

Combat Support Field Manual

A collection of essays by Boilerman

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An Introduction to Support for the Combat Troops

By Boilerman

The inspiration and driving force behind this collection of essays was my desire to know in precise terms how many troops were in a BattleMech regiment. The Classic BattleTech field manuals go into some detail on the standard combat arms of BattleTech: BattleMech, Armored, Infantry, Artillery and Aerospace but we hear almost nothing of supporting arms. This collection is my attempt to introduce some details that we can use to flesh out our units.

The information in these essays comes from a few canon CBT sources such as *Maximum Tech* and a variety of US Army field manuals as well as quite a few people, former military and not, that provided excellent feedback, information and advice. Thank you everyone! You know who you are. I would also like to thank Discord for converting all of these essays into PDF format and Medron Pryde for hosting it on his website.

As you may already know the military has a language all its own. I have tried to limit the technical jargon in these essays, this is a game, not the army but I feel I must use some of their terminology. One thing I feel that needs clarification at the beginning is the difference between the combat arms, combat support arms and combat service support arms of a military.

In the real world the combat arms of the US Army are Air Defense Artillery, Armor & Antiarmor, Aviation, Engineers, Field Artillery, Infantry, and Reconnaissance. All directly or indirectly engage the enemy in combat. Combat support arms provide services or information that assists the combat arms in combat. The major combat support arms of the US Army are the Chemical Corps providing NBC support, Military Intelligence, the Military Police and the Signal Corps. The combat service support (CSS) arms provide services and support to sustain the combat and combat support arms. Major combat service support functions include providing maintenance, health services, supply and transportation. In simple terms the combat arms fight the battles, the combat support arms coordinate the fights and the combat service support arms feed the fighters and take care of the casualties.

In BattleTech we can add one major combat arm, the BattleMech Corps, to the list of combat arms and aerospace transport, the DropShips and JumpShips, to the combat service support arms.

I feel I must also clarify the meaning of several other military terms as well: assigned, attached, organic, direct support and general support. Although I tried to limit their use these words have crept into some of the essays and their exact meanings can be confusing.

When a unit is *assigned* to a command it is relatively permanent. The command exercises control and/or administration responsibility over the assigned unit. When a unit is *attached* the relationship between the unit and the larger command is temporary. In the US Army many CS and CSS units are attached to combat units during operations. When not on an operation the CS and CSS units are grouped together in their own commands. This makes training and administration much easier for everyone. *Organic*, in the military sense, is just

another way to say that the unit is assigned to the command, i.e. a BattleMech company is organic to a BattleMech battalion.

When a supporting unit is attached to a combat unit or any other type of unit for that matter, its relationship to the supported unit and its commander must be clarified. When a support unit is *directly supporting* another it is under the operational control of the supported unit: that is the commander of the supported unit can issue orders directly to the supporting unit. If the supporting unit is providing general support the commander of the supported unit must make a request for support through higher headquarters. For example: An AFFS RCT commander attaches a combat engineer company to an infantry regiment for a battle. The engineering company is *directly supporting* the infantry regiment. The regiment commander can issue orders to the engineering company commander as he sees fit. If one of the regiment's battalion commanders needs engineering support he must make a request through the chain of command to the regiment commander since the battalion is only receiving general support from the engineering company. This may all seem rather complicated and bureaucratic but it to insure people follow the plan; just because someone outranks another does not necessarily mean that they have the authority to order them to do something. In the end this is to keep everyone on the same page in the play, or is that plans, book.

I hope you enjoy these essays as much as I did writing them. If you have any comments or suggestions I can be reached at either Classic BattleTech forums at <http://www.classicbattletech.com/> or at the Heavy Metal Pro forums at <http://www.heavymetalpro.com/>.

Command Structures & Styles in the 31st Century

by Boilerman

Commanding soldiers is difficult. It requires experience and a great deal of resources to command even a small company. Large units require much more of both.

In the Inner Sphere the organization of command has largely descended from the systems developed by the old SLDF. Therefore let us examine the old SLDF system first and use it as a base line to examine the various militaries of the Inner Sphere.

Important Positions & Titles

Some of the information below may seem obvious to most but it is stated here to clarify and avoid misunderstandings later in this paper.

Commanding Officer (CO): he is ultimately responsible for *everything* that happens within his command. This includes tactical employment, training, sustainment and administration. He must know the capabilities of his soldiers, his equipment and his enemy. It is also important that he know how to command through his subordinate commanders.

Executive Officer (XO): the CO's chief assistant and second-in-command. He directs, coordinates, and supervises the actions of the command staff. He is also the chief coordinator with higher command and adjacent and supporting units. XO's are also commonly assigned elements of the command to accomplish specific missions.

Command Sergeant Major (CSM): traditionally he is the most senior and most experienced enlisted soldier in the command. He advises the CO on the welfare of the enlisted soldiers in the command and as a member of the CO's personal staff he has direct access to the CO anytime, within reason. He performs duties as assigned by the CO but monitoring morale and discipline and acting as an unofficial liaison between the enlisted soldiers and their CO is his primary duty. In battlemech units it is traditional for the CSM to operate as the CO's wingman. In armored units the CSM traditionally commands the second vehicle in the commander's section..

First Sergeant (1SG): each company has a First Sergeant. He is the senior enlisted soldier within the company and an expert in the individual and NCO skills of his particular company type. Note that 1SG is a title, not a rank. The duties of a 1SG include supervising the supply, maintenance, communications and other routine operations of the company for the Co. CO. He also acts as a tactical advisor to the Co. CO.

Supply Sergeant: each company is assigned a supply sergeant. He is a supply and administrative specialist. His job is to coordinate with the Co. 1SG and the BTLN S-4 to insure the company receives the supplies that it requires. The Supply Sergeant normally rides in the BTLN field train and only comes forward to the front-line positions to issue supplies. When in the rear with the field train the Supply Sergeants are supervised by the S-4 and provide much of the S-4 manpower. In the old SLDF the Supply Sergeants also functioned as the company's chief administrative clerk coordinating with the BTLN S-1. Supply Sergeants have a heavy

work load but modern communications and computer equipment do much of the “paperwork” processing.

The Command Staff

Commanding troops in battle is a full time operation that even with an abundance of computer and communications hardware requires a small army to accomplish efficiently in a timely manner. Battalion-sized units and above have a fairly extensive staff that assist the CO in planning and executing any mission assigned to them by higher headquarters. The staff also conducts the day-to-day housekeeping operations required in all militaries. The basic staff structure is broken down into five areas of responsibility.

S-1 Personnel: the S-1’s basic responsibilities cover anything human resources related. Besides processing the personnel paperwork they supervise the medical support and function as legal advisors if no Judge Advocates are available. S-1 officers are normally administrative specialists and many are warrant officers.

S-2 Intelligence: the S-2 and his staff is responsible for all matters related to military intelligence, counter-intelligence and operational security within the unit. The S-2 and his staff collect intelligence information using whatever sources are available. Most of his sources are the soldiers within the command and those of adjacent units. The S-2 staff is responsible for maintaining the situation map of the enemy and environment including weather. The staff also passes along any information requested by the command’s subordinate units. Besides the S-2 staff, which usually number 2 or 3 enlisted intelligence specialists any attached MI assets answer to the S-2 Officer. Most front-line combat battalions are allotted an MI squad to assist in collecting and evaluating ELINT and HUMINT. S-2 officers are usually career intelligence officers or transfer into intelligence staff work following disqualification from other career fields such as the Mechwarrior Officer field. This allows a military to retain valuable experience and exploit it when it might otherwise be lost.

S-3 Operations: the S-3 officer, and his staff, are responsible for all matters concerning plans, operations and training. This staff prepares, coordinates and publishes the Standard Operating Procedures and orders issued by the CO. They are the main synchronizers of the unit’s combat assets during tactical operations and function in a manner not unlike air traffic controllers. As combat directors for the CO the S-3 staff and the S-3 officer in particular must be experts on the capabilities of the soldiers within the command. The S-3 officer is always from the same Corps as the CO and his troops, just like the XO. And in most militaries he is next in line to take command behind the XO if something should happen to his senior officers. The S-3 staff is usually made up of communications technicians expert in the operation of the sophisticated Command, Control & Communications (C³) systemsⁱ used in most command vehicles. If any additional communications assets are assigned to the unit they normally answer to the S-3. Most front-line combat battalions are allotted an Communications squad to assist in maintaining communications links with adjacent units and higher command.

S-4 Logistics: the S-4 officer, and his staff are responsible for coordinating supply, maintenance, transportation and services for the unit. They project future requirements and do their best to fill them based on operational plans and guidance from the CO. The S-4 staff also monitors and reports equipment readiness to the CO. The S-4 officer is normally a career supply specialist. In the old SLDF his staff normally consisted of the company supply sergeants. All supply, transport and field services assets assigned to the unit answer to the S-4 officer.

The Command Styles & Structures of the Inner Sphere Militaries

The old SLDF standard command structure is the baseline for all IS militaries today but all services have adapted it to their needs. All militaries have philosophies and traditions that dictate as much how a unit's Command & Control system operates as what is efficient.

Again let us start with an examination of the old SLDF system. The old SLDF used separate command units at all levels from the BTLN level on up to the Corps level. The philosophy was that a commander's primary responsibility was to command, not to fight. According to the SLDF integrated command units took away assets from the fight when a commander must command and took away the commander from his command when he must fight. Few soldiers can both fight and command the wider battle efficiently at the same time. Therefore due to this philosophy separate command elements evolved within the SLDF at all levels above the company. At the Company and PLTN levels separate command assets were considered unnecessary due to the relative proximity of all command assets. Within an SLDF Infantry Co. the CO directly commanded the Co. HQ/Heavy Weapons PLTN.

The AFFS operates on much the same principals as the old SLDF; although there are exceptions. Within their infantry companies the Co. CO and 1SG make up the entire company command element. The AFFS tends to spread its heavy weapons out among the individual infantry platoons. Within their battlemech and armored formations some units have separate command units at battalion and regiment level and some do not. It appears to be tradition based and varies from fighting corps to fighting corps. For example all units assigned to the Davion Brigade of Guards maintain separate command units; the Avalon Hussars do not at regiment level and below..

The DCMS on the other hand takes a near polar opposite approach to command from that of the old SLDF. The Code of Bushido demands that a samurai must lead from the front and fight along side his soldiers. As all combat corps officers within the DCMS are at least nominally considered samurai to separate the command element from the combat elements would be unthinkable in the DCMS. This is not to say that the DCMS does not provide command support elements. They do. These assets are normally collected within a Headquarters Support Platoon assigned to the first company of every battalion. The First BTLN of every regiment has more HQ assets than the other two battalions as it must coordinate the actions of the First BTLN as well as the whole regiment.

The CCAF takes a highbred approach. At battalion level the command group is integrated within the First Co. of the BTLN. At the REGT level and above separate command units are the norm.

The FWLM has a system similar to that of the DCMS with one major exception; their infantry. All FWLM Infantry units are based on fours. Four platoons make a company, four companies make a battalion etc. At the company level the Co. CO directly commands the combined HQ/Heavy Weapons PLTN.

The Com Guards use an integrated command system adding the appropriate headquarters support assets to their existing system. The Kungsarmé of the FRR simply uses the system they inherited from the DCMS but some speculate that this is due to the lack of assets to create separate command units rather than ideology. The new SLDF in a break with the past is using integrated command units as well. Again this is due to the lack of assets rather than philosophy. The Eridani Light Horse in keeping with their long history and traditions are maintaining their separate command units.

The LCAF/LAAF, at least for the moment, is maintaining the AFFS model that was adopted during their hoped for union with the AFFS. There of course is no standard command structure among mercenaries; although the more talented units seem to be converting to separate command units at battalion and regiment level.

Command structures are often overlooked by the armchair generals but to understand a military one must understand their philosophy, style and structure.

Command Support: without it all you have is a mob.

ⁱ OOC: the C³ system I am referring to is the Mobile HQ equipment listed in *Maximum Tech*.

Maintaining the Troops in the 31st Century v2

by Boilerman

Military equipment, especially combat equipment requires constant preventive maintenance to keep it in top condition. Battlemechs, the most complex ground combat system developed by humanity, require dedicated support personnel with specialized skills. Most other types of military equipment require technical support personnel as well. Below is a short overview about how they are organized and equipped to perform their duties.

The Battlemech Company and its Support Team

Most battlemechs are organized into companies of twelve. Most militaries provide a support team of technicians to a company sized unit to provide for its maintenance support requirements, whether they are organic to the company or attached at the discretion of higher headquarters. Most military services strive to provide one battlemech technician, simply called a tech, per battlemech. One assistant technician, or astech for short, normally assists a team of two techs. Ideals are tough to reach in the real world; the average tech section supporting a battlemech company has only four techs and two astechs. A battlemech company's techs and astechs are grouped into a section with the senior tech functioning as section leader.

It is commonly believed that a tech is assigned to just one mech and works on it exclusively. This is not true. Mechs are amazingly complex machines that require considerable amounts of knowledge and expertise to maintain properly. The battlemech technical field consists of ten specialized sub-fields¹. Most techs do not gain a high skill level in all ten fields for a decade or two, if ever. To get around this techs specialize in a few fields and pool their skills to maintain the mechs in their care. Only one group of these specialists has a unique title: Armorer. They specialize in weapon systems and are also responsible for the ammunition stocks carried in the company's field train. The average tech section of six has one armorer.

A tech is useless without his tools. Most military services group the entire tech section's tool set in one location for convenient transport in the field. Some use customized workshop trucks. Another option is the Standardized Shipping Container/Shelter method, which is commonly referred to as a Field Repair Shelter, FRS or fresh. A FRS unit usually has doors at one end and the long-side walls usually swing up to provide easy access to the contents of the shelter. These walls also provide convenient overhead cover from the weather when in the field. These FRS units are loaded onto Palletized-Loading-System equipped trucks for transport when required. This frees the truck up to be used for other purposes if not transporting the fresh.

Regardless of whether a unit uses workshop trucks or FRS units the contents are the same. First and foremost the FRS or workshop truck is equipped with several complete tool sets. Additionally there are complete sets of repair kits for each mech in the company. A note on repair kits: they are basically kits of minor parts that are regularly needed to conduct preventative maintenance. Repairing battle damage usually entails replacing more than a few small parts. Materiel, aside from a small stock of replacement armor, for repairing battle damage usually comes up from central stocks outside the battlemech company's tech section.

Several larger pieces of equipment are also normally found in the tech section's tool set but their availability and numbers vary considerably based on how well a unit is equipped overall. These include repair platforms and exoskeletons. Most military services strive to provide three repair platforms and two standard-weight and two lightweight exoskeletons per tech section.

Most workshop trucks and FRS units also have a small material-handling crane (MHE). These cranes are normally mounted at the back end of the truck or shelter. Most only have a capacity of three tons at maximum extension. This is rarely a problem though; at home base most mech hangars have fully functional gantry cranes capable of lifting an entire mech and in the field a mech with hand actuators can assist when required.

Additionally all FRS units come equipped with generators to power tools, lights and diagnostic equipment. Workshop trucks of course use the vehicle's engine for power generation when required.

Vehicle Maintenance

Vehicle maintenance is generally handled differently. All vehicles except the lightest have crews of more than one person. This coupled with the fact that vehicles are far simpler and easier to maintain allows vehicle crews to do most of their own basic preventative maintenance. Almost all vehicles come equipped standard with a complete tool set for this work.

For the more specialized maintenance jobs a vehicle unit is supported by a maintenance support section of mechanics: usually at the ratio of one section per battalion. This section is equipped like a mech tech section with one major difference: they do not require repair platforms.

Maintenance Beyond the Company Level

A tech or mechanic section, whether assigned at either the lance, company or battalion level does not provide all the maintenance support for a unit, whether vehicle or mech.

Normally a battlemech regiment has a Maintenance Support Company with several specialized platoons. Two of those platoons are the Recovery and Salvage Platoon and the Coolant Platoon. The standard organization for both platoons calls for six vehicles of the appropriate type but again available assets vary from unit to unit. One section of two vehicles from each platoon is normally attached to each battlemech battalion.

If a mech goes down recovery begins as soon as possible. In most recovery operations two recovery vehicles are sent out to work as a team to recover the downed mech. It is then driven back to the RGT support area for evaluation. If it can be repaired by the regiment work begins as soon as possible and is led by the Technical Support Platoon of the Maintenance Support Company.

The Technical Support Platoon is a collection of regiment's top techs in the battlemech technician field. During peacetime operations they are called in on repair and maintenance jobs that are too complex or time consuming for the company level techs to accomplish. They also frequently train the less skilled techs and astechs. In wartime they do much the same thing and generally lead major battle damage repair jobs.

If a mech is damaged beyond the capabilities of the facilities at the Tech Support Platoon's disposal, or their skills, the mech is packed up and shipped back to a Battlemech Repair Depot. Most major militaries have access to only a few Battlemech Repair Depots and most are well within a nation's borders so a mech sent to one can be out of action for months due to transit times alone.

Vehicle regiment Maintenance Support Companies are organized and operate in much the same way as their battlemech counterparts with only a few differences. First: vehicle regiment Maintenance Support Companies have no need of coolant vehicles. Second: they are of course staffed with mechanics rather than techs. And third: they normally have a lot more recovery vehicles than their battlemech counterparts. Most vehicle regiments have three Recovery and Salvage Platoons of four recovery vehicles each providing one recovery vehicle per company. This additional recovery vehicles are required because they are not as resilient as mechs. Mobility kills are also more common in vehicle units than battlemech ones. One advantage vehicles do have over mechs is that when the need recovery normally one recovery vehicle will do: at least under normal circumstances.

This is by no means an exhaustive study summary of the maintenance support field: just simple a brief. There are almost as many ways to organize and conduct maintenance support operations as there are military services that need them. But most militaries follow these basic guides which all, clan and Inner Sphere alike inherited from the old SLDF.

ⁱ The technician sub skills that apply to mechs are: Ballistic, Communications, Electronics, Fusion, Jet if jumpjet equipped, Lasers, Missile, Mechanics, Myomer and Support. The technician sub skills that apply to vehicles are: Ballistic, Communications, Electronics, Fusion, ICE, Lasers, Missile, Mechanics, Rotor if VTOL and Support.

Author's Notes: This paper is based on the real world system the US Army uses to support in combat battalions. Each battalion of armor or infantry has a maintenance platoon. Each section of the platoon supports one company. The Forward Support Battalion that supports each Brigade has a Maintenance Company to provide additional support to the combat units in the Brigade.

Rearming the Troops in the 31st Century v2

by Boilerman

Even with all the energy-based weapons of today battle in the 31st century depends on getting ammunition to the frontline soldiers. Centuries of unrelenting warfare have honed the science of ammunition replenishment to a fine edge.

Basic doctrine used across the Inner Sphere and beyond calls for a mech to be rearmed within five minutes of arriving at the RAP. This assumes a lot of things that should be discussed in a little more detail.

First of all, RAP stands for Re Arming Point. It is a commonly used term that describes a location where rearming and other support operations such as refueling are conducted. A RAP is located as far forward as possible to limit transit time from the battlefield but it must be located in a relatively secure area. Few units survive long in a RAP that is under fire.

Operations in a RAP are normally conducted as a team effort by several groups of support personnel. The main players are the techs, astechs, armorers, assistant armorersⁱ and supply specialists of the unit.

Things have begun to happen at the RAP long before a battlemech arrives from the battlefield. As the mechwarrior approaching he transmits any relevant data to the RAP personnel. This usually includes a BDA or battle damage assessment of the mech as well as ammunition requirements and his personal condition. Most mech battle computers can do this automatically if properly asked by other computers in the unit's communications network.

A quick assessment of this data determines what happens next. If the mechwarrior is injured he is usually sent to the aid station. If the mech is overheating he is sent to a coolant truck, if available, as it can be very dangerous to rearm an overheating mech. If the mech is in need of repairs it is sent to the appropriate repair site. Which site, or if it is sent at all, depends on the mech's BDA and the operational situation.

If the mechwarrior makes it through all this he is finally directed to a rearming "pit" where the real fun begins. Pit is an ancient term for where the work of rearming actually occurs. The reasoning behind the name has been lost to antiquity. A pit crew usually consists of an astech, tech, armorer or assistant armorer and a supply specialist. As the mech approaches the pit the crew is staging the required ammunition on a repair platform. When the mech arrives the mechwarrior places the mech's back to the repair platform and opens the ammunition hatches.ⁱⁱ The platform is raised and the pit crew, usually in exoskeletons, removes the spent ammunition canisters, if not already ejected, and inserts fresh ones. If the platform needs to be repositioned to reach other ammunition hatches the mechwarrior generally moves the mech instead. This is usually quicker than moving the platform but must be done with extreme caution as an extended repair platform can easily be knocked over. In fact most military organizations require that platform be lowered before the mech moves.

As the pit crew is rearming the mech a tech is usually checking it over and fixing any problems he can in a predetermined amount of time, usually five to ten minutes. The time limit is set to prevent a repair job from interfering with getting the mech back into the field or creating a backlog of mechs waiting to rearm. A well-trained pit crew can rearm a mech within five minutes assuming the mech is not damaged significantly and they have had the proper amount of time and information to prepare for its arrival.

RAP operations for vehicles are very similar. The only major differences are that vehicle crews frequently help the process along and units with ICE powered vehicles normally set up a second pit for refueling. Most commanders consider the risks of simultaneously rearming and refueling too great. Some vehicle mounted weapon systems are hand loaded. On those vehicles the ammunition generally needs to be stowed by hand as well.

ⁱ Armorers and assistant armorers are simply technicians and assistant technicians specialized in weapons systems.

ⁱⁱ All mechs have their torso ammunition bin hatches on their backs to maximize the frontal armor protection.

Author's Notes: No canon information that I know of really discusses this process. I simply based this on what I know about the real world military and how they handle rearming and refueling of combat aircraft, especially the A-10. If I remember correctly the standard for the A-10 is fifteen minutes for refueling and loading ammo for the cannon, a half dozen bombs and a couple of maverick missiles.

