

Artigo

BRASILIA – 50 YEARS OF URBAN TERRITORIAL DYNAMICS

Rafael Sanzio Araújo dos Anjos

p. 01-25

Magazine



T - T - T

Electronic Magazine: Tempo
- Técnica - Território, V.3,
N.1 (2012), 1:25 ISSN:
2177-4366

How to quote this article:

Anjos, R. S. A. dos.

BRASILIA – 50 YEARS OF URBAN TERRITORIAL DYNAMICS - Revista

Eletrônica: Tempo - Técnica - Território, v.3, n.1

(2012),p.01:25 ISSN: 2177-4366.

Available in: <http://periodicos.unb.br/index.php/ciga/>

This work is licensed under a Creative
Commons LicenseAtribuição-NãoComercial 4.0
Internacional.

BRASILIA – 50 YEARS OF URBAN TERRITORIAL DYNAMICS

Rafael Sanzio Araújo dos Anjos

▪ Geographer (UFBA), Doctor in Spatial Information (POLIUSP – BR/IRD-FR), Post-Doctor in Ethnic Cartography (MRAC-BE). Associate Professor at the Geography Dept. of University of Brasilia (UnB) / Director of the Applied Cartography and Geographic Information Center of UnB (*Centro de Cartografia Aplicada e Informação Geográfica* – CIGA) / Director of the Milton Santos Geographic Documentation Center of UnB.

▪ Tel: 55(61)3107-7242 E-mail: cartografia@unb.br

Website: www.unb.br/ih/ciga & www.rafaelsanziodosanjos.com.br

Abstract: The urban Federal District (*Distrito Federal – DF*), like most Brazilian metropolitan spaces has shown similar problems, differentiating in degree and intensity of its spatial processes. One of the most relevant issues happens due to the quick paced and uncontrolled urban growth, a spatial fact that causes environmental, social, economic, institutional, and political damage, and mainly, compromises the territorial planning process. Amongst the main spatial components that stimulate expansion, the differentiated polarizing effect of the main locations, the great construction sites of the official process of real estate speculations and the private urban installment plans' consolidation are highlighted. The research seeks spatial representation and interpretation of Brasília's urban aggregate growth process from the 50's of the past century until the first decade of the XXI century, as well as graphically representing the expansion vectors of the urban historiography and tendencies of a close future. The work process shows that the assurance of survival of the preserved spaces is incompatible with territorial usage. These spatial observations, which are processed systematically in other Latin American urban areas, above all, point to the importance of a more effective management of territorial use and dynamics as a fundamental component to decrease territorial incompatibilities and incongruities. This research is one of the products and result of the *Projeto Instrumentação Geográfica e Dinâmica Territorial* (Geographic Instrumentation and Territorial Dynamics Project), processed in the monitoring program of territorial usage in Central Brazil.

Key Words: Territorial dynamics, Brasília, Urban growth, Urban planning, Dynamic cartography.

Resumo: O Distrito Federal (DF) urbano, a exemplo da maioria dos espaços metropolitanos brasileiros têm exibido problemas parecidos, com diferenças no grau e na intensidade dos seus processos espaciais. Uma das questões mais relevantes se processa no crescimento urbano acelerado e descontrolado, fatos espaciais causadores de danos ambientais, sócias, econômicos, institucionais, políticos e, principalmente, comprometedores do processo de planejamento territorial. Dentre os principais componentes espaciais estimuladores da expansão, mostra-se em destaque o efeito polarizador diferenciado das principais localidades, os grandes canteiros de obras do processo oficial de especulação imobiliária e a consolidação dos parcelamentos urbanos privados. O estudo busca fazer uma representação e leitura espacial do processo de crescimento do conjunto urbano de Brasília dos anos 50 do século passado ao final da primeira década do século XXI, assim como, mostrar graficamente os vetores de expansão dessa historiografia urbana e as tendências para o futuro próximo. O processo de trabalho mostra que a garantia da sobrevivência dos espaços preservados está em processo de comprometimento e o monitoramento sistemático do crescimento urbano revela as

incompatibilidades no uso do território. Estas constatações espaciais, que se processam de forma sistemática em outras áreas urbanas da América Latina sobretudo, apontam para a importância de uma gestão mais efetiva do uso do território e da dinâmica territorial, como componente fundamental para minorar as incompatibilidades e incongruências territoriais. Este estudo faz parte dos produtos e resultados do Projeto Instrumentação Geográfica e Dinâmica Territorial, operacionalizado no programa de monitoramento do uso do território do Brasil Central.

Palavras Chave: Dinâmica territorial, Brasília, Crescimento urbano, Planejamento urbano, Cartografia dinâmica

RESUMEN: El Distrito Federal (DF) urbano, el ejemplo de la mayoría de los espacios metropolitanos brasileños han mostrado problemas similares, con diferencias en el grado y la intensidad de sus procesos espaciales. Uno de los temas más relevantes se procesa en lo crecimiento urbano acelerado y descontrolado, factos espaciales causando daños ambientales, sociales, económicos, institucionales, políticos y sobre todo comprometer el proceso de planificación territorial. Entre los principales componentes espaciales estimuladores de la expansión aparece en foco el efecto polarizador diferenciado de las principales localidades, los grandes sitios de construcción del proceso oficial de la especulación inmobiliaria y la consolidación de urbanos privados. El estudio pretende hacer una representación y lectura espacial del proceso de crecimiento del conjunto urbano de Brasília de los años 50 del siglo pasado hasta al final de la primera década del siglo XXI, así como, mostrar gráficamente los vectores de expansión de esa historiografía urbana y las tendencias para el futuro cercano. El proceso de trabajo muestra que la garantía de la supervivencia de los espacios preservados está en proceso de compromiso y lo monitoreo sistemático del crecimiento urbano revela las incompatibilidades en el uso del territorio. Estas hallazgas espaciales, que procesan de forma sistemática en otras áreas urbanas de América Latina en particular, señalaron la importancia de una gestión más efectiva del uso de lo territorio y de la dinámica territorial, como componente clave para mitigar las incompatibilidades e incongruencias territoriales. Este estudio es parte de los productos y los resultados del Proyecto Instrumentación Geográfica y Dinámica Territorial, puesta em marcha en el programa de monitoreo del uso del territorio del Brasil Central.

Palabras Clave: Dinámica territorial, Brasília, Crecimiento urbano, Planificación urbana, Partografía dinámica

Introduction

The land, the territory and territoriality have great importance within the thematic of changes and alterations in the national, regional, and local spaces. We advocate that it is possible to graphically represent and interpret the spatiality configured throughout time and point out its tendencies and physical-environmental restrictions. We support the idea that geography is the science of territorial dynamics and this fundamental component, in a broad sense, is still the best instrument to observe what happened because it presents marks of spatial historicity of what is happening, in other words, it contains records of agents of the present geographic configuration and of what may happen - that is, it

is possible to capture force lines of the spatial movement and point out possibilities of spatial structure for the near future. We cannot lose sight of the fact that this area of knowledge has the compromise of making the world and its dynamics comprehensible to society, of giving explanations for the territorial transformations and of pointing solutions for a better spatial organization. Geography, therefore, is a fundamental subject for the formation of the Brazilian people's citizenship, which presents a singular heterogeneity in its ethnic and social-economic composition and in spatial distribution. In this physical realm is where the cultural and symbolic references of the population are recorded, is where their territoriality is located (ANJOS, 2005).

An important fact to remember is that the United Nations' actions relative to territorial order have revealed and maintained themselves with little success, overall due to lack of a clearly defined policy for the Brazilian territory. Particularly in the country's urban space, this situation has caused, amongst other social-spatial dysfunctions, a continuous anarchical expansion, be it in the vertical, horizontal or rural zone growth, in such a manner that the space density increases more and more, resulting in its deterioration. In this sense, most Brazilian cities show similar problems and present differences in degree and intensity of spatial processes. Expansion of urban peripheries and consequent swelling of the cities is doubtlessly one of the most evident processes in most medium and large sized cities, having various dimensions from economic, political and social mechanisms that take place in the urban space. Although expansion of urban peripheries is generally a common characteristic of most cities and can be explained, it does not form a homogeneous body and present specificities which requires viewing through a more accurate observation lens.

