F.A.S. PUBLIC INTEREST REPORT

Journal of the Federation of American Scientists (FAS)

Volume 45, No. 5

MYSTERY AIRCRAFT

September/October 1992

GOVERNMENT FLIES BLIND WHEN IT CLASSIFIES THE EXISTENCE OF AIRPLANES

Claimed sightings of unusual, high-speed, highaltitude, highly maneuverable vehicles during the last few years have led many to speculate, and some to conclude, that the United States has developed a fleet of new aircraft and is either testing them or already flying several types in operational service.

Speculation concerning secret aircraft is nothing new. There was considerable controversy over the unveiling of the SR-71 reconnaissance plane. And the F-117A "Stealth Fighter" generated widespread speculation before it was unveiled late in the Reagan presidency.

A certain measure of agnosticism is appropriate when asking whether or not new mystery aircraft exist. Although there is a growing body of evidence that could be interpreted to suggest that one or two more advanced aircraft are still obscured by government secrecy, this evidence remains suggestive rather than conclusive.

That this should be the situation is not surprising, for while the various stratagems of secrecy used to protect advanced weapons programs are imperfect, they are not entirely in vain. However, to acknowledge at least a measure of success in such a secrecy effort is not to endorse the wisdom of continuing it.

For those who must depend on unclassified data, it is no simple chore to demonstrate that such aircraft exist, even in the face of what might be considered strong evidence.

While it is obvious that the extent and nature of "black programs" are hidden from potential adversaries, and the public, what is less clear is the extent of knowledge and understanding that exists at the highest levels of the US government.

Are top decision makers fully aware of all that goes on in the bowels of government-financed aerospace design shops? In recent years the Congress and senior government officials charged with oversight and funding of military programs have taken actions that seem patently inconsistent with the existence of these reported secret aircraft.

But it would not be unusual for only a very few political officials to be privy to these programs. If those who are charged with spending public money are unaware of what is being purchased, how is the need for these programs determined? Who is held accountable if billions of dollars are misspent?

It should be emphasized that the oversight process does not require disclosure of all technical details, many of which are likely to be properly classified. But the current system allows secrecy to envelop the very existence of a program, its purpose, and its cost.

Not surprisingly, abuses sometimes result from this practice, which prevents effective oversight. A number of program failures, cost overruns, and instances of fraud have been attributed to excessive secrecy in the defense budget.

In matters of science and technology, secrecy is at best of limited effectiveness and is, more often, an obstacle to development. In the best of circumstances, secrecy can offer some degree of lead time over competitors who, sooner or later, are bound to duplicate or independently achieve the desired goal.

More importantly, secrecy tends to obstruct technological development by inhibiting communication of useful information, increasing costs, generating public mistrust, and, all too often, promoting fraud and abuse.

Nevertheless, over-classification in military aerospace programs, among others, remains rampant. Secrecy extends so far beyond the legitimately classified details of sensitive technologies that

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one can only conclude that it is being used to protect controversial programs from public awareness more than from hostile intelligence services.

No one would dispute that advanced military technologies require some degree of protection. But it is clear that the secrecy surrounding classified aircraft programs has become self-defeating and even absurd.

For the most part, secrecy in technology is both ineffective over the long term and counterproductive. The diminished threat to the U.S. and increasing budget pressures now dictate increased openness and accountability in the hyper-classified field of military aerospace.

No firm judgment can be made concerning the existence of currently unacknowledged secret aircraft programs. If such programs do exist, it seems more likely that they encompass a handful of experimental vehicles, perhaps unpiloted, rather than fleets of operational aircraft.

Nonetheless, reports of sightings of such aircraft continue to grow, and the existence of several types of operational aircraft are widely credited in the trade press, as well as by stock market analysts. Our analysis of the classified budget suggests that prototype development programs might exist, but that the evidence is ambiguous.

However, numerous Congressional actions over the past five years have clearly been predicated on the assumption that such programs do not exist.

Either the Congress has been misled into believing that there are no such aircraft, or the public has been misled into believing that there are.

The time has come to clear the air. An open Congressional hearing is required to look at the way classification is applied to aircraft programs and determine if it is justified.

-John E. Pike

Editor's Note: This issue of the Public Interest Report is based on a revised and expanded study of "Mystery Aircraft," first released by FAS in April of this year. The highly excerpted version comprising this report is the work of John Pike, Director of the Space Policy Project; Steven Aftergood, Director of the Secrecy & Government Project; Tiffany Tyler, Research Assistant to the Space Policy Project, and Dorothy Preslar, Special Assistant to the President.

The study is available from FAS for \$8.00 to cover photocopying and shipping costs. Please specify "Mystery Aircraft" when ordering and make checks payable to the FAS Fund. FAS

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Watching The Skies For Another Blackbird

The retirement of the SR-71 "Blackbird," coupled with a spate of sightings of "lights in the sky," has led to considerable speculation both in the trade and popular press of the existence of new secret aircraft.

