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Approved For Release 2008/01/14 : CIA-RDP80T00246A001300090001-7

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INFORMATION REPORT

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COUNTRY
Hungary/USSR

SUBJECT
Technical Details on Hungarian Air Force MIG-17 and MIG-15 Aircraft

DATE DISTRIBUTED
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SUPPLEMENT TO REPORT #

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THIS IS UNEVALUATED INFORMATION

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[This report is the result of a joint collection effort by the Air Force and CIA, and is disseminated in accordance with the provisions of NSCID #7.]

1. Pestvideki Gepgyar was the main Hungarian Air Force inspection, repair, and overhaul depot, handling the following types of Hungarian Air Force aircraft during the periods indicated:

Up to May 1955:	YAK-9 and IL-10
May 1955 - November 1956:	MIG-15 series aircraft (MIG-15, MIG-15 bis, uti-MIG-15)
June 1956 - November 1956:	MIG-17

2. Pestvideki Gepgyar did not handle any Soviet Air Force aircraft.

3. The Hungarian Air Force had 200 MIG-15 and 60 MIG-17 aircraft assigned as of November 1956. After May 1955, all major inspection and repair of Hungarian Air Force MIG-15 series aircraft was done at the Pestvideki Gepgyar. The first four MIG-17 aircraft delivered to the Hungarian Air Force were received at Kecskemet airfield (46/56N - 19/45E) in September 1955. In June 1956, these first four Hungarian Air Force (HAF) MIG-17s arrived at Pestvideki Gepgyar for major inspection and overhaul. After June 1956, increasing numbers of HAF MIG-17s arrived at the Pestvideki Gepgyar for inspection and repair. As many as 20 MIG-17 aircraft were observed simultaneously at Pestvideki Gepgyar. This was the only Depot in Hungary handling the inspection and repair of HAF first line jet aircraft.

4. MIG-15 Aircraft:

[Collector's Comment: For later comparison purposes, and in order to judge source's reliability, source was questioned concerning the MIG-15 aircraft and he provided the following data.]

a) The MIG-15 was powered by one RD-45 engine developing 2500 kg of thrust with no augmentation.

b) The MIG-15 bis, called the "Eagle" by the Hungarians, was powered by one VK-1 centrifugal flow jet engine, developing 2700 to 2740 kg of thrust with no augmentation. 5950#-6030#

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25X1

c) On the MIG-15 bis:

1)	Cruise speed	760 km/hr
2)	Maximum dive speed	1050 km/hr
3)	Takeoff speed	180-190 km/hr
4)	Landing speed	180-220 km/hr
5)	Gross takeoff weight	5 metric tons
6)	Wing cathedral	1.70
7)	Fuselage length	10 meters
8)	"Theoretical" ceiling	15300 meters
9)	Practical ceiling	14000 - 15000 meters

The MIG-15 bis could reach the theoretical ceiling only under optimum flight test conditions. [Collector's comment: source did not know the rate of climb associated with the practical ceiling between 14000 to 15000 meters.] At 15000 meters most MIG-15 bis aircraft had no rate of climb remaining; the aircraft was not to be operated above the practical ceiling.

d) Bailout from the MIG-15 was feasible only below 700 km/hr. Due to the tendency of the pilot to strike the vertical fin during ejection, the early MIG-15 was fitted with an explosive charge to remove the top of the vertical fin prior to ejection.

e) The main maintenance break in the MIG-15 fuselage was located at the 13th frame, exactly mid-way along the fuselage length of 10 meters.

