



Connected BIM

How technology is changing our industry

Thomas Gregersen

Sr. Technical Sales Specialist, Northern Europe





Introduction





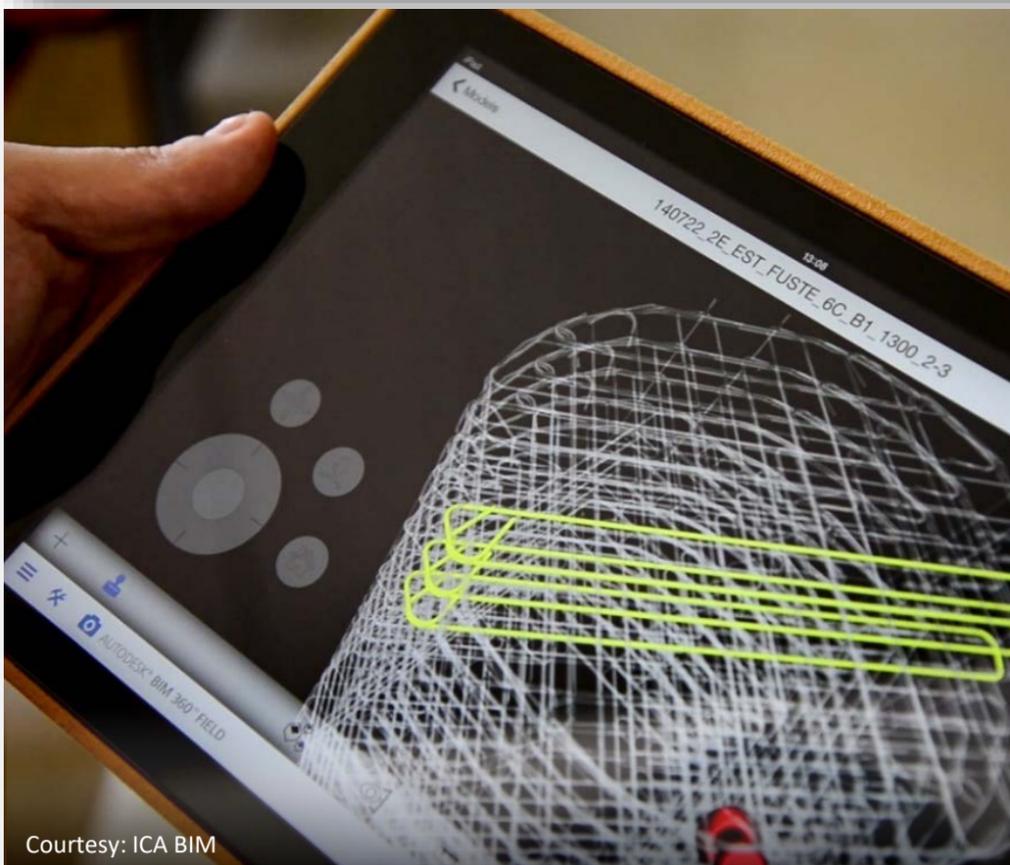
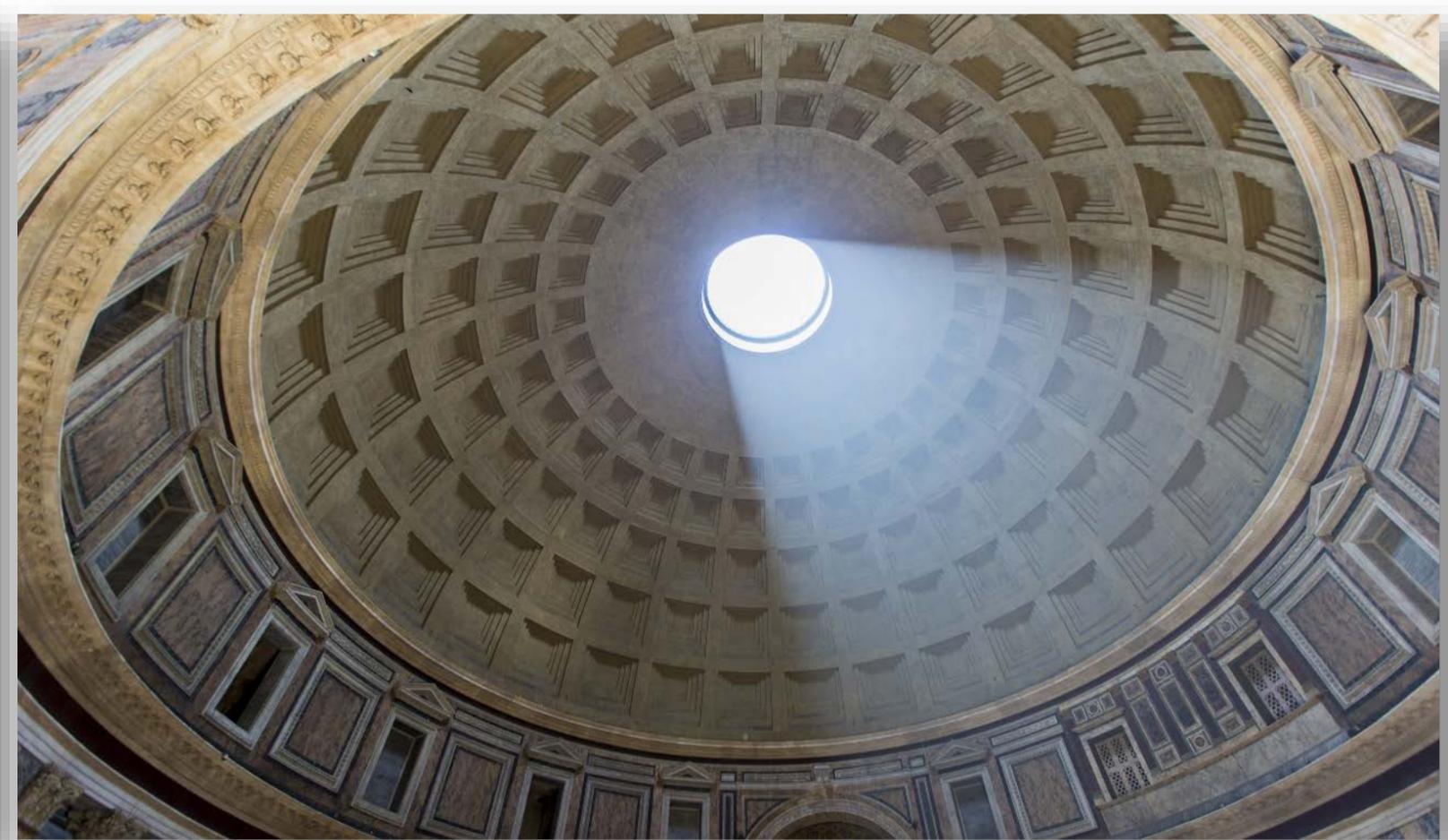


