INVESTIGATION OF APPLICATION OF ERTS-I DATA TO INTEGRATED STATE PLANNING IN MARYLAND

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16. Abstract

This Type II, No. 1 report covers the activities performed during the initial orientation and work period.

This project will evaluate the usefulness of remote sensor data in state planning. It aims at a first level operational planning system resulting in concrete land use plans for 1975 and 1995.

The Maryland part of the CARETS land use inventory has been extended to include the western most Maryland counties. The interpretation is completed, field checking retrification and final drafting will be completed by November 15, 1972.

Central concepts, such as land capability and land suitability are being defined. These concepts will allow the integration of remote sensor data with conventional data to be used operationally in a planning decision making system.

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PREFACE

(a) OBJECTIVE. This interim report describes the important activities and work performed during the initial orientation and work period until September 30, 1972 from award of the contract on June 22, 1972. The objective of the total contract is to evaluate the utility of remote sensor data in integrated state planning and to produce initial state land use plans for 1975 and 1995. Therefore, the contract is concerned not only with data collection and land use identification. Its major emphasis is to derive such information from remote sensor data as are necessary and sufficient to allow statewide planning decision making. To achieve relevant decision making capability additional available socio-economic information is being integrated with remote sensor derived information. A set of state objectives, projections of population, employment, industry and income growth as well as limitations imposed by projected state expenditures are assumed.

An inventory of current land uses in Maryland will be established. Subsequently, land capabilities will be defined. Land capability is a concept that will determine the uses that any particular land type can accommodate. It is found that a definition of capabilities will require the inclusion of physiographic land characteristics as well as, at least, economic costs associated with developing land for particular uses in order for capability to be an operational concept in the planning context.

Given existing physical and social conditions in Maryland as well as planning objectives and budgetary limitations, the suitability of new land uses will be evaluated. While certain areas may have the capability to accommodate a wide variety of land uses, only a limited number of uses may be suitable: lower costs of development for some uses may render them preferable to other uses requiring high investments; because of social or environmental objectives and because of the pre-existing urban, industrial and rural structure, certain uses may not be desirable or suitable in particular areas. An operational concept of suitability for planning will be developed.

From past trends and projections land requirements by various employment and industry categories will be calculated for the period of 1970 to 1995. If the sum of land demands exceeds available land,

adjustments of development trends - or changes in state objectives - are required. The result of this comparison should then initiate a shift of the land use pattern from land extensive to land intensive uses until the difference is reconciled. The resulting pattern will then become a new, refined planning objective.

The above statements indicate a research direction leading towards an operational decision process. The final objective of the project is to evaluate the effectiveness of the remote sensor based planning process.

(b) SCOPE. The scope of this project will allow for taking into account the major important planning variables which should be considered for effective and rational planning decisions. Within these limitations, however, an operational decision system will be developed. Refinements of the basic concepts and operational links must be done at a later date.

(c) CONCLUSIONS. Progress in establishing the basic land use inventory and in conceptualizing the integration of remote sensing derived information into an integral state planning system would indicate that the scientific and operational objectives of the contracts will be achieved successfully.

1. INTRODUCTION

To date three related activities have been carried on simultaneously. They are: (a) collection and provision of required state information by the Department of State Planning; (b) extension of the Maryland land use inventory; as it is compiled by the Geography Applications Program (GAP) of USGS, is in progress; (c) definition of basic concepts and initial design of a state planning process based on remote sensor data from satellite and aircraft are being conceptualized.

For a detailed breakdown of work performed, Type I reports should be consulted.

2. REPORT

2.1 PRELIMINARY. The work outline and the distribution of collaborative efforts between the Department of State Planning (DSP) and Earth Satellite Corporation (ES) are completed. Tasks were further refined and initial delivery schedules were agreed upon.

2.2 STATE INFORMATION. The Department of State Planning in Maryland has commenced to collect and to provide necessary physical and socio-economic data for the project. Definition of further information needs and information collection by the project team is underway and parallel to the program of the definition of the planning system.

