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The NASA/Baltimore Applications Project: An Experiment in Technology Transfer

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by

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ABSTRACT

A program to assist the City of Baltimore in solving some of its problems through technology has been underway for five years. The activity has been intentionally low profile to enhance the focus on the problem and not on the expectations from the relationship. The experiment, known as the NASA/Baltimore Applications Project, has been conducted by a NASA technologist working full-time in the Office of the Mayor. A continuing liaison with the Goddard Space Flight Center, other federal agencies and academia has covered a wide scope of tasks. "First cut" assistance has dominated the activity; implementation has been performed by city employees, frequently through private industry.

Among the conclusions drawn from the experiment thus far are that 1) the problems of a large city most often do not require highly sophisticated solutions--in fact, the simpler the solution, the better; 2) a problem-focused approach is a greater help to the city than a product-focused approach; 3) most problem situations involve several individuals or organized groups within the city; 4) mutual trust and good interpersonal relationships between the technologist and the administrator is as important for solving problems as technological know-how.

THE NASA/BALTIMORE APPLICATIONS PROJECT: AN EXPERIMENT IN TECHNOLOGY TRANSFER

OBJECTIVE

The objective of this paper is to describe those factors that have been found to be appropriate in technology transfer activities through the NASA/Baltimore Applications Project (BAP) in the City of Baltimore. On the basis of the findings of this experiment it appears that most programs to transfer technology to cities and towns in the U.S. fail to recognize several necessary features of the process. What follows is a brief review of the BAP, the ground rules and rationale of the experiment, a description of the approach to technology transfer that was used, and finally, drawing on this experience, a statement of what the author believes to be the essentials to a proper technology transfer process.

BACKGROUND OF THE EXPERIMENT

At the specific request of the City of Baltimore, the National Aeronautics and Space Administration (NASA) through its Goddard Space Flight Center (GSFC) at Greenbelt, Maryland engaged in a program to assist the City with technology. The program, which is experimental in nature, was named the NASA/Baltimore Applications Project (BAP). It has been in operation since May 6, 1974. In this experience a number of things have been learned about technology transfer to a local government. Some of the findings about the transfer process are discussed here with a particular emphasis on suggested approaches that might be followed by any city that wants to obtain technological help. For details of specific BAP events the reader is referred to the annual reports of the experiment. (See Bibliography)

There is considerable recent history of programs and plans of formation of institutions, consortia and other groups that are concerned with improving the transfer of technology to solve problems in U.S. cities and towns. There appear to be a number and variety of drivers to institutionalize this assistance activity. Among these are for-profit business, not-for-profit business, special interest groups (e.g. the U.S. Conference of Mayors, League of Cities, National Association of State Legislatures, etc.), federal technological agencies, academia and, in addition, the U.S. Congress. With such "horsepower" one might expect great things to be happening--and some good things are. However, the relationship existing between the government of a city and the work of technology remains a very complex and a very fragile one. The fragility and the complexity suggest a need for adequately deliberate, well thought-out attempts to unite the two. H. L. Mencken, the satirist of Baltimore, is reported to have said, "For every complex problem there is a simple solution...and it's wrong." While the present flurry in the world of technology transfer is not necessarily "wrong," (it's probably too early in the process to assess that) a number of our activities don't seem to be bearing the fruits expected. There have been several projects and a lot of discussion of transfer activity, but to the author's knowledge no outstanding track record has developed as yet. There is no paradigm of emulatable success. An attempt will be made in what follows to describe some things that in the author's opinion are basic to the success of this fragile and complex technology transfer process. These observations are based on five and a half years of operation of the NASA/Baltimore Applications Project (BAP). The author has been privileged to serve as Director of the project since its beginning in May 1974, so it is a firsthand, "hands-on" accounting.

ORIGINS

The first visible event in establishing the BAP was a letter from Robert Embry, Commissioner of Housing and Community Development for the City, to the NASA Administrator. But there must have been several things in Baltimore that preceded this letter. What triggered the whole idea was Embry's reading in the New York Times of an event in which New York City had received specific technical assistance from the federal government for one of their city departments. Embry's letter essentially said, "Whom do we see to get help for Baltimore?" It was followed in a few days by a letter from then Congressman, now Senator, Paul Sarbanes to the Administrator saying "I urge a prompt response." Because of the proximity of the Goddard Space Flight Center (GSFC) in Greenbelt, Maryland to Baltimore, our Center was selected by the NASA Administrator to carry out further conversations with the City. It is important to note that GSFC had the option to stop or go ahead with the experiment at this juncture. The policy of Goddard's management at that time was to offer help to the community so long as it did not interfere with the on-going Center mission. The Baltimore experiment is really a Goddard experiment; that is while we had the endorsement of NASA Headquarters, we had the sole responsibility for its undertaking and its consequences.