Ingenting gjør

Ingeniør



THE FUTURE OF
MAKING THINGS



Courtesy: ICA BIM



Courtesy: Erik Mårtensson/NCC



Courtesy MX3D



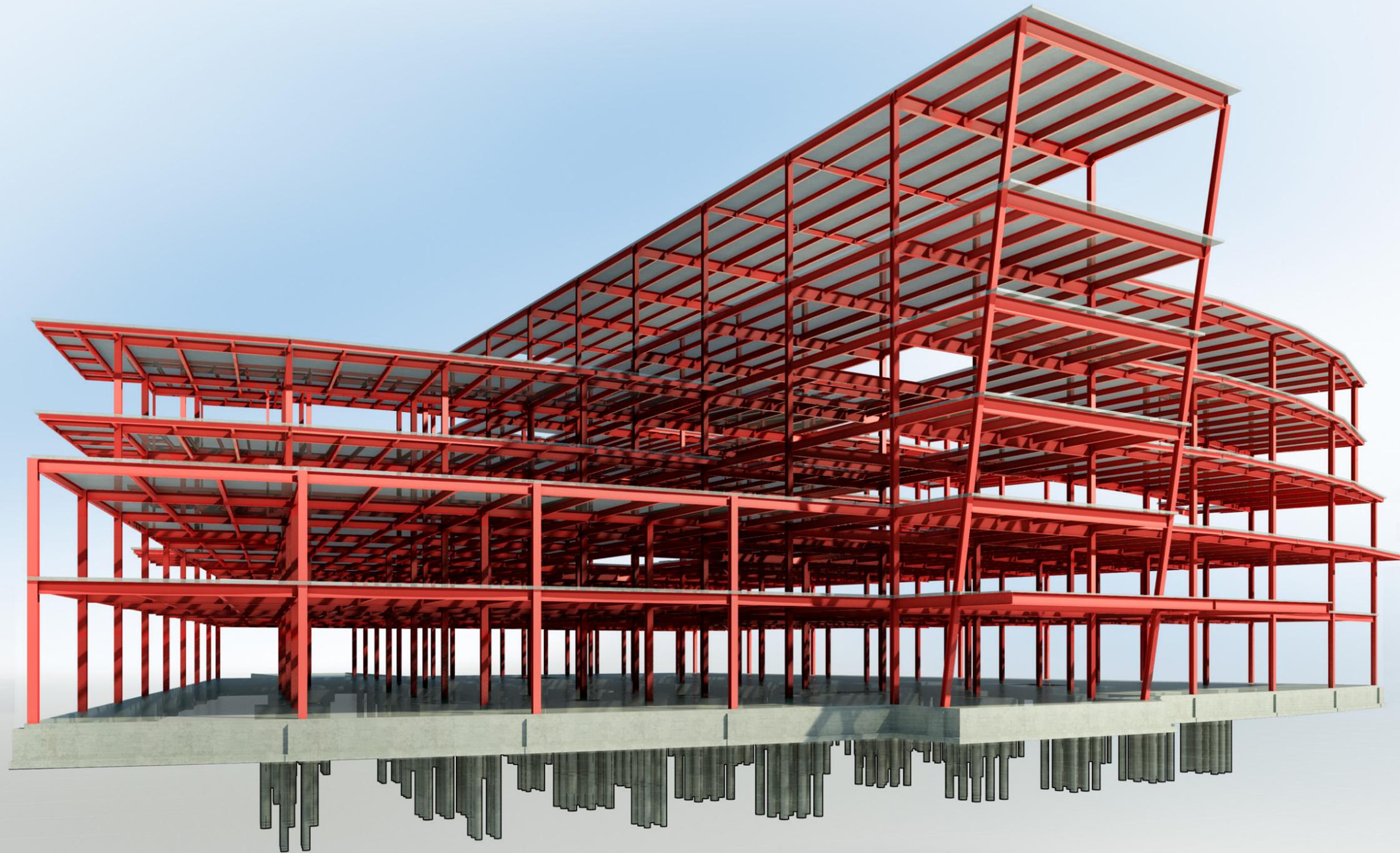
DESIGN

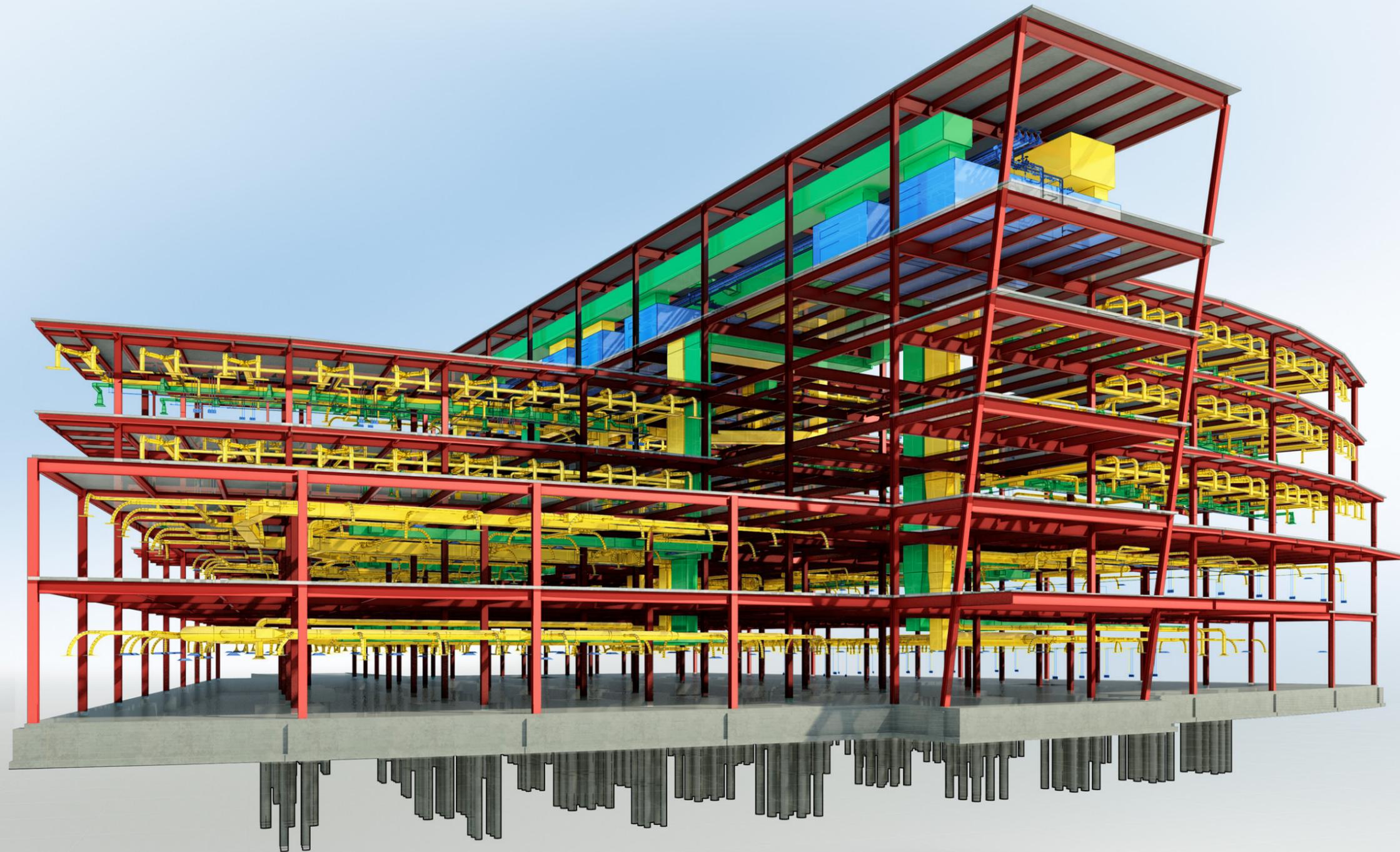
Building Information Modeling

BUILD

OPERATE









Optimization: 2D to BIM & VDC





DESIGN

