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OXC - 4589
Copy 5 of 6

4 March 1963

MEMORANDUM FOR : The Record

SUBJECT : Visit To Lockheed [redacted] Re Escape System

25X1

1. On Monday, 25 February, the undersigned met at Burbank with

[redacted]	Lockheed
Warren Shepardson	Lockheed
	Lockheed
	Wright-Pat AFB
	D. Clark Co.
[redacted]	Firewel Co.
	[redacted] Tech. Rep. of Firewel Co.

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to discuss the last series of high Q dummy drops made at El Centro, California, and the resultant parachute modifications and future test schedule.

2. Actions taken regarding the parachute system follow:

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a. [redacted] will fabricate two prototype guards for main canopy jettison releases. They will also modify one of their other production releases to fit our requirements. These possible improvements will be evaluated on 28 February.

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b. Four survival seat cushions provided by [redacted] will be evaluated [redacted] at Firewel Co. to determine comfort characteristics. These include the NATO, Navy F&H, modified [redacted] and pneumatic types.

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c. Lockheed will take immediate steps to modify the escape system to delay man-seat separation four seconds after ejection. This will provide necessary deceleration and wind blast decay.

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DATE: 4626 REVIEWER: [redacted]

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The two-second delay which has been used was proven inadequate via high Q tests at El Centro.

d. Parachute harness and pack modifications:

(1) The wrap around webbing of the first stage parachute pack will be changed from type 8 to type 22 condition "F" for increased strength.

(2) Main risers will be increased four inches in length. Packing experience indicates this change.

(3) Pack retention webbing will be added between the bottom of the parachute and the seat sling to ensure a closer retention to the man of the chute and survival kit. A wrap around webbing for the emergency oxygen container will also be incorporated for the same purpose.

e. Four dummy drops will be made from B-66 aircraft at El Centro during early April at the new high Q. This will be done by dropping at 20M and 300 KIAS. One more live jump will be made at low speed and altitude over water to test the improved flotation incorporated in the full pressure suit. Four tests on the deck at very low speed (65 knots) will be made [redacted] in April. The ejection seat program will begin by early May. 25X1

3. On Wednesday, 27 February, the undersigned met [redacted] with: 25X1

[redacted] 25X1

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25X1 [redacted] Agency Representative 25X1
Warren Shepardson Wright-Pat AFB
25X1 [redacted] Tech. Rep. for
Firewel

25X1 Two [redacted] Pilots

Approximately ten full pressure suit flights have been made by Lockheed pilots and five suit flights by our pilots. Items discussed and action to be taken is as follows:

a. Helmet tie down.

Problem - difficult to pull down when suit becomes pressurized and inability to release after suit pressure is dissipated.

Action - [redacted] of D. Clark Co. is working on a fix which should be at [redacted] approximately 18 March. In the interim the pilots will index the pull down tab so that it will be in an intermediate position which will provide comfort without suit pressure and still prevent the helmet from excessive rise when suit pressure is introduced.

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b. Pressure suit gloves vs. control stick.

Problem - when pressurized the pilot loses tactical discrimination between finger tips and the stick. This combined with excessive bulk of the control stick head with its many buttons makes precise control difficult.

Action - Lockheed is shortening the control stick height for better man-stick relationship.

- D. Clark Co. is further customizing gloves for individual pilots - especially pilots with small hands - for increased reach to all stick control functions.

25X1 - [redacted] will investigate other control stick heads. The present one is the same as used in the B-58 aircraft.

c. Neck ring.

Problem - difficult to turn head.

Action - D. Clark Co. is retrofitting all helmet rings to provide easier head mobility by way of more efficient bearings and teflin rings.

d. Helmet.

Problem - helmet weight vs. suspension.

Action - D. Clark Co. presently working on new suspension system to provide better weight distribution. Other possibilities to improve this situation include larger head pads, head pads made of more porous material and increased ear pad diameter.

e. Helmet visor reflectance.

Problem - Reflection from instrument panel but more severely from direct sun during turns and during refueling is inhibiting necessary pilot vision.

Action - Immediate action being taken is to paint the instrument panel black and darken the pilots face with burned cork. Both of these remedies help but do not solve the entire problem. Another quick fix which will be pursued immediately is to fabricate a dark mask made of a soft, nonirritating and absorbent material. [redacted] 25X1
25X1 [redacted] will research the drug industry for possible use of nonparticulant materials that could be applied to the face without irritation during or subsequent to flight.

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- Long range action has been in process by the D. Clark Co. with [redacted]
25X1 [redacted] to provide improved visors. However, this has been slow due to the fact that D. Clark Co. has had no authority to indicate who might want the end product or how many might be required. In essence the D. Clark Co. is unable to push these efforts since they are only requesting the involved companies to pursue the problem. [redacted] has submitted one sample which shows promise but a weight penalty 25X1
25X1 is involved. [redacted] is working on a laminated visor.

f. Suit altimeter.

Problem - Pilots desire this device to be assured their suit has inflated to the required pressure in case of

pressure loss in the cabin.

Action - Two GFE altimeters will be provided D. Clark Co. who will then make up a kit to permit field installation.

g. Pressure suit underwear.

Problem - Excessive shrinkage after washing is being experienced. The question of white underwear vs. some other color was mentioned.

Action - D. Clark Co. will pre-shrink underwear, before shipping. [redacted] will coordinate with [redacted] and make recommendation re color.