Word of a successor or follow-on to the SR-71 appeared in print almost simultaneously with the initial Air Force moves to end the program. Reports suggesting that a follow-on, a more capable successor to the Blackbird, had been flying since early 1987 derived at least in part from the need to explain the proposed termination of the SR-71.

Testing The Public Record

However, the existence of such an SR-71 follow-on is fairly difficult to accept, especially if one credits at face value the evidence of the public record of the debate over the decision to terminate. It is true that some of the official statements made during the debate may be viewed as what would be expected in an effort to protect the existence of a classified program, and other statements and actions may be understood as motivated by self-interest. But the sum total of the record from 1988 through 1990 is not easy to reconcile with the existence of a near-term replacement for the SR-71.

First, shortly before the Air Force decided to retire the SR-71, a \$900 million update program had been completed to keep the plane in service through the year 2010. Over \$350 million had been spent on an new Advanced Synthetic Aperture Radar System (ASARS-1), and more than \$1 billion in spare parts were on hand. These activities are difficult to reconcile with the simultaneous existence of a replacement for the SR-71.

Air Force Denied SR-71 Replacement

Second, a number of public statements directly assert that there is no such project as an SR-71 follow-on. General Michael Dugan, then serving as commander of US Air Forces in Europe, told *Defense News* in April 1989 "... if you're thinking of looking at something that resembles the SR-71, forget it ... That kind of vehicle, absent the SR-71, is not on the horizon."

During the course of Senate hearings in mid-1989, John Glenn decried the end of the program and expressed concern about the absence of a near-term replacement.

And in mid-1992, three years later, the House Appropriation Committee noted that the retirement of the SR-71 had greatly reduced capability to acquire and disseminate near-real-time broad area search imagery to tactical military forces and issued a report stating "There is no other current DOD or intelligence program to adequately address this requirement."

Satellites Available To Substitute

Third, the case for retiring the SR-71 was explicitly predicated on the assumption that improved space capabilities, such as the new Lacrosse imaging radar satellite, had rendered the SR-71 superfluous. Given the traditional sensitivity concerning satellite reconnaissance systems, it is somewhat difficult to imagine that such explicit reference would be made to these satellites, merely to obscure the existence of an SR-71 follow-on.

Fourth, it is difficult to understand how the Air Force and Defense Department could be publicly making the case *against* aircraft reconnaissance in the form of the SR-71, while secretly making the case *for* aircraft reconnaissance in the form of an SR-71 follow-on. It is equally difficult to understand how the Congress could publicly accept the "case against" in public and accept the "case for" in secret.

Fifth, those who were skeptical that satellites could fully substitute for reconnaissance aircraft appeared to view the continuation of SR-71 operations as the only recourse. Senate Intelligence Committee staff member James Currie lamented "There's nothing else that can replace it."

Political Struggle Indicates No Follow-on

Thus it is somewhat difficult to understand the highly visible political struggle waged by the Senate Armed Services and Intelligence Committees to continue or restore the SR-71, unless there were no SR-71 follow-on.

Finally, it is difficult to understand why, if there were a follow-on in the works, the Air Force and Defense Department did not disarm supporters of the SR-71 with a simple announcement that a replacement for the SR-71 capability was under development, and further details would be released at an appropriate time. Such a statement would have avoided considerable political grief, without compromising the security of the program.



The retirement of the SR-71 "Blackbird" was largely predicated on the view that essential reconnaissance functions could be performed by intelligence satellites.

Data Sources, Hypotheses and Conclusions

The possible existence of high performance mystery aircraft is based on a mosaic of three types of data:

Open Source Information—Stealthy or hypersonic aircraft don't just spring full-blown from the forehead of Zeus. Advanced aircraft programs come to fruition only after extensive research, proofs of concept and prototypes. While knowledge of the nature and extent of a particular research program may not prove the existence of a "black" aircraft, it does provide useful insight into the direction of aviation development and gives an indication of a particular secret aircraft's technical plausibility.

Budget Data—A range of budgetary and financial clues may suggest the existence of one or more mystery aircraft. Analysis of classified funding line items in the Defense procurement budget provides one source of evidence. And analysis of corporate financial statements and cash flow accounts provide supporting evidence.

Like Al Capone, "black" aircraft may be uncovered not by sightings or hard testimony, but by an audit trail. If more money is flowing into a particular company's coffers than can be explained by the amount of aircraft or other hardware being produced, one may infer that some project is being financed that the public is not privy to.

Observations—As early as October 1990, star gazers began reporting an increased number of unexplained lights and noises in the California sky. While one might make tongue-in-cheek comments about the proclivity of those on the western side of the San Andreas fault to see mystical bodies, the number of reports and their consistency suggest that there may be some basis for these sightings. Furthermore, the observational range has widened, even to Europe.

There are two hypotheses to account for these various data points:

The **Operational Hypothesis** suggests the current or impending existence of significant numbers (at least dozens) of several types of operational aircraft;

The **Experimental Hypothesis** suggests that this evidence is better understood in terms of the existence of a few, perhaps a handful, of unique technology demonstrators that are not the precursors of a fleet of operational vehicles.

