Multiple digital media in realizing various urban spaces: Project 2050 Taiwan

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Abstract. In Taiwan, it is a common phenomenon that landscape, urban spaces, and buildings are not considered as a whole by governments at all levels and private clients. More terribly, the government has never proposed any urban statement for the future. The Minister strongly therefore proposes this statement: 2050 vision Taiwan, aim to design the public spaces for the life of Taiwan in the year 2050. The Council for Culture Affairs plans to spend two years to cover 100 locations and invite 20 design teams to provide new vision of the places. Our design team, AleppoZONE first conducts the initial stage of this project that includes three areas of Taiwan: Taipei as the capital of Taiwan is expected to become a better place reflecting new and old space combination. Hsinchu is planned to explore the prototype for a digital city where digital technology is well-installed in the city plaza and public buildings. In the island of Pen-Hu, the ecology and high-tech transportation are equally considered to shape Pen-Hu as an island with nature. In the process, design team successfully synthesizes digital models and dynamic films into virtual and physical coexisting environmental animations by using multiple digital media in realizing the 2050 vision cities. The aim of this research is to give a throughout introduction of this project.

Keywords. digital media; urban spaces; representation

Introduction

Taiwan's Dreamscape for 2050

In most large cities in Taiwan, many architectural designers are quite unhappy with the modernization of Taiwan's cities and of the lack of architectural design quality, particularly when it comes to public areas and public buildings (fig1, 2). The unsatisfactory way in which government agencies at all levels have directed planning and building projects to beautify Taiwan's cities has created an urban landscape which makes Taiwan a fifth rank nation even in Asia; much less can Taiwan be compared with the advanced nations of Europe, the USA and Japan. There are many factors which have led to this situation. In addition to basic architectural educational issues, the most important issue was changes in public policy. In other countries, for instance, architecture and urban design are important creative expressions, and are considered a reflection of the culture and art of that particular location. Thus, the design process is normally overseen by a "Department of Culture". In Taiwan, however, the

process is quite different with such designs being under the control of the Ministry of the Interior, in its Construction Department. Clearly, this department is responsible for ensuring the proper construction a building, of safety procedures, of fire prevention considerations, etc. But cultural considerations are simply overlooked. Furthermore, when it comes to urban planning and architectural design, another problem exists with the appraisal and selection process, wherein a "Black Box" selection process is employed in the interests of lower costs. Naturally, this results in deterioration in overall quality.

In the last few years we have seen Taiwan turning a corner in this respect and are beginning to see more and more examples of projects that have broken free of this old model. Take a project in the city of I-Lan, for example. Because of clear construction controls and a clear concern for the quality of public spaces, we have seen many high quality designs in the city of I-Lan recently, such as the Dong Shan River—Luo Dong Sports Park, or the I-Lan Cuo, etc. Plus, the Ministry of Education, in an effort to encourage reconstruction following the devastation caused by the major earthquake in September of 1999, brought together the creative energies of both government and the private sector in designing several first-rate school campus models. In yet another example, over the past four years, the city of Hsin-Chu has dealt with both local architecture and overall city development by setting up an excellent project appraisal and implementation process, whereby all structures, old and new, in the city can achieve beautification.

In an effort to take a further step towards comprehensive improvements, the Head of the Council for Cultural Affairs, Chen Yu Xiu, paid a visit to Japan to gain a better understanding of Japanese urban planning. What she found was that Japanese urban planning is conducted with consideration for both urban planning and architectural construction with plans that stretch between 20 to 30 years, with each stage of the plan carefully mapped out. Such long-term planning concepts have been in use in western countries for many years. Mrs. Chen is now very eager to see such planning implemented in Taiwan. That is, she hopes to do away with the conservative and shortsighted policies presently in use, and allow cities and architecture to add an artistic dimension.

Thus, she has outlined an objective for the next 50 years. She hope that we will temporarily suspend the restrictions that reality places on our imaginations, so as to allow exceptional and gifted designers, who are committed to achieving their ideals, to create exceptional city spaces for Taiwan. Further, it is hoped that all citizens will take part, will dream together, and dream of how beautiful Taiwan's cities could be in 50 years time. If one looks at Taiwan Island from the air, it is a beautiful site to behold. As you move closer to the ground, however, the man-made environment below is quite unsightly. Thus, as we look forward to Taiwan's Dreamscape for 2050, we need to dream together, and dram of cities and a cityscape that is as beautiful as nature that surrounds us.

