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STATEMENT BY THE OPERATIONS-RESEARCH CONSULTING GROUP TO THE UNITED NATIONS

IN RESPONSE to Mr de Seynes' letter of 11 January 1961, the group of consultants have reached the following consensus

1. Operations research, a methodological approach that complements various substantive disciplines, provides powerful tools for solving important problems of decision-making encountered in the industrialization of newly developing countries
2. This approach is applicable at various levels of economic aggregation. For individual enterprises and industrial complexes, techniques already employed in relatively developed countries are readily adaptable. For development planning at the national level, operations research is applicable in principle and represents an extension of available methodology of economic programming. In particular, it would facilitate the systematic integration of micro- and macro-system studies, and has demonstrated its potentialities in solving problems of industrialization in Argentina, Brazil, Israel, Mexico, Puerto Rico, U A R, and other countries, especially in the context of national development planning
3. The operations-research approach provides logical guide lines for the collection of economic and other relevant data within a versatile framework, and the availability of such a statistical system would in turn facilitate the application of such techniques as simulation, linear programming, inter-industry analysis and queuing theory in raising the productivity of available capital, labor, and material resources
4. The United Nations should use its existing instrumentalities and media to bring to the attention of new developing nations the opportunity for fruitful use of operations-research techniques in solving various problems encountered in industrialization. It may be appropriate to devote an issue of the *Bulletin on Industrialization and Productivity* to existing and potential applications. Furthermore, the 27 March 1961 meeting of the Committee for Industrial Development might provide an appropriate occasion for ascertaining the experiences, and soliciting the views, of representatives of newly developing countries with respect to the operations-research approach
5. The Committee for Industrial Development should also consider the desira

bility of a United Nations-sponsored Conference on the needs and uses of operations research in solving problems of newly developing countries. If it decides on such a conference, a multi-national and inter-disciplinary professional group could assist in organizing the program to render maximum benefit to these countries.

6. The United Nations Secretariat should consider the assumption of certain responsibilities in the application of operations research in solving problems of newly developing countries. These responsibilities would include serving as a clearing house for information on methodology and specific applications, maintaining liaison with national and international groups working on these problems and also with the operations-research profession, and the promotion of further work to explore areas of general interest in this field. These functions may eventually require the establishment of an operations-research staff.

31 January 1961

THE USE OF ABSTRACT MANNED SIMULATION TO AID WEAPON PLANNERS

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MODERN weapon systems are a complex amalgam of the end item hardware, the support ground operational and support equipment, spare parts, trained operational and logistical personnel, and a set of operational goals with a management system designed to help attain them. Given a choice of a hardware system to be developed into a weapon system, the weapon system's planners are left with an enormous number of choices between competing alternatives before that hardware system is developed into an operational weapon system. This decision-making process may involve several hundred 'milestones,' many opinions, more than six years, and several billion dollars.

The purpose of this letter is to describe the more important features of a Rand Logistics Systems Laboratory experiment, the primary purpose of which was to develop an abstract, manned simulation technique for estimating the actual system-wide gains and costs that would most likely result for an operational weapon system for many of these required, detailed planning decisions.

The weapon chosen for the experiment was a cryogenic ICBM of the 1963-65 time period. The system under concentrated study became the operational (albeit hypothetical) ICBM tactical unit, such as a squadron or wing, for two reasons. The ultimate effectiveness of the weapon system depends on performance of this unit, and second, the bulk of the support resources and initial costs of the weapon system are also in the tactical unit. (For a fuller description of the 'LP-II', the second Rand experimental model and technique, see References 1 and 2.)

The sheer cost and effort in producing a large-scale manned simulation of a