# Rocket Engine Test Facility Design

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*Hearings* Springer Science & Business Media
In support of plans to add a second control room to the Rocket Engine Test Facility at NASA, Cleveland, OH, the existing control room was analyzed to determine the most severe accidental explosion it could safely withstand. This potential accident was used as the design threat to develop a preliminary design for the new control room. The analysis and design calculations were based on procedures from Army TM 5-1300/NAVFAC P-397/AFM 88-22 and the computer program CBARCS, which automates some of the procedures in the manual. To evaluate the degree of conservatism in the analysis, experimental data with charge weights and structural dimensions similar to the control room's were selected and analyzed. Results indicate that the existing room will safely withstand an explosion equivalent to 1,000 lb of TNT detonated at the rocket test stand 20 ft away. To survive the same accident, the new control room (to be constructed on top of the old one) should have 1-ft thick walls existing walls are 2 ft thick with 0.33% reinforcement (existing walls have 1.55%). Comparison of data with analysis indicates that an accidental explosion equivalent to approx. 1,800 lb of TNT will cause unacceptable damage to the control room. This analysis results in a much more economical design for the new control room than would be achieved by constructing a new room identical to the old control room.

NASA Thesaurus Blast Analysis and Design of Rocket Engine Test Facility Control RoomsIn support of plans to add a second control room to the Rocket Engine Test Facility at NASA, Cleveland, OH, the existing control room was analyzed to determine the most severe accidental explosion it could safely withstand. This potential accident was used as the design threat to develop a preliminary design for the new control room. The analysis and design calculations were based on procedures from Army TM 5-1300/NAVFAC P-397/AFM 88-22 and the computer program CBARCS, which automates some of the procedures in the manual. To evaluate the degree of conservatism in the analysis, experimental data with charge weights and structural dimensions similar to the control room's were selected and analyzed. Results indicate that the existing room will safely withstand an explosion equivalent to 1,000 lb of TNT detonated at the rocket test stand 20 ft away. To survive the same accident, the new control room (to be constructed on top of the old one) should have 1-ft thick walls existing walls are 2 ft thick with 0.33% reinforcement (existing walls have 1.55%). Comparison of data with analysis indicates that an accidental explosion equivalent to approx. 1,800 lb of TNT will cause unacceptable damage to the control room. This analysis results in a much more economical design for the new control room than would be achieved by constructing a new room identical to the old control room.Blast Analysis and Preliminary Design of Control Rooms for the Rocket Engine Test Facility at NASA Lewis Research CenterIn support of plans to add a second control room to the Rocket Engine Test Facility at NASA Lewis Research Center, Cleveland, OH the existing control room was analyzed to determine the most severe accidental explosion it could safely withstand. This potential accident was used as the design threat to develop a preliminary design for the new control room. To evaluate the degree of conservatism in the analysis, experimental data with charge weights and structural dimensions similar to the control room's were selected and analyzed. Results indicate that the existing room will safely withstand an explosion equivalent to 1,000 1b of TNT denoted at the rocket test stand 20 ft away. To survive the same accident, the new control room (to be constructed on top on the old one) should hav e 1-ft-thick walls (existing walls are 2 ft thick) with 0.33-percent reinforcement (existing wall have 1.55 percent). Comparison of data with analysis indicates that an accidental explosion equivalent to approximately 1,800 lb of TNT will cause unacceptable damage to the control room.Ground Test Facility for SEI Nuclear Rocket EnginesNuclear Thermal Propulsion (NTP) has been identified as a critical technology in support of the NASA Space Exploration Initiative (SEI). In order to safely develop a reliable, reusable, long-lived flight engine, facilities are required that will support ground tests to qualify the nuclear rocket engine design. Initial nuclear fuel element testing will need to be performed in a facility that supports a realistic thermal and neutronic environment in which the fuel elements will operate at a fraction of the power of a flight weight reactor/engine. Ground testing of nuclear rocket engines is not new. New restrictions mandated by the National Environmental Protection Act of 1970, however, now require major changes to be made in the manner in which reactor engines are now tested. These new restrictions now preclude the types of nuclear rocket engine tests that were performed in the past from being done today. A major attribute of a safely operating ground test facility is its ability to prevent fission products from being released in appreciable amounts to the environment. Details of the intricacies and complications involved with the design of a fuel element ground test facility are presented in this report with a strong emphasis on safety and economy.Design and Thermodynamic Analysis of a Hydrogen-oxygen Rocket Engine Test FacilityOperation of a Cryogenic Rocket Engine In support of plans to add a second control room to the Rocket Engine Test Facility at NASA Lewis Research Center, Cleveland, OH the existing control room was analyzed to determine the most severe accidental explosion it could safely withstand. This potential accident was used as the design threat to develop a preliminary design for the new control room. To evaluate the degree of conservatism in the analysis, experimental data with charge weights and structural dimensions similar to the control room's were selected and analyzed. Results indicate that the existing room will safely withstand an explosion equivalent to 1,000 1b of TNT denoted at the rocket test stand 20 ft away. To survive the same accident, the new control room (to be constructed on top on the old one) should hav e 1-ft-thick walls (existing walls are 2 ft thick) with 0.33-percent reinforcement (existing wall have 1.55 percent). Comparison of data with analysis indicates that an accidental explosion equivalent to approximately 1,800 lb of TNT will cause unacceptable damage to the control room.

