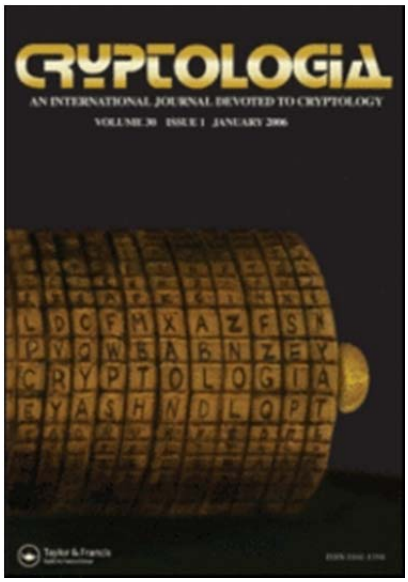
From the Archives: The U.S. and West German Agent Radio Ciphers



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Abstract

The translation of an in-house research paper of the communist Polish counterintelligence depicting the ciphers and the one-way radio communications patterns used by the U.S. and West German intelligence services against Poland in the 1960s and early 1970s is presented.
Keywords: DFC37; DFD21; numbers stations; one-way agent radio communications and ciphers; Polish Ministry of Interior (MSW) II Department (Counterintelligence)

1. Introduction

The agent management behind the Iron Curtain posed several problems to the western intelligence services during the Cold War. Because of security considerations, the safest way to communicate with the agent was through non-personal manners such as dead drops, invisible ink letters, or radio. In addition, the messages were encrypted to provide security.

While the letters could be opened and read by the enemy and the officers, for example, working under diplomatic cover could be captured while filling or emptying the dead drops in a hostile country, the one-way high frequency (HF) radio communications provided an ultimate solution to the security issues while controlling the assets on unfriendly soil. First, the commercial receiver could be possessed even in oppressive regimes without causing suspicion. Second, it was almost impossible for enemy counterintelligence to detect the instances when an agent was listening to the broadcasts unless the person was under tight surveillance or the counterintelligence was monitoring the radio spectrum in close distance from the agent's receiver at work. Third, the agents did not need long and laborious training in radio communications, for they were simply to copy the cipher text and decrypt it according to prearranged schemes. More attention could therefore be granted to the ciphers and the decryption process.

The agent broadcasts took the form of groups of numbers transmitted in voice or telegraphy on HF bands in the various languages of the world, hence their transmitters are known as “numbers stations.” Such a way of controlling the assets in socialist countries, especially Poland, was implemented by western intelligence services during the Cold War, as evidenced by the presented document.

2. The Document

The translation of an internal research paper of the communist Polish secret service on the ciphers and one-way West German and U.S. agent radio communications is presented, which came from the Archives of the Polish Institute of National Remembrance (IPN), a governmental body that stores the vast archives of the former Polish communist security apparatus [4] (Figure 1).

