SATURN
QUARTERLY REPORT
NO. 12
Apr - May - Jun - 1962

1
00:00:22,039 --> 00:00:28,220
At almost midnight on April 24 at Cape Canaveral's
Launch Complex 34, the scheduled ten hour

2
00:00:28,220 --> 00:00:38,519
long countdown began for the launching of
the second Saturn test flight vehicle, SA-2.

3
00:00:38,519 --> 00:00:45,120
All automatic propellant loading and sequencing
processes were conducted satisfactorily.

4
00:00:45,120 --> 00:00:52,559
The countdown proceeded without a single technical
hold.

5
00:00:52,559 --> 00:00:59,660
One thirty minute range hold was called, however,
until a ship could clear the range area.

6
00:00:59,660 --> 00:01:05,040
Shortly after 9:00 A.M.

7
00:01:05,040 --> 00:01:13,750
on April 25, six months after the spectacularly
successful first Saturn flight, the countdown

8
00:01:13,750 --> 00:01:19,970
for SA-2 had reached its final seconds.

9
00:01:19,970 --> 00:01:57,710
"Ten, nine, eight, seven, six, five, four,
three, two, one, zero."

10
00:01:57,710 --> 00:02:04,580
Ignition, thrust buildup, and liftoff wee
normal.

11
00:02:04,580 --> 00:02:09,420

Objectives of the SA-2 launch included flight
testing of the booster stage and operational

12
00:02:09,420 --> 00:02:12,629
testing of associated launch facilities.

13
00:02:12,629 --> 00:02:18,159
Structural integrity of the Block I airframe
and aerodynamic characteristics were confirmed

14
00:02:18,159 --> 00:02:21,290
and capabilities of the control system demonstrated.

15
00:02:21,290 --> 00:02:26,569
The propulsion system performed normally throughout
powered flight.

16
00:02:26,569 --> 00:02:31,430
All electrical networks and instrumentation
functioned properly with very satisfactory

17
00:02:31,430 --> 00:02:42,870
telemetry signals received.

18
00:02:42,870 --> 00:02:56,980
Maximum velocity of over 3,700 miles per hour
was attained.

19
00:02:56,980 --> 00:03:02,559
The sloshing effects observed during the SA-1
flight was reduced to an acceptable level.

20
00:03:02,559 --> 00:03:10,519
Cutoff occurred at 110 seconds for inboard
engine and 116 for outboard as predicted.

21
00:03:10,519 --> 00:03:19,980
In virtually every respect, the SA-2 flight
was successful.

22
00:03:19,980 --> 00:03:42,250
[Sound of Engines Firing]

23
00:03:42,250 --> 00:03:53,730
SA-2 also carried out a secondary, or bonus,
scientific experiment known as Project Highwater.

24
00:03:53,730 --> 00:04:00,329
At an altitude of sixty-five miles, the vehicle,
whose dummy upper stages carried 23,000 gallons

25
00:04:00,329 --> 00:04:06,489
of water as ballast, was purposely exploded
to investigate the optical, ionospheric, and

26
00:04:06,489 --> 00:04:14,010
meteorological effects which water vapor has
on the high atmosphere.

27
00:04:14,010 --> 00:04:18,810
About fifteen percent of the water evaporated
and the remaining eighty-five tons formed

28
00:04:18,810 --> 00:04:27,419
a cloud of very small ice particles along
the remained of the vehicle trajectory.

29
00:04:27,419 --> 00:04:33,139
Prior to SA-2's flight, laboratory experiments
in connection with Project Highwater were

30
00:04:33,139 --> 00:04:36,680
conducted at Marshall Center's Astrionics
Division.

31
00:04:36,680 --> 00:04:40,780
Saturn flight conditions are simulated by
using a vacuum chamber.

32

00:04:40,780 --> 00:04:46,630
To facilitate viewing, coloring is added to
the water in the test tube.

33
00:04:46,630 --> 00:04:50,470
In this experiment, the tube is suspended
in the horizontal position.

34
00:04:50,470 --> 00:04:55,180
A solenoid operated hammer breaks the tip,
releasing the water.

35
00:04:55,180 --> 00:04:58,930
Because of the low pressure, the water evaporates
rapidly.

