

CHRONOLOGICAL OVERVIEW OF THE DEVELOPMENT OF COMMUNICATIONS AND GUIDELINES FOR PREPARING A MONOGRAPH

Jungić Predrag

- February 2006 -

GENERAL SECTION

During the First Serbian Uprising (1804-1813) there was a so-called messenger service, carried out at greater distances by mounted couriers. At that time, a courier service was organized via the relay system. For communication at close range and directly on the battlefield, dispatch riders cavalrymen and infantrymen served as the main means.

♦ **Military Encyclopedia 10, Military Publishing Institute Belgrade, 1975, p. 461.**

♦ **THE SERBIAN PEOPLE'S ARMY, 1861-1864, Života Đorđević, 1984.**

In 1901, a law on the structure of the army in Serbia was passed. Serbia had a land army, divided into main and auxiliary branches and services. The main genres consisted of: infantry, cavalry, artillery and engineers and auxiliaries: medical orderlies, transport personnel, administrative departments and gendarmerie.

♦ **FIRST BALKAN WAR (Operations of the Serbian Army), Historical Institute, Volume I, Belgrade, 1959, pp. 207-240.**

The Engineering Command was a purely troop command. It was responsible for all engineer (pioneer and pontoon), telegraph, and searchlight units.

♦ **FIRST BALKAN WAR (Operations of the Serbian Army), Historical Institute volume one, Belgrade 1959. – ORGANIZATION, FORMATION AND DOCTRINE p. 213 (fifth paragraph), p. 215 first paragraph.**

The Engineering Command in Niš commanded two battalions. The Second Battalion included a telegraph company and a pigeon-post station.

♦ **FIRST BALKAN WAR (OPERATIONS OF THE SERBIAN ARMY), HISTORICAL INSTITUTE, VOLUME I, BELGRADE, 1959 - ORGANIZATION, ESTABLISHMENT, AND DOCTRINE, P. 221.**

In Serbia before the Balkan Wars of 1912. - In 1913, war formations were provided: for Supreme Command 2 telegraph and telephone section, radio station and pigeon-post station; for each army per telegraph and telephone section, radio station and pigeon-post station; for each infantry division per telegraph and telephone section; for artillery, cavalry, and infantry regiments per telephone department.

♦ **Military Encyclopedia 10, VIZ Belgrade, 1975, p. 462.**



An overview of the numerical status, telegraph departments, Supreme Command, I, II and III armies at the beginning of the war in 1912.

♦ **FIRST BALKAN WAR (Operations of the Serbian Army), Historical Institute, Volume I, Belgrade, 1959, pp. 869-881.**

RELEASE OF A CARRIER PIGEON FROM VARDIŠTE TO NIŠ (FROM THE HEADQUARTERS OF THE LIME SQUADRON) IN 1914.

In the Balkan Wars of 1912, - in 1913 signal units of the Serbian Army were initially insufficiently used. The command staff had no confidence in the technical communications equipment and little help to liaison officers. The newly formed signal units were insufficiently equipped and lacked practical experience, so the connections provided for in the mobilization plans were not achieved, but the connection was maintained as in

earlier times with couriers and ordonances.

The increased stability of the command posts, the wider network of permanent TT lines and the increased training of liaison personnel enabled a more successful solution to the problems of organisation and reliability of liaison operations in 1913.

♦ **Military Encyclopedia 10, VIZ Belgrade, 1975, p. 462.**



THE OPTICAL TELEGRAPH OF THE SON-IN-LAW'S WARD ON THE GROUNDS IN 1912



POLISH TELEPHONE - LIME SQUAD - 1914



1914. – communication equipment and their organization, during the First World War, were significantly behind the development of other combat means. During the First World War, there was insufficient preparation in terms of communication. It was only in this war that their importance became evident. This had as a result not only a huge increase in communication means and their technical development, but also the need to establish procedures, application and organization of communication.

♦ **RELATIONS and RULES through the history of warfare, Svetozar Ribar Regiment, Belgrade, 1954.**

PUTTING TELEPHONE LINES IN POSITION BEFORE SAILING IN 1913.

The Serbian Army entered World War I with insufficient and long-lasting means of communication. The lack of technique was compensated by courier links and the maximum use of the state PTT system during the struggle through Serbia.

♦ **RELATIONS and RULES through the history of warfare, Svetozar Ribar Regiment, Belgrade, 1954.**

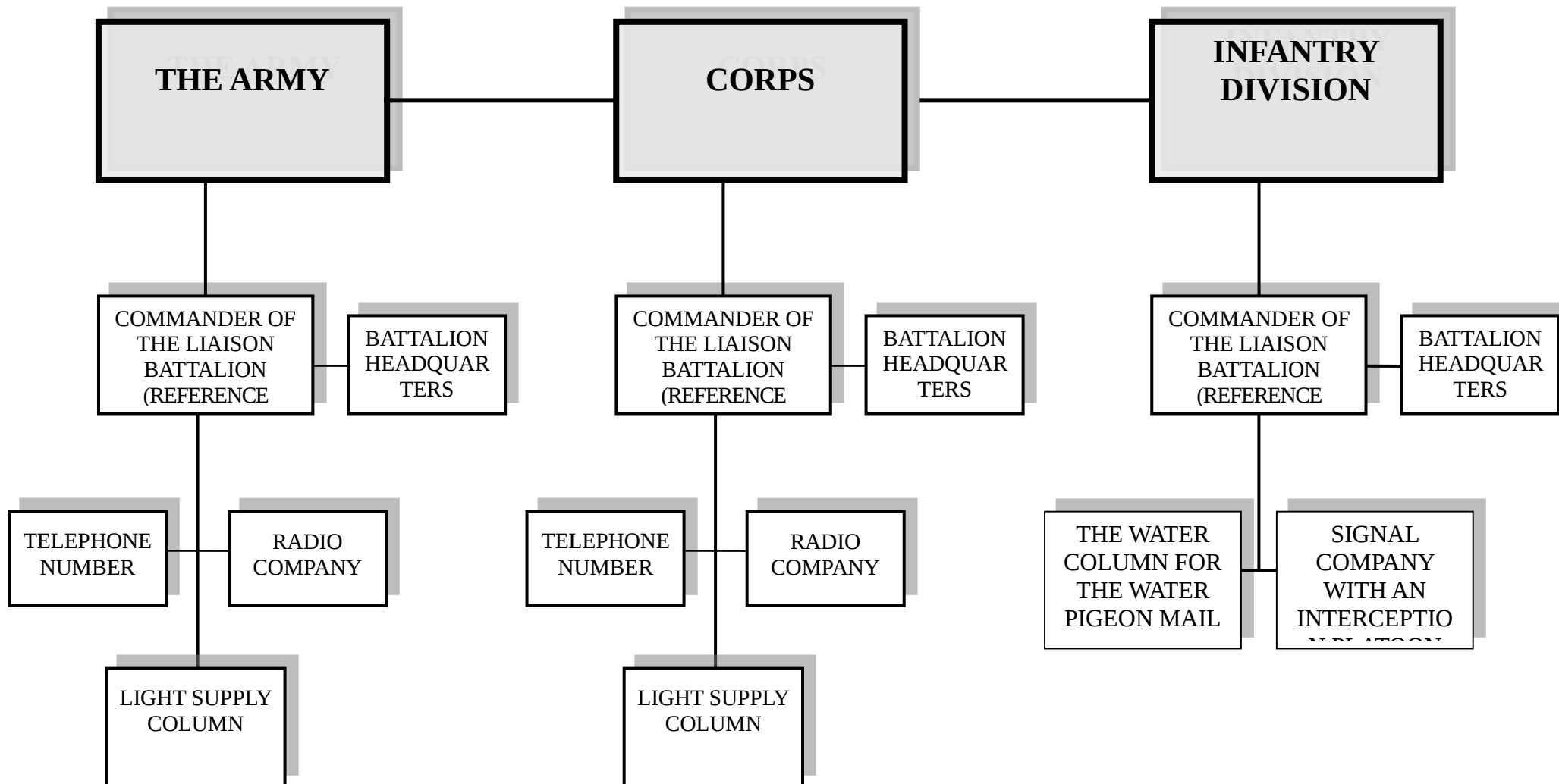
1916. - During the general reorganization of the Serbian Army in 1916, there was also a reorganization of relations at Krf and on this occasion, on the proposal of Minister of War General Božidar Terzić, an order on war telegraph was issued. It was implemented in full with new means, especially wireless telegraphs which allowed a different approach to organizing communication from the Supreme Command and by depth, which is regulated by regulations.

The Military Telegraph Regulations provide for telegraph and trunk telephone and signal departments. One cable and one radio telegraph department is provided for the Supreme Command, and one cable telegraph department for each army, infantry and cavalry division. Corps telephone divisions are also provided for each infantry regiment, and telephone and signal divisions for each artillery regiment and division.

(Ordinance is declared under pov.FćR br 1716 of 20.09.1916.)

♦ **FOR THE PURPOSES OF THIS SUBHEADING, THE FOLLOWING ENTRIES ARE INSERTED:**

ORGANIZATION OF THE SIGNAL UNIT OF THE SERBIAN ARMY World War I, according to the Military Telegraph Regulation, KRF, 1916.



In the Military Telegraph Regulations, Krf, 1916, it is stated further: - The duty of a wartime military telegraph to establish the necessary telephone telegraph links for military purposes, to organize orderly telegraph and telephone transport on them, as well as to maintain in good condition the state telegraph and telephone network and traffic in the hands of the military sector

-

The provisions of the Regulation could not be implemented immediately because both communication equipment and personnel were lacking. Training courses for non-commissioned officers have been opened in Thessaloniki and PTT personnel and technical students have also been recruited.

ORGANIZATION OF SERBIAN ARMY SIGNAL UNITS IN WORLD WAR I, 1916,
ACCORDING TO THE MILITARY TELEGRAPH REGULATION, CORFU, 1916.

♦ **Military Encyclopedia 10, Military Publishing Institute Belgrade, 1975, p. 464.**





POLISH (MOVABLE) WIRELESS STATION - SOLON FRONT

Some information on the organization of telephone connections between infantry and artillery in the Serbian Army to adapt artillery fire to infantry maneuvers.

♦ **This is a list of the official languages of the Republic of Serbia.**

In the case of Supreme Command, Army and Corps commands (head of the telegraph service with assistants for TT radio and artillery communication) a similar situation existed in the Serbian Army on the Thessaloniki front.

♦ **Military Encyclopedia 10, Military Publishing Institute Belgrade, 1975, p. 464.**



IN POSITION THE SOLONIAN FRONT From 1916-1918

An analysis of the telegraph's development shows that its importance was immediately correctly assessed. However, the organization of its application in military practice was quite controversial. It was first considered that civilian personnel and telephone and telegraph equipment would be able to provide communications for bulk units on the battlefield. Seeing that this method could not satisfy the needs, it was provided for in most armies to separate the Military Telegraph Service and subordinate the army with the state telegraph still being used. She handed out the national, state and Polish telegraphs.

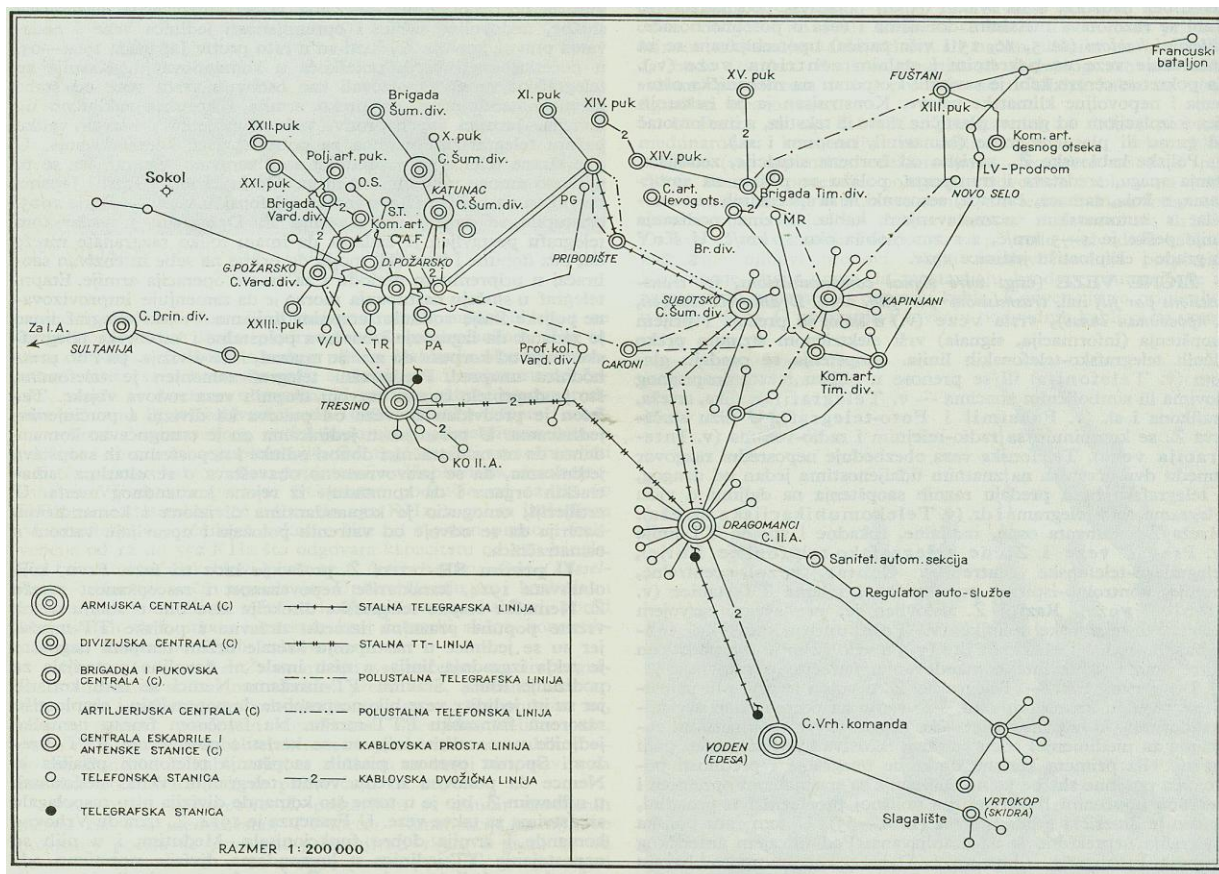
In preparation for the war, the state telegraph expanded its network to those areas where an army concentration was envisaged.

The Etap telegraph was tasked with maintaining the link between the state and Polish telegraph

The Polish telegraph was used for communication between army headquarters and the terminal stations of the stage telegraph (for communication above) and with neighbors, as well as for communication between army headquarters and corps headquarters.

Similar to other armies in Europe at the time, it is assumed that there were attempts to organize telegraphs in both the Serbian Army and later in the Yugoslav army on this principle.

♦ The history of warfare, regiment Svetozar Ribar, p. 129-131. Belgrade, 1954



NETWORK TT LIAISON OF THE 2ND SERBIAN ARMY SOLON FRONT IN 1917

In the final period of the first World War, it was clearly evident that all the conditions were met for the connection to become an independent branch of the military, however this connection was in the composition of engineering and under direct command of the Engineering Command, and it did not have the conditions to become self-organized and develop its own tactics and to build its own unique system of military and peace communication connections.

According to the peacekeeping formation, there was no professional liaison in any command, headquarters or establishment. The association was headed by the elders of those times' views and clans of the army who had insufficient knowledge of the problem of organizing relations.

Until one. In September 1919, she was trained in each army by one telegraph company for communications, which were a direct component of the engineering of those armies. In addition to conducting training, these platoons served to form war organs and signal units.

♦ COMMUNICATIONS IN THE NATIONAL LIBERATION WAR (Communications in the prewar period, pp. 8.) Mirko Četković, Belgrade, 1976.

Experiences gained in the first World War had a significant impact on the organization of command and communication. For larger units, the use of national telephone and telegraph lines was considered only intensive, while the Polish telephone was considered only for smaller units.

♦ The history of warfare, regiment Svetozar Ribar, p. 25-35. Belgrade, 1954

As far as the organisation of liaison was concerned, the rule was always that a subordinate should establish a liaison with the alleged. In principle, any staff who had the means for liaison was obliged to establish a liaison with the alleged without any order.

The principle of establishing contact behind the lines was one of the misconceptions. In the war, the old soldiers were not concerned about establishing a wire connection with the assumed enemy. This was natural, since the gaze and efforts of each old soldier were directed towards the enemy. Therefore, the prior establishment of contact was more correct and was adopted during the first world war. However, the rules of the Yugoslav Army, after the first world war, still prescribed the principle of establishing contact behind the lines.

♦ **The history of warfare, regiment Svetozar Ribar, p. 131-136. Belgrade, 1954**



EXERCISE ON THE VISIT OF THE CHIEF OF STAFF NOW, 1931.

In 1926, the Zemun Telegraph Command (a composition of one telegraph and one wireless squadron and workshop) was formed to prepare and train people only for the purposes of Supreme Command. Two years later the army telegraph squadron was disbanded, and a telegraph regiment was formed in Sarajevo.

In 1930, the Telgraf Command was joined by a telegraph regiment, a battalion of pigeon mail and a searchlight regiment.

- ♦ **The history of warfare, regiment Svetozar Ribar, p. 126, please. Belgrade, 1954**

The telegraph command was disbanded in 1930 and, instead, a telegraph regiment in Sarajevo and a battalion for wireless communications in the ground were formed.

The regiment as the only signal unit of the combined units, in addition to conducting training for active military and senior personnel, was central to forming war signal units for the purposes of Supreme Command.

- ♦ **COMMUNICATIONS IN THE NATIONAL LIBERATION WAR (Communications in the prewar period, pp. 9.) Mirko Četković, Belgrade, 1976.**

1930s to 1940s. There was not enough importance attached to the equipment, the means and the organization of the connection - quality and especially the quality of the equipment was poor.

- ♦ **The history of warfare, regiment Svetozar Ribar, p. 127. Belgrade, 1954**

ORGANIZATION OF THE SIGNAL UNIT OF THE YUGOSLAV ARMY, 1936

(through a war formation)

- ♦ **Military Encyclopedia 10, Military Publishing Institute Belgrade, 1975, p. 465.**

Development of the means and signal unit in the period from 1920-1940 - briefly.

- ♦ **TACTICS OF SEIZURE, M. Aksentijević, B Rošulj, Belgrade 1984.**

It was considered that the primary and main means of communication would be the courier and the existing peacekeeping PTT network. Radio communication was considered dangerous because of its ability to be wiretapped and gauge, so it should be avoided and not applied at all.

- ♦ **COMMUNICATIONS IN THE NATIONAL LIBERATION WAR (Communications in the prewar period, pp. 11.) Mirko Četković, Belgrade, 1976.**



You were born in 1936.

1932-1940. Training of personnel and communications equipment. So that the army of then-Yugoslavia entered World War II with insufficient and extremely outdated and unsavlorous technical means of communication, especially in the field of radio-communication,

among which were equipment as far as the first World War, which had been previously confiscated from the peacekeeping and especially from the war armament of all European countries.

- ♦ **COMMUNICATIONS IN THE NATIONAL LIBERATION WAR (Obuka kadrova and communications equipment., pp. 10 - 13.) Mirko Četković, Belgrade, 1976.**

The equipment of the signal unit was obsolete and in particular radio stations, which had been acquired in the name of repairs from Germany - models from the 1918 war. The telegraph and telephone equipment was of very different types. It was only on the eve of the war that studies were made to develop more modern communications equipment, especially radio stations. Models of new types of radio stations, phones and power plants have been adopted. Their construction in the country began in 1940.

- ♦ **The history of warfare, regiment Svetozar Ribar, p. 127. Belgrade, 1954**

Information on the procurement of communication equipment, and on the construction of radio stations at the CHECK Military Technical Institute and enterprises in Belgrade is available, in its original form, in the following archives:

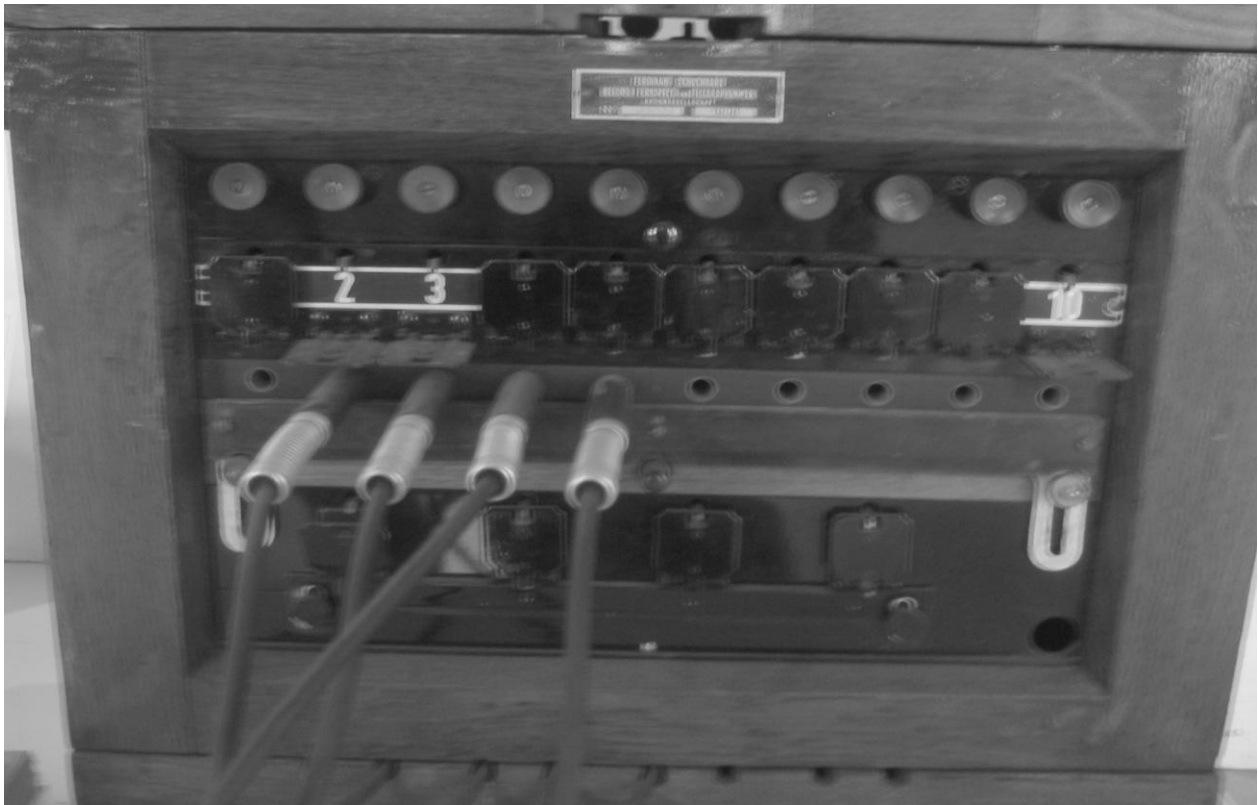
- ♦ **HISTORICAL OFFICE FOR THE DEVELOPMENT OF RELATIONS, SCHC V, AND I EI AND PED, BELGRADE**

In the operational part of Supreme Command's headquarters, there was only a reference for an engineering colonel's liaison, and in the background command of VK - Command postal telegraph service. In the army and division commands, there were only reference officers for communication, with no other personnel, they were part of the operational parts of their headquarters, and in the transportation departments of their commands the background were army and division mail.

