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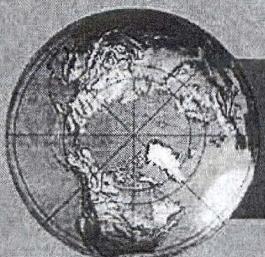
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OVERHEAD view of recent Paris Air Show. For details on the Soviet transports shown see article beginning page 36.

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FOREWORD

MISSION: The mission of the monthly *Defense Intelligence Digest* is to provide all components of the Department of Defense and other United States agencies with timely intelligence of wide professional in-

terest on significant developments and trends in the military capabilities and vulnerabilities of foreign nations. Emphasis is placed primarily on nations and forces within the Communist World.

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JOSEPH F. CARROLL
 Lt General, USAF
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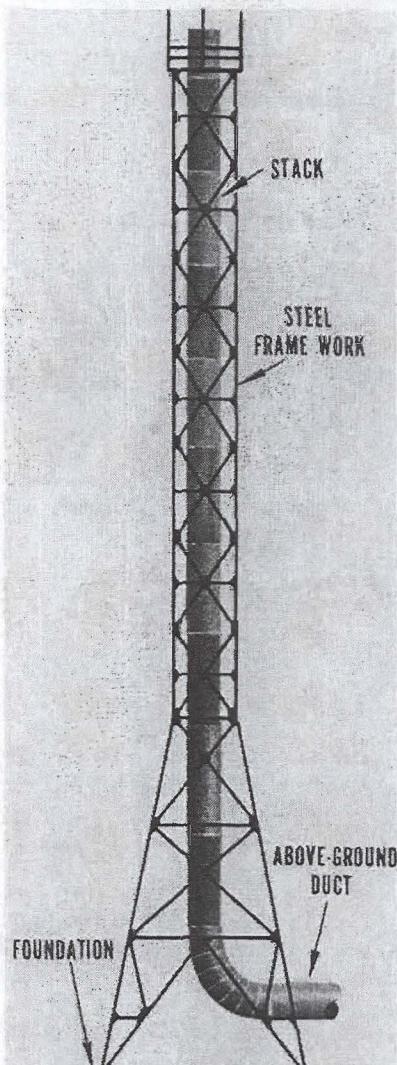
CHANGING ROLE FOR KHIMKI IN THE SOVIET AEROSPACE PROGRAM

Construction of a new test tower, in conjunction with certain published diagrams and definite interests expressed in the writings by a noted Soviet missile designer, indicate an expanded liquid-propellant role has been initiated for Khimki 456 in Soviet missile and space programs

SINCE 1946 and the arrival of German missile specialists and their equipment, Khimki 456—officially known as Moskva Missile and Space Propulsion Development Center (MMSPDC) Khimki 456—has been associated with the development of liquid-propellant engines. The plant covers about 200 acres and has a floorspace of approximately 1.4 million square feet, almost 1.3 million of which is in one building. Khimki 456 includes three, possibly four, liquid rocket engine test stands. Two sections share the floorspace: the Special Design Bureau (OKB) headed by V. P. Glushko, and Production Plant 456.

The major concern at Khimki has been the development of large, progressively higher thrust rocket engines. Historically the facility also has produced templates and tooling for the main series producer of each engine and provided guidance in the initial production stages. This production role was exemplified by the Dnepropetrovsk Missile Development and Production Center, which produced engines as well as airframes for the short-, medium-, and intercontinental-range ballistic missiles.

In 1966 a new structure was reported in the Khimki test-stand area. The structure emerged as a tower having a height of 325 feet and a diameter of 23 feet. While the tower's function cannot be determined, its probable purpose is to vent toxic fumes resulting from testing high-energy propellants such as fluorine or a fluorine compound. Such a purpose is partially substantiated through comparison of the tower with a drawing of a similar structure, illustrated in



TOWER diagram as shown in Soviet press. [U]

