C65-4629

APOLLO

GUIDANCE AND NAVIGATION

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APOLLO GUIDANCE AND NAVIGATION PROGRAM

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(Unclassified Title)

REPORT E-1445

MONTHLY TECHNICAL PROGRESS REPORT

PROJECT APOLLO GUIDANCE
AND
NAVIGATION PROGRAM

August 1963

[redacted]
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ACKNOWLEDGEMENT

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PREFACE

This progress report consists of two sections. The first section covers schedules for components and assemblies of the Apollo Guidance Equipment, together with comments about each chart.

The second section contains comments on the LEM guidance equipment studies.

A tabulation of all meetings attended by MIT/IL Apollo personnel is also included at the end of the second section.

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

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SECTION I

APOLLO GUIDANCE EQUIPMENT

Figure I-1 is the delivery schedule for command module G&N Systems. This schedule has been revised in accordance with NASA/MSC letter from Mr. D. Gilbert to Mr. M. Trageser, dated 28 August 1963. (Reference SGP (RWY:mmp), 28 August 1963)

G&N System Delivery Schedule

AGE	MIT Delivery Date MIT Lab, Downey	ACSP Delivery Date - ACSP Dock	Block Status
5	1 Jan 1964		I
6		3/23/64	I
7		6/ 7/64	I
8		7/ 7/64	I
20		7/ 7/64	I
10		8/ 1/64	I
11		8/15/64	I
17		9/ 1/64	I
12		10/ 1/64	I
9		10/15/64	I
13*		11/15/64	II
18		12/ 1/64	II
14		12/15/64	II
15		1/ 1/65	II

The allocation of G&N Systems shown in Fig I-1 is unchanged from last month's report. However, NASA has indicated that a re-allocation of Systems is in process, and Fig I-1 will be revised upon MIT/IL's receipt of a new allocation list.

Figure I-2, CM Flight Test Schedule (Proposed), is an MIT/IL proposed G&N System flow plan presented to NASA/MSC in May 1963 (MIT/IL letter AG-382-63). If MSC approves the flow plan "hangar queen" concept, Fig I-2 will be revised to be compatible with the new G&N delivery schedule shown in Fig I-1.

* This schedule is predicated on design release eleven (11) months prior to the first Block II System delivery.

The schedule status of AGE-4, Fig I-3, as contained in APOLLO Project Memo #700, dated 30 August 1963, by A. Laats, is as follows:

> "The present equipment delivery schedules indicate that AGE-4 System assembly and testing will start on 7 October 1963. This date is dependent on the delivery of equipment to the Systems Laboratory as follows:

Equipment	Responsibility	Need Date
1. AGE-4 harness with PSA J-Box	J. Nevins	10/7/63
2. D&C panels and electronics: G&N panel IMU control panel CDU frame	J. Nevins	10/8/63
3. IMU, 3 CDU's PSA trays 1, 2, 3, 4, 5, 6, 7, 10	J. Miller	10/15/63
4. AGC or AGC Simulator	E. Hall	10/15/63
5. Optics Lead (or Simulator); optics PSA trays 8, 9; 2 optics CDU's	A. Koso	11/1/63

Equipment not listed is either available now or can be incorporated at any time.

In order to support the tests at ACSP prior to GSE delivery, both coolant and portable temperature control are required. It is expected that the MIT/IL thermal lab (E. Hickey) can temporarily furnish a coolant pump, coolant lines and connectors, and a portable temperature controller. This equipment is required on 10 October 1963.

Figure I-4 is the AGE-5 delivery schedule. Alignment and calibration work on the AGE-5 Inertial Subsystem was scheduled for the period from 15 September to 15 November, and system assembly and test was scheduled to begin on 15 November 1963. However, a slippage in delivery of PSA blue modules for AGE-4 has caused an AGE-4 schedule slip which in turn caused a slip in AGE-5. Hence, alignment and calibration work on AGE-5 Inertial Subsystem is now predicted to begin in late October and continue to mid-December when system assembly and test can begin.

A schedule for Guidance Theory and Programming is shown in Fig I-5. It is planned to replace this chart with a schedule derived from the PERT chart covering this effort.

Figure I-6 is the delivery schedule for all guidance computers. AGC-4, an MIT/IL breadboard unit, is functioning and will be available for use with AGE-4 when required. AGC-4B, the Raytheon Learner Model to be used during system assembly and test of AGE-5, has a predicted delivery date of 19 February 1964. (This date is expected to be advanced to approximately December 1963 by a rescheduling effort underway at Raytheon) Subassemblies for AGC-5 are expected to be delivered during the period 17 December 1963 through February 1964.

Figure I-7 is the delivery schedule for all IMU's. Thermal testing is continuing on IMU-1. IMU-2 will be rebuilt with new stub shafts subsequent to which vibration tests will be re-run. IMU-4 is undergoing functional checkout and alignment tests as part of the AGE-4 inertial subsystem marriage and checkout.

IMU-5 inter-gimbal subassemblies are being wired and resolvers are being checked. All other parts for IMU-5 are available except the PIP's and case, which should be available in the near future.

Figure I-8 is the PSA delivery schedule. PSA-1 (Thermal) was delivered to MIT/IL by ACSP in June 1963. PSA-2, under construction by MIT/IL,is approximately four weeks behind schedule. The vibration model PSA (VM) was delivered to MIT/IL by ACSP in July 1963.

Delivery of PSA-4 has slipped about four weeks, from 15 August to 15 September 1963. PSA-4A (rack mounted) is complete except for temperature control electronics modules which should be available by 15 September 1963.

Delivery of PSA-5A by ACSP is expected early in September 1963. PSA-5 (Class B), scheduled for completion by 15 October 1963, is approximately four weeks behind schedule.

PSA Junction Boxes for early tests of PSA-4 and -5 will be "test", not "flight", configuration. Fabrication of these test junction boxes is on schedule to support these early tests. Flight configuration will be available for scheduled shipment of PSA-4 and -5 from MIT/IL.

Figure I-9 is the delivery schedule for CDU's. TD A-147 calls for delivery of 15 CDU's to MIT/IL by ACSP to the following schedule, which also includes ACSP's estimated delivery dates.

Quantity	Scheduled Delivery Date	ACSP Expected Delivery Date	Documentation	Use
2	8/ 1/63	9/ 5/63	Less than Class A	Optics
3	9/15/63	10/18/63	Less than Class A	Inertial
3	10/15/63	11/ 1/63	Less than Class A	Inertial
2	10/15/63	11/ 1/63	Less than Class A	Optics
2	11/ 1/63	11/ 1/63	Less than Class A	Optics
2	11/ 1/63	11/ 1/63	Less than Class A	Optics
1	11/ 1/63	12/15/63	Class A	Vibration

Figure I-10 is the delivery schedule for all navigation bases. The navigation base for AGE-2, scheduled for delivery to MIT/IL by ACSP on 30 June 1963 is now expected to be delivered on 15 September 1963. This slippage was caused by the brazing problem.

The navigation base for AGE-4 was delivered to MIT/IL in July 1963, by ACSP. Navigation base for AGE-5, scheduled for delivery to MIT/IL by ACSP on 1 October, is expected on 15 October 1963.

Figure I-11 is the delivery schedule for all Display & Control subsystems. The breadboard D&C panels (G&N Indicator Panel, IMU Panel and Optical Shroud), scheduled for delivery by ACSP on 1 July 1963, are expected to slip until 2 September 1963 due to a delay in honeycomb panel delivery.

D&C-1 panels are expected to be completed on 20 September 1963 with the exception of the optical shroud which is expected to be completed on 11 October 1963. On 29 August 1963, MIT/IL issued TD A-173 to ACSP cancelling the requirement to ship the AGE-1 D&C Group to MIT/IL; AGE-1 D&C shall be held at ACSP pending completion of environmental test plans and procedures by ACSP.

D&C-2 panels are expected to be complete on 20 September 1963 with the exception of the optical shroud which is expected 11 October 1963. D&C-4 panels are expected on 4 October 1963.

D&C-5: The G&N Indicator Panel and IMU Panel (scheduled 1 November 1963) are expected to be delivered on 18 December 1963.

Figure I-12 is the delivery schedule for optical subsystems. In August 1963 NASA agreed to MIT/IL's request for a revised schedule of optical subsystem deliveries as follows (Reference NASA/MSC letter SGR 63-147 dated 13 August 1963; and MIT/IL letter AG 551-63 dated 12 July 1963):

Optics-1	15 September 1963
Optics-2	15 October 1963
Optics-3	1 November 1963
Optics-4	15 November 1963
Optics-5	15 December 1963

All optical subsystems are to be assembled at Kollsman. The first three subsystems are to be used for design verification, the fourth subsystem (Optics-4) is to be used with AGE-4, and the fifth subsystem (Optics-5) is to be used on AGE-5.

Figure I-13 is the delivery schedule for all Map and Data Viewers. MDV-1 and -2 are reported by Kollsman to be about six weeks behind schedule caused by a delay in procurement of four long-lead items (support mirror, access door, bracket lamp, and lens housing). Completion of MDV-1 and -2 is now expected on 15 October 1963.

MDV-4 is approximately four weeks behind schedule caused by the same long-lead items as noted for MDV-1 and -2. Delivery of MDV-4 is now expected 17 October 1963.

MDV-5 is reported on schedule, with delivery expected on 30 October 1963.

TD K-79 was issued in August 1963 authorizing Kollsman to conduct thermal evaluation tests on MDV-1, and mechanical integrity tests on MDV-2. Subsequent to the above tests, overstress testing in the critical areas is to be performed to establish appropriate safety margins.

Figure I-14, covering Midcourse Guidance Studies is included only to avoid discontinuity in reporting. In future reports this figure will be replaced by a schedule of guidance studies that will be derived from the PERT printout of this program.

Figure I-15 is the delivery schedule for Raytheon's ground support equipment.

Computer Test Sets: The first breadboard computer test set, originally scheduled for delivery in May 1963, was delivered to MIT/IL on 23 August 1963. Estimated delivery dates for subsequent test sets are as indicated.

Computer Simulators: Computer Simulator #3, scheduled for delivery in June, was completed on 30 August 1963. (Actual delivery was held up pending a NASA waiver on a final test specification. This delivery is expected on 4 September 1963.)

Computer Calibration Units: Calibration Unit #2 scheduled for delivery to MIT/IL on 23 August 1963 is expected to be delivered on 27 September 1963.

Figure I-16 is the delivery schedule for AC Spark Plug ground support equipment.

Test Stations: ACSP has indicated that delivery of the preproduction test set scheduled for delivery to MIT/IL in August 1963 is now expected on 5 November 1963. The next preproduction GSE, allocated to ACSP and scheduled for completion on 1 October 1963, is expected to be complete on 21 December 1963. The first production test station, scheduled for delivery to NAA on 1 December 1963, is now expected to be delivered by 10 January 1964.

Rotary Tables: TD A-122, dated 21 February 1963 and amended by MIT/IL letters AG 280-63 and AG 436-63, authorizes ACSP to procure 10 Ultra Precision Rotary Tables. In accordance with this TD, Rotary Table Numbers 6, 9, and 11 shall be delivered directly from the vendor to the allocations identified below, and ACSP is to arrange source inspection and acceptance at the vendor's facility.

Serial No.	Allocation	Delivery Date
6	MIT System Lab/NAA	9/30/63
9	MIT System Lab/NAA	4/ 1/64
11	MIT System Lab/AMR	4/ 1/64

Rotary Table Numbers B, 1, 2, 4, 7, 8, 10 are to be delivered to ACSP, Milwaukee.

Inertial Component Temperature Controllers: The Inertial Components Temperature Controller (ICTC) consists of two units: a Portable Temperature Controller (PTC) and a Battery Pack and Alarm System, each enclosed in a combination case. The PTC has been designed and will be procured by MIT/IL and furnished GFP to ACSP. ACSP will fabricate only the battery and alarm pack. The ICTC delivery schedule is shown in accordance with ACSP's statement of work dated 28 January 1963, and MIT/IL TD A-135.

Portable Temperature Controllers: Under the provisions of ACSP's statement of work (28 January 1963) and TD A-135 ACSP is obliged to deliver a complete Inertial Component Temperature Controller containing a GFP Portable Temperature Control Unit. To accomplish this, MIT/IL and ACSP have agreed to the delivery schedule shown (reference MIT/IL letter AG 651-63 dated 8 August 1963).

IMU Shipping Containers: The IMU Shipping Container is to be used to control the temperature of the IMU and to protect it from excessive shock and vibration environments during shipment. The delivery schedule shown is in accordance with ACSP's statement of work dated 28 January 1963.

IMU Transportation Carts: The transportation carts will be used for transportation of the G&N units in manufacturing, engineering, and test preparation areas.

Figure I-17 is the Kollsman GSE delivery schedule as contained in Kollsman's 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. It is planned to present this schedule in a different format as soon as the revisions are checked out and approved.

In August 1963, MIT/IL issued six TD's authorizing Kollsman to proceed with the following items:

K-89	Purchase and fabricate parts for four (4) Short Retro-reflecting Periscope Assemblies.
K-90	Purchase and fabricate parts for five (5) Alignment Mirror Assemblies.
K-91	Purchase and fabricate parts for two (2) Functional Testers.
K-92	Purchase nine (9) 2-1/2-inch autocollimators.
K-93	Investigate, choose, and design (as required) holding stands and/or fixtures for supporting Optics Subsystems Testing.
K-94	Investigate, choose, and design (as required), optical wedges and associated holding fixtures for supporting Optics Subsystem, System, and Post Installation Testing.

