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PROJECT DOCUMENT COVER SHEET

APOLLO 17

PHOTOGRAPHIC PROCESSING CONTROL DOCUMENT

REPORT NUMBER	DATE
JL12-301	16 November 1972

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PHOTOGRAPHIC PROCESSING CONTROL DOCUMENT

INTRODUCTION:

This document defines the control parameters to be used by the Photographic Technology Division for the processing of all films flown on Apollo Mission J-3. It also defines the procedures necessary for establishment of processing control and will serve as a vehicle for denoting and solving any problem areas or conflicts which may occur prior to the mission. This document will be updated whenever new information is obtained.

REFERENCES:

Report MSC-04947	Film Handling Procedures for Manned Space Flights
Report MSC-05826	Procedures for Processing Scientific Instrumentation Bay (SIM Bay) Films
Report JL12-201	Film Handling Procedures for Apollo 17 Lunar Sounder
Report TN 72-4	Determination of Film Processing Specifications for the Apollo 17 S-209 Lunar Sounder Experiment
Report TN 72-11	Kodak Film Type SO-394-4-1 Mottling and Hypersensitization Tests

LIST OF ABBREVIATIONS

ASPO	-	Apollo Systems Program Office
BW	-	Black and white film
CEX	-	color exterior film
CIN	-	color interior film
CM	-	Command Module
CSM	-	Command Service Module
D-log E	-	relation of density to logarithm of exposure
°F.	-	degrees Fahrenheit
°K.	-	degrees Kelvin
fpm	-	feet per minute
HBW	-	high speed black and white film
HCEX	-	high speed color exterior film
in.	-	inch(es)
LM	-	Lunar Module
log E	-	logarithm of exposure
mm	-	millimeter
MBW	-	medium speed black and white film
MSC	-	Manned Spacecraft Center
NASA	-	National Aeronautics and Space Administration
ND	-	neutral density
PSO	-	Photo Science Office
PTD	-	Photographic Technology Division
SCW	-	Space craft window
SIM Bay	-	Scientific Instrument Module; area in Command Service Module containing the Panoramic, Stellar, Metric cameras, and Lunar Sounder recorder.
T	-	Tanks
TVBW	-	television black and white film
VHBW	-	very high speed black and white film

1.0 Apollo 17 Sensitometric Exposure and Processing Conditions

PCD	FILM DESIGNATION	FILM TYPE	EMULSION NUMBER	SIZE	PROCESSOR	CHEMISTRY	FILTRATION	EXPOSURE TIME
A	BW	3400	262	5 in.	Fultron	MX-819	4750°K + W12	1/50
B	HBW	3401	386	35mm	Hi-Speed	D-19	5500°K	1/50
C	HBW	3401	384	70mm	Fultron	MX-819	5500°K	1/50
D	LBW	3414	24	5 in.	Fultron	MX-819	4750°K	1/25
E	VHBW	2485	108	70mm	Hi-Speed	D-19	5500°K + SCW +1.0ND	1/100
F	VHBW	2485	108	35mm	Hi-Speed	D-19	5500°K + SCW +1.0ND	1/100
G	VHBW	2485	108	16mm	Hi-Speed	D-19	5500°K + SCW +1.0ND	1/100
H	TVBW	3400	262-5	70mm	Hi-Speed	D-19	2850°K + P-11	1/10
I	CEX	SO-368	18-81	70mm	Hi-Speed	ME-2A	5500°K	1/50
*I'	HCEX	SO-168	12-1	70mm	Houston	ME-4	5500°K	1/100
J	CEX	SO-368	018-81	16mm	Hi-Speed	ME-2A	5500°K	1/50
K	CIN	SO-168	9-1	35mm	Houston	ME-4	5500°K	1/100
L	CIN	SO-168	012-01	16mm	RAM	ME-4	5500°K	1/100

* Possible replacement for SO-368 (70mm) on the Lunar Surface, if launch is delayed.

2.0 Film Magazine Identification

2.1 Command Module

Film Width	Magazine Designation	Film Designation	Film Type
16mm	AA	CEX	SO-368
	BB	CEX	SO-368
	CC	CEX	SO-368
	DD	CEX	SO-368
	EE	CEX	SO-368
	FF	CEX	SO-368
	GG	CEX	SO-368
	HH	CIN	SO-168
	II	CIN	SO-168
	JJ	VHBW	2485
70mm	KK	CEX	SO-368
	LL	CEX	SO-368
	MM	CEX	SO-368
	NN	CEX	SO-368
	OO	CEX	SO-368
	PP	CEX	SO-368
	QQ	VHBW	2485
	RR	VHBW	2485
35mm	SS	CIN	SO-168
	TT	CIN	SO-168
	UU	VHBW	2485
	VV	VHBW	2485
	WW	VHBW	2485
	XX	VHBW	2485
	YY	VHBW	2485
	ZZ	VHBW	2485

2.2 Lunar Module

70mm	A	CEX	SO-368
	B	CEX	SO-368
	C	CEX	SO-368
	D	CEX	SO-368
	E	CEX	SO-368
	F	CEX	SO-368
	G	HBW	3401
	H	HBW	3401
	I	HBW	3401
	J	HBW	3401

Film Width	Magazine Designation	Film Designation	Film Type
70mm	K	HBW	3401
	L	HBW	3401
	M	HBW	3401
	N	HBW	3401
16mm	O	CEX	SO-368
	P	CEX	SO-368
	Q	CEX	SO-368
70mm	R	HBW	3401

2.3 SIM Bay Film Identification

Camera	Film Width	Film Length	Film Designation	Film Type
Panoramic	5 in.	6470 ft.	LBW	3414
Metric	5 in.	1550 ft.		3400
Stellar	35mm	550 ft.	HBW	3401
Lunar Sounder	70mm	675 ft.	TVBW	3400

3.0 DETERMINATION OF FILM PROCESSING CRITERIA

3.1 The Photo Science Office is responsible for coordination of all operations regarding establishment of film processing criteria and film certification procedures.

3.2 Contact group responsible for each photographic application on the mission:

Earth Orbital - Earth Observations

Robert McDonald
Andrew Potter
Andy Patterson

Lunar Orbital - NASA Photo Team

Douglas Lloyd

Lunar Surface - Surface Science Team

William R. Muehlberger
Henry Holt
Ray Batson
Jay Rennilson

Documentary - Public Affairs Office

Lunar Sounder S-209 - Apollo Systems Program Office

Gary Coultas
Dan Mangieri
Ron Kelly

3.3 Determine critical parameters; film, gamma, speed, lighting conditions, shutter speed range, curve shape, etc.

3.4 Perform any necessary preliminary testing.

3.5 Coordinate results and establish process control curve with group designated in 3.2.

4.0 FILM CERTIFICATION PROCEDURES

4.1 The sensitometric characteristics of each film type and emulsion are established by exposure on the I-B sensitometer and are controlled by processing as determined for the respective films. The condition for sensitometric exposure of each film type is specified as to:

a. Color temperature

b. Filtration, as prescribed by the film application

c. Exposure needed to place the resulting density exposure relationship in a desired position on the D-log E curve.

4.2 After the processing machine has been certified, five sensitometric strips are processed. The densitometric values of these processed exposure wedges are averaged and the result is plotted to represent the certification data for subsequent sensitometric control for that particular film type.

4.3 Visually inspect one roll of each film type and size in white light for dirt, scratches, coating imperfections, etc.

4.4 After the inspection is completed, the inspected roll will be visibly marked and retained intact until after processing of the mission film.

.0 PROCESS CONTROL CURVES