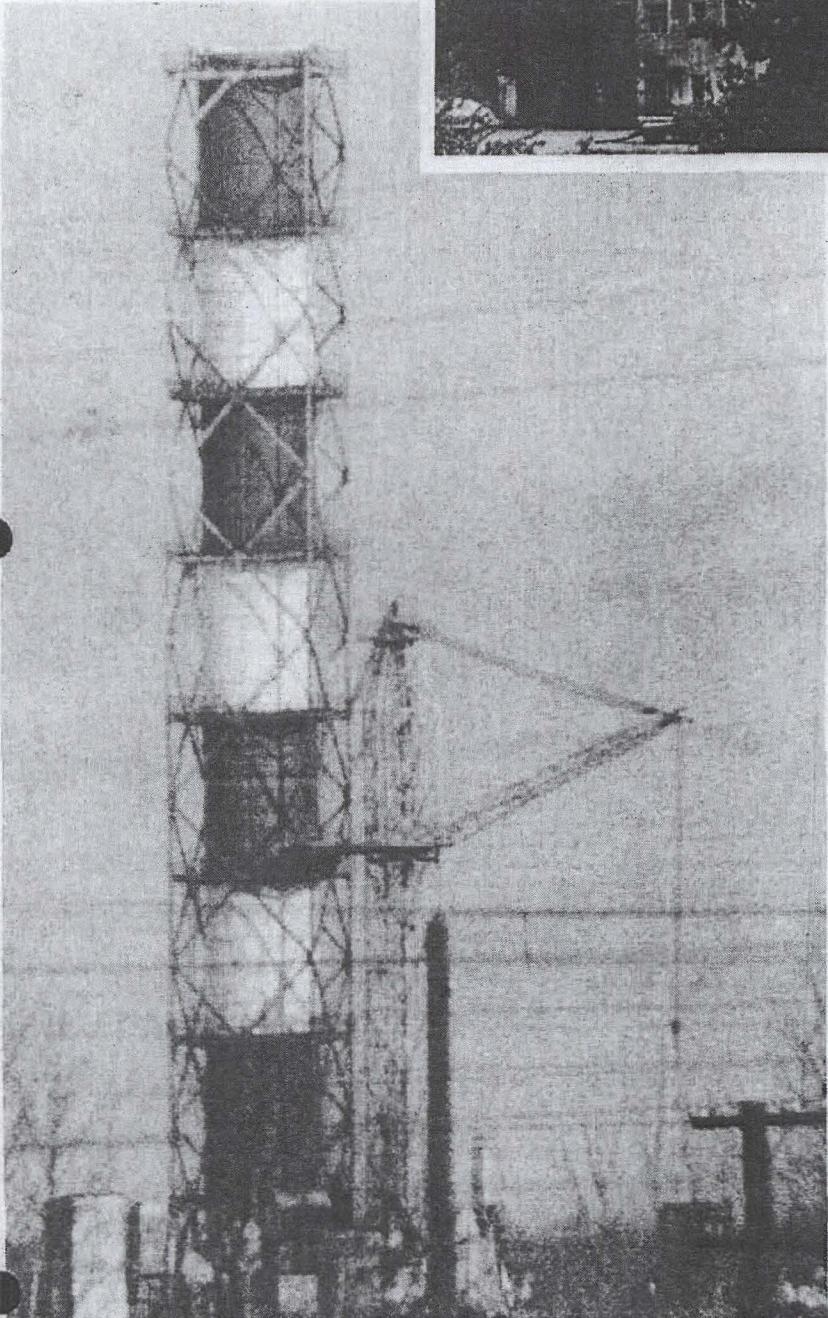
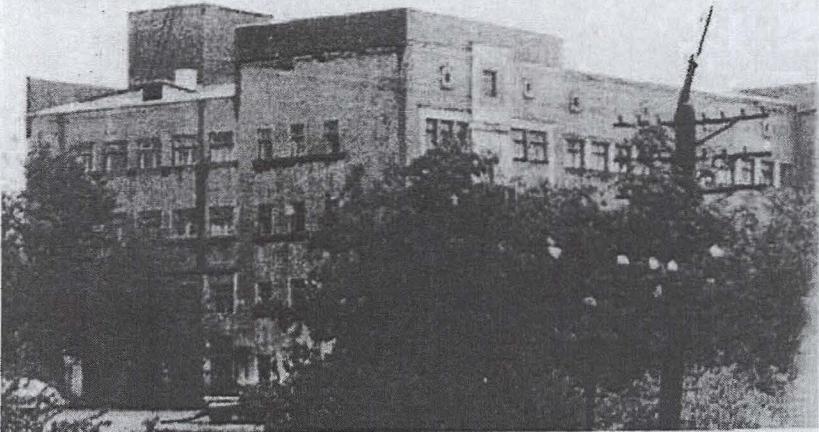
a Soviet publication, identifying the tower as part of a venting system for toxic fumes.

The venting and dispersion of toxic fumes can take one of several forms. Fumes can be vented directly from the test stands through a high stack directly into the atmosphere. This system is acceptable unless the fumes are heavy and of such persistency that they will not dissipate before reaching the ground, possibly endangering a populated area. Another method is to pass the fumes through a filter-and-washdown process that collects the heavy toxic particles and vents fumes that are either nontoxic or have been reduced to a safe level of toxicity. The latter method probably would be used since Khimki is in a highly industrialized, populated area.

The tower might also be part of a high-altitude simulation apparatus employed to produce upper atmospheric conditions in testing upper-stage engine performance. It may serve both venting and simulation functions.

If Khimki 456 is involved in toxic venting and high-altitude simulation, its future role may concentrate on high-energy propellants and upper-stage or space propulsion systems. This is a logical step, since the size of the older test stands precludes their use in the development of the large high-thrust, single-chamber engines required for future boosters. Development of engines for large boosters may now be a function of the Zagorsk Rocket Engine Test Facility, about 40 miles northeast of Khimki. This installation historically has been associated with OKB 456 and is known to have a large test stand.

EXTERNAL view of part of Khimki propulsion center near Moscow at right; new 325-foot test tower under construction below. 181



Further evidence supporting a new role for Khimki in the development/production of high-energy propellants and upperstage or space propulsion systems may be found in the writings of a "Professor Georgiy V. Petrovich," a probable *nom de plume* of Valentin Petrovich Glushko, the chief designer at OKB 456. His writings in late 1965 show a preoccupation with the specialized space propulsion systems used for the Luna, Cosmos, Vostok, Voskhod, Polyut, Elektron, Zond, Molniya, and, by inference, Soyuz vehicles.

The Soviets have shown an interest in fluorine compounds. While these represent the most likely choice for high-energy fuels, other compounds, such as the boron-based fuels, should not be ruled out. Numerous reports over the years indicate that the Soviets are either using improved liquid fuels or investigating the use of other additives, including aluminum, beryllium, boron, magnesium, sodium, lithium, silicon, and their compounds. More recently, Soviet officials have procured an unclassified US document concerning the reaction of fluorine and fluorine-oxygen (FLOX) mixtures on various types of materials. While not conclusive by itself, this expressed interest in high-energy propellants, coupled with the new structure at Khimki 456 and the interest of the chief designer of OKB 456 in space propulsion systems, suggests a probable new propellant role for Khimki 456. Because of the extensive demands of the missile and space programs, requirements may call for further expansion of development, test, and production facilities. [END]