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# BALTIMORE APPLICATIONS PROJECT THIRD ANNUAL PROGRESS REPORT



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**JUNE 1977**

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# THIRD ANNUAL PROGRESS REPORT

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June 1977

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# BALTIMORE APPLICATIONS PROJECT
# THIRD ANNUAL PROGRESS REPORT

## BACKGROUND

On May 6, 1977 three years of activity of the NASA-Baltimore Applications Project (BAP) were completed. A detailed account of how the BAP came about has been compiled by the National Academy of Public Administration (NAPA) in their report[1] evaluating the project. Descriptions of the specific interrelationships between the BAP and elements of the local governments of the City of Baltimore along with the rationale for BAP operation have been provided in previous progress reports[2,3,4] and will not be described here.

## DISTINCTIVE BAP CHARACTERISTICS AND OPERATING STRATEGY

There is a large group of federal agencies that have dominantly technological orientations. Some of these agencies provide a direct service to the public through their technology (e.g. weather service, postal service, coast guard). Other agencies provide service to the public through technology in an indirect way (e.g. environmental protection, transportation, agricultural research, occupational safety). Still other agencies with strong technological orientation provide service to the public as a subordinate part (spinoff) of their chief mission (e.g. NASA, defense). For many years NASA has made its expertise available to the general public through its technology utilization program. ("Spinoff 1977"[5] covers a wide range of NASA technology utilization activities in a very readable way.) Several other federal departments and agencies operate similar programs. One singular characteristic of these programs is that they appear to first derive a useful technique, device or procedure and then look for places to apply it (or "customers" to "buy" it). This mode of technology transfer has been called "technology push".

The BAP experience has provided NASA and Goddard Space Flight Center with an opportunity to listen to the user describe his problem and then to search for one or more possible alternative courses of action, to discuss these with the user and if the user so desires, to help him choose the "best" solution. This mode of technology transfer has been referred to as "user pull". It has been perhaps the singular difference between BAP activity and most other previous activity in technology transfer and utilization.

A specific request for assistance from the City of Baltimore to NASA (see Reference 1) was the key element for starting the program. This invitation from the City, though seemingly a minor point, has proved to be an important contributor

to any success accruing to the BAP. Because Baltimore "pulled" the technical assistance from NASA and the federal government, the atmosphere and mind set for the BAP activity has been such that the problem, as perceived by the City, has been at the center of discussions. If an existing NASA technology fit the problem, it was always one of the possible solutions suggested. There has been a conscious attempt in the BAP to avoid appearances of selling only a NASA (or other federal) brand technology to solve some arbitrary problem. Thus the focus has been the City's problem and not a NASA/federal solution.

A second distinctive characteristic has been in the organizational location of the BAP and its resultant access to the Departments and agencies of the City of Baltimore. The functional relationship between the Mayor's Physical Developments Coordinator (Bernie Berkowitz) and the BAP Director has facilitated beneficial activity. The wide breadth and adequate depth inherent in the Coordinator's normal role coupled with his understanding of the political dimensions of the problems and the solution options have helped to provide the BAP with added effectiveness.

The location of the BAP in the Mayor's Office and the Mayor's invitation to attend the regular weekly meeting of his Physical Development Cabinet have provided adequate authorization and "exposure" for BAP entree into the City Departments. Yet the profile of activity has been sufficiently low and behind the scenes that expectations for BAP achievements were maintained at an achievable level.

## TASK EVOLUTION

In the "user pull" atmosphere of the BAP there has been a natural and logical sequence through which tasks have evolved. First is the listening or problem identification phase. Through conversation with and questioning of the Department Heads, Bureau Chiefs, Division Chiefs, engineers and technicians, it has been possible to illuminate and define a number of tasks and problems. The next step was one of searching for one or more possible solutions, discussing these with the City personnel and assuring that they had a good understanding of all the options. On many occasions one of these alternative courses of action was selected by the City personnel. Sometimes a choice was recommended by the BAP Director. Once in a while none of the suggested solutions were adopted.

## ROLES

As identified in Reference 4 (p. 9) the roles played by the BAP and its Director have necessarily covered a wide range. First was the role of problem seeker

and problem definer or identifier. Next was the role of information gatherer or agent. It was always necessary to assure an up-to-date knowledge of the state of development of each field of technology considered. The NASA and other federal and commercial data bases, though occasionally somewhat "dated", were of great value in filling this need. The information agent was required to have a proper skepticism in his search for the true state of the art. It was essential that he recognize and understand his own limitations of knowledge and that he know where to seek good help and advice and that he be able to obtain it so that the "truth" could be available to the decision maker in the City government whom he was trying to help.

There are numerous other roles the BAP Director was called upon to play relative to technological solutions to the City's problems. Among these in order of frequency of experience are: technical advisor, technology assessor, ombudsman, grantsman and active participant in a task.

