LEADERS

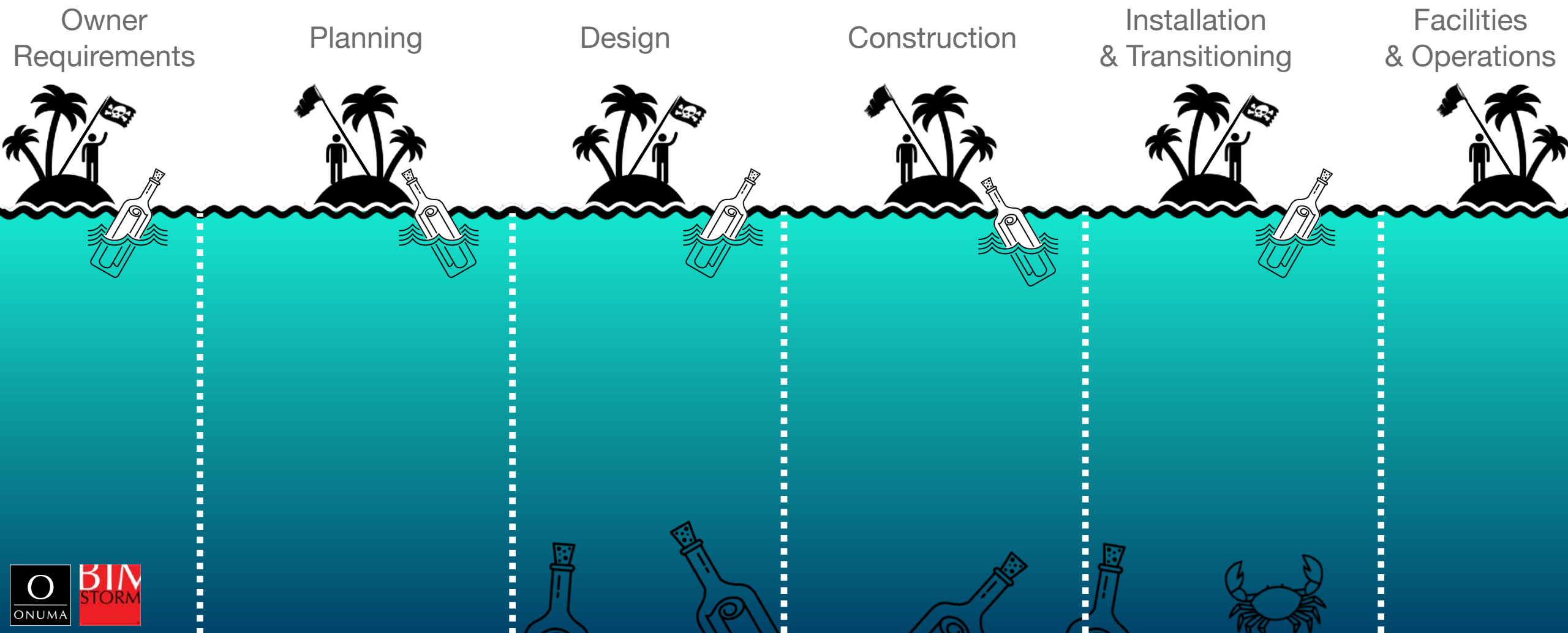
BUILDING INFORMED ENVIRONMENTS

Kimon Onuma, FAIA

ONUMA · BIM STORM · ONUMA SYSTEM · BIM genie

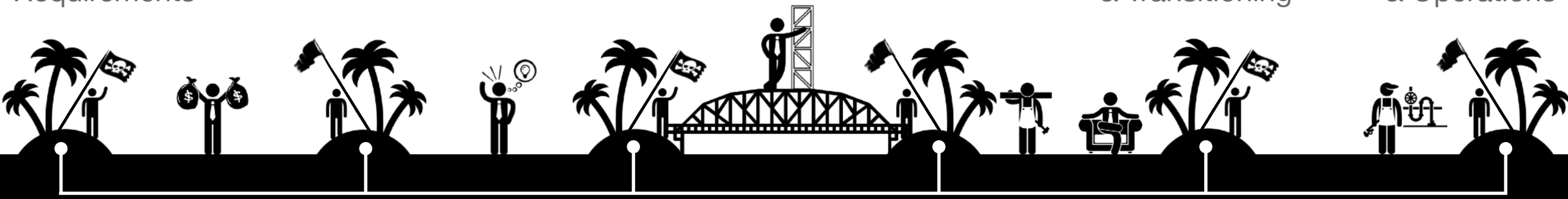
2021 Asset Leadership Network China
reStructuring America
Rethinking the concept of value in national assets and infrastructure.
Building on Success

Islands


Owner Requirements
Planning
Design
Construction
Installation & Transitioning
Facilities & Operations

PLATFORMS

Owner Requirements | Planning | Design | Construction | Installation & Transitioning | Facilities & Operations

