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CONFIDENTIAL

NAVAIR 00-110AGM-1

Standard Aircraft Characteristics

NAVY MODEL
AGM-84A
AIRCRAFT

(TITLE UNCLASSIFIED)

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PUBLISHED BY DIRECTION OF THE COMMANDER OF THE NAVAL AIR SYSTEMS COMMAND

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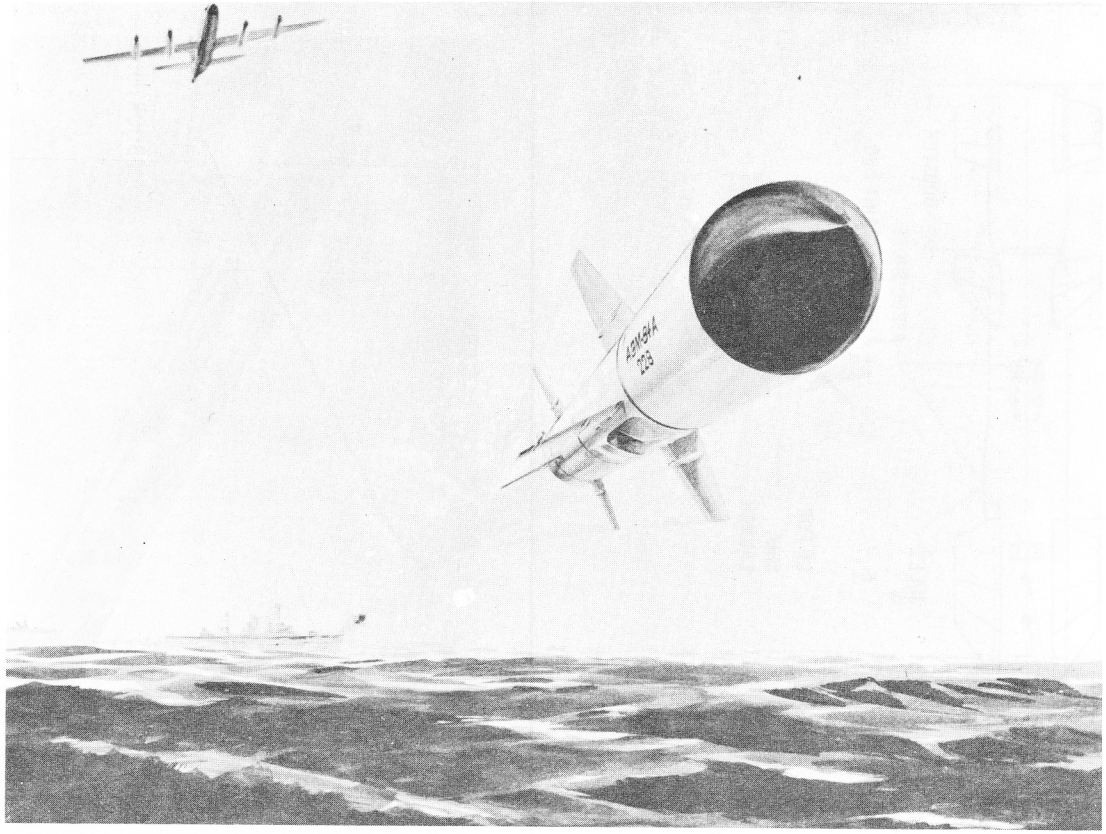