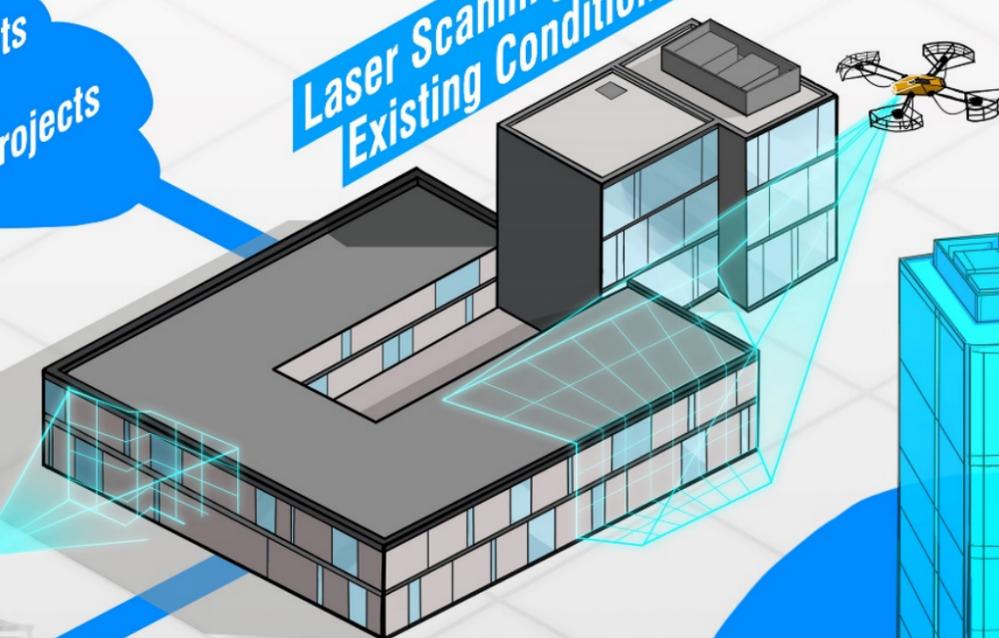
Connected BIM

BUILD

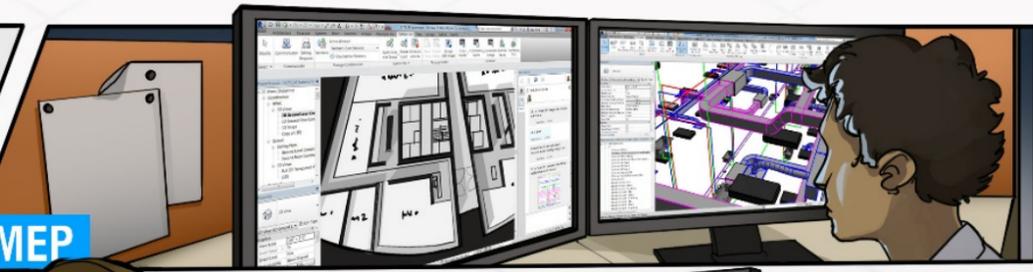
OPERATE

Data insights collected from previous projects

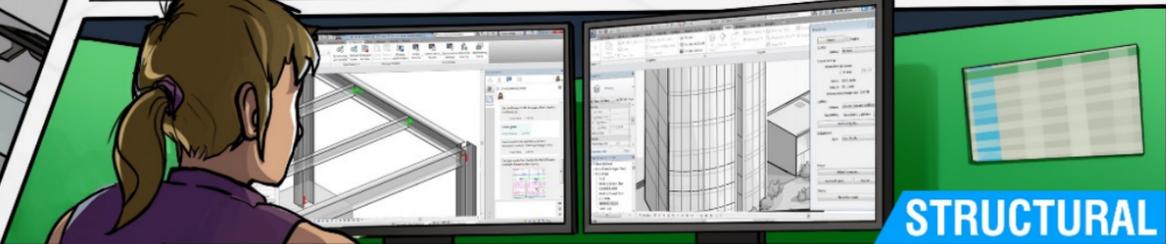
Laser Scanning Existing Conditions



ARCHITECT



MEP

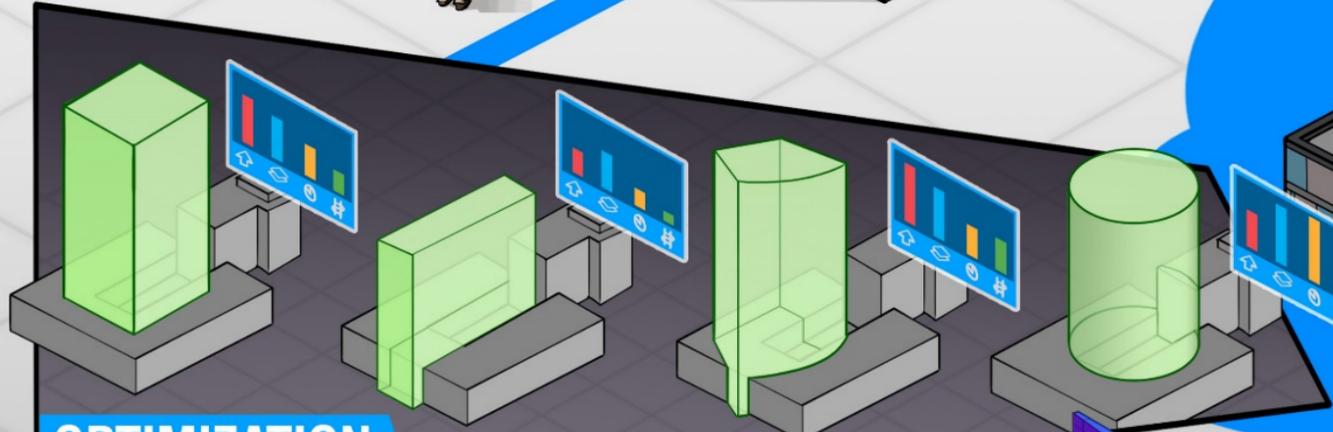


STRUCTURAL

Multi-Team Collaboration



