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MASSACHUSETTS INSTITUTE OF TECHNOLOGY

APOLLO

GUIDANCE AND NAVIGATION

Approved Milton B. Trageser Date 8/16/63
MILTON B. TRAGESER, DIRECTOR
APOLLO GUIDANCE AND NAVIGATION PROGRAM

Approved Roger B. Woodbury Date 8/19/63
ROGER B. WOODBURY, ASSOCIATE DIRECTOR
INSTRUMENTATION LABORATORY

[redacted]

(Unclassified Title)

REPORT E-1389

QUARTERLY TECHNICAL PROGRESS REPORT,
PROJECT APOLLO GUIDANCE
AND
NAVIGATION PROGRAM,
Period ended June 1963

(NASA Contract NAS9-153)

[1963] 48p rep

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[redacted] INSTRUMENTATION LABORATORY

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ACKNOWLEDGEMENT

This report was prepared under the auspices of DSR Project 55-191, sponsored by the Manned Spacecraft Center of the National Aeronautics and Space Administration through Contract NAS9-153.

PREFACE

This Quarterly Technical Progress Report consists of the Milestone Charts covering the schedules for all components and assemblies of the Apollo Guidance Equipment, together with comments or a discussion for each chart.

There is also a tabulation of all meetings attended by MIT/IL Apollo personnel.

The report concludes with a bibliography listing the reports published by the MIT Instrumentation Laboratory under the Apollo Program.

TABLE OF CONTENTS

PROGRESS SUMMARIES

Figure I-1 shows the current delivery schedule for guidance and navigation systems to be used in the Command Module. As noted in last month's report, MIT/IL has discussed a proposed change in the composition of Blocks I and II, which would make AGE 13 the first Block II system (Reference MIT/IL letter AG-382-63, dated 23 May 1963). Figure I-1 has not been changed to reflect this proposal, since a formal approval has not been received from NASA.

Figure I-2 shows a proposed flight test schedule for the command module, giving the allocation of AGE systems to airframes. This proposal was presented to NASA in May 1963 by MIT/IL and is documented in Letter AG-382-63, dated 23 May 1963.

The philosophy underlying this proposal is our desire to ship G & N systems destined to fly on flights SA 111, SA 112, and SA 113, from the factory assembly point directly to AMR without passing these systems through NAA's facility at Downey. Scheduling the delivery of G & N flight systems in this manner accomplishes two important objectives:

a) It reduces the amount of shipping and handling which flight systems must undergo.

b) It reduces the accumulated AGE operating time prior to flight from approximately 1000 hours to 500 hours.

Figure I-3 shows a proposed LEM flight test schedule, giving the allocation of LEM Guidance and Navigation Systems (LGE) to LEM vehicles. The proposal was presented to NASA by MIT/IL in May, 1963, and is documented in Letter AG-382-63 dated 23 May 1963.

This schedule was derived using the same philosophy as that contained in the Command Module Flight Test Schedule, Figure I-2. The LGE systems destined to fly are shipped from the factory assembly point directly to AMR for installation in the appropriate LEM. To check out the LEM vehicles at Grumman (GAEC), LGE 2, 5, 10, 11 are used. LEM 3 is checked out at GAEC by LGE 2 which then becomes a spare at SWMR. LGE 10 and LGE 11 remain at GAEC for checkout of LEM 5, 6, 7, 8, 9, 10 and 11.

Figure I-4 shows the delivery schedule for all subsystems contained in AGE 4. The target date for delivery of AGE 4 to Downey by MIT/IL has been changed from 15 October 1963 to 15 November 1963.

The objectives of AGE 4 are as follows: (Reference Apollo Project Memo No. 575, L. S. Wilk)

1. Demonstrating the proper operation of the Apollo G & N as represented in AGE 4.
2. Demonstrating the proper operation of the G & N GSE.
3. Proofing of the pre-installation AGE test procedures.
4. Proofing of the MIT System Test Laboratory facilities.
5. Proofing of the MIT G & N Laboratory at NAA.
6. Proofing of the MIT G & N Laboratory at AMR.

Figure I-5 shows the schedule for AGE 5 subsystems. A slippage of 3 months is shown in the Wiring Diagram and Flight Test Program caused by lack of a preliminary mission profile from NASA (Reference MIT/IL letter AG-357-63 dated 27 May 1963). AGC 5 is shown 8 weeks behind schedule. The recent mechanical design change if approved immediately will cause no further slip in the delivery of AGC 5. IMU-5 is shown 6 weeks behind schedule. IMU-5 will be assembled with 16 x resolvers with old stub shafts, and retrofitted when new units are received.

Figure I-6 shows the delivery schedule for AGE 9 subsystems. Under existing plans, AGE 9 is the first G & N system in Block II. However, MIT/IL has recently discussed with NASA a proposed change to the composition of Blocks I and II, which would make AGE 9 a Block I system and AGE 13 the first Block II system. (Reference MIT/IL letter AG-382-63 dated 23 May 1963).

AGE 9 is considered to be on schedule with the exception of AGC 9 which must lag AGC 5 by at least 4 weeks due to limitations in production and testing.

The schedule for Guidance Theory & Programming is shown in Fig. I-7. This effort is considered to be on schedule with the exception of the milestone event entitled "Preliminary NASA Mission Profile Required from NASA" which is required by MIT/IL for analysis and preparation of the flight computer programs, but which has not yet been received. This slippage has been reported to MSC in letter AG-357-63 dated 27 May 1963.

Figure I-8 shows the delivery schedule for all guidance computers. As reported in last month's report, a new mechanical design has been proposed for the computer. AGC 4 is functioning as a computer in the laboratory at MIT.

AGC 4B is shown approximately seven weeks behind schedule.

AGC 5 is considered to be approximately eight weeks behind schedule in terms of meeting the schedule delivery date, due to an expected late delivery to MIT/IL of the chassis assembly, drivers, power supply, and miscellaneous components.

The IMU Development Plan is shown in Fig. I-9. Thermal testing is continuing on IMU-1. IMU-2 will be rebuilt with new stub shafts and vibration tests will be rerun. IMU-4 alignment checks are continuing.

IMU-5 will be assembled with 16 x resolvers with old stub shafts, and retrofitted when new units are received.

IMU assembly drawings are approximately 50% released.

Figure I-10 gives the delivery schedule for all PSA Subsystems. PSA 2 is about 2 weeks behind schedule. PSA 3 (MIT/IL breadboard) is considered to be on schedule. PSA 4 and 5, under construction by MIT/IL to class B documentation, are four weeks behind schedule. PSA 6, under construction by AC Spark Plug to class B documentation is reported to be 5 weeks behind schedule.

Figure I-11 shows the delivery schedule for CDU subsystems. Six CDU gear boxes from AC Spark Plug are undergoing laboratory tests and checkout at MIT/IL. CDU's for system 5 are reported 2.5 weeks behind schedule.

In May 1963, MIT/IL issued TD A-147 to AC Spark Plug calling for delivery of 15 CDU's to the schedule shown below. AC Spark Plug's current estimated delivery dates are shown adjacent to the scheduled delivery date.

Quantity	Schedule Delivery Date	ACSP Expected Delivery Date	Documentation	Use
2	8/1/63	8/25/63	Less than Class A	Optics
3	9/15/63	10/16/63	Less than Class A	Inertial
3	10/15/63	10/19/63	Less than Class A	Inertial
2	10/15/63	10/19/63	Less than Class A	Optics
2	11/1/63	11/2/63	Less than Class A	Optics
2	11/1/63	11/2/63	Less than Class A	Optics
1	11/1/63	11/10/63	Class A	Vibration

Figure I-12 gives the delivery schedule for the Navigation Base subsystems. Navigation Base for AGE 2 is about 2 weeks behind schedule, with delivery expected 12 July 1963. Navigation Base for AGE 4 is about 3 weeks behind schedule. Navigation Base for AGE 5 is on schedule.

Figure I-13 shows the delivery schedule for all D & C Subsystems. The breadboard D & C panels under construction by AC Spark Plug are about 6 weeks behind schedule due to vendor lead time required for honeycomb panels. The D & C panels

for systems 1, 2, 4, 5, and 6 are behind schedule. D & C panels for system 5A are expected to be delivered on schedule (1 August 1963) if a material substitution of aluminum and wood for honeycomb panelling is allowed (for 5A only).

The Optical Subsystem Schedule is shown in Fig. I-14. All systems are considered to be on schedule.

Figure I-15 shows the delivery schedule for all Map and Data Viewers. All systems are shown as being on schedule.

Figure I-16 shows the current schedule for mid-course guidance studies. Additional studies are being considered and will be added to the chart as soon as the initial planning is complete.

Figure I-17 shows the delivery schedule for all Raytheon ground support equipment. The first breadboard computer test set is expected to be delivered to MIT/IL by Raytheon in August 1963. A computer simulator was delivered to MIT/IL by Raytheon on 28 June 1963.

Figure I-18 shows the delivery schedule for all AC Spark Plug ground support equipment. This schedule is in accordance with the AC Spark Plug statement of Work dated 28 January 1963, with appropriate modifications as detailed in the recovery plan authorized by NASA TWX SGC 4-233 dated 11 April 1963.

The breadboard test set scheduled for delivery to MIT/IL by AC Spark Plug on 1 August 1963 is expected to be about 6 weeks late.

Figure I-19 shows the GSE delivery schedule for Kollsman Instrument Corporation. This schedule is in accordance with the Kollsman Statement of Work dated 11 April 1963, with appropriate modifications as listed in the recovery plan authorized by NASA TWX SGC 4-233 dated 11 April 1963.

In June 1963, MIT/IL issued TD K-75 authorizing Kollsman to design and prepare for manufacture optical GSE items listed below:

	ITEM	DELIVERY DATE
1.	Precision Test Fixture	10/1/63
2.	Functional Tester	10/1/63
3.	5 inch collimator	10/1/63
4.	Mirror alignment fixture	10/1/63
5.	2-1/2 inch collimator	10/1/63
6.	Short retroreflecting periscope and alignment equipment	10/1/63

Figure I-20 shows a PIP delivery schedule. During May and June, seven PIP's were acceptance-tested at Sperry:

PIP No.	Date:
1 AP 15	5/20/63
1 AP 16	5/24/63
1 AP 17	5/24/63
1 AP 18	5/28/63
1 AP 19	5/31/63
1 AP 20	6/14/63
1 AP 21	6/18/63

The following PIP's have been reserved for system AGE 5: 1 AP-15, 1 AP-18, 1 AP-19, 1 AP-20, 1 AP-21, 1 AP-22.

Figure I-21 shows an IRIG delivery schedule. During May, two IRIGS were accepted at ACSP by NASA:

IRIG No.	Date
1 A-9	5/8/63
1 A-10	5/23/63

These are the last of 10 ACSP IRIGS received at MIT/IL. The following IRIGS are reserved for system AGE 5: 1 A-8, 1 A-10, MIT-69.

During the interval between 1 June and 30 June, MIT/IL Apollo Project personnel attended meetings as shown on Table I.

