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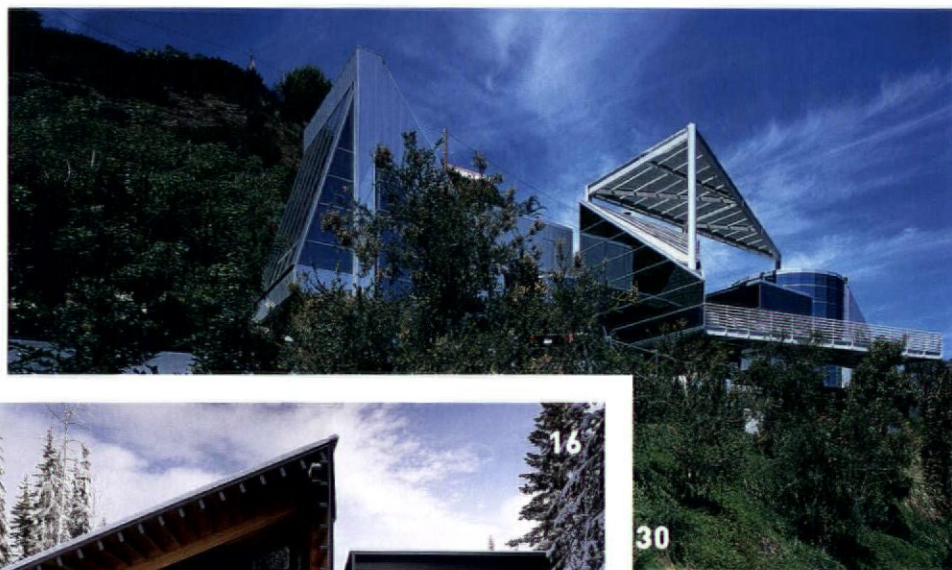
Architect: CO Architects

Landscape: Mia Lehrer & Associates

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JANUARY/FEBRUARY 2013



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EDITOR'S NOTE

We often find ourselves circling back to the same themes or ideas. Is it a question of obsession? Do we feel the need to continue exploring until we come upon the perfect resolution? Or are we simply programmed to return to the site of previous successes?

Certainly, this year's AIA/LA Design Awards winners are applauded for both taking steps into the uncharted and perfecting what is familiar.

I myself am returning to the familiar pages of FORM magazine after spending the last two years exploring different expressions of writing. During this time, I have learned that drawing upon experiences outside your comfort zone is incredibly valuable when applied to those areas that ignite your passion. The two work together seamlessly and without one the other would suffer. In this issue, we applaud those willing to take a risk: the winners

of the AIA/LA awards, who continue to push boundaries in an effort to drive new innovation, and Graft architecture for melding different disciplines and styles to create a unique identity. We also reflect on Ed Niles' symphonies of steel and metal in his beloved Malibu and the journey that has taken Koning Eizenberg from Sydney to Santa Monica.



Eric Roth



Alexi Drosu
Editor in Chief

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1 THINKING AND MAKING

During the past two decades, I have been asked from time to time to consider a candidacy as president of the AIA/LA. As it happened, those two decades paralleled our efforts to build a practice at Johnson Fain as well as teaching appointments, some books, lectures and a number of out-of-town commissions. I had always declined until Stuart Magruder, the incoming president, called in the summer of 2011 to inquire again. I asked myself if there was a particular and attractive challenge in the practice of architecture for which an AIA platform and a year's focus might, if not resolve, then bring into a brighter light. This inquiry ultimately led to a series of six questions all cohering around the topic of THINKING AND MAKING; and FORM magazine generously agreed to print and post the inquiry.

QUESTION 1.

SO, WHAT'S AT STAKE? MY CURIOSITY IS AIMED AT the recurring disconnect between architectural criticality and practice: the failed interface between the worlds of theory, experimentation and the academy on the one hand and the professional production of building designs on the other. While expressing my own interest in theory and production in *The Big Idea: Criticality and Practice in Contemporary Architecture* (2006), I admitted to the following:

"Maintaining these two interests has not been as simple as it sounds. In the university setting, there commonly exists a clear, if seldom discussed, Maginot line between architects who teach and write and those who produce buildings in their offices. I suppose this line is held in place by the minor agendas of both parties, but it conveys to an audience of students and interested parties a typically Western dichotomy of thinking versus doing. It's a brain versus hand kind of thing. And the dichotomy seems, to me, deeply useless to any generation of architects."

Most of us are familiar with the tacit pedagogical skirmishes waged between the thinkers and the makers of architecture. Over time, the battles take on different rhetorical exchanges, the current one growing mostly out of the compelling "performative logics" of digital parametrics. A recent graduate director of one of Los Angeles's schools of

architecture stated that "theory is not just irrelevant but was and continues to be an impediment to a culture of innovation in architecture." Manuel DeLanda, the brilliant author of *Philosophy and Simulation* (2011) and a visiting professor at USC has said that "most philosophers and theorists in the 20th century were idealists; that is, they did not believe in the existence of a material world that is independent of our minds. Idealism is mostly useless as a theoretical apparatus for architects because it cuts them off from the world, making them think exclusively about phenomenological experience."

While this shift away from explicit theory continues, even among critically-inclined practitioners, our heightened interests in performance, programming, algorithms, engineering and material sciences, and other quantitatively-grounded concerns, now appear to have overtaken our prior interest in narrative and theory, which historically tended toward qualitative content. Speaking at a recent symposium, Mohsen Mostafavi, the dean of the Harvard Graduate School of Design, said to the architects in the audience: "We have been exploring how architecture constructs its own knowledge. What's interesting is that many of you no longer take up the project of signification. You seem fascinated with the design process more than its product. The

emphasis is on design as performance."

K. Michael Hays, the author and theoretician, noted similarly that "the idea is that authorship and the aesthetic go away if you can find the right information source to respond to. And what's happening today for me is that architects are finding different ways to extend the kinds of information flows, technologies and programs that a building can respond to. The whole formal problem starts to disappear."

Is it possible then that, in addition to the ebb of theory and narrative, the historically enshrined domain of aesthetics, its reliance on form-making and the pedestal of authorship are not far behind?

T.S. Eliot may have been the most plain-speaking about the link between critical thinking and making. Criticism that accompanies working, he suggested, is of "capital importance... in the work of creation itself. Probably indeed, the larger part of the labour of sifting, combining, constructing, expunging, correcting, testing: this frightful toil is as much critical as creative." For a year, and in "Six Questions," we'll investigate the relationship between THINKING AND MAKING, and, if failing to achieve a détente between the thinkers and makers in our profession, we'll hope, at least, to expand our sense of the architectural universe that accommodates both.

Scott Johnson, FAIA, founder and design partner at Johnson Fain, is president of the AIA/LA.