5. [Collector's Comment: To clarify which type of MIG-17 (FRESCO A, B, C, or D) that the source had seen, several general questions were asked to establish the type of MIG-17 aircraft inspected and repaired at the Pestvideki Gepgyar from June to November 1956. For initial general identification, source stated that all MIG-17s observed by him at the Pestvideki Gepgyar were equipped with afterburner engines, had speed brakes on both sides of the aft fuselage, had a radome above the nose air intake, and were equipped with range only radar. Within this description which applied to all MIG-17s he had seen, source stated that the Pestvideki Gepgyar had worked on MIG-17s of five separate series. The major differences between these series were the types of engines, placement of landing lights, instrumentation, and types and placement of associated equipment. Some MIG-17s had hydraulically operated landing gear; others had electrically operated gear. According to source, there were occasions when, of 20 MIG-17 aircraft in for inspection and repair, 17-18 would be different in some way. Source stated that although MIG-17s within a particular series from an individual factory would be fairly identical, MIG-17s built at another factory would have enough differences to make the repair and inspection process at the Pestvideki Gepgyar of considerable difficulty.] The Soviets removed almost all factory, nameplate, and other identification data from MIG-17 components before they arrived at the Pestvideki Gepgyar. The USSR did not provide the Hungarians with blue-prints marked with station numbers and other data; therefore the Hungarians were forced to create their own station number and identification data for aircraft components. The differences between individual MIG-17s and the lack of adequate blueprint data forced technicians at the Pestvideki Gepgyar to photograph each step in the disassembly process of each new type of MIG-17 to insure that the aircraft would be reassembled correctly. The electrical wiring-especially was usually a riddle. These MIG-17s were not old Soviet Air Force aircraft, but were delivered new to the Hungarian Air Force direct from Soviet factories.

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25X1

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6. The MIG-17 had a net weight of 5500 kg and a gross weight of 6500 kg when it was combat loaded with ammunition and had internal and external fuel. The combat load of ammunition weighed about 200 kg, and external fuel and tanker approximately 800 kgs. At this gross takeoff weight, the MIG-17 had a practical ceiling of 17000 meters with the afterburner operating. The afterburner, however, could be operated only for a maximum of three minutes, since the turbine blades would burn out if the afterburner was operated longer. As a result of this limitation, MIG-17s were rarely flown higher than 15,500 meters altitude. A MIG-17 had a maximum speed of 1200 to 1250 km/hr at sea level. Since the MIG-17 was designed for high speed, its low speed stability was less than that of the MIG-15. Due to the fact that the MIG-17 is not symmetrical, it tends to right wing drop at higher speeds, with a violent tendency to pitch down and roll to the right at speeds in excess of Mach .94, even though the Soviets gave a nominal Mach 1.2 maximum allowable speed in their specifications for this aircraft. The Soviet figure was based on a maximum performance flight conducted under optimum conditions. Because of several MIG-17 crashes resulting from loss of control above Mach .94, a stop, fastened by hooks and screws, was mounted on the throttle quadrant of all HAF MIG-17s to prevent speeds above Mach .94. Normal MIG-17 flight procedure involved takeoff and climb using external fuel, drop of wing tanks at 10,000 meters, switch to rear fuel tank, and then finally to main tank.

[On file [redacted] are four memory sketches (Figures 1-4) of the MIG-17] 25X1

7. The MIG-17 fuselage was of semi-monocoque construction with aluminum alloy skin, butt joined with flush counter sunk rivets. Length of the fuselage was 11.5 meters (1.5 meters longer than the MIG-15). MIG-15 and MIG-17 fuselage airframes were identical forward of the 13th frame [See Figure 1 - Point 1], each being five meters long. Aft of the 13th frame, the MIG-17 was 6.5 meters long whereas the MIG-15 was only five meters. The additional weight of the MIG-17 rear of the 13th frame was compensated for by the additional weight of electronic equipment forward with the result that the CG of the MIG-17 was only two inches lower than that of the MIG-15 just forward of the 13th frame. A tail skid was affixed to the ventral fin at the lower aft fuselage [See Figure 1 - Point 2]. A hydraulically-operated speed brake was located on both sides of the aft fuselage section [See Figure 1, Point 3]. The MIG-17 had a main fuel tank, made of rubberized material, located to the rear of the pilot and forward of the engine containing just under two thousand liters, and an auxiliary U-shaped rear tank around the tailpipe containing 250 liters. The MIG-17 was capable of carrying one 500 liter external tank, pylon mounted, under each wing. The maintenance and production break in all MIG-15 series and MIG-17 fuselages was at the 13th frame.

