FUTURE GROUND COMMANDERS CLOSE SUPPORT NEEDS AND DESIRABLE SYSTEM CHARACTERISTICS pdf

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Future Ground Commanders' Close Support Needs and Desirable System Characteristics. Future Ground Commanders' Close Support Needs and Desirable System.

Supply is the acquiring, managing, receiving, storing, and issuing all classes of supply, except Class VIII, required to equip and sustain Army forces see table This wide-ranging function extends from determining requirements at the national level to issuing items to the user in theater. See chapter 8 for Classes V and IX. See JP for Class X. They consist of clothing exchange, laundry and shower support, textile repair, mortuary affairs, preparation for aerial delivery, food services, billeting, and sanitation. Transportation is moving and transferring units, personnel, equipment, and supplies to support the concept of operations. Transportation incorporates military, commercial, and multinational capabilities. Transportation assets include motor, rail, air and water modes and units; terminal units, activities, and infrastructure; and movement control units and activities. Maintenance entails actions taken to keep materiel in a serviceable, operational condition, returning it to service, and updating and upgrading its capability. It includes performing preventive maintenance checks and services; recovering and evacuating disabled equipment; diagnosing equipment faults; substituting parts, components, and assemblies; exchanging serviceable materiel for unserviceable materiel; and repairing equipment FM The ultimate key to effective maintenance is anticipating requirements. Explosive ordnance disposal EOD is the detection, identification, on-site evaluation, rendering safe, recovery, and final disposal of unexploded explosive ordnance. It may also include explosive ordnance that has become hazardous by damage or deterioration JP EOD support neutralizes domestic or foreign conventional, nuclear, biological, and chemical NBC munitions, and improvised devices that present a threat to military operations and to military and civilian facilities, materiel, and personnel. Health service support HSS consists of all services performed, provided, or arranged to promote, improve, conserve, or restore the mental or physical well-being of personnel in the Army and, as directed, for other services, agencies, and organizations. HSS conserves the force by preventing disease and nonbattle injuries DNBIs ; clearing the battlefield of casualties; providing far-forward medical treatment and hospitalization; providing en route care during medical evacuation; providing veterinary, dental, combat stress control, and laboratory services; and ensuring adequate Class VIII supplies, medical equipment, and blood are available. Human resource support HRS provides all activities and functions to sustain personnel manning of the force and personnel service support to service members, their families, Department of the Army civilians, and contractors. These activities include personnel accounting, casualty management, next-of-kin notification, essential personnel services, postal operations, and morale, welfare, and recreation. Joint doctrine refers to human resource support as personnel service support. Financial management operations FMO encompasses the two core processes of resource management and finance operations JP FMO make resources available when and where they are needed, and assist the commander in maintaining fiscal responsibilities. FMO are necessary for contracting and providing real-time information, accounting, and finance-related services. Resource management operations ensure that operational policies and procedures adhere to law and regulations, develop command resource requirements, and leverage appropriate fund sources to meet them. Legal support is the provision of operational law support in all legal disciplines including military justice, international law, administrative law, civil law, claims, and legal assistance to support the command, control, and sustainment of operations. Religious support is the provision and performance of operations for the commander to protect the free exercise of religion for soldiers, family members, and authorized civilians. It includes providing pastoral care, religious counseling, spiritual fitness training and assessment, and religious services of worship. It also includes advising the command on matters of religion, morals and ethics, and morale. Army band support is the provision of music to instill in soldiers the will to fight and win, foster the support of citizens, and promote National interests at home and abroad. Bands support information operations, provide music to the civilian community, promote patriotism and

interest in the Army, and demonstrate the professionalism of Army forces. Engineer units, normally in a direct support DS relationship to CSS headquarters, are responsible for constructing, maintaining, and rehabilitating the theater distribution system. Their responsibilities include support to other services, agencies, and multinational forces. The numbers and types of engineer units involved in such operations depend on mission, enemy, terrain and weather, troops and support available, time available, civil considerations METT-TC factors. Of particular importance are the size of the support bases required, existing host nation HN infrastructure, and the perceived threat. FM describes an agile Army force. Agile forces are mentally and physically able to transition within or between types of operations with minimal augmentation, no break in contact, and no significant additional training. Responsiveness, flexibility, and economy are key CSS characteristics that enable CSS forces to support an agile combat force and execute operations more swiftly than their opponents. They help get the force what it needs to initiate, sustain, and extend operations. Agile CSS forces allow combat forces to adapt quickly to full spectrum operations and missions, while expending as few resources as possible and minimizing the CSS footprint. Agile Army CSS requires planning and development within the context of unified action-operations that involve joint, multinational, and interagency organizations. Department of Defense DOD executive agent directives, combatant commander lead-service designations, interservice support agreements, contracted support arrangements, and multinational support agreements help commanders tailor the deployment of Army CSS organizations and make overall support as effective, yet as economical as possible. Elements of the strategic base, such as the U. Commanders integrate them into the overall CSS force. They provide support at the operational level and, in certain scenarios, the tactical level. Other aspects of an agile CSS force are modular designs, the ability to tailor CSS organization for the supporting mission, and the ability to conduct split-based operations. Selected CSS units are structured as modular organizations. This allows commanders to employ individual modules to provide a support function, while the rest of the unit remains operational. This lower-level force tailoring enhances responsiveness. CSS force tailoring refers to determining and deploying the right mix of CSS units to support the force or mission. Split-based operations refer to performing certain CSS administrative and management functions outside the joint operations area JOA , whether in a secure location in the communications zone COMMZ , at an intermediate staging base ISB , or at home station. Soldiers and civilians can perform personnel, materiel, and distribution management functions without deploying to the JOA if the information systems are adequate. This helps minimize strategic lift requirements, reduce the CSS footprint in theater, and still meet support requirements. The Army has begun the challenging transition from a supply-based to a distribution-based CSS system. Distribution-based CSS replaces bulk and redundancy with velocity and control. During this transition, some units may not be able to execute all operations percent according to distribution doctrine. However, only an agile distribution-based CSS system will allow Army forces to be strategically responsive and operationally effective across the full range of military operations. Distribution includes all the actions performed to deliver required resources units, materiel, personnel, and services to, from, and within a theater. Distribution-based CSS includes visibility, management, and transportation of resources flowing to supported forces, as well as the information systems, communications, and physical and resource networks of the distribution system. Chapter 5 discusses distribution-based logistics. The following are critical aspects of a distribution-based system. Throughput is the flow of sustainability assets in support of military operations, at all levels of war, from point of origin to point of use. It involves the movement of personnel and materiel over lines of communications using established pipelines and distribution systems. Throughput distribution bypasses one or more echelons in the system to minimize handling and speed delivery forward. Distribution-based CSS emphasizes using containerization, to include palletization and packaging within materiel-handling equipment constraints , to accommodate support and improve velocity. Velocity is achieved by throughput of resources from the sustaining base directly to tactical-level support organizations as much as possible. A configured load is a single or multicommodity load of supplies built to the anticipated or actual needs of a consuming unit, thereby, facilitating throughput to the lowest possible echelon. MCLs are

