1
00:00:00,000 --> 00:00:20,590
I

2
00:00:24,400 --> 00:00:22,510
launched high above the clouds and

3
00:00:26,560 --> 00:00:24,410
filtering atmosphere on February

4
00:00:28,960 --> 00:00:26,570
fourteen nineteen eighty the solar

5
00:00:31,930 --> 00:00:28,970
maximum Observatory is a source of very

6
00:00:33,190 --> 00:00:31,940
detailed information about the Sun for

7
00:00:35,680 --> 00:00:33,200
the first nine months of the plan

8
00:00:38,710 --> 00:00:35,690
two-year mission the satellite collected

9
00:00:40,390 --> 00:00:38,720
spectacular new data hundreds of

10
00:00:41,979 --> 00:00:40,400
scientists gathered at NASA's Goddard

11
00:00:44,260 --> 00:00:41,989
Space Flight Center in Greenbelt

12
00:00:46,420 --> 00:00:44,270
Maryland in a ground observatories

13
00:00:49,060 --> 00:00:46,430

around the world to study the Sun and

14
00:00:51,040 --> 00:00:49,070
solar flares scientists made numerous

15
00:00:53,860 --> 00:00:51,050
discoveries and raised many new

16
00:00:56,200 --> 00:00:53,870
questions about the Sun then in late

17
00:00:58,090 --> 00:00:56,210
nineteen eighty-three fuses failed in

18
00:01:00,280 --> 00:00:58,100
the attitude control subsystem module

19
00:01:02,079 --> 00:01:00,290
this meant that the satellite could no

20
00:01:05,049 --> 00:01:02,089
longer point precisely at the

21
00:01:06,760 --> 00:01:05,059
observation areas on the Sun fortunately

22
00:01:09,130 --> 00:01:06,770
solar max was the first of a new breed

23
00:01:11,530 --> 00:01:09,140
of satellites build of standardized

24
00:01:14,410 --> 00:01:11,540
components and designed to be repaired

25
00:01:16,750 --> 00:01:14,420
in space the faulty attitude control

26
00:01:19,090 --> 00:01:16,760
module is one of the three replaceable

27
00:01:21,910 --> 00:01:19,100
box-like units that control power

28
00:01:24,789 --> 00:01:21,920
command functions and the positioning of

29
00:01:26,830 --> 00:01:24,799
the satellite these units are part of

30
00:01:30,069 --> 00:01:26,840
the multi-mission modular spacecraft or

31
00:01:33,279 --> 00:01:30,079
mms which makes up the lower portion of

32
00:01:35,980 --> 00:01:33,289
the solar max satellite the upper

33
00:01:38,789 --> 00:01:35,990
portion the observatory contains seven

34
00:01:40,870 --> 00:01:38,799
different instruments for solar research

35
00:01:42,459 --> 00:01:40,880
however a considerable amount of

36
00:01:44,740 --> 00:01:42,469
planning and preparation had to be

37
00:01:48,160 --> 00:01:44,750
accomplished before that repair could

38
00:01:50,919 --> 00:01:48,170

occur the solar maximum repair mission

39
00:02:15,460 --> 00:01:50,929
in 1984 chalked up a number of

40
00:02:19,450 --> 00:02:18,040
these successes were possible because of

41
00:02:21,700 --> 00:02:19,460
some of the unique management approaches

42
00:02:25,000 --> 00:02:21,710
and decisions made back in the late

43
00:02:26,590 --> 00:02:25,010
1960s and early 1970s certainly there

44
00:02:28,870 --> 00:02:26,600
must be some very interesting management

45
00:02:31,690 --> 00:02:28,880
lessons learned from the mms and solar

46
00:02:33,490 --> 00:02:31,700
max experience i'm dutch funny retreat

47
00:02:35,140 --> 00:02:33,500
on behalf of the NASA program and

48
00:02:37,420 --> 00:02:35,150
project management training and

49
00:02:39,550 --> 00:02:37,430
development initiative now let's go to

50
00:02:42,130 --> 00:02:39,560
Goddard Space Flight Center and get some

51
00:02:46,960 --> 00:02:42,140
insight on the mms from frank cipollina

52
00:02:49,600 --> 00:02:46,970
the project manager for the mms thanks

53
00:02:52,090 --> 00:02:49,610
for joining us sepi what were some of

54
00:02:54,460 --> 00:02:52,100
the more dominant management challenges

55
00:02:58,390 --> 00:02:54,470
that allowed for the development of the

56
00:03:02,050 --> 00:02:58,400
modular spacecraft well that's the most

57
00:03:05,560 --> 00:03:02,060
dominant challenge was the desire to try

58
00:03:09,820 --> 00:03:05,570
to fly more science at less cost and the

59
00:03:12,699 --> 00:03:09,830
period of the late sixties inflation was

60
00:03:15,220 --> 00:03:12,709
beginning to skyrocket the Apollo

61
00:03:18,340 --> 00:03:15,230
program was coming down phasing down

62
00:03:21,490 --> 00:03:18,350
along with it the budgets were dropping

63
00:03:24,370 --> 00:03:21,500

off and yet from a scientific taste or

64
00:03:26,830 --> 00:03:24,380
desire or flavor we were getting many

65
00:03:28,990 --> 00:03:26,840
many good new missions to fly and

66
00:03:30,910 --> 00:03:29,000
searching desperately to find the

67
00:03:34,330 --> 00:03:30,920
dollars as an agency to fly those new

68
00:03:37,210 --> 00:03:34,340
scientific missions and that was really

69
00:03:39,880 --> 00:03:37,220
the challenge that we as a center try to

70
00:03:42,370 --> 00:03:39,890
step up to since we are a scientific

71
00:03:45,030 --> 00:03:42,380
Space Flight Center well how can you

72
00:03:48,160 --> 00:03:45,040
answer a question like

73
00:03:53,050 --> 00:03:48,170
well when I think back I am amazed at

74
00:03:55,300 --> 00:03:53,060
how how it came out but in fact the the

75
00:03:58,210 --> 00:03:55,310
aspects of answering it took four years

76
00:04:01,090 --> 00:03:58,220
of very very hard work and an intense

77
00:04:05,740 --> 00:04:01,100
team of experienced scientists and

78
00:04:07,810 --> 00:04:05,750
engineers the den center director 1970

79
00:04:12,190 --> 00:04:07,820
formalized such a team and challenge

80
00:04:14,800 --> 00:04:12,200
them basically to look at what are the

81
00:04:17,710 --> 00:04:14,810
elements of spacecraft cost and how

82
00:04:21,009 --> 00:04:17,720
could we in fact reduce those costs that

83
00:04:25,600 --> 00:04:21,019
team concentrated on looking at the

84
00:04:28,240 --> 00:04:25,610
space crafts of the 1960s 150 280 some

85
00:04:30,580 --> 00:04:28,250
odd spacecrafts the NASA designed built

86
00:04:32,320 --> 00:04:30,590
and launched in that decade and they

87