It is obviously the Operational Hypothesis that is the more interesting and provocative, for it implies the existence of significant American military capabilities beyond those publicly acknowledged by the US Government. The various types of evidence have suggested the possible existence of at least four different types of mystery aircraft:

• Aurora/Senior Citizen, a high-speed (Mach 4 to Mach 6) high altitude reconnaissance aircraft;

• Exotic Propulsion Aircraft, a high-speed (up to Mach 8) high altitude unmanned vehicle, based on Pulse Detonation or External Combustion engines, designed for reconnaissance or attack missions;

• TR-3A, a subsonic stealthy reconnaissance aircraft, similar to the F-117A attack aircraft; and

• Stealth Aircraft Pre-Prototypes of various unique configurations, intended to test features of proposed production vehicles.

Although conflicting reports and the fragmentary nature of the evidence preclude definitive conclusions, the totality of the data presently available supports the following conclusions:

(1) It is probable that at least one high-speed, highaltitude experimental air vehicle is currently undergoing flight tests. Current evidence does not permit conclusive determination of whether this vehicle is best understood in terms of "Aurora" or as an Exotic Propulsion Aircraft. It is unclear whether or not this is a piloted vehicle, or a drone similar to the D-21 that was associated with the SR-71. It is less likely that this vehicle is in production or has achieved operational status.

(2) It is possible that the TR-3A program does exist, and that a few dozen of these aircraft are currently in production or operational.

(3) It is highly probable that one or more one-of-a-kind Stealth Aircraft Pre-Prototypes are in existence, though these are not part of a production program.

These conclusions are tempered by the profound difficulty faced in reconciling observer reports and financial analyses with Congressional and Defense Department actions over the past five years. Taken at face value and in isolation, this record is consistent with the existence of no more than a small number of experimental aircraft, which do not represent the initial examples of large production runs of operational systems. While the Operational Hypothesis cannot be excluded on the basis of current data, the Experimental Hypothesis appears more powerfully explanatory.



The SR-71 "Blackbird" was unveiled in 1964 by President Johnson to counter election year charges that continental air defenses had been slighted by the Democratic Administration. This was ten years after research on the aircraft began, seven years after funding began as a CIA program, four years after the press posited a Mach 4 reconnaissance airplane of striking resemblance to the SR-71 and two years after production began. According to one report, even the Joint Chiefs of Staff were kept in the dark.

Though spurred by political considerations, Johnson's official acknowledgment in no way compromised the "Blackbird's" effectiveness in collecting information for over a quarter of a century.

I. "AURORA"/SENIOR CITIZEN

Reports of plans for a high-performance piloted replacement for the SR-71 date back more than a decade. Subsequent observations of mysterious aerial phenomena have been connected with the 1988 reports that "Aurora" was a Mach 6 stealthy reconnaissance aircraft that was being developed to replace the SR-71.

According to a report in the July 26, 1992 Sunday Telegraph, "... Aurora was being flown from a base in the Nevada desert to an atoll in the Pacific, then on to Scotland to refuel before returning to the US at night. Specially modified tanker aircraft are being used to top up Aurora's tanks with liquid methane fuel in mid-air ... The US Air Force is using the remote RAF airbase at Machrihanish, Strathclyde, as a staging point ... The mystery aircraft has been dropping in at night before streaking back to America across the North Pole at more than six times the speed of sound ... An F-111 fighter bomber is scrambling as the black-painted aircraft lands, flying in close formation to confuse prying civilian radars."

Open Source Information

Beginning in the mid-1980s, the Air Force and NASA supported a number of studies of aircraft that are consistent with accounts of the "Aurora" project. Although these studies have not been linked to actual development efforts, they provide some insight into the potential configuration and capabilities of such a plane. Under an Air Force contract, Boeing Military Airplane Co. designed an interceptor capable of sustaining supersonic speeds. It was reported that wind tunnel tests would be conducted under a 26 month \$572,000 follow-on contract. This effort also included detailed studies of aircraft subsystems. Similar studies were conducted by Lockheed and General Dynamics.

Keeping an aircraft sufficiently cool during extreme speeds is a primary challenge of hypersonic flight. One potential solution, incorporated in the Air Force studies, is also being explored by researchers at NASA's Langley Research Center.

Budget and Financial Data

The first suggestion that these studies might be translated into operational hardware appeared in the Fiscal Year 1986 procurement program document, colloquially known as the P-1, dated 4 February 1985. A line item in this document, labeled "Aurora," was slated to receive \$80 million in 1986, and over \$2.2 billion in 1987. Since this line item appeared next to the line funding the TR-1 reconnaissance aircraft, it stirred up a hornet's nest of conjecture that a secret aircraft was being developed to replace the aging SR-71.