Modular Construction

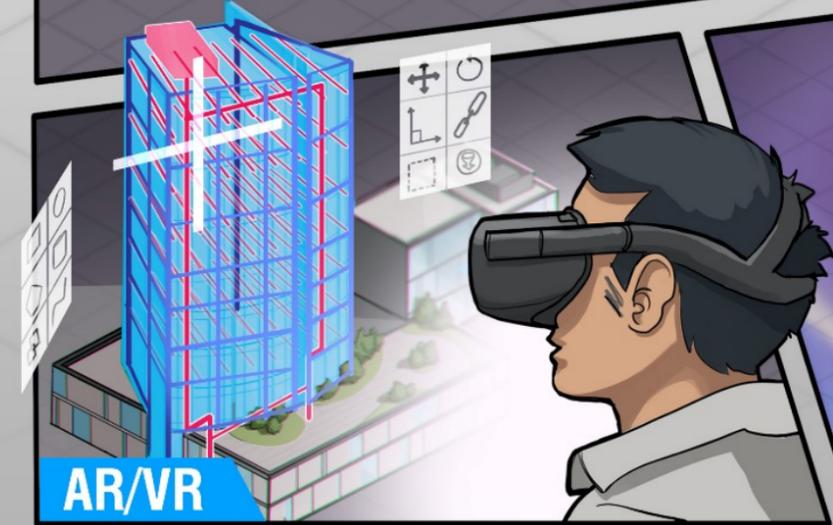


OPTIMIZATION

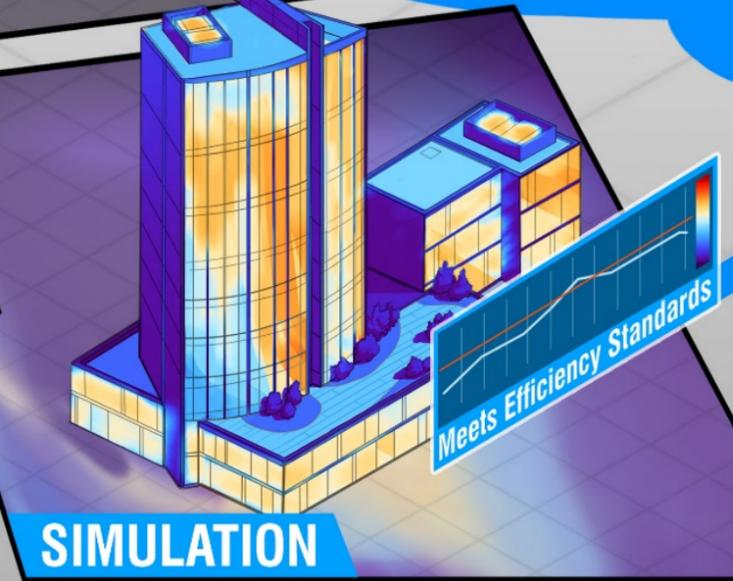
CONNECTED BIM

Consolidated Design Assets in the Cloud

Design to Fabrication

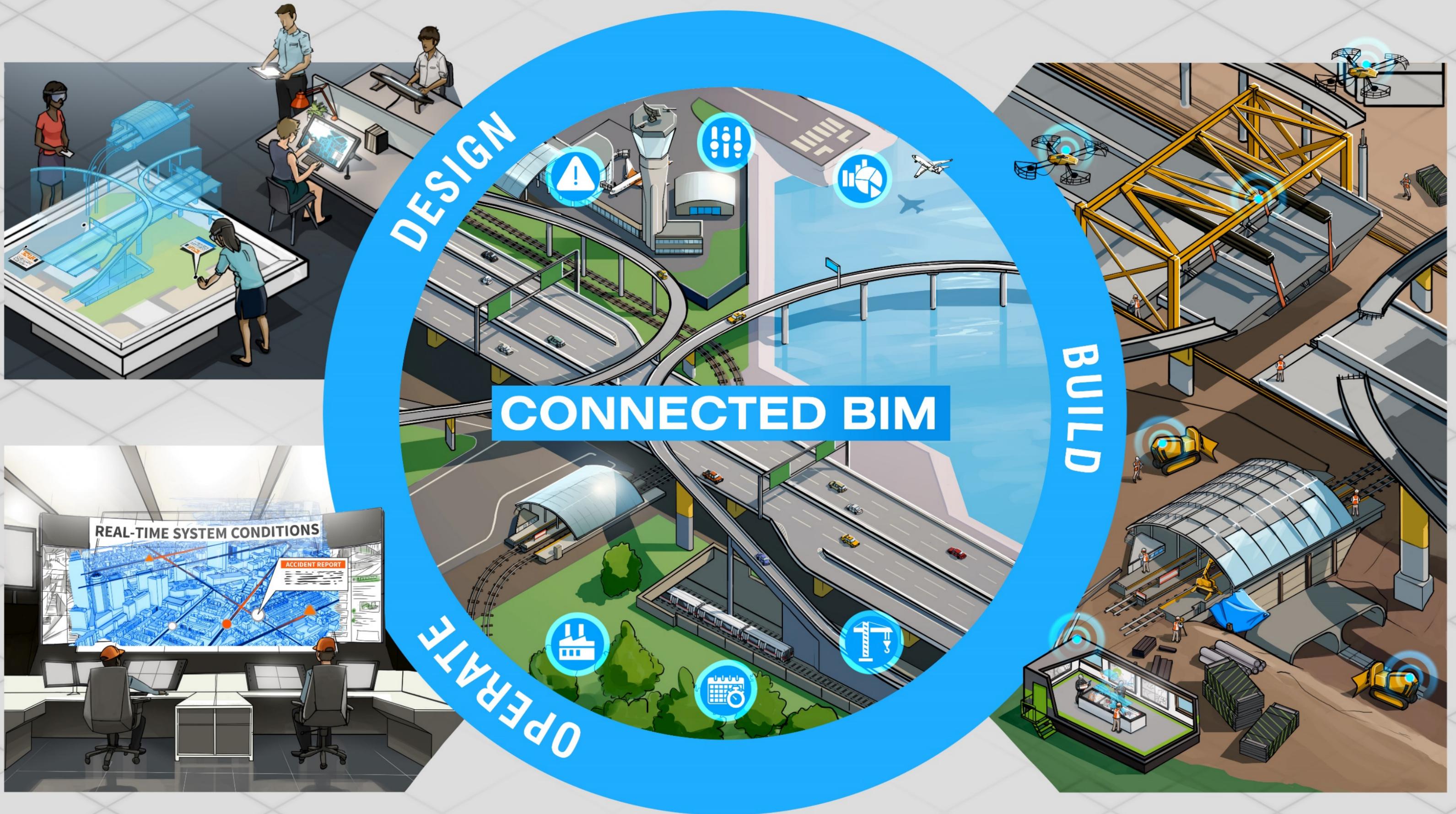


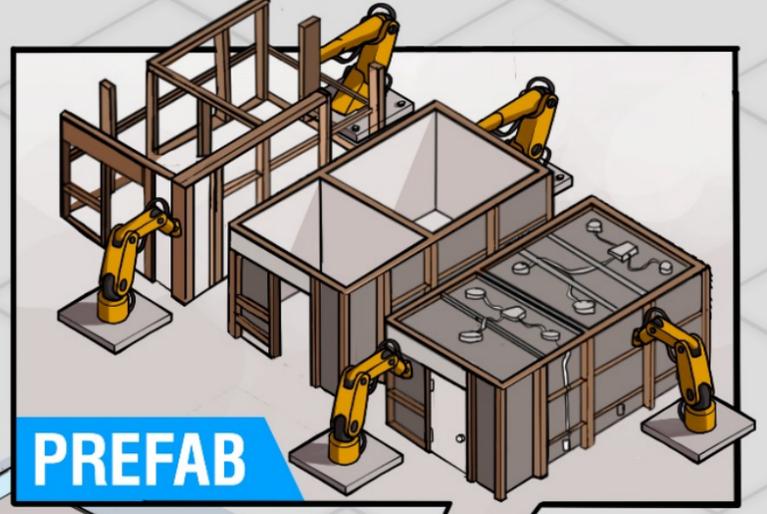
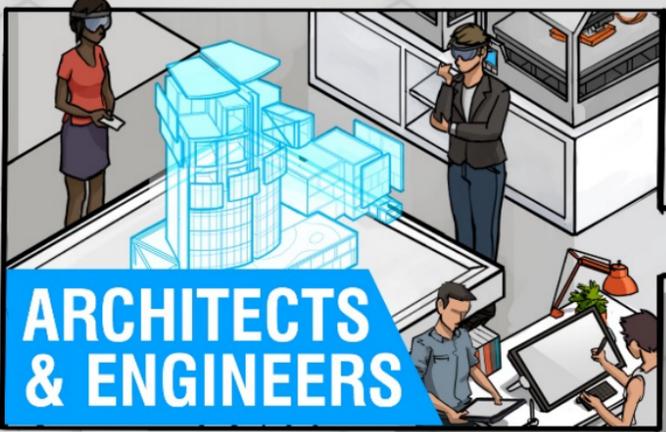
AR/VR