36
00:04:58,930 --> 00:05:02,570
Cooling is so fast that ice flakes for immediately.

37
00:05:02,570 --> 00:05:11,470
With the tube in this position, water boil
off is slow and sporadic.

38
00:05:11,470 --> 00:05:17,070
In a second experiment, a vial is suspended
vertically, the tip is broken, and a boiling

39
00:05:17,070 --> 00:05:18,760
reaction occurs.

40
00:05:18,760 --> 00:05:22,200
With the vial vertical, water boil off is
constant.

41
00:05:22,200 --> 00:05:28,380
In both experiments, pressure is so low that
the ice which is formed has an unusually low

42
00:05:28,380 --> 00:05:29,380
temperature.

43
00:05:29,380 --> 00:05:42,990
Ice maintained at this temperature is very
hard and elastic.

44
00:05:42,990 --> 00:05:59,490
Three static test firings of the third Saturn
flight vehicle, SA-3, were held at Marshall

45
00:05:59,490 --> 00:06:06,030
this quarter, two of thirty seconds duration
and the final one running 119 seconds.

46
00:06:06,030 --> 00:06:11,360
Defective bearings and main shafts resulted
in excessive turbopump vibration in the first

47
00:06:11,360 --> 00:06:12,360
test.

48
00:06:12,360 --> 00:06:17,630
Defective parts were replaced and pumps and
engines were satisfactorily retested before

49
00:06:17,630 --> 00:06:19,930
the engines were reinstalled.

50
00:06:19,930 --> 00:06:29,780
Later firings encountered no difficulty.

51
00:06:29,780 --> 00:06:35,210
Assembly of the booster for the fourth Saturn
flight test vehicle, SA-4, was completed on

52
00:06:35,210 --> 00:06:43,280
May 28, and the stage is now undergoing pre
static test checkout.

53
00:06:43,280 --> 00:06:47,960

Fabrication of components and subassemblies,
such as this thrust frame barrel assembly

54
00:06:47,960 --> 00:06:53,870
for the fifth Saturn flight booster, SA-5,
first of the Block II series, was carried

55
00:06:53,870 --> 00:06:59,240
out this quarter by Marshall's Manufacturing
Engineering Division.

56
00:06:59,240 --> 00:07:07,150
A number of new fabrication fixtures, such
as this one for making Saturn spider beam

57
00:07:07,150 --> 00:07:15,120
assemblies, have been placed into service
for Block II booster fabrication.

58
00:07:15,120 --> 00:07:20,389
Looking toward future fabrication techniques
for Saturn or other space vehicles, Marshall

59
00:07:20,389 --> 00:07:26,700
engineers are investigating exploding bridgewires
in a fluid media as a means of forming and

60
00:07:26,700 --> 00:07:29,660
working metals.

61
00:07:29,660 --> 00:07:37,020
In this test, a piece of flat stock aluminum
is loaded onto a female die and securely mounted.

62
00:07:37,020 --> 00:07:43,930
A crane hoists the die and stock into the
forming tank, which is filled with water and

63
00:07:43,930 --> 00:07:50,710
the exploding bridgewire is properly positioned.

64
00:07:50,710 --> 00:07:57,870
The ultra-fast discharge of a large capacitor
bank explodes the bridgewire, creating a high

65
00:07:57,870 --> 00:08:00,310
energy shockwave in the water.

66
00:08:00,310 --> 00:08:06,280
This shockwave, along with hydrodynamic pressure
pulses, forms the metal into the previously

67
00:08:06,280 --> 00:08:08,270
evacuated die.

68
00:08:08,270 --> 00:08:13,270
Advantages of forming materials by this method
lie in the control of forming and relative

69
00:08:13,270 --> 00:08:25,020
ease of operation.

70
00:08:25,020 --> 00:08:31,800
Hayes International Incorporated in Birmingham
is fabricating several Block II booster components,

71
00:08:31,800 --> 00:08:36,140
including fins, lower shrouds, and engine
skirts.

72
00:08:36,140 --> 00:08:42,550
Fin design utilizes the spar, rib, and skin-type
structure, which provides a high degree of

73
00:08:42,550 --> 00:08:44,639
structural reliability.

