
NASA
3

1
00:00:02,400 --> 00:00:03,500
The boundaries of flight

2
00:00:03,500 --> 00:00:04,633
research have been explored by

3
00:00:04,633 --> 00:00:06,067
only a few.

4
00:00:06,067 --> 00:00:07,367
Few have touched the edge of

5
00:00:07,367 --> 00:00:08,500
space in a rocket powered

6
00:00:08,500 --> 00:00:10,233
research aircraft or stunned

7
00:00:10,233 --> 00:00:11,567
skeptics by successfully flying

8
00:00:11,567 --> 00:00:14,233
wingless airplanes.

9
00:00:14,233 --> 00:00:15,667
Few have tempted fate for the

10
00:00:15,667 --> 00:00:17,300
sake of research and discovery

11
00:00:17,300 --> 00:00:19,133
of the unknown.

12
00:00:19,133 --> 00:00:20,367
Bill Dana is one of those few

13
00:00:20,367 --> 00:00:21,933

aviation pioneers that has

14
00:00:21,933 --> 00:00:23,300
reached beyond the cutting edge

15
00:00:23,300 --> 00:00:24,767
of technology.

16
00:00:24,767 --> 00:00:25,933
Throughout his distinguished

17
00:00:25,933 --> 00:00:27,467
career he has piloted many of

18
00:00:27,467 --> 00:00:28,733
the experimental flight research

19
00:00:28,733 --> 00:00:30,367
aircraft that have

20
00:00:30,367 --> 00:00:31,567
revolutionized aeronautics and

21
00:00:31,567 --> 00:00:33,333
space flight.

22
00:00:33,333 --> 00:00:34,900
Bill became interested in

23
00:00:34,900 --> 00:00:36,733
airplanes as a boy growing up in

24
00:00:36,733 --> 00:00:38,433
Bakersfield, California.

25
00:00:38,433 --> 00:00:40,233
Bill Dana: I remember seeing

26
00:00:40,233 --> 00:00:44,033
B-25’s and P-38’s flying over at

27
00:00:44,033 --> 00:00:46,967
the start of WWII and there was

28
00:00:46,967 --> 00:00:49,967
something very glorious and

29
00:00:49,967 --> 00:00:53,433
exciting about the war birds.

30
00:00:53,433 --> 00:00:55,733
I was attracted to it and I

31
00:00:55,733 --> 00:00:58,933
never really lost the ambition

32
00:00:58,933 --> 00:01:01,367
to fly those aircraft.

33
00:01:01,367 --> 00:01:02,667
Bill graduated from West Point

34
00:01:02,667 --> 00:01:05,200
in 1952 and became an Air Force

35
00:01:05,200 --> 00:01:06,267
officer.

36
00:01:06,267 --> 00:01:07,667
He served as a fighter pilot in

37
00:01:07,667 --> 00:01:09,633
Korea flying F-84’s.

38
00:01:09,633 --> 00:01:11,700

After the war he graduated from

39
00:01:11,700 --> 00:01:13,467
USC with a Master’s Degree in

40
00:01:13,467 --> 00:01:15,800
Aeronautical Engineering.

41
00:01:15,800 --> 00:01:18,233
He joined NASA in 1958 and began

42
00:01:18,233 --> 00:01:20,500
flying as a research pilot in

43
00:01:20,500 --> 00:01:22,700
1959.

44
00:01:22,700 --> 00:01:23,867
Pete Knight: When I first

45
00:01:23,867 --> 00:01:25,467
met him he was just a

46
00:01:25,467 --> 00:01:27,000
young punk kid

47
00:01:27,000 --> 00:01:27,633
that came to NASA

48
00:01:27,633 --> 00:01:28,600
and of course I was a big

49
00:01:28,600 --> 00:01:29,833
test pilot at Edwards and

50
00:01:29,833 --> 00:01:31,867
thought who is this kid?