SIMULATION

Meets Efficiency Standards





200 250 350 450 550



E

McKinsey & Company

McKinsey Global Institute

12 Disruptive Technologies

Renewable energy

21,000 TWh annual global electricity consumption

13 billion tons in annual carbon dioxide emission from electricity generation

\$3.5 trillion value of global electricity consumption

65% lower price for solar photovoltaic cell per watt since 2000

Advanced oil & gas exploration & recovery

3x increase in efficiency of US gas wells between 2007 & 2011; 2x increase for oil wells over the same period

30 billion barrels of crude oil produced globally

\$3.4 trillion revenue from global sales of crude oil

Advanced materials

\$1000 vs \$50: Price difference of 1 gram of nanotube over a decade

115x strength-to-weight ratio of carbon nanotubes vs steel

\$4 billion revenue from global carbon fibre sales

3D printing

90% decrease in price of home 3D printers compared to 2009

\$11 trillion worth in global manufacturing GDP

8 billion pieces of toys manufactured globally a year

Energy storage

40% price decline in Lithium-ion battery pack in an electric vehicle since 2009

\$100 billion estimated value of electricity for households currently without access

1.2 billion people without access to electricity

Next-generation genomics

10 months to double sequencing speed per dollar

\$6.5 trillion global health-care costs

100x increase in acreage of genetically modified crops between 1995 to 2012; 2.5 billion people employed in agriculture

Mobile Internet

Fastest supercomputer in 1975 cost \$5m, with equal performance as an iPhone 4, which cost \$400

4.3 billion people yet to be connect to the Internet today

\$1.7 trillion worth of GDP related to the Internet

1.1 billion smartphone users, with potential to use automated digital assistance apps

Automation of knowledge work

100x increase in computing power from IBM's Deep Blue (1997) to Watson (2011)

\$9+ trillion global costs of employing knowledge workers, which is 27% of global employment costs

Internet of Things

300% increase in connected machine-to-machine devices since 2008

1 billion things that could be connected to the Internet across different industries

\$36 trillion operating costs of key affected industries

Cloud technology

18 months to double server performance per dollar

2.7 billion internet users served by 50 million servers worldwide

\$3 trillion spending by enterprises on information technology

Advanced robotics

170% growth in sales of industrial robots between 2009 and 2011

320 million manufacturing workers may be potentially affected

Autonomous and near-autonomous vehicles

300,000+ miles driven by Google's autonomous cars with only 1 accident (which was human-caused)

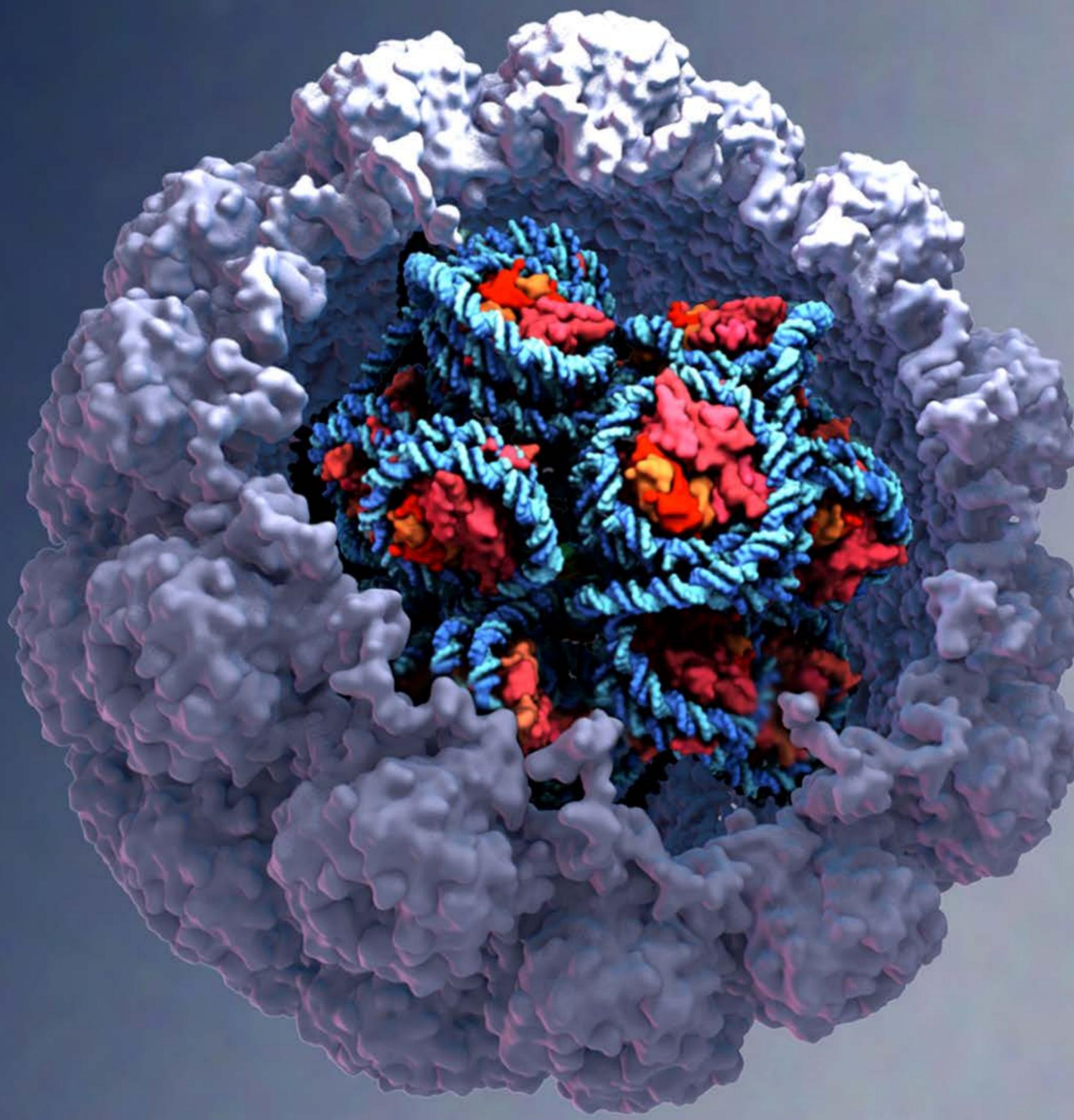
\$6 trillion in global manufacturing employment costs, which is 1.9% of global workforce

