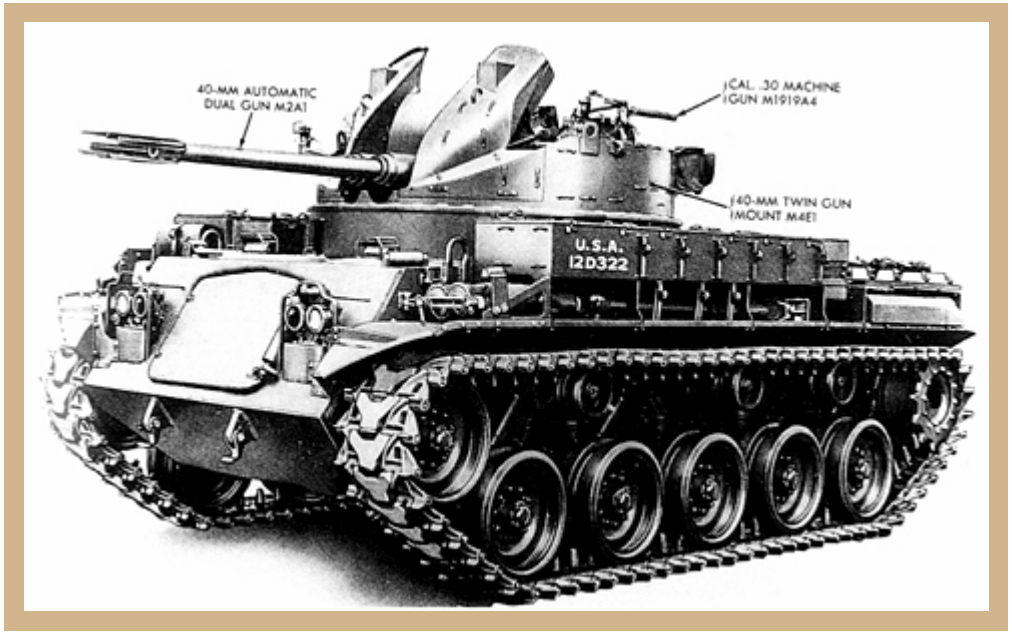
US M42 "Duster", Part 1



Picture 1:
Officially named "Gun, Twin 40mm, Self-Propelled M42", the Duster self-propelled anti-aircraft gun was a result of design work during the Korean War in the early 1950s. Fist produced in 1952 and entering service in 1953, the M42 Duster hull was made of all-welded steel armor varying in thickness from 0.35in (9mm) to 1in (25mm). The Duster hull was a modified version of the M41 Walker Bulldog light tank and included most of the same automotive components including the engine and transmission. The regulation crew consisted of six men, a driver and a radio operator/commander with their two seats in the bow (driver at left), and a gunner and sight setter in the open-topped turret with their two loaders behind them. The main guns inside the turret were twin 40mm cannons and a .30cal machine gun could be pintle mounted on the turret wall. Elevation and traverse for the 40mm guns was powered via an oil gear system and included back-up manual hand cranks. All in all, the vehicle packed quite a wallop, but most of its active combat life was spent firing at ground targets, not aircraft, as we shall see as we explore the interior of this post WWII design.

Picture 2:
The M42 was originally manufactured with an air-cooled, horizontally opposed, six-cylinder Continental AOS 895-3 engine with Allison CD-500-3 cross-drive transmission. This was the same set up as in the M41 Walker Bulldog and when the engine was swapped for the Continental AOSI 895-5, fuel-injected version (the "I" in "AOSI"), the official vehicle title was changed to M42A1.

The Duster we will be spending most of our time inside is this privately owned M42A1, photographed by the author back in the mid 1990's at a military vehicle rally in Ohio. I believe this Duster belonged at one time to the Ohio National Guard, which used these vehicles until the late 1980's or early 1990's when many National Guard units retired their Dusters. It is also possible that this particular vehicle has served in Vietnam, as we will see later.