8. MIG-17 wing structure was the same as the MIG-15 wing structure. The rear or main spar was attached to the 13th frame. Angle of leading edge sweep back was 45 degrees. Cathedral was 2.0; the wing root was 247 centimeters long and had a thickness of 28 centimeters. The tip chord was 180 centimeters long with a maximum thickness of 14 centimeters. Wing span was the same as the MIG-15. Each wing had three flow fences. Wings were equipped with fowler type flaps. No MIG-17s have leading edge slots.

9. Empennage - both vertical and horizontal stabilizers were swept back at an angle of 45 degrees. Horizontal tail of the MIG-17 was an NACA 0008 airfoil section. [Collector's Comment: Airfoil actually had a Soviet designation but source and some of his associates calculated that the airfoil section was the same as the NACA section.] There are no MIG-17s with a variable incidence horizontal stabilizer. The scheduled major inspection of airframes was due at 300 hours.

10. Propulsion - All MIG-17s were equipped with one single compressor, single turbine, centrifugal-flow afterburner engine, but three different and interchangeable afterburner engines were installed in the MIG-17s. The three centrifugal flow engines were as follows:

a) VK-1 with a dry thrust of 2700 kgs, augmented thrust approximately 200 kgs higher. Total approximately 2900 kgs.

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b) VK-1A with a dry thrust approximately 100 kgs higher than the VK-1 or approximately 2800 kgs. Augmented thrust approximately 200 kgs higher. Total approximately three thousand kgs.

c) VK-1F with a dry thrust of three thousand kgs, augmented thrust approximately 200 kgs higher. Total approximately 3200 kgs.

11. This data was obtained from the Pestvideki Gepgyar translations of the official Soviet-supplied Handbook for Airframes and Powerplants accompanying each engine and each aircraft. Data in each Handbook was corrected after each test flight. The main differences between the three engines were thicker and stronger turbine and compressor blades in the VK-1A and VK-1F and slight changes in the exterior dimensions of the later model engines. There was no tail pipe liner on any of the afterburner VK-1 series engines. The entire afterburner nozzle protruded from the aft end on all MIG-17s at Pestvideki Gepgyar [See Figure 1 - Point 4]. This nozzle could be positioned by the pilot to any point between maximum and minimum by a lever control on the left side of the cockpit. The nozzle was a segmented type nozzle, actuated by a hydraulic cylinder mounted on the top side of the tailpipe, slightly to the left of center, which actuated all segments. Segments operated similar to cowl flaps, edges touching in open position, edges overlapping in closed position. Segments were shaped similar to an airfoil cross section. A new engine was operated for a 200 hour period prior to a complete scheduled overhaul. After one overhaul, the engine would be operated only 100 to 160 hours. The maximum permissible time at full throttle with the VK-1 series in afterburner was three minutes. The limit was due to the weakness of turbine blades which would burn and fly off. The Soviets use a one percent additive to fuel at the refinery for the purpose of lubricating fuel pumps and to prevent formation of ice crystals in fuel. I believe it was ethylene glycol, as is used in cooling systems of liquid cooled engines.

12. Electronics - the three major electronic components of the MIG-17s observed at Pestvideki Gepgyar were known by the Soviet designation as the UPN system. The entire system drew 700 watts total input when operated from a battery cart before starting engine. These three major components included:

a) Range-only aid-to-intercept radar [See Figure 2 - Point 1].

b) IFF [See Figure 2 - Point 2].

c) Tail warning radar [See Figure 2 - Point 3].

I do not know the Soviet or Hungarian designation for any of the system components, nor can I furnish extensive details on the radar systems of the MIG-17. There was only one Hungarian at the Pestvideki Gepgyar who had been cleared as politically reliable to do the actual repair work on radar components. I was permitted, however, to enter the room where radar components were inspected and repaired and have seen the "black boxes". When MIG-17 aircraft were flown to Budapest/Tokol airfield for major inspection at the Pestvideki Gepgyar, Soviet personnel removed the electronic radar components from the nose section of the aircraft behind tarpaulin covers after landing and prior to the actual delivery to the depot.