74
00:08:44,639 --> 00:08:47,450
Three basic fin configurations are used.

75
00:08:47,450 --> 00:08:53,399
Four large fins will be located at ninety
degree intervals around the booster.

76
00:08:53,399 --> 00:08:58,449
Two configurations of stub fins will be located
at right angles to each other between the

77
00:08:58,449 --> 00:08:59,899
large fins.

78
00:08:59,899 --> 00:09:04,610
Three of these have provisions for venting
liquid hydrogen from the vehicle's second

79
00:09:04,610 --> 00:09:05,610
stage.

80
00:09:05,610 --> 00:09:10,500
In addition to providing flight stability,
these eight fins have vehicle support and

81
00:09:10,500 --> 00:09:11,500
hold down fittings.

82
00:09:11,500 --> 00:09:20,149
The
lower shroud, which Hayes makes for Saturn

83
00:09:20,149 --> 00:09:26,180
Block II boosters, is basically a corrugated
skin structure with continuous rings supporting

84
00:09:26,180 --> 00:09:31,360
the entire unit.

85
00:09:31,360 --> 00:09:36,920
Republic Aviation Corporation of Long Island,

New York, is another prime example of industry

86
00:09:36,920 --> 00:09:40,939
at work for Saturn.

87
00:09:40,939 --> 00:09:45,779
One of the world's largest banks of numerical
control machines, which operate from taped

88
00:09:45,779 --> 00:09:52,339
manufacturing instructions, is being put to
use by Republic Aviation for fabrication of

89
00:09:52,339 --> 00:09:59,670
various Saturn components.

90
00:09:59,670 --> 00:10:05,319
The first of the Saturn LOX and fuel tanks
manufactured by Ling-Temco-Vought near Dallas,

91
00:10:05,319 --> 00:10:09,029
Texas, were delivered to the Marshall Center
this quarter.

92
00:10:09,029 --> 00:10:17,860
During transportation, the tanks are protected
from damage by a custom made shipping container.

93
00:10:17,860 --> 00:10:22,680
Marshall personnel thoroughly inspect each
tank prior to acceptance.

94
00:10:22,680 --> 00:10:28,329
Tanks are subjected to an air pressure leak
test with Freon used as a tracer gas.

95
00:10:28,329 --> 00:10:36,550
If leakage exists, an electronic instrument
detects the area of escaping gas.

96
00:10:36,550 --> 00:10:43,459
Delivery of the H-1 engines, both inboard
and outboard, for the SA-5 booster was accomplished

97
00:10:43,459 --> 00:10:51,309
early in April by the contractor, Rocketdyne
Division of North American Aviation Company.

98
00:10:51,309 --> 00:10:56,999
Small model rocket engines, such as the 500
pound thrust H-1 model are being fabricated

99
00:10:56,999 --> 00:11:06,279
by the Marshall Center's Test Division for
use in gathering data about their real counterparts.

100
00:11:06,279 --> 00:11:11,910
One-tenth scale models of the C-I Saturn's
booster and S-IV stage have been tested in

101
00:11:11,910 --> 00:11:16,889
the high altitude chamber to study interstage
separation problems.

102
00:11:16,889 --> 00:11:20,569
[Sound of Engines Firing]

103
00:11:20,569 --> 00:11:26,399
Test objectives were to obtain data on pressure
versus interstage separation distances and

104
00:11:26,399 --> 00:11:33,129
to determine the effect of a modified conical
flow deflector on the hot gas back lag.

105
00:11:33,129 --> 00:11:39,699
A one-twentieth scale model of a Block II
Saturn booster was tested in conjunction with

106

00:11:39,699 --> 00:11:45,459
a model flame deflector of the type intended
for use on the launch pedestal of Launch Complex

107
00:11:45,459 --> 00:11:50,439
37, now under construction at Cape Canaveral.

108
00:11:50,439 --> 00:12:01,180
[Sound of Engines Firing]

109
00:12:01,180 --> 00:12:06,559
This test program enables engineers to study
base region environmental pressures, temperatures

110
00:12:06,559 --> 00:12:13,279
and heating rates, as well as flame deflector
effectiveness under hot firing conditions.

