B-1B FACT BOOK

North American Aircraft
Rockwell International
INTRODUCTION

TABLE OF CONTENTS
INTRODUCTION

This B-1B Fact Book is a collection of white papers and briefing material on a variety of subjects related to the B-1B. The purpose of this document is to provide a ready source of information for use in daily activities. Although this book is not intended for public distribution, individual sheets may be provided to constituents at the discretion of recipients. When reviewed in total this document should provide a general review of many key topics associated with the B-1B program and its history. However, it is not the primary purpose of this document to provide current program status. Users should refer to other sources for specific program status.

This update to the Fact Book encapsulates pertinent information on the B-1B Program, highlighting the following sections:

- Section A - General Aircraft Description & Assignments
- Section B - Mission Performance
- Section C - Defensive Systems
- Section D - Weapon Systems
- Section E - Achievements / Awards
- Section F - Maintenance Improvements
- Section G - Enhancements / Improvements
- Section H - Logistics Support
- Section I - Incidents / Mishaps

Improvements to the aircraft (Section G). Also included are informative sections on; (Section F) and a Summary (Section H). A listing of OPR's for each section and subjects within that section is provided. These OPR's can be contacted for additional details and support as required.

The introductory section has been expanded to enhance the use of this book. The information in this section is presented in briefing format. Included are; Corporate and Division organizational charts, Mission Statements and Goals.

You will find a small section preceding the Fact Book. It is a brief company profile to acquaint you with Rockwell International, its diverse nature, its leaders, its history, and its pride.

The Fact Book will be updated periodically, new topics will be added as appropriate. The master copy of this document is prepared and maintained by the Research & Engineering Dept. If excerpts are used from these sheets, all elements of the Fact Book format should be removed so that they are not confused with the original document. Use of the Fact Book for purposes other than those specified herein should be approved by Howard Chambers, Vice President Strategic Systems and B-1B Program Manager, North American Aircraft. Suggestions for changes/additions/improvements to this book should be forwarded to: W. Zamboni, or J. Ramirez, Div. 011, Dept., 722, MC SL06, Tels 797-1399 & 797-2096 respectively.
## A. B-1B Aircraft Description

<table>
<thead>
<tr>
<th>Description</th>
<th>Page</th>
<th>OPR</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-1B Aircraft Description</td>
<td>A-1</td>
<td>R. Woods</td>
<td>797-1768</td>
</tr>
<tr>
<td>B-1B Aircraft Assignments</td>
<td>A-2</td>
<td>W. Scott</td>
<td>432-8600</td>
</tr>
<tr>
<td>Tool Disposition</td>
<td>A-3</td>
<td>B. Rhodes</td>
<td>797-2973</td>
</tr>
</tbody>
</table>

## B. Mission Performance

<table>
<thead>
<tr>
<th>Mission</th>
<th>Page</th>
<th>OPR</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIOP Penetration Mission</td>
<td>B-1</td>
<td>T. Logan</td>
<td>797-1809</td>
</tr>
<tr>
<td>SIOP Design Mission Profile</td>
<td>B-2</td>
<td>T. Logan</td>
<td>797-1809</td>
</tr>
<tr>
<td>B-1B Mission Range</td>
<td>B-3</td>
<td>T. Logan</td>
<td>797-1809</td>
</tr>
<tr>
<td>Automatic Terrain Following (ATF) Range</td>
<td>B-4</td>
<td>T. Logan</td>
<td>797-1809</td>
</tr>
<tr>
<td>Automatic Terrain Following (ATF)</td>
<td>B-5</td>
<td>T. Logan</td>
<td>797-1809</td>
</tr>
</tbody>
</table>

## C. Defensive Systems

<table>
<thead>
<tr>
<th>System</th>
<th>Page</th>
<th>OPR</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-1B Penetration Projections</td>
<td>C-1</td>
<td>D. Waller</td>
<td>797-3758</td>
</tr>
<tr>
<td>Defensive Avionics System</td>
<td>C-2</td>
<td>D. Waller</td>
<td>797-3758</td>
</tr>
<tr>
<td>1122 (Technique) Antenna Retrofit Program</td>
<td>C-3</td>
<td>D. Waller</td>
<td>797-3758</td>
</tr>
<tr>
<td>Radar Warning Receiver</td>
<td>C-4</td>
<td>D. Waller</td>
<td>797-3758</td>
</tr>
<tr>
<td>Radar Cross Section</td>
<td>C-5</td>
<td>D. Waller</td>
<td>797-3758</td>
</tr>
<tr>
<td>Anechoic Facility</td>
<td>C-6</td>
<td>D. Waller</td>
<td>797-3758</td>
</tr>
<tr>
<td>COMM / NAV Management System</td>
<td>C-7</td>
<td>D. Waller</td>
<td>797-3758</td>
</tr>
</tbody>
</table>

