251.3</td>
<td>50</td>
<td>0</td>
<td>0</td>
<td>75</td>
<td>75.62</td>
<td>24.5</td>
</tr>
<tr>
<td>2. GO beg, Qs HA, Sep</td>
<td>100</td>
<td>155.46</td>
<td>82.1</td>
<td>90</td>
<td>5</td>
<td>267</td>
<td>100</td>
<td>48.4</td>
<td></td>
</tr>
<tr>
<td>3. GO beg, Qs Hwy, Sep</td>
<td>70</td>
<td>155.75</td>
<td>92.22</td>
<td>50</td>
<td>1</td>
<td>267</td>
<td>100</td>
<td>45.47</td>
<td></td>
</tr>
<tr>
<td>4. GO thru, Qs HA, Sep</td>
<td>45</td>
<td>183.04</td>
<td>140.95</td>
<td>75</td>
<td>3</td>
<td>240</td>
<td>60</td>
<td>51.4</td>
<td></td>
</tr>
<tr>
<td>5. GO thru, Qs Hwy, Sep</td>
<td>50</td>
<td>183.21</td>
<td>154.15</td>
<td>60</td>
<td>1</td>
<td>239</td>
<td>50</td>
<td>40.31</td>
<td></td>
</tr>
</tbody>
</table>

Raw data is then converted to value scores through the value functions developed for each measure. As an example, the value function (or curve) developed to convert raw data into a value score for the “Time in Queue” measure is shown in figure 8, below. In this value function, the curve is monotonically decreasing but not linearly. This represents the reality that a soldier much more highly values waiting in a queue less than an hour than more than an hour.

![Value Function for Time in Queue Measure](image)

Figure 9. Value Function for Time in Queue Measure

The raw data into value scores for each measure for each potential solution and results in the value matrix. Returning to the weights developed in the Swing Weight matrix from the Problem Definition phase, a weighted sum is calculated for each potential solution. These “total value scores” are reflected in the matrix found in table 4, below. As can be seen, Potential Solution 2 scores the highest and becomes recommended solution.

Table 4. Total Value Scores

<table>
<thead>
<tr>
<th>Candidate Solution</th>
<th>Percentage of Soldiers Accounted</th>
<th>Time in System (min)</th>
<th>Time In Queue (min)</th>
<th>Percentage correctly Filed (%)</th>
<th>Visual Scale (0-5)</th>
<th>Dwell Time (min)</th>
<th>GO Briefing Attendance (%)</th>
<th>Utilization of servers (%)</th>
<th>TOTAL VALUE V(x)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Baseline (do nothing)</td>
<td>10.9</td>
<td>4.6</td>
<td>0.3</td>
<td>1.6</td>
<td>0.0</td>
<td>0.0</td>
<td>3.5</td>
<td>3.5</td>
<td>24.5</td>
</tr>
<tr>
<td>2. GO beg, Qs HA, Sep</td>
<td>15.6</td>
<td>20.3</td>
<td>17.6</td>
<td>2.8</td>
<td>7.8</td>
<td>6.2</td>
<td>4.7</td>
<td>2.3</td>
<td>77.3</td>
</tr>
<tr>
<td>3. GO beg, Qs Hwy, Sep</td>
<td>10.9</td>
<td>20.3</td>
<td>15.9</td>
<td>1.6</td>
<td>1.6</td>
<td>6.2</td>
<td>4.7</td>
<td>2.1</td>
<td>63.0</td>
</tr>
<tr>
<td>4. GO thru, Qs HA, Sep</td>
<td>5.4</td>
<td>18.7</td>
<td>6.2</td>
<td>2.3</td>
<td>4.7</td>
<td>5.5</td>
<td>2.8</td>
<td>2.4</td>
<td>48.1</td>
</tr>
<tr>
<td>5. GO thru, Qs Hwy, Sep</td>
<td>6.6</td>
<td>18.7</td>
<td>5.1</td>
<td>1.9</td>
<td>1.6</td>
<td>5.5</td>
<td>2.3</td>
<td>1.9</td>
<td>43.6</td>
</tr>
</tbody>
</table>
3.4 Presentation of Results

The recommended solution was presented to the Assistant Division Commander for Support for the 101st Air Assault Division as the Senior Decision Maker for the study. Though he validated and agreed with all the analysis, contrary to the insights provided by the DOC staff, the ADC(S) stated that it was very important to conduct the GO briefing as the last thing the soldiers experience prior to deploying. He also stated that he was willing to accept that less than 100% of the soldiers would attend this briefing. This completely changed the analysis. The lesson learned here is to speak with the Decision Maker in the first Phase and not a surrogate, if at all possible!

Given this new information, the value hierarchy was redesigned as shown at figure 9, below. As this was identified as the most important criteria in the hierarchy, the new branch was added on the left of the hierarchy as well as the two additional associated measures.

