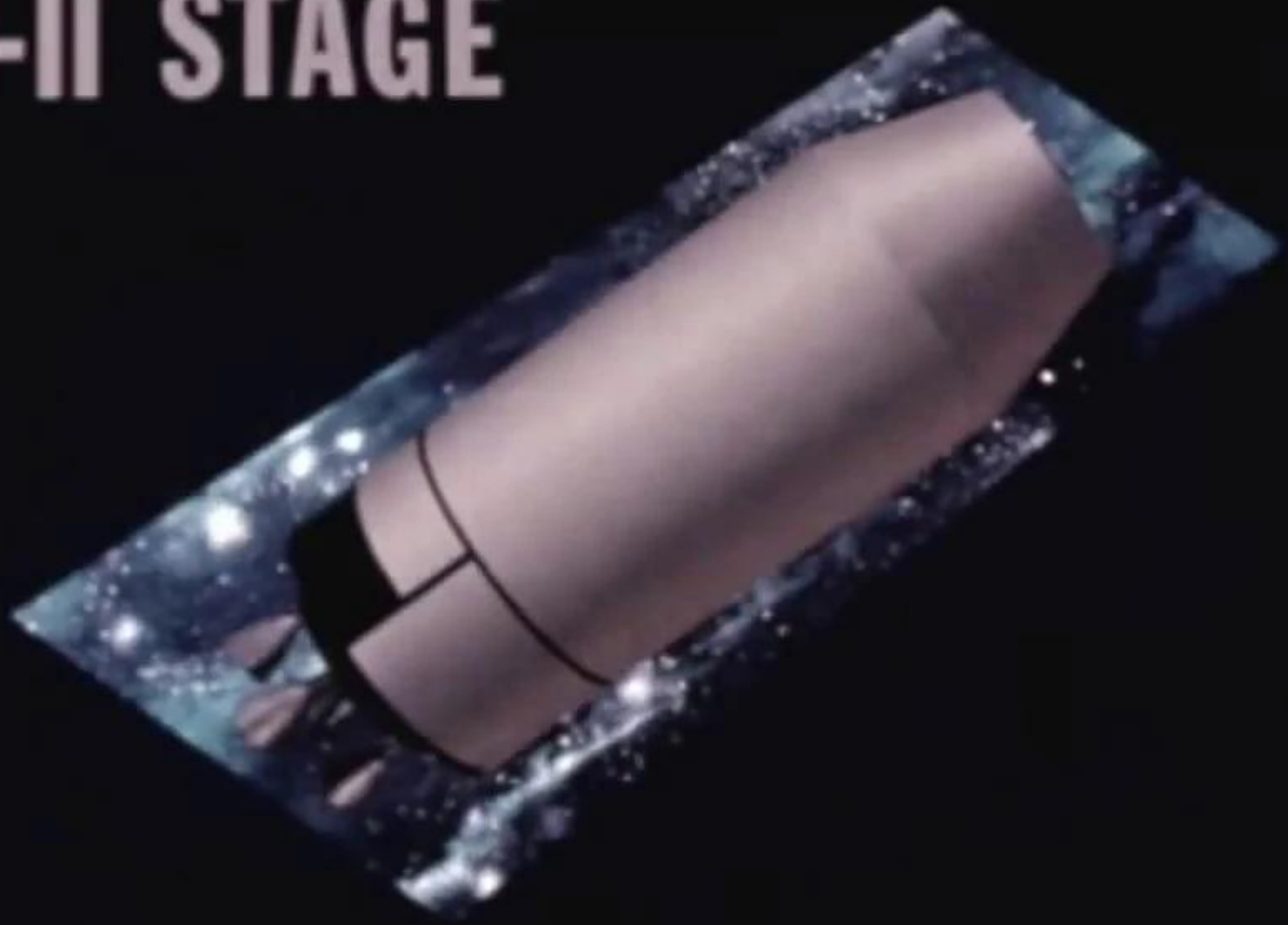
S-II STAGE



1
00:00:16,129 --> 00:00:13,789
Saturn five quarterly film report number

2
00:00:19,330 --> 00:00:16,139
four covers progress during the period

3
00:00:21,800 --> 00:00:19,340
September October November 1963

4
00:00:32,420 --> 00:00:21,810
highlighting Saturn ground test stage

5
00:00:34,459 --> 00:00:32,430
construction s 1c efforts at Marshall

6
00:00:36,560 --> 00:00:34,469
this quarter were primarily in support

7
00:00:40,250 --> 00:00:36,570
of the test fuel tank and the static

8
00:00:42,709 --> 00:00:40,260
firing test stage installation of s 1c

9
00:00:45,319 --> 00:00:42,719
test tank upper bulkhead @e slosh

10
00:00:47,479 --> 00:00:45,329
battles was completed in early October

11
00:00:52,090 --> 00:00:47,489
following receipt of the previously

12
00:00:57,830 --> 00:00:55,369
the lower bulkhead and wiring for the

13
00:00:58,849 --> 00:00:57,840

test fuel tank were welded together in

14
00:01:00,889 --> 00:00:58,859
late September

15
00:01:03,290 --> 00:01:00,899
prior to installation of the bulkhead

16
00:01:08,770 --> 00:01:03,300
polar cap as originally scheduled to

17
00:01:14,539 --> 00:01:11,870
the polar cap Philips problem for the

18
00:01:17,690 --> 00:01:14,549
test fuel tank was resolved by October

19
00:01:19,789 --> 00:01:17,700
1st and the cap was welded in place and

20
00:01:21,649 --> 00:01:19,799
he sloshed baffles were later installed

21
00:01:25,810 --> 00:01:21,659
completing assembly of the lower

22
00:01:28,219 --> 00:01:25,820
bulkhead Marshalls recently completed

23
00:01:31,219 --> 00:01:28,229
hydrostatic test and vertical Assembly

24
00:01:33,590 --> 00:01:31,229
Building was placed in operation in

25
00:01:36,260 --> 00:01:33,600
early November for the first time to

26
00:01:38,870 --> 00:01:36,270
accomplish vertical assembly of the s 1c

27
00:01:41,480 --> 00:01:38,880
test fuel tank the fuel tank upper

28
00:01:44,359 --> 00:01:41,490
assembly consisting of bulkhead wiring

29
00:01:48,260 --> 00:01:44,369
and skin section was first hoisted into

30
00:01:50,450 --> 00:01:48,270
the hydrostatic Tower where it remained

31
00:01:52,789 --> 00:01:50,460
while the lower assembly was inverted by

32
00:01:56,240 --> 00:01:52,799
means of a turning device aboard the C

33
00:01:58,340 --> 00:01:56,250
frame s 1 C components transporter after

34
00:02:00,889 --> 00:01:58,350
inversion the lower assembly was moved

35
00:02:06,530 --> 00:02:00,899
inside and lowered into position in the

36
00:02:08,570 --> 00:02:06,540
vertical assembly pit the upper assembly

37
00:02:11,059 --> 00:02:08,580
was then lifted by cranes under the

38
00:02:12,650 --> 00:02:11,069

lower assembly for mating after the

39
00:02:13,610 --> 00:02:12,660
proper alignment had been made between

40
00:02:19,900 --> 00:02:13,620
the two assembly

41
00:02:25,160 --> 00:02:23,150
assembly of the s-1 seed test fuel tank

42
00:02:30,400 --> 00:02:25,170
aft adapter assembly neared completion

43
00:02:36,380 --> 00:02:33,770
