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2/14/77

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KSC LAUNCH OPERATIONS DIRECTIVE NO. 9

To: Distribution

From: Rocco A. Petrone
Rocco A. Petrone
Director of Launch Operations

Subject: SCHEDULING AND CONTROL PROCEDURES FOR COMMAND CONTROL SYSTEM RECEIVERS

1.1 PURPOSE

The purpose of this directive is to define the control procedure that will minimize unwanted signals or commands from affecting a vehicle that has its command receivers energized but is not the addressee of the signal or command.

2.1 SCOPE

Multiple vehicle/system tests in conjunction with vehicles in orbit require scheduling of radio frequency radiation and reception. RF radiation is controlled and scheduled in accordance with AFETR 100-3 and other directives. Reception must be controlled whenever an unwanted signal or command could create a hazard or system malfunction which would result in excessive loss of test time. The command systems are the most susceptible systems in this category. The following frequencies are utilized for these operations: 450, 2101.8, 2106.4, 2119 MHZ. This directive applies when any receiver that may receive an unwanted signal or command can cause a system malfunction and loss of test time. The requirements of LOD#6 paragraph 7.1.1.1 must be observed when a hazardous operation is conducted. This directive does not supersede the provisions of other directives that pertain to RF operations such as AFETRR 100-3 or RCE1 30-29.

3.1 RESPONSIBILITIES

a. The radiation or frequency controller at each launch complex or other test areas is responsible for determining that no strong unwanted radiation on the receiver frequency is expected while performing a TCP or other special receiver tests. The radiation and frequency controllers are the only personnel that can obtain radiation clearance or the information needed for receiver protection. Identification of the radiation or frequency controller depends on the level of the test being conducted and work area location. For small system tests or special tests not directly involving a launch vehicle or spacecraft, any frequency or radiation controller can act as required. For a launch vehicle or spacecraft integrated test the appropriate Test Conductor is the frequency and radiation

controller. For space vehicle tests the Test Supervisor becomes the frequency and radiation controller. When a conflict in schedule develops, the frequency or radiation controller will contact the KSC Scheduling Office, TS-TSM-3, for resolution of the scheduling conflict based on existing operational priorities.

b. The KSC Scheduling Office, TS-TSM-3, is responsible for controlling priorities for tests that utilize command system frequencies. These priorities will be established by the Director of Launch Operations. When schedule conflicts are encountered, the KSC Scheduling Office will upon request advise the responsible frequency or radiation controllers the priority which has been assigned to the tests in question. Conflicts in priorities will be referred to the Launch Operations Manager (LO-OPN) for resolution.

c. The responsible NASA or contractor systems engineers will identify those tests or periods of operation during which receiver protection is required and indicate the requirement in the appropriate TCP. In the case of special tests or a test not covered by a TCP, the responsible engineers will inform the Radiation and Frequency Controller when the receiver protection is required.

4.1 INSTRUCTION

a. The responsible NASA or contractor system engineers will examine all tests where the receiver outputs are energized into an operating system. They will identify as critical those tests where an unwanted signal or command could cause an unwanted action to result or an unwanted command to be stored in the system.

b. When these critical tests are formalized in a test checkout procedure, the TCP shall indicate that frequency protection is required and the receiver frequencies involved. For a receiver critical test being performed without a TCP, the system engineer will inform the Radiation or Frequency Controller of the desirability of frequency protection and the frequencies involved.

c. The TCP or system engineer will also indicate the environment in which the receiver will be operating; i.e., open loop uncaptured, open loop captured, closed loop uncaptured, or closed loop captured.

d. When informed by the TCP or by the system engineer of the desirability of frequency protection and when frequency clearance has not previously been requested, the Radiation or Frequency Controller will advise the AFFCA office (853-7034) of the need for receiver protection. The AFFCA does not schedule receiver protection unless it is scheduled by an Operational Directive but they will advise the requestor if any transmitters are scheduled on the frequencies involved during the time period specified. Information regarding the location and

radiated power of any scheduled activities will be obtained. Any change in the scheduled activity prior to or during the test period will be provided to the requestor by the AFFCA Office. If another transmitter is scheduled on the same frequency and time as the receivers in the critical test, the Radiation or Frequency Controller will evaluate the desirability of maintaining the schedule or re-scheduling the test to a time where no conflict exists.

5.1 PROCEDURE

The procedure to be followed in complying with this directive is included as Attachment 1.

End of Directive.

Date: August 31, 1967

ATTACHMENT 1

Procedure:

General Information:

Purpose: This procedure prevents unintentional reception of scheduled radiated command signals. Reception of unwanted signals can cause improper or erroneous test results that necessitate extensive retesting to determine what caused the apparent malfunction. This procedure does not supersede existing procedures and regulations that pertain to the command control receivers operating in a hazardous environment. Call signs, format, and times may be changed if it is desirable to incorporate this procedure into another procedure.

Call Signs: AFFCA, Range frequency scheduling, 853-7034.

TSM-3, KSC scheduling, 867-3013.

RO, Command system receiver operator.

FC, Frequency or Radiation Controller. A list of personnel that have been assigned as frequency or radiation controllers is available from TS-TSM-2, 867-2136. If the test is controlled or directed by a test supervisor or a test conductor, he is the cognizant controller.

Time	Seq.	Command Sta.	Response Sta.	Description
-15'	1	RO	FC	Request frequency protection for duration of this test. The command receiver operation is on _____ MHZ. The receiver will be operating open or closed loop.
-13'	1	FC	AFFCA	This is FC _____, we have a receiver test scheduled on _____ MHZ from _____ AM to _____ PM. Will you advise me of any scheduled radiation on that frequency and inform me if there is any change in schedule during this test.
-10'	1	AFFCA	FC	A. We have no scheduled activity at this time. B. We have _____ station scheduled from _____ PM to _____ PM radiating open or closed loop.
-10'	2-B	FC	TSM-3	We have a conflict in utilization of the command control frequency _____ MHZ. We have a receiver test at _____ and _____ station is scheduled to radiate at _____ PM to _____ PM. Can you advise who has priority.

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<u>Time</u>	<u>Seq.</u>	<u>Command Sta.</u>	<u>Response Sta.</u>	<u>Description</u>
-10	2-B-1	TSM-3	FC	A. You have priority. We will advise _____ station to reschedule their test. B. Station _____ has priority. We would advise you to reschedule your test.
-10'	2A 2B-1A	FC	RO	We have a secure frequency. You may energize your receivers.
-10'	2B-1B	FC	RO	We can not obtain a secure frequency and must reschedule the test some other time.