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SHOWROOM

Chef's Choice

Tasteful new designs for the kitchen



2



5



6

1. BULTHAUP

For its iconic b3 kitchen design, Bulthaup is now offering Solid Walnut doors as a distinctive finishing option. Made by sandwiching solid material with thin layers of aluminum, the sturdy panels lend a warm counterpoint to the b3's streamlined silhouette. losangeles.bulthaup.com

2. AGA

While the cast-iron exterior of AGA's Total Control cooker resembles the company's classic models, the touch-screen control panel inside hints at its advanced capabilities. The new design, available in thirteen colors, allows for its three ovens and two hotplates to be operated independently. aga-ranges.com

3. VARENNA BY POLIFORM

Varenna by Poliform's new Artex kitchen is comprised of modular units in varying sizes. Offered in a wide spectrum of lacquered colors, as well as woods ranging from walnut to elm, the modern system inspires personal expression. poliformusa.com

4. SNAIDERO USA

Snaidero USA's recently unveiled IDEA40 kitchen showcases the subtle but sleek updates designer Paolo Pininfarina made to the 40-year-old IDEA line. Two-tone cabinetry in high-gloss metallic lacquers, dual-level countertops and integrated lights keep the timeless cabinetry turning heads. snaidero-usa.com

5. POGGENPOHL

Poggenpohl's introduction of the +Artesio kitchen collection aims to integrate cooking and living functions into one seamless space. A new dark brown laminate, Terra, compliments coordinating leather banquette seating as well as a Brushed Terra Pine veneer available as paneled wall cabinetry. poggenpohl.com

6. FAGOR

Known for its built-in induction cooktops, Fagor is expanding its presence in the kitchen with its new Dual-Zone Wine Cooler. The 24-inch appliance offers two distinct cooling zones and five glide-out racks, which hold up to forty-four bottles. fagoramerica.com

Zero-Net Gains

El Cerrito's Recycling Center serves as a model built to change with the future

THE ORIGINAL EL CERRITO RECYCLING AND ENVIRONMENTAL Resource Center was born from a community need and so, in rebuilding the center, Noll + Tam Architects were inspired by the community's devotion to environmental stewardship.

"It was important for us to create a strong sense of place for the community, a great place for the gathering and interaction of the center's diverse users and visitors, a demonstration project for zero net waste, net zero energy use, restoration and regeneration, and maximizing community value," says Chris Noll.

As a result, the designers conceived a circular canopy structure that creates a strong visual identity, enforces the idea of recycling and reuse, and provides a geometry that efficiently organizes visitor parking and traffic flow. The project also includes a 2,200-square-foot administrative building and a 6,400-square-foot operations building.

The designers incorporated corrugated steel, reclaimed wood and other highly sustainable and durable materials to echo the industrial function of the facility. The "no frills" strategy allows for the maximum use and integrity of all structures and materials, and the facility is anticipated to receive LEED Platinum certification. Indeed, the entire building project is recyclable and can be taken apart and reconfigured to adapt to changing technology. For example, interchangeable modular roof units in the canopy can be modified to meet new or changing activities for the center.

The project, however, was not without its challenges. The existing center was built upon a former dumpsite, about 60 feet of landfill of unknown quality. The designers needed to develop a solution that would minimally disturb potentially hazardous materials.

"An 'inverted moment frame' with deep grade beams was used instead of piles to support the

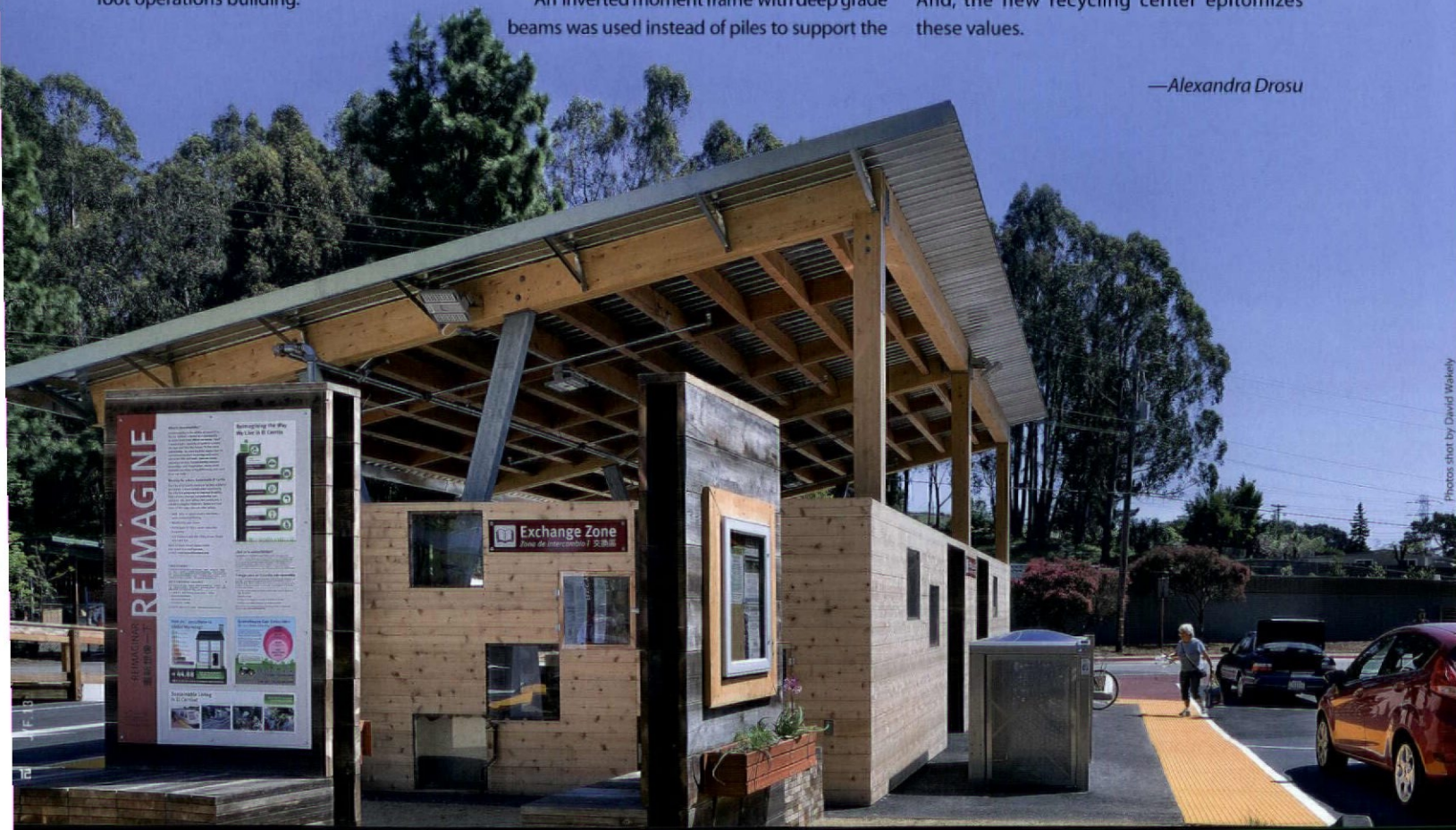


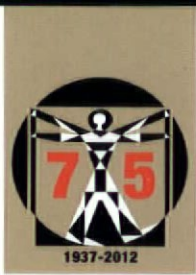
main shed and circular plaza structures," says Noll. "The modular office building is supported on a matrix of grade beams interconnected by a thick slab-on-grade foundation."

The designers also minimized regrading, except in the case of improving water flow and directing storm water to new bioswales. Other sustainable design elements include an 11,000-gallon cistern for rainwater collection used for flushing toilets and irrigating landscape. The center relies on renewable energies, including 10kW photovoltaic panels installed on the canopy, to operate.

"We find beauty and inspiration in solutions that are rooted in what is practical, simple, and respectful of the existing context," says Noll. And, the new recycling center epitomizes these values.