Following the initial letter from Baltimore were several meetings between Goddard and Baltimore personnel. It was decided in these discussions to have the project director located in the Mayor's Office and have the Director carry out, independently, a program to provide technological assistance to the City over a period of two years. There was a pretty intensive search for the person to be the project director, and the author was fortunate to have been selected.

One condition coming out of the discussions was that either party could terminate the experiment at any time, or for any reason. After the two year experimental period, the project relationship continued at the request of the City of Baltimore for more than four additional years, and has now grown into a sort of continuing relationship. An important point to be made here is the City took the initiative and asked for assistance. There are some subtle issues connected with that event which will be discussed later.

GETTING STARTED

In 1974 there was no precedent for such a continuing activity, so the BAP Director was free to do whatever appeared to be most suitable to help Baltimore with and through technology. A study of the City organization showed that the Mayor had arranged his government in Baltimore into two separate operations which he called "cabinets"--one addressed the physical plant and operations part of the municipal function--the other attended to the human and social service element of the city. The functioning departments of most any city may be quite naturally separated into these two categories. The Department of Finance for obvious reasons is represented in both cabinets.

After a few weeks on the job it was clear that the dominantly technological activity in the City operations was in the physical development cabinet. Mr. Bernie Berkowitz, the Mayor's Physical Development Coordinator and the principal interface for our experiment, had suggested that this might be true. Although there were 21 City Departments, all of these did not routinely attend their respective Cabinet meetings; they became involved usually if and when the need to do so demanded. Therefore, the attendees (active membership) of these two Cabinets comprised the more routinely active Departments. The resulting

functional Cabinet structure is shown below. This then allowed for a natural separation of the originally 21 City Departments into two groups of technologically intensive departments and discussion with them on just what they perceived their problems to be.

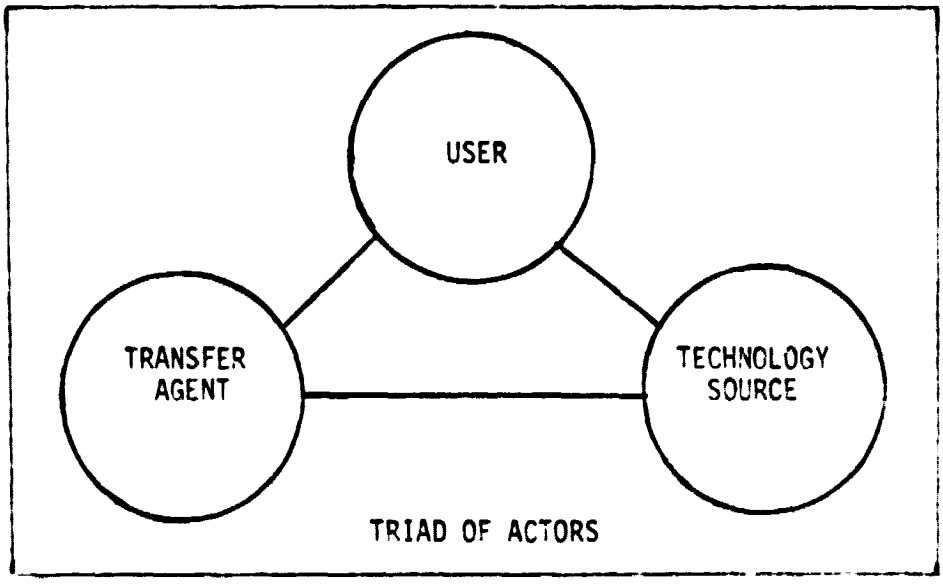
Technology Classification of Departments	
Intensive	Less Intensive
Education	Assessments
Fire	Audit
Health	Comptroller
Hospitals	Economic Development
Housing & Community Development	Finance
Planning	Law
Police	Legislative Reference
Public Works	Post-Mortem Examiners
Recreation & Parks	Real Estate
Transit & Traffic	Social Services
	Treasurer

In time and with further discussion with department subordinates, a list of tasks or technology areas that were fairly well objectified and defined was developed. The next step was one of searching for solutions to each one of these for a variety of solutions, if you will. It is important to note that these were tasks that came from the City officials themselves. They were not derived from technology that happened to be familiar to the BAP experiment director or to NASA; they were derived directly from the discussions with City officials.