111
00:12:13,279 --> 00:12:19,309
The new Block II Saturn booster assembly station
was installed during this report period in

112
00:12:19,309 --> 00:12:24,279
Marshall’s recently expanded Saturn assembly
building, which now contains over two hundred

113
00:12:24,279 --> 00:12:28,440
thousand square feet of floor space.

114
00:12:28,440 --> 00:12:33,649
The tooling ring for the SA-5 booster has
be fabricated and work is scheduled to begin

115
00:12:33,649 --> 00:12:39,839
in July on SA-5 booster assembly.

116
00:12:39,839 --> 00:12:44,480
Selection of International Business Machines,
Incorporated of [Wiego,] New York to develop

117
00:12:44,480 --> 00:12:48,550
the guidance computer for Saturn C-I was announced
this quarter.

118
00:12:48,550 --> 00:12:54,920
For test purposes, the computer will be aboard
the SA-5.

119
00:12:54,920 --> 00:13:00,750
Also slated for initial use on SA-5 is a new
camera eject mechanism which will help to

120
00:13:00,750 --> 00:13:04,360
provide a photographic record of vehicle actions.

121
00:13:04,360 --> 00:13:10,320
Along the spider beam of the SA-5 booster,
eight movie camera pods and paraballoon recovery

122
00:13:10,320 --> 00:13:17,420
packages will be mounted into ejection cylinders.

123
00:13:17,420 --> 00:13:23,110
In this laboratory test at the Marshall Center,
gaseous nitrogen is used as a pressurant.

124
00:13:23,110 --> 00:13:27,990
When sufficient pressure is attained, the
firing switch is closed and the camera pod

125
00:13:27,990 --> 00:13:31,820
and recovery package are ejected.

126
00:13:31,820 --> 00:13:38,809
SA-D, the test vehicle which had provided
vital dynamic vibration data contributing

127
00:13:38,809 --> 00:13:43,830
to the success of the first two flight vehicles,

was removed from Marshall’s Dynamic Test

128
00:13:43,830 --> 00:13:47,480
Stand this quarter, its mission completed.

129
00:13:47,480 --> 00:13:53,870
A new vehicle, SA-D-5, a simulation of SA-5,
will be built at Marshall and later installed

130
00:13:53,870 --> 00:13:57,949
in the stand for testing.

131
00:13:57,949 --> 00:14:06,990
Marshall’s Static Test Stand will soon be
modified to accommodate two Saturn C-I boosters

132
00:14:06,990 --> 00:14:07,990
simultaneously.

133
00:14:07,990 --> 00:14:12,800
The old test position in which Jupiter and
Juno II rockets were once tested has already

134
00:14:12,800 --> 00:14:18,749
been removed in preparation for creating a
second Saturn booster test position in its

135
00:14:18,749 --> 00:14:23,819
place.

136
00:14:23,819 --> 00:14:28,559
Several major construction projects are changing
the Marshall Center horizon.

137
00:14:28,559 --> 00:14:34,180
The nine story central laboratory and office
building, scheduled for completion next January,

138
00:14:34,180 --> 00:14:38,699

will be the center’s tallest building.

139
00:14:38,699 --> 00:14:43,199
Personnel of the Propulsion and Vehicle Engineering
Division are due to begin occupying their

140
00:14:43,199 --> 00:14:47,410
new five story addition in July.

141
00:14:47,410 --> 00:14:52,160
And Manufacturing and Engineering Division
has already moved into its recently finished

142
00:14:52,160 --> 00:14:54,089
addition.

143
00:14:54,089 --> 00:14:59,779
At any division, a group of Chrysler engineers
and technicians are presently receiving orientation

144
00:14:59,779 --> 00:15:06,070
on Saturn fabrication and assembly methods
in preparation for Chrysler’s future C-I

145
00:15:06,070 --> 00:15:13,040
booster manufacturing at Marshall’s Michoud
Operations Plant near New Orleans.

146
00:15:13,040 --> 00:15:18,389
Twenty miles from Michoud at Slidell, Louisiana,
this new $2 million building has been acquired

147
00:15:18,389 --> 00:15:21,490
by NASA from the Federal Aviation Agency.