On the other hand, demand for comprehension and resolution of complex issues of society's dynamics are rising and cartography is one of the best placed instruments to answer and inform more seriously what occurred, what is happening and what can occur with territory. In this sense, representations of the monitoring process of the territory, latest generation remote sensing products (mainly satellite images), as well as graphic modeling of the territory (synthesis cartography), form a group of fundamental geographic tools for investigations of this nature. These allow a graphic revelation of what occurs in spatial dynamics and become each day more indispensable for representing, overall, a bridge between levels of observation of reality and a simplification, reduction and explanation and tips for decision making and problem solving (ANJOS, 1992).

We cannot lose sight of the fact that a map is not a territory, but in cartography products are the best possibilities of representing and comprehending the historicity of territory. It is important to remember

that cartography isn't just a drawing either! It is a strategic resource of humanity to transmit, represent and study spatial knowledge. It can effectively aid two fundamental devices of territorial dynamics: technical control, especially answering what occurred and what effectively occurs in territory and political articulation, evidencing and possibly interfering in desirable or non-desirable tendencies for the population and for the dominant system.

This article has the objective of creating a spatial representation and interpretation of the growth process of urban Distrito Federal (Federal District) in the last forty years of the past century, until the ending of the first decade of the XXI century, as well as graphic representation of the expansion vectors of this urban dynamics. In spite of Brasilia's fifty years of existence, if we compare its historiography with the ones of most Brazilian cities, a lot has been written about its particular spatial organization. However, few studies approach the urban spatial dynamics contemplating many analytical dimensions and prospective views of the urban group from interpretation of real and operating tendencies.

Another relevant aspect is the fact that geographically, at the Brazilian *Planalto Central* (Central Highlands) is the synthesis of all "Brazils". This is where we find a young metropolis which already shows spatial contradictions, verified in the great and ancient cities of Brazil.

In this way, we intend, with this article being directed to the urban dynamics thematic, to circumscribe the phenomenon of geographic expansion in the territory, particularly urban, identify its specificities, quantify the problematic and overall, seek for an extensive interpretation. The paper is divided in four parts. Initially, there will be a discussion in relation to presumptions adopted for territorial dynamics, urban expansion, spatial monitoring, urban spots, amongst other relevant references to the context of the thematic in question. The following part discusses the monitoring of urban expansion in DF (Federal District) and the spatial history of its growth vectors. Another portion discusses the aspect of the present and a near future's urban spot, the expansion vectors and references related to environmentally restricted spaces for urbanization in the Federal District. The last section contains the conclusion and spatial recommendations directed towards two distinct segments: growth vectors and environmentally restricted spaces for urbanization. Through this structure, the aim is to effectively contribute to expand the knowledge of territorial dynamics in a more ample sense, in other words, to contemplate structural thematic axis in order to understand them in a geographic and cartographic perspective.

0. An approach for urban space, territorial dynamics and cartographic representation

We seek an approach of the urban space in a dynamic perspective, where the reference is the city's growth rate, one of the basic components of urbanization. It is a spatial process with temporal dimension, in which comprehension on the present time constitutes changes of the past and possibility of variations for the near future. In this manner, spatial dynamics is understood as a group of interconnected and established events, where their interaction reflects the structure of reality. In spite of urban periphery's expansion being in a general sense a common characteristic to most Brazilian cities and can be explained, it does not take on a homogeneous aspect. The expansion process that takes place and the spatial configuration resulting from the urban spot take on local characteristics, with particular specificities, and this makes their understanding an even more complex task. However, it is a premise that problems faced by cities have solutions, that there are alternatives for progress and life quality, that it is possible to direct urban expansion and the investigation instruments and devices to control unwanted tendencies exist.

Based on the various possible interpretations aroused by the terms of urban growth, territorial monitoring and spatial structures, it is considered fundamental to express our understanding. Initially, it is important to highlight that we understand the city's physical expansion as one of the basic components for urbanization, as a social and human space. We also take into consideration that the urban road system model is one of the basic factors for dispersive growth and pulverization of the city. Being so, in this and in other papers, we assume that there is horizontal growth of the city space and it is a spatially noticeable process, dynamic, with territorial extension and resulting in configurations. We also utilize, overall in cartographic documentation, the expressions "urban surface" and "urban spot" meaning the urbanized area of the territory. A spot is understood as a limited portion of the territory that differs from the surrounding environment (ANJOS, 2008).

Another premise states that development of spatial monitoring allows a review of the history of determined geographic facts, making it possible to reinterpret the occurred processes, supplying elements for perceiving what happens in present days, as well as providing verification of the spatial tendencies. It is important to remember that a spatial monitoring process allows for characterization of two essential dimensions of geographic information, that is, the place where it is found and the moment in which it occurs. **Figures 01** and **02** graphically reveal the fundamental references for recording and reading of territorial monitoring and capture the force lines of spatial growth.

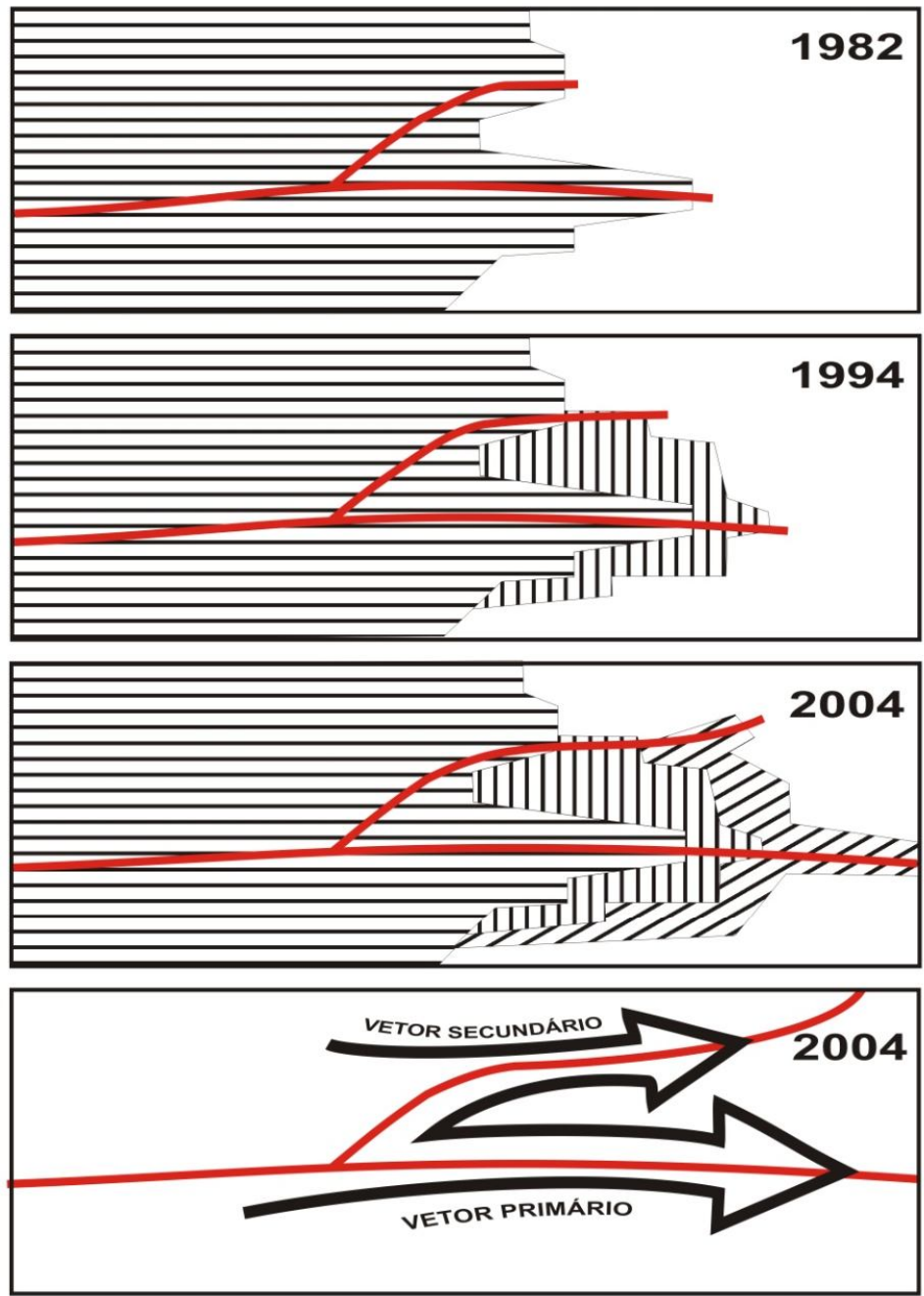
Referring to the understanding of a spatial structure, we agree with Serra's concept that defines it as being the "totality of existent interactions between the elements of the groups, between group classes and the group of spatial points considered" (SERRA, 1987, p. 36). This concept contemplates in a certain way definitions already proposed by other authors and is not contrary to the understanding that expression "structure" has been taking on in contemporary science.

