



# Smithsonian

*National Air and Space Museum*

## Mandel Lenkowsky Early Vertical Flight Development Collection, 1936-1946

Roseann E. MacLean

2004



National Air and Space Museum Archives  
14390 Air & Space Museum Parkway  
Chantilly, VA 20151  
Business Number: Phone: 703-572-4045  
NASMRefDesk@si.edu  
<https://airandspace.si.edu/archives>

## Table of Contents

Collection Overview .....	
Administrative Information .....	1
Biographical Note .....	2
Scope and Contents .....	2
Arrangement .....	2
Names and Subjects .....	
Container Listing .....	
Series 1: Correspondence and Manuscript Notes, 1941-1945 .....	4
Series 2: Scientific and Mathematical Notes, Aircraft Drawings, and Published Works, 1935-1952 .....	5

## Collection Overview

<b>Repository:</b>	National Air and Space Museum Archives
<b>Title:</b>	Mandel Lenkowsky Early Vertical Flight Development Collection
<b>Date:</b>	1935-1952
<b>Identifier:</b>	NASM.1989.0099
<b>Creator:</b>	Lenkowsky, Mandel
<b>Extent:</b>	2.18 Cubic feet (2 records center boxes)
<b>Language:</b>	English .
<b>Summary:</b>	This collection includes notebooks containing scientific notes and mathematical calculations, a random assortment of journals and periodicals, published reference books, and a few advertising and promotional brochures all pertaining to American experimental military and commercial vertical flight from the late 1930s to the late 1940s. The collection also contains photographs of the following helicopters: Sikorsky XR-1, XR-4, YR-4, XR-5, XR-6, XR-6A, VS-300; Kellet XO-60 and XO-61; and Rotachute P-4. Also included are photographs of helicopters by Pitcarin, Landgraf, Greyhound Bus, Spratt, Berliner, Ochmichen, and DeBothezat.

---

## Administrative Information

### Acquisition Information

Leslie Lenkowsky, gift, 1989, 1989-0099, NASM

### Processing Information

Arranged and described by Roseann E. MacLean, 2004.

Encoded by Amanda Buel, 2015.

### Preferred Citation

Mandel Lenkowsky Early Vertical Flight Development Collection, Acc. 1989-0099, National Air and Space Museum, Smithsonian Institution.

### Restrictions

No restrictions on access

### Conditions Governing Use

Material is subject to Smithsonian Terms of Use. Should you wish to use NASM material in any medium, Please submit an Application for Permission to Reproduce NASM Material, available at [Permissions Requests](#) .

## Biographical Note

Mandel Lenkowsky was a civil and aeronautical engineer. He attended the Guggenheim School of Aeronautics at New York University from September 1933 until June of 1937. He later attended the School of Engineering at Princeton University from October to November of 1943. His post graduate work detailed the development of rotary wing aircraft. Lenkowsky was employed as an aeronautical draftsman at the U.S. Naval Air Station, Lakehurst, New Jersey, from February 1941 until June of 1941. In August of 1941, Lenkowsky was employed by the Army Air Forces (A.A.F.) Materiel Center, as a project engineer. Lenkowsky resigned from the Army Air Forces at Wright Field in Dayton, Ohio, in October of 1944 to dedicate full time to the completion of his book on the development of the helicopter.

---

## Scope and Contents

The Mandel Lenkowsky Early Vertical Flight Development Collection contains correspondence, manuscript notes, notebooks of scientific and mathematical notes, periodicals, and published reference materials about experimental military and commercial vertical flight from the 1930s to the 1940s. The collection includes photographs of the Sikorsky XR-1, XR-4, YR-4, XR-5, XR-6, XR-6A, VS-300; Kellet XO-60 and XO-61; and Rotachute P-4 helicopters; as well as the Berliner, DeBothezat, Greyhound Bus, Landgraf, Ochmichen, Pitcairn, and Spratt helicopters.

The collection contains chapters from Mandel Lenkowsky's unpublished manuscript, *The Helicopter*, and his correspondence with Macmillan Publishing Company. The book was scheduled for publication in the summer of 1945. In his correspondence, Lenkowsky stated he would like to focus primarily on the development of the Focke helicopter (Germany, 1934-37) and was trying to secure rights to mention it in his book. There is no evidence in the collection that Lenkowsky completed the book or that it was ever published.

---

## Arrangement

The collection is arranged into the following series:

Series I: Correspondence and Manuscript Notes

Series II: Scientific and Mathematical Notes, Aircraft Drawings, and Published Works

---

## Names and Subject Terms

This collection is indexed in the online catalog of the Smithsonian Institution under the following terms:

Subjects:

- Aeronautics
- Aeronautics, Commercial
- Aeronautics, Military
- Aeronautics, Military -- Research
- Helicopters
- Helicopters -- Flight testing
- Kellet XO-60 Autogiro
- Kellet XO-61 Autogiro
- Periodicals
- Sikorsky (USA) R-4 (H-4) Family

Sikorsky (USA) R-6 (H-6) Family  
Sikorsky (USA) VS-300 Family  
Sikorsky (USA) XR-4  
Sikorsky (USA) XR-5  
Sikorsky (USA) XR-6  
Sikorsky (USA) XR-6A

Types of Materials:

Notebooks  
Photographs  
Publications

---

## Container Listing

### Series 1: Correspondence and Manuscript Notes, 1941-1945

Scope and Contents: This series covers correspondence between Mandel Lenkowsky and the military service and Macmillan Publishing Company regarding the possibility of publishing his manuscript on the development of the helicopter. The manuscripts appear to be unfinished works of Mandel Lenkowsky on the helicopter. The dates of this material range from 1941 until 20 May 1945.