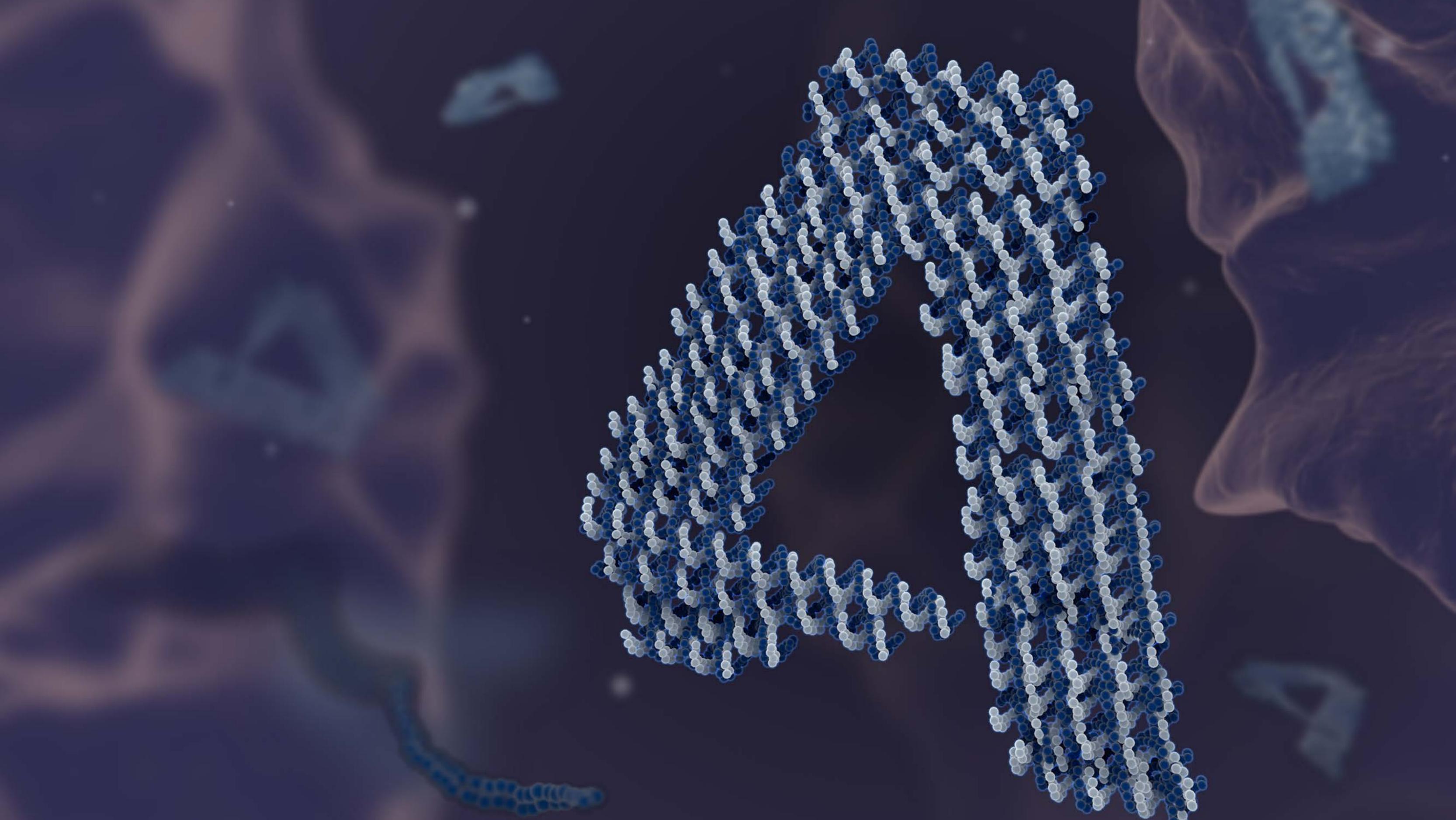
\$4 trillion automobile industry revenues

1 billion cars & trucks; 450,000 civilian, military & general aviation aircraft globally

Created by:
Daniel Tay
May 2013 Singapore
boingx5@gmail.com
www.tayxiongsheng.com
@tayxiongsheng

Advanced materials





3D Printing



WARNING
KEEP HANDS
CLEAR OF
MOVING PARTS

CAUTION
HOT SURFACE
DO NOT TOUCH



<https://www.youtube.com/watch?v=v2moJF8kqlg>

Build Finished!
Build Time 01h29m



FUELED BY | **AUTODESK®**
123D®

MakerBot Replicator 2
DESKTOP 3D PRINTER





SNØHETTA
DESIGN





Mobile internet

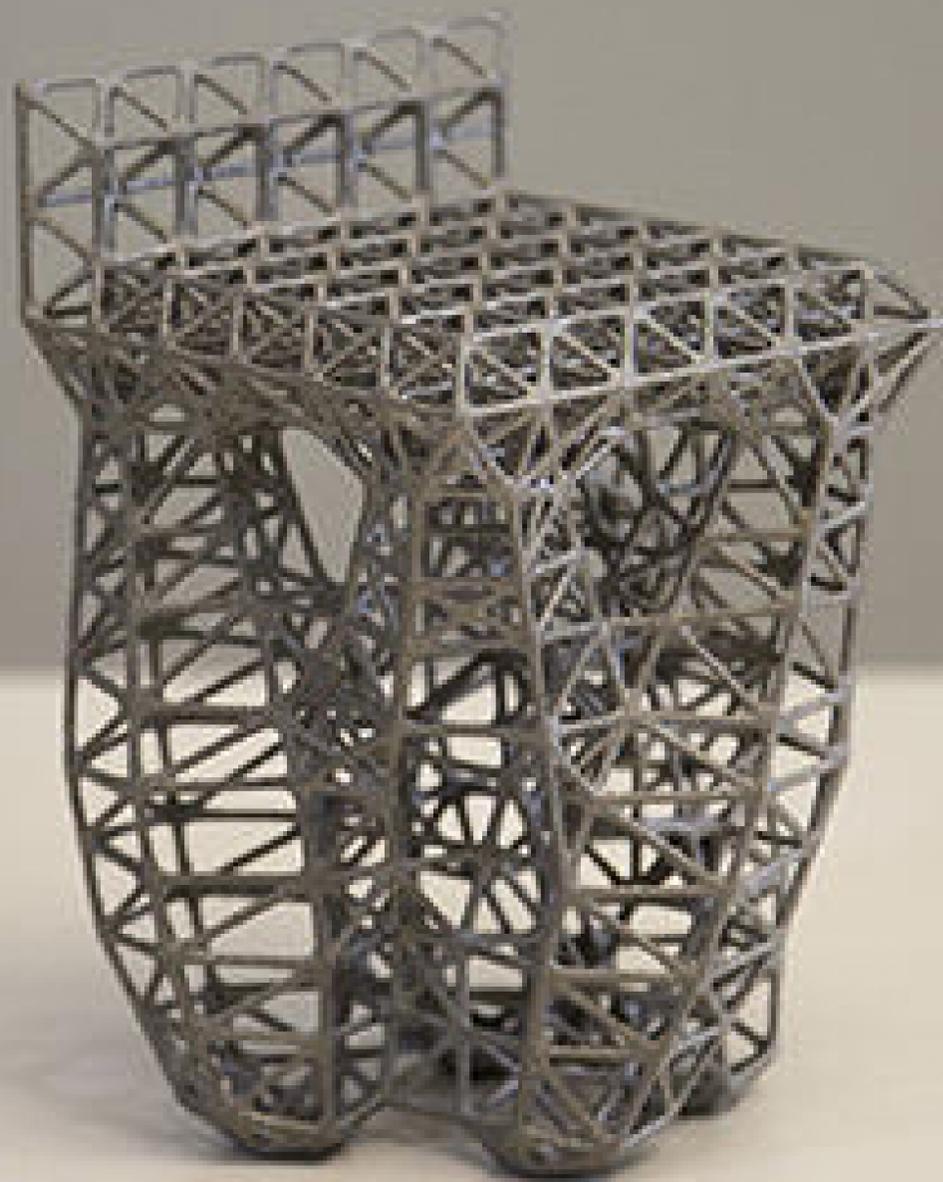




Automation of knowledge work





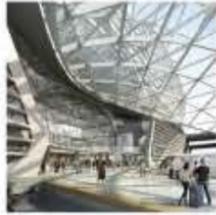




Internet of things







United Construction

Bayfront Arena

Project Dates: Aug 16, 2016 – Jun 12, 2018



PROJECT RISK



The risk level for this project is poor, and has been trending down for the past week.