- ♦ **Central War Library, and so forth. 97.628 - Military armament and equipment of the army.**



TA M-33, year 1933.



1933 INDUCTOR POWER PLANT, GERMAN ORIGIN

The operational parts of the headquarters of the higher combined units, finally with the operational part of the Supreme Command Headquarters, had in their composition, as a leading and technical liaison body in warfare, only one senior officer, who was neither physically nor professionally able to successfully manage the organization, planning and control of all types of liaisons for the purposes of commanding his staff, nor the work of the signal unit on establishing, maintaining and controlling these liaisons.

This fact shows how wrong and outdated the concept of organizing command, control, and communication was in wartime conditions, since it predicted a hierarchy, distribution, and placement of commands and headquarters (CM) on main communication lines and in places where mail had been established during peace time, giving the utmost attention and significance to the provision of necessary connections through couriers, ordonanzas, and connections over the existing peace-time TT network. Such a concept of organizing command, control, and communication in wartime conditions, which essentially dates back to Balkan and the first world war, completely demolished the practice of the first day of the short day April war, since the largest number of commands and headquarters – due to the bombing of the main PTT nodes – had no actual connections with their previously assumed and assigned commands, units, and establishments.

- ♦ **COMMUNICATIONS IN THE NATIONAL LIBERATION WAR (Ratni organi and signal units., pp. 14 - 17.) Mirko Četković, Belgrade, 1976.**

The regulation on the formation of mobile and wartime armies provides for the following military units:

Signal Battalion Supreme Command Staff, 4 wired bands, 1 wireless band, telegraph telephone station and mechanical workshop.

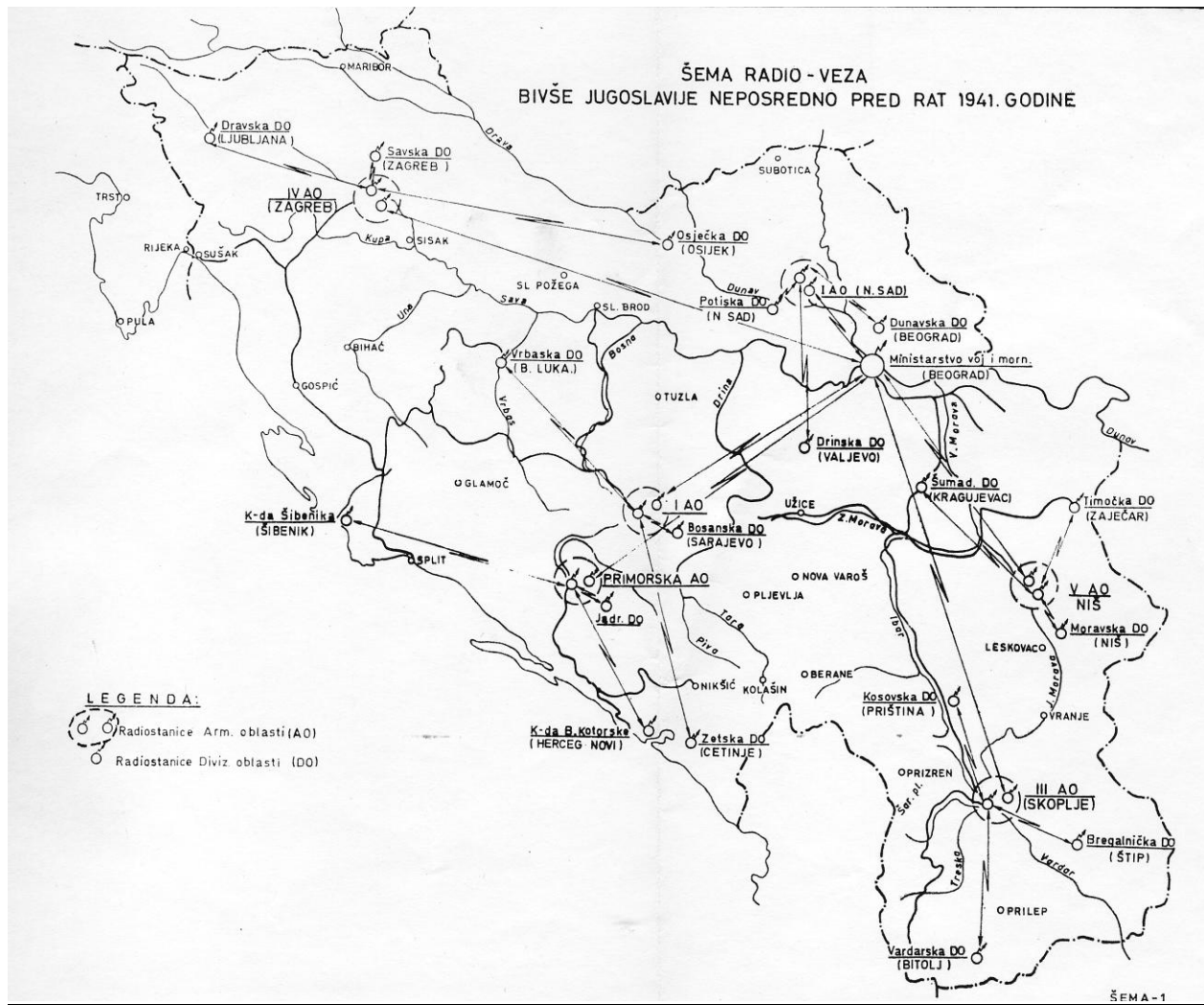
The cable bands were commanded by four watermen and a general section, with a total of 278 men. They provided communication equipment with telephone centers and apparatus, a sea-type telegraph apparatus, cable and other boundary material, and equipment for lifting single- and double-wire cable telegraphs and telephone lines.

The wireless brigade had command, three watches and protected with a total stand of 93 soldiers and elders. One special car fitted with a 200W radio station.

The telephone and telegraph station was equipped and manned to set up and operate the call centre and the Morza telegraph station, a mechanical workshop and radio and TT repair equipment.

- ♦ **Central War Library, and so forth. 97.628 - Military armament and equipment of the army.**

Although liaison is a key element in ensuring command and control in all situations, the highest and highest levels of leadership have not taken adequate measures to ensure the most effective links during the country's most critical periods - during mobilization, concentration and infantry times of war.



THE PRE-WORLD WAR II RADIO COMMUNICATION SCHEME IN THE YUGOSLAV ARMY

The signal battalion of the Supreme Command, according to the mobilization plan, was supposed to have completed the mobilization by 9 April. It managed to complete the mobilization with only 20% of its personnel and means of transportation, while it was found that the technical equipment for communication was largely faulty and incomplete, especially radio stations which did not have power sources. After suffering two bombings, it ended up in Sarajevo and was disbanded there.

From the first day of the war, PTT links were completely paralyzed and functioned only on a few short-term relationships, mostly in the hands of Ustasha and other treacherous Five Colonial elements who used them extensively to deceive, give false instructions to staffs and commands. The PTT system was the most technologically backward in Europe.

Radio liaison - In recent years, prior to the outbreak of war, there has been an approach to organizing and establishing military territorial radio links for the Ministry of Army and Navy with army area commands, army area commands with division area commands and division

area commands with their garrisons. By the start of the war, radio communications were organized and established according to a pattern.

All the radio stations were station-type, apart from the radio links shown on the schematics, the radio stations mounted in as many as 20 garrisons of the other 100 garrisons had no connection to the presumed.

Work on all radio networks was a fixed schedule from time to time. No instructions on how to proceed and operate in wartime conditions have been prepared for any station (removal of radio stations outside populated areas, special equipment and instructions for their installation, provision of power source, codes, mode of operation etc.)

The Ministry of the Army and Navy's 1 KW radio station, mounted in the Ministry of the Army and Navy building and partly on the Stars, operated exclusively on the city's electrical grid, so it was disabled due to bombing on the first day of war.

- ♦ **COMMUNICATIONS IN THE NATIONAL LIBERATION WAR (Preparation of communications and their operation during the war, pp. 18 - 25.) Mirko Četković, Belgrade, 1976.**

A brief summary of the state of relations before World War II

- ♦ **COMMUNICATIONS IN THE NATIONAL LIBERATION WAR (Preparation of communications and their operation during the war, pp. 26 - 28.) Mirko Četković, Belgrade, 1976.**

In the National Liberation War of the people of Yugoslavia at the beginning of the uprising, couriers were the main means of communication. In the Free Territory of Serbia in November 1941. The Supreme Headquarters handled the facts using intact parts of the PTT line.

- ♦ **Military Encyclopedia 10, Military Publishing Institute Belgrade, 1975, p. That's 469.**

The organization and connection in the National Liberation War was resolved without any fixed principles and principles, everyone understood that the continuity of command and control depended on the connection (Directive VH of 10.08.1941).

For the purposes of operational military links, they consisted of command and control links, organised by staffs and commands at all levels with directly subordinate units and links to assumed and neighbouring staffs and commands. They shall be established and maintained on a reciprocal, direct and indirect basis in accordance with the needs, capabilities and specific combat situations.

- ♦ **COMMUNICATIONS IN THE NATIONAL LIBERATION WAR (Uslovi and mogućnosti pojedinih vrsta veza, pp. 57.-65.) Mirko Četković, Belgrade, 1976.**

In 1941 and 1942, the main and basic, most often and only type of communication was courier communication, while communications by technical means were applied only occasionally and

on an incomparably smaller scale. He used the radio type only to communicate with a commentator in late 1942.

The lines of communication were only established on liberated territories (which constantly formed and disappeared) using the existing PTT connection system.

The couriers were most often assigned and given orders by commanders or their deputies and chiefs of staff. Due to the frequent and large-scale changes in combat situations of the constant movement of units, and thus very frequent change of headquarters (command posts) of staff, these orders often contained only basic elements, with no complete and concrete data on how to perform the task. In addition, couriers were always given additional explanations and verbal information about direction of movement, enemy etc., and all those details that would facilitate and enable them to carry out the task, as well as the procedure in case of capture.

While the establishment of direct courier links within the competence of the vertical and horizontal command and control organizational structure was a basic principle in the organisation of courier links, this principle has been abandoned whenever required by needs, situations and combat deployments. In such cases, the lower staff and commands established courier links with the nearest upper staff and the higher staff with a second- or third-level subordinate staff, or command. This method of maintaining courier relations was successful and very useful. In order to make the most rational and efficient use of courier connections for alleged and subordinate staff, the couriers of the alleged headquarters submitted reports of the subordinate staff in a timely manner and the couriers of the subordinate headquarters issued orders, directives and instructions.

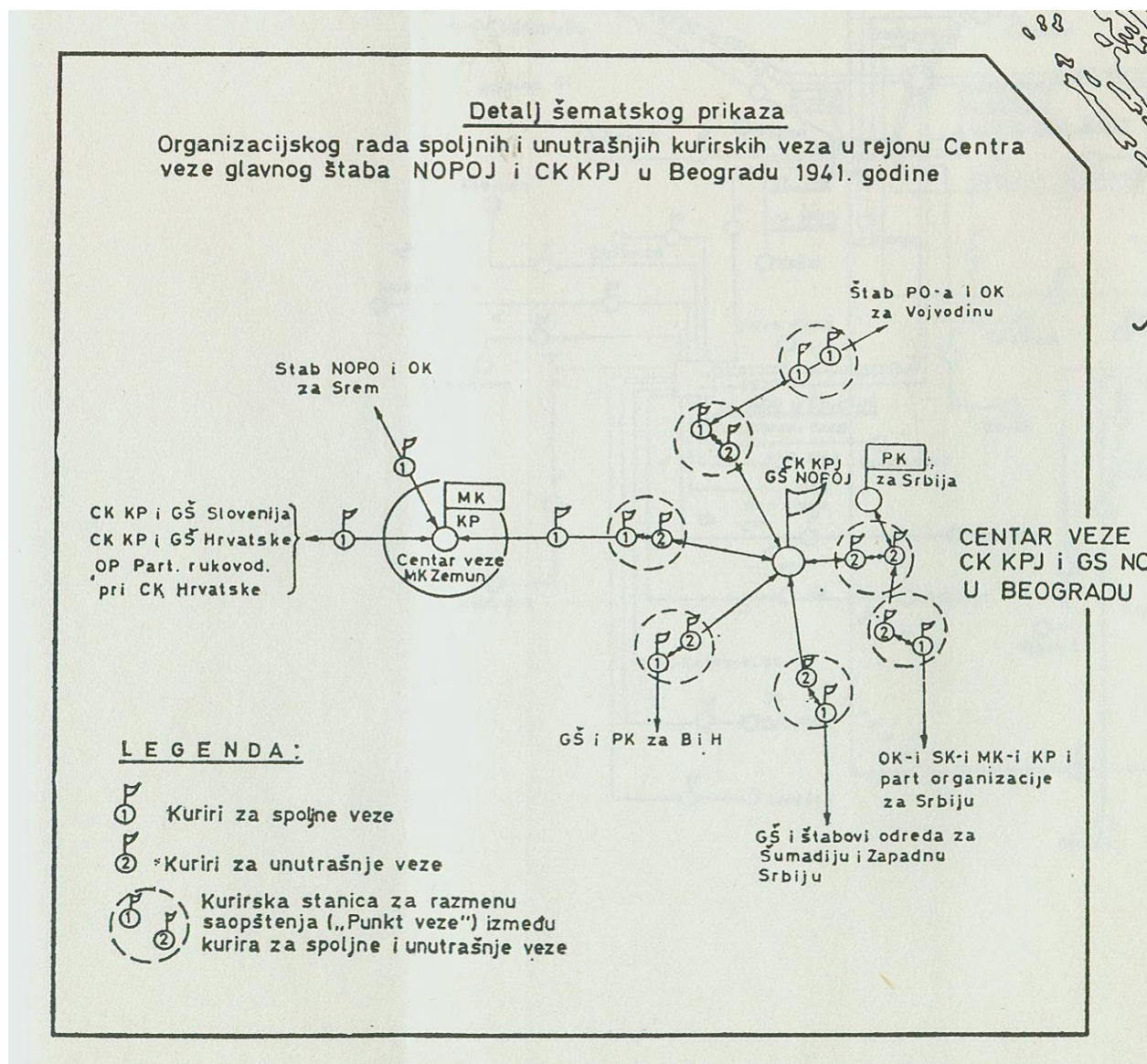
- ♦ **COMMUNICATIONS IN THE NATIONAL LIBERATION WAR (Methods of organizing, establishing, and maintaining courier communications, pp. 66.-92.) Mirko Ćetković, Belgrade, 1976.**

Relations were maintained by means of mutual couriers between the headquarters and the command but this organization of courier relations was slow, disorderly and uncertain and due to the great

Distance between the headquarters and command. Due to the need for stronger and more immediate command and control of combat operations, as well as the dangers and uncertainties of movement of couriers across the undeclared territories. Since modern technical means of communication, primarily radio equipment that would best provide command and control in such conditions, were not available, the solution had to be found in a better organization of courier communications. To that end, the organisation of relay courier services was approached.

Relay courier links consisted of a multitude of relay courier stations, which made up the relay courier line. The composition of the stations and their interconnections depended on the configuration of the land, the length of the relay line and our courier movement, the number of courier routes a given station had to maintain connection with, and other combat conditions. Depending on the conditions, the stations were set up principally at a distance of 10 km or more from each other and consisted of two couriers to one water of 15-20 couriers. The stations were called connection points, connection lines. The relay stations consisted in principle of commanders and two couriers for each direction to maintain communication. The couriers for the relay and terminal stations provided the subordinate units with their own forces and resources.

- ♦ **COMMUNICATIONS IN THE NATIONAL LIBERATION WAR (Relay courier communications, pp. 109.-204.) Mirko Ćetković, Belgrade, 1976.**



Liaison of the High Command

Internal courier services - The organisation of internal courier services was given great attention and it was carried out in a very original, simple but efficient way that allowed for relatively efficient and safe operation.

There were special couriers in every relationship, who didn't know about the other relationships. Two couriers who met at exactly the right place at exactly the right time and exchanged written or oral messages. The couriers were obliged to exchange the contracted passwords in return for communication to the specified locations (contact points or public spaces). Each courier knew who the message was from, but he didn't know to whom or where it was being delivered.

External courier links - were completely separate from internal courier links, but functionally a single system ran with them. External courier contacts were with provincial and other authorities. The couriers didn't know each other, so they were constantly legitimizing themselves with a response and passwords at the end-of-life courier stations.

Personal contacts - very often applied in 1942, thus Vsh was always at the center of events in places where he could directly manage operations.

- ♦ **COMMUNICATIONS IN THE NATIONAL LIBERATION WAR (Communications of the Supreme Headquarters, pp. 205.-220.) Mirko Četković, Belgrade, 1976.**

Relations between the High Command and the provincial authorities, explained in detail:

- ♦ **COMMUNICATIONS IN THE NATIONAL LIBERATION WAR (Communications of the Supreme Headquarters with the provincial leaderships, pp. 242.-286.) Mirko Četković, Belgrade, 1976.**

These are the authentic testimonies of fighters, leaders and people who worked to get their messages across the country.

Each volume (five books) has five thematic volumes. The first deals with the management of NOBs from Vsh to minimum units, the second part covers topical themes - different for each volume, the third discusses all types of connections, means and units of connection, and the fourth is related documents (telegrams and authentic documents).

The current themes of the volumes are as follows:

- First volume - first radio stations that broadcast in the first year of war
- The second volume highlights the stories of national heroes (legends)
- The third is the connection to the battles of Neretva and Sutjeska.
- The fourth volume - Wood
- Fifth Tom - connections from the occupied cities

- ♦ **RATNA SEĆANJA COMMUNICATIONS IN THE NATIONAL LIBERATION WAR , VIZ Belgrade, 1981. (Knjige 1 do 5, oko 6000 str)**

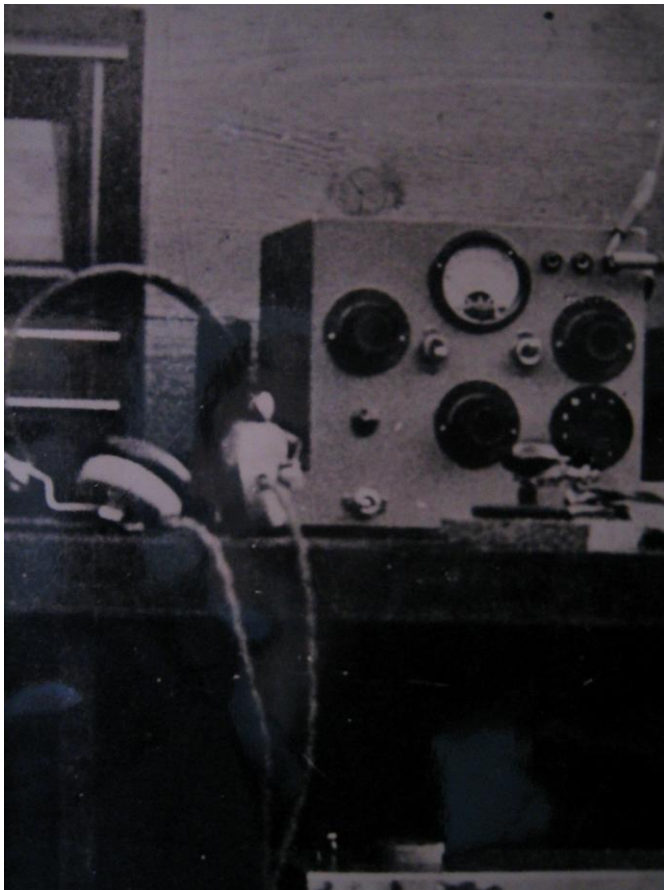
A significant event in the development of sex relations during the Liberation War was the Counseling of the Chairs held on 26 September 1941, which, among other things, established military organization and command, thus creating a basis for the organization of sex relations in the National Liberation War. (September 26 was celebrated in the period after the National Liberation War as Family Day until).

The Chairs' meeting set out the basic principles and tasks for the development of the linkage breed as a special breed of armed forces by deciding on the creation of a unified and solid military and political organization of the armed forces and on the prospect of their development into bulkier, more mobile and manoeuvrable units capable of fighting at any time and in all parts of Yugoslavia....

Immediately before the consultation in the chairs of units of the Valjevic PO they seized a German prima-sale radio station in s.Ribare, about 40W, which was immediately completed and equipped for work by the then conductor and courier of the Valje department Isidor Brdarić Iso,

who before the war was a dental technician and radio amateur. The same radio station was ordered by the Supreme Headquarters, transferred to the Chair and mounted as a broadcast under the name "First Partisan People's Liberation Radio Station". She was working on a 40-foot wavelength with the call sign "Listen, listen, listen! This is the first national liberation radio station. It was also the first radio broadcast of a liberation movement in Europe, and it aired every day at 9 p.m.

- ♦ **COMMUNICATIONS IN THE NATIONAL LIBERATION WAR (Communications of the Supreme Headquarters, pp. 242.-300.) Mirko Četković, Belgrade, 1976.**



PARTISAN SUPPLY STATION IN 1942.

In the situation and stage of development of NOP and armed conflict in Serbia and other parts of Yugoslavia, even more extensive, complex and new tasks have been put before the liaison with a view to ensuring command and control at all levels and across all lines. Thus, to ensure command and control of the Supreme Commander and other Užić authorities, a communication system was organized and established, the basic elements of which were the communications center in Užić, internal and external courier and telephone connections, and, to a much lesser extent and in a special way, radio-communications.

The communications center of the High Staff was organized in accordance with the schedule and needs of the executive bodies on the territory of the city of Užica, had basic elements of telephone and radio-centres, courier links and expeditions

(scheme 14).

