Broadening the Perspective of Technology in Architectural Practice

October 19, 2012 | Stanford, CA
Stanford University Center for Integrated Facility Engineering

Advancing the Value of Technology in Architecture

John Roach
Executive Director, Technology Services
Foundation for California Community Colleges

Rob Barthleman, AIA
Principal
ARCHITECTURE/vbn

Broadening the Perspective of Technology in Architectural Practice is registered with AIA CES.
Online + Components: **TAP101912W**
Stanford CIFE Live Event: **TAP101912S**
Questions? Contact tap@aia.org

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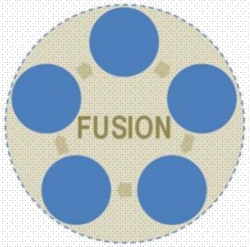
California's Community Colleges

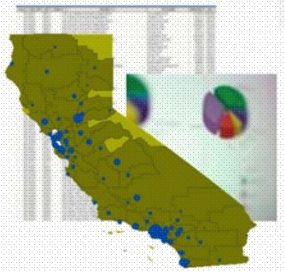
The largest system of public higher education in the world

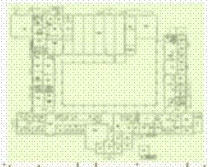
- 72 Districts
- 112 Colleges
- 300 Sites
- 24,000 acres
- 5,000 Buildings
- 71 Million Square Feet
- 2.75 Million Students

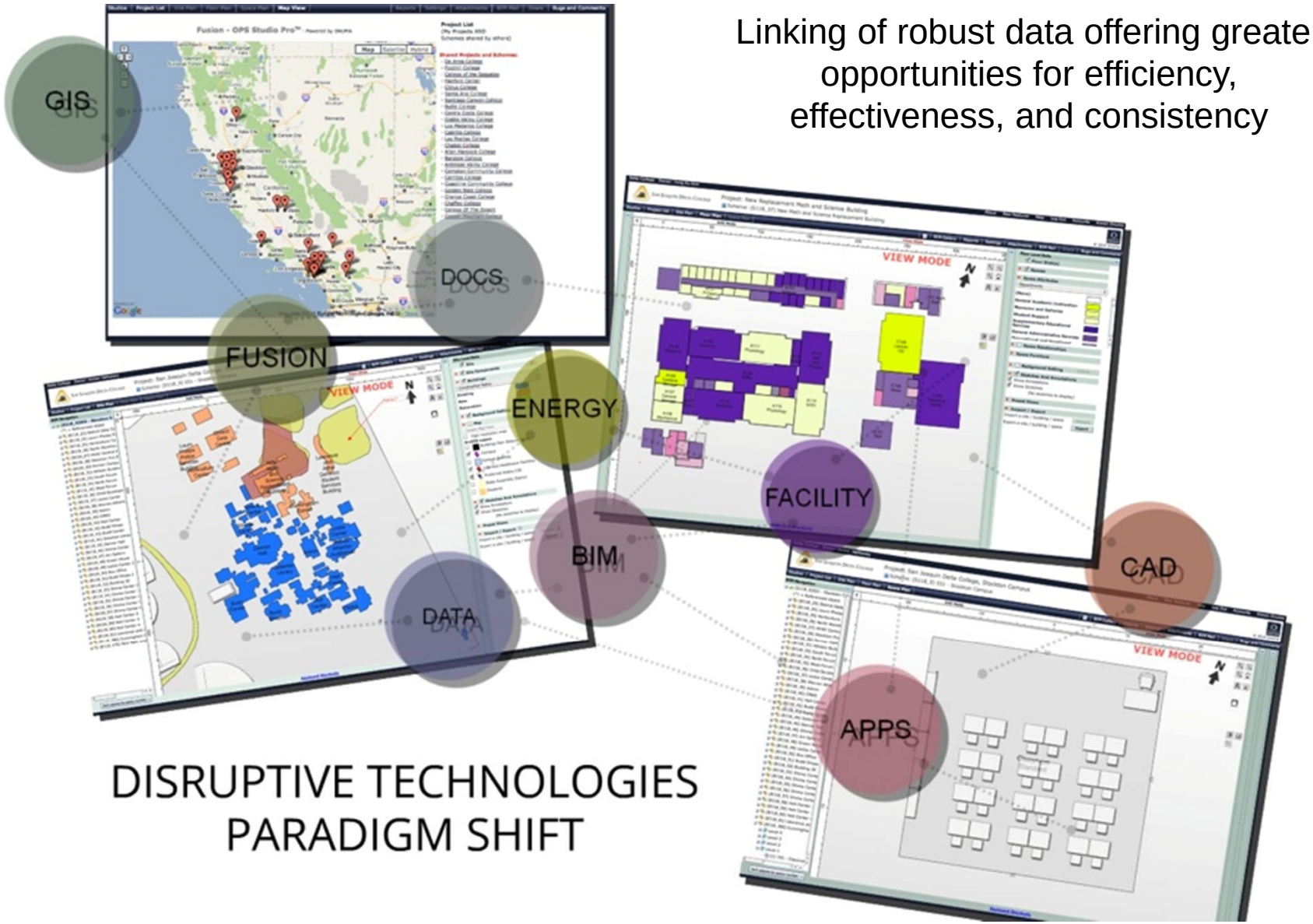


On-site Building Assessments

Web portal

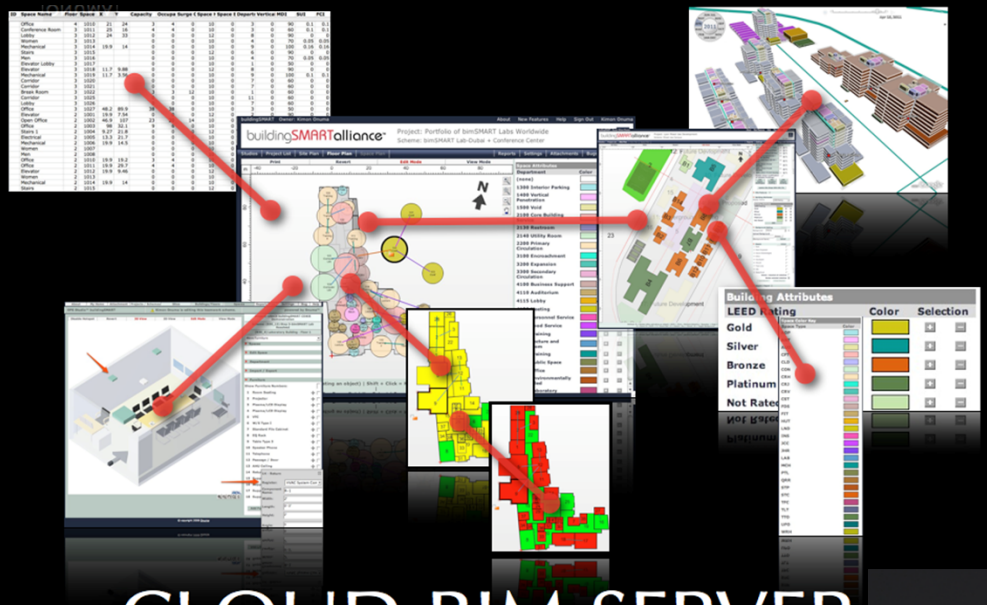



Architectural drawings database



Linking of robust data offering greater opportunities for efficiency, effectiveness, and consistency

