Berlin 10 August 1937

EXCERPTS FROM NOTES ON CRITIQUE OF 1937 COMMAND POST SIGNAL EXERCISE BY THE CHIEF, BRANCH 7; AIR FORCE GENERAL STAFF

.....

5. Air Report Collecting Point. It became evident that the Air Report Collecting Center at Air Headquarters and at Air Force Headquarters+ performed valuable services in the interception of radio reports by reconnaissance planes, of reports by the Aircraft Reporting Service, and of voice-radio communications of own fighters. At the Air Report Collecting Center will also be collected and collated with the previously mentioned reconnaissance and aircraft reporting reports, all particularly urgent reports from the Radio Intercept Service concerning the enemy air forces.

.....

6. Air Force Radio Intercept Service. The Air Force Radio Intercept Service is still only in its initial stages of organization. In contrast with the employment of radio intercept units by the Army, the Air Force radio intercept units in this exercise were therefore not assigned the mission of securing complete coverage on the radio pattern of the enemy. Instead, the only motorized intercept platoon which could be formed for the exercise was employed on the Red side from cases to case in individual missions.

These operations provided the following experience:

a. Within a very short space of time it was possible to intercept all aircraft reporting communications of the Aircraft Reporting Company. Initial faulty finding in locating the station of individual aircraft on the first day were eliminated on the second day of the exercise. On the second day of the exercise it was possible to decode the aircraft reporting signals. However, up to the end of the exercise no success was achieved in attempts to track the course of own (Red) bomber units.

b. After a few hours it was possible to intercept voice radio communications of the Blue fighters. Radio communications of the Blue tactical reconnaissance planes and of the Blue bomber wing could not be intercepted. Above all, efforts to intercept the lively radio traffic of the bomber wing failed, and this would have been necessary during the execution of the penetration in the Delmenhorst airport area after the transfer flight from Greifswald.

The reason for this failure is to be found, apart from the rpovisional composition of the intercept platoon, in the unintended dense radio screen caused by the exceptionally heavy air traffic control and training radio traffic throughout the entire Home Air Defense Zone and Army radio traffic. From this experience it appears quite possible this protective screen to some extent will also exist in the event of an actual war, since then it would also be necessary to carry on air traffic control, training and other radio traffic.

As part of the Radio Intercept Service activities, Red was assigned individual missions of limited radio jamming

+ The Air Force in the German organization included the Anti-Aircraft Artillery arm.

and radio deception. Success was achieved in jamming the aircraft reporting communications ~~xxxx~~ within the Home Air Defense Zone and in deceiving the aircraft reporting units of the Aircraft Reporting Company.

For a proper evaluation of these measures, however, the following must be established:

Successful radio jamming presupposes operations on the precise frequencies used by the enemy, and an enemy expecting such measures will as a rule not find it difficult to use alternate frequencies.

However, radio deception as practiced against the aircraft reporting units of the Aircraft Reporting Company by means of the transmission of false air traffic reports would be a considerably more difficult matter in the case of a real opponent than in the case of a simulated opponent in an exercise. It would be necessary to train and have available for the purpose personnel thoroughly conversant with the foreign radio communications procedures. Even then the slightest inaccuracy would suffice to enable the enemy to detect the deception.

.....

2d Company,
Training and Experimental Battalion
Inclosure to 393/37, Secret

Halle/Saale, 14 Aug 37

EXPERIENCE REPORT

COMMAND POST SIGNAL EXERCISE 1937

I. OPERATING PRINCIPLES.

The Air Signal Intercept Platoon was committed as shown in the attached sketch. Commitment of the platoon at three points proved a sound measure. These three points must be chosen as close to the enemy as possible and in such a manner that at the given depth of the intelligence coverage area favorable DF angles (60^{o}) will be formed even in the case of the farthest enemy targets. The DF posts marked red in the sketch were interconnected and connected with the data interpreting center by telephones operated by the postal authorities. The DF posts marked blue communicated by wireless, through a light Air Signal Corps radio team with the data interpreting center.

Consolidated commitment of the DF and control instruments at one site facilitates leap-frog movements during displacements, supply and replacement movements, communications, and disciplinary supervision. The number of installations to be used will depend on the number of communication channels to be covered. During the exercise it proved possible

to locate the transmitters of the Blue aircraft reporting units as well as the Blue radio beacons. If the enemy should make use of long-wave radio for air communications it would be necessary to commit another DF installation. It is essential to place the redio receiver platoon and the data interpretation elements in the immediate vicinity of the DF center in order to insure the speediest transmission of orders and interpreted data.

In view of the necessity to consider radio tehhnical aspects, the intercept company commander should be allowed to choose the site for his company. During the exercise it was found necessary to echelon one or two radio receiver teams approximately 30 miles rearwards in order to make allowance for dead zones in which enemy shortwave radio traffic could not be intercepted. In the case of a very wide DF operating base line it might prove advisable to place one radio receiver team each at DF station I and III to intercept low-power enemy transmitters near by. During the exercise it was not possible to detect and locate enemy air traffic control radio traffic because that traffic was conducted in the far enemy rear with low volume, so that the messages were submerged by the high volume air traffic control radio communications of units not participating in the exercise. Here, the employment of intercept radio operators on board of reconnaissance

planes (long-range units) seems to hold out prospects of success. For this reason it is necessary to include on the table of organization of each Air Force intercept company 3-6 airborne radio operators in the rank of sergeant. During peace these would serve to train their company in airborne radio operations and during flight in war could detect characteristic feautures in foreign radio traffic; during war they might also serve the same purposes on ships, this latter being a wartime mission.

Experience during the command post exercise showed that the operational order for a radio intercept company must contain the following points:

(1) Penetration depth in the operation.
(2) The boundaries of the intelligence zone.
(3) Areas of main effort for detection and locating operations.
(4) Command post of the general commanding the air forces served.
(5) An outline map or written description of the existing wire communications and airfields.

The order must be given timeously enough to enable the company to carefully reconnoiter suitable sites for, and to establish its three DF stations as well as its rearward radio receiver team, leaving one or two days before commencement of the exercise during which the company can identify the normal radio traffic in the assigned intelligence zone.

II. EQUIPMENT:

II. EQUIPMENT.

The intercept platoon committed in the command post signal exercise comprised one data ~~interpreting~~ evaluation team, four radio receiver teams, six DF teams, and three light air signal radio teams. In the matter of instruments the platoon had morse code, high frequency, and all frequency receivers, for DF operations long- and mediumwave installations, and as control transmitter a motorized Type Fu. G. III--Ground unit. These instruments are only conditionally suitable for the Air Signal Corps Intercept Service. The Morse code receiver is suitable only to monitor aircraft reporting communications because of the time lost in changing tapes and because of inadequate selectivity. The high-frequency receiver does not cover the 50-90 meter wavebands. The all-frequency receiver is not transportation-proof. The long and medium wave DF instrument has a receiving capacity permitting a location of air traffic control communications transmitted by 100-Watt instruments at a maximum distance of only 72 miles. All receivers used should have the same scale graduation to facilitate tuning in and the finding of the frequencies ordered. The Fu G III instrument is difficult to tune in on shortwave bands and subject to failure due to shock during transportation. The Type C small power unit is not suitable for sustained operation, but must be maintained

in constant operation during control DF activities, although transmissions only occur during approximately 90 minutes each 24 hours. As a control transmitter the instrument should have a transformer and be powered by batteries, if for no other reason then to provide training as a mobile transmitter using a roof-type antenna in simulation of an aircraft. The three-phase converter can be used only very rarely because there are usually no facilities to plug in this instrument. To improve the equipment, the priority supply to the intercept company of new Morse code receivers is recommended, besides three 100-square-meter DF installationsto receive far distant transmitters. The technical inertia of the frame here is not important, since it will not be used to locate mobile transmitters. Flexibility of the company during displacements will not be impaired by this heavy equipment to any serious extent because it has enough long- and medium-wave DF instruments available for leap-frog movements in displacement.

The data interpreting element of the platoon was an improvised unit with provisional and inadequate equipment, which seriously delayed work. It is essential to assign the data interpreting unit 2-meter omnibuses carrying all equipment necessary for interpreting operations.

A special telephone cable and a portable switchboard must be provided connecting the receiver teams and the DF stations with the data interpreting element. Another line between each receiver team and the data interpreting element must also be provided to enable the data interpreting element to listen in to important communications intercepted. In the light of experience during the past winter it appears advisable to provide a heavy power heating and lighting units for the data interpreting and receiver platoon premises. This power unit could at the same time furnish electricity for the control transmitter and DF Station II.

III. VEHICLES.

The organization of the intercept platoon shows that too many motor vehicle dirvers are assigned for the necessary number of radio operators. To economize in motor vehicles the organization of a new Control-DF team as follows; is recommended:

1 Type 15 motor vehicle with telephone center as command vehicle

1 Type 72 motor vehicle with built-in Fu-G-III--Ground (motorized) instrument as control transmitter and

1 two-axle DF trailer.

It is necessary to use a Type 72 motor vehicle for the Fu-G-III--Ground (motorized) set because the Type 61- motor vehicle of the company is overloaded by 2,200 pounds with this set

and therefore tends to sway, and because these vehicles are not strong enough to haul a 2-axle DF trailer in addition to their load. As a further measure to economize in motor vehicles it is recommended that the radio receiver teams betrained for transportation 50 percent on Motor Vehicle Type 72 and 50 percent on 2-axle service trailers.

IV! PERSONNEL.

The personnel strength was inadequate for continuous operations during the exercise. One-half of the teams must have three men per radio receiver, the other teams can temporarily be assigned two men per receiver as an experiment. It is not possible in the intercept service for radio operators to function at the same time as drivers, since either the vehicle or the intercept operations will suffer. The number of radio operators required must therefore be assigned in full and the number of drivers can be reduced as recommended in Par. III, above. According to the operating organization of the company, each of the three DF stations must be assigned a cook, a clerk, and an Air Force Signal Corps equipment administrator, so that the troops within the station can operate independently insofar as their housekeeping and minor repairs to their equipment are concerned.

DF Station II, to which the radio receiver platoon and the data interpreting elements will be attached, will be numerically so strong that it will need a large type field kitchen.

V. INTERCOMMUNICATIONS.

Even if no wire lines are available, the control radio transmitter teams will be adequate for safe connections between the three DF stations. One control frequency will be required per DF installation. Provisions are made for motorcycle communications if necessary. For communications between the data interpreting element and the generallcommanding the air forces served it will be possible to make use of the telephone lines of the nearest Air Force commander to that headquarters. In view of the long distances separating these headquarters from the data interpreting section and t that section from the DF stations thought should be given to the advisability of assigning a helicopter, since personal reports by the company commander to the general commanding the air forces served will be indispensable.

S/ Riba
Certified Correct:S/Gottschling.

D.R.d.Lw.u.Ob.d.L
LA. NVW/III c geh.

Excerpts from original dated 15 September 1939

SITUATION FOR INTERCEPT SERVICE UNITS IN AIR MANEUVER BY AIR COMMAND II, 1935, 24-25 SEPTEMBER 1935

A. GENERAL SITUATION. Red Western Power and Blue Eastern Power have been at war since beginning of August. Frontier between Red and Blue on the ground in a line extending from Nordeney through Minden, southwest fringes of Thuringia Forest to Hof. Blue has been forced to retire eastward during August and September. Since 20 September operations on the ground have been brought to a halt in a line from Luebeck along the east banks of the Elbe-Trave Canal to the eastern banks of the Elbe River as far as the borders of Czechoslovakia.

B. SITUATION BLUE.

1. On the Ground. Since mid-September Blue has been assembling attack forces in the area around and south of Luebeck-Schwerin under the Army Group commanding in the Luebeck-Havelberg zone. The attack is to be launched early in October to strike the flank of enemy forces which have advanced in the Elbogen (Bend) area towards Stendal.

2. In the Air. Continuous air attacks by the superior Red air forces against the Oder River bridges between Stettin and Fuerstenberg have seriously XXXXXX disrupted Blue supply and

replacement movements. Most of these movements Blue ~~are~~ seaborne for Blue's north flank.

Blue bomber forces have recently attacked enemy air ports in the area south of Osnabrueck. A few Red air ports south of Osnabrueck were reported evacuated on 23 September.

C. RED SITUATION

1. Ground. To continue its drive in the sector of the provisional army group engaged in the Stendal-Luebeck area it is essential to move forward new troops and to develop the communication lines to the front in captured Blue territory.

2. Air. Owing to demolition of the airfields ~~of~~ Blue in the captured territory the units of the Red Air Force supporting the north flank in the zone of the provisional army group were only able to displace farther eastwards into the zone of operations west of the Elbe River on 23 September.

D. SITUATION FOR RADIO INTERCEPT OPERATIONS.

Past monitoring of the radio traffic on both sides has revealed that the two air forces generally are communicating on the following wavebands:

a. 300-600 meters
b. 900-1200 meters
c. 2000-3000 meters
d. 3200-5800 meters

It is known, however, that both Blue and Red are equipped with radio instruments capable of operating on all frequences between 100 and 6,000 kHz.

By Order
S/Gottschling

Distribution:

Reich Minister of Air
& CINC, Air Force
Air Office, Sig.Div/III c Secret

~~Excerpts from~~ the Original ~~letter~~ Dated ~~7 August~~ 1936

Air Force maneuver Central Germany, 1936; Intercept Service--Situation.

A. GENERAL SITUATION

After a period of severe tension between Blue (Central State) on the one hand and Red (Eastern State) and Green (Western State) on the other hand, Blue War Office ~~xxxiXxxxx xxxx~~ proclaimed Mobilization and a state of accelerated preparation for defense effective on 17 August. Early on 18 August, Red broke off diplomatic relations with Blue. An early Red mobilization is to be expected.

Since beginning of the tension the frontier guard forces on both sides have been called up and the frontier positions are occupied.

In fulfillment of treaty obligations, Green (West) will mobilize and concentrate its forces simultaneously with Red (East).

BORDERS OF BLUE (Central State)

North: Baltic Sea and North Sea.

East : Oder River between Stettin and Hohensaaten, then line through Hoehensaaten/Freienwalde, Strausberg, Koenigswusterhausen, Zossen, Luckenwalde, Herzberg, Uebigau, Riesa, Nossen, Freiberg, Neuhausen (at

border with Czechoslovakia).

South: Neuhausen, along border Germany with Czechoslovakia at Waldhausen (at northern fringe of Bohemian Forest) through Weiden, Pressarth, Bayreuth, Bamberg, Schweinfurth.

West : Schweinfurth-Bad Kissingen-Gersfeld-Fulda River between ~~Schweinfurth~~ Gersfeld and Muenden-Goettingen-Northeim-Kreiensen-Sessen-Gielde-Schoeningen-Salzwedel-Hitzacker on the Elbe-Elbe River to mouth.

Localities: ~~All Blue~~ all (Central State).

Red (Eastern State): All territory east of Blue border.

Green (Western State): all territory west and south of Blue

Czechoslovakia: Neutral.

B. GROUND AND AIR SITUATION: Blue and Red.

Blue and Red ground forces started strategic concentration on 17 and 18 August, respectively. On both sides Civil Air Defense and Air Raid Warning Service mobilized. Both Air Forces at their tactical airfields close to border ready for take-off. Their targets on both sides are the opposing air forces and their ground installations; mobilization centers, routes used in mobilization, administrative centers, industries. Owing to heavy Red superiority, however, Blue compelled to place more emphasis on defensive action. It is to be assumed that initial Red air strikes will be directed against targets in southern part of Blue, with particular

emphasis on industrial region of Leipzig-Halle, which is of vital importance for Blue.

Treaty between Red and Green permits Red air forces to land and re-supply on Green airfields.

C. SITUATION FOR RADIO INTERCEPT SERVICES.

Past observation of Blue and Red radio communications shows that both air forces use the following frequencies:

1. In general use the following bands:

295-1200
2500-3500
4000-3800.

2. a. Intercommunications between bomber forces and bomber ground-air communications on frequencies between 3200 and 5700 kHz.

b. Communications between reconnaissance units and their tactical and field type airfields as a rule on long-wave between 300 and 600 kHz.

c. Communications between airborne fighters and their ground installations on short-wave voice-radio. Frequencies so far recorded between 2500 and 3200 kHz.

d. Civil Air Defense units use transmitters operating on frequencies between 295 and 3200 kHz.

e. Air traffic control communications hitherto observed on 327 kHz.

f. Neither side has yet been able to determine the detailed Aircraft Reporting Service organization of the other side.

g. Call signals in the past have been made up of three letters of the alphabet and two numerals. In the case of the bomber forces it was also observed that the call signal was formed by adding a letter of the alphabet and/or a numeral to the basic call signal when communicating with radio sub-stations. As a rule call signals changed daily.

It is also known that both Blue and Red have radio equipment covering the whole range from 100 to 6,000 kHz.

By Order
S/ Gottschling.

Distribution:

Note: Intercept operations in Air Force Maneuver Central Germans, 1936, were directed by the Army Intercept Control Station Treuenbrietzen under Captain Randewig supported by Air Force Major Gottschling and Captain Immisch (Reich Air Ministry, Air Office, Signal Affairs Division/IIIc).

Appendix 5, Chapter 4a, Section 5.

C O P Y

ARMY HIGH COMMAND
File: E 13 AHA In 7 Ic/IV
No.: 852/36 Secret. Berlin, 18 March 1936

To

Army Group Commands 1-3

Signal Staff Officers 1-3

Corps Area Command	I	HQ copy	plus	3
	II	"	"	"	1
	III	"	"	"	2
	IV	"	"	"	1
	V	"	"	"	3
	VI	"	"	"	2
	VII	"	"	"	3
	VIII	"	"	"	3
	IX	"	"	"	3
	X	"	"	"	1
Army and Air Force Signal School		"	"	"	2

Information Copy to CINC, Air Force

" " " Air Office, Signal Affairs Division

" " " Joint Military High Command Office (Wehrmachtamt), Intelligence Division

SUBJECT: Allocation of intercept coverage zones to the intercept companies and cooperation between intercept companies and static intercept stations.

1. The individual intercept companies are allocated intercept zones. The observation of communications traffic in these zones and the interetation of the data thus procured will form the basis for training.

2. Each in ercept company is allocated three intercept zones:

a. A Category I Intercept Zone. Training must qualify the company for immediate commitment to monitor radio communications within this zone and enable it to secure complete coverage on all radio traffic in the area and to interpret the date thus secured.

b. A Category II Intercept Zone. Training must insure that the company will be able, after a brief initial period of preparation, be able to secure complete coverage on all radio traffic within this zone and to interpret the data thus secured.

c. A Category III Intercept Zone. Training must insure that the company after a longer initial period of preparation will be able to intercept and interpret all radio traffic occurring within this zone. It XXXXX will be furnished all data essential for this purpose. Special training for this type of intercept activities need not be given

If a company should be committed in such a zone it might be necessary to reinforce it with trained personnel from a static intercept station.

3. Efforts will be made to so arrange Categories I, II, and III in such a way that the company involved will be able to cover it from its current station. Radio traffic to be intercepted will include all radio communications between static and mobile radio stations of the Air

Force and all other static and mobile military and paramilitary radio stations, such as those of the border patrol and frontier defense units, and so forth.

