

it's located in an area of impending military activity. These requirements must then be balanced against each other and the priority order determined.

Another example of the inter-relationships is apparent in this triangle formed by intelligence, traffic analysis, and cryptanalysis. Both traffic analysis, through its study of net structure and its constant surveillance of traffic contacts, and cryptanalysis, through the production of readable messages, make direct contributions to intelligence. However, intelligence is not merely the passive receiver of this material. It digests the information coming out of these operations, fuses it with items received from other sources, and feeds the final result back into the signal intelligence process where it can be used as the basis for further exploitation. And we should not overlook the very close relation existing between traffic analysis and cryptanalysis. Actually one complements the other, traffic analysis dealing chiefly with the headings and the externals of the intercepted message, and cryptanalysis with the text and the internals. Proper performance of either traffic analysis or cryptanalysis depends on the degree of integration achieved between the two.

The direct benefit which intelligence derives from the reading of enemy traffic provides intelligence with a definite interest in what traffic is under analysis. Intelligence, in this sense, supplies priorities since, under usual conditions, it's not possible to attack all of the enemy systems at one time. Thus, intelligence might feel that, judging by the units holding different cryptographic systems, messages in system X are of higher intelligence value than those in system Y or system Z, and consequently asks that the main cryptanalytic effort be devoted to the former. However, there's one important caution to be exercised in the direction of these efforts. Very often, it's necessary for the cryptanalyst to solve some of the less important systems in order to break into those of greater value. Solution of the lesser systems

I wish I had the time to give you a detailed picture of such a unit which was one of several under my command in France from the middle of August 1944 to the end of hostilities in Europe. I can give you a few details only and show you a few pictures which may give you some idea of the extent of the operations. I'll also cite a few examples of the results achieved. The unit I've in mind was known as Signal Security Detachment "D", which began field operations in the middle of August 1944 and operated quite effectively until the end of hostilities in Europe.

The mission of the Detachment was the procurement of signal intelligence from the solution of German medium- and low-grade tactical codes and ciphers for the AC of S, G-2, 12th Army Group; the coordination and technical supervision of the Signal Radio Intelligence Companies and Signal Service Companies operating under units assigned to 12th Army Group; and technical liaison with adjacent Army Group Signal Intelligence units and with those of higher headquarters. The Detachment was also charged with the responsibility of enforcing the general signal intelligence policies of the War Department, Hq. ETOUSA, and 12th Army Group, among the Signal Radio Intelligence units of 12th Army Group.

As I've already indicated, Detachment "D" was charged with the responsibility of passing to the Assistant Chief of Staff, G-2, 12th Army Group, signal intelligence procured from the analysis of enemy low-grade and medium-grade tactical traffic. This was accomplished in two ways.

(1) Direct telephone communication was available until 4 March 1945, when, due to the tactical situation, the Detachment operated too far in advance of tactical headquarters to allow utilization of metallic telephone lines. However, radio or teletype (or both) links maintained constant communication from that date onwards. The appointment on 3 February 1945 of a liaison officer

from the Detachment to G-2 Section also aided in the smooth flow and interpretation of signal intelligence.

(2) All pertinent technical reports published by the Detachment were transmitted daily to G-2 Section. These reports supplemented and enlarged upon the information already passed to the G-2 Section by communication means previously described.

The complete record of all signal intelligence, of immediate value only, transmitted to G-2 Section by telephone-radio or teletype is much too voluminous for me to tell you about. All I can indicate here is to say that from 1 September 1944 to 1 April 1945 the unit gave G-2 over 1400 items of signal intelligence derived from German medium-grade ciphers, 630 items derived from low-grade codes and ciphers, and 160 items derived from traffic analysis and D/F work.

It's not possible to evaluate the signal intelligence made available to G-2 Section, either in the form of immediately applicable information (i.e., location of division or army ammunition, supply and fuel dumps, command posts, etc.), or in the form of confirmation of prisoner-of-war reports, large scale movements or intentions of major enemy formations and the appearance of new battle units in a given sector. But I can say that the daily G-2 Intelligence Summary made great use of the signal intelligence supplied by the Detachment, two out of every three items being information provided by the unit. Incidentally, this Intelligence Summary was sent by teletype, operational priority, to the following headquarters:

SHAEF Main
6th Army Group
21 Army Group (Main)
8th Air Force
1st U.S. Army Command
3rd U.S. Army Main
9th U.S. Army Main

15th U.S. Army Forward
12th Army Group Main
12th Army Group Tac
First Allied Airborne Army
Com Z
ASCZ
9th Air Force Advance

Now a few words about the relationships between Detachment "D" and some other units. It's mission in connection with the signal radio intelligence units of 12th Army Group was subdivided into three categories. The first was that of reporting signal intelligence of immediate value to Army and Corps G-2's. All technical signal intelligence of tactical value, particularly that coming from the solution of medium-grade ciphers, was transmitted daily by the most expeditious means to the Army Signal Radio Intelligence Companies. This intelligence was reported to Army and Corps G-2's, as has been said; but it was also employed as a basis for allocating intercept and direction-finding coverage priorities.

