FOOT-POUND

ADS-40A-SP
13 March 2000
CAGE Code 18876

AERONAUTICAL DESIGN STANDARD

STANDARD PRACTICE

AIR VEHICLE FLIGHT PERFORMANCE DESCRIPTION

AMSC N/A

ADS-40A-SP

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AIR VEHICLE FLIGHT PERFORMANCE DESCRIPTION

UNITED STATES ARMY AVIATION AND MISSILE COMMAND

AVIATION ENGINEERING DIRECTORATE

REDSTONE ARSENAL, ALABAMA

FUNCTIONAL DIVISION: _____

SUBMITTED BY: _____
Barry J. Baskett
Director of Aviation
Engineering

APPROVED BY: _____
Dr. Larry O. Daniel
AMCOM and PEO, Aviation
Standards Executive

DATE: MAR 13 2000

Certification Record

Board Date: 06 march 2000

Document Identifier and Title:

ADS-40A-SP, Aeronautical Design Standard, Standard Practice, Air Vehicle Flight Performance Description

Rationale for Certification:

Decision:

General Type	**Decision (√)**	**Certification**
Specification		Performance
		Detail
Standard		Interface Standard
	X	Standard Practice
		Design Standard
		Test Method Standard
		Process Standard
Handbook		Handbook (non-mandatory use)
Alternative Action		

	Concur	Nonconcur	Date
Division Chief Samuel T. Crews	√		7 March 2000
AMCOM Standardization Branch Chief William J. Smith	√		8 March 2000
Director, Aviation Engineering Barry J. Bassett	√		7 Mar 2000
AMCOM and PEO, Aviation Standards Executive Dr. Larry O. Daniel	√		13 MAY 00

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1. SCOPE

This Standard Practice Aeronautical Design Standard specifies the flight performance data required to document the characteristics and capabilities of an air vehicle. It is the purpose of this standard to provide a clear and complete documentation of the air vehicle flight performance at a level of detail which is consistent with the current stage of design/development of the aircraft. The data requirements are divided into three levels: Level I, Level II, and Level III. Level I (the minimum requirement) addresses the level of detail which would be available during the late conceptual design or early preliminary design stage of the air vehicle. Level II addresses the level of detail which would be available during the late preliminary design or early detailed design stage. Level III addresses the level of detail which would be available during the late detailed design or flight test stage. Each level is intended to be consistent with the corresponding level in ADS-10C-SP, Air Vehicle Technical Description Selected sections of this standard may be added to or deleted. This standard is intended to prescribe a minimum quality of documentation at each Level.

1.1 Purpose. This Standard Practice Aeronautical Design Standard is a communications tool. It provides a standard set of data requirements to provide documentation of air vehicle flight performance. This standard contains a set of requirements designed to be tailored for each contract by the contracting agency. The tailoring process intended for this standard is the deletion of non-applicable requirements.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, and 5 of this standard. This section does not include documents cited in other sections of this standard or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, documents users are cautioned that they must meet all specified requirements documents cited in sections 3, 4, and 5 of this standard, whether or not they are listed.

2.2 Government documents. The following Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

ADS-10C-SP Aeronautical Design Standard, Air Vehicle Technical Description

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in

this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. DEFINITIONS

3.1 Acronyms.

AEO	All Engines Operative
AEI	All Engines Inoperative
C_D	Isolated Rotor Propulsive Force (Drag) Coefficient (wind axis)
C_H	Isolated Rotor Propulsive Force Coefficient (shaft axis)
C_L	Isolated Rotor Lift Coefficient (wind axis)
C_N	Yawing Moment Coefficient
C_P	Engine Power or Rotor Power Coefficient
C_{Pc}	Engine Power Coefficient required for VROC.
C_{Ph}	Engine Power Coefficient required for HOGE.
C_T	Isolated Rotor Thrust Coefficient (along shaft)
C_W	Air Vehicle Weight Coefficient
CDRL	Contract Data Requirements List
CP	Contingency Power (2.5-minute limit in OEI conditions)
ECU	Environmental Control Unit
FM	Figure of Merit
GPV	Generalized Power Variation: $(C_{Ph}-C_{Pc})/(0.707*C_W^{1.5})$
HOGE	Hover Out of Ground Effect
HIGE	Hover in Ground Effect
IAW	In Accordance With
IGE	In Ground Effect (Height above ground measured from extended landing gear)
IRP	Intermediate Rated Power (30-minute limit)
KTAS	Knots True Airspeed
L/D_e	Ratio of Lift to Equivalent Drag (Total Air Vehicle)
MAGW	Maximum Alternate Gross Weight
MCP	Maximum Continuous Power
MRP	Maximum Rated Power (10-minute limit)
N_r	Rotor RPM
OEI	One Engine Inoperative
OGE	Out of Ground Effect
PMGW	Primary Mission Gross Weight
r	Main Rotor Local Radius
R	Main Rotor Radius
ROC	Rate of Climb
ROD	Rate of Descent
SDGW	Structural Design Gross Weight
SL	Sea Level

