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Untangling a secret budget puzzle

TRAINING THE GENERALS

BEYOND HORIZON

BOMB POWER BOOSTED

In search of the Pentagon's billion dollar hidden budgets

How the US keeps its R&D spending under wraps

BY BILL SWEETMAN

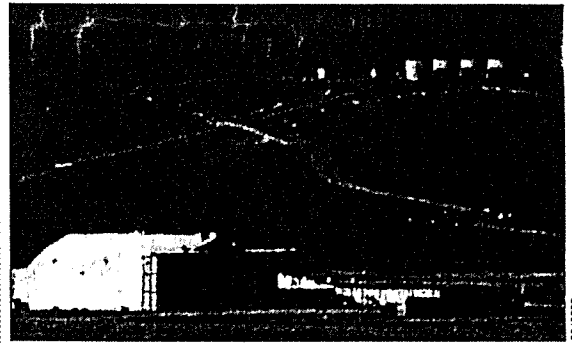
On 8 January last year, around 6.45pm, residents of Delaware in the US were startled by a sonic boom, strong enough to shake walls, rattle windows and cause the citizens to call their local police offices, demanding explanations. This particular speeder, however, could not only outrun any highway-patrol cruiser in Delaware, but was beyond the reach of anyone else in the state. Even the US Air Force, with its surveillance radars at Dover Air Force Base, was unable to identify the miscreant.

The incident was not isolated. A rudimentary data search turns up a stream of such incidents since the early 1990s, from Florida to Nebraska, Colorado and California, with a similar pattern: a loud and inexplicable boom. The phantom boomers appear to avoid densely populated areas, and the stories usually go no further than the local paper. Only a few local papers have a searchable website, so it is highly probable that only a minority of boom events are reported outside the affected area.

The first conclusion from this data is that supersonic aircraft are operating over US. Secondly, we may conclude that the USAF and other services either cannot identify them, or that they are misleading the public because the operations are secret.

The latter case is supported by the existence of a massive secret structure, which can truly be described as a 'shadow military', and which exists in parallel with the programs that the Department of Defense (DoD) discloses in public. It is protected by a security system of great complexity. Since 1995, two high-level commissions have reported on this system, and have concluded that it is too complex; that it is immensely expensive, although its exact costs defy measurement; that it includes systematic efforts to confuse and disinform the public; and that in some cases it favors security over military utility. The defense department, however, firmly resists any attempt to reform this system.

As the Clinton administration begins its last year in office, it continues to spend an unprecedented proportion of the Pentagon budget on 'black' programs — that is, projects that are so highly classified they cannot be identified in public. The total sums involved are relatively easy to calculate. In the unclassified version of the Pentagon's budget books, some budget lines are identified only by codenames. Other classified programs are covered by vague collective descriptions, and the dollar numbers for those line items are deleted. However, it is possible to estimate the total value of those items by subtracting the



In the late 1980s, this large hangar — with an uninterrupted opening around 60m wide and over 20m high — was constructed at Area 51, the USAF's secret flight test center at Groom Lake, Nevada. The project that it was built to house remains secret. (photo: Jane's)

unclassified items from the category total.

In Financial Year 2001 (FY01), the USAF plans to spend US\$4.96 billion on classified research and development programs. Because white-world R&D is being cut back, this figure is planned to reach a record 39% of total USAF R&D. It is larger than the entire army R&D budget and two-thirds the size of the entire navy R&D budget. The USAF's US\$7.4 billion budget for classified procurement is more than a third of the service's total budget.

Rise and rise of SAPs

Formally, black projects within the DoD are known as unacknowledged Special Access Programs (SAPs). The Secretary or Deputy Secretary of Defense must approve any DoD-related SAP at the top level of the defense department. All SAPs are projects that the DoD leadership has decided cannot be adequately protected by normal classification measures. SAPs implement a positive system of security control in which only selected individuals have access to critical information. The criteria for access to an SAP vary, and the program manager has ultimate responsibility for the access rules, but the limits are generally much tighter than those imposed by normal need-to-know standards.

For example, an SAP manager may insist on lie-detector testing for anyone who has access to the program. Another key difference between SAPs and normal programs concerns management and

oversight. SAPs report to the services, and ultimately to the DoD and Congress, by special channels which involve a minimum number of individuals and organizations. In particular, the number of people with access to multiple SAPs is rigorously limited.

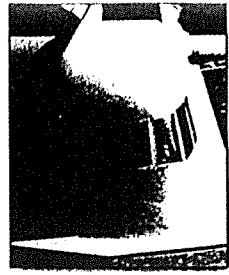
In 1997, according to the report of a Senate commission (the Senate Commission on Protecting and Reducing Government Secrecy), there were around 150 DoD-approved SAPs. These included SAPs initiated by the department and its branches and those initiated by other agencies (for example, the Central Intelligence Agency [CIA] or the Department of Energy) in which the DoD was involved. SAPs are divided into three basic types: acquisition (AQ-SAP), operations and support (OS-SAP) and intelligence (IN-SAP). Within each group are two major classes — acknowledged and unacknowledged.

