



1
00:00:01,156 --> 00:00:04,726
NARRATOR: It has been called the
world's greatest piggyback ride:

2
00:00:05,336 --> 00:00:09,366
a space shuttle, atop a
Boeing 747 jet aircraft.

3
00:00:09,726 --> 00:00:12,766
But this is no ordinary 747,

4
00:00:13,476 --> 00:00:17,096
this is the Shuttle
Carrier Aircraft...the SCA.

5
00:00:17,446 --> 00:00:22,826
This specially modified jumbo
jet was not only a taxi service

6
00:00:22,826 --> 00:00:25,886
for the shuttle, but also
helped in the development

7
00:00:26,286 --> 00:00:27,376
of the shuttle itself.

8
00:00:28,306 --> 00:00:31,366
In 30 years of flying,
the majestic image

9
00:00:31,366 --> 00:00:35,446
of a spacecraft joined to
the SCA, became a symbol

10
00:00:35,776 --> 00:00:37,326
of American invention
and ingenuity.

11
00:00:47,786 --> 00:00:52,896

MUSIC NARRATOR: You
searched the sky...

12

00:00:53,006 --> 00:00:55,296

you heard the roar of the
engines getting closer...

13

00:00:55,296 --> 00:00:58,496

then someone would
shout..."there it is."

14

00:00:59,396 --> 00:01:03,726

The SCA. In the 30 year
history of the space shuttle,

15

00:01:03,966 --> 00:01:07,856

if you were one of millions
of people who saw the SCA fly

16

00:01:07,946 --> 00:01:10,516

over your town, you
understood the excitement it

17

00:01:10,516 --> 00:01:10,876

could generate.

18

00:01:11,366 --> 00:01:12,796

(Crowd cheering at
SCA) Moultrie-

19

00:01:13,176 --> 00:01:20,186

"It was always a pleasure
to have the locals come out;

20

00:01:20,186 --> 00:01:24,646

to have the kids be able to
look up and see a shuttle

21

00:01:24,786 --> 00:01:27,306

on top of the airplane.

22

00:01:27,306 --> 00:01:29,406

That's certainly a
huge memory of mine.

23

00:01:29,836 --> 00:01:33,066

When I was a teenager,
when I lived in Huntsville,

24

00:01:33,066 --> 00:01:34,876

Alabama where I was raised...and

25

00:01:34,876 --> 00:01:38,816

at the time I was a Von Braun
Civic Center in Huntsville

26

00:01:38,816 --> 00:01:41,806

and looking up and
seeing...THIS airplane.

27

00:01:42,256 --> 00:01:46,536

And who would have thought
I would have ever have flown

28

00:01:46,536 --> 00:01:47,426

this airplane.

29

00:01:47,636 --> 00:01:51,456

How ironic that I would
end up being a guy

30

00:01:51,456 --> 00:01:54,686

who flew the airplane and being
lucky enough to be the last guy

31

00:01:54,686 --> 00:01:58,436

to fly this vehicle for a
30 year shuttle program."

32

00:01:58,436 --> 00:02:04,726

NARRATOR: The unique image of
two sleek vehicles attached

33

00:02:04,766 --> 00:02:08,726

in a seemingly impossible
configuration, evokes feelings

34

00:02:08,886 --> 00:02:12,316

of progress, elegance,
and achievement.

35

00:02:12,776 --> 00:02:15,626

NARRATOR: To understand how the
Shuttle Carrier Aircraft came

36

00:02:15,766 --> 00:02:18,376

to be, you must understand
the shuttle itself.

37

00:02:19,166 --> 00:02:22,646

It was America's first
reusable spacecraft.

38

00:02:22,916 --> 00:02:24,506

At the end of a space mission,

39

00:02:24,986 --> 00:02:27,706

the shuttle would reenter
Earth's atmosphere,

40

00:02:27,866 --> 00:02:30,046

then it would glide
down to a runway

41

00:02:30,046 --> 00:02:32,146

at the Kennedy Space
Center in Florida.

42

00:02:32,496 --> 00:02:34,736

There engineers would get

43

00:02:34,736 --> 00:02:37,766
to work refitting the
spacecraft for another mission.

44

00:02:38,276 --> 00:02:41,316
But NASA had other
landing sites,

45

00:02:41,876 --> 00:02:44,306
such as Edwards Air
Force Base in California.

46

00:02:44,846 --> 00:02:48,986
If the shuttle landed
here...it would need a way back

47

00:02:49,416 --> 00:02:53,716
to its launch site in Florida.

48

00:02:53,716 --> 00:02:55,266
For flying the skies on Earth,

49

00:02:55,266 --> 00:02:59,326
NASA engineers first thought
perhaps the shuttle could have

50

00:02:59,326 --> 00:03:01,596
its own jet engines.

51

00:03:01,596 --> 00:03:05,176
But these proved to be
too heavy, too complex

52

00:03:05,176 --> 00:03:06,816
and too costly to develop.

