TIME SAVER

CHAPTER IV

REORGANIZATION OF THE MILITARY

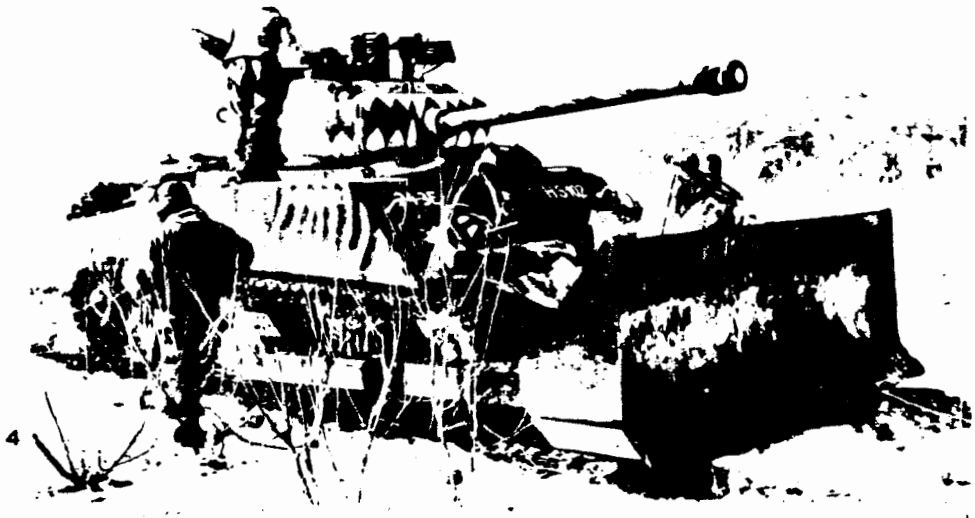
In the aftermath of WW II as previously mentioned, Technical Intelligence Operations as well as all intelligence functions had been considerably reduced. Funds for research and development were very limited, but a new tank was in the development stages. It would be vastly improved over the WW II Sherman tanks. At the end of World War II, the United States possessed a large, experienced armored force, which was concentrated primarily in Europe. The backbone of this armored force was the M4 Sherman medium tank, which also constituted the bulk of our allies' armored strength. But while the Sherman was a robust and mechanically reliable vehicle, by 1945 its thin armor and main armament were decidedly inferior to the latest German and Russian tanks. The final version of the Sherman, the M4A3, somewhat redressed this imbalance with the addition of a high velocity 76mm cannon, but the basic design had just about reached its limits.

During World War II, the U.S. Army had worked on a number of designs to supplement the Sherman, but through a lack of foresight and philosophical stupidity these new designs were not pushed along until the latter part of 1944, when the battlefield situation in Europe was desperate for a more heavily armed and armored tank to counter the increasing number of German Panther and Tiger tanks being encountered. As a result of this, the new M26 General Pershing heavy tank was rushed to Europe in the closing months of the European conflict to aid the outclassed Sherman. With its 90mm gun and well designed ballistic shape, the Pershing acquitted itself well in the few contacts it had with German armor before the war ended.

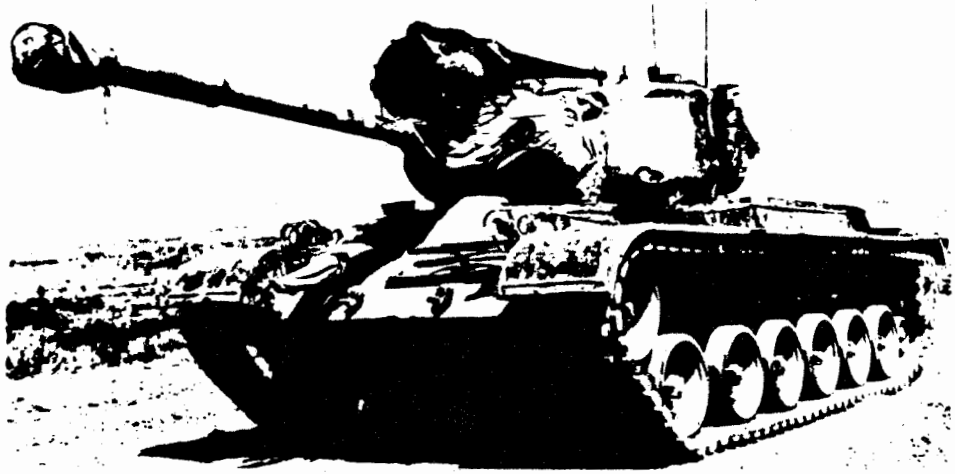
The British, whose traditional doctrine of having specialized categories of tanks to work with infantry on the one hand, and, to operate in armored divisions against enemy tanks, on the other hand was revised as a result of experience gained in the North African campaigns. In September, 1942, the War Office requirement for tank development laid emphasis on the need for a "universal" or general purpose tank chassis which could be readily adapted to meet various specialized tasks including development in both the above-mentioned Infantry and Cruiser roles. In the past, it had been necessary to have a number of chassis designs, each of a distinctive and separate pattern, with all the disadvantages inherent with this lack of standardization.

At the same time as design was in progress on the heavy "Cruiser" A41 in 1944, work was also proceeding on the more heavily armored "Infantry" tank, with the Tank Board's decision of 1942 which had laid emphasis on the advantages to be obtained from standardization of designs for the two categories. It was intended that the weight of the A45 prototypes would be 55 tons with a maximum speed of 18 mph. These prototypes, which were to

(Below) The M4 Sherman was the backbone of US armed forces during the Second World War and into the Koren War. This M4A3 equipped with a dozer blade sits outside of Seoul during the see-saw fighting which took place after Chinese forces entered the Korean War. (US Army)

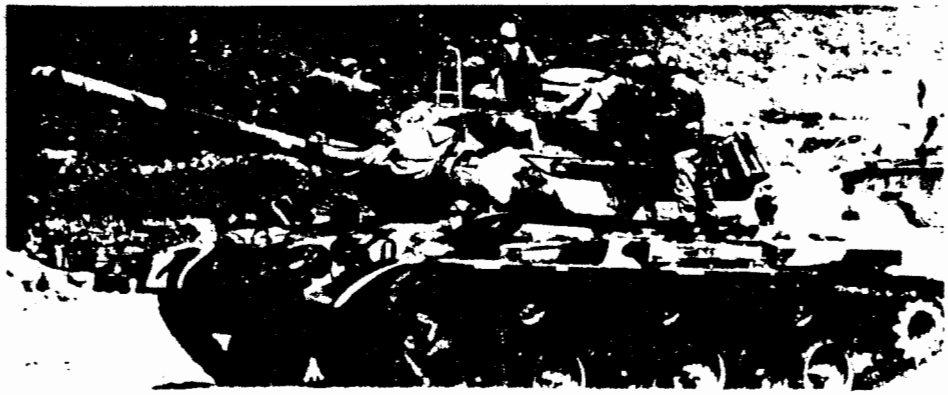


(Below) The replacement for the M4 Sherman was the M26 Pershing which saw service during the waning days of World War II in Europe. It proved to be far more effective against the heavier German tanks than did the Sherman. This Marine Corps Pershing covers the Naktong River during the later stages of fighting around the Pusan Perimeter (USMC)

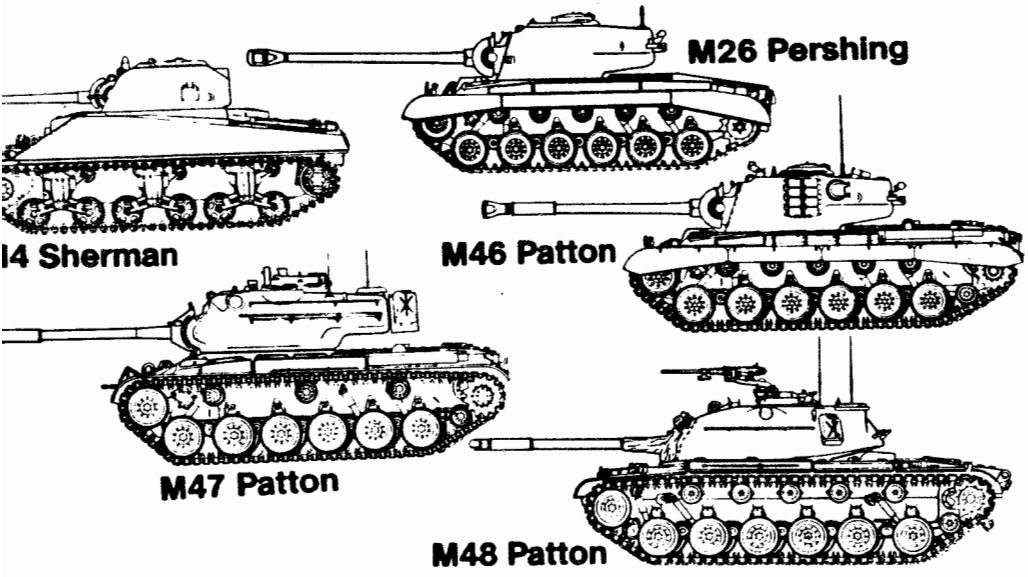


(Above) While satisfied in general with the M26 the army decided to modernize the Pershing and correct certain mechanical problems which the tank exhibited. The rebuilt Pershing was designated the M46 Patton and featured a new transmission, engine, bore evacuator, as well as changes in the fire control and suspension systems.

(Below) The next major American tank was the M47 which resulted from the grafting of the turret from the cancelled T42 series onto the hull of an M46. This South Korean Marine M47 taking part in *Exercise Team Spirit 1983* carries the unusual camouflage pattern often found on Korean tanks. (Wakui via Green)



elow) This M48 is being demonstrated to the press during ceremonies at Aberdeen Prov- g Grounds. (US Army)

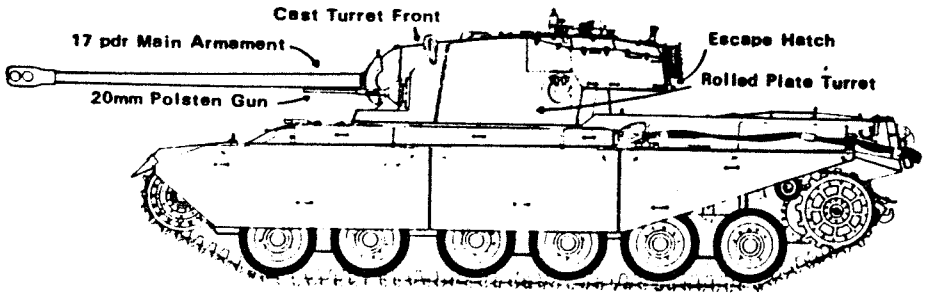


A41 PILOT MODELS

Pilot models	Designation	Main armament	Secondary armament	Distinguishing features
1-5	A41	17 pdr	20 mm Polsten	rear circular escape door
6-10	A41	17 pdr	20 mm Polsten - Optional linkage	rear circular escape door
11-15	A41	17 pdr	7.92 mm Besa MG - Optional linkage	rear circular escape door
16-18	A41S	77 mm	7.92 mm Besa MG - Optional linkage	7.92 mm Besa MG in ball mounting
19-20	A41S	77 mm	7.92 mm Besa MG - Optional linkage	rear circular escape door

A-41 with 17 pdr and 20mm Polsten gun on left hand side of turret. Note that all optical equipment on the turret and for the driver has been removed. The first ten A-41 pilot models were all fitted with the 20mm Polsten gun, but this took up a disproportionately large amount of space and was considered too large for an anti-personnel weapon. [R.A.C. Tank Museum]

Centurion Mk I



have a frontal armor of six inches equivalent thickness and incorporate the A41 turret and gun, were scheduled to be completed by mid-1946.

But by this time, the Sherman and the Churchill had demonstrated their ability of fulfilling the "Cruiser" and "Infantry" roles which had hitherto called for individual particular-purpose vehicles. This led to the abandonment of the separate Cruiser/Infantry concepts as a result of which only the A41 design which successfully met all the requirements for a "universal" tank was proceeded with. Several years were to elapse before the A45 appeared in quite a different form as the FV 214 Conqueror.

The go-ahead was given in July 1943 for work to proceed on the development of a "heavy cruiser tank." By this time, and in the light of further operational use of armor, the General Staff had modified these priorities and although reliability was still the number one requirement, other factors had to be given attention. The priorities had now become:

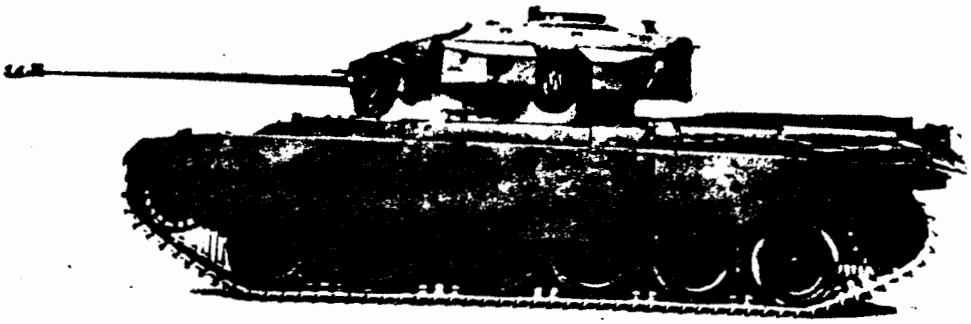
1.) Reliability
2.) Durability (minimum running life of 3,000 miles)
3.) Maximum weight 40 tons
4.) Armament
5.) Armour
6.) Speed and endurance
7.) Adequate fighting compartment

Later that year it was decided that power was to be provided by the Meteor engine derived from the Rolls-Royce aero-engine that had more than proved its worth in RAF aircraft.

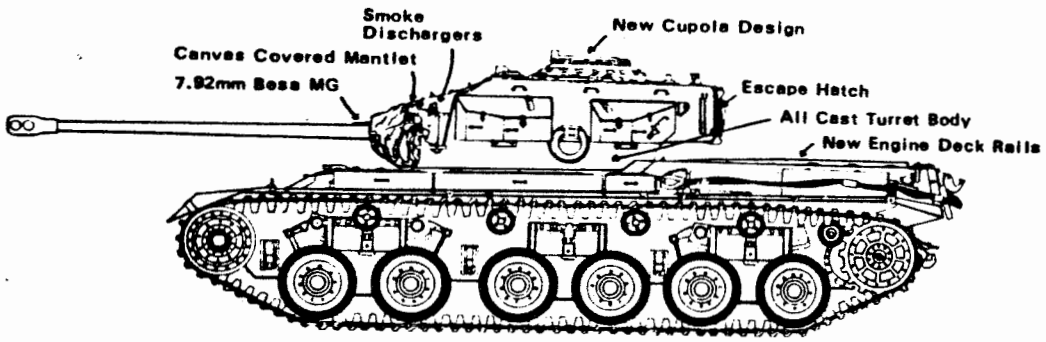
A.E.C. were appointed "production parents' for the A41 project as it was now officially designated. The first mention of the A41 was when the outline specification was presented to the Tank Board in November 1943. All the knowhow derived from allied and enemy intelligence reports as well as user reports were incorporated in the A41 design.

Cross country performance comparable with that of the Comet was accorded higher priority than road speed in this their first design by the Department of Tank Design which also stipulated the importance of a high reverse gear. At this time the German 88mm gun was recognized as being a formidable weapon when used against tanks and had more than proved itself in the Western Desert fighting. It was, therefore, logical that any future tank protection should be proof against this 88mm gun. As well as being able to deal with the Tiger tank, the main armament was required to fire a HE round.

The frontal armor specified for the vehicle was to be based on an equivalent thickness of four inches, this value being reduced

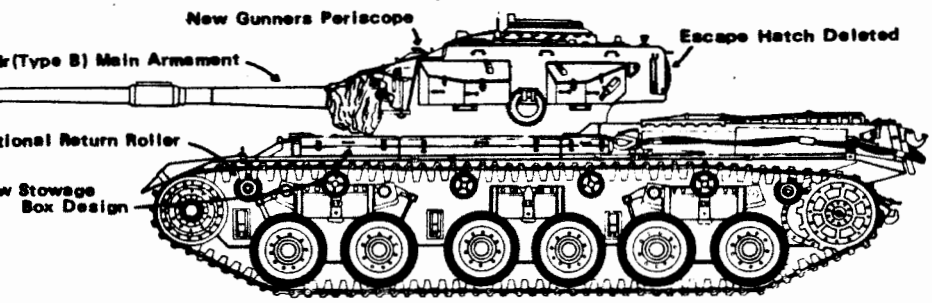


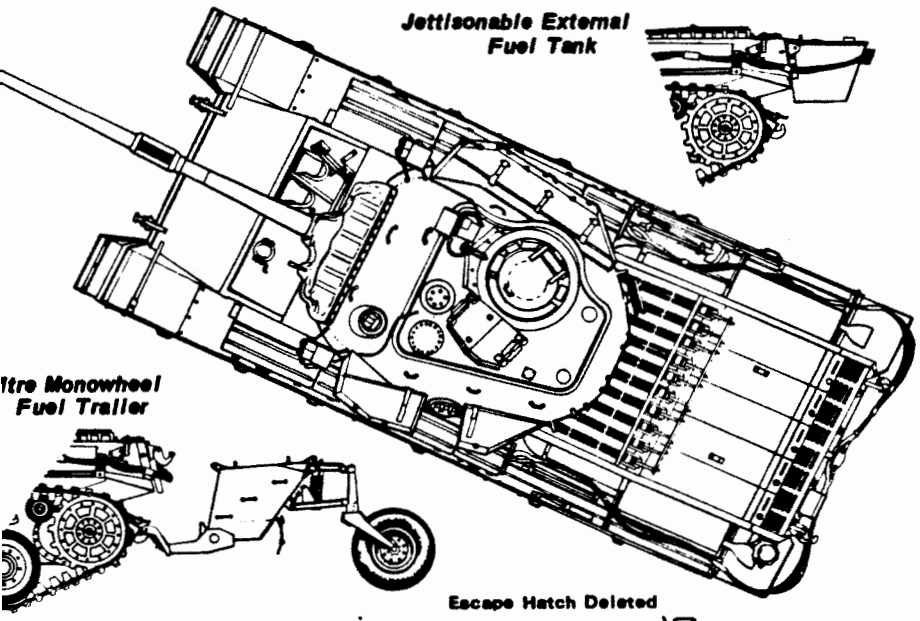
Centurion Mk 2

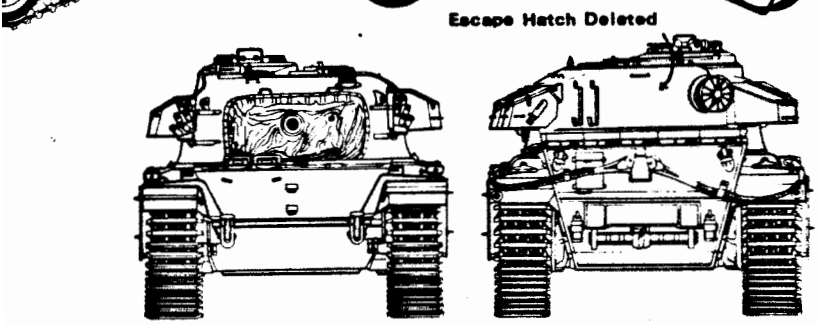


The A41A or Centurion Mk 2 was basically an up-armored A41 including such modifications as a new turret formed from a one-piece casting mounting a 17 pdr stabilized in azimuth and elevation. The 7.92 mm Besa MG is now mounted coaxially. The turret has a new rotatable vision commander's cupola and a centrally located rear turret escape hatch. [RAC Tank Museum]

