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NATIONAL PROVING GROUND
FOR FREEWAY SURVEILLANCE AND
CONTROL AND ELECTRONIC TRAFFIC AIDS

(John C. Lodge Freeway Traffic Surveillance
and Control Research Project)

Research Activity Progress Report
as of October 1, 1963

and

Proposed Project Program

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for presentation at
Organizational Meeting
October 30, 1963

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JOHN C. LODGE FREEWAY TRAFFIC SURVEILLANCE
AND CONTROL RESEARCH PROJECT

Research Activity Progress Report
as of October 1, 1963

I. Status of Active Studies --

A. Completed Reports:

Reports have been published on the following studies:

1. Shoulder Usage on an Urban Freeway
2. Lane Changes on an Urban Freeway
3. The Effect of Incidents on an Urban Freeway
4. Television Equipment for Traffic Surveillance
5. Development and Preliminary Evaluation of the John C. Lodge Surveillance Project
6. Blankout Signals for Freeway Traffic Control

B. Current Studies:

1. Evaluation of Television System
 - a. The initial evaluation of the television system has been completed. This evaluation covered camera characteristics, monitors, camera accessories, transmission facilities and equipment. This evaluation was presented in the report "Television Equipment for Traffic Surveillance," December 1962.
 - b. Location of camera evaluation has been given separate treatment. By use of a movie camera, various locations of cameras have been simulated. This study investigates the location of cameras to determine if fewer cameras can be utilized from

these other locations (e.g. - side of freeway) and still provide the necessary TV coverage.

- c. Evaluation of monitor output to determine TV observer abilities and limitations.

Data collection and statistical analysis have been completed. Preparation of report remains.

2. Evaluation of Traffic Control System - Lane Signals, Speed Signs, and Ramp Controls

- a. Preliminary evaluation of lane control signals has been completed. Results were presented in the report "Development and Preliminary Evaluation of the John C. Lodge Surveillance Project."
- b. Preliminary ramp closure evaluation has been completed. Preliminary report under review.
- c. Evaluation of supervisory control equipment-- This study covers the control panel and confirmation panel, and circuitry and method of confirmation. Individualizing speed control and addition of two spans of lane signals require redesign of this equipment. This work is in the initial stages.
- d. Development and evaluation of several types of lane signals and speed signs. This study is a performance evaluation as to impact, maintenance, power requirements, etc., of these types of lane signals; incandescent, fluorescent, and neon, based on project experience. A new multi-lamp lane signal (incandescent) has been developed and installed. Report on development has been published.

3. Traffic Operational Research

This area is directed to research in traffic characteristics and behavior, and to provide base data for evaluation of the Television System and the Control System.

a. Travel Time Studies:

- (1) Report on "Measuring Travel Time from TV Surveillance," is under way. Analysis is complete. Final report writing remains.
- (2) A comprehensive travel time comparison for the various conditions of weather, time of day, volumes, speed, density, etc., is under way. Computer programs have been completed. Comparisons and analysis will begin in the near future.

b. Freeway Volume Study:

- (1) To provide base volume data for use in evaluation of "before" and "after" comparisons related to the Control System, an extensive data collection program has been completed. The report on this data is being written for comparisons under the Control System. Volume data is being collected continuously and processed from Fischer-Porter punch tape to IBM cards. The volume data is collected by lane, for 24 hours each day.

Ramp volumes, lane distribution, and traffic classification will be part of this study.

c. Vehicular Incidents on an Urban Freeway:

Analysis of one year's data on vehicle disabilities and accidents under way.

d. Additional studies, started but held in abeyance, in order to complete priority studies:

- (1) Characteristics of Stoppage Wave. Partial data collection has been completed. Additional data collection is required.
- (2) Prediction of Stoppage. Some data collection has been completed; however, much more is required.
- (3) Constricted Flow Study. More data collection required.

4. Evaluation of Automatic Sensing and Computer Equipment

- a. In this general area of research, some evaluation of various vehicle detectors, applicable to this Project, has been done. Data has been collected for the comparison of radar and sonic detectors. Evaluation of the sonic detector, from Project experience, is part of this study.
- b. Computer and Data Processing Equipment. An appraisal study of the mass data collection capability of the sensing instrumentation on the Project is under consideration to determine the equipment necessary to properly and adequately accommodate their potential. Initial investigations have been made for this appraisal and reflected for the budgeting. In this regard, much cooperation has been forthcoming from industry and other research organizations in assisting in the determination.

