NVIDIA®

CUDA Conference

Walter Mundt-Blum

March 6th, 2008

NVIDIA

NVIDIA's Businesses

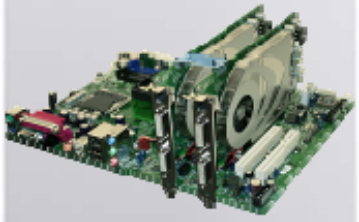
Multiple Growth Engines

GPU

Graphics Processing Units

MCP

Media and Communications Processors



PESG

Professional Embedded & Solutions Group

Consumer Electronics

Handheld GPU

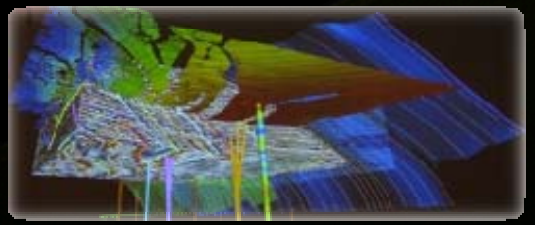

NVIDIA
Build for Professional

NVIDIA Quadro

- 15,000 person years of professional GPU experience
- 200 engineers dedicated to applications
- 13 Million Quadros shipped
- $1B invested each year in GPU development – the most advanced processors on earth



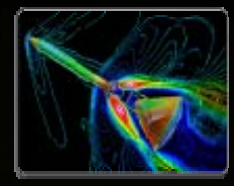



NVIDIA GPU Families

Consumers:
Entertainment

Professionals:
HPC



Professionals:
Design & Creation

NVIDIA Quadro NVS

Professional 2D
Corporate
Server

NVIDIA Quadro FX

Core Technical 3D
WS Applications

Industry Solutions

Quadro SDI
Quadro G-Sync
Quadro Plex
Middleware

NVIDIA Quadro
Delivering the broadest range of Professional Graphics Solutions

#1 Brand of Professional Graphics Solutions

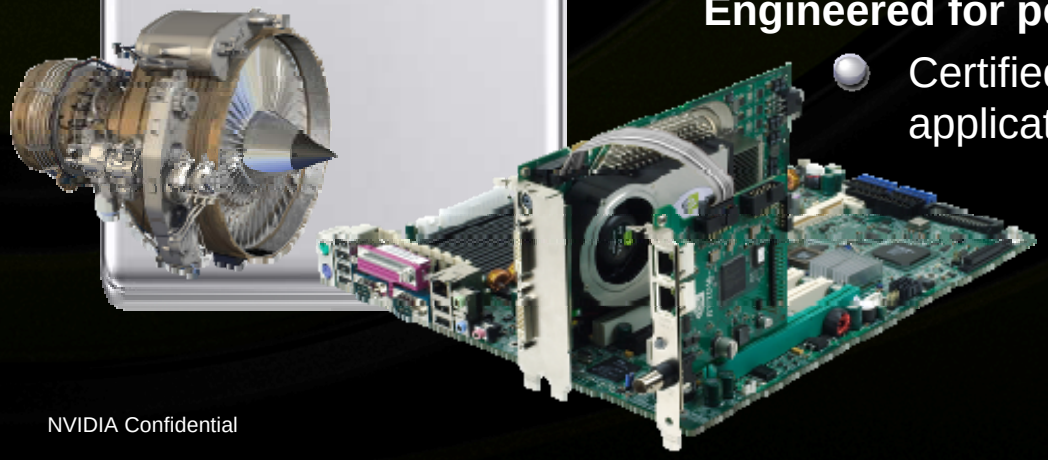
- **~ 80% Market Share units / +80% Revenue**

Powering the most advanced solutions in the world

- Visualization Centers – Aerospace and Automotive
- Medical Imaging – Mass General
- Scientific Computing
- Digital Film Production
- HD Broadcast Graphics
- MCAD for Automotive, Aerospace & Oil & Gas

