ADVANCED AIRCRAFT PROGRAM

1. Under consideration by the Office of Special Activities, DD/S&T, is an Advanced Aircraft concept which features speeds as high as Mach 20, altitudes of 200,000 feet, and a reconnaissance range of 6700 nautical miles. The program (code name Project RHEINBERRY) has not been funded, nor has it formally been submitted for approval pending further preliminary studies by OSA. These studies will be in conjunction with the DDI relative to requirements and with DD/S&T/OSI on vulnerability aspects. The General Dynamics Proposal (Project Isinglass), which considered a Mach 5-6 aircraft, flying at 110,000 feet, was considered infeasible because of vulnerability to SA-2 and Griffon missiles.

2. The most promising concept is that proposed by McDonnell Aircraft of St. Louis, featuring a design which draws on that company's experience in ASSET (Aerothermodynamic Structural Systems Environmental Tests), MERCURY, GEMINI, and the M122 Aeroballistic Missile. High temperature metals are expected to solve heat problems. These metals have previously been tested by McDonnell in the above programs and valuable experience gained therein. The engine proposed would be a Pratt-Whitney advanced rocket engine using liquid hydrogen/oxygen fuel. The feasibility of engine concept has been proven by subscale tests of major components and with extensive experience on the RL-10.

3. The planned aircraft would be lifted to a height of 25,000 feet by a B-52 mother ship, released, and then boosted to an altitude of approximately 200,000 feet and attaining a speed of Mach 20. A final horizontal range of 480 nautical miles is used in the landing maneuver, which would be by means of rear skids and a forward nose wheel similar to the X-15 system. Total range of the mission would be 7500 nautical miles from start to finish, including boost and landing maneuvers. Total elapsed mission time would be 1 hour, 15 minutes.

4. Projected camera resolution is one foot on the ground and a 40 to 50 nautical mile swath. It would be capable of carrying film for 6000 nautical miles of photography. Design concepts will also take into consideration the addition of other sensory equipment as necessary.

5. There will be a briefing in mid-November after all contractors concerned have had opportunity to present proposals and to discuss concepts, objectives and hardware.

ISINGLASS

The constantly improving Soviet radar and maximum intercept capability pose a threat to the life span of current aircraft reconnaissance programs such as the U-2 and the A-12. Project ISINGLASS has as its objective the development of a sophisticated aircraft capability to outdistance the possible Soviet intercept threat over the next five to ten years. It is envisaged that an aircraft capability of Mach 20 and altitudes of 200,000 feet must be developed. With this in mind, limited studies have been initiated and are proceeding.

Next 3 Page(s) In Document Denied

Sanitized Copy Approved for Release 2011/09/27 : CIA-RDP90B00170R000100130001-9

TOP SECRET

25X1

CENTRAL INTELLIGENCE AGENCY

25X1

Memorandum of Conversation

25X1

DATE: 1 July 1965
Copy 7

25X1

SUBJECT : Conversations with McDonnell Aircraft and P&W Senior Personnel, 30 June 1965

PARTICIPANTS: McDonnell; 25X1
P&W, and Cunningham, CIA. 25X1

COPIES TO : Deputy Director for Science and Technology
Deputy for Technology, OSA
Programs Staff, OSA
Security Staff, OSA
Deputy for Field Activities, OSA
Deputy Assistant Director, OSA

1. Through a coincidence, McDonnell 25X1
Aircraft Corporation, and of P&W, met in 25X1
Mr. Cunningham's office the afternoon of 30 June. had come 25X1
from the Pentagon where he had met with General Garrity on the MAC portion of the F1-11 contract, and had broken off from 25X1
when the three of them 25X1
together with Dr. Wheelon had concluded their meeting with the DCI.

2. We spent nearly two hours informally discussing ISINGLASS, including an oral report Mr. Cunningham gave on the briefing of the Kinzel Committee earlier in the afternoon, together with discussions about forthcoming briefings on ISINGLASS in Washington, i.e. the 13 June updating briefing of Dr. McMillan and the 22 July briefing of the PSAC reconnaissance panel, which apparently Dr. Wheelon mentioned to also gave Mr. Cunningham 25X1
a copy of the letter written by which was left with the Director 25X1
in their session earlier in the day.