Centurion Mk 5

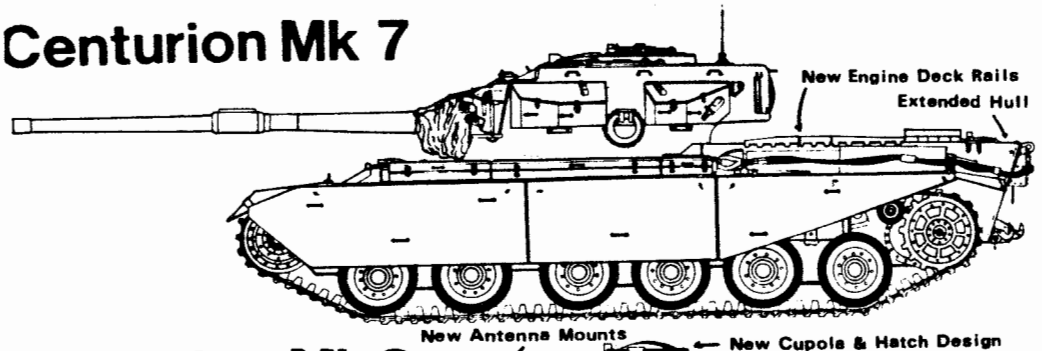




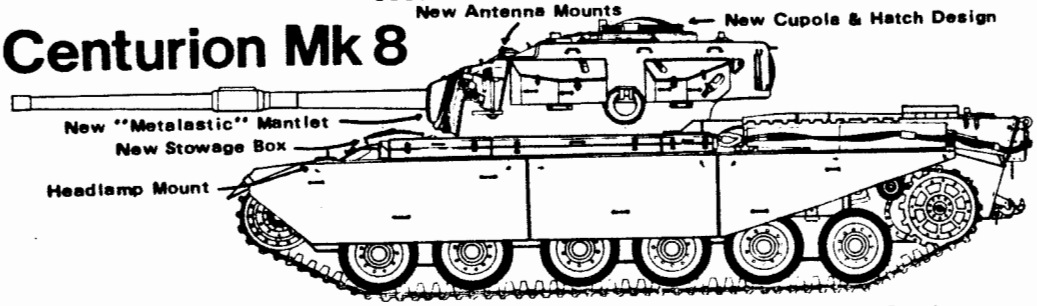


h Army Centurion Mk 5 which is distinguishable by the 20 pdr gun with extractor [type B barrel] and a .30 in. M1919A4 Browning MG in place of itish co-axially mounted Besa MG. The rear escape hatch in turret has removed. [RAC Tank Museum]

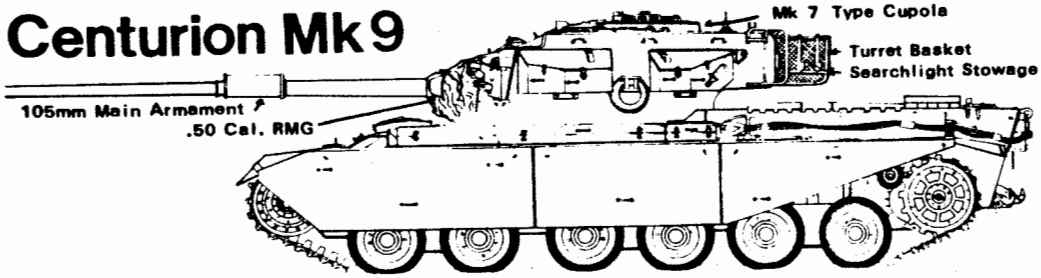
Centurion Mk 7



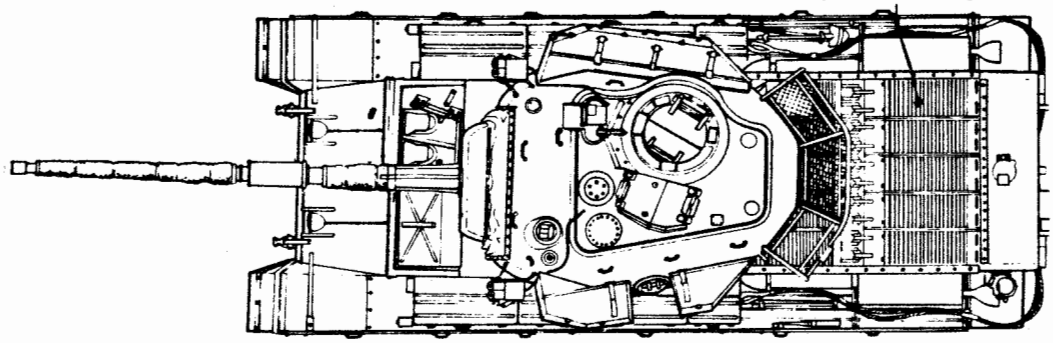
Centurion Mk 8

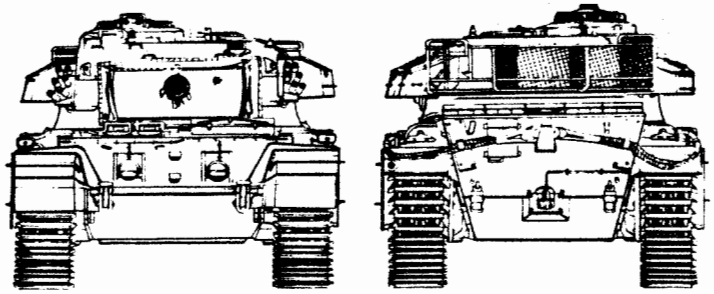


Centurion Mk 9



Centurion Mk 10



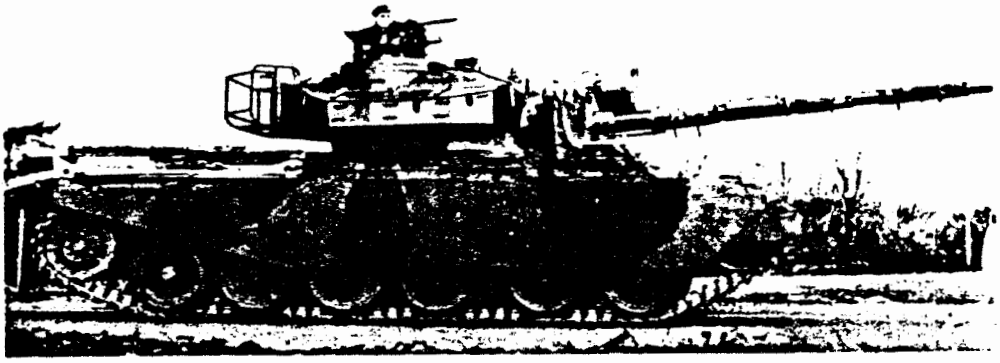


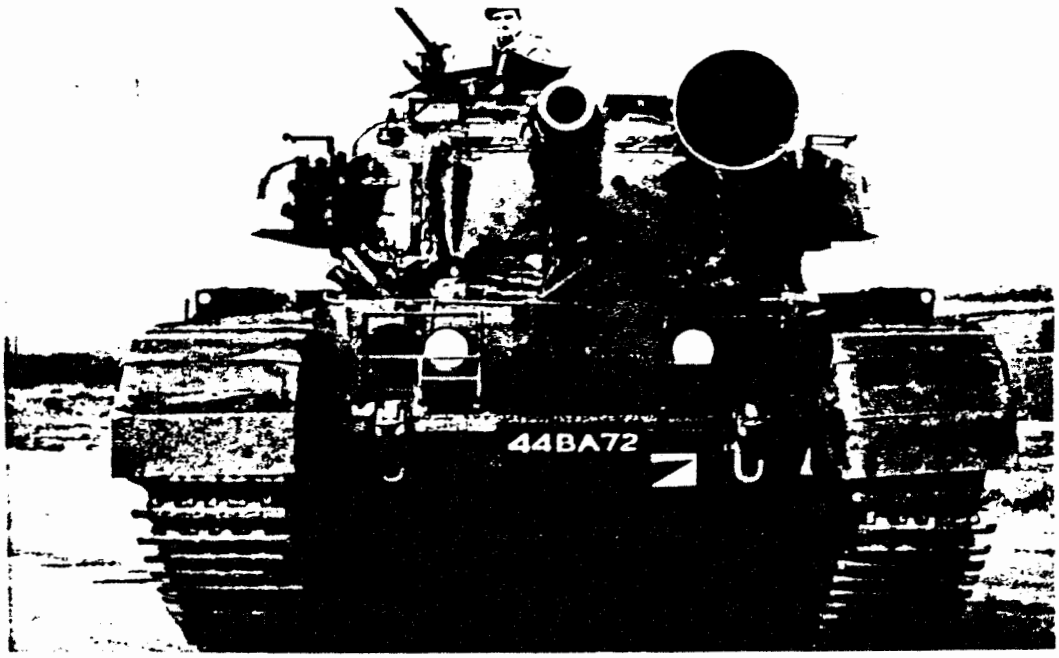
nturion Mk 8 with 20 pdr gun and commander's cupola with two-part hatch. e headlights had previously been introduced on some Mk 7's. [RAC Tank seum]

ve] Centurion Mk 10 with 105 mm gun. This particular tank lacks the nal sleeve round gun barrel. Similar variants were exported to Sweden e they were designated Stridsvagn 101. [RAC Tank Museum]

Centurion Development

Basic Mark	Designation	Derived from	State	Main armament	Secondary armament	RMG equipment	IR equipment
Mark 1	A41*	A41	—	17 pdr	One 7.92 mm Besa MG	—	—
Mark 2	A41A	Mark 1	upermoured	17 pdr	One 7.92 mm Besa MG	—	—
Mark 3	—	Mark 2	—	20 pdr	One 7.92 mm Besa MG	—	—
Mark 4	A41T	—	—	95 mm	One 7.92 mm Besa MG	—	—
Mark 5	FV 4011	Mark 3 hull	—	20 pdr	Two .30 Browning MG	—	—
Mark 5/1	FV 4011	Mark 5	upermoured	20 pdr	Two .30 Browning MG	—	—
Mark 5/2	FV 4011	Mark 5	—	105 mm	Two .30 Browning MG	—	—
Mark 6	FV 4011	Mark 5	upermoured	105 mm	Two .30 Browning MG	—	—
Mark 6/1	FV 4011	Mark 6	—	105 mm	Two .30 Browning MG	—	IR night fighting equipment
Mark 6/2	FV 4011	Mark 6	—	105 mm	Two .30 Browning MG	.50 RMG	IR night fighting equipment
Mark 7	FV 4007	New hull with Mk 5 turret	—	20 pdr	Two .30 Browning MG	—	—
Mark 7/1	FV 4012	Mark 7	upermoured	20 pdr	Two .30 Browning MG	—	—
Mark 7/2	FV 4012	Mark 7	—	105 mm	Two .30 Browning MG	—	—
Mark 8	FV 4012	Mark 7 hull	—	20 pdr	Two .30 Browning MG	—	—
Mark 8/1	FV 4012	Mark 8	upermoured	20 pdr	Two .30 Browning MG	—	—
Mark 8/2	FV 4012	Mark 8	—	105 mm	Two .30 Browning MG	—	—
Mark 9	FV 4015	Mark 7	upermoured	105 mm	Two .30 Browning MG	—	—
Mark 9/1	FV 4015	Mark 9	—	105 mm	Two .30 Browning MG	—	IR night fighting equipment
Mark 9/2	FV 4015	Mark 9	—	105 mm	Two .30 Browning MG	.50 RMG	IR night fighting equipment
Mark 10	FV 4017	Mark 8	upermoured	105 mm	Two .30 Browning MG	—	—
Mark 10/1	FV 4017	Mark 10	—	105 mm	Two .30 Browning MG	—	IR night fighting equipment
Mark 10/2	FV 4017	Mark 10	—	105 mm	Two .30 Browning MG	.50 RMG	IR night fighting equipment
Mark 11	FV 4017	Mark 6	—	105 mm	Two .30 Browning MG	.50 RMG	IR night fighting equipment
Mark 12	FV 4017	Mark 9	—	105 mm	Two .30 Browning MG	.50 RMG	IR night fighting equipment
Mark 13	FV 4017	Mark 10	—	105 mm	Two .30 Browning MG	.50 RMG	IR night fighting equipment





more views of the Mk 13, the final production version of the Cen-

turion (RAC Tank Museum)

to 60% for the sides. The A41 was also designed to give adequate protection to the suspension -- one of the most vulnerable parts of a tank -- by the incorporation of armored skirting plates to counter the hollow charge anti-tank weapon menace. In addition, mines which were getting bigger and more difficult to detect made it necessary for belly and suspension components to be strengthened. The maximum weight of 40 tons had been originally laid down by the General Staff for the following reasons:

a) size and strength of bridges
b) transport by rail
c) width of vehicle for traffic movement
d) reliability decreases as the weight increases

The General Staff later had to increase this weight to 60 tons to ensure adequate protection against the developments that had taken place in German anti-tank weapons.

The final A41 specification was accepted by the Tank Board in February 1944. The aim was for pilots and pre-production models to be produced towards the end of that year so that in the absence of difficulties small scale production might begin in the second quarter of 1945. The Tank Board recorded that "this project had their full support and should proceed with all possible energy." By May 1944 an order had been placed with the Ministry of Supply for 20 prototypes having 17 pdr guns -- in fact, on the last five prototypes 77mm guns were installed -- with different combinations of 20mm Polsten guns and 7.92 mm MGs. By April 1945, six prototypes A41 were being made ready for service in Germany, but arrived too late to see action. In the meantime, the first production version of the A41 or Centurion Mk 1, of which 100 were manufactured, was well in hand.

As a result of experience in the European Theater and after a careful analysis of the captured German Tiger tanks, modifications were planned for the Centurion. By January 1945, an up-armored model, the A41A or Centurion Mk 2 was produced incorporating the first major modifications under the design parentage of Vicker's-Armstrong at their Newcastle works. The Centurion Mk 2 was basically an up-armored A41 hull with the difference that the final drive spur wheels were designed to give a different gear ratio (7.47:1 instead of 6.49:1) and the turret was formed from a one-piece casting which housed a rotatable vision cupola mounting nine episcopes and one periscopic binocular.

Instead of the Besa MG having a separate mounting in the turret, it was now mounted coaxically with the main armament, but remaining on its left. In this configuration the mounting enabled the Besa MG to have an elevation of 20° and a depression of 12°. Fitted in the turret roof for use by the gunner was a mounting and range gear for indirect laying with an incorporated periscopic azimuth and elevation to ensure accurate shooting by neutralizing unsteadiness of the platform with the vehicle running, this was

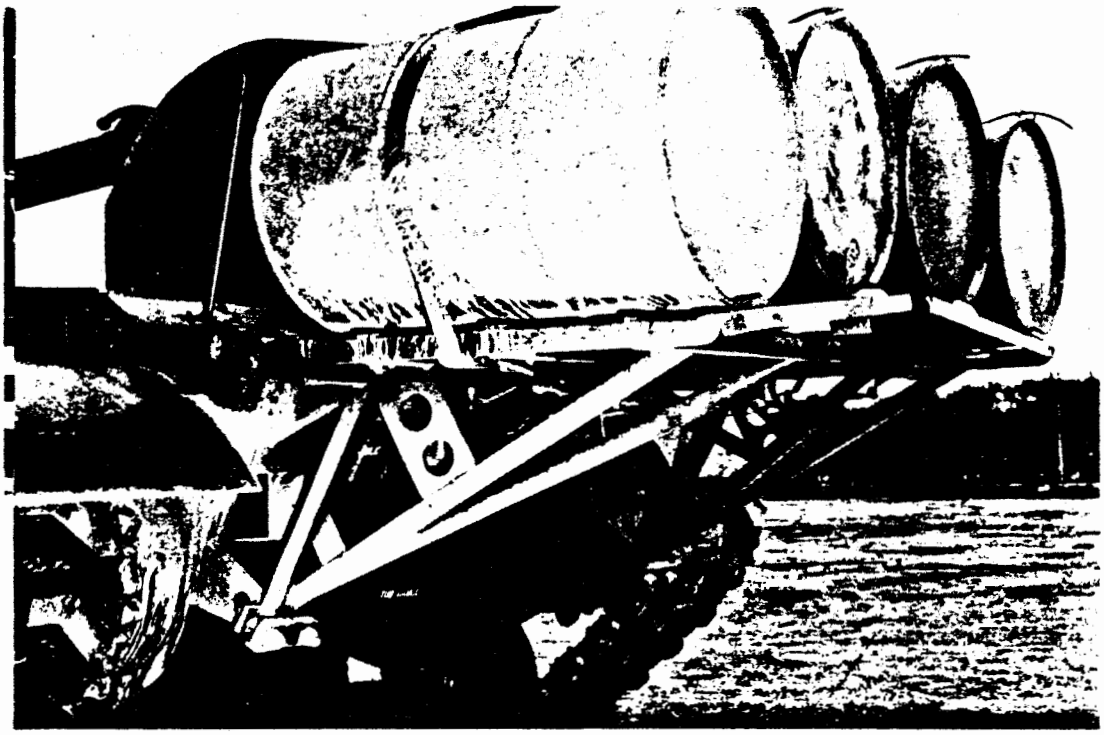
achieved by means of two electrically-driven gyroscopes for controlling the elevating and traversing gear respectively.

The Centurion tank went through numerous modifications culminating in the Mark 13. Centurions saw action in Korea, the Suez Canal in 1956 the Kashmire issue in 1965 between India and Pakistan, the Mid-East in 1967, Vietnam in 1968 and the Mid-East again in 1973. The Centurion was withdrawn from service in the British Army in 1971 and replaced by a new design, the Chieftan. The full story of the design changes of the Centurion are contained in numerous works to include "CENTURION IN ACTION" by Squadron/Signal publications published in 1976.