built inside a theater of operations for a specific mission, unit, or purpose. UCL is a configured load built to the known requirements of a consuming unit. These loads are normally built in the corps AO to be delivered directly to the consuming unit. Scheduled delivery involves moving resources from the supporting organization to the supported units at agreed-on time intervals. Distribution managers at each echelon coordinate with the supported unit to establish scheduled delivery times for routine replenishment. Generally, this includes items such as bulk fuel, ammunition, and operational rations. Time-definite delivery TDD is a commitment between the CSS manager and the supported commander and specifies order-ship times OSTs within which specified commodities requested by the supported unit must be delivered. The commander responsible for both the supporting and supported organizations establishes the TDD as part of the distribution plan. TDD parameters are normally expressed in terms of hours or days for each major commodity. If the commander wants to establish shorter TDD schedules, he has to accept larger stockage levels forward on the battlefield, shorter LOC, or both, with an accompanying loss of flexibility and agility. Effective distribution depends on the movement control principle of maximum use of carrying capacity. This principle involves more than loading each transport vehicle to its maximum cubic carrying capacity. It also means using all available transport capability in the most efficient manner. While allowing for adequate equipment maintenance and personnel rest, transportation operators should keep transportation assets loaded and moving as much as the situation permits. Adhering to the principles of velocity management may conflict with this principle. Delivering a shipment rapidly may require transporting it in a less-than-truckload shipment. Individual commanders and logisticians must consider the ramifications of maximizing the carrying capacity or transporting in less-than-truckload shipment when developing the distribution plan. Velocity management VM is an Army-wide total quality management, process-improvement program. VM strives to provide world-class logistics support while providing a hedge against unforeseen interruptions in the logistics pipeline by leveraging information technologies and optimizing its processes. The overarching objective is to get supplies into the hands of the warfighter in days or hours, not weeks. VM dramatically improves the responsiveness and efficiency of the Army logistics system. VM works with logistics applications and technology as process enablers. These enablers provide commanders, from strategic to tactical level, the ability to maintain visibility of materiel movement, receipt, storage, and inventory throughout all logistics operations. Information systems, such as joint total asset visibility JTAV and Global Transportation Network GTN , integrate multiple distribution and transportation enablers into a single data warehouse. Several management tools give the logistician the ability to manage assets proactively and provide responsive support. Another management tool is the equipment downtime analyzer EDA , a decision support tool that improves measurement of equipment readiness and its components. It works by combining data from various Army databases to provide a comprehensive picture of overall operational results. For deployment planning and contingency operations, logisticians can use the deployment stock planner DSP to create a deployment authorized stockage list ASL tailored to their specific mission and environmental conditions. The DSP is a software tool that allows a unit to compare a deployment stock package to its current ASL quickly, allowing the unit to make any necessary changes to the package. A key component to VM is establishing and maintaining site improvement teams SITs by installation commanders. Commanders organize SITs to focus on logistics processes on their installation. The SIT uses the methodology of define, measure, and improve for logistics optimization at the organization level. The program of the SIT includes a review of VM-established metrics and those metrics listed in AR and AR , and a translation of these metrics into logistics process objectives for the organization. Ultimately, VM enhances total performance as the Army reduces stockpiles and converts to precision, speed, and tailored logistics.

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2: FM Chapter 1, Fundamentals of Army Combat Service Support

": The fundamental importance of close support (augmenting firepower to support engaged ground forces) has been understood for decades, but Desert Storm and more recent operations have raised questions about whether the demand for close support has changed or even disappeared.

Nation Apr 8, 5: It cannot survive or operate effectively where there are more advanced aircraft or air defenses. Air Force photo by Senior Airman Carlin Leslie The military commander responsible for ensuring that the Air Force is prepared and capable of winning future wars said the move was unfortunate, but unavoidable in a tightening fiscal environment. This is about what I have to do. That money is to be spent on higher priority weapons, including the long-delayed F Joint Strike Fighter. It was designed to operate in support of ground forces and built to take punishment from surface-to-air fires. It has been reconfigured to carry only conventional munitions. Both the B-1 and A were produced in the early s through the s. Russell, the retired Chief Master Sergeant, echoed the sentiment that a vast number of JTACs resent the decision made by the leaders of their service to retire the A The aircraft flies low and slow â€” an asset for targeting enemy ground troops. And its cockpit is heavily armored, which protects its pilot from ground fire. It is good for one thing and one thing only. And that is close air support. This former JTAC also requested anonymity in this article because he works for a company with Defense Department contracts. Air Force photo by Tech. Hostage said he pledged to the Army that the Air Force would build on what it has learned during the wars in Iraq and Afghanistan. We are not going to give up any of the elegance of what we developed. You may get some AC [ground-attack gunship], but I guarantee the overwhelming response will be the A The As checked in and, in rapid succession, destroyed three of the four BRDM reconnaissance vehicles that were calling in fires on top of our column. But Hostage also said that if there were no As available during a close-proximity fight, he was sure JTACs would accept whatever aircraft were available. Is the A Thunderbolt a Cold War relic, or a battlefield workhorse?

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3: Airmen at odds with Air Force brass over future of beloved A plane | PBS NewsHour

Ever since World War II, the importance of close support-responsive, flexible fire support that is needed near enough to friendly forces that it requires detailed integration and coordination-has been well understood by ground commanders. But Desert Storm and other operations since the end of the.

Essential Functions of the Gladiator system include: The Gladiator Program is a U. Changes in service deficiencies and required capabilities have led both services to reevaluate the existing ORD and to initiate efforts to revise or approve new Requirements Documents for robotic systems supporting the tactical commander. The system will reduce risk and neutralize threats to Marines across the full spectrum of conflict and range of military operations. Fielding of the Gladiator is estimated for The Gladiator is designed primarily to support dismounted infantry during the performance of their mission across the spectrum of conflict and range of military operations. Additionally, the Gladiator will deploy non-lethal area denial and crowd control weapons. The Gladiator will be expeditionary in nature, inherently simple, durable, multi-functional, and easily transported and operated in the littoral battlespace. The TUGV system will be fielded to infantry battalions and combat engineer companies and must be strategically, operationally, and tactically deployable worldwide in ground, aircraft and sea transport conveyances available to the MAGTF. It is expected that the OCU will exchange video and data signals with the Gladiator via a non-tethered military link. The Gladiator must be supportable within the existing Department of the Navy three-level maintenance concept organizational, intermediate, and depot using common tools and general-purpose test equipment to the maximum extent possible. The system cannot increase the expeditionary embarkation footprint or manpower requirements of the MAGTF and will be operated by designated, vice dedicated, personnel. The systems must be expeditionary in nature, inherently simple, durable, multi-functional, and easily transported and operated in littoral battlespace. Operating forward of the GCE units, the TUGV will perform situational awareness and enemy neutralization tasks while permitting the operator to remain covered and concealed. The TUGV will be operational and maintainable in all types of climates, weather conditions, and terrain where Marines deploy. The Gladiator will significantly enhance the ability of tactical units to rapidly detect, locate, track, and neutralize close-in threats i. Non-Lethal Weapons are defined as follows: Unlike conventional lethal weapons that destroy their targets principally through blast penetration and fragmentation, non-lethal weapons employ means other than gross physical destruction to prevent the target from functioning. Non-lethal weapons are intended to have one, or both, of the following characteristics: Remotely employed NLMPMs should assist the warfighter with mission tasks by enhancing engagements, providing a broader range of desired and precisely directed target effects, and significantly reducing injury to warfighters. The NLMPMs shall be expeditionary in design and support, inherently simple, durable, tailored, and easily integrated into the TUGV power and control systems, as well as have independent target tracking and acquisition, power, and control systems when mounted on other systems or in the ground emplaced mode. In addition, the NLMPM should have the capability to be dismounted and employed independent of any platform e. The TUGV is designed to support dismounted ground forces during the performance of their mission, across the spectrum of conflict and range of military operations. The NLMPM is intended to be capable of engaging targets, both point and area, at various ranges and elevations relative to the base mounting platform TUGV, tactical vehicle, etc. The TUGV will execute the following non-lethal mission tasks:

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4: Close air support - Wikipedia

Get this from a library! Future ground commanders' close support needs and desirable system characteristics. [Bruce W Don; United States. Department of Defense.