APOLLO MILESTONE CHART FOR DELIVERY SCHEDULE FOR GUIDANCE & NAVIGATION SYSTEMS

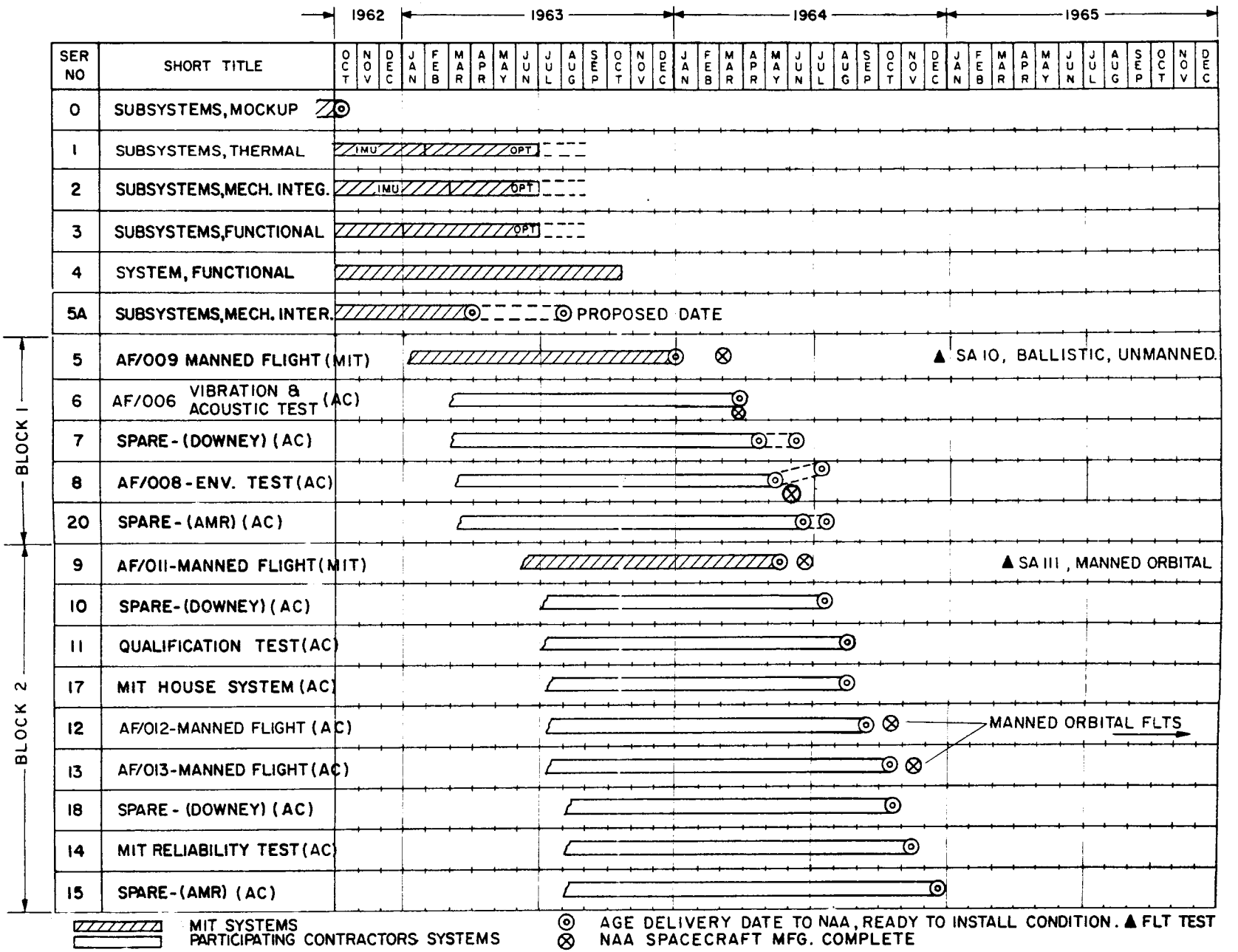


Fig. I-1

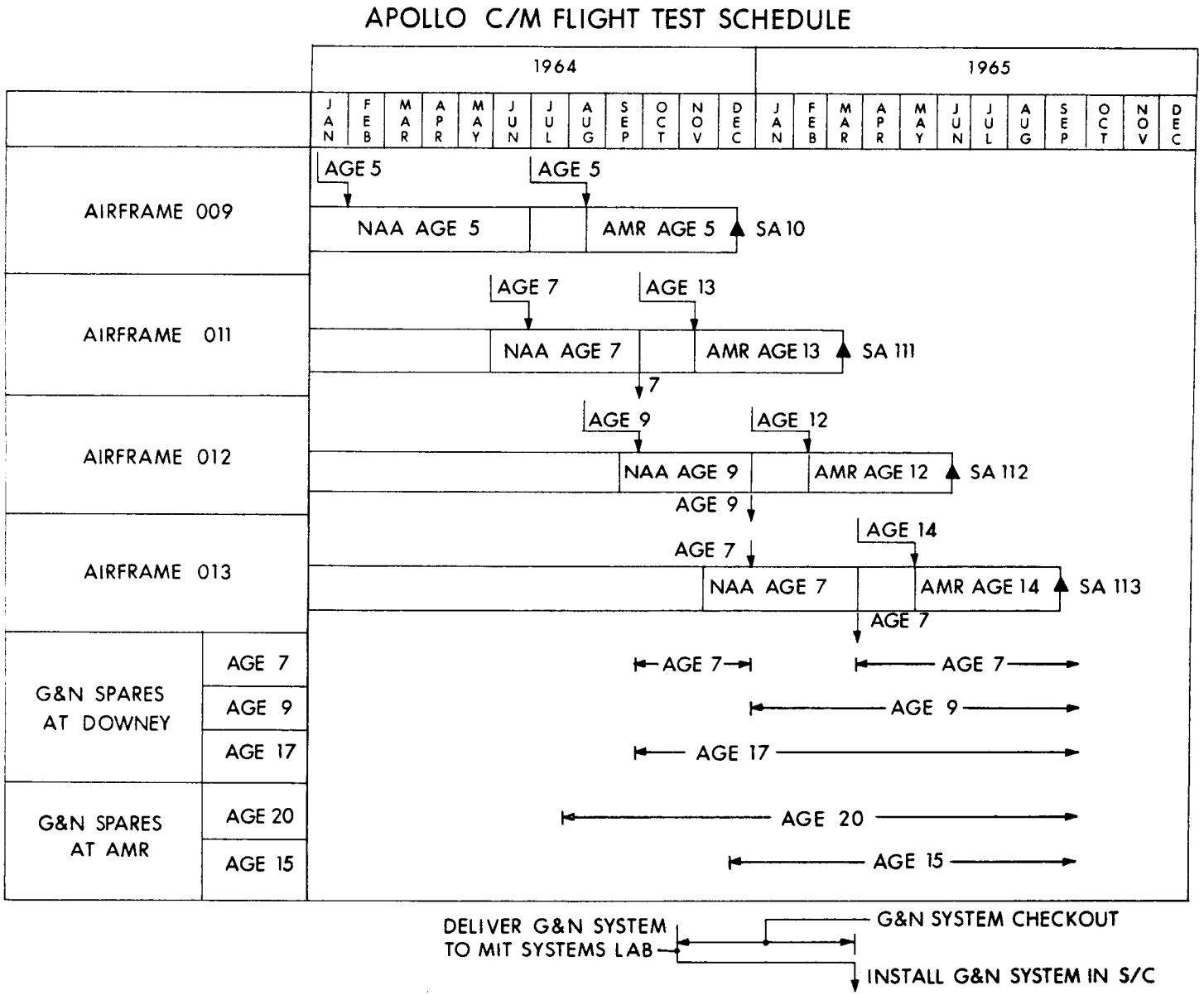

APOLLO C/M FLIGHT TEST SCHEDULE
1964
1965
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
AIRFRAME 009
AGE 5
AGE 5
NAA AGE 5
AMR AGE 5
SA 10
AIRFRAME 011
AGE 7
AGE 13
NAA AGE 7
AMR AGE 13
SA 111
7
AIRFRAME 012
AGE 9
AGE 12
NAA AGE 9
AMR AGE 12
SA 112
AGE 9
AIRFRAME 013
AGE 14
AGE 7
NAA AGE 7
AMR AGE 14
SA 113
AGE 7
G&N SPARES AT DOWNEY
AGE 7
AGE 9
AGE 17
G&N SPARES AT AMR
AGE 20
AGE 15
AGE 7
AGE 7
AGE 9
AGE 17
AGE 20
AGE 15
DELIVER G&N SYSTEM TO MIT SYSTEMS LAB
G&N SYSTEM CHECKOUT
INSTALL G&N SYSTEM IN S/C

Fig. I-2

APOLLO LEM FLIGHT TEST SCHEDULE

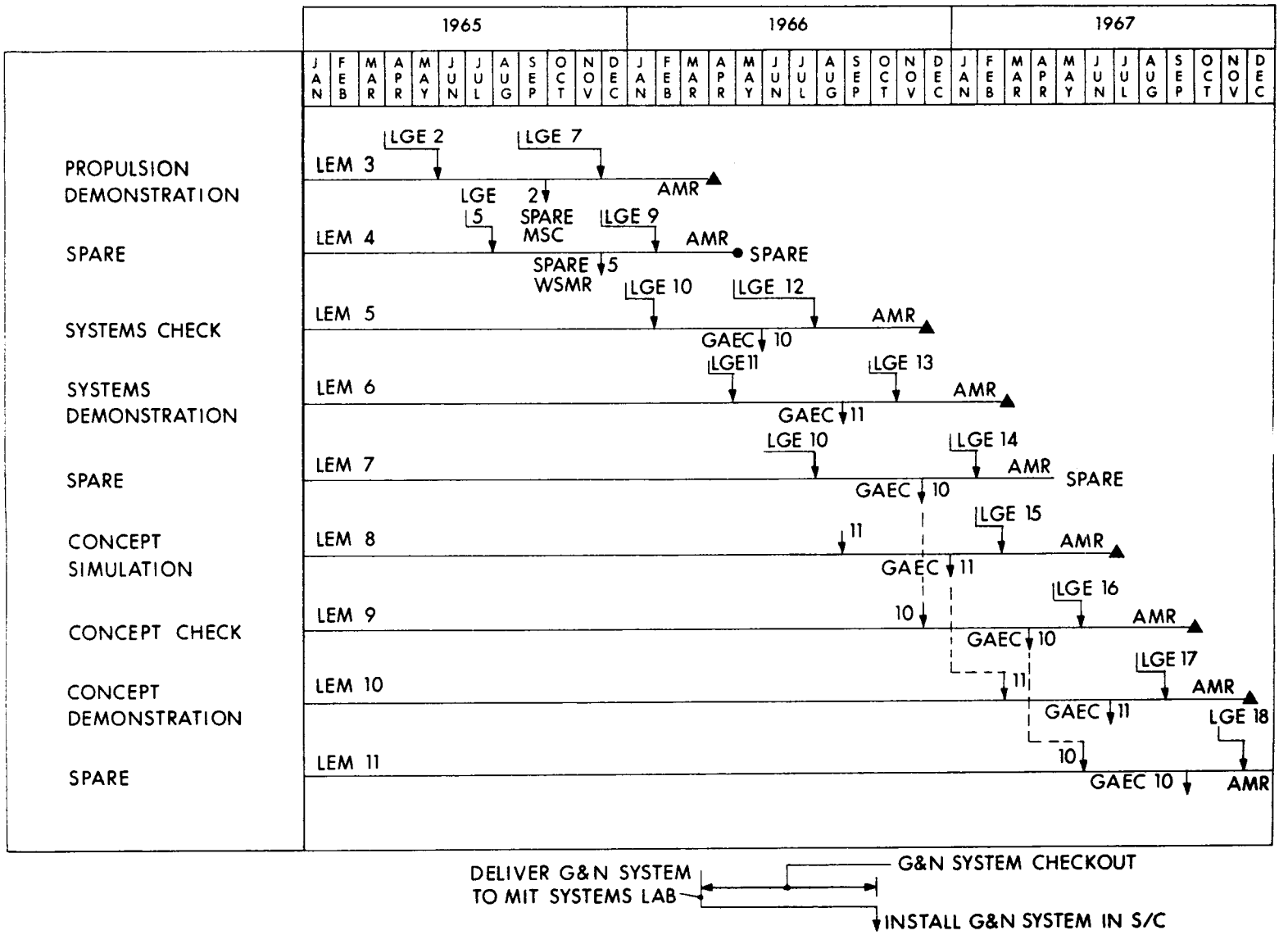


Fig. I-3

APOLLO MILESTONE CHART FOR AGE 4

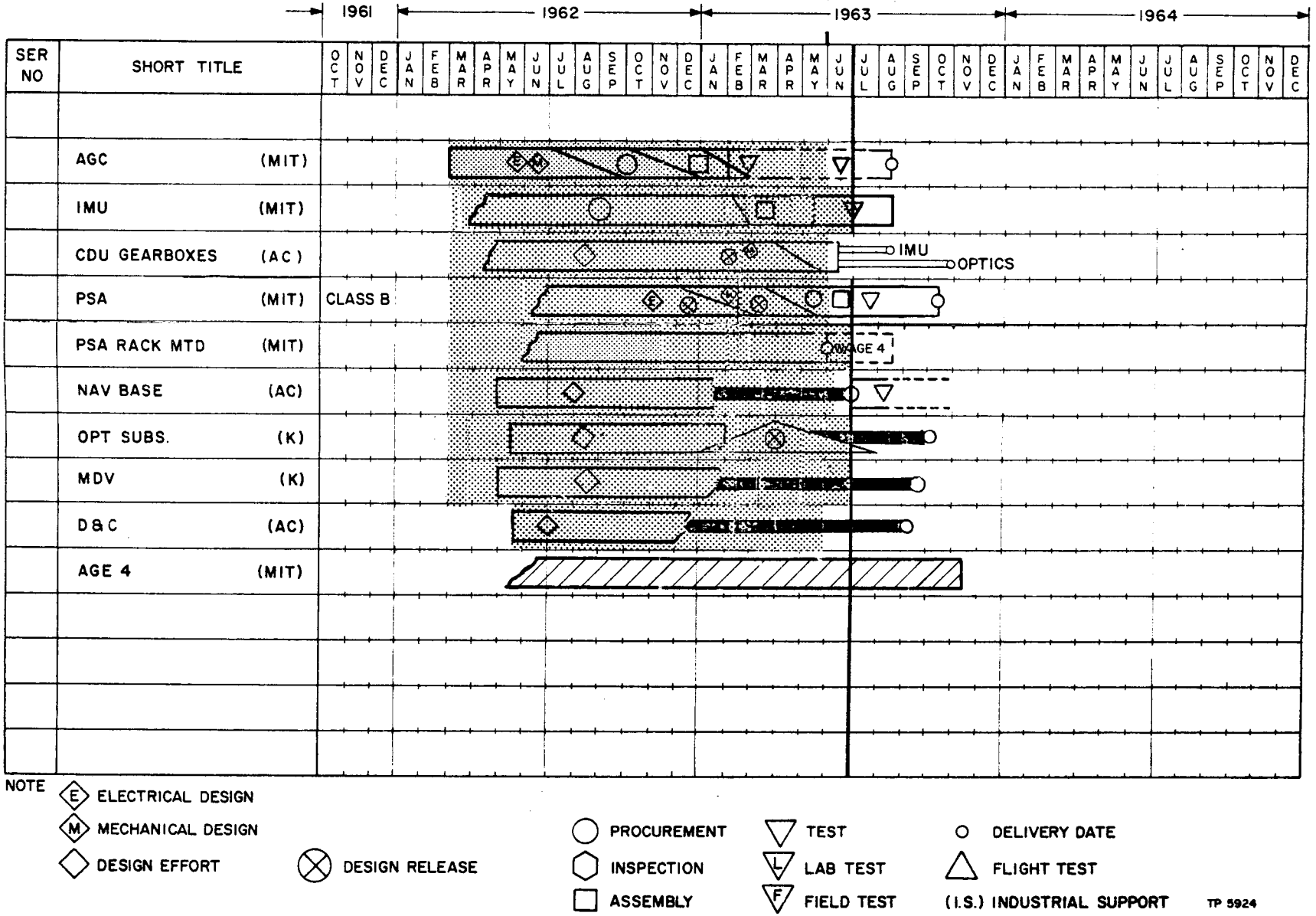


Fig. I-4

APOLLO MILESTONE CHART FOR AGE 5

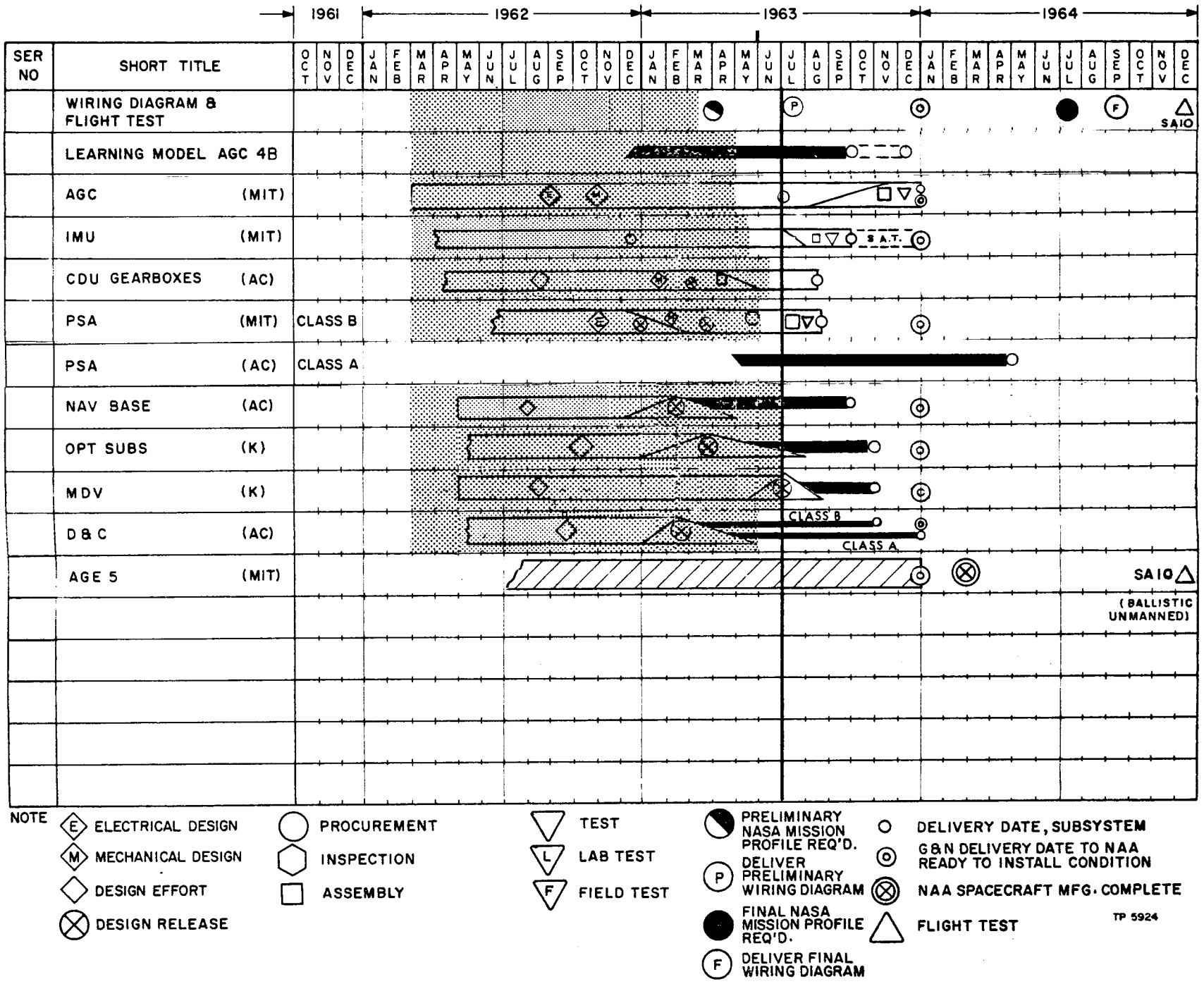


Fig. I-5

APOLLO MILESTONE CHART FOR AGE 9

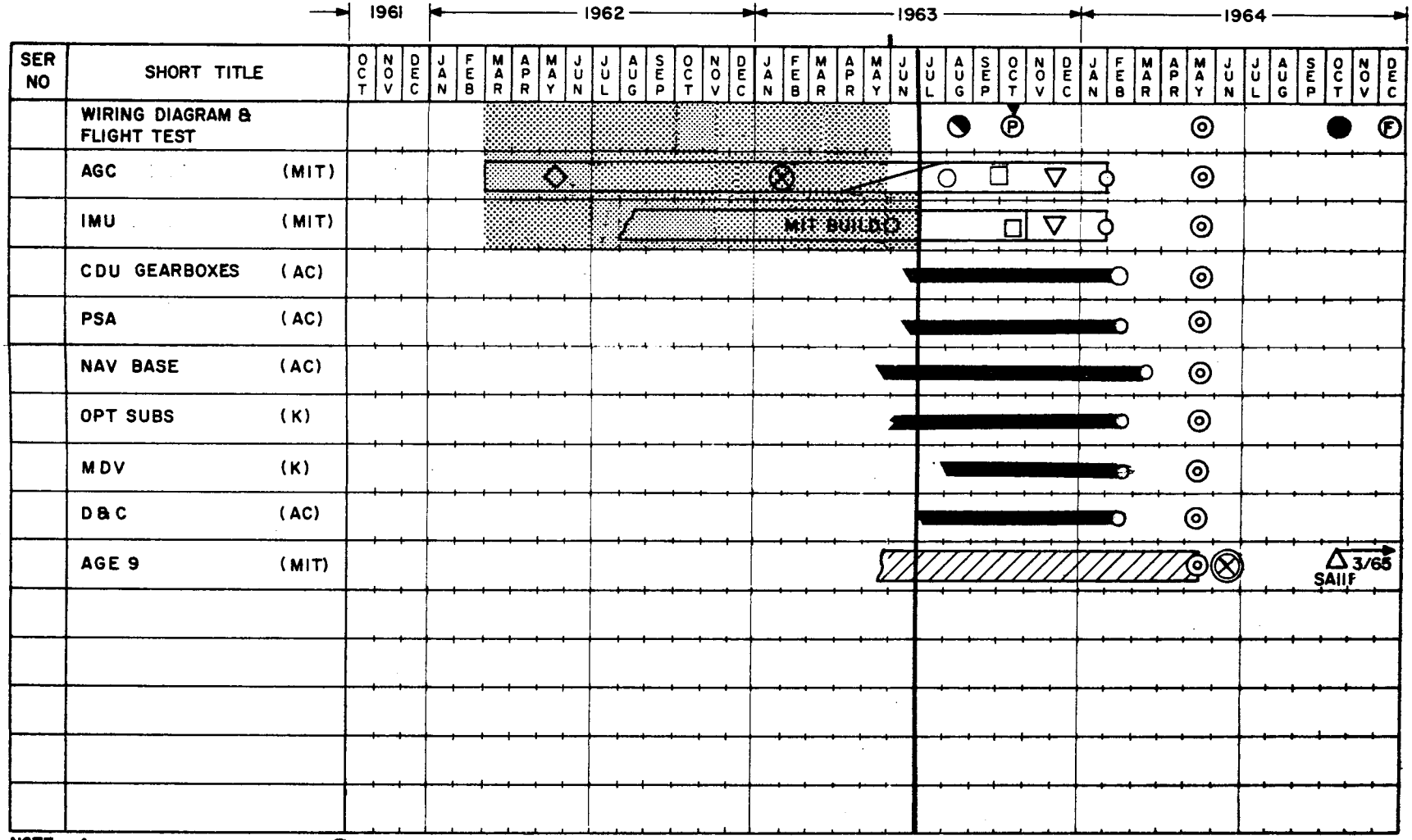


Fig. I-6

APOLLO MILESTONE CHART FOR GUIDANCE THEORY & PROGRAMMING (EARTH ORBITAL MISSION)

