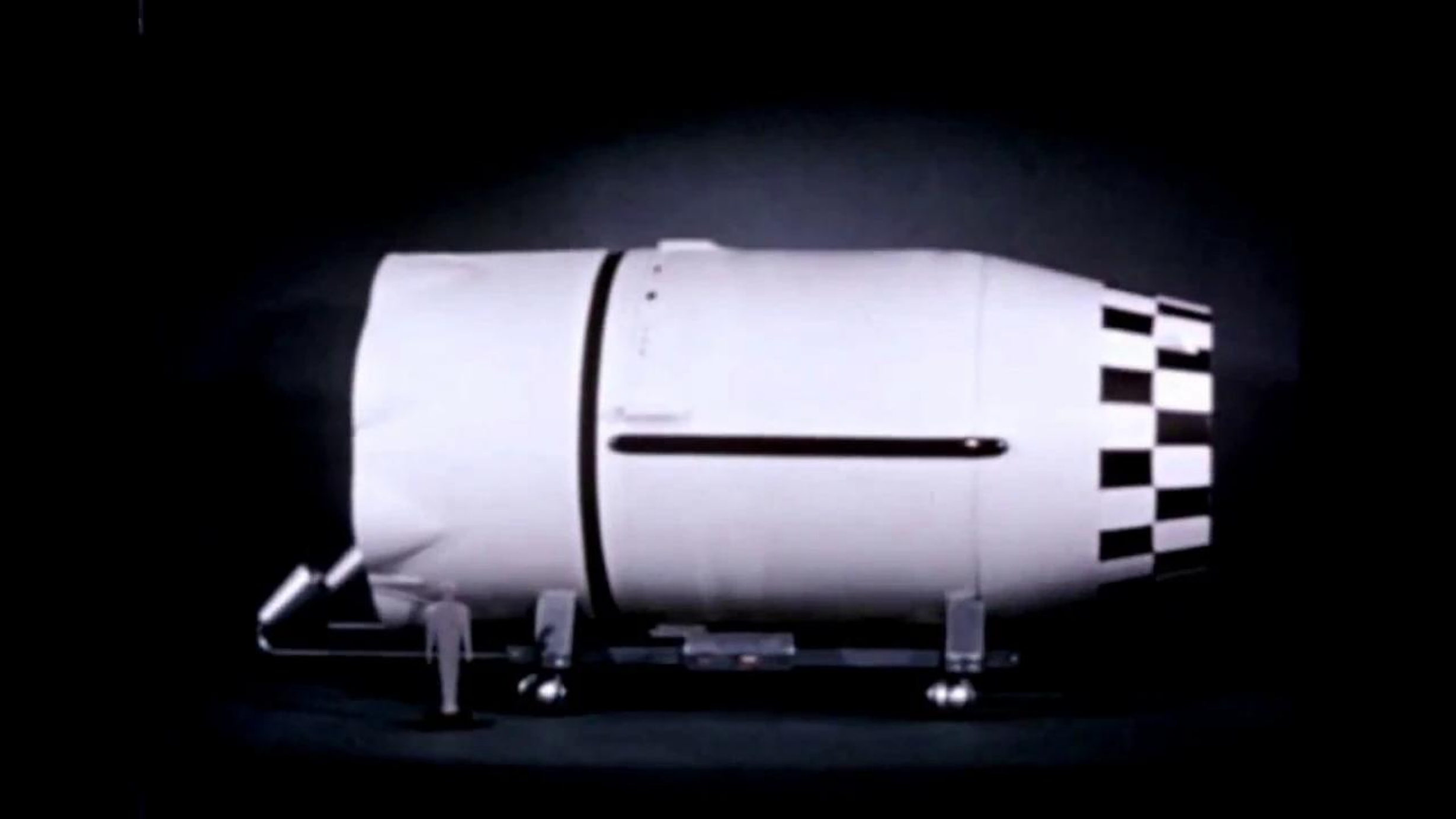

1
00:00:03,400 --> 00:00:02,540
[Applause]