Then the elements of the telephone center were lost: the telephone center and the remaining TT – equipment – units of the city post, internal telephone connections through permanent air city TT – lines, and final telephone stations at individual military, political and party command units, establishments and other combat and social-political organizations. This type of connection was fully applied in the armed conflict and the National Liberation War on the large areas that were liberated, almost exclusively using the existing PTT – system – TT – equipment in the post and final telephone stations in smaller populated places and permanent air lines, since the headquarters and commands of the units and the Paris command on the field had not been equipped with TT – equipment, tools, materials and technical personnel for raising cable and other telephone lines, during the occupation and liberation of individual places, they took the post

equipment and collected resources and materials for the telephone connections of the headquarters and commands of the partisan units on the liberated territory.

The elements of the radio stations were as follows:

The first-ever radio station, which at the time was intended to maintain radio communication with the Comintern and through it with the government of the then Soviet Union and the Red Army, broadcasts radio stations for reporting on the combat actions of armed units and development of liberation struggle and revolution on all issues, as well as several radio receivers for listening to radio broadcasts of the radio station - Free Yugoslavia - that operated around Moscow, broadcasting stations of Moscow, London and Dr.

Because of the tactical and operational characteristics and capabilities, due to work in both liberated and non-liberated territories, working at any time of day or night, on any terrain and at all distances according to the power and frequency range of a radio station (RU), radio communications were, compared with other types of communications implemented in the National Liberation War, the best at ensuring safe, continuous and efficient handling and commanding under all conditions (military-political, operational - tactical and others).



RADIO STATION OF THE 8TH CORPS IN 1944.

In addition, the provision of professional staff as a basic element of radio communication was a special and complex problem. The training of cadres of this profile is long-lasting, complex and requires special organizational, material and personnel conditions, which were objectively small during the first two years of the National Liberation War. As a result, even those few seized radio stations were not used during this period because there was no professional management staff or working telegraphist in the headquarters and commands of the unit.

The Courier Centre consisted of a courier station Vsh and CK KPJ for maintaining internal courier links with all the main management offices located in Uzice itself - their courier stations as well as courier stations for maintaining external military and party contacts, then with PO staffs and commands, lower Party bodies and organisations on the ground, with the national, provincial and regional military-political leadership and with the Party leadership of Bulgaria and Albania.

♦ **COMMUNICATIONS IN THE NATIONAL LIBERATION WAR (Communications of the Supreme Headquarters, pp. 300.-343 .) Mirko Četković, Belgrade, 1976.**

The different circumstances, conditions and possibilities of initiating and carrying out the armed uprising and the National Liberation War conditioned the emergence and growth of various military and political organizational forms of the armed forces in certain provinces of our country, which significantly influenced the creation and development of units and organs of liaison. Already during 1941 the formation of a signal unit of different composition and names was envisaged and approached, such as: courier groups, courier departments, communication lines and dr.

Partisan units on the territory of Serbia were numerous and had a wide operational area. Therefore, based on the directives and instructions, special signal units were formed, similar to the units in the brigades. In the Instruction of the Main Staff of Serbia from November 1942 on the organization and training of the partisan units, the basic principles, composition and division of the staff and command, and the organization of command and communication within the unit. Thus, in this Instruction, in addition to other things, it states: "The unit consists of the staff of the unit, the battalion (or squad), the young battalion (or squad), the strike units and special units, the staff of the unit is divided into the command part, that is, the command of the unit and the auxiliary part, which is composed of the communication apparatus, the section for communication, the military court, the superintendent, the sanitation and the agitropa... communication service in the unit includes all the means of communication that are available to the staff and the lower units. From them, they are formed for the needs of the staff of communication. The communicator of communication is also used as a reference for the organization of the communication service within the unit."

Thus, by order for the organization of the guerrilla army, from October 1941, the headquarters of the NOP division for Montenegro, Boku and Sandžak provided for the formation of platoons, battalions, brigades and units as the highest tactical units, and within the brigade to form lines of communication composed: a guide, courier tenth of force 10 infantry couriers, courier tenth of 6-20 cavalry couriers and TT radio-tenths to be formed as soon as the radio and TT equipment are provided for these other tens.

As with all units of the ANR and signal units, they are organized, created and formed at all combat headquarters and commands without material resources, professional personnel and appropriate rules and regulations. Under such conditions the only possible and useful principle of connection was - connection must be -. Formed according to needs, personnel and material capabilities and largely based on their own combat experience and warfare practice, signal units in the period 1941-1942 were of varying strengths, manpower, formation and material composition.

♦ **COMMUNICATIONS IN THE NATIONAL LIBERATION WAR (Communications of the Supreme Headquarters, pp. 343. - 374 .) Mirko Četković, Belgrade, 1976.**

In the second and third years of the Second World War, in addition to irreplaceable couriers, existing or newly constructed wires and significantly more radio stations were used on our premises. The development and growth of the NOP and the Liberation Army required qualitative improvements in relations. Due to the emerging situation, VŠ NOV and POJ and other management indicates the need to improve relations, and in spring 1943 begins work and the first course of communication at VŠ which was preceded by courses on the territory of the Main Headquarters.



RADIO STATIONS MANUFACTURED IN PARTISAN WORKSHOPS

In the year 1944, in addition to the other connections, much more was applied to the radio-connections established with the allies and obtained radio stations. This fact, as well as the absence of experience and application in work and solid ciphering, began to be used by the enemies, or their strength for radio – the information collected about the distribution of our commands and movement of units (case of the discovery and confirmation of the location of VŠ NOV and POJ, radio -goniometrisanjem, after which followed the infantry on Drvar). The signal units and their organs evolved and formed as highly rational units, from divisions, through lines, platoons and battalions to liaison brigades.

The end of World War II and the beginning of the peacetime period saw a kind of relationship with:

- 7 liaison brigade,
- 40 battalions for liaison division,
- Three line battalions
- about 120 signal company brigades,
- About 360 lines to connect the battalion,
- 28 lines connecting military areas,
- Official school and communication school,
- 48 courses for liaison officers,
- Main storage facility for communication
- Approximately 30,000 different communication devices (85% seized, while 15% obtained from allies)
- About 35,000 members of the sexes of the bond.

The existing Technical (engineering) section, headed by Vladimir Smirnov Volodya, was temporarily responsible for the problem of telephone and telegraph communications and postal traffic, and through its - PTT section -, which was represented by Referent for PTT traffic Pero Vuković. He was directly subordinate to the head of Isidor Jakšić - Lala. The head of the Department for Military Authorities in the background was Moshe Piyada, who directed the head of the technical department to organize the territorial PTT as efficiently as possible...

PTT section, or its reference for PTT traffic and assigned to the technical group and telephone desk, formed the TT sector at VŠ.

Radio - service (radio - relations) was headed by Veljko Dragičević, who at the time of promotion to officer rank was also presented as head of radio - service at VŠ NOV and POJ.

The courier sector and courier relations at VŠ NOV and POJ were managed by Marko Popović-Piper.

The information protection (encryption and decryption) was entrusted to the encryption sector headed by Branka Savić.

For operational - tactical purposes, the main connections were courier, with additional signals in combat schedule, while telephone connections were used by brigade headquarters as the most important internal and cooperation links based on the existing PTT system in the territory where they were located.

- ♦ **COMMUNICATIONS IN THE NATIONAL LIBERATION WAR 1943 - 1945 (pp. 9. - 36 ., pp. 307 - 309.) Dr. Veseljko Huljić and Milovan dželebdžić, Belgrade, 1984.**



The liaison, although it was in the war and much later called - communications service - , rather than a clan, had in its composition a number of units and means. The percentage in the composition of the liaison was between 8.7 and 9.6 percent of the army composition, which only indicates the degree of development and dependency of the units of the liaison species as a whole. The connection was significantly more developed in the KoV - than in other technical aspects of JA. In its composition it had a telephone - telegraph specialty, radio, courier and signal specialty and unit. The above-mentioned specialties were organized as in the infantry into divisions, squadrons, platoons, battalions, regiments and brigades. Departments and pipelines were filled with individual specialties, and all of the specialty connections were organized within higher units.

- ♦ **The development of the SFRJ Armed Forces (Yugoslav People's Army book I, p.**

Seven of them. 31), Prof. Dr. Gojko Miljanić,

In the period from 1959-1968, the Yugoslav People's Army bond breed evolved out of the bond service, the organizational structure remained the same, and the bond breed developed as a single breed for all aspects of the Yugoslav People's Army, on many issues and for the OS as a whole. He's connected vertically from Supreme Command to the regiment. It's made up of CoV, although it's a unique genus, with a fairly large percentage of nearly 10% of coV members.

During this period, work has been done to extend radio links to all infantry, artillery, armored personnel, engineers and ABHO units. In modern conditions of combat operations where greater mobility of units is required and in the event of nuclear strikes, radio equipment has been accepted as a basic means of communication.

Priority in the development of communication routes during this period was given to the development of radio-relay connections in higher commands, and personal radio stations were introduced for commanders, ultimately with division commander.

The type of connection in this period had long-term development plans, constantly and successfully followed the development of the organization and formation of the KoV unit, as well as conceptual changes. This required rapid adaptation of units and means of communication to each new situation and organisational change, and also very successfully followed directions and trends in the development of means of communication in foreign armies.

- ◆ **Development of the Military Forces of the SFRJ (Yugoslav People's Army Book I, pages 128 – 129.) prof.dr Gojko Miljanić, captain**

1945 - 1953 COMMAND (MANAGEMENT) CONNECTION

The liaison command of the war organisation has moved to a peacekeeping force with the following composition:

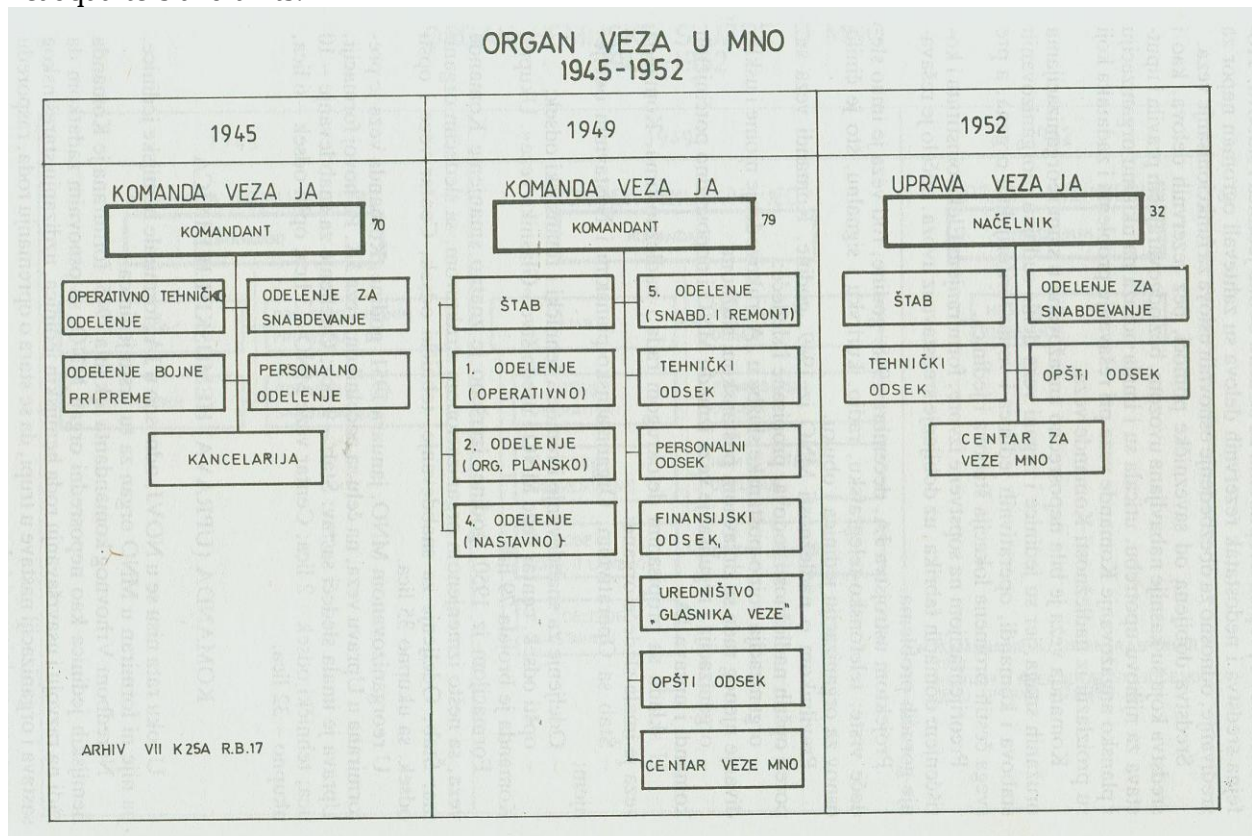
- 1. The Combat Preparedness Unit,**
- 2. The personnel department,**
- 3. Supply and office.**

In addition to the tasks related to the professional management of liaison units and the organisation of liaison for the purposes of the JA and the Supreme Commander, the Liaison Command has focused a large part of its activities on providing the material and technical resources, literature and regulations necessary for the professional training of units and staff.

In the absence of spare parts and trophies, an enormous effort was required to arrange or ensure the basic conditions for the operation of the link.

Resources obtained from the Allied assistance, without spare parts, and the resources which were later purchased through import, had an impact and left a mark on the overall organization and planning engagement of the Command in the resolution of the problems and tasks that emerged from the Command's authority.

The liaison command was directly involved in all reorganisations of the armed forces, as the units and liaison bodies shared the fate of the reorganized headquarters and commands, operational units and military-territorial authorities, and above all frequent changes in the location of headquarters and units.



By refocusing on its own sources, establishing the Electricity Institute and using domestic factories, along with obtaining import funds, the burning problems began to be solved.

By the design of the JA, in December 1948, the type of communication had the following types: telephone-telegraphic, radio, courier and signalling, which formed the basis for unit organization and training.

In addition to the general authority of the sexes, the 1949 MNO Competence Regulations stipulate that:

- **the organisation, management and coordination of the military-postal service in JA with the State Postal Service;**
- **the organisation and regulation of links between MNOs and directly subordinate commands and JA management.**

In accordance with the prescribed working environment and competencies, the liaison command had the following organs:

- **headquarters with the Operational, Organisational Planning and Training Department;**
- **Supply and repair department, technical and financial section;**
- **the general section, the communications center of the MNO and the editorial board of Communications.**

The Command had a total of 79 people.

With the formation in 1950, a significant reduction of the Command's liaison with a somewhat altered organizational structure was carried out, with the following bodies:

- the headquarters,
- Supply department, technical section,
- communications centre and general section
- There's a total of 35 faces.

In a reorganized MNO, in January 1951, the Liaison Command was transformed into the Liaison Registry, headed by the liaison chief JA.

The Board of Directors shall be composed as follows:

- Staff - 9 persons;
- Supply department - 10 persons;
- the technical section - 2 persons;
- the communications center MNO - 3 persons
- General section - 6 faces, U
- 32 faces for the purchase.

In the field of military intelligence, it is important to note that this report was published by the Ministry of Foreign Affairs of the USSR. 90-92

In 1953, and then in 1969. Management of liaison with the Yugoslav People's Army

In 1953, the following organizational changes were made to the link family:

Its auxiliary line and radar were combined into a single auxiliary line of communication; the technical communications service and the liaison line became a common line, or service for all three branches of the armed forces.

In 1961, the Yugoslav People's Army's radar and computer control unit was removed from the responsibility of the Administration for Signals, and transferred to the responsibility of the Assistant Secretary of State for National Defence Affairs for the Air Force and PVO.

In 1964, the technical and financial services authorities were removed from the liaison board and incorporated into the relevant back-sector administrations.

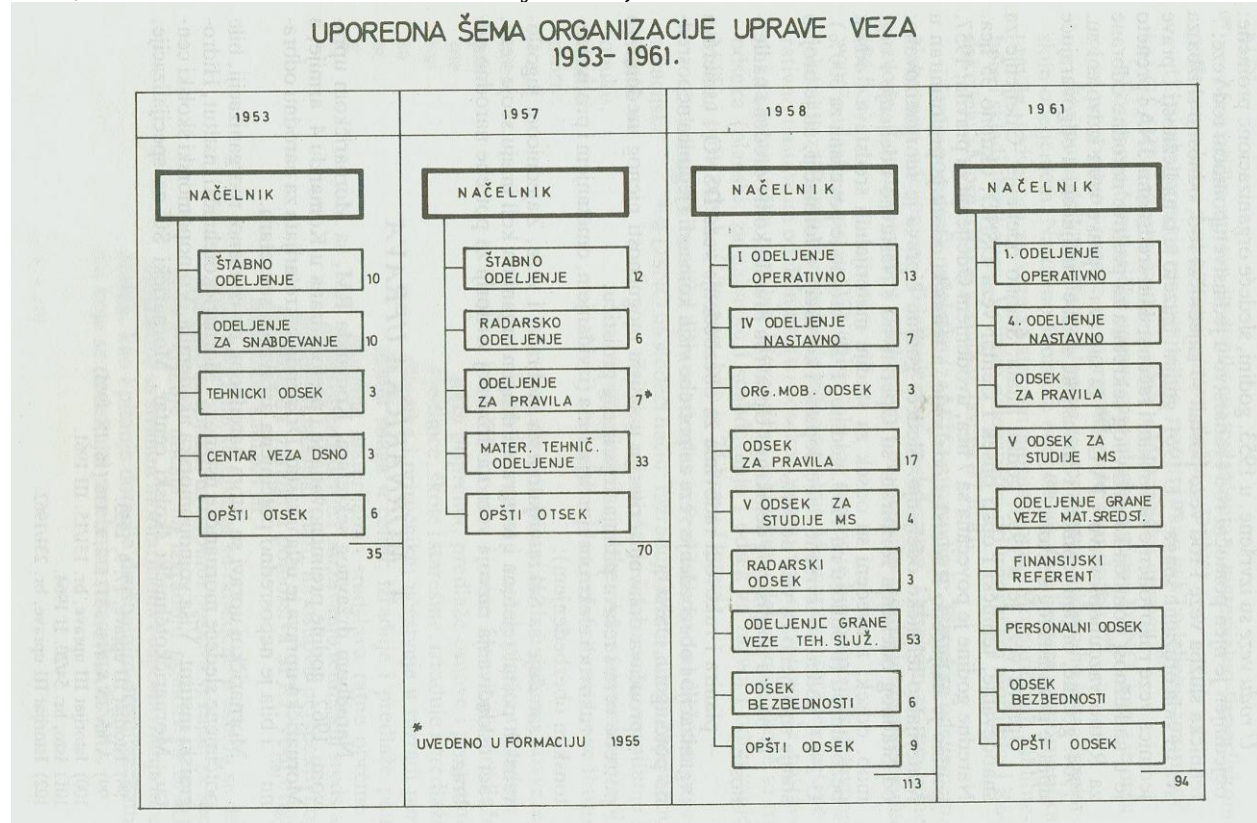
In 1953, the liaison office had:

- the headquarters department,
- Supply department,
- technical and general sections; and
- The DSNO communication centre,
- 35 total faces.

The following year it was increased to 7 persons, with the introduction of a Rules Department; In 1957, the Radar Department was incorporated and the technical department was transformed into the Materials-Technical Department.

The following year the Management Board was reorganized: from the headquarters department, the Operational and Teaching Department and the org.mob. section were

formed, and a material resources study and safety section were introduced (compared to 1953, in 1958 the number increased by 300%).



In 1961, further additions and corrections were made to the formation, but the number of members was reduced by more than 50%.'

The Rules of Procedure provide for the following powers:

- plans and manages the work to secure DSNO's links and directs organisation and provision of liaison for the needs of higher commands and non-command units but subordinate to the DSNO;
- examine the territory of a State in terms of its possibility to regulate the use of communications and address issues arising therefrom;
- controls electronic effects (interference, interference and anti-fouling) tonksim obezbeđenjem
- cooperate with the Secretariat for Transport and Communications, the Yugoslav Postal, Telephone and Telegraph Association and other relevant bodies to coordinate the development of communications on national territory for the purposes of national defence.

In the field of military intelligence, it is important to note that this report was published by the Ministry of Foreign Affairs of the USSR. Other articles



Relationship in the early post-war years.

Other, not further worked than hot-rolled

The end of the war and the beginning of peaceful construction, a kind of connection awaited with: 7 liaison brigades, 40 liaison division battalions, 3 line battalions, about 120 signal company brigades, about 360 liaison battalion lines, 28 area liaison lines, officer school and liaison school, 48 liaison sub-officers courses and main liaison warehouse.

At the forefront of the connection line was the JA Connection Command. The liaison in armies and divisions was headed by the liaison commands of the army, or division, and in the brigades by liaison chiefs and Jedi commanders.

The organisational composition of the link family consisted of the following structure and organisation of the units and assemblies of the link:

- **the Ministry of National Defence liaison brigade composed of: brigade command, radio-division with radio receiver and radio transmitter squadrons, 2 line battalions of three squadrons, technical and auxiliary squadrons;**
- **the Army Liaison Brigade is composed of: brigade command, 2 liaison battalions of which 1st Battalion has a radio and telegraph squadron, and 2nd Battalion two cable and one construction-line squadron, courier squadron, auto-water and intendant's water;**

- the signal battalion of a division composed of: battalion command, radio, telephone and courier battalion command, two-water telephone line battalion, stationary and transportation battalion;

- Signal company brigade composition: platoon command, radio water, telephone line and courier department.

- liaison unit battalion composition: commander of radio, telephone and courier departments.

During 1946 the line battalions were reformed into 6 independent line brigades, of which 4 were deployed in Belgrade and one each in Leskovac and Zadar.

During 1947, the post-official communication courses in the MNO liaison brigades, army and division liaison battalions were disbanded, and training battalions of the Army liaison composition: command, radio-command, telephone-telegraph company and auxiliary battalion were formed. In the MNO liaison brigade instead of two linear, a TT-battalion was formed: Liaison Centre expedition, electro-machine station, telephone and telegraph company. At the same time, a technical squadron was disbanded and a rear and courier squadron were formed as independent units.

The development of the post-war linkage genre was all in line with the development and modernization of the Yugoslav People's Army, the state and growth of the country's connectivity (PTT and other systems), as well as the development of domestic industries primarily electronic.