Some of the acknowledged SAPs — most of them — started as unacknowledged programs. This is the case with the F-117 and B-2, and (on the operations side) with army's 160th Special Operations Air Regiment (SOAR). The existence of these programs is no longer a secret, but technical and operational details are subject to strict, program-specific access rules.

An unacknowledged SAP — a black program — is

a program which is considered so sensitive that the fact of its existence is a 'core secret', defined in USAF regulations as "any item, progress, strategy or element of information, the compromise of which would result in unrecoverable failure". In other words, revealing the existence of a black program would undermine its military value.

The Joint Security Commission which was convened by then-deputy Secretary of Defense Bill Perry in 1993, and which reported in 1995, concluded that SAPs had been used extensively in the 1980s "as confidence in the traditional classification system declined". By the time the report was published, however, the DoD had taken steps to rationalize the process by which SAPs were created and overseen. Until 1994, each service had its own SAP office or directorate, which had primary responsibility for its programs. The Perry reforms downgraded these offices and assigned management of the SAPs to a new organization at defense department level. This is based on three directors of special programs, each of whom is responsible for one of the three groups of SAPs — acquisition, operations and intelligence. They report to the respective under-secretaries of defense (acquisition and technology, policy and C⁴ISR).



The threat of armed force is used routinely to protect classified programs. Area 51 is defended by a force of armed security personnel who work for a civilian contractor and by helicopter patrols, and the eastern border of the site is ringed with electronic sensors. (photo: Bill Sweetman)

WARNING

Restricted Area

It is unlawful to enter this area without permission of the Installation Commander.

Sec. 21, Internal Security Act of 1950, 50 U.S.C. 797

While on this Installation all personnel and the property under their control are subject to search.

Use of deadly force authorized.

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The near-US\$5 billion in black programs in the USAF research and development budget are in the acquisition category. They are overseen within the DoD by Maj Gen Marshal H Ward, who is director of special programs in the office of Dr Jacques Gansler, under-secretary of defense for acquisition, technology and logistics. Gen Ward heads an SAP Coordination Office and, along with his counterparts in the policy and C⁴ISR offices, is part of an SAP Oversight Committee (SAPOC), chaired by the Deputy Secretary of Defense, John Hamre, with Dr Gansler as vice-chair. The SAPOC is responsible for approving new SAPs and changing their status; receiving reports on their status; and, among other things, making sure that SAPs do not overlap with each other. This was a major criticism in the 1995 report: "If an acquisition SAP is unacknowledged," the commissioners remarked, "others working in the same technology area may be unaware that another agency is developing a program. The government may pay several times over for the same technology or application developed under different special programs."

This problem was particularly prevalent in the case of stealth technology: in the lawsuit over the A-12 Avenger II program, McDonnell Douglas and General Dynamics charged that technology developed in other stealth programs would have solved some of the problems that led to the project's cancellation, but that the government did not supply it to the A-12 program. Today, Gen Ward is the DoD-wide overseer for all stealth technology programs. The SAPOC

co-ordinates the reporting of SAPs to Congress. Whether SAPs are acknowledged or not, they normally report to four Congressional committees — the House National Security Committee, the Senate Armed Services Committee, and the defense subcommittees of the House and Senate Appropriations committees. Committee members and staffs are briefed in closed, classified sessions.

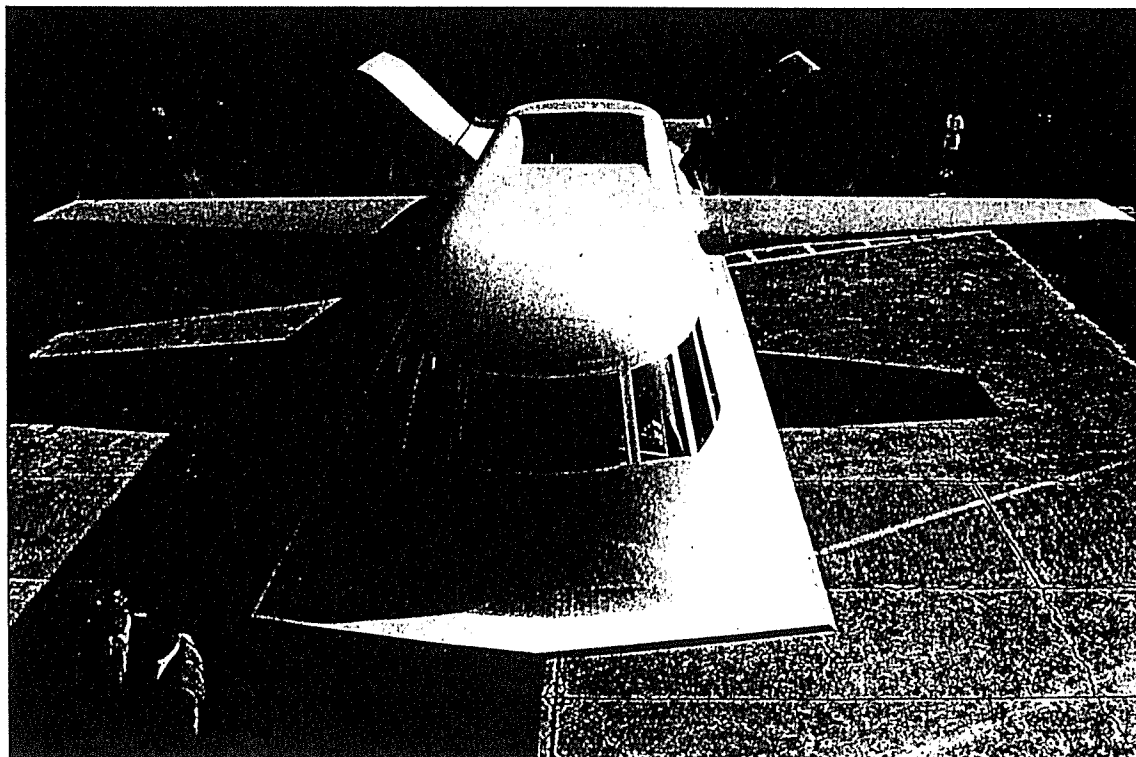
The government may pay several times over for the same technology or application developed under different special programs'

