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Central Intelligence Agency



Washington, D.C. 20505

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14 DEC 1990

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MEMORANDUM FOR: Mr. Robert W. Daniel, Jr.  
Director  
Office of Intelligence  
Department of Energy

SUBJECT: Soviet Participation in U.S. Accelerator  
Program: Risky Business

The attached paper is in response to your letter dated  
30 November 1990. We have addressed a number of  
uncertainties that will be encountered when negotiating with  
the Soviets. If you have any questions or comments  
regarding this paper, please contact

OSWR,

Director  
Scientific and Weapons Research

Attachment:  
SW M 90-20050

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Central Intelligence Agency



Washington, D. C. 20505

DIRECTORATE OF INTELLIGENCE

14 DECEMBER 1990

Soviet Participation in US Accelerator Program:  
Risky Business

Summary

*High energy physics research has been done internationally for over three decades. However, proposals to build the Superconducting Super Collider (SSC) with international contributions mark the first time the United States has taken this approach for accelerator construction. In particular, negotiations with the USSR are upcoming.*

*We believe that Soviet financial and technical capabilities to contribute to the SSC program in the next decade are limited. Reliance on Soviet contributions for essential SSC components could risk the project's success. We are unaware of a Soviet decision on which of several new accelerators--including SSC--to support, but we believe that the Soviets might cancel one or both of their planned new domestic accelerators.*

\*\*\*\*\*

This memorandum was prepared by \_\_\_\_\_, the Office of Scientific and Weapons Research. Comments and questions are welcome and may be directed to OSWR.

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### Background

During the last 30 years, research in high energy (or particle) physics has been an international endeavor. A country (or in the case of Europe, a group of countries) has built an accelerator and other countries have been invited to contribute to the construction of detectors and to participate in the research (experimental) program. The United States is trying to enlist foreign help for the construction of the Superconducting Super Collider (SSC). The United States previously has not pursued foreign participation in the construction of a large accelerator. Although this approach has been discussed for fusion projects such as CIT and ITER, none have yet reached the construction stage.

Consequently, such joint construction activities do not have a track record by which to judge their prospects. In the case of Soviet participation, the upheavals in all areas of their society introduce even more uncertainties. Information on Soviet contributions to detector construction at foreign accelerator facilities and Soviet progress on domestic accelerator construction programs, however, provide indications of what can be expected for Soviet contributions to the construction of the SSC.

### Introduction

In order to develop a position for negotiations with the Soviets about their contributions to SSC construction, it would be useful to know:

- o What will the Soviets offer.
- o What can they contribute.
- o What will they want in return.
- o Who will make the decisions.

An important input to these considerations will be Soviet intentions to complete domestic accelerators and to participate in the construction of the Large Hadron Collider (LHC) at CERN.

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#### Competing Accelerators\*

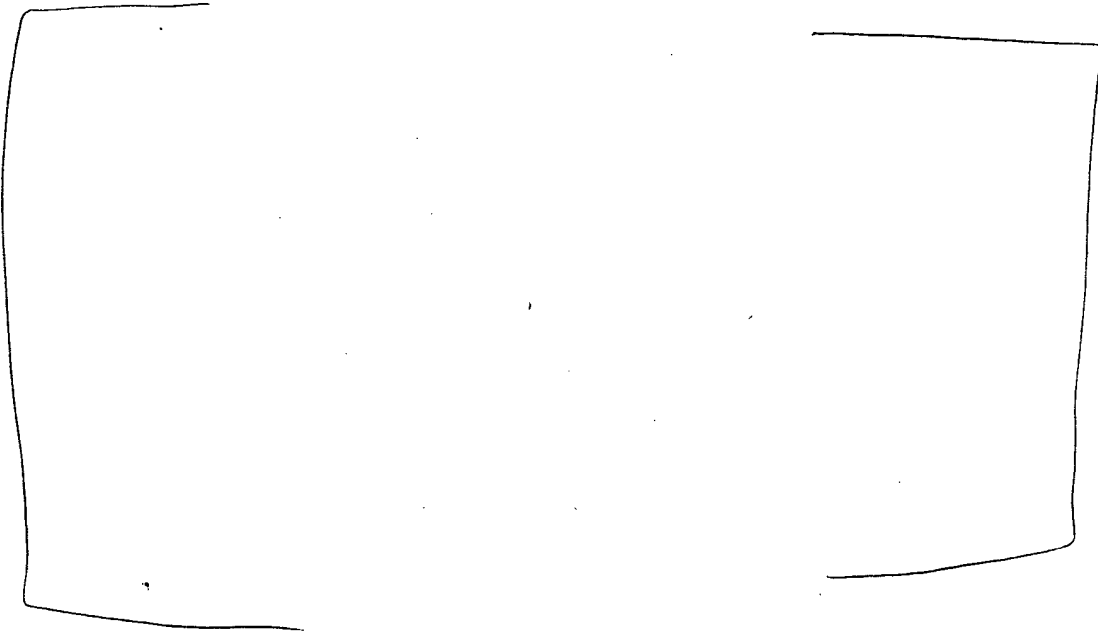
The Soviets have designated the Institute of High Energy Physics (IHEP) at Serpukhov as their center for high energy physics research. In 1989 engineers at IHEP finally completed the tunnel for their UNK accelerator. [

