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Telemetry and chase-aircraft photography have permitted a practically complete reconstruction of the sequence of events that took place; however, the single factor or combination of factors which caused the accident have not been precisely identified.

The launch CASAARD drones carried more fuel than those launched previously and was approximately 25 percent heavier. Although elevator control travel had been increased to compensate for the additional weight, the drone nevertheless separated from the launch aircraft at a slower rate than anticipated, and the two remained relatively close for a longer period than on previous launches. It should be noted that the aerodynamic flow patterns that the drone and carrier aircraft are in close proximity are not well understood, and this void has not been filled either in extensive wind tunnel testing or from flight tests instrumentation. The accident therefore could have been the result of unusual airfoil interactions between drone and launch aircraft at the time of separation.

Other factors which might have caused or contributed to the accident could have been an out-of-limits center of gravity, the loss of a small piece of metal somewhere on the drone or carrier aircraft, excessive yawing of the carrier aircraft at launch, excessive yawing of the drone immediately after launch, abnormal operation of the release mechanism, etc. However, there is no evidence to indicate that any of these conditions did exist. On the contrary, telemetry from the highly instrumented launch aircraft and drone showed that all equipment operated normally and that flight conditions at launch were within the specified envelope.

The contractor, as a result of his analyses, has concluded that the CASAARD launch site at Mach 3.2 is a marginal operation, in that launch accidents can occur as a result of only slight deviations from the norm in numerous areas. The Project Office and I share that belief on the basis of the limited evidence in hand.
A rather detailed study on the feasibility of alternative launch methods for the AARDIV drone was completed just prior to the accident (the study had been initiated because of problems associated with acquiring the third launch aircraft considered necessary for the operational program and the prospects of obtaining additional launch aircraft in the future in the face of possible attrition). The results of this study indicate that the program can be completed to a safer and probably more reliable method of launch, with minimal program slippage, and at reduced cost. The most promising alternative technique is to launch the drone from a B-52 wing-pylon in the same manner that the X-15 and RIM-2/200 air-to-surface missiles are launched. I propose to extend the THAAD/RIM Program to this launch technique.

Briefly, the drone will be modified to permit attachment to a special pylon on a B-52 and to carry an external solid-propellant booster, which will provide approximately 20,000 pounds of thrust for about 70 seconds. The drone/booster combination will be dropped from the B-52 at Mach 0.8 at 45,000 feet. After a basic separation distance is achieved, the rocket booster will be ignited and will accelerate the drone to a speed in excess of Mach 3 at approximately 80,000 feet. During the rocket boost phase, the drone will be guided by the present flight control system (obviating the need for any guidance of the rocket booster). The booster and its attaching hardware will be jettisoned after ramjet ignition. From that point on, the drone will proceed on its flight in a manner identical to the present flight profile (Mach 5,3 cruising speed at 55,000 feet altitude, air catch of the payload, etc).

The B-52 is capable of carrying two drones. Modification of the B-52 consists of attaching a new pylon under each wing to existing attachment points and the installation of a dual-launch control station in the present Fine Control and ECP operator positions. It should require approximately six months to manufacture the pylons and modify the first B-52 launch aircraft using existing control consoles and instrumentation, and eight months to procure additional control equipment and to modify a second B-52. Two launch aircraft would provide a reasonable operational capability. The B-52's can be made available from the USAF inventory.
A tasked NOSIAD mission against targets in South China Sea/Asia would begin at Area 51, launch the drone in the vicinity of Okinawa about 15 hours later, and return non-stop to Area 51 in a total elapsed time of about 24 hours. Two aerial refuellings would be required for the B-52. Recovery of the drone/payload could occur approximately one and one-half hours after launch and take place in a “safe” area designated by the mission profile (e.g., in the Bay of Bengal or the South China Sea).

Assuming an early program go-ahead, it appears feasible to begin flight testing of the D-21B/0-21B combination early next summer. It is estimated that at least three D-21B/0-21B launches will be required to prove out the launch/rocket boost concept, the time D-21B's with cameras installed could be launched thereafter at a one-per-month rate. Therefore, a limited operational capability is possible one year from go-ahead. All B-52 testing and operations could be conducted from Area 51. Should Area 51 not be available in the future, operations could be conducted from Area 175.

The original NOSIAD Program included the two modified B-52 launch aircraft and 20 drones and cameras, of which 15 remain in the inventory (five drones have been expanded into area in ground test, and four in flight test). A follow-on procurement of fifteen additional drones and cameras was approved by OCS; however, the contractors were not authorized to begin work on this second increment until after the first drone had been accomplished. After the accident, this second increment was reduced from fifteen to seven drones. For the B-52, program planning has anticipated the modification of a third B-52 into a launch aircraft in FY 67, and the procurement of a third increment of 24 drones and twelve cameras in FY 68.