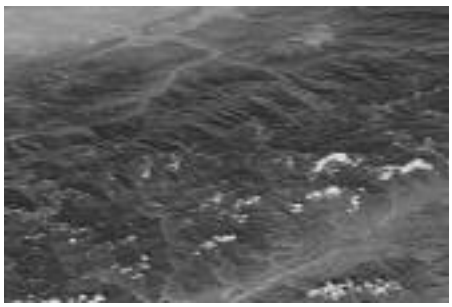


Figure 1. Bird view of Taiwan

Figure 2. Ugly view of the Taiwan city

Related Works

Experiences and Work Models from Overseas

When attempting to plan a comprehensive city architecture, as is done in foreign countries, it is important to bring together the opinions of all those involved and to create an all-inclusive plan, as opposed to simply one governmental department or agency running the entire process independent of outside input. Take Richard Meier, for example, an American architect who brought together over 20 different well-known architects in planning a major overhaul to California's cities. In Japan, architect Arata Isozaki used a similar approach, as have many countries in Europe. Thus, it is important that we follow the lead of these good examples in achieving Taiwan's Dreamscape for 2050. We need to bring together as many new and cutting-edge architects as we can and together design and build exciting and innovative space concepts.

Previous works in realizing the urban spaces

In an urban space, there are sub-spaces contained with different characteristics such as historical, technical, and ecological features. These spaces with different attributes can be realized and represented through different digital media. Earlier researchers utilized a great amount of computer visual imaging technologies to simulate urban spaces. Wang etc. (1998) was able to evaluate and study an urban space of a historical city through recreating the city using this visual imaging technology. Other than static simulation, computerized 3D modeling and multimedia animations have also been frequently utilized later on(Bai and Liu 1998; Day and Radford 1998; Wang, Umeki et al. 1998). Bai and Liu (1998) used technologies of visual imaging, computerized 3D modeling, and multimedia animation to represent an urban space for visual impact analysis. In addition to these technologies, Virtual Reality was further utilized to enhance the dynamic features and interactive relationships between human bodies and environments of different attributes, which became a new media for urban space representation (Fukuda and Nagahama 2002; Tang, Liu et al. 2002).

Process of the Project

This process is expected to take three years to complete, and will be divided into 3 stages. We hope to explore six major cultural and artistic areas at 100 different locations. These 100 locations should be places that, in the eyes of all participants, are not only places of particular significance but that are places in need of improvement. These locations can then be categorized into one of 6 different artistic or cultural zones. Naturally, such decisions will be made only after significant consultations with members of the relevant cultural and artistic communities. As well, experts familiar with historical sites (i.e. The New Taiwanese Image Research Center), with landscape design, with ecology, with leisure, with performance, and those familiar with other types of activities relating to literary performances, to cultural ceremonies, and to technological issues. In addition, for each public project, one academic and one architect will be invited to lend assistance in Taiwan's Dreamscape for 2050.

In addition, cutting-edge designers will be specially invited to the project to help in creating a new vision for Taiwan in accordance with the ideals of The New Taiwanese Image Research Center. However, one of the most important considerations for the design and implementation phases will be to keep in constant contact with local residents and to make sure that opinions and ideas are flowing in both directions between the designers and the residents. In keeping with this idea, it will be important to invite cultural experts to participate in discussions in the hope of accurately reflecting the artistic and cultural uniqueness of each of the regions being improved. Thus, the future will created together.

The 1st Year

The scope of the first year's agenda will include 8 cities, 7 townships, and 5 outlying islands (please see figure 1): Ji Long City, Taipei City, Tan Shui City, Bei Tou City, Hsin Chu City and Hsin Chu County, San Yi, Tai Chung City, Lu Gang, Jia Yi, Tai Nan City, Kao Hsiung City, Mei Nong, Zhi Ben, the Hua-Lian Tai-Dong Gorge Area, I-Lan, Peng Hu, Kin Men Island, Ma Zu Island, Green Island, Orchid Island, etc (figure3). Plus, so as to represent all of these regions, we intend to invite academics from various institutions to attend.

