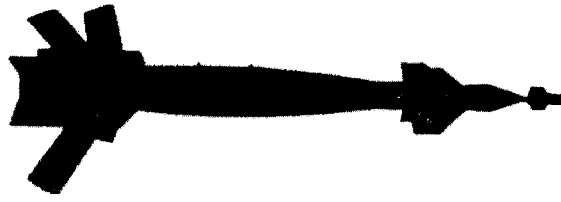
PAVEWAY II
LASER GUIDED BOMB
BID QUALIFICATION PLAN



3 July 2000

Revision A

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Approved by: _____ 4/26/00
US Navy Date

Revision Page

Revision A; 3 July 2000

	Page	Paragraph	Change/Correction .....
1.	4	1.7, Table	Loss of Acquisition Phase changed from 3 to 2.
2.	5	1.7	The word "expected" deleted.
3.	5	3.1	Wording added "by the offeror".
4.	5	3.2	Wording changed to "A report will be provided to the Government on phase 2 testing results."
5.	8	4.23	Wording added "a slant range of 16,000 feet slant range and .."
6.	8	4.25	Paragraph numbering corrected.
7.	9	4.31.3	Wording changed from "and" to "or". Wording added " by the offeror".
8.	10	4.32.2	Paragraph numbering corrected.
9.	12	5.1	Add "4.31.3".

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PAVEWAY II
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BID QUALIFICATION PLAN

1.0 OVERVIEW

1.1 Scope

This plan covers efforts necessary to qualify a potential producer to bid as a source supplier for GBU-10, GBU-12 and GBU-16 Laser Guided Bombs. GBUs (Guided Bomb Units) are purchased as kits consisting of one each Computer Control Group (CCG) and one each Airfoil Group prepackaged in containers of specified design. Kits shall be form, fit, and function compatible to current existing inventories. For bid purposes, scope is limited to GBU-16s only. This qualification plan is designed to demonstrate offeror's competency to bid on Paveway II procurements.

1.2 Background

The Paveway II Laser-guided bombs have been the weapon of choice in conflicts dating back to the Viet Nam war. They were extensively used in the Persian Gulf conflict and in Kosovo.

1.3 Program Title

The program title for this effort is the PAVEWAY II Laser Guided Bomb Bid Qualification Program. The purpose of this document is to define the design qualification and verification requirements for an offeror's performance based Laser Guided Bomb Guidance kit equivalent in form, fit and function to the current Paveway II weapon system.

1.3.1 Offeror's Responsibility

Upon offeror receipt of this document, it shall be the offeror's responsibility to respond back to the government with specific plans, schedules and procedures as to how they will accomplish this qualification plan.

1.4 Precedence:

In the event of a conflict between the text of this document and the references cited herein, the Paveway II Performance Specification takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

Note: all Paveway II performance specifications shall be complied with, tested and performed.

1.5 Applicable Documents

Performance Specification for Laser Guided Bomb Weapon System	Document Number AS 6192
Paveway Security Classification Guide	dated 1 May 98

1.6 Program Objectives

This Laser Guided Bomb (LGB) qualification program is designed to demonstrate that the offeror meets the requirements of the Laser Guided Bomb Weapon LGB Performance Specification. In particular, the qualification program will verify that the LGB:

a) Is a form, fit and function alternative, i.e., comparable size, weight, shape, moments of inertia, to the currently supplied LGBs;

b) Can be employed by all aircraft currently authorized to carry and release LGBs without changes to currently held flight clearance limits;

c) Shall provide acquisition, terminal accuracy and performance in accordance with the requirements of the LGB Performance Specification

d) Shall not impact LGB logistics systems, equipment, procedures and aircrew training

e) Shall operate within environmental conditions and limitations specified in LGB Performance Specification

f) Shall meet system reliability and shelf life requirements as stated in the LGB Performance Specification.

g) Shall operate with the existing Paveway test set, the TTU-373, with no logistical or software changes required to the test set.

1.7 Qualification Schedule

The qualification program involves three separate phases: Phase 1 - Qualification Analysis, Phase 2 - Qualification Ground Test and Phase 3 - Qualification Flight Test. The qualification program has been designed to allow parallel testing, where possible, in order to minimize the time required for qualification. The following Table depicts the requirements by paragraph of the LGB Performance Specification and shows in which phase of the Qualification Test program they will be verified. Other tests will be performed as necessary. The offeror shall provide a detailed qualification schedule. . Detailed test plans and procedures shall be written for each phase by the offeror and provided to the Government.