The proposed new NOSIAD Program includes the following major elements:

1. Two B-52 aircraft (already tentatively identified in the OCS inventory) will be modified into launch aircraft.

The first B-52 can be modified in approximately six months, with the second following about three months later.
2. The 15 B-52 drones remaining from the original procurement increment will be modified into a D-21B configuration which is compatible with D-52 launch and rocket boost. The first of these can be ready in six months, and the fifteenth nine months later (December 1967).

3. The second procurement increment of seven drones (modifications has just begun) will be produced as D-21B models rather than the original B-52 models. The first of these would be delivered in January 1968, and the seventh in June 1968.

4. Field operations, if required, will begin in the fall of 1967. For planning purposes, a one-per-month launch rate is assumed.

5. A third increment of sixteen drones will be procured for delivery between July 1968 and June 1969.

A schedule for the proposed new DICEDARD Program is included as Attachment 1.

Specifically, the following portions of the new DICEDARD Program would require FY 67 funds:

1. Modification of the two B-52H launch aircraft.

2. Refit of the 15 B-52's remaining from the original procurement to the D-21B configuration.

3. Production of the seven additional drones and carriers from the second procurement increment into D-21B models.

4. Minor taxiway construction at Area 51 to accommodate the B-52.

5. Long-lead time procurement against the delivery of sixteen drones and eight carriers in FY 69.
A continued $19.4 million of FY 67 obligating authority will be required for the B-52/5-13B program, compared with the previous estimate of $31.5 million for the A-12/OXCART launch. A comparison of FY 67 fund requirements is shown in Inclosure 2. It should be noted that the reduction is primarily in the support area and reflects the fact that the new smaller rocket boosted-flight test program was terminated in FY 66, and that the B-52 will be maintained by Air Force rather than contractor personnel.

FY 68 fund requirements have been estimated on the basis of replacing B-52I launchers of previously procured drones and engines at a one-per-month basis, and completing financing of eight drones and four cameras in the third procurement increment, the initial long-haul time procurement having been initiated in FY 67. The remaining eight drones and four cameras of the third increment may of sixteen drones and eight cameras would be financed in FY 69.

It is estimated that $31.5 million of FY 69 funds will be required for this proposed program. This total compares with the earlier estimate of $71.7 million for new drone procurement and the support of A-12/OXCART launches at a one-per-month rate. A more detailed cost comparison is set forth in Inclosure 3.

In summary, the success of the July 30 launch accident indicates that the OXCART launch from an A-12 type aircraft is a marginally-safe operation; however, the program can be maintained to utilize a B-52 launch platform/solid rocket booster launch technique with minimum program slippage and for less FY 67/68 funds than previously estimated. Although it is not likely that the OXCART drone will be employed in large quantities on a routine basis in the near future, I believe there is a need for this unmanned capability in crisis reconnaissance situations and to augment satellite coverage when needed in special areas such as South China, and that such a drone is likely to be used increasingly in the future—particularly as ground and air forces improve in certain areas.
It is recommended that the Executive Committee approve the reorganization and continuation of the THOMPD Program as described in this memorandum.

Seconded

Alexander H. Fler
FY 67 TAGBOARD FUNDING REQUIREMENTS

1. PREVIOUSLY APPROVED PROGRAM

a. Operational Support:
   (1) A-12 Launch Aircraft $15.22
   (2) Drone Aircraft/Engine 5.10
   (3) Drone Camera 1.87
   $21.19

b. Investment: (1)
   (1) Drone Aircraft/Engine 34.56
   (2) Drone Camera 3.76
   38.32
   TOTAL: $59.51
   NET FY 67 NOA: $34.51(2)

2. PROPOSED PROGRAM

Operational Support $7.37
Modify two B-52H's 4.1
Modify original 15 drones 13.23
Procure 7 additional drones 20.53
Procure 7 additional cameras 2.17
Minor construction at Area 51 .38
Long lead procurement for 16 drones and
  3 cameras (FY 69 delivery) 5.30
   TOTAL: $33.58 (2)
   NET FY 67 NOA: $28.38

(2) This covers the second procurement increment of 15 drones
and 15 cameras, as originally planned. After the July 30 accident,
the procurement increment was reduced to seven drones and seven
cameras. Not included was a requirement for $3.1 million to
modify a third A-12 into a launch aircraft.

(2) Net total of FY 67 New Obligating Authority reflects carry-
over of FY 66 funds.

Inclosure 2
Inclusions:

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<td>(1) Drone (2) Camera</td>
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PROCEDURE PROCLAM

For 60 EXAMINATIONS

OCEAN/TOCARD

Approved for release: 2018/11/16 CON311471D

[Signature]