[About Risk](#)

SUBCONTRACTOR RISK

Today

Overall



CC Concrete	High
NextGen Panels	High
Majestic Steel	Medium
Joe's Plumbing	Medium
Rebar Masters	Medium

HIGH RISK ISSUES

Water Rework Key Activity Inspection Uncategorized



- #22244 - Open penetrations in concrete...** To: CC Concrete, Inc. Open 24 days
 Open penetrations in the concrete framing are not sealed and water is leaking after the recent weather event. There is damage to the finishes. Detailing of the penetration is in progress.
- #22116 - The waterproofing barrier...** To: NextGen Panels Open 14 days
 The waterproofing barrier installed does not meet the required standards. These needs to be rectified and QC verified before the external walls are closed out.
- #22105 - The EIFS installed...** To: NextGen Panels Open 7 days
 The EIFS installed is not per manufacturers documents. There is no flashing and moisture is seen inside the enclosure. The whole enclosure needs to be made weatherproof.
- #21984 - The concrete treads...** To: CC Concrete, Inc. Open 7 days
 The concrete treads on the South side of Arena stairs are sloped incorrect!! Ponding of water noticed after a weather event. This has to be fixed ASAP. And the slope on all treads needs to be checked. There might be a potential RFI to the architect.
- #21966 - Fireproofing incomplete at...** To: Majestic Steel Open 6 days
 Fireproofing incomplete at steel members. Needs to be completed before the scheduled external inspection
- #21898 - Repair concrete at base...** To: CC Concrete, Inc. Open 5 days



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Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Success

Solution

Business Strategy

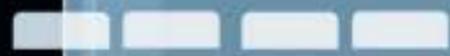
Innovation
Branding
Solution
Marketing
Analysis
Ideas
Success
Management

Innovation
Branding
Solution
Marketing
Analysis
Ideas
Success
Management

● SOCIAL NETWORK



Cloud technology



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- SHOW BUSINESS
- NETWORK
- MUSIC
- CINEMA
- BUSINESS/FINANCE
- WORLD NEWS

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- INTERNET
- LIVE CHAT
- MEDIA
- PHOTOS
- VIDEOS
- MUSIC



BUSINESS
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 NEWS



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- SHOW BUSINESS
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SOME
 MONEY







Advanced robotics

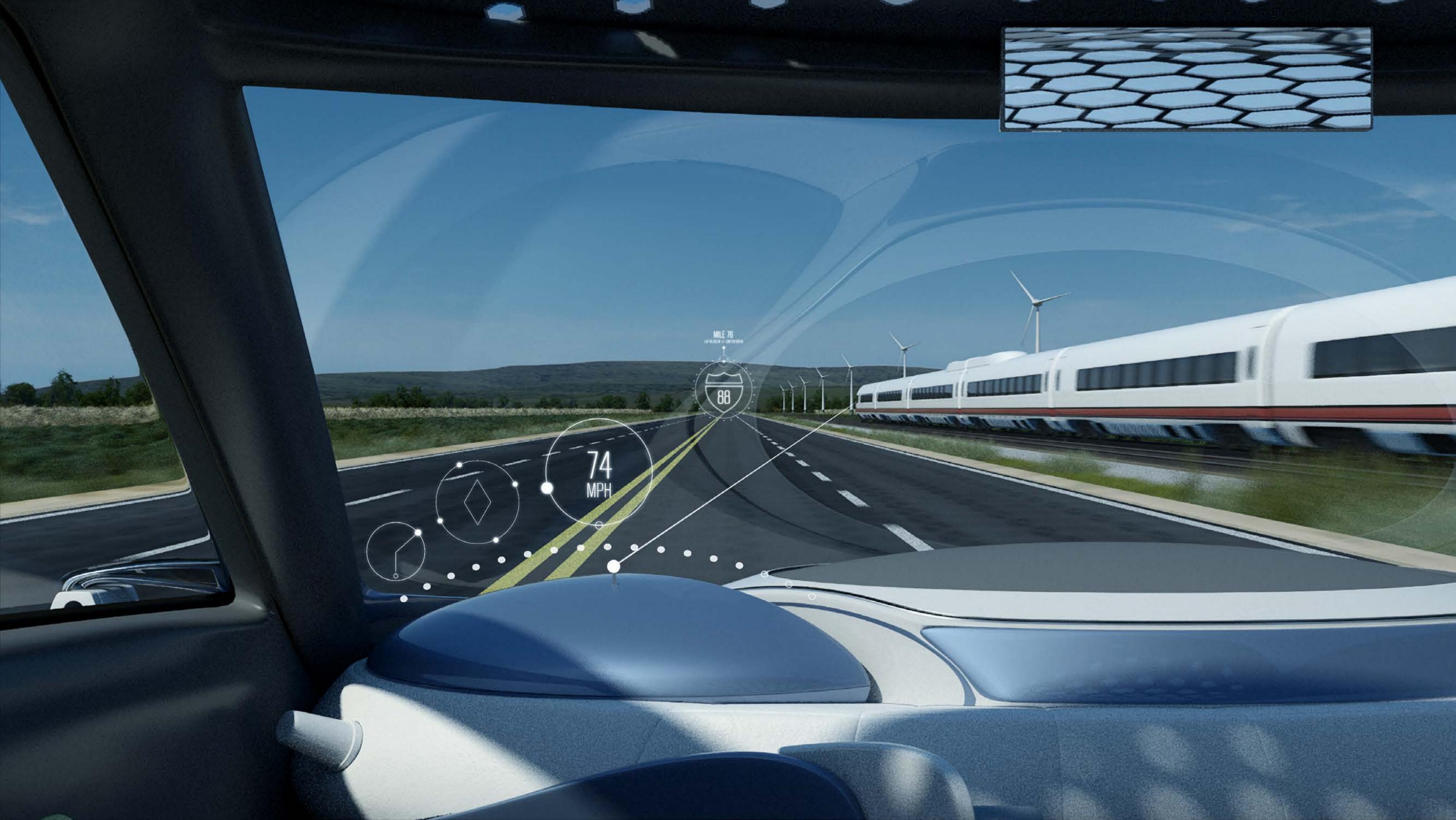




nLINK



Autonomous & near autonomous vehicles



MILE 76
UP HIGHWAY 88



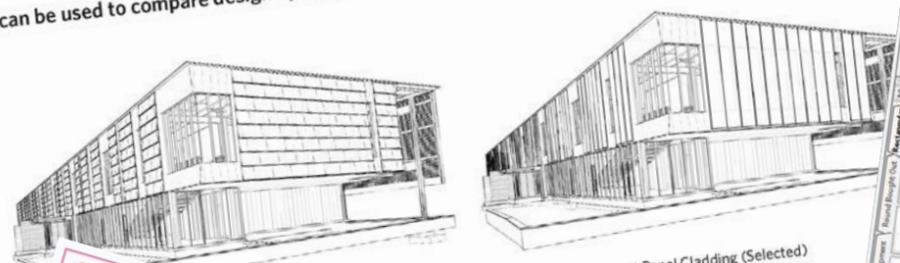
74
MPH





But!

Tally™ can be used to compare design options.



