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# Design Engineering, Architecture and Manufacturing Workflow

# **D**CLTechnologies





# Design Engineering, Architecture, and Manufacturing in the Modern Era.

In modern times, change is the only constant. The design engineering, architecture, and manufacturing industries are all seeing paradigm shifts in how products and structures are being developed and built.

Advances in simulation and analysis, digital twins and generative design are enabling new design paradigms.

Augmented Reality (AR), Virtual Reality (VR), and Photo-Realistic visualization are enhancing design and collaboration.

If you are producing or planning to produce interactive and new-dimensional content for these industries, or companies serving them, you should be prepared to look at your toolsets and review the way you work.

## See the most common industry workflows below.

Integrated design, additive manufacturing and IoT technologies are driving ever-increasing product complexities.

Building Information Modelling (BIM) is driving better design and manageability of projects.



# Engineering and Manufacturing Workflow

To compete in a world where production is moving from commoditization to personalization, today's leading engineers and manufacturers need to streamline workflows using high performance workstations. The challenge is doing that effectively whilst incorporating new technologies such as IoT, reducing physical prototypes and enhancing collaboration.



### **See Dell solutions below:**

# Product Design

# Simulation and Analysis

DETAILED DESIGN	SIMULATION / ANALYSIS (CAE)	VISUALIZATION	MANUFACTURII (CAM)
sign in full detail.	Evaluate performance to meet specifications.	Simulate visual experience.	CNC Machining, create tool paths / additive MFG.
Inventor®	ANSYS <sup>®</sup> Mechanical <sup>™</sup>	Autodesk 3ds Max®	Autodesk HSMWorks
Fusion™	ANSYS® Fluent®	Dassault Systèmes®	MasterCAM
Systèmes® <s®< td=""><td>Autodesk Inventor®</td><td>SolidWorks®</td><td>Dassault Systèmes® DEMIA</td></s®<>	Autodesk Inventor®	SolidWorks®	Dassault Systèmes® DEMIA
	Autodesk Fusion™	Dassault Systèmes®	Dassault Systèmes <sup>®</sup> SolidWorks <sup>®</sup> CAM
Systèmes® CATIA®	Dassault Systèmes®	SolidWorks <sup>®</sup> Visualize	
®	SolidWorks®	Dassault Systèmes® 3DExcite	PTC Creo <sup>®</sup>
NX™	Dassault Systèmes® CATIA®	Dassault Systèmes® CATIA®	Siemens NX™ CAM
	PTC Creo®	PTC Creo <sup>®</sup> Render Studio	SolidCAM
	Siemens NX™	Siemens NX™	Vero Software EDGECAM
		Siemens TCVis™	SURFCAM

# Visualization





# Fixed Product Design

### Precision 5820 Tower

Dell Precision 5820 Tower workstation delivers scalable performance for 2D and 3D CAD applications, such as:

Dassault Systèmes<sup>®</sup> – SolidWorks<sup>®</sup> and CATIA<sup>®</sup>, Autodesk Inventor<sup>®</sup>, Autodesk AutoCAD<sup>®</sup>, PTC Creo<sup>®</sup>, Siemens NX<sup>™</sup>

#### Precision 5820 Tower

Expand your ideas with the Precision 5820 Tower. Featuring high performance in an innovative, versatile compact design and the latest Intel<sup>®</sup> Xeon<sup>®</sup> processors.





#### 3Dconnexion SpaceMouse Pro

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#### Dell UltraSharp 27 USB-C Hub Monitor | U2721DE

Get a stable, wired connection to your network and peripherals on this sleek 27" QHD hub monitor with RJ45, USB-C and a host of other ports.