assembly of the fuel tank for the s1 CT

44
00:02:39,140 --> 00:02:36,390
the static firing test stage got

45
00:02:41,180 --> 00:02:39,150
underway this court the lower bulkhead

46
00:02:43,970 --> 00:02:41,190
has been completed and work is in

47
00:02:46,130 --> 00:02:43,980
progress on the upper bulkhead work on

48
00:02:51,920 --> 00:02:46,140
the first LOX bulkhead will begin in

49
00:02:55,699 --> 00:02:51,930
December welding of cylindrical skin

50
00:02:58,520 --> 00:02:55,709
sections began in November erection of

51
00:03:00,470 --> 00:02:58,530
the main assembly fixture for the s-1 CT

52
00:03:03,110 --> 00:03:00,480
thrust structure at Marshall has been

53
00:03:04,670 --> 00:03:03,120
completed this plus installation of the

54
00:03:07,039 --> 00:03:04,680
center engine support fixture

55
00:03:09,350 --> 00:03:07,049
essentially completed the Boeing portion

56
00:03:13,069 --> 00:03:09,360
of the s-1 sea tooling erection program

57
00:03:17,059 --> 00:03:13,079
in addition Boeing also delivered two

58
00:03:19,309 --> 00:03:17,069
MSFC all s1 CT fuel tank bulkhead

59
00:03:23,449 --> 00:03:19,319
tooling assembly of the thrust structure

60
00:03:26,390 --> 00:03:23,459
began in November construction at

61
00:03:28,819 --> 00:03:26,400
Marshall of an s-1 sea stage simulator

62
00:03:31,430 --> 00:03:28,829
by Martin Baltimore was completed in

63
00:03:33,349 --> 00:03:31,440

October the simulator will be used to

64
00:03:35,930 --> 00:03:33,359
provide weight and center of gravity

65
00:03:40,729 --> 00:03:35,940
data for transportation handling and

66
00:03:43,159 --> 00:03:40,739
test our clearances at Marshall's s1 see

67
00:03:45,259 --> 00:03:43,169
static test stand erection of the steel

68
00:03:47,839 --> 00:03:45,269
superstructure was finished this quarter

69
00:03:50,330 --> 00:03:47,849
all deflectors support trusses have been

70
00:03:52,809 --> 00:03:50,340
in placed installation of the deflector

71
00:03:54,770 --> 00:03:52,819
manifolds and piping is underway

72
00:03:58,330 --> 00:03:54,780
installation of the Technical Systems

73
00:04:02,059 --> 00:03:58,340
for the stand is proceeding on schedule

74
00:04:04,129 --> 00:04:02,069
at Marshall's Michou operations Boeing's

75
00:04:06,199 --> 00:04:04,139
s once the activity this quarter

76
00:04:08,690 --> 00:04:06,209
consisted largely of installation of

77
00:04:10,759 --> 00:04:08,700
tooling and fixtures such as this upper

78
00:04:14,710 --> 00:04:10,769
and lower thrust ring assembly fixture

79
00:04:18,020 --> 00:04:14,720
which was fabricated at Boeing Wichita

80
00:04:20,539 --> 00:04:18,030
in this inner tank sub assembly fixture

81
00:04:23,300 --> 00:04:20,549
three panels will be spliced forming a

82
00:04:25,310 --> 00:04:23,310
60-degree segment of the inner tank six

83
00:04:29,640 --> 00:04:25,320
such segments will comprise a full

84
00:04:34,990 --> 00:04:33,040
the first enter tank which was a half of

85
00:04:37,089 --> 00:04:35,000