You may be interested a bit in the mechanics of forwarding the signal intelligence. The most convenient means of transmission of technical signal intelligence to the field units was radio, teletype, and courier. Two radio broadcasts, naturally in a very secure cryptographic system, were made daily, one in the morning and one in the early evening to establish coverage priorities and to assist in the preparation of technical reports for the respective G-2 Sections. Technical signal intelligence was also transmitted by the same means at any hour of the day or night when the urgency of the information so warranted.

The second mission of the Detachment in its relationships with other units was the consolidation of technical material of all field units. All technical data from the signal radio intelligence units of 12th Army Group, for example, were consolidated daily with those obtained by the two intercept units directly responsible to Detachment "D" and with data received from intercept units of the

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two flanking Army Groups (6th and 21). Items of immediate value were transmitted along with intelligence. In addition, all such data were published in greater detail in reports of the Intelligence Branch of the Detachment and dispatched to the field units.

The daily publication of the Intelligence Branch not only aided the field units in the normal execution of their missions, but provided the only means of maintaining technical continuity on enemy formations during the frequent moves of the field units. This was particularly true when Army and Corps fronts were radically alerted, resulting in an entirely new, and frequently unfamiliar, group of enemy units facing them.

The third and last mission of the Detachment in its relationships with other units was that connected with exercising supervisory control over operations of Signal Radio Intelligence Field Units. Policies concerning operations emanating from high headquarters, or those arising from within Detachment "D" from time to time, were distributed and enforced. Aid in complying with the policies was provided in the form of directives, special technical reports, and by conferences at the Detachment headquarters. Also frequent liaison visits to the field units were made by technical experts from the Intelligence Branch. Continuous liaison was maintained with 21 and 6th Army Group signal radio intelligence agencies both by personal visits and by radio-teletype and telephone communications on a twenty-four hour basis. All technical reports published were exchanged with those two organizations.

Now let me cite only a very few of the large number of items of signal intelligence value furnished by Detachment "D".

The covername which was applied to the intelligence resulting from the solution of German medium-grade codes and ciphers was CIRO-PEARL. Examination of more than 6000 solved CIRO-PEARL messages during the few months' period of

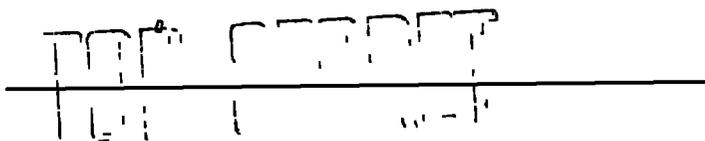
active operations of the Detachment shows that the major part of all the information derived can be placed roughly into four main categories:

- a. Information concerning unit locations and dispositions.
- b. Situation reports and operational directives.
- c. Troop movements.
- d. Status reports, including a variety of statistical information observed in numerous stereotypic or form reports.

Let's see the kind of data furnished under the first category. Over 90% were concerned with enemy command posts and order of battle. The fact that CIRO-PEARL produced such information about German divisions often in as few as 8 to 12 hours after the messages had been intercepted placed an extremely high premium on the dissemination of the information.

Let's take a look at some of the information as it applied to forward areas. Naturally, information concerning unit command posts would be of deep interest. The period during which CIRO-PEARL produced the maximum intelligence, both in quantity and in quality, occurred during the Ardennes offensive 16 December 1944 to 2 February 1945. Messages from thirteen divisional and similar formations in and near the "Bulge" area were read. The divisions listed represented the bulk of armored and mobile formations employed by the Germans during that offensive and constituted the major threat to Allied forces. Consequently, the CIRO-PEARL intelligence gained from these formations not only indicated accurately the trend of operations carried out by all enemy units within the "Bulge", but also provided G-2 with reliable information at a time when other intelligence sources were relatively unproductive or non-existent.

The 130 PZ "LEHR" Division provided the most noteworthy example of continuous information during this period, particularly in the matter of divisional element CP's. Here are two or three CIRO-PEARL messages of 17 January 1945, selected to illustrate examples of high priority division and divisional element CP locations:



130 PZ LEHR DIV Ic:

"Div Ic located at WEILER on 17 Jan."

