Script Prepared For:

Bell-Boeing V-22 Osprey

Subject:

Tilt Rotor History Video
Written for the
V-22 Rollout Ceremony
Ft. Worth, Texas

Prepared by:

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VISUAL	AUDIO
	(sound effect: a sustained note, or wind rushing)
	NARRATOR: The dream -- to achieve the full range of flight.
footage of osprey (bird) soaring	
	To soar…
osprey momentarily hovers	
	to hover.
osprey dives for fish and sharply ascends	
	to dive… and ascend.
montage of many early aircraft designs, showing both airplane and vertical lift concepts	
	Throughout time, man has dreamed of many ways to achieve flight — to rise upward. To soar with wings extended.
early fixed-wing airplanes such as Wright brothers, Bleroit, Voisin-Farman, etc.	
	In this century, the dawn of powered flight began… with fixed wing airplanes.
early helicopters such as Cornu, Petroczy, Oehmichen, etc.	

VISUAL	AUDIO
	Others chose to rise with rotary wings — the helicopter!
examples of both fixed wing and helicopter aircraft, showing separation of the 2 types	
	From that single dream — to fly — the pathways of flight have diverged.
commercial jetliner rolling down runway and taking off	
	The airplane has become the efficient, economical vehicle for medium and long distances.
helicopter taking off	
	The helicopter, operating from small areas, has been the workhorse for short distances.
	The dream for some is to bridge the gap between the airplane and the helicopter. For them, the dream has never died.
V-22 GRAPHIC AS TITLE FOR VIDEO	
	(MUSIC BEGINS)
photo of Herrick standing beside HV-2A convertiplane. Start tight on Herrick, then zoom back to show aircraft.	
	The dream begins to take shape in the early 1930s. One aircraft is able to fly like

VISUAL	AUDIO
	an airplane, then the non-powered upper wing rotates for a vertical landing.
drawing of Baynes Heliplane	
	In 1937, a heliplane is patented but never built — A craft remarkably similar to later tilt rotor designs.
	At the end of World War Two, many forward thinkers begin developing convertiplane designs, and building prototypes.
	In 1950 the U.S. Air Force announces a competition — to design a true working convertiplane.
photo of McDonnell XV-1	
	The McDonnell company builds a compound helicopter — known as the XV-1 — based on a pressure jet plus a tip-burning rotor.
photo of Lichten	
	But Bell Aircraft decides on a different approach, guided by the leadership of its chief engineer for the project, Robert Lichten.
XV-3 roll out	
	Under his guidance, Bell rolls out the tiltrotor XV-3 in 1955.

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early XV-3 hover test	Powered by a single reciprocating engine located in the fuselage, the first version of the XV-3 has three-blade rotors mounted on tall pylons at the ends of the wings.
	During an attempt to convert from hover to forward flight, the XV-3 experiences violent vibration in the wings and rotors. Bell test pilot Richard Stansbury is forced to crash land the XV-3 from a height of 100 feet.
	(Music stops)
	The first XV-3 is destroyed. But the dream of tilt rotor flight does not die.
	(Music resumes)
wind tunnel testing of modified XV-3 with 2-blade rotors, conducted at NASA's Ames Research Center full-scale wind tunnel	
	After analyzing the cause of the instability, Bell modifies the design, and tests a two-blade rotor system mounted on shorter pylons.

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footage of XV-3 conversion flight	
	On December 17, 1958, the modified XV-3 achieves the world's first complete in-flight tilt rotor conversion from helicopter to airplane mode, and back to helicopter mode.
	Over the next seven years, the XV-3 is tested by NASA, the Air Force and the Army. In all, it performs more than 100 full conversions between helicopter and airplane modes. Boeing VZ-2 (V-76)
	During the same period, Boeing develops a test bed vertical take off and landing aircraft. The Boeing VZ-2 is a tilt wing aircraft that helps prove the V-TOL concept. On July 15, 1958, the VZ-2 successfully converts from helicopter to airplane flight.
	In sevenyears of testing, it achieves more than 200 successful conversions between helicopter and airplane modes.
	At the conclusion of government funding for the XV-3 program in 1966, two companies continue to pursue the dream of tilt rotor technology — Bell and Boeing.
Boeing wind tunnel tests, including 1/10th aeroelastic model, 13-ft performance rotor	

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	During the late 1960s and early 1970s, Boeing Vertol conducts more than 35-hundred hours of testing of tilt rotor models, including hundreds of hours of wind tunnel tests.
26-ft full-scale demonstrator rotor	
	With support from NASA and the Army, Boeing builds a 26-foot full-scale demonstrator rotor,
full-scale wing tested under rotor downwash	
	and a full-scale wing designed to alleviate rotor download.
	During the same period, Bell undertakes intensive efforts for a new tilt rotor design.
	In 1972, NASA and the Army's Air Mobility Research and Development Laboratory award both Bell and Boeing contracts to begin new tilt rotor designs.
photos of XV-15 project personnel in conference	
	A year later, Textron's Bell Helicopter is chosen to design, fabricate and test a totally new tilt rotor research aircraft —
dramatic shot of XV-15	

