

CLASSIFICATION

TO: [REDACTED] (TWX FAX ONLY)

NOV 55 000 177889

ACTION: PRIORITY

INFO:

ACTION: _____

CORONA/RESIDENT OFFICE

CITE: [REDACTED]

SLUG

REF A [REDACTED]

B

C

ATTN: [REDACTED]

FROM:

SUBJ:

1. EXCESSIVELY LONG DISIC CAMERA OPERATIONS WERE INADVERTENTLY PROGRAMMED ON THE H-TIMER FOR MISSION 1106. ADDITIONALLY, AS OUTLINED IN REF. MESSAGE, SEVERAL OF THESE OPERATIONS WERE ACTUALLY TAKEN.
2. FOLLOWING IS AN EXPLANATION OF THE SOFTWARE ERROR LEADING TO THE CUTTING OF THESE OPERATIONS ON THE H-TIMER TAPE:

COPY TO [REDACTED] Yes No

- A. THE GENERATION OF EMERGENCY PAN, CASCADE, AND DISC EVENTS INVOLVES THE USE OF THREE LARGE SOFTWARE MODULES. THE FIRST TWO MODULES ARE "CALICO-1" AND "CALICO-2" WHICH WERE ORIGINALLY DEVELOPED BY [REDACTED] PERSONNEL AND WHICH ARE BASICALLY IDENTICAL TO THE "CALICO-1" AND "CALICO-2" MODULES PRESENTLY IN USE AT [REDACTED]. THE THIRD MODULE, "CASOEN", WAS DEVELOPED FOR USE AT [REDACTED] IN CUTTING THE DSR EVENTS.
5. A LOGIC ERROR EXISTED IN THE SECOND MODULE, "CALICO-2", WHICH IS USED TO COMPUTE THE ACQUISITION TIMES ASSOCIATED WITH ALL UNIVERSAL AREAS ACQUIRED DURING EACH ORBIT REVOLUTION. THIS ERROR ONLY OCCURRED WHEN COUPLED WITH A UNIQUE PATTERN OF ACQUISITIONS FOR AREAS 601 THROUGH 603 (ANTARCTICA). THESE AREAS WERE INCLUDED AS PART OF THE AREA REQUIREMENTS SPECIFIED BY THE [REDACTED] FOR CUTTING THE DISC INDEPENDENT CAMERA PROGRAM. THIS ERROR RESULTED IN CUTTING ERRONEOUSLY LONG DISC INDEPENDENT CAMERA OPERATIONS ON APPROXIMATELY TWO REVS EACH DAY. SINCE AREAS 601 THROUGH 603 WERE NOT USED IN CUTTING THE EMERGENCY PAN OR CASCADE EVENTS THIS ERROR HAD NO EFFECT ON PAN CAMERA PROGRAMMING. THESE ERRONEOUSLY LONG OPERATIONS WERE NOT FLAGGED DURING [REDACTED] CHECKING SINCE THEY DID NOT EXCEED THE MANUFACTURER SPECIFICATION OF 2700 SECONDS MAXIMUM OPERATING TIME PER ORBIT REVOLUTION.

TO THE BEST OF OUR KNOWLEDGE THIS WAS THE FIRST OCCURRENCE OF THIS LOGIC ERROR SINCE THIS WAS THE FIRST MISSION WITH OPERATIONS PROGRAMMED FOR UNIVERSAL AREAS 601 THROUGH 603.

3. THE FOLLOWING ACTIONS HAVE BEEN TAKEN AT [REDACTED] TO ELIMINATE THIS PROBLEM:

- A. CORRECTION AND CHECKOUT OF "CALLOS-S" TO ELIMINATE THE ERROR. CORRECTIONS HAVE NOW BEEN MADE AND FINAL CHECKOUT IS UNDERWAY.
- B. ADDITIONAL LOGIC ADDED TO THE THIRD MODEL, "CASCHN," TO CHECK FOR EXCESSIVELY LONG ACQUISITIONS OF A SINGLE AREA. THIS LOGIC IS NOW BEING GOOD AND WILL BE INCORPORATED AND THOROUGHLY CHECKED OUT PRIOR TO MISSION 1107.