The Air Force quickly denied the existence of a secret program, and said the "Aurora" budget line was simply (continued on next page)

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one site for B-2 bomber funds when that program was highly classified. One Air Force official commented, "I wish I could say it is (an SR-71 follow-on), because we'd love to have it. But it's just accounting, I'm afraid."

In the FY 1986 budget, the "Aurora" line item projected a request of over \$2 billion in the FY 1987 budget. But a year later, when the FY 1987 budget was submitted, "Aurora" had vanished as mysteriously as it had first appeared.

However intriguing this sequence, it does not reflect one very crucial fact: No money was ever appropriated by name for "Aurora."

The same FY 1986 procurement program document that included the \$2.2 billion funding projection for "Aurora" in FY 1987 also projected that the FY 1987 funding for the Special Update Program would be \$139 million. The next year, not only had "Aurora" disappeared, but the Special Update Program budget request was \$700 million more than projected when the FY 1986 budget had been presented.

It is not implausible that this change reflected a decision not to proceed with producing an operational system but instead to conduct some sort of prototype propulsion test program. The \$1.5 billion appropriated for the Special Update Program account since 1987 would be consistent with such a prototype effort.

The coincidental movement of the two budget line items is certainly highly suggestive and also identifies a possible source of funding for an experimental high-speed, highaltitude aircraft primarily aimed at intelligence gathering.

Observations

A wide range of reports of mysterious aerial phenomena have been associated with "Aurora." There are two classes of reports—those that are consistent with a limited experimental test program and those that are suggestive of an operating craft.

Probably the most compelling evidence for such flight tests are the series of unusual sonic booms chronicled above Southern California in mid to late 1991. On at least five occasions, these sonic booms were recorded by 25 of the 220 US Geological Survey sensors across Southern California used to pinpoint earthquake epicenters. The incidents were recorded in June, October, November, and late January 1991.

Seismologists estimate that the aircraft were flying at speeds between Mach 3 and 4 and at altitudes of 8 to 10 kilometers. The aircraft's flight path was in a North North-East direction, consistent with flight paths to secret test ranges in Nevada.

Seismologists say that the sonic booms were characteristic of a vehicle smaller than the 37 meter long shuttle orbiter. Furthermore, neither the shuttle nor NASA's single SR-71B were operating on the days the booms were registered.

Reported sightings of unusual high performance aircraft are not confined to the Southwestern United States. More recently, similar observations have also been reported in

Classified	Aircraft	Budget
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AIRCRAFT PROCUREMENT	OTHER PROCUREMENT	
Aurora	Special Update Program	
FY86	• • • • • • • • • • • • • •	FY86
1980	50	
1981	123 554	
1982	217	
1984	656	
1985 -	928	
1986 80	84	
1987 (2,272)	851	(139)
1988 -	121	
1989	126	
1990	122	
1991	105	
1992	162	
1993	176	

Millions of Dollars

Numbers in parentheses are FY86 projections All others are actual appropriations

other parts of the United States, as well as in Europe. These reports are particularly intriguing because they are difficult to reconcile with an experimental test program, since there would be no reason for test flights to be conducted in Europe. Rather, these reports would have to be understood in the context of the deployment of an operational aircraft.

Interpretation

In 1990, it was suggested that "Aurora" (also reportedly designated "Senior Citizen") had been intended to be the SR-71's successor, but had been canceled along with the "Blackbird" in 1989. According to the Senate Armed Services Committee, in 1989:

"... the Congress directed the Department [of Defense] to develop a viable long-term road map for airborne reconnaissance. The Department has not done that and will not have that road map available until next year. Even then, the Department has proposed to initiate an extraordinarily expensive effort to reproduce the capabilities inherent in the SR-71. The committee cannot endorse that request ... "

Representative Robert Livingston (R-LA) noted during a January 1990 House Appropriations Committee hearing that "The possible follow-ons [to the SR-71], which again we can't even talk about, even if we were going ahead with them, wouldn't be available for many years, six or seven years, and we are not going ahead with them."

These official pronouncements are difficult to reconcile with other forms of evidence suggesting the existence of a manned SR-71 follow-on. $\hfill \Box$

II. EXOTIC PROPULSION AIRCRAFT

While the depiction of an "Aurora" aircraft seems consistent with the confines of present technological imagination, other SR-71 follow-on prognosticators suggest more alien craft.

Aviation Week & Space Technology has proposed a current "black" aircraft that is something akin to a 1960s Sci-Fi concept. The magazine depicts an elongated diamond shaped vehicle (one hesitates to call it an aircraft) similar to a "flattened football." The airframe's dimensions might be 110×69 feet. Due to intense heat, the vehicle would have a heat-streaked appearance similar to that of the space shuttle. Contrary to intuition, the aft body would appear distinctly more pockmarked than the fore sections, as if the most intense heat was experienced at the rear of the craft.

This vehicle would have a dual propulsion system. Jet



NASP X-30

The National Aerospace Plane (NASP), designated the X-30, derived from a highly classified, Special Access Required, Defense Advanced Projects Agency (DARPA) project called "Copper Canyon," which ran from 1982-85. Although the NASP effort was announced by President Reagan in a State of the Union address, much of the project remains shrouded in secrecy.