53

00:03:06,816 --> 00:03:11,356

NASA would have to find another way to transport the shuttle.

54

00:03:11,356 --> 00:03:14,146
Enter John Kiker, an engineer

55

00:03:14,146 --> 00:03:17,316
at the NASA Johnson Space Center in Houston, Texas.

56

00:03:17,316 --> 00:03:20,306
Kiker: "I made a little sketch of this and put it on my desk,

57

00:03:20,396 --> 00:03:24,066
and then after several weeks I called up Boeing one day

58

00:03:24,066 --> 00:03:26,426
and told 'em not to laugh but I wanted to show 'em something."

59

00:03:26,426 --> 00:03:28,846
(Model airplane buzzing)
NARRATOR: Using model airplanes,

60

00:03:28,846 --> 00:03:35,366
Kiker and his team proved the concept

61

00:03:35,366 --> 00:03:39,756
of transporting the shuttle on the back of a 747 jumbo jet.

62

00:03:40,856 --> 00:03:43,866
In addition, the tests showed the shuttle could be air

63

00:03:43,966 --> 00:03:45,586
launched off the

back of the plane.

64

00:03:46,556 --> 00:03:49,896

The idea was accepted and
the Shuttle Carrier Aircraft

65

00:03:50,296 --> 00:03:50,626

was born.

66

00:03:51,076 --> 00:03:52,176

The SCA first flew the shuttle

67

00:03:52,256 --> 00:03:55,606

in what was called the
Approach and Landing Tests.

68

00:03:55,856 --> 00:04:00,286

The shuttle Enterprise was
lifted on the back of the SCA

69

00:04:00,326 --> 00:04:04,486

to an altitude of about
twenty-seven thousand feet...and

70

00:04:04,486 --> 00:04:05,006

air launched.

71

00:04:06,566 --> 00:04:08,406

The aerodynamic tests
were crucial

72

00:04:08,406 --> 00:04:11,786

in proving the shuttle's ability
to glide down to a landing,

73

00:04:12,456 --> 00:04:14,926

and helped engineers
refine the shuttle design.

74

00:04:16,496 --> 00:04:20,856

Just as significant, the
imagery of the SCA and shuttle

75

00:04:20,996 --> 00:04:25,446

in action was the public's first
glimpse of an amazing new era

76

00:04:25,446 --> 00:04:28,386

of spaceflight that was
just on the horizon.

77

00:04:29,436 --> 00:04:35,186

The shuttle became a renowned
and iconic space vehicle;

78

00:04:35,376 --> 00:04:38,136

the SCA allowed those of
us on the Earth to share

79

00:04:38,196 --> 00:04:42,006

that excitement when it
served role as a shuttle taxi.

80

00:04:42,856 --> 00:04:46,666

Mission by mission, SCA crews
eagerly listened for word

81

00:04:47,026 --> 00:04:48,006

if the shuttle would have

82

00:04:48,006 --> 00:04:50,466

to land somewhere
other than Florida...

83

00:04:50,696 --> 00:04:52,186

Moultrie: " We start
getting excited

84

00:04:52,416 --> 00:04:55,426

when we hear the
weather's bad in Florida.

85

00:04:55,756 --> 00:04:59,336

Those few of us that
fly this airplane

86

00:04:59,526 --> 00:05:01,206

LIKE bad weather in
Florida (laughs).

87

00:05:01,206 --> 00:05:03,706

We get a chance to do our jobs.

88

00:05:03,706 --> 00:05:07,396

So...as soon as we know
the shuttle is en route

89

00:05:07,526 --> 00:05:10,516

to California, that's when
we start getting involved

90

00:05:10,516 --> 00:05:13,226

with the shuttle ferry team.

91

00:05:13,226 --> 00:05:14,896

Moultrie: "Basically
the shuttles are brought

92

00:05:14,896 --> 00:05:19,106

into the mate/de-mate facility
and they're hoisted up,

93

00:05:19,146 --> 00:05:22,126

and the Shuttle Carrier
Aircraft, the 747 is moved

94

00:05:22,456 --> 00:05:26,096

under the shuttle and then
the attachments are made."

95

00:05:26,096 --> 00:05:29,266

NARRATOR: The shuttle and its cargo can weigh anywhere

96

00:05:29,266 --> 00:05:31,166

from one-hundred-sixty thousand,

97

00:05:31,616 --> 00:05:34,496

to two-hundred-twenty thousand pounds.

98

00:05:34,496 --> 00:05:38,776

To lift and fly with that much weight on its back,

99

00:05:38,896 --> 00:05:40,756

the SCA had some special modifications

100

00:05:41,446 --> 00:05:44,086

that make it unlike any other jetliner.

101

00:05:44,166 --> 00:05:48,266

Most noticeable were vertical fins mounted on the tail.

102

00:05:48,456 --> 00:05:50,606

The shuttle caused air turbulence

103

00:05:51,096 --> 00:05:53,896

and the fins brought back stability to the flight.