4. FOLLOWING IS THE SEQUENCE OF EVENTS LEADING TO THE CUTTING OF THESE EXCESSIVELY LONG DISK INDEPENDENT OPERATIONS ON THE H-FINGER TAPE:

- A. DATA MESSAGE [REDACTED] - SENT TO [REDACTED] AND [REDACTED]
13 JANUARY 1969 - RECOMMENDED UNIVERSAL AREA/INCREMENT GROUPINGS FOR MISSION 1106 CASCADES. ALSO REQUESTED DEFINITION OF UNIVERSAL AREA INPUTS FOR CUTTING DISK INDEPENDENT AND EMERGENCY PROGRAM ONE.
- B. TWX MESSAGE [REDACTED] - SENT TO [REDACTED] AND [REDACTED]
16 JANUARY 1969 - INVITED [REDACTED] AREA REQUIREMENTS FOR CUTTING DISK AND EMERGENCY PROGRAM ONE.

- C. DATA MESSAGE [REDACTED] - SENT TO [REDACTED] 21 JANUARY 1969 -
DEFINED THE DISIC OPERATIONS AND EMERGENCY PROGRAM ONE
OPERATIONS WHICH WERE GENERATED BY THE "CALICO-1", "CALICO-2",
AND "CASGEN" MODULES. PROVIDED TO [REDACTED] FOR EDITING PRIOR
TO H-TIGER PUNCHING.
- D. TELEPHONE CONVERSATION BETWEEN [REDACTED] AND [REDACTED] PERSONNEL -
23 JANUARY 1969 - [REDACTED] INDICATED PROGRAM WAS ACCEPTABLE
AND [REDACTED] WAS GIVEN APPROVAL TO CUT DISIC AND EMERGENCY
PROGRAM ONE IN ACCORDANCE WITH [REDACTED] (C. ABOVE).
- E. 27 JANUARY 1969 - [REDACTED] SENT INPUTS TO VAPE FOR H-TIGER
PUNCHING. DISIC INDEPENDENT OPERATIONS WERE THOSE SENT
TO [REDACTED] IN [REDACTED] (C. ABOVE).
5. IT SHOULD BE NOTED THAT THERE ARE TWO MODES OF DISIC CAMERA
CONTROL, "SLAVE" AND "INDEPENDENT". DISIC CAMERA CONTROL CAN
BE COMMANDED TO EITHER OF THESE TWO MODES AT EACH CONTROL
STATION ACQUISITION BY REAL-TIME COMMAND. THE SELECTED MODE
THEN WILL BE IN EFFECT UNTIL COMMANDED AT A SUBSEQUENT CONTROL
STATION ACQUISITION. IN THE "SLAVE" MODE THE DISIC CAMERA
TURNS ON ONLY AT THE TIME THE PAN CAMERAS ARE TURNED ON AND
DISIC TURNS OFF AT THE TIME THE PAN CAMERA TURN OFF. IN THE
"INDEPENDENT" MODE THE DISIC CAMERA IS TURNED ON AND OFF BY
STORED PROGRAMMER COMMAND FROM THE H-TIGER. IN ADDITION,
DISIC WILL BE TURNED ON DURING ALL PAN CAMERA OPERATIONS.

AS CAN BE SEEN, THE DISIC CAMERA HAS THREE POSSIBLE SOURCES OF POWER; EITHER OF THE PAN CAMERAS, OR A STORED PROGRAMMER COMMAND. IN THE "INDEPENDENT" MODE THE DISIC CAMERA OPERATES AS LONG AS POWER COMES FROM ANY OF THE THREE SOURCES AND IN THE "SLAVE" MODE DISIC OPERATES ONLY IF POWER COMES FROM EITHER OF THE TWO PAN CAMERA SOURCES.

DISIC INDEPENDENT OPERATIONS FORCED ON THE M-TIMER TAPE CONSIST OF AN "ON" PUNCH FOLLOWED BY AN "OFF" PUNCH. POWER FROM THE STORED PROGRAMMER SOURCE IS AVAILABLE AT ALL TIMES BETWEEN THE "ON" PUNCH AND THE "OFF" PUNCH. THIS POWER WILL REACH THE DISIC CAMERA ONLY IF DISIC CONTROL IS SET IN THE "INDEPENDENT" MODE. THUS IT IS POSSIBLE TO TURN THE DISIC CAMERA ON WHEN COMMANDING FROM "SLAVE" TO "INDEPENDENT" MODE DURING A PRE-PROGRAMMED DISIC INDEPENDENT OPERATION. IT IS ALSO POSSIBLE TO TURN THE DISIC CAMERA OFF WHEN COMMANDING FROM "INDEPENDENT" TO "SLAVE" MODE DURING A PRE-PROGRAMMED DISIC INDEPENDENT OPERATION.