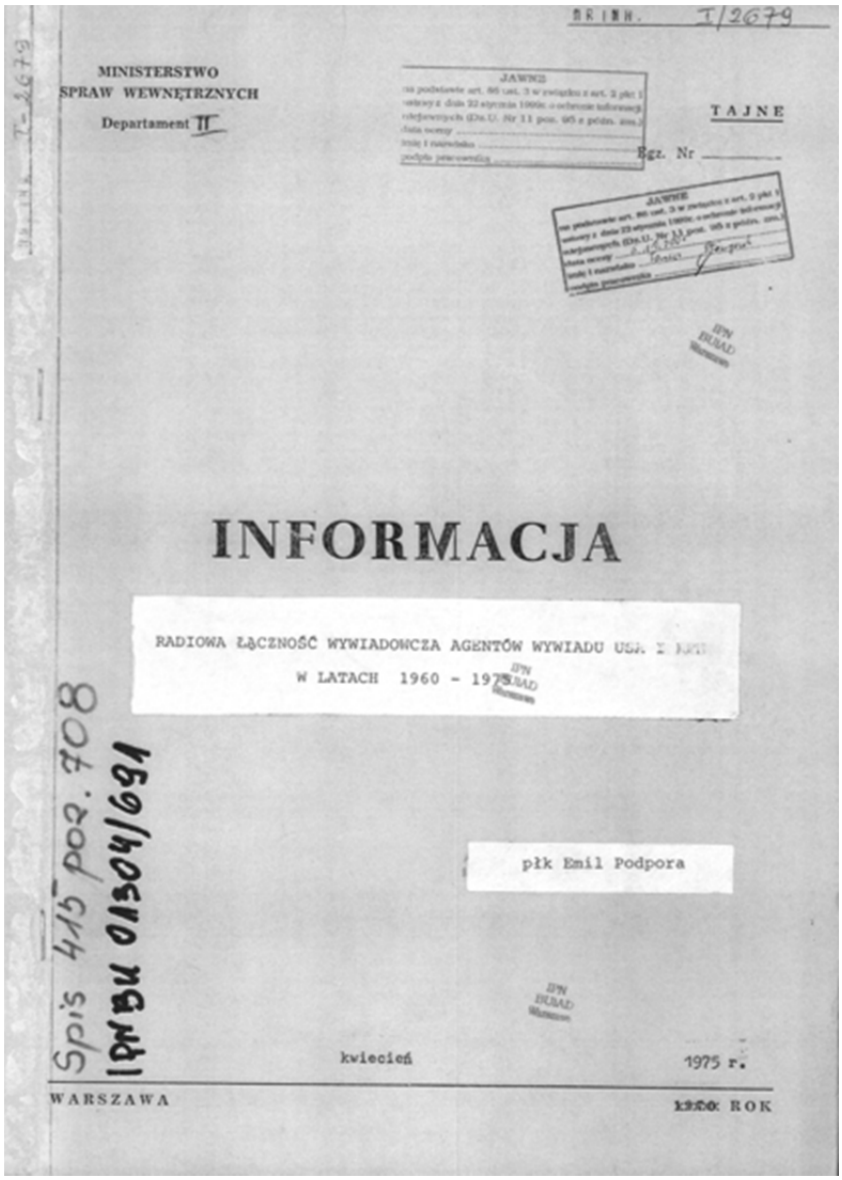

Figure 1. Cover page of the report with the declassification labels and tags from the archives of the Polish Institute of National Remembrance (file No. IPN BU 01304/691).

Warsaw on 25 April 1975

TOP SECRET[1]

ODS-00292/…/75

Agent radio communications of the US and West German intelligence services between 1960 and 1975

During the past 15 years, 12 foreign agents were detected. They possessed the equipment to maintain one-way radio communications. Four of them were working for U.S. intelligence while eight worked for West German intelligence.

Among these 12 agents, two were arrested, including a U.S. agent Jerzy Strawa[2] in 1967 and one working for the BND,[3] Erwin Kuhnert,[4] in 1960.

The radio messages for the U.S. and West German agents are transmitted from the radio centers located in West Germany at Frankfurt am Main and in Munich.

The analysis of their one-way radio communications allows us to isolate the qualities of the ciphers used by the West German and US intelligence services.

Radio Communications Systems Used by the BND Agents

West German intelligence maintains communications with their agents operating in Poland through two transmitting sites:

1. The radio transmitter located at Frankfurt am Main The transmitting site is operational from February 1959 and the transmitter covers all of Europe. Every year it sends data to about 200 agents. The first agent who received a coded message from this site on 8 October 1959 was Erwin Kuhnert, arrested on 15 November 1960 (had been recruited in August 1959). During the 16 years of activities of this site, our service has arrested one agent who received broadcasts from this transmitter (E. Kuhnert) and controlled seven others as secret collaborators[5] under the counterintelligence games.

Table 1.

No.	Name/codename	Date received	Equipment
1	KUHNERT	Aug. 1959	Callsign 840 “Accord” receiver Key based on words: DEIN STAR 35 cipher pads with 170 groups each magnifying glass
2	T/W MAJA	Jul. 1960	Callsign 062 “Accord” receiver communications plan (Tue., Fri., Sun.) Cipher key based on words ZA OWIES cipher groups on narrow paper roll new cipher pads
		Feb. 1963	
3	T/W BOGDAN	Jul. 1961	Callsign 228 SANYO receiver, headphones communications plan (Mon., Thu., Sun.) key based on words ZA OWIES instructions how to use the

			abbreviations spelling table, cipher pads callsign changed into 182 callsign changed to 493 new cipher pads key based on words ZA OWIES communications plan (Mon., Thu., Sun.)
		1963	
		1968	
4	T/W Neptun	Aug. 1961	Callsign 287 communications plan (Mon., Thu., Sun.) cipher pads key based on words ZA OWIES "Braun" receiver new cipher pads, headphones callsign changed into 419
		1962	
		1963	
5	T/W Barbara	Aug. 1961	Callsign 626 communications plan (Tue., Fri., Sun.) key based on words DEIN STAR cipher pads radio set"Slomenau" (GDR) callsign changed into 928
		Jun. 1963	
6	T/W Hania	1966	Callsign 841 communications plan (Mon, Thu, Sun) cipher based on words ZA OWIES cipher pads "Standard" receiver
7	T/W Zdzisław	Jul. 1970	Callsign 474, "Bajazzo" receiver communications plan (Tue., Fri., Sun.) key based on words DEIN STAR cipher pads, list of abbreviations, spelling table "Satellit" receiver callsign changed into 611
		Feb. 1971	
		Apr. 1972	
		Sep. 1972	
8	T/W Zbyszek	Oct. 1974	Callsign 221 key based on words ZA OWIES cipher pads communications plan (Mon., Wed., Thu., Sat., Sun.) "Standard" receiver

2. Their basic equipment is listed in Table 1.
3. The radio transmitter located in Munich Only one agent, T/W Zdzisław (No. 7 in Table 1) maintained communications with this site. His communications plan was changed in September 1972 from the Frankfurt am Main station to the one in Munich. His equipment consisted of a subminiature receiver, crystals set,[6] communications plan for the entire year, cipher pads, and the key based on the words DEIN STAR. The Munich transmitting site is constantly on the air and covers the entire globe. Each year it sends broadcasts for about 220 agents.