Medical Support for the Troops in the 31st Century v2

by Boilerman

Medical support for soldiers, whether on the battlefield or not, is as important as food, water and ammunition. There are a number of basic rules of combat medicine. They are based on lessons learned the hard way by the first SLDF and reinforced again during the Succession Wars Era and over two hundred years of unrelenting conflict.

- Start treatment as far forward as possible; the quicker a wounded soldier is treated the greater his chances of survival.
- The primary combat corps (Battlemech, Infantry, Armor etc.) should have approximately one combat medic per 40 soldiers attached to their unit.
- Combat support units (Combat Engineers, Artillery etc.) should have approximately one combat medic per 80 soldiers as they see much less direct combat.
- Rear echelon support units do not need attached combat medics. Medical personnel assigned to rear echelon medical units provide support as required.
- Overall medical support should average out to about one medic for every thirty soldiers.

All combat medical support begins on the battlefield with the combat medic of a Medical Platoon. Combat medics are emergency medical trauma technicians. They usually travel with the unit they are attached to; eating with them, caring for them and sometimes even dying beside them. Most conventional front-line combat companies have at a minimum one combat medic attached. Normally only one or two combat medics are attached to a battlemech battalion. This might seem like they are being short changed but in reality with only 36 to 40 mechwarriors and usually less than 25 support personnel a battlemech battalion is generously supported.

The combat medics are organized into the Combat Medic Section of the Medical Platoon which is either attached or organic to a front-line combat regiment in most militaries. There are two additional sections within the Medical Platoon: the Treatment Section and the Ambulance Section.

The Treatment Section, commonly called a MASH, is the heart of the platoon and is its headquarters. It establishes a forward treatment facility around the Platoon Leader, usually the only medical doctor in the unit, and his Assistant Platoon Leader, who generally is a Physician's Assistant or Nurse Practitioner. The Treatment Section performs routine sick call, triage, as well as emergency care for the soldiers of the parent unit or anyone else within their area of responsibility in accordance with the Ares Convention. A Treatment Section can vary in size from as few as three to as many as twenty. Most militaries provide at least one customized medical vehicle to each Treatment Section. These "MASH trucks" vary widely in capabilities but all do the same thing-support the medics. They usually are equipped with advanced diagnostic equipment as well as surgical facilities. These vehicles also have plenty of storage space for medical supplies. It should be noted that medical supplies are generally distributed by the Medical Corps rather than the Quartermaster Corps in most militaries.

When the Treatment Section receives casualties it divides into two teams. The PLTN LDR will usually start treatment of the most serious cases immediately as the ASST PLTN LDR conducts triage of all casualties and prioritizes their care. Once triage is complete the ASST

PLTN LDR will begin treating the less serious cases that do not require a fully qualified medical doctor's care. Because of this two team approach to treatment most of the MASH vehicles can support treatment of at least two cases simultaneously.

A basic Ambulance Section at a minimum consists of two or three medics, a few drivers and a few vehicles to transport injured personnel. The vehicles can be anything from commandeered civilian cars to elaborately equipped Medical Evacuation VTOLs. Due to the separation of forces during a campaign VTOLs are considered essential by most militaries for medical evacuation: especially of the more critical cases. Most units have a mix of ground vehicles and VTOLs. The general rule of thumb is one ambulance per company of infantry or armor or battalion of battlemechs.

Beyond a front-line regiment's Medical Platoon are a number of other echelons of medical care to support the soldiers. Names and actual sizes vary depending on the military service but all have the same function- treat wounded and ill soldiers, providing the long-term care needed for full recovery.

In most cases Medical Platoon leaders are trained trauma surgeons and experts in emergency medicine. Since trauma surgeons are not experts in all fields of medicine the next echelon, commonly called an evacuation hospital, has a collection of medical doctors and officers with other specialties. Surgeons in specialties other than emergency trauma, dentists, epidemiologists, neurologists and psychiatrists are all commonly found in evacuation hospital units. It should be understood that a Medical Platoon is frequently moving with its parent unit and has little space for transporting recuperating soldiers. Therefore those that can not be returned to duty after treatment are transported to an evacuation hospital unit for further treatment, rest and recuperation as soon as possible.

If a wounded or sick soldier can fully recuperate within several months he will most likely remain at the evacuation hospital until he is ready to return to duty. If his recuperation will take longer or he will never fully recover the soldier will be evacuated off of the contested world and sent to medical facilities light years away as soon as possible for rehabilitation. That is once he is strong enough to travel. Most militaries have a few specialist hospital dropships for these kinds of missions. They are fully function hospitals capable of handling dozens of serious or critical cases at once: whether they are dirty-side or in orbit. Since hospital dropships are rare many dropships, in particular infantry transports, have facilities to operate as patient ferries for those soldiers not requiring intensive care during transit.

Wars can be waged without medics and doctors but only the most callous or desperate commanders send their soldiers to battle without such support. Most troops *won't* leave home without them.

Author's Note: the only basic rule of thumb from *Combat Operations* has one medic per thirty to forty soldiers over all. I have adjust this essay from its first incarnation to reflect that fact. I would use the "excess" medics using the guidelines above to form the rear echelon medical units. My real world source for this paper was US Army Field Manual 4-02.4 *Medical Platoon Leader's Handbook*.

Supply Operations in the 31st Century

By Boilerman

Amateurs study tactics; professionals study logistics. So says the ancient axiom of war. Although it is not quite true it is very important for soldiers to understand their logistics requirements and the resources available: as that dictates all else on the battlefield. More than one general laid the foundations of his own defeat by ignoring his logistics. Tukkayid is just one of the most recent examples.

This essay will not attempt to explore every facet of logistics; entire books have attempted and failed to do that. No. This essay will only give the most basic overview of how supplies are moved to and on the battlefield and how the units responsible for such missions are organized.

Be it spare parts, food, ammunition or fuel all are consumed in enormous quantities by an army, whether in garrison or the field. It is the responsibility of command staffs at all levels to monitor supplies and project future requirements. It is almost a universal complaint of commanders, regardless how well equipped the unit, that they do not receive everything they require so using what is available at maximum efficiency is perhaps a command staff's most valuable skill.

Ever since the computer was invented logisticians have used it to calculate and plan. In the last ten centuries it has allowed a drastic reduction in the amount of personnel required to handle the "paperwork" it takes to "feed" a modern army. The senior battalion staff member responsible for logistics planning is the S-4 Officer. The S-4 Officer assisted by his small staff and the Company Supply Sergeants can usually handle all the logistics planning for an entire battalion.

Systems and equipment for physically moving the supplies have generated similar improvements in efficiency. All-terrain forklifts, loadermechs, and exoskeletons are far more quicker than loading by hand. Palletized-Loading Systems for trucks and their trailers allow a shipping container to be loaded aboard the truck in less than a minute without additional equipment.

The use of standard containerized cargo systems has drastically reduced the time and cost required to move large quantities of materiel. In fact all Inner Sphere militaries utilize cargo systems that can seamlessly integrate with civilian shipping networks allowing a state, in times of emergency to provide transport assets it might not otherwise have. The clans make no distinction between transport for civilian or military purposes. If the clan toulman requires shipping civilian sector assets are dragooned without trouble.

Most all militaries maintain centralized depots to stockpile supplies of all sorts. When an order arrives at a depot the supplies are collected and packaged for shipment. Most supplies are already prepackaged in 1 to 5 ton lots. Ammunition, for example, usually comes in standardized 1-ton canisters. These canisters allow easy and quick reloading of battlemech and vehicle ammunition bins but handling them individually can

increase the workload of transport forces exponentially. So to keep the work to a minimum these smaller packages of supplies are packed into larger containers for shipment. The standard shipping package used throughout the Inner Sphere and far beyond is the Standard Shipping Container (S²C). These containers are roughly 2.5 meters by 2.5 meters by 6 meters and are deliberately sized to easily fit transport trucks and trailers, both civilian and military. Most military S² Containers are loaded with 19 tons of supplies; add in the weight of the container itself and you have a 20-ton load.

Once the container is loaded at the depot it is in turn loaded onto a dropship for the long trip to the receiving unit.

Whether the final destination is a war zone or a garrison once the dropship has arrived at the proper world the container is unloaded from the cargo dropship and sent to a depot near the spaceport to wait for the final trip to the receiving unit. From this point on, unless transported by suborbital flight, a Supply Corps Truck Company or equivalent moves the container.

Most Transport Companies of today are organized on the old SLDF Transport Company (TransCo) model. An SLDF TransCo was equipped with 32 prime movers. These large, often fusion powered, trucks could carry one S² Container and tow a trailer carrying another one. These trucks travel at average convoy speeds of 32 km/hr cross-country. One TransCo can haul 64 S² Containers moving over 1200 tons of supplies at once.

The typical TransCo is organized into, a Company Headquarters Section, two Truck Platoons with 16 prime movers each, and a Maintenance Section. If the prime movers are ICE powered models the company may have a Fuel Section with up to 4 fuel trucks although it is today in most Inner Sphere militaries simply use a portion of their prime movers' cargo capacity to haul fuel.

A TransCo normally hauls containers from the spaceport depot to the receiving unit, usually a regiment-sized organization. Then the receiving regiment collects and distributes the supplies with its own transport assets.

Regiment Resupply

Most combat regiments throughout the Inner Sphere militaries have a supply company, whether attached or organic, to coordinate resupply operations for the regiment. These supply companies usually have sufficient assets to transport several days worth of supplies for the regiment. Supply companies are tailor-made for the regiment they are assigned to; an assault battlemech regiment requires much more supply support than a regular infantry regiment.

The regimental supply company transports normally carry all supplies in the S² Containers they were packed into at the central theater depot. To speedily breakout these supplies personnel are generally outfitted with forklifts and/or industrial exoskeletons. A well-trained team can empty an S² container in minutes.

Company Field Trains

In the SLDF field resupply of combat companies was accomplished by the company field train. The SLDF was nothing if not meticulous about planning everything: logistics most of all. The SLDF worked out complicated tables of allowance for each type of company. These tables listed the amounts of ammunition, armor and other consumable supplies the company's field train carried based of vehicle or battlemech models assigned to the company. Over the years of the Succession Wars era these tables were simplified. Today the average field train carries a supply stock of 10 tons for a light lance, whether battlemech or vehicle: 20 tons for medium lances, 25 tons for heavy lances and 30 tons for assault lances. Infantry company field trains also reserved 1 ton of lift capacity per platoon for small arms and infantry heavy weapons ammunition. This allotment was only intended to last for a single day in moderate combat conditions. Additional reserves of replacement armor, ammunition and all major spare parts were held by regiment supply units.

The typical company field train consists of three to six trucks with trailers. These trucks transport the companies technical and support staff and their equipment as well as the company supply stock. The SLDF assigned trucks to each field train based on unit type. The typical Striker or Light Horse regiments used fast wheeled hover transports; Heavy Assault and Dragoon regiments were generally issued largest fusion-powered prime movers. Today most militaries issue whatever is available.

Standard SLDF doctrine called for regiment supply units to resupply company field trains once per day under normal operational conditions. The field trains collect the supplies and move them forward to the combat units. When heavier than normal combat conditions are expected the regiment will allocate supply unit assets to reinforce and support the company field trains. If the regiment is expected to range beyond normal the reach of its supply train the a variety of methods can be used to keep it supplied.

Bulk fluid supplies such as water and fuel are frequently moved by pipeline. Construction Engineer units organized and equipped specifically for pipeline operations are usually assigned to front line units by higher headquarters as required. Of course these pipelines normally terminate some distance from the front lines. Again trucks fill the gap. Dedicated tanker trucks are common but the most common method of moving fuels and water by truck is to use a collapsible bladder tank strapped to the bed of the truck. The bladders are not as durable as most tanks but are easily replaced and allow the truck to be used for other purposes when not functioning as a tanker.

Large and important units such as battlemech regiments or an AFFS Regimental Combat Team can be spread over an entire planet or several planets in several different systems. In the case of units spread over a single planet suborbital supply lifts are quicker and more convenient than over-land transport even if they are far more expensive. Basically the S³ container is loaded onto an air or aerospace craft and flown to the unit requiring it. All sorts of aerospace craft can be used for this: dropships, small

craft, even conventional aircraft and VTOLs. These operations require special care in a combat zone to avoid losses.

In the case of units spread over several worlds a whole new tier is often inserted in the supply system. Supplies are often delivered to a centrally located depot for the unit in question. Then the unit transports the supplies to its subordinate units. This is common among the AFFS Regimental Combat Teams. Even if they do not have the aerospace assets to move the entire team they usually have one or two jumpships and a few dropships to allow communications and transfer of supplies and personnel. If a unit does not have these types of assets they either have to rely on higher headquarters or make their own arrangements with civilian companies. Both methods are common. In fact many units commonly use combinations of all three methods. It all depends on what's available at the moment and which is more convenient.

Logistics are, without doubt, one of the biggest headaches a commander will ever face.

Supplies-you won't get far without them.

Author's Notes: As a history major and someone very interested military affairs I find the subject of logistics fascinating. Most of the ideas in the essay come from what I've skimmed from US Army field manuals and the history I have read about warfare. The Standard Small Shipping Container idea was inspired by the real world containerized shipping system. More details of the S³ container can be found if you do a search for it on this board. The 20-ton limit comes from discussions at the Heavy Metal Pro forums <<http://www.heavymetalpro.com/>>. Several of use there had designed cargo vehicles and found that a 20-ton container was easier to design around than a 25-ton container. For those that don't know the old *Mercenary's Handbook 3055* had a supply system built around a 25-ton container. IMO it was a pretty good system but 20-ton containers were just easier.

Company Field Trains & Regimental Supply Companies

Addendum to Supply Operations

Each combat lance has a set amount of cargo capacity within the company field train reserved for its ammunition, replacement armor, spare parts and other supplies. Ten tons are normally allotted for a light lance, 20 tons for a medium lance, 25 tons for a heavy lance and 30 tons for an assault lance. This stockpile is intended to last a single day under “moderate” combat conditions.

Battalion support personnel man company field trains: in the case of a BattleMech regiment the Battalion Support Platoon provided most of the manpower. Vehicle and infantry battalions normally have a supply section to man the company field trains. Under normal circumstances Co. Admin/Supply Sergeants also act as drivers in the field trains. Foot infantry regiments that only have support vehicles generally have enough trucks within the company field train to transport the infantry as well as their supplies.

Normally once per day the RGT supply company restocks the company field trains. Each RGT supply company normally has transport capacity for two additional day’s worth of supplies. RGT supply companies will also manage any stockpiles the RGT accumulates but cannot move in one transport lift. Higher headquarters units may assign additional transport units to assist a RGT supply company if needed.

<u>RGT Wt Class</u>	Typical Transport Capacity		<u>RGT Supply Company</u>
	Company Field Train		
	<u>Each Train</u>	<u>All Trains</u>	
Foot Infantry	6 tons	54 tons	240 tons
Light	30 tons	270 tons	540 tons
Medium	60 tons	540 tons	1080 tons
Heavy	75 tons	675 tons	1350 tons
Assault	120 tons	810 tons	1620 tons

The chart below breaks down the RGT Supply Company’s assets, personnel and cargo trucks, by the RGT weight class. Note: a Heavy Armored RGT would have the same basic Supply Co. assets as a Heavy BattleMech RGT. However Vehicle RGT Supply Companies may also have additional assets to transport fuel. The Foot Infantry RGT *Supply Platoon* is for a basic Foot Infantry RGT that only has support vehicles. If the Infantry RGT uses Armored Personnel Carriers or Infantry Fighting Vehicles treat the RGT like an Armored RGT of the appropriate weight class.

<u>RGT Wt Class</u>	<u>Personnel</u>	<u>#of Trucks</u>	<u>Truck Cargo Capacity</u>
Foot Infantry	24	12	20 tons
Light	54	27	20 tons
Medium	54	27	40 tons
Heavy	60-72	30-36	40 tons
Assault	72-90	36-45	40 tons

Author's Notes: the truck cargo capacities are based on my own experience designing trucks using the existing CBT Vehicle Construction Rules. My designs use a convoy speed of MP3/5 and the trucks generally a wheeled chassis. The lighter vehicles for the light regiments could easily be faster to avoid slowing down these normally faster units. I imagine these numbers will change a bit when the Support Vehicle Construction Rules are published in the *Combat Equipment*, which is due out this summer.

Field Accommodations for the Troops in the 31st Century

by Boilerman

Unlike rations or water supplies a commander can provide little shelter for his troops in the middle of a battle. Soldiers must use either what they have on hand or can find. In the rear areas things get a lot better for the soldier. Their commanders can provide facilities that range in comfort level from the little-better-than-a-foxhole to palatial. Most commanders though strive to provide basic if rather spartan accommodations.

Shelter on the Battlefield

On the front lines of a battlefield most civilians envision soldiers living in holes in the ground universally known as foxholes. Although true it is only partly true. Soldiers, especially foot soldiers are by their very nature survivors. They will use anything they can find if it will improve their chances of survival or their comfort level.

Mechwarriors are the kings of the battlefield in more ways than one. A mechwarrior might find his cockpit cramped and uncomfortable for long operations but with a waste disposal unit, a box or two of MREs and a dozen liters of water he has all the basics for survival covered; and he is the envy of every foot soldier for it. Vehicle crews have it much the same way too. At the very least they have shelter from the wind and rain and a power source to heat their coffee.

From a shelter point of view foot infantry have it the toughest of all soldiers on the front lines. By tactical necessity they are generally required to live in their foxholes for long periods and their toilet facilities tend to be cat holes scratched out for a single use or possibly a trench dug for use by many. If they are lucky they might get to spend the night in a bubble tent, if they have one, back at the overnight bivouac behind the line of foxholes somewhere. Foxholes are intended to protect against enemy fire rather than the weather.

To provide protection from the weather most militaries issue excellent foul weather clothing but some rely on the old shelter half poncho. This ancient implement of war has protected soldiers from the weather for thousands of years. And when two or more are connected together properly they have a small tent. All that is required are a few poles, some line and a few stakes, all of which is normally issued with a poncho. The bubble tent may have superseded the shelter half poncho as the preferred shelter of foot soldiers everywhere but the poncho is still common: especially among militia forces.

Shelter Behind the Front Lines

Shelter behind the front lines generally constitutes tentage although a variety of hard-wall portable shelters are also available. Tents are an ancient invention. They are mentioned numerous times in the old testament of the Christian *Bible*: itself based on the older Jewish *Torah*. But other than basic function the tents of old would not resemble modern tents: especially those used by the military.

Tentage

A tent is defined as a collapsible fabric shelter. Poles are generally used to give shape to the fabric. Tents come in a very wide variety of shapes and sizes: from the one-man survival shelter to the enormous battlemech repair shelters. Let's examine some tents based on their size and function.

The smallest group of tents in general issue in most militaries are the bubble tent series. These are very light and are generally meant for use as basic survival shelters. They come in sizes ranging from the one-soldier type up to the twelve-soldier variety. In these relatively small and cramped tents one-soldier's space is generally defined as 1.5 square meters of area: barely enough to lie down in. Packs and other equipment are generally sheltered under the tent's fly just outside the tent. Separate flies allow for some alteration of the exterior color of the tent for camouflage purposes as well as provide additional weather protection. In all but the largest bubble tents the ceiling is barely high enough to allow a man to sit up; making them seem even more cramped when full of people and equipment.

What the bubble tent excels at is basic survival shelter. They are relatively light even when you account for the climate-control and waste disposal systems. Batteries for the climate-control system can add a lot of weight though. Something that should be noted is the climate-control system is a survival feature. It is meant to keep people from freezing to death in extreme conditions. It will not make the tent a tropical paradise in a blizzard. The internal sanitation system is very basic and survival oriented as well. For their price and weight though a bubble tent is a good investment. Most militaries issue bubble tents as basic shelter for the troops when not at a base camp or permanent base with better accommodations.

Larger General-Purpose (GP) tents are used by militaries to build most encampments. They have enough overhead room to allow a man to stand without crouching: although an Elemental might be a bit uncomfortable. GP tents come in a variety of shapes and sizes but in general they come in three basic frame designs: the Pop-Up Frame, the Assembly-Required Frame and the Airframe. The basic principal behind each is simple. A pop-up frame tent allows a few soldiers to pull the frame in opposite directions expanding the frame and the fabric into a recognizable tent shape. Pop-up frames are expensive and weight more than the other designs but can be erected quickly. The assembly-required frame tent requires, as the name suggested, the frame be assembled as the tent is setup. Although it is more time consuming to setup it is the cheapest basic tent design and therefore quite popular.

The third basic design is the airframe or blowup tent. As its name implies the supporting structure of the tent is made up of sealed fabric tubes into which air is pumped. These types of tents are among the largest available. The weight and time required to erect a similar large sized frame tent makes them impractical compared to the airframe type. The airframe's tubes are normally compression to about 550kPa (80PSI) to provide the necessary strength and rigidity. Because of the need for an air compressor, which adds to the cost and mass of the tent, framed tents tend to dominate at the smaller scales where people are the primary occupants and airframe tents dominate at the larger scales where battlemechs, large vehicles and aircraft are the intended

occupants. Most air compressors designed for use inflating airframe tents can also be used to deflate them. This insures the tent is compacted as much as possible for packing.

All tents have a flexible fabric skin. Usually it is a UV proof polymer coated kevlar or kevlar like fabric. This is not to say that tents are bulletproof; they are not. But they are extremely strong and can stand years of regular, hard, use in the field.

The typical tent has several layers to its fabric skin. The outer layer is of course for protection against the weather; most tents also have an inner layer with a space of a centimeter or two between it and the outer one. This is to provide some insulation value to the tent. The inner layer is usually a very light color, off whites or light greens are most common, to enhance the light level in the tent. The outer layer is generally colored to meet the camouflage requirements of the user. Of course camouflage netting is also used to help conceal tentage when necessary.

Floor material is even stronger than the wall and roof fabric. Many manufacturers also offer portable hard flooring to protect the floor material. Most portable flooring is made of thin plastic slats which will easily roll up into a cylinder for compact storage.

Almost all tents are equipped with windows and entryways with coverings to allow people and fresh air to flow in and out. The covers are to maintain light discipline when required. All military GP tents are light tight capable: that is when sealed for blackout conditions they do not emit any interior light.

