Lesson 3.5c
Combining Physical Terrain (PT) Factors
Lesson 3.5c Content

• Military Aspects of the Terrain
  – Map Overlays

• Military Aspects of the Weather
  – Weather Effects Matrix
Learning Outcomes

• Conduct an analysis of Physical Terrain, by identifying the military aspects of the terrain

• Classify terrain areas according to the mobility afforded, i.e. “unrestricted”, “restricted”, “severely restricted”

• Produce a Combined Obstacle Overlay and an Avenue of Approach Overlay

• Assess the impact of climate / weather on PT as exemplified by a Weather Effects Matrix
Military aspects of the terrain

• Why do we need to determine the Military Aspects of the terrain?
  • To determine its effects on Military Operations

• What are the Military Aspects of the Terrain?
  • Observation & Fields of Fire
  • Cover & Concealment
  • Obstacles
  • Key Terrain
  • Vital Terrain
  • Avenues of Approach

• Consider all of these factors when analysing terrain, but always focus on the ones of most relevance to the specific situation at hand.
Observation & Fields of Fire

- Observation applies to what can be seen / needed to gain information about actors
- Fields of Fire applies to what can be hit
Cover is the protection from direct and indirect fires

Concealment is protection from observation
Obstacles: natural or man-made obstruction to disrupt, fix, turn, canalize or block movement
Key terrain gives an advantage to forces or opposing groups.
Vital ground

- Ground of importance
- Retained or controlled for mission success
The COO integrates the evaluations of the various factors into a single product that depicts the effects of the environment on mobility.
Overlay Preparation

**CLASSIFICATION**

Correct as of: DTG*

**Heading (Subject/Title/Topic of Overlay)**

Ref.: Map (scale, serial number, name)

* Key Terrain
* Restricted Terrain
* Severely Restricted Terrain
* Built-up Areas
* Rivers & Lakes
* Land Lines of Communications (LLC)
* Railroad
* No go waterway
* Slow go waterway*
* Bridge
* No go waterway**
* Outside Rainy season
* Already in Slow- or No go area

* Date Time Group
Learning Activity

• **Situation:**
  - Using the course scenario create a combined obstacle overlay in your AIR.

• **Task:**
  - Study the map and completed overlays and create:
    - Obstacle overlay
    - Key Terrain and Vital Ground overlay
  - Insert factors into the 3-column format (3CF) and make deductions
  - Draw up a list of Information Requirements

• **Time:** 30 minutes (group work and discussion)

<table>
<thead>
<tr>
<th>FACTOR</th>
<th>DEDUCTION</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Border crossing at Point X is Key Terrain</td>
<td>Threat Actor A needs to be able to pass through BXP to reach consolidation area. UN needs to control/surveillance BXP. Local population Traders will need BXP open to meet market expectations.</td>
<td>RFI. Who controls BXP X?</td>
</tr>
</tbody>
</table>
Learning Activity

- **Situation:**
  - You are still analyzing the terrain and are about to finalize and disseminate the products.

- **Task:**
  - Study the map and create the AAO and the MCOO
  - Insert factors into the 3-column format (3CF) and make deductions
  - Draw up a list of Information Requirements

- **Time:** 30 minutes (group work and discussion)

<table>
<thead>
<tr>
<th>FACTOR</th>
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<tbody>
<tr>
<td>Good LLOC moving from east to west, surrounded by plains.</td>
<td>Threat Actor A requires cover and concealment to move and may choose a different AoA. Threat actor B needs to space to move armour and so will likely choose this AoA.</td>
<td>IR. What terrain areas will confirm or deny threat actor COA?</td>
</tr>
</tbody>
</table>
Remember

You are not alone:
- Terrain Analysis a total UN staff effort

Get support:
- Engineer staff (G-3)
- GIS cells (both military and civilian)

Use mnemonics:
- OCOKA - Observation & fields of fire, Cover and concealment, Obstacles (manmade / natural), Key terrain, Avenues of approach

Why and for whom?
- To understand the terrain and its effects on our operations
- For the staff, not just for the intelligence branch
Weather and Climate

**AOE**

**Analysis of the Operating Environment**

*Human factor orientated*

Threat and opportunities are integrated

**Phase 1**

**OEE**

*Operating Environment Evaluation*

- **a. Physical terrain**
- **b. Human terrain**
- **c. Information terrain**

*Inter-relation, interaction and 'flow'*

**Phase 2**

**AE**

*Actor Evaluation*

Emphasis on influencing / threatening actors (Threat Evaluation - TE) and opportunities

**Phase 3**

**SI**

*Situation Integration*

Emphasis on interaction (systems) on the ground between factor developments and actor behavior presented in integrated predictive scenario’s and ACOA’s
Difference Weather and Climate

Weather:
- Short-term state of the atmosphere
- Can vary from time to time or location to location
- Always includes time and location

Climate:
- Long-term pattern of weather
- Long-term = 30 years or more
- Average weather over many years in one specific place
Weather Effects on Operations

- Visibility
- Wind
- Precipitation
- Cloud cover / ceiling
- Temperature
- Humidity
## Weather forecast and Effects Matrix