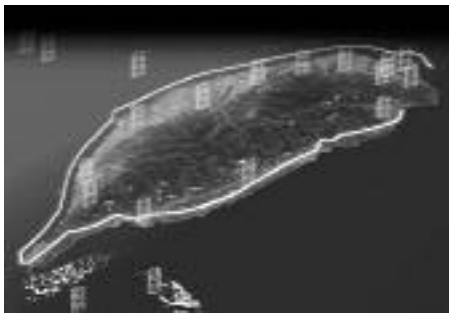


Figure 3. Scope of the 1st year

Our design team, AleppoZONE is first conducts the initial stage of this project. At the 2002 National Cultural Forum, the Council for Cultural Affairs together with the Chiao Tung University Institute of Architecture announced the Taiwan's Dreamscape for 2050 initiative, its work structure, and its operational model. The objective for this forum is for all parties in attendance to come together in creating a common vision, after which the details of this vision will be organized and consolidated by the Council for Cultural Affairs and the Chiao Tung University Institute of Architecture so as to be presented nationally by the Head of the Council for Cultural Affairs, Mr. Chen, in 2003. This framework will then provide a reference for all levels of government to consider. Eventually, this work is to be published in various professional periodicals, as well as in book format, both domestically and internationally, and will also be presented at various national conferences and initiatives.

The operational method

For the operational methods of digital media, the design team initially divided the island of Taiwan into ten areas according to their historical, cultural, ecological, technical, and metropolis attributes. To illustrate the relationship between Taiwan's city visions and spaces in these ten areas, the design team chose, after careful assessment, 1 the capital – Taipei to represent the historical changes and visions of an urban city space – a historical city, 2 Hsinchu to represent the technical features of a city in the future, and 3 the ecological island – Penghu to represent a future technology, transportation, recreation space. Each of the above three scenes are produced into two 1.5-minute synthesized animations; each presents a current situation and vision in 2050. Utilizing multimedia editing technology, these six segments are then integrated into a ten-minute video containing both virtual and real ele-

Figure 4. Current situation and vision in 2050 of the three areas

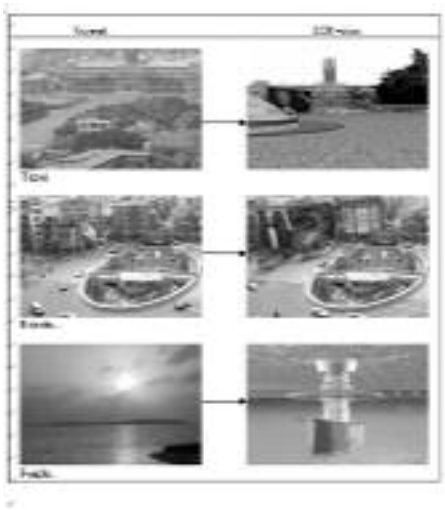
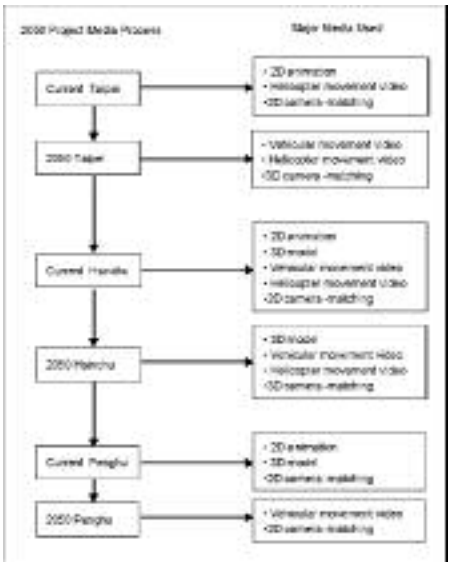


Table 1. Multi media in representation

ments as a presentation of 2050 Taiwan (figure 4).

Since the previously mentioned scripts utilized various 2D dynamic media (ex: animation and video) to realize and represent the diversity of cities, media utilized varies according the city context we wish to present. Other than the great amount of actual filming and animation synthesis used in producing the segments for Hsinchu and Penghu, the designers also utilized the dynamic camera-matching technology, which has had twenty years of history utilized by the movie industry, to film, from air, segments for the cities of Taipei and Hsinchu. These images are then dynamically synthesized with 3D models of buildings and sites for the future to achieve a movie-quality simulation effect. Before the segments are filmed, trackers have to be placed in the physical location. After the trackers are in place, filmed dynamic footages are then input into the professional film synthesis software – Maya Live. The software tracks the tracker in the physical location and then automatically compiles the 3D paths and positions for the camera. With the aid of 3-dimensional positioning, the design team was able to merge the 3D models into the films and produce synthesized films that have coherent proportions and perspective angles as the background images.

In this project, advantages of each media were maximized and fully utilized to produce higher quality simulation animations. Table 1 is the preliminary arrangement of media used in each city representation.