Picture 3:
There are three hatch entrances into the driver and radio operator's compartment in the front end of the vehicle. The most obvious hatch is the large door on the front armor plate, but there are also two over-head hatches on top of the roof and in the picture you can see the right hatch propped partially open at the upper left corner of the frame. Early Dusters had an additional door flap between the two over-head hatches that when opened and combined with the two open hatches provided a large opening for passing ammo from the hull up to the turret. This central connecting hatch was hinged at the front to open up and over onto the front armor, and its hinges can easily be seen at the top of the front armor plate, even when the hatch is closed. Later vehicles were manufactured with a solid armor plate replacing this space between the two oval crew hatches when it was decided the central door was unnecessary and seldom used anyway.

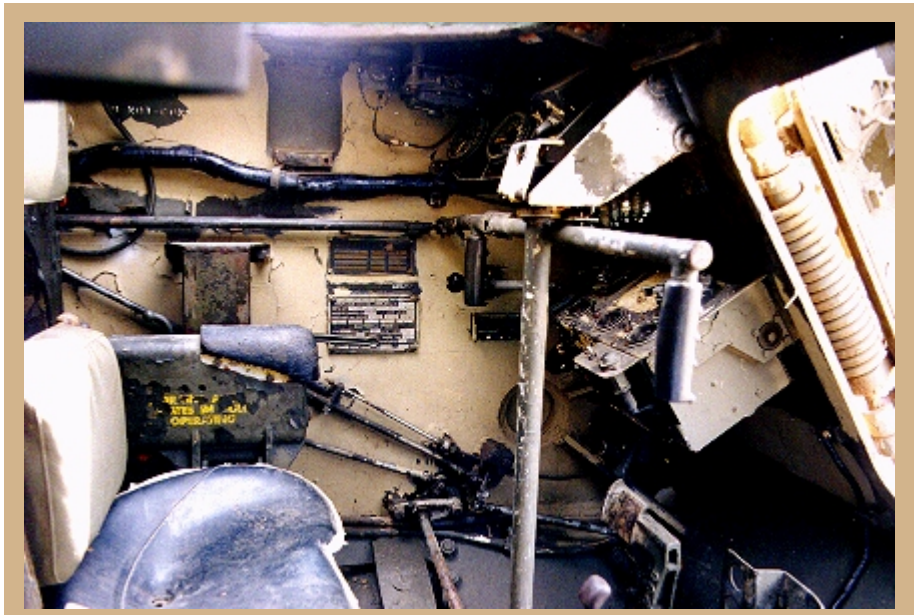
The large front door was used mostly for loading ammo into the hull storage racks. It could be locked closed from the inside with the two handles on its edge, or locked open via a latch on the front armor plate, and the great weight of the door was partially balanced by a spring assist on the door hinge. Periscopes for the driver and radio operator were mounted in their hatches and were the M13 or M13B1 types. The driver was also later provided with an M19 infrared replacement periscope for his over-head unit. The hatch-mounted periscopes could be rotated 360 degrees. I believe the bulky stowage box on the inside of the front door is the container for the IR periscope with an extra periscope head storage bin on the front of the container.

Picture 4:
The photograph shows the driver's seat in the front of the hull with the front access door opened wide for the photo shot. Steering the machine was via the T-bar handle you see on the right, the left side of the T connecting to rods that lead back along the hull wall to the engine compartment and transmission at the rear. To turn right the right handle of the T bar is pulled back, to turn left you pull back on the left handle. The tightness of the turn depends on which gear range you are in and how fast you are going. Gearbox shifting was accomplished with the lever on the floor. The automatic transmission had only two forward ranges (Low and High) and one reverse speed, so manual shifting between each gear was no longer necessary. The transmission provided power shifting for all ranges as well as hydraulic power steering with mechanically operated multiple disk brakes. The service brake pedal is barely visible in the lower right corner while the main instrument panel is visible as a tan box at the right (we'll see more of this later).

