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APOLLO

GUIDANCE AND NAVIGATION

Approved Milton B. Trageser Date 9/10/63
MILTON B. TRAGESER, DIRECTOR
APOLLO GUIDANCE AND NAVIGATION PROGRAM

Approved [signature] Date 7/26/63
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INSTRUMENTATION LABORATORY

(Unclassified Title)

REPORT E-1410

MONTHLY TECHNICAL PROGRESS REPORT

PROJECT APOLLO GUIDANCE

AND

NAVIGATION PROGRAM

July 1963

[redacted]

INSTRUMENTATION LABORATORY

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PREFACE

This Monthly Progress Report consists of Milestone Charts covering schedules for components and assemblies of the Apollo Guidance Equipment, together with comments about each chart.

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

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

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PROGRESS SUMMARIES

Figure I-1 shows the delivery schedule for guidance and navigation systems to be used in the Command Module. NASA approved, on 1 August 1963, MIT/IL's proposed change in the composition of Blocks I and II, thereby making AGE 13 the first system in Block II. However, MIT/IL's flow plan (Figure I-2) providing for shipment of G & N systems intended for flight directly to AMR, was not approved pending further evaluation within MSC.

NASA's decision as contained in Datafax letter, SG (PEE:wb) dated 1 August 1963, from D. Gilbert to M. Trageser was as follows:

> "The flow plan which provides for shipment of Guidance and Navigation systems intended for flight directly to AMR cannot be approved at this time. This flow plan is considered to be desirable from the point of view that less running time will be on a flight system than if it were shipped to the spacecraft manufacturer, tested at that point as well as tested prior to launch at AMR. It will be necessary to secure the opinions of a number of MSC divisions before this flow plan can be approved. For present planning purposes it should be considered that all systems will be shipped to the spacecraft manufacturer for test and assembly with spacecraft prior to shipment to AMR. ASPO will undertake to resolve this flow plan with other elements of MSC as soon as possible.
>
> "The delivery schedule presented for the Command Module shows a change in Block II delivery from a previous change point at System 9 to a new change point at System 13 coincident with delivery of the first LEM Guidance and Navigation. This change in Block II starting point is considered satisfactory with the condition that Command Module systems must not be delayed because of the LEM System Design Release.
>
> "The flight plans for AFRM 009 call for this to be an unmanned ballistic flight and a guidance and navigation system will not be

provided as part of the on-board systems. G & N System No. 5, previously allocated to AFRM 009, will now be allocated to North American's House Spacecraft No. 1. Since the basic electrical and mechanical integration of the G & N with the spacecraft will be performed on House Spacecraft No. 1 instead of ARFM 009, it is imperative that this system be delivered on time as indicated in the G & N recovery plan. No relaxation will be permitted in the delivery requirements for G & N System 5."

MIT/IL submitted a proposed Apollo Guidance Equipment Flow Plan to NASA in letter AG-382-63, dated 23 May 1963, as reflected in Fig. I-2. This proposal has not yet been approved nor has any alternate been adopted. After a flow plan has been approved, Fig. I-2 will be modified to indicate the respective airframes to which the various AGE's will be assigned.

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

A meeting was held in July to determine status of AGE-4 hardware (Fig. I-4). (Reference Apollo Project Memo #659, dated 24 July 1963, by P. J. Sarmanian). The following paragraphs have been abstracted from the above named memo, and supplement the AGE-4 schedule information contained in last month's report.

"Delivery of PSA-4, and therefore the start of Inertial Subsystems testing has slipped about one month, from 15 August to 15 September. It is expected that on 15 September those trays of electronics necessary to start Subsystems tests will be available. Hopefully, the remaining trays will be delivered in time to prevent delaying the completion of Subsystem tests.

"AGE-4 Systems tests, as a result of the one month slip indicated above, should start on 15 October, rather than 15 September (see enclosure I of APM #603). ACSP has indicated that delivery of the preproduction GSE will slip from 15 August to 10 September.

"The interim AGE-4 J-Box and harness have slipped from 26 July to 7 September, leaving about five weeks of marriage and checkout time. J. Flanders' test PSA J-Box will follow two weeks later. D. Test will have one cold plate built for PSA-4 rather than depend upon NAA's delivery.

NASA confirmed on 1 August 1963 a change in flight plans for Airframe 009, into which AGE 5 was to be installed (Fig. I-5).

As noted in last month's report, alignment and calibration work on the AGE-5 Inertial Subsystem is scheduled for the period from 15 September to 15 November 1963. On 15 September, IMU-5, the breadboard PSA, the consignment breadboard GSE, and the interim AGE-5 CDU's should be available; after a short period of marriage and functional checkout, actual alignment procedures can be started. As with the AGE 4 Inertial Subsystem, this time schedule is considered tight, and a two-shift operation will be employed so that the subsystem will be available to start systems testing on 15 November.

The blue module PSA-5 is scheduled for completion on 15 October; replacement of the breadboard PSA at that time is possible. However, an anticipated PSA-5 delivery slippage of two to three weeks, and subsystem down time in changing over, may be prohibitive. Consequently, initial use of PSA-5 may occur in the systems lab.

System assembly and test of AGE-5 is scheduled to begin 15 November 1963. The following hardware or suitable substitutes must be available and ready on that date.

a) IMU-5
b) PSA-5 (blue module)
c) Preproduction GSE
d) CDU-5
e) Cooler
*f) AGE-5 harness and J-Box (married and checked out)
*g) D&C-5
*h) N. B. -5
*i) AGE-5 Optics Subsystem
*j) AGC-5
*k) AGE fixture (including cold plates)

The asterisked equipment is required in the systems lab on 15 October for marriage and functional checkout prior to systems tests.

Figure I-6 showing the Apollo Milestone Chart for AGE-9 will be deleted from future Technical Progress Reports. In accordance with the directive in Datafax letter SG (PEE:wb) dated 1 August 1963 from D. Gilbert to M. Trageser, all work on AGE-9 has ceased and efforts are now toward delivery of AGE-13 as the first Block II AGE system in its stead.

A schedule for Guidance Theory and Programming is shown in Figure I-7. It is planned to replace this chart with a schedule derived from the existing PERT chart covering this effort.

Figure I-8 gives 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. The present outlook for AGC-5 is that it will be several weeks late. It is planned that AGC 4B, the Raytheon Learner Model, will be used in its place during system assembly and test of AGE 5. However, the latest PERT forecast is that AGC 4B will be delivered on 24 February 1964, approximately twelve weeks later than its scheduled date of 1 December 1963. AGC 6, scheduled for delivery to AC Spark Plug on 15 January 1964, is expected to be delivered on 8 April 1964, approximately twelve weeks behind schedule.

Figure I-9 shows the delivery schedule for all IMU's. Thermal testing is continuing on IMU 1. IMU 2 will be rebuilt with new stub shafts and vibration tests will be rerun. IMU 4 is undergoing functional checkout and alignment tests as part of the AGE 4 inertial subsystem marriage and checkout.

IMU 5 intergimbal 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. IMU assembly drawings are approximately 75% released.

Figure I-10 gives the PSA delivery schedule. PSA 1 (Thermal) was delivered by ACSP to MIT/IL on 7 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 on 5 July 1963.

Delivery of PSA 4, and therefore the start of AGE 4 Inertial Subsystem testing, has slipped about one month, from 15 August to 15 September. It is expected that on 15 September those trays of electronics necessary to start subsystem tests will be available. PSA 4A (rack mounted) is complete except for the temperature control electronics modules which should be available by 15 September.

PSA 5 (Class B), scheduled for completion by 15 October, is approximately four weeks behind schedule. PSA 5A, scheduled for completion by 1 August, is about two weeks behind schedule.

Note: 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-11 shows the delivery schedule for CDU subsystems. In May 1963, MIT/IL issued T. D. 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 as follows:

Quantity	Scheduled Delivery Date	ACSP Expected Delivery Date	Dcoumentation	Use
2	8/1/63	8/20/63	Less than Class A	Optics
3	9/15/63	10/19/63	Less than Class A	Inertial
3	10/15/63	11/30/63	Less than Class A	Inertial
2	10/15/63	11/30/63	Less than Class A	Optics
2	11/1/63	11/16/63	Less than Class A	Optics
2	11/1/63	11/16/63	Less than Class A	Optics
1	11/1/63	12/14/63	Class A	Vibration

Figure I-12 shows 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 on 1 September 1963. The delay is due to a problem of brazing the individual beryllium members which form the navigation base. (To alleviate the problem, consideration is being given to using a solid navigation base for AGE 6 and subsequent systems).

The Navigation Base for AGE 4 was delivered to MIT/IL on 12 July 1963. The Navigation Base for AGE 5, scheduled for delivery on 1 October 1963, is expected on 18 September 1963.

Figure I-13 shows the delivery schedule for all D & C subsystems. The breadboard D & C panels (G & N Indicator Panel, IMU Panel, and D & C Optical Shroud) under construction by AC Spark Plug and scheduled for delivery on 1 July 1963, are expected to be delayed until 21 September due to a delay in honeycomb panel delivery. D & C 1 and D & C 2, scheduled for delivery on 1 August 1963, are expected on 16 September 1963. D & C 4, scheduled for delivery on 1 September 1963, is expected on 1 October 1963. D & C 5A, scheduled for delivery on 1 August 1963, is expected on 9 August 1963.

D & C 5: The G & N Indicator Panel, scheduled for delivery on 1 November 1963, is expected on 15 January 1964 due to a revised estimate of Class A SCD drawing releases and firm definition of long lead parts. The IMU Panel, scheduled for delivery on 1 November 1963, is expected on 24 December 1963 due to late release of Class A drawings and procurement of long lead items.

Figure I-14 shows the Optical Subsystem Schedule. In July, MIT/IL issued TD K-82 authorizing the mechanical assembly of optical subsystems 1, 2, and 3. This assembly shall be accomplished at KIC as an in-house manufacturing effort,

rather than the originally contemplated resident effort at MIT/IL. It is understood that Kollsman will deliver optical subsystems 1, 2, and 3 on either of the following schedules:

	A	B
Optics 1	10/15/63	9/15/63
Optics 2	11/15/63	10/15/63
Optics 3	12/15/63	10/30/63

Alternate A is based on the assumption that Optics 4 and 5 are to be delivered in accordance with the schedule indicated in 11 March 1963 NASA Statement of Work for KIC. Alternate B is based on the assumption that Optics 4 and 5 are to be delivered by 15 November 1963 and 15 December 1963, respectively. MIT/IL has recommended that NASA approve the alternate B delivery schedule.

The optical subsystem for AGE 5A was delivered to MIT/IL on 26 July 1963.

Figure I-15 shows the delivery schedule for all Map and Data Viewers.

MDV 1 and 2 are considered by KIC to be approximately six weeks behind schedule. MDV 4 is reported by KIC to be about four weeks behind schedule, and MDV 5 is considered to be on schedule.

Figure I-16, 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-17 shows the delivery schedule for Raytheon's ground support equipment.

Computer Test Sets. The first breadboard computer test set, originally scheduled for delivery in May, is expected to be delivered to MIT/IL on 23 August 1963. Final modifications to Breadboard Test Sets #1 and #2 have caused the delay in delivery. Estimated delivery dates for subsequent test sets are as shown in Figure I-17.

Computer Simulators. Computer simulator #3, originally scheduled for delivery in June, is expected to be delivered to MIT/IL on 16 August 1963. Design changes to Computer Simulator #2, reflecting additional procurement, have caused the delay in delivery. In June, MIT/IL issued T. D. R-5L authorizing Raytheon to fabricate one additional computer simulator to Block I CM configuration. This simulator is to be delivered to AC Spark Plug by 1 March 1964.

Computer Calibration Equipment. NASA authorized the following delivery schedule for Computer Calibration Units in order to satisfy MIT/IL's request for a second calibration unit at MIT to conduct crystal oscillator aging tests (reference NASA TWX SGP 6-361 to MIT/IL dated 20 June 1963):

Unit	Destination	Delivery Date
2	MIT	8/23/63
3	ACSP	8/30/63
4	NAA	9/30/63
5	MIT	10/30/63 then to
	AMR	6/1/64
6	MSC	11/30/63

Raytheon reports that Calibration Unit #2 is expected to be delivered to MIT/IL on 27 September 1963.

Figure I-18 shows the delivery schedule for AC Spark Plug ground support equipment.

Test Stations. ACSP has indicated that delivery of the preproduction GSE, scheduled for delivery to MIT/IL on 15 August, will slip to early October. This late delivery could delay the start of system testing on AGE 4. The next preproduction GSE, allocated to ACSP and scheduled for completion on 1 October 1963, is expected to slip to late November. The first production GSE test station, scheduled for delivery to NAA on 1 December 1963, is expected to slip to March 1964.

Rotary Tables: TD A-122 dated 21 February 1963 and amended by MIT/IL letter AG-280-63 (29 April 1963), authorizes AC Spark Plug to procure 10 Ultra-Precision Rotary Tables in accordance with procurement specification PS 1002065 dated 6 February 1963. 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 AC Spark Plug is to arrange source inspection and acceptance on these units at the vendor's facility.

Serial No.	Allocation	Delivery Date
6	MIT System Lab/NAA	9-1-63
9	MIT System Lab	9-1-63
11	MIT System Lab/AMR	3-15-64

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

The Inertial Component 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 AC Spark Plug. AC Spark Plug will fabricate only the battery and alarm pack. The ICTC delivery schedule is shown in accordance with AC Spark Plug's statement of work dated 28 January 1963, and MIT/IL TD A-135.

Portable Temperature Controllers: Under the provisions of AC Spark Plug's statement of work (28 January 1963) and TD A-135, ACSP is obliged to deliver a complete Inertial Component Temperature Controller containing the GFP Portable Temperature Control Unit. To accomplish this AC Spark Plug has requested the delivery schedule shown below. (Reference ACSP letter AP-M-992 dated 31 July 1963).

Unit	ICTC Delivery Date	Allocation	PTC Required (GFP)
B	10/1/63	MIT	9/15/63
1	12/1/63	ACSP	6 wks prior to delivery
2	1/1/64	ACSP	6 wks prior to delivery
3	2/1/64	ACSP	6 wks prior to delivery
4	3/1/64	NAA	6 wks prior to delivery
5	4/1/64	MSC	6 wks prior to delivery
6	4/1/64	NAA	6 wks prior to delivery
7	5/1/64	NAA	6 wks prior to delivery
8	6/1/64	AMR	6 wks prior to delivery
9	7/1/64	AMR	6 wks prior to delivery

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 AC Spark Plug's Statement of Work dated 28 January 1963.

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

Figure I-19 shows 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 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

In July, MIT/IL issued TDK-85 directing Kollsman to purchase and fabricate parts for two Precision Test Fixtures per NASA Drawing 1016910 and subassembly drawings thereof.

Figure I-20 shows a PIP delivery schedule. During July, the following PIP's were acceptance-tested at Sperry: Serial numbers 1 AP-22, 1 AP-23, 1 AP-24, 1 AP-25, 1 AP-26.

On 23 July 1963, the following PIP's were delivered to AC Spark Plug for use in their Learner Model IMU:

APOLLO 16 PIP
1 AP-9
1 AP-14

For the third pendulum required in the IMU, MIT/IL has designated that Sperry pendulum (APOLLO 16 PIP) Serial # AP-4, which was at ACSP for Pendulum console checkout, be used.

