Paper #047

Command and Control Effectiveness
And Operational Success: An Exploration

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Visualization of Research Question

Measures of C2 Effectiveness  Real Life Results
Measures of C2 Effectiveness

C2 System

Exogenous Variables

Operational Success Or Failure

Posited Relationships Among C2 Variables
Definitions of C2 Effectiveness Variables

Situational Awareness - is the ability of two or more entities (e.g. individuals, units, organizations) to develop a similar awareness of a situation.

Situational Understanding - exists when two or more entities are able to develop a similar understanding of a situation.

Collective Adaptability - the ability of C2 to cope with a variety of circumstances and stresses by altering structures and processes (adaptability).
<table>
<thead>
<tr>
<th>C2 Approach</th>
<th>Degree of Shared Awareness</th>
<th>Degree of Shared Understanding</th>
<th>Adaptability of the Collective C2 Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edge C2</td>
<td>Broad, Deep, Tailored and Dynamic</td>
<td>Broad, Deep, Tailored and Dynamic</td>
<td>High</td>
</tr>
<tr>
<td>Collaborative C2</td>
<td>Significant</td>
<td>Significant</td>
<td>Moderate</td>
</tr>
<tr>
<td>Coordinated C2</td>
<td>Limited</td>
<td>Limited</td>
<td>Limited</td>
</tr>
<tr>
<td>De-Conflicted C2</td>
<td>Focused on the Boundaries</td>
<td>None</td>
<td>Extremely Limited</td>
</tr>
<tr>
<td>Conflicted C2</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>
Major Combat Operations Statistical Model
A Visual Depiction

Variables
- Training (Individual/Collective)
- Integrated Combat Power
- Decision-Making
- Information Processing
- Timing
- Operational Leadership
- Opponent

Factors
- Capabilities
- Information
- Leadership

Dependency
- Joint Operations Outcome (Success Or Failure)
### Measurement Scales for Quality and Importance

#### QUALITY SCALE

<table>
<thead>
<tr>
<th>Extremely Low Quality</th>
<th>Low Quality</th>
<th>Somewhat Low Quality</th>
<th>Fair Quality</th>
<th>Somewhat High Quality</th>
<th>High Quality</th>
<th>Extremely High Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

#### IMPORTANCE SCALE

<table>
<thead>
<tr>
<th>Extremely Unimportant</th>
<th>Unimportant</th>
<th>Somewhat Unimportant</th>
<th>Neither Important or Unimportant</th>
<th>Somewhat Important</th>
<th>Important</th>
<th>Extremely Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

- The quality scale ranges from 'Extremely Low Quality' to 'Extremely High Quality' with rating values from 1 to 7.
- The importance scale ranges from 'Extremely Unimportant' to 'Extremely Important' with rating values from 1 to 7.
Joint Operational Success means the degree to which the specific major combat operation succeeded in achieving its objectives and/or effects.

1. Completely Unsuccessful
2. Unsuccessful
3. Somewhat Unsuccessful
4. Neither successful nor unsuccessful
5. Somewhat Successful
6. Successful
7. Completely Successful

Measurement of Operational Success
## Correlational Results

<table>
<thead>
<tr>
<th></th>
<th>OS-M</th>
<th>OS-C</th>
<th>SA</th>
<th>SU</th>
<th>CA</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS-M</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>OS-C</td>
<td>0.743</td>
<td>1.000</td>
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<tr>
<td>SA</td>
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<td>0.373</td>
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<tr>
<td>SU</td>
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<td>0.420</td>
<td>0.673</td>
<td>1.000</td>
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<tr>
<td>CA</td>
<td>0.259</td>
<td>0.439</td>
<td>0.226</td>
<td>0.282</td>
<td>1.000</td>
</tr>
</tbody>
</table>

**Legend:**
- **OS-M**: Operational Success from Main Model
- **OS-C**: Operational Success from Cohort
- **SA**: Situational Awareness
- **SU**: Situational Understanding
- **CA**: Collective Adaptability
Conclusions

1. NATO C2 Effectiveness is correlated with Operational Success.

2. Hedge: measured through quality, not effectiveness. Fuzziness.

3. Effectiveness itself not well defined in NATO Model.

4. Strong inter-correlation between Awareness and Understanding. (Possible statistical bias from the degree of correlation.)

5. Findings reinforce validity of NATO C2 Maturity Model.