APPENDIX D

WEATHER EFFECTS ON ARTILLERY

Artillery in the field is heavily weather dependent. Not only must you contend with those weather effects common to all other units but you must also compensate for a number of special effects in the area of target acquisition and aiming. Listed below are weather effects for artillery operations that are not contained in the WTDA tables.

BAROMETRIC PRESSURE. Air pressure affects projectile trajectory, barofuzing, and fire control calculations.

CLOUDS AND SKY COVER. Low ceilings affect target acquisition systems and terminally guided munitions. Low overcast clouds will limit the effectiveness of aerial illumination devices.

DENSITY. The thickness of the atmosphere (heavy air) affects fire control. The greater (heavier) the density, the shorter the range.

HUMIDITY PROFILE. This scale is used to compute virtual temperatures for ballistic firing data.

ILLUMINATION. The best use of most NVD require about a quarter (23 percent) of the moon, 30 degrees above the horizon, scattered clouds, and the sun more than 5 degrees below the horizon. Additional weather products dealing with the use of E-O devices are available from your SWO.

PRESSURE PROFILE. Barometric pressure profiles are essential in both baroarming and barofuzing. They are required for calculating densities for ballistic firing data.

REFRACTIVE INDEX. This index affects radar, laser, and infrared distance measurements.

SURFACE WINDS. Trajectory data and first round hit capability are degraded by high crosswinds. Winds affect the accuracy of rocket fire and Firefinder radar trajectory computations.

SURFACE TEMPERATURE. Frozen ground increases the time a crew has to stabilize their weapon. Extreme cold affects gun accuracy and fuse functioning. High temperature
affects stability of ammunition such as white phosphorus (WP). It also reduces rate of fire greatly because of crew heat fatigue.

TEMPERATURE PROFILE. This is another condition that affects calculations of ballistic artillery firing. The profile is used to compute virtual temperatures for artillery firing. Extreme cold affects gun accuracy and fuse functioning.

THUNDERSTORMS AND LIGHTNING. Electrical storms restrict the use of some munitions and fuse types.

VISIBILITY. This affects visual target acquisition, fire adjustment, and E-O target designation. Reduced visibility affects the placement of forward observers (FO) and fire support teams.

WINDS ALOFT. Strong winds aloft impact all ballistic projectile aiming calculations. Accurate and timely meteorological data can compensate for the problem.

WIND PROFILE. Wind profiles play a major role in ballistic wind compensations for artillery firing.
Table D-1. Weather effects from cloud ceilings.

<table>
<thead>
<tr>
<th>WEATHER VALUE (FEET)</th>
<th>SEVERE DEGRADATION</th>
<th>MODERATE DEGRADATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SYSTEM/EVENT</td>
<td>REMARKS</td>
</tr>
<tr>
<td>LT 500</td>
<td>ATACMS</td>
<td>Target acquisition</td>
</tr>
<tr>
<td>LT 600</td>
<td>COPPERHEAD</td>
<td>Target acquisition</td>
</tr>
<tr>
<td>LT 800</td>
<td>SADARM</td>
<td>Target acquisition</td>
</tr>
<tr>
<td>LT 1,000</td>
<td></td>
<td>ATACMS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Army aircraft</td>
</tr>
<tr>
<td>LT 1,500</td>
<td></td>
<td>COPPERHEAD</td>
</tr>
<tr>
<td>LT 3,300</td>
<td></td>
<td>SADARM</td>
</tr>
</tbody>
</table>
Table D-2. Weather effects from reduced visibility.

<table>
<thead>
<tr>
<th>WEATHER VALUE (METERS)</th>
<th>SEVERE DEGRADATION</th>
<th>MODERATE DEGRADATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SYSTEM/EVENT</td>
<td>REMARKS</td>
</tr>
<tr>
<td>LT 200</td>
<td>FO</td>
<td>NVG (PVS-5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Infrared aiming light (PAQ-4)</td>
</tr>
<tr>
<td>LT 400</td>
<td></td>
<td>NVS (PVS-2)</td>
</tr>
<tr>
<td>LT 500</td>
<td>DRAGON</td>
<td>FO</td>
</tr>
<tr>
<td>LT 600</td>
<td></td>
<td>NVS (PVS-4)</td>
</tr>
<tr>
<td>LT 1,000</td>
<td>TOW</td>
<td>DRAGON thermal sight (TAS-5)</td>
</tr>
<tr>
<td>LT 1,200</td>
<td></td>
<td>NVS (TVS-2, TVS-5)</td>
</tr>
<tr>
<td>LT 2,000</td>
<td></td>
<td>NVS (TVS-4)</td>
</tr>
<tr>
<td>LT 3,000</td>
<td></td>
<td>TOW thermal sight (UAS-12)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Handheld thermal viewer (PAS-7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Thermal night observing device (UAS-11)</td>
</tr>
<tr>
<td>LT 3,500</td>
<td></td>
<td>AFO</td>
</tr>
</tbody>
</table>
Table D-3. Weather effects from surface wind.