Figure I-21 shows an IRIG delivery schedule. As noted in last month's report, the last of ten ACSP IRIG's were received at MIT/IL in May.

On 23 July 1963, the following IRIG's were delivered to AC Spark Plug for their Learner Model IMU:

APOLLO 25 IRIG
1A-4
1A-5
1A-7

Three IRIG's for AGE 5 (Serial numbers MIT 69, 1A-8, 1A-10) have left the IMU Test Lab, W7-153) to be installed on the AGE 5 inertial platform.

During the interval between 1 July and 31 July, MIT/IL Apollo Project personnel attended meetings as shown on Table I.

Fig. I-1

APOLLO MILESTONE CHART FOR DELIVERY SCHEDULE FOR GUIDANCE & NAVIGATION SYSTEMS

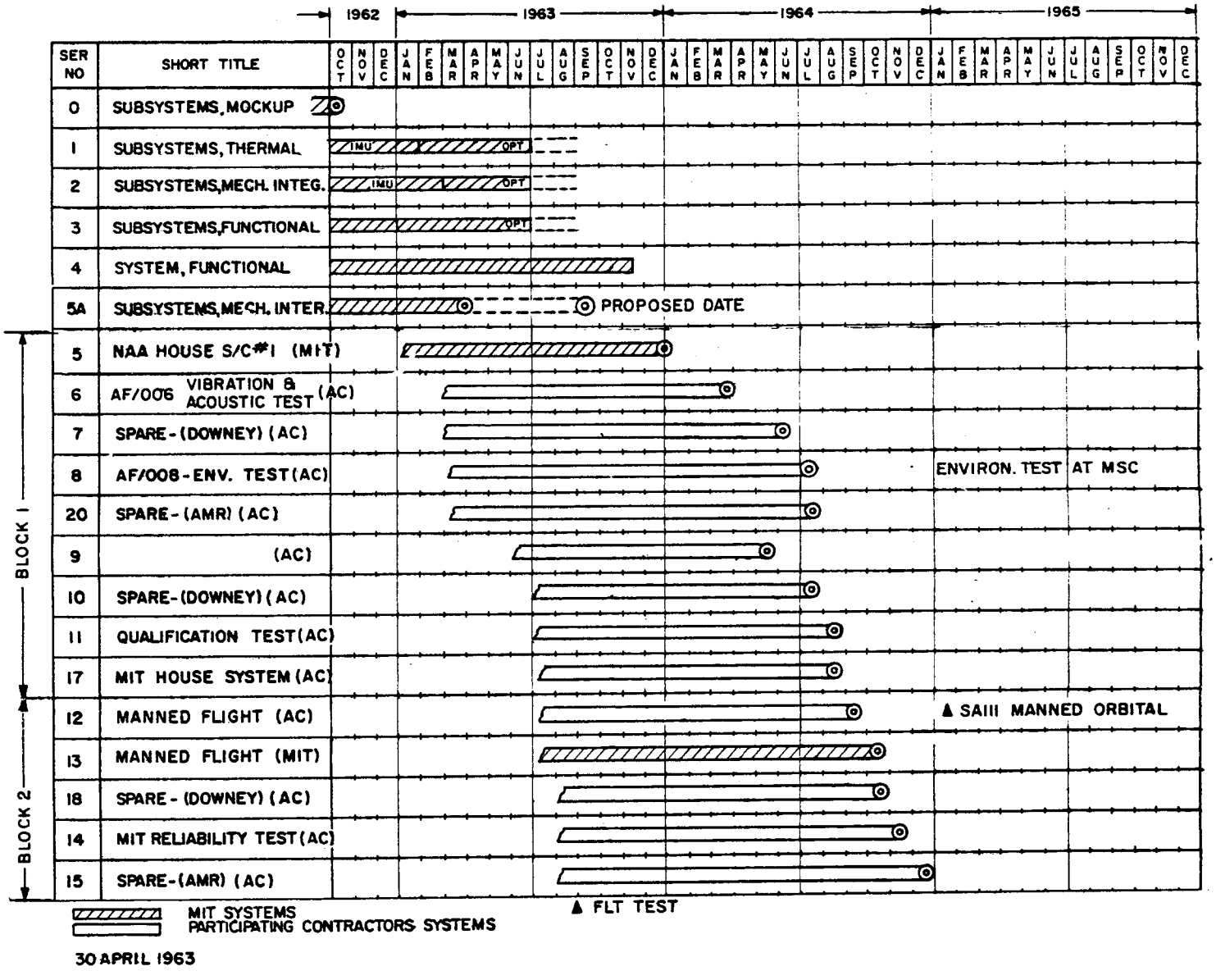

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Fig. 1-2

APOLLO C/M FLIGHT TEST SCHEDULE

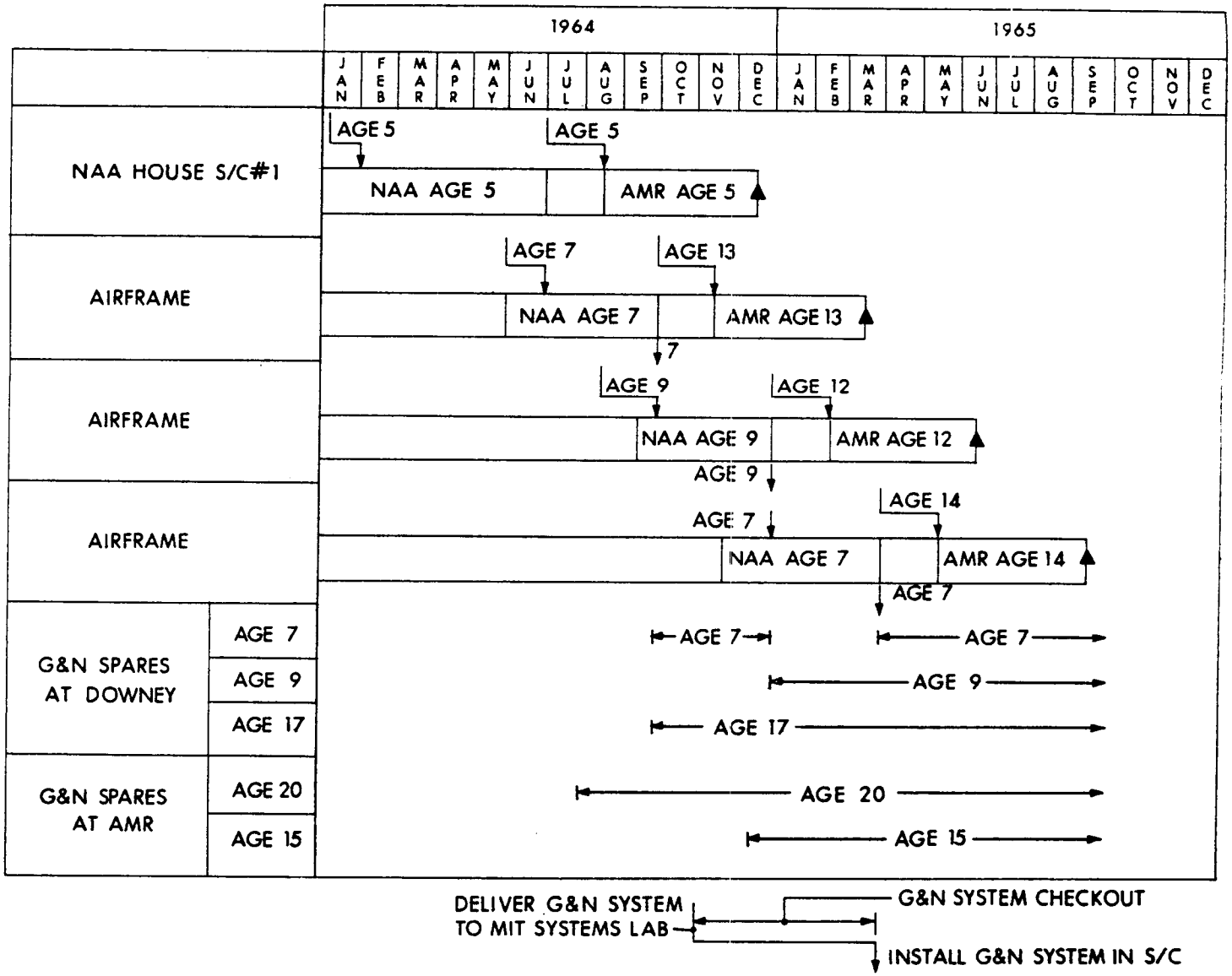


Fig. I-3

APOLLO LEM FLIGHT TEST SCHEDULE

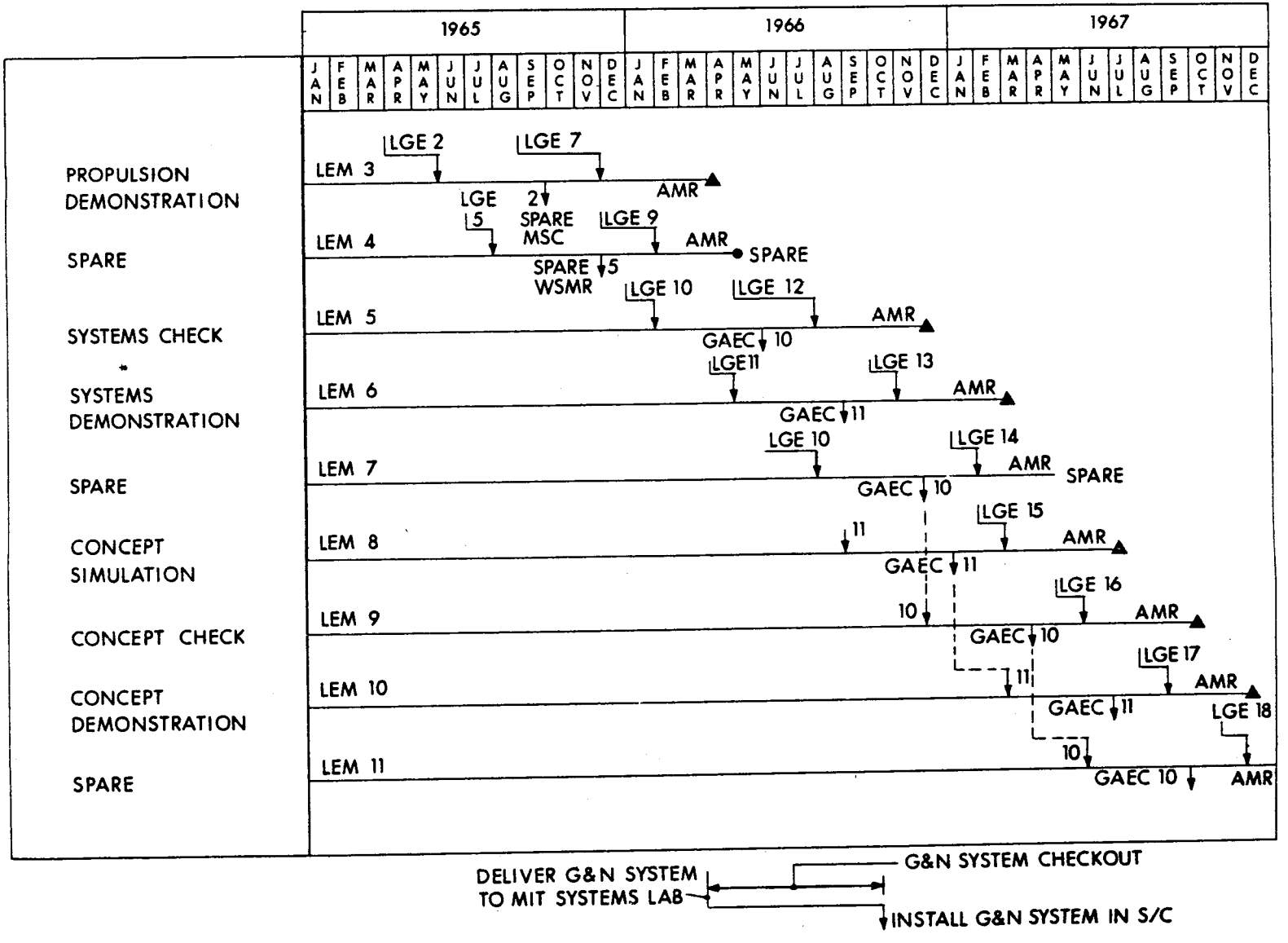
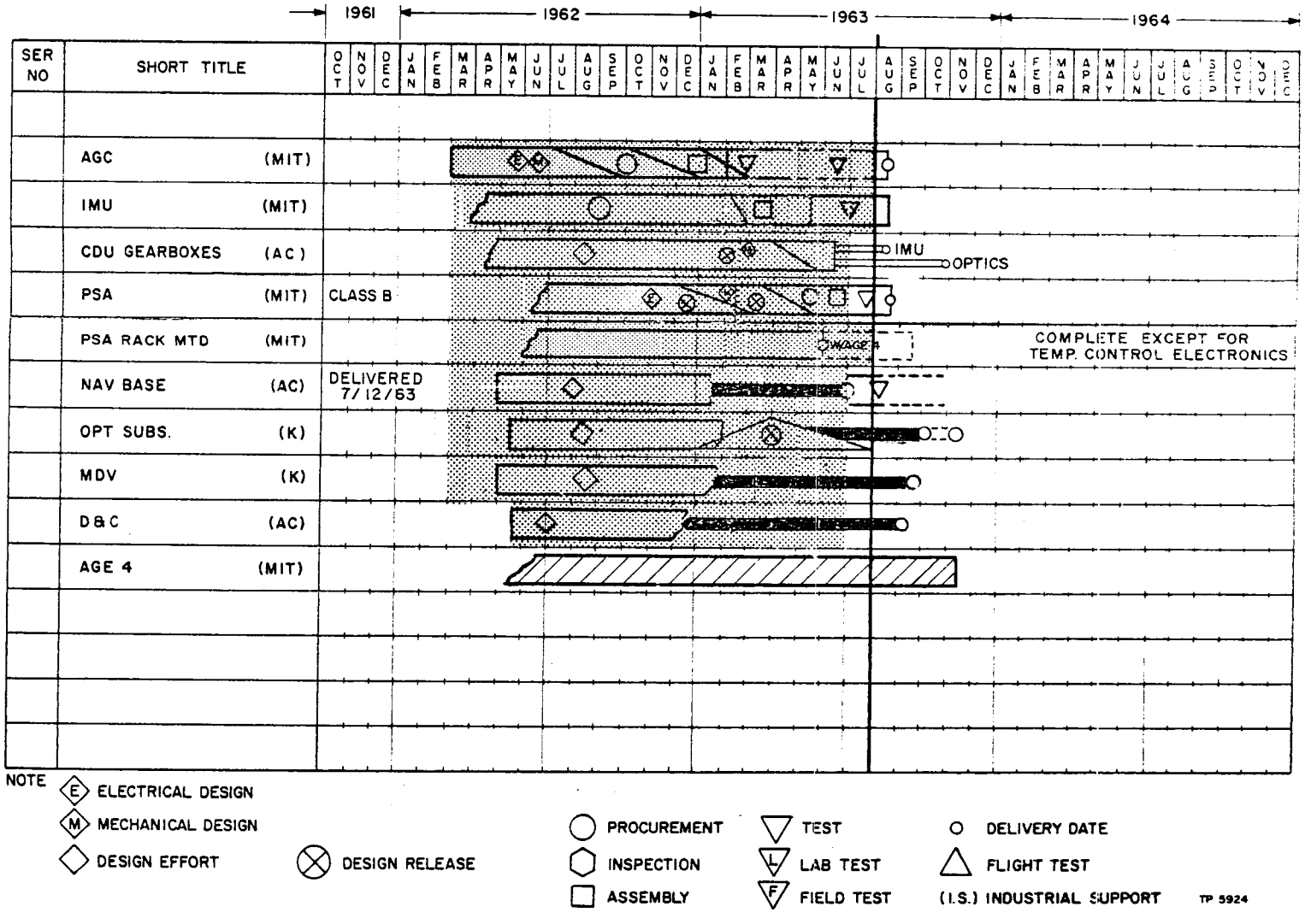


