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FACTORY TEST PLAN

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FACTORY TEST PLAN

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NUCLEAR SPACE PROGRAMS – LOCKHEED MISSILES & SPACE COMPANY
Sunnyvale, California

FACTORY TEST PLAN

The scope of the RIFT factory test for S-N-TA-1, the first "battleship" tank, is shown in Chart NSP 2905. This plan encompasses all tests beginning with source inspection and receiving inspection of raw materials, components, assemblies, and subsystems and proceeding through functional tests of components, subassemblies, subsystems, systems, and simulated launch test.

The Functional Test Requirement (FTR), originated by an appropriate engineering design organization, is the authority for factory testing. The FTR contains test requirements, specifications, tolerances, and special test equipment requirements.

A Functional Test Procedure (FTP), describing details for conducting a test in accordance with an FTR, is originated by the Factory Test Planning organization and submitted to Engineering, Test Operations, and Product Assurance for joint approval. Test equipment required in support of FTP is determined during the preplanning phase concurrently with design development and obtained by Manufacturing.

Test equipment which duplicates the ground support equipment (GSE) at NRDS or AMR will be patterned after GSE design and ordered and controlled as factory test equipment (FTE). Other FTE will be designed by Factory Test Planning and approved by the cognizant engineering organization or the product assurance organization in the case of laboratory test equipment.

Test equipment which duplicates the ground support equipment (GSE) at NRDS or MILA will be patterned after GSE design and ordered and controlled as factory test equipment (FTE). Other FTE will be designed by Factory Test Planning and approved by the cognizant engineering organization or the product assurance organization in the case of laboratory test equipment.

In Chart NSP 2907, the RIFT Factory Test Plan for S-N-1 (first flight article) is presented in pictorial form. Factory Test Plan operations at each phase of manufacture will be conducted according to one or more of the following operations:

- Source inspection
- Receiving inspection, serialization and process-control numbering
- Functional test
- Nondestructive test
- Tool and gage (calibration) test
- Subassembly test
- Final checkout
- Shipping inspection
- Transportation inspection

TESTS – PHASE I

Subsequent to undergoing source inspection, receiving inspection, nondestructive testing, and tool and gage calibrations, structural and other raw materials will undergo fabrication and subassembly in the tank assembly area and then be subjected to fabrication and assembly tests. Here, radiographic weld tests, ultrasonic tests as applicable, cleanliness tests, dimensional tests, and alignment tests will be conducted.

TESTS – PHASE II

Initial tests of the liquid hydrogen tank pneumatic integrity will be conducted after complete structural assembly. Hydrostatic instrumentation calibration and checkout will also take place.

TESTS – PHASE III

Hydrostatic and structural pressure tests will be conducted to further insure the pneumatic and liquid integrity of the liquid hydrogen tank.

TESTS – PHASE IV

Subsequent to completion of the hydrostatic and structural pressure tests, the final assembly tests and cold soak tests will be conducted.

Insulation, vapor barrier, and final internal assembly leak tests are performed. Electrical continuity, power, and distribution system checkout takes place, together with checkout for signal conditioning and valving and regulator equipment. Following these final assembly tests, the cold soak tests are performed at the Cold-Flow Facility by Test Operations personnel.

TESTS – PHASES V AND VI

Final mating and testing will occur after completion of the cold soak and return of the stage to the propellant tank fabrication facility. Interstage and nose fairing checkout, interface checkout, final calibration of instrumentation, subsystem, system, integrated system, as well as simulated launch (countdown and flight test) checkout, will be conducted.

TESTS – PHASE VII

Alignment test and weight and balance test will be carried out in Phase VII.

