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CATIA V5 Machining Solutions
Taking productivity to a higher level…….

Steve Ward – IBM PLM Solutions
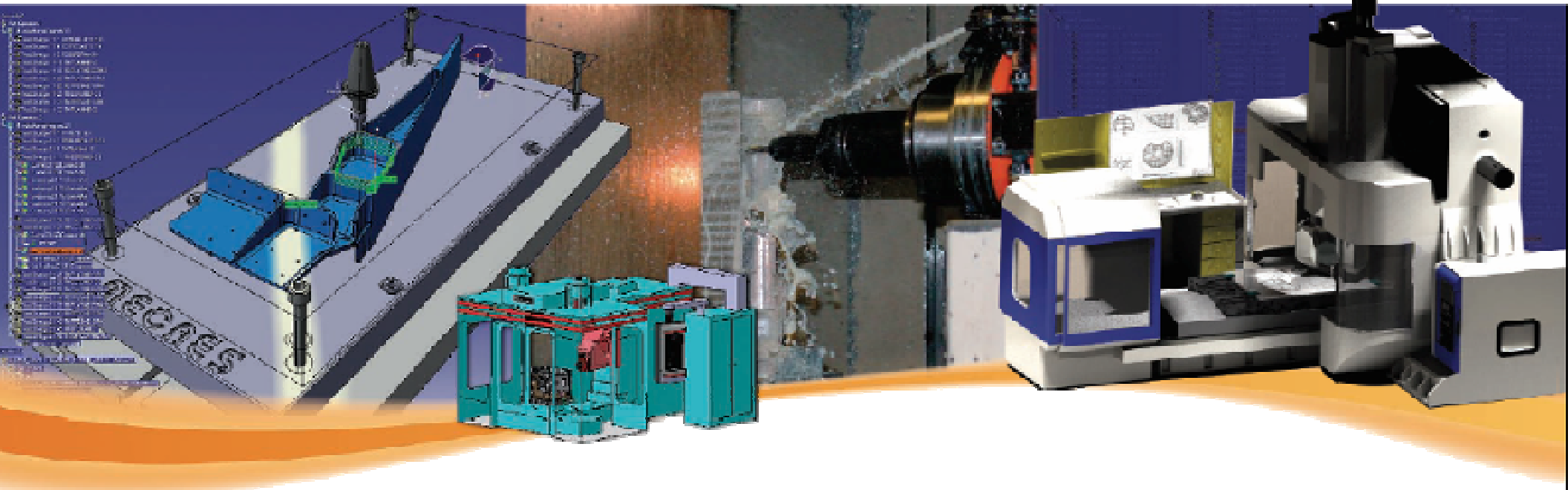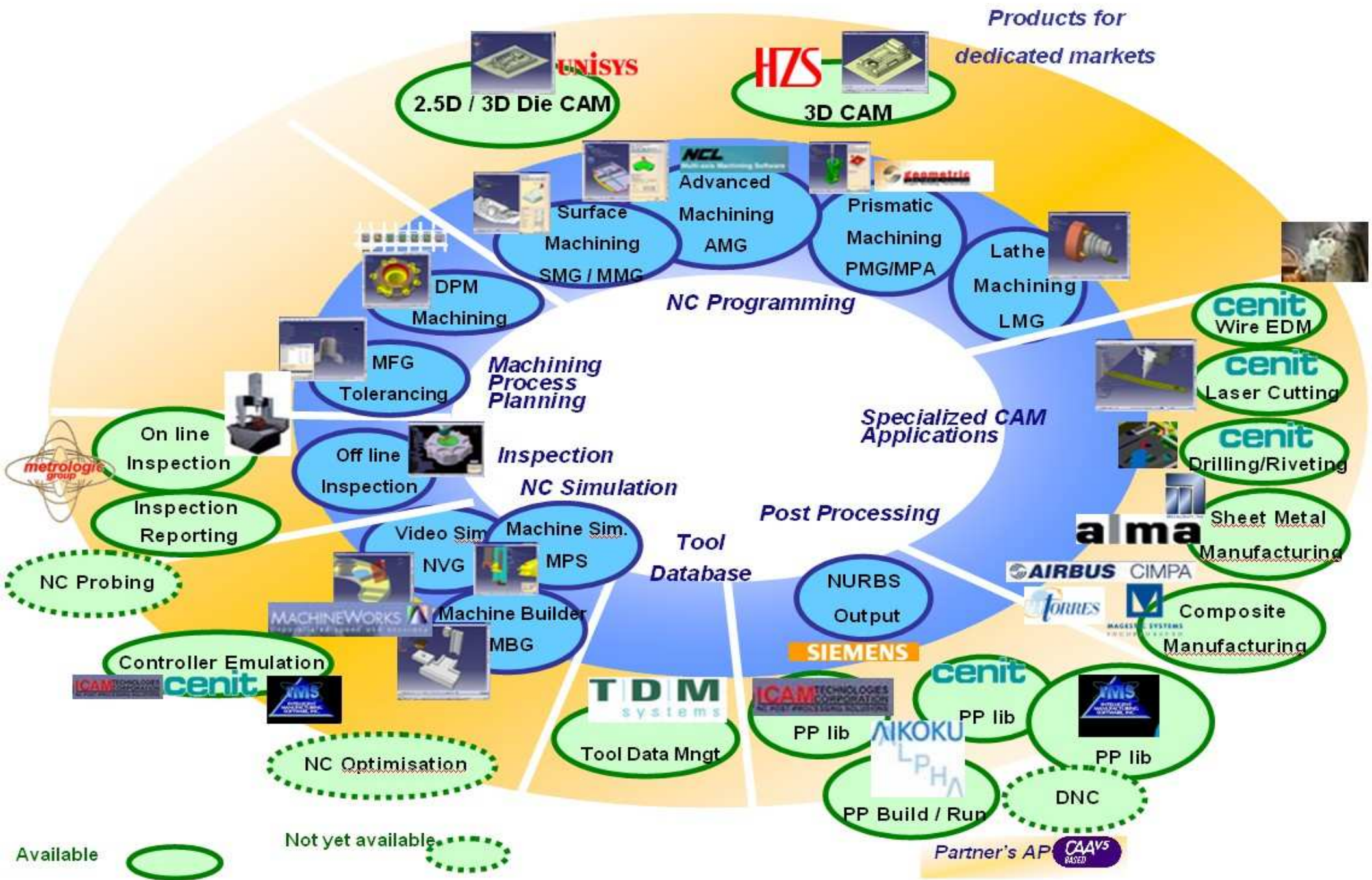**27th September 2007**