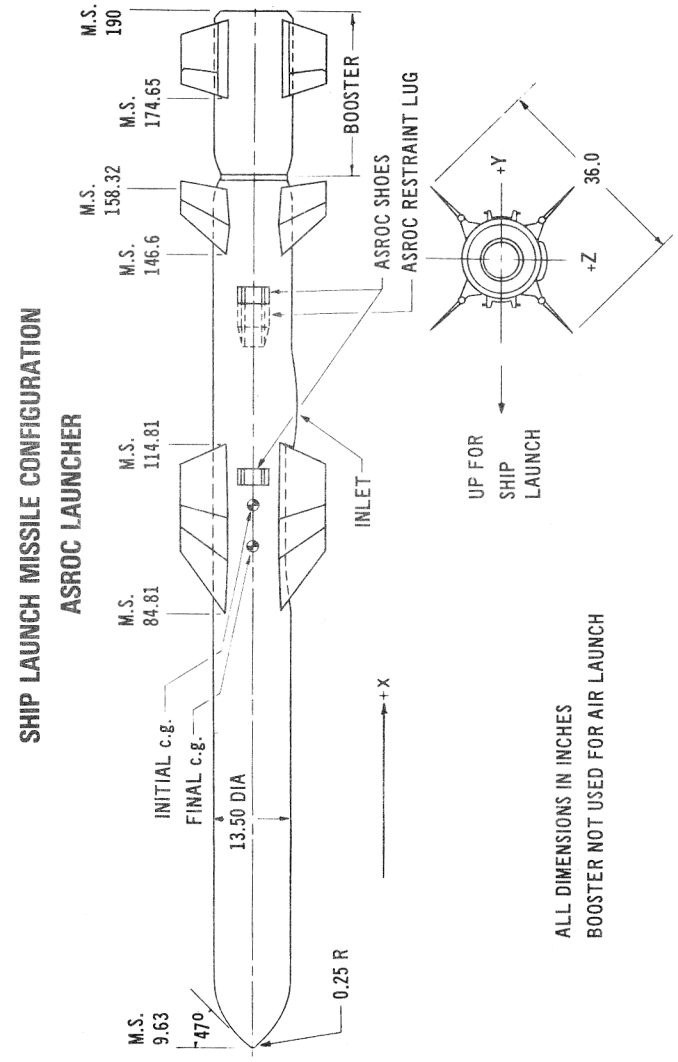
STANDARD AIRCRAFT CHARACTERISTICS

GUIDED MISSILE

AGM-84A "HARPOON"

