1
00:00:18,670 --> 00:00:23,130
This fifth quarterly film report to the National Aeronautics and Space Administration covers

2
00:00:23,130 --> 00:00:29,350
progress during July, August, and September 1960 on Project Saturn under development at

3
00:00:29,350 --> 00:00:36,910
NASA's George C. Marshall Space Flight Center in Huntsville, Alabama.

4
00:00:36,910 --> 00:00:40,550
The Saturn system will be for general use in the heavy space vehicle field.

5
00:00:40,550 --> 00:00:46,090
With activation of the Marshall Center on July 1, 1960, NASA assumed full control of

6
00:00:46,090 --> 00:00:53,059
Project Saturn as the Army relinquished program management.

7
00:00:53,059 --> 00:00:57,879
By the time of President Eisenhower's formal dedication of the center on September 8, 1960,

8
00:00:57,879 --> 00:01:11,120
NASA's historic effort to develop the gigantic Saturn space vehicle was well underway.

9
00:01:11,120 --> 00:01:15,610
Final assembly of the first Saturn flight booster, SA-1, at Marshall's Fabrication

10
00:01:15,610 --> 00:01:20,430
and Assembly Engineering Division, moved target schedule completion to early this November.

11
00:01:20,430 --> 00:01:24,979
Earlier in the quarter, SA-1 assembly had
been hampered by many engine modifications

12
00:01:24,979 --> 00:01:30,050
and by continuing shortages of miscellaneous
mechanical components, such as pressure regulators,

13
00:01:30,050 --> 00:01:37,360
switches, hydraulic packages, and actuators.

14
00:01:37,360 --> 00:01:42,710
Assembly began last May, utilizing the same
assembly station in which SA-T, the first

15
00:01:42,710 --> 00:01:51,439
Saturn booster, used successfully for captive
firing tests, had been accomplished.

16
00:01:51,439 --> 00:01:56,450
In other vehicle developments, the contract
was signed July 28 with Douglas Aircraft Company

17
00:01:56,450 --> 00:02:07,150
for the S-IV stage, second stage of the Saturn
C-I vehicle, the first flight configuration.

18
00:02:07,150 --> 00:02:12,300
Convair Astronautics is conducting studies
for adaption of Centaur-type hardware for

19
00:02:12,300 --> 00:02:15,500
use as the Saturn’s third stage, called
S-V.

20
00:02:15,500 --> 00:02:20,540
Dummy upper stages are being made to be flown
on the first few flight vehicles where only

21

00:02:20,540 --> 00:02:26,490
the booster will be powered.

22
00:02:26,490 --> 00:02:31,569
Modification and assembly of H-1 engines delivered
by Rocketdyne was effected this quarter, readying

23
00:02:31,569 --> 00:02:35,250
them for installation on the SA-1.

24
00:02:35,250 --> 00:02:39,620
The booster unit is made up of a cluster of
eight such conventional liquid-fueled rocket

25
00:02:39,620 --> 00:02:49,230
engines, each developing 188,000 pounds of
thrust, or an overall thrust of about 1,500,000

26
00:02:49,230 --> 00:02:53,069
pounds.

27
00:02:53,069 --> 00:03:00,110
Installation of the first engine on SA-1 began
in August.

28
00:03:00,110 --> 00:03:04,760
Wrap-around fuel and liquid oxygen suction
lines were then attached to each engine.

29
00:03:04,760 --> 00:03:09,409
Through these lines, fuel and LOX are pumped
from their respective tanks into the combustion

30
00:03:09,409 --> 00:03:15,069
chambers of the eight engines.

31
00:03:15,069 --> 00:03:19,560
Electrical wiring and the pressurization system
were also installed.

32
00:03:19,560 --> 00:03:24,829
Forty-eight fiberglass spheres placed on the
spider beam will store gaseous nitrogen at

33
00:03:24,829 --> 00:03:29,610
3,000 pounds per square inch to pressurize
the fuel tanks.

34
00:03:29,610 --> 00:03:34,020
By September, all eight engines were in place
for fitting purposes.

35
00:03:34,020 --> 00:03:38,180
Final installation of outboard engines and
all suction lines was set for late September

36
00:03:38,180 --> 00:03:44,659
or early October.

37
00:03:44,659 --> 00:03:49,019
Installation of equipment in the SA-1's
instrumentation canisters was also moving

38
00:03:49,019 --> 00:03:51,970
along steadily in the Marshall Center's
shops.

39
00:03:51,970 --> 00:03:58,379
Four canisters of the same general type will
carry guidance, control, and telemetry equipment.

40
00:03:58,379 --> 00:04:08,329
One of these will house the ST-90 stabilized
platform.

41
00:04:08,329 --> 00:04:12,959
Structural testing of SA-1 assemblies and
components was typified by experiments carried

42

00:04:12,959 --> 00:04:18,550
out in the structures and mechanics division
on the 10,000 pound test tail section assembly,

43
00:04:18,550 --> 00:04:23,760
every single structural part of the booster,
to verify its structural design for flight

44
00:04:23,760 --> 00:04:30,500
logs and static firing rebound logs, and thus
to determine if modifications may be needed.

45
00:04:30,500 --> 00:04:34,910
Testing includes gathering of sting gauge
and phot stress data while loads placed on

46
00:04:34,910 --> 00:04:40,260
the tail section assembly in the test fixture
simulate actual structural propellant and

47
00:04:40,260 --> 00:04:46,910
thrust logs.

48
00:04:46,910 --> 00:04:51,670
Ground support equipment, such as the support
and hold down arms of the Saturn launcher,

49
00:04:51,670 --> 00:04:56,890
also was undergoing rigid testing in a test
fixture which can simulate loads the arms

50
00:04:56,890 --> 00:04:58,400
will be required to bear.