Fig. I-4

APOLLO MILESTONE CHART FOR AGE 4



APOLLO MILESTONE CHART FOR AGE 5

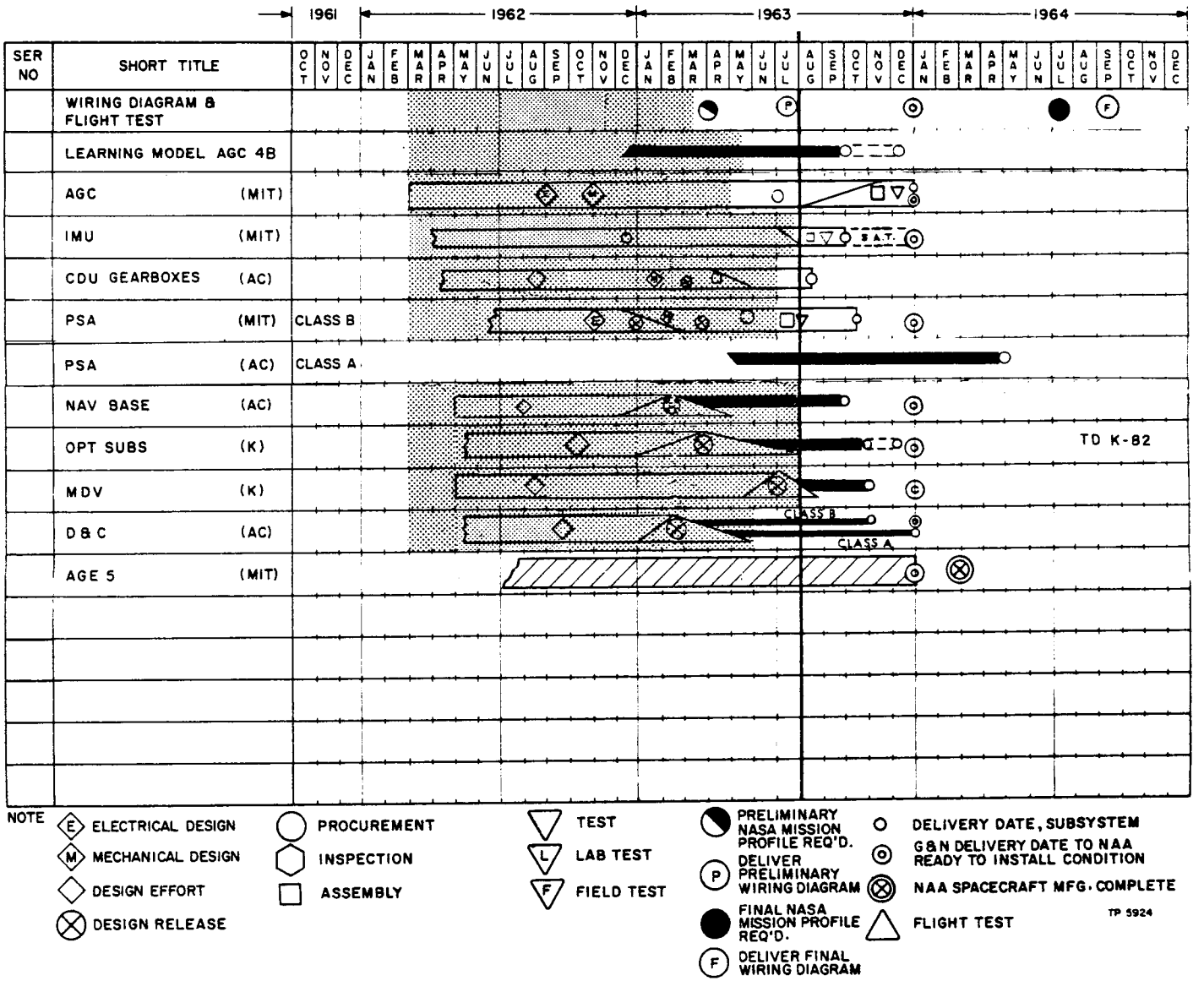
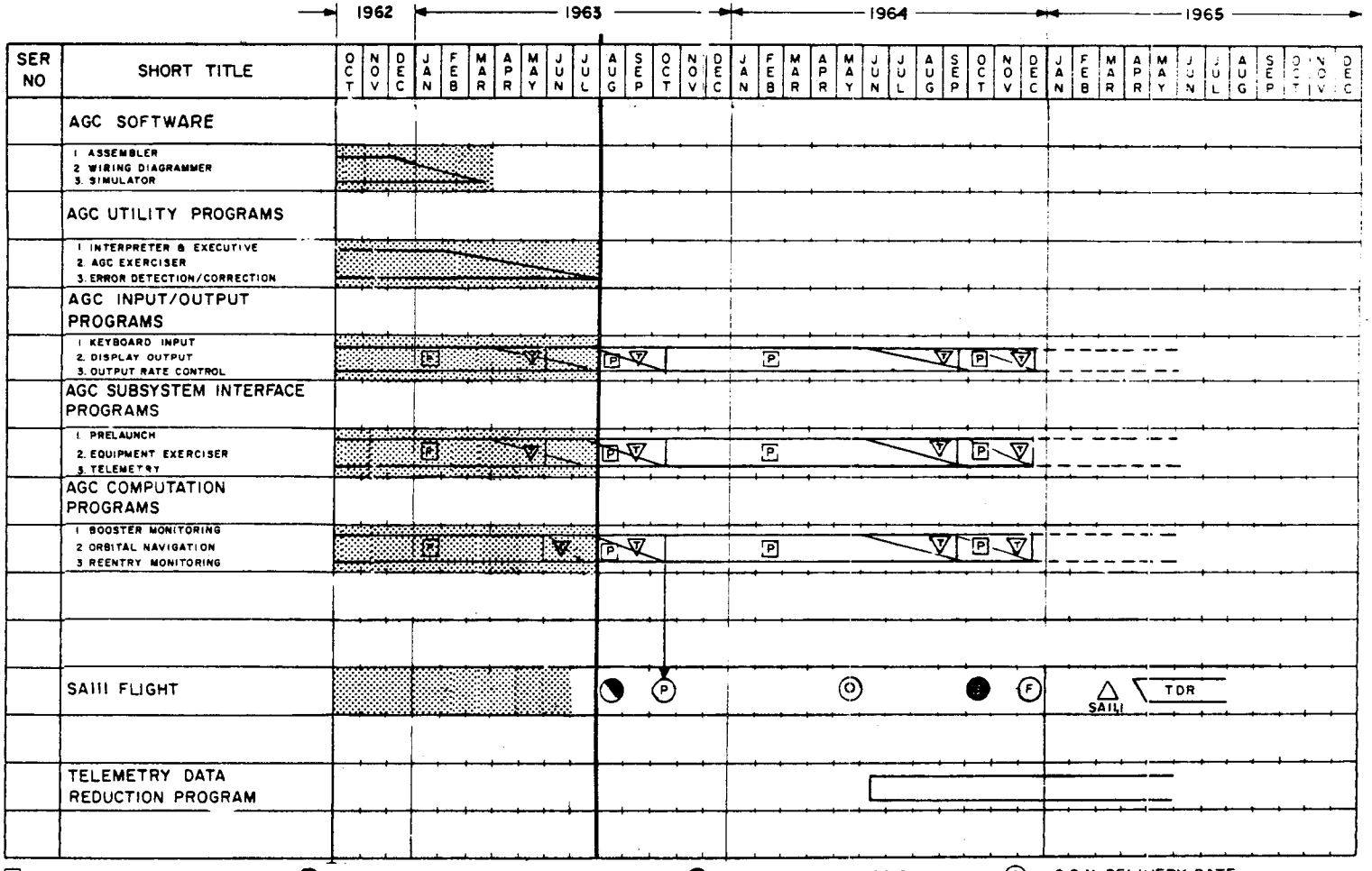


Fig. I-7

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



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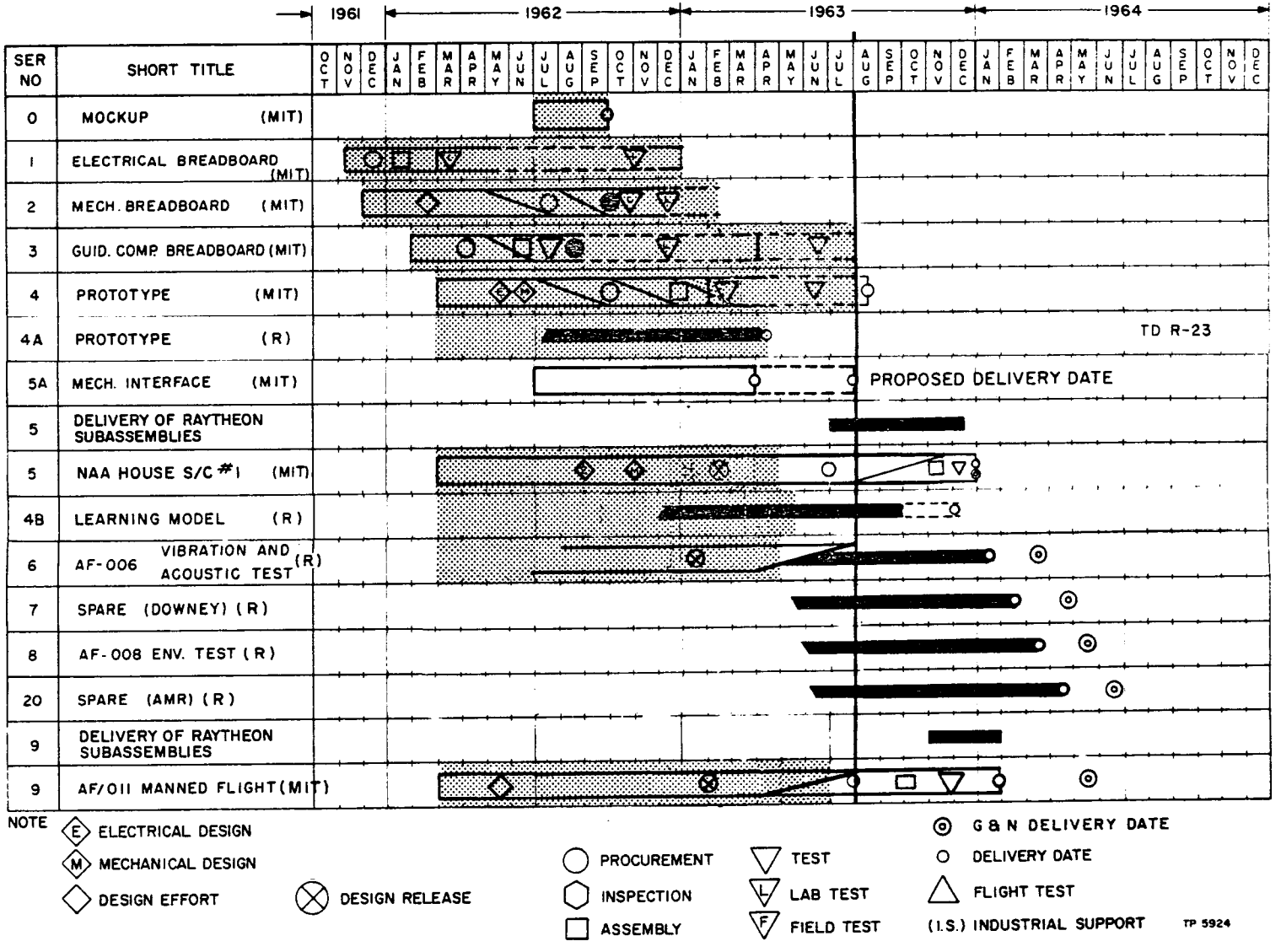

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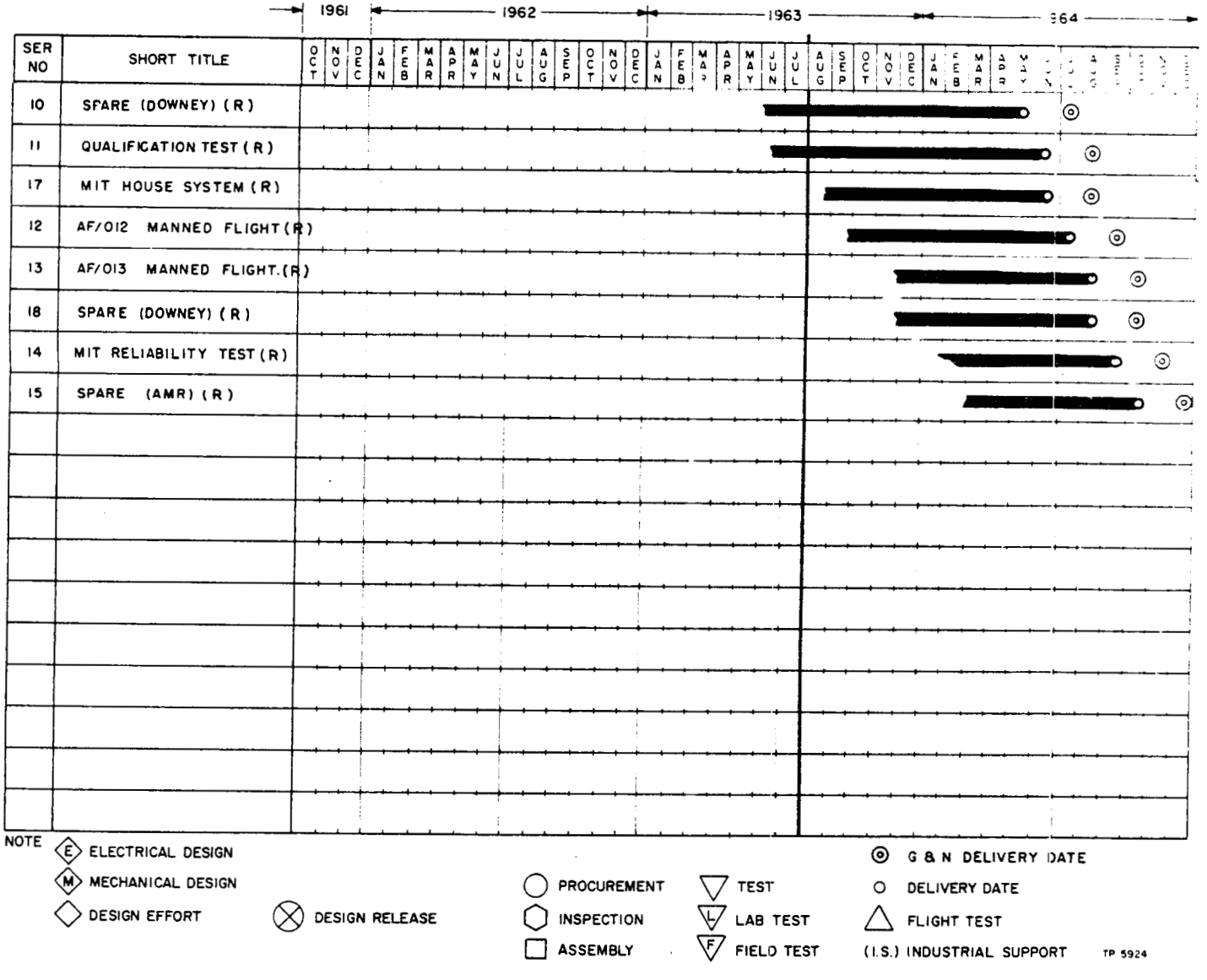
Fig. 1-8 (cont'd)