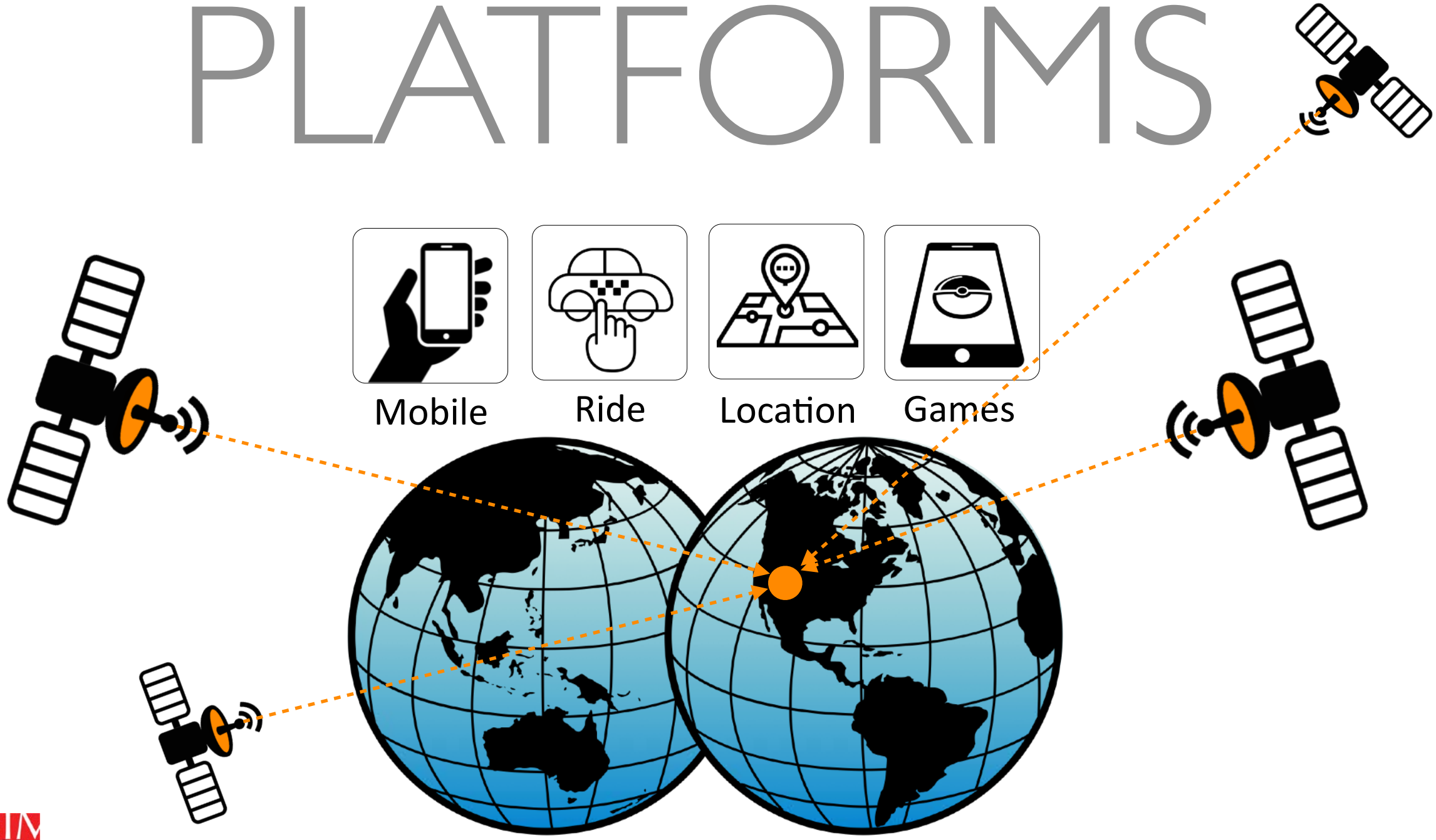


DIGITAL PLATFORM - Web APIs

DATA

ONUMA BIM STORM

PLATFORMS



ONUMA

BIM STORM

ONUMA

BIM STORM

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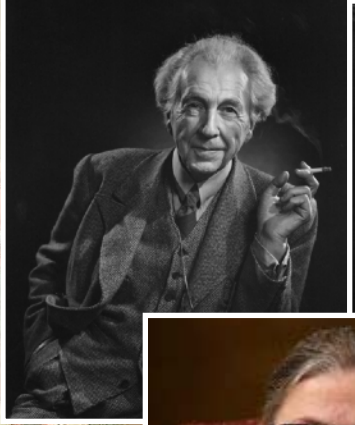
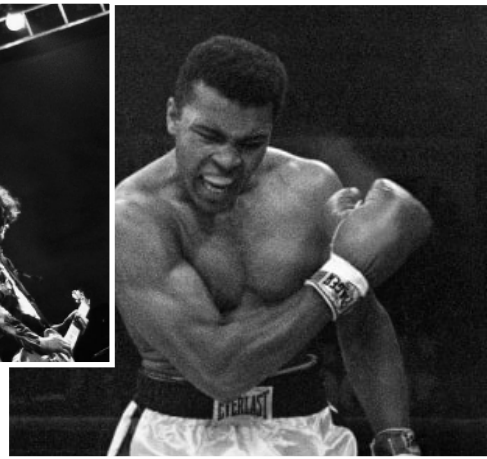
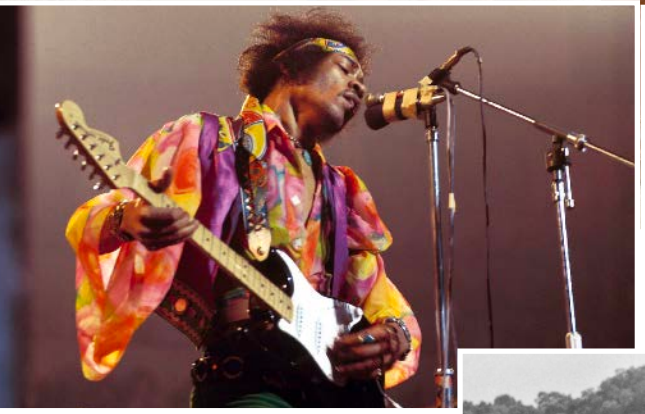
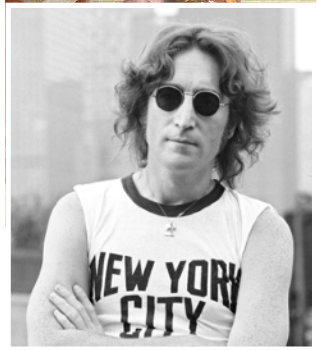
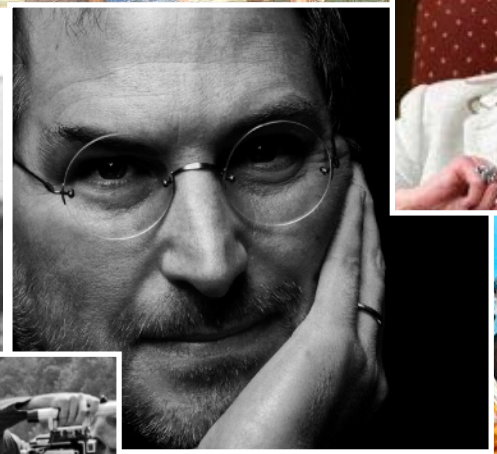
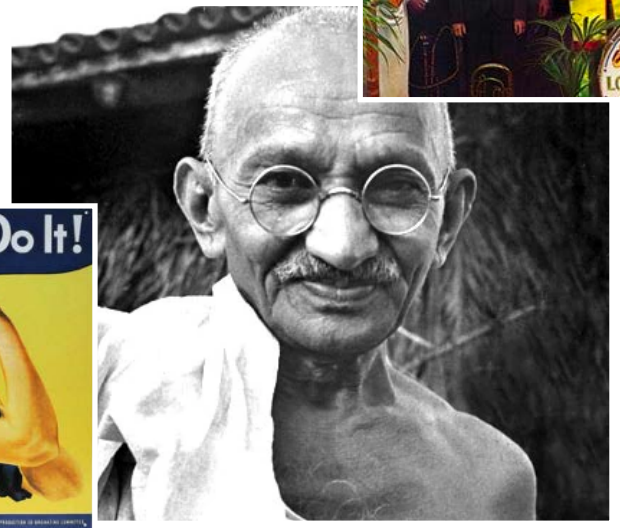