Figure I-18 is the PIP delivery schedule. Delivery status as of 1 September 1963 is as follows:

Sperry deliveries scheduled thru 1 September 1963	-	33
Delivered by Sperry thru 1 September 1963	-	25
Delivered by Minicom	-	7
Total PIPS on hand	-	32

Figure I-19 is the IRIG delivery schedule. Delivery status as of 1 September 1963 is as follows:

ACSP deliveries scheduled thru 1 September 1963	-	28
Delivered by ACSP thru 1 September 1963	-	15
Delivered by Minicom thru 1 September 1963	-	10
Total IRIGS on hand	-	25

APOLLO MILESTONE CHART FOR C/M G&N SYSTEM DELIVERY

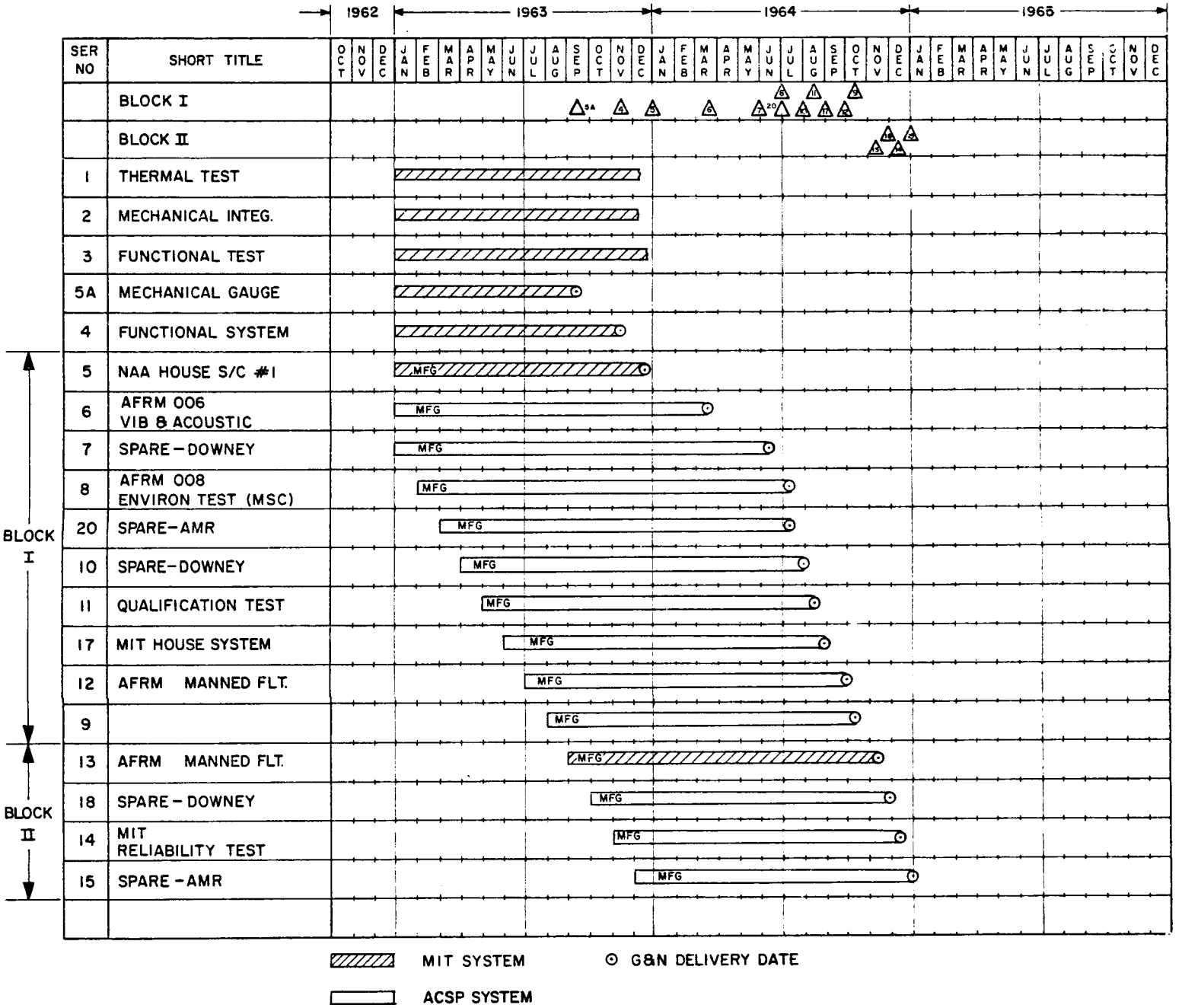


Fig. I-1

APOLLO C/M FLIGHT TEST SCHEDULE

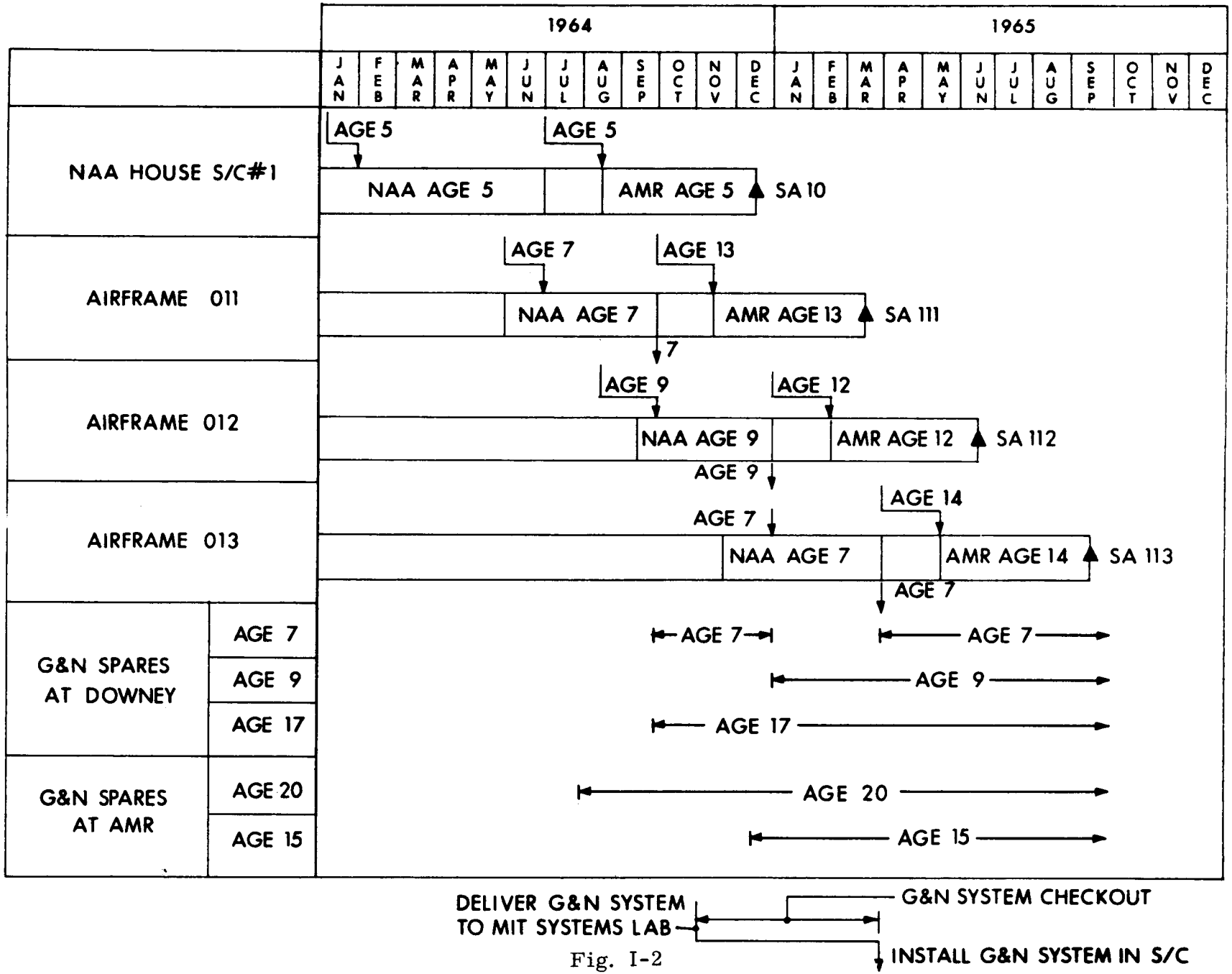


Fig. I-2

APOLLO MILESTONE CHART FOR AGE 4

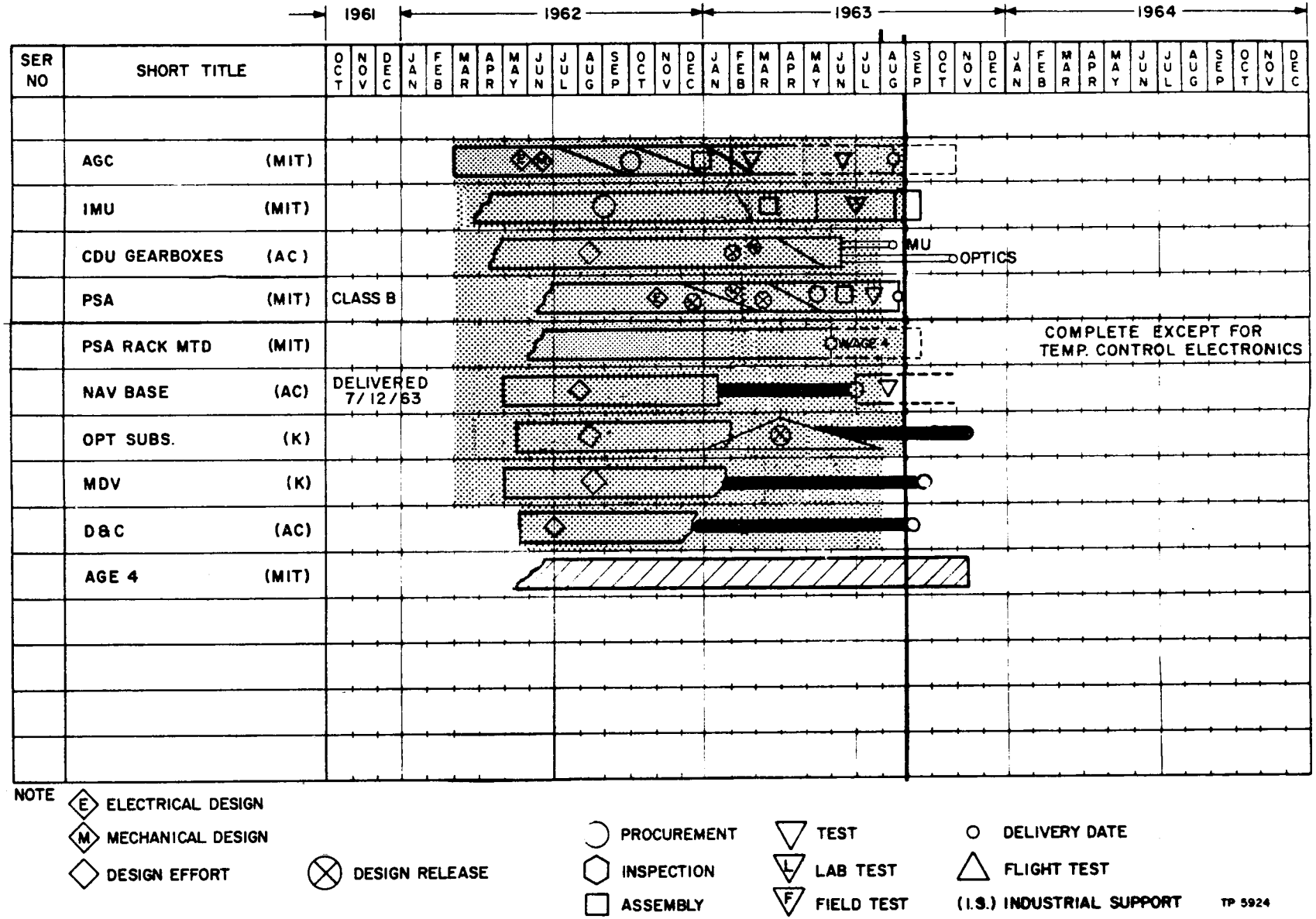


Fig. I-3

APOLLO MILESTONE CHART FOR AGE 5

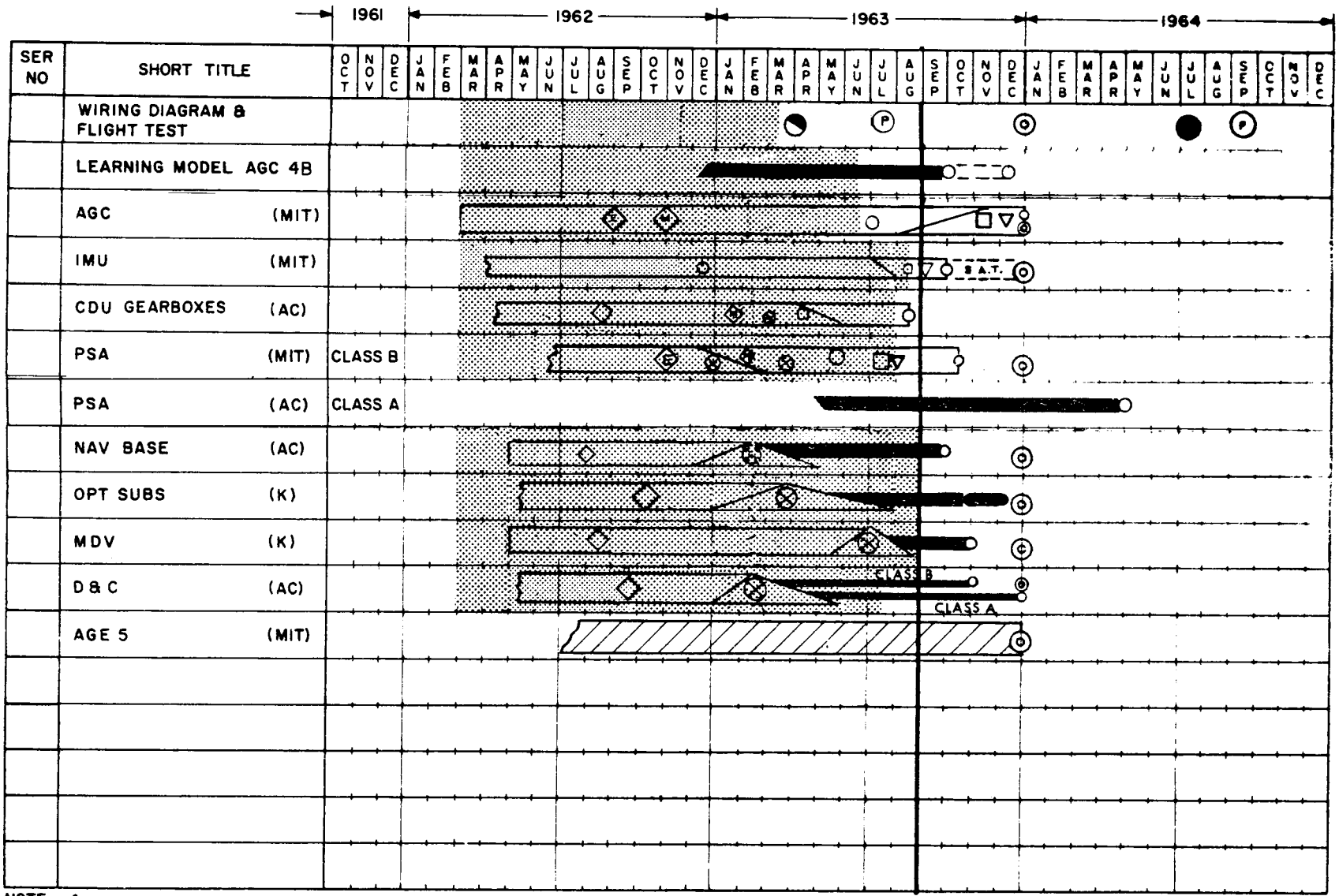


Fig. I-4

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

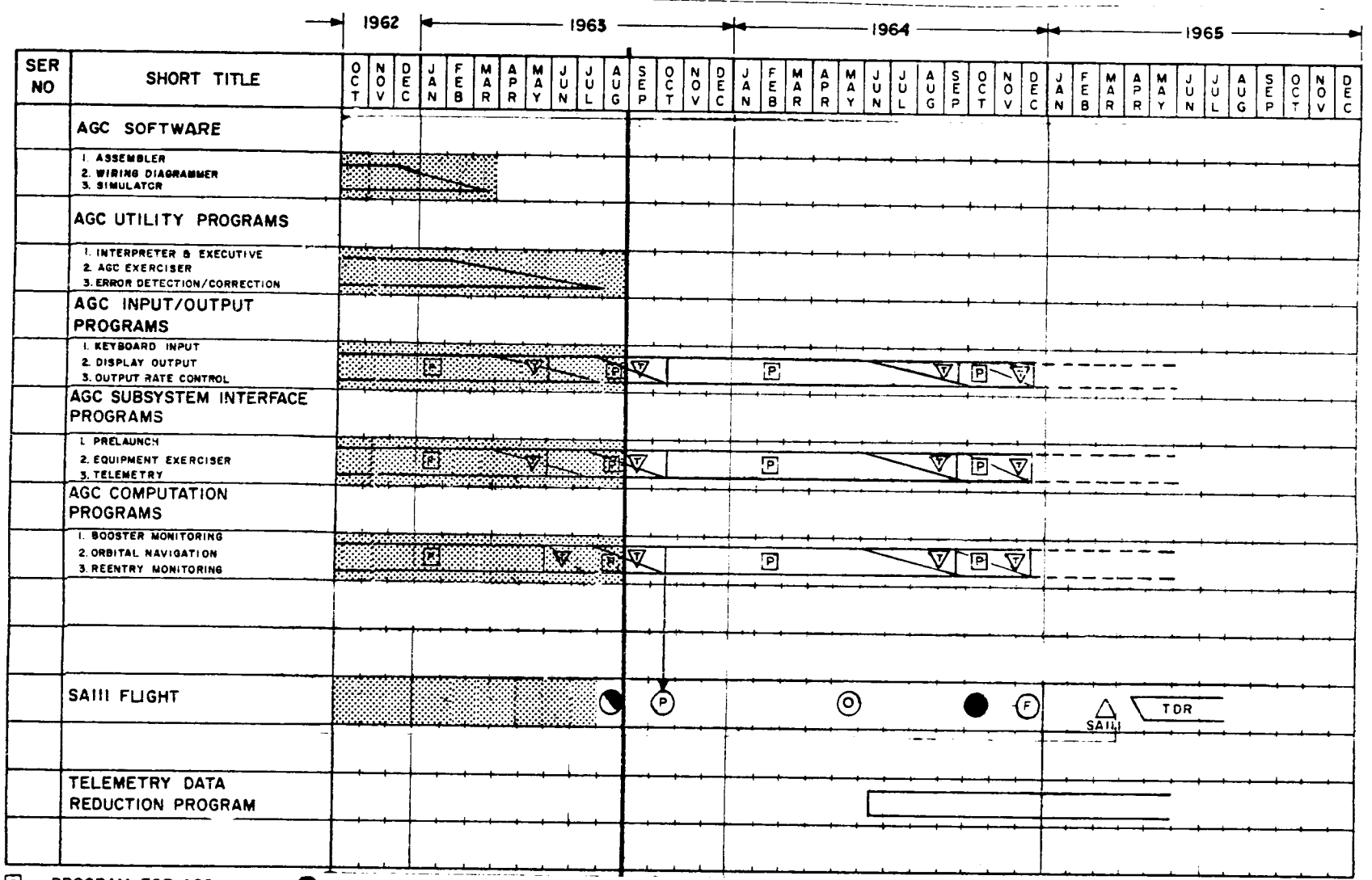


Fig. I-5

APOLLO MILESTONE CHART FOR APOLLO GUIDANCE COMPUTER (AGC)