13. Aid-to-intercept radar - the nose radome was approximately 20-23 cm deep and was of an "anteater" configuration rather than perfectly symmetrical like the radome on the F-86D [See Figure 2 - Point 4]. The radome extended from the top of the fuselage almost to the aircraft midline at the nose air intake. The radome was of a plastic like material, non-inflammable, and painted silver like the rest of the aircraft. All MIG-17s delivered to Pestvideki Gepgyar had this radome bulge above the nose air intake but none had a radome mounted in the center or bottom of the nose air intake. The radome above the air intake contained a range-only radar. Range data obtained by this radar was presented in the cockpit to the left of the gun sight on a dial similar to the pedometer portion of an automobile speedometer. The antenna was not used

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in the nose radome for this range-only radar. When a target is picked up, a buzzer signal sounds in the cockpit. The radar can indicate a target at five km, and present accurate range data at two km. At a range of 10 km there is no contact. I do not know of any MIG-17s with more than a range-only radar and have never seen a cathode ray tube type presentation in a MIG-17 cockpit.

14. In an area beneath a large hatch behind the nose radome and forward of the cockpit were mounted radio receivers, two oxygen bottles, and a battery. This was also the area where the "black boxes" associated with the range-only radar were installed, but on all MIG-17s these "black boxes" had been removed for inspection and repair at the radar repair shop. I have seen one "black box" in this area, and did note on MIG-17s delivered to the Pestvideki Gepgyar that from this one black box in the nose area three cables with plugs and connectors at the free end led to an area directly in front of the cockpit instrument panel where they terminated without connection. Immediately adjacent to the termination of these cables was a large hole in the instrument panel [of unspecified size] over which a plain metal plate had been secured by screws. Several cables also ran forward and down from the same black box to unconnected terminations in the center of the nose air intake island. I recall that the entire lower half of the nose air intake island and an adjacent portion of the skin covering at the bottom of the nose air intake was removeable, being secured only by 24-30 Molly screws [See Figure 2 - Point 5]

15. IFF: the IFF components were mounted forward of the engine in the center lower fuselage [See Figure 2 - Point 2]. I know of no air-to-air IFF equipment installed in the MIG-17s used by the HAF. Identification was accomplished by a ground controller only. Each unit of 12 aircraft had its own coded IFF signal. On most MIG-17s a mast type antenna approximately 25 cm x 6 cm x 5 cm set in a ceramic insulator, protruding perpendicularly from the left side of the fuselage below the leading edge of the canopy about half way down to the wing [See Figure 3 - Point 2]. A manually operated destruction switch for IFF gear was located on the left side of the cockpit. The IFF system was self-destructive when a force of 10 Gs was applied to the aircraft. The MIG-17 aircraft used by flight leaders had more electronic equipment than the others. I observed MIG-17s with a vertical mast antenna rising perpendicularly from the fuselage just to the rear of the 13th frame [See Figure 3 - Point 3]. I also saw one MIG-17 with three mast type antennas, one located on the upper right side of the fuselage just to the rear of the canopy, the second on the upper left side of the fuselage near the leading edge of the canopy, and the third below and behind the second about half way between the canopy and the wing [See Figure 3 - Point 1 and Point 2]. I also have seen a MIG-17 with a mast antenna on the lower left side of the fuselage near the leading edge of the wing [See Figure 3 - Point 4]. I have never seen a MIG-17 with any sort of a tearshaped radome beneath the left center portion of the fuselage. However, I have seen an electronic shipment arrive at the Pestvideki Gepgyar from the USSR containing a large tear-shaped object with a metal-like finish. Packed with this object in a nylon bag were various electrical plugs and connectors. The tear-shaped object had holes for screws around its perimeter.