6. SWATH PLOTS OUTPUT FROM [REDACTED] DURING FLIGHT PROVIDE A PICTORIAL DISPLAY OF ALL DISIC INDEPENDENT OPERATIONS AND THE ASSOCIATED CONSUMPTION FOR THE [REDACTED]. DATA USED AT [REDACTED] AND [REDACTED] CONTAIN DISIC INDEPENDENT OPERATION REV NUMBERS, LATITUDES COVERED, NOMINAL CONSUMPTION, AND THE LAST ACCEPTABLE COMMAND STATION ACQUISITION PRIOR TO THE START OF EACH OPERATION. IN THE CASE

OF A DIBIC INDEPENDENT OPERATION WHICH STARTS BETWEEN TWO STATIONS AND EXTENDS PAST THE SECOND STATION, DATA AVAILABLE AT [REDACTED] AND [REDACTED] DO NOT INDICATE THE POSITION WHICH COULD BE CONTROLLED AT THE SECOND STATION BY COMMANDING FROM "SLAVE" TO "INDEPENDENT" MODE. THE EXCESSIVELY LONG OPERATION ON REV 18 ^{BEGAN} [REDACTED] AT LATITUDE 61.4 DEGREES NORTH-DESCENDING AND ENDED AT LATITUDE 81.4 DEGREES SOUTH DESCENDING. PRIMARY CONTROL, OR CONTROL OF THIS ENTIRE OPERATION, COULD HAVE BEEN PLACED EITHER AT REV 17 [REDACTED] (MAXIMUM ELEVATION OF 21.8 DEGREES) OR 18 [REDACTED] (MAXIMUM ELEVATION OF 4.9 DEGREES). ADDITIONALLY, SECONDARY CONTROL, OR CONTROL OF LESS THAN THE ENTIRE OPERATION, COULD HAVE BEEN ACHIEVED BY COMMANDING TO THE "INDEPENDENT" MODE AT REV 18 [REDACTED] (MAXIMUM ELEVATION OF 33.9 DEGREES) AFTER THE STORED PROGRAMMER "ON" PUNCH HAD BEEN EXECUTED BUT PRIOR TO EXECUTION OF THE "OFF" PUNCH. THE ENTIRE OPERATION WAS LISTED FOR CONTROL AT REV 17 [REDACTED] SINCE THE REV 18 [REDACTED] ACQUISITION DID NOT MEET NORMAL MINIMUM ACQUISITION ELEVATION CRITERIA OF 5 DEGREES AND THE REV 18 [REDACTED] ACQUISITION OCCURRED AFTER THE "ON" PUNCH. THE COMMAND TO "INDEPENDENT" MODE WHICH RESULTED IN TAKING MOST OF THIS OPERATION WAS DONE AT REV 18 [REDACTED] AFTER THE "ON" PUNCH HAD BEEN EXECUTED BUT PRIOR TO THE "OFF" PUNCH. BEGINNING ON MISSION 1107 THE DATA USED AT [REDACTED] AND [REDACTED] WILL REFLECT BOTH PRIMARY AND SECONDARY COMMAND STATION CONTROL OF EACH DIBIC INDEPENDENT OPERATION CUT ON THE R-TIMER TAPE. USING

THE REV 18 DISIC OPERATION AS AN EXAMPLE, THE NEW LISTINGS WOULD INDICATE CONTROL AND CONSUMPTION OF THE OPERATION FOR THE TIME PERIODS OF REV 18 [REDACTED] ACQUISITION, REV 18 [REDACTED] FADE TO REV 18 [REDACTED] RISE, REV 18 [REDACTED] ACQUISITION, AND REV 18 [REDACTED] FADE TO THE "OFF" PUNCH.