00:04:34,060 --> 00:04:32,330
focused not so much with the design

88
00:04:36,130 --> 00:04:34,070

characteristics of the space crafts but

89
00:04:39,240 --> 00:04:36,140
rather with the design characteristics

90
00:04:42,130 --> 00:04:39,250
as how they related to cost and the cost

91
00:04:44,470 --> 00:04:42,140
aspects and then finally with that

92
00:04:46,990 --> 00:04:44,480
database we went to private industry and

93
00:04:51,100 --> 00:04:47,000
we did some rather significant economic

94
00:04:54,550 --> 00:04:51,110
studies focusing on design parameters as

95
00:04:57,190 --> 00:04:54,560
a function of cost but what were some of

96
00:05:00,550 --> 00:04:57,200
the findings of those studies well touch

97
00:05:02,650 --> 00:05:00,560
there were four major findings of the

98
00:05:06,130 --> 00:05:02,660
studies the first one not so surprising

99
00:05:08,770 --> 00:05:06,140
said that in the period of the 60s we

100
00:05:12,640 --> 00:05:08,780
did not have any significant commonality

101
00:05:14,470 --> 00:05:12,650
of space crafts second findings said

102
00:05:16,720 --> 00:05:14,480
that even though we had point design

103
00:05:19,450 --> 00:05:16,730
spacecrafts within those space crafts

104
00:05:23,170 --> 00:05:19,460
were in fact a lot of common boxes black

105
00:05:25,180 --> 00:05:23,180
boxes equipment and the third finding

106
00:05:26,850 --> 00:05:25,190
which was probably the most significant

107
00:05:30,850 --> 00:05:26,860
from a cost containment point of view

108
00:05:33,220 --> 00:05:30,860
was the fact that almost the vast

109
00:05:35,740 --> 00:05:33,230
majority of the spacecraft developments

110
00:05:37,600 --> 00:05:35,750
we were spending anywhere from thirty

111
00:05:40,600 --> 00:05:37,610
three percent to sixty percent of the

112
00:05:43,600 --> 00:05:40,610
total program costs in the integration

113
00:05:46,630 --> 00:05:43,610

and test phase of the spacecraft that in

114
00:05:49,510 --> 00:05:46,640
itself highlighted something that

115
00:05:50,980 --> 00:05:49,520
perhaps we could deal with from new

116
00:05:52,200 --> 00:05:50,990
spacecraft architecture new spacecraft

117
00:05:54,779 --> 00:05:52,210
design

118
00:05:57,059 --> 00:05:54,789
and in effect that really said we were

119
00:05:59,850 --> 00:05:57,069
spending a lot of time reinventing the

120
00:06:01,680 --> 00:05:59,860
spacecraft wheels when in fact the only

121
00:06:04,379 --> 00:06:01,690
thing that was changing was the outside

122
00:06:06,960 --> 00:06:04,389
architecture of the spacecraft the last

123
00:06:09,150 --> 00:06:06,970
point was the point that kind of gave us

124
00:06:12,420 --> 00:06:09,160
credence for multi mission capability

125
00:06:15,390 --> 00:06:12,430
and that is that for most of those 150

126
00:06:17,969 --> 00:06:15,400
to 180 missions many of those could be

127
00:06:20,730 --> 00:06:17,979
synthesized into four different

128
00:06:23,339 --> 00:06:20,740
performance categories and if somehow we

129
00:06:25,320 --> 00:06:23,349
could design a spacecraft that could

130
00:06:27,600 --> 00:06:25,330
meet the performance requirements of

131
00:06:29,939 --> 00:06:27,610
those four categories we have the

132
00:06:32,400 --> 00:06:29,949
essence of a system which would not

133
00:06:35,070 --> 00:06:32,410
necessitate so to speak reinventing the

134
00:06:37,140 --> 00:06:35,080
spacecraft for those four types of

135
00:06:39,300 --> 00:06:37,150
missions but what was some of the

136
00:06:41,490 --> 00:06:39,310
programmatic issues in the environment

137
00:06:47,730 --> 00:06:41,500
that allowed for the acceptance of the

138
00:06:49,260 --> 00:06:47,740

modular spacecraft concept Pat I guess

139
00:06:51,120 --> 00:06:49,270
it could be summarized by one word

140
00:06:53,640 --> 00:06:51,130
netword with skepticism there was a

141
00:06:56,760 --> 00:06:53,650
tremendous amount of skepticism although

142
00:06:58,649 --> 00:06:56,770
people saw economic studies saw the cost

143
00:07:01,710 --> 00:06:58,659
benefits that am elated from those

144
00:07:03,120 --> 00:07:01,720
studies the most significant problem

145
00:07:05,850 --> 00:07:03,130
that we had was what we were proposing

146
00:07:07,709 --> 00:07:05,860
was a revolutionary spacecraft and in

147
00:07:10,800 --> 00:07:07,719
proposing a revolutionary spacecraft

148
00:07:12,570 --> 00:07:10,810
there's always this fear that a it may

149
00:07:14,580 --> 00:07:12,580
not work technically when it's once it's

150
00:07:17,790 --> 00:07:14,590
put in orbit the risk is very high and

151
00:07:19,830 --> 00:07:17,800
the second point is the fact that in the

152
00:07:22,140 --> 00:07:19,840
development process it may not be

153
00:07:23,939 --> 00:07:22,150
feasible to contain the cost growth you

154
00:07:26,219 --> 00:07:23,949
may run into new technological problems

155
00:07:29,580 --> 00:07:26,229
that had never been faced before so we

156
00:07:32,270 --> 00:07:29,590
had to focus over that four or five year

157
00:07:34,740 --> 00:07:32,280
period in dealing with our critics in

158
00:07:37,950 --> 00:07:34,750
attempting to answer those four major

159
00:07:39,950 --> 00:07:37,960
problems those questions of cost

160
00:07:42,719 --> 00:07:39,960
containment out of skepticism of

161
00:07:45,629 --> 00:07:42,729
performance of risk assessment risk

162
00:07:47,969 --> 00:07:45,639
managed well sepi what was the influence

163
00:07:51,360 --> 00:07:47,979

of Apollo and shuttle on your program at

164
00:07:53,550 --> 00:07:51,370
that time I think we can best answer

165
00:07:55,589 --> 00:07:53,560
that question if we walk up now to the

166
00:07:58,200 --> 00:07:55,599
shuttlebay trainer and take a look at

167
00:08:14,590 --> 00:07:58,210
our latest mms spacecraft that's been

168
00:08:19,570 --> 00:08:17,260
now that we're up here dutch i think i

169
00:08:21,250 --> 00:08:19,580
can better explain the impact and the

170
00:08:22,960 --> 00:08:21,260
influences of both the Apollo and the

171