—Alexandra Drosu



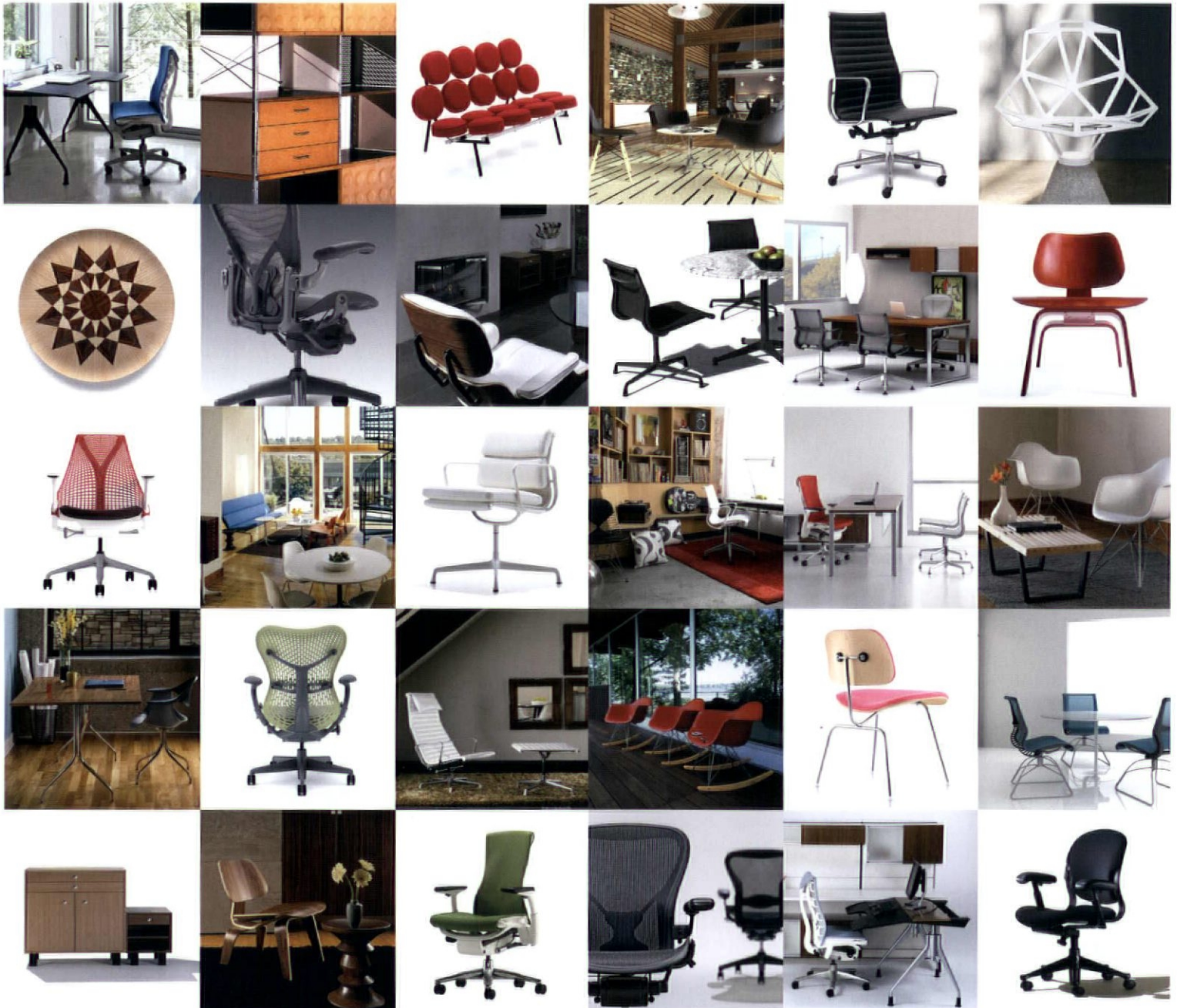


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MAKING THE GRADE

ASSIGNMENT: Generate long-term design strategies for the arid and semi-arid West's water-scarce future.

STUDENT NAMES: Francis Silagon, Alexander DeCicco, Hugh Vanho

SCHOOL: California College of the Arts—San Francisco

MAJORS: 4th year Bachelors of Architecture

PROFESSORS: Katherine Rinne and David Fletcher

PROJECT TITLE: FresNOW!

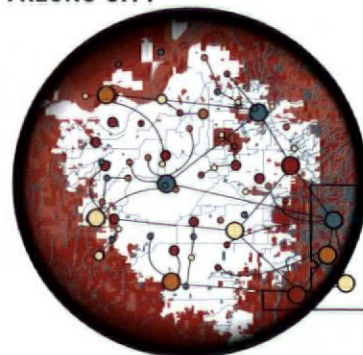
PROJECT DESCRIPTION: FresNOW! focuses on the Southeastern Growth Area (SEGA), a 9,000-acre site, located in Fresno, California, to develop a new local, communal and sustainable farming region based on the research of four types of farming: crop farming, hydro farming, decomp farming and energy farming. Through political interventions in Fresno, we would redefine the methods of land ownership, water rights and usage via applications of new policies, which would be set incrementally over the next 150 years.

DESIGN TOOLS: Adobe Illustrator, Adobe Photoshop, Rhino 3D

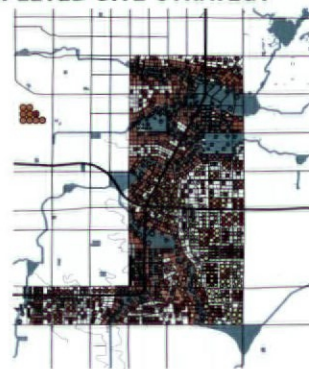
INSPIRATION: Socialist ideologies, resource scarcity, histories of water distribution and land acquisition, dystopian manifestos

DESIGN HEROES: Gordon Matta-Clark

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"The Burj Khalifa is fascinating not only because it is the tallest skyscraper in the world but because its layered architecture creates an illusion of gradual evaporation and it is integrated perfectly into the urban landscape," says Ruel.

IMAGE: *Mirage*, Dubai, 2012 | PHOTOGRAPHER: Nicolas Ruel

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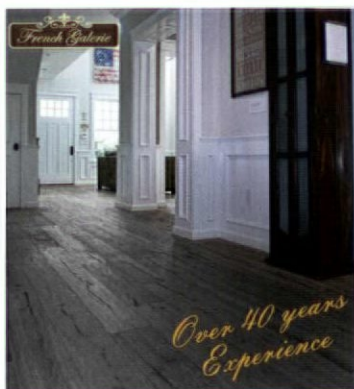
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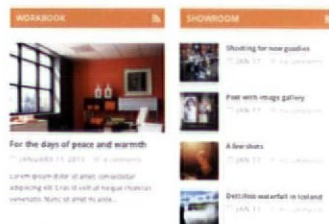
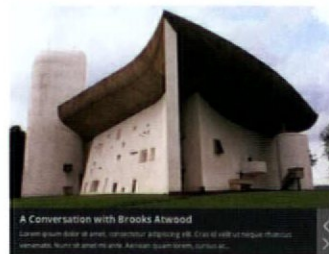


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VR: I am now 26 and I'm trying to understand as much as possible about concepts like Time Space and Existence. You are now 82, what should I learn about Existence?

AI: After the burst of the economic bubble in Japan in 1990, I noticed that Post-Modernism as a topic was mentioned less and less. Today, you seldom hear about it. The same thing happened 25 years ago. Modernism was under full-scale attack, and after the cultural revolution in 1968, it was never mentioned by anyone.

To place these events in the context of different eras, one can refer to two events that happened in Japan in 1995: the Great Hanshin Earthquake and the sarin gas attack on the Tokyo subway. This was exactly 50 years after the end of the Second World War. In place of Post-Modernism, Information Technology and Globalization were the hot topics. Post-Modernism did not only reverse time, but shuffled it in its

entirety, and saved it all in a database by utilizing information technology. In short, time was broken into pieces, saved in a non-chronological manner, and readily available to be summoned at will. During this era, space also became subject to shuffling. The world which consisted of boundaries, where the waning of racially homogeneous nations, disappearance of national borders, and complex systems were separate entities co-existing in a space with its own order, was converted into code and saved on a database. In other words, the time and space that the year 1995 consisted of has been separated from the system that it belonged to, shuffled, and converted into an intangible form of digital code.