Figure A presents a listing of the higher priority tasks at the end of two years. Figure B shows a similar listing of lower priority tasks. The first

column is a listing of the tasks identified at that time. The second column shows a Roman numeral I, II, or III representing an increasing level of sophistication of the technology seemingly needed for the task. The important factors in the remaining columns are the Goddard or non-city personnel and the Baltimore person responsible for the task area. In this case the role that was played by the BAP director was that of technology broker. It was important to the project that the City department heads know that the project director couldn't or didn't personally know all the answers. In the majority of cases shown, a linkage was made between the Baltimore personnel and NASA or other personnel knowledgeable for the specific task. Incidentally the "N's" indicate a direct NASA relationship to a given technology area. Overall there has been about a 35 percent ratio of Baltimore task areas to NASA experiences and GSFC operating experience.

There have been some formal studies of the actors involved in this part of the process of technology transfer. Perhaps the most notable is that of Lambright and Teich[1] in which they identify (very logically) a triad of actors.



TRIAD OF ACTORS

The Baltimore experience bears this concept out with one major condition imposed. In a given task it has been our experience that a role is most often played by many individual actors. In the task involving solar heating for the Upton Community Center, for example, the list of actors includes:

Bureau of Construction
Architect
Engineering Subcontractor
Technology Advisor
Neighborhood Citizens
Mayor
Physical Development Cabinet
Department of Energy (Grantors)
Procurement Officer
Building Contractor
Hardware/Software Vendor

The triad model thus is a definite but logical simplification of the reality experienced in practice.

After about two-and-a-half years the problem identification type of activity seemed to decrease and more time was spent in providing counsel, advice and assistance with implementation procedures. Among the present areas of continuing activity are energy cost concerns, computer use in the Health Department, and a computer-aided-dispatch system for the Fire Department.

In March 1977 the report of an evaluating panel was published.[2] The panel was organized by the National Academy of Public Administration (NAPA) under a NASA

contract. It was chaired by Dr. Ruth Davis, now an Undersecretary for the Department of Energy. The panel carried out interviews and discussions with Baltimore, Goddard and other personnel to effect their evaluation role. The general conclusion of the panel was that the Baltimore experiment was a unique and worthwhile approach to technology transfer. They recommended that the same techniques and approaches be tried in other cities and towns. Since that time, Goddard has become involved with five other cities in Maryland. However, there is insufficient experience in these places to draw substantive conclusions at this time.

SOME THINGS LEARNED

An important remaining question is whether the procedure used by Baltimore, NASA and Goddard to set up this experiment is appropriate to establishing technology transfer relationships in any city or town that wants help. There are some key observations and some rather basic conclusions that can be extracted from the Baltimore experience.

What are the essentials for any city to find the kind of technological help it needs? These are some of the subtle issues mentioned earlier. Let us consider this question from four aspects: The roles of the city, the general requirements of the process, the technologist, and the program sponsor.

First, the city--they must be aware of their need for help with technology. There is usually awareness of need for some kind of help, but it may not be focused, for example, on technological areas. There must be a faith that real help is available. Without this an air of distrust and unbelief can develop.

It takes a modicum of self-confidence on the part of the city to ask for help. An air of failure or inadequacy can develop when a city administrator or politician admits he needs help. For his political survival he must move carefully, but, move, he must. Lastly for the city, there must be a willingness to experiment. There is attached here the possibility that a technological innovation or solution might fail. The willingness on the part of the elected officials to take that risk must prevail. I believe all four of these elements were present in Baltimore at the time they sent the letter to the NASA Administrator. While there are numerous references to statements about the needs of politicians for power not advice, it has been the authors experience in Baltimore that the first need is to overcome the feeling of not being threatened by technology.