DISRUPTIVE TECHNOLOGIES PARADIGM SHIFT

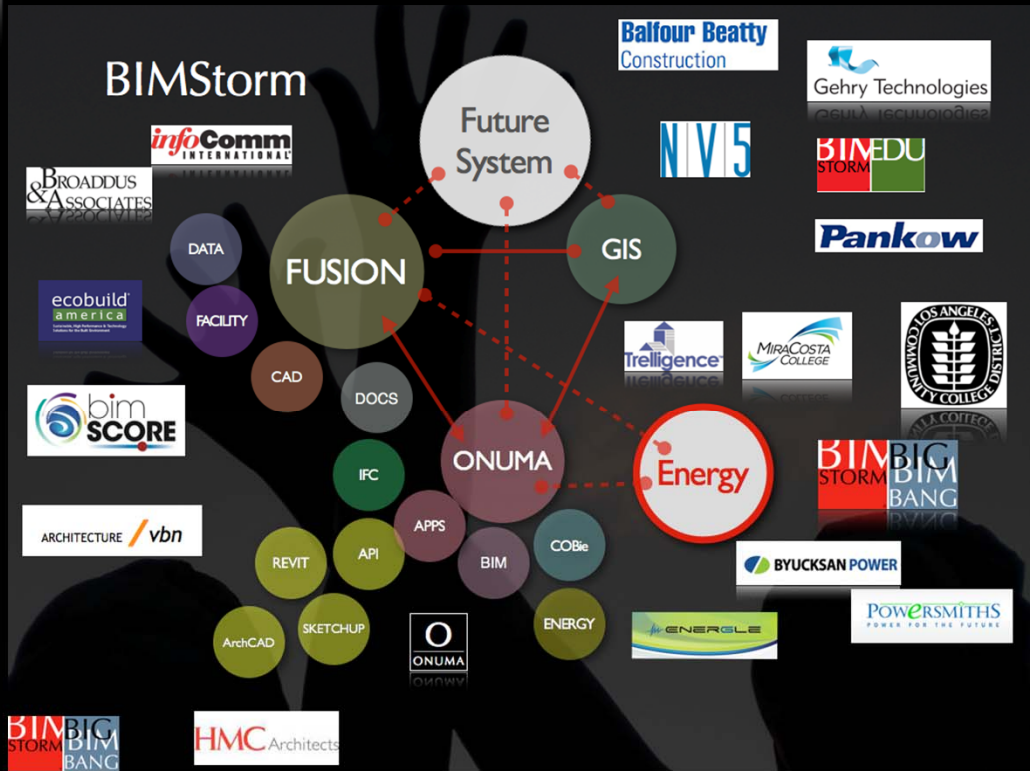


CLOUD BIM SERVER

Linking intra-system data with developing technologies and systems to expand value of data

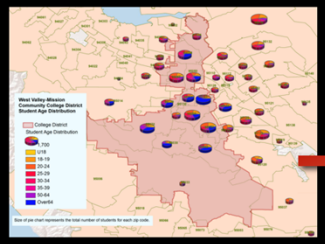
Seeking linkage to energy systems and utilities