2
00:00:18,310 --> 00:00:03,410
[Music]

3
00:00:18,320 --> 00:00:21,700
[Applause]

4
00:00:26,120 --> 00:00:24,920
this sixth quarterly film report to the

5
00:00:28,820 --> 00:00:26,130
National Aeronautics and Space

6
00:00:31,690 --> 00:00:28,830
Administration covers progress during

7
00:00:34,639 --> 00:00:31,700
October November and December 1960 on

8
00:00:37,220 --> 00:00:34,649
project Saturn under developmental

9
00:00:38,720 --> 00:00:37,230
supervision of NASA's George C Marshall

10
00:00:41,840 --> 00:00:38,730
Space Flight Center at Huntsville

11
00:00:44,779 --> 00:00:41,850
Alabama shown here in a one-tenth scale

12
00:00:47,360 --> 00:00:44,789
model the Saturn vehicle is designed for

13
00:00:50,139 --> 00:00:47,370

use in orbiting payloads in excess of 10

14
00:00:52,930 --> 00:00:50,149
tonnes launching Mars and Venus probes

15
00:00:55,400 --> 00:00:52,940
affecting soft landings on the moon and

16
00:01:04,219 --> 00:00:55,410
injecting man satellites and space

17
00:01:06,140 --> 00:01:04,229
stations into orbit a major milestone in

18
00:01:08,149 --> 00:01:06,150
the Saturn program was approached during

19
00:01:09,770 --> 00:01:08,159
this report period with virtual

20
00:01:12,830 --> 00:01:09,780
completion of assembly of the first

21
00:01:18,170 --> 00:01:12,840
Saturn booster depicted in this quarter

22
00:01:21,140 --> 00:01:18,180
scale model the booster or s1 stage for

23
00:01:22,820 --> 00:01:21,150
the first flight vehicle called s a1 was

24
00:01:25,450 --> 00:01:22,830
scheduled to be released to the Marshall

25
00:01:33,050 --> 00:01:25,460
Center quality division On January 9th

26
00:01:35,120 --> 00:01:33,060
1961 for inspection and check-out basic

27
00:01:39,050 --> 00:01:35,130
steps in the booster assembly which

28
00:01:41,480 --> 00:01:39,060
began May 28 1968 rest in this series of

29
00:01:45,520 --> 00:01:41,490
drawings including positioning of the

30
00:01:52,719 --> 00:01:48,710
connecting the 105 inch diameter Center

31
00:01:57,670 --> 00:01:52,729
liquid oxygen tank to the tail section

32
00:02:05,450 --> 00:02:01,340
installing the 870 inch diameter LOX and

33
00:02:08,300 --> 00:02:05,460
fuel tanks here the complete booster is

34
00:02:13,430 --> 00:02:08,310
shown on its fixture ready to leave the

35
00:02:15,350 --> 00:02:13,440
shop final assembly accomplished

36
00:02:17,720 --> 00:02:15,360
quarter included installation of the

37
00:02:21,650 --> 00:02:17,730
boosters 8h 1 engines furnished by

38
00:02:24,430 --> 00:02:21,660

Rocketdyne the upper stage support used

39
00:02:27,620 --> 00:02:24,440
for attaching the Saturn's upper stages

40
00:02:29,900 --> 00:02:27,630
upper stage support shroud and the for

41
00:02:34,280 --> 00:02:29,910
instrumentation canisters which carry

42
00:02:36,410 --> 00:02:34,290
control and telemetry equipment a new

43
00:02:39,560 --> 00:02:36,420
series of static test firings of the

44
00:02:43,870 --> 00:02:39,570
modified Saturn test booster SAT one

45
00:02:45,500 --> 00:02:43,880
began this quarter at Marshall on

46
00:02:47,900 --> 00:02:45,510
December 20th

47
00:02:50,480 --> 00:02:47,910
a successful 62nd test of all the

48
00:02:52,700 --> 00:02:50,490
engines was conducted an earlier test on

49
00:02:55,040 --> 00:02:52,710
December 2nd had been terminated by a

