

Appendix C

ACRONYMS AND GLOSSARY

List of Acronyms

A&CO	— assembly and checkout	LoADS	— low altitude defense system
ABM	— antiballistic missile	LUA	— launch under attack
ABNCP	— Airborne National Command Post	MAP	— multiple aim point
AFY	— acre-feet per year	MaRV	— maneuverable reentry vehicle
AIRS	— Advanced Inertial Reference Sphere	MF	— medium frequency
ALCC	— Airborne Launch Control Center		— square miles
ALCM	— Air-Launched Cruise Missile	;I RV	— multiple independently targetable reentry vehicle
AMST	— Advanced medium short takeoff and landing aircraft	MPS	— multiple protective shelters
ANMCC	— Alternate National Military Command Center (Ft. Richie, Va.)	MT	— megaton
A SAT	— antisatellite	MWe	— megawatts of electricity
ASW	— antisubmarine warfare	NCA	— National Command Authorities
BMD	— ballistic missile defense	NEACP	— National Emergency Airborne Command Post
BMDSCOM	— Ballistic Missile Defense Systems Command (U.S. Army)	NMCC	— National Military Command Center (Pentagon, Washington, D. C.)
C'	— command, control, and communications	nm i	— nautical mile
CBO	— Congressional Budget Office	NORAD	— North American Aerospace Defense Command
CEP	— circular error probable	NTS	— Nevada Test Site
DE IS	— draft environmental impact statement	Occ	— Operational Control Center
DOD	— Department of Defense	ORV	— Off-Road Vehicle
DU	— defense unit (LoADS)	PLU	— preservation of location uncertainty
EAM	— Emergency Action Message	psi	— pounds per square inch
EHF	— extremely high frequency	RDT&E	— research, development, test, and evaluation
EIS	— environmental impact statement	RV	— reentry vehicle
EMP	— electromagnetic pulse	SAC	— Strategic Air Command (U.S. Air Force)
EMT	— equivalent megatonnage	SALT	— Strategic Arms Limitation Talks
FOC	— full operational capability	SATCOM	— Satellite communications
FROD	— functionally related observable difference	ScC	— Standing Consultative Commission
GBS	— Ground Beacon System	SHF	— super high frequency
GPS	— Global Positioning System	SIOP	— Single Integrated Operational Plan
HF	— high frequency	SLBM	— submarine-launched ballistic missile
ICBM	— intercontinental ballistic missile	SWFLANT	— Strategic Weapons Facility, Atlantic, U.S. Navy
ICT	— intelligence cycle time	SWFPAC	— Strategic Weapons Facility, Pacific, U.S. Navy
IGPS	— Inverted Global Positioning System	TEL	— transporter-erector-launcher
IMU	— inertial measuring unit	UHF	— ultrahigh frequency
loc	— initial operating capability	USAF	— U.S. Air Force
KT	— kiloton	USN	— U.S. Navy
LF	— low frequency	VLF	— very low frequency