## D. Weapon Systems

<table>
<thead>
<tr>
<th>System</th>
<th>Page</th>
<th>OPR</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weapons Carriage - Internal</td>
<td>D-1</td>
<td>D. Dang</td>
<td>797-1383</td>
</tr>
<tr>
<td>Weapons Carriage - External</td>
<td>D-2</td>
<td>D. Dang</td>
<td>797-1383</td>
</tr>
<tr>
<td>Weapons / Store Loadouts</td>
<td>D-3</td>
<td>D. Dang</td>
<td>797-1383</td>
</tr>
<tr>
<td>Nuclear Weapons</td>
<td>D-4</td>
<td>D. Dang</td>
<td>797-1383</td>
</tr>
<tr>
<td>Impact of Start I &amp; II on External Hardpoints</td>
<td>D-5</td>
<td>D. Dang</td>
<td>797-1383</td>
</tr>
<tr>
<td>Conventional Weapons</td>
<td>D-6</td>
<td>D. Dang</td>
<td>797-1383</td>
</tr>
<tr>
<td>CMUP Phase I: CBU Integration</td>
<td>D-7</td>
<td>D. Dang</td>
<td>797-1383</td>
</tr>
<tr>
<td>MK-82 Guided Tailkit &amp; Virtual Umbilical (BVUD)</td>
<td>D-8</td>
<td>D. Dang</td>
<td>797-1383</td>
</tr>
</tbody>
</table>
### E. Achievements/Awards

<table>
<thead>
<tr>
<th>Page</th>
<th>OPR</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-1B Achievements</td>
<td>E-1</td>
<td>B. Rhodes</td>
</tr>
<tr>
<td>B-1B Operational Inspections / Evaluations</td>
<td>E-2</td>
<td>R. Pasco</td>
</tr>
<tr>
<td>Manufacturing Productivity Award</td>
<td>E-3</td>
<td>B. Rhodes</td>
</tr>
<tr>
<td>Freedom 1 Flight</td>
<td>E-4</td>
<td>B. Rhodes</td>
</tr>
<tr>
<td>Freedom 2 Flight</td>
<td>E-5</td>
<td>B. Rhodes</td>
</tr>
<tr>
<td>1988 Mackay Trophy</td>
<td>E-6</td>
<td>B. Rhodes</td>
</tr>
<tr>
<td>Bold Crusade Flight</td>
<td>E-7</td>
<td>B. Rhodes</td>
</tr>
<tr>
<td>Coronet Bat Flight</td>
<td>E-8</td>
<td>B. Rhodes</td>
</tr>
<tr>
<td>Time to Climb Records</td>
<td>E-9</td>
<td>M. Metevia</td>
</tr>
<tr>
<td>Competition Results</td>
<td>E-10</td>
<td>K. Russworm</td>
</tr>
</tbody>
</table>