Engineered for performance and quality

- Certified on all leading professional applications



Unified Architecture Quadro Family

NVIDIA

NVIDIA Quadro FX 5600

+ 2x Frame Buffer – 1.5GB

NVIDIA Quadro FX 4600

NVIDIA Quadro FX 3700

+ 1.5x Frame Buffer (768MB)
+ SDI/Genlock/Framelock

NVIDIA Quadro FX 1700

+ Stereo Connector
+ SLI
+ 1.3x Performance

NVIDIA Quadro FX 570

+ 2x Frame Buffer (512MB)
+ HD Video Connector
+ 1.3x Performance

NVIDIA Quadro FX 370

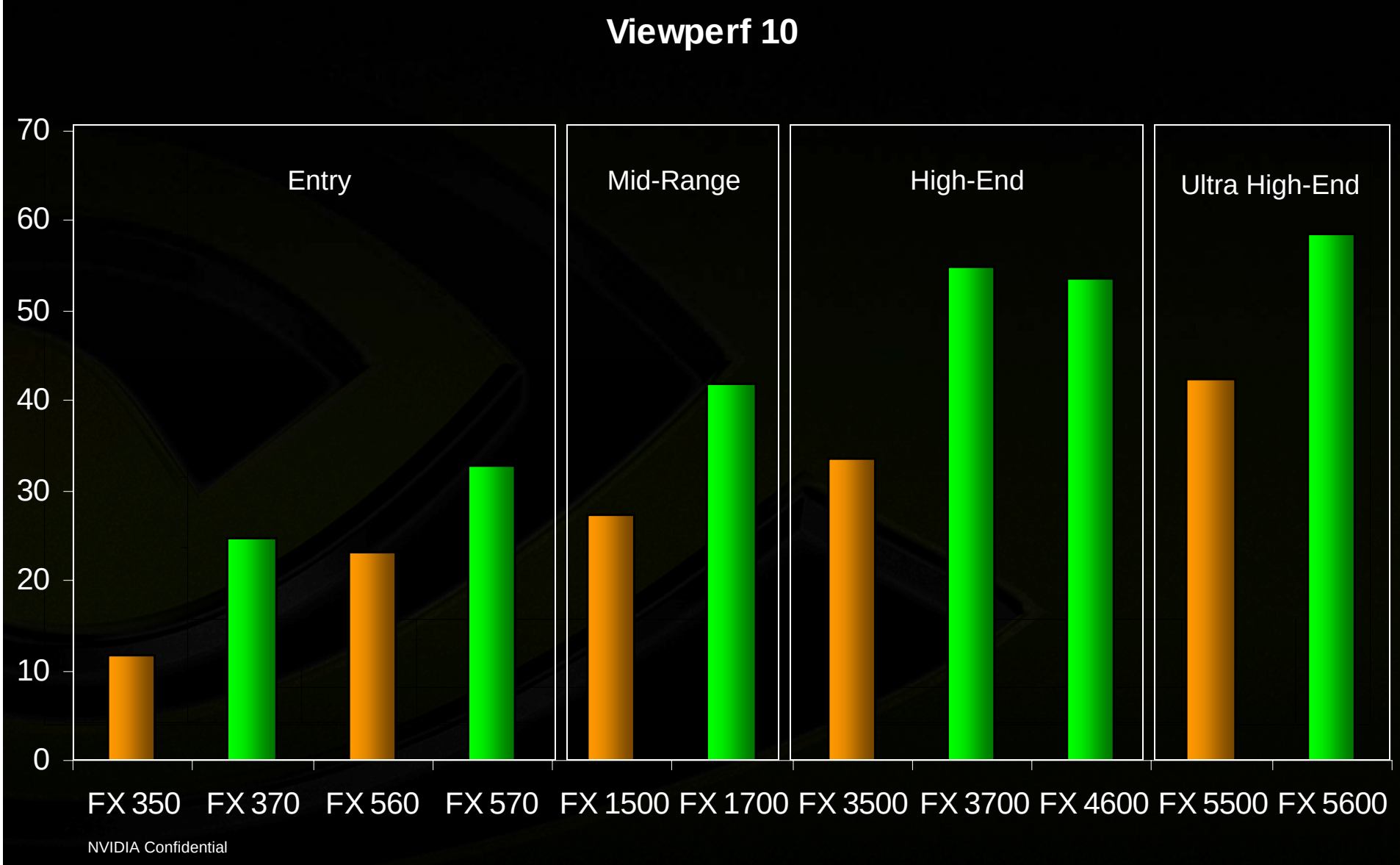
+ Dual Dual Link DVI
+ 1.3x Performance

Pro 3D

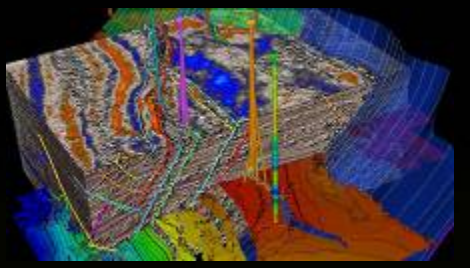
Pro 2D

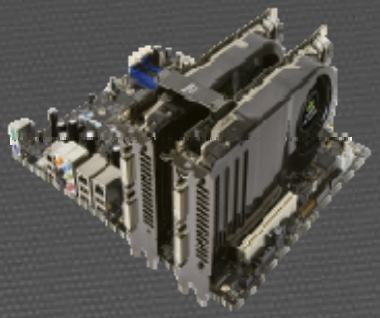
NVIDIA Quadro NVS 290

Exceptional Performance

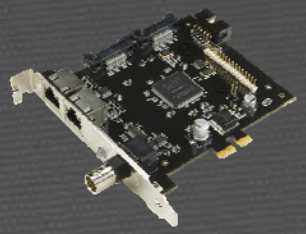


Best-of-class Industry Solutions

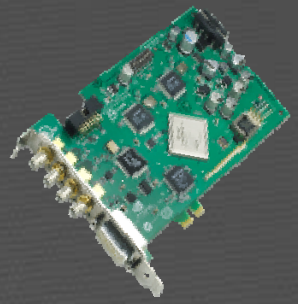




NVIDIA
SLI



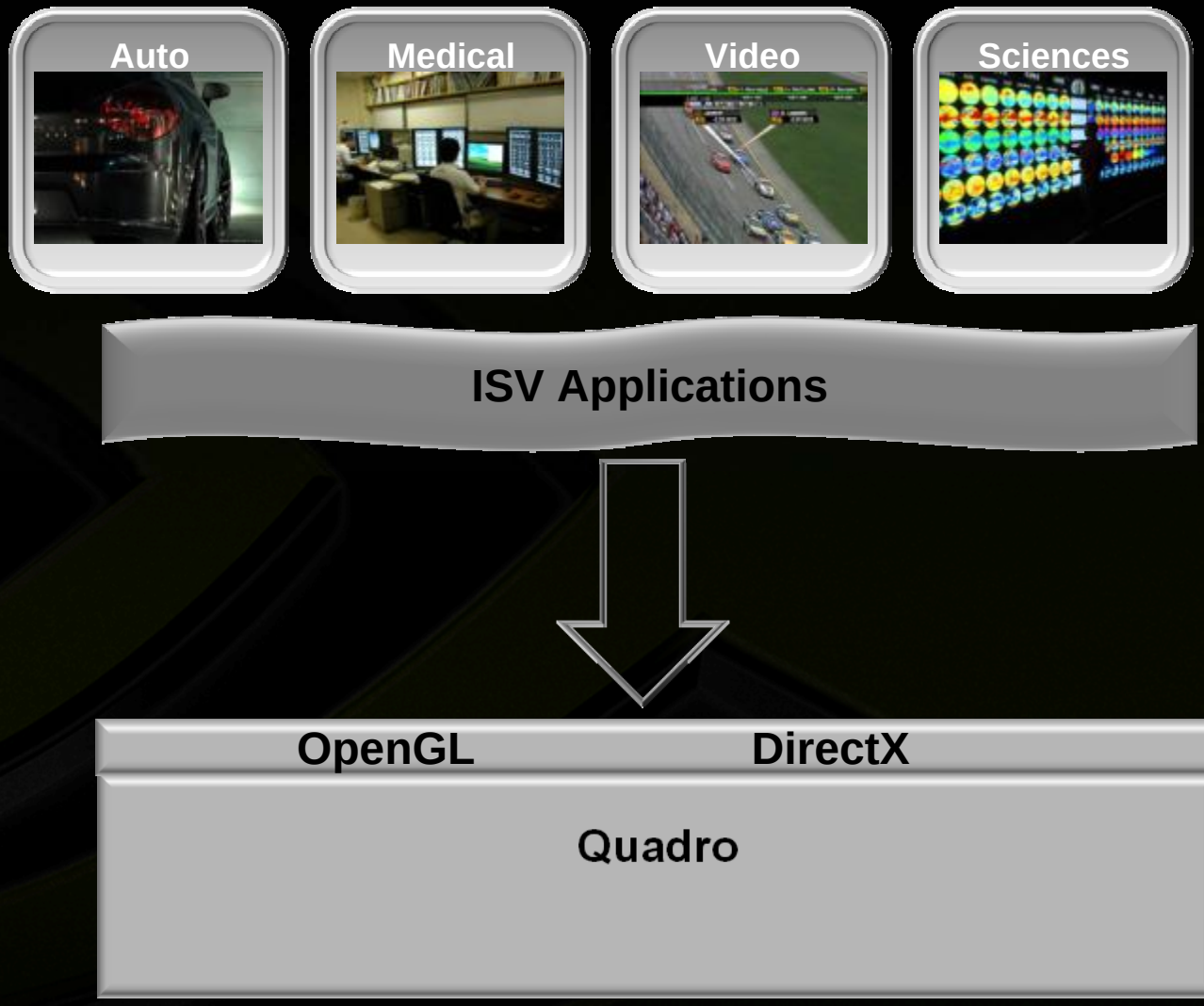
NVDIA
G-Sync II



NVIDIA
HD SDI

NVIDIA
Quadro Plex VCS

1.0 Quadro Component Sales



CATIA Features

- Breakthough, Realistic Rendering within the CATIA viewport
- CgFX Shader Integration
- CgFX Shader Creation Tools (Programmers, Artists, and “average” CATIA operators)
- Enables accelerated time to market throughout upstream and downstream production development

