16-FOOT TRANSONIC TUNNEL

TEST PLAN

TUNNEL DYNAMICS STUDY
16-FOOT TT TEST 897

TUNNEL ENTRY DATE: August 18, 1997
TUNNEL EXIT DATE: August 25, 1997

Approval: (Signature/Date)

Lead Test Engineer: ____________________________

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
LANGLEY RESEARCH CENTER
### 1. General Test Information

#### 1.1 Test Personnel

##### 1.1.1 16-Foot Test Team

<table>
<thead>
<tr>
<th>Name</th>
<th>Role/Title</th>
<th>Telephone (W)</th>
<th>Telephone (H)</th>
<th>E-mail</th>
<th>M/S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tim Kariya</td>
<td>Test Project Engineer</td>
<td>43037</td>
<td>599-8403</td>
<td>t.t.kariya@larc</td>
<td>280</td>
</tr>
<tr>
<td>Jim Byrd</td>
<td>Alternate Test Engineer</td>
<td>45961</td>
<td></td>
<td>j.e.byrd@larc</td>
<td>280</td>
</tr>
<tr>
<td>Tom Mills</td>
<td>Alternate Test Engineer</td>
<td>48127</td>
<td></td>
<td>c.t.mills@larc</td>
<td>280</td>
</tr>
<tr>
<td>Lloyd Marks</td>
<td>Test Director</td>
<td>X43066</td>
<td></td>
<td>l.r.marks@larc</td>
<td>280</td>
</tr>
<tr>
<td>Andrew Boney</td>
<td>Data Specialist</td>
<td>X43034</td>
<td></td>
<td>a.d.boney@larc</td>
<td>280</td>
</tr>
<tr>
<td>Charles Mercer</td>
<td>Facility Manager</td>
<td>X43043</td>
<td></td>
<td>c.e.mercer@larc</td>
<td>280</td>
</tr>
<tr>
<td>Mike Taylor</td>
<td>Facility Coordinator</td>
<td>X45913</td>
<td></td>
<td>r.m.taylor@larc</td>
<td>280</td>
</tr>
<tr>
<td>Gary Koeppel</td>
<td>Instrumentation Coordinator</td>
<td>X44835</td>
<td></td>
<td>g.e.koeppel@larc</td>
<td>280</td>
</tr>
</tbody>
</table>

##### 1.1.2 Research Team

N/A

##### 1.1.3 Other Support Personnel

<table>
<thead>
<tr>
<th>Name</th>
<th>Role/Title</th>
<th>Telephone</th>
<th>E-mail</th>
<th>M/S</th>
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<tbody>
<tr>
<td>Roger Cundiff</td>
<td>Automation control engineer</td>
<td>X47848</td>
<td>r.l.cundiff@larc</td>
<td>442</td>
</tr>
<tr>
<td>Greg Humphreys</td>
<td>Automation control engineer</td>
<td>X46980</td>
<td>g.l.humphreys@larc</td>
<td>442</td>
</tr>
<tr>
<td>Mark Motter</td>
<td>Automation control engineer</td>
<td>X46978</td>
<td>m.a.motter@larc</td>
<td>442</td>
</tr>
<tr>
<td>John Casadevall</td>
<td>Modcomp DAS programmer</td>
<td>865-0000 (289)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>William Salyer (Sal)</td>
<td>Photographer supervisor</td>
<td>X43526</td>
<td>w.c.salyer@larc</td>
<td>425</td>
</tr>
<tr>
<td>Jack Hughes</td>
<td>NDE supervisor</td>
<td>X44110</td>
<td>j.t.hughes@larc</td>
<td>397</td>
</tr>
<tr>
<td>ETTD Cellular</td>
<td>Instrumentation</td>
<td>879-5578</td>
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#### 1.2 Test Meeting Schedule

<table>
<thead>
<tr>
<th>Meeting Name</th>
<th>Meeting Time</th>
<th>Meeting #</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Meeting</td>
<td>Informal</td>
<td>M1</td>
</tr>
<tr>
<td>Initial Test Planning Meeting</td>
<td>Informal</td>
<td>M2</td>
</tr>
<tr>
<td>Preliminary Test Plan Review</td>
<td>Informal</td>
<td>R1</td>
</tr>
<tr>
<td>Model Design Reviews</td>
<td>Informal</td>
<td>R2</td>
</tr>
<tr>
<td>Final Test Plan Review</td>
<td>Informal</td>
<td>R3</td>
</tr>
<tr>
<td>Pre-test Meeting</td>
<td>Informal</td>
<td>M3</td>
</tr>
<tr>
<td>Staff Briefing</td>
<td>Informal</td>
<td>M4</td>
</tr>
<tr>
<td>Test Readiness Review</td>
<td>Informal</td>
<td>R4</td>
</tr>
<tr>
<td>In-Test Review</td>
<td>Informal</td>
<td>R5</td>
</tr>
<tr>
<td>End-of Test Staff Debriefing</td>
<td>Informal</td>
<td>M5</td>
</tr>
<tr>
<td>End-of Test Customer/Management Debriefing</td>
<td>Informal</td>
<td>M6</td>
</tr>
</tbody>
</table>
1.4 Test Documentation Required
1.4.1 Customer Requirements Form
1.4.2 Test Plan
1.4.3 Model Request Form
1.4.4 Model Safety Report
1.4.5 16-Foot TT Request for Support
1.4.6 Model Installation Form
1.4.7 Post-test Debriefing
1.4.8 Post-test Data Transmittal Letter

2. Test Program

2.1 Test Description

2.1.1 General Test Description
- Determine the dynamic characteristics of tunnel empty test section flow.

2.1.2 Specific Test Objectives
- Determine the dynamic characteristics of the tunnel tank static pressure.
- Determine the dynamic characteristics of the test section static and total pressures.
- Verify tunnel transient frequency.

2.1.3 Test Classification
Model Classification: None.
Data Classification: None.
Security Procedures: None.

2.2 Test Matrix

2.2.1 Tunnel Test Conditions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Schedule</th>
<th>Set point tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mach number</td>
<td>0.20, 0.30, 0.40, 0.60, 0.80, 0.85, 0.90, 0.95, 0.98, 1.05, 1.10, 1.15, 1.20, 1.25</td>
<td>±0.003</td>
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<tr>
<td>Stagnation pressure</td>
<td>N/A 16-Foot TT</td>
<td></td>
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<tr>
<td>Stagnation temperature</td>
<td>N/A 16-Foot TT</td>
<td></td>
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<tr>
<td>Reynold's number</td>
<td>N/A 16-Foot TT (~4 million/ft)</td>
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2.2.2 Model Attitude Test Conditions

<table>
<thead>
<tr>
<th>Parameter</th>
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<th>Set point tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha</td>
<td>0°</td>
<td></td>
</tr>
<tr>
<td>Beta</td>
<td>0°</td>
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2.2.3 Other Model Test Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Schedule</th>
<th>Set point tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure ratio</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Mass flow</td>
<td>N/A</td>
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2.2.4 Customer-desired Data Amount
N/A

2.2.5 Facility Estimated Data Amount
N/A