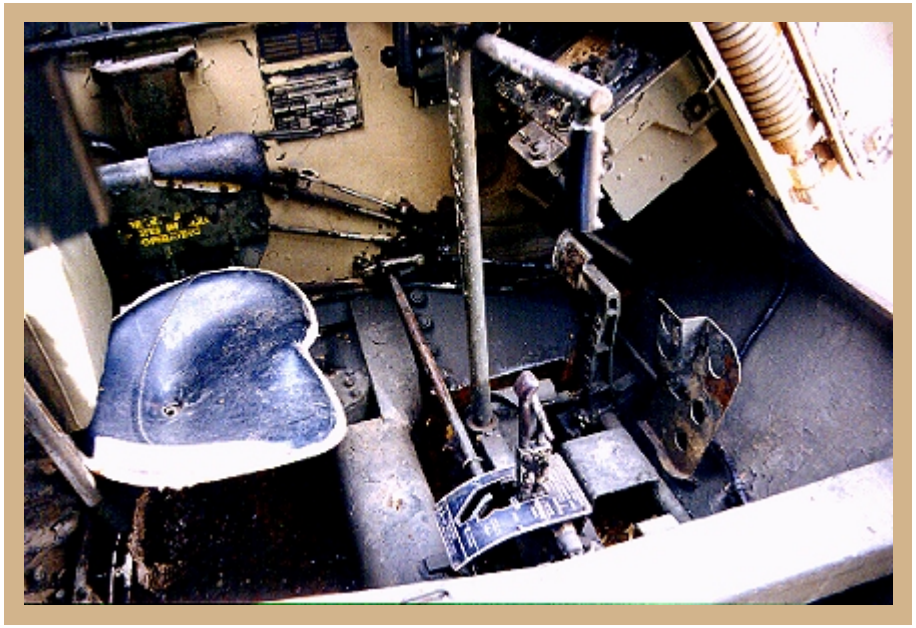
Note the head pad on the bulkhead behind the driver's seat. To the right of the pad is a small red handle to activate the fire suppression system in the engine compartment at the rear of the hull. The system consists of two 10lb CO2 cylinders with discharge nozzles on the compartment walls. The system can also be activated from outside the vehicle via a red handle located on the roof just behind the driver's hatch. A portable 5lb CO2 cylinder is also mounted up in the turret. The lower of the two yellow decals reads, "Caution. High Intensity Noise. Hearing Protection Required".

Typically, the interior crew compartment in the front of the hull was painted OD green at the factories, but crews and maintenance shops often repainted them white or off-white to lighten them up. The formed seat bottom is black and the back and head pad are black or canvas green. Most everything else is black or a dark shade of gray.

Picture 5:
If you haven't taken a look inside the engine compartment yet, the vehicle identification plate on the wall identifies this as a M42A1 version of the Duster, manufactured by Cadillac Motor Car Division of General Motors at the Cleveland Tank Plant. The other prime contractor was ACF Industries of Berwick, Pennsylvania. Here you can just see the front face of the instrument panel, the large T steering handle and its top brace, and the brake and accelerator pedals down on the floor. Normal driving would be done with the seat elevated and the driver's head out of his over-head hatch for the best view. But while buttoned up inside he could only use his periscope hanging down from the closed hatch cover, the viewing glass hanging directly in front of his face. The decision to include only one periscope for the driver seems a bit dated today when modern AFV designers provide as many vision devices as possible. Having to continually rotate his one periscope while driving the Duster must have been a real pain for him. The controls on the left side of the seat control its elevation. If the vertical control lever is pulled back the seat can be raised ore lowered and then locked in position. This is normally done while sitting in the seat, as the action is spring loaded and will force the seat up if there is no counter weight on it. The seat can



be pulled forward or back by using the horizontal lever and sliding the seat to the position wanted. The driver's seat can also be dropped into a vertical position when more room is needed for loading ammo by pulling down on the red trip lever. The radio operator's seat works the same way.