50
00:02:57,770 --> 00:02:55,050
malfunction sensor at one point seven

51
00:03:00,200 --> 00:02:57,780
seconds difficulties involving excessive

52
00:03:04,300 --> 00:03:00,210
low temperature of an engine component

53
00:03:10,040 --> 00:03:07,220
plans are now underway for a new Saturn

54
00:03:11,900 --> 00:03:10,050
static test firing stand to be located

55
00:03:14,690 --> 00:03:11,910
about a mile west of the one presently

56
00:03:16,820 --> 00:03:14,700
in use addition to this facility will

57
00:03:18,740 --> 00:03:16,830
enable the center to conduct two booster

58
00:03:21,800 --> 00:03:18,750
captive firing operations in the same

59
00:03:24,229 --> 00:03:21,810
period eight Ron a division of Aerojet

60
00:03:26,390 --> 00:03:24,239
General Corporation has been selected to

61
00:03:28,910 --> 00:03:26,400
do the engineering and design criteria

62
00:03:31,000 --> 00:03:28,920
work on the new stand this phase is

63
00:03:33,350 --> 00:03:31,010

expected to require about seven months

64
00:03:35,900 --> 00:03:33,360
construction contracts will be awarded

65
00:03:38,000 --> 00:03:35,910
separately ultimate cost to the static

66
00:03:42,979 --> 00:03:38,010
test facility will be ten million eight

67
00:03:45,740 --> 00:03:42,989
hundred thousand dollars meanwhile also

68
00:03:48,170 --> 00:03:45,750
in the test area a striking new landmark

69
00:03:50,270 --> 00:03:48,180
rose against the skyline as the new

70
00:03:53,570 --> 00:03:50,280
dynamic test facility shown in this

71
00:03:55,940 --> 00:03:53,580
artist's sketch was erected the 204 foot

72
00:03:58,160 --> 00:03:55,950
tall structural steel tower looms

73
00:04:01,430 --> 00:03:58,170
twenty-seven feet higher than the nearby

74
00:04:03,350 --> 00:04:01,440
static test span the new facility begun

75
00:04:05,810 --> 00:04:03,360
last July will be used to determine

76
00:04:08,120 --> 00:04:05,820
structural bending frequencies of the

77
00:04:10,130 --> 00:04:08,130
entire Saturn vehicle while on launch

78
00:04:11,930 --> 00:04:10,140
support arms and the structural

79
00:04:13,940 --> 00:04:11,940
frequencies of the vehicle while

80
00:04:16,670 --> 00:04:13,950
suspended to simulate free flight

81
00:04:18,500 --> 00:04:16,680
conditions other tests such as pro

82
00:04:20,539 --> 00:04:18,510
current loading and the resultant

83
00:04:22,550 --> 00:04:20,549
structural deflections will be conducted

84
00:04:28,010 --> 00:04:22,560
the facility will be finished in the

85
00:04:33,119 --> 00:04:30,929
as the first Saturn booster was being

86
00:04:35,519 --> 00:04:33,129
put together in the fabrication and

87
00:04:37,409 --> 00:04:35,529
assembly engineering division hundreds

88
00:04:39,089 --> 00:04:37,419

of engineers and technicians were at

89
00:04:41,550 --> 00:04:39,099
work in other Marshall shops and

90
00:04:44,159 --> 00:04:41,560
laboratories building and testing the

91
00:04:47,369 --> 00:04:44,169
many complex components which go into

92
00:04:50,070 --> 00:04:47,379
the great space vehicle for instance

93
00:04:52,559 --> 00:04:50,080
this control computer assembled by the

94
00:04:54,719 --> 00:04:52,569
guidance and control division when the

95
00:04:56,670 --> 00:04:54,729
board the Saturn the control computer

96
00:04:58,890 --> 00:04:56,680