Spec Para.	Description	Qual Phase
3.4.1	Aircraft Installation Interface	Phase 2
3.4.2	Activating Lanyards	Phase 2
3.4.3	Bomb Mechanical Interface	Phase 1 & 2
3.4.4	Bomb Electrical Interface	Phase 2
3.4.5	Code Selection Switches	Phase 2
3.4.6	TTU-373 Test Interface	Phase 2
3.4.7	Laser Designator Interface	Phase 3
3.6.2	Preflight Readiness Testing	Phase 3
3.6.2	Radiated Susceptibility and Compatibility	Phase 2
3.6.3	Radiated Emissions	Phase 2
3.6.3	Code Selection	Phase 1 & 2
3.6.4	Aircraft Upload/Download	Phase 2
3.6.5	Captive Carriage	Phase 3
3.6.7	Safe Separation and Jettison	Phase 3
3.6.8	Release Envelopes	Phase 3
3.6.9	Weapon Activation	Phase 2
3.6.9.1	Allowable Delivery Modes	Phase 3
3.6.9.2	Weapon Arming	Phase 2
3.6.9.3	Operating Time	Phase 2
3.6.10.1	Laser Code	Phase 2
3.6.10.2	Acquisition Range	Phase 3
3.6.10.3	Sensitivity	Phase 2
3.6.10.4	Field of Regard	Phase 2
3.6.10.5	Pulse Width Discrimination	Phase 2
3.6.10.6	Multi-Laser Environment	Phase 2
3.6.11	Terminal Guidance	Phase 3
3.6.11.1	Loss of Acquisition	Phase 2
3.6.11.2	Terminal Impact Accuracy	Phase 3
3.7.1	High Temperature	Phase 2
3.7.2	Low Temperature	Phase 2
3.7.3	Temperature-Altitude	Phase 2
3.7.4	Temperature-Shock	Phase 2
3.7.5	Rain	Phase 2
3.7.6	Dust	Phase 2
3.7.7	Fungus	Phase 2
3.7.8	Salt Laden Atmosphere	Phase 2
3.7.9	Humidity	Phase 2
3.7.10	Explosive Atmosphere	Phase 2
3.7.11	Vibration	Phase 2
3.7.12	Mechanical Shock	Phase 2
3.7.13	Acceleration	Phase 2
3.7.14	Immersion	Phase 2

3.7.15	Electromagnetic Environments	Phase 2
3.8.1	Stores Compatibility	Phase 1
3.8.2	Portability Requirements	Phase 1
3.9.1	Mass and Center of Gravity	Phase 1 & 2
3.9.2	Dimensions	Phase 1 & 2
3.10.1	Out-Of-The-Box Reliability	Phase 1 & 3
3.10.2	Guidance and Control Reliability	Phase 3
3.10.3	Coding Reliability	Phase 1
3.10.4	AFG Reliability	Phase 1 & 2
3.10.5	Mean Time Between Failures	Phase 2
3.11	Maintainability	Phase 1 & 2
3.11.4	Air Carriage Life	Phase 2 & 3
3.12	Human Factors Engineering	Phase 1 & 2
3.13	Interchangeability	Phase 1 & 2
3.14	Safety	Phase 1
3.14.3	Fuze Activation	Phase 1
3.14.4	Hazard Protection	Phase 1
3.14.5	Personnel Hazard	Phase 1

A report describing the tests conducted and the results shall be provided at the conclusion of each phase. Quick look reports outlining performance observed may be provided for each flight demonstration mission. A consolidated final qualification report is to be provided with the offeror's proposal.

1.8 Security Classification/Data Protection

The Paveway Security Classification Guide will be used as guidance for protecting information and materials pertaining to the Paveway laser guided weapons.

2.0 General Description

The Paveway II LGB weapon systems (GBU-10, 12, and 16) are a laser guided component built system. The components consist of:

Bomb: MK-82, MK-83, MK-84 and BLU-109
Guidance Units
Air Foil Groups

Each system shall be capable of being used with various aircraft, designators, personnel, and tactics as defined in this Qualification Plan and in the Performance Specification.

2.1 Interchangeability

LGB components shall be form, fit and function replacements for existing PAVEWAY II system level components.

3.0 QUALIFICATION TESTING

3.1 Phase 1 Qualification Analysis

Phase 1 consists of offeror-conducted analyses and evaluations conducted at the offeror's plant or other qualified location. The purpose of this phase is to determine whether the offeror's LGB is able to meet the LGB Performance Specification to include but not limited to electrical, structural, safety and aerodynamic data and analysis. Paragraph numbers in parentheses are references to the paragraph requirements contained within the LGB Performance Specification. Detailed test procedures shall be written for these tests by the offeror.

3.2 Phase 2 Qualification Ground Test

Phase 2 consists of offeror-conducted compliance demonstrations conducted primarily at the offeror's facility or a qualified subcontract laboratory. The purpose of this phase is to demonstrate that the offeror's LGB fully complies with all aspects of the LGB Performance Specification that can be verified without flight-testing. A report will be provided to the Government on phase 2 results of testing.