However, there are several serious limitations to Congressional reporting of SAPs. One of these is time. In the first quarter of 1999, the defense subcommittee of the House Appropriations committee scheduled half a day of hearings to review 150 very diverse SAPs. Another issue, related to time and security, is that the reporting requirements for SAPs are rudimentary and could technically be satisfied in a couple of pages.

A more substantial limitation on oversight is that some unacknowledged SAPs are not reported to the full committees. At the Secretary of Defense's discretion, the reporting requirements may be waived. In this case, only eight individuals — the chair and ranking minority member of each of the four defense committees — are notified of the decision. According to the 1997 Senate Commission, this notification may be only oral. These "waived SAPs" are the blackest of black programs.

How many of the SAPs are unacknowledged, and how many are waived, is a question which only a few people can answer: eight members of Congress, the members of SAPOC (including the Deputy Secretary of Defense), and the Secretary of Defense.

Page 27 Northrop's Tacit Blue, an experimental low-observable aircraft designed to carry a Hughes battlefield-surveillance radar, was tested at Area 51 in 1982-85 and unveiled in 1996. Although the program originated under the Ford Administration, it is the most recent classified manned-aircraft program to have been disclosed. (photo: Bill Sweetman)



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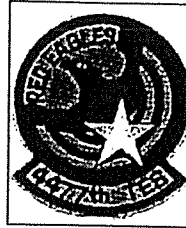
A final question is whether SAP reporting rules are followed all the time. Last summer, the House Defense Appropriations Committee complained that "the air force acquisition community continues to ignore and violate a wide range of appropriations practices and acquisition rules". One of the alleged infractions was the launch of an SAP without Congressional notification. In their day-to-day operations, SAPs enjoy a special status. An SAP manager has wide latitude in granting or refusing access, and because their principal reporting channel is to the appropriate DoD-level director of special programs. Each service maintains an SAP Central Office within the office of the service secretary, but its role is administrative — its primary task is to support SAP requests by individual program offices — and its director is not a senior officer.

Within the USAF, there are signs that SAPs form a 'shadow department' alongside the white-world programs. So far, no USAF special program director has gone on to command USAF Materiel Command (AFMC), AFMC's Aeronautical Systems Center (ASC), or their predecessor organizations. These positions have been dominated by white-world logistics experts. On the other hand, several of the vice-commanders in these organizations in the 1990s have previously held SAP oversight assignments, pointing to an informal convention under which the vice-commander, out of the public eye, deals with highly sensitive programs. The separation of white and black programs is further emphasized by arrangements known as 'carve-outs', which remove classified programs from oversight by defense-wide security and contract-oversight organizations.

Cover mechanisms

A similar parallel organization can be seen in the organization of the USAF's flight-test activities. The USAF Flight Test Center (AFFTC) has a main location at Edwards AFB, which supports most USAF

flight-test programs. Some classified programs are carried out at Edwards' North Base, but the most secure and sensitive programs are the responsibility of an AFFTC detachment based at the secret flight-test base on the edge of the dry Groom Lake, Nevada, and known as Area 51. The USAF still refuses to identify the Area 51 base, referring to it only as an 'operating location near Groom Lake'. It is protected from any further disclosure by an annually renewed Presidential order.



Shoulder patch from the 4477th Test and Evaluation Squadron (TES), the covert USAF unit which has tested numerous Soviet aircraft at Area 51. (photo: Jane's)