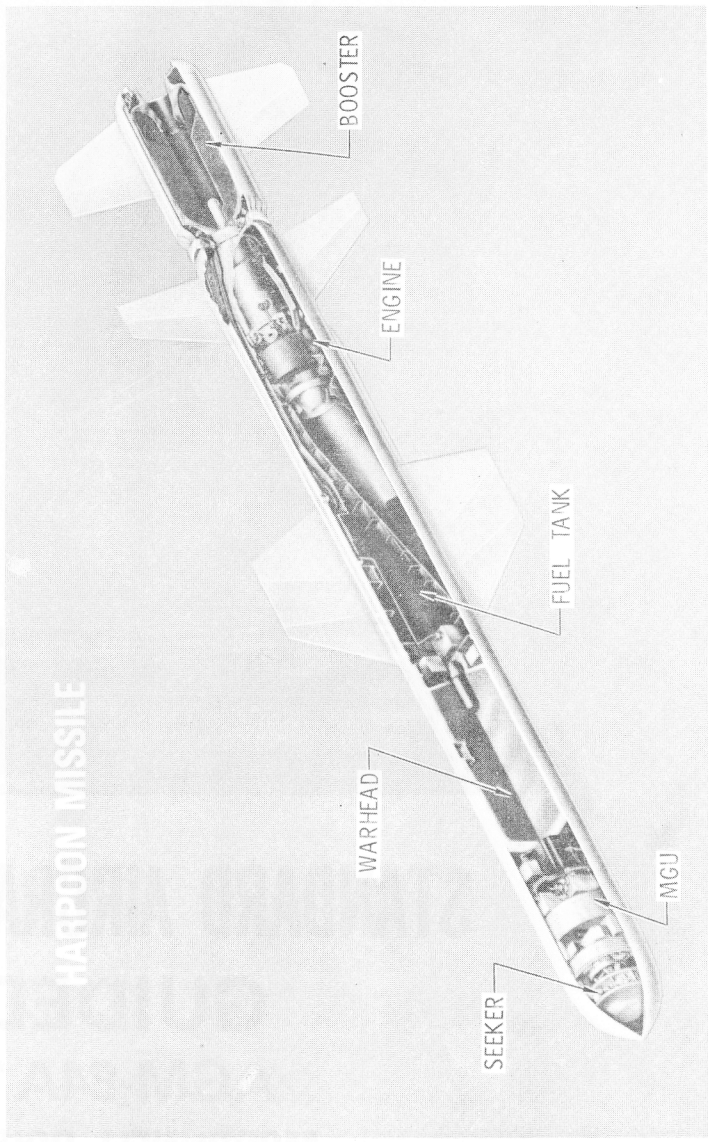
MCDONNELL DOUGLAS CORPORATION

NAVAL AIR SYSTEMS COMMAND
NAVY DEPARTMENT



DESCRIPTIVE ARRANGEMENT

NAVAL AIR SYSTEMS COMMAND
NAVY DEPARTMENT



INBOARD PROFILE

POWER PLANT

SUSTAINER	
NO. & MODEL	(1) XJ402-CA-400
MFR	TELEDYNE CAE
TYPE	SINGLE SPOOL TURBOJET
ENG. LENGTH	29.41 IN.
BOOSTER	
NO. & MODEL	(1) 72P250001
MFR	AEROJET
TYPE	SOLID ROCKET

RATINGS

SUSTAINER	
SLS THRUST	660 LB
SLS SFC	1.20
ROTOR SPEED	40,800 RPM
BOOSTER	
TOTAL IMPULSE	36,780 LB SEC
BURN TIME	2.84 SEC

ELECTRONICS

RADAR SEEKER

KU BAND, FREQUENCY AGILE ACTIVE RADAR
35 KW PEAK POWER
GIMBALED PLANAR ARRAY ANTENNA, MONOPULSE TRACKING
EXTENSIVE ECCM FEATURES
SIZE: 12.5 IN. DIA. 16.0 IN. LENGTH
WEIGHT: 63 LB
POWER: 684 W AVERAGE

MIDCOURSE GUIDANCE UNIT

INTEGRATED DIGITAL COMPUTER, AND 3 AXIS STRAPDOWN ATTITUDE REFERENCE
COMPUTER MEMORY = 8000 WORD, ADD TIME = 3.5 MICROSECOND
ATTITUDE REFERENCE
3 LEAR 1903 HF RATE INTEGRATING GYROS
3 SUNSTRAND 116A ACCELEROMETERS
SIZE: 12 x 10.2 x 6 INCH
WEIGHT: 26 LB
POWER: 127W

RADAR ALTIMETER

C-BAND, SHORT PULSE ACTIVE RADAR (AN/APN 194)
100 WATT PEAK TRANSMITTED POWER
10 TO 5000 FT ALTITUDE MEASUREMENT
3 FT OR 4% ALTITUDE ACCURACY
SIZE: (RECEIVER/TRANSMITTER) 7.4x3.8x3.1 IN.
WEIGHT (INCLUDING 2 ANTENNAS) 5.5 LBS

MISSION AND DESCRIPTION

THE AGM-84A HARPOON MISSILE IS AN ANTISHIP MISSILE DESIGNED FOR LAUNCH FROM AIRCRAFT, SURFACE SHIPS, SUBMARINES AND SHORE BASED INSTALLATIONS. IT WILL DELIVER A PENETRATION/BLAST WARHEAD TO RANGES IN EXCESS OF 60 NAUTICAL MILES. THE HARPOON IS DESIGNED FOR LOW ALTITUDE CRUISE TO MAXIMIZE RADAR SEEKER ACQUISITION PROBABILITY AND MISSILE SURVIVABILITY.

THE INITIALIZATION AND LAUNCH PHASES DIFFER FOR AIR LAUNCH AND SURFACE/SUBMARINE LAUNCHES. ALL OF THE HARPOON LAUNCH PLATFORMS, EXCEPT AIRCRAFT, REQUIRE A SOLID PROPELLANT BOOSTER TO PROVIDE THE NECESSARY INITIAL IMPULSE. FOR AIRCRAFT LAUNCHES, THE LAUNCH ENERGY CONDITIONS ARE PROVIDED BY APPROPRIATE COMBINATIONS OF AIRCRAFT SPEED AND ALTITUDE. HOWEVER, ONCE THE BOOSTER HAS BEEN SEPARATED FROM THE HARPOON MISSILE FOLLOWING SURFACE AND SUBMARINE LAUNCHES, THE MISSILE FLIGHT CHARACTERISTICS AND MISSION CAPABILITIES BECOME INDEPENDENT OF THE LAUNCH MODE. THE BASELINE HARPOON TRAJECTORY HAS A COMMON MIDCOURSE LOW ALTITUDE CRUISE BETWEEN 50 AND 200 FEET, AND A COMMON TERMINAL POP-UP MANEUVER. THRUST DURING THESE COMMON MIDCOURSE/TERMINAL PHASES IS PROVIDED BY A SMALL TURBOJET ENGINE. THE MIDCOURSE AND TERMINAL ALTITUDE IS MEASURED BY AN ALTIMETER, AND THE MISSILE FLIES A PROGRAMMED HEADING ESTABLISHED BY THE INITIAL LAUNCH-TO-TARGET GEOMETRY. HEADING REFERENCE IS ESTABLISHED BY THE THREE AXIS STRAP-DOWN ALTITUDE REFERENCE SYSTEM.