4. In several of the Category I Intercept Zones, the radio traffic during peace will be so small that it will not be possible to give practical training in the interception and interpretation of data. In such cases practical training will be given in Category II and III zones.

5. ~~Zone Allocations~~.

Intercept Company	Intercept Zone	Category
N.41,(Koenigsberg)	Poland,Lithuania,	I
	Russia	II
	Latvia,Esthonia	III
N.18 (Liegnitz)	Poland	I
	Czechoslovakia	II
	Russia	III
N.7 (Munich)	Czechoslovakia	I
	Italy, ~~Hungary,Rumania~~	II
	France,Austria, Switzerland	III
N. 25 (Stuttgart-Cannstatt)	France (including N.African Colonies)	I
	Switzerland	II
	Spain	III
N. 9 (Wetzlar)	France (Continental)	I
	Belgium	II
	Britain, Holland	III

Army & AF Signal School, Halle on Saale	France, Belgium	I
	Britain	II
	Holland	III

6. The Cryptographic Center of the Reich Ministry of Defense will furnish the companies the necessary basic data for their monitoring and interpreting activities.

7. Intercept companies and Static Intercept Stations will currently exchange all intercept and data interpreting results.

COINCIDING INTERCEPT ZONES

Intercept Zone	Intercept Company	Static Intercept Station
Poland	N.41, N.18	Koenigsberg, Jueterbog, Breslau
Lithuania, Latvia Esthonia	N. 41	Koenigsberg
Russia	N. 41, N. 18	Koenigsberg, Jueterbog, Breslau
Czechoslovakia	N.18, N.7	Jueterbog, Breslau Munich
Italy	N.7	Munich
Austria	N.7	Munich, Breslau
Switzerland	N.7, N.25	Munich
France	N.9, N.25, N.7 Army & AF Sig.School	Stuttgart, Muenster
Spain	N. 25	Stuttgart
Belgium	N.9, Army & AF Sig School	Muenster
Britain	N.9, Army & AF Sig School	Muenster
Holland	N.9, Army & AF Sig School	Muenster

~~Appendix 5, Chapter 4a, Section 5.~~

8. If it is not possible to moniter an intercept zone from the garrison of an intercept company, radio operators from the company will be temporarily attached to the static intercept station (or that station's) frontier DF station) with which its intercept zone coincides. Any extra expenditures incurred will be paid from the funds allocated to Signal Battalions 7, 9, 18, 25, and 41 under Chapter VIII A 17, Head 34. Only such ratings and privates will be so attached to the static stations who have already received adequate intercept training and require only supplementary training. In general there will be no exchange of personnel between the ~~personnel of the~~ companies and ~~those~~ of the static intercept stations. However, such exchanges may be arranged in special circumstances by the corps area commands.

9. For advanced training, data interpreting personnel of the intercept companies can be attached to the appropriate static intercept stations for training courses lasting three months. Such personnel will also be detached for participation in the training courses conducted by the Cryptographic Center of the Reich Defense Ministry.

10. The use of the intercept companies to monitor foreign maneuvers in cooperation with the static intercept stations will be stepped up from 1 June 1936 on. Two mobile field

assignments per intercept company annually are envisaged.

Each such assignment will be ordered by the Reich Ministry

of Defense.

By Order

S/ Fellgiebel

Certified Correct

S/ Liebscher
Technical Signal Inspector

ORGANIZATION OF THE RADIO RECEIVER SERVICE

(Particularly during Operations of 1st Platoon, 26th Signal Battalion in the Rhineland). Status 21 April 1936

Legend.

= Receiving Station

= DF Post

= Control Transmitter

R.K.M. / Chi.Stelle / Auswertung = Reich Ministry of Defense, Cryptographic Center, Data Interpreting

Gen.Kdo VI / Abw.Stelle = Corps Area Command VI, Intelligence Division

F.Fu.E.Stelle Muenster / Auswertung = Static Intercept Station Muenster, Data Interpreting

F.Fu.E.Stelle Stuttgart / Auswertung = As above for Stuttgart

Verst.1.Zug 3./N.26 = Reinforced 1st Platoon, 3d Company, Signal Battalion 26

Empfangszentrale = Receiving Center

3.5Km.s.s.o.Nideggen (1 Km.nördl.Muldenberg) = 3.5 kilometers southsoutheast of Nideggen (1 kilometer north of Muldenberg).

3.5 Km.nortdwestl.Tondorf = 3.5 kilometers northwest of Tondorf.

5 km.s.s.o.Löbenich 1.5 km nördl.Gevelsdorf, sudl. Erkelenz = 5 kilometers ssothsoutheast of Loebenich (1.5 kilometersnorth of Gevelsdorf, south of Erkelenz

4 km nordostw. Aldekerk = 4 kilometers northeast of Aldekerk

P.1, P.2, P.3, P.4 = DF Points or Stations 1, 2, 3, and 4.

Map Scale 1:300,000.

Static Intercept Station Muenster
Br. B. No. 166/36 Secret

Legend.

Gang der Meldungen	Reporting Channels
R. K. M.	Reich Ministry of Defense
Chi - Stelle	Cryptographic Center
Auswertung	Data Interpreting
Fallweise	From case to case
F.F.E.-Stelle Muenster	Static Intercept Station Muenster
Auswertung	Data Interpreting
Gen.Kdo. VI	CorpsArea Command VI
Abw. Stelle	Intelligence Division
~~XXXXXXXXXXXX~~ 3./N.26	3d Co.,26th Sig.Bn.
F.-Zentrale Juelich	Radio Center,Juelich
Laufend	Continuous

Ausgehende Meldungen — **Outgoing Messages**

Symbol	Meaning
________ +	Telephone Situation Reports
-:-.- -.-	Broadcast reports
- - - - -	Radio Situation Reports
.... ++	Daily Reports (Diplomatic)
+ + + + + +	Radio reports
-.-.-.-.-	Diplomatic Code message
-/-/-/ -/ -/	Belgian code messages
>>>>>>>	Tension operational reports
~~	French code messages
# # # # #	-"- daily reports
~~The times given~~ Die Zeitangaben sind Abschlusszeiten der Meldungen	The times given denote time message ended

Incoming Messages

Symbol	Meaning
-x-..-x-..-x-..	Telephone interim reports
—0—0—0—0—0—	DF reports in numerals (telephone)
x x x x x x x	" " (by letter)
....	Daily reports from intel agents
-/-.-/-.-/-.-/-.-/-	Tension reports
-/-/-/-/ -/-/ -/-/	Radio Situation Reports
-x-x-x-x-x-x-x-x	Reliable (de-coded) messages
+ + + + + + + +	Radio reports
>>>>>>>>	Operating reports

Footnote +, p. 155: Frequencies, networks and times of radio traffic

Footnote ++, p. 155: Only identification messages, such a call signals, contact signals, operating signals, end of message etc.

Appendix 8, Chapter 4a, Section 14.

Graph 1

Legend.

Erfassung Peil-Kdo.Stand Auswertung	Intercept element D/F C.P. Data Interpreting
Peilbasis von 150-250 km des Lang-u.Mittelwellen-Peilzuges einer Fern Aufkl. Komp.	90-150 mile operating base line of the long- and mediumwave D/F platoon of a long-range radio intelligence company

Graph 2

Legend.

1.,2.,3. Peil Grundlinie (10, höchst. 15 km)	First,Second,Third D/F operating base line (6 to maximum of 9 miles)
Optimale Peilbasis von 30 km des Kzw-Nahfeldpeil-Einsatzes einer Nahaufkl. komp.	Optimal D/F operating base line of 18 miles in shortwave D/F operation by a close-range radio intelligence company.
b, c, d,	Intercept, Control D/F, and data interpreting stations
a	Intercept, Control D/F and data interpreting center
- - - - - - - - - -	Radio communication channels
//////////////////	Telephone (Wire) communication channels.

(Only tentative, not stereotype)

CHAPTER 5

Teil 6 THE RADIO INTERCEPT MISSION FOR THE AIR FORCE
(With one Appendix)

The mission of the Intercept Service has been dealt with in broad outline in the chapterson general definitions, the specific organization of the Intercept Services. and the employment of those services with the Army. Although the mission of the service for the Air Force was in many points similar to its mission for the Army, there were certain special features which merit mention.

In accordance with the nature of air power, special emphasis in communications intelligence will naturally be on the interception and interpretation of communications of the foreign air forces in order to supplement the data procured with other intelligence media, such as air reconnaissance, press monitoring, and agents reports.

I. PEACETIME MISSIONS AND MISSIONS DURING TIMES OF TENSION AND IN WAR.

1. Peacetime Missions.

a. Monitoring of Communications Traffic in General and Air Communications in Particular in Adjacent Countries. Special attention must be devoted to the more important Army, Navy and Air Force maneuvers and air defense and air raid protection exercises.

b. Special Data Interpretation Objectives. The important items here are: characteristic features of foreign air organization (including the ground organization of foreign air forces); foreign air tactics; command, reporting, and navigation systems; operating procedures, coding methods, radio frequencies used, particularly in connection with reconnaissance activities, artillery adjustment fire, DF activities and deceptive and concealment communications traffic. All traffic of these types was to be kept under constant observation in order to learn lessons for application in own operations.

c. Exploitation of Foreign Radio Traffic for Navigation by Own Bomber Forces. Foreign transmitting stations which can serve as radio beacons must be kept under constant observation to familiarize personnel with their frequencies and operating procedures and to be prepared for any changes which might be introduced during war.

d. Coordinated Action with the Aircraft Reporting Service to Test the Efficacy of the Radio Intercept Service.

2. Missions during war. In the event of war it is necessary that the Intercept Service must already during peace have procured the basential basic data required for war and must during war devote its attention primarily to the following missions.

a. Recognition of the operational and tactical intention

3 intentions of the hostile command by means of timeous detection of the strategic concentration of enemy air power. Here, early determination of the types of air units stationed at the various enemy air bases is of eminent importance.

Intercept data is a valuable supplement to the intelligence data procured by close and long range air reconnaissance, and the objective of the missions assigned to these two branches of the intelligence service will as a rule coincide. Particularly during dark and at times when the enemy are in a position to deny the approach of own reconnaissance planes, radio intelligence will temporarily be the only means of intelligence available.

b. Since bomber forces penetrating over enemy territories must as far as possible avoid radio communications in order not to betray their position to the enemy, the radio intercept service will have the mission of tracking the bomber force and ascertaining whether it has succeeded in executing its mission, and whether it has suffered losses. Very often this can be ascertained at an early stage from enemy radio communications.

c. For use by the Aircraft Reporting Service, all items of information intercepted which reveal the take off of enemy air units and their penetration over own territories as well as their approach routes must be reported currently and immediately to the Air Defense Command and to the nearest local

4 station of the Aircraft Reporting Service. This tracking of enemy air forces is particularly important during that part of their approach flight which is beyond the operating range of own D/F installations++ and own visual and oral air observers.

d. For navigational purposes it is essential to determine to what extent the foreign radio transmitters remain in service which have been recorded during peace as suitable for navigation of own air forces, and whether they continue to operate at the known times, or at what changed times, and what call signals and frequencies they use; efforts must also continue

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Footnote +, p. 160: As will be seen at the close of this present chapter, the information offered here is based on a decree of 1935, according to which the reports concerned were to go not to the "Defense Forces" but to the officers commanding the various air defense areas directlyas well as to the nearest local station of the Aircraft Reporting Service. After activation of the various air fleet headquarters, with their radio intercept control stations and their III (Intercept) Battalions for their HQ Air Signal Regiments, the intercept control stations were required to forward all reports, inclusding those on approaching enemy air units to the intelligence staff officers of their respective air fleets, to the Aircraft Reporting Service. and to the Cryptographic Center of the AF CINC. It was only as a result of wartime experience later on that they reported directly to the air defense forces. In addition, air corps were assigned their own headquarters intercept companies and where necessary individual fighter units were assigned special radio intercept detachments.

Footnote ++: The 1935 decree could not use the term radio position-locating installations because these only came into use later. For this reason the text of the last sentence in Par. 2.c, in the original reads: ".....of particular importance for thet part of their approach flight which is 'also' outside the effective range of own observers.

to detect other radio transmitters which could serve as navigational supports for own operations. Any radio beacons or other radio transmitters thus used for navigation by own units during operations against the enemy must be kept under constant observation, also while units using them are en route.

e. In connection with the above the Intercept Service will at times be able, during enemy air operations extending into German territories, to determine the location, transmitting time and frequencies and call signals of the radio beacons by which the enemy air units orient themselves while en route. This will not only make it possible for German air units in an immediate penetration into enemy territory to use these radio beacons for their own orientation, but will also create possibilities for interference with the enemy orientation system or for transmissions designed to mislead the enemy.

f. Another mission of the Radio Intercept Service for the Air Force is to intercept and interpret enemy and neutral weather reports and to use them for navigational purposes.

II. THE NEED FOR CONSTANT TRAINING AND PRACTICE!

The demands made by an air force on the radio intercept service during its own or foreign air maneuvers as well as in times of emergency are such that they can only be fully met by personnel constantly and systematical trained to execute the

6 missions enumerated under I, 1, and 2, above.

In addition to such personnel training it is urgently essential to establish a separate communications network available for exclusive use by the Radio Intelligence Service.

Only a Radio Intercept Service functioning at lightning speed can satisfactorily execute the missions assigned to it by an air force, and can make it possible for its own side's command to take effective countermeasures against enemy action.

III. Sections I and II, above are based on the basic regulation issued by the Minister of Aviation and CINC of the Air Force, Signal Section, Operations (IIIc) Division of June 1935 under the title"The Missions of the Radio Intercept Service for the Air Force, " and signed "Martini (Der R. d. L. u. Ob. d. L. (LA. (NVW) Ia/III a.g. vom Juni 1935: "Das Aufgabengebiet des H.-Dienstes fuer Zwecke der Luftwaffe," gez. Martini (Abtlgs. Chef: LA/NVW); Distribution: Reich Defense Ministry 10 copies, Air Defense Area Commands I-V, each 1, Signal Division/Air Office 4 copies.

For further information the reader is referred also to the appendix to this present chapter: "Directives for the Observation of Foreign and Own Air Maneuvers (Richtlinien fuer die Beobachtung fremdstaatlicher und eigener Luftmanoever.)"

CHAPTER 5. Appendix

COPY

The Reich Minister of Aviation and CINC of the Air Force — Berlin, 27 September 1935

DIRECTIVES FOR THE OBSERVATION OF FOREIGN AND GERMAN AIR MANEUVERS

1. Radio intercept and data interpreting activities will include all radio traffic of both parties connected with the air maneuver, and thus all radio communications of the attacker, the forces defending on the ground and in the air, the aircraft reporting, and the civil air defense air raid warning services.

2. It is particularly important to gather all experience for use in a case of emergency and to determine whether the Radio Intercept Service (known as Observation Service in the case of the Navy) actually can meet all requirements and what improvements are necessary in this direction. Will it be able to recognize the ground organization (headquarters, command posts and tactical airfields), the strengths of the air forces committed and their operational plans and the location of their commands, the point of commitment and strength of ground defenses timeously, and over and beyond this can it be expected to recognize the approach routes and targets of attackers early enough to permit timeous action by the active and passive air defense authorities, which past experience seems to indicate is beyond the capabilities of the aircraft reporting Service?

3. In detail the Air Force in the matter of the interception of radio communications during the air maneuver attaches special importance, ~~inter alia~~, to the following points:

a. Operational orders (for reconnaissance units, bomber wings, including information of their bombing targets, and fighter wings) and the take-off and return landing reports of attacking units.

b. The call signals of ground and air-carried transmitters (of particular importance to detect attacker's coordinating signals after take off).

c. The dispatch of bomber wings (and their bombing targets), fighter wings, and reconnaissance units of the defenders (operational orders, take-off and return landing reports, coordinating signals after take off).

d. Call signals of defender's ground-air radio stations.

e. All air traffic control communications (weather reports, DF traffic, positions of radio beacons (mobile) and landing beacons, route orientation to prevent collisions during flight in cloudy and foggy weather without lights.).

f. Reports by the aircraft reporting service and forward patrol aircraft, if such are committed, and the time-lag of such reports.

g. Radio communications of the antiaircraft artillery forces.

h. Orders given

by wing commanders while airborne

by ground commands and air ports to ~~airborne~~ units during flight

ground commands to ground defense units.

i. Reports by

reconnaissance planes (tactical reports)

reports on air combat action

reports on bombing action

station reports by aircraft, etc.

j. Approach direction and time of enemy bomber forces or individual planes.

Certified a true copy

S/ Liebscher, Tec. Inspector (Sig).

CHAPTER 6

BASIC PRINCIPLES TO BE OBSERVED IN THE INTERPRETATION OF RADIO INTERCEPT DATA; IN INTERCEPT RADIO OPERATION, AND IN THE SELECTION OF PERSONNEL FOR THE SERVICE
(TRAINING, BACKGROUND KNOWLEDGE)

A. DATA INTERPRETING.

Together with data securing, data interpreting is the most important element of the whole radio intelligence service.

I. THE NATURE AND PURPOSES OF DATA INTERPRETING.

1.

1. Under data interpreting is understood the processing of the material from the various branches of the Intercept Service (radio receiver service, DF service, telephone listening service, actual intercept service, and so forth), and its analyzation in order to secure therefrom reliable data or safe assumptions concerning the enemy situation, followed by its formulation to make it intelligible to the higher level user commands. These activities are carried out by the data interpreter element, and the processing personnel are called data interpreters.

2. As a secondary mission the data interpreting element must record all acts of negligence by the enemy communications services which facilitated the interpretation and bring them to the notice of those responsible for the control of communications on its own side, so that these can take measures to protect own communications traffic against jeopardization. These authorities will at all times gratefully accept all recommendations in this direction.

II. The process of data interpreting is organized in

Operations interpreting

DF reports interpreting

Communications traffic interpreting

Message content analysis (including decoding)

Final interpretation.

In practice these processes overlap closely.

1. ~~Operations Interpreting~~. By recognizing and recording foreign operating procedures, operations interpreting or operations analysis provides the groundwork for observation of radio communications. From such items as call signals, frequencies used, connecting and operating signals and traffic procedures (traffic and message formulations) it is possible to identify the intercepted transmitters as to their nationality, whether they are Army, Navy, Air Force stations, or stations of the Postal or other civil authorities, and whether they are mobile or static units, and so forth. In a certain sense the operations interpreting might be called the intelligence branch for tracing foreign radio transmitters.

2. DF data interpretation or analysis by coordinating the DF data obtained by the individual DF installations determines the station of intercepted radio transmitters and their movements, if any; the station or position of a radio transmitter indicates the position of the command to which it belongs. From the positions thus determined it is possible to determine the geographical

3 disposition of the troops committed.

The findings of the operations and DF reports interpretation are used to compile the positions overlay, on which the map position of every radio transmitter located is entered together with its call signal and the time at which its location was detected.

3. Communications Traffic Interpreting or Analysis serves to clarify the [illegible] intercommunications and traffic relations between the various foreign radio transmitters. Entry of these interrelations together with notes on the wave lengths used (hence the radio traffic network) in the positions overlay produces the geographically oriented radio traffic map. Combined with the finding of the operations analysis, it provides information on the commitment of the various radio transmitting stations and the units to which they belong and affords indications as to troop strengths, organization, movements and intentions of the enemy.

