PLANNING FOR IMPACT:
A CASE STUDY OF THE IMPACT OF THE SPACE PROGRAM ON HUNTSVILLE, ALABAMA

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A thesis presented to the faculty of the Graduate School of Public Administration, New York University, in partial fulfillment of the requirements for the degree of Master of Urban Planning.

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New York University
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New York 3, New York

February 1967

PREFACE

Technology has been a major shaper of the human community through history. In our own time we have seen vast changes in the dimension and content of urban life brought about by the advent of such technological achievements as the telephone, television, the automobile, the skyscraper, and now the earth satellite. This writer has long been interested in the relationships between technology, culture, and the human community; and has found focused within the scope of urban planning a means of bridging the gap between the sciences and the humanities.

It is within this perspective, then, that I have undertaken this study, joining with others who are increasingly concerned by the problems of cities under increasing urbanization and concerned over the lack of attention which the scientific and technological establishments have paid to these problems.

Only through an increased understanding of the urban community as it functions within today's increasingly technological society can we hope to harness modern science to serve the needs of man.

I would like to acknowledge my gratitude to Dean Ray F. Harvey and Professor Herman G. Berkman of the Graduate School of Public Administration of New York University, who made it possible for me to pursue this study under NASA Grant

NGR33-016-067. And I am additionally indebted to Professor Berkman who guided me through the formulation of the study design and whose critical evaluation and insightful council was invaluable.

I would also like to express my appreciation to Lenard Mandelbaum whose knowledge of Huntsville was a great asset to my work, to Lawerence Rinderknecht for his encouragement and helpful suggestions, and to Dean Y. Matthews, Director of Planning of the Huntsville City Planning Commission, and Marion I. Kent, Chief of Community Relations for NASA at the George C. Marshall Space Flight Center, for the cooperation and personal assistance which they gave me during my brief stay in the city of Huntsville, Alabama.

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INTRODUCTION

The United States space effort embraces an intricate system of men, materials and ideas, organized into a social invention which will guide us into a new era in human history -- the Space Age.

The U.S. space program is relatively new, and yet it has already generated considerable impact. Indicative, for example, is its economic impact.

> The first and fundamental fact is that we are spending upwards of five billion dollars a year in our civilian space effort. There are widespread impressions that these vast sums are somehow blasted off into space and that space science and technology themselves are highly esoteric pursuits, remote from the mainstream of our national life. These impressions, which are quite wide of the mark, contribute directly to the conclusion that a nebulous prestige is the major, if not the only reward of our exertions.
>
> In fact, over 90 per cent of our space dollars are spent in American industry and find there way into wages, salaries, and other compensation. The materials actually launched into space represent about 2 per cent of the direct space expenditure. Only 1 per cent of our gross national product is used, but, given the normal economic multiplier, the civil space program creates spending in the economy on the order of 20 billion dollars a year. Thus, the preponderant impact is upon industry, here and now. Over 20,000 firms participate directly in contracts and subcontracts under the program. These firms employ more than 400,000 people. The engineers and scientists involved represent only about 5 per cent of the nation's total.[1]

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[1] Arnold W. Frutkin, "United States Space Program and Its International Significance," The Annals, Vol. 366 (July 1966), p. 90.

In addition, space is perhaps the major federal program which has involves such an extensive cross-cut of the intellectual community. It cuts across almost all of the academic specialties, from biology and psychology to physics and astronomy. Like the railroad era at the turn of the century, the space program is certain to generate technological, economic, cultural and ideological change. Already, scientific, technological, and management spin-off from the space program is being utilized in a wide variety of non-space activities.

City planners are also being drawn into contact with the space program. Spin-off from aerospace research industries is currently being applied to urban and city problems, particularly in the use of computer models and systems analysis techniques.

Planners, moreover, have become directly involved in trying to deal with the direct impact of space program facilities on local communities. It is this aspect of the space program which is our immediate concern. In what sense can we understand this impact and therefore be able to plan for it?

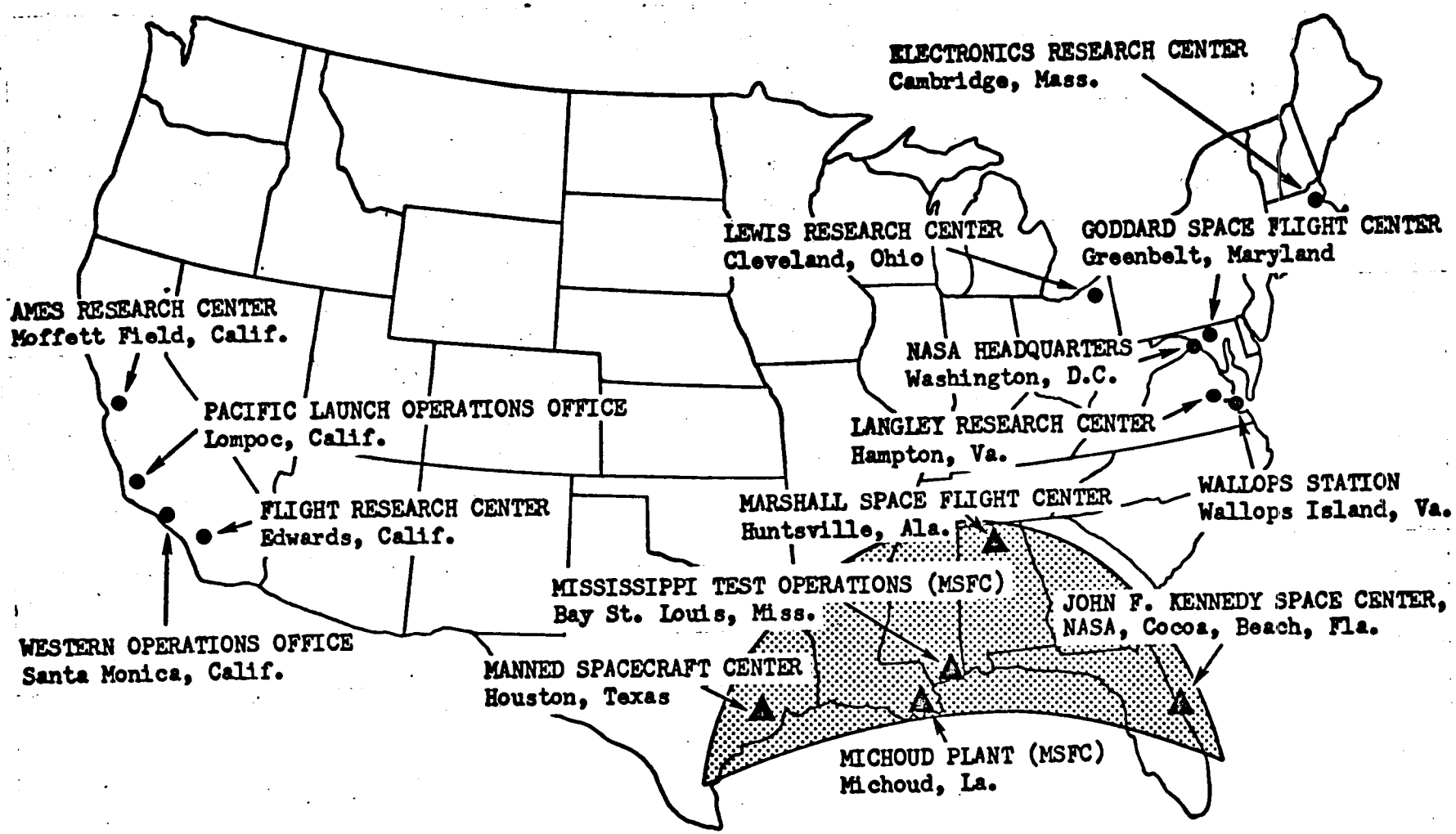
The purpose of this study is to explore the thesis that urban planning has an important role to play in shaping the consequences of space program impacts on the urban community, and that the space effort benefits from such planning. It is our further hypothesis that planning for these impacts is possible, feasible and desirable. In

moving toward these objectives this study will focus on the development of a selected urban community responding to the impact of the space effort.

Examination of space facilities impact will show that impact can be sufficiently understood, and that urban planning can act to maximize the "desirable" effects of this impact, and minimize its undesirable results.

The community selected for intense research is Huntsville, Alabama, site of the George C. Marshall Space Flight Center. This is one of over 15 major sites at which the National Aeronautics and Space Administration has located facilities. See Figure 1.

Huntsville was selected for several reasons. First, it was one of the earliest communities to experience the impact of the space program. It provides us with fifteen years of continuous, economic, social, and political response to the demands of that program. Second, Huntsville's size and essentially agricultural background before the space impact puts into sharper relief that area's subsequent growth and development. Thus, the space program impact has not been muddied by the pre-existence of a large complex industrial economy or by a large heterogeneous urban population which would have made it more difficult to isolate community reactions to space program expansion. Because Huntsville was a small, mostly rural, southern community, the introduction of the space effort in 1950 resulted in



Source: National Aeronautics and Space Administration.

Figure 1.--Major NASA Installations.

measurable changes, which can be readily traced to the space effort.

More specifically, we will look at the economic and population responses of Huntsville, how these affected the community and how the local government met the changing demands of the community. We then will be able to see more clearly how urban planning, as a tool of government decision-making, may expedite problem solving by guiding city development and anticipating needs generated by the space program. We will examine such questions as the relation of community size to impact, how the physical location of Huntsville affected its growth, and the style of Huntsville's adaptation. We shall also note the ability of the space program to convert aerospace economic impact into a foundation for a new technological economic base. Finally we will examine the responsibility of the space agency, as an example for other federal agencies, to anticipate the effects of its facilities on local communities through urban planning and the advantages to the space effort derived from such planning.

From this specific material, then, Huntsville's impact response will become evident; its city problems, its development pattern, and its growth stages. From the specific case of Huntsville will emerge the basis of a general impact pattern and a general case for planning for impact.

CHAPTER II

PLANNING FOR IMPACT

In order to understand what is meant by planning for impact, it is essential to look more closely at the two terms planning and impact.

Impact

What do we mean by impact in its general sense; and how does this apply to the space program?

In most dictionaries the word impact is defined as meaning shock, collision, or a concentrated force of one thing acting upon another thing; while in others it is also defined as a strong force producing or compelling change. The term impact, then, denotes the occurrence of a dramatic or dynamic event at some point in time which causes repercussions through time, not unlike throwing a stone into a calm body of water and studying the splash and ripples which are generated by the impact of the stone on the water.

This is certainly a much too simplistic analogy of a complex space program operating within a complex society, constantly casting pebbles and stones on an already heavily rippled water. If we must use the term impact to describe the relationship between such complex variables as the space program and other aspects of our society, we must constantly

remind ourselves that this is a complex interacting feedback relationship which continues through time.

The simplistic cause and effect notion, "if X then Y," often imparted by the term impact will not serve as an adequate basis for understanding changes influenced by the space program. "If X then Y" can mean many things. Is X necessary and sufficient for Y, is X necessary but not sufficient for Y, or is X neither necessary nor sufficient for Y, but they appear to be associated together? These statements of deterministic causality, probabilistic causality, and correlation without causality quickly complicate simple assertions of cause and effect.[1]

Causal relationships between relatively independent variables will be extremely complex and multi-variate. Seymour Lipset makes this point clear in his book Political Man where in the methodological discussion of his approach to the relationship between economic development and democracy he says:

> This approach also stresses the view that complex characteristics of a total system have multi-variate causation and consequences, in so far as the characteristic has some degree of autonomy within the system. Bureaucracy and urbanization, as well as democracy, have many causes and consequences, in this sense.
>
> From this point of view, it would be difficult to identify any one factor crucially associated with, or "causing," any complex social characteristic. Rather all such characteristics

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[1] Russell L. Ackoff, Scientific Method (New York: John Wiley & Sons, Inc., 1962), p. 16.

> (and this is a methodological assumption to guide research, and not a substantive point) are considered to have multi-variate causation, and consequences.[2]

Impact, then, envolves certain notions about the way events happen in time, and the complex relationships between these events, a sudden usually unexpected event initiating complex multivariate repercussions through time.

Several examples of impact can be drawn from the early history of the American space effort. In 1945 Wernher von Braun, Germany's top rocket expert, had willingly surrendered to the U.S. Army, after which, along with 120 of his top men, he was sent to the United States under an Army contract to build rockets for this country.

The German scientists were sent to Fort Bliss, Texas, where they were generally ignored, keeping themselves busy with some old captured V-2 rockets. The words "missile" and "outerspace" were not common in the halls of Congress at this time, and while some experimental work was being done in this area by the Air Force, it was apparently being given low priority.

The impact of the Korean War initiated still another chain of events, which was to affect Huntsville, Alabama and the space effort. In 1941, at the beginning of World War II, the Army had constructed two arsenals in Huntsville. These facilities, a chemical warfare plant and a shell loading

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[2] Seymour M. Lipset, Political Man: The Social Bases of Politics (Garden City, New York: Doubleday & Co. Inc., 1960), p. 74.

plant, located within the Army military reservation at Huntsville had been closed down since 1946.[3] Now in 1950, they were suddenly reactivated under the Army Ordinance Research and Development Division in time for the arrival of 350 scientists including the 120 Germans from Fort Bliss.[4] The arrival of these scientists in Huntsville, Alabama in 1950 represents the initial space impact on Huntsville.

Von Braun's task was to build an Army long range missile. And three years later in 1953 the Army's Redstone ballistic missile was successfully launched at Cape Canaveral. In 1954, Von Braun unsuccessfully pressured Washington to let him orbit a five pound piece of metal with a specially adapted Redstone, but the decision was made instead to depend on the development of the Navy Vanguard, a scientific non-military missile and satellite. Meanwhile, Von Braun had been instructed to develop and build 12 Army Jupiter-C intermediate range ballistic missiles, the first successfully launched on September 20, 1956. While Von Braun and the Army would liked to have used a Jupiter-C fourth stage as the first United States satellite, the Vanguard had been given the exclusive assignment by the White House to orbit our first satellite and the Army had to hold back.[4]

On October 4, 1957 an event occurred which had a greater impact on the United States space program than any

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[3] Huntsville City Planning Commission, Huntsville, Alabama Population and Economy: Background Trends, Report 1, prepared by Hill and Adley Associates, Inc., Planning Consultants, Atlanta, Georgia (July 1963), pp. 6-7.

[4] "Space: Reach for the Stars," Time, February 17, 1958, pp. 21-25.

other single event to date; the Soviet Union successfully launched the world's first artificial man-made satellite, Sputnik I. By November the Army had its go-a-head to launch a satellite; and after a dog carrying Sputnik II and several Vanguard failures, Wernher von Braun finally orbited the first American satellite, Explorer I, on the evening of January 31, 1958.

Sputnik I represents the single major impact which has been responsible for the expansion of the space program to its current levels. The resulting space race with Russia and our current all out program to get the first man on the moon represent commitments which can be related back to the Sputnik impact.

For Huntsville and many local communities throughout the United States, Sputnik generated two major developments; one, a general acceleration of the U.S. space effort; and two, the creation of the National Aeronautics and Space Administration.

With the increase in space expenditures, interservice rivalries and conflict between the military and civilian bureaucracies developed over who should control outer space programs and dollars.[5] These problems were partially resolved in July of 1958 when Congress enacted and President Eisenhower signed into law the National Aeronautics and Space Act of 1958. Under the Act the National Aeronautics and

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[5]Lillian Levy, "Conflict in the Race for Space," Space: Its Impact on Man and Society, ed. Lillian Levy, (New York: W.W. Norton & Co., Inc., 1965), pp. 188-211.

Space Administration was given the primary mission of planning, directing, and conducting the exploration of space. And in cooperation with NASA, the Defense Department was to retain its control over military space projects. As a consequence the Development Operations Division, from the Redstone Arsenal at Huntsville, of the Army Ballistic Missile Agency along with all of its personnel and facilities were transfered to NASA, over strong Army objections.[6]

The George C. Marshall Space Flight Center (MSFC) officially began operations on July 1, 1960 with 1600 of the Army's original 40,000 acres, while the Army continued its work envolving military missiles and the Guided Missile School at the Redstone Arsenal.

The sudden reactivation of the Army arsenals in 1950 had an immediate impact upon Huntsville's economy. By the end of 1950 approximately 1000 persons were employed there, climbing to around 8,000 in 1955 and 17,000 by 1961.[7] The social impact was just as immediate. While Huntsville was wary of the Germans, the Germans were not indifferent toward Huntsville. They bought land, built homes, and took an active interest in community affairs. They organized discussion groups, professional societies, a string quartet, and formed the nucleus of a 60-piece symphony orchestra. Hannes Leuhrsen laid out Huntsville's divided highway; Werner Kuers was the symphony concertmaster; the city

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[6] Ibid..

[7] City Planning Commission, op. cit., pp. 7-8, 45.

school system supplemented its teaching staff with the wives of rocket engineers and scientists; and one Huntsville engineer Clarence Ellis, ground a 21.5 inch mirror in his basement for the city's astronomical association telescope.[8]

April 14, 1955 was declared "New Citizenship Day" by the Huntsville Rotory Club. It was the day the German scientists including Wernher von Braun became United States citizens.[9] After that day, they were fully accepted into a community of which they were already a part.

Impact, then, can be thought of as a term which describes an initial event which has led to primary, secondary, tertiary, and so on, consequences down to and including in our example a "citizen day" celebration.

This notion of impact should not be misread as a simplistic or deterministic cause and effect theory of history, but as a recognition of the extent to which a social invention as overwhelming as the space program can impact a community and society. As a social invention, the space program will undoubtedly play a continuously significant role in the development of society. Social invention has been defined as:

> ... an invention that is technological (e.g., missiles, launching pads), economic (e.g., involving large-scale employment of manpower,

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[8]Paul O'Neil, "The Splendid Anachronism of Huntsville," Fortune, June 1962, pp. 151-155, 226-238.

[9]"Rocket City, U.S.A.," Newsweek, January 30, 1956, pp. 27-31.

> widespread use of materials), political (e.g., involving new forms of legislation, and new dispositions of political forces), sociological (e.g., affecting kinship groups, communities, classes), intellectual (e.g., changing man's views of space and time), and so forth. My definition is admittedly broad; but I believe it is the only one that does justice to the reality of the space program and its impact on society.[10]

The space program, then, has impacted our society in general and in specific ways. In Huntsville, Alabama, it already has had a direct impact on the number of jobs, and a more indirect or secondary impact on housing, sewers, parks, social organization, attitudes, and community decision-making, for example. Indeed, as one recent study has put it:

> It is these secondary consequences, or ramifications of the primary impact, that may have the greatest significance for society, and that need the most concentrated study. The hope, of course, is that once we understand more about these consequences - initially "unintended consequences"...the more we shall be able to do to control them.[11]

For the most part, the use of the term impact to describe an event and what follows from that event implies that the consequences of impact are unforeseen, unintended, and that the costs and benefits which result from impact must be accepted as a matter of chance. It is the basic tenet of this thesis to show that this is not the case. The consequences of impact can be predicted within the

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[10]Bruce Mazlish (ed.), The Railroad and the Space Program: An Exploration in Historical Analogy (Cambridge, Mass.: The MIT Press, 1965), p. 11.

[11]Ibid., pp. 14-15.

framework of probabilistic causality; and that, in particular, urban planning can mediate the impact of an aerospace facility on an urban community such that costs can be minimized and benefits maximized through the explicit development of decision-making alternatives through which a community can guide its development past impact obstacles and toward community goals.

Planning Process

Urban planning is the means by which a community can fortify itself with the knowledge of impact repercussions and armed with this knowledge can then act within a rational decision-making framework, to guide community development. Planning, then, through the development of goals and objectives can direct decision-making toward choices which will lead a community away from unintended consequences, and instead to the fruitful implementation of policies and actions which will move that community toward its reasoned goals.

Of course there is a whole range of objectives and goals, usually different for each interest group; the goals of one group often conflicting with those of another. One major result of planning is to make explicit these varying goals, to indicate choices which can be made, and the consequences which are implied by each of those alternative choices.

Planning is not content with unintended consequences, but attempts to develop alternative courses of action which

filtered through the democratic decision-making mechanism of government can lead to the implementation of actions to reinforce consequences leading toward objectives and goals and to inhibit those consequences preventing the realization of goals.

Many fields including anthropology, architecture, economics, geography, human ecology, operations research, political science, public administration, social psychology, sociology, and others have and are continuing to contribute to the understanding of planning. This broad interdisciplinary base has provided a wide range of inquiry into the subjects of social change, urban problems, and city planning.

City or urban planning can be divided into two broad areas of concern; one, the planning process, policy orientation and decision-making, and two, the technical process which includes information gathering techniques, economic, population, land use, and other studies, as well as plan making and plan implementation proceedures.

Definitions of planning can be found in many sources. Some are simple: "Speaking broadly, planning is simply deciding in advance what to do."[12] Some are complex: "Planning is the reconstruction of an historically developed society into a unity which is regulated more and more perfectly by mankind from certain central positions. . . . Planning is

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[12]Henry Fagin, "Planning Organization and Activities Within the Framework of Urban Government," Planning and the Urban Community, ed. Harvey S. Perloff (University of Pittsburgh Press, 1961), p. 105.

foresight deliberately applied to human affairs, so that the social process is no longer merely the product of conflict and competition."[13] Sociologist Alvin Boskoff defines planning as "a continuous process of controlling, regulating, and coordinating the most significant activities and social processes from 'key positions' of knowledge and authority."[14]

Professional city planners have devoted a great deal of attention to this area and have defined this process in greater detail.

> The behavioral usage of process in planning literature is in a tradition not unlike that found in the social sciences generally. In current planning thought, this usage of the planning process has to do with a sequence of action which begins with establishing certain goals, involves certain decisions as to alternative ways of achieving these goals and eventually takes the form of steps for carrying out decisions, followed by evaluation and perhaps a new sequence of action.[15]

> We define planning as a process for determining appropriate future action through a sequence of choices. We use determining in two senses: finding out and assuring. Since appropriate implies a criterion for making judgments concerning preferred states, it follows that planning incorporates a notion of goals. Action embodies specifics, and so we face the question of relating general ends and particular means. We further note from the

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[13]Karl Mannheim, Man and Society in an Age of Reconstruction (New York: Harcourt, Brace and Co., 1949), p.193.

[14]Alvin Boskoff, The Sociology of Urban Regions (New York: Appleton-Century-Crofts, 1962), p. 303.

[15]F. Stuart Chapin, Jr., "Foundations of Urban Planning," Urban Life and Form, ed. Werner Z. Hirsch (New York: Holt, Rinehart, & Winston, Inc., 1963), p. 224.

> definition that action is the eventual outcome of planning efforts, and, thus, a theory of planning must be directed to problems of effectuation.[16]
>
> Planning is viewed as a process - a series of evolutionary and rationally organized steps which lead to proposals for guided urban growth and development. . . . A series of guides to consistant and rational public and private decisions in the use and development of urban land.[17]

It is with this broad planning perspective, as opposed to ad hoc attempts to cope with every community problem as it arises as an unintended consequence of space program impacts, that we shall attempt to review the growth of Huntsville, Alabama which followed the intervention there of federal space research commitments.

This planning perspective, however, must sit within a much broader framework in order to understand the relationships between the community and the space program. While planners have been actively developing theories and models of urban spacial structure, they seem inappropriate for our purpose.[18] The planned change literature is also of little help to us in this regard.[19] Bruce Mazlish has,

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[16]Paul Davidoff and Thomas A. Reiner, "A Choice Theory of Planning," Journal of the American Institute of Planners, XXVIII (May 1962), p. 103.

[17]F. Stuart Chapin, Jr., Urban Land Use Planning (2d.ed.: Urbana: University of Illinois Press, 1965), p.349.

[18]For a concise review of these theories see Chapin Ibid., Chapter 2.

[19]Ronald Lippitt et al., Dynamics of Planned Change (New York: Harcourt, Brace, & World, Inc., 1958), and Warren G. Bennis, Kenneth D. Benne, and Robert Chin (eds.), The Planning of Change: Readings in the Applied Behavioral Sciences (New York: Holt, Rinehart and Winston, Inc., 1964), and Wilbert E. Moore, Social Change (Englewood Cliffs, New Jersey: Prentice-Hall Inc., 1963).

however, developed a generalized framework which can act as a broad backdrop for this study.

> In the discussion of historical analogy, I stated that the highest aim, scientifically, would be the production of generalizations that could then be applied to further materials. This is not to say that hunches or intuitions derived from the study of historical analogy are to be looked down upon; they are valuable in themselves, and may be all that we can secure. Indeed, the attempts at generalizations that follow cannot pretend to be rigorously and narrowly formulated. In fact, they may be considered only a halfway step from generalities to generalizations.[20]

His five generalizations are restated below including brief statements as to their applicability to Huntsville.

1. All social inventions develop as part of complex societal systems and create complex effects on those systems, and thus must be studied in multivariate fashion. Population increases created by the Army and NASA in Huntsville have had complex effects on city services, public facilities, local politics, the community social structure, and so forth.

2. No social invention can have an overwhelming unique or cataclysmic determining economic impact. Changes in Huntsville have occured through time. While the economic base of the community changed, it did so mediated by the complexity of previously existing social and political institutions. However, it may be true that this generali-

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[20]Mazlish, Op. cit., p. 34. His generalizations can be found on pp. 34-36.

zation has greater validity on the national level than on the local level.

3. All social inventions will aid some areas and developments, but will harm others. Many problems were created in Huntsville during its growth from a rural southern cotton community to its present status as a space age research center. Benefits are always obtained at some economic and social cost.