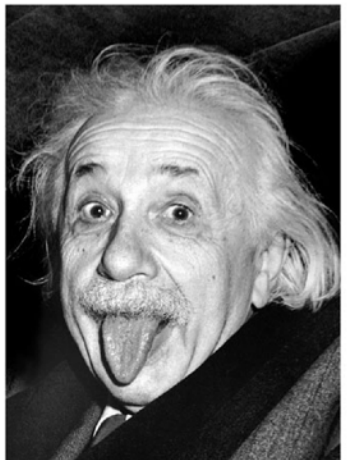


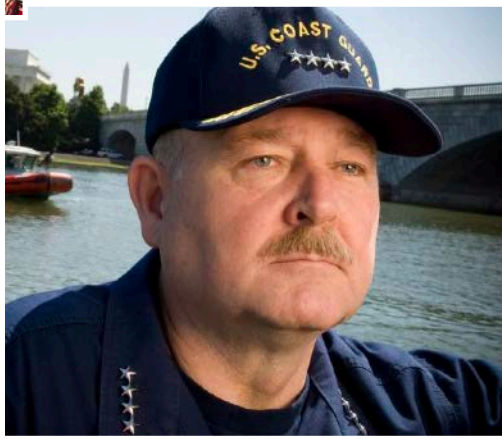






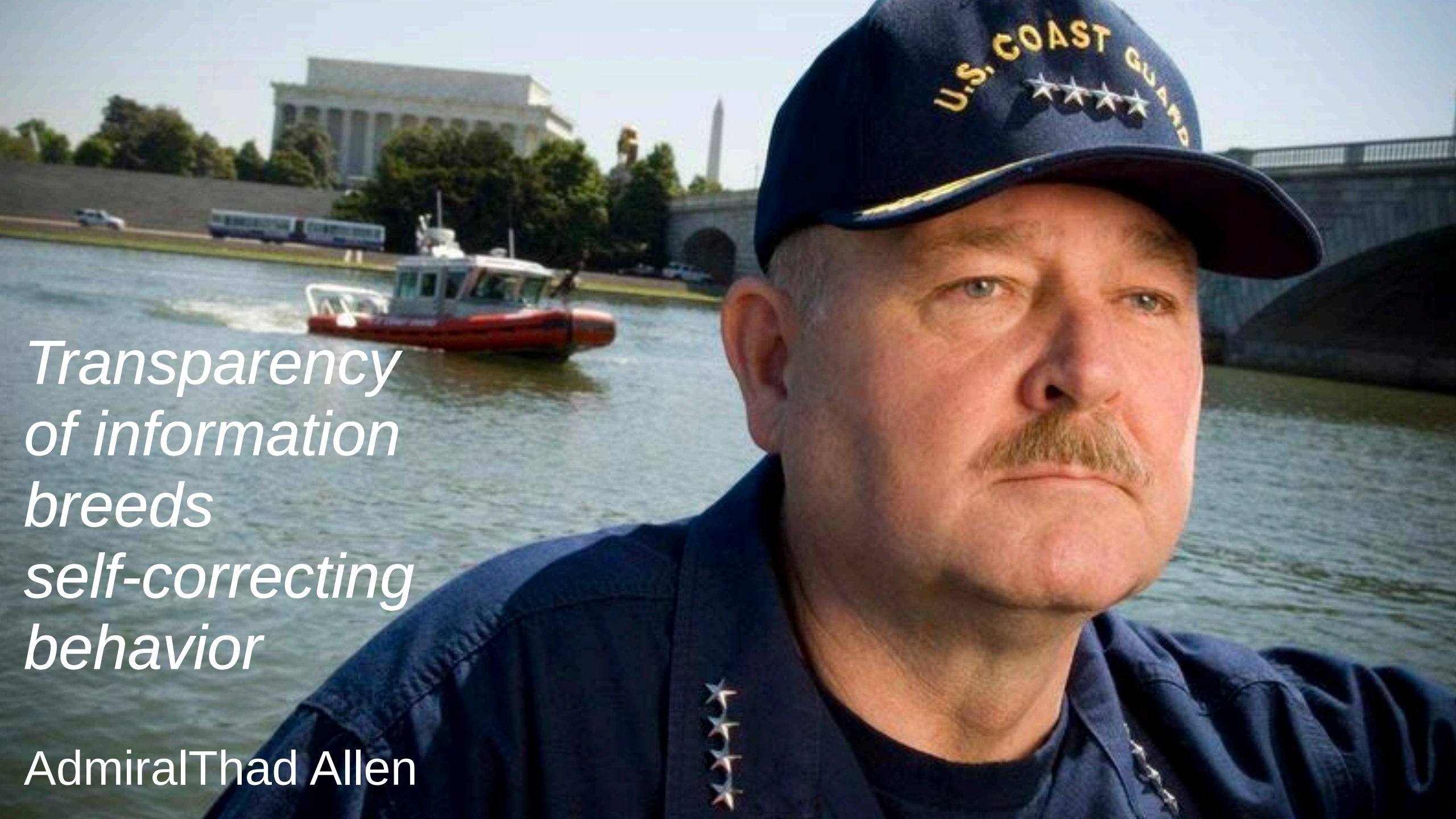






ONUMA

BIM STORM

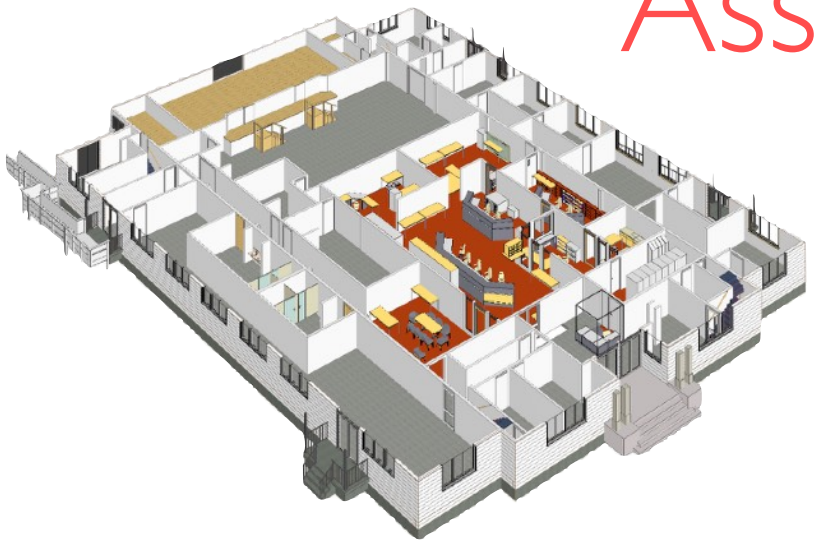


Transparency of information breeds self-correcting behavior

AdmiralThad Allen

US Coast Guard

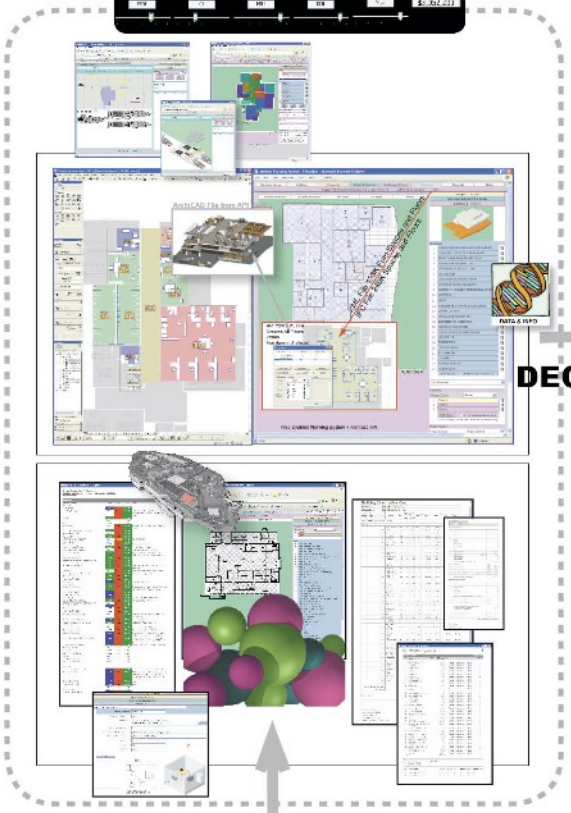
Assets



2003

ONUMA

DEMAND

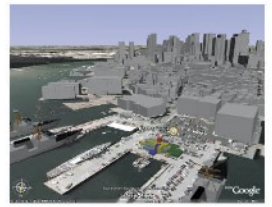


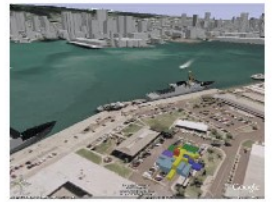
DECISIONS

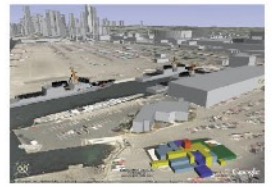
SFCAM ROAD MAP

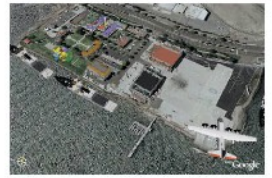
SUPPLY

Data from BIMs, Metrics & Other Sources



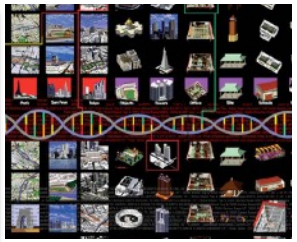


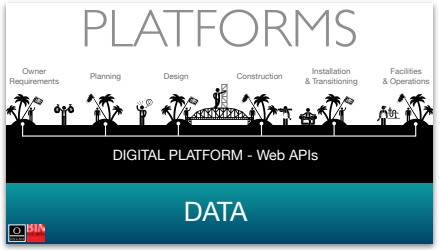




30 Years of Building Information Modeling (BIM)

Object Genome AIAPF Award





Web enabled BIM and GIS

Pre BIM
3D and Data

ONUMA.com

Revit

Keyhole

ONUMA
BIMServer

BIMStorm

Facility
Management

Modelshop

Filemaker

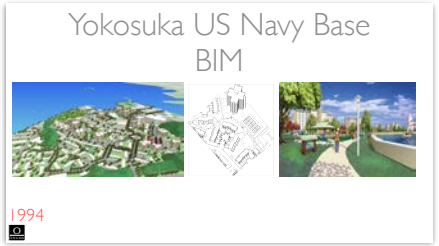
Archicad

SketchUp

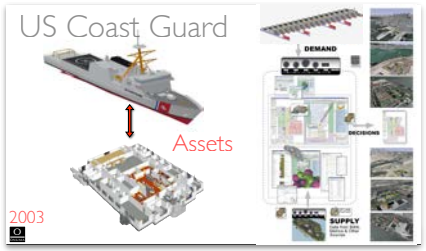
First use of Keyhole
(Google Earth) and BIM

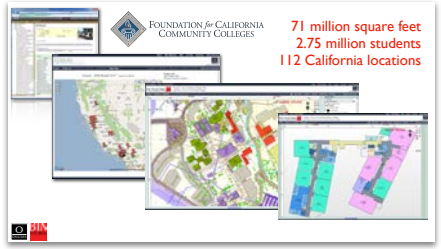
California Community Colleges
FUSION, CCC GIS ONUMA

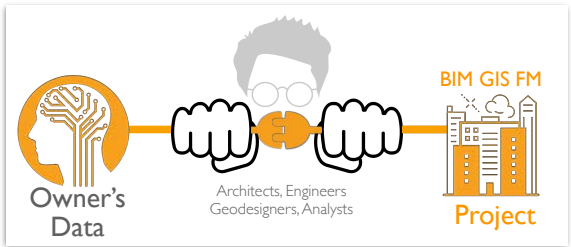
Large Government Agencies
BIM, GIS, Lifecycle Roadmaps



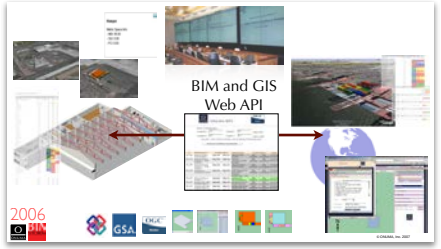
City Scale BIMs with Smart Objects
(Forcing BIM to be like GIS!)







