

62-6734/6

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17 OCT 1962

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1 tr prepared on 5 Oct and ltr prepared on 11 October were combined into one. by O/Exec Director. (Note: ltr prepared on 5 Oct was in O/DDCI awaiting signature when second ltr, prepared 11 Oct, was rec'd; consequently, letters combined and changed for signature Exec Director)

*copy*  
**Dr. J. Herbert Hollomon**  
**Assistant Secretary for**  
**Science and Technology**  
**U. S. Department of Commerce**  
**Washington 25, D. C.**

Dear Dr. Hollomon:

With further reference to our letter of 22 September, and in compliance with your request of 12 September, we are enclosing our comments on the weather modification program of the USSR.

We were somewhat delayed in answering the other questions posed by your Committee because the background materials sent by your office did not reach us until 4 October. Our comments on this material are also enclosed.

I believe this completes the support requested in reference letter. However, please call on us if we can be of further assistance.

Sincerely yours,

(signed) Lyman B. Kirkpatrick  
**Lyman B. Kirkpatrick**  
Executive Director

On file DOC release instructions apply.

Enclosures:

- 10 copies of weather study
- 2 copies each of comments on Project STROBE and WMO Report

*Comma*

ORIGINATED BY:

/s/

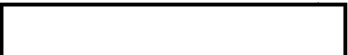


5 + 12 Oct 62

Chief, SASB/Space Div/OSI

CONCURRENCES:

/s/



5 + 12 Oct 62

8 + 12 Oct 62

/s/ Albert D. Wheelon

AD/SI

/s/ Ray S. Cline

9 + 16 Oct

DD/I

(All signatures on original version) 430154

This material contains information from a national defense system which, if disclosed, could result in the identification of sources, methods, or revelations of which in law.



**COMMENTS ON A PROPOSED SYSTEM FOR SATELLITE TRACKING  
OF BALLOONS AND EMERGENCIES (PROJECT STROBE), REPORT  
OF THE CONSTANT LEVEL BALLOON SYSTEM STUDY GROUP TO  
THE JOINT METEOROLOGICAL SATELLITE ADVISORY COMMITTEE,  
DATED MAY 1962**

This report proposes a combination of the meteorological satellite and the constant level balloon techniques to form a system known as project STROBE. Essentially, project STROBE would be a world-wide system of orbiting satellites and constant level balloons, each taking and telemetering meteorological observations; but, in addition, the satellites would be used to track and acquire data from the balloons. The STROBE system is aimed at overcoming the short-comings of each of the two component techniques.

As requested, our comments are concerned with Conclusion 5 which states, "That international acceptance of the system can be anticipated because of the value of the meteorological data it will provide, and because the balloon network to be established will constitute no hazard to aircraft."

Soviet policy over the past several years has been well defined as it relates to flights of balloons and aircraft of foreign origin over the territory of the USSR. Balloons and aircraft for scientific reconnaissance not only have been denied access to the airspace over Soviet territory but they have been shot down when they strayed accidentally over the borders. The Soviet Union is extremely sensitive on this point; and it is unlikely that the government would agree to overflight proposals no matter how attractive the scientific benefits.

To date, the Soviets have not taken serious issue with the flight of artificial earth satellites over their territory; but, should they develop the capability, it is probable that they would shoot down selected foreign satellites orbited over the USSR without permission. It is unlikely that the Soviet attitude will change appreciably under present cold war conditions. Communist China and the European Bloc countries can be expected to follow the Soviet lead in any negotiations relating to overflight for scientific purposes.

In spite of this unfavorable outlook, we see no harm in making a proposal for the implementation of Project STROBE to the World Meteorological Organization and the United Nations. However, alternative proposals, such as the confinement of STROBE operations to non-Sino-Soviet Bloc areas should be considered.