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h. Press To Test (PTT)

Problem - Comfort.

Action - Firewel is providing a PTT lock which will enable pressurized flight as long as the pilot chooses to keep the lock on. Under pressure the suit is forced away from the pilot along with all hardware and straps thus giving him the opportunity to move around within the suit. He will be able to easily release the lock and return to normal vent pressure when he so desires.

4. Other items discussed were as follows:

a. An ECP is presently at OCAMA via USAF to modify F-101 aircraft to accommodate the full pressure suit. [redacted] will follow up on this regarding the possibility of our retro-fitting an F-101 for training flights.

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b. Ground school.

Problem - Dosage. It was believed by those attending the last ground school that too much material was given in two short a period of time, i.e., eight hours

per day does not give the class adequate time to digest and ask questions on subjects covered.

Action - Lockheed responsibility.

c. Survival kits.

Problem - Components.

Action - It was clarified that the components of the kit were for survival purposes and not escape and evasion. Kits are built up at [redacted] Vacuum packed winter items such as walk around sleeping bag components will replace other items per judgement of personal equipment people at [redacted]

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3. On Thursday, 28 February, a meeting was held at Burbank with the following people in attendance:

[redacted]	Lockheed
[redacted]	Lockheed
[redacted]	Lockheed
[redacted]	Firewel
[redacted]	D. Clark Co.
Warren Shepardson	Wright-Pat AFB
Harry Collins	Hq. AFSC

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This meeting was held to summarize the two preceding meetings of the week and finalize on actions to be taken. Of prime importance was the matter of oxygen consumption being experienced during full pressure suit flights at [redacted] To date, according to [redacted] the average has been twenty-two liters per minute. However, this average is only for a few flights of relatively short duration. Also, these were first flights with the full pressure suit which may have some bearing on the consumption rate.

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[redacted] will investigate immediately the spring loaded exhalation valve vs. compensating valve as a possible source of oxygen waste.

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6. Following is a summary of various circumstances which were graphically presented by [redacted]

I. Present System
Vol. 875 cu. in. x 2 cylinders
2000 lbs. in each cylinder

Consumption Conditions
30 min. ground and climb to 27M
Cabin alt 27M and 5.00 PSIA

Assumed Avg. Rates	Time
17.8 LPM - suit 5.50 PSIA	8 1/2 hrs.
18.75 LPM - suit 5.25 PSIA (Firewal Runs)	8 1/2 hrs.
22.20 LPM - suit 3.88 PSIA (U-2 alt)	8 1/2 hrs.

II. Present System with bottles charged to 2500 PSI
Vol. 875 cu. in. x 2 cylinders

Consumption Conditions
30 min. ground time and climb to 27M
Cabin at 27M and 5.00 PSIA

Assumed Avg. Rates	Time
24.8 LPM - suit 5.50 PSIA	8 1/2 hrs.
19.15 LPM - suit 5.25 PSIA	10 1/2 hrs.
18.30 LPM - suit 5.50 PSIA	10 1/2 hrs.

III. New bottles - 2" longer
Increased volume to 952 cu. in. x 2 cylinders
and charged to 2500 psi

Consumption Conditions
20 min ground and climb to 27M
Cabin at 27M and 5.00 PSIA

Assumed Avg. Rates	Time	Use emergency O_2 (120 cu. in.) at 20 LPM
20 LPM - suit 5.50 PSIA	10 1/2 hrs.	1 hr.
20.9 LPM - suit 5.25 PSIA (Firewal chamber)	10 1/2 hrs.	1 hr.
24.42 LPM - suit 3.88 PSIA (U-2 alt)	10 1/2 hrs.	1 hr.

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IV. New bottles - 6 1/2" longer
Vol. of 1125 cu. in. x 2 cylinders and
charged to 2500 PSI

Consumption Conditions
30 min. ground and climb to 27M
Cabin at 27M and 5.00 PSIA

Assumed Avg. Rate	Time
23.5 LPM - suit 5.50 PSIA	10 1/2 hrs.

V. New bottles - same as IV above except the bottles are charged to 2800 PSIA

Consumption Conditions
30 min. ground time and climb to 27M
Cabin alt 27M and 5.00 PSIA

Assumed Avg. Rate	Time
21.70 LPM - suit 5.50 PSIA	14 hrs.
23.45 LPM - suit 5.50 PSIA	12 1/2 hrs.
27.80 LPM - suit 5.50 PSIA	10 1/2 hrs.

7. After reviewing the above conditions it was decided that Firewel should proceed with installing 2500 lb. gauges and charge all present bottles to this PSI as soon as possible (Condition II above). Concurrently, they will order new bottles 6.5 inches longer which will accept 2800 PSI. 25X1 [redacted] will provide drawings which will confirm the new length and outside diameter. By May of this year all aircraft should be retrofitted with the longer bottles charged to 2500 PSI. This will meet conditions described in IV above. In the meantime the 2800 PSI capacity will be pursued. The reason for not going to 2800 PSI initially is that some problems are forecast at this pressure.

8. The pros and cons of using liquid oxygen were discussed and 25X1 [redacted] will look further into the possibility.

25X1 [redacted]

25X1 DD/OSA [redacted]
Distribution:
1-DD/OSA
2-C/DD/OSA
3-AD/SA
4-DD/OSA
5-DD/OSA
6-DD (Chrono)

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