Major organizational and formative changes in the genealogy were made in 1948. The first military mobilization development came into force. The units have moved to a peacekeeping formation. The type of liaison has 10 liaison regiments, 1 corps and 24 liaison battalions division, about 90 signal company regiment brigade, 10 construction-line battalions, officer school and liaison school, 5 training battalions liaison AO, 5 warehouses and liaison workshop. \

This reorganization of the liaison regiments in formation gives them radio brigades, TT battalions and mixed units, a battalion or battalion, and instead of the courier units which are abolished, units for auxiliary liaison centres are formed. All units shall be established as depots of non-renewable reserves - NR - in which the material and technical resources for combat units are stored. In the Corps liaison battalion, the base is made up of radio, TT and line brigades for semiconductor lines and in the battalion liaison division the command brigade (radio and TT-water) and telephone line brigade. Radio communications in JA were organized from Supreme Command, to armies, divisions and brigades mostly on one channel and with the operation of radio stations into multiple radio networks - work over time.

Telephone and telegraph connections almost didn't even exist. The Supreme Command had direct links to Belgrade - Novi Sad, Belgrade - Nis and Belgrade - Sarajevo. All available line units are engaged in repairs to broken lines jointly with the PTT authorities. At the beginning of 1946, an inter-garrison telephone station was installed, which included a single channel, UNF TFb-1 for Zagreb, Sarajevo, Nis, Split and Novi Sad. Zagreb could also be reached by a tourist route, via the New Now and Osijek. In addition to the establishment of inter-garrison TT lines, urgent work is also being done on repairing garrison fixed and cable lines.

The courier link is used from Supreme Command to the lowest units. As early as 1947, the three-lane UNF BSO-3 was installed on Belgrade - Zagreb, Belgrade - Sarajevo and Belgrade - Niš routes. A ten-digit telegraph station was put into operation at the General Staff to be replaced by a 90-digit station that same year.

The type of relationship during the height of external pressure (1949-1953)

With the publication of the Resolution of the Communist Party Information Bureau (1948) pressures on our country are increasing. The blockade of our country, except the border with Greece,

Italy and Austria, almost complete. All relationships are frozen, by then very developed. All cooperation has been severed, and the so-called economic blockade is drastic. The consequences of such international behaviour have also been strongly felt by a kind of connection, primarily in the material and technical supply of means and equipment for communication. They've overwhelmed all sources of foreign supply. For existing communications equipment, spare parts were increasingly lacking. Too much reliance on importing equipment, we lived and felt in the field of our army's equipment and certain aspects of its work. From the standpoint of relationship preparation, the current situation is even more difficult. Our own

The gravity and mastery of building and securing the territorial means of communication went to the borders of some Western countries. The emerging situation required that such orientation should continue, but also to accelerate preparations for connectivity across borders.



THE WORK OF A SERVANT AT THE SCV IN 1949

Changes in organization, formation and gender training. The breed shall adapt its organisation and formation to the changes which are significant during this period. First of all, all signal units serving commands from regiments and brigades to the army in their composition have radio, TT and linear compositions which, compared

with an earlier period, have increased and strengthened in manpower and resources while courier and other auxiliary units maintain an earlier level. In military areas (AO), post-secondary schools are abolished and training battalions are formed with the addition of reserve officers. At the end of the period, the training battalions of the military areas are transformed into the corps' liaison battalions.

Signal units take part in maneuvers, raise lines to and within the border belt, are engaged in providing communication in commands and units. They worked mostly practically on the land and gained new experience.

The mandatory classification of radio and telegraph operators (RTG) and TGRs for elders and soldiers was ordered to improve their training and fitness.

Only about 50% of the old age and 12% of the soldiers were not successful. The worst results were in the old age who were stationed on various posts, such as warehouses, and other places.

Continue to offer great attention. Detailed guidelines for organisational, methodological and material provision of instruction have been developed. All these elements are inscribed in the work schedule for each lesson, as well as in a reminder of interest. They organize and carry out demonstration-methodological activities on a massive scale.

Practical training is given priority.



TRAINING AS A RADIO TELEGRAPHIST IN 1946.

The development of gender relations in the period 1954-1964.
Reorganization of the sexes

During this period, the type of connection enters with new achievements reflected in improving and raising personnel's military capabilities, increasing the power of radio equipment from the Corps to Supreme Command RU 400 W, introduction of radio-teleprinter and radio-relay devices into the line of communication equipment, multi-channel telephone and telegraph communications between Supreme Command, Army and Corps and between elements of KM command and background KM, introduction of motorized trans-transport from Division to Supreme Command, formulation of units for radio-relay and radio-tele-interconnection.

During this period radio communications were extended to the infantry, engineer, artillery, mountain and ABHO units. Multi-channel telephone and telegraph communications are being conducted from the Corps command garrison, military areas to the command garrison, division, brigade and regiment. Over 3,000 km of new, permanent airlines have been built and about 600 km repaired. The deployment of operational and territorial commands and their division into command elements of the KM, RKM, PKM, thereby adapting them to contemporary combat conditions, has made it necessary to reorganize the line of communication in accordance with the requirements imposed by modern warfare. During this period, when nuclear tactical means emerged and new war doctrines were created, it was approached to acquire new means of communication and adapting the former to new conditions. At that time, a demand was also made for the reorganization of the gender relationship because it is also a direct consequence of organizing leadership and command under new conditions.



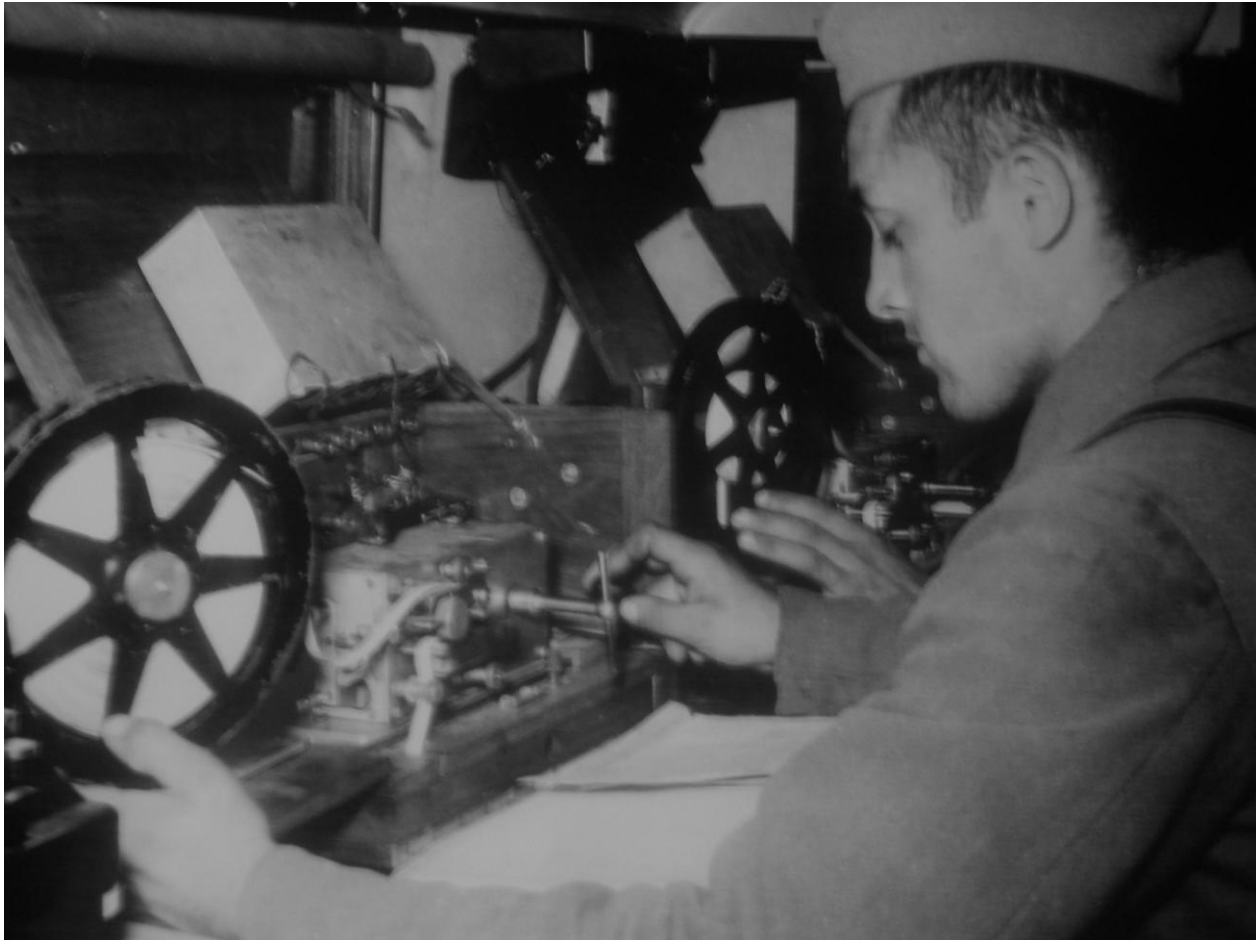
RADIO OPERATORS ON ASSIGNMENT IN 1954.

In the context of increased mobility of units and possible use of nuclear means, radio equipment has been adopted as a basic means of communication, since it provides for the fastest transmission of information through its tactical and technical characteristics, enables long-distance command and simultaneous exchange of information with more participants. But in order for that to be possible under our circumstances, some

important questions had to be addressed. First, there was the need to unify radio equipment. To that end, the improvement of communication devices is approached. In the first place, it was aimed at reducing weight and volume, simplifying maintenance and improving working conditions for the means of communication (increasing the number of channels, shortening the time to establish a connection, improving exploitation, ensuring inter-species productivity and services).

In order to improve the overall relationship system and to regulate obligations and responsibilities for its unified operation in peaceful and war-like conditions during this period, several fundamental issues have been addressed that have defined the further development and

organisation of the relationship. So a unique kind of connection was introduced from Supreme Command to the brigade. (Until then, signal units had the specialty of the - vista species to which they belonged). Specific links shall be defined for the purposes of connecting operational and territorial commands, signal personnel shall be introduced into regiments- brigades, priority shall be given to the development of radio-radio communications at higher command levels, personal radio stations shall be introduced closely to the division commander.



THE SEA TRANSMITTER IN SERVICE IN 1955.

The new organization and transformation of the gender bond is the result of adopted conceptual solutions based on much greater needs but also our larger capabilities. Liaison management has been improved at all command levels.

Unit formations are aligned with material capabilities. The issue of territorial liaison units is being addressed more fully. Reserved signal units are being formed for all command levels, from Supreme Command to brigade. More intensive study of electronic effects and their impact on the communication system, as well as the possibilities for an anti-electron protection signal unit, is beginning.

During this period, units for territorial connections are organized and formed. With this definition in the system of connections of armed forces, the concept that will later in its further development

and growth gain full meaning in the general international defense concept is accepted. Thus, for the purpose of the Supreme Command, the Military Zones and the War Area, territorial signal units are formed, which in their composition include: radio, radio-relay, telephon-telegraph and line units. The basic task of the territorial signal units was to provide connections for the needs of the territorial commands of the armed military zones (A), or the commands of the war areas and corps (K). In addition, they serve as a support for the commands and units of operational warfare for the provision of their garrison and inter-garrison connections. The next period should further define and complete the complete concept of territorial connections and connections of operational commands and units, and in the integrated system by function, provide the full unity of the system of connections of armed forces in the whole.

1959 to '68. The Yugoslav People's Army bond breed evolved from the bond service, as a unique breed for all types of Yugoslav People's Army and in many respects also for the armed forces. He's connected vertically from Supreme Command to the regiment. It's the Ground Forces, although it's a uniquely general-army breed, with a fairly large percentage of nearly 10% of the KV.

During this period radio communications were extended to all infantry, artillery, armored personnel, engineers and ABHO units. In the context of increasing mobility of units and possible use of nuclear means, radio means have been adopted as a basic means of communication, since they are the fastest medium for long-range information transmission. At the same time, a permanent telephone line was established between army commands and military areas, then between all garrisons in which regiments and brigades are located.

In the process of upgrading signal units, many new means were to be acquired, existing radios were to be improved so that they are light in weight and easily mobile; then, the number of connection channels was to be increased, the time taken to establish a connection shortened, the exploitation of the means of communication improved and the safe establishment of links and connectivity between sexes and types of devices was to be ensured.

the harvesting power. For this purpose, special multi-purpose station wagons have been introduced into the equipment of units, especially larger ones. Special links have been established for operational and territorial commands and signal personnel have been introduced into regiments and brigades. Priority has been given to the development of radio-relay links in higher commands, and personal radio stations have also been introduced for commanders, ultimately with division commander.

During this period, intensive work was undertaken to reduce the weight and dimensions of the radios, and to find the energy needed to power them. The introduction of transistors has greatly reduced the number of errors, ensured faster and more economical production, easier repair and maintenance of radio equipment. Since 1967, integrated means have been introduced, allowing for further reduction in size, weight and power required to operate the radio equipment. By more efficiently solving the problem of unification of means, it has been possible to produce radio equipment with a large number of frequencies, equipped for all kinds and services and all commands.



Telephone and telegraph communications equipment have retained two-way Polish cables, as communication carriers only for the lower tactical units, while higher frequency telephone and telegraph devices have been introduced for all other purposes, so that wired TT lines are increasingly pressing radio relay devices for this purpose.

During 1967, several important RTU-100s on a field vehicle were also produced, followed by the Polish M.63 telephone and VZ-12-K frequency-carrying device as well as other modern communications equipment. At the same time, the power of the radio equipment for unit needs up to army command level was increased by 2-3 times, between armies and divisions by four times, divisions and regiments by 2.5 times, regiments and battalions by 1.3 times, etc.

The stationary radio-rail links are used primarily at a strategic and operational level but are being gradually introduced throughout the combined ESHL.

The type of link regularly had long-term development plans, consistently and successfully monitored the development of the organisation and formation of the KoV unit, as well as conceptual changes. This required rapid adaptation of the units and means of communication to each new situation and organizational change. At the same time, directions of development of communication means in foreign armies have been successfully followed.

In 1945-1985 the Yugoslav People's Army Land Forces were disbanded. Miljanić Gojko, Military Publishing and Newspaper Centre, Belgrade, 1988, p. 128-129.

1 - STATE OF THE LINK IN THE PRE-WAR PERIOD

RELATIONS IN THE FORMER YUGOSLAV ARMY

Political and military commanders of the former Yugoslav Army have not extracted the necessary lessons from the first World War. Insufficient attention has been given to the development of the offensive doctrine, the supervision of the refinement of combat techniques, the preparation of the armed forces and equipment, the refinement of the command system and the issuing of orders, and the adequate training of the military and old-fashioned composition.

The connection, as a kind of army, did not exist in the former Yugoslav army. She was on the organ engineering staff. There was no expert body to handle the development and refinement of the relationship. There's been neglected work on the code despite the fact that she was applied in the first World War.

The military industry was very poorly developed; communications equipment was purchased in the advanced capitalist countries of Europe. It was not until 1939 that production of the first radio stations, telegraph machines and small telephone stations began.

capacity at the Military-Technical Facility and enterprises - Signal - and - Godevac - in Belgrade.

The estimates were that the main means of communication would be couriers and the existing PTT network. However, in our case the PTT, by its scale and particularly qualitative nature, was the least developed tunnel in Europe. There were a lot of poor airlines, mostly between major cities.

The capitulation of the old Yugoslavia and the collapse of the former Yugoslav Army resulted in all technical communications equipment being captured by the occupier and domestic traitors. A large number of personnel connected to this – officers and non-commissioned officers – were captured. Therefore, in the evening before the National Liberation War, in terms of the possibility of using the capacity and resources of the former Yugoslav Army, the material-technical base did not exist.

II- DEVELOPMENT OF LINKS IN THE NATIONAL LIBERATION WAR

The testimony of the participants and war correspondents show that the main factors which significantly influenced the development of relations during the National Liberation War were: the state of illegal party ties;

The development of the NOV and POJ; the need to lead war and revolution; the system and method of guiding and commanding armed formations in the National Liberation War, and the material and technical capabilities under the conditions of the National Liberation War.

Depending on these factors, it is possible to look at the development of connections in the National Liberation War in three main phases that are an expression of conditions at a given time.

First phase - beginning of the armed uprising until the formation of the brigade, or until the end of 1941. This includes the period of numerous units of different types, composition, purpose and size (attacking and diversions groups, guerrilla units, partisan units, battalions and groups) in which the basic form of organization of the partisan groups was. From the aspect of command and communication, especially in this phase, the historical consultation at Stolica on 26 September 1941 is of particular importance, where decisions were taken that had exceptional significance for the subsequent development of the National Liberation War. In

addition, the consultation led to the establishment of solid foundations for command and communication in the National Liberation War.

The basis of the connection during this period is already existing illegal links-the KPI. They're getting...

They are in charge of the new situation and unit forwarding during the initial period.

The National Liberation War. The network of party leaders, military headquarters and commandos has been covered

The whole territory of our country, so the system of party relations was used. Soon enough, relations were expanding, primarily on a territorial basis. Prisoners in 1941.

They included military-territorial commands, the organs of a new people's government, training and intelligence service of the headquarters, command and unit and inform-

Secret agencies in cities and the immigration office.

In addition, relations with the Comintern and the leadership of some neighboring communist parties were organized and established.

At a time of fragmented lands and terrible terror, and the impossibility of expanding the necessary technical means and difficult courier movements, crucial were:

coordination of ideas, personal contacts, instructors, and delegates sent by the Supreme Headquarters to the pro-

Only the ends of our country, connections through illegal points in major cities and illegal party press.

During this period, courier, signal, wired and radio communications were used.

Courier relations were the most massive and basic in this period. In the Organization

the courier connections were not significantly altered compared to the one that existed before the start of the National Liberation War, but they were significantly expanded and implemented alongside illegal, and re-

on the liberated territory, then in the partisan units
other units.

Signal links were applied in lower units to simple signal-

Other, of a kind used in the manufacture of electrical equipment

For the purposes of headings 8306-9406, the following applies:

The funds provided by the units.

The lines are maintained primarily on liberated territories using PTT and railway network. However, there are also cases where these networks are used on occupied territories, including communication lines for the purpose of carrying out short conversations and transmitting messages and notifications.

The radio link has been used to a very limited extent due to the lack of technical means. The Supreme Headquarters maintained radio contact with the Comintern and the Croatian Headquarters, and at the end of 1941 with other units.

Available data indicate that the Supreme Headquarters of Western Serbia and

The Cable Republic had, for those occasions, developed and regular relations on the liberated territory and fairly safe and regular, although relatively slow connections, with the provincial the party's main and regional leadership and military headquarters.

Second phase- period of formation of brigades, divisions and corps, respectively

From the end of 1941 until Italy's surrender on September 9, 1943.

The basic characteristic of this phase is the formation of operational and operational-Ritual units and commands, which were crucial to the continuation of our armed struggle and revolution. This is also the most difficult and decisive period of our liberation war, and the most difficult conditions to secure command, command and communications.

Due to the loss of free territory in western Serbia at the end of 1941 and the beginning of 1942 and the great terror of the occupiers and Quisling, the difficulties of maintaining links between the Central Committee of the CCP and the Supreme Headquarters with the Party committees and main parties have increased significantly.

staffs of Serbia, Macedonia, Croatia, Vojvodina, Slovenia and regional units

The European Union has also made progress towards the establishment of a new framework for cooperation between Kosovo and Metohija.

The Provincial Committee of Serbia.

Therefore, at a meeting of the Supreme Headquarters on 25 December 1941 in Rogatica, it was decided to set up the Zagreb-based Organization Secretariat for the Unoccupied Areas. It was essentially an auxiliary command post with the powers and functions of the High Command.

During this period, the High Headquarters provided links with the newly formed units, the headquarters of BiH and Montenegro directly, and with the others through the Organized Secretariat for Unleashed Areas.



At this stage: all types of communications, and in particular those maintained by technical means whose main source of supply is captured from the enemy; units for communication of the High Staff, headquarters and in operational-tactical and territorial units and commands are being formed and developed; training of communication personnel begins - first in Croatia and Slovenia and on 10 May 1943 work began and the first radio-telegraphic course at the High Staff.

Radio communications are used on a much larger scale than in the previous period. In the first months of 1943, the Supreme Headquarters, in addition to liaising with the Comintern, also maintained radio communications with the main headquarters of Croatia and

Slovenia.

A radio and encryption section have been set up at the headquarters. some commands and units subordinate to the Supreme Command.

The wiring connections shall be organised and used depending on the situation and condition of these means.

on the territory and within commands and units. In addition to the external ones, there are also internal ones.

The widespread use of wires we have during the existence of Bihać re-audience in the liberated territory.

Next to the High Command, next to the telephone section, there is a mobile line group, supplied with linear material and tools. In brigades, divisions and Corps units were formed to connect the pipes and in some, platoons.

The third phase - the period from the surrender of Italy to the final liberation of our country, that is, from 10 September 1943-15 May 1945.

This phase is characterized by the rapid growth of the NOV and POJ, the development of the present-day and the transition to new and more forms of military organization, the development of genders and sexes, the transformation of the corps and the formation of armies as the highest armed formations in the National Liberation War.

In the second half of 1943 and in 1944, the material-technical base of the relationship grew significantly. For example, at the end of 1944, the 8th NOVJ Corps had 152 radio stations, 67 telephone stations, 564 telephones, and 1,691 miles (1,691 km) of cable.

In addition to seizures from the enemy, some of the resources, especially radio, were obtained from the Allies. In parallel with the introduction of new technical means, intensive work has been carried out on their study and training of liaison personnel.

The units and signal personnel developed and formed as highly rational units, from the division through the lines, platoon and battalion to liaison brigade. In 1945, we arrived with advanced and technically equipped communications units, which were the Supreme Headquarters of NOV and POJ, respectively General Staff JA and other operational and military-territorial commands, enabled successful management of all operations, including final operations to finally liberate our garrison.

At the end of the National Liberation War, the NOV and POJ, or Yugoslav armies, used to a certain extent all then known and allied armies used types of communications at the end of World War II. The extent of the connection was in line with our then-possible: resources (mostly seized during the war and a small part obtained from the Allies) were limited in quantity and very diverse tactical features and usability. Of course, planning, organizing, and maintaining a relationship was very complicated.

(III) POST-WAR DEVELOPMENT OF THE AXLE CONNECTION SYSTEM

At the end of the National Liberation War, a kind of connection was made up: Seven army and MNO liaison brigades, 40 division liaison battalions, 3 line battalions, about 120 signal company brigades, about 360 battalion liaison lines, 28 military area liaison lines, an officer school, 48 post-official liaison courses and a main liaison warehouse. In these constituent units there were about 30,000 different devices (of which about 85% captured by the enemy) and about 35,000 people.