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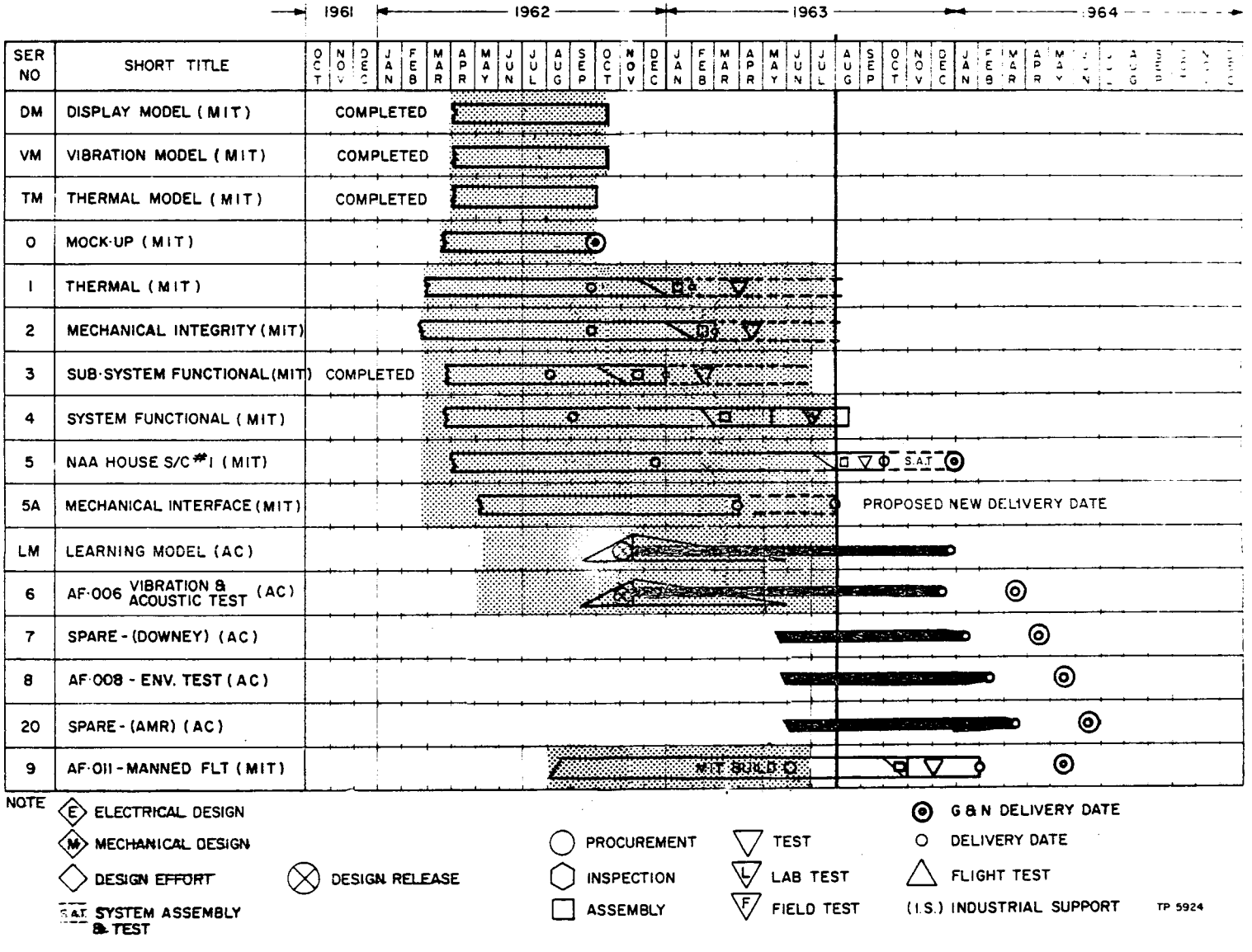

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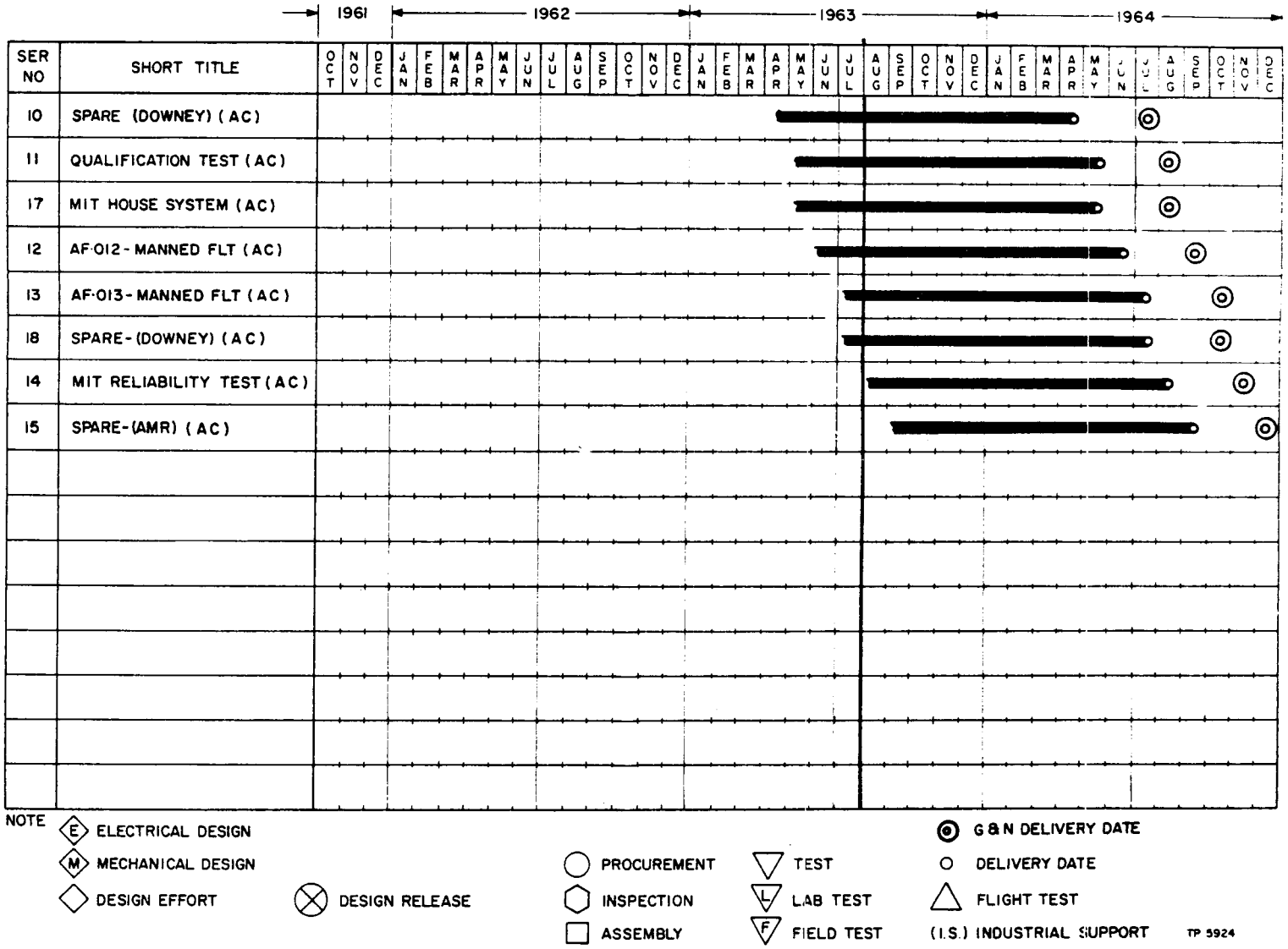


Fig. 1-10

APOLLO MILESTONE CHART FOR POWER AND SERVO ASSEMBLY (PSA)

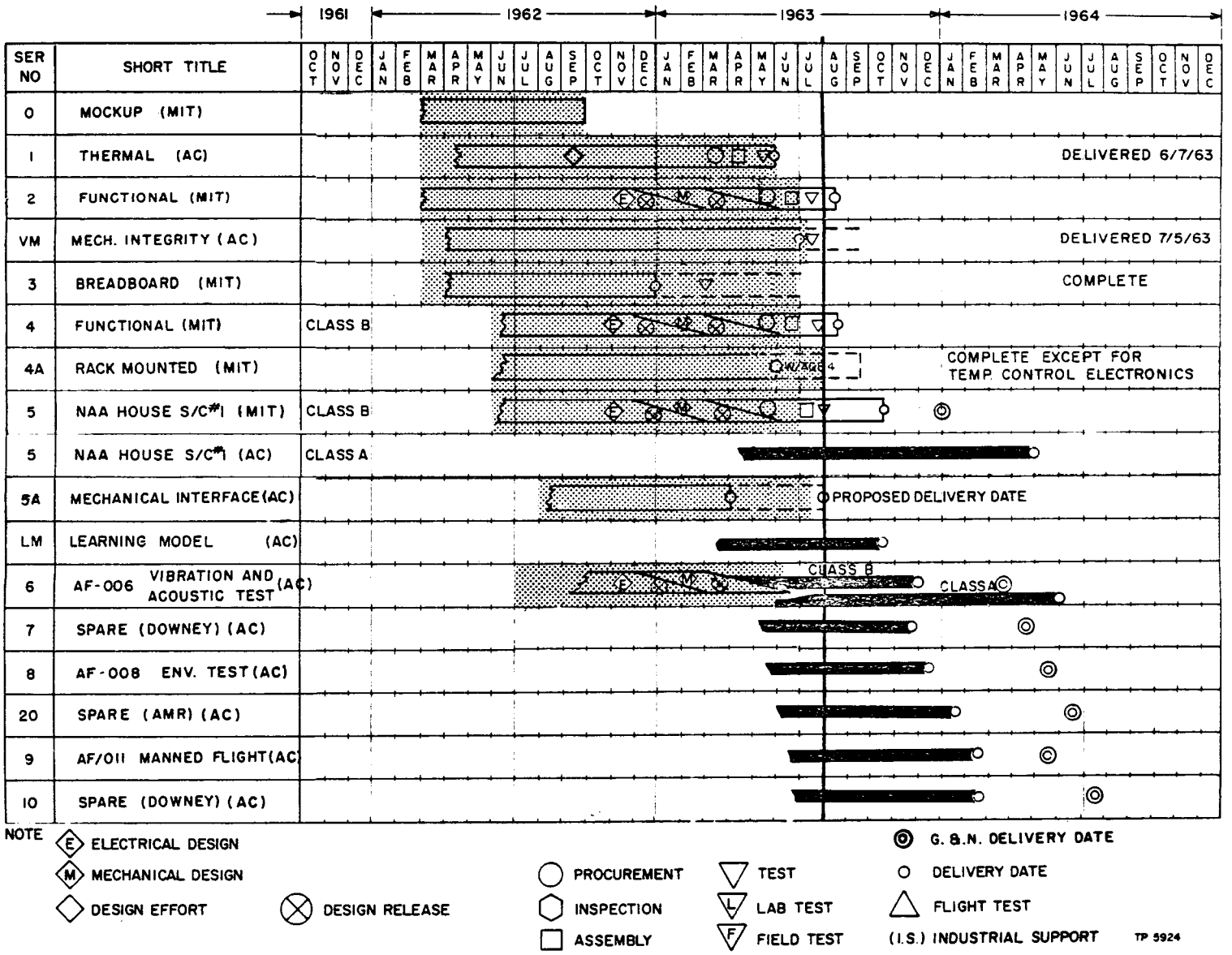
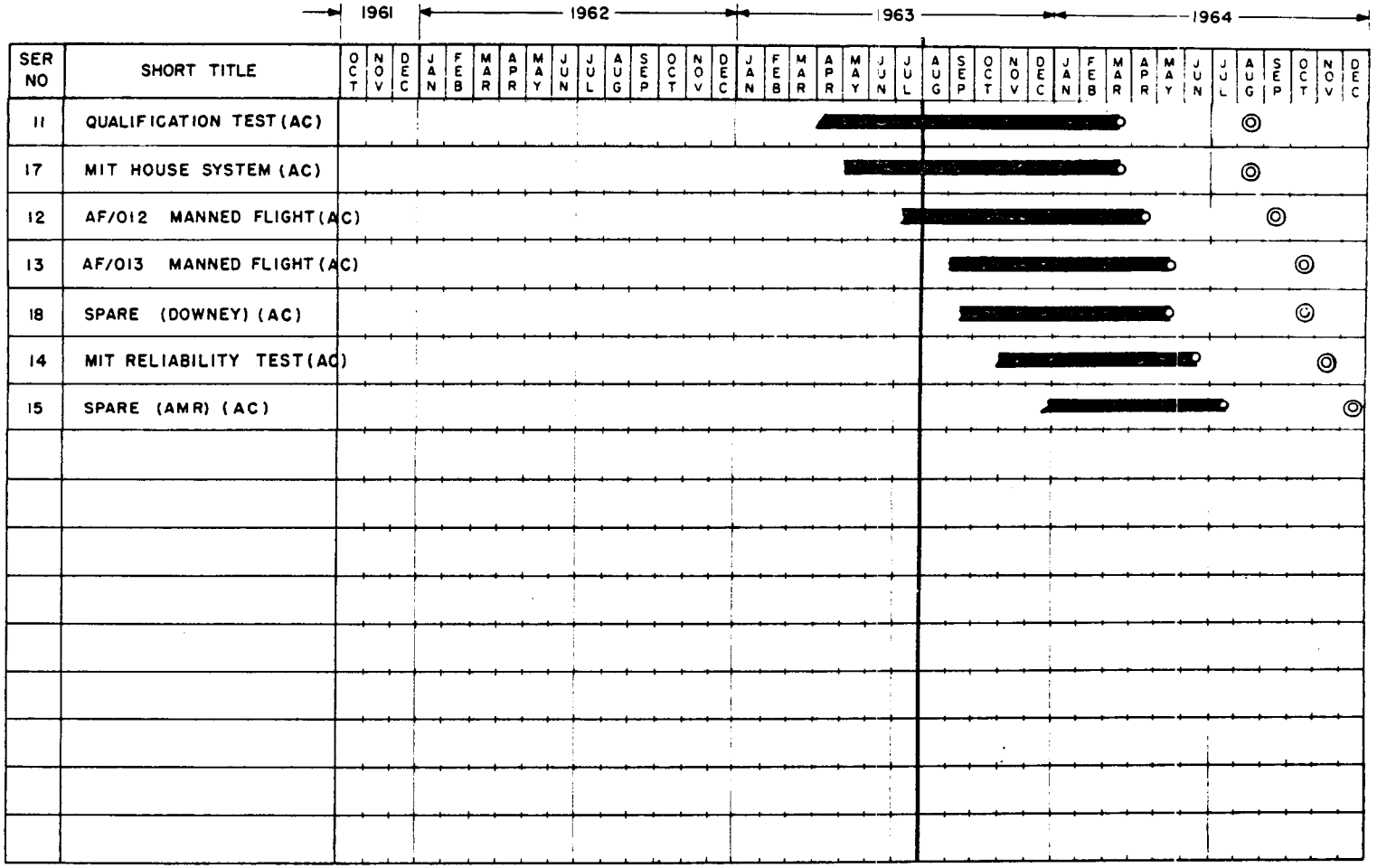


Fig. 1-10 (cont'd)

APOLLO MILESTONE CHART FOR POWER AND SERVO ASSEMBLY cont.