will accept electrical signals from

97
00:05:01,830 --> 00:04:58,900
various sources within the vehicle which

98
00:05:03,600 --> 00:05:01,840
sense vehicle performance then it will

99
00:05:06,330 --> 00:05:03,610
automatically perform suitable

100
00:05:08,339 --> 00:05:06,340
computations and send electrical signals

101
00:05:17,760 --> 00:05:08,349
to the engine swivel apparatus for

102
00:05:20,249 --> 00:05:17,770
proper control of the vehicle flight the

103
00:05:22,140 --> 00:05:20,259
computer is of modular design the

104
00:05:24,390 --> 00:05:22,150
various circuits have been designed as

105
00:05:26,369 --> 00:05:24,400
independent modules which can be

106
00:05:32,450 --> 00:05:26,379
assembled and tested separately and

107
00:05:37,320 --> 00:05:34,829
among other components undergoing

108
00:05:39,990 --> 00:05:37,330
intensive testing at the centre were the

109
00:05:42,119 --> 00:05:40,000
vehicle's telemetry antennas six of

110
00:05:43,860 --> 00:05:42,129
which are used on the booster to radiate

111
00:05:47,219 --> 00:05:43,870
the power generated by the eight

112
00:05:49,230 --> 00:05:47,229
telemetry transmitters in this test the

113
00:05:52,139 --> 00:05:49,240

impedance characteristic of a telemetry

114
00:05:54,420 --> 00:05:52,149
antenna is being plotted the impedance

115
00:05:55,860 --> 00:05:54,430
measurement being made provides an

116
00:05:58,110 --> 00:05:55,870
indication of the antenna performance

117
00:06:01,679 --> 00:05:58,120
over the band of frequencies to be

118
00:06:03,980 --> 00:06:01,689
transmitted in another test an antenna

119
00:06:06,899 --> 00:06:03,990
radiation pattern is being recorded a

120
00:06:09,600 --> 00:06:06,909
120th scale model of a Saturn vehicle is

121
00:06:12,029 --> 00:06:09,610
rotated while a fixed antenna transmits

122
00:06:14,610 --> 00:06:12,039
a radio frequency signal to miniature

123
00:06:16,619 --> 00:06:14,620
antennas on the model the amplitude of

124
00:06:19,379 --> 00:06:16,629
the receive signal is then recorded as

125
00:06:21,869 --> 00:06:19,389
the model rotates providing a plot of

126
00:06:28,709 --> 00:06:21,879
relative signal strength versus viewing

127
00:06:31,679 --> 00:06:28,719
angle in another Marshall laboratory

128
00:06:34,079 --> 00:06:31,689
detailed experimentation involving the

129
00:06:36,420 --> 00:06:34,089
actuators for the Saturn booster was

130
00:06:38,969 --> 00:06:36,430
being carried out hydraulic arms

131
00:06:40,080 --> 00:06:38,979
activated by the vehicles guidance and

132
00:06:42,090 --> 00:06:40,090
control system

133
00:06:44,159 --> 00:06:42,100
the actuators will gimbal the four

134
00:06:46,530 --> 00:06:44,169
outboard engines of the Saturn cluster

135
00:06:48,890 --> 00:06:46,540
of eight during flight to hold a Saturn

136
00:06:51,780 --> 00:06:48,900
on course and maintain proper attitude

137
00:06:54,360 --> 00:06:51,790
the actuators are capable of exerting a

138
00:06:59,190 --> 00:06:54,370

force of 12,000 pounds from a source

139
00:07:01,440 --> 00:06:59,200
pressure of 3000 psi tests check the

140
00:07:03,540 --> 00:07:01,450
ability of the mechanical and electrical

141
00:07:06,090 --> 00:07:03,550
components to satisfy the design

142
00:07:12,330 --> 00:07:06,100
parameters set up as requirements for

143