3.3 Phase 3 - Qualification Flight Test

Phase 3 consists of offeror-conducted compliance demonstrations, which may be conducted at Government facilities such as Naval Air Warfare Center (NAWC) China Lake, California or other areas. The purpose of this phase is to demonstrate that the offeror's LGB fully complies with all aspects of the LGB Performance Specification that can be verified through flight-testing. Unless otherwise stated, structural analysis, using MIL-A-8591H methods as a guide, load and vibration tests, and inspections of the GBU shall be performed prior to flight test demonstration.

4.0 PERFORMANCE SPECIFICATION QUALIFICATION

4.1 Aircraft Installation Interface (Performance Specification 3.4.1)

By analysis it will be shown that the LGB uses the correct suspension lug (MS 3314 for the MK82/MK 83 or MK3 Mod 0 lug for the MK84). This will be accomplished during Phase 2.

4.2 Activating Lanyards (Performance Specification 3.4.2)

By analysis it will be shown that the LGB has separate lanyards to activate the CCG, AFG and any ordnance subsystems. By demonstration it will be shown that separate lanyards are used when mounted on the host aircraft and lanyards have the same performance criteria as the current LGB. This will be accomplished during Phase 2.

4.3 Bomb Mechanical Interface (Performance Specification 3.4.3)

By demonstration it will be shown that the offeror's CCG can be attached to the front of the bomb using a forward adapter contained in the AFG and the AFG can be attached to the rear of the bomb as can the current CCG and AFG. It will be demonstrated that arming wire can be routed to the fuze assembly through the wing assembly of the AFG. The offeror shall provide tolerance analysis data for the CCG to bomb interface and for the AFG to bomb interface. This will be accomplished during Phase 1 and 2.

4.4 Bomb Electrical Interface (Performance Specification 3.4.4)

By analysis it will be demonstrated that there is no electrical interface between the CCG, and the AFG. This will be accomplished during Phase 2.

4.5 Code Select Switches (Performance Specification 3.4.5)

By testing it will be shown that LGB Code Select Switches, and control of the short, long and last pulse logic are provided to identify the laser code which the LGB shall acquire. This will be accomplished during Phase 2.

4.5.1 Long and Short Last-Pulse-Logic (Performance Specification 3.6.10.7)

Long and Short Last-Pulse-Logic (LPL) shall be controllable using the Code Select means. The guidance electronics shall include the option to select Long LPL enable gate of 30.0 –3, +5 microseconds, or a Short LPL enable gate of 1.0 ± 0.5 microseconds. This will be accomplished during Phase 2.

4.6 Code Correlation/Missing Pulse Logic (Performance Specification 3.6.10.8)

A valid PRF code sequence shall be correlated and acquisition shall be generated by receipt of the 7th but not prior to the 4th consecutive valid code pulse, for any valid code (Ref: AFAL-TR-73-400). Guidance commands shall be generated upon receipt of the first valid code pulse after acquisition has occurred. This shall be accomplished in phase 2.

4.7 Interpulse Period Stability (Performance Specification 3.6.9)

A code sequence shall be correlated if the following interpulse period stability conditions are met:

a. +5.0 +/- 0.5 microseconds and –5.0 +/- 0.5 microseconds variation from the selected interval when averaged over three or any larger number of intervals.

b. +12.0 +/-1.0 microseconds and –12 +/- 1.0 microseconds maximum variation from the selected interval for any single interval.

This shall be accomplished in phase 2.

4.8 TTU-373 Test Interface (Performance Specification 3.4.6)

By demonstration it will be shown that the LGB is testable with a Government Paveway Digital Test Set (TTU-373). The offeror will be provided access to a TTU-373 at Hill Air Force Base, Utah on a non-interference basis. The offeror's guidance and seeker section shall be compatible and test successfully with the TTU-373 test set. No modifications to the test set will be required for testing of the offeror's guidance and seeker sections on the TTU-373.This will be accomplished during Phase 2.

4.9 Laser Designator Interface (Performance Specification 3.4.7)

By demonstration it will be shown that the LGB will acquire and guide on a Government provided laser designator with the minimum characteristics called out in Table II of the Performance Specification. This will be accomplished during Phase 3.

4.10 Preflight Readiness Testing (Performance Specification 3.6.2)

By demonstration it will be shown that the LGB does not require preflight readiness testing other than physical inspection of the bomb and safing equipment once mounted on the host aircraft. This will be accomplished during Phase 3.