## TASK CATEGORIES

For convenience the 43 tasks in which some activity has taken place within the past year are categorized into six discipline areas. These are, alphabetically, Energy, General, Health, Management, Public Safety, Solid Waste and Water. Some tasks overlap two areas and are noted accordingly in Tables 1 and 2. From detailed task descriptions in Appendix A and Appendix B the reader can get fuller insight into the meaning of each category. These 43 tasks are further separated into groups of higher and lower priority.

## TASK STATUS

Tasks have been placed into four progress categories as in previous annual reports. These are:

Active - presently some on-going activity.

Inactive - activity delayed for one or more reasons; intention of further pursuit.

Completed - BAP no longer needs to be involved due to transfer or completion of original task.

Discontinued - for reasons of priority or commercial availability of a task resolution, task activity was stopped.

Table 1

Higher Priority Tasks

| Task Title | Status | Energy | General | Health | Management | Public Safety | Solid Waste | Water |
|---|---|---|---|---|---|---|---|---|
| CIP Software | 2 | | | | ● | | | |
| Data System Demonstration | 3 | | ● | | | | | |
| Data Collection Platform Experiment | 1 | | | | | | | ● |
| Energy Conservative Industrial Park | 1 | ● | | | | | | |
| Energy Coordinator | 3 | ● | | | | | | |
| Energy Audit of Selected Buildings | 1 | ● | | | | | | |
| Fire Department Dispatch System | 1 | | | | ○ | ● | | |
| Fountain - City Hall Water Clock | 3 | | ● | | | | | |
| Housing & Community Development Data System | 2 | | | | ● | | | |
| Health Department Workshops | 4 | | | ● | | | | |
| Incinerator Energy Recovery | 3 | ● | | | | | | |
| Landsat - Intralab for RPC | 3 | | ● | | | | | |
| Landsat - Data Utilization | 3 | | | | | | | ● |
| Methane Recovery | 4 | ● | | | | | | ○ |
| Solar - Baltimore City Hospital | 2 | ● | | | | | | |
| Solar - Convention Center | 4 | ● | | | | | | |
| Solar - Firehouse | 2 | ● | | | | | | |
| Solar - SERI | 4 | ● | | | | | | |
| Solar - Upton Multipurpose Center | 2 | ● | | | | | | |
| Wastewater Symposium | 3 | | | | | | | ● |

1 - Active
2 - Inactive
3 - Completed
4 - Discontinued

● Primary Area
○ Secondary Area

Table 2
Lower Priority Tasks

| Task Title | Status | Energy | General | Health | Management | Public Safety | Solid Waste | Water |
|---|---|---|---|---|---|---|---|---|
| Char/Ash | 4 | | | | ○ | | ● | |
| Child Health Management Info. System | 4 | | | ● | ○ | | | |
| Digital Traffic Emergency Routing | 1 | | | | | ● | | |
| Dutch Elm Disease | 3 | | | | ● | | | |
| Health Department MIS | 2 | | | ● | ○ | | | |
| High Rise Housing | 4 | | ● | | | | | |
| Infra-red Overflight | 1 | ● | | | | | | |
| Lake Roland Desiltation | 3 | | ● | | | | | |
| Laser Building Cleaner | 4 | | ● | | | | | |
| Law Enforcement - Criminal Justice MIS | 4 | | | | | ● | | |
| Law Enforcement - Police Location System | 4 | | | | | ● | | |
| Meals-on-Wheels Package Food | 4 | | | ● | | | | |
| Pollution Situation Center | 4 | | ● | | | | | |
| Propagation Tests | 1 | | ● | | | | | |
| Risk Management Briefing | 3 | | | | ○ | ● | | |
| Sewer Flow Meter | 2 | | | | | | | ● |
| Solar - Aquarium Heating | 2 | ● | | | | | | |
| Street Sweeper Concepts | 4 | | | | | | ● | |
| Thermoradiation of Sludge | 3 | | | | | | | ● |
| Water Pollutant Detection | 1 | | | | | | | ● |
| Water System Simulation | 2 | | | | ○ | | | ● |
| Zinc Paint Tests | 3 | | ● | | | | | |
| Zoo Methane Generation | 3 | ● | | | | | ○ | |

1 - Active
2 - Inactive
3 - Completed
4 - Discontinued

● Primary Area
○ Secondary Area

## PLANS FOR THE NEXT INTERIM

The BAP has received a request from Mayor Schaefer for continuance of the project for another year. Goddard management has approved and the BAP is entering into a fourth year of activity.

At this time it is becoming clear that the searching for tasks and the problem identification stage is largely complete. The next step needed appears to be a review of the tasks previously identified and a selection of one or more of them for study in greater detail that might lead up to a specific experiment or an implementation at some time in the future.

The type of assistance to Baltimore is expected to be of an advisory nature and to relate to technical disciplines in which Goddard, NASA or perhaps other federal agencies or laboratories that choose to become involved have notable expertise or experience. Perhaps typical of the kind of task is the Fire Department Dispatch (A-7). Here the Goddard experience in communications and in interfacing operators with computers with communication systems (e.g. for the NASA data links for the worldwide network) may be highly appropriate to the Fire Department needs. Some of this Goddard know-how and experience in the energy area has already been utilized in conjunction with the BAP solar energy programs.