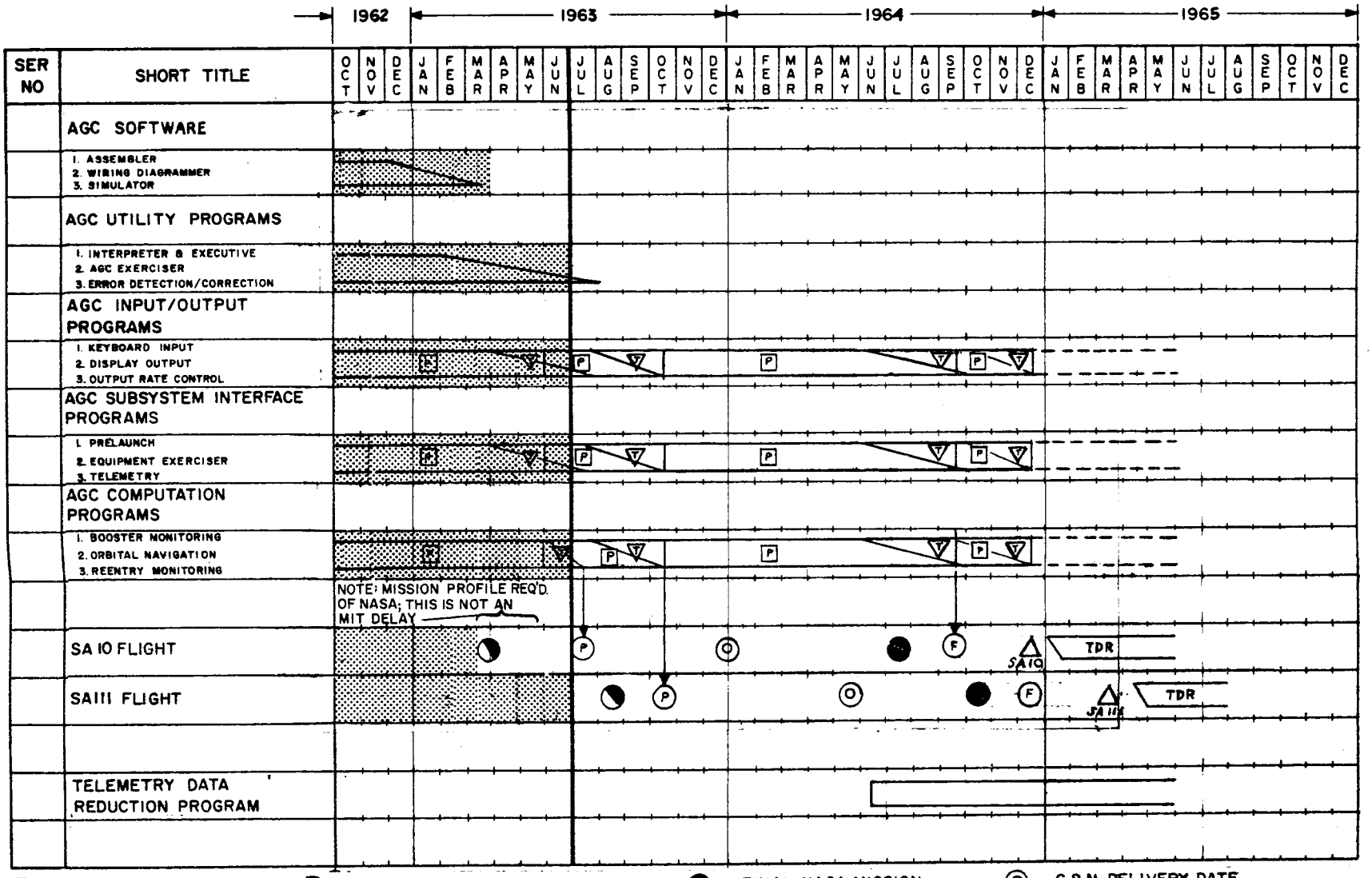


Fig. I-7

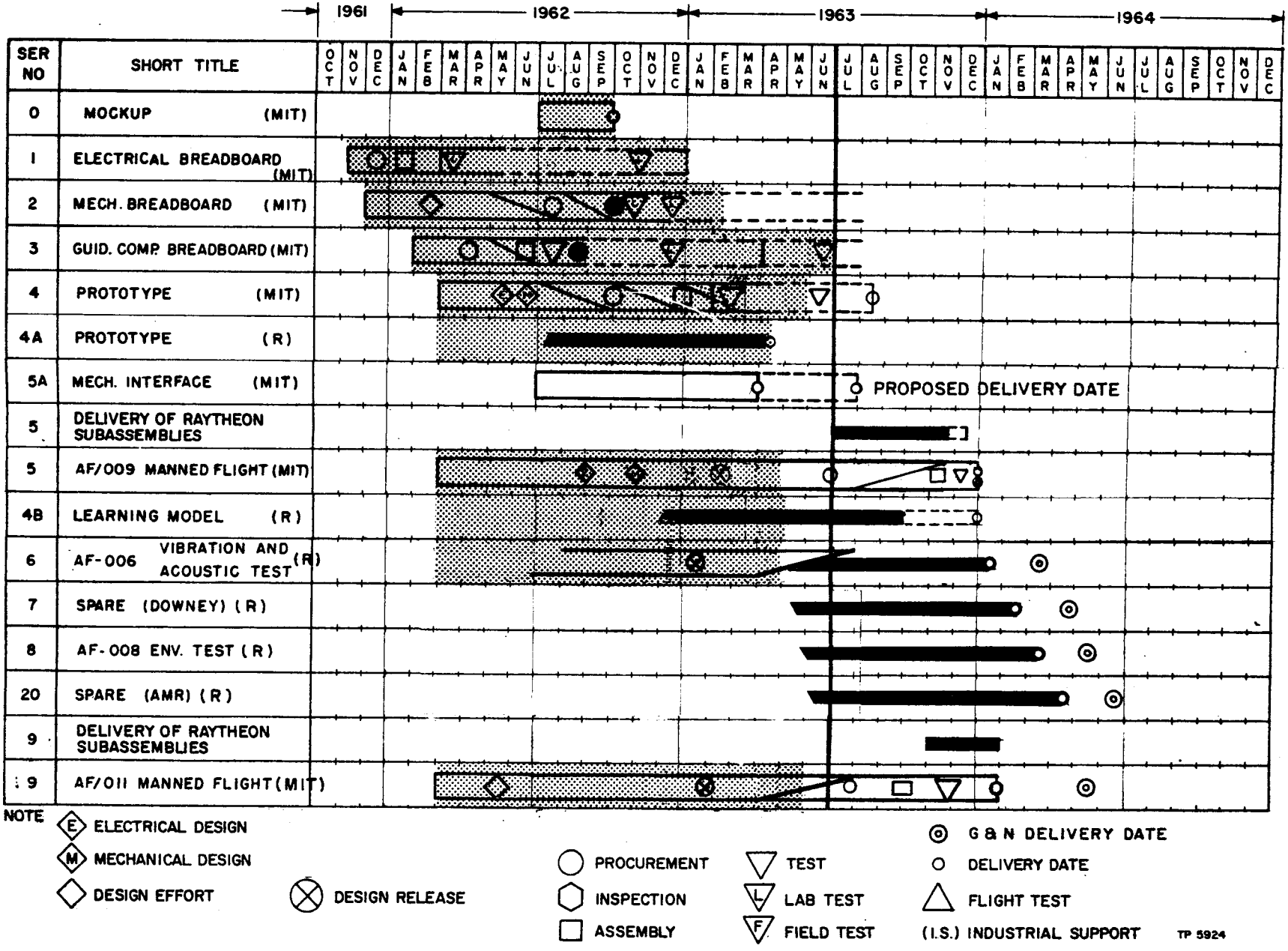

APOLLO MILESTONE CHART FOR APOLLO GUIDANCE COMPUTER (AGC)
1961
1962
1963
1964
SER NO
SHORT TITLE
0 MOCKUP (MIT)
1 ELECTRICAL BREADBOARD (MIT)
2 MECH. BREADBOARD (MIT)
3 GUID. COMP. BREADBOARD (MIT)
4 PROTOTYPE (MIT)
4A PROTOTYPE (R)
5A MECH. INTERFACE (MIT)
5 DELIVERY OF RAYTHEON SUBASSEMBLIES
5 AF/009 MANNED FLIGHT (MIT)
4B LEARNING MODEL (R)
6 AF-006 VIBRATION AND ACOUSTIC TEST (R)
7 SPARE (DOWNEY) (R)
8 AF-008 ENV. TEST (R)
20 SPARE (AMR) (R)
9 DELIVERY OF RAYTHEON SUBASSEMBLIES
9 AF/011 MANNED FLIGHT (MIT)
PROPOSED DELIVERY DATE
NOTE
E ELECTRICAL DESIGN
M MECHANICAL DESIGN
DESIGN EFFORT
DESIGN RELEASE
PROCUREMENT
INSPECTION
ASSEMBLY
TEST
L LAB TEST
F FIELD TEST
G & N DELIVERY DATE
DELIVERY DATE
FLIGHT TEST
(I.S.) INDUSTRIAL SUPPORT
TP 5924

Fig. I-8

APOLLO MILESTONE CHART FOR APOLLO GUIDANCE COMPUTER (cont.)

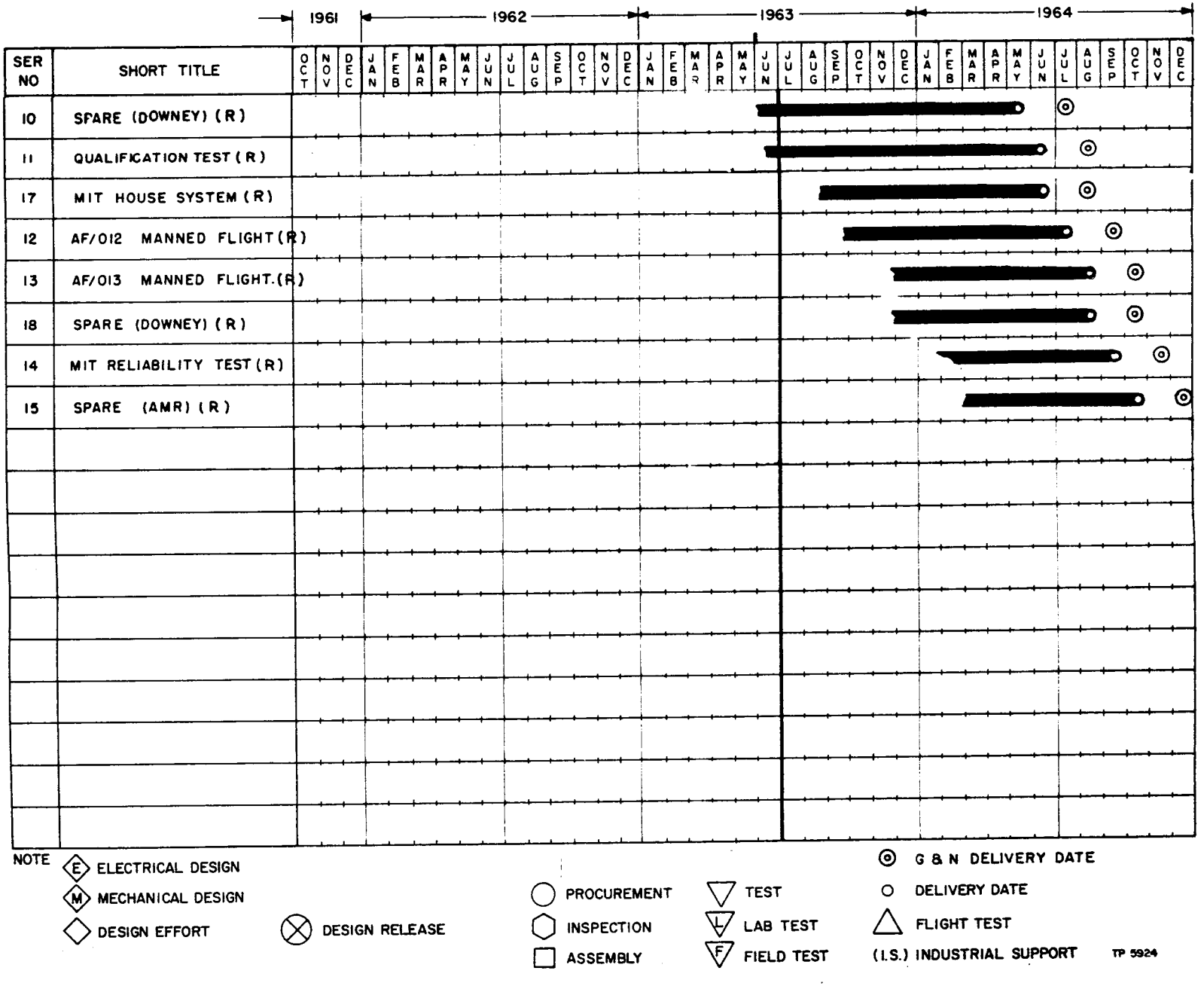


Fig. I-8 cont.