Therefore, a large shift in the entity seems to occur every 25 years. Would one call this a law, or simply repetition? In reality, it is simply an unexpected change. The truth is, the ages that we live in are subject to shifting. It is a phase shifting out of place,



Courtesy of the Global Arts Affairs Foundation

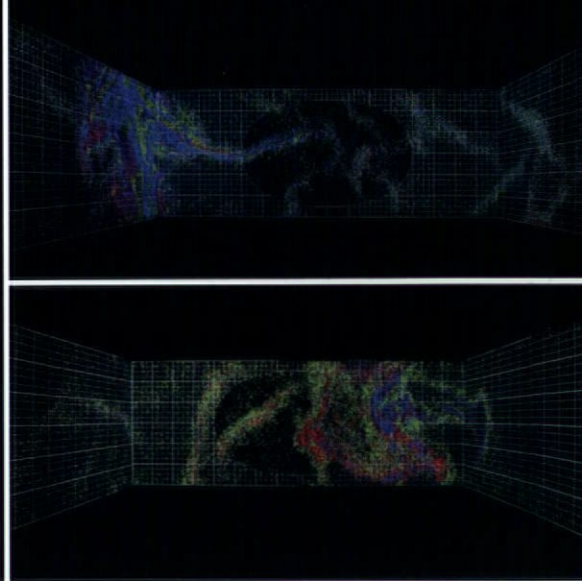
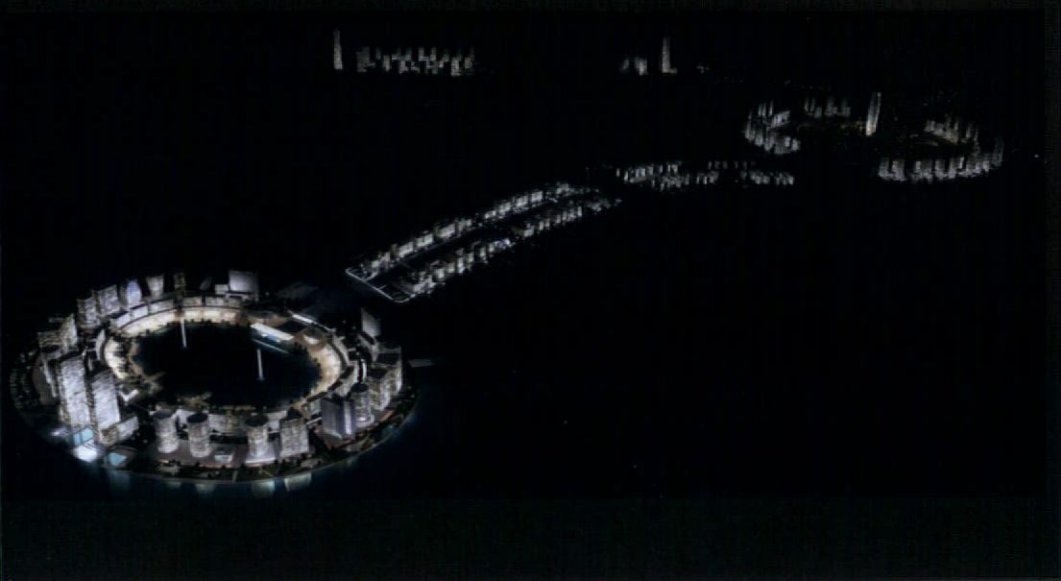
and by transitioning smoothly into a new phase it results in a sort of a catastrophe. In that sense, I believe that the current era is very likely to shift once again. The manner in which this shift occurs is not logical, and happens without you noticing it. The only time you realize it has happened is when you start to notice that people around you are talking about different things. ■

ABOVE: Isozaki presents his plan. BELOW: A model of the urban development in the Zhendong District.

"I may be able to create a space that provides a simulated experience of that something divine, regardless to how artificial or fake that actually may be."



Courtesy of the Global Arts Affairs Foundation



ABOVE: Stills from the Isozaki video depicting the urban development plan for the Zhengdong District dubbed "Future Steps".

to any other city I had visited before. Despite the lack of color, the city itself dissipates into the light via the glass—a space that dissipates in its entirety like mist. In that sense, *Coordinates, Twilight and Hallucinations* ties itself to *The Castle* and *In Praise of Shadows*.

Karlyn De Jongh: The Greek philosopher Protagoras once said: "Man is the measure of all things." In your architecture, you deal with people from all over the world, who are physically and culturally different. In a global world, can you still take 'man' as the measure?

AI: When a new city space grows into a metropolitan space, especially the type of spatiotemporal city development that is seen on the coastal regions in North America, it is not possible to grasp what is happening with the modern day notions in which time maintains its continuation on a straight axis. Space spreads homogeneously and light spreads properly. Within the city space, various symbols scatter without weight or size. By recognizing this fact, a person is able to move around in a city. It is simple semiology, which is a question about the signs seen in current cities, or a question of cognition. This kind of change has made obsolete the existing notions of "Time" and "Space" that began with Bauhaus, which had been referred to in modern architecture and modern design. These two words can no longer be used. Furthermore, one cannot go in the direction of weight or gravity. Despite that fact, a structure emerges equipped with its own system. This has emerged as the role of the Architect and Artist, in which a question is presented as to how a city can be built without the previously prevalent notion of time and space, which is as if a city itself is such a hypothesis.

That being said, zapping through the remote control of a television is like looking at a building. Say we have a preconceived image of a piece of architecture, but what we see changes drastically when we move where we stand. It is as if it is a continuous switch of perception, and

continuation of image does not exist. It is a form of "monad" where all become particles and time is instantly irrelevant.

KDJ: Already in 1962 you spoke about decay. In an interview for the Global Art Affairs Foundation, artist Lee Ufan told me: "Man is always trying to ensure that human-made things exist, or 'live on' forever. But, nature always works to break them down and return them to their original elements. Thus we could say nature and humans are fighting." How do you see this relation between man-made objects and nature?

AI: My impression of the year 1968 is that of being involved in social disturbance—being pushed around by waves not knowing what we were drifting towards. However in the '70s, I had the impression that color was being lost. At that moment, everything fantastical disappeared. In the '60s, anything high tech was still considered partially fantastical. There was the psychedelic and drug culture, and a movement to connect everything toward illusions. That suddenly all disappeared in the '70s. Drug culture was reduced to merely one dropping out of society or a movement of returning to nature. Hippies became nothing more than the way they dressed. Architecture was no exception, and all expression became bleak. Even fine arts became predominantly overridden by minimalism and conceptualism. Briefly during the early '70s in Japan, the Mono ha emerged. Various works and artists such as Arte Povera in Italy, "Support/Surface" in France, Joseph Beuys in Germany, and Richard Serra in the U.S., all had roots in the rejection of illusionism, and embraced ideas, which were supported by notions such as the laws of nature, and the presence of matter or space correspondence. Personally, I believe that the Mono ha movement, to an extent, was driven by a rebound effect. Saying "no more" to art forms that utilized technology.

In 1985, I was involved in designing *The Palladium*. This was an old opera house built in

1926 that was being converted into a disco. At the time, I mainly designed cultural facilities, so people wondered why I decided to work on something that was so commercial. I didn't particularly understand why myself, but I gave it [some] thought.

The first thing that caught my interest was when they explained to me that this was not like a typical disco club you would find in Japan, but that the objective was to create a disco that enables the audience to have an altered-space experience. Instead of an altered-space experience induced by the effects of marijuana or cocaine, the theme was more literal. With lights flashing simultaneously with the music, the challenge was to test the extent to which the image of the vintage space could be altered with technology and modern media. Architecture is inherently limited to creating a static contour. However, the essence lies in the various contraptions that are installed within that contour. When it is time for the contraptions to be installed, light and sound designers work together with the sole focus of figuring out how to most effectively shower the human five senses with a combination of images, lights and sounds.

