Improving PTSD Treatment for US Military Personnel via Enterprise Architecting

By Elizabeth Cilley Southerlan, SDM ‘12
Agenda

- Background and context
- Current state analysis of Military Psychological Health Enterprise at Camp Lejeune through Enterprise Architecting
- Using information from EA analysis to determine transformation
**Note to Audience**

Research was drawn from literature, such as reports written within MIT’s Sociotechnical Systems Research Center (SSRC) as well as public information; site visits and personal interviews were not performed as part of this research effort.

Information was used to aid the as-is analysis of Camp Lejeune with the intent to present a framework for a large-scale transformation; it should be further vetted prior to conducting actual transformations, at any level of the enterprise.
Section I

Background & Context
Background on Sociotechnical Systems Research Center and PTSI Project at MIT

- **Sociotechnical Systems Research Center (SSRC)**
  - Interdisciplinary research center
  - Mission is to see collaborative, holistic, systems-based solutions to complex sociotechnical challenges

- **The Post-Traumatic Stress Innovations (PTSI) project**
  - Collaboration with the U.S. Military to analyze the national military psychological health system to understand the current state of the system
  - Both quantitative and qualitative information and methods are being used to map the enterprise’s policies, decisions, as well as their interactions
  - Objective of the project is to develop recommendations for architecting a more efficient and effective future military psychological health system, specifically in support of service members and their families affected by post-traumatic stress
Enterprise Architecting, a field within Engineering Systems

- **Engineering Systems Defined**
  - Applies approaches from
    - Engineering
    - Social sciences
    - Management
  - Creates solutions for complex socio-technical challenges

- **Enterprise Architecting Defined**
  - Subfield of ES
  - Emphasizes the application of holistic thinking to “design, valuate and select” the future state of an enterprise
  - Serves as a tool to allow organizations, to achieve improved future states by first understanding their current state in terms of 8 specific elements or views; these views are strategy, policy/external factors, organization, process, knowledge, information and related technology, and products/service

- **Focus on the ENTERPRISE**
  - Utilizes an enterprise perspective to approach the system, in which there is a particular focus on relationships and interactions among the elements of the system
EA applied through analysis of both elements and their relationships within an enterprise

- Elemental views are used as “lenses” to assess the current state of an enterprise
- Also important to consider:
  - Ecosystem
  - Stakeholders

<table>
<thead>
<tr>
<th>VIEW</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategy</td>
<td>Goals, vision and direction of the enterprise, including business model and competitive environment.</td>
</tr>
<tr>
<td>Organization</td>
<td>Organizational structure as well as relationships, culture, behaviors, and boundaries between individuals, teams, and organizations.</td>
</tr>
<tr>
<td>Policy / External Factors</td>
<td>External regulatory, political, and societal environments in which the enterprise operates.</td>
</tr>
<tr>
<td>Information</td>
<td>Information needs of the enterprise</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Flows of information and system/technologies for information availability.</td>
</tr>
<tr>
<td>Knowledge</td>
<td>Implicit and tacit knowledge, capabilities, and intellectual property resident in the enterprise.</td>
</tr>
<tr>
<td>Processes</td>
<td>Core processes by which the enterprise creates value for its stakeholders.</td>
</tr>
<tr>
<td>Services / Products</td>
<td>Services and/or Products produced by the enterprise for use by its stakeholders.</td>
</tr>
</tbody>
</table>
Illustrative architectural construct provides generalized representation of how the enterprise views interrelate as well as influence each other.

- Example: this framework was constructed based on years of research; however, the exact relationships and flows should be adapted to fit specific enterprises based on their nature and context. The solid lines show primary relationships and influences of the elements or views, and the dotted lines are secondary ones.
Why EA for PTSI?

- The Department of Defense (DoD) presented a need to transform its Military Psychological Health Enterprise (MPHE) at multiple levels.
- High level assessment suggested complex organizational structure and complicated relationships between policies and processes.
A demonstrator site was selected to support design of a transformation framework

- EA was to be used assess the current state and as an approach to perform enterprise transformation of the complex MPHE of the DoD
- The way in which the multiple levels of the enterprise would be transformed had yet to be determined
- Research approach was to determine how the information collected at a demonstrator site, contained within the micro-level of the enterprise, could be utilized to support a transformation plan that will be scaled to the size of the entire enterprise
- Camp Lejeune, a Marine Corps base in North Carolina, received recommendation from high-level Marine and Navy medical general officers and was chosen as a demonstrator site, at which the initial transformation process will begin.
Hierarchy of Military Health System mirrors that of DoD