Architects, Engineers, Builders, and Facilities Management

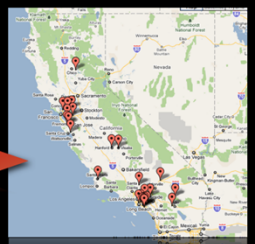


1. Log In
2. Studios
3. Projects
4. Site
5. Building
6. Room
ONUMA
Levels of Specificity

1. Define Project

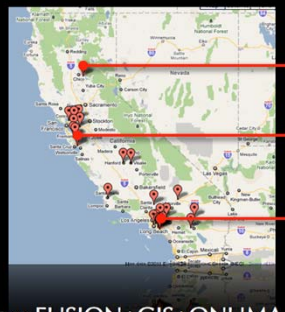


Demographic Data from GIS



Defines District Need

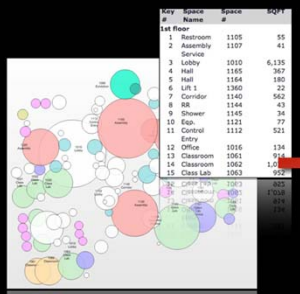
2. Planning Proposals



From FUSION+GIS+ONUMA

District Projects as Excel and BIM from ONUMA

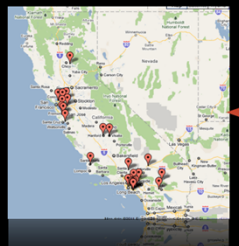
3. Design



District Planning Proposal Data

Design Team Works in BIM or CAD

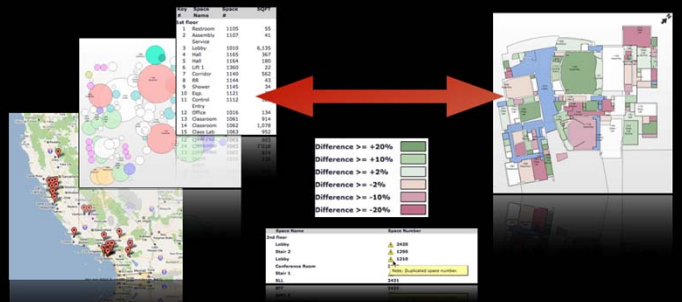
4. Submit Back to District



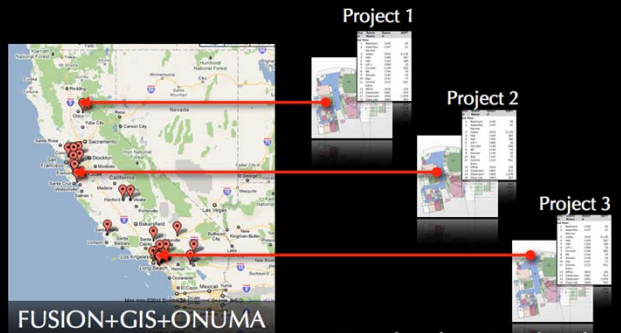
Design Back in FUSION GIS ONUM

Design Submitted Back to District

5. District Review



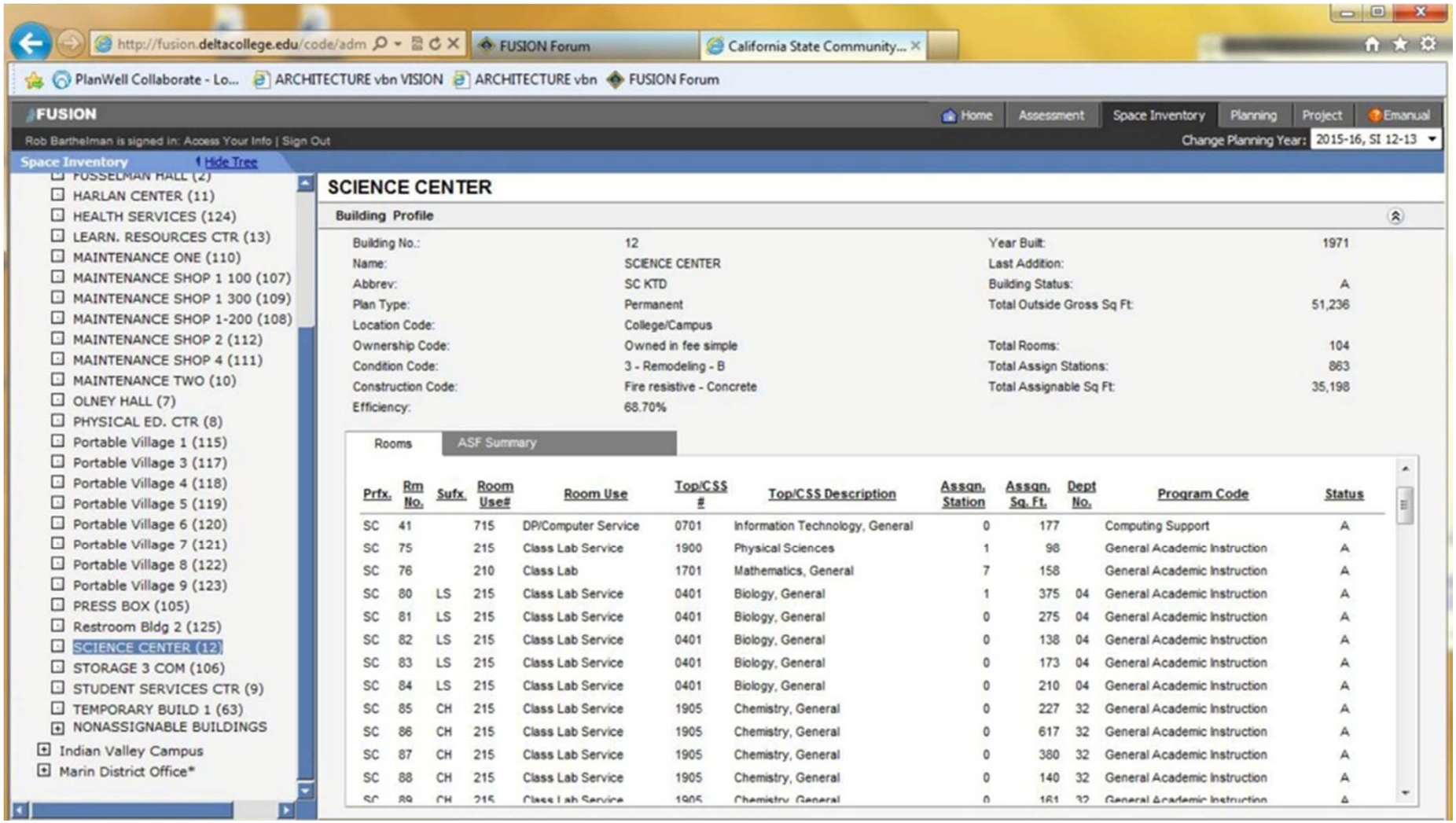
6. As Built



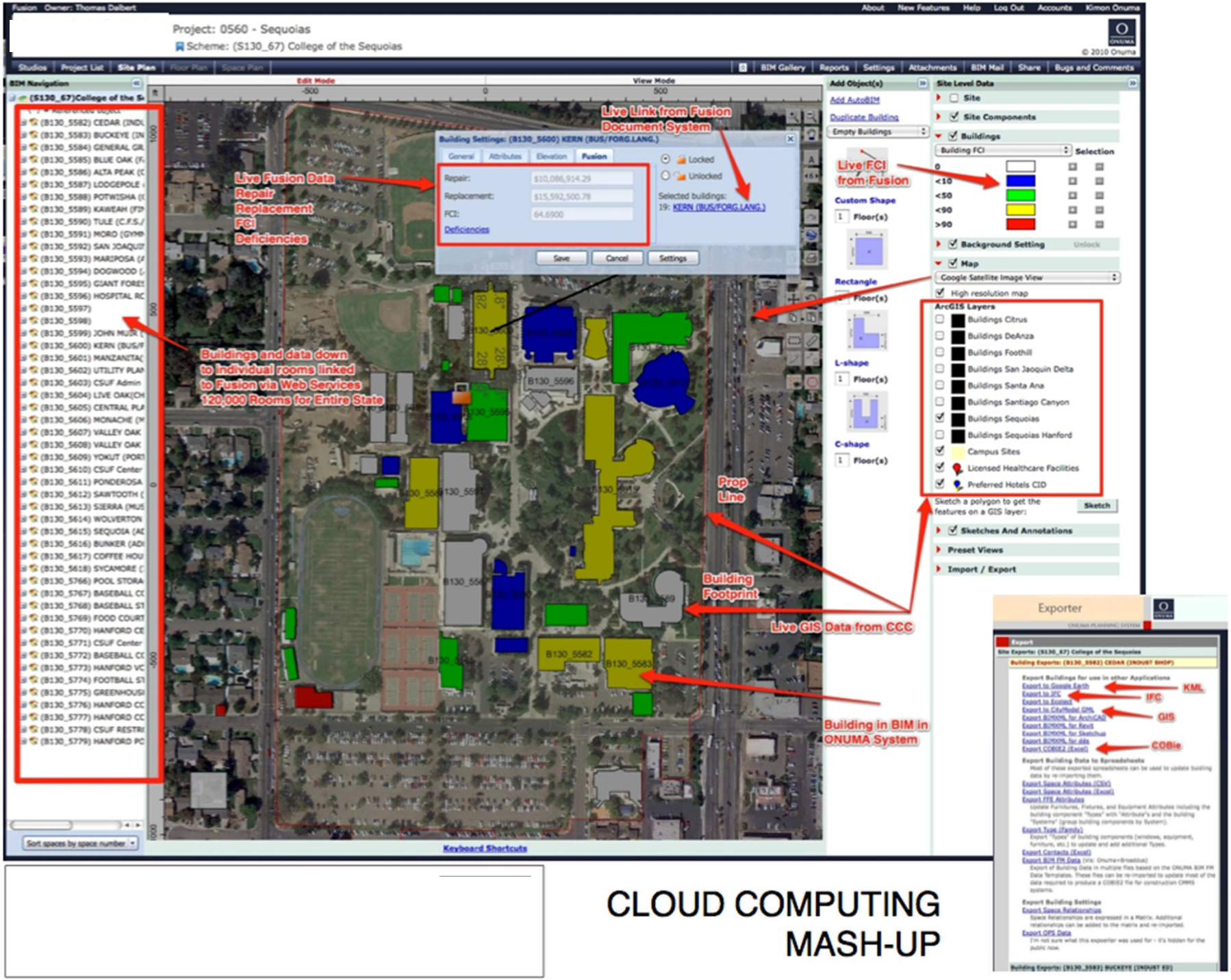
FUSION+GIS+ONUMA gets more refined with each project

