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SANDIA SYSTEMATIC DECLASSIFICATION REVIEW
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PROPOSAL FOR SE117 SIMULATOR

SC-DR-66-689

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Introduction

This report is a reply to a request from Organization 1512 for a cost estimate and proposal for portable equipment to simulate the Mk3 arm and fire subsystem. The main purpose of the simulator is to generate appropriate signals for check out of telemetry equipment which monitors all significant points of the Mk3 AFS. The simulator will simulate all MC items in the Mk3 AFS and will provide for substituting certain actual MC items as they become available.

The Mk3 AFS

In the Mk3 arm and fire subsystem, events are timed by ESD's and G-switches which sense significant G-levels of the missile trajectory. The only external signal required during flight is a STAS (Safe-to-Arm-Signal) from the missile. The ESD's and G-switches activate the thermal batteries, arm the warhead, enable the radar, and start the back-up timer. Fire signals are generated in succession by the radar, the back-up timer, and the impact fuse.

Design Proposal - Electrical

The simulator will use an electronic programmer to simulate closure of the ESD's and G-switches at the proper times. It will also simulate the outputs of the mechanical and electronic timers as well as the fire signals from the radar and the impact fuse.

The programmer will have a maximum running time of 100 seconds. Events may be timed within 0.1 second. Approximately 40 press-to-test indicator lights on the front panel will give a Go-No/Go indication of each of the telemetry signals. The press-to-test feature will allow a test signal to be applied to any telemetry channel by simply pressing the appropriate light.

Two telemetry output connectors will be provided. One will have 28v (raw) output signals and the other will have 5v (conditioned) output signals. This will allow check out of the telemetry system either with or without the external signal conditioner.

The simulator will be designed so that the following actual MC-items may be plugged in and used in place of the simulated circuitry.

1. Mechanical Timer	XMC-2166
2. Electronic Timer	XMC-2294
3. Relay	MC-1905
4. Transverter	
5. Trigger Circuit	

Actual ESD's, G-switches, radar, or thermal batteries will not be used in the simulator.

The simulator will require 115V AC input power. Self-contained power supplies will develop 28V DC and 9.2V DC to simulate the thermal batteries and provide power for circuit operation. A 1500V DC supply will be used to simulate the transverter output.

Design Proposal - Mechanical

The simulator will be contained in two portable aluminum carrying cases. One case will contain the two power supplies (28V and 9.2V) with the remainder of the simulator being housed in the second, or main, case. Power from the power supply unit will be connected to the main case by a detachable cable. Space in the lids of the cases will provide a storage area for power cables and any auxiliary equipment. Approximate dimensions of each case are 13 5/8" x 20 5/8" x 12 1/4". The estimated weight of the power supply unit is 60 pounds and 40 pounds for the main unit.

The panel of the main unit will contain controls for performing a simulated fusing and firing function with indicators that display completed circuit functions. Indicator lamps will be of the press to test variety.

An itemized list of estimated cost for the three SE117's is provided in Figure 1.

COST ESTIMATE

	Cost/Hr	Hours	Total	
DESIGN				
Electrical Engineering	$16.50	280	$ 4,620	
Engineering Liaison	16.50	100	1,650	
DRAFTING	9.70	320	3,104	
DESIGN AUDIT	16.50	80	1,320	
MATERIAL				
Breadboard, changes, etc.			250	
SUBTOTAL A				$10,944
MANUALS				
Engineer	$16.50	40	$ 660	
Writer			2,013	
SUBTOTAL B				$ 2,673
PRODUCT TESTER, 3 each				
FABRICATION				
Engineering	$16.50	40	$ 660	
SHOP LABOR				
Electrical	9.10	300	2,730	
Mechanical	9.70	108	1,050	
Cables	7.40	72	534	
Inspection	9.20	40	368	
CHECKOUT				
Engineer	$16.50	80	$ 1,320	
MATERIAL			12,645	
SUBTOTAL C				$19,307
GRAND TOTAL				$32,924

FIGURE 1

The first unit will be available 21 weeks after receipt of order, and units two and three will be available 13 weeks after delivery of the first unit.