Future trends/Concerns

- Positive and negative effects of local, state, and federal regulations on use of unmanned systems
- More issues will arise with maintaining traffic management as the number of unmanned vehicles in use increases
- Drone-in-a-box (like scooters in a city) will increase drone-as-a-service use in industry (i.e., security industry)
- Emergence of artificial intelligence and increases in autonomy of drones will allow for on-demand mobility and delivery (i.e., self-driving cars and taxis, delivery of food and packages, etc.)
- Sensor advancements will increase capabilities and/or situational awareness
- BVLOS will enable UAS industry expansion and impact roles/responsibilities in UAS occupations
- With increased autonomy of systems, we run the risk of issues arising from humans not paying as close attention.
- Manufacturers are working on hybrid transportation mode or “pop up” vehicles (i.e. Airbus, Audi, and Porsche)
- Advancements in the industry will lead to additional legal implications and liability concerns with unmanned systems use
- Infrastructure necessary to implement BVLOS, extended capabilities, etc. needs to be in place first; the lack of broadband in many areas (especially rural) will limit expansion of UAS industry
- Need to develop test sites in VA for underwater unmanned vehicles

Definitions of Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
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<tbody>
<tr>
<td>AI</td>
<td>Artificial Intelligence</td>
</tr>
<tr>
<td>AR</td>
<td>Augmented Reality</td>
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<tr>
<td>ATV</td>
<td>All-Terrain Vehicle</td>
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<tr>
<td>BVLOS</td>
<td>Beyond Visual Line of Sight</td>
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<tr>
<td>CAD</td>
<td>Computer-Aided Design</td>
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<tr>
<td>CAN</td>
<td>Controller Area Network</td>
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<tr>
<td>CTD</td>
<td>Conductivity Temperature Depth</td>
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<td>ESC</td>
<td>Electronic Speed Controllers</td>
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<tr>
<td>FOD</td>
<td>Foreign Object and Debris</td>
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<tr>
<td>FPV</td>
<td>First-Person View</td>
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<tr>
<td>GIS</td>
<td>Geographical Information System</td>
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<tr>
<td>GNSS</td>
<td>Global Navigation Satellite System</td>
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<tr>
<td>GPS</td>
<td>Global Position Satellite</td>
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<tr>
<td>IMU</td>
<td>Inertial Measurement Unit</td>
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<tr>
<td>IP</td>
<td>Ingress Protection</td>
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<tr>
<td>ITAR</td>
<td>International Traffic in Arms Regulations</td>
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<tr>
<td>I2C</td>
<td>Inter-Integrated Circuit</td>
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<tr>
<td>LAANC</td>
<td>Low Altitude Authorization and Notification Capability</td>
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<tr>
<td>LED</td>
<td>Light-Emitting Diode</td>
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<tr>
<td>LIDAR</td>
<td>Light Detection and Ranging</td>
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<tr>
<td>NDVI</td>
<td>Normalized Difference Vegetation Index</td>
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<tr>
<td>OSHA</td>
<td>Occupational Safety and Health Administration</td>
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<tr>
<td>PDB</td>
<td>Power Distribution Boards</td>
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<tr>
<td>PPE</td>
<td>Personal Protective Equipment</td>
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<tr>
<td>PPK</td>
<td>Post-Processed Kinematic</td>
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<tr>
<td>RF</td>
<td>Radio Frequency</td>
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<tr>
<td>RTK</td>
<td>Real-Time Kinematic</td>
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<tr>
<td>SD</td>
<td>Secure Digital</td>
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<tr>
<td>SPI</td>
<td>Serial Peripheral Interface</td>
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<tr>
<td>SQL</td>
<td>Structured Query Language</td>
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<tr>
<td>SWAP</td>
<td>Size Weight and Power</td>
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<tr>
<td>UAS</td>
<td>Unmanned Aircraft System</td>
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<tr>
<td>SUAS</td>
<td>Small Unmanned Aircraft System</td>
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</table>

This initiative was paid for in part by a federal U.S. Department of Labor, Employment and Training Administration Workforce Innovation and Opportunity Act (WIOA) award made to Thomas Nelson Community College by the pass-through entity, Virginia Community College System.
<table>
<thead>
<tr>
<th>DUTIES</th>
<th>TASKS</th>
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<tbody>
<tr>
<td><strong>A.</strong> Plan unmanned systems mission</td>
<td>A.01 Identify mission requirements (e.g., deliverables, objectives, etc.)&lt;sup&gt;*&lt;/sup&gt;</td>
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<tr>
<td><strong>B.</strong> Coordinate operational logistics</td>
<td>B.01 Communicate with stakeholders*</td>
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<tr>
<td><strong>C.</strong> Maintain unmanned vehicle systems</td>
<td>C.01 Perform progressive inspections</td>
</tr>
<tr>
<td><strong>D.</strong> Maintain unmanned vehicle power systems</td>
<td>D.01 Inspect batteries for damage</td>
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<tr>
<td><strong>E.</strong> Integrate unmanned vehicle payloads</td>
<td>E.01 Review specs and manuals</td>
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<tr>
<td><strong>F.</strong> Perform pre-mission testing</td>
<td>F.01 Develop pre-mission checklist</td>
</tr>
<tr>
<td><strong>G.</strong> Execute unmanned systems mission</td>
<td>G.01 Run pre-mission checklist</td>
</tr>
<tr>
<td><strong>H.</strong> Manage captured data</td>
<td>H.01 Retrieve captured data</td>
</tr>
<tr>
<td><strong>I.</strong> Maintain professional knowledge</td>
<td>I.01 Obtain IAS-pilot license</td>
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* Denotes tasks performed multiple times in various states.