Project #: D-48-527  
Center #: 10/11-6-P5085-0A0  

Contract#: 508-D15056  
Prime #: 

Subprojects ?: N  
Main project #: 

Project unit: DEAN ARCH  

Project director(s): 
PEPONIS J  

Sponsor/division names: VETERANS ADMINISTRATION  
/ VA MEDICAL CENTER  
Sponsor/division codes: 120  
/ 000  

Award period: 910205 to 910315 (performance)  
910315 (reports)  

Sponsor amount  
Contract value 2,262.00  
Funded 2,262.00  
Cost sharing amount 0.00  

Does subcontracting plan apply ?: N  

Title: PLAN ANALYSIS OF NURSING HOME FLOOR PLANS - STUDENT SUPPORT  

PROJECT ADMINISTRATION DATA  

OCA contact: William F. Brown 894-4820  

Sponsor technical contact 

DIANE PLA  
(404)728-7657  
VA MEDICAL CENTER  
1670 CLAIRMONT ROAD  
DECATUR, GA 30033  

Security class (U,C,S,TS) : U  
ONR resident rep. is ACO (Y/N):  
Defense priority rating : NA  
NA supplemental sheet  
Equipment title vests with: Sponsor X GIT  
NONE PROPOSED.  

Administrative comments -  
INITIATION OF D-48-527. FIXED PRICE ORDER WITH O/H WAIVED. STUDENT SUPPORT.
**NOTICE OF PROJECT CLOSEOUT**

**Closeout Notice Date**: 03/20/91

**Project No.**: D-48-527

**Project Director**: PEPONIS J

**Center No.**: 10/11-6-P5085-0A0

**School/Lab**: DEAN ARCH

**Sponsor**: VETERANS ADMINISTRATION/VA MEDICAL CENTER

**Contract/Grant No.**: 508-D15056

**Prime Contract No.**: 

**Title**: PLAN ANALYSIS OF NURSING HOME FLOOR PLANS - STUDENT SUPPORT

**Contract Entity**: GTRC

**Effective Completion Date**: 910315 (Performance) 910315 (Reports)

**Closeout Actions Required**:

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**Subproject Under Main Project No.**

**Continues Project No.**

**Distribution Required**:

- **Project Director**: Y
- **Administrative Network Representative**: Y
- **GTRI Accounting/Grants and Contracts**: Y
- **Procurement/Supply Services**: Y
- **Research Property Management**: Y
- **Research Security Services**: N
- **Reports Coordinator (OCA)**: Y
- **GTRC**: Y
- **Project File**: Y
- **Other**: N

**Final Invoice or Copy of Final Invoice Submit**
Dear Betty Rose Connell,

Please find enclosed the final report for project no D-48-527, as specified in the Deliverable Schedule. I would be delighted to discuss this report with you and to explore its implications for your work.

Yours sincerely,

Dr John Peponis
Associate Professor

copy: William F. Brown, Office of Contract Administration, GIT
AN ANALYSIS OF THE PLANS OF SEVEN VETERANS ADMINISTRATION NURSING HOMES USING "SPACE SYNTAX".  
The spatial dimensions of control of nursing staff over patients.  

FINAL REPORT  
Project Number: D-48-527.  
Sponsor: Veterans Administration/VA Medical Center  

15 March 1991  

Dr. John Peponis  
Yoon Kyung Choi  

College of Architecture  
Georgia Institute of Technology  
Atlanta  
GA 30332-0155
1. Scope of this report

This report addresses the spatial configuration of medical centers with respect to the exercise of control of nursing staff over patients. The aim is to identify the configurational parameters underlying the variation of nursing home plans and to clarify how these may assist or hinder the nursing staff in their supervisory and nursing duties. The seven VAMC analyzed were selected and provided by VA research staff and their plans are offered in Figures 1-7. They are meant to represent typical designs which recur throughout the VA system nationwide. Also, they are meant to embody more clearly the evolving principles of design and organization that have been adopted by the VA.

The application of syntactic techniques of analysis has helped to identify different models of spatial layout. It is hoped that by giving analytic and quantitative definitions to the parameters involved in these models we can assist both the formulation of researchable questions and the intelligent generation and evaluation of designs. It must be emphasized, however, that the test of syntactic models in relation to systematic data concerning elopement incidents was explicitly beyond the scope of the project. Therefore, the report is of an exploratory nature and its conclusions are tentative.