4.11 Radiated Susceptibility and Compatibility (Performance Specification 3.7.15)

By analysis, testing and demonstration, the offeror shall show their GBU is capable of meeting the performance requirements of the performance specification while being subjected to electromagnetic interference as specified in MIL-STD-461, paragraphs 3.2.3 and 3.2.4.3 and as modified by Performance Specification paragraph 3.6.2. This will be accomplished during Phase 2.

4.12 Radiated Emissions (Performance Specification 3.7.15)

By analysis, testing and demonstration, the offeror shall show their GBU is capable of meeting the performance requirements of the performance specification while being tested for radiated emissions as specified in MIL-STD-461, paragraphs figures 2-9 and 2-10, curve 2. This will be accomplished during Phase 2.

4.13 Code Selection (Performance Specification 3.6.3)

It shall be demonstrated by analysis and testing that codes are available to be set into the guidance unit and that the code settings can be set while the LGB is mounted on the host aircraft. This will be accomplished during Phase 1.

4.14 Aircraft Upload/Download (Performance Specification 3.6.4)

An LGB will be assembled and uploaded/downloaded on an F/A-18 to demonstrate compatibility with the host aircraft and the standard ordnance handling, transport, and loading equipment. This will be accomplished during Phase 2.

4.15 Captive Carriage (Performance Specification 3.6.5)

Capability to operate within the flight envelopes specified will be demonstrated by, in-flight loads and structural integrity flight test as defined byMIL-A-8591H and modified by Figures 1 through 6 and figure 10 of the Performance Specification. This will be accomplished during Phase 3. Use of Navy Aircraft shall require coordination with the Navy PMA 201office.

4.16 Safe Separation and Jettison (Performance Specification 3.6.7)

By analysis it shall be shown that the LGB weight, center of gravity, and dimensions are equal to the existing LGB's thus precluding any problems with safe separation and jettison of the weapon from the host aircraft. During flight test it will be verified that the LGB shall not impact the launch aircraft when carried, ejected, or jettisoned in accordance with the conditions for carriage and release within the limits shown in Figures 1 through 6 and figure 10 of the Performance Specification. It will be demonstrated that

the offeror's LGB will maintain the canards in a trail mode until aircraft separation delay (1.5 seconds) and laser acquisition is achieved. This will be accomplished during Phase 3.

4.17 Release Envelopes (Performance Specification 3.6.8)

It shall be demonstrated during flight test the LGB can be released within the release envelopes defined by the performance specification and the envelopes defined in this Qualification Plan. This will be accomplished during Phase 3.

4.18 Weapon Activation (Performance Specification 3.6.9)

By examination it shall be shown that the LGB does not require power, initialization data, or commands from the launch aircraft and that the LGB is activated by lanyard pull during ejection. It shall be demonstrated that the lanyard's pull force on the aircraft shall not exceed 300 pounds each and that the lanyards require a minimum of 40 pounds each for activation. This will be accomplished during Phase 2.

4.19 Allowable Delivery Modes (Performance Specification 3.6.9.1)

The capability for the LGB for level and dive releases shall be verified during flight-testing. This shall be accomplished during Phase 3.

4.20 Weapon Arming (Performance Specification 3.6.9.2)

By examination it shall be shown that the LGB ordnance subsystems (fuze, bomb, and other detonation components) are armed by only lanyard pull and operate autonomously. This shall be accomplished during Phase 2.

4.21 Operating Time (performance Specification 3.6.9.3)

It shall be verified by demonstration that the LGB will operate for a minimum of 60 seconds. This shall be accomplished during Phase 2.

4.22 Laser Code (Performance Specification 3.6.10.1)

It shall be shown through test and demonstration that the LGB will acquire and guide on targets illuminated with the standard USAF and STANAG 3733 Band I codes as set on the code select switches. This will be accomplished during Phase 2.

4.23 Acquisition Range (Performance Specification 3.6.10.2)

A test will be performed to show acquisition of a target with a slant range of 16,000 feet, a minimum of 0.9 reflectivity and with a minimum visibility of 15 nautical miles. This will be accomplished during Phase 3.

4.24 Sensitivity (Performance Specification 3.6.10.3)

It shall be demonstrated that the LGB has a sensitivity level between 100 and 1000 nano-watts per square centimeter at the detector dome when illuminated with a laser light source as defined in the Performance Specification paragraph 3.4.7. This will be accomplished during Phase 2.

4.25 Dynamic Range (Performance Specification 3.6.10.10)

When the sensitivity level has been established as described in paragraph 4.24, the power level of the laser light source shall be increased by a factor of 2 x 10 to the 5th power or 53 dB steps. The CCG shall maintain acquisition throughout the dynamic range. This shall be accomplished in phase 2.

4.26 Field of Regard (Performance Specification 3.6.10.4)

Testing will show that the LGB has a field of regard of 38 +10, -4 degrees relative to its velocity vector. This will be accomplished during Phase 2.