Picture 6:
A similar photo, but looking down more, shows the foot pedals and gear shift to better advantage. The pedal on the right is the accelerator and the left is the service brake. A note on the gate for the shifter provides a brief reminder to disengage brakes before trying to drive off and also indicates shifter positions for Neutral Park, Neutral Steer, Low, High, and Reverse (the farthest left-rear position). Notice that the shift has both a T handle reverse release as well as the actual shift knob handle.

The instrument panel box is the same as the one used in the M41 with electrical switches at the two top corners, a small instruction plate between them, and three dials below along the lower edge. The switches at the upper right include magneto, starter and booster switches. A special switch operates the degasser, shutting off the supply of fuel to the carb in order to stop the engine. The degasser is pressed at the end of the day to stop the engine and then the magnetos are turned off also. The switches at the upper left include vehicle light switches like the headlights and blackout lights. At the bottom of the panel are three gages, two are fuel tank gages. The instrument dials for the speedometer and tachometer are mounted separately on a small panel to the upper left of the driver, just visible in the previous picture, and next to these is a small panel for controlling the auxiliary generator engine, known as "Little Joe". Little Joe provides power for the turret elevation and

traverse when the main vehicle engine is not running.

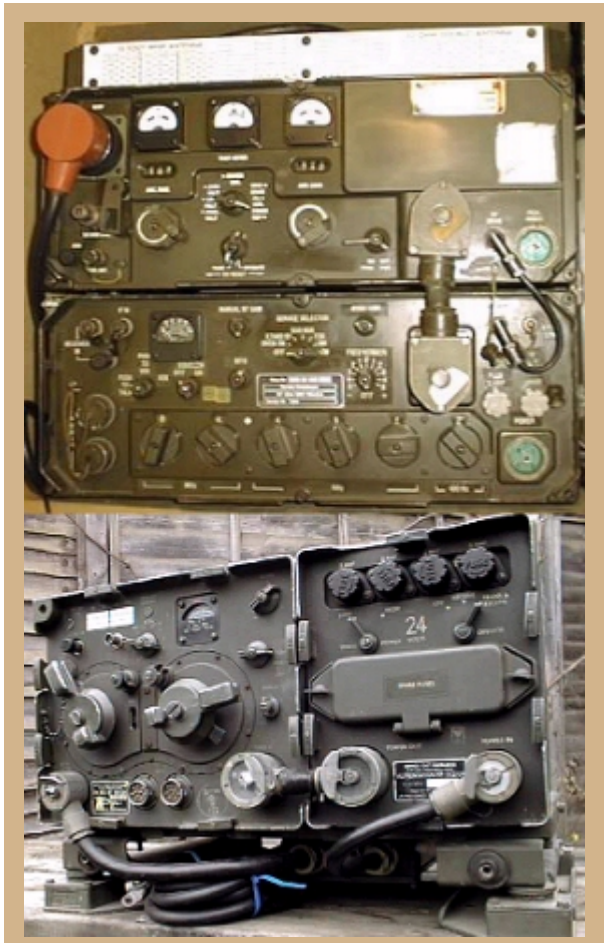
The metal cover over the front torsion bar runs across the hull floor just forward of the driver's seat and the shifter connection linkages run to the left hull wall where they follow the wall back to the engine compartment and transmission along with the steering rods. The engine is governed to 2950 no load. On the wall to the left of the driver is the hand throttle, which is pulled out to increase engine speed and pushed in to slow it. To move it the small button in the center must first be pushed in. The throttle control is most important when warming up the engine when the rpms must be set for maximum effect.

The floor was originally white, but has turned to a muddy gray with use and age. The entire interior up here has been repainted, perhaps a few times, and the layers of paint are peeling here and there.