### F. Maintenance Improvements

<table>
<thead>
<tr>
<th>Page</th>
<th>OPR</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel Leak Sealing</td>
<td>F-1</td>
<td>D. Della-Penna</td>
</tr>
<tr>
<td>Central Integrated Test System Maturation</td>
<td>F-2</td>
<td>A. Stelmak</td>
</tr>
<tr>
<td>Wing Spoiler Blocking Valve Manifold</td>
<td>F-3</td>
<td>J. Schmidt</td>
</tr>
<tr>
<td>Four Bolt Flange</td>
<td>F-4</td>
<td>J. Schmidt</td>
</tr>
<tr>
<td>Ejection Seat Thruster</td>
<td>F-5</td>
<td>T. Pitti</td>
</tr>
<tr>
<td>Hatch Remover</td>
<td>F-6</td>
<td>J. Rapp</td>
</tr>
<tr>
<td>Windshield Delamination</td>
<td>F-7</td>
<td>J. Rapp</td>
</tr>
<tr>
<td>Egress System</td>
<td>F-8</td>
<td>A. Erazo</td>
</tr>
<tr>
<td>NLG Uplock Actuator Bellcrank</td>
<td>F-9</td>
<td>R. Binder</td>
</tr>
<tr>
<td>G. Enhancements &amp; Improvements</td>
<td>OPR</td>
<td>Phone</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----</td>
<td>--------</td>
</tr>
<tr>
<td>Enhancements</td>
<td>G-1</td>
<td>K. Lynch 797-3000</td>
</tr>
<tr>
<td>Safety, R&amp;M Improvements</td>
<td>G-2</td>
<td>R. Pasco 797-3252</td>
</tr>
<tr>
<td>Conventional Capability</td>
<td>G-3</td>
<td>K. Lynch 797-3000</td>
</tr>
<tr>
<td>Bird Strike</td>
<td>G-4</td>
<td>R. Woods 797-1768</td>
</tr>
<tr>
<td>Flight Control System</td>
<td>G-5</td>
<td>N. Johnson 797-1755</td>
</tr>
<tr>
<td>Engine Exhaust Nozzle Outer Flaps</td>
<td>G-6</td>
<td>M. Benavides 797-2077</td>
</tr>
<tr>
<td>Engine Ruggedized Fan Blades</td>
<td>G-6</td>
<td>M. Benavides 797-2077</td>
</tr>
<tr>
<td>Crew Turbocompressor Upgrades</td>
<td>G-6</td>
<td>A. Erazo 797-2067</td>
</tr>
<tr>
<td>Generator Control Unit and System Integration Panel Redesign</td>
<td>G-7</td>
<td>B. Eaton 797-2054</td>
</tr>
<tr>
<td>EMUX Sparkle</td>
<td>G-8</td>
<td>J. Eden-Logan 797-3796</td>
</tr>
<tr>
<td>CITS Upgrade</td>
<td>G-9</td>
<td>N. Skillman</td>
</tr>
<tr>
<td>Ejection Seat Horizontal Positioning Actuator</td>
<td>G-10</td>
<td>A. Erazo 797-2067</td>
</tr>
<tr>
<td>Fire Warning and Extinguishing Panel</td>
<td>G-11</td>
<td>A. Erazo 797-2067</td>
</tr>
<tr>
<td>Ejection Seat Load Arrestor</td>
<td>G-12</td>
<td>A. Erazo 797-2067</td>
</tr>
<tr>
<td>MSOGS and Horizontal Situation Indicator (HSI) Electrical Power Sources</td>
<td>G-13</td>
<td>A. Erazo 797-2067</td>
</tr>
<tr>
<td>Short Range Attack Missile II</td>
<td>G-14</td>
<td>A. D'Onofrio 797-2823</td>
</tr>
<tr>
<td>Ice Protection</td>
<td>G-15</td>
<td>M. Benavides 797-2077</td>
</tr>
<tr>
<td>Engine Inlet Ice Protection System</td>
<td>G-16</td>
<td>M. Benavides 797-2077</td>
</tr>
<tr>
<td>Instrument Landing System</td>
<td>G-17</td>
<td>J. Eden-Logan 797-3796</td>
</tr>
<tr>
<td>SCAS Servo Cylinder (Pitch / Roll)</td>
<td>G-18</td>
<td>J. Kaulukukui 797-2074</td>
</tr>
<tr>
<td>Flap / Slat and Controller Redesign</td>
<td>G-19</td>
<td>J. Kaulukukui 797-2074</td>
</tr>
<tr>
<td>Overwing Fairing Modification (FD/FI, SIM)</td>
<td>G-20</td>
<td>D. Spory 797-2928</td>
</tr>
<tr>
<td>A/C Locations Impacted</td>
<td>G-21</td>
<td>J. Yosan 797-2942</td>
</tr>
<tr>
<td>Reliability and Maintainability</td>
<td>G-22</td>
<td>B. Farr 797-2843</td>
</tr>
<tr>
<td>Operational Maturation</td>
<td>G-23</td>
<td>W. Scott 432-8600</td>
</tr>
<tr>
<td>Sorties Flown vs. Sorties Scheduled</td>
<td>G-24</td>
<td>W. Scott 432-8600</td>
</tr>
<tr>
<td>B-1B Service Life</td>
<td>G-25</td>
<td>A. Denyer 797-2825</td>
</tr>
<tr>
<td>B-1B Mission Capable Rate</td>
<td>G-26</td>
<td>R. Pasco 797-3252</td>
</tr>
</tbody>
</table>
## Table Of Contents - OPR LIST (cont.)