However, when I began thinking about experiences in such settings, I encountered some problems. It was already clear that nature was disappearing from cities. Furthermore, religious facilities traditionally served as a sanctuary to the people. For example, it had always been tradition to go to a church to be in touch with God, but that custom was being lost.

Because of such shifts, it has become more and more difficult to encounter another person or a thing, or even ideally something divine, when living the every day city life. I am very certain about this fact. That was when I thought I may be able to create a space that provides a simulated experience of that something divine, regardless to how artificial or fake that actually may be. That, I thought, was what a disco could be.

Sarah Gold: It seems you have always been an artist and architect in one; collaborating with other artists and creating not only architecture but also artworks. How would you describe yourself?

Arata Isozaki: I personally define myself as an "Artist-Architect". As an Architect, I was close to the Metabolism Group movement. As an Artist, I was associated with various writers and art critics of the art industry in such movements as Neo-Dadaism, which evolved into concepts such as "color" and "environment", and eventually came into fruition in the form of *Omatsuri Hiroba* (Festival Square) at the World Expo in 1970. Since I was conceptualizing architecture and cities in the context of art, it only made sense to complement architecture with art.

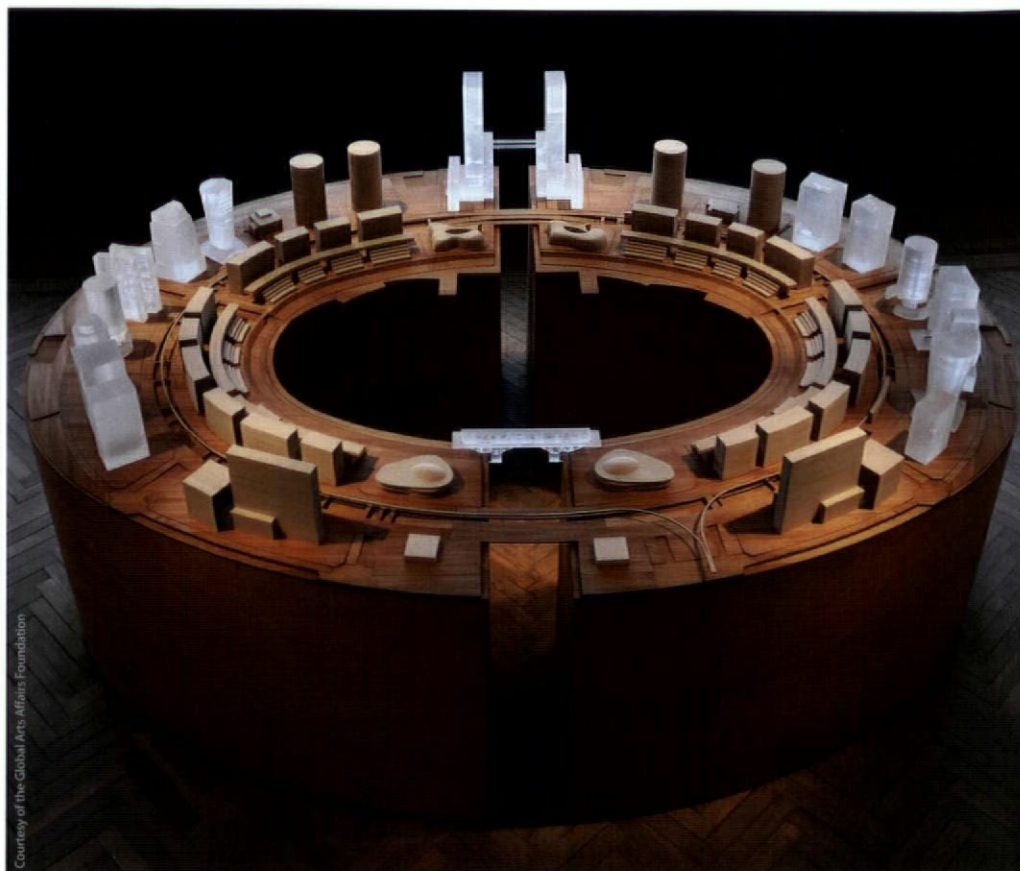
Valeria Romagnini: At the 2012 Venice Biennale, you won the Global Art Affairs Foundation Prize for your presentation at Palazzo Bembo. You made a design in order to create a city, which works as a closed urban space, independent from its surroundings. Can you explain how it is possible to conceive a city which can be independent from its surrounding?

AI: During the second half of the '60s, I was predominantly engaged with concepts of "color" within architecture, namely the effects of timeless light. In the '70s, I took a metaphysical position towards everything I approached, just like Atsushi Miyagawa who critiqued critiques. This is a method that I have incorporated over the years, where the artist himself, is not allowed to actually touch anything. The problem is designed in a way to enable the form itself to self-develop, without an artist having to actually do anything. In that sense, it relies on participation from the audience, or in this case, the local residents. Instead of a top-down structure, the form is developed through an indefinable network. This is a method that has been attempted by many people since, but at the time in the '70s, I was attempting to give a solid formula to the indefinability of a self-creating art form. One places a piece of technology with an inherit system embedded, and without involving an artist, you leave the site. Eventually, a form is generated automatically over time. I experimented with this concept at the *Omatsuri Hiroba* (Festival Plaza) during the Japan World Exposition in 1970.

The question of whether design is expression or control rose during this time period. "Control" could nowadays possibly be defined as "governing". In the case of a city, how would one govern? This issue is closely related to events such as: the campaign against the Japan-US security treaty in the 60s, naked Neo-Dada dancing, the "Thousand-

Yen Bill Incident", red and black tents in Shinjuku, and the occupation of Yasuda Auditorium at Tokyo University.

It is undeniable that Expo '70 was the starting point of crowd control in Japan. Up until then, I had had experience in city design, but the 300-hectare area involved absolutely all aspects of design. The infrastructure included multiple mechanical contraptions that were potentially dangerous, ranging from the multipurpose underground utility conduits to moving walkways. The magnitude was nothing short of planning an entire city. At the same time, I was constantly thinking about how to break the various boundaries that occur when a city is planned. In that sense, I commend Dada Kan who ran through the Expo naked. What balls he had, literally. The security [boundaries] was extremely high. That makes his actions admirable. There was also someone who managed to climb up the Tower of the Sun (Taiyo no Tou). Most people would criticize the design of the tower for enabling this. Regardless, it is incredible that this person slipped through the barriers and climbed the tower. It is about breaking the law. That is in itself, a performance.



OPPOSITE: Installation view at the Palazzo Bembo for the 13th Venice Architecture Biennale. THIS PAGE: A model of the Zhengdong New District.

VR: We could say that the city is a living organism. Many big decisions have been taken and many different influences through architecture have contributed to the world as we know it. What does Time mean for you in relation to the spaces you create?

AI: Space is not a tangible form existing in front of us, but rather something that occurs to us when we enter a space and notice its existence. In that sense, I question as to whether we have misinterpreted a very basic principle in this modern era by attempting to define time and space by giving it form and weight. During the 20th century, this notion has gradually become refined and eventually was philosophically understood as representation and meaning (such as is Signifier and Signified). However, at the time, this differentiation did not exist. Franz Kafka's *The Castle* and Junichiro Tanizaki's *In Praise of Shadows* (In'ei Raisan) are familiar literary references that embody this form of experiencing space.

I personally hope that my text *Coordinates, Twilight and Hallucinations* (Zahyo hakumei to genkaku; 1965) would be revisited. In 1963, I visited New York City. I wrote about the difference I perceived in the space compared

TIME, SPACE & EXISTENCE:



An interview with Arata Isozaki

By Karlyn De Jongh, Sarah Gold & Valeria Romagnini

As part of the Venice Biennale program, the Global Arts Foundation strives to spotlight more philosophical themes in art and architecture. Three of the organization's curators had an opportunity to sit down with the famed architect and speak with him on how these subjects relate to his work.