3. who is not necessarily the world's most optimistic 25X1
individual, appeared to be somewhat concerned over the Director's reported statement to the effect that "the NRO problem would have to be solved before ISINGLASS could get off the ground". Mr. Cunningham thinks was 25X1

TOP SECRET

25X1

FORM NO. 1132 (11-23-36)

also somewhat disturbed by the inference he drew from a remark attributed to the Director that it was not clear what form the final management of ISINGLASS might take, including the possibility of some sort of outside contract supervision, He said rather plainly that he got the impression that the Director was feeling his way, and that it seemed to him unlikely that he would "go out on a limb" at this time in his career for anything as major as ISINGLASS unless it were relatively noncontroversial.

25X1

4. Mr. Cunningham pointed out that he felt we still had a certain amount of homework to do with the Director, not only in acquainting him more fully about the operation of ISINGLASS and the confidence we have in it, but in giving him a fuller understanding of the background we have in the so-called "skunk works" business, the net savings to be derived in time and money from using his special legislative authority, as well as the degree to which we feel that if we do not do ISINGLASS in its present form, someone else may well pre-empt us.

5. We also concluded, from a technical standpoint, that it might be well to recognize a separation period between the projected six months feasibility effort and the full scale go ahead. We talked in terms of a break of from two to three months, during which time an expert panel, either existing or ad hoc, could properly evaluate the initial results and draw a meaningful conclusion about the wisdom of forging ahead. Our presentations to date have, in the interest of complete truth, emphasized perhaps too much the total weapons system time and cost, which may have had the net result of leading people to believe that there was no fork in the road for subsequent decision making. For example, our current updated eight year fiscal forecast shows needed in fiscal year 1966, without clearly indicating that this includes for the feasibility phase. I have discussed this tactical change with General Ledford and he is in agreement that such a shift in emphasis could not help but be a good idea.

25X1

25X1

6. While there was not much overt enthusiasm over immediate prospects evidenced by any of the principals, they did leave with the feeling that we were doing all that was humanly possible to move ahead with the program. I do believe, however, that we must obtain some funding in some way for at least

a portion of the feasibility program by the end of September, or face the prospect that the ISINGLASS Program may expire from understandable concern on the part of the contractors for our inability to make things mesh. The high point of the discussion was Mr. Cunningham's ability to report to them the extremely favorable reaction of Dr. Stever at the Kinzel Committee meeting to the ISINGLASS Program.

(Delivered by hand) June 20, 1965

Admiral W. F. Raborn, Director
Central Intelligence Agency
Washington, D. C.

Dear Admiral Raborn:

I understand that [redacted] has recently talked to you about the proposed rocket powered reconnaissance aircraft which our two companies have been investigating for Dr. Wheelon's group. I have been impressed by the relative simplicity of the aircraft and launch system as compared to other very high Mach number aircraft and the considerable advantage it seems to enjoy in terms of very rapid reaction, low vulnerability and wide choice of launch points and flight paths. Since orbital reconnaissance vehicles, current and planned, are susceptible to destruction at their fixed launch bases at the very time when hard intelligence is apt to be most urgently needed, this system which could be operated from the many bases capable of handling B-52 aircraft, would appear to offer a major advantage in terms of reduced vulnerability. I want to assure you that we at United Aircraft are convinced of the soundness of the proposed system and have therefore offered to provide $17,000,000 in development and production facilities in the event a firm full-scale engine development program were carried to completion by the Government. 25X1

As a result of a discussion in May of 1964 between your Mr. John Parangosky and our people, and prior to the joint study effort with McDonnell Aircraft, we undertook a study to investigate the various possible successors to the Oxcart aircraft for the time when the forecast improvement in defense missiles would require a quick reaction system with less vulnerability than either the Oxcart or satellite systems. As a result of this study, our engineers became convinced that ranges of over 7000 miles could be achieved with a boost glide aircraft powered by a high pressure hydrogen rocket engine. Our experience with the hydrogen fueled RL10 rocket engine includes individual thrust chambers which have been fired some 11 hours and 350 times, 6 high time engines which have accumulated an average of three hours on a single build, and 36 engines which have been fired in space without a single malfunction. This background has proved to us that, by application of the design and development techniques evolved through the years in the development of turbojet and piston engines, the durability and reliability characteristics required for manned aircraft can be achieved in rocket engines.

