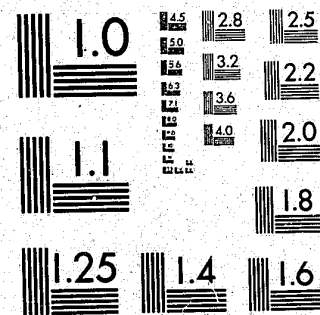


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CENTER FOR THE INTERDISCIPLINARY STUDY OF SCIENCE AND TECHNOLOGY

AND

GRADUATE SCHOOL OF MANAGEMENT

NORTHWESTERN UNIVERSITY

Evanston, Illinois 60201

Report to

National Institute for Law Enforcement
and Criminal Justice

Studies and Action Programs on the

Law Enforcement Equipment R&D System

Evaluative Study of the Equipment Systems Improvement Program

NILECJ Grant No. 74-NI-99-0004-G

Michael Radnor

Principal Investigator

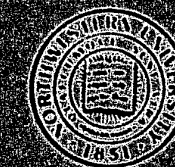
January 31, 1975

Volume I Introduction and Overview

Volume II The Research Program

Volume III Recommendations for Further NILECJ Research

Volume IV Appendices



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U.S. Department of Justice
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Volume III

RECOMMENDATIONS FOR FURTHER NILECJ RESEARCH

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1.1 The Approach

The Northwestern 1974 research reported on in Volume II was essentially exploratory, rather than hypotheses testing. While, as was seen, some hypotheses were generated and explored in a preliminary manner, this was not the main focus of our study. As a result of this exploratory phase NILECJ is now at a point at which we believe it would be meaningful and valuable to add a formal hypotheses testing dimension to future research programs in many of the issue areas being investigated.

Also, the research we performed had of necessity to be confined to a descriptive research mode. Again, we feel that we have reached a point where such NILECJ supported studies could move in several areas to a normative action mode of work that would involve policy proposals, program and institutional designs and training activities, supported by on-going research.

These two shifts are also congruent with our own typical program perspectives, i.e., hypotheses testing and applied research. We have always seen our research group as playing a linkage role between the sources of knowledge to be found in the disciplines and the practitioners operating in the field. This is shown diagrammatically by Figure 1 taken from a paper written by the principal investigator (M. Radnor) in 1969.

Critical here is the linking of knowledge bases to the required policies and decisions that the practitioner must make. This is also reflected in our perspectives on hypotheses formulation as shown in Figure 2, a model which Professor Albert H. Rubenstein and Michael Radnor have been using for a number of years. The key implication here is the tying together of our knowledge of the R&D process and previous research in this area with the general organizational behavior literature in the hypothesis (or as we have termed it there -- proposition) generation process and then feeding back to results of tested hypothesis. Figure 3 describes the specific paradigm which the Northwestern R&D management research teams have been using to go from general research questions to propositions to research designs and instruments.

Another implication of Figure 1 is the need for cooperation between key staff personnel from mission organizations (agencies) and university research personnel. We believe this to be vital, particularly in the design and action stages and will make this a key element in our work strategy for any future