Radio Ciphers Used by the BND

The characteristic quality of the ciphers used by the BND for one-way agent communications is that the agents are equipped with the instructions with the cipher pads made on narrow but long stripes of thin paper, named “bug rolls,” and the keys.

The agents, who possess a good command of German, receive instructions in that language and from 1959 until now are equipped with a similar key based on the words DEIN STAR.[7] The key is based on the Table 2.[8]

Table 2.

	0	1	2	3	4	5	6	7	8	9
	D	E	I	N			S	T	A	R
4	B	C	F	G	H	J	K	L	M	O
5	P	R	U	F	W	X	Y	Z	.	,

The agents, who do not know German, have been equipped since 1960 to today with a common key based on the words ZA OWIES,[9] which looks like Table 3.[10]

Table 3.

	0	1	2	3	4	5	6	7	8	9
	Z	A				O	W	I	E	S
2	R	B	C	C	D	E	F	G	H	J
3	K	L	L	M	N	N	Ó	P	R	S
4	T	W	Y	Z	ż	˙	,	?	-/	-//

The agents are also given the communications plans.

Those who listen to the Frankfurt am Main station get the following schedules:

Day	Time	kHz	meters
Monday	17-18.00	4010	75
	19-20.00	3370	89
	21-22.00	4010	75
	23-24.00	3370	89
Thursday	10-17.00	3370	89
	18-19.00	4010	75
	20-21.00	3370	89
	22-23.00	4010	75
Sunday	14-15.00	4010	75
	20-21.00	4010	75

In October 1974 (T/W) Zbyszek was given an extended communications plan, which gave

him 20 instead of 10 opportunities to receive the messages every week:[11]

Day	Time	No.	MHz	Day	Time	No.	MHz
Mon.	16-16.30	14	3.370	Wed.	16-16.30	14	3.370
	18-18.30	15	4.010		18-18.30	15	4.010
	20-20.30	14	3.370		20-20.30	14	3.370
	22-22.30	15	4.010		22-22.30	15	4.010
Thu.	17-17.30	15	4.010	Sat.	17-17.30	15	4.010
	19-19.30	14	3.370		19-19.30	14	3.370
	21-21.30	15	4.010		21-21.30	15	4.010
	23.23.30	14	3.370		23-23.30	14	3.370
Sun.	13-13.30	14	3.370	Sun.	17-17.30	14	3.370
	19-19.30	14	3.370		23-23.30	14	3.370

Those who listen to the Munich station get the following schedules:[12]

Days	Mon.		Wed.		Fri.	Sun.	
Time (MEZ)	2000	2130	2000	2130	2000	2130	2130
No.	1	2	3	4	5	6	7
Jan.	5015	4543	5015	4543	5015	4543	4543
Feb.	5015	4543	5015	4543	5015	4543	4543
Mar.	5732	4543	5732	4543	5732	4543	5182
Apr.	5732	5182	5732	5182	5732	5182	5770
May	7858	5770	7858	5770	7858	5770	5770
Jun.	7858	7740	7858	7740	7858	7740	7740
Jul.	7858	7740	7858	7740	7858	7740	7740
Aug.	7858	5770	7858	5770	7858	5770	5770
Sep.	5732	5181	5732	5182	5732	5181	5770
Oct.	5015	4543	5015	4543	5015	4543	5182
Nov.	5015	4543	5015	4543	5015	4543	4543
Dec.	5015	4543	5015	4543	5015	4543	4543

Crystallization:[13]

	Mon.		Wed.		Fri.	Sun.	
MEZ	2000	2130	2000	2130	2000	2130	2130
Jan.	19	20	19	20	19	20	20
Feb.	19	20	19	20	19	20	20
Mar.	21	20	21	20	21	20	20
Apr.	21	20	21	20	21	20	22
May	26	22	26	22	26	22	22

Jun.	26	25	26	25	26	25	25
Jul.	26	25	26	25	26	25	25
Aug.	26	22	26	22	26	22	22
Sep.	21	20	21	20	21	20	22
Oct.	19	20	19	20	19	20	20
Nov.	19	20	19	20	19	20	20
Dec.	19	20	19	20	19	20	20

Frequency list:

Crystal No.	**kHz**	**Crystal No.**	**kHz**
06	2656	26	7858
08	2707	27	8173
09	2745	28	9040
10	2780	29	9325
11	2830	30	10177
12	3228	31	10460
13	3262.5	32	10500
14	3370	33	10740
15	4010	34	11545
16	4543	35	11617.5
18	4888	36	12092
19	5015	37	12210
20	5182		
21	5732		
22	5770		
23	6370		
24	7404		
25	7740		

Numbers of crystals:

No.	**Crystal**	**Frequency**
1	19	5015
2	20	5182
3	21	5732
4	22	5770
5	25	7740
6	26	7858
7	28	9040
8	30	10177

Call Signs

Each BND agent is given a call sign—a three-digit number such as 921, 046, 851, etc.

