

**Secret NOFORN**

EO 1.3526 3.3(6) (1) (2) (3)  
EO 1.3526 3.5(1)

**b (1) b (3)**

THE CENTRAL  
INTELLIGENCE  
AGENCY AND  
OVERHEAD  
RECONNAISSANCE

The U-2 and OXCART  
Programs, 1954 - 1974

Gregory W. Pedlow and  
Donald E. Welzenbach

FREEDOM OF INFORMATION RELEASE TO THE NATIONAL SECURITY ARCHIVE  
www.nsarchive.org

**Secret**

~~Secret NOFORN~~

The Central Intelligence Agency  
and Overhead Reconnaissance:

---

The U-2 and OXCART Programs, 1954-1974

~~Secret~~

~~Secret NOFORN~~

The Central Intelligence Agency  
and Overhead Reconnaissance:

---

The U-2 and OXCART Programs, 1954-1974

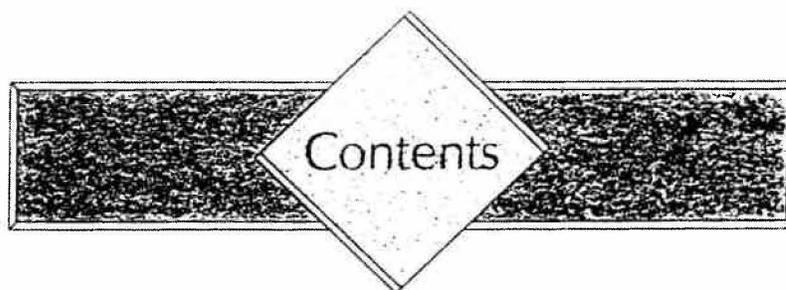
Gregory W. Pedlow  
and  
Donald E. Welzenbach



History Staff  
Central Intelligence Agency  
Washington, D.C.

1992

~~Secret~~



◆ <b>Chapter 1</b>	
<b>Searching for a System</b>	
The Need for High-Altitude Reconnaissance.....	1
Early Postwar Aerial Reconnaissance.....	2
New Approaches to Photoreconnaissance.....	4
The Air Force Search for a New Reconnaissance Aircraft.....	8
Lockheed CL-282 Supporters and the CIA.....	13
Scientists and Overhead Reconnaissance.....	17
The BEACON HILL Report.....	17
Concern About the Danger of a Soviet Surprise Attack.....	19
The Air Force Intelligence Systems Panel.....	21
British Overflight of Kapustin Yar.....	23
The Intelligence Systems Panel and the CL-282.....	24
The Technological Capabilities Panel.....	26
Project Three Support for the Lockheed CL-282.....	27
A Meeting With the President.....	32
CIA and Air Force Agreement on the CL-282.....	33
◆ <b>Chapter 2</b>	
<b>Developing the U-2</b>	
The Establishment of the U-2 Project.....	39
Funding Arrangements for Project AQUATONE.....	43
Major Design Features of the U-2.....	45
The Development of the Camera System.....	48
Preparations for Testing the U-2.....	56
Security for the U-2 Project.....	59
The CIA – Air Force Partnership.....	60
Technical Challenges to High-Altitude Flight.....	61
Delivery of the First U-2.....	66
Initial Testing of the U-2.....	68
U-2s, UFOs, and Operation BLUE BOOK.....	72

~~Secret NOFORN~~

Hiring U-2 Pilots ..... 73  
 Pilot Training ..... 75  
 Final Tests of the U-2..... 76  
 Three Fatal Crashes in 1956..... 79  
 Coordination of Collection Requirements ..... 80  
 Preparations To Handle the Product of U-2 Missions..... 82  
 The Impact of the Air Force Project GENETRIX Balloons..... 84  
 AQUATONE Briefings for Selected Members of Congress..... 88  
 The U-2 Cover Story..... 89

◆ Chapter 3

**U-2 Operations in the Soviet Bloc and Middle East, 1956-1958**

The Deployment of Detachment A to Lakenheath ..... 94  
 The Move to Wiesbaden ..... 95  
 President Eisenhower's Attitude Toward Overflights..... 96  
 First Overflights of Eastern Europe ..... 100  
 First U-2 Flights Over the Soviet Union..... 104  
 Soviet Protest Note ..... 109  
 The End of the Bomber Gap..... 111  
 Tactical Intelligence From U-2s During the Suez Crisis ..... 112  
 Renewed Overflights of the Soviet Union ..... 122  
 Radar-Deceptive "Dirty Birds" ..... 128  
 The New Detachment C ..... 133  
 Detachment B Flights From Pakistan ..... 135  
 The Decline of Detachment A ..... 139  
 ..... 142  
 Declining Overflight Activity..... 143  
 Concerns About Soviet Countermeasures Against the U-2 ..... 147  
 More Powerful Engines for the U-2..... 149  
 Intervention in Lebanon, 1958..... 152  
 British Participation in the U-2 Project ..... 153  
 The U-2 Project at the Beginning of 1959..... 157