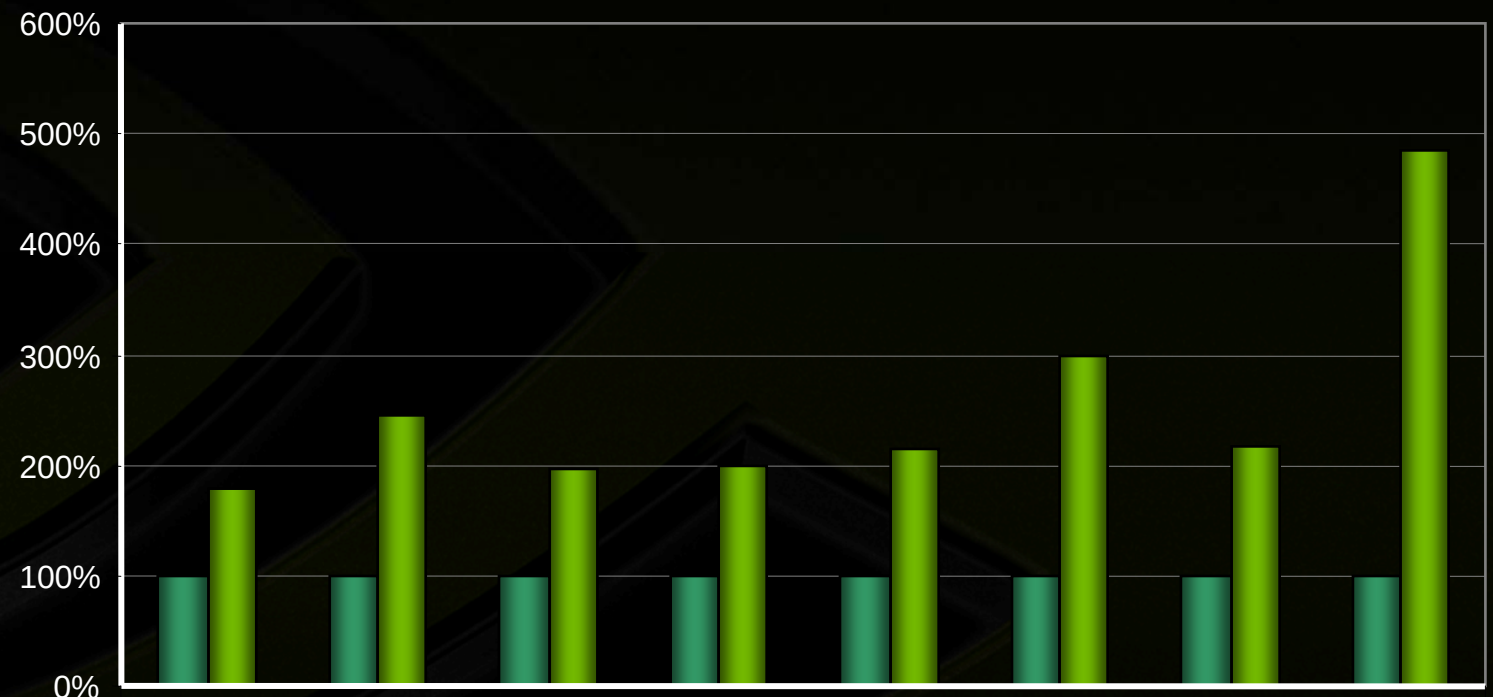
NVIDIA Quadro Application Configuration Engine (ACE)

- Graphics hardware and applications automatically configured for maximum application performance and “correctness”
  - Manual user interaction no longer required
- Available even when multiple applications are running (e.g. Studio Tools + CATIA)
- Driver automatically detects the application and sets the appropriate application profile.
- Available with Windows Vista since July 07; Windows XP since November 07

NVIDIA Quadro FX

Architected for Workstation Performance

Relative Performances of NVIDIA Quadro FX vs. GeForce equivalent (at same clock/power budget)



	3dsmax-03	catia-01	ensight-01	light-07	maya-01	proe-03	sw-01	ugs-04
GeForce equivalent	100%	100%	100%	100%	100%	100%	100%	100%
NVIDIA Quadro FX	178%	246%	196%	200%	214%	298%	216%	484%

AutoCAD System Requirements:

Autodesk Recommends a Professional-Class GPU

AutoCAD

Features & Specifications

Features

1024x768 VGA Adapter

White Papers

Read white papers on a variety of AutoCAD® software topics and features.

- Microsoft® Windows Vista™, Windows® XP Home and Professional (SP2), Windows® 2000 (SP4)
- 512 MB RAM
- 750 MB free disk space for installation
- 1024x768 VGA with True Color

OpenGL or DirectX capable Workstation Graphics Class card (NVIDIA Quadro)

The System requirements for Windows Vista or 3D modeling (32 and 64-bit AutoCAD)

- Intel® 3.0 GHz or greater
- 2 GB RAM or greater
- 2 GB free hard disk available not including installation
- 1280 x 1024 32-bit color video display adapter (True Color) 128 MB or greater, OpenGL®, or Direct3D® capable workstation class graphics card.
- For Windows Vista, a Direct3D capable workstation class graphics card with 128 MB or greater is required.

Get information on graphics hardware certified for use with AutoCAD 2008.

⊞ Windows Vista
⊞ Windows Vista 64-bit

NVIDIA - NVIDIA Quadro FX 350M
6.14.0010.8469
⊞ Windows XP
⊞ Windows 2000

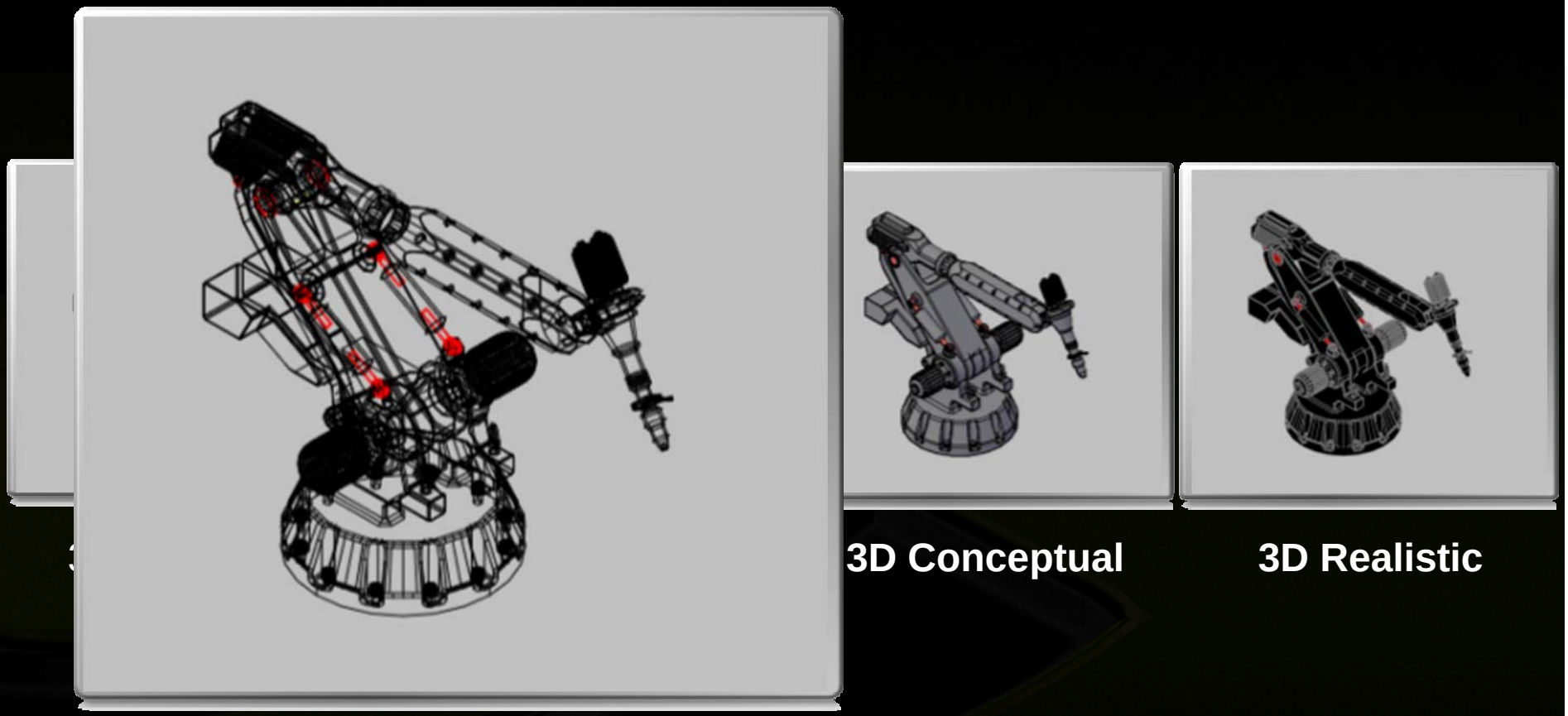
NVIDIA - NVIDIA Quadro FX 360M
6.14.0011.119
⊞ Windows XP
⊞ Windows 2000