Photos courtesy of ESA

As Spaceport comes on line, Foster + Partners are collaborating with the European Space Agency, exploring the possibilities of 3D printing to construct lunar habitations. Their first 1½-ton mock-up resembles an igloo or a mud hut, demonstrating that the more things change, the more they appear the same. However, the low-tech appearance is deceptive. The space lander will carry a tubular module containing a membrane that can be inflated to provide a support structure for construction. A robot-operated 3D printer will layer this with lunar soil, using a foam-like cellular structure to provide the best strength-weight ratio. There's airlock for entry, and the base will protect four astronauts from meteorites, gamma radiation, and high temperature fluctuations. As Foster partner Xavier de Kestelier observes: "As a practice we are used to designing for extreme climates on earth and exploiting the environmental benefits of using local, sustainable materials; our lunar habitation follows a similar logic."

This self-constructing system may resolve the problem of transporting and assembling prefabricated modules, and could be adapted to the needs of remote terrestrial communities. Already, the Sasakawa International Center for Space Architecture at the University of Houston offers an M.Sc. in the subject, and one could imagine other architectural schools adding space architecture to their curriculum. In Playa Vista, UCLA has leased one of the hangars in which Howard Hughes constructed the Spruce Goose, and is using industrial robots to develop intelligent buildings. Could space be their next destination? ■



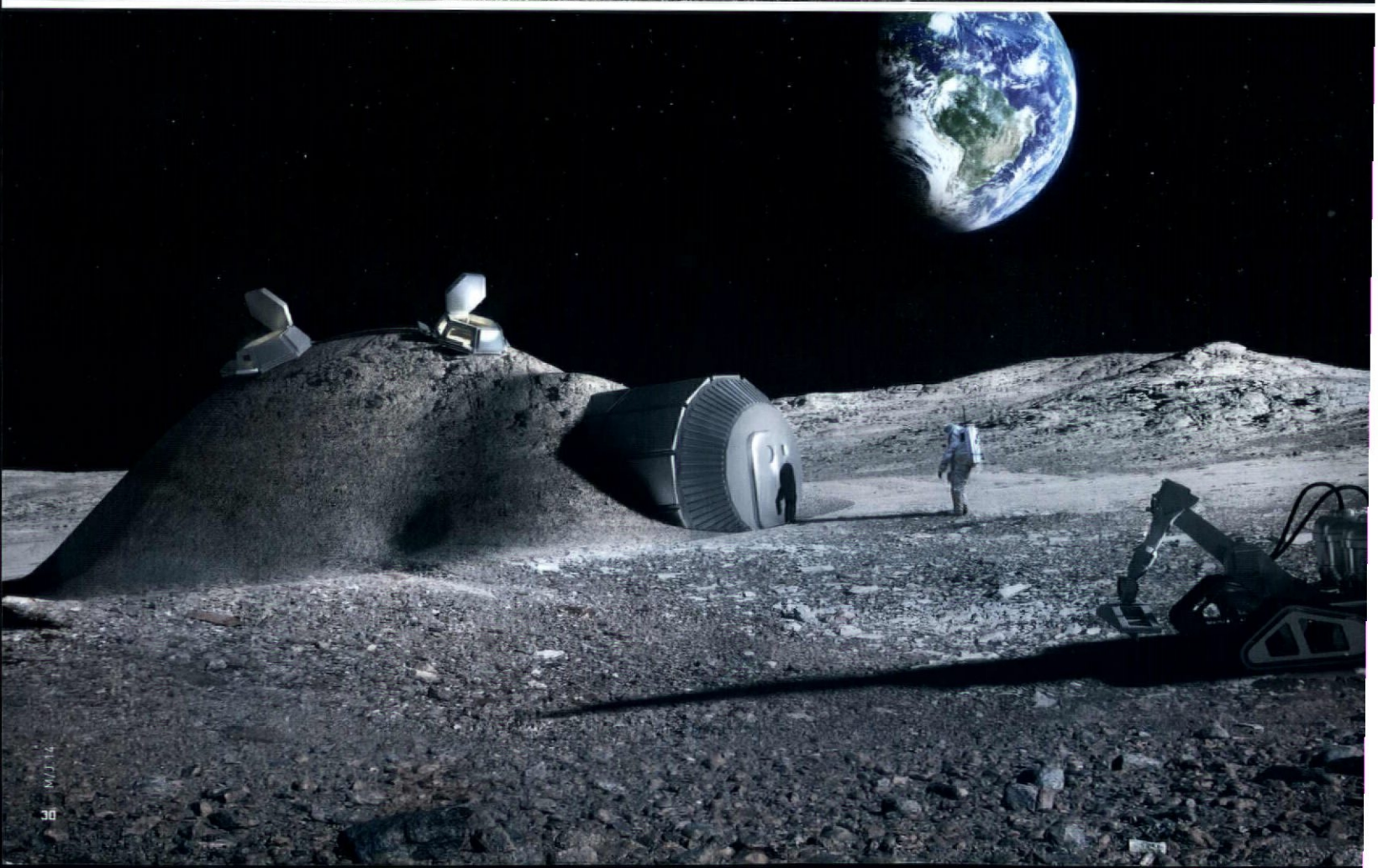
Photos courtesy of ESA

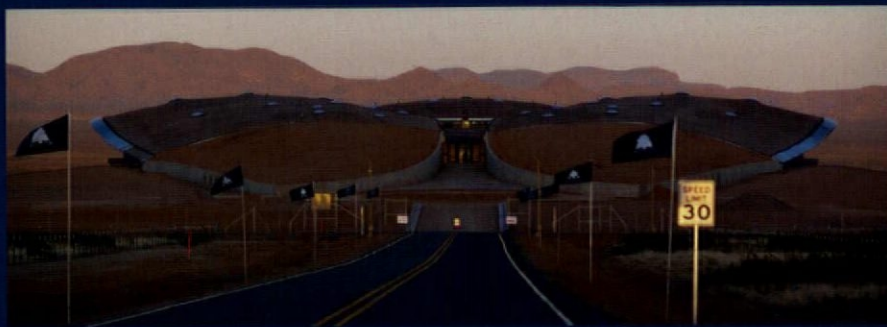


Photos courtesy of ESA, Foster + Partners

OPPOSITE TOP: Autonomous robots are used to 3D print a cellular structure that protects the inhabitants from gamma radiation, meteorite impacts and extreme temperature fluctuations. OPPOSITE BOTTOM: Lunar outpost near the moon's south pole.

THIS PAGE TOP LEFT: This 1.5 tonne building block was produced as a demonstration of 3D printing techniques using lunar soil. The design is based on a hollow closed-cell structure reminiscent of bird bones to give a good combination of strength and weight. THIS PAGE TOP RIGHT: The UK's Monolite supplied the D-Shape printer for ESA's 3D-printed lunar base study, with a mobile printing array of nozzles on a 6m frame to spray a binding solution onto a sand-like building material. 3D printouts are built up layer by layer. First, the simulated lunar material with magnesium oxide turning it into paper to print with. Then for structural ink, a binding salt is applied which converts material to a stone-like solid. ABOVE: The outpost is designed as a modular system which can be extended in the future.





Photos courtesy of Nigel Young, Foster + Partners



OPPOSITE TOP: Initial drawings of the Spaceport. BOTTOM: Foster unveils the completed construction. THIS PAGE: The Spaceport blends with the New Mexican landscape, and all operations are housed under one roof.