4. The Message Content Analysis processes and clarifies the actual contents of intercepted communications. If messages are encoded, they must first be decoded.

5. The final Analysis consolidates the individual findings of the various interpreting or analysing elements and produces the tactically clarified radio traffic map. From the overall result it draws conclusions and formulates them

4 as reports. Thus, the situation map and the written situa-
report develops, the latter taking the place of an oral re-
port furnishing all information not visible from the situatio
map.

B. RADIO RECEIVING SERVICE AND INTERCEPT PERSONNEL. Radio intercept personnel for the receiving operations and for data interpretation are as follows

Radio Receiver Operators(simultaneously DF operators)
Data Interpreters and Language Translators
Decoders.

I. ~~Radio Intercept Radio and DF Operators~~.

1. Training and Background Knowledge.

a. Must be able to receive 100-120 morse code ciphers per minute.

b. Must be completely familiar with the radio charastics of the country which they are to cover, namely,

radio operating procedures
traffic circuits
traffic receiving
the frequencies used
the nature of the call signals used.

c. In like manner. the radio operators must be able to differentiate between messages from transmitters of an

army
a navy
an air force
a police force, a railway system or a postal service

5 press agencies
inter-state communications (diplomatic services)
colonial service messages
weather, exchange, and mercantile messages
private messages
operating messages
agents' messages.

2. Employment. With the above qualifications, the intercept radio operator is employed

in radio traffic detection missions executed on special orders when the radio situation is unclarified;

in monitoring missions, which when possible will be continuous and otherwise intermittent;

in radio receiving missions which according to circumstances might be continuous or might be ordered from case to case.

a. In the case of a completely unclarified radio situation in which all data required for the definition of a mission are lacking, including information on wavelengths and call signals used, radio traffic detection might be ordered. In such casxs the mission is subdivided in accordance with the wavelengths on which the individual radio receivers can operate. The object is to clarify the situation in respect to the nature and scope of foreign radio traffic and thereby create the possibility for more precise directives
6 governing monitoring and intercept missions.

Monitoring means that certain channels using identified

6 call signals will be kept under constant surveillance. The purpose is to secure adequate information concerning the radio receiving range concerned, that is, monitoring must make it possible to determine the operating procedures, traffic circuits, traffic volume, normal radio picture, and deviations from the normal.

c. Radio receiving means the actual process of radio interception of communications, uninterruptedly, on specified traffic channels. The object is to intercept every radio message and all radio traffic and thereby obtain a complete radio picture. The identification of radio traffic by foreign intelligence agents is also included under this head.

A well trained intercept radio operator must be able to support the data interpreting work of the actual data interpreters and to supplement it. This applies both to the technical and tactical analysis of radio intercept data.

II. DATA INTERPRETING AND DECODING PERSONNEL:

1. Data Interpreters. These personnel require a knowledge of several foreign languages, and if possible should be certified translators. They must also be familiar with

the general radio circumstances of the country against which they are to operate

the military establishment and organization of that country, its army organization, its various arms and services, their training programs,

7 their commands and weapons, etc.

and must have a practical working knowledge of their own signal equipment and signal traffic, together with an intimate knowledge of tactics and operations.

2. Assistant Data Interpreters. Smaller demands are ma made on these personnel, particularly in regard to their linguistic qualifocations. They are employed primarily at operating, traffic, and DF analysis.

3. Decoding Personnel. These personnel must have the same standards of education and training as the data interpreters. Decoding ability presupposes such a high degree of talent that not every good data interpreter is suitable for specialized training as a decoder.

4. Broadcast Monitoring. The constant monitoring of radio broadcast traffic is also a responsibility of the data interpreters. [illegible] emphasis here will be on items of a military nature or having a bearing on military matters or events. It is essential to establish a card index containing the following:

a. a list of all broadcasting stations to be monitored and showing their position, their wavelengths, their sound volume or transmitting power and their operating range, etc.;

8 b. information on characteristic features of the broadcasting station involved and any special events recorded concerning it.

For further information on the subject of radio broadcast monitoring the reader is referred to Chapter 4a, 11, and Chapter 10, V, 7.

CHAPTER 8

Teil 8
p. 1

URGENTLY ESSENTIAL MEASURES TO BE TAKEN BY TROOPS TO COMPLICATE FOREIGN COMMUNICATIONS INTERCEPT OPERATIONS

The concepts of security: Concealment and Interference; Deception; and Camouflage have been dealt with previously in Chapter 4 under definitions of the Radio Intercept Service. Here, these subjects of signal communications and signal intercept security measures will be dealt with in more detail with reference to their practical application ; they are closely bound up with the subjects of telephone and radio discipline.

I. TELEPHONIC COMMUNICATIONS DISCIPLINE. In matters of telephonic communications Paragraphs 14-43 of Volume 3 of the Training Manual for the Signal Corps (Ausbildungsvorschrift fuer die Nachrichtentruppe) under the Head "Secrecy in Telephonic communications (Geheimhalten des Fernsprechverkehrs)" were effective also for the Air Signal Corps. The following are a few of the key words appearing there

Obligation not to divulge contents of messages; Notes and Diaries; Restriction of Telephone Communications; Risks of Interception by the Enemy (hazardous zones); Possibility of Lines being Tapped; Strict Communications Discipline; Dialects; Code Names; Code Name Lists; Encoding; Notice: Caution, the Enemy is Listening in! (Achtung, Feind Hoert Mit!)" to be displayed at every telephone

pp 176-179 not used

instrument, and so forth.

2 II. Radio Coding (Funkverschleierung)

1. Radio communications on longwave frequencies are the most vulnerable to enemy interception and therefore in all cases require protection. Shortwave communications offer some degree of security since they are not quite as easy to locate. However, this security is only very conditional. It was only in former times that shortwave transmissions were relatively secure against locating.

2. In the matter of the possibility of interception the situation is as follows:

a. Shortwave communications can be intercepted at greater distances than longwave communications and possibly in areas in which the enemy can operate with numerous reveivers without fear of interference.

b. The fact that a larger number of closely adjacent frequencies can be used in shortwave transmission naturally complicates efforts of the enemy to obtain a complete coverage.

c. The question as to whether the advantages of the disadvantages preponderate must be decided from case to case.

3. A security system can only be effective if it is uniformly directed and supervised. The security mea-

2 measures enforced must not be applied in a stereotype manner but must be adjusted to current situations.

Personnel must be enlightened on the hazards involved

3 and by means of factual examples must be educated to understand and accept the maasures taken to safeguard communications. One necessary measure here is to insure that one or a number of color placards are displayed in every radio transmitting and receiving room with the words "The Enemy is Listening In!"

The delays and complications caused by the imposition of security measures must be accepted as a necessary evil. Only a commander fully aware of the hazards of enemy interception can judge whether a message can be dis atched uncoded and thus more speedily--but at the same time more easily intercepted and understood by the enemy, or whether it should be encoded and thus delayed--but thereby in a form less easily used by the enemy.

4. In other respects the purpose of radio coding in times of peace, tension, or war is to preserve the picture which the enemy has developed from continuous observation of our radio traffic.

The radio-technical data from which the enemy will compile this picture is secured by the enemy radio intercept service from, among other sources:

9 (a) Our air traffic control communications as they will be conducted during times of peace, tension, and war pursuant to orders.

(b) Our radio communications in ground-air traffic.

(c) The radio communications traffic of our ground networks.

5. It would be pointless to enter into the hampering effects of security measures, the implementation of which has been dealt with previously in Chapter 1, II, 6.

III. Deceptive Measures in the Conduct of Telephonic Communications will rarely apply to the Air Signal Corps, since its units are not committed close enough to the front areas. The necessity might arise, however, when it is assumed that enemy agents are tapping the wires, to play simulated and false information into their hands by means of telephonic and teletype messages.

In such cases the use of code names should not be forgotten and mention should be made during the telephone conversation that the matter should not be discussed over the telephone.

IV. Deceptive Radio Traffic. Radio deception can be practiced even during peace, the purpose being to lead thhe opposing side to draw false conclusions. The execution of such a program calls for intensive preparation and conscientious

execution. Its execution must always be ordered by some high level headquarters and carried out by the signal units, supported by air units, and in cooperation with the intercept services.

V. RADIO DISCIPLINE AND RADIO CODING.

Certain weaknesses which will always provide indications for a data interpreting element are inherent im every radio communications traffic system. The purpose of radio discipline and radio coding is to reduce these hazards to a minimum.

For this reason the following maxims apply to every radio operator:

(1) Adhere strictly to radio discipline;

(2) After every displacement to a new site delay the first transmission as long as possible;

(3) Transmit as infrequently and as briefly as possible; never transmit more than is absolutely essnetial;

(4) Do not use more power in transmitting than is required to reach the receiving station;

(5) Reduce coordinating signals to the barest possible minimum;

(6) Once radio contact is established and if reception is too loud request the opposite station to reduce its transmitting power;

(7) Rotate morse code operators;

(8) Do not practice familiarization traffic prior to

the start of regular operations. This includes the normal procedure of contact and coordinating tests, which should be avoided not only prior to real mobilization but also prior to large-scale field exercises and maneuvers. These practices provide excellent indications for the enemy.

9. Avoid transmitting more than one message with a similar text when transmitting encoded orders and reports.

10. As far as possible encode addresses and signatures

11. Use no clear text and transmit no messages of a private nature.

All of the above are security measures which the troops should observe on their own initiative. Any other measures will be applied only on orders from the command headquarters concerned. The following are only a few such measures:

Monitoring of own signal traffic;

Jamming of and other interference with enemy signal communications traffic ;

Radio silence;

Simulated radio communications traffic;

Change of call signals and frequencies used;

Change of operating procedures;

Change of code keys, etc.

Unsystematic call signals and frequencies;

Avoidance of call signals the arrangement of which makes it possible to detect relations between transmitting stations and other agencies;
Frequent and unsystematic change of codes used.

~~Use no clear text~~! This was one of the basic principles, and nevertheless the German Air Force radio communications during exercises not long before the war still evidences many weaknesses. During the Warnemuende air maneuver the Army radio intercept units committed for the purpose succeeded in identifying the Air Force organization. An after-action report states as follows on the subject:

> Although nothing whatever was known concerning the organization, call signal system and traffic identification system of the Air Force, it was possible to identify the network within a relatively short time. This was done almost exclusively from clear text passages included in messages in combination with the call signal system; the wing and flight leaders of the bomber wings were clearly identifiable. In this way it was possible to determine the strength of the bomber wings committed, just as the fighter squadrons, communication by wireless telephony, were identifiable by the call names, which immediately revealed the purpose and mission of the person speaking (for example call-names such as Ground (Boden), Kondor, Meise (titmouse). The [redacted] antiaircraft defense communications network proved the least vulnerable because of the small volume of communications traffic.

Since communications in clear text (bomber units) and in clear text voice radio communications (fighter units)

in combination with call signal characteristics and the inadequate concealment provided by the code names used provide very ample indications making it possible to determine the entire air tactical organization, the question might be of very great importance whether it would not be advisable to introduce a simple code writing for the bomber units which would be handled speedily and safely in order to provide a safeguard against the enemy radio intercept services. In the case of the telephonic communications of the fighter forces, it appears advisable to use less easily intelligible code names.

8 The above after-action report reveals the weakness of the entire radio communications system of the German Air Force at the time. In contrast with their former practices, the French and the Belgians had clearly recognized the importance of encoding and otherwise camouflaging their radio communications and thereby complicated matters exceedingly for the German Radio Intercept Service.

A German Radio Intercept Service report on a French maneuver at the time states

The interpretation of the intercepted maneuver radio communications traffic presented difficulties such as had never been encountered previously.

The reader is also referred to the appendix attached to t
this present chapter.

187 CHAPTER 7, APPENDIX

COPY

Air Office, Signal Division IIIc

(IIIc please to R 1)

To the Branch Chief

Attached study for the Map Maneuver on Tuesday, 2 April 1936.

1 Inclosure

S/ Gottschling

(Very instructively and interestingly written:

S/ Martini.

Air Office Signal Division (IIIc) Secret
File Az. 40 a 16

Berlin, 27 March 1936

SUBJECT: Map maneuver, Winter 35/36.

GERMAN RADIO COMMUNICATIONS TRAFFIC FROM THE VIEWPOINT OF THE FRENCH RADIO INTERCEPT SERVICE

Although the French Radio Intercept Service holds a high opinion of the organization and training of the German Air Signal Corps, it assumed that certain weaknesses inherent in every system of radio communications were also to be found in the German radio communications system. This view was vindicated.

In view of the situation the German authorities admittedly imposed severe restrictions on radio communications. Nonethe less the French Radio Intercept Service was already able to to ascertain that the Germans endeavored to safeguard their radio communications by a daily change in their call signals and frequencies of their airborne transmitters and in the call signals of their ground transmitters. This somewhat complicated the intelligence activities of the French Radio Intercept Service.

However, a pleasing discovery was the fact that the call signals of the air traffic control system do not change. The French therefore decided to exploit this circumstance immediately for a bombing attack against a German air base.

The bomber wing assigned the mission to attack put excellently trained
trained radio operators from commercial air lines on a number of its aircraft. From their civilian occupation these men were accustomed to communicating with the German air traffic control radio stations
radio stations; using the frequencies discovered by the Intercept service and the call signals also discovered by them, they contacted the unknown German air base , requested weather information allowed themselves to be radio guided and in this way arrived directly over the air base, which was found to be that of Celle. Here the aircraft did their bombing. The piloting air base radio transmitter had rendered the French bombers excellent service and owing to the suddenness of their attack they
attack they escaped without interference and returned safely to their base airfield.

As previously mentioned the frequent change of German call signals complicated the activities of the French radio intercept units. This was balanced by the fact that the aircraft reports radioed in accordance with preestablished signal schedules provided all the more data for radio intelligence work. The lack of a suitable encoding method for use by the German bomber and reconnaissance units thus proved a valuable aid for the French. There was another factor which considerably facilitated operations of the French intercept units: since the

signal chart indicators (Signaltafelgruppen) allocated to the German air units
the German air units apparently were inadequate for all their needs, they frequently transmitted in clear text. From this circumstance the French service learned for application in French radio traffic that a frequent change of current signal codes charts was absolutely essential, namely, charts intended only for specific missions or to be used in accordance with appropriate daily orders. The disadvantage was accepted as a necessary evil that any unit not in possession of the current code chart and the daily order would not be able to receive communications.

Although the French profited from the use of signal chart code groups by the German air units (bombers and reconnaissance planes), their use did benefit German operations, since the decoding and interpretation of German messages intercepted was delayed, so that the French commands often received the interpretations too late to make use of the information. At the same time, however, the circumstances supported the French Chief of Air Signal Services in his repeated demand for the creation of very simple encoding devices or methods for use by bomber and reconnaissance units. In doing so he naturally realized that the German Radio Intelligence Service would undoubtedly succeed in cracking any such code system once it had enough data available, but

even then the decoding would probably take so long that the interpretation of intercepted French messages would reach the German commands too late to be of any tactical use. In contrast with his colleague in the French Navy, he is opposed to the use of code group books, realizing that with such books in use one can never know whether a copy has been lost and thus become known to the enemy.

As far as the German fighter units are concerned, the French Radio Intercept Service discovered that they very rarely and sometimes ineptly made use of code names.

In summarzing, the Chief of the French Radio Intelligence Service (Air) was able to issue the following experience report:

> Although little was known to us concerning the tactical organization, the call signal arrangement and the traffic signals of the German Air Force we succeeded in identifying their radio networks within a relatively short time and almost exclusively on the basis of clear text passages included in their otherwise coded messages combined with our acquired knowledge of their call signal system; the wing and flight commanders of their bomber wings were clearly identifiable. We were thus able to determine the strengths of the bomber wings committed and also to identify the fighter squadrons, the code names of which provided immediate indications

as to the purpose and mission of the unit signalling, their communications being by telephony. The most difficult to identify was the radio traffic of the Aircraft Reporting Service, since its communications volume was relatively small. It nevertheless seems advisable to complicate the operations of the German Radio Reporting Service by means of radio interference.

Since German communications in clear text Morse code transmissions (bomber and reconnaissance units) and in clear text voice transmissions (fighter units), combined with call signal characteristics and the inadequate concealment of the code names used have provided our own radio intelligence with abundant indications for the elucidation of t the entire German air tactical organization, the question of introducing a simple secret code suitable for speedy and safe handling for use by our own bomber and reconnaissance units to secure our own communications against enemy radio interception seems a matter of signifocant importance. In the matter of our fighter units and their voice radio communications it appears advisable to check their code names as to their vulnerability.

S/ Gottschling

Distribution:
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Intel Officer 1 Copy
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CHAPTER 8

BUILD-UP OF THE GERMAN AIR FORCE RADIO

INTERCEPT SERVICE

Organization, Personnel, Training, Equipment, Chains of Command, Operations, and Missions

I. PREPARATORY MEASURES, 1934-1936.

1. Formulation of Principles Governing the Build-Up. Following establishment of the Reich Air Ministry a Section III (Radio) was formed in early May 1934 within the Signal Division of the Air Office under Major Lindner (retired). The new section included a Sub-Section IIIc for the future Radio Intercept (or Radio Intelligence) Service of the Air Force which was placed under Captain Gottschling (retired), until then on the staff of the Cryptographic Center of the Army High Command. The Air Signal Corps being at the time still in its incipient stages, work in this new field had to be confined to purely preparatory measures. Very close contact was established with the Army Radio Intercept Service, where the principles for the training of personnel for the new Air Force Radio Intercept Service , the basic principles of its missions, and its organization were formulated and the initial requirements in personnel and equipment were worked out.

In the matter of equipment advice was also obtained from the Navy, and in that of personnel investigations started to ascertain where it would be possible to find highly qualified

civilian wireless operators and translators. For the time being no thought could be given to the activation of purely military units in the new service, since it was more urgently important to build up a signal force in the form of units to construct and operate wire communications networks.

2. The Selection and Call-Up of Civilian Intercept Personnel for Employment as Civil Servants. Towards the end of 1934 it was possible to commence personnel procurement. To find appropriately qualified, linguistically trained and intellectually gifted persons to pioneer the service, which was destined later to become such an eminently efficient organization, was a difficult problem. Recruiting was done surreptitiously through newspapers, professional journals, and the appropriate organizations. In the case of telegraph and radio operators these organizations were, inter alia, the Seafarers, Postal, Lufthansa (German Airways), and Railway Employees Unions, for translators the Associations of Germans abroad, the language schools, and the universities. The Air Ministry also approached the other Ministries with request for support through the release of such personnel.

The personal data on applicants were submitted to a careful scrutiny by the police and the Counter-Intelligence Division, and personnel were accepted only through the agencies attached to the Air Ministry, the Air District

Commands, and the air unit headquarters (or the agencies preceding them) to recruit civilian personnel and to handle their affairs. The actual employment was handled in such a way that the employees and officials had no knowledge of the actual purpose. Extreme caution was also exercised during the period of preparatory training which then followed, until a renewed screening was concluded to ascertain the reliability of the personnel concerned.