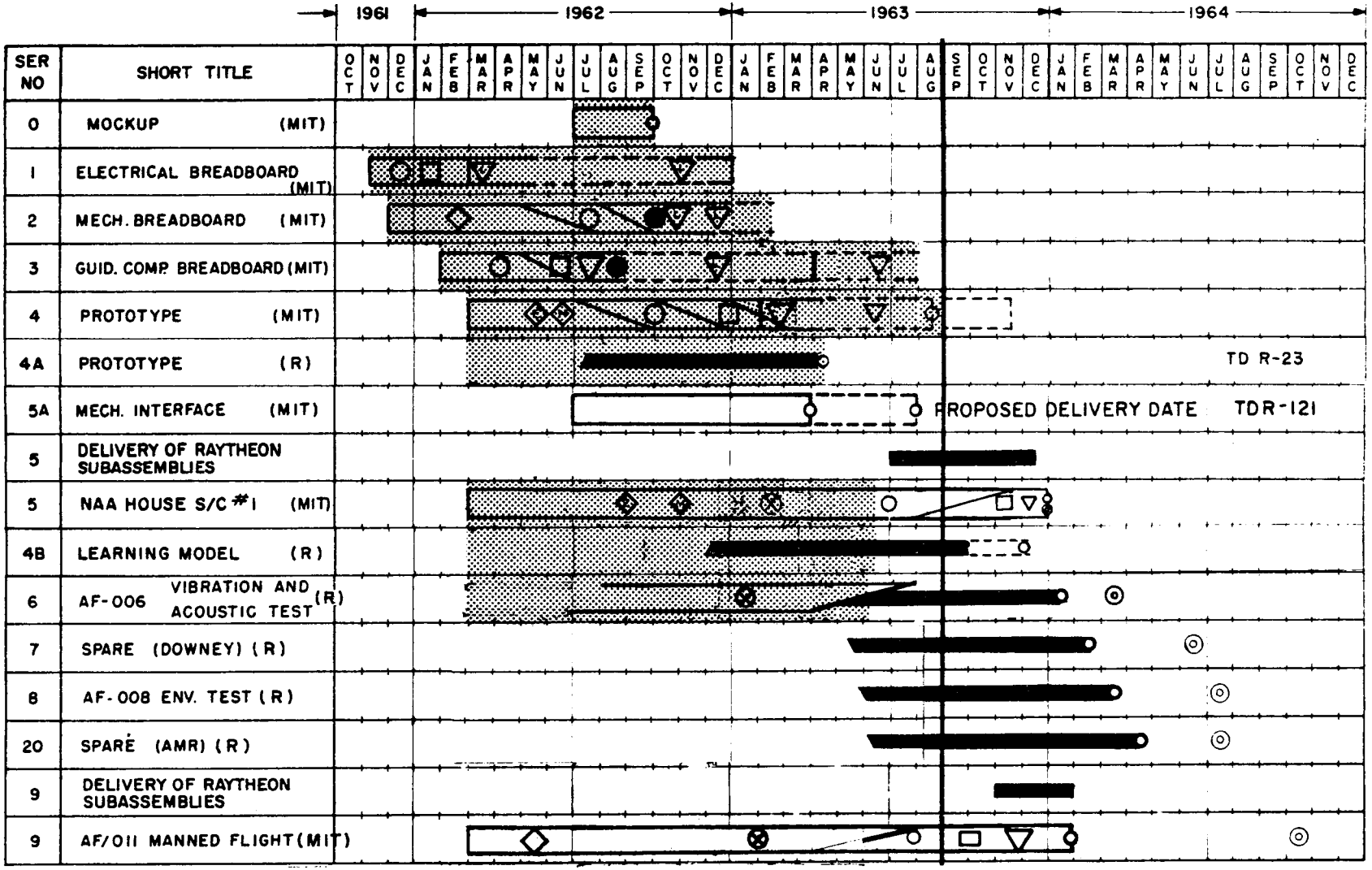


Fig. I-6

APOLLO MILESTONE CHART FOR APOLLO GUIDANCE COMPUTER (cont.)

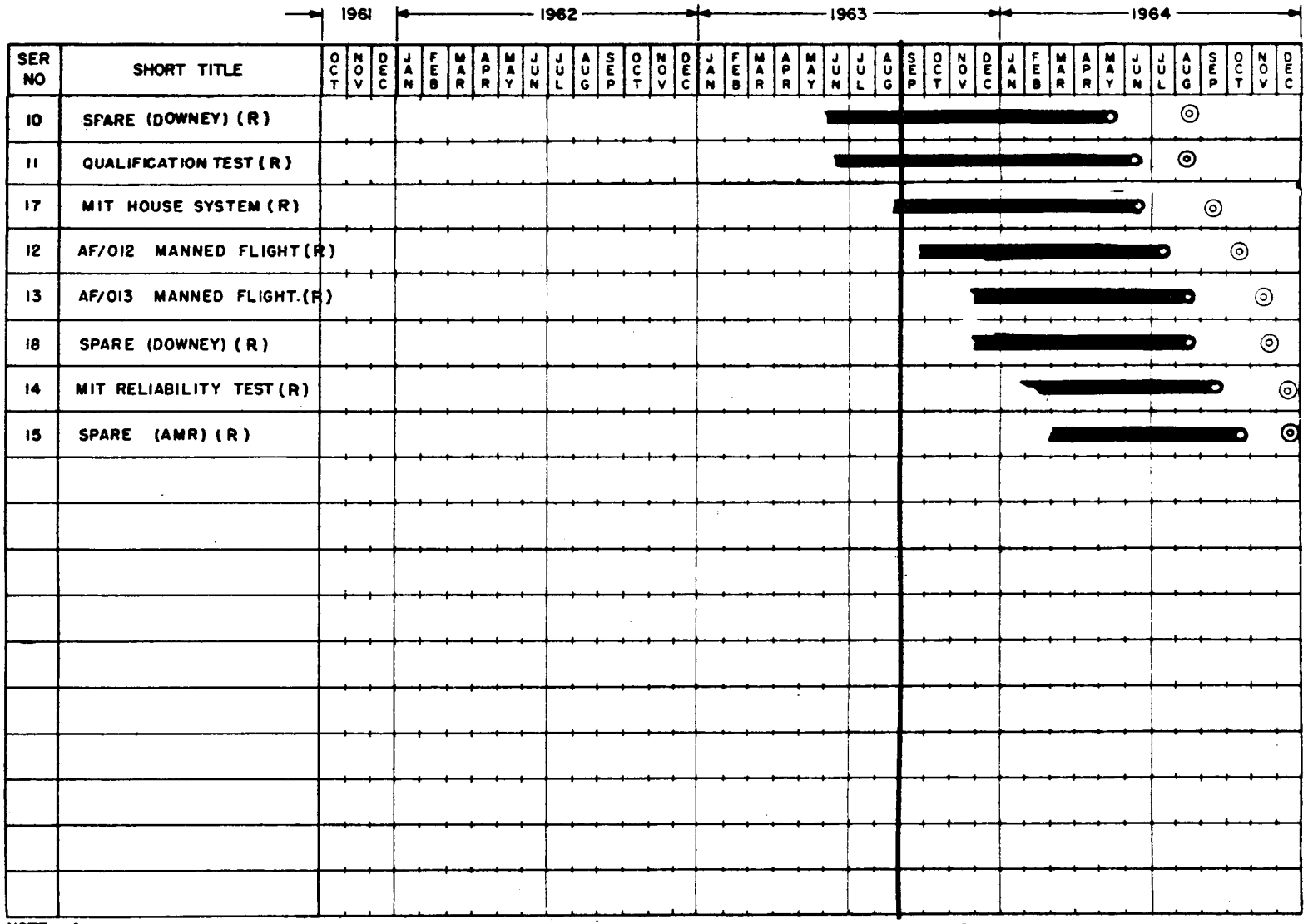


Fig. I-6 (cont)

APOLLO MILESTONE CHART FOR IMU DEVELOPMENT PLAN

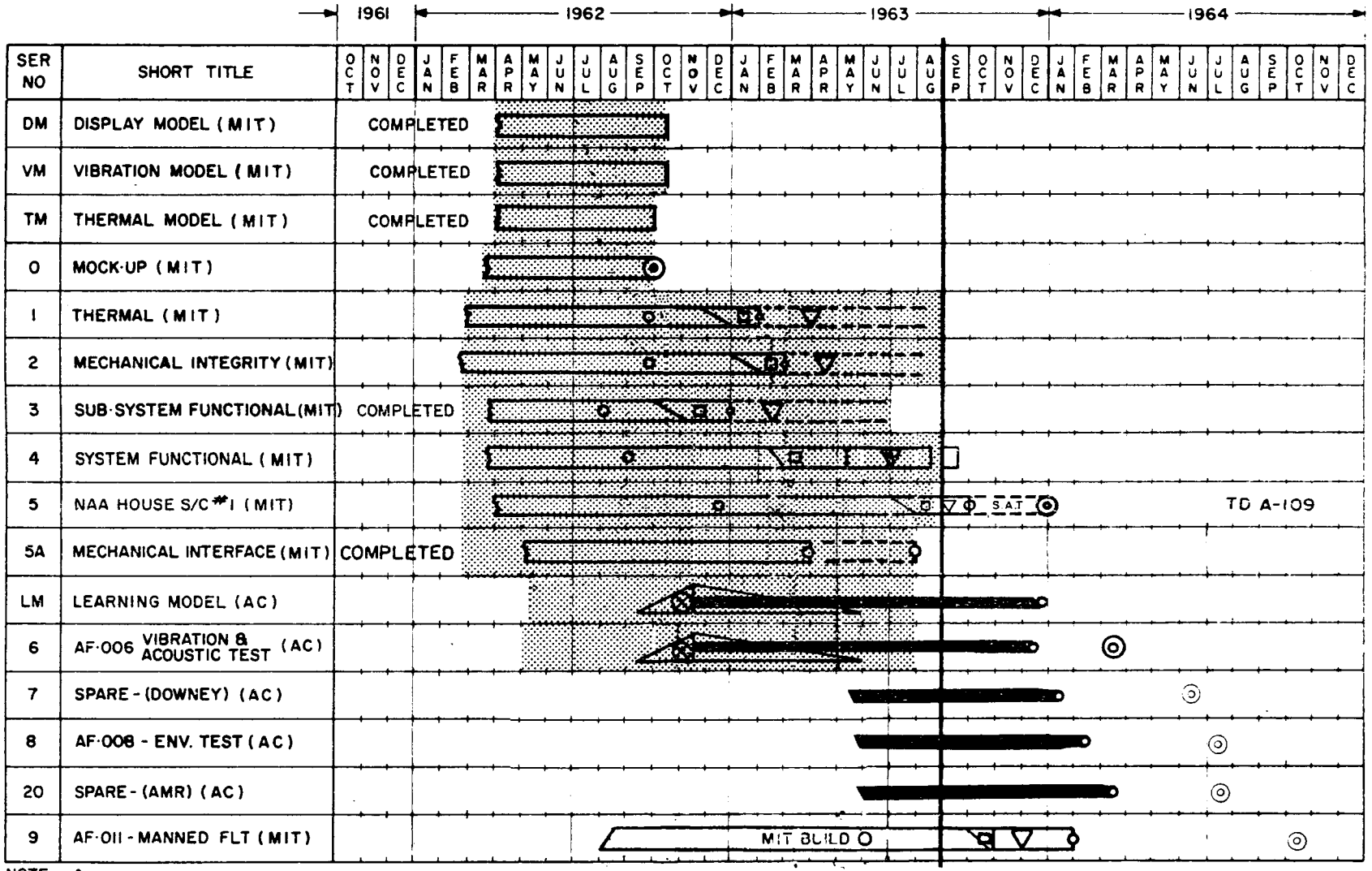


Fig. I-7

APOLLO MILESTONE CHART FOR IMU DEVELOPMENT PLAN (CONTINUED)