Completed Project data from Contractors Delivered back as

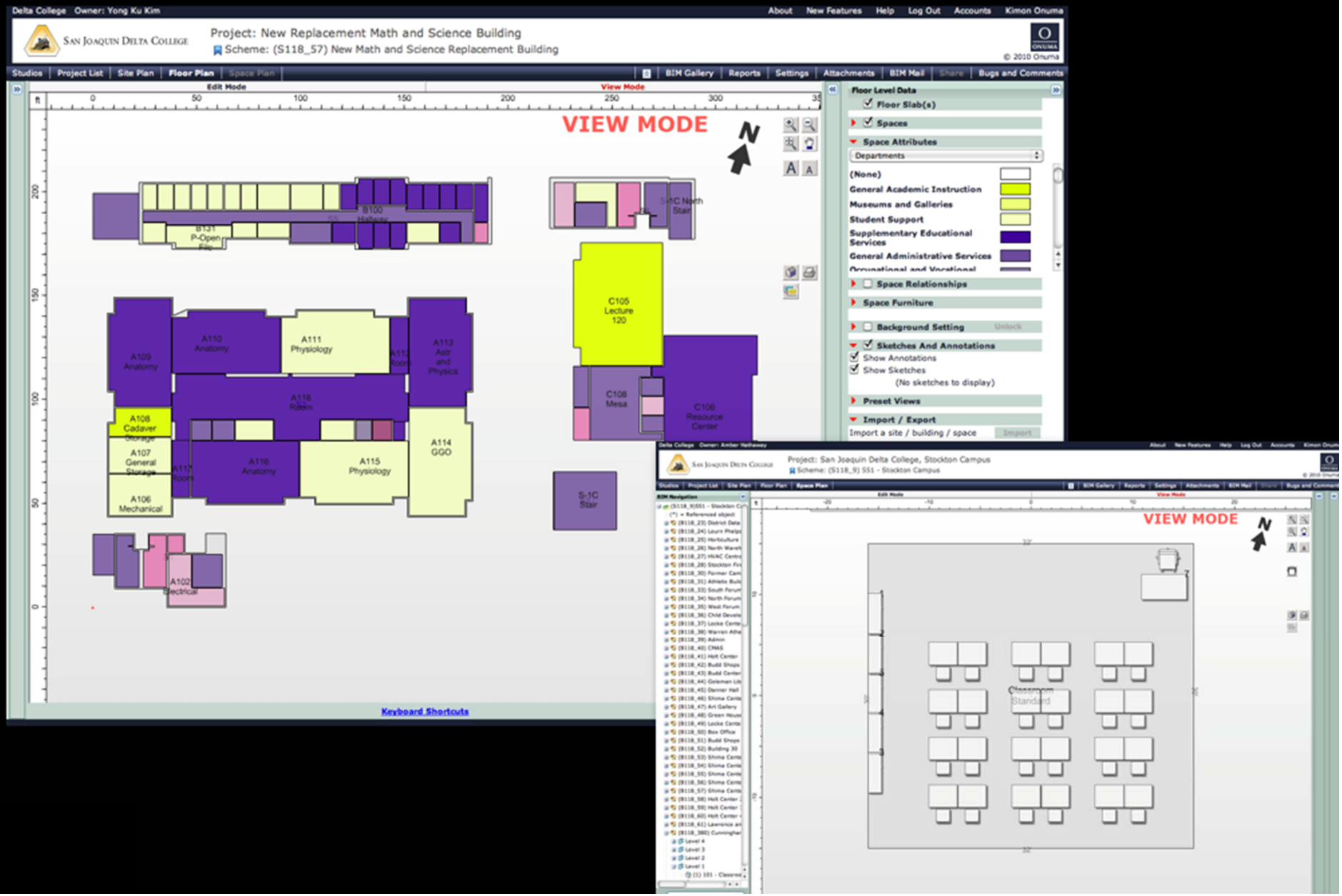
California Community Colleges' FUSION Database



Robust data, but difficult to navigate, sort, and visually assess

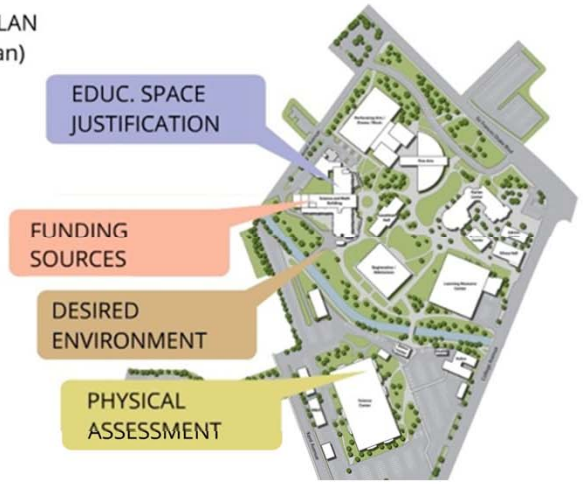


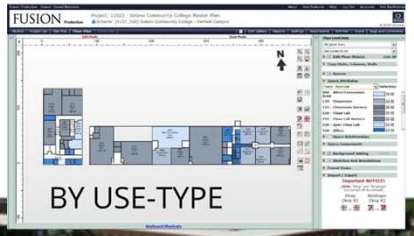
CLOUD COMPUTING MASH-UP


Delta College Owner: Yong Ku Kim
About New Features Help Log Out Accounts Kimon Onuma
San Joaquin Delta College
Project: New Replacement Math and Science Building
Scheme: (S118_57) New Math and Science Replacement Building
© 2010 Onuma
Studios Project List Site Plan Floor Plan Space Plan
BIM Gallery Reports Settings Attachments BIM Mail Share Bugs and Comments
Edit Mode
View Mode
VIEW MODE
N
B100
B131
P-Open File
S-1C North Stair
C105
Lecture
120
C106
Resource
Center
C108
Mesa
A109
Anatomy
A110
Anatomy
A111
Physiology
A113
Astr
and
Physics
A118
Riem
A108
Cadaver
Storage
A107
General
Storage
A106
Mechanical
A116
Anatomy
A115
Physiology
A114
GGO
S-1C
Stair
A102
Electrical
Keyboard Shortcuts
Floor Level Data
Floor Slab(s)
Spaces
Space Attributes
Departments
(None)
General Academic Instruction
Museums and Galleries
Student Support
Supplementary Educational Services
General Administrative Services
Space Relationships
Space Furniture
Background Setting
Unlock
Sketches And Annotations
Show Annotations
Show Sketches
(No sketches to display)
Preset Views
Import / Export
Import a site / building / space
Import
Project: San Joaquin Delta College, Stockton Campus
Scheme: (S118_9) S51 - Stockton Campus
VIEW MODE
N
Classroom
Standard