16. Tail warning radar - A tail warning radar device was located in the vertical stabilizer at a point immediately adjacent to and touching the rear of the HAF star insignia [See Figure 2 - Point 3]. Access to this equipment was obtained through a circular opening approximately 38 cm in diameter on the left side of the vertical stabilizer. I have never seen the equipment itself nor do I know the type and location of the radar antenna used. I know of no plastic or plexiglass type material used anywhere in the empennage area except the top of the vertical fin which was of plexiglass material. The rearmost point of the junction of the vertical and horizontal stabilizers had provision for the fitting of a plastic cone shaped object approximately eight cm in diameter which was a navigation light. The narrow diameter cables led from the center of the vertical stabilizer to this junction point. In addition, mountings for cables of larger diameter also traversed the same route. The Soviets retained the electrical wiring to the tail that they had formerly used in the MIG-15 to detonate the tail explosive device which was located at the same point in the vertical stabilizer

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25X1

in which the MIG-17 tail warning radar equipment was installed. The effective range of this tail warning radar was 600 meters. When a target was picked up, a red light indicater flashed on the instrument panel in the cockpit.

17. Armament:

a) Guns - The MIG-17 had the same armament as the MIG-15, 1 x 37 mm gun and 2 x 23 mm guns. The MIG-17 carried 80 rounds for the 37 mm gun and 160 to 180 rounds for each of the 23 mm guns. Both guns had a muzzle velocity of 200 meters per second. The 37 mm gun had a rate of fire of 600 rounds per minute and the 23 mm guns had a rate of fire of 800 rounds per minute each. The 37 mm gun had the designation NC 37 (NS37) and the 23 mm gun had the designation NPC 23 (NRS23). All three guns on the MIG-17 were bore sighted at Budapest/Tokol for an impact area the size of a man's hand at a range of 400 meters.

b) Bombs - The MIG-17 was capable of carrying a 100 kg bomb on each pylon.

c) Rockets - The MIG-17 was capable of carrying a package of seven air-to-ground rockets on each pylon. These rockets were approximately 15 to 18 centimeters in diameter and two meters long. At the pylon suspension location, the wing chord is 180 cm. Installed rockets extended approximately 20 cm aft of the trailing edge of the wing with rocket noses in line with the leading edge of the wing. They were packaged in such a way that seven of them occupied about the same frontal area as an external fuel tank. The burn-out velocity of the rockets was 1500 meters per second. The main rocket body was approximately 180 cm in length and the fins were approximately 20 cm in length. Each rocket had four fins. I do not know the weight of each individual rocket nor the size of the warhead. I believe that the rocket warhead was approximately 1/3 or 1/2 the weight of the entire rocket. The rocket package rack was attached to the pylon at five points of suspension. Rockets were fired singly by the pilot. Rockets used a solid propellant. I have no knowledge of any air-to-air rockets, guided or unguided, being used by either the HAF or SAF in Hungary.

[On file] are Figures 5 and 6 of the above rockets.] 25X1

d) Gun Sight - The MIG-17 gun sight was located atop the fifth frame about 25 cm in front of the pilot's face. The designation of the sight was indicated by a label reading HC7 (NSP). Gun laying and firing was accomplished manually using this sight. As the pilot read the radar range from the indicator dial to the left of the gun sight, he manually fed the indicated range into the sight by a twisting action on the throttle handle. Range dial on the sight was calibrated from 400 to 800 meters. A total of nine separate range circles could be projected on the sight depending on the range data manually fed into the sight. Range circles appeared for ranges between 800 and 400 meters in 50 meter increments. All HAF pilots were required to study and memorize the wing span of all potential enemy aircraft.

18. Rearview Mirror - due to a blind spot behind the pilot, the MIG-17 was equipped with a prismatic rear view periscope set in the canopy just above and forward of the pilot's head. The top of the periscope protruded slightly from the canopy. When the pilot received a red light warning from his tail warning radar, he could manually flip down the visor type mirror and achieve rear vision in a vertical scan of 0 degrees to plus 45 degrees and horizontally 45 degrees to either side.

19. Pitot head - All MIG-17s had only one pitot static head located on the right wing approximately one-quarter of the distance in from the tip. There was no automatic coupling from the pitot tube to the speed brakes. Speed brakes were pilot-activated only by a push button on the control column.

20. Landing gear wells - when the main gear was retracted, the wheels touched the skin surface of the upper surface of the wing.

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21. Electronic gear - there were two black boxes mounted on the gun tray, one of which was connected to the radio altimeter. Each of these boxes measured approximately 40 cm x 40 cm x 13 cm. I did not know the function of the second box.

