



Smart Cities & the Metaverse: The Cyber-Physical Relationship

the city redefined

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Founder & Chairman, TDG



Smart Cities Development
Design | Construction | Operations
Innovation Development and Delivery
Housing | Transportation | Technology | Energy | Media

Forbes

“Changing The
World”



“An American Business
Titan”

Bloomberg

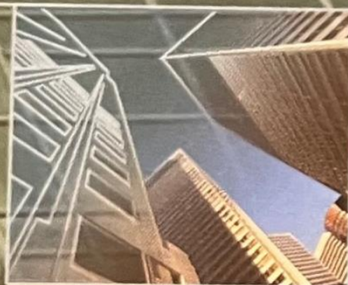
“Global Leader”





revit
revolutionizing building design

getting started
with **Revit**



made in the U.S.A

revit
revolutionizing building design

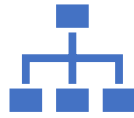
Release 1.01

Copyright © 2000
Revit Technology Corporation
6/00

TDG Technology Experience



Digital Twins / Virtual Worlds / Metaverse
Cyberplaces - 1997



Project Management
Buzzsaw - 2000



Building Information Modeling (BIM)
Revit – 2001



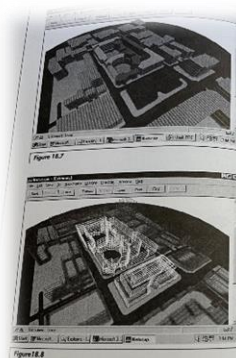
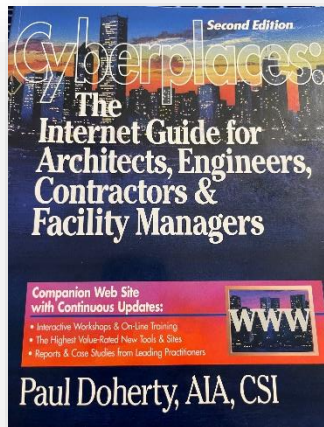
Facility Management
TRIRIGA – 2008



Smart Cities
TDG - 2008



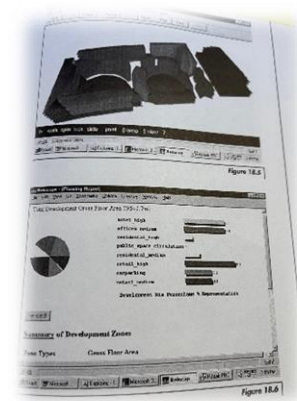
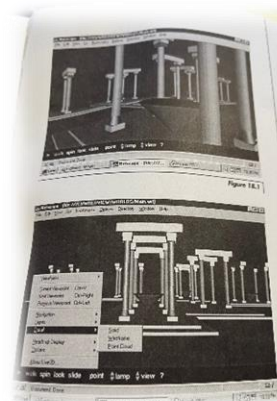
VFX
Screampoint – 2012



Virtual Income per square meter
This data was written directly in our Web browser, where it could be accessible to other members of the design team. Not only was it a tool to keep the multidisciplinary team of design, development and design criteria.
As a further enhancement to our design, we used VRML models of the building were created and exported, integrated into a final presentation of the site. In order to enhance the model, we built in 3D displays with varying levels of complexity. While the application development was originally intended for our design, it was felt that it could also be applied to architectural development. Furthermore, the HTML files were written with Java capabilities to enable future integration of the core and retail income that could be added to a standard developer's budget calculator for a site.

Conclusion
Designers are starting to implement their practice using object-oriented communication technology and VRML, because they see the advantages of enabling clients to review and appreciate designed spaces in three dimensions—on their own time, on their own computers, through the Internet. With the use of VRML, the separate, static nature and difficult-to-change 3D tools of the past are history. Providing VRML models from your CAD documents can be a good solution to client expectations. VRML can help facilitate a better design dialog with clients and has added value as a marketing tool.