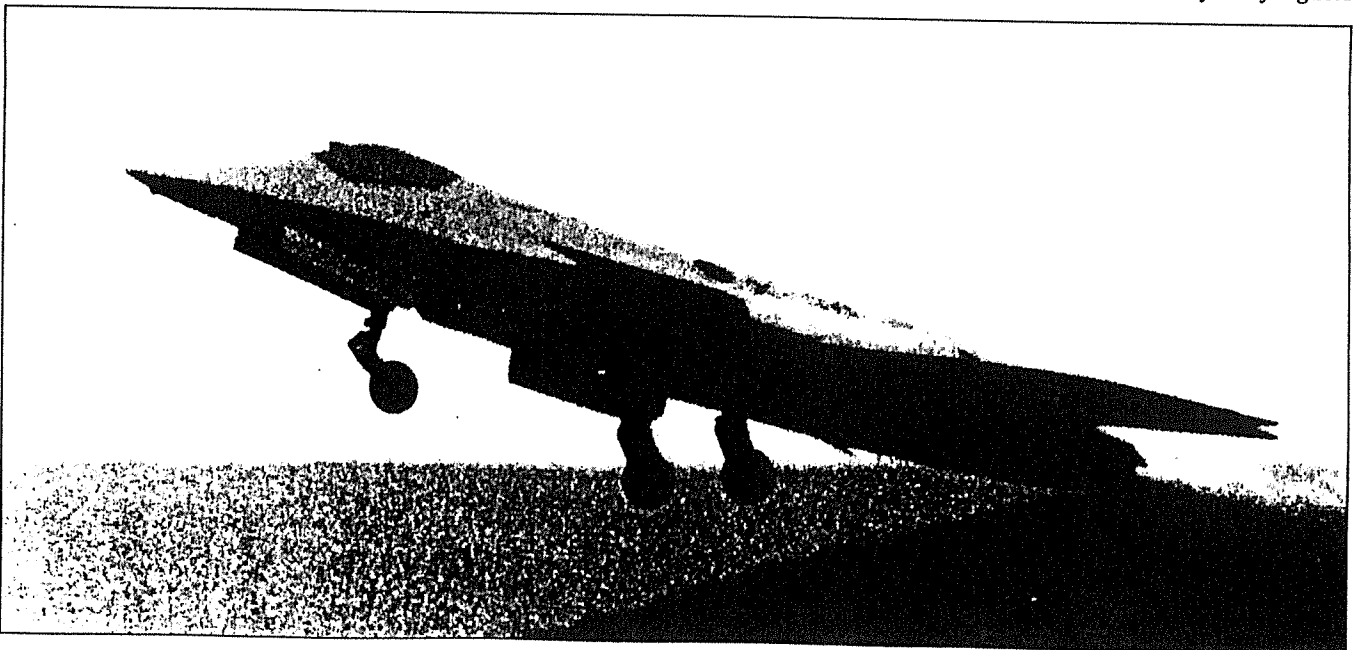
Area 51's linkage to Edwards is a form of 'cover' — actions and statements which are intended to conceal the existence of a black program by creating a false impression in public. The 1995 Commission report concluded that cover was being over-used. While conceding that cover might be required for "potentially life-threatening, high-risk, covert operations", the report stated baldly that "these techniques also have increasingly been used for major acquisition and technology-based contracts to conceal the fact of the existence of a

facility or activity". The report added that "one military service routinely uses cover mechanisms for its acquisition [SAPs], without regard to individual threat or need".

Cover mechanisms used by the DoD have included the original identification of the U-2 spyplane as a weather-research aircraft and the concealment of the CIA's Lockheed A-12 spyplane behind its acknowledged cousins, the YF-12 and SR-71. Another example of cover is the way in which people who work at Area 51 are nominally assigned to government or contractor organizations in the Las Vegas area, and commute to the base in unmarked aircraft.

After the first wave of 'skyquake' incidents hit Southern California in 1991-92, and preliminary results from US Geological Service seismologists suggested that they were caused by overflights of high-speed aircraft, the USAF's Lincoln Laboratory analyzed the signatures from one boom event and concluded that it was caused by navy fighter

The Boeing X-36 unmanned prototype started as a Special Access Program and was partly declassified in 1996 so that McDonnell Douglas could use its technology in its Joint Strike Fighter proposal. Some aspects of its design — including its use of stealth technology and its thrust-vectoring exhaust — remain classified. (photo: Boeing)



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operations offshore. The confirmed DoD use of cover makes it impossible to tell whether the USAF report is genuine or a cover story. The fact that cover is extensively used to protect black programs adds weight to the theory that some white-world projects may, in fact, be intended as cover. One example is the X-30 National Aerospaceplane (NASP) project, which was launched in 1986, cut back in 1992 and terminated in 1994. In retrospect, the stated goal of NASP — to develop a single-stage-to-orbit vehicle based on air-breathing scramjet technology — seems ambitious and unrealistic.

Considered as a cover for a black-world hypersonic program, however, NASP was ideal. NASP provided a credible reason for developing new technologies — such as high-temperature materials and slush hydrogen — building and improving large test facilities, and even setting up production facilities for some materials. These activities would have been hard to conceal directly, and would have pointed directly to a classified hypersonic program without a cover story.

Vanishing project syndrome

Intentional cover is supported by two mechanisms, inherent in the structure of unacknowledged SAPs, that result in the dissemination of plausible but false data, or disinformation. Confronted with the unauthorized use of a program name or a specific question, an 'accessed' individual may deny all knowledge of a program — as he should, because its existence is a core secret, and a mere "no comment" is tantamount to confirmation. The questioner — who may not be aware that an accessed individual must respond with a denial — will believe that denial and spread it further.