SLS	Sea Level, Standard temperature
TOGW	Take-Off Gross Weight
V	Airspeed
V_{BE}	Airspeed for best endurance: the airspeed for minimum fuel flow.
V_{BR}	Airspeed for 99% of best range (high side): the higher of the two airspeeds at which the value of specific range is 99% of its maximum (i.e., measured on the "high side" of the maximum).
VROC	Vertical Rate of Climb
V_{climb}	Airspeed for Best Rate of Climb
V_T	Rotor Tip Speed
VVR	Vertical Velocity Ratio: VROC/(ΩR*sqrt(C_W/2))
α_s	Main Rotor shaft angle with respect to wind.
α_{tpp}	Main Rotor tip path plane angle w.r.t. wind.
μ	Advance Ratio, V/ΩR
θ	Temperature Ratio
Ω	Rotor Rotational Speed
π	Pi
ρ	Air Density
σ	Geometric rotor solidity
σ_T	Thrust-weighted rotor solidity

3.2 Nondimensionalization.

Dimensional forces shall be nondimensionalized by:

$$\rho*\pi R^2*(\Omega R)^2;$$

Dimensional moments shall be nondimensionalized by:

$$\rho*\pi R^3*(\Omega R)^2;$$

Dimensional power shall be nondimensionalized by:

$$\rho*\pi R^2*(\Omega R)^3.$$

4. GENERAL REQUIREMENTS

4.1 General.

4.1.1 Documentation content. The data shall be documented as specified in this standard. (See 6.2.) The documentation shall include the following elements in the following order: Summary, Table of Contents, List of Figures, List of Tables, the main body, List of References and Appendices (if any).

4.1.2 Documentation media. The complete documentation shall be provided in the

media as specified in the contract. (See 6.2.)

4.1.3 Graphs and tables. Graphs and tables shall be presented in a manner that depict and delineate the results of the documented data.

a. If a graph has been constructed based on experimental information then the data points shall be included in symbol format.

b. Where accuracy would be enhanced and facilitated, equations for plotted curves shall be documented.

c. The scales and grids used on graphs shall facilitate interpolation and reading of data directly from the graphs.

d. The layout of graphs shall facilitate comparisons between graphs. In general, this means that all graphs which show a particular parameter shall use the exact same scale for that parameter. As a specific example, all graphs with airspeed on the x-axis and power on the y-axis shall use the same ranges and physical lengths for each axis so that graphs can be physically overlaid to compare data.

e. Tables shall be provided when more detail than can be documented in graphic presentations is desired, and also, to provide certain types of computer inputs or single point factors. As with graphic data, the exact format of the table shall be a function of the variables to be tabulated. For points representing a function, there shall be enough points tabulated to allow linear interpolation between points without introducing significant errors.

4.2 Configuration definition. At a minimum, data requested for a "range of weights and/or drag values or coefficients" shall include the following:

a. The range of weights (or the corresponding weight coefficients) shall include the minimum and the maximum flying weights for the stated atmospheric conditions.

b. The range of drag values (or the corresponding drag coefficients) shall include the minimum ("clean") and maximum ("dirty") drag configurations which are intended for the operation of the aircraft as defined by the system specification; it is expected that the minimum and maximum shall be a function of air vehicle weight (i.e., there is limit as to how clean a heavy aircraft can be and how dirty a light aircraft can be).

c. The values of weight coefficients used and the increment between them shall be "rounded" and "convenient" numbers (e.g., weights and their increments end in two zeros). The same concept shall apply to drag values/coefficients.