Judging by the evaluation of the panel organized by the National Academy of Public Administration[1] the activities of the BAP for the two and a half years encompassed by their study have been a success. They endorse and encourage the course of action outlined above (greater depth of involvment leading to implementation). The panel also recommends geographic broadening of activities to include other cities, countries and the executive and legislative branches of the State of Maryland. While these suggestions are welcomed the ground rules of the Goddard technology transfer philosophy insists on "user pull" (the user must really have a problem and must want and ask for help); within the constraint program expansion is welcome. Such activities with other jurisdictions than the City of Baltimore are outside the scope of BAP and will be reported separately.

In August of 1976 Mr. Philip Yaffee joined the BAP staff. He has been involved individually in a number of task areas and will take over the responsibilities for leading some of the activities in the next phase of BAP.

## CONCLUSIONS

During this interim, consideration has been given to 43 task areas. Eight of these tasks are still considered active; nine are classified as inactive; thirteen

are completed and thirteen have been discontinued. The usefulness to the Baltimore City government of activity along the lines of BAP has been established. There is a mutual interest in determining the processes and possible benefits accruing to extending activities to consider providing assistance in greater depth in a few task areas. Tentatively these extended task areas include the Data Collection Platform Program (A-3)*, the Energy Conservative Industrial Park (A-4), the Energy Audit (A-6), the Fire Department Dispatch (A-7), and the Digital Traffic Emergency Routing (B-3).

*Numbers in parentheses refer to items in Appendices A and B.

# APPENDIX A

## DETAIL DISCUSSION OF HIGH PRIORITY TASKS

# APPENDIX A

## DETAIL DISCUSSION OF HIGH PRIORITY TASKS

### A-1. CAPITAL IMPROVEMENT PROGRAM (CIP) SOFTWARE

The Capital Improvement Program (CIP) for the City involves the construction of buildings, roads, etc. As described in previous reports[3,4], NASA program management techniques have been discussed with Baltimore personnel. The PROJACS system distributed by IBM was selected by the City for their use. We have offered assistance and consulting advice for its implementation. The task is considered inactive until the City requests further assistance.

### A-2. DATA SYSTEMS DEMONSTRATION

NASA and other federal agencies have established technical information retrieval systems based on computer storage. Several commercial firms also vend an information service. The Goddard library employs a mix of commercial and federal retrieval systems for carrying out research at the Center. The information, while it is not up to the day of issue, is none the less current enough to represent the state-of-the-art of the technology in question.

The question arose as to the possible usefulness of these retrieval systems to city employees and to their consultants and contractors. Arrangements were made to perform searches for a half dozen technology based firms and technology oriented City employees. The gamut of questions ran from reclamation methods for old tires to biomass energy production; from strength of concrete beams to district heating techniques.

The idea was to inform the participants of the capabilities of the various retrieval systems and to let them make their own decisions about the usefulness of the system to their purposes. Had there been a concensus of adequate usefulness for the systems, arrangements with the North Carolina Science and Technology Research Center had been made to try out a service outlet located in the City of Baltimore for a brief period.

The concensus apparently was not favorable to great usefulness. It appears that the kinds of questions and problems dealt with by the participants are closer to the conventional state of the engineering art than was supposed before the experiment.

## A-3. DATA COLLECTION PLATFORM (DCP) EXPERIMENT

This experiment has been generally described in a previous report[4]. The progress to date has been limited seriously by consecutive failures of the InterOcean probe (Model 500 CSTD). The communication subsystem works perfectly. Signals have been sent through the Landsat satellite and processed at Goddard. The difficulty is the unreliability of the InterOcean sensors. A different probe (Martek) has been obtained from the NASA-National Space Technology Labs in Bay St. Louis, Mississippi. The sensors are now being checked out by Mr. Meredith Wilson of Goddard (Electromechanical Branch, Code 721) and the Martek probe is being integrated with the platform by Code 721 personnel in conjunction with the Baltimore engineers. Reliability of the sensors and the probe unit have been serious deterrents to progress. These difficulties point up the places which need considerable work before DCP systems for water quality can become operational. The task remains in an active status.

## A-4. ENERGY CONSERVATIVE INDUSTRIAL PARK

Federal interest in energy conservation in an industrial park environment is intensifying. It is felt that some part in their concern was motivated by an unsolicited proposal to the Energy Research and Development Administration (ERDA) from the City Planning Department[6]. Preliminary studies will incorporate consideration of coal gassification as a possible element in the industrial complex. The industrial base in the City and the general industrial complexion of its commerce makes Baltimore a prime candidate for trying out the energy conservative park concept. This task will remain active but will become a part of the program in the Office of the Mayor's Energy Coordinator (see A-5).