History[edit] World War I[edit] The use of aircraft in the close air support of ground forces dates back to World War I , the first significant use of aerial units in warfare. The aircraft was a visible and personal enemyâ€”unlike artillery â€”presenting a personal threat to enemy troops, while providing friendly forces assurance that their superiors were concerned about their situation. Though most air-power proponents sought independence from ground commanders and hence pushed the importance of interdiction and strategic bombing, they nonetheless recognised the need for close air support. E 2d was one of the first aircraft to be used for close air support in the observer is demonstrating the use of the rear-firing Lewis gun. By that point, the startling and demoralizing effect that attack from the air could have on the troops in the trenches had been made clear. At the Battle of the Somme , 18 British armed reconnaissance planes strafed the enemy trenches after conducting surveillance operations. The success of this improvised assault spurred innovation on both sides. In , following the Second Battle of the Aisne the British debuted the first ground-attack aircraft, a modified F. E 2b fighter carrying lb bombs and mounted machine-guns. After exhausting their ammunition the planes returned to base for refuelling and rearming and returned to the battlezone. Other modified planes used in this role were the Airco DH. By that time, effective anti-aircraft tactics were being used by the enemy infantry and pilot casualties were high, although air support was later judged as having been of a critical importance in places where the infantry had got pinned down. As well as strafing with machine-guns, the planes were modified with bomb racks; the plane would fly in very low to the ground and release the bombs just above the trenches. I , a First World War German ground-attack aircraft The Germans were also quick to adopt this new form of warfare and were able to deploy aircraft in a similar capacity at Cambrai. While the British used single-seater planes, the Germans preferred the use of heavier two-seaters with an additional machine gunner in the aft cockpit. The Germans adopted the powerful Hannover CL. II and built the first purpose built ground attack aircraft , the Junkers J. During the Spring Offensive the Germans employed 30 squadrons, or Schlasta , of ground attack fighters and were able to achieve some initial tactical success. It was during the Sinai and Palestine Campaign of that Close Air Support was first proven to be an important factor in ultimate victory. After the British achieved air superiority over the German aircraft sent to aid the Ottoman Turks , squadrons of S. Combined with a ground assault led by General Edmund Allenby , three Turkish armies soon collapsed into a full rout. No 1 Squadron made six heavy raids during the day, dropped three tons of bombs and fired nearly 24, machine gun rounds. The close air support doctrine was further developed in the interwar period. Most theorists advocated the adaptation of fighters or light bombers into the role. During this period, airpower advocates crystallized their views on the role of air-power in warfare. Aviators and ground officers developed largely opposing views on the importance of CAS, views that would frame institutional battles for CAS in the 20th century. The newly formed RAF contributed to the defeat of Afghan forces during the Third Anglo-Afghan War by harassing the enemy and breaking up their formations. Following from these successes, the decision was made to create a unified RAF Iraq Command to use air power as a more cost-effective way of controlling large areas than the use of conventional land forces. The Condor Legion reduced the city of Guernica to rubble, and greatly influenced German military strategists. During the Spanish Civil War German volunteer aviators of the Condor Legion on the Nationalist side, despite little official support from their government, developed close air support tactics that proved highly influential for subsequent Luftwaffe doctrine. Marine Corps Aviation was used as an intervention force in support of U. Marine Aviators experimented with air-ground tactics and in Haiti and Nicaragua they adopted the tactic of dive bombing. Aviators, who wanted institutional independence from the Army, pushed for a view of air-power centered around interdiction, which would relieve them of the necessity of integrating with ground

forces and allow them to operate as an independent military arm. They saw close air support as both the most difficult and most inefficient use of aerial assets. Close air support was the most difficult mission, requiring identifying and distinguishing between friendly and hostile units. At the same time, targets engaged in combat are dispersed and concealed, reducing the effectiveness of air attacks. They also argued that the CAS mission merely duplicated the abilities of artillery, whereas interdiction provided a unique capability. Ground officers contended there was rarely sufficient artillery available, and the flexibility of aircraft would be ideal for massing firepower at critical points, while producing a greater psychological effect on friendly and hostile forces alike. Fuller and Basil Liddell Hart. Instead he proposed that: For this purpose the close co-operation of low-flying aircraft As a continental power intent on offensive operations, Germany could not ignore the need for aerial support of ground operations. Though the Luftwaffe , like its counterparts, tended to focus on strategic bombing, it was unique in its willingness to commit forces to CAS. Unlike the Allies, the Germans were not able to develop powerful strategic bombing capabilities, which implied industrial developments they were forbidden to take according to the Treaty of Versailles. Experience in the Spanish Civil War lead to the creation of five ground-attack groups in ,[dubious â€" discuss] four of which would be equipped with Stukas. The Luftwaffe matched its material acquisitions with advances in the air-ground coordination. General Wolfram von Richthofen organized a limited number of air liaison detachments that were attached to ground units of the main effort. These detachments existed to pass requests from the ground to the air, and receive reconnaissance reports, but they were not trained to guide aircraft onto targets. These preparations did not prove fruitful in the invasion of Poland , where the Luftwaffe focused on interdiction and dedicated few assets to close air support. General Heinz Guderian , one of the creators of the combined-arms tactical doctrine commonly known as " blitzkrieg ", believed the best way to provide cover for the crossing would be a continuous stream of ground attack aircraft on French defenders. Though few guns were hit, the attacks kept the French under cover and prevented them from manning their guns. Aided by the sirens attached to Stukas, the psychological impact was disproportional to the destructive power of close air support although as often as not, the Stukas were used as tactical bombers instead of close air support, leaving much of the actual work to the older Hs units for the first years of the war. In addition, the reliance on air support over artillery reduced the demand for logistical support through the Ardennes. Though there were difficulties in coordinating air support with the rapid advance, the Germans demonstrated consistently superior CAS tactics to those of the British and French defenders. Later, on the Eastern front , the Germans would devise visual ground signals to mark friendly units and to indicate direction and distance to enemy emplacements. Fortunately for the Germans, his order was issued too late to be implemented, and the Luftwaffe commander followed the schedule he had previously worked out with Guderian. Their decline was caused by the growing strength of the Red Air Force and the redeployment of assets to defend against American and British strategic bombardment. In during the Battle of France , the Royal Air Force and Army headquarters in France were located at separate positions, resulting in unreliable communications. The stunning effectiveness of German air-ground coordination spurred change. Woodall British Army issued the Wann-Woodall Report, recommending the creation of a distinct tactical air force liaison officer known colloquially as "tentacles" to accompany Army divisions and brigades. When trained tentacle teams arrived in , they cut response time on support requests to thirty minutes. One aircraft would be attacking, another in flight to the battle area, while a third was being refuelled and rearmed at its base. If the first attack failed to destroy the tactical target, the aircraft in flight would be directed to continue the attack. The first aircraft would land for its own refuelling and rearming once the third had taken off. Light reconnaissance aircraft would observe enemy activity and report it by radio to the FASL which was attached at brigade level. The controller rode in the "leading tank or armoured car" and directed a "cab rank" of aircraft above the battlefield. By the time the Italian Campaign had reached Rome , the Allies had established air superiority. They were then able to pre-schedule strikes by fighter-bomber squadrons; however, by the time the aircraft arrived in the strike area, oftimes the targets, which were usually trucks, had fled. These were pairings of air controllers and army liaison officers at the

front but able to switch communications seamlessly from one brigade to another â€" hence Rover. Incoming strike aircraft arrived with pre-briefed targets, which they would strike 20 minutes after arriving on station only if the Rovers had not directed them to another more pressing target. Rovers might call on artillery to mark targets with smoke shells, or they might direct the fighters to map grid coordinates, or they might resort to a description of prominent terrain features as guidance. However, one drawback for the Rovers was the constant rotation of pilots, who were there for fortnightly stints, leading to a lack of institutional memory. US commanders, impressed by the British tactics at the Salerno landings, adapted their own doctrine to include many features of the British system. This incorporated the unerring belief that unescorted bombers could win the war without the advent of ground troops. This doctrine proved to be fundamentally flawed. However, during the entire course of the war the USAAF top brass clung to this doctrine, and hence operated independently of the rest of the Army. Thus it was initially unprepared to provide CAS, and in fact, had to be dragged "kicking and screaming" into the CAS function with the ground troops. USAAF doctrinal priorities for tactical aviation were, in order, air superiority, isolation of the battlefield via supply interdiction, and thirdly, close air support. So few aerial assets were assigned to U. The situation improved during the Italian Campaign , where American and British forces, working in close cooperation, exchanged CAS techniques and ideas. Army shared headquarters, meeting every evening to plan strikes and devising a network of liaisons and radios for communications. However, friendly fire continued to be a concern â€" pilots did not know recognition signals and regularly bombed friendly units, until an A was shot down in self-defense by Allied tanks. The expectation of losses to friendly fire from the ground during the planned invasion of France prompted the black and white invasion stripes painted on all Allied aircraft from However, there was no training to match the purchases. Six months before the invasion of Normandy , 33 divisions had received no joint air-ground training. He developed the "armored column cover", where on-call fighter-bombers maintained a high-level of availability for important tank advances, allowing armor units to maintain a high tempo of exploitation even when they outran their artillery assets. He also used a modified antiaircraft radar to track friendly attack aircraft to redirect them as necessary, and experimented with assigning fighter pilots to tours as forward air controllers to familiarize them with the ground perspective. When the armored units broke out of the Normandy beachhead, tank commanders were able to communicate directly with overhead fighter-bombers. However, despite the innovation, Quesada focused his aircraft on CAS only for major offensives. Typically, both British and American attack aircraft were tasked primarily to interdiction, even though later analysis showed them to be twice as dangerous as CAS. The American Navy and Marine Corps used CAS in conjunction with or as a substitute for the lack of available artillery or naval gunfire in the Pacific theater. Navy and Marine F6F Hellcats and F4U Corsairs used a variety of ordnance such as conventional bombs, rockets and napalm to dislodge or attack Japanese troops utilizing cave complexes in the latter part of World War II. As early as the Battles of Khalkhyn Gol in , Soviet aircraft had the task of disrupting enemy ground-operations. This use increased markedly after the June Axis invasion of the Soviet Union. Joseph Stalin paid the Il-2 a great tribute in his own inimitable manner: Marines fighting Chinese forces during the Korean War , December Though eventually the Air Force supplied sufficient pilots and forward air controllers to provide battlefield support, coordination was still lacking. Since pilots operated under centralized control, ground controllers were never able to familiarize themselves with pilots, and requests were not processed quickly. In December , Lt.