Programmatic Analysis and Alignment with Facilities

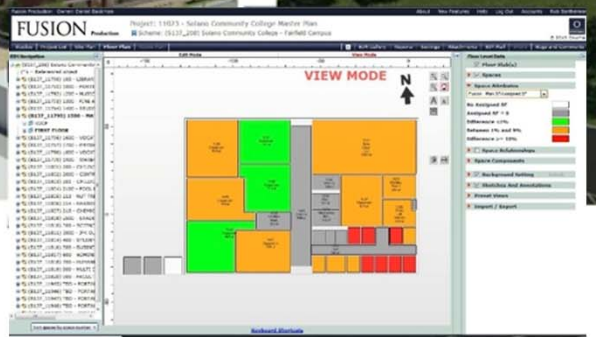
EDUCATIONAL MASTER PLAN
CAPITAL PLAN (master plan)
FACILITY ASSESSMENT
FUNDING SUBMITTALS

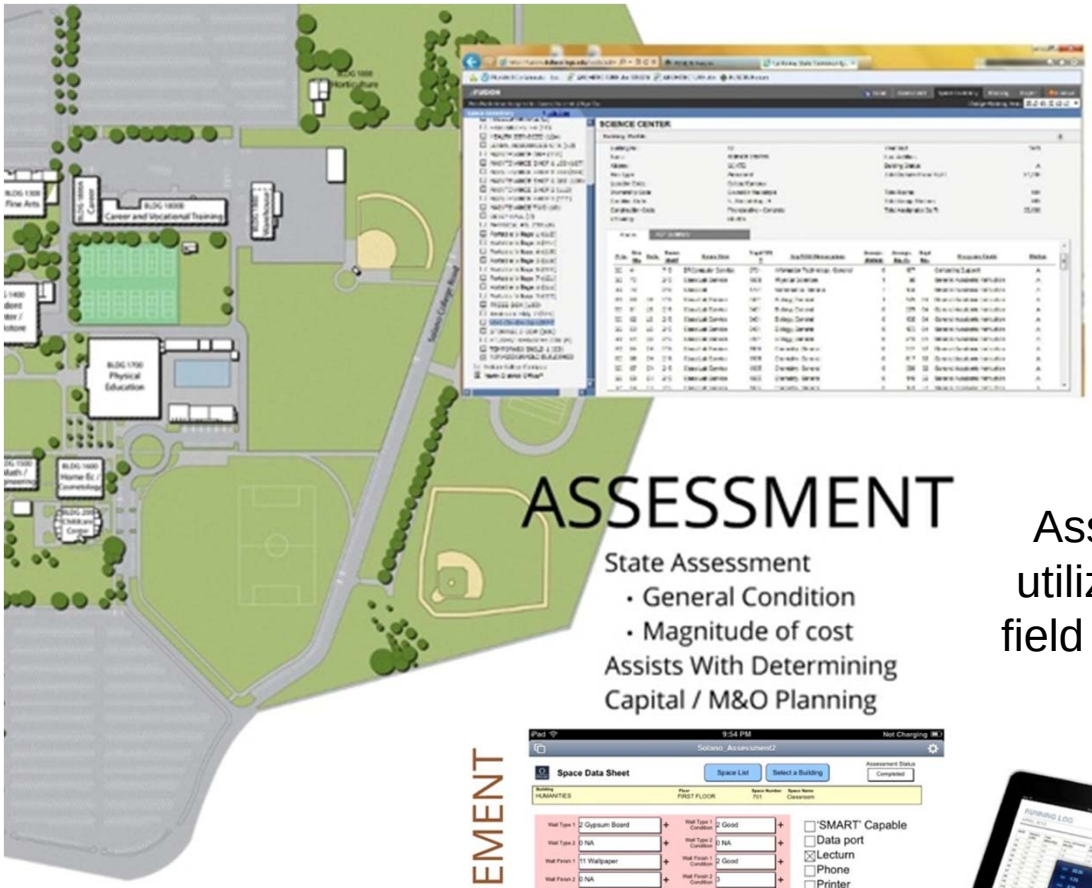




Tie to existing data sources

- FUSION Database
- Alignment For Accuracy
  - Square Footage
  - Assessment
  - Space Use
  - Project Planning
    - 5 year Cap Plan
    - Individual Projects





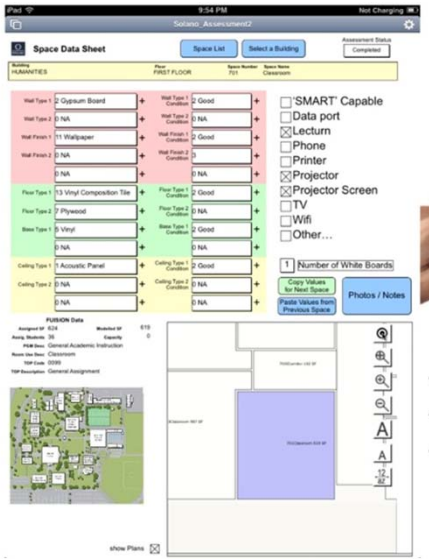
ASSESSMENT

State Assessment
- General Condition
- Magnitude of cost

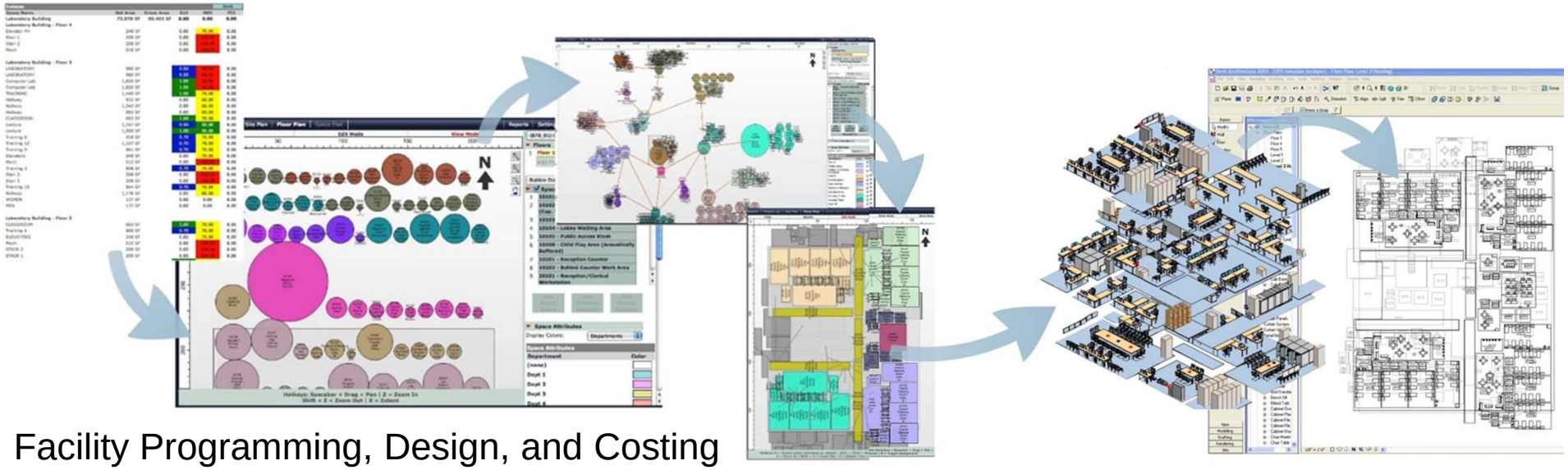
Assists With Determining Capital / M&O Planning