00:07:15,030 --> 00:07:12,340
gambling the engines as shown in this

144
00:07:17,310 --> 00:07:15,040
single engine static test firing to

145
00:07:24,210 --> 00:07:17,320
provide guidance and control for the

146
00:07:26,670 --> 00:07:24,220
huge vehicle at the Aero ballistics

147
00:07:28,379 --> 00:07:26,680
division the program of aerodynamics

148
00:07:30,390 --> 00:07:28,389
research in development was being

149
00:07:32,810 --> 00:07:30,400
conducted in support of the center's

150
00:07:35,730 --> 00:07:32,820
present and future space programs

151
00:07:37,980 --> 00:07:35,740
examples of this work were the cold jet

152
00:07:40,290 --> 00:07:37,990
tests run to aid in the analysis and

153
00:07:42,960 --> 00:07:40,300
evaluation of the rocket engine floor

154
00:07:45,990 --> 00:07:42,970
the Saturn booster as it impinges on the

155
00:07:48,140 --> 00:07:46,000
launch deflector using a 125th scale

156
00:07:50,580 --> 00:07:48,150
model of the Saturn booster base an

157
00:07:54,600 --> 00:07:50,590
investigation of base flow patterns was

158
00:07:56,670 --> 00:07:54,610
made as high pressure air 500 psi was

159
00:07:58,909 --> 00:07:56,680
exhausted at Mach 3.18

160
00:08:01,980 --> 00:07:58,919
through nozzles onto the model deflector

161
00:08:04,380 --> 00:08:01,990
the flow of the gaseous exhaust of the

162
00:08:07,170 --> 00:08:04,390
Saturn engines is simulated by the air

163
00:08:09,360 --> 00:08:07,180

jet by taking pressure measurements on

164
00:08:12,240 --> 00:08:09,370
the base and by using various flow

165
00:08:14,670 --> 00:08:12,250
visualization techniques engineers can

166
00:08:17,550 --> 00:08:14,680
determine flow patterns that will exist

167
00:08:19,980 --> 00:08:17,560
around the boosters base in January a

168
00:08:22,200 --> 00:08:19,990
pebble bed heater is to be installed in

169
00:08:25,640 --> 00:08:22,210
the air supply so that the engine flow

170
00:08:30,570 --> 00:08:25,650
may be heated to 600 degrees Fahrenheit

171
00:08:33,000 --> 00:08:30,580
as work on the first Saturday us tier

172
00:08:35,370 --> 00:08:33,010
neared completion dummy upper stages

173
00:08:38,040 --> 00:08:35,380
were being built to provide an entire

174
00:08:41,190 --> 00:08:38,050
vehicle to test booster propulsion

175
00:08:44,550 --> 00:08:41,200
control and structure the dummy second

176
00:08:46,740 --> 00:08:44,560
stage called the s4 stage was fabricated

177
00:08:48,990 --> 00:08:46,750
and assembled at Marshall the dummy

178
00:08:52,740 --> 00:08:49,000
stage uses as its principal part a

179
00:08:53,550 --> 00:08:52,750
modified 105 inch diameter tank similar

180
00:08:55,019 --> 00:08:53,560
to that you

181
00:09:02,910 --> 00:08:55,029
for the center tank in the booster

182
00:09:05,639 --> 00:09:02,920
itself steel struts or lingerie is

183
00:09:08,249 --> 00:09:05,649
fabricated at Marshall were joined to

184
00:09:10,350 --> 00:09:08,259
the tank and a metal skin attached thus

185
00:09:14,579 --> 00:09:10,360
bringing the dummy up to the live stages

186
00:09:17,160 --> 00:09:14,589
diameter of 220 inches assembly work

187
00:09:19,319 --> 00:09:17,170
began in late November using an assembly

188
00:09:22,650 --> 00:09:19,329

fixture which had been provided by the

189
00:09:25,110 --> 00:09:22,660