Glossary

- ABM Treaty:** Formally entitled the “Treaty between the United States of America and the Union of Soviet Socialist Republics on the limitation of antiballistic missile systems,” this Treaty limits the deployment of antiballistic missile systems by the United States and the Soviet Union to specific sites and to specific technical characteristics. The Treaty is of unlimited duration, subject to review every 5 years. The Treaty was amended in 1974 limiting the deployment of antiballistic missile systems to one site containing no more than 100 interceptor launchers and missiles.
- Acoustic Transponders:** Navigation aids attached to the ocean floor which when queried respond by emitting a signal permitting a submarine or surface ship to determine its location with great precision.
- Acquisition Costs:** The amount of money invested in research, development, test, production, and procurement of a weapon system but not covering costs of operating and maintaining the weapon system once it has reached operational capability and is deployed with military forces.
- Adaptive Preferential Defense:** A tactic for multiplying the effectiveness of an antiballistic missile defense system by defending only a small proportion of the total number of targets under attack.
- Ad Hoc Retargeting:** The ability to construct strategic nuclear attacks which have not been previously included in the wide range of pre-planned attack options comprising the U.S. Single Integrated Operational Plan.
- Advanced Inertial Reference Sphere (AIRS):** An advanced guidance system presently being developed for the MX missile.
- Airborne Launch Control Center (ALCC):** Aircraft used to launch MX missiles deployed in a multiple protective shelter basing mode.
- Air-Launched Cruise Missiles (ALCM):** Small unmanned airplane-like vehicles armed with nuclear weapons.
- Alert Rate:** The number of U.S. strategic nuclear delivery vehicles armed, manned, or deployed on combat patrol during peacetime conditions.
- Antisubmarine Warfare (ASW):** Methods of warfare utilizing specialized sensors, data processing techniques, weapons platforms, and weapons intended to search for, identify, and destroy submarines.
- Area Kill:** See Barrage Attack.
- Arms Control Agreement Verification:** The process of collecting and analyzing information to determine whether or not parties to an international arms control agreement are complying with its terms.
- B-52:** A heavy intercontinental range strategic bomber deployed by the United States. B-52 bombers can be equipped with gravity bombs, short-range attack missiles, or air-launched cruise missiles.
- Ballistic Missile Defense (BMD):** Systems for defense against missiles which follow trajectories resulting from gravity and aerodynamic drag following termination of powered flight. This term is used interchangeably with ABM systems.
- Barrage Attack:** An attack using nuclear weapons to cover a large area with a given severity of blast and/or thermal nuclear effects.
- Baseline Design:** As used in this study, the term “baseline design” refers to the Air Force MX basing design, May 1981. This design includes both the design of the MX missile as well as the multiple protective shelter basing mode.
- Blackout:** A condition in which the heat and radiation from an atmospheric nuclear explosion ionize the surrounding volume of air causing radar signals passing through the affected region to be absorbed or reflected.
- Breakout:** As used in connection with discussion of the LoADS ABM system, breakout refers to the rapid deployment of the LoADS defense unit by use of explosive charges to break through the top of the protective shelter permitting the defense unit to activate its radar and launch its interceptor missiles.
- Circular Error Probable (CEP):** A measure of the accuracy with which a weapon can be delivered. It is the radius of a circle around a target of such size that a weapon aimed at the target has a 50-percent probability of falling within the circle.
- Cold launch:** The use of a gas generator to build up steam pressure inside a cannister housing a ballistic missile which forces the missile out of the cannister prior to the ignition of the first stage rocket motor. The temperature of the steam used to eject the missile from the cannister is quite hot; however it is substantially less than the many thousand degrees Fahrenheit of the rocket motor exhaust, and hence the term “cold launch.”
- Command, Control, and Communications (C³):** The systems and procedures used to ensure that the President, senior civilian and military officials, and U.S. strategic nuclear forces remain in com-