<u>For The City</u>

- Awareness of their need for help
- Belief in the Availability of Help
- Adequate Self-Confidence
- Willingness to Experiment

Second, <u>the process</u>--much has been said about "user pull". It is a facet of technology transfer which I feel to be absolutely required. There are many examples of "non-pulled" attempts at transfers where the motives of one or more participants were not consistent with a sincere desire for help which is the definition of user pull. Closely related to sincere user pull for technological assistance is the need for <u>focus on the problem</u>. Here the action of the

technologist must be relevant to the solving of the problem, not an attempt to "sell" a particular technology as a solution. So often well meaning technologists want to explore the ways in which the technology with which he is most specialized can be brought to bear on the problem.

The process should be one which maintains a reasonably low overall profile. Some exposure or hoopla is necessary, particularly at the beginning, but when the exposure gets too high or lasts too long, the tendency is to heighten expectations beyond a realistic point of achievement. Maintaining the atmosphere of an experiment helps here.

A classical scientific approach to solving problems should be followed. This approach is used wherever possible in Baltimore. Elements of this stepped process are: First, identifying and defining the problem; this is accomplished through mutual discussions between Baltimore officials and the appropriate technologists. Second, searching for a variety of solutions. This search encompasses the technical literature, existing data bases, discussions with recognized and knowledgeable people in NASA and other federal agencies and in academia and industry. The idea is to get a number of approaches, suggestions, examples of related experience or alternatives in the search for possible solutions. Third, presenting these solutions to the responsible Baltimore officials. The technologist returns to the responsible local officials to <u>array the alternatives</u> before him and together evaluate each one from a technical standpoint. The technologist should remember in this part of the activity that the local official has the continuing responsibility for the

area in which the problem has been identified. It is relatively easy for a capable technologist to provide answers in the technological realm. Often the technologist is lacking in his knowledge of those non-technical realms so important to operating a government that is responsive to its constitutents. This is the "politics" of the decision process. Fourth, helping the local officials to evaluate or weigh their options if they want that kind of help. It is important for the decisions to be made by the local officials. Continuing advice and counsel should be made available if needed. One of the more important elements of technology transfer activity is the search for as many alternatives to solving a problem as can be found. The experience of the writer in the BAP indicates that any option, including "none of the above," is best made by the responsible local official, the technologist serving principally as the source and communicator of technical knowledge and potential impacts for the local official in making this decision.

One final aspect of the process should be mentioned. The technologist must have a very high degree of freedom to carry out his function. For this reason the amount of reporting required and the schedule milestones to be met should be minimized. Some reporting and review is helpful to the transfer process. In the Baltimore experience an annual report has seemed to satisfy these needs.

For The Process
User Pull
Problem (not product) focus
Low Program Profile
Stepped Process
Minimum Reporting/Scheduling

Now let us turn to the role of the technologist--First, he must be there. He must be an obvious, available technologist-in-residence. It may be possible to have regular "office days" several days per week; but there should be no perceptible barriers to his availability to officials in the city he's trying to serve. He should literally be "the city's technologist." The task of transferring technology to solve problems can't be effectively done in isolation or by remote control.

Second, it is important for the technologist to listen. This helps to assure the most complete statement of the problem as seen by the local official. It is so easy for the technologist to jump ahead to what might appear to be an appropriate technology with which he is familiar and to come up with a solution strategy before the whole picture is explained, or before due consideration of long term consequences is assessed. He could miss something by not hearing the whole story.

Third, the technologist (and the city officials as well) should recognize that no one person can have answers to every technological question that arises. When the area of concern is unfamiliar, the proper role for the technologist tends to become one of brokering. He should find persons who are specialists in the relevant area and enlist their help. This is where access to a capable sponsoring center or backup laboratory is of great value; the technologist-in-residence should search there for the needed expertise first. Through his own knowledge, the advice of others or the evidences of literature research through his center library, he can usually identify persons in other federal agencies, nearby academes or the appropriate commercial sector who can offer expert counsel

and advice on a subject. Whatever the source of expertise the technologist-in-residence should now play the role of critical learner and do his best to assure that the expert provides a complete description of the technique in question.

Lastly, the technologist should only rarely get involved with unilateral decision making about best options. These decisions are best made jointly with the city official. It should be further noted that the best technological option may not be the best implementable solution to the original problem. It must be recognized that there is a political dimension to some decisions. These decisions can and should be made by officials who are directly responsible to the people, the local elected officials.

