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DEPARTMENT OF THE ARMY  
HEADQUARTERS ARMY SECURITY AGENCY  
WASHINGTON 25, D. C.

CSCAS-70  
SUBCOMMITTEE REPORT NO. 21

14 February 1949

## MEMORANDUM FOR THE ARMY SECURITY AGENCY TECHNICAL COMMITTEE

Subject: Initiation of Project 29-70-004, ASAF 1, Classification as to Type, and Assignment of Priority Thereto

## 1. REFERENCE:

IRS from Chief, Operations Division to Chief, Research and Development Division, dated 13 August 1948, Subject: Teletype Tape Comparator.

## 2. DISCUSSION:

a. Agencies Concerned:

- (1) Cognizant Agency: Army Security Agency
- (2) Directing Agency: Army Security Agency
- (3) Requesting Agency: Army Security Agency
- (4) Participating Agency: None
- (5) Coordinating Agency: Navy
- (6) Other Probable Interested Agencies: USAF

b. Purpose:

To develop a teletype tape comparator for CSCAS-90. The equipment will be built for general cryptanalytic problems and will be used in comparing two teletype tapes.

c. Description:

This equipment will consist of a high speed dual tape drive, photo-electric sensing mechanism, memory mechanism for storing baud information, combining and comparison circuits, translating mechanism for translating 6 bauds into one of 64 characters, electronic counters, interconnecting plugboards, and a printer for recording the output results.

d. Related Material:

None

e. Development History and Status:

An experimental model of the ASAF 1 equipment has been built to prove the theory possible. This work has been done under Project 29-70-001, Application of Electronics to Cryptology.

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NSA on 08-07-2013 pursuant to E.O.  
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f. Proposed Development:

- (1) The proposed development will consist of the following phases:
  - (a) Further research study
  - (b) Continued tests and development of present experimental model.
  - (c) Construction of three service test models.
  - (d) Development will be conducted at Army Security Agency.
- (2) Three service test models will be required. The service tests will be conducted by CSCAS-70 and 90.
- (3) The assignment of a 1-C priority to this project is recommended, within the terms of Paragraph 3a(2)(c) of War Department Circular 71, 18 March 1947, because of its intended operational use.
- (4) The estimated cost of this project is \$65,000.
- (5) It is estimated that the development will be initiated upon approval and completed 18 months thereafter.

g. Security Classification:

- (1) The equipment will be classified Confidential.
- (2) This equipment will be considered in the "limited" category.
- (3) Cryptographic clearance will not be required for personnel concerned in the development.

3. RECOMMENDATIONS:

The Subcommittee recommends that Project 29-70-004, ASAF 1, be established, classified as Development Type, Service Test Type, and assigned a priority of 1-C.

4. EXHIBITS:

Military Characteristics

5. COORDINATION:

Coordination was accomplished with the following agencies:

Navy

USCRAD



LEO ROSEN  
Chairman, Cryptologic  
Subcommittee, ASATC

1 Incl.  
Exhibit "A"

EXHIBIT "A"

Proposed Military Characteristics for the ASAF 1

I. General Information

A. Objective (Operational Requirement)

There is a military requirement for a device which will compare and analyze data from teletype tape at a high rate of speed.

B. Functional Characteristics

The device shall:

1. Drive two seven level teletype tapes in synchronism, and read the information from both tapes by means of photoelectric readers at the rate of 5000 characters per second.
2. Store this information for a length of five characters from each tape.
3. Compare the stored information in various combinations for coincidence or non-coincidence, comparing as individual units or as sums or differences.
4. Provide eleven electronic counters (capacity 0000-9999) for counting the outputs of the coincidence circuits.
5. Provide two 6/64 translators for the output of two, and circuits for comparing and analyzing the output of the two translators.
6. Have available a set of switches which will be the equivalent of one level of a comparatively short third tape.
7. Provide a maximum of plugging facilities to increase the versatility of the device.
8. Be capable of utilizing the digital recorder now under development or other rapid means of recording the readings on the counters.

C. Tentative Technical Considerations

1. General:

With the exception of the input and output mechanisms, the equipment will be completely electronic. A combination of vacuum tubes and thyratrons will be used to make up the tube complement.

2. Input.

The input will be from a mechanical tape drive which is under development at the present time.

3. Output:

It is proposed that the output be put into the digital recorder which is now under development. For greater versatility an attempt will be made to use IBM recording equipment in the event that a satisfactory digital recorder is not completed.

4. Counters:

The chief technical problem at the present time is to develop a satisfactory counter which will have long operational life and be capable of driving the recording mechanism.

D. Type of Installation

This equipment will be designed as a fixed installation.

E. Proposed General Location of Equipment

Headquarters, Army Security Agency.

F. Limiting Weight and Volume Factors

These factors are not critical; however, the volume should be kept as small as possible.

G. Desirable Life Expectancy of Equipment with Reasonable Maintenance

5 Years.

II. Performance Requirements

A. Accuracy

The equipment must be 100% accurate while it is in operation.

B. Breakdown Time

Equipment will be designed so all parts are interchangeable to minimize delays due to breakdowns.

C. Flexibility

See Section I, Paragraph B (7).

III. Operation and Maintenance Considerations

A. Operating Time

The equipment is to be designed for continuous use; however, it is expected that it will be operated about eight hours per day.

B. Number of Operators and Estimated Skill and Number of Maintenance Personnel

1. Operators:

One semi-skilled per machine

2. Maintenance:

The equipment will be maintained by regular laboratory personnel with complete laboratory test equipment.

C. Provisions for Field Maintenance

See Par III B(2).

IV. Physical Characteristics

A. Power Requirements

The equipment will operate from the regular ac power lines (117 volts  $\pm$  10%, 60 cycles).

B. Adaptability to Modification

The equipment should be easily modified for use on any problem in its general field.

C. Ruggedness, Temperature Extremes, Ventilation, Humidity, Pressure etc.

Should be capable of operating in a room with controlled humidity and temperature. The temperature will vary between 75°F and 85°F and the humidity between 50 and 60%.

D. Equipment Arrangement for Operators Efficiency and Comfort

As efficient as possible consistent with functional characteristics.

E. Integral Test Equipment.

Tube tester and test oscilloscope will be built into equipment.

F. Transportability and Any Special Packaging Requirements

Air transportability is not required or desired. No special packaging requirements.

G. Destruction Requirements

No special means of destruction required.