The expression "spatial scheme", also applied in this research, refers to complex relations existent between the actors of the various dimensions of geographic space organization. In this sense, when we discuss the scheme of territorial agents, we are referring to the noticeable relationships that happen in territorial dynamics, occurring and measurable.

As maps are selective graphic representations of the real world with qualitative and/or quantitative cartographic messages, the records of variation of certain entities over time and space are still one of the most relevant and attractive segments of discussion in Thematic Cartography. The conceptual complexity existent in this segment of scientific cartography, due to its many approaches, has a fundamental concern in dynamic representations. This happens because the spatial entities and their respective attributes change in position, as well as in physiognomy of the territory, and these issues of graphic representation are still under discussion and refinement.

The most commonly adopted solutions for dynamic maps can be characterized based on two basic principles: first, by inserting the spatial information in an evolving context (temporal series or time intervals, for instance), composed of a process that results in many thematic maps that show the operating changes in its appearance; the other way is resolve the issue of dynamic cartographic representation is to present in a single map the effected changes (position and physiognomy) in a classified spatial entity. We have followed the first procedure, amongst the more commonly applied solutions, for maps with dynamic representations. The development of territorial monitoring is one of the main points for dynamic representation, since spatial historicity allows an effective reading of the movements that have happened and the directions taken (ANJOS, 1991).

FIG. 01
REGISTRATION PROCESS OF VECTORS
URBAN GROWTH IN THE TERRITORY



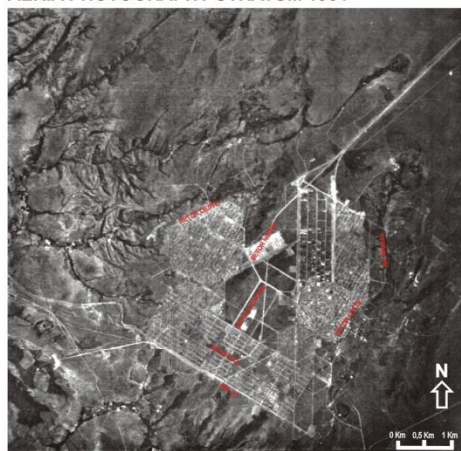
LEGEND

URBAN AREA 1982	URBAN AREA 1994-2004
URBAN AREA 1982-1994	ROAD SYSTEM ESTRUTURAL (AXLE CONDUCTORS OF URBANIZATION)
	VECTOR URBAN EXPANSION

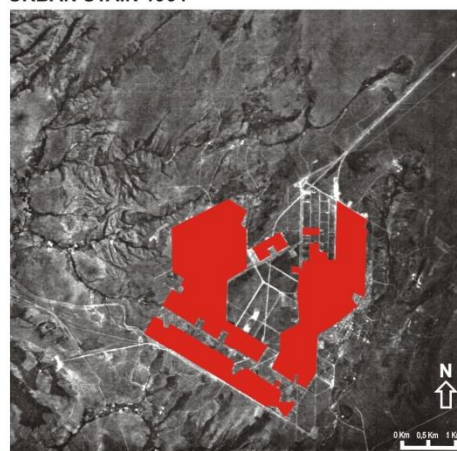
© GEOGRAPHIC AND CARTOGRAPHIC PROJECT BY GEÓGRAFO RAFAEL SANZIO ARAÚJO DOS ANJOS. TECHNICAL ASSISTANT: TALITA CABRAL. CREA 15604/D E-mail: cig@unb.br BRASÍLIA - DISTRITO FEDERAL - BRASIL 2007

FIG. 02 FORMATION OF THE INFORMATIONAL BASE OF THE URBAN EXPANSION MONITORING IN THE TERRITORY - THE EXAMPLE OF GAMA LOCATION - DISTRITO FEDERAL 1964-2007

AERIA PHOTOGRAPHY STRATUM 1964



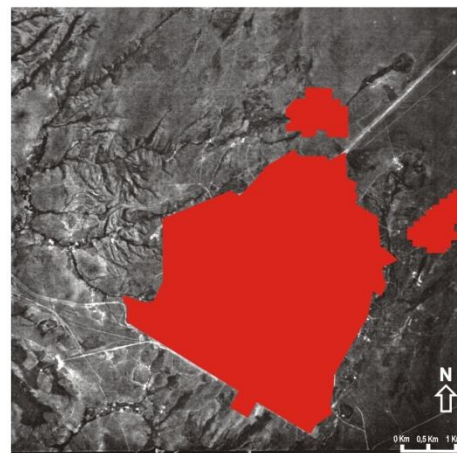
URBAN STAIN 1964



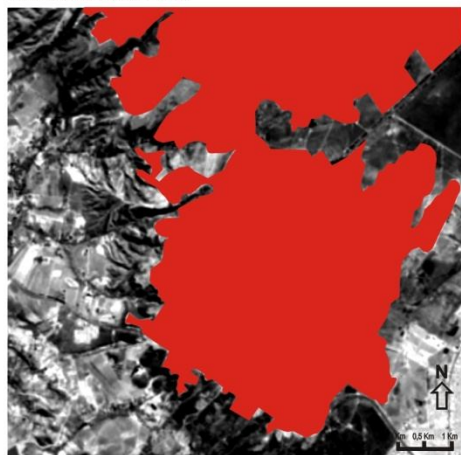
URBAN STAIN 1977



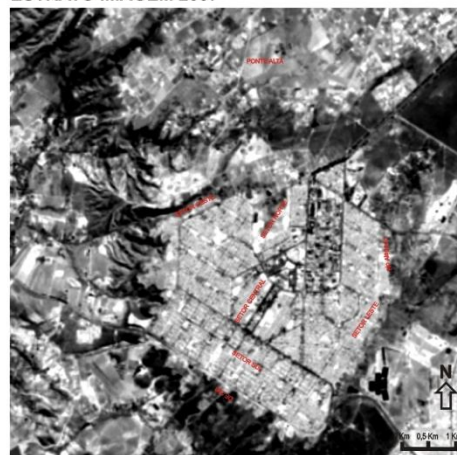
URBAN STAIN 1995



URBAN STAIN 2005



ESTRATO IMAGEM 2007



SOURCE: ANJOS, R.S.A. 1991 / ANJOS, R.S.A. 1995 / ATUALIZATION OF URBAN STAIN YEAR 2000 - ANJOS, R.S.A. 2001© GEOGRAPHIC AND CARTOGRAPHIC PROJECT BY GEÓGRAFO RAFAEL SANZIO ARAÚJO DOS ANJOS TECHNICAL ASSISTANT: TALITA CABRAL E RAFAEL FARIAS. CREA 15604/D E-MAIL: cartografafa@unb.br. BRASÍLIA - DISTRITO FEDERAL - BRASIL. 2007

As we touch upon the subject of systematization of the process of urban space evolution as a possibility to, in a simplified form, represent aspects of territory dynamics, there is margin for the existence of an urban situation that can be treated in this process of capturing reality. The process of monitoring the urban expansion of the Federal District (*Distrito Federal* - DF), our space for interpretation and representation are presented in the following part.

1 Monitoring of urban expansion in DF 1940 – 2010 and dynamics of expansion vectors

Monitoring of urban expansion of DF, in other words, graphic representation of urban spatial dynamics, arises from the search of a more ample interpretation, seeking minimization of fragments and directs itself to a practical application, without any intention of exhausting the theme. It is symptomatic that the urban space of the Federal District has not been deserving of a great number of group studies, be it because of the interdisciplinary coverage, be it due to the necessity of technologies and sophisticated tools with great capacity for data integration, or even for the challenge of dealing with territory as lens that allow a view of the whole. Making predictions for the urban space is also fearful. However, not dealing with the future of the city is desertion.

