**Future Weapons Design**

**Incredible USAF Future Weapons**

**Future Weapons for Future Wars**

Source: Air Force 2025 Study
(From Web Site at http://www.au.af.mil/au/2025/)

1.1 Hypersonic Attack Aircraft A high-speed strike vehicle capable of projecting lethal force anywhere in the world in less than four hours. Operating at Mach 12 and a cruise altitude of 100,000 ft, this vehicle is a reusable two-stage system comprised of an unmanned boost vehicle and a manned hypersonic strike aircraft. The gas turbine-engine boost vehicle requires a conventional runway and accelerates the strike vehicle to Mach 3.5 and 65,000 ft. The strike vehicle then separates and uses a ramjet/scramjet engine to reach its cruise condition. The total system range is 10,000 nautical miles (NM); the hypersonic strike vehicle has an unrefueled range of 5,000 NM. It is capable of launching precision-guided munitions, including the hypersonic air-to-ground missile described in system 5.4, at a standoff distance of 1,450 NM. Alternatively, the platform may be used to transport an uninhabited unmanned air vehicle described in system 4.2.

1.2 FotoFighter A highly maneuverable, stealthy, inhabited advanced fighter aircraft whose skin is fitted with an array of diode lasers and sensors. Efficient electronic control of the laser arrays allows this fighter to engage multiple targets simultaneously with varying degrees of lethality. At low powers, the arrays can function as transmitters and receivers for low probability of interception (LPI) communications. Threat detection, target illumination, and tracking are also possible.

1.3 Container Aircraft An aircraft consisting of an airlifter in which standard shipping containers form integral structures of the fuselage. The aircraft consists of three baseline sections: the cockpit, the wing box, and the empennage. In its simplest form, the "short" version-the aircraft is capable of flight by joining the cockpit, wing box, and empennage directly together. With standard shipping containers installed between the cockpit and wing box and between the wing box and the empennage, the aircraft can be configured to carry cargo ("stretch" version). The first wave of container aircraft to arrive in a theater of operations "disassembled." The cockpit then forms a command and control facility, the aircraft engines generate the base power, the wings provide fuel storage, and the containers themselves (when empty) provide shelter for troops, supplies, and equipment. This concept provides a mobile base.

1.4 Lighter-than-Air Airlifter A very large capacity, rigid-frame lighter-than-air vehicle that provides one million pound airlift capability with a unrefueled range of 1,2500 NM. This vehicle also has the ability to deploy and recover powered UAVs while stationary or in-transit. Vehicle is able to house support materiel, personnel, and MEDVAC modules depending upon mission requirements.

1.5 Supersonic Airlifter A Mach 2.4 supersonic airlifter that provides 50,000 pound airlift capability with a unrefueled range of 5,000 NM. This vehicle provides the capability to deliver military personnel (roughly 150), advanced precision weapons, and appropriate resupply anywhere in the world within hours.

1.6 Stealth Airlifter (SA) An all-weather, low-observable aircraft capable of low supersonic cruise and dedicated to special operations forces (SOF). With an unrefueled range up to 4,000 NM, it can be used to insert and extract SOF teams, as well as to extract high value assets (HVA) and weapons of mass destruction. The SA connected to a global information management system (say, GIMS System 8.1) for all source intelligence, weather, navigation, and communications.

1.7 Global Transport Aircraft (GTA) A global reach transport airplane of less than one million pounds take off gross weight, capable of carrying 150,000-250,000 pounds 12,000 to 10,000 NM respectively. This vehicle also can deploy powered UAVs and parafoils. The GTA house support materiel, personnel, and MEDVAC modules, depending upon mission requirements. This aircraft also be modified for use as a tanker.

2.1 Strike UAV A low-observable, uninhabited air vehicle that loiters sub-sonically over the region of interest for long periods of time (24+ hours) until directed to strike. Its primary mission is to engage ground targets with standoff precision munitions; however, it also has a limited air-to-air capability. It relies on off-board sensors to supply reconnaissance and targeting information as well as command and control, although it has sufficient on-board sensor capability to allow it to perform preprogrammed missions.