Following the Nazi surrender in Europe, U.S. Army officials were able to examine in detail the latest strides in German tank development. In addition, these same officers saw the latest Soviet armor, most of which totally outgunned current allied tanks. But while these discoveries prompted concern, the sudden appearance of the atomic bomb in August of 1945 caused this concern to diminish, since most ranking officials, both political and military, saw the beginning of a new era in warfare. Most American political and military leaders felt that conventionally equipped armed forces were a thing of the past. With the surrender of Japan, the United States rapidly began to demobilize the huge military machine created to defeat the Axis powers. Little though was given toward modernizing those forces that were to remain, except for the Air Force, which with its new atomic strategic deterrent weapons, was now considered to be the main battle force. Fortunately, a great deal of usable equipment had been mothballed, including large numbers of M4 Shermans on the outside chance that they might be needed someday.

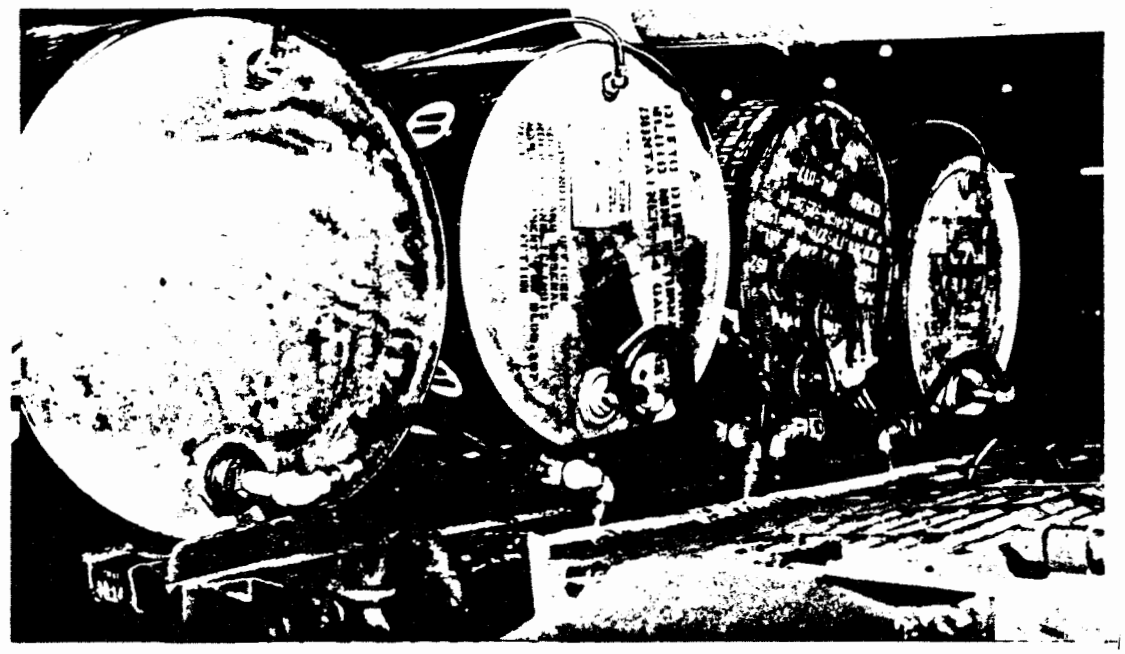
During the immediate post war years little attention was given to developing a replacement for the M26 Pershing, which had been reclassified as a medium tank. As the Pershing slowly began replacing the older Shermans, the M4s were largely relegated to training duties, or assigned to reserve and national guard units. A few Shermans, modified for special duties, as armed bulldozers, flame-throwers, or infantry support tanks, were kept in front line service since they adequately fulfilled these roles and no replacement was available. By 1948, however, the initial euphoria which followed the end of World War II had disappeared as the cold war intensified between the United States and the Soviet Union. This led to attempts at modernizing American armored forces stationed in Europe to counter the ever growing communist forces in Eastern Europe.

With the outbreak of hostilities in Korea, the 528th Ordnance Technical Intelligence Detachment was dispatched to Korea and brought back the first captured T34/85. The engineering analysis that was done on this tank in 1951 by Chrysler was too late to be of any influence on the immediate production of the M48 series.



(Above) One of the most serious early problems of the M48 was its limited range due to limited internal fuel storage and high fuel consumption. To help alleviate this problem a jettisonable rack capable of holding four 55 gallon drums of fuel was installed which increased the tank's range considerably. (US Army via Binder)

(Below) The fuel was fed into the hull through a series of lines attached to the rear hull. The system was basically unarmored and presented a serious fire hazard in a combat situation, and was restricted to use in non-combat zones only. (US Army via Binder)



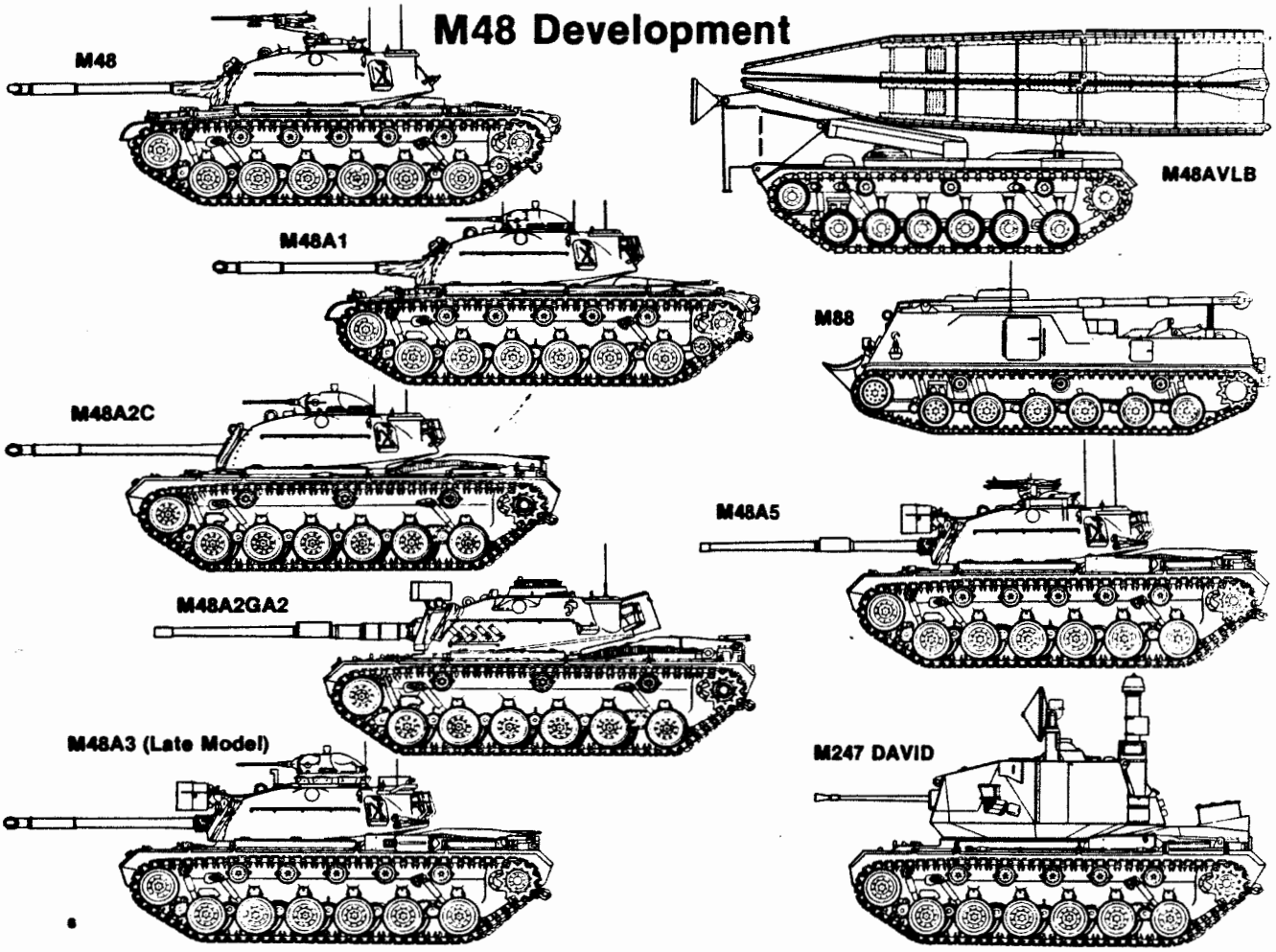
The T48, as it was known originally, was initiated in December 1950 by letter contract awarded to the Chrysler Corporation. In March 1951, the Fisher Body Division of General Motors Corporation and the Ford Motor Company were awarded letter contracts for supplemental production and in October 1954 Chrysler received another contract for additional vehicles. Deliveries began in April 1952 and were completed in May 1956. These were the M48C (training type), M48 and M48A1. Standardization as the M48 had taken place in May 1953 despite the fact that tests had disclosed many defects.

In 1960, the Comptroller General and the General Accounting Office issued a report on the production of the M48 tanks. It is worth noting some of the problems that were discussed in the report.

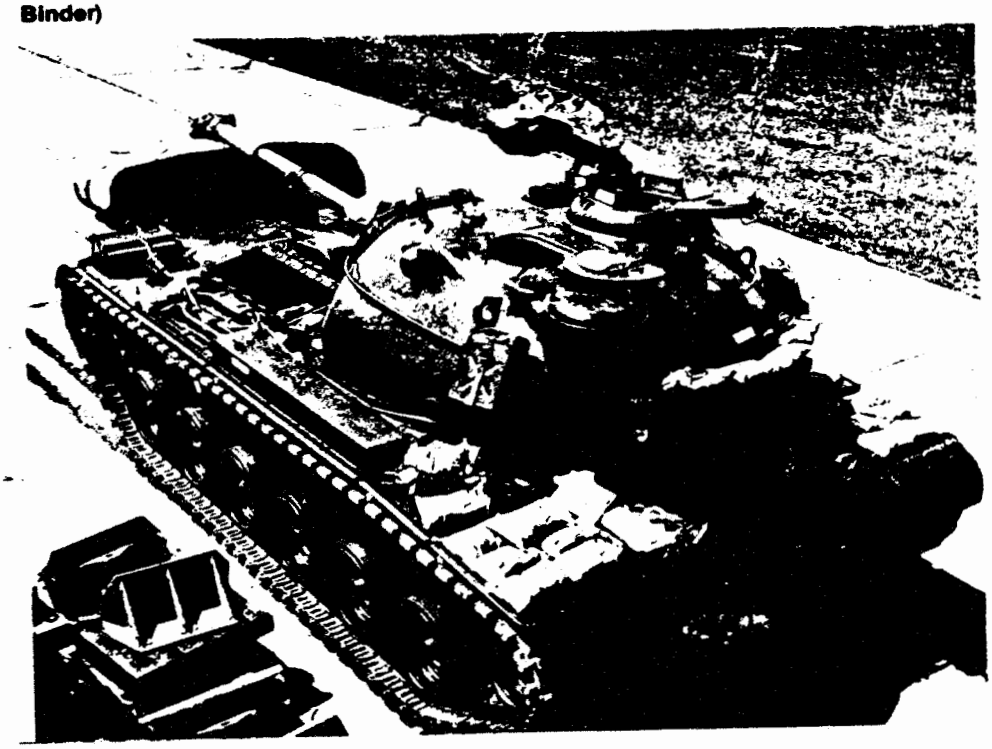
> "There were serious defects imparing the operation and maintenance of the M48 and M48A1 Full Tracked Medium Gun Combat Tanks, to use their full name. These defects were found in initial models and throughout production and continued to exist in spite of numerous and costly modifications over the period 1951-58. In fact it was held that "Initial production vehicles were defective to such an extent that they were not acceptable even for training purposes." The Controller General also reported that the situation was due to the practice of "contracting for volume production prior to adequate assurances that identified defects could be corrected during production or by subsequent modifications."
>
> Tracks were thrown, the rangefinders could not be used by everyone even with normal vision and originally the tanks could be shifted into reverse while the vehicle was in motion. This was a cause for much mechanical breakdown and later production was modified to prevent it. Despite limited usage, the tanks frequently were out of commission due to breakdowns in engines, transmission, tracks and suspension with an average of 2-7 failures for every 100 miles of operation. The Army insisted that the problems were due mainly to improper maintenance, failure to follow instruction manuals and poor driving habits, all of which probably were true.
>
> The Army accepted responsibility based on the premise that the Korean War had justified crash procurement although most of the vehicles were delivered after hostilities in Korea had ceased in mid-1953.

This report by the Comptroller General, although critical, must be viewed in the proper

M48 Development



To provide some measure of protection a light metal shield could be raised to deflect small arms and shrapnel as well as deflect gasoline away from the vehicle. Prior to entry into a combat zone both the rack and fuel drums were to be jettisoned. (US Army via Binder)



perspective. It was perhaps the first specific analysis of defects in a given series of tanks to be made public anywhere in the world, although the report on Wartime Tank Production presented to Parliament in England in July 1946 had been even more critical but on a broader base. Most track-laying vehicles must be properly cared for and maintained or they will exhibit similar defects, a well-established fact not yet learned by commanders who lack tank experience or who are unable to enforce discipline."

Numerous technical problems were found in the early production models which delayed full-scale deployment until 1958. The M48 tank was revised several times with the final series being the M48A5. Early in its production life the M48 was fitted with a snorkling kit which enabled it to ford water obstacles up to a depth of 4.1 meters. The analysis of Tiger tanks captured in WW II had provided the concept and analysis of possible European conflict produced scenarios that had identified the need for fording equipment. American technology would produce a tank that could out-perform the fielded Soviet tanks of the period. However, there appears to have been little effort made to analyze Soviet experience in tank design or field experience and no effort to analyze Soviet Science and Technology to determine possible future developments in Soviet weapons.

Despite all the problems with the initial production vehicles, the Army decided to standardize on the T48 and in April of 1953 it was designated the 90mm Gun Tank M48 and named the Patton 48, by which time over 900 had been produced. During the production run some changes occurred in external fittings, but these were minor in nature. Early problems with the engine, transmission and suspension and tracks necessitated the setting up of modification centers to correct these various problems. However, the high fuel consumption of the M48 Patton, which resulted in a range of only 75 miles, could not be so easily solved. An interim solution for troops in the field was simply to add a jettisonable rack to the rear of the tank to carry four 55 gallon fuel drums. For obvious reasons these fuel drums were used only to extend the tank's range outside of the combat zone, since the entire system was unarmored, and extremely vulnerable to enemy fire, creating a serious fire hazard if the vehicle ventured into a combat zone without jettisoning the fuel drums.

Had there been an extensive technical intelligence effort in the post World War II era and had there been an in-depth study done of the Soviet experience with add on fuel tanks, many of the problems could have been avoided, thus saving time and money. Had there been some research into what the Soviets had done to defeat the effects of the Panzerfaust, the M48 might have been improved. Unfortunately, the few qualified Technical Intelligence personnel in the service were in the Washington area or deployed to Korea.

Since Intelligence had been considered a wartime expedient, (and then only in the combat zone) or of a strategic nature, there was no Intelligence support at the various arsenals.

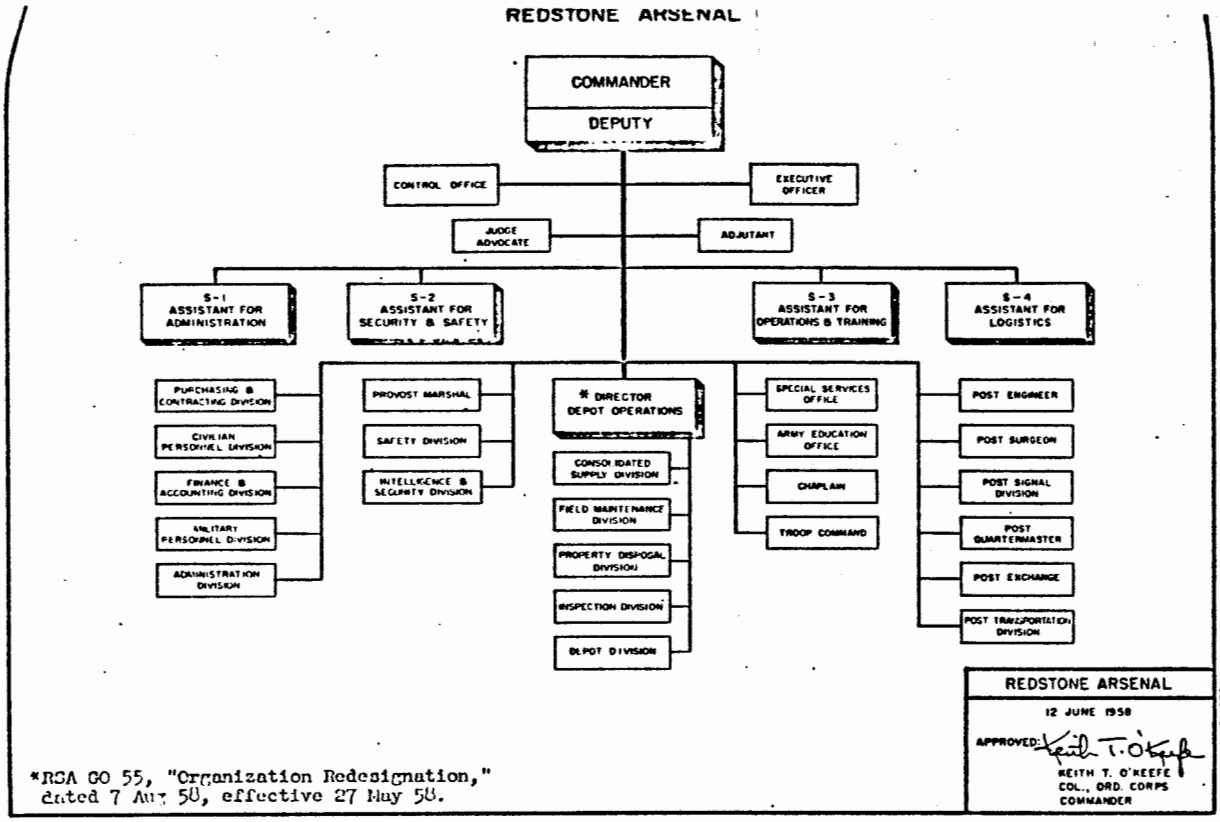
Because of future changes that would occur in the material acquisition process, it is important to review the basic procurement process that existed in the 1950s. The Ordnance Corps developed equipment and the using arm tested the item and either accepted or rejected the item. For example, small arms were developed by the Ordnance Corps and tested by the Infantry, tanks were developed by the Ordnance Corps and tested by Armor branch.