The Way to Decipher the Messages

After copying the groups from the messages (the first group is the marker of the appropriate pad, which is in the possession of an agent), the agents write the groups from the pad above them and, after subtraction, get numbers they change into plain text using the appropriate table with the actual key.

Example:[14]

Pad:	64056 34589	56780	06653
Message:	64056 92478	14417	23755
Subtraction:	00000 42111	42373	83908
Plain text:	00000 Y 111 Y P R(o) SZE [“No. 1 please.”]		

The following rules are applicable to the decipherment.

- The subtraction is done without “carrying”[15];
- According to the table of the key, the digits 2 and 3 or 2, 3, and 4 are matched with the digits following them[16];
- The numbers or names are repeated three times and are clasped in (two) Y-Y, while 111 is equal to 1.
- After the decipherment, the used pads are to be destroyed.

According to the presented data, the BND agents operating in Poland belong to the agent groups who receive the messages as the first ones on Mondays and Tuesdays.

Radio Ciphers Used by US Intelligence

In contrast to West German intelligence, U.S. intelligence avoids using fixed elements as keys, fixed radio schedules, or call signs in their one-way agent communications.

The agents are equipped with the appropriate radio receivers, keys and tables, and pads or book ciphers.

U.S. intelligence uses diverse cipher systems in their agent communications. To illustrate them, an example of the complex and laborious decrypting method used by J. Strawa, who had a key based on a book and a modified cipher table, is provided in Table 4.

Table 4

No	(Code) name	Date received	Equipment
1	Jerzy Strawa	1963	Telefunken receiver, cipher book (a tradefairs catalog), key based on words KARTEN, KOSAK and the date of birth of his wife: 14.8.930 (1,000 omitted), modified Vigen?e table, burst data receiver, cipher pads, a recorder radio schedule.
		1964	A new Nord Mende set, book cipher (German health lexicon)
2	"Jaskinia"	1963	Sony receiver, pads, cipher key based on the alphabet (A-01 . . Z-26), communications plan
3	"Sahara"	recruited in 1965	The equipment was to be delivered for the agent by the connection, who did not arrive in Poland. The agent was trained with ciphers. Key based on the word PROCHOWICE

J. Strawa used the words KARTEN and KOSAK (as keys) and the modified date of his wife's birth (14.8.930)[17] to prepare the table (See Table 5).

Table 5

	1 4 8 9 3 0 2 5 6 7
	K A R T E N
7	O P Q R S T U V W X
6	S T U V W X Y Z A B
5	A B C D E F C H I J
2	K L M N O P Q R S T

The digits 1, 4, 8, 9, 3, 0 were equal to the letters K A R T E N, but when the digits 7, 6, 5, and 2 occurred in the cipher text, the agent matched them in pairs with the digits that immediately followed them. First digit indicated the row, and the second the column; the square in which they crossed was the plain text letter; for example, 71 = O, 51 = A, 58 = C, etc.

The first step the agent performed after reception was to change the digits into the letters according to the table. For example:

- 23565 92822 58625 78523 46655 23155[18]
- O I D M Q C Y J R G E A A H O K I I

The following operation was to prepare another group with the book provided by (U.S.) intelligence to decipher the message. To find the appropriate page and verse, the agent used the following combination: he counted the date of radio transmission as the day of the year and added 10; for example 24 March 1974 was the 83rd day of the year:

January: 31 days + February: 28 days + March: 24 days = 83 + 10 = 93.

The date (the day of the month) of the transmission indicated the verse on the page, from which the agent had to copy the letters and group them in lines of 10 characters each.[19]

http://www.swldxer.co.uk/polish.mht (printed copy)

T A R G E S I N L O

S U N C K A N N K O

S T B A R E Z E I T

V E R L O R E N C E

H E N W E N N E T W

A E I N E W E N I C

E R H A R N L O S E

U R S A C H E V O K

L I E G T B I O C H

E M I E W E N N I N

The letters read vertically were used to complete the deciphering process. The agent copied them under the letters he got from substituting the numbers from the cipher text according to his key.

O I D M Q C Y J R C E A A H

T S S V H A E U L E A U T E

To finally decipher the message he used a table built by writing the alphabet in the reverse order. The table was based on the Vigenére square.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A
B	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z
C	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y
D	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X
E	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W
F	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V
G	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U
H	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T
I	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S
J	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R
K	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q
L	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P
M	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O
N	N	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N
O	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	T	T	S	R	O	P	O	N	M
P	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	S	S	R	Q	P	O	N	M	L
Q	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	R	R	Q	P	O	N	M	L	K
R	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	Q	Q	P	O	N	M	L	K	J
S	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	P	P	O	N	M	L	K	J	I
T	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	O	O	N	M	L	K	J	I	H
U	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	N	N	M	L	K	J	I	H	G
V	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	M	M	L	K	J	I	H	G	F
W	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	I	N	L	L	K	J	I	H	G	F	E
X	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	K	K	J	I	H	G	F	E	D
Y	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	J	J	I	H	G	F	E	D	C
Z	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	I	I	H	G	F	E	E	C	B

So, the message looked like this:[20]

```
23565 92822 58625 78523 46655 23155
O I D M Q C Y J R G E A A H O K H
T S S V H A E U L E E A B A M E E
-----------------------------------
S Z E S C X X W X P R Z Y S Z L O
```

The agent used the Telefunken receiver, which was later replaced by the set made by Nord Mende along with the new radio schedule.