2.2 Reconnaissance UAV An uninhabited reconnaissance aerial vehicle (URAV) that can be employed either as an independent system or in conjunction with other airborne, ground-based, and spaceborne systems. The URAV is fitted with a variety of multispectral sensors, such as infrared, optical, radar, and laser, and collects images, signals intelligence (SIGINT), electronic intelligence (ELINT), and other information. It loiters sub-sonically at very high altitudes over the region of interest for extended periods of time without refueling. The URAV also can be used as part of a bistatic configuration, in which it illuminates the region of interest while different sensors receive and process the information.

2.3 Uninhabited Combat Air Vehicle (UCAV) A vehicle that can be employed either as an independent system or in conjunction with other airborne, ground-based, and space- based systems. It carries a suite of multispectral sensors (optical, infrared, radar, laser, etc.) supplies information to its suite of standoff precision guided munitions. UCAV loiters at high altitude over the region of interest for long periods of time (24+ hours) until called upon to strike a target. While in its subsonic loiter mode, it can perform a surveillance and reconnaissance mission for the Global Information Management System (System 8.1). It could be used as part of a bistatic configuration in which it illuminates a region of interest while a different sensor receives and processes the information. As a secondary mission, it can perform electronic countermeasures (ECM) and electronic counter-countermeasures (ECCM) roles.

2.4 Precision Delivery System A suite of powered and parafoil UAVs capable of autonomous flight for the purpose of all-weather precision (within 1 meter) airdrop. High altitude (40,000 ft) precision airdrops can be achieved using GPS or INS-guided parafoil delivery systems. This technique allows equipment/supplies to be delivered to forward-deployed forces while transport aircraft remain hundreds of miles from the drop zone. Positions can be determined using light detection and ranging (LIDAR) or a GPS instrumented radio drop sound. Powered UAVs and deliver smaller, high value packages from greater standoff ranges.

2.5 UAV Mothership A large capacity, long-loiter-time, uninhabited subsonic air vehicle used to deploy and recover smaller combat UAVs. It also can replenish them with weapons and propellant. This air vehicle has the ability to collect, convert and store solar energy, and then transfer energy through physical means or via beaming to other airborne vehicles such as the FotoFighter (System 1.2).

2.6 Exfiltration Rocket (ER) A system designed to quickly extract special operations forces (SOF) teams from the mission area. This system would be brought in during the SOF insertion and assembled at the exfiltration launch site. After mission completion, the SOF team members load themselves and any other items, such as a high value asset (HVA) or weapon of mass destruction (WMD), into the ER and then take off. The payload and passengers are recovered via an air-retrievable payload system or through a "soft" landing in a friendly area.

3.1 Orbital Maneuvering Vehicle (OMV) An uninhabited orbital propulsion and docking system used to take payloads from an earth-to-orbit lift vehicle and place them in their final orbital plane, or used to fetch and return orbiting payloads to a central repair and recovery location. The system is be capable of carrying line replaceable units (LRU) to a damaged/degraded satellite and accomplishing on-site repair or replacement. It is designed to allow refueling of civil, commercial, and military satellites as well as the rearming of military space weapons platforms.

3.2 Orbital Combat Vehicle (OCV) An uninhabited orbital propulsion and docking system used to take payloads from an earth-to-orbit lift vehicle and place them in their final orbital plane, or used to fetch and return orbiting payloads to a central repair and recovery location. The system can also carry line replaceable units to a damaged/ degraded satellite and accomplish on-site repair or replacement. It is designed to allow refueling of civil, commercial, and military satellites as well as the rearming of military space weapons platforms. The OCV is fitted with a medium power high- energy laser system for limited defense and counterspace missions.