51
00:01:31,867 --> 00:01:33,000
He was an exceptional pilot

52
00:01:33,000 --> 00:01:35,967
He was a dedicated professional

53
00:01:35,967 --> 00:01:38,167
in terms of when you gave Bill a

54
00:01:38,167 --> 00:01:39,700
test card you knew that's what

55
00:01:39,700 --> 00:01:40,833
he was going do and he was

56
00:01:40,833 --> 00:01:42,200
going to follow that test card

57
00:01:42,200 --> 00:01:43,567
and follow that profile to the

58
00:01:43,567 --> 00:01:45,267
best of his ability.

59
00:01:45,267 --> 00:01:46,633
And he was going to get you all

60
00:01:46,633 --> 00:01:48,367
of the data that he could

61
00:01:48,367 --> 00:01:49,767
Bill flew the rocket powered,

62
00:01:49,767 --> 00:01:53,433
X-15, to a top speed of 3,897

63
00:01:53,433 --> 00:01:55,367

mph and achieved astronaut

64
00:01:55,367 --> 00:01:56,533
status when he reached an

65
00:01:56,533 --> 00:01:59,733
altitude of 310,000 feet.

66
00:01:59,733 --> 00:02:01,567
His evaluations of the X-15's

67
00:02:01,567 --> 00:02:02,800
vertical displays in

68
00:02:02,800 --> 00:02:04,767
demonstration of energy

69
00:02:04,767 --> 00:02:06,300
management techniques for

70
00:02:06,300 --> 00:02:07,267
approach and landing contributed

71
00:02:07,267 --> 00:02:09,400
to the overall success of that

72
00:02:09,400 --> 00:02:10,600
program.

73
00:02:10,600 --> 00:02:12,733
The X-15 was both figuratively

74
00:02:12,733 --> 00:02:16,267
and literally the high point of

75
00:02:16,267 --> 00:02:17,067
my career.

76
00:02:17,067 --> 00:02:18,800
And the reason the X-15 was my

77
00:02:18,800 --> 00:02:20,133
favorite airplane was the

78
00:02:20,133 --> 00:02:23,200
performance was vastly superior

79
00:02:23,200 --> 00:02:26,133
to anything else I'd flown.

80
00:02:26,133 --> 00:02:27,800
The first X-15 mission was

81
00:02:27,800 --> 00:02:28,800
exciting.

82
00:02:28,800 --> 00:02:29,967
I had done a lot of practice in

83
00:02:29,967 --> 00:02:31,300
the simulator, and I can't tell

84
00:02:31,300 --> 00:02:33,033
you how many hours in the

85
00:02:33,033 --> 00:02:35,233
simulators that I had.

86
00:02:35,233 --> 00:02:36,800
Probably 50 or 100, all of this

87
00:02:36,800 --> 00:02:38,200
for a 10 minute flight.

88
00:02:38,200 --> 00:02:39,800

And I had flown several hundred

89
00:02:39,800 --> 00:02:41,100
practice landings in various

90
00:02:41,100 --> 00:02:42,933
fighter airplanes that we

91
00:02:42,933 --> 00:02:46,067
configured to fly like an X-15

92
00:02:46,067 --> 00:02:48,067
and then go practice dead stick

93
00:02:48,067 --> 00:02:49,500
landings in.

94
00:02:49,500 --> 00:02:51,867
I guess my perception of the

95
00:02:51,867 --> 00:02:54,433
first flight was that it would

96
00:02:54,433 --> 00:02:57,800
just be a routine motoring back

97
00:02:57,800 --> 00:02:59,733
to the dry lakebed back at

98
00:02:59,733 --> 00:03:01,733
Edwards and the tense part would

99
00:03:01,733 --> 00:03:04,600
be the dead stick landing

100
00:03:04,600 --> 00:03:06,367
because I'd never flown a dead

101
00:03:06,367 --> 00:03:07,833
stick landing before.

102
00:03:07,833 --> 00:03:09,300
All of my landing had been with

103
00:03:09,300 --> 00:03:11,800
an engine running to get me out

104
00:03:11,800 --> 00:03:13,500
of trouble if need be.