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5: MANEUVER AIR SUPPORT (MAS)

Ever since WWII, the importance of close support-defined as responsive, flexible fire support that is needed near enough to friendly forces that it requires detailed integration and coordination-has been well understood by ground commanders.

You can help by adding to it. Relaxing the C requirement to allow vehicles to be transported in a stripped down configuration allowed the weight cap to be increased from 18 tons per vehicle, to 24 tons. Design[edit] Chassis and components. Most vehicles were protected with Hard-kill active protection systems capable of defeating most threats. Protection from higher caliber rounds as well as anti-tank guided missiles would be provided by an active protection system manufactured by Raytheon known as " Quick Kill ". Use of a common chassis was to reduce the need for specialized training of personnel and allow for faster fielding of repairs. The MGV platform utilized a hybrid diesel-electric propulsion system. The MGV also employed numerous weight-saving features, including composite armor, composite and titanium structural elements, and continuous band tracks. Early Northrop Grumman wheeled concept firing a solid state laser. FCS-Wheeled was an early concept designed to demonstrate hybrid-electric drive system and two-man cockpit workstation. The vehicle would have also had some type of active protection system. The arrangement of the turbine and drive motor provided for a two-man, side-by-side cockpit and a sizable payload compartment. Reconnaissance and surveillance vehicle[edit] XM Reconnaissance and Surveillance Vehicle RSV The XM Reconnaissance and Surveillance Vehicle RSV featured a suite of advanced sensors to detect, locate, track, classify and automatically identify targets under all climatic conditions , day or night. The suite included a mast-mounted, long-range optoelectronic infrared sensor, an emitter mapping sensor for radio frequency interception and direction finding , chemical sensor and a multifunction radio frequency sensor. The RSV also features the onboard capability to conduct automatic target detection , aided target recognition and level-one sensor fusion. This required the use of an integrated sensor network to detect enemy forces. It would be capable of providing direct support to the dismounted infantry in an assault, defeating bunkers , and breaching walls during tactical assaults. The NLOSC provided networked, extended-range targeting, and precision attack of point and area targets in support of other combat units with a suite of munitions that include special purpose capabilities. The Non-Line-of-Sight Cannon provided sustained fire for close support and destructive fire for tactical standoff engagement. It was an ton class vehicle that would have been a replacement for current vehicle systems in the ton weight class. It would provide a level of air transportability that current M systems cannot at present match. The system as proposed looked to add capabilities that the current M systems do not offer. One of the proposed systems advantages was the ability to switch shell types quickly on a one by one basis allowing an illumination round to be followed by a point detonation round, to be followed by an area effect round. This would have given the system the ability to fire different rounds as required by different fire calls or to change types of shells. For instance, destroying a building then engaging anyone fleeing the area with the next round. The rate of fire in the proposed system would have enabled more rounds sent downrange in a given amount of time, allowing more firepower per system than available with the current M system. A MRSI mission is where the cannon fires several rounds at different trajectories allowing the rounds to impact on the same target at the same time, resulting in little or no reaction time for the enemy to adjust its position. This was accomplished by including the autoloader from the Crusader project which achieved the goals of a much improved fire rate with a reduction in required crew. Navigation of the vehicle and targeting information were provided via GPS and networked information systems. This also allowed the system to use a crew of two instead of five. This was desirable, as staffing continues to be a major contributor to life cycle cost of any combat system. Prototype 1 made its first public appearance on the National Mall in Washington on June 11, A total of eight prototypes were delivered to the U. Army Yuma Proving Ground, Arizona, by It had a fully automated firing control system and a manually assisted, semi-automated ammunition loading system. It uses a crew of 3. As part of an

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NLOS-M battery, individual NLOS-M vehicles will provide precision-guided rounds to destroy high-value targets, protective fires to suppress and obscure the enemy, and illumination fires. All of these will be in close support of infantry maneuver units. The FCS command, control, communications, computers, intelligence, surveillance and reconnaissance C4ISR network enables the NLOS-M fire control system to conduct semi- to autonomous computation of technical fire direction, automatic gun lay, preparation of the ammunition for firing, and mortar round firing. The recovery vehicle is designed to hold a crew of three with additional space for three additional recovered crew. The ICV featured a crew of 2 and space for 9 passengers. All four platform versions have similar exteriors to prevent targeting of a specific ICV versions. The ICV can move, shoot, communicate, detect threats, and protect crew and critical components under all climatic conditions , day or night. The squad would have access to Army and joint fire delivery systems from external sources e. Networking with other components of the unit of action permits rapid identification of targets and improves situational awareness. The Medical Vehicle serves as the primary medical system within the unit of action UA and will have two mission modules: The time-sensitive nature of treating critically injured soldiers requires an immediately responsive force health protection system with an expedient field evacuation system. Command and control vehicle[edit] XM Command and Control Vehicle C2V The XM Command and Control Vehicle C2V was to provide for information management of the integrated network of communications and sensor capability within the unit of action and provide the tools for commanders to synchronize their knowledge of combat power with the human dimension of leadership. It was to be located within the headquarters sections at each echelon of the unit of action down to the company level, and with its integrated command, control, and communications equipment suite, was to make command and control on the move possible. The C2Vs were to contain all the interfaces required to enable the commander to leverage the power of the C4ISR network and provides the means for leaders at all levels to achieve information superiority and situational understanding. In addition, the C2Vs were meant to make possible the establishment, maintenance and distribution of a common operating picture fused from the friendly, enemy, civilian, weather and terrain situations while on the move. The crew was to use its integrated C4ISR suite communication, computers and sensor systems to receive, analyze and transmit tactical information via voice, video and data inside and outside the unit of action. The C2V was also planned to employ unmanned systems, such as unmanned aerial vehicles UAVs to enhance situational awareness throughout the unit of action.

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6: Global Positioning System - Wikipedia

Future Ground Commanders' Close Support Needs and Desirable System Characteristics. by United States Department of Defense Office of the Secretary of Defense (Author.