3.3 Satellite Bodyguards A small constellation of defensive satellites (approximately five) placed in close proximity to the protected asset. "Hunter-killers" actively seek out threats and incapacitate them with directed energy weapons. Detection of threats from the surface or air is done by an off-board sensor suite (say, systems 8.1 or 8.2) and supplied to the "hunter-killer" satellites. Detection of space-based threats is done by the "hunter-killer" satellites themselves. Decoy satellites appear identical (both electromagnetic and visual) to the protected assets to confuse an aggressor; when approached, the decoy can impact and disable the enemy craft.

4.1 Piloted SSTO Trans-atmospheric Vehicle A system that provides space support and global reach from the earth's surface to low-earth orbit (LEO) using a combination of rocket and hypersonic air-breathing technology. The trans-atmospheric vehicle (TAV) takes off vertically, is refuellable in either air or space, and can land on a conventional runway. It has a variable payload capacity (up to 10,000 pounds) and performs as both a sensor and weapons platform. Alternate missions include satellite deployment and retrieval from LEO and deployment of an anti-ASAT weapon.

4.2 Uninhabited Air-Launched Trans-atmospheric Vehicle A multirole trans-atmospheric vehicle (TAV). Launched from an airborne platform (such as System 1.1), it is capable of rapid deployment (or retrieval) of satellites providing communication links, intelligence information, and so forth. It carries a suite of multispectral sensors (optical, infrared, radar, laser, etc.) for surveillance and reconnaissance missions. This TAV is a rocket-powered vehicle approximately the size of an F-15, capable of carrying several small satellites (6 ft x 6 ft x 6 ft, 1000 lbs each) to low earth orbit. Further, it could perform an antisatellite (ASAT) role. This TAV can land on a conventional runway.

5.1 Adjustable Yield Munition (AYM) An approach to achieve precise matching of the weapon's effect to the target's characteristics. By manipulating the explosive yield of a weapon (i.e., "dial-a-yield"), together can greatly reduce collateral damage. This is particularly advantageous when flexibility and precision are both required: a platform on patrol, awaiting targets of opportunity, can utilize the same weapon for a hard kill with a large yield or for a surgical, mission-only kill with a tailored yield. One approach to controlling the yield is to change the material composition of the explosive at the molecular level.

5.2 Advanced Air-to-Air Missile A long range air-to-air missile that receives real-time target information from off-board sensors and utilizes reactive jets and an on-board computer to acquire, pursue and destroy enemy air assets, including cruise missiles. Terminal tracking and guidance may employ a combination of LIDAR, Infrared (IR), radio frequency (RF), magnetic anomaly detection (MAD), Jet engine modulation (JEM), photographic, and acoustic sensors.

5.3 Airborne High-Power Microwave Weapon A pulsed power airborne high power microwave (HPM) system. This medium range weapons system constitutes the primary payload of the host escort defense aircraft. The system generates variable magnitude HPM fields that disrupt or destroy electrical components in the target region. It can engage both air and ground targets.

5.4 Standoff Hypersonic Missile An hypersonic air-to-ground missile launched from a hypersonic strike vehicle (System 1.1). It utilizes a scramjet to propel itself at Mach 8 toward the intended high-value target, then glides to target at Mach 4; its flight trajectory is altered as needed via off-board control. Its high-speed air-launched range is 1,450 NM.

5.5 Attack Microbots, A term that describes a class of highly miniaturized (1 millimeter scale) electromechanical systems being deployable en masse and performing individual or collective target attack. Various deployment approaches are possible, including dispersal as an aerosol, transportation by a larger platform, and full flying/crawling autonomy. Attack is accomplished by a variety of robotic effectors, electromagnetic measures, or energetic materials. Some "Sensor Microbot" capabilities are required for target acquisition and analysis.

5.6 Airborne Holographic Projector A projector system that displays a three-dimensional visual image in a desired location, removed from the display generator. The projector can be used for psychological operations and strategic perception management. It is also useful for optical deception and cloaking, providing a momentary distraction when engaging an unsophisticated adversary.

5.7 Hybrid High-energy Laser System (HHELS) A system consisting of several ground-based, multimegawatt high-energy chemical lasers and a constellation of space-based mirrors. HHELS can be used in several modes of operation. In its weapons mode with the laser at high power, it engages air, space, and ground targets by reflecting a laser beam off one or more of the mirrors to the intended target. It can also be used for target tracking, limited space debris removal (1-10 centimeter objects), and replenishment of satellites.