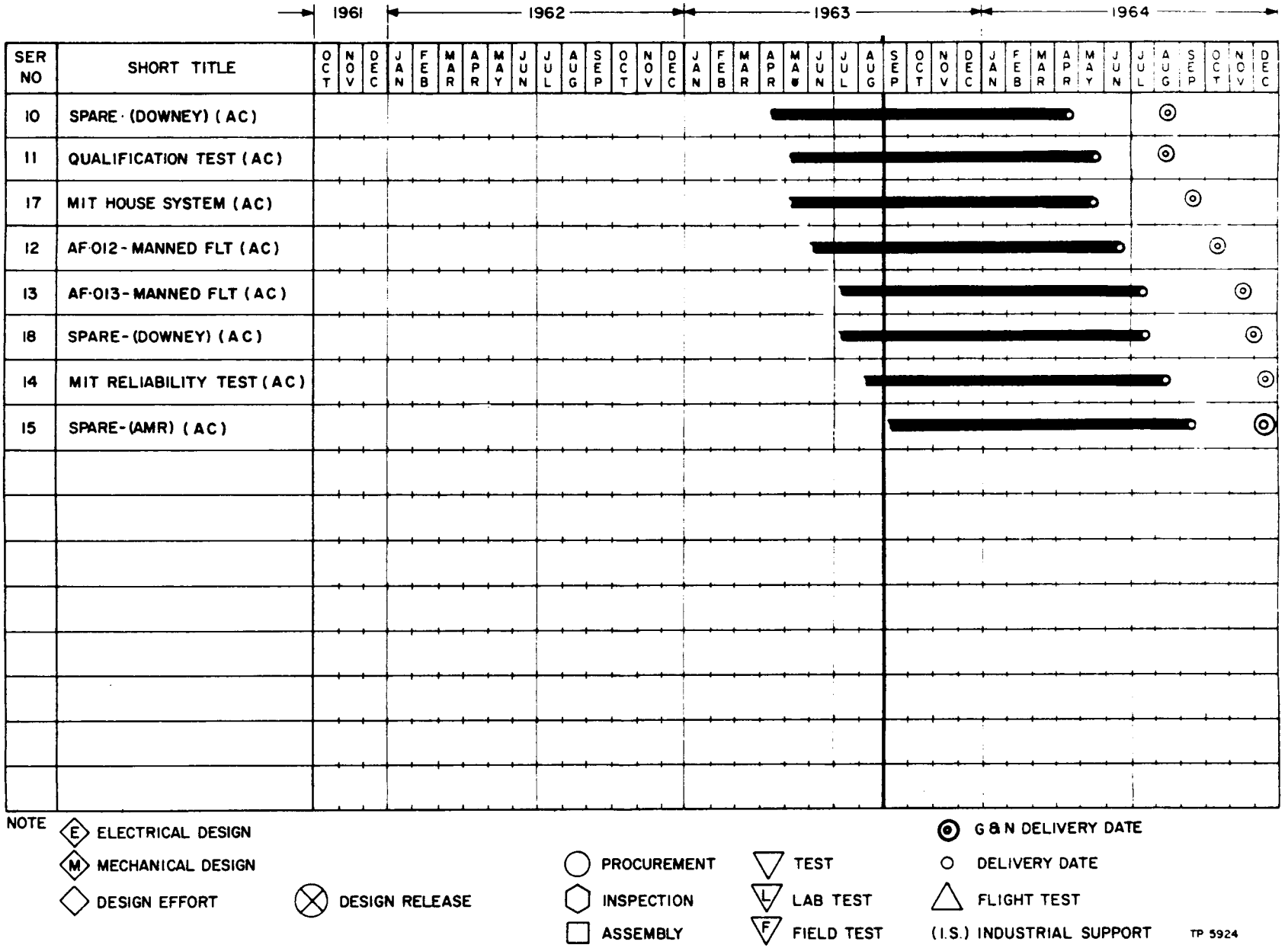


Fig. I-7 (cont)

APOLLO MILESTONE CHART FOR POWER AND SERVO ASSEMBLY (PSA)

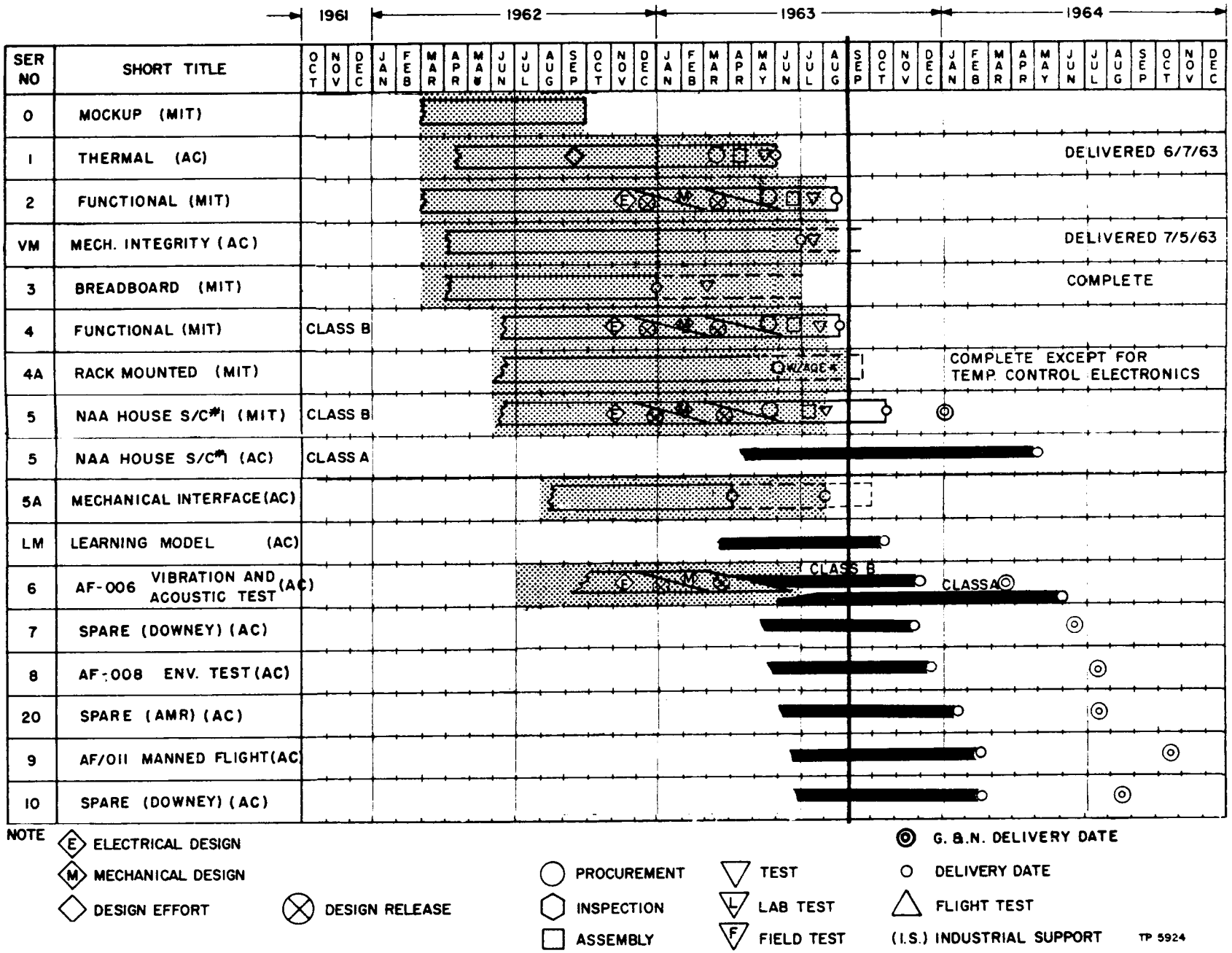


Fig. I-8

APOLLO MILESTONE CHART FOR POWER AND SERVO ASSEMBLY cont.

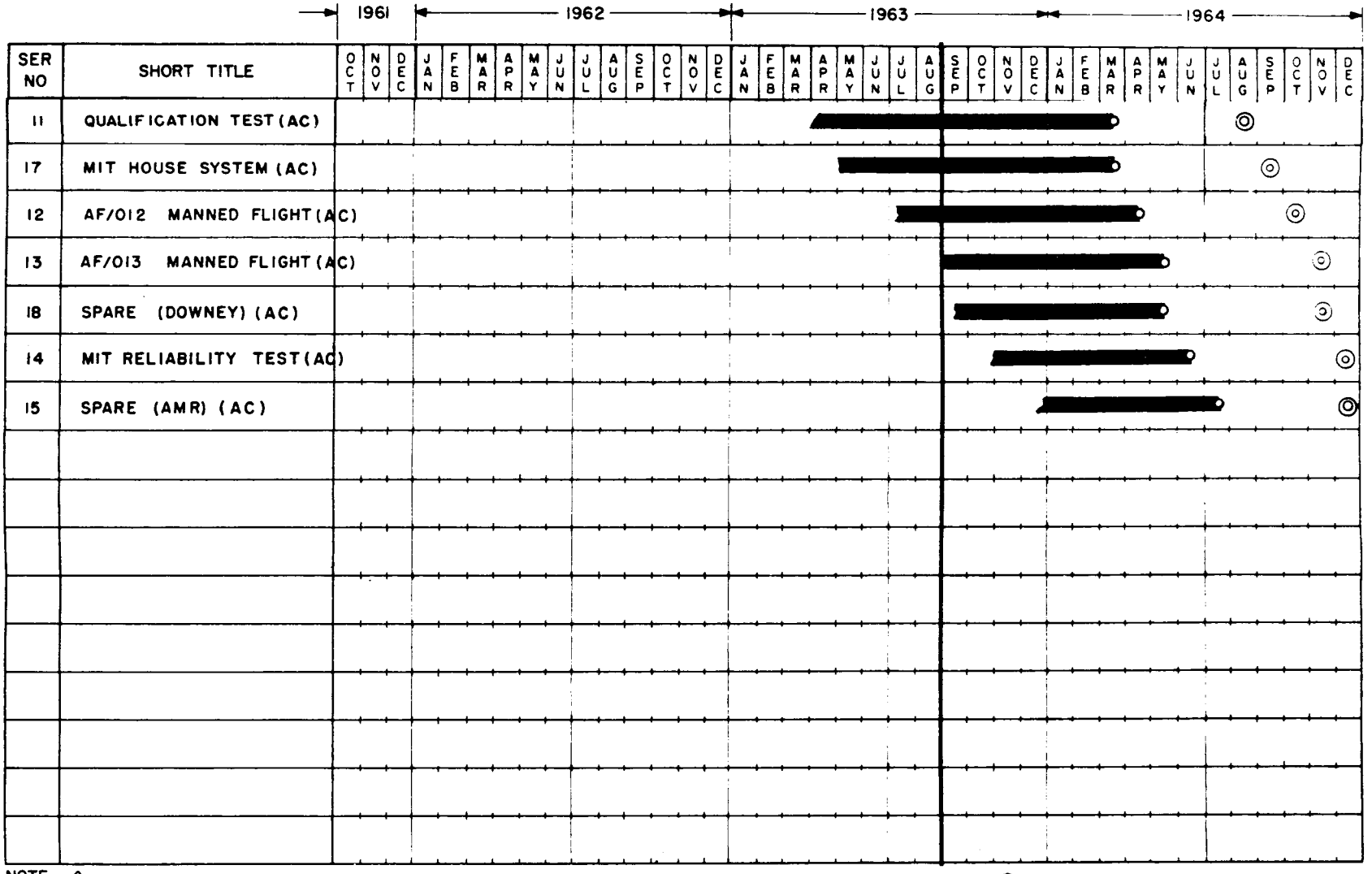


Fig. I-8 (cont)