Most GP tents have attachment points at their entryways for vehicle boots and vestibules. A vehicle boot is a large tube of fabric that attaches to the end of a vehicle and a tent. It allows people to move freely between the vehicle and tent without going out into the open. Most Command Post (CP) tents come with boots to attach to command vehicles. A vestibule is similar; they are used as entryways for some tents to retain heat or as connecting tubes between tents.

Most GP tents have built-in electrical systems. These must be plugged into a power source of some sort such as a camp electrical grid, battlemech, or vehicle. The tent's electrical system powers built-in flexible light panels and electrical outlets.

Unlike bubble tents most general-purpose military tents do not have built-in climate-control systems. When a bubble tent's climate-control system wears out the whole tent has to be replaced. For small bubble tents this is not a major expense but it is impractical for GP tents. Separate climate-control units (CCU) are provided for GP tents. This equipment is connected to the tent by simple fabric ducts. The CCU is located outside the tent. A CCU operates on one of three basic principals to do the actual climate-control. For those units that are just heaters there are fuel burning and electric heater types. The third operating principal is the heat pump. It is capable of both heating and cooling depending on which is required at the time. Heat pumps are generally electrically powered but some absorption cycle heat pumps, which burn fuel, are available. In extreme arctic conditions heat pumps do not work as well as regular heaters so most are equipped with built-in backup heaters.

Some notes on military tent standards and specifications: Most military tents, including enormous airframe tents, are designed to withstand horrible weather conditions. Most are designed to function in sustained winds of 45 m/s (100MPH) and bursts of up to 55 m/s (123MPH). This is accomplished mainly through exterior shape design and anchoring. As a result most tents are cone, dome or half-cylinder shaped. Most tent designs will support up to 97.5 kg/m² (20 lb. per ft²) of snow load for 12 hours or more.

Hard-Wall Shelters

Most hard-wall shelters (HWS) are built out of modified shipping containers. Their bulk and mass make them difficult to transport in significant numbers so they are relatively rare. Kitchen, laundry, latrine and shower services are the most common facilities found in hard-wall shelters. The amounts and kinds of equipment and setup times these facilities require make the expense and trouble of a HWS worthwhile.

Standard Base Camp Sets

For almost as long as there have been organized armies leaders have been trying to standardize their equipment to make planning and equipping easier. For centuries commanders have been able to purchase base camp sets through their respective supply systems. Using one stock number would get several truckloads of equipment delivered. Assuming of course the budget had the funds for it.

Standardized base camp sets come in a variety of sizes. Generally the size is based on the number of soldiers to be billeted (provided living space for). Some militaries provide standard sets based on unit type but as a general rule standard base camp sets only provide billeting, camp services and *space* for administration and medical services. Tenant units provide for all their own equipment and personnel beyond these basic services. Standard base camp space requirements are:

<u>Space Usage</u>	<u>Area Required per Soldier</u>
Billet (Living Quarters)	4m ²
Administration/Medical	.5m ²
Dining Facility	.5m ²
Kitchen, if in a tent	.2m ²
Laundry/Latrine/Shower, if in a tent	.4m ²

Notes: these are average space requirements. To determine the amount of tent space required multiply the area required per soldier by the number of soldiers to be housed at the base camp. These calculations do not include vehicle and battlemech repair shelters or storage space requirements for fuel, ammunition or other supplies.

Base Camp Facilities

Base camps are generally used for one of reason: more permanent facilities are not available. This is either due to the location of the soldiers or the condition of local permanent

facilities. When a unit uses a field camp they do want to enjoy the camping experience. They *need* the amenities of a permanent base to support the soldiers. Generally the amenities in a field camp are spartan and not equal to a permanent facility but they are adequate.

Base camps provide a variety of services beyond basic billets. They fall into two categories: Field Services, which include the mess (kitchen & dining facilities), laundry, latrine and shower facilities. Note: the typical shower facility includes sinks and mirrors for shaving etc. Utilities are the second group of services. They include electricity generation and distribution and water storage, treatment and distribution. Laundries, latrines and showers are generally clusters close together near the main utilities center to minimize the size of the distribution systems. Mess facilities though close to these other services are set some what apart for sanitary reasons.

At base camp most militaries strive to provide three hot meals per day, one hot shower per soldier every other day and laundry services in the amount of 2kg per soldier per day. These services are often curtailed though due to shortages of some kind.

Field Service units have their own personnel but most militaries require tenant units clean their billets and provide manpower to assist the field service personnel. It is generally called KP duty but only about half of the assigned manpower assist the cooks. Usually a base camp can be run by six personnel per 150 soldiers. Occasionally civilians are hired for such work although it can be difficult to find reliable loyal help near a combat zone.

Soldiers from the Engineer Corps operate utility services. They monitor, operate and maintain the electrical generators, water purification, storage and disposal equipment and their networks of cables and piping. Most utilities teams have two generators and two water purification systems.

Command Posts & Field Repair Shelters

Tentage for Command Post (CP) and Field Repair facilities are not provided in most standard base camp sets. They are purchased separately. Command vehicles normally come equipped with their own command post tents. When ever time and conditions permit these tents are setup to provide extra space for the command team. These tents come equipped fabric boots that connect the tent to the command vehicle. The general rule of thumb for space in a CP tent is 4m² per command staff member that use the tent.

Airframe tents are frequently used for battlemech or vehicle field repair. Due to their size and cost most units provide only one airframe tent, capable of providing shelter to two battlemechs or vehicles per combat company. Equipment is rotated through as required for maintenance or repair. If space and time is short techs and mechanics simply have to make do and work outside using tarps for protection from the weather.

A typical example of an airframe tent capable of protecting two battlemechs is the R10C made by Air Vertigo Inc. of Outreach. It is basically cone-shaped 18 meters tall and 20 meters in diameter at the base. The tent and its anchoring equipment weight 3.3 tons and its air

compressor weights another half ton. The complete package costs 38,200C-Bills: including the air compressor. Setup time is usually 12 hours. Tear down time is six hours.

Rules for Base Camp Operation

CBT engine ratings do not translate into real world energy output but base camps need an energy source of some kind. Battlemechs and vehicles can easily be plugged into a camp electrical grid. It is assumed that fusion powered vehicles as well as battlemechs are used as much as possible to conserve fuel. As a baseline assume 50 CBT Engine Rating Points are required to power a 150 soldier all-electric base camp in extreme arctic conditions. Actual generator sets can be designed using the existing Vehicle Construction Rules.

Water consumption is difficult to calculate for a unit in camp. For simplicity's sake assume that water requirements will remain the same as if the troops were on the front lines. But at base camp upwards of 75% of water used can be captured and recycled if the unit is equipped with water purifiers.

Base camps require personnel to operate and maintain the facilities. An average of 6 soldiers for every 150 in camp are required. Two are Field Servicemen and operate the kitchen, and laundry. Two are Utilities Engineers. They operate and maintain all utilities services. The remaining two are assigned from the tenant unit to assist the other four.

Base camp equipment needs regular maintenance. Assume an annual budget of 10% of the cost of the camp set is necessary to maintain it. This is under average conditions. A battle damaged set may require complete replacement.

Author's Notes: All equipment except the Waste Water Incinerator in this essay is based on real world stuff. The airframe tent is based on the Airbeam tent system developed by Vertigo Inc. Their airbeam tents are just entering service in the US military. Check them out at www.vertigo-inc.com. The other tent designs have been around for years. Heat pumps work like any other refrigeration cycle. They have been used in the desert southwest of the USA for years to both heat and cool homes.

The space, field service facilities and manpower requirements for this essay were developed from information on the US Army's Force Provider System. It is a prepackaged base camp set for almost 600 soldiers, including the FP Platoon that operates and maintains the camp. Each of these FP modules fits into around 100 TRICON shipping containers. A TRICON is a 1/3-sized ISO Container (8x8x6½ ft). Fully loaded they weight about 10,000 lb. each. The Waste Water Incinerator was inspired by the Waste Disposal Unit in the battlemech cockpit description in the *CBT Companion*.

Sustenance for the Troops in the 31st Century

by Boilerman

They are seldom given the attention or resources that they deserve but ration and water quantity and quality can be among the chief complaints offered up by the troops. A good commander understands this and puts some effort and resources into providing the best that he can.

Rations

Surveys have never conclusively proven which is the biggest grip of the troops: their food or the weather. But without doubt the troops' rations, and its quality, are things that the savvy commander pays close attention to. Few things can ruin a unit's morale faster than horrible rations.

Rations for soldiers are generally divided into three broad categories: combat rations, field rations and garrison rations. Combat rations, are what most people think of when they imagine a soldier's diet. These prepackaged meals are high in calories, low in flavor require no preparation and are designed to be eaten quickly on the go. In theory a soldier can live indefinitely on them; realistically most soldiers would mutiny rather than live for month on combat rations in anything but the most dire of circumstances. The smallest emergency/combat rations are the pill type. A handful of these pills can provide complete nutrition. More commonly combat rations are nutrition bars packaged with a powdered drink mix and some sort of confection.

Field rations are a step above combat rations. They are still prepackaged, preserved and somewhat bland and unappetizing but they are much closer to a real meal. Individually packaged field rations are almost universally known as MREs or Meals-Ready-to-Eat. They can be bought with chemical heaters to warm the meal; all that is required is to add about 75 ml of water.

Combat rations and MREs rations normally come with a small package of incidentals. Normally it includes a small pack of toilet paper and pack of matches and some type of seasonings for the food. Some of the better rations also included packs of instant coffee or tea, sugar, a pack of gum and even candy. Many field rations include a package of crackers and spread as a between meal snack.

The other major type of rations are known unit rations. Generally unit rations are prepackaged partially prepared meals for a whole units of soldiers. Field type unit rations (FU rations) are easily prepared in a field kitchen. Most only require heating in an oven or on a steam table. Garrison type unit rations (GU rations) are similar to FU rations. The only real difference between the two is prepackaged some parts of GU rations requires refrigeration; they are in fact the only type of prepackaged ration that does require refrigeration. Frozen food is generally much more flavorful the prepackaged foods that can survive at room temperature therefore they are more popular with the troops. And garrison rations can of course be made from fresh food supplies if desired. Obtaining the fresh food can be difficult for some garrisons

though. Most unit rations are packaged to allow the cooks to prepare them in lots as small as twenty meals.

A note on shelf life: contrary to popular myth rations have a limited shelf life and none from the old SLDF have been edible for centuries. Most combat and field rations stored at standard room temperature are good for a couple of decades. Once removed from their climate-controlled warehouses their shelf life usually dwindles quickly, especially in a hot climate.

A note on cost: it is a delicious irony that the palatability of military rations is inversely proportion to their cost. In other words: the more expensive the ration the worse the taste but expediency on the battlefield dictates far than cost and flavor. This is principally due to the processing to concentrate the food and the packaging expenses.

The menus of all types of rations varies with the culture of the troops that consume them. Rice dominates the rations of the CCAF and DCMS. Bread, pasta and other wheat based products dominate in the rations of the FWLM and AFFS. For those that prefer the cuisine of western cultures the LCAF/LAAF is considered to have the best rations. It would seem that Social General Syndrome has its advantages.

How rations are prepared can be as important as the rations themselves. At the most basic level combat rations and MREs can be eaten cold right out of their wrappers. But when possible most troops prefer hot rations.

Heating rations can be accomplished in a variety of ways from as quaint as boiling pot of water over a campfire to “nuking” them in a microwave ovens. MREs can be bought with chemical heaters built into the packaging; all a soldier has to do is add water. Small personal or squad camp stoves can be used as well. All a soldier has to do is heat the food pouch in boiling water for a few minutes. Most vehicles and battlemechs come with small built-in microwave ovens or water heaters for their crews and any embarked passengers. And most veterans know how to warm a ration pouch on a heatsink or vehicle exhaust manifold.

Preparing unit rations is a bit more complicated and requires some equipment. Field kitchens to serve groups as small twenty soldiers to as large as a 600 are available. Most come as a package, run off of a variety of fuels and use cogeneration techniques to maximize fuel efficiency. A basic company-sized field kitchen can be run by as few as two soldiers and can prepare up to three meals a day for 150 soldiers. The average battalion level field kitchen can prepare up to 600 meals at once with as few as eight people.

Most larger field kitchen sets come in standardized shipping containers that also double as the kitchen shelter. These containerized kitchens usually have extra storage capacity for a few pallets of field type unit rations so that all things are close at hand. And some of the more elaborate containerized field kitchens also have small reefers to carry garrison rations or more palatable delicacies such as steaks. If a kitchen does not have its own reefers though refrigerated shipping containers are common.

Liquid Rations

The consumption of alcoholic beverages by soldiers is as old as war. Many soldiers consider it their right to drink, sometimes to excess when not actually fighting. Indeed in the LCAF/LAAF it is a right protected, and controlled, by regulations.

In the LCAF/LAAF a enlisted soldier is issued one 500ml beer per day; officers must purchase it. If the soldier so chooses or under combat conditions or when the beer is not available a soldier receives a credit. Except on rare occasions a soldier is only allowed to draw out two of allotted beers in 24 hours and he may never draw out in advance. Field-grade and general officersⁱ of the LCAF/LAAF are authorized to take up to one case of wineⁱⁱ with them into the field per three months that they are expecting to be deployed. Most armchair pundits naturally suspect these regulations were instituted by Social Generals: the wine cellars for themselves and the beer to placate the troops.

Most other militaries allow soldiers to purchase alcoholic beverages when available when they are in the field. Officers and NCOs are expected to prevent drinking to excess.ⁱⁱⁱ

Water

Water is life. It can not be said any simpler. This is as true in military operations as it is in colonization efforts. Without water military operations can not happen. And even on worlds where water is relatively plentiful its quality is always suspect. Therefore all major military forces across known space possess and operate extension water purification and distribution systems.

The SLDF studied the water requirements for its troops extensively and their standards are the basis for all Inner Sphere House military and the Clan Touman standards.

Basic Water Requirements for troops in the field (Daily Liters per Soldier):

<u>Function</u>	<u>Sustained Ops.</u>	<u>Minimum Req.</u>
<i>Hot Arid Desert Conditions (Worst case scenario)</i>		
Drinking	10.0	10.0
Personal Hygiene	6.5	1.0
Field Feeding	0.5	0.5
Heat Casualty Treatment	<u>0.5</u>	<u>0.5</u>
Subtotal	16.5 liters	12.0 liters
<i>Temperate Climate Conditions (Average case scenario.)</i>		
Drinking	6.0	6.0
Personal Hygiene	6.5	1.0
Field Feeding	<u>1.0</u>	<u>1.0</u>
Subtotal	13.5 liters	8.0 liters

Note: these standards assume a 10% loss rate due to evaporation and spillage. Water masses 1kg per liter (8.34 lb. per US Gallon).

There are a variety of mobile water purification systems designed for military operations. These systems operate on two principals: reverse osmosis (RO) and the Jamerson-Ulikov (J-U) purification process. The reverse osmosis system forces the water through a ceramic filter under high pressure. The Jamerson-Ulikov process has only recently been rediscovered in the Inner Sphere thanks to the Gray Death Memory Core. It is a much simpler and cheaper system than the reverse osmosis system, especially in large scale applications for municipal use.

Military grade water purification systems fall into three broad size categories: portable, small and large. Most portable systems, whether RO or J-K type usually mass about 250kg with their support equipment kit of hoses and collapsible tanks. The average portable system can meet the water requirements of 100 soldiers living in worst case scenario conditions. The average small water purification system weights two tons with its complete support kit and can purify enough raw fresh water to support 600 troops under worst case conditions. The much larger tactical systems weight in at 10 tons with a single support kit and can support as many as 3000 troops.

For tactical flexibility most militaries provide twice the filtration capacity needed to insure redundancy. As an added precaution each team operating their system as far from the other as possible to prevent both systems from being destroyed in a single attack.

For transportation of water, as well as most liquid fuels, most militaries use bladder type collapsible tanks strapped to the flatbeds of cargo trucks and the flat-racks used on Palletized-Loading-System equipped trucks. This system is slightly more fragile than dedicated water tanker trucks but it allow the supply transport system to be far more flexible. The bladder tanks are usually made of kevlar or similar polymer fibers and come in a wide variety of sizes to allow tailoring of the load placed on the trucks.

Water Drilling Operations

Surface water is a scarce commodity on some worlds. But it is the rare world that has no water, assuming you know where to look for it. To reach this hidden water most militaries maintain a water well drilling capability within their Engineer Corps. Water drilling operations require considerable technical expertise to locate and then reach the water though so some militaries prefer to contract for this kind of support. It is extremely expensive but there are a number of firms in the Inner Sphere that specialize in it. As most well water is contaminated or brine it needs to be purified like any other water source.

Waste Water Disposal

Water is a precious commodity in most any combat zone and on many worlds. Measures such as recycling must be taken to use available resources as efficiently as possible. But some water, despite the best efforts of scientists must be dumped in all recycling and purification processes. No process is 100% efficient. This waste water is generally very

hazardous and must be disposed of properly. What constitutes proper disposal though varies considerably from world to world.

Black water, that is water contaminated with human and animal waste, can be disposed of in a number of ways. The most desirable method is to either pump or transport it to a municipal sewage treatment facility. This is not convenient most of the time though. Simply dumping in lined pits is another possibility but the most common method, which was pioneered by the old SLDF is incineration. It meets all safety and environmental standards and can be done with a minimum of fuss if the proper equipment is available.

A waste water incinerator consists on a oven into which the black water is pumped at a steady rate. The water evaporates thanks to the heat and is released to the atmosphere to re-enter the natural cycle. The remaining waste is reduced to inert ash or broken down into gases that can safely be emitted along with the steam. Electricity powered incinerators are the most common; they are easily powered by a battlemech or fusion powered vehicle^{iv}. As a side note most containerized latrines use similar technology to avoid the use of water for flushing^v. The latrine systems are either powered directly from the camp electrical grid or use fuel of some sort.

**Sustenance: without water and food life does not exist.
Without them was does not exist.**

ⁱField-grade officers are of the rank of Major (or its equivalent) to full Colonel.

ⁱⁱ The case may not exceed 12 liters in total capacity.

ⁱⁱⁱ OOC: I'm sorry guys but I had to include this. But the planned beer cart and instant powdered beer seemed a bit too much.

^{iv} In most Inner Sphere militaries having your battlemech or vehicle assigned to incinerator duty is considered a punishment and insult. Therefore most incinerators are actually plugged into the camp power grid. That duty is certainly not considered good but at least it is not insulting.

^v See the battlemech cockpit waste reclamation system entry in the *CBT Companion* for more information.

NBC Warfare & Defense in the 31st Century

By Boilerman

NBC warfare is defined as the use of nuclear, biological or chemical weapons to incapacitate or kill. These weapons are often referred to as Weapons of Mass Destruction (WMD). Although their use has been outlawed by every war convention since the twentieth century they have been used often enough that every military service trains to survive and fight through WMD attacks.

A scan of even the most basic Military Almanac will reveal tens if not hundreds of attacks using these weapons. Every school child in the Inner Sphere knows that nuclear weapons were tossed about like toys during the First and Second Succession Wars. Chemical weapons, though discussed less often than nuclear weapons are no less deadly and have claimed millions of lives. Notable examples of WMD use abound. The Kentares Massacre was perpetrated by poisoning the water supplies of all the major cities on the planet. More recently a particularly nasty chemical weapon known as UrbStryc-A was used against the 12th Vegan Rangers on the planet Wei and forces loyal to Katherine Steiner-Davion used nuclear weapons during the Federated Commonwealth Civil War.

Even the clans are not immune to the allure of these weapons. The so-called “not-named” Clan Wolverine used a nuclear weapon to destroy a scientific facility of Clan Snow Raven. And though technically not a WMD Clan Smoke Jaguar used orbital bombardment to obliterate the city of Edo on Turtle Bay; killing upwards of one million in the space of an hour.

Cases of known biological attacks are far less common than with the other two types of WMD. One relatively well-known case of biological weapons use was on the planet of Tall Trees during the Fourth Succession War. A Davion military force became infected with a very virulent virus that was fatal within two hours. Exact details have never been made public but it is believed that the Davion force entered a previously contaminated area and was not attacked directly.

The Threat

Regardless of the fact that they are illegal under the Ares Convention all major powers in the Inner Sphere and beyond are known to have or have in the past developed, deployed and used all three types of WMD: although it is never admitted to publicly.

Most of the nuclear weapons available today are a legacy of the Pre-Star League and Star League Eras. Nuclear weapons were developed and deployed by all the powers of the Pre-Star League Era. It is one of those ironies of history that in many cases these nuclear weapons frequently outlived the states that produced them. The most common nuclear weapon available today is the Davy Crockett Nuclear Missile, a battlefield system developed for and by the SLDF. Most were abandoned by the SLDF when General Kerensky called for his exodus. Abandoned stockpiles of Davy Crockett missiles, along with other larger, more powerful weapons left behind by the SLDF, were the main source of nuclear weapons used during the First and Second Succession Wars. It is almost as though the General wanted the Inner Sphere to destroy itself.

As a battlefield weapon the Davy Crockett's warhead is designed for blast effect: that is explosive power. Radiation hazards are limited to fallout, which is dust, ash and debris thrown up and irradiated by the actual nuclear blast. The radiation and contamination hazard created by a Davy Crockett missile generally decays within weeks to radiation levels that are tolerable.

Chemical weapons are almost as common as nuclear ones. The technology to produce chemical weapons is easy to develop; in fact most chemical weapons are simply highly concentrated insecticides. Chemical weapons can be broken down into two broad categories: persistent and non-persistent. Persistent chemical weapons are area-denial weapons. Their goal is to prevent or slowdown access to equipment or an area. These weapons usually leave a thick oily residue that can take weeks or months to breakdown in arid environments. Rain will eventually wash the chemical agent off but once it seeps into the soil it can persist for decades or even centuries. Non-persistent chemical weapons are intended to incapacitate soldiers immediately and disperse harmlessly within minutes so that an area can be occupied quickly without the need for decontamination. Most non-persistent chemical weapons are gaseous in nature and in most cases only a gasmask is required for protection.