Vietnamese provincial authorities assessed that 85 percent of the city was destroyed and up to 1, civilians were killed in the operation. The military continues to struggle with built-up environments with civilians presentâ€”a struggle that grows dramatically alongside the scale of the town or city in question. The recent battles in Aleppo, Mosul, and Raqqa show how this reality persists. In fact, the story of Ben Tre pales in comparison to recent urban battles. The battle to liberate Mosul, Iraq came after Islamic State fighters seized and had occupied the city for over two years. It took nine months, one hundred thousand Iraqi security forces and a large contingent of US military support to take Mosul back. An estimated , Iraqis were displaced by the battle. When the former residents of Mosul returned, there was little left. Over forty thousand homes and sixteen neighborhoods were completely destroyed. The fight to reclaim Mosul was not led by, or fought with, US forces, but Iraqi forces were supported by US intelligence, airpower, and artillery fire. Nevertheless, there is little reason to believe a US military operation would have used different methods or would have resulted in substantially fewer civilian casualties and less destruction. When I attend conferences on urban combat I am frequently asked questions about protecting civilians in urban warfare and why urban combat is so uniquely destructive. But, in all these events, I have never been asked the more straightforward question: Why must the military destroy a city to save it? These discussions are often raised in the context of the efforts of the United Nations and humanitarian aid organizations to prohibit the use of explosive weapons in urban combat. Statistics are cite d showing that during recent battles in the Middle East, three out of every four victims of explosive weapons were civilians. Context in war is everything. Urban warfare can include any of the many missions that fall within the full range of military operations. It might be a humanitarian aid operation that involves small battles against insurgent or criminal forces fighting over aid resources. It could be operations against terrorist, guerilla, or insurgent forces conducted during a larger stability operation against a single or more complexly multiple anti-government and often competing factions. Or it could take the form of an all-out assault on a city occupied by enemy forces. On top of this, the political situation, rules of engagement, number of enemy forces, enemy capabilities and tactics, presence and status of civilians, and the capability and size of the military organization conducting the operations all further contribute to define the specific character of warfare. It could be a nonstate paramilitary organization with military training and capabilities, like the Chechen rebels in the battles for Grozny in â€” and â€” Or it could be a well-equipped and prepared terrorist organization, like the Islamic State in the battles across Iraq and Syria since Regardless, the most destructive urban battles usually occur when an enemy force decides to defend from within a city and an opposing force has decided the city must be reclaimed or the enemy eliminated. Cities represent the toughest and most complex environment within which armed forces conduct military operations. Defending forces can also use the terrain to funnel military forces into dense areas that break up formations and limit their ability to conduct maneuver warfareâ€”the preferred way of operating for Western military forces. Defenders can literally turn every building into a battlefield with a single sniper or small group of fighters that attacking forces must either fight or destroy. The history of urban warfare is full of cases of tenacious enemy forces using a single building or a series of buildings to hold off far superior attackers. To understand how a military will execute an operation to reclaim a city, a student of war must understand both military doctrine and historical case studies. Every city is distinctive, every enemy is unique, and therefore every battle is different. But by looking at current doctrine alongside a survey of history, we can identify some commonalities in approaches and even make assertions on the likely way the military might best fight in cities in the future. Destroying Cities to Save Them: Inside Military Doctrine US Army urban doctrine includes no specific guidance on how to recapture an occupied city. It does provide general characteristics, as well as things like

sequencing of forces, task organization considerations, and recommended steps for urban offensive operationsâ€”which are precisely the same as offensive instruction s for other environments. In planning a major, offensive urban operation to liberate a city, the military will identify the form of maneuver and type of offensive task. The most common and likely form of maneuver and offensive task for this mission will be a penetration to conduct a deliberate attack. A penetration maneuver seeks to penetrate a prepared and comprehensive enemy defense at an advantageous and hopefully unexpected location. A deliberate attack is just that, one that is planned. It is the opposite of a hasty attack, in which a unit executes an unplanned attack to take advantage of a particular situation e. Doctrine recommends the following phases for deliberate attacks: To remove some of the jargon and simplify, if military forces seek to reclaim an occupied city they will: Once military forces penetrate into an urban area, their formations are disaggregated by the dense physical terrain. This is where a majority of urban attacks rapidly break down into firefights between small groups of soldiers and enemy forces. Furthermore, small groups of attacking soldiers are often required to clear every room, from one building to the next, block by block. When soldiers clearing buildings identify enemy forces, they will either deploy close-quarters combat techniques to enter and clear the enemy-held buildings or they will engage the structures with direct, indirect, and aerial-delivered munitions to kill the enemy forces inside. These munitions range from hand-carried weapons to vehicle-mounted direct-fire weapons, artillery, mortars, rotary- and fixed-wing aircraft, and even unmanned aerial vehicles. Soldiers often begin urban assaults by attempting to enter and clear all buildings, because it allows them the ability to positively identify exactly what is in them. Frequently, however, after suffering casualties or when momentum slows and the soldiers are unable to dislodge or even reach the enemy inside the buildings, they resort to attacking buildings by fire. It is important to point out the difference between planned and unplanned fire support. Planned fires involves a targeting process that identifies what locations are to be fired upon and when, includes collateral damage risk calculations, and even incorporates legal reviews of targets to be hit before and during the urban operation. Unplanned fire support is used by maneuvering forces to suppress or destroy known and suspected enemy locations, prevent enemy escape, and provide friendly forces freedom of maneuver. Soldiers have more precision fire options than ever beforeâ€”guided munitions, including the millimeter Excalibur howitzer round, guided multiple launch rocket system rounds, and aircraft missiles and bombs with low-explosive yields. Soldiers will use the best tools they have available to accomplish the task at hand. A vivid example of the difficulty inherent in entering buildings in major urban fights is described in detail in Reimagining the Character of Urban Operations for the U. Richard Natonski, acknowledged an even greater shift. The Historical Case A survey of historical cases of urban warfare yields an array of important insights, the most significant of which has to do with the tools available to the forces involved in these cases. There are very few toolsâ€”a compelling argument could be made that there are zeroâ€”in modern US Army formations designed for major combat operations in dense urban terrain. And they are designed to destroy the enemy, not to liberate civilians or to ensure low collateral damage. Major wargames that determine the capabilities and size of military formations primarily involve two state actors fighting a major battle in places like the open plains of Eastern Europe, deserts of the Middle East, or littoral areas of Asia and the Pacific. Military units are designed with capabilities optimized to destroy enemy forces in these environments. This means that there are no urban-specific units in the US Armyâ€”not a single one that is specifically dedicated to preparing for combat in cities. Force design also includes factors of adaptability. While designed for major combat operations against near-peer threats currently Russia and China in a limited amount of settings, all US Army formations are expected to adapt to the full range of military operations, against all types of enemies e. While special forces do have the advantage of being regionally alignedâ€”so at least they can focus their training to a more specific regionâ€”there are none focused on major urban areas. Consequently, when faced with major urban combat to reclaim an occupied city, general purpose military units and soldiers attempt to adapt tools and tactics designed for other environments. Many of these toolsâ€”like tanks and Bradley infantry fighting vehicles that provide mobile protected fire or precision-guided munitions that limit collateral damageâ€”do

provide soldiers needed capabilities in urban environments. Others have to be greatly adapted from their traditional purposes, like howitzers being used to punch holes into walls. Over time, the capabilities and force designs of the US military have changed although the focus on state-based enemy forces and large, open environments has shown a remarkable staying power. Current combat planning scenarios may actually provide soldiers with access to less adaptable weapons and techniques than past force designsâ€”a fact made apparent by an examination of historical cases. Military units today have fewer tools to adapt to a major urban fight than they did, for example, during the Vietnam War. In the Battle of Hue , soldiers and Marines were asked to quickly adapt from jungle to urban fighting. Ernie Cheatham did a quick review of urban doctrine and then directed his staff to collect as many penetrating and explosive tools as possible, to aid in the intense urban fight they were about to undertake. Both flamethrowers and tear gas have been shown to be effective tools for clearing enemy forces from buildings without totally destroying them. Flamethrowers can penetrate small openings and fill fortified positions with both fire and smoke. Tear gas can force enemy forces to evacuate fortified positions within buildings, especially when the military objective is focused as much on reclaiming terrain as killing individual fighters. Today, soldiers have neither flamethrowers nor tear gas. In , the US Defense Department issued a directive that ceased the tactical use of flamethrowers. International efforts to ban the weapons gained support following the Vietnam War. While some experts believe flamethrowers could be legal in combat situations where no alternative weapons that would cause less suffering are available, the US military does not use them. Yet a look at the most recent cases of urban warfare makes clear why such tools are better suited to city fighting than most others available. In July , while discussing the final firefights of the battle to liberate Mosul, Gen. I saw things I have only ever read about in history books. It was the last week. Mosul had been cleared except for a x meter postage stamp. Then it shrunk to x It took about a week to take that. The buildings had been turned into bunkers. On the last day I watched reconnaissance video feed of the final Iraqi assault. There was an Iraqi bulldozer driver driving through that field of rubble and on each side of the bulldozer was a squad of Iraqi infantry walking along protecting the bulldozer and as ISIS fighters popped up out of the rubble, the bulldozer would turn towards them and bury them whole, infantry walking along would drop grenades in holes and shoot guys trying to fire rockets to knock it out. Townsend highlights both the difficult, destructive nature of retaking a city from a determined enemy, as well as the need for tools like flamethrowers. Tear gas has been banned as a method of warfare since , when the US Senate ratified the Chemical Weapons Convention of To be sure, any use of chemical agents is a slippery and dangerous slope. But there is an important discussion to be had about where legal and normative boundaries are drawn. One of the first uses of gas in war was to clear trenches during World War I. One could draw similarities between the challenge of crossing open ground and that of entering and clearing trenches, bunkers, or buildings in urban environments. While tear gas is widely used for crowd-control purposes in urban policing, it is off limits to the US military in combat. Bans on flamethrowers and tear gas were clearly made with the good intention of protecting civilians and preventing unnecessary human suffering. But the ban may have actually made the situation worse.