Picture 7:
Here is the view toward the radio operator's side of the front compartment. The radio equipment has been stripped from its shelf on the right wall of this vehicle (our left), but typically it was filled with the AN/GRC-106 radio set along with an AN/GRR-5 intercommunication set and interphones. The AN/GRC-106 was used for intervehicular and command communications and the AN/GRR-5 provided air defense artillery intelligence. You can make out the square support post for the commander's crew seat as well as the operating levers for elevation and dumping on the right side of the seat. On the top shelf behind and to the left of the commander's seat is a small crew heater and directly behind the seat is a narrow passage leading back around to the sides of the fighting compartment turret where ammo was stored. At the back of these passages is an access door to the engine compartment. Passing along the floor from the crew heater to this front of the compartment is a heater duct.

Although still called an assistant driver's or radio operator's position in some manuals, this right seat was normally the gun commander's seat. Notice that it lacks any driving controls. There are four dome lights up front, one on the ceiling over the driver's area, one to the left front of the driver, one over the commander's seat, and one in the storage compartment forward of the engine access doors. Like most dome lights in US vehicles of this time, there were both white and red lenses available, the red used during blackout operations.

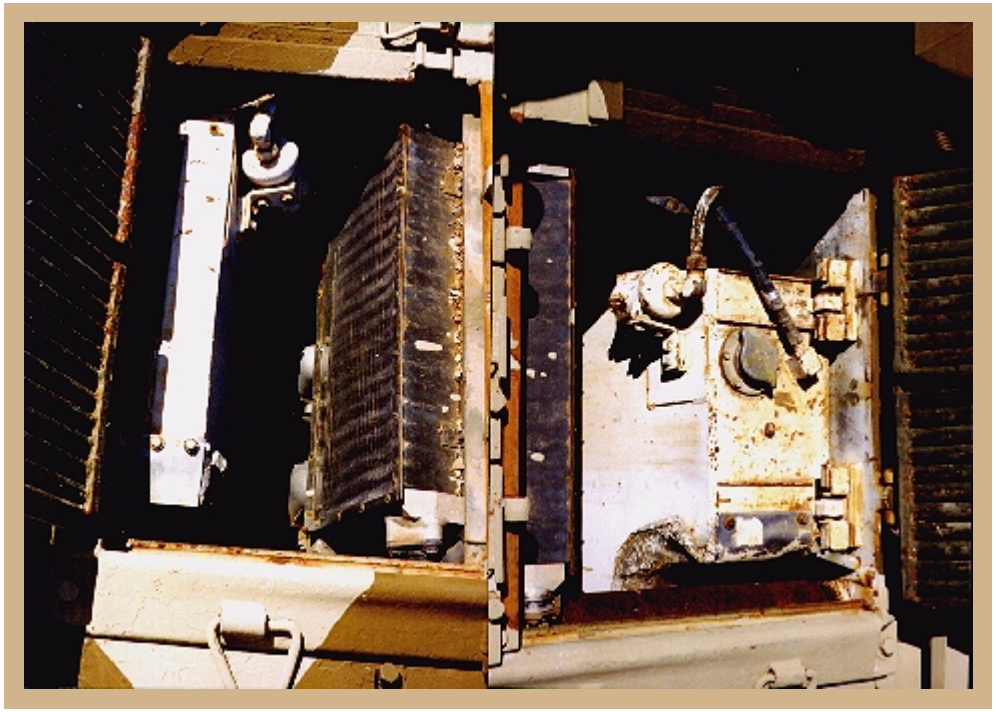
Picture 8:
The AN/GRC-106 radio set is an AM high frequency mobile use type (although it could also be used as a static ground set) composed of a RT-662 receiver-transmitter (R/T) with a power amplifier AM-3349 sitting on top of the R/T. The RT-662 is a solid state R/T weighing 47lbs and has a frequency response of between 2.0 to 29.999 MHz. The radio runs on 27 volts DC.