105
00:03:13,500 --> 00:03:16,433
When I launched with the X-15 it

106
00:03:16,433 --> 00:03:18,200
turned out to be the other way

107
00:03:18,200 --> 00:03:19,967
around.

108
00:03:19,967 --> 00:03:21,700
All the excitement was while the

109
00:03:21,700 --> 00:03:23,067
engine was running.

110
00:03:23,067 --> 00:03:24,767
It had a great big engine with

111
00:03:24,767 --> 00:03:26,333
lots of acceleration and things

112
00:03:26,333 --> 00:03:29,633
happening very, very fast.

113
00:03:29,633 --> 00:03:30,967

I really did not catch up with

114
00:03:30,967 --> 00:03:32,633
the airplane until I was down to

115
00:03:32,633 --> 00:03:34,200
about Mach 2 where I had been

116
00:03:34,200 --> 00:03:36,633
before in fighter airplanes.

117
00:03:36,633 --> 00:03:38,067
Here I was back over Edwards at

118
00:03:38,067 --> 00:03:41,067
about Mach 2 and I had been

119
00:03:41,067 --> 00:03:43,033
there before so the landing was

120
00:03:43,033 --> 00:03:44,667
very comfortable.

121
00:03:44,667 --> 00:03:45,933
It was all the things before the

122
00:03:45,933 --> 00:03:47,500
landing that I got behind the

123
00:03:47,500 --> 00:03:49,067
airplane on.

124
00:03:49,067 --> 00:03:51,100
Milt Thompson once said that the

125
00:03:51,100 --> 00:03:52,533
X15 was the only airplane he had

126
00:03:52,533 --> 00:03:53,500
ever flown where he was glad

127
00:03:53,500 --> 00:03:57,167
when the engine quit.

128
00:03:57,167 --> 00:03:59,400
But early flight research did

129
00:03:59,400 --> 00:04:00,733
not come without a great deal of

130
00:04:00,733 --> 00:04:03,133
unknown risk.

131
00:04:03,133 --> 00:04:04,733
Bill Dana, like many of the test

132
00:04:04,733 --> 00:04:06,033
pilots spent hours practicing

133
00:04:06,033 --> 00:04:07,300
their emergency procedures in

134
00:04:07,300 --> 00:04:09,133
the simulator and in the

135
00:04:09,133 --> 00:04:11,100
training aircraft.

136
00:04:11,100 --> 00:04:12,400
He was probably one of the

137
00:04:12,400 --> 00:04:14,900
better people to have around in

138
00:04:14,900 --> 00:04:16,867

an emergency or some unexpected

139
00:04:16,867 --> 00:04:19,633
anomaly. He just seemed to have

140
00:04:19,633 --> 00:04:21,867
a knack for grasping the

141
00:04:21,867 --> 00:04:23,467
situation and then doing

142
00:04:23,467 --> 00:04:25,133
something right.

143
00:04:25,133 --> 00:04:27,167
He was dedicated to running the

144
00:04:27,167 --> 00:04:28,767
simulator as much as possible to

145
00:04:28,767 --> 00:04:31,333
evaluating all of those

146
00:04:31,333 --> 00:04:33,033
emergency procedures and

147
00:04:33,033 --> 00:04:34,867
eventualities that might take

148
00:04:34,867 --> 00:04:36,967
place. And he was well prepared

149
00:04:36,967 --> 00:04:39,533
for each flight. That paid off

150
00:04:39,533 --> 00:04:42,200
because he too had his

151
00:04:42,200 --> 00:04:43,867
emergencies in the airplane as

152
00:04:43,867 --> 00:04:46,367
we all did and I think you can

153
00:04:46,367 --> 00:04:48,467
probably count on one hand the

154
00:04:48,467 --> 00:04:51,267
number of X15 flights that went

155
00:04:51,267 --> 00:04:52,600
without some kind of an

156
00:04:52,600 --> 00:04:55,433
emergency happening. All of them

157
00:04:55,433 --> 00:04:56,533
weren't serious but there was

158
00:04:56,533 --> 00:04:57,600
some sort of an emergency on

159
00:04:57,600 --> 00:05:00,233
probably 90 percent of the

160
00:05:00,233 --> 00:05:01,200
flights.