an entered tank assembly for the test

86
00:04:43,360 --> 00:04:37,099
fuel tank has been completed and shipped

87
00:04:45,480 --> 00:04:43,370
to MSFC the forward handling ring will

88
00:04:48,040 --> 00:04:45,490

be assembled in this fixture at miss you

89
00:04:50,200 --> 00:04:48,050
the forward handling ring will be used

90
00:04:52,839 --> 00:04:50,210
in assembly and transportation of the

91
00:04:55,120 --> 00:04:52,849
major components of the s-1 C stage and

92
00:05:00,309 --> 00:04:55,130
will become part of the transporter for

93
00:05:02,529 --> 00:05:00,319
the entire stage construction continued

94
00:05:05,469 --> 00:05:02,539
on misused vertical Assembly Building in

95
00:05:07,779 --> 00:05:05,479
hydrostatic test stand by November first

96
00:05:10,059 --> 00:05:07,789
Boeing had been granted beneficial

97
00:05:12,249 --> 00:05:10,069
occupancy and was installing the bridge

98
00:05:16,120 --> 00:05:12,259
crane and other facilities inside the

99
00:05:18,850 --> 00:05:16,130
building at Boeing Wichita profile

100
00:05:20,589 --> 00:05:18,860
milling of the upper cap for the 33 foot

101
00:05:22,990 --> 00:05:20,599
long Center engine support has been

102
00:05:25,420 --> 00:05:23,000
performed this is part of the thrust

103
00:05:27,399 --> 00:05:25,430
structure assembly contouring is

104
00:05:32,200 --> 00:05:27,409
necessary to fit the cap to the sheer

105
00:05:34,330 --> 00:05:32,210
web assemblies at Boeing Seattle's

106
00:05:36,700 --> 00:05:34,340
saturn v support work continued

107
00:05:38,800 --> 00:05:36,710
including compression testing on a panel

108
00:05:41,439 --> 00:05:38,810
simulating the oxidizer tank skin

109
00:05:43,629 --> 00:05:41,449
configuration test data recorded

110
00:05:45,520 --> 00:05:43,639
included applied load versus

111
00:05:47,800 --> 00:05:45,530
longitudinal deflection of the panel

112
00:05:50,140 --> 00:05:47,810
ultimate load sustained strain

113
00:05:57,070 --> 00:05:50,150

distribution in the panel versus applied

114
00:05:59,469 --> 00:05:57,080
load and failure mode at North American

115
00:06:02,140 --> 00:05:59,479
Aviation's space and Information Systems

116
00:06:04,270 --> 00:06:02,150
Division s2 structural test stage

117
00:06:06,309 --> 00:06:04,280
fabrication and assembly continued

118
00:06:10,059 --> 00:06:06,319
during the report period at the seal

119
00:06:12,580 --> 00:06:10,069
beach final assembly facility by early

120
00:06:14,920 --> 00:06:12,590
October welding was completed on the 12

121
00:06:21,040 --> 00:06:14,930
thick thin parts required for the aft

122
00:06:22,689 --> 00:06:21,050
common static bulkhead at seal Beach the

123
00:06:26,279 --> 00:06:22,699
structural steel framing for the

124
00:06:28,629 --> 00:06:26,289
vertical Assembly Building is complete

125
00:06:30,760 --> 00:06:28,639
functional check out of the 50 ton

126
00:06:33,879 --> 00:06:30,770
capacity gantry crane has been

127
00:06:35,860 --> 00:06:33,889
successfully performed two ovens to heat

128