22. Loop antenna - the radio compass loop antenna was installed in any of three different locations depending on the individual MIG-17:

a) On top of the fuselage just forward of the 13th frame, in a rectangular plastic mounting approximately 38 cm long, 18 cm wide, protruding three cm above the skin surface.

b) On top of the fuselage just aft of the 13th frame in an identical mounting to "a" above.

c) On the lower aft fuselage approximately 3/4 of the way back in a circular flush mounting approximately 38 cm in diameter.

23. Marker beacon - a marker beacon was included inthe MIG-17. A bell sounded when the aircraft was over a check point.

24. Radio altimeter - a radio altimeter is installed in the aircraft. Dipole antennas for this altimeter were located under each wing.

25. Navigation aids - Other than radio compass, marker beacon, and radio altimeter, I knew of no additional equipment. Landing could be controlled by a ground unit via radio communications when necessary. A system was employed by the HAF whereby signals were obtained from two radio stations in the broadcast band at Budapest and Belgrade. The pilot could position himself in relation to the direction of these signals. When lost, HAF pilots were instructed to fly north to avoid landings or crashes in Yugoslavia and probable internment. Some HAF pilots deliberately became "lost" in order to visit airfields in Poland and Czechoslovakia.

26. VHF equipment - MIG-17s were equipped with a VHF command transceiver which had five crystal controlled channels. The pilot manually changed crystal units to change frequency upon direction of the ground controller or flight leader. No other tuning was necessary. The radio could be tuned manually, however, when crystals were removed.

27. Hydraulic boost - On all MIG-15 series and MIG-17 aircraft, the engine powers a hydraulic system for aileron boost operating at 60 atmospheres. The MIG-17 has no boost for elevator control. An electric motor designated the UT-6 powered elevator trim tabs.

28. Fuel pressurization - All MIG-17 fuel tanks were pressurized to 0.3 atmospheres by engine bleed for the purpose of assisting electronic fuel transfer pumps. A pressure regulator was located on top of the 13th frame which controlled both cockpit and fuel tank pressurization.

29. Storage batteries - the MIG-17 has two electrical storage batteries, one under the forward hatch and the second at an unspecified location.

30. Cockpit cooling - no mechanical refrigeration for cockpit cooling was used on the MIG-17, and I know of no Soviet use of this on other aircraft. MIG-17 cockpit ventilation was similar to that in the MIG-15.

31. Microphone - HAF pilots of the MIG-17 were equipped with a throat microphone. I have never seen the HAF using microphones installed in the oxygen mask.

32. Emergency equipment - MIG-17 pilots were equipped with seat-style emergency parachutes. Upon ejection, the seat automatically released from the pilot and activated parachute deployment. Full deployment of the ribbontype parachute took 15 seconds. There was no provision for free fall and delayed opening when ejecting at extreme altitudes. Pilots were equipped with an emergency bail out bottle which had to be connected to the oxygen mask prior to ejection. The bottle is filled to 150 atmospheres pressure but I do not know how long the bottle would provide sufficient oxygen during parachute descent.

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25X1

33. Anti-G suits - MIG-17 pilots use an anti-G suit giving 270 mm pressure above ambient pressure. I know of no pressure suit developed by the Soviets.

34. Airspeed indicator - MIG-17 airspeed indicator had no temperature compensation device.

35. Ejection seat - the MIG-17 ejection seat had a face blind firing mechanism which fires the canopy as the pilot pulls the blind down, firing the seat when it is fully down. Standard ejection procedures, however, included ejection through the canopy if necessary. The seat is made to break a hole through the canopy through which the pilot passed.