4. All social inventions develop in stages, creating different effects during these different phases. Clearly the influx of 50 German scientists into the Huntsville community right after World War II had a much different effect than the leveling off of NASA's local employment requirements will have now in a much later stage of the development of the city's space complex.

5. All social inventions take place in terms of a social "style" which will effect the shape of that invention. The solutions to problems in Huntsville naturally could only be resolved within the context of particular historical modes of thought, action, and governmental decision-making prevalent in that area. The political process, resolution of conflict, acceptance and rejection of social and technological change would only take place within the cultural milieu of an American southern Alabama city. And such changes and adaptations by the City of Huntsville have undoubtedly fedback to changes and adaptations by NASA and Army policy. While many adapta-

tions to change in Huntsville may be common to other American cities under similar pressures, others may be unique.

In spite of the complexity inherent in a dynamic environment where many complex variables are constantly pushing and pulling upon the expectations and objectives of individuals and organizations, planning can act to organize and communicate information essential for reasoned decision-making. In order to plan, data must be organized into useable information such that an understanding of past relationships will support confident assertions about the future. Only through an examination of the past, the present, and the probable and possible future can we begin to distinguish between expected events and desired events, in order that such feedback will permit mid-course corrections to bring us to our desired goals.[21]

Planning Techniques

A city or community is an aggregation of economies, persons, activities, and attitudes organized into social systems which are able to satisfy the needs and desires of the individual members of that community.

Planning must be able to draw from these complex interactions information which when organized into tech-

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[21]Herman G. Berkman, "Planning Information Systems and Electronic Data Processing," Proceedings on Applications of Data Processing to Local Government (New York: Rand McNally & Co., 1967).

nical land use planning studies can act as a decision-making guide for community development. As an important planning text notes:

> Of first importance in tooling up for land use planning are studies of the structure and vitality of the urban economy as key considerations in gauging the amount and rate of land development that is likely to occur in a city. Accordingly, considerable attention is given to methods of studying the makeup and general health of the urban economy. Analyses of employment and population prospects are extensions of these foundation studies, and supply the actual yardsticks needed for estimating amounts and rates of future land development. Then attention is focused on attitudes and behavior patterns to obtain insights into activity systems which must be accommodated in land use planning. But to apply data obtained from measurements of growth and studies of activity systems, it is necessary to have a basic description of the existing and past physical setting of the urban area.[22]

A city is a locus of economic activity. And it is the income generating capacity of the economic base which controls a city's growth and its population size and composition. The population of a city also acts as a vital input to the urban economic system creating the local demand which generates a market for both public and private goods and services. The individual wage earner is both a source of government revenue as well as the object of private competition for consumer dollars. To see Huntsville, in this perspective, we can visualize the entire city as one writer has put it:

> Composed as it is of special districts, of specialized facilities, of specialized

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[22]Chapin, Urban Land Use Planning, p. 103.

> labor, and of various services, as one big factory. Its job is to produce services for its own inhabitants and for areas outside its borders at the lowest possible cost with maximum efficiency.
>
> In the city we have at work the economies of cost minimization and of aggregation, of returns to variable proportions, of scale, and the external economics of urbanization.[23]

> The city is a giant revenue receiver and spender. It is to some extent like any business which produces goods and services. Production requires revenues and investment similar to investments in capital assets of an industrial plant. The physical city is a heavy fixed-capital investment. Its streets, fire and police stations, libraries, schools, water works, incinerators, etc., are its capital assets.[24]

The dimensions of the urban economy are studied by planners so that the location of economic activity will satisfy goals of optimization in the use of resources.[25] The economic objectives include increased accessibility, meaning reduced transportation cost; internal economies of scale, enabling plant layout and size to conform with cost curve analyses; benefits of external economies, derived through the clustering of activities and the sharing of

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[23] Herman G. Berkman, Our Urban Plant (Madison, Wisconsin: University of Wisconsin Extension, 1964), p. 22.

[24] Ibid., p. 14.

[25] Detailed economic analyses have been undertaken for NASA by Walter Isard of the Department of Regional Science of the University of Pennsylvania, and others. A listing of such studies is currently under way as part of a NASA grant to the Graduate School of Public Administration of New York University.

facilities possible with improved economies of aggregation; and the reduction of costs inherent in obsolete street patterns and deteriorated buildings, by the continual replacement of blighted and congested elements of the existing physical urban plant.

Economic base studies, input-output studies, cost-benefit analyses, and economic equilibrium models are all differing technical tools which enable planners to grasp the future production, distribution, and employment characteristics which will generate changes in the urban pattern. If these changes can be anticipated, problems associated with economic change can be dealt with realistically before they develop into local diseconomies. Such studies enable planners to anticipate problems generated by impact.

Urban planning, through the framework of government, can enable a community to optimize the location of its public facilities, and with the proper use of zoning and subdivision regulations can guide the development of a community by the determination, control, and regulation of a comprehensive arrangement of land uses.

Population studies are also a vital part of planning's technical tools. We thus note that:

> Population size gives an indication of the overall dimensions of the physical environment and supplies a basic yardstick for the estimation of space needs for various categories of land use. When the time element is introduced and future trends in population size are estimated, these trends become the basis for estimating future dimensions and future

> space needs. Investigations of population composition extend these analyses to such qualitative considerations as age groups, household sizes, and income composition of the population. Thus studies of population composition assist in estimating residential space requirements for various dwelling types consistent with existing and anticipated family sizes, income levels, and the needs of each segment of the life cycle. They assist in determining the amount of space needed for recreation areas, schools, and other community facilities for all segments of the population, - small children, teen-agers, families, and old people. Finally, investigations of population distribution provide clues as to how these various land uses and facilities should be located in the urban area.[26]

Planning is vital in order to accommodate increasing populations drawn to communities in response to job and income generating economic impact. Again costs associated with a rapid increase of public facility investment can be minimized with appropriate planning, while at the same time providing increasing urban amenities.

Information to follow concerning Huntsville will show that the space impact generated a particular kind of population in-migration which tended to reinforce the economic boom aspects of the community. Most of the people who migrated to Huntsville had negotiated well paying jobs in Huntsville before their arrival; and thus, although requiring basic services from Huntsville, they spent heavily in the city and had the money to do so reinforcing the local economy.

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[26]Chapin, Urban Land Use Planning, p. 181.

Activity patterns, community organization, and attitude studies are also important tools for planners. These studies can indicate behavioral reactions and kinds of social organization which develop from impact, and also serve to indicate people's needs and desires with respect to their community environment.

Recruitment problems, the ability to attract new industry, and even the operational costs involved in the attitudes of scientists and clerks which effect their work output are tied to human organizational systems and social-psychological environmental variables. In Huntsville, for example, community pride identifying Huntsville as the nation's first "space city," as well as early active participation in community affairs by the German scientists, reinforced the positive aspects of the space program impact making Huntsville's adaptation that much easier.

Planning through the use of activity and attitude studies can foresee human resource costs and take steps to eliminate them by planning for urban form and aesthetics as well as through recommendations regarding the makeup and desirability of existing or needed voluntary and informal community organizations.

It is through the use of all of these study techniques that planning for impact is possible; and it is for this reason that we shall refer to the economic and population material prepared by the Huntsville City Planning Commission in future chapters.

Conclusion

We have looked at the terms impact and planning; impact, the occurrence of an event which initiates, through time, a series of complex interactions or responses; and planning, a process which indicates to government decision-makers courses of action which will guide community development toward stated goals and objectives. We have argued that the impact of a social invention as vast as the space program can be understood not only within the broad five point framework presented, but in detail sufficient to plan for the impact of the space program on a specific urban community. Impact repercussions can be foreseen; and the utilization of urban planning studies can provide impact response information -- the foundation for impact planning.

Having sketched out the relationships between impact, planning, the community, and the space program, we shall in the following chapters examine a specific case in order to demonstrate that space program impact can be understood and that planning for impact can yield rewards for both urban communities and federal agencies.

CHAPTER III

HUNTSVILLE

Huntsville Alabama is located ninety miles north of Birmingham, geographically isolated in a valley surrounded by rolling hills, the highest Monte Sano. Highway 231 runs north-south through the city, the Army's Redstone Arsenal and NASA's Space Flight Center are to the west of the highway, and Huntsville's central business district to the east, the Tennessee River forming a natural boundary to the south. With a 1965 population of 143,000 and a population increase of 340% between 1950 and 1960, Huntsville, Madison County's seat, is today a modern space-age boom town.

This city is the specific community which has been selected in order to study the impact of the space program on the urban community. In this chapter we shall examine Huntsville today, the current city problems which have resulted from sixteen years of space program influence.

Why is historical material necessary for this study? First, it gives us a general informational background of Huntsville which provides us with an additional perspective with which we can more intelligently evaluate the current state of the city. Secondly, it gives us an insight into a basic cultural mystique or image which is an intrinsic part of a city or region, an image which often yields

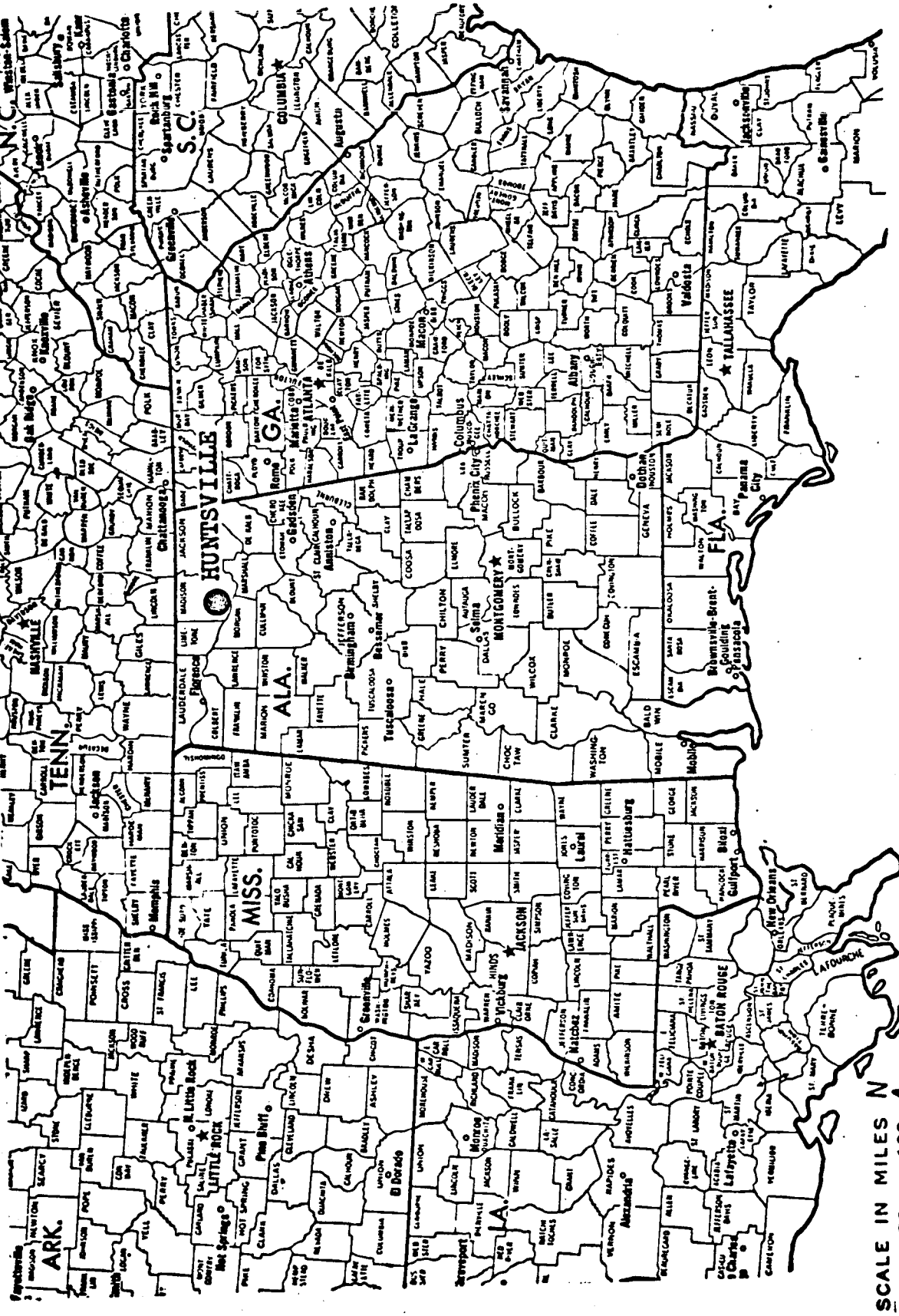

Figure 2.--Alabama and Surrounding States.

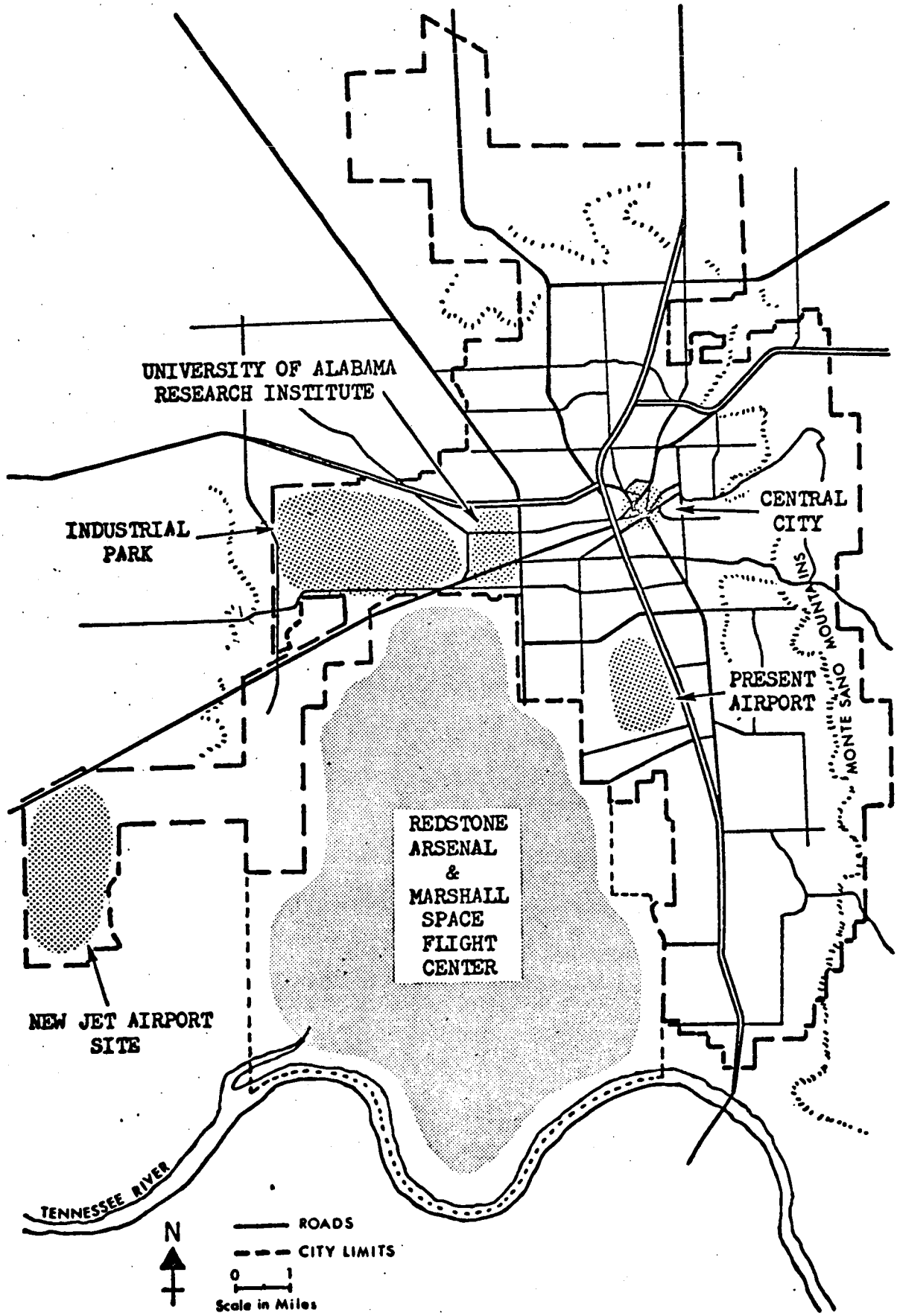

Figure 3.--City of Huntsville, Alabama.

insights into attitudes and modes of behavior prevalent in an area. And finally, it can show us specific patterns of development which the community has experienced in the past, patterns of events which have not been forgotten by current decision makers.

Historical Setting

The city had its beginning in 1805 when John Hunt, a Revolutionary War veteran, came from Tennessee into the Mississippi Territory that the Indians then called Ah-la-bama. There he built a log cabin by the "Big Spring", thus founding the town which eventually took his name. In 1808 Madison County came into being via a proclamation issued by the Governor of the Mississippi Territory, encouraging migration into these rich bottom lands. Within a few years, however, the small farmers were outnumbered by the wealthy slave-owning planters who used the Federal Government land sale of 1809 to greatly increase their holdings in the town, originally named Twickenham.[1] The early population of Twickenham was around 300 persons, but the area grew rapidly and by 1825 a census of Madison County showed a population of 1,512 persons, 926 whites and 586 Negroes.[2]

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[1]Huntsville-Madison County Chamber of Commerce, Huntsville Industrial Expansion Committee, Information Kit: Facts and Figures on Living in Huntsville, Madison County, Alabama (Litho. in U.S.A., 1964). See sheet "History."

[2]Huntsville City Planning Commission, Huntsville, Alabama Population and Economy: Background Trends, Report 1, Prepared by Hill and Adley Associates, Inc., Planning Consultants, Atlanta, Georgia (July 1963), p. 2.

In 1811 the official name was changed to Huntsville; and by 1812 a newspaper, a public school, a library, a bank, a church, and many new stores were all firmly established. In 1819 Alabama achieved Statehood, and Huntsville became the first Capital of the State.[3]

The Civil War period was difficult for Huntsville. It was occupied by Federal troops from 1862 until 1865 and it was not until the 1870's that Huntsville began to recover from the ill effects of the war.[4]

From about 1880 to 1930 Huntsville's economy was dominated by the textile industry. As the cotton crops moved further westward with the new settlers and their virgin lands, the textile industry moved into the older cotton areas. The competition for mills ushered in a new industrial era. Huntsville's population jumped 60% from 4,977 in 1880, to 7,995 in 1890, due to the rapid industrial expansion created by the textile mills. The first large industrial plant, the Huntsville Cotton Mill Company, was organized in 1881 for the manufacture of thread. Other mills were soon to follow along with supporting trades and industries including repair shops, foundries, cotton gins and warehouses. Industrial expansion continued through the early 1900's, new mills being built until there were fourteen in all.[5]

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[3]Huntsville-Madison County Chamber of Commerce, op. cit..

[4]Huntsville City Planning Commission, op. cit., p. 2.

[5]Ibid., pp. 4-5.

During these years, through World War I, Huntsville prospered. While textiles dominated the local economy other industries were also located in Huntsville including two carriage and buggy factories, an ice plant, a canning plant, two foundries, two machine shops, and a few wood processing plants.[6] However, most of the economy was tied to Huntsville's textile mills, which were not destined to survive the 1930's.

The Depression wiped out most of the mills. Hundreds of jobs were lost; and as the mills closed and the industrial economy collapsed, farmers were forced off their mortgaged land adding to Huntsville's already high unemployed population.[7] And yet, the agricultural base of Madison County persisted and eventually prospered. During the years before World War II Madison County was Alabama's leader in cotton production and Huntsville became the "Watercress Capital of the World."[8]

It was not until 1941 that the industrial economy would begin its recovery. In August of 1941 the Army began construction of a chemical warfare plant and a shell loading plant at two arsenals, the Huntsville and the Redstone, adjacent to Huntsville. The two facilities began production early in 1942 increasing employment in Huntsville 68% over 1940 to approximately 30,000 persons by 1944.[9] It was

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[6] Ibid., p. 5.

[7] Ibid., p. 6

[8] Huntsville-Madison County Chamber of Commerce, op.cit..

[9] Huntsville City Planning Commission, op. cit., p.6.

soon realized, however, that this World War II boom would not last and the Huntsville Industrial Expansion Committee was formed to attract new industry into the area in an attempt to diversify the economy of the city. The committee did draw ten new firms into Huntsville, but their employment of 600 persons could not offset the decline of the Army Arsenals. In 1946 the arsenals closed down and Huntsville again experienced an industrial slump not unlike that of the 1930's.[10] An estimated 15,000 jobs were lost;[11] unemployment rose sharply; Huntsville's textile industry continued to decline; and gradually increasing numbers of people left Huntsville for opportunities in other cities.

This brings us up to the initial space program impact by the Army in 1950.

Of particular interest to this study is the consistent historical impact pattern which emerges from Huntsville's background. For example, the 60% jump in population between 1890 and 1900 marking the beginning of the textile industrial impact on Huntsville is remarkably analogous to the 68% jump in employment between 1940 and 1944, created by the opening of the Army chemical warfare and shell loading plants. These are in turn analogous to the rapid population increase following the space program impact in 1950.

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[10] Ibid., p. 7.

[11] "Boom: Sky-High," Newsweek, April 21, 1958, pp. 96-97.

Looking at it another way, we find that by 1930, the textile mills had all but collapsed and Huntsville found itself in the midst of an economic depression. And after the closing of the Army plants in 1946, Huntsville again experienced a severe industrial slump. It is no wonder, then, that one of the chief concerns of Huntsville officials and citizens, today, is whether they are protected from a NASA withdrawl or space expenditure cutbacks.

The background of Huntsville is one of impact after impact, without planning. Today, however, the city of Huntsville is searching for some way to break the city's boom-bust historical cycle.

Urban planning by indicating economic, population, administrative, and public facility weaknesses or diseconomies within an urban community can indicate appropriate courses of action to enable a city to effectively pursue city problems associated with both urban growth or decline.

But in addition, we should not forget the powerful positive role which even a thin historical image can perform. For example, historic pride whether as the "Watercress Capital of the World" or as the "First Capital of Alabama," has been a factor which has helped Huntsville's leaders to rally the community around the current tag "Space City, U.S.A.," as they have struggled with the adaptation of the city to space program impact.

City Problems

Huntsville today is a complex urban city. As we shall document in the following chapters, the aerospace industry effectively dominates the economy, directly and indirectly controlling 90% of all wages in the city. While population increases from urbanization, natural increase, and in-migration to Huntsville's job generating economy have put a great strain on the city's ability to provide needed public facilities and services. For example, Huntsville's local school construction program has built one class room a week since 1950 and still has had to resort to portable class rooms during certain periods.[12]

The rapid growth of the city is indicated in Table 1 which shows us the scale of growth which has occurred in Huntsville since 1950. These statistics begin to give us a feeling for the scope of development which has taken place; and for the social, economic, and political pressures and problems created by an influx of highly educated scientists, engineers, and technicians supported by a federal payroll, and demanding local services.

The city, sixteen years after the initial space program impact, is still responding to space agency expansion and continues to show the strains of prolonged rapid growth. One can still find the old city, negro slums, once proud

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[12] League of Women Voters, Huntsville, Alabama, Know Your Town: Huntsville, Alabama (February 1966), p. 30-31.

TABLE 1

INDICIES OF GROWTH IN HUNTSVILLE, ALABAMA

	1950	1963	1964	1965
Population	16,437	114,800	123,519	143,600
City Limits	4.71 Sq. Miles	75.24 Sq. Miles	92.31 Sq. Miles	104.6 Sq. Miles
Electric Meters	17,228	45,891	52,134	55,412
Water Meters	7,480	28,999	34,445	36,696
Gas Meters (1952)	2,352	20,113	22,447	22,931
Vehicle Registration	15,030	69,480	83,155	89,800
Telephones	8,807	76,159	91,518	100,059
Building Permits	$ 5,123,560.41	$ 81,282,490.00	$ 76,967,691.51	$ 71,472,716.70
Postal Receipts	$ 250,097.23	$ 1,446,927.62	$ 1,750,473.65	$ 2,042,625.47
Students, City Schools	3,138	23,556	28,264	31,343
Median Family Income		$6,313. (1960)	$ 7,200.00 Est.	$ 7,500.00 Est.
Retail Sales	$43,809,000.00	$200,000,000.00	$204,832,391.00	$228,000,000.00

Source: Huntsville-Madison County Chamber of Commerce

mansions, and "main street" as contrasted to the new Huntsville with its shopping centers, new residential subdivisions, and modern administrative buildings.

Figures 4 through 14, photographs taken by this writer in the spring of 1966, show us Huntsville today; and indicate to us many of the problems which have resulted from space program impact.

This visually directed inquiry will focus on four major elements of Huntsville's environment: transportation, industry-education, the central city, and housing.

Huntsville's local transportation system is the automobile. While there is a local bus system, which provides city and school bus service under a franchise with the city, almost everyone travels by car. Huntsville, while also served by railroad and bus links, really has only one major convenient transportation mode, other than the automobile, which links it with other major cities -- the airplane.

The present Huntsville airport is inadequate to handle the kinds of air traffic which are necessary to tie the MSFC with other NASA, military, and administrative government facilities throughout the nation. Direct flights from New York to Huntsville are infrequent and jet aircraft are unable to land in Huntsville. Huntsville is, however, building a new airport. The new jet airport facility, now under construction, is jointly financed by federal, state, county, and city moneys, the federal government paying 50% of the total cost.[13] The Huntsville Madison

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[13] Ibid., p. 21.