These were the forces that needed to be provided at the same time: leadership and command links for the JA and peaceful development and link building.

The links developed in the post-war period in line with the development, organisational improvement and modernisation of the OS and, above all, the leadership and command of the Yugoslav People's Army, the state and development of core connections (PTT and other systems) and the development of domestic industry, especially electronics. In this regard, we will consider the development of relations in the years immediately following the war, and then every ten years.

- **The development of the sexes in connection between 1945 and 1948.**

The scheme of direct links for the command, management and presentation of the Supreme Headquarters is very fragmented and links are maintained with: four main headquarters, Operational Headquarters for Kosovo and Metohija, five armies, Naval Headquarters, Maritime Commands for Northern, Middle and Southern Adriatic and their constitutions and units, KNOJ Headquarters, Military Base NOVJ Headquarters in Italy, military schools, Allied and all diplomatic missions of Yugoslavia. Such a development required numerous communication unit organs at all levels of command and control in the JA.

At the forefront of the connection line was the JA Connection Command. Liaison in the armies and divisions of commanders

The brigades are the liaison commands of the army, or division, and the brigades are the liaison chiefs and unit commanders.

Radio communications in JA were organized from Supreme Command to armies, divisions and brigades, mostly on one channel, and with the operation of radio stations into multiple radio networks - running over time.

Telephone and telegraph communications were virtually nonexistent. The Supreme Command had direct links on the Belgrade-Novı Sad, Belgrade-Niš, and Belgrade-Sarajevo routes. All available line units were engaged in repairing destroyed lines together with PTT personnel. In addition to establishing inter-garrison telegraph and telephone lines, urgent work was carried out to repair permanent and cable lines within the garrisons.

A ten-digit telegraph station was put into operation at the General Staff, and in the same year it was replaced by a 90-digit central. The development of the peacekeeping army, the command of the Yugoslav People's Army establishment conditioned the need for more direct links and more channels of communication between individual command levels.

During 1948, three single-channel and three triple-channel frequency-carrying devices were assembled and put into operation at the General Staff Communications Centre (CV), MNO and CV Army.

The telephone links between army commands (corpses) and their subordinate commands (units) are mainly maintained by physical TT lines, which the JA has taken over from PTT transport companies. In directions where it was not possible to secure the lease of TT plumbing from PTT, the connector unit commands are at PTT's power plants.

During 1948, the construction of the Belgrade hub (object) began - construction of tourist-conducting lines and internal installations for war communication centers. The purpose of the construction of the linking hub was to ensure greater strength and resilience of the connection in case of a serious disruption of the connection at the Belgrade garrison.

The development of the sexes in connection between 1945 and 1948 has several important characteristics. First of all, the transition from war to a peacekeeping organization and link formation was consistent with the reorganization of the JA; also, accordingly, there were the peacekeeping construction and training of the senior and military corps, the drawing up of the first plans and training programs for the signal unit and for education and their seniority.

Restoration of broken links, primarily permanent airlines, then the only transmission routes, training of trapped telephone stations and other technical means and the release into operation of minimum capacities, a slight build-up of new connectivity capacity, with very

A variety of technical means (seized, seized, war reparations and aid from East and West) - was a very complex and difficult task.

Increased efforts by all the specialties of the liaison type have enabled links to be established and maintained for the needs of JA commands and institutions and relevant bodies and organisations in society, under difficult working conditions (frequent reorganisations, pre-location of commands, units and JA institutions). This was caused by the Army's transition from war to peacetime conditions and its strategic-operational deployment in those conditions. In parallel, the material and technical business was organised and the means of communication and equipment were unified. All of this was done in the context of increased demand for all commands of degrees for links, horizontal and vertical.

The period from 1945-1948 was the most difficult in peacekeeping construction, without adequate professional and trained personnel, with scant and time-consuming trooper techniques and equipment, with a major reliance on imports of foreign technical means of communication, mainly from the USSR. By unilateral termination of interstate treaties, Eastern European countries have blocked us economically. Our initial results in the manufacture of communications equipment have paved the way for us to go.

- **Development of the sexes in the period 1949-1958.**

The consequences of the Inframiro Resolution have also been strongly felt by some kind of connection, primarily in the material and technical supply of means and equipment for communication. The emerging situation demanded that this orientation be continued and extended, but also to accelerate preparations for connections to all borders.

The type of relationship adapts the organisation to changes that have occurred during that period. First of all, all signal units serving commands from regiments and brigades to the army have in their composition: radio, TT and linear formations which, compared with an earlier period, have

increased and strengthened in manpower, resources while courier and other auxiliary units maintain an earlier level.

During 1953 for the first time JA radio-rail equipment was connected.

The General Staff of the Yugoslav People's Army adopted, in 1955, a proposal for a Liaison Administration to improve liaison on the General Staff - Military Area - Army - Corps relationship by introducing: radio stations of greater force 400 W, radio-radio and radio-teleprinter links, multichannel telephone and telegraph communications between army and corps, and command post (KM), Supreme Command - background KM army; then, between relevant liaisons at military area level - military area, whose reorganization and formation was ongoing; in the same sense, it is important that motorised transportation for signal units, armies and corps centres be provided with greater maneuverability and quicker transfer of liaison units to Supreme Command in field conditions.

On the basis of the proposals adopted on increasing the number of channels and introducing new modern technical means of communication for the Yugoslav People's Army signal unit, an amendment to and supplementation to the formation of a signal unit, at the level of the VK, army and corps, comprising radio-relay and radio-teleprinter communications units, was adopted.

In this period, almost at the height of command, commands are placed on three commanding elements:

- ◆ **the command position (KM),**
- ◆ **the reserve command post (RKM); and**
- ◆ **the rear command position (RCP) of the second part of the command.**

In the deployment of these command elements, it is normally stipulated that a single atomic strike cannot destroy multiple elements of a given command simultaneously.

The arrangement of the territory in relation was not uniquely, and by legal norms, resolved. This question was more of a goodwill issue for the Yugoslav People's Army and relevant PTT entities, so there were a number of weaknesses during its implementation.

During this period (1949-1958) the type of connection achieved new achievements, which are reflected in improving and raising personnel's military capabilities, increasing RU strength from Corps to Supreme Command RU 400 W, introduction of radio-teleprinter and radio-relay devices into line communication equipment, and multichannel telephone and telegraph communications between VK, army and corps, and between elements commanding KM and PKM, introduction of motor transportation from Division to Supreme Command, formation of units for radio-relay and radio-teleprinter.

Radio communications have been extended to the infantry, engineer, mountain and ABHO units. Multi-channel telephone and telegraph communications are being established from garrison commands of Corps - military areas to garrison commands of divisions, brigades and regiments.



TRAINING IN THE PLACEMENT OF A SLING IN 1946.

More than 6,500 km of new, permanent airlines and pipelines have been built, of which about 3,000 km in the border zone.

The deployment of operational and territorial commands and their division into command elements (KM, RKM, PKM), thereby adapting them to contemporary combat conditions, has been conditioned by the reorganization of the linkage genre, as well as the demands imposed on modern warfare.

In the context of increased mobility of units and possible use of nuclear means, radio means have been adopted as a basic means of communication, given that their tactical and technical characteristics provide for the fastest transmission of information, long-range command capability and simultaneous exchange of information with a larger number of participants.

There has been a need to unify radio equipment. In order to achieve this, the approach to improvement of connecting devices has led to a reduction in weight and volume, simplification of maintenance and improvement of working conditions for connecting devices (increasing the number of channels, shortening the time to establish a connection, improving exploitation, ensuring inter-breed and service productivity, etc.).

• Development of the sexes in the period 1959-1969

The basic characteristic of the relationship genre in 1962/63 was given by the design and implementation of Plans 1 and 2 -. The plan sets the goal of removing all perceived shortcomings of an organizational-forming nature and bringing signal units into harmony with the conditions imposed by any modern war.

The plan envisaged significant changes in the line of business, but all personnel and material issues could not be resolved because they were based on limited resources available. The plan partly addresses the issue of modernising gender, relationships and its full realization is foreseen in detail by a prospective plan.

In the first phase of the implementation of Plan - Darbvar 2 -, the following changes and amendments are envisaged:

- ◆ The type of connection shall be defined as unique from VK to battalion (battery), regardless of whether the signal units are composed of other types, genders and services;
- ◆ Priority is given to RR links over other types of links;

- ◆ the territorial RR links of the KoV, RV and RM are united into a single system in peace and war;
- ◆ the RR territorial units shall be formed as a component of the territorial linkage units providing links for all three branches of the armed forces;
- ◆ signal units shall be formed to serve the CV at PKM;
- ◆ Reserve signal units were introduced for all command echelons from the Supreme Command (VK) down to division level. They were intended to establish communications centers (CV) to replace destroyed ones, reinforce signal units that had suffered heavy losses, and form communications centers for newly established temporary commands, such as operational groups (OG), tactical groups (TG), etc.;
- ◆ the issue of a signal unit for artillery communications, fire control at division, brigade and regimental level has been resolved;
- ◆ Special territorial line troops shall be formed for the territorial maintenance of military TT lines; special signal personnel - commanders of a signal unit shall be established in divisions, brigades and regiments of all types of the Yugoslav People's Army;
- ◆ selected radio stations for movement into the air-ship corps (VaK);
- ◆ For the platoon connection, RUP-3 radio stations are introduced; the number of war-evident species is reduced;
- ◆ the regrouping of troops for training has been reorganized;
- ◆ The commanders' personal radio stations have been put in place.

During 1964, an analysis of the capability of the signal unit for anti-electronic security (PEO) was carried out and it was found that this is mainly based on the application of classical measures, namely:

- ◆ measures of a general nature, including the procedures set out in the General Management Code;
- ◆ the organisation of communications, technical and other procedures to protect the communication system as a whole; and
- ◆ specific measures aimed at protecting certain types of connections.

During 1964 the concept of building territorial links, in particular centres and RR connections, was intensively implemented. The network of inter-city connections is expanding, the links on RR lines are more stable and quality, disruptions in connections have almost been eliminated. That year's radio broadcasts were done to support organizations. New radio networks are being organized in case of mobilization. Connections are checked from time to time. The basic weakness in territorial radio links is that of outdated and time-consuming RU's, which means that at lower command levels 30% of the RU's involved are from an operational army signal unit, which would lead to a disruption of that system when it is most needed.

Between 1959 and 1964, in the evolution of the sex bond, it basically has the following character-sticks:

- ◆ the introduction of a single line of communication from Supreme Command to liaison brigade, which is of multiple significance for the unified planning and training of liaison personnel throughout the Yugoslav People's Army;
- ◆ dynamic adaptation of linkage formations and linkage organisations, with knowledge on the conduct of any future war by nuclear means; definition of links for operational and territorial command needs and, in this regard, consideration of the physiognomy of territorial links that become, in peace and war, a pillar of armed forces' links as a whole;
- ◆ the establishment of territorial link units at VK, AO, VP level; intensive training of link personnel. In addition to regular training, which trains thousands of active and reserve officers and non-commissioned officers, the method of short courses, seminars, etc., in which elders acquire the latest knowledge from communication tactics, new techniques, etc., as well as professional skills essential for the management and operation of a unit under contemporary conditions, is widely used;
- ◆ the introduction of liaison bodies at brigade level, thereby significantly improving organisation, professional relationship management and consideration of training problems and other issues relevant to the efficient functioning of liaisons in the joint echelon;
- ◆ the formation of a backup signal unit from VK to brigade, ensuring greater strength in liaison at all command levels; reorganization of the linkage line under the - D-1 - and - D - 2 - plans, adapting the commuter units at all command levels to new conditions for the deployment of command elements (KM, RKM, PKM); a significant inflow of domestically produced linkage resources and equipment, but also a relatively high percentage of assembly of parts and assemblies by manufacturers, ranging from 40-60%, which needs to be accelerated with additional efforts and increased financial investment in the domestic industry;
- ◆ the relatively satisfactory completeness, with a high diversity of linking techniques ranging from trophies, toys, outdated to the latest modern domestic and foreign production techniques;
- ◆ An intensive effort to acquire new means and equipment of communication, whereby our country, in this part of the electronics industry, is beginning to get its own production. In this one-off only, it was won and entered serial production of 25 means and items of communication equipment, which was a sure sign that it had embarked on its own path to building the telecommunications-caching technology and equipment industry.

The period of 1945-1950.

Immediately after the war, as during it, communications in the country were shared in terms of use. This period was characterized by the joint reconstruction of destroyed communications, primarily permanent overhead wire lines, which were then the only connecting routes; the restoration of existing telephone exchanges and other technical equipment, and the commissioning of minimum capacities; limited construction of new capacities; diverse technical equipment; and the use of communications primarily for the needs of the Yugoslav People's Army, national security, and reconstruction, and only then for other purposes. Because JPTT could not meet the needs of rapid economic development and communications users, dedicated communications networks outside JPTT began to be created for objective reasons.

At that time, considerable efforts were made to connect all our highest commands and republics and provinces with fixed airlines because the connecting routes of the JPTT system had been

almost completely destroyed. Construction-line and other units have made a full contribution to the construction of cable connections not only in the Yugoslav People's Army but also wider.

This period is also characterised by the use of multi-channel telephone frequencies by carriers in directions to Zagreb, Sarajevo, Niš, Split and Novi Sad, thus starting multiple and more economical use of wires.

In these early postwar years (1946, 1947) a considerable amount of VF radio equipment, multichannel telephone and telegraph equipment and teleprinters were purchased abroad. This, together with the National Liberation War communications devices, constituted an initial material base (among others about 200 frequency-carrying telephone defeated and 215 teleprinters) from which the system of communication OS began its construction.

During this time, three important decisions were taken to further develop the relations: first, on regular training of liaison staff and technical service branches (the Liaison School was established in August 1945);

The second was the establishment of a military-technical liaison institute,

And third, about the founding of the Connection Workshop No. 150 which were ahead of today's high

developed maintenance workshops and assembly plants as well as some companies for production

She's got accessories and communication equipment.

When those decisions are analyzed today, it is concluded that they were crucial for relying on their own strengths and in the area of communication. That's the entire development of the connection, and all subsequent events have confirmed it. Applying these decisions to date, the training system for military liaison personnel has been developed, many scientific, development and production organizations and modern-scale repair capacities.

In this period, the type of connection made efforts to equip a multi- and, as already mentioned, multi-faceted communication technique. At the same time, it was necessary to maintain links and develop a communication system for the purposes of commanding and controlling rapidly developing units and combat systems. Several communication centers and several tens of thousands of kilometres of fixed air wire lines were built connecting the headquarters of certain commands to cover operational, strategic and most important tactical directions. In addition, in 1948 the first domestic sea-going machines were produced, small capacity telephone stations in Poland and thousands of telephones.

Around 1950, when the sources of foreign communication funds were changed for known reasons, there was a slowdown in equipment. The outcome was found in the partial reorientation of overseas asset purchases and, most importantly, in the firm orientation to develop an electronics industry that will manufacture and connect devices.

The period from 1950-1960.

This time period is characterised by the production of equipment and means of communication in domestic factories; the expansion of radio links in infantry, engineers and other units; the increase in power of radio equipment (400) at higher command levels and the introduction of radio-teleprinters;

the introduction of a radio-relay connection, which is a qualitative leap in OS connections; significantly increasing the throughput of the communication system and creating conditions for the integration of radio-relay and wired communications between OS.



LINES INTRODUCED TO THE POWER PLANT, EXERCISE 1953.

During this period, multi-channel telephone and telegraph devices were used to command divisions, brigades, and regiments. More than 3,000 km of new, permanent air-conditioned lines have been built and about 600 km repaired.

A significant and useful decision from that period was to focus on the transistorous rice technique. This overstepped the stage of miniature and subminiature radio-tubes which, from a technological point of view, was very significant.

In those years, the formation of a unit for territorial, or station-based connections. Continued and

organized the territory connections, and the construction of the infrastructure system of connections OS.



RECEIPT OF THE TELEGRAM 1952.

By constructing a stationary part of the connection system, a new phase in the

development of the OS connection system begins. This conceptual solution makes the signal units of the OS's operational components more mobile, as they are reduced at the expense of the territorial (stationary) units that provide radio-relay and wired connections on a territorial basis.

The period between 1950 and 1960 was the most difficult time in our post-war relationship. It is full of efforts to overcome enormous difficulties and new tasks. The need for leadership and command grew and worsened (remember the situation on our borders in the 1950's).

Some sources, on which the computer had been canceled, a good part of the funds were left without spare parts, maintenance was in full swing. In such conditions for further development of the link, there was a decisive determination to accelerate the training of staff and technical service branches of officers, junior officers, skilled workers, technicians and engineers, and to develop as much as possible the domestic military communications industry, first of all the most mass-produced and later also other professional electronics. This pioneering period of organizing, researching and developing our own forces has resulted in the successful design and production of certain SRTs which, at that time, was an extraordinary success for our science, economy and OS.

The period is 1960-1970.

Earlier efforts during this period are yielding visible results. The Yugoslav People's Army communication system is growing quantitatively and qualitatively, becoming an increasingly reliable command and control element and as a kind of army in everything follows and reflects the level of development of our OS at that time. Specifically, at that time they were particularly:

- further developed the relationship doctrine and tactics of using gender and the relationship system in general. This line further ensures the uniformity of liaison in the Yugoslav People's Army and defines the OS liaison system and how they are to be used for the purposes of the Yugoslav People's Army and OS;
- the implementation of the initiative on sister linkage unity in the FRG and the establishment of a roadmap for implementation;
- at the end of the period, a strong development of territorial defence links as OS components began;
- many tactical and technical rules, guidelines, manuals were issued; this was a much more productive period than before.
- introduced numerous and varied techniques in the Yugoslav People's Army, expanded the transmission network system and steadily increased the total capacity and each type of connection. Especially developed and fully affirmed radio-relay connection - truthfully these were small-channel and predominantly ground systems. At the same time, a strategic plan for the construction and multi-channel radio-relay equipment was being established by domestic

production and relying on the system of resistant objects and ground stations - centers. This had a fundamental significance for the further development of this type of connection in the Yugoslav People's Army, or in the OS;



- domestic institutions and industry dominate the development and production of many telecommunications equipment and other electronic means, so that by the end of that period and the beginning of the following period, the Yugoslav People's Army was equipped with around 70-80% of its domestic pro-production communications equipment. It is true that some of these means, in terms of concept and especially production technology, did not fall within the world's elite electronics at the time. In spite of this, it is an extraordinary success for the domestic forces as the country became increasingly free from import and dependence on foreign countries and the Yugoslav People's Army gained very efficient, functional and necessary means and communication systems;

- increasing attention is paid to general, military and technical-technical education of ideally-politically committed and conscious personnel as our greatest value. The training of personnel is therefore further improved in line with the development of the overall military school system;

- the training and upbringing of soldiers, units and liaison bodies, not only of active but also reserve components of the armed forces, are increasingly at the centre of all commands;

- in terms of organization and formation, changes in the Yugoslav People's Army are followed, and some internal: formation of unit for stationary (territorial) part of the system of connections; encryption of information enters into the composition of the connection; from the connection, a branch of the connection is separated, and in the organizational and in all other aspects, it enters into the single technical service of KoV-a or Yugoslav People's Army, the process of joining with similar specializations starts, which has resulted in more universal supply of means and their smaller number per station, or main unit in the system of connections;

- reserve signal units are formed at certain command levels;
 - more than 150 research and development projects have been launched, a huge number which can only be mastered through the ultimate efforts of relevant military and civilian technical institutions and personnel. This is a period of increasing focus on involving civilian experts and electronics institutions in military research and development communications programs. They are the result of many new means and their transfer into production;
 - increased financial investments not only in development but particularly in the procurement of communications technology. The implementation of the equipment plans in terms of financial and physical production volume has been growing year by year, especially since 1965. This ensured a more orderly replenishment, in particular of the Yugoslav People's Army, with basic resources contributed from domestic production and partly from imports;
 - the process of building the infrastructure for the management, command and communication system or territorial planning has continued and certain forward-looking programmes in this area have been adopted.
- It is therefore a period of even more intensive networking equipment, the development of OS systems and quantitative and qualitative changes in OS connections in line with the overall needs of the Yugoslav People's Army, namely OS and KONO.

In the period after 1970.

A stronger future trend in the development of connections is continuing. The previously invested scientific efforts and financial resources result in an accelerated replenishment of the OS with means of communication.

The achievement of the level of development of the OS connection system, enables the upgrading and further development of the OS and the application of KONO imposes activities whose aim is to make the links even more suited to the needs of the country's defence management system and the OS command and control and command and the spirit of armed conflict strategy.

In order to achieve this, it is logical and only rightly given the basic basis for further development of relations was and are other concepts of general defence, system of management of country defense and command and control of armed forces and use of all combat systems. Therefore, during this time the end-points for further development of the OS connection as well as the ONO concept and the country defence management and command system and its OS are constantly updated and improved. In doing so, the experience of the National Liberation War is maximized and modern advances in technology and trends in further development of military telecommunications are taken into account.

Among the most important developments in the early 1970's were adopted doctrinal resolutions.

The first setting establishes that the liaison system of the OS is part of the liaison system of Yugoslavia and, as one of its subsystems, should be developed depending on it and in accordance with it.

Secondly, the need to manage the country's defence and command armed forces, especially in emergency situations and during war, can only be met by using the entire infrastructure of Yugoslavia's communications system.

These two settings significantly define the direction of development of relations in the country, especially in the OS and its preparation for war. They arise from the fact that, by aggressively imposing war, they would lead on their territory with all the forces and resources of the country. Therefore, anything we build well will come in the after-day conditions of war, provided that the prescribed and accepted terms of protection and other conditions are respected when building a communications system in the country.

The next doctrinal arrangement states that all families, views, and components of the OS are unified in a single system. This implies accurately defined tactical criteria and technical performance of equipment and systems of connection that are applied in the Yugoslav People's Army and TO. In this way, in addition to the above, technical-exploration unity, or connection, cultivation, cooperation, coordination, communication and notification to all subjects of the armed battle and resistance on the fronts, areas, units and in the battlefield, that is, in the Yugoslav space and each part of it.



The Armed Forces liaison system is a combination of mobile and stationary (semi-nuclear) parts resistant to combat, electronic and other effects of the aggressor.

A mobile component is being developed in all units, commands and headquarters of the Yugoslav People's Army and TO.