FIGURE 1 MANAGEMENT RESEARCHER ROLE

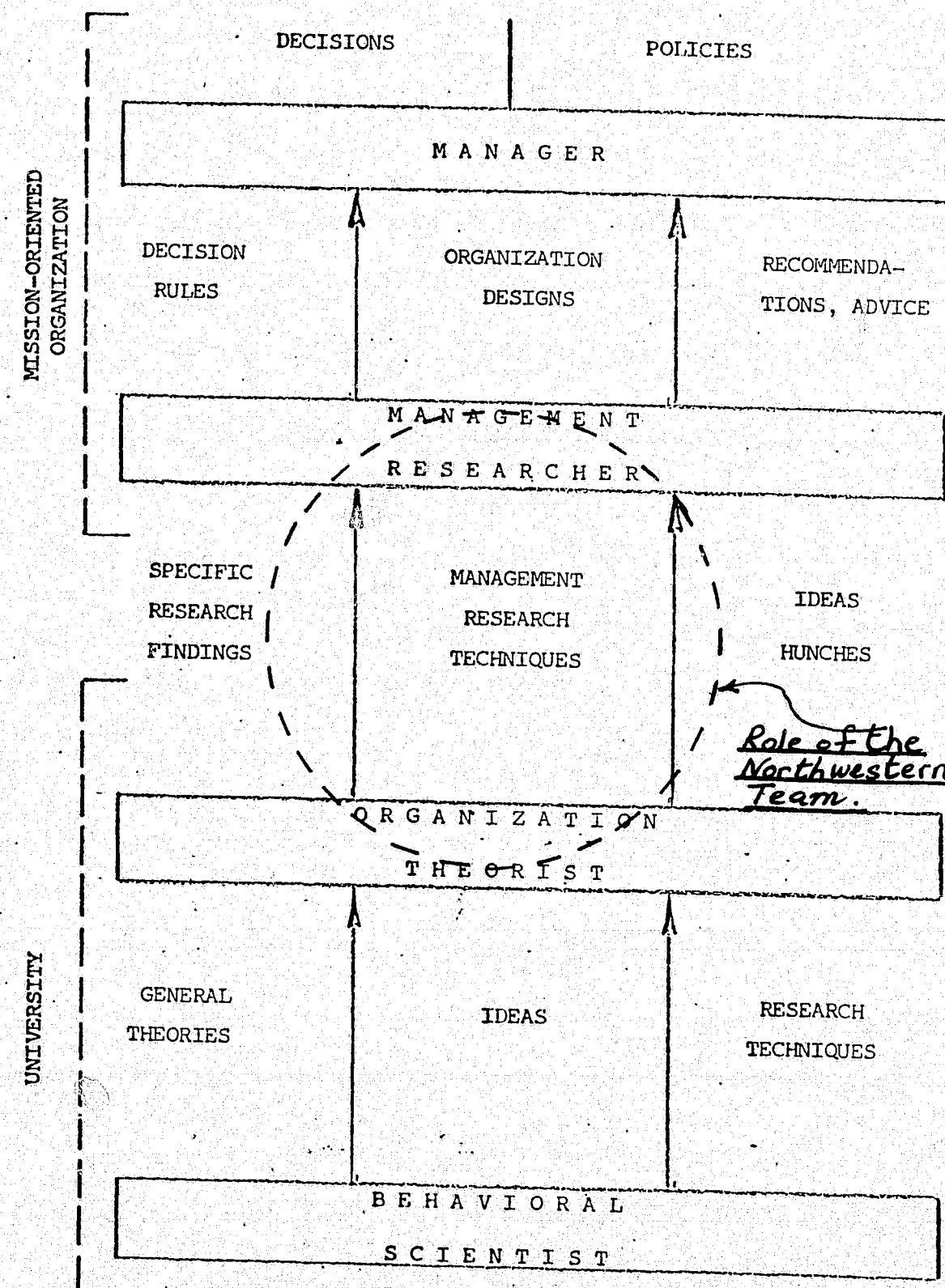


FIGURE 2 THE USE OF MULTIPLE SOURCES FOR PROPOSITIONS
ABOUT ORGANIZATIONAL BEHAVIOR IN R&D

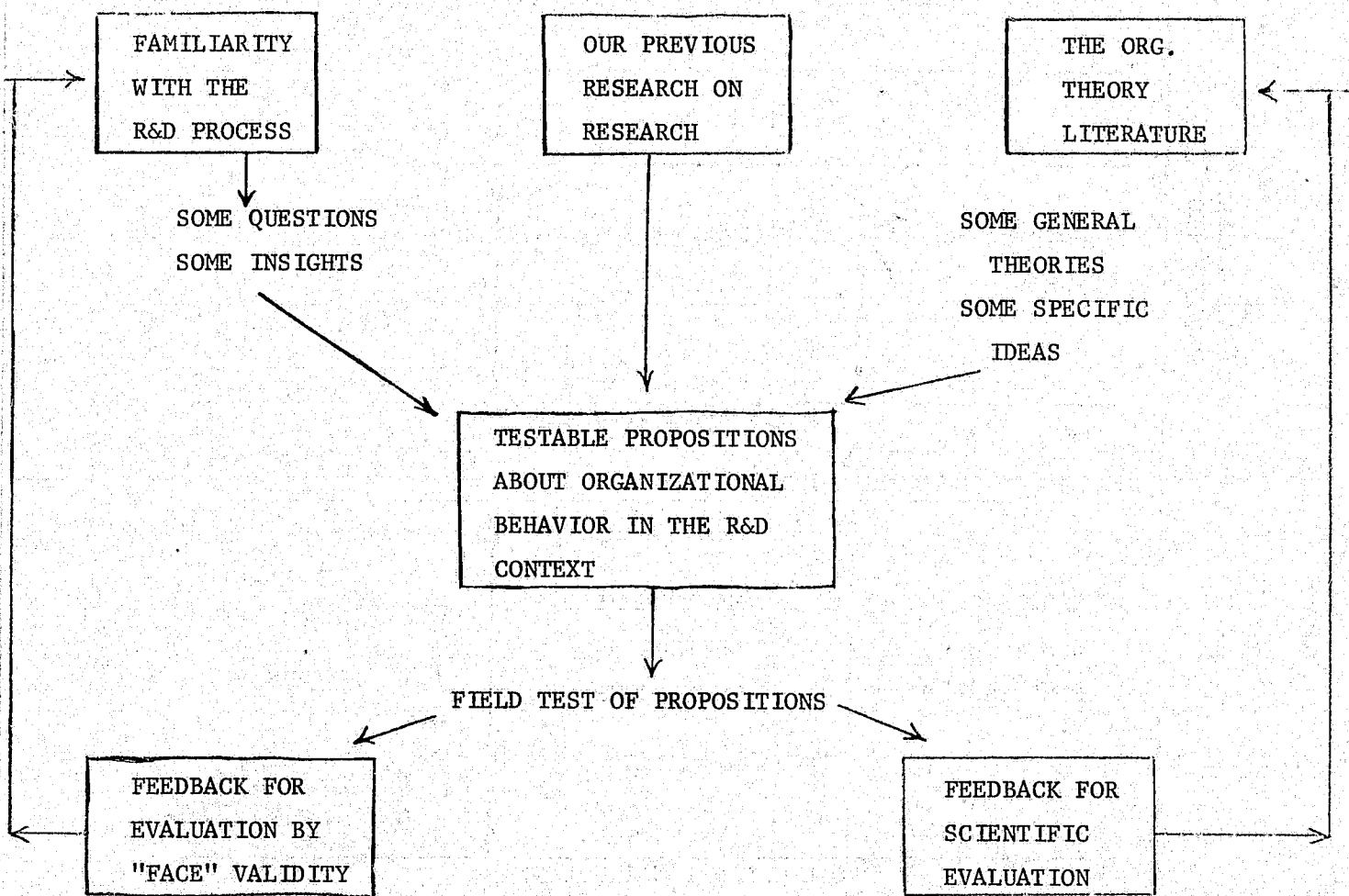
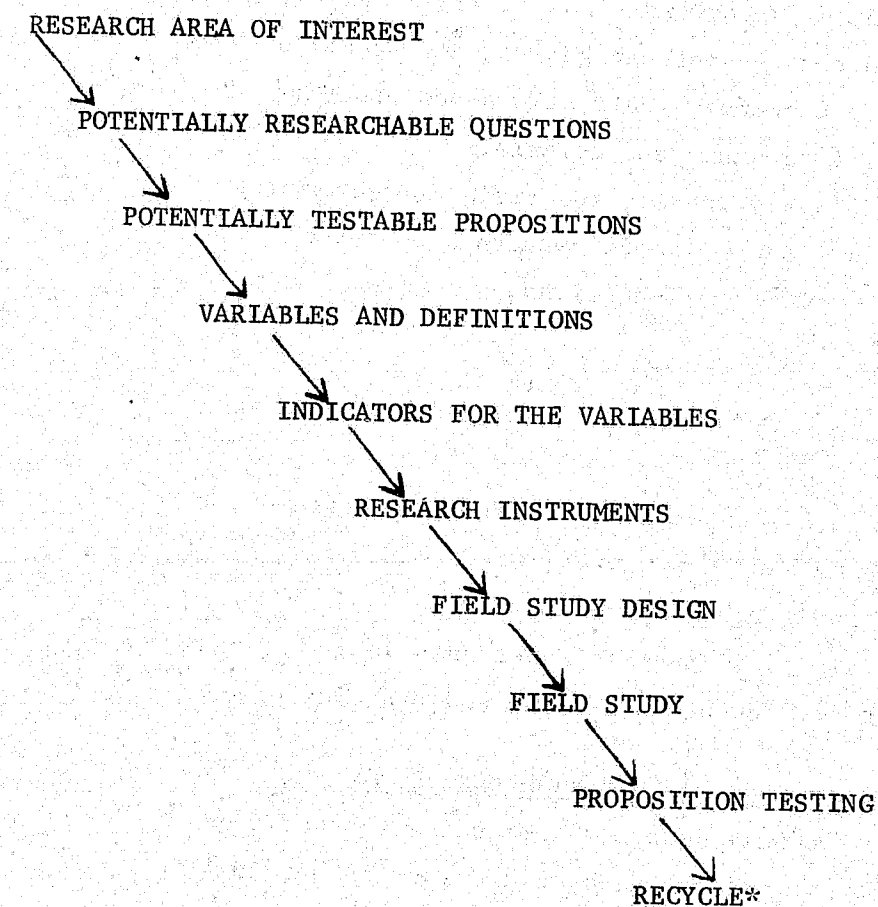


FIGURE 3 OUR APPROACH TO PROPOSITION BASED FIELD RESEARCH



*Of course recycling occurs at every stage and a typical design procedure does not necessarily occur in the sequence indicated.

studies for NILECJ in which we may become involved.

Regarding this action phase we are recommending several types of action outputs.

1. Policy and strategy recommendations to NILECJ policy makers and program monitors -- both in general and specific terms
2. Designs of new recommended institutions and programs
3. Specific training programs and materials
4. Experiments to be performed in the field on recommended concepts -- in the form of model programs operated under controlled observed conditions.

1.2 Specific Recommendations

These recommendations follow the outline of goals described in Section 1. These goals are:

1. Further study of issues explored in the 1974 Northwestern study
2. Specification and study of new issues
3. Study of additional product types
4. Expansion of sample and range of user agencies
5. Carrying out of selected experiments and training programs.

1.2.1 Further Study of Issues from the 1974 Northwestern Study

Based on our research findings we are recommending further study by NILECJ of two of the issue areas on which we focussed in our 1974 program. These are:

- i) Cooperation among users
- ii) Information transfer and dissemination.

These two areas were selected for this additional effort because they appeared to us to offer not only the kind of policy action potential that we see as necessary in each of the issue areas with which we are working, but also useful leverage opportunities for NILECJ, and were hence worth the added investment. These leverage opportunities may be derivable from piggy-backing on other on-going LEAA programs. Thus LEAA has been funding cooperative equipment acquisition programs and even applying pressure on some smaller and suburban police departments to engage in such joint activity. Thus it would seem cost/effective for NILECJ to engage in and support studies of the nature and consequences of such cooperation and how it might be channelled to result in the maximum positive impact on equipment system improvement. Given LEAA's

interest, NILECJ might be able to have many more dollars at work experimenting with and observing equipment and systems cooperation programs that would normally be fundable from a research institute program. Thus we also saw this cooperation area as a productive arena for the design of an action program -- in this case the development of training packages to aid agencies becoming involved in or considering equipment cooperation programs.