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COMMENTS ON FIRST REPORT ON THE ADVANCEMENT OF  
ATMOSPHERIC SCIENCES AND THEIR APPLICATION IN THE LIGHT  
OF DEVELOPMENTS IN OUTER SPACE, WORLD METEOROLOGICAL  
ORGANIZATION, GENEVA, 1962

Abstract: This is a report from the World Meteorological Organization to the United Nations proposing several cooperative actions relating to the atmospheric sciences. The WMO report is in response to Resolution 1721 (XVI), entitled "International Cooperation in the Peaceful Uses of Outer Space," adopted by the General Assembly of the United Nations on 20 December 1961. The resolution deals with several aspects of space development and includes a specific section on the atmospheric sciences, weather forecasting, and related questions. The preface to the report emphasizes that it is preliminary and is not intended to present a fixed or final program.

The report, in reviewing developments in "outer space," calls attention to the considerable potential offered by meteorological satellites for advancing knowledge of the nature of atmospheric processes. As the basis for most of the actions proposed, the report states "WMO believes that the full exploitation of the new meteorological data which can be provided by artificial satellites necessitates an expansion and rearrangement of the present system whereby conventional meteorological observations are made and exchanged under procedures laid down by WMO.

The report proposed a "World Weather Watch" to ensure that each country will have meteorological data from weather satellites and conventional exchanges to meet its needs. It proposes world and regional centers as the first steps in establishing the World Weather Watch. Washington and Moscow are designated as World Centers, and establishment of a third World Center in the Southern Hemisphere is envisaged. Several regional centers are considered, with the first preferably in Western Europe. Certain funding proposals are made including the establishment of a UN World Weather Fund which would be used to provide technical assistance for the implementation of the WMO program.

Comments: In considering from a U.S. point of view the WMO proposals relating to meteorological satellite programs, there are factors and implications other than those of a purely scientific nature which should be considered. As requested, we shall confine our comments largely to these non-scientific considerations and to the probable Soviet actions in response to the WMO proposals.

With respect to military considerations, it is recalled that weather information has been withheld by the United States and enemy nations in all modern wars, including World Wars I and II. Broadcasts or other disclosures of weather observations and forecasts under wartime conditions so obviously would be giving aid to the enemy that we shall not dwell

on that point. Modern approaches to scientific weather forecasting have attempted but by no means have solved the problem of weather forecasting for so-called "silent areas," that is, areas from which no observations are available. The weather satellite at present offers the best known solution for providing certain helpful weather information from silent areas (enemy nations). For this reason, we consider it important that the United States maintain full control of its weather satellite program at all times.

In addition to the positive wartime benefits of our weather satellites, their use against us under certain conceivable conditions may be a possibility. Thus, should an enemy nation learn the key radio signal which would trigger the data read-out and transmission systems of one of our satellites, that nation might be able to use this means of obtaining weather data over our territory from our own satellites. This seems to indicate that we should maintain strict technical control over the transmissions of each of our satellites. Certainly further investigation is indicated to determine whether this is a real problem.

The Soviet Union has lagged behind the United States in initiating a meteorological satellite program; but, according to statements by various Soviet scientists and leaders in the space program, they plan to become serious competitors in that area, and we expect them to orbit a weather satellite soon. The Soviets are aware of the military advantages of such a satellite; also the secrecy which surrounds their entire space program and their desire to exploit the scientific and propaganda aspects of their new space achievement will probably contribute to make them reluctant or unable to cooperate fully in the WMO proposals outlined in this report. Based upon their past actions, stalling or evasive tactics rather than outright refusal to participate in the WMO programs may be expected. Such an anticipated course of action on their part suggests that this country should wait and negotiate directly with the Soviets rather than to make early unilateral commitments to the WMO which might place us at a disadvantage compared to the USSR in case of hostilities.

It is recognized that the WMO, an agency of the United Nations, performs a useful function in that it provides a means of international coordination and data exchange for national meteorological services. Our comments are not meant to imply that this country should not cooperate in WMO programs. It may be that ways are available or can be found to participate in some or all the proposed WMO programs relating to weather satellites and at the same time retain reasonable assurance that our national interests are fully protected. Our comments are aimed at obtaining full consideration and discussion of all aspects of this problem. For other views from U.S. agencies which have long considered meteorological

problems in case of hostilities, we suggest that comments on the problem be solicited from Commander, Air Weather Service, MAES, Scott Field, Belleville, Illinois, and Chief, Naval Weather Service, Washington 25, D. C. The National Aeronautics and Space Agency would be able to contribute on technical questions relating to meteorological satellite controls. We have no objection to your forwarding this paper to these organizations for review and comment.