2.3 INVENTORY. GAP is preparing a general land use inventory of a major part of Maryland lying within the CARETS area. It has been agreed between DSP and GAP, that GAP will make the results of its classification available to the Department of State Planning (DSP), Maryland. Not included in the GAP inventory are the western three Maryland counties - Washington, Alleghany and Garrett.

On the basis of black and white imagery obtained from ASCS and USGS and various U-2 overflights it was possible to establish the current land uses of those counties. Overlays outlining land uses have been completed and are ready for selective field checking.

2.4 SYSTEM CONCEPTUALIZATION. The initial conceptualization of the remote sensor data based planning system is in progress. Key concepts such as land capability, land suitability are being defined in operational terms. Linkages between physical and socio-economic descriptors are being formulated. Initial integration of these concepts towards an operational state planning system are being made. Since these concepts and system linkages have not been defined before, several revisions and refinements of the emerging concepts are anticipated.

2.5 PROGRAM FOR NEXT REPORTING INTERVAL

2.5.1 DSP will continue to provide to the contractor statistical and resource information in the form of maps, tables and

reports. Continued collaboration between DPS and ES will assist in developing the research program towards an operational system for use by the Maryland Planning Department and other Maryland agencies.

2.5.2 The land use inventory will be completed by November 15, 1972 according to the classifications developed by GAP. A subsequent refinement in selected areas is planned. As of the date of this report it is not known whether existing imagery (Mission 144 in particular) is sufficient to meet levels of refinement desired. It is very likely that refinement of the land classification as needed by Maryland and for testing the planning concepts which are being developed will have to be based on forthcoming U-2, RC-10, IR imagery.

2.5.3 The initial, intuitive concepts of land capability and land suitability will be further analyzed and formulated in such a way as to make them integral operational parts of the decision system. The remote sensor based decision system will be further investigated, its individual components developed and finally synthesized. The required inputs from remote sensor data as well as socio-economic sources require particular attention and effort in order to be made compatible in the overall planning decision system.

3. CONCLUSIONS

This report covers the initial orientation and analysis period. Nevertheless, substantial program on the main contract tasks have been made. The Maryland land use inventory will be completed within the next weeks. Central concepts which will make it possible to use remote sensor data in a state planning system are being formulated and initial system linkages are being defined. During the next six month reporting period it is anticipated that a quasi-operational system will be achieved and, in addition, tested against available data.

REPORT SUMMARY FOR SUBDISCIPLINE

1.D SOIL SURVEY AND CLASSIFICATION

A Demonstration Experiment in the Application of ERTS-I Data to Integrated State Planning in the State of Maryland

The objective of this project is to evaluate the utility of remote sensor data in integrated state planning and to produce initial state land use plans for 1975 and 1995. Therefore, the contract is concerned not only with data collection and land use identification, but a major emphasis is also to derive such information from remote sensor data as are necessary and sufficient to allow statewide planning decision making. To achieve relevant decision making capability, additional available socio-economic information is being integrated with remote sensor derived information. A set of state objectives, projections of population, employment, industry and income growth as well as limitations imposed by projected state expenditures are assumed.

To this end, a wide variety of physical (and social) parameters need to be considered, placing the project into the above category and subcategory.

REPORT SUMMARY FOR SUBDISCIPLINE

1.H GENERAL

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2.A LAND USE CLASSIFICATION

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2.C THEMATIC MAPPING

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2.E HUMAN POPULATION DENSITIES AND LOCATIONS SURVEYS

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2.G TRANSPORTATION SYSTEMS SURVEYS

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4.A WATERSHED SURVEYS

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4.C ESTUARY AND WETLANDS SURVEYS

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7.F SURVEYS OF AND DEGRADATION FROM CULTURAL PRESSURES

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10.B STATE

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10.C REGIONAL

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