148
00:15:21,490 --> 00:15:26,489
The building, which contains 53,000 square
feet of floor space, is being occupied by

149

00:15:26,489 --> 00:15:39,550
some 500 Chrysler employees in a move to alleviate
a critical office space problem at Michoud.

150
00:15:39,550 --> 00:15:45,180
At the Mississippi Test Facility site, negotiations
are now underway with some 200 land owners

151
00:15:45,180 --> 00:15:46,950
in the construction area.

152
00:15:46,950 --> 00:15:56,149
The government schedule calls for outright
acquisition of title to the area by July 31.

153
00:15:56,149 --> 00:16:01,510
Construction of Saturn Launch Complex 37 continued
at Cape Canaveral during this report period.

154
00:16:01,510 --> 00:16:07,279
Work includes construction of the mobile 3,500
ton steel service structure,

155
00:16:07,279 --> 00:16:13,600
268 foot high umbilical tower and steel launch
pedestal,

156
00:16:13,600 --> 00:16:16,799
circular concrete blockhouse,

157
00:16:16,799 --> 00:16:21,709
LOX and fuel storage facilities, and servicing
facilities.

158
00:16:21,709 --> 00:16:27,060
Construction of major items is about sixty
percent complete and progressing on schedule.

159
00:16:27,060 --> 00:16:33,259
When finished, complex 37 will have two Saturn

launch positions, utilizing a single control

160
00:16:33,259 --> 00:16:36,249
center and service tower.

161
00:16:36,249 --> 00:16:41,829
At Douglas Aircraft Company, contractor for
Saturn's S-IV stage, cold flow tests have

162
00:16:41,829 --> 00:16:48,249
been successfully completed at the Sacramento
test facility using a single RL-10 liquid

163
00:16:48,249 --> 00:16:51,610
hydrogen-liquid oxygen engine.

164
00:16:51,610 --> 00:16:55,410
Five additional engines were received this
quarter from Pratt & Whitney.

165
00:16:55,410 --> 00:16:59,910
After acceptance checking at Santa Monica,
the engines were shipped to Sacramento and

166
00:16:59,910 --> 00:17:04,920
installed in the battleship test vehicle in
preparation for the second phase of the Battleship

167
00:17:04,920 --> 00:17:11,860
Test Program.

168
00:17:11,860 --> 00:17:16,930
Modification of test stand Number 2, which
will be used for the all systems testing,

169
00:17:16,930 --> 00:17:19,980
continued on schedule.

170
00:17:19,980 --> 00:17:25,100

The steam system was being installed during
this report period and other necessary hardware

171
00:17:25,100 --> 00:17:31,920
is now available for completion of the stand.

172
00:17:31,920 --> 00:17:36,570
Cornell Aeronautical Laboratory, Buffalo,
New York, has been conducting a series of

173
00:17:36,570 --> 00:17:41,870
tests with a S-IV model in an altitude chamber,
looking toward solution of problems which

174
00:17:41,870 --> 00:17:47,260
occur when a portion of the engine's hot
exhaust gas escapes from the exhaust plume

175
00:17:47,260 --> 00:17:52,760
and flows into the base region.

176
00:17:52,760 --> 00:18:02,260
During this test, which lasts for only five-thousandths
of a second, pressure and temperature measurements

177
00:18:02,260 --> 00:18:07,540
are taken on the base plate of the model using
miniature, highly sensitive instruments.

178
00:18:07,540 --> 00:18:13,420
By ESO electric pressure transducers are mounted
behind orifices in the base plate at locations

179
00:18:13,420 --> 00:18:19,280
where pressure is to be read.

180
00:18:19,280 --> 00:18:25,410
Fragile thermometers consist of a thin film
of metallic paint applied to a quartz button.

181
00:18:25,410 --> 00:18:29,740
When the surface of the button is heated by
the gas, the electrical resistance of the

182
00:18:29,740 --> 00:18:31,490
metallic film changes.

183
00:18:31,490 --> 00:18:37,030
Then, the output voltage signal of the thermometer
denotes the instantaneous temperature of the

184
00:18:37,030 --> 00:18:45,900
particular location under survey.