Also, people may honestly believe that there are no black programs in their area of responsibility. For example, Gen George Sylvester, commander of Aeronautical Systems Division in 1977, was not 'accessed' into the ASD-managed Have Blue stealth program, even though he was nominally responsible for all USAF aircraft programs. Had he been asked whether Have Blue existed, he could have candidly and honestly denied it. Presented with a wall of denial, and with no way to tell the difference between deliberate and fortuitous disinformation, most of the media has abandoned any serious attempts to investigate classified programs.

The process of establishing an SAP is, logically, covert. To make the process faster and quieter, the DoD may authorize a Prospective SAP (P-SAP) before the program is formally reviewed and funded: the P-SAP may continue for up to six months. The P-SAP may account for the 'vanishing project syndrome' in which a promising project simply disappears off the scope. Possible examples include the ultra-short take-off and landing Advanced Tactical Transport, mooted in the late 1980s; and the A/F-X long-range stealth attack aircraft, ostensibly cancelled in 1993.

A further defense against disclosure is provided by a multi-level nomenclature system. All DoD SAPs have an unclassified nickname, which is a combination of two unclassified words such as Have Blue or Rivet Joint. (Have, Senior and Constant are frequently used as the first word in Air Force programs, Tractor in the army and Chalk in the navy.) Even in a program that has a standard designation, the SAP

nickname may be used on badges and secured rooms to control access to information and physical facilities.

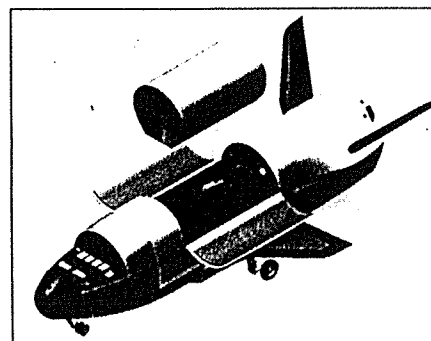
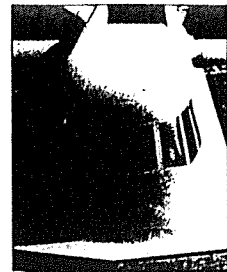
A DoD SAP may also have a one-word classified codename. In this case, full access to the project is controlled by the classified codename. The two-word nickname, in this case, simply indicates that a program exists, for budgetary, logistics or contractual purposes. The purpose, mission and technology of the project are known only to those who have been briefed at the codename level. Therefore, for example, Senior Citizen and Aurora could be one and the same.

Both the 1995 and 1997 panels recommended substantial changes to the classification system, starting with simplification and rationalization. SAPs are not the only category of classification outside the normal confidential/secret/top secret system: the intelligence community classifies much of its product as Sensitive Compartmented Information (SCI) and the Department of Energy uses Restricted Data (RD) and Critical Nuclear Weapons Design Information (CNWDI). The panels called for a simplified system that would encompass SAPs, SCI and the DoE standards.

Both commissions also accused the DoD and other agencies of protecting too much material within special access boundaries, and doing so in an inconsistent manner. As the 1995 report put it: "Perhaps the greatest weakness in the entire system is that critical specially protected information within the various compartments is not clearly identified."

One general told the commission that an SAP was like "trying to protect every blade of grass on a baseball field. He had to have a hundred players to guard the entire field, when only four persons to protect home plate would suffice."

Different services used different standards to determine how and when to establish SAPs, according to the 1995 commission. In one case, two services and the DoE were running concurrent programs with the