51
00:04:58,400 --> 00:05:03,640
The launcher at Cape Canaveral will have four
retractable support arms and four hold down

52
00:05:03,640 --> 00:05:04,640
arms.

53
00:05:04,640 --> 00:05:08,750
The support arms help to support the huge
booster until after ignition.

54
00:05:08,750 --> 00:05:13,280
The thrust of the booster itself builds up
sufficiently to enable it to stand alone.

55
00:05:13,280 --> 00:05:18,000
Then, the support arms must be moved back
quickly in order to allow takeoff clearance

56
00:05:18,000 --> 00:05:20,160
for the booster’s tail shroud section.

57
00:05:20,160 --> 00:05:25,390
The pneumatically operated arms can retract
sixty-two inches in eighty-four one hundredths

58
00:05:25,390 --> 00:05:28,050
of a second.

59
00:05:28,050 --> 00:05:32,690
At full retract, the support arms send an
electrical signal to the hold down arms to

60
00:05:32,690 --> 00:05:34,080
release the booster.

61
00:05:34,080 --> 00:05:39,700
The hold down arms can retain the booster
until full thrust before release.

62
00:05:39,700 --> 00:05:44,670
Until called upon to hold down the booster,
the hold down arms also assist in supporting

63
00:05:44,670 --> 00:05:46,980

the huge vehicle.

64
00:05:46,980 --> 00:05:53,500
Eventually, all eight arms will be sent by
the contractor to Marshall for full simulation

65
00:05:53,500 --> 00:05:58,650
testing, individually and then as a complete
system, before being installed on the launching

66
00:05:58,650 --> 00:06:03,640
pedestal at Cape Canaveral.

67
00:06:03,640 --> 00:06:09,410
As testing and assembly of SA-1 proceeded,
the test booster, SA-T, emplaced in the captive

68
00:06:09,410 --> 00:06:13,082
test stand, was being modified and built up
to conform to the SA-1 configuration.

69
00:06:13,082 --> 00:06:20,300
The modified version, called SA-T-1, will
be static tested in late November to prove

70
00:06:20,300 --> 00:06:22,530
out the flight configuration.

71
00:06:22,530 --> 00:06:31,020
These tests will enable the designer to incorporate
any desired changes in SA-1.

72
00:06:31,020 --> 00:06:36,870
Fabrication and structural assembly of the
SA-2, the second flight booster, also was

73
00:06:36,870 --> 00:06:41,960
underway at Marshall, including circumferential
welding of the boosters eight, seventy-inch

74
00:06:41,960 --> 00:06:49,030
diameter, fuel containers and work on the
thrust frame barrel assembly and the outriggers,

75
00:06:49,030 --> 00:06:53,840
thrust frames used to support the booster
on the launching pad, two of which are attached

76
00:06:53,840 --> 00:07:01,350
to the four outboard engines, which gimbal
for control and guidance.

77
00:07:01,350 --> 00:07:07,010
Beginning in September, a new assembly station
for final assembly of the SA-2 booster was

78
00:07:07,010 --> 00:07:13,470
being installed.

79
00:07:13,470 --> 00:07:18,470
At Cape Canaveral, construction of the sixty-five
acre Saturn launch complex is progressing

80
00:07:18,470 --> 00:07:19,470
satisfactorily.

81
00:07:19,470 --> 00:07:27,290
Major site items include a movable service
structure 310 feet high, blockhouse, umbilical

82
00:07:27,290 --> 00:07:33,030
tower, concrete launch pad area, and high
pressure gas facilities.

83
00:07:33,030 --> 00:07:40,800
A beneficial occupancy inspection of the blockhouse
was held July 7 and Marshall’s launch operations

84
00:07:40,800 --> 00:07:44,020

directorate took beneficial occupancy on the
same date.

85
00:07:44,020 --> 00:07:53,860
Work is also proceeding on the booster unloading
facility.

86
00:07:53,860 --> 00:07:57,840
Construction of a Tennessee River facility
at Redstone Arsenal, to be used for loading

87
00:07:57,840 --> 00:08:03,870
the Saturn booster onto its specially-made
barge, is scheduled for completion by mid-October.

88
00:08:03,870 --> 00:08:08,250
The booster will be loaded onto the barge
from a dock at the end of a 200 foot long

89
00:08:08,250 --> 00:08:10,570
slip cut into the bank of the Tennessee.

90
00:08:10,570 --> 00:08:16,060
The slip is sixteen feet deep, forty feet
wide at the bottom, and 140 feet wide at the

91
00:08:16,060 --> 00:08:18,810
top.

92
00:08:18,810 --> 00:08:23,690
The barge in which the booster will be transported
from Redstone to the Cape is due to be delivered

93
00:08:23,690 --> 00:08:30,640
by the contractor, Todd Shipyard of Houston,
Texas, by December.

94
00:08:30,640 --> 00:08:35,180
Another big construction job got started at
Marshall as the foundation was laid for the

95
00:08:35,180 --> 00:08:40,710
new Saturn Dynamic Test Facility, which will
be used for vibration and other tests of the

96
00:08:40,710 --> 00:08:42,770
entire Saturn vehicle.

97
00:08:42,770 --> 00:08:48,720
The facility will feature a 204 foot tall
structural steel test tower, twenty-seven

98
00:08:48,720 --> 00:08:53,990
feet taller than the present static firing
test stand, with a stiff leg derrick and hoist

99
00:08:53,990 --> 00:08:58,560
on top of it and an adjacent control and instrumentation
building.