161
00:05:01,200 --> 00:05:02,400
I think I was willing to endure

162
00:05:02,400 --> 00:05:05,133
the risks to be allowed to face

163
00:05:05,133 --> 00:05:06,833

the challenges.

164
00:05:06,833 --> 00:05:10,367
That is what risk solving is…

165
00:05:10,367 --> 00:05:12,833
surmounting a challenge.

166
00:05:12,833 --> 00:05:15,900
To be able to fly a mission that

167
00:05:15,900 --> 00:05:18,067
appears to be very hazardous and

168
00:05:18,067 --> 00:05:20,533
to fly it safely is a formidable

169
00:05:20,533 --> 00:05:22,633
accomplishment.

170
00:05:22,633 --> 00:05:24,900
I think it was that

171
00:05:24,900 --> 00:05:26,033
accomplishment that drove me to

172
00:05:26,033 --> 00:05:28,100
face the challenges.

173
00:05:28,100 --> 00:05:29,633
But there was something that

174
00:05:29,633 --> 00:05:30,933
Bill feared more than the danger

175
00:05:30,933 --> 00:05:32,067
itself.

176
00:05:32,067 --> 00:05:33,600
Bill: There was a whole staff of

177
00:05:33,600 --> 00:05:35,800
engineers in the control room

178
00:05:35,800 --> 00:05:38,233
watching every move you make and

179
00:05:38,233 --> 00:05:40,667
my fear was that I would do

180
00:05:40,667 --> 00:05:42,067
something that would embarrass

181
00:05:42,067 --> 00:05:44,400
myself in the eyes of my peers

182
00:05:44,400 --> 00:05:45,567
and that was the fear. I don't

183
00:05:45,567 --> 00:05:47,200
ever remember being afraid I was

184
00:05:47,200 --> 00:05:49,700
going to die.

185
00:05:49,700 --> 00:05:50,800
Bill’s experience with the

186
00:05:50,800 --> 00:05:52,467
rocket powered X-15 aircraft

187
00:05:52,467 --> 00:05:54,467
ideally led him into the lifting

188
00:05:54,467 --> 00:05:55,800

body program.

189
00:05:55,800 --> 00:05:56,933
He was instrumental in

190
00:05:56,933 --> 00:05:58,100
validating that these vehicles

191
00:05:58,100 --> 00:06:00,833
could be precisely controlled

192
00:06:00,833 --> 00:06:02,000
and landed on conventional

193
00:06:02,000 --> 00:06:03,333
runways.

194
00:06:03,333 --> 00:06:04,433
His efforts gave NASA the

195
00:06:04,433 --> 00:06:05,933
confidence it needed to proceed

196
00:06:05,933 --> 00:06:08,733
with the space shuttle design.

197
00:06:08,733 --> 00:06:10,300
He became a believer in the

198
00:06:10,300 --> 00:06:11,867
lifting body program after

199
00:06:11,867 --> 00:06:13,100
watching Dale Reed and Milt

200
00:06:13,100 --> 00:06:15,100
Thompson fly the plywood M-2

201
00:06:15,100 --> 00:06:17,033
behind a C-47 transport

202
00:06:17,033 --> 00:06:19,633
aircraft.

203
00:06:19,633 --> 00:06:21,667
That probably was a big turning

204
00:06:21,667 --> 00:06:23,000
point in my assessment of the

205
00:06:23,000 --> 00:06:24,467
lifting body.