Biological weapons are created from naturally occurring diseases, be they spread by germs, viruses or naturally made toxins. Biological weapons are the cheapest of the three types of WMD to develop and manufacture. Mother Nature has done the majority of the work already; all a scientist does is weaponize the disease for easy long-term storage and dispersal. Contrary to popular belief no biological weapon has been created from scratch in a laboratory. All were developed from known diseases encountered by humanity: some new, some old. In fact most "biological weapons research" is simply standard medical research conducted by civilian authorities across known space to deal with diseases found in the general population.

The Defense

The first line of defense against the standard three WMD is knowledge. A soldier must be trained to understand, survive and fight in an NBC environment to accomplish his mission regardless of the circumstances he finds himself in. Training begins in Boot Camp and continues throughout his career.

After Boot Camp a soldier's primary source of NBC Defense training is his unit's NBC Defense Specialist. This NCO conducts individual training: lecturing and drilling soldiers on all aspects of NBC Defense. The unit's operations staff is also expected to conduct regular large-scale unit drills.

Most military services consider the NBC NCO position a collateral duty and assign it to a senior NCO within a company or battalion. Due to their small size in terms of manpower battlemech battalions, and similar units, generally only have one NBC NCO whereas most infantry or armored battalions have three or four.

In an NBC environment knowledge does a soldier little good without the proper survival equipment. Proper survival equipment means three things: detection, protection and decontamination.

Most militaries outfit individual soldiers with small chemical detectors. The cheapest and most common is a multi-spectrum litmus type paper that changes color in the presence of certain families of chemicals. This type of detector is usually a simple lightweight badge. A soldier, among his many other responsibilities, is expected to check it regularly. Most vehicles and battlemechs are equipped with electronic detectors that give audible alarms when chemical agents are detected and in a few cases readings on the specifics of the chemical agent detected. More detailed analysis requires more powerful equipment. Technical support personnel are frequently called upon to perform these detailed tests with scanalyzers.

Small electronic radiation detectors, known as radiacs, are available to test for any radiation hazard. Most platoons are issued one if the unit is expected to encounter a known or suspected radiation hazard, which is not all that uncommon on some worlds due to natural radiation and man-made nuclear blasts. Of course eyes and ears will “detect” the nearby detonation of a nuclear weapon long before any radiac indicates a radiation hazard. As with chemical detectors most combat vehicles and battlemechs are equipped with a radiac of some sort.

A soldier’s protective suit and gasmask are his most important pieces of NBC equipment; a detector serves no real purpose if a soldier has nothing to protect himself with. At its most basic level personal protective gear consists of a gasmask and an overgarment of some sort. Most NBC overgarments today are made of lightweight Gore-Tex. It may be an ancient invention but it is still very effective. The Gore-Tex allows perspiration to vent off, cooling the soldier, but prevents water and chemical agents from seeping through to the soldier. This drastically improves the comfort level for the soldier, especially when compared to rubber-impregnated overgarments, which are still relatively common. Many units issue light environment suits; these are perfectly capable of dealing with chemically contaminated environments and offer one additional advantage: light environment suits are washable. Standard Gore-Tex chemical suits are thrown away at the first opportunity once they are contaminated.

Vehicles and battlemechs provide another level of NBC protection for soldiers. Even if not equipped with NBC protection systems vehicles and battlemechs provide overhead cover from fallout and chemical agent droplets. Vehicle NBC protection systems are broken down into two broad categories: overpressure and hose-fed systems. An overpressure system does exactly that; the environment control system pressurizes the vehicle with filtered air above outside atmospheric pressure so that chemical agents and fallout do not migrate into the vehicle. The inside of the vehicle is a shirtsleeves environment so no protective equipped need be worn. Of course if the crew needs to exit the vehicle they all must don protective gear and take care not to track in contaminants.

A hose-fed NBC protective system is far less comfortable than an overpressure system as all personnel in the vehicle must wear, at the least, masks. The mask plugs into the vehicle

system with a hose, hence the name, and the vehicle system provides filtered air that is normally humidified and cooled to provide some comfort. Many consider the hose-fed system a cumbersome waste but wearing, and breathing through a gasmask for an extended period of time can be very tiring even without hard physical exertion. The hose-fed NBC system is much appreciated by the mechanized infantry. For simplicity's sake hose-fed gasmasks generally have attachment points for filter canisters as well to allow a soldier to disconnect from the system without the need to change masks.

As already noted hose-fed NBC systems are relatively common on APCs and IFVs, they are also common on less advanced vehicle designs. Battlemechs and the more advanced, and comfortable, armored vehicles use overpressure NBC systems.

When in an area with a radiation hazard care must be taken: armor provides a good shield against radiation *but* exposure to it must be minimized, as the damage caused to a living organism by it is cumulative. Most all noteputers carried by NCOs and Officers, as well as many mission computers in vehicles and battlemechs, have programs to calculate stay-times in a hazardous environment to prevent over exposure to radiation.

Cleaning Up Afterwards

Decontamination can be done a number of ways and all sorts of equipment can be used to do it. The easiest method of decontamination is to not decontaminate; equipment is simply abandoned and personnel are issued new gear. This is of course very expensive and impractical for most services so true decontamination must be done. For personnel the most common method of decontamination is to take a shower: water and mild detergent work best. Harsher chemicals, such as bleach, along with water do a good job most equipment.

Another common decontamination agent is Absorbent Powder. The powder is comes in small and large single-use packs to decontaminate either personnel or vehicles. Inside the pack is a powder puff that is patted around the site of the contamination. The powder absorbs and neutralized the chemical agent and is safe to leave in place until the user can arrange a shower. A small absorbent powder pack has enough powder to cover the whole upper body of an average person; a large pack, with its large glove-type powder puff has enough powder to decontaminate the exterior of a midsize family sedan. Pressurized chemical sprays that also neutralize the chemical agent are available but not recommended for use on personnel. These sprays come in bottles that look much like fire extinguishers so always be careful to grab the correct bottle.

Decontamination of large numbers of soldiers and equipment is very difficult as almost no dedicated decontamination equipment is available in many military units; ad hoc, spur of the moment, planning is usually the order of the day. Some ideas to keep in mind: battlemechs are relatively easy to decontaminate if a river is handy: the 'mech simply takes a bottom walk although some scrubbing might be necessary around joints. Firefighting equipment can also come in handy for decontamination operations. Thankfully large-scale nuclear and chemical attacks are few and far between and are generally very localized events. A combat brigade can easily absorb the loss of a company or two of troops as they decontaminate.

Biological Warfare Defense

Detection, protection and decontamination for biological attack requires an almost completely different approach from that for nuclear and chemical attack. For obvious reasons bio-warfare defense is the realm of the Medical Corps. Biological weapons in most cases do not manifest themselves until well after the attack itself, or rather the event when the bio agent was introduced. It is for this reason and the fact that minute quantities of biological agents can create enormous problems that most bio-warfare is covert in nature. This makes preparation very important. Intelligence gathering into possible threats and research and development into vaccines and treatment methods are usually the number one priority to counter a biological attack. The most important thing an individual soldier can do to defend against bio attack is to maintain good hygiene in the field. Near the individual soldier level the combat medic and the supporting medical teams monitor everyone's health, the operating environment, and unit field sanitation to detect and stop bio attacks, whether perpetrated by a human enemy or Mother Nature, before they become dangerous. In point of fact biological warfare never ends for the Medical Corps.

NBC attacks are to be understood not feared. But if truth be told most militaries in the Inner Sphere do have reason to fear; proper NBC defense training is lax or non-existent in many units and few have sufficient stockpiles of detection, protection and decontamination equipment. Even among elite prestige units with abundant resources NBC defense is a relatively low priority. On the bright side NBC warfare is relatively rare on today's battlefield and perhaps the most fearsome WMD, biological agents, receive considerable attention thanks to the efforts of medical personnel.

NBC Warfare: be afraid, be very afraid!

Air Defense Artillery in the 31st Century

by Boilerman

Air Defense Artillery, better known as Anti-Aircraft Artillery or more simply AAA (pronounced triple A) is a little appreciated but a necessary support arm in all militaries.

It is a widely accepted fact that the best aerospace defense is a strong aerospace offense. An aerospace fighter is the best weapon system available to shoot down another aerospace fighter. But aerospace fighters are not always where they are needed or wanted by everyone. The Air Defense Artillery (ADA) provides the air defense at those times.

Air Defense for the Front Lines

Front line combat units are generally not directly supported by the ADA. The weapons and targeting & tracking systems mounted on most battlemechs and vehicles are quite capable on engaging aerospace craft. Some vehicles and battlemechs excel at ADA: the RFL-3N Rifleman Battlemech and the Partisan Air Defense Tank have truly fearsome reputations. But despite their capabilities it is rare for the ADA to be assigned such weapons. These are reserved for front line duty protecting and supporting the combat forces.

Rear-Area Air Defense Artillery

Forces labeled as Air Defense Artillery are used to provide basic air defense to the rear of the front lines. Their primary mission is to protect rear area assets that might not have their own ADA capability.

Doctrine used by most militaries call for a layered air defense whenever possible. Aerospace fighters on interceptor or CAP duty constitute the first layer. Long-range air defense assets of the front line combat units form the second layer. These front line assets are normally spread over a wide front providing only a thin screen for units to their rear but their screen is still useful. The third layer is generally the first made up of units from the artillery.

Field Artillery units to the rear of the front line provide another screen. It can actually extend some way out ahead of the front line combat forces. It must be remembered though that Field Artillery units have another important mission - indirect fire support for the combat forces. Therefore Field Artillery will not always be available for ADA duty. Field artillery units assigned an ADA role generally form the outer of the next two layers of air defense. These long-range assets are assigned to Area-Defense (AD) missions. They choose sites to cover their assigned territory. The inner layer of the air defense is assigned to short-range ADA assets. These units are assigned to protect specific assets such as a depot. This is generally called Point-Defense (PD) duty. These units choose sites close to the assets they are assigned to protect.

As their name suggests the ADA is considered an artillery arm by most militaries. Their name comes from the fact that cannons, today field artillery cannons and autocannons, were and still are the most common ADA weapon. Although common cannons are not the only ADA weapon available. Towed LRM launchers are the second most popular ADA weapon and even

towed SRM launchers and twin-machine gun mounts can be found in some units: although they are considered weapons of the desperate.

As most militaries place their ADA units low on the priority list older weapon systems still dominate. Only in the past several years have ADA units started receiving the LB X series autocannons. A few Artemis IV equipped LRM systems have also appeared recently along a few Streak systems. Though still in prototype stage the Thunderbolt Missile holds promise as another capable ADA weapon. The Field Artillery is also receiving the Arrow 4 Missile System.

ADA Organization

The Air Defense Artillery evolved a millennia ago within the Field Artillery (FA) Corps. Over the centuries several militaries have separated the ADA from the FA but currently most ADA units within the Inner Sphere are part of the FA.

Thanks to their common lineage the ADA maintains the same basic organization as the FA. Weapon systems are organized into sections, platoons, batteries and battalions and on occasion regiments. The actual number of weapon systems can vary considerably based on the type assigned. Generally the heavier the weapon the fewer there are. Most ADA units assigned to point defense duty have two or three times to number of weapons that a long-range unit might have due. Most PD platoons break down into sections to protect more than one asset whereas FA and other AD platoons generally remain together as one group.

Over the centuries the amount of ADA provided to large main maneuver and combat formations has shrunk. This is due primarily to the deprivations of the Succession Wars. Among the clans it is due to their preference for battlemechs and other front line combat systems along with their bidding system. Among the armies of the Inner Sphere ADA capabilities dropped more than actual numbers suggest as mobile systems that were not destroyed were transferred to front line units to help replace losses. In turn ADA units were given less capable but cheaper towed systems.

During the first Star League Era an SLDF Division had one vehicle ADA regiment assigned to the Armored Brigade within the Division. This provided a ratio of one ADA Company per front line combat regiment within the division. A more common ration today is one ADA Platoon per front line combat regiment. The AFFS RCT is a convenient example. Each RCT actually fields a Field Artillery REGT. The REGT has on battalion of Field Artillery where all of the classic artillery systems such as the Snipers and Long Toms are clustered. The second battalion is Air Defense Artillery. Towed autocannons and LRM launchers predominate within the ADA battalion.

Rules for ADA

See *Battletech Master Rules Revised Edition* Special Case Rule on FLAK p82 for rules on how to use field artillery pieces (including the Arrow 4 missile) as Air Defense Artillery. Also see *Aerotech 2* and presumably *Aerotech 2, Revised*, for rules on ground-to-air fire.

Short-ranged towed antiaircraft artillery can be simulated in one of two ways. *Maximum Tech* provides rules for towed field guns on pages 38 & 39. A towed gun requires one crewman per ton. The second option is to treat the towed AAA piece as a vehicle and use the Vehicle Construction Rules along with the optional trailer construction rule on page 76 of *Maximum Tech*.

Air Defense Artillery: every little bit helps.

Author's Notes: the *Star League Source Book* has an organizational chart for an SLDF Battlemech Division. The division has a Divisional HQ BTLN, one Aerospace Brigade (with 1 ASF REGT, 1 Air Transport REGT and 1 VTOL REGT), an Infantry Brigade (3 M. Inf. REGTs & 1 Lt. Battlemech BTLN), an Armored Brigade (2 ARMD REGT & 1 ADA REGT), 2 Battlemech Brigades (with 3 Battlemech REGT), an Artillery Brigade (with 3 Artillery BTLN), a Cavalry BTLN (with 3 LAM Co. & 2 ARMD CAV Co.), a Combat Engineer BTLN, a Communications BTLN and a BTLN labeled S, presumably a Supply BTLN. Some of the labeling is indecipherable. Example: the DIV HQ BTLN is clearly labeled as a BTLN but has a BTLN of dropships and a Medium Battlemech BTLN subordinated to it. This is not standard practice in such charts so you decide what the HQ BTLN has.

Combat Engineers in the 31st Century

by Boilerman

The mission of the Combat Engineer is about one thing – mobility. Deny it to the enemy. Maximize it for your own force. That has been their mission for over two thousand years. Combat Engineers are proficient at laying and removing minefields, building and demolishing obstacles, bridges and roads; they are even quite adept at assaulting field fortifications.

The history of the combat engineer can be traced back to terran antiquity. Most ancient armies, such as the Roman Legions, used their regular troops, supervised by engineers, as a labor pool for road and fortification construction. As engineer skills became more specialized whole units of soldiers, trained as engineers, or sappers, as they are often called in some armies, were created. These units provided almost all labor requirements for engineering operations.

By the 20th century engineers had been split into two basic categories: Civil Engineers, those that primarily build facilities and roads, and Combat Engineers, which provide support to the main combat corps: artillery, infantry and armor. Combat Engineers do their work on or very close to the front lines and destroy things as often as build them.

When the triangle system of ground force organization (2 units on the line, one in reserve) was developed during 20th century the standard organization for a Combat Engineer Company was also developed. In most militaries a Combat Engineer Company (CE Co.) consists of a Company Headquarters Section, two Combat Engineer Platoons and one Equipment Platoon. Many CE Companies also have a Utilities Platoon.

Combat Engineer Platoons are organized like infantry and provide the main labor pool. Combat Engineers are trained in a variety of skills from demolitions to carpentry to mine clearance. They are almost always provided with vehicles to transport their equipment. Their tool lockers can consist of just about anything found in a hardware store and quite a few not found elsewhere. Chainsaws, flame-throwers, plastic explosives, crowbars, mine detectors and shovels are all staples in a CE tool set. CE platoons are also outfitted with a complete set of infantry weapons since they are frequently used as infantry reserves when times get tough.

The Equipment Platoon operates the heavy equipment of the company. Combat Engineering Vehicles and Armored Bridge Launching Vehicles are standard issue. An Equipment Platoon usually has two of each and may have other equipment as well.

Utilities Platoons operate and maintain utility service equipment, such as large generator sets and water purification and treatment systems. Most Utilities Engineers (UE) units belong to and are assigned by headquarters above a regiment but some have their own UE assets.

Under the triangle organizational system one CE Co. supports one regiment of three combat battalions. One CE platoon and a section from the Equipment Platoon normally supports each forward battalion. This has been the standard for ten centuries. Variations are common and specialist engineers units abound though.

During the Star League era another basic CE platoon organization was introduced by the SLDF. They called it the Combined CE Platoon. It was essentially a CE Co. in miniature. The platoon consisted for a four Combat Engineer squads equipped like any other CE PLTN. But the platoon also had several unique vehicles. Instead of standard APC vehicles the platoon had Combat Engineer Support (CES) Vehicles.

These CES vehicles transported the engineers, their equipment and also were equipped to function as Combat Engineering Vehicles. They had a bulldozer blade with mine plow attachment and an oversized engine to make use of them. Some models also had backhoe attachments mounted on the side. Since these vehicles were a series of compromises there were not as effective as more specialized vehicles but the SLDF considered them effective enough to deploy widely. Since a CESV can not do everything the SLDF Combined CE Platoon was also equipped with an Armored Bridge Launching Vehicle.

The most common specialty CE unit is the Bridging Company. These units carry and deploy prefabricated bridges to cross rivers and similar obstacles that are too wide to cross with standard vehicle deployed bridges, which can only reach about 30 meters. A bridge company usually carries between 180 and 240 meters of bridging. This bridging can be used to create one large bridge or up to 6 small bridges. Ribbon type bridging can also be used as a raft. The use of rafts is actually quite common at crossing points near an active combat zone. Rafts present a mobile target and are much harder to hit than a stationary bridge.

Overall the proportion of combat engineers has declined somewhat in the last five hundred years. Battlemechs, with their inherent mobility, do not require the same amount of direct CE support as infantry or armor. Hover equipped units do not require much CE support either. Front line units are normally supported at standard levels but less well equipped units such as garrison brigades can find themselves with no CE support at all.

Organization above the company level can vary widely. Most AFFS RCT units consolidate the their engineer assets into a single regiment assigned to the RCT Support Brigade. CE Companies are then assigned as the mission requires rather than spread out piecemeal. The DCMS assigns a CE Co. to most of their Forward A.R.C. brigades and many of their independent regiments.

Combat Engineers may not be well known or well understood but they are as important as any of the main combat corps of any military service. Without them most campaigns would fail; even the smallest river can become impassable without bridging during the rainy season.

Combat Engineers – don't leave home without them!

Author's Notes: for rules on Combat Engineers see *Maximum Tech*.

Communications Support in the 31st Century

By Boilerman

Military communications is perhaps the least known and least understood combat support arm of any military in the Inner Sphere. Many armchair generals assume that since every battlemech and most infantry have communicators of some type additional technical personnel, trained in communications support, are not required; nothing can be further from the truth.

Specialist military communications units do not provide communications within a company or in many cases even a battalion. Military communications units link battalions spread over wide areas, often whole planets, together in a network that allow a regiment or brigade commander to communicate with, command, and control his units from a distance. Without this communications support command and control would become virtually impossible.

The Types of Communications Specialists

Most militaries require a number of different types of communications specialists to function at full capability. Most divide their communications specialists, or comtechs, into three broad categories: C³ Specialists, Cryptology Technicians, or Crypto-techs, and technicians specialized in establishing and maintaining wide-area communications networks. This last group is what most people are referring to when they use the term comtech.

Most of the communications specialists assigned to headquarters units at the battalion, regiment and brigade levels are C³ specialists. These soldiers are trained to provide Communications, Command, and Control support to their assigned unit by operating and maintaining the communications networks *within* the unit. As the battlefield commander's main advisors on all things communications related C³ specialists write the instructions on choice of radio frequencies and automatic encryption techniques and procedures at his direction. During actual battle C³ specialists generally function like air traffic controllers issuing orders to subordinate units, sending messages informing neighboring units of current conditions and providing a picture of the battlefield to their commander as he requires. Most C³ specialists have technical skills enabling them maintain and repair electronics. Most also have proficiency in computer programming as almost all military communications systems are digital and transit data as numerical information packets. C³ specialists make up the majority of the operations staff within battalion, regiment and brigade headquarters units. [Ed. Note: See the Command Structures Section of the Manual for additional information on headquarters units.]

Cryptology technicians, also known as Crypto-techs normally work for Military Intelligence examining signals intelligence. The nature of digital communications encryption today means that it is virtually impossible to decrypt a 512-bit dual key encryption: the odds are several billion to one against it. Crypto-techs do much of the "leg" work collating data on enemy transmissions collected by combat units and stored in Battle-ROMs. Such information is the main source of electronic intelligence on today's battlefield when properly cross checked. [Ed. Note: see the Military Intelligence Section of this Manual for more information.]

True comtechs are the last major type of communications specialist. They are usually grouped into separate communications units with the mission of establishing and maintaining wide-area communications networks. These units transport, locate, erect and maintain a variety of communications equipment to provide this vast network.

Most Inner Sphere militaries continue to use the old SLDF standard ratio of one communications platoon per front line combat regiment to apportion comtechs. Most Communications Platoons are grouped into companies and battalions. Platoons are then detached and assigned as necessary to support front line units.

Each Communications Platoon usually consists of 28 soldiers organized into four squads. The first squad functions as the platoon headquarters element and can usually be found close to the unit it is directly supporting. The major mission of the HQ squad is to plan and coordinate with the supported unit, to direct its roving communications squads, and to maintain the network links to insure proper routing of all data. The other three squads are almost independent and roam vast territories erecting, physically maintaining and regularly relocating the remote assets of the communications network. This remote equipment includes small microwave and/or laser relay towers, radio repeater stations and remote satellite uplinks. These squads also frequently lay fiber optic landlines.

Tying Communications Systems Together

A wide variety of military communications systems are available; military forces regularly use everything from radio to laser link communications. [Ed. Note: for further information on actual communications systems and their capabilities please refer to your *Combat Operations* manual.] But one thing that is not well understood is how these systems are tied together to provide full spectrum communications between combat and support elements and their command structure.

Most company level combat units use a radio-based system as their primary means of communications. On the battlefield it is an excellent piece of equipment; the wide broadcast capability of radio insures instant on demand communications for troops on the move without the need for exacting antenna alignment. When stationary for extended periods of time most units utilize landline systems to conceal their location as much as possible from the enemy. Temporary landlines are easily strung out from reels for short distance by hand and plugged into a communications set. Most command radio sets are dual capable and will accept either copper wires or fiber optics as well as transmit via radio wave.