Box 1, Folder 1	Correspondence, Coast Guard and Selective Services, 1941-1945
Box 1, Folder 2	Correspondence-Government Agencies: Civil Service, War Department, Navy, WMC, etc., 1943-1945
Box 1, Folder 3	Correspondence- Klemin, Summerill Tubing, Spicer Manufacturing Corp., Sikorsky, 1943-1944
Box 1, Folder 4	American Helicopter Society letter with membership list, May 20, 1945
Box 1, Folder 5	Correspondence with Macmillan Publishing Company, 1944-1945
Box 1, Folder 6	Type written manuscript entitled: "Outline for Proposed Helicopter Book", undated
Box 1, Folder 7	Mandel Lenkowsky "The Helicopter Today: Its Background and Its Future", 1943
Box 1, Folder 8	"Helicopter Problems," "Early Helicopters," "Successful Helicopters," and "Sikorsky's Helicopters" [Lenkowsky?, unfinished chapters], undated
Box 1, Folder 9	"Let's Take a Ride in the XR-4", "Types of Aircraft", "Preface", and "The How and Why" [Lenkowsky?, unfinished chapters], undated
Box 1, Folder 10	"Preface", "Ch. 1-Meet the Helicopter" and "Ch.2 The Mechanics of Flight" [Lenkowsky?, unfinished chapters], 1943
Box 1, Folder 11	Miscellaneous notes and parts of publications regarding rotary wing aircraft, undated
Box 1, Folder 12	US Congress, House. H.R. 10605 Public no.787, 75th Congress. Chapter 852. 3D sess. [authorizing funds for the development of rotary wing and other aircraft], June 30, 1938 Pierre Faure "Thirty Years in the Service of Aviation; Louis Breguet" [1938?, translated 1944] Comparison of Rotor "Outline of Report for Reeves", "Some Final Thoughts", [Lenkowsky?] December 12, 1944 Gilbert Magill "Rotor craft" [with illustrations], undated

[Return to Table of Contents](#)

## Series 2: Scientific and Mathematical Notes, Aircraft Drawings, and Published Works, 1935-1952

**Scope and Contents:** This series contains scientific and mathematical notes, aircraft drawings, and published works. The published works are organized by aircraft model, then company or government institution. It also contains two poems written about the helicopter, photographs of the XR-1, XR-1A, XRG-XRGA, XO-6, Debothezat, Berliner, Ochmichen, Pitcairn, Landgrat, VS-300, Greyhound Bus, Sprah, Kellet XR-8, XR-4, XR-5, XR-6 also XR-6A, YR-4, YR-4B helicopters, military and civilian, and personal photos. The photos are arranged by aircraft type, then chronologically.

Box 1, Folder 13	Project Record Computation Book, project record no. MX-245 [XR-6 Engine, YR-4A, XR-8 Blades], February 23, 1942-December 1943
Box 2, Folder 1	Project Record Computation Book, Project Record no.1, March 29, 1943
Box 2, Folder 2	Project Record Computation Book, Project Record no. 2, October 27-29, 1943
Box 2, Folder 3	Project Record Computation Book miscellaneous, [Rotary Wing Parachute, 6 pages dispersed], undated
Box 2, Folder 4	Mathematical notes, Sikorsky reports on helicopters and miscellaneous models [including: R-1A, R-4B, R-5, R-6A, XR-8, XR-9, XR-10], circa September 4, 1941-February 2, 1945
Box 2, Folder 5	Miscellaneous mathematical notes and manuscript notes written about the history of helicopters, rough drawing of a helicopter, drawings of airfoils [models including XR-4, XR-8, R-6A, engine P-V XHRP-1, Focke 284, referencing several technical manuals], June 1945
Box 2, Folder 6	Miscellaneous materials on limits of helicopter design, [Diehl, Bernett, and Howard], 1952
Box 2, Folder 7	Helicopter Flight Demonstration [VS -300, XR-4], April 20, 1942
Box 2, Folder 8	Flight Demonstration of the XR-4 Aircraft Project List for 1943, April 27, 1942
Box 2, Folder 9	Army Air Forces Memorandum Report on XR-4, A.A.F.41-18874, December 30, 1942
Box 2, Folder 10	Army Air Forces Memorandum Reports on YR-4B, A.A.F.42-107237, December 7, 1943 and June 13, 1944
Box 2, Folder 11	Some Considerations of Roughness Experienced During Helicopter Flight, model YR-4A, April 18, 1944
Box 2, Folder 12	Flight Test Measurements of Stress and Motion of the Main Rotor Blades, Model YR-4A, May 18, 1944