Regardless of the level of infrastructure and stationary component development and their scale of use in the Yugoslav People's Army and TO, especially for strategic and operational-strategic Ko-mands, mobile centres and mobile communications equipment are also an integral part of every

command (staff) of the combat system and many combat assets. One of the concrete starting points for link building is to align the combat readiness of the link system with the command's combat readiness level. They are constantly working or preparing so that they can, if necessary, take action immediately. This requirement is the result of specific needs and implies appropriate technical, organisational, personnel and working conditions. From these settings, in the 1970s special efforts were made to create a unified system of communications in the country and to prepare that system - as a whole and subsystem for emergency and war conditions. In addition to the Yugoslav People's Army, all other entities - labour organisations and their communities, DPZ, DPO and others - engaged in these work. In these activities a special place is taken by the emergency preparedness consultation of January 1975. The results of joint efforts and work are:

- legislative and legal regulation of the area of communications (appropriate provisions on relations in the 1974 Constitution of the Federal Republic of Germany, the 1974 Basic Law on the Relationship System, which for the first time in our country has been legally governing the area of communication, then provisions in the Law on National Defence and a series of intergovernmental regulations, as well as other documents);

- the adoption of an evaluation of KONO's links are of strategic importance, underpinning the unity of relations between Yugoslavia and the war and guiding the development of Yugoslavia's relationship system;

- the harmonisation and verification of the positions on the unity of relations in Yugoslavia, which are maintained by the interconnection of all or the corresponding systems of relations existing in the FRY. It has been established that this unity should be based on:

- (1) common planning and construction principles, in particular transmission systems;
- (2) common technical standards;
- (3) the single rules for the transmission of communications;
- (4) the unified protection of links and information (anti-electronic protection, crypto-protection and identification features);.

- the adoption of programmes for the construction of foot and subsea cable networks.

The concept of the network is based, inter alia, on the working conditions and needs of the OS and other actors at war, and on the necessity for it to be a modern transmission system in present and future times (digital transmission and commutation, lighting codes etc.).

This network is being built with the joint resources of JPTT, non-political societies and SSNO. Some of the characteristics of the development of the OS connection in the Oval Period are:

- very intensive development and construction of radio-relays. Due to its particular importance for the UNO, the financing of the construction of the programme involves, under the 1979/80 law, a federation;

- quantitative and qualitative growth of radio links (expansion to the pipelines and parts) the separation of COV genus units; the development of a radio-telephone network, the further increase in power and the wider use of radio-teleprinters; the installation of devices in certain facilities - by -circular and stationary; the widespread application of radio links to current traffic; organisational changes etc.);

- the start of automation of traffic, in particular telephone, by implementing and deploying a new system of stationary and mobile telephone stations. This appropriation is intended to cover expenditure relating to the implementation of the programme, including expenditure on technical assistance and other support measures.

- rapid growth in the use of technical means for cryptographic information protection, as well as quantitative and qualitative growth in the protection of links and information;

- a long-term programme to build mobile hubs that are significantly more functional, economical and resilient than previous solutions;

- the replenishment of the unit with new quantities of means of communication is constantly increasing, mainly from domestic sources. However, due to the rapidly growing needs of the OS, these domestic sources were inadequate or slow and a certain amount of quality equipment was purchased at random;

- the organisation of the territory by means of infrastructure construction links is constantly increasing in both scope and quality.

The overall material development of the breed is monitored by appropriate education and the number of pupils and listeners increases at all levels of education. In the postwar period, some 600,000 soldiers were trained in a variety of specialties, many of which are useful to the country's economy and about 40,000 active-duty and reserve military elders and liaison officers attended military schools. Then, there are significant changes in the training and upbringing programs of soldiers and units; the educational material base in schools and troops has been radically improved.

In terms of organization and formation, the bonding genre has progressed and been perfected. In addition to the rest, stationary link units have been formed and this part is completely affirmed and demonstrated the correctness of the 1960s orientation. It's specifically in regular and emergency situations it showed full value as it carried the bulk of traffic from the Yugoslav People's Army and TO, served as a safe base for extending connections by mobile and other means according to the needs of various users in specific situations and was the linkage subsystem of the OS with the other subsystems of the Yugoslav communications system.

The rationalization of the signal unit formation continued: new types of means of communication and the whole system of communication that was daily expanding, being adopted and covered without increasing the number of human beings, on the contrary, was gradually decreasing; by basic education and through courses the army, especially younger officers, were trained for more speciality, which gave certain effects in terms of gender reduction as well; a similar effect was also the introduction of newspapers into the mobile communications centers and their systems units. However, all this did not produce the desired effect in reducing the number of relations between members of the sexes, especially in the Yugoslav People's Army. Accordingly, appropriate studies have been carried out resulting in systemic solutions that achieve an optimal gender-relationship with the other genders and services of the Yugoslav People's Army and TO, followed by a human/technical means/capacity-channel/user relationship.

Two other areas were the subject of very intensive and arduous work. These were scientific research and the modernization of the technical-technological base of the development and production of equipment in the country. In the field of NIR, the main place was taken by research programs whose goal was to provide systems with very promising operational-tactical concepts and technical-technological realization. Here, a strong expression of the earlier idea of the development of the system of connections on the basis of digital technology, or digital integrated communication system, was achieved. The research covered and included all other technical areas of connections, future transmission and protection of information. This basic trend is also reflected in the development of the means and system of connections. Naturally, the development of the means in analog technology, which was in progress, was continued after a certain selection, but also given and additional tasks to be solved which will allow a cost-effective transition from analog to digital technology. At the same time, it is necessary to take into account the real material-technical, technological and other constraints of our country and the conditions of its defense and leadership in the armed conflict. In addition, the initiation and development of new families of radio systems.

Analyses have shown that support for the modernisation of domestic professional electronics is necessary and the development of basic technologies and the production of components and components in the country and their import substitution is imperative for further development of modern electronics in the country.

From there, significant forces outside the OS have been initiated to jointly develop basic technologies and components in the country. The value of such a policy adopted and adopted by scientific, research, development and production organisations in society has already been confirmed by a number of significant results. The programmes adopted, as well as the ones ahead, will continue to confirm this because they are backed by qualified personnel, allocated material and monetary resources. Of course, this also implies the necessary coordination to implement these results in all relevant OS and wider systems.

Accordingly, this time period can be characterised by: the adoption of the doctrinal and forward-looking approaches to the development of the OS connection system, the struggle for the replenishment of the SRT signal unit (at the end of the period about 85% of domestic production resources); the search for a more rational organisation of the connection and, in particular, the gender of the connection; the orientation towards the pursuit of as modern a forward-looking connection system based on digital, microprocessor and computing techniques; the development and conquest in domestic production of basic technologies, components and components; the significant development of a stable part of the connectivity system and the regulation of the relevant territory, and the great effort and determination of the outcome of the creation of a (single) sister network in Yugoslavia. Overall, the Axis linkage system has grown stronger and established itself in the country as a significant component of the ONO linkage system.

In the Oval Period, JPTT and JRT communication systems and functional systems were significantly developed and prepared for wartime operation or UNO needs.

WARTIME MEMOIRS: COMMUNICATIONS IN THE NATIONAL LIBERATION WAR, Volume 5, VIZ, Belgrade, 1981, pp. 10-26

- **Development of the gender relationship between 1970 and 1974**

Intensive work is being done on the modernisation of mobile CVs. It defines a system of links between the armed forces that make up stationary links (hitherto known as territorial links), and mobile links.

The stationary links shall be implemented within the framework of the preparation of the territory by link, thereby ensuring a permanent combat readiness of the system in all conditions, greater robustness and a secure base for organizing mobile communications in peace and war.

Mobile links are, by their dedicated organisation, capabilities and all other elements, dimensioned to the needs of commands and OS staff.

Mobile and stationary connections in the OS, using, where appropriate, other connection holders' connection systems, shall ensure maximum capacity capabilities, greater economy and robustness of the system as a whole. Stationary communications, in a way, represent the first ESL connection - they provide effective command in peace and war and are the backbone of growing mobile communications in war.

The reorganization of commands, units, staff and establishments significantly influenced the organ-positioning and structure of the communication gender units at all command levels of the OS. Connection is the factor that makes a good part of the command and control function, which it's an integral part of, and it reflects the complexity or simplicity of that system itself. There's a reason we put the management and command system at the forefront when it comes to relationships, because it has a crucial impact on the organization, formation and development of relationships. From this point of view, demands for a reduction in the human population status of the link species are exaggerated if on the other hand the number of coman-di (staff), units, channel numbers etc. is increased. In the process of solving this important question, it has been discovered that when it comes to the kind of connection, its size can be reached by an almost exact path, which is basically what needs to be followed, and that is:

- Number of commands, size of command, internal organization of work, wartime work-
The following information shall be provided in accordance with the provisions of this Regulation:
In the case of a control unit, the following information shall be provided:
Type of connection, number and purpose of the communication channel by command level and number
The waitress on the means of communication.

The OS connection system shall consist of two integral parts:

the first, stationary, which is implemented in the framework of territorial preparation and jointly with other liaison system holders and ensures constant combat readiness for command and peaceful communication during mobilization and early wartime; and

the second, mobile,

which carry out commands, staff and units by means of supply, mainly autonomously or relying on the stationary links of the OS, or on other operators of communications systems in the

country. From this point of view, the OS links are an integral part of the Yugoslav-Vietnamese linkage system and are based on the needs of the management and command of the OS and in line with the other links in the country.

- **Development of the gender relationship between 1975 and 1985**

Organisational and formative changes in the bodies, establishments and units of liaison shall be carried out in line with changes and modernisation of other genera of COV, RV and PVO and RM. The emphasis of the organisational and training changes is on meeting increasing demands and needs, in particular with the assembly of automated units and formed corps, as well as overall management and command, while reducing the number of lines. The effects of organisational and training changes shall ensure:

- greater economic efficiency and effectiveness of the communication system; reduction of the size of the PkCV unit, their greater autonomy and speed in establishing communications; reduction of the number of vehicles, improvement of the formation structure of the signal unit; increase of the number of / (missing term)
the situation of peacekeeping personnel in Classification R units; resolving the link between defence commands of cities at the headquarters of army and VPO commands in peace and war;
- the establishment of appropriate OSCE units for Kosovo and Vojvodina. During this

period, the possibilities of filling up appropriate formation posts of active military personnel with civilian persons at stationary contact points shall be explored, criteria for maintaining means of communication in the CSF and contact points shall be laid down in accordance with the new organisation.

During this period, changes are also made to the command elements. The reserve command position, as a commanding element, shall be deleted and the highlighted command position (ICM) shall be introduced.

The command levels: army, corps, division, regiment, brigade, PKM army and technical division are equipped to ensure the functioning of



operational centres, which represents significant changes from an organisational point of view and communication capacity.

As an element of command, the ICM shall be organised, as appropriate, at the discretion of the Commander. It's meant for the commander and our closest team.

The communications center at IKM organizes and maintains a highly mobile mixed-signal unit, radio, relay, courier and basic connecting wireless means of communication.

The deployment and basic operation in Polish conditions is carried out from the command post, whereby the internal deployment of elements, depending on the level of command, ranges from a few hundred meters from the headquarters as a result of technical solutions to several tens of kilometres.

During this period, in relation to the previous one, there were significant positive changes. The faster growth of contacts and the amount of financial resources have led to:

- extremely low initial population, especially concentrated in the central position; weak development of the OS connection infrastructure, and in the country, the need to correct as soon as possible the construction of certain command and connected objects;
- the increased needs for and modernisation of border, scouting and electronic reconnaissance units, military police, schools and school centres;
- the introduction of direct communication channels for a number of elders;
- the significant expansion of written information CZs; the formation of some new genera;
- The following information shall be provided:
- the provision of certain liaison capacities for the needs of the highest authorities and organisations of the Federation;
- increase in investment in NIR and larger domestic industry possibilities.

During this period, there are qualitative changes in the completion of technical means for connection and crypto-protection.

During this period, the formation organization consists of signal units in moving links:

- **the units, cabins, platoons, battalions and liaison regiments;**

and in stationary links:

- Division, RR hub, section, SCV battalion and regimental rank. The working organisation shall be carried out for mobile connections via PkCV and for station-run connections via SCV.

The intensive modernisation of the linkage type, initiated in the previous period, extends to 1975-85. The organisation and modernisation are taking on a broader dimension and are carried out in parallel with the changes and modernisation of the other genera KV, RV and PVO and RM. The focus of organisational and training changes is on meeting growing demands and needs, in particular with the deployment of highly-mechanised units and the formation of corps;

- the PkCV units shall be assembled, ensuring their greater autonomy and connection speed;

During this period, the power of the radio equipment at all command levels is increased by 1.3-5 times, which, in addition to the rest, is very significant from an electronic interference point of view.

Radio-television connections have been implemented from the UK to some battalions, high-speed data transmission has been ensured, infrastructure is connected to the network, which is of particular importance in terms of resilience and robustness of the connection;

- the RR network of 120 channels and the RR facilities have been completed;
- the digitalisation and group protection of voice information have begun;
- the construction of a network of undersea and undersea cables has continued;
- It has established links to underground and submarine cables with a large number of commands and DPZs.

♦ **YUGOSLAV PEOPLE'S ARMY - GROUND FORCES, VOLUME III, MILITARY PUBLISHING AND NEWSPAPER CENTER, BELGRADE, 1988, PP. 265-420.**

Command and communications; communications centers and wire routes; relocation of communications centers.

♦ **Signal company brigade and regiment rule, edition 1965, Military printing enterprise Belgrade**

Command and communications; communications centers and wire routes; relocation of communications centers.

♦ **Signal rule battalion army, edition 1969, war press split.**

Command and communications; communications centers and wire routes; relocation of communications centers.

♦ **Signal regiment rule of the army, 1965 edition, Military Press Belgrade.**

Modern development of the sexes of connection (1965-1980)

Organisation and improvement of the gender relationship in the spirit of the concept of general defence

During this period, a significant step was taken in the development of the unique system of connections within the SFRJ, starting from the Constitution, up to joint agreement on the use of

connections and equipment suppliers. The essence and purpose of the refinement of the connection system is to ensure a greater effectiveness of the connections in the overall strength of our country's defense. The connections, as a significant element of leadership and command, are given the appropriate place in our doctrinal documents where the uniqueness of the SFRJ connection system is especially emphasized. They are one of the prerequisites for the organized, successful and integrated functioning of all defense subjects. From this standpoint, the connections have a strategic role in ONO. The unique command and control of all levels and degrees, OS and DPZ, implies and ensures the uniqueness of the connection system across which it is realized in the large part. The uniqueness and modernization of the SFRJ connection system (in addition to security, ductility, and larger maneuvering possibilities), on all levels of command, have been considered and recognized both as economic justification and as strategic necessity, especially when dealing with significant programs such as: new connection centers, cabling, radio-relay connections, production of equipment for mass use in OS, DPZ, and others. The areas for further unique operation in the development of the SFRJ connection system are large, which implies an increase in expenditures. The system of training personnel in cryptography has been regulated. Priority is given to radio-relay connections at higher command levels and territorial connections. Signal personnel are introduced at lower command levels and radio-apparatus for unit command - leader. The approach to the organization of the study of electronic effects on connections has been introduced. The connection type is introduced throughout the depth of command of the Yugoslav People's Army.

Appropriate signal units for the needs of the Federation, units for active electron activity, territorial liaison battalions and territorial liaison centres have been formed. The manual and command system has been constantly developed and adapted to growing needs and possibilities. In this direction, a number of legal, organisational, material and technical measures were taken in the late 1960s and early 1970s in line with the doctrine of the UNO concept. There have been significant changes in the organisation, grouping and forecasting of the use of armed forces, mass growth and strengthening of territorial defence. In this regard, there is also an increase in the overall needs of all types of connections in the armed forces. During this period, territorial defence headquarters were formed as part of all socio-political communities. The Yugoslav People's Army has undergone appropriate organisational and training adjustments in line with the country's defence needs. Operational centers have been established in joint force commands and at higher command levels.

In the period of 1971-1975 defines the policy of development of command and communication systems. The Constitution of the FRY, the Constitutions of the SR and SAP and the Law on National Defence lay the foundations for the conduct of international defence by hand and regulate a number of issues in this area, with a view to coordinating the development and creation of conditions for technical, technological and operational unity of communications in the FRY, which is of utmost importance for further building up the country's communication system and adapting it to the UNO concept.

The establishment of strategic operational groups and their commands has given lasting solutions for further modernisation of the communication spectrum and a priority in building the communication system as a whole. The communication emerged from anonymity during this period; the Command set a number of tasks before it: to provide as soon as possible links for the newly formed commands and headquarters of the highest units of the Yugoslav People's Army and TO, their interconnection, to open up to the links of other structures of society (PTT, JJ, EP,

radio and television), to connect with them; to make the communication system more robust, with greater capacities and possibilities of obtaining touring connections; that is, precisely, the aforementioned part, the realization of the link according to the ONO concept.

The systematic experience gained in the development of the bond genus during this period has established elements that almost accurately show the conditionality of the bond size.

It's, first of all, the number and size of command degrees on one side, and the type of connection and their number of channels on the other. This also leads to the conclusion that a bond type is the result of the development of other structures in which it is embedded, not the cause of their development. It has been found that the adoption and development of new technologies and means of communication does not dismantle existing systems, but merely builds on them further, making them stronger and more vibrant, thus increasing their effectiveness and potential.

During this period, a plan for the development and modernization of the linkage genus was adopted which essentially addresses the concept and fissionology of the linkage genus and brings the genus into one more favourable position than signal units of foreign armies, especially neighbouring countries.

The development and modernisation of the linkage is carried out in three phases.

In the first phase, an existing status restoration is carried out on the basis of available and appropriate linking techniques are procured. The assembly of the coupling set and assembly into a smaller number of vehicles shall be carried out, and the stationary connections shall be adjusted and extended as a whole, with an emphasis on RR.

A number of scientific research tasks are underway to ensure that domestically produced means of communication with modern technology, for all types of communications and for all armed forces structures, can be established as soon as possible. Special efforts are being made to modernise the means of protecting the transmission of all kinds of information and procurement of means of communication for anti-electronic security in our conditions.

In the second phase, the process of modernising communications at all command levels is continued, multi-string capacity of stationary radio and rail networks is increased, it is brought to a final stage and a series of other activities aimed at elevating the links of the armed forces as a whole.

And in the third phase, in addition to continuing the implementation of the second phase programme, the focus is on military science and research; technical requirements are being set and solutions are being sought that ensure the development of armed forces links by the end of this century. It is precisely this long-term R&D policy that ensures the rational alignment of available forces with material capabilities.

During this period, the work of the Armed Forces Command and Staff shall be organised according to a system of operational centres, which will have a significant impact on the internal organisation and deployment of working bodies in Polish conditions. These technical solutions and connectivity capabilities adapt the organisation and working grouping of commands and staff, and the connection is organised along the lines of all command elements, increasing the power of the radio equipment and the number of channels at all command levels.

In the period 1971-1980, about 100 scientific research projects were carried out, of which over 80% were completed. In the period 1971-1975 alone, exploitation testing was carried out on 29 and contracted production for 20 new means of communication. The introduction of new frequency-carrying radio-relay devices and high-capacity automated telephone stations in stationary links has enabled the construction of a communication network based on the - netke - principle, with the possibility of bypassing the selection of participants. A study has also been carried out to introduce automatic commutation of telegraphic transmissions, the implementation of which is underway.

The domestic communication devices are in line with intergenerational regulations by their performance, which, among other things, enables the construction of a single technical and technological communication system in the FRG.

The protection of the transmission of information, in particular by written means, is increasingly being extended and deepened, and solutions for the protection of the transmission of oral information on all transmission routes are being sought at an accelerated pace. A greater number of scientific institutions are involved in these tasks.

In the field of anti-electronic interference, further research, procurement and development of appropriate devices are continuing, studying achievements in this area, organising and taking minimum measures in accordance with the ONO concept and our capabilities.

Intensive work is underway to modernize the mobile communication centers. It defines the system of armed forces links that make up stationary links, hitherto known as territorial links, mobile links.

The stationary links shall be implemented within the framework of the preparation of the territory by link, thereby ensuring a permanent combat readiness of the system in all conditions, greater resilience and a secure base for organizing mobile communications in peace and war.

Mobile communications are, by designated organisation, capabilities and all other elements, dimensioned to the needs of commands and armed forces headquarters. Mobile and stationary links in the Armed Forces, using, where appropriate, and other linkage systems of the linkage holders, shall ensure maximum capacity capabilities, greater economy and robustness of the system as a whole.

Stationary links, in a way, represent the first eshelon of communications between armed forces providing effective command in peace and war and a mainstay of growing mobile communications in war.

♦ **BATTLESHIPS OF YUGOSLAVIA 1941 TO 1981, (GROUP OF AUTHORS), VIZ, Belgrade, 1982.**

Connection as a kind of army; The organ signal unit; Elements of connection; Type of connection;

♦ **The tactics of communication for the SROV, SCV in 1972.**

The communication system in the FRG; The following information shall be provided: the system of connection to the OS;

♦ **System, types and elements of connection, Major Health Personnel with SCV in 1975.**

System of Communication in the SFRJ; System of Communication in the OS; Signal Personnel in the OS; Signal Units in the OS; Organization of Communication in the OS; Organization of Communication in the KoV; Organization of Communication in the RV and PVO; Organization of Communication in the RM; Communication in the Armed Conflict; Provision of the Communication System; Protection of Communications and Information; Operation of the Units of Communication in the OS; Operation of Signal Units in the OS.

♦ **Regulation of the relationship between OS and amendments to the 1979 edition (amended 1987), Belgrade Military Press.**



Elements of the connection system; Principles of connection organization; Organization of connections in b/d; Command; Execution of connections; Protection of connections and information; Movement of connection elements and provision of the connection system.

♦ **Signal company rule, 1990 edition. Military presses Belgrade**

Elements of the connection system; Principles of connection organization; Organization of connections in b/d; Command; Execution of connections; Protection of connections and information; Movement of connection elements and provision of the connection system.

♦ **Signal Battalion rule, issued in 1988. Military presses Belgrade**

Elements of the connection system; Principles of the organization of connections; Purpose, task and composition of the signal unit; Functioning of the army connections; Command; Implementation of connections; Protection of connections and information; Movement of elements of the connection system and the provision of the connection system.

♦ **Signal regiment rule, issued in 1984. Military presses Belgrade**

♦ **A book of basic patterns of communication, published in 1977. The Yugoslav People's Army**

DEVELOPMENT OF THE RELATIONSHIP BETWEEN RV AND PVO

In the Serbian Army, French squadrons were equipped with radio stations on their planes and a unit was formed to maintain air-to-air communications at the airport.