Temporary landlines also allow a unit to erect a radio transmitter as much as 10 kilometers away from any base camp. This allows the unit to transmit via radio when necessary without giving away their exact location. Most armies will bomb any enemy radio transmitter at the first opportunity. The transmitter tower is usually a total lose but the equipment is relatively easily replaced. In fact most units have multiple transmitter towers to provide backups. These transmitter towers also allow a communications platoon to tie directly into an existing civilian landline system as well. All that is required is a relatively close tie in point. Fiber optic lines can be strung tens of kilometers if necessary. Fiber optic cables have been the preferred carrier

medium for a millennium for landlines, both civilian and military, because of their light weight and large bandwidth.

Satellites & Other Space based Communications Systems

Militaries have long relied on communications satellites to relay traffic around a planet quickly and cheaply. Placing as few as four satellites in geo-synchronous orbit can provide complete coverage of a typical planet. All a unit needs to tap into this communications network is a satellite uplink and the proper codes.

Unfortunately satellites are prime targets and destroying them is an excellent way to disrupt an enemy communications network. For this reason most militaries deploy a large number of satellites, far more than are actually needed, to provide far more targets than can easily be dealt with. Standard model communications satellites are both cheap and easily deployed. Most militaries also do their best to insure aerospace superiority. Satellites are rarely at the top of an invader's target list and if he has to worry about fighters he rarely has the time to deal with satellites.

Communications satellites, and for that matter all military satellites are a valuable resource. Arguments have gone back and forth for centuries between ground forces and naval forces over who should actually control satellite networks, whether they are communications or reconnaissance type. Since the beginning of the Succession Wars era and the destruction of most naval forces, ground forces in most militaries have been given ultimate control of satellite assets. Naval forces, especially in an invasion or raid, are responsible for putting the satellites in orbit but ground force communications units control them.

Occasionally a dropship or specialized small craft is used in place of a satellite as an orbiting communications or reconnaissance asset. Most dropship crews detest such duty, as it is both monotonous and very dangerous: lone dropships are very vulnerable. At these times the senior ground force communications headquarters is given operational control of the dropship assigned to the mission. The captain of the dropship is still responsible for his command and has the authority to do what is necessary, given the circumstances, to preserve his ship but differences of opinion between dropship captains and ground commanders over circumstances have led to more than one courts martial. For these reasons both ground and naval forces prefer to do their best to provide adequate satellite assets.

For a commander good communications are key to success on the battlefield. It may be an overused cliché but communications are a force multiplier; they allow a commander to maneuver his forces based on the latest intelligence reports received from his troops. History has shown repeatedly that smaller armies are quite capable of defeating a much larger force if they can apply the pressure at the proper location and time: this would be impossible without modern communications on today's battlefield.

Communications: without them your deaf, dumb, blind and dead.

Military Intelligence Support for the Troops in the 31st Century

by Boilerman

Military Intelligence: it is often called an oxymoron. But it is an important, some would say *the* most important, piece of the decision-making puzzle for a commander. Without the information that Military Intelligence provides he is as blind as a bat in broad daylight. A variety of sources have previously discussed Military Intelligence¹ so this paper will focus primarily on MI support for units on the tactical and operational level, primarily from the regiment level down to the company level.

First of all what is Military Intelligence? Most would say it is information about the enemy but it is far more than that. Most Military Intelligence organizations define Military Intelligence (MI) as evaluated information about the enemy's composition, disposition and intentions and terrain and weather. MI is created when all information available is evaluated. Most MI organization further define Information or Combat Information (CI) as raw unevaluated data. The distinction may seem minor but is important as all information must be evaluated together to get the big picture.

Tactical Military Intelligence operations begin with the tactical commander. His first responsibility is to determine what information he needs. These needs are then translated into priorities by his staff. The MI staff then sends requests to higher command for what CI and MI they can provide and coordinates with the operations staff to generate mission orders for subordinate units to collect CI to meet the commander's information requirements.

All major Inner Sphere Houses maintain elaborate intelligence organizations. House Liao has the Maskirovka, the Draconis Combine the ISF to name just a few. All of these organizations collect data and process it for their respective national command authorities. Through open sources to more covert means they collect, analyze and then disseminate all kinds of information to legitimate users at all levels throughout their governments and militaries regarding all aspects of their enemies. Much of this information is relevant to military commanders at all levels. . Enemy Tactical Organization & Equipment information or TO&Es, topographic and climatic information are the most common requests by military commanders but by no means their only requests

The most valuable source of CI for a commander is his own troops. They see and fight the enemy frequently, if not everyday and are at his command to go collect it.

One point about MI and CI that must be understood is the relationship between a commander and how much he relies on each. The lower a combat commander is within the chain of command the more a commander relies on CI rather than MI. A Company Commander (Co. CO) will almost exclusively rely on CI from his troops whereas a Regimental Commander (REGT CO) will use more MI in his decision-making process. This is due primarily to the highly perishable nature of CI. A Co. CO is very close to the action, frequently directing his soldiers in the midst of it. He must make split-second decisions on the information at hand. A REGT CO, on the other hand, rarely gets CI before it is outdated. He is forced to rely on reports passed up the chain of command to help formulate his plans. A REGT CO must also plan much

further into the future and deeper into the battle space than a Co. CO. MI, along with his own experiences and judgment, allows a senior commander to evaluate a situation and reasonably guess what will happen.

Counter Intelligence

Military Intelligence organizations have another major responsibility - counter the intelligence gathering capabilities of the enemy. The mission of Counter Intelligence (CI) operations is to detect, evaluate, counteract and/or prevent hostile intelligence collection, subversion, sabotage and terrorism by the enemy or on his behalf by surrogates.

Counter Intelligence operations at the regimental level and below generally focus on Operations Security (OPSEC). Most CI operations begin with the profiles of friendly forces. These profiles are then used to identify vulnerabilities based on the enemy's reconnaissance, intelligence gathering and insurgency capabilities. From these assessments recommendations are made to fix the vulnerabilities that are found thus improving OPSEC. OPSEC is the responsibility of every soldier from the top commanders down to the private serving up the mashed potatoes on the chow line. As the old saying goes; loose lips sink ships.

CI can take other forms. Deception operations, the spreading of deliberate misinformation, are common. This type of CI is generally planned above the regimental level but units at all levels are generally called upon to play a role, whether they know it or not. The most successful deception operation in history has to be House Davion's successful redeployment of almost a dozen Regimental Combat Teams in the Galahad Exercises leading up to the Fourth Succession War. Both the Maskirovka and the ISF were well aware of the redeployments but because of the circumstances of them and the patience with which they were conducted the AFFS still managed to obtain complete strategic surprise when they invaded the Capellan Confederation.

Psychological Operations

Psychological Operations, more commonly known as psyops, are generally defined as operations intended to influence the perceptions of enemy soldiers and the general population of enemy states. For the most part psyops are conducted against the enemy; when conducted against ones own people they are generally referred to as propaganda operations. And that is exactly what they are - propaganda.

At the regimental level and below psyops are generally limited to press releases and press conferences by commanders and their designated spokesmen. Psyops operators are kept together in special MI units and are only be parceled out to tactical units for support of specific missions.

Intelligence & Combat Information Collecting

Most tactical commanders must rely on their own troops for CI to meet their MI needs. To accomplish this part of their mission most front-line soldiers are equipped with a variety of sensor systems that can provide useful CI.

The most common and simplest information collectors eyes and ears; all soldiers have them *the key* is training them to use them. Soldiers must be observant and report exactly and only what they see and hear. It is not their job to speculate on what it might be.

Electronic Warfare

Almost all modern military equipment, especially combat equipment emits some form of radiation that is detectable. These emissions are usually created by active targeting and tracking systems or communications systems. Intercepting and evaluating these emissions is a time honored tradition on the battlefield. And it can be an extremely valuable source of information about the enemy.

Most modern combat vehicles and almost all aerospace fighters, military dropships and jumpships, as well as battlemechs are equipped with Electronic Support Measures (ESM) equipment to detect and classify radio, microwave and laser emissions. The information ESM provides is known as Electronic Intelligence or ELINT.

All Targeting & Tracking (T&T) and Command, Control and Communications (C³) systems emit signals in some wavelength in some pattern. One of the major chores of MI units is to collect data to identify what system emits in what pattern and on what frequencies. This data is stored in the ESM computer memory and lets the operator know what type of system is emitting the signal that is detected and potentially what units carry the system. This data when collected and analyzed can provide a fairly good picture of what is out there: assuming of course the enemy is transmitting and one is able to detect that transmission.

The ESM sets on most vehicles are fairly simple; some are so simple that they can only indicate that a system is transmitting and has perhaps locked onto the vehicle. The more advanced ESM sets are capable of classifying the signal, provide threat warnings if necessary, indicate direction and strength, as well as indicate what units are known to use the equipment in question. If several ESM units are linked together via communications systems they can triangulate the source. The better ESM sets can also record all of this information for later review by MI signals experts.

ESM operations are conducted at all levels in the military community. Besides collection by battlefield units such as battlemechs satellites and dropships in orbit provide ESM data as well communications eavesdropping. Unlike in the 20th century few specialist vehicles of any type are required for ESM operations. And all that is required to conduct most Electronic Counter Measures (ECM) operations is the addition of a Guardian ECM Suite to a vehicle or battlemech.

Collecting and correlating all the ELINT from the ground forces for processing into a coherent picture for use by commanders falls to the MI signals experts. These experts within each MI Squad attached to each front-line combat BTLN are trained to operate and maintain the modified Command, Control, Communications & Intelligence (C³I) systemsⁱⁱ which assists them in their work.

Collection Operations at the Tactical Level

To collect information in a combat zone you generally need to go out and get it. For battlefield commanders this usually means sending his troops out into harm's way.

Every soldier along the front-lines is his own Observation Post (OP). Many commanders also assign a few troopers to go out in front of the main lines and establish OPs. These are usually connected to Command Posts (CP) via some kind of communications system to rapidly relay any vital information. Telephones using strung fiber optic lines are the most common form of communication device for this work since it does not emit a signal that can be detected or intercepted. Because of the nature of forward OP work infantry conduct most of these operations.

Another common technique for CI collection is the patrol. Patrols have a variety of uses but the information they can collect is always useful. Patrols can consist of as few as two or three infantry conducting a reconnaissance patrol on foot to as large and strong as an entire company of battlemechs conducting a fighting patrol through contested territory. One common use of patrols is the placement of remote sensors. Data from these can provide advanced warning of an engagement, composition of engaging forces and their direction and speed. Patrols can also be used in a CI as well rooting out enemy OPs and blocking and harassing enemy patrols.

Military Intelligence Assets

As noted most tactical combat units from the battalion level on down have few specialist MI personnel. The majority of information collection is done by the troops of the battalion. At Company level no MI specialists will be found at all. The BTLN CO does have a small Intelligence staff that usually consists of an officer, in many services referred to as the S-2ⁱⁱⁱ, and two or three enlisted intelligence specialists expert in analysis and interpretation. The S-2 is not always a specialist intelligence officer. The primary job of the S-2 and his staff is to prioritize their CO's MI requirements and collect it for his use. They also pass along any information that company commanders might request.

At the Regiment level MI assets are a little larger. The REGT CO will have his own Intelligence Officer and staff, usually consisting of no more than five or six. Their duties are much the same as those at BTLN level. Some regiments also have specialist Scout Platoons. These scouts can range from infantry trained for Long Range Reconnaissance Patrols (LRRP pronounced lurrp) to specialist scout vehicles, battlemechs and VTOLs. They are all usually trained for deep penetration operations.

A regiment will also be assigned an MI PLTN to assist in the collection and processing of any intelligence. Whether these MI assets are organic to the REGT or attached by high command depends on the style of military service in question. But what matters is the support provided. Normally each MI PLTN has the assets to provide one MI Squad to each combat BTLN within the REGT. The squad will have two or three signals experts, a couple of interrogators and one or two CI experts. Each squad will usually have one or two vehicles to transport themselves and their equipment. Most MI squads have six personnel and the average MI PLTN rarely exceeds 18.

Meta unit MI assets do not vary much from military to military although their organization may. As examples: an AFFS RCT usually has one MI BTLN assigned with 9 standard MI PLTNs and any additional MI assets such as Drone Operator Teams and LRRP Squads. If the RCT is temporarily assigned any special operators such as a Rabid Fox team they are generally hidden within the MI BTLN's assets and paperwork. The FWLM generally assigns an oversized MI Company to their front-line combat brigades. The DCMS assigns reinforced MI PLTNs with 6 squads to their Forward ARC meta units. It must be noted that in the DCMS ISF minders do not answer to the MI commanders. They rarely know who the ISF assets are within their Forward ARC. It must also be noted that all Inner Sphere militaries have additional unattached MI units which they use to reinforce their front-line and garrison units when required.

Military Intelligence is perhaps the least understood arm of any military. This is the way most MI units like it. The less you know about them the easier it is for them to operate. But hopefully this paper has given you a little more information on their missions and capabilities.

Military Intelligence - you won't know where to go or what to do without it.

ⁱ The Intelligence Operations Handbook, the Intelligence section in *Combat Operations* and hopefully *Covert Operations*.

ⁱⁱ OOC: This C³I system is simply the Basic Mobile Headquarters Equipment listed in *Maximum Tech*.

ⁱⁱⁱ S-2: Staff Officer #2. In this ancient staff position numbering system S-1 is administration, S-3 Operations and S-4 Supply. The system goes back to prespace-flight Terra and the Army of the United States of America. This Army was obsessed with standardization and through NATO and thus the Terran Alliance influenced all subsequent militaries including the SLDF.

Author's Notes: Operationally MI in the real world provides most of the Electronic Warfare support for the ground troops. They also provide almost all of the ground surveillance electronics such as ground observation radars. Since CBT has so many gadgets on its vehicles and battlemechs it seemed natural to me to place most of the electronic warfare capability with the regular ground troops. After all CBT militaries are very lean; at least that is my impression.

Military Police Support for the Troops in the 31st Century

by Boilerman

Controlling and coordinating a fighting force of thousands can be a daunting task, even in the 31st century. A commander needs a variety of resources to accomplish this even in an age when speed-of-light communications are his primary means of control and coordination. One of the less known but still very important resources at a commander's disposal are the MPs; the Military Police.

When most people envision an MP they generally see a man in uniform with an armband equipped with a whistle and a billiclub chasing down drunk and disorderly soldiers on liberty from the combat zone. Although this is one of the MP's duties it is just one of a multitude.

Traditionally an MP's duties are divided into five areas: Maneuver & Mobility Support, Area Security, Internment & Resettlement, Law & Order and Police Intelligence Operations.

Maneuver & Mobility Support (MMS): historically route surveillance and traffic control is a major responsibility for the Military Police. Before the invention of electronic navigation aids they were critical to insuring the proper navigation and flow of troops and supplies to the correct locations. This is still true today although MPs tend to focus more on route surveillance today. Traffic control usually amounts to herding civilian refugees as most military vehicles are equipped with GPS systems and inertial navigation aids. An important part of their surveillance mission includes noting possible points of ambush along their assigned routes. In the event of enemy activity they deal with it or call for reinforcements if the enemy force is beyond their capabilities.

Area Security (AS): AS beyond basic surveillance has mostly passed from the responsibilities of the Military Police. Most house militaries now employ specialist infantry units for such operations. For example: the standard AFFS RCT has two Foot Infantry Regiments. Their main function is static defense but they also provide detachments for security at fixed installations such as air bases and supply depots. Because of the mobility of MP units they are still frequently used as a rear area reconnaissance force: noting potential danger points and looking out for insurgents and terrorists. One other responsibility in this category is personal security. MPs generally provide the personal bodyguards for high ranking commanders and other VIPs that might be within their area of operations.

Internment & Resettlement (IS): Or prison guard duty as it is often called is another duty often shared with other specialist infantry formations. MPs do provide manpower for processing Enemy Prisoners of War (EPW) as they are collected. Civilian Internees are usually collected by the MP's as they go about rooting out potential terrorists and insurgents. Forced resettlement has thankfully become a very rare thing in the Inner Sphere. The Ares Convention has seen to that. But a conquering force is responsible for the civilians it has conquered. If a neighborhood has been destroyed in

the course of a battle, which does occur, it is the responsibility of the MPs supervised by officers assigned as Military Governors to help deal with the problem and find shelter and relief supplies for the refugees.

Law & Order (L&O): just like their civilian counterparts the Military Police are tasked with enforcing Law & Order in areas under their control. Their responsibility is limited to just military personnel when in garrison but in a combat zone or in areas under Martial Law behind a combat zone they have authority over both civilians and military personnel. Contrary to many popular stories MP's in a Martial Law Zone do maintain some judicial procedure but that procedure can be very swift when needs require. This part of the MP's mission also include criminal investigation. Most MPs assigned to criminal investigative work are seasoned veterans. Their job is to investigate any and all crimes that involve or are suspected of involving military personnel or military property. Their investigations can range from petty theft to murder and rape. Military Police frequently function as customs officers as well for military units in transit between worlds.

Police Intelligence Operations (PIO): PI operations usually focus on criminal activity in a given location but do include terrorist and insurgence intelligence collection and assessment in coordination with regular military intelligence units. Most of the criminal activity an MP sees is associated with the theft of military property and supplies so the majority of PIOs focus on this. MPs are also responsible for the personal security of key personnel. Besides providing body guard services they are heavily involved in assessing the threat and security arrangements for such VIPs.

Organization & Equipment

Military Police are organized much like infantry. And in most militaries they are considered to be specialty of infantry. A squad of six to eight working in two teams is generally the smallest standard MP unit. An MP platoon usually has three to four squads. Due to the nature of their mission mobility is very important to MPs therefore most units are equipped vehicles of some sort. They can range anywhere from 1-ton jeeps up to 5 and 10-ton armored cars but jeeps are the most common. Aside from a pintle mounted MG on the vehicle most MPs are equipped with standard infantry weapons; although most have a pistol as much as a sign of office as a weapon. Interestingly battle armor is being issued to some MP units as a way to improve their capabilities, especially for fighting insurgents and terrorists. Although it is far too early to tell if this will become a standard practice for all MPs or just a few.

The amount of MPs assigned to a meta unit varies with the military and the larger unit's mission. The FWLM usually assigns a single reinforced platoon of six squads of six MPs to each of their front-line combat brigades. The AFFS assigns anywhere from a single company to a battalion to each of their regimental combat teams. It generally depends on the make up and training of their two Foot Infantry Regiments. The DCMS usually assigns a single platoon to each of their Forward ARC units made up of a battlemech regiment, infantry regiment aerospace fighter wing and an armored battalion.

Interesting most house militaries usually assign at least an MP platoon to reinforce any base MP personnel that might be hosting a mercenary unit. Mercenaries in general have a reputation for being rowdier than most and a little light fingered. Generally mercenaries do not have separate MP organizations. These duties if assigned at all are given as an additional responsibility.

Most large non-battlemech formations such as the FWLM Infantry Brigades tend to have a larger proportion of Military Police as these units tend to have more static occupation duties than battlemech based units. Often they may have as much as a regiment of MPs although the units may use names more closely tied to a history as infantry than as military police.

Operationally MPs traditionally are commanded by the Provost Marshal of a meta unit. This is a title, not a rank; he is the senior law enforcement officer in the unit. As such he is normally a member of the meta unit's command staff and has direct access to the unit commander. An officer with the title of PM is often dual hatted: that is he fills another staff position as well. When this is the case he is usually the unit commander's Chief of Staff.

The Military Police; cops of the combat zone.

You don't need them until you need them and then you *really* need them.

Author's Notes: All of the Inner Sphere Field Manuals give me the impression that most combat support (like Artillery & Combat Engineers) and combat service support (like Military Police) corps like the Military Police are actually specialties within Infantry Corps in the Inner Sphere Militaries. In the real world they are separate Corps (not fighting Corps but just organizations). I don't know how this is going to affect the TOEs I eventually plan on writing, if at all, but I thought I'd throw that in if some were wondering. The main real world source for this paper was *US Army FM 3-19.1 Military Police Operations*.

Support Organization Throughout the Inner Sphere Military Services By Boilerman

Most Inner Sphere militaries mimic the old SLDF to some extent or another. This is not all that unusual. Why reinvent the wheel when the SLDF system worked so well for so long? But over time each House military adapted the SLDF system to suite their own unique requirements to the point that today each military service is quite different from the others in the Inner Sphere. It is as true for their approaches to the combat support and combat service support arms as it is for their combat arms.

The SLDF: Old & New

Since the old SLDF is the foundation for Combat Support and Combat Service Support organization in the Inner Sphere a little background information on their system is useful.

Most armchair historians are amazed that an SLDF BattleMech Division could do anything when they look at divisional tactical organization charts since the division has almost no combat service support assets. But the SLDF was very successful: how is this possible?

The answer is actually quite simple; in the SLDF the *regiment* was responsible for most combat service support functions. This meant that the regiment had a complete set of technical support or maintenance support specialists, medical support units and supply & transport assets to maintain it where ever it may be. This allowed the division commander to focus on the battle planning, not logistics and administration. The SLDF however did realize that logistics would be a part of a division commanders plans and provided some extra flexibility in the form of a transport battalion of prime mover type trucks and an aero transport regiment of transport aircraft. One transport company, along with a transport aircraft wing, was normally assigned to each of division's three front line combat brigades.

Many armchair historians have commented that even this arrangement was too small for proper logistics operations, and it would have been but for one other factor: the SLDF trump card – aerospace superiority. The SLDF had the navy and aerospace fighter force that could insure the delivery of supplies directly to the regiments that needed them thus limiting the distance vulnerable ground based supply convoys had to travel.

Combat support forces were generally handled in a completely different manner by the SLDF. A standard SLDF Division had an Armored Brigade and several separate battalions that provided necessary combat support to the BattleMech and infantry regiments as required at the discretion of the division commander. Field and air defense artillery, as well regular armored formations, were rationed out from the Armored Brigade: Military Intelligence and communications platoons along with Combat Engineers came from their respective battalions. It should be noted that while an SLDF BattleMech Division only had a single combat engineer battalion: an infantry or mechanized infantry division had a full regiment. Each SLDF division normally had a company of Military Police as well.