<table>
<thead>
<tr>
<th>Page</th>
<th>OPR</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>H. Logistics Support</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operational Support Equipment</td>
<td>H-1</td>
<td>E. Lewis</td>
</tr>
<tr>
<td>Technical Orders</td>
<td>H-2</td>
<td>D. Freasier</td>
</tr>
<tr>
<td>Spare Parts</td>
<td>H-3</td>
<td>J. Romero</td>
</tr>
<tr>
<td>I. Incidents/Mishaps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-1B Flight Safety</td>
<td>I-1</td>
<td>D. Elliot</td>
</tr>
<tr>
<td>La Junta Mishap - A/C 84-0052</td>
<td>I-2</td>
<td>B. Rhodes</td>
</tr>
<tr>
<td>Dyess Mishap - A/C 85-0063</td>
<td>I-3</td>
<td>B. Rhodes</td>
</tr>
<tr>
<td>Ellsworth Mishap - A/C 85-0076</td>
<td>I-4</td>
<td>B. Rhodes</td>
</tr>
<tr>
<td>Wing Sweep Overtravel Incidents - A/C 84-0051</td>
<td>I-5</td>
<td>L. Arkoumanis</td>
</tr>
<tr>
<td>Fuel Tank Rupture Incident - A/C 83-0066</td>
<td>I-6</td>
<td>J. Yosan</td>
</tr>
<tr>
<td>A/C 85-0070 Incident - NLG Extension Failure</td>
<td>I-7</td>
<td>W. Clark</td>
</tr>
<tr>
<td>25 Longeron Repair</td>
<td>I-8</td>
<td>S. Oh</td>
</tr>
<tr>
<td>Main Landing Gear Actuator Mount</td>
<td>I-9</td>
<td>R. Binder</td>
</tr>
<tr>
<td>B-1B Aircraft Grounding</td>
<td>I-10</td>
<td>D. Worcester</td>
</tr>
<tr>
<td>A/C 83-0071 Mishap</td>
<td>I-11</td>
<td>D. Worcester</td>
</tr>
<tr>
<td>A/C 86-0128 Mishap</td>
<td>I-12</td>
<td>D. Worcester</td>
</tr>
<tr>
<td>A/C 86-0114 Aft Equipment Bay Fire</td>
<td>I-13</td>
<td>D. Worcester</td>
</tr>
<tr>
<td>A/C 86-0106 Mishap</td>
<td>I-14</td>
<td>M. Mathews</td>
</tr>
<tr>
<td>A/C 86-0104 ECS Contamination</td>
<td>I-15</td>
<td>P. Wongchinda</td>
</tr>
<tr>
<td>Tail Structural Problem</td>
<td>I-16</td>
<td>J. Rapp</td>
</tr>
</tbody>
</table>
DISTRIBUTION