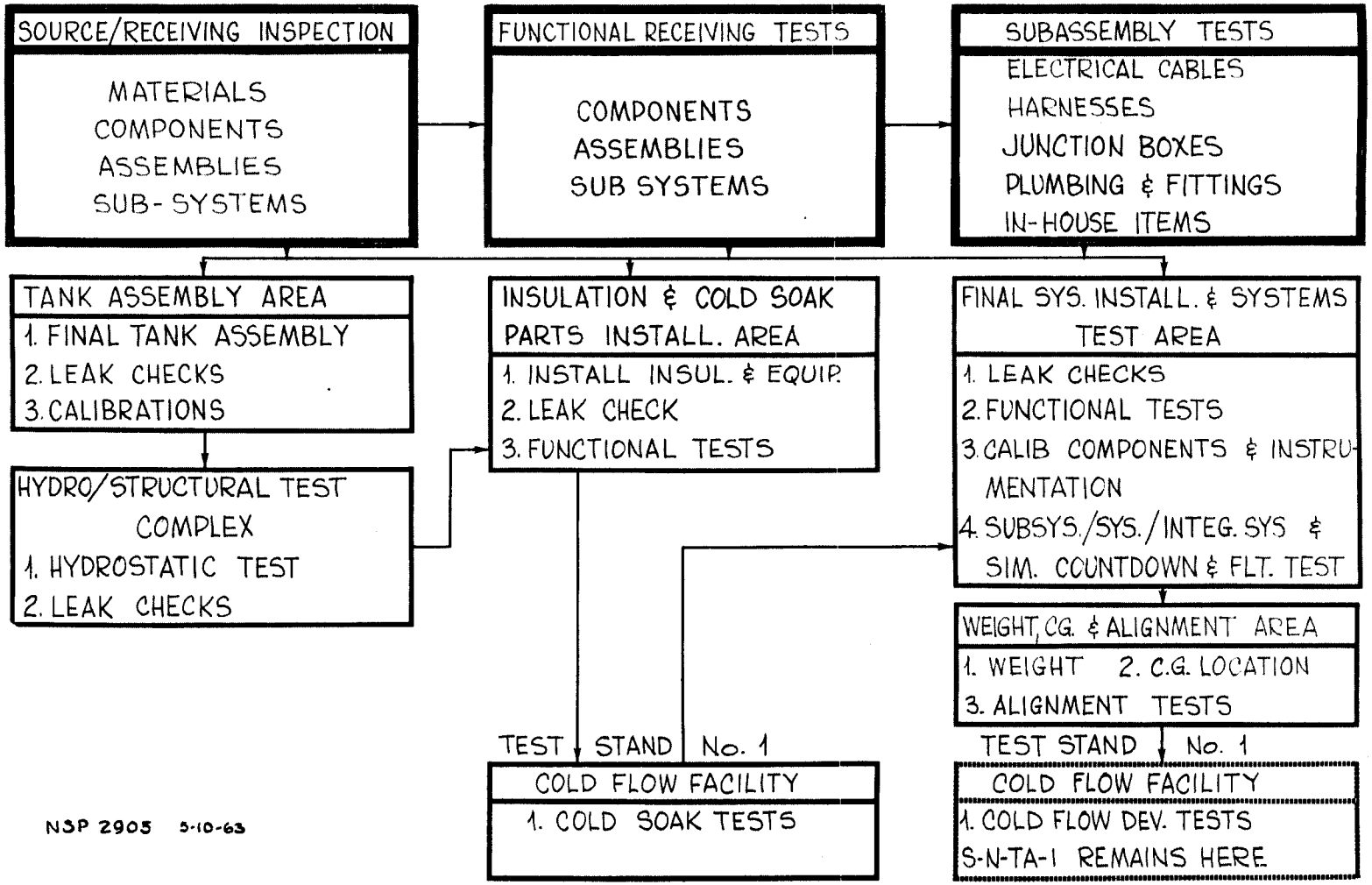
TESTS – PHASES VIII AND IX

Following the alignment test and weight and balance test, the stage will be transferred from the propellant tank fabrication facility to the Cold-Flow Facility for final acceptance testing by the Test Operations personnel.

A block diagram flow chart, indicating an alternate sequence of events for the S-N-1 Factory Test Plan, is shown in Chart NSP 2906. Here the initial cold soak operation and testing are conducted just prior to the final acceptance testing in the Cold-Flow Facility (CFF) and the stage remains in the propellant tank fabrication facility until transfer to CFF. Such a sequence depends on the confidence level achieved in the manufacture of those stages preceding the first flight stage.