APOLLO MILESTONE CHART FOR CDU GEARBOXES

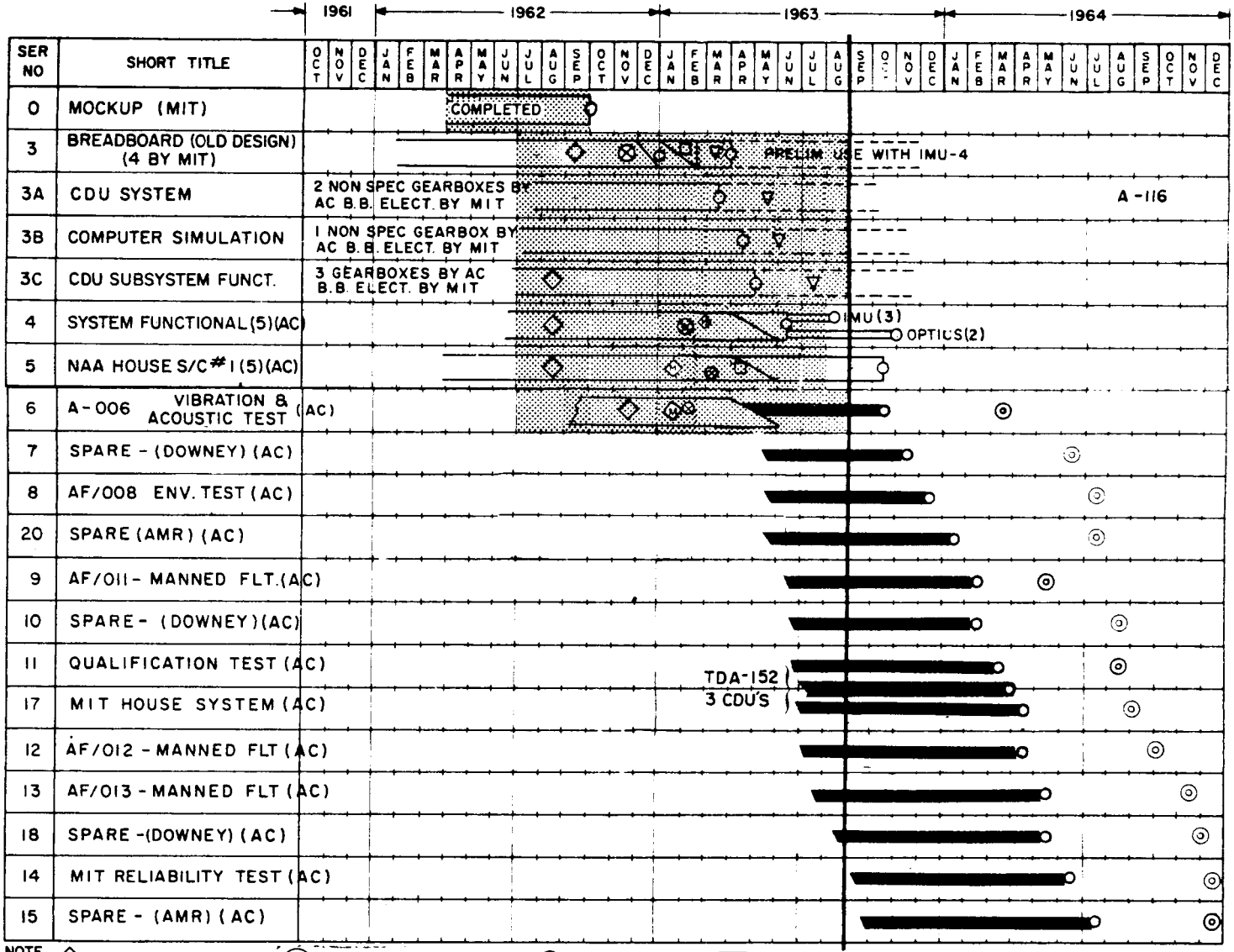


Fig. I-9

APOLLO MILESTONE CHART FOR NAVIGATION BASE SUB-SYSTEM

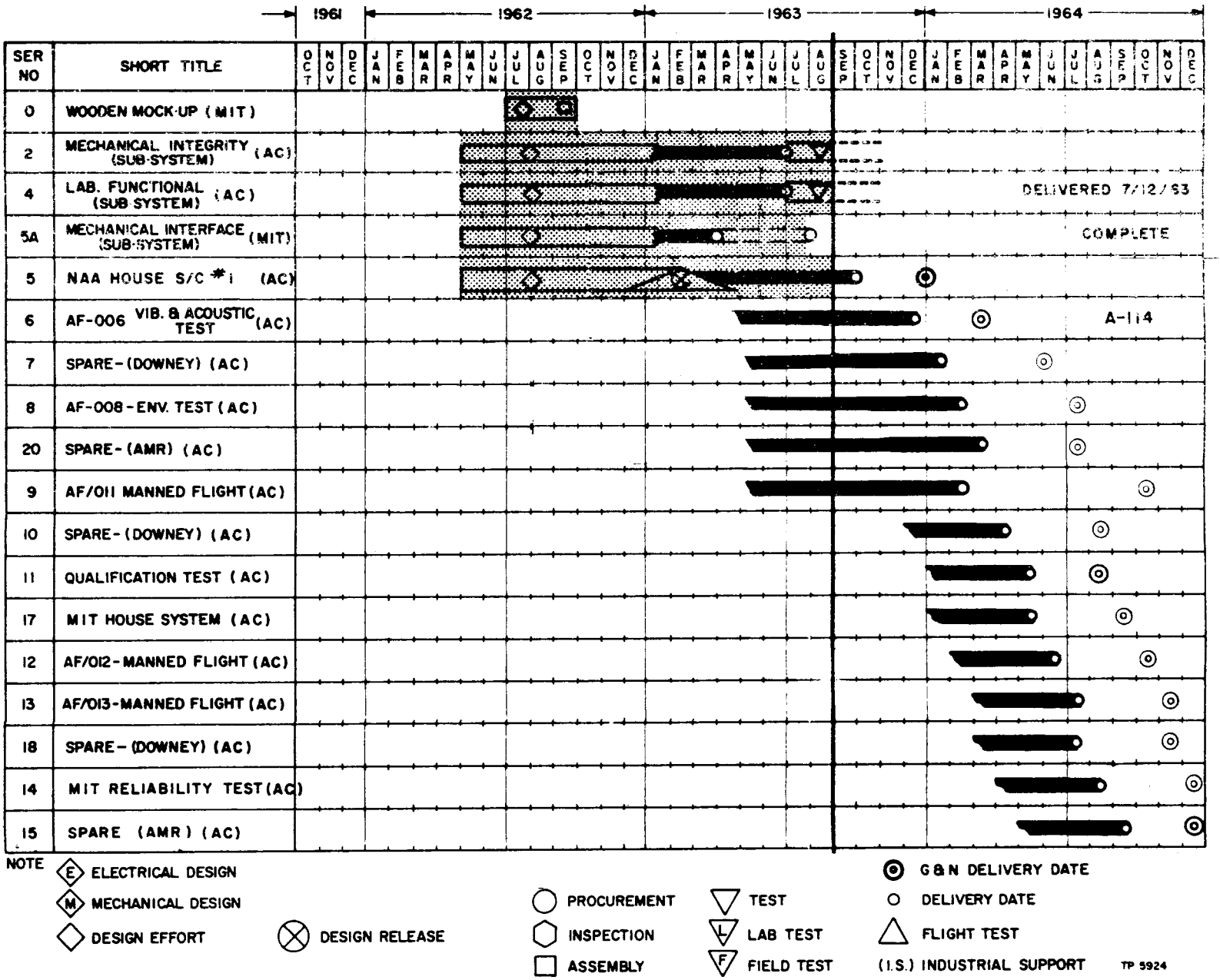


Fig. I-10

APOLLO MILESTONE CHART FOR DISPLAY & CONTROL SUBSYSTEMS

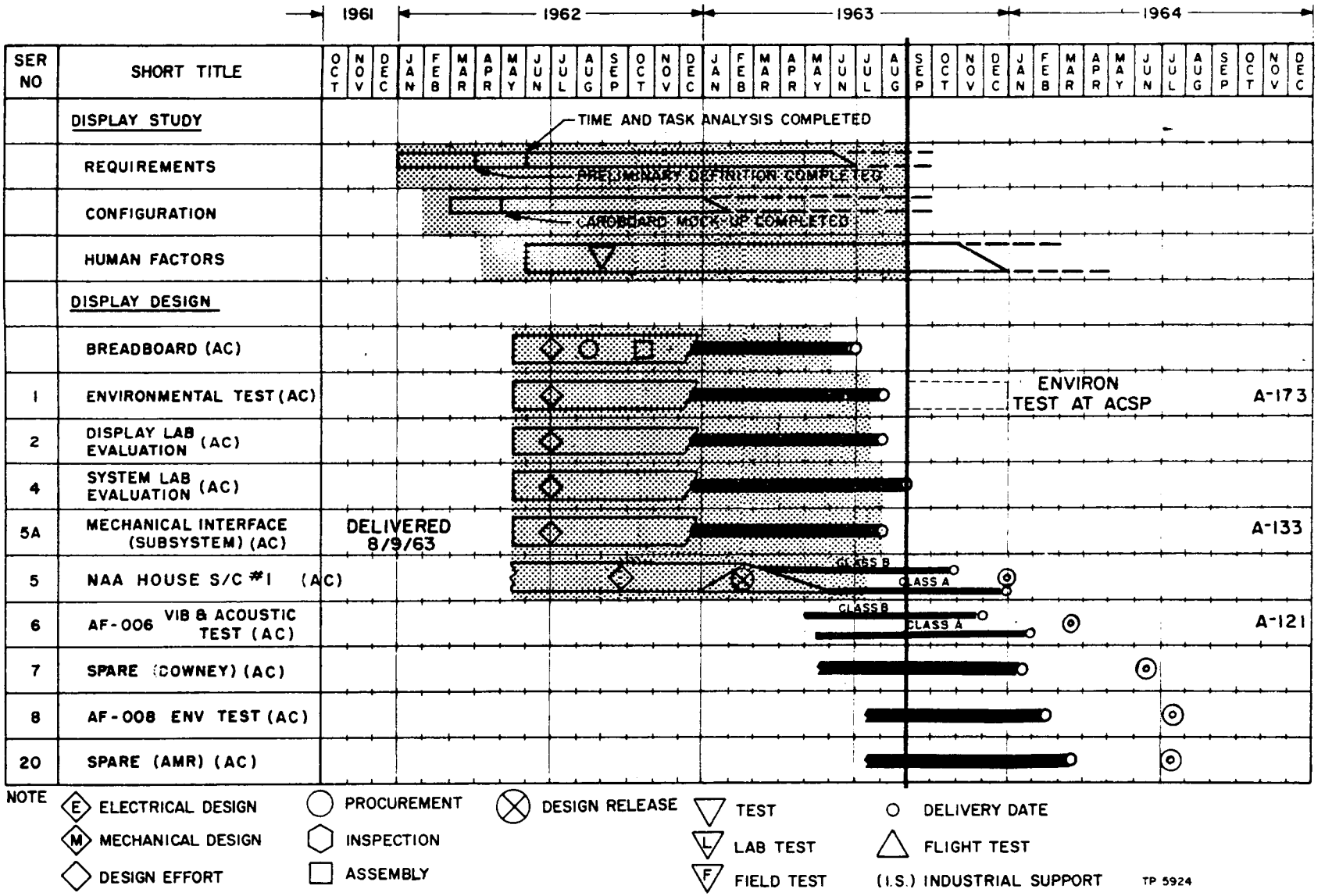


Fig. I-11

APOLLO MILESTONE CHART FOR DISPLAY AND CONTROL SUBSYSTEM

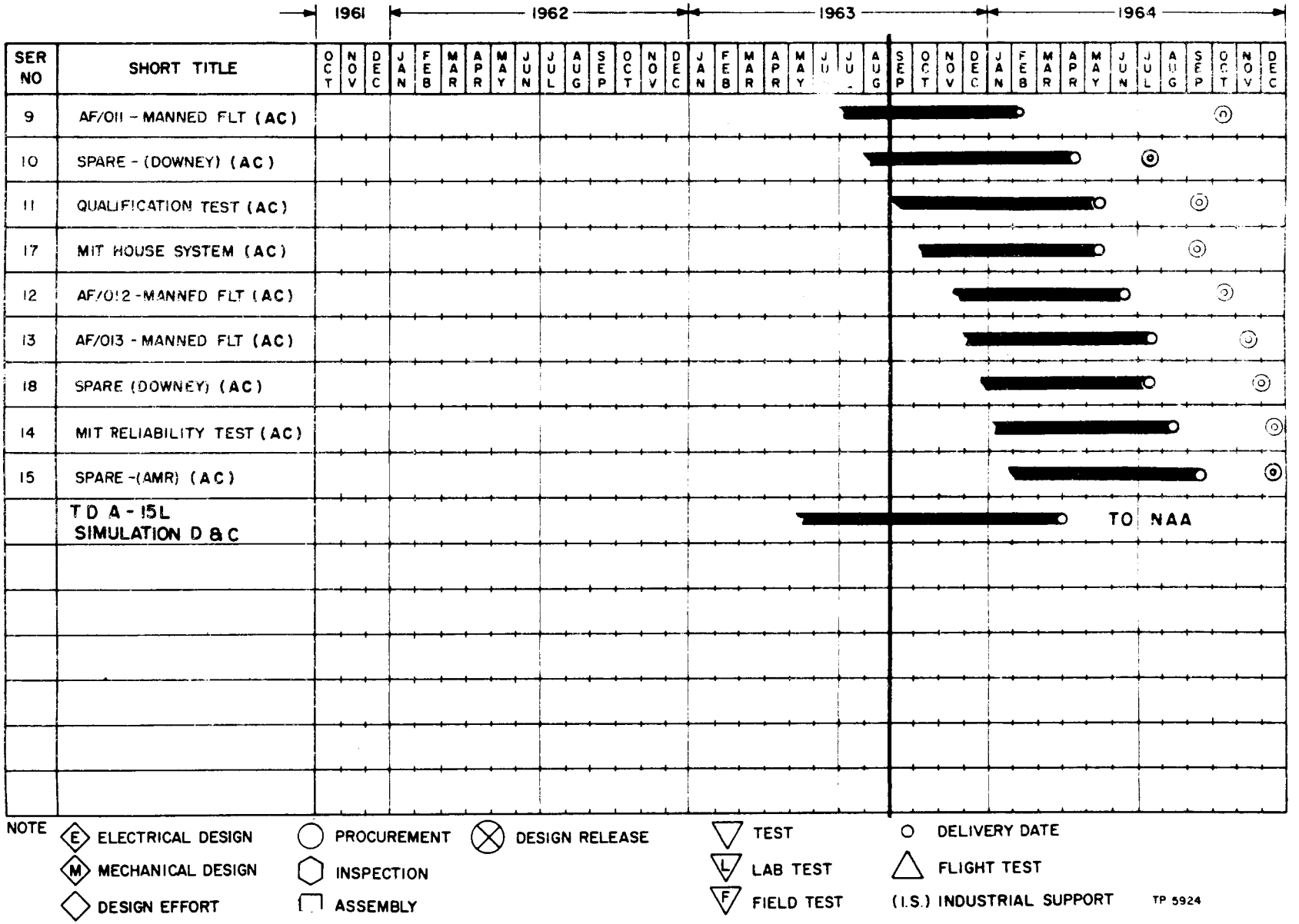


Fig. I-11 (cont)

APOLLO MILESTONE CHART FOR OPTICAL SUBASSEMBLY

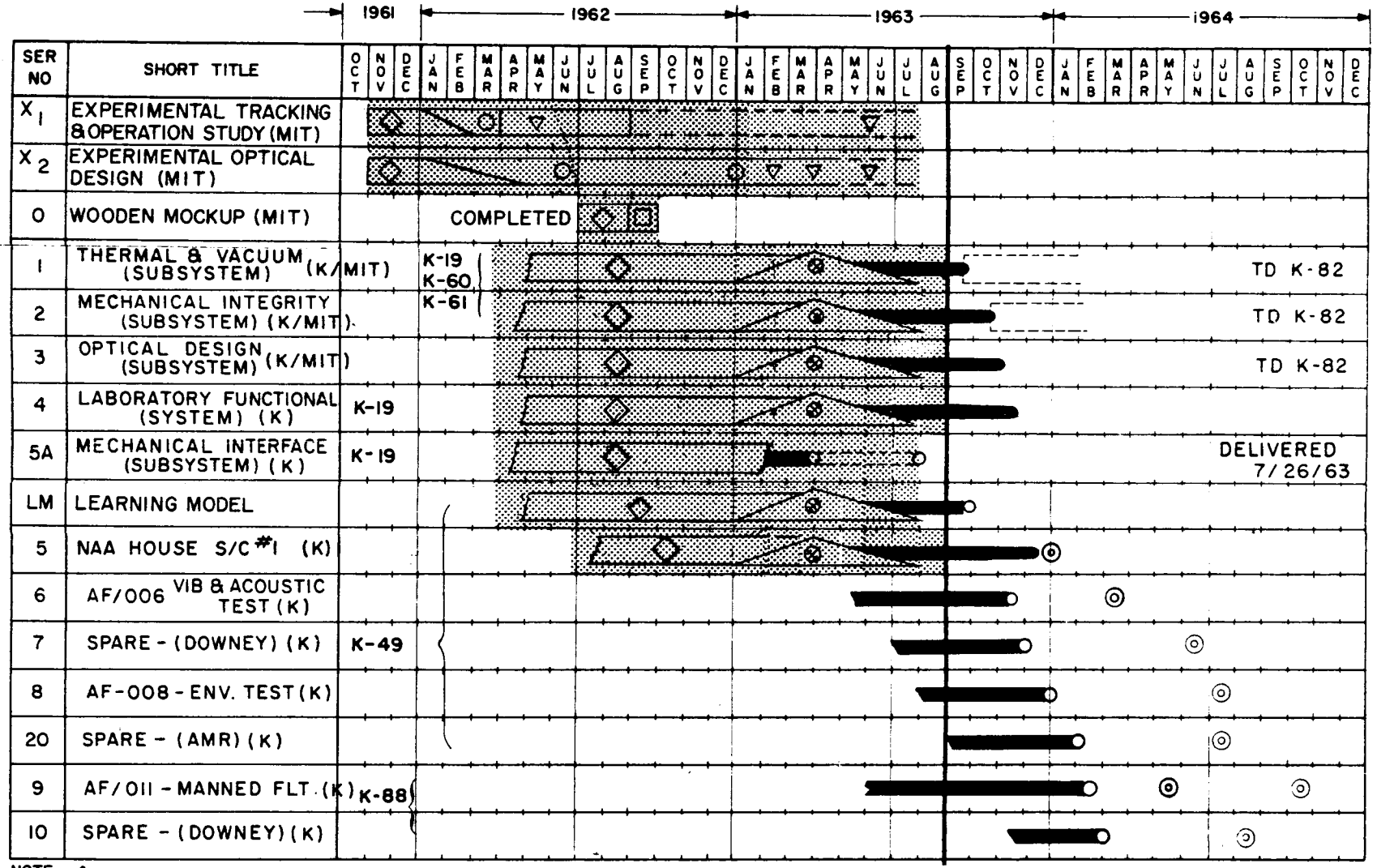


Fig. I-12

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

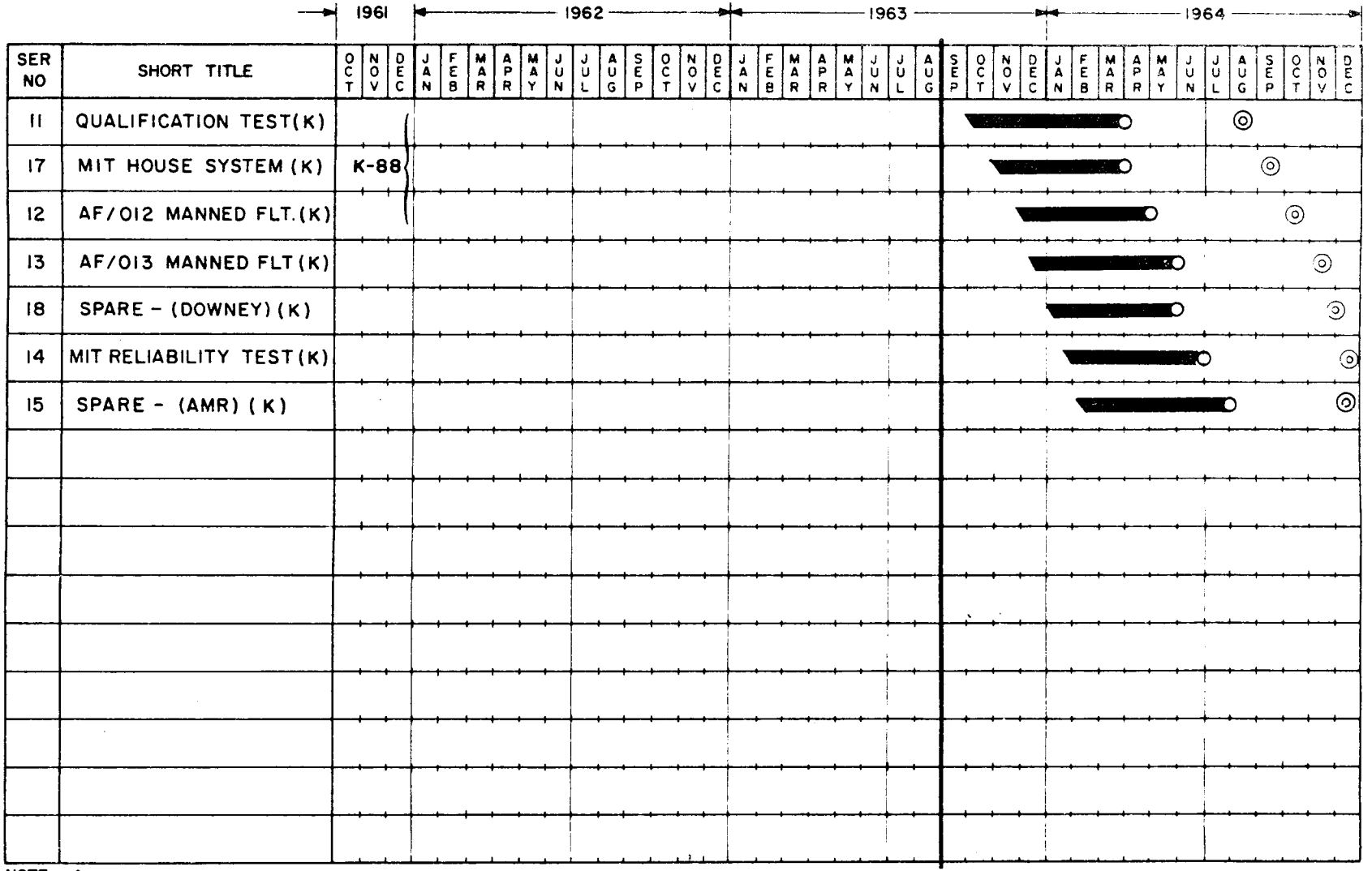


Fig. I-12 (cont)