Adamek, K.     D/725, 011 - OKC
Adams, C.      D/521, 114 - PI08
Anderson, E. L. D/721, 011 - SL23
Andrew, S.     D/164, 011 - SL70
Arkoumanis, L. D/722, 011 - SL06
Bell, R. C.    D/164, 011 - SL70
Bernardin, R.  D/164, 011 - SL70
Bilsing, R. M. D/724, 011 - SK77
Binder, R.     D/722, 011 - SL15
Booth, M.      D/724, 114 - PG13
Bradford, P.   D/722, 011 - SL02
Brown, S.      D/722, 011 - SL30
Butler, J. A.  D/724, 011-HAMP
Carlson, S.    D/521, 114 - PI08
Carver, L.     D/440, 011 - SK77
Chambers, H. E. D/101, 011-SL23
Clanton, R.    D/521, 114 - PI08
Clark, W.      D/722, 011 - SL06
Cocolis, P.    D/764, 001 - WASH
D’Onofrio, A.  D/722, 011 - SL02
Dahlin, G.     D/164, 011 - SL70
Dehnert, R. Col. OC-ALC
Dennis, J. W., Jr. D/724, 001 - WARN
Eakin, G       D/751, 001 - HAMP
Eaton, B.      D/722, 011 - SL06
Eaton, B.      D/722, 011 - SL06
Ecklund, K.    D/521, 114 - PI08
Eden-Logan, J. D/722, 011 - SL25
Elder, K.      D/521, 114 - PI08
Ellis, T.      D/521, 114 - PI27
Erazo, A.      D/722, 011 - SL06
Fekete, K.     D/722, 011 - SL56
Freasier, D.   D/435, 114 - PH51
Freasier, H.   D/725, 011 - OKC
Froman, R.     D/722, 011 - SL25
Furney, R.     D/722, 011 - SL30
Garibay, M.    D/521, 114 - PI08
Gibson, B. Maj DCMO, 011 - SK32
Goduto, T. G.  D/440, 011 - SK77
Green, M.      D/724, 011 - SK77
Grenier, C.    D/521, 114 - PI08
Gulick, L.     D/722, 011 - SL02
<table>
<thead>
<tr>
<th>Name</th>
<th>D/XXXX, YYYY - ZZZZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handler, D.</td>
<td>D/727, 011 - SL27</td>
</tr>
<tr>
<td>Hansen, L.</td>
<td>D/722, 011 - SL15</td>
</tr>
<tr>
<td>Harrison, R. G.</td>
<td>D/722, 011 - SL25</td>
</tr>
<tr>
<td>Helton, C. C.</td>
<td>D/744, 001 - DAYT</td>
</tr>
<tr>
<td>Hendricks, P.</td>
<td>D/723, 011 - SL30</td>
</tr>
<tr>
<td>Herold, W. G.</td>
<td>D/440, 011 - MCAF</td>
</tr>
<tr>
<td>Herrera, L.</td>
<td>D/164, 011 - SL70</td>
</tr>
<tr>
<td>Hibma, R. A.</td>
<td>D/101, 011 - SK73</td>
</tr>
<tr>
<td>Hill, S. W.</td>
<td>D/715, 001 - WASH</td>
</tr>
<tr>
<td>Hollis, M.</td>
<td>D/363, 011 - PI13</td>
</tr>
<tr>
<td>Huff, N.</td>
<td>D/164, 011 - SK63</td>
</tr>
<tr>
<td>Isch, F. C.</td>
<td>D/744, 001 - DAYT</td>
</tr>
<tr>
<td>Jones, C. M.</td>
<td>D/821, 055 - FA68</td>
</tr>
<tr>
<td>Kaulukukui, J.</td>
<td>D/722, 011 - SL06</td>
</tr>
<tr>
<td>Kawabe, D.</td>
<td>D/164, 011 - SL70</td>
</tr>
<tr>
<td>King, B.</td>
<td>D/722, 011 - SL30</td>
</tr>
<tr>
<td>Krouse, K. E.</td>
<td>D/724, 011 - KAFB</td>
</tr>
<tr>
<td>Lang, G.</td>
<td>D/440, 011 - SK77</td>
</tr>
<tr>
<td>Langford, C.</td>
<td>D/724, 011 - SK63</td>
</tr>
<tr>
<td>Lepo, P.</td>
<td>D/521, 114 - PI08</td>
</tr>
<tr>
<td>Lynch, K.</td>
<td>D/722, 011 - SL30</td>
</tr>
<tr>
<td>Marek, V.</td>
<td>D/723, 011 - SL30</td>
</tr>
<tr>
<td>Mathews, J. M.</td>
<td>D/093, 011 - SL34</td>
</tr>
<tr>
<td>Matthews, R. Col.</td>
<td>WPAFB</td>
</tr>
<tr>
<td>Maynes, M.</td>
<td>D/722, 011 - SL23</td>
</tr>
<tr>
<td>Mazourek, G.</td>
<td>D/722, 011 - SL30</td>
</tr>
<tr>
<td>McGinnley, J. Lt. Col.</td>
<td>D/183, 113 - EAFB</td>
</tr>
<tr>
<td>Meeker, D.</td>
<td>D/722, 011 - SL02</td>
</tr>
<tr>
<td>Metevia, M.</td>
<td>D/722, 011 - SL30</td>
</tr>
<tr>
<td>Ming, D.</td>
<td>D/720, 011 - SL30</td>
</tr>
<tr>
<td>Modiest, L.</td>
<td>D/722, 011 - SL02</td>
</tr>
<tr>
<td>Norfleet, J.</td>
<td>D/521, 114 - PI08</td>
</tr>
<tr>
<td>O'Brien, M.</td>
<td>D/723, 114 - PI59</td>
</tr>
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<td>D/722, 011 - SL06</td>
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<td>Parke, R.</td>
<td>D/722, 011 - SL56</td>
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<td>Parks, L.</td>
<td>D/521, 114 - PI08</td>
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<tr>
<td>Pasco, R.</td>
<td>D/440, 011 - SK77</td>
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<td>Ralston, J.</td>
<td>Gen (Sel.) - HQ ACC</td>
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<td>Ramirez, J.</td>
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<td>Romero, J.</td>
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<td>Rosenthal, J.</td>
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<td>Ruder, D.</td>
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<td>Scruggs, S.</td>
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<td>Skillman, N.</td>
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<td>Zinn, D.</td>
<td>751</td>
</tr>
</tbody>
</table>
A. B-1B AIRCRAFT DESCRIPTION
Subject:  B-1B AIRCRAFT DESCRIPTION

The B-1B, a multi-role bomber, is designed to function as a flexible asset in the ACC strategic Single Integrated Operational Plan (SIOP). The aircraft is designed to stand alert for up to 30 days with a minimum of maintenance and be airborne within minutes of a scramble order. The aircraft is fully self contained and can be operated from remote locations.

The B-1B is capable of operation in a nuclear weapons environment (overpressure, thermal flash and radiation, electromagnetic pulse and transient radiation effects).

While designed as a penetrator, the aircraft can handle a variety of conventional munitions and nuclear weapons missions.

This swing-wing aircraft is equipped with four General Electric F-101-GE-102 afterburning turbojet engines, extensive offensive and defensive avionics systems and an onboard central integrated test system.

- **PERFORMANCE**
  
  Mach 1.2 at altitude  
  Mach .95 at sea level

- **ENGINES**
  
  General Electric (4)  
  F101-GE-102  
  Thrust (sea level static) 30,700 lb. (ea.)