The high pressure rocket engine concept, which makes this vehicle performance possible by providing very high specific impulse (455 seconds) with a small engine cross section, has been under study at Pratt & Whitney Aircraft since 1960. Only by employing high pressure combustion (3000 psi) can the engine provide the required thrust and specific impulse and yet be made small enough to make this type of vehicle possible. Over the past five years component test results have proved to us the completed feasibility of this concept and we have become solidly convinced that this is a major jump in the state-of-the-art. Back in the late 1940's we were similarly enthused over the (for then) high compression twin-spool turbojet cycle and at that time too, we had a very difficult time getting support, but when we did, the J57 turned out to be a big jump ahead - both through much lower fuel consumption and for afterburner efficiency, giving augmentation in excess of 60% over basic thrust.

In mid-[illegible] the Air Force gave us some funds for further work on the high pressure concept - and later NASA also gave us some support. As of now we feel we have demonstrated the feasibility of all major engine components. Some 13.1 million dollars have been invested in this development.

The distribution of program costs between sponsors is:

Pratt & Whitney Aircraft	$7.7 million
USAF	4.1 million
NASA	1.3 million
TOTAL	$13.1 million

In addition, an investment of more than $4.3 million has been made by the Corporation for facilities capable of high pressure research type work.

We are now to the point where we can proceed with confidence with a full-scale engine development program and have submitted a proposal for such a program. If, however, it is not possible to mount such an effort at the present time, I strongly recommend that we be authorized to proceed with an engine demonstrator program which could be accomplished in nine months for a cost of approximately $12.5 million and would provide the best possible answer as to the feasibility of the overall system. At the request of your people, we have also submitted a proposal for running the turbopumps in connection with the preburner but without the main chamber. This feasibility demonstration could be accomplished in six months for $9.5 million.

In my humble opinion we are already late in getting this new intriguing concept really under way.

Sincerely,

[redacted] 25X1

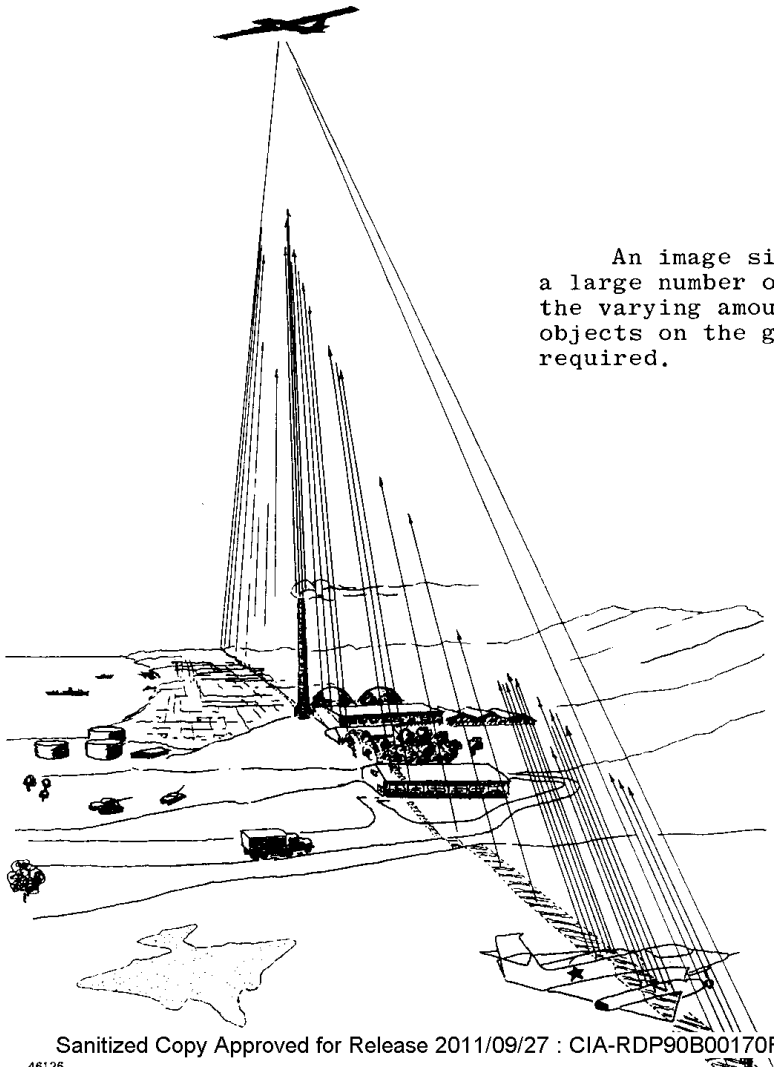
Chairman

emp

[redacted] 25X1

(2)

INFRARED SCANNING SYSTEMS



An image similar to a photograph is produced from a large number of parallel line scans. The scans record the varying amounts of thermal radiation from separate objects on the ground. No supplementary illuminant is required.