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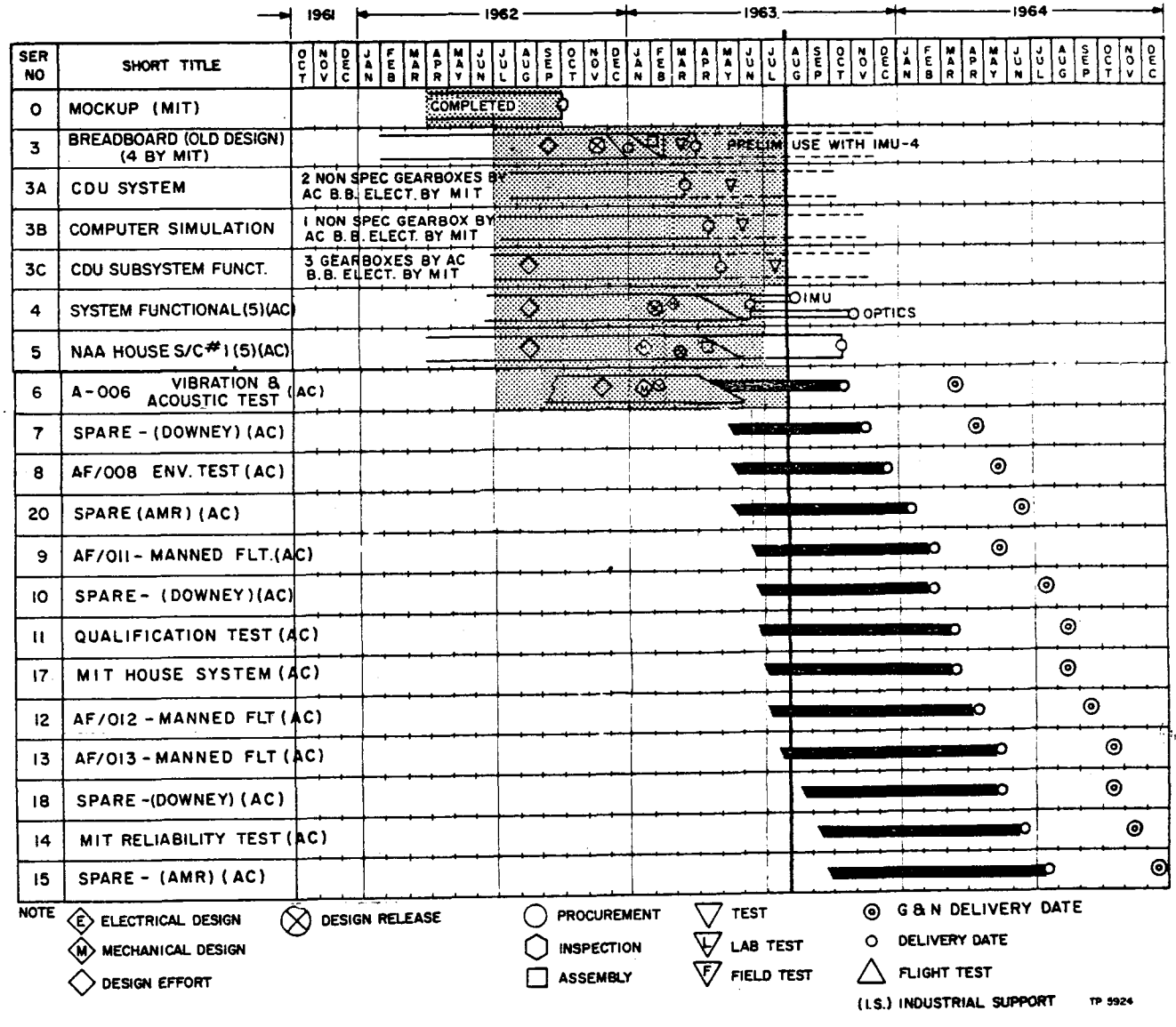
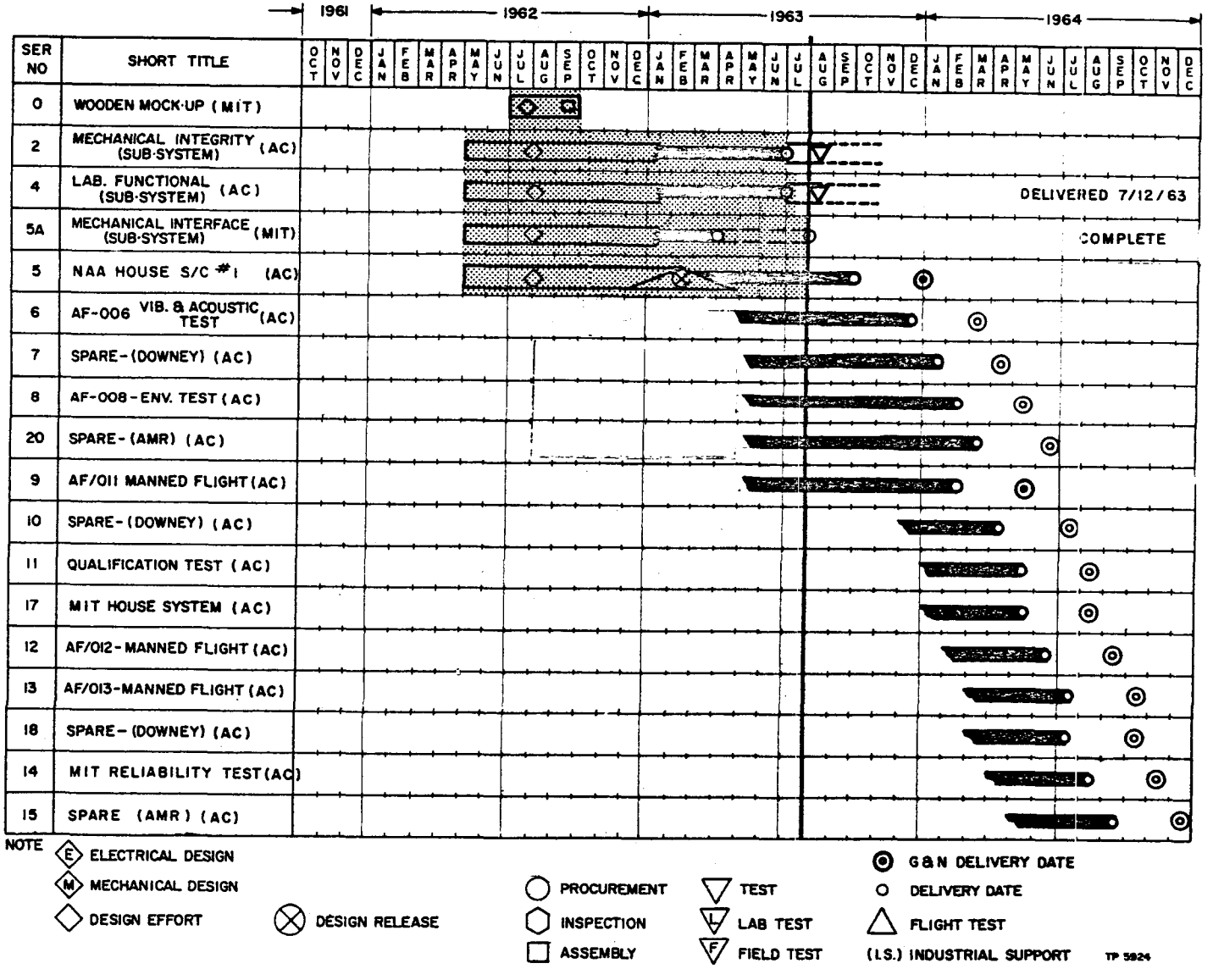


Fig. I-12

APOLLO MILESTONE CHART FOR NAVIGATION BASE SUB-SYSTEM



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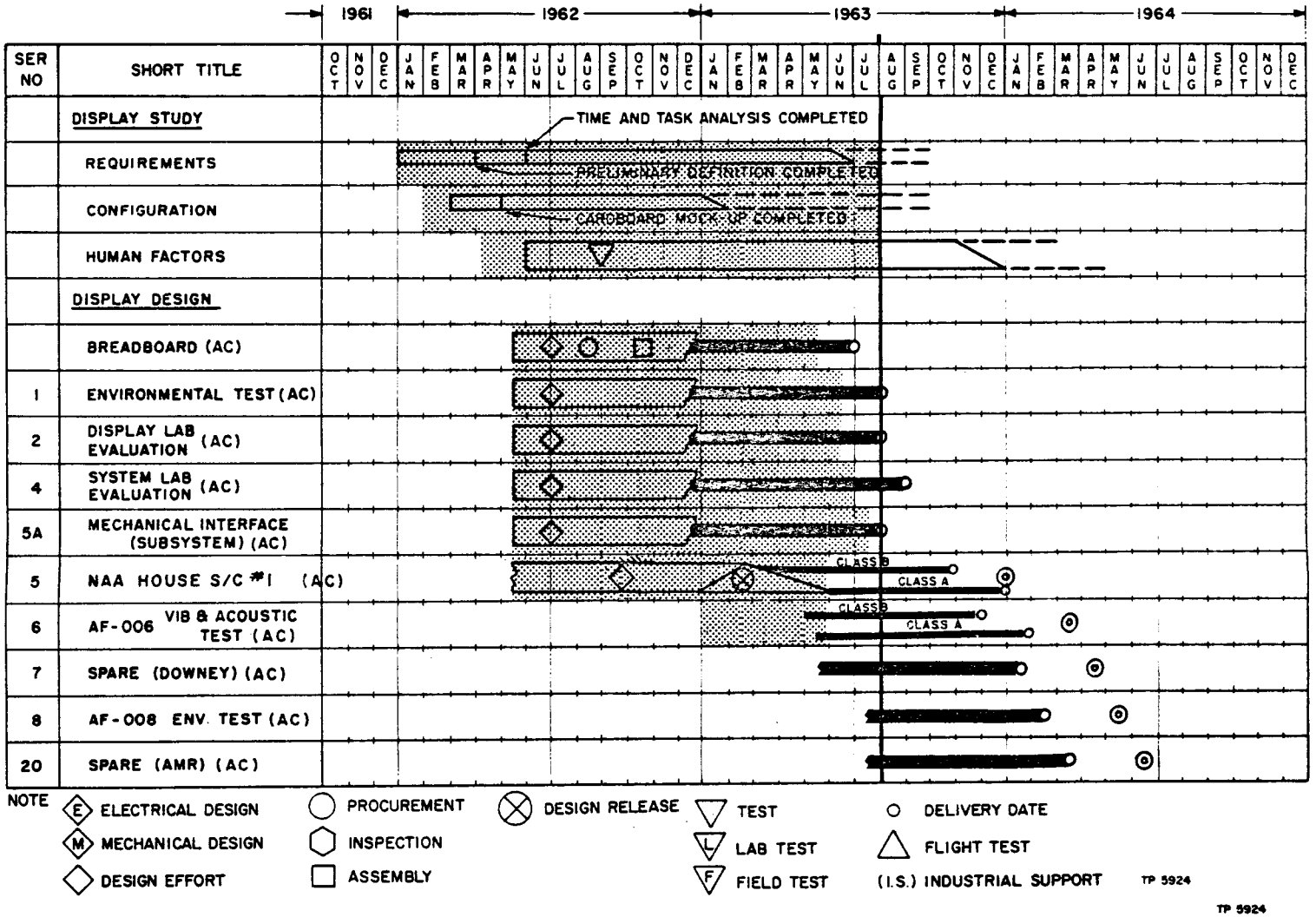

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Fig. I-13 (cont'd)

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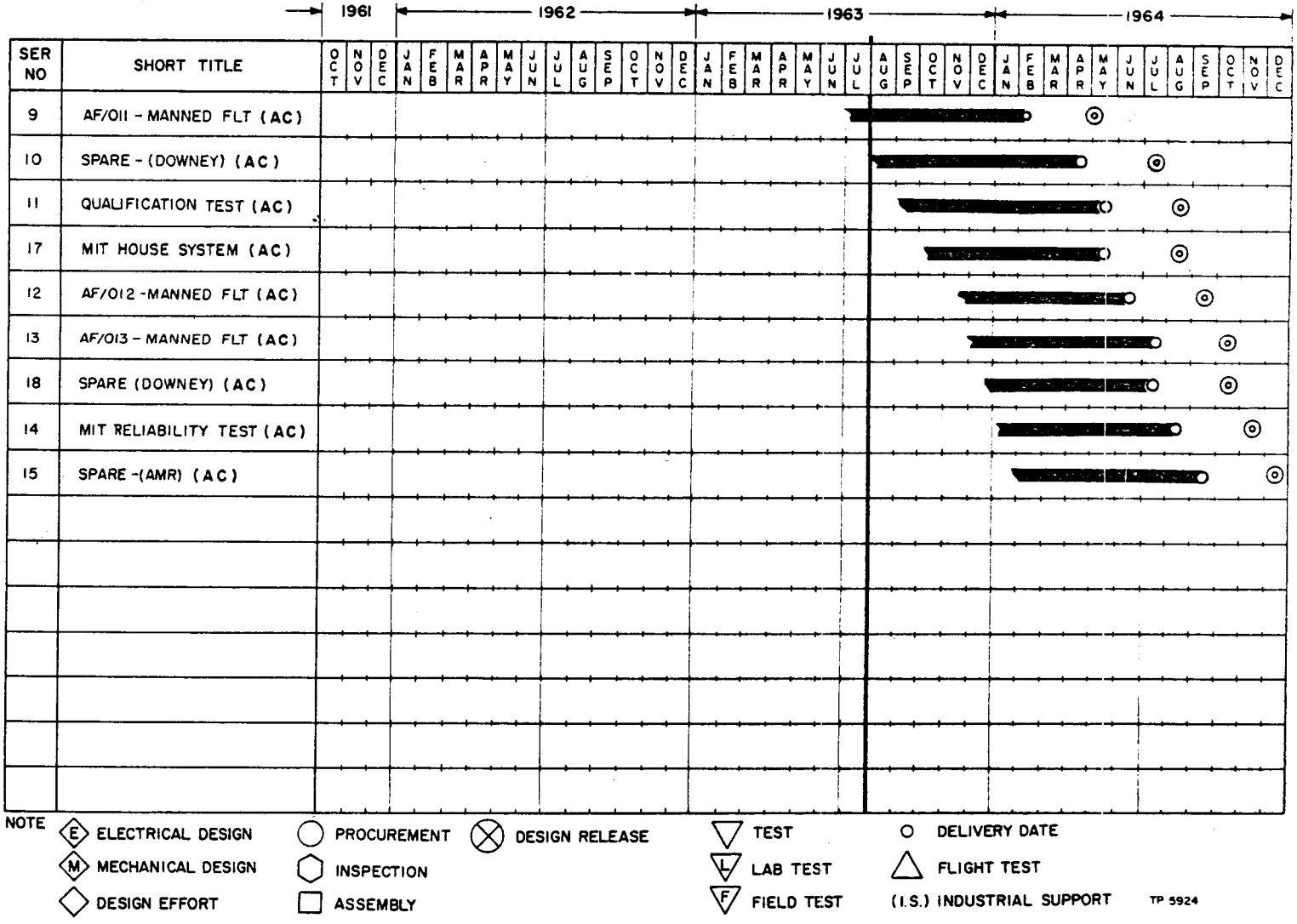