00:08:26,400 --> 00:08:22,970
shuttle program had on our spacecraft

172
00:08:29,350 --> 00:08:26,410
architecture perhaps the most single

173
00:08:32,830 --> 00:08:29,360
critical dilemma that was posed to us in

174
00:08:36,270 --> 00:08:32,840
the early 70s was the dilemma of having

175
00:08:39,339 --> 00:08:36,280
to deal with how to shuttle eyes and

176
00:08:41,589 --> 00:08:39,349
make our spacecraft systems serviceable

177
00:08:44,380 --> 00:08:41,599
one of the most fundamental problems

178
00:08:46,270 --> 00:08:44,390
that we had was that all our economic

179
00:08:49,870 --> 00:08:46,280
studies were showing study after study

180
00:08:51,670 --> 00:08:49,880
after study the advantages from a cost

181
00:08:53,550 --> 00:08:51,680
control point of view and a foremost

182
00:08:55,780 --> 00:08:53,560
serviceability point of view of

183
00:08:57,900 --> 00:08:55,790
repairing servicing changing out

184
00:09:01,540 --> 00:08:57,910
payloads on orbit for these spacecrafts

185
00:09:03,940 --> 00:09:01,550
by the same token the experience factor

186
00:09:06,190 --> 00:09:03,950
that the agency had had on the Apollo

187
00:09:09,790 --> 00:09:06,200
program was the very high cost of man

188
00:09:15,310 --> 00:09:09,800

rating equipment and our customers view

189
00:09:18,490 --> 00:09:15,320
this as a is basically a very serious

190
00:09:20,980 --> 00:09:18,500
cost control problem and we had to hit

191
00:09:24,340 --> 00:09:20,990
this problem very hard and we had to hit

192
00:09:27,360 --> 00:09:24,350
it hard head on and deal with it and I'm

193
00:09:30,930 --> 00:09:27,370
point by point basis what we did

194
00:09:34,570 --> 00:09:30,940
basically was to rely very heavily on a

195
00:09:36,220 --> 00:09:34,580
very significant series of economic

196
00:09:39,160 --> 00:09:36,230
studies to delte not so much with

197
00:09:41,790 --> 00:09:39,170
serviceability but with how to build a

198
00:09:44,500 --> 00:09:41,800
lower-cost better architectured

199
00:09:48,120 --> 00:09:44,510
multi-mission type of spacecraft system

200
00:09:50,800 --> 00:09:48,130
and what we did with our customers was

201
00:09:54,250 --> 00:09:50,810
convince them that whether we serviced

202
00:09:55,480 --> 00:09:54,260
on orbit or not whether we launched on

203
00:09:57,520 --> 00:09:55,490
the shuttle are launched on a

204
00:10:00,100 --> 00:09:57,530
conventional launch vehicle and our

205
00:10:02,590 --> 00:10:00,110
spacecraft was architecture to fly

206
00:10:05,680 --> 00:10:02,600
either way fly on a delta fly on a Titan

207
00:10:07,390 --> 00:10:05,690
or even or fly on the shuttle regardless

208
00:10:09,130 --> 00:10:07,400
of the method of launch regardless of

209
00:10:11,680 --> 00:10:09,140
whether one considered serviceability or

210
00:10:14,650 --> 00:10:11,690
not the architecture of the spacecraft

211
00:10:17,530 --> 00:10:14,660
was such that it's economies were

212
00:10:20,590 --> 00:10:17,540
significantly lower by virtue of the

213
00:10:22,630 --> 00:10:20,600

fact that we in fact did make it modular

214
00:10:25,270 --> 00:10:22,640
and easy to assemble and test on the

215
00:10:27,390 --> 00:10:25,280
ground and therefore because we reduce

216
00:10:30,690 --> 00:10:27,400
that integration in Tesla a time

217
00:10:32,580 --> 00:10:30,700
we were able to save some thirty to

218
00:10:36,000 --> 00:10:32,590
forty percent of a typical program

219
00:10:37,890 --> 00:10:36,010
caused by negating the need for first of

220
00:10:40,230 --> 00:10:37,900
all redeveloping of the spacecraft and

221
00:10:42,540 --> 00:10:40,240
then shortening typical space graphs

222
00:10:44,700 --> 00:10:42,550
integration and test time with the

223
00:10:46,890 --> 00:10:44,710
observatory instruments and that was the

224
00:10:49,790 --> 00:10:46,900
fundamental approach by which we hit

225
00:10:52,950 --> 00:10:49,800
this problem and eventually I think that

226
00:10:54,330 --> 00:10:52,960
particular approach did persist and we

227
00:10:55,800 --> 00:10:54,340
were finally able to convince our

228
00:10:57,900 --> 00:10:55,810
customers so that was the better way to

229
00:11:00,660 --> 00:10:57,910
go well sepi what were some of the

230
00:11:03,120 --> 00:11:00,670
aspects of those economic studies well

231
00:11:05,910 --> 00:11:03,130
there were eight economic studies run

232
00:11:08,610 --> 00:11:05,920
during the nineteen seventy-two 1975

233
00:11:11,610 --> 00:11:08,620
period and the majority of the economic

234
00:11:13,980 --> 00:11:11,620
studies dealt with the level of

235
00:11:16,080 --> 00:11:13,990
spacecraft modularity from an economic

236
00:11:19,410 --> 00:11:16,090
point of view from a lower cost possible

237
00:11:21,710 --> 00:11:19,420
point of view we dealt with trying to

238
00:11:24,780 --> 00:11:21,720

understand the economic implication of

239
00:11:26,790 --> 00:11:24,790
making an entire spacecraft modular and

240
00:11:29,310 --> 00:11:26,800
throw away able replaceable at the

241
00:11:31,350 --> 00:11:29,320
spacecraft level the next level down was

242
00:11:33,240 --> 00:11:31,360
at the subsystem level and then we

243
00:11:35,130 --> 00:11:33,250
looked at the individual component

244
00:11:38,430 --> 00:11:35,140
modularity that is making individual

245
00:11:40,860 --> 00:11:38,440
components removable and replaceable the

246
00:11:42,750 --> 00:11:40,870
most significant economic study of all

247
00:11:44,730 --> 00:11:42,760
that is when i say significant i mean

248
00:11:47,850 --> 00:11:44,740
that had the most impact and influence

249
00:11:51,000 --> 00:11:47,860
with our potential customers was the

250
00:11:54,390 --> 00:11:51,010
Aerospace Corporation study that dealt

251
00:11:56,400 --> 00:11:54,400
not with servicing but with the economic

252
00:11:59,340 --> 00:11:56,410
benefits associated with having a

253
00:12:02,010 --> 00:11:59,350
standard modular spacecraft that could

254
00:12:04,220 --> 00:12:02,020
accommodate four or five different sets