APOLLO MILESTONE CHART FOR IMU DEVELOPMENT PLAN

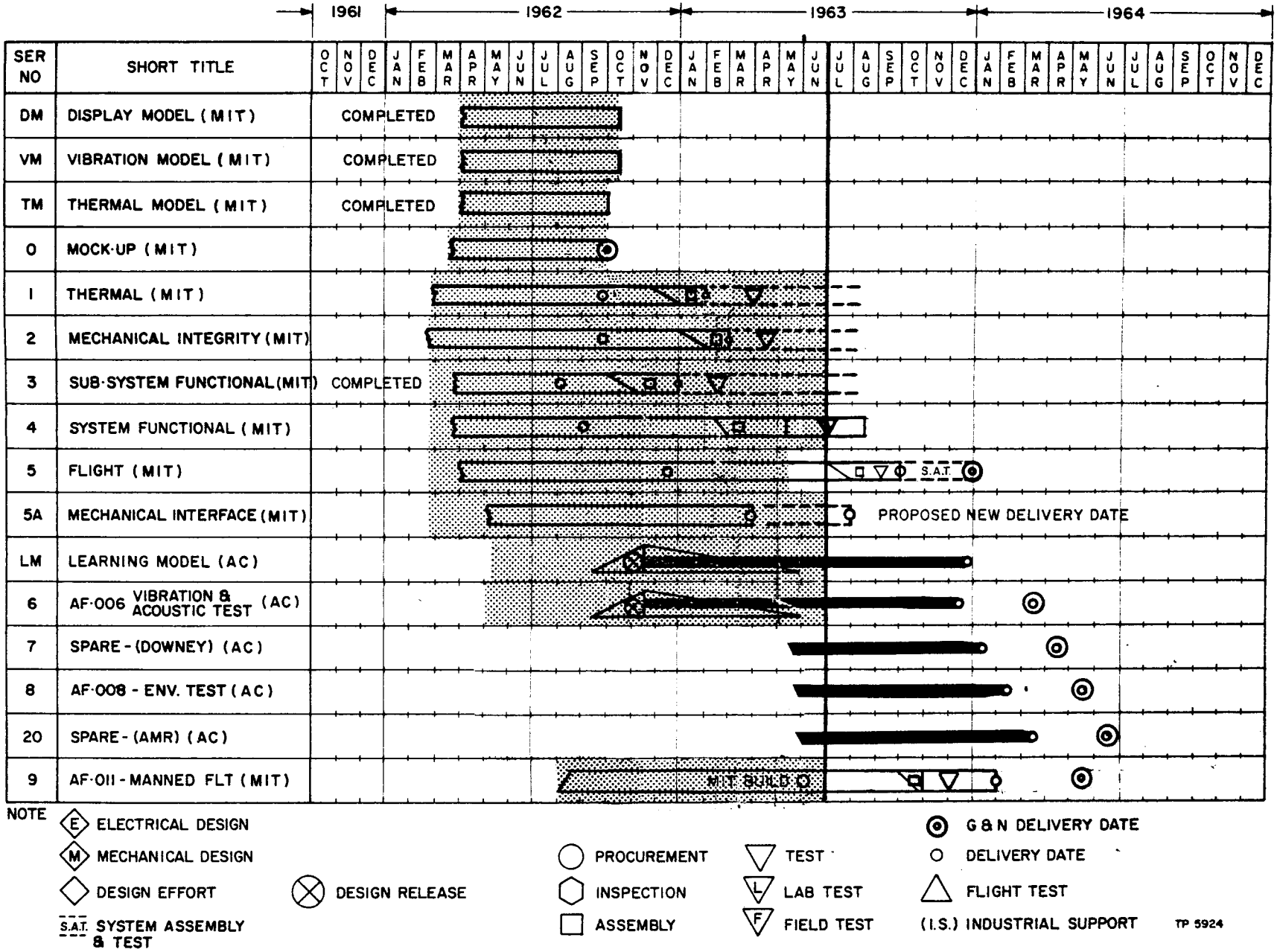


Fig. I-9

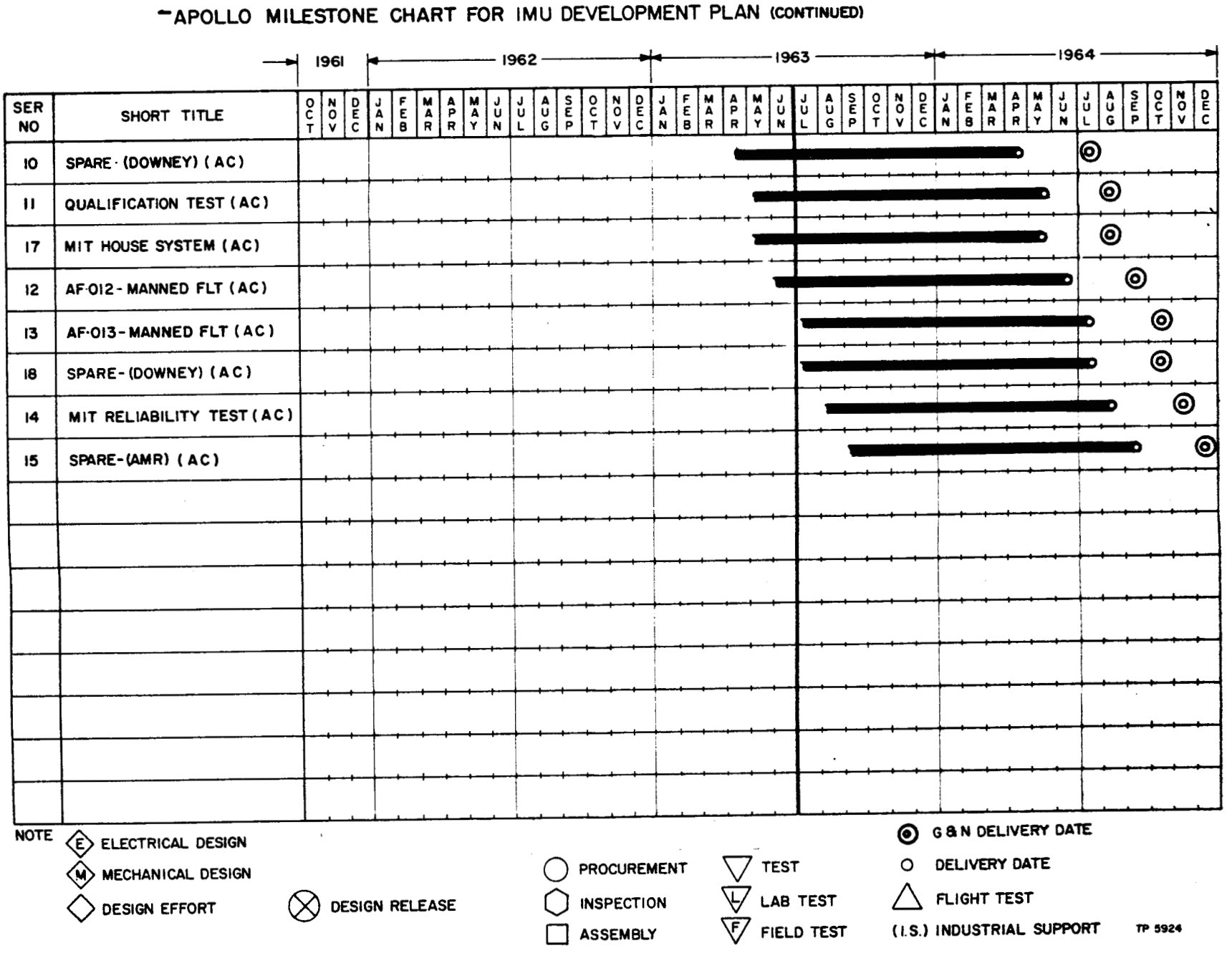

APOLLO MILESTONE CHART FOR IMU DEVELOPMENT PLAN (CONTINUED)
1961
1962
1963
1964
OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
SER NO
SHORT TITLE
10 SPARE (DOWNEY) (AC)
11 QUALIFICATION TEST (AC)
17 MIT HOUSE SYSTEM (AC)
12 AF-012 - MANNED FLT (AC)
13 AF-013 - MANNED FLT (AC)
18 SPARE - (DOWNEY) (AC)
14 MIT RELIABILITY TEST (AC)
15 SPARE - (AMR) (AC)
NOTE
E ELECTRICAL DESIGN
M MECHANICAL DESIGN
DESIGN EFFORT
DESIGN RELEASE
PROCUREMENT
INSPECTION
ASSEMBLY
TEST
L LAB TEST
F FIELD TEST
G & N DELIVERY DATE
DELIVERY DATE
FLIGHT TEST
(I.S.) INDUSTRIAL SUPPORT
TP 5924

Fig. I-9 cont.

APOLLO MILESTONE CHART FOR POWER AND SERVO ASSEMBLY (PSA)

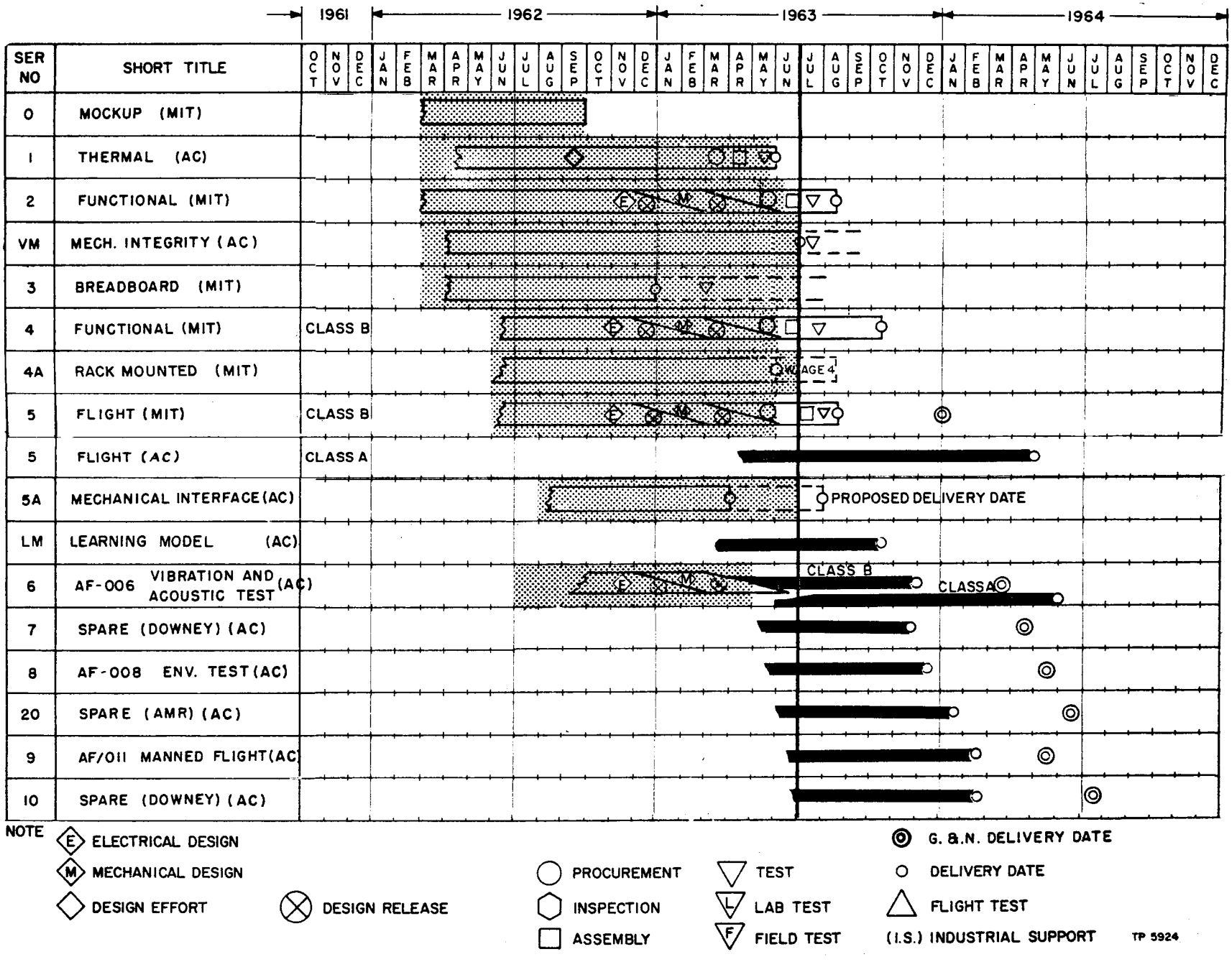


Fig. I-10

APOLLO MILESTONE CHART FOR POWER AND SERVO ASSEMBLY cont.

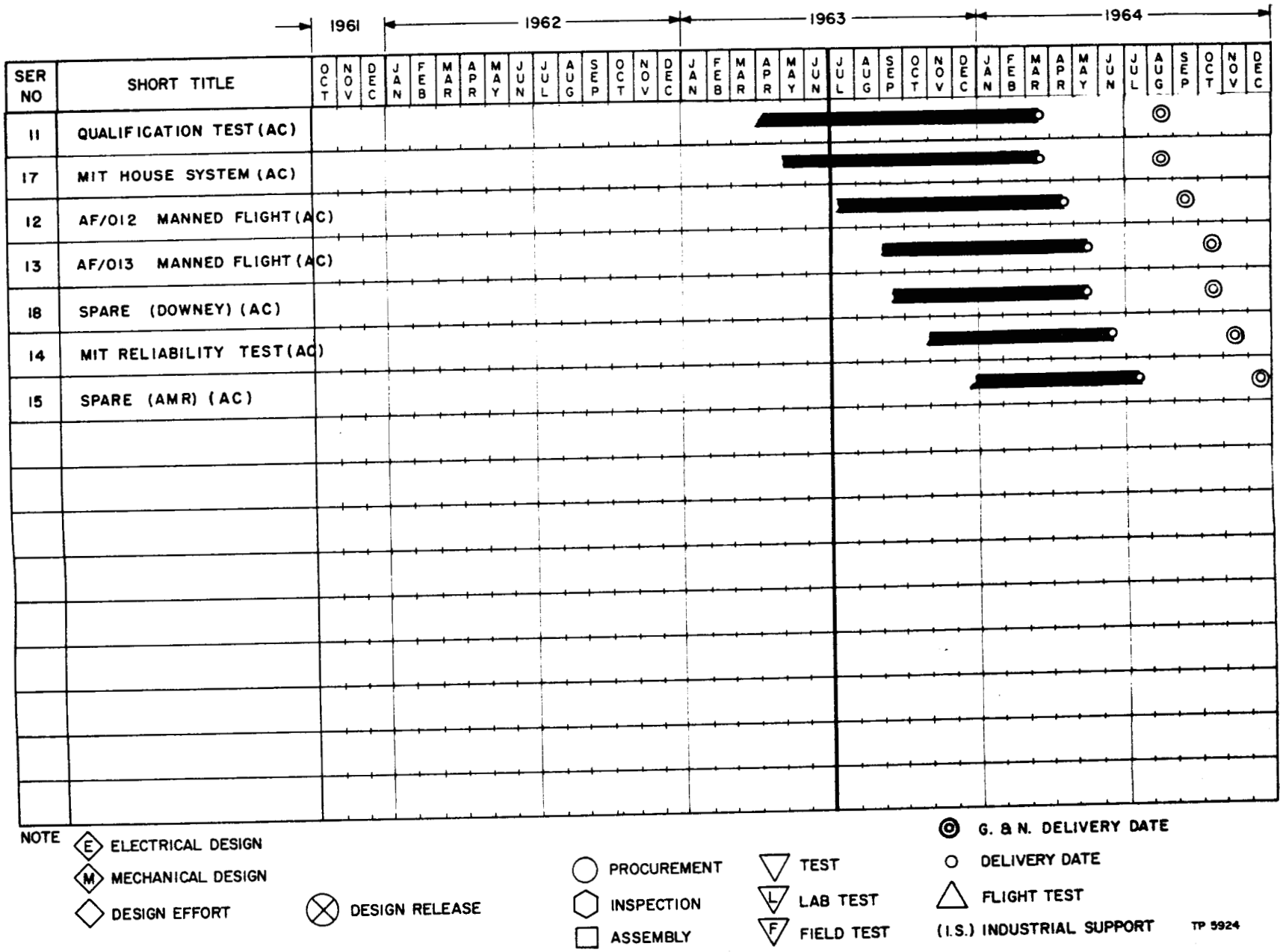


Fig. I-10 cont.