206
00:06:24,467 --> 00:06:25,633
When I saw the full scale

207
00:06:25,633 --> 00:06:27,500
plywood airplane on the tow line

208
00:06:27,500 --> 00:06:31,233
behind the C-47, I realized we

209
00:06:31,233 --> 00:06:33,767
had an air worthy shape and it

210
00:06:33,767 --> 00:06:35,000
defied imagination.

211
00:06:35,000 --> 00:06:37,633
It did not look like the M-2 had

212
00:06:37,633 --> 00:06:38,900
any visible means of support,

213
00:06:38,900 --> 00:06:40,567

but there it was flying quite

214
00:06:40,567 --> 00:06:41,333
nicely.

215
00:06:41,333 --> 00:06:42,767
It released from the tow line,

216
00:06:42,767 --> 00:06:44,800
glided back over the lakebed,

217
00:06:44,800 --> 00:06:47,067
flared and landed.

218
00:06:47,067 --> 00:06:49,233
I think at that time I became a

219
00:06:49,233 --> 00:06:51,967
believer in the lifting body

220
00:06:51,967 --> 00:06:53,500
shape.

221
00:06:53,500 --> 00:06:54,667
With skepticism heightened after

222
00:06:54,667 --> 00:06:56,600
the M2-F2 crash, Bill personally

223
00:06:56,600 --> 00:06:58,467
led the effort to validate the

224
00:06:58,467 --> 00:07:00,700
revised aerodynamic database and

225
00:07:00,700 --> 00:07:03,300
control system for the M2-F3

226
00:07:03,300 --> 00:07:04,400
Simulator.

227
00:07:04,400 --> 00:07:06,000
To ensure the vehicle would be

228
00:07:06,000 --> 00:07:07,567
stable and controllable.

229
00:07:07,567 --> 00:07:09,200
A third vertical fin was also

230
00:07:09,200 --> 00:07:11,200
added to the M2 shape to prevent

231
00:07:11,200 --> 00:07:13,933
yaw due to aileron deflection.

232
00:07:13,933 --> 00:07:16,167
I had no apprehensions about the

233
00:07:16,167 --> 00:07:17,867
first flight in the M2-F3 and

234
00:07:17,867 --> 00:07:19,833
the flight went off exactly as

235
00:07:19,833 --> 00:07:21,033
predicted.

236
00:07:21,033 --> 00:07:23,300
The airplane had about 25 or 30

237
00:07:23,300 --> 00:07:24,800
more flights.

238
00:07:24,800 --> 00:07:28,467

All of them without grief so I

239
00:07:28,467 --> 00:07:30,033
knew the M2-F2 had handling

240
00:07:30,033 --> 00:07:32,533
quality problems and I knew how

241
00:07:32,533 --> 00:07:33,533
to fix them.

242
00:07:33,533 --> 00:07:35,233
I knew they were fixed in the

243
00:07:35,233 --> 00:07:37,500
M2-F3 and I was not apprehensive

244
00:07:37,500 --> 00:07:39,100
about it.

245
00:07:39,100 --> 00:07:40,400
I do remember coming back into

246
00:07:40,400 --> 00:07:44,567
the briefing room from that

247
00:07:44,567 --> 00:07:46,433
first flight in the M2-F3 and

248
00:07:46,433 --> 00:07:51,267
the attendees of the debriefing

249
00:07:51,267 --> 00:07:52,433
applauded as I walked in the

250
00:07:52,433 --> 00:07:53,567
room.

251
00:07:53,567 --> 00:07:55,500
I never had that happen before

252
00:07:55,500 --> 00:07:58,267
or after and it kind of disarmed

253
00:07:58,267 --> 00:07:59,700
me.

254
00:07:59,700 --> 00:08:01,433
I was not prepared for it and I

255
00:08:01,433 --> 00:08:02,500
did not see the need for

256
00:08:02,500 --> 00:08:04,000
applause there because I knew I

257
00:08:04,000 --> 00:08:05,400
was flying a safe airplane.