## A-5. ENERGY COORDINATOR

In December 1976 Mayor Schaefer asked the Director of BAP to consider a full time program which would address the City's problems relating to energy, its conservation and its conversion (e.g. solar). A tentative program outline included a full Energy Coordinator in the Mayor's Office. The use of the Intergovernmental Personnel Act (IPA) of 1970 was chosen as the means of providing the City with the proper person filling the position on a temporary assignment basis (one to two years). Permission to select nominees from amongst qualified personnel at Goddard was obtained from Center management and a selection process was instituted to pick the best person for the job. Mr. Chesley Looney was the person selected and he should be reporting for duty in Baltimore sometime in June 1977. The original assignment is for one year with an option for extension for an additional year if the City so chooses. The salary split is 50-50

between the City and Goddard Space Flight Center. Responsibility for most of the energy related activities of BAP will be assumed by the Energy Coordinator, who is the Director of the Baltimore Energy Project (BEP).

## A-6. ENERGY AUDIT OF SELECTED CITY BUILDINGS

To focus attention on energy concerns in the City prior to the arrival of the Energy Coordinator a contract was let to the University of Tennessee to carry out energy audits in several selected buildings in the City. The objective was twofold; first, to determine if and where energy savings might be realized and second, to determine the best procedures to be followed by other jurisdictions in a similar set of circumstances. Twelve buildings will be critically audited for energy use. City personnel will be involved and will assist University personnel with the audits. Changes will be recommended in operating procedures and equipment so as to reduce energy consumption. Cost of changes will be taken into account in assessing the overall effectiveness. A report of the audits and the recommendations will be delivered in the fall of 1977.

## A-7. FIRE DEPARTMENT DISPATCH SYSTEM

The Baltimore City Fire Department has asked the BAP for assistance in their consideration of a new emergency vehicle dispatch system for Baltimore. A bond issue some time in the future will be used to pay for the improvement. Mr. Phil Yaffee, National Needs Office (Code 702) has been intimately involved in the activities of the committee preparing for the change. He has outlined the kind of process used by NASA for similar activity and has prepared a draft of the statement of work for the system design study. The task will remain in the active category at least until the City contract for the design study is complete and evaluated.

## A-8. FOUNTAIN/WATER CLOCK FOR CITY HALL

The renovated City Hall is near completion. The interior design is such that two interior courts, open the full height of the building, are provided. It is the Mayor's desire to install within one of these courts a major attraction for both visitors and city residents. A combined fountain and water clock is contemplated.

A meeting with Mr. Ed Oppel, Director, Bureau of Construction Management and Mr. Leo D'Aleo, consulting architect for the City Hall, was held to discuss ideas, concepts and technological problems. A brief brainstorming session was held at Goddard for the same purpose. Mr. D'Aleo was provided with the names

of several local firms, some firms in other states and the names of some "fountain designers" who specialize in institutional displays, models or art forms of this type.

The task is considered completed. Further assistance will be provided if engineering problems within Goddard's special areas of expertise are encountered during its implementation.

## A-9. HOUSING AND COMMUNITY DEVELOPMENT DATA SYSTEM

Mr. Jay Brodie, Deputy Commissioner of Housing and Community Development (HCD), asked the BAP for some suggestions and advice on data systems which would help improve the control of the business of HCD. It seems that when an expenditure is initiated the next reporting event is when the money is actually spent. Mr. Andre Van de Putte of HCD visited Mr. Chesley Looney at Goddard and was informed of the business reporting system (commitment, obligation, disbursement, etc.) used in the conduct of Goddard procurements. Mr. Van de Putte was very interested in our system and returned to Baltimore hopeful of implementing a similar procedure for HCD. The task is considered complete, but we will certainly accommodate HCD with further counsel or information should they need it.

## A-10. HEALTH DEPARTMENT WORKSHOP

The workshop methodology used in the Senior Citizen's High Rise Workshop in September 1975 was successfully applied to a Health Department Workshop conducted during the period July 21-23, 1976. The workshop was held at the Donaldson Brown Center of the University of Maryland at Port Deposit, Maryland. The purpose of the workshop was to identify and prioritize the health needs of Baltimore as perceived by the participants; to develop recommended policies, goals and structures for meeting these needs; and to explore the applicability of technology to operations of the Health Department.

Thirty-four members of the Health Department, representing all organizations and levels, participated in the workshop. Six Goddard personnel served as advisors in workshop techniques to the six individual teams formed from the participants. The deliberations and recommendations of each team were reported orally at a general session of all participants and were summarized in a written report which was included in the overall workshop report[7].

While it is still too early to judge the success of the workshop in terms of concrete accomplishments, changes in program emphasis, organizational changes,

etc., the comments received from many of the participants, including the Commissioner of Health, indicate that the workshop was a very worthwhile effort. For many of them this was their first experience in an open, first-name, face-to-face encounter in which problems of mutual interest could be freely discussed. The workshop opened up lines of communication, enhanced the inter-personal relationships between participants, exposed upper-level management personnel to the concerns and needs of their subordinates, and generated organizational and operational concepts which may be beneficial to the Health Department and the City.