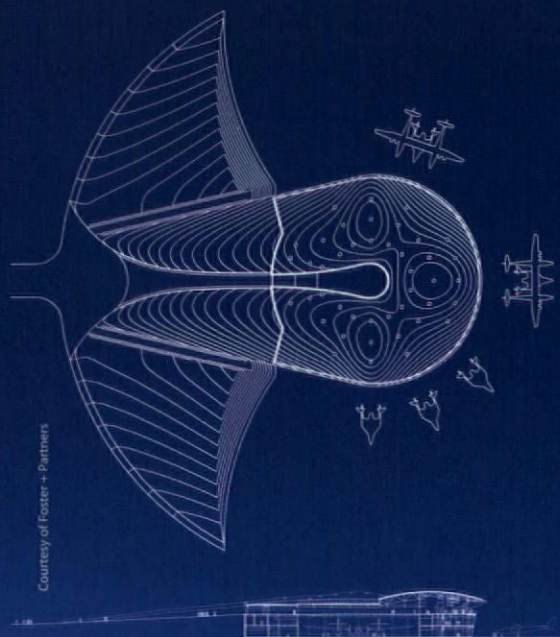
Foster was the ideal choice to design this facility. He once declared the Boeing 747 to be his favorite structure, he has designed several of the world's best airports (Stansted, Chek Lap Kok, Beijing), and he flies his own plane. It helps, too, that he's passionate about sustainability. "Spaceport presents all the technical challenges of an airport, inly more so," says Foster. "We've tried to make the experience uplifting in every sense. For operational efficiency, the

hangar, control and passenger terminal functions are all combined under one roof....we've aimed to minimize its visual impact by digging it in below ground level [gaining] significant energy saving benefits from the thermal mass of the partially buried structure." It's expected to achieve a LEED Gold accreditation.

The building is designed to be read from space—who knows what aliens are looking down expectantly—and to provide

panoramic views for spectators, who enter via a deep channel lined with exhibits on space exploration and the region. Like Saarinen's TWA Terminal at JFK, now an abandoned historical relic, Spaceport rekindles the thrill of flight as an end in itself, rather than a means of getting somewhere quickly—just as it was in pioneering days. It's sure to inspire many similar ventures from China to Qatar, so architects can look forward to commissions for a new variant on a familiar building type.





Courtesy of Foster + Partners

As the film *Gravity* demonstrated, space presents unique challenges that fiction can safely ignore. In *Le Voyage dans la Lune*, French movie pioneer Georges Méliès showed top-hatted space explorers battling selenites with their umbrellas, an entertainment of 1902 that's available on YouTube. Constructivist artist Alexandra Exter designed an angular palace for *Aelita: Queen of Mars*, a Soviet silent movie, and Orson Welles shocked America with his 1938 radio report of a Martian invasion. Thrilling as the success of the moon lander and Mars Rover were, they've destroyed our illusions. We already knew that the moon wasn't made of green cheese and that Mars was not home to the predatory invaders of *War of the Worlds*. Now we are certain that both our near neighbors are lifeless, airless wastelands, hostile to humans, and plans for settlement are being tested in the Utah desert and on a remote Canadian island. There, scientists spend months in prefabricated cylinders, venturing out in pressurized suits and excavating the barren terrain as though they were on another planet.

What role is there for architects, when the technical challenges are so far beyond those on Earth? It begins with the human dimension. When NASA's

Skylab, the first space station, was being designed in the late 1960s, engineers proposed a windowless capsule in which the astronauts would communicate via computer. The misbehavior of Hal in *2001: A Space Odyssey* cast doubt on that solution. Astronaut C. Gordon Fullerton spoke for his peers: "Give me a window and binoculars any day over a high-tech solution." Architects were brought in as advisors, a window was incorporated into the design, and gazing out at Earth was a major release for explorers cooped up for weeks in outer space.

Dreams of breaking free from the pull of gravity have created a market for space tourism. A few fat cats paid up to \$20 million to share the hostel-like accommodations of the Russian space shuttle; now, Virgin Galactic is offering a luxurious taste of weightlessness for a mere \$250,000 a suborbital trip, and they commissioned Norman Foster, an English lord and passionate aviator, to design the first spaceport in New Mexico. Roswell, where a flying saucer may have landed in 1947, and the White Sands Missile Proving Grounds are a few hours' drive away—appropriate symbols for a scientific frontier, and for the adventurers who will be joining Sir Richard Branson and his children on the first flight.



SPACE

A NEW FRONTIER FOR ARCHITECTURE

BY MICHAEL WEBB

HUMAN IMAGINATION FAR OUTSTRIPS our physical capabilities and the laws that govern the universe. Visionaries conjured alien civilizations and space exploration even before the first terrestrial flight. In *Earth to the Moon*, Jules Verne described the odyssey of three astronauts launched from Florida, a century

before the first Apollo Mission did just that. Konstantin Tsiolkovsky, a Russian autodidact, penned the first scientific treatise on space travel in 1903, proposing a rotating wheel to serve as a space station, assembled by a fleet of shuttles. German rocket engineer Wernher von Braun refined that concept in a 1952 magazine

article, "Man Will Conquer Space", before working to make it happen. Stanley Kubrick appropriated Braun's wheel for *2001: A Space Odyssey*. Reality and speculation feed off each other, but the present International Space Station is more a product of adhocism than the sleek images of science fiction.

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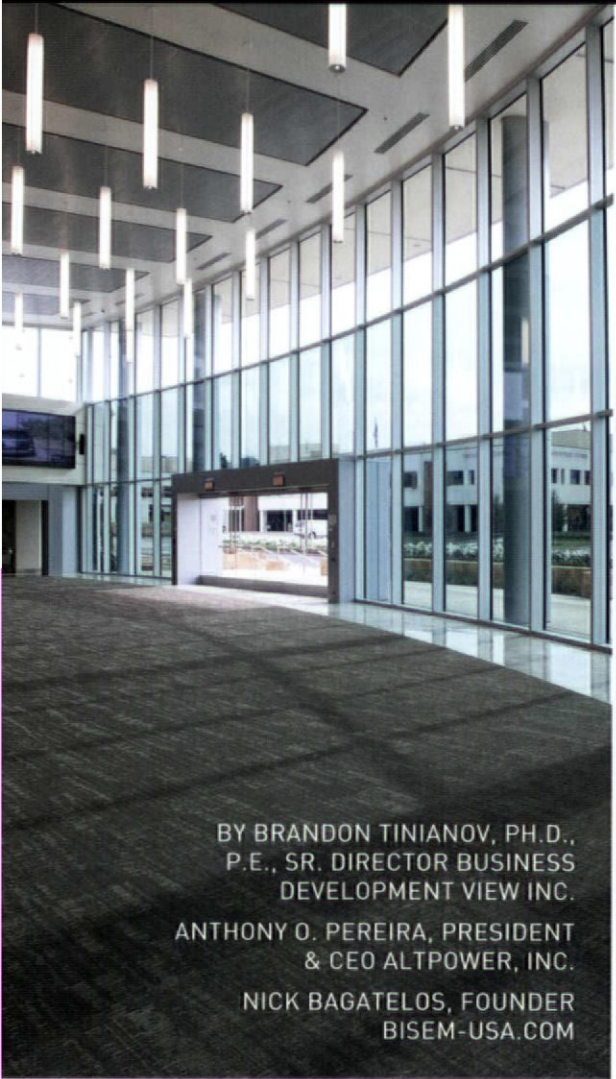
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RETROFIT THE FACADE TO ACHIEVE NET ZERO BUILDINGS

In 1995, the Sacramento Municipal Utility District (SMUD) built a state-of-the-art customer service center, designed to be a welcoming place for the public, and provide a world-class example of sustainable building design.