◆ Chapter 4

**The Final Overflights of the Soviet Union, 1959-1960**

The U-2 and the "Missile-Gap" Debate..... 159  
 The Last Overflight: Operation GRAND SLAM ..... 170  
 The Aftermath of the U-2 Downing ..... 177  
 The Withdrawal of the Overseas Detachments..... 181  
 The Fate of Francis Gary Powers..... 183  
 Changes in Overflight Procedures After May 1960 ..... 187

~~Secret NOFORN~~

## → Chapter 5

**U-2 Operations After May 1960**

U-2 Operations in Latin America .....	197
U-2 Support to the Bay of Pigs Invasion.....	197
Aerial Refueling Capability for the U-2.....	198
U-2 Coverage During the Cuban Missile Crisis.....	199
U-2s Over South America .....	211
U-2 Operations in Asia .....	211
Detachment C and the Indonesian Revolt of 1958.....	211
China Offshore Islands Dispute of 1958.....	215
U-2 Support for DDP Operations in Tibet.....	216
U-2Cs for Detachment C.....	217
U-2 Crash in Thailand.....	219
End of Detachment C Operations.....	219
Detachment G Missions Over Laos and North Vietnam .....	221
New Detachment on Taiwan .....	222
Use of Detachment H Aircraft by US Pilots.....	230
U-2s in India.....	231
Increasing Responsibilities, Inadequate Resources in Asia.....	233
Advanced ECM Equipment for Detachment H.....	237
Use of Infrared Scanner Over PRC Nuclear Plants .....	238
.....	240
The End of U-2 Overflights of Mainland China .....	242
Peripheral Missions by Detachment H.....	244
Operation SCOPE SHIELD Over North Vietnam .....	246
Improvements in U-2 Technology .....	247
Modification of U-2s for Aircraft Carrier Deployment.....	247
Use of Carrier-Based U-2 To Film a French Nuclear Test Site... ..	249
A New Version of the U-2.....	251
Replacement of the Original U-2s With U-2Rs.....	253
The Final Years of the U-2.....	253
Support to Other Agencies .....	254
Overseas Deployment Exercises and Missions.....	255
The Phaseout of the Office of Special Activities .....	257

## → Chapter 6

**The U-2's Intended Successor: Project OXCART, 1956-1968**

The Evaluation of Designs for a Successor to the U-2 .....	260
Competition Between Lockheed and Convair.....	267
The Selection of the Lockheed Design.....	270
Efforts To Reduce the A-12's Radar Cross Section.....	274
The OXCART Contract .....	277

~~Secret NOFORN~~

New Technologies Necessitated By OXCART's High Speed.....	279
Designing the OXCART's Cameras.....	281
Choosing Pilots for OXCART.....	283
Selection of a Testing Site for the OXCART.....	283
Delivery of the First OXCART.....	286
Changes in the Project Management.....	286
OXCART's First Flights.....	288
Speed-Related Problems.....	290
New Versions of the OXCART.....	291
The Question of Surfacing a Version of the OXCART.....	292
Additional Problems During Final Testing.....	295
Discussions on the OXCART's Future Employment.....	297
First A-12 Deployment: Operation BLACK SHIELD.....	304
The End of the OXCART Program.....	307
Possible Successors to the OXCART.....	312
Summary of the OXCART Program.....	313
◆ <b>Chapter 7</b>	
◆ <b>Conclusion</b>	
U-2 Overflights of the Soviet Union.....	315
Participation of Allies in the U-2 Program.....	319
U-2s as Collectors of Tactical Intelligence.....	319
Advances in Technology.....	320
Cooperation With the Air Force.....	321
Impact of the Overhead Reconnaissance Program on the CIA.....	321
◆ <b>Appendix A: Acronyms.....</b>	<b>325</b>
◆ <b>Appendix B: Key Personnel.....</b>	<b>327</b>
◆ <b>Appendix C: Electronic Devices Carried by the U-2.....</b>	<b>335</b>
◆ <b>Appendix D: U-2 Overflights of the Soviet Union,</b>	<b>337</b>
<b>4 July 1954–1 May 1960</b>	
◆ <b>Appendix E: Unmanned Reconnaissance Projects.....</b>	<b>339</b>
◆ <b>Bibliography.....</b>	<b>347</b>
◆ <b>Index.....</b>	<b>355</b>



**Warning Notice**


---

 Intelligence Sources or Methods Involved (WNINTEL)
**National Security Information**


---

 Unauthorized Disclosure Subject to Criminal Sanctions
**Dissemination Control Abbreviations**

NOFORN (NF)	Not releasable to foreign nationals
NOCONTRACT (NC)	Not releasable to contractors or contractor/consultants
PROPIN (PR)	Caution—proprietary information involved
ORCON (OC)	Dissemination and extraction of information controlled by originator
REL...	This information has been authorized for release to...
WN	WNINTEL—Intelligence sources and methods involved
	Classified by [redacted] Declassify: OADR Derived from multiple sources

---

 All material on this page  
is Unclassified.