The execution of the process of interpreting territory usage with remote sensing products, which provide a view in distinct spatial resolutions, the spaces considered as urban involve the following activities: residences, commerce, industry and institutions, in other words, constructed areas of the territory, identification conditions in the form of spots in the working scale. It is important to highlight that the existent and non-occupied urban parcels, aggregated or not to the continuous urban area, were considered in the interpretation process. In this way, each investigated moment had its independent thematic mapping, corresponding to two basic facts - the effectively occupied urban spot and the parceled areas. The identification of spaces that have suffered alteration during the urban expansion was accomplished by overlapping cartographic documents from each historical moment.

The fieldwork was used as terrestrial basis, checking and defining that showed problems of separation with other uses. The result is a sequence of thematic maps that constitute the monitoring of urban expansion in DF, showing successive incorporation of new areas in the city cluster, result of a collective creation, recording temporary features of the urban space, with different forms and rhythms.

The eight spatial configurations registered in **Figure 03** represent the concrete expression of urban dynamics in the geographic space, in other words, a synthesis of the historical processes acting on the formation and consolidation of each moment. The spatial data of expansion on the urban territory in DF show the successive incorporation of new areas to the urban cluster, registering momentary features of space, with different shape and rhythm. The interpreted spatial expressions approach distinct phases with different conceptions of a city, especially in the form by which power is exerted and the means of production of the space.

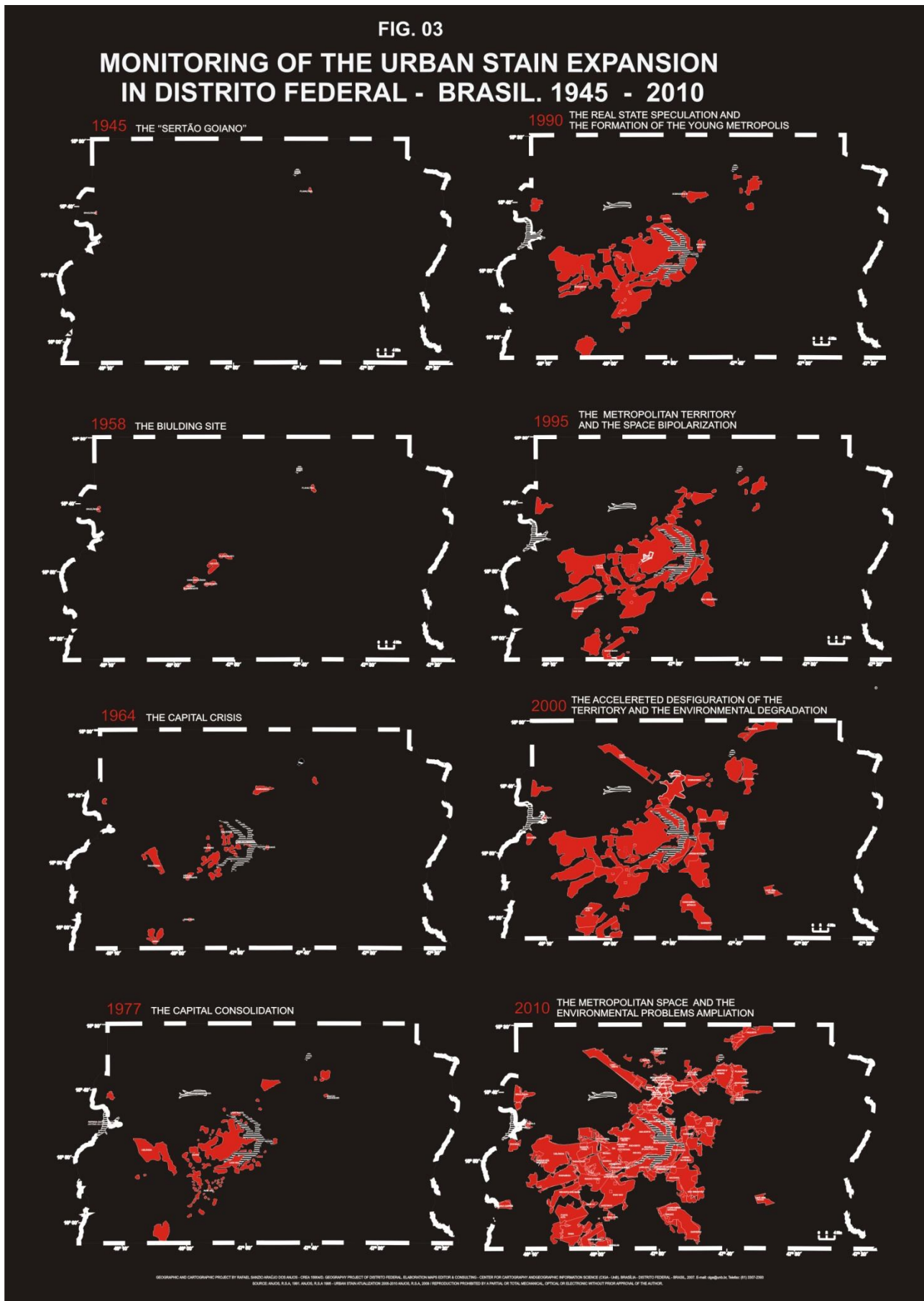
This chronological sequence expresses, cartographically, that the urban space is never organized in a definitive manner, that it is not static; on the contrary, it modifies and moves permanently. The syntheses of the main historical-spatial-environmental conjectures of territorial monitoring are the following:

1958 –This is the period of physical implementation of the Federal District (*Distrito Federal*), when the process of territorial transformation of the nuclear area of the *Cerrado* Biome is effectively begun. It can be characterized as the Work Site moment;

1964 - With a spot of 4.588 ha, we verify a city with scarce and small spots, evidencing a spatial pulverization process of the implanted urban cores. This period reflects the crisis of the administrative capital of the country;

1977 - Brasília reveals an urban group, representing the first favorable process of urban expansion, increasing 11.526 ha in its urban spot. The definition of a poly-nucleated urban structure reinforces the consolidation of the federal capital, reflecting strong social-spatial segregation;

1990 - This is the phase of exhaustion of spaces for expansion in the *Plano Piloto* and in most of the denominated “satellite cities” that were implemented. It is observed that a greater number of invasions for habitation appear and there is an intensification of additional measure of the State, creating settlements without discussing the habitation problem in the necessary dimension. With a young urban cluster extending for 30.962 ha, Brasília presents itself with indicators of a Young metropolis, be it for **2000** – With a surface of approximately 64.690 ha, therefore more than twice the urban area of 1990, a more assumed metropolitan urban cluster is verified, overall due to the territorial dimension, the environmental degradation process and tensions in the structural and secondary road system;



2010 - The urban spot of metropolitan expression, a fast-paced rhythm of territorial transformation (rural-urban and agricultural-urban) and a significant amplification of environmental problems, the concrete result of a young metropolis is an urban cluster of 90.000 ha and similarities to structural issues of the great, older Brazilian cities. Brasília truly presents itself as a summary of Brazil: the old and the new, projected and non-projected, richness and poverty, planned and unplanned, high density and low density, resulting in a territory filled with extremes and territorial contradictions. The rapid and uncontrolled growth process (see data in **Graphs 01** and **02**) that took place brings attention not only to the increase of poverty and environmental degradation, but also in the downsizing of a fragmented urban cluster, which reinforces and still maintains a social-spatial segregation in the territory.

This spatial monitoring represents the concrete expression of the urban dynamics in the geographic space, that is, the synthesis of historical processes acting upon the formation and consolidation of each moment. The clippings in time show specific situation in determined moments, constituting static views, but when observed as a group, a dynamic view is possible, in other words, capturing the movement of diverse rhythms and spatial history. With references that accuse the highest rate of urbanization in the country (over 90% of urban population) and of not being able to foreshadow the problematic situations that could possibly occur in the expansion process, DF has projected in its metropolitan and young landscape, especially in the outskirts, the spatial contradiction that can be observed in the Brazilian metropolis. The monitoring of confirmation of the tendencies of urban expansion of DF's territory are discussed in the following item.

1.1 Dynamics of the urban expansion vectors of DF

Development of spatial monitoring allows us to relive the history of geographic facts, what happens presently and also capture dislocations of spatial flow. Through this, based on the force lines from the formation and growth processes of urban spots, verified in the spatial monitoring of DF, it has been possible to measure the movement of the expansion vectors developed throughout time and space. The expansion vectors at the territory are most evidently conducted by the structural road system. The

cartographic solution that was used to represent the spatial flow tendency of the urban parcels has for premise the representation of the vectors. The expansion vectors are characterized for being a segment with linear or zonal dimension that presents an oriented direction. The resulting maps present materialization of the dislocations through arrows, according to the pointed direction. Its variations in the presentation form occur according to length, size, grain and shape (ANJOS, 1992).

