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**Report Documentation Page**

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Agenda

- Research Purpose
- Background and Relevance
- Productivity/Consumer Surplus
- Economic Analysis/Unit of Measurement
- Summary of Findings
- Real Options
- Options Analysis
- Conclusions/Question
- Contact Information
The purpose of this research is to explore the application of smartphone technology and create a business case for deployment in the USMC tactical environment.

The Future Environment

Force Implications for 2025

“To remain the Nation’s force in readiness, the Marine Corps must continuously innovate. This requires that we look across the entire institution and identify areas that need improvement and effect positive change.”

-Marine Corps Vision and Strategy 2025
-Commandant’s Planning Guidance 2010
• USMC units deployed during OEF/OIF purchased unsecure cell phones from the local markets.
• Current USMC junior personnel are smart phone literate and BYOD is common practice.
• Sleeved (secure) smart phones part of Mobility JCTD.
• Portable/private deployable 4G LTE cell systems reviewed
  • Oceus Networks for tactical broadband
• Hypotheses:
  • Sleeved smart phones may be both operationally and economically justifiable.
  • Productivity increases are the primary benefit
  • Consumer Surplus is the primary measurement
Communications Options

Man-Packable Communications Systems (ICB-C2, 2012)

Ruggedized, Secure, Sleeved Smart Phone (Scorpion H2)
There have been large improvements in efficiency and technology in the private sector and at home, but not in interactions with the Government. (Peter Orzag, U.S. Budget Director, 2010)
Consumer Surplus

- Consumer Surplus (CS): The maximum sum of money a consumer would be willing to pay to consume a given amount of a good, less the amount actually paid. (OMB A-94 guidelines)
- Multiple analysis of consumer surplus from US, UK and Canada.
  - Average CS for Voice/text: $2.09/day
  - Average for Mobile Broadband: $.90/day
  - Total average CS baseline for analysis $2.99/day
Consumer Surplus
Economic Analysis

• Methods and Assumptions:
  • NPV, with Inflation and Discount Rate
  • Economic Life of Equipment
  • Fully Burdened Cost of Fuel/Fuel Usage
  • Investment costs in phones/sleeves
  • Consumer Surplus
  • Maintenance is a “wash” between smart phones and other communications gear.
  • Sensitivity Analysis and Real Options Considered
Unit of Analysis

- Unit of analysis. Force Size:
  - Squad = 13 Marines (1620 squads in USMC)
  - Company = 182 Marines (117 infantry, 65 support)
  - Company COC = 10 to 12 of 65 Support
  - USMC = 195,000 Strong
  - Work Days = 365 workdays deployed
  - Rotation: 2 days dwell for 1 day deployed
- Analyzed at the Squad and Company levels
## Numerical Factors

<table>
<thead>
<tr>
<th>Assumptions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Riflemen in a squad</td>
<td>13</td>
</tr>
<tr>
<td>Additional personnel at a COC</td>
<td>65</td>
</tr>
<tr>
<td>Duty days per year</td>
<td>365</td>
</tr>
<tr>
<td>Smartphone price</td>
<td>$640</td>
</tr>
<tr>
<td>H2 sleeve price</td>
<td>$1,100</td>
</tr>
<tr>
<td>L-3 Guardian phone price</td>
<td>$3,250</td>
</tr>
<tr>
<td>PRC-152</td>
<td>$4,800</td>
</tr>
<tr>
<td>PRC-152A</td>
<td>$10,000</td>
</tr>
<tr>
<td>Oceus Networks RU module (200 connections)</td>
<td>$450,000</td>
</tr>
<tr>
<td>Tethering equipment (smartphone to PRC-152)</td>
<td>$1,434</td>
</tr>
<tr>
<td>COC equipment maintenance costs/month</td>
<td>$5,600</td>
</tr>
<tr>
<td>Maintenance cost saving</td>
<td>50%</td>
</tr>
<tr>
<td>COC fuel use/gallons per day</td>
<td>20</td>
</tr>
<tr>
<td>FBC fuel</td>
<td>$15</td>
</tr>
<tr>
<td>Fuel savings projected</td>
<td>30%</td>
</tr>
<tr>
<td>Dwell time (% at home base)</td>
<td>67%</td>
</tr>
<tr>
<td>Barracks efficiency benefits/productivity gain/cost saving/per day</td>
<td>$2.99</td>
</tr>
<tr>
<td>Inflation</td>
<td>1.1%</td>
</tr>
<tr>
<td>Discount rate</td>
<td>-0.8%</td>
</tr>
<tr>
<td># Squads in USMC (approx. 21,000 riflemen)</td>
<td>1620</td>
</tr>
<tr>
<td>Alternative</td>
<td>Worst Case</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Secure sleeved smart phone (1)</td>
<td>$(1,863)</td>
</tr>
<tr>
<td>Secure, sleeved smart phones for a squad (13)</td>
<td>$9,931</td>
</tr>
<tr>
<td>Secure, sleeved smart phone (non-deployed) (13)</td>
<td>$(22,212)</td>
</tr>
<tr>
<td>Secure-sleeved smart phones + Oceus (13)</td>
<td>$(84,649)</td>
</tr>
<tr>
<td>NSA secure smart phone + Oceus (13)</td>
<td>$(71,111)</td>
</tr>
<tr>
<td>Tethered smart phones to PRC-152 (13)</td>
<td>$(58,660)</td>
</tr>
<tr>
<td>Company support smart phones (65) + Oceus</td>
<td>$(221,160)</td>
</tr>
<tr>
<td>Company sleeved phone (182) + Oceus</td>
<td>$(416,172)</td>
</tr>
</tbody>
</table>
Real Options