00:06:38,710 --> 00:06:35,870
treat honeycomb cores have been

129
00:06:40,810 --> 00:06:38,720
certified at

130
00:06:42,910 --> 00:06:40,820
Santa Susana propulsion fields

131
00:06:45,700 --> 00:06:42,920
laboratory facility the locked storage

132
00:06:47,860 --> 00:06:45,710
vessel has been accepted by s and ID and

133
00:06:53,010 --> 00:06:47,870
the liquid hydrogen storage vessel is

134
00:06:57,550 --> 00:06:55,990
the inner and outer bulkhead domes for

135
00:06:59,830 --> 00:06:57,560
the battleships liquid hydrogen

136
00:07:02,560 --> 00:06:59,840
propellant tanks are in the final stage

137
00:07:04,570 --> 00:07:02,570
of fabrication the LOX propellant tank

138
00:07:11,410 --> 00:07:04,580

and the inner and outer liquid hydrogen

139
00:07:13,450 --> 00:07:11,420
tank walls have been fabricated the s2

140
00:07:15,880 --> 00:07:13,460
battleship thrust structure was finished

141
00:07:17,920 --> 00:07:15,890
at s and I DS Los Angeles division in

142
00:07:20,170 --> 00:07:17,930
November and was delivered to Santa

143
00:07:25,300 --> 00:07:20,180
Susana for installation scheduled to

144
00:07:27,520 --> 00:07:25,310
start in December deliveries to the koko

145
00:07:29,950 --> 00:07:27,530
one battleship test stand this quarter

146
00:07:33,060 --> 00:07:29,960
included flame deflector superstructure

147
00:07:35,350 --> 00:07:33,070
and mechanical and electrical systems

148
00:07:38,260 --> 00:07:35,360
similar items have been delivered to the

149
00:07:40,150 --> 00:07:38,270
Coco for all systems tests and and the

150
00:07:46,690 --> 00:07:40,160
service tower has been erected to over

151
00:07:48,880 --> 00:07:46,700
two-thirds of its full elevation study

152
00:07:51,760 --> 00:07:48,890
of the base area portion of the s2

153
00:07:53,830 --> 00:07:51,770
electromechanical mock-up has provided s

154
00:07:55,420 --> 00:07:53,840
and ID engineers with information

155
00:08:01,960 --> 00:07:55,430
pertaining to the installation of the

156
00:08:04,420 --> 00:08:01,970
heat shield to j2 engine simulators were

157
00:08:06,790 --> 00:08:04,430
also delivered to s and I T the

158
00:08:08,890 --> 00:08:06,800
simulator is a functional mock-up of the

159
00:08:11,920 --> 00:08:08,900
production engine and is used as an

160
00:08:14,050 --> 00:08:11,930
advanced vehicle development aid valves

161
00:08:16,590 --> 00:08:14,060
electrical and ignition systems our

162
00:08:18,909 --> 00:08:16,600
production hardware and our operational

163
00:08:21,280 --> 00:08:18,919

components that do not operate during

164
00:08:23,140 --> 00:08:21,290
pre-flight check out our hard mock-ups

165
00:08:33,410 --> 00:08:23,150
but configuration weight and

166
00:08:38,840 --> 00:08:36,140
at Douglas Aircraft Slater Complex in

167
00:08:41,210 --> 00:08:38,850
Sacramento where s4b stages will be

168
00:08:43,550 --> 00:08:41,220
static fired the superstructure for the

169
00:08:48,500 --> 00:08:43,560
battleship test stand beta one was

170
00:08:50,200 --> 00:08:48,510