6.1 Global Area Strike System (GLASS) A system incorporating of a high-energy laser (HEL) system, a kinetic energy weapon (KEW) system, and a trans-atmospheric vehicle (TAV). The HEL system consists of ground-based lasers and space-based mirrors which direct energy to the intended target. The KEW system (System 6.2) consists of terminally guided projectiles, with and without explosive enhancers. The TAV (System 4.1) is a flexible platform capable of supporting maintenance and replenishment of the HEL and KEW space assets, and can also be used for rapid deployment of special operations forces. Target definition and sequencing is managed externally (e. g., using GIMS (System 8.1)).

6.2 Space-Based Kinetic Energy Weapon (KEW) A general class of low earth orbit (LEO) based weapons that include a variety of warhead types from flechettes and pellets to large and small high density rods. The KEW may be directed at air, space, and ground targets; it achieves its destructive effect by penetrating the target at hypervelocity. Sensor information is provided to the KEW by a main sensor suite off-board of the vehicle (such as GSRT [System 8.2] or GIMS [System 8.1]). However, each armament has a minimal sensor capability (e. g., GPS receiver) and a simple flight control system for maneuver.

6.3 Space-Based High Power Microwave Weapon (HPM) A weapon system capable of engaging ground, air, and space targets with a varying degree of lethality. It consists of a constellation of satellites deployed in low-earth orbit (LEO) (approx. 500 NM) that can direct an ultrawideband (UWB) of microwave energy at ground, air, and space targets. Its effect is to generate high electric fields over a target area tens to hundreds of meters in size, thereby disrupting or destroying any electronic components present.

6.4 Space-Based High-energy Laser (HEL) System A multimegawatt high-energy chemical laser constellation that can be used in several modes of operation. In its weapons mode with the laser at high power, it can attack ground, air, and space targets. In its surveillance mode, it can operate using the laser at low power levels for active illumination imaging or with the laser inoperative for passive imaging.

6.5 Solar-Powered High-energy Laser System A space-based, multimegawatt, high-energy solar-powered laser constellation that can be used in several modes of operation. In its weapons mode with the laser at high power, it can attack ground, air, and space targets. In its surveillance mode, it can operate using the laser at low power levels for active illumination imaging, or with the laser inoperative for passive imaging.

6.6 Solar Energy Optical Weapon (SEOW) A constellation of space-based mirrors which allow solar radiation to be focused on specific ground, air, or space targets. The lethality of this system is limited, due to optical diffusion; however, it may prove useful for disruption or perhaps weather control.

6.7 Asteroid Mitigation System A system that protects the Earth/Moon system from Earth- crossing objects (ECOs) by either deflecting or fragmenting ECOs such that they no longer pose a threat. Deflection could be accomplished using nuclear explosive devices.

7.1 Spoken Language Translator A hand-held or worn device that translates oral communications in near real-time. It enhances multinational operational effectiveness in all areas, including training, diplomacy, special operations, and conventional ground operations. It is capable of one-for-one word substitution in a wide variety of languages, and it provides two-way communications between the owner and another person. The system has a limited ability to compensate for differences in sentence syntactic structures, cultures, dialects, and idioms/slang, and a limited ability to select words according to context. Careful placement of both microphones and both speakers is required for deconfliction (not having to hear both languages simultaneously), limiting the scope of its operation; the system is best suited for controlled two-way communications such as by telephone, radio, or computer. The system also is useful for written text translation.

7.2 Personal Digital Assistant (PDA) An individual's connection to the information systems of 2025. This assistant is a hand-held or wristwatch size unit. Input modes include both touch and voice. The PDA is the warrior's secure, high-capacity connection to the distributed C4I system. The PDA maintains the owner's personal data such as medical and training records. It learns and remembers the owner's preferences and needs so that requests for information are properly tailored. It is self-securing: it recognizes the owner through a number of biometrics which ensures that it cannot be commandeered. In short, the PDA is a single device replaces the cellular telephone, radio, personal computer, identification and banking cards, and any other personal information- management device of the nineties.