Assessment Team utilized iPads, in the field capturing of data

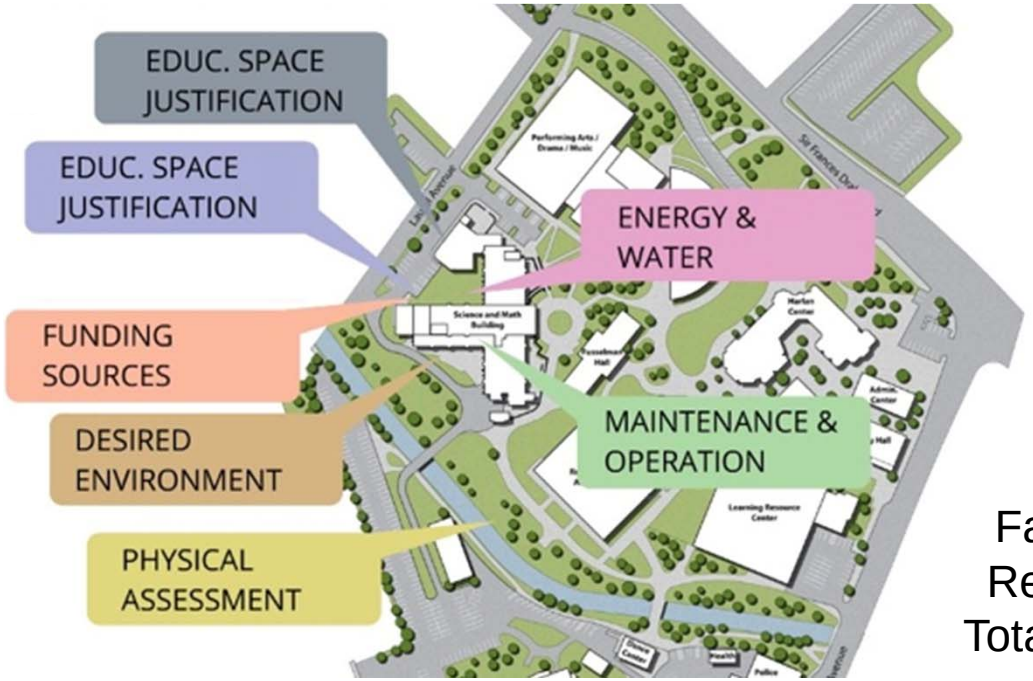
FACILITY MANAGEMENT



- Greater Detail
- Self-maintained
- Automated
  - Cost Analysis
  - M&O Analysis



Facility Programming, Design, and Costing

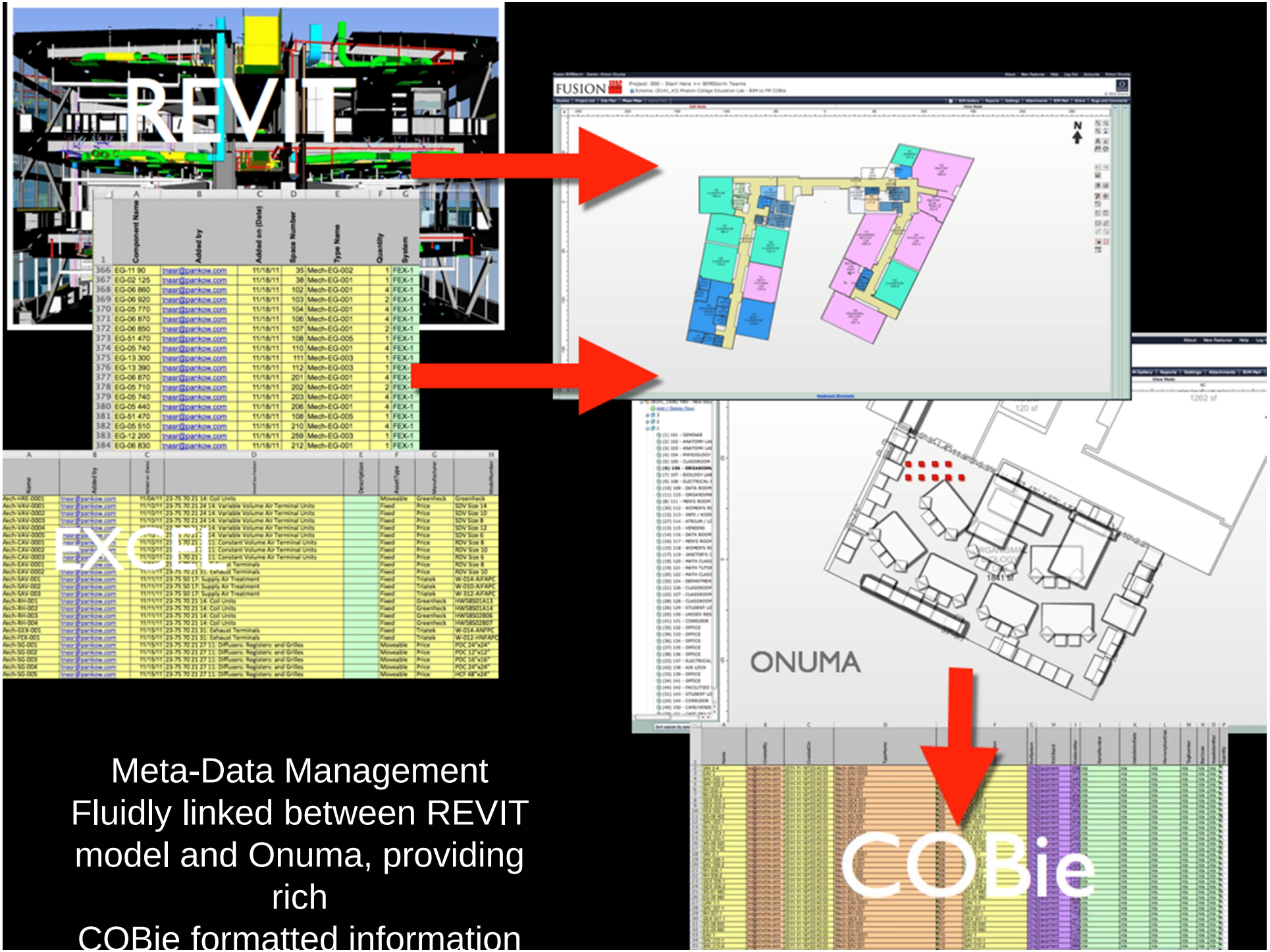


Facility Management
Return on Investment
Total Cost of Ownership

CLASS SCHEDULING, SPACE ANALYSIS

M&O Requirements
Work Ticketing

LIFE SCIENCE LECTURE (130)
Space Number and Name
LIFE SCIENCE LECTURE (130)
Space Area
1,908 sf
Space Height
10 feet
Floor
4TH FLR
Capacity
0 People
Occupancy
0 People
Furniture
0 Pieces
ENERGLE
LED_05
Usage
History
Today
This Month
Now
324.2 Wh
324.2 Wh
22.3 W
-1.07 %
-53.25 %
CO2 0.1 g
CO2 0.1 g
S1 S2 S3 User DR
Apply
ON OFF
0%
LED
4250K
BEFORE
AFTER