Military missions for the X-30 include the same highaltitude reconnaissance role that would be performed by the suggested "Aurora" aircraft, raising speculation that Phase 2 of the X-30 *is* the "Aurora." engines buried in the fuselage would propel the vehicle to supersonic speeds, when a novel external burning mechanism would take over as the fundamental propulsion method.

Open Source Information

The technical and trade press literature includes a number of references to exotic propulsion concepts that may find application in advanced military aircraft. These include pulsed detonation engines, external combustion engines, and waveriding aerodynamics.

Pulsed detonation engines, also referred to as pulsed detonation wave engines, employ a shock wave (created in an explosion that propagates supersonically) to compress a fuel-oxidizer mixture prior to combustion, similar to supersonic inlets that utilize external and internal shock wave for pressurization.

"External propulsion" is another hypersonic propulsion technique currently being actively explored. During the 1950s and 1960s, research began on exotic external-combustion propulsion systems. An aircraft would achieve hypersonic flight by pumping fuel from its midsection into a cone of air bounded by its shock wave. Interest in this technique continues, particularly at NASA for the X-30 National Aerospace Plane.

Another exotic propulsion technique is "waveriding." It has been reported that at least one aerospace corporation has developed and is marketing a concept for an unmanned hypersonic vehicle that is designed to operate at speeds around Mach 10 or higher.

Budget and Financial Data

The previous budget analysis pertaining to "Aurora" is also applicable to the Exotic Propulsion Aircraft. However, while the \$1.5 billion appropriated for the "Special Update" Program is consistent with an effort to develop and test a single high-speed high-altitude aircraft, it is far from clear that this amount would support more than one such effort. It may also be questioned whether decisionmakers would choose to carry more than one competing propulsion concept to the prototype flight stage of development.

Thus while budgetary considerations render plausible the existence of test prototypes of either "Aurora" or a more advanced Exotic Propulsion Aircraft, the simultaneous existence of both is much less plausible. Budget and financial data do not discriminate between the relative plausibility of these two classes of vehicles.

Observations

Three classes of observations have been reported to suggest the existence of an Exotic Propulsion Aircraft, possibly using a pulse detonation engine. These observations include distinctive exhaust contrails, unusual engine noises, and intercepted radio transmissions. Various re-(continued on next page)

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ports suggest that this aircraft's "slow-frequency (about 1 Hz.) pulsing sound" was accompanied by a thick, segmented smoke trail or contrail. Lighting patterns indicated the aircraft is approximately 100 feet long.

Observations of distinctive exhaust contrails that have been associated in some reports with pulsed detonation engines date back to 1989. Described variously as 'cotton balls strung on heavy yarn,' 'donuts on a rope' and 'a coiled spring,' they have been "seen" throughout the U.S. and in Europe.

A link between the sightings of the donut-on-a-rope contrail and the reports of distinctive sounds was established in a sighting on 23 March 1992 near Amarillo, Texas. Steven Douglas took a series of pictures of the contrail, describing the engine noise as a:

"... strange, loud pulsating roar ... unique ... a deep pulsating rumble that vibrated the house and made the windows shake ... similar to rocket engine noise, but deeper, with evenly timed pulses."

In addition to providing the first photographs of the distinctive contrail previously reported by many, the significance of this sighting was enhanced by Douglas's reports of intercepts of radio transmissions:

"Air-to-air communications ... were between an AWACS aircraft with the call sign "Dragnet 51" from Tinker AFB, Okla., and two unknown aircraft using the call signs "Darkstar November" and "Darkstar Mike." Messages consisted of phonetically transmitted alphanumerics. It is not known whether this radio traffic had any association with the "pulser" that had just flown over Amarillo."

Reports from Scotland suggest that this vehicle has been

tested outside the U.S. The July 26 Sunday Telegraph carried a report of people hearing "ear-splitting noises" and seeing "smoke-rings in the sky early this year."

Interpretation

As much as these observations are intriguing, they are difficult to reconcile with one another. While many observers agree on the unusual sounds, they have given a wide range of descriptions as to the their nature. The pulsating tone emanating from these sightings has been taken as an indication of some form of pulse detonation engine. Some observers report a characteristic frequency as high as 60 Hertz, while others give a frequency as low as 1 Hertz.

A technical analysis of pulse detonation engines suggests that engines operating at the thrust levels associated with military aircraft would operate at between 100 and 200 Hertz (pulses per second). While Doppler shifting may reconcile this value with the reported 50-60 Hertz pulsation, it is more difficult to reconcile this with the reports of a 1 Hertz pulsation.

It is also difficult to reconcile a pulse rate of 100-200 Hertz with the observed donut-on-a-rope contrails. The association of these contrails with a pulse detonation engine would seem to be predicated on the supposition that each "donut" is a product of a single pulse detonation.