By 1953, Ordnance Technical Intelligence Operations in Korea were scaled back and the units and personnel involved were returned to CONUS. The concept was to assign an Ordnance Technical Intelligence unit to each arsenal. These units would provide technical expertise on foreign equipment that had been encountered in combat. In 1954, this would have been Soviet designed and developed material. The 528th Ordnance Technical Intelligence Detachment returned to Aberdeen Proving Ground, the 507th Ordnance Detachment (TI) was to be assigned to the Tank-Automotive Command in Detroit, and the 283rd Ordnance Detachment was assigned to Redstone Arsenal in Alabama, while the 84 OTID was stationed in Japan and the 2013th was stationed in Germany. The other detachments were inactivated, those detachments retained were stationed at Aberdeen Proving Ground.

In a similar type of organization, the Combat Arms branches established small "think tanks" with the mission of determining to what extent science and technology could improve our capability. They made great strides almost overnight. This was possible because they were staffed with experienced personnel. The armed helicopter and the Air Mobile Concept were two of the ideas that came out of the First group, but they lacked Intelligence support that would have kept them current!

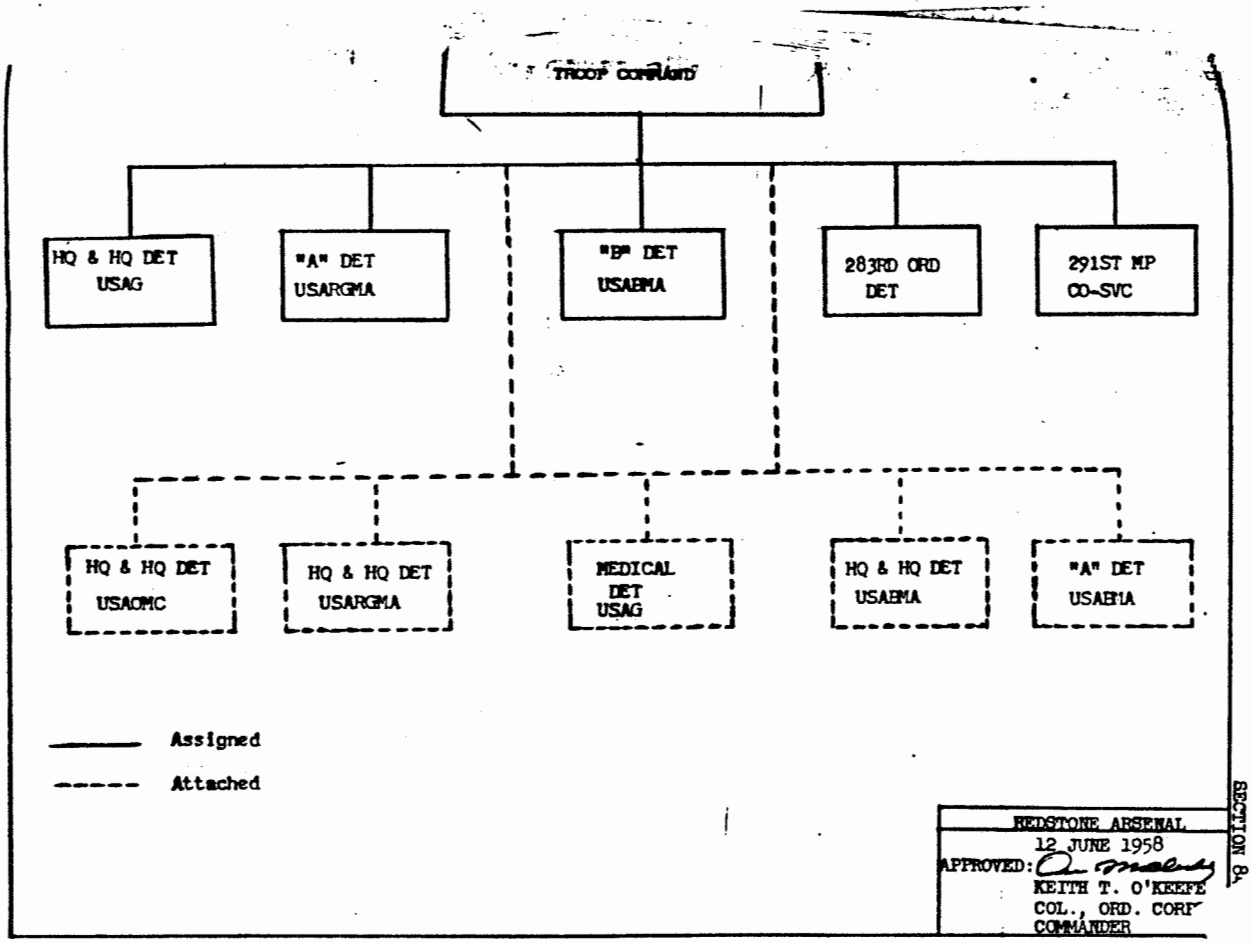
In the area of missile development, United States efforts were fragmented and lacked organization. During WW II, Redstone Arsenal had been an artillery loading facility co-located with a Class IV Supply Depot. When the Army began research and development on rockets, Redstone Arsenal was chosen rather than White Sands, N.M. and the widely separated loading buildings were converted to office space.

The first organizations that were formed at Redstone were the Army Ballistic Missile Agency, the Army Rocket and Guided Missile Agency, and the Guided Missile School. The United States first attempt to put a satellite in orbit was conducted by the Navy using the Vanguard Rocket. The attempt failed and very shortly the Russians succeeded in putting Sputnik in orbit. Since the Navy had failed, the Army was allowed to try. Dr. Von Braun, using a modified "production" Redstone missile was successful. This resulted in all the organizations at Redstone being combined



*RSA GO 55, "Organization Redesignation," dated 7 Aug 58, effective 27 May 58.

CHART 3



into the Army Ordnance Missile Command. In 1953, with the return to CONUS of the Technical Intelligence detachments, the 283rd OTID, commanded by Captain Nottrodt, was assigned to Redstone for intelligence support; however, there was a limited amount of information coming in on Soviet developments, so much of their work dealt with captured WW II items. In 1957-1958 the 283rd OTID was located in one of the converted loading buildings. This was partly the origin of what would become the Missile Intelligence Agency.

Strategic missile systems that were developed at Redstone were the Jupiter and the Thor. Because of range limitations placed on the Army, the Thor was transferred to the Air Force. The Minuteman missile system, however, was on the drawing board as were numerous Tactical Rocket Systems.

In what the world Almanac called the "American Decade," large outlays of money for research and development were made by both the U.S. and USSR which focused on items with a military application. In 1952 the U.S. detonated the first Hydrogen Bomb followed by the Russians in 1953 and Great Britain in 1957. In 1951, articles began to appear in German Scientific publications which provided some insight to German exploitation of captured British Radar and communication equipment. This information was understood by personnel involved in developing electronic equipment but the intelligence aspect was not stressed.

Despite the effort in WW II to make the world safe for democracy, the world was anything but safe as Korea had demonstrated. After two years of sporadic fighting, an armistice was signed July 27, 1953. U.S. troops remained in the South, and U.S. economic and military aid continued. The war, however, stimulated rapid economic recovery in Japan, Certain areas of the world were becomming the center of regional trouble spots.

In China, starting in 1952, industry, agriculture, and social institutions were forcibly collectivized. As many as several million people were executed as Kuomintang supporters or as class or political enemies. The Great Leap Forward, 1958-60, unsuccessfully tried to force the pace of development by substituting labor for investment. To the South in Indochina Ho Chi Minh's forces, aided by Russia and the new Chinese Communist government, fought French and pro-French Vietnamese forces to a standstill, and captured the strategic Dienbienphu camp in May, 1954. The Geneva Agreements divided Vietnam in half pending elections which were never held, and recognized Laos and Cambodia as independent nations. The U.S. began to aid the anti-Communist Republic of Vietnam in the South.

Across the world, in the Middle East, Arab revolutions placed leftist, militantly nationlist regimes in power in Egypt (1952) and Iraq (1958), but Arab unity attempts failed (United Arab Republic joined Egypt, Syria, Yemen 1958-61) to form the Arab

League. Arab refusal to recognize Israel (an Arab League economic blockade of Israel began in Sept. 1951) led to a permanent state of war, with repeated incidents. Israel occupied the Sinai, and Britain and France took the Suez Canal, in Oct. 1956, but were replaced by the UN Emergency Force. The Mossadegh government in Iran nationalized the British-owned oil industry in May 1951, but was overthrown in a U.S.-aided coup Aug. 1953.

In Latin America, Dictator Juan Peron, of Argentina in office since 1946, enforced land reform, some nationalization, welfare state measures, and instituted curbs on the Roman Catholic Church, but crushed his opposition. A Sept. 1955 coup deposed Peron. The 1952 revolution in Bolivia brought land reform, nationalizations of tin mines, and improvement in the status of Indians, who nevertheless remained poor. The Batista regime in Cuba was overthrown in Jan. 1959, by Fidel Castro, who imposed a communist dictatorship, and aligned Cuba with Russia. A U.S.-backed anti-Castro invasion at the Bay of Pigs in Apr. 1961 was crushed. Self-government advanced in islands of the British Caribbean. Thus conditions were ripe for the Soviets to expand their influence by assisting in revolutions.

It was becomming more difficult for the U.S. to maintain a large Armed Force in Europe, in the United States and to respond to world wide crisis. Efforts were made to reduce the number of U.S. troops in Europe, however to do so would have been an open invitation to Soviet aggression. The solution was to rearm Germany, and by 1954 the German Army was reestablished and the process of rearming took place.

One firm that was involved was Interarmco whose president was Sam Cummings, a former clerk with the CIA whose function during the Korean war had been to examine photographs of Soviet weapons taken by OTID's. One of Sam Cummings principle assistants was Thomas B. Neslon, another member of the Ordnance Technical Intelligence operations during the Korean War. Cummings' Interarmco, according to one magazine story had and inventory of 20,000 to 25,000 obsolete weapons.

In a 1956 magazine article, it was pointed out that Cummings cannot buy American surplus guns in the States, but he can outsell Uncle Sam through his foreign purchases. The U.S. price on the Garand rifle, which was available to shooters from the Army Director of Civilian Marksmen at a little over $100 including packing, can be bought from Sam Cummings for $80. When it comes to hoss trading Cummings can out-swap the government. U.S. sales must be for dollars only. Cummings will take anything he can get. He'll trade Colombian tin for Chilean nitrate for Argentine beef to get dollars. He will carry accounts in a dozen different currencies in as many banks, just to keep doing business. In one soft-currency nation in South America Cummings stumbled across one of the major finds of recent years. It was practically his only true "collector gun" deal, involving several thousands of the

exceedingly rare Winchester 1873 muskets. The ordinary rifles and carbines were plentiful, but the muskets for 30 years had been looked on as very scarce. That they were still considered scarce was proved by the three Florida dealers who were practically at each other's throats jockeying for the "exclusive franchise" to sell these muskets to Florida collectors. Cummings wasn't concerned. He sold them all to one dealer who came down from his upstate store to pick them up at the foreign trade zone in New York.

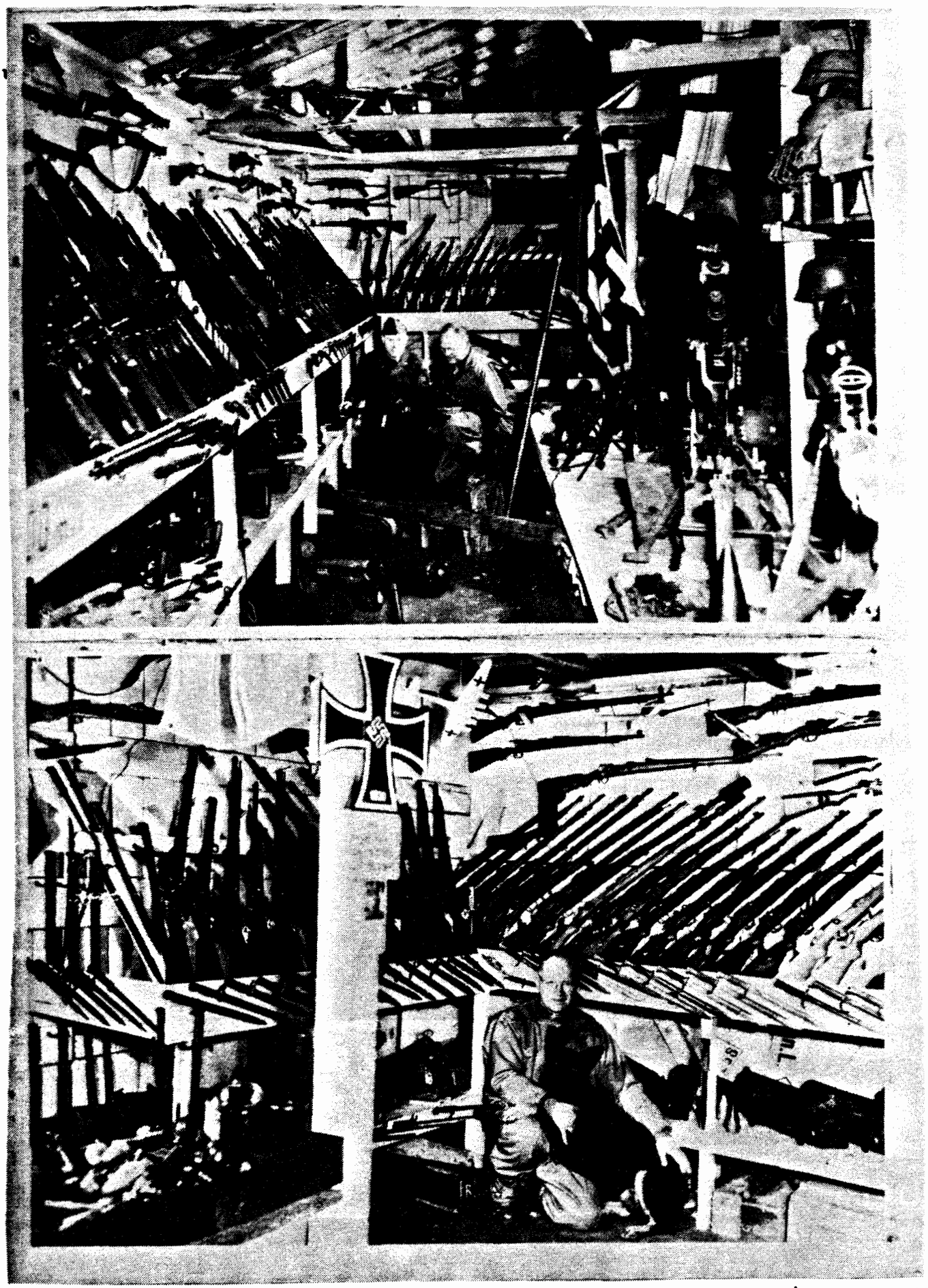
When asked about deals in South America, Cummings replied, "I've been to South America a few times." "in 1951 I shipped a quantity of assorted submachine guns to Nicaragua on State Department license, cleared by the U.S. government. Darned if those same guns didn't turn up last year in Costa Rica across the border, where Nicaraguan rebels were planning a revolt in their own country! The Costa Rican authorities wanted to sell the guns back to me but I wasn't too interested--it was a small lot of about 400 pieces, mostly M3's, Reisings, and a few Berettas. There were some new Madsen guns in the lot, too, made in Denmark."

He turned and picked up one of the flat Madsens. "This is sort of the 'oyster shell' school of tommy gun design. It opens up into two flat halves for cleaning and assembly. Sell a lot of those guns. I guess this sample has been shown to more government buyers than any other gun there is. I don't want the idea to get around that I sold those guns to cause a fuss in Costa Rica. I have some very nice friends there--Colonel Domingo Garcia and Major Jorge Pacheco of the Costa Rican army I know well. Bought over 11,000 obsolete guns that Costa Rica had a couple of years ago and cleaned out their arsenal so they like me to drop in when I'm down that way--it's a beautiful country."

Cummings expressed amusement at some of the uses his customers find for the Anti-tank guns he picked up in Finland. Some were sold to laboratories testing armor plate. Others went to a whale co-operative in Alaska, located near a spot where the whales come too close to shore for their own good. Cummings throws back his head and roars with laughter at the though: "When the whale yawns, he swallows that red-hot slug - Gulp!" An Arizona dentist who bought an anti-tank gun to shoot rabbits reported: "I don't hit many but when I do - Oh man!"

Many of these weapons would have been useful for training the military had there been an organization to conduct the training. Cummings also began to go after the big orders. In 1956 he sold twenty-six Swedish Vampire jets to Trujillo for three and a half million dollars. His biggest single deal was twenty million dollars' worth of arms and involved three countries and took a year and a half to negotiate.

Cummings has no qualms about supplying both sides in a conflict, "Any supplier of basic commodities sells to both sides," he says. "Coca-Cola sells to both Arabs and Israelis." When you



Col. George B. Jarrett shown with a portion of the foreign weapons collection at the Ordnance Museum in April 1954. (Photo:Forgett)

are selling guns, however, the results can be embarassing. Cuba's Fulgencio Batista had been one of Cummings' regular customers. When Fiedel Castro overthrew him in 1959, Cummings kept supplying the new regime with Armalite rifles until the State Department stopped licensing sales to Cuba.

Sometime later, Cummings was in the Dominican Republic demonstrating the Armalite to Trujillo. A group of Cuban-based guerillas had just landed at Puerto Plata. General Kovacs, Trujillo's Hungarian-born military advisor, was examining a captured Cuban rifle on his desk when Cummings came in with Trujillo.

Cummings is also fully conscious that he sells arms to underdeveloped countries who are diverting hard currency from social reforms to afford them, and whose leaders are exponents of Goering's adage "Guns will make us powerful. Butter will only make us fat." "They think they must have the weapons to parade down the main boulevard on Independence Day," he says, "and make the people think they are safer than they are as they shout 'viva la Libertad.'" "In the final analysis, the morality of armaments boils down to who makes the sale."

Another former member of the Ordnance Technical Intelligence operations, Val Forgett had left the service and founded Service Armament Company, later known as Navy Arms. Forgett was a close associate of Col. George Jarratt who remained active in the Ordnance Museum at Aberdeen Proving Ground. Because of political and economic considerations, large amounts of the German war material that had been captured by U.S. troops during WW II, was disposed of as government surplus and much of this went to both of these firms. While most of it was used to rearm the small armies of Central America, a large amount of the material was made available to individual citizens. If one had the money, one could purchase almost anything and have it delivered by mail. The Soviet Union however, used its surplus captured material to rearm its satellite nations and to supply guerilla armies who were engaged in wars of national liberation. While both the U.S. and the Soviet Union invested heavily in research for nuclear weapons, the Soviets also retained their war time design teams for all aspects of weapon development and continued to expand their intelligence efforts. American Diplomatic and intelligence efforts were limited and produced only photographs of new systems as they appeared in the Moscow May Day parades. This was sufficient, however, for stragetic planning purposes and Army doctrine and tactics were modified accordingly.