Further, designers can share the models and interactive presentations via networks, like Intranets, with others in their own company (see the Bechtel story in Chapter 17, "Risk Mitigation Applications: Industry Case Studies"). These tools, combined with the growing





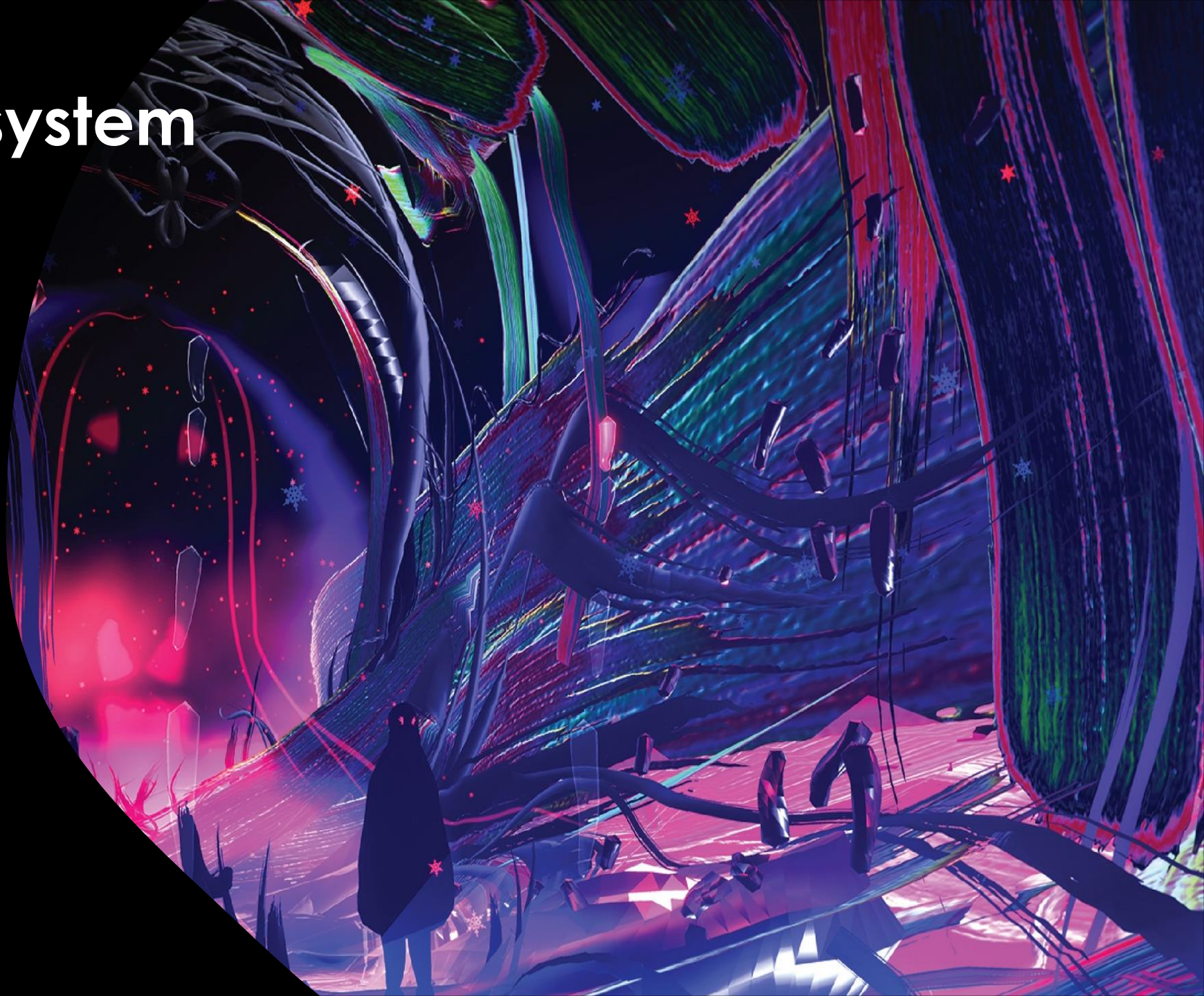
Digital Twin



Metaverse Ecosystem

Digital Twins
Virtual Worlds
Metaverse

Levels of Engagement
Levels of Experience





tdg[®]

Powered by  **VIM**[™]