finished in late September the

171
00:08:52,550 --> 00:08:50,210
battleship tank has been assembled

172
00:08:54,590 --> 00:08:52,560
insulation has been installed and the

173
00:09:00,230 --> 00:08:54,600
tank is scheduled for installation in

174
00:09:02,540 --> 00:09:00,240
the beta one stand during December the

175
00:09:06,410 --> 00:09:02,550
beta complex block house was virtually

176
00:09:08,900 --> 00:09:06,420
completed during the quarter at beta 3

177
00:09:10,370 --> 00:09:08,910
the all systems tests and work on the

178
00:09:14,420 --> 00:09:10,380
superstructure and propellant storage

179
00:09:17,000 --> 00:09:14,430
tanks continued activity at the Douglas

180
00:09:19,160 --> 00:09:17,010
s4b mock-up area at Santa Monica

181
00:09:21,260 --> 00:09:19,170
included electrical component

182
00:09:23,660 --> 00:09:21,270
installation in the apt thrust structure

183
00:09:26,420 --> 00:09:23,670
work on electrical paneling in the apt

184
00:09:29,360 --> 00:09:26,430
skirt installation of the customer

185
00:09:32,390 --> 00:09:29,370
connect panels da C's mating area to the

186
00:09:36,110 --> 00:09:32,400
j2 engine work on the instrumentation

187
00:09:39,650 --> 00:09:36,120
probe work on the liquid oxygen probe

188
00:09:43,610 --> 00:09:39,660

and instrumentation wiring of the

189
00:09:46,100 --> 00:09:43,620
forward dome the s4 B auxilary

190
00:09:48,260 --> 00:09:46,110
propulsion subcontractors Marquardt

191
00:09:49,910 --> 00:09:48,270
company and tat Co continued

192
00:09:52,760 --> 00:09:49,920
developmental activity during the

193
00:09:55,390 --> 00:09:52,770
quarter mark watt was engaged in thrust

194
00:09:58,540 --> 00:09:55,400
chamber fabrication and testing for its

195
00:10:03,150 --> 00:09:58,550
1715 thrust liquid propellant college

196
00:10:06,810 --> 00:10:03,160
two of which will be used for p stage

197
00:10:09,630 --> 00:10:06,820
at TEPCO post-test evaluation and design

198
00:10:12,000 --> 00:10:09,640
of a pre prototype 150 pounds thrust

199
00:10:14,100 --> 00:10:12,010
attitude control engine was in progress

200
00:10:16,500 --> 00:10:14,110
because of development problems

201
00:10:19,320 --> 00:10:16,510
encountered Marshall determined that

202
00:10:21,560 --> 00:10:19,330
Tapco would develop two engines of 150

203
00:10:24,060 --> 00:10:21,570
pounds thrust one for attitude control

204
00:10:26,460 --> 00:10:24,070
requirements for Saturn 1b and five

205
00:10:29,610 --> 00:10:26,470
vehicles the other to meet college

206
00:10:31,680 --> 00:10:29,620
requirements for Saturn 5 this decision

207
00:10:41,460 --> 00:10:31,690
was made in order that the Saturn 1b

208
00:10:43,830 --> 00:10:41,470
scheduled a major milestone in the f1

209
00:10:46,020 --> 00:10:43,840
engine program was achieved on schedule

210
00:10:48,540 --> 00:10:46,030
in September with the completion of the

211
00:10:53,820 --> 00:10:48,550
first f1 production engine at rocket

212
00:10:55,200 --> 00:10:53,830
Dean's Canoga Park plant designated for