Lockheed Aircraft Corporation the 105

190
00:09:27,299 --> 00:09:25,120
inch tank can be water ballasted to

191
00:09:30,179 --> 00:09:27,309
simulate the weight of the actual second

192
00:09:35,509 --> 00:09:30,189
stage assembly of the dummy is scheduled

193
00:09:41,429 --> 00:09:38,460
Douglas Aircraft Company contractor for

194
00:09:43,860 --> 00:09:41,439
the live s4 stage is now making a

195
00:09:46,170 --> 00:09:43,870
full-scale mock-up of the front and rear

196
00:09:48,960 --> 00:09:46,180
sections of the stage and its plant in

197
00:09:51,449 --> 00:09:48,970
Santa Monica California the mock-up is

198
00:09:53,100 --> 00:09:51,459
necessary for study of problems which

199
00:09:56,879 --> 00:09:53,110
will be involved in building the actual

200
00:10:01,139 --> 00:09:56,889
stage live s for about forty one and a

201
00:10:03,059 --> 00:10:01,149
half feet long will utilize for 17,500

202
00:10:05,819 --> 00:10:03,069
pound thrust liquid hydrogen liquid

203
00:10:08,699 --> 00:10:05,829
oxygen engines developed by the Pratt &

204
00:10:11,009 --> 00:10:08,709
Whitney division of United aircraft the

205
00:10:17,579 --> 00:10:11,019
first three Saturn vehicles flown will

206
00:10:18,749 --> 00:10:17,589
have dummy second stages a dummy third

207
00:10:22,259 --> 00:10:18,759
stage called

208
00:10:25,170 --> 00:10:22,269
s5 is being made by Convair astronautics

209
00:10:28,199 --> 00:10:25,180
at San Diego California convair will

210
00:10:31,259 --> 00:10:28,209
also make the live third stage a 10-foot

211
00:10:33,299 --> 00:10:31,269
diameter modified centaur stage using

212
00:10:35,970 --> 00:10:33,309
two liquid hydrogen liquid oxygen

213
00:10:38,460 --> 00:10:35,980

engines similar to those in the second

214
00:10:42,449 --> 00:10:38,470
stage convair is preparing a proposal

215
00:10:44,850 --> 00:10:42,459
for the s5 contract dummy S five stages

216
00:10:50,369 --> 00:10:44,860
will be used in the first six Saturn

217
00:10:52,499 --> 00:10:50,379
vehicles as the first Saturn V achill

218
00:10:54,449 --> 00:10:52,509
took shape construction of the unique

219
00:10:56,189 --> 00:10:54,459
river barge which will transport the

220
00:10:58,110 --> 00:10:56,199
booster from Huntsville to Cape

221
00:10:59,819 --> 00:10:58,120
Canaveral was being done at Todd

222
00:11:03,480 --> 00:10:59,829
shipyards in Houston Texas

223
00:11:05,759 --> 00:11:03,490
the Saturn booster 82 feet long in 21

224
00:11:07,260 --> 00:11:05,769
and a half feet in diameter is too large

225
00:11:09,900 --> 00:11:07,270
for conventional ship

226
00:11:12,150 --> 00:11:09,910
by rail highway or air so this

227
00:11:15,450 --> 00:11:12,160
one-of-a-kind barge was designed for

228
00:11:16,620 --> 00:11:15,460
NASA by the Army Transportation car cost

229
00:11:18,060 --> 00:11:16,630
to the craft was three hundred

230
00:11:20,940 --> 00:11:18,070
forty-four thousand eight hundred

231
00:11:23,160 --> 00:11:20,950
dollars the barge has been named clayman

232
00:11:26,370 --> 00:11:23,170
for the Greek sea god known as a

233
00:11:28,470 --> 00:11:26,380
protector of ships it is 180 feet long

234
00:11:33,750 --> 00:11:28,480
and thirty eight feet wide and has a

235
00:11:35,810 --> 00:11:33,760
weight displacement of 450 tons while

236
00:11:37,830 --> 00:11:35,820