7. THE LOGIC ERROR IN THE "CALICO-2" SOFTWARE MODULE CREATED SOME UNDESIRABLE AND EXCESSIVELY LONG DISIC INDEPENDENT CAMERA OPERATIONS PRIMARILY OVER WATER. HOWEVER, TO THE BEST OF [REDACTED] KNOWLEDGE, THE [REDACTED] SWATH PLOTS PROVIDED BY [REDACTED] TO [REDACTED] ACCURATELY DEPICTED THE COVERAGE AND CONSUMPTION ASSOCIATED WITH ALL DISIC INDEPENDENT OPERATIONS CUT ON THE H-TIMER TAPE. IT WAS FROM THESE SWATH PLOTS THAT THE DECISION WAS MADE BY [REDACTED] PERSONNEL TO OPERATE THE DISIC CAMERA IN THE "SLAVE" OR "INDEPENDENT" MODE. THIS DECISION WAS THEN PROVIDED TO [REDACTED] AND [REDACTED] AS PART OF THE [REDACTED] SENT PRIOR TO EACH CONTROL STATION ACQUISITION AND APPROPRIATE COMMANDING WAS PERFORMED TO ACHIEVE THE MODE REQUESTED.

THE [REDACTED] DUTY OFFICER CALLED THE [REDACTED] DUTY OFFICER IN MAKING THE REV 18 DISIC CONTROL DECISION. IN THIS CONVERSATION THE [REDACTED] DUTY OFFICER QUESTIONED WHETHER COMMANDING TO "INDEPENDENT" MODE ON REV 18 WOULD RESULT IN TAKING ALL, OR PART, OF THE DISIC INDEPENDENT OPERATION CUT ON REV 18. THE ANSWER GIVEN BY THE [REDACTED] DUTY OFFICER WAS "NO." TWO FACTORS CONTRIBUTED TO THIS ERRONEOUS STATEMENT BY THE [REDACTED] DUTY OFFICER:

A. AS EXPLAINED IN SECTION 6. ABOVE, THE DATA USED AT [REDACTED] AND [REDACTED] WERE MISLEADING. THIS OPERATION WAS LISTED AS BEING CONTROLLED AT REV 17 [REDACTED] WITH NO ADDITIONAL DATA SHOWING THAT PART OF THE OPERATION WOULD BE TAKEN IF "INDEPENDENT" SCENE WAS COMMANDED ON REV 18.

B. THE TELEPHONE CONVERSATION OCCURRED AT A TIME WHEN THE [REDACTED] DUTY OFFICER WAS EXTREMELY BUSY WITH ^{TIME-CRITICAL} PERS-_A PASS ACTIVITIES.

SINCE THE OPERATION TAKEN ON REV 115 OCCURRED UNDER NEARLY IDENTICAL CIRCUMSTANCES TO REV 18, IT IS POSSIBLE THAT THE ERRONEOUS INFORMATION PROVIDED ON REV 18 WAS USED BY THE [REDACTED] DUTY OFFICER. HOWEVER, NO PHONE CONVERSATION OCCURRED IN CONJUNCTION WITH THE REV 115 DECISION.

8. IN ACCORDANCE WITH SECTIONS 3. AND 6. ABOVE [REDACTED] WILL TAKE THE FOLLOWING ACTIONS TO ASSURE THAT THIS TYPE OF DIBIC FILM WASTAGE DOES NOT OCCUR ON FUTURE MISSIONS:

- A. CORRECT THE "CALICO-2" SOFTWARE TO ASSURE THAT ERRONEOUS OPERATIONS ARE NOT CUT.
- B. MODIFY THE "CASGEN" SOFTWARE TO PROVIDE ADDITIONAL OPERATIONS CHECKING.
- C. MODIFY DATA CONTENT AND/OR DATA FORMATS USED BY [REDACTED] AND [REDACTED] PERSONNEL DURING FLIGHT TO ASSURE CLARITY.

9. THE PRESENT TECHNIQUE OF CUTTING DISK INDEPENDENT AND PAN EMERGENCY PROGRAM ONE OPERATIONS BASED SOLELY ON UNIVERSAL AREA REQUIREMENTS SHOULD BE REVIEWED PRIOR TO MISSION 1107. THIS TECHNIQUE POSSIBLY IS TOO GROSS FOR EFFICIENT FILM UTILIZATION AND, IF SO, NEEDS TO BE MODIFIED PRIOR TO THE MISSION. [REDACTED] PERSONNEL PLAN TO DISCUSS THE PRESENT PROGRAMMING TECHNIQUES AND POSSIBLE MODIFICATIONS WITH THE OSP SOFTWARE PERSONNEL SCHEDULED TO VISIT [REDACTED] DURING THE WEEK OF 17 MARCH 1969.

CONCURRENCE: [REDACTED]

RELEASE: [REDACTED]