II. Project Expenditures --

Item	July 1, 1960	July 1, 1963	Committed
	to July 1, 1963	to November 1, 1963	
Equipment Purchase Orders	\$241,905.00	--	\$19,200.00
TV Maintenance	9,691.00	\$1,248.00	--
Cable Rental & Maintenance	54,027.00	6,700.00	--
Equipment Installation and Maintenance Costs	74,551.00	22,355.00	6,745.00
Salaries	29,945.00	7,676.00	--
Utilities	<u>9,150.00</u>	<u>10,237.00</u>	<u>--</u>
	\$ 419,269.00	\$48,216.00	\$25,945.00

Funds budgeted to Project.....	\$480,000.00
Expenditures to July 1, 1963.....	<u>419,269.00</u>
Balance.....	60,731.00
Expenditures to November 1, 1963...	<u>48,216.00</u>
Balance.....	\$12,515.00
Less Committed Funds.....	- <u>25,945.00</u>
Balance (deficit).....	-\$13,430.00

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NATIONAL PROVING GROUND
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(John C. Lodge Freeway Traffic Surveillance
and Control Research Project)

Proposed Project Program

I. Proposed Research for First Year's Program --

The following research is proposed for the first year's program for this Project, within the potential of the proposed Project staff. This program is also based upon the current research under way.

A. Traffic Control System:

Preliminary evaluation of parts of the control system has been completed. It is essential that the evaluation be completed as the first order of business in the first year's program.

1. Evaluation of Lane Control, including new Multi-Lamp Signals.
 - a. Effects of lane closure -- blockages.
 - b. Driver observance.
 - c. Flow characteristics and rates during lane closures.
2. Evaluation of Speed Controls.
 - a. Method and effect.
 - b. Driver observance.
3. Evaluation of Ramp Controls.
 - a. Method and effect.
 - b. Driver observance.
4. Developing System Control Concept, Procedures, and Criteria.
 - a. Analysis of available courses of action.
 - b. Testing of parameters.

- c. Evaluation of equipment potential.
 - d. Other.
 - 5. Continued Development and Evaluation of Supervisory Control Equipment, Control Confirmation Panel Design.
- B. TV System Evaluation:
 - 1. Continued evaluation of the television system, and accessories.
 - 2. Completion of the study of TV observer abilities and limitations.
- C. Computer and Data Logging and Processing Equipment Needs:
 - 1. An appraisal study must be conducted early in the first year's program to determine the application and needs of automatic data logging and processing for computer operation. These areas include:
 - a. Traffic data collection and analysis.
 - b. Control function logging.
 - c. General daily incidents logging.
- D. Traffic Detection System Needs:
 - 1. Determination of traffic detection equipment needs to provide the control operator with traffic information by a network of detectors located at several points throughout the study area. Information obtained will be: volume, speeds, and occupancy.
- E. Traffic Characteristics Studies:
 - 1. Freeway Traffic Characteristics.
 - a. To provide basic volume data for use in evaluation of control system operation or for use as "before" and "after" data in other studies.
 - b. Interrelationship of density--occupancy concepts. The density concepts of vehicles per mile vs percent occupancy concept.

- c. Freeway lane distribution and classification.
- d. Effects of diverted ramp traffic on surface streets.

2. Study of Congestion.

- a. Characteristics of stoppage wave.
- b. Characteristics of starting wave.
- c. Prediction of congestion and breakdown.

II. Project Costs -- First Year --

Operating Costs.....	\$70,000.00
Research Activities.....	50,000.00
Equipment Costs.....	70,000.00
Project Staff.....	<u>130,000.00</u>
	\$320,000.00

III. Equipment Requirements -- First Year's Program --

- A. Replacement and Rehabilitation of Lane Control Signal System -- Replacement of signals with new type multi-lamp signal and modernization of controls and control display.