255
00:12:07,410 --> 00:12:04,230
of missions without redevelopment and

256
00:12:10,320 --> 00:12:07,420
that could be assembled by virtue of its

257
00:12:12,630 --> 00:12:10,330
modularity on the ground significantly

258
00:12:15,810 --> 00:12:12,640
faster and therefore less expensive that

259
00:12:17,460 --> 00:12:15,820
study highlighted the key that our

260
00:12:19,560 --> 00:12:17,470
customers were really looking for the

261
00:12:21,990 --> 00:12:19,570
potential of a thirty to forty percent

262
00:12:24,390 --> 00:12:22,000
savings for each of the specific

263
00:12:28,710 --> 00:12:24,400

missions that would use a so-called

264
00:12:30,120 --> 00:12:28,720
standard or common spacecraft bus well

265
00:12:34,200 --> 00:12:30,130
what were some of the conclusions of

266
00:12:37,320 --> 00:12:34,210
those studies the the conclusions

267
00:12:41,190 --> 00:12:37,330
especially the aerospace conclusion led

268
00:12:43,680 --> 00:12:41,200
our customers to forget about the

269
00:12:47,300 --> 00:12:43,690
sort of speak the risks associated with

270
00:12:49,440 --> 00:12:47,310
servicing they sort of put servicing

271
00:12:51,150 --> 00:12:49,450
requirements out of their mind and it

272
00:12:53,580 --> 00:12:51,160
was very nice for them to say we won't

273
00:12:55,680 --> 00:12:53,590
do anything to preclude servicing but by

274
00:12:58,980 --> 00:12:55,690
the same token we won't have to spend

275
00:13:02,040 --> 00:12:58,990
any money at making a system serviceable

276
00:13:05,220 --> 00:13:02,050
because modularity and rapid ground

277
00:13:07,050 --> 00:13:05,230
integration and test breeds ease of

278
00:13:09,150 --> 00:13:07,060
servicing on orbit and I think of all

279
00:13:12,120 --> 00:13:09,160
the conclusions of one could draw that

280
00:13:13,950 --> 00:13:12,130
was the one that really put the message

281
00:13:16,260 --> 00:13:13,960
across to our customers and everybody

282
00:13:20,610 --> 00:13:16,270
could sort of speak be the Maytag could

283
00:13:23,040 --> 00:13:20,620
watch the Maytag repairmen leaning on

284
00:13:25,230 --> 00:13:23,050
his washing machine and should the day

285
00:13:28,140 --> 00:13:25,240
ever arise that we did have to conduct

286
00:13:30,510 --> 00:13:28,150
an emergency repair maintenance the

287
00:13:34,620 --> 00:13:30,520
system could in fact be compatible to do

288
00:13:38,010 --> 00:13:34,630

it well semi wasn't really difficult

289
00:13:39,900 --> 00:13:38,020
selling upper management well I guess I

290
00:13:42,930 --> 00:13:39,910
would have to say yes and so it took us

291
00:13:44,910 --> 00:13:42,940
five years to do that I think that in

292
00:13:47,400 --> 00:13:44,920
looking back in the process of trying to

293
00:13:50,330 --> 00:13:47,410
convince upper management we had to deal

294
00:13:54,060 --> 00:13:50,340
with some very specific questions and

295
00:13:57,510 --> 00:13:54,070
convince the upper management at NASA

296
00:14:00,090 --> 00:13:57,520
headquarters that this plunge was was

297
00:14:03,060 --> 00:14:00,100
worth was worth their investment and was

298
00:14:05,370 --> 00:14:03,070
worth taking a risk to do and the way we

299
00:14:07,980 --> 00:14:05,380
did that was first of all find that

300
00:14:12,270 --> 00:14:07,990
first willing customer that first

301
00:14:15,990 --> 00:14:12,280
program who by either necessity or by

302
00:14:18,120 --> 00:14:16,000
cost constraints was willing to join

303
00:14:22,640 --> 00:14:18,130
with us and that program happened to be

304
00:14:27,180 --> 00:14:22,650
the solar max mission spacecraft program

305
00:14:29,130 --> 00:14:27,190
the process by which we sold them on the

306
00:14:30,690 --> 00:14:29,140
approach was first of all we convinced

307
00:14:32,340 --> 00:14:30,700
them that we could launch on any launch

308
00:14:34,800 --> 00:14:32,350
vehicle that we did not have to wait for

309
00:14:38,280 --> 00:14:34,810
the shuttle we could launch on a delta

310
00:14:45,270 --> 00:14:38,290
or a Titan and the next process was the

311
00:14:47,810 --> 00:14:45,280
process of invincible risk by virtue of

312
00:14:50,430 --> 00:14:47,820
the amount of breadboarding and

313
00:14:52,110 --> 00:14:50,440

Technology testing we were doing here on

314
00:14:53,449 --> 00:14:52,120
the ground and got it over this five

315
00:14:56,809 --> 00:14:53,459
year period

316
00:14:59,929 --> 00:14:56,819
the last aspect had to do with our

317
00:15:02,900 --> 00:14:59,939
convincing null hinners that from a

318
00:15:05,090 --> 00:15:02,910
solar max observatory point of view from

319
00:15:09,109 --> 00:15:05,100
an agency point of view from a

320
00:15:12,169 --> 00:15:09,119
futuristic thinking that on-orbit

321
00:15:16,009 --> 00:15:12,179
servicing down the pike a modular

322
00:15:18,079 --> 00:15:16,019
spacecraft up front more economical

323
00:15:20,509 --> 00:15:18,089
approach for not just a solar max

324
00:15:24,499 --> 00:15:20,519
mission but for landsat missions and

325
00:15:26,600 --> 00:15:24,509
future uars missions and so on that a

326
00:15:28,689 --> 00:15:26,610
common spacecraft that could take care

327
00:15:31,419 --> 00:15:28,699
of four or five different types of

328
00:15:33,710 --> 00:15:31,429
mission constraints requirements and

329
00:15:36,650 --> 00:15:33,720
configurations would be best for the

330
00:15:39,619 --> 00:15:36,660
agency and no hitters had the wisdom to

331
00:15:42,169 --> 00:15:39,629
step up to that and said yes we will

332
00:15:52,720 --> 00:15:42,179
take the plunge we will go with this

333
00:15:57,129 --> 00:15:54,460
we're fortunate to have with us today

334
00:15:59,620 --> 00:15:57,139
dr. Nowell Henner's the associate deputy

335
00:16:02,019 --> 00:15:59,630
administrator of NASA and dr. Anthony

336
00:16:03,790 --> 00:16:02,029
kallio the vice president for management

337
00:16:07,810 --> 00:16:03,800
and operations at the planning research

338
00:16:09,850 --> 00:16:07,820

corporation in October of 1976 dr.