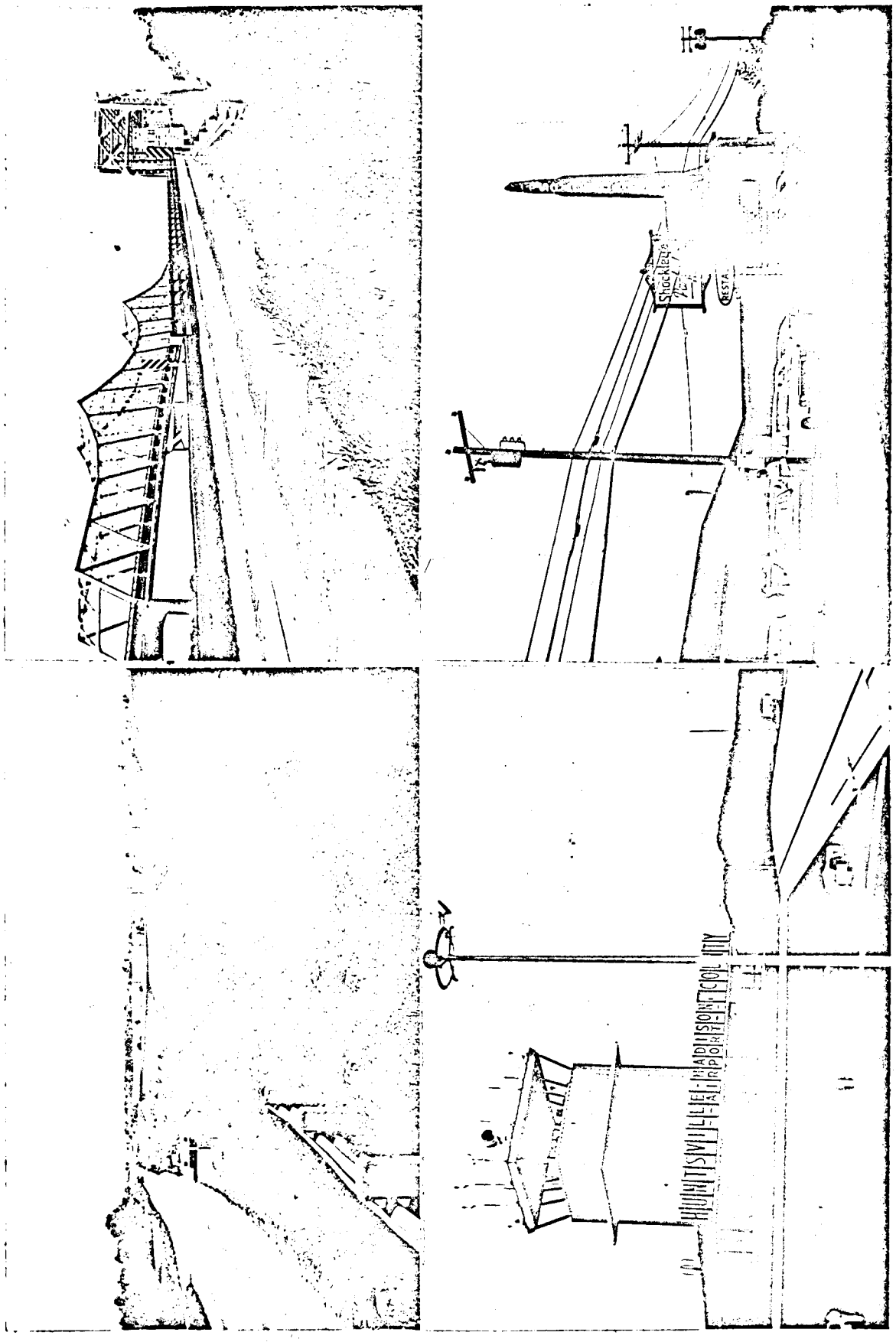


Figure 4.--Bridge Approach looking South, and Bridge across the Tennessee River, Huntsville Airport, and Highway Motel.

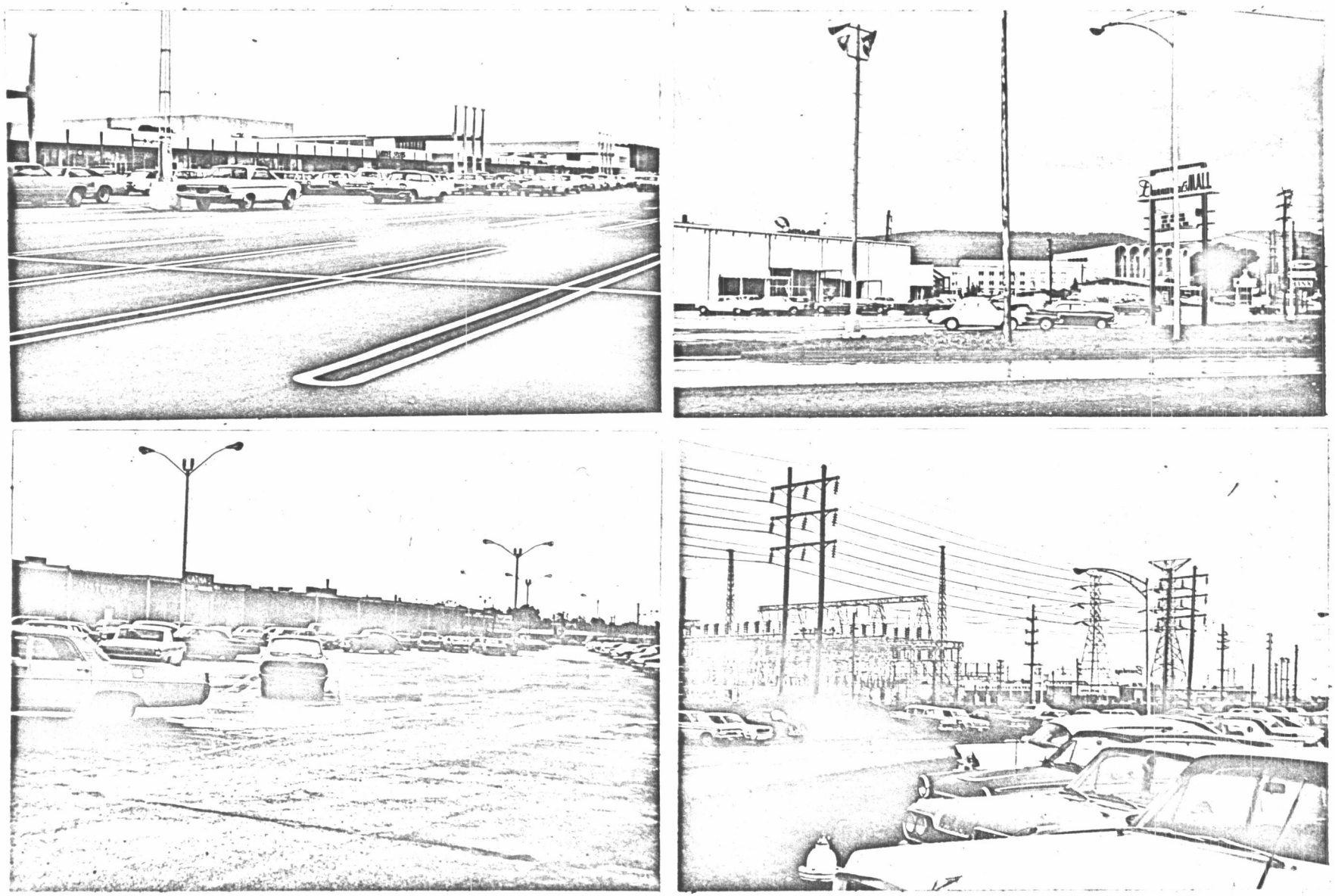
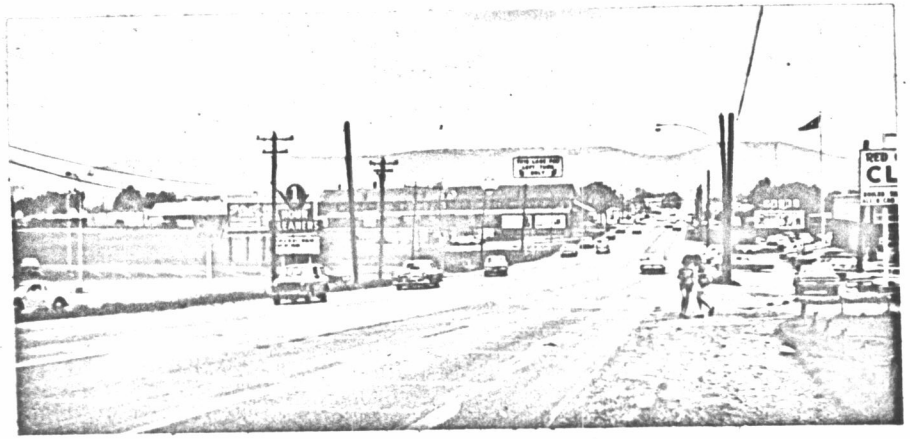
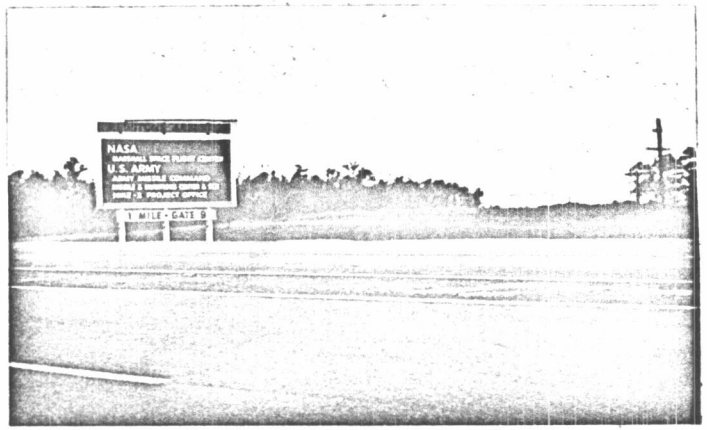


Figure 5.--Highway Shopping Centers, Parking, and Overhead Wires.





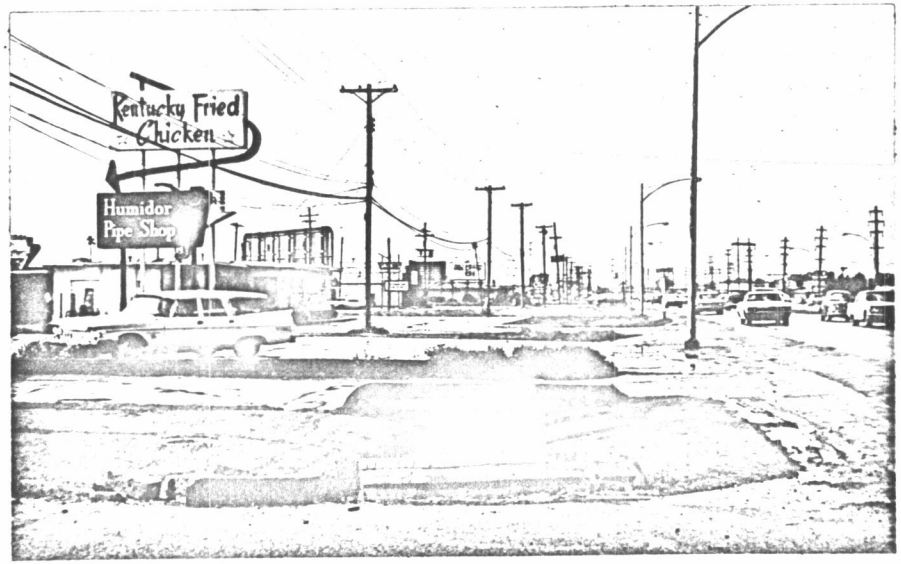


Figure 6.--Strip Development along the Highways to the Arsenal Gates.

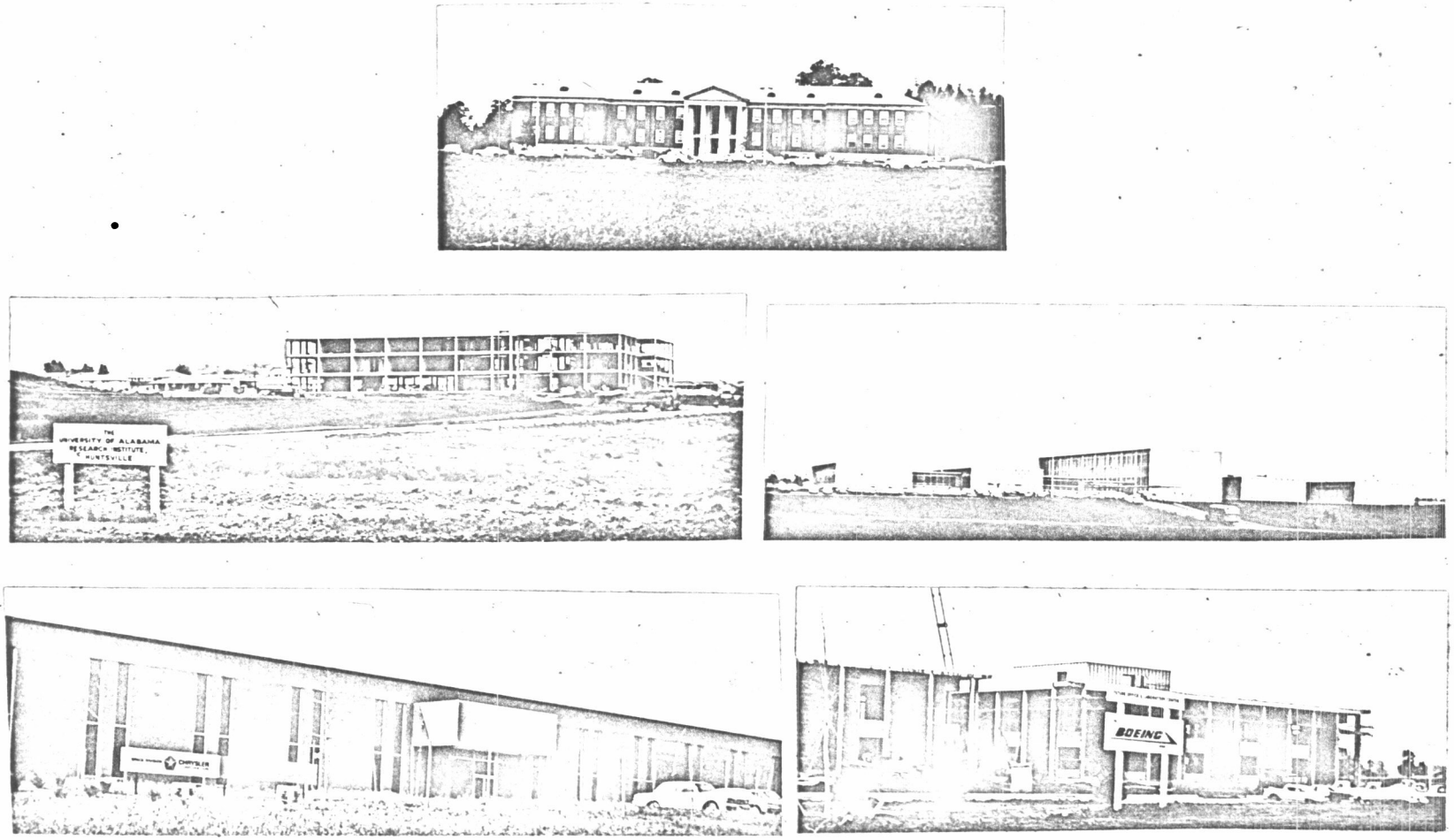
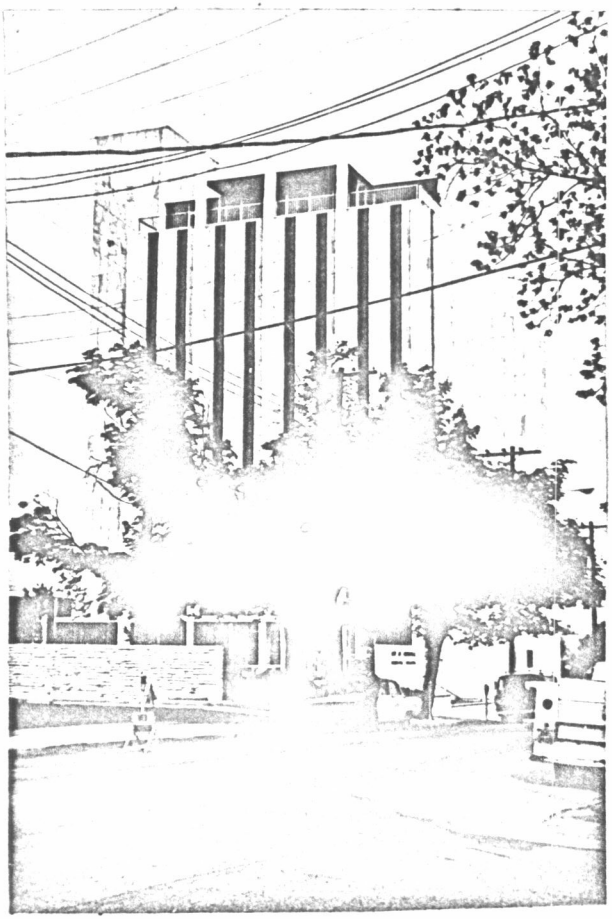


Figure 7.--University of Alabama College and Research Institute in Huntsville, and New Buildings in the Industrial Park.



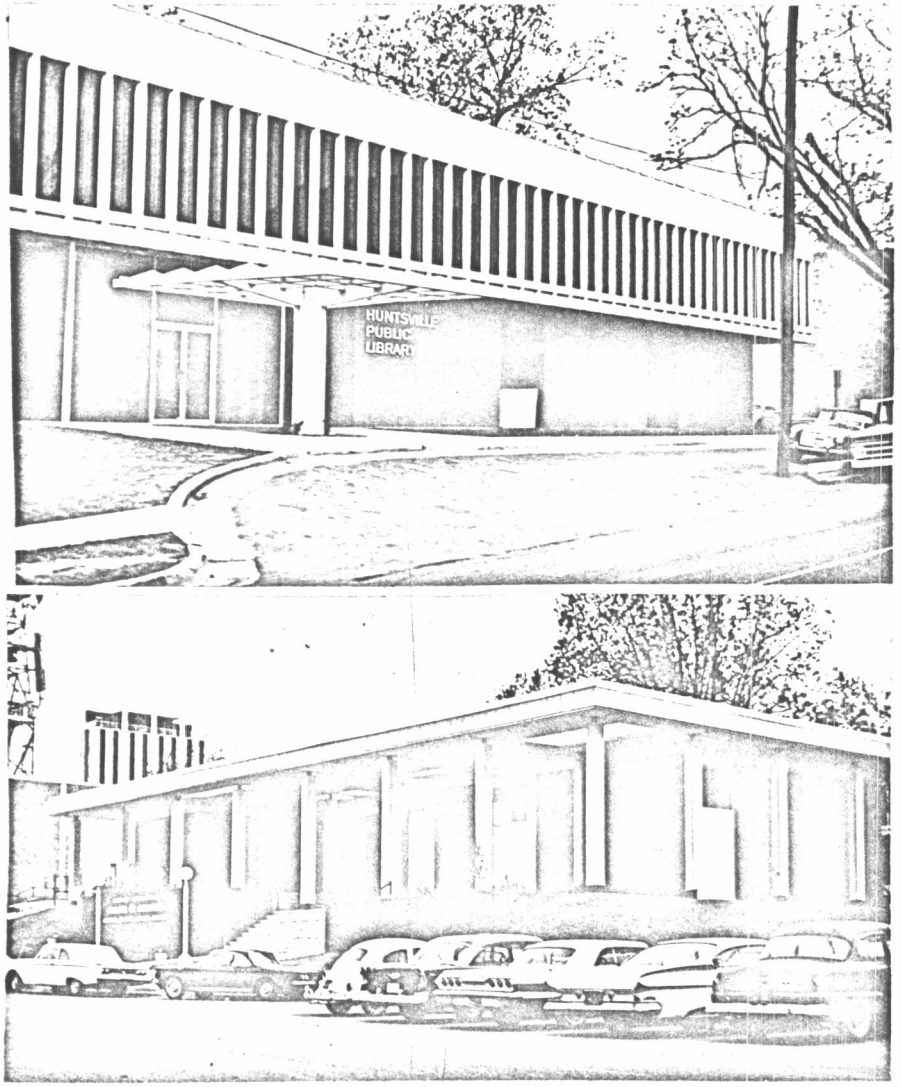
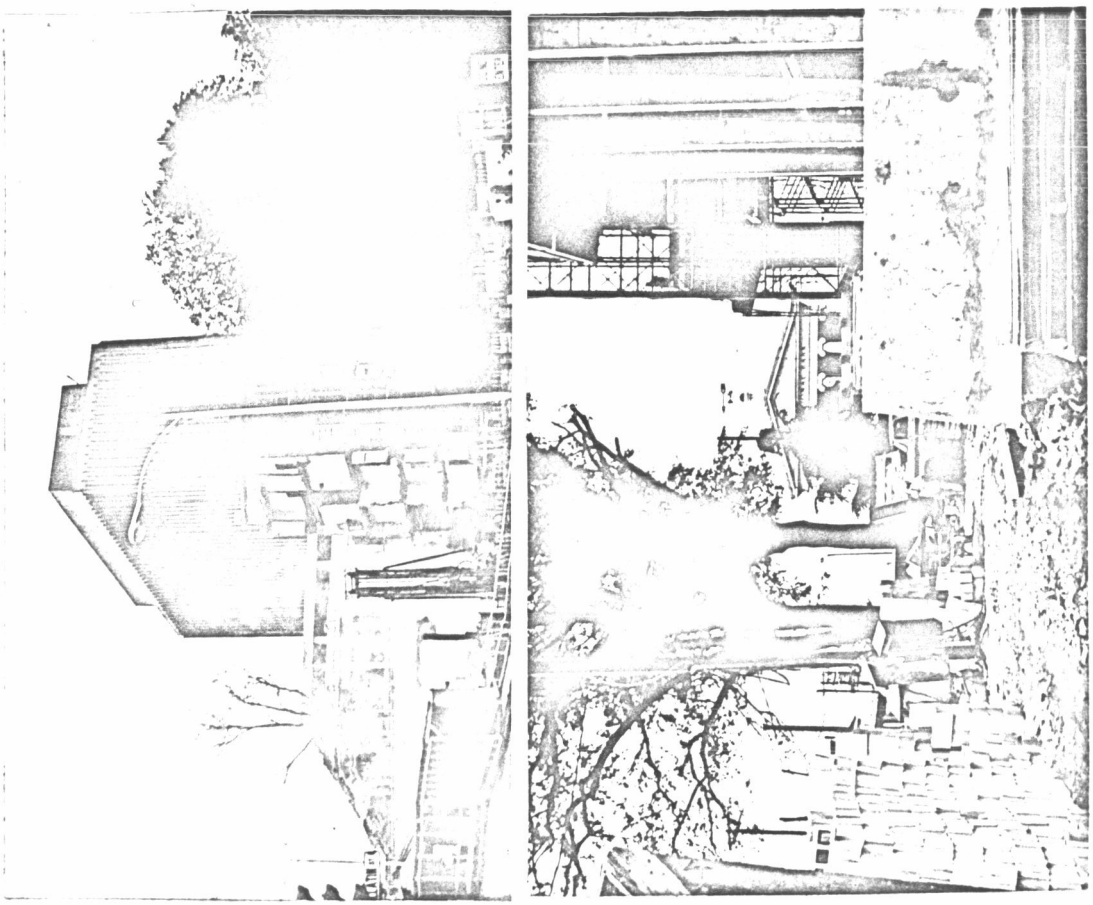


Figure 8.--New Municipal Building, Library, and Chamber of Commerce.