3, Training of the Cadre of Civilian Instrument Operators, Data ~~Interpreters, and Translators~~.

a. ~~Preparatory Courses Conducted by Air Signal Corps, Itself Still in Process of Organization~~. In April 1935 it was possible to call up the first personnel. If conditions were appropriate, new employees were attached immediately for training to the static radio intercept stations of the Army, or were sent by the Air Ministry or the Air District Commands then being formed to the incipient Air Signal Corps for participation in advanced training courses for civilian radio operators, and in signal technical information courses for civilian data interpreters and translators. In this way the Reich Air Ministry established in the Kladow-Hottengrund Air Force Caserne (still incomplete) a first training course for a core of translators for various languages the number of whom had meanwhile mounted to twentyfive.

The course here lasted six months, and the personnel were transported daily to and from their private homes in Berlin. by trucks. The instructor was a retired Captain Cherubin, and the subjects of instruction were the basic concepts of radio technology, Morse code telegraphy, en- and decoding. All known methods of encoding were treated, including use of the Enigma instrument. Instruction lasted from 0800 to 1700 hours daily, with a break of one hour for lunch.

These cadre personnel later served as instructors in the courses which followed and also in courses arranged at the various air district command headquarters. The unit responsible for each course supplied the necessary premises, terrain, equipment, aids and regulations for training. If that unit still lacked the necessary specialist personnel for the purpose, these were assigned from other quarters.

Training was very thorough. ~~XXXXXXXXXXX~~ Instruction in the theories was given by experts of known quality, but emphasis was placed on practical training from the very outset. All participants were trained to use the pack-type of radio receiver and DF instruments and the 1- and 2-axle DF trailer, so that they could be employed practically in small-scale field exercises of the troops.

After completion of this course, from which the later data interpreters and decoding specialists, particularly

for the later Cryptographic Center of the Air Ministry, were selected, followed a course for [illegible] transmitter operators, also in Kladow-Hottengrund. These were personnel with considerable experience in the subject of radio who had been released to the Air Force by the Luft-Hansa airways, the Postal Service, the Railways, and the merchant marine.* The training target here was to produce personnel who could reliably and without difficulty receive 100-120 [illegible] Morse signals per minute. It was found that a radio operator could only be employed four hours daily under the strenuous conditions of practical employment in radio interception, although he could in cases of emergency be used for a second short shift.

Germans from foreign countries with a sound educational background proved excellent as translators. They had grown up in foreign countries and attended the schools there. In most cases they had a perfect knowledge of the language spoken in their countries and were reliable in point of loyalty. The term ethnic Germans was restricted to persons of German descent coming from the countries of Eastern and Southern Europe: Russia, Poland, Czechoslovakia

* Marine wireless telegraphy operators who were members of the Debek (German Association for Wireless Telegraphy). This association provided such personnel for the German merchant marine and had available competent officer and other wireless operating personnel. Its main office was formerly at Berlin-Charlottenburg 2, Hardenbergstrasse 29.

Rumania, Yugoslavia, and Hungary. For the languages spoken in western southwestern and northern Europe personnel had to be drawn almost exclusively from among German citizens by b birth.+

The training program for radio intercept personnel at the various air district commands was the same as that just described.

b. Training of Air Force Radio Intercept Personnel by the Army Radio Intercept Service. The radio intercept civilian personnel of the Air Force transferred immediately or after a basic course of air signal training to the Army Radio Intercept Service for training were distributed among the Army High Command Cryptographic Center and the various Army static radio intercept stations. It was only here that they received the basic training in radio intercept operations, which could then be followed up by advanced training in the Air Force Radio Intercept Service. The stations in question for the purpose were the radio intercept section Jueterbog of the Army Signal School and later the stations at Treuenbrietzen, Breslau, Koenigsberg, Muenster-Mauritz,

+ Conditions of employment included the requirement that the candidate must first have passed a University exam in translating. The diploma awarded was valid only for employment in the military services, and was not as comprehensive as the usual diploma. Sub-Section IIIc, under Major Gottsc ling, selected the personnel, who were then engaged by Captain Heitz of the Signal Division, Air Office. Later, recruiting was centralized at the air district commands and their successors, with the exception of personnel for the Air Ministry.

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Soecking bei Starnberg, near Munich, whose monitoring zones included the European countries involved, so that the personnel could be familiarized with the countries they would have to cover for the Air Force. The Army units also monitored the communications traffic of the foreign air forces, so that there was no difficulty in preparing the Air Force personnel in this respect and then employing them specifically for this purpose. The intelligence data thus gathered was then forwarded from the Army data interpreting agencies to the agencies of the Air Force concerned: the Air Ministry and the air district commands.

Personnel of the Army Radio Intercept Service were very thoroughly trained in continuous courses for basic and advanced training, and the Air Force personnel were included in this training program. The Army Radio Intercept Services consisted of the Cryptographic Center at the Reich Ministry of Defense, static radio intercept and static f ontier D/F stations and mobile radio intercept companies.

The radio intercept service of the Navy, where it was called the Observation Service, supported the Air Force by reporting to it any data intercepted that might be of value to it. The naval service consisted of a Central Observation Station, control stations, regional stations and local stations. Information considered of importance for the Air

Force was reported to the Air Ministry and to Air District Command VI ((Seaward) . For this reason and probably also because of the special characteristics of maritime radio intelligence, the Air Force later refrained from establishing its own statistic radio intercept stations for Air District Command VI (Seaward).

c. Training Objectives.

(1) Intercept Radio Receiving Service. In the preparatory training courses radio operators were from the outset separated in classes according to capabilities and progress and trained to receive a minimum of 120 ciphers in foreign text per ten minutes. Any candidate not capable of achieving this minimum performance was used in some other capacity or released from the service. Besides other high-capacity receivers, the receivers most commonly used in practical receiving work were the Pack Emper B type.

When assigned to duty at the static stations, radio operators were graded in Pay Scale (Employees) 7 with an extra performance allowance of 10 percent, because they already had years of
years of career experience. Many of them were members of the Association for Wireless Telegraphy. At the static stations they received further training in the use of rapid transmitters. On reaching a performance of 135 ciphers per ten minutes in a foreign language they were raised to Pay Scale 6 plus

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a performance allowance of 15 percent. In other respects radio operators at the static stations were trained through employment at the special intercept receivers (See Chapter 9, 1 b), through orientation on foreign radio traffic methods and their characteristic features, and through service at the forward e temporized operating posts. The intercept radio operator also had to be familiar with the techniques of wave-band searching, on which point the following is offered here: The frequencies to be watched evolved from foreign radio traffic through wave-band search operations. From radio traffic observations the individual receivers were then each assigned assigned a frequency range of, for example, 20 kHz, which they were to watch. The Cryptographic Center also assigned principal frequencies to be watched, which the static stations sub-divided among the various receivers. (See also Chapters 6 and 9).

(2) DF Service. What has been said above applied equally to DF radio operating personnel since their employment as DF radio operators did not preclude their use also as intercept radio operators. DF training was given with portable DF instruments, 1- and 2-axle trailers, with heavy type Goniometers and with Adcock DF instruments plus appliances. Furthermore these personnel received training in the mobile operation of forward intercept posts. The DF radio operator was also required to be able to assist the DF data interpreter in the

14 preparation of DF sketches and DF maps: had to be familiar with the conference circuit system (Konferenzschaltung)used in combined DF operations and with receiver controlled DF (Kommandopeilen) operations. (See also Chapter 6 and 9).

(3) Data Interpreting and Decoding. Data interpreters and decoders were for the most part personnel with advanced education, business training plus linguistic abilities, Germans from abroad or who had spent some time abraad as business representatives, university graduates, former press employees, mathematicians, and learned scholars. Appropriately gifted radio (intercept) operators were also used successfully. Great demands were made on the reliability of these personnel and on the constancy with which they would be on the watch. In preparatory courses they had to become familiar with the fundamentals of radio techniques; equipment data; German radio traffic, both transmitting and receiving; German radio communication methods, and en-and de-coding. The radio traffic methods of foreign countries, their specific language pepeculiarities as contained in intercepted material, and the fundamentals of data interpreting in practice, these personnel had to familiarize themselves with in the course of their routine duties at the static radio intercept stations. This work required close industry, intensive thought, and great personal interest and in the case of the specialized

decoder the reading of encoded messages called for even greater and more diversified talent than in other activities. The training target was to have personnel with a thorough mastery of the whole complex of subjects involved, and whether an individual was capable of achieving this goal could be determined only on the basis of his work. Personnel in this category were placed in the Pay Scale 5 class with prospects of promotion (see also Chapter 6 and 9).

(4) ~~Coordination of Peacetime and Wartime Training~~.

There was no difference between the peacetime and wartime training program. The missions were the same, but the requirements of war called for even greater speed of operation. The wartime expansion of the service also called for a bigger influx of young recruits whom the old cadre personnel had to train. However, in war it was not possible to use the new recruits in actual operations as part of their training, so that these had to be handled by the cadre personnel alone. During the war intercept personnel were also occasionally attached temporarily to the Cryptographic Center for special orientation. There were also no significant changes in equipment during the war, and no training instructions existed for the radio intercept service; all that was available in this field were references to the complex of missions and occasional compilations of points raised at conferences.

The employment of intercept personnel on aircraft might be called a wartime special type of mission which evolved and which required special training for suitable members of the service. Operations of this type had already been carried out prior to the war, with a zeppelin, off the shores of England. During the war radio operators were placed in bomber aircraft to intercept the ultrashortwave communications of enemy fighters, also off the coast of England. In future it might be advisable to give special training in this field for the interception of communications on even shorter frequencies.

d. Careers for Civilian Personnel; Termination of Service. The categories required in the service were, in descending order: Scientific assistants, data interpreters, translators, de-coders; intercept service radio operators; cartographers; transmitter operators; clerical staff, including females. On this subject see also the section on personnel employed at an intercept station in Chapter 10, I, c.

Without special reasons personnel were not allowed to terminate their contracts, since they possessed classified information; they were apprised of this fact when they entered the service.

4. ~~Later Procurement of Radio Intercept Personnel~~. Originally handled by the Reich Air Ministry, personnel procurement became increasingly a responsibility of the various

17 air district commands, where it was handled by the staff signal officer. The air signal battalions involved in this field had to concentrate particularly on the selection of military replacements for the radio intercept companies and platoons. In each case the chief of the appropriate static station served in an advisory capacity. Personnel and personnel recruitment indexes were maintained, the main index being at the Air Ministry.

5. The Training of Civil Service Radio Technologists and Officers for the Radio Intercept Service. The Radio technologists originally employed by the Air Force with the status of Air Force officials came from the signal units of the Army; some had already served in the Army Radio Intercept Service and some had been temporarily attached to that service by the Air Force for training. Later, the Air Force was able to avail itself of officials trained within the Air Signal Corps. They received specialised radio intercept training within the radio intercept units of the Air Force by means of orientation assignments before T/O assignment to the Radio Intercept Service. The qualifications required in such personnel and the tests they had to pass at the Air Signal School in Halle on the Saale were highly diversified and very severe. Orientation was also provided on the signal communications of the Army and Navy.

Originally, officers also received their radio intercept training through temporary attachments to the Army Radio Inter-

Intercept Service, later through assignments with the static stations of the Air Force or orientation at the Air Ministry Cryptographic Center, before their regular assignment to a static station or a radio intercept company or platoon. In most cases the companies trained their own junior officers. Officers of the Air Signal Corps Reserve and also reserve members of the civilian radio intercept forces received military training through participation in maneuvers and field exercises. Suitable civilians who had served in the intercept service were earmarked for that service after completing their obligatory term of military service. If suitable for the purpose, reserve officers could join the intercept service in active status.

6. Equipment. During the initial stages the Air Force used the equipment in use for radio intercept purposes in the Army and the Navy and then developed improved types in cooperation with the constructional and testing installations of the Army the Navy and the Air Force. The compilation in Chapter 9, 1,b provides a survey of the items and types of equipment used+

Ad II. Initiation of the Air Force Radio Intercept Service.

1. at 0700 on 21 September 1936 the service commenced operating as a component of the Air Force, when one team was committed on each side in the combined Army-Air Force maneuver of Group Command 2 in September 1936 to intercept and interpret German communications. These teams were organized extemporarily by the then

+ Another compilation is offered in Chapter 10, D, III.

The team committed on the "Blue" side was commanded by Major (Reserve) E.Gottschling of Sub-Section IIIa, Air Office, Reich Air Ministry, that committed on the side of "Red" by Captain Riebeof the Air Signal School at Halle on the Saale. The "Blue" team had five pack type receivers, was assigned under Air Force 3/Intelligence Division, and was in operation from 0700, 21 September to 1200, 25 September.+ No DF instruments were used. The receiver operators were military personnel trained in German Air Force radio communications and the results obtained for this reason could be considered satisfactory. This first commitment can be considered as the actual inception of anRadio Intercept Service organic to the German Air Force.

2. Activation of the Static Stations and of the Central Data Interpreting Agency, the Cryptographis Center.

a. Development in 1936. On 1 October 1936 the regular assignment of Air Force radio intercept personnel under the Army was cancelled and they were gradually transferred back to the Air Force to form an intercept station within the Air Ministra; this station on 1 January 1937 became the central data interpreting agency, the Cryptographic Center. At the same time personnel were returned to the Air Force to activate one static station

+ Obviously "2 September" at bottom of p. 208, above (Teil 3, p. 19).

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each for Air Districts 1-5, which were to be placed in buildings hired for the purpose or in temporary premises in casernes.

21 A start was made on 15 October 1936 with the establishment of three of these stations; suitable Air Signal Corps officers and technical officials were assigned to command and direct these stations, which were operated by civilians. The three stations were situated as follows: that of Air District Command 3 in Breslau-Krietern, that of Air District Command 4 at Muenster, and that of Air Dostrict Command 5 at Muenchen-Stadelheim--from April 1938 on at Muenchen-Solln, and from January 1939 at Oberhaching-Deisenhofen near Munich. They were assigned operating areas covering countries appropriate to their respective locations. Some personnel of the Air Force Radio Intercept Service remained for the time being with the Army, since the Army continued to handle some functions for the Air Force until the new service could adapt itself.

b. Development in 1937. The Signal Division of the Reich Air Ministry became Branch 7 of the Air Force General Staff. Sub-Section IIIc, responsible for Radio Intercept Services, on 1 January 1937 was reorganized in two sub-sections, Sub-Section IIIc 1(under Major Gottschling) and III 2 (under Captain Immisch). The former retained its missions of directing and developing the Radio Intercept Service, the latter became the

Cryptographic Center, the final data interpreting agency of the highest levels of command. The Cryptographis Center was assigned the best data interpreters and translators available; it was sub-divided into branches, each handling certain countries.

In 1937 a start was made at the construction of special buildings as premises for the static radio intercept stations, first for the stations at Telgte, near Munich, Pulsnitz, near Dresden, and Glindow, near Werder (Potsdam), all of which received the best installations available. Other static stations established were at Insterburg (later Kobbelbude near Koenigsberg, 1 January 1937); Dresden-Klotzsche (later Pulsnitz, 1 April 1937); Potsdam-Eiche (later Glindow near Werder (1 April 1937); Baden-Baden, 1 May 1937.

The following commands thus had the number of stations stated in each case in 1937:

(a) Reich Air Ministry (one); Air District Commands 2,(Berlin) and 1, Koenigsbers (one each); (b) Air District Commands 3,Dresden, 4,Munester, and 5, Munich (each two); (c) Air Didtrict Command 6--seaward, had no station since it was served by the Navy Radio Observation Service. Air District 7, Braunschweig also had no station because it was in the center of Germany, too far distant from the borders. The static radio intercept stations served as intelligence gathering agencies of the Commander in Chief

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of the Air Force and at the time simultaneously of the air district command headquarters. In matters of radio intercept operations they were assigned under the Cryptographic Center at the Air Ministry, in matters of administration and discipline under the nearest air signal battalions. Only if the nearest such battalion was too far distant, as in the case of Baden-Baden, was some other arrangement made.

There were thus in 1937 a total of seven static radio intercept stations. At the time they were designated as weather stations for purposes of concealment, the abbreviation used being a capital W, as follows: Insterburg W-11; Breslau W-13; Muenster/Telgte W-14; Munich/Stadelheim W-15; Dresden/Pulsnitz W-23; Baden-Baden, W-25; Potsdam/Glindow W-RLM (W-RLM = Weather Station, Reich Air Ministry). The necessary surveys had also already been made for Station Trier W-24. According to requirements the static stations echeloned one or two or more temporary operating points forward, which in matters of radio receiving and DF data rendered excellent services. These forward posts were designated Wo-stations (Wo = weather research) for purposes of concealment. The radio intercept companies still in process of organization supported the static stations with personnel and equipment for these forward posts.

c. Development in 1938. After the annexation of Austria the static station at Wien-Hirschstetten and the special purpos-

purposes station od Budapest-Matyás foeld were established, in addition to the static stations at Trier and Husum. Accordingly there were in 1938 11 completely installed static radio intercept stations.

The individual static stations were assigned areas to keep under observation, as follows:

Air District Command	Station Located at	Assigned Radio Intercept Area
3	Pulsnitz	Czechoslovakia; secondarily Poland, Russia
3	Breslau-Krietern	Poland, Russia, Czechoslovakia
4	Telgte	Britain, Belgium, Holland
4	Husum	Britain, Skandinavia (cooperated with Army Radio Intercept Station Telgte (later Control Station 2))
4	Trier	France, Belgium, Holland
5	Munich	Czechoslovakia, Italy, Balkans (this station in about April 1938 transferred from Muenchen-Stadelheim to Muenchen-Solln, and nine months later to Oberhaching near Munich.
5	Baden-Baden	France, French Colonies
1	Kobbelbude	Russia, Poland, Lithuania, Latvia, Esthonia.

25	Air Command	Station Located at	Assigned Radio Intercept Area
	from 1 Apr 38 AF Comd Ostmark, Vienna; from 16 Mar 39 Fourth Air Fleet, Vienna	Wien-Hirschstetten Budapest-Matyásfoeld	Czechoslovakia, Rumania, Balkans, Russia
	Air Ministra & Air District Command 2	Glindow	Russia, Poland.

As an example of operations the forward (radio intercept and DF) points committed in 1937.1939 are listed here, as follows:

Organic to	Static Intercept Station	Forward Post	Areas Covered
Air Ministry	Glindow	Koschuetz bei Schneidemuehl East Pomerania	
Air District Command 3	Pulsnitz	1. Rosen, west of Katscher near Ratibor, Upper Silesia	Czechoslovakia
		2. Hein, south of Habelschwerdt, County Glatz	"
		3. Schoenberg, Oberlausitz	"
		4. Breitenbruss Erz-Mountains	"
		5. Winklarn, Bavarian Forest (Operated with Munich Station)	"
		6. Saatz Egerland 7. Zwittau, Moravia	Established at German occupation of Sudetenland
Air District Command 5	Muenchen-Solln	1. Winklarn, 8 miles S/E of Upper Viechtach, Bavarian Upper Palatinate (Operated with Station Pulnitz)	

Organic to	Static Intercept Station	Forward Post	Areas Covered
Air District Command 5--Cont.	Muenchen-Solln--Continued	2. Cham, Bavarian Upper Palatinate	
		3. Pocking, 6 miles SE of Griesbach, Lower Bavaria	
		4. Seeg, 7.5 miles NE of Fuessen, Bavarian Allgaeu	
		5. Maria Saal, 4.6 miles NE of Kaernten (after closing of Austrian Station Villach, Kaernten and first transfer to Preding, 17.4 miles SE of Graz, Styria	
		6. Mallorca, Mediterranean (30 Oct 37-12 Jan 38, during Spanish Civil War (See Chapter 10, 2, b (5)	
Air District Command 4	Tlegte	1. Pewsum (Wo-112)+, 6.6 miles NW of Emden (periodically transferred to Borkum), later with sub-post Marienhave on Aurich-Norddeich road (see Chapter 10, B IV, 1a (1)	
		2. Xanten, Lower Rhine (Summer 1939) (see Chapter 10, B IV, 1a, (4) (a)	
AF Command Ostmark	Wien-Hirschstetten	1. Poisdorf, 31 miles N of Vienna	
		2. Halbturn, 4.4 miles SE of Neudiehl am See, Burgenland (for Posts 1 & 2 see Chapter 10, B, I, 3, a, (2)	

+ Wo = Weather Research Station = Code designation for forward DF posts.