- Real Options Analogous to financial options
- Approach for staged investment for risky opportunities
- Right, but not the obligation to continue investment
- Being “in the money” relates to tech/operational success
- Intended to mitigate, not eliminate risk.
- Productivity considered to be the element of risk
  - Test concept in small (~1000 users) organization
  - Home base/barracks to mitigate tactical risk
  - Run for two years, evaluate, continue through 10 years
  - Expand constituency with each option out to 20,000 users
  - Analyze for incremental improvements in productivity
  - ONLY move forward IF successful in prior stage
## Options Analysis

### Low Productivity

<table>
<thead>
<tr>
<th>Option</th>
<th>Years</th>
<th>Investment</th>
<th>Annual Efficiency</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,000 smartphones</td>
<td>10</td>
<td>$(640,000)</td>
<td>$366,825</td>
<td>$2,116,744.00</td>
</tr>
<tr>
<td>20,000 smartphones</td>
<td>8</td>
<td>$(12,800,000)</td>
<td>$7,336,500</td>
<td>$31,007,797.00</td>
</tr>
<tr>
<td>Oceus + sleeves</td>
<td>6</td>
<td>$(44,500,000)</td>
<td>$10,950,000</td>
<td>$20,962,197.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>$54,086,738.00</strong></td>
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</table>

### Average Productivity

<table>
<thead>
<tr>
<th>Option</th>
<th>Years</th>
<th>Investment</th>
<th>Annual Efficiency</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,000 smartphones</td>
<td>10</td>
<td>$(640,000)</td>
<td>$731,205</td>
<td>$5,744,202.64</td>
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<tr>
<td>20,000 smartphones</td>
<td>8</td>
<td>$(12,800,000)</td>
<td>$14,624,090</td>
<td>$88,989,055.14</td>
</tr>
<tr>
<td>Oceus + sleeves</td>
<td>6</td>
<td>$(44,500,000)</td>
<td>$21,827,000</td>
<td>$74,863,966.30</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>$169,597,224.09</strong></td>
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</table>

### High Productivity

<table>
<thead>
<tr>
<th>Option</th>
<th>Years</th>
<th>Investment</th>
<th>Annual Efficiency</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,000 smartphones</td>
<td>10</td>
<td>$(640,000)</td>
<td>$1,467,300</td>
<td>$13,072,154.00</td>
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<td>20,000 smartphones</td>
<td>8</td>
<td>$(12,800,000)</td>
<td>$29,346,000</td>
<td>$206,118,978.00</td>
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<tr>
<td>Oceus + sleeves</td>
<td>6</td>
<td>$(44,500,000)</td>
<td>$43,800,000</td>
<td>$205,848,414.00</td>
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<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>$425,039,546.00</strong></td>
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</table>
Conclusions/Questions

• As technology advances the expectations of youth changes
• The business case may complement the military rationale
  • Military need precedes technological application
  • Technology flexibility may feed into military need
• A staged investment program strong choice for implementation.
  • Determine whether productivity materializes
  • Validate application in tactical environment
• Questions?
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