#### Dell Premier Wireless Keyboard and Mouse | KM717



# Mobile Product Design Precision 7550

Dell Precision 7550 workstation delivers scalable performance for 2D and 3D CAD applications, such as:

Dassault Systèmes<sup>®</sup> – SolidWorks<sup>®</sup> CATIA<sup>®</sup>, Autodesk Inventor<sup>®</sup>, Autodesk AutoCAD<sup>®</sup> PTC Creo<sup>®</sup>, Siemens NX<sup>™</sup>

#### Precision 7550

World's most powerful 15" mobile workstation.\* Extract maximum performance from demanding applications with 10th Gen Intel<sup>®</sup> Core<sup>™</sup> and Xeon<sup>®</sup> 8-core processors, up to 128GB of 2933MHz memory and 6TBs of storage.



\*When equipped with Intel® Xeon® W-10885M (2.40 GHz to 5.30 GHz), 128GB ECC/nECC RAM, NVIDIA® Quadro RTX™ 5000 (16G) graphics

running at 80W. Based on Dell analysis of competitive products using

publicly available data, March 2020.



3Dconnexion SpaceMouse Wireless patented 6-Degrees-of-Freedom (6DoF) sensor Keep pace with graphic and dataintensive tasks, including VR and AI, with up to NVIDIA<sup>®</sup> Quadro RTX<sup>™</sup> 5000 professional graphics. Our advanced and patented thermals keep the system running at peak performance while keeping the system cool and quiet.







Experience captivating details and true-tolife color reproduction on this brilliant 27" 4K monitor with the widest color coverage in its class.

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#### Dell Premier Wireless Keyboard and Mouse | KM717

Jabra Evolve 75 Stereo MS H





#### Dell Performance Dock | WD19DC

# Fixed Simulation and Analysis (CAE) Precision 7920 Tower

The Dell Precision 7920 Tower workstation delivers scalable performance for CAE applications, such as:

ANSYS<sup>®</sup> Mechanical<sup>™</sup>, Fluent<sup>®</sup>, Discovery<sup>™</sup> Live, Altair<sup>®</sup> HyperWorks<sup>®</sup>, solidThinking<sup>®</sup>, COMSOL Multiphysics<sup>®</sup>



#### **Precision 7920 Tower**

The world's most powerful and first AI-Ready workstation.\* The 7920 Tower is great for customers who are running complex application environments including interactive design and analysis of very large data sets, as well as emerging applications/workloads like AI and VR.





#### **3Dconnexion SpaceMouse Wireless** This easy to carry wireless device, has a patente 6-Degrees-of-Freedom (6DoF) sensor that allows you to rotate zoom and manipulate

\*Based on Dell internal analysis of competitive products as of March 2018.

#### Engineering and Manufacturing >



#### **Dell UltraSharp 32 Ultra HD 4K Monitor with PremierColor | UP3216Q 3840 x 2160 at 60 Hz** Ideal monitor for mainstream CAD providing great color quality and resolution for detailed 2D/3D modeling.



#### Dell Premier Wireless Keyboard and Mouse | KM717

Not only will it enhance productivity, but its elegant design will fit into virtually any workspace. For increased productivity you can simultaneously pair up to two compatible devices with Bluetooth<sup>®</sup> LE.

# Mobile Simulation and Analysis (CAE)

### Precision 7750

The Dell Precision 7750 workstation delivers scalable performance for CAE applications, such as:

ANSYS<sup>®</sup> Mechanical<sup>™</sup>, Fluent<sup>®</sup>, Discovery<sup>™</sup> Live, Altair<sup>®</sup> HyperWorks<sup>®</sup>, solidThinking<sup>®</sup>, COMSOL Multiphysics<sup>®</sup>

#### Precision 7750

Extract maximum performance from demanding applications with 10th Gen Intel<sup>®</sup> Core<sup>™</sup> and Xeon<sup>®</sup> 8-core processors, up to 128GB of 2933MHz memory and 8TBs of storage. Keep pace with graphic and data-intensive tasks, including VR and AI, with up to NVIDIA<sup>®</sup> Quadro RTX<sup>™</sup> 5000TM professional graphics. Our advanced and patented thermals keep the system running at peak performance while keeping the system cool and quiet.