Organic to	Static Intercept Station	Forward Post
Air District Command I (Air Force Command E.Prussia)	Kobbelbude	1. Tussainen b. Ragnit (SE of Tilsit 2. Nimmersatt, N Memelland 3. a forward post in Masuria
AF Command Ostmark (Austria)	Budapest-Matyásfoeld	1. Nyiregyháza between Tokay & Debrecen, N.Hungary (mid-1938-early 1939). Large radie receiver station with DF & forward sub-stations: Mármaros-Sziget, 104 miles E of Nyregyháza and Szolyva-Nagy-Bistra, 69 miles NE of Nyregyháza 2.Szeged, E. Hungary 3.Pápa, 27 miles S of Raab, W.Hungary (from Oct/Dec 1938 (for all three see Chapter 10, B, I, 3, a (2).

The static radio intercept stations not mentioned in the above compilation had also in the meanwhile developed their networks of forward posts in accordance with the importance of their respective missions.

Also in addition to above, two cruises were carried out by zeppelin in 1938, with radio intercept personnel aboard along the eastern coast of Britain to detect English and French frequencies not hitherto recorded. These cruises are mentioned by Churchill in his memoirs.

d. Development in 1939. Besides a further general improvement in capabilities, the static stations in 1939 were thoroughly reorganized together with the whole network. The

existing static stations by order dated June 1939 became AF Radio Intercept Control Stations and new control stations were established. Together with various assigned units, these control stations became the central agencies for radio intelligence covering specific large areas, such as East, West, South, North. This insured more uniform operations by and a better control and direction of the static radio intercept formations, which had by this time assumed considerable proportions. At the same time the control stations became intelligence gathering organs of the respective Air Force commands and were designated accordingly. As part of this reorganization the Air Ministry static station at Glindow ceased to be a normal intercept agency. It served now to monitor German radio communications and continued as a major DF. station.

Personnel from the Glindow station and from Station W-21 (formerly W-23) in Pulsnitz were used to establish Control Station 1 (of First Air Fleet) in Pulsnitz and Station W-21 in Deutsch Krone. The First Air Fleet had its headquarters in Berlin. Control Station 2 (of Second Air Fleet in Braunschweig) was activated at Station W212 (formerly W-14) in Telgte and remained there while peace lasted. Control Station 3 (of Third Air Fleet, Munich) was activated at Station W-13 (formerly W-15).+ The already

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existing Control Station 4 (of Fourth Air Fleet,Vienna) was further expanded.++

In each case the controls stations were assigned areas to cover which were appropriate to the missions of the Air Force headquarters ~~xf~~ they served in the event of mobilization. The Control Station of the First Air Fleet, for example, had its radio intercept stations at Kobbelbude, near Koenigsberg in Eastern Prussia; at Deutsch-Krone;Breslau, and cooperated with the station at Wien-Hirschstetten (Vienna) and the Special Purposes Weather Station Budapest-Matyásfoeld intercepting all communications in the eastern areas. All important intercept and other data were exchanged among the control stations and used. This whole new arrangement changed nothing in the assignment of the stations under the nearest air signal battalions for administrative and supply purposes, or under the nearest such regiments, and at the same time the assignment under the Air Ministry also remained unchanged. The responsible agency there was now designated Branch 3 (Cryptographic, Chief Signal Officer (Chef, NVW/Abt 3 (Chi)). Previously, the static radio

~~Footnote +, p. 215~~: Organization of Control Station 3 (for Third Air Fleet) also started at the same time at Oberhaching-Deisenhofen near Munich in the premises and under the chief of Station W-13 (Lt.Col. Kobbelt), but was only completed two months prior to the war. It was to be transferred to Third Air Fleet Headquarters at Munich, with Lt.Col.controlling it and Station W-13 simultaneously. At mobilization, however, it was transferred under Kobbelt directly to the air fleet's ~~xxxxx~~ command post at Roth near Nuremburg. See Chapter 10, B, IV, ~~3 and 4 plus Appendix.~~ 3a, (1) and (4)

++ For developments under Fourth Air Fleet see Chapter 10, B, I, 3 and 4 plus Appendix.

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intercept stations had been intended as intelligence gathering agencies of the appropriate air district commands, but in practice they at no time served this purpose.

In 1939 there were thus in existence four AF Radio Intercept Control Stations (designated Weather Control Stations and ten radio intercept operating stations (called Weather Stations), as follows :

aa. Weather Control Stations:+

W-Leit-1, Pulsnitz, for First Air Fleet, Berlin (under Lt.Co.Gottschling)

W-Leit-2, Braunschweig, for Second Air Fleet, Braunschweig (under Major Dr.Ulrich)

W-Leit-3, Munich-Oberhaching-Deisenhofen, for Third Air Fleet Munich (under L.Col.Kobbelt)

W-Leit-4, Vienna, for Fourth Air Fleet, Vienna (under General Adametz).

bb. Weather Stations (their unit designation numbers had already been changed):+

W-16, Kobbelbude (formerly W-11); W-21, Deutsch-Krone; W-11, Breslau (formerly W-13); W-14, Wien-Hirschstetten; Special Purposes Weather Station Budapest/Matyásfeld; (W-12,Telgte Formerly W-14); W-22, Husum, W-33 Trier (formerly W-24); W-23, Baded-Baden (formerly W-25.

+ Each control station was numbered after the air fleet it served. In the numbering system for the weather stations under these control stations, the second digit was that of the air fleet served (formerly it had been the number of the appropriate air districh command). The second digit represented the consecutive number of the station within an air fleet zone and started in each zone with 1. For example, Third Air Fleet had Weather Stations 13, 23, 33. The only exception to this numbering system was Weather Station W-16 of AF Command Eastern Prussia.

30 The number W-21 (formerly W-23) was used previously to designate the Pulsnitz station and now that at Deutsch-Krone W-15, previously in Munich had been moved to Oberhaching-Deisenhofen and had become W-13.

c. The New Mobilization Assignment 1939. The new organization was also more in conformance with mobilization requirements than the previous arrangement, for which reason no changes occurred at mobilization in early September 1939. The control stations remained intelligence gathering organs of the respective air fleet headquarters and at mobilization became organic elements of the respective air fleet air signal regiments, where they were reorganized as separate III Battalions. Brought up to strength through the assignment of supplementary officers, NCOs and men, and reorganized as provisionally motorized companies, the static intercept stations could, if required, operate on the line in the field. The control elements at battalion headquarters continued to serve as receiving and data interpreting agency; reinforced with supplementary personnel and provisionally motorized, these elements when necessary could be moved closer to the air fleet command post. With their wire communication networks they could at the same time maintain rearward communications with the air fleet headquarters and the Headquarters of the Commander in Chief of the Air Force to transmit the

32 interpreted data to those headquarters. From the beginning of the war, the civilian personnel, insofar as they were employed in enemy territoriesbecame subject to military service regulations and were placed in uniform. Later, many of them were properly inducted for military service through call-up orders . Whenever necessary, the newly activated battalions in addition to the companies formed from the former static radio intercept stations created other new companies,using for the purpose the officers and other military personnel allocated under mobilization plans plus appropriately trained radio intercept personnel.

The disposition of the radio intercept network was,accordingly, as follows:

aa. Control Station W-Leit I (of First Air Fleet).

Command Post of First Air Fleet at Mobilization: Country Estate Heningsholm (property of von Bodenhausen family).

Command Post of III Battalion, Signal Regiment I and of Control Station W-Leit I: Casernes of I Battalion, Signal Regiment 1, in Bernau, also operating site of Control Station 1 (see also Chapter 10,B,I, 2a and 2b. Battalion Commander and Control Station Chief: Lieutenant Colonel Gottschling.

Command Post of Second Air Fleet at Mobilization(simultaneously Command Post of Control Station W-Leit-2: Braunschweig.

Command Post of III Battalion, Air Signal Regiment 2: Airfield Querum, Braunschweig. Control and data interpreting elements at Air Fleet Headquarters in Braunschweig, radio receiving and DF elements at

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Airfield Querum. (See also Chapter 10, B, IV, 1 b, b, 1.

Battalion Commander and Station Chief: Major Dr.Ulrich.

Headquarters of Third Air Fleet and Control Station W-Leit-3 at Mobilization: Roth near Nuremburg.

Command Post of III Battalion, Air Signal Regiment 3: Muenchen (Signal Regiment 3), because Chief of Control Station W-Leit-3 was not simultaneously CO, III Battalion. (See also Chapter 10, B, IB, 2, b, b, 1 and 2.

CO, III Battalion: Lieutenant Colonel von Seelen;
Chief of Control Station W-Leit 3 directing all communications interception operations: Lieutenant Colonel Kobbelt (Noteby Translator:"W-Leit 1"in the German text is obviously an error).

Command Post of Fourth Air Fleet at Mobilization: Bad Reichenbach, [illegible] Lower Silesia.

Command Post of Control Station W-Leit-4 at Mobilization: Peacetime premises at Schwarzenbergerplatz 13, Vienna-50, peacetime headquarters of Fourth Air Fleet Signal Staff Officer

Command Post of III Battalion, Air Signal Regiment 4 at [illegible] advanced command post of Fourth Air Fleet in Bad Reichenbach, Lower Silesia (see also Chapter 10, B, I, 3 and 4.

CO III Battalion, Air Signal Regiment 4 and Chief of Control Station W-Leit-4: Brigadier General Adametz.

At mobilization Control Station W-Leit-1 of the First Air Fleet moved from Pulsnitz to Pernau. The Radio Intercept Station Pulsnitz remained as a large-area DF station and at the same time served as a training base.

The Air Ministry radio intercept station continued its

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mission of monitoring German radio communications and could also be used as a large DF station.

bb. The III Radio Intercept Battalion forming a part of each air fleet air signal regiment consisted of a battalion headquarters staff, a weather reporting control station, and approximately three radio intercept companies. The battalion headquarters was formed from the weather reporting control station plus newly assigned supplementary military personnel; the radio intercept companies were fromed from the assigned weather stations reinforced with military personnel, or were newly activated at mobilization. Radio intercept companies or elements threof could also be tactically assigned to ~~xxxx~~ static weather stations not converted as companies.

For more details on the mobilizations measures for activation and/or expansion of the III Radio Intercept Battalions of the air fleet air signal regiments see Chapter 10.

The weather reporting control stations (battalion headquarter staff) now, at mobilization controlled the following weather stations:

<u>First Air Fleet Weather Reporting Control Station</u>

Command Post at Bernau with Station W-11 (formerly W-16) Kobbelbude; Station W-21, Deutsch-Krone (later at Bromberg); Station at Pulsnitz.

<u>Second Air Fleet Weather Reporting Control Station</u>

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Command Post at Braunschweig with Station W-12, Telgte; Station W-22 Husum-Milstedt.

Third Air Fleet Weather Reporting Control Station

Command Post at Roth bei Nueremburg with Station W-13, Oberhaching-Deisenhofen, near Munich; Station W-23 Baden-Baden; Station Station W-33, Mainz-Ginsheim (hitherto at Trier).

Fourth Air Fleet Weather Reporting Control Station

Command Post at Wien-Mauer (Vienna) and advanced Command Post at Reichenbach, Lower Silesia, with Station W-14, Wien-Hirschstetten (Vienna); Special Purposes Weather Station Budapest Mátyásfoeld. Station W-11, Breslau, was only assigned as W-24 to the Fourth Air Fleet after conclusion of the campaign in Poland, but was required in radio intercept operations to cooperate with the 7th Radio Intercept Company, Air Signal Regiment 4, activated in Silesia by the Fourth Air Fleet at mobilization.

This expansion of the radio intercept services was well arranged in mobilization plans and functioned satisfactorily. Commitment and operations also functioned as preplanned, but was destined to produce no spectacular results in the Blitz campaign against Poland.

The Polish air forces were soon put out of action, and the their radio communications, which had not been very voluminous even during peace, soon ceased completely. This applied in

36 particular to the Polish air forces' network of ground radio communications linking the various air bases, which was soon silenced owing to the destruction of these air bases by bombing. Only radio broadcast traffic remained to be intercepted up to the end of the campaign.

One cause for serious complaints was from the outset the defective wire communications network of the German Air Force in the northeastern troop concentration and attack area. The separate lines requested for the Radio Intercept Service had not been approved although the requirement had been stated in good time by the troops. The number of lines available was inadequate, and the wire and radio communications branches (of the Cryptographic Center) in the Air Ministry had failed to take timeous action for the provision of a separate network for the Radio Intercept Service. The rearward communications network of the Air Force as such had been well developed during peace, but it was so overloaded with operational communications that even urgently important secret teletype messages to the Air Ministry and/or to the air fleets were seriously delayed.

The communication facilities which the 9th anf 10th Radio Intercept Companies of Air Signal Regiment 1, committed in the frontier areas were from the outset so insufficient that there was no possibility whatever for teletype

communications with battalion headquarters [illegible] . The bare wire lines which the Service shared were in no way adequate to meet requirements; usually, conversation were unintelligible. At the beginning of the campaign Eastern Prussia was still isolated from the rest of Germany, and communications with Station W-16, Kobbelbude, committed there, encountered even greater difficulties because the underwater cable was seriously overloaded. As far as radio intercept operations were concerned, Eastern Prussia was thus in what might be called an insular position. If the Polish air forces had been stronger this situation might have been disastrous, since it would have been impossible for the radio intercept units committed in the forward areas to give timely warning of an approaching enemy air force to attack targets in the German interior.

Apparently, the higher levels of command in Germany relied with certainty on a blitz campaign producing quick results and therefore did not take the development of permanent position type wire communications into serious consideration. Owing to the early destruction of Polish air power the one weather reporting control station committed in the northern sector actualy proved adequate to handle both the interception and interpretation of the remaining volume of Polist air radio communications in the northern half of Poland.

In the southern areas under German attack in the Polish campaignthe communications situation was not much better than that described above for the northern half of the theater. However, there were at least static radio intercept stations in existence in the south, onne each at Vienna, Budapest, and Breslau, plus the Weather Control Station W-4 at Vienna, which, however, had no radio receivers of its own. All of these remained in their peacetime premises during the campaign and thus had a smoothly functioning network of wire communications at their disposal.

Conditions in the Western Theater at the beginning of the war differed radically from those in Poland in that no mobile warfare developed in the West , so that German forces did not advance into enemy territories. Here the radio mixxxx xxx intelligence mission under conditions of position warfare were essentially the same as the peacetime mission. Supported by a permanent organization and by far better wire communication facilitiesin the western XXXXXXXXXXXXXX and northwestern frontier areas, including the offshore regions, radio intelligence operations were more simple hereand, owing to the greater volume of radio traffic of the Western opponents, more productive.

3. Critique of the German Static Radio Intercept Stations System. In a summarized critique of the static station radio intercept system of the German Air Force the following evolves:

Supported by a cadre of highly competent civilian personnel, the performances of the static radio intercept stations during the last two years of warfare and during the initial stages of the war achieved remarkably high standards. During peace it had been possible to follow developments in the foreig air forces in all details on their organization, strengths, operating methods and commitment, training, etc., as well as to monitor their maneuvers with great precision and to formulate in writing all information thus obtained. Wartime radio intercept operations and the initial phases of the war thus corresponded in every respect to what had been anticipated. Initial difficulties were soon overcome.

4. Activation of the Radio Intercept Companies (and Platoons).

a. 1936 and 1937.

aa. On 1 October 1936 the 2d Company(DF and Radio Intercept Training and Experimental) was activated under the Air Force Training and Experimental Regiment at Halle on Saale (the Air Signal School). With the regiment it moved to Air Signal Corps base at Koethen, Anhalt, on 1 November 1937.

bb. On 1 October 1937 the following DF and Radio

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intercept companies were organized in the air signal battalions of Air District Commands 2, 3, 4, and 5, of the Reich Air Ministry, and in the Air Signal Training Battalion:

3d Company, Air Sig Reg 12, Pernau, Air District Command 2
3d " " " " 13, Dresden, Air District Command 3
3d " " " " 14, Muenster, " " " 4
3d " " " " 15, Munich, " " " 5
3d " " " Battalion, AF CINC HQ., Potsdam-Eiche, Reich Air Ministry
3d " " " Training Battalion, Greifswald.

At the end of 1937 there were thus in existence a total of seven DF and Radio Intercept Companies. Companies of this type were lacking only in Air District Commands 1 and 7; Air District Command 6 (Seaward) did not require any such unit, since the Naval Observation Service performed the necessary functions for it.

cc. A DF and Radio Intercept Company consisted of the following:

Command Echelon (Company Headquarters Staff (personnel strength: 2,13,10,20)†

2 DF and Radio Beacon (Leuchtfeuer) platoons (personstrength, each: 1,13,50 plus 1 official)

1 Radio Intercept Platoon (personnel strength: 2,21,88 and 1 official)

Total personnel strength of company: 6, 60, 198, 3 officials, and 20 casual employees.

+ 20 casual employees.

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b. 1938 and 1939. Expansion of the mobile branch of the radio intelligence forces co ntinued after 1 October 1938 so that the pattern in 1939 was as follows:

aa. Each battalion of an air fleet (formerly Air Force Group) air signal regiment had the following units:

1 Radio Operating and Radio Intercept (Combined) Company, meaning that each radio operating company included one radio intercept platoon. In each regiment this company in the I Battalion was designated as the 2d Company, in the regiment's III Battalion as the 6th Company.