In monitoring the urban growth dynamics in DF, the expansion vectors in the urban historiography of this territory are measured. Based on the movements of the expansion process, it was possible to identify the force lines in the urban area at different historical moments, as well as pointing out the present developing vectors. The main expansion vector is understood to be a territorial extension with well evidenced marks of the present and near future's urban growth, being its main conductor the road system and the conductor-stimulator factor of the spatial transformation process. The secondary expansion vectors are understood to be areas with a tendency of having space added to the urban space, nearly all are associated to a road axis and with agents operating for its expansion with greater or smaller evidence.

The movements expressed by the vectors shown in **Figures 04** and **05** represent the tendencies captured from a specialized historic process. The most significant tendencies are the following:

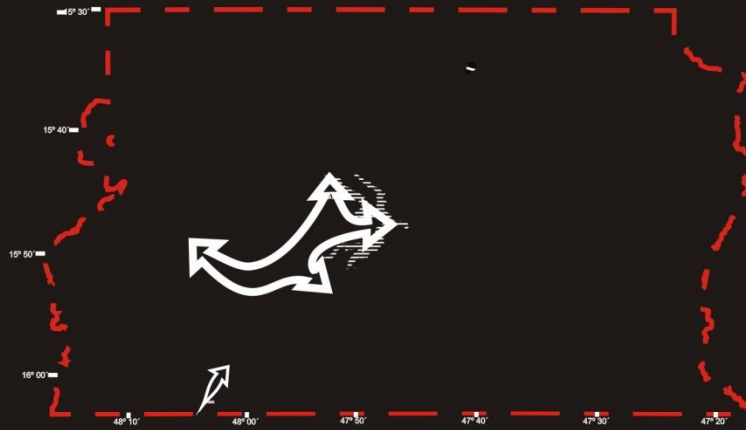
1. *Sobradinho Planaltina Fercal Lago Oeste* Axis

In this Northern segment of *Distrito Federal*, in the four expansion flows and urban consolidation, the structural issue is the environmental impairment caused by the high habitation density (*Arapoangas*, for instance), expansion to areas of springs concentration and irregular terrain (locations of the *Fercal* vector are some examples) and the anthropic pressure at the boundary of Brasília's National Park (*Parque Nacional de Brasília*) (the occupation density of *Lago Oeste* constitutes the evident situation in this process).

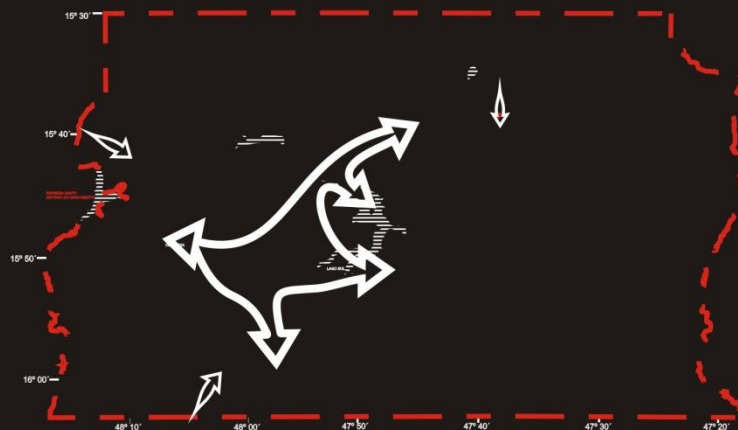
2. *Taguatinga, Ceilândia* and *Brazlândia* Axis

On the road flow, in the direction of locations such as *Águas Lindas de Goiás* and *Pirenópolis*, the expansion process and consolidation of great peripheral housings in *Águas Lindas de Goiás* and the use transformation in horticultural areas close to the *Descoberto* Dam (*Barragem do Descoberto*), constitute the fundamental factors of the territorial configuration change operating in this part of DF.

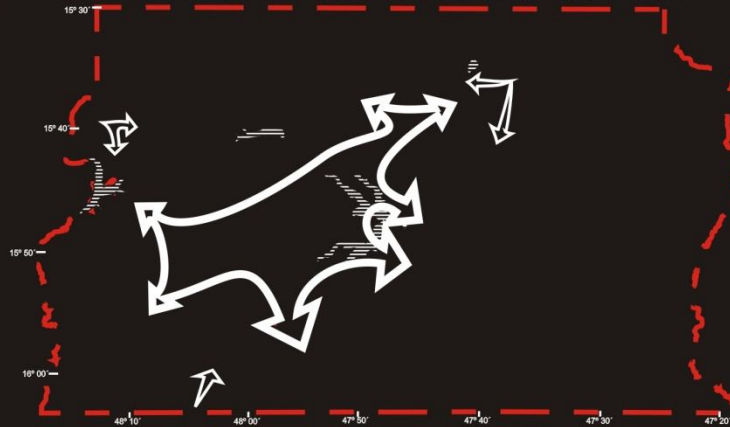
FIG. 04
MONITORING THE DYNAMICS OF GROWTH
URBAN IN DISTRITO FEDERAL 1964 - 1977 - 1995
VECTORS OF URBAN EXPANSION IN DF. 1964 - 1977



VECTORS OF URBAN EXPANSION IN DF. 1977 - 1990



VECTORS OF URBAN EXPANSION IN DF. 1990 - 1995



LEGEND



VECTOR OF GROWTH
URBAN PRINCIPAL



VECTOR OF GROWTH
URBAN SECONDARY



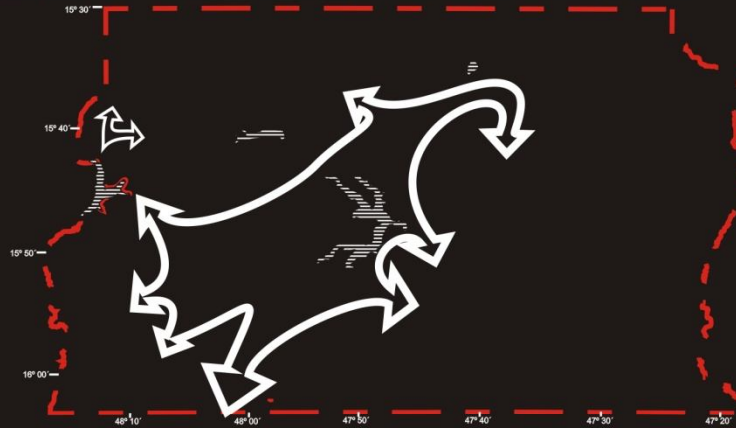
DIKE - DAM



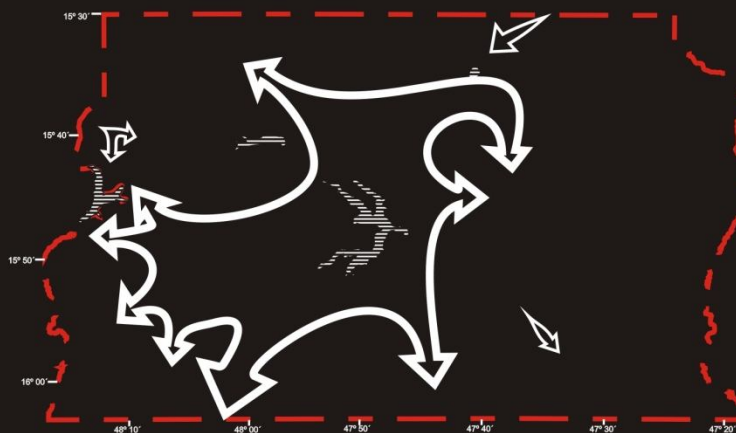
LIMIT DF

PROJETO CARTOGRÁFICO E GEOGRÁFICO BY RAFAEL SANZIO ARAÚJO DOS ANJOS - CREA 15604/D. CIGA - UnB . BRASÍLIA - DISTRITO FEDERAL - BRASIL, 2007 . E-mail: cartografia @unb.br
FONTE: ANJOS, R.S.A, 1991 - ANJOS, R.S.A 1995 - ATUALIZAÇÃO DA MANCHA URBANA 2007 - ANJOS, R.S.A, 2001