/On file [redacted] are the sketches mentioned in the above report. 25X1
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[redacted] SKETCH OF MIG-17

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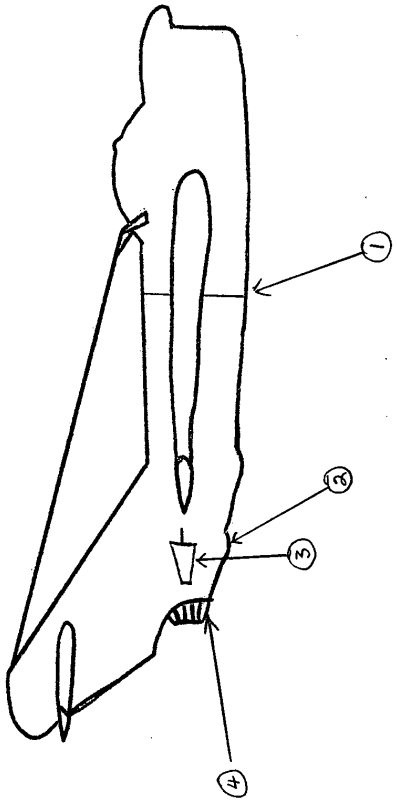
retouched by interviewer

FIGURE 1



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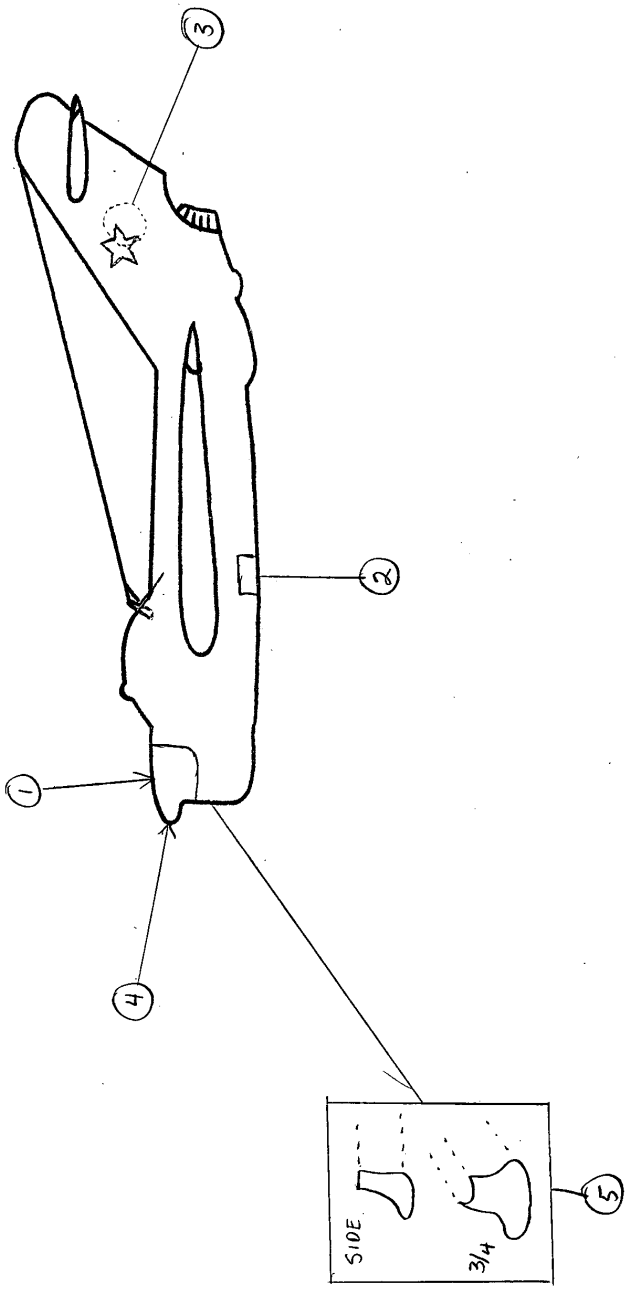
[redacted] SKETCH OF MIG-17 25X1

RETOUCHED BY INTERVIEWER

figure 2



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[redacted] SKETCH OFMIG-17

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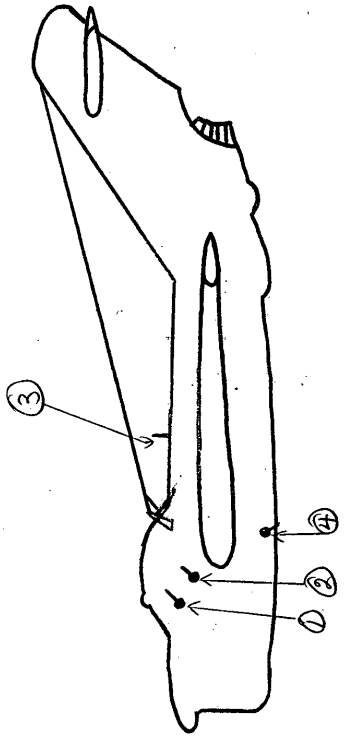
FIGURE 3