Similarly we see the information dissemination area as an excellent leverage opportunity. In this case NILECJ itself funds a substantial dissemination program. Input on methods to create optimal impact in the equipment systems areas, if implemented, could bring significant added resources to the benefit on an ESIP. Here too we also saw the potential for an action program. In this case we are suggesting a field experiment in which selected agencies will be given easy access to information on a full range of products, systems, use experience, etc. -- of the type that might be available from a well run clearing house. Details of both action programs mentioned here will be given later.

1.2.2 Specification and Study of New Issues

Based on our research to date we identified a set of issues that we felt to be of great potential importance and to be researchable (or at least to have significant researchable dimensions). We have indicated a priority ordering - studies that should be initiated at once and others that might be carried out over some longer period. These latter we have identified therefore for later and longer term attention. There are, in addition, numerous other essential issue areas that we felt fell outside the special competence of our team to comment upon or to fall into less researchable areas (at least in the near term sense). Most of the suggestions relating to the economics of the R&D process and economic impact studies were in this category. We see major issues in the organizational/systems areas and we believe we should concentrate on recommendations here where our expertise is the greatest.

The full list of issue areas was given in Volume I. Here we will deal only with the five new issue areas that are being proposed for future NILECJ activity. These are:

- . Development of upgraded user in-house capabilities and modes of operation.
- . Problems and opportunities with small producers

- . Design of regional centers in which selected equipment and expert assistance would be made available to L.E. users
- . Development of strategies for Federal government policy for product development and commercialization
- . International cooperation to achieve improved information exchange, joint programs and possible market expansion.

Development of Upgraded User In-House Capabilities and Modes of Operation

General Statement of Issue

One of the critical gaps we have observed in the R&D and innovative system in law enforcement lies in the weakness of user agency in-house equipment and systems capabilities. To take but one example, the NILECJ standards program is at least in part a strategy to overcome the weakness that most police departments have in being able to select and use necessary products. But eventually this gap must be dealt with head on. The issues have to do with the specific subject area in which this weakness becomes apparent, taking into account the variation that is to be found across user agencies. More systematic data is required on these questions. We can then go on to consider such issues as; optimal size and composition of specialist groups; organizational arrangements for such in-house capabilities; requirements, strategies and mechanisms for upgrading and creating necessary skills through training programs of all kinds - including on-the-job; who can assist in this developmental process (government, industry, consultants and universities) and how; the role of cooperation strategies, and problems and requirements for implementation.

Sub-issues

1. What are the major deficiencies in current in-house evaluation, capabilities, i.e. planning, research, equipment, purchasing, equipment and systems installation, maintenance and utilization?
2. How do these capability deficiencies differ by major user type? How do they vary by manpower (skills and numbers), information processing capability and status?
3. How large should such a capability be, relatively, and what mix of skills is required for effectiveness? How should they be organized and what organizational role should they perform? How should they

- operate in their agencies? How might this affect the role and behavior of the Police Chief in some of the smaller agencies?
4. What capabilities exist for manpower development and training? What kind of training should be given - for search and acquisition, evaluation skills, technical skills for the effective use of equipment and systems, for methods for implementing new products and systems, methods to adapt organizationally to new systems (eg. computers), etc. What are the self development capabilities of law enforcement personnel - individually, through associations, etc.?
5. Who can play what role in developing this capability? What should be the role of federal and local government, the producers and distributors of equipment, consultants, universities and others.
6. To what extent can in-house capability gaps in individual law enforcement user agencies be compensated for by cooperative/regional programs that provide such capabilities on a part time consultative basis? How can such cooperative mechanisms be established? In which areas of skill inadequacies should such cooperative mechanisms be established?
7. What are likely to be some of the major problems of implementing such capability up-grading programs? What should the time horizon and expected investment be? How can the problems be minimized, the costs cut and the time horizon shortened?

This topic will be one of the areas in which we are recommending that NILECJ undertake action programs. These could include the design of training programs capable of being given at universities and other training schools as well as in programmed form for use at agencies (e.g. video taped programs).

Problems of and Opportunities with Small Producers

General Statement of Issue

The small firm often finds itself on the periphery or even outside of federal technology development programs. And yet, because of the highly diffused law enforcement system and the gaps to be observed in internal user capabilities, the small company may be playing, and/or be capable of

playing a much more significant role in the upgrading of the field than that for which it is often given credit.

Based on our findings to date it would appear to be important to identify more definitively the roles such firms are currently performing and to explore their future potential for the field. To what extent, for example, might they act in a systems consulting role -- a major present gap and one that might well be fillable by a smaller regional firm? What specific problems do they and would they encounter (e.g. with cash flow, limited R&D capabilities) and how could Federal government, perhaps in cooperation with larger high technology companies, assist them and consequently both of them take advantage of their potential contribution.