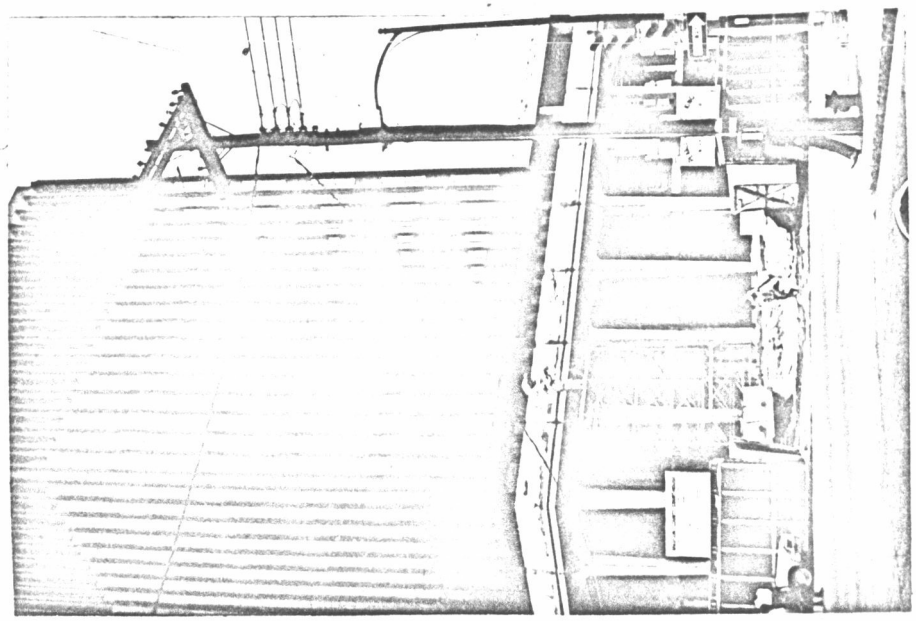
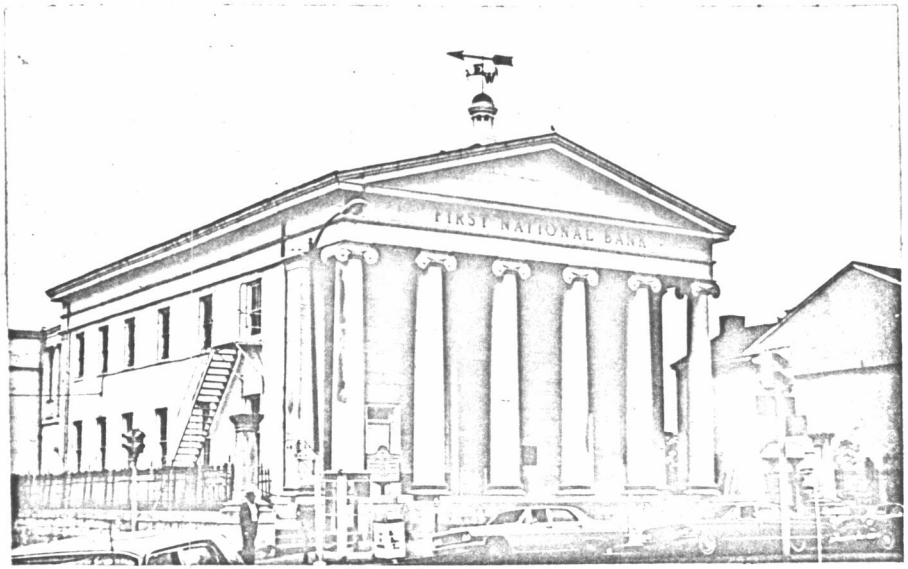


Figure 9.--New County Courthouse.



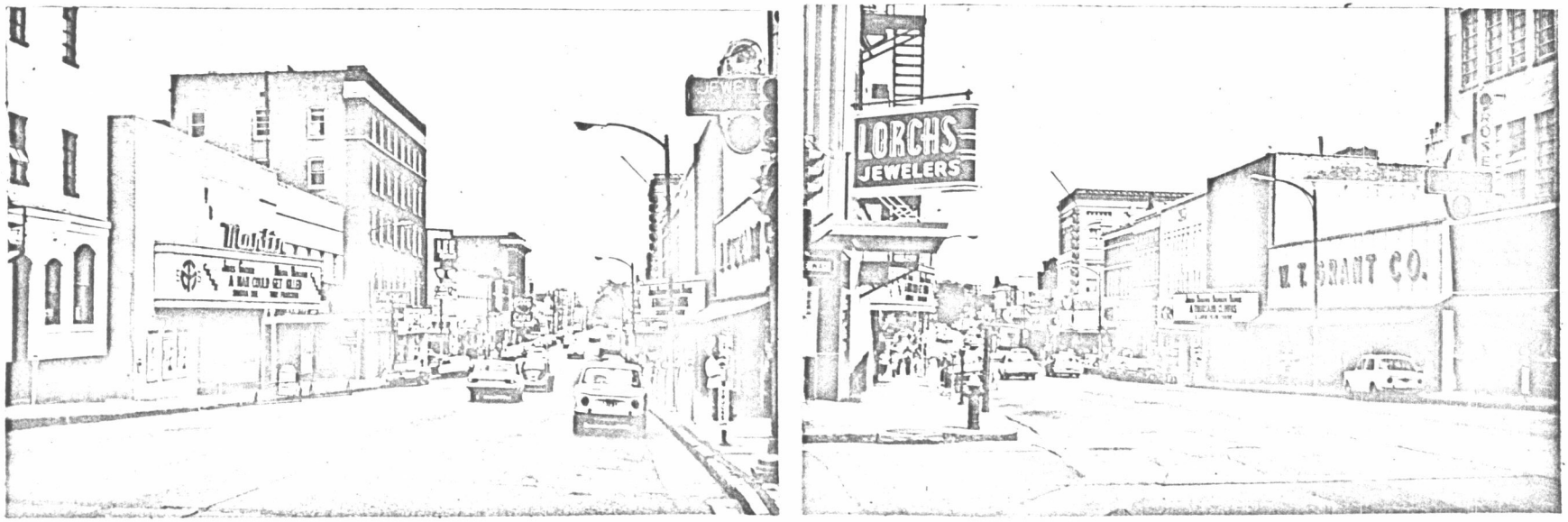


Figure 10.--Historic Central City Bank and "Main Street."

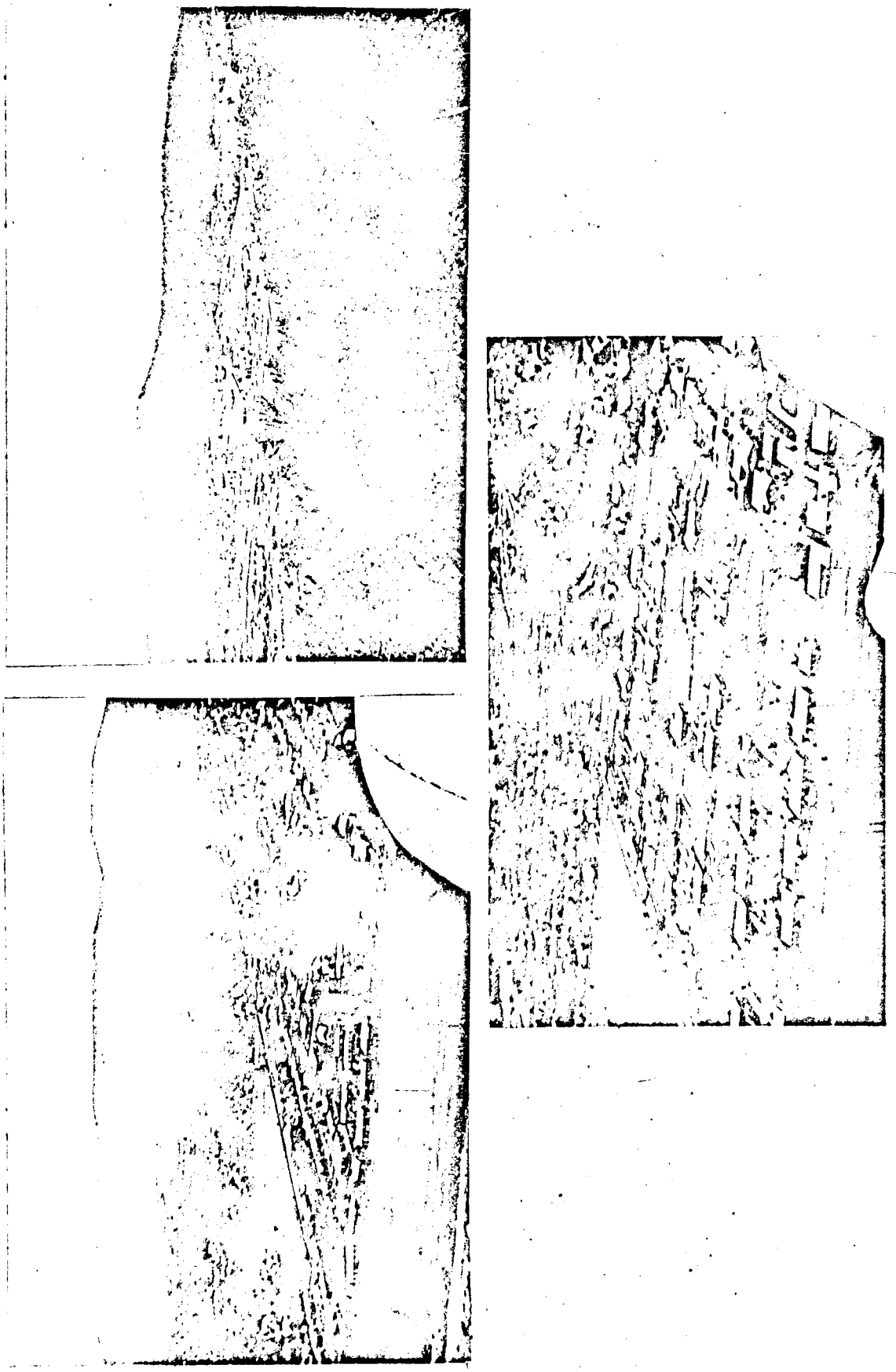


Figure 11.--New Residential Subdivisions.

Figure 12.--Old Historic Southern Homes.

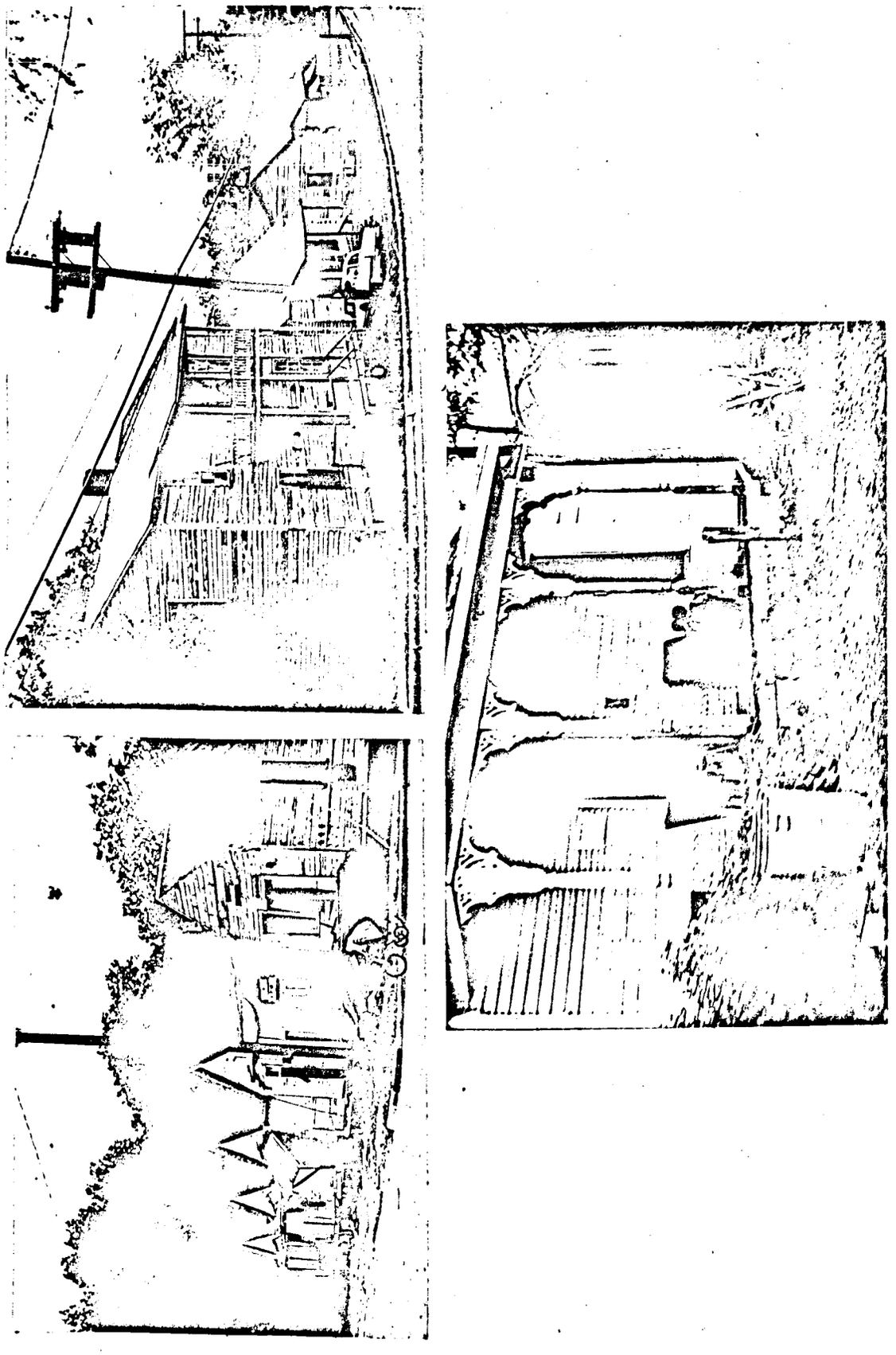


Figure 13.--Slums.

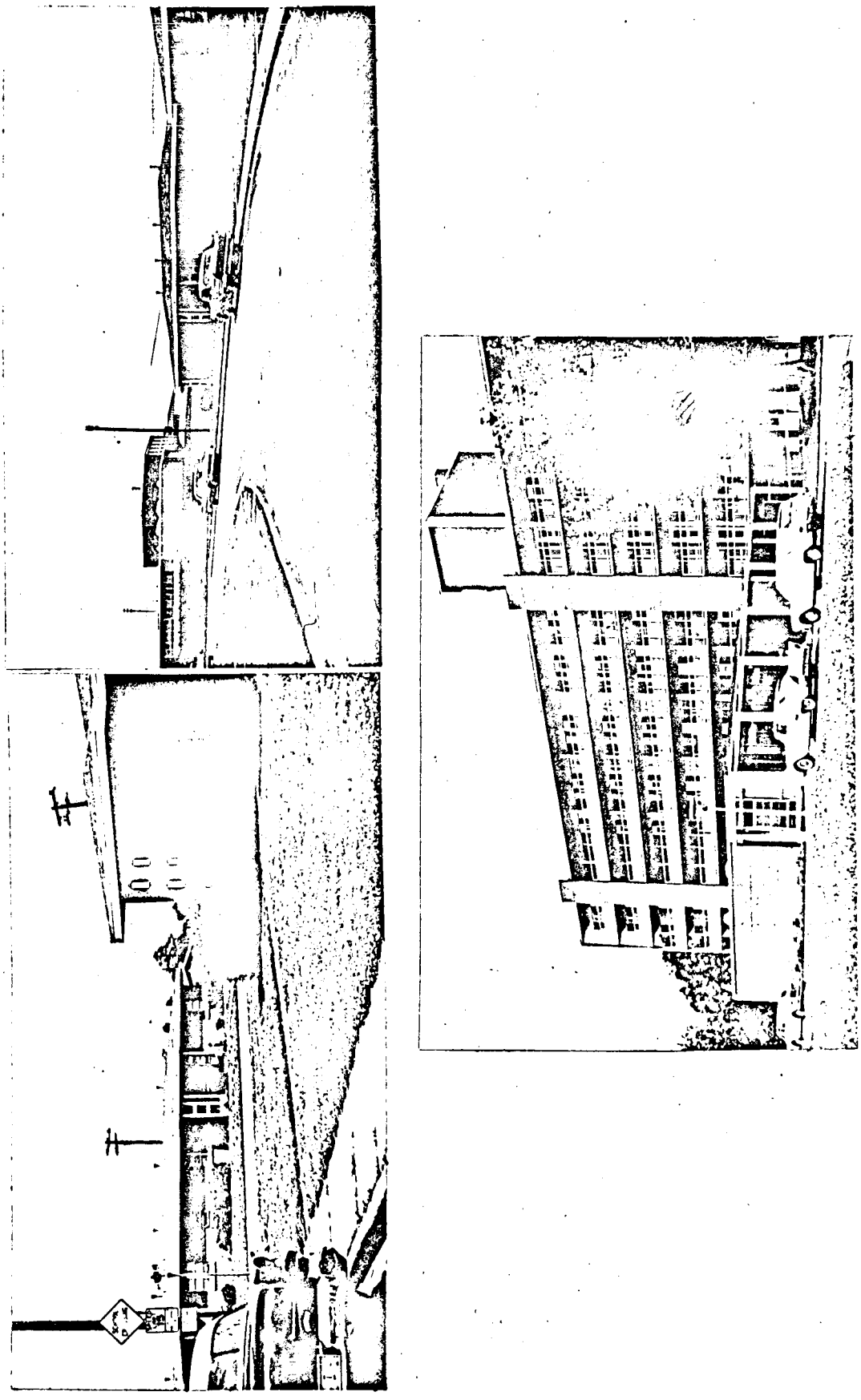


Figure 14.--Public Housing.

County Airport Authority which will own and operate the airport has been given approval by the state legislature to sell and retire bonds for additional funds.[14]

This information highlights the problem of Huntsville's geographic isolation from the rest of the country. If Huntsville wishes to become an educational-industrial-administrative center for space program operations and research, then it will have to greatly improve its accessibility to the rest of the nation. Increasing accessibility means not only lowering transportation cost and time, but mandates improving communication links, Any healthy urban center must provide access to people, places, activities, information, ideas, and access to opportunities.

The predominance of automobile transportation in Huntsville has brought with it the familiar conditions which blight our urban highways. Shopping centers, motels, restaurants, and hotdog stands all crowd the roadbed competing for the best highway locations. The arrival of the automobile in a city whose street pattern was well established before the 1920's, has created major problems. Like other modern day cities, Huntsville has found it difficult to adapt to a world where the automobile is the predominant means of local travel. Space program economic growth has been followed by population growth; and with the people come cars. We can see that a second bridge has been built across the Tennessee river to accomodate the increasing

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[14] Ibid..

traffic. And we can see the neon signs, telephone poles, overhead wires, and vast parking lots which hug the Huntsville highway system. Can these urban blighting influences be controlled? What kinds of morning and evening rush hour traffic jams have been created at specific gates into the Army and NASA installations? What is the scope of the growing traffic problem in Huntsville? And how are highway and street improvements being financed?

Huntsville's higher educational system consists of Alabama Agricultural and Mechanical College and Oakwood Junior College -- both Negro institutions -- and the Huntsville campus of the University of Alabama.[15] In addition, the University of Alabama Research Institute is now under construction in Huntsville. This new research institute is located adjacent to the Huntsville industrial park where several of the aerospace contracting firms are also building plants. It is hoped by Huntsville officials that the clustering of the research institute, the industrial park, the University of Alabama, and the Marshall Space Flight Center will form the nucleus for an education-aerospace-research interdependance which can act as a stabilizing economic and social base for Huntsville's future. However, this objective raises several problems. Are Huntsville's educational facilities and academic atmosphere of sufficient quality to attract the necessary human resources to make Huntsville a first rate science center? Should the indus-

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[15] Huntsville-Madison County Chamber of Commerce, op. cit., See "Higher Education."

trial park be restricted to research oriented firms? And if not, have attempts to attract other industries to Huntsville been successful? Has the presence of a highly skilled and educated labor force attracted particular industries to Huntsville? Are any or all of these approaches going to be successful as means of diversifying Huntsville's economy? And has Huntsville's newly arrived highly educated population significantly changed the educational or cultural climate of the community?

A glance at the pictures of Huntsville's central city area will indicate that some changes are taking place. In contrast to the newly built library and municipal buildings, however, we see that "main street" with its two movie theaters looks as if it belongs to a previous period. The big shopping centers along the highways with their superior ability to handle the automobile shopper have captured most of the retail trade from the older city center.

Huntsville has embarked on a complete central city renewal program in an attempt to revitalize the old city core. The new modern buildings, including the new county court house still under construction, which are all a part of the central business district renewal plan, represent the emergence of a new Huntsville -- modern and forward looking. Will the attempts to breathe new life into the city's core be successful in the face of continuing competition from developing highway and suburban centers? What problems and obstacles were encountered in getting

political and citizen approval for core renewal? How is it being financed? Does the new modern architecture symbolize the dominance of new community attitudes or has it only helped to alienate the oldtimers against the younger newcomers? Have differences between the older residents and the newly arrived scientists and engineers generated value conflicts which have split the community and complicated local governmental decision-making?

The housing situation in Huntsville gives us quite contrasting pictures. We see the new subdivisions, the old southern homes, the slums, and the public housing developments. Housing is always a major problem in any expanding community. The availability of suitable housing at suitable locations as well as related public facilities such as parks, schools, hospitals, police and fire protection, must constitute a major responsibility of local government and therefore a major problem. What types of regulations and what controls have been established to guide residential development? Has NASA had a recruitment problem which can be related to an inability to find adequate housing? Has there been a problem with land speculation? Have new suburban communities been created or has population growth occurred in previously established small villages or towns? Have steps been taken to preserve the older historic homes as local landmarks? Has the availability of water, electricity, and sewer lines retarded residential or industrial development? What has been the role of federal, state, and local government in the financing of housing and public

works? How have racial integration difficulties aggrevated housing problems? And to what extent has racial friction disrupted community social organization creating anxiety and bad feelings between social groups?

These are, of course, only some of the questions which can be asked about Huntsville 1966. And such questions can only be answered by detaied studies which focus on specific aspects of Huntsville's development.

Conclusion

While all of the above problems are properly the result of the space program impact on the community, our task is to show that these problems can be organized, isolated, studied, and understood, not just as community problems, but understood as predictible outgrowths of space program impact. It is toward this end, that I have identified a general sequence of impact stages through which these fine grain problems can be seen as basic responses to development pressures released by space program impact.

Table 2 presents these stages, within which we shall organize the community response information on Huntsville.

While these stages represent only a very crude first step, they point the way toward a general impact planning model and will help to organize our thinking as we proceed in our analysis of the space program impact on Huntsville.

In the following chapters we will proceed to fill in this outline with specific information concerning

TABLE 2

FRAMEWORK OF IMPACT
RESPONSE STAGES

Initial Economic Space Program Impact
Rapid Increases in Population In-migration
Government Response
Increasing Municipal Expenditures
Increasing Revenue Needs
Attempts to Control Growth
Changes in Government Organization
Changes in Local Community Organization

Huntsville's economic, population, and government responses to the space program impact. An understanding of these impact elements will give us the factual basis from which planning for impact must begin.

CHAPTER IV

ECONOMIC CHANGE IN HUNTSVILLE

The economic changes brought about by federal space expenditures in Huntsville constitute an initial stage in community impact response. In this chapter we want to document in some detail the direct economic impact of the space program on Huntsville.

Since 1950, the economy of Huntsville can be divided into two broad sectors, the space economy and the non-space economy. Out of a total employment of approximately 45,000 persons the space sector accounts for 31,000 and the non-space sector for roughly 14,000, not including agriculture which employs between 2,000 and 5,000 persons depending upon the season.[1]

It is estimated, however, that 90% of the wages generated in Huntsville come from the space sector involving approximately 41,000 jobs, 31,000 plus the non-space jobs estimated at 10,000 which are dependant upon the space payroll. These 10,000 non-space jobs are allocated so that of 41,000 jobs linked to the space economy 22,500 are

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[1] The figures used in this chapter refer generally to the 1960-1962 time period, unless otherwise indicated. It is my intent to sketch the broad economic framework of Huntsville rather than presenting a detailed economic analysis.

estimated to be dependant upon Army employment, and 18,500 upon NASA employment.[2]

The space program created jobs in Huntsville. And people came to Huntsville to fill those jobs. Five major elements summarize this economic impact. One, the Army and then NASA actually created jobs where none had previously existed. Two, the NASA installation attracted a clustering of subcontractor firms to Huntsville which provided the community with additional jobs and additional people. Three, these jobs pay wages. And these wages were spent in Huntsville causing a great expansion of the local non-space economy. Four, the weakness of the local non-space industries, continuing urbanization -- rural to urban migration, and the wage structure differential, attracting labor to space firms at the expense of non-space firms, brought about continuing increases in population while at the same time increasing the economic dominance of the space sector. And last, we see that the people who were drawn to Huntsville by the space economy are people with college and post-graduate college degrees.

Space Economy

Since the establishment of the Marshall Space Flight Center (MSFC), in 1960, the space sector of Huntsville's economy has beçome divided into three parts, the Army,

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[2]Huntsville City Planning Commission, Huntsville, Alabama Population and Economy: Analysis of Growth Potential, Report 2, prepared by Hill and Adley Associates, Inc., Planning Consultants, Atlanta, Georgia (August 1963), pp. 30-32.

NASA, and private aerospace contractors. It is important to realize that the Army and NASA are seperate government operations. Cutbacks in the space program which would affect NASA operations at Huntsville would not necessarily affect the vast Army installations.

The Army Missile Command conducts research and testing of Army land and air defense missile systems. It also trains personnel in conjunction with the Army Ordinance Guided Missile School, located in the Army arsenal at Huntsville, in missile maintenance and support.

The Army Missile Command employs more people than NASA at the MSFC, fluctuating between 16,800 and 17,000 -- variations in employment reflecting short term changes in individual Army projects.[3]

A 1960 study prepared by the Army indicated that the educational background of the Army's civil service and military personnel at Huntsville was high. Nearly 300 people had advanced degrees out of 2,300 college graduates while an additional 2,300 people had some college education. This sums to 4,600 out of an indicated total of 11,794 civil service and military personnel.[4]

Most of the Army personnel manage programs as contrasted to the MSFC where over half of the NASA personnel work directly with actual rocket componants. The Army contracts out entire weapon systems to various prime con-

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[3]Huntsville City Planning Commission, Huntsville Alabama Population and Economy: Background Trends, Report 1, prepared by Hill and Adley Associates, Inc., Planning Consultants, Atlanta, Georgia (July 1963), p. 45.

[4]Ibid., p. 46.

tractors maintaining as its major role the coordination and management of weapon systems development, and the deployment and support of overseas missile forces. Contractor firms, therefore, are not attracted to Huntsville by the Army arsenal since weapons development work is subcontracted by prime contractors from their various locations throughout the country.[5] In-house contractor personnel, however, do contribute to the total Army employment picture as can be seen in Table 3.