3DS
CATIA

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CATIA V5 Machining

Products for dedicated markets

2.5D / 3D Die CAM — uNISYS

HZS — 3D CAM

NC Programming

Surface Machining SMG / MMG

Advanced Machining AMG — NCL

Prismatic Machining PMG/MPA — geometric

Lathe Machining LMG

DPM Machining

MFG Tolerancing

Machining Process Planning

cenit — Wire EDM

cenit — Laser Cutting

cenit — Drilling/Riveting

On line Inspection — metrologic group

Off line Inspection

Inspection

Specialized CAM Applications

Sheet Metal Manufacturing — alma

Inspection Reporting

NC Simulation

Post Processing

AIRBUS CIMPA

TORRES MAGESTIC SYSTEMS

NC Probing

Video Sim. NVG

Machine Sim. MPS

Tool Database

NURBS Output

Composite Manufacturing

Machine Builder MBG

SIEMENS

cenit — PP lib

Controller Emulation — ICAM cenit IMS

NC Optimisation

TDM systems — Tool Data Mngt

ICAM — PP lib

AIKOKU ALPHA

IMS — PP lib

DNC

PP Build / Run

Partner's API — CAAV5 BASED

Available

Not yet available

1 CATIA V5 Machining | Overview - What is it?

■ A CATIA V5 Fundamental :

– Natively integrated in V5 architecture

– Available through family of dedicated applications

■ A comprehensive set of capabilities allowing to support a fully integrated and collaborative 3D product design, tooling design and machining preparation and simulation environment:

– Use a wide set of machining applications (from 2 ½-Axis including Lathe up to advanced 5-Axis)

– Capture corporate process knowledge

– Integrate a high level of automation & standardization
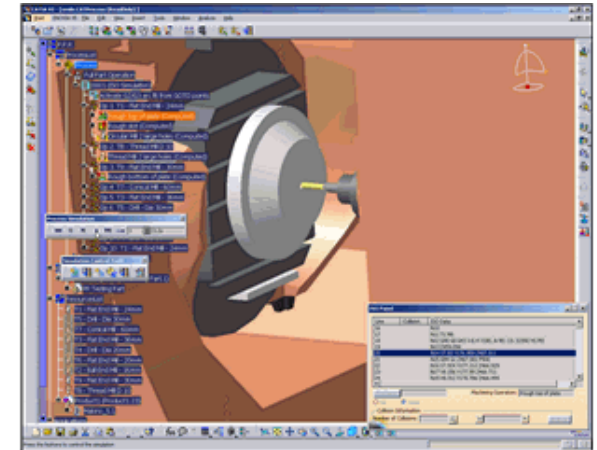
1 CATIA V5 Machining | Overview - What is it?