4.3 Units and sign conventions.

a. The units for data documented shall conform to the following guidelines: all data typically or historically presented to the pilot in English or nautical units (e.g. altitude, rate of climb, airspeed) shall be given in that set of units; all other parameters shall be given in metric units.

b. The sign conventions for all forces and moments shall be defined and illustrated in the data documentation.

4.4 Nondimensional data. Nondimensional flight performance information shall be documented in the form of a baseline carpet plot at a constant $N_r/\sqrt{\theta}$ and accessory load in a specified condition for a range of C_W or C_L which is sufficient to derive gross weight values from the minimum to maximum flying weights for ambient temperatures from -5° C to 35° C and pressure altitudes from sea level to 10000 ft. Compressibility effects shall be shown in the form of additional carpet plots at sufficient values of constant $N_r/\sqrt{\theta}$ to represent the above temperature range. The effects of drag shall be shown in the form of carpet plots at the baseline $N_r/\sqrt{\theta}$ for a sufficient number of configurations.

4.5 Rotor speeds. For Levels I and II, all dimensional flight performance shall be documented for normal or design rotor speed (power on or off, as appropriate). For Level III, the dimensional documentation shall also include other allowable rotor speeds (autorotation and special cruise etc.).

4.6 Substantiation. The documentation shall include a substantiation of the origin and accuracy of the flight performance data documented therein. The depth of substantiation shall be commensurate with the Level which is specified for the documentation. At a minimum, substantiation shall include a description of the methodology used to produce the data with specific reference to analytical techniques (to include actual input data and a short description), wind tunnel data, and/or flight test data, as applicable, with corrections explained in detail. The substantiation documentation shall be included in the same section with the related specific flight performance information required by this standard.

5. DETAILED REQUIREMENTS

5.1 Isolated nondimensional main rotor flight performance.

5.1.1 Vertical flight.

5.1.1.1 Level I. Isolated main rotor Figure of Merit (FM) vs blade-loading coefficient (C_T/σ) for OGE and 35° C conditions shall be provided.

5.1.1.2 Level II. All Level I data plus the isolated main rotor thrust coefficient (C_T) vs isolated main rotor power coefficient (C_P) in Hover Out of Ground Effect (HOGE), Hover In Ground Effect (HIGE) and Vertical Rate of Climb (VROC) Out of Ground Effect (OGE) of 500 ft/min conditions shall be provided for 35° C (HIGE data shall be based on a rotor-hub to ground-plane distance equivalent to the air vehicle hovering with the extended landing gear height equal to 5 ft).

5.1.1.3 Level III. In addition to all Level II information, a complete description of rotor performance from HIGE at 2 ft landing gear height up to HOGE shall be provided. The variation of C_P with Mach number shall be documented for HOGE. Also, induced velocity (nondimensionalized by average momentum velocity) at the rotor blade shall be documented as a function of r/R for 3 C_T's.

5.1.2 Forward flight.

5.1.2.1 Level I. Data shall be documented for the rotor state at PMGW and 4000 ft/ 95° and MAGW at 2000 ft/ 70° C to show the ratio of main rotor lift to equivalent main rotor drag (L/D_e) as a function of advance ratio, (μ). The rotor Lift and details of the D_e calculation shall be documented in tabular form.

5.1.2.2 Level II. In addition to the Level I requirements, isolated rotor power coefficient, C_P/σ as a function of isolated main rotor lift (C_L/σ) and propulsive (C_D/σ) force coefficients for μ= 0.20, 0.30 and 0.40 and three rotor shaft angles (α_s= 0.0°, 5.0° and 10.0° forward) shall be documented for 35° C. The main rotor side force shall be that which is required to counteract the force produced by that required of the anti-torque system.

5.1.2.3 Level III. All Level II data shall be documented to include the rotor tip path plane angle (α_{tpp}) for each condition. In addition, the variation of isolated rotor performance with advancing tip Mach number shall also be documented.