NVIDIA - NVIDIA Quadro FX 370
6.14.0011.6262
⊞ Windows XP
⊞ Windows 2000
⊞ Windows XP 64-bit
7.15.0011.6262
⊞ Windows Vista
⊞ Windows Vista 64-bit

NVIDIA - NVIDIA Quadro FX 4500
6.14.0010.9136
⊞ Windows XP
⊞ Windows 2000
⊞ Windows XP 64-bit
6.14.0011.6250
⊞ Windows XP
⊞ Windows 2000
⊞ Windows XP 64-bit

Unprecedented Performance & Quality

Get the Most Out of All AutoCAD Visual Styles

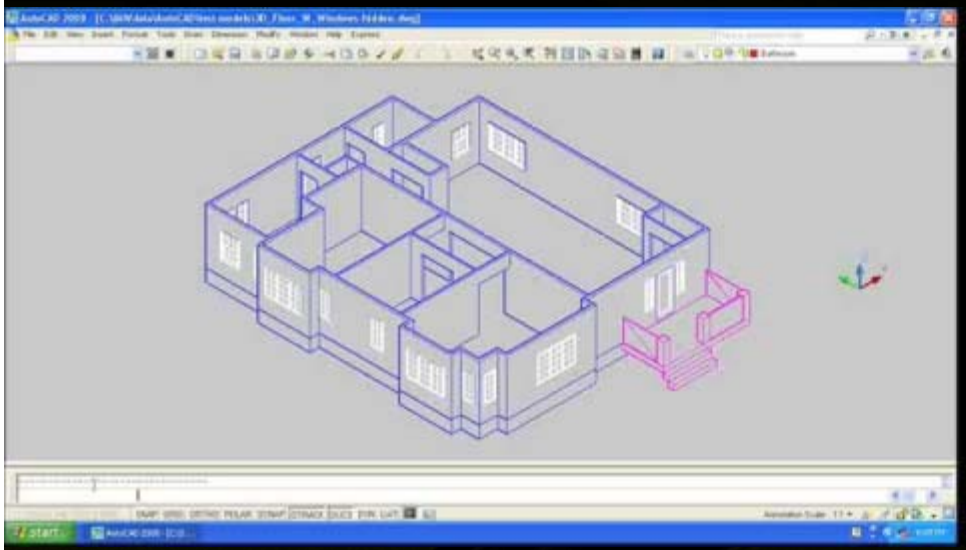


3D Conceptual

3D Realistic

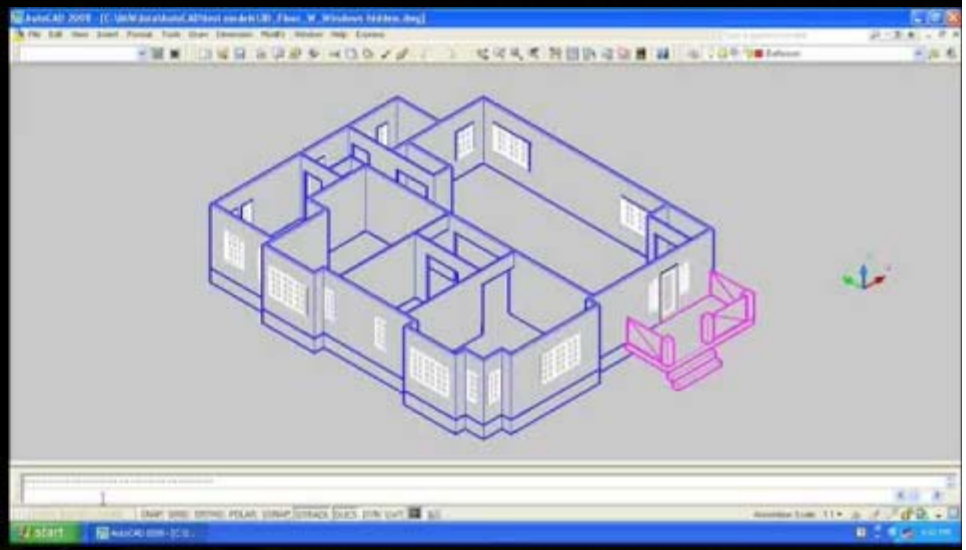