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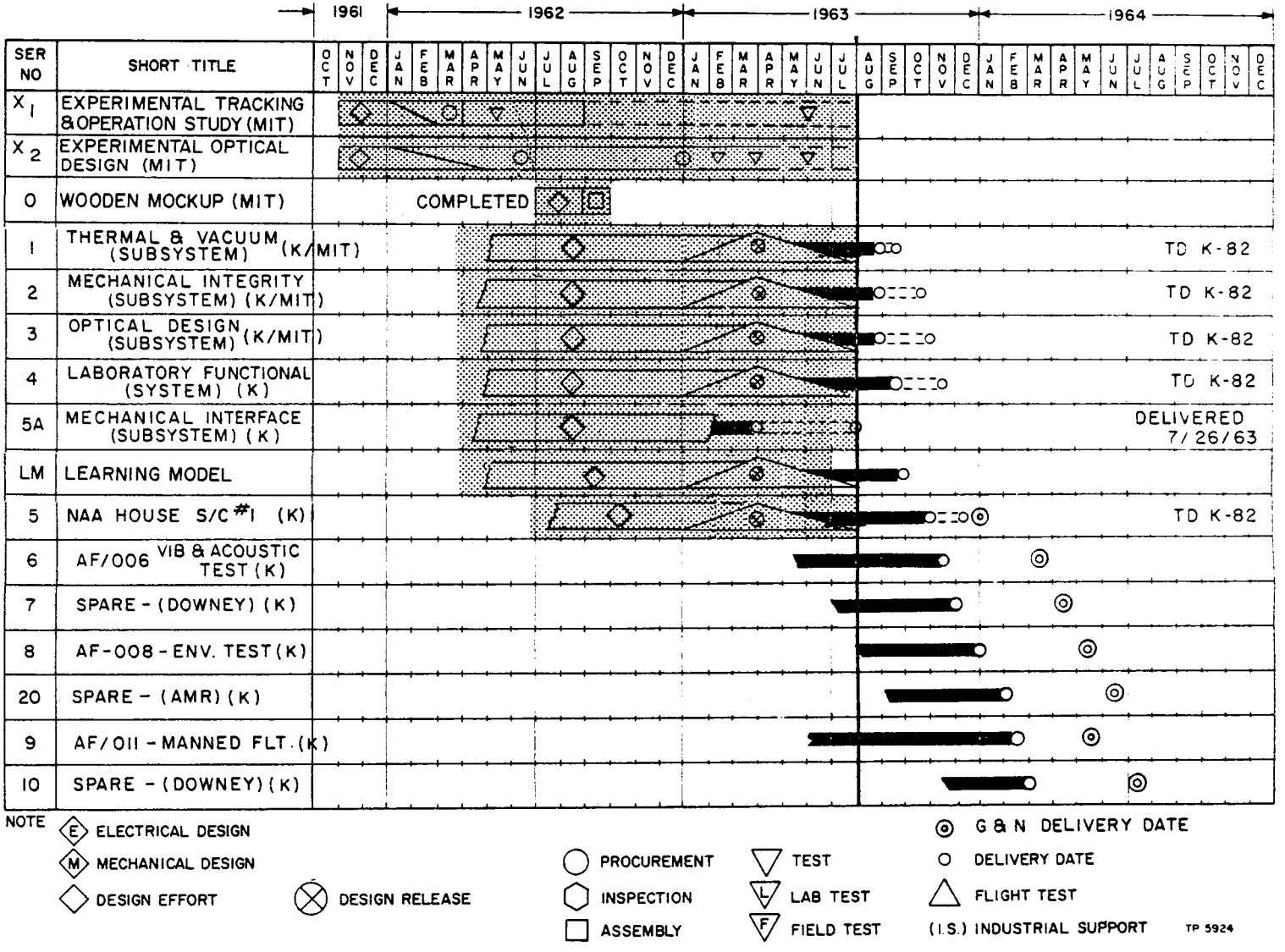

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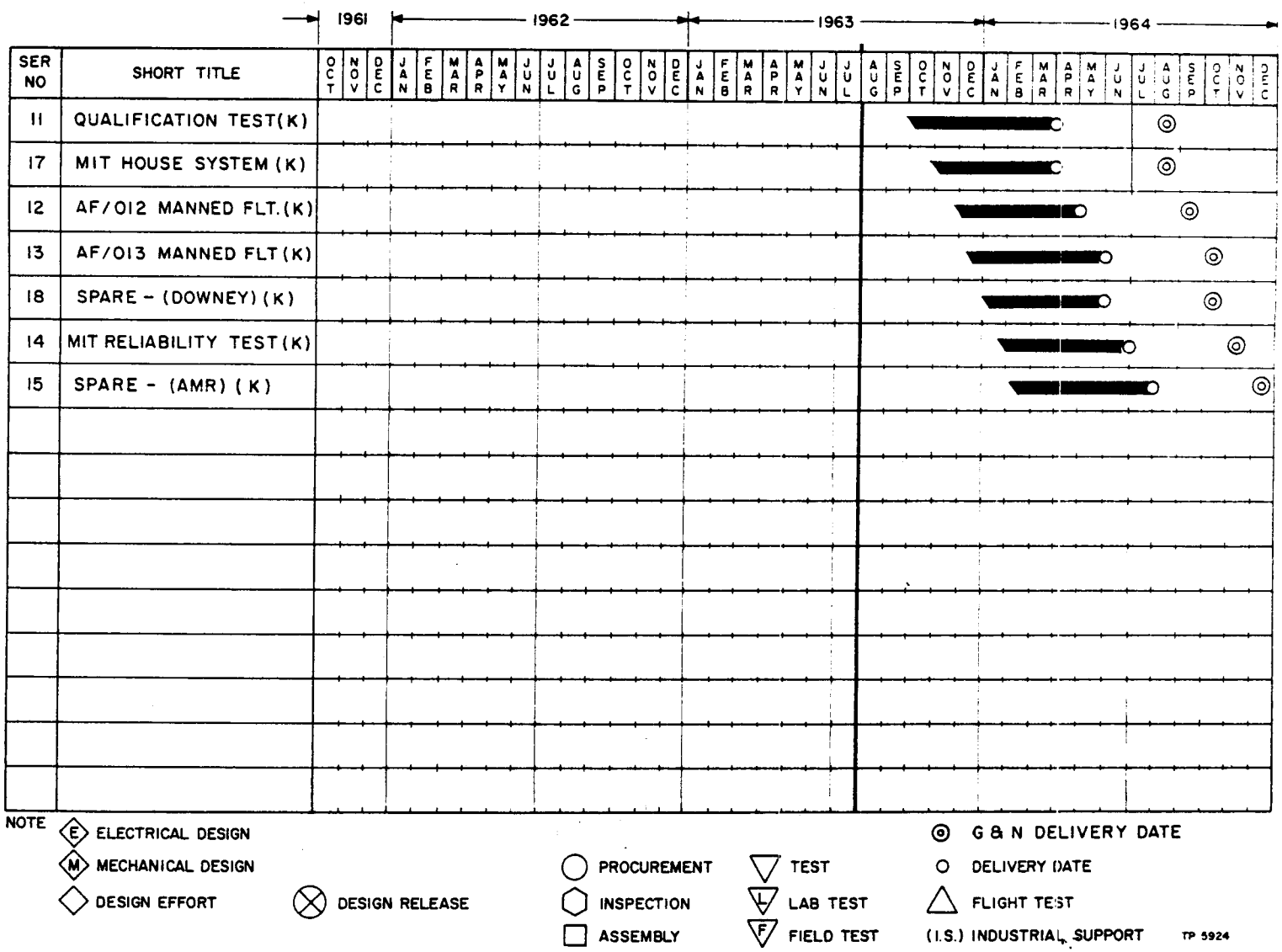


APOLLO MILESTONE CHART FOR MAP AND DATA VIEWER SYSTEM

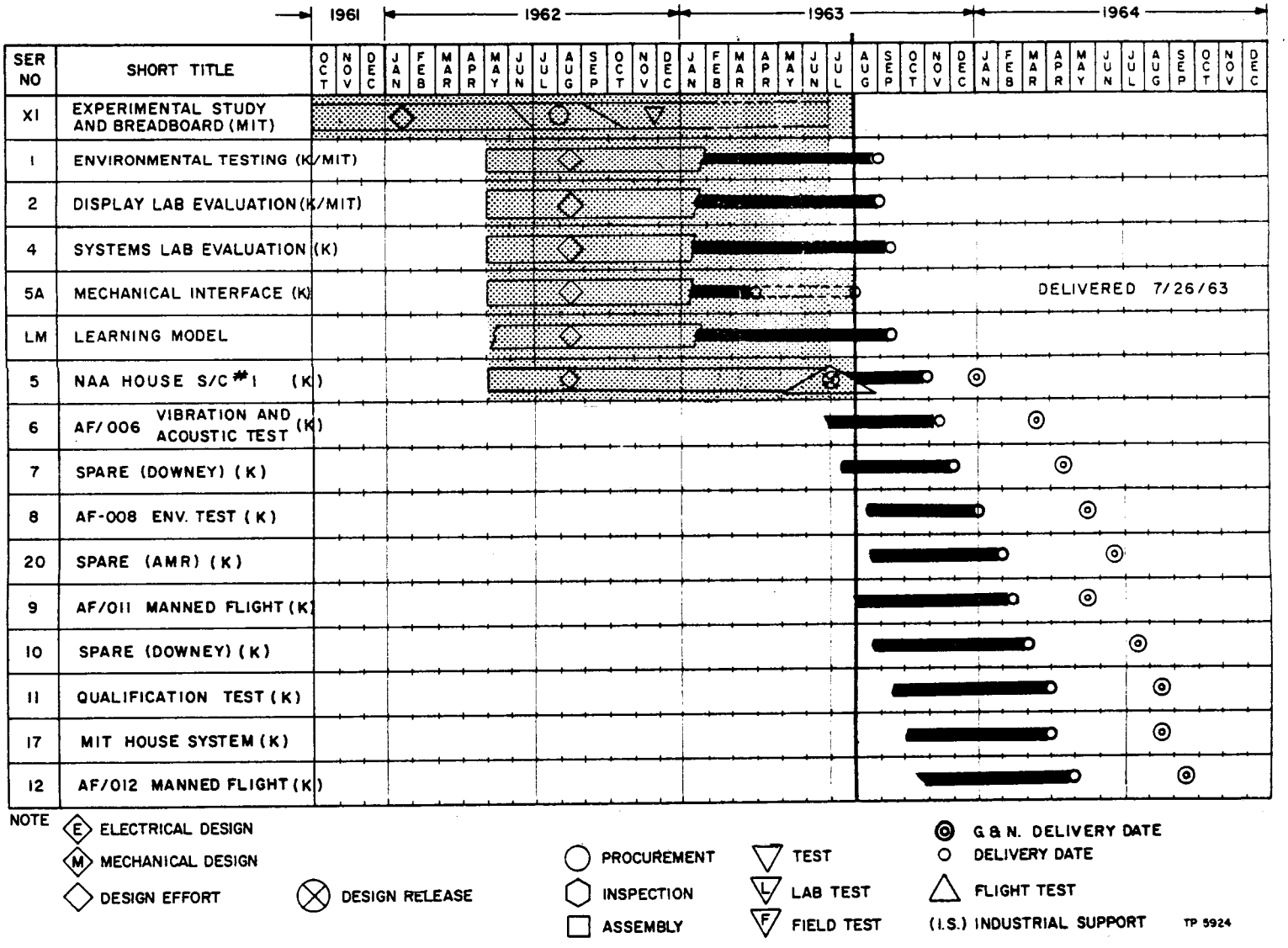
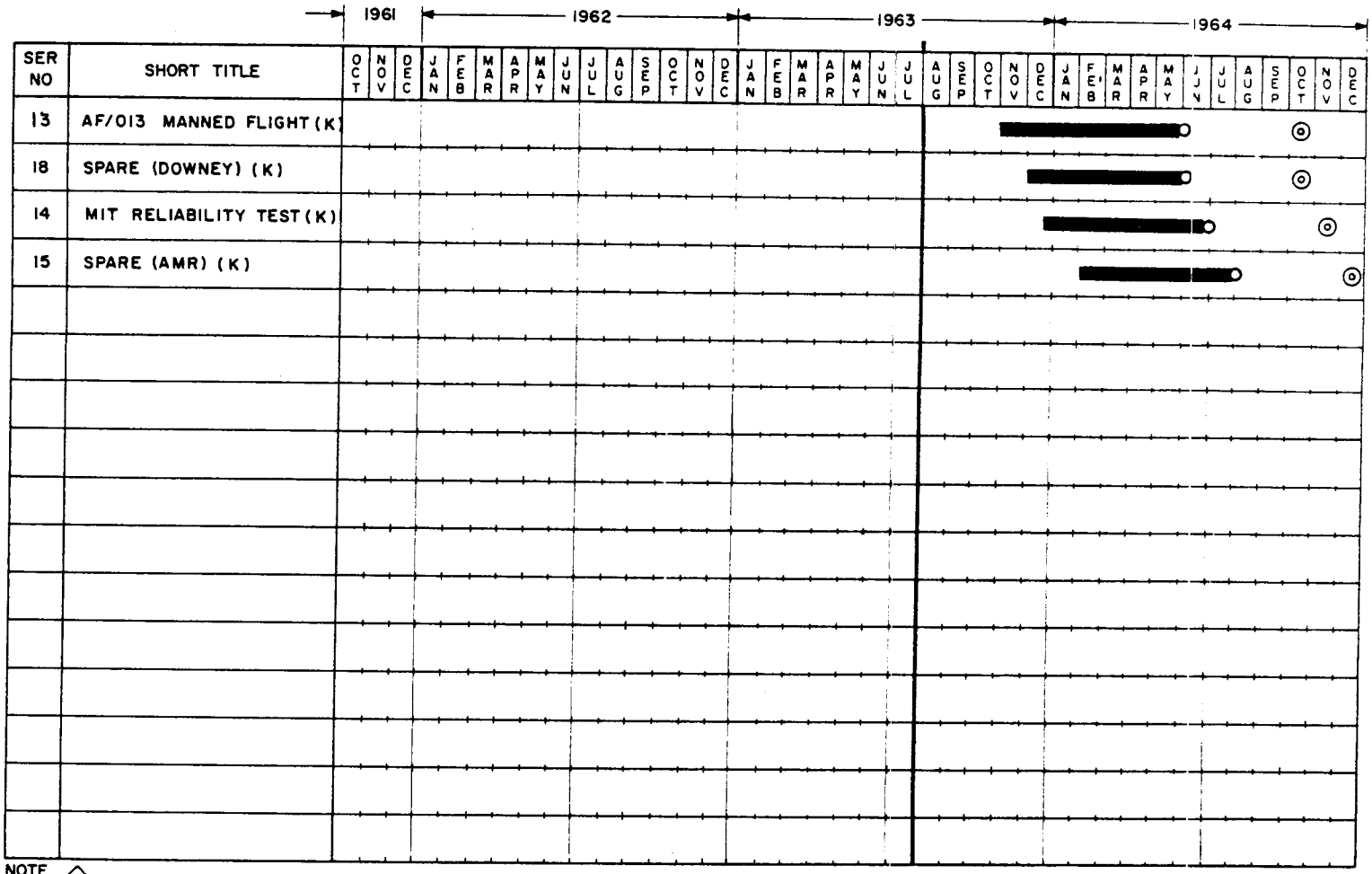
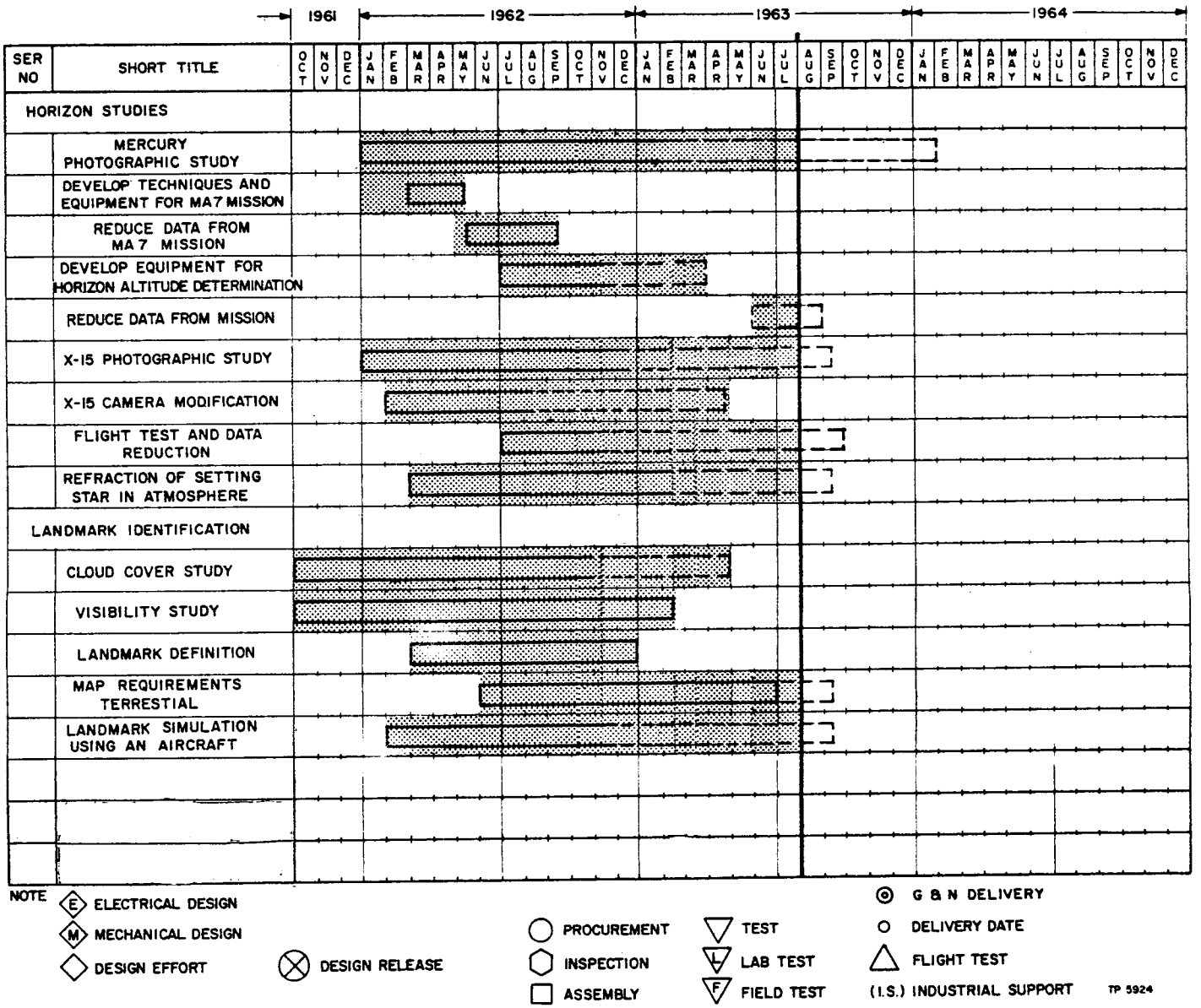