Gaming

FORTNITE





Hollywood





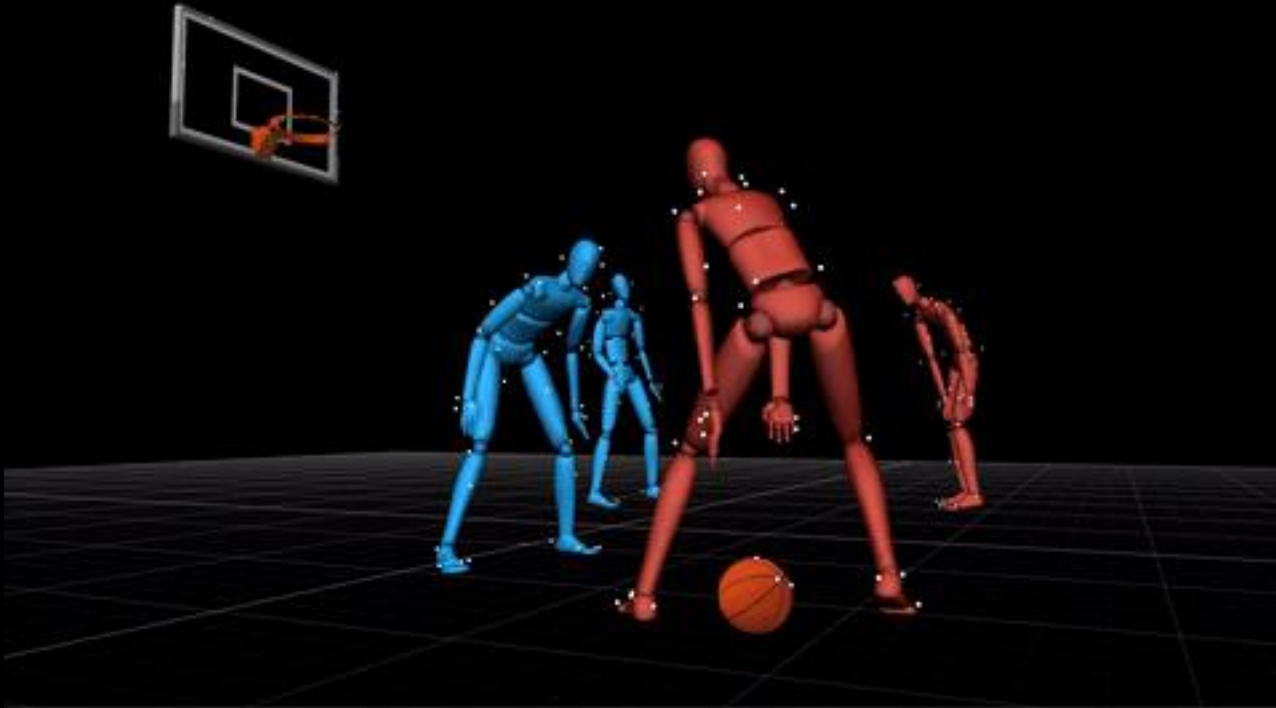


Project Controls



New Medium & Dimension

Real time motion capture with flawless voice chat



Shown: The head, arms, and everything above your waist can be controlled very accurately with IK. The lower body can be animated (less accurately) by triggering motion captured data as shown here, and rigging the character to follow. Or, mobile players can control with a traditional on screen joystick, and invoke animations like these.

Using inverse kinematics, our XR Ecosystem determines exactly how your head, arms, hands, and entire upper body move. You can control most of your character with incredible lifelike movement, almost without thinking. Your friends will recognize your body language.

Combining this with traditional motion capture techniques allows us to put you in the game. The experience feels remarkably real - play by moving.

Build Your Avatar

Create a digital self

XR Ecosystem allows you to build your own avatar quickly and easily to bring your virtual self to life as you explore, play, and party XR.



Modular Design

Mix and match from a large library of head and body parts, clothes, sports jerseys etc. Fancy a change? Simply decide who you want to be today swap and roll out into a new virtual world where VR and AR collide.