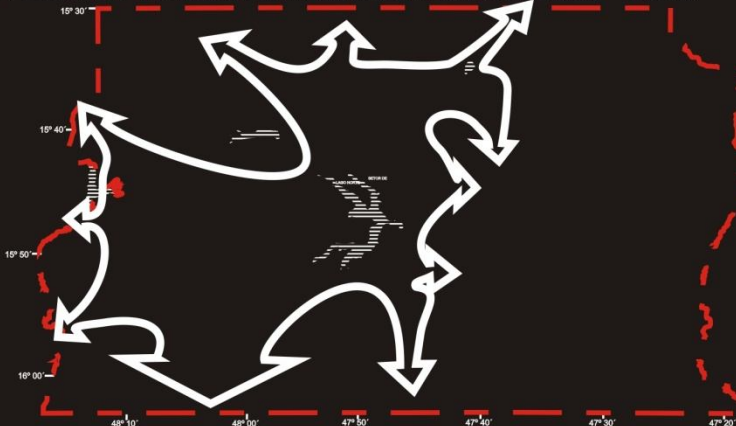
FIG. 05
MONITORING THE DYNAMICS OF GROWTH
URBAN IN DISTRITO FEDERAL 2000 - 2005 - 2010
VECTORS OF URBAN EXPANSION IN DF. 1995 - 2000



VECTORS OF URBAN EXPANSION IN DF. 2000 - 2005



VECTORS OF URBAN EXPANSION IN DF. 2005 - 2010



LEGEND



VECTOR OF GROWTH
URBAN PRINCIPAL



VECTOR OF GROWTH
URBAN SECONDARY



DIKE - DAM



LIMIT DF

PROJETO CARTOGRÁFICO E GEOGRÁFICO BY RAFAEL SANZIO ARAÚJO DOS ANJOS - CREA 15604/D. CIGA - UnB - BRASÍLIA - DISTRITO FEDERAL - BRASIL, 2000 - E-maitcartografia @umb.br
 FONTE: ANJOS, R.S.A. 1991 - ANJOS, R.S.A 1995 - ATUALIZAÇÃO DA MANCHA URBANA 2007 - ANJOS, R.S.A, 2001

3. *Taguatinga, Samambaia and Santo Antônio do Descoberto* Axis

Consolidation of the *Samambaia* urban space, flow directed to *Goiânia* and configuration of *Santo Antônio do Descoberto* as a dormitory town and bearer of an expansion and consolidation of urban housings directed to the boundary of DF compose the basic stimulating elements of this expansion vector located in the West portion of the federal territory.

4. *Gama South Outskirts Luziânia* Axis

With a regional scenario flow, connecting the center of the country to the South-Southeast Region, this vector expresses the dynamic nature in the South direction of DF. The consolidated urban housings of high density in locations of *Novo Gama*, *Valparaíso* and *Cidade Ocidental*, associated to the significant growth of the municipal capital of *Luziânia*, reveal a strong process of fast transformation that went by and still goes through this urbanization axis at RIDE-DF. This is the most important territorial dynamics expansion vector.

5. *East Vale São Bartolomeu* Axis

The left margin of the *São Bartolomeu* River valley constitutes the preferred territorial extension for the process of expansion of urban housings in *cerrado* areas with different preservation levels. Three growth lines are well defined in this direction, the fundamental consequence being environmental impairment, overall for the water sources (siltation) and vegetation coverage, particularly the spring which are being destroyed by the urban traces of installments.

The dynamics pointed by the growth movements shown in the thematic maps must be faced as another instrument to help comprehend territorial dynamics, as a background for a decision making sector and not as a consummated fact in space. Basic aspects of the constitution of the urban spot for the near future and environmental commitment are approached in the following part.

2 Dynamics of the urban space in a near future and physical-environmental restrictions of DF

The identification and recognition process of the present urban spot and its growth vectors constitutes as a reference for configuring future tendencies. The spatial ascertainments, like different levels of

consolidation of urban parceling, systematically pulverized in DF's territory are indicators that show the irreversibility of this spatial process, as well as thickening of the urban structure (ANJOS, 2008).

There is a possibility that not all of the spots will be consolidated, due to interference of State actions or by a real stabilizing of the habitation deficit. However, the projected area of 91.334 ha presented in the extremities of practically all urban growth axis (2010), must be understood as yet another instrument to aid in the comprehension of a developing spatial process, as a reference for government decisions and actions, overall. This graphic representation of the formation of urban spots is not only a spatial indicator to aid in the comprehension of a developing urban process, as well as scenery for real and possible bases of the territory's urbanization. Some ascertainments of the transformation process in the usage of territory are relevant:

1. It was verified that the present and near future's urban spot continue to and possibly will continue to occupy areas previously covered by herbaceous vegetation. This fact was established in the implementation of locations such as Samambaia, Ceilândia, Gama, Santa Maria, and recently, in urban occupations such as Estrutural and Itapoã. The main issue is that during the speculative process of territory usage, involving natural and urban spaces, the latter assumes a more valued position;

2. The productive agricultural spaces are also significant examples of transformation in urban spaces. The Agricultural Colony Vicente Pires (*Colônia Agrícola Vicente Pires*), in the proximities of Taguatinga, is the most emblematic example of this type of transformation, followed by a more recent process in the area of Ponte Alta, in the whereabouts of Gama. Some areas of the preservation planted forest of pines and eucalyptus constitute, in spite of the environmental restrictions, vulnerability spaces for urban occupation. In the proximities of Paranoá, a significant area has been deforested for a non-authorized urban expansion. Due to the importance of these areas as recharge spaces for aquifers, and also, of limiting the urban growth process, the matter of permanent territorial monitoring becomes a fundamental component to diminish the spatial incongruence in transformations of territorial use (ANJOS, 2005).

The distribution of the presented spots must be faced as an auxiliary instrument to comprehension of a process that unwinds, as a background screen for decision making and not as the whole of it. It is understood that it is only possible to have a consistent posture in measures to be taken presently when the perspectives of what the future will be like are visible, feeding, therefore on expectations and

especially on speculations of what could happen. The future of the city is not treated as a certainty, but as a tendency. Our focus is to work with spatial tendencies and ascertainments, real and acting.

It is relevant to notice that the monitoring of urban expansion dynamics constitutes only one record of time-space, but reflects public, population, economic and cultural dynamics. The data reveals a continuous growth of the urban spot and its population and points to the management of the problem of space for habitation. The population increase takes place basically in outskirts areas, creating dysfunctions in Brasília's urban structure. A severe effect of this accelerated population growth is the disjunction with the economic growth and urban infra-structure, generating unemployment and traffic jams on the structural roads, especially in the outskirts. This spatial situation, with movements of the urban space, still reveals an urban cluster that maintains itself without being able to preview and solve problems that affect it, especially related to the growth process. Even more, investigation of the evolution of the urban spot allows the supposition of a tendency of stabilization of the urbanization phenomenon, mainly due to concrete existent limitations in the usage pattern of DF's territory. The physiographic restrictions in DF's territory to the urbanization process are briefly characterized in the following item.

2.1 Environmentally restricted spaces for urbanization in DF

Even though the urban cluster of Brasilia is one of the most studied spaces of Brazil, many of its locations and part of the urban spot are present in areas where there are environmental restrictions to urbanization. Besides the people who inhabit these nuclei having suffered from the serious problems caused by the lack of planning, the decision making sector, due to the high costs created by the precariousness of the managing process, sees itself forced into releasing a great amount of resources towards infra-structure.

The indicators which are constituted of physiographic elements (soil, geology, slope gradient, geomorphology, vegetation, climate, etc.) are important references in characterizing restrictive spaces to urban occupation. At this opportunity, we give preference to classes of greater environmental vulnerability, or, to types of soil and slope gradient of the terrain (ANJOS, 2008).

Taking the relationship between soil type and erosion susceptibility in *Distrito Federal* as reference, it was possible to classify two basic categories: moderate soils (Reddish Brunizem, Cambisols, Oxisols, Red-Yellow Podzolic) and strong (Quartz Sands, Cambisols, Red-Yellow Podzolic and Alluvial And Hydromorphic Soils). In reference to slope gradient, areas with gradients over 20% are considered as environmentally restrictive for urban occupation.