First use of
Level of
Development
LOD for BIM



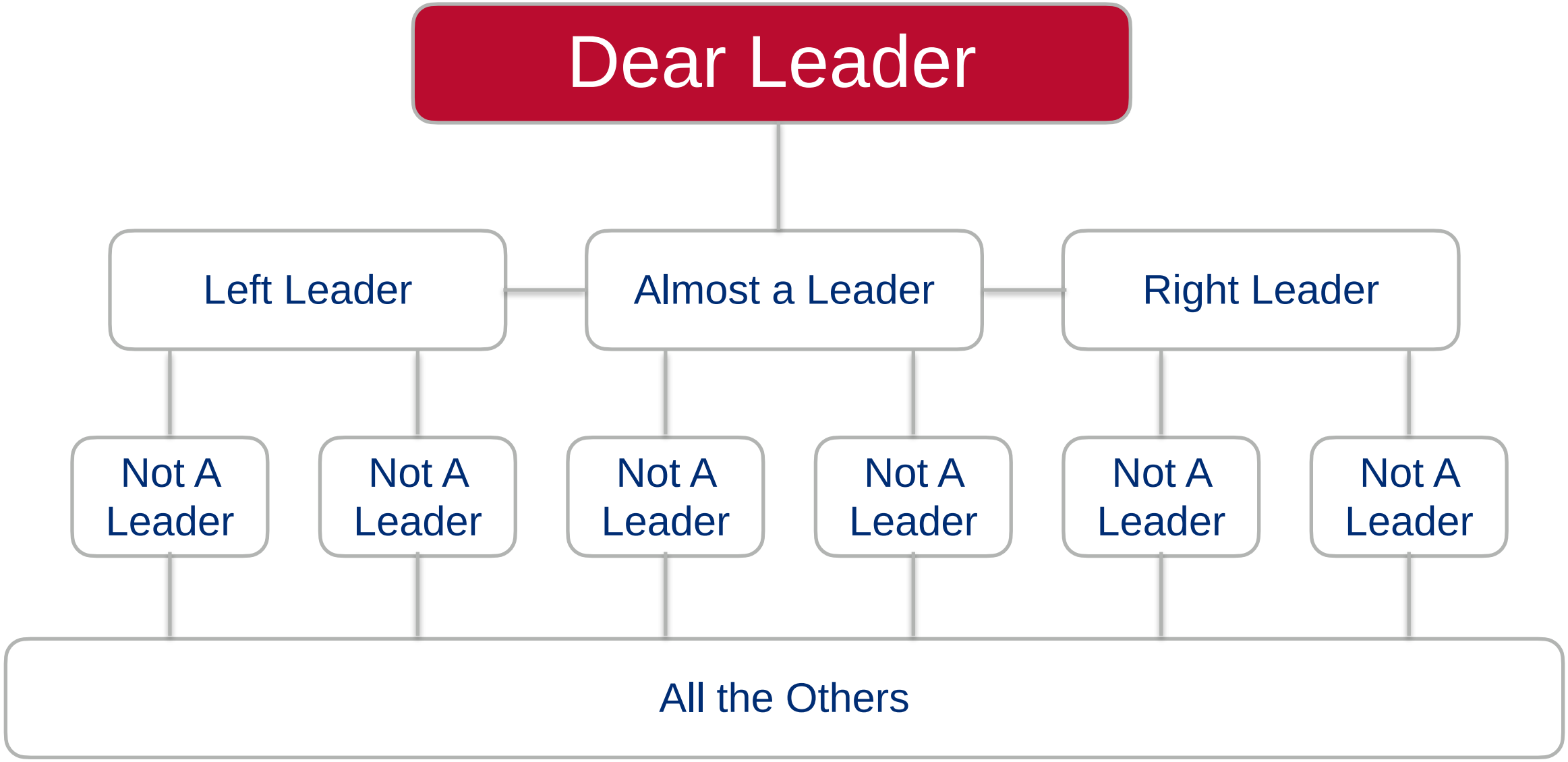
Open
Geospatial
Consortium

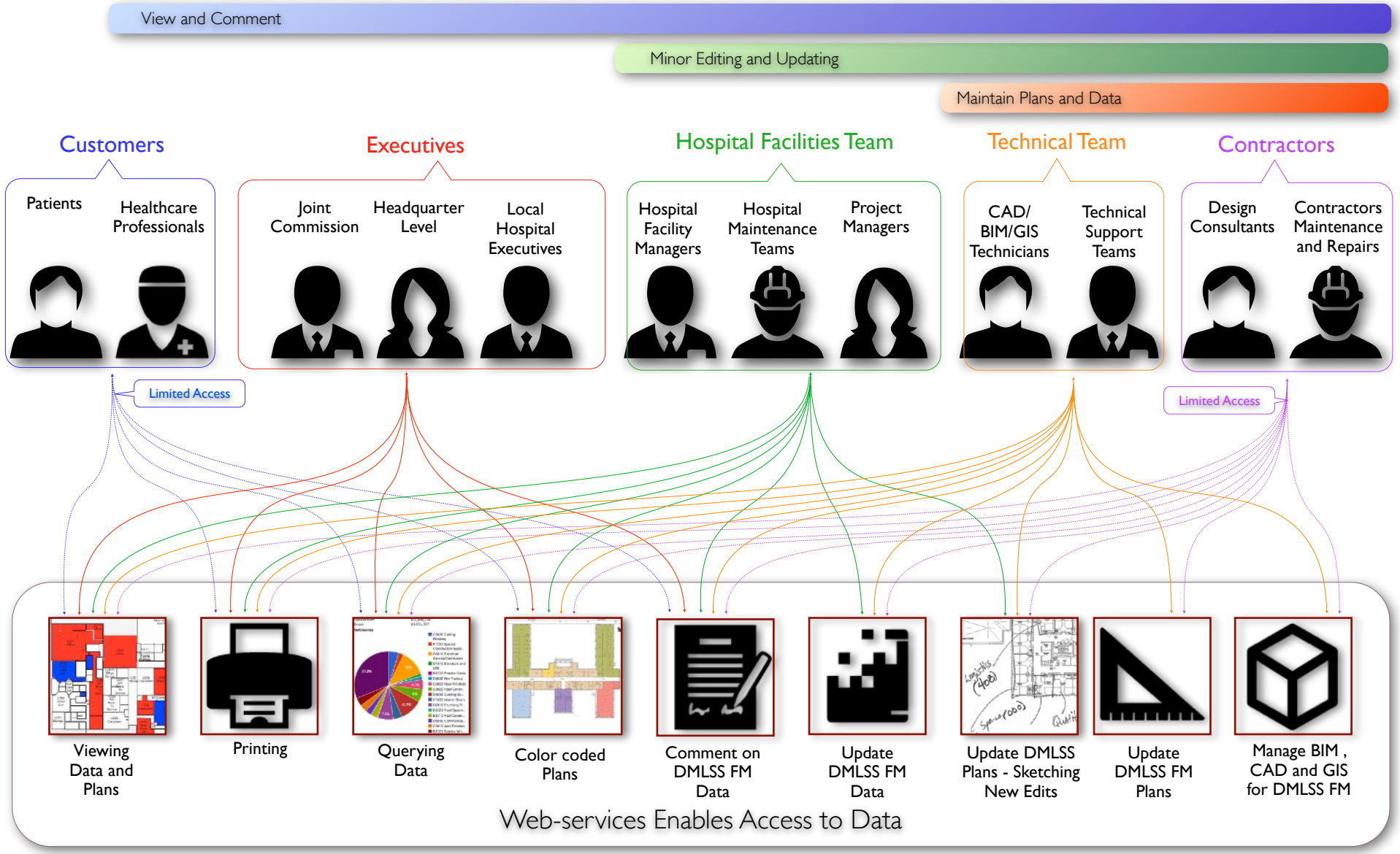
BIM, GIS
CMMS

ONUMA

BIM STORM


EQUITY
Less Pyramids


Dear Leader
Left Leader
Almost a Leader
Right Leader
Not A Leader
Not A Leader
Not A Leader
Not A Leader
Not A Leader
Not A Leader
All the Others


View and Comment
Minor Editing and Updating
Maintain Plans and Data
Customers
Patients
Healthcare Professionals
Executives
Joint Commission
Headquarter Level
Local Hospital Executives
Hospital Facilities Team
Hospital Facility Managers
Hospital Maintenance Teams
Project Managers
Technical Team
CAD/ BIM/GIS Technicians
Technical Support Teams
Contractors
Design Consultants
Contractors Maintenance and Repairs
Limited Access
Limited Access
Viewing Data and Plans
Printing
Querying Data
Color coded Plans
Comment on DMLSS FM Data
Update DMLSS FM Data
Update DMLSS Plans - Sketching New Edits
Update DMLSS FM Plans
Manage BIM , CAD and GIS for DMLSS FM
Web-services Enables Access to Data

ONUMA


WHERE?
Less Stuff

1974-2006 Tokyo

1990 Pasadena

~2009 Pasadena

Architecture: Onuma System Cuts Down on Design Time

Continued from page 1

processes that are far more efficient.

The technology will allow architects to shorten turnaround time from weeks to days, or even hours in some cases.

And last month, the Pasadena-based nine-member firm got a four-year $2.8 million contract from the Smithsonian to help design an updated master plan for the institution's museums. Onuma's firm will use its software to help in-house architects and engineers plan future renovation and expansion of the organization's nine million square feet of museum and research space.

Supercharged spreadsheet

Onuma's Web-based tool can be described as a supercharged spreadsheet programmed with all the data about a project, from the square footage to the cost estimates and environmental impacts.

The project's architects, developers and project managers each get a user name and password and varying levels of access to the information.

The typical design process of large-scale buildings can take months, sometimes years, to complete because of its complexity and elements of interdependency. If the square-footage of a room is altered, for example, then new numbers have to be sent to a price estimator to make a revised construction cost estimate.

RINGO H.W. CHIU/LABJ

Centered: Kimon Onuma with employees at his eponymous company in Pasadena.

On the Onuma Planning System, an architect can add furniture or shave off floors of a planned building, and the Web-based software calculates in real-time how much those changes will affect the cost. The software also handles environmental impacts, such as traffic flow, and infrastructure concerns, including water, sewer and electricity systems.

That's not to say the Onuma's system will sweep the industry. The technology faces resistance from those who say that the system requires a new level of information sharing during the early stages of design, which can result in a blame game in court if later construction fails or the finished product has defects or there are cost overruns.

Since the architects, developers, contractors and builders all contributed to the design process and in essence, corporately own the building information model, it could become unclear who is responsible for a problem.

Steven Ryder, an L.A.-based senior associate at architecture firm **NBBJ**, said that despite these concerns, there's no question that real-time design and high-tech information sharing are the future of the industry.

"But the issue of liability will need to get worked out on the national level and the American Institute of Architects is kind of a dinosaur and has yet to significantly address this issue," Ryder said.

RK Stewart, president of the American Institute of Architects said Onuma's Web-based tool is at the "cutting edge of where the industry is already headed."

The organization is advocating what's called "integrated practice," where every party involved in the building process, from archi-


2009~Now - VIRTUAL

Woodstock

SHARING

ONUMA

BIM STORM

25 SOLUTIONS NKAD Non-Engineering Software AEC Macs for Architects | CADALYST LABS REVIEWS Calgard trueSpace 7.5 HP Compaq 8710w Autodesk Design Review 2006 | MANAGEMENT Educational Resources for CAD Managers

cadalyst

Integrating Technology for Manufacturing, AEC and GIS www.cadalyst.com

By Kenneth Wong

The Summer of BIM

A counterculture design festival breaks down the usual barriers.

What if one summer — or in this case, winter — a bunch of idealistic architects, designers, building owners, contractors, and consultants decided to do away with the professional hierarchies, business protocols, and legal constraints that have long prevented them from working together? What if they converged on a destination and simply spent the day exchanging ideas about the high-rises, hospitals, firehouses, and schools they envision building there?

The Woodstock of BIM (building information modeling), as the organizers prefer to call it, took place this winter (**figure 1**). On January 31, soon after sunrise, 133 individuals from Boston, Maryland, Hawaii, Canada, Mexico, Japan, the Netherlands, the Philippines, and elsewhere (http://bimstorm.com/LAX/play) began to transform the 60 city blocks east of Dodger Stadium in Los Angeles (**figure 2**). A day later, they left behind 420 buildings, encompassing 54,755,153 square feet. Perhaps the most astonishing number is the total mileage traveled by the participants: zero.

How could this be? Because the 24-hour design fest took place in virtual space, courtesy of Onuma Planning System (OPS), a Web-based BIM collaboration platform.

In this article

The Fruits of a Dream

When Kimon Onuma founded his architecture practice in 1988 in Pasadena, California, he was following in the footsteps of his father, who began his Tokyo architectural firm in 1972. Onuma sincerely believes the building industry is ripe for a revolution. In December 2007, he had the idea for a free event that would bring together a cross-section of the industry. He dubbed it BIMStorm LA.

For the event to succeed, he figured it needed several crucial elements:

- It had to be conducted in real time.
- It had to be hosted via the Internet (so people could see one another's ideas).
- It should have no lag time (so an architect wouldn't have to wait two weeks after he or she had submitted something to get feedback).
- It had to be based on open and interoperable data standards (**figure 3**).

Onuma already had in his possession the technology that could facilitate this gathering. OPS, his company's flagship product, is the software-as-a-service (SaaS) model for BIM. You don't have to install software. You simply go online from a browser to use the OPS features.