APOLLO MILESTONE CHART FOR CDU GEARBOXES

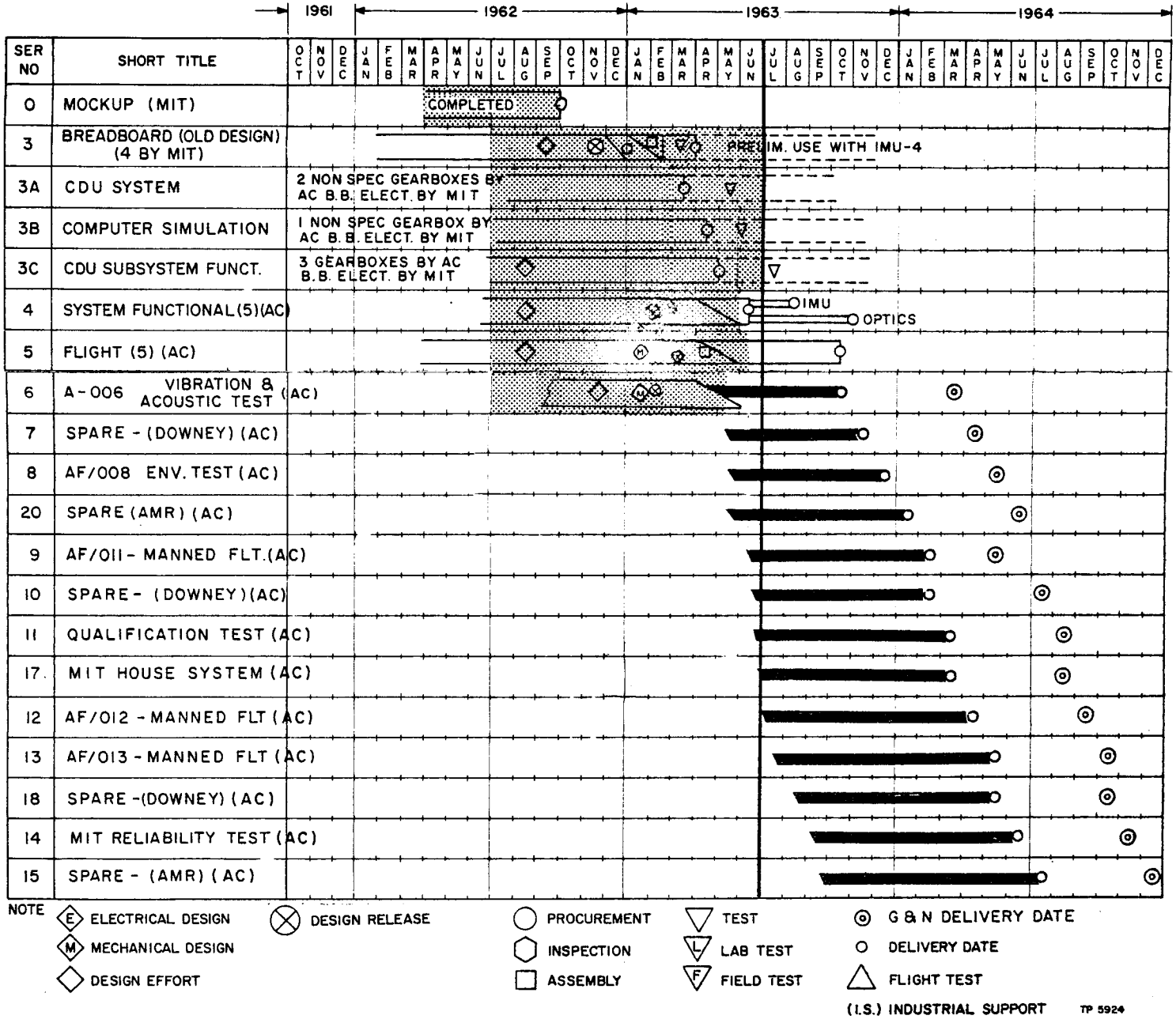


Fig. I-11

APOLLO MILESTONE CHART FOR NAVIGATION BASE SUB-SYSTEM

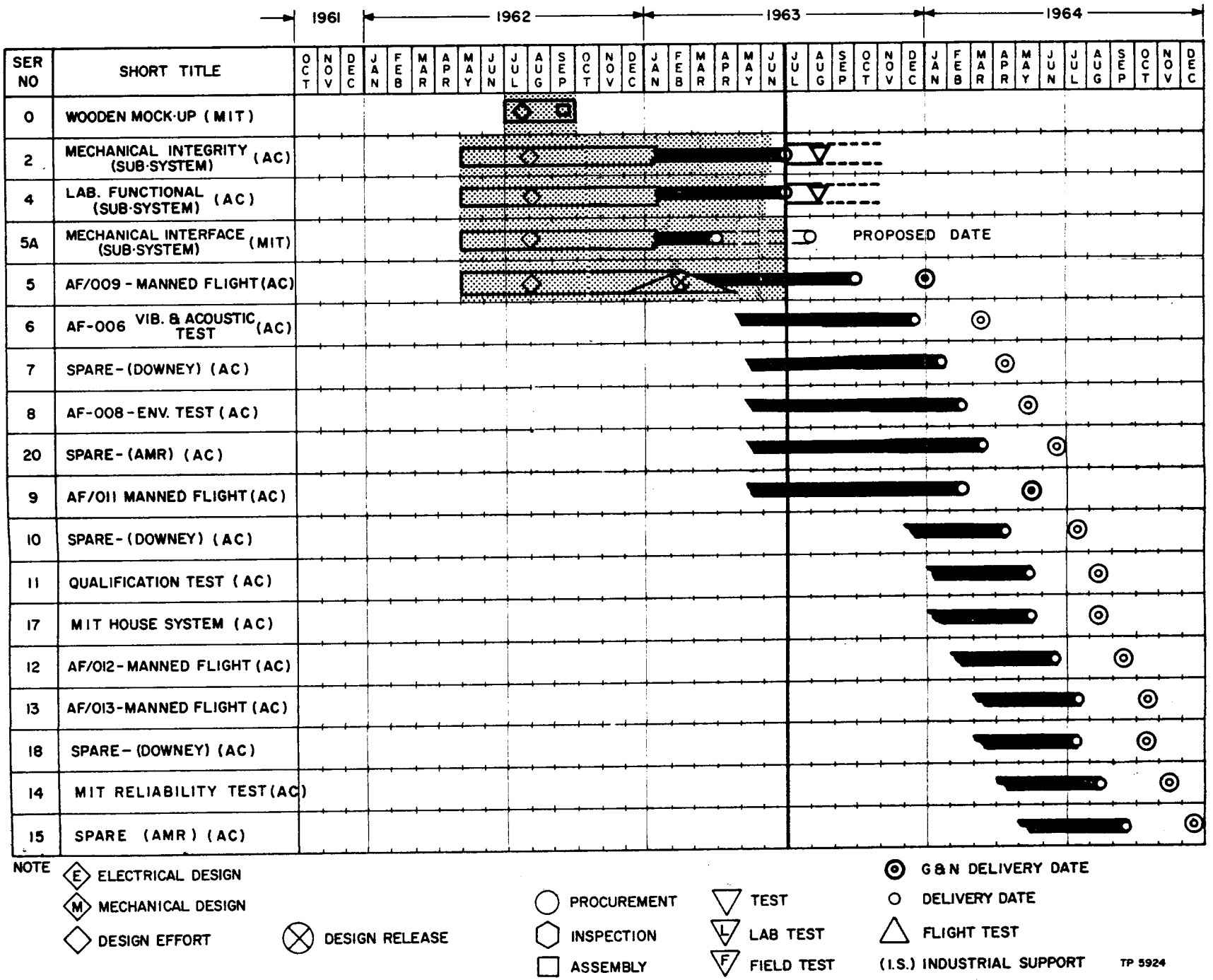


Fig. I-12

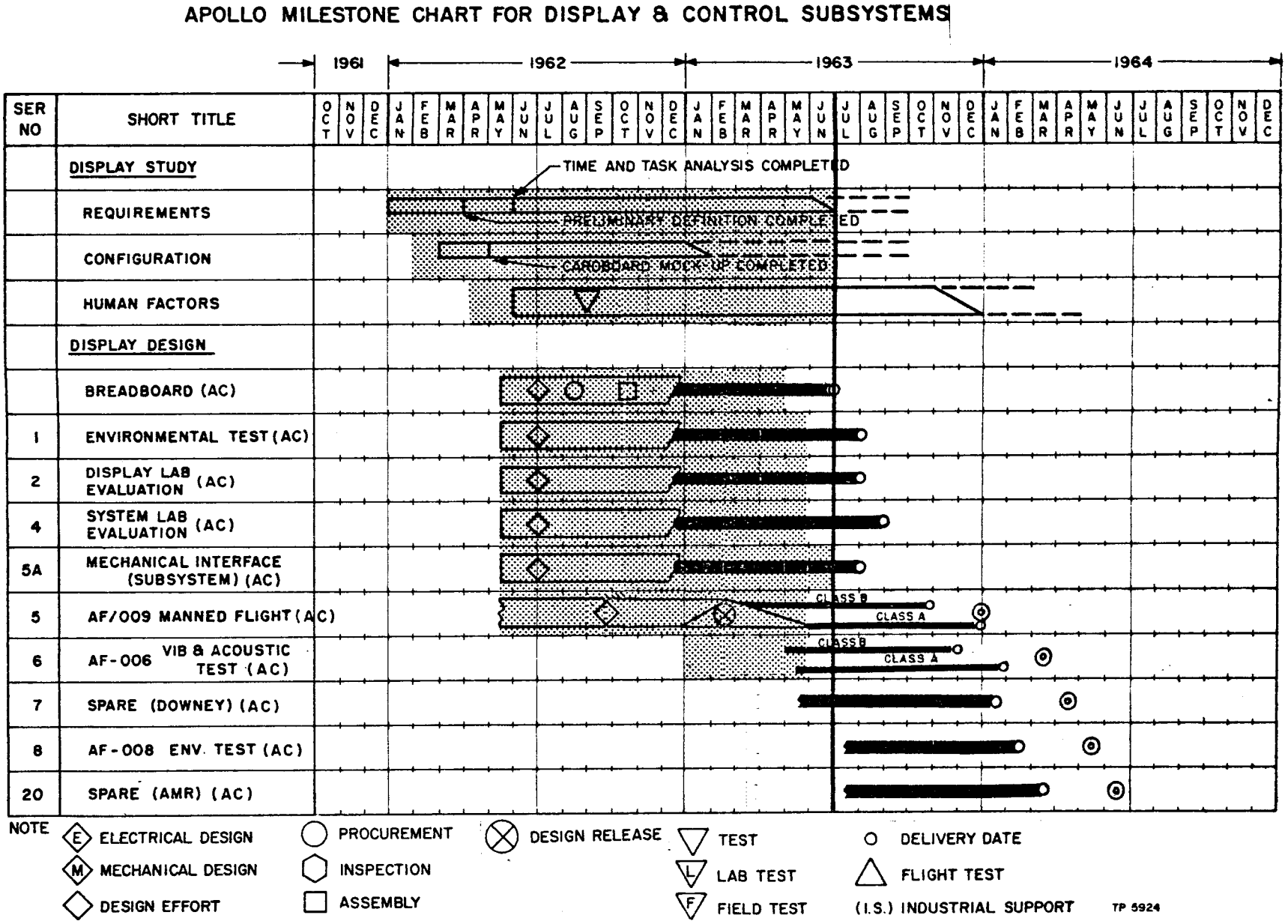

APOLLO MILESTONE CHART FOR DISPLAY & CONTROL SUBSYSTEMS
1961
1962
1963
1964
SER NO
SHORT TITLE
DISPLAY STUDY
TIME AND TASK ANALYSIS COMPLETED
REQUIREMENTS
PRELIMINARY DEFINITION COMPLETED
CONFIGURATION
CARDBOARD MOCK UP COMPLETED
HUMAN FACTORS
DISPLAY DESIGN
BREADBOARD (AC)
1 ENVIRONMENTAL TEST (AC)
2 DISPLAY LAB EVALUATION (AC)
4 SYSTEM LAB EVALUATION (AC)
5A MECHANICAL INTERFACE (SUBSYSTEM) (AC)
5 AF/009 MANNED FLIGHT (AC)
CLASS B
CLASS A
6 AF-006 VIB & ACOUSTIC TEST (AC)
CLASS B
CLASS A
7 SPARE (DOWNEY) (AC)
8 AF-008 ENV. TEST (AC)
20 SPARE (AMR) (AC)
NOTE
E ELECTRICAL DESIGN
M MECHANICAL DESIGN
DESIGN EFFORT
PROCUREMENT
INSPECTION
ASSEMBLY
DESIGN RELEASE
TEST
L LAB TEST
F FIELD TEST
DELIVERY DATE
FLIGHT TEST
(I.S.) INDUSTRIAL SUPPORT
TP 5924

Fig. I-13

APOLLO MILESTONE CHART FOR DISPLAY AND CONTROL SUBSYSTEM

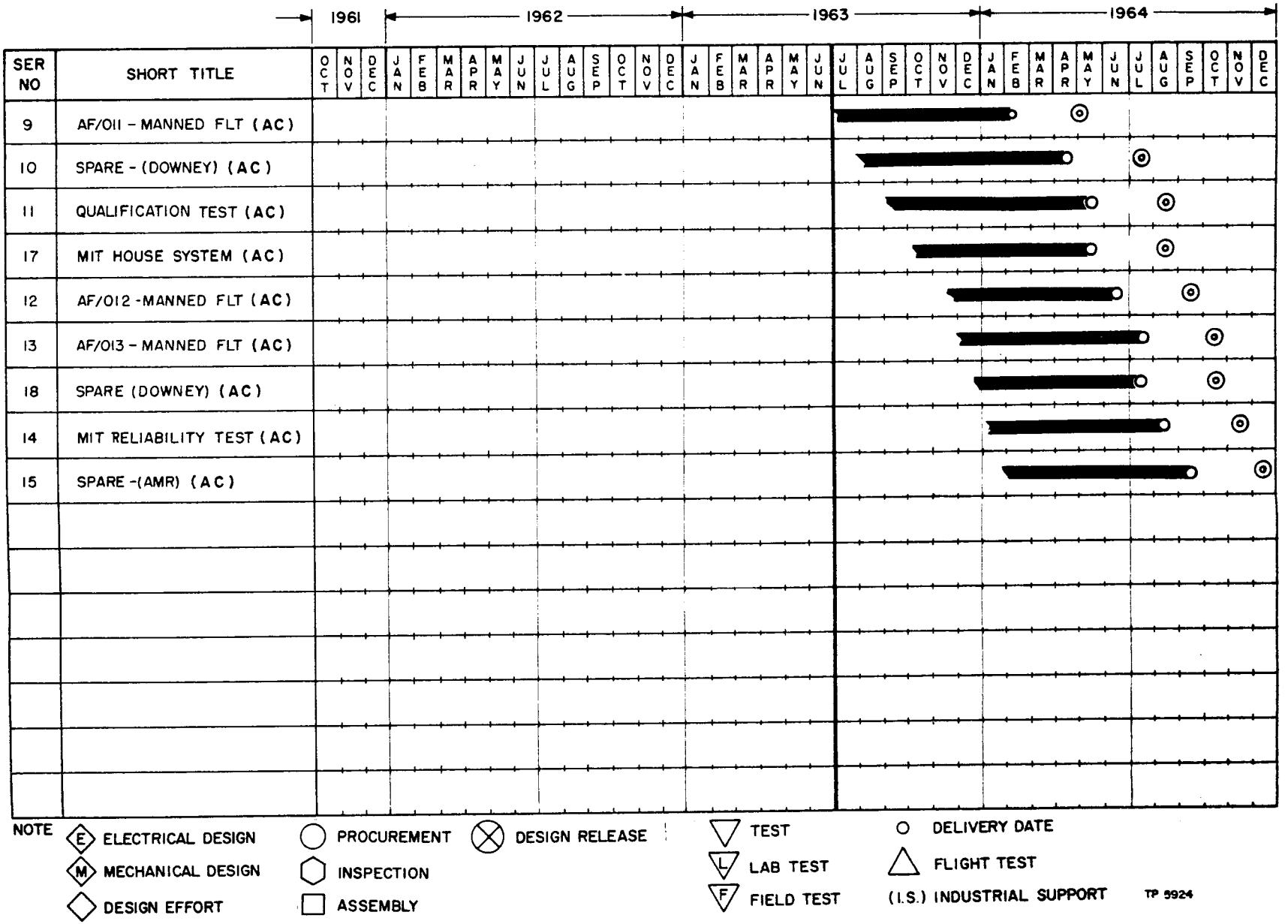


Fig. I-13 cont.