Also indicated is the overland transport test to be conducted on S-N-1 by Test Operations.

FACTORY TEST PLAN
S-N-TA-1 SEQUENCE



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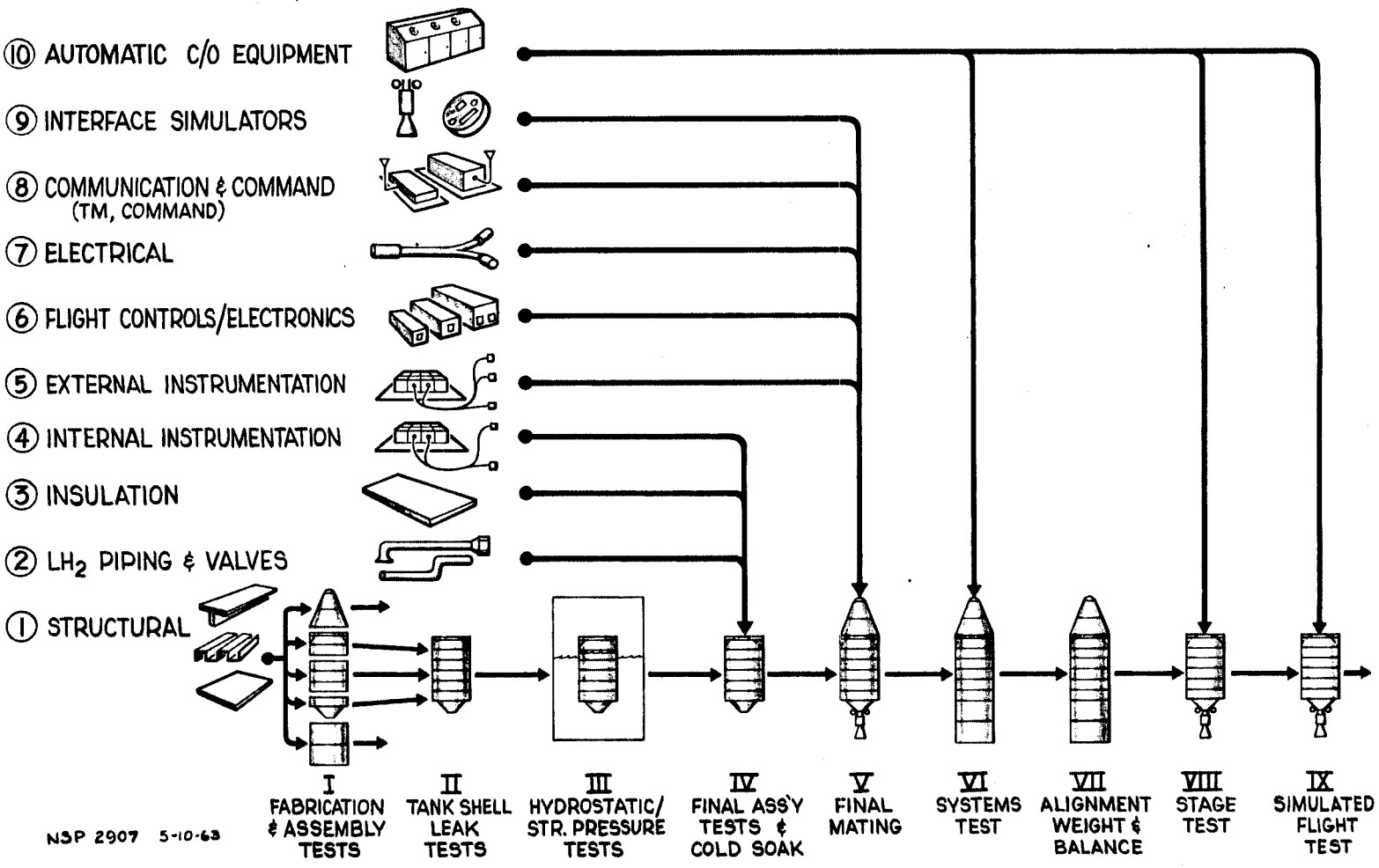
FACTORY TEST PLAN, S-N-1 PROPELLANT TANK FACILITY