Survival on the modern battlefield meant dispersion of people and equipment to minimize the damage caused by a nuclear explosion. During WW II and Korea the Army had been organized in what was called a triangular fashion, three companies in a battalion, three battalions in a regiment and three regiments in a division. This system changed to what was called the Pentomic Army with five battalions in a battle group. This concept did not last very

HEADQUARTERS, COMMUNICATIONS ZONE, EUROPEAN THEATER OF OPERATIONS

COMMANDING GENERAL:
Lieut. Gen. John C. H. Lee
***
DEPUTY COMMANDER
and
CHIEF OF STAFF:
Maj. Gen. T. B. Larkin
—
DEPUTY CHIEF OF STAFF:
Col. Charles R. Broshous

PLANNING CO-ORDINATION:
Col. Ira K. Evans

SECRETARY GENERAL STAFF:
Col. G. K. Withers

PUBLIC RELATIONS OFFICER:
Col. H. A. Hall

CONTROL DIVISION:
Col. C. R. Broshous

LIAISON SECTION:
Col. E. E. Farman

INSPECTOR GENERAL:
Brig. Gen. O. L. Haines

HEADQUARTERS COMMANDANT:
Brig. Gen. A. R. Kimball

GENERAL STAFF SECTIONS

ASSISTANT CHIEF OF STAFF, G-1
Col. James M. Franey

ASSISTANT CHIEF OF STAFF, G-2
Brig. Gen. G. Bryan Conrad

ASSISTANT CHIEF OF STAFF, G-3
Brig. Gen. George S. Eyster

ASSISTANT CHIEF OF STAFF, G-4
Brig. Gen. Morris W. Gilland

ASSISTANT CHIEF OF STAFF, G-5
Brig. Gen. Cuthbert P. Stearns

GENERAL PURCHASING AGENT
Brig. Gen. W. R. Allen

COMMUNICATIONS ZONE SECTIONS

ADVANCE SECTION
Brig. Gen. Ewart G. Plank

CHANNEL BASE SECTION
Brig. Gen. Fenton S. Jacobs

NORMANDY BASE SECTION
Maj. Gen. Henry S. Aurand

OISE INTER MEDIATE SECTION
Brig. Gen. Charles O. Thrasher

SEINE SECTION
Brig. Gen. Pleas B. Rogers

UNITED KINGDOM BASE
Brig. Gen. Edward F. Koenig

CONTINENTAL ADVANCE SECTION
Maj. Gen. Arthur R. Wilson

DELTA BASE SECTION
Brig. Gen. John P. Ratay

BREMEN PORT COMMAND
Maj. Gen. Harry B. Vaughan

ASSEMBLY AREA COMMAND
Maj. Gen. Royal B. Lord

Organization of the Communications in Europe at the conclusion of WW II. Taken from the book, "AMERICAN ENTERPRISE IN EUROPE, The Role of the SOS in the Defeat of Germany, printed in France under Reverse Lend Lease in June 1945

long, and had little effect on division level headquarters and higher.

America's foreign policy during most of the 1950's and on into the 60's was based on supporting various treaties worldwide. Military strategy was developed to implement this policy. In the pacific, the major U.S. presense was the Far Eastern Command in Japan with the 8th U.S. Army in Korea. At sea, the Navy's Pacific Command headquartered in Hawaii was the primary means that the United States had for both intelligence gathering and showing the flag.

In NATO, the primary commitment was the two U.S. Corps of 7th U.S. Army with a tremendous supply line stretching from the East German border back to the factories in the United States. This supply line stretched across the vast area of France and the Atlantic Ocean. This became a costly system and it was eventually decided that France would become a war reserve "warehouse" while daily supplies for the forces in Germany would be delivered by truck from the port of Bremerhaven. In the event of a war, the "warehouse" in France would deliver supplies to the front line and at about the same time that the "warehouse" was empty, new supplies would be arriving from the United States along with the mobilized reserve.

The Army's headquarters in Europe was U.S. Army Europe with several subordinate commands. Combat forces were assigned to 7th U.S. Army with its V and VII Corps and the logistic support was placed under the 3rd Logistic Command and 4th Logistic Command in France. U.S. Army Europe headquarters in Heidelberg, Germany became the focal point for intelligence to include Technical Intelligence. The primary emphasis of Technical Intelligence in Europe became the production of various identification hand books which were based upon photographs in Moscow along with unclassified descriptions of the various weapons of the Warsaw Pact. Because of political consideration and a lack of Soviet weaponry, there was a limited amount of training conducted in Europe on the Soviet Forces. What training there was, was conducted at two major training areas, Grafenwoher and Hohenfels and made use of "the agrressor". Peacetime conditions combined with a lack of large scale room to maneuver precluded any realistic training exercises. To rectify this, a series of annual exercises called REFORGER (Return of Forces to Germany) were conducted.

Intelligence collection in Europe was channeled through the Army and Air Force channels. There was a limited amount of interpretation of events at the local level.

What intelligence was collected worldwide led to a realization that the Soviets were developing both strategic bombers and missile systems. The immediate threat would come by air, hence improved air defense weapons were needed.

Although the genesis of Ballistic Missile Defense within the Army is somewhat imprecise, a number of R&D efforts initiated in the mid-1940's were certainly germane. In 1944, Project Thumper was initiated directed toward the development of a high-altitude antiaircraft missile to defend against rockets of the German V-2 type. Later, in February 1945, the NIKE program was initiated. This led to the fielding of the first air defense surface-to-air missile, the NIKE AJAX, which was widely deployed for the defense of the United States. This system was followed later by a much improved version, the NIKE HERCULES, which was even more widely deployed in the US, NATO countries, Japan and elsewhere and remained in some national inventories as late as in the 1980s. These systems were the progenitors of the first ballistic missile defense system, the NIKE ZEUS, or as it was originally called, the NIKE II.

The NIKE family of missiles had been designed and developed to cope with aircraft and missile (ICBM), the submarine-or-surface-launched intermediate-range ballastic missile (IRBM), and the air-launched ballistic missile. In addition, Cold War tension between the USSR and the US had been raised to a new level of intensity.

In 1955, the Department of the Army requested that a study be done by the newly created Army Ballistic Missile Agency (ABMA), headed by Maj. Gen. John B. Medaris. This effort was to examine a new forward looking ground-to-air guided missile system capable of effectively defending against targets which might threaten the Continental United States (CONUS) during the 1960's and 1970's. The 18-month study was conducted by Bell Telephone Laboratories (BTL), which utilized the experience gained in developing NIKE surface-to-air missiles. The US Air Force, also interested in ABM defense, engaged BTL as well and, at the same time, conducted a study through the Western Electric Company.

While these investigations were going on, a considerable technical debate ensued within the scientific community. Many scientists and engineers supported the effort. Others were highly skeptical to the point of saying that it would be impossible to intercept a target going 24,000 feet per second. ICBM's would be plunging toward their destination at speeds ranging form 15,000 to 20,000 mph. It would, they scoffed, be comparable to "hitting a bullet with a bullet." President Eisenhower, at the time, shared some of this skepticism and philosophy.

Despite the skepticism, the Army study convincingly demonstrated that the concept was feasible. Some 50,000 simulated intercept runs were made with varying threat parameters and intercept altitudes. By the time the NIKE II study was completed, the unbelievers, at least within the military, had been converted. In October 1956, the results of the studies were presented to Lt. Gen. J. M. Gavin, then Army Deputy Chief of Staff for research and Development (R&D), and the Army General staff. Results yielded a definition of the threat, a discussion of the guidance problem in

BMD, a recommended solution for an anti ICBM defense system, and a proposed 6-year schedule for development of the system.

Meanwhile, the Air Force BMD study efforts were continuing. Like the Army, the Air Force program had its genesis in an antiaircraft missile program known as the GAPA (Ground-to-Air Pilotless Aircraft) system. A later offspring of this program and the Air Force's study effort was the Air Force BMD contender known as the WIZARD, a concept based upon intercepting an ICBM during the mid-course portion of its trajectory.

The existence of these two competing programs led to a decision by the Secretary of Defense, on January 16, 1958, regarding the major service responsibilities for BMD development. He approved recommendations that the Air Force develop only the early warning system and associated communications. The Army was charged with the R&D of a deployable missile system for ICBM defense. A joint Army-Air Force Committee was established to monitor the missile development.

The Army named its new project NIKE ZEUS. By the end of 1956, funds had been made available in the amount of $9 Million, and contracts were placed. December 1957 marked the beginning of actual development work, and the first project office was established the next year. The Redstone Antimissile Systems office was created in October 1957 under ABMA in Huntsville, Alabama. By January 1958, the project had been stamped "S-Priority," the highest national priority, by the National Security Council.

In 1958, Lt. Gen. Arthur G. Trudeau who replaced Gavin, as Chief of Research and Development, Department of the Army, was proud to be quoted on the challenge for ZEUS. "To detect, acquire, and destroy a target as small and fast as the ICBM requires a great advance in the state of the radar art," he said. To accomplish these jobs, the NIKE ZEUS would develop "several radars, including an acquisition radar, a target tracking radar, a discrimination radar, and a missile tracking radar." In addition to the radar equipment, the project would include "a set of high-speed computers, the ZEUS Missile with its guidance package and warhead, and the necessay communication links to connect and control these items."

The ZEUS acquisition radar was a long-range, high-data-rate instrument capable of scanning the sky over a range of several hundred miles. The acquisition radar then transferred its data to a more precise needle-beamed radar that refined the location of the target. Discrimination radars were designed to appraise the threat and sort out the deadly warhead from the harmless decoys. This complete target data enabled the system to fire at the proper time. The missile-tracking radar then directed the defending ZEUS missile toward and intercept of the enemy ICBM at an extremely high altitude. Several prototypes of these ZEUS mechanically-

steered radars were built and tested. The missile itself was a three-stage, solid-fuel weapon.

The finest civilian and military scientific talent available converged on the ZEUS product. Experts with 15 years' experience in perfecting ground-to-air defensive weapons guided the development. Col. John G. Zierdt, Commander of the Army Rocket and Guided Missile Agency (ARGMA) confidently predicted in 1960 that the test flights planned for 1961 and 1962 would be on schedule and successful. "All of the Army technical services were working on the program." he said, and "fourteen government laboratories were participating." Western Electric Company, Inc., was the prime contractor for the system, and BTL had overall research and design responsibility. Principal subcontractors included Allis-Chalmers Manufacturing Co., Armstrong Cork Co., Burns and Roe, Inc., Continental Can Comapany, Inc., Continental Electronics Manufacturing, Douglas Aircraft Co., Dow Chemical Co., Goodyear Aircraft Co., Lear, Inc., Narmco Manufacturing Co., Remington Rand Univac, Sperry Gyroscope, Steel Products Engineering, Stromberg-Carslon Co., Texas Instruments, Inc., Thiokol Chemical Corp., and Vickers, Inc. To compress system development into the minimum feasible time, concurrent testing was undertaken. Every component of the system, ranging from tiny transistors to huge radar antennas, was worked on simultaneously.

The NIKE ZEUS was tested at four major sites: Ascension Island in the Atlantic; White Sands Missile Range, New Mexico; Point Mugu, California; and Kwajalein Island in the Pacific. Each site played a progressive role in the test and development plan. At Ascension Island, the radars were exercised against ICBM/IRBM targets launched from Florida. At White Sands, components were tested and integrated into a full system installation. A shortage of space at White Sands, however, necessitated longer-range tests at Point Mugu, California. An extensive Firing program from Point Mugu over the Pacific Missile Range simulated long-range missile engagements. A complete ZEUS System was constructed at Kwajalein Missile Range (KMR). There, realistic attack conditions were undertaken. It was planned that the ZEUS would be pitted against an ATLAS ICBM launched from the Vandenburg Air Force Base in California

Later in 1962, the successful culmination of the project was achieved. On July 19, 1962, the NIKE ZEUS successfully intercepted an ICBM fired from Vandenberg AFB in California. The miss distance was estimated to be within the lethal blast radius of the ZEUS warhead. A second ICBM intercept occurred on December 12, 1962, in a duplicate test that was completely successful. The principle of "hitting a bullet with a bullet" had been established.

Although these tests were called a major technical triumph, they failed to win the battle to deploy a ballistic missile defense (BMD).

In January 1961, the Army had forwarded to then Secretary of Defense McNamara a NIKE ZEUS Defense Production Plan. The plan called for the production and deployment over 8 years of 29 defense centers, 70 batteries and supporting equipment, and 3,610 missiles. Total cost was estimated at $8 billion. The first two phases of the plan, calling for deployment of NIKE ZEUS around 12 metropolitan areas, was approved in September 1961. This was reversed in 1962, however, when DOD decided that only those funds required to keep the ZEUS development at top priority level would be used.

During this debate in 1962, General Trudeau disclosed that the Army was working on two major improvements to the NIKE ZEUS: a high acceleration missile known as the SPRINT and a multifunction phased-array radar, the ZMAR, capable of performing all of the tasks required to acquire and intercept an ICBM reentry vehicle.

On January 5, 1963, the Army was directed to revise its NIKE ZEUS system to incorporate the two new components disclosed earlier by General Trudeau. The longer-range ZEUS missile and certain other ZEUS components were to be retained, and the resultant system was called, for lack of a better name, NIKE X.

Public disclosure of the decision to revise the NIKE ZEUS program did not occur until February 1963 during the Congressional budget hearings at which time Lt. Gen. Dwight Beach, who was now the Army's Chief of R&D, and then Lt. Col. C. J. LeVan, one of his staff officers, explained the details of the program. At that time, it was also disclosed that the NIKE ZEUS test program at Kwajalein would continue to provide data and a means to evaluate decoy discrimination techniques for inclusion in NIKE X and to gather data to assist the Air Force and Navy to design reentry systems. This latter objective contributed to the establishment of the Air Force ABRES program.

Returning in time to 1956, Army intelligence in Europe recovered the first example of the "new" Soviet AK-47 which was replacing the SKS semi-automatic rifle that had become standard in the Soviet Army. It was, according to Dr. Ezell's 1985 book on the AK-47, the third production model, although this fact would not be apparent until some 30 years later. Since there was no technical intelligence detachment at Picatinny arsenal where small arms were developed, it is doubtful that this weapon had any impact upon U.S. designed weapons. As discussed elsewhere, the Army was about to field a new rifle, the M14 and the M60 machine gun, which was based upon the 1934 German MG34 and its refinements to include the MG42 and FG42, a paratrooper version of the MG34. The other major weapon systems under development were the M48 tank and the M60 tank. As problems in the M48 series tanks were discovered, they were corrected. For the most part, these changes dealt with the main gun or the engine.

In 1956, Nikita Khrushchev, First Secretary of the USSR's communist party, denounced Stalin's excesses, which marked a drastic

DEPARTMENT OF THE ARMY

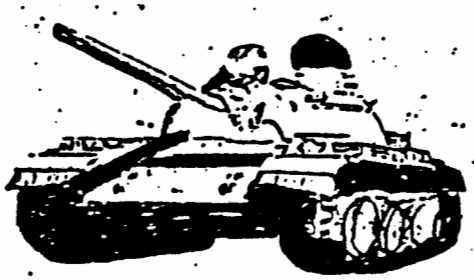
A GUIDE TO THE COLLECTION OF TECHNICAL INTELLIGENCE

DEPARTMENT OF THE ARMY
AUGUST 1953

INSTRUCTION MANUAL

FOR

T-54 TANK



REPRODUCED BY

INSTRUCTION MANUAL
for
THE COMPONENTS AND OPERATION OF
THE T-54 TANK

TRANSLATED BY

PREPARED FOR

U. S. ARMY

Center Line, Michigan

BY AUTHORITY:

change in Soviet thinking. In June, a workers' uprising against communist rule in Poznan, Poland, was crushed and by July Egypt had taken control of the Suez Canal. British and French troops invaded Egypt at Port Said on November 5 and a ceasefire was forced by U.S. pressure stopping the British, French, and Israeli advance by November 6. A revolt began in Hungary and Soviet troops and tanks moved in to crush the anti-communist rebellion.

In the same month that the Hungarians revolted and were crushed, the 507th Ordnance Det (TI) was transferred from Aberdeen Proving Ground to OTAC (Ordnance Tank Automative Command) in Detroit. By early 1957, they received distribution from ACSI (Assistant Chief of Staff, Intelligence) of photographs of the material recovered during the Hungarian Revolt. These were the first good photos that the U.S. had of the Soviet's new T54 tank.

Lt. John Baker, who commanded the 507th during the unit's move to Detroit, took the photos to Mr. Paul Denn, the principle architect of the M48 tank, and jokingly asked, "Why can't we design a tank like that?" Mr. Denn gave a very interesting and informative talk to the unit on U.S. design procedures. Military requirements were generated by AFF Board #2 at Fort Knox. He took these requirements and designed a vehicle that would fit the specifications. He then took each feature of the T54, which the Technical Intelligence people considered to be superior, and proceeded to approximate what the Soviet specification must have been and then showed what the specifications of AFF Board #2 had been for the same item. It was apparent that in designing the M48 and M60 tanks the U.S. had sacrificed lightness and low silhouette to obtain some nice-to-have frills.

One project that was accomplised by the 507th Ordnance Detachment was having the operator's manual for the new Soviet T54 tank translated into English. This was one of many documents that had come into U.S. possession during the Hungarian revolution having been captured by Hungarian Freedom Fighters from the Soviet troops, who suppressed the rebellion. The Soviets were equipped with the new JS III heavy tank and T54 tanks. An unconfirmed story was that one T54 tank crew deserted and drove their tank toward the Austrian border. Because of political considerations, the Austrians could not allow the tank to enter Austria. The crew grabbed on to their 100-mm. rounds and crossed the border on foot. These rounds eventually made their way to the U.S. At that time, most foreign material that was received was considered classified, and test and evaluation was done in a secure facility at Aberdeen Proving Ground. Eventually, reports would get to the various arsenals. Several of these rounds were used in testing the vulnerability of the T95 tank, an experimental and radically new prototype, which never became a production model.

Unfortunately, there was no continuity at the AFF Board as it was a three-year assignment, and design criteria for U.S. combat vehicles would swing from one extreme to another. By 1957,

General Gavin was Chief of Research and Deveolpmemt and, based upon the shifting concepts of future military operations, a decision was made that almost everything had to be air-transportable.

In addition to providing support to the Tank-Automotive Command, the 507th Ordnance Detachment (TI) conducted demonstrations of newly developed small arms for the National Guard. Although not directly related to tank design, the Technical Intelligence teams did serve as a liaison element with other Ordnance Commands that had material under development.

In an effort to assemble all the data that had been collected during WW II, Korea and elsewhere, efforts were underway to assemble some form of a data base. Personnel of 9301 special troops at Aberdeen Proving Ground were put to work at the H.P. White Laboratory and in the FBI's Firearms Section. Working under the auspices of Colonel J.B. Jarrett, a series of manuals were developed on small arms to advise our military attaches overseas what was already known to U.S. R&D elements. Jarrett had made numerous recommendations that the U.S. consider adoption of the German MP44 Assault Rifle but was ignored, as there had been too much time and money spent to develop a "light rifle." These manuals were never sent to various troop units.

