## INDT 100 Lesson 3

### Overview
Manipulation of units used in Aerospace industry.
Unit conversions
New units

### Purpose

### Objectives
Skills/information that will be learned.
- Recognize Common units.
- Identify the quantity associated with each unit.
- Know where to find information on unfamiliar units

### Information
(Give and/or demonstrate necessary information)
Common quantities that we have units for:
- Time, temp, Pressure, Distance, Area, Volume, Flow-rate, Velocity, Angle, Light, Noise, Pain, Electrical potential, Electrical Flow, Resistance, Clarity, Power, Work
- All the units that apply to the above:
  - Special units for Aeronautics: See Below

### Verification
(Steps to check for student understanding)
Throw-out some physical situations and ask how to measure them.

### Activity
(Describe the independent activity to reinforce this lesson)
Use the “antique” aircraft instrumentation and see exactly what they are and what units they are displayed in. Possibly build a lab or trainer board where these can be used for training.

### Materials Needed
- BCT

### Teacher’s or other reference


Discuss the Mars Rover debacle…

### Other Resources

### Summary
Quantities and units are part of our communications. Very important.
<table>
<thead>
<tr>
<th>Category</th>
<th>Unit</th>
<th>Equivalent Units</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acceleration</strong></td>
<td>meters/second(^2) (m/s(^2)), kilometers/second(^2) (km/s(^2)), (kilometers/hour)/second (km/h-s), g-unit (g)</td>
<td>inches/second(^2) (in/s(^2)), feet/second(^2) (ft/s(^2)), (miles/hour)/second (mph/s), g-unit (g)</td>
</tr>
<tr>
<td><strong>Angle</strong></td>
<td>radian (rad), degree (deg), revolution</td>
<td>radian (rad), degree (deg), revolution</td>
</tr>
<tr>
<td><strong>Angular acceleration</strong></td>
<td>radians/second(^2) (rad/s(^2)), degrees/second(^2) (deg/s(^2))</td>
<td>radians/second(^2) (rad/s(^2)), degrees/second(^2) (deg/s(^2))</td>
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<tr>
<td><strong>Angular velocity</strong></td>
<td>radians/second (rad/s), degrees/second (deg/s), revolutions/minute (rpm), revolutions/second (rps)</td>
<td>radians/second (rad/s), degrees/second (deg/s), revolutions/minute (rpm), revolutions/second (rps)</td>
</tr>
<tr>
<td><strong>Density</strong></td>
<td>kilogram/meter(^3) (kg/m(^3))</td>
<td>pound mass/foot(^3) (lbm/ft(^3)), slug/foot(^3) (slug/ft(^3)), pound mass/inch(^3) (lbm/in(^3))</td>
</tr>
<tr>
<td><strong>Force</strong></td>
<td>newton (N)</td>
<td>pound (lb)</td>
</tr>
<tr>
<td><strong>Inertia</strong></td>
<td>kilogram-meter(^2) (kg-m(^2))</td>
<td>slug-foot(^2) (slug-ft(^2))</td>
</tr>
<tr>
<td><strong>Length</strong></td>
<td>meter (m)</td>
<td>inch (in), foot (ft), mile (mi), nautical mile (nm)</td>
</tr>
<tr>
<td><strong>Mass</strong></td>
<td>kilogram (kg)</td>
<td>slug (slug), pound mass (lbm)</td>
</tr>
<tr>
<td><strong>Pressure</strong></td>
<td>pascal (Pa)</td>
<td>pound/inch(^2) (psi), pound/foot(^2) (psf), atmosphere (atm)</td>
</tr>
<tr>
<td><strong>Temperature</strong></td>
<td>kelvin (K), degrees Celsius (°C)</td>
<td>degrees Fahrenheit (°F), degrees Rankine (°R)</td>
</tr>
<tr>
<td>Torque</td>
<td>newton-meter (N-m)</td>
<td>pound-feet (lb-ft)</td>
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<tr>
<td>----------</td>
<td>--------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Velocity</td>
<td>meters/second (m/s), kilometers/second (km/s), kilometers/hour (km/h)</td>
<td>inches/second (in/sec), feet/second (ft/sec), feet/minute (ft/min), miles/hour (mph), knots</td>
</tr>
</tbody>
</table>