The modern SLDF is a much smaller organization than its predecessor. At the moment it has only a handful of combat regiments; it barely has enough to claim that it has two combat brigades worth of troops. For the most part the modern SLDF follows the old SLDF model; most regiments have their own combat service support assets and for the moment combat support assets are either a part of the regiment or loaned to it by an Inner Sphere state.

Organization of the standard old SLDF BattleMech Division:

Division Headquarters

BattleMech Brigade (x2)

Brigade Headquarters

BattleMech Regiment (x3)

Mechanized Infantry Brigade

Brigade Headquarters

Mechanized Infantry Regiment (x3)

Armor Brigade

Brigade Headquarters

Armor Regiment (x2)

Air Defense Artillery Regiment

Field Artillery Regiment

Aerospace Brigade

Brigade Headquarters

Aerospace Fighter Regiment

Aero Regiment

Aero Transport Regiment

Civil Engineer Battalion

Reconnaissance Battalion (LAM)

Division Combat Support Elements:

Combat Engineer Battalion

Communications Battalion

Military Intelligence Battalion

Military Police Company

Division Combat Service Support Elements:

Field Hospital Battalion

Transport Battalion (Ground)

The typical SLDF BattleMech regiment has the following organization:

BattleMech Battalion (x3)

BattleMech Company (x3)
Technical Support Platoon
Supply & Transport Platoon

RGT Support Battalion

Technical Support Company
Supply & Transport Company
Medical Platoon
Field Services Section

The AFFS

For several centuries the AFFS has used a combined arms approach to combat with their Regimental Combat Teams (RCT). These teams are made up of about ten regiments worth of combat troops: one BattleMech regiment, three armor regiments (normally two medium and one heavy) and five infantry regiments (normally one jump, two foot and two mechanized). An RCT normally has a field artillery battalion and two aerospace fighter wings as well. Including its support an AFFS RCT can easily run anywhere from 11,000 to 14,000 troops.

The overriding priority for combat unit commanders in the AFFS is commanding the fight against the enemy. It may seem contrary to logic but most militaries place a wide variety of responsibilities on their commanders and quite a few of those responsibilities might not have anything to do with their mission as a combat commander. To alleviate some of these extra responsibilities, primarily administration of their support assets, the AFFS centralized all support functions outside the combat regiments of an RCT. As an example combat support troops, such as combat engineers and air defense artillery are pooled together into a single battalion or regiment. These combat support battalions or regiments normally answer to one of the combat brigade commanders: i.e. the RCT Engineer Regiment is normally a part of the Infantry Brigade. Companies and platoons are detached from these larger units and assigned as support by RCT Headquarters as necessary based on mission requirements.

Combat service support assets, such as medical and technical support personnel are organized into mixed Support Battalions in the RCT Support Brigade. Each support battalion is assigned to support one combat regiment. These battalions have a rather generic makeup consisting on a Technical Support or Maintenance Support Company, Medical Company, Supply & Transport Company and a Field Services Platoon. Although each support battalion is assigned to a specific combat regiment on a semi-permanent basis the Support Brigade Commander can reassign them to reinforce one combat regiment at the expense of another. Due to the semi-permanent relationship between a support battalion and its combat regiment the TO&E of the battalion is frequently “fine-tuned” to better meet the needs of the combat troops. Some examples: a BattleMech regiment support battalion normally has a single medical platoon and the typical support battalion assigned to a foot infantry regiment may have only half the personnel of one assigned to a mechanized infantry regiment.

Support battalions assigned to independent AFFS regiments use the same basic organization as those assigned to an RCT. Combat support assets assigned to an independent regiment answer to the regimental commander directly.

A typical AFFS RCT has the following organization:

RCT Headquarters

BattleMech Regiment

BattleMech Battalion (x3)

BattleMech Company (x3)

Aerospace Brigade

Brigade Headquarters

Aerospace Fighter Wing (x2)

Any and all DropShips and JumpShips assigned to the RCT answer to the Aerospace Brigade Commander.

Armor Brigade

Brigade Headquarters

Armor Regiment, Medium (x2)

Armored Battalion, Medium (x3)

Armored Company (x3)

Armor Regiment, Heavy

Armor Battalion (x3)

Armor Company (x3)

Artillery Regiment

Field Artillery Battalion

Field Artillery Battery (x3)

Air Defense Artillery Battalion

Air Defense Artillery Battery (x3)

Infantry Brigade

Brigade Headquarters

Infantry Regiment, Foot (x2)

Infantry Battalion, Foot (x3)

Infantry Company, Foot (x3)

Infantry Regiment, Jump

Infantry Battalion, Jump (x3)

Infantry Company, Jump (x3)

Infantry Regiment, Mechanized (x2)

Infantry Battalion, Mechanized (x3)

Infantry Company, Mechanized (x3)

Engineer Regiment

Combat Engineer Battalion (x2)

Note: normally one battalion is mechanized and equipped with armored vehicles. The other is normally motorized and equipped with soft-skinned support vehicles.

Combat Engineer Company (x3)

Civil Engineer Battalion

Note: normally the CE Battalion directly supports the Aerospace Brigade.

Bridge Company

Support Brigade

Brigade Headquarters

Communications Battalion

Communications Platoon (x10)

Military Intelligence Battalion

Military Intelligence Platoon (x10)

Medical Battalion

Field Hospital (Company) (x3)

Note: this battalion provides specialist medical support services to and evacuates patients from the support battalion medical units.

Military Police Company

Military Police Platoon (x3)

Support Battalion (x10)

Technical Support or Maintenance Support Company

Supply & Transport Company

Field Services Company or Platoon

Medical Company or Platoon

Note: each battalion supports one of the nine RCT combat regiments; the tenth battalion directly supports the Aerospace Brigade.

Transportation Battalion

Transportation Company (x3)

Note: some RCT transport battalions also have a squadron of heavy conventional transport aircraft similar to the FWL Planet Lifter.

The CCAF

The CCAF uses an organizational system that is unique. All other military services use either an integrated command structure or a separate command structure above company level. The only time a mixture is used, at least in a BattleMech regiment, is when combat losses force, a hopefully temporary, reorganization. Even in the case of the AFFS, which uses both types of command styles, depending on the corps, the style is uniform throughout its regiments. The CCAF, however, uses both systems within its BattleMech and armor regiments. Command is integrated at battalion level and separate at the regiment level.

Combat support and combat service support are organized in a uniquely CCAF manner as well. Most technical support and some supply & transport within a BattleMech regiment are

assigned at lance level. Each lance has its own squads of technical support and supply & transport personnel.

All MechWarriors across the Inner Sphere are accorded some level of privilege; it is only nature that such elite soldiers should be treated as a cut above the rest. But some say the CCAF gives its MechWarriors too many privileges however. This talk of course comes from outside the confederation and neglects one important fact - the CCAF is simply providing officers their due. In the CCAF *all* MechWarriors are officers and in reality CCAF MechWarriors actually have very few privileges in the field. They also have a lot more work to do than the typical enlisted MechWarrior.

With rank comes responsibility. Even if a CCAF MechWarrior is not a lance leader he has duties beyond being just a simple MechWarrior: as officers and commanders-in-training they are expected to lead. Accordingly the two most junior Sao-wei of a BattleMech lance supervise its two support squads. One Sao-wei administers the technical support squad, the other the supply & transport squad. The number two Sao-wei functions as the lance leader's assistant. In the new augmented lances the number two Sao-wei may also find himself directly supervising the non-BattleMech combat assets of the lance. Air lances of the CCAF operate in a similar manner.

CCAF armor and infantry companies, whether Line or Home Guard, generally consolidate their maintenance support and supply & transport assets in company level field train platoons. Armor company field train platoons usually have one recovery vehicle, with its crew of mechanics, since most standard vehicle maintenance is done by the vehicle crew in the CCAF. A mechanized infantry company rarely has any maintenance support assigned beyond the vehicle crews since most companies rarely have more than three large platoon-sized armored personnel carriers or infantry fighting vehicles. A mechanized infantry battalion will have one recovery vehicle held at battalion level however. A foot infantry company has no maintenance support personnel and the field train platoon is usually little more than a squad with five or six trucks: the CCAF at the least provides soft-skinned trucks to its foot infantry when possible to provide operational mobility.

Each regiment and battalion has additional CSS assets. BattleMech and armor battalions usually have a supply & transport platoon, an infantry battalion may just have a section, to feed supplies to the company or lance supply units. BattleMech battalions also have a recovery & salvage team. In addition most regiments also have a supply & transport company.

The CCAF generally assigns combat medics to each infantry platoon, armor company, and BattleMech company. Each infantry battalion, armor regiment and BattleMech regiment also has a medical treatment section. The CCAF also trains personnel from other career fields as combat lifesavers. Although they are not as well trained as combat medics these soldiers can administer first aid beyond the basics all soldiers are taught.

Combat support, whether assigned permanently or attached temporarily is usually held at the regiment level. The CCAF uses the same basic ratios that other services use when assigning CS. A regiment, regardless of type, will normally have a communications platoon, Military

Intelligence platoon, air defense artillery platoon and a field artillery platoon attached or assigned. Combat engineers, traditionally considered specially trained infantry in the CCAF, are usually assigned to each Home Guard and conventional Line regiment. The high command is also considering making it standard for BattleMech regiments as well but for the time being the CCAF does not consider engineers essential for BattleMech operations.

The nominal CCAF BattleMech Regiment organization with support is as follows:

BattleMech Regiment

RGT Command Company

RGT Command Lance (with complete HQ support)

BattleMech Lance (x2)

Air Defense Artillery Platoon

Communications Platoon

Field Artillery Platoon

Military Intelligence Platoon

Medical Treatment Section

BattleMech Battalion (x3)

BattleMech Company (x3)

BattleMech Lance (x3)

Supply & Transport Platoon

Technical Support Section

RGT Supply & Transport Company

Aerospace Fighter Flight (x2)

Aerospace Fighter Squadron (x2)

Armor Battalion

Armor Company (x3)

Armor Platoon (x3)

Field Train Platoon

Supply & Transport Platoon

Infantry Battalion

BTLN Command Section

Headquarters Support Section

Supply & Transport Section

Medical Treatment Section

Infantry Company (x3)

Infantry Platoon (x3)

Additional CSS assets assigned:

Field Hospital (Company)

Transport Company

The Com Guards & Word of Blake Militia

The Com Guards and the Word of Blake Militia were a single organization up until the Comstar Schism. Thanks to their common heritage they share a common organizational structure.

From the time the Com Guards came out into the public eye following the Fourth Succession War until they gathered on Tukayyid for their first large scale battle the Com Guards were a widely dispersed army operating in roughly battalion-sized units. Since most Level Threes, as these battalions are called, are intended to operate independently they are completely self-contained; the one except is interstellar transport.

All Level Twos have their own technical support personnel. Of course the type and amount varies based on the composition of the Level Two. Note that the Com Guards group all combat service support into their Zeta branch.

Each Level Three also has a seventh Level Two that is rarely discussed. It contains a variety of Level One units. The first Level One listed is always Mu: a combination of Intelligence analysis, non-HPG communications and headquarters support. The Zeta Level One is primarily a supply & transport unit. The support Level Two also contains a Kappa: Medical squad and specialist combat engineer Iota Level One squad. Another Level One, invariably made up of ROM agents, functions as a combined Military Intelligence and Police force conducting intelligence, counter-intelligence and Law Enforcement operations as well as frequently functioning as a Special Operations Force in some Com Guard and WOB Militia Divisions. The support demi-company also has a Lambda Level One of air defense artillery. Note that field artillery is usually found within one of the six combat Level Two units of a Level Three "battalion." ADA is grouped with the support in the Com Guards because its primary mission is protecting the support assets from air attack; most Com Guard combat units have a sufficient number of weapon systems capable of air defense.

The typical Com Guard or WOB Militia Division organization:

Level 3 "Battalion" (x6)

Note: a level 3 is a combined arms formation. Composition varies.

Level 2 Combat "Demi-Company" (x6)

Note: a level 2 is usually made up of troops a single combat arm.

Level 1 "Combat Squad" (x6)

Level 1 Zeta "Support Squad"

Level 2 Support "Demi-Company"

Level 1 Mu L3 Headquarters Support & Communications "Squad"

Level 1 Lambda Air Defense Artillery "Squad"

Level 1 Iota Combat Engineer "Squad"

Level 1 Kappa Medical "Squad"

Level 1 Rho Intelligence Gathering "Squad"
Level 1 Zeta Supply & Transport "Squad"

The DCMS

The DCMS, like all other Inner Sphere military services, uses the regiment as its standard combat formation. Aside from its Forward Average Regimental Composition (FWD ARC) unit, which is only a semi-permanent and relatively small brigade, the regiment is the largest standard combat formation in the DCMS.

Each DCMS combat regiment, regardless of type, has its own combat service support assets. As a way to start administrative training as early as possible among its commanders each combat company within the regiment is assigned its own Field Train Platoon, or Section. This unit includes any technical support or maintenance support personnel assigned to the company as well as the company supply sergeant, a medic or two and a few field services personnel that double as cargo transport drivers. The company commander is responsible for all administrative tasks required to support the company field train. Although the DCMS does not select officers based solely on their administrative skills this system of early exposure, at least by the standards of most other military services, does help the DCMS identify officers with the potential for higher command.

In a similar manner combat service support personnel are assigned at battalion level as well, consolidated into the Battalion Support Company. The company usually has some additional maintenance support or technical support personnel that are assigned to assist the combat companies as the CO sees fit. In an armored battalion this usually amounts to three or four recovery vehicles and their mechanic-trained crews; in a BattleMech battalion a commander might have two or three additional teams of technicians as well as one or two recovery vehicles. The Battalion Support Company will also have a supply section with a few more cargo trucks. It should be understood that a DCMS regiment does not have any additional supply and transport assets than what is typical in other military services. The DCMS simply distributes its resources differently. The Company Field Train Platoons or Sections will account for about a third of the regiment's transport capacity, as will the assets at battalion level and regiment level.

The DCMS uses a slightly different integrated command structure than most other military services. The Headquarters Support section, normally directly attached to a command lance in other services is formed into a platoon along with the battalion's communications section and a Military Intelligence section. This platoon is a part of the Battalion Support Company and the senior administrator within this platoon normally commands the entire support company. The Battalion Headquarters Support Platoon in infantry and armor battalions will also have a medical treatment section.

The DCMS assigns yet more combat support and combat service support assets to at regimental level. If the regiment is BattleMech or light armor the medical treatment section is at regimental level. There will also be supply and transport assets at the regiment level. An independent regiment, that is any regiment not a part of a Forward ARC, may also have combat

engineer, field artillery, and air defense artillery support assigned by either the Procurement Department or higher command as required. If the Procurement Department assigns the support it is usually a semi-permanent arrangement; if a prefecture or district commander attaches the support it is usually just for the term of a specific mission.

The DCMS forms a small brigade around most of its BattleMech regiments. This brigade normally referred to as a Forward ARC, short for Average Regimental Composition, consists of the BattleMech regiment, a full DCMS aerospace fighter wing of 36 fighters, an armored battalion and an infantry regiment. Under the Forward ARC concept infantry and armor assigned to assist a BattleMech regiment are actually combat support assets of the BattleMech regiment and combat forces fighting along side the BattleMechs. Therefore BattleMech commanders will treat them as such; this is not to say that the infantry and armor are treated harshly, on the whole they are treated quite fairly by DCMS standards but they are support for the BattleMech forces and therefore operate in a supporting role.

Traditionally any additional combat support or combat service support forces assigned to the Forward ARC are placed under the infantry regiment commander. Generally each Forward ARC has a combat engineer company, artillery company and Military Police platoon assigned to it by the Procurement Department. The artillery company is usually a mixed unit with two platoons for field artillery and two platoons of air defense artillery. Higher command can and will attach additional supporting forces of all types to a Forward ARC if the mission requires it. An experienced, senior Tai-Sa commanding a Forward ARC can find himself commanding as many as half a dozen other combat regiments if higher command deems it necessary.

The typical DCMS Forward ARC:

BattleMech Regiment

- BattleMech Battalion (x3)*
- BattleMech Company (x3)*
- BattleMech Lance (x3)*
- Company Field Train Platoon*
- Battalion Support Company*
- Headquarters Support Platoon*
- Supply & Transport Platoon*
- Regiment Supply & Transport Company*
- Medical Treatment Section*
- Field Services Section*

Aerospace Fighter Wing

- Aerospace Fighter Company (x3)*
- Aerospace Fighter Flight (x2)*
- Support Flight*

Infantry Regiment

- Infantry Battalion (x3)*
- Infantry Company (x3)*
- Infantry Platoon (x3)*

Company Field Train Section
Battalion Support Company
Headquarters Support Platoon
Supply & Transport Section
Medical Treatment Section
Regiment Supply & Transport Platoon
Regiment Maintenance Support Platoon
Regiment Field Services Platoon

Armored Battalion
Armored Company
Armored Platoon (x3)
Company Field Train Platoon

Battalion Support Company
Headquarters Support Platoon
Supply & Transport Platoon
Combat Engineer Company
Artillery Battery
Field Artillery Platoon (x2)
Air Defense Artillery Platoon (x2)
Transportation Company
Evacuation Hospital (Company)
Military Police Platoon

The FWLM

Until very recently the FWLM was not a single, unified and centrally commanded military service. Traditionally each province within the Free Worlds League raised and outfitted its own forces and made them available to the Captain-General only by a vote from parliament. Regiments from throughout the League show an amazing level of uniformity of organization, however, thanks to a strong history of officer exchanges between FWL provincial forces. And things have only improved in the FWLM in the last twenty years since Thomas Marik became the Captain-General.

As with most of the other Inner Sphere military services the standard combat formation of the FWLM is the regiment. The FWLM forms brigades by grouping several regiments together under one commander and some garrison forces are also formed into divisions by grouping two or more brigades together into one command.

The FWLM traditionally assigns combat support and combat service support units to regiments and brigades on a relatively permanent basis. Almost all combat service support assets within the regiment are assigned to the battalions since it is the primary responsibility of the battalion commander, or the first battalion executive officer since the FLWM uses an integrated command structure, to organize logistics. Maintenance support or technical support

platoons, depending on the type of regiment, Catering-Corps (field service) sections and Medical sections or platoons make up the bulk of these assets. In the case of a BattleMech battalion all of its technicians are grouped into the Technical Support Platoon along with all of their equipment, which includes a pair of coolant trucks and recovery vehicles. Each battalion also has an oversized supply & transport platoon assigned. In fact most FWLM technical support and supply & transport platoons are twice the size of those found in other services since there are no combat service support assets held at the regiment level.

FLWM doctrine places most battle planning responsibility on the regiment commander and his command staff. To insure the commander has the forces to accomplish any plans most combat support assets are assigned at the regiment level and allocated to the battalions as plans require it. The FWLM tries to provide a complete set of combat support elements to each regiment but, like all the other services in the Inner Sphere, it has trouble doing so. Each BattleMech regiment usually has a battery of field artillery, usually either Long Tom or Sniper artillery pieces. Conventional regiments however usually have to satisfy themselves with Thumper artillery pieces or, in some cases, just a few LRM Carriers. Each regiment has an air defense platoon or two within its artillery battery as well. Most regiments also have their own communications platoon, Military Intelligence platoon and Military Police section attached. Combat engineer companies are usually only assigned to conventional regiments on a permanent basis due to the inherent mobility of BattleMech forces.

Each FWLM brigade, whether formed around a BattleMech regiment or conventional will also have some additional combat service support units assigned. Generally a company-sized Field Hospital unit and a ground transportation company are assigned for every two regiments worth of combat troops within the brigade.

The composition of a standard FWLM BattleMech Brigade is:

Brigade Headquarters

BattleMech Regiment

- BattleMech Battalion (x3)*
- BattleMech Company (x3)*
- Technical Support Platoon*
- Supply & Transport Platoon*
- Catering-Corps Section*
- Medical Section*
- Artillery Battery*
- Communications Platoon*
- Military Intelligence Platoon*
- Military Police Section*

Aerospace Fighter Wing

- Aerospace Fighter Squadron (x3)*
- Technical Support Platoon*
- Supply Platoon*

Catering-Corps Section
Medical Section

Armor Regiment

Armor Battalion (x3)
Armor Company (x3)
Maintenance Support Platoon
Supply & Transport Platoon
Medical Platoon
Catering-Corps Section

Artillery Battery
Combat Engineer Company
Communications Platoon
Military Intelligence Platoon
Military Police Section

Infantry Regiment (x2)

Infantry Battalion (x4)
Infantry Company (x4)
Supply & Transport Platoon
Medical Platoon
Catering-Corps Section
Maintenance Support Section

Artillery Battery
Combat Engineer Company
Communications Platoon
Military Intelligence Platoon
Military Police Section

Additional Brigade assets:

Field Hospital (Company) (x2)
Transport Company (x2)

The LCAF & the LAAF

Thanks to the influence of the AFFS the LCAF began to form Regimental Combat Teams shortly before the formation of the AFFC actually merged the two militaries. But long before this the LCAF had a long and very successful history providing essential support elements to its combat formations.

The business of the Lyran Commonwealth is business or so goes the old adage. The Lyran Commonwealth has always had a powerhouse economy, which has made the LCAF among the most lavishly equipped forces in the Inner Sphere. In fact the powerful Lyran

economy has allowed it to outlast its enemies even when its military has had problems defeating them. Some would argue that it is Social General Syndrome that has prevented the LCAF from defeating its enemies. Others would argue that the relatively minor problem of SGS has created the means to fight the enemy.

Whether one subscribes to the theory of Social General Syndrome or not what is known for a fact is that the so called Social Generals are, in general, very competent administrators. Competent administration is the backbone of a strong economy and the barons of industry all across the Lyran Commonwealth seem to breed excellent administrators for government and military work as well as business. This class of administrators within the LCAF has always seen to it that *all* troops, not just a few elite units, received the best equipment and support possible.