- **WEIGHTS (LB.)**
  
  Maximum Taxi 477,000  
  Maximum Flight 477,000  
  Maximum Payload 133,800  
  Internal 75,000  
  External 58,800  
  Weight Empty 186,807

- **30 YEAR SERVICE LIFE**
# Geometric Data

<table>
<thead>
<tr>
<th>Item</th>
<th>Wing Fwd Pos</th>
<th>Wing Aft Pos</th>
<th>Horizontal Tail Total</th>
<th>Vertical Tail Total</th>
<th>Structural Mode Ctrl</th>
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<tr>
<td>Area ~ sq. ft</td>
<td>1946.0</td>
<td>1946.0</td>
<td>509.0</td>
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<td>Aspect Ratio</td>
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<td>3.14</td>
<td>3.95</td>
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<td>Taper Ratio</td>
<td>.35</td>
<td>---</td>
<td>.30</td>
<td>.30</td>
<td>.20</td>
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<td>Thickness Ratio</td>
<td>REF: LINES DRAWINGS</td>
<td>.07 Root 04 Tip</td>
<td>.10 Root .03 ZF126 TO TIP</td>
<td>.05</td>
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<td>Airfoil Section</td>
<td>NA 69-190-2 IIB-2.1.1</td>
<td>MDDP 902101</td>
<td>MDDP 902201</td>
<td>MDDP 902802</td>
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<tr>
<td>Leading Edge Sweep</td>
<td>15.0</td>
<td>67.5</td>
<td>42.5</td>
<td>45 AT .25C</td>
<td>60</td>
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<td>Dihedral Angle</td>
<td>-1.94</td>
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<td>0</td>
<td>---</td>
<td>-30.0</td>
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<tr>
<td>Incidence Angle</td>
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<td>0 TIP</td>
<td>---</td>
<td>---</td>
<td>DEFL - 20.0</td>
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<td>Mac Length ~ inches</td>
<td>184.053</td>
<td>---</td>
<td>149.385</td>
<td>188.954</td>
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<tr>
<td>Mac Loc ~ inches</td>
<td>344.2327</td>
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<td>110.373</td>
<td>84.825</td>
<td>12.511 TRUE</td>
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## Control Surface Data

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<tr>
<th>Item</th>
<th>Flap</th>
<th>Spoiler</th>
<th>Slat</th>
<th>Rudder</th>
<th>Horiz. Tail</th>
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<tbody>
<tr>
<td>Type</td>
<td>Single Slotted</td>
<td>Upper Surface Only</td>
<td>Powered</td>
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<td>All Movable</td>
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<tr>
<td>Area ~ sq. feet</td>
<td>310.38</td>
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<td>Deflection</td>
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<td>0 TO 70 UP</td>
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## Landing Gear Data

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<th>Item</th>
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<th>Auxiliary</th>
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<tr>
<td>Tire Size &amp; Type</td>
<td>B46 X 16.0 - 23.5 TWIN TANDEM</td>
<td>35 X 11.5 - TWIN</td>
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<tr>
<td>Ply Rating</td>
<td>30</td>
<td>24</td>
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<tr>
<td>Rolling Radius ~ inches</td>
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<td>Flat Radius ~ inches</td>
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<td>Strut ~ Total Stroke ~ in</td>
<td>16.50</td>
<td>21.0</td>
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<td>Strut-Static To Compressed</td>
<td>3.5</td>
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## Propulsion Data

**Four General Electric F101-GE-102 Engines**
## B-1B Aircraft Assignments

<table>
<thead>
<tr>
<th>45 A/C Dyess AFB</th>
<th>26 A/C Ellsworth AFB</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2) 83-0065</td>
<td>(42) 85-0082</td>
</tr>
<tr>
<td>(3) 83-0066</td>
<td>(60) 86-0100</td>
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<tr>
<td>(4) 83-0067</td>
<td>(61) 86-0101</td>
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<td>(5) 83-0068</td>
<td>(63) 86-0103</td>
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<td>(6) 83-0069</td>
<td>(65) 86-0105</td>
</tr>
<tr>
<td>(7) 83-0070</td>
<td>(67) 86-0107</td>
</tr>
<tr>
<td>(8) 83-0071</td>
<td>(68) 86-0108</td>
</tr>
<tr>
<td>(10) 84-0050</td>
<td>(69) 86-0109</td>
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<td>(11) 84-0051</td>
<td>(70) 86-0110</td>
</tr>
<tr>
<td>(13) 84-0053</td>
<td>(72) 86-0112</td>
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<td>(14) 84-0054</td>
<td>(77) 86-0117</td>
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<td>(15) 84-0055</td>
<td>(79) 86-0119</td>
</tr>
<tr>
<td>(16) 84-0056</td>
<td>(80) 86-0120</td>
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<td>(17) 84-0057</td>
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<td>(18) 84-0058</td>
<td>(83) 86-0123</td>
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<td>(19) 85-0059</td>
<td>(84) 86-0124</td>
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<td>(22) 85-0062</td>
<td>(86) 86-0126</td>
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<td>(25) 85-0065</td>
<td>(90) 86-0130</td>
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<td>(34) 85-0074</td>
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### A/C Manufactured in Lots