<table>
<thead>
<tr>
<th>Date:</th>
<th>Mon 25 Nov 2018</th>
<th>Tue 26 Nov 2018</th>
<th>Wed 27 Nov 2018</th>
<th>Thu 28 Nov 2018</th>
<th>Fri 29 Nov 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Weather type</strong></td>
<td>![Sun]</td>
<td>![Sun]</td>
<td>![Clouds]</td>
<td>![Rain]</td>
<td>![Clouds]</td>
</tr>
<tr>
<td><strong>Max Temp °C / °F</strong></td>
<td>27°C / 81°F</td>
<td>24°C / 75°F</td>
<td>23°C / 74°F</td>
<td>23°C / 74°F</td>
<td>23°C / 74°F</td>
</tr>
<tr>
<td><strong>Min Temp °C / °F</strong></td>
<td>17°C / 63°F</td>
<td>16°C / 61°F</td>
<td>12°C / 54°F</td>
<td>11°C / 52°F</td>
<td>11°C / 52°F</td>
</tr>
<tr>
<td><strong>Clouds</strong></td>
<td>Clear</td>
<td>Scattered</td>
<td>Broken</td>
<td>Overcast - Rain</td>
<td>Overcast - Rain</td>
</tr>
<tr>
<td><strong>Precipitation</strong></td>
<td>0 – 15 mm</td>
<td>0 – 15 mm</td>
<td>0 – 15 mm</td>
<td>225 – 290 mm</td>
<td>250 – 300 mm</td>
</tr>
<tr>
<td><strong>Humidity</strong></td>
<td>25 %</td>
<td>25 %</td>
<td>60 %</td>
<td>75 %</td>
<td>75 %</td>
</tr>
<tr>
<td><strong>Wind direction</strong></td>
<td>SW</td>
<td>SW</td>
<td>SE</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td><strong>Sunrise and set</strong></td>
<td>06.07 / 18.58 hour LT</td>
<td>06.08 / 18.59 hour LT</td>
<td>06.09 / 19.00 hour LT</td>
<td>06.10 / 19.01 hour LT</td>
<td>06.11 / 19.02 hour LT</td>
</tr>
<tr>
<td><strong>Moonrise and set</strong></td>
<td>20.16 / 07.47 hour LT</td>
<td>21.04 / 08.33 hour LT</td>
<td>21.37 / 09.19 hour LT</td>
<td>22.17 / 10.04 hour LT</td>
<td>22.57 / 10.51 hour LT</td>
</tr>
<tr>
<td><strong>Illumination % night</strong></td>
<td>Illumination 88.5 %</td>
<td>Illumination 81.6 %</td>
<td>Illumination 73.4 %</td>
<td>Illumination 64.1 %</td>
<td>Illumination 53.9 %</td>
</tr>
</tbody>
</table>

### Weather effects matrix

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<th>Date:</th>
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</thead>
<tbody>
<tr>
<td><strong>UN Personnel</strong></td>
<td>Heavy rain</td>
<td>Heavy rain</td>
<td>Heavy rain</td>
<td>Heavy rain</td>
<td>Heavy rain</td>
</tr>
<tr>
<td><strong>UN Materiel</strong></td>
<td>Heavy rain</td>
<td>Heavy rain</td>
<td>Heavy rain</td>
<td>Heavy rain</td>
<td>Heavy rain</td>
</tr>
<tr>
<td><strong>Rotary Wing and VSTOL</strong></td>
<td>Visibility</td>
<td>Visibility</td>
<td>Visibility</td>
<td>Visibility</td>
<td>Visibility</td>
</tr>
<tr>
<td><strong>Fixed wing - transport</strong></td>
<td>Visibility and wind</td>
<td>Visibility</td>
<td>Visibility</td>
<td>Visibility</td>
<td>Visibility</td>
</tr>
<tr>
<td><strong>UAV</strong></td>
<td>Visibility &amp; wind</td>
<td>Visibility &amp; wind</td>
<td>Visibility &amp; rain</td>
<td>Visibility &amp; rain</td>
<td>Visibility &amp; rain</td>
</tr>
<tr>
<td><strong>Movements (roads)</strong></td>
<td>Flooding risk</td>
<td>Flooding risk</td>
<td>Condition &amp; Flooding</td>
<td>Condition &amp; Flooding</td>
<td>Condition &amp; Flooding</td>
</tr>
<tr>
<td><strong>Movements (off road)</strong></td>
<td>Distance reduction</td>
<td>Distance reduction</td>
<td>Distance reduction</td>
<td>Distance reduction</td>
<td>Distance reduction</td>
</tr>
<tr>
<td><strong>Communications</strong></td>
<td>Distance reduction</td>
<td>Distance reduction</td>
<td>Distance reduction</td>
<td>Distance reduction</td>
<td>Distance reduction</td>
</tr>
<tr>
<td><strong>Specific effects on UN Operating Environment</strong></td>
<td>NSTR</td>
<td>NSTR</td>
<td>NSTR</td>
<td>DPRE / Flooding</td>
<td>DPRE / Flooding</td>
</tr>
<tr>
<td><strong>Legend</strong></td>
<td>Non-assessable / NSTR</td>
<td>Favorable</td>
<td>Marginal</td>
<td>Unfavorable</td>
<td>Unfavorable</td>
</tr>
</tbody>
</table>
Learning Activity

**Situation:** Using the weather forecast on the matrix supplied to you, decide what affects this will have on Sector ISR assets

**Time:** 30 minutes (group work and discussion)

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<tr>
<td>Fog due on 07 Dec 2019</td>
<td>Threat Actor A likely to attempt to move to exploit lack of UN ISR resources.</td>
<td>Action. UN to deploy OP on NAI 1.</td>
</tr>
</tbody>
</table>
Take Away

• PT analysis is crucial to OEE as it is the basis for analysis of the Human and Information Terrains

• Terrain analysis overlays are based on accurate mapping and is essential to MPKI and MDMP

• Climate and weather affect PT

• COAs for the UN and mandate spoilers are determined by PT
Questions?