Sub-Issues

1. What is the current and potential role of small producers in the law enforcement equipment innovation and diffusion process? To what extent do they perform a unique enterpreneurial role? Are they able to act as local systems and service consultants? What differentiates the small and very small (tiny) producers?
2. How successful are small producers in various segments of the market and in various geographical regions? Can a small producer survive if he is only in law enforcement? Are they more or less effective in communicating availability of products and in servicing users, especially small users?
3. What specific problems do they experience that differ from those normally encountered by producers in the law enforcement market? Can the small firm really afford to do R&D, to sell and service the multitude of small users, cope with the cash flow problems that result from generally slow paying local governments and cope with the difficulties of competitive bidding? Are they able to be flexible enough to handle special equipment requests as against stock items?
4. What can be done by Federal government to assist competitive small firms assume the roles in which they could make major contributions? How could this competence be augmented? Is there possibly a more effective division of labor between innovating, high technology,

large producers and small firms acting in diffusion and support roles (or vice versa)? Could Federal government promote such partnerships in appropriate conditions?

The issues in this area of research require further elaboration and conceptualization leading to the generation of specific hypotheses to be tested.

Design of Regional Centers in which Selected Equipment and Expert Assistance would be made Available General Statement of Issue

One potentially attractive option for stimulating and assisting law enforcement agencies in equipment and systems is the creating of regional centers. Such centers could act to aggregate user demand for specialized and costly equipment which might not be attainable by an individual user. This could be either because of absolute cost and/or because of low cost/effectiveness due to only occasional usage. This is the obvious benefit but there may be more subtle and even more profound results. Such centers might act to bridge the gap between need and recognized product utility, and often as important, familiarity. By making sophisticated new and perhaps less familiar products easily available and providing the expertise in use and maintenance along with the equipment, a center could act to bring those agencies that could afford and justify acquisition on their own to a point where that step becomes feasible. Thus it becomes a technology pulling and diffusing device, acting in many ways like the agricultural extension service. Also, as a source of close-by and familiar expertise, a center could act to supplement the in-house capabilities of local users and even turn into an important training mechanism.

There are however many issues to be explored and problems to be overcome if such a concept is to be implemented. What specifically would be the role and functions of such centers? Which equipment and facilities should they have? How should they be set up, organized and funded -- how much from local and from Federal sources? How large should they be; how

large a region should they serve? How would they operate and be staffed? How could LEAA evaluate the benefits? These are vital questions for which answers are currently lacking. However, there are models of such institutions from which we can learn -- both in law enforcement abroad and in other fields and this experience should be utilized to supplement data gathered on the issues of direct concern. This input could then provide the basis for a preliminary design of such a center.

Sub-Issues

1. What should the role and functions of such a center be? To what extent should the role be service as demanded by users or missionary. To what extent would the center be involved in equipment renting or loaning, expert supply, general consulting and training? Should it have other roles such as a testing, evaluation and information dissemination? Could a center be used to supplement user in-house capabilities in a reinforcing rather than weakening effort?
2. Which equipment should it have? Should this be only occasionally used, expensive, sophisticated, newest, or most likely to be adopted. How would decisions be made between competitive models? How would the equipment be acquired?
3. How should such a center operate? What would be the basis for rental charges -- subsidized rates, payment according to need and ability, free trial usage, sliding scale with rate of use, etc.? Would there be any limits on usage? Would there be limits on the responsibility of personnel? To whom would they be responsible?
4. How large an investment would be required to set up a center -- a series of centers? How large should they be; how large a region should they serve? How would they be funded; how much local and how much from federal sources?
5. How would such a center be staffed? Could the right kind of people be found, attracted and kept?
6. What are the models of such centers in law enforcement and other fields from which **experience** can be gained?
7. What would be the criteria and methods by which the effectiveness of such centers would be measured; over what time horizon?

While there do remain significant areas here in which it would be desirable to learn more before embarking on an action program, it was our conclusion (given the needs of the field) that here was an opportunity to put new knowledge to work on a project that could bring real early benefits. Further details of this project will be discussed in 1.2.5 below in the section of action programs.

Development of Strategies for Federal Government Policy for Product Development and Commercialization General Statement of Issue

Federal government and NILECJ in particular must have a developed perspective on the strategy and implementation options that can guide its policies and programs. It is vital that effort be expended on pulling together the knowledge and experience applicable to this question that is available. This could come from studies like ours and others, the less organized but still very valuable wisdom of those experienced in the field, etc. Here the aim should be to provide operational guidelines for such basic questions as where should federal investments in the total R&D innovation and diffusion system be made, what should such actions consist of, how should they be effected, what does it take to monitor and evaluate such programs and what can be done to improve and maintain the image and legitimacy of the federal role and intervention at local (user and producer) levels? This explicitly recognizes that Federal government must see itself as being involved in the total system from R&D to commercialization to utilization and not just in new product research.

Sub-Issues

1. Where should be the location of Federal intervention in the system? What are the most effective federal policies with respect to leveraging, seed money and/or impact points? How much should be invested at various points (e.g. product development versus equipment usage training) at various times, locations, etc. in connection with various product areas?
2. What are some of the most effective types of federal actions with respect to: supporting research, developing prototypes, providing training, disseminating information, developing new institutions, strengthening existing organizations, changing regulations, developing procedures, designing model programs, establishing advisory services,

conducting evaluations, developing standards, developing markets, identifying trends, and fostering cooperation (among users and producers)? How can an inventory of policy options be developed for use at the federal, regional, state and local levels? What are the most effective types of producer and user incentives for stimulating the development and use of improved law enforcement equipment?