- munication with each other, able to plan for the use of nuclear weapons, to choose among options, to deliver orders to the forces in the field, and to receive word that the forces have executed or attempted to execute their orders during the course of peacetime or wartime operations.
- Damage Expectancy:** The probability that a nuclear weapon will arrive at and destroy its target.
- “Dash-on= Warning”:** A concept in which MX missiles on vehicles are dispersed rapidly upon receipt of warning that an attack appears underway to a nearby shelter where the MX missile is quickly inserted.
- Desertification:** The significant reduction of biologic activity and accelerated deterioration of soils in arid land ecosystems.
- Dynamic Pressure:** A measure of the gusting winds following the shock front produced by a nuclear detonation.
- Emergency Action Message (EAM):** Orders to U.S. strategic offensive forces for the initiation or termination of a strategic nuclear attack.
- Electromagnetic Pulse (EMP):** A sharp pulse of electromagnetic energy produced by a nuclear explosion capable of damaging unprotected electrical and electronic equipment at great distances.
- Endoatmospheric Defense:** ABM systems which operate in the sensible portion of the Earth’s atmosphere, typically at altitudes from the ground to 100,000 ft.
- Environmental Impact Statement (EIS):** A description of the possible range of impacts on the socioeconomic and physical environments prepared by the Air Force pursuant to the requirements of the National Environmental Policy Act.
- Endurance:** The ability of a strategic weapons force— including both strategic nuclear weapon delivery vehicles and associated command, control and communications systems — to survive and function for weeks or months following a nuclear exchange.
- Equivalent Megatonnage:** The yield of a nuclear weapon in megatons, to the two-thirds power. A measure of the area that can be barraged to a given overpressure.
- Exchange Ratio:** The number of nuclear weapons that must be used by an attacker to destroy one nuclear weapon belonging to an adversary.
- Exoatmospheric Defense:** ABM systems that operate outside the atmosphere.
- External Navigation Aid:** Devices external to a missile or platform used to provide information to the missile or missile platform on its position and velocity.
- Flush:** A launch of manned aircraft or a rapid deployment of submarines or surface ships in response to either tactical or strategic warning to preserve as much of the force as possible in the event of a nuclear attack.
- Fractionation:** The division of the payload of a missile into a larger number of warheads with smaller individual yields.
- Fugitive Dust:** Dust generated by construction activities and vehicular traffic on and off roads which migrates from the area immediately surrounding such activities to distant locales.
- Full Operational Capability (FOC):** The date on which the planned number of weapon systems has been deployed and control of the forces given to the operational military command for the entire force.
- Functionally Related Observable Differences (FRODS):** Structures added to similar airframes or naval vessels to differentiate among them thereby facilitating direct observation by national technical surveillance systems permitting verification of each party’s compliance with the terms of an arms control agreement.
- Global Positioning System (GPS):** A system of artificial satellites currently being deployed by the United States in the 1970’s and 1980’s intended to provide accurate position and velocity data to facilitate improved navigation and missile accuracy.
- Hardness:** A measure of the resistance of an object to the effects of nuclear detonations.
- Hard Targets:** Targets that have been specifically designed to withstand the blast, thermal radiation, and other effects of nuclear weapon detonations nearby.
- Horizontal Shelters:** Protective shelters for the MX missile constructed such that the missile and its launch support equipment are inserted into the structure and stored in a horizontal position.
- Inertial Guidance:** A guidance system for missiles, aircraft, and ships which relies solely on a self-contained set of instruments carried aboard the platform to determine changes of velocity and position from a known initial point.
- Inertial Measuring Unit (IMU):** A device installed in the uppermost stage of a ballistic missile used to derive missile accelerations throughout flight, and to obtain velocity and position data which is used to navigate the missile.
- Initial Operating Capability (IOC):** The date on which a small number of weapon systems is turned