The NASA installation at the MSFC functions quite differently. NASA employs research and development personnel directly who work on the development of complete propulsion systems at MSFC in Huntsville. This management style attracts a clustering of services to Huntsville including subcontractor firms whose personnel are thus able to engage in frequent face-to-face discussions and decision-making which NASA's scientists and technicians require. NASA also exerts management control from Huntsville over its installations at Michoud and at the Mississippi Test Area.

The wage structure for government and aerospace contractor employees is quite good. Not only are government civil service grades above southern wage rates in general, but the high proportion of scientific and administrative professional employees, with and without graduate

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[5]Huntsville City Planning Commission, Report 2, op. cit., pp. 15-17.

TABLE 3

ARMY MISSILE COMMAND EMPLOYMENT

	1961	1962	Change, 1961-62 Number	Percent
Civil Service	9,500	9,200	-300	- 3.2
Military	3,300	3,600	300	9.1
Contractor	4,200	3,700	-500	-11.9
Total	17,000	16,500	-500	- 2.9

Source: Huntsville City Planning Commission

degrees, has brought into Huntsville a considerable number of persons whose salaries range from $7,000 to $15,000 per per year. For example, NASA employs at the MSFC in Huntsville over 3,000 professional persons with Bachelor's degrees of which over 280 have Master's degrees and over 85 have Ph.D. degrees.[6]

Employment at MSFC has increased rapidly since 1960, with the expansion of the Saturn space vehicle program, to approximately 7,000 persons in 1963. Tied to MSFC by NASA subcontracts are over twenty-five aerospace firms with employment around 10,000, half of which are employed directly on the arsenal, in-house contractor personnel, and half at company plant locations in Huntsville.[7] The NASA employment picture can be seen in Table 4.

In summary, the statistical material is somewhat inconsistant depending on how the in-house contractor workers are divided. In general, however, it is adequate for our purposes to know that the direct space related employment in Huntsville by the Army approximates 17,000, by NASA 10,000 and by contracting aerospace firms 4,000 giving us an estimated 31,000 jobs tied directly to the space economy, to which must be added an additional

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[6]Huntsville-Madison County Chamber of Commerce, Huntsville Industrial Expansion Committee, Information Kit: Facts and Figures on Living in Huntsville, Madison County, Alabama (Litho. in U.S.A., 1964), see sheet "Industrial and Business Growth."

[7]Huntsville City Planning Commission, Report 1, op. cit., p. 48.

TABLE 4

EMPLOYMENT AT MARSHALL SPACE FLIGHT CENTER

	Civil Service	Contractor Personnel	Total
1960	4,500	800	5,300
1961	5,700	1,500	7,200
1962	6,600	2,100	8,700
1963 (Projected)	7,000	3,100	10,100

Source: Huntsville City Planning Commission

10,000 non-space jobs which are considered directly dependant upon space employment wages.[8] We can thus consider 41,000 jobs to be dependant upon the space economy.

Non-Space Economy

The non-space economy not including agriculture is summarized in Table 5.

We can immediately see that those groups with significant growth are retail trade; business, repair, and personal services; and construction precisely those industry groups tied to the increase in population brought about by the expanding space economy. The rest of the non-space industrial sector is relatively weak.

The long standing trend of declining employment in the textile industry has continued, in spite of a short lived improvement in 1950 at the beginning of the Korean War. With the closing of the Lincoln Mills in 1957, textile employment dropped from about 700 to 100 persons; and today only one small textile mill remains, the Huntsville Manufacturing Company.[9]

Among non-durable manufacturing, other than textiles, the food processing and printing and publishing industries appear to be growing, together adding over 400 jobs between 1950 and 1961. However, the relative growth of durable goods manufacturing is somewhat better. Due to low

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[8]Huntsville City Planning Commission, Report 2, op. cit., p. 30.

[9]Huntsville City Planning Commission, Report 1, op. cit., p. 11.

TABLE 5

EMPLOYMENT IN SELECTED INDUSTRY GROUPS,
MADISON COUNTY

	Employment	Percent of Total
Retail Trade	4,361	30.2
Wholesale Trade	893	6.2
Finance, Insurance and Real Estate	707	4.9
Business, Repair and Personal Services	5,076	35.1
Transportation, Communication and Public Utilities	919	6.4
Printing and Publishing	146	1.0
Construction	2,345	16.2
Total	14,447	100.0

Source: Huntsville City Planning Commission

electrical power costs and the business generated by the space economy, durable goods employment has doubled between 1950 and 1961. What is important to note as one looks at these changes in Tables 6 and 7, is that the actual numbers of jobs belonging to the non-space manufacturing sector is very small when compared with the numbers of people employed by the aerospace industries.

Huntsville's non-space manufacturing wage rates are relatively low compared with the wages in the space sector. At the government installations wage rates are set by a Wage Board and are very close to private aerospace contractor wage rates in order to discourage job switching from government to private industry. These wage rates average about 30% higher than those paid by local non-space companies.[10] With company managerial personnel excluded, 17% of Huntsville's non-space workers are unskilled and earn under $3,100, 61% are semi-skilled earning between $3,100 and $3,950, and 22% are skilled earning over $3,950.[11]

The wage rate differencial has created a situation where unskilled workers will gain early years of experience at the local non-space companies and then switch to space jobs. Local low wage firms have become a training ground for many unskilled workers.[12] This has most certainly

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[10] Ibid., p. 10

[11] Ibid., p. 5.

[12] Ibid., p. 4.

TABLE 6

EMPLOYMENT IN NON-DURABLE MANUFACTURING INDUSTRIES EXCEPT TEXTILES, MADISON COUNTY

Industry	1950	1961	% Change 1950-61
Food Processing	146	516	253
Printing and Publishing	72	146	103
Leather	582	796	37
Chemicals	387	263	-32
Other	72	54	-25
Total	1,259	1,774	41

Source: Huntsville City Planning Commission

TABLE 7

EMPLOYMENT IN DURABLE GOODS INDUSTRIES, MADISON COUNTY

Industry	1960	1961	Number	Percent
Lumber	106	151	45	42
Furniture	78	62	34	121
Stone, Clay and Glass	84	175	91	108
Primary Metals	-	52	52	-
Fabricated Metals	201	370	169	84
Machinery	301	296	-5	-2
Electrical Machinery	-	342	342	-
Other	-	27	27	-
Total	720	1,475	755	105

Source: Huntsville City Planning Commission

weakened the non-space manufacturing sector of the economy to the benefit of the space sector. And the fact that relatively few people are employed in non-space manufacturing, perhaps as few as 3,000, means that the flow of federal money into Huntsville's space facilities controls not only most of the jobs, but even more significantly the high paying jobs and, therefore, probably over 90% of the wage generating capacity of the economy.

The rapid growth of Huntsville is reflected in the rapid growth of the construction industry. Responding to the need for new homes and schools the industry jumped in employment from 245 to almost 3,000 persons between 1950 and 1962, as indicated in Table 8.

Retail sales also reflect the population growth in Huntsville jumping from $18 million to $64 million between 1948 and 1962, an increase of over 250%. The growth in sales has responded to the change in Huntsville from a low wage textile community to a large prosperous city where individual incomes rose as fast as the population. The growth of Huntsville also transformed it into a regional market center drawing many shoppers from adjacent counties.

With increased population and increased per capita spending the automobile began to play its role. In 1948 a car was not a necessity because the city was small and compact. But with the expansion of arsenal employment,

TABLE 8

CONSTRUCTION EMPLOYMENT
IN THE HUNTSVILLE AREA

Year	Employment	Year	Employment
1950	245	1956	1,145
1951	295	1957	1,738
1952	452	1958	2,132
1953	465	1959	2,736
1954	610	1960	2,209
1955	952	1961	2,345
		1962*	2,797

* April thru June.

Source: Huntsville City Planning Commission

this changed. Automobile commuting to the Army Missile Command and to the MSFC was and is a necessity; and with increasing real personal income the people of Huntsville began to buy cars. Automotive sales jumped 268%, a new parkway was built and three shopping centers were quick to rise among its right-of-way. The Huntsville CBD became a symbol of the past as retail sales shifted to the highway shopping complexes, which with their improved access and auto orientation became the hub for regional shopping. The establishment of Huntsville as a regional shopping center along with increases in personal income and population pushed apparel sales up 292% and furniture and appliance sales up 385% between 1948 and 1962.[13]

Wholesale trade also experienced similar growth along with the service trades. In Madison County wholesale trade added roughly 300 jobs by 1958, and finance, insurance, and real estate added another 300 jobs by 1961.[14]

Table 9 indicates changes of employment in business, personal, and repair services. Personal services which include laundries, barber shops, drug stores and similar businesses increased along with population increases. Hotel-motel employment also grew due to the constant flow of government and business executives in and out of Huntsville dictated by the face-to-face communication

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[13] Ibid., pp. 23-26.

[14] Ibid., pp. 27-29.

TABLE 9

EMPLOYMENT IN BUSINESS, PERSONAL,
AND REPAIR SERVICES, MADISON COUNTY

	1956	1961	% Increase
Hotels and motels	187	414	121.4
Personal services	341	478	40.2
Misc. business services	1,260	3,835	204.4
Auto repair, garages	57	127	122.8
Misc. repair services	27	53	96.3
Motion picture	49	62	26.5
Amusement and recreation	44	107	143.2
Total	1,965	5,076	158.3

Source: Huntsville City Planning Commission

requirements of administering and coordinating the complexities of the space program. The miscellaneous business services category refers to certain research and development service laboratories drawn to Huntsville by space-age technological needs. The bulk of the jobs indicated in Table 9 are those which are tied to personal spending; and the personal income of most of the people of Huntsville is in one way or another dependant upon continued space program spending in Huntsville.

Agriculture

Agriculture in Madison County continues to be a stable industry. Changes have, however, been taking place as modern agricultural methods have been adopted. The small farms are disappearing at a rate of five per week either being combined into large commercial farms or being absorbed by the suburban fringe of Huntsville.[15] In general, the small tenant farmer without much money or machinery has lost out economically to the large farms and the residential and industrial developers.

This has led to continued urbanization, which is a familiar phenomenon in this country; the small farmer squeezed off the land by agricultural mechanization and suburban home building, moving into the cities in search of industrial jobs. These people are generally absorbed into the low skilled manufacturing or service jobs of the economy.

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[15] Ibid., pp. 32-35.

Rural to urban migration has been the usual source of people entering the American city; people who are not highly educated, who are not skilled for industrial work, and who are not familiar with the social mores of urban life. During the current period of rapid economic expansion, local problems from this type of rural to urban migration into Huntsville are probably insignificant. What is unusual about Huntsville is the overwhelming in-migration of highly skilled and highly educated people, drawn by the aerospace industry.

Conclusion

Out of approximately 45,000 workers in 1962 the space sector of Huntsville's economy accounted for about 31,000. An additional 10,000 non-space jobs are indirectly linked to the space sector leaving 4,000 jobs, less than 10%, tied to agriculture and non-space manufacturing.

Agriculture, while still strong at the county level, has only a small role to play in Huntsville's economy. In a similar way much of the non-durable manufacturing, textiles, food processing, printing and publishing, have been effected by national trends not local ones. And it is this group which represents less than 10% of the wages generated by the local economy.

On the other hand, construction, retail and wholesale trade, service industries, and some durable goods manufacturing have been directly affected by the space

economy. The space sector plus these non-space industries make up the main thrust of the city's economy, generating 90% of its wages.

The multiplier effect created by the pumping of federal funds into Huntsville's space economy, estimated at 175 million dollars in 1962,[16] can be seen in the unfolding of the following interrelated events.

First, we have the initial establishment of a new industry and new jobs in Huntsville. As these initial space installations grew, they encouraged a clustering in Huntsville of private aerospace firms who provided essential services for NASA's technical operations, creating additional local jobs. The wage rate advantage of these aerospace jobs reinforced by continuing weakness in local non-space industries gradually contributed to the present day dominance of the space program economy in Huntsville.

Secondly, the pumping of federal money into Huntsville's space-age industries created a demand for qualified people to fill available high skilled well paying jobs. At first, both the government and private firms filled many of the jobs by transferring needed personnel to Huntsville from other parts of the country. But as Huntsville's economic growth spread from the space sector to the non-space sector, it also began to draw in new people to fill increasing numbers of non-space jobs.

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[16] U.S. News and World Report, November 12, 1962, p. 73.

Thirdly, the large jump in wages and salaries reflecting the new highly skilled industrial base, multiplied the economic impact as the demand for goods and services coupled with real income purchasing power accelerated the growth of the non-space economic sector.

And lastly, the thrust of the economic impact was concentrated in Huntsville. There were no other local communities to compete for Huntsville's new spending power. Huntsville's relative geographic isolation meant that its growth was not diffused among many centers. The concentration of the impact in Huntsville at a time when it was small, economically depressed, and geographically isolated, meant that its growth potential was high, that this potential would not be weakened by competition from other communities, and that Huntsville's local decision makers -- a group of citizens representing business, real estate, and government -- would be anxious to benefit from this enormous growth potential. Naturally as Huntsville grew it became the dominant regional market place and urban center; and this regional growth componant drew even more people and money from outlying counties into Huntsville.

An additional impact was also quietly taking place. In the 1960-1962 period, the Army and NASA employed between them 7,500 persons who had some college education of which over 5,000 of these had college degrees, including over 600 with Master's and Ph.D. degrees. We can safely estimate that close to 100% of these persons did not live in Huntsville before 1950. This group must have

had a major social impact on the Huntsville community. We shall look at these population changes and others in greater detail in the following chapter.

Huntsville does have some very promising economic assets. It has an abundant industrial water supply, low cost TVA electrical power, a three million dollar University of Alabama Research Center, and a highly skilled labor force. In the last chapter we shall discuss some new approaches which might be utilized to enable Huntsville to acquire a more balanced and stable economy.

Having looked at the economic impact, and having begun to shape from it the general pattern of Huntsville's response, let us now move ahead in order to consider the population changes which have occurred in Huntsville as a result of this economic space program impact.

CHAPTER V

POPULATION CHANGE IN HUNTSVILLE

As we have indicated, the economic impact on Huntsville set in motion multi-variate forces which led to a population increase of 340%, from 16,437 to 72,365 people, between 1950 and 1960. This growth is the outcome of a complex interaction process between the city's space economy and consumer economy, which pushed Huntsville into its present position as one of the major market and urban centers in Alabama.

Accurate information on past, current, and future dimensions of a population which is changing as a result of impact is essential in order to plan for impact. Population projections enable planners to translate numbers of people into land use requirements. From population information planners are able to estimate specific space activity needs necessary for the support of that population, and to plan for the optimum location of future land uses and public facilities. Schools, hospitals, parks, streets, sewers, water, police and fire protection are some of the services supplied by local government in response to local population needs. The inability to anticipate these needs within a framework of planned community development results in increased city infrastructure costs due to the inefficient utilization of public resources.

The problems of rapid uncontrolled community growth are not only costly to government, but in so far as they contribute to an unhealthy and unstable urban environment, represent severe liabilities to the efficient operation of local space program facilities, as well as inflicting costs on individual persons within the community. The inability to receive proper health care, the lack of access to education or jobs, represent costs to individuals which when translated into human feelings and attitudes make a city an unattractive place to live.

In order to plan for Huntsville's future public facility needs, one must examine the city's population growth and characteristics. And of additional importance for this study, an examination of Huntsville's population changes will enable us to understand the city's growth as a componant of space program impact response.

In the following pages we shall examine Huntsville's population growth in considerable detail in an attempt to show how it changed the city and generated demands on local government. Then, in the next chapter, we shall be able to see how Huntsville went about meeting these population pressures; and begin to indicate how the future of Huntsville is dependant upon the ability of government to meet the diverse public needs of the people who live, work, and play in Huntsville.

Population Size

To understand the effects of population growth in Huntsville, it is essential that we have some sense of the importance of size.

To begin with, the scope and intensity of responses and repercussions from impact initiated by the establishment of a space program facility within a community, will depend upon the initial population size of the community or city before impact, as well as the size and characteristics of the space facility and the rate of growth which it generates. For example, if NASA opened a small office in a large urban city such as New York the impact on the city would be very small, other things being equal.[1]

In Huntsville, then, we have the establishment of a large space program facility in a small city. We can measure the size of the NASA-Army installation in terms of its actual physical size, 40,000 acres; its economic size, pumping 175 million dollars a year into Huntsville; and by the population increment which it employes, 31,000 people in 1962. The Army and NASA together directly employed twice as many people in 1962 than the total size of Huntsville's population in 1950. An increase of 340% over ten years signifies the powerful impact on Huntsville, a

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[1]It is important to qualify this statement because there are cases where a seemingly small event may have a vast impact. For example, if one additional person were to visit New York City tomorrow we would not expect any noticeable changes to occur. However, if that one person was the President of the United States, then his impact on the city would be great and quite noticeable.

rate of in-migration of sufficient numbers to overwhelm any initial space program opposition.

Just how small was Huntsville before the space program impact? In 1950 Huntsville ranked fourteenth in population size after the following Alabama cities: Anniston, Bessemer, Birmingham, Decatur, Dothan, Florence, Gadsden, Mobile, Montgomery, Phenix City, Prichard, Selma, and Tuscallosa. In 1960, only the Alabama cities of Birmingham, Mobile, and Montgomery had populations greater than Huntsville and the Huntsville SMSA ranked third after the SMSA's of Birmingham and Mobile.[2]

Huntsville's population growth can be seen in a number of ways. It can be read directly from Table 10 and Figure 15. We see that Huntsville grew 340% between 1950 and 1960 and continued to grow by 70% between 1960 and 1964. The growth in the 14 years since 1950 has been nearly eight times as great as the increase over the previous 100 years. The Huntsville City Planning Commission feels that this growth will continue, and projects the city's population to 200,000 by 1970 and over 300,000 by 1985.[3]

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[2] U.S. Bureau of Census, U.S. Census of Population, Characteristics of Population, I, Alabama, 1950 and 1960. SMSA, Standard Metropolitan Statistical Area, is an area simply defined as a county or counties containing one or more cities of 50,000 or more people, officially established by the U.S. Government Bureau of the Budget. The Huntsville SMSA is coterminous with the Alabama counties of Madison and Limestone.

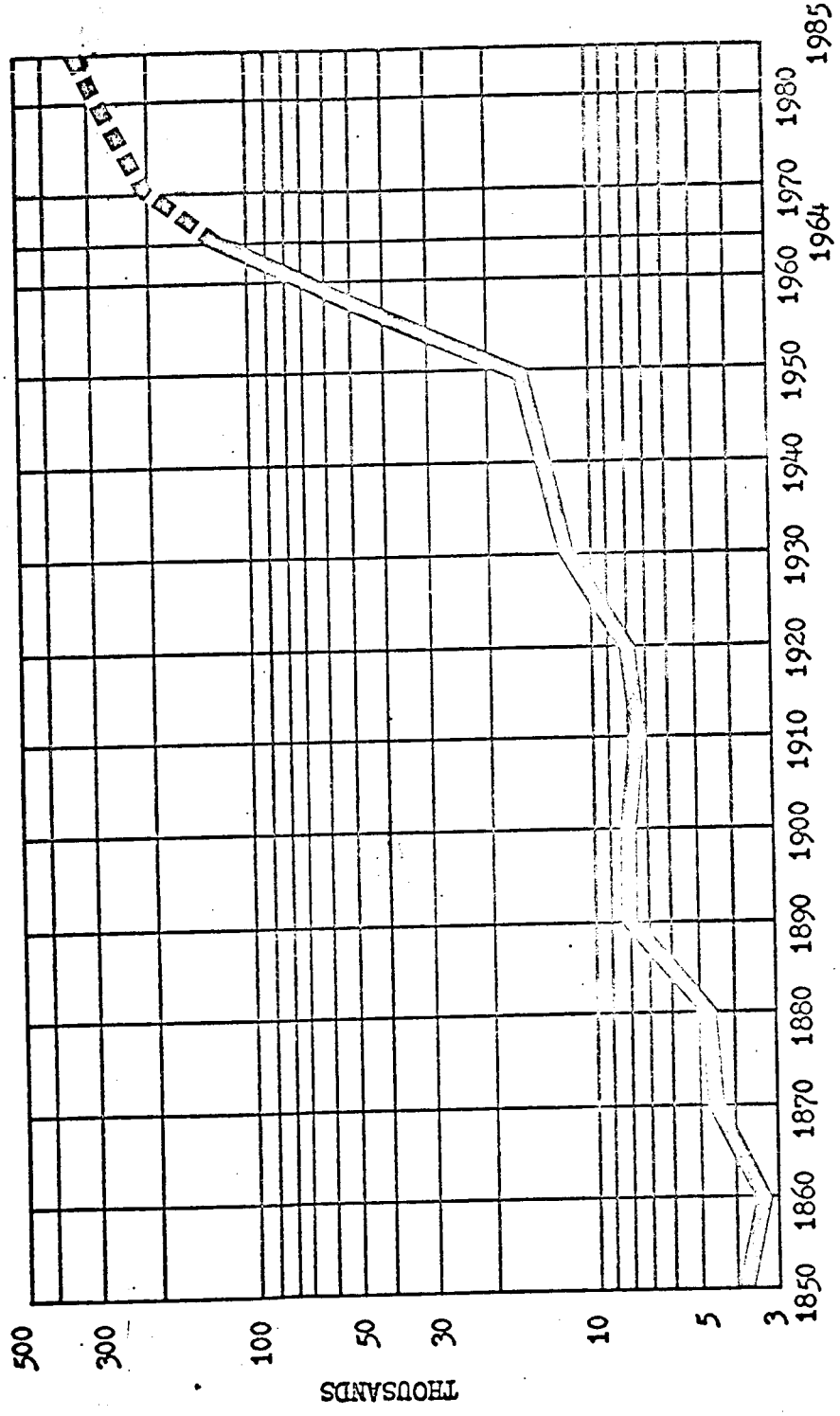
[3] Huntsville City Planning Commission, Population 1964 Huntsville and Madison County, (Huntsville Alabama: March 1965), p. 22.

TABLE 10

HUNTSVILLE POPULATION 1850 - 1985

Year	Population	Increase Over Preceding Census	
		Number	Percent
1850	3,863	-	-
1860	3,634	771	26.9
1870	4,907	1,273	35.0
1880	4,977	70	1.4
1890	7,995	3,018	60.6
1900	8,068	73	0.9
1910	7,611	-457	-5.7
1920	8,018	407	5.3
1930	11,554	3,536	44.1
1940	13,050	1,496	12.9
1950	16,437	3,387	26.0
1960	72,365	55,928	340.3
1964	123,519	51,154	70.7
1970	203,000	79,481	64.0
1975	250,000	47,000	23.0
1980	290,000	40,000	16.0
1985	325,000	35,000	12.0

Source: Huntsville City Planning Commission



Source: Huntsville City Planning Commission

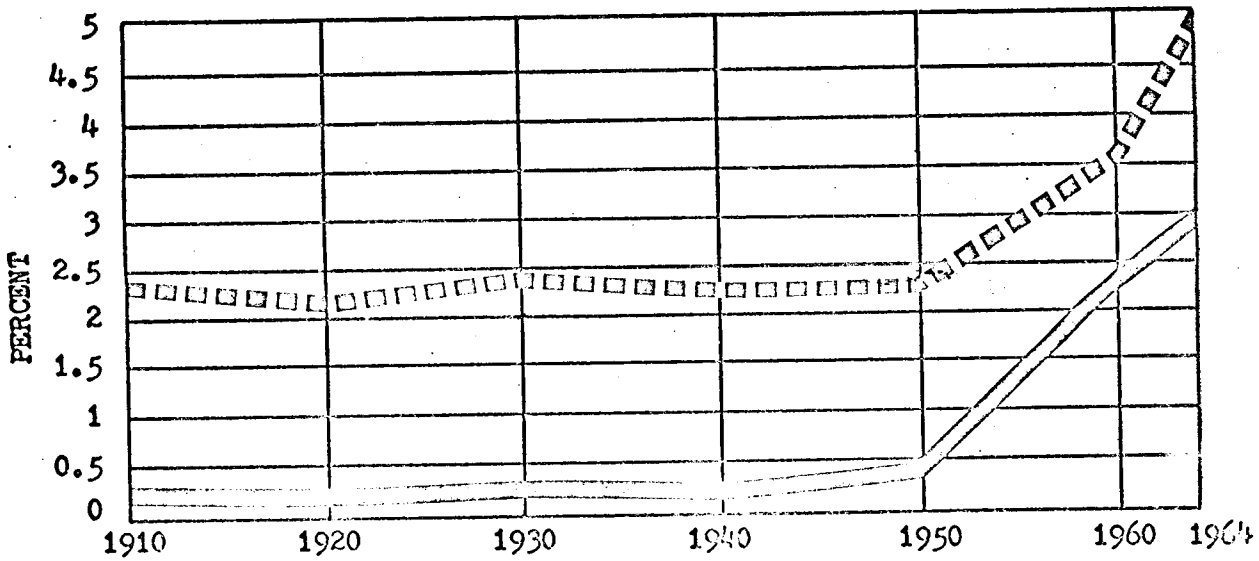
Figure 15.--Huntsville Population 1850-1985.

Another way to view this growth can be seen in Figure 16, which illustrates the growth of Madison County and Huntsville by showing each of their populations as its percent of the total population of Alabama.

As Huntsville grew it became the central urban core of northern Alabama. This central place function has been one of the major factors behind the population growth of the city and the urbanization of the county. This central place function of Huntsville is substantiated by two sets of data, the urbanization of Madison County, and the commuting patterns to Huntsville.