339
00:16:11,290 --> 00:16:09,860
Henner's the god ur team working a new

340
00:16:14,139 --> 00:16:11,300
breed of spacecraft called the

341
00:16:16,629 --> 00:16:14,149
multi-mission modular spacecraft came to

342
00:16:18,790 --> 00:16:16,639
NASA headquarters to see if they can get

343
00:16:21,400 --> 00:16:18,800
a decision to use the solar maximum

344
00:16:22,960 --> 00:16:21,410
mission with the mms spacecraft what

345
00:16:25,720 --> 00:16:22,970
were some of the factors that you had to

346
00:16:28,509 --> 00:16:25,730
consider in making that decision touch

347
00:16:30,699 --> 00:16:28,519
when the goddard folks came down to

348
00:16:33,430 --> 00:16:30,709
headquarters talking about the mms

349
00:16:35,740 --> 00:16:33,440
approach right off the bat it was more

350
00:16:38,110 --> 00:16:35,750
than just the solar max mission they do

351
00:16:39,939 --> 00:16:38,120
realize that I had a potential for lots

352
00:16:42,340 --> 00:16:39,949
of missions and in fact that was one of

353
00:16:44,650 --> 00:16:42,350
the benefits being advertised for the

354
00:16:47,079 --> 00:16:44,660
mms approach that you use the same basic

355
00:16:49,000 --> 00:16:47,089
design for many missions I'll come back

356
00:16:50,769 --> 00:16:49,010
to that we had though at the time

357
00:16:53,439 --> 00:16:50,779
something called the low-cost systems

358
00:16:56,170 --> 00:16:53,449
office under the chief engineer Walt

359
00:16:59,019 --> 00:16:56,180
Williams at that time they did the basic

360
00:17:01,509 --> 00:16:59,029
economic studies of the mms and

361
00:17:03,160 --> 00:17:01,519
concluded that if you were to do just

362
00:17:05,049 --> 00:17:03,170
one you wouldn't really reap the

363
00:17:07,210 --> 00:17:05,059

benefits of it but that if you could buy

364
00:17:08,949 --> 00:17:07,220
a block of four or five spacecraft

365
00:17:12,610 --> 00:17:08,959
that's what you'd really see the return

366
00:17:15,340 --> 00:17:12,620
on the investment now we realize that

367
00:17:17,530 --> 00:17:15,350
the intangibles were going to save money

368
00:17:20,289 --> 00:17:17,540
also not just the acquisition but the

369
00:17:22,809 --> 00:17:20,299
the common design common components the

370
00:17:24,909 --> 00:17:22,819
sparing philosophy the fact that the

371
00:17:27,039 --> 00:17:24,919
modular approach the serviceability

372
00:17:29,500 --> 00:17:27,049
would let you do the testing on the

373
00:17:32,770 --> 00:17:29,510
ground and a lot easier way than

374
00:17:35,320 --> 00:17:32,780
typically from the inside out but then

375
00:17:38,190 --> 00:17:35,330
we came up against our friends over at

376
00:17:41,710 --> 00:17:38,200
OMB the office of management and budget

377
00:17:44,020 --> 00:17:41,720
they understood the concept and said

378
00:17:46,419 --> 00:17:44,030
fine we'll let you go ahead with the

379
00:17:49,419 --> 00:17:46,429
solar max mission and the mms but we're

380
00:17:52,780 --> 00:17:49,429
not going to approve a block by a five

381
00:17:55,150 --> 00:17:52,790
spacecraft their argument was that we

382
00:17:57,580 --> 00:17:55,160
didn't have mission approval for the

383
00:17:58,930 --> 00:17:57,590
other four spacecraft even though we

384
00:18:01,210 --> 00:17:58,940
could say we know things are coming

385
00:18:03,370 --> 00:18:01,220
downstream we typically get a new

386
00:18:05,020 --> 00:18:03,380
mission approved every year that didn't

387
00:18:06,500 --> 00:18:05,030
wash with them so they r approved the

388
00:18:08,600 --> 00:18:06,510

only for the solar

389
00:18:11,090 --> 00:18:08,610
max mission at that time and Lance I

390
00:18:14,180 --> 00:18:11,100
just had to wait till his time came in

391
00:18:15,770 --> 00:18:14,190
the Landsat subject brings us to dr.