4.27 Pulse Width Discrimination (Performance Specification 3.6.10.5)

The ability to detect and discriminate against a suitable laser pulse of more than 325 nanoseconds will be demonstrated in a laboratory test. It shall be shown that acquisition will occur when a

light source with a maximum pulse width of 100 nanoseconds, as defined at the half power points, is detected within the field of view of the CCG. Acquisition shall not occur when a light source has a pulse width greater than 325 nanoseconds. This will be accomplished during Phase 2.

4.28 Multi-Laser Environment (Performance Specification 3.6.10.6)

A laboratory demonstration will be conducted showing the LGB's ability to operate in an environment with the number of lasers as specified in paragraph 3.6.10.6 of the Performance Specification within the seeker's field. The GBU's shall acquire and guide on the properly designated target in accordance with the Code Select Switches in an environment containing multiply designated targets as specified in the performance specification. This shall be demonstrated through analysis and demonstration. This will be accomplished during Phase 2.

4.29 Terminal Guidance (Performance Specification 3.6.11)

During flight testing it will be shown that the LGB will guide the designated target until impact with the LGB generating canard commands to guide to the target. This shall be accomplished during Phase 3.

4.30 Loss of Acquisition (Performance Specification 3.6.11.1)

It shall be demonstrated that in the event acquisition of the designated target has been lost, the LGB will initiate a ballistic trajectory. This will be accomplished during Phase 2.

4.31 Terminal Impact Accuracy (Performance Specification 3.6.11.2)

4.31.1 A ground-based laser designator will be used to provide target designation. Radar data and time-space-position equipment may be used on each release to analyze item performance. Chase aircraft photography may be utilized to film AFG deployment, bomb separation and for safety of the test aircraft. Meteorological data such as wind direction; speed and ambient temperature will be collected for the area during the time of the missions.

4.31.2 The results of this phase will demonstrate that the offeror's LGB meets the Circular Error Probable (CEP) requirement of 30 feet or better as called out in the LGB Performance Specification. For the purpose of CEP performance evaluation the following definitions shall hold.

1. The CEP of that specified accuracy population sample shall be defined as the median bomb impact distance found at the 50% point on a plot of cumulative percent versus miss distance.

2. No-tests which shall always be excluded from the accuracy population, shall be defined to include weapons dropped where:
    a. Weapon is released outside of envelope.

4.31.3 Hardware-in-the-loop (HITL) testing or 6 Degree-of-freedom (DOF) simulation analysis shall be generated by the offeror for each release condition prior to actual weapon release. All of paragraph 4.31 shall be accomplished during Phase 3.

4.32 Environments (Performance Specification 3.7.1 through 3.7.14)

Production representative offeror LGB's will be tested and verified in accordance with the following environmental tests in accordance with MIL-STD-810 and the Performance Specification:

a. High Temperature
b. Low Temperature
c. Temperature-Altitude
d. Temperature Shock
e. Rain
f. Dust
g. Fungus
i. Salt Laden Atmosphere
j. Humidity
k. Explosive Atmosphere
l. Vibration
m. Mechanical Shock
n. Acceleration (CCG Only)

o. Immersion

4.32.1 Each AFG shall have the following performance characteristics at room ambient temperature unless otherwise stated for the above environmental tests:

4.32.2 Wing Latch Release Force (Performance Specification 3.6.12.1)

The force required to release the wing latch shall not be less than 40 pounds and not greater than 80 pounds.

4.32.3 The offeror's Air Foil Group (AFG) shall provide identical access and visibility to tail fuzes as provided by existing items.

4.32.4 Wing Opening Time (Performance Specification 3.6.12.3)

The minimum time required for the four (4) wings of the wing assembly to travel from the folded and locked position upon latch release to the fully deployed position of 70 ± 5 degrees from the centerline of the wing assembly shall be 0.5 seconds. The maximum time limits required for the four (4) wings to travel from the folded and locked position upon latch release to and angle of 60 degrees from the centerline of the wing assembly shall be as listed below:

Temperature	Time
-55 degrees C	4.0 seconds
Room Temp (20 – 26 degrees C)	1.6 seconds
+ 72 degrees C	1.6 seconds

All of paragraph 4.32 shall be accomplished during Phase 2.

4.33 Stores Compatibility (Performance Specification 3.8.1)

By analysis it will be shown that the LGB complies with the stores compatibility requirements of MIL-STD-1289A as a guide and requires no modifications to the fuzes or bombs. This will be accomplished during Phase 1.

4.34 Portability Requirements (Performance Specification 3.8.2)

It will be demonstrated that the assembled CCG is two man portable and that the assembled wing assemblies is four man portable. This will be accomplished during Phase 1.