~~Secret NOFORN~~

## FOREWORD

---

This History Staff Monograph offers a comprehensive and authoritative history of the CIA's manned overhead reconnaissance program, which from 1954 to 1974 developed and operated two extraordinary aircraft, the U-2 and the A-12 OXCART. It describes not only the program's technological and bureaucratic aspects, but also its political and international context. The manned reconnaissance program, along with other overhead systems that emerged from it, changed the CIA's work and structure in ways that were both revolutionary and permanent. The formation of the Directorate of Science and Technology in the 1960s, principally to develop and direct reconnaissance programs, is the most obvious legacy of the events recounted in this study.

The authors tell an engrossing story. The struggle between the CIA and the US Air Force to control the U-2 and A-12 OXCART projects reveals how the manned reconnaissance program confronted problems that still beset successor programs today. The U-2 was an enormous technological success: its first flight over the USSR in July 1956 made it immediately the most important source of intelligence on the Soviet Union. Using it against the Soviet target it was designed for nevertheless produced a persistent tension between its program managers and the President. The program managers, eager for coverage, repeatedly urged the President to authorize frequent missions over the Soviet Union. President Eisenhower, from the outset doubtful of the prudence and propriety of invading Soviet airspace, only reluctantly allowed any overflights at all. After the Soviets shot down Francis Gary Powers' U-2 on 1 May 1960, President Eisenhower forbade any further U-2 flights over the USSR. Since the Agency must always assess a covert operation's potential payoff against the diplomatic or military cost if it fails, this account of the U-2's employment over the Soviet Union offers insights that go beyond overhead reconnaissance programs.

Indeed, this study should be useful for a variety of purposes. It is the only history of this program based upon both full access to CIA records and extensive classified interviews of its participants. The authors have found records that were nearly irretrievably lost and have interviewed participants whose personal recollections gave information available nowhere else. Although the story of the manned

~~Secret~~

~~Secret~~ NOFORN

reconnaissance program offers no tidy model for imitation, it does reveal how resourceful managers coped with unprecedented technological challenges and their implications for intelligence and national policy. For this reason, the program's history provides profitable reading for intelligence professionals and policymakers today.

Many people made important contributions to the production of this volume. In the History Staff's preparation of the manuscript, Gerald Haines did the final revision, [redacted] again demonstrated her high talent as a copy editor, and [redacted] provided staunch secretarial support throughout. As usual, we are indebted to more members than we can name from the Publications, Design, and Cartography Centers in the Office of Current Production and Analytic Support, whose lively interest in the publication went far beyond the call of duty. Their exceptional professional skill and the masterly work of the Printing and Photography Group combined to create this handsome volume.

Donald E. Welzenbach, who began this study, and Gregory W. Pedlow, who completed it, brought complementary strengths to this work. A veteran of CIA service since 1960, Mr. Welzenbach began research on this study in 1983, when he joined the DCI History Staff on a rotational assignment from the Directorate of Science and Technology. After tireless documentary research and extensive interviewing, he finished a draft manuscript of the history before returning to his directorate. In early 1986, Gregory W. Pedlow, a new member of the DCI History Staff, was assigned to complete the study. A Johns Hopkins University Ph.D. who has served as an Army intelligence officer and University of Nebraska professor of history, Dr. Pedlow undertook important research in several new areas, and reorganized, edited, and revised the entire manuscript before leaving CIA to become NATO Historian in late 1989. The final work, which has greatly benefited from both authors' contributions, is the CIA's own history of the world's first great overhead reconnaissance program. ♦

J. Kenneth McDonald  
Chief, CIA History Staff

April 1992

~~Secret~~

~~Secret NOFORN~~

## PREFACE

When the Central Intelligence Agency came into existence in 1947, no one foresaw that, in less than a decade, it would undertake a major program of overhead reconnaissance, whose principal purpose would be to fly over the Soviet Union. Traditionally, the military services had been responsible for overhead reconnaissance, and flights deep into unfriendly territory only took place during wartime. By the early 1950s, however, the United States had an urgent and growing need for strategic intelligence on the Soviet Union and its satellite states. At great risk, US Air Force and Navy aircraft had been conducting peripheral reconnaissance and shallow-penetration overflights, but these missions were paying a high price in lives lost and increased international tension. Furthermore, many important areas of the Soviet Union lay beyond the range of existing reconnaissance aircraft. The Air Force had therefore begun to develop a high-altitude reconnaissance aircraft that would be able to conduct deep-penetration reconnaissance missions over the Soviet Union. President Dwight D. Eisenhower and his civilian scientific advisers feared that the loss of such an aircraft deep in Soviet territory could lead to war and therefore authorized the development of new non-military aircraft, first the U-2 and later the A-12 OXCART, to be manned by civilians and operated only under cover and in the greatest secrecy. Primary responsibility for this new reconnaissance program was assigned to the Central Intelligence Agency, but the Air Force provided vital support.