APOLLO MILESTONE CHART FOR MAP AND DATA VIEWER SYSTEM

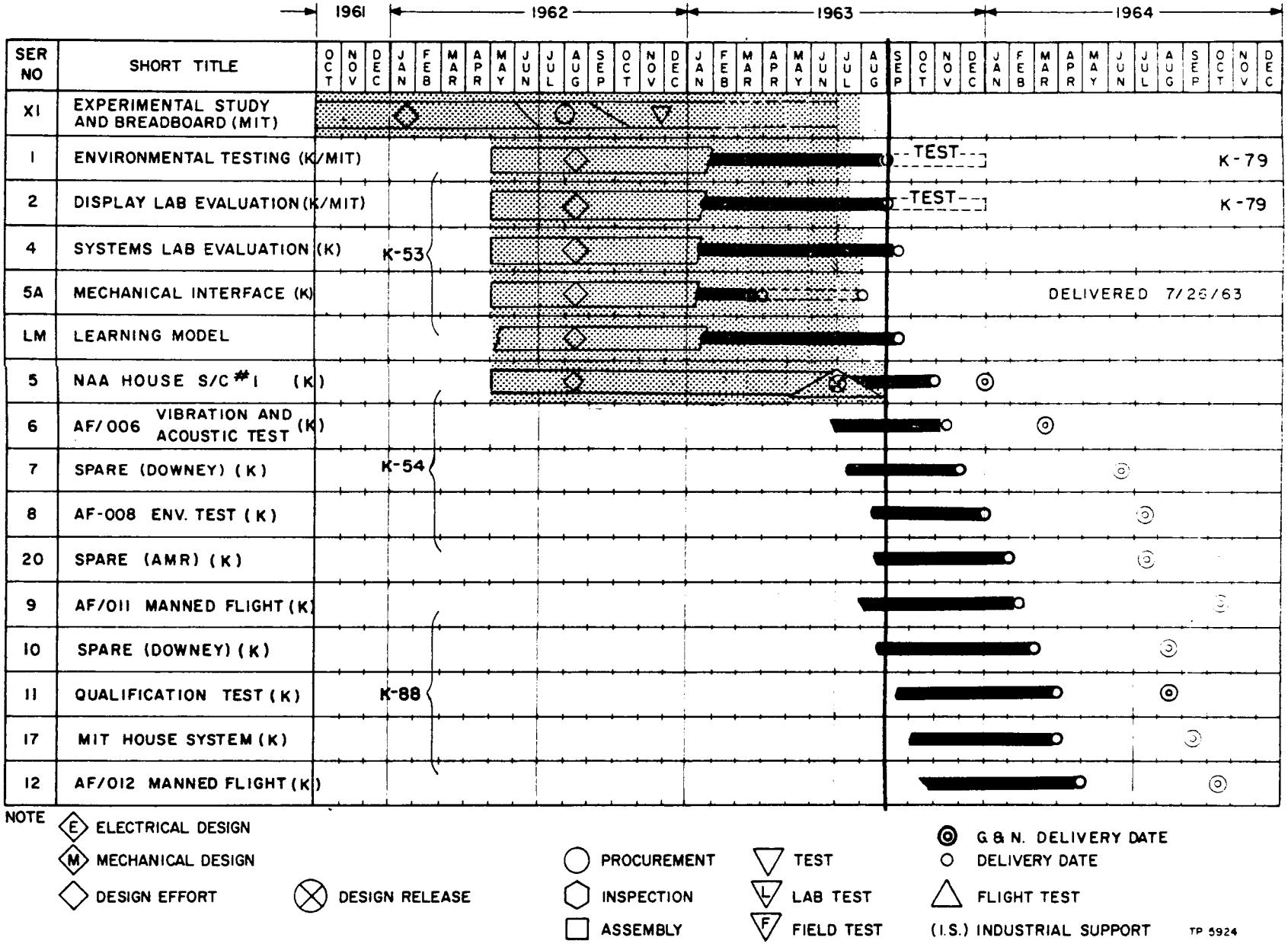


Fig. I-13

CONFIDENTIAL

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

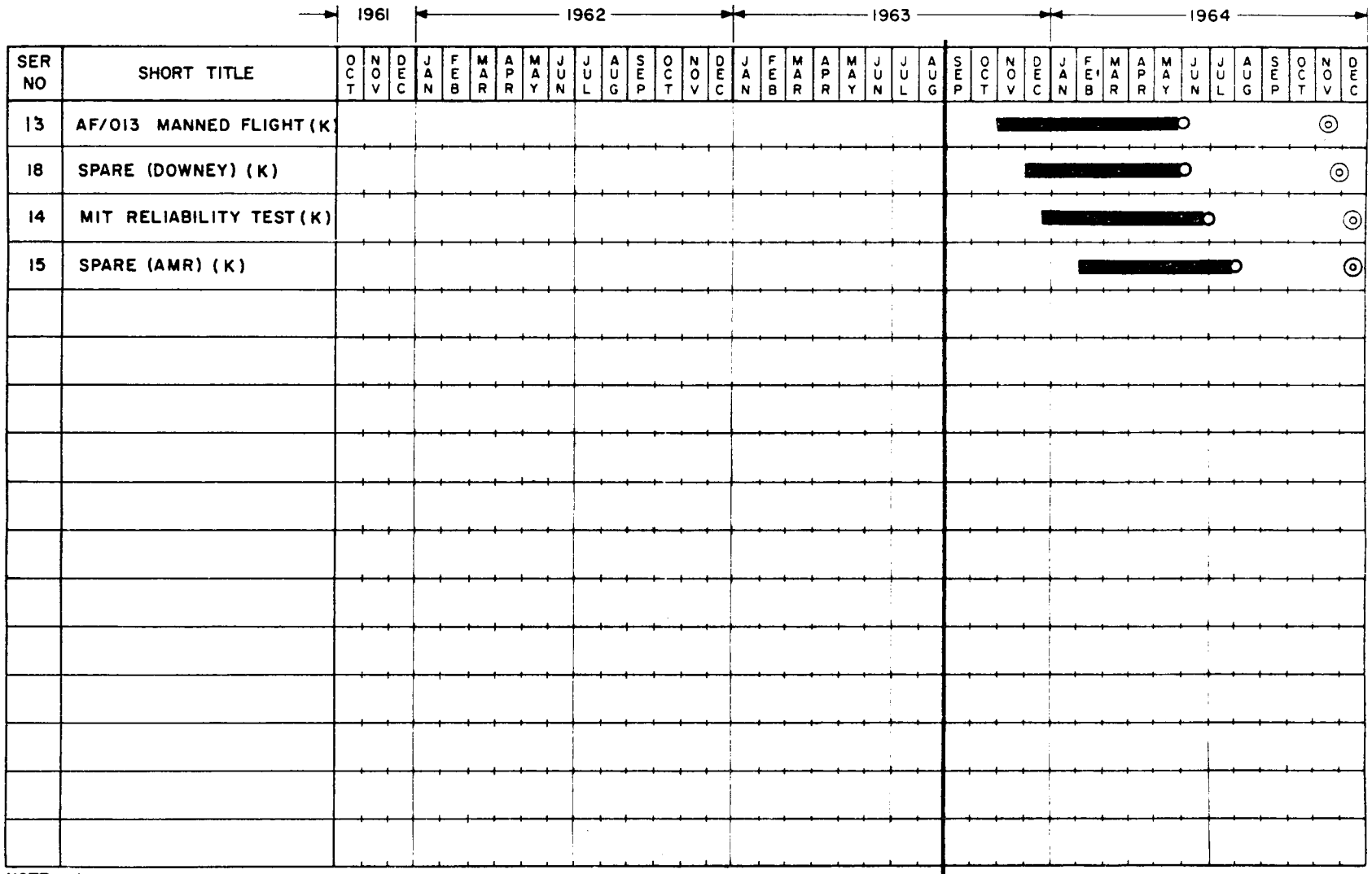


Fig. I-13 (cont)

APOLLO MILESTONE CHART FOR MIDCOURSE GUIDANCE STUDIES

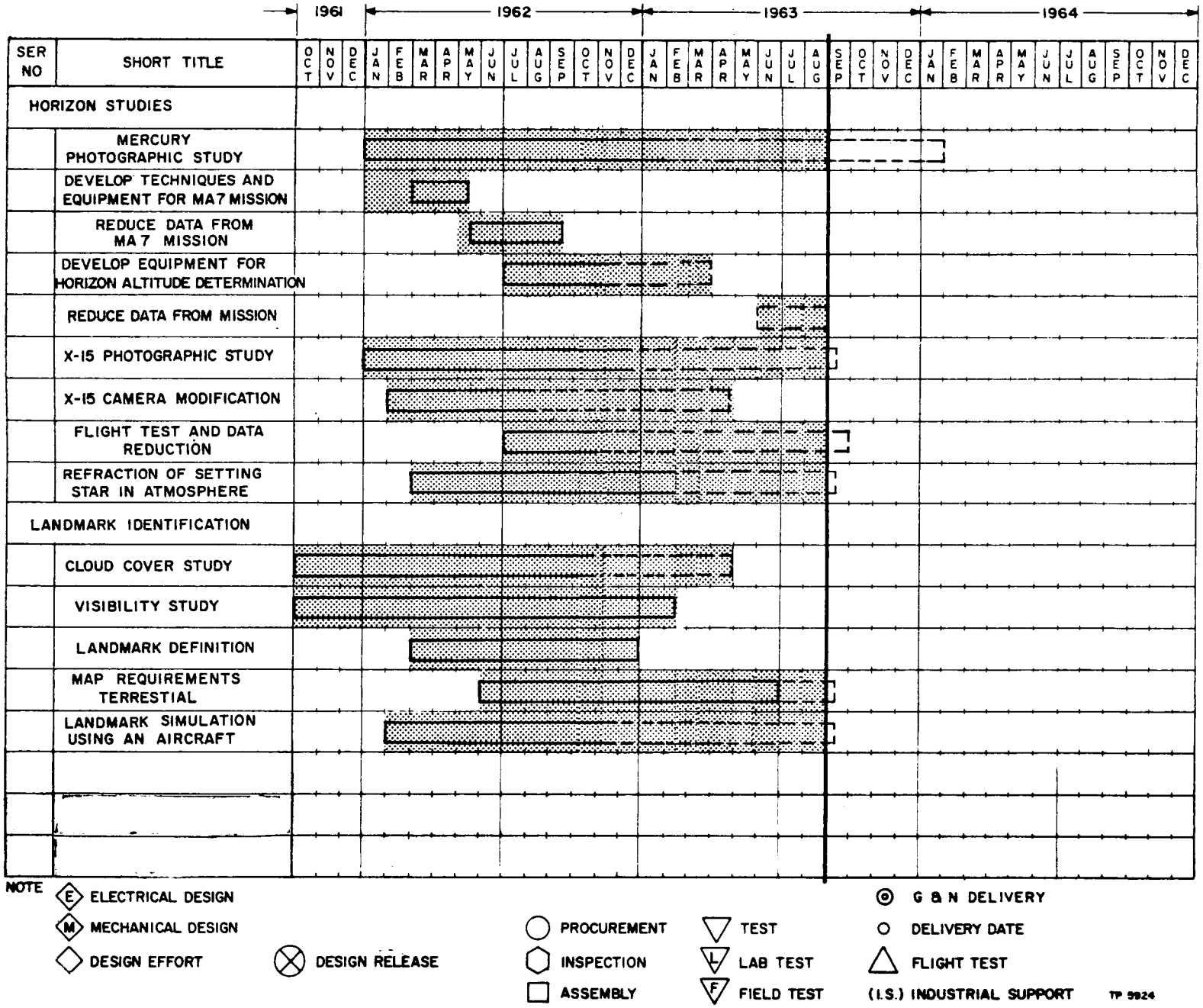


Fig. I-14

APOLLO MILESTONE CHART FOR MIDCOURSE GUIDANCE STUDIES (cont.)