Presence

Our XR Ecosystem cleverly bridges the technology between the VR and AR users, allowing them to share many of the same experiences across dramatically different platforms.

- See your VR friends' avatars in your real home, as if they were visiting
- Watch live TV, sporting events games and content on a shared screen, while chatting and playing
- Play mini games with them, intermixing AR and VR



Shown: A VR player, and an AR player, as seen from a third perspective (another AR player).

Metahuman Avatar



Live, interactive humanoids



Customer Experience

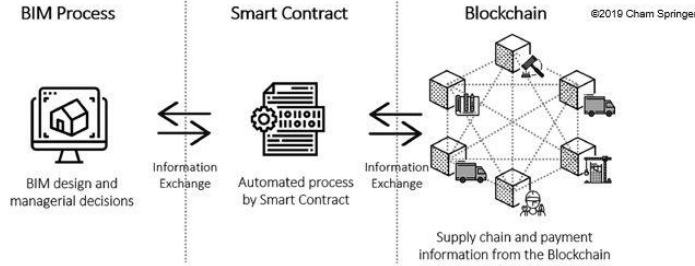


Location-based Experience



TDG's partnership with Digitwin provides an Augmented Metaverse experience for the upcoming Season 4 for the hit streamed series, Stranger Things. Customers are able to scan a QR code during episodes that will expand their experience beyond their physical TV screen.

Blockchain



Construction Data Assurance™

Blockchain DAO

Decentralized Autonomous Organization

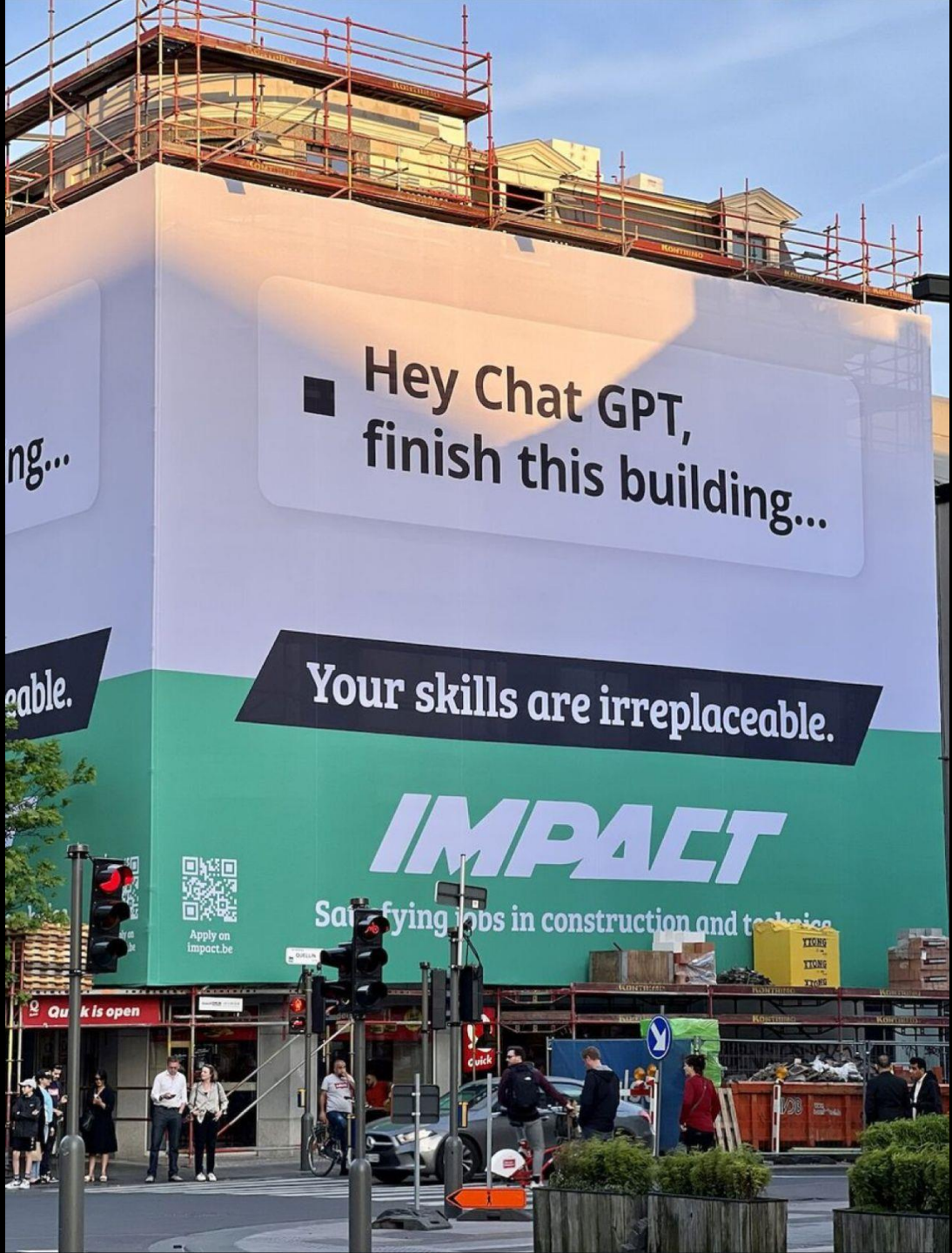
- Industry Associations
- Private AEC Companies
- Building Product Manufacturers
- NGOs
- Government Institutions