A call sign was also agreed on, which was the foxtrot melody transmitted for 5 minutes followed by the cipher text groups.

Less sophisticated systems were used by secret collaborators[21] in the counterintelligence games against U.S. intelligence, cover-named JASKINIA[22] and SAHARA.

To decipher the messages they used the small factor pads, which measured 5 × 8.8 cm and various keys.

The agents copied the groups from the pads over the groups from the cipher text and then subtracted them without carrying; for example:[23]

```
57238 72135 62253 45955 77989
57238 20727 61223 95033 72948
-----------------------------
00000 52418 05030 50922 05041
```

Then they divided the output into two-digit groups, which were the basis to solve the cipher text with the prearranged key.

U.S. intelligence used a simple key in the JASKINIA game, which consisted of marking the order of letters with numbers; for example, A = 01, F = 06, L = 12, T = 20, etc.

EP[24]

3. The Secret Thesis

Some more hints of Polish security's knowledge of West German agent radio communications can be found in the recently declassified dissertation written in 1982 at the Academy of Internal Affairs in Warsaw [1].[25] It detailed the history of development of one-way agent radio communications and its use against the socialist countries. Its author, Cpt. Jachimiak, confirmed the main transmitting sites were located at Munich and Frankfurt am Main and he asserted both have been used jointly by the German and U.S. intelligence services. Furthermore, he listed other radio sites at London, Cyprus, Athens, Ankara, and Bödo that played similar roles. According to the information possessed by the Polish secret services, the telegraphic transmitters for one-way agent communications had radio frequency power between 1 and 10 kW, while AM voice stations had from 10 to 20 kW. The telegraphic messages were sent in Morse code of four- or five-letter groups at speeds of 4 to 20 Morse groups per minute, while the voice stations used the broadcasts of five-digit groups in German or English. Each agent was assigned a three-letter call sign and the usual message length was

10 to 80 groups. To decipher these the agents were provided with one time pads (OTP) and keys. Jachimiak noted that without the OTP it was virtually impossible to solve the cipher text [1].

According to him, the one-way agent radio communications were first used by the BND around 1956. He noted this type of communications was used more frequently in the socialist countries (behind the Iron Curtain), while two-way agent radio operations usually took place in the Third World countries. However, starting in 1957, the BND improved the communications with their agents by equipping them with burst transmitters to radio reports back to headquarters.[26] Because of the advancements in the foreign equipment design, it became difficult for Polish SIGINT to detect such transmissions. According to Jachimiak, it detected 100 burst transmissions in 1973, but only 5 in 1977.[27] The last known burst data transmission at the time of writing the thesis, which was detected by Warsaw Pact SIGINT, took place at the end of 1979 and originated from Prague, Czechoslovak Socialist Republic.[28]

Nevertheless, the one-way “blind” HF broadcasts were common from 2 February 1959 according to Warsaw Pact data. However, Jachimiak mentioned there were two West German transmitters that belonged to the Communications Ministry of the Federal Republic of Germany, which were on the air from the early 1950s, as DFD21 (on 4010 kHz from 1953) and DFC37 (on 3370 kHz from 1951) and were supposedly sending messages to agents in the field.

Each agent was equipped with a commercial receiver that covered the HF band. If it was unavailable, a usual AM receiver could be used, coupled with a transverter[29] provided by West German intelligence, which was to be plugged into a 4.5 V battery. This converter has two sockets: a red and a black one and comes with two crystals, a red and a black, which are used depending on the radio band. An external antenna has to be plugged into one of the sockets. The second socket is to be connected to the antenna connector of a commercial receiver without the HF band. As a note, German intelligence advised the agents to unplug the crystal so that the converter did not oscillate when not in use, which might be detected by the enemy's SIGINT.

Starting in the 1960s the agents were gradually equipped with portable burst data transmitters[30] that could be powered from the mains in urban scenarios or by batteries in the field to supplement their communications capabilities with their principals in the West. The agents were issued the manual burst coders, which could send the coded messages at speeds of 90 to 360 baud. Some of them were equipped with the more sophisticated coders, which used magnetic tape.[31] As of 1 January 1977 the BND introduced a new burst transmitter that could send coded messages at 600 baud.[32]

The author concluded that the German agents operating in socialist countries were to gather various information on military, political, and economic affairs. They were not given any specialized task or target. When long messages appeared, they were usually related to money transfers and payments, the remarks to reports dispatched through other channels, such as by the invisible ink, or the change of mailing addresses.

About the Author

Jan Bury received his M.A. and Ph.D. from the Oriental Institute, University of Warsaw. He also studied at the universities in Kuwait, Tunis, Oxford, and Nijmegen. Currently he holds the post of a Research Fellow in Mid-Eastern affairs at the Polish Institute of International Affairs in Warsaw. His professional interests are linked to war and conflict in the contemporary Arab World, United Nations peacekeeping, and peace-building in the Arab World, and non-military aspects of wars. Dr. Bury is also a member of the Editorial Board of *Cryptologia*.