AutoCAD 3D Hidden Visual Style

Quadro Delivers Up to 3X Performance Increase



Consumer Graphics

GeForce 8600 GTS



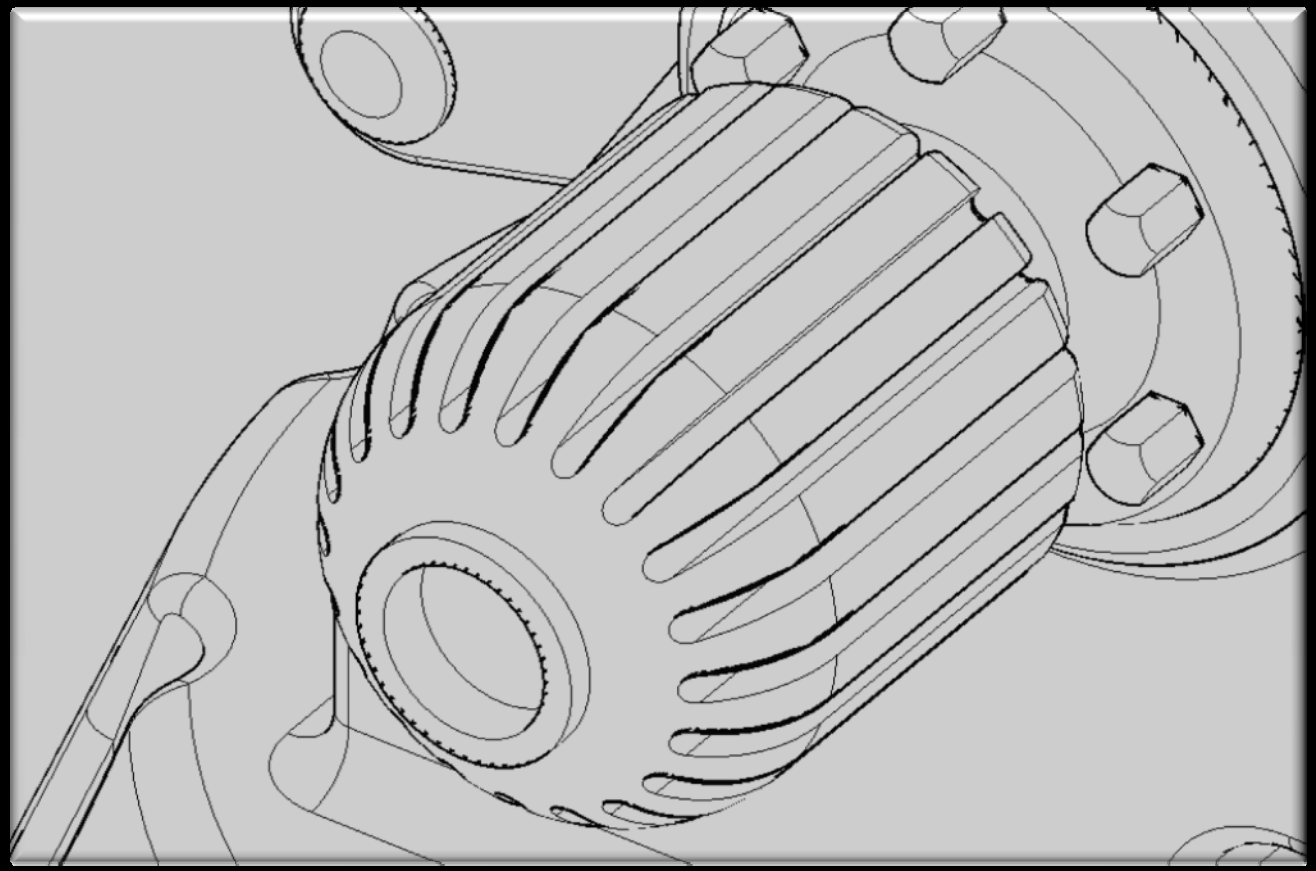
Professional Graphics

Quadro FX 370

Superior Image Quality

Dramatically Higher Image Quality with AutoCAD

Smooth Lines

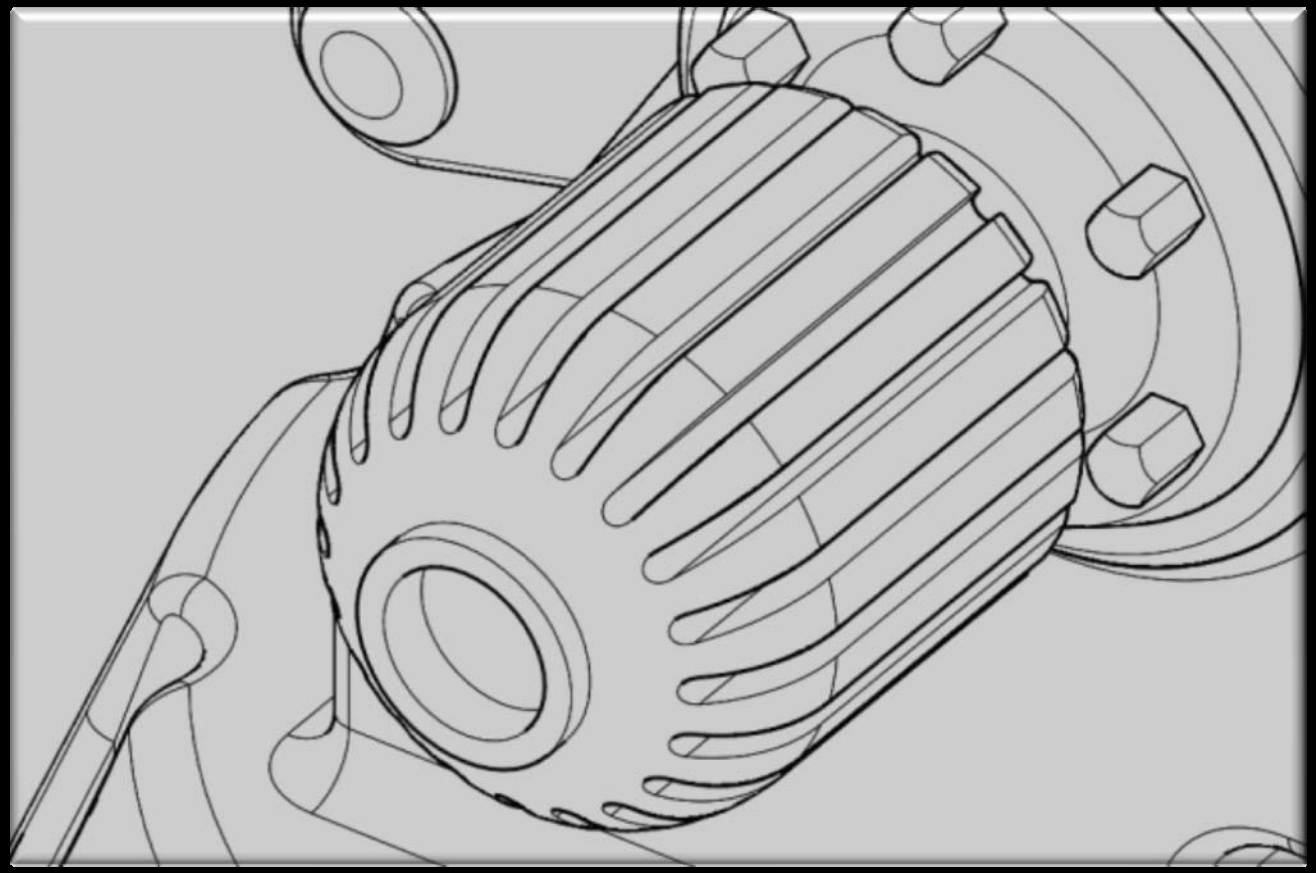


Consumer Graphics with out smooth lines

Superior Image Quality

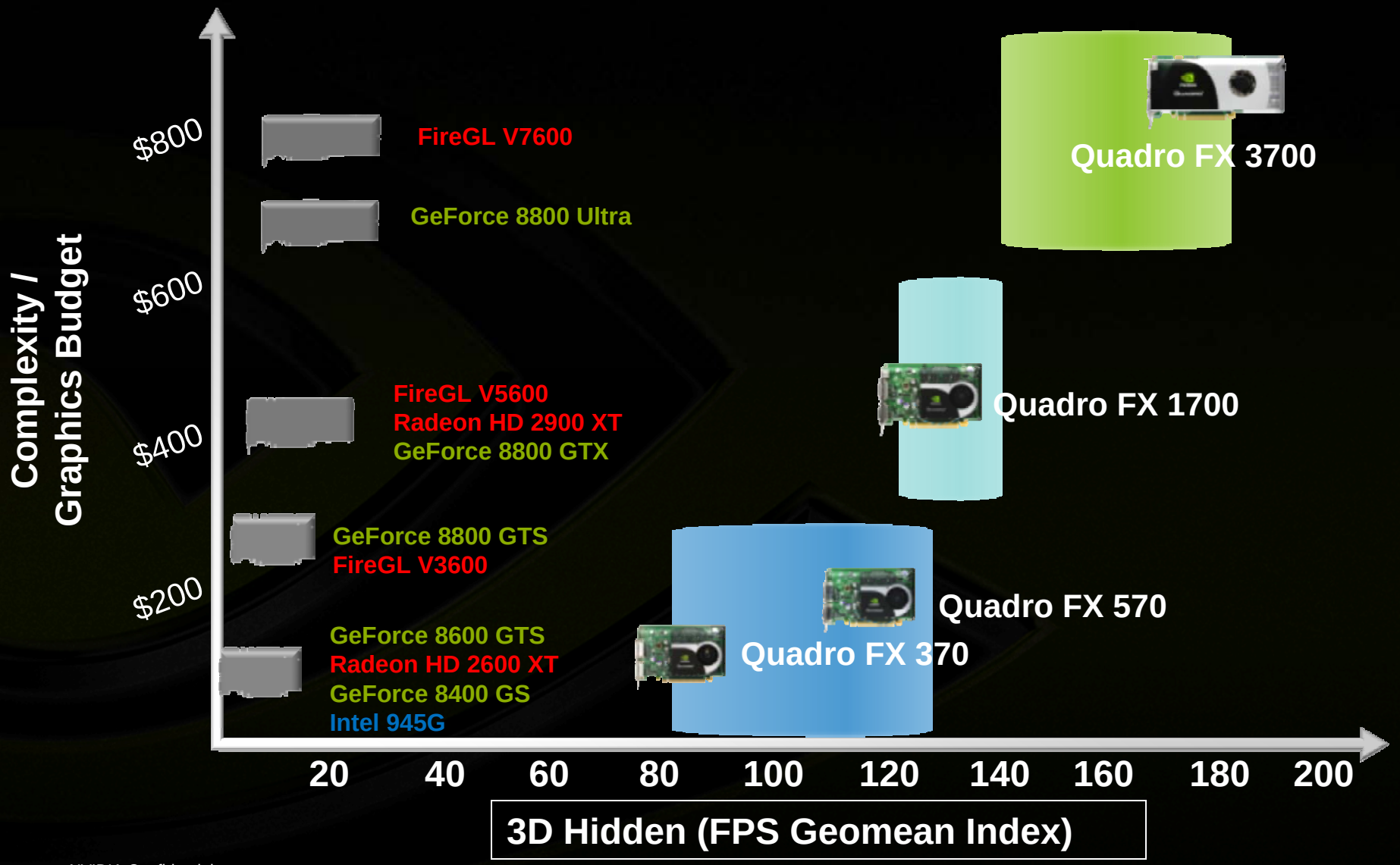
Dramatically Higher Image Quality with AutoCAD