Back at the various combat arms branch schools, the combat development organizations had decided to setup a field laboratory to test some of the concepts which had been developed. Experienced combat officers were assigned to do the qualitative analysis and civilian analysis were hired to do the quantitative analysis. One of the first experiments involved the problem of tank/anti-tank warfare. The military was charged with developing scenarios which would isolate the two critical factors within the framework of rational two-sided actions. Almost immediately, some serious problems arose. While the military felt they could do a reasonable job of assessing the qualitative aspects, the analysts couldn't figure out ways to obtain their data. Little by little, the combat scenarios were compromised. In the end, the military officers were left holding the bag. They couldn't come up with many qualtitative results, because much of the combat reality they had cranked in at the start had been eliminated.

One of the first things to go was the 3.5-inch rocket launcher. Since data collectors were required to accompany each tank and antitank weapon, there wasn't much realism to infantrymen hiding behind trees or in ditches when the data collectors were standing in plain sight beside them. Needless to say, the 3.5's achieved very few successes. In fact, the data base was so small after the first runs that they were pulled out of the action. And with that, they seemed to have disappeared from our military thinking as well.

Despite the fact that most of the people who were involved were either experienced or otherwise competent, the entire system

left a lot to be desired both in terms of acquisition of information about foreign technical developments, processing and dissemination of the information as well as test and evaluation of equipment. It is a tribute to those involved that progress was accomplised in fielding new or improved versions of the M48 tank. There are so many variations of the M48 that a listing would serve no real value in understanding the role of Ordnance Technical Intelligence. The history of the M48 series of tanks as well as the scientific and technical advances that produced these changes are a complete history in themselves and are beyond the scope of this book.

The U.S. Army during the 1950's and 1960's relied on recoiless rifles as the primary antitank weapon for the infantry, however by the late 1960's the LAW, light antitank rocket entered service. The Soviet Union as well as several European nations continued development of weapons that had been started in WW II Germany. In the early 1950's the French firm of NORD-AVIATION fielded the SS10 wire guided antitank missile which was battle tested during the Suez crises of 1956. NORD-AVIATION also fielded the ENTAC missile which entered service with the French Army in 1957 and was widely exported. This weapon was launched from its container and the control system allowed one man to control up to ten ground based missiles from one position or four missiles which were mounted to a jeep. To improve upon the SS10, the French then developed the SSII and later the SS12. In the Unites States, the U.S. Aerophysics company developed the DART missile but it was never accepted for service.

With an appreciation of some of the lessons learned from the study of the official history of WW II and Korea, it was apparent that changes were needed. As the United States entered the decade of the 60s, several events occurred which on the surface would appear to have little direct relationship to tank design but would provide the impetus for future development.

The Joint Chiefs of Staff, which served in an advisory capacity on military affairs, had very little access to any form of intelligence other than what came in via the State Department, the National Security Agency and the CIA. Since most of their requirements were for strategic intelligence and current intelligence, they had little need for technical intelligence.

In the mid-1950s, the Army created the Strategic Army Corps based at Fort Bragg. It was designed as a form of a rapid deployment force and consisted of the XVIII Airborne Corps and assigned units. One major exercise involved the deployment of the entire Corps to Puerto Rico. The 283rd Ordnance Detachment (Technical Intelligence) which was assigned to the Missile Command was contacted to support the Corps Headquarters. The detachment drew a jeep and a 2-1/2 ton shop van and convoyed to Fort Bragg and deployed to Puerto Rico. Upon return from the exercise, the unit returned to Redstone Arsenal. While the exercise proved that

it was possible to deploy a Technical Intelligence Detachment with a Corps, there was no advanced training of the troops on foreign material or its value to the intelligence effort. Since this was a training exercise, no foreign material was recovered,. Of prime importance to a possible combat operation was the fact that the personnel assigned to the Technical Intelligence Detachment had rotated through the various commands that the Technical Intelligence units had supported. They were first and foremost collectors, but part of their mission was the dissemination of weapon system information to the Corps Intelligence officers who could then inform the troops.

Since there was not an extensive effort overseas to recover or obtain foreign material, there was little for Technical Intelligence personnel to do other than update various identification guides. Whatever foreign material was recovered overseas was processed through the existing intelligence system which was slow and cumbersome and was at times staffed by people who were not professional in their approach to intelligence. In addition, there was almost no effort made to inform the troops about new developments foreign or domestic. Every now and then an article would appear in a commercial publication, and military journals did a reasonably good job of keeping people informed, but the distribution was limited.

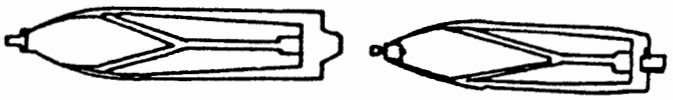
In Huntsville, Alabama, Captain Nottrodt with the 283rd O.T.I.D. had made several speeches to local civic groups on WW II wartime technical intelligence and the value of exploiting foreign technology. As one might suspect, he encountered stiff opposition because of the now famous "not invented here!" syndrome. In Detroit, Lt. John Baker with the 507th O.T.I.D. had put on a presentation of the new U.S. small arms. This presentation had been done in conjunction with Co. F of the 425th Infantry of the Michigan National Guard, but it had limited value for training or weapons development. It would have been better if the Technical Intelligence units had put on a demonstration of WW II Soviet weapons.

In the fall of 1955, I had entered Valley Forge Military Academy as a high school freshman. My roommate was from the Dominican Republic where his father was the Chief of Staff of the Army. He showed me several photographs of his family and it was apparent that the military was receiving weapons of Soviet design. Future conflicts that the U.S. might engage in would involve Soviet Bloc weapons but as a high school freshman there was not much I could say about it.

The arms race between both sides had continued and included artillery weapons and rockets. Nuclear warheads had been reduced from the size of those dropped on Japan to a size that allowed them to be employed tactically. American weapons included the Honest John Free Rocket, the Davy Crockett weapons system, and various guided missiles for use at varying ranges. The Soviets

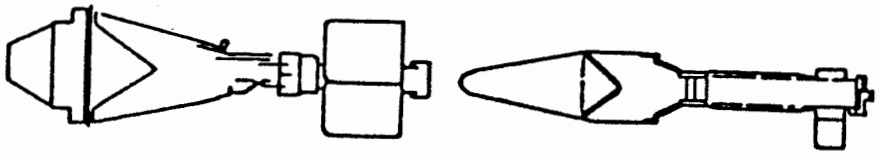
WORLD WAR II 1949 1959

Gun Projectile



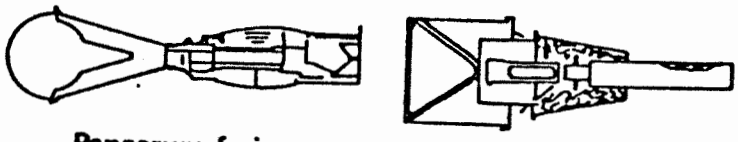
75 mm HL, German BP-350M

Grenades
Propelled



Panzerfaust PG-2

Hand Thrown



Panzerwurfmine RPG-43

PROGRESSION OF SOME SOVIET SHAPED CHARGE MUNITION DESIGNS
FROM GERMAN ORDNANCE TO MODERN SOVIET ORDNANCE

displayed their FROG 1 (Free Rocket Over Ground) in November 1957 at a parade in Moscow.

NATO and Warsaw Pact nations continued to watch each other across the "Iron Curtain" border. Border incidents were the major problems and great efforts were launched to prepare American personnel to cope with these incidents. By 1959, while still in high school, I had the opportunity to witness a demonstration team of the U.S. Army. It was Russian-born Americans dressed in Russian uniforms with Russian weapons. They put on an act depicting a border incident and showing how we would cope with that situation. Our school had a lot of displaced people as janitors and kitchen help and the appearance of troops in Russian uniforms almost created a panic among the foreign-born help. However, most military training still made use of the 1947 Aggressor and was not very effective. There was very little information in the public domain on the Soviet military.

The most notable exception was a book written by Col. Louis Ely published in 1959 called "The Red Army Today". He had taken numersous interviews with Soviet defectors and created a composite soldier from each of the various branches of the Soviet military. It was very informative but as a high school senior, I could see limited value for the information.

In the arena of strategic weapons and science and technology, the Soviets, in 1957, had launched Sputnik, a satellite that orbited the earth. This event came as a technological surprise to the U.S. In partial response, the Defense Department established DARPA, the Defense Advanced Research Projects Agency. Here scientists and engineers could work on developing advanced concepts in science and technology that would have a military application. They reported to the Secretary of Defense through an under secretary.

Soviet scientific work dealing with conventional weapons and warheads was summed up in a book published in 1959 entitled, "Physicis of an Explosion," written by Baum, Stanyukovich, and Shekter. This brought up-to-date the scientific research conducted since World War II. The major work prior to that had been General Pokrovskii's book, "Military Use of Directed Explosion", published in Moscow in 1944, however, none of the books were available in school libraries. New Soviet weapons employing shaped charges were appearing! The Soviet RPG-6 hand grenade had "merged" with the Panzerwurfmine captured from the Germans to become the RPG-43 hand grenade which was refined into the RKG-3. The concept of the Panzerfaust antitank rocket had been copied in the form of the RPG-2 which gave way to the RPG-7. The 75mm HL round of World War II Germany was copied in the BP-350M round that was deployed in the late 1940s. This evolved into the BK-4 round. The Soviet antitank guided missile which was deployed in 1959 was the SHMEL (3m6), NATO code name SNAPPER, but for a variety of reasons, it did not receive a great deal of attention. The

Ballistic Research Lab conducted several theoretical computer studies of the effects of these weapons, but lacking large quantities of these weapons, testing against U.S. vehicle designs was impossible. In addition, there does not appear to have been any effort at forecasting trends in antitank weapons based upon an exploitation of Soviet Scientific literature.

I had read extensively about German weapons development during WW II and had seen a collection of Japanese weapons which had been placed in the ROTC Department Arms Room. During the summer of 1959, I toured Europe and saw many museums and battle sites of WW II. While in Holland, I came in contact with a firm that had been supplying weapons to Dutch forces in Indonesia. I managed to obtain a WW II German MP40 submachine gun, which I brought back to the United States. In the fall of 1959, I became a freshman at Gettysberg College and I signed up for ROTC and became a member of the ROTC drill team. It was unique as it was the Aggressor Drill Team, the only one in the nation. We wore a foreign uniform, responded to commands in a foreign language and marched with a high step and a goose step. The only thing missing was foreign weapons. After one semester I departed from Gettysberg College and by the fall of 1960, I was enrolled as a cadet at the Citadel in Charleston, SC where we were preparing for the Civil War Centennial Celebration and were more concerned with getting muzzle loading cannon! I felt like I had stepped through a time machine going backwards.

In my first year, I joined the Cadet Museum Committee which was responsible for developing the museum which had been established on the third floor of the library. I was assigned to the weapons and munitions committee. The museum had an accumulation of items ranging from Civil War era bread to WW II weapons. The schools alumni sent in war relics from all over the world to include some advisors in Vietnam, who were assigned to MACV (Military Advisory Command, Vietnam).

While I was studying about the Civil War and reconstruction, the United States was deploying long range IRBMs in Europe. A 1959 coup in Cuba had resulted in the installation of a communist regime under Fidel Castro. An effort to invade Cuba at the Bay of Pigs sponsored by the Central Intelligence Agency failed when President Kennedy decided to withhold air support. The Soviets continued to supply the Cubans with advanced weapons. Little information was available about Fidel Castro to the military.

Recognizing the need for better intelligence worldwide, in 1961, the Defense Intelligence Agency (DIA) was established as an agency of the Department of Defense by DOD Directive 5105.21, dated 1 August 1961. DIA, under provisions of the National Security Act of 1947, as amended, operates under the direction, authority, and control of the Secretary of Defense. The chain of command runs from the Secretary of Defense through the Joint Chiefs of Staff to the Director.

SF Light Weapons Specialist, 10th SFG, pre-1962, Bad Tolz, Bavaria

Under its Director, the Defense Intelligence Agency was responsible for producing and disseminating defense intelligence to satisfy the intelligence requirements of the Secretary of Defense, the Joint Chiefs of Staff, and major components of the DOD. It was to accomplish this either by use of internal resources; through the management, control, and coordination of the intelligence functions of other DOD activities, or through cooperation with other intelligence organizations.

DIA was to review and coordinate those DOD intelligence functions retained by or assigned to the military departments. It also was to develop guidance for the conduct and management of such functions for review, approval, and promulgation by the Secretary of Defense. DIA also had the responsibility of supervising the execution of all approved plans, programs, policies, and procedures for the DOD general intelligence functions and activities for which DIA had management responsibility. It was to assist in obtaining the maximum economy and efficiency in the use and management of the DOD intelligence resources. This organization would serve to manage the Defense Attaches and provide a means of collating all the reports coming in from all over the world.

The impact that this reorganization would have on the field was not readily apparent but quickly showed up in the Republic of Vietnam. In his book, "The Twenty-Five Year War", Gen. Palmer stated that, a critical weakness apparent in MACV at the time was the lack of an adequate U.S. intelligence capability that could focus on the war on the ground. Moreover, the South Vietnamese intelligence service, virtually destroyed when Diem was overthrown, had not yet recovered The U.S. Army, which earlier had developed a credible ground order of battle on enemy forces in Southeast Asia, in the late 1950s shifted the responsibility for this task to U.S. Army, Pacific (USARPAC) in Hawaii, anticipating the loss of the Army's intelligence analytical capabilities to the Defense Intelligence Agency (DIA) when it was established in October 1961 with a U.S. Air Force officer as its first director. Predictably, DIA showed little interest in the subject. Then USARPAC, lacking the personnel resources and believing that MACV (established in February 1962) was assuming the responsibility, ceased work on the ground order of battle in Southeast Asia. The first MACV J-2 was an Air Force officer who was not interested in ground intelligence, so that area was relatively neglected until the summer of 1965 (after Gen. Palmer's visit to Vietnam) when the first experience Army intelligence officer was assigned as J-2 MACV. Thus a hiatus existed for about six years with respect to work on the ground order of battle in Southeast Asia. Considering the central importance of such intelligence, particularly in the kind of warfare being waged in Vietnam, this performance was inexcusable.

The same adverse effect also applied to U.S. Forces in Europe but as combat never broke out, this defect remained obscure.

Almost as soon as DIA was established, the Army began the process of creating the Military Intelligence Branch, which was originally known as Army Intelligence and Security Branch. According to several people it was quickly filled with people who had not done well in other branches. The end result was that military training exercises that were conducted overseas and in the United States lacked a great deal of realism. In most cases, the Battalion S2 was removed from his position as intelligence officer and placed in command of the Aggressor Force which utilized U.S. equipment and operated much the same as a U.S. unit. While the training provided the combat soldier with practice at handling prisoners and reporting what had been observed, there was no concerted effort to integrate the information or perform any analysis of the collected information. What few positions there were for this type of work, worked with classified documents and produced classified studies that never got to the troops.

The United States had always placed greater emphasis on events and threats that would effect the security of the nation. As such the Navy and then the Air Force had been the predominant force both in recognizing a threat and responding to the threat so it was understandable that the Defense Intelligence Agency would have a preponderance of Air Force and Naval Officers. What seems inexcusable was the Army's failure to accept reality and plan accordingly.

The Army was, however, reorganizing its procurement process. In 1962, the various technical services were reorganized and the Army Material Command was established which placed all of the material acquisition process under one command. Included was the Tank-Automotive Command as well as other commands such as the Missile Command. A subordinate command that was also established was the Foreign Science and Technology Center.

Weapons developments under this organization were managed by Project Managers who reported to Army Material Command who in turn advised the Assistant Chief of Staff for Force Development who authorized production rather than the Chief of Staff doing so. An overoptimistic Project Manager, or one with the human desire to "look good" so that the Secretary of Defense and the Bureau of the Budget would not be critical from a financial standpoint, could ignore user test reports and submit optimistic reports to higher-ups. Often the reports at higher headquarters were not examined critically and continued to be initialed without question and passed on.

Prior to the reorganization of the Army, the Army's S&TI efforts had been part of the Technical Branch of OACSI, DA, and the technical services. The technical services intelligence offices operated independently, utilizing their own resources and facilities designed to meet their own special requirements. As previously mentioned in the late 1950s most of the technical services intelligence offices, had been placed under one roof at

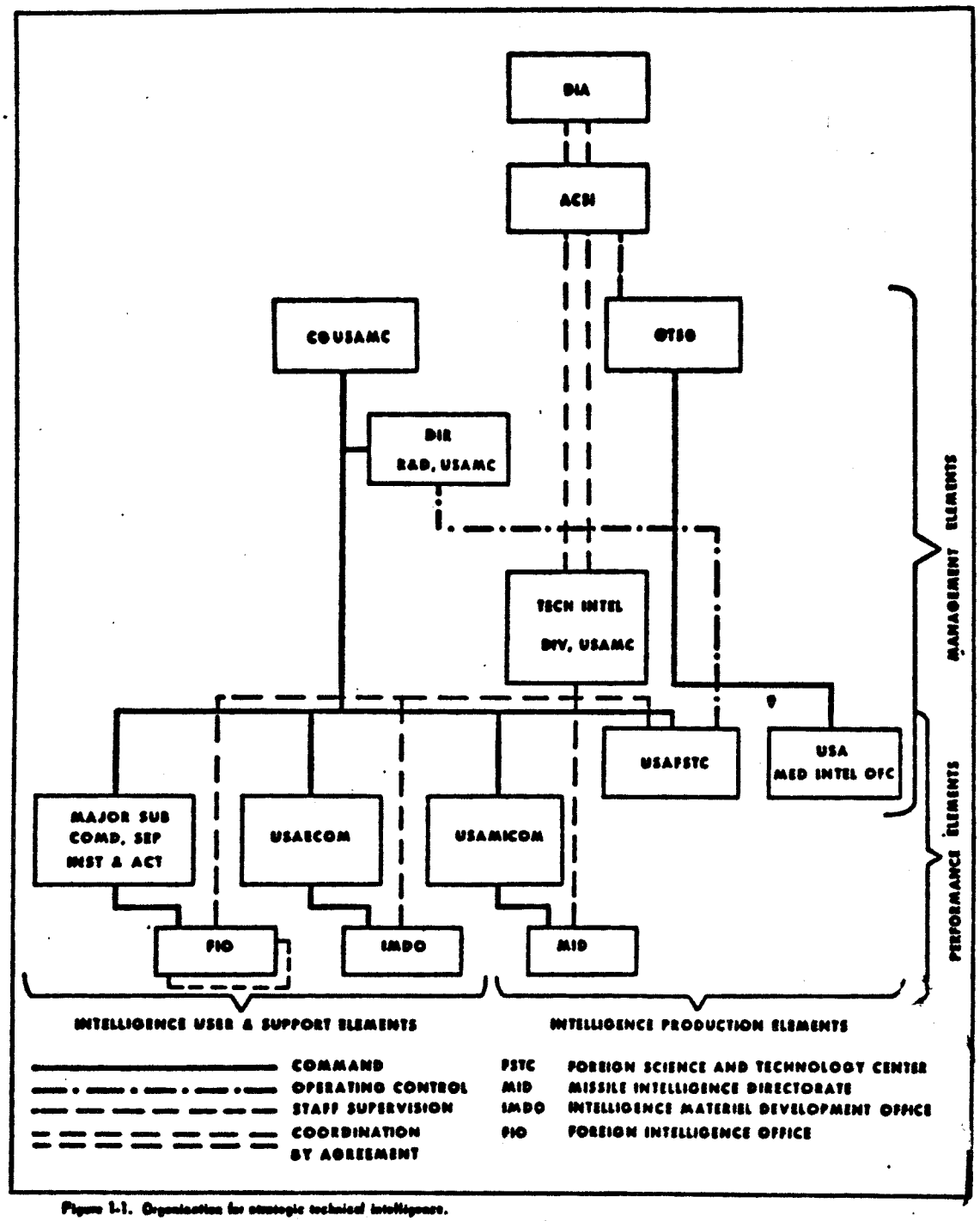


Figure 1-1. Organization for strategic technical intelligence.