Based on published photographs, the "donuts" appear to be approximately 100 meters apart. Assuming a detonation pulse rate of 100 Hertz, this would imply a velocity of 10 kilometers per second, or 36,000 kilometers per hour (roughly Mach 36), one-and-one-half times orbital velocity. While it is asserted that the Exotic Propulsion Aircraft is a high-speed vehicle, this is at least four times faster than the speeds normally associated with this aircraft.

Thus, while the reports of unusual auditory signatures may be indicative of the existence of some type of advanced air vehicle, they do not appear to constitute conclusive evidence of the existence of an Exotic Propulsion Aircraft.



Speculation that an "Aurora" program existed was fueled by this 1985 artist's concept of a Lockheed design for a Mach 5 high-altitude aircraft.

For several years it has been suspected that a closely held aircraft such as a TR-3A existed, although its designation and mission were unclear. Recently, it has been posited that the aircraft was designed to collect and transmit nearreal-time digital photo information directly to F-117As for immediate tactical applications.

The TR-3A reportedly has a range of more than 5,000 kilometers and the ability to operate at both low and high altitudes. It may be as long as 42 feet with a 60-65 foot wingspan. Modified twin General Electric F-404 engines rated in the 12,000-pound thrust range are the most likely powerplant.

Though the aircraft is believed to have supported F-117A operations in the Persian Gulf War, its identity could have been protected from public scrutiny by limiting it to U.S. fighters.

Open Source Information

Apart from press reports, there is essentially no opensource information supporting the existence of such an aircraft. Indeed, what evidence does exist would tend to support the contrary proposition, that there is no such program.

During 1991, Lockheed made a major effort to convince the Congress to support a billion dollar program to build 24 additional F-117A aircraft, and to purchase equipment that would enable the F-117A to perform reconnaissance missions. The aircraft would be modified to carry the ATARS camera system in one weapons bay, and a synthetic aperture radar (SAR) in the aircraft's other weapons bay. This palletized installation would permit the aircraft to be converted back to the attack configuration in about four hours.

Although the proposal was endorsed by the Senate Armed Services Committee, it was fiercely opposed by the Air Force, which ultimately prevailed in eliminating funding for the project.

The operational characteristics of the proposed reconnaissance version of the F-117 are virtually identical to those that have been suggested for the TR-3A. Unavoidably, this episode raises questions about the plausibility of the existence of the TR-3A.

Budget and Financial Data

The assertion that mystery aircraft like the TR-3A exist implies that some item in the Defense budget can be arguably associated with the program. A not-implausible accounting can be made that identifies an item that could have gone to the TR-3A.

Prior to 1989, much of the funding for the B-2 Advanced Technology Bomber was contained in an Air Force Aircraft Procurement line item designated "Other Production Charges." While the Navy allocated approximately \$50 million for the same line item (indicative that there is indeed something that actually consists of other production charges, whatever such a miscellaneous category might encompass), the Air Force allocation for the item had



cally motivated announcement and denial set by the SR-71 program was repeated with the F-117A. The first report claiming that a small stealth fighter was under development appeared in the summer of 1975.

By 1978, the number of reports had increased and speculation was rampant. The acknowledgment of a stealth program in 1980 by the Carter Administration was ignored by Reagan, who moved the program back into the "black" when he took office the next year. As the aircraft took to the skies in the late 1980s and two of them crashed, the intense effort to keep them secret began to falter and Reagan in 1988 re-acknowledged the stealth fighter.

Last year's public controversy over Lockheed's proposal to produce a reconnaissance version of the F-117A casts doubt on the existence of a TR-3 stealth reconnaissance airplane program.

peaked at over \$3.5 billion by 1987.

This mystery was solved with the FY 1989 budget, which for the first time provided unclassified budget figures for the B-2. And at that point, the "Other Production Charges" line dropped nearly \$2 billion from the previous year.

III. TR-3A



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But solving one mystery revealed another—even without the Stealth Bomber, "Other Production Charges" received over \$1 billion in 1989, and about half a billion each year thereafter. That the remaining activity in this account covers sensitive activities was confirmed by the House Appropriations Committee in 1992, when it noted that the explanation of its \$118 million reduction from the \$686 million request was itself classified.

A careful review of the Air Force budget fails to disclose any other program of comparable magnitude which could account for this level of expenditure. The recent funding level of the same line item is strongly suggestive of a continuing program to procure additional stealth aircraft, and is consistent with published accounts of the TR-3A program.

This connection is further strengthened by the similarity in magnitude between the funding level of "Other Production Charges" and the cash flow stream and employment at Lockheed Aeronautical Systems Group. As early as 1988, for example, financial analysts printed sales estimates for Lockheed's Aeronautical Systems Group that far exceeded any income explained by the firm's known programs.

An analysis by Bernstein & Co. showed year-by-year Lockheed revenues for 'stealth programs' [plural] increasing from \$563 million in 1982 to \$1.126 billion in 1988, then leveling off at \$752 million in 1990 through 1992.