392
00:18:17,960 --> 00:18:15,780
Kelly at the time you are working with

393
00:18:19,850 --> 00:18:17,970
dr. hunters on this project but we're

394
00:18:22,310 --> 00:18:19,860
not yet the associate administrator for

395
00:18:23,750 --> 00:18:22,320
Earth applications the office that would

396
00:18:25,820 --> 00:18:23,760
later have responsibility for that

397
00:18:28,130 --> 00:18:25,830
spacecraft now where were some of the

398
00:18:31,280 --> 00:18:28,140
considerations that you had to make in

399
00:18:34,040 --> 00:18:31,290
this decision in that timeframe October

400
00:18:36,050 --> 00:18:34,050
76 I believe one of the problems that

401
00:18:38,780 --> 00:18:36,060
was going on with a another budget issue

402
00:18:41,360 --> 00:18:38,790
and even though all of us trained by

403
00:18:43,850 --> 00:18:41,370
NASA or know the importance of balancing

404
00:18:47,090 --> 00:18:43,860
performance cost and schedule a Landsat

405
00:18:48,470 --> 00:18:47,100
was having a difficult time with the

406
00:18:53,060 --> 00:18:48,480
office of management and budget because

407
00:18:55,100 --> 00:18:53,070
the project was not approved the way it

408
00:18:57,560 --> 00:18:55,110
was originally proposed by NASA that was

409
00:18:59,510 --> 00:18:57,570
to carry two instruments a multispectral

410
00:19:02,180 --> 00:18:59,520
scanner which was the old instrument and

411
00:19:03,620 --> 00:19:02,190
a new thematic mapper it was believed at

412
00:19:06,560 --> 00:19:03,630
that point in time that if it was an

413
00:19:08,390 --> 00:19:06,570

experimental program that the thematic

414
00:19:10,490 --> 00:19:08,400
mapper was the only instrument was that

415
00:19:12,950 --> 00:19:10,500
was needed and the multispectral scanner

416
00:19:16,520 --> 00:19:12,960
was not needed so there was the project

417
00:19:19,100 --> 00:19:16,530
was in the throes of being redefined as

418
00:19:21,200 --> 00:19:19,110
to between Earth NASA and the office of

419
00:19:23,570 --> 00:19:21,210
management budget so it was unclear what

420
00:19:27,110 --> 00:19:23,580
the spacecraft design would be secondly

421
00:19:28,490 --> 00:19:27,120
if we had to go to such a design for any

422
00:19:30,890 --> 00:19:28,500
spacecraft whether it was a space

423
00:19:32,870 --> 00:19:30,900
science or an application spacecraft it

424
00:19:34,850 --> 00:19:32,880
would have to be dual compatible because

425
00:19:37,370 --> 00:19:34,860
if it were to fly on the shuttle

426
00:19:40,610 --> 00:19:37,380
ultimately it would also have to in the

427
00:19:42,680 --> 00:19:40,620
in the early years fly on a expendable

428
00:19:44,360 --> 00:19:42,690
launch vehicle and then finally for

429
00:19:46,220 --> 00:19:44,370
those who were interested in polar

430
00:19:47,720 --> 00:19:46,230
orbits we would have to fly out of the

431
00:19:50,270 --> 00:19:47,730
Western test range that it'd have to be

432
00:19:52,430 --> 00:19:50,280
compatibility with that facility so this

433
00:19:55,040 --> 00:19:52,440
presented a number of uncertainties for

434
00:19:56,780 --> 00:19:55,050
a whole series and of a spacecraft that

435
00:19:59,900 --> 00:19:56,790
were being considered at that period of

436
00:20:02,690 --> 00:19:59,910
time well in summary considering that

437
00:20:05,960 --> 00:20:02,700
whole time frame from 76 on to when

438
00:20:08,120 --> 00:20:05,970

solar max flu what kind of lessons

439
00:20:11,000 --> 00:20:08,130
learned can you share with the current

440
00:20:14,790 --> 00:20:11,010
and new managers within NASA well the

441
00:20:17,550 --> 00:20:14,800
gutter team back in 77 as they have

442
00:20:20,880 --> 00:20:17,560
in the past continue to be had a great

443
00:20:23,870 --> 00:20:20,890
ideas and the idea of the multi-mission

444
00:20:26,250 --> 00:20:23,880
spacecraft was a very creative one and

445
00:20:28,370 --> 00:20:26,260
the second part of it was they were very

446
00:20:30,630 --> 00:20:28,380
persistent with that whole notion of

447
00:20:33,660 --> 00:20:30,640
getting the multi-mission spacecraft

448
00:20:36,750 --> 00:20:33,670
phone I was not a supporter at the time

449
00:20:39,860 --> 00:20:36,760
and it turned out through their bright

450
00:20:42,660 --> 00:20:39,870
ideas and their persistence or tenacity

451
00:20:44,280 --> 00:20:42,670
persevered and we got to see in the

452
00:20:46,590 --> 00:20:44,290
nineteen eighty-four timeframe for the

453
00:20:49,080 --> 00:20:46,600
recovery of a solar max mission and its

454
00:20:51,390 --> 00:20:49,090
retrofitting and placing it back in the

455
00:20:54,120 --> 00:20:51,400
service that the concept that they had a

456
00:20:56,610 --> 00:20:54,130
good concept well thought out well

457
00:20:59,250 --> 00:20:56,620
engineered with the persistence of that

458
00:21:01,380 --> 00:20:59,260
team is leading the way for the future

459
00:21:03,810 --> 00:21:01,390
to the space station in this shuttle so

460
00:21:05,520 --> 00:21:03,820
it was a good idea and with good ideas

461
00:21:08,130 --> 00:21:05,530
staying with that I think is an

462
00:21:10,740 --> 00:21:08,140
important point for NASA engineers to

463
00:21:12,720 --> 00:21:10,750

consider what doctor enters what kind of

464
00:21:15,570 --> 00:21:12,730
summary lessons learned would you like

465
00:21:17,550 --> 00:21:15,580
to pass on to the new managers Dutch I

466
00:21:20,700 --> 00:21:17,560
think there are a number there Tony

467
00:21:23,970 --> 00:21:20,710
touched on on several of them clearly

468
00:21:26,910 --> 00:21:23,980
having a solid technical product to sell

469
00:21:29,820 --> 00:21:26,920
has to be number one without that forget

470
00:21:32,730 --> 00:21:29,830
it then once you get past that you've

471
00:21:34,680 --> 00:21:32,740
got to have a salesman and I'll put it

472
00:21:36,360 --> 00:21:34,690
that way you're out there in the field

473
00:21:39,810 --> 00:21:36,370
you've got to come in and convince a

474
00:21:41,520 --> 00:21:39,820
range of people here at headquarters and

475
00:21:43,860 --> 00:21:41,530
organizations first you've got the

476
00:21:45,930 --> 00:21:43,870
program office I say the program office

477
00:21:47,550 --> 00:21:45,940
that's your first customer but then on

478
00:21:49,200 --> 00:21:47,560
something like the mms which went across

479
00:21:51,210 --> 00:21:49,210
many program officers you had to touch

480
00:21:53,970 --> 00:21:51,220
base with many and get people to

481
00:21:55,700 --> 00:21:53,980
understand that there was a payoff and

482
00:21:59,130 --> 00:21:55,710
coming together on something like the

483
00:22:01,050 --> 00:21:59,140
mms then you had to work the controllers

484
00:22:02,700 --> 00:22:01,060
office you had to work the low-cost

485
00:22:05,130 --> 00:22:02,710
systems office and you had to get over

486
00:22:06,720 --> 00:22:05,140
and work OMB so you've got to understand

487
00:22:08,580 --> 00:22:06,730
when you're out in the field that you

488
00:22:10,550 --> 00:22:08,590

can't go to one point head coach but

489
00:22:12,960 --> 00:22:10,560
you've gotta play across the board and

490
00:22:17,700 --> 00:22:12,970
aggregate the support for what you're

491
00:22:20,880 --> 00:22:17,710
trying to do Tony mentioned being

492
00:22:23,940 --> 00:22:20,890
tenacious in this project I think you've

493
00:22:25,990 --> 00:22:23,950
seen all mostly the ultimate tenacious

494
00:22:30,400 --> 00:22:26,000
yes a leader

495
00:22:32,740 --> 00:22:30,410
and it's epi we've got that sepia is a

496
00:22:34,360 --> 00:22:32,750
bulldog I could still feel that Keith

497
00:22:38,290 --> 00:22:34,370
marks up here in the neck he doesn't

498
00:22:40,750 --> 00:22:38,300
like old sepi so believed that what he

499
00:22:42,490 --> 00:22:40,760
was doing was right after spending a

500
00:22:45,070 --> 00:22:42,500
while with him he just fell in said yeah

501
00:22:46,810 --> 00:22:45,080
he's right the other thing he did of

502
00:22:49,360 --> 00:22:46,820