AT A PRESET DISTANCE FROM THE TARGET, THE FREQUENCY-AGILE PULSE RADAR SEARCHES A PRESELECTED OPERATIONAL AREA (NARROW, MEDIUM, NORMAL) DEPENDING ON TARGETING INFORMATION AND TARGET AREA CONGESTION. THE ALL-WEATHER SEEKER AND GUIDANCE PROVIDE HIGH HIT PROBABILITY AGAINST A SPECTRUM OF TARGETS RANGING FROM A PATROL BOAT (< 80 PERCENT P_{HIT}) THROUGH A LARGE CRUISER TARGET (> 90 PERCENT P_{HIT}) FOR SEA STATES FROM 0 THROUGH 5 WITH 12 FT SWELLS.

DEVELOPMENT

CONTRACT AWARD	JUNE 1971
FIRST FLIGHT	MAY 1972
EXPECTED SERVICE USE	JUNE 1976

DIMENSIONS

LENGTH (INCL. 29.5" BOOSTER)	180.37 IN.
FUSELAGE DIA	13.50 IN.
SPAN	36.00 IN.
WING AREA	253.13 IN^2
CONTROL SURFACE AREA	98.89 IN^2
REF. AREA	0.994 FT^2

WEIGHTS

AIR LAUNCH	POUNDS
INITIAL	1210.66
SUSTAINER STARTED	1206.63
BURNOUT	1096.79
SHIP LAUNCH	
INITIAL	1528.88
BOOSTER BURNOUT	1379.38
BOOSTER JETTISONED	1208.28
SUSTAINER STARTED	1204.25
BURNOUT	1094.41

FUEL

SUSTAINER	
TYPE	JP-4
WEIGHT	113.24 LB
BOOSTER	
TYPE	C-1 POLYURETHANE
WEIGHT	146.6 LB

ORDNANCE

THE WARHEAD SECTION CONSISTS OF A PENETRATING AND LOAD CARRYING STEEL STRUCTURE, EXPLOSIVE, SAFE AND ARM DEVICE, CONTACT FUZE AND PROXIMITY FUZE COMPONENTS.

TOTAL WEIGHT	– 510 LB
EXPLOSIVE WEIGHT (DESTEX)	– 215 LB
SAFETY-ARMING	– DYNAMIC PRESSURE PROBE ARMING
PRIMARY FUZE	– DECELERATION ACTIVATED CONTACT WITH DELAY
BACKUP FUZE	– PROXIMITY USING PENCIL SIDE-LOOKING LASER BEAMS