CDA Member Access for the following solutions

- Analysis
- Reports
- Custom, Repeatable Reporting
- Benchmarks
- Other 3rd Party Offerings



AI



ng...

■ Hey Chat GPT,
finish this building...

eable.

Your skills are irreplaceable.

IMPACT

Satisfying jobs in construction and technical



Apply on
Impact.be

Quick is open





THE LINK

SpecGPT

Solution: AI Assistant

- Imagine if all project documents were accessible to an AI Agent
- Imagine if all project systems were accessible to that agent
- Imagine it was trained to answer questions for various stakeholders





What This Means

No more hunting for information

You can just talk to it

Any information from within project documents or from project management software, scheduling software...

Agent can write an email for you, including information from project docs

Different answers for different permissions & roles

SpecGPT

Chat History

K: 21



Welcome to SpecGPT! How can I help you today?



what do I need to do before starting roof installation?



Before starting roof installation, you need to conduct pre-installation meetings at the site with the installer and all other trades involved. This is to familiarize the installer with the conditions at the site and the related work. Additionally, you need to review the conditions of the substrate and finishes, as well as the structural loading limitations of the roof deck. It is also important to review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and other construction elements that may affect the roofing system. Finally, you should review the governing regulations and requirements for insurance and certificates, as well as the temporary protection requirements for the roofing system during and after installation.



please rewrite that in 5 sentences



The provided context includes various sections and procedures regarding substitutions, construction, and installation for different trades on the SCB 625 W. Adams Street project in Chicago. It provides information on how to submit substitution requests, the requirements and qualifications for substitutions, and the coordination and approval process. It also includes guidelines for cutting, removing, and patching existing work, as well as requirements for cleaning and protecting the site. The context emphasizes the importance of coordination, adherence to regulations, and the responsibility of the contractor to ensure the quality and compatibility of substitutions and installations.

Ask a question...



DALL-E 2

DALL-E 2 is an AI system that can create realistic images and art from a description in natural language.



getting-started

DavidH 07/21/2022 12:36 AM
Hey! We're excited to have you as an early tester in the Midjourney Beta.

To expand the community sustainably, we give everyone a limited trial (around 25 queries), and then several options to buy a full membership.
- Full memberships include: unlimited generations (or limited w/ a cheap tier), and generous commercial terms.

HOW TO USE (PLEASE READ)
To create images:
1) Go to one of the "newbie" bot channels (below)

12:37 AM

Midjourney

NEWCOMER ROOMS
newbies-1

2) Type `/imagine` and then whatever you want
3) The bot will send you 4 images in 60 seconds
4) Click numbered buttons underneath to get upscales (U) or variations (V)

Note: If you don't see the channels, please restart your Discord app or browser.