At their headquarters, they designed an Energy & Technology Center to showcase energy saving and sustainable technologies. It is a 1,000-square-foot glass room meant to study both top-light and side-light daylighting strategies. An unfortunate outcome of the design is that the solar heat gain that manifested from a 100 percent window-to-wall ratio made the room intolerable for any typical use. This room reaches temperatures of up to 150 degrees Fahrenheit, on many summer afternoons. Cooling the space drives up building peak loads and energy consumption—not an option in a LEED Platinum facility. In the words of client, Jim Barnett, principal architect SMUD PV Programs: “Twenty years ago, the Solar Room was a rare and advanced facility designed to develop, test and simulate daylighting strategies with full scale dioramas. It turned into a literal melting pot for displays.”

SMUD contacted BISEM to help with retrofit strategies to reduce solar gain at the facade. The strategy was to create an envelope solution to

reduce glare, solar heat gain, generate clean energy, and cool the space with an off-grid evaporative cooling technology. The team decided to apply the newest daylighting control, and energy generating envelope technology to mitigate the problem. The energy design team decided on the integration of three technologies: Electrochromic glass to control daylighting and tune the SHGC, CdTe thin film photovoltaic panels to generate DC power and create shading, and DC evaporative coolers to harness PV power.

View Dynamic Glass uses Electrochromic technology to change its solar transmission properties (in the ultra-violet, visible and infrared spectrum) in response to a small-applied voltage (< 5 volts). This enables control of the amount of light and radiative heat passing through a window.

A solar electric photovoltaic (PV) curtain wall was chosen to generate power for the DC evaporative coolers, as well as reduce heat gain and glare on the south wall. The chosen

PV uses CdTe thin film technology deposited between two tempered sheets of glass, which allows for seven percent light transmission. This technology was specified, because these modules have a uniform appearance and operate more efficiently in higher temperatures.

Since the space did not have adequate duct work to cool the room in high solar heat gain conditions, SMUD supplied two direct current evaporative coolers to provide the cooling load for the room. The two units were installed below the BIPV (Building Integrated Photovoltaic) system, and the PV units were directly connected to the DC coolers.

The result is a 1000-square-foot glass enclosure that meets all of the parameters defined by SMUD, with beautiful aesthetics, tunable SHGC and Net Zero[®] Energy. It is no longer a “melting pot.” According to Barnett: “The Solar Room has again become a demonstration of strategies, which reduce solar heat gain and glare, generates its own electricity and showcases off-grid DC technologies.” ■

COMPLEX GEOMETRY AND FACADE PERFORMANCE: PERFORMANCE-DRIVEN FACADE DESIGN

BY WON HEE KO, GRADUATE FACADE ENGINEER, BURO HAPPOLD

Contemporary building design can have complex configuration in overall mass of building as well as facade module that are in strong contrast to box-shapes of the past.

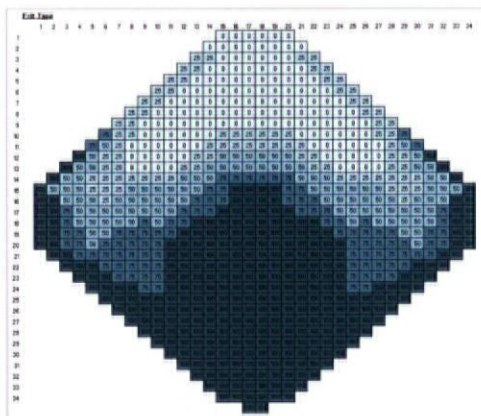
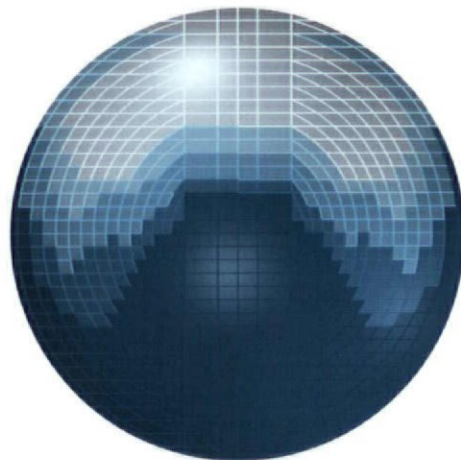
This tendency makes accurate building energy simulation more difficult. Although sophisticated software exists to predict the performance of buildings and help architects make better decisions that reduce energy use, such programs are generally not able to deal with complexities of unconventional facade design. This is especially critical in regard to fenestration of high-rise office buildings, which have a large proportion of glazed area. Therefore, it has become important for architects and engineers to understand the angular dependence on direct solar heat gain for high performance building envelope design.

In this presentation, a research thesis and paper were introduced: Tilted glazing: angle-dependence of direct solar heat gain and form-refining of complex facades and Tilted glazing in building simulation and form-refining of complex facades. This research project focuses on the effect of angular dependence on direct solar heat gain (DSHG) from tilted glazing. Variables that affect the optical properties of inclined glazing have been researched. One of the main variables, angle of incidence was chosen to be investigated in this presentation. The prescriptive path in ASHRAE 90.1 defines requirements of glazing properties depending on climate and building type regardless of the angular dependence of solar heat gain. For example, current SHGC is independent of angle of incidence. This can lead to errors in the

building performance prediction. To improve DSHG calculation, a master spreadsheet that includes incident angle calculation based on the specific location, time and surface azimuth was developed. The effect of incident angle was reflected in direct solar heat calculation based on perpendicular direct incident solar radiation and the effective SHGC to produce the spreadsheet. Using this spreadsheet, one can predict the amount of DSHG from each area of tilted glazing, with time-dependence throughout the year.

Along with the researches, Buro Happold's case projects were mentioned to show the practical application of the research to the professional building engineering/design field. These cases include faceted building mass and modules as well as material selection based on DSHG. For the faceted building mass, an algorithm was developed in Grasshopper (a plug-in for Rhino 3D), linking to the master spreadsheet. This algorithm can extract the surface azimuth and tilt angle of any surface from a given faceted form of building in Rhino, and the surface information is input back into the spreadsheet to calculate the DSHG of the surface. Based on this process, one can easily see the total DSHG of a whole building. The faceted facade module project includes the process of defining the module geometry according to each facade orientation for passive solar strategies. The last case project has a glass dome and an Grasshopper algorithm which can provide the quick solar gain feed-back from IES-VE based on solar gain from different material selection introduced.

The presentation clearly showed the importance of accounting for the angular dependence of glazing, which is not generally included in building simulation programs, energy codes, and even architects'



Rhino, Grasshopper and Excel, Solar Gain Calculations

perceptions. Without visual editing software such as Grasshopper, this process would have been possible only with time-consuming calculations and multiple iterations in the past. At the present time, technical innovation allows such studies to be conducted in an easy, quick and accurate way. ■

BY KELLY A. HENRY, M.ARCH, MBA, LEED AP

ULTRA HIGH PERFORMANCE CONCRETE SOLUTIONS FOR INNOVATIVE ARCHITECTURE

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precasters can achieve complex shapes that are extremely durable, cost effective, and require little maintenance. Ductal® works well for today's innovative concrete applications and supports new trends in architecture: purity of line, delicacy, enhancement of texture and mineral bias.

G8WAY DC, a new 16,000 ft² open-air, multi-use pavilion located on the east campus of the historic Saint Elizabeths Hospital in Washington, D.C. Intended for casual dining, a farmer's market and community events, it has a thin, 1¾ inch, lightweight roof made with UHPC that provides shelter below and a spacious, landscaped seating area above. Designed by Davis Brody Bond, the roof is approximately 122 m (400 ft) long x 7.6 m (25 ft) high x 18.3 m (60 ft) wide at its broadest point. ■

G8WAY DC. Design and photo by Davis Brody Bond