Fig. 1-15

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



APOLLO MILESTONE CHART FOR MIDCOURSE GUIDANCE STUDIES



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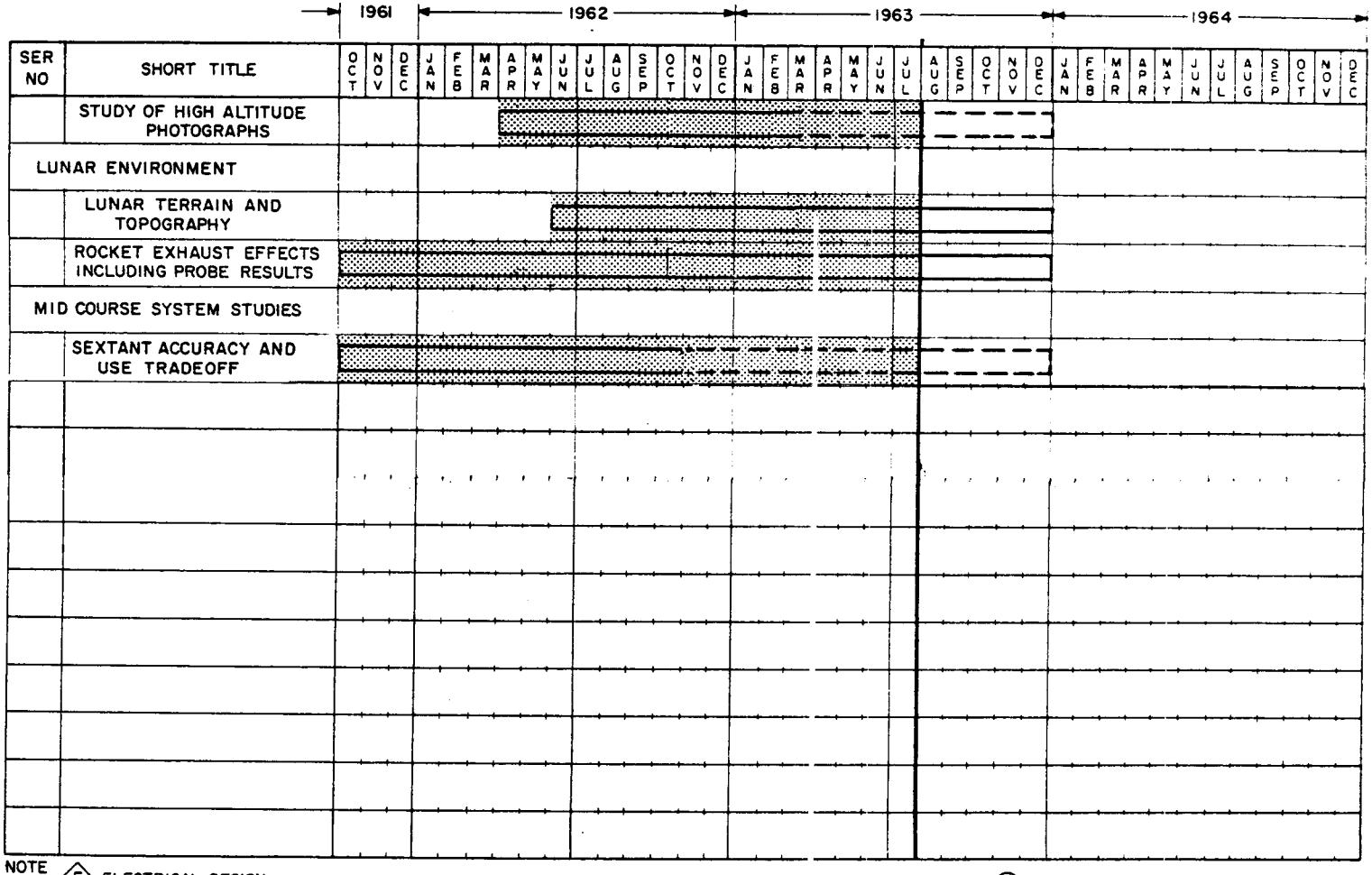


Fig. I-17

APOLLO - RAYTHEON GSE DELIVERY SCHEDULE

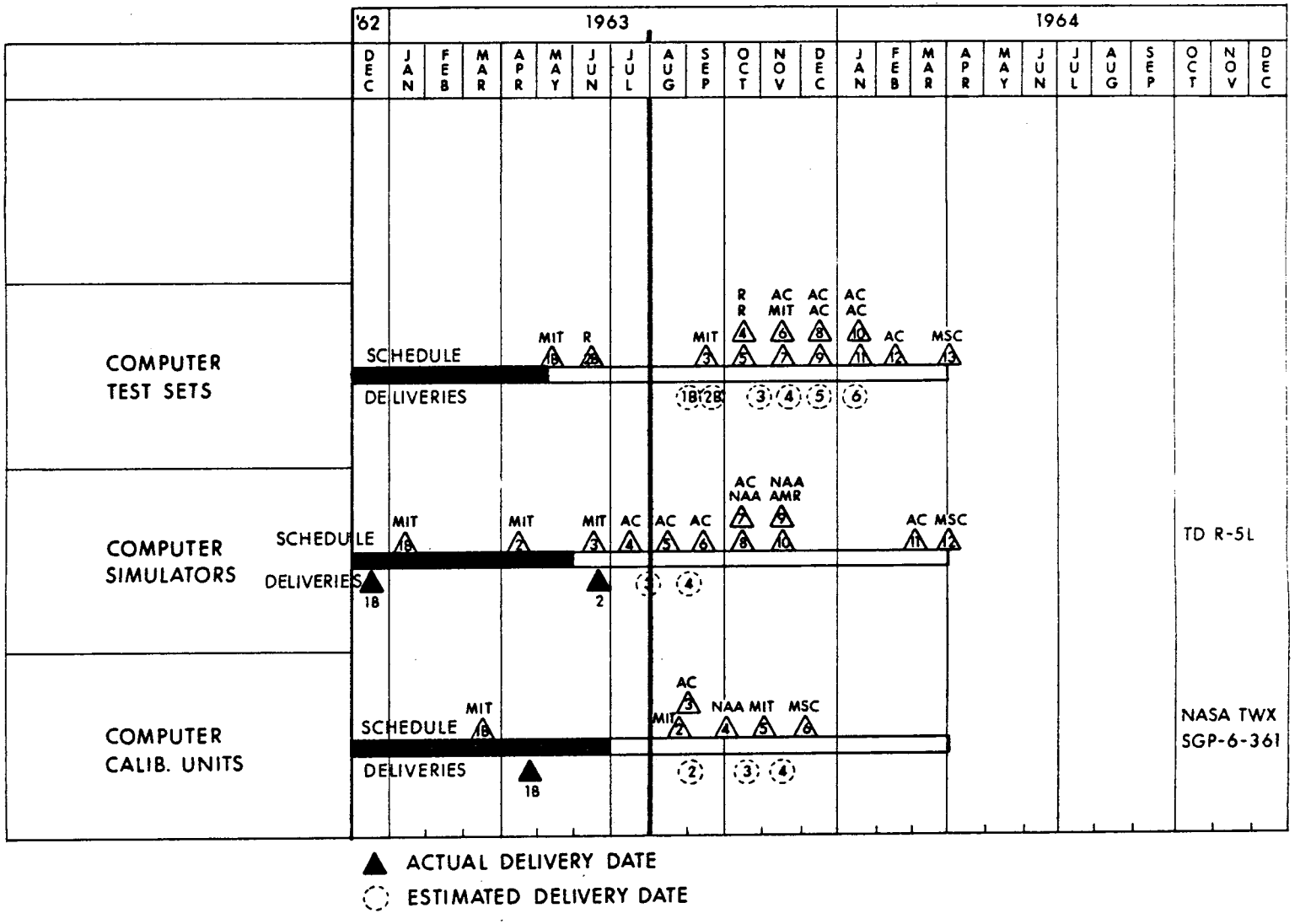
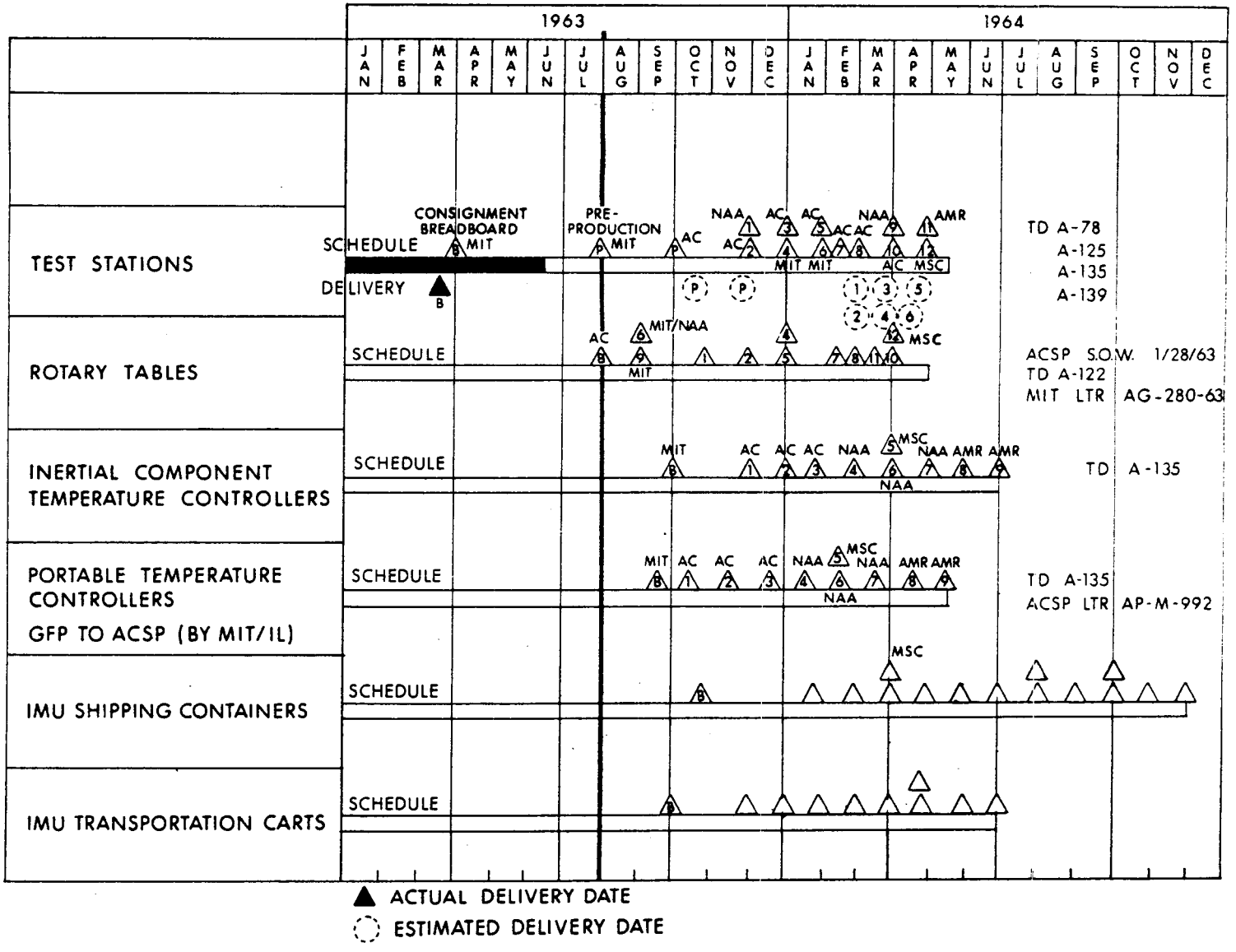
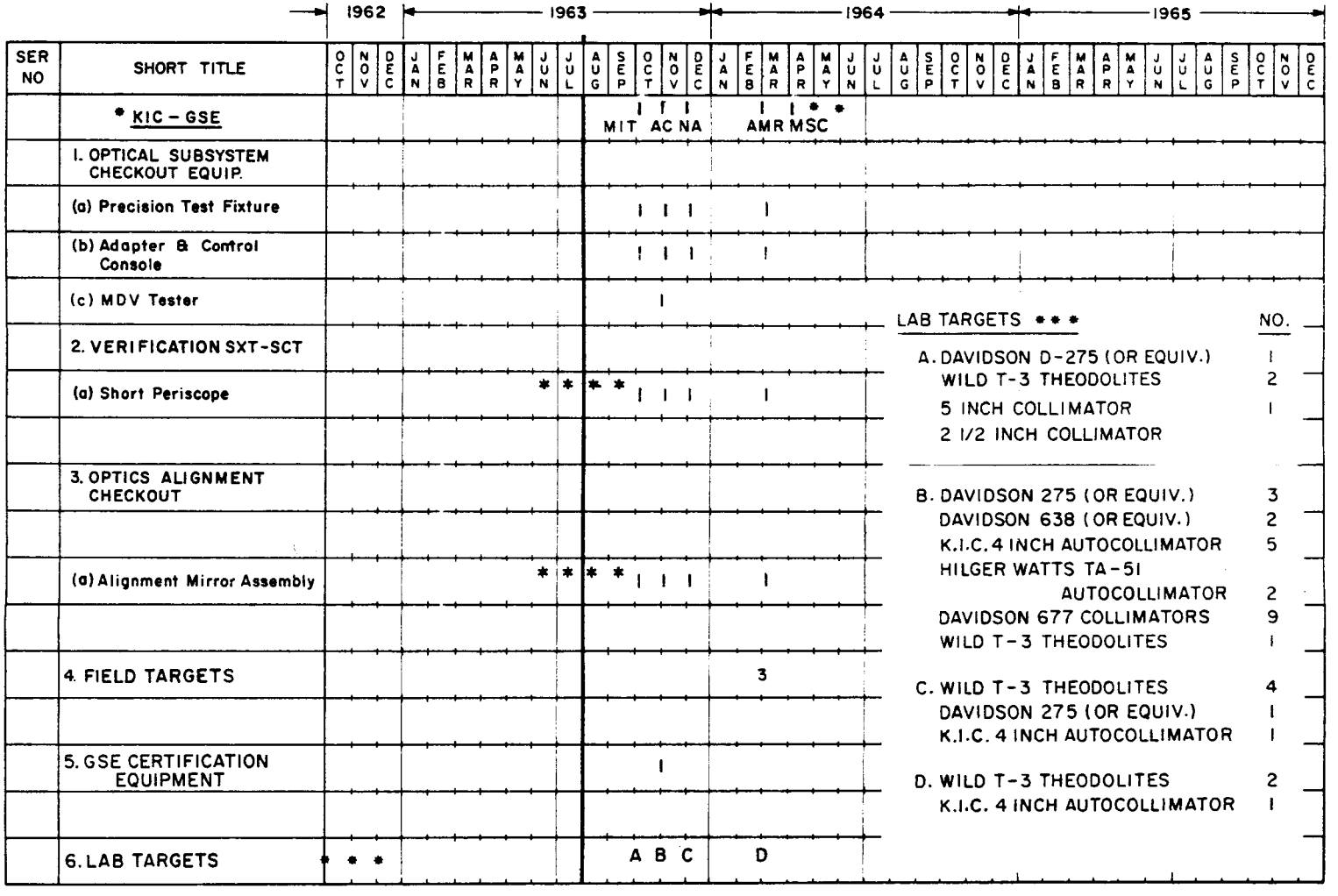