3. How can we best allocate funds so as to enhance various aspects of the system? Which policies and programs should be conducted on a centralized and which on a decentralized basis? What program selection criteria should be utilized in assigning federal resources to law enforcement programs? What is the feasibility of utilizing other federal agency equipment innovation and diffusion policies at NILECJ? How can NILECJ interface well with LEAA programs at the state and local level?
4. What are the more effective evaluation and monitoring procedures to be used by NILECJ with respect to funded programs? What types of capability does NILECJ need to manage such programs? What types of support research should be going on in relation to this management process?
5. What measures can be taken to improve the legitimacy and image and effective intervention of federal initiatives in the law enforcement system?

International Cooperation to Achieve Improved Information Exchange, Joint Programs and Possible Market Expansion

General Statement of Issue

Law enforcement is a world wide problem and efforts for improvement are to be found in many countries. While practices do vary, there are also many similarities to be found. Law enforcement agencies in many countries use the same or similar equipment and systems, and there have also been developments in some places which have not yet diffused to others. These developments may be in specific equipment and products but they may also come in operational systems and in organizational arrangements. In a number of countries the centralization of law enforcement has permitted the early establishment of national law enforcement laboratories and programs -- for example, in Great Britain and Japan. There is evidence

that there is experience abroad that could be useful in the U. S., and vice versa. In addition, the commonality of concern with and need for new equipment creates a potential for not only joint development and R&D information exchange programs but also the possibility of significant market aggregation opportunities. This could come either through import/export arrangements or even perhaps from joint commercialization programs.

Sub-Issues

We have identified three categories of sub-issues that need investigating:

1. Comparative analysis of equipment and equipment systems usage and policies. This includes understanding the variations in emphasis on equipment usage, priorities and legal and informal constraints relating to use of various products. Also, of interest are the various administrative and organizational practices that influence product acquisition and use and their impact (e.g. purchasing practices, testing practices). It will be important to identify special mechanisms such as national laboratories, equipment centers, etc. so as to be able to benefit from comparative experiences.
2. The specific issue areas in which international cooperation could take place. This includes identifying specific useful areas of experience either with equipment types or with institutions, joint R&D programs, joint field testing of new products (taking advantage of the variation in opportunity provided by multi-national situations -- legal, social and economic), and possibly even joint commercialization. It might be possible for example to reduce the risk to both governments and the private sector by organizing such arrangements. An important dimension might be in intergovernmental agreements in cooperation with industry that for example could see the U. S. supporting the development, commercialization and exporting of one product, and the British concentrating on and exporting another, so acting to aggregate markets for both, and so on with other countries. Specific note will have to be made of national import/export regulations and laws that might have an impact.
3. Examination of the alternative opportunities, means and targets for international cooperation. With which countries should and could we cooperate? What extent of information sharing is possible, and how

transferable is the experience? How can such cooperation be initiated and maintained? What would be the role of and means of setting up conferences, demonstration and equipment exchange programs and trade fairs? Could there be a co-location of, for example, a NILECJ staff member at the British Home Office Law Enforcement Scientific Development Branch, and vice versa?

Topics such as those described above could form a major program in themselves. At this point we are recommending that NILECJ undertake a pilot feasibility study only -- one which would sharpen the issues and uncover some of the potential avenues and opportunities. Considerable information could be gathered from published sources and by correspondence. This effort could act to intensify present embryonic NILECJ proges with Canada and elsewhere.

There has already been some encouragement on this concept as a consequence of a visit last summer by the principal investigator of this study (Radnor) to London, U. K., in which some extremely interesting and potentially important avenues of work opened up. During that visit, Dr. Radnor met with:

- Mr. R. A. Root, Head of Management Services of the Metropolitan Police Department, Scotland Yard, London
- Dr. David Leach, Senior Scientific Officer in charge of the Equipment Section of the Metropolitan Police Department Scotland Yard, London
- Mr. Geoffrey Phillips, Director Police Scientific Development Branch The Home Office
- Mr. J. B. Howard, C.B. Under Secretary of the Home Office

These meetings indicated that there were extremely important areas of work going on in both the U.S.A. and the U.K. that did not seem to be transferring for the mutual benefit of both countries. At both Scotland Yard and the Home Office, their awareness of the work going on within NILECJ and elsewhere seemed to be sketchy, at best, and it appears (very importantly) that we do not have a full awareness of some of the extremely interesting developments taking place in the U.K. These include not only some important equipment projects, but some potentially very important organizational systems experiments in the use of equipment closely related to some of the areas emerging from our own study. One example is related to one of our proposed areas of work, the setting up of regional equipment centers designed to make new, costly and sophisticated equipment available

to local constabularies, together with the experts needed to operate this equipment.

They have expressed tremendous interest in the research we are doing and wish to stay in touch and cooperate, and we are now receiving published materials from them. We believe that there would be enormous benefits to NILECJ from closer cooperation with the British. To aid in this process, we discussed with the Home Office people the possibility of a major British university becoming involved in the study at their end and they were enthusiastic. Professor S. Eilon, Head of the Management Sciences Department of the Imperial College of Science and Technology, London University, and one of our long time cooperators, has expressed an interest in participating. In addition, our extensive network of researchers in Europe and Japan would permit such work to be initiated at marginal cost to NILECJ.