Option 2 - Translucent Panel Cladding (Selected)

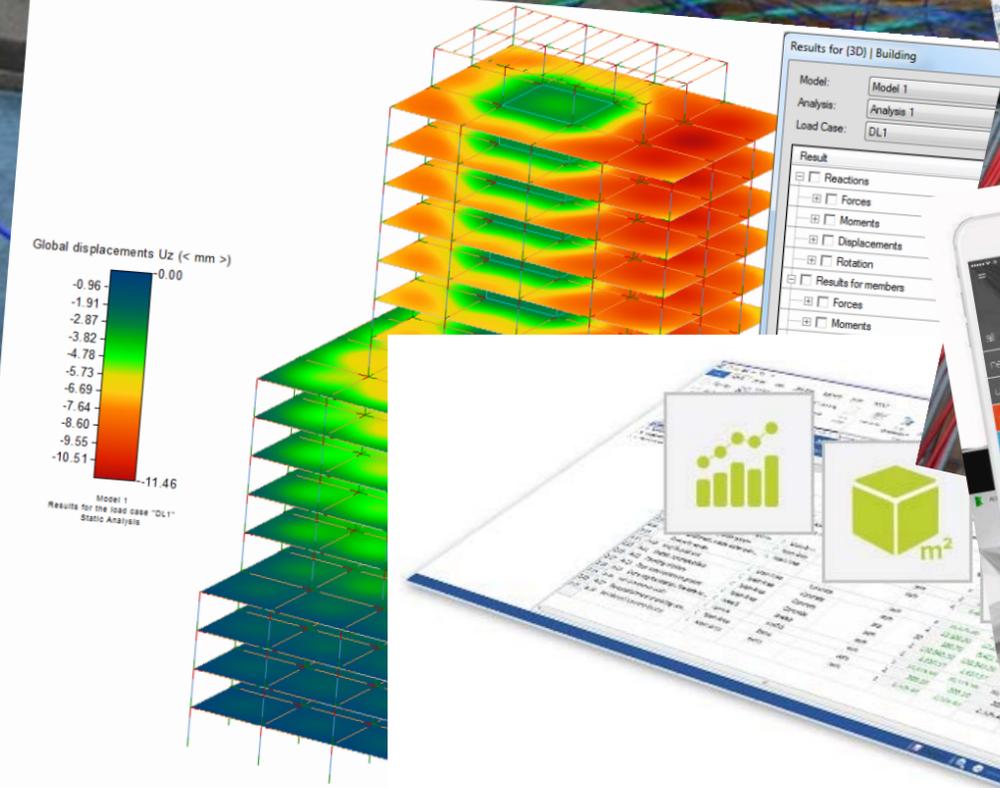
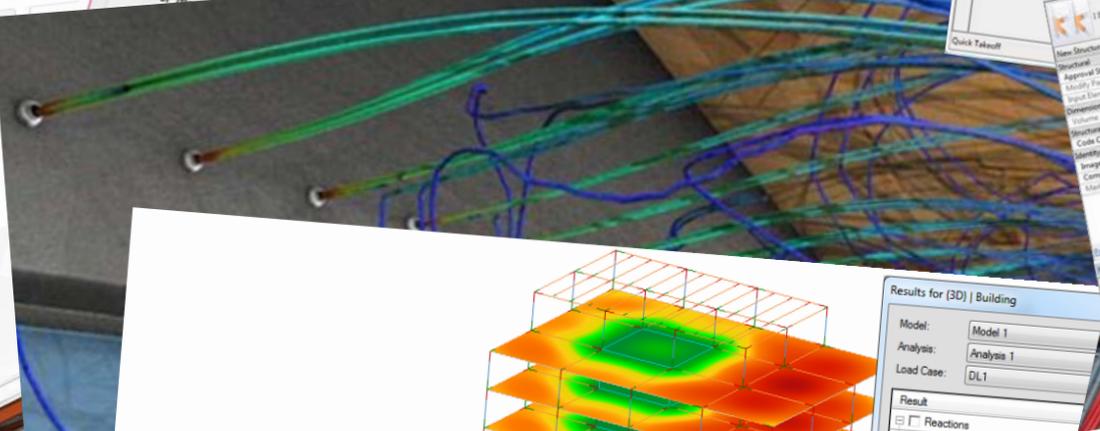
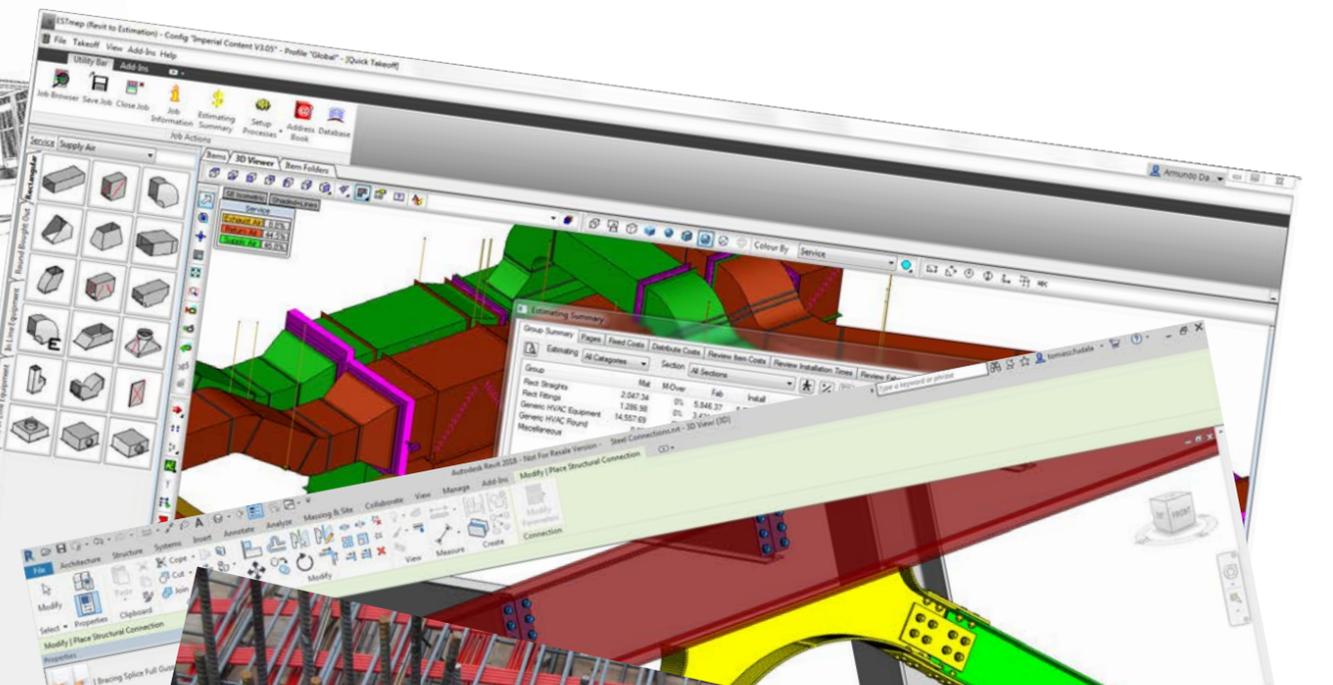
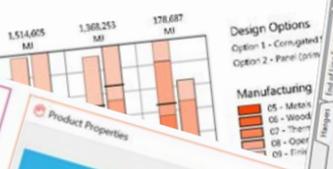
Balancing Method

ID: 000001
Name: [input field]
Description: 123

Balancing Limits of the pressure drop

Zone valve Min Max
Radiator valve 500

Limits for the





Make anything.