Passive night reconnaissance, surveillance

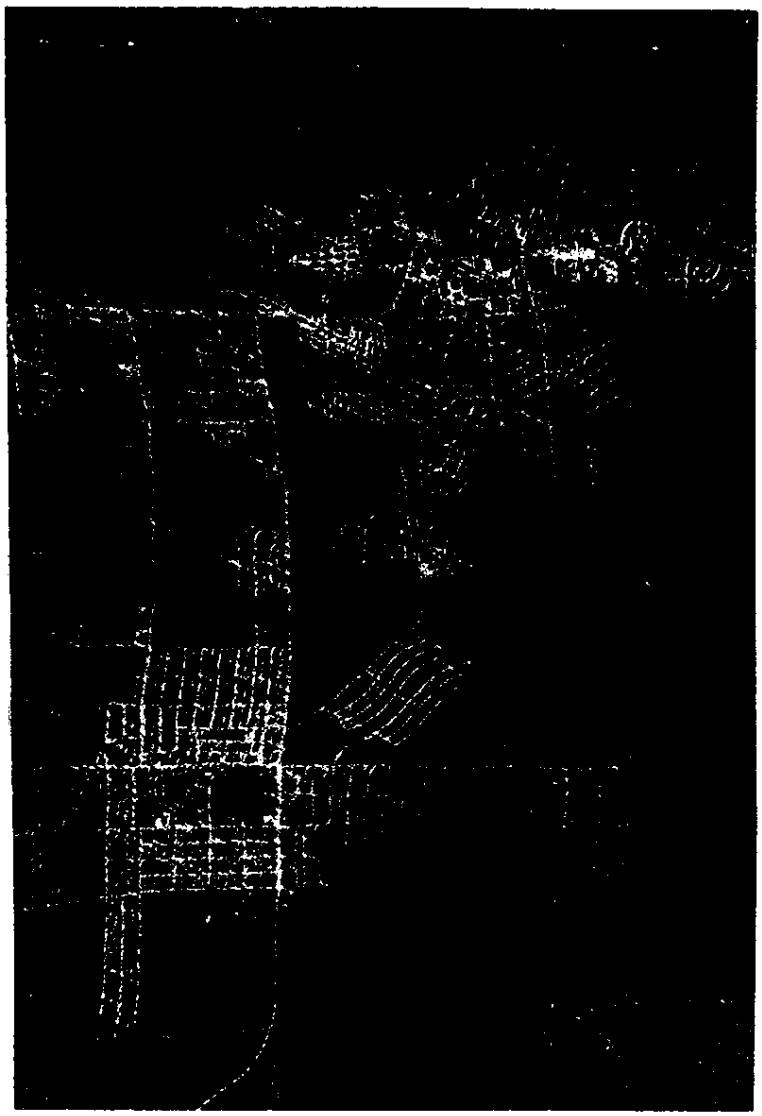
Thermal detection of activity or occupancy
- industrial exhaust stacks, chimneys
- industrial liquid effluents
- special storage examples
- heated buildings
- warm engines, fires

Detection of recent events
- thermal "ghosts" or residual images
  - (aircraft traffic, missile launch)
- wakes of ships