Figure 1. The Woodstock-inspired poster for BIMStorm LA

Figure 2. The 50-million-square-foot area east of Dodger Stadium was the focus of BIMStorm LA

The OPS IFC Model Server would function as the central repository to host all the projects and the entries. For modeling and analysis, players could use Graphisoft's ArchiCAD, Autodesk's Revit, Nemetschek North America's VectorWorks Architect, Roland Messerli AG Informatik's EliteCAD, Square One Research's Ecotect, Google SketchUp, or anything compatible with Industry Foundation Classes (IFC) standards. Supporting documents and site data could be supplied in Excel, Google Earth, and even pen and paper (so long as they could be scanned and brought into the communal environment).

After a planning session and a practice run, teams began to form. Team A included two architects and a government agency employee with expertise on project request submittals. Team V included an architect in North Carolina and two architects in Maryland, who also happened to be software developers from Nemetschek North America. In Team E, a Revit user was paired with an ArchiCAD user. Several people joined the foray as spectators. Code reviewers, structural analysts, LEED specialists, and green consultants also stood ready to offer input from the sidelines.

On the designated day, at 11 A.M. in Boston, 4 P.M. in London, and 6 A.M. in Honolulu, the BIMStorm struck.

Figure 3. The use of open standards allowed projects created in different BIM tools to coexist in Google Earth's virtual terrain within the Onuma Planning System.

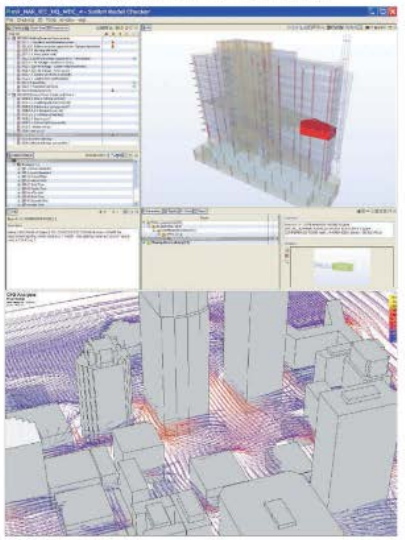


Figure 4. While the design teams were working on the geometry, some analysts were running code checks (top); others were performing airflow analyses (bottom) on the available models.

Green Moon Rising

"Essentially, there were teams designing, teams analyzing, and they were all interacting with one another, too . . . Analysts were submitting their reports without the teams even realizing that they were working in the background," said Onuma (**figure 4**).

One of the analysts was Karen Weber, a green-roofing consultant and cofounder of Earth Our Only Home. "I'm neither an engineer nor an architect," she admitted. "My company's main mission is to get green roofs on buildings."

Weber issued a general pitch to the teams, outlining the type of green roof that would work best in Los Angeles' climate and is currently being developed by Roofscapes (www.roofscapes.com) — "a dual-media green roof with specific drought-resistant plants that weighs about 40 pounds per square foot and costs about $15 [per square foot] to install," she said.

She points out that, aside from the aesthetic appeal, the green roof saves

ONUMA BIM STORM

Integration Today Using Open Standards: BIMStorm™, Rotterdam to Los Angeles and Beyond

By Kimon Onuma, FAIA

Projects from BIMStorm™ players. The image is from Google™ Earth, which had a network link to BIMStormPenn State iCON Lab during the BIMStorm™ providing interaction in real time with Google™ Earth and other applications. This is a stacked view of all schemes in an inverted pyramid representing actual square footage.

Penn State iCON Lab during the BIMStorm™.

I OFTEN GET ASKED: "what BIM platform should we use?" We all like simple decisions. Vanilla or chocolate? PC or Mac? Revit, ArchiCAD, VectorWorks, or other BIM? We like sticking to a brand. For BIM, "open standards" is the "new brand" we need to stick to. Information stored in proprietary formats will become irrelevant in this information centric age. Organizations that understand this will flourish like the Internet and those that do not will fade like a Betamax.

BIMStorm™ was proof that a stunning amount of collaboration and change is possible today with many tools. Yet, tools do not matter. BIM does not matter. Data and knowledge is valuable and BIM is just a container for data. What does matter is how data is exchanged and the process in which it's exchanged. The "new brand" gives us broader choices on how data is used which will liberate the industry to get down to business. Technology is not the barrier to change, the cultural shift in how we collaborate is the challenge.

MODEL SERVERS

Expedia uses the open standards of the web to harness data which lets reservations happen in real-time. There are no phone calls to check flight or hotel availability because it is all happening in real-time. Imagine downloading static Excel or PDF files for an airline reservation.

BIMStorm™ is much like Expedia. Model servers are different from storing actual BIM files on an FTP site and downloading the entire building. With a model server, data is accessible to users without needing to download the BIM and opening it in client applications.

Tower in BIMStorm™. Rendering by Acusourcing, background by Google™ Earth, BIM by Onuma.

The recent Boston, Rotterdam and Los Angeles BIMStorms™ prove model server based exchanges work. Many users were able to work on multiple projects in real-time, making the massive scale collaboration possible.

ROTTERDAM TO LOS ANGELES

The Netherlands Department of Ministry (RGD) invited 60 architectural teams to a five day charrette to design a series of buildings valued at 1.3 billion Euros in Rotterdam. Along with cost and area calculations, RGD wanted BIM. With 60 teams doing their own project and using different coordinate systems, the bridges and buildings were not aligning. Cost and area calculations could not be aggregated and did not update automatically.

Last November 2007 the project started with the teams using a variety of tools and processes, from paper and pencil to 3D models. BIM did not appear until the second day and models were not using a standard format or a common geospatial coordinate system. Aligning projects to each other and deriving calculations proved to be impossible. The situation was spiraling out of control.

Structural BIM image by SSFM, rendering by Acusourcing, BIM by Onuma.

A panel of industry experts observed the BIMStorm™ and commented:

LARS CHR CHRISTENSEN, BUILDINGSMART INTERNATIONAL

"BIMStorm™ LAX was a sandbox and revolutionary in the way it allowed participants to collaborate in real time. We need more time to play around now in order to avoid mimicking the old way of doing things and really understand how we should utilize the full BIMStorm™ and interoperability potential."

MARIO GUTTMAN, AIA

"The BIMStorm™ was an eye opener that things are going to change a lot more quickly that we thought because change doesn't have to be planned out in advance. Everything is going to be out there for your application to access and we don't need an endless series of committee meetings to make this happen."

TONY RINELLA

"BIMStorm™ is a revelation for Integrated Project Delivery teams looking for new and efficient means of collaboration. We saw international design and analysis talents coming together instantly as needed to further projects. BIMStorm™ opens a new universe of possibilities for procurement and contracting in our increasingly competitive and globalizing AECOO economy."

DANA K. "DEKE" SMITH, FAIA

"The buildingSMART alliance™ is all about changing the way we do business and for a brief 24 hours some of us stopped how we normally do work and we played and had a little fun. We stepped out of our stovepipes a bit and we saw what life might be like without all the self-imposed conventions, working in a collaborative free information exchange world. We did not worry about digital rights management, and contract law or liabilities. It was a breath of fresh air and we needed that to start the change in the industry."

RK STEWART, FAIA

"Collaboration continues to be the biggest question across the industry. How people can share data to make projects move forward. The BIMStorm™ was the condensed period that focused a certain amount of collaboration but there were some pretty clear lines that people did not cross when they had the opportunity to. Communication happened on the fringes and then it fed back to the center, why did some teams decide to go to a 2nd channel, or why did they hold to the boundary of a site and not go further."

MICHAEL TARDIF, ASSOC. AIA, HON. SDA

"BIMStorm™ LAX, as a proof-of-concept demonstration, provided a very large number of participants an opportunity to kick the tires and evaluate OPS technology. From that perspective, it was an unqualified success. Future BIMStorms™, as public events, could be even more successful if they were planned more closely with a municipal or regional planning authority, and if teams had more information about other participating teams and the skills they bring to the process. The educational experience would be greatly enhanced by introducing these real-world conditions and constraints, with the added bonus that the results might help move an actual urban-planning effort forward."