The LCAF, like many other military services, developed their support organizational system around the regiment, which at the time was their largest standard combat formation. All organizations above that level were either temporary brigades formed for a single campaign or were corps of common lineage and traditions such as the Lyran Guards Corps. As part of this organizational system each regiment, whether BattleMech, armor or infantry, has its own set of support elements organized into the Regiment Support Battalion. It should be noted however that the LCAF considered artillery a combat arm, just like infantry BattleMechs and armor, and organized them into separate regiments with their own support elements. This is quite different from other Inner Sphere military services that generally consider artillery a combat support arm and assign units as small as a platoon to their combat regiments. To further confuse matters the LCAF would split up Artillery Regiments, which usually consisted of a field artillery battalion and air defense artillery battalion for individual operations.

When the LCAF began forming Regimental Combat Teams the decision was made to keep all support assets within the regiment as before: the system had, after all, worked marvelously for several centuries. This caused some friction within the AFFC once it formed but eventually it was accepted and some among traditional AFFS units even began to envy the Lyran support system. Today Regimental Combat Teams still exist within the LAAF, almost as a testament to the aborted union of the two states and their military services. But the LAAF support system is all Lyran.

A typical LAAF RCT is organized as follows:

RCT Headquarters

BattleMech Regiment

BattleMech Battalion (x3)

BattleMech Company (x3)

Support Battalion

Technical Support Company

Supply & Transport Company

Communications Platoon

Medical Platoon

Military Intelligence Platoon

Field Services Section

Aerospace Brigade

Brigade Headquarters

Aerospace Fighter Wing (x2)

Aerospace Fighter Squadron (x3)

Wing Support Squadron

Civil Engineer Battalion

Note: all DropShips and JumpShips assigned to the RCT are a part of the Aerospace Brigade too.

Armor Brigade

Brigade Headquarters

Armor Regiment, Medium (x2)

Armor Battalion, Medium (x3)

Armor Company (x3)

Support Battalion

Combat Engineer Company

Maintenance Support Company

Supply & Transport Company

Medical Company

Communications Platoon

Field Services Platoon

Military Intelligence Platoon

Armor Regiment, Heavy

Armor Battalion (x3)

Armor Company (x3)

Support Battalion

Combat Engineer Company

Maintenance Support Company

Supply & Transport Company

Medical Company

Communications Platoon

Field Services Platoon

Military Intelligence Platoon

Artillery Regiment

Field Artillery Battalion

Field Artillery Battery (x3)

Air Defense Artillery Battalion

Air Defense Artillery Battery (x3)

Support Battalion

Maintenance Support Company

Supply & Transport Company

Communications Platoon

Field Services Platoon

Medical Platoon

Military Intelligence Platoon

Infantry Brigade

Brigade Headquarters

Infantry Regiment, Foot (x2)

Regiment Headquarters

Infantry Battalion, Foot (x3)

Battalion Headquarters

Infantry Company, Foot (x3)

Support Battalion

Combat Engineer Company

Supply & Transport Company

Medical Company

Communications Platoon

Field Services Platoon

Maintenance Support Platoon

Military Intelligence Platoon

Infantry Regiment, Jump

Regiment Headquarters

Infantry Battalion, Jump (x3)

Battalion Headquarters

Infantry Company, Jump (x3)

Support Battalion

Medical Company

Supply & Transport Company

Communications Platoon

Field Services Platoon

Maintenance Support Platoon

Military Intelligence Platoon

Infantry Regiment, Mechanized (x2)

Regiment Headquarters

Infantry Battalion, Mechanized (x3)

Battalion Headquarters

Infantry Company, Mechanized (x3)

Support Battalion

Combat Engineer Company

Maintenance Support Company

Medical Company

Supply & Transport Company

Communications Platoon

Field Services Platoon

Military Intelligence Platoon

Additional Support Assets Assigned to the RCT:

Medical Battalion

Field Hospital (Company) (x3)

Note: this battalion provides specialist medical support services to and evacuates patients from the support battalion medical units.

Transportation Battalion

Transportation Company (x3)

Note: some RCT Transport Battalions also have a squadron of heavy conventional transport aircraft similar to the FWL Planet Lifter.

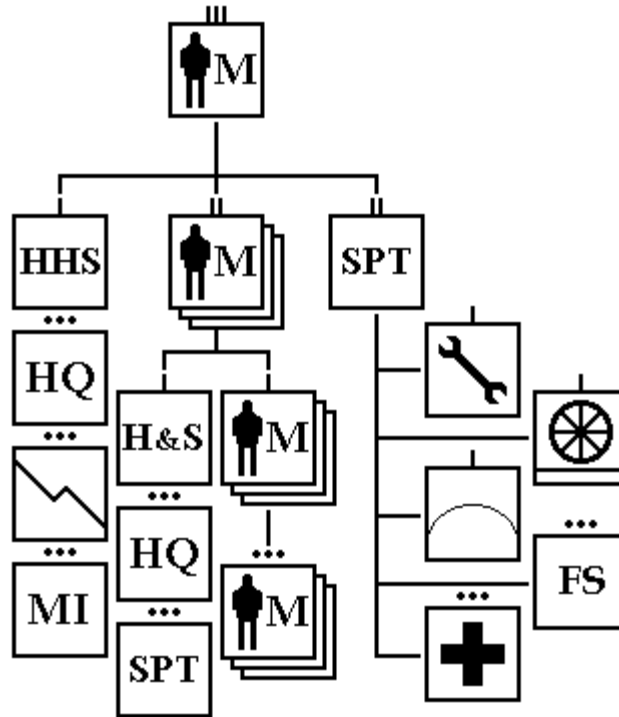
Military Police Company

Military Police Platoon (x3)

Generic Medium BattleMech Regiment TO&E With Separate Command Elements

Assumptions:

- the average weight class is medium and all equipment is level 1.
- except for first level maintenance all support assets are held at regiment level and de/attached as required.
- for simplicity's sake the Aerospace Wing is not included in this TO&E.



RGT Headquarters Support Company, Personnel: 79

Regiment Headquarters Platoon, Personnel: 14

RGT Commander*

RGT Executive Officer*

RGT S-1 Administrative Officer & Assistant (2)

RGT S-2 Intelligence Officer* & 3 Military Intelligence Specialists (3)

RGT S-3 Operations Officer* & 3 C³ Specialists (3)

RGT S-4 Logistics Officer & Assistant (2)

Major Equipment: varies, typically 4 BattleMechs & 2 HQS variant HVY APCs.

*MechWarriors.

Military Intelligence Platoon, Personnel: 28

Major Equipment: varies, typically 4 MI variant HVY APCs.

Communications Platoon, Personnel: 28

Major Equipment: varies, typically cargo trucks.

BattleMech Battalion (x3), Personnel: 79

Battalion Headquarters & Support Company, Personnel: 40

Headquarters Lance, Personnel: 10

BTLN Commanding Officer*

BTLN Executive Officer*

BTLN S-1: Administrative Officer (1)

BTLN S-2: Intelligence Officer* & 2 Military Intelligence Specialists (2)

BTLN S-3: Operations Officer* & 2 C³ Specialists (2)

BTLN S-4 Logistics Officer (1)

*MechWarriors.

Major Equipment: varies, typically 4 BattleMechs & an HQS variant HVY APC.

Support Platoon, Personnel: 30

PLTN HQ Squad, Personnel: 3, 2 Techs & 1 Astech.

Technical Support Squad (x3), Personnel: 9, 6 Techs & 3 Astechs

Major Equipment: varies, typically workshop trucks or FRS units plus cargo trucks.

BattleMech Company (x3), Personnel: 13

BattleMech Lance (x3), Personnel: 4

Major Equipment: 4 BattleMechs

Co. Admin/Supply SGT

Regiment Technical Support Company, Personnel: 72

RGT Technical Support Platoon (x3), Personnel: 18

Major Equipment: varies, typically workshop trucks or FRS units.

Coolant Platoon, Personnel: 18

Major Equipment: typically 6 coolant trucks.

Recovery & Salvage Platoon, Personnel: 18

Major Equipment: typically 6 recovery vehicles.

Regiment Supply Company, Personnel: 54

Major Equipment: varies, typically 27 cargo trucks, also see RGT Supply Co. section.

Air Defense Platoon, Personnel: 28

Major Equipment: typically 4-8 trailer mounted Air Defense Weapon Systems

Field Service Platoon: Personnel: 12

Major Equipment: varies, typically enough field camp equipment for the RGT.

Medical Platoon: Personnel: 16

Major Equipment: varies, typically ambulances & MASH vehicles.

Total Regiment Personnel: 494

Major Equipment:

BattleMechs 124

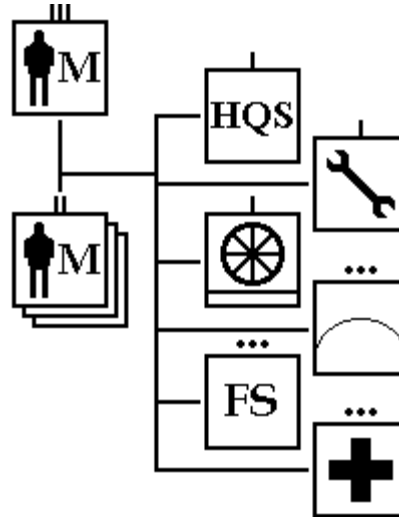
Heavy APCs, variants 9

Recovery Vehicles	6
Coolant Trucks	6
Trucks, various types	Varies

Generic Medium BattleMech Regiment TO&E

Assumptions:

- regiment has an integrated command structure.
- the average weight class is medium and all equipment is level 1.
- except for first level maintenance all support assets are held at regiment level and de/attached as required.
- for simplicity's sake the Aerospace Wing is not included in this TO&E.



BattleMech Battalion (x3), Personnel: 72

BattleMech Company (x3), Personnel: 13

BattleMech Lance (x3), Personnel: 4

Major Equipment: 4 BattleMechs

Co. Admin/Supply SGT

BLTN Headquarters Support Section, Personnel: 6

BTLN S-1: Administrative Officer (1)

BTLN S-2: Intelligence Officer* & 2 Military Intelligence Specialists (2)

BTLN S-3: Operations Officer* & 2 C³ Specialists (2)

BTLN S-4 Logistics Officer (1)

*The BTLN S-2 & S-3 Officers also command BattleMech Lances.

Major Equipment: varies, typically an HQS variant HVY APC.

BTLN Technical Support Platoon, Personnel: 27

Technical Support Squad (x3), Personnel: 9, 6 Techs & 3 Astechs

Major Equipment: varies, typically workshop trucks or FRS units plus cargo trucks.

RGT Headquarters Support Company, Personnel: 66

Regiment Headquarters Support Platoon, Personnel: 10

RGT S-1 Administrative Officer & Assistant (2)

RGT S-2 Intelligence Officer* & 3 Military Intelligence Specialists (3)

RGT S-3 Operations Officer* & 3 C³ Specialists (3)

RGT S-4 Logistics Officer & Assistant (2)

Major Equipment: varies, typically 2 HQS variant HVY APCs.
*The RGT S-2 & S-3 Officers also command BattleMech Lances.

Military Intelligence Platoon, Personnel: 28

Major Equipment: varies, typically 4 MI variant HVY APCs.

Communications Platoon, Personnel: 28

Major Equipment: varies, typically cargo trucks.

RGT Technical Support Company, Personnel: 72

RGT Technical Support Platoon (x3), Personnel: 18

Major Equipment: varies, typically workshop trucks or FRS units.

Coolant Platoon, Personnel: 18

Major Equipment: typically 6 coolant trucks.

Recovery & Salvage Platoon, Personnel: 18

Major Equipment: typically 6 recovery vehicles.

RGT Supply Company, Personnel: 54

Major Equipment: varies, typically 27 cargo trucks, also see RGT Supply Co. section.

Air Defense Platoon, Personnel: 28

Major Equipment: typically 4-8 trailer mounted Air Defense Weapon Systems

Field Service Platoon: Personnel: 12

Major Equipment: varies, typically enough field camp equipment for the RGT.

Medical Platoon: Personnel: 15

Major Equipment: varies, typically ambulances & MASH vehicles.

Total Regiment Personnel: 463

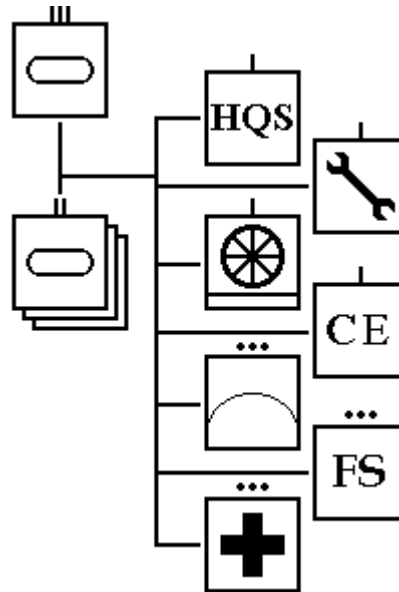
Major Equipment:

BattleMechs	108
Heavy APCs, variants	8
Recovery Vehicles	6
Coolant Trucks	6
Trucks, various types	Varies

Generic Vehicle Regiment TO&E

Assumptions:

- regiment has an integrated command structure.
- except for first level maintenance (done by vehicle crews) all support assets are held at regiment level and de/attached as required.



Vehicle Battalion (x3), Personnel: See Below

Vehicle Company (x3), Personnel: varies, see below.

Vehicle Lance (x3), Personnel: varies, see below.

Major Equipment: 4 combat vehicles.

Co. Admin/Supply SGT

BLTN Headquarters Support Section, Personnel: 6

BTLN S-1: Administrative Officer (1)

BTLN S-2: Intelligence Officer* & 2 Military Intelligence Specialists (2)

BTLN S-3: Operations Officer* & 2 C³ Specialists (2)

BTLN S-4 Logistics Officer (1)

*The BTLN S-2 & S-3 Officers also command vehicle lances.

Major Equipment: varies, typically an HQS variant HVY APC.

BTLN Supply Section, Personnel: 9

Major Equipment: varies, typically 6 cargo trucks.

RGT Headquarters Support Company, Personnel: 66

Regiment Headquarters Support Platoon, Personnel: 10

RGT S-1 Administrative Officer & Assistant (2)

RGT S-2 Intelligence Officer* & 3 Military Intelligence Specialists (3)

RGT S-3 Operations Officer* & 3 C³ Specialists (3)

RGT S-4 Logistics Officer & Assistant (2)

Major Equipment: varies, typically 2 HQS variant HVY APCs.

*The RGT S-2 & S-3 Officers also command vehicle lances.

Military Intelligence Platoon, Personnel: 28

Major Equipment: varies, typically 4 MI variant HVY APCs.

Communications Platoon, Personnel: 28

Major Equipment: varies, typically 8 cargo trucks.

RGT Vehicle Maintenance Company, Personnel: 72

Maintenance, Recovery & Salvage Platoon (x3), Personnel: 18

Major Equipment: typically 6 recovery vehicles per platoon.

Maintenance Support Platoon, Personnel: 18

Major Equipment: typically 6 Maintenance/Workshop Trucks or FRS units.

RGT Supply Company, Personnel: varies, see RGT Supply Company section.

Major Equipment: varies, typically a dozen or more cargo trucks.

Combat Engineer Company, Mechanized, Personnel: 68

Major Equipment: typically 2 Heavy Armored Personnel Carriers, 2 Armored Bridge Launching Vehicles & 2 Combat Engineering Vehicles

Air Defense Platoon, Personnel: 28

Major Equipment: typically 4-8 trailer mounted Air Defense Weapon Systems

Field Service Platoon: Personnel: Varies

Major Equipment: varies, typically enough field camp equipment for the RGT.

Medical Platoon: Personnel: Varies

Major Equipment: varies, typically ambulances & MASH vehicles.

Vehicle crew requirements vary widely. As a general rule assume 1 crewman per 15 tons of vehicle mass.

<u>Personnel per:</u>	<u>Vehicle</u>	<u>Lance</u>	<u>Company*</u>	<u>Battalion*</u>	<u>Regiment*</u>
Light (2-39 tons)	1-3	4-15	13-45	54-153	477-792
Medium (40-59 tons)	3-4	16-18	49-55	162-180	819-876
Heavy (60-79 tons)	4-5	19-22	58-67	189-216	914-998
Assault (80-100 tons)	6-7	27-28	73-85	234-270	1070-1182

*Includes all assigned personnel whether vehicle crew or support.

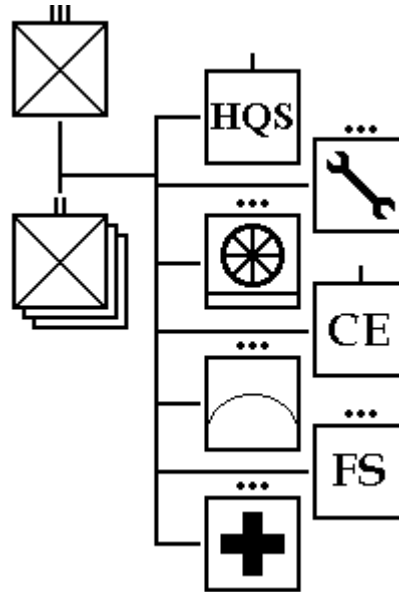
Major Equipment:

Combat Vehicles	108
Heavy APCs, variants	10
Recovery Vehicles	18
Armored Bridge Launching Vehicles	2
Combat Engineering Vehicles	2
Cargo Trucks of various types	Varies

Generic Foot Infantry Regiment TO&E

Assumptions:

- regiment has an integrated command structure.
- except for first level maintenance, done by the truck drivers, all support assets are held at regiment level and de/attached as required.
- each infantry battalion has enough soft-skinned vehicles to transport all infantry as well as their supplies.



Foot Infantry Battalion (x3), Personnel: 267

Foot Infantry Company (x3), Personnel: 85

Foot Infantry Platoon (x3), Personnel: 28

Co. Admin/Supply SGT

BLTN Headquarters Support Section, Personnel: 6

BTLN S-1: Administrative Officer (1)

BTLN S-2: Intelligence Officer & 2 Military Intelligence Specialists (2)*

BTLN S-3: Operations Officer & 2 C³ Specialists (2)*

BTLN S-4 Logistics Officer (1)

Major Equipment: varies, typically an office truck.

**The BTLN S-2 & S-3 Officers also command infantry platoons.*

BTLN Supply & Transport Section, Personnel: 6

Major Equipment: Varies, typically 9 cargo trucks.

RGT Headquarters Support Company, Personnel: 66

Regiment Headquarters Support Platoon, Personnel: 10

RGT S-1 Administrative Officer & Assistant (2)

RGT S-2 Intelligence Officer & 3 Military Intelligence Specialists (3)*

RGT S-3 Operations Officer & 3 C³ Specialists (3)*

RGT S-4 Logistics Officer & Staff (2)

Major Equipment: varies, typically 2 office trucks.

*The RGT S-2 & S-3 Officers also command infantry platoons.

Military Intelligence Platoon, Personnel: 28

Major Equipment: varies, typical 4 office trucks.

Communications Platoon, Personnel: 28

Major equipment: varies, typically 8 cargo trucks.

RGT Vehicle Maintenance Platoon, Personnel: 12

Major Equipment: varies, typically 3 wreckers & 3 Maintenance trucks.

RGT Supply Platoon, Personnel: 24

Major Equipment: varies but typically a dozen cargo trucks.

Combat Engineer Company, Motorized, Personnel: 64

Major Equipment: varies, typically 2 or more cargo trucks for CE PLTN transport, 2 Bridge Launching Trucks & 2 Light Combat Engineering Vehicles.

Air Defense Platoon, Personnel: 28

Major Equipment: varies, typically 4-8 trailer mounted ADA weapon systems.

Field Service Platoon: Personnel: 24

Major Equipment: varies, typically enough field camp equipment for the RGT.

Medical Platoon: Personnel: 33

Major Equipment: varies, typically ambulances & MASH vehicles.

Total of Regiment Personnel: 1052

Major Equipment:

Office Trucks	9
Cargo/Infantry Transport Trucks	Varies
Wrecker Trucks	3
Maintenance Trucks	3

The Field Repair Shelter

The Field Repair Shelter (FRS) is ancient concept in maintenance support. The mission of this piece of equipment is to centrally locate all the tools, maintenance parts and equipment needed to perform standard preventive maintenance support a technician or mechanic squad provides to a company of battlemechs or vehicles.

Most FRS units are built into a standard 20-ton shipping container shelter that weights in at 1000kg empty. Most have double swing out doors at one end and a small Material Handling Crane (MHE) at the other. In addition the long side walls on most swing up for easier access and overhead cover for a workshop area.

Normally a FRS is outfitted with a generator, four complete tools sets, including diagnostic computers and several exoskeletons to allow several people to work at once. The FRS will also contain the basic Maintenance/Repair Kits for each of the vehicles or mechs in the company. Since most companies are made up of several different designs each mech or vehicle may require completely different set kits. FRS units assigned to battlemech units also have tie-down spots inside for three repair platforms. If the FRS is assigned to a vehicle unit the space is used for additional parts.

All of this makes for a nice compact package that can be pulled onto any Palletized-Loading-System equipped vehicle. Fully outfitted and stocked the average FRS costs less than 250,000.00 C-Bills and under non-combat conditions cost about 9,300.00 C-Bills to restock every quarter (3 months).

Item	Mass	Cost.
Standard Small Shipping Container Shelter	1000kg	2000cb
Generator, ICE r10	1000kg	2000cb
MHE, 3-ton Capacity at Maximum Extension	1500kg	45000cb
Tool Sets, 4 and Exoskeletons 2 Light & 2 Standard	1500kg	54000cb
Repair Kits for 12 Mechs (wt 675kg each)	8100kg	93000cb
Repair Platforms, 3	6900kg	37500cb
Subtotals	20000kg	233500cb

Tool Sets Include:

Deluxe Tool Set	50kg	750cb
Noteputer	.5kg	500cb
Personal Computer	3kg	250kg
Handheld Torch	1kg	40cb

No weights are given for the Exoskeletons so that leave almost 1300kg for them and what ever other tools you think should be included.