FUTURE GROUND COMMANDERS CLOSE SUPPORT NEEDS AND DESIRABLE SYSTEM CHARACTERISTICS pdf

7: Elements Of Power: Debunking The Close Air Support Myths: Part 1

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First Class Frank Antenori. As and Apaches do a much better job, because they can move at a slower speed. What have we lost and how did we lose it? The men see our pilots; they watch them come in low and take terrible chances. It makes them want to go forward again. The effect is as if they were drawn by a magnet. Such flying was not uncommon by pilots of both allied and enemy air forces during WWII, Korea and some stages of the war against North Vietnam. Unfortunately for our infantry, it has gone out of style for a number of reasons. The popular excuse is that the air defense threat has become so ferocious as to preclude flying above enemy ground forces at altitudes below 10, feet. In Korea and Europe, the sky is overcast at two to three thousand feet over forty percent of the time. Knowing that the visible presence of tactical aircraft will be curtailed by an overcast sky above the battlefield is good news to enemy commanders who can be expected to exploit this factor to their advantage. Also, the possibility for overcast skies may constrain plans for offensive action by our ground commanders, knowing that they can not count on a full measure of combat air support should they need it. Flying low over a battlefield has always been dangerous business because ground troops possess large numbers of guns varying from pistols to high rate of fire machine guns and medium caliber anti-aircraft guns. A typical division may have as many as 10, automatic weapons. Troops are taught to create a hail of bullets above the battlefield for aircraft to fly into and they seem to enjoy the opportunity to shoot at airplanes. Most hits are received from the forward hemisphere and below. And, the faster the airplanes fly, the greater will be the depth of penetration of projectiles into their structure. When they concentrate their fires, Soldiers can make the sky virtually uninhabitable up to at least five thousand feet. If one must make passes over a battlefield, experience has taught that it is best to fly above 10, or below feet. Flying very low, especially through rolling terrain or urban areas, minimizes the possibility of an air defense weapon being pointed at and tracking a passing aircraft. Attacking ground forces beneath an overcast sky was especially hazardous on both the Eastern and Western Fronts in Europe during WWII but tactical pilots managed to be effective in spite of seemingly ever present gunfire. Has the gun density or lethality increased during the past fifty years? The problem lies not with gun density and lethality but rather with the character of our aircraft. Following , the aircraft industry was directed to design for nuclear vice conventional war. For nuclear war, exposure to ground fire is not a problem worthy of consideration. Attack and fighter aircraft for the next two decades were designed primarily to deliver nuclear bombs to key targets deep in enemy territory under all weather conditions. Attacking enemy ground forces was not to be a part of their repertoire. The design emphasis was on maximizing range and speed, and airplanes were especially tailored for high-low-high mission profiles. Nuclear warfare design criteria contributed heavily to the losses of such airplanes as the F, F-4, F-8, F and A-6 in Vietnam. Typical deficiencies included a lack of fuel tank self-sealing, lack of redundancy of control arteries, lack of protection for the pilots, use of highly flammable hydraulic fluid and lack of protection for the very tender jet engines to name just a few examples. The yield of such design habits, appropriate for nuclear war, was low tolerance to bullets and shrapnel as demonstrated by the high performance combat aircraft employed against Vietnam. The original Il-2 was a single-seater. The forward fuselage around the engine and cockpit was built with kilograms 1, pounds of steel ranging from 5 to 12 millimeters a fifth to half inch thick. The engine radiators were placed behind the engine in the armored body, while the air intakes were placed on top of the nose. K-4 armor glass was used in the cockpit, with thicknesses from 55 to 65 millimeters 2. Considering the relative vulnerability of the high-performance jet fighters which populate the worlds airforces, it is understandable that flying about at lower altitudes above a battlefield is deemed foolhardy. An anomaly occurred during the late sixties due to concern over the attrition of our tactical aircraft in Vietnam and projections of the possible disaster our pilots would face beneath the overcast in a war

against the USSR in Europe. Because the AX aircraft would be used primarily in support of ground troops, the U. Army had significant input into the necessary characteristics of the aircraft. The AX needed "To perform in close coordination with ground troops, in a high intensity small-arms fire environment, and for extended periods of time with a high payload. The requirement for fast response to Army needs is to be met three ways: The AX should be able to take off and land from 2,foot runways. Although it turned out to be much larger and less agile than desired, it was a major improvement over the nuclear age combat aircraft and serves as an indicator of what might be accomplished if a follow-on effort was sponsored by the DoD. Touted as a single-purpose aircraft, its loiter performance, ease of maintenance and toughness led to its broad application in Desert Storm. SUs have an excellent combat record in Afghanistan and Chechnya , and been almost impossible to shot down. Flying beneath an overcast sky so as to discover and attack the enemy is generally discouraged and sometimes forbidden, even with the worlds least vulnerable jet airplane, the Warthog. In reality, its not that easy for the air defender who is also interested in his own survival , especially if the near sky overhead is dominated by aggressive pilots who are not only providing air support but concurrently hunting and attacking air defense elements. Of course, in view of the inadvisability to expose our inappropriate aircraft to gunfire, the air defender is unlikely to face such an air threat. The United States is capable of producing the technologies to see through the clouds and there are lots of techniques you can use to do that. In one sense, the overall threat faced by U. The most disruptive and worrisome air defense element hardly even exists in the world today, that threat is enemy fighter interceptors flown by experienced and competent fighter pilots. For perspective, the top ten German Luftwaffe aces shot down a total of aircraft. The leader among that band of killers was young Eric Hartman with victories. To further remind of our experience: Army Air Force lost twice as many airmen in three and one half years of combat operations than the total number of men killed air and ground during ten years of fighting in Vietnam. And, the losses seldom caused a significant alteration of air campaign plans. Aircraft attrition rates overall for our most prominent military actions were: Additionally, in terms of total losses, aircraft lost due to mishaps, collisions with each other or the ground, fuel exhaustion, etc. The personal attrition rate for one who may have been the worlds most aggressive attack pilot to survive WWII, Luftwaffe Colonel Hans Ulrich Rudel , was slightly over one percent having been shot down 32 times while flying over sorties on the Eastern Front, primarily against the Russian army. From the perspective of a war planner, perhaps attrition should be considered within a framework that includes the aircraft, pilots and ground elements as a package. Should the survivability of pilots, because of their perceived value and scarcity, be considered independent of the total engaged force? Imagine what would have happened to the Army ground forces engaged in the desperate battle at Ia Drang in had there not been experienced and aggressive pilots attacking the enemy at below tree top level [2]. Also, consider that the air tactics and techniques required to be effective under such circumstances require frequent practice with the ground component because the skills of both are perishable. Is it rational to assume that pilots can practice high-altitude stand-off tactics for years and on the spur of the moment, descend and engage in a desperate fight at low altitude beneath an overcast and expect to survive and provide effective air support? Experience has shown that in "war", pilot and grunt survivability are intertwined with victory or defeat. Casualties were beginning to pile up. I was determined that history would not repeat itself in the valley of the Ia Drang. We had one thing George Custer did not have: In this situation, external fires, especially from the A-1s, saved the unit from annihilation. The presence of maneuver air support can reduce the probability of having such situations develop to the point where "save the day" actions are necessary. Under my MAS concept, key members of the Fixed-wing JAAT elements would have attended the mission prep briefing and would have been applying recce fires as the lift force was proceeding to the landing zone. They would have also been performing local recce and been in position when the contact was made. The North Vietnamese would never have been able to organize the attacks that resulted in a near Little Big Horn. And the total operation would probably have killed hundreds more enemy with little loss of 7th Cav. You would not be supported by "strangers". The introduction of nuclear weapons in reinforced a long held view that the best use of air power