For most technologists the opportunity to study the internal operations of a city and to observe the objectives and motivations of the operating departments is rare indeed. A lack of such knowledge and understanding by technologists can be a serious barrier to providing proper assistance. It may be that some city administrators, having been so engrossed in keeping the sometimes creaky operations going, also suffer from a dimming of their objective. A city's chief function is the provision of public facilities and services for its citizens. This gives the city a dynamic kind of appearance, but it necessitates a continuous or operational character to the functions for which the city government is responsible. A city that has one or more individuals dedicated to "planning" is fortunate; it is rare that the planners can assume the role of a technological research and development department. Many planning decisions are associated with "growth" or with regional change and development. These are not intimately connected with technology in general or with specific knowhow

(e.g., energy recovery from solid waste) in particular. Most cities have no continuing need for this kind of technical expertise in-house--knowledge so specific and in the required depth is not a part of the normal city operations. This is not to say that a city does not need knowledgeable technical operators. It is that most of the technical skills needed to date are operationally oriented. The situation indicates that in-house technical expertise ("capacity") or a broad based technologist-in-residence might be a valuable adjunct to a city in planning its future. This must be recognized and the responsibility felt by the technologist involved.

In the BAP experiment the technologist-in-residence is called upon to play a variety of roles. Several seem to stand out. Baltimore's original unsolicited request for assistance characterized, implicitly at least, the roles of problem identifier and problem definer. Once contact with a local administrator is established, problems which the administrator and the interviewer feel are important appear; a problem seeker role emerges. This evolves to a role as technology assessor. Insight as to where to get good information on potential solutions necessitates a role as information gatherer or agent. A mix of intelligence, skill and humility is needed because a technologist-in-residence is not likely to be expert in all the areas he is likely to encounter. He must become a sort of technology broker, who knows when to seek assistance, where to go for the best information and how to present his findings to the person with the original problem. This latter need calls for a role as teacher.

On the basis of the BAP experiment there are several other recognizable roles. Some of these fall directly into the adviser category; others are akin to

ombudsman. Sometimes the role as grantsman must be played. Lastly, there are the roles of doer of a task or "doer-watcher," where an expert from another federal agency or outside organization is called in to do a task and the technologist-in-residence is there to introduce people and to monitor progress in the name of the city.

For The Technologist

- Be There
- Listen
- Get Good Help
- Joint Effort With Local Officials
- Multiple Roles

Finally, let us discuss the role of the program sponsor in the technology transfer experiment. This participant in the experiment is usually overlooked since traditionally the sponsor has been at the front end of the event. However, the technology transfer experiment always has more than one prime mover or stakeholder. (cf. the Lambright and Teich triad) As a result, there needs to be a better recognition and delineation of the role for the program sponsor. The sponsor's responsibility to the other principals must be better identified than it has been in the past.

First, given adherence to the process conditions just discussed, there should be a gracious or eleemosynary atmosphere developed by the technology center or agency sponsoring the program and those experts in technology who get involved.

The center should be willing to commit the best manpower available to provide the best technological advice. It should be willing to underwrite the technologist's salary along with small discretionary costs for supporting literature, library searches, travel, etc. The attitude of the center should not be one of using the experiment to find places to apply its own technology, but should focus on solving the city's problems with the most appropriate technology wherever the search might lead. Honest objectivity should prevail--huckstering is non-productive and undesirable.

The whole enterprise will benefit from a kind of good neighbor philosophy in the center management and project staffing. Things which are done by the center for the community in which it exists are usually benefiting the center's own employees since they are likely to be citizens of that community. The center must account for the funding of the experiment. The funding required is likely to be small relative to other center programs. Items other than routine salary, etc. might be made available through a discretionary center director's account. Large expenditures by a city are usually made available through routine channels such as bond issues, federal grants or the general fund. If a center director has no community feeling or no discretionary funding or manpower prerogative, he should clearly never allow a program of this type to start, since only negative results are likely to be achieved. There needs to be an environment, in the sponsoring center, of encouragement and approval. When the technologist on-site in the city comes back to the center and asks for the best experts to assist him, those experts should feel the personal freedom and the approval of management to give their best. However, problems of recruiting the most capable help sometimes arise due to other job priorities. Center management should set

the tone of the program in the beginning by encouraging participation by the best people available whenever practicable and giving the City's problem the same level of support as other on-going center programs. Thus the City's problem is made equal in importance to others at the center. With this endorsement of center management support it is felt that qualified participants will be more inclined to get involved and find the time in their busy schedules to assist the technologist in his quest for solutions.