The Air Signal Corps had in Germany proper, corresponding to the three air fleet headquarters there, three air signal regiments. At two battalions to each regiment this gave a total of 6 Radio operating and radio intercept (combined) companies (motorized), as follows:

One company each at					Competent Static Radio Intercept Station+
Bernau,	2d Company,	I Bn,	Air Sig Regt	1	Breslau
Dresden/ Klotzsche	6th "	II Bn, "	S "	1	Pulsnitz
Braunschweig	2d Company,	I Bn, "	" "	2	Husum
Muenster/ Gremmendorf	6th "	II Bn"	" "	2	Telgte
Munich	2	" I Bn, "	" "	3	Baden-Baden
	6th	"II Bn, "	" "	3	Munich

+ Referred to throughout this manuscript as "Weather Stations" (Note by Translator).

bb. The Training and Experimental Regiment at Koethen had one motorized radio operating and radio intercept(combined) company.+

cc. The AF CINC HQ Air Signal Battalion at Potsdam-Eiche had

1 motorized (6th) radio intercept company consisting of

1 (mtz) radio intercept platoon
1 platoon of radio intercept operating personnel
1 operating platoon.

dd. After the annexation of Austria Air Signal Battalion 18 was formed. Its 2d Radio Operating and Radio Intercept Company was organized from the two telegraph (radio) companies of the former Austrian Federal Army stationed at Klosterneuburg and Graz and operating the two radio receiving stations of the old Austrian army. The operating post of the new 2d Company for radio reception by its radio intercept platoon was at Wien-Hirschstetten (Vienna). From this receiving station ~~[illegible]~~ Radio Intercept Station W-14, Wien-Hirschstetten developed. On 1 June 1939 Air Signal Battalion 18 became the I Battalion of the newly activated Air Signal Regiment 4, and its 2d Company became the 2d Radio Operating and Radio Intercept (Combined) Company of the same regiment. At mobilization this 2d Company split to form the 6th Radio Operating and the 7th Radio Intercept Companies. The II Battalion, Air Signal

Regiment 4, newly established at Reichenbach, Lower Silesia, had no combined radio operating and radio intercept company, and did not activate a radio intercept company at mobilization.

For details on the radio intercept units in Austria, the reader is referred to Chapter 10, B, I, 3 and 4.

c. Personnel and Vehicular Strength. A motorized radio intercept platoon according to T/O (Air) No. 3149 (Staerkenachweisung Nr. 3149 (L)) of 1 July 1938 consisted of the following:

Platoon leader, etc.

Intercept and data interpreting elements, namely

1 officer in charge of intercept operations

3 radio intercept NCOs

5 radio operating NCOs:

1 DF data interpreter; 1 DF control operator; 1 traffic data interpreter, 1 final data interpreter, 1 operating data interpreter.

16 enlisted men: 2 DF interpreters; 2 DF control operators; 3 signal data interpreters; 2 traffic data interpreters; 3 translators; 1 final data interpreter; 1 cartographer; 2 card index clerks; 1 truck driver; 1 driver for medium-size bus with trailer as data interpreting premises (still under development),

Footnote +, p. 228: The Air Signal Training and Experimental Regiment had as its 2d Company a motorized radio operating and radio intercept (combined) unit: the 1st Platoon was a radio operating, its 2d a radio intercept unit. Its 3d Platoon was an air signal experimental unit which also tested DF instruments.

--replacable by two personnel carriers; 1 2-wheel trailer (Type Sd.Ah.24) for heavy type power unit A; 11 signal teams, namely 1 motorized switchboard operating team, 2 motorized longwave radio intercept teams, 2 motorized shortwave radio intercept teams, 3 motorized radio intercept-DF teams, and 3 short- and longwave radio intercept teams.

5. Operations, Training, Missions, and Cooperation Between Static and Mobile Radio Intercept Units.

a. General Operating Principles. The motorized radio intercept platoons activated during peace as part of the air signal regiments of air fleet and other headquarters could be employed under peacetime conditions to support and reinforce the static stations. Under mobilization conditions they could be expanded to form specific radio intercept companies, or they could be combined with existing static intercept stations, one such platoon and one such station forming a two-platoon company. In this latter case they were more or less locally confined and had the missions of the static intercept stations; in the former case their mobility enabled them to be assigned to the operational air forces and execute missions for them even during an advance into enemy territory, which the static intercept stations were unable to do so easily since their displacements took up considerable time. Their peacetime and mobilization missions, respectively, were in accordance with these circumstances.

As far as training in intercept operations was concerned it would undoubtedly have been better for the motorized units if they had formed integrated units with the static stations during peace from the outset, as set forth in Chapter 11, 5 and 6, below, instead of only being attached to them temporarily from case to case. Under such an arrangement it would still have been possible to assign c mpletely motorized radio intercept units to the operational combat air forces.

b. The Peacetime Training Missions of the Radio Intercept Companies (or Platoons) and their Cooperation with the Static Radio Intercept Stations.

(1) To give their military radio intercept enlisted personnel basic training in radio operating; and in radio intercept operations--within the company and in cooperation with the static stations in the form of temporary attachments or daily service with the static stations.

(2) To intercept and record foreign radio communications at their garrisons for their own training and exercise purposes and in accordance with their allocated intercept zones, which for each company coincided with the zone of the static station with which it cooperated.

(3) To support the static stations with personnel reinforcements and by reconnoitering, installing and manning forward frontier operating points. This included

investigations to locate the required wire communication lines, arrangements for their use, and the construction of the necessary connecting lines. These operations were part of particularly important research work

aa. to secure improved detection and interception of increased foreign radio communications;

bb. to conduct DF tasks, particularly controlled DF operations.

(4) To conduct independent operations in monitoring foreign maneuvers or troop movements, for example in times of crisis.

(5) To act as intelligence organs for the Red or Blue side in German air maneuvers.

(6) To insure continued radio intercept training for the military personnel, who usually served only brief assignments; this was very necessary, since otherwise the performances of these personnel would have fallen too far behind those of the professional civilian personnel of the static stations.

c. Peacetime and Wartime Operations and Radio Intercept Missions.

(1) The static branch of the Radio Intercept Service in war and in peace was an intelligence organ serving the Commander in Chief of the Air Force and as such had missions of a military-political or strategic nature, besides operational and tactical missions.

Military-political or strategic intelligence includes the gathering of information on

Mobilization, cooperation between Army, Navy, and Air Forces;

War objectives, Propaganda, relations with other States;

Supplies and personnel replacements, public sentiment in the interior of a country.

The mission of securing this information was in the first place one of the static radio intercept stations; the interpretation of the data thus secured was a responsibility of these stations and of the central authority. There was cooperation between the Air Force Radio Intercept Service and its counterparts of the Army and Navy.

The purpose of operational intelligence is to gain an insight into the areas of strategic concentration of foreign air powers, their ground organization, their strengths, and their targets of attack.

Tactical intelligence includes everything concerning foreign air forces not falling under the heading of operational intelligence. The following are some of the operational and tactical intelligence missions involved:

aa. Monitoring of the ground-ground communications of the ground installations of the enemy air forces, particularly of the operational bombing, strategic reconnaissance, aritllery observer and tactical reconnaissance air forces.

bb. The detection of enemy air power concentrations, new air bases, etc.

cc. The detection and tracking of approaching enemy bomber forces in order to inform defending fighter and antiaircraft artillery forces and the aircraft reporting service.

ee. The detection of new enemy radio beacons to provide data for action to put them out of action, and the interception of foreign weather reports for purposes of navigation.

ff. Technical radio monitoring to determine foreign radio traffic methods (including voice radio communications), signal and other codes, reconnaissance unit reporting systems, map coordinating systems, methods of command dissemination in ground-ground, ground-air, and air-air radio communications.

For further details on the subject see Chapter 5:"Missions of the Radio Intercept Service for the Air Force" and Chapter 1: "definitions....."

(2) The mobile branch (motorized radio intercept companies) of the Radio Intercept Service during war served primarily as intelligence organ of the operational air forces, the mission here being to gather operational and tactical intelligence data on the enemy operational air forces

within the assigned zone or zones. In this mission the mobile branch received effective support from the static radio intercept stations of the Air Force, such support including the provision from the static stations of experienced and able radio operators, radio traffic data interpreters, translators and/or data interpreters. The data gathered was also furnished to the static stations. The fact that the units of the mobile branch were motorized gave them the advantage, in contrast with the static stations, that they could operate form any point or area which offered the most favorable conditions for radio interception. However, this advantage incurred the disadvantage that as the units advanced into enemy territory the distance to their rearward wire communications networks increased. Their intelligence reports therefore arrived too late to be of use unless it was possible to construct the necessary new lines or use other communications facilities which functioned speedily and safely.

d. ~~Characteristic Appraisal in the War~~. In wartime radio intercept operations the static radio intercept stations form the backbone of the whole radio intercept network. They can be compared with strong fortresses from which the assault units, represented here by the mobile radio intercept units are committed, in accordance with the general and tactical situation, wherever the command considers that

the most favorable opportunities exist for the gathering of operational and tactical (battle reconnaissance) radio intelligence.

e. The initial Stages of War, Position and Mobile Warfare. The above account of the wartime radio intercept operations contains the principles as they were established in mobilization schedules and plans, a pattern which proved sound in the campaign against Poland and in the phase of position warfare in the Western Theater. An insight into how preparations were made already during peace for such operations against the eventuality of war is provided in the "Directives for the Operations of an Air Signal Radio Intercept Battalion--motorized (Richtlinien fuer den Einsatz einer Ln.Funkbeobachtabteilung--mot.)" included at the end of this present study. The sketches included there provide a very graphic picture.

During mobile warfare, later, the static radio intercept stations in the home zone of operations declined in importance. At the fluent fronts and in occupied enemy territories only fully motorized units or units rendered temporarily mobile were employed. For more details on this aspect see Chapter 10.

CHAPTER 9

ORGANIZATION OF A GERMAN AIR SIGNAL CORPS
RADIO INTERCEPT OPERATING OR CONTROL STATION
OPERATING PROCEDURES AND MISSIONS
(With Two Appendixes)

1. Equipment.

a. A Radio Intercept Operating Station or Radio Intercept Control Station was a radio receiving station with a large number of receiving antennae in various lengths and sizes plus the necessary radio receivers for ultrashortwave reception on wavelengths from 1 to 10 meters, shortwave from 10 to 100 meters, and long- and mediumwave from 200 to 2,500 meters. For operations these wave ranges were in each case were subdivided into smaller wavebands, so that an appreciable number of receivers were available for each wave range.

The same procedure was used at DF stations, from the large landgoniometer stations equipped with frame antennae in sizes up to 100 square meters down to the small 2- and 4-wheel trailer-mounted stations with their frame antennae of only 3/4 meter surface, also for reception on various wave lengths, but with the difference that DF operations required a long operating base line of 24 to 36 miles or more to determine the location of transmitters, since otherwise the angle of reception would have been too acute

so that the results obtained might have lacked precision.

Inintially Type LM DF instruments were used but were not fully satisfactory since it was impossible with them to orient transmitters operating on shortwave bands. For this purpose instruments were then made available which operated on the principle of the Adcock direction finder. Owing to its small antenna frame of approximately 3/4 meters the LM instrument proved unfavorable for the radio receiving service, since the receiving capacity of the small frame remained small in spite of strong amplifiers, so that the sound volume of distant transmitters was too small. Later, the Goniometer was developed, in which the frame antenna had a surface of approximately 25 square meters and a corresponding height of ten meters (33 feet) from the ground, in order to increase considerably the sound volume of distant transmitters.

b. A Radio Intercept ~~XXXXXXX~~ Control or Radio Intercept Operating Station had the following isntruments:

I. RECEIVERS.

a. General. The necessary complement was 20 to 30 instruments: Telefunken all-wave; Pack receiver Type emper B; radio intercept reveivers Types A, B, C, D designated according to the descending wavelengths.

b. Types.

Pack Radio Receiver Set (Tornister Empfaenger) Model 445 Bs/b 150-6670 kHz

" " " " Model b 100-6670 kHz

Intercept Radio" " Type E 417 N 75-3333 kHz (stationary)

" " " " " " " (for mobile operations)

Heavy Longwave " " Type Naval Special 846 Sx 75-1500 kHz

" Shortwave " " " E 390 Gr. 1500-24000 kHz

Mains-connected Unit EN 410 (Netzgeraet)

" " " EN 401 "

Broadcast receiver with shortwave receiver attachment (trade model)

" " " " receiver attachment Type E.R.I.

II. Transmitters.

Type Fu G X a/b, Ground, 70 W. 3000-6000 kHz

" Fu H IIIa, " 40/70 W. 300-600 kHz 3000-6000kHz
Radio Beam Instrument T Transceiver, roughly 600 kHz

III. DF Instruments.

Portable DF Type LMW P/24 b 315 (Army Model) 75-6000 kHz

Shortwave Revolving-Antenna DF 3000-6000 kHz

Gr.U-Adcock or H-Adcock 40-1600 kHz

Shortwave Adcock NVA 1500-15000 kHz

Short-Range DF

DF Control Instrument (Askania)

Tent

2-axle and 1-axle DF trailer

IV. Miscellaneous.

Speed Morse Recorder with tape spool, built in in operating table, stationary.

As above, mobile

Radar teletype transceiver

Radio teletype transmitter T 36

Tape recorder with play back (Steel tone-instrument-Magnetophone-Creed-selsyn-Reproducer-recorder)(Stahlton-Maschine-Magnetofon-Creed-Geber-Heber-Schreiber)

Rectifying Apparatus (G.G.5)

Special Accessories Set for Sihnal Instruments No 123

As above, No 125

Non-Sensitive Wavemeter (Grobwellenmesser) 30-30000kHz

1 Set Control Instruments for Radio Operation Station

Interference Search and Measuring Gear

Tube tester Fu R.P.G.I

G-Teletype Instrument

Portable Switchboard

Telephone Instruments

Emergency Power unit.+

2. Personnel Strength and Vehicles.

a. An Air Signal Corps Radio Intercept Station according to T/O 3408 (Air) of 1 July 1937 had the following personnel and motorvehicles (plus trailers)

+ For details on instruments see also Chapter 10, D, III.

1 Chief (military officer)

5 technical officials (radio technologists)

1 scientific assistant (salaried employee)

1 equipment administrator (Air Signal Master Sergeant) +

1 corporal

1 ") teletype operator
2 men) G-teletype operators

1 Corporal)
3 men) telephone switchboard operators

68 civilian employees:

8 data interpreters

5 translators

50 radio intercept operators

1 cartographer

1 radio instrument specialist

3 clerks (could also be female)

5 Motorists:

2 motorcyclists

1 passenger car driver

2 truck drivers

Motor Vehicles

2 heavy type motorcycles with sidecar (o)

1 medium sedan-type car (o)

1 light truck (o)

1 medium truck (o) served also as personnel carrier

Trailers

2 Navigation DF trailers (2-axle) (S.dh.Ah.447)

b. An Air Signal Corps Redio Intercept Control Station was authorized the following strength according to T/O 3406 (Air) of 1 July 1938:

1 Chief (military officer)

5 Signal Service technical officials

1 Equipment administrator (Air Signal Corps)
1 corporal--radio operator
3 teletype operators (including 1 corporal)
4 telephone " " 1 "
2 scientific assistants
12 data interpreters
8 translators
30 intercept operators
1 cartographer
1 radio instrument specialist
3 clerks
5 motorists
2 motorcyclists
1 passenger car dirver) including 1 corporal
2 truck drivers)

Motor Vehicles:
2 heavy type motorcycles with sidecar (o)
1 medium type passenger car (closed) (o)
1 light truck, open (o)
1 medium truck, open (o)
1 medium omnibus (o) (until procurable replaced by 1 personnel carrier)

3. Siting. The site for the establishment of a static radio intercept station within an area circumscribed by military considerations (command control, intercept zone assigned) was to be so selected that its position insured the least possible interference by electric currents with its receiving and DF operations. Particular care was to be taken to avoid: terrain with ore deposits; the vicinity of electric power stations, power electricity transmission lines, railway lines, large watercourses, lake

large water courses, lakes, mountains, leaf tree forests of any considerable size. To improve and increase their radio and DF receiving capacities, the static radio intercept stations echeloned mobile intercept posts forward, under the camouflage designation of "Waather Research Posts", while they themselves were known under the camouflage designation of "Weather-Radio-Receiving Stations." Very carefully camouflaged the weather research posts at times moved into the immediate vicinity of the frontiers and produced very satisfactory results.

4. Buildings and Installations. Static radio intercept stations were housed in solidly constructed stone, single-floor buildings, with saddle roofs and attics, and provided with cellars. Each such station had its own water main, sewage system, central heating and a power aggregate to supply electricity in any emergency. All working premises were on the ground floor, including the radio receiving rooms, the data interpreter offices, the DF control instruments for the DF instruments organic to the station, teletype, telephone and radio transmitting offices, and the administrative offices in addition to equipment storage rooms and washing facilities. In the cellars were the power unit, accumulators, workshops, central heating plant, and the coal storage. The attic contained a sizable conference hall, an emergency kitchen,

rest rooms and general storage rooms. Adjacent to the main building were a garage and a dwelling house for the officials and in some cases for the station chief. The antennae and the longwave DF instruments, which was permanently installed, were placed in a position in proper relation to the radio receiving offices. The large shortwave DF installations were approximately 1 to 2 kilometers from the main building in terrain particularly favorable for receiving, if possible in damp marshy ground or meadows. These installations were called DF villages (Peildorf).

If there was no village or town near by, a settlement had to be established. If civilian and military personnel had to commute over long distances, the nearest Air Signal Corps unit made buses available for the purpose. Later, the T/O & E for static radio intercept stations included such buses. The military personnel serving training details at the station were either brought to the station daily or were housed in prefabricated houses at the station, where they also received their meals. When it was urgently necessary to establish a static radio station speedily, it was sometimes necessary to use already existing buildings. Such stations usually did not have the full complement of installations, personnel, and instruments and were more in the nature of temporary establishments.

5. Wire Communications and Communications Transmission.

The static radio intercept stations were linked with the telephone and teletype network of the Air Force, and also with the telephone system of the Postal Department; the same applied to t heir sub-stations and posts. Each station had a G-teletype instrument. The station was authorized to dispatch urgent priority messages through the postal system and through the Air Force network;+ in addition a radio transmitter was installed for use in an emergency. The Air Force Radio Intercept Service did not have a separate communications network of its own similar to the "Heinrich" network of the Army,++ although plans existed for the establishment of such a network. Plans were under consideration for a decimeter transmission system, since success in radio intercept operations usually depended on the speedy transmission of the results obtained.

6. Station Chiefs and Personnel; Performance Standards.

Each station was headed by an officer in the rank of captain or a field grade officer. The technical officials were employed in the administration, and in the radio and DF services, in the data interpreting elements and in the outstation system. The scientific assistants were employed in the data interpreting and decodingsections and at times also in radio and DF operations. They were employees in the higher pay scale.

+ For more details see Appendix 1 to Chapter 9: Emergency Calls
++ For more details on the Army "Heinrich" communications network see Chapter 4a, 11.

The radio intercept and DF operating personnel and the equipment available to a static radio intercept station were adequate for the permanent and continuous operation of 8-10 radio receivers and 2-3 DF installations. To insure availability of electric current at all times, an emergency power unit was installed in the main building. Appropriate personnel for the maintenance of all machinery and instruments were available, such as a radio technician specialist. The radio receivers and DF instruments were tuned in separately to separate wavebands. Exceptionally severe demands had to be made on the radio and DF personnel, which were far in excess of the demands made on average radio operators.

The reason for the large percentage of civilian radio intercept operators, data interpreters, and decoders in the Radio Intercept Service was that it was only civilians who possessed the necessary high qualifications. For them the work at which they were employed was their normal profession. By offering appropriate salaries it was possible to select, test and retain the most capable candidates. This was the only possible way to build up a staff of really capable decoders as a cadre. The really capable translators were appropriately educated ethnic Germans who had grown up in foreign countries. Military personnel usually served only brief assignments in the service,

during which they were unable to achieve the high standards of performance of these civilians. Frequently they were used merely as assistant personnel. In data interpretation all that was required from them was traffic data interpretation. In future it will be essential to insist on a larger cadre of suitable military radio intercept personnel assigned for longer periods. In the matter of the technical officials it will also be necessary in the future to select and train such personnel exclusively to meet radio intercept requirements. The professional radio intercept personnel will in the future continue as the backbone of the whole service. Military control, supervision, and direction, in which capacity experts are employed, must not under any circumstances be reduced in favor of the civilian sector.