After the conclusion of the formal workshop program on July 23 a session was held to explore the applicability of technology (management information systems particularly) in enhancing the effectiveness of the Health Department. Participants included the senior management personnel of the Health Department, NASA/Goddard personnel, the Director of the Mayor's Office of Telecommunications, and representatives of NASA Headquarters, HUD, and NBS. MIS developments which may be adaptable to Health Department requirements were described by the HUD and NBS representatives. The determination of the specific MIS requirements and specifications which will satisfy the needs of the largest number of Health Department users is the first step in MIS implementation. Coordination of MIS requirements and formats between the health departments of cities of comparable characteristics would provide a basis for meaningful exchange of statistical data. These and related areas are to be explored in subsequent discussions within the Health Department, between the Health Department and other Baltimore departments, and between the health departments of various cities.

## A-11. INCINERATOR ENERGY RECOVERY

Following the analysis of the Baltimore Incinerators on Pulaski Highway by Berger Associates[8], it is clear that energy recovery from the stack exhaust of the new incinerators planned for installation soon will be cost effective as well as energy conservative. A decision has been reached by the management of the Department of Public Works that the form of energy recovery device recommended (waste heat boilers) or some similar state of the art device will be made a firm technical performance requirement for the next incinerators constructed. The analysis shows that energy recovered can more than supply the rather large amounts of electric power required by the electrostatic precipitators. The task is considered complete at this time.

## A-12. LANDSAT – INTRALAB FOR REGIONAL PLANNING COUNCIL (RPC)

One of the difficulties in trying to apply satellite remote sensed data to a densely populated urban area derives from the need to resolve small parcels of land. When resolutions of 100 meters or less are needed, satellite data is somewhat tedious to work with. However, when larger areas (e.g. several hectares) are the smallest units of concern Landsat data is more readily utilizable. The area around Baltimore as identified through the Regional Planning Council (RPC) is very interested and concerned with both present and future water supply. Scientists at Goddard have had some success using Landsat data to investigate land usage with specific reference to water supply and to identify many needed characteristics of the watershed. With the guidance of scientists working with the Intralab program at Goddard, personnel at RPC have launched a program to investigate the usefulness of Landsat imagery for scrutiny of the Baltimore watershed. As with most other Intralab programs, RPC is the student and Goddard personnel are the teachers, counselors and guides relative to establishing a meaningful processing of Landsat data on RPC computers with RPC personnel doing most of the work.

It is not yet possible to assess the benefit and usefulness to water supply characterization for the Baltimore area. Further, since the activity is well underway through a recognized NASA organizational element (Intralab) and somewhat indirectly affects the City of Baltimore, the "catalytic" role of BAP in getting this relationship started is assumed to be complete. Barring further need for BAP activity the task will not be reported further.

## A-13. LANDSAT DATA UTILIZATION

As a means of getting firsthand knowledge of the capability and usefulness of Landsat imagery to meet the needs of the Baltimore Department of Public Works in relation to water supply and reservoir condition, the City let a contract with the General Electric Co. (GE), Greenbelt, MD to examine land use changes, siltation, and, if possible, buildup of algae in the City's reservoirs. While this task has been outside the direct scope of BAP activity, we did provide assistance in evaluating the GE proposal and some technical counsel to City personnel relative to the contract. Findings from the Landsat data have helped City personnel in identifying land use in the watershed; benefits from this contract activity have played a large role in motivating the Regional Planning Council (RPC) to examine the possibilities of building up an in-house capability in Landsat imagery analysis (see A-12).

## A-14. METHANE RECOVERY

As reported previously, activities to recover methane from waste water treatment processes at Back River are in limbo due to study and consideration of major revisions to the treatment plant in the future. Data from the Goddard literature search on utilizing methane in in-plant operations revealed no reference to any experiences. Conclusions reached previously (June 1976) have been reexamined and found to be still valid. While this area for engineering development (on-site methane utilization) seems to be one of importance, it is one falling into the area of responsibility of the Environmental Protection Agency (EPA) for development. Barring a specific request from the City, further BAP activity on this task is discontinued.

## A-15. SOLAR

### Baltimore City Hospital

In a meeting with Mr. Ewald Hanke, the new chief engineer for the Baltimore City Hospital, and Mr. Andrew Parker (Mueller Associates) the BAP Director discussed the possible uses of solar energy at the hospital complex. Mr. Hanke was encouraged to consider very simple systems at first since he had the intention of doing the design and implementation with his in-house staff. Hot water supply for a single building was emphasized as a straightforward system that could be done with low risk of failure and with reasonable payback time. Rough system cost estimates were discussed. This task is considered inactive at this time.

### Convention Center

Architects and engineers have studied the information supplied by BAP on possible solar application to the Convention Center. For a number of reasons, principally associated with the degree of completion of the design (costs to redesign) and the inability to incorporate a solar system which would be cost effective in a reasonable time with the present state of the art, the use of solar for the convention center has been rejected for the convention center. The task is discontinued.

### Fire House No. 46

City personnel with the assistance of engineers for Mueller Associates designed a solar heating and cooling system for Fire House No. 46 located at 5000 Reisterstown Rd. Together they compiled a technical and a cost proposal[9] to the U.S. Energy Research and Development Administration (ERDA). The

proposal soliciting a grant for differential costs for the solar portion of the firehouse was accepted by ERDA under their demonstration program. The City's ability to prepare, submit and win highly technical solar grant proposals has apparently been established. It should be said that this activity was almost entirely that of the City and its colleagues. BAP had nothing more than a small advising role in the entire process. It is very rewarding to the technologist (BAP director) to see his "progeny" perform so well. The task is considered inactive until such time as BAP assistance is solicited.