MEMORANDUM FOR:

*Gen. Carter*

*An interim reply to  
the Holloman Weather Control  
Committee with info re  
Soviet weather control program.*

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(DATE)

FORM NO. 101 REPLACES FORM 10-101  
1 AUG 54 WHICH MAY BE USED.

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Executive Registry

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**Distribution:**

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2-SD/SI; 2-AD/SI

OSI/SD/ [redacted] 5 Oct 62

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Dr. J. Herbert Holloman  
Assistant Secretary for  
Science and Technology  
Department of Commerce  
Washington 25, D. C.

Dear Dr. Holloman:

In compliance with your request of 13 September we are  
enclosing our comments on the weather modification program  
of the USSR.

Since the background materials mailed by your Office for  
use in answering other questions posed by your Committee did  
not reach us until the afternoon of 4 October, we are obliged  
to delay the remainder of our comments until studies can be  
made. We expect to forward our reply soon.

Faithfully yours,

Marshall A. Carter  
Lieutenant General, USA  
Deputy Director

**Enclosure:**

19 copies of  
weather study

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ORIGINATED BY: [redacted]

Chief, SASB/Space Div/OSI

5 Oct 62  
Date

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[redacted]  
Chief, Space Division/OSI Date

[redacted]  
Deputy Director/Intelligence Date

OCT 1962

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As [redacted] Director/Scientific Intelligence

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# WEATHER CONTROL RESEARCH AND DEVELOPMENT IN THE U.S.S.R.

(Issued on 4 October 1962 by the Office of Scientific Intelligence, Central Intelligence Agency, for use of the Holloman Weather Control Committee)

## 1. General Evaluation of Soviet Weather Control Program. The

Soviet Union has a large and competent weather control research and developmental program. The Soviet approach consists of scientific research, largely in the area of cloud and precipitation physics, and field experiments. Modern methods of laboratory research are used to support the basic scientific program. Meteorological radar, airplanes, and small rockets are used in the experimental work.

## 2. Soviet Capability and Specific Achievements. There are no

indications that the Soviet Union has achieved or is about to achieve any large scale control of the weather at this time. The greatest Soviet accomplishment to date has been in devising techniques to dissipate low super-cooled clouds and fog and in setting up an operational program to utilize these techniques to clear air fields in the USSR. Soviet efforts to induce precipitation from clouds have been similar to those of the United States and results have been rather inconclusive. The Soviets have claimed some success in the prevention of hail by use of rockets carrying pyrotechnical devices for producing and dispersing silver-iodide particles but the accuracy of the claimed results is questionable.

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3. Relative Standing of U. S. and Soviet Programs. With external expert assistance, this Agency for the past six years has conducted a continuing survey of the Soviet cloud physics and weather modification program. Reports of results were published in 1958 and 1960 and a third summary report is nearing completion at the present time. In each of the studies, the Soviet scientific research in cloud physics has been evaluated as slightly behind that of the United States while Soviet work in radar meteorology and weather modification has been judged to be significantly (approximately two to five years) behind that of the United States. The fact that much of the Soviet work is classified has been taken into consideration in arriving at these comparative standings, but Soviet secrecy in this area does limit somewhat our confidence in this appraisal. A consideration in attempting to project these relative standings into the future is the fact that a weather modification breakthrough is possible in either the United States or the Soviet Union. However, because of the tremendous amounts of energy involved in weather processes, such breakthroughs are not considered likely in the near future.