course and his team was that they

503
00:22:51,730 --> 00:22:49,370
produced they promised a certain product

504
00:22:53,770 --> 00:22:51,740
on a schedule and they brought it in and

505
00:22:55,060 --> 00:22:53,780
we're seeing that now through the rest

506
00:22:57,250 --> 00:22:55,070
of the program even though we started

507
00:23:00,340 --> 00:22:57,260
with just solarmax it did get used for

508
00:23:02,620 --> 00:23:00,350
landsat it became used on the upper

509
00:23:04,540 --> 00:23:02,630
atmosphere research satellite there are

510
00:23:06,010 --> 00:23:04,550
components of it modules on the gamma

511
00:23:08,500 --> 00:23:06,020
ray observatory and there are pieces of

512
00:23:10,270 --> 00:23:08,510
it in the space telescope and it really

513
00:23:11,800 --> 00:23:10,280

has formed the basis for a lot of our

514
00:23:15,850 --> 00:23:11,810
thinking on the polar platform for the

515
00:23:18,550 --> 00:23:15,860
space station there's one last thing the

516
00:23:20,200 --> 00:23:18,560
Goddard management at the time came

517
00:23:22,810 --> 00:23:20,210
Seppi a lot of leeway in the project

518
00:23:24,850 --> 00:23:22,820
they believed in and said go to it so it

519
00:23:26,410 --> 00:23:24,860
was an environment which encouraged that

520
00:23:28,000 --> 00:23:26,420
innovation and that's something we've

521
00:23:29,890 --> 00:23:28,010
got to be sure we keep up so these

522
00:23:32,440 --> 00:23:29,900
bright ideas can surface in the system

523
00:23:34,930 --> 00:23:32,450
get through it gets old thank you very

524
00:23:37,330 --> 00:23:34,940
much dr. Henner's and dr. Kelly no i'm

525
00:23:40,090 --> 00:23:37,340
sure that the nasa work for us and

526
00:23:42,190 --> 00:23:40,100
specially the young NASA managers have a

527
00:23:43,810 --> 00:23:42,200
better appreciation for how management

528
00:23:45,280 --> 00:23:43,820
decisions are made at the associate

529
00:23:47,350 --> 00:23:45,290
administrator level thank you very much

530
00:23:49,630 --> 00:23:47,360
and now let's go to Goddard Space Flight

531
00:23:53,560 --> 00:23:49,640
Center and see the multi-mission modular

532
00:23:55,570 --> 00:23:53,570
spacecraft well semi what was the impact

533
00:23:59,980 --> 00:23:55,580
of the failure of the solar max

534
00:24:04,090 --> 00:23:59,990
spacecraft on your program well looking

535
00:24:07,540 --> 00:24:04,100
back in time I feel that the impact of

536
00:24:09,550 --> 00:24:07,550
solar max failure in fact the fine

537
00:24:14,170 --> 00:24:09,560
pointing failure of the attitude control

538
00:24:18,370 --> 00:24:14,180

subsystem represented both a tragedy in

539
00:24:21,790 --> 00:24:18,380
a triumph a tragedy in the sense that we

540
00:24:24,760 --> 00:24:21,800
launched the spacecraft with two years

541
00:24:27,610 --> 00:24:24,770
of observation objectives and after the

542
00:24:29,230 --> 00:24:27,620
first year we lost our fine pointing we

543
00:24:31,600 --> 00:24:29,240
had all the solar physicists and

544
00:24:33,850 --> 00:24:31,610
ground-based observatories all over the

545
00:24:37,419 --> 00:24:33,860
world making simultaneous observations

546
00:24:39,010 --> 00:24:37,429
with the solar max physicist here at

547
00:24:41,590 --> 00:24:39,020
Goddard to

548
00:24:44,350 --> 00:24:41,600
to uncover some of the big secrets of

549
00:24:46,030 --> 00:24:44,360
solar flare theory when we lost by

550
00:24:48,820 --> 00:24:46,040
appointing we lost much of that

551
00:24:52,380 --> 00:24:48,830
capability and I think that was

552
00:24:55,210 --> 00:24:52,390
certainly an adversity on the other hand

553
00:24:57,310 --> 00:24:55,220
by virtue of the fact that we have

554
00:25:00,190 --> 00:24:57,320
designed the spacecraft which in fact

555
00:25:02,530 --> 00:25:00,200
was serviceable on orbit since we had

556
00:25:05,200 --> 00:25:02,540
built this flight support system to go

557
00:25:07,720 --> 00:25:05,210
up and take care of that problem and

558
00:25:12,310 --> 00:25:07,730
since we had a desire as an agency to

559
00:25:14,680 --> 00:25:12,320
basically put our faith in the

560
00:25:17,890 --> 00:25:14,690
transportation system which we said

561
00:25:20,560 --> 00:25:17,900
could do repair and should do repair of

562
00:25:24,960 --> 00:25:20,570
satellites in orbit we put all those

563
00:25:29,530 --> 00:25:24,970

aspects together just doing going for it

564
00:25:32,290 --> 00:25:29,540
represented a confidence represented an

565
00:25:35,110 --> 00:25:32,300
objective for the agency of meeting its

566
00:25:38,170 --> 00:25:35,120
goal of understanding where the

567
00:25:39,880 --> 00:25:38,180
development of resources and what their

568
00:25:42,370 --> 00:25:39,890
intention was in the first place and

569
00:25:43,740 --> 00:25:42,380
bringing all elements of the agency

570
00:25:48,780 --> 00:25:43,750
together the manned spaceflight

571
00:25:50,920 --> 00:25:48,790
transportation element the scientist the

572
00:25:53,290 --> 00:25:50,930
observatory builders bringing them all

573
00:25:55,600 --> 00:25:53,300
together and doing a very successful

574
00:25:58,360 --> 00:25:55,610
repair mission represented a significant

575
00:26:00,640 --> 00:25:58,370
triumph and all that one has to do is

576
00:26:03,400 --> 00:26:00,650
look at what happened in the next 12

577
00:26:06,130 --> 00:26:03,410
months after the successful solar max

578
00:26:09,370 --> 00:26:06,140
repair mission first of all we did

579
00:26:11,770 --> 00:26:09,380
retrieved two spacecrafts Westar and

580
00:26:17,050 --> 00:26:11,780
palapa both of which are going to be

581
00:26:19,570 --> 00:26:17,060
relaunched next we repaired sin com4 and

582
00:26:22,390 --> 00:26:19,580
put it up into orbit into its

583
00:26:26,080 --> 00:26:22,400
operational regime or it's working fine

584
00:26:29,680 --> 00:26:26,090
to this day solar max which was repaired

585
00:26:31,870 --> 00:26:29,690
in 1984 is working fine and still

586
00:26:34,720 --> 00:26:31,880
collecting very valuable scientific data

587
00:26:38,290 --> 00:26:34,730
and in fact for the last four and a half

588
00:26:40,000 --> 00:26:38,300

to five years he has been operating fine

589
00:26:42,370 --> 00:26:40,010
and being able to collect some

590
00:26:45,100 --> 00:26:42,380
significant scientific data as the solar

591
00:26:47,620 --> 00:26:45,110
cycle is going back up and I think you

592
00:26:50,680 --> 00:26:47,630
put all those aspects together it

593
00:26:54,850 --> 00:26:50,690
represented this this triumph aspect as

594
00:26:59,150 --> 00:26:57,050
what's that be looking back to nineteen

595
00:27:02,060 --> 00:26:59,160
seventy when your challenge was to get

596
00:27:05,750 --> 00:27:02,070
more science for less cost what advice

597
00:27:08,630 --> 00:27:05,760
can you give your new project managers

598
00:27:10,460 --> 00:27:08,640
and what have you learned well I think

599
00:27:12,460 --> 00:27:10,470
in terms of what have we learned and

600
00:27:14,930 --> 00:27:12,470
what the accomplishments have been

601
00:27:18,260 --> 00:27:14,940
looking back and looking first of all

602
00:27:20,870 --> 00:27:18,270
here at UA RS which represents the sixth

603
00:27:23,660 --> 00:27:20,880
or seventh production spacecraft common

604
00:27:25,490 --> 00:27:23,670
to several different missions and even

605
00:27:27,710 --> 00:27:25,500
more importantly the fact that this

606
00:27:30,340 --> 00:27:27,720
particular ACS subsystem was the one

607
00:27:32,920 --> 00:27:30,350
that flew for four years on solar max

608
00:27:35,090 --> 00:27:32,930
was brought back from space and

609
00:27:36,710 --> 00:27:35,100
refurbished twenty-five to thirty

610
00:27:39,260 --> 00:27:36,720
percent of the cost of a new spacecraft

611
00:27:41,360 --> 00:27:39,270
and now we'll be flying again on a

612
00:27:44,000 --> 00:27:41,370
spacecraft almost three times more

613
00:27:46,010 --> 00:27:44,010

complicated and expensive I think that