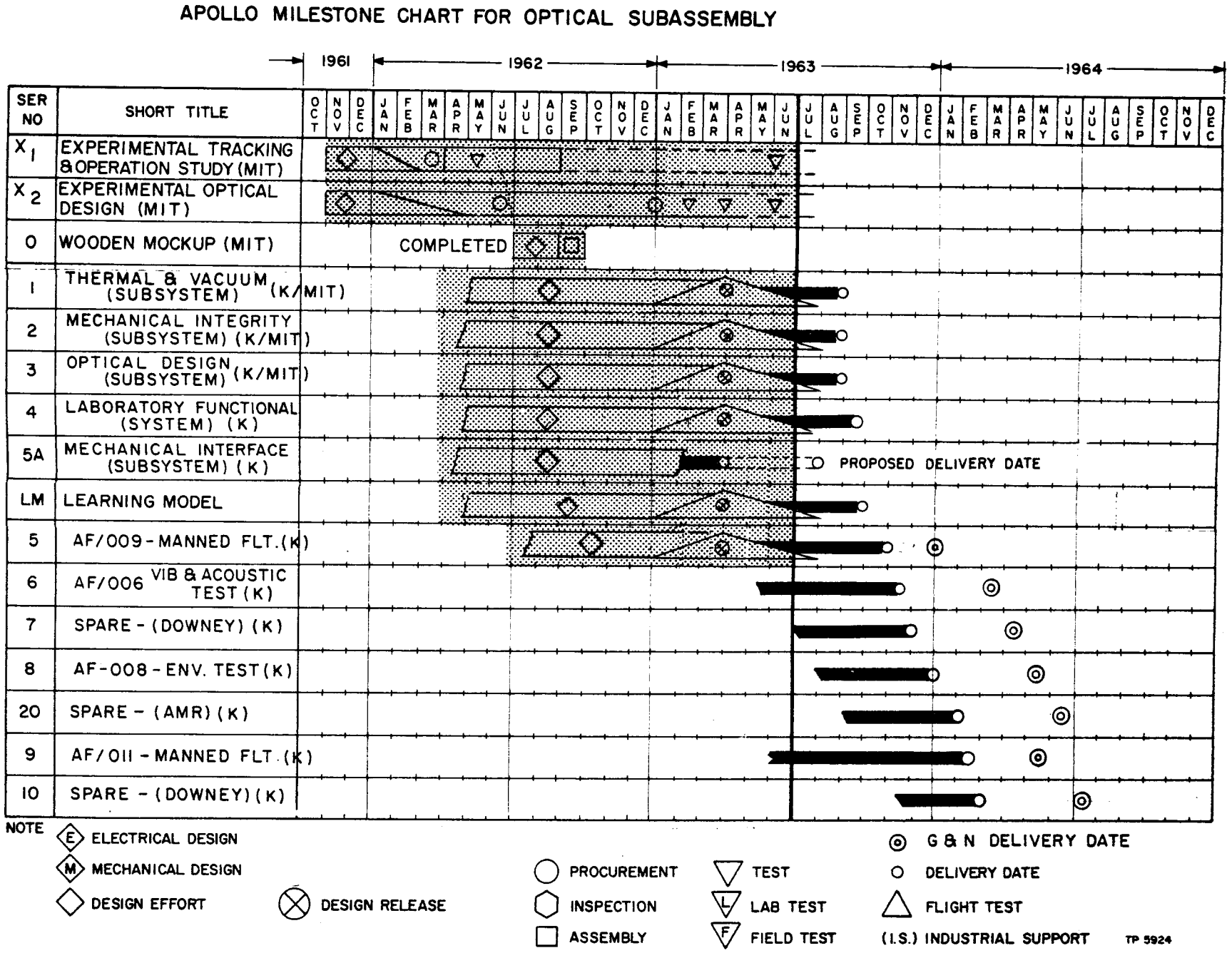

APOLLO MILESTONE CHART FOR OPTICAL SUBASSEMBLY
1961
1962
1963
1964
SER NO
SHORT TITLE
X1 EXPERIMENTAL TRACKING & OPERATION STUDY (MIT)
X2 EXPERIMENTAL OPTICAL DESIGN (MIT)
0 WOODEN MOCKUP (MIT)
COMPLETED
1 THERMAL & VACUUM (SUBSYSTEM) (K/MIT)
2 MECHANICAL INTEGRITY (SUBSYSTEM) (K/MIT)
3 OPTICAL DESIGN (SUBSYSTEM) (K/MIT)
4 LABORATORY FUNCTIONAL (SYSTEM) (K)
5A MECHANICAL INTERFACE (SUBSYSTEM) (K)
PROPOSED DELIVERY DATE
LM LEARNING MODEL
5 AF/009 - MANNED FLT. (K)
6 AF/006 VIB & ACOUSTIC TEST (K)
7 SPARE - (DOWNEY) (K)
8 AF-008 - ENV. TEST (K)
20 SPARE - (AMR) (K)
9 AF/011 - MANNED FLT. (K)
10 SPARE - (DOWNEY) (K)
NOTE
E ELECTRICAL DESIGN
M MECHANICAL DESIGN
DESIGN EFFORT
DESIGN RELEASE
PROCUREMENT
INSPECTION
ASSEMBLY
TEST
L LAB TEST
F FIELD TEST
G & N DELIVERY DATE
DELIVERY DATE
FLIGHT TEST
(I.S.) INDUSTRIAL SUPPORT
TP 5924

Fig. I-14

APOLLO MILESTONE CHART FOR OPTICAL SUBASSEMBLY (CON'T.)

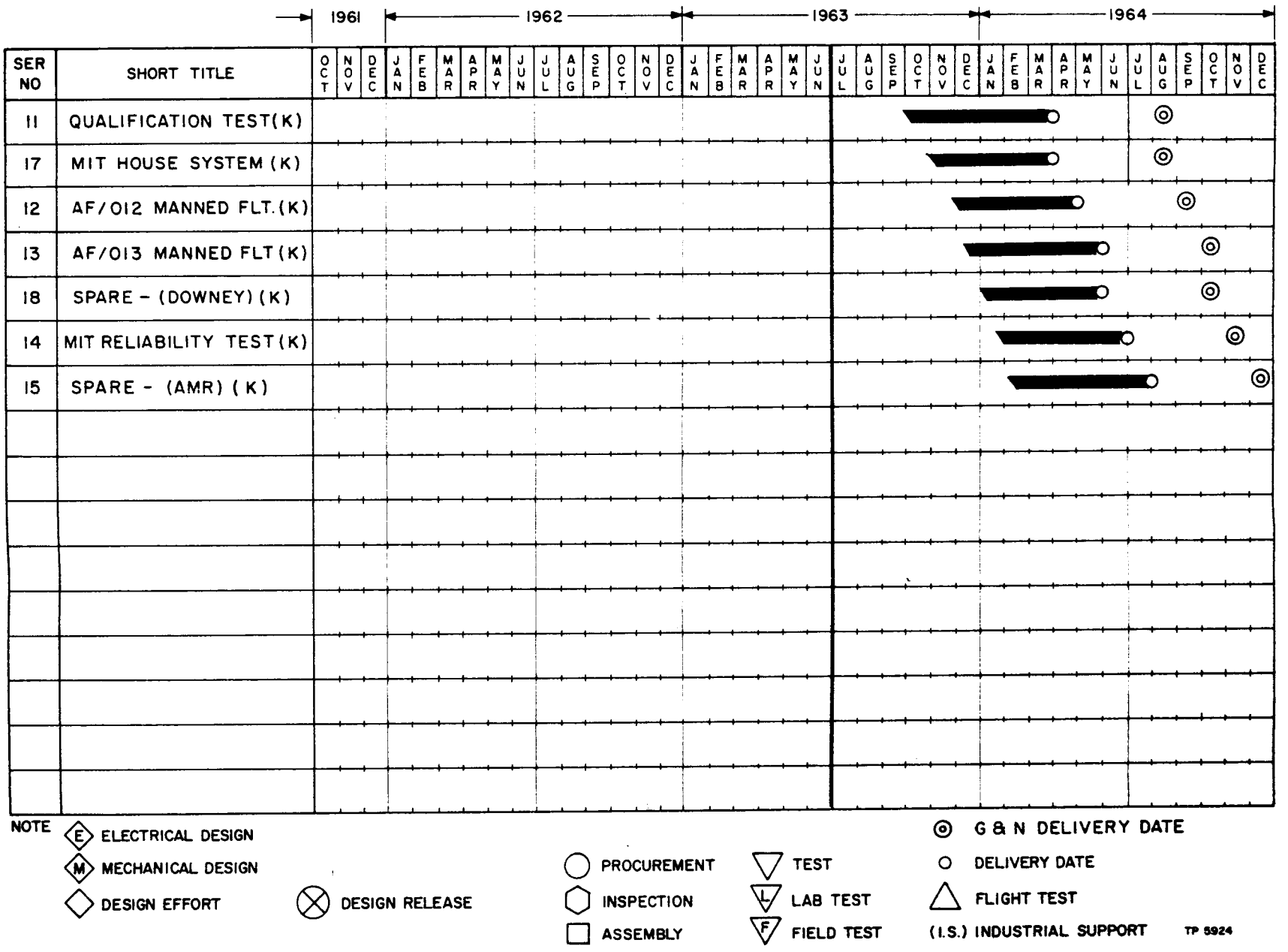


Fig. I-14 cont.

APOLLO MILESTONE CHART FOR MAP AND DATA VIEWER SYSTEM

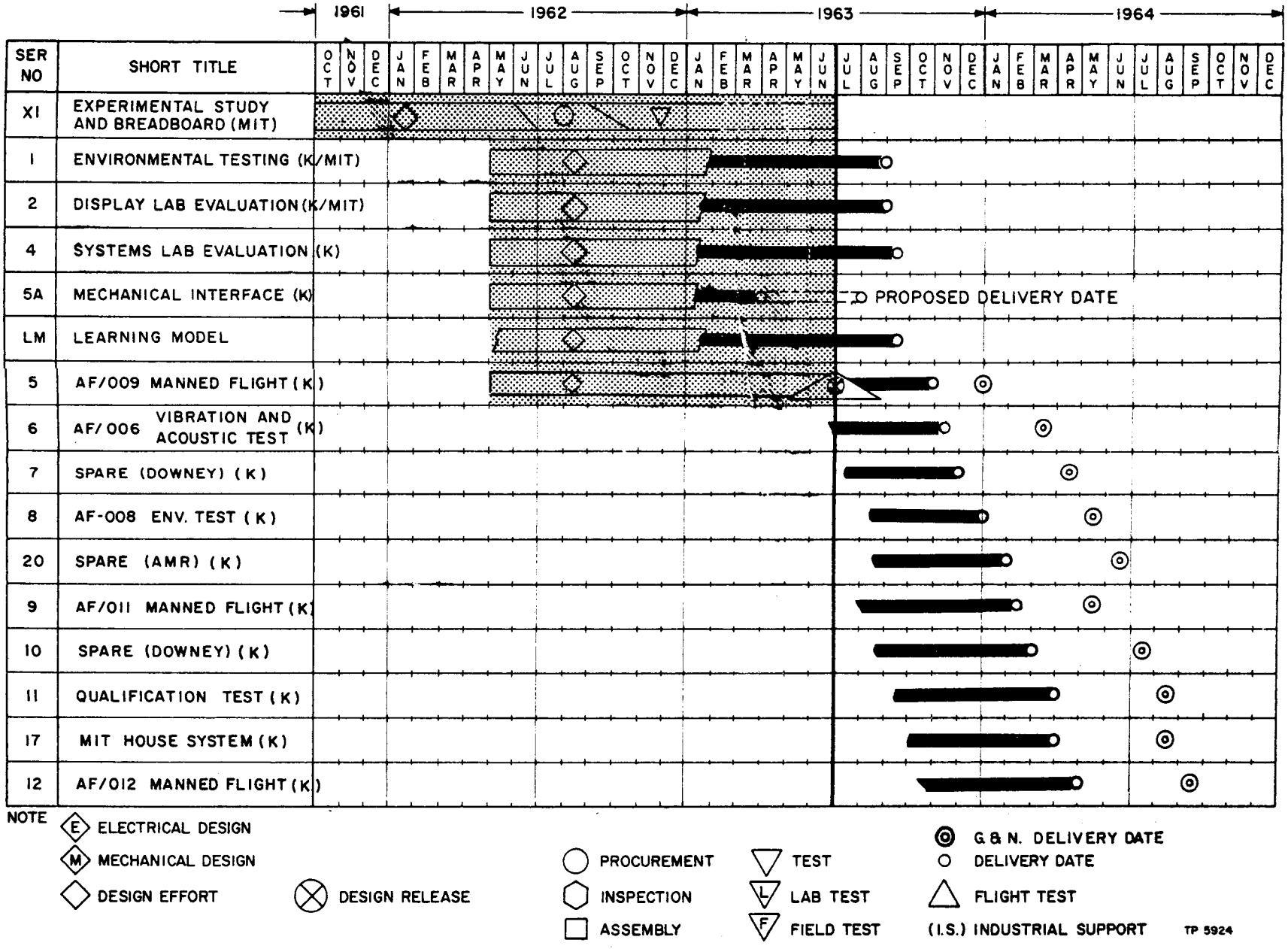


Fig. I-15

APOLLO MILESTONE CHART FOR MAP AND DATA VIEWER SYSTEM (cont.)

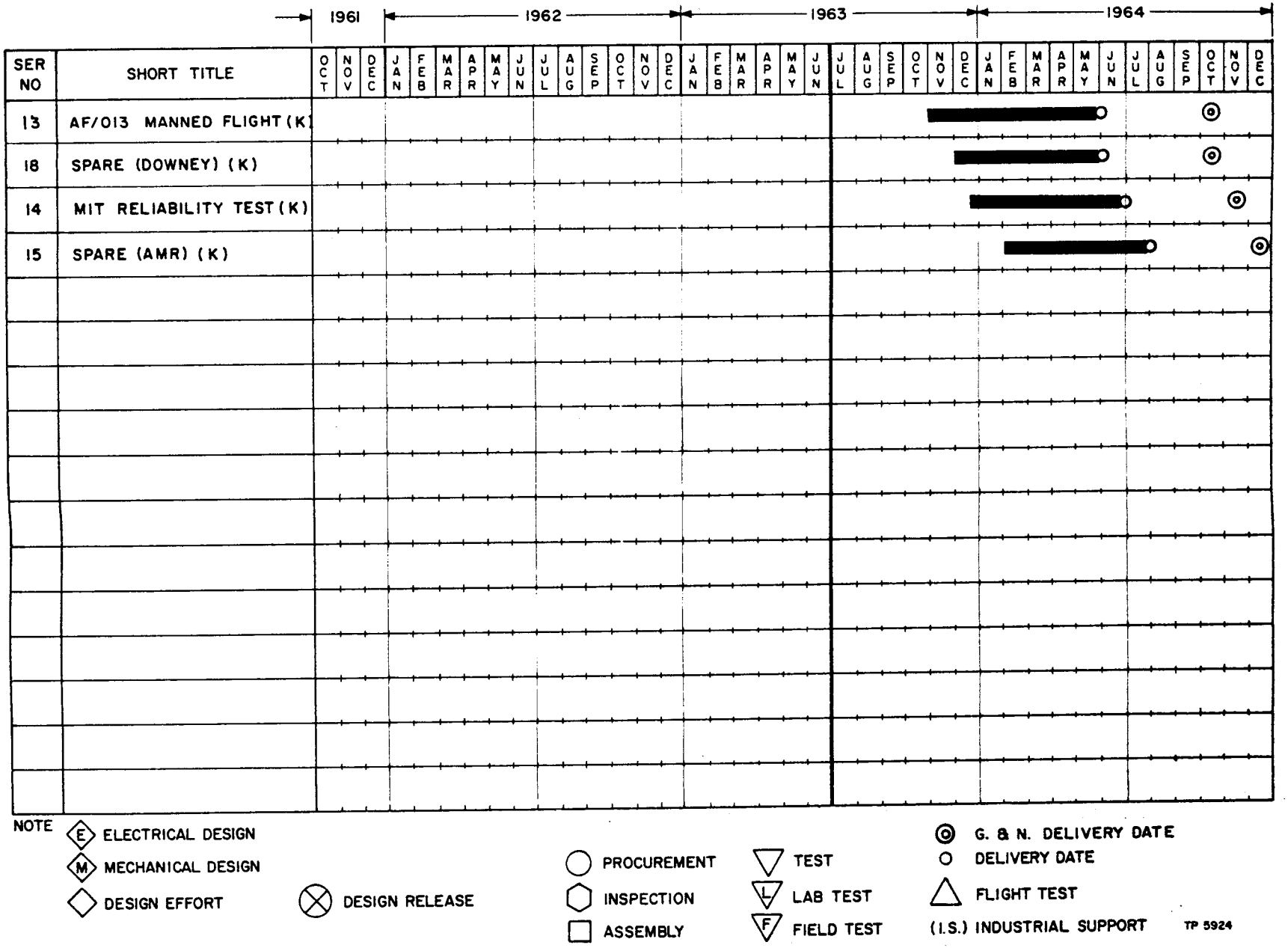
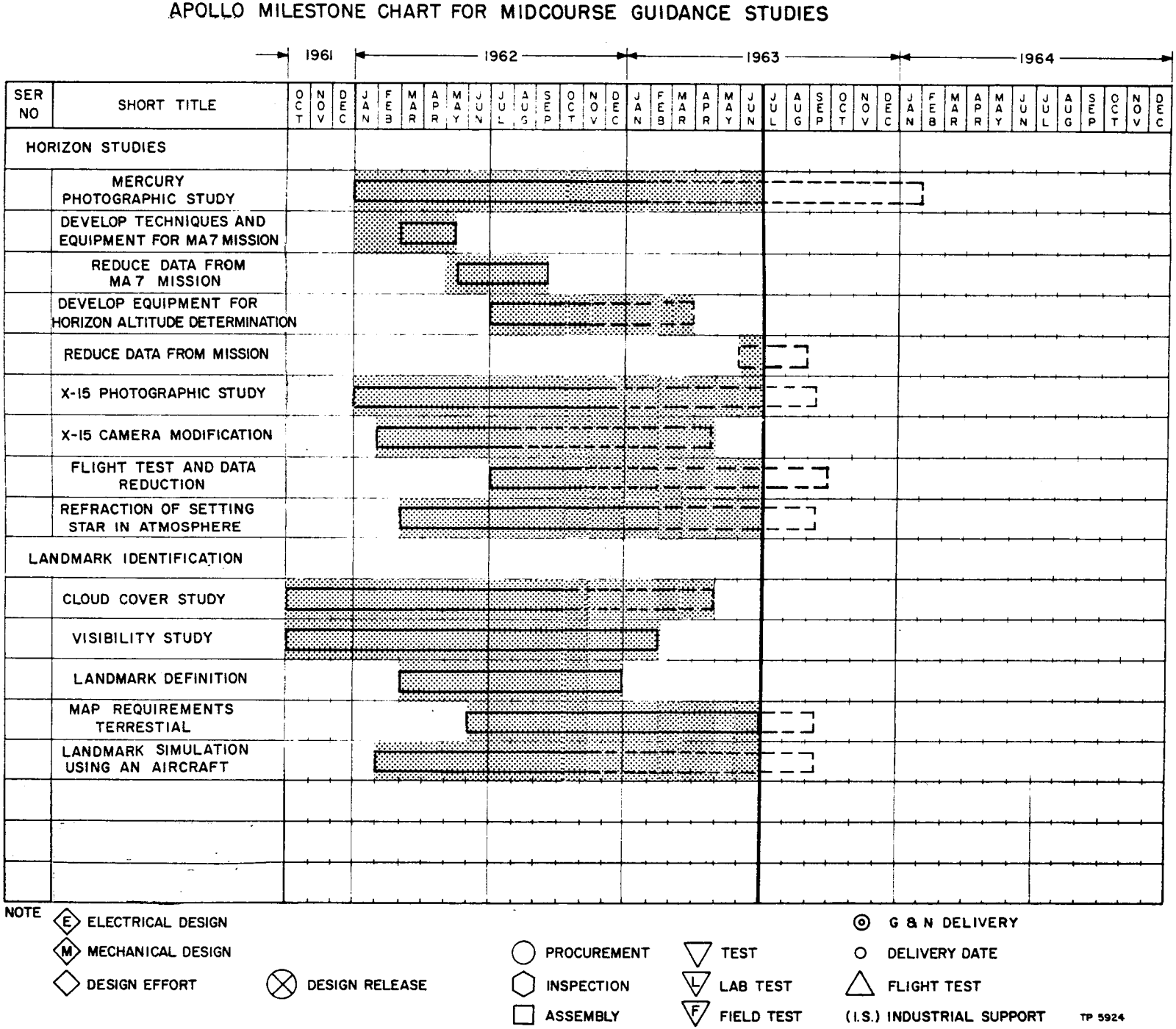