5.2 Isolated nondimensional anti-torque system. If the ability of parts of the system to produce anti-torque is inherently linked to the system being installed on the air vehicle, then data shall be documented for that part of the system installed on the air vehicle; in addition, data shall be documented for any part of the system that can be analyzed as isolated.

5.2.1 Level I. Anti-torque system power coefficient C_P, (nondimensionalized using main rotor parameters) vs main rotor power coefficient (C_P) shall be documented for both HOGE and HIGE (5 ft) conditions, for 500 fpm VROC, and for the range of advance ratios (μ).

5.2.2 Level II. All Level I data plus data for the anti-torque system C_T and/or yawing moment coefficient C_N, as appropriate, as a function of anti-torque system power coefficient C_P, shall be provided for the air vehicle in right sidewards flight (OGE) for velocities of 15, 30 and 45 KTAS as well as for HOGE.

5.2.3 Level III. All Level II data plus data for the anti-torque system C_T and/or yawing moment coefficient C_N, as appropriate, shall be documented as a function of anti-torque system power coefficient C_P, and cockpit yaw control and component control position for the air vehicle at all permissible airspeeds and heading/ sideslip angles. At airspeeds at or below the maximum lateral and rearward airspeeds, data shall be provided at airspeed increments of 15 KTAS or less and heading angle increments of 30 degrees or less; the airspeed/heading combination which is most critical in terms of power requirements shall be identified. At airspeeds above the maximum lateral airspeed, data shall be documented at sideslip angle increments of 5 degrees or less up to the limits of the sideslip envelope.

5.3 Installed engine performance.

5.3.1 Power available at engine output shaft. Data shall be documented for the installed power available at Maximum Continuous Power (MCP), Intermediate Rated Power (IRP), and Maximum Rated Power (MRP) with All Engines Operating (AEO) and at Contingency Power (CP) with One Engine Inoperative (OEI) for the stated conditions. A breakdown of the engine installation losses from each source (e.g. engine inlet, engine bleed air, accessory pad, particle separator, exhaust system) shall be provided.

5.3.1.1 Level I. Installed power available at zero airspeed for Standard Day, 21° C Day, and 35° C Day shall be provided for SL to 10000 ft pressure altitude.

5.3.1.2 Level II. The information provided in Level I shall be augmented to include installed static power available for altitudes between 0 and at least 12000 ft for Standard Day and for temperatures between -5° F and 120° F (increments of 25° F so that data at 70° F and 95° F are specifically included). For air vehicle configurations that cruise more efficiently (better nautical miles per pound of fuel) at altitudes above 12000 ft, data shall be provided up to those pressure altitudes.

5.3.1.3 Level III. The information provided in Level II shall be augmented to include installed power available at representative forward speeds.

5.3.2 Other engine parameters.

5.3.2.1 Level I. Fuel flow at SLS, 2000 ft/21° C, and 4000 ft/35° C, for power settings at static conditions between idle and MRP (e.g., idle, 50% MCP, 75% MCP, MCP, IRP, MRP) shall be provided. Fuel flow data shall include a 5% margin for conservatism.

5.3.2.2 Level II. All Level I data plus data for fuel flow, net engine jet thrust, and momentum drag vs power setting and airspeed for the range of altitudes and temperatures of Paragraph 5.3.1.2 shall be provided.

5.3.2.3 Level III. In addition to all Level II data, details shall be documented on sources of momentum drag to include mass flows and momentum recovery efficiency for each significant contributor to momentum drag.

5.4 Air vehicle vertical flight performance.

5.4.1 Total power required.

5.4.1.1 Level I. Total air vehicle Figure of Merit (FM) vs normalized weight coefficient (C_W/σ) for OGE conditions at 35° C shall be provided.

5.4.1.2 Level II. All Level I data plus data for engine power coefficient, C_P/σ, vs air vehicle weight coefficient, C_W/σ, for HOGE, HIGE (5 ft), and 500 ft/min VROC shall be documented for 35° C. VROC capability at 95% IRP, 95% MRP, and MRP vs gross weight at 2000 ft/21° C and 4000 ft/35° C shall be furnished for the range of weights. The Generalized Power Variation (GPV) shall be documented as a function of Vertical Velocity Ratio (VVR).

