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US STEALTH PROGRAMS AND TECHNOLOGY: SOVIET EXPLOITATION OF THE WESTERN PRESS

Summary

The Western press has reported extensively on US Stealth -- or very low observable (VLO) systems -- since the mid-1970s. Western reporters often intertwine fact and analysis when writing about US programs. This blending of fact and analysis probably keeps US Stealth programs shrouded in mystery and perpetuates false rumors about the capabilities of Stealth technology. We believe the majority of Stealth technology articles found in the press reiterate well-established signature-reduction techniques that have appeared in technical journals and books.

The Soviets read the Western press to learn about US Stealth programs and technology. They likely used this information to develop comparable offensive systems, to focus research and development efforts toward the design of defenses to counter the Western Stealth threat, and to guide their covert intelligence collection efforts. Although the Soviets use the press to learn about US military systems, we estimate that the special access controls surrounding the US Stealth programs have reduced the amount and quality of militarily significant reporting appearing in the press.

The Soviets likely have a good understanding of US Stealth programs and technology from successful Western technology acquisitions, their research and development efforts, and their analysis of the Western press. The relationship among Soviet Stealth acquisitions, the press, and the Soviet weapons development cycle leads us to conclude that the Soviets may be at the prototype stage of an indigenous Stealth program.

Background

The Soviets have a multi-channel Western technology acquisition effort that relies upon a network of covert intelligence operations, trade diverters, international trade agreements, and open source collectors. This well-funded collection effort is targeted primarily against US defense contractors, their affiliates overseas, and their competitors [redacted] the Soviets seek information about future Western military systems to develop comparable offensive systems, to focus research and development efforts towards the design of defenses to counter Western threats, and to estimate the relative technology level of the Soviet Union vis-a-vis the West.

The Soviets use the Western press to guide their covert intelligence collection efforts and trade

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diversion programs. Using information that is available to the public, the Soviets develop "shopping lists" of primary defense contractors and their affiliates bidding on military contracts or working on specific military systems. [redacted] These collection lists identify the locations, key personnel, and major responsibilities of US defense contractors. Although they are the focus of numerous covert intelligence collection efforts, [redacted] Western defense contractors with their proprietary and government security controls are still difficult targets for the Soviets.

We estimate that Soviet efforts to collect open-source information from the West are extensive. In the late 1970s and early 1980s, Soviet open-source collectors acquired information on developing and manufacturing composite materials for missiles and space systems, acoustical data for developing low-frequency sonars for submarines, and magnetic recording systems.

The Western Press and US Stealth Programs

The Western press has reported extensively on US Stealth programs -- or very low observable (VLO) systems -- since the mid-1970s. A June 1975 article in Aviation Week and Space Technology stated that Northrop, Lockheed, and McDonnell Douglas were studying the feasibility of building a "high-speed, high-performance fighter or attack aircraft that could escape enemy radar, infrared and visual tracking." By June 1977 the magazine announced the maiden flight of Lockheed's new reduced-signature Stealth fighter designed for enhanced "survivability in hostile environments."

Our analysis indicates that the existence of most US Stealth systems -- the so-called "F-19," Advanced Technology Bomber (ATB, or B-2), Advanced Cruise Missile (ACM), and Advanced Tactical Fighter (ATF) -- was reported in the Western press a little more than a year after they entered the concept development phase of weapons development. An exception was the Navy's Advanced Tactical Aircraft (ATA) program which received little or no press coverage until defense contractors submitted bids on the full-scale development contract in 1984.

Press articles consist of educated guesses by aerospace analysts, information that is intentionally released to the public by military or industry representatives, and "leaks" of classified information. Reporters writing for newspapers and magazines often intertwine fact and analysis when describing US Stealth systems. We believe that this blending of fact and analysis keeps US Stealth programs shrouded in mystery, perpetuates false rumors about Stealth technology, and complicates the job faced by those Soviet analysts struggling to determine the capabilities of US Stealth systems. A case in point are the ATB's radar cross section (RCS) values that have been reported by several US magazines and newspapers as between 5.0 m^2 and 0.000001 m^2.

Stealth information printed in Western newspapers and journals is either technical or programmatic. Technical articles report information that is useful to Soviet aerospace design engineers, such as materials of construction, aircraft shape, performance, and RCS estimates. Programmatic articles describe the contractors, production schedules, deployment dates, and other non-technical aspects of US Stealth systems.