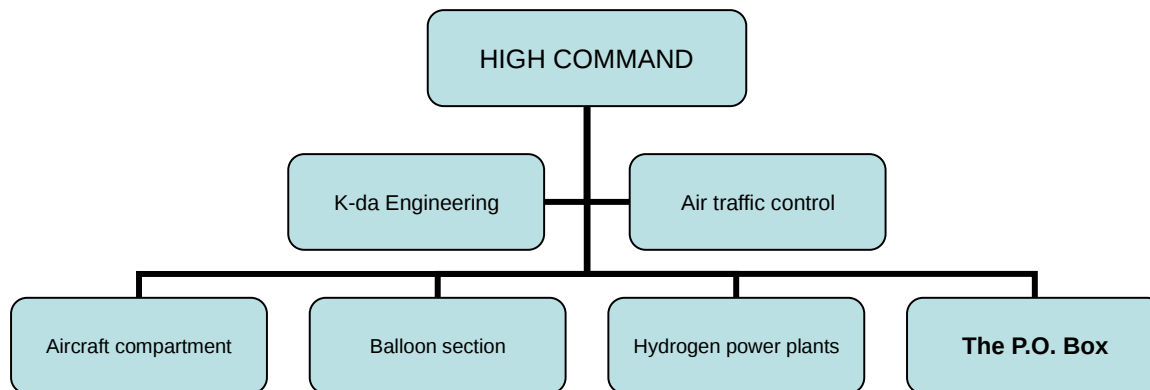
The 1915 Belgrade PVO observation stations used signal panels (in the form of arrows) to mark enemy aircraft flights; the stations were connected by telephone with the city command.

In 1917, the Radio-Aviation Service was formed at Supreme Command, headed by a senior engineer officer, to be added to the Chief of Telegraphs of Supreme Command. Army telegraphs and wireless sections controlled the airline's radio-telephone connections, and for airport area communications and seeding were headquartered in front of the infantry divisions.

The division telegraph units comprise the telegraph departments for organizing and maintaining TT links between army squadrons and art. units.

Squadron communications provided internal and aerial connections.

- ♦ **This article is intended to provide an overview of the various aspects of this Directive.**
475



By order of the Minister of War, Duke Radomir Traveler, from 24. In December 1912, the Air Force Command was established, the same body as above.

Data on the air traffic control clock and food. Connections and war and the same.

- ♦ **Aircraft of Serbia and Yugoslavia 1901. - 1994, Zlatomir Grujić, War books, Belgrade, 1997**



FIRST SERBIAN SQUADRON

In the first World War, the organization of radio communication by the Serbian air force utilized French experiences, materials and instructors. The first squadron that arrived in Niš in 1915 had experience regarding the maintenance of radio communication, and had a department for communication which organized airfield radio communications and communications with the land forces.

In late May 1916, the first radio-telegraphic course for aviation purposes was held in Krakow.

In March 1917, the Radio-Aviation Service was formed under the Serbian Supreme Command.

The Air Force was headed by the Army's radio section and division.

♦ **This article is intended to provide a summary of the results of the study. Other articles**

In the National Liberation War of the people of Yugoslavia the First Fighter Squadron and Second Fighter Squadron NOVJ were involved in the radio-linking system of the Allied Balkan Air Force (Balkan Air Force) by forming a group of air divisions NOVJ organized all necessary radio links, on the ground front and in final operations JA existed and functioned radio command links and

Inter-aircraft seeding, inter-airport seeding, KOV seeding, call and flight instruction, for the indication of radio navigation assistance to aircraft in the air and seeding with the USSR Air Staff.

Unique planning and organization of the connection ensured the signal section KJRV.

♦ **This article is intended to provide a summary of the results of the study. Other articles**

The emergence of connectivity in RV and PVO dates to the emergence of NOV and POJ, and their development is turbulent as well as the development of aviation. With the appearance of our first aircraft in May 1942, flying the folk heroes Franjo Kluz and Rudi Tchaikovek, the first airline connections appear, with what was then

Mostly signal and courier.

The creation of the air force unit at VŠ NOV and POJ (16. 9. 1943.) and the First air force base in Livan (14. 10. 1943.) increased the need for contacts.

The first air base, among other things, was tasked with gathering all the aviation specialists, including the travelers.

In his report to the Supreme Headquarters of NOV and POJ from 14. In November 1943, the base reported that it already had a number of vehicles in its lineup. Besides, the base is said to have an organized connection with 8th Corps NOV and POJ.

The First Air Force Base was later sent to training in Africa and from it signal units were created into the 1st and 2nd Fighter Squadrons.

(April-July 1944) These two squadrons had successfully joined the NOVJ as early as 1944.

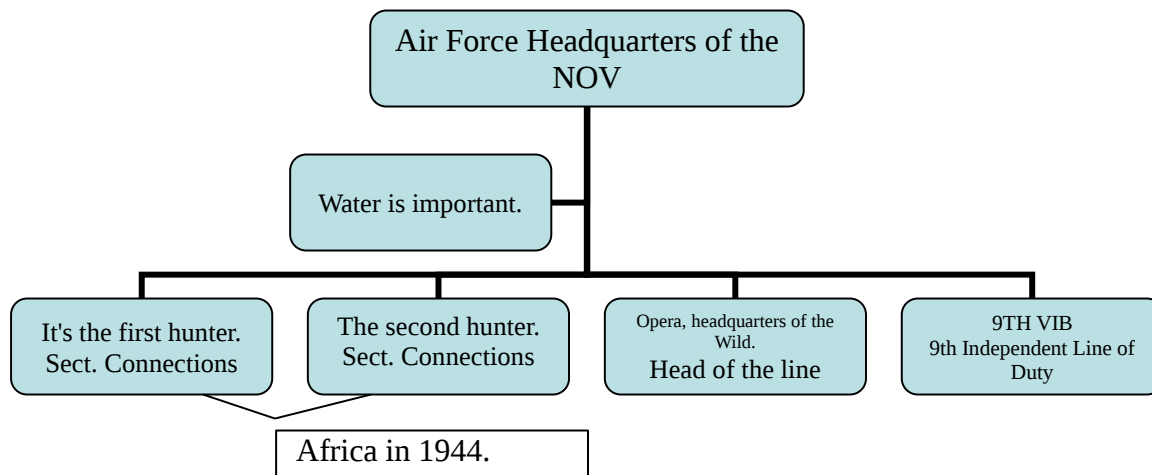
The war test.

Formation of the air force staff on 29 October 1944 in Zemun, and the establishment of a signal section (commander of the regimental company E. Pikl) with the task /no_think

To form the necessary units and to organize the liaison of Air Force Headquarters with subordinate commands and units soon to be formed.

The signal section soon forms a linking conduit and establishes the first communications of the Air Force headquarters. By the end of 1944, this unit had 2 officers and 24 enlisted men.

By order of VŠ NOV and POJ 29.12. In 1944, the 11th and 42nd Air Divisions and the 9th Air Field Base were formed. Within these units organs and signal units are formed, so at that time the Air Force has organs and signal units, according to scheme no. 1 and 2.



Scheme

1 - Air Force organs and signal units November 1944-1945.

A full set of organs and signal units were provided by the NOVJ personnel, those who completed short courses at the Air Force Headquarters in the Specialist Air School in Novi Sad and the Airborne Divisions, and with a certain number of personnel who joined the NOVJ upon returning from captivity.

The material communications equipment was of different origin:

- in the 1st and 2nd Hunting Squadrons of England.
- in 11th and 42nd divisions and 9th VOB - Soviet
- in the waters of the air force's headquarters and at airports, trophies (conquered from the enemy) and Allied aid.

All of this suggests that there was a huge diversity in both humans and materials, which created difficulties in organizing and maintaining relationships.

During this time, command, planting, communications, weather services, as well as airline connections are organized. In command (earth) communications, telephone and telegraph (teleprinter) links were also established.

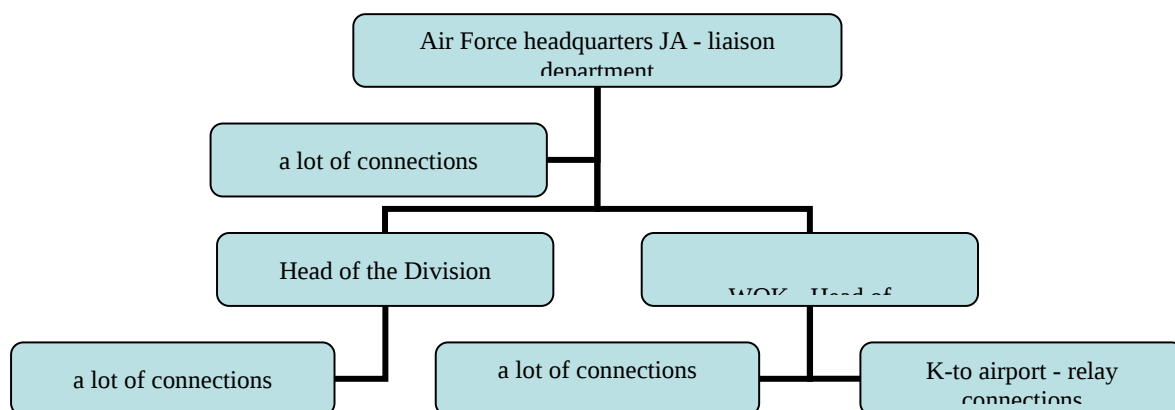
For radio-navigation, trophy navigation means have been used.

In July 1945, the air force was reorganized:

- the formation of a peace-keeping airborne division;
- it's spreading to 9. The airspace command (VOK) shall be established as a background command and shall have its own subordinate airport command (KA);
- The liaison command of the IAF is being transformed into a liaison brigade, and in late 1945 and early 1946 an ensign battalion.

The number of airborne and rear-end units increased sharply in relation to the war situation and was constantly increasing, so the number of signal units continued to increase.

Scheme 2 gives an organizational scheme for the Air Force's organ and signal unit in late 1945, with minor changes remaining until 1948.



Scheme 2 - Organ and signal units RV in late 1945

In the period 1945-1948, significant efforts were made to restore and install airports, including repairs of airport wire lines, airport communication and navigation facilities and dr.

In addition, work is being done on training and creating the necessary networking frameworks, organizing education, drawing up curricula and programs, writing and translating textbooks, repairing the means of communication and navigation that have been collected throughout our country, transforming human connections with new means purchased or acquired from Eastern and Western allies, implementing commands and units through various exercises.

The connections are constantly expanding and improving. Radio communications are being established with all subordinate commands, units and airports. Order progress has been made in the expansion of wireless connections to all commands, starting with the operation of automatic telephone links at airports.

Significant results have been achieved in the organisation of air links and in the introduction of aircraft radio navigation. The safety of flying is increasing every day.

Radio links of the meteorological services are organised with all airports and weather centres in the Republic, data is also received from European weather centres.

The Royal Air Force Specialist School is successfully training soldiers and liaison officers.

With the outbreak of an Informbiro resolution in 1948 for the entire country and its army, difficult days have begun. Total blockade by the USSR and all Eastern countries, and The poorly developed relations with Western countries have made it necessary for us to fully focus on our own strengths and, having the technology carefully used in sustainability. In the period 1948-1953, further reorganization of the IAF was carried out which led to the creation of new and larger signal units in it.

In the Air Force Command, a signal regiment is created, in the Air Corps battalions, and in the other units of the platoon and liaison lines.

At the end of this period, the Air Force is re-armed with modern technology and jet aviation from Western countries, with new communications equipment and radio navigation on board. There is an intensive approach to human transformation and the introduction of new techniques into operational operation.

Especially challenging was the acquisition of multi-channel VVF radios for air and radio navigation.

After 1953, a new, even more complex task is set before the RV connection:

- **organisation of communications in the VOJIN service which have grown from the simplest (visual observer links) to highly complex for transmitting radar observation data, the notification and instruction in an automated VOJIN system;**
- **the acquisition of radio-teleprinter technology and its operational introduction (the first radio-teleprinters were introduced in 1954).**
- **the adoption of multi-channel radio and frequency-carrying devices, which represents an entirely new quality in communication development. The first RR connections in the RV and PRVO were established in 1955, which were also the first RR connections in the Yugoslav People's Army;**
- **the acquisition of modern means of radio and radar navigation (automatic radio-gonometry and headlights, commercial and landing radars, light-signalling devices at airports, etc.);**
- **the organisation and successful functioning of communication systems in PVO missile units;**
- **the acquisition and deployment of photo-telegraphic facsimile devices in the R&D and PVO meteorological service. This type of connection is introduced for the first time in the Yugoslav People's Army by RVi PVO;**
- **conquering other state-of-the-art means of communication and crypto-protection.**
- ♦ **periodical VEZIST number 1. 1976. year (Bilten šCV, Belgrade), Short overview of creation and development of contacts in RV and PVO**

When I. Squadron NOVJ was formed in mid-1944, the RAF assigned an air liaison officer. In this squadron in October 1944, a liaison line was formed. The water was later transferred to Zemun; it represented the core of connection in RV.

For the purposes of the Air Division Group headquarters, a signal company was formed in Novi Sad in February 1945 as part of the 9th Regional Air Force Base Air Service Battalion, and in March 1945 a signal company as part of the new Fighter Division Air Service Battalion.

Due to relatively limited connections for command and operational management, it was formed in early April 1945 at the Novi Sad signal company at the operational headquarters of the Air Division Group (later reinforced and relocated to Sombora region).

In the final operations, the signal units provided for RV tasks and conducted training in humanity. By the end of the National Liberation War, signal units were organized on a smaller or larger scale at all airports. The Air Force Command (KJRV) has established a liaison department with the task of managing the organisation and operations of the signal unit.

In addition to ensuring the effectiveness of the communication centre, the KJRV organized in 1945 additional courses (radio-telegraph, TT and teleprinter) for training and a full signal unit. This battalion, at the beginning of 1946, was raised to a battalion and 24th VIII Battalion in 1948 to a signal regiment KJRV.

After World War II, new communications equipment and electronics were introduced in large numbers. Particular attention shall be paid to the development of communication in the VOJIN PVO system. Until the advent of jet aviation, it was considered sufficient to upgrade existing communications systems and adapt them to the conditions of possible nuclear war.

The organisation shall be dominated by a unified airport system and the uniformity of airport network connections on the territory of the Air Corps and senior staff. The VOJIN system is part of the RV, and the joint effects with the COV and RM unite the airborne observation and watering organs (airborne observation and watering organs in corps and divisions and frontline observation and guidance organs).

With the advent of jet aviation, the development of technical means of communication and electronics has focused on:

- Adjustment of the communication system for increased mobility and capacity of communication links;
- Integration of command of aircraft through elements of the Military System;
- Supply of matériel through common KM commands and headquarters and unit KoV;
- Integration of certain types of communication over the radio-relay system; development of more suitable means for strategic RV operating systems.

The following:

Existing technical communications equipment shall be supplemented by infrared, television, phototelegraph and signal devices of reduced dimensions suitable for transport and transmission.

♦ **This article is intended to provide an overview of the various aspects of this Directive.**
476

In the RV and PVO Armed Forces of the SFRJ, the radio-band is equipped with modern media-TVs and organized into radio centers at air commands, at airports, PVO elements territory, radio-grids, ground-to-ground, ground-to-air and air-to-air communication radios and radio stations working in centres. Airports are organised with special radio-networks for flight control and radio communications for command and seeding, air reconnaissance and aviation. In the higher commands, radio networks and radio operations are organised as appropriate for commanding, aviation call-ups, instructions, plantings and other purposes.

♦ **This article is intended to provide a summary of the results of the study. Other articles**

The following information shall be provided:

Organisation of the airport's operational centre links

Organisation of liaison in the aviation units

Organization of communications in the Anti-Aircraft Artillery Units

Organisation of communications in the VOJIN units

Organization of communications in airborne units

Organization of communications in the meteorological service

- ◆ **Rule of Connection OS, War Printers Belgrade 1979 (with amendments and supplements 1987. year) p. 108-134.**

A contact system in the colour performance zone of the PVO tactical units

Use of communication and communication system elements in the area of schedule and combat of tactical units RV and PVO

Interconnection characteristics in the executive command system of tactical units RV and PVO

- ◆ **Combine tactical units RV and PVO in color, regiment. Bakić Milorad CVVsh RV and PVO in 1990.**

- Basics of the organisation of a subsystem of connections in RV and PVO
- Specifications of the R&D and PRC connection organisation
- Distribution of RV and PVO connections by purpose

- ◆ **TJ RV and PVO liaison organization, regiment. Myodrag Stanić was born in Belgrade in 2000.**

- Connection in RV and PVO as part of the OS connection system
- Subsystems for connections in RV and PVO
- Elements of the connection subsystem in RV and PVO
- Signal units in RV and PVO
- Distribution of links to purpose
- Principles for planning, organising, establishing and maintaining connections in R&D and PDO
- Organizing communications between RV and PVO Command
- Air support connections KoV, RM
- Connections at the airport
- Connections to PVO territories and groups of OS
- Organizing the JOIN

- ◆ **Guidance for the organisation and operation of relations in RW and PVO, SSNO 1982.**

Air traffic and navigation

- ◆ **Navigation and air communications, by Luigi Branne, 1987 edition.**

DEVELOPMENT OF THE RELATIONSHIP IN THE NAVY

Between the two world wars.

- There were 3 reconnaissance centers on the coast of the Republic of Yugoslavia (Northern Shipyard, Middle Shipyard and South Adriatic Shipyard), through which most of the radio traffic for naval commands, units and installations on shore and shipping units was carried out; the main headquarters and transit centre were located in the Shipyard. From the communication centre in Zemun, Command RM also maintained direct radio links to the hubs in Sheibenik and Klincin., River Fleet Command (RRF) and Naval Air Command (PV), and directly with ships supplied with KT radios of greater power.

The Selca, Sibenik and Klinca centers have been uniting in their radio communications sector with the coastal commands, facilities and marine units of RM, including Squadron Command. The connection between the power plants was made by TT-lines, and exceptionally radio-lines. The Sibenik and Klinci stations were also registered as international coastal radio stations, to provide permanent assistance to the maritime navigation safety service for vessels supplied with ST and KT radios. With the warships of the squadron, the stations organised radio communications in one ST and one KT radio network (depending on the equipment of the ships) through medium and large power stations (40-500 W), mainly German-made.

The service at the radio stations was carried out according to a specific pattern, with accurate forecasts of the working time for each ship. The RRF Command has been linking, via its radio network, to the naval units of its component. The PV team in the Divulje organised radio communications with hydroplanes (Kumbor, Divulje and Vodice), airplanes, as well as aviation seeding with reconnaissance centers and ships.

◆ **Military Encyclopedia book 7 (Belgrade edition of 1974 p. 676)**

In the National Liberation War of the people of Yugoslavia at sea until 1943 there were no organized signal units, but courier links were widely used to transfer mail between commands and units on shore and naval facilities at bases.

Boats and armed ships were often the main task of maintaining connections between the coast and the islands. In regular night operations, the ships used the most optical signals (lamps). In January 1943 the RM Section at IV Operational Zone ordered the establishment of the TT-line Podgor - Zastrog and the organization of a reconnaissance service. Significant progress was made in September 1943. The Maritime Coastal Commands have primarily sought to restore and establish TT lines between post offices, military commands and observation stations on their territory. The signal stations were only later organized due to a lack of personnel. Submarine cables to the Mediterranean islands were trained immediately after certain zones were liberated.

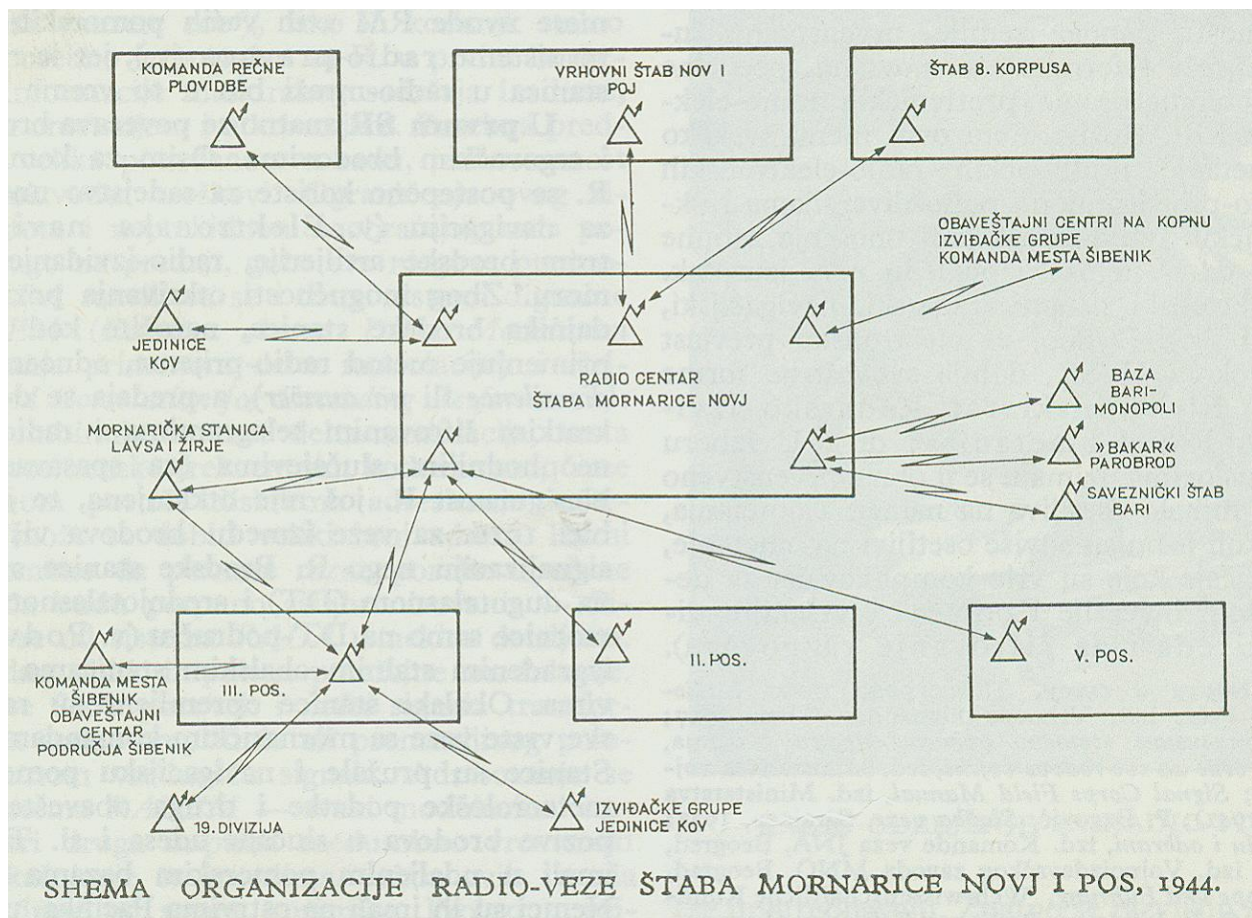
Naval headquarters NOV is delivering 31. X 1943 Special Order for the organization and establishment of signalling communications and coastal surveillance services.