185
00:18:45,900 --> 00:18:53,770
By observing the time history of this temperature,
the local heating rate is determined.

186
00:18:53,770 --> 00:18:58,830
Fast responding instruments such as these
permit Cornell Aeronautical Laboratory scientists

187
00:18:58,830 --> 00:19:04,800
to study rocket base heating problems in short-duration
experiments.

188
00:19:04,800 --> 00:19:09,640
Such tests are better controlled and much
more economical to perform than conventional

189
00:19:09,640 --> 00:19:13,850
techniques involving continuous operations.

190
00:19:13,850 --> 00:19:19,390
Here is one frame taken from a high-speed
Schlieren motion picture film showing shockwaves

191
00:19:19,390 --> 00:19:28,680
created by the combusted gases exhausting

into the vacuum chamber.

192
00:19:28,680 --> 00:19:35,350
Preliminary flight rating endurance testing
of the S-IV stages RL-10A-3 engine was successfully

193
00:19:35,350 --> 00:19:48,510
completed on June 9 by the engine contractor,
Pratt & Whitney, at West Palm Beach, Florida.

194
00:19:48,510 --> 00:19:54,060
Twenty-six PFRT firings totaling 4,096 seconds
were conducted.

195
00:19:54,060 --> 00:19:58,710
Initial inspection showed the engine to be
in good condition.

196
00:19:58,710 --> 00:20:04,700
A series on non-firing gimbal tests of the
RL-10A-3 using Douglas Aircraft Company plumbing

197
00:20:04,700 --> 00:20:08,550
connections was also carried out.

198
00:20:08,550 --> 00:20:13,760
To test engines and hardware for possible
structural weakness, a stress coat was applied

199
00:20:13,760 --> 00:20:19,350
on metal surfaces to locate areas of structural
yield.

200
00:20:19,350 --> 00:20:23,820
Various gimbal angels and frequencies were
applied to the engine to simulate he worst

201
00:20:23,820 --> 00:20:27,420
expected flight conditions.

202
00:20:27,420 --> 00:20:32,990
Both engine and vehicle plumbing withstood
the tests satisfactorily.

203
00:20:32,990 --> 00:20:37,320
In support of the engine program, facilities
completed at Pratt & Whitney's Research

204
00:20:37,320 --> 00:20:44,690
and Development Center this quarter included
a new vertical single engine test stand and

205
00:20:44,690 --> 00:20:51,100
a 90,000 gallon vacuum jacketed liquid hydrogen
spherical storage container.

206
00:20:51,100 --> 00:20:56,360
As progress continued this quarter on the
Saturn C-I, shown alongside the Statue of

207
00:20:56,360 --> 00:21:02,000
Liberty in an artist's conception to dramatize
its great size.

208
00:21:02,000 --> 00:21:07,910
Work was also underway on the even larger
Advanced, or C-V, version of Saturn.

209
00:21:07,910 --> 00:21:18,050
The C-V will stand about 350 feet tall, as
compared to 170 for C-I.

210
00:21:18,050 --> 00:21:24,490
The C-V, shown in model form, will be able
to hurl over 200,000 pounds into a 300 mile

211
00:21:24,490 --> 00:21:25,490
orbit.

212

00:21:25,490 --> 00:21:31,120
The vehicle could use two stages for Earth
orbit missions and three stages for escape

213
00:21:31,120 --> 00:21:32,120
missions.

214
00:21:32,120 --> 00:21:38,440
Launching of the first C-V is expected in
1965.

215
00:21:38,440 --> 00:21:43,460
At Marshall, construction is proceeding on
the Static Test Facility to be used for testing

216
00:21:43,460 --> 00:21:45,380
C-V boosters.

217
00:21:45,380 --> 00:21:51,260
The concrete foundation for the massive stand
plunges over forty-five feet into the Earth.

218
00:21:51,260 --> 00:21:59,480
Including its crane, the new test structure
will be 405 feet tall.

219
00:21:59,480 --> 00:22:05,380
Over 1,000 employees of the Boeing Company,
contractor for the Saturn C-V booster, are

220
00:22:05,380 --> 00:22:07,630
now at work in the Huntsville area.