4.35 Mass and Center of Gravity (Performance Specification 3.9.1)

The physical characteristics of each kit component will be measured and compared to the appropriate Performance Specification requirements to determine their conformity. Tables 5 and 6 of the Performance Specification shall be used as guidelines. Variations in nominal mass properties shall be in accordance with MIL-HDBK-244. This will be accomplished during Phase 2.

4.36 Dimensions (Performance Specification 3.9.2)

The physical characteristics of each kit component will be measured and compared to the appropriate Performance Specification requirements to determine their conformity. Figures 11 through 13 of the Performance Specification shall be used as guidelines. This will be accomplished during Phase 1and 2.

4.37 Out of the Box Reliability (Performance Specification 3.10.1)

By analysis it shall be shown that the CCG will pass mission readiness testing on the Paveway Digital Test Set (TTU-373) with a probability of 0.96. Preflight testing shall be accomplished prior to flight to verify the 0.96 probability. This shall be accomplished during Phase 1 and 3.

4.38 Guidance and Control Reliability (Performance Specification 3.10.2)

By analysis it shall be shown that the CCG has a probability of 0.96 of surviving the period from out of box testing until impact without failure. This will be accomplished during Phase 1. It will also be demonstrated during the flight testing of Phase 3.

4.39 Coding Reliability (Performance Specification 3.10.3)

It will be shown by analysis that the coding reliability will be 0.995. This will be accomplished during Phase 1.

4.40 AFG Reliability (Performance Specification 3.10.4)

It will be shown by analysis and demonstration that the AFG reliability for proper wing opening time is 0.99 percent. This will be accomplished during Phase 1and 2.

4.41 Maintainability (Performance Specification 3.11)

A maintainability assessment will be conducted by analysis to determine that the LGB kit has been designed consistent with the current maintenance concepts. Analysis shall show minimum maintenance and repair time is required and shelf life and service life requirements will be achieved. This will be accomplished during Phase 1and 2.

4.42 Air Carriage Life (Performance Specification 3.11.4)

It shall be determined by flight testing, environmental testing and analysis that the LGB shall remain safe and meet its performance specifications for a minimum air carriage life of 20 hours. This will be accomplished during Phase 2 and 3.

4.43 Human Factors Engineering (Performance Specification 3.12)

It will be demonstrated that inspection, installation or removal of the fuze is possible without removal of the AFG. Analysis will be used to ascertain that normal weapon support activities can be performed while wearing normally used protective or severe weather clothing. This will be accomplished during Phase 1and 2.

4.44 Interchangeability (Performance Specification 3.13)

It shall be demonstrated by analysis and demonstration that all CCG's and AFG's are interchangeable and replaceable with each other and that the offeror's CCG and AFG are interchangeable with the existing CCG and AFG. This will be accomplished during Phase 1 and 2. These interchangeable parts include but are not limited to the following:

a. CCG
b. Air Foil Group
c. Forward Adapter
d. Containers
e. Fuze retainer nuts
f. Arming lanyards
g. Fins
h. Fasteners/screws/nuts/pins
i. Weapon build-up/Special tooling
j. Technical Orders
k. Fuze seal nut, clamp ring, retainer bolt

4.45 Safety (Performance Specification 3.14)

It shall be shown by analysis the probability that the GBU may possess a single point failure, which would give rise to damage that prevents the aircraft from completing its missions, shall be less that 10^{-6}

4.46 Reusable Container

An assembled CCG will be loaded into Government provided reusable container CNU-288/E or CNU-317/E to demonstrate that the offeror CCG can be stored and retrieved in all respects as the existing MAU-169. The MXU-667 will be loaded into the MXU-667 metal drum (NSN 8140-01-224-2798) to demonstrate they can be stored and retrieved in all aspects as the existing AFG's. Capability to be stored in the existing containers will demonstrate the units can be transported worldwide the same as the existing units. This will be accomplished during Phase 2.

4.47 Stress Analysis

A structural stress analysis shall be performed on the offeror LGB kits. The analysis will be conducted in accordance with the latest version of MIL-A-8591 and the structural requirements of the Performance Specification. This will be accomplished during Phase 1 and 2.

4.48 Auto Tracking Threshold (Performance Specification 3.6.10.11)

The contractor shall demonstrate that in the event of multiple laser return signals which are a result of overspill and/or underspill of laser energy about the target, the CCG shall incorporate a tracking threshold which inhibits tracking of any laser return signal with a peak level less than 5% of the largest signal within the LPL Enable gate. But, shall always track the last pulse within the LPL Enable gate, providing that the peak pulse level is greater than 12.5% of the largest return signal within the gate. If the last pulse peak level is between 5% and 12.5% of the largest signal within the LPL Enable gate, the CCG shall track either pulse. The above requirements assume that return pulses are above the minimum noise tracking threshold. This shall be accomplished in phase 2.