PZ GREN REGT 901:

"Attempt communication with PGR 901 at WANDEBOURCY immediately..."

PZ GREN REGT 902:

"Kp/P1 Btl 130, for delaying action, will be with PGR 902 in the future and will move into TAVIGNY"

Often, CIRO-PEARL provided intelligence concerning the sectors which enemy units occupied or were to occupy, giving information of high value regarding unit disposition from an order-of-battle point of view. Messages which announced main lines of resistance, outguard lines of resistance, sector boundary lines, sector junction points, and neighboring units frequently afforded G-2 clear and reliable estimates of specific enemy situations. There isn't time to give you more than one example:

"SS PZ Grenadier Regt 3 'Deutschland' is at ELBEUF; SS PZ Grenadier Regt 4 'Der Fuehrer' is in the FORET D'ELBEUF. Boundary line (between regiments): railroad. Front and reconnaissance to the southeast. Artillery located east of BOSCO-ROGER EN ROUMOIS. Reconnaissance battalion with DIV reserve at LE THUIT (several in area)."

During the ten-month period under review, it was observed that the CIRO-PEARL intelligence of widest scope and greatest interest originated in messages involving enemy situation reports and field orders. It was noted that whenever the enemy was retiring rapidly or otherwise engaged in extremely fluid combat, ^{of} the need/subordinate enemy units for precise and current information concerning their immediate situation (and also concerning the disposition and condition of Allied forces in or out of contact) elicited numerous detailed and accurate situation reports and operational directives on the part of headquarters, generally at division level. Situation reports originating with Division Ia (operations) and passed down to lower commands included not only information concerning friendly and enemy troops, but also specific orders and directives which were to take effect as a result of the situation indicated. Intelligence

concerning Allied disposition was most reliably reported in divisional Ic (Intelligence) reports and in situation reports emanating from divisional reconnaissance and artillery elements.

From CIRO-PEARL analyses, numerous announcements of enemy unit troop movements came to light during the campaign in the West. Although most intelligence items of this nature dealt with localized relocations and main-line-of-resistance readjustments, several notable instances of large scale and fairly long term troop movements appeared, involving formations up to the size of a division.

For the purposes of this lecture, the rail movement of the armored and heavy weapons elements of 10 SS PZ Div "Fruntsberg", from their rest and refit area in Holland southward to join the main body of the division, are of interest. A series of CIRO-PEARL communications pertaining to this rail movement were read from 13 to 19 December 1944, at the time when the Ardennes offensive was getting under way. Just previous to this period the PZ Gren R_gt_s (less heavy weapons companies) of 10 SS PZ Div were attempting to hold back the Allied drive north-east of Aachen. The rest of the division was refitting in Holland, in the area of RUURLO. There isn't time to go into the details, but suffice to say that practically every movement was noted in the messages and complete information was made available to G-2, by virtue of almost immediate CIRO-PEARL intelligence from each day's messages.

A prolific source of CIRO-PEARL intelligence was found in communications which contained a variety of unit status reports. The major part of these reports was transmitted in stereotypic fashion, but according to a special itemized form, the headings or titles of which we didn't know at first. Consequently, detailed study had to be made in the case of each individual message in order that exact interpretation could be effected. Unit Status Reports

transmitted in CIRO-PEARL messages fell into four distinct categories: tank states; weapons states; strength reports; and supply reports.

Here, for example, is the way in which a report on the state of weapons efficiency within an enemy unit often provided intelligence of importance. The following message was originated by SS PZ Jaeger Abteilung 2 of 2 SS PZ Div "Das Reich" on 18 September 1944 during the withdrawal of the division into the Westwall at PRUEM:

"A/T preparedness state of Div elements:
 SS "Deutschland" (SS PGR 3)
 5 x 7.5 cm A/T guns
 5 x Fueppchen (Rocket projectors)
 Kampfgruppe MILIUS (attached to 2 SS PZ Div)
 2 x 7.5 cm. PAK
 2 x 8.8 cm. PAK/Flak
 SS "Der Fuehrer" (SS PGR 4)
 3 x 7.5 cm. PAK
 1 x 5 cm. PAK
 1 Assault gun
 2 SS PZ Aufkl Abt
 4 x 7.5 cm. PAK"

Casualty reports were often in detail. For example, the 341 Sturmgeschuetz Brigade, while heavily engaged in the defense of the KOELN plain, requested on 12 December 1944 that all batteries furnish a survey of casualties sustained from "date of initial employment" until 12 December. One battery replied:

"Casualties sustained since 31 July 1944:

	<u>Officers</u>	<u>NGO</u>	<u>OR</u>
Killed	5	4	4
Severely wounded	-	2	7
Lightly wounded	1	9	16
Missing	2	8	19
Captured	-	4	3
At Ft. Nazaire	-	1	3"

Fuel and ammunition reports offered valuable information concerning the state of supplies. Here's an example. The SS PZ Regt 1 of 1 SS PZ Div "ISSAH", while engaged in heavy combat in the Ardennes, filed the following fuel and ammunition report with the Div Ib (Supply) on 12 January 1945:

"Fuel Report 12 January:

OTTO fuel allocation:-

Received from Army	10 cbm.
Consumption	10 "
Supply on hand	1 "
Supply of Diesel fuel	0.5 "
Motor oil	3.8 "
Utility oil	0.4 "
Grease	400 kgm.

Ammo expenditure report: 8-12 Jan.

Pistol cartridges (SMK)	4,500 rds.
Pistol cartridges (7.65 MM)	200 "
Flare cartridges (type 41)	20 "
Signal cartridges (red)	10 "
Signal cartridges (green)	10 "
Smoke cartridges (orange)	--

Urgent need for repaired tank and for salvage missions:

OTTO (required)	
1 Abt	10 cbm.
501 (Hy Tiger Bn)	8 "
DIESEL (required)	
1 SS PGR	3 "

Per Order: GRUHLE (Hstuf. Adju. SS PZ Regt 1)."

So much for CIRO-PEARL intelligence, most of which was provided by Detachment "D" in its primary mission of supplying G-2, 12th Army Group with signal intelligence. I've already indicated that Detachment "D" had another mission, that of technical coordination of the many signal radio intelligence units assigned to tactical units for the purpose of deriving intelligence from the low-grade German code and cipher traffic in their immediate fronts. We called the intelligence resulting from low-grade codes and ciphers PEARL intelligence, and if time permitted I could give you numerous illustrations and examples. In addition, there was THUMB intelligence, which was that obtained by direction finding. Here's a chart which will show you how many signal radio intelligence units there were and their attachment. You'll note that there were 8 signal radio intelligence companies serving the 6th Army Group, 12th Army Group, 1st, 3rd, 7th, 9th, and 15th Armies; in addition, there

were two such companies serving Detachment "D", and 14 such companies serving as many corps. Quite an aggregation, and these had somehow to be coordinated to make them effective.

Beginning in the month of September 1944, Detachment "D" assumed responsibility for all outgoing and incoming materials to and from all signal radio intelligence units of 12th Army Group. This channelization meant that a detailed record could be kept of all materials exchanged by the numerous field units and Detachment "D", excluding captured documents. This sort of arrangement was very effective in maintaining a high level of technical efficiency by all field units, since the work of each unit by itself could in reality not amount to very much; but when the work of each unit was supplemented and was supported by the work of all the others, the effect was not merely one of addition but rather of multiplication. As new signal radio intelligence units came into the field, such as those of the 9th and 15th Armies, these were added to the list of units coordinated technically by Detachment "D". I may say that in executing this part of its mission, Detachment "D" did much toward molding the many field signal radio intelligence units into one large cooperating family, all with the same general mission. The results produced by all units received rapid and efficient dissemination, a factor of the highest importance in the collection and reporting of signal intelligence. But it is to be noted that collaboration, coordination, and cooperation is vital to success in this field, and that is one of the principal reasons why these radio intelligence units must be integrated within and directed technically by a single agency. Note the word integrated, because coordination of independently-controlled signal intelligence units is not as efficient as integration of those units under a central technical direction. Here's a comment from the final report of one of our large signal intelligence organizations that operated successfully in the war, the 849th Signal Intelligence Service:

"One of the most definite conclusions to be drawn from signal intelligence experiences in the Mediterranean Theater is that radio intelligence and signal intelligence operations should not be conducted by independent organizations working in conjunction with each other. Operations of the four Radio Intelligence Companies in the Mediterranean Theater in providing intercept facilities for Detachments of the Intelligence Branch have involved many difficult problems of command and policy between the Companies and Detachments. It is felt that the only proper arrangement is to provide for both radio intercept and signal intelligence personnel in a single unit, as in the case of the 3915th and 3916th Signal Service Companies activated in early 1945. All matters of command and policy are then the responsibility of one officer, the Commanding Officer of the unit, who can prevent differences of opinion between intercept and intelligence personnel concerning such things as advisability of moving the unit, determining proper intercept sites, promotions, and supply from interfering with operations."