The observation on **Figure 06**, which represents thematic cartography along with the extension of the environmentally restrictive spaces for urbanization (urban occupation), indicates the following:

A. First, the valley of *São Bartolomeu* River, from the spots of restrictive spaces, has an extension which deserves particular attention, be it at the right (East) margin with the progress of great cultures, be it at the left side (West) with distinct records of urban growth;

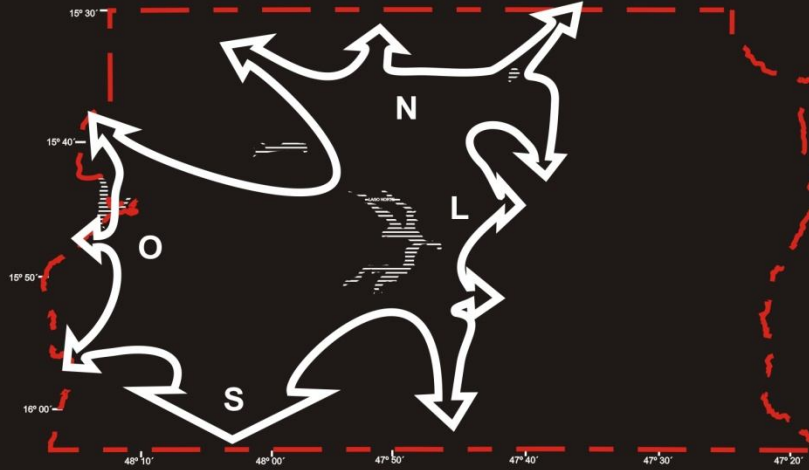
B. The North – Northeast of DF, being vulnerable at spaces with irregular topography, great concentration of springs, dense drainage system, and many records of caves and waterfalls, constitutes an area of relevant importance to monitor and plan the occupation process and spatial interventions;

C. The South – Southwest area is where the main axis of the territorial dynamics of DF is found, and consequently, by the records of environmentally restrictive spaces, this is the cluster where urban environmental damages are most significant. The erosive processes registered in the outskirts of the *Ceilândia* location are a historical reference of this conflict during the occupation process.

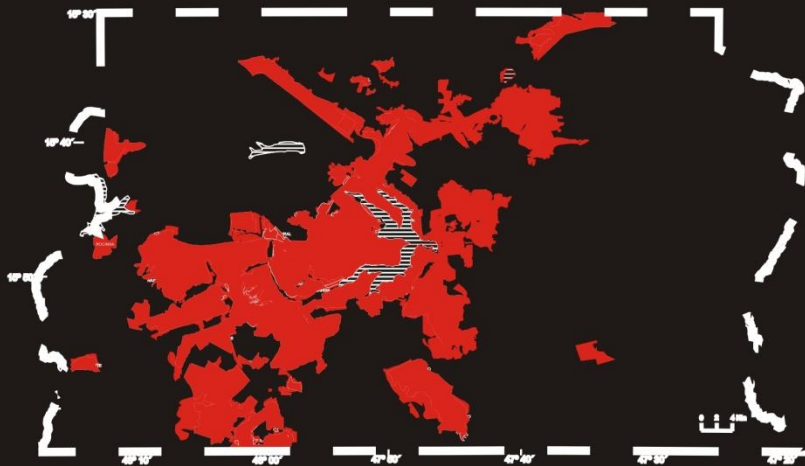
Figure 07 shows four examples of consolidated urban spaces with distinct habitation types, geographically located in areas with physiographic restrictions to urbanization. These kinds of conflicting occurrences are confirmed in many segments of the present urban spot's structure of DF. Some references of urban expansion vectors and contexts of restrictive spaces for urbanization, as well as the main conclusions and recommendations of the study are treated in the following section.

FIG. 06

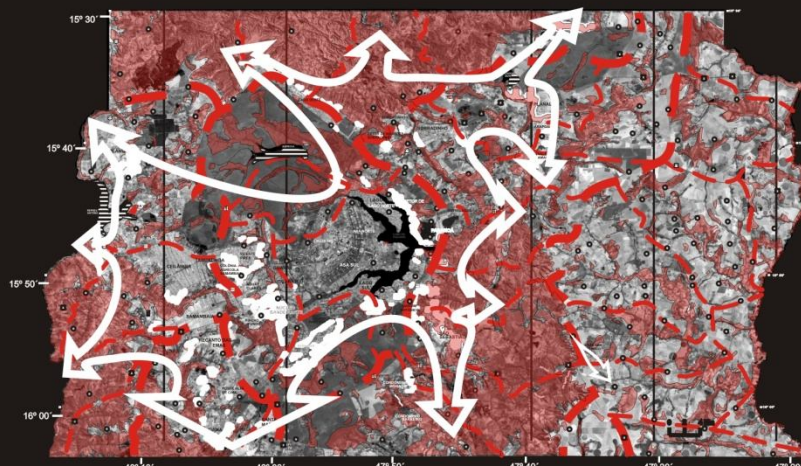
Dominant Directions in the Urban Expansion Vectors DF. 2005 - 2010



URBAN STAIN OF DF 2010 - METROPOLITAN AREA AND EXPANSION OF ENVIRONMENTAL PROBLEMS



PHYSICAL SPACES RESTRICTIVE URBANIZATION AND THE URBAN EXPANSION VECTOR OF DF. 2005 - 2010

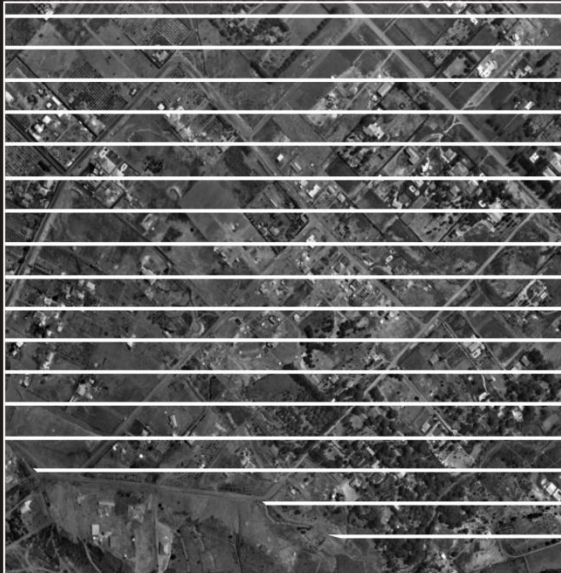


CARTOGRAPHIC PROJECT AND GEOGRAPHIC BY RAFAEL ARAÚJO DOS ANJOS - CREA 15604 / D. CIGA - UNB. , BRASÍLIA - DISTRITO FEDERAL - BRAZIL, 2010. E-mail: cartografia@unb.br
SOURCE: ANJOS, RSA, 1991 - ANJOS, RSA 1995 - URBANA STAIN UPDATE 2007 - ANJOS, RSA, 2000

FIG. 07

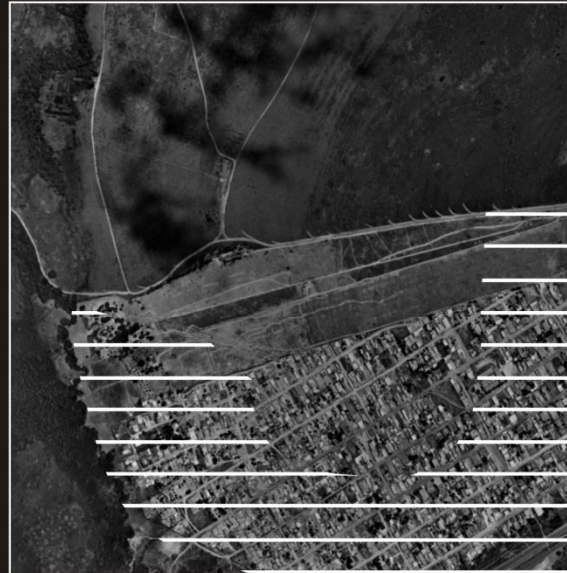
EXAMPLES OF AREAS WITH ENVIRONMENTAL RESTRICTIONS FOR URBANIZATION IN DISTRITO FEDERAL