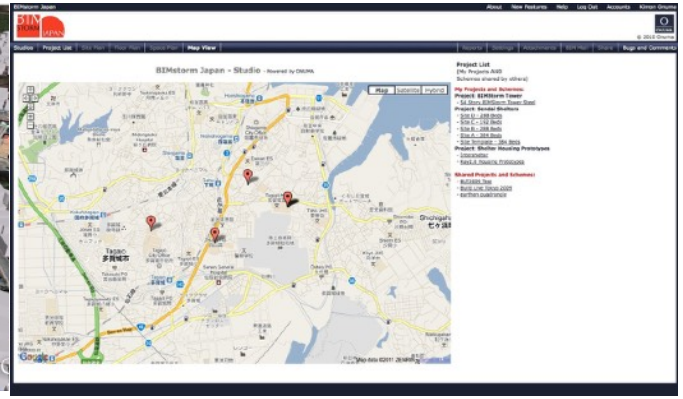
2008

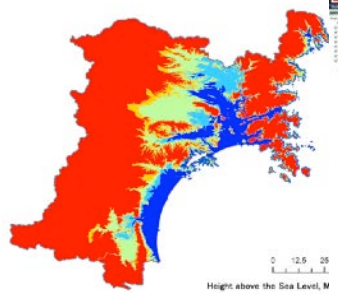
ONUMA BIMSTORM

Penn State iCon Lab and Prof. John Messner's Class Participating in BIMStorm LAX

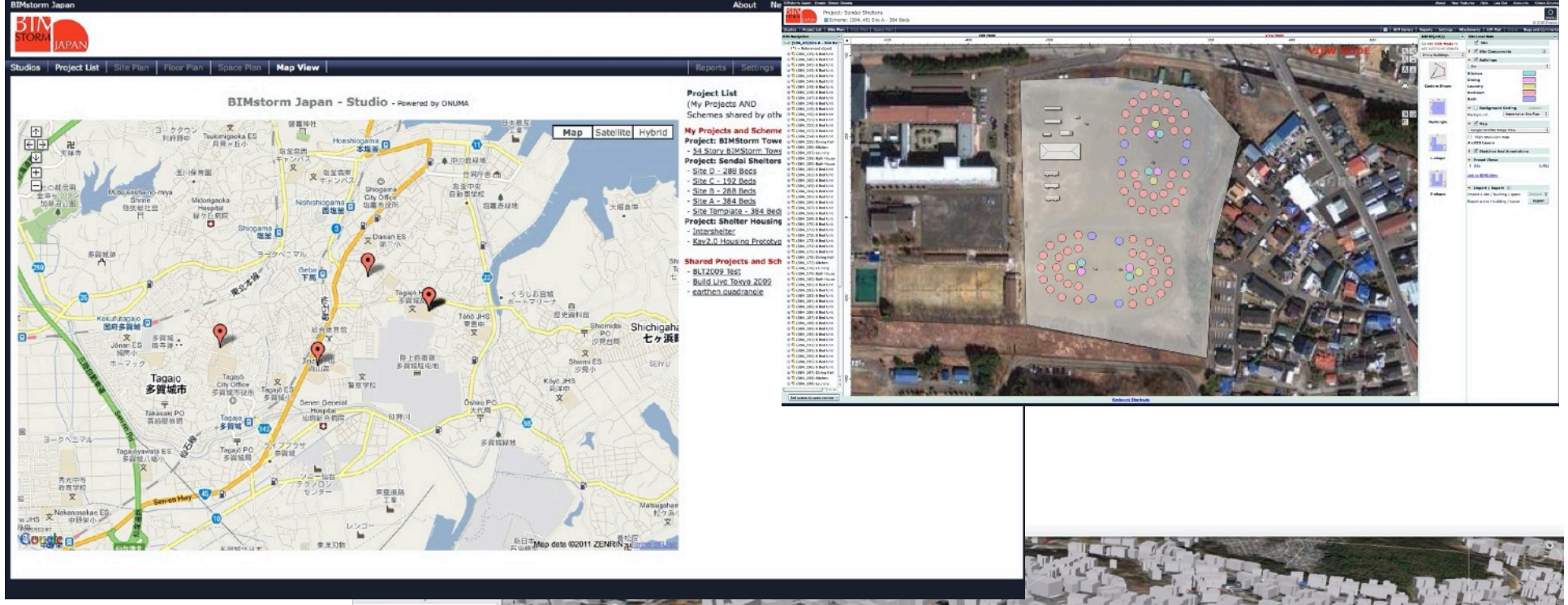
BIMStorm Japan Response to Tsunami Damage

In Response to the Earthquake & Tsunami : Housing and Emergency Shelter Planning and Mobilization

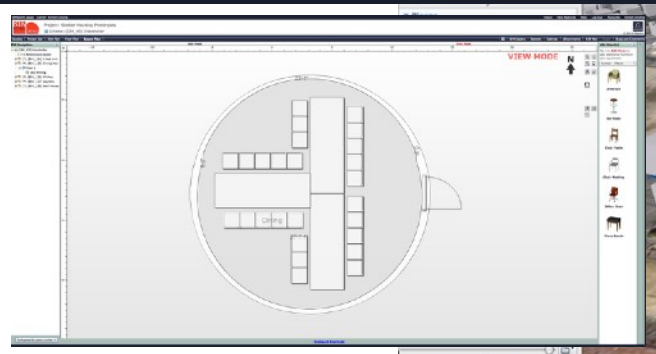


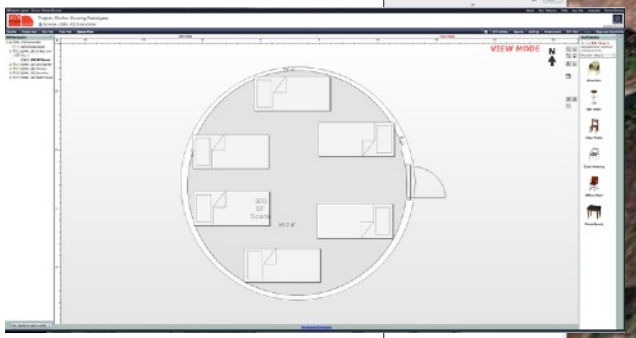


APRIL 12 - Arriving in Japan


BIMstorm Japan
About
Studios
Project List
Site Plan
Floor Plan
Space Plan
Map View
Reports
Settings
BIMstorm Japan - Studio - Powered by ONUMA
Map
Satellite
Hybrid
Project List
(My Projects AND
Schemes shared by oth
My Projects and Scheme
Project: BIMStorm Towe
- 54 Story BIMStorm Towe
Project: Sendai Shelters
- Site D - 288 Beds
- Site C - 192 Beds
- Site B - 288 Beds
- Site A - 384 Beds
- Site Template - 384 Bed
Project: Shelter Housing
- Intershelter
- Kay2.0 Housing Prototyp
Shared Projects and Sch
- BLT2009 Test
- Build Live Tokyo 2009
- earthen quadrangle
Tagajo
多賀城市
Map data ©2011 ZENRIN

VIEW MODE


VIEW MODE


VIEW MODE


©2010 Google

APRIL 6


Tagajo Elementary School - 192 Beds
- Site Area: 6,696 m2
- Building Total Gross Area: 1,216 m2
- Total Cost: $1,039,748
- Total Energy Use: 59,060 kWh
- Last Edited: 04/09/2011 - 08:56 AM
- Scheme Owner: Kimon Onuma
- Scheme ID: (S84_50)
- Studio: BIMstorm Japan
This Google Earth file is generated from the Onuma - Model Server.
Changes the owner makes to this project will be visible in this Google Earth file in real time.
For creating other Network Linked Google Earth files or for outputting other file formats such as Excel, BIM, and SketchUp from Onuma:
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BIM STORM