5.4.1.3 Level III. In addition to the Level II information, the same parameters shall be documented for 6000 ft/35° C. Also, enough non-dimensional information shall be documented to determine the variation of air vehicle hover flight performance between 2 ft extended landing gear wheel height and OGE. In addition, the variation of HOGE C_P/σ with main rotor tip Mach number shall be documented for the range of C_W/σ.

5.4.2 Download.

5.4.2.1 Level I. Download at HOGE shall be provided as a percentage of gross weight for PMGW at 4000 ft/35° C and for MAGW at 2000 ft/21° C.

5.4.2.2 Level II. For the same cases as in Level I, the downwash velocities at the fuselage waterline used as a reference point for determination of the vertical drag shall be shown as a function of station line. The reference drag, area and any other force contribution (engine exhaust, tail boom induced drag, etc.) used for determination of download shall also be provided. The variation of download as a percentage of gross weight for the series of possible HOGE Gross Weights shall be provided for the Level I atmospheres.

5.4.2.3 Level III. All Level II data plus download in HIGE (5 ft wheel height) shall be documented.

5.4.3 Altitude capability.

5.4.3.1 Level I. Vertical flight altitude capability shall be documented for HIGE (5-ft), HOGE, and 500 fpm VROC at 95% IRP and 95% MRP (AEO) as a function of gross weight for Standard Day conditions at pressure altitudes from 0 to at least 10000 ft and for 21° C Day and 35° C Day conditions at pressure altitudes from 0 to at least 8000 ft.

5.4.3.2 Level II. All Level I data plus data at power settings of MRP with AEO and CP with OEI shall be documented.

5.4.3.3 Level III. The same information as Level II shall be documented.

5.5 Air vehicle forward flight performance.

5.5.1 Level flight performance.

5.5.1.1 Level I. Documentation of the ratio of air vehicle Gross Weight to equivalent drag ($GW/D_{e,}$) (based on engine power required) vs advance ratio (μ) shall be provided. Data shall be documented for PMGW at 4000 ft/ 35° C and MAGW at 2000 ft/ 21° C. In addition, documentation of dimensional level flight performance shall be provided which includes: total engine power required, Specific Range and power available (MCP, IRP, MRP, CP @ OEI and transmission limit) as a function of true airspeed at 2000 ft/21° C and 4000 ft/ 35° C. The documentation shall include a range of gross weights at a baseline drag level. A list of the specified configuration gross weights and their incremental drag difference from the baseline shall appear on the documentation. Instructions (which may include an auxiliary plot) to permit a drag correction calculation for the specific configurations, shall be included. The documentation shall also include lines which show V_{BE} and V_{BR}.

5.5.1.2 Level II. All Level I nondimensional data plus the engine power coefficient (C_P) vs gross weight coefficient (C_W) shall be provided for the range of advance ratios (μ) and air vehicle parasite drag areas at 35° C. All Level I dimensional information plus that for specific configurations (weight, drag, etc.) as described in the referencing RFP shall also be provided. If more detail than that documented in ADS-10C-SP is required to describe the derivation and buildup of the air vehicle lift, drag and moment, then it shall be included here.

5.5.1.3 Level III. All Level II plus dimensional information for 6000 ft/ 95° C shall be provided.

5.5.2 Rate of climb.

5.5.2.1 Level I. No Rate of Climb (ROC) information is required.

5.5.2.2 Level II. The ROC capability shall be provided at the airspeed for best climb velocity (V_{climb}) vs gross weight for SLS, 2000 ft/21° C, and 4000 ft/35°C conditions using MCP, IRP, and MRP with AEO for the range of weight and drag configurations.

5.5.2.3 Level III. All Level II data plus data at 6000 ft/35° C and 8000 ft/35° C shall be provided.

5.5.3 Ceiling.

5.5.3.1 Level I. Ceilings shall be documented for OEI forward flight at MCP, IRP, MRP, and CP as a function of gross weight for Standard Day conditions at pressure altitudes from 0 to at least 10000 ft and for 21° C Day and 35° C Day conditions at pressure altitudes from 0 to at least 8000 ft. OEI forward flight ceiling shall be defined as the maximum altitude at which a 100 ft/min ROC can be maintained over a 40 KTAS airspeed range.