In the coastal sectors, short training courses were held in early 1944 to train the first personnel for TT units. By order of the Navy's organization, Naval headquarters is 10. In 1943 the XI in the naval headquarters and coastal commands (sectors) provided for sectors of communication and code with reference links.

By November 1943, a Guide for the Observation and Communication Service was issued.

Navy headquarters then had their own radio stations on Hvar, Long Island and Lastov. During 1944, Visa's regular channels of communication were maintained by courier, radio and TT routes to various coastal points and many islands. In mid-1944, the first regular radio and telegraph and signal courses began.

- ♦ This article is intended to provide an overview of the various aspects of this Directive.
475



The development of the liaison service in the Yugoslav Navy has two periods: wartime (NAVY liaison) and post-war (JRM liaison).

The communications service during the National Liberation War was closely associated with the formation and development of the New Navy. From the beginning of the uprising until the formation of the Navy NOVJ, there was no special naval-river communications service. However, this does not mean that the relationship was not maintained during that period or given adequate attention. It is sufficient to mention maritime partisan links, then special courier links, the use for its own purposes of an enemy liaison system and so on, in order to establish how the foundations of a liaison service were laid much earlier than it was officially form-banned. This applies in particular to the organization of links along the entire eastern Adriatic coast and islands until the surrender of Italy.

The communication service of the Navy NOVJ has three distinct periods:

- **From the surrender of Italy to the withdrawal of the New Navy's headquarters on the island of Vis in January 1944**
- **Then the period of time until the liberation of the coast and islands, from Pag Island to Bojan in late 1944.**
- **and the last period of war, until the final liberation of Yugoslavia.**

All three periods are of particular importance for the development of the naval liaison service, although a particularly significant period is still to be found. Therefore, we would like to present some basic information about the liaison service of the New Zealand Navy in the period from January to October 1944, as it was operating almost normally and fully organized during that period.

Immediately after the formation of Naval Headquarters NOVJ (starting operations on 26 October 1943 in Hvar) took a number of measures to establish and organize a naval communications service. As early as October 31, 1943, the coastal seaports were ordered to immediately set up signalling courses and organize an observation service. At the same time, the Allies were requested to provide a certain amount of resources for connecting the first-rate radio stations needed.

A liaison department has been set up in the New Navy's headquarters to manage the entire liaison service. This section had a code department. At the same time, maritime coastal sector headquarters are set up as liaison reference offices to manage the liaison service in their area.

The organisation of the liaison service encountered great difficulties because the operational situation required a fast and constant connection, with neither training staff nor the necessary means of communication available. In such a situation, the only solution was to rely on one's own, albeit modest, forces and seek help from allies.

At the beginning of November 1943, Naval Headquarters NOVJ, then based in Hvar, had only three radio stations, one on Long Island (headquartered at III POS), another at Navy headquarters and a third on Lastov (formerly a permanent Italian radio station).

The radio link was maintained only between the naval headquarters of NOVJ and Lastov, while the radio link with the 8th Corps and 26th Division due to an inappropriate radio station was weak and unsafe.

The existing telephone lines on the islands and shores have been taken over by New Zealand, and are also being used for the purposes of the New Zealand Navy.

The big problem was the lack of radio telegraph and other technical staff.

The initial difficulties were gradually overcome, and soon an observation service was established, albeit on a very modest scale. Due to the lack of signal reflectors and heliographs, optical communication between individual observatories could not be established, so telephone communications were mostly used. However, there were also major difficulties because the monitoring stations between certain maritime sectors were not connected by telephone and so data was sent to sector headquarters.

The organization and establishment of the liaison service in certain maritime coastal sectors took place under rather difficult conditions, as they were accompanied by water battles with an enemy who tried to occupy the entire coastline and islands. As a result, the initial organization of the liaison service had to be changed several times.

Mostly by the end of 1943. The maritime sector II, III, IV and V of the NOVJ Navy established a liaison service although its organisation and scope depended on many factors, in particular the specificity of the territory. However, the problem of maintaining links between certain maritime coastal sectors, particularly neighbouring ones, remained open. The relationship between the Navy's headquarters and the maritime coastal sector has been gradually functioning with great difficulty, which is of great importance.

The withdrawal of the New Navy's headquarters to Vis in January 1944 marked a new phase in the development of communications services. The situation was such that the naval headquarters of NOVJ, then IV and V maritime area sectors with their units were withdrawn to Vis, while III POS remained on Long Island and Cornwall, and II POS was in Senju until 20 January 1944, and then withdrew to the northern part of Long Island. Therefore, the communication system had to be organized on a new basis, as Vis became the headquarters of the New Zealand Navy. The basic routes of the connection were with Visa to the II and III maritime coastal sectors, Base Bari (Italy), and the 8th Corps. However, it was only the initial system of communication on Vesuvius. It was gradually expanding for operational and other needs.

In addition, it should be emphasised that the Allies also established their own communication system, which was used in special cases for the purposes of the New Navy. The same goes for the 26th Division's communications system that was on Vesuvius.

The Vis soon became the communications center of the Navy's New York, where communication was established and organized. This applies in particular to wireless, radio, courier and surveillance services with a surveillance system.

In parallel, a communication system was established linking the NOVJ naval headquarters with subordinate units and assumed commands outside Visa (radio-connection and courier connections). All this required very great effort, despite the many difficulties that were often insurmountable.

The communications service of the NOVJ Navy was in a sense also a personnel service, because by virtue of it special cruisers were organized on Vesu, whose finished listeners filled not only the units of the NOVJ Navy but also other units of the NOVJ.

With the arrival at High Command, the communications service of the Navy NOVJ played a significant role in organizing and establishing the High Command's communication system. In addition, certain communications equipment and a number of good and experienced radio-telegraphists have been put at the disposal of the High Command.

Accordingly, the communications service of the Navy NOVJ has been experiencing its steady rise since early 1944 both in material and personnel terms, which was very significant for its further development.

When establishing and organizing the Navy's communications system, a major problem was that they lacked the necessary communication equipment. This problem could not be solved without the help of the Allies. The Navy's headquarters have repeatedly asked the Allied representatives to resolve this issue, because operational activity couldn't be imagined without its own communications system.

Following a persistent search, the Allies, although with some delay, handed over certain means of communication to the New Navy.

The material received enabled the establishment of a communication system for the NOVJ Navy, as the increasingly important subordinate, assumed and subordinate commands and units were provided with adequate funds, albeit in minimal quantities due to their large shortage. It was especially important that all the resources were of the same origin. However, due to shortages, no radio stations were installed on the ships.

The communications equipment acquired and seized required high-quality maintenance and repair. In the absence of adequate personnel, NOVJ Navy was unable to immediately set up workshops for repairing communications equipment, in particular a radio-technical workshop. That's why repairs were made to the 8th Corps radio workshop on Vesuvius, even though this workshop had only one radio technician and very poor tools. However, a special Telephone Technical Workshop was immediately set up with two technicians.

A very large need for communication material could not be resolved except by seeking help from allies.

Despite all difficulties, the NOVJ Navy established and maintained its own communications system, which largely met all command, operational and planting needs. Here, the first thing to

think about is radio communication, telephone communication, signaling and courier communication.

In anticipation of the further development of the communications service, in July 1944 Naval Headquarters NOVJ requested a certain amount of radio, telephone and signal equipment for communication and consumables from the Allies through the Supreme Command. Although not everything requested was delivered, what was obtained nevertheless made it possible to await the return of the Navy to shore, which began in September 1944, when the fighting for Dalmatia's final liberation began.

In July 1944, the Vis-Hvar telephone line was thoroughly repaired (a 40 metre cable was replaced), so that the telephone connection functioned normally, although an examination found that the submarine cable had broken somewhere.

It also installed a power station for the National Committee for the Liberation of Yugoslavia with all connections and phones. In mid-July, the length of Vesu's IV POS phone lines was 121 km of telephone cable and 64 km of copper wire. All coastal sectors have been provided with new battery charging engines, which has solved the radio power problem.

The greatest shortage was of heliographs, signal reflectors, aldis lamps, binoculars and signal flags, especially for the needs of armed ships, patrol boats and observation stations. There was also a shortage of electrolytes for lead batteries and dry batteries.

In September, all the headquarters of the maritime coastal sector also received radio stations of type SCR-284, which were fully adapted to their needs. These radio stations were used as headquarters.

Because of these resources and good organization, the communications service played a significant role in the liberation struggle between September and December 1944.

The organization of the New Navy Liaison Service consisted of: The Department for Liaison of the Naval Headquarters, New Zealand, headed by a liaison officer, and the Section for Liaison of the Maritime Coastal Sector, headed by a liaison officer.

The New Navy's communications department had a radio station, a wireless hub.

and a courier group, while the maritime coastal sector communication sections had a radio centre, a cable linking centre with the TT-section, a courier group, observatories and signal stations.

The ships had an organized signal connection, and only a small number of ships had permanent radio stations.

The radio station of the Naval Headquarters NOVJ initially had two radio stations with 5 radiotelegraphs (3 radio stations with 15 radiotelegraphs in August).

The radio link was held only during the day, with no particular problems. Every radio station had its own code.

As a result of work on establishing the telephone network at Vesuvius, it was formed in February 1944 as a signal company with an initial number of 27 fighters and managers.

The connection between the islands was maintained via an existing undersea cable network, While the courier relationship is maintained on Long Island-land.

The observatories were connected by optical means of communication, while those on the Vesuvius had a telephone connection.

A courier service was also organized at Vis, as well as the Vis-Continental and Vis - the occupied islands.

The Allied garrison on the Vesuvius had a permanent radio contact with its commands in Italy. This is what the Navy's connection to February 1944 looked like in basic charts.

A special instruction was issued for the service of sightseeing and transport, one of the first rules of engagement in the Navy.

VISU has organized various courses for travellers - signal course, radio telegraph course, telephonist course etc.

◆ **Sources:**

Archive of the Military Historical Institute - Documentation of the Mornari-ce NoV for the period of October 1943 – May 1945

Naval Review, Volume 1, Zagreb, 1962, p. 765

Naval Review, Volume 12, Rijeka, 1974, p. 350

The newspaper Vezist, Belgrade 1976.

National Liberation War of the people of Yugoslavia

With the funds seized and expert personnel gathered, radio communications are gradually being organized in the Navy. Following the surrender of Italy, Coast Command Split maintained intermittent radio communications with the armed steamships Baker and Stone from September 1943. In the Naval Headquarters of the New Zealand Navy, Hvar, in October 1943, a communication department and radio station were established.

After moving the Navy's headquarters to o. Well, in early 1944, conditions became more favorable for the wider organization of radio communications as a number of Allied radios were received. The Naval Headquarters Radio Center maintains intermittent and permanent radio communications with:

- Eighth Corps,
- the maritime coastal sectors (POS),
- the relay stations of Leo and Zee,
- Bases and
- the Allied headquarters in Italy (Barre and Naples),
- Scout groups and ships travelling in the direction of Vis? Bar? Napulj.

A training course for radio-telegraphist was organized at the Naval Headquarters in February 1944. The POS has organized its own radio communications with the Navy Headquarters, subordinate commands and units, and plantation radio communications with the COV. Armed ships and patrol boats exclusively and temporarily used portable KT radio stations at landings, maintaining a connection to battalion headquarters and a seeding link between the descent units. In a landing raid on the islands of Korcula and Mljet (19-26). IV 1944), between command and individual ships in the colony, radio-telephone communication was organized with light transmission stations (Walkie-Talkies).

Due to the increased demand and lack of equipment, radio communications were maintained on an agreed time schedule, and extremely permanently.

Since mid-1944, there have been regular radio communications with naval units.

NB Red Star, Hadron and Partizan had medium-powered radio stations for intercommunication and co-operation with COV and light low-power transmission stations for radio-telephone communication.

In October 1944, a SCR-284-A radio operator was established between the River Navigation Command in Belgrade and the Naval Headquarters, and in a special radio-network connection with the bases in Kladov, Novi Sad, Šapc, Brcko, Slav. A ship and a naval delegation in Bucharest.

Reorganization of Mornarice NOVJ from and 1st March 1945, through the liaison headquarters of the Mornarice, maritime and coastal commands, have been formed radio centers (v.) in the system of independent radio stations, which with minimal number of equipment solved various radio liaison needs.

◆ **Military Encyclopedia book 7 (Belgrade edition of 1974 p. Other articles of Chapter 6**

1948-1960 - Liaison and observation service in the War Office

Its task was to establish and maintain a link for successful and continuous command of Naval units and installations within the unit, with adjacent units and between sight units.

There were many problems in maintaining the connection, primarily due to the obsolescence of devices for which spare parts were difficult to procure.

The Split-River relationship used a high frequency channel of the PTT Directorate, and from Rijeka to Pula a physical line and one high frequency channel. Due to frequent failures and interruptions on the Split-Rijeka line, especially in winter days, command of the 5th Naval Zone was difficult.

The telephone line with Vise is operated by a wire, and the Palagrus one-way submarine cable. The coastal observation and communications service of the Yugoslav Naval Command lacked the necessary number of transmitters and the work between receiving and transmitting radio was difficult.

The coastal surveillance and communication centres of the maritime zones lacked a receiver for the connection between the coastal surveillance and communications operations centers of the Yugoslav Navy Command and their subordinate observation posts. They had the same disadvantage with observation stations with long-lasting radio stations. The commanders of the observation stations were mostly young active-duty noncommissioned officers with little to no experience. The commanders at all the signal stations were manual sub-officers, who to their knowledge were not much different from their subordinate sailors, so this created difficulties in maintaining communication. The signal stations lacked the required heliographs for observation and signalling stations to maintain communication with the floating units.

Almost all signal stations in 1954 received a nightlight with batteries for night work. The work of the observatories was greatly helped by the publication, in 1955, of the Excerpt from the International Signal Book -, - Rules for Signal Traffic -, - Shadows of Observatory and Signal Stations Vision - and - Regulations for Coastal Observation and Communications Services -.

As early as 1959 and 1960, all ships were 100% loaded with communications and surveillance equipment, mostly equipment acquired as aids or purchased, and only a small portion was of Trojan origin. In order to replenish the Navy units with the means of communication and bring them into a satisfactory state, large financial resources were allocated.

During this period, the Navy was equipped with 64 radars, 324 radio stations, 164 radio receivers, 154 radio transmitters, 52 PELs, etc.

At that time, a general overhaul of many electronic devices was needed, which, coupled with inadequate capacity and lack of expertise, presented enormous difficulties.

The OSOJ (observation and reporting) service, despite the lack of modern resources and staff problems, operated efficiently thanks to the good organisation of observation stations and a staff that performed tasks successfully in difficult conditions.

Development of Armed Forces of the SFRJ 1945.-1985., Military Navy, group of authors, Military Publishing and News Center, Belgrade, 1988., p. 59-61

1960 - 1968 - Navy and SEALs.

Because command security depends on the reliable operation of the communications system, particular attention during this period was devoted to organizing radio-relay hubs and territorial communications centers. In the territory of the 4th Army, the communications system was based on the radio-relay hubs at Panos (Velebit), Kozjak, Kuna (Pelješac), Velež, and Lovćen, and the centers at Šibenik, Knin, Split, and Mostar.

In order to improve the territorial communication system, significant work has been carried out and a wire line from Rijeka to Pula has been laid, a cable line from the Cape - Bileć line has been added, technical modernisation of Army radio stations and military areas have been made, telephone connections have been extended, radio-relay connections have been provided for the purposes of surveillance and reporting services and communications with the armed forces.

There were some shortcomings in the organisation of command and relations with the Navy: unresolved links between warship fleets in subordinate divisions and units, insecure connections between submarine command and submarines in surface and underwater navigation. The new organization ensured a more secure connection throughout, but there was still an uncertain link between the 4th Army Command and the 1st Fleet, and the command of military areas with their fleets. In addition, weaknesses in both territorial and operational radio links were noted, such as the absence of a maritime hub on land (in ports) and an unresolved integration of naval radio links with the territorial system of radio-railway and telegraph-telephone links.

The camera crews in their lineup did not have specially trained personnel or their own communications equipment. This problem was particularly felt in the drills. However, in each case a solution was found - by organizing the fleet's command post on one of the warships or auxiliary ships, or even on land (regularly in the OROSt composition or hub).

The radio link between 4th Army Command and 1st Fleet was resolved by the introduction of a radio-teleprinter. The R-21 and R-22 destroyers are equipped with additional radio receivers - PSE-1300 -, with teleprinters - simens -, and additional radio transmitters - FSK-200 -. Gradually, the long-lived VF radios (TCS and BS) were replaced by new - RD-1 - on all new ships and on older ones when repaired. During 1963, the territorial communications center of the 4th Army Command was modernized.

In order to better resolve the link, in particular with the Navy, it was proposed to install high frequency radio equipment and plan radio communication centers for the 4th Army Command and military areas (marine area) and to procure modern equipment.

▪ **Development of Armed Forces of the SFRY 1945.-1985., Military Navy, group of authors, Military Publishing and News Center, Belgrade, 1988., p. 92-93**

1970 Radio communications in the RM of the SFRY Armed Forces are divided into:

- **radio communication units and installations on land; and**
- **radio communications on ships.**

Land-based radios are in much the same way as those in COV.

Radio communications on ships are the basic type of communication between these units and each other and with the units and commands on shore. Radio means of different frequency ranges, power, transmission speed and mode of operation are used to maintain these connections, including domestic production.

These liaisons shall be organised and managed by the relevant authorities in the commands of naval units and on board vessels.

1968 - 1985 - Liaison and OSOJ in the Navy.

At the beginning of that period, the signal units and the OSOJs in the Navy were not technically equipped and trained to control maritime space and to provide a reliable command and seeding link on the Adriatic Sea Fleet.

In the crisis situations (October 1973 and March-April 1974) it was shown that reconnaissance, alerting and reporting at this military base were not sufficiently efficient because an appropriate system was not built and there were no adequate technical means. In order to address these problems, the VOJIN (air monitoring, reporting and guidance) system and the Adriatic Naval Monitoring and Reporting Service have been operatively integrated.



THE WRECKAGE WAS DISCOVERED IN 1962

In the period up to 1975, depth of observation was increased with four new 40-mile radar stations, covering almost the entire Adriatic.

Six more modern, agile-frequency radars have been introduced into the tactical observation and reporting network since 1980, which are more resistant to interference than previous generations of radar.

The operational integration and modernisation of the observation and reporting service and the air surveillance, reporting and guidance services at operational level have created significantly more favourable conditions for sea and air control in the Adriatic.

In view of the increased sensitivity of the Navy to electronic effects and the increased ability of aggressors to detect them by integration, necessary measures have been taken to increase the robustness of the connection and grip systems.

By modernizing the OSOJ's tactical radar surveillance network, completing the air surveillance, reporting and guidance system at JVP, building and equipping command posts and communication centers, completing the RR communications systems under the - SOVA - and - USOV - plans, building an underwater cable system and replenishing the vessel facilities and coastal defence units with more modern radio equipment - by 1986 a communication system was built that was able to provide necessary, timely and secure connections to the Republic of Korea on the nuclear navy.

In 1985 the introduction of a new automated command and information system began.

The Navy is being given the ability to monitor situation on the ground and receive, process and deliver data in a real short time, with high levels of combat readiness, resilience and stability, high operational capacity, and secrecy of information.

The new STINA-JADRAN command and information system, which integrates the Navy's radar, reconnaissance (radio and radio intelligence) and weapon systems, represents a whole new quality of situation monitoring and command, and significantly improves the combat readiness of the Navy and other forces in the JVP.

The Command and Information System shall aim to provide support to the command in the process of preparing, adopting, executing and controlling decision-making. It contributes to the improvement of combat capabilities of all Naval units in the Adriatic Navy by providing timely, accurate and up-to-date information of command systems and their durable, secure and fast transmission to users.

The network of the STINA-JADRAN command and information system shall consist of:

(a) Stationary part on land:

- Stine-C (in the KVPO operational centre)
- 3 Stine - S (at the KVPS operational centre),
- 3 Stine - R (in the base's operational centre),
- 1 Stina - on the batteries of coast-to-coast missiles and
- 1 Stina - to the OB and mobile art divisions.

(b) Ship part:.

- 29 C3 IS 509
- 6903-202

ON THE HEAD AND TAIL.

Stina C, the headquarters of STINA, is located at the Naval Area Command's main command post and ensures its operation.

Three STINE-S, sector STINE, are located at command posts 5, 8 and 9 of the naval sector. Three STINE-Rs have been located at the naval bases M. Lošinj, Vis and Lastovo. The KIS's ship parts are located on the large patrol vessels VPBR-31 and VPBR-32, and on 6 rocket guns.

Sensors for command and information systems - STINA shall consist of:

- seven radars » 9 KR -409 «, which are in a stationary connection system, included in the KIS-a system. The communication network allows for 38 direct connections between participants of the system. The connections are strengthened. It is possible to achieve 128 connections of the second degree, that is, connections with one intermediary. The number of possible connections in the third degree is 616.

The STINA-JADRAN command and information system shall provide the command and capability to make use of all the achievements of modern decision theory and operational research, such as algorithms for optimizing the planning of naval unit schedules, preparation and deployment of force and resources in the nuclear navy.

In the field of military intelligence, the United States has been involved in a number of terrorist attacks. 125-126.

CONNECTION IN MARINE UNITS RM

- The ship's communications system.
- Connection in the floating unit.

CONNECTION TO THE RM SUBMARINES

- Specification of organisation and application of links on submarines
- Type and distribution of submarine links
- Organisation and application of submarine-related types in location, dispersal, escorting and combat operations at sea

- ♦ **Tactics of communication and observation second part, captain frigate Smailović N., (Marine School Center, Split 1972 p. 6-80.**

- The organisation of the liaison of the strategic operational group to JPV

- Organization of the relations between the Navy
 - Organisation of liaison between the Coastal Defence Joint Operational Tactical Unit
 - Organisation of communications in coastal artillery and missile units
-
- The following information shall be provided:
 - Organization of the ZTJ liaison on the river
-
- ♦ **Rule of Connection OS, War Printers Belgrade 1979 (with amendments and supplements 1987. year) p. 134-145.**