the playmon was being built in houston

237
00:11:39,930 --> 00:11:37,840
construction of a slip and dock to

238
00:11:41,670 --> 00:11:39,940

accommodate it was completed on the

239
00:11:44,490 --> 00:11:41,680
Tennessee River at the Marshall Center

240
00:11:47,190 --> 00:11:44,500
the booster will be transported by Road

241
00:11:49,410 --> 00:11:47,200
the five miles from the assembly area to

242
00:11:51,660 --> 00:11:49,420
the dock loading and unloading of the

243
00:11:53,670 --> 00:11:51,670
booster will be accomplished by use of a

244
00:11:55,440 --> 00:11:53,680
wheeled carriage or dolly which will

245
00:11:59,250 --> 00:11:55,450
support the booster through all phases

246
00:12:01,650 --> 00:11:59,260
of transit in late November the philemon

247
00:12:05,190 --> 00:12:01,660
arrived at its new homeport in Alabama

248
00:12:07,530 --> 00:12:05,200
after a 16 day 1,500 mile trip along the

249
00:12:09,870 --> 00:12:07,540
intercostal canal from Houston to New

250
00:12:12,390 --> 00:12:09,880
Orleans up the Mississippi River to

251
00:12:14,640 --> 00:12:12,400
Cairo Illinois on the Ohio River to

252
00:12:17,340 --> 00:12:14,650
Paducah Kentucky and then the rest of

253
00:12:19,560 --> 00:12:17,350
the way on the Tennessee loaded with its

254
00:12:21,960 --> 00:12:19,570
booster cargo it will take a similar

255
00:12:23,880 --> 00:12:21,970
trip back to the Gulf of Mexico then

256
00:12:26,660 --> 00:12:23,890
around the southern tip of Florida to

257
00:12:38,980 --> 00:12:26,670
reach Cape Canaveral this route is about

258
00:12:45,350 --> 00:12:43,190
at its destination work is proceeding on

259
00:12:47,720 --> 00:12:45,360
an unloading area where the booster will

260
00:12:49,780 --> 00:12:47,730
be taken off the barge and transported

261
00:12:52,430 --> 00:12:49,790
to the launch site about one mile away

262
00:12:54,980 --> 00:12:52,440
at the launch site itself known as

263
00:12:58,220 --> 00:12:54,990

complex 34 where the Saturn will be

264
00:13:00,380 --> 00:12:58,230
fired in September of 1961 major

265
00:13:02,510 --> 00:13:00,390
structural assembly has been finished on

266
00:13:05,120 --> 00:13:02,520
the 310 foot tall

267
00:13:08,090 --> 00:13:05,130
Saturn service tower second highest

268
00:13:10,250 --> 00:13:08,100
structure in the state of Florida the

269
00:13:12,320 --> 00:13:10,260
Saturn block house completed last July

270
00:13:15,230 --> 00:13:12,330
was being fitted out with interior

271
00:13:16,040 --> 00:13:15,240
equipment such as racks panels consoles

272
00:13:18,710 --> 00:13:16,050
and wiring

273
00:13:21,260 --> 00:13:18,720
work is also underway on the protocol

274
00:13:23,120 --> 00:13:21,270
and servicing area and construction of

275
00:13:27,620 --> 00:13:23,130
the launch pedestal is continuing on

276
00:13:29,810 --> 00:13:27,630
schedule as Complex 34 progresses design

277
00:13:32,090 --> 00:13:29,820
criteria are being established or

278
00:13:34,280 --> 00:13:32,100
construction of a second Saturn space

279
00:13:37,640 --> 00:13:34,290
vehicle launching site to be known as

280
00:13:39,890 --> 00:13:37,650
complex 37 the additional complex will

281
00:13:42,110 --> 00:13:39,900
be needed to support anticipated vehicle

282
00:13:44,570 --> 00:13:42,120
firing rates and to serve as a backup