Solar Energy Research Institute (SERI)

Colorado has been selected by ERDA as the site for the new non-profit institute, SERI. The important factor associated with this task was the discovery that there was no organization in Baltimore or the State of Maryland which was both alert to and capable of responding to technical proposal requests of this type. Some benefit might derive in the future if there were organizations or facilities which could not only respond to such technical opportunities but also independently generate new ideas based on emerging technologies that might be beneficial to the City, the state or to our commercial and industrial development. Increased awareness of need for technological advice in Maryland is indicated by the recent hiring by the Department of Legislative Reference of a full-time Science and Technology Advisor for the General Assembly.

The SERI task is considered to be in a discontinued status.

Upton Multipurpose Center

The proposal for the Upton Multipurpose Center has been discussed previously (June 1976).[4] Activities for the construction of the Center have been proceeding. BAP involvement has been minimal. This task is considered inactive until such time as request for further assistance is received.

## A-16. WASTE WATER SYMPOSIUM

The Waste Water Symposium sponsored by the Engineering Society of Baltimore, Inc. and the Baltimore Department of Public Works was held on October 14, 1976. The program included the following agenda:

> Municipal Wastewater Treatment: Present Problems and Opportunities
>
> Rehabilitation and Expansion of Back River and Patapsco Waste Water Treatment Plants

Activated Carbon Applied to Waste Water Treatment

Oxygen Activated Wastewater Treatment

Thermal Radiation Treatment of Sewage Sludge

Prototype Application of Single Parameter Sludge Age Control Technology

Aluminum Phosphate Precipitation

Land Disposal by Spray Irrigation

Information supplied by BAP served as a basis for a part of the program. The task is now considered completed.

# APPENDIX B

## DETAIL DISCUSSION OF LOWER PRIORITY TASKS

# APPENDIX B

## DETAIL DISCUSSION OF LOWER PRIORITY TASKS

### B-1. CHAR/ASH SEPARATION

The Baltimore Chapter of the American Institute of Aeronautics and Astronautics (AIAA), desiring to become involved in some form of contribution of their collective talents to the City of Baltimore, requested that the BAP identify a suitable task for them to voluntarily engage in on behalf of the City. The pyrolysis plant[3] was designed to recover ferrous metals, glass aggregate and steam in processing solid waste. One output product consisted of a combination (about 50 percent each) of char and ash. Together these products are virtually unusable. Separated they are useful output. Because the separation process would involve fluid dynamics of some form, the separation question seemed like a suitable task for AIAA and was suggested to them. They collectively produced a draft report which analyzed some techniques for separation and some costs associated with the process. The draft was delivered to the Department of Public Works by AIAA. It should be emphasized that this was volunteer work on the part of AIAA members, the BAP role was simply one of identifying a suitable task. Future modification of the pyrolysis plant to incorporate char/ash separation will be given due consideration after the plant has been brought into an operational status.

### B-2. CHILD HEALTH MANAGEMENT INFORMATION SYSTEM (CHMIS)

As a result of Health Department priorities and the Health Department Workshop (See A-10), there has been no further consideration of a CHMIS. The concentration for assistance in information systems has been in the area of mental health and drug abuse (See B-5).

### B-3. DIGITAL TRAFFIC EMERGENCY ROUTING

The concept of routing emergency vehicles through traffic congestion in the central business district and other places in the City has been described previously.[4] Mr. Phil Yaffee (Code 702) and Mr. John Todd, Systems Development & Analysis Branch (Code 582) have held several discussions with personnel in the Department of Transit and Traffic regarding the idea. Appropriate and specific information on the digital system has been provided. Several approaches to including emergency vehicle routing in the digital system will next be discussed with system contractor personnel. This task is one of the continuing tasks for BAP.

## B-4. DUTCH ELM DISEASE

Mr. Douglas Tawney, Director, Department of Recreation and Parks, cited problems with disease in elm trees in the City. Our research uncovered considerable information on Dutch Elm Disease available through the Elm Research Institute in Harrisville, New Hampshire. The Institute has available limited quantities of a new promising chemical for treatment (Lignasan BLP) at no charge when it is applied by volunteer labor. All the information was turned over to the Department of Recreation and Parks for their consideration and decision.

## B-5. HEALTH DEPARTMENT MANAGEMENT INFORMATION SYSTEM (HDMIS)

As noted above, early consideration for use of computer based MIS for the Baltimore City Health Department was centered around child health and the records associated therewith. Deliberation and mutual consideration of the use of data bases and MIS in the Health Department led to the option for a smaller, more tractable data base within the Department as a better vehicle for learning about the implementation and use of such a system. The selection of the mental health (MHMIS) areas as a suitable one to try was based on (1) the availability of several software packages with a good potential for modification to suit Baltimore's needs and (2) the moderate size of the mental health data to be incorporated. As of this writing, the City Health Department is engaging in conversations on the MHMIS with the State Health people. There is some delay expected in implementation due to the desire to consider inclusion of drug abuse and related programs in the system. Equally important is the consideration of the organizational structure as it will influence and be influenced by the use of a computer based MIS. This task area is considered inactive until the Health Department personnel reach some of these managerial decisions about continuing the program.