Cost Estimate.....\$20,000.00

- B. Vehicle Detector Equipment -- A network of presence detectors for providing complete traffic information for control system operation. This includes detectors, transmission lines, installation, controls and display panel.

Cost Estimate.....\$50,000.00

IV. Project Staff --

<u>Number</u>	<u>Classification*</u>	<u>Annual Salary</u>	<u>Total</u>
1 ✓	Highway Administrator VI	\$15,500.00	\$15,500.00
2	Highway Traffic Engineers IV	9,600.00	19,200.00
2	Highway Traffic Engineers III	8,200.00	16,400.00
2	Highway Traffic Technicians II	6,200.00	12,400.00
1	Highway Traffic Technician I	5,400.00	5,400.00
2	Highway Traffic Aide A	4,600.00	9,200.00
6	Highway Traffic Aide B (part-time)	4,400.00	8,800.00
1	Stenographer-Clerk A	4,500.00	<u>4,500.00</u>

Total.....\$91,400.00

Consultants, Part-time Employees..... 32,000.00

Staff Travel and Subsistence..... 6,600.00

Total Personnel (less contractual services).....\$130,000.00

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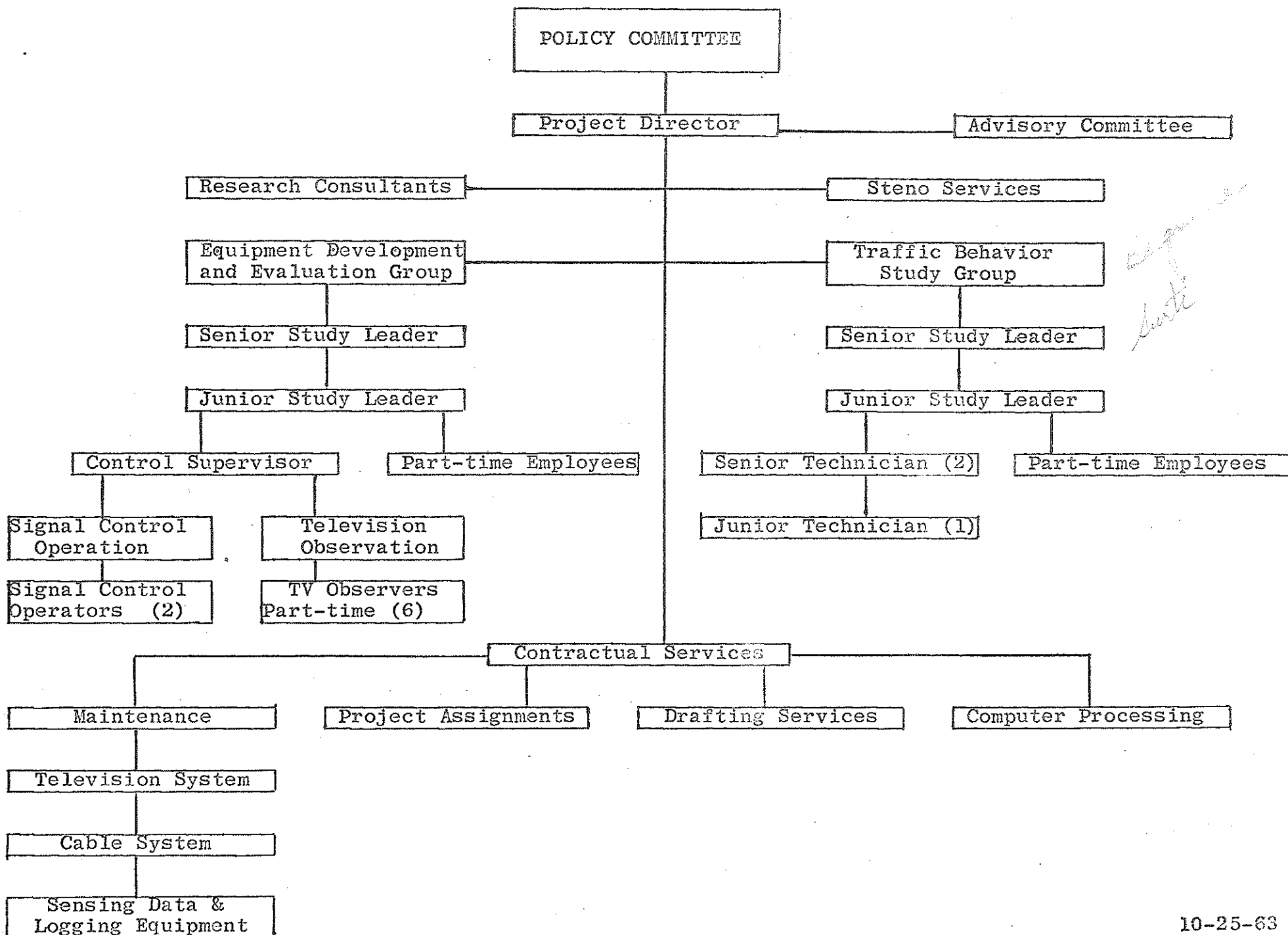
* Indicates equivalent Michigan State Civil Service salary, responsibilities, and duties.