- over to the commander of a military force for incorporation into the operational forces of the United States.
- Intelligence Cycle Time (ICT):** The period of time from the sighting of a target to the time weapons can be delivered against it.
- Inverted Global Positioning System (IGPS):** A concept for a system of ground-based radio beacons to be used to provide navigational information for mobile MX missiles and various platforms carrying such missiles.
- Kill Vehicles:** Independently guided nonnuclear weapons that are used in the exoatmospheric antiballistic missile systems to destroy incoming nuclear weapons.
- Kilofeet:** 1,000 ft.
- Knot:** 1 nautical mile per hour.
- Kilotons (kT):** Equivalent to 1,000 tons of TNT.
- Launch Under Attack (LUA):** A doctrine for strategic forces requiring their launch upon receipt of warning of an attack on the United States.
- Layered Defense:** An antiballistic missile system consisting of both an exoatmospheric defense and an endoatmospheric defense.
- Lifecycle Costs:** Costs of research, development, test, procurement, operation, maintenance, modification, and dismantling of a weapon system over the period from initial research and development to retirement or dismantling of the last weapon system.
- Low Altitude Defense System (LoADS):** A system proposed by the Army as an endoatmospheric antiballistic missile defense.
- LoADS Defense Unit (DU):** This consists of a radar, interceptor launchers, and interceptors mounted on a mobile unit and deceptively deployed in conjunction with MX missile deployments.
- Maneuvering Reentry Vehicle (MaRV):** An independently targetable reentry vehicle which can maneuver to evade ballistic missile defense or to obtain better accuracy.
- Microwave Radiometers:** Instruments that can detect electromagnetic emissions such as radio transmissions or radar signals used to detect and identify the transmitting platform.
- Minuteman:** An ICBM deployed by the United States in two models. Minuteman II is a three stage, solid fueled missile armed with a single nuclear weapon; Minuteman III is armed with three independently targetable nuclear weapons.
- Multiple Aim Point:** A term for basing a force of ICBMS among a larger number of protective missile shelters. See *Multiple Protective Shelter*.
- Multiple Protective Shelter (MPS):** A term describing a basing mode for land-based missiles in which missiles are deployed among a large number of hardened structures. These are designed and distributed to provide protection against nearby nuclear weapon detonations.
- MX Missile:** Missile X or missile experimental; the proposed U.S. Air Force advanced ICBM.
- Northern Minuteman Wings:** Minuteman missiles deployed at Malmstrom Air Force Base, Mont.; Grand Forks, N. Dak.; Warren Air Force Base, Wyo.; and Ellsworth Air Force Base, S.Dak.
- National Technical Means of Verification (NTM):** Technical intelligence information collection systems which are under national control for monitoring compliance with the provisions of an arms control agreement. NTM include photographic reconnaissance satellites, aircraft based systems such as radars and optical systems, as well as sea- and ground-based systems such as radars, antennas for collecting telemetry, and seismic recorders,
- National Command Authorities (NCA):** The President, the Secretary of Defense, and the Joint Chiefs of Staff and their designated successors authorized to initiate an order for the use of nuclear weapons.
- National Emergency Airborne Command Post (NEACP):** A modified Boeing 747 transport aircraft equipped with a wide array of communications equipment for use by the President and other members of the National Command Authorities in the event of a nuclear war.
- Nevada Test Site (NTS):** A facility where the United States detonates nuclear explosive devices underground.
- North American Aerospace Defense Command (NORAD):** A joint U.S.-Canadian military command responsible for outer space, air space surveillance and air defense of the North American Continent.
- Ocean Mobile Systems:** Basing of the MX missile by deploying the missile aboard small submarines or surface ships.
- Operational Control Center (OCC):** Peacetime operating base for logistic support and physical security for the MX missile force.
- Overlay:** concept for exoatmospheric antiballistic missile defense.
- Overpressure:** The transient pressure, usually expressed in pounds per square inch, exceeding the ambient atmospheric pressure, due to the shock wave generated by an explosion.

- Permeable Metal:** A metal with a strong magnetic response.
- Point Kill:** The destruction of a hardened target at a fixed location.
- Postattack:** The period of time following a nuclear exchange between the United States and the Soviet Union.
- Preattack:** The period of time preceding a nuclear exchange between the United States and the Soviet Union.
- Preservation of Location Uncertainty (PLU):** The engineering of the MX missile, its transporter-launcher vehicle, the protective shelter, to prevent an outside observer from determining the precise location of the MX missile among the many available shelters which could house it.
- Rad:** A unit of absorbed dose of radiation.
- Reentry Vehicle:** That portion of a ballistic missile which carries the nuclear weapon and reenters the Earth's atmosphere to reach its target.
- Refit:** The resupply of naval vessels with fresh food, fresh water, fuel, other consumables, installation of new equipment, repair of equipment on board, and the embarkation of a new crew.
- Reliability:** The ability of a missile system to carry out an order from its receipt to the detonation of a weapon against its target.
- Responsiveness:** A measure of the length of time required for U.S. strategic forces to receive, authenticate, and implement an order from the National Command Authorities for the use of nuclear weapons.
- Retargeting:** The process of assigning new targets for a strategic nuclear weapon delivery vehicle.
- Readable TEL:** A missile-carrying vehicle chosen for a previous U.S. Air Force MPS design, that could transport, erect to a vertical position, and launch the MX missile.
- Reentry Vehicles (RV):** As used in this report, reentry vehicles contain nuclear weapons.
- SAFEGUARD:** An antiballistic missile system deployed by the United States in the early 1970's containing both large and small phased array ABM radars and exoatmospheric and endoatmospheric interceptors.
- SALT:** An acronym for the bilateral negotiations between the United States and Soviet Union on the subject of Strategic Arms Limitation Talks. SALT I refers to the agreements concluded in May 1972 including the ABM Treaty and the interim Agreement on Strategic Offensive Nuclear Weapons.
- SCC:** The joint U.S.-U.S.S.R. Standing Consultative Commission, a deliberative and negotiating body established by the ABM Limitation Treaty which meets semiannually to review implementation of the ABM Limitation Treaty and other Strategic Arms Limitation Agreements in force.
- Shock Front:** The leading edge of a wave of air pressure created by an explosion.
- Shoot-Look-Shoot:** A tactic for attacking MX deployed in an MPS or defended MPS mode in which the attacker fires a salvo of reentry vehicles, observes the effects of such an attack, and then attacks shelters left undamaged by the first attack.
- Silo:** A fixed, vertical structure housing an ICBM and its launch support equipment including power supply, communications equipment, and environmental control equipment which has been constructed to withstand the effects of nearby nuclear explosions.
- Single Integrated Operational Plan (SIOP):** The preplanned nuclear attack options prepared for the consideration of the President by the Department of Defense.
- Site Activation Task Force:** A Joint U.S. Air Force and U.S. Army team which will check out and accept individual MPS shelters when the construction contractor believes construction has been completed.
- Small Submarine Basing:** A basing concept utilizing submarines displacing 2,500 to 2,800 tons on which MX missiles are deployed and operated in deep ocean waters within 1,000 to 1,500 miles from the continental United States in the North Atlantic or Gulf of Alaska. The concept as used by OTA differs in several respects to the "small sub underwater mobile" (SUM) basing concept advanced by Sidney Drell and Richard Garwin.
- Smallsub Underwater Mobile (SUM) Basing:** A concept for the deployment of MX missiles on small submarines proposed by Sidney Drell and Richard Garwin.
- Split Basing:** As used in this report, split basing refers to the construction of multiple protective shelters for the MX missile in two regions of deployment. One half of the MX force would be deployed in portions of Texas and New Mexico and the other half of the force would be deployed in Nevada and Utah.
- Sprint:** A very high acceleration, nuclear-armed endoatmospheric ABM interceptor missile deployed by the United States in the early 1970's as part of the SAFEGUARD ABM system.
- SSBN:** Designator of nuclear-powered, fleet ballistic, missile-carrying submarines deployed by the United States, the Soviet Union, France, and the United Kingdom.