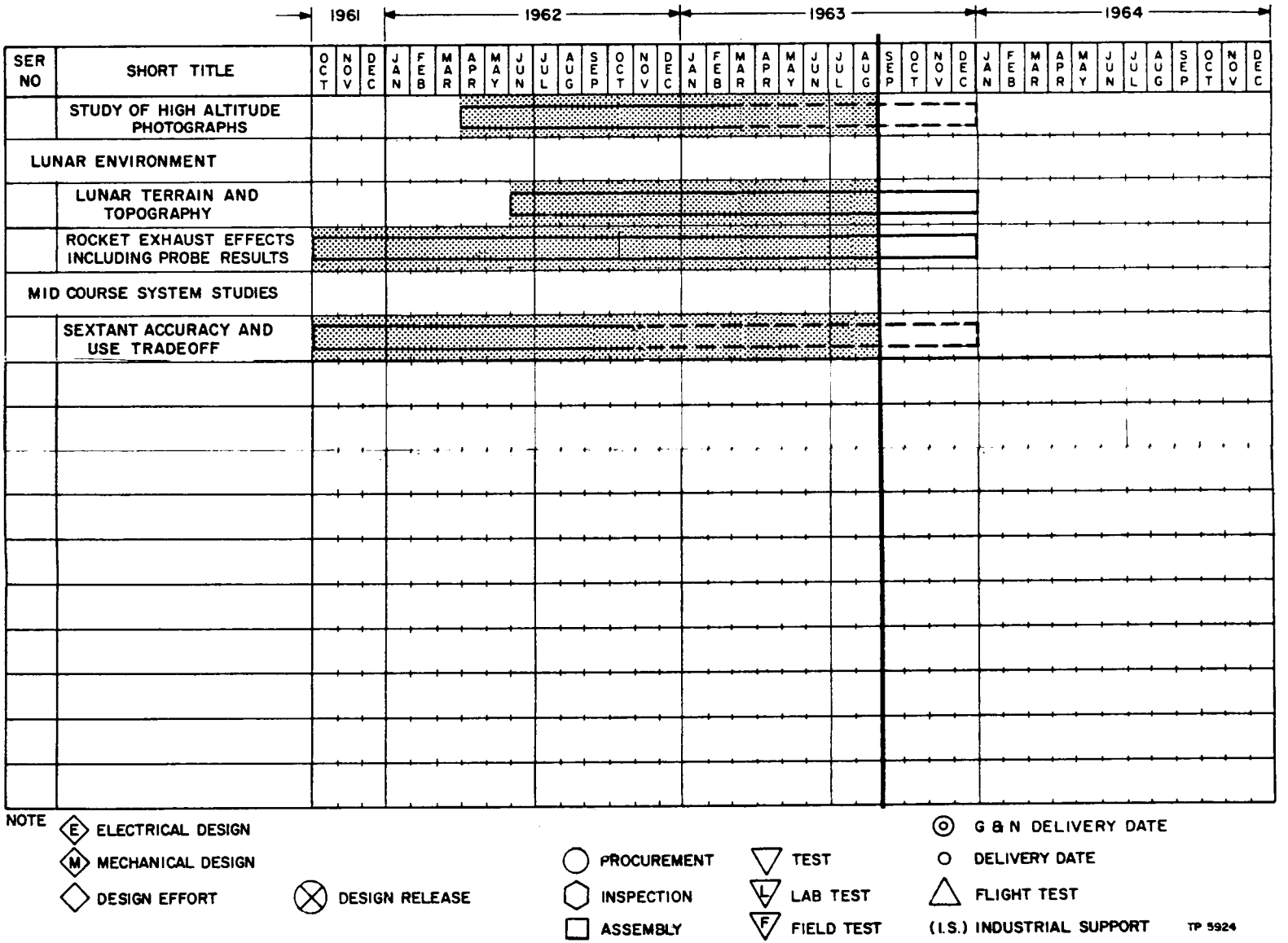


Fig. I-14 (cont)

APOLLO - RAYTHEON GSE DELIVERY SCHEDULE

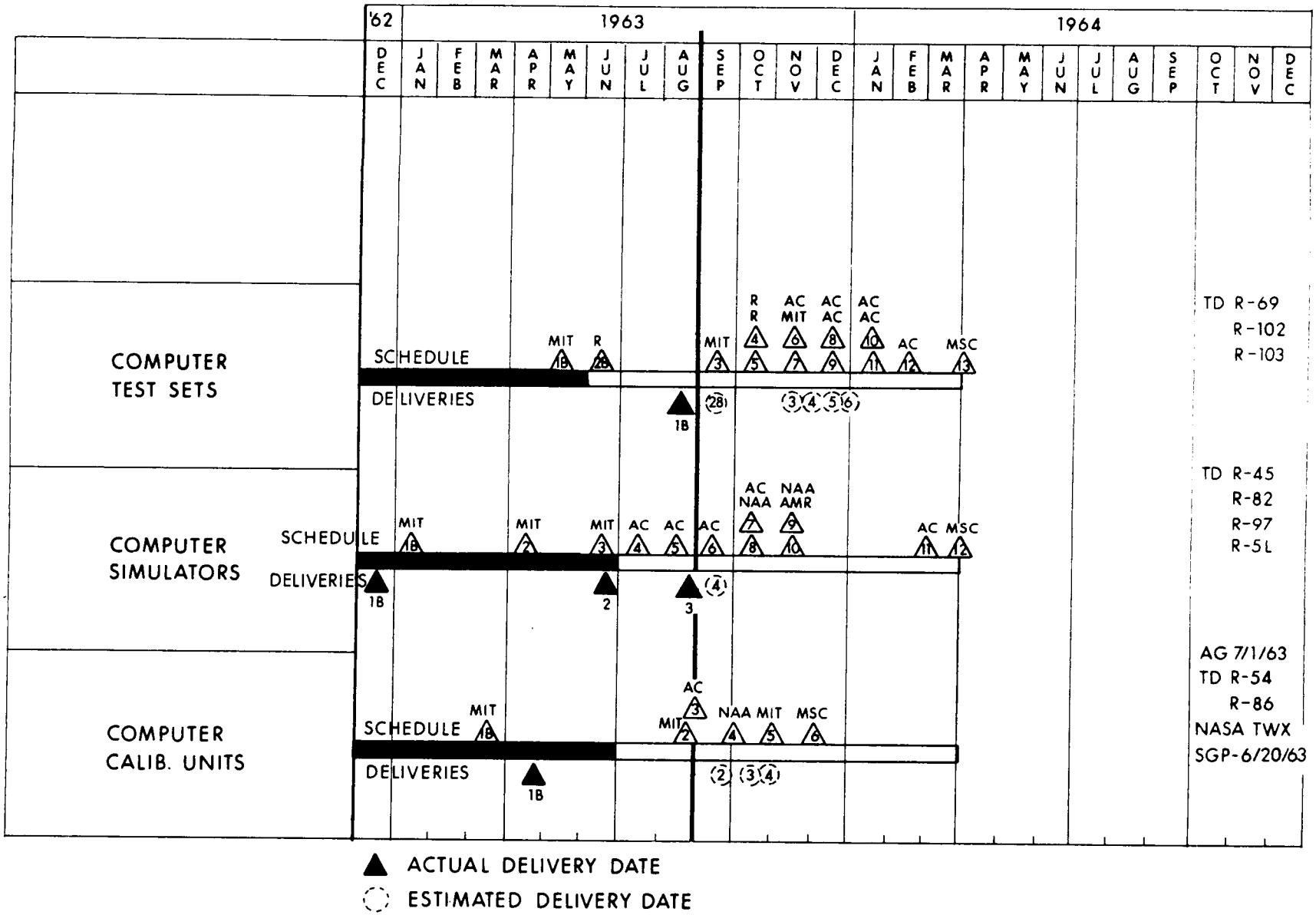


Fig. I-15

APOLLO - AC SPARK PLUG GSE SCHEDULE

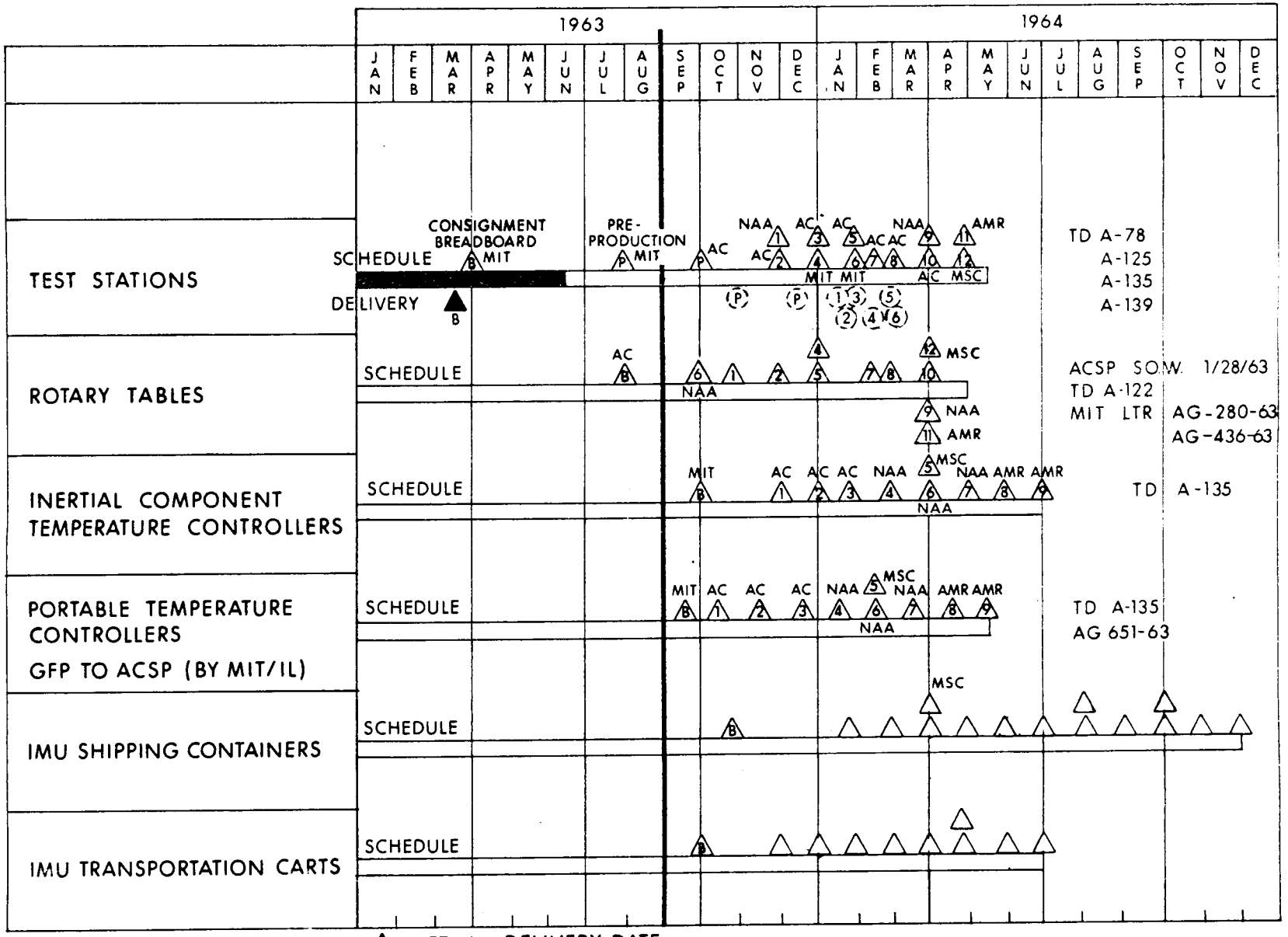
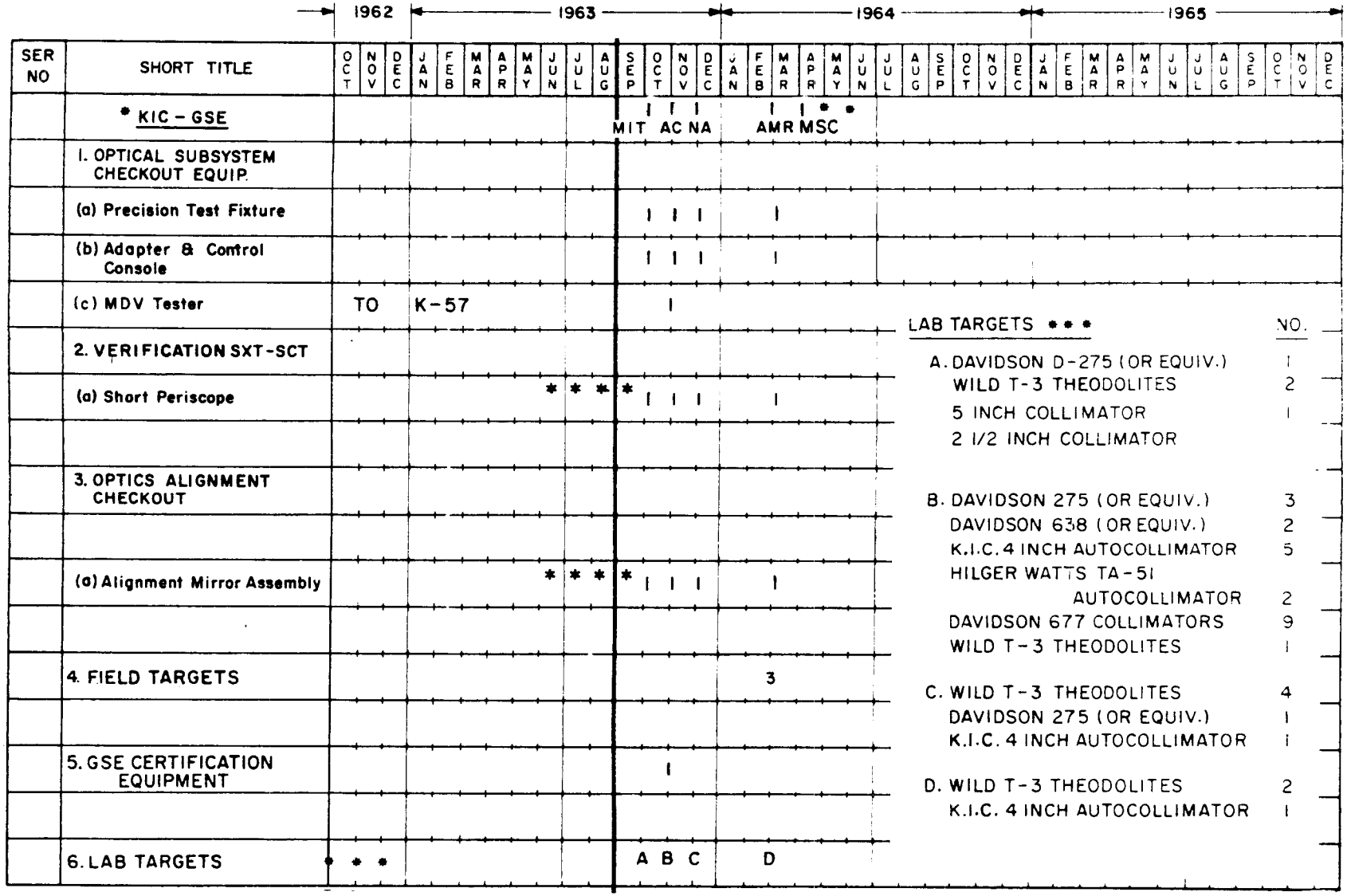