1.2.3 Study of Additional Product Types

In the 1974 study we investigated ten equipment types. This has moved us closer to the point where we will be able to specify the policy options to be pursued in relation to advancing the development and utilization of various equipment types. We feel that it would be important to strengthen the basis of the equipment typology which we have developed by adding to the sample to increase the variety of dimensions, and permit some validation.

Products and systems should be added from the following categories:

1. Patrol function (products of high, medium and low technology).
2. Socio-technical systems, products in which there is a close man-product relation.
3. Integrated systems products - where the product involves a package rather than an item.

The following is a possible list from which to select:

Patrol function

- a) High technology
 - Computers in automobiles
- b) Medium technology (One from two)
 - Vehicles
 - Radar equipment
- c) Low technology (One from three)
 - Helmets

Uniforms

Handcuffs

Socio-Technical Systems (One from two)

Para-medics

Riot Control

Integrated Systems

Mobile laboratories

1.2.4 Expansion of Sample and Range of User Agencies

In our study we spoke to over 150 user organizations, over 100 in some depth. The distribution according to type and size can be seen in Table 1 (Volume II). It is clear that while we were successful in reaching a good range of user types, there are areas of the distribution of the typology that need strengthening. This is particularly so for the county police departments, sheriffs, and the smaller police departments (under 50 officers), the bigger suburban cities and the special agencies.

Studies should be undertaken to supplement this sample. In all cases when we interviewed at a user organization we collected a great deal of general data on the agency and its problems. Thus cumulatively we were laying down a very valuable data base on users. This will be very useful when, for example, in the future NILECJ wishes to compare problems of small users with those experienced by others. Overall target should be to add another 50-75 new, user agencies in-depth. These 150-200 users with whom we are developing a healthy on-going relation will become a valuable data resource. At some future time a mailed questionnaire may prove valuable but it is our belief that at this time little reliance could be placed on the type of data which could be so obtained. Plans should be made to allow for cooperation and interchange of findings between various research groups who might be involved in any future studies.

1.2.5 Selected Experiments and Training Programs

The rationale for the work recommended in the following action programs has already been described. This section will briefly elaborate on various possible work elements.

Cooperation Among Users - Design of Training Materials

Our specific suggestion in this area involves the design of training programs. There is a need to create course outlines, notes, class materials, case studies and other participation materials that can be used in training courses of various lengths (half day to one week). These should be pilot tested with actual users. Designs are also needed for packaged or canned short presentations that can be used at user sites. Commercial production and reproduction could then be undertaken by NILECJ following completion of the designs.

Information Transfer and Dissemination - Design and Conduct of a Field Experiment

One possible experiment would be the providing to selected user agencies of a very full information service on a set of products. This set could consist of several products that have been and would be the object of study in NILECJ programs. The objective of the experiment should be to attempt to identify both attitudinal and behavioral changes over the experimental period and in comparison with a matched control group of user agencies.

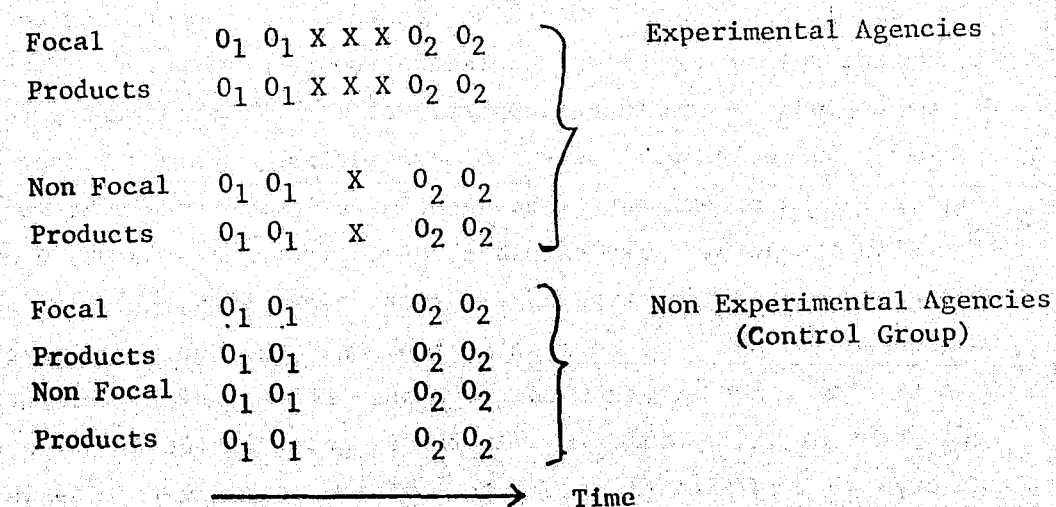
The products selected should be from ones that the agencies do not currently use - e.g. from light weight body armor, low light, non-lethal weapons, vehicle locators, voice identification, weapons detection and mobile laboratories. It will be necessary to have a set of products that none of them have at the start (or were not already in a real sense about to acquire), but which it would be feasible for them to seriously consider. To control for both pre-test contamination and Hawthorne effects the list of focal products should be supplemented with several others that they do not have, but which will be the beneficiaries of only a lesser information service in the experiment. The agencies selected should be within the same size category. They should also be either all roughly comparable in other characteristics, type of district, capability, etc., or selected in matched groups. Random selection could then be used to split them into treatment and non treatment groups. A total of approximately 15 in each group might be aimed at. As far as possible the agencies should be selected with sufficient spread to minimize communication between treatment and non-treatment sites.