- MHS is multilevel, with direction flowing down from Macro level to the Meso level, by way of policies, and the Meso level is responsible for creating and managing process executed at the Micro level to ensure the direction given to the Micro level is followed.
Camp Lejeune at a Glance

- Home to approximately **131,000 people**
- Majority of population, a combined 75%, is composed of Active Duty Marines and their Family Members
- Offers a number of services to its residents
  - Marine and Family Services are offered through the Marine Corps Community Service (MCCS)*
  - Youth Services are offered through the Camp Lejeune Child, Youth and Teen Programs (CYT)
  - Family housing is offered through the Camp Housing Services
  - Employment services are offered through Career Resource Management Center (CRMC)
  - Medical Services are provided by the Naval Hospital at Camp Lejeune*

*Included in MPHE at Camp Lejeune, see Analysis in Section II
Two motivating factors inform a two phase approach

Motivating factors

• Support the development of an improved future state for the DoD’s MPHE by using Enterprise Architecting to investigate the current state of the MPHE at the selected demonstrator site, Camp Lejeune
• Combine the use of Enterprise Architecting tools with multilevel analysis techniques to create a framework that supports transformation of a complex, multilevel enterprise

Approach

• First Phase: employ EA to understand current state of the micro-level enterprise, Camp Lejeune
• Second Phase: investigate potential application of multilevel analysis tools to determine how the information gathered about the micro-level enterprise can be used to develop a framework that supports a multilevel transformation
• The research was presented in my thesis in descriptive, rather than prescriptive, as both phases were, in fact, the objectives of my thesis
Section II

Current State Analysis using EA
Defining the Military Psychological Health Enterprise (MPHE) Ecosystem and Stakeholder Groups at Camp Lejeune

- MPHE at Camp Lejeune: sum of all constituent elements of the MHS that contribute to behavioral healthcare provided to Marines, and family members, stationed at Camp Lejeune (terms “psychological” and “mental” health considered synonymous)

- MPHE Stakeholder Groups
  - Navy Bureau of Medicine and Surgery (BUMED)
  - Marine Corps Forces Command (MARFORCOM)
  - Wounded Warrior Regiment (WWR)
Defining the MPHE Stakeholders at Camp Lejeune: BUMED

- Navy Bureau of Medicine and Surgery (BUMED)
  - Provides institutional medical support for the psychological health enterprise at Camp Lejeune
  - Primary objective is to care for service members, families, retirees, and eligible civilian employees.
  - MPHE services determined based on whether PH issue is deployment related or not
Defining the MPHE Services at Camp Lejeune: BUMED

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  - Primary objective is to care for service members, families, retirees, and eligible civilian employees.
  - MPHE services determined based on whether PH issue is deployment related or not
  - Four main programs under BUMED that are operated by the Naval Hospital’s Mental Health Department
Defining the MPHE Stakeholders at Camp Lejeune: MARFORCOM

- Marine Corps Forces Command (MARFORCOM)
  - War-fighting branch of this enterprise
  - While not directly in the Naval Hospital chain of command, it is still concerned with the behavioral health of its Marines since behavioral health plays a significant part in personnel and unit readiness
  - Main beneficiary of the Camp Lejeune MPHE, the Marine receiving PH care, is a part of the II Marine Expeditionary Force (MEF)
Defining the MPHE Services at Camp Lejeune: MARFORCOM

Referrals

- **Division Psychiatry** – clinic available to 2nd Marine Division Marines and sailors. The clinic provides access to therapy (group and individual) and medication to struggling service members, usually post-deployment.
  - Marines must get a referral from the Medical Officer (MO) at their battalion aid station to see Division Psych.
- **Operational Stress Control and Readiness (OSCAR) program** – launched by Division Psychiatry (expanded psych services to 2nd, 6th, and 8th Marine Regiments). OSCAR teams provide team training to each unit which is meant to help sensor PH programs for the commander to identify and refer Marines that need it; a filtering mechanism (understaffed); These professionals are not primarily mental health professionals, but are meant to serve primarily as an educational function.
- **Chaplain** – assigned to each Division, Airwing, or Logistics Group to ensure the spiritual fitness of their Marines while they are deployed. They are also available to Marines and their families while in garrison. They often provide a back door for the system to autocorrect as Marines and family members may feel more comfortable speaking with someone outside of a medical setting.
- **Military OneSource** – a free service provided by DoD to MEF and families to provide them with information on “every aspect of military life.” They offer both website and phone access.
- **Human Factors Program** – proposed as enterprise standard for USMC; believed to include all PH Stakeholders within each unit.
Defining the MPHE Services at Camp Lejeune: MARFORCOM

Force Preservation

- **Family Readiness Officer (FRO)** – a civilian hired to support commander in communication and managing families; the FRO helps Marines manage the needs of their family while staying focused on their mission.