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Notes

[1]The document is no longer secret since it was declassified on 5 November 2006 under the provisions of the Polish *Secret Information Protection Act* of 22 January 1999 (Dz.U. 1999 Nr 11 Poz. 95, with further amendments). Its author, Col. Emil Podpora, was an officer working at the II Department (Counterintelligence) of the Ministry of Interior in Warsaw. In January 1976, he is believed to have assumed a post of the deputy head of Section III (West German) of the II Department.

[2]Jerzy Strawa, M.Sc. was recruited by U.S. intelligence around 1960 and was active until his arrest in 1967. He used a number of hitech paraphernalia for wireless communications with his principals, as well as hollowed stones as dead drops. He received capital punishment for his espionage activities in front of a firing squad; however, the exact circumstances of his death remain unclear.

[3]Bundesnachrichtendienst (BND) was at that time the West German foreign intelligence service.

[4]Erwin Kuhnert was recruited in August 1959 by West German intelligence service and, after having been detected by Polish security, was arrested on 15 November 1960.

[5]The abbreviation T/W (*Tajny Współpracownik*, i.e., a secret collaborator) used in the document was a term in Polish *lingua securitatis* reserved for a secret agent recruited or turned by the security who voluntarily provided information to the security service and was usually compensated for his or her efforts. Perhaps the detected and turned agents listed in Table 1 were offered partial immunity from the charges of espionage and they consented to cooperate.

[6]The author was unable to ascertain the type of the receiver.

[7]Surprisingly, many BND agents behind the Iron curtain were provided with similar keys at the expense of their own security.

[8]The Table 2 is unusual, but apparently contains typeset errors, as the letter “R” is repeated in the last row, (it should rather be replaced with “Q”), while the letter “F” in the same row should be “V”.

[9]This means: “for oat,” quite an unsophisticated term for a key.

[10]Table 3 contains Polish characters, while the letter “U” is missing. It is unknown whether this can be attributed to another typeset error.

[11]The numbers referred to the crystals for the receiver in possession of the agent.

[12]Frequencies of the schedule were provided in kHz. MEZ (Mitteleuropäische Zeit) indicated the Central European Time.

[13]The crystals' numbers do not correspond with the frequencies from the previous table.

[14]The Table with the key “ZA OWIES” was used in the decipherment. In the original, the plain text was wrongly given as “Nr. 1 prosz/ę/”, which means “No. 1 please”. However, the careful examination of the groups suggests the missing Polish letter was actually “o”.

[15]This refers to the Polish description of this peculiar scheme popular in ciphers, which is simply subtraction “modulo 10.”

[16]This note is enigmatic and perhaps refers to the German language table.

[17]The date was 14 August 1930. A thousand were omitted in the year.

[18]The groups were to be divided as follows: 23 56 59 28 22 58 62 57 8 52 3 4 66 55 23 1 55. Typos are present here. The G should be a C and an H should be in place of the I at the end.

[19]The original document only suggested the groups came from a tradefairs catalog, but did not specify its contents or title. Hence, the table contains almost random words or letters without any sense.

[20]The plaintext in the last line means: “SIX xx IN x [have] ARRIVED.” The G in the top line should have been a C (another typo).

[21]That is, the agents turned by the security.

[22]Means a “cave.”

[23]Again, this is subtraction modulo 10. The original contains an error in the central group, as 62253-61223 is not 05030, but rather 01030. Apparently, the document's author, Col. Podpora, was not too careful.

[24]Col. Emil Podpora's initials at the end of the original document.

[25]The Academy of Internal Affairs (ASW) in Warsaw, which existed from 1972 to 1989, was a college subordinated to the Polish Ministry of Interior. It provided undergraduate, postgraduate and doctoral level education to the police, Security Service (SB), and the border guards (WOP). The main courses were in crime detection, criminology, criminal law, civil law, undercover police work, economy, history, political science, and psychology.

[26]The burst emissions were known in Polish security as “BKN” (*Bardzo Krótkie Nadawanic*), meaning “Very Short Transmissions.”

[27]The data provided in the document was based on the annual reports on the Polish Ministry of Interior's SIGINT (*Biuro RKW MSW*) work. The detected burst transmissions from 1973 to 1977 were 100 in 1973, 66 in 1974, 29 in 1975, 27 in 1976, and 5 in 1977.

[28]In fact, it came out that the burst transmissions were difficult to intercept by the Polish SIGINT, what is evidenced in [2]. On 17 November 1966 at 2108 local time, SIGINT detected a West German agent's burst transmission on 2987 kHz in the vicinity of Stettin. Although the message was long and the transmitter remained on the air for 24 seconds, and again, after 4 minutes, for 17 seconds, the direction finders (DF) were unable to precisely

ascertain its position. The officials concluded the transmission took place from a vessel in the Bay of Stettin. The memo contained a map with coarse fixes from five COMINT/DF stations in north-west Poland.

