



Fig. 12.14. Launch of the first MX-774 (RTV-A-2) on 13 July 1948 at White Sands Proving Ground. Photo courtesy of Karel J. Bossart, Jr. and U.S. Air Force.

alcohol fuel and liquid oxygen oxidizer into the combustion chamber. The engines developed specific impulse 210 s at sea level, comparable to that of the V-2.

The launches of the MX-774 were not entirely successful, but the engines worked up to one minute and the new lightened structure was successfully demonstrated. The swiveling engines perfectly controlled rocket attitude and flight path. In short, the basic missile concepts have been validated. During the first flight, for example, the vehicle deviation from the nominal path did not exceed 11 ft (3.3 m). The three test vehicles reached altitudes 1.2, 24, and 30 miles (1.9, 39, and 48 km), respectively.

After cancellation of the MX-774 program by the Air Force, Convair continued some of its work on long-range ballistic missiles, mostly further “paper” studies of the con-

### **MX-774 Test Flights**

### **Convair Carries On**

#### **INDEPENDENT DEVELOPMENT OR ESPIONAGE?**

In March 1947, the leading Soviet rocket designer Sergei P. Korolev gathered his engineers and outlined for them a new approach to the design of ballistic missiles. One of the engineers, Georgii S. Vetrov, recalled (Vetrov 1986) that Korolev suggested the use of two new features in future rockets, separation of the nose cone and making propellant tanks supporting elements of rocket structure.

It is possible that these Korolev's ideas grew out, logically and independently, of the Soviet work focused at that time on reproduction of the German V-2.

It is not excluded, however, that Korolev gleaned some insight from the MX-774 program in San Diego. The Soviet missile espionage in the United States likely followed the same pattern as the highly successful theft of nuclear secrets. The KGB and the military intelligence GRU provided the obtained information only to the very few top Soviet scientists and engineers. These trusted specialists subsequently introduced American discoveries and designs into their projects without revealing the sources to their subordinates. In case of the atomic bomb, for example, the head of the Soviet nuclear program Igor V. Kurchatov reportedly played such a role. Assuming the same pattern in guided missiles, Korolev would have most likely been among the very few persons briefed about the details and achievements of secret American programs.

So, were the innovations proposed by Korolev a logical development of the Soviet missile work or results of the espionage on the MX-774? The answer is likely preserved in the Russian archives.

**M. Gruntman**  
*Blazing the Trail. The Early History of  
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# Blazing the Trail

## The Early History of Spacecraft and Rocketry

**Mike Gruntman**

**AIAA, Reston, Va., 2004**

ISBN 156347705X; 978-1563477058

**505 pages with 340 figures**

**Index: 2750+ entries, including 650 individuals**

This book presents the fascinating story of the events that paved the way to space. It introduces the reader to the history of early rocketry and the subsequent developments which led into the space age. People of various nations and from various lands contributed to the breakthrough to space, and the book takes the reader to far away places on five continents.

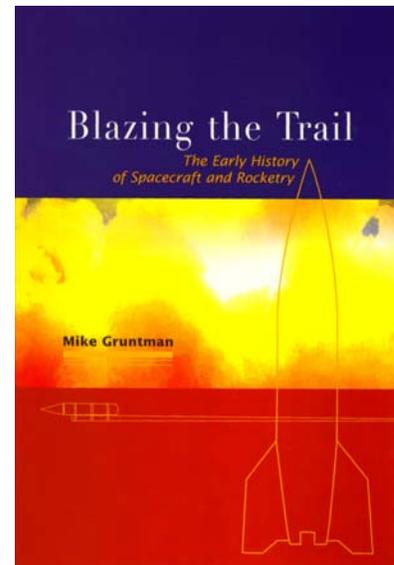
This world-encompassing view of the realization of the space age reflects the author's truly unique personal experience, a life journey from a child growing on the Tyuratam launch base in the 1950s and early 1960s, to an accomplished space physicist and engineer to the founding director of a major U.S. nationally recognized program in space engineering in the heart of the American space industry.

Most publications on the topic either target narrow aspects of rocket and spacecraft history or are popular books that scratch the surface, with minimal and sometimes inaccurate technical details.

This book bridges the gap. It is a one-stop source of numerous technical details usually unavailable in popular publications. The details are not overbearing and anyone interested in rocketry and space exploration will navigate through the book without difficulty. The book also includes many quotes to give readers a flavor of how the participants viewed the developments. There are 340 figures and photographs, many appearing for the first time.

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Book details (including **index** and **reviews**) at: <http://astronauticsnow.com/blazingthetrail/>

About the author. Dr. Mike Gruntman is professor of astronautics at the University of Southern California. Accomplished physicist, Mike is actively involved in research and development programs in space science and space technology. He has authored and co-authored 300 scholarly publications, including 4 books.