The Agency's manned overhead reconnaissance program lasted 20 years. It began with President Eisenhower's authorization of the U-2 project in late 1954 and ended with the transfer of the remaining Agency U-2s to the Air Force in 1974. During this period the CIA developed a successor to the U-2, the A-12 OXCART, but this advanced aircraft saw little operational use and the program was canceled in 1968 after the Air Force deployed a fleet of similar aircraft, a military variant of the A-12 called the SR-71.

Neither of these aircraft remains secret today. A great deal of information about the U-2 and its overflight program became known to the public after 1 May 1960, when the Soviet Union shot down a CIA U-2 and publicly tried its pilot, Francis Gary Powers. Four years

~~Secret~~

~~Secret NOFORN~~

later, at press conferences in February and July 1964, President Lyndon B. Johnson revealed the existence of the OXCART-type of aircraft, although only in its military YF-12A (interceptor) and SR-71 (strategic reconnaissance) versions.

The two CIA reconnaissance aircraft have also been the subject of a number of books, beginning with David Wise's and Thomas B. Ross's *The U-2 Affair* in 1962 and then Francis Gary Powers' memoirs, *Operation Overflight*, in 1970. Two recent books give many more details about the U-2 and OXCART aircraft: Michael Beschloss's *Mayday: Eisenhower, Khrushchev and the U-2 Affair* (1986) and William Burrows's *Deep Black: Space Espionage and National Security* (1987). Although well written and generally accurate, these books suffer from their authors' lack of access to classified official documentation. By drawing upon the considerable amount of formerly classified data on the U-2 now available to the public, Beschloss has provided an accurate and insightful depiction of the U-2 program in the context of the Eisenhower administration's overall foreign policy, but his book does contain errors and omissions on some aspects of the U-2 program. Burrows's broader work suffers more from the lack of classified documentation, particularly in the OXCART/SR-71 section, which concentrates on the Air Force aircraft because little information about the Agency's aircraft has been officially declassified and released.

After the present study of the Agency's overhead reconnaissance projects was completed, a new book on the U-2 was published in the United Kingdom. Chris Pocock's *Dragon Lady: The History of the U-2 Spyplane* is by far the most accurate unclassified account of the U-2 program. Pocock has been able to compensate for his lack of access to classified documents by interviewing many former participants in the program, especially former pilots. Pocock is also quite familiar with aircraft itself, for he had worked with Jay Miller on the latter's excellent technical study of the U-2: *Lockheed U-2* (1983).

There has also been a classified official study of the U-2 and OXCART programs. In 1969 the Directorate of Science and Technology published a *History of the Office of Special Activities* by

~~Secret~~

~~Secret NOFORN~~

Helen Hill Kleyla and Robert D. O'Hern. This 16-volume Top Secret Codeword study of the Agency's reconnaissance aircraft provides a wealth of technical and operational information on the two projects but does not attempt to place them in their historical context. Without examining the international situation and bureaucratic pressures affecting the president and other key policymakers, however, it is impossible to understand the decisions that began, carried out, and ended the CIA's reconnaissance aircraft projects.

In preparing this study of CIA's overhead reconnaissance program, the authors drew on published sources, classified government documents, and interviews with key participants from the CIA, Air Force, contractors, scientific advisory committees, and the Eisenhower administration. The interviews were particularly important for piecing together the story of how the CIA became involved in overhead reconnaissance in the first place because Agency documentation on the prehistory of the U-2 project is very sketchy and there are no accurate published accounts. Research on the period of actual reconnaissance operations included the records of the Director of Central Intelligence, the Office of Special Activities in the Directorate of Science and Technology, and the Intelligence Community Staff, along with documents from the Eisenhower Presidential Library in Abilene, Kansas, and additional interviews.

Both authors are grateful for the assistance they have received from many individuals who played important roles in the events they recount. Without their help a good deal of this story could never have become known. The assistance of Agency records management officers in the search for documents on the overhead reconnaissance program is also greatly appreciated.

To ensure that this study of the Agency's involvement in overhead reconnaissance reaches the widest possible audience, the authors have kept it at the Secret classification level. As a result, some aspects of the overhead reconnaissance program, particularly those involving satellites and related interagency agreements, have had to be described in very general terms. The omission of such information is not significant for this book, which focuses on the Agency's reconnaissance aircraft. ♦

~~Secret~~