4. Soviet Schemes for Influencing the Weather and Climate in Certain Areas. The Soviet press has carried a number of articles proposing schemes aimed at influencing the weather and climate over substantial areas. Examples of these schemes are those proposing the damming of the Bering Strait, the melting of the arctic ice cap, and the creation of an

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inland sea in Siberia by damming the northward-flowing Ob River. Some of these proposals have been made by reputable people, but not by weather experts. Even within the Soviet Union, leading meteorologists have disagreed on the probable effects of some of their schemes. Others have pointed out that long and detailed studies would be required to determine in advance the effects of such large-scale engineering projects and that it would be dangerous to undertake such projects without a fair degree of confidence in the results. At the present time there are no indications that the Soviet Union intends to undertake any project of this nature which would influence the weather and climate of the United States.

5. Soviet Objectives and Possible Applications of Weather Control.

Principal objectives of Soviet work in the development of weather control is to overcome the unfavorable weather and climatic conditions which handicap agriculture and industry over large sections of their territory. Should they achieve a significant measure of large-scale weather control, there is no doubt that they would use it also for military advantage in case of war. Should surreptitious techniques be developed, Soviet use of weather control against cold-war enemy nations in peacetime for economic advantage is also a distinct possibility.

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6. Classified Areas of Soviet Research. Much of the Soviet work in radar meteorology is classified, apparently as a result of the similarity or dual roles of military and meteorological radar equipment. Known radars in use for meteorological purposes include the Kobalt (3.2 cm) and the SCR-545-A (10.7 cm), a U. S. surplus early warning radar. Forty sets of the latter type were supplied to the USSR in 1951. Recently the Soviets have mentioned new especially designed Soviet weather radar equipment but details on it are not yet available. Most of the Soviet large-scale weather modification experimental work is classified, probably because of the military implications. Since 1956 the Soviets have conducted extensive fog and cloud studies, including cloud seeding tests, in the Arctic.

7. Weaknesses in the Soviet Program. Soviet weather modification programs appear to be less well balanced than those of the United States. For example, the Soviets have done little in the modification of warm (non-supercooled) clouds. There are no reports of attempts to seed large storm areas, but probably some work has been done in that area. There is no evidence of carefully designed rain-making experiments that can be analyzed by statistical tests of significance. The quality of Soviet equipment is somewhat inferior in most instances. The Soviets

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have lagged in high altitude meteorological research which may contribute to knowledge of weather processes, and they have been slow in setting up high speed electronic computers for meteorological computations and research. Such computers would be useful in checking weather modification proposals.

8. Soviet Airplanes Used in Weather Research. The use since 1960 of the jet bomber, IL-28 and the jet airplane, TU-104, for weather modification experimental work attests to some Soviet priorities in that area. Other airplanes reportedly used include the PO-2 in 1948; the IL-12 and the LI-2 in 1956; the LO-3, the LO-4, the KM-2, and the TU-4 in 1959; the IL-14 from 1956 to 1960.

9. Leading Soviet Research and Experimental Centers. The principal scientific institutes engaged in cloud physics and weather modification work are the Institute of Applied Geophysics, and the Institute of Atmospheric Physics, Moscow; the Main Geophysical Observatory, Leningrad, and the Central Aerological Observatory, near Moscow. The first two institutes are subordinate to the Academy of Sciences, USSR <sup>while</sup> ~~which~~ the latter two observatories are under the Chief Directorate of the Hydro-meteorological Service, USSR. Approximately 40 other institutes and universities are involved to some extent in related research. The principal

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permanent sites for laboratory and experimental work in weather modification are located on or near Mt. Elbrus under the High Mountain Institute of Applied Geophysics which in 1961 was formed from the former Kahardin Balkar Branch of the Institute of Applied Geophysics in Nal'chik (43 29N, 43 37E). Weather modification activities have been conducted at these sites for several years. The elevation of the former branch to the status of an institute indicates increased emphasis on weather control research. The institute has four laboratories, a high mountain geophysical station and a number of experimental field sites.