- **Substance Abuse Control Officer (SACO)** – a position held by a Marine Corps officer, embedded in unit, to provide substance abuse education/prevention, urinalysis screening and assistance to the commander on substance abuse related matters.

- **Substance Abuse Counseling Centers** – provide screening and assessment services to Marines seeking to be referred; after screening, Marines can enter the system at any of three levels:
  - Early Intervention (difficulty with addiction)
  - Outpatient (pattern of abuse)
  - Intensive Outpatient (diagnosed as dependent)

- **Naval Center Combat Operational Stress Control (NCCOSC)** – BUMED program that works to promote resilience of Marines. They also investigate best practices in diagnoses and treatment of PTSD and TBI. NCCOSC’s initiatives are informed by science and provide measureable, robust results.
Defining the MPHE Services at Camp Lejeune: MARFORCOM

Marine Corps Community Services

- Marine Corps Community Services (MCCS) is a service organization that is dedicated to promoting readiness and retention of Marines and their families. They accomplish this by delivering valuable programs, products, and services to the Camp Lejeune community in a positive manner. Many of the employees at MCCS used to work at social services; this service is also limited in resources. According to the website, MCCS offers the following services:
  - Community Counseling
  - Resilience Education
  - Family Advocacy Program (FAP)
  - Sexual Assault Prevention and Response (SAPR)
  - Military Family Life Consultant (MFLC)
  - Families overcoming stress (FOCUS) Project
  - Exceptional Family Member Program (EFMP)
  - Financial Management Program
  - New Parent Support Program
Process for a Marine to obtain Psychological Health services from BUMED and MARFORCOM

1. Marine presents a PH need
   - Self Referral
     - Y: Visit small unit leadership and/or chaplain (first line of defense)
     - N: Self referral at primary care location (battalion or regimental aid station)

2. Y: Psychological health technician begins execution of standard intake form (to determine PH route)
   - N: OSCAR or Div Psych embedded in regiment

3. Y: Deployment related issue
   - N: Additional Treatment believed necessary
     - Y: Return to unit (possibly continue visits with first line of defense)
     - N: Sent to Mental Health Clinic / Centralized Intake and Referral Center (CIRC)*
     - Y: Sent to Deployment Wellness Clinic*
     - Y: Referral Routed back to OSCAR or Div Psych team for provision

*Two licensed, clinical social workers allocate marine to actual provider using centralized scheduling system
*Routed to TRICARE network if time to be seen > 28 days
Strong relationship between BUMED and MARFORCOM Services found

• Three ways to receive Psychological care for PTSD:
  1. Referral to BUMED Services via MEF PH services
  2. Force Preservation:
     • General Safety
     • Substance Abuse
     • Combat Operational Stress Control (COSC)
     • Suicide Prevention
  3. Mandatory physical and psychological health screening scheduled with Deployment Health Center
Defining the MPHE Stakeholders at Camp Lejeune: WWR

- **Wounded Warrior Regiment (WWR)**
  - Provide and facilitate comprehensive and coordinated medical and non-medical support to wounded, ill, and injured Marines and their family members throughout the phases of recovery.
  - The WWR makes the smallest contribution to the MPHE at Camp Lejeune, as it requires Marines to complete a multistep and selective application process to enter the program. However, includes the components, and their interactions, of the micro-level enterprise [Camp Lejeune] that contribute to the MPHE.
Defining the MPHE Services at Camp Lejeune: WWR