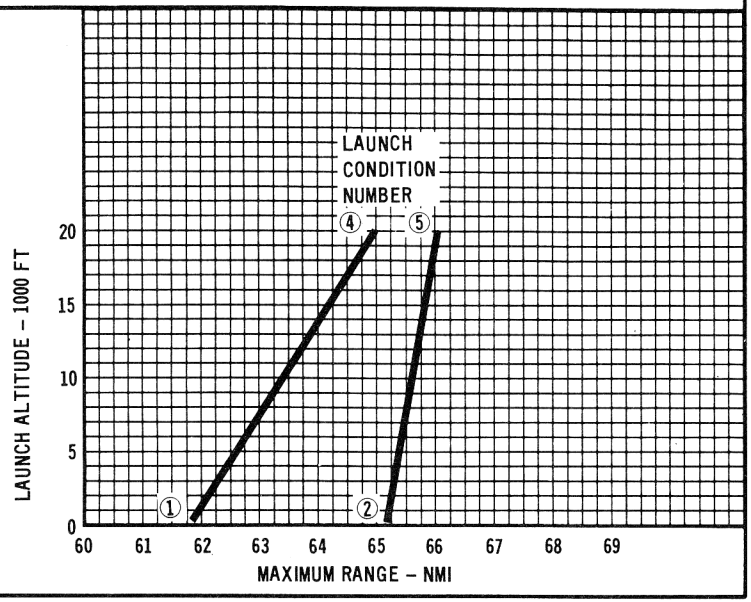
FLIGHT PATH SUMMARY

LAUNCH CONDITION NUMBER	1	2	3	4	5	6
LAUNCH ALTITUDE, FEET	200	200	10,000	20,000	20,000	0 (A)
LAUNCH MACH NUMBER	0.43	0.90	0.60	0.38	0.90	0
MAXIMUM MACH NUMBER	0.85	0.90	0.90	0.97	1.0	0.86
RANGE AT CRUISE PULLOUT, NMI	0	0	3.2	5.1	5.9	3.1
CRUISE MACH NUMBER	0.851	0.851	0.851	0.851	0.851	0.864(H)
MAXIMUM RANGE, NMI	61.9	65.2	64.4	65.0	66.1	64.8
TIME TO MAXIMUM RANGE, SEC	423.0	419.0	422.9	433.3	428.8	423.9

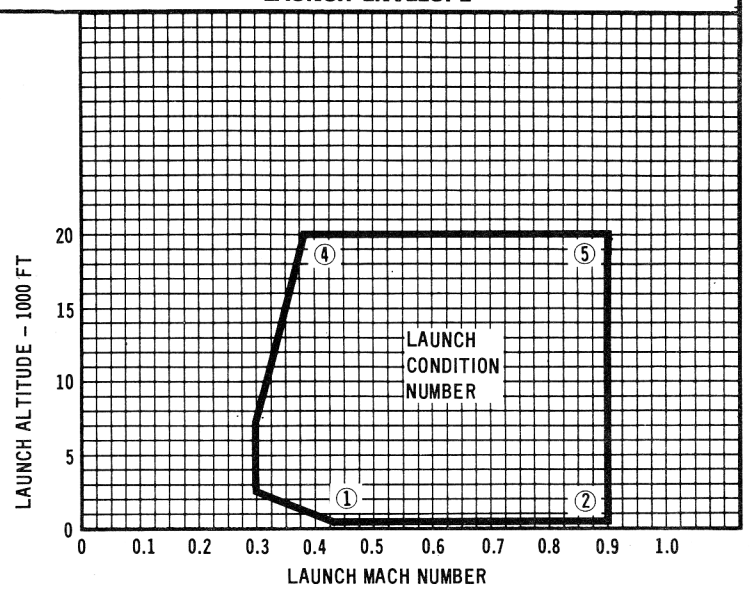
NOTES

(A) SURFACE LAUNCH
(B) MAXIMUM RANGE BASED ON FUEL EXHAUSTION AT IMPACT (109.84 LB)
(C) NOMINAL STANDARD DAY PERFORMANCE
(D) BASED ON CRUISE AT 200 FEET
(E) SUSTAINER AT MAXIMUM POWER AT LAUNCH FOR ALL AIR LAUNCHES
(F) ALL PERFORMANCE DATA ARE BASED ON CALCULATIONS UTILIZING WIND TUNNEL DATA
(G) ALL TRAJECTORIES TERMINATED WITH A POP-UP MANEUVER INITIATED 2.5 NMI FROM IMPACT
(H) SURFACE LAUNCH CONFIGURATION HAS SLIGHTLY LESS DRAG THAN AIR LAUNCH
(I) ALL DATA ARE BASED ON THE DESIGN PHASE CONFIGURATION (JULY 1972)