7.3 Virtual Interaction Center A virtual reality environment in which commanders can immerse themselves in a three-dimensional representation of the battlespace. Information from a global information system, such as GIMS (System 8.1) is displayed in a virtual reality environment, giving the commander situational awareness. The center also has the capability to replay battles and engagements and to simulate "what if" scenarios.

8.1 Global Information Management System (GIMS) A pervasive network of intelligent information gathering, processing, analysis, and advisory nodes. It collects, stores, analyzes, fuses, and manages information from ground/air/space sensors and all source intelligence. All types of sensors (i.e., acoustic, optical, radio frequency, olfactory, etc.) are used. However, the true power of this system is its use of neural processing to provide the right type of information based on the user's personal requirements.

8.2 Global Surveillance, Reconnaissance, and Targeting System (GSRT) A space-based omni-sensorial collection, processing, and dissemination system to provide a real-time information database. This database is used to create a virtual-reality image of the area of interest. This image can be used at all levels of command to provide situational awareness, technical and intelligence information, and two-way command and control.

8.3 Sensor Microbots A class of highly miniaturized (millimeter sized) electromechanical air and ground systems capable of being deployed en masse to collect data, perform individual and collective data fusion, and communicate that data for further processing and distribution. Various deployment approaches are possible, including dispersal as an aerosol, transportation by a larger platform, and full flying/crawling autonomy. Data collection is accomplished through miniaturized onboard sensors, typically restricted to one or two sensors per unit due to size and power limitations. Communications are possible by transmission through relay stations ("relaybots") or physical collection of the microbots. Some applications of sensor microbots are security net to guard own assets, surveillance and reconnaissance, and intelligence gathering on adversary assets.

8.4 Multiband Laser Sensor System A suite of laser devices that inspects and models target components. Different frequencies of electromagnetic energy vary in their ability to penetrate materials. For a particular material, one frequency will reflect off the surface, another will penetrate. By employing a suite of laser devices over a wide frequency range, planners can accomplish complete internal and external inspection of a structure and develop a full three-dimensional model. This tool can be used for nondestructive inspection of components, target vulnerability analysis, target identification and decoy rejection, and reconnaissance. This suite of laser devices can be carried on an airborne platform, but it clearly has ground-based applications also.

8.5 Asteroid Detection System A network of ground and space sensors which search for, track, and characterize space objects that are large enough and in an orbit to threaten the earth-moon system. The system also includes a centralized processing center that fuses data from all of the available sensors, catalogs the known objects, and distributes information to the known authorities.

9.1 Mobile Asset Repair Station (MARS) A mobile facility near the battlefront where parts can be repaired or manufactured . In wartime, replacement parts are repaired or manufactured in the theater of operations for a variety of deployed weapon systems through MARS. The mobile facility can be land-based or water-based in the theater of operations, but out of harm's way. The facility features a set of fully-integrated flexible manufacturing systems (FMS) and robotic systems that are linked to the commercial manufacturers. These manufacturers supply the specifications to the FMS which then produces the part or component. Many of the required materials necessary for MARS to manufacture the components obtained from local countries.

9.2 Weather Analysis and Modification System A diverse set of weather prediction and modification tools that allows manipulation of small-to-medium-scale weather phenomena to enhance friendly-force capabilities and degrade those of the adversary. Many of the sensors required for this system are assumed to be external e. g., part of the global information management system (GIMS), discussed in System 8.1.

9.3 Sanctuary Base A secure, low observable, all-weather forward-operating base that reduces the number of assets requiring protection from attack. The runway, power systems, ordnance storage, aircraft maintenance assets, and C4I systems are self-maintaining and self-repairing. Base security is highly automated. Chemical/biological hazards are cleaned up by nanobots and biotechnology. Robots perform refueling, weapons loading, maintenance, security, and explosive ordnance destruction.