## B-6. HIGH RISE HOUSING

At the request of Mr. VanStory Branch, Director, Housing Management Division, Department of Housing and Community Development, a meeting was held to discuss two problems of concern to him. The first involves methods of limiting ingress to public high rise housing to residents and authorized visitors. The second concerned methods of handling problems related to advancing senility of elderly residents in senior-citizen's high rise buildings.

Mr. Phil Yaffee of BAP discussed the technological possibilities for application to the first problem with several agencies (Institute for Community Design Analysis; Center for Residential Security; HUD Inspector General's Office; Urban Institute; Institute for Law Enforcement and Criminal Justice and several industry representatives). The technologies considered included voice recognition, finger and hand print recognition, as well as techniques for increased motivation, incentives and training for building guards. There was a general conclusion that while the problem was a formidable one there is technology that could be applied though the present costs appear to be prohibitive due to lack of specific technique development and market engineering. There is also very little likelihood of a totally automatic system being satisfactory; the human element is considered necessary when dealing with humans.

The second problem posed by Mr. Branch was discussed with Mrs. Selma Gross, the Mayor's Commissioner on Aging; the National Council on Aging in Washington and others concerned with geriatric problems. It was obvious early in the consideration that technology was not at the core of the possible solutions to these kinds of problems. A meeting with Miss Nancy Wilson of the Texas Research Institute on Mental Science (TRIMS) was arranged. She briefed the Baltimore personnel on the way TRIMS operated and made several suggestions as to how Baltimore might approach a solution. Work on this task area has been discontinued.

## B-7. INFRARED OVERFLIGHT

One of the major concerns of the City government is energy conservation and its attendant dollar saving. Aircraft infrared (IR) images have demonstrated the ability to remotely detect heat leaks from buildings, steam lines, smoke stacks, etc. Information on this technology has been accumulated for the Coordinator of Energy Conservation who will soon be assigned to the Mayor's Office.

## B-8. LAKE ROLAND DESILTATION

The concept of extracting useful products (sand, gravel) from the dredging operations to be carried out at Lake Roland have been described previously[3,4]. Also described was the related scheme for pumping unusable products (clay, silt) downstream (Jones Falls) to the quarry at Coldspring. The Department of Recreation and Parks has studied the techniques and their cost benefits and determined that the old way was the cheapest. For this reason further work on this task will not be undertaken.

## B-9. LASER BUILDING CLEANER

The idea of using a laser to remove graffiti, dirt, mold, etc. from buildings and statues has been discussed previously[3]. It was considered too dangerous and not cost effective at present for use on buildings. Further consideration was to have been confined to cleaning fine works of art for which there was need for a better, non-destructive cleaning procedure. Due to low priority no further work has been done and the task will be discontinued.

## B-10. LAW ENFORCEMENT TECHNOLOGY

### Criminal Justice Information System

Following the event of supplying the Criminal Assignment Commissioner of Baltimore, Mr. George Riggin, with information on PROMIS, the PROsecutors Management Information System, there has been no further dialog on MIS for criminal justice for Baltimore. Having supplied the data requested, the task is considered completed.

### Police Location System

Technology for police location has not been pursued further due to lack of priority. The task is discontinued.

## B-11. MEALS-ON-WHEELS (MOW)

In conjunction with the TRIMS activity mentioned above (B-6) discussions were held as to the usefulness of the NASA developed, nutritionally balanced packaged meal for use in the Meals-On-Wheels (MOW) program in Baltimore. In the City, as in other jurisdictions, there seems to be a high potential for a packaged meal market for the elderly and the shut-ins. The MOW program provides hot meals to those unable to get out five days a week. The usefulness of the packaged meal arises for the weekend and holiday cases when MOW is not operating.

Two sample meals were provided to Dr. Susan Guarnieri for her information and disposition. There is interest both in the City and throughout the State of Maryland in the use of some kind of meal package but one is not commercially available at this time. It appears that a considerable market must be aggregated before such meals will be put into production. This task is considered inactive although liaison with the Technology Utilization Office at Goddard, Mr. Don Friedman, is continuing. He is pursuing the problem on behalf of the Technology Utilization program at Goddard.

## B-12. POLLUTION SITUATION CENTER

As described previously[3] the ability to design and implement an experimental pollution situation center is limited by the availability of sufficiently accurate, reliable sensor elements that can be located in the proper places and that do not require frequent calibration and servicing. The perceived need for a Center of this type is not of high enough relative priority for further pursuit by BAP. For that reason work on the task is discontinued.