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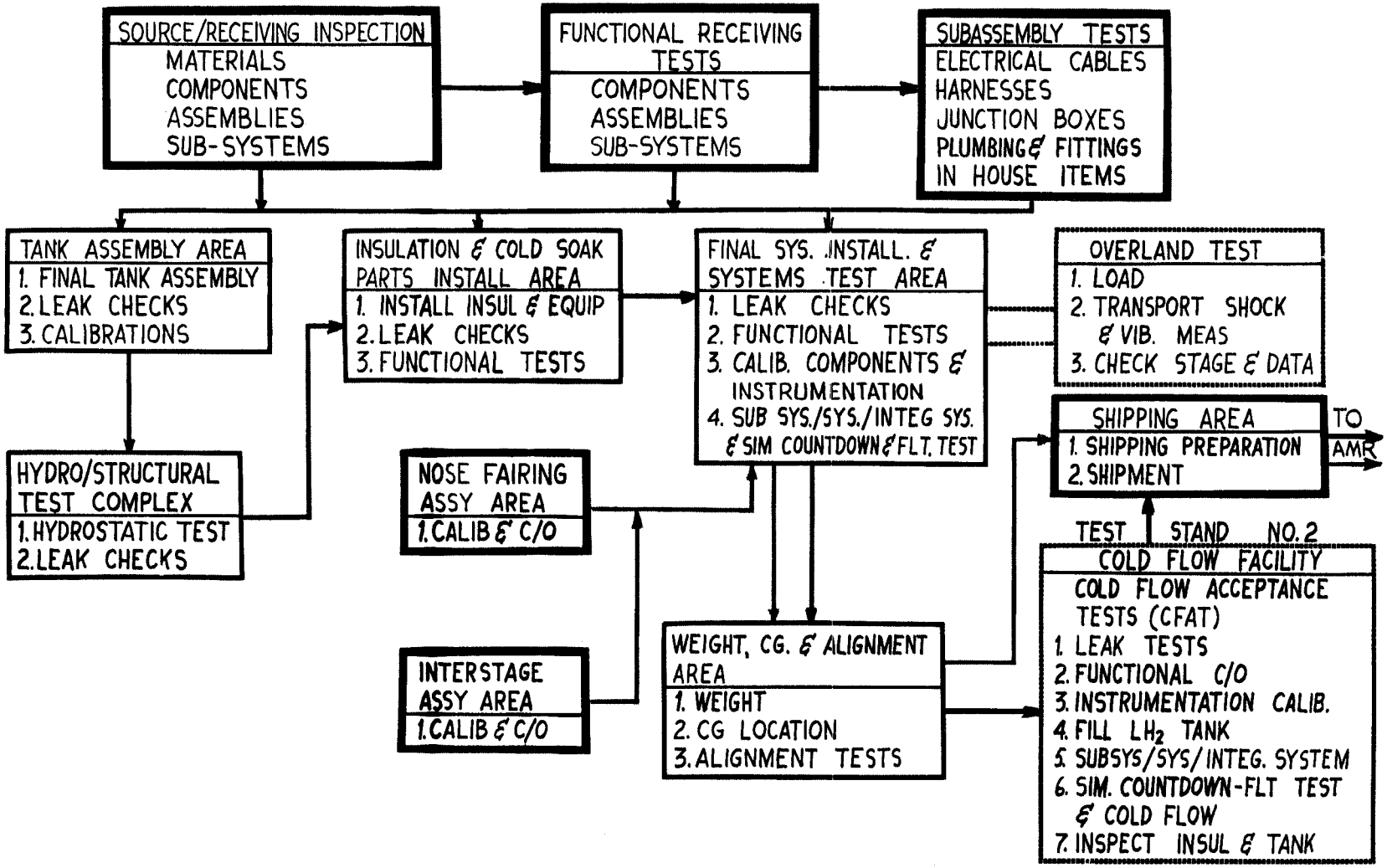
FACTORY TEST PLAN S-N-1 SEQUENCE



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