HTC Vive Pro Eye<sup>™</sup> Review rendered architectural projects in virtual reality and allow clients to experience a realistic interpretation of the finished product.



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#### Dell Premier Wireless Keyboard and Mouse | KM717

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**3Dconnexion SpaceMouse Wireless** This easy to carry wireless device, has a patented 6-Degrees-of-Freedom (6DoF) sensor that allows you to rotate, zoom and manipulate.





#### Dell Performance Dock – WD19DC

Dell's most powerful dock\* delivers the ultimate productivity experience. Charge your system faster, support up to three displays and connect to your peripherals a single cable with dual USB-C connectors

\*Based on Dell internal analysis of competitive products us publicly available data as of February 2019. Power Delivery of up to 130W when used with compatible Dell systems. ExpressCharge Boost is available on select Dell systems.



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# Fixed Visualization

### Precision 5820 Tower

The Dell Precision 5820 Tower workstation delivers scalable performance for visualization applications, such as:

Dassault Systèmes<sup>®</sup> – SolidWorks<sup>®</sup> Visualize, 3DEXCITE, Autodesk<sup>®</sup> 3ds Max<sup>®</sup>, VRED Siemens PLM Teamcenter<sup>®</sup> Visualization

#### Precision 5820 Tower

Expand your ideas with the Precision 5820 Tower. Featuring high performance in an innovative, versatile compact design and the latest Intel<sup>®</sup> Xeon<sup>®</sup> processors.





HTC Vive Pro Eye<sup>™</sup> Review rendered architectural projects in virtual reality and allow clients to experience a realistic interpretation of the finished product.



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#### **Dell UltraSharp 32 8K Monitor | UP3218K 7680 x 4320 at 60 Hz** A large format monitor with high resolution and color quality, ideal for visualization.



#### Dell Premier Wireless Keyboard and Mouse | KM717

t only will it enhance productivity, but its elegant design will fit into virtually / workspace. For increased productivity you can simultaneously pair up to two mpatible devices with Bluetooth® LE.



#### X-Rite Colorimeter i1Display Pro

Ensure a perfectly calibrated and profiled display to your client's color palette while delivering the speed, options and flexibility needed to maintain color accuracy.



#### 3Dconnexion SpaceMouse Pro

With an advanced ergonomic design on-screen display, SpaceMouse Pro superior comfort and a simpler, mor productive workflow.

and delivers

# Mobile Visualization

# Precision 5750

The Dell Precision 5750 workstation delivers scalable performance for visualization applications, such as:

Dassault Systèmes<sup>®</sup> – SolidWorks<sup>®</sup> Visualize, 3DEXCITE, VRED, Autodesk® 3ds Max<sup>®</sup>, VRED Siemens PLM Teamcenter<sup>®</sup> Visualization

#### Precision 5750 the world's thinnest, lightest and smallest 17" workstation.\* Designed to Impress.

Deliver the power for maximum performance for demanding professional software with 10th Gen Intel<sup>®</sup> Core<sup>™</sup> and Xeon<sup>®</sup>, up to 8-core processors, the performance of your up to NVIDIA<sup>®</sup> Quadro RTX<sup>™</sup> 3000 (6GB) graphics, 64GB of 2933MHz memory (with ECC memory options), 4TBs of storage with RAID options, and also 4 Type C Thunderbolt ports for super fast data transfers.





**HTC Vive Pro**<sup>™</sup>





\*Based on Dell analysis using publicly available data, January 2020. The smallest refers total surface area of the mobile workstations.

#### Engineering and Manufacturing >

You don't have to compromise performance with this small, lightweight workstation. In fact, go ahead and fuel your creative talents and look great while doing it. The 5750 is even Ready for VR and Al.



Dell UltraSharp 32 4K USB-C Monitor | U3219Q Experience outstanding screen performance on this 31.5" 4K USB-C monitor featuring InfinityEdge and multitasking capabilities.