No attempt is made to offer a complete introduction to "space syntax". This would be too cumbersome and would substitute poorly for the published relevant literature1. However, to make the report as self-contained as possible we will offer definitions of the main variables in the main text or in footnotes.

The structure of the report is as follows. In the first two parts, we introduce two intuitively accessible dimensions of variability. The first concerns the positioning of the nurse station. The second concerns the circulation system conceived as a pattern which can either approximate a "tree" or a "net". In the subsequent

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parts we introduce some additional variables in order to give precise definition to properties which are less accessible intuitively.

2. The nurse station and the pattern of direct visual control.

The visual relationship between the nurse station and the rest of the premises is a key to the ease or difficulty with which staff can keep an eye over patients without special effort. To explore this relationship we have drawn the "isovists" showing the area which is visually covered from a point central to the nurse station (Figures 8-14). The concept of the "isovist" is of course borrowed from Benedikt\(^2\): The "isovist" of a point covers the area of a plan which is visible from that point in all directions.

- The Amarillo VAMC illustrates an interface of almost total direct control. For the sake of argument we may call this a "direct surveillance" model. The isovist covers most of the circulation, the entrance to the wing and parts of the lounges. Placing the lounges next to the nurse station is itself a critical decision facilitating direct and almost effortless control. The design allows that one person at the nurse station can directly control movement in and into the wing, from one position\(^3\).

- This model is in great contrast to the pattern at the Dallas VAMC. For the sake of argument we may call this the "door-check" model. The nurse station controls the entrance into the unit but has no direct view of the bedroom corridor. Views into the lounges are also not possible\(^4\).

- A third model is suggested by the Bedford VAMC. We would like to call this an "information center" model. The nurse station is located at a major circulation junction, central to the wing.

\(^2\)M L Benedikt (1979): To take hold of space: isovists and isovist fields, *Environment and Planning B*, vol.6, pp.47-65

\(^3\)Interestingly, staff at the center have positively remarked upon the good visibility afforded from the station while also noticing and criticizing the fact that the corridor through which the wing is approached is not itself visible. Interestingly, that corridor also controls access to the dinning room.

\(^4\)Staff at the center have commented that the positioning of the nurse station creates a large "blind area".
However, it does not allow visual surveillance over the circulation, the entrance or the day rooms.

The above buildings, therefore, can be taken to represent three alternative emphases with regard to the nurse-station isovist. It is clear that Dallas would serve the requirements of natural and direct surveillance most poorly. The other buildings seem to offer different versions of these fundamental models. The Atlanta VAMC leans towards the "direct surveillance" model. It is, however, a weaker version of the model because the nurse station fails to extend into the corridors and the isovist consequently becomes more limited. Long Beach, leans towards the "door-check" model while, Salisbury resembles Bedford as well as Amarillo, the resemblance with Bedford arising from the positioning of the station at a key junction but away from the entrance into the wing. The French VAMC is a "direct model" but differs from the other buildings in that it is organized "in the round" rather than "linearly" and is planned for a much lower "rooms/nurse station" ratio.

3. Continuity and segmentation in the overall layout.

The model presented above is "local" in the sense that it deals with the direct spatial relationships sustained by one space: the nurse station. This needs to be set in the context of "global" configurational properties describing the layout as a whole. The main distinction we wish to draw here is between layouts in which circulation forms a continuous network, thus approximating a "net" and layouts which are clearly segmented thus approximating a "tree". The more accurate syntactic terminology would distinguish "distributed" systems, in which every point is accessible from at least two independent routes, and "non-distributed" systems which include points which are only accessible from one route. The terms "distributed" and "non-distributed" refer directly to the potential of control: Distributed systems objectively distribute control over access.

- The Amarillo center is a clear non-distributed model with no circulation loop involved anywhere. The segmentation into three radial "pavilions" converging towards the control point is evident.

3/15/91
The VAMC at Dallas, on the other hand includes four circulation loops in each of the two main wings which therefore are distributed systems. The relationship of each wing to the central core, however, is non-distributed: there is only one point of access, precisely the point controlled by the nurse station. The core part of the building also includes an internal circulation ring as well as several rings through use spaces. The Dallas VAMC, therefore, illustrates the possibility of having distributed subsystems relate in a non-distributed way, thus creating "check points" to which control efforts must be directed.

The Bedford VAMC, like Amarillo, is a non-distributed "tree" configuration. The surprising thing is that no control space seems located near the main entrance at all.

The relevance of the distinction between distributed and non-distributed layouts becomes apparent when the other four examples are considered. All four entail some number of rings. Atlanta, however, approximates very closely to the non-distributed model. In Long Beach, circulation loops remain internal to the wing and relate in a non-distributed way to the entrance which is itself subject to nurse control as in Dallas. In French there are two entrances into the main unit, none of them directly visible from the nurse station. Finally, at Salisbury we have the most intriguing example of a distributed system with numerous rings. From the point of view of control this would appear to engender risks that patients could leave their sections unobserved. This risk is especially obvious since the nurse station isovist extends into the radial corridors but not into the peripheral ones.

We can therefore conclude this preliminary exploration of the plans by suggesting that the ability to exercise control effortlessly can be impaired in two ways: either by a poor nurse station isovist as illustrated by Dallas, or by a distributed circulation system as illustrated by Salisbury. On the other hand, direct control is assisted by strong isovist and non-distributed circulation as best exemplified by Amarillo.

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5 Staff at the center suggested that the "circular building" allowed elopement. But contrary to our "isovist findings" they praised the good sightlines from the nurse station. Perhaps in this respect they were being conscious of radial more than peripheral corridors.

3/15/91
4. Introducing measures of integration

In this section we approach the three buildings from the point of view of the measure of "integration", a measure which is central to syntactic analysis. The integration value of a "space" describes its relationship of the system as a whole in terms of the number of intervening "spaces" that must traversed in order to reach every part of the system. Integration is, in other words, a measure of accessibility which takes into account syntactic rather than metric distance.

Of course, any analysis of relationships requires that we specify the "units" or "elements" under consideration. In space syntax there are two basic ways of representing a configuration, according to its "local" or "global" constituents. The "local constituents" are the fewest and fattest convex spaces that are necessary to cover the plan. Convexity guarantees that every constituent space is fully visible and accessible from any of its points without going outside its boundaries. The "global constituents" are the longest and fewest straight lines which must be drawn in order to cover the system and all the permeabilities between convex spaces which are available. Quite evidently, the linear representation of a system sacrifices complete local coverage to maximize global reach: when we look or walk down an axial line we may see several spaces ahead but we do not necessarily see the full width of those spaces.

Our analysis here is based on the linear or "axial" representation of the VAMCs for the simple reason that global axial relationships usually constitute the fundamental structure of a layout with local convex relationships acting like "fine tuning" devices. Furthermore, previous research has shown that correlations between aspects of space use and spatial configuration are stronger

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6 We do not, in this paper deal with the technical definition of integration measures. The reader will find an account of these measures in Hillier and Hanson (1984): op.cit. For the purposes of this paper higher integration values stand for more integrated spaces (this is achieved by taking the reciprocal of the measure of RRA which is presented in Hillier and Hanson (1984).
and clearer when the axial rather than the convex representation is taken into account.7

Figures 15-21 show the integration cores of the seven plans analyzed as a whole, while figures 22-26 show the integration core of a unit at Dallas and Bedford, Salisbury, Long Beach and French respectively. An integration core comprises the most integrated spaces in each system. As a matter of convention we usually include the 10% of the total number of spaces. The diagrams also indicate the rank order of integration of the core lines. In section 6 we will discuss the configuration of these cores. In the next section, however, we will focus on the (average) integration value of particular functional spaces.

5. Stable and variable dimensions of integration inequalities.

Intuitive inspection suggests that the nurse stations are always situated in integrated parts of the building and are more integrated than bedrooms. In Table 1 we present evidence which confirms this intuitive impression. The integration values presented in Table 1 describe the corresponding spaces either according to the axial line which traverses them, or according to the lines which control access to them. For example, bedrooms are described according to their own value and according to the value of the corridor in front of them. Furthermore, the analysis has been carried out first for the building plans as a single whole, and then for units or wings as independent systems.8

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8 Very often there is not a single "best way" of analyzing a plan. Indeed, quite frequently the most important findings arise when the analysis of a plan taken as a whole is compared to an analysis of parts of the plan considered as separate systems. Other alternative representations, for example including or excluding permeabilities which are not available to all users, or considering or ignoring boundaries which are not rigid are often worth pursuing.
In five cases, the nurse stations are more integrated than bedrooms when we represent them by the line running inside them them\textsuperscript{9}. The two exceptions are Salisbury and Long Beach. When we represent function-spaces according to the circulation spaces linked to them, however, only Dallas departs from the rule with bedrooms more integrated than the nurse station. Dallas also differs from the other cases when we analyze only the circulation component of the plans and ascribe to function-spaces the integration value of the corridors connected to them. All these relationships apply to the system as a whole as well as to a "unit" analyzed in isolation.

Thus, in the case of Dallas, the implication of placing the nurse station in a position which controls the entrance to the unit, is that the nurse station becomes syntactically remote from the rest of the unit. In all the other centers, the nurse station is placed to command the integration system, if not by being integrated internally, at least by being attached to the integrated spaces. The integrated location of the nurse station is in other words "genotypical" to our sample. Although this seems an unsurprising finding it may nevertheless be functionally crucial. Research on offices\textsuperscript{10}, laboratories\textsuperscript{11}, museums\textsuperscript{12}, and educational institutions\textsuperscript{13} has shown that movement inside buildings may be correlated with the pattern of integration such that more integrated spaces are more densely used. Should this apply to nursing homes it would imply that the nurse station is strategically placed to control movement.

\textsuperscript{9}This is a rather simple example of what we may call an "inequality genotype": The spatial relationship between two "function" or "space-use" categories is structurally stable across a range of specific plans. The idea of an "inequality genotype" has, for example, proved very useful in the analysis of vernacular houses: Hillier, B., Hanson., J., Graham, H., (1987) "Ideas are in things." Environment and Planning B, 14:363-385. Similar genotypes can however be found in other types of building: Markus, T. (1987): Buildings as Classifying Devices. In Environment and Planning B, v.14, 467-484; Peponis, J. (1985) "The spatial culture of factories." Human Relations, 38: 357-390.

\textsuperscript{10}Unit for Architectural Studies, (UAS), University College London. Director B. Hillier.

\textsuperscript{11}UAS/UCL

\textsuperscript{12}Yoon Kyung Choi. PhD thesis currently under preparation, GIT.

What is perhaps more interesting than the syntactic relationship between nurse station and bedrooms, is the less stable performance of the dayrooms. In Dallas the day rooms are less integrated than both the nurse stations and the bedrooms, in spite of their geometrically central position. In Amarillo on the other hand, the dayrooms are more integrated than the bedrooms but less integrated than the nurse station. In Bedford the dayrooms are more integrated than both the nurse station and the bedrooms. In Atlanta and Salisbury when the interior is considered the day room is most integrated but this does not apply with regard to the attached circulation space. In French the position of the dayroom is unstable depending on the system of reference of the analysis. The dayroom function is therefore "relationally unstable". We have here another potential dimension for comparative analysis.

The degree to which the dayroom is subject to control is variable but more interestingly so are the ways in which control seems to be applied. Sometimes control arises as a by product of an integrated location. In Bedford, for example, the dayroom can be more easily supervised because it is visible from people moving in the main corridor, and because the path from the dayroom to the entrance goes past the nurse station. Similarly, in Amarillo, and French the day room may be constantly supervised. Atlanta looks similar but presents an anomaly in that the relation to the dayroom to the entrance is almost beyond visual control from the nurse station.

In all the four examples control seems to arise from the integrated placing of the dayroom. On the other hand, in Salisbury the day room is supervised by the nurse station but also placed deep inside the building thus becoming comparatively segregated when its attached circulation space is considered. There seem, therefore to be two viable control strategies, "exposure" as in Bedford and "containment" as in Salisbury. The two may of course combine as in Amarillo and French.

Finally, in Dallas the day room is not visible from the nurse station, nor located off an integrated corridor. Furthermore, insofar as nurses will frequently be in the bedroom corridors, the supervision of the dayroom may depend upon a very deliberate effort.
6. The spatial pattern of integration.

In the preceding section we used the measures of integration in order to explore the way in which the main functional categories of the building program become spatialized in the plan. In principle, this kind of analysis addresses the way in which the building program becomes systematically mapped in space over a sample of cases. Buildings, however, can also be studied as purely spatial systems, over and above functional or departmental boundaries. Indeed, the overall pattern of integration of a building plan seems to "generate" social and cultural functions over and above those which are directly specified in the program or directly planned by the user organization. The patterns of movement, informal encounter and awareness are the main space-use variables that have been shown to relate to the pattern of integration.

Since we have no systematic use data, we will here limit ourselves to a discussion of a relationship which is usually critical in most analyses: the relationship of local part to global whole as buildings grow larger. The relevant information is presented in Table 2. The table presents average integration values for the whole plan as well as for a typical component unit where appropriate. It also distinguishes between the average value of the whole system and the average value of the circulation sub-system. Thus, the relationship of part to whole can be studied in two ways. First, in terms of the relationship between the circulation subsystem and the whole system, and second in terms of the relationship between the unit-part and the whole plan.

- In Amarillo, the circulation system considered on its own is less integrated than the whole system. This simply reflects the interruption caused by the nurse station extending into the corridor junction. Furthermore, the principle of growth of Amarillo entails the repetition of rather "trivial" parts consisting of a central corridor with rooms on both sides. Thus, the whole spatial structure is invested with making the nurse station dominant. Atlanta resembles Amarillo without, of course, the interruption of the circulation system by the nurse station.

- Dallas provides, once more, an obvious and telling contrast and a more elaborate and subtle spatial structure. When all spaces
are included in the analysis, the unit and the whole system have the same degree of integration — much higher than Amarillo as expected of systems with rings. When we consider the circulation alone, however, we observe that the unit has a very high degree of integration while the whole system appears much less integrated. This amplifies that the unit becomes an autonomous spatial entity, within a system which is overall quite integrated. In other words, we are dealing with a combination of integration and differentiation, rather than with differentiation through separation.

We can clarify the principle of differentiation further. If we observe the integration cores\textsuperscript{14} of the unit and the whole system, we see that they overlap quite extensively. However, the rank order of integration changes. While the lines into the unit are most integrated from the point of view of the system as a whole, it is the line at the back of the unit which integrates the unit considered separately. The changing rank of integration is the mechanism which differentiates part from whole.

This may become a crucial consideration if we allow for different categories of users to have different "ranges" of movement. It is possible, for example, that the appropriate system of reference for interpreting the movement of staff is the system as a whole, while for patients it may be the unit. With the nurse station acting as a check-point to control elopement beyond the unit, Dallas seems to offer spatial scope for some degree of "natural\textsuperscript{15}" movement inside the unit (with some potential for modulating exposure or privacy by using the relative complex internal circulation system).

Long Beach approximates the same type of model as Dallas with the unit more integrated than the whole particularly when circulation only is considered. Predictably, French also belongs in this category the size of the unit keeps the internal circulation simple and without loops thus making its integration weaker than the integration of internal circulation at Dallas and Long Beach.

\textsuperscript{14}The integration core simply comprises the most integrated spaces of a system. The usual convention is to include 10\% of the total number of spaces.
\textsuperscript{15}The term "natural" movement has been used by Hillier to denote movement which is generated and modulated by the spatial pattern, over and above programmatic or organizational provisions.
Bedford illustrates a third alternative. The building seems to suggest a principle of growth whereby a single dominant corridor acquires more and more integrating power as transverse corridors are added to it. Thus, the whole appears more integrated than the parts. The rank order of integration, however, is the same for the whole and for the parts, suggesting that the local and the global systems are syntactically almost undistinguishable. Ultimately, the main corridor has the potential to become a "main street". If elopement is a major concern a spatial structure which would otherwise encourage "liveliness" may be seen to also entail unnecessary dangers. It would seem that in this regard, Salisbury is a "distributed" version of Bedford, with the "main street" turned into a "race track".

We therefore seem confronted by three models of growth. The first repeats a "standard" radial unit off a central control and reference point. This model is compatible with "direct surveillance" along lines familiar from "panoptical designs" in this and in other types of building. The second mode of growth creates well integrated and easily identifiable units, with relatively independent internal circulation systems and related these units to global structure of the building in a non-distributed way. This model would allow some degree of "contained autonomy", or "contained freedom" of movement within the units, while controlling communication from one to the other. The third model of "continuous growth" seems to create the greater potential problems for control. As the system grows large and as the number of people moving in a space or visible from a space increases, the chances of anonymity and elopement also increase. The integrity of the system as a single whole may support a dense informal culture but may not be compatible with regimes of surveillance unless means other than the layout are taken into account (door locks, alarm devices and tags etc.)

7. Provisional model of "interface" types.

Overall, the study of integration values seems to amplify the distinction of different control models introduced in the first two sections. The aim of syntactic analysis is to identify subtle as well as basic variations and to found typological distinctions upon an understanding of morphological principles in such a way that "types"
are not conceived as "stereotypes". For the sake of clarity, however, we may attempt a schematic statement of what we see as the most fundamental contrast in the type of "spatial interface" between patients and nursing staff.

**Dallas** and **Long Beach** seem to consistently lean towards a **discreet control model** whose key features are: 1) the strategic location of the nurse station at the entrance to the unit; 2) the relative segregation of the nurse station from the bulk of the accommodation inside the unit (this applies to Dallas but not equally to Long Beach); 3) the relative privacy of the dayroom (in Dallas only); 4) the provision of a distributed circulation system inside the unit with a non-distributed connection to the rest of the building; 5) the subtle differentiation of parts within an integrated whole, through the changing rank order of integration. **Amarillo**, on the other hand, consistently leans towards a **direct control model** whose key features are: the "panoptical" position of the nurse station to command both the pattern of integration and the isovist structure of the plan; the exclusion of any circulation loop; 3) the subjection of dayrooms to the strongest control from the nurse station; 4) the growth of the plan through the repetition of elementary corridor wings. **Atlanta** and **French** resemble **Amarillo** but are not perfect examples. In the case of **Atlanta** the nurse station isovist is weaker and the dayroom unsupervised; in the case of **French**, the butterfly plan does not allow for a repetitive addition of radial units.

8. A discussion

The analysis offered in the preceding sections suggests that the layout-types that have been used for VA nursing homes vary significantly. The parameters of variability seem to have implications for the performance of layouts with regard to the exercise of control over patients. Future design, future design guidance and future policy, both with regard to the management of existing facilities and with regard to the construction of new ones would therefore be better informed if the implications of the variables presented above were evaluated against systematic empirical data. Since such evaluation was beyond the scope of the current project we will limit ourselves to some tentative thoughts about the issues raised above.
From the point of view of direct control, it is evident that the layout of Amarillo should perform better than most other layout-types. On the other hand, it is equally evident that Dallas and perhaps Long Beach would perform less satisfactorily. The reasons for this lie mostly with the nature of the nurse-station isovist and the nature of the circulation system as discussed in sections 2 and 3 above.

We do not think that the conclusion we should draw from the analysis should be limited to this observation. In institutions such as nursing homes, the regime of control needs to be balanced against the provision of an "ordinary" and pleasant environment. Nursing homes and medical centers are not merely custodial institutions. This suggests that control needs to be balanced against other requirements. The day to day experience of most buildings suggests that the patterns of movement, awareness and encounter create a latent form of society, and sometimes an informal pattern of socialization which are central to the way in which buildings function socially. It would seem possible, therefore, that Dallas may represent an attempt to respond to the dual requirements of providing for control while also allowing and containing areas which are less strictly supervised. The almost obvious shortcoming of Dallas with regard to direct supervision and the limitations of the specific design should not blind us to the potential that the approach may have in principle, a potential that could be better brought out by a modified design.

Put simply the question seems to be as follows: Should we resign ourselves to the idea that the requirements of control and those of a pleasant spatial culture are in opposition? Or is it possible to combine spatial regimes of effortless and economical control with spatial cultures of socialization and pleasant life? This is a question well beyond the present paper, but certainly not beyond the requirements of good building design. The analysis we have presented above, however, allows us to attempt at least a methodological contribution.

Control, we suggest, has two spatial natures, not one. On the one hand, it arises from opportunities of direct surveillance. The aim of control, from this point of view is to ensure that what is
prescribed happens and what is prohibited does not happen. On the other hand, control might arise from the ability of a building to contain an open-ended range of activities in such a way as to make it unlikely that they will transgress certain organizational and spatial boundaries. We propose, in other words that, from a spatial point of view, control should be classified into "active" and "passive". What Amarillo has to offer is ample scope for active control. What Dallas or Long Beach seem to offer, potentially if not actually, is the possibility of passive control.

While active control may be a matter of "obvious" spatial properties, like a strong nurse-station isovist and a strategic nurse-station location, passive control seems to require a balanced consideration of the syntax of the layout as a whole. We would like to illustrate what we mean by hypothetical example. Suppose that in the interests of a pleasant human environment patients were allowed, and even encouraged, to move unescorted within specified areas. Suppose, furthermore, that they were tagged so that alarms would be set off when they approach exits which are not mean to be available to them. It is clear that the system would work more efficiently if the syntax of the layout tended, without other effort, to direct patient movement towards their assigned domain rather than outside it. If indeed movement was shown to correlate with integration, then the issues discussed in section 6 would become critical to the successful operation of such an organizational arrangement.

If indeed the distinction of passive and active modes of control helps to clarify some of the organizational issues faced in VA nursing homes, and if policy aims were oriented towards the combination of supervisory regimes with non-custodial spatial cultures, then the issues raised in this report may warrant further consideration and may require further research on the correlations between layout and space use. The ultimate aim of this research would be two-pronged. The model illustrated by Amarillo could be developed, especially around the central part, so as to enhance the social potential of the complex which includes the dayrooms, the nurse station and the corridor intersection. In parallel, the model illustrated by Dallas could be developed to maximize the potential advantages while also offering the scope for direct control which seems missing at the moment.
### TABLE 1. Integration Values for Three Main Function Categories

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"A" values are based on the analysis of the whole system and describe a space according to the line that run through it

"B" values are based on the analysis of the whole system and describe a space according to the circulation lines connected to it

"C" values are based on the analysis of the circulation and the public spaces and describe a space according to the circulation lines connected to it
## TABLE 2. System Integration Values for the Seven VAMCs

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Figure 1. Floorplan of the Dallas VAMC
Figure 2. Floor plan of the Amarillo VAMC
Figure 3. Floorplan of the Bedford VAMC
Figure 4. Floorplan of the Atlanta VAMC
Figure 5. Floorplan of the Salisbury VAMC
Figure 6. Floorplan of the Long Beach VAMC
Figure 7. Floorplan of the French VAMC
Figure 8. Isovist from the Central point of Nurse Station: Dallas VAMC
Figure 9. Isovist from the Central point of Nurse Station: Amarillo VAMC
Figure 10. Isovist from the Central point of Nurse Station:
Bedford VAMC
Figure 11. Isovist from the Central point of Nurse Station: Atlanta VAMC
Figure 12. Isovist from the Central point of Nurse Station: Salisbury VAMC
Figure 13. Isovist from the Central point of Nurse Station: Long Beach VAMC
Figure 14. Isovist from the Central point of Nurse Station: French VAMC
Figure 15. Integration Core of the Dallas VAMC: Whole System
Figure 16. Integration Core of the Amarillo VAMC: Whole System
Figure 17. Integration Core of the Bedford VAMC: Whole System
Figure 18. Integration Core of the Atlanta VAMC: Whole System
Figure 19. Integration Core of the Salisbury VAMC: Whole System
Figure 20. Integration Core of the Long Beach VAMC: Whole System
Figure 21. Integration Core of the French VAMC: Whole System
Figure 22. Integration Core of the Dallas VAMC: Unit Whole System
Figure 23. Integration Core of the Bedford VAMC: Unit Whole System
Figure 24. Integration Core of the Salisbury VAMC: Unit Whole System
Figure 25. Integration Core of the Long Beach VAMC: Unit Whole System

NOTE: FOR DETAILED PLAN OF NURSING UNITS, SEE DRAWING 'WING C' - TM
Figure 26. Integration Core of the French VAMC: Unit Whole