Other important things to know

- Once your trial has ended, become a paid membership with `/subscribe` or go to <https://www.midjourney.com/account>
- For detailed information and how-to go to <https://midjourney.gitbook.io/docs>
- To see your creations sign in at: <https://midjourney.com/>
- By using our service you agree to our `#rules`

Need help? Ask in `#trial-support` or type `/info` to see your account details (edited)

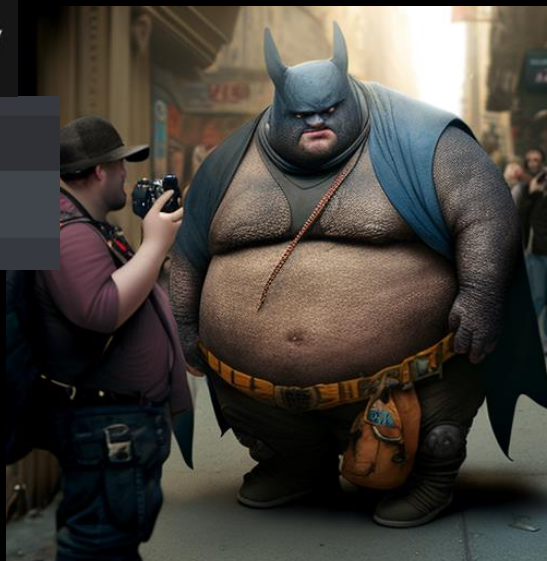
DavidH 07/21/2022 12:49 PM
Have fun! ❤️



Midjourney

prompt The prompt to imagine

`/imagine`



Midjourney

newbies-113 Bot room for new users. Type `/imagine` then describe what you want to draw. S

100+ new messages since 9:20 AM

V1 V2 V3 V4

interior of a vr theater - @PaulDohertyAIA (fast)

U1 U2 U3 U4

V1 V2 V3 V4





roomGPT.io

Generating dream rooms using AI for everyone.

Take a picture of your room and see how your room looks in different themes. 100% free – remodel your room today.