258
00:08:05,400 --> 00:08:07,467
But it was still made clear to

259
00:08:07,467 --> 00:08:08,800
me that other people were

260
00:08:08,800 --> 00:08:10,867
apprehensive about that flight.

261
00:08:10,867 --> 00:08:14,067
Bill has been involved in 45

262
00:08:14,067 --> 00:08:15,500
other types of research aircraft

263
00:08:15,500 --> 00:08:17,133

distinguishing himself as an

264
00:08:17,133 --> 00:08:18,367
internationally recognized

265
00:08:18,367 --> 00:08:20,167
test pilot.

266
00:08:20,167 --> 00:08:22,300
I really appreciate the things

267
00:08:22,300 --> 00:08:24,033
that Bill has done over the

268
00:08:24,033 --> 00:08:25,467
years for the programs I have

269
00:08:25,467 --> 00:08:27,267
been involved with. Everything

270
00:08:27,267 --> 00:08:28,833
he has ever done has been very,

271
00:08:28,833 --> 00:08:33,367
very professional and very good.

272
00:08:33,367 --> 00:08:34,767
Fitz Fullton: Sometimes we

273
00:08:34,767 --> 00:08:36,167
forget that NASA is really

274
00:08:36,167 --> 00:08:38,467
doing a job for the country and

275
00:08:38,467 --> 00:08:40,167
I think Bill's part in that is

276
00:08:40,167 --> 00:08:41,600
significant.

277
00:08:41,600 --> 00:08:43,100
Ed Schneider: He never stood up

278
00:08:43,100 --> 00:08:44,300
in front of me or anyone else

279
00:08:44,300 --> 00:08:45,533
that I can ever recall

280
00:08:45,533 --> 00:08:47,167
and say, "Hi, I'm Bill Dana. I'm

281
00:08:47,167 --> 00:08:48,967
really great".

282
00:08:48,967 --> 00:08:50,033
He didn't do things with words,

283
00:08:50,033 --> 00:08:51,233
he did things by actions

284
00:08:51,233 --> 00:08:52,567
and you knew he was great by

285
00:08:52,567 --> 00:08:54,367
watching what he did.

286
00:08:54,367 --> 00:08:56,933
I certainly would like to have

287
00:08:56,933 --> 00:08:57,933
done more.

288
00:08:57,933 --> 00:09:00,067

I would have liked my career to

289
00:09:00,067 --> 00:09:01,067
have lasted longer and looking

290
00:09:01,067 --> 00:09:02,533
back I think I could have been

291
00:09:02,533 --> 00:09:04,067
more productive, but on the

292
00:09:04,067 --> 00:09:05,400
other hand I am grateful for a

293
00:09:05,400 --> 00:09:07,233
long run of doing what I like to

294
00:09:07,233 --> 00:09:08,300
do.

295
00:09:08,300 --> 00:09:09,833
I was fortunate enough to have

296
00:09:09,833 --> 00:09:12,800
some really good programs fall

297
00:09:12,800 --> 00:09:14,700
my way.

298
00:09:14,700 --> 00:09:16,867
Bill Dana’s contributions in the

299
00:09:16,867 --> 00:09:18,700
fields of aeronautical and space

300
00:09:18,700 --> 00:09:20,633
research have established a

301
00:09:20,633 --> 00:09:22,067
legacy that is looked upon with

302
00:09:22,067 --> 00:09:23,133
awe.

303
00:09:23,133 --> 00:09:24,133
It’s also a legacy that

304
00:09:24,133 --> 00:09:25,900
continues everyday at Dryden.

305
00:09:25,900 --> 00:09:28,133
Bill embodies the Dryden spirit

306
00:09:28,133 --> 00:09:29,700
of a talented individual working

307
00:09:29,700 --> 00:09:31,400
to shape the future.

308
00:09:31,400 --> 00:09:33,167
His example of professionalism,

309
00:09:33,167 --> 00:09:35,133
modesty, and dedication to a

310
00:09:35,133 --> 00:09:36,933
career he truly loves is