5.5.3.2 Level II. In addition to all Level I data, forward flight ceilings at MCP and IRP with AEO shall be documented as a function of gross weight for Standard Day, 21° C Day, and 35° C Day conditions. AEO forward flight ceiling shall be defined as the maximum altitude at which a 100 ft/min ROC can be maintained at V_{climb}.

5.5.3.3 Level III. Level II information shall be documented.

5.5.4 Rate of descent.

5.5.4.1 Level I. No Rate of Descent (ROD) information is required.

5.5.4.2 Level II. Autorotative ROD vs V shall be provided at 2000 ft/21° C for MAGW and 4000 ft/35° C at PMGW.

5.5.4.3 Level III. In addition to Level II information, Height/ Velocity diagrams shall be provided for SLS, 4000 ft/35° C and 5000 ft/ 5° C at Structural Design Gross Weight (SDGW) and MAGW for OEI and AEI. The descent conditions which determine the height/ velocity envelopes shall be described.

5.6 Power breakdown.

5.6.1 Non-rotor power required (at engine output shaft). Non-rotor power required shall be defined as power required at the engine output shaft less main rotor and anti-torque power. It shall include such items as drive system, electrical system, hydraulic system, ECU, etc.

5.6.1.1 Level I. Total non-rotor power required as a function of operating condition shall be documented. As a minimum, data shall be provided for all normal operating conditions that have a significant effect (e.g., engine power used, rotor speed, air density) on non-rotor power required.

5.6.1.2 Level II. All Level I data shall be documented plus a detailed breakdown of non-rotor power required by source (e.g., stages of transmission, electrical power effeciency).

5.6.1.3 Level III. Level II information shall be presented.

5.6.2 Rotor power required.

5.6.2.1 Level I. No data required.

5.6.2.2 Level II. Dimensional and nondimensional power required at the engine output shaft shall be provided as a function of V for PMGW, at 4000 ft/35° C showing the breakdown of power into at least the following categories: main rotor, anti-torque system, drive system, accessories, etc. The main rotor category shall include subcategories of induced (including the effects of non-uniform inflow), profile, parasite, and non-ideal (where non-ideal includes stall and compressibility, preferably as separate categories, and excludes the effects of non-uniform inflow).

5.6.2.3 Level III. Level II information shall be documented.

5.7 Mission flight performance.

5.7.1 Tactical missions.

5.7.1.1 Level I. A mission description, for each specified in the document which cites this standard, shall be included. At a minimum, the description shall include the following for each mission leg:

a. Type of mission activity (HOGE, HIGE, Cruise, Reserve etc.) and atmospheric condition (pressure altitude and free air temperature).

b. Gross Weight at mission leg start and associated VROC capability (if HOGE mission activity).

c. Forward flight velocity and duration.

d. Ordnance load or cargo load.

e. Fuel flow, mission leg fuel and specific range.

f. Total power required and power available.

h. Rate of Climb OEI at V_{climb} for cruise legs of Self-Deployment mission, if applicable.

5.7.1.2 Level II. Level I information shall be documented.

5.7.1.3 Level III. Level II information shall be documented.

5.7.2 Mission radius.

5.7.2.1 Level I. Mission radius as a function of expendable ordnance or cargo shall be shown for gross weight at HOGE conditions and 100% takeoff power for the Primary mission profile with a variable mission radius (cruise out equals cruise back). The warm-up, battle station approach and departure (HOGE/NOE), battle station and reserve legs shall be the same as the specified Primary Tactical mission. The Mission radius information shall be shown for 2000 ft/21° C and 4000 ft/35° C.

5.7.2.2 Level II. Level I information shall be documented.

5.7.2.3 Level III. Level II information shall be documented.

5.8 Maneuvering flight performance.

5.8.1 Required maneuvers.

5.8.1.1 Level I. Time histories of the maneuvers referenced in the document which cites this standard shall be documented. As a minimum, the maneuvers shall be described using the following parameters as functions of time: Flight path airspeed; Air Vehicle X, Y, and Z position with respect to the ground; Air Vehicle pitch, roll, and heading angles; Air Vehicle pitch, roll, and yaw rates; Rotor speed; Rotor shaft power; Engine power required and available; Power available from speed/altitude loss; Air Vehicle normal load factor at center of gravity. In addition, control positions (preferably those in the cockpit) are desired, if available.