![Figure 10. Revised Value Hierarchy](image)

As the Potential Solution 2 clearly scored the highest in the initial analysis, only that solution was modified to conduct the new analysis. As can be seen in the screen shot from the simulation in figure 10, below, the green soldiers have completed their processing and are attending the GO briefing in Holding Area A, the soldiers in Holding Area C are being processed through the PPC stations, and the soldiers in Holding Area B are waiting to begin processing.
Figure 11. Screen Shot from Enhanced Potential Solution

After scoring each of the original potential solutions and the enhanced solution, the new value scores are calculated in a similar fashion as described previously. The resulting total value matrix is shown at table 5, below. The enhanced solution is clearly the best (not surprisingly) and is insensitive to reasonable changes in the weights. This becomes the new recommended solution for implementation.

Table 5. Total Value Scores after Enhancement

<table>
<thead>
<tr>
<th>Candidate Solution</th>
<th>Percentage of Soldiers Accounted</th>
<th>Time in System (min)</th>
<th>Time In Queue (min)</th>
<th>Percentage correctly Filed (%)</th>
<th>Visual Scale (0-5)</th>
<th>Dwell Time (min)</th>
<th>GO Briefing Attendance (%)</th>
<th>Utilization of servers (%)</th>
<th>Time between briefing and departure (min)</th>
<th>Time at PPC not briefing (min)</th>
<th>TOTAL VALUE V(x)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Baseline (do nothing)</td>
<td>6.9</td>
<td>2.9</td>
<td>0.2</td>
<td>1.0</td>
<td>0.0</td>
<td>0.0</td>
<td>2.2</td>
<td>2.2</td>
<td>19.8</td>
<td>16.5</td>
<td>53.7</td>
</tr>
<tr>
<td>2. GO beg, Qs HA, Sep</td>
<td>9.9</td>
<td>12.9</td>
<td>10.0</td>
<td>1.8</td>
<td>5.0</td>
<td>3.9</td>
<td>3.0</td>
<td>1.4</td>
<td>0.0</td>
<td>13.8</td>
<td>66.7</td>
</tr>
<tr>
<td>3. GO beg, Qs Way, sep</td>
<td>6.9</td>
<td>12.9</td>
<td>8.9</td>
<td>1.0</td>
<td>1.0</td>
<td>3.9</td>
<td>3.0</td>
<td>1.4</td>
<td>0.0</td>
<td>16.5</td>
<td>55.4</td>
</tr>
<tr>
<td>4. Go thru, Qs HA, Sep</td>
<td>3.4</td>
<td>11.9</td>
<td>3.5</td>
<td>1.5</td>
<td>2.0</td>
<td>3.5</td>
<td>1.8</td>
<td>1.5</td>
<td>9.9</td>
<td>3.1</td>
<td>42.1</td>
</tr>
<tr>
<td>Enhanced Solution</td>
<td>9.9</td>
<td>5.1</td>
<td>4.4</td>
<td>2.0</td>
<td>5.0</td>
<td>1.1</td>
<td>2.8</td>
<td>1.3</td>
<td>19.8</td>
<td>18.8</td>
<td>70.1</td>
</tr>
</tbody>
</table>

Each measure was analyzed for sensitivity of the associated weight to determine the overall sensitivity of the recommended solution. While holding all other swing weights constant, one value measure weight at a time is varied, the other measure weights are re-normalized, and each candidate solution is rescored. As a general rule of thumb, a variance of +/-10% around the original swing weight measure is considered reasonable. POI (points of indifference), indicated with arrows, are identified and tested for the preferred solution. In the example below, Figure 11, references the measure, “Time between briefing and departure (min).” Its original weight is 100 and as is shown, there is no POI, or no two solutions competing for the final decision - clearly the Enhanced Solution is the dominant solution. The final decision is not sensitive to this particular value measure and in fact, this is the case for all of our value measures.
4. Summary and Implementation

The recommended solution has been implemented at the Fort Campbell PPC with great results. There is much less congestion, the soldiers are processed far more efficiently and the lead time for each unit has been reduced leaving on average approximately 2 more hours for the soldiers to remain with their families and the unit headquarters. More soldiers are attending the GO briefing also. In the end, this was a very successful project.

5. Insights for Practitioners

The foremost implication of this study is the importance of direct initial contact with the decision maker. Due to a number of factors, a surrogate for the decision maker was used in the stakeholder analysis. Though analysis was easily adjusted, this added additional time to the study and reduced the credibility of the initial analysis.

Another important implication is the robustness of the Systems Decision Process. New measures were quickly added and converted into scores. Though this process is rigorous in its analytics, the iterative nature of the process allows the analyst to revisit each step along the way to ensure the problem is correctly stated, the potential solutions are complete and the analysis is correct.

Finally, development of a robust simulation to conduct the analysis allowed quick development of an enhanced solution. If a more specialized simulation was used it would have greatly increased follow-on analysis time. The new simulation and eventual solution was completed in less than a few hours and the study was ready for implementation by the PPC at Fort Campbell.
6. Conclusions

Leaving a family to deploy to a combat theater is very difficult for a soldier. Allowing them to stay with their family for even an additional hour or two is well worth the analysis time that spent on this project. Anything that can be done for these brave men and women of our Armed Forces is appreciated as they bravely go where their country sends them.

7. References