Smooth Lines



Professional Graphics with smooth lines

Performance for Every User



AutoDesk “GStest”

NVIDIA Quadro®

Range of Professional Graphics Solutions

Mobile/Notebook

Desktop

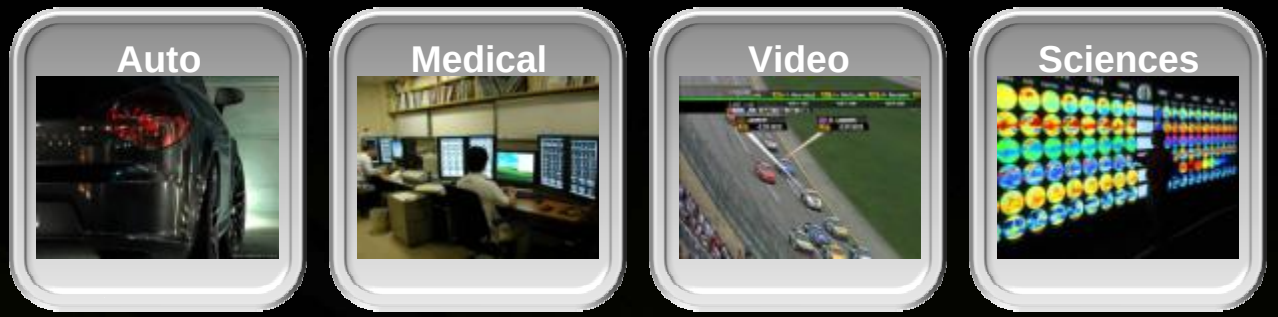
Power Desk Side

Remote Desktop Blades

Remote Graphics Servers

Images courtesy of Softimage Co. and Avid Technology Inc., model provided by Acony

2.0 Quadro Platform



Solutions Enablement: DevRel / Apps Engr

ISV Applications

NVSG	CUDA	Reality Server	Mental Ray	Mental Mill	PhysX

Cg	Plex	SDI	GSync	SLI

Quadro

Platform 1: Automotive Design

Solutions Enablement: DevRel / Apps Engr

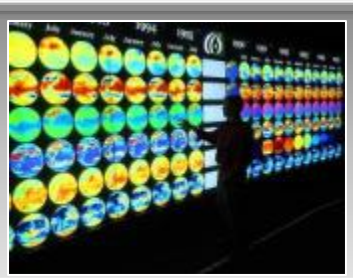
AutoDesk Showcase & RTT DeltaGen

NVSG	CUDA	Reality Rerver	Mental Ray	Mental Mill	PhysX

Cg	Plex	SDI	GSync	SLI

Quadro

Platform 2: Sciences



Solutions Enablement: DevRel / Apps Engr

Oak Ridge National Labs (ORNL)
CEI Ensight

NVSG	CUDA	Reality Server	Mental Ray	Mental Mill	PhysX

Cg	Plex	SDI	GSync	SLI

Quadro

Platform 3: Broadcast

Solutions Enablement: DevRel / Apps Engr

SportVision - NASCAR

NVSG	CUDA	Reality Server	Mental Ray	Mental Mill	PhysX
Cg	Plex	SDI	GSync	SLI	

Quadro

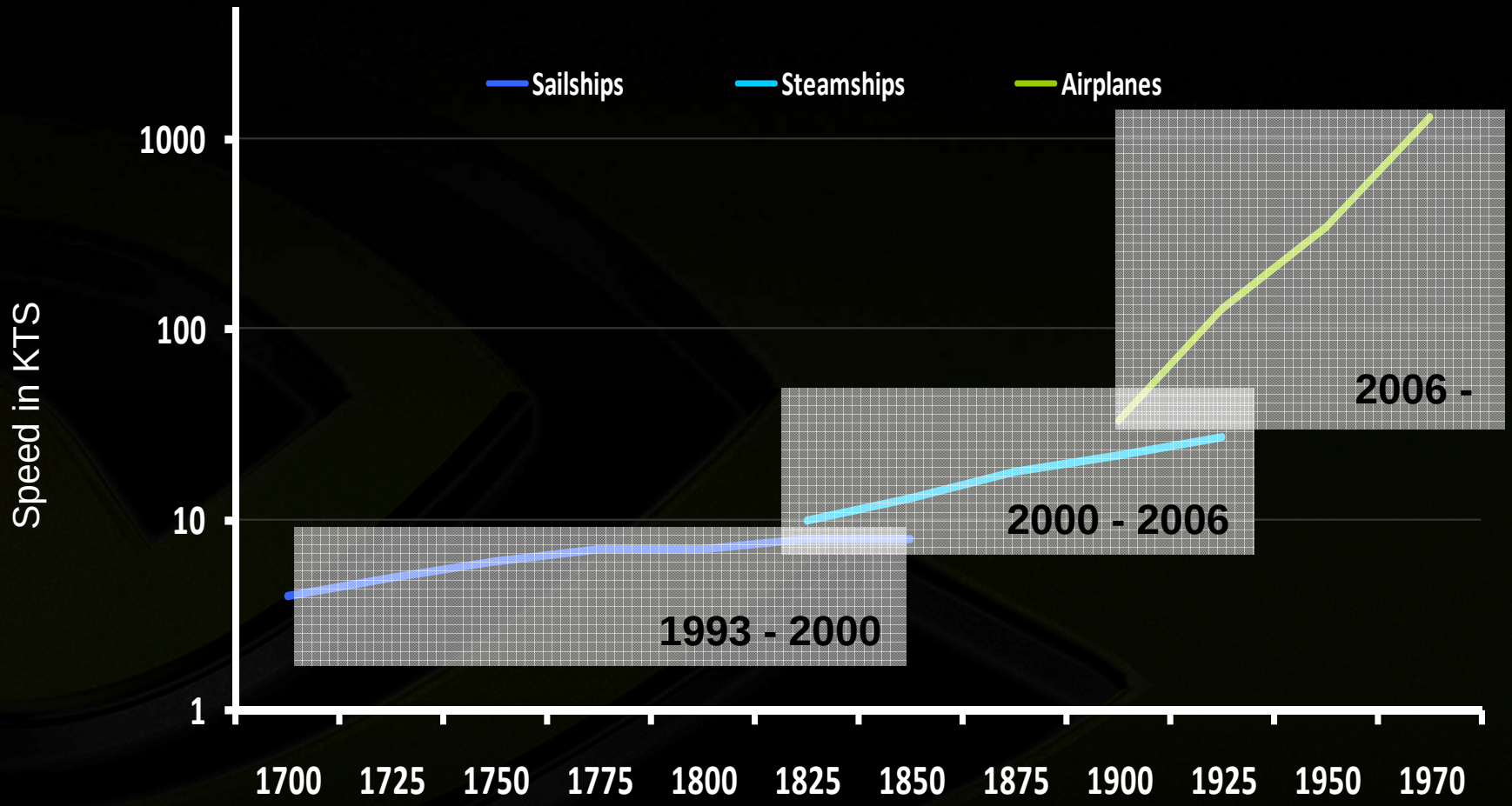
DraftTrack: Navier-Stokes meets NASCAR

- Calculation of real-time air flows at *200* MPH
- Previously impossible -- hours to run on high-performance cluster
- Developed by 2 Univ of Washington grad students, presented SIGGRAPH 06