Lockheed officials deny reports that suggest the company is involved in developing or producing an unknown airplane and insist they are applying their expertise in sensor programs. Despite the denials, it is intriguing to note that the roughly half-billion dollars of unexplained Lockheed revenue neatly matches the half-billion dollars of unexplained expenditure in "Other Production Charges" for the Air Force.

Interpretation

It is suggested that the TR-3A aircraft could have evolved from a number of 1970s era classified programs aimed at developing both a deep-interdiction strike fighter and a companion vehicle to gather target location data. It appears that a plethora of "black" programs based on stealth techniques were recommended to the services and intelligence agencies between 1976 and 1983.

It is very difficult to understand how Lockheed could engage in a very public controversy involving the Air Force, and Sam Nunn, Chair of the Senate Armed Services Committee, about production of a reconnaissance version of the F-117A, if the company was already involved in the production of a virtually identical aircraft, the TR-3A.

Based on the statement by an Air Force spokesman that the service was not looking for a stealthy reconnaissance aircraft, the existence of the TR-3A must be regarded as suspect, unless one is prepared to accept the proposition that this entire episode, involving a large number of senior government and corporate officials, was merely part of an elaborate cover and deception operation, intended to obscure its existence.

WHERE "SPECIAL ACCESS" GOES WRONG

Special access—the secrecy classification system that gave birth to "black programs"—has consistently presented such a temptation to fraud and abuse that in 1991 the House Armed Services Committee concluded that it "is now adversely affecting the national security it is intended to support."

To take one recent example, special access was implicated in the collapse of the A-12 naval aircraft program, with the resulting loss to taxpayers of several billions of dollars. The House Committee observed that "special access restrictions on the A-12 program and the lack of appropriately cleared auditors . . . prevented the program from receiving adequate management control and oversight . . ." leading to its ultimate cancellation.

Night Vision For Pet Projects

The special access system effectively serves to undermine the most minimal level of independent oversight and accountability. A common perception is that approximately 80% of highly classified defense programs buried in the "black world" are there primarily to avoid oversight. Most are "pet projects" that would not survive if subjected to "white world" scrutiny.

In fact, it appears that many black aircraft programs are designed only to penetrate Congressional airspace. That is to say, wasteful, dangerous, or highly speculative programs will have a much higher chance of being funded by Congress if they are highly classified.

In-Depth Review Turns Shallow

A study by staff members of the House Armed Services Committee in 1990 revealed that only five to ten percent of all special access programs are actually reviewed in depth by Congress.

This is partially due to a shortage of cleared staff members, as well as false or inadequate reporting by the Executive Branch. And of course, the prospect of avoiding Congressional oversight serves as a further incentive for the Executive Branch to place even more programs in the special access category.

The Structure Of The Classified Budget: Obscure But Not Perverse

Some have assumed that the funding for the Central Intelligence Agency and National Reconnaissance Office is entirely hidden from view—completely off-budget, or widely dispersed among a large number of accounts in many government agencies, or disguised in some obscure accounting transaction of the Federal Financing Bank, or perhaps secreted somewhere among the subsidy programs of the Agriculture Department.

Under such assumptions, the billions of dollars appropriated each year for such programs as "Selected Activities" or "Special Programs" would provide more than enough money to finance a vast fleet of exotic aircraft.

But a more detailed consideration of the classified budget provides little basis for believing that these line items actually provide funding for such purposes.

Off-Budget Programs Are Nonexistent

While the structure of the classified budget is obscure, it is not perverse. Line items in the budget may be given opaque names, like "Selected Activities," which obscure their programmatic content. But there are no activities that are not included in some budget item, however obscurely—there are no off-budget programs.

Other line items, such as "Special Programs" (the nomenclature used for the National Reconnaissance Office) may omit the value of the budget. But in such cases, a fair approximation of the omitted value may be obtained by subtracting the sum of those lines for which values are given from the total provided for the budget category which includes the omitted values.

It may also be fairly assumed that the multitudinous Navy classified budget items, such as "Chalk Coral" and "Retract Amber," are funding only Navy projects, rather than Air Force programs. And it may also be assumed that Aircraft Procurement accounts only fund aircraft, and that Missile Procurement accounts only fund missiles or space vehicles, though the more generic Other Procurement accounts clearly fund a wide range of programs.

"Selected Activities" of "Other Procurement"

The "Other Procurement" Air Force account includes a line item opaquely labeled "Selected Activities," which typically accounts for about half of the total budget of this account. Analysis of the outlay rates for this and other budget accounts reveals an interesting anomaly. Procurement accounts, which fund the purchase of hardware, typically spend about 5% to 15% of their appropriation in the first year, with outlays rising to 20% to 40% in the second and third years, and declining thereafter.

This reflects the contracting process, in which several years are required to complete manufacture of hardware. In contrast, personnel and operations and maintenance accounts, which are largely for payroll and supplies, typically have first year outlay rates of 50% to 80%.