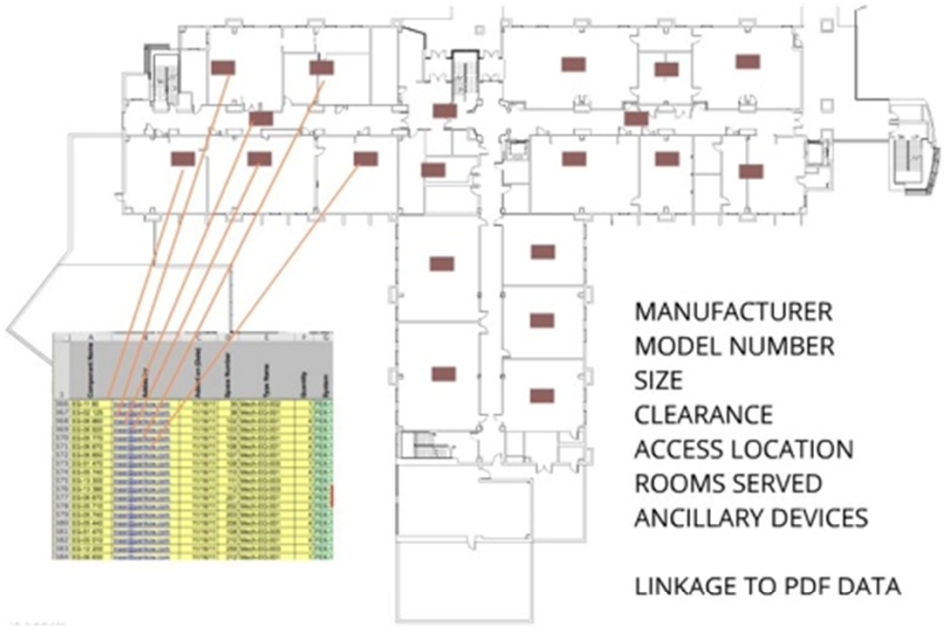


Meta-Data Management
Fluidly linked between REVIT model and Onuma, providing rich
COBie formatted information

COBie at COLLEGE OF MARIN

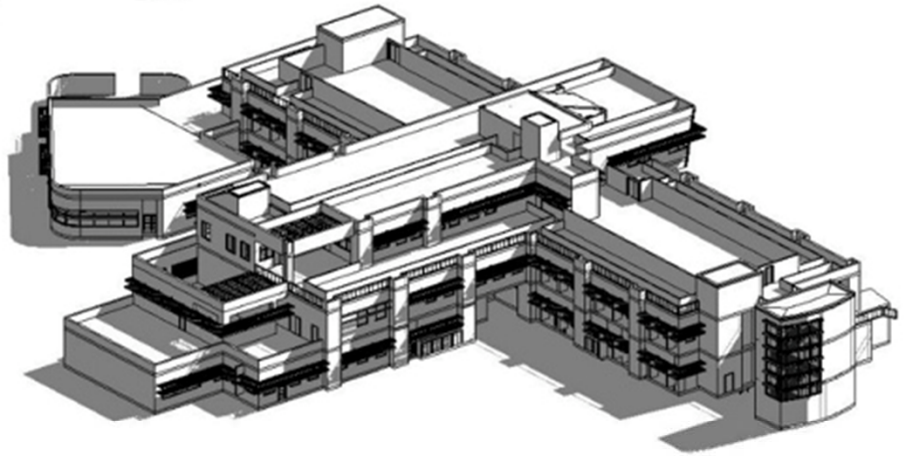
Tracking of pertinent building systems information; utilization of

- construction document schedules
- contractor M&O deliverables
- insert data from systems into table, linked to building
- all other pdf information can be linked to the 'BIM'