Skyline DIANE Publishing
The launch of Sputnik in 1957 not only began the space age, it also showed that Soviet rockets were

more powerful than American ones. Within months, the US Air Force hired Rocketdyne for a feasibility study of an engine capable of delivering at least 1 million pounds of thrust. Later, NASA ran the development of this F-1 engine in order to use it to power the first stage of the Saturn V rocket that would send Apollo missions to the Moon. It is no exaggeration to say that without the F-1 engine NASA would not have been able to achieve President Kennedy ' s 1961 challenge to his nation to land a man on the Moon before the decade was out.

Reusable Booster System National Academies Press

Blast Analysis and Design of Rocket Engine Test Facility Control Rooms

**Reports and Documents** LAP Lambert Academic Publishing

This book presents the operational aspects of the rocket engine on a test facility. It will be useful to engineers and scientists who are in touch with the test facility. To aerospace students it shall provide an insight of the job on the test facility. And to interested readers it shall provide an impression of this thrilling area of aerospace.

A Test Bench for Study of Liquid Rocket Engines

The present book is the result of two masters works about liquid propulsion. These works were developed at the Technological Institute of Aeronautics (ITA) in collaboration with the Institute of Aeronautics and Space (IAE). The main focus of the book is the development of an experimental educational tool which can be used in the formation of graduate students, training of personnel of the Institute of Aeronautics and Space (IAE) and also in research on liquid rocket engines. Covered topics include liquid rocket engine fundamentals, design and calculation of liquid rocket engines, methodology of laboratory work, development of test stand installation, measurement systems and uncertainty measures, control and data acquisition system and program development methodology. Audience for which the book was written: professionals and students involved in space technology, including researchers, engineers, designers and managers.

NASA Authorization for Fiscal Year 1964

This document summarizes the design and installation of an air-breathing engine test facility at the Alliant Techsystems, Inc. (ATK) Rocket Center, WV plant located at NAVSEA's Allegany Ballistics Laboratory (ABL). The design process, requirements, and performance of the new facility are discussed. The purpose of the facility is to provide a state-of-the-art testing capability that addresses tactical air-breathing propulsion and materials testing needs. The facility project, a collaboration of the U.S. Navy and ATK, will enable testing that will address current and future U.S. interests in tactical integral-rocket/ramjet and next-generation propulsion.

**Development, Growth, and State of the Atomic Energy Industry**

Describes the individual capabilities of each of 1,900 unique resources in the federal laboratory system, and provides the name and phone number of each contact. Includes government laboratories, research centers, testing facilities, and special technology information centers. Also includes a list of all federal laboratory technology transfer offices. Organized into 72 subject areas. Detailed indices.

*Hearings*

On June 15, 2011, the Air Force Space Command established a new vision, mission, and set of goals to ensure continued U.S. dominance in space and cyberspace mission areas. Subsequently, and in coordination with the Air Force Research Laboratory, the Space and Missile Systems Center, and the 14th and 24th Air Forces, the Air Force Space Command identified four long-term science and technology (S&T) challenges critical to meeting these goals. One of these challenges is to provide full-spectrum launch capability at dramatically lower cost, and a reusable booster system (RBS) has been proposed as an approach to meet this challenge. The Air Force Space Command asked the Aeronautics and Space Engineering Board of the National Research Council to conduct an independent review and assessment of the RBS concept prior to considering a continuation of RBS-related activities within the Air Force Research Laboratory portfolio and before initiating a more extensive RBS development program. The committee for the Reusable Booster System: Review and Assessment was formed in response to that request and charged with reviewing and assessing the criteria and assumptions used in the current RBS plans, the cost model methodologies used to fame [frame?] the RBS business case, and the technical maturity and development plans of key elements critical to RBS implementation. The committee consisted of experts not connected with current RBS activities who have significant expertise in launch vehicle design and operation, research and technology development and implementation, space system operations, and cost analysis. The committee solicited and received input on the Air Force launch requirements, the baseline RBS concept, cost models and assessment, and technology readiness. The committee also received input from industry associated with RBS concept, industry independent of the RBS concept, and propulsion system providers which is summarized in Reusable Booster System: Review and Assessment.

*The Saturn V F-1 Engine*

Nuclear Thermal Propulsion (NTP) has been identified as a critical technology in support of the NASA Space Exploration Initiative (SEI). In order to safely develop a reliable, reusable, long-lived flight engine, facilities are required that will support ground tests to qualify the nuclear rocket engine design. Initial nuclear fuel element testing will need to be performed in a facility that supports a realistic thermal and neutronic environment in which the fuel elements will operate at a fraction of the power of a flight weight reactor/engine. Ground testing of nuclear rocket engines is not new. New restrictions mandated by the National Environmental Protection Act of 1970, however, now require major changes to be made in the manner in which reactor engines are now tested. These new restrictions now preclude the types of nuclear rocket engine tests that were performed in the past from being done today. A major attribute of a safely operating ground test facility is its ability to prevent fission products from being released in appreciable amounts to the environment. Details of the intricacies and complications involved with the design of a fuel element ground test facility are presented in this report with a strong emphasis on safety and economy.

*Project Rover, U. S. Nuclear Rocket Development Program*

**Development of the NAVSEA/Alliant Techsystems Tactical Airbreathing Propulsion, Integral-Rocket/Ramjet-Engine Test Facility**

1971 NASA Authorization

**Department of defense, Department of the air force, Department of the navy**

Hearings

Hearings, Reports and Prints of the Joint Committee on Atomic Energy

Military Construction Appropriations for 1967

*Confidential Documents*

*Congressional Record*

*Military construction appropriations for 1989*