The Soviet Government also has approved the construction of a linear electron-positron collider (VLEPP) at the IHEP. We believe it unlikely, however, that the VLEPP will actually be constructed. [

\* More details on accelerators being planned by the USSR and CERN are given in two CIA reports--the Typescript "Prospects for Soviet Cooperation on the US Super Collider Project: Moscow More Willing Than Able" (31 July 1990) [

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#### Soviet Offer

A primary consideration in Soviet decisions on contributions to SSC construction likely will be the development of Soviet R&D and production capabilities. The Soviets probably want to use the SSC agreement to stimulate the development of new, or improved, materials and equipment that would have applications in the civilian economy. The proffered items could include:

- o Superconducting cable and/or magnets.
- o Electrical substation and power conditioning equipment.
- o Tunneling equipment and crews.
- o Construction, technical, and scientific personnel.
- o Construction materials and equipment.
- o Electronics, possibly including small computers.

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### Soviet Capabilities



### Soviet Rewards

We believe the initial Soviet offers will include a price for their participation in SSC construction. The "rewards" sought could be the transfer of US scientific and computer equipment to the USSR or the US purchase of additional Soviet scientific equipment, likely in amounts exceeding ten million dollars. In view of the Soviet needs for food and other basic consumer goods, it is possible the Soviets could link SSC and US provision of consumer goods. The Soviets are likely to back off from these "requests," maybe completely; but we believe some type of "reward" would help this agreement, and future scientific agreements, proceed more smoothly.

The Soviets' bottom line likely is full participation in the SSC experimental program after the accelerator becomes operational. Although they might want to stimulate their domestic industries or to receive US equipment without an expenditure of hard currency, we believe they will not allow these goals to jeopardize their participation in the SSC experimental program.

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### Soviet Decisions

The Soviet decisionmaking process is constantly evolving and has changed since our previous reports (see footnote on p.3) on Soviet participation in the SSC experimental program. As a result of Gorbachev's proposals in November 1990 to restructure the government, the formerly influential President's Council is being abolished. At this time, which high-level bodies may be involved in decisions on SSC participation remains very unclear. We believe that the people most likely to be involved in negotiations will be high-level representatives from the Ministry of Atomic Power and Industry (MAPI) and from the institutes directly involved in the exchange. The institutes involved could be:

- o Kurchatov Institute of Atomic Energy, Moscow.
- o Institute of High Energy Physics, Serpukhov.
- o Institute of Theoretical and Experimental Physics, Moscow.
- o Institute of Nuclear Physics, Novosibirsk.
- o Konstantinov Institute of Nuclear Physics, Leningrad.
- o Yefremov Electrophysical Institute, Leningrad.
- o Lebedev Institute of Physics, Moscow.

Some of the people likely to be involved are:

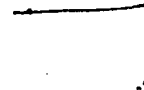
- o V. F. Konovalov, MAPI minister.
- o B. V. Nikipelov, MAPI first deputy minister.
- o Ye. P. Velikhov, IAE director.
- o A. N. Skrinskiy, INP and IHEP.
- o L. D. Solov'yev, IHEP director.

On 30 December 1988, the Soviet Council of Ministers approved a list of 14 high-priority S&T programs; high energy physics was on this list. The State Committee for Science and Technology (GKNT) was given the responsibility of funding these programs. Thus, it is possible that the GKNT, as well as the Academy of Sciences, might also become involved in SSC negotiations. It needs to be noted, however, that the GKNT may be dissolved or replaced in upcoming restructuring of the Soviet Government.

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#### Soviet Finances



[ 27 September 1990, deputies to the Supreme Soviet had approved Soviet participation in the international fusion program known as ITER. The article also stated that the deputies felt that all Soviet republics should invest in the ITER program. This could be an indication that the means for funding Soviet participation in foreign programs has not yet been established and remains problematic

#### Overview

We believe that Soviet capabilities, both financial and technical, to contribute to the SSC program are limited. A significant amount of additional data on the capabilities of the particular Soviet industries and facilities involved are needed before an informed decision on Soviet participation can be made. Even if such data were currently available, the rapidly evolving nature of the Soviet society and economy means dependence on Soviet contributions for vital SSC construction items could risk the success of the project

The question of which accelerator(s) to support probably has not yet been decided by Soviet officials. We believe that the Soviets are likely to cancel the VLEPP, and possibly UNK, and divert the resources to the SSC or LHC. We believe that the Soviets cannot make substantial contributions to both SSC and LHC. Whether the Soviets support SSC or LHC likely will depend on which accelerator appears, at the time of the decision, to have the greatest chance of actually being completed in a reasonable time frame