104

00:05:53,896 --> 00:05:58,276

Other than the fins, it might appear this was an ordinary

105
00:05:58,316 --> 00:05:59,036
jumbo jet.

106
00:05:59,196 --> 00:06:03,216
But as SCA Flight Engineer
Henry Taylor can tell you,

107
00:06:03,746 --> 00:06:05,806
there were some very
important differences

108
00:06:06,216 --> 00:06:10,226
between a regular 747 and
a Shuttle Carrier Aircraft.

109
00:06:10,226 --> 00:06:13,176
Henry Taylor: " We're
here inside the main cabin

110
00:06:13,176 --> 00:06:14,686
of the Shuttle Carrier Aircraft.

111
00:06:14,686 --> 00:06:17,676
As you can see, there's no
insulation, no paneling,

112
00:06:18,026 --> 00:06:20,276
all the lavatories and
galleys have been removed

113
00:06:20,276 --> 00:06:21,036
to save weight.

114
00:06:22,656 --> 00:06:26,346
Above me is one of the
two bulkheads...this one

115
00:06:26,346 --> 00:06:30,466
and this one...that are

used to provide support

116

00:06:30,556 --> 00:06:31,866
for the orbiter attach points."

117

00:06:31,866 --> 00:06:33,786
Taylor (continued):
"The attach points

118

00:06:33,786 --> 00:06:36,996
for the Shuttle Carrier Aircraft
are in the same location

119

00:06:37,256 --> 00:06:39,996
that the orbiters attach to
the external tank for launch.

120

00:06:40,786 --> 00:06:44,446
The aft section of the
airplane, there's two struts

121

00:06:45,156 --> 00:06:49,256
with what we call balls...and
those go up inside the orbiter.

122

00:06:49,256 --> 00:06:52,756
In the front, there's a small
little tripod adapter fitting

123

00:06:52,896 --> 00:06:55,136
that mounts to the
structure that's been added

124

00:06:55,196 --> 00:06:56,046
to the Shuttle Carrier Aircraft.

125

00:06:56,716 --> 00:07:00,506
Somebody made a kind of
joke, although it's relevant.

126

00:07:01,306 --> 00:07:05,476

By the aft attach points it says, "attach orbiter here,

127

00:07:05,756 --> 00:07:07,976

note: black side down," which of course,

128

00:07:07,976 --> 00:07:10,486

the black for the tiles...it's kind've a joke

129

00:07:10,486 --> 00:07:12,416

to make sure somebody doesn't put it on upside down."

130

00:07:12,616 --> 00:07:15,406

NARRATOR: Although the plane itself had all the necessary

131

00:07:15,596 --> 00:07:17,656

technical requirements, for a safe flight,

132

00:07:18,176 --> 00:07:22,056

the highly skilled crew monitored the systems carefully,

133

00:07:22,136 --> 00:07:24,756

and experienced a different type of ride...

134

00:07:25,296 --> 00:07:28,976

Moultrie: "From a pilot's stand point, there's a long wait,

135

00:07:29,466 --> 00:07:32,626

when the power is pushed up...you don't really realize

136

00:07:33,376 --> 00:07:34,906
the time that you're going to be

137

00:07:34,976 --> 00:07:39,196
on the runway before rotating
the airplane into the air.

138

00:07:39,566 --> 00:07:40,586
There's a big wait.

139

00:07:40,716 --> 00:07:43,736
That was the big thing
impressed upon me, I think,

140

00:07:43,886 --> 00:07:45,256
on my first shuttle ferry."

141

00:07:48,846 --> 00:07:50,466
NARRATOR: As the
shuttle program ended,

142

00:07:50,856 --> 00:07:55,746
the SCA had one final mission:
deliver the shuttles Enterprise,

143

00:07:56,206 --> 00:08:00,836
Discovery and Endeavour to
their respective museums.

144

00:08:00,866 --> 00:08:04,046
Across the United
States, for one last time,

145

00:08:04,146 --> 00:08:07,636
people got to see the
unique vision of spacecraft

146

00:08:07,836 --> 00:08:09,646
and aircraft joined in flight.

147

00:08:09,986 --> 00:08:16,886

And with that, the SCA
with a shuttle was not seen

148

00:08:16,886 --> 00:08:20,376

in the sky again, but it will
always remind us of a bold age

149

00:08:20,376 --> 00:08:22,446

of determination and invention.

150

00:08:22,696 --> 00:08:24,586

Taylor: "When the orbiter
is on top of the SCA,

151

00:08:24,586 --> 00:08:26,416

it creates so much interest

152

00:08:26,466 --> 00:08:27,946

because it is such
a unique sight.

153

00:08:28,856 --> 00:08:30,156

People come out by the thousands

154

00:08:30,296 --> 00:08:33,356

to see us wherever we
stop...to come see this very

155

00:08:33,356 --> 00:08:35,066

unique combination."

156

00:08:35,356 --> 00:08:38,696

Taylor: "People appreciate
and people respond to things