Few Western publications "reveal" new information about US Stealth programs. Most publications tend to reprint information that is first published in the major aerospace journals -- such as Aviation Week and Flight International. These journals probably employ the best investigative reporters with US industry and military contacts. The Soviets likely believe that Western newspapers, including The New York Times and The Washington Post, are not the best first-hand sources of US Stealth program information (see Appendix I).

One of the most well-respected and authoritative reporters following US Stealth programs is British author Bill Sweetman, editor of Interavia and International Defense Review. Descriptions and sketches of US Stealth aircraft that first appeared in Sweetman's book entitled Stealth Aircraft have been reprinted in other publications numerous times.

[redacted]

The Western Press and US Stealth Technology

The Western press also reports extensively on US Stealth technology independent of any specific weapons system. Popular Science, IEEE Spectrum, and other Western magazines have published numerous "how-to" Stealth articles since 1980 outlining the general composition and application of radar absorbing materials (RAM), shaping, and other techniques used to reduce the signatures of aircraft. Authors of a July 1988 article in Popular Science wrote that their information came from public Congressional hearings, statements made by political and military officials, expert opinion, and unclassified technical literature.

While some of these articles are excellent primers on Stealth technology, we believe the majority of these articles reiterate well-established signature-reduction techniques and reveal little new information about US Stealth systems. We do not believe that a Western magazine or newspaper has published a factual account of how the United States "does Stealth," although many publications have speculated about the subject. Even if information revealing US Stealth technology secrets has been published in the press, the information likely has been couched in terms of speculation -- diminishing the author's credibility and making the information less likely to be believed by the reader.

The Press: What the Soviets are Reading

The Soviets read the Western press to learn about US Stealth programs and technology.

[redacted] Soviet writers have been citing Western press sources since 1980. Writing in late 1987, a Soviet military author remarked that, although Stealth technology is classified, many articles that have appeared in the Western press make it possible "to put together a fairly complete picture of the concept."

We found that Soviet authors often copy the Western press when referring to US Stealth systems and technologies. A late-1985 Soviet article describing the benefits of Stealth technology likely used graphs first published in International Defense Review. Many Soviet descriptions of US Stealth aircraft that have been published by Soviet authors seem to be compilations of news articles first published in the West.

Although many Western periodicals have reported the existence of US Stealth programs, we believe the Soviets rely more on some publications

and authors for information than others. Evidence indicates that the Soviets find more information in the pages of the major aerospace magazines than newspapers (see Appendix I).

Bill Sweetman frequently is cited in Soviet military publications. Sketches of the "F-19" and ATB that first appeared in Sweetman's book likely have been reprinted by the Soviets. We estimate that more than forty percent of the Western press sources cited by Soviet authors were articles written by Sweetman or appeared in magazines affiliated with him.

The Western Press and Soviet Stealth: A Possible Scenario

We believe the Soviets have begun a Stealth development program [redacted] The Soviets likely have a good understanding of US Stealth programs and technology from successful Western technology acquisitions and their research and development efforts. [redacted] our ability to determine the effect of Western press information on a comparable Soviet Stealth system is limited.

Previous Soviet acquisitions of Western technology [redacted] evolved from the collection of samples or blueprints to the purchase of production equipment. The similar pattern of Soviet Stealth acquisitions and our understanding of the Soviet weapons development cycle lead us to conclude that the Soviets may be at the prototype stage of an indigenous Stealth program. The following chronological scenario is our best estimate of how the Soviets may have used Western press information since the mid-1970s to assist their development of Stealth systems.

[redacted]

The 10th Five-Year Plan

Western press reporting immediately before and during the Soviet 10th Five Year Plan (FYP, 1976-1980) probably was used by the Soviets to forecast the first generation of US fighter aircraft with reduced radar, infrared, acoustic, and optical signatures. Press articles published between 1975 and 1980 were not extensive or detailed, but did report the existence of the "F-19" and the ATF. According to numerous press articles, the US Defense Advanced Research Projects Agency (DARPA) was funding Stealth research at Northrop, Lockheed, and McDonnell Douglas throughout the late-1970s. Other Western aerospace magazines reported that the "F-19" was made of a patented RAM consisting of aluminum mesh and plastic sponge, was powered by a pair of General Electric turbojet engines, and had a dual reconnaissance/strike role.