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<thead>
<tr>
<th>A/C Manufactured in Lots</th>
<th>11 A/C McConnell AG</th>
<th>11 A/C GSU Det 34 Ellsworth</th>
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<tbody>
<tr>
<td>Lot I - A/C 1 Only</td>
<td>(20) 85-0060</td>
<td>(51) 85-0091</td>
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<td>Lot II - A/C 2 thru 8</td>
<td>(24) 85-0064</td>
<td>(57) 86-0097</td>
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<td>Lot III - A/C 9 thru 18</td>
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<td>(64) 86-0104</td>
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<td>Lot IV- A/C 19 thru 52</td>
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<td>(76) 86-0116</td>
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<td>Lot V-A/C 53 thru 100</td>
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<td>(34) 85-0074</td>
<td>(81) 86-0121</td>
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### GAANG - Georgia Air
- National Guard to be equipped with B-1B’s in the near Future
  - (60) 86-0100 (91) 86-0131
  - (61) 86-0101 (94) 86-0134
  - (63) 86-0103 (98) 86-0138
  - (65) 86-0105 (99) 86-0139

### A/C Lost in Accidents with Brief Explanation

<table>
<thead>
<tr>
<th>A/C Lost in Accidents with Brief Explanation</th>
<th>2 A/C Edwards AFB</th>
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</thead>
<tbody>
<tr>
<td>(12) 84-0052 --Lost 09-25-87 @ La Junta, Colorado</td>
<td></td>
</tr>
<tr>
<td>(23) 85-0063 --Lost 11-09-88 @ Dyess AFB, Texas</td>
<td>(9) 84-0049</td>
</tr>
<tr>
<td>(36) 85-0076 --Lost 11-17-89 @ Ellsworth AFB S.D.</td>
<td>(28) 85-0068</td>
</tr>
<tr>
<td>(66) 86-0106 --Lost 12-01-92 @ I-165, Van Horne TX</td>
<td></td>
</tr>
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</table>
Subject: TOOL DISPOSITION

Background:

During peak production of the B-1B in the mid-1980s, a total of approximately 167,000 production tools were being utilized by Rockwell (the B-1B airframe contractor) or suppliers. When the last production B-1B 86-0140 (100) was delivered in April 1988, a carefully planned procedure was implemented. This plan provided for:

(a) Storage of all critical tooling deemed essential for after-production needs, including battle damage repair, structural modifications required by changing mission needs, and spares.

(b) Keep most expensive tooling and only discard tooling that can be replaced quickly and inexpensively.

(c) Retain long lead time tooling that would require a substantial period of time to rebuild.

(d) A portion of the non-dimensional special tooling was sent to Air Force operational and maintenance bases and the balance was scrapped. This category includes such items as work platform ramps around aircraft and large cargo containers for shipping major subassemblies.

Facts:

As a result of the implementation of the above plan, approximately 57 percent of peak production tooling was retained in government storage and at Rockwell or suppliers; however, this retained tooling represents 80 percent of the total value (cost) of all B-1B tooling and includes all of the long lead time tooling. Additional tooling that may be required would only represent 20 percent of overall tooling value and this supplemental tooling required could also be made quickly. A total of 96,000 tools are currently available with 66,000 in Government storage; and 30,000 at Rockwell and suppliers. This is illustrated in the following figure.

Status:

Tools not in Government storage or use are available as contingency tooling or spares:

MOST B-1B TOOLING IS IN STORAGE AND AVAILABLE TO SUPPORT MODIFICATIONS
B. MISSION PERFORMANCE
Subject: SIOP PENETRATION MISSION

Background:
The B-1B is part of the Single Integrated Operational Plan (SIOP) which allocates strategic assets to specific targets. The B-1B SIOP penetration mission profile consists of four phases: Takeoff and Cruise; Penetration and Weapon Delivery; Withdrawal; and Recovery.

Takeoff for SIOP missions occur from continental U.S. bases. Cruise length is variable depending on the target and mission and is accomplished at best cruise altitude with inflight refueling as required. At penetration, the B-1B descends to 200 feet AGL and accelerates to a minimum of 0.85 Mach. Withdrawal is accomplished at the same altitude at a minimum of 0.55 Mach. Recovery for a SIOP mission occurs at a non-U.S. base and may include a climb to cruise altitude as necessary.

The exact penetration distance flown varies with the specific category of B-1B mission. Mission flexibility is afforded with the carriage of internal fuel in any or all of the weapon bays through the installation of non-jettisonable, cylindrical fuel tanks. For the longest missions, two bays may be loaded with fuel and only one bay with weapons.