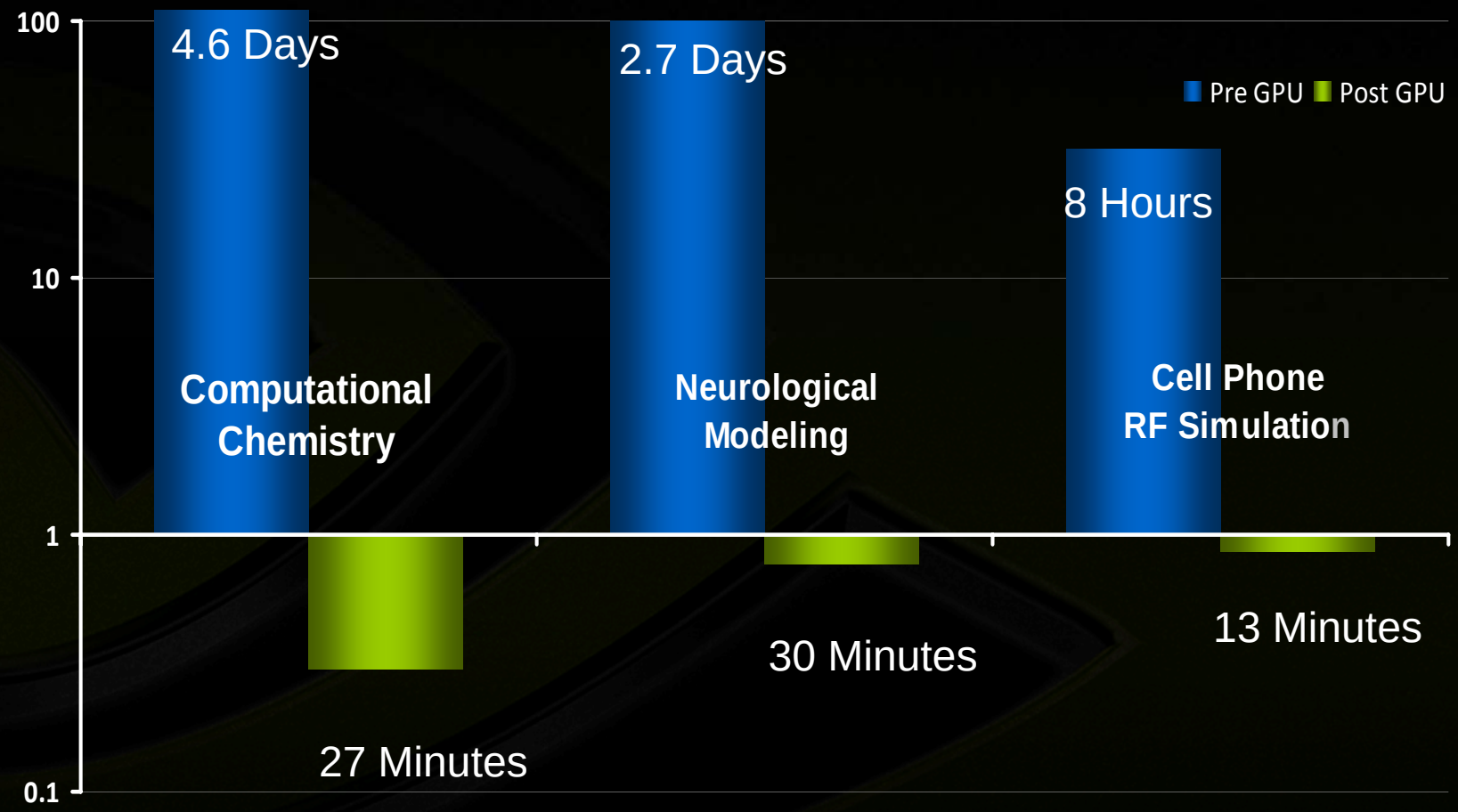
NVIDIA®

GPU Computing vs GPGPU

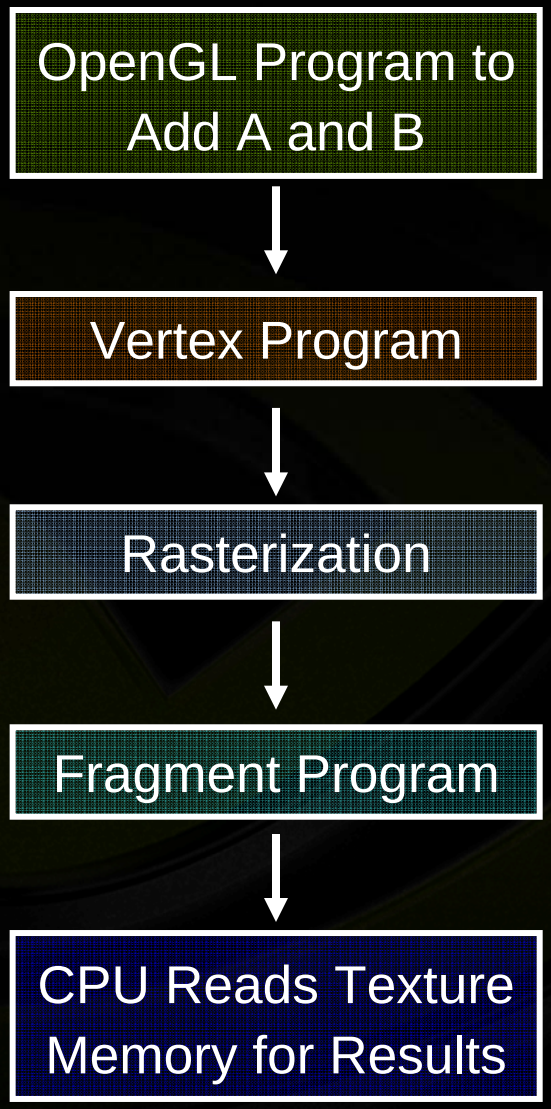
Transportation Discontinuity



Time to Discovery



Streaming GPGPU Programming



Start by creating a quad

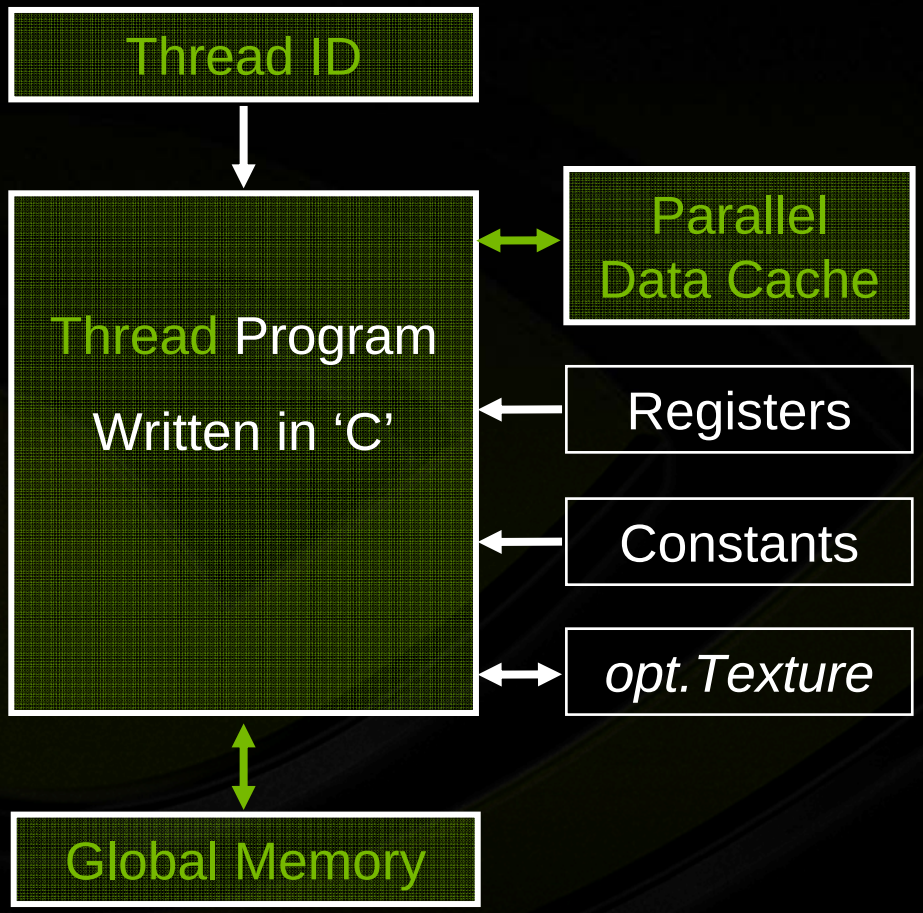
"Programs" created with raster operation

Read textures as input to OpenGL shader program

Write answer to texture memory as a "color"

All this just to do A + B

New GPU Computing Model



- Dedicated computing mode
- Thread programs use 'C'
- On-chip shared memory
- General load/store

Areas of CUDA use

- Oil and Gas (seismic)
- Financial (risk modeling)
- Medical (3D X-Ray Imaging)
- Automotive & Aerospace (Crash + CFD Simulation)