Standalone Devices

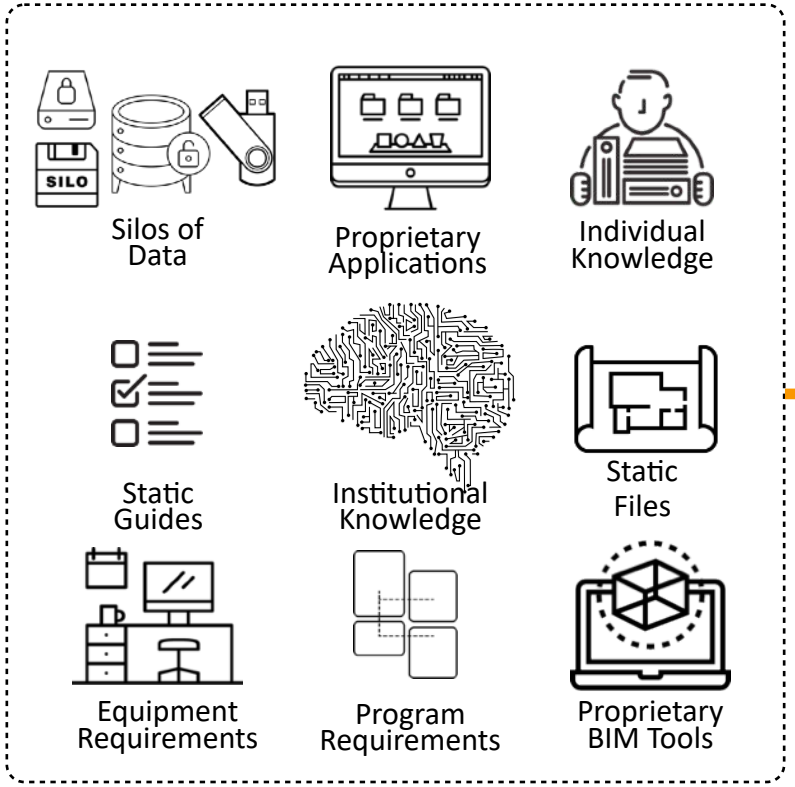
Pre-2007

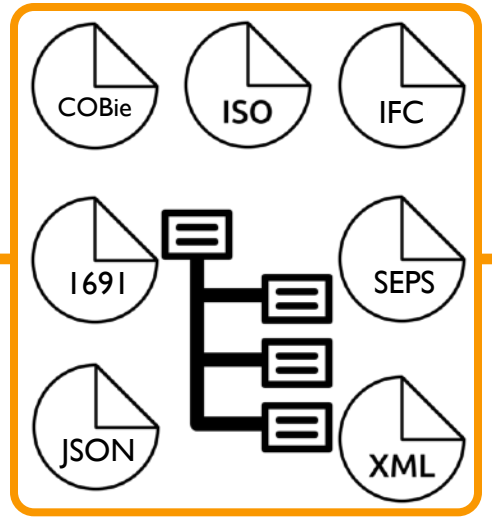
Post 2008

Platforms with Rules

Easy to Use Apps

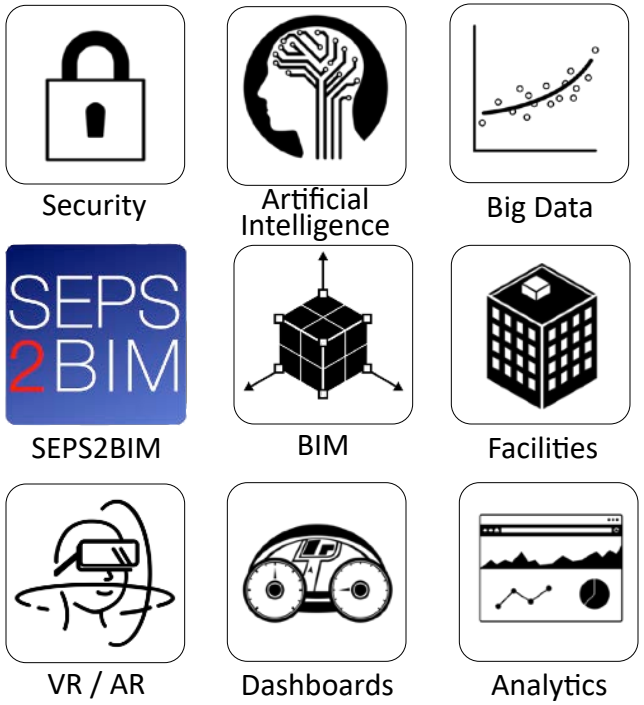
Institutional Knowledge & Data



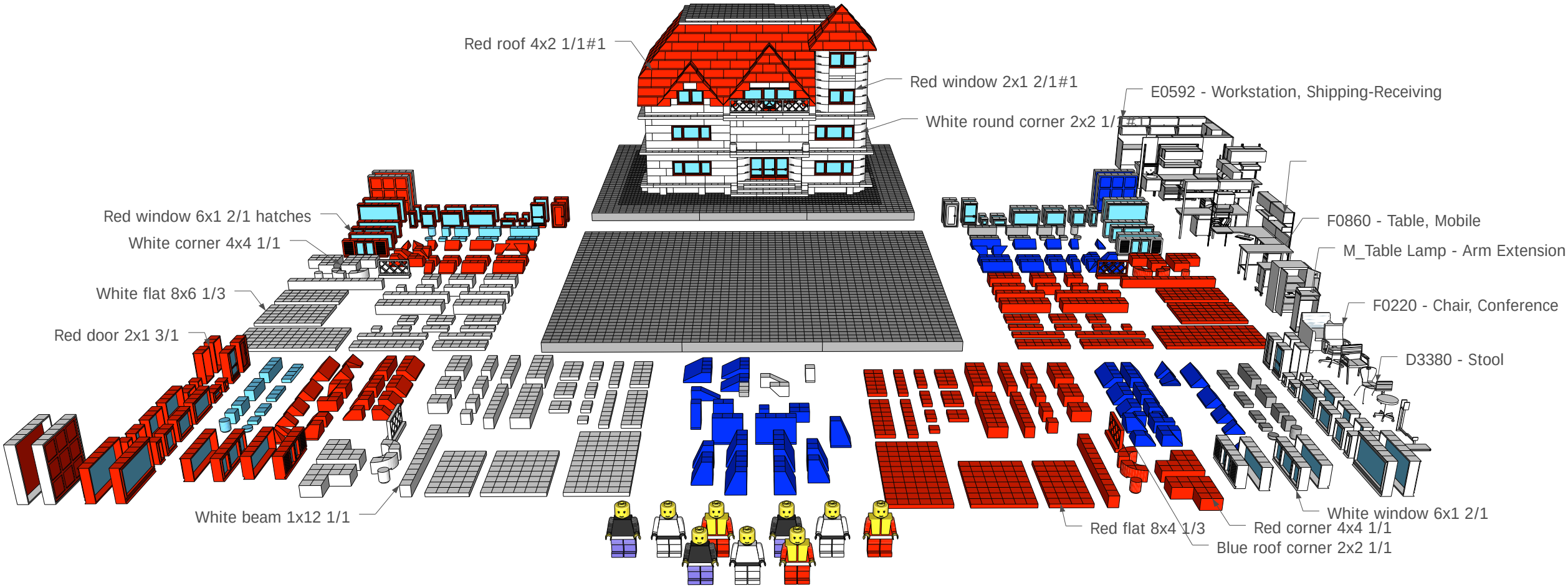


Clear Rules as Standards

Easy to Use Apps



Easy to Understand and Use Standards



Owner's Data

Architects, Engineers
Geodesigners, Analysts

Assets

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CONNECT!

Owner's Data

Architects, Engineers
Geodesigners, Analysts

BIM GIS FM

Assets

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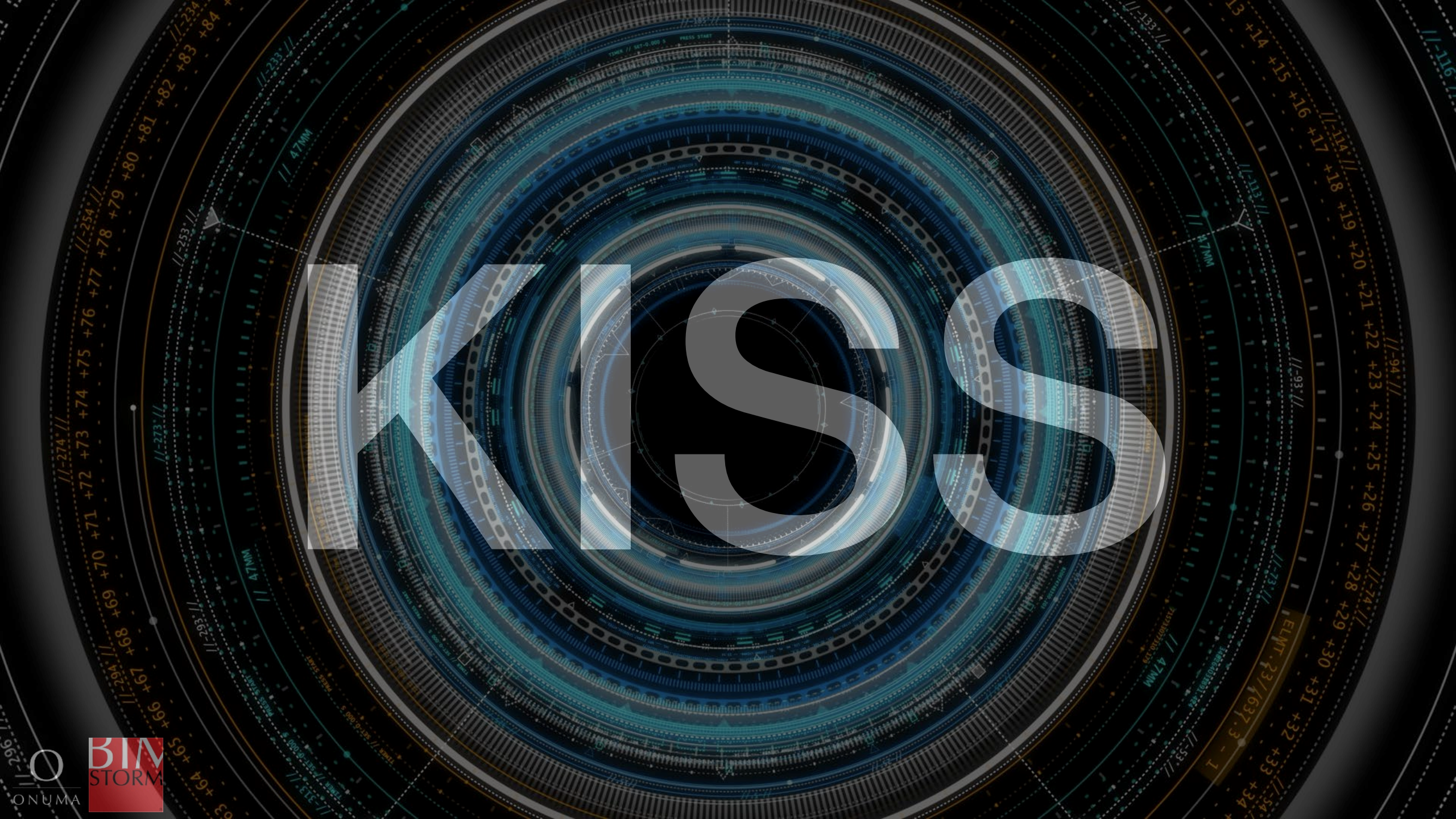
KIS

“Life is like riding a bicycle.
To keep your balance, you must keep moving.” **Albert Einstein**

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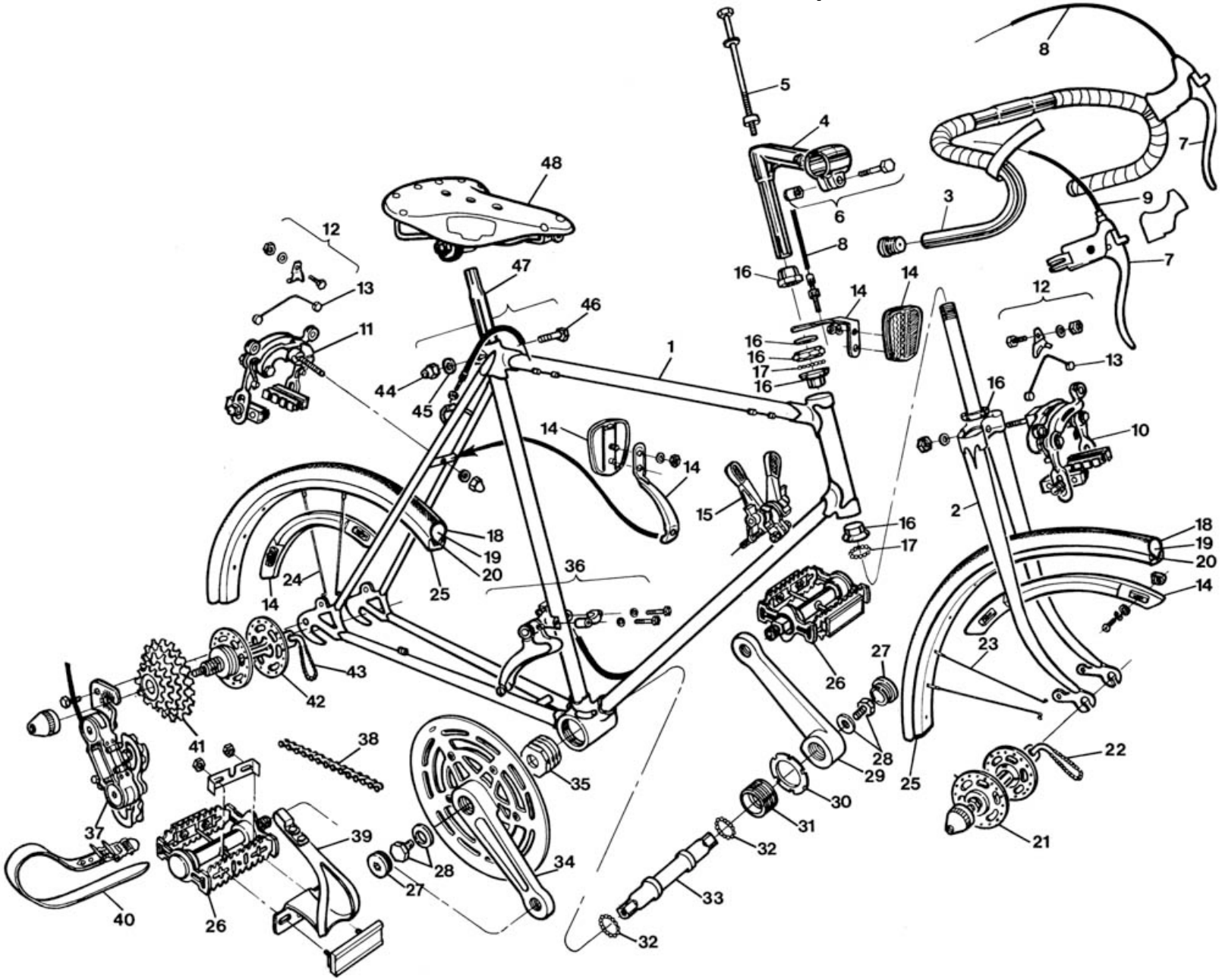
Standards and Details are Important....