The SIOP penetration mission is one of five Specification Missions for the B-1B used as a design reference. The other four being Shoot-Pen, Standoff, World Wide Power Phase I, and World Wide Power Phase. The penetration mission is most commonly used for mission analysis at this time.

Table B-1: SIOP Mission Specification Requirements with 24 SRAM-A Carried Internally

<table>
<thead>
<tr>
<th>Parametric</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Takeoff gross weight</td>
<td>433,406 lbs.</td>
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<tr>
<td>Takeoff fuel</td>
<td>187,560 lbs.</td>
</tr>
<tr>
<td>Payload</td>
<td>53,040 lbs.</td>
</tr>
<tr>
<td>Operating weight (less fuel &amp; payload)</td>
<td>192,806 lbs.</td>
</tr>
<tr>
<td>Calculated range</td>
<td>5,903 n.miles</td>
</tr>
<tr>
<td>Specification range requirement</td>
<td>5,886 n.miles</td>
</tr>
</tbody>
</table>

Status:
The existing fleet of B-1B aircraft is capable of meeting the range and payload requirements for the SIOP penetration mission.
Figure B-1: SIOP DESIGN MISSION PROFILE

- **Optimum Cruise**
- **MIL PWR Climb**
- **KC-135A Buddy Refuel**
- **B-1B Contract Requirement = 5886 N MI**
- **B-1B Status Range Capability = 5903 N MI**
- **500 N MI Recovery**
- **1000 N MI Penetration**

B-B NOTEBOOK-7/20/95
Subject: B-1B MISSION RANGE

The B-1B has been evaluated for the performance of several types of missions. Several of these missions are described in the following table to illustrate the mission flexibility and performance of the B-1B. The Single Integrated Operational Plan (SIOP) Specification Mission, a primary strategic mission of the B-1B, is included as reference.

<table>
<thead>
<tr>
<th>Mission</th>
<th>Profile</th>
<th>Weapons</th>
<th>Refueler</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spec SIOP</td>
<td>Hi-Lo-Hi</td>
<td>24 SRAM A</td>
<td>KC-135A</td>
<td>5903 NM</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>KC-135R</td>
<td>6360 NM</td>
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<td></td>
<td></td>
<td></td>
<td>KC-10A</td>
<td>7358 NM</td>
</tr>
<tr>
<td>Conventional</td>
<td>Hi-Lo-Hi</td>
<td>56 MK82</td>
<td>KC-135R</td>
<td>8400 NM</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>KC-10A</td>
<td>9466 NM</td>
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<tr>
<td>ACM Standoff</td>
<td>Hi</td>
<td>16 ACM</td>
<td>NONE</td>
<td>4425 NM</td>
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<td></td>
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<td>KC-135R</td>
<td>5430 NM*</td>
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<tr>
<td>Penetration</td>
<td>Hi-Lo-Lo</td>
<td>16 SRAM A</td>
<td>KC-10A</td>
<td>5963 NM*</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>2 x KC-135R</td>
<td>7220 NM*</td>
</tr>
</tbody>
</table>

* Includes 3016 NM at 200 feet and .85 Mach
The B-1B has the capability to perform ATF for very long distances. The distance has increased considerably since the program began.

Further increases in range can be achieved through the addition of external fuel tanks or through the decrease in wing sweep during the penetration phases of a mission. While these enhancements have been studied in some detail, there are currently no plans for implementation.

**Today (SEF Aircraft)**

- 0.85M, 67.5 degree sweep 3016 NM
- 0.55M-0.85M, 55-67.5-degree sweep 3905 NM

**Enhancements**

- 0.45M-0.85M, 35-67.5 degree sweep 4200 NM
  - plus
  - External Fuel Tanks (six 1000 gallon) 4670 NM
Subject: AUTOMATIC TERRAIN FOLLOWING

Background:
The B-1B's survivability when penetrating defenses will depend in part on its ability to fly low to avoid radar detection. Therefore, the B-1B is equipped with Terrain Following and Terrain Avoidance radar modes.

The B-1B is designed to fly in an Automatic Terrain Following (ATF) mode at 200 feet above ground level, in all weather, and at night. The B-1B incorporates several ATF modes. One mode, known as "hard ride," closely follows terrain contours and is intended for use in high threat environments. "Soft ride" does not approximate the contour of the ground as closely, providing a smoother flight.

The ATF function produced frequent false fly-up signals during initial use by operational air-crews. As a result, the Air Force suspended ATF training until software modifications were made and tested.

After ATF software modification testing and the B-1B bird strike modification (refer to Bird Strike, page G-4), low-level training was resumed in 1989.

Facts:
The current ATF hardware with block 4.5 software is a fully functional and tested ATF system which meets the ACC mission requirement for both hard and soft rides.

ACC air-crews are routinely using the ATF system to train for combat missions.

EARLY ATF PROBLEMS SOLVED, SYSTEM WORKS WELL