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SAF-E280-81

1 May 1981

D/ODP  
SAFE

MEMORANDUM FOR: Director of Communication

VIA : Director of Data Processing/s/ BTJ

FROM : [redacted]  
Director, Consolidated SAFE Project Office

SUBJECT : External Building Communications Support to Project SAFE

REFERENCES : A. OCE-M79-089 dated 13 March 1979  
B. ODP-8-2284, SAF-E274-78 dated 29 December 1978

1. The SAFE remote building communications requirements, as outlined in reference B, have been refined and now include only two buildings through CY-83. Requirements beyond CY-83 have not been identified. Currently the plan is to support up to 25 SAFE terminals in [redacted] and up to 10 terminals for training in the Chamber of Commerce (C of C) building. The requirement to have these two circuits available for testing is 1 October 1982. [redacted]

2. Based upon reference A it is assumed that the Office of Communication (OC) will provide the transmission media and cryptographic equipment in support of the SAFE remote building requirements. Since the reference correspondence took place it is our understanding that OC plans to have a new standard statistical multiplexer on hand circa mid 1982. In keeping with this standardization practice we are evaluating the possibility of GFEing this same statistical multiplexer for Project SAFE. To that end, please provide an assessment of cost, schedule, and technical approach (consider electrical interface as described in paragraph 3). To simplify this process we expect that OC will procure and install the multiplexers and other necessary hardware including the racks. Project SAFE will transfer the appropriate funds to OC. [redacted]

3. To keep the number of transmission lines between the SAFE computer center and the OC signal center to a minimum it is suggested that the Headquarters multiplexers be installed in the SAFE computer center. For the initial requirements through CY-83 the Bus Interface Units (BIU) for the remote building terminals will reside in the SAFE Computer Center. The electrical characteristics of the BIU and the Delta Data 7260T terminal are described below.

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- A. Asynchronous data lines at 9.6kps will be RS-422 balanced interface. The connector on the BIU will be RS-449 37 pins. The connector on the 7260T terminal will be a 25 pin connector.
- B. Control lines between the BIU and the terminal, Clear to Send (CTS) and Request to Send (RTS) will be RS-423 unbalanced at the BIU and RS-232C unbalanced at the terminal. Though the RS-232C terminal interface for control lines and the RS-423 BIU control lines may be compatible over a short distance, this may present a problem between the Multiplexer and the terminal over a much longer distance. There does not appear to be any problem between the BIU and the multiplexer when the control line at the BIU is RS--423 and the multiplexer is speced to be MIL-STD188-114.

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4. In addition to the multiplexer links requested in paragraph 2 above we also request that OC support SAFE in the intrabuilding lines as well. It is our understanding that both  and C of C have a red line grid system that can support the SAFE terminals in CY-83. Though we cannot identify the exact location of the  and C of C terminals at this time we request your support in this matter; the exact location of these terminals will be provided by 1 April 1982.

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5. The various electrical interfaces between equipment described in paragraph 3 above requires further discussion and for this and any other additional information on this subject please contact

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*cc: c/ED/ODP via DD/P/ODP*

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ODP-8-2284  
SAF-E274-78  
29 December 1978

MEMORANDUM FOR: Director of Communications

FROM : [redacted]  
Director, Consolidated SAFE Project Office

SUBJECT : Support for Project SAFE [redacted]

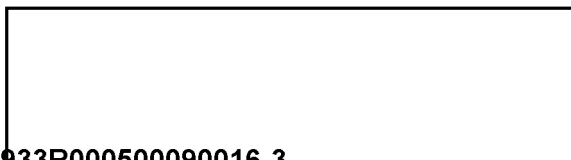
REFERENCE : OC-M77-427, dated 27 June 1977

1. The reference requests by 1 January 1979 information required by the Office of Communications to support Project SAFE with secure communications links between Headquarters Building and several remote Agency buildings. The support required of the Office of Communications for Project SAFE includes the cryptographic equipment at each location and the transmission media between. This support is required by 1 June 1981 to meet operational test requirements. The following is keyed to the reference memorandum:

- A. [redacted] (NPIC)  
Ames Building  
Key Building  
Chamber of Commerce

B. LOCATION	TEST (FY-81)	IOC (FY-82)	FOC (FY-84)
[redacted]	1	42	131
Ames Building	1	42	61
Key Building	1	82	286
Chamber of Commerce	1	1	4

C. The signalling rate for each SAFE terminal is specified to be at least 9600 baud, however, due to system overhead, cryptographic synchronization, error control and line protocol the data rate required over the interbuilding link for each terminal is at least 13.8 Kilobaud. The maximum acceptable bit error rate for the total interbuilding link is  $10^{-6}$ . The required availability of the system including crypto equipment and transmission media equipment, is 0.995. To preserve the required system interaction, especially for error



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control functions, the maximum cumulative interbuilding link round trip delay for all elements must be less than 50 milliseconds.

D. The total number of SAFE terminals now identified for FOC is given in subparagraph (B) above. It is quite possible however that another remote location may also need access to SAFE during the FY 1982 through FY 1986 time frame. This is due to the uncertainty of office relocations and the possible addition of another building to support the Agency requirements. To take this into account add the following:

LOCATION	IOC (FY-82)	FOC (FY-84)
Building ?	20	75

2. In addition to SAFE terminals located in the remote buildings, it is anticipated that some number of Automated Data and Storage Retrieval System (ADSTAR) terminals will be located in the remote buildings prior to the FOC date. This requirement will be forwarded to the Office of Communications when firm.



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Attachment: Reference

Distribution:

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OCE-M79-084

MEMORANDUM FOR: Director, Consolidated SAFE Project Office

25X1 FROM :   
Chief, Engineering Division, OC

SUBJECT : Support for the SAFE Project  25X1

REFERENCE : ODP-8-2284/SAF-E274-78, dated 29 December 1978

25X1 1. The reference identifies the projected SAFE data requirements for Agency annex buildings through FY 1984. The reference also identifies the data rate required over the interbuilding link for each terminal to be at least 13.8 kilo-bits.

25X1 2. The specified 13.8 kbs data rate is not a standard data rate. Several manufacturers were approached to determine current and projected capabilities to satisfy non-standard data rate requirements. This cursory survey indicates that manufacturers, although not developing equipment for non-standard data rates, could possibly modify their product lines for this type requirement should quantity warrant. Statistical multiplexers are available for standard data rates up to 9.6 kbs, with predictions of 56 kbs in two to three years. However, statistical multiplexers will not satisfy the specified round trip delay for the SAFE interbuilding requirements. The only available time division multiplexers for non-standard data rates require synchronous inputs, operate at a 1.544 mbs (T-1) aggregate and are approximately four times the cost of the currently used T-1 multiplexers.

3. Based on the above presented arguments, the projected SAFE communications requirements should be structured such that the data rates and distribution will be compatible with

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SUBJECT: Support for the SAFE Project

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existing communications equipment and COMSEC specifications for the SAFE communications bus. Therefore, it is requested that the following guidelines be used to determine the interface criteria between the SAFE interbuilding communications device and the transmission media.

a. For Agency annexes which require a small number of SAFE terminals, data shall be presented for transmission at 56 kilobits with MIL-STD-188, synchronous, Non-Return to Zero (NRZ) format.

b. If requirements exceed four 56 kilobit circuits for any one Agency annex, paragraph 3c below shall apply.

c. For Agency annexes which require a large number of SAFE terminals, data shall be presented for transmission at 1.544 megabits (T-1 rate). The current OC standard units are the SMC-210/SMT series. Should another unit be considered, OC would like to evaluate its impact on spare parts, technical training, etc.

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4. The above guidelines provide the most efficient means to interface the projected SAFE communications requirements, as described in reference, with the standard communications media. It is emphasized that these guidelines do not address the error rate specifications cited in the reference. It is our understanding that the error detection/correction will be a function of the terminals and/or first level multiplexer systems. It is estimated that the communications channel interbuilding delay will be well under that specified in reference.

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5. Adherence to these guidelines and careful consideration of the technical parameters of the communications media, when designing the project SAFE interbuilding network, will ensure that the communications media will be transparent to the operational system.

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