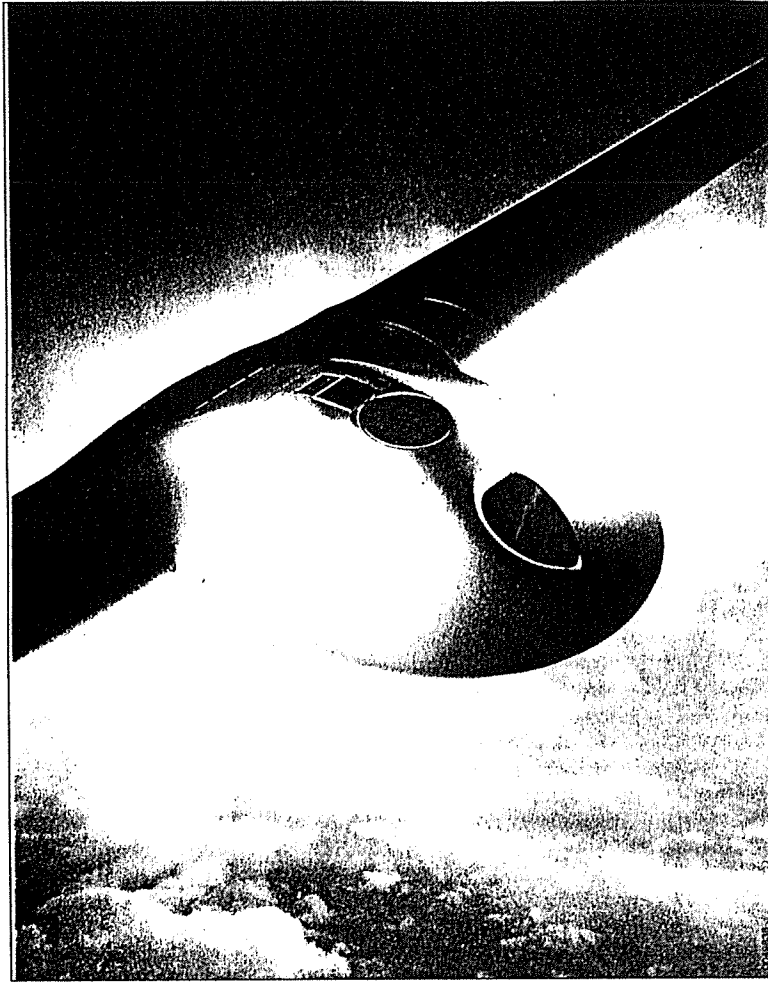


Boeing's X-37 spaceplane, being developed for NASA, was originally designed by Rockwell and supported by the USAF as a special access program. The designation X-40 applies to its military variants. (photo: NASA)

'Presented with a wall of denial, most of the media has abandoned any serious attempts to investigate classified programs'

same technology. One military service classified its program as Top Secret Special Access and protected it with armed guards. The other military service classified its program as Secret Special Access with little more than tight need-to-know protection applied. The DoE classified its program as Secret, adopting discretionary need-to-know procedures. "This problem is not uncommon", the report remarked.

The commission gave up on efforts to measure the direct costs of security, saying that "no one has a



The now-cancelled Lockheed Martin/Boeing DarkStar may have been a scaled-down version of a large, long-endurance stealth reconnaissance UAV which was cancelled in 1993 after at least \$1 billion had been spent on its development. (graphic: Lockheed Martin)

good handle on what security really costs". Direct costs, the commission estimated, ranged from 1% to 3% of total operating costs in an acknowledged SAP, and from 3% to 10% on a black project, although one SAP program manager estimated security costs could be as high as 40% of total operating costs. The commission found that there was no way to estimate the indirect costs of security, such as the lost opportunities to rationalize programs.

The 1995 commission also pointed out that the military utility of a breakthrough technology is limited if commanders do not know how to use it. A senior officer on the Joint Staff remarked that "we still treat certain capabilities as pearls too precious to wear — we acknowledge their value, but because of their value, we lock them up and don't use them for fear of losing them". The report implied that the SAP world keeps field commanders in the dark until the systems are ready for use and even then, "they are put under such tight constraints that they are unable to use [SAP products] in any practical way".

Risk management

Both the DoD's own commission and the later Senate commission pushed for a simpler system, with more consistent rules, and based on the principle of risk management: that is, focusing security efforts to protect the information that is most likely to be targeted and would be most damaging if compromised.

Since 1995, the US Government has declassified some programs. Northrop's Tacit Blue, a prototype for a battlefield surveillance aircraft, was unveiled in 1996, but it had made its last flight in 1985 and had not led to an operational aircraft. The USAF publicly announced the acquisition of MiG-29s from Moldova in 1998 — however, the previous history of the 4477th Test and Evaluation Squadron, which has flown Soviet combat aircraft from Area 51 since the 1970s, remains classified.

Some recent programs appear to combine an unclassified and a SAP element. One example is the Boeing X-36 unmanned test aircraft. The X-36 itself was disclosed in March 1996, when it was nearly complete: at the time, it was a McDonnell Douglas project, and it clearly resembled the company's proposed Joint Strike Fighter design. However, it was also a subscale test vehicle for an agile, very-low-observables combat aircraft, incorporating a still-classified thrust vectoring system with an externally fixed nozzle. The nozzle itself remains classified, and it is likely that a full-scale radar cross-section model of the design was also built under a secret program.

Another hybrid is the USAF's Space Maneuver Vehicle (SMV), originated by Rockwell but a Boeing project. This appears to have been black before 1997, with the designation X-40. (The USAF has reserved the designations X-39 to X-42 for a variety of programs.) A subscale, low-speed test vehicle was revealed in that year; it was described as the Miniature Spaceplane Technology (MiST) demonstrator and was designated X-40A, a suffix that usually indicates the second derivative of an X-aircraft. Late last year, Boeing was selected to develop a larger SMV test vehicle under NASA's Future-X program — this effort is unclassified, and is designated X-37. The question is whether the USAF is still quietly working on a full-scale X-40 to explore some of the SMV's military applications, including space control and reconnaissance.

Another indication of greater openness is the fact that the three reconnaissance unmanned air vehicle (UAV) programs launched in 1994-95 — the Predator, DarkStar and Global Hawk — were unclassified. The General Atomics Gnat 750, which preceded the Predator, was placed in service under a CIA black program, and the DarkStar and Global Hawk, between them, were designed as a substitute for a very large, long-endurance stealth reconnaissance UAV developed by Boeing and Lockheed and cancelled in 1993. However, the budget numbers indicate that unacknowledged SAPs are very much alive. Neither has the DoD taken any drastic steps to rationalize the security system. Recent revelations over the loss of data from DoE laboratories have placed both Congress and Administration in a defensive posture, and early reform is unlikely.