Other radio sets used in the Duster were any of the AN/VRC-8 through 10 series of FM units, ranging in frequencies from 20-28Mhz, 27-39Mhz, and 38-54.9Mhz, respectively. Major components included a RT-66, 67, or 68 R/T with continual tuning presets, a PP-112 power supply, and a C-375 control box. The R/T was mounted to the left with a short power cord connecting it to the power supply box on the right.

These two images are loaned to us from the Army Radio Sales web site and illustrate for us an AN/GRC-106 set (top) and an AN/VRC. Looking at the 106 set (top), the main power is at the lower right and the row of six knobs across the face includes controls for KC and MC. Audio jacks are to the left of the knobs and the service selector knob is centered above the equipment ID plate in the center of the face. The typical antenna for this set is a 4.57m (15ft) whip type seen mounted on one of the front gun shields. The AM-3349 power amp perched on top of the R/T shows part of reference chart for the antenna tuning and loading chart at the upper right of the face, the power switch at the lower right, and the WHF plug at the upper left. The decision of which radio set was to be used in the Duster depended on when the vehicle was in operation, its mission, and the type of unit the vehicle was assigned to. Notice that the receiver-transmitter and the power supply are the common components in both radios, although they look very different. The AN/VRC is shown mounted on its shock tray which not only provided some protection but also simplified connecting the set to the vehicle power and antenna systems.

Picture 9:
As I mentioned earlier, the rack at the rear of the driver's compartment held a 24volt crew heater and this photo shows the unit tucked up into the top shelf of the rack. The heater duct running up along the floor to the front of the compartment is on the right and passes under us. It connects to the outlet on the right side of the heater, the fan belt guard for the forced air system is seen covering a good part of the front of the heating unit. The engine compartment also had a heater. It was a 6kw heat exchanger mounted on top of the aux. engine/generator in the engine compartment. By moving a damper lever on the heater the engine compartment could be warmed during cold weather before starting the engine, assisted by the crew who threw a tarp over the louvers on the engine deck while Little Joe did his pre heating. Once the main engine was warmed and started, the tarp was removed to allow the excess heat to escape.



Picture 10:
Information on the air cooled gasoline engine can be found in the M41 Walker Bulldog pages, including an image from the TM with all the many engine deck access hatches opened to show the engine and surrounding equipment. These two images illustrate the equipment under the side deck louvers that flank the main hatch for the engine itself (the central louvered hatch is direct access to the large fan on top of the engine, not the air filters, as stated in some references). The photos show some of the engine oil and transmission fluid coolers (radiators) that are attached directly to the sides of the power pack. This photo was taken of a retired Texas National Guard vehicle in the summer of 1993. The front of the Duster is toward the top of the page.

Picture 11:
The Dusters in Vietnam played a key role in ground support and anti-guerilla activity. This US Army photo of a 4/60th Artillery vehicle at Landing Zone "Uplift" was taken in October of 1967. The three Air Defense Artillery (ADA) units in Vietnam with Dusters during the war were the 1st Battalion/44th Artillery, the 4th Battalion/60th Artillery, and the 5th Battalion/2nd Artillery. Each of the ADA battalions had over a thousand men but the units never operated as batteries or battalions. Instead, the assets were spread throughout the battalion's area of responsibility, the smaller units operating mainly under Sergeants. Other batteries included Quad .50cal units, Searchlight units, and Hawk Missile units.

The original conical flash hider was replaced with unique three-pronged flash suppressors early in the production run, but in Vietnam these were often removed. Otherwise, this is pretty much a stock Duster in action. The turret was crowded when everybody was aboard, and in this case the gunner on the left is accompanied by a loader standing next to him. The sight setter on the far side of the gun is also accompanied by his loader, and the vehicle commander, a Sergeant, is standing outside the turret. The Sergeant is standing on the ammo storage boxes mounted above the spare barrel stowage; the two over-head hatches of the driver's compartment are visible at this angle.

TO M42 DUSTER, PART 2

BACK TO AFV INTERIORS HOME PAGE