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[redacted] SKETCH OF MIg-17 25X1

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FIGURE 4

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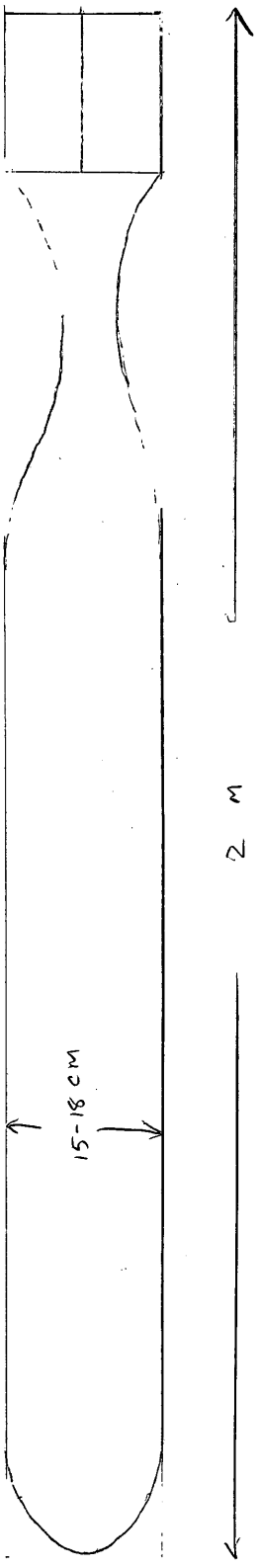
[redacted] SKECTH OF ACFT ROCKET 25X1

REDRAWN BY INTERVIEWER

FIGURE 5



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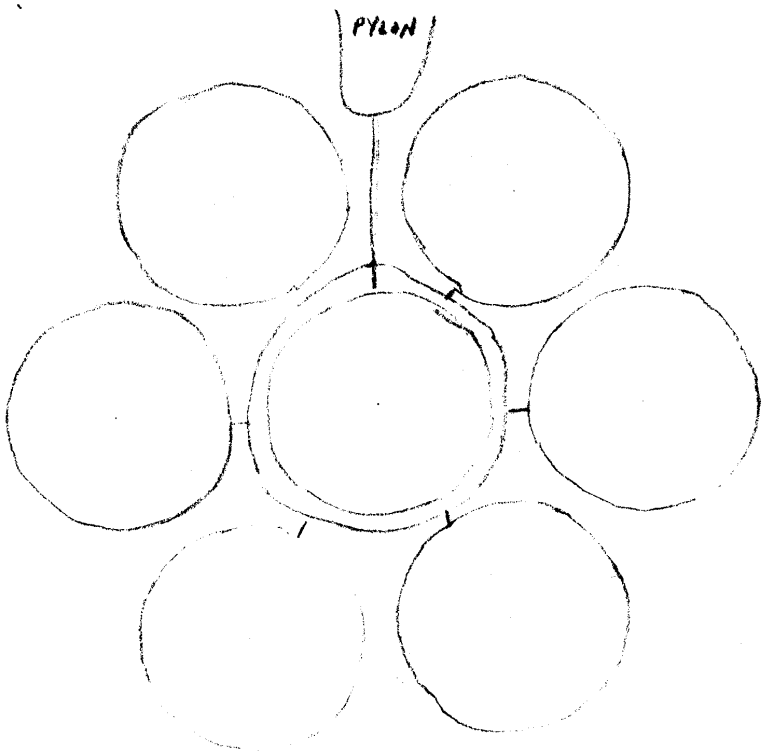
[redacted] SKETCH OF ROCKET PACKAGE

REDRAWN BY INTERVIEWER

FIGURE 6



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