is attacking those critical strategic nodes which a military commander chooses to believe are essential for his enemy to continue fighting. Although the use of nuclear weapons was unlikely, the orientation of air forces toward deep strike established a mindset and doctrines which carried over to the employment of air-delivered conventional weapons. Nuclear warfare thinking proved to be an obstacle to maintaining effective conventional air warfare doctrine. And, generations of pilots, trained to perform deep strike interdiction with these aircraft and lacking combat experience in direct air support are unlikely candidates to recover the lost art described in the opening statement of this paper. Since the Nation lacks appropriate resources for such combat flying, revival of the mission is unlikely to occur without a major effort by the benefactors of such services, the ground forces. Change can only occur if current ground component commanders speak out on behalf of the grunts who will be confronted with classical combat situations in the future. Where are the ground combat veterans who might testify as to the value of and need for the air support that was once available? They were sparse in number to begin with and most are retired or deceased. The strategic strike focus of the fifties dominated the minds of air planners during the Vietnam War. Could this account for the fact that direct air support was provided for only ten percent of SEA ground actions? Perhaps "out of sight, out of mind" may account for the fact that ground force commanders seemed content with this meager contribution by air. Accompanying this question is the observation that the resource consuming effort of bombing North Vietnam and attempting to interdict the flow of supplies into the South failed to accomplish its objective. These thoughts lead to questions like: How might TacAir contribute to evolving ground warfare concepts? In seeking the answer to this question, the author interviewed scores of ground combat veterans from three wars and other military events in addition to many who are involved in thinking about a range of possible future conflicts. Evolving doctrines portray Light Forces operating deep in enemy territory relying on information dominance and quick decisive actions to keep the enemy off-balance. Light Force concepts emphasize reliance on external fires and various forms of "reach back" assistance. Also popular among "advanced thinkers" is the term "effects based assessment" EBA for evaluating various external fires alternatives. Encouraging troops to a higher level of aggressive conduct in the face of adversity would clearly be a positive "effect". The testimony of the Battalion Commander in the opening paragraph of this paper illustrates how the visible direct support by skillful pilots can serve to lift the spirits of the troops at a critical time. Is this not an example of the ultimate in terms of "effects based" value. Interviews with scores of combat veterans retired and active reveal the need for Continuous Overhead Presence COP of perceptive air crews who are working as an integral part of the GCE. The expressed need is for a virtually organic airborne partner who understands the commanders intent and can provide the following functions with minimum interruption to ground maneuver: Local surveillance and reconnaissance.

FUTURE GROUND COMMANDERS CLOSE SUPPORT NEEDS AND DESIRABLE SYSTEM CHARACTERISTICS pdf

8: Why Militaries Must Destroy Cities to Save Them - Modern War Institute

close-support capabilities; however, this research subsequently refocused specifically on close air support (CAS) capabilities in recent conflict and the possible implications for the future. The research provides an overview of the requirements process that led to existing CAS.

By , ten more experimental Block-I satellites had been launched to validate the concept. On May 2, "Selective Availability" was discontinued as a result of the executive order, allowing civilian users to receive a non-degraded signal globally. Bush updated the national policy and replaced the executive board with the National Executive Committee for Space-Based Positioning, Navigation, and Timing. Bradford Parkinson , professor of aeronautics and astronautics at Stanford University , conceived the present satellite-based system in the early s and developed it in conjunction with the U. Parkinson served twenty-one years in the Air Force, from to , and retired with the rank of colonel. GPS developer Roger L. Easton received the National Medal of Technology on February 13, The IAF Honors and Awards Committee recognized the uniqueness of the GPS program and the exemplary role it has played in building international collaboration for the benefit of humanity. Basic concept of GPS[edit] This section needs additional citations for verification. Please help improve this article by adding citations to reliable sources. Unsourced material may be challenged and removed. The satellites carry very stable atomic clocks that are synchronized with one another and with the ground clocks. Any drift from true time maintained on the ground is corrected daily. In the same manner, the satellite locations are known with great precision. GPS receivers have clocks as well, but they are less stable and less precise. GPS satellites continuously transmit data about their current time and position. A GPS receiver monitors multiple satellites and solves equations to determine the precise position of the receiver and its deviation from true time. At a minimum, four satellites must be in view of the receiver for it to compute four unknown quantities three position coordinates and clock deviation from satellite time. More detailed description[edit] Each GPS satellite continually broadcasts a signal carrier wave with modulation that includes: A pseudorandom code sequence of ones and zeros that is known to the receiver. By time-aligning a receiver-generated version and the receiver-measured version of the code, the time of arrival TOA of a defined point in the code sequence, called an epoch, can be found in the receiver clock time scale A message that includes the time of transmission TOT of the code epoch in GPS time scale and the satellite position at that time Conceptually, the receiver measures the TOAs according to its own clock of four satellite signals. From the TOAs and the TOTs, the receiver forms four time of flight TOF values, which are given the speed of light approximately equivalent to receiver-satellite ranges. The receiver then computes its three-dimensional position and clock deviation from the four TOFs. The height may then be further converted to height relative to the geoid e. These coordinates may be displayed, e. User-satellite geometry[edit] Although usually not formed explicitly in the receiver processing, the conceptual time differences of arrival TDOAs define the measurement geometry. The line connecting the two satellites involved and its extensions forms the axis of the hyperboloid. The receiver is located at the point where three hyperboloids intersect. While simpler to visualize, this is the case only if the receiver has a clock synchronized with the satellite clocks i. There are marked performance benefits to the user carrying a clock synchronized with the satellites. Foremost is that only three satellites are needed to compute a position solution. If it were an essential part of the GPS concept that all users needed to carry a synchronized clock, a smaller number of satellites could be deployed, but the cost and complexity of the user equipment would increase. Receiver in continuous operation[edit] The description above is representative of a receiver start-up situation. Most receivers have a track algorithm , sometimes called a tracker, that combines sets of satellite measurements collected at different timesâ€”in effect, taking advantage of the fact that successive receiver positions are usually close to each other. After a set of measurements are processed, the tracker predicts the receiver location corresponding to the next set of satellite measurements. When the new measurements are collected, the receiver uses a weighting scheme to

combine the new measurements with the tracker prediction. In general, a tracker can a improve receiver position and time accuracy, b reject bad measurements, and c estimate receiver speed and direction. The disadvantage of a tracker is that changes in speed or direction can be computed only with a delay, and that derived direction becomes inaccurate when the distance traveled between two position measurements drops below or near the random error of position measurement. GPS units can use measurements of the Doppler shift of the signals received to compute velocity accurately. In typical GPS operation as a navigator, four or more satellites must be visible to obtain an accurate result. Applications for GPS such as time transfer , traffic signal timing, and synchronization of cell phone base stations , make use of this cheap and highly accurate timing. Some GPS applications use this time for display, or, other than for the basic position calculations, do not use it at all. Although four satellites are required for normal operation, fewer apply in special cases. If one variable is already known, a receiver can determine its position using only three satellites. For example, a ship or aircraft may have known elevation. Some GPS receivers may use additional clues or assumptions such as reusing the last known altitude , dead reckoning , inertial navigation , or including information from the vehicle computer, to give a possibly degraded position when fewer than four satellites are visible. March Learn how and when to remove this template message The current GPS consists of three major segments. These are the space segment, a control segment, and a user segment. Air Force develops, maintains, and operates the space and control segments. GPS satellites broadcast signals from space, and each GPS receiver uses these signals to calculate its three-dimensional location latitude, longitude, and altitude and the current time.

FUTURE GROUND COMMANDERS CLOSE SUPPORT NEEDS AND DESIRABLE SYSTEM CHARACTERISTICS pdf

9: Gladiator Tactical Unmanned Ground Vehicle

Accuracy is by far the most important. When CLOSE air support is called for, that means the friendlies are in dire straits and the enemy is CLOSE at hand. Whenever I released my weapons, I hoped and prayed they fell on the enemy, and not my compat.

