

CENTRAL INTELLIGENCE AGENCY

TELETYPED INFORMATION REPORT

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CLASSIFICATION [REDACTED]	DISSEMINATION CONTROLS [REDACTED]
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DATE DISTR. 9 NOVEMBER 1957	PRESERVE <input type="checkbox"/>	PRIORITY
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COUNTRY USSR	PLACE ACQUIRED [REDACTED]	ROUTING <input type="checkbox"/>
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SUBJECT ANALYSIS OF SOVIET EARTH SATELLITE AND LAUNCHING DEVICE

DATE OF INFO [REDACTED]	REFERENCES [REDACTED]
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APPRAISAL OF CONTENT (TENTATIVE) OPINION

SOURCE [REDACTED]

1. THE TOTAL THRUST OF THE SECOND SOVIET SATELLITE (SPUTNIK II) MUST HAVE BEEN 1,000 TONS OR MORE, AND ITS WEIGHT AT LAUNCHING MUST HAVE BEEN 500,000 KILOGRAMS OR 500 METRIC TONS. THIS CONCLUSION IS BASED ON CALCULATIONS EMPLOYING A THOUSAND-TO-ONE RATIO OF TOTAL WEIGHT TO PAYLOAD WEIGHT AT LAUNCHING. IF IT IS TRUE, THEREFORE, THAT THE PAYLOAD WEIGHT WAS APPROXIMATELY 500 KILOGRAMS, THE TOTAL WEIGHT AT LAUNCHING OF THE THREE-STAGE ROCKET MUST HAVE BEEN 500,000 KILOGRAMS.
2. THE TYPE OF FUEL EMPLOYED IS DIFFICULT TO DETERMINE, BUT IT MUST HAVE BEEN A COMBINATION OF KEROSENE AND LIQUID OXYGEN. THE USSR HAS USED THIS FUEL IN PREVIOUS TESTS AND HAS DONE CONSIDERABLE RESEARCH TO IMPROVE METALS USED IN COMBUSTION CHAMBERS FOR SUCH FUEL MIXTURES. KEROSENE AND LIQUID OXYGEN GIVE A HIGH COMBUSTION TEMPERATURE AND HIGH EXHAUST VELOCITY; THE COMBUSTION PRESSURE IS BELIEVED TO BE HIGHER THAN IN AMERICAN ROCKETS.
3. ALTHOUGH A FUEL MIXTURE OF KEROSENE AND LIQUID OXYGEN IS KNOWN TO PRODUCE HIGH EXHAUST VELOCITY, UTILIZATION OF THIS ADVANTAGE DEPENDS ON IMPROVEMENTS

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IN METALLURGICAL TECHNOLOGY: THAT IS, IN THE DEVELOPMENT OF SPECIAL STEELS AND COOLING SYSTEMS. THE SOVIET UNION MUST HAVE MADE ADVANCES IN THIS FIELD IF IT

USED THE KEROSENE-LIQUID OXYGEN FUEL MIXTURE.

4. THE JET EXHAUST VELOCITY WHEN USING KEROSENE-LIQUID OXYGEN FUEL MAY REACH 3,000 METERS PER SECOND. CONSIDERING IT POSSIBLE THAT THIS HAS BEEN ACHIEVED, THE USSR MAY NOW BE WORKING ON A FUEL MIXTURE OF HYDROGEN AND LIQUID OXYGEN WHICH MAY PRODUCE JET EXHAUST VELOCITIES OF AS HIGH AS 5,000 METERS PER SECOND.

5. IT IS BELIEVED THAT 95 PERCENT OF THE INITIAL WEIGHT OF THE SPUTNIK II ROCKET WAS FUEL.

6. THE LAUNCHING OF TWO EARTH SATELLITES MUST BE CONSIDERED A STUPENDOUS SCIENTIFIC ACHIEVEMENT. IT DOES NOT APPEAR THAT THESE SATELLITES CAN BE EMPLOYED FOR WAR PURPOSES SINCE THEIR TRAJECTORY IS SO PRECISE THAT THEY CAN BE DESTROYED BY ROCKETS SUCH THE "FAR SIDE" ARMED WITH ATOMIC WARHEADS. THE SUCCESSFUL LAUNCHING OF THESE SATELLITES DOES INDICATE, HOWEVER, THAT THE USSR HAS PERFECTED AN ICBM WHICH THEY CAN PUT ON ANY DESIRED TARGET WITH ACCURACY.

COMMENT: EVALUATION REQUESTED OSI, NAVY, ARMY, AIR

FIELD DIST. NONE

(END OF MESSAGE)