<table>
<thead>
<tr>
<th>WEATHER VALUE (KNOTS)</th>
<th>SEVERE DEGRADATION</th>
<th>MODERATE DEGRADATION</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>SYSTEM/EVENT</td>
<td>REMARKS</td>
</tr>
<tr>
<td>GT 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GT 20</td>
<td>GSR</td>
<td>Increased noise</td>
</tr>
<tr>
<td>GT 25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GT 30</td>
<td>Meteorological processor (GMD-1)</td>
<td>Inhibits balloon launch</td>
</tr>
<tr>
<td>GT 35</td>
<td>Artillery detection radar (TPQ-38)</td>
<td>Stow antenna</td>
</tr>
<tr>
<td>GT 40</td>
<td>Personnel</td>
<td></td>
</tr>
<tr>
<td>GT 50</td>
<td>Communications antennas</td>
<td>Setting up</td>
</tr>
</tbody>
</table>
### Table D-4. Weather effects from temperature.

<table>
<thead>
<tr>
<th>WEATHER VALUE (°F/°C)</th>
<th>SEVERE DEGRADATION</th>
<th>MODERATE DEGRADATION</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>SYSTEM/EVENT</td>
<td>REMARKS</td>
</tr>
<tr>
<td>LT -25/-32</td>
<td>TOW DRAGON Rocket launcher (M202A1) Handheld thermal viewer (PAS-7) Dry cell battery Personnel</td>
<td>Only 20% effective</td>
</tr>
<tr>
<td>LT -20/-28</td>
<td></td>
<td>NVS (PVS-4) Maintenance</td>
</tr>
<tr>
<td>LT 0/-18</td>
<td>Wheeled vehicles Dry cell battery</td>
<td></td>
</tr>
<tr>
<td>LT 20/-6</td>
<td>Thermal night observation device (UAS-11) Platoon early warning system (TRS-2) DRAGON</td>
<td></td>
</tr>
<tr>
<td>LT 32/0</td>
<td>NVG (PVS-5) Personnel Small arms and machine guns</td>
<td></td>
</tr>
<tr>
<td>GT 85/29</td>
<td>Personnel</td>
<td></td>
</tr>
<tr>
<td>GT 95/35</td>
<td>Personnel See [app 1] for water consumption</td>
<td></td>
</tr>
<tr>
<td>WEATHER VALUE (°F/°C)</td>
<td>SEVERE DEGRADATION</td>
<td>MODERATE DEGRADATION</td>
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<tr>
<td>-----------------------</td>
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</tr>
<tr>
<td></td>
<td>SYSTEM/EVENT</td>
<td>REMARKS</td>
</tr>
<tr>
<td>GT 125/52</td>
<td>All NVS</td>
<td></td>
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<tr>
<td></td>
<td>Generators</td>
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<tr>
<td></td>
<td>155-mm how (M198) ammunition</td>
<td></td>
</tr>
<tr>
<td></td>
<td>105-mm how TACFIRE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Laser infrared observation set (GVS-5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LANCE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>WP artillery rounds</td>
<td>Become unstable</td>
</tr>
</tbody>
</table>
Table D-5. Weather effects from precipitation.

<table>
<thead>
<tr>
<th>WEATHER CONDITION</th>
<th>SEVERE DEGRADATION</th>
<th>MODERATE DEGRADATION</th>
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<tbody>
<tr>
<td></td>
<td>SYSTEM/EVENT</td>
<td>REMARKS</td>
</tr>
<tr>
<td>Light rain or snow</td>
<td></td>
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<tr>
<td>Moderate rain or snow</td>
<td>Wheeled vehicles</td>
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<tr>
<td>Heavy rain or snow</td>
<td>Mortar operations</td>
<td>Ammunition</td>
</tr>
<tr>
<td></td>
<td>Personnel movement</td>
<td>Refueling</td>
</tr>
<tr>
<td></td>
<td>Laser systems</td>
<td>Communications</td>
</tr>
<tr>
<td></td>
<td>LOS communications</td>
<td>Equipment storage</td>
</tr>
<tr>
<td></td>
<td>Target acquisition</td>
<td></td>
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<tr>
<td>Thunder-storm/lightning</td>
<td></td>
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<tr>
<td>Light freezing rain</td>
<td>Personnel</td>
<td></td>
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<tr>
<td></td>
<td>Wheeled vehicles</td>
<td></td>
</tr>
<tr>
<td>Moderate freezing rain</td>
<td>Personnel</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wheeled vehicles</td>
<td></td>
</tr>
<tr>
<td>SNOW DEPTH (INCHES)</td>
<td></td>
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</tr>
<tr>
<td>GT 3</td>
<td>Personnel movement</td>
<td></td>
</tr>
<tr>
<td>GT 6</td>
<td>Personnel movement</td>
<td>20-mm and 40-mm ammunition</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wheeled vehicles</td>
</tr>
<tr>
<td>GT 12</td>
<td>Wheeled vehicles</td>
<td></td>
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<tr>
<td>GT 20</td>
<td></td>
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<tr>
<td>GT 30</td>
<td>Tracked vehicles</td>
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</tbody>
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