The commander must work in a medium which his eyes cannot see; which his best deductive powers cannot always fathom; and with which, because of constant changes, he can rarely become familiar. This understanding will become the basis for developing a theory and a practical philosophy of command and control. No single activity in war is more important than command and control. Command and control by itself will not drive home a single attack against an enemy force. It will not destroy a single enemy target. It will not effect a single emergency resupply. Yet none of these essential warfighting activities, or any others, would be possible without effective command and control. Without command and control, campaigns, battles, and organized engagements are impossible, military units degenerate into mobs, and the subordination of military force to policy is replaced by random violence. In short, command and control is essential to all military operations and activities. With command and control, the countless activities a military force must perform gain purpose and direction. Done well, command and control adds to our strength. Done poorly, it invites disaster, even against a weaker enemy. Command and control helps commanders make the most of what they haveâ€”people, information, material, and, often most important of all, time. In the broadest sense, command and control applies far beyond military forces and military operations. Any system comprising multiple, interacting elements, from societies to sports teams to any living organism, needs some form of command and control. Simply put, command and control in some form or another is essential to survival and success in any competitive or cooperative enterprise. Command and control is a fundamental requirement for life and growth, survival, and success for any system. We often think of command and control as a distinct and specialized functionâ€”like logistics, intelligence, electronic warfare, or administrationâ€”with its own peculiar methods, considerations, and vocabulary, and occurring independently of other functions. But in fact, command and control encompasses all military functions and operations, giving them meaning and harmonizing them into a meaningful whole. None of the above functions, or any others, would be purposeful without command and control. Command and control is not the business of specialistsâ€”unless we consider the commander a specialistâ€”because command and control is fundamentally the business of the commander. Sometimes this recognition takes the form of a conscious command decisionâ€”as in deciding on a concept of operations. Sometimes it takes the form of a preconditioned reactionâ€”as in immediate-action drills, practiced in advance so that we can execute them reflexively in a moment of crisis. Sometimes it takes the form of a rules-based procedureâ€”as in the guiding of an aircraft on final approach. Some types of command and control must occur so quickly and precisely that they can be accomplished only by computersâ€”such as the command and control of a guided missile in flight. Other forms may require such a degree of judgment and intuition that they can be performed only by skilled, experienced peopleâ€”as in devising tactics, operations, and strategies. Sometimes command and control occurs concurrently with the action being undertakenâ€”in the form of real-time guidance or direction in response to a changing situation. Sometimes it occurs beforehand and even after. Furthermore, planning increases knowledge and elevates situational awareness. Effective training and education, which make it more likely that subordinates will take the proper action in combat, establish command and control before the fact. The immediate-action drill mentioned earlier, practiced beforehand, provides command and control. Likewise, analysis after the fact, which ascertains the results and lessons of the action and so informs future actions, contributes to command and control. Some forms of command and control are primarily procedural or technical in natureâ€”such as the control of air traffic and air space, the coordination of supporting arms, or the fire control of a weapons system. Others deal with the overall conduct of military actions, whether on a large or small scale, and involve formulating

concepts, deploying forces, allocating resources, supervising, and so on. This last form of command and control, the overall conduct of military actions, is our primary concern in this manual. Unless otherwise specified, it is to this form that we refer. Since war is a conflict between opposing wills, we can measure the effectiveness of command and control only in relation to the enemy. The basis for all command and control is the authority vested in a commander over subordinates. Authority derives from two sources. Official authority is a function of rank and position and is bestowed by organization and by law. Personal authority is a function of personal influence and derives from factors such as experience, reputation, skill, character, and personal example. It is bestowed by the other members of the organization. Official authority provides the power to act but is rarely enough; most effective commanders also possess a high degree of personal authority. Responsibility, or accountability for results, is a natural corollary of authority. Where there is authority, there must be responsibility in like measure. Conversely, where individuals have responsibility for achieving results, they must also have the authority to initiate the necessary actions. We suggest a different and more dynamic view of command and control which sees command as the exercise of authority and control as feedback about the effects of the action taken. The commander commands by deciding what needs to be done and by directing or influencing the conduct of others. Control takes the form of feedbackâ€”the continuous flow of information about the unfolding situation returning to the commanderâ€”which allows the commander to adjust and modify command action as needed. Feedback indicates the difference between the goals and the situation as it exists. Feedback may come from any direction and in any formâ€”intelligence about how the enemy is reacting, information about the status of subordinate or adjacent units, or revised guidance from above based on developments. Feedback is the mechanism that allows commanders to adapt to changing circumstancesâ€”to exploit fleeting opportunities, respond to developing problems, modify schemes, or redirect efforts. The result is a mutually supporting system of give and take in which complementary commanding and controlling forces interact to ensure that the force as a whole can adapt continuously to changing requirements. But given the nature of war, can commanders control their forces with anything even resembling the omnipotence of the chess player? We might say that a gunner is in control of a weapon system or that a pilot is in control of an aircraft. But is a flight leader really directly in control of how the other pilots fly their aircraft? Is a senior commander really in control of the squads of Marines actually engaging the enemy, especially on a modern battlefield on which units and individuals will often be widely dispersed, even to the point of isolation? Are commanders even remotely in control of what the enemy does? But it is a delusion to believe that we can truly be in control of the enemy or the situation. And the further removed commanders are from the Marines actually engaging the enemy, the less direct control they have over their actions. We must keep in mind that war is at base a human endeavor. We could not get people to act like mindless robots, even if we wanted to. Given the nature of war, the remarkable thing is not that commanders cannot be thoroughly in control but rather that they can achieve much influence at all. We should accept that the proper object of command and control is not to be thoroughly and precisely in control. The turbulence of modern war suggests a need for a looser form of influenceâ€”some- thing that is more akin to the willing cooperation of a basketball team than to the omnipotent direction of the chess playerâ€”that provides the necessary guidance in an uncertain, disorderly, time-competitive environment without stifling the initiative of subordinates. A complex system is any system composed of multiple parts, each of which must act individually according to its own circumstances and which, by so acting, changes the circumstances affecting all the other parts. A boxer bobbing and weaving and trading punches with his opponent is a complex system. A soccer team is a complex system, as is the other team, as is the competitive interaction between them. A squad-sized combat patrol, changing formation as it moves across the terrain and reacting to the enemy situation, is a complex system. A battle between two military forces is itself a complex system. But even if this is not so, even if each of the parts is fairly simple in itself, the result of the interactions among the parts is highly complicated, unpredictable, and even uncontrollable behavior. Each part often affects other parts in ways that simply cannot be anticipated, and it is from these unpredictable interactions that complexity

emerges. With a complex system it is usually extremely difficult, if not impossible, to isolate individual causes and their effects since the parts are all connected in a complex web. The behavior of complex systems is frequently nonlinear which means that even extremely small influences can have decisively large effects, or vice versa. Particular factors can often be decisiveâ€”details only known to those who were on the spot. It is not simply the number of parts that makes a system complex: A machine can be complicated and consist of numerous parts, but the parts generally interact in a specific, designed wayâ€—or else the machine will not function. While some systems behave mech- anistically, complex systems most definitely do not. Complex systems tend to be open systems, interacting frequently and freely with other systems and the external environment. Our approach to command and control must find a way to cope with this inherent complexity. While a machine operator may be in control of the machine, it is difficult to imagine any commander being in control of a complex phenomenon like war. This view of command and control as a complex system characterized by reciprocal action and feedback has several important features which distinguish it from the typical view of command and control and which are central to our approach. First, this view recognizes that effective command and control must be sensitive to changes in the situation. This view sees the military organization as an open system, interacting with its surroundings especially the enemy , rather than as a closed system focused on internal efficiency. An effective command and control system provides the means to adapt to changing conditions. We can thus look at command and control as a process of continuous adaptation. Second, the action-feedback loop makes command and control a continuous, cyclic process and not a sequence of discrete actionsâ€—as we will discuss in greater detail later. Third, the action-feedback loop also makes command and control a dynamic, interactive process of cooperation. Command and control is thus fundamentally an activity of reciprocal influenceâ€—give and take among all parts, from top to bottom and side to side. Fourth, as a result, this view does not see the commander as being above the system, exerting command and control from the outsideâ€—like a chess player moving the chess piecesâ€—but as being an integral part of this complex web of reciprocal influence. And finally, as we have mentioned, this view recognizes that it is unreasonable to expect command and control to provide precise, predictable, and mechanistic order to a complex undertaking like war. The basic elements of our command and control system are people, information, and the command and control support structure. The first element of command and control is peopleâ€—people who gather information, make decisions, take action, communicate, and cooperate with one another in the accomplishment of a common goal. People drive the command and control systemâ€—they make things happenâ€—and the rest of the system exists only to serve them. The essence of war is a clash between human wills, and any concept of command and control must recognize this first. Because of this human element, command is inseparable from leadership. The aim of command and control is not to eliminate or lessen the role of people or to make people act like robots, but rather to help them perform better. Human beingsâ€—from the senior commander framing a strategic concept to a lance corporal calling in a situation reportâ€—are integral components of the command and control system and not merely users of it. All Marines feel the effects of fear, privation, and fatigue.

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