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1-1-64
1-IV
1-II*

*Get 3 - Bergman conflict
Lundholm
Vacant - same PA
with 1-1-64 given - 6/10/64*

*7-1-64
1-IV
1-II*

Proposed Project Organization



Signature
Part

Proposed Operating Procedure for Policy Committee

of the

NATIONAL PROVING GROUND
FOR FREEWAY SURVEILLANCE AND CONTROL
AND ELECTRONIC TRAFFIC AIDS

The membership of the Policy Committee will consist of one representative from each of the states contributing to this National Research Program, plus a representative from the Bureau of Public Roads, the City of Detroit, and the Wayne County Road Commission.

This Committee will be headed by the representative from the Michigan State Highway Department who will be known as the Chairman.

Each participating state, along with the City of Detroit and the Wayne County Road Commission, will notify the Chairman of its designated representative.

It shall be the responsibility of the Policy Committee to approve a yearly program of research and approve a financial budget necessary to perform this work. It shall review and approve reports of research work for publication. It shall establish policies governing the conduct of the Project. The Project Director shall serve as an ex-officio member of the Policy Committee and shall attend meetings of said Committee. Periodic meetings of this Committee shall be held to carry out its functions.

Addendum to Proposed Operating Procedure for Policy Committee

Due to the great distances separating some member states from the location of the Project, it may be difficult to hold meetings of the entire Policy Committee at frequent intervals, even as seldom as twice a year. If this should prove true, it may be expedient for the Policy Committee to designate an advisory committee to work with the Project Director in carrying out the work program.

This committee can be entrusted with the powers of authorizing the Project Director to hire personnel, both permanent and part-time; to obtain the services of consultants as needed; to approve equipment purchases and the outlay of funds exceeding a certain set figure.

Since this committee may be required to meet as often as once a month, membership on the committee should be limited to those who can attend meetings in Detroit on a monthly basis. It is suggested that a representative from the Michigan State Highway Department, the City of Detroit, and the Bureau of Public Roads serve on this committee. The balance of the committee's membership will be dependent on those states who will be able to send a representative to regular meetings in Detroit.

NATIONAL PROVING GROUND
FOR FREEWAY SURVEILLANCE, CONTROL
AND ELECTRONIC TRAFFIC AIDS

Organizational Meeting -- October 29-30, 1963

Location - Detroit and Lansing, Michigan.

Attendance - Representatives of the Highway Departments of
Cooperating States, the City of Detroit, the
Wayne County Road Commission, and the Bureau
of Public Roads.

Host - State of Michigan, Highway Department

Schedule

Tuesday, October 29, 1963 -- 2:00 p.m.

TV Project Site and Facilities Inspection Tour --
John C. Lodge Freeway, Detroit, Michigan.

Project Control Center located at the Herman Kiefer
Hospital, Detroit, Michigan.

Wednesday, October 30, 1963 -- 8:30 a.m.

Project Organizational Meeting in the Office of
Mr. Howard Hill, Managing Director, Michigan State
Highway Department, Lansing, Michigan.

Meeting Agenda

1. Review of Project activities to date.
2. Proposed Research Program -- First Year.
3. Organization of Policy Committee.
4. Organization of Technical Staff.
5. Reporting of Project Activities.
6. Planning of Future Work.

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