A telling indication of the state of declassification, however, was the release in 1998 of the CIA's official history of the U-2 program. It is censored to remove any mention of the location of the program. However, an earlier account of the U-2 program, prepared with the full co-operation of Lockheed and screened for security, includes a photo of the Area 51 ramp area. It shows hangars that can still be located on overhead and ground-to-ground shots of the base, together with terrain that can be correlated with ridgelines in the Groom Lake area.

However, the DoD has opposed legislation — along

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the lines of the 1997 Senate report — that would simplify the current system and create an independent authority to govern declassification.

In the summer of 1999, Deputy Defense Secretary John Hamre said that the DoD was

opposed to the entire concept of writing all security policies into law, because it would make the system less flexible. The DoD is also against the idea of a "balance of public interest" test for classification. Another major concern was that an independent oversight office would be cognizant of all SAPs.

Hans Mark, director for defense research and engineering, defended the current level of SAP activity in his confirmation hearing in June 1998. SAPs, Mark said, "enable the DoD to accomplish very sensitive, high payoff acquisition, intelligence, and operational activities". Without them, he said, "many of these activities would not be possible, and the effectiveness of the operational forces would be reduced as a result. I am convinced that special access controls are critical to the success of such highly sensitive activities."

Industry's role

Not only have SAPs held their ground, but their philosophy has also spread to other programs and agencies. NASA's 'faster, better, cheaper' approach to technology demonstration and space exploration has been brought to the agency by its administrator, Dan Goldin, who was previously involved with SAPs with TRW. The Advanced Concept Technology Demonstration (ACTD) programs conducted by the Defense Advanced Research Projects Agency (DARPA) are also based on similar principles to SAPs. In some cases — such as Frontier Systems' A160 long-endurance helicopter demonstrator — DARPA contractors are providing effective security outside a formal SAP framework.

SAPs are visible in the prosperity of special-program organizations within industry. Boeing's Phantom Works, founded in 1992 on the basis of existing black-program work at McDonnell Douglas but with

'A test vehicle is being assembled in a hangar divided by a high curtain...'

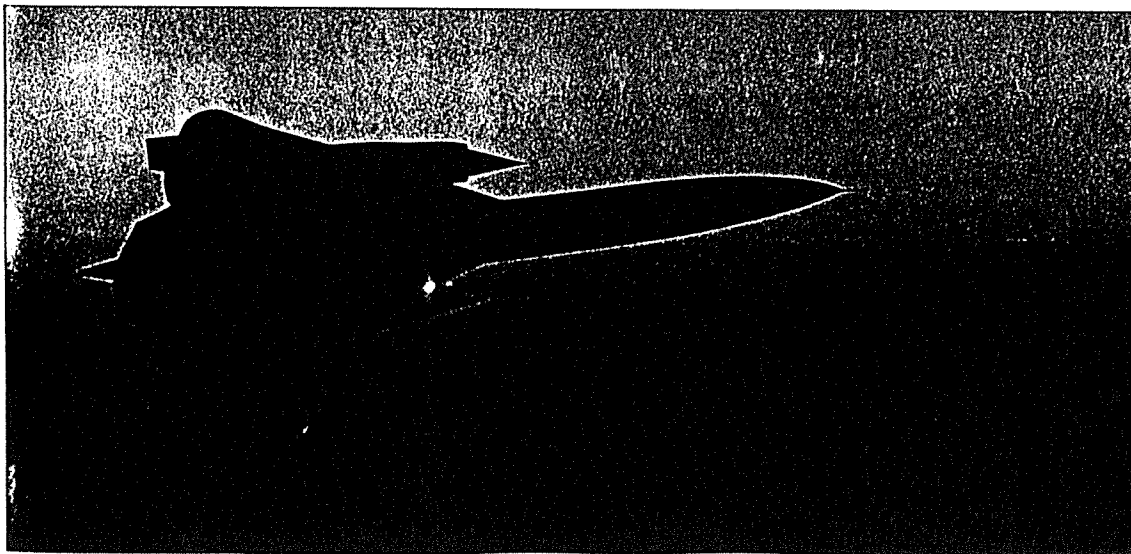
only a small staff, and the St Louis operation still appears to be active. Its main white-world program has been the construction of the forward fuselages of the X-32 prototypes, but this only occupies one of many secure hangar bays. The X-32 prototypes are being assembled at Palmdale, in a hangar divided by a high curtain. Another test vehicle is being assembled in the same hangar, behind a high curtain, and background music plays constantly to drown out any telltale conversations.

In the early 1980s, Boeing expanded its military-aircraft activities and built large new facilities — including an engineering building and indoor RCS range at Boeing Field — which were specifically designed to support SAPs, with numerous, physically separate 'vaults' to isolate secure programs from each other. Boeing's black-projects team at Seattle is considered to be one of the best in the industry.

Lockheed Martin's Skunk Works has changed in character since the 1970s. The original Advanced Development Projects (ADP) unit was built around a core group of engineering leaders, who would tap people and resources from the 'white-world' Lockheed-California company when they were needed. In the 1980s, the Skunk Works grew in size and importance, while Lockheed-California diminished. Today, the Skunk Works is a large, stand-alone organization with 4,000-plus employees. As far as the world knows, its output in the past 10 years comprises two YF-22 prototypes, parts of two DarkStar prototypes, the X-33 RLV and the two X-35 JSF demonstrators.

