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15 Sept 64 OX

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VULNERABILITY OF THE OXCART VEHICLE  
TO THE CUBAN AIR DEFENSE SYSTEM

An analysis has been conducted to determine the vulnerability of the OXCART vehicle to the Cuban air defense system. The analysis has used digital simulation techniques and is based on parameters of the vehicle and of air defense radar and SA-2 systems. The performance objective of the OXCART program is sustained flight at Mach 3.2 and an altitude of 85,000 feet on reconnaissance missions. However, in the present time frame (circa November 1964) the aircraft will be capable of missions over Cuba at Mach 2.8 and an altitude of 78,000 to 82,000 feet. This vulnerability estimate is therefore based on level flight at the latter speed and altitude.

I. THE CUBAN EARLY WARNING CAPABILITY

With the dense deployment of Soviet ground radars and existing command/control communications nets, the Cuban air defense system will detect the OXCART vehicle in sufficient time to alert defensive weapons installations.

APPROVED FOR RELEASE  
DATE: AUG 2007

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## II. THE CUBAN AIR FORCE CAPABILITY

Cuban aircraft have no capability against the OXCART vehicle flying at altitudes of 70,000 feet or above. The MiG-21, armed with AA-2 missiles, has only a marginal attack capability on subsonic targets at altitudes of 65,000 to 68,000 feet.

## III. VULNERABILITY OF THE OXCART TO CUBAN SAM SYSTEMS

The SA-2 SAM systems now deployed in Cuba, however, will present a distinct threat to the OXCART vehicle operating at the stated performance of Mach 2.8 and 78,000 feet altitude. When in a state of readiness, the SA-2 S-band radar conservatively will acquire the vehicle at a range of more than 47 nautical miles. With ample time for target identification and track, missile launch could be expected at a range of about 30 nautical miles.

On a full reconnaissance mission over Cuba, a course that did not detour around SAM sites would pass within 15 nautical miles of 10 or more SA-2 sites, and the vehicle would be within engagement range of each site for periods varying from about 35 to 135 seconds. In about 25% of the cases, the vehicle would be in the area of unacceptable

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vulnerability\* It would not be possible to avoid all of the SAM sites and still obtain the required coverage of Cuba.

It is important to note that Cuban SAM sites are not in an optimum readiness state. COMINT indicates that many sites are operating with less than three ready missiles and that some cannot launch all their ready missiles at one target. However, this is not the case at all sites and reaction by some Cuban SAM sites must be expected. Furthermore, as the OXCART vehicle operates against it, the effectiveness of the Cuban SAM system can be expected to improve over a period of time.

#### IV. ADDITIONAL CONSIDERATIONS

The OXCART development program is nearing completion. Full flight performance of Mach 3.2 at an altitude of 85,000 feet is expected <sup>next spring</sup> and necessary defensive countermeasures will be ready concurrently. Full flight performance plus the programmed countermeasures should insure survivability against the SA-2 SAM system.

It must be concluded that use of the OXCART over Cuba will provide Soviet specialists with extremely <sup>VALUABLE</sup> technical and tactical data on limitations of the SA-2 system against the OXCART target and with an

\*Vulnerability here considers the vehicle passing through a defended zone where the SA-2 miss distances are 100 feet or less.

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urgent inducement to develop modifications aimed at improving SAM defenses in the Soviet Union. Of equal importance is the fact that protracted employment of OXCART over Cuba will furnish the Soviets with a virtually unrestricted opportunity to study and analyze at first hand vehicle performance characteristics, <sup>tactical</sup> doctrine and, later on, the defensive system characteristics under actual operational conditions. It would appear also that regular use of OXCART over Cuba might well stimulate the introduction thereof of more sophisticated air defense weaponry by the Soviets in the form of improved acquisition and tracking radars, as well as later and improved versions of ground-to-air missiles.

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