10. The Planned All-Union Cloud Year, 1964-65, Indicator of Continuing Soviet Emphasis on Weather Modification. Since 1959, Soviet meteorologists have planned an All-Union Cloud Year, a period of intensive research on clouds and fog. A resolution of the founding conference stated in part, "The tasks of the Year must be a significant enlargement of our knowledge of clouds and fogs. . . for the future perfection of prognosis of clouds, and then for active control over them." As now scheduled, the Soviet Cloud Year will coincide with the International Quiet Sun Year (IQSY) and will therefore take advantage of the availability of world-wide geophysical data supplied by cooperating nations. All leading countries, including the United States, plan to participate

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In the IQSY. The fact that the Soviet Union has approved a nation-wide intensive program for study of clouds and fogs indicates that problems of weather forecasting and weather control are of continuing priority and are considered sufficiently important to warrant allocation of considerable resources to their solution.

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TO	NAME AND ADDRESS	INITIALS	DATE
1	DD/I		10/9/62
2	Exec Director	15/LBK	11 OCT
3	DDCI		
4	Note: See notation on ER file copy of final letter.		
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**Remarks:**

25X1 *Ref - ER 62-6734, 18 Sept 62*

(Proposed letter to Dr. Hollomon and memo from AD/SI to DCI dtd 4 Oct got to O/DCI simultaneously -- memo is attached as background.)

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O/Exec Dir

has copy of the study)

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5 OCT 1962

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Executive Registry  
62-7328

4 OCT 1962

MEMORANDUM FOR: Director of Central Intelligence

SUBJECT: Report on Meeting with Hollomon Weather Control Committee

REFERENCES: (1) Letter from Dr. Hollomon, Assistant Secretary for Science and Technology, U.S. Department of Commerce, dated 12 September 1962

(2) Letter to Dr. Holloman from Acting DCI dated 22 September 1962

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1. [Redacted] of the Office of Scientific Intelligence met at 1000 hours, 26 September with committee members Dr. Thomas F. Malone, Captain Daniel Rex (USN), and Mr. Frederick L. White (NSF). Dr. Malone, President of the American Geophysical Union and past President of the American Meteorological Society, chaired the meeting in the absence of Dr. Hollomon.

2. The committee was established at the request of Dr. Jerome Weisner and the Department of State to formulate U.S. policy and objectives relating to proposals before the United Nations and the World Meteorological Organization for international cooperation in large-scale weather control research.

3. The meeting of the committee with CIA representatives was to determine the specific needs of the committee for intelligence advice and to present informally some of CIA's findings relating to Soviet weather control research and development. The Committee was interested in obtaining CIA opinion on the following questions: (1) What are Soviet capabilities in weather control as compared with the United States?

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SUBJECT: Report on Meeting with Hollomon Weather Control C ommittee

- (2) Would the Soviets gain or lose by cooperation with the United States?
- (3) What are the prospects for Soviet cooperation in such a project?

4. The CIA representatives expressed some informal opinion but emphasized more detailed information would be presented in an Agency letter to be forwarded soon. The informal opinions were: (1) There are no indications that the Soviets have achieved or are about to achieve any large-scale control over the weather. The Soviets have a large weather modification research program but it is behind that of the United States; therefore (2) the USSR would have more to gain than the United States in a cooperative program of the type proposed. (3) The prospects are not good for full Soviet cooperation in a proposed program because (a) as proposed, the program would involve balloon and other over-flights over the territory of the Soviet Union; (b) it would require disclosure of Soviet progress in radar and other equipment of significance to air defense; and (c) it would disclose the exact status of Soviet knowledge of weather control techniques. These points will receive elaboration in our reply.

5. The committee expressed satisfaction with our approach and indicated that our opinions would be very useful.



ALBERT D. WHEELON  
Assistant Director  
Scientific Intelligence

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<b>CENTRAL INTELLIGENCE AGENCY OFFICIAL ROUTING SLIP</b>			
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2	ExecDirector	10 Oct	
3	DDCI		
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	<b>ACTION</b>	<b>DIRECT REPLY</b>	<b>PREPARE REPLY</b>
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Deputy Director/Intelligence

Assistant Director/SI

Date: 19 Sept 62

Date: 8 SEP 1962

SEP 1962  
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Carter

Dr. J. Herbert Hollomon  
Assistant Secretary for  
Science and Technology  
U. S. Department of Commerce  
Washington 25, D. C.