Figure 1–1. Army organization for strategic technical intelligence.

US ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER

Arlington Hall Station, Arlington, Virginia - a move that facilitated their merger in 1962.

On 1 August 1962 the Foreign Science and Technology Center was established as a Class II activity under the operational control of the U.S. Army Material Command, with duty station at Arlington Hall Station. For the most part FSTC was staffed with "hardware' oriented personnel from the technical services where emphasis had been on weapon and equipment characteristics. Mission requirements soon established the need for staffing in the engineering and scientific fields. By September 1963, FSTC was moved from Arlington Hall Station to the Munitions Building in Washington, DC. This was the FSTC home for almost seven years. During these years the authorized strength fluctuated from a low of 420 to a high of 628. The recruitment of engineers and scientists was a slow process.

As the system was set up, the Foreign Science and Technology Center was under the Command of the CG U.S. Army Material Command, the operational control of the Director of R&D for AMC and under the staff supervision of the Technical Intelligence Division of AMC which in turn was under the staff supervision of the ACSI and the Defense Intelligence Agency. Each major subordinate command would have its own Foreign Intelligence Officer. The main benefit that this organization would have was centralized control and coordination of the analysis of equipment that was collected in the field. This information would be consolidated into reports and passed to the Foreign Intelligence Officers in the subordinate commands, thus reports on sightings of new Soviet equipment from such diverse places as Moscow and the Mid-East could be combined with detailed technical reports such as the one done by Chrysler on the T34 tank to forecast future trends, although this was not done for several years.

Slowly, but surely, the Foreign Science and Technology center was beginning to have its impact on both the intelligence system through the Defense Intelligence Agency and on the material acquisition process. Material developers were beginning to request information of a technical nature. In 1964 the Office of Technical Services, an activity of the Department of Commerce, was formally renamed the Clearing House for Federal Scientific and Technical Information. It was to make available to the public unclassified technical reports and translations.

As a result of activity in Vietnam, and particularly in the waters off shore, the U.S. Congress in August passed what became known as the Tonkin Agreement, named after the Gulf of Tonkin. In simple terms, it allowed President Johnson to use whatever force he deemed appropriate to contain communist aggression in Vietnam. It marked a turning point for the war and a gradual buildup of American troops began.

In the same year, TACTEC (Tactical Technology Center), funded by the Defense Advanced Research Projects Agency (ARPA), and a

number of other military agencies, was established at Battelle's Columbus Laboratories to meet the needs of the DOD for assistance in science and technology relevant to tactical warfare.

The TACTEC scope encompassed the technology of tactical warfare from incipient insurgency to tactical nuclear warfare. Among the subject areas included were: Weapons, Munitions, and Armor; Materials; Surveillance, Communications and Electronics; Engine and Propulsion Technology; Aeronautical Sciences; Target Acquisition and Identification; Ocean Sciences; Socio-Technical Sciences; and Operations Analysis.

Organized as it was within and as a part of Battelle-Columbus, TACTEC enjoyed a unique advantage in being able to draw upon the knowledge and capabilities of Battelle's more than 1,000 engineers and scientists to provide answers to the questions posed by its sponsors and to furnish technological assistance in R&D programs.

The TACTEC was capable of providing quick responses to determine what information was available on specific topics; to evaluate novel ideas; or to answer specific technical questions; providing scientific and technical assistance to qualified requesting agencies either at Battelle-Columbus, at the agency's facility, or, by special arrangement, overseas. It maintained an information analysis center/data base of over 40,000 documents covering science and technology relevant to tactical warfare, and performed R&D tasks to develop or evaluate systems, performed research on devices of phenomena of potential value in tactical warfare and conducted feasibility studies on devices or systems.

Battelle, however, was not part of either the Intelligence system or the material acquisition system, but was a contractor, dependent upon information and material supplied by those organizations who sponsored the research. Unlike the many consulting firms which sprung up in the Washington area, who simply produced paper studies, Battelle had the capability to manufacture experimental items. In addition, it had the largest foreign science library outside of the Library of Congress. The full list of projects that Battlle Labs worked on was extensive and many were classified. One of many operations was translating foreign technical publications for input into the newly developed computer data base.

The major disadvantage to this system was that it removed from the field all the personnel in the Ordnance Detachments (TI). The Ordnance TI detachments were de-activated and would only be filled as needed. The Army also established a separate branch, AIS -Army Intelligence and Security which would later be known as the Military Intelligence Branch. The organizations that were established to provide intelligence support in the field were very extensive and required specialized personnel. The basic plan called for a Military Intelligence Battalion to support the field Army and various Intelligence Detachments to support divisions and

corps. The corps level intelligence detachment was the lowest level at which a Technical Intelligence element was authorized. Their purpose was to advise the Corps Commander through the G2 of the capabilities of enemy weapons and to coordinate the field collection teams that would operate in the theater in the event of war. Since there were no large scale military operations, there was a lack of captured material for backhaul and analysis. Occasionally, items of value would be brought by defectors and these items were evacuated by conventional intelligence processes. The reports on this material were submitted by the intelligence elements.

The principle point for coordination of intelligence in Europe was still the G2 of the U.S. Army Europe in Heidelberg. The G2 section published a series of Identification Handbooks which were quite voluminous and provided photographs of virtually every piece of equipment in the Soviet inventory. As new items were reported, they were included in the subsequent revision. These Identification Handbooks were distributed to the field in Europe, but they received very little attention. Intelligence received very little emphasis among the combat elements and even less among the logistic elements.

In the area of Southeast Asia, the U.S. was becoming more involved than most people realized. In 1967, then Secretary of Defense McNamara commissioned a history of the U.S. involvement in the expanding war in Vietnam. Publicly released in the news media in 1971, the history provides an excellent accounting of events. It is sufficient to say that President Kennedy transformed the "limited-risk gamble" of the Eisenhower Administration into a "broad commitment" to prevent communist domination of South Vietnam.

Since 1956, when the Geneva agreements were signed, the U.S. military mission in Saigon was limited to 685 personnel. Among the key documents which relate to the period were two which relate to Technical Intelligence. One was the U.S. Ambassador's '60 Analysis of the Threats to Saigon Regime, transmited by cable on September 16, 1960 from Saigon. There were two dangers, one was the possibility of a coup against the regime of President Diem and the other was gradual Viet Cong extension of control over the countryside which would mean loss of free Vietnam to the communists.

The next key document was a memorandum from Walt V. Rostow, Deputy Presidential Assistant for National Security to President Kennedy, on April 12, 1961, which contained nine proposals for action. Proposal Number 5 was the sending to Vietnam of a research and development and military hardware team which would explore with Geneal McGarr which of the various techniques and gadgets now available or being explored might be relevant and useful in the Vietnam operation.

By 29 April 1961, President Kennedy, at a National Security Council meeting, approved a series of military actions which increased the size and scope of operations of the MAAG. Additional actions were also considered necessary to assist the G.V.N. in meeting the increased security threat resulting from a new situation along the Laos-G.V.N. frontier--included was "(2) assist the G.V.N. to establish a Combat Development and Test Center in South Vietnam to develop, with the help of modern technology, new techniques for use against the Viet Cong forces (approximately four U.S. pesonnel)."

In the area of covert operations were continued recommendations to expand field intelligence, unconventional warfare, counter-intelligence and communications intelligence. Since Technical Intelligence was almost non-existent and not considered truly a part of intelligence, it was not mentioned per se. However, the reference to the R&D and military hardware team and the combat development test center were missions that could have been filled by a Technical Intelligence operation, had it existed. Given 1960s thinking on the subject, this would not have occurred to anyone.

The world situation continued to provide trouble spots with each one becoming a crisis in the news media and in the government. In the Central America area, the Castro regime had consolidated its hold on Cuba and an abortive effort was made to invade the island and depose Castro. The well known "Bay of Pigs" invasion in 1961 failed as the United States did not support the invading forces.

In NATO, in an effort to contain possible Soviet aggression, IRBM's had been deployed along with various tactical systems which had a nuclear capability. These systems included the Jupiter missiles in Turkey. As a counter to this threat, the Soviets began to supply the Cubans with offensive missiles. Aerial photographs began to document this build up. It must be assumed that these missiles were transported by ships leaving from Soviet controlled ports along the Baltic Sea.

On September 1, 1962 my father, a merchant marine ship's officer was in the Port of Gydinia Poland on board the ship Moore Mac Owl. He became dead in a very mysterious shipboard accident. By October 1962, the Cuban missile crisis commanded world attention. A naval blockade ensued and the Soviets backed down and removed the missiles but not before the U.S. had agreed to remove its Jupiter missiles from Turkey, where they posed a threat to the Soviets.

Based on experience gained in the Cuban Missile Crisis and because of friction among the NATO Allies, President Kennedy began a crash action program to install control systems on all U.S. Nuclear weapons assigned to NATO. Engineers at Picatinny Arsenal were pulled from other projects to develop the system which had its impact on work being done to develop other systems.

During 1963, Vietnamese President Diem attempted to maintain control in Vietnam while his sister, Madam Nhu came to the United States to solicit additional support for her country. I was in my senior year and had been elected Chairman of the Cadet Museum Committee and Cadet president of the Citadel-Charleston Chapter of the Sons of the American Revolution. We undertook a project to help supply the South Vietnamese. Our efforts were directed toward the South Vietnamese Military Academy. I had several exchanges of letters with General Oui. Unknown to us, Gen Oui was involved in a plot to overthrow President Diem. With the apparent approval of the U.S. Government, President Diem was deposed and executed. As R.O.T.C. cadets were not privileged to receive the daily dispatches from Vietnam but the museum received a considerable amount of artifacts and weaponry from alumni who were serving in Vietnam. Several of the documents that we received were the early technical intelligence bulletins which showed the various weapons that were possibly in the hands of the Viet Cong or NVA. Since the museum had samples of many of these weapons, I engineered a display of Japanese weapons at the museum. In addition, I obtained a un-registered Soviet submachine gun.

A fellow cadet, Richard Irby, lived in the Washington area and his father was on the Department of the Army staff. I asked him to arrange for his father to go to Interarmco and obtain some ammunition for the weapon. Once back at school, I took the weapon out to the woods and put on a demonstration for a select group of cadets. It was not terribly effective but as it was an unsanctioned event, it was the best that could be done.

In the Spring of 1964, I received notification that I was to be commissioned as an Ordnance officer. In June, I graduated and was commissioned as a 2nd LT. In August, I reported for temporary duty at Aberdeen Proving Ground. Upon completion of the Ordnance officer basic course, I was retained at Aberdeen to attend the Tank-Automotive Maintenance officer course, to be followed by a three year tour in Germany. I had requested training in Small Arms Maintenance and a tour in Korea!

While at Aberdeen, I had the opportunity to tour many of the R&D labs where I saw new equipment that was under development to include the SS10 and SS11 missiles system. In addition, I had the opportunity to tour the Ordnance museum, before the collection was put in storage to make room for the Test and Evaluation Command.

In addition, we were shown an area known as "Behind the Iron Curtain" where Soviet bloc and other foreign weapon systems were being evaluated. We were never shown any and were never told anything about what was being done.

Within the world of tank design, the U.S. was in the process of fielding the M60 tank and the Soviet union fielded the T62 tank. The M60, armed with the British 105mm gun grew out of the M48. In 1960 some 180 were ordered and tested, following which

720 more were ordered. In 1962 the M60A1 went into production and were supplied to Austria, France, Iran and Italy where several more were produced despite the fact that several European tanks were its equal. The Soviets were in the process of fielding a new tank, to be known as the T62 which was reported to have a 115mm gun.

At the same time as the British 105mm gun was being considered, the Army established a requirement for future armed combat vehicles stating that "a direct fire, armored vehicle-mounted missile be available for operational use at the earliest possible date. The first result was the initiation of the Sheridan light reconnaisance vehicle program.

The Defense Department originally had intended to adopt the Shillelegh system on a crash basis which would upgun these vehicles until the MBT 70 (a joint U.S./West German effort to field a new main battle tank for the 1970s) became available. Modified M60A1 vehicles were to become the M60A1E1 in which an electronic computer replaced the previous mechanical computer. New vehicles produced in the same form were to be called M60A1E2. The first of the former appeared in 1965. The turrets from the modified M60A1 tanks were then to be placed on M48 A3 tanks.

In addition to developing new equipment the Army was in the process of reorganizing their numerous overseas commands. The largest commitment of troops was the U.S. Army Europe which, as was mentioned, had its combat elements in 7th U.S. Army which controlled V U.S. and VII U.S. Corps. These Corps, along with French, British, and West German Corps made up the bulk of NATO's front line forces. Other NATO nations manned "forward" postions.

Because of the fact that there is still a large American military force in Europe, there is much that, because of security considerations, cannot be discussed. My initial assignment in Europe was to the Permissive Action Link Detachment. We traveled in two and four man teams all over Europe to Combat and Combat Service Support units. On one trip to Greece, I had the opportunity to visit a trade fair where there was a great deal of machinery from behind the Iron Curtain. I reached the conclusion that there was a great deal to be learned from the study of foreign material and that, hopefully, the government was doing something about it. I asked my unit commander about Technical Intelligence, but he had limited knowledge of the subject.

In his 1986 book, Blundering Into Disaster: Surviving the First Century of the Nuclear Age, Defense Secretary Robert McNamara wrote, that "In the mid-1960s we had irrefutable evidence that the Soviets were deploying an antiballistic-missile system around Moscow--a system to defend their capital against our long-range missiles. We made the reasonable--but perhaps incorrect-assumption that they would deploy the system across the entire Soviet Union. Why would anyone put a system around one city and

nowhere else? Were a nationwide Soviet ABM system to be put in place, it would require that we make major changes in our force levels.

The Congress believed that the proper response to a fullfledged Soviet antiballistic-missile network was for the U.S. to deploy its own countrywide ABM system. The Army had been working on such systems since the late 1950s, first the Nike-Zeus and later the Nike-X. In 1966, therefore, the Congress authorized and appropriated $167.9 million for production of a Nike system (when fully deployed, the weapons would probably have cost a total of $30 billion). President Johnson and Secretary of Defense McNamara believed the system would provide little if any protection either to the U.S. population or U.S. weapons. The Defense Department refused to spend the funds that Congress had appropriated.

On December 6, 1966, Deputy Secretary of Defense Cyrus Vance, the Joint Chiefs of Staff and McNamara went to Austin, Texas to meet with the President and Walt Rostow, special assistant to the President for national security affairs. Their purpose was to review with the President the defense budget for the fiscal year 1968, which was to be presented to the Congress in February 1967. Among the items to be considered was the recommendation of the JCS that the budget request include funds for production of an antiballistic-missile system. McNamara explained to the President that the JCS had recommended the action, but that Vance and he strongly opposed it.

The President called on each of the five service Chiefs in turn, and each one of them urged approval of the ABM program. Walt Rostow sided with the Chiefs. This was an extraordinarily difficult moment for President Johnson. McNamara never hesitated to disagree with a unanimous recommendation of the Joint Chiefs if he felt it was the wrong decision. In this case, however, Congress had already passed a law authorizing production of the ABM system. To continue to refuse to proceed in the direction that had been supported by the Congress, and to do so in the face of a unanimous recommendation by the Chiefs, put the President in an almost untenable position.

At that point McNamara said to the President, "The Chiefs' recommendation is wrong; it's absolutely wrong. The proper response to a Soviet ABM system is not the deployment of an admittedly 'leaky' U.S. defense. The proper response is action that will ensure that we maintain our deterrent capability in the face of the Soviet defense. What the Chiefs are recommending has nothing to do with maintaining that deterrent. If our deterrent force--our offensive missiles and bombers--was of the proper size before the Soviets deployed their defenses, it must now be expanded to ensure that the same number of weapons will land on Soviet targets, after taking account of the attrition the U.S. missile force will suffer as it passes through the Soviet defen-

ses. So for the U.S. to deploy an ABM defense is the wrong response to the Soviet action. McNamara wrote, "But since we are in this bind, why don't we do this; put a small amount of money in the budget for ABM procurement, but state in the budget, and in my written report to the Congress, that none of those funds will be spent and no decision will be made to deploy an ABM system until after we make every possible effort to negotiate an agreement with the Soviets, which will prohibit deployment of defenses by either side and will limit offensive forces as well."

The President seized on this proposal as a way out of a very difficult position and in late 1966, President Lyndon Johnson made the decision to deploy a later version of the NIKE X, McNamara informed Dean Rusk, the Secretary of State, of the President's decision. He immediately approached the Soviets, seeking to initiate negotiation of an ABM treaty. They refused to participate even in preliminary discussions of such an agreement.

In June 1967 the Soviet Premier, Aleksei Kosygin, came to New York City to visit the United Nations. After some difficulty, it was arranged for the Premier and President Johnson to meet on June 23 at Glasboro, N.J. -- Glassboro is halfway between New York and Washington--to discuss the question of ABM deployment. At lunch in New Jersey on that June day, the President, the Premier and a group of their associates were sitting around a small oval table. It was clear the President was becoming frustrated by Kosygin's failure to see the U.S. point of view on ABM defenses. Finally, the President turned to McNamara and asked him to explain the U.S. position.

McNamara said, "Mr. Prime Minister, you must understand that the proper U.S. response to your Soviet ABM system is an expansion of our offensive force. If we had the right number of offensive weapons to maintain a deterrent before you put your defenses in, then to maintain the same degree of deterrence in the face of your defense, we must strengthen our offense. Deployment of a Soviet ABM system will lead to an escalation of the arms race. That's not good for either one of us."