VISUAL	AUDIO
	the XV-15.
XV-15 hover	
	Utilizing modern turbine engines and advanced designs, the first of two XV-15s makes its first hover flight in 1977.
wind tunnel tests of XV-15	
	Following extensive wind tunnel tests of ship number one,
XV-15 conversion flight	
	the second aircraft is flown, and achieves full conversion to airplane mode in 1979.
Sequence of XV-15 tests and demonstrations, including shipboard evaluations, nap-of-earth, slope landing, over New York skyline, overwater rescue, guest pilot program featuring Sen. Goldwater and others, other demos and tests.	
	Over the next nine years, the two XV-15s test, prove and display the reality of tilt rotor technology by making more than 18-hundred conversions, flying to 26,000 feet, and reaching a true airspeed of more than 300 knots in level flight — more than twice the crusing speed of a conventional helicopter.
XV-15 with new composite rotor blades	
	Near the end of the XV-15 program, Boeing designs and manufactures advanced

VISUAL	AUDIO
	composite rotor blades for improved useful load and hover lift performance.
shot of the 14 December 1981 document as a background device	
	By the early 1980s, the stage is set for the world's first operational tilt rotor aircraft. A December 1981 document publishes the requirements for the Joint Services Advanced Vertical Lift Aircraft — or JVX — program.
footage of existing military helicopters, showing troops deploying, heavy lift, etc.	
	The challenge is formidable. Compared to existing helicopters, the JVX tiltrotor will be called upon to carry an equal payload at twice the speed, over twice the distance… all at a lower cost.
Bell-Boeing personnel in conference, or group shot	
	The two leaders in the field, Bell and Boeing, combine their expertise to participate in the Joint Services program competition.
Bell footage featuring XV-3 and XV-15	
	It proves to be a winning combination — Bell's 30 years experience in tilt rotor design, drive systems…

VISUAL	AUDIO
Boeing footage featuring wind tunnel testing and fuselage construction	
	…Boeing's leadership in wing and fuselage design, fly-by-wire flight controls, and advanced composite materials…
Allison footage of military helicopter engine testing	
	…Plus the success of Allison with its turboshaft engines for the military.
	On April 25th, 1983, the Naval Air Systems Command awards the Bell-Boeing team the contract for the preliminary design of the JVX tilt rotor.
CAD/CAM designs, NASA outdoor proprotor test, cockpit simulation	
	(music)
V-22 wind tunnel testing, various shots	
	Nearly ten-thousand hours of wind tunnel testing are carried out — more than for any rotary wing program in history.
	The official name of the JVX aircraft is announced… the V-22 Osprey. In May 1986, the Navy awards a seven-year full-scale development contract to produce six flight test V-22s.

VISUAL	AUDIO
fabrication of V-22 parts, molds, layering of composite materials, etc.	
	Fabrication of the first flight test aircraft progresses. Nearly all wing and fuselage structural elements are fabricated from graphite-epoxy composite laminates.
fuselage being weighed, and readied for shipment	
	The first V-22 fuselage produced by Boeing Helicopter is prepared for shipment to Bell Helicopter.
	As the first flight test V-22 aircraft is readied for roll out, the various integrated systems are installed. They include:
proprotors	
	Proprotors with uniquely advanced airfoils designed for optimum performance in both hover and cruise flight modes…
engines	
	Two fuel efficient Allison turboshaft engines with a high power-to-weight ratio…
avionics	
	And advanced avionics, featuring "glass cockpit" instrumentation, a heads-up helmet-mounted display, and a digital fly-by-wire flight control system.

VISUAL	AUDIO
	(Music change)
	From the beginning, the dream of tilt rotor flight has never died. The V-22 Osprey represents the latest success in the persistent path toward achieving the full range of flight, but the potential is not yet fulfilled.
views of future applications, (Coast Guard, disaster relief, commercial commuter transportation, etc.)	
	Military and civil applications abound, both here in the United States, and overseas. Future uses of the tilt rotor are limited only by our imaginations.
V-22	
	Today, the V-22 Osprey is adding a new dimension to the dream of flight.
	And tomorrow is just another dream away.
V-22 GRAPHIC LOGO	
Live reveal sequence begins immediately at conclusion of video tape. V-22 graphic logo remains on screen, but background fades to black, leaving the logo on a black background.	

VISUAL	AUDIO
Black background dissolves to "live" shot of V-22 as the lighting reveal begins. V-22 is seen at first in silhouette. V-22 logo then dissolves out so audience is able to watch the V-22 reveal on the video projection screens.	

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