For The Program Sponsor

- Benevolent Atmosphere
  - Best Available Manpower
  - Small Discretionary Costs
- Good Neighbor Attitude
- Encouraging Approving Environment
- Experimental
- Minimum (Zero) Institutionalization or Bureaucratizing
- Minimum Reporting/Milestones

These conditions or requirements for providing help with technology call for courage to experiment, to depart from the routine procedures and relationships. That courage must be a ground rule for all who would participate at whatever level of their involvement.

CONCLUSION

In summary of the foregoing comments it is possible to cite some essential factors that should be recognized by all participants.

1. A city is basically people living in community.

2. A city has a basic requirement to provide services and facilities for its citizens.

3. There are "people" problems and there are "technology" problems--the difference must be recognized.

4. There must be an awareness by both the elected and the administrative officials of a need for advice in re technology by the city. The city, because of its operational nature, has great difficulty in keeping up with the state-of-the-art of all the technology with which it could be involved.

5. The city's need is for good advice, not just dollars. While every city could do more and probably do it better with additional money, the basic need in the realm of technology is for good advice. Money alone can buy advice, but it may not be "good" advice. A capable technologist-in-residence can help to assure the quality of the advice procured.

6. The elected and administrative officials should have an honest and objective assessment of their city's intrinsic capability (capacity) for understanding and dealing with technology. The level of a city's capability may actually be low; however, an honest assessment of that (low) level is most advisable. While local officials may not like to admit certain incapacity, the price to be paid for less-than-candid assessment can be large expenditures for things that are oversize, undersize, or which don't work.

7. The benefit afforded by the traditional problem solving sequence should be recognized. That hierarchy is simply to: a) define the problem, b) search for a number of possible solutions, c) evaluate each solution as objectively as possible, d) select the "best" solution, e) place and carry out the implementation and f) adjust and adapt as needed to optimize results.

8. When a city chooses to fill a technologist-in-residence position, the person selected should establish or have a working relationship with a nearby public (possibly private or academic) technology-based institution, if this is possible. Arrangement should be made so that the institution will serve as a resource for modern technical information and know-how.

9. The technologist should have his base of operations in the city he's trying to help. He must be available to city officials.

10. In conducting a technology assistance program, benefit often derives from recognizing the enterprise (certainly the early stages) as an experiment. The nature of the experimental atmosphere helps provide for a) ability to stop activity at any time; b) a high degree of objectivity in establishing the schedule and conduct in the program, and c) reasonable expectations. It also helps the jurisdictional government to avoid the opprobrium of failure. In some cases it may be possible to perform scaled-down experiments and save on costs. The hazard of scaling down too far (too much difference in the experiment and the full-size model) must be noted and avoided.

Lastly, it must be recognized that the interrelationship for providing assistance with technology to a city or town is a fragile one at this time; it is likely to remain so in future years. The problem is really not technology or exotic unsolvable problems. It is not a lack of interest in the subject of technology for the public benefit or of willingness of all parties to get involved. The problem is really one of knowing where and how to get started. And, most importantly, there is a misunderstanding of the roles each actor should play and of the proper place of technology withal. This misunderstanding, with all the unknowns and untrieds, can lead to a real fear of getting involved. City

officials are not conversant with the latest in technology; there may be little on-site "technological capacity." Technologists are not cognizant of all the vagaries of politics or public administration. This lack of knowledge of each other's worlds tends to heighten distrust and fear on all sides.

Some day there may be a fully institutionalized technology transfer function, but it will not be born easily. It must be born with a sense of personal trust between all participants. The strategy presented here, in the opinion of the author, is a necessary development before institutionalization takes place.

In summary on the basis of the BAP experience in Baltimore, technology itself, either hard or soft, is likely to be less of a barrier to assistance to a city than the personal or organizational motivation of the participants in the transfer process.

