EXPLORER AND VANGUARD

Bumpy Road

The road to the American satellite was bumpy, to say the least. The early enthusiasm about Earth-orbiting satellites in the immediate after-the-war years had gradually dissipated as a result of lack of government support. Not all activities, fortunately, stopped: dedicated space enthusiasts continued to publish scientific articles advocating small research satellites, and RAND was evaluating the utility of spacecraft for overhead reconnaissance.

The same exigencies of the Cold War that had called for the ICBM pointed to satellite reconnaissance as a top national security priority. The studies performed by RAND with close participation of industrial contractors culminated in a report, issued in March 1954, on the Project Feed Back describing a military satellite equipped with a television camera. In addition, technology was rapidly advancing in many areas important for spacecraft, such as invention of the transistor in 1947 and practical (silicon-based with reasonable efficiency) solar cells in 1953, enabling significantly more efficient and capable satellites.

Converging Developments

Several converging developments in the early 1950s would lead to the American satellite. In 1952, the *International Council of Scientific Unions* approved the concept of the International Geophysical Year. Subsequently, the National Academy of Sciences formed the United States National Committee for the IGY. The Committee was chaired by Joseph Kaplan who headed the University of California's *Institute of Geophysics*, later known as *Institute of Geophysics and Planetary Physics* (IGPP), since its foundation in 1944.

IGY

An American scientist, Lloyd V. Berkner, was a key figure in formulating and advancing the concept of the IGY. Subsequently he served as vice president of a special international committee arranging and coordinating the IGY activities. At its meeting in Rome, Italy, in October 1954, the committee accepted a proposal by

PLAN FOR IGY

The plan for a third International Polar year, later broadened in scope and renamed the International Geophysical Year 1957-1958, originated on April 5, 1950, at a small dinner party of geophysicists at my home [in] ... Silver Spring, Maryland. The basic concept was put forward by Lloyd V. Berkner. He and Sydney Chapman were principally responsible for developing and enlarging the concept to a persuasive level of detail and potential implementation, with the help of suggestions by others present: Ernest H. Vestine, J. Wallace Joyce, S. Fred Singer, my wife Abigail, and myself ... .

Following the dinner, as we were all sipping brandy in the living room, Berkner turned to Chapman and said, “Sydney, don't you think that it is about time for another international polar year?” Chapman immediately embraced the suggestion, remarking that he had been thinking along the same lines himself. The conversation was then directed to the scope of the enterprise and to practical considerations of how to contact leading individuals in a wide range of international organizations in order to enlist their support. The year 1957-1958, the 25th anniversary of the second polar year and one of anticipated maximum solar activity, was selected. By the close of the evening Chapman, Berkner, and Joyce had agreed on the strategy of proceeding.

James A. Van Allen, 1982
(Van Allen 1984, 49)

Fig. 15.12. Redstone (left) and Jupiter C (right) missiles at the U.S. Space and Rocket Center in Huntsville, Alabama. The Jupiter C consisted of the elongated Redstone as the first stage and added upper stages of clusters of scaled-down solid-propellant Sergeant rockets. The Jupiter C was developed for the Army program to test the nose cone reentry and demonstrated that it was capable of launching an Earth satellite in 1956. The Army proposed to use this launcher for Project Orbiter in 1956. Photo courtesy of Mike Gruntman.

Small Satellites for Scientific Purposes

American scientists (Berkner, Kaplan, Fred Singer, Homer E. Newell, Jr., James Van Allen, and several others) to recommend "that the thought be given to the launching of small satellite vehicles, to their scientific instrumentation, and to the new problems associated with the satellite experiments ..." (Green and Lomask 1971, 23). The National Academy of Sciences actively advocated and lobbied through various parts of the Eisenhower administration the idea of preparing and launching American scientific satellites as part of the IGY.

Project *Orbiter*

In September 1954, von Braun's group in Huntsville produced a report entitled "The Minimum Satellite Vehicle Based upon Components Available from Missile Development of the Army Ordnance Corps." The report argued that a 5-lb (2.2-kg) Earth-circling satellite could be placed in orbit using existing Army missile hardware by adding clusters of solid-propellant Loki rockets to the modified Redstone rocket serving as the first stage. In a couple of months, the Army and the Navy joined the resources of the ABMA's organization in Huntsville, Jet Propulsion Laboratory, Office of Naval Research, and several industrial contractors in what was become known as *Project Orbiter*. The Navy took the responsibility for the payload and tracking facilities, while the Army's tasks included modifying the Redstone and developing the Loki rocket clusters.

Sergeant

Army's JPL conducted a feasibility study in support of Project Orbiter and suggested the substitution of the scaled-down Sergeant solid-propellant rockets, under development at JPL at that time, for the Loki rockets. This improvement should

M. Gruntman, *Blazing the Trail. The Early History of Spacecraft and Rocketry*, AIAA, Reston, Va., 2004 p. 349

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Blazing the Trail

The Early History of Spacecraft and Rocketry

Mike Gruntman

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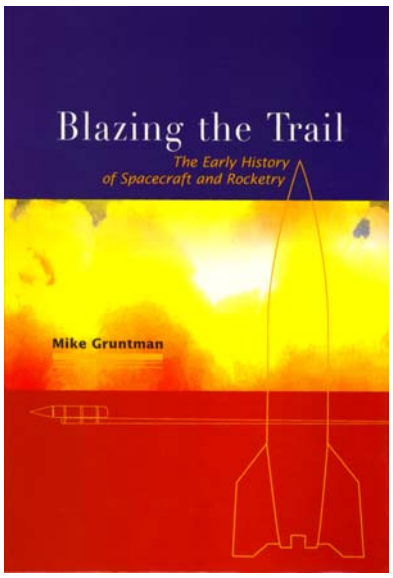
505 pages with 340 figures
Index: 2750+ entries, including 650 individuals



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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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 nearly 300 publications, including 4 books.

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