Fig. I-16

APOLLO MILESTONE CHART FOR KOLLSMAN INSTRUMENT CORP. GSE

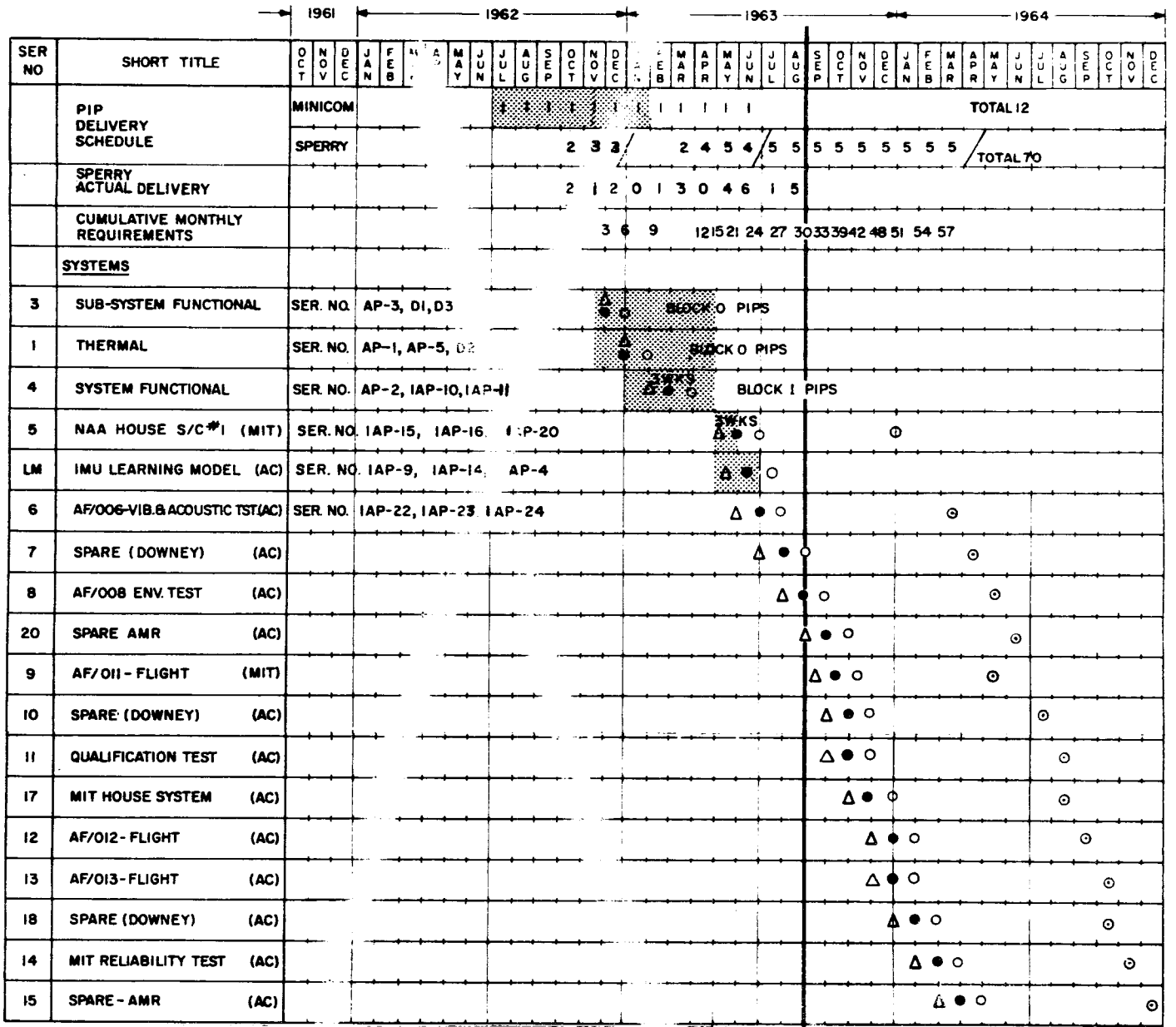


* K.I.C. STATEMENT OF WORK SGC - 100 - 133, DATED 11 MARCH, 1963 **** TD K-75

* * 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-17

APOLLO MILESTONE CHART FOR PIP REQUIREMENTS & DELIVERY SCHEDULES



NOTE
Δ DELIVERY OF PIPS FOR CALIBRATION
● DELIVERY OF PIPS FOR INSTALLATION ASSY.
○ IMU SUBSYSTEM DELIVERY DATE
⊙ G&N DELIVERY DATE (READY TO INSTALL IN S/C)

Fig. I-18

APOLLO MILESTONE CHART FOR IRIG REQUIREMENTS AND DELIVERY SCHEDULES

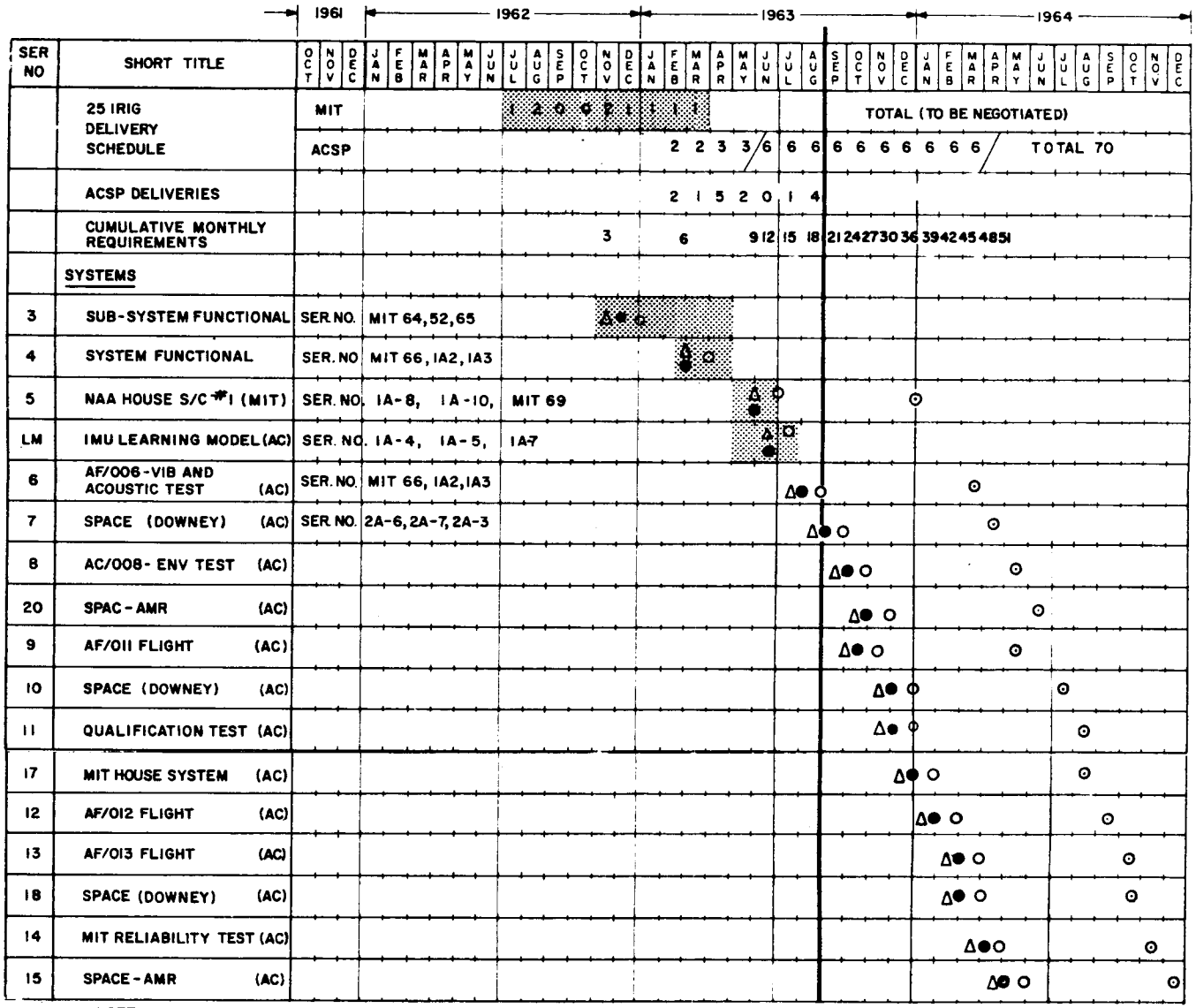


Fig. I-19

SECTION II
LUNAR EXCURSION MODULE
GUIDANCE EQUIPMENT STUDIES

During August 1963 several meetings were held between MIT/IL and GAEC to coordinate design and development studies. During these meetings questions of radar specifications, thermal interfaces and GSE tests facilities were discussed and several points agreed upon. It was further agreed that more information must be obtained on several items before definite agreement can be reached. These action items are due in September 1963.

In order that the reporting on the LEM studies can be brought up-to-date a list of all the Technical Directives relating to the LEM is included on the following pages:

Figure II-1 is a preliminary flow plan for the LEM Flight Test Schedule. This figure will be revised as required to reflect any future changes.

LEM TECHNICAL DIRECTIVES

No.	Title	Date Initiated
A- 1L	LEM Project Management	6/10
A- 2L	Resident Effort	6/10
A- 3L	Documentation	6/10
A- 4L	Scheduling and Reporting	6/10
A- 5L	Resident Effort: PSA Wiring Integration	7/11
A- 6L	Resident Effort: CDU and IMU Resolvers	7/11
A- 7L	Resident Effort: PIPA Development Group	7/11
A- 8L	IMU Electronics Resident Engineers	7/16
A- 9L	Resident Effort: CDU Electronics Design	7/19
A-10L	LEM GSE Resident Engineer	8/14
A-11L	Resident Effort	8/20
A-12L	Resident Effort: PSA	8/20
A-13L	Resident Effort: Optics	8/20
A-14L	Resident Engineer: IMU Assembly	8/20
A-15L	Environmental Studies	8/20
A-16L	LEM Test Requirements	8/21
A-17L	LEM GSE Interchangeability	8/26

LEM TECHNICAL DIRECTIVES (Cont'd)

No.	Title	Date Initiated
K- 1L	Resident Effort: LEM Concept	6/11
K- 2L	Internal Engineering: LEM Concept	6/11
K- 3L	Project Management: LEM Concept	6/11
K- 4L	Documentation: LEM Concept	6/21
K- 5L	Design Analysis	8/ 2
R- 1L	LEM Project Management	6/13
R- 2L	Resident Effort	6/13
R- 3L	Documentation	6/13
R- 4L	Scheduling and Reporting	6/13
R- 5L	LEM Hardware Fabrication	6/13
R- 6L	LEM Hardware Fabrication	6/13
R- 7L	LEM Hardware Fabrication	6/13
R- 8L	LGE Systems Test Procedures	6/21
R- 9L	AGC In-Flight Maintenance Study	7/23
R-10L	LEM G&N GSE Resident	8/ 5
R-11L	GSE Requirements for LGC	8/ 5
R-12L	Thermal and Structural Analysis of LGC Design	8/ 5
R-13L	Core Rope Manufacturing Study	8/ 5

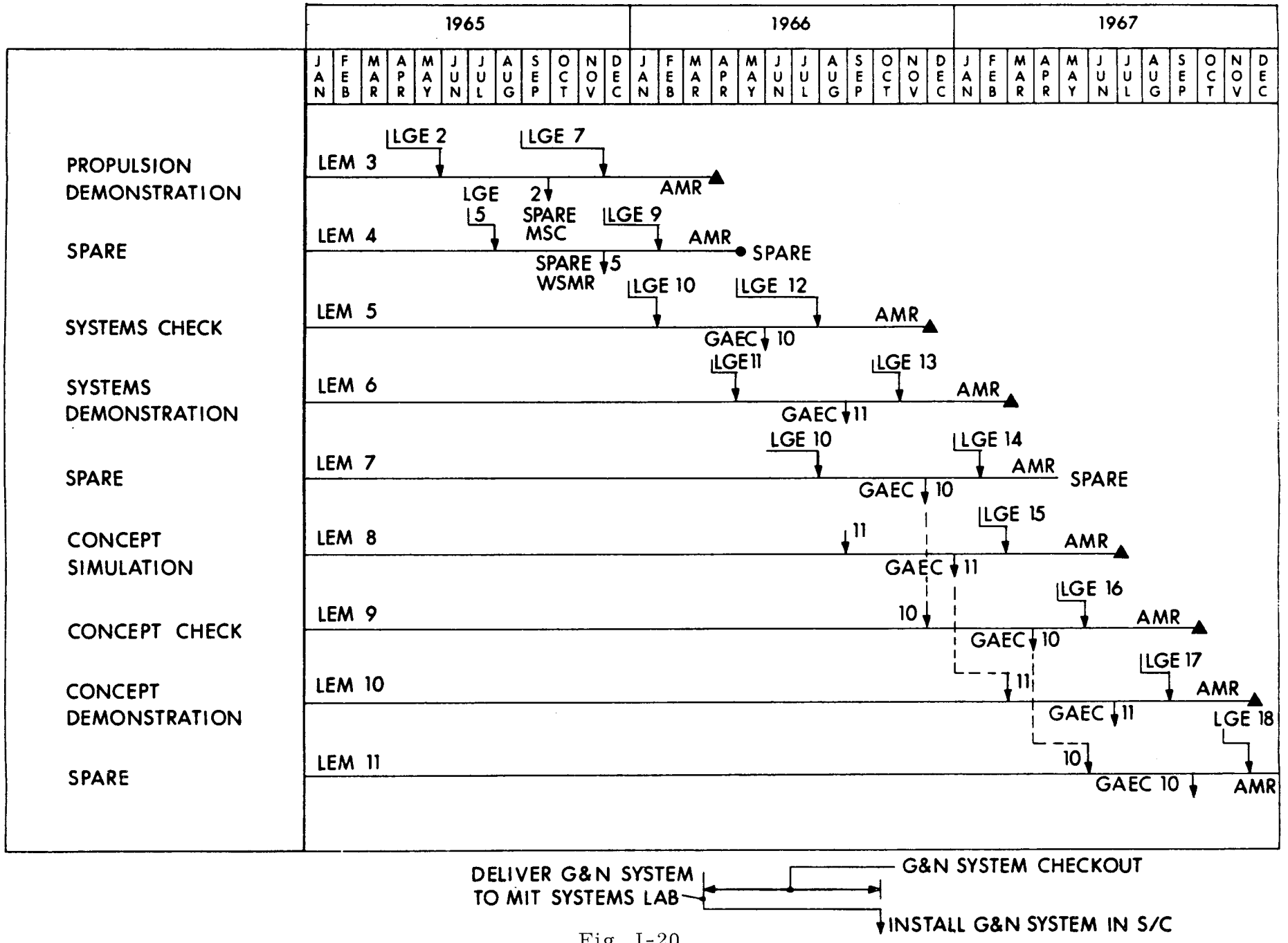

APOLLO LEM FLIGHT TEST SCHEDULE
1965
1966
1967
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC
PROPULSION DEMONSTRATION
SPARE
SYSTEMS CHECK
SYSTEMS DEMONSTRATION
SPARE
CONCEPT SIMULATION
CONCEPT CHECK
CONCEPT DEMONSTRATION
SPARE
LEM 3
LEM 4
LEM 5
LEM 6
LEM 7
LEM 8
LEM 9
LEM 10
LEM 11
LGE 2
LGE 7
AMR
LGE 5
2
SPARE MSC
LGE 9
AMR
SPARE
SPARE 5 WSMR
LGE 10
LGE 12
AMR
GAEC 10
LGE 11
LGE 13
AMR
GAEC 11
LGE 10
LGE 14
AMR
SPARE
GAEC 10
11
LGE 15
AMR
GAEC 11
LGE 16
10
AMR
GAEC 10
LGE 17
11
AMR
GAEC 11
LGE 18
10
GAEC 10
AMR
DELIVER G&N SYSTEM TO MIT SYSTEMS LAB
G&N SYSTEM CHECKOUT
INSTALL G&N SYSTEM IN S/C

Fig. I-20

TABLE I

MEETINGS ATTENDED BY MIT/IL APOLLO PERSONNEL

Period 1 August through 31 August 1963

Date	Location	Subject
1-2 August	MSC	SGA Panel
5-6 August	MIT	Design Review
5-9 August	MSC	FOD Support
6 August	MIT	Contract & Schedule Review
7 August	Raytheon, Sudbury	Progress Report
8 August	MIT	C/M LEM Sync.
8 August	ACSP, Milwaukee	Progress Report
14 August	MIT	LEM Guidance System
15 August	MIT	Spares Provisioning with P/C
15-16 August	S&ID	S&ID/MIT Mtg. #63
15-16 August	MIT	S&ID/MIT Mtg. #64B
23 August	MIT	Hughes Connector Usage
23 August	MIT	Maintenance and Repair Manual Mtg #8
27-28 August	Cape Canaveral	Apollo Checkout Panel #5
27 August	GAEC	Applicability of CSM G&N GSE to LEM
29 August	ACSP Milwaukee	Apollo Gyro Program
29 August	MIT	Thermal Mtg

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No.	Type	Period Ended
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 1963 (C)
E-1308	Monthly	April 1963 (C)
E-1378	Monthly	May 1963 (C)
E-1389	Quarterly	Period ended June 1963 (C)
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E-1445	Monthly	August 1963 (C)

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