5.0 Flight Envelopes

5.1 Success Criteria:

Success shall be determined by using the CEP definition of paragraph 4.31.2. All 20 drops must meet the requirements of paragraph 4.31.2 and match the 6 DOF flight path simulation of paragraph 4.31.3

5.2 Aircraft and Range Use

The F/A-18 aircraft shall be used for all drops called out in this qualification plan. The offeror shall be responsible for scheduling and coordinating all aircraft and range times and usage.

The following tables and figures outline the total number of drops required for qualification.

GBU-16
DROPS

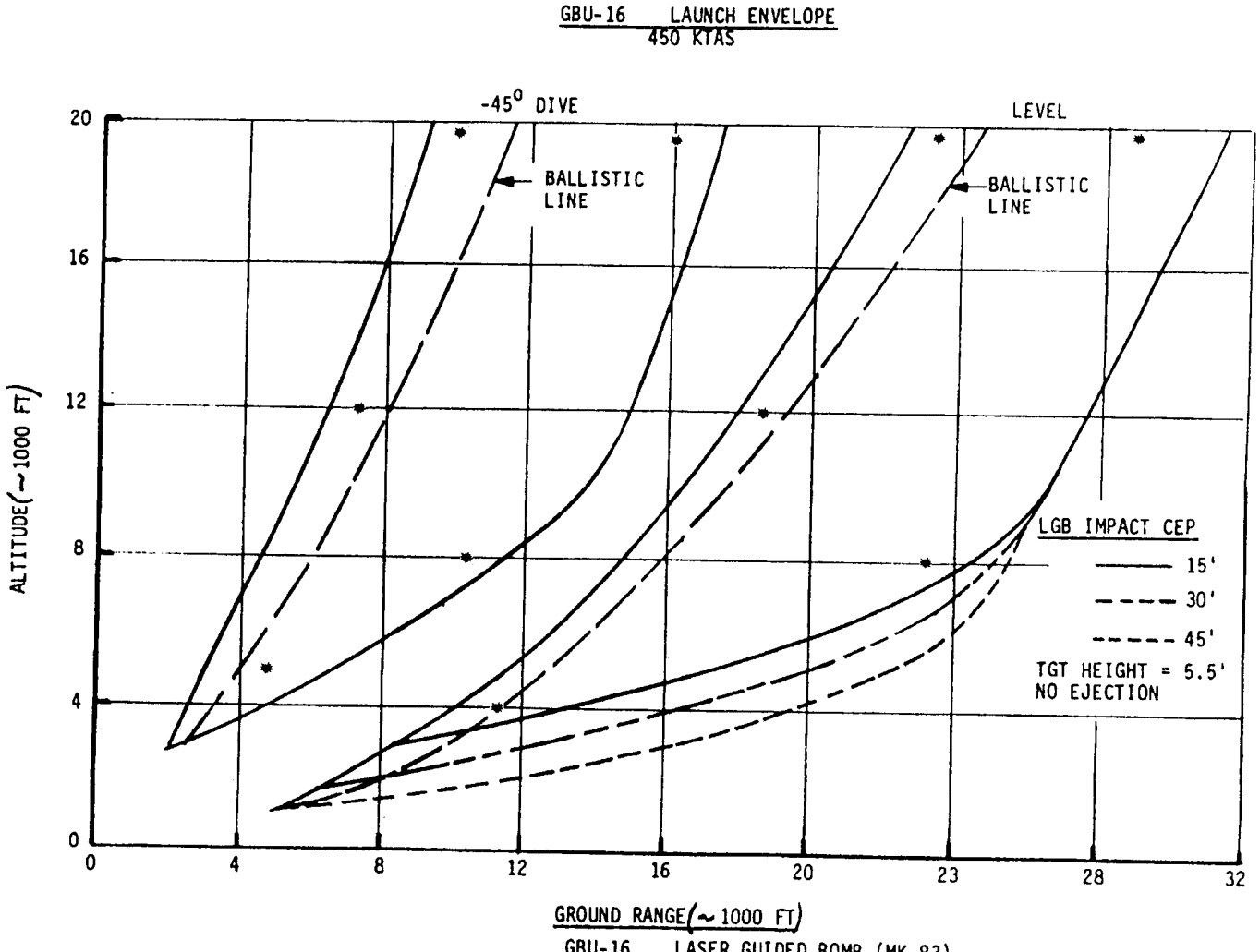
450 KTAS Speed

45 Degree dive		0 Degree dive	
ATTITUDE (FEET)	RANGE (FEET)	ATTITUDE (FEET)	RANGE (FEET)
5000	5000	4000	11000
8000	10000	8000	22000
12000	9000	12000	18500
20000	16000	20000	22500
20000	10000	20000	29000