All the participating agencies could be given the same pre-test interview to examine their level of knowledge and understanding on the

equipment items - availability, use and experience, their predispositions to acquire the products and on any actions they may have taken in this direction. The treatment group might then be supplied with considerable product information; through mailed packages prepared by us; through face-to-face discussions; and if possible, through presentations by other users and company representatives. Attempts should be made to enlist relevant user and producer support for this experiment. In the case of the products added for control purposes information could be supplied of far less complete and intensive character and without the personal attention given for the main products. The agencies should not be informed which are the products of special interest.

This information could, for example, be supplied over a period of approximately one year. At the conclusion of this period both treatment and non-treatment agencies could be questioned on search and acquisition behavior and interviewed on attitudinal change on the products. We would expect to find both cases of positive and negative impact of the information depending on the products concerned and needs of the agency. It will also be necessary to attempt to identify the degree to which decision making is being based on the product information supplied.

Diagrammatically the experiment can be shown as follows:



(see next page for legend)

Legend:

0 ₁ 0 ₁ - Observations at t ₁	X X X - Intensive Information Service
0 ₂ 0 ₂ - Observations at t ₂	X - Minimal Information Service

The experiment will permit comparisons between the intensive and minimal information service treatments in the experimental agencies, and (for each of these product categories) between the agencies who did and who did not receive the information service. It should therefore be possible to demonstrate the impact of information availability and quality as well as the forms of such impact. We realize that a one year period is unlikely to be sufficient to lead to actual product acquisition behavior in most cases so that the impact is more likely to be seen in attitude and decision making process changes. An extension of the experiment would be to continue the observation period beyond one year to test for longer range lagged behavioral impacts.

In-House User Capabilities

In this area the action effort could consist of the design and pilot testing of training programs in both the course and programmed forms as described in the User Cooperation case.

Design of a Model Regional Equipment and Expert Center

The issues that would require dealing with have already been discussed. The objective here would be to develop an actual institutional design to the point that NILECJ would be capable of evaluating the feasibility of pursuing the project to full implementation.

It should be NILECJ's objective to support and carry out studies to provide the guidelines that would enable a contract to be let to a commercial organization who would develop detailed costed plans and proceed to the actual physical establishment, manning and initial operation.

1.3 Summary

The future studies we have proposed to NILECJ build on the conceptual framework, the large accumulated data base, the excellent contacts developed and the experience the Northwestern group garnered in L.E. The objective should be to deepen and broaden NILECJ's understanding of the R&D system so as to permit development of additional, improved and more detailed policy alternatives and strategies. Effort should also be initiated to implement certain of our specific recommendations through cooperative action programs.

If NILECJ aim to improve its strategic planning and program management its knowledge of the R&D system (on the supply and user sides) must be moved beyond the first step developed by us in the 1974 study. This requires further analysis of previously researched issues and investigation of additional issues. The samples of users, producers, and products, though substantial, must be expanded if we are to have the necessary confidence in our conclusions and recommendations for policy making. Hence we propose that NILECJ undertake as a priority:

- 1) Further Analysis of Data & Issues from 1974 Northwestern Study
 - a) Secondary data analysis on previously identified issues
 - b) Examination of new and reformulated proposition using existing data in previously and newly identified issue areas
 - c) Further data acquisition in two of the issue areas
 - (i) Cooperation among users; and (ii) Information transfer and dissemination (areas in which special leverage opportunities exist for NILECJ)
- 2) Specification and Study of New Issues
 - a) Development of Upgraded User In-House Capabilities
 - b) Problems of and Opportunities with Small Producers
 - c) Requirements and Functioning of Regional Equipment Centers

In each case it will be necessary to study the issue and, as before, the researchers should present NILECJ with specific action recommendations - including implementation requirements.

In addition to these issue areas we have identified two topic areas which we have deemed worthy of special project attention:

- d) Development of Strategies for Federal Government Policy for Product Development and Commercialization. (This unit will be specifically focussed on developing improved tools and inputs for NILECJ policy making and program management processes in the L.E. equipment area.)

- e) International Cooperation to Achieve Improved Information Exchange, Joint Programs and Possible Market Expansion. (This unit will aim at improving our capability of benefitting from international opportunities at the NILECJ and wider systems levels, by providing specific recommendations and contacts.)

- 3) Study of Five Additional L.E. Products
(to supplement those already completed) - to improve the equipment typology
- 4) Expansion of Sample and Range of User Agencies - especially adding smaller users. We have selected three areas for "action" programs in which NILECJ should take first steps to bring about implementation of several of our policy proposals.
- 5) Action Programs: Experiments and Training
 - a) Design and pilot test training programs to aid and stimulate Cooperation among users. Packaged short programs should be one of the outputs.
 - b) Conduct field experiment in Information Transfer and Dissemination - by providing selected P.D.'s with an equipment information service to attempt to improve decision making.
 - c) Design of training programs to help upgrade User In-House Capabilities.
 - d) Design a Model Regional Equipment and Expert Center.

END