#### **Dell Premier Wireless Keyboard and Mouse | KM717**



#### X-Rite Colorimeter i1Display Pro





**3Dconnexion SpaceMouse Pro** 

#### **Dell Thunderbolt Dock | WD19TB**

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# Architecture, Engineering and Construction (AEC) Workflow

Today's AEC professionals have to wear multiple hats. They need to be able to design and visualize to meet customer needs, become greener, and quickly drive critical business decisions. The challenge is finding the appropriate workstations that support their need for photo-realistic rendering and AR/VR technology, and drive more efficient performance and collaboration.

CONCEPT DESIGN	VISUALIZATION / PRESENTATION	문) ARCHITECTURAL DESIGN	ANALYSIS- STRUCTURAL, LIGHTING	MECHANICAL / ELECTRICAL PLUMBING (MEP)	DOCUMENTATION	CONSTRUCTION PLANNING	BUILDING CONSTRUCT
Quickly evaluate design options and massing studies.	Simulate, share and collaborate visual appearance and ideas.	Define appearance – shape, look and feel.	Analyze structural performance to meet specifications.	SYSTEMS Evaluate performance to meet specifications.	Document to pass on the Construction.	Plan and coordinate building process.	Plan and coordinate building process.
Trimble <sup>®</sup> Sketchup™	Autodesk 3ds Max	Autodesk Revit	Autodesk Revit Structure	Autodesk Revit MEP	Autodesk AutoCAD®	Autodesk NavisWorks	CNC Machining, crea
Autodesk SketchBook® Pro	Autodesk Revit Live	GRAPHISOFT ARCHICAD	Autodesk Advance Steel	Autodesk AutoCAD MEP	GRAPHISOFT® ARCHICAD		paths / additive MFG
Autodesk <sup>®</sup> Formit	Autodesk NavisWorks®	Bentley Microstation	Tekla Structural Designer	Autodesk NavisWorks®	Bentley Microstation		
Insta 360 Pro™	Epic Games	Robert McNeel Associates Rhino®	Bentley Microstation	Trimble <sup>®</sup> PipeDesigner			
Adobe Illustrator®	Unreal Engine		Bentley STAAD.Pro	PipeDesigner			
Grasshopper 3D	Unity 3D		Bentley RAM Steel				
Bentley AECOsim	Chaos Vray						

### See Dell solutions below:

# Architectural Design

Mechanical, Electrical, and Plumbing









# Fixed Architectural Design Precision 3640 Tower

The Dell Precision 3640 Tower workstation saves space and features ISV certification for architectural applications such as:

Autodesk Revit<sup>®</sup>, AutoCAD<sup>®</sup>, GRAPHISOFT<sup>®</sup> ARCHICAD, Bentley Software MICROSTATION, Robert McNeel & Associates Rhino®

#### **Dell Precision 3640 MT**

Unmatched performance and affordability in an expandable mini-tower design that is perfect for engineers working with entry 3D or complex 2D graphics, as well as power users working with large data sets and complicated analysis. Ready for VR.





HTC Vive Pro<sup>™</sup>





#### Dell UltraSharp 27 4K PremierColor Monitor | UP2720Q

Create on your terms with the world's first 27" 4K monitor with built-in colorimeter\* and Thunderbolt<sup>™</sup> 3.

\*With up to 95% coverage of the DCI-P3 color space, based on Dell analysis of publicly available data of competitive monitors, Aug 2019.



#### X-Rite Colorimeter i1Display Pro



# **Dell Premier Wireless Keyboard and Mouse | KM717**



you to stay focused on your project with





# Mobile Architectural Design Precision 5550

The Dell Precision 5550 workstation delivers power with mobility and features ISV certification for architectural applications such as:

Autodesk Revit<sup>®</sup>, AutoCAD<sup>®,</sup> GRAPHISOFT<sup>®</sup> ARCHICAD, Bentley Software, MICROSTATION, Robert McNeel & Associates Rhino®

#### Precision 5550

The redesigned 5550 is the world's smallest 15" mobile workstation\* and is absolutely stunning to look at. Experience better contrast ratios, touch support and picture quality with a 16:10 4-sided InfinityEdge display, up to HDR.