Fig. I-15 cont.


APOLLO MILESTONE CHART FOR MIDCOURSE GUIDANCE STUDIES
1961
1962
1963
1964
SER NO
SHORT TITLE
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MERCURY PHOTOGRAPHIC STUDY
DEVELOP TECHNIQUES AND EQUIPMENT FOR MA7 MISSION
REDUCE DATA FROM MA 7 MISSION
DEVELOP EQUIPMENT FOR HORIZON ALTITUDE DETERMINATION
REDUCE DATA FROM MISSION
X-15 PHOTOGRAPHIC STUDY
X-15 CAMERA MODIFICATION
FLIGHT TEST AND DATA REDUCTION
REFRACTION OF SETTING STAR IN ATMOSPHERE
LANDMARK IDENTIFICATION
CLOUD COVER STUDY
VISIBILITY STUDY
LANDMARK DEFINITION
MAP REQUIREMENTS TERRESTIAL
LANDMARK SIMULATION USING AN AIRCRAFT
NOTE
E ELECTRICAL DESIGN
M MECHANICAL DESIGN
DESIGN EFFORT
DESIGN RELEASE
PROCUREMENT
INSPECTION
ASSEMBLY
TEST
L LAB TEST
F FIELD TEST
G & N DELIVERY
DELIVERY DATE
FLIGHT TEST
(I.S.) INDUSTRIAL SUPPORT
TP 5924

Fig. I-16

APOLLO MILESTONE CHART FOR MIDCOURSE GUIDANCE STUDIES (cont.)

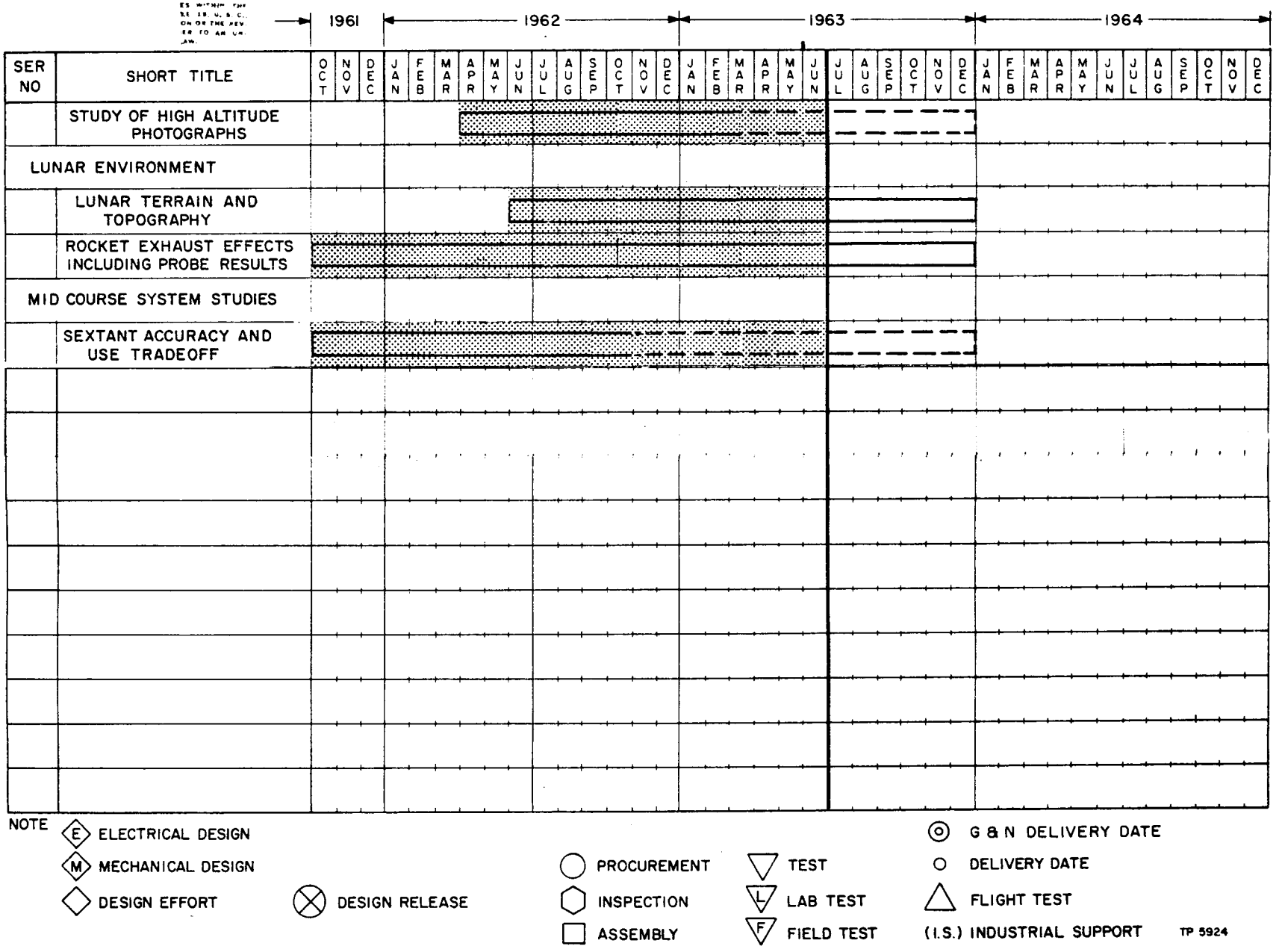
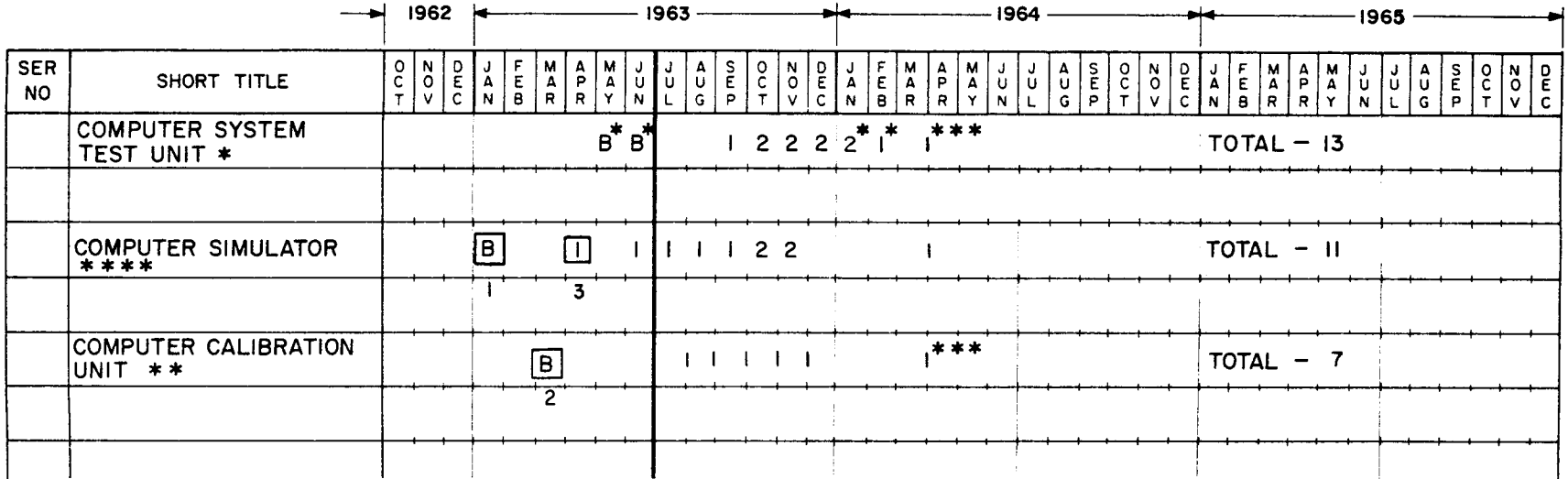


Fig. I-16 cont.

APOLLO MILESTONE CHART FOR SCHEDULE FOR RAYTHEON GSE



* NASA LETTER SGC DATE 1/28/63 TO MIT.

ALLOCATION OF COMPUTER TEST SETS:

	COMPUTER SIMULATOR	
B - 5/24/63 TO MIT	**** TENTATIVE ALLOCATION:	
B - 6/21/63 TO RAYTHEON	B - 1/15/63 TO MIT	
1 - 9/27/63 TO MIT	1 - 4/15/63 TO MIT	
1 - 10/10/63 TO RAYTHEON	1 - 6/15/63 TO MIT	COMPUTER CALIBRATION UNIT
1 - 10/30/63 TO RAYTHEON	1 - 7/15/63 TO ACSP	** ALLOCATION:
1 - 11/15/63 TO ACSP	1 - 8/15/63 TO ACSP	B - 3/15/63 TO MIT
1 - 11/30/63 TO MIT/ACSP/AMR	1 - 9/15/63 TO ACSP	1 - 8/1/63 TO MIT
1 - 12/15/63 TO ACSP	1 - 10/15/63 TO ACSP	1 - 9/1/63 TO NAA
1 - 12/30/63 TO ACSP/NAA	1 - 10/15/63 TO NAA	1 - 10/1/63 TO ACSP
1 1/15/64 TO ACSP	1 - 11/15/63 TO NAA	1 - 11/1/63 TO AMR
1 1/30/64 TO ACSP/NAA	1 - 11/15/63 TO AMR	1 - 12/1/63 TO NASA
1 2/15/64 TO ACSP/AMR	1 - 4/1/64 TO MSC	1 - 4/1/63 TO MSC
1 4/1/64 TO MSC		