- Star Tracker:** A device carried aboard a ballistic missile used to obtain information on the position and orientation of the missile in relationship to a known star for purposes of improving in-flight guidance and the accuracy with which a reentry vehicle could be delivered against a target.
- Strategic Triad:** The three different types of platforms used by the United States to deliver strategic nuclear weapons: ICBMS, submarines carrying SLBMS, and bombers carrying gravity bombs, short-range attack missiles, and long-range air-launched cruise missiles.
- Submarine-launched Ballistic Missile (SLBM):** A ballistic missile carried in or attached to and launched from a submarine.
- SUM:** An acronym for Smallsub Underwater Mobile basing for MX proposed by Sidney Drell and Richard Garwin,
- Transporter-Erector-launcher (TEL):** A vehicle designed for an earlier version of MPS basing which would have been used to transport the MX missile, erect it to a vertical position, and then launch it.
- Time-on-Target Control:** The ability to control the time at which several nuclear weapons arrive at a particular target.
- Transattack:** The period of time in which the United States and the Soviet Union are actively engaged in the exchange of nuclear weapons. This can be a period of minutes or can extend for hours or even days,
- Transporter-** A vehicle designed to transport the MX missile or a mass simulator, and to perform an exchange of either missile or the mass simulator and a protective shelter.
- Trident Missile:** A modern submarine launched ballistic missile deployed by the United States. The Trident I missile is currently being produced and deployed; the Trident II would be a larger and more accurate missile proposed for initial deployment in the late 1980's.
- Trident Submarine:** A very large nuclear-powered, ballistic missile-carrying submarine being deployed by the United States.
- Valley Cluster Basing:** A variant of MPS basing for the MX missile in which missiles may be moved freely among the protective shelters in an entire valley as opposed to only within a cluster.
- Vertical Shelters:** Protective shelters for the MX or Minuteman missile resembling ICBM silos, housing the missile and its mobile launch support equipment in a vertical position.
- Warning Systems:** Satellites, ground-based radars, and other mobile sensors used to provide the United States warning of an impending ICBM, SLBM, or bomber attack.
- Yield:** The energy released in an explosion. The energy released in the detonation of a nuclear weapon is generally measured in terms of the kilotons or megatons of TNT required to produce the same energy release.

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