221
00:22:07,630 --> 00:22:13,940
The company is expected to employ more than
1,500 there during 1962, most of whom will

222
00:22:13,940 --> 00:22:19,140
later be transferred to Marshall’s Michoud
Operations where the giant boosters will be

223
00:22:19,140 --> 00:22:23,850
manufactured.

224
00:22:23,850 --> 00:22:29,910
At North American's Aviation Space and Information
Systems Division, contractor for the Saturn

225
00:22:29,910 --> 00:22:36,950
C-V's S-II, or second, stage, work this
quarter included hot flow tests using scale

226
00:22:36,950 --> 00:22:42,070
model engines with a model flame deflector
of comparable scale, to determine optimal

227
00:22:42,070 --> 00:22:45,250
engine orientation for the five engine S-II
configuration.

228
00:22:45,250 --> 00:22:50,700
[Sound of Engines Firing] Secondary objectives
of the tests include determination of various

229
00:22:50,700 --> 00:22:56,980
deflector parameters such as pressure, temperature,
and heat flux profiles, plus investigations

230
00:22:56,980 --> 00:23:00,610
of filmed coolant injection methods.

231
00:23:00,610 --> 00:23:04,870
The scale model engines produce a total thrust
of 5,000 pounds.

232
00:23:04,870 --> 00:23:09,680
The deflector is coated with zinc chromate
paint, which burns away during firings to

233

00:23:09,680 --> 00:23:16,980
reveal areas of probable burn throw.

234
00:23:16,980 --> 00:23:22,010
Fabrication of an S-II stage and transporter
model, designed to verify that the booster

235
00:23:22,010 --> 00:23:28,230
transporter will meet all maneuverability
requirements, is now complete.

236
00:23:28,230 --> 00:23:34,070
Using a road gauge fabricated to the same
dimensions as the S-II transporter, a month-long

237
00:23:34,070 --> 00:23:38,940
survey has been conducted to determine the
feasibility of routes proposed for over land

238
00:23:38,940 --> 00:23:44,750
transportation of the stage from Port Hueneme,
California to North American's static test

239
00:23:44,750 --> 00:23:52,630
facility at Santa Susana, a distance of some
fifty miles.

240
00:23:52,630 --> 00:23:57,850
A plater model has been made to serve as a
tooling aid for constructing a female layup

241
00:23:57,850 --> 00:24:03,130
dye, which will be used to form bulkhead gore
segments for the S-II mockup.

242
00:24:03,130 --> 00:24:07,940
The sweeping frame employed in this operation
will later be used to sweep the production

243
00:24:07,940 --> 00:24:16,900

tooling master.

244
00:24:16,900 --> 00:24:22,410
Two antenna radiation pattern models of the
C-V Saturn have been completed and one has

245
00:24:22,410 --> 00:24:27,410
been shipped to the Los Angeles Division where
initial testing will be performed until the

246
00:24:27,410 --> 00:24:30,860
S&ID antenna range is operational.

247
00:24:30,860 --> 00:24:35,790
The program will determine the numbers and
types of antennas required for telemetry,

248
00:24:35,790 --> 00:24:42,430
command control, and tracking aids, and will
establish specific locations and angular orientation

249
00:24:42,430 --> 00:24:45,600
of antenna types selected.

250
00:24:45,600 --> 00:24:52,010
A highly significant advance in the Saturn
program occurred this quarter when the mammoth

251
00:24:52,010 --> 00:24:58,350
F-1 engine, five of which will be clustered
for the C-V booster, underwent its first full

252
00:24:58,350 --> 00:25:03,760
duration static tests at full thrust of 1.5
billion pounds.

253
00:25:03,760 --> 00:25:08,890
The test was conducted at the NASA high thrust
area at Edwards, California by the F-1's

254
00:25:08,890 --> 00:25:21,330
developer, Rocketdyne Division of North American Aviation.

255
00:25:21,330 --> 00:25:28,390
The ground test was sustained for 151.8 seconds, approximately flight duration, before being

256
00:25:28,390 --> 00:25:30,390
terminated as programmed.