614
00:27:49,040 --> 00:27:46,020
that basically is indicative of the fact

615
00:27:51,830 --> 00:27:49,050
that we have accomplished the goal of

616
00:27:53,960 --> 00:27:51,840
reducing cost of future missions by

617
00:27:56,660 --> 00:27:53,970
virtue of our being able to build and

618
00:28:00,680 --> 00:27:56,670
serve as common modular spacecrafts on

619
00:28:04,910 --> 00:28:00,690
the ground and and relaunch and maintain

620
00:28:08,210 --> 00:28:04,920
some form of a standard spacecraft

621
00:28:09,800 --> 00:28:08,220
production base and I think that that I

622
00:28:12,920 --> 00:28:09,810
feel very good about that accomplishment

623
00:28:15,920 --> 00:28:12,930
I think as far as the the lessons

624
00:28:19,640 --> 00:28:15,930
learned for future project managers the

625
00:28:21,650 --> 00:28:19,650
most fundamental reality today is that

626
00:28:24,260 --> 00:28:21,660
the cost pressures of the 80s and the

627
00:28:27,320 --> 00:28:24,270
90s are even more severe than the cost

628
00:28:31,040 --> 00:28:27,330
pressures of the 70s and for a project

629
00:28:34,040 --> 00:28:31,050
manager to effectively be able to cost

630
00:28:37,370 --> 00:28:34,050
manage and schedule manager program he's

631
00:28:41,660 --> 00:28:37,380
got to be dogmatically pragmatic he's

632
00:28:43,880 --> 00:28:41,670
got to make hard decisions on trade-offs

633
00:28:47,510 --> 00:28:43,890
between cost and performance and

634
00:28:49,690 --> 00:28:47,520
schedule and those trade-offs have to be

635
00:28:52,610 --> 00:28:49,700
made in a rather timely fashion today

636
00:28:56,720 --> 00:28:52,620
much more so I believed and they were in

637
00:29:00,130 --> 00:28:56,730
a period of the 70s I think that by the

638
00:29:04,340 --> 00:29:00,140

same token that project manager today

639
00:29:06,259 --> 00:29:04,350
has to be an astute philosophical leader

640
00:29:09,079 --> 00:29:06,269
he cannot be afraid

641
00:29:11,269 --> 00:29:09,089
of basically grabbing the cutting edge

642
00:29:12,769 --> 00:29:11,279
of technology in any given area whether

643
00:29:14,959 --> 00:29:12,779
it be in the scientific instrument area

644
00:29:17,469 --> 00:29:14,969
or in the spacecraft performance area

645
00:29:21,259 --> 00:29:17,479
and moving ahead with that technology

646
00:29:23,389 --> 00:29:21,269
without fear he's got to be determined

647
00:29:25,909 --> 00:29:23,399
he's got to be an astute philosophical

648
00:29:29,539 --> 00:29:25,919
leader and he's got to bring his team

649
00:29:35,239 --> 00:29:29,549
along with them in order to make true

650
00:29:37,549 --> 00:29:35,249
progress in this space arena project

651
00:29:39,889 --> 00:29:37,559
management is really a bottom line art

652
00:29:41,629 --> 00:29:39,899
form of leading a group of technical and

653
00:29:45,139 --> 00:29:41,639
business people into accomplishing a

654
00:29:47,089 --> 00:29:45,149
common goal and that the success that a

655
00:29:50,989 --> 00:29:47,099
project manager can have is directly

656
00:29:53,539 --> 00:29:50,999
dependent on what I call the three P's

657
00:29:58,099 --> 00:29:53,549
of project management persistence

658
00:30:00,409 --> 00:29:58,109
patience and people dedication project

659
00:30:03,619 --> 00:30:00,419
managers got to have that goal he's got

660
00:30:04,999 --> 00:30:03,629
to have a fervent desire and demonstrate

661
00:30:09,139 --> 00:30:05,009
that fervent desire of accomplishing

662
00:30:13,430 --> 00:30:09,149
that goal and finally touch the most

663
00:30:16,339 --> 00:30:13,440

important point of all is that a project

664
00:30:18,829 --> 00:30:16,349
manager cannot succeed unless he can

665
00:30:22,209 --> 00:30:18,839
inspire his team of technical and

666
00:30:25,729 --> 00:30:22,219
business experts to follow him and

667
00:30:29,119 --> 00:30:25,739
that's what project management i think

668
00:30:31,399 --> 00:30:29,129
is all about well suppy thank you very

669
00:30:33,709 --> 00:30:31,409
much for your help and your guidance and

670
00:30:35,119 --> 00:30:33,719
wisdom and on behalf of the NASA program

671
00:30:37,339 --> 00:30:35,129
and project management training and

672
00:30:38,749 --> 00:30:37,349
development initiative one thank you and

673
00:30:40,159 --> 00:30:38,759
your Goddard team and the NASA

674
00:30:42,440 --> 00:30:40,169
headquarters team for making this

675
00:30:44,209 --> 00:30:42,450
training film possible well that's thank

676
00:30:48,799 --> 00:30:44,219
you very much I thoroughly enjoyed it it

677
00:30:50,829 --> 00:30:48,809
was idea thank you thank you you have

678
00:30:53,119 --> 00:30:50,839
just seen a NASA pilot video program

679
00:30:54,709 --> 00:30:53,129
prepared as part of the program and

680
00:30:57,469 --> 00:30:54,719
project management training and

681
00:30:59,869 --> 00:30:57,479
development initiative this video series

682
00:31:02,239 --> 00:30:59,879
is intended to be a vehicle to which

683
00:31:03,769 --> 00:31:02,249
former and present NASA managers can

684
00:31:06,649 --> 00:31:03,779
share their experiences with other

685
00:31:09,709 --> 00:31:06,659
employees especially those interested in

686
00:31:11,839 --> 00:31:09,719
management the video programs in this

687
00:31:13,909 --> 00:31:11,849
series focus on the exchange of

688
00:31:16,609 --> 00:31:13,919

approaches in the informal communication

689
00:31:20,060 --> 00:31:16,619
of various NASA project management

690
00:31:21,710 --> 00:31:20,070
styles the video programs are geared to

691
00:31:24,560 --> 00:31:21,720
gathering and sharing the individual and

692
00:31:26,860 --> 00:31:24,570
team experiences and lessons learned and

693
00:31:29,000 --> 00:31:26,870
the managers of past NASA projects

694
00:31:31,540 --> 00:31:29,010
hopefully these experiences will be

695
00:31:34,640 --> 00:31:31,550
useful to the future cadre of managers

696
00:31:37,340 --> 00:31:34,650
each program in the series will document

697
00:31:39,470 --> 00:31:37,350
one project in an educational format

698
00:31:41,750 --> 00:31:39,480
containing a brief history or summary of

699
00:31:43,940 --> 00:31:41,760
the project followed by a discussion on

700
00:31:47,720 --> 00:31:43,950
how these people managed and overcame

701
00:31:49,370 --> 00:31:47,730
their program obstacles the audience

702
00:31:51,740 --> 00:31:49,380
will be introduced to different

703
00:31:54,320 --> 00:31:51,750
real-life project scenarios and through

704
00:31:55,640 --> 00:31:54,330
the videos will better understand why

705
00:31:58,400 --> 00:31:55,650
certain management approaches were

706
00:32:01,790 --> 00:31:58,410
selected and why some styles have been

707
00:32:03,950 --> 00:32:01,800
more successful than others each program

708
00:32:07,160 --> 00:32:03,960
will discuss detailed information about

709
00:32:08,980 --> 00:32:07,170
the project's objectives and history is

710
00:32:11,930 --> 00:32:08,990
told by the project managers themselves

711
00:32:14,380 --> 00:32:11,940
the audience for the series is the NASA

712
00:32:16,550 --> 00:32:14,390
program and project management workforce

713
00:32:18,590 --> 00:32:16,560

especially the new less experienced

714
00:32:21,470 --> 00:32:18,600
managers who may not be familiar with

715
00:32:23,240 --> 00:32:21,480
the details of past projects this

716
00:32:25,280 --> 00:32:23,250
program will bring together NASA's

717
00:32:27,380 --> 00:32:25,290
seasoned professionals and capture many

718
00:32:29,390 --> 00:32:27,390
of their projects in brief visual

719
00:32:31,910 --> 00:32:29,400
learning sessions which will be made

720
00:32:33,200 --> 00:32:31,920
available to a broad audience we hope

721
00:32:35,420 --> 00:32:33,210
this series will aid in the development

722
00:32:37,430 --> 00:32:35,430
of a corporate memory that will benefit

723
00:32:40,070 --> 00:32:37,440
both current and future generations of

724
00:32:41,630 --> 00:32:40,080
NASA personnel thanks for listening and