Page Denied

 [redacted] 25X1

TOP SECRET

EXECUTIVE OFFICE OF THE PRESIDENT

OFFICE OF SCIENCE AND TECHNOLOGY

WASHINGTON, D.C. 20506

April 9, 1970

MEMORANDUM FOR

ARGO Steering Committee

Attached is a memorandum relating to a possible use of ELINT satellites for earth science and technology work. It was written [redacted] a member of the PSAC Ground Warfare Panel, who recognized -- along with a recent PSAC Space Sciences Panel report -- the possibility of transducers sensing environmental conditions and emitting signals to satellite collectors. I hope you find the document of interest. 25X1

[redacted] 25X1

Attachment (unclassified when separated from cover memo)

EXCLUDED FROM AUTOMATIC DOWNGRADING AND DECLASSIFICATION

[redacted] [redacted] 2525X1

TOP SECRET

This document consists of 1 pages No. 12 of 15 Copies, Series A

Date: March 3, 1970

To:

From

25X1

Subject: Nonmilitary Applications of DCPG Sensing Technology

In the past few years an entirely new information gathering technology has been developed for military applications, sponsored by Defense Communications Planning Group, utilizing unattended ground sensors. A spectrum of data collection/data management techniques now exists; the entire system is evolving rapidly into one of enormous scope and sophistication. Much of the DCPG function is being taken over by the STANO Command of the Army. Security considerations allow only the nondetailed discussion below in an unclassified memo.

The technology is directed toward detecting, classifying, and locating military targets of interest, principally personnel and vehicles. The principal sensing methods are seismic, magnetic, acoustic, infrared, and radar. The sensors are meant to be inexpensive, expendable with limited life, and emplaced by various methods including airborne and hand. The outputs from the individual sensors in a sensor field are collected and transmitted by radio to a central collection facility. In certain instances a relay is needed. At the central collection facility the data are analyzed and classified into preselected categories using automatic data processing. The resulting intelligence is communicated to the user.

It can be seen that the system is comprised of three subsystems, namely, individual remote sensors, data transmission, and data analysis. Logic dictates an overall design wherein certain requirements for commonality exist at the interfaces; sensors of every type must be so designed that their outputs are compatible with the input requirements of the radio link. In other words, the system is so flexible that in principle it can accept the outputs of sensors of entirely different phenomena than that for which the system was originally designed. Of course, new software at the data analysis center would have to be provided to classify the data from new types of sensors, but the hardware should remain the same.

With the very large investment by Department of Defense in this technology, it is worthwhile to consider application to some of our more pressing nonmilitary problems. Two which come to mind are 1) remote sensing of earth resources; and 2) monitoring of environmental pollution. Consider each of these.

The resources of the earth can be classified into areas such as agriculture, forestry, geography, geology, hydrology, oceanography, geodesy, and cartography. A few examples of the very large number of needs within these areas are: acreage determination for agriculture commodity control, soil surveying and mapping, crop reporting and forecasting, disease detection in field crops, forest fire detection and control, and forest surveying.

Many approaches to remote sensing of earth resources are under consideration, for example, multispectral photography from satellites. With so many types of resources, distributed so widely, no single collection and analysis technique will suffice.

It should be possible to employ the DCPG developed technology as an aid in evaluating certain of our earth resources. Sensors could be developed to detect crop disease, forest fires, soil moisture, water salinity, and a long list of other phenomena whose parametric values are subject to temporal change. Methods for airborne sensor implantation, radio link design, and data analysis could be carried over directly from DCPG.

The second area of interest is environmental pollution. Pollutants can be classified into natural or man-made, primary or secondary, and major or minor. The five major primary pollutants are carbon monoxide, hydrocarbons, sulfur dioxide, nitrogen oxides, and particulate matter. Secondary pollutants include oxidants such as ozone, sulfur trioxide, nitrogen pentoxide. The peroxy acylnitrates, collectively labeled PAN, are instrumental in producing photochemical smog.

Many of the pollutants exhibit diurnal and seasonal changes. Their distributions also show large local geographical variations. In order to be able to control the level of the pollutants it is necessary to be able to monitor their concentrations.

Although sensors are available for measuring the concentrations of many of the pollutants, they are largely laboratory instruments. Also there does not yet exist any means for deploying fields of sensors, collecting a large amount of data from the many sensors in a field and from many fields, and reducing the enormous amount of data. With the very large national interest in environmental quality control, techniques to accomplish this will ultimately emerge.

The existing DCPG data collection/data reduction technology should find immediate application in monitoring pollution. By far not the least consideration is the skill developed by DCPG in seeing that laboratory type sensing techniques are reduced to mass produced, inexpensive, rugged, disposable devices.

Among the advantages to the nation of the application of the DCPG sensing technology to such nonmilitary problem areas as earth resources and environmental pollution are the following:

1. A direct, positive, hardware oriented approach to the solution of pressing problems about which there has been much discussion but little technical implementation.

2. Effective use of our national financial resources in finding nonmilitary applications of a military technology developed at great expense. The past three Secretaries of Defense, including Secretary Laird, have expressed interest in finding nonmilitary applications of military expertise.

3. Rapid entry into these fields by modification of existing hardware.

4. Carry over of the entire systems approach from the military problems to the nonmilitary ones.

5. The possibility of using the existing DCPG organizational structure including management team.

6. From a public relations point of view, an easily visible hardware oriented program which readily demonstrates nonmilitary applications of military technology to pressing national problems.

With this in mind, I suggest that a study be made of the nonmilitary applications of the DCPG remote sensing technology to include, but not be limited to, the earth resources and environmental pollution control areas. Such a study might be conducted through PSAC, or perhaps through the National Academy of Sciences, National Academy of Engineering.

25X1