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1. THRU: AS-80
TO: AS-20 AS-81 20 Jul 49

Subpanel on Systems
Mr. Wolfand Ext 389

It is requested that the inclosed letter and associated inclosures be forwarded to Mr. J. Z. Millar, Western Union Telegraph Company, New York.

1 Incl
Ltr to Mr. J. Z. Millar
w/2 incls

A. W. SMALL
Acting Chief, Technical Staff
Security Division

20-22 Jul 49

~~CONFIDENTIAL~~

2 June 49

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CSGAS-81

20 July 1949

Western Union Telegraph Company
60 Hudson Street
New York, New York

ATTENTION: Mr. J. Z. Millar

Dear Sir:

Inclosed is the information you requested at the meeting on 7 July 1949 of the United States Research and Development Board Subpanel on Systems.

The item on the Communication Facilities Survey was included for your use, as desired, at the suggestion of Mr. Brady. It should be noted that all the members of the subpanel, including yourself, have been approached for information to be included in the Survey and are, therefore, familiar with the project, even if only superficially.

Should you find that the material as presented is not comprehensive enough to answer questions which you may foresee, I will be glad to have reproduced and forwarded, at your request, studies which explain in greater detail the purpose and presently visualized composition of a Master Encryption Transmission System.

Sincerely yours,

2 Incls
1. Tech estimate of a secure integrated comm system
2. Comm facilities survey

DAVID WOLFAND
ASA Member
Subpanel on Systems

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TECHNICAL STATUS OF A SECURE INTEGRATED COMMUNICATION SYSTEM

History

1. One of the responsibilities of the Army Security Agency is the provision of communication security equipment for the Department of the Army. An obvious adjunct of this responsibility is coordination with the Signal Corps to assure that there will be a minimum of impairment of the communication system, both electrically and operationally, as a result of the addition of the crypto-equipment to the system.

2. In the process of planning for the utilization of crypto-equipments, now under development, in the proposed Army communication system, it became apparent that the number and types of crypto-equipments involved could be materially reduced by the provision of equipments, especially on trunk circuits, which employ a "Master Encryption" principle. The system would then be known as a Master Encryption Transmission System or METS.

3. a. The METS involves the development of equipments which will be generally capable of: (1) enciphering wide bands of all types of information (speech, facsimile, carrier telegraph, high-speed facsimile, etc.) of any classification, and (2) providing security against traffic analysis by the emission of random signals even while no information is actually present for encipherment.

b. For specific application to the Army communication system, these equipments would be required to encipher the outputs from the multi-channel carrier telephone equipments presently being developed by the Signal Corps. It should be noted also that an equipment of a similar type for encipherment of a single voice-channel of information is also under consideration.

4. Although the requirement for a METS has existed for some time, it was not until recently, as pointed out above, that the type of equipment which might possibly be provided was visualized. The latter was due to:

a. The trend on the part of the National Military Establishment and especially the Department of the Army toward a standardization of the communication system and instruments.

b. The development of new techniques in pulse coding of wide bands of information. (It is felt at this Agency that only by a system using a common denominator for all types of information, such as pulse code, can a securely enciphered system be accomplished.)

5. These ideas were presented to the Signal Corps and an informal committee was formed whose function is to coordinate, as closely as

possible, the development of communications and crypto-equipment development.

Status

6. One meeting of this committee has been held to date, at which time it was concluded that the primary problem confronting the committee was the formulation of a plan of a study to determine the cost of a completely secure integrated communication system as compared to a similar system with no security provisions, and to a system providing compromise or intermediate degrees of security through the use of presently known techniques. The cost of security, as mentioned above, will be given in terms of characteristics which directly affect the establishment and use of the communication system, such as:

a. Quantity, size, weight, and complexity of terminal and outside plant equipment.

b. Installation, operation, and maintenance time.

c. Personnel training and clearance problems.

7. Since insufficient information regarding pulse code techniques is available within ASA or SCEL to formulate positive conclusions with regard to bandwidth requirements, amplitude, and phase distortion limits and the effects of noise and crosstalk, it was decided to present a proposal to the Bell Telephone Laboratories for a theoretical study of pulse code techniques and their effect on the design parameters of the terminal and transmission facilities required in an integrated communication system. If an agreement is reached with the BTL, a task will be assigned under an existing Signal Corps service contract. If the BTL are not agreeable to such a task or if available funds are insufficient to cover the required work, other means of obtaining the desired information will have to be decided upon by the committee.

8. A meeting with representatives of the BTL will be held some time later this month.

COMMUNICATION FACILITIES SURVEY

1. It becomes quite obvious, when the provision of security for a communication system is considered, especially if the system is to remain unimpaired, that a knowledge of the transmission and operational characteristics of the system should be known to the security equipment designer and the systems engineer.

2. Since this information is sometimes unavailable and at other times requires a great amount of time and effort to obtain, it was felt that a central source of this information would be desirable.

3. Accordingly then, the Army Security Agency, with the knowledge of the Signal Corps, undertook to establish such a centralized source. As originally planned, the final documents were to contain the input and output characteristics of all end instruments and terminal equipments, as well as the transmission characteristics of the terminal equipment and transmission facilities in use or intended for use by all the military services and commercial communication organizations. When the magnitude of the task was realized, it was decided to include only those items of present military equipment which were classified STANDARD as to type except in those cases where it was expected that LIMITED STANDARD equipment would be in use for some time to come. However, an attempt is being made to obtain as much information as may be available on all items under development, as well as the policy governing these developments.

4. The cooperation of the technical services within the National Military Establishment and the major commercial organizations has been obtained and the project is now about 60 per cent completed. The tabulation of information in final form has yet to be accomplished. The two volumes, one on present and one on future equipments and facilities, are expected to be published by the end of 1949.