The urbanization of Madison County can be seen in Table 11 and Figure 17, which show that, by 1964, 71% of the people living in Madison County lived within the city of Huntsville.

The distribution of the population which commutes to jobs located in Huntsville can be seen in Figure 18. This map indicates that the three counties of Limestone, Marshall, and Morgan contribute roughly an equal proportion of around 1000 commuters each, Lincoln County Tennessee ranking fourth. A special survey conducted in January 1963 by the Marshall Space Flight Center showed that 73% of their permanent employees lived in Madison County and 94% lived within an estimated 25 miles of MSFC. On the other hand, of those workers commuting to the Army Arsenal only 74% live within 25 miles of the arsenal. It seems that the newer professional people recruited nationally to work for



Source: Huntsville City Planning Commission

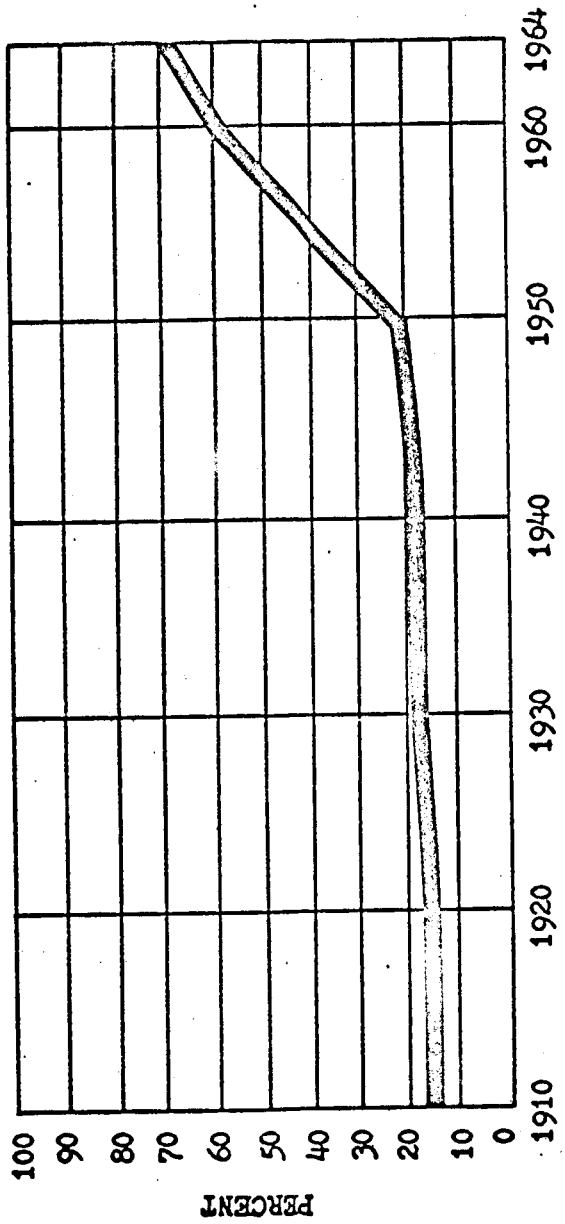
Figure 16.--Comparative Population Growth as a Percentage of Alabama.

TABLE 11

URBANIZATION OF MADISON COUNTY

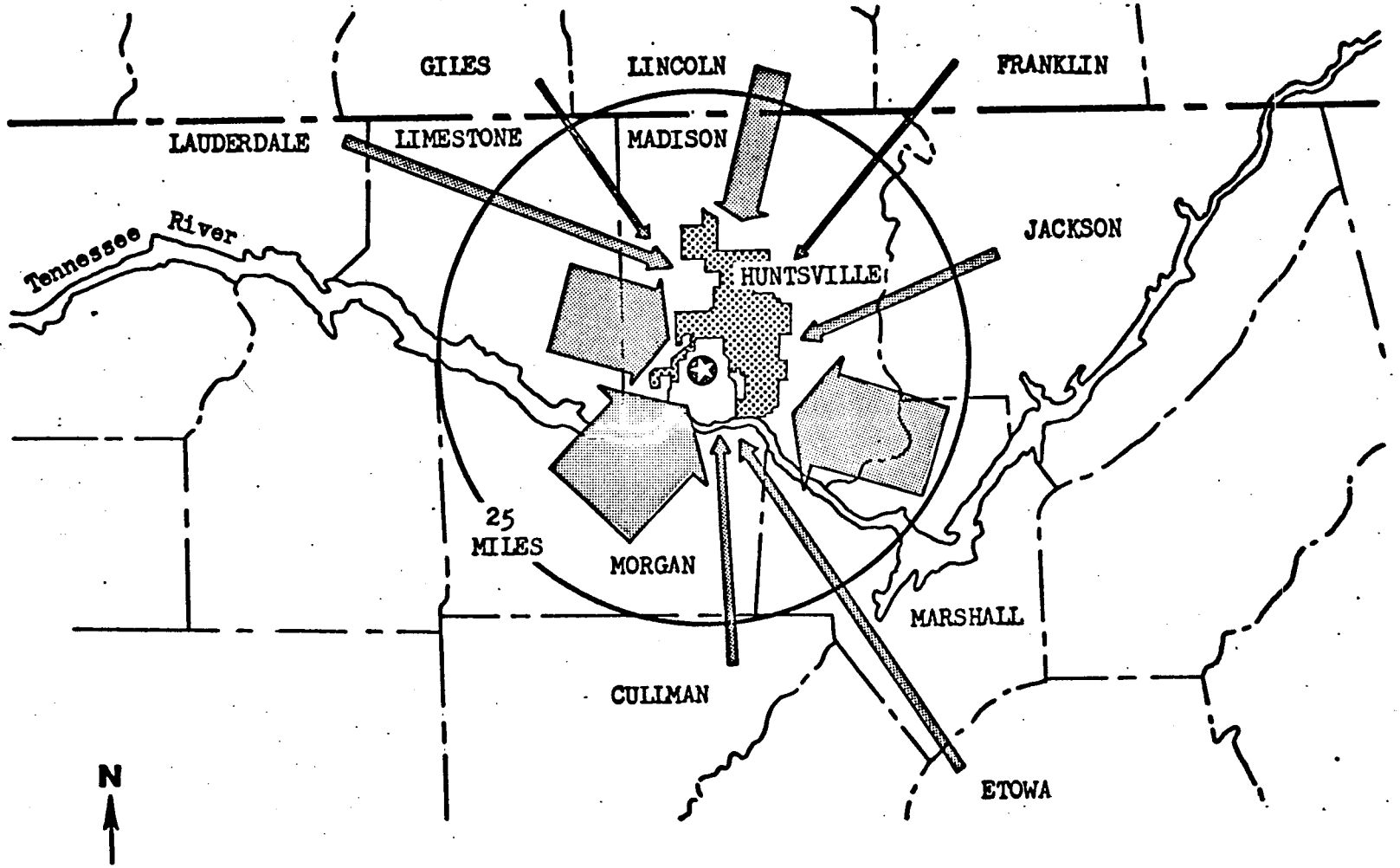
Year	Population	Per Cent Increase	Percent living in Huntsville
1930	64,623	-	17.9
1940	66,317	2.6	19.7
1950	72,903	9.9	22.5
1960	117,348	60.9	61.7
1964	173,285	44.7	71.0

Source: Huntsville City Planning Commission, and U.S. Bureau of Census, Special Census of Madison County, Alabama, 1964.



Source: Huntsville City Planning Commission

Figure 17.--Huntsville's Population Percentage of Madison County.



Source: Huntsville City Planning Commission

Figure 18.--Commuting Pattern to the Marshall Space Flight Center.

NASA at the MSFC have settled largely in the city of Huntsville, the urban center of the region; while the blue collar workers recruited locally have rural family ties in the region and in general commute to Huntsville from much greater distances. The Army arsenal apparently employs a larger percentage of these local workers.[4]

This brings us to a more detailed look at the componants which make up Huntsville's population growth. Population growth results from both migration and natural increase. Natural increase has contributed substantially to the county population. While the number of deaths has remained relatively stable, the number of births has increased steadily since 1950, adding 31,474 persons between 1950 and 1964. Since the actual county population was 173,285 in 1964, the net in-migration was the difference or 141,811 people between 1950 and 1964. See Tables 12 and 13 following.

These three sets of data, urbanization, commuters to Huntsville, and natural increase indicate that the vast majority of the 141,811 migrants to Madison County, between 1950 and 1964, were mostly the professional college graduates who were recruited nationally to work for NASA and the Army and who moved into the city of Huntsville accounting for the rapid urbanization of the county. In

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[4] Huntsville City Planning Commission, Huntsville, Alabama Population and Economy: Analysis of Growth Potential, Report 2, prepared by Hill and Adley Associates, Inc., Planning Consultants, Atlanta, Georgia (August 1963), pp. 13-15.

TABLE 12

POPULATION OF MADISON COUNTY

Year	Number of Persons	Increase	
		Number	Percent
1910	47,041		
1920	51,268	4,227	8.9
1930	64,623	13,355	26.0
1940	66,317	1,694	2.6
1950	72,903	6,586	9.9
1960	117,348	44,445	60.9
1964	173,285	55,937	44.7

Source: Huntsville City Planning Commission

TABLE 13

NATURAL INCREASE IN MADISON COUNTY

Year	Number of Births	Number of Deaths	(Births Minus Deaths) Natural Increase
1950	1,952	680	1,272
1951	2,140	652	1,488
1952	2,158	697	1,461
1953	2,154	692	1,462
1954	2,206	629	1,577
1955	2,209	564	1,645
1956	2,173	597	1,576
1957	2,115	666	1,449
1958	3,003	686	2,317
1959	3,396	698	2,698
1960	3,477	735	2,742
1961	3,613	762	2,851
1962	3,673	784	2,889
1963	3,995	796	3,199
* 1964	3,206	658	2,848
Total	41,470	10,296	31,474

* January through September
Source: Huntsville City Planning Commission

other words, we do not have in Huntsville a case of extensive rural to urban migration, but a case of professionals migrating from one urban area to another. This is a relatively new phenomena which we are beginning to experience more and more in this country and which is expected to make up the major migration flows within the United States, replacing the traditional rural to urban patterns predominant during industrialization.

This is perhaps one of the most important features which can be attributed to space program impact as distinguished from other economic impacts. The establishment of a NASA installation in an area creates a professional middle class migration from other urban areas in the country to that urban community which is nearest to the NASA location. In the Huntsville case, this migration changed Madison County into an urban county.

One of the most interesting aspects of this migration to Huntsville, is the way in which the southern cultural mystique has acted as a selective and adaptive force. The large majority of the newcomers to Huntsville, professionals, white collar workers, and even some blue collar workers, have apparently come from the southeastern states, where the pull from Huntsville's growing economy is clearly most influential; while many others are southerners who have returned to the South from jobs

or universities throughout the country.[5] Jobs in the South apparently have a stronger attraction for southerners than non-southerners.

This is a particularly important factor because it may partially explain why a drastic increase in the numbers of middle class professionals in Huntsville has not generated overwhelming changes in the cultural or attitude structure of the community. The social and political history of the South has generated a national image of the South, well known to all Americans, which has acted and continues to act as a selective migration factor. Recent political events in the South will undoubtedly effect the recruitment power of the Marshall Space Flight Center. With Mrs. Wallace as the Governor of Alabama, George Wallace running for the President of the United States on a third party ticket, and the prospect of Lester Maddox as Governor of Georgia, it is not likely that professional people from the North will be easily convinced that their stereotyped feelings about the "old" South are out of date.

It is also interesting to note that no social-political image of the South existed for the original German scientists who settled in Huntsville in 1950. And today, it is still these scientists who form the nucleus of the scientific expertice which is essential to the success of the NASA mission at the Marshall Space Flight Center.

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[5]Huntsville City Planning Commission, Huntsville, Alabama Population and Economy: Background Trends, Report 1, prepared by Hill and Adley Associates, Inc., Planning Consultants, Atlanta, Georgia (July 1963), p. 57.

Now let us turn to the detailed information on Huntsville's population characteristics.

Population Characteristics

The following population material will detail two aspects of Huntsville's growth; one, further evidence which substantiates the fact that Huntsville's newcomers were predominately young, well educated, White families, who were well paid by professional space related jobs; and two, that a proportionately decreasing Negro minority has been completely bypassed by Huntsville's rapid economic growth.

The age-sex population pyramid, Figure 19, for the years 1950, 1960, and 1964 reveals a number of interesting factors. We can clearly see the increasing numbers of people in the 25 to 34 age span indicating that this is the group which has been migrating into Huntsville to meet the city's labor force needs. Also evident is the small percentage of persons in the teenage and old-age groups. In contrast the numbers of pre-school and elementary school age children are large and have been increasing.[6]

Between 1950 and 1960 the median age of Huntsville's population had declined by 4.7 years, indicating again the influx of young families into the city. In this same period the number of school age and pre-school age children

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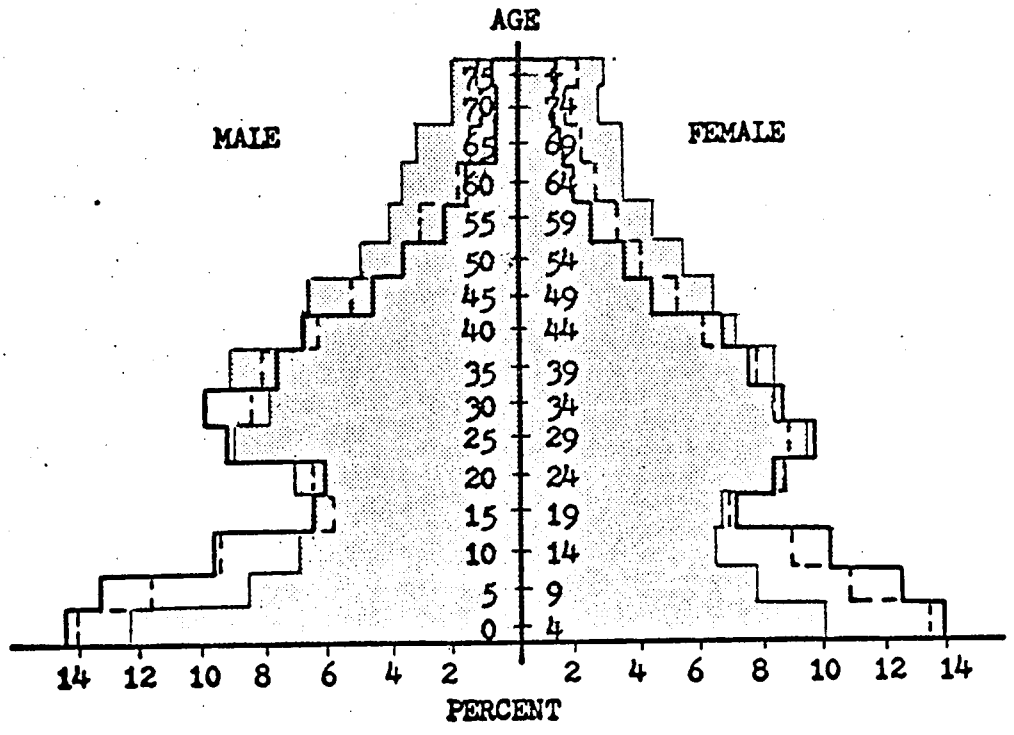
[6]Huntsville City Planning Commission, Report 1, op. cit., pp. 58-59.



Source: Huntsville City Planning Commission

Figure 19.--Population Pyramid of Huntsville 1950, 1960, 1964.

increased by 462%, which vividly explains why the Huntsville school system has been expanding its facilities at a rate of one new class room a week over the past ten years.[7]

The influx of new people into Madison County and Huntsville, drawn by the aerospace research and development industries has greatly increased the educational level of the population, as indicated by Table 14. The average number of school years completed for the Madison County population rose from 7.5 to 10.8 between 1950 and 1960, while the average in Huntsville's urban fringe was 14.5 years completed.[8]

Income levels also increased dramatically with the addition of space science personnel to Huntsville's population. Table 15 clearly shows this jump. Median family income climbed 166% between 1950 and 1960 from $2,370 to $6,386 per year.[9]

Huntsville's decreases in the proportion of farm workers to white collar professional, technical, clerical, and personal service workers mirror changes in local education and income levels.[10] Declines in unskilled jobs and vast increases in the number of highly skilled space-age jobs has created a differencial migration which has

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[7] Ibid.

[8] Ibid., p. 60.

[9] Ibid., p. 62.

[10] Ibid., p. 65

TABLE 14

NUMBER OF SCHOOL YEARS COMPLETED
BY PERSONS 25 YEARS AND OVER, MADISON COUNTY

	School Years Complete 1950	1960	1950-1960 Percent Change
No school years completed	3.8	2.0	- 1.8
1 - 4 years	21.4	11.0	-10.4
5 - 8 years	38.1	26.4	-11.7
9 - 11 years	15.7	17.6	+ 1.9
12 years	11.9	23.0	+11.1
13 - 15 years	4.4	9.0	+ 4.6
16 and over	3.0	11.0	+ 8.0
Total	100.0	100.0	

Source: Huntsville City Planning Commission

TABLE 15

PERCENTAGE DISTRIBUTION OF FAMILIES
BY INCOME RANGES, HUNTSVILLE AND ALABAMA

Income Range	Huntsville 1949	Huntsville 1959	Alabama 1959
Under $1,000	20.8%	5.2%	12.7%
$1,000 - $1,999	21.3	7.4	13.9
$2,000 - $2,999	18.0	7.5	12.5
$3,000 - $3,999	15.1	8.1	11.7
$4,000 - $4,999	10.7	9.3	10.9
$5,000 - $5,999	5.3	9.7	10.0
$6,000 - $6,999	3.0	9.3	7.8
$7,000 - $9,999	2.7	22.6	12.6
$10,000 and over	3.0	20.9	7.9

Source: Huntsville City Planning Commission

altered the occupational structure of Huntsville, bringing into the city highly educated people to fill well paying skilled white collar jobs.

The racial characteristics of the population have also undergone some changes, as can be seen in Table 16. The proportion of the population which is non-white has been steadily declining. In a strange way, this is the result of no-change creating change. The Negro population has remained generally stable. Very few Negroes have participated in the large scale in-migration of persons to Huntsville. In fact 92% of the Negroes living in Huntsville in 1960 lived somewhere in Madison County in 1955.[11]

The Negro population has traditionally lived in rural county areas; but with the demise of the small farm in Madison County, there has been a continuing rural to urban migration. This local migration plus natural increase accounts for most of the non-white population in Huntsville.[12]

Population pyramids for 1960 and 1964 by race, Figure 20, show clearly that the Negro population has not directly participated in Huntsville's space-age boom. While the 25-34 age-sex cohorts show the in-migration of Whites to aerospace jobs, the same non-white cohorts show little change.

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[11] Ibid., p. 66.

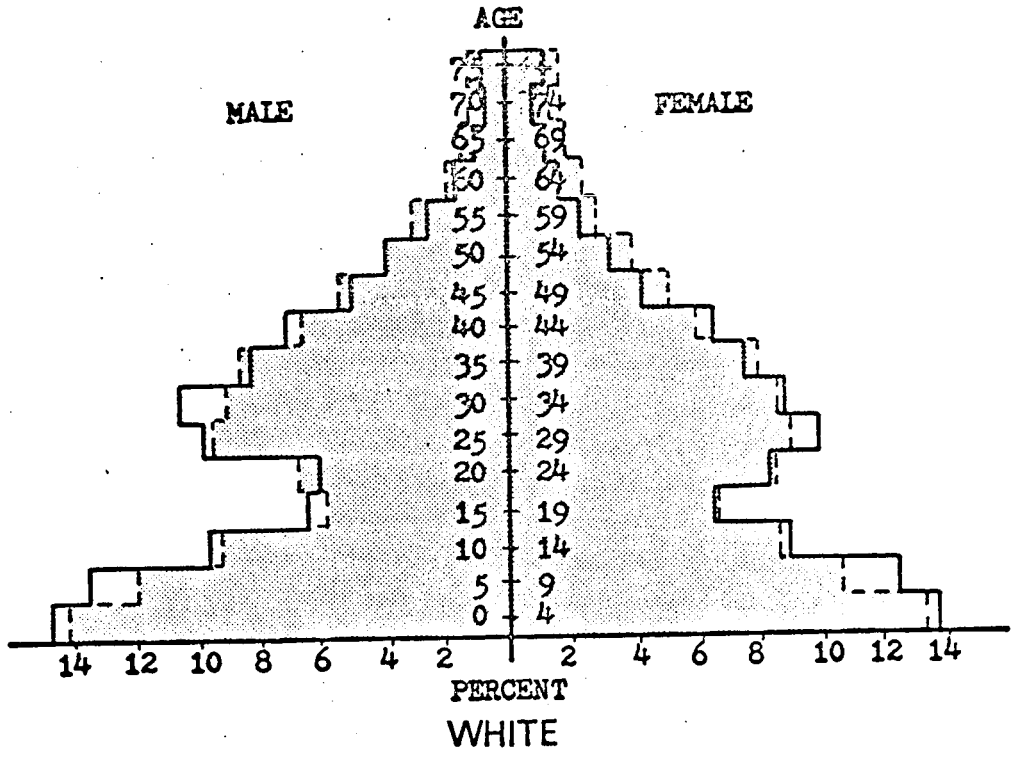
[12] Ibid..

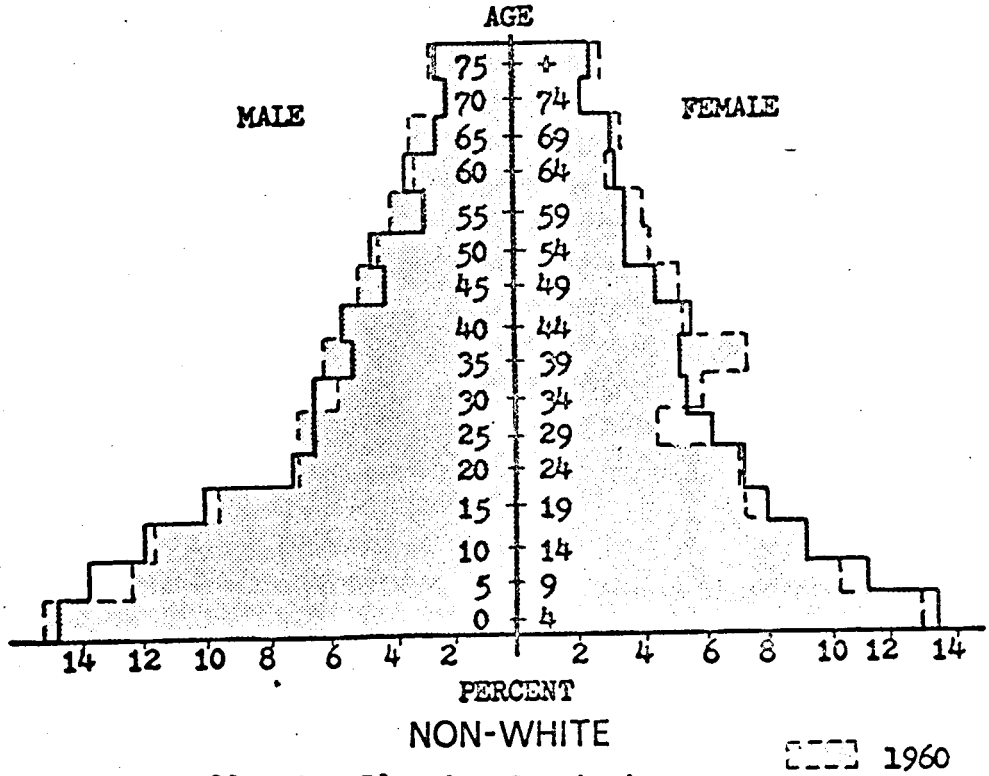
TABLE 16

POPULATION OF HUNTSVILLE, TOTAL AND NON-WHITE

Year	Total	Non-White	Percent Non-White
1930	11,554	3,825	33.1%
1940	13,050	4,715	36.1
1950	16,437	5,250	31.9
1960	72,365	10,091	13.9
1964	123,519	11,560	9.4

Source: Huntsville City Planning Commission, and U.S. Bureau of Census, Special Census of Madison County, Alabama, 1964.





Source: Huntsville City Planning Commission

Figure 20.--Population Pyramids of Huntsville 1960 and 1964 by Race.

The separate and not equal aspects of the Negro community also can be seen in the education and income statistics. The average number of school years completed by the non-white population of Huntsville in 1960 was 7.3 years as compared to 11.8 for the total population.[13] And Huntsville's non-white family median income was only $2,457 in 1959 as compared to the 1959 family median income for the total population of Huntsville of $6,386.[14]

The Negro community has not participated equally with the White community in reaping the benefits of Huntsville's growing economy.

Conclusion

In general, the population push into Huntsville was made up of young White middle class families well educated and well paid by space related jobs in Huntsville. They came predominantly from urban areas in the southeastern part of the country to a city which prior to 1950 was a small depressed rural southern town, and in doing so completely altered its population make-up.

The dynamics and magnitude of this change, which pushed Huntsville into the position of being the third largest urban center in the state of Alabama, raises many questions. Among some of these questions which we have

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[13] Ibid., p. 67.

[14] U.S., Bureau of the Census, U.S. Census of Population: 1960 Characteristics of Population, I, Part 2, Alabama.

not already considered are those related to the population growth impact on community attitudes and social organization. For example, the Negro community was effected by changes which went on around it, but did not include it. How much has the Negro community participated in the growth of the non-space sector of the economy? How was the general impact of the civil rights revolution upon the White and Negro communities of Huntsville altered by the rapidly changing population and economy? Have the federal, state, and local governments faced up to their responsibilities to the Negro minority in Huntsville? Have the increasing numbers of well educated people, previously exposed to urban life and social change from experience in other cities, been ready to accept and support social change in Huntsville much earlier than the long time local residents and politicians? Or has the southern background of many of the newcomers been strong enough to maintain long time southern community attitudes?