- Manufacturing (CAD + Design)
- Video (Encoding, Augmented Technology)

Design

Real Time Ray Tracing on a Single WS

Fluid Simulation

CAD Simulation

Augmented Technology

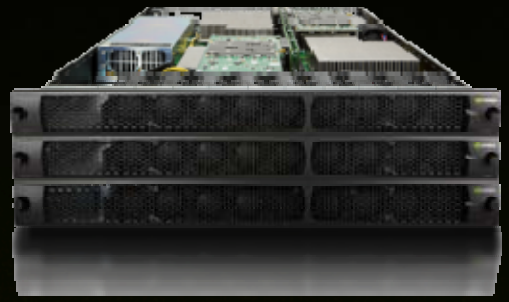

NVIDIA
HPC Hardware

NVIDIA Tesla®

Introduces complete Range of Professional Graphics Solutions

Desktop

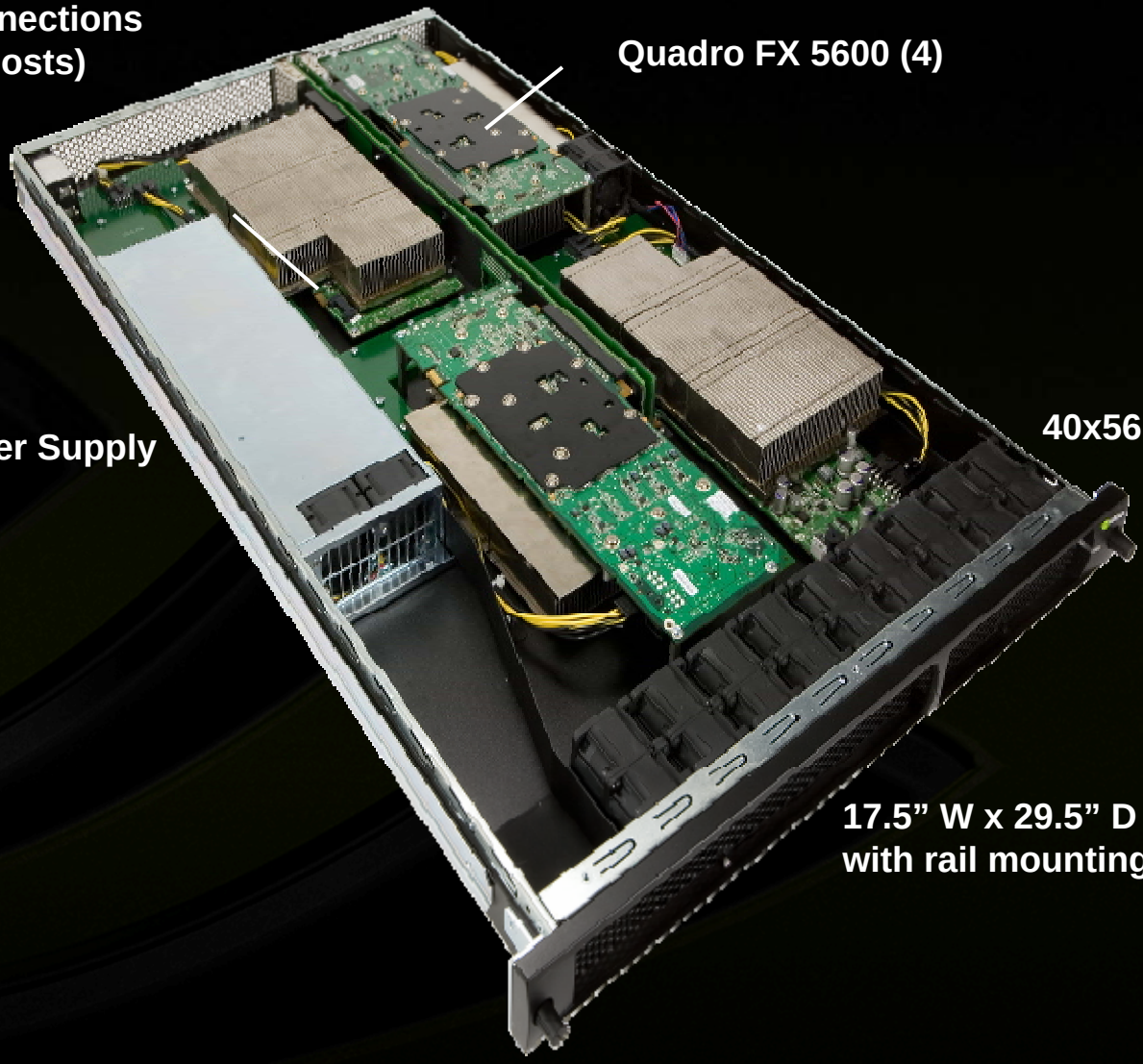
Power Desk Side



Remote Graphics Servers

Images courtesy of Softimage Co. and Avid Technology Inc., model provided by Acony Games.

Quadro Plex Model S4 Graphics Server



Gen 2 PCI Express Switch Connections (1 or 2 Hosts)

Quadro FX 5600 (4)

110-220VAC

Power Supply

40x56mm Fans

17.5” W x 29.5” D x 1U Chassis with rail mounting

NVIDIA®

Thank You!