B/1 DELIVERED TO MIT 12/28/62

B/2 DELIVERED TO MIT 4/26/63

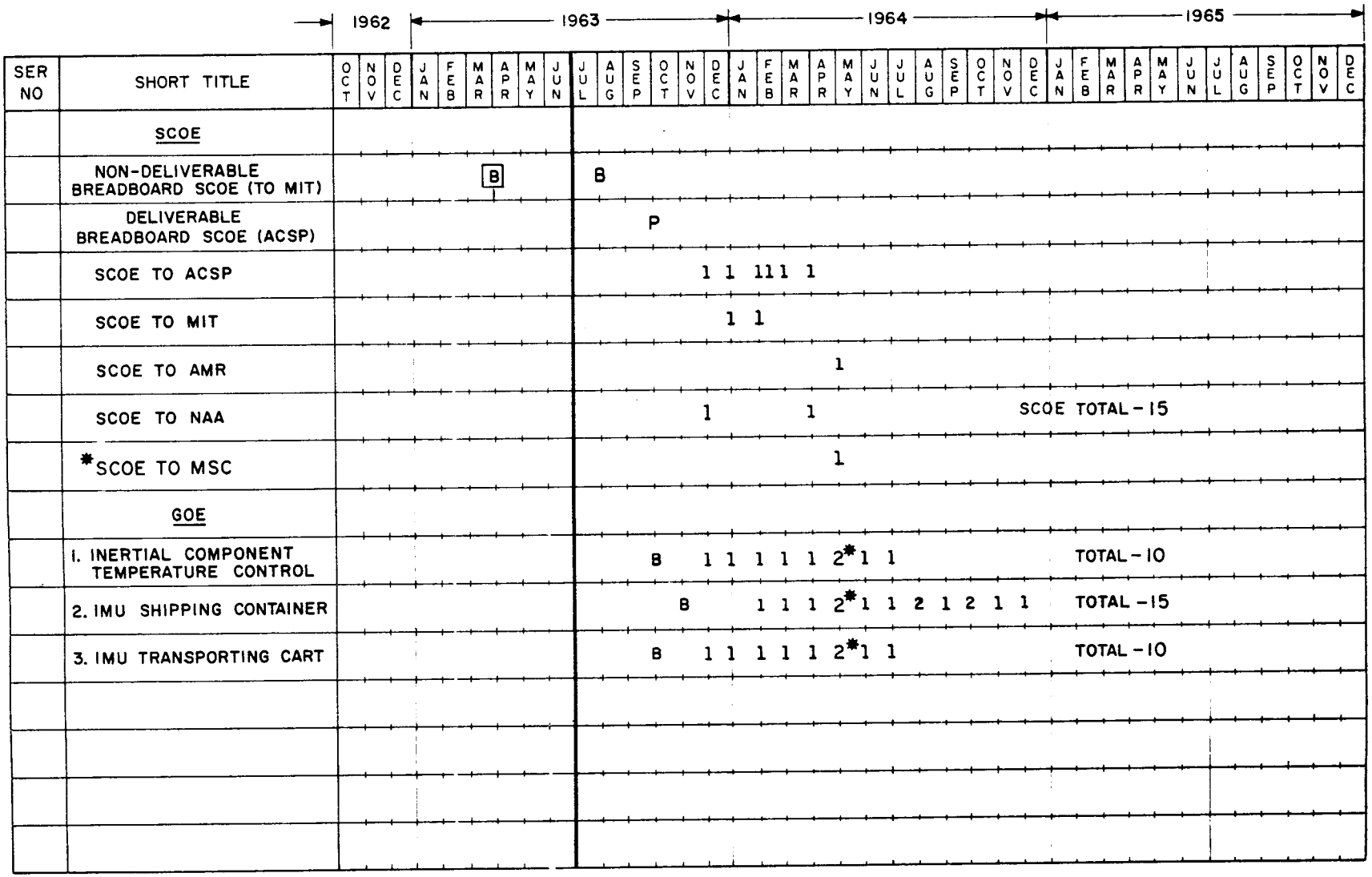
I/3 DELIVERED TO MIT 6/28/63

** MIT T.D. R-86 DATED 8 APRIL 1963

*** NASA TWX SGC-4-233, DATED 11 APRIL 1963, PARAGRAPH 3H.

Fig. I-17

5.9 APOLLO MILESTONE CHART FOR AC SPARK PLUG GSE

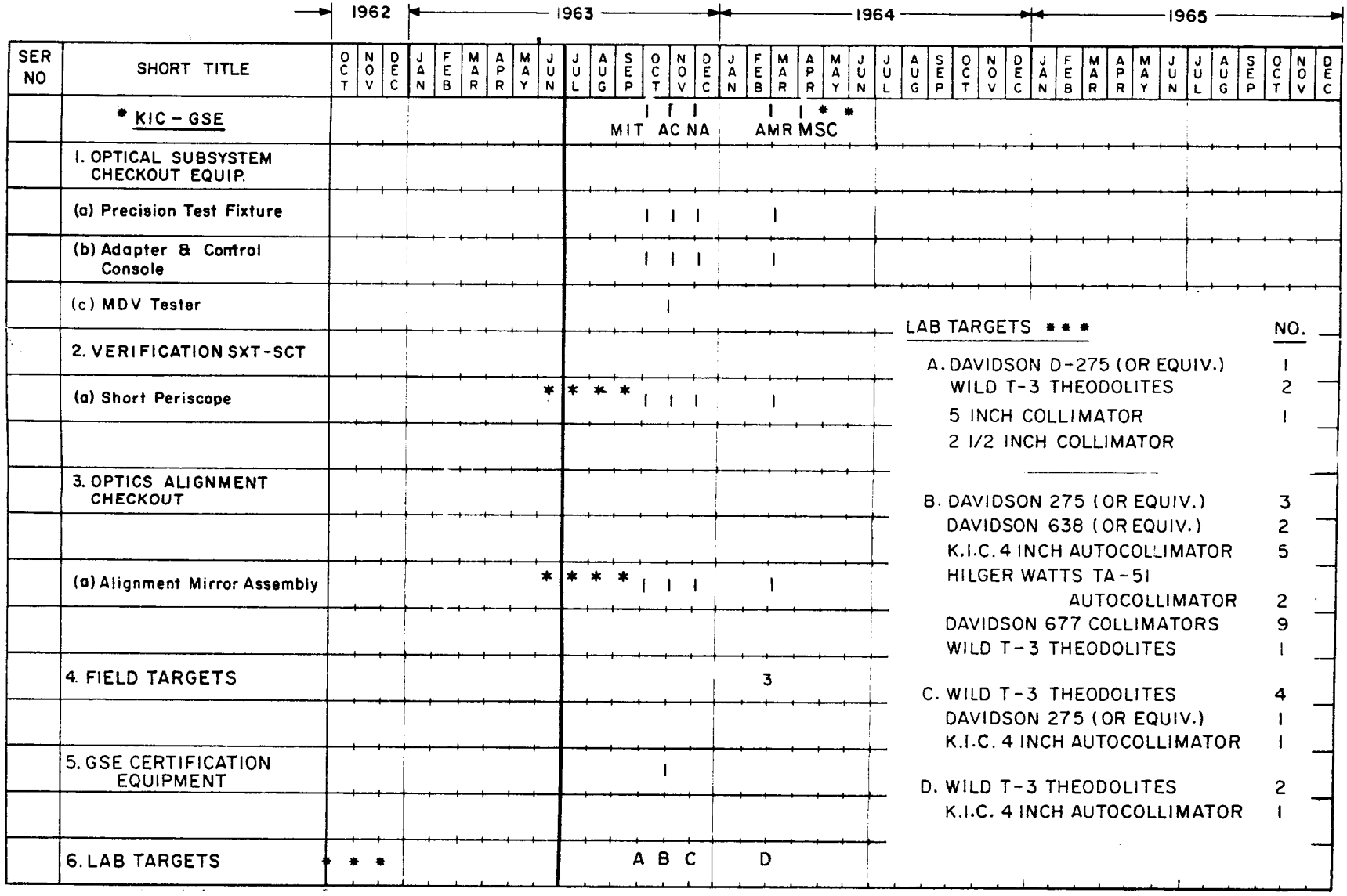


* NASA TWX SGC-4-233 DATED 11 APRIL, PARAGRAPH 2F

[B] DELIVERED TO MIT 12 MARCH 1963

Fig. I-18

APOLLO MILESTONE CHART FOR KOLLSMAN INSTRUMENT CORP. GSE



* K.I.C. STATEMENT OF WORK SGC - 100 - 133, DATED 11 MARCH, 1963 **** TD K-75

* * NASA TWX SGC 4 - 233, DATED 11 APRIL 1963, PARAGRAPH 4
ONE SET OF OPTICAL GSE REQUIRED AT MSC BY 1 APRIL 1964.

Fig. I-19

APOLLO MILESTONE CHART FOR PIP REQUIREMENTS & DELIVERY SCHEDULES

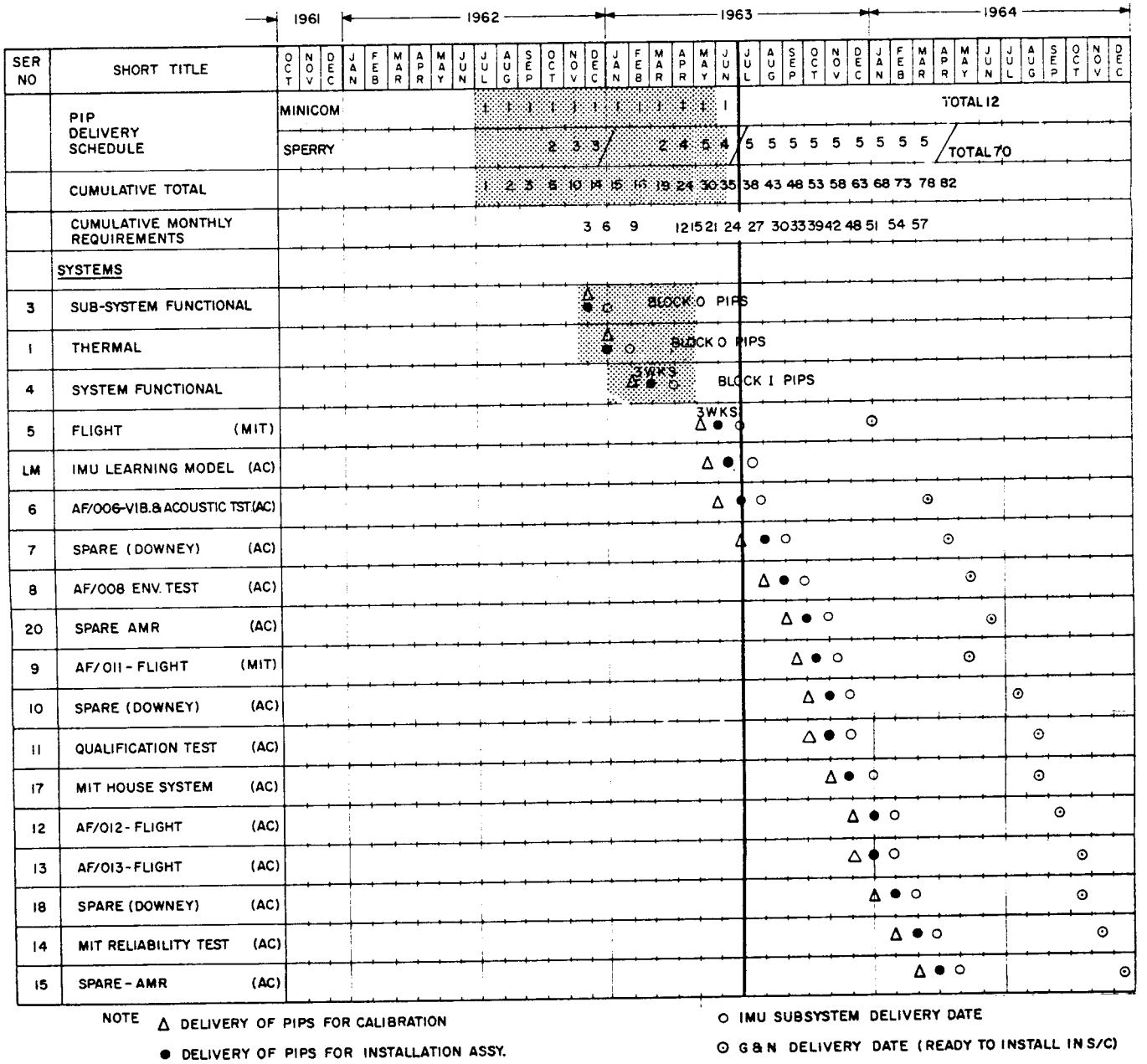


Fig. I-20

APOLLO MILESTONE CHART FOR IRIG REQUIREMENTS AND DELIVERY SCHEDULES

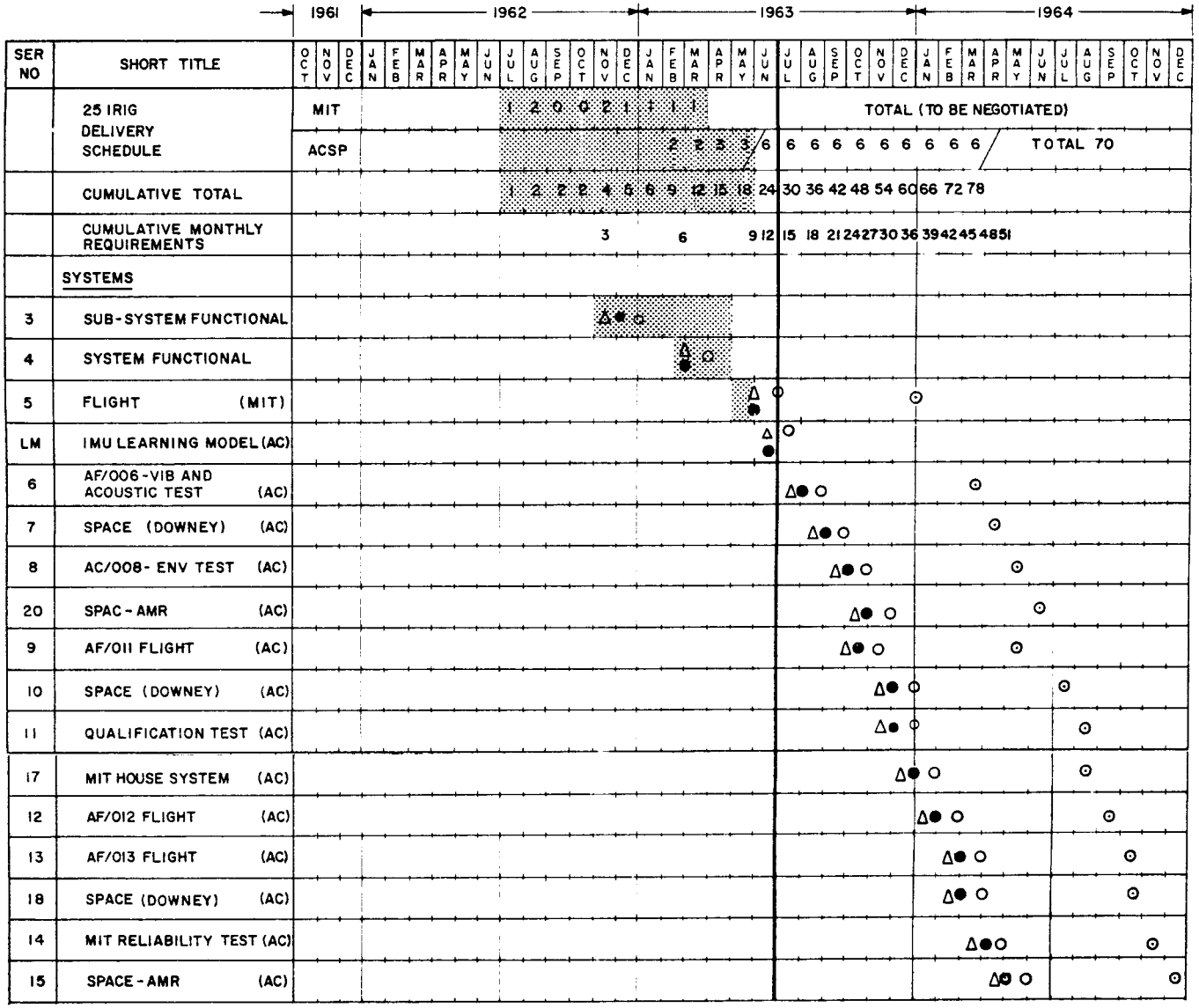


Fig. I-21

TABLE I

MEETINGS ATTENDED BY MIT/IL APOLLO PERSONNEL

Period 1 June through 30 June 1963

Date	Location	Subject
3 June	MIT	In-flight Tests and Failures
3-4 June	GAEC	LEM Operations and Installation Meeting
3-4 June	Raytheon	Design Status Review
4 June	MSC	Apollo S/C Mission Trajectories Sub-panel
4-5 June	AMR	Check-out Panel
5 June	Marshall	Crew Safety Systems Panel
5 June	MSC	Crew Safety Systems Panel
5-6 June	KIC	Design Status Review
6 June	MSC	Navigation and Guidance
6-7 June	S&ID	Computer and Packaging
10 June	MSC	Apollo Gyro Program Review
10 June	San Francisco	NASA/Ames Research Center
11 June	Ames	G&N Simulation
11 June	MIT	Reliability Meeting
11 June	MSC	GOSS Systems Meeting
11-12 June	MSC	Crew Safety and Abort Panel
11-12 June	GAEC	Design Review/Operations
12 June	MSC	Apollo Test Systems Meeting
12 June	MSC	GSE Systems Meeting
17-18 June	MIT	Management Practices
18 June	Langley Research Center	LEM Technical Conference
18 June	MIT	LEM/SCS Interface Meeting
18 June	MIT	STU Meeting
19-20 June	MSC	Documentation
20 June	MIT	Simulation Committee
25 June	MIT	G&N Schedule and Test Planning
25 June	S&ID	STU/Design Review
25 June	McDonnell Aircraft Corp.	Project Mercury Reliability & Control Review Meeting

TABLE I (cont'd)

Date	Location	Subject
26 June	MSC	Guidance System Meeting #6
27 June	MSC	C/M S&C Meeting #16
27 June	MSC	LEM W/S

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No.	Type	Period Covered
E-1067	Monthly	August 11 through September 13, 1961 (C)
E-1068	Monthly	September 13 through October 4, 1961 (C)
E-1099	Monthly	October 4 through November 9, 1961 (C)
E-1116	Quarterly	Period ended December 11, 1961 (C)
E-1117	Monthly	December 11, 1961 through January 16, 1962 (C)
E-1139	Monthly	January 16 through February 1962 (C)
E-1140	Quarterly	Period ended March 11, 1962 (C)
E-1157	Monthly	March 11 through April 11, 1962 (C)
E-1177	Monthly	April 11 through May 1, 1962 (C)
E-1199	Quarterly	Period ended June 11, 1962 (C)
E-1236	Monthly	June 11 through July 17, 1962 (C)
E-1237	Monthly	July 17 through August 21, 1962 (C)
E-1238	Quarterly	Period ended September 11, 1962 (C)
E-1302	Monthly	September 11 through October 11, 1962 (C)
E-1303	Monthly	October 11 through November 13, 1962 (C)
E-1304	Quarterly	Period ended December 11, 1962 (C)
E-1305	Monthly	December 11, 1962 through January 11, 1963 (C)
E-1306	Monthly	January 11 through February 11, 1963 (C)
E-1307	Quarterly	Period ended March 31, 1963 (C)
E-1308	Monthly	Month of April 1963 (C)
E-1378	Monthly	Month of May 1963 (C)
E-1389	Quarterly	Period ended June 1963

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