These and other aspects of social change in the community life of Huntsville are potential topics for future research, including studies of the local decision-making process, social structural changes, and others which are beyond the scope of this present report.

We have, however, continued to develop a greater understanding of the changes and complexities which have occurred as a result of the space program impact on

Huntsville. And having examined the economic and population changes, which have created pressures for public action by the city government of Huntsville, we shall now proceed to consider the government response to these pressures.

CHAPTER VI

GOVERNMENT RESPONSE IN HUNTSVILLE

In the previous chapter we have seen how the population of Huntsville grew to include 123,519 people in 1964. It is this population growth which has put increasing pressure on the local government to supply needed public services and facilities for Huntsville's citizens.

The relationship between community size and municipal expenditures has been pointed out by Robert Wood in his book, 1400 Governments. Wood utilizing a factor analysis technique reduced twenty environmental variables mathematically to seven factor groups. The major factor isolated by Wood was "community size."

> COMMUNITY SIZE is the most prominent index of all, bearing a closer relation to governmental expenditures than all other factors combined. In another way, however, it is surely the least interesting, because it reflects the perfectly obvious fact that the more persons and property a municipality services, the larger are its expenditures.[1]

The population growth of Huntsville, then, can be viewed as the general causal factor behind the increasing expenditure and revenue needs of the city.

In this chapter we shall indicate how the local government of Huntsville has attempted to cope with these increasing budgetary pressures, by examining in some detail

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[1]Robert C. Wood, 1400 Governments, (Cambridge: Harvard University Press, 1961), p. 35.

the financial and organizational structure of the city government.

Since the structure of local government itself is effected by the impact of a large federal space facility on the community and by the economic and population changes which effect both the local constituency and inevitably the people who hold public office, it will be of considerable importance to look at the complexities and intricacies which are a part of local government.

The planning process presents a set of alternatives and recommendations which can or can not be acted upon by government officials. The governmental decision-making process and the individuals who participate in that process form the key elements which determine the implementation of public policies, generated, evaluated, and presented by an impact planning process. Therefore, the organization and administration of local government is closely tied to the ability of that government to implement urban planning recommendations.

It is our purpose to sketch the broad parameters of Huntsville's administrative response to the space program impact on Huntsville, and to do this, the structure of the city's administrative organization and a framework for understanding governmental action and response shall be an integral part of this chapter.

The following outline of governmental impact response, Table 17, will be used to organize and structure

TABLE 17

GOVERNMENT IMPACT RESPONSE STAGES

Increasing Municipal Expenditures
Public Safety - police, fire, health
Public Works - streets, water, sewers
Public Services - transportation, education, recreation
Increasing Revenue Needs
Taxes
Special Districts, Annexation
Increase Property Assessments
Change Debt Limitations
Grants-in-aid
Attempts to Control Growth
Changes in Government Organization

our thinking as we proceed to analyse the public administrative actions of the city.

City Expenditures

The need to increase city expenditures can be seen clearly in the expansion of Huntsville's public safety and education requirements.

The expansion of the police and fire departments has been great since 1950 as would be expected. In 1950 the fire department of the city of Huntsville had 18 full time employees jumping to 164 full time employees in 1965. Fire department expenditures also jumped from $51,400 in 1950 to $953,500 in 1965. The same situation can be seen in the police department which had only 36 full time employees in 1950 compared with 160 in 1965. The police department expenditures also increased from $106,800 in 1950 to $1,301,700 in 1965.[2] As the city has expanded in population and in the number of structures, it is clear that the vital services supplied by police and fire departments must likewise be increased.

The vast increase in the school age population since 1950 has placed a great strain on the local school system. "In 1950 Huntsville's schools with thirteen buildings served slightly more than 3,138 children on a budget of $438,263.

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[2] International City Managers' Association, Municipal Year book 1950 (Chicago: 1950); and the League of Women Voters, Huntsville, Alabama, Know Your Town: Huntsville, Alabama (February 1966), p. 14.

Today thirty-four schools are trying to meet the needs of over 31,343 children on a budget of about eight and one half million dollars."[3]

The city schools are financed 18% by the city and county, 67% by the state, and 15% by the federal government due to the large number of government employees with children in the area. Of Huntsville's ad valorum tax of 41 mills, 20 mills go to education. The State Educational Trust Fund which is the source of 97% of all state education funds receives 2 mills; 4 mills go to the county educational system which returns 68% of this money to the city schools; 3 mills go directly to the city schools; 5 mills to city capital school expenditures; and 5 mills to school bonds and interest.[4]

"Until 1962 when the bonded indebtedness limit was reached and building was halted, a classroom a week was being built."[5] The use of portable class rooms and split sessions have been used during such periods when new school facilities were not yet available. In 1965, however, the state legislature made new funds available for school construction; and in December 1965 the Ford Foundation gave the Huntsville and Madison-County school systems a $2,700,000 grant for an educational improvement program for preshool

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[3] League of Women Voters, op. cit., p. 26.

[4] Ibid..

[5] Ibid., p. 30.

and elementry school age culturally disadvantaged children.[6]

While the financing of education has been one of the major problems in Huntsville, it is one area where sources of revenue are readily available from county, state, and federal governmental levels.

City Revenue

The city receives its operating funds from the ad valorem or property tax, a gross receipts tax, sales and user taxes on sewers, gasoline, cigarettes, beer, liquor, a mortgage and deed tax, and licenses and permits. The state and county also take a share of the funds collected from most of the sales and user taxes. Table 18 showing the city revenue sources for the year ending September 1965, indicates the kinds of taxing devices which have been used by the city of Huntsville. The city also receives a share of state funds in the form of state aid to schools, health, welfare, and other programs.

"The per capita state and local taxes in Alabama are the lowest in the Southeast and 40 percent lower than the United States' average."[7] Alabama has a state income tax which is withheld from payrolls, running from 1.5% for the first taxable $1000 after exemptions and deductions, up to 5% for taxable income over $5,000.[8]

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[6] Ibid., p. 31.

[7] Huntsville-Madison County Chamber of Commerce, Huntsville Industrial Expansion Committee, Information Kit: Facts and Figures on Living in Huntsville, Madison County, Alabama (Litho. in U.S.A., 1964), See sheet "Taxes and Licenses."

[8] Ibid..

TABLE 18

GENERAL FUND REVENUES, CITY OF HUNTSVILLE,
FOR THE YEAR ENDING SEPTEMBER 30, 1965*

Gross Receipts Taxes	43.1%	$4,473,529.62
Ad Valorem Taxes	6.3	651,265.06
Excise Tax on Financial Institutions	.3	26,129.23
A. B. C. Stores	.9	94,818.92
Beverage Taxes & Licenses	3.5	363,956.46
Electric System	6.1	634,831.73
Gas System	1.3	137,614.19
Housing Authority	.4	41,499.31
Gasoline Taxes	3.9	411,120.21
Lodging Taxes	.6	62,553.52
Tobacco Taxes	2.5	260,135.18
Privilege Licenses	8.8	909,516.06
Automobile Licenses	1.6	168,913.60
Taxi Cab Licenses	.1	6,879.00
Building Permits	2.6	272,056.11
Electrical Permits	1.7	111,472.37
Plumbing Permits	.6	62,385.00
Taxi Cab Drivers Permit	-	1,320.00
Sign Permits	-	65.00
Gas Permits	.1	10,480.25
Recorders Court Fines & Forfeitures	3.0	309,790.00
Water System Appropriation	1.1	110,476.50
Parking Meter Collections	.3	34,285.00
Golf Course Receipts	.5	56,125.50
Cemetery Receipts	.4	37,459.42
Swimming Pool Receipts	.1	8,257.05
Repair Shop Charges	.7	68,491.40
Parking Meter Fines	.3	27,991.35
Rent	-	4,566.96
Royalties on Airport Rock	-	3,491.59
Sale of Property	.1	5,000.00
Sewer Tappage Charges	.1	14,460.00
Dog Pound Receipts	.1	6,818.50
Coffee Shop (Municipal Building)	-	53.74
Interest	1.3	135,721.85
Cash Discounts	.1	12,185.96
Civil Defense Appropriation from State of Alabama	.1	10,913.55
Civil Defense Appropriation from Madison County	.2	18,733.62
Sundry	.1	6,952.33
5-Mill Tax Fund Appropriation	7.7	799,812.27
Total	100.0%	$10,372,127.41

* Not an audited report
Source: League of Women Voters, Huntsville, Alabama

The state legislature has set a maximum rate of 60% of the market value for property assessment, but in Madison County-Huntsville the actual property tax is based on an assessed valuation of 25% of the market value. The tax rate is $2.60 per $100.00 assessed value in the county and $4.10 per $100.00 of assessed valuation in the city, less a homestead exemption of $13.00 locally and a $2,000 homestead exemption allowed by the state against its portion of these revenues. The breakdown of the 41 mill ad valorem tax can be seen in Table 19, almost half of which goes for schools.[9]

The state has set the city debt limit at seven percent of the assessed valuation of real and personal property located in the city, currently assessed at 118 million dollars. School, sewer, and assessment bonds are not charged against the debt limit. In addition all bonds issued by the city which require additional ad valorem taxes pledged to debt retirement must be put to a referendum.[10] Expenditures for the city of Huntsville for the year 1964-65 can be seen in Table 20.

The use of annexation and special districts are common ways of increasing city revenues.

> By creating special districts, the governments of more general jurisdictions are able to pinpoint areas of growth and to assure that the costs in

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[9] League of Women Voters, op. cit., pp. 14-15.

[10] Ibid., p. 12.

TABLE 19

HUNTSVILLE AD VALOREM TAX

To State, 6.5 Mills	
School Tax	3 Mills
General Tax	2.5 Mills
Soldier Tax	1 Mill
To County, 11.5 Mills	
General Tax	5 Mills
Road and Bridge Fund	2.5 Mills
Countywide School Tax A	3 Mills
Countywide School Tax B	1 Mill
68.4 percent of the latter two taxes reverts to the City Board of Education.	
To City, 23 Mills	
General Tax	10 Mills*
Special School Tax A	5 Mills
Special School Tax B	5 Mills
District School Tax	3 Mills
Total	41 Mills

* 5 mills goes to the general fund and 5 mills to a sinking fund for the amortization of general obligation bonds issued.

Source: League of Women Voters, Huntsville, Alabama

TABLE 20

GENERAL FUND EXPENDITURES, CITY OF HUNTSVILLE,
FOR THE YEAR ENDING SEPTEMBER 30, 1965*

Street Dept.	23.4%	$2,423,360.80
Sewers & Drainage	8.1	841,408.75
Garbage	6.2	640,071.95
Recreation Dept.	5.1	525,593.80
Golf Course Dept.	.5	51,912.05
Asphalt Plant	2.2	225,602.68
Traffic & Sign Dept.	3.1	317,569.99
Police Dept.	12.6	1,301,733.97
Parking Meter	.1	10,799.49
Fire Dept.	9.2	953,515.49
Repair Shop Dept.	.1	127,373.02
Revenue Dept.	1.5	156,130.38
Administrative Dept.	1.1	107.925.36
Purchasing Dept.	.2	18,882.27
Building Dept.	1.2	118,743.48
Personnel Dept.	-	0
Inspection Dept.	1.8	184,754.72
Cemetery & Grass Dept.	.9	93,205.06
City Planner & Minimum Housing	1.2	121,227.42
Engineering Dept.	1.5	156,821.14
Civil Defense Dept.	.4	39,082.83
Legal Dept.	.5	45,740.67
General	5.6	576,560.20
Special Appropriations	13.0	1,345,106.53
Total	100.0%	$10,383,122.05

* Not an audited report.

Source: League of Women Voters, Huntsville, Alabama

> these areas are born by their residents alone. In addition to this geographical segregation of responsibility, there is functional segregation, in that the expenses of a single public program can be paid for by the actual users. In some cases, the services provided on a district basis are mundane: sewage disposal, street lighting, fire protection, water supply, and refuse collection. In other cases, the district is a flexible instrument to meet essentially modern needs. Parking authorities, park districts, and housing authorities are obvious examples.[11]

The authority as an organizational form has been used extensively in Huntsville as a device for handling the rapidly increasing needs of the city without having to get continual public approval through referendums, and to avoid debt limitation problems. There exist in the Huntsville area the Housing Authority, the Airport Authority, the Public Building Authority, the Hospital Building Authority, the Library Building Authority, and the Madison County Public Building Authority.[12]

Figure 21 clearly shows how the city of Huntsville has grown by annexation from 5 to 105 square miles since 1950, in an attempt to keep the expanding population on the city's tax roles.

While constrained by the state legislature, the city can increase its revenue by making changes in property assessments or debt limitations. And the increasing availability of grant-in-aid funds from the state and federal government will continue to be utilized as

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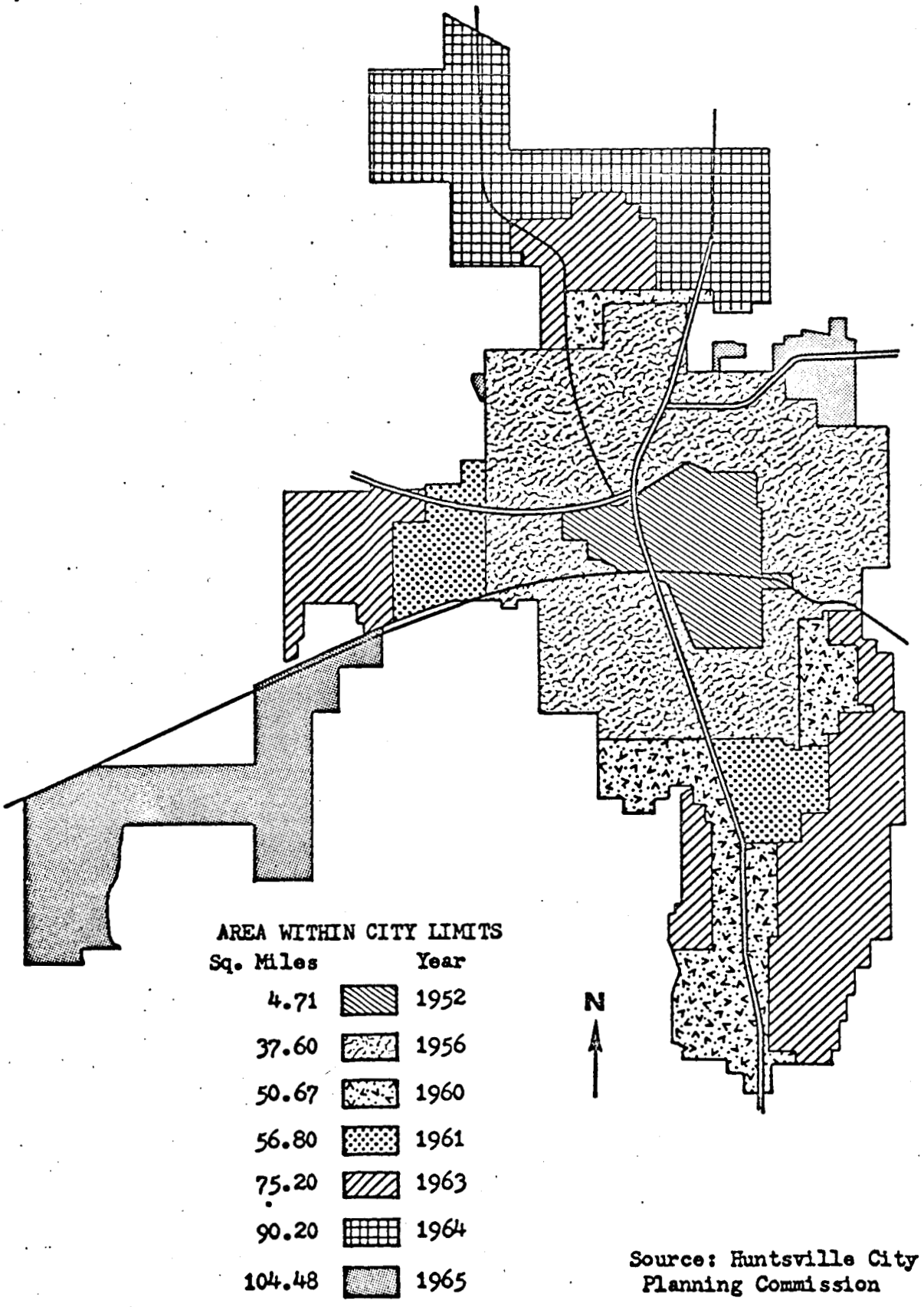
[11] Wood, op. cit., p. 74.

[12] Huntsville-Madison County Chamber of Commerce, op. cit., "Community Planning and Development."



Source: Huntsville City Planning Commission

Figure 21.--City Limit Annexations.

important revenue sources particularly for schools, welfare, health, highways, and redevelopment.

Planning and Urban Development

An additional method, different from fiscal manipulation, for controlling government expenditures is to control the growth which generates public expenditures through the use of zoning, planning, and industrial promotion. This technique has been utilized by Huntsville.

Control over planning and city development in Huntsville is divided between the Huntsville City Planning Commission, whose responsibilities include comprehensive master planning and control of all zoning and subdivision regulations; and the Huntsville Housing Authority, which exercises local control over federally aided low rent housing and urban renewal projects.

The Huntsville City Planning Commission was established in 1948, and is made up of twelve members including the mayor, the city attorney, one member from the city council, and nine citizens appointed by the mayor. The commission maintains a planning staff of six persons including two full time professional city planners. State enabling legislation permits local planning, but no financial assistance is currently available from the state. The state does have a Community Planning Division which is hidden within the Alabama State Planning and Industrial Development Board. The planning division puts out

a newsletter, but that is apparently the only sign of its existance. A move is currently under way to initiate and pass state enabling legislation which would permit county planning, now non-existant in Alabama. Planning is financed through the city budget and federal planning grants-in-aid. The power to zone rests with the city council acting on the recommendations of the planning commission. Current zoning ordinances were adopted by the city in 1964, and legally extend five miles beyond the city limits.[13]

In 1962 the planning commission applied for and received an Urban Planning Assistance grant under the provision of section 701 of the Housing Act of 1954, as amended; identified as "ALA. P-9." The major work completed under this grant included the following ten major items.

1. Planning Considerations Report
2. Base Mapping
3. Economic Base and Population Study
4. Neighborhood Analyses
5. Community Facilities Plan
6. Major Street Plan
7. Land Use Plan
8. Zoning Ordinance
9. Subdivision Regulations
10. Public Improvements Program and Capital Improvements Budget

These reports were prepared under the direction of the planning commission with the assistance of planning con-

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[13] League of Women Voters, op. cit., p. 35. And the Huntsville-Madison County Chamber of Commerce, op. cit., "Community Planning and Development."

sultants. The commission is, in addition, considering further studies in its continuing planning effort; including a Mass Transportation Study, a Community Shelter Plan, a Plan for Madison County, a Community Renewal Plan, as well as continual updating of its zoning and subdivision ordinances.[14]

The Huntsville Housing Authority is a public corporation established in 1941 and headed by a board of five commissioners appointed by the mayor for five year staggered terms. Under the board is a staff of seventy-three people headed by an executive director and assistant director. As an authority it is autonomous and independent, its operations financed through the sale of bonds. The authority currently operates 1,155 low rent units including two high rise units designed for the elderly. It is also the official agency responsible for carrying out the urban renewal programs. While projects are initiated by the city council upon recommendation of the planning commission and its staff; the planning, implementation, and completion of projects is administered by the housing authority in cooperation with the planning commission and other city agencies.[15]

Since 1956, the city has initiated six urban renewal projects covering approximately 485 acres, and has received

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[14] Huntsville City Planning Commission, Project Completion Report: Urban Planning Project ALA. P-9 (Huntsville, Alabama: February 1965).

[15] League of Women Voters, op. cit., p. 34.

over six million dollars in federal funds with an estimated twenty million dollars in future funds committed to the Huntsville urban renewal program. Huntsville, not content with past progress, has already designated fourteen additional clearance and rehabilitation projects for future action.[16]

Through the Atlanta regional office of the Department of Housing and Urban Development the federal role in 701 planning grants, public housing and urban renewal programs of Huntsville is administered with the approval, cooperation, and coordination of local Huntsville officials.

Huntsville's programs and accomplishments in planning and redevelopment represent an on-going commitment to the future ordered growth of that city. Its commitment to planning, urban renewal, and public housing, in the face of state constraints and a general anti-federal southern tradition, make Huntsville one of the cities which is trying to live up to the often faultering image of the "New South."

The development of an industrial park and the establishment of the University of Alabama Research Institute in Huntsville represent additional positive steps which the city has taken in an attempt to establish a sound stable industrial tax base.

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[16]Huntsville City Planning Commission, Public Improvements Program, (Huntsville, Alabama; February 1965), p. 19.

Government Organization

The effective integration and coordination of these fiscal and development techniques is related to the governmental administrative environment, which effects government decision-making thereby controlling the policies and actions of government officials. By examining the structure of the governmental system, we will be able to appreciate the complexities of government decision-making with respect to the implementation of policies and programs which flow from urban planning.

The state government in Alabama has in general kept a hands off policy with respect to local governmental matters. In spite of the vacillating political ambitions of Governor Wallace his consistant anti-Washington rhetoric, and his defiant positions on school integration, his state legislative programs have not been conservative.

> The Wallace legislative programs have been in the neo-Populist tradition that has flurished in Alabama since the agrarian revolt of the eighteen-nineties. In three years, he doubled the state debt to build schools and highways, built a network of junior colleges and trade schools designed to serve the lowest income groups and put through legislation providing free schoolbooks. He raised taxes to support education, increase old-age pensions and strengthen mental-health programs.[17]

State enabling legislation has permitted Huntsville to take part actively in federal planning, housing, and urban renewal

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[17]Ray Jenkins, "Mr. & Mrs. Wallace Run for Governor of Alabama," New York Times Magazine, April 24, 1966, p.84.

programs. And since 1964 Huntsville has begun to desegregate its school system, which receives considerable federal aid due to the large number of federal employees' children in the system.

The county government in Madison County, while a relatively weak partner in local government matters, does contribute to the decision-making structure of the local governmental system. The county forms an important link in the intergovernmental system, working in conjunction with the city or the state as the situation dictates. Madison County does exercise major control over health and welfare, and handles all tax assessment and collection for the county and the City of Huntsville.

The City of Huntsville is an incorporated place deriving all of its power from the Alabama state legislature which stipulates that a municipality may: (1) acquire and hold property, (2) collect license taxes, (3) construct or purchase school buildings, electric light plants and water works, (4) organize a police force for protection of citizens and maintain order, (5) organize a fire department, (6) protect health and maintain sanitation, (7) condemn land for public museums and art galleries, and (8) additional powers fairly implied in, or incident to, the above stated powers.[18]

Huntsville was incorporated in 1811, when its government was run by a board of five trustees. The

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[18] League of Women Voters, op. cit., p. 7.

mayor-town council form was introduced in 1828 and continued until 1911 when the city returned to a commission form. Finally in 1916 the city inaugurated the present mayor-council organization recently strengthening the powers of the mayor in 1965.[19]

The mayor and the city council are elected at large, the mayor serving a four year term, and the councilmen four year staggered terms. The president of the city council is elected by the council. The mayor does not preside at council meetings and does not have a vote on the council, but may veto its ordinances within ten days of their passage. The council, however, can override the mayor's veto by a two-thirds vote.[20]

The city council is the local legislative body. Within it rests the policy making responsibilities of the government. The council consists of five elected members, approves and adopts the budget, and generally meets in public session twice a month. The council president appoints three councilmen to each of several city department committees. These committees study the needs and operation of the departments, making periodic policy recommendations to the full council and the mayor.[21] The mayor is a full-time city chief executive who is constantly being constrained by the part-time city councilmen who oversee all city government functions.

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[19] Ibid., p. 4.

[20] Ibid., p. 7.

[21] Ibid., p. 8.

The following list of official boards, authorities, and committees (Table 21) indicates the degree to which power is distributed between many factions, even though key persons in the power structure probably sit on several boards and committees. It is clear that the more important ones are appointed by and responsible to the council and not the mayor. Housing and planning seem to make up those groups responsible to the mayor, the members of which all have terms longer than the mayor's term, with the exception of the seventeen member beautification committee.

In general, Huntsville occupies a central position within a decentralized decision-making governmental structure. It operates under a weak mayor-council form as illustrated by Figure 22.