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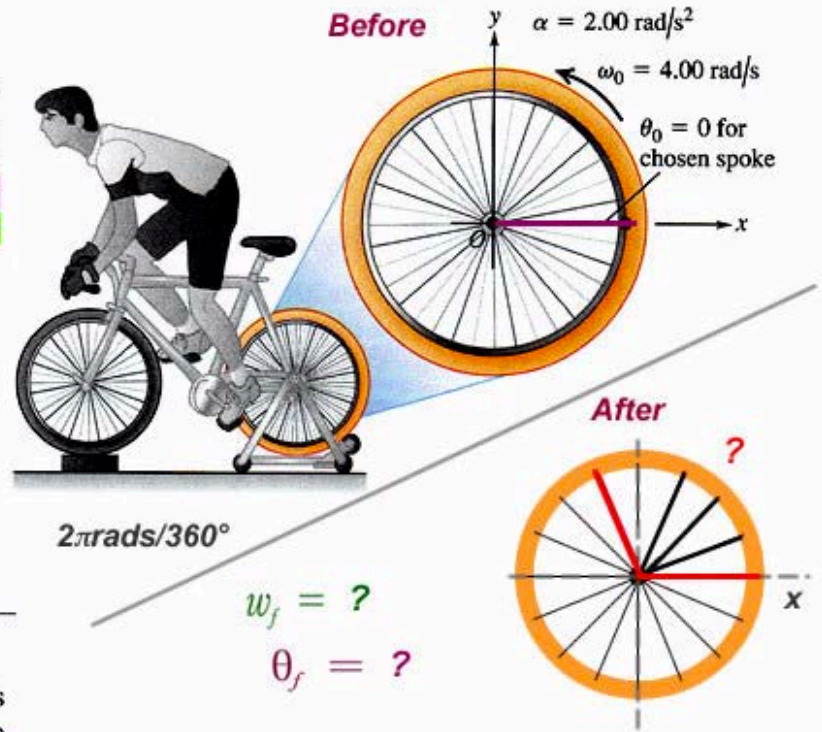
The Science is Important...

EXAMPLE 9.2 **Rotation of a bicycle wheel**

The angular velocity of the rear wheel of a stationary exercise bike is 4.00 rad/s at time $t = 0$, and its angular acceleration is constant and equal to 2.00 rad/s². A particular spoke coincides with the $+x$ axis at time $t = 0$ (Figure 9.8). What angle does this spoke make with the $+x$ axis at time $t = 3.00$ s? What is the wheel's angular velocity at this time?

$\theta_f = ?$

$\omega_f = ?$



Angular Motion Equations

$$\omega_f = \omega_o + \alpha t$$
$$\omega_f^2 = \omega_o^2 + 2\alpha\Delta\theta$$
$$\theta_f = \theta_o + \omega_o t + \tfrac{1}{2}\alpha t^2$$
$$\theta_f = \theta_o + \tfrac{1}{2}(\omega_o + \omega_f)\,t$$

SOLUTION *What is given?*

SET UP We take $\theta = 0$ at the position where the chosen spoke is horizontal, and we take the counterclockwise sense of rotation to be positive. The initial conditions are $\theta_0 = 0$, $\omega_0 = 4.00$ rad/s, and $\alpha = 2.00$ rad/s².

SOLVE We can use Equations 9.11 and 9.7 to find θ and ω at any time. The angle θ is given as a function of time by Equation 9.11:

$$\theta = \theta_0 + \omega_0 t + \tfrac{1}{2}\alpha t^2$$
$$= 0 + (4.00\ \text{rad/s})(3.00\ \text{s}) + \tfrac{1}{2}(2.00\ \text{rad/s}^2)(3.00\ \text{s})^2$$
$$= 21.0\ \text{rad} = 21.0\ \text{rad}\left(\frac{1\ \text{rev}}{2\pi\ \text{rad}}\right) = 3.34\ \text{rev.} = \theta_f$$

answer

The wheel has turned through three complete revolutions plus an additional 0.34 rev, or $(0.34\ \text{rev})(2\pi\ \text{rad/rev}) = 2.14\ \text{rad} = 123°$. Thus, the chosen spoke is at an angle of 123° with the $+x$ axis.

The wheel's angular velocity ω is given as a function of time by Equation 9.7, $\omega_f = \omega_0 + \alpha t$. At time $t = 3.0$ s,

$$\omega_f = 4.00\ \text{rad/s} + (2.00\ \text{rad/s}^2)(3.00\ \text{s}) = 10.0\ \text{rad/s}.$$

Alternatively, from Equation 9.12, we get

$$\omega_f^2 = \omega_0^2 + 2\alpha(\theta - \theta_0)$$
$$= (4.00\ \text{rad/s})^2 + 2(2.00\ \text{rad/s}^2)(21.0\ \text{rad}) = 100\ \text{rad}^2/\text{s}^2,$$
$$\omega_f = 10.0\ \text{rad/s} = 1.59\ \text{rev/s}.$$

REFLECT Note the step-by-step similarity between these equations and the kinematic relations for straight-line motion.


Less Talk....
Just Ride the bike...
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BIM STORM


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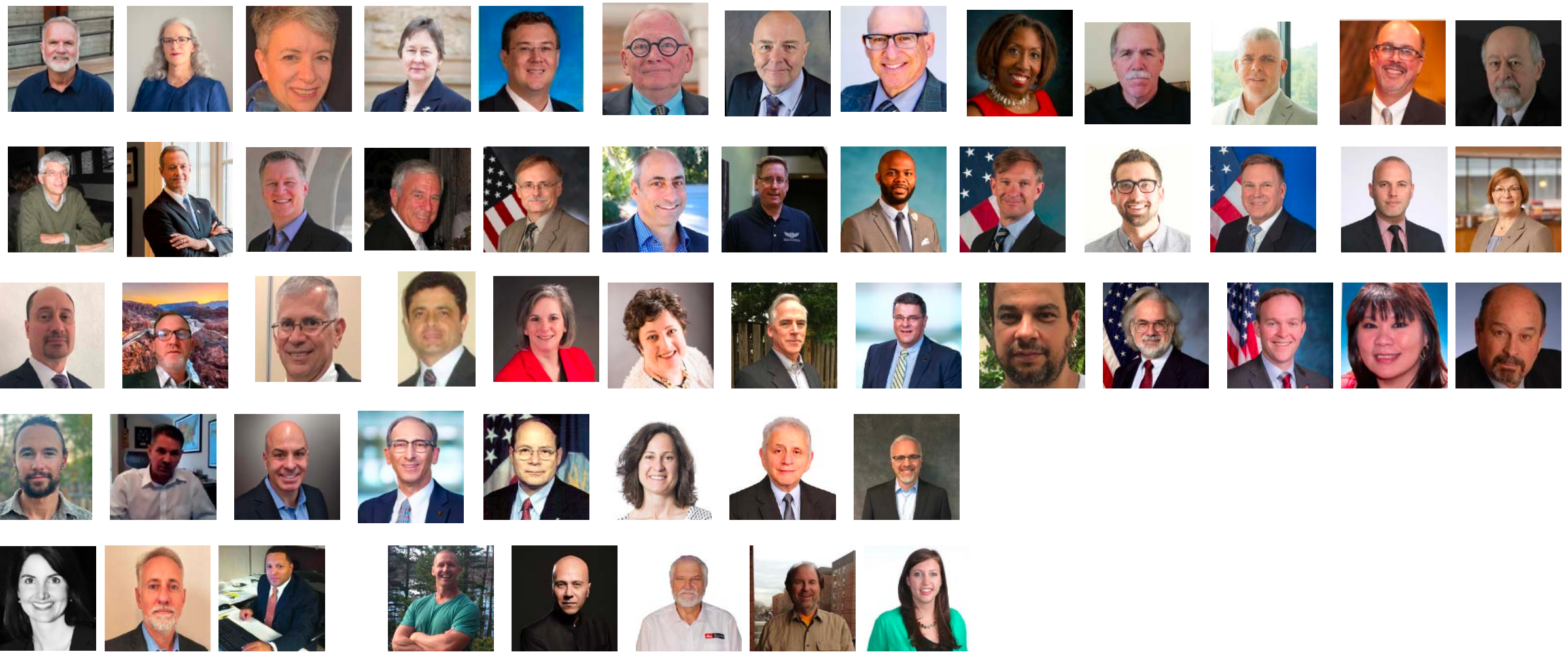
Building on Success



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