7. Chains of Command and Operations. In specifically radio intercept matters the static radio intercept stations were assigned under the central radio intercept authority in the Reich Air Ministry, in Branch 3 (Cryptographie) , Signals Division; administratively and for supply purposes they were assigned under the nearest Air Signal Corps field units. Due to their staff of highly qualified personnel, the static radio intercept stations were the backbone of the entire Radio Intercept Service, and the Cryptographic Center, as the highest authority in this field, had particularly competent personnel. The radio intercept

companies, which during peace consisted predominantly of personnel on brief assignment, were unable to achieve the performance standards of the static stations. As a rapidly mobile and well equipped field force, however, they were indispensable. However, the first condition for the successful employment was the immediate creation of securely functioning communications lines with the authorities controlling the radio intercept service with which they were required to cooperate, namely, the Air Signal Corps Radio Intercept Control Stations, the Radio Intercept Stations, and in given circumstances the Cryptographic Center of the Air Force Headquarters Signal Division. the continuous training given during the war and the assignment of highly qualified personnel did much to remedy the weaknesses referred to above.

The operations of a static radio intercept station depend on the missions it is assigned on the basis of the intercept zone it covers. There were continuing missions and special missions. Furthermore, no limits were placed on the initiative of the personnel in detecting new communications traffic. Each radio intercept station was assigned as its zone areas which held out the best prospects for successful operations in view of its own location. Special missions, for example the mission of monitoring maneuvers, had to be assigned as far ahead of time as possible, in order to be able to increase coverage

through the commitment of mobile forward radio intercept posts at sites close to the border. Camouflaged as Weather Research Posts (~~Wetterforschungsstellen~~), these forward radio receiving and DF postswere furnished by the static radio intercept stations (themselved under the camouflage designation of Weather-Radio-~~"~~eceiving-Stations) from their own staff and equipment.

3. ~~Radio Intercept and DF Data Interpretation~~. The most important element of a static radio intercept station was its data interpreting element with the data interpreters, translators and decoders employed in that element. The fundamental aspects of data interpretation have been treated previously in Chapter 6 of this present study, and only brief reference will be made here to the performance of the data interpreting functions in practice. These were subdivided into

> operating data interpretation, DF data interpretation, communications traffic interpretation, content interpretation, and final consolidated data interpretation.

The data interpreters were classified as 1st, 2d, and when necessary 3d data interpreter, and had to do their own written work. The 1st Data Interpreter was the best qualified man and was responsible for the whole process of data interpretation. The 2d Data Interpreter handled the card indexes and posted any necessary alteration in it. The 3d Data Interpreter was responsible for ~~xxxxxxx,xxxxx~~ the recording,etc., of air and daily reports, DF reports and messages sent in from the receiver elements of the station. All material received was submitted first

to the 1st Data Interpreter, who screened them for importance. Those he considered unimportant he deleted, and then passed the material on to the 3d Data Interpreter, who recorded the various messages. At this point the material was divided. The 1st Data Interpreter took over the daily and the DF reports for analysis, while the messages went to the translators. The analyses of these messages were forwarded for centralized interpretation; clear text messages were consolidated as what were called "radio Messages", the decoded messages as "reliable messages." Air reports provided information on aircraft types, the parent headquarters of the various units, etc. The 2d Data Interpreter sorted the material and entered items of information in the card index. All material intercepted was forwarded to the Cryptographic Center, including messages which appeared unimportant.

From the radio receivers, the reports went to the operating data interpreter and simultaneously to the 1st Data Interpreter, who at the same time was the final data interpreter. Important for the operating data interpreter was the time of interception, since it was possible to determine that certain transmitters always transmitted at the same time. Other important items here were the wavelengths, to determine whether these changed, and if so when and according to what pattern; the call signals, from which it was possible to determine the nationality of

of the transmitting stations, since every country uses a different type of call signals; the connecting symbols between the two call signal symbols--the Poles, for example used a "z" the Russians an "ä", and the Czechs a "de." The message heading is also very revealing, since from it one can recognize the operating signal. Of great importance are also the ramarks made by the receiving radio operator. Under a heading "Remarks" the intercepting operator was to enter everything he had discovered concerning the foreign station concerned, such as tone, idiosyncracies of the transmitting operator, etc. The operating analysis could be described as the identifying service for the identification of foreign radio transmitting stations. Another responsibility of the operating data analyst was to maintain the various indexes up to date.

DF data analysis, as its name implies, is concerned with the analysis of al DF data received. Here special care had to be devoted to the preparation of the maps, the precise determination and identification of the located site of transmitters, correction of the DF results by a daily determination of direction finder deviation curve (Funkbeschickungskurve) of each DF ope ator and the use of same in the DF data analysis. A precise DF check on the traffic of a number of DF posts at one and the same time was essential in order to determine whether the transmitter located was an

airborne or a ground unit. If bearings were taken from only one side and the airman transmitting happened to be on acourse towards the DF station it was not easy to determine whether the station detected was on the ground or in the air, because the angle of interception remained the same.

In the analysis and interpretation of voice messages, and of foreign radio operations, the results obtained in an analysis of DF data must be used, since they facilitate such interpretations.

(1) The DF posts must be so located that they provide an operating base line allowing of at least one cross-bearing. In order to obtain better and more precise fixings it is advisable to have three DF posts.

(2) It is essential that at least two adjacent, if not all DF posts, be interconnected by wire or radio telegraphy and even better by voice radio (the operators should have breastplate microphones and headgear receivers , the purpose being to insure constant readiness to communicate with other DF operators and leave the hands free for immediate DF activities).

3. The messages following intercepted call signals, some of which may already have been identified as of some specific units, must all be listened in to, together with all other traffic.

4. The station of the intercepted transmitter, as determined by cross-bearings taken, must be taken into consideration in the data analysis.

5. With due regard for the necessity of as long an operating base line as possible, mobile DF posts should be located as close to the frontier as possible (if necessary 2 or 3 instruments at one post to monitor a number of frequencies.

In the interpretation of radio intercept and DF date, cooperation was maintained in all cases with the other radio intercept stations of the Air Force and when possible also with those of the Army and the Navy. The results of the interpretation were reported to the appropriate tactical headquarters. The more efficiently the radio intercept and DF elements function, the more favorable will be the situation of the tactical commands in drawing conclusions from and basing their decisions on the reported results. It is essential that the forward radio intercept posts be manned daily in order to be constantly posted on the daily deviations caused by variations of temperature, conditions of fog, etc.in the individual segments of the enemy territory and thus in a position to provide the adjustment data essential for precise DF locating.

The purpose of radio traffic analysis is to determine the interrelations between the individual radio transmitters

intercepted. After this has been done a radio outline map is prepared. Particular attention must be paid to the appearance of new transmitting stations, the disappearance of stations hotherto in evidence, and the communications system to which the transmitting stations belong. Insofar as newly detected transmitting stations are concerned, a radio traffic pattern must be worked out.

The content analysis or interpretation requires considerable detail work; it serves to clarify the pure text of intercepted messages--after decoding in the case of encoded messages. A number of card indexes must be maintained.

The final data interpretation again is the responsibility of the 1st Data Interpreter. It provides information on wverything which has been discovered on the day in question, such as the appearance of new transmitters, etc. It is consolidated as the final daily report in the form of a Communications Operations "eport together with a situation outline map and the radio intelligence report. "Reliable Information" is the content of decoded messages which, since the information has been gained from current radio traffic can be considered as absolutely reliable and correct.

9. Reporting.

a. Each month consolidated lists were compiled showing call signal and operating identification signal

analyses; communications operations reports; "Reliable" reports; the frequencies monitored; aircraft take-off and landing reports intercepted; weather reports intercepted, and so forth. These consolidated reports were called Radio Intercept Technical Reports (H.-technische Berichte). Together with an "Activities Report" this report was forwarded to the central data interpreting authority, the Cryptographic Center in Branch 3 (Cryptographic), Signal Division, Reich Air Ministry, and to other appropriate parties. The accumulated material was forwarded by registered mail. Important and urgent data, such as intercepted messages requiring de-coding, were forwarded by G- teletype. This system also functioned smoothly during the war.

b. The following information is offered concerning the Radio Intercept Technical Reports:

(1) These were reports concerned mainly with operating experience and results, and which dealt with the whole preceding month.

(2) They had to contain, in the first place,

(a) Outline maps showing the newly detected radio communications networks or systems;

(b) precise details on features peculiar to the radio traffic intercepted;

(c) Identification of the detected transmitting

stations and their messages as transmitted in clear or transmitted in code (code signal chart or other encoding systems);

(d) call signal changes, with particular emphasis on whether the changes occurred at regular intervals or irregularly;

(e) Description of changed reception when the intercepting post displaced to a new position;

(f) Consolidated presentations of DF results in the form of outline maps with brief explanatory text.

For more information on this subject the reader is referred to Chapter 9, Appendix 2.

(e) The activities Report was to contain information as follows on the following subjects:

Personnel: Actual strength; movements; new arrivals and departures; personnel on temporary detail;

Equipment: On hand; T/O equipment; equipment on loan.

Radio Operations: Zones monitored; radio receivers in operation; number of hours in operation.

Reception Conditions: and miscellaneous.

10. Finally, the following is a list of the questions data interpreting and decoding personnel had to ask themselves when handling the material obtained in order to arrive at appropriate results:

(1) What were the operating procedures of the radio networks of the individual foreign air forces?

(2) What call signals and frequencies are being used?

(3) What types of radio communication networks have been detected?

(4) Are communications also taking place with other networks?

(5) What are the geographical boundaries of the individual radio networks?

(6) What are the communication procedures when units are airborne: ground-air, gorund-ground, air-air?

(7) What abbreviations are used in air force radio communications: air-air, air-ground, ground-ground?

(8) Are abbreviations other than those internationally use in use?

(9) Can some other meaning be placed on the international abbreviations?

(10) What are the principal times of traffic of the individual radio networks?

(11) When do these times change or is there a constantly occurring change?

(12) Is it possible from a transmitter's tone and sound volume to determine what air units it belomgs to, or to some certain headquarters or command?

(13) What types of call signals (numbers or letters of the alphabet), mixed BZB, BBZ or ZBB are used,and how frequently do they change?

(14) Is it possible from a change in the radio traffic

(14)--Continued: to determine a change in the tactical command or in operations?

(15) Can a surprising increase in the volume of radio traffic be taken as a sign of tactical measures (for example, maneuvers, field exercises, internal disorders)?

(16) What radio networks transmit radio telegrams, and what is the nature of such transmissions: code or clear text?

(17) Are general radio messages transmitted to all stations of a network or even beyond that to stations of other networks? (Recognition of control and sub-stations, etc.).

(18) What is the composition pattern of messages in the individual radio networks?

(19) On the basis of specific message composition patterns, is it possible to draw conclusions as to a tactical air force command?

(20) Is any regularity in the brevity or lengthiness of radio code messages recognizable ? (Decoding).

(21) From the contents of messages or from a frequent recurrence of letters or the constantly repeated appearance of letter-groups in the same position within messages, is it possible to draw conclusions concerning the type of code key in use?

(22) What are the reasons when a radio message from one station is relayed by another?

(23) How are weather reports transmitted in the air radio service?

(24) From special characteristics in the weather,

(24)--Continued:ground, altitude, and atmospheric-pressure reports, is it possible to draw conclusions as to the parent unit?

(25) How are weather reports exchanged between the various airfields?

(26) Is tactical radio traffic also conducted or are tactical messages also transmitted within the air radio network?

(27) If a radio report has always been transmitted at a certain time and the time changes, can it be assumed that the radio personnel and therefore also the tactical unit committed in the area concerned have been changed?

(28) What transmitting peculiarities have been detected and what is their significance?

(29) Can increased occupation of an area be assumed from increasingly lively air radio traffic?

(30) Can an analyzation and interpretation of the intercepted material provide indications concerning the strength, disposition, and mission of a unit?

11. Radio Communications Situation Reports and the Monitoring of Radio Broadcasting Traffic.

a. Radio Communications Situation Reports. These reports had to cover the following aspects:

(1) Radio traffic density or capacity (less dense or denser than before).

(2) Appearance of new radio networks or systems.

(3) Sound volume of the intercepted stations (weaker than otherwise).

(4) Aircraft movements (from where to where).

(5) Changes of the otherwise customary traffic signals. The appearance of completely new radio traffic types and features.

(6) Call signal and frequency changes, if any, (with very precise details on wavelengths).

(7) Departures from the normal traffic patters in the timing of communications or use of transmitting station.

(8) Any large increase of coded messages (when possible with information on the coding method used). If new radio networks or new transmitters made their appearance, every effort was to be made to determine their position and report it simultaneously in the appropriate Immediate Radio Intercept Report. The report also had to state whether a newly detected station was already established as belonging to an air force network or not. Efforts had to continue to eepedite to the utmost the transmission of intercepted messages. It was a selfunderstood standing rule that all Immediate Radio Intercept and Radio Situation Reports were to be forwarded by special line as top priority urgent messages (SSD = Spezial Sender Dringend = Special Transmitter Urgent). Time of transmission: punctually at 16 hours daily.

b. Monitoring Broadcast Radio Traffic. On 24 September the following static radio intercept stations received orders to monitor radio broadcasting traffic in

the countries stated:

Station	Country to be Monitored
AF CINC HQ Weather Station w/ Station W-16, Kobbelbude	Russia
Station W-11 Breslau	Poland
" W-16 Kobbelbude	Lithuania
" W-13, Munich	Italy
" W-23, Baden-Baden	France
" W-12, Telgte	Britain

Radio broadcast traffic monitoring was only to be conducted insofar as it did not jeopardize the execution of other assigned radio intercept missions. Particular attention was to be given to the braodcasting times for the news programs. Any item of news which appeared important was to be reported immediately to the Chief, Cryptographic Center.

From the above order it is evident that, in contrast with the Army Radio Intercept Service, the Air Force Radio intercept Service did not attach acute importance to the monitoring of the radio broadcast traffic of foreign states. Also noticeable is the fact that Stations W-21 at Pulsnitz, W-22 at Husum, W-24 at Trier, W-14 at Vienna and Special Radio Intercept Station at Budapest were not assigned radio broadcast monitoring missions, although all of them were already in existence at the time.

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The Army Radio Intercept Se vice systematically monitored the radio broadcast traffic of all foreign powers the transmissions of which it was possible to intercept, and maintained a card index on all radio broadcasting stations in existence throughout the world.

For more details on the subject of radio broadcat traffic monitoring by the Army see Chapter 5a, 1, c.

For more details on the general subject matter of this present Chapter 9, see Appenxixes 1 and 2 to this chapter.

CHAPTER 9, APPENDIX 1
(to Paragraph 5)

COPY

Date: 22 January 1937, Time: 1400

Teletype Message
From: Reich Air Ministry, Air Office (Signal Division/Sub-Section IIb).

To : Air District Commands I, II, III, IV, V, VI, VII, and Section I, Air Signal Division, Air Office.

Subject: ~~Special Messages~~.

Effective immediately, the Chiefs of Weather Radio Receiving Stations (the code name for Radio Intercept Stations --Note by Translator) are authorized to make use of the "Special Messages (~~Ausnahme-Gespraeche~~)" Air Force Telecommunications System and to use the lines of the DRP System for Class SRA communications during exercises and maneuvers. The appropriate offices and telephone switchboards will be informed accordingly immediately.

RLM LA (NVW/IIb)
NBL has been informed directly with the addition that the Chiefs of Section III and Sub-Section III-c-1 have the same authorization.

S/ Kierfeld.

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COPY

Pulsnitz, 5 June 1939

FIRST AIR FLEET HQ
Weather Reporting Control Station
Br. B. No. 28c/39 Secret
~~Technisches Radio Intercept Reports~~

SUBJECT: Technical Radio Intercept Reports.

To: Weather Radio Receiving Station 21

~~Deutsch-Krone~~.

A. According to instruction from Chief, Air Signal Division, Branch 3 (Cryptographic) to First Air Fleet Weather Reporting Conteol Station the Technical Radio Intercept Reports of the Weather Stations in the zone of the First Air Fleet will be prepared as follows:

1. The Technical Radio Intercept Reports are not Radio Intelligence Reports and also not chronological compilations of index material.

2. They are reports which shall contain principally operating experience and operating results and will cover an entire month.

3. In the first place they will contain:

a. Outline maps of newly detected radio networks;

b. a precise listing of all characteristic features of radio traffic intercepted;

c. Identification of the transmitting stations and their intercepted radio traffic according to clear text and code text traffic (code signal schedules or charts, other encoding methods);

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d. Call signal changes, with details on regularly or irregularly occurring changes;

e. Description of changed receiving conditions when intercept operating posts change their sites;

f. Compilation of DF data obtained, in the form of outline maps together with brief explanatory text.

4. Concerning content analysis they will contain only items which are of value for the development and operations of the Radio Intercept Service now and in the future. As in the past, the reports will contain nothing concerning decoding activities.

B. Station W-21 will dispatch its Technical Radio Intercept Report

1. Complete (that is, comprising all countries monitored) only to Chief, Signal Division and to ~~XXXXXXXXXXXXX~~ First Air Fleet Control Station W-Leit-1.

2. Copies of the Russian and Polish parts of the Report will be forwarded to Stations W-14, Vienna (Wien-Hirschstetten) and to Special Purposes Weather Station Budapest, the latter through Fourth Air Fleet, Vienna.

C. ~~Addresses~~:

1. Control Station W-Leit, Fourth ~~XXXX~~ Air Fleet: Vienna 50, Schwarzenbergerplatz 13;

2. Special Purposes Weather Station Budapest:
Outer cover: Fourth Air Fleet HQ/Signal Staff Officer,
Wien 50, Schwarzenbergerplatz 13;

2.--Continued:

Inner cover: Special Purposes Weather Station
Budapest-Matyásfoeld

To be forwarded by courier.

s/Gottschling
Lt.Colonel. Chief

CHAPTER 9a

THE CONTROLLED DF OPERATIONS METHOD

1. Definition. Controlled direction finding involves a control center directing simultaneous action by two or more DF posts at a greater or lesser distance from one another. Under orders received from the control center (called the control transmitter) by light signals, telephone, or radio, and stating the frequencies to be checked, the controlled DF posts simultaneously take bearings on a radio transmitter by intercepting its wavelengths in order to determine its location.