EXAMPLE OF RISK AREAS



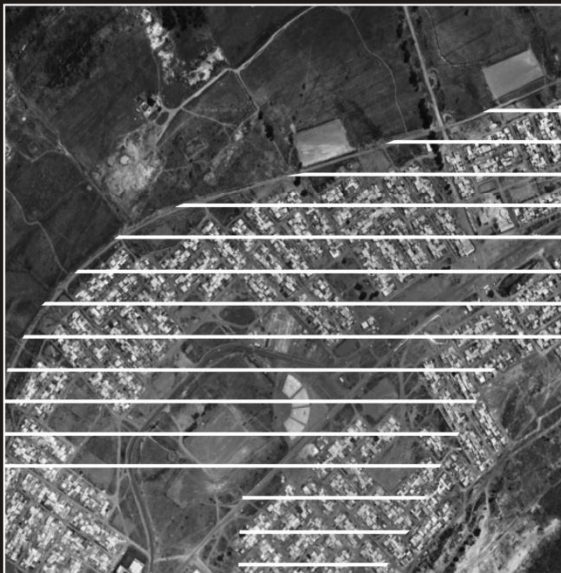
ÁGUAS CLARAS

SITE LOCATION IN HAZARDOUS AREAS IN DF



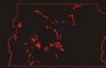
PLANALTINA

SITE LOCATION IN HAZARDOUS AREAS IN DF



RECANTO DAS EMAS

SITE LOCATION IN HAZARDOUS AREAS IN DF



SÃO SEBASTIÃO

SITE LOCATION IN HAZARDOUS AREAS IN DF



PROJETO CARTOGRÁFICO: GEOG. RAFAEL SANZIO A. DOS ANJOS, CIGA - GEA - UNB, BRASÍLIA - DF - BRASIL, 2002 E-mail: ciga@unb.br AUXILIAR TÉCNICO: LEONARDO F. FREITAS.

3. Conclusions and recommendations

In the process of giving closure to the study, it was found to be relevant to highlight some basic territorial facts confirmed in the spatial structural ascertainments of the cartographic documentation developed, particularly in crossing the present expansion vectors, the urban spot for the near future, the hydrographic basins and the physical-environmental restrictions of *Distrito Federal*. The spatial integrations reveal conflicting territories and that configure a series of incongruences in occupation patterns and their tendencies, facts that express a series of incompatibilities and contexts in the forms of taking over this space. Seeking systematization of the group of observations, we have grouped four basic orientations according to the tendencies configured in the present urban expansion vectors. They are the following:

The Urban Dynamics Core (C)

In the *Paranoá* Basin is located the core of territorial dynamics of DF and the most environmentally compromised spaces. Pressure and invasion of spaces of environmental preservation reveal the importance of creating real devices to decentralize activities in this important territorial unit. The many occurrences of consolidated urban spaces in areas of environmentally physical restrictions point to the need of more detailed investigation of the damage level and existent solutions in these sites. In this sense, the implementation of a priority spatial monitoring to control the process and aid in solving the problems is a structural path do diminishing and stabilizing these records. With few exceptions, like the *Paranoá* and *Sobradinho* locations, most part of the urban space is already expropriated, as well as a significant portion of the East of DF, characterized by occupation for agroindustry. A significant part of the problems from incompatible territorial usage lies in the disharmony between the executable proposition and the land's reality. The *Paranoá* basin will still detain most of the extension of the consolidated area of *Distrito Federal*. The amplification of alteration of the natural draining system and the soil sealing of the territory points to gravening of the environmental conditions of the central area of DF.

North Vectors (N)

The space of the *Maranhão* Basin, due to its environmental sensibility, revealed by the concentration of water springs, the irregular landscape, and the extensions of gallery forests and *cerradão*, shows a need for priority of compatible uses with the particular characteristics of this territorial unit. Physiographic restrictions of the *Maranhão* River basin's region reaffirm the previous observation that concerns the stimulated occupation pattern(s) in this geographic unit will constitute the survival reference of the preserved springs, of the exuberant vegetation and stable irregular topography. Particular attention should be given, as well, to areas that are environmentally sensitive in the North of DF. The urban expansion border, particularly of private land parceling in the outskirts of *Sobradinho* and *Lago Oeste*, require systematic monitoring in the sense of avoiding and expanding the chain reaction of erosive processes in the area.

South Vector (S)

The springs of *Corumbá* River basin, with significant occupation and consolidated locations such as *Gama* and a series of spaces in usage transformation process (agricultural to urban) such as the *Ponte Alta* area, point to the necessity of a more efficient territorial management.

East Vector (L)

In the *São Bartolomeu* basin, where we find great extensions of *Cerrado* with different alteration levels, is the most vulnerable space for use transformation, especially urban and agricultural. The *São Bartolomeu* River valley, with its strategic placement between vast extensions of great cultures and the urbanization core, proves to be a prioritized vulnerable area to additional environmental problems, mainly due to the group of urban growth vectors already in development and the consolidation of this territorial unit. The *São Bartolomeu* River basin, because of its mediating importance between the great urban and agricultural spaces, assumes a structural role in territorial equilibrium. At the left (West) margin of this hydrographic unit is where the urban expansion advancement and the greatest change in configuration of the altered *cerrado* vegetation are concentrated.

West Vector (O)

The presence of the *Taguatinga-Ceilândia-Samambaia* urban group at the *Descoberto* River basin indicates demographic concentration in a dynamic space still surrounded by agricultural spaces, already in process of use transformation.

Figure 08 shows a group of expansion vectors with distinct spatial expressions and territory strength, facts that reveal a necessity of geographic monitoring of the space as a basic tool for the planning process and territorial management.

A tendency for stabilization of horizontal urban expansion of DF is established, be it in spatial records or in quantitative data. In other words, the velocity of the expansion of the urban cluster of Brasília must continue in a slower rate than the ones verified earlier. With this perspective, a new territoriality for urban *Distrito Federal* is configured, where the creation of an ample planning and management structure will be necessary, one that does not implicate of weakening of the decision making sector but attributes different features to it with less centralized, more representative and more direct actions.

The holistic knowledge to create alternatives for territorial occupation, that redirects some present undesired tendencies to avoid compromising more development and the living quality of the population, presently goes through a retake of reflections about new spatial elements acting in the urban fabric of this territory, based upon realistic presumptions, from the point of view of the production process as well as from its own limits.

The lack of a permanent evaluation process of the decision making sector over the growth of the urban cluster of Brasília is a historical gap to be corrected in order to obtain management with better apprehension of the spatial dynamics. In this sense, the information flow between State companies through a territorial planning center with clearer specification of attributions and fulfillment of data flow manager is a structural institutional gap in DF and RIDE.

4 Bibliographic References

ANJOS, R.S.A.

Crescimento Urbano Horizontal do Distrito Federal. *Revista Humanidades*, Brasília, v.8, n. 3. Editora Universidade de Brasília, p. 407-415, 1992.

ANJOS, R.S.A. Estruturas básicas da dinâmica territorial no DF. In.: PAVIANI, A ; GOUVÊA, L.A. *Brasília: controvérsias ambientais*. Brasília: Editora Universidade de Brasília, 2003, p. 199-215.

ANJOS, R.S.A. *Expansão urbana no Distrito Federal e Entorno Imediato (1964-1990): Monitoramento por meio de dados de sensoriamento remoto*. Brasília, 1991. 136 f. Dissertação (Mestrado em Arquitetura e Urbanismo)- Instituto de Arquitetura e Urbanismo, Universidade de Brasília.

ANJOS, R.S.A. *Modelagem dos processos formadores da dinâmica espacial urbana no Distrito Federal do Brasil*, São Paulo, 1995. 220 f. Tese (Doutorado em Informações Espaciais) - Escola Politécnica, Universidade de São Paulo.

ANJOS, R.S.A. *Projeto geografia do Distrito Federal: cartografia para o planejamento do território e educação espacial*. Brasília: Mapas Editora& Consultoria, 2005.

ANJOS, R.S.A. Vetores de crescimento urbano do Distrito Federal: suas tendências atuais e os fatores espaciais intervenientes. In.: *WORKSHOP. Processos formadores e o espaço urbano do Distrito Federal*. Universidade de Brasília/NEUR-CEAM/Depto. de Geografia-IH/Depto. de Urbanismo – IA: Brasília, 1992. 16p. (Mimeografado).

ANJOS, R.S.A. *Dinâmica territorial: monitoramento – cartografia – modelagem*. Brasília: Mapas Editora& Consultoria, 2008.

SERRA, G. *O Espaço natural e a forma urbana*. São Paulo: Nobel, 1987. 211p.