- The care team works together to coordinate the Marine’s medical and non-medical care. Each role has specific duties:
  - **Primary Care Manager (PCM):** provide/coordinate medical care, maintain health records, refer/approves Marine to specialist when necessary
  - **Medical Case Manager (MCM) / Nurse Case Manager (NCM):** nurse or social worker responsible for bringing medical practitioners together and coordinating access to specialists and non-routine medical services.
  - **Marine Section Leader (SL):** provide accountability and tracking information of Marine’s progress through the WWR’s Mind, Body, Spirit and Family Lines of Operations programs on a daily basis; also serve as mentor and advocate for Marines by providing small unit leadership and discipline necessary to support mental, physical, and emotional healing.
  - **Recovery Care Coordinator (RCC):** non-medical resource subject matter expert that helps Marine and family define recovery, rehabilitation, and reintegration goals. Also responsible for developing and executing Comprehensive Recovery Plan (CPR).
  - **District Injured Support Coordinators (DISC):** Mobilized Marine Reservists that are geographically dispersed to assist Reserve and former WWR Marines by providing face-to-face contact with Marine and family, VA coordination assistance, and informing Marine of local education and employment resources. They also identify VA OIF/OEF Coordinators to help coordinate combat Veteran medical care.
X-Matrix used to provide insight to driving forces within MPHE at Camp Lejeune

- Information has been “grouped into views (Process, Organization, etc)
- Driving forces of MPHE at Camp Lejeune
  - Stakeholder Groups
  - Resources
  - Key Processes
  - Stakeholder Values
- Relationships between components within these views must be analyzed
  - E.g. what resources within different parts of the organization are performing key processes

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<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Res</td>
<td>SG</td>
<td>Part of chain of command</td>
<td>Interacts with group</td>
<td>Does not interact with group</td>
</tr>
<tr>
<td>Res</td>
<td>KP</td>
<td>Performs process for own strategic group and for other group(s)</td>
<td>Performs process for own strategic group</td>
<td>Does not perform process</td>
</tr>
<tr>
<td>SV</td>
<td>SG</td>
<td>Contained within group’s strategic objectives</td>
<td>Supported by group’s strategic objectives</td>
<td>Not supported by group’s strategic objectives</td>
</tr>
<tr>
<td>SV</td>
<td>KP</td>
<td>Directly supported by key process</td>
<td>Indirectly supported by key process</td>
<td>Not supported by key process</td>
</tr>
</tbody>
</table>
### X-Matrix for MPHE at Camp Lejeune

#### Stakeholder Groups
- MEF Commanding Officer
- MEF Sergeant Major
- WWR
- Marine Section Leader
- Recovery Care Coordinator
- District Injured Support Coordinators
- Battalion Chaplin
- Marine Corps Community Service (MCCS) Representative
- Navy Surgeon General
- Psychologist

#### Resources
- X-Matrix for MPHE at Camp Lejeune
- Stakeholder
- Values
- Resources
- Key Processes

#### Key Processes
- Stakeholder Group processes
- Health care processes
- System design and management
- Leadership, Innovation, Systems Engineering

#### System Design and Management
- System design and management functions
- System design and management components
- System design and management tools

#### Stakeholder Values
- Values for stakeholders
- Values for processes

#### MEF Commanding Officer
- Directly part of organization
- Directs Marine to specific organization
- Directs Marine to specific organization
- Directs Marine to specific organization

#### MEF Sergeant Major
- Directs Marine to specific organization
- Directs Marine to specific organization
- Directs Marine to specific organization
- Directs Marine to specific organization

#### WWR
- Directs Marine to specific organization
- Directs Marine to specific organization
- Directs Marine to specific organization
- Directs Marine to specific organization

#### Marine Section Leader
- Directs Marine to specific organization
- Directs Marine to specific organization
- Directs Marine to specific organization
- Directs Marine to specific organization

#### Recovery Care Coordinator
- Directs Marine to specific organization
- Directs Marine to specific organization
- Directs Marine to specific organization
- Directs Marine to specific organization

#### District Injured Support Coordinators
- Directs Marine to specific organization
- Directs Marine to specific organization
- Directs Marine to specific organization
- Directs Marine to specific organization

#### Battalion Chaplin
- Directs Marine to specific organization
- Directs Marine to specific organization
- Directs Marine to specific organization
- Directs Marine to specific organization

#### Marine Corps Community Service (MCCS) Representative
- Directs Marine to specific organization
- Directs Marine to specific organization
- Directs Marine to specific organization
- Directs Marine to specific organization

#### Navy Surgeon General
- Directs Marine to specific organization
- Directs Marine to specific organization
- Directs Marine to specific organization
- Directs Marine to specific organization

#### Psychologist
- Directs Marine to specific organization
- Directs Marine to specific organization
- Directs Marine to specific organization
- Directs Marine to specific organization
Additional Matrix analysis performed to determine dominant views of MPHE at Camp Lejeune