> In the weak mayor-council plan, the administrative department heads and board members are either elected by the people or selected by the council. The mayor makes few appointments which are not ratified by the council, and his power of removal is quite limited. He frequently is given veto power, but this may be overridden ordinarily by either a simple or a two-thirds majority of the governing body. Usually the mayor is charged with the responsibility of overseeing the work of the various administrative departments and of seeing that the laws of the city are properly enforced. All too often he is held responsible for the proper administration of the city's affairs, but seldom is he vested with the power to fulfill this responsibility.[22]

It should be pointed out that since October 1964 when the present mayor, Glenn H. Hearn, succeeded Mayor Searcy, mayor for twelve years when the job was a part-time post,

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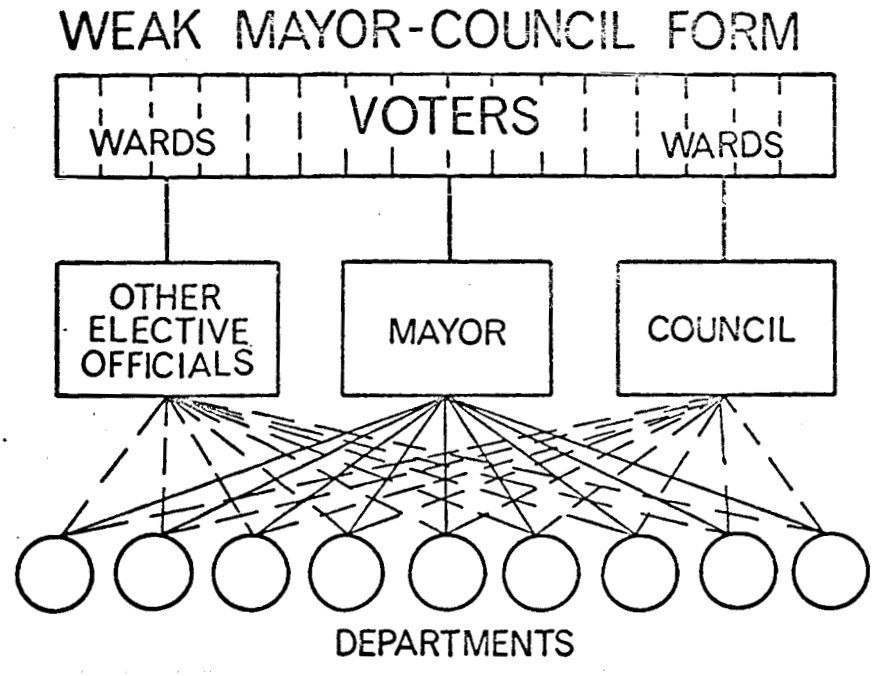
[22] Institute of Public Affairs, Forms of City Government (Sixth edition, Austin: University of Texas, 1963), p. 3.

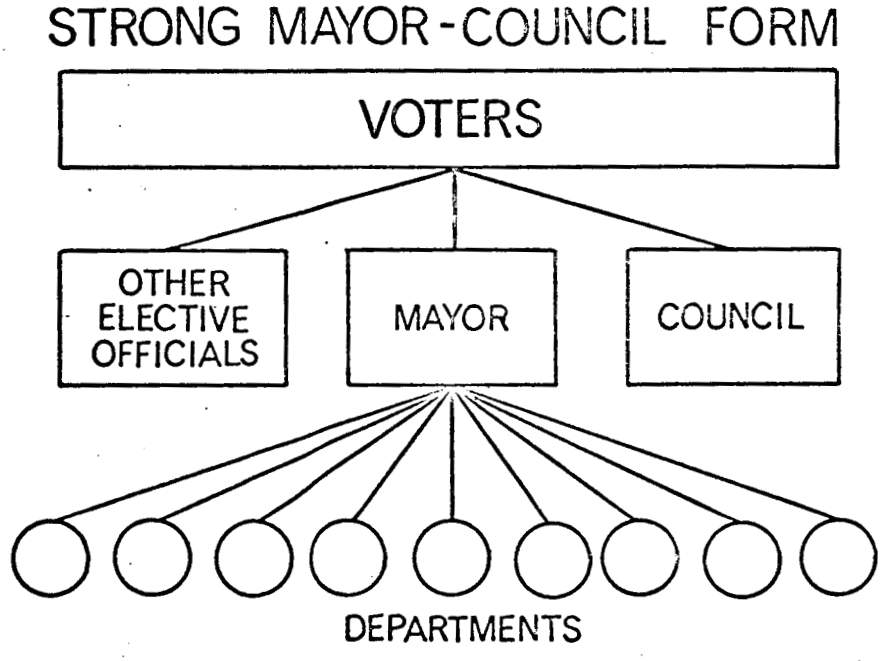
TABLE 21

OFFICIAL BOARDS, AUTHORITIES, AND COMMITTEES OF HUNTSVILLE AND MADISON COUNTY

Name	Number of Members	Term
Appointed by and Responsible to the Council:		
Huntsville Electric Utility Board	3	3 yr.
Huntsville Gas Utility Board	3	3 yr.
Huntsville Water Works Utility Board	3	3 yr.
Huntsville Hospital Board	6	6 yr.
Huntsville Hospital Building Authority	4	6 yr.
Huntsville Board of Education	5	5 yr.
Huntsville Public Library Board	5	6 yr.
Huntsville Library Building Authority	3	6 yr.
Board of Licensing and Appeals for Construction Industries	15	4 yr.
Minimum Housing Standard Board of Appeals	6	4 yr.
Burritt Museum and Park Committee	10	4 yr.
Flood Study Committee	25	1 yr.
Industrial Development Board	7	2-7 yr.
Appointed by and Responsible to the Council and Madison County:		
Huntsville-Madison County Airport Authority	5	5 yr.
Huntsville Hospital Board	5	5 yr.
Huntsville-Madison County Civil Defense Board	5	5 yr.
Appointed by and Responsible to the Mayor:		
Huntsville Housing Authority	5	5 yr.
Huntsville Zoning Board of Adjustment	5	5 yr.
Air Pollution Control Board	5	5 yr.
Beautification Committee	17	3 yr.
Planning Commission	12	6 yr.

Source: League of Women Voters, Huntsville, Alabama





Source: Institute of Public Affairs, Forms of City Government (6th ed. Austin: University of Texas, 1963).

Figure 22.--Weak and Strong Mayor-Council Governmental Forms.

steps have been taken to increase the executive power of the mayor. In other words, as the city grew and the pressures on local government increased there was a partially successful effort to strengthen the organizational structure of the city government.

However, the decision-making structure still remains highly decentralized. For example, the authority as an organizational form has been used extensively as a device for handling the rapidly increasing needs of the city without having to get continual public approval. The creation of many separate authorities, agencies, and boards, in the absence of any strong executive power able to control them, means the multiplication of relatively independent decision-making nodes in the political structure.

> In the case of the five municipalities with commission or weak-mayor forms of government the structural relationships among the planning commissions, low-income housing and renewal authorities, and code enforcement agencies paralleled closely the centrifugal, loosely drawn associations mentioned previously. . . . What cemented the disjoined pieces of apparatus in these five communities together into viable, cooperative instruments was the pre-eminent influence of private organizations and individuals that gave leadership to the planning and implementing of feasible renewal programs. By controlling certain instruments of community decision-making and information (the press, realty associations, lending facilities, business enterprises, labor unions, partisan organizations, and voluntary benefactive associations) it become possible to build support for renewal projects.
>
> In particular were such non-formal groups in these communities capable of wielding influence in the designation of members to planning and renewal

> boards, of initiating and dominating citizen advisory committees, . . . of minipulating the city councils and key department heads in pertinent matters, and in general of building community support on behalf of renewal undertakings.[23]

While this article is particularly concerned with planning and renewal activities, the description seems appropriate for understanding the way in which local decision-making has probably taken place within the Huntsville-Madison County governmental system.

Conclusion

The government of Huntsville has responded to the space impact one, by increasing its expenditures in order to meet increasing population needs; two, by increasing revenues to pay for increased spending; three, by trying to control development through planning and zoning; and four, by trying to adjust the city administrative organization to fit the present day needs of a modern urban city.

In general Huntsville has taken advantage of most of the fiscal minipulation and growth control techniques available to municipalities. However, the skillful use of these techniques to achieve desired goals is quite another matter. Huntsville's difficulty seems to lie in its present weak mayor-council form which has severely limited the mayor's power to implement the recommendations of line and staff departments within the city administration.

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[23] Harry W. Reynolds, Jr., "Local Government Structure in Urban Planning, Renewal, and Relocation," Public Administration Review, XXIV (March 1964), p. 18.

The weakness of the executive arm of the city of Huntsville may partially explain why local city planning has been relatively ineffective, in spite of the fact that the city planning commission has been in existence since 1948. And yet, recent planning in Huntsville has been very productive. Increasing attention will have to be placed, however, on the regional impact of continued Huntsville growth; and stronger attempts should be made to enable city-county planning collaboration in Alabama, particularly in Huntsville. Until now Huntsville has been able to cope with this problem by annexation, but the city is probably reaching the limit of its ability to increase its area of legal jurisdiction. As the necessity for regional planning increases, so too will it be increasingly necessary to improve local governmental organization and the paths of intergovernmental communication, cooperation, and coordination.

But perhaps an equally important problem or question is the degree to which NASA has been able to influence key political decisions within city government. With NASA's relatively complete control over the economy, it would be surprising if NASA did not exercise considerable control over local political decision-making.

On the one hand, the existence of a decentralized political structure, characterized by the diffusion of power into many independent and quasi-independent units, may enable NASA, as a single strong unified voice, to assert

its power quite easily. However, on the other hand, the relative independence of the separate decision-making nodes within the political system may make it difficult for NASA to control local decision-making without the support of a coalition of these independent units. Coalition politics -- "you do something for me; and I'll do something for you" -- may be one way of controlling NASA's local political power. And yet, to the degree that NASA is able to control the flow of funds into these independent units, it will be able to control their political allegiance. Nevertheless, Huntsville's decentralized decision-making system may in some ways be effective in limiting the raw power of Huntsville's dominant employer, the federal bureaucracy.

Further study will be necessary to unravel the political intricacies surrounding Huntsville's governmental decision-making machinery. The existence of coalition politics, however, does not invalidate the need for impact planning. Planning for impact is essential in order to provide for a future aesthetic and efficient urban environment which will be crucial to NASA's future in Huntsville, and Huntsville's future as a dynamic urban center. Planning for impact can pinpoint community problems, urban diseconomies, and environmental deficiencies of mutual concern to all community groups, and can help to indicate areas of political consensus which will make possible the implementation of plans with the cooperation and coordination of city, county, state, and federal governments.

CHAPTER VII

AN OVERVIEW

Huntsville's Impact Response

A review of Huntsville, Alabama as a specific case of space program impact on a local community will show that impact response can be understood. While we have raised many questions concerning various aspects of Huntsville's development, the general pattern of the city's development remains clear.

Huntsville, because of its geographic position and its historic dominance of the Madison County region, has developed into a single strong center. In contrast, under a similar NASA impact at Cape Canaveral, Brevard County, Florida, growth was distributed between Eau Gallie, Cocoa, Melbourne, and Titusville creating a polynucleated settlement pattern.[1] This difference in settlement pattern is significant. For Huntsville the advantage of monoculeated urban concentration was double. One, the federal government had only one city government decision-making group to work with; and secondly Huntsville did not have to share its market place, labor force, or its grants-in-aid with other local competing communities. This undoubtedly has simplified intergovernmental problems and enabled federal and local officials to deal more effectively with community problems.

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[1] Institute for Social Research, The Florida State University, NASA Impact on Brevard County, (Tallahassee: 1966), pp. 10-11.

The focus of the space impact upon the single community of Huntsville is really the fundamental point. The concentration of the impact in Huntsville at a time when it was small and economically depressed meant that the growth potential was high, that it would not be diffused among many centers, and that Huntsville's local decision-makers stood to benefit from this enormous potential growth.

This concentrated development pattern can also be seen as influencing three other important community developments; (1) the size, concentration, and characteristics of the population in-migration, (2) the development of community pride, and (3) the ability of the positive attitudes initially taken by the Germans toward the community to result in the development of a common community bond.

First, the people who moved into Huntsville, educated middle class scientists, engineers, and technicians were a great asset to the city in two ways. They were predominantly from the South and familiar with southern "ways" not creating any disrupting social change; while at the same time they were a welcome boost to the city's economy. The entry into the community of an urban population, concentrated in a single location, the majority of whom had negotiated well paying jobs in Huntsville before their arrival, reenforced the growth of the local economy. While they needed only basic services from Huntsville, they were ready to spend money in the city and they had the payroll cash to do so. (In contrast, unemployed low income in-migrants generally

require high services from a city, particularly health, welfare, police, and fire, while contributing little to the local economy.) Since there was no place else to spend, money flowed into Huntsville, naturally as Huntsville grew it became even more dominant as a regional market place and urban center.

Second, community pride must have helped. After all, Huntsville was a city of several historic firsts. And now it could identify itself as America's first "space city." Because the space activity was not distributed among many competing local communities, as in parts of California and Florida, Huntsville was able to reap the full benefit of its local space pride. And this pride was additionally supported by the ability of Huntsville to claim the top space brains in the country and perhaps the world, Von Braun and his German staff.

And finally, the active interest and early participation by the Germans in community life broke down early uneasiness toward them and in effect united the community in support of the space program.

A more detailed study of the community organization in Huntsville is certainly needed. For example, a community study by Florida State University in Brevard County, Florida, revealed a wide gap between the interests of NASA employees and those of other local residents.

> Employees of NASA are relatively independant of the community deriving there income from an outside source of funds. . . . Thus it seems that work is the common bond rather than the community. This reverses the usual pattern of diverse work interest, but common community interest.[2]

It seems that the multi-centered development pattern surrounding the Cape has contributed to this social phenomenon. One would suspect, however, that a similar study of Huntsville would not indicate a similar fragmentation of community organization.

We can see how this concentration or monoculeated settlement pattern influenced and shaped the development of the city as these three aspects of community growth interacted.

Another dominant theme can be seen as running through all that has happened in Huntsville. This is the space program itself. Huntsville is dependent upon the space economy; and the major concern of the city is focused on the future of the local space economy -- what's going to happen after the moon. The important question is how much of the city's future is dependent upon decisions made outside of Huntsville.

This problem illustrates a clear case where the desire of the city administration not to be vulnerable to a space program withdrawal or cut back, conflicts with the NASA and Army tendancy to view Huntsville as a local complex of facilities to be used solely to satisfy their needs.

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[2] Ibid., pp. 18-19.

These federal agencies must respect the legitimate needs of the city and should explore more openly their responsibilities to the balanced development of the city which in the long run will serve best the goals of both the community and the local space agencies.

Huntsville, too, has a responsibility to look beyond the space program. Huntsville's challenge lies in its ability to convert NASA's presence into a foundation for a new technological and industrial base which will not be dependent upon NASA. This can be done through the utilization of spin-off from space technology, which has already yielded important products for medical, industrial, and consumer markets.[3]

While Huntsville has taken steps toward the development of an industrial-education-research complex, it should move quickly to prevent that complex from being dependent upon federal space dollars by broadening its education and research base through the utilization of space spin-off technology to create non-space intellectual and industrial capacity for the city.

A third dominant theme seems to run through Huntsville's development response, its southern culture. Not only has this affected the city's migration flow, but has remained an important social factor. Of all the problems

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[3]New York Times, "Space Patents are 'Spun Off' by NASA," November 27, 1966.

and difficulties which Huntsville officials have had to face, the issue of racial integration is still probably the number one problem. Of course, this problem is only one part of a "Southern style" within which any adaptation to a new social invention, such as the space program, must take place. The integration problem in Huntsville, in addition, is a good example of the complex interactions of social, political, and economic variables which we have discussed in earlier chapters, and therefore bears closer examination.

School integration came to Huntsville on the 25th of August 1964 when the County Board of Education of Madison County desegregated the school system with the admission of four negroes to the eleventh and twelfth grades of previously all white Sparkman High School.[4]

The satisfactory integration of school systems has not been easy either in the North or the South. In Huntsville the situation was complicated by the presence of NASA, the shortage of school facilities due to rapid growth, the decreasing proportion of Negroes in the population, and the economic boom being enjoyed by the local business community.

> Huntsville was shaken last year when the National Aeronautics and Space Administration told of the difficulty in recruiting engineers for the Marshal Center because of Alabama's reputation on race relations. The agency hinted that the facilities could be moved out of the state.

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[4] New York Times, August 26, 1964.

> Huntsville business leaders are making it plain that they are not going to allow their boom to be jeopardized by a poor racial reputation.
>
> A number of areas had been desegregated before the passage of the Civil Rights Act of 1964. Governor George C. Wallace is not interfering. Negroes find that the going is still slow and that they have to keep pressing. But an important gain is that they are maintaining a constant dialog with the white leadership and have found that they can negotiate most of their problems.
>
> Schooling and housing remain two of the most difficult areas.
>
> Under a court ordered plan of grade-by-grade desegregation the school system has put 39 of 2,400 Negro pupils in integrated classes.[5]

While actions by Governor Wallace at the state level seem ominous concerning the school problem, for example the apparent passage of legislation which would in the fall of 1966 prohibit the state's public schools from desegregating voluntarily,[6] the possibilities inherent in new educational programs which could be implemented in Huntsville still remain. For example, if Huntsville's existing Negro colleges would alter their present programs toward space science, with the support and help of NASA, the local Negro community which up to this point has not taken part in the local space generated economic boom could begin to be a more active partner in the economic and social development of the city. Studies of the current curricula of these colleges, where their graduates live, the jobs they hold, etc., could lead to an evaluation of the relevance of those programs in today's changing society, such that changes in their academic structure could take place. Changes such that local young-

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[5] New York Times, May 23, 1965.

[6] New York Times, September 1, 1966.

sters proud of their space age city and inspired by the sights and sounds of rockets and test stands could fulfill space science ambitions through participation in work-study programs with NASA, the Army, and space contracting firms in conjunction with the public high school system and all of the local college systems.

Whether the problem of school integration has been easier or more difficult for Huntsville as compared with other urban centers in the South is not immediately evident. Huntsville certainly has the potential to overcome this problem; and it will be increasingly important for NASA, the city, and the non-white community to develop some mutual goals and policies with regard to this social problem.

Social change, of course, entails both costs and benefits. But if Huntsville is to choose to move ahead as a part of the new South, many old customs and mores will have to abandoned. Social and personal costs will be evident, particularly when the "haves" must learn to share their good fortune with the "have-nots."

We have shown that Huntsville's impact response can be understood. But more than that, from the analysis of available information on Huntsville, we have been able to establish a general outline, of impact response stages, as presented in Table 22. While additional work needs to be done in this area, an examination of material available from the Institute of Social Research of Florida State University, on NASA impact in Brevard County, Florida,

TABLE 22

A GENERAL OUTLINE OF IMPACT RESPONSE STAGES

Initial Economic Space Program Impact

Rapid Increases in Population In-migration

Government Response

- Increasing Municipal Expenditures
  - Public Safety
  - Public Works
  - Public Services
- Increasing Revenue Needs
  - Taxes
  - Special Districts, Annexation
  - Increase Property Assessments
  - Change Debt Limitations
  - Grants-in-aid
- Attempts to Control Growth
- Changes in Government Organization

Changes in Local Community Organization

indicates that growth problems there can also be organized into a similar formal. Of course, these stages do not occur in a strict sequential order, but rather interact in a complex multivariate changing societal environment. They do, however, point the way toward the possible future development of a general impact planning model, which could act as a guide not only to the space agency and to other federal agencies, but also to cities and communities.

For Huntsville, then, three major forces, which can be attributed to Huntsville and not NASA, have molded the city's unique adaptation to space impact within the framework of the general impact response stages; one, the geographics of Huntsville which concentrated development; two, the complete dominance of the economy by the space activities; and three, the southern culture which has acted as a selective migration factor and has dominated the social and political environment.

Federal Responsibility

In trying to bridge the gap from the specific to the general, one can not help but notice how in Huntsville we have a space program and a city program locked together by a mutual interdependence. NASA's ability to recruit and keep personnel in Huntsville is dependent upon the capital improvements, public services, and urban environment which the city must plan and implement. On the other hand, the city is economically dependent upon NASA. Since NASA is by

far the stronger partner in this relationship, we are led to consider the broad role of federal agency responsibility with respect to planning for impact.

NASA, as an arm of the federal government, does have a responsibility to communities within which it operates; and this responsibility could be exercised with greater vigor and imagination than is usually evident within the context of standard public relations procedures.

Agencies of the federal government have recently begun to engage in what has been termed master planning.[7] While this planning effort is commendable and desirable, it has been limited in scope. The planning has been confined to official installation areas directly under federal control, and has been limited to detailed site plans, engineering and construction feasibility studies, and on-base water, sewage, road, and parking plans. This focus on physical plant requirements and site layout for government property only, to the exclusion of economic, and population impact studies represents a narrow minimum effort approach which can no longer be justified.

The federal government should move quickly to expand its planning efforts to include planning for impact. Why? Because meaningful federal master planning must take into account a broad range of community needs and problems which

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[7] U.S. House of Representatives, Master Planning of NASA Installations, Report of the Committee on Science and Astronautics, Eighty-ninth Congress, first session, Serial C, 1965, and second session, Serial N, 1966.

extend beyond government property, and which effect federal facility operations. As our specific case study has shown, the total cost structure of operating a federal facility is more than just its specific physical plant. The ability to recruit personnel, for example, will depend upon the physical and social environment in which federal employees and their families must live and work, upon access to good education and the availability of recreation and entertainment. The lack of these kinds of elements can make up a significant part of total site costs.

Political pressures are often the only major considerations taken into account in considering site locations. Impact planning offers a rational process for the systematic evaluation of alternative site locations with respect to an agency's overall mission and the impact reprecussion costs of the alternative sites.

In Huntsville, for example, inadequate intercity transportation facilities, problems in personnel recruiting related to Huntsville's urban environment, the long circuitous routing of rocket boosters by barge from the Tennessee River to the Mississippi River to the Gulf of Mexico and across to Cape Kennedy, all indicate high costs associated with poor accessibility. Low accessibility means significant transportation costs in the movement of parts and equipment, as well as significant costs in personnel movement between Washington, Huntsville, and other NASA installations.

The impact reactions of a local comminity, in spite of expert detailed planning within the specific government site, can result in significant costs for facility operations. These costs can be evaluated by urban planners engaged in planning for impact.

Planning for impact should be an integral part of government space program planning, and should also be utilized by other federal agencies.

Planning for impact, as a part of government planning, also has another important role to play. It can act to coordinate space programs with city programs.

For example, much attention has been given recently to the need for massive research and development into human environmental systems. The New York Times, reporting on a recent United Nations Committee on Housing, Building, and Planning session in Geneva, quotes Pier P. Spinelle of the United Nations as follows:

> The decisions to explore man's urban environment and to do something about it are still lacking. . . . But there is no doubt that the planning and organization of the urban environment on an international scale must receive in the years ahead concentrated application of science and technology and infusions of massive research and development efforts at least comparable to those which have gone into man's space ventures.[8]

Such efforts could be undertaken by our federal government; and part of such an effort could fall within the scope

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[8] New York Times, October 2, 1966.

of current NASA goals and objectives. The development of man-machine environments for manned space and moon stations relates directly to urban research.

Orbiting space stations and moon cities, where men and women will live and work are no longer science fiction. This constitutes the new frontier for the space program. More people will be going into space for longer periods of time, on longer flights, and in larger groups. And yet we still know very little about the physiological and social-psychological needs of men and the types of life support systems which will satisfy those needs.

The human community, then, and planning for that community are fundamental topics of research for both a "space" program and a "city" program.

NASA is undoubtedly working on the design of self-sufficient man-machine environments which will be the prototypes for use in space and on the moon. It seems perfectly reasonable, then, to suggest that a considerable part of that research and testing could be coordinated with studies relevant to existing earth communities. Such cooperation could lead to new innovations in urban environmental design for existing cities as well as for isolated barren military and scientific outposts on earth and in alien celestial locations. It is already evident that aerospace research can benefit from the spin-off of underwater marine studies currently being conducted by Jean Costeau, the U.S. Navy, and others. Communities of men living and working beneath

the ocean for extended periods of time exist today.[9]

NASA could in cooperation with local Huntsville officials, as well as through NASA scientific personnel who are citizens of Huntsville, work on new ideas and approaches to housing, transportation, communication, education, sewage, and other aspects of the human community environment. And most importantly, new techniques should be tested, tried, and implemented. New processes and techniques in computerized education, for example, could be implemented on a city wide basis with the cooperation of the city government and the scientific institutions which are located in Huntsville. Such innovations could create benefits for the whole community, while transforming Huntsville into a real "City of the Future."

One avenue for the implementation of federal responsibility to our cities is through the space program. The development of joint goals by "space" scientists and "city" scientists for urban environmental studies would yield vital information for the development of both earth and non-earth based nature-man-machine community life support systems.

What is not commonly realized is that the federal space budget is closely tied to the city budgets of many cities and communities through the country, of which Huntsville, Alabama is only one example. The question raised in the halls of Congress should not be cities or space, but how we ought to coordinate the economic, social, and tech-

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[9]New York Times, " 'Aquanauts' to Dwell and Work on the Ocean Floor Off Hawaii," December 5, 1966.

nological aspects of these two vital federal programs into a combined effort which will best serve the national interest.

Conclusion

The impact of a social invention on society, or more specifically the impact of the space program on Huntsville, Alabama has been the subject of this thesis.

We have shown, first, that impact repercussions can be understood and that urban planning studies can provide information sufficient to form a sound base for impact planning. Secondly, we have indicated how planning, by being able to anticipate impact repercussions, can indicate steps necessary to maximize impact benefits while reducing impact costs.

The utilization of urban planning techniques is a means toward understanding the effects of impact. And the distillation of impact response information through the urban planning process yields a long range guide for city development and a short range strategy for the solution of impact problems.

This broad impact perspective can then act as an input into federal government site master planning and local community master planning, creating a new bridge of communication, cooperation, and coordination between the federal government and local levels of government.

Urban planning, is, of course, only a small part of the total social science spectrum, and yet it is perhaps the only specialty which is attempting to bring together within

a rational framework the relationships between technological, economic, social, political, and physical environmental change, to enable man to freely choose from among alternative courses of action those which will lead him toward utopia.

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