2. The Execution of Controlled DF Missions. (See sketch in Appendix to Air Force Radio Intelligence).

a. It will be assumed here that the transmitter used as the DF control transmitter is an instrument operating on the Morse code syster It is stationed near to the radio intercept receiving center of a radio intercept company or of a statio radio intercept station, with which it is connected by wire. In the receiving center a number of radio receivers are tuned in to the various frequencies of an assigned waveband.

b. As soon as one of the intercept radio receiver operators at the receiving center detects an unknown transmitter in operation, he immediately by telephone passes on the frequency concerned to the control transmitter operator, who immediately

transmits the information to the light radio operating teams attached to the individual DF teams, which must be distributed along an adequately long operating base line. These radio operators on receiving the message immediately inform the DF operators, giving them the stated frequency. As soon as these have taken bearings on the desired unknown transmitter they use their breastplate telephones to report the direction determined, called the bearing angle (Peilkreis- or PeilwinKel) to the DF data interpreting element (the radar station chief). For DF purposes the circle is divided into angles of 0° to 360°. Using a compass the DF circle of the DF instrument is aligned to north, so that the magnetic meridian passes through the site at which the DF instrument is situated. The DF teams thus with their directional or beam antennae of their DF instruments take bearings on the strange transmitter and determine the receiving angle in re ation to the geographical North.

c. The DF data interpreting element is located next to the receiving center. Here the DF map is fastened on to the top of a table. The map must be large enough to show the area in which the strange transmitter is assumed to be. The sites of the DF posts are marked on the map with pins; these pins are at the same time the pivot in each case of a DF circle made of transparent celluloid and oriented north, marked with scale gradings corresponding to those on the DF circles used

with the DF instruments. The pivot or center pins ~~xxxx~~usually have ~~xx~~ varicoloured glass heads. Attached to the pins are what are called direction-finding threads, each ending in a light weighter. These direction-finding threads are oriented according to the angle counts reported by telephone and sometimes by loudspeaker from the individual DF posts. At some point they will intersect and will usually form a triangle, the center of which is the site of the transmitter on which bearings have been taken. Under exceptionally favorable circumstances the threads will all intersect at only one point, which in such case will be the more precisely determined site of the transmitter.

d. Under existing circumstances it is recommended that as a DF control transmitter use should be made of instruments similar to the Fu.G-16 , 40 Watt, 7-8 meter ultrashortwave, or a small 20-Watt transmitter, similar to the one produced by the firm of Lorenz and operating on shortwave frequencies, or an appropriate transceiver, to gether with an antenna mast which should not be too long, but as inconspicuous as possible (only shortwave Dipole). The 20-Watt ultrashortwave instrument used with this antenna is a small voice radio transmitting and receiving set in the size of a cigar box with a miniature antenna, a small battery box, plus earpieces and microphone all in one piece, similar to a table telephone.

e. To expedite and simplify controlled DF operations use can be made of double-headgear for the DF operator. This headgear consists of an earpiece for reception from the DF instrument and a second earpiece for direct reception from the radio operator in the radio receiving center, who, in wire communications,will use a breast or throat microphone for the transmission of ordxrs to the DF posts. Reports from the DF operator to the DF data interpreters will be made through the DF operator's breast microphone.

f. In contrast with the radio intercept companies, the static radio intercept stations had properly installed permanent type DF operating premises.

In these premises were suspended loudspeakers through which came the DF instructions relayed by the radio operators of the receiving center, for example of a weather reporting Control station to the radio intercept stations connected to it for DF operations; In special types of DF missions these could be DF posts of the Army, the Navy, or the Air Force Air Traffic Control Service. In spite of the long distances over which the DF posts forming a team in any such mission might be spread, the i nstructions came over so loud that the DF operator could hear them even while operating with both earpieces of his headgear in position. After taking the required bearing, the DF operator entered the results on a tabular form showing the time of the day, the frequency, the receiving angle and whether the results were good or bad; at the same time he reported the DF results through his breast or throat microphone to the DF post chief.

In detail the following remains to be said on this subject:

The intercept radio operator monitoring a foreign wave band in the radio receiving center had on his desk next to his radio receiver a microphone, or he made use of a throat microphone, which was connected with the telephone wire to the DF post of the radio intercept station and/or to telephine wires to other DF posts.

Whenever he desired a bearing to be taken, he established telephone connection by merely pressing a botton. The frequency and the call signal spoken into his microphone was repeated in the bunker of the DF post by loudspeaker. The Radio operator attached to the DF post relayed the message in the same way and, also in the same way, relayed the results obtained by the DF operator to the DF data interpreting center where it was received by the intercept radio operator and at the same time was announced by loudspeaker at the DF map desk.

g. This system of request and result transmission can be adapted to suit any particular circumstances.

h. The radio intercept companies committed in the forward areasused morse telegraphy for the transmission of orders and wire or radio communications for the reply. In the future it will be essential to use only voice radio communications here. The static radio intercept stations preferred wire lines for telephonic, loudspeaker, or teletype communications, using special lines even over great distances. Only when it was not possible to allocate or construct telephone lines for the purpose, they used Morse telegraphy, for example, across bodies of water, as was the case in DF operations in southern Italy and Greece (see Chapter 10, A, VI, 1). The use of light signal methods for the transmission of orders or requests must be considered obsolete under modern conditions.

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i. To determine possible deviation in DF data caused by temperature fluctuations, conditions of fog, shifting minimum (~~wanderndes Minimum~~) and so forth, daily spot checks can be made by taking bearings on known permanent transmitting or broadcasting stations. This will provide the information needed for current adjustments.

In the case of permanently installed DF instruments, for example those of the static radio intercept stations, a radio test is undertaken only once, namely when the supplying firm makes delivery. This test ~~XXXXXXXXXXXXXXXX~~ is necessary for the acceptance protocol. It takes up some time, the process being for a plane to circle the DF post in a wide radius, transmitting messages at intervals measured in degrees (each 1° or every 5degrees), of which the DF instrument takes bearings. The purpose here is to detect faulty functioning of the DF instrument, the accepting authorities wanting to be able to say when the test is over "...the measuring or direction finding data of this DF instrument is not quite accurate in such and such a direction." This is not due to any flaw in the instrument but can be caused by a number of extraneous influences, such as ground conditions, for example the presence of ore deposits, underground watercourses, rivers, railway lines, forests, etc.

References:

DF data analysis and interpreting: see Chpater 6, A, II, 2 and Chapter 9, Par. 8.

DF operators : Training and Background Knowledge, Operations, see Chapter 6, B, I, Par. 1 and 2.

Training targets in the DF Service: See Chapter 8, I, 3, c (c2) and Chapter 10, D, II, Paragraphs 2 and 3.

DF personnel. Radio Intercept Service DF teams: see Chapter 8, II Par. 4, c.

DF instruments and equipment: See Chapter 9, Par. 1, b, III, and Chapter 10, D, III.

Lateral connections in controlled DF operations: See Chapter 10, B, VI.

4. DF Service Regulations; Principles of DF Operating Methods; Ideas on DF Services in the Future. In about 1940 the Commander in Chief of the Air Force had a regulations manual on the ~~XXX~~Controlled DF Traffic printed. Allegedly, it was numbered G-32. It was compiled by Major Dr. Ulrich, Commanding Officer of the III Battalion, Air Signal Regiment 2 and Chief of Radio Intercept Control Station W-Leit 2 in Brussels/shapdal.

No changes have occurred and none are likely to occur in the future in the principles governing Radio DF methods and controlled DF traffic since the initial stages of a

systematic DF service during World War I, in 1915-16.

In view of the great speed at which modern aircraft travel and the possibility to exploit the advantages of ultrashortwave voice radio communications it might be advisable in the future for each radio intercept company committed in the field to move small and highly mobile radio intercept and DF teams to positions ahead of the artillery and as far forward into the infantry positions as possible. These teams could consist of 3 or 4 men, could be spaced at intervals of approximately 12 miles and could use voice radio for their reporting. Owing to the speed at which the contents of such messages could be interpreted and translated into the appropriate action the risk of their interception by the enemy would not constitute a hazard. The equipment recommended for such purposes would be a combined DF and ultrashortwave receiver instrument, which could be used for both purposes. The radio intercept-DF operating teams would be organized in units of each 3 or 4 teams, which could report their data through one or two intermediate stations farther in the rear back to the company command post or if necessary to some other command post. In posts so far forward it would be possible to obtain much clearer and more easily intelligible reception of the enemy air radio communications, particularly

with tanks, artillery, etc., than would be possible for the more rearward static radio intercept stations with their forward operating posts of all types, which necessarily miss much of the radio traffic because of the small operating range of the enemy transmitters used in the combat zones. The larger volume and timeous reception of DF data obtainable by the recommended means would react particularly in favour of friendly fighter action, which could produce successful results even at the great speeds involved. Speed in the transmission of data is the first requirement in an air force radio intercept service.

5. Historical Review. The following historical review is offered in order to provide a true concept of the wartime DF operations, namely, in the form in which they functioned as far back as in World War I and, inter alia, were translated into fighter action, and as they functioned in World War II on a far greater and more successful scale.

Going back to the days of the inception of DF operations in World War I, Major General Lindner, at that time in command of the telegraphic services of the Twelvth Atmy (under General von Gallwitz) at Soldau, rendered meritorious services in the eastern theater of operations. Direction finding operations were conducted as early as in January-February 1916 at Provisional Army von Gastrow in Mlava in cooperation

with the adjacent stations at Plock and Ortelsburg. The direction finding stations in those days were called "Directional Receiving Stations (Richtempfangsstellen), and Malwa was the first such station established, where all operations were based on the 1:300,000 scale map. Lieutenant Colonel Max Ulrich, Air Signal Corps, and a commander in the Radio Intercept Service in World War II, was at that time a 2d Lieutenant of the Reserve, and played a leading role in the establishment of this first direction finding station.+

After that assignment, Dr Ulrich had the mission of applying the experience gained in Df Operations to the Western Theater at Verdun. For this purpose he was transferred on 1 March 1916 to Heavy Truck Wireless Station 39 (Schwere Kraftwagen-Fu-Station 39) under Fifth Army at Stenay commanded by the Crown Prince of Germany and later by General of Artillery (Lieutenant General) von Gallwitz. Later in the year 1916 Dr. Ulrich, under orders from the Chief of Staff, West, also established DF stations at Provisional Army (Armee-Abteilung) C and at the Third Army, both of which produced good results. Dr. Ulrich reports on his success at the Fifth Army as follows:

A radio receiving station was established at Stenay. It was the second such station on the western front.

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It was found that very good reception was obtained on wavelengths under 600 meters approximately around 400 meters down to around 120 meters (communications between front trench stations and aircraft). New types of receivers first had to be procured for this purpose, since the normal sets were not suitable for intercept purposes because they only operated on wavelengths above 600 meters After new spools had been procured lively traffic was found on these wavelengths, which in the past had not been detected. The first radio receiving station in the western front was at the Fourth Army. I think it was Radio Receiving Station 2. It was committed at Thielt. After I had established my radio receiving stations, I went about establishing three "directional receiving stations" in the zone of the Fifth Army, each of which at the same time had one receiving instrument to intercept messages sent in code. The new stations were immediately linked with direct long distance telephone cable lines to the station at Stenay. Prior to the arrival of the directional receiving instruments from the depot in Berlin, a so-called Telefunken compass was constructed at Stenay,with parts available on the spot, to take bearings on other longwave transmitters. This instrument was destined to produce excellent results.

In the meanwhile the directional receiving instruments arrived from Berlin and were immediately plugged in to the completed mast installations and placed in operation. The three directional receiving stations were located in Andevanne, Maugiennes, and Norry le sec. Owing to the configuration of the front line being exceptionally favorable for DF operations,(it almost formed a perfect triangle at Verdun) very good direction finding results were obtained. The first bearings taken were on the French transmitters operating within the fortress area of Verdun, namely the transmitting stations of the fortification outworks and of the divisional and corps stations, down to the level of front trench stations. Then, first as an experiment, bearings were taken on aircraft directing the adjustment fire of French batteries against German ammunition and other depots. The idea to attempt to take direct bearings on aircraft was engendered by a chance conversation I had with airmen of the Fifth Army, who mentioned that there were always a number of French aircraft in the air. It was known, they said that these were reconnaissance and artillery spotting planes, but it was not known which of them were the artille

Footnote +, p. 277: For more details on Radio Receiving and Radio Directional Receining Services in the Eastern Theater see (1) pp , below (a,b,c) of present chapter and (2) Chapter 2, III, Par. 1.

artillery planes and which the reconnaissance. I told them that I might be able to help them and we arranged that as soon as planes took off and were flying in their predetermined circles I would call them and inform them over what map grid xxx such an aircraft was flying; this owuld make it easier for them to find the plane and shoot it down or drive it away. This was a first experiment, but it succeeded, and very soon things functioned smoothly with our airmen. We were able to inform them the moment the French planes left the ground, that is, when they gave their take-off or call signal, thereby testing the functioning of their radio instruments, and when they by means of the call signals requested the radio stations at the adjustment batteries they were serving to tune in their receivers. We were thus able to take bearings on them already on their base airfields at the takeoff and could with ease track them until they reached their operating area. We also determined the turnabout points of the outward and homeward elipses req ired for their mission of directing the French artillery adjustment fire, ahich we detected by taking bearings. We were thus able to inform our airmen timeously: "Artillery Plane YF in air above German map grid ...., please fire." Usually our planes suon returned past our station,

wobbling as they passed to signal us that they had brought own an enemy plane. However, even before they returned we were aware that the French plane was no longer in the air, because its radio communications had ceased abruptly and had not been resumed. There were days on which 2 to 3 French planes were brought down in this way.+

General Klemme of the Air Signal Corps++ writes of his experience in the radio intercept and direction finding service during World War I as follows:

a. Transferred on 15 December 1915 to the Twelvth Army+++, which had bogged down in position warfare on the east front, as Chief Radio Signal Officer, I suffered terribly from boredom after my former very active assignment. My colleague farther north, Captain Lindner,++++ advised me to support the cryptographic station of the Army High Command. Since my post was on a slight rise, my receivers obtained voluminous material. Some time later I was assigned three professors, Koch, Giebel, and Leithaeuser, together with other personnel and equipment to establish direction finding stations, which developed excellently after a very brief experimental phase. We soon established

+ See also Chapter 2, III, 2.
++ General Klemme: see Chapter 10, A, III, 10.
+++ At the time in captain rank, Klemme, as CO, Radio, at Twelvth Army (CG von Fabeck), in Lido was in command of Radio Detachment 13.
++++ Captain Lindner, who succeeded Captain Klemme at Twelvth Army, was probably transferred in the same capacity to Army Gp HQ at Slonin under Field Marshal Prince Leopold of Bavaria.

an adequate DF operating base line which at my command post on the DF map produced steadily improving results with very acute angles, so that it was possible to determine very precisely the point from which the transmitting stations were operating.

With support from the Army High Command Cryptographic Station I compiled a beautiful list of Russian command agencies, together with their call signals, frequencies, characteristics of the operators, and characteristic feautures of the headquarters involved, etc.

b. On 21 August 1916 I was transferred, together with all radio stations, direction finding posts, and so forth under my direct command, as CO of Radio Detachment 13 to Army "eadquarters South on the Carpathian front, where signs seemed to indicate the approach of another offensive by Brussilow. We immediately established an intercept and DF base area to support the existing station of the army and soon discovered that the enemy radio transmitting stations which had disappeared from the old front areas were now reappearing in the south.

When my DF posts were functioning properly I proceeded one day with my first consolidated "radio intelligence report" to report orally to the Chief of Staff, who first refused to believe what I told him. Already on the next

day the following arrangement was established, on my recommendation for radio intelligence reporting: "CO, Army HQ Radio Detachment 13,+ will report orally in the evening on the troop units detected and their destination in night movements. The Intelligence Officer will instruct his agents and spies, sound-ranging teams will be assigned, and aircraft will be over the indicated destination areas at dawn to observe the arrival of the moving columns in their destination areas. On the next morning a conference will take place to discuss the results produced by these intelligence media in order to check the accuracy of the radio intelligence report."

This first radio and DF intelligence action functioned so well that the entire Russian plan of concentration was uncovered and countermeasures could be taken in time.

c. On 15 January 1917 I was transferred as CO, Army HQ Radio Detachment 20, to the Austrian army group under CG von Boehm-Ermoli, where I was again able to employ my radio intercept and DF service, with a minor modification, for our command. The 1st and 2d Prussian Guards Divisions formed the first attack wave in the breakthrough

+ The designation Army HQ Radio Detachment (AKO-Funk) used here anticipates events, since it was only introduced later, when the CO, Radio, was placed directly under the COFS. The designation was valid on 15 Jan 17, when Captain Klemme was transferred to the Army Group of von Boehm-Ermoli (see 5, c, on following page), since the change had been introduced by then.

battle in Eastern Galicia, and with each of these two divisions went a small team organized by me and made mobile with XXXXXX Austrian Army pack mules and equipment. Another such team accompanied the second attack wave. At Army Group Headquarters we had a large map spread out and a number of telephone lines to the radio intercept center which, besides its mission of current intelligence on enemy movements, had instructions to monitor the radio traffic of our own forces. A quich breakthrough through the enemy lines was expected, and since it would not be possible to follow up a rapid advance with telephone lines, the forward headquarters and staffs were well equipped with radio stations.

At the opening of the offensive I was present at Army Group Command Post and with assiatance by my staff members personally entered up the radio intercept reports coming in over three telephone lines, so that I was posted immediately, with details shown on on the map, on the situation with our own foremost troops and on movements in the enemy rear. I had not informed the Chief of Staff, General Bardolf, of my intentions, since I first wanted to see whether my plans would function. When he first approached my map during the forenoon he examined it in astonishment. Soon he returned with the Commanding General to show him "this newfangled idea of the mad Prussian." When the slowly

arriving reports from the front areas later in the day confirmed the accuracy of my map presentation, the whole conduct of operations was based on my map. The result was that the whole complex of reinforcement, material, ammunition and ration supply movements and so forth could be handled faster than the reports could arrive from the front areas. When the stage was then reached at which the radio transmission of orders and instructions to the attack divisions at the front functioned smoothly and securely, the radio intelligence branch had once again proved itself the best supporter of tactics.

In World War II DF units detected not only the enemy artillery air units, but also the enemy air forces approaching to attack our tank forces and infantry movements. Above all, the enemy bomber forces were identified already in their home bases, tracked continuously, and their current position kept constantly XXXXXX posted. This made it possible to dispatch fighters against them in such good time that they were able to shoot down considerable numbers of the bombers, particularly during the first years of the war. Particularly along the coastline of France, Belgium, and Holland, opposite England, a coordinated network of radio intercept and DF stations was thus established which enabled our fighters to successfully engage the enemy bomber forces already during

their approach across the sea. Conspicuously good services were rendered here by units of the III Battalion, Air Signal "egiment 2, namely Radio Intercept Control Station W-Leit 2, Station W-12, Telgte, W-22 at Husum, and particularly the radio intercept station Wissent, besides other such stations in position along the Channel coast. The take-off and navigational signals and communications by radio of the enemy bomber forces made it possible to identify them and determine their current position. The voice radio communications of the enemy fighters in their combat and orientation tactics also made it possible to detect their take-off and approach in good time by a close watch on these communications.

As the war drew on, however, it became increasingly difficult for the radio intercept units to recognize approaching enemy bomber forces owing to improved enemy radio discipline. In many cases they therefore had to rely on support by radar instruments which could detect approaching enemy aircraft already at a distance of up to 160 miles. Even at this stage, however, it was still possible for the Radio Intercept Service to monitor enemy radio communications in the areas where the enemy forces were concentrating and in this field radar will not completely displace the radio intercept and DF services.