TDRWP Operational Acceptance Test Plan (2019)

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• Work has been contracted out to upgrade the KSC Tropospheric Doppler Radar Wind Profiler (TDRWP) to improve the Effective Vertical Resolution (EVR) from ~450 m to 300 m while staying out of the Amateur Radio frequencies.

• KSC Weather has asked the Natural Environments (NE) branch to conduct an Operational Acceptance Test (OAT) to verify the EVR is 300 m and that the TDRWP is working as good or better than prior to the upgrade.
# OAT Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Criteria</th>
<th>Rationale</th>
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<tbody>
<tr>
<td>Time Interval</td>
<td>5 min</td>
<td>Supports DOL timeline.</td>
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<tr>
<td>Vertical Data Interval</td>
<td>150 m</td>
<td>Consistent with database used for SLS design.</td>
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<td>Wind Accuracy</td>
<td>1.5 m/s root-mean-square component difference between 1,795 – 19,430 m</td>
<td>Accuracy of heritage balloon and DRWP systems. Altitude range over which TDRWP was certified to prior to upgrades.</td>
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<tr>
<td>Effective Vertical Resolution</td>
<td>300 m</td>
<td>KSC Weather requirement for upgrade to be considered successful.</td>
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<tr>
<td>Data Collection Period</td>
<td>Greater of 60 days or the number of days that yield 30 concurrent balloon and TDRWP profiles</td>
<td>Consistent with prior OAT methodologies that ensures enough data is analyzed to accurately draw conclusions from.</td>
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Methodology

• Time interval will be measured as the time it takes to obtain a profile under nominal conditions.

• Vertical interval will be calculated as the size of the maximum range gate.

• Wind accuracy is determined as the Root Mean Square (RMS) component difference between time and height matched TDRWP profiles and Automated Meteorological Profiling System (AMPS) balloons.
  – Result is altitude band where the wind accuracy requirement (1.5 m/s RMS or less) is met.
  – This will be assessed as in the TDRWP full certification in 2018 implementing quality control techniques, accounting for spatial separation error, and rounding the RMS values to nearest 0.1 m/s.

• EVR will be calculated via spectral analysis of TDRWP pairs.
Forward work

• Conduct the OAT analyses as data becomes available.

• Document the results of the analyses and deliver a report to the KSC Weather Office 1 month after data collection period ends.