**HTC Vive Pro**<sup>™</sup>

#### X-Rite Colorimeter i1Display Pro

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\*Based on Dell analysis using publicly available data to compare 15" mobile workstations, January 2020. The smallest refers total surface area of the mobile workstations.

#### Architecture, Engineering and Construction >



#### Dell UltraSharp 49 Curved Monitor | U4919DW

Enjoy a revolutionary 49" dual QHD curved monitor with ultra wide views, multitasking features and seamless USB-C connectivity for an immersive work experience.

# Dell Thunderbolt Dock | WD19TB

Via a single cable



# **Dell Premier Wireless Keyboard and Mouse | KM717**



#### Jabra Evolve 75

stay focused on your project with ambient noise

#### Sonnet eGFX Breakaway Box 550 | **US Only**

rendering speeds, connect to 8K or 4K





# Fixed MEP

### Precision 5820 Tower

The Dell Precision 5820 Tower workstation delivers performance and reliability for MEP and HVAC applications, such as:

Autodesk<sup>®</sup> Revit<sup>®</sup> MEP, AutoCAD<sup>®</sup> MEP, Navisworks<sup>®</sup>, Trimble<sup>®</sup>, PipeDesigner<sup>™</sup>, DuctDesigner<sup>™</sup>, and a 4K Display.

#### Precision 5820 Tower

Perfected to your vision. Expand your ideas with the Precision 5820 Tower and the latest Intel<sup>®</sup> Xeon<sup>®</sup> processors. Featuring high performance in an innovative, versatile compact design.





3Dconnexion SpaceMouse Wireless patented 6-Degrees-of-Freedom (6DoF)





#### Dell UltraSharp 27 USB-C Hub Monitor | U2721DE Get a stable, wired connection to your network and peripherals on this sleek 27" QHD hub monitor with RJ45, USB-C and a host of other ports.

Dell Premier Wireless Keyboard and Mouse | KM/1/



# Mobile MEP Precision 7550

The Dell Precision 7550 workstation delivers performance and reliability for MEP and HVAC applications, such as:

Autodesk<sup>®</sup> Revit<sup>®</sup> MEP, AutoCAD<sup>®</sup> MEP, Navisworks<sup>®</sup>, Trimble<sup>®</sup>, PipeDesigner<sup>™</sup>, DuctDesigner<sup>™</sup>, and a 4K Display.

#### **Dell Precision 7550**

The newly designed 15" mobile workstation is small enough to fit inside the previous generation, yet brings even more performance with the latest Intel<sup>®</sup> Core<sup>™</sup> or Xeon<sup>®</sup> processors, up to NVIDIA<sup>®</sup> Quadro RTX<sup>™</sup> 5000 graphics, scalable and fast storage (6TB) and memory (128GB, 2933MHz) options and an advanced thermal design to keep the system cool while hard at work.





3Dconnexion SpaceMouse Wireless

#### Architecture, Engineering and Construction >



Dell UltraSharp 38 Curved Monitor | U3818DW Enjoy expansive views, incredible visuals and improved multitasking with this 38" curved monitor with an InfinityEdge display.

#### Dell Performance Dock | WD19DC









# **Fixed Structural** Engineering

Precision 5820

The Dell Precision 5820 Tower workstation delivers scalable performance and reliability for structural engineering applications, such as:

AutoCAD<sup>®</sup> Revit<sup>®</sup> Structure, Advance Steel, Tekla<sup>®</sup> Structural Designer, Bentley Software MICROSTATION, STAAD.Pro, RAM<sup>®</sup> Steel.