[29]The set seems to be useful only in case the agents listened to the DFD21 or DFC37 broadcasts. Its type remains, however, unknown.

[30]The type of the transmitter is believed to be the SP15 either with the “gramophone disc” coder or the manual RT3 burst coder, as depicted in the figures in the appendices of the thesis [1]. More information on these sets can be found in [3].

[31]Although the type of such a device was not mentioned in the document, it is believed to have been the US AN/GRA-71 burst coder.

[32]It is believed the type of such a set was the SP20 with the RT3 manual or electronic coders. See [3] for more details.

List of Figures

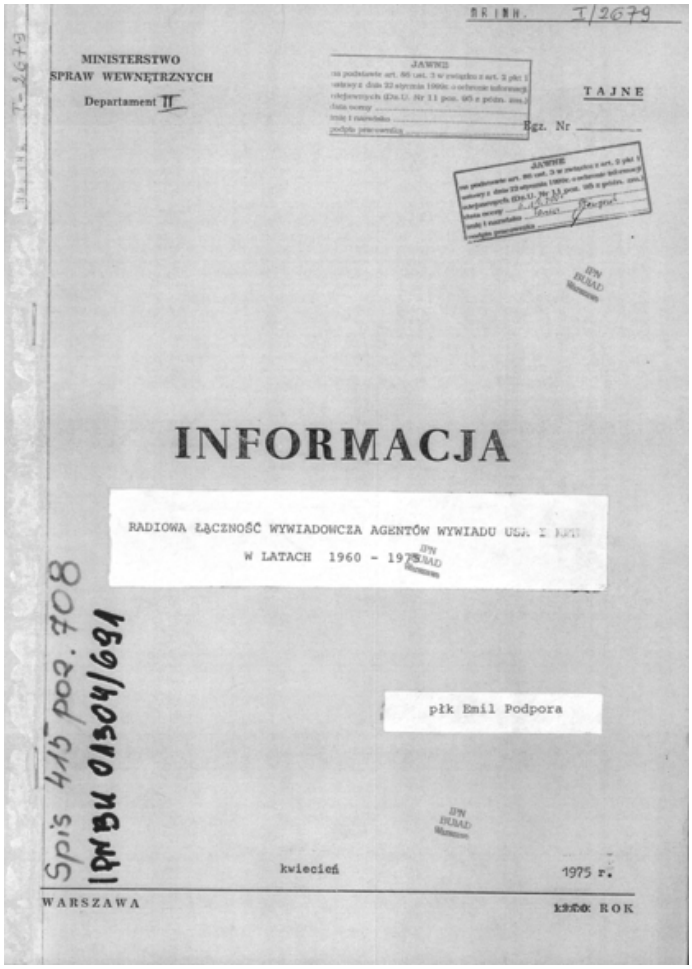

Figure 1. Cover page of the report with the declassification labels and tags from the archives of the Polish Institute of National Remembrance (file No. IPN BU 01304/691).

List of Tables

Table 1.

No.	Name/codename	Date received	Equipment
1	KUHNERT	Aug. 1959	Callsign 840 “Accord” receiver Key based on words: DEIN STAR 35 cipher pads with 170 groups each magnifying glass
2	T/W MAJA	Jul. 1960	Callsign 062 “Accord” receiver communications plan (Tue., Fri., Sun.) Cipher key based on words ZA OWIES cipher groups on narrow paper roll new cipher pads
		Feb. 1963	
3	T/W BOGDAN	Jul. 1961	Callsign 228 SANYO receiver, headphones communications plan (Mon., Thu., Sun.) key based on words ZA OWIES instructions how to use the abbreviations spelling table, cipher pads callsign changed into 182 callsign changed to 493 new cipher pads key based on words ZA OWIES communications plan (Mon., Thu., Sun.)
		1963	
		1968	
4	T/W Neptun	Aug. 1961	Callsign 287 communications plan (Mon., Thu., Sun.) cipher pads key based on words ZA OWIES “Braun” receiver new cipher pads, headphones callsign changed into 419
		1962	
		1963	
5	T/W Barbara	Aug. 1961	Callsign 626 communications plan (Tue., Fri., Sun.) key based on words DEIN STAR cipher pads radio set“Slomenau” (GDR) callsign changed into 928
		Jun. 1963	
6	T/W Hania	1966	Callsign 841 communications plan (Mon, Thu, Sun) cipher based on words ZA OWIES cipher pads “Standard” receiver
7	T/W Zdzisław	Jul. 1970	Callsign 474, “Bajazzo” receiver communications plan (Tue., Fri., Sun.) key based on words DEIN STAR cipher pads, list of abbreviations, spelling table “Satellit” receiver callsign changed into 611
		Feb. 1971	
		Apr. 1972	
		Sep. 1972	

8	T/W Zbyszek	Oct. 1974	Callsign 221 key based on words ZA OWIES cipher pads communications plan (Mon., Wed., Thu., Sat., Sun.) "Standard" receiver

Table 2.

	0	1	2	3	4	5	6	7	8	9
	D	E	I	N			S	T	A	R
4	B	C	F	G	H	J	K	L	M	O
5	P	R	U	F	W	X	Y	Z	.	,

Table 3.