Improved imagery through haze, light fog

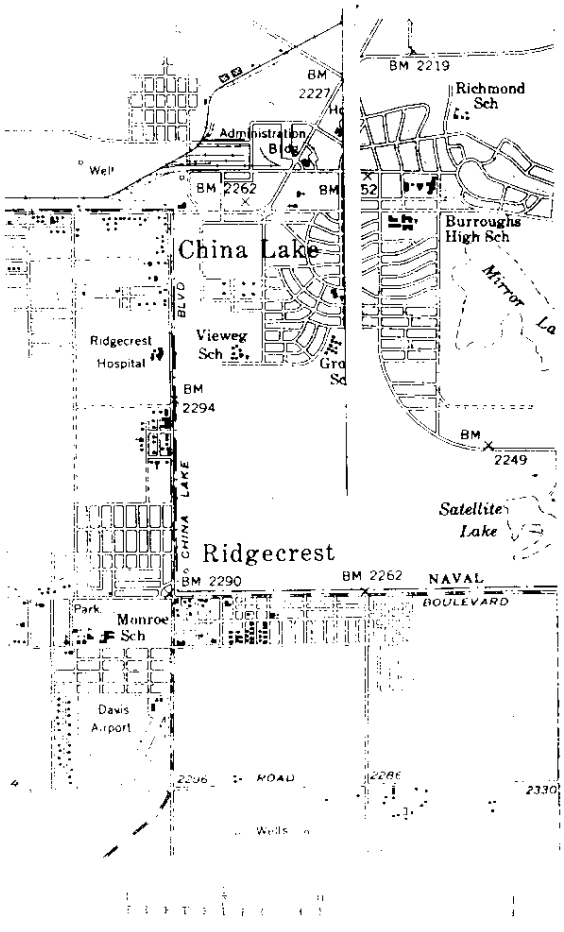
SECRET

46126



½ millimadian IR image
taken from a U-2 at 70,000 ft altitude
10:19 PM, 1 Oct 1964
with no supplementary lighting.
(10 × magnification from original negative)

70,000 feet



INFRARED IMAGERY

- Infrared scanners respond to the self-emitted radiation of objects and thus they permit passive night photography.
- The grey-tones of an IR image vary according to the temperature and emissivity of the objects. As illustrated here, dark areas are either colder or have lower infrared emissivity than the light areas.

Sanitized Copy Approved for Release 2011/09/27 : CIA-RDP90B00170R000100130001-9

BIRDWATCHER II

This is a flight function monitoring device on the OXCART which continuously and sequentially samples the condition of the assigned sensors on a go, no-go basis. The system reports any malfunction to a ground station at which time it is determined whether the malfunction can be remedied or that the aircraft should turn back. BIRDWATCHER II modified a similar system developed for the U-2. Although its purpose and function are similar, it is more highly developed and has a greater number of sensors. In the event of aircraft disaster, this system can trace the cause and effect which led to any mishap.

Sanitized Copy Approved for Release 2011/09/27 : CIA-RDP90B00170R000100130001-9

25X1

BRASS KNOB

There have been some 87 missions flown in the last 90 days. Most of these missions have received routine reactions with no hard evidence of any hostile intent. Practice tracking by SA-2 radars and ELINT collection has shown that the Soviets are re-equiping the FAN SONG radar from the newer C-band to the older S-band in at least 12 sites. It is estimated that this trend will continue, and finally, that Cubans will be trained to operate these sites.

KEMPSTER B

Kempster B is a concept using an electron gun mounted in the aircraft to generate an ion cloud in front of the aircraft to reduce its radar cross section. Substantial progress has been achieved in solving formidable technical problems, and experimental airborne equipment is now available to verify the concept.

Sanitized Copy Approved for Release 2011/09/27 : CIA-RDP90B00170R000100130001-9

Project CHIVE

This is a new concept for Agency-wide information service. Intended to replace most of the present OCR information systems. CHIVE is expected to include advanced hardware elements, including ultra large capacity electronic random storage and automated document image retrieval devices.

Project CHIVE is the task charged to the Development Division/OCS to investigate the application of EDP to the central (positive intelligence) information storage and retrieval activities of the Agency, and to design an improved information retrieval system. This developmental program cuts across all Agency organizational lines in that the information needs of all components are being considered. Contractor assistance is being provided by IBM.