Generate your dream room

Original Room



Generated Room



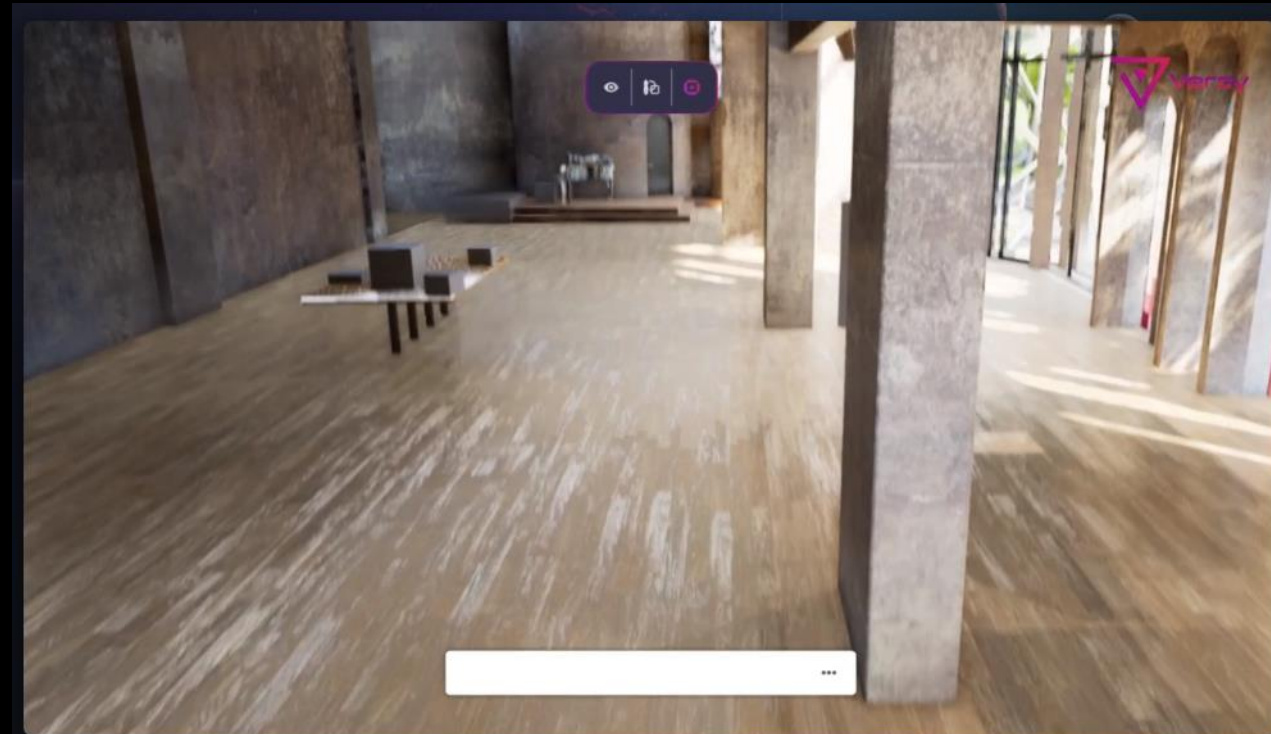
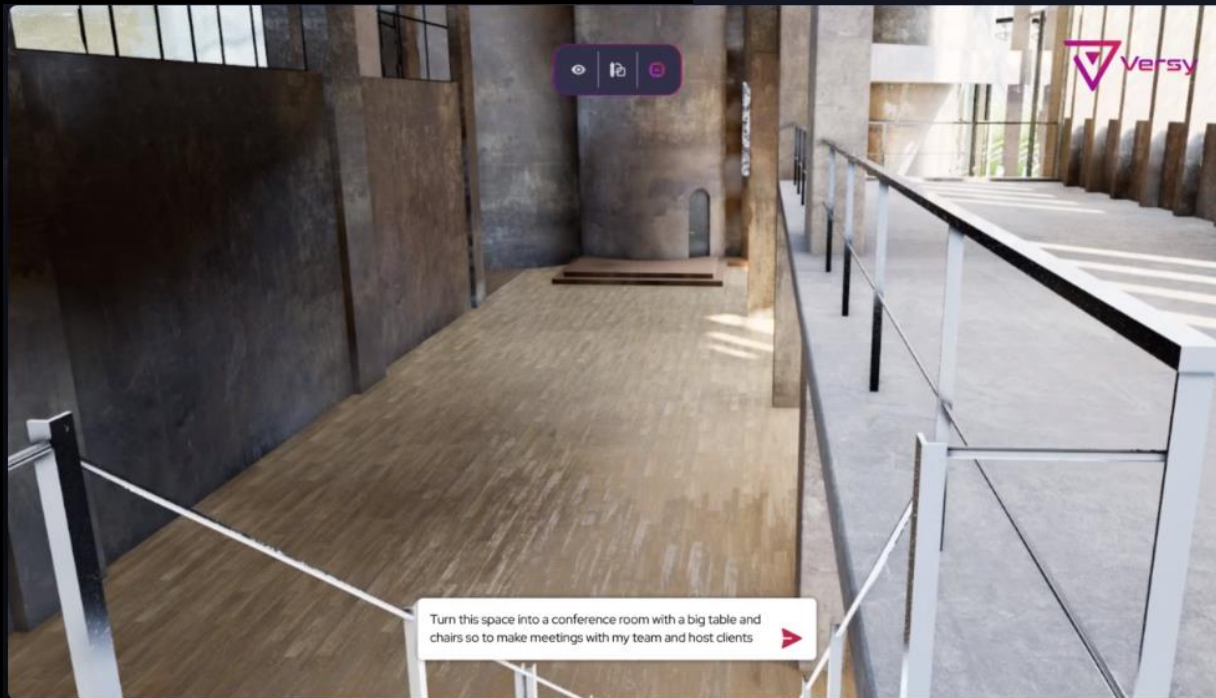