213
00:10:57,750 --> 00:10:55,210

delivery to the Marshall Space Flight

214
00:10:59,670 --> 00:10:57,760
Center the engine was first shipped for

215
00:11:04,790 --> 00:10:59,680
its acceptance testing to the large

216
00:11:11,460 --> 00:11:08,580
here test stand 1 b2 had been selected

217
00:11:13,200 --> 00:11:11,470
for the static firing series a program

218
00:11:15,510 --> 00:11:13,210
in which the engine was subjected to

219
00:11:17,820 --> 00:11:15,520
operation under carefully prescribed

220
00:11:23,090 --> 00:11:17,830
conditions

221
00:11:27,440 --> 00:11:25,760
she or separate buries the engine

222
00:11:29,390 --> 00:11:27,450
successfully meant the acceptance

223
00:11:31,910 --> 00:11:29,400
testing requirements before being

224
00:11:35,480 --> 00:11:31,920
returned the Rocketdyne plan for final

225
00:11:39,610 --> 00:11:35,490
check out the longest firing was for 117

226
00:11:44,690 --> 00:11:42,860
the initial f1 production engine was

227
00:11:50,120 --> 00:11:44,700
then transported aboard the pregnant

228
00:11:52,460 --> 00:11:50,130
guppy aircraft to the Marshall Center on

229
00:11:56,120 --> 00:11:52,470
November 19th the engine was installed

230
00:11:57,950 --> 00:11:56,130
in Marshalls s1 static test stand one

231
00:12:01,340 --> 00:11:57,960
position of which was recently modified

232
00:12:03,020 --> 00:12:01,350
to accommodate the f1 propulsion system

233
00:12:08,150 --> 00:12:03,030
testing of the engine was scheduled to

234
00:12:10,370 --> 00:12:08,160
begin in early december at edwards

235
00:12:12,680 --> 00:12:10,380
rocket site construction continued this

236
00:12:14,510 --> 00:12:12,690
quarter on a new complex to provide test

237
00:12:17,300 --> 00:12:14,520
facilities for production f-1 engines

238
00:12:20,240 --> 00:12:17,310

and to increase R&D engine test

239
00:12:22,700 --> 00:12:20,250
capabilities tank installation was

240
00:12:24,680 --> 00:12:22,710
accomplished on stand 1c and the

241
00:12:29,720 --> 00:12:24,690
superstructure was completed on 1e

242
00:12:32,030 --> 00:12:29,730
during the report period to keep pace

243
00:12:34,460 --> 00:12:32,040
with the production of both R&D and

244
00:12:36,200 --> 00:12:34,470
production engines new manufacturing

245
00:12:39,980 --> 00:12:36,210
facilities have recently been completed

246
00:12:42,410 --> 00:12:39,990
at Canoga Park over 200,000 square feet

247
00:12:45,530 --> 00:12:42,420
of manufacturing space has been added

248
00:12:50,750 --> 00:12:45,540
for the use jointly of the F 1 and J 2

249
00:12:53,420 --> 00:12:50,760
engine programs delivery of J 2 engines

250
00:12:56,060 --> 00:12:53,430
from rocket Dean's Canoga Park plant 2s

251
00:13:00,320 --> 00:12:56,070
and ID for the S 2 electromechanical

252
00:13:02,690 --> 00:13:00,330
mock-up began in late November a scale

253
00:13:05,360 --> 00:13:02,700
model of the altitude facility to be

254
00:13:08,240 --> 00:13:05,370
used at the Delta 2 test stand for the

255