In mid-1999, Lockheed Martin disclosed that a new advanced-technology organization had been set up within the Skunk Works, headed by veteran engineer Ed Glasgow, to explore the potential or revolutionary technologies. In the unclassified realm, these include a hybrid heavy-lift vehicle combining lighter-

an added emphasis on low-cost prototyping, has been expanded by the new Boeing to include facilities and people at Palmdale and Seattle. While the headquarters of the Phantom Works is being moved to Seattle, this move directly affects



The Lockheed YF-12C reconnaissance aircraft was disclosed before its first flight, but its testing and operation was used to mask the existence of its covert precursor, the CIA's A-12. The latter was not disclosed until 1982, 14 years after its retirement. (photo: NASA)



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The Soviet Union was presumably aware of the location of Area 51 by the early 1960s, when its first reconnaissance satellites began to survey the United States. However, the Pentagon continues to avoid acknowledging its existence.

than-air and aerodynamic principles, and a supersonic-cruise vehicle with design features that virtually eliminate a sonic boom signature on the ground.

The Skunk Works' renown has overshadowed another Lockheed Martin organization with a long-standing connection with SAPs, located within Lockheed Martin Tactical Aircraft Systems (LMTAS) at Fort Worth. This group has existed since the late 1950s, when General Dynamics sought special-programs work to keep its engineering workforce together between major projects. Notable projects include Kingfish, which was the ramjet-powered rival to Lockheed's A-12 Blackbird and continued in development into the early 1960s, and the RB-57F, a drastically modified Canberra designed for high-altitude reconnaissance missions.

Big safari

More recently, the group worked on early stealth concepts — including the design which led to the Navy's A-12 Avenger II attack aircraft — and has modified transport-type aircraft for sensitive reconnaissance missions under the USAF's Big Safari program.

Northrop Grumman's major involvement in manned-aircraft SAPs may be winding down as the Pico Rivera plant — which housed the B-2 program — is closed down and its workforce disperses. However, the company's acquisitions in 1999, including Teledyne Ryan Aeronautical (TRA) and California Microwave, indicate that it will remain a force in UAV programs, including SAPs. TRA has a long association with SAPs and SAP-like programs, dating

back to Vietnam-era reconnaissance UAVs and the AQM-91 Firefly high-altitude, low-observable reconnaissance drone tested in the early 1970s.

Raytheon has acquired important SAP operations through acquisitions. The former Hughes missile operation was presumably involved in the classified air-breathing AMRAAM variant that was apparently used in Operation 'Desert Storm', and in subsequent extended-range air-to-air missile programs. Texas Instruments developed the ASQ-213 HARM Targeting System pod under a black program between 1991 and 1993, when it was unveiled. (HTS was a classic example of a 'vanishing' program: briefly mentioned in early 1990, it turned black shortly afterwards.) The former E-Systems has been heavily involved in intelligence programs since its formation.

Next stealth

One likely strategic goal of current SAPs is the pursuit of what one senior engineer calls "the next stealth" — breakthrough technologies that provide a significant military advantage. Examples could include high-speed technology — permitting reconnaissance and strike aircraft to cruise above M4-5 — and visual and acoustic stealth measures, which could re-open the airspace below 15,000ft (4,600m) to manned and unmanned aircraft.

The existence of high-supersonic aircraft projects has been inferred from sighting reports, the repeated, unexplained sonic booms over the US and elsewhere, the abrupt retirement of the SR-71 and from the focus of white-world programs, such as NASP and follow-on research efforts such as the USAF's HyTech program. The latter have consistently been aimed at gathering data on speeds in the true hypersonic realm — well above M6, where subsonic-combustion ramjets give way to supersonic-combustion ramjets (scramjets) — implying that speeds from M3 to M6 present no major unsolved challenges.

One researcher in high-speed technology has confirmed to *IDR* that he has seen what appear to be photographs of an unidentified high-speed aircraft, obtained by a US publication. In a recent sighting at Area 51, a group of observers claim to have seen a highly blended slender-delta aircraft which closely resembles the aircraft seen over the North Sea in August 1999. Visual stealth measures were part of the original Have Blue program, and one prototype was to have been fitted with a counter-illumination system to reduce its detectability against a brightly lit sky. However, both prototypes were lost before either could be fitted with such a system. More recent work has focused on electrochromic materials — flat panels which can change color or tint when subjected to an electrical charge — and Lockheed Martin Skunk Works is known to have co-operated with the DoE's Lawrence Berkeley Laboratory on such materials.

Yet, the plain fact is that the public and the defense community at large have little idea of what has been achieved in unacknowledged SAPs since the early 1980s. Tacit Blue, the most recently declassified product of the black-aircraft world, actually traces its roots to the Ford Administration. If nothing else, the dearth of hard information since that time, shows that the SAP system — expensive, unwieldy and sometimes irrational as it might seem — keeps its secrets well. Whatever rattled the dinner tables of Delaware a year ago may remain in the shadows for many years. ■