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GEORGE C. MARSHALL SPACE FLIGHT CENTER  
HUNTSVILLE, ALABAMA

# Memorandum

SMS *ms*

TO : See addressees  
Through: Mr. Moore, R-ASTR-N *BM*

FROM : R-ASTR-NG

DATE: September 12, 1966

In reply refer to:  
R-ASTR-NG-121-66  
CMcMahan/FHopkins/lw/876-8476

SUBJECT : Clarification of Sperry support of Saturn Flight Program Development  
in support of R-ASTR-NG under Schedule Order #3

## 1. Introduction

The work required of Sperry in the development of Saturn Flight Programs has been defined as the result of a series of meetings attended by the following:

### ASTR-NG

S. Seltzer  
M. Brooks  
C. McMahan  
W. Chubb  
J. Blanton  
H. Brown

### Sperry

T. Sloan  
R. Rossler  
L. Holland  
F. Hopkins  
F. Randall  
G. Harrison

The effectivity, work scope, initial schedule, and task organization are summarized in the following paragraphs.

## 2. Effectivity

Sperry will phase into the preparation of MDD's and FMDD's, review of EDD's and Level I programs and processing of change orders for 200 series and 500 series missions. Target effectivity is as follows:

MDD: 209 and subsequent  
504 and subsequent

EDD & Lev. I Review: 207/208  
503

FMDD: 207/208  
503

Change Orders: 207/208  
503

The depth of the initial coverage on each type of document will depend upon the rate of skill development of the personnel involved.

*DATE*

It is expected that Sperry will be able to make a significant contribution to Change Orders, EDD's, Level II, and FMDD's on 207/208 and 503. However, during the first periods when coverage of more than one document is required, priority will be given to the preparation of the first MDD on the basis that the learning and familiarization process will be best served by this approach.

### 3. Workscope

Since the initial efforts will be on an MDD (504), primary consideration has been given to defining the MDD preparation work effort. As familiarization with the flight program progresses, further detail will be added to the work required on the other documents.

#### MDD

The work required in preparation of each section of an MDD is identified in the table below. The left hand column is the anticipated MDD outline. Even if the outline changes, the work required in preparing the document will remain the same.

MDD PREPARATION  
- WORKSCOPE

(Sperry Effort Required)

Task	Text Only	Review or Analysis	Simulation	Flow Chart or Diagram	Incorporate ASTR INPUT Only
1. Summary	x				
2. Introduction	x				
3. Objectives	x				
4. Prelaunch test routine		x			
5. Powered flight					
Ground Support (Var. az)		x			
Guidance					
Navigation } Control	x	x	x		
Sequencing		x		x	
Telemetry					x
6. Coast Orbital Operation					
Guidance					
Navigation } Control		x	x	x	
Sequencing		x		x	
Telemetry					x
DCS					x
Orbital Checkout					x
MCC-H Rqmts.					x
7. Abort/Alt. Missions		x	x	x	
8. General					
Algorithms		x			
Binary Scaling		x			
Failure & Back- up modes		x	x	x	
Flt. Test Procedure					x
Sim. Study Rqmts.					x
Coordinate System					x
9. References	x				

Simulations related to navigation, guidance, and control will consist of nominal flight with the addition of perturbations as time permits. Perturbations will be supplied by R-ASTR-NG. In all areas, equations and flow charts will be augmented by clarifying text as required.

#### EDD & Level I Program Review

This review will consist of detailed analysis for consistency with stipulated requirements, validation of detailed flow charts, and analysis or simulation to verify recommended modifications.

#### FMDD

The preparation of the FMDD is similar to the preparation of the MDD except that it is based on revised data. The FMDD effort is expected to be on the order of 20% of the MDD effort.

#### Change Order

Sperry will maintain files on all change orders. Additionally Sperry will perform necessary analysis and review on ASTR or Sperry initiated ECR's, and on IBM originated ECP's as deemed necessary by ASTR.

#### 4. Initial Schedule

The major milestones in the preparation of MDD 504 are as follows:

Commence Data Review and preparation of Simulation Decks	7-12-66
Start Simulation	8-15-66
Complete Simulation nominal cases	9-15-66
Complete Simulation back-up and alternates	10-7-66
Complete initial MDD draft including flow charts	10-15-66
Complete review and revision; deliver draft to ASTR	11-7-66
Coordination Meetings 9-15, 10-1, 10-15-66.	

During the early phases of the above schedule, there will be continuous consultation with ASTR personnel for learning purposes. A planning review meeting is planned prior to commencing simulation runs to determine the adequacy and necessity of the planned simulation study. Further coordination meetings are planned to be held as data and results become available.

#### 5. Task Organization

The analytical and simulation work to be done by Sperry will be done by

"off-site" personnel. The active group will be organized as follows:

Coordination Group

Prepares and edits all text material, accomplishes necessary review, analysis, and documentation for prelaunch test routines, and ground support requirements. Provides assistance as required in other areas.

Navigation/Guidance Group

Accomplishes analysis, simulation, and documentation in areas where navigation and guidance is of primary concern (nominal flight, portions of alternate mission study during powered flight).

Control Group

Accomplishes analysis, simulation and documentation in areas where control is of primary concern (orbital flight).

System Integration Group

Performs necessary review and analysis of sequencing requirements. Accomplishes analysis, simulation, and documentation for failures and backup modes.

The on-site MDD coordinator will administer the Sperry flight program effort for R-ASTR-NG, and maintain continuous surveillance on all documents in process. He will be responsible for channeling all formal communication between ASTR and Sperry (off-site), and will circulate and maintain files on all documents, correspondence, and change orders.

*C. M. McMahan*

C. M. McMahan, R-ASTR-NG

*Frank Hopkins*

F. Hopkins, Sperry (R-ASTR-NG)

Addressees:

R-ASTR-Z, Mr. Kruidenier  
 R-ASTR-N, Mr. Moore /Mr. Green  
 R-ASTR-NG, Mr. Seltzer/Mr. Brooks/Mr. McMahan  
 R-ASTR-NG, Branch file/record copy  
 R-ASTR-NGI, Mr. Blanton/Mr. Nicaise/Mr. Hight  
 R-ASTR-NGA, Mr. Drawe/Mr. Schultz/Mr. Kennel/Mr. Roberts/Dr. Nurre  
 R-ASTR-NGD, Mr. Chubb/Mr. Brown/Mr. Jones  
 Sperry, (R-ASTR-N) Mr. T. D. Sloan  
 Sperry, (R-ASTR-N) Mr. R. Rossler  
 Sperry, (R-ASTR-N) Mr. F. Randall  
 Sperry, (R-ASTR-NG) Mr. Holland

CONCURRENCE:

*William Green*

WILLIAM GREEN

Technical Representative, C-1 Appendix