Box 2, Folder 13	Army Air Forces Specification for A.A.F. model R-4B [Sikorsky Aircraft Model VS-316-A-2], October 21, 1943
Box 2, Folder 14	Army Air Force Specification on A.A.F. Model R5-A; Information on Load Distribution for XR-5, Drawing of XR-5 Helicopter, Rotor Hinge locations, March 23, 1944
Box 2, Folder 15	Army Air Forces Specification for A.A.F. Model R-6A, January 10, 1944
Box 2, Folder 16	Sikorsky Aerodynamics Report Utility Cargo Twin Engine Helicopter, May 17, 1944
Box 2, Folder 17	Basic Instruction Manual for Army Pilots and Mechanics for model Y0-60 Aircraft. Report number 000.10, August 7, 1943
Box 3, Folder 1	Army Air Forces Memorandum Reports on Y0-60, A.A.F.42-13607; serial numbering-47-1668-A and addendum #1, undated
Box 3, Folder 2	XR-1A Three view Platt-Le Page Aircraft Company, 5x700, September 15, 1941
Box 3, Folder 3	XR-6, XR-6A Sikorsky Aircraft General Arrangement Drawing VS-06-01-1001, September 16, 1943
Box 3, Folder 4	XO-61 Autogiro Pitcairn three view drawing #7111, August 11, 1941
Box 3, Folder 5	Miscellaneous drawings of helicopters
Box 3, Folder 6	An Aerodynamic Analysis of the Autogiro Rotor, 1934; Wind Tunnel Tests of a 10ft Diameter Gyroplane Rotor, 1935; National Advisory Committee for Aeronautics
Box 3, Folder 7	The American Helicopter Society, Inc., Semi Technical Bulletin No.1, May 1944 The American Helicopter Quarterly, January 1946
Box 3, Folder 8	Bibliography of Rotary Wing Aircraft, US Army Air Forces Greyhound Looks Ahead to Integrated Air-Bus Service, 1945
Box 3, Folder 9	Contribution to the Aerodynamics of Rotating-Wing Aircraft, Part I and II, G. Sissingh, December 1939
Box 3, Folder 10	The Flight of Helicopter, H.B. Squire [pages are stuck together please do not photocopy], October 1935
Box 3, Folder 11	Journal of the Aeronautical Sciences, May 1942, April 1943, June 1943, and September 1936
Box 3, Folder 12	"Lectures on Rotary Wing Aircraft," Alexander A. Nikolsky, October 1, 1943



Box 3, Folder 13	National Advisory Committee for aeronautics Technical Note No.626, Static Thrust Analysis of the Lifting Airscrew by Montgomery Knight and Ralph A. Hefner, December 1937
Box 3, Folder 14	Notes on Helicopter Design Theory: A Series of Lectures Delivered March-April 1944 at Princeton University, Alexander A. Nikolsky, 1944
Box 3, Folder 15	Performance of Rotating Wing Aircraft, by K. Hohenemser, No. 871, July 1948 National Advisory Committee for Aeronautics [Ingenieur-Archive, Vol.8], December 1937
Box 3, Folder 16	Physical Principles of the Helicopter. Lecture Notes by J.A. J. Bennett Department of Aeronautical Engineering, Princeton University, undated
Box 3, Folder 17	Rotary Wing Aircraft: A series of articles, Aircraft Engineering, James A.J. Bennett, January 1940-August 1940
Box 3, Folder 18	Rotorplane Airworthiness (Part-06), Papers by Montgomery Knight and Walter Castles, January 29, 1942
Box 4, Folder 1	The Story of the Helicopter by Devon Francis, 1946
Box 4, Folder 2	A Study of Auto-gyro Rotor Blade Oscillations in the Plane of the Rotor Disc by John Wheatley
Box 4, Folder 3	Transactions of the A.S.M.E, April 1939
Box 4, Folder 4	Various newspaper/periodical clippings concerning the helicopter, undated
Box 4, Folder 5	Four news articles on the early helicopter, 1939-1945
Box 4, Folder 6	Helicopter Poetry: "The Stump Jumper's Lament"; "The Hell Cop"
Box 4, Folder 7	Photographs Model X0-61, X060 and Rotachutes P-34, also photographs of Kellet Aircraft Corp. employees, early 1940s
Box 4, Folder 8	Photographs, various group shots involved with the XR-5, X060 captions on back of some photos, YR-4B rotor and hub
Box 4, Folder 9	Photographs "Manny", XR-4, XR-5, XR-6 also XR-6A, YR-4, YR-4B. Photographs circa 28 Mar 1945, May 11, 1942
Box 4, Folder 10	Photographs XR-1, XR-6, XR-6A, Debothezat, Berliner, Ochmichen, Pitcairn, Landgrat, VS-300, Greyhound Bus, Sprah, Kellet XR-8

[Return to Table of Contents](#)