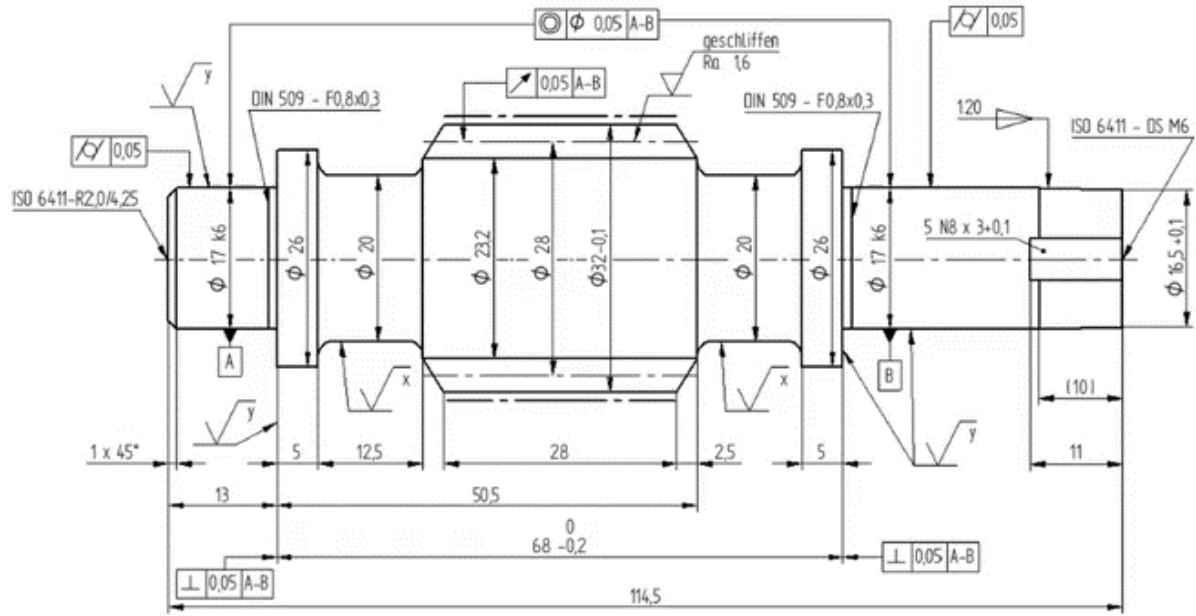
Transform Text into Virtual Experiences

Let words, build Worlds.
Generative AI at your service.

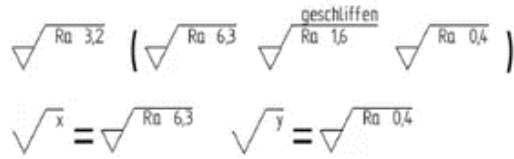


Text-to-Space





unbemaßte Radien R15



Schnecke	
Zahnezahl	1
Mittlenkreis - Durchmesser	28
Modul	2
Zahnhöhe	4,4
Flankenrichtung	rechtssteigend
Steigungshöhe	6,283
Mittensteigungswinkel	4° 5' 8"
Verzahnungsqualität	9 DIN 3965
Achsabstand	47 ± 0,25

Übersetzungstafel		
Passmaß	Hochstmaß	Mindestmaß
5 N8	4,998	4,980
17 k6	17,012	17,001

Tolerierung		Allgemeintoleranz	Werkstücktoleranzen	Maßstab
ISO 8015		ISO 2768-mK	Din 6784	2:1
1	Initial design	12.03.2006	Datum	Name
2	Design change	21.04.2013	Bearb.	20.03.2006
3	Change of Material	19.07.2019	Gepr.	
			Norm	
RITOWERK GmbH & Co. KG 82333 München, Deutschland				Blatt
Zeit: Adresse: Datum: Name:				EL

Schneckenwelle
2730-A-712





Projects





HEDA GROUP
和达集团
幻·西·为·本·达·期·致·远

Qingdao International Virtual Reality Theme Park



Concept Design



Luxury Resort Hotel Towers & Residences

انسجام



Harmony



AI will not take your job.

People using AI will take your job.



REIMAGINING
THE URBAN
EXPERIENCE

SMART CITIES

PAUL DOHERTY



Unlocking The Metaverse

A Guide For
The Built Environment

Paul Doherty

WILEY



National Institute of Building Sciences
BUILDING INNOVATION
Conference



the digit group, inc.

www.thedigitgroup.com

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the city redefined