FIGURES

Task Title	Level	GSFC Personnel	Status			Baltimore Personnel
			Active	Completed	Discontinued	
Fire Station Location	II	R. Nelson			✓	A. Hilsenrad
Hazard and Crisis Planning	II	W. Parsons[1]		✓ N		Several
Health Department Workshop	II	E. Wolff	✓			J. DeHoff
Incinerator Energy Conversion	II	J. Robinson	✓ N			E. Neff
Industrial Park Development MIUS	II	E. Hays[2]	✓ N			Several
Energy Conservation/Reuse	III	E. Metzger	✓			N. Curran
Insecticide Technology	I	E. Woods[3]		✓		V. Branch
Lake Roland Silt Utilization	II	J. Steckel	✓			D. Tawney
Senior Citizen's Hi-Rise	II	J. Mills	✓			S. Gross
Solar Energy Programs Aquarium	III	E. Hymowitz	✓			A. Liebeskind[4]
Convention Center Solarization	III	E. Hymowitz	✓			R. Donkervoet[5]
Sharp-Leadenhall School Solarization	III	W. Terrill[6]			✓	C. Lantz
Solar Energy Research Institute	II	T. Golden		✓		B. Berkowitz
Upton Center Solarization	III	E. Hymowitz	✓			B. Berkowitz
Westport Domestic Hot Water System	II	T. Golden			✓	Several
Water Quality Programs* Data Collection Platform Experiment	I	F. Gordon	✓ N			J. Valcik
Landsat Data Utilization - Baltimore	II	W. Dallam[7]	✓ N			E. Neff
Sewer Flow Meter	II	T. Golden	✓			T. Armbruster

[1] Boeing, KSC, Fla.
[2] NASA/Johnson Space Ctr.
[3] Univ. of Md. Extension Service
[4] Deisemer, Catzen & Assoc.
[5] Cochran, Stephenson & Donkervoet, Architects
[6] General Electric Co., Valley Forge, Pa.
[7] General Electric Co., Beltsville, Md.
[N] Related to NASA technology
*See Lower Priority Tasks

Figure A. Higher Priority Tasks

Task Title	Level	GSFC Personnel	Status			Baltimore Personnel
			Active	Completed	Discontinued	
Char/Ash Separation	II	L. Gunshol[1]	✓			E. Zuber
Child Health Information System	II	(Vacant)	✓			J. Rhyne
Communication System Programs Information Systems Exps.	II	(Vacant)	✓			M. Rimmerman
Satellite Propagation Tests	III	(Vacant)	✓N			M. Rimmerman
Computer Graphics	II	J. Sos		✓N		R. Dietrich[2]
Culture Transporter Tests	I	A. Carella		✓N		A. Wood
Digital Traffic/Emergency Routing	II	(Vacant)	✓			W. Davis
"Flat" Wiring	I	T. Golden		✓N		Several
Laser Building Cleaner	II	J. McElroy	✓			Several
Law Enforcement Technology Criminal Justice Info. System	II	J. Todd	✓			G. Riggin
Police Location System	III	S. Durrani	✓N			R. Norton
Lead Paint Detection	III	L. Magoon[3]			✓	E. Dubin
Municipal Information/Data Base	II	(Vacant)			✓	H. Tall
NASA Program Management Techniques	II	J. Zarega	✓N			Several
Rapid Bacteria Detection	II	T. Golden		✓		J. Deffoff
Rat Control Experiments	III	B. McNamara[4]			✓	D. Yeres
Science Education Assistance	II	(Vacant)	✓			G. Lennon
Soft Surface Materials	I	T. Amyes[5]			✓	G. Bunn
Street Sweeper Concepts	III	(Vacant)	✓			F. Kuchta
Wastewater Treatment Methane Recovery	II	T. Golden	✓			F. Kuchta
Wastewater Symposium	II	T. Golden	✓N			R. Beckwith
Water Quality Program* Algae/Nutrient Detection	III	(Vacant)	✓			(Vacant)
BOD/Heavy Metal Detection	III	J. Trombka	✓N			F. Kuchta
Landsat Data - RPC	II	B. Sellman	✓N			J. Manley[6]
Pollution Situation Center	III	(Vacant)	✓N			(Vacant)
Water System Simulation	II	(Vacant)	✓			F. Kuchta
Zinc Paint Tests	I	J. Schutt	✓N			B. Blake
"911"	I	T. Golden		✓		W. Schaefer

AIAA Baltimore Chapter
Deceased
NASA Headquarters

[4]Aberdeen Prov.
[5]Stanford Research Inst.
[6]Baltimore Regional Planning Council

*See Higher Priority Tasks
[N]Related to NASA Technology

Figure 8. Lower Priority Tasks

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