Uniquely, the Other Procurement Air Force account has a first year outlay rate that has ranged from over 40% to nearly 60%. The only possible explanation for this anoma-

ly is that the "Selected Activities" portion of the Other Procurement Air Force account is in fact not a procurement activity, with a low first-year outlay rate, but rather a fund for personnel and operating expenses, with their characteristic high first-year outlay rate.

In recent years, the "Selected Activities" line item has been somewhat in excess of \$5 billion annually. This value is consistent with the roughly \$3 billion that is the reported budget of the Central Intelligence Agency, as well as the personnel and operations and maintenance budget of the National Reconnaissance Office. There is no reason to doubt this conclusion.

However, the next line down from "Selected Activities" in the "Other Procurement" Air Force account is an item with an equally charming name, "Special Update Program." This proximity in the budget suggests some relationship in mission as well as procurement. It is plausible that this line item includes procurement of intelligence collection systems of interest to the CIA or Air Force, other than satellites, which are funded elsewhere in the budget. Funding for this line item peaked at over \$900 million in 1985, then dropped to \$84 million in 1986. This suggests that whatever special procurement funded under this account in the early 1980s had been concluded.

Talents Under the Secrecy Basket?

Is it possible that some "black world" breakthroughs have commercial, as well as military, potential? A report in *Aviation Week & Space Technology* (March 9) said that one scientist experienced in "black" programs identified four technologies as possibilities:

---Electrostatic bulk cooling methods that instantly alter the thermal equilibrium of a large optical lens or mirror.

----Use of random access memory (RAM) to detect or transmit low levels of near and far infrared energy which, when incorporated into a feedback system for temperature stabilization, could be used as an esoteric IR detector that is simple and reliable.

-Low observable ceramics made from powdered, depleted uranium. (The resulting dielectric material has approximately 92 percent the bulk density of depleted uranium, but is about 20 times harder.)

---Short pulse Doppler radar (which may be the "black world's" term for ultra-wideband radar) that could detect air vehicles 2,500 nm away in all weather conditions.

Considerable funds have been expended in the development of highly classified technologies. It may be that few of the "black" programs have produced anything of relevance to the commercial world. But the present level of secrecy makes it impossible to know.

A MODERN MYTH OF THINGS SEEN IN THE SKY

The distinction between the existence of mystery aircraft and the existence of *reports* of their existence resembles the distinction between the existence of flying saucers, and the existence of *reports* of Unidentified Flying Objects. While few accept the existence of flying saucers, none can deny the existence of reports of Unidentified Flying Objects.

Parallels In Phenomena

An understanding of the mystery aircraft phenomena is impossible outside the context of the UFO phenomena, for mystery aircraft remain, despite the best efforts of investigators, reporters, and analysis, Unidentified Flying Objects. Indeed, considered as sociological and epistemological phenomena, the parallels between reports of flying saucers and reports of mystery aircraft are striking.

First, reports of observations of mystery aircraft have coincided with reports of observations of flying saucers. The state of Nevada has been the site of a major UFO flap for the past several years. Indeed, the question of whether an Unidentified Flying Object is reported as a sighting of a mystery aircraft or a flying saucer may have more to do with the predisposition of the individual observer than with the nature of the observed phenomena. Thematic apperception—"I wouldn't have seen it if I hadn't believed it" is a well established element of the psychology of human perception.

Second, the nature of many of the mystery aircraft reports are strikingly similar to other UFO reports. Strange lights seen moving erratically or at high speed in the sky have long been core elements of the UFO phenomena. Investigations of flying saucer reports have consistently demonstrated how even experienced and trained observers can misinterpret familiar phenomena seen under unfamiliar (or even familiar) circumstances. Although this precedent cannot exclude the existence of novel aircraft, it does

suggest caution in interpreting such reports.

Similarly, reports of radars tracking high speed targets were a staple of the early flying saucer literature, though these were subsequently dismissed as resulting from anomalous radar propagation or operator inexperience. The incidence of such reports has declined with the availability of improved equipment and greater operator experience. But anomalous propagation of radar signals, creating false targets on radar screens, is an abiding problem.

Reports of intercepted radio conversations that are alleged to emanate from high-performance aircraft, such as "Aurora," may instead emanate from pranksters. Such mischief makers have actively propagated flying saucer sightings, and were a major source of the Crop Circle phenomenon in the United Kingdom.

Finally, one is struck by the similarity between the cultural significance of the mystery aircraft phenomenon and that of the other Unidentified Flying Object phenomenon—claims of sightings of flying saucers. Carl Jung noted that belief in flying saucers was a response to the deep cultural anxieties of a society threatened with sudden nuclear annihilation.

Anxiety, Aviation and American Greatness

Belief in the existence of marvelously capable and highly secret aircraft resonates with some of the deeper anxieties of contemporary American society. Aviation has long been one of the distinguishing attributes of American greatness, from Kitty Hawk to Desert Storm. But the economic challenge of Japan, and the declining fortunes of the military aerospace industry, have created growing uncertainties about the future. It would be comforting to believe that the decline of America and American aerospace was more apparent than real.

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