Dear Dr. Hollomon:

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Your letter of 12 September requesting our appraisal of foreign activities and intentions in weather control has been referred to our atmospheric and space sciences group for action. [Redacted] chief of the group, has indicated that this problem has been under study for several years and that a report can be prepared and forwarded to you on or about 1 October. In the meantime, he has contacted Mr. Fred White of your staff and made an appointment to meet with members of your committee at 1000 hours on 26 September for a preliminary discussion of available information and to learn how his group can best serve your needs.

I trust that these arrangements are satisfactory and we can be of assistance.



25X

(Signed) Marshall S. Carter  
Marshall S. Carter  
Lieutenant General, USA  
Acting Director

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18 Sep 62

RECEIVED DIRECTOR FILE

*Carter*

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THE ASSISTANT SECRETARY OF COMMERCE  
WASHINGTON 25, D.C.

Executive Registry

62-6734

September 12, 1962

Lt. General Marshall S. Carter  
Acting Director  
Central Intelligence Agency  
Washington 25, D. C.

Dear General Carter:

As you may know there has recently been established within the Government an Interagency Group consisting of Messrs. Wiesner, Waterman, Dryden, Cleveland, Brown and myself, as chairman, to formulate an official position with respect to an international cooperative effort in the atmospheric sciences as proposed by President Kennedy last fall and approved unanimously by the United Nations. The U.N. Resolution made explicit reference to exploring the possibility of large-scale weather control. As you doubtless are aware, there has been considerable speculation concerning the feasibility of this and a general recognition of the possibility of some day doing this can not be excluded. An official statement issued by the American Meteorological Society emphasized this with the comment:

"Development in recent years have suggested that limited control of weather and climate may be scientifically possible."

Against this background, I would be particularly interested to have your appraisal of U.S.S.R. activities and intentions in this area. There are three reasons for believing that this is an appropriate time to make a careful review of this:

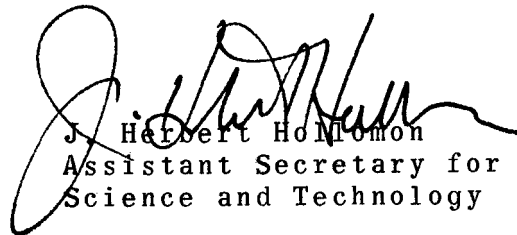
- 1) It is well known within the scientific community in this country that the Soviet scientists have been interested in this matter for some time. For example, after a visit from Professor Eugene Federov, Director of the Institute of Applied Geophysics and Scientific Secretary to the Physical Science section of the Soviet Academy of Science, Dr. Harry Wexler recalled: "I received a definite impression that under his direction and stimulation, Soviet scientists were making broad attacks on the scientific basis of weather modifications on a variety of scales."

2.

- 2) Among the resolutions adopted at the Sixth All-Union Called Conferences held in 1959 at the Institute of Applied Geophysics of the Soviet Union Academy of Sciences was this statement: "Needed is a more daring approach directed toward completion of studies of influencing large-scale meteorological processes and commands."
- 3) The draft program of the Soviet communist party presented to its 22nd Congress last October carried this statement: "Under the Socialist system of economy, scientific and technical progress enabled man to employ the riches and forces of nature both effectively in the interests of the people, to discover new types of energy and to create new material and to develop means of weather control (emphasis added), and to master outer space."

Since it is essential that our position be prepared within the next two months, there is some urgency in this matter and I would appreciate any light that you may be able to shed on Soviet intentions.

Sincerely yours,

  
J. Herbert Holloman  
Assistant Secretary for  
Science and Technology

STAT



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AD/SI

Please prepare interim reply for  
Acting Director's signature, and see if we  
can't have a report for them by 1 October.  
Please route reply through this office.

LBK

Asst

ER 62 - 6734 - ltr dtd Sept 12 from/Sec'y of Commerce J. Herbert Hollomon  
re Interagency Group to formulate official position with respect to International  
cooperative effort in the atmospheric sciences proposed by President last Fall -  
asks appraisal of USSR activities and intentions in this area.

Executive Director

14 Sept 62