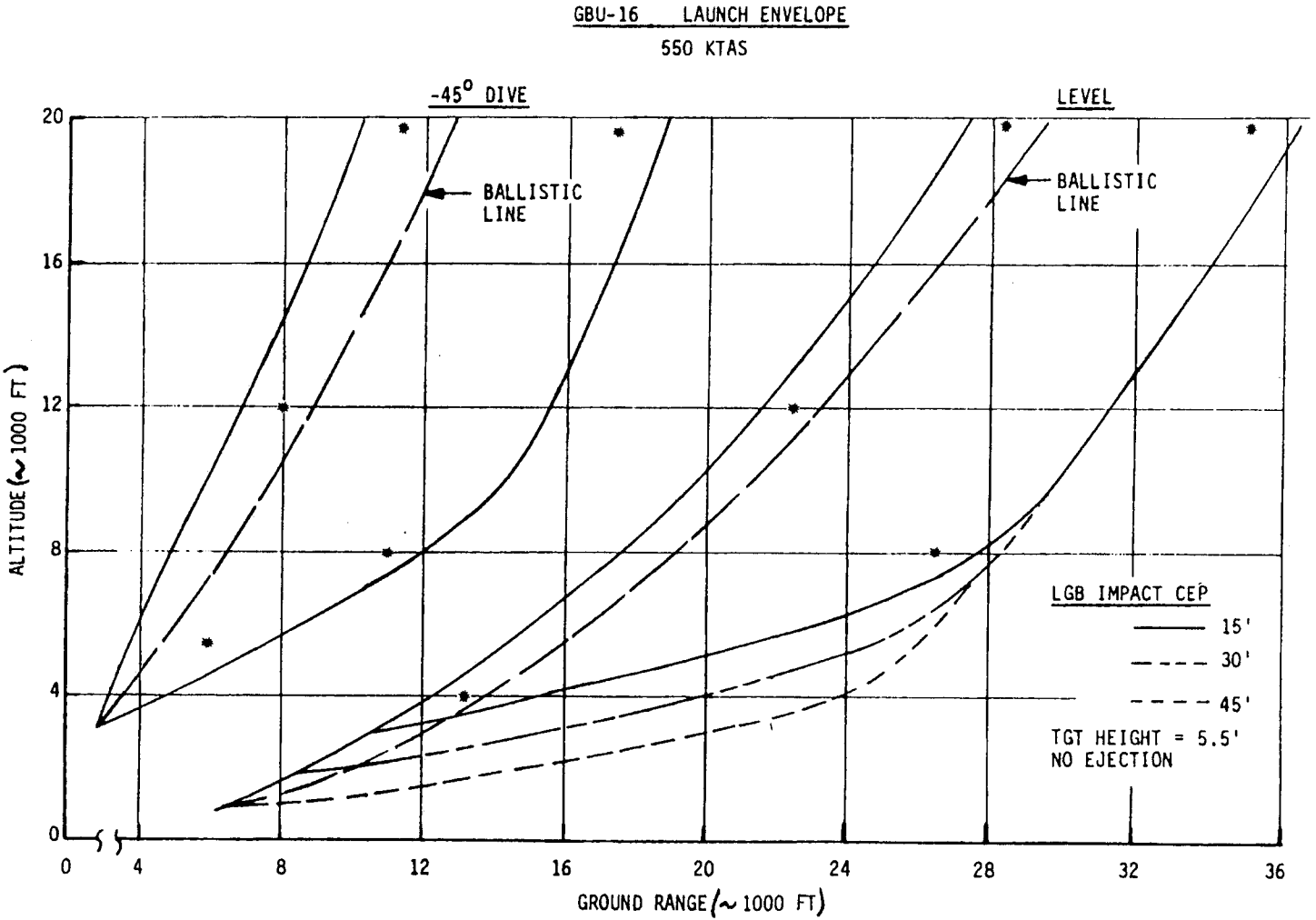
550 KTAS Speed

45 Degree dive		0 Degree dive	
ATTITUDE (FEET)	RANGE (FEET)	ATTITUDE (FEET)	RANGE (FEET)
5500	6000	4000	13000
8000	11000	8000	26500
12000	8000	12000	22500
20000	17000	20000	28500
20000	11000	20000	34500

The following flight envelopes incorporate the above drops as depicted with the ✸ on the flight envelope charts



GBU-16 LASER GUIDED BOMB (MK 83)
(U) LAUNCH ENVELOPE @ 450 KTAS (ASSUMING 16K FT SLANT RANGE ACQ)



GBU-16 LASER GUIDED BOMB (MK 83)
(U) LAUNCH ENVELOPE @ 550 KTAS (ASSUMING 16K FT SLANT RANGE ACQ)