Answer to Key Customer Challenges

- **Develop Competitive Advantage - "Differentiate" :**
  - Manufacture and simulate in one PLM integrated environment
  - Single CAM system covering a wide set of machining applications
  - Capture corporate process knowledge to run user's best practices
  - High level of automation and standardization
- **Reduce Product Development Cycle - "Be faster" :**
  - Create and re-use generic machining processes
  - Simulate and validate early in the process
  - Part correctly machined the first time without any collision
- **Reduce Product Development Costs - "Be more efficient" :**
  - Improved quality of finished parts
  - Decrease programming time thanks to associativity between Design and Manufacturing
- **Extend Business Volume - "Grow" :**
  - Plan, detail, simulate and optimize machining activities to build better products
  - Optimize the use of machine tools

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1 CATIA V5 Machining | Overview - What is it?

CATIA Machining in Productive Use

From prismatic to complex parts ...

... in different manufacturing segments ...

- ◆ Prototype manufacturing
- ◆ Tooling manufacturing
- ◆ Part manufacturing

... and in all industries

- Aerospace, OEM & suppliers
  - Airbus, Boeing, Cessna, Dassault Aviation, EADS, Eurocopter, Lockheed Martin, ...
  - Aircraft Philipp, CAMTech, Fokker Special Products, Messier Dowty, Patria, AST, Pratt&Whitney, …
- Automotive, OEM & suppliers
  - Audi, Daimler Chrysler, Ilmor, Porsche, Renault, TATA motors…
  - Aweba, Bosch, Gedia, Hirschvogel, Michelin Kronprinz, PFO, TRW, …
- Consumer goods, Industrial Equipments,High-tech…
  - ARC International, ETA/Swatch, Feber, Guy Degrenne, Smoby, …
  - Duerkopp Adler, Fredk Pollard, Grundfos, Homag, Karl Mayer,ISCAR, BOBST …
  - Black&Decker, Weidmueller, …

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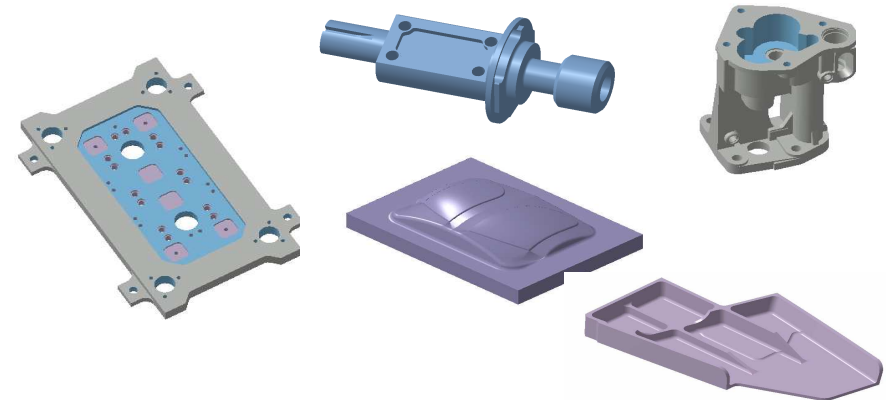
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2 CATIA V5 Machining | Value Proposition

- **Reduced administration and skill efforts by covering a wide set of** applications with a single system

- **Ease-of-learn and ease-of-use** due to a very intuitive user interface

- **High efficiency in part programming** due to a tight integration between tool path definition and computation, tool path verification and Output generation

- **Optimize tool path and machining time** by offering a wide set of machining operations

- **High level of automation and standardization** by capturing and reusing proven manufacturing know-how and by CATIA Knowledgeware integration

- **Effective change management** due to a high level of associativity between product engineering, manufacturing processes and resources

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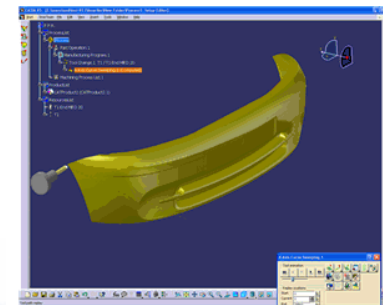
3 # CATIA V5 Machining | Total Solution

Core NC Functionality

- Axial Operations
  - Wide set of Drilling cycles
    - Powerful management of machining patterns
    - Integrated with Design Patterns and features
- Prismatic Machining Areas and Prismatic Rework Areas
- Pocketing Operation
- Facing Operation
- Profile Contouring Operation
- Curve Following Operation
- Groove Milling operation
- Point to Point Operation
- Prismatic Roughing operation