These early press articles were well-timed to influence Soviet strategists forecasting US military developments and the threat of new military systems throughout the 1980s and early 1990s. We believe it likely that a Soviet forecast -- partially derived from Western press articles -- convinced the Soviets to launch a Stealth fighter research program (NIR[2]) during this five-year plan.

Soviet collection requirements for Western technology may indicate that a Stealth NIR program was underway. We estimate that many of these requirements were derived from Western press articles. [redacted]

[redacted]

[2]Soviet military technology development is referred to as Scientific Research Work (nauchno-issledovatel'skaya rabota, or NIR). Final producible system design, development, and qualification is conducted as Experimental Design Work (opytno-konstuktorskya rabota, or OKR).

By the end of the 10th FYP, the Soviet Stealth fighter likely was poised to begin the experimental design phase (OKR) of weapon system development.

The 11th Five-Year Plan

From 1981 to 1985, the duration of the Soviet 11th FYP, numerous magazines and newspapers printed stories describing US efforts to build and test Stealth aircraft and cruise missiles. The "F-19" and the ATF received much press coverage during this period. Several US Stealth systems made their press debuts, including the ATB, ATA, ACM, and the unnamed SR-71 follow-on reconnaissance aircraft.

Engineers working on the Soviet Stealth fighter program -- which we believe was in the OKR phase of weapon development during the 11th FYP -- may have learned US Stealth design information from press stories describing the "F-19," ATF, and to a lesser extent, ATA. The Western press reported that US Stealth aircraft used internal weapon bays, inwardly-canted fins, zig-zag engine intake channels, and baffled engine exhausts. Even if the Soviets already were aware from their own research that these US designs were desirable to reduce an aircraft's signatures, the Western press confirmed that such aircraft could fly.

We believe that press coverage of Northrop's ATB contributed to a Soviet Stealth bomber NIR program that probably began as early as 1980. Newspaper and magazine articles about the ATB from the period were sketchy, but may have revealed enough information to give the Soviets an idea of the size and mission of the aircraft. Defense Daily, in an article published in 1981, stated that the ATB would investigate and demonstrate metalized radome technology, high-temperature magnetic RAM, and low-RCS array antennas. A 1981 Los Angeles Times article described one of the competing ATB designs as a "flying wing" weighing approximately 550,000 pounds.

The 12th Five-Year Plan

We believe that the Soviets [redacted] -- were aware of the missions, capabilities, designs, and deployment dates of most major US Stealth systems by 1986, the beginning of the current 12th FYP (see Appendix II). The Soviets may have used this pool of classified and unclassified information to refine their earlier forecasts of US military developments, to estimate the deployment dates of US Stealth systems, and to direct the collection efforts of their intelligence agencies. The ongoing Soviet Stealth [redacted] programs -- [redacted] probably benefited little from press reports during this period.

By early 1988 the Western press had reported -- and the Soviets likely read -- that:

- The ATB will be powered with four F101-GE-102 turbofan engines. Made of titanium with epoxy-graphite composites, the bomber will have a maximum range of 12,100 kilometers. The first flight of the aircraft is scheduled for late 1988.

- Between 50 and 71 of the "F-19" aircraft are operational and based in Tonopah, Nevada. The aircraft conduct overseas reconnaissance missions from bases in the United Kingdom and Alaska. The "F-19" has an estimated RCS of 0.1 m^2. Probable onboard weapons include AGM-65 Maverick air-to-surface missiles and BLU-109/B hard-target munitions.

- The ATF will be similar in size to the F-15E fighter, but will be made largely of composite materials such as silicon carbide-reinforced aluminum. Armed with a M61A1 20mm Vulcan cannon, AIM-9L Sidewinder missiles, and AIM-120 AMRAAM missiles, the ATF will have a combat radius of between 1,200 and 1,400 kilometers.

- The ATA probably will be powered with two modified General Electric F404 engines. The aircraft will be subsonic, but may have

a supersonic dash capability. Approximately 450 ATAs will be built, and each aircraft will have a range of 1110 kilometers.