Fig. I-18

APOLLO - AC SPARK PLUG GSE SCHEDULE



APOLLO MILESTONE CHART FOR KOLLSMAN INSTRUMENT CORP. GSE



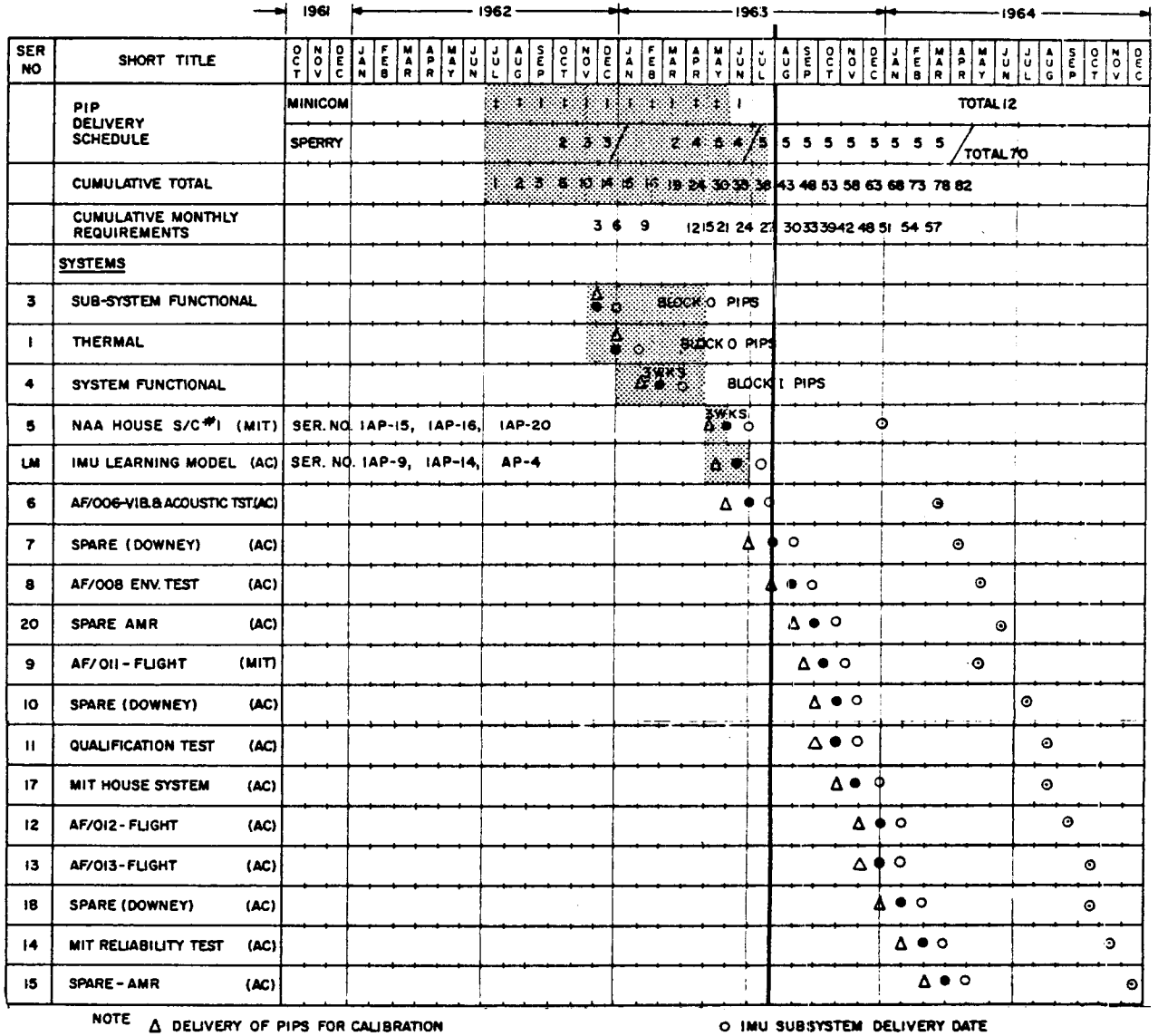
* K.I.C. STATEMENT OF WORK SGC-100-133, DATED 11 MARCH, 1963

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

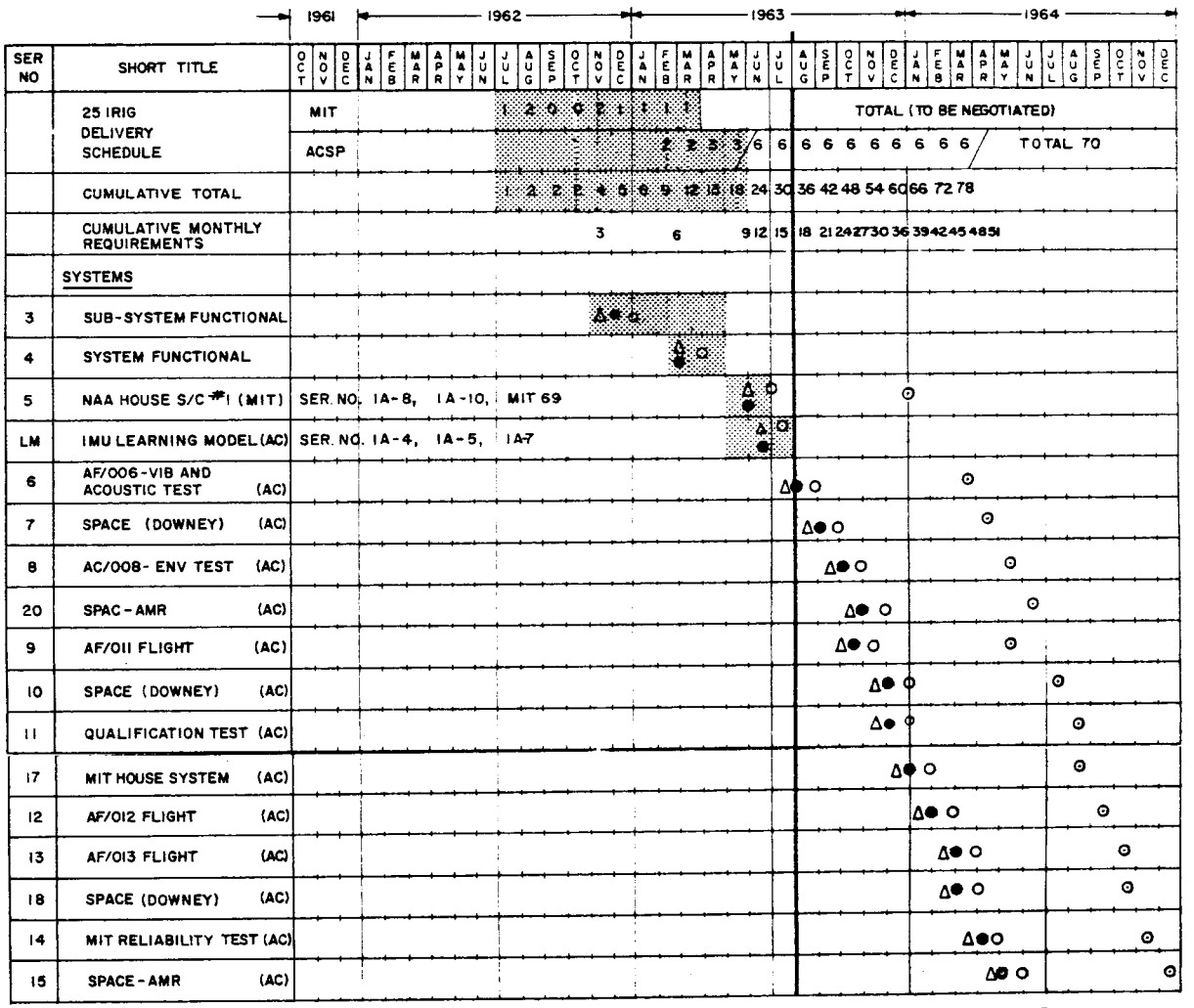
**** TD K-75

Fig. I-20

APOLLO MILESTONE CHART FOR PIP REQUIREMENTS & DELIVERY SCHEDULES



APOLLO MILESTONE CHART FOR IRIG REQUIREMENTS AND DELIVERY SCHEDULES



NOTE Δ DELIVERY OF IRIGS FROM SUPPLIER TO USER

● READY FOR INSTALLATION IN IMU

○ IMU SUBASSEMBLY DELIVERY DATE

⊙ G AND N DELIVERY DATE

Table I

Meetings Attended by MIT/IL Apollo Personnel

Period 1 July through 31 July 1963

Date	Location	Subject
7/1, 2	S&ID	GSE Coldplate Meeting
7/2, 3	MIT	S&ID/MIT Mtg. #60B, PACE
7/2, 3	GAEC	GAEC/MIT Mtg. #L10B. Dynamics
7/8-20	MSC	LEM/CM Interface & Project Plans
7/8	MIT	Spacecraft Integration Mtg.
7/9, 10	KIC	Mo. KIC Mtg.
7/15, 16	GAEC	LEM/G&N Coord. Mtg. #1A
7/15, 16	GAEC	G&N Discussion
7/16	MSC	GOSS Panel
7/16	GAEC	Thermal Meeting
7/16	S&ID	NASA-Saturn/Apollo Guidance Implementation
7/17, 18	MSC	Check-out Panel
7/17	S&ID	S&ID/MIT Mtg. #61B, Thermal Interface
7/18, 19	MSC	Sys. Mtg. #6 - Entry Guidance
7/18, 19	S&ID	NASA Tech. Coord. Mtg. #10A
7/19	MSC	Measurement Panel
7/22	MIT	Apollo Computer
7/23, 24	MIT	S&ID/MIT Mtg. #62B, Exchange of GSE Technical Information
7/25	MIT	Status Review Mtg./ACSP
7/25, 26	MIT	S&ID/MIT Mtg. #63B, Integrated System Test Working Mtg.
7/30	NASA Hdq., Washington	LEM Working Group
7/30, 31	MIT	In-flight Test, GAEC/MIT #L11B
7/31	MSC	LEM Stability & Control Mtg. #5
7/31-8/1	MIT	Simulation Mtg. #4
7/31-8/1	AMR	PACE 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)
E-1410	Monthly	July 1963 (C)

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