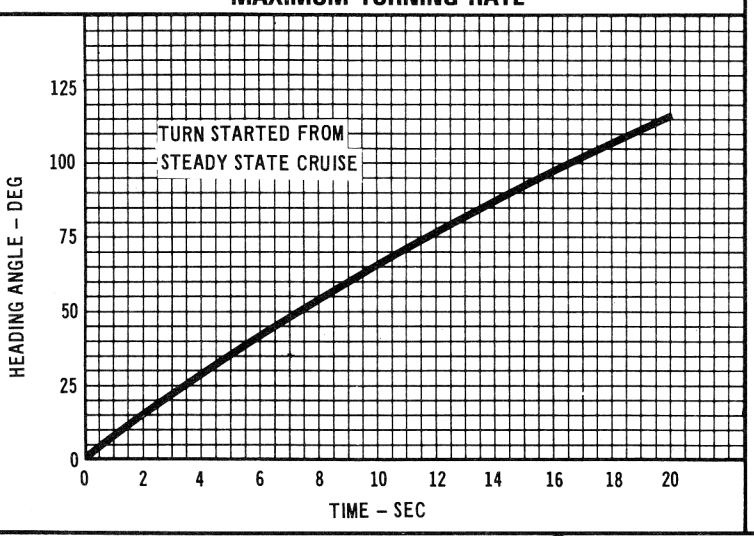
MAXIMUM RANGE



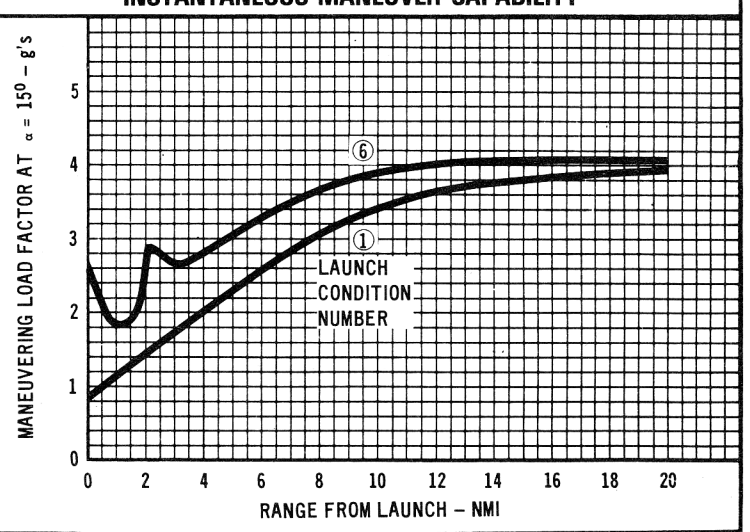
LAUNCH ENVELOPE



MAXIMUM TURNING RATE

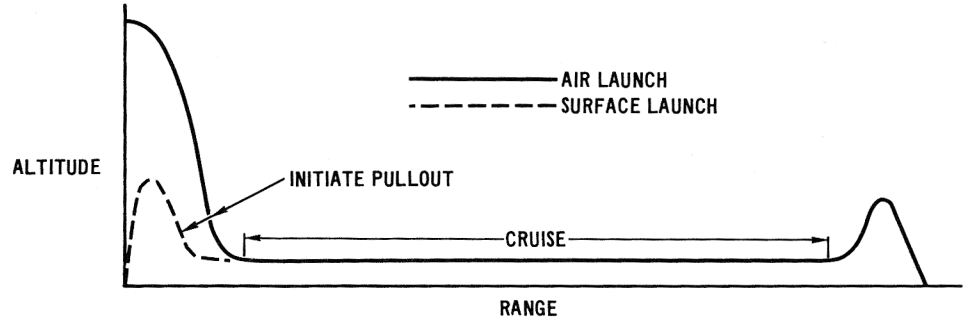


INSTANTANEOUS MANEUVER CAPABILITY



NOTES

TYPICAL MISSION PROFILES



TYPICAL SEQUENCE OF EVENTS

AIR LAUNCH

1. SUSTAINER STARTED APPROXIMATELY 10 SECONDS BEFORE LAUNCH
2. SUSTAINER AT MAXIMUM POWER APPROXIMATELY 6.5 SECONDS AFTER START
3. LAUNCH
4. DESCEND TO CRUISE ALTITUDE
5. CRUISE AT 50 TO 200 FEET AT MAXIMUM POWER
6. INITIATE TERMINAL MANEUVER
7. TARGET IMPACT

SURFACE LAUNCH

1. BOOSTER IGNITION (2.84 SEC BURN TIME)
2. BOOSTER BURNOUT, BOOSTER/MISSILE SEPARATION, COMMAND SUSTAINER START, INITIATE AERODYNAMIC CONTROL
3. DESCEND TO CRUISE ALTITUDE
4. CRUISE AT 50 TO 200 FEET AT MAXIMUM POWER
5. INITIATE TERMINAL MANEUVER
6. TARGET IMPACT

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