MANUFACTURER
MODEL NUMBER
SIZE
CLEARANCE
ACCESS LOCATION
ROOMS SERVED
ANCILLARY DEVICES

LINKAGE TO PDF DATA

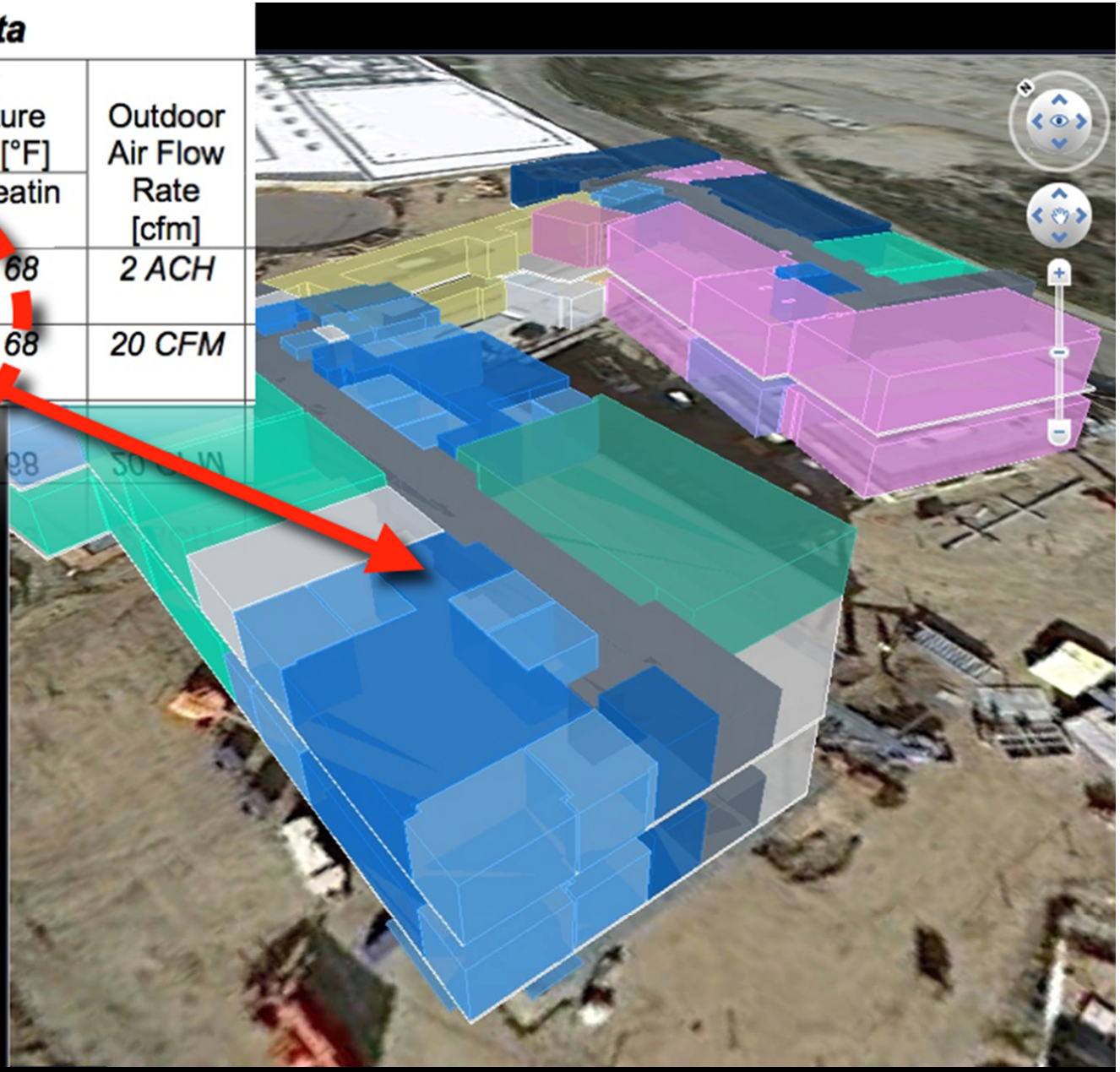


Collecting data within the COBie standard

FUSION Training
Project: 730 - Glendale
Scheme: (S130_85) Glendale College
Studios | Project List | Site Plan | Floor Plan | Space Plan
BIM Gallery | Reports | Settings | Attachments | BIM Mail | Share | Bugs and Comments
BIM Navigation
(S130_85)Glendale College
(*) = Referenced object
(B130_10716) 45 - SAN GABRIE
Add / Delete Floor
Floor 3
Floor 2
Floor 1
Edit Mode
View Mode
Floor Level Data
(No ghost floor)
Site context is off
Edit Floor Slab(s)
Copy Slabs, Columns, Walls
Spaces
Normal View
Space Attributes
Selection
0099 - General Assignment
0514 - Office Technology/Office Computer Applications
0600 - Media and Communications
0700 - Information Technology
0801 - Education, General
power submeter in electrical room
CHW and HHW sensors on pipe in ceiling
room ambient air temp sensor
Sort spaces by space number
Keyboard Shortcuts
ENERGLE
LED_01
Usage
History
Today
473.5 Wh
₩ 25
This Month
21.7 kWh
₩ 1,132
Now
43.0 W
-12.88 %
1.66 %
CO2 0.2 g
CO2 9.2 g
52.1
68.9
S1 S2 S3 S4 User
ON OFF
0%
5000K
LED
Air Handler Discharge Air Temperature 57.33
65
60
490 500 510 520
8:52:40 AM PDT
Performance Validation

Table 11: Room Design Data

Room Name	Space Temperature Setpoints [°F]		Outdoor Air Flow Rate [cfm]
	Coolin	Heatin	
Typical Exam Room - ED	*72*	*68*	*2 ACH*
Typical Exam Room - MOB	*75*	*68*	*20 CFM*

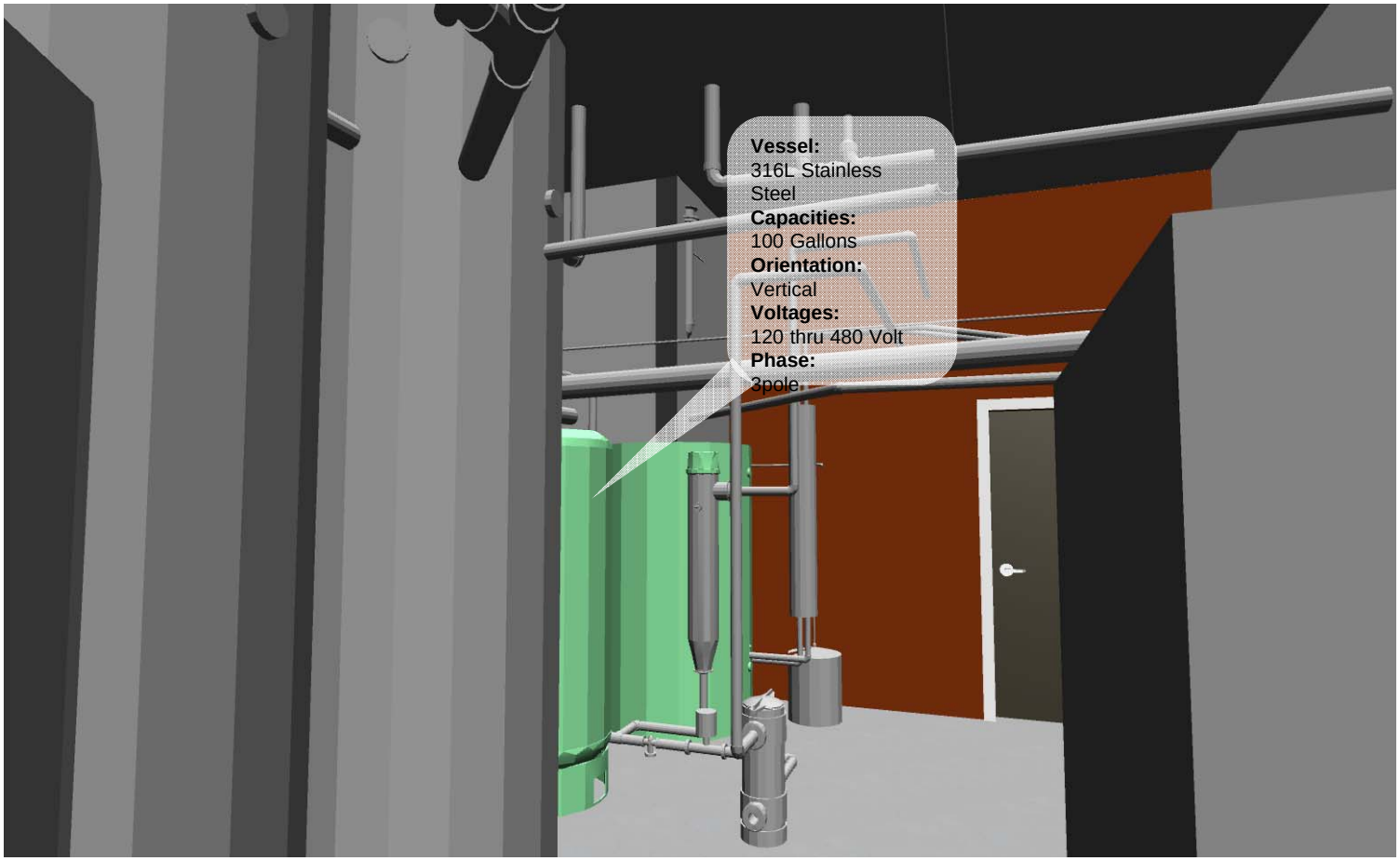


Advancing to what's next…

Gaming technologies allow for first-person experience in 3D environments. User and Stakeholder visualizations foster greater success.

Seeking connection of facilities data to first-person, 3D visualization

Advancing to what's next…



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