#### **Precision 5820 Tower**

Perfected to your vision. Expand your ideas with the Precision 5820 Tower and the latest Intel<sup>®</sup> Xeon<sup>®</sup> processors. Featuring high performance in an innovative, versatile compact design.





3Dconnexion SpaceMouse Pro





#### Dell UltraSharp 27 USB-C Hub Monitor | U2721DE

Get a stable, wired connection to your network and peripherals on this sleek 27" QHD hub monitor with RJ45, USB-C and a host of other ports.

#### Dell Premier Wireless Keyboard and Mouse | KM/1/



# Mobile Structural Engineering Precision 5750

The Dell Precision 5750 workstation delivers scalable performance and reliability for structural engineering applications, such as:

AutoCAD<sup>®</sup> Revit<sup>®</sup> Structure, Advance Steel, Tekla<sup>®</sup> Structural Designer, Bentley Software MICROSTATION, STAAD.Pro, RAM<sup>®</sup> Steel.





**3Dconnexion SpaceMouse Pro** With an advanced ergonomic design and productive workflow.

\*Based on Dell analysis using publicly available data to compare 17" mobile workstations, January 2020. The smallest refers total surface area of the mobile workstations.

#### Architecture, Engineering and Construction >

#### **Dell Precision 5750**

This all-new 17" mobile workstation is the smallest, thinnest and lightest in its class.\* Immerse yourself into the 16.10 4-sided InfinityEdge display, up to HDR400, while working away on the elegant keyboard and large touchpad. This system is just over 4.7lbs, yet has the power to be Ready for VR.





Dell UltraSharp 32 4K USB-C Monitor | U3219Q Experience outstanding screen performance on this 31.5" 4K USB-C monitor featuring InfinityEdge and multitasking capabilities.

#### Dell Thunderbolt Dock | WD19TB





# Fixed Visualization

# Precision 7820 Tower

The Dell Precision 7820 Tower workstation delivers scalable performance for visualization applications, such as:

Dassault Systèmes® SolidWorks® Visualize, 3DEXCITE, Autodesk<sup>®</sup> 3ds Max<sup>®</sup>, VRED, Siemens PLM Teamcenter<sup>®</sup> Visualization.



#### **Precision 7820 Tower**

Push your ideas beyond boundaries with the Precision 7820 Tower. Featuring a dual-socket architecture for maximum performance in a compact design. It is ready for emerging applications, like AI and VR.





#### **HTC Vive Pro Eve**<sup>™</sup>







X-Rite Colorimeter i1Display Pro





# Mobile Visualization

# Precision 7750

The Dell Precision 7750 mobile workstation delivers scalable performance for visualization applications, such as:

Dassault Systèmes<sup>®</sup> SolidWorks<sup>®</sup> Visualize, 3DEXCITE, Autodesk<sup>®</sup> 3ds Max<sup>®</sup>, VRED, Siemens PLM Teamcenter<sup>®</sup> Visualization.

#### **Dell Precision 7750**

The newly designed 17" mobile workstation is also small enough to fit inside the previous generation, yet brings even more performance with the latest Intel<sup>®</sup> Core<sup>™</sup> or Xeon<sup>®</sup> processors, up to NVIDIA<sup>®</sup> Quadro RTX<sup>™</sup> 5000 graphics, scalable and fast storage (8TB) and memory (128GB, 2933MHz) options and an advanced thermal design to keep the system cool while running the most intensive applications.





HTC Vive Pro Eye Review rendered architectural

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Dell Premier Wireless Keyboard and Mouse | KM717



Architecture, Engineering and Construction >





#### Dell UltraSharp 32 4K USB-C Monitor | U3219Q

Experience outstanding screen performance on this 31.5" 4K USB-C monitor featuring InfinityEdge and multitasking capabilities.







#### **3Dconnexion SpaceMouse Pro** With an advanced ergonomic design more productive workflow.

#### X-Rite Colorimeter i1Display Pro

profiled display to your client's color

#### **Dell Performance Dock | WD19DC**