5.8.1.2 Level II. Level I information shall be documented.

5.8.1.3 Level III. Level II information shall be documented.

5.8.2 Longitudinal acceleration.

5.8.2.1 Level I. Maximum longitudinal acceleration and deceleration capability and corresponding fuselage attitude for conditions of constant altitude using MRP shall be documented as a function of V at a light, medium, and heavy gross weight for 2000 ft/21° C, and 4000 ft/35° C.

5.8.2.2 Level II. Level I information shall be documented.

5.8.2.3 Level III. Level II information shall be documented.

5.8.3 Sustained load factor.

5.8.3.1 Level I. Maximum $C_{W/\sigma}$ capability vs μ at both a representative Primary and Maximum Alternate configuration shall be shown for a sustained flight condition where no change of airspeed and/or altitude is used as additional energy for the maneuver. Limit considerations such as rotor control system endurance loads, sustained maneuver tip path plane pitch rate, vibration levels and stability shall be stated.

5.8.3.2 Level II. In addition to Level I information, normal load factor, turn rate and turn radius as a function of V shall be documented for a Light, Primary, and Maximum Alternate Mission Configuration at MRP or drive system power limit for 2000 ft/21° C, and 4000 ft/35° C.

5.8.3.3 Level III. Level II information shall be documented.

5.8.4 Transient load factor.

5.8.4.1 Level I. Maximum C_W/σ as a function of μ shall be documented for a Primary and Maximum Alternate configuration for a transient maneuver condition. The Air Vehicle transient capability is defined as that level which can be maintained or sustained for up to 3 seconds. If this level of C_W/σ is different than that for the sustained condition (5.8.3.1), then the limiting factors shall be stated.

5.8.4.2 Level II. In addition to Level I information, the Maximum transient normal load factor shall be documented as a function of V for a light, Primary, and Maximum Alternate configuration at 2000 ft/21° C and 4000 ft/35° C for MRP or drive system power levels. Airspeed and altitude loss/gain required shall be shown as well as entry airspeed and rotor tip path plane pitch rate.

5.8.4.3 Level III. Level II information shall be provided.

5.8.5 Decelerating turn.

5.8.5.1 Level I. Flight path deceleration in a constant-altitude turn due to maximum transient normal load factor shall be documented as a function of V for a light, Primary, and Maximum Alternate configuration at 2000 ft/21° C, and 4000 ft/35° C conditions. The corresponding turn rate and radius plus fuselage pitch and roll attitudes are also desired.

5.8.5.2 Level II. Level I documentation shall be provided.

5.8.5.3 Level III. Level II documentation shall be provided.

5.8.6 Lateral acceleration.

5.8.6.1 Level I. Lateral acceleration capability vs VROC for PMGW configuration at 4000 ft/ 35° C and MAGW configuration 2000 ft/ 21° C conditions using MRP or drive system limit shall be shown.

5.8.6.2 Level II. In addition to Level I documentation, data for IRP shall be provided.

5.8.6.3 Level III. Level II documentation shall be provided.

5.9 Directional control capability.

5.9.1 Level I. For 2000 ft/ 21° C and 4000 ft/35° C, the allowable wind velocity as a function of azimuth shall be shown for the applicable handling qualities control margin for a representative Primary and Alternate Configuration.

5.9.2 Level II. Level I documentation shall be shown also for the required maximum landing slope.

5.9.3 Level III. Level II documentation shall be provided.

6. NOTES

6.1 Application of weights and configuration. The weights and configurations referenced in this document are defined IAW the System Specification against which this standard is being applied.

6.2 Documentation media. The data required from this standard should be listed on the Contract Data Requirements List (DD Form 1423) when this standard is applied on a contract, in order to obtain the data, except where DFARS subpart 227.405-70 exempts the requirements for a DD Form 1423.