-- The ACM will be carried by the B-52 and the B-1B bombers. General Dynamics -- one of two primary contractors -- is encountering numerous technical problems that have put the ACM program behind schedule. Each ACM will be similar in size to the AGM-86B. The first missile will be deployed at Sawyer Air Force Base in Missouri.

Soviet Counter Low Observables

Soviet knowledge of US Stealth systems [redacted] has allowed the Soviets to better anticipate what offensive threats they will face in the future and possibly to focus research on counter low observable (CLO) systems. We have no evidence of a Soviet CLO system, however. Most of the upgrades we see in Soviet air defenses probably are attributable to the normal weapon development cycle and a response to the US family of cruise missiles.

[redacted]

Appendix I. Primary Western Press Sources of US Stealth Information

Periodicals

Air International *
Armed Forces Journal *
Aviation Week and Space Technology *
Defense Electronics *
Defense Week *
Flight International *
Interavia Aerospace Review *
International Defense Review *
Newsweek *
Jane's All the World's Aircraft
Jane's Defence Weekly
Special Electronics *
Strategy and Defense *

Newspapers

International Herald Tribune *
The Los Angeles Times
The New York Times *
The Washington Post

Reference Newsletters

Defense Marketing Services
World Missile Forecast

Books

Sweetman, Bill; "Stealth Aircraft, Secrets of Future Airpower"

* ----- Publications specifically cited by Soviet military writers

Appendix II. Technical US Stealth Information Published in the Western Press, 1975 to 1988 (U)

Advanced Technology Bomber (ATB)

status:	entering production
engines:	four F101-GE-102 turbofans
max. takeoff weight:	159,000 to 170,000 kilograms
payload:	eight ACMs
wingspan:	52 meters
length:	unknown
crew:	two to four
cruising speed:	Mach 0.72 to 0.85
cruising altitude:	15,200 meters
range:	9,250 to 12,100 kilometers
max. payload weight:	18,100 kilograms
radar cross section:	0.000001 to less than 5.0 m^2
construction:	titanium with epoxy-graphite composites

Advanced Tactical Fighter (ATF)

status:	prototype development
engines:	under development
max. takeoff weight:	22,700 kilograms
payload:	AIM-9L Sidewinder, AIM-120 AMRAAM
wingspan:	unknown
length:	unknown
crew:	one
cruising speed:	Mach 2.5 with afterburner, Mach 1.4 without afterburner
cruising altitude:	unknown
range:	1,200 to 1,400 kilometers
max. payload weight:	unknown
radar cross section:	0.05 to 0.1 m^2
construction:	composites, silicon carbide-reinforced sheet

"F-19"

status:	deployed
engines:	one or two modified GE F404 engines
max. takeoff weight:	13,600 pounds
payload:	two to four Maverick AGM-65 missiles, BLU-109B hard-target munitions
wingspan:	7 to 11 meters
length:	17 meters
crew:	one
cruising speed:	subsonic to greater than Mach 2.5
cruising altitude:	18,300 meters
range:	1110 kilometers
max. payload weight:	unknown
radar cross section:	0.1 to 0.5 m^2
construction:	Fiberloy composite material

Advanced Tactical Aircraft (ATA)

status:	engineering development
engines:	two modified GE F404 engines
max. takeoff weight:	27,200 kilograms
payload:	unknown
wingspan:	unknown
length:	unknown
crew:	two
cruising speed	subsonic, with supersonic dash
cruising altitude:	unknown
range:	1110 kilometers
max. payload weight:	unknown
radar cross section:	unknown
construction:	unknown

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Advanced Cruise Missile (ACM)

status:	engineering development
engine:	Williams International F112 turbofan
size:	similar to AGM-86B
speed:	subsonic
range:	3,700 to 11,100 kilometers
radar cross section:	unknown

SR-71 Follow-On

status:	under development
engines:	unknown
max. takeoff weight:	unknown
payload:	unknown
wingspan:	unknown
length:	unknown
crew:	unknown
cruising speed:	Mach 5.0
cruising altitude:	greater than 30,500 meters
range:	unknown
max. payload weight:	unknown
radar cross section:	unknown
construction:	unknown

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SUBJECT: US Stealth Programs and Technology: Soviet Exploitation of the Western Press

External Distribution:

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