Kosygin was furious. The blood rushed to his face, he pounded on the table, and he said, "Defense is moral; offense is immoral!" That was essentially the end of the discussion. The Soviet Union was by no means ready at that time to discuss an agreement banning defensive systems.

Following their return to Washington, there was unanimous agreement among the JCS, the President and McNamara that the U.S. must initiate action to expand its offensive forces. The cheapest way to do that was to develop MIRVs. By placing more than one warhead on each missile, the U.S. could increase the number of warheads far more cheaply than by building more missiles. But it was recognized this was a very dangerous step--if the Soviets followed our lead, as we must assume they would, it would lead to

a dramatic increase in the offensive forces of each side. The U.S., therefore, concluded that it would proceed with the development of MIRVs, but it would make no decision to deploy them until we had explored fully the possibilites of negotiating an agreement to prohibit defenses. If such a treaty was negotiated, the MIRV program would be scrapped.

On September 18, 1967, the Secretary of Defense announced the planned deployment of the NIKE. The system was now known as the SENTINEL and was to be deployed as a thin defense against the Chinese threat. This decision triggered a series of emotional Congressional, scientific and grass-root debates.

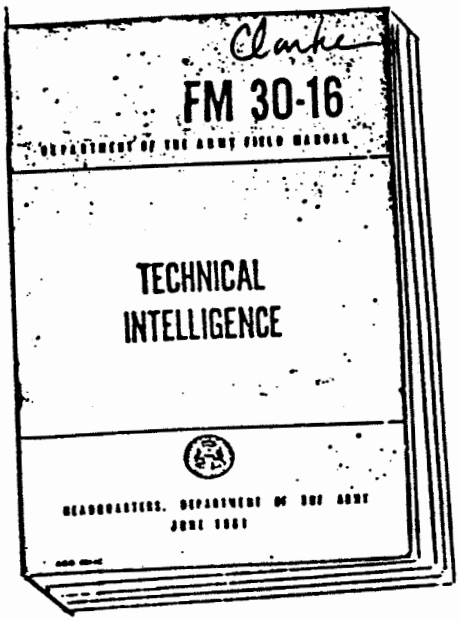
When McNamara left office in February 1968, the Soviets were still moving ahead with the ABM system, and the U.S. MIRV program was acquiring a strong constituency in this country. What followed is a matter of record.

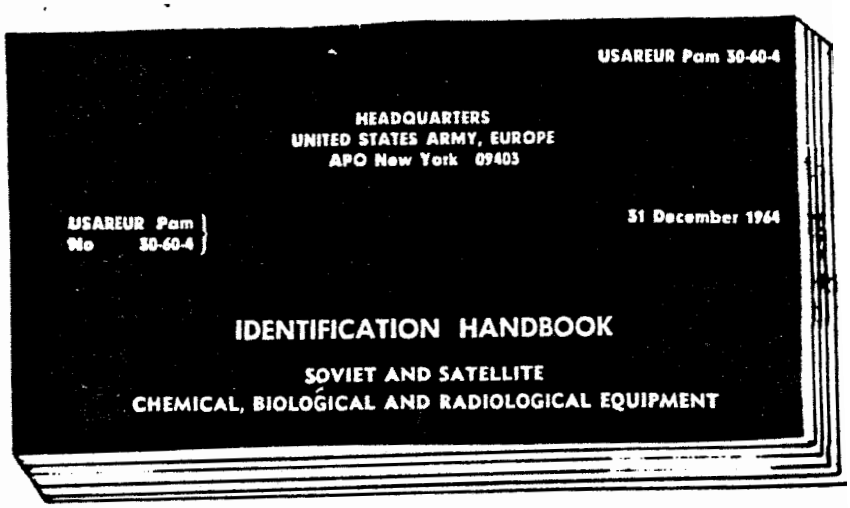
Finally, on March 14, 1969, President Nixon announced that the SENTINEL would not be deployed. A revised misson and a new name were applied. The new BMD was dubbed the SAFEGUARD and was to be deployed to defend the land-based ICBM fields. This deployment was initiated, and one site was virtually completed, and then the program was once again terminated mainly because of the well-organized efforts of the BMD opponents and MAD advocates. History had repeated itself.

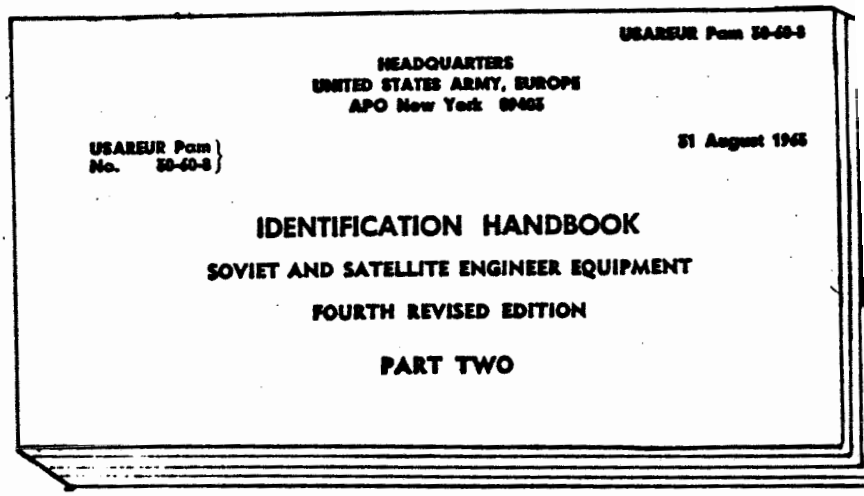
In spite of this checkered deployment history, the technical accomplishments remain significant. Major advances were made in the Army's BMD efforts, but only because of the ability to exploit captured German hardware and Research and Development reports.

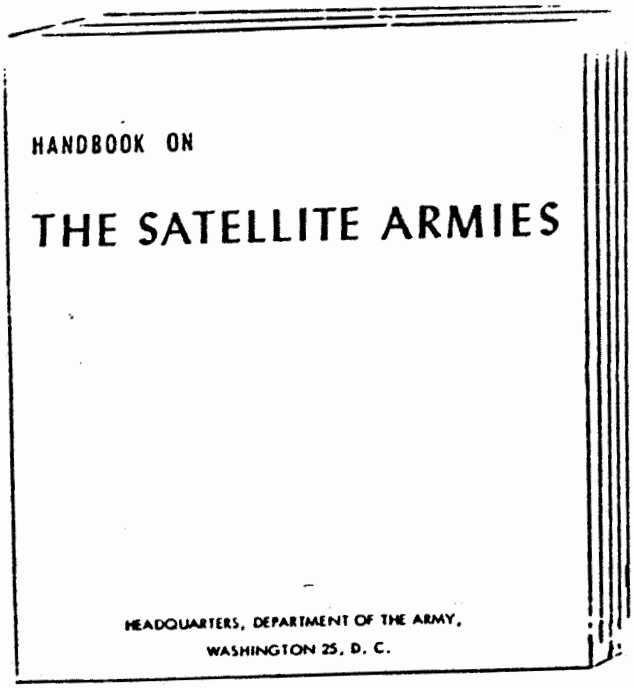
The basic concern of all the military forces in Europe was the possibility of an invasion by the Soviet Union. To this end, there were numerous "alerts" although there was another name for this exercise. The basic strategy was to use conventional forces to hold the line, while Reserve forces in the United States were mobilized, and sent to deployment sites in France where they would draw equipment from pre-positioned bases and deploy into combat. Hopefully, nuclear weapons would not be employed.

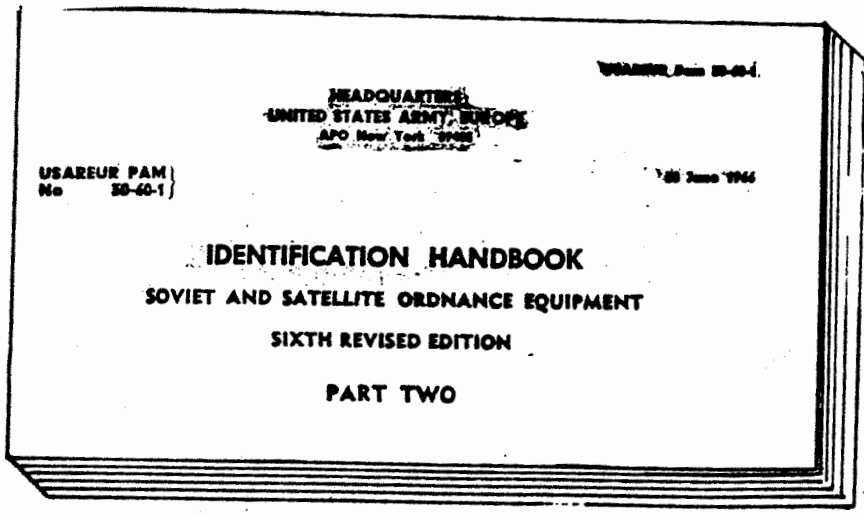
The military intelligence effort still relied heavily on observers in Moscow and aerial photographs of the Soviet Union. In 1952 they had observed and reported on the PT76 light reconnaisance tank, in 1957 the BTR50 armored personnel carrier, the SS-1 guided missile and the FROG 1 (Free Rocket Over Ground), a Soviet version of the American Honest John Rocket. In 1960, the FROG 3 appeared and in November 1961, the BTR 60, a wheeled version of an infantry transport. By May 1964 the SA4 missile had been put on display and by November 1964, a new weapon the BM21 multiple launch rocket was placed on display. Analysis of the photographs of this weapon showed that it was 115mm and the capabilities were calculated for a 115mm rocket and included in U.S. intelligence estimates.











FOREWORD

This publication, a complete revision of DA Pam 30-50-2, 15 May 1954, deals with the armies of the seven Satellite nations of eastern Europe. While each is treated in a separate chapter, extensive material applicable to most or all of them is contained in Chapter 1, Introduction. For a full understanding of any one army, therefore, the reader is advised to consult Chapter 1 as well as the country chapter. Further details on Soviet tactical doctrine, organization, training, and equipment—all of which have been adopted in varying degrees by the Satellites—are presented in DA Pam 30-50-1, *Handbook on the Soviet Army*, 31 July 1958.

The term "army" as used in this pamphlet refers to the ground forces of the regular military establishment. (Actually, the army in all the countries concerned includes the air forces, and in several countries the naval forces as well.) The militarized security forces are also discussed.

In 1965 at the Mayday Parade two new weapons were displayed, the T62 tank, an improved version of the T54/55 tank and a new antitank missile the AT3, given the NATO code name of SAGGER. These systems were reported on by the defense attachés in Moscow to the Defense Intelligence Agency where the assessment of Soviet Military power was prepared. in addition, the U.S. Army Europe prepared numerous updated identification guides on these weapons. Responsibility for this project rested with the Production Branch of the Intelligence Division of U.S. Army Europe in Heidelberg. The actual work was done by various Technical Intelligence Detachments. The 48th Chemical Detachment (T.I.) was one of these units and prepared USAREUR pamphlet 30-60-4 dated 31 December 1964.

There were at least 8 different pamphlets in the series with PAM 30-60-1 on Ordnance material and 30-60-8 on engineer equipment. The distribution of these handbooks was limited and were never distributed to personnel in the rear areas. Training of U.S troops in Europe was done at local units and at the two training centers in the 7th Army area, Grafenwoher and Hohenfels. What training there was did not include any foreign material. The only major exceptions to this were the Special Forces with their headquarters at Bad Tolz. There, the troops received some training with foreign weapons. In the armored cavalry regiments on the borders, there were some efforts at realism and one unit had a mannekin in an East German uniform.

In mid 1966, while on leave in Spain, I met with King Simeon, exiled King of Bulgaria and after discussing our cadet days, we discussed Soviet policies toward Europe and its satellite nations. In addition, I had become friends with a German family in Bonn. He had been a member of the "Front Aufklaring Einheitzen" during WW II and was currently working for the German government. In August 1966, I requested a transfer to Military Intelligence and reassignment to Vietnam, where I felt that intelligence had a better chance of collecting examples of Soviet military material. In an almost incredible example of military logic, I was reassigned to France to command a Military History Detachment of two people.

At the same time, 7th Army Headquarters was about to be merged with Headquarters U.S. Army Europe. In a surprise move, 7th Army reassigned most of the officers to units in the field. U.S. Army Europe was then confronted with literally hundreds of daily reports coming in from the field but with no one to handle the volume of paper work that had been generated.

In October 1966, I reported for duty in Orleans, France with Hq. U.S. Army Communications Zone. I quickly determined that very few people understood U.S. Military strategy for defense of Europe, nor did they understand NATO. Most of the personnel were so far removed from the "front line" that they had no idea what was involved in fighting either a nuclear or conventional war.

Many officers simply considered France a vacation command. This entire concept had been shattered when France withdrew from the NATO military alliance and required the Americans to depart France or turn their logistic bases over to French control. Several officers suffered a severe nervous breakdown over the stress of the move and could not function.

The logistic support of U.S. forces committed to NATO had been a matter of concern to both Congress and the military. The cost of support was considerable and efforts were under way to move supplies and repair facilities into Germany, closer to the front line troops. In addition to a study done by the JCS; the Army had begun efforts to reduce the "overhead" in Europe and to streamline its administrative support. This reorganization was contained in the TASTA-70 study which had a formal publication date of March 1967, however, it was available during much of 1966.

In early 1966, French President Charles De Galle had issued an ultimatum that all U.S. bases in France were to be placed under French command or removed from France. A decision was made that U.S. bases would be removed, either to Germany, England or elsewhere. The logistic command was caught in a squeeze play. They had to be out of France by March 1967 but had no where to go. A massive political and diplomatic effort was launched to secure facilities in England, the Netherlands, Belgium and elsewhere. A considerable effort went into studies of how logistic facilities could be relocated to best support NATO's tactical doctrine. Tactical doctrine was the subject of many heated discussions as it was based on the strategy adopted by NATO which was changing. The principle questions that were raised were: "was the U.S. and NATO prepared to use tactical nuclear weapons to stop a possible Soviet attack. In addition there was the question of destroying a good bit of Western Germany in the process."

The move of the logistic command from France was accomplished by mid 1967. A great deal of the information involving the move remains classified. However, the loss of a rear area in France considerably reduced the ability of NATO front line forces to conduct retrograde operations while waiting for reserve reinforcements from England and the United States. This was not overlooked by the Soviets.

Until about 1970 Soviet Military doctrine held as a basic tenet that any major war in Europe would naturally escalate rapidly to involve the widespread use of at least tactical, and quite probably strategic, nuclear weapons. During the late 1960s there grew up in Soviet political circles the realization that, if for any reason a major war were to start, it was clearly in the interests of the Soviet Union to be able to win it before the Western alliance could reach a decision to use nuclear weapons. As a reflection of this political realization, the first few years of the decade saw a gradual shift of emphasis in the Soviet military press from a study of the nuclear battlefields to a study of

conventional operations, albeit with the proviso that in any major conventional conflict, weapons of mass destruction might be used at any moment.

Whether any war which began in Europe would remain purely conventional or would involve nuclear weapons, the Russian victory, the Soviets felt, would only be certain if the war could be won quickly. On a nuclear battlefield, weapons of mass destruction would be widely available to reduce effective defense to a minimum: consequently the main tactical concern in such a war was to achieve a rapid rate of advance through a country where going had been rendered difficult by contamination and destruction. By speed and maneuver, armored protection and mass decontamination the Soviets would hope to reduce their own vulnerability to enemy nuclear weapons. To improve their chances of doing this, the Soviet General Staff began in 1967 to issue to their Army a vehicle expressly designed for - and, all agree, very well tailored to --rapid offensive operations in nuclear war. This vehicle was the BMP.

Since one of the main threats to the viability of highly mobile attacking units under nuclear conditions was considered to be enemy air power, large funds were also allocated during the 1960s to improving anti-aircraft systems, probably at the expense of armored self-propelled artillery. Forced, as they were in 1970 to meet the political requirement that the Soviet Army be able not only to fight and win a war with conventional weapons, but to do so very quickly indeed so as to lessen the dangers of escalation to global holocaust, it must have rapidly become clear to the Soviet General Staff that both the tactics and equipment of their army were not adequate to the task. Equipment was available in insufficient quantity, and was often of an unsuitable type. Tactical doctrine for conventional war was weak, and the army was poorly practiced in it.

For models of conventional operations upon which to base their plans, training schedules, and calculation of weapon and equipment norms for this 'new' conventional battle, the General Staff turned its enormous military history department to studying successful -- and unsuccessful -- offensive operations of the 1941-45 war. At the strategic level, this study provided adequate information for a model of a war won quickly (the Soviet campaign against the Japanese in Manchuria in 1945 was considered an excellent example for study and, presumably, emulation). At the lower tactical level, however, the advance of technology (for example the increase in the ranges and destructive effects of weapons, the increase in mechanization and mobility of troops, the emergence of guided missiles) rendered historial studies almost useless. The U.S. Army was in much the same condition but lacked the historial perspective.

Thus as the United States entered the Vietnam era, the strategic intelligence gathering process consisted of reconnaissance

satellites and other aerial reconnaissance platforms, defense attachés stationed in various parts of the world military advisors with foreign armies and communications monitoring done from a variety of stations, both on the ground and on board special ships to include the USS Liberty and USS Pueblo. In theory all the information collected by various sources was consolidated into an analysis done by DIA, CIA, NSA and the state department and delivered to the President via the National Security Council and the National Security Advisor.

The Combat Intelligence System and the Technical Intelligence System was almost non-existant. The Scientific and Technical Intelligence effort was for the most part handled by civilian scientists, many of whom had been recruited from Germany after WW II. Their work, while important was far removed from the reality of the modern battlefield. In addition, there was almost no effort made to inform the troops in the field about what was going on in the world. People in the service read the newspapers put out by the various commands and the few English language papers that were available, but there was a limited understanding of events.

In March 1967, having gotten the 11th Military History Detachment moved to its new location, I was replaced as commander and returned to my prior assignment in the nuclear weapons field. Within a few weeks, I was branch transferred to Army Intelligence and Security and ordered to return to the United States in late June to attend an intelligence orientation program at Fort Holabird, Maryland.

On NATO's southern flank friction between Greece and Turkey continued to produce its share of concern especially since we had teams operating in a the area from time to time. Further to the east, the Middle East was experiencing rising tension. The Soviet Union continued to supply various Arab nations with weapons. To a certain degree the U.S. supported Israel with weapons, however, among most of the U.S. personnel in Europe the conversation revolved around Vietnam. Most of the "old timers" in our unit had been reassigned to Vietnam and we were receiving a constant stream of correspondence on the war in Vietnam. There was a considerable difference between what they told us about the war and what the newspapers told us.