- Matrix to depict how each **task/process**, performed by each **resource**, contributes to the state of a **specific view**

<table>
<thead>
<tr>
<th>Resources/Task</th>
<th>Information</th>
<th>Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Division Psychiatrist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OSCAR team member</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marine Corps Community Service (MCCS) Representative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Navy Surgeon General</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychological Health Technician</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical Social Worker (BUMED Scheduling)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mental Health Provider: Deployment Health Center</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mental Health Provider: Deployment Wellness Center</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mental Health Provider: Central Intake Referral Center</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mental Health Provider: Mental Health Clinic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mental Health Provider: Substance Abuse Rehabilitation Program</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mental Health Provider: Multidisciplinary Treatment Team</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mental Health Provider: Spiritual Wellness Group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer(s) of marine needing BH care</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Cells edited when resource contributes to particular view and total contribution is determined by summing each column
Correlation of dominant views to the areas that were mentioned to have the most issues in the as-is analysis. For example, there were many comments made about the lack of resources, which is heavily tied to the Organization view.

Policy / External Factors view is the least dominant but this is not surprising since the policy is created and delivered from a higher level of the enterprise.
Analysis of driving forces and dominant views help to illustrate architectural construct of the current state of the MPHE at Camp Lejeune

Findings from EA analysis

- MPHE Stakeholders share common interest to improve MPHE
  - Much of area of improvement lies within interaction between stakeholder groups
  - Large number of contributions to MPHE space … leading to discontinuities in care

- Dominant Views:
  - Organization
  - Processes
  - Information

Vital takeaway for creating a transformation plan

- While strategically aligned, stakeholders need to improve the way in which their resources contribute to the overall PH care given to Marines
Section III

Using information from EA analysis to determine transformation
To improve interactions between MPHE resources, interactions between resources across multiple levels should be analyzed.

Leveraging EA analysis findings

• We have seen many intra- and inter-level interactions occurring across the views outlined in the as-is state of the MPHE at Camp Lejeune and across the levels of the entire enterprise.
• Identifying specific interactions between the major contributors to EA views in the lower level of an enterprise, as well as how these contributors interact with the higher levels of the enterprise, can help to model the impact of making changes at higher levels.
• This will allow multiple future states of the organization to be considered, via modeling, and support the architect’s ability to select an optimal future state for all levels of the enterprise.

Multilevel matrix approach inspired

• Multilevel matrices can be used to account for this additional level of information.
• Rob Nicol’s thesis (MIT - 2010) proposes a multilevel analysis approach called Multi-Domain Process Matrix model (MDPM), seen below; this model represents organization, processes, and information elements of a multilevel enterprise in an analytically useful way that can be used to evaluate interactions among many variables across multiple levels.
Multilevel matrices used to gain visibility to the interactions between the stakeholder groups (SG) based on resources and tasks (1/3)

Step 1: Prepare complex matrix to depict who is performing what tasks from each SG

<table>
<thead>
<tr>
<th>SG</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>MARFORCOM</td>
<td>Gathers information about Marine from administering Psychological care</td>
</tr>
</tbody>
</table>
Multilevel matrices used to gain visibility to the interactions between the stakeholder groups (SG) based on resources and tasks (2/3)

Step 2: Separate information from Step 1 into (3) new matrices, according to SG resource
- The color-coding is reassigned so that a change in color does not represent a change in resource alignment it represents a task alignment (BUMED example continued below)

One Matrix, All BUMED resources, same information as was presented in Step 1
Multilevel matrices used to gain visibility to the interactions between the stakeholder groups (SG) based on resources and tasks (3/3)

Step 3: For each stakeholder group, project the tasks performed by its resources onto the same plane

All BUMED resources
Incorporate interactions between levels of enterprise to predict enterprise impact of making changes at higher levels

Recall enterprise hierarchy
- Direction flows from Macro level to the Meso level, by way of policies
- Meso level responsible for creating, managing process executed at the Micro level to ensure the direction given to the Micro level is followed

Framework to predict impact
- In the specific case of the DoD MPHE:
  - If policy changes were made at the highest level that impacted processes at lower levels
  - Combining elemental information obtained through EA analysis with multi-level interaction
  - Insight can be used to model the potential future states of an enterprise to support both the design and selection of a transformation plan for the enterprise
Works Cited
Works Cited