Author's Notes: the FRS was inspired by the real world system the US Army is fielding for its mechanized forces. All listed tools and kits are from *Lostech* or the *Mechwarrior* RPG 3edition.

Base Camp Equipment

Tentage

Most typical General Purpose (GP) tents are shaped like domes or half-cylinders. The width of the half-cylinder and the radius of dome designed GP tents generally do not exceed 5 meters. This is to keep the tent mass and assembly process manageable. Larger frame type tents are possible but time consuming to erect. Airframe designs are used if large tents are required. Airframe tents are generally use cone, dome and half-cylinder shapes. All tent design types and their support equipment, if any, have an Equipment Rating of C/C/A.

For simplicity's sake a GP tent's mass and cost are based on floor space. Mass and cost include all parts, except air compressors, necessary to setup the tent. Furniture is sold separately. Portable flooring is optional.

<u>Tentage & Support Equipment</u>	<u>Mass per m²</u>	<u>Cost per m²</u>
Frame, Pop-up	8kg	50C-Bills
Frame, Assembly Required	7kg	25C-Bills
Airframe, GP-sized	5kg	50C-Bills
Airframe, Large	10kg	100C-Bills
Equipped with built-in Electrical Outlets & Lights	.5kg	15C-Bills
Climate-Control Unit*, Heater Only	.5kg	15C-Bills
Climate-Control Unit*, Heat Pump	.75kg	25C-Bills
Portable Flooring	2kg	2C-Bills

*Large Airframe tents are not normally climate-controlled. If necessary small portable CCUs are normally located near personnel as they work.

Notes: Area of a Circle = πr^2 , Area of a Rectangle = Length x Width

<u>Additional Tentage Equipment</u>	<u>Mass</u>	<u>Cost</u>
Air Compressor, for GP Airframe Tent	50kg	200C-Bills
Air Compressor, for Large Airframe Tent	500kg	2000C-Bills
Camouflage Net Kit, 25m ² Hexagon with Pole Set	30kg	100C-Bills
Shelter Half Poncho & Kit (1m Pole, 6Stakes & Line)	2kg	25C-Bills
Vehicle Boot	5kg	50C-Bills
Vestibule	5kg	50C-Bills

Note: inflation time for a typical 50m² GP airframe tent is about 15 minutes. A large airframe tent can take as much as 6 hours.

Example: the most common GP tent: Assembly-Required Frame Type, with built-in electrical & lights. It uses a fuel powered heater-only CCU. Size 5m x 10m, Total Area: 50m², Mass: 400kg, Cost: 2750C-bills.

Camp Furniture

You can approach camp furniture two different ways: buy each piece individually or buy it in groups based on the amount of manpower in the camp. All camp furniture has an Equipment Rating of C/C/A.

<u>Type of Furniture</u>	<u>Mass</u>	<u>Cost</u>
Furniture per Soldier in Camp	20kg per Soldier	1C-Bill per kg
Military Cot	10kg	5C-Bills
Folding Chair	2kg	2C-Bills
Folding Table 1m x 2m	5kg	5C-Bills
Map Board	1kg	1C-Bill
Storage Locker .5m x 1m x .75m	2kg Empty	3C-Bills

Field Service Equipment

Field service equipment includes facilities for the mess, laundry, latrine and shower services. These facilities require tents for shelter if not mounted in containerized shelters. All facilities have their own water heaters, if required, but must be supported with electrical power. These facilities are generally classified by the number of soldiers they are designed to support. All Field Service Equipment has an Equipment Rating of C/C/A.

<u>Non-Containerized</u>	<u>#of Soldiers</u>		
<u>Field Service Equipment Sets</u>	<u>Supported</u>	<u>Mass</u>	<u>Cost</u>
Company Level Kitchen	150, 3 Meals/Day	500kg	1,000C-Bills
Battalion Level Kitchen	600, 3 Meals/Day	2000kg	4,000C-Bills
Four Head Shower Unit	150	100kg	250C-Bills
Sixteen Head Shower Unit	600	400kg	1,000C-Bills
15kg Per Hour Laundry Unit	150	150kg	500C-Bills
60kg Per Hour Laundry Unit	600	600kg	2,000C-Bills
6 Toilet, 6 Urinal Incinerator Latrine Unit	150	1000kg	3,000C-Bills
Stand-alone Waste Water Incinerator*	150	1000kg	15,000C-Bills

*At Base Camp assume 75% of water is recycled and only 25% is incinerated or lost.

<u>Containerized</u>	<u>#of Soldiers</u>		
<u>Field Service Equipment Sets</u>	<u>Supported</u>	<u>Mass</u>	<u>Cost</u>
Trailer Mounted Mobile Kitchen	150, 3 Meals/Day	1 ton	4,000C-Bills
Containerized Kitchen	600, 3 Meals/Day	5 tons	16,000C-Bills
Containerized Sanitation Facility*	150	6 tons	30,000C-Bills
with Built-in Waste Water Incinerator		7 tons	45,000C-Bills
Containerized Laundry, Cap. 1200kg/Day	600	8 tons	8,000C-Bills
Containerized Latrine, 6 Toilets, 6 Urinals	150	2 tons	12,000C-Bills
with Built-in Waste Water Incinerator		3 tons	30,000C-Bills

*The Containerized Sanitation Facility is a combination unit with laundry, latrine and shower facilities. This container requires more setup than most containerized systems but it is still minimal compared to non-containerized facilities. No black water systems need to be opened to setup or tear down this unit.

Tactical Water Purification Systems

Tactical Water Purification Systems use either the Jamerson-Ulikov (JU) process or the ancient reverse-osmosis (RO) system. RO filter elements should be replaced regularly; every 20 times the system's daily capacity if the water source is salt water or brackish or 60 times the capacity if it is relatively clean fresh water. The JU process does not require filter replacements.

Tactical Water Purification Systems come in three basic sizes: Portable, Small and Large. The portable system will support 150 soldiers, the small system 600 soldiers and the large system 3000 soldiers. Their respective capacities are: 2500 liters per day, 10,000 liters per day and 50,000 liters per day. This is assuming the raw water is relatively clean fresh water. If it is salt water, brackish or heavily contaminated daily purification capacities are cut in half. Large TWP systems come with their own generator set if containerized or use the vehicle's engine for power if vehicle mounted.

A storage & support kit is necessary to store purified water. It normally consists of a pump or two, hoses and collapsible drums or bladder type tanks. The standard collapsible drum can carry 2000 liters of water. A drum with carry yoke attached can be carried by a battlemech with hands, as an under-slung load below a VTOL or towed behind a ground vehicle at slow speeds. Each full drum weights 2200kg of which 2000kg is water. Bladder type tanks come in a variety of sizes; a typical depot-sized bladder will hold 20,000 liters. Frequently several storage kits are hooked together to create vast storage depots.

Most militaries issue sufficient water purification systems to purify twice the required amount of water under worst-case conditions. Other than replacing filters once a purification and water storage system is setup it only requires monitoring.

<u>Equipment</u>	<u>Equipment Rating</u>	<u>Mass</u>	<u>Cost</u>	<u>Notes</u>
Portable Tactical JU Water Purifier	E/D/A	250kg	3,000CB	-
Portable Tactical RO Water Purifier	C/C/A	250kg	15,000CB	-
Replacement RO Filter for a PTWP	C/C/A	50kg	5,000CB	-
PTWP Storage & Support Kit	C/C/A	500kg*	5,000CB	Cap. 5,000 l.
Small Tactical JU Water Purifier	E/D/A	1 ton	10,000CB	-
Small Tactical RO Water Purifier	C/C/A	1 ton	50,000CB	-
Replacement RO Filter for a STWP	C/C/A	250kg	25,000CB	-
STWP Storage & Support Kit	C/C/A	1ton*	5,000CB	Cap. 20,000 l.
Large Tactical JU Water Purifier	E/D/A	5 tons	50,000CB	-
Large Tactical RO Water Purifier	C/C/A	5 tons	250,000CB	-
Replacement RO Filter for a LTWP	C/C/A	1000kg	125,000CB	-
LTWP Water Storage & Support Kit	C/C/A	5 tons*	25,000CB	Cap.100,000 l.

*Weight Empty

<u>Other Utility Equipment</u>	<u>Equipment Rating</u>	<u>Mass</u>	<u>Cost</u>	<u>Notes</u>
Electrical Distribution Kit*	C/C/A	2 tons	2,000CB	-
ICE Generator, 25 Rating	C/C/A	1 ton	2,000CB	-

*Provides cables, transformers and distribution controls for a 150 soldier camp spread over 5 hectares (approximately 12.3 acres).

A Typical Base Camp Set

The Soldier-150 Base Camp Set offered by Air Vertigo Inc. of Outreach is typical of the camp sets available today. It is not fancy but it provides all the basics plus a few extras. It does not come with any containerized field service equipment.

Number of Personnel Supported: 150

Tentage Required	Area (m ²)
Billets	600
Administration & Medical Services	75
Dining Facilities	75
Kitchen Space	30
Laundry, Latrine, & Shower Space	<u>60</u>
Total Area:	840 m ²

Tentage Provided in the set: 10 5x5m GP Tents & 12 5x10m GP Tents. All tents are Assembly-Required Frame type and are equipped with electrical systems and Electric Heat Only CCUs. The set also comes with a Company Level Kitchen Set, a Four-Head Shower Unit, one 15kg/Hr Laundry Set, a 6 Toilet, 6 Urinal Incinerator Latrine, a single Waste Water Incinerator, a full set of camp furniture, 2 Portable RO Type Tactical Water Purifiers with 6 spare RO Filters and 2 PTWP Storage & Support Kits, 3 r25 Gas Turbine Generator Sets and 1 Camp Electrical Distribution Kit.

Total Mass: 19,270kg *Total Cost:* 147,000C-Bills

Supplies for the 31st Century Soldier

Rations

Ration Type	Mass/Meal	#of meals/Pallet	wt/Pallet	Base Cost/Meal
Emergency 24 hr Pill Ration	.2kg	-	-	15 CB
Combat/Emergency Ration	.2kg	2400	480kg	2.5 CB
Field Rations (MREs)	.4kg	1200	480kg	2 CB
Unit Ration, Field Type	.8kg	600	480kg	1.5 CB
Unit Ration, Garrison Type	.8kg	600	480kg	1.4 CB

OOO for the fun of it: as with most things in life rations can be bought on the cheap. Suppose the Supply Corps officers and vendors had a grading system for rations. The system would use a grading scale A through D. Grade A rations would cost 20% above base line, Grade B quality would be the base line. Grade C rations would cost 75% of base line and grade D rations would cost 50% of base line. I leave the moral and health effects of these ideas to the game master.

Cooking Gear

Item	Equipment Rating	Mass	Cost	Notes
Squad Stove	B/A/A	.4/.8kg	8 CB	Wt & Wt w/fuel for 7 MREs
Squad Cook Set	B/A/A	.4kg	10 CB	-

Iodine Tablets

One bottle of tablets treats about 25 liters of water. One dose kills most micro-organisms such as bacteria, giardia and viruses.

Ceramic Filter Straw

More of a toy for children than a survival tool; it is fragile, rarely survives to useful life of up to 25 liters. The ceramic filter element removes Bacteria, protozoa, giardia, crypto, cholera, salmonella, e.coli as well as most particulate matter.

Hand Pumped Ceramic Filter

With vigorous pumping this filter will purify up to 1.5 liters of water per minute. The filter can be used to clean brackish water as well as suspect fresh water. The filter element should be replaced about every 500 liters. The ceramic filter element removes Bacteria, protozoa, giardia, crypto, cholera, salmonella, e.coli as well as most particulate matter.

Gravity Drip Water Filter

Known almost universally as the coffee-pot filter the gravity drip water filter is by far the most common water filter in use in areas without properly treated water. Water is poured into the top reservoir and filters through to the lower reservoir at a rate of about 2.5 liters per day. The filter element set should be replaced about every 1500 liters. The ceramic filter element removes Bacteria, protozoa, giardia, crypto, cholera, salmonella, e.coli as well as most particulate matter.

Item	Equipment Rating	Cost	Weight	Notes
Iodine Tablets	B/B/A	1CB/Bottle	50g	-
Filter Straw	C/C/A	2CB ea.	25g	-
Hand Pumped Filter	C/C/A	15CB	.4kg	-
Replacement Filter	C/C/A	12CB	.25kg	-
Gravity-Drip Water Filter	C/C/A	40CB	3kg*	*wt empty
Replacement Filter Set	C/C/A	36CB	2.5kg	-

Author's Notes: the larger kitchens and water purification gear will be included in the Tools & Equipment section I will include in the Field Accommodations paper.

Field Fortifications in the 31st Century **by Boilerman**

Field fortifications are almost as old as war itself. Rocks and dirt piled around a convenient location probably constituted the first fortress. Now probably tens of thousands of years later the quick and hasty fort is still made the same with same stuff; it just has better packaging.

Sandbags are by far the most common building block in history for field fortifications. Sandbags have been made of a wide variety of materials burlap and woven polypropylene plastic have been the two standards for centuries. The bags, when empty measure about 65 x 35 centimeters. When properly filled they weight about 18 kilograms. Sandbags usually are supplied empty in bales of 1000 and are filled on site. The average soldier can fill 20 sandbags in an hour. Ten soldiers can fill 1500 sandbags with a total volume of about 19 cubic meters in 7 hours on average if provided with good quality fill material. Sand is by far the preferred fill material: it does not clump much even when wet. But most any fill material can be used.

The second most common and by far the most popular field fortification is the old Hesco Concertainer. A concertainer cube is made of a collapsible wire frame cube 1-meter square at the base and 1.25 meters tall. A bag of the same material as a sandbag is tied to the top of the concertainer with plastic zip ties. Any convenient fill material is dumped into the open top of the cube forming a fairly resilient barrier against small arms, artillery splinters etc. A concertainer is made up of a series of cube frames connected together. Two soldiers can pull out, set up and fill an 8-cube concertainer (10 cubic meter vol.) using a loader vehicle of some sort in as little as 20 minutes. The labor and time saved using a concertainer has made it a huge success with soldiers and commanders alike ever since it was invented in the late 20th century.

Concertainers can be stacked to provide taller walls where required. A standard 3.75-meter high wall has 3 levels with a base of 3 concertainers and second level of 2 concertainers with a single concertainer on top. Walls can of course be made thicker by adding courses of concertainers beside the first concertainer section. To prevent settling of stacked concertainers mechanical compaction is recommended. Most concertainer manufacturers also offer stamped-steel roof planking. Fill material is piled on top of these planks for overhead protection. The concertainer's wire frame can be used to make corners, curves or straight sections as required.

<u>Equipment</u>	<u>Equipment Rating</u>	<u>Mass</u>	<u>Cost</u>
Sandbag, Polypropylene, Bale of 1000	C/C/A	50kg	30 C-Bills
Sandbag, Burlap, Bale of 1000	B/B/A	100kg	30 C-Bills
Concertainer, per 1x1x1.25m Cube Section	C/C/A	15kg	10 C-Bills
Steel Roof Plank, .5x5m	C/C/A	100kg	25 C-Bills

Author's Notes: I spotted an article on the HESCO Bastion system and had to add it to the Combat Engineer essay. To check out the real HESCO Bastion system go to <http://www.hescobastion.com>.

The Standard Shipping Container & its Sister Designs

by Boilerman

What is known throughout inhabited space as the Standard Shipping Container (S²C) began life in the later part of the twentieth century. To improve cargo handling times, and profits, the transportation industry set a series of standards for the construction and use of shipping containers. The sizes of these containers were based on the smallest part of the transportation system: the long haul semi tractor-trailer truck. Before and even during the Star League era the standards were revised several times but the basic dimensions remained the same.

Today, over a millennium after its introduction, the S² container remains the basic building block of civilian and military shipping. This container hauls 60% of the packaged freight moved in the Inner Sphere. Most other packaged freight is moved in the S² container's sister designs: the Standard Long "dually" shipping container and Standard Short "mini" shipping container. Both are conveniently sized to fit into the system designed around the S²C.

Since its introduction the materials used to construct the S² container has changed several times. Composites, the old Star League standard, are still plentiful on most industrialized planets but in the last several centuries some planet have had to resort to steel. Empty a composite S² container weights about 1 ton and is normally loaded with 24 tons. Most militaries only load an S² container to a gross mass of 20 tons. This practice began with the SLDF to reduce the wear and tear on their transport trucks under very rough off-road conditions. Most Inner Sphere militaries still adhere to the practice.

S² containers are used for a wide variety of purposes besides as a transport container. Their most common use is as a shelter. S² Container/Shelters come in a variety of configurations that allow them to be used as miniature barracks, machine shops, even offices. A standard, no frills, S² container comes with full width double swing out doors at both ends; models with doors along the sides are also available. S² Container/Shelters can come with almost any type door in almost any location on the container that the customer desires. Swing out and up side panels are common. These allow easy access and provide overhead protection. Doublewide models that have one or both sides telescope out from the main body of the container are available. Some container/shelter models are also designed to be attached side-by-side or end to a side. These allow container manufacturers to offer customers portable buildings outfitted with basic amenities such as water, heat and electricity. And they can be setup in just a few hours: complete with multiply stories if desired. Multistory container buildings usually have exterior stairs that must be assembled after the containers are set in place.

Standard Shipping Container (S²C)

External Dimensions: 2.5m x 2.5 m x 6m

Actual Volume: 37.5 m³

Usable Volume: 31 m³

Tare (Empty) Mass: 1 ton, 2.25 tons if made of steel

Gross Mass Loaded to Civilian Standards: 25 tons, *Payload:* 24 tons

Gross Mass Loaded to Standard Military Specifications: 20 tons, *Payload:* 19 tons

Other Common Sizes of Shipping Containers

Standard Long Shipping Container (AKA the Dually)

External Dimensions: 2.5m x 2.5 m x 12m

Actual Volume: 75 m³

Usable Volume: 32 m³

Tare (Empty) Mass: 2 tons, 4.5 tons if made of steel

Gross Mass Loaded to Civilian Standards: 50 tons, Payload: 48 tons

Standard Short Shipping Container (AKA the Mini)

External Dimensions: 2.5m x 2.5 m x 3m

Actual Volume: 18.75 m³

Usable Volume: 16 m³

Tare (Empty) Mass: .75 tons, 1.5 tons if made of steel

Gross Mass Loaded to Civilian Standards: 12.5 tons, Payload: 11.75 tons

Gross Mass Loaded to Standard Military Specifications: 10 tons, payload 9.25 tons

Support Equipment for the Container System

By Boilerman

A variety of support equipment is available to assist logicians. Labeling, after the actual container transport assets and container handling equipment, is perhaps the most important part of the containerized cargo system. All standard shipping containers, except for logos, look alike. All that stands between a smoothly operation system and complete chaos is not knowing what's in the box.

Over the years a many different labeling systems have been developed. One of the oldest, most successful and most widely used labeling system is the Standard Container Marking Label. The SCM label is a sticky back printed label that uses a 2D barcode to encode all relevant information about the container and its contents. Standard information on the label includes origin, destination, a basic contents invoice, Hazmat data and contact information. The label, which is only about 15cm by 10 cm, can hold about 15 pages of standard text information. It also has some relevant data in plain text Standard English. The barcode can be read by most any data scanners commonly found at container and cargo facilities.

For security the SCM label has a dual key encryption system to keep invoice lists and other data confidential. When a container is packed the shipper sends an email document with all of the container information into the Stellar Transport Industry Association Shipping Information System. The STIA SIS routes the email to all stations along every likely route the container may take to its destination. If the container is to travel off-world Comstar automatically routes the email through all appropriate HPG stations and to all appropriate terminals. When a container arrives at a terminal its SCM label is scanned, the two keys are assembled to unlock the complete information file for the container and those with the appropriate security access can read any information they need beyond the basic information listed in the open access portion of the email or on the SCM label.

In the last two decades the Electronic Shipping Container Marker (ESCM) has been reintroduced. Although the technology was never actually lost the ESCM fell into disuse in the Inner Sphere during the Succession Wars. The ESCM transmits the same information as that on an SCM label up to 100 meters via radio. Location information is also provided if the facility or planet has a local or global positioning system. The ESCM uses the same dual key encryption system as that built into the existing STSIS SCM label/email system. For backup all ESCM equipped containers are also required to use standard SCM labels. The STIA has set a goal to have all standard shipping containers equipped with ESC markers y 3075.

<u>Equipment</u>	<u>Equipment Rating</u>	<u>Mass</u>	<u>Cost</u>	<u>Notes</u>
Standard Container Marking Label	D/C/C	Negligible	Negligible	-
SCM Printer	D/C/C	2kg	100CB	
Electronic Container Marker	D/C/C	.1kg	50CB	-

Containers transport a wide range of material. Shippers use a variety of small containers to efficiently pack a standard container. Plastic pallets are the most common; boxes of whatever

is to be shipped are stacked up on one forming a cube rough 1.2 meters to a side. It is then wrapped in cellophane to prevent spillage and packed into the S² container.

The Container Cage (CC) and Universal Load Box (ULB) are two more popular methods for packing shipping containers. A Container Cage is a simple collapsible box shape usually made of aluminum or composites. Three will easily fit inside an S² container. The cage is made of bars to allow personnel to easily see what is inside. Most Container Cages are used by militaries to carry gear of all sorts for the troops. On occasion they are pressed into service as cells for prisoners-of-war.

The Universal Load Box is another common container for use within an S² container. It is a relatively lightweight reusable aluminum or composite collapsible box 1.15 meters to a side. It meant to be a more secure replacement for the pallet and can be locked to prevent pilferage.

Container Cage (CC)

External Dimensions: 2.25m x 2.25 m x 1.95m

Usable Volume: 9.8 m³

Tare (Empty) Mass: 250kg

Maximum Gross Mass: 6500kg, Payload: 6250kg

Universal Load Box (ULB)

External Dimensions: 1.15m x 1.15m x 1.15m

Usable Volume: 1.5 m³

Tare (Empty) Mass: 20kg

Maximum Gross Mass: 1200kg, Payload: 1180kg

Author's Notes: Worktroll provided the SCM label idea. Thanks Worktroll!

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