	0	1	2	3	4	5	6	7	8	9
	Z	A				O	W	I	E	S
2	R	B	C	C	D	E	F	G	H	J
3	K	L	L	M	N	N	Ó	P	R	S
4	T	W	Y	Z	ż	·	,	?	-/	-//

Day	Time	kHz	meters
Monday	17-18.00	4010	75
	19-20.00	3370	89
	21-22.00	4010	75
	23-24.00	3370	89
Thursday	10-17.00	3370	89
	18-19.00	4010	75
	20-21.00	3370	89
	22-23.00	4010	75
Sunday	14-15.00	4010	75
	20-21.00	4010	75

Day	Time	No.	MHz	Day	Time	No.	MHz
Mon.	16-16.30	14	3.370	Wed.	16-16.30	14	3.370
	18-18.30	15	4.010		18-18.30	15	4.010
	20-20.30	14	3.370		20-20.30	14	3.370
	22-22.30	15	4.010		22-22.30	15	4.010
Thu.	17-17.30	15	4.010	Sat.	17-17.30	15	4.010
	19-19.30	14	3.370		19-19.30	14	3.370

	21-21.30	15	4.010		21-21.30	15	4.010
	23.23.30	14	3.370		23-23.30	14	3.370
Sun.	13-13.30	14	3.370	Sun.	17-17.30	14	3.370
	19-19.30	14	3.370		23-23.30	14	3.370

Days	**Mon.**		**Wed.**		**Fri.**	**Sun.**	
Time (MEZ)	2000	2130	2000	2130	2000	2130	2130
No.	1	2	3	4	5	6	7
Jan.	5015	4543	5015	4543	5015	4543	4543
Feb.	5015	4543	5015	4543	5015	4543	4543
Mar.	5732	4543	5732	4543	5732	4543	5182
Apr.	5732	5182	5732	5182	5732	5182	5770
May	7858	5770	7858	5770	7858	5770	5770
Jun.	7858	7740	7858	7740	7858	7740	7740
Jul.	7858	7740	7858	7740	7858	7740	7740
Aug.	7858	5770	7858	5770	7858	5770	5770
Sep.	5732	5181	5732	5182	5732	5181	5770
Oct.	5015	4543	5015	4543	5015	4543	5182
Nov.	5015	4543	5015	4543	5015	4543	4543
Dec.	5015	4543	5015	4543	5015	4543	4543

	Mon.		**Wed.**		**Fri.**	**Sun.**	
MEZ	2000	2130	2000	2130	2000	2130	2130
Jan.	19	20	19	20	19	20	20
Feb.	19	20	19	20	19	20	20
Mar.	21	20	21	20	21	20	20
Apr.	21	20	21	20	21	20	22
May	26	22	26	22	26	22	22
Jun.	26	25	26	25	26	25	25
Jul.	26	25	26	25	26	25	25
Aug.	26	22	26	22	26	22	22
Sep.	21	20	21	20	21	20	22
Oct.	19	20	19	20	19	20	20
Nov.	19	20	19	20	19	20	20
Dec.	19	20	19	20	19	20	20

Crystal No.	**kHz**	**Crystal No.**	**kHz**
06	2656	26	7858

08	2707	27	8173
09	2745	28	9040
10	2780	29	9325
11	2830	30	10177
12	3228	31	10460
13	3262.5	32	10500
14	3370	33	10740
15	4010	34	11545
16	4543	35	11617.5
18	4888	36	12092
19	5015	37	12210
20	5182		
21	5732		
22	5770		
23	6370		
24	7404		
25	7740		

No.	**Crystal**	**Frequency**
1	19	5015
2	20	5182
3	21	5732
4	22	5770
5	25	7740
6	26	7858
7	28	9040
8	30	10177

Pad:	64056	34589	56780	06653
Message:	64056	92478	14417	23755
Subtraction:	00000	42111	42373	83908

Plain text: 00000 Y 111 Y P R(o) SZE [“No. 1 please.”]

Table 4

No	**(Code) name**	**Date received**	**Equipment**
1	Jerzy Strawa	1963	Telefunken receiver, cipher book (a tradefairs catalog), key based on words KARTEN, KOSAK and the date of birth of his wife: 14.8.930 (1,000 omitted), modified Vigen?e table, burst data

			receiver, cipher pads, a recorder radio schedule.
		1964	A new Nord Mende set, book cipher (German health lexicon)
2	“Jaskinia”	1963	Sony receiver, pads, cipher key based on the alphabet (A-01 . . Z-26), communications plan
3	“Sahara”	recruited in 1965	The equipment was to be delivered for the agent by the connection, who did not arrive in Poland. The agent was trained with ciphers. Key based on the word PROCHOWICE

Table 5

		1	4	8	9	3	0	2	5	6	7
		K	A	R	T	E	N				
7		O	P	Q	R	S	T	U	V	W	X
6		S	T	U	V	W	X	Y	Z	A	B
5		A	B	C	D	E	F	C	H	I	J
2		K	L	M	N	O	P	Q	R	S	T