## B-13. PROPAGATION TESTS

An examination of the area of the central business district of the City of Baltimore in which interference (blockage and multipath) with satellite propagation might possibly occur due to high rise buildings, shows a relatively small region. This small geographic area of concern coupled with the low probability in the next decade of the City operating a mobile satellite communications system identifies this task as one of fairly low relative priority. Further effort by BAP will be discontinued. This does not alter the need for scientific propagation data for other larger and denser high rise districts (e.g. New York City) or for an organized propagation measurement program through our communications technologists.

## B-14. RISK MANAGEMENT BRIEFING

Because of the risk of loss of life and the costs associated with loss of equipment, NASA has developed a risk management technique in which usefully accurate determination of probability of failure can be calculated before an event takes place. The system does not eliminate risk; it helps to identify and quantify it in relative terms. It has its origin in the manned NASA launches where it was important to anticipate insofar as possible the probabilities associated with each event or each component's contribution to the hazard.

The BAP sponsored a briefing on the risk management system for the City officials involved with emergency related activities (police, fire, health, safety, etc.). They were fully informed about the risk management technique by personnel from Kennedy Space Center and Boeing Corp., the on-site contractor responsible for risk assessment at that Center. The City officials gave consideration to the adoption of the system and concluded in general that the risks involved in their operations did not warrant utilization of such an elegant and sophisticated program.

## B-15. SEWER FLOW METER

Discontinued for reasons of priority.

## B-16. SOLAR AQUARIUM HEATING

The bond issue in support of the Baltimore Aquarium was successful. Financing for the aquarium is assured. The contractors for the building engineering have been selected (Mueller Associates) and are most capable in the knowledge and working experience in solar energy systems. For this reason BAP considers this task inactive; we will provide counsel and advice as needed by the City.

## B-17. STREET SWEEPER CONCEPTS

Further activity on new concepts for cleaning streets has not occurred due to its low priority. The task will be discontinued for that reason.

## B-18. THERMORADIATION OF SLUDGE

Tacit reference was made in the last annual report regarding thermoradiation of sludge. This process is a direct outgrowth of the NASA program to remove all possible contaminants from spacecraft that were to land on another planet or on the moon. Techniques for using heat to sterilize and for using radioactive radiation for destroying microbes were well known; the new discovery was that synergistic action takes place when you combine the two. Simultaneous application of heat and some forms of radioactive radiation results in more than the "sum" of the heat and the radioactivity alone. The technique of thermoradiation is used in several places in Europe for the treatment of sludge. The treatment takes place with the sludge in liquid form permitting easier handling of the "purified" waste.

A briefing for the personnel of the Department of Public Works by Mr. H. D. (Jack) Sivinski, Sandia Corp., was arranged. Sandia is in charge of development of the technique by ERDA. The use of thermoradiation is now included as an option in the planning for future Baltimore waste water treatment systems.

## B-19. WATER POLLUTANT DETECTION

The water parameters of interest here are the presence of algae, nutrients and metals along with concern for biological oxygen demand. There are obviously

other parameters of concern (e.g. bacteria) in supplying water to the City. However, knowledge of these parameters has a high potential for usefulness through remote in situ data collection systems (See A-3). Developments for sensing these pollutants in an unattended, in situ application is moving very slowly. As mentioned above in the discussion of data collection platform experiments, the communication subsystems are fully developed and in limited use. Sensor subsystems, the subject of this section, are significantly behind in development. There are several possible reasons. Among these is the lack of a good demonstration of usefulness for an unattended system for data collection that might encourage development of reliable pollutant sensors. (This demonstration is one of the objectives of the data collection platform experiments, Sec. A-3).

## B-20. ZINC PAINT TESTS

Checks have been made on the salt spreaders which were coated with the NASA-developed zinc paint. The spreaders that were coated stand out notably as to apparent imperviousness to rust and surface degradation. Commercialization of the zinc paint is being pursued by Dr. John Schutt, the NASA inventor.

## B-21. ZOO METHANE GENERATION

The Baltimore Zoo has a problem with animal defecation and waste. The U.S. Health officials will not allow the transportation of animal waste from exotic hoofed animals off the zoo grounds for fear of spread of hoof and mouth disease. The Baltimore Zoo has tried composting the waste on City property but this has led to citizen complaints. They are now shredding the waste and feeding it into the city sewer for normal waste water processing. The Director of the Zoo, Dr. Arthur Watson, and the Curator, Dr. Ted Roth, were interested in alternatives to this process. Among alternatives was the possible use of animal waste to generate methane as a source of energy for zoo operations. A brief investigation of the technical processes available, the amount of waste at the zoo and the costs of such a system was made. With the help of scientists at the Department of Agriculture it was concluded that such an option would not be cost effective from a fuel saving standpoint. The task is considered complete.

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15. Supplementary Notes

Some 43 task areas are discussed.

16. Abstract

The program to assist the City of Baltimore with technology of all types has completed its third year of operation. The report describes activities of the 12 months ending May 6, 1977. Some 43 task areas are discussed. The task identification is essentially complete. The next phase of work will be directed to more specific technical assistance in fewer high priority areas.

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