Sanitized Copy Approved for Release 2011/09/27 : CIA-RDP90B00170R000100130001-9

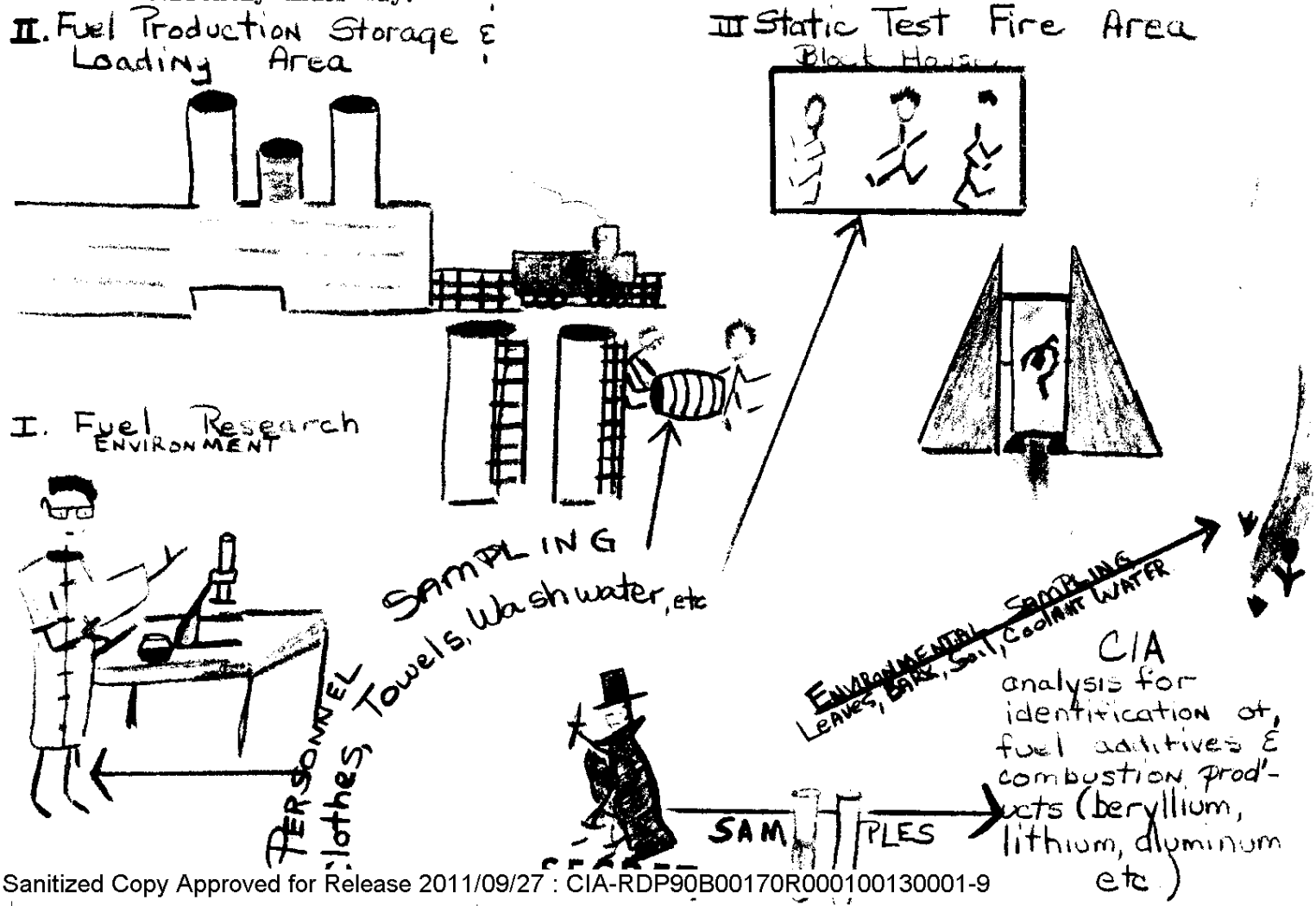
Sanitized Copy Approved for Release 2011/09/27 : CIA-RDP90B00170R000100130001-9

PROJECT ALP -- Automatic Language Processor

This includes special purpose hardware being built by IBM to translate natural languages (Russian-to-English initially) and Stenowriter symbolic language (Stenocode-to-English). The ALP system will include a high capacity, random access, electro-optical storage device (not a standard IBM product) developed by IBM Research.

Rocket Propellent Fuels

The power obtainable from a fuel dictates the payload, distance, and mission of a rocket. Our ~~new~~ knowledge of more powerful fuels indicates we can develop better rockets and missiles. This project is for the purpose of developing detection techniques and devices for obtaining information on the fuels being investigated and employed in other countries. The immediate and remote environs of rocket test facilities become contaminated with fuel and/or exhaust ingredients that are detectable. Highly sensitive chemical and biological detection procedures already developed can be applied to humans, e.g., hands, ears, hair, clothing, engaged in research or production on rocket fuels. The extension of these techniques to air, plants, trees, and soil is currently under way.



Sanitized Copy Approved for Release 2011/09/27 : CIA-RDP90B00170R000100130001-9