00:13:10,670 --> 00:13:08,250
j2 program was tested this quarter at

256
00:13:16,700 --> 00:13:10,680
component test lab number 4 of rocket

257
00:13:19,700 --> 00:13:16,710
Dynes propulsion field laboratory the

258
00:13:22,370 --> 00:13:19,710
Delta 2 test stand which affords a 500

259
00:13:30,060 --> 00:13:22,380
second run capability for the j2 engine

260
00:13:36,070 --> 00:13:33,580
the Delta to weed position was activated

261
00:13:40,180 --> 00:13:36,080
on November 9 with the initial Larry of

262
00:13:43,090 --> 00:13:40,190
a j2 kitchen November 27 the first j2

263
00:13:45,910 --> 00:13:43,100

extended duration ground test the static

264
00:13:48,850 --> 00:13:45,920
wiry of 510 seconds was successfully

265
00:13:55,960 --> 00:13:48,860
accomplished the Delta to aim position

266
00:13:58,000 --> 00:13:55,970
will be activated in early December at

267
00:14:00,760 --> 00:13:58,010
the Marshall Space Flight Center steel

268
00:14:03,640 --> 00:14:00,770
erection for the Saturn 5 dynamic test

269
00:14:06,070 --> 00:14:03,650
stand began in early October completion

270
00:14:10,470 --> 00:14:06,080
of the 360 foot tall structure is

271
00:14:12,940 --> 00:14:10,480
scheduled in November of 1964

272
00:14:15,370 --> 00:14:12,950
construction continued this quarter on

273
00:14:20,020 --> 00:14:15,380
the Saturn 5 high pressure water system

274
00:14:22,090 --> 00:14:20,030
at Marshall the 250 pounds pressure

275
00:14:25,600 --> 00:14:22,100
industrial water system which utilizes

276
00:14:28,420 --> 00:14:25,610
huge pipes up to 8 feet in diameter will

277
00:14:30,880 --> 00:14:28,430
have a pumping capacity of 270,000

278
00:14:33,280 --> 00:14:30,890
gallons a minute millions of gallons of

279
00:14:36,670 --> 00:14:33,290
water will be forced by this system into

280
00:14:42,250 --> 00:14:36,680
flame deflectors at the s1c and f1

281
00:14:44,830 --> 00:14:42,260
engine static test stands at Marshalls

282
00:14:47,260 --> 00:14:44,840
Mississippi test operations phase 1

283
00:14:50,760 --> 00:14:47,270
dredging of the Pearl River and Little

284
00:14:53,620 --> 00:14:50,770
Lake was completed in late October the

285
00:14:56,650 --> 00:14:53,630
MTO construction dock was finished in

286
00:14:58,960 --> 00:14:56,660
November highway construction is well

287
00:15:01,990 --> 00:14:58,970
underway with some access roads also

288
00:15:04,090 --> 00:15:02,000

under construction one of the major

289
00:15:07,530 --> 00:15:04,100
buildings under construction is the

290
00:15:10,120 --> 00:15:07,540
warehouse and emergency service building

291
00:15:12,700 --> 00:15:10,130
the laboratory and engineering building

292
00:15:15,820 --> 00:15:12,710
which will serve as MTO headquarters

293
00:15:19,480 --> 00:15:15,830
will be built on this site pile-driving

294
00:15:21,790 --> 00:15:19,490
for the foundations of MTO's s2 static

295
00:15:25,600 --> 00:15:21,800
test stand began during the report

296
00:15:29,020 --> 00:15:25,610
period and excavation work for the 350