Achievements

Finally, a 10 minutes animation which constitutes digital models and dynamic films in the virtual and physical coexisting environmental is presented in the forum. Three area simulations are given, which feature virtual reality models as references.

1. Taipei's "Cultural Corridor",

which is essentially the key area between the President's office and the Sung Shan Tobacco Factory

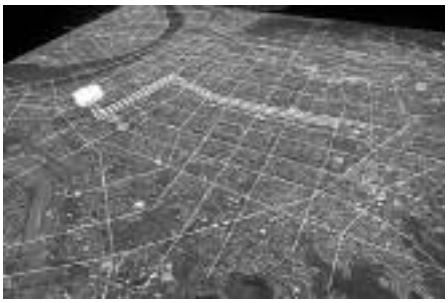


Figure 5. Cultural Corridor

Figure 6. President's office

Figure 7. President's office Plaza

Figure 8. President's office Plaza

Figure 9. Tobacco Factory

Figure 10. Tobacco Factory

Figure 17.Express Train

Figure 18. Undersea Tunnel

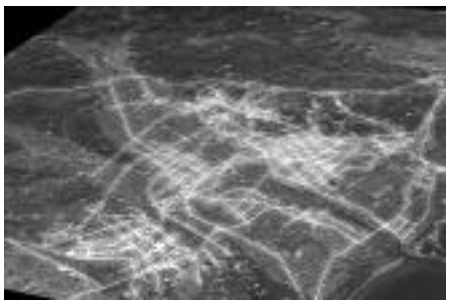
Figure 19. Undersea Station

Figure 20. Eco-tourism Center

Figure 11. Hsin-Chu

Figure 12. ITRIS Freeform

2. Hsin-Chu's "Digital City"



3. Peng-Hu's "Eco-tourism Center"

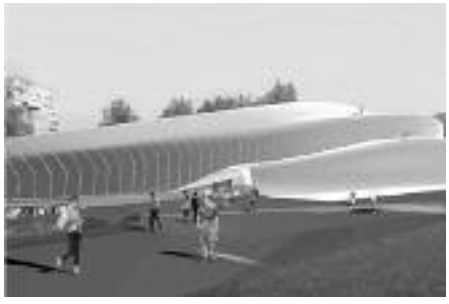


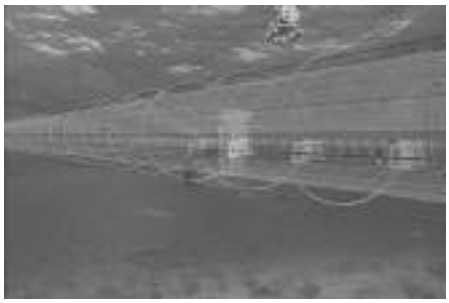
Figure 13. National Digital

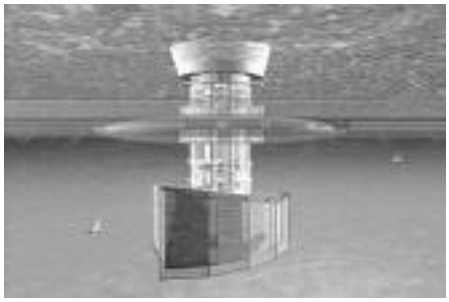
Figure 14. Technology East City Gate

Figure 15. Peng-Hu

Figure 16. Undersea Tunnel

All Citizens Participate in the Design: In Virtual Form





While the areas of city planning and architectural design are normally reserved for only professional architects, for the purposes of this design project, it is essential that the public have the opportunity to interact with the designers. Through the participation of the general public, the project can truly achieve synergy and thereby allow achieve a more complete and ideal outcome. The problem is, however, that architects normally express themselves and their ideas through complicated charts and models, things that are far too specialized for members of the general public to understand and thus could hinder effective communication and interaction between these two groups. In an effort to allow these two groups to interact more easily and efficiently, Chiao Tung University Institute of Architecture has drafted a plan that will utilize virtual reality technology in allowing abstract ideas to be translated into real, tangible images—essentially using 3D animation to express the future appearance of the designs. Also, so as to achieve more realistic 3D images, the technology will merge virtual reality technology with real aerial photography technologies. The effect of all of this technology will be to allow members of the general public to see a visual image, an image of

the future development of their city, and to see how these changes will impact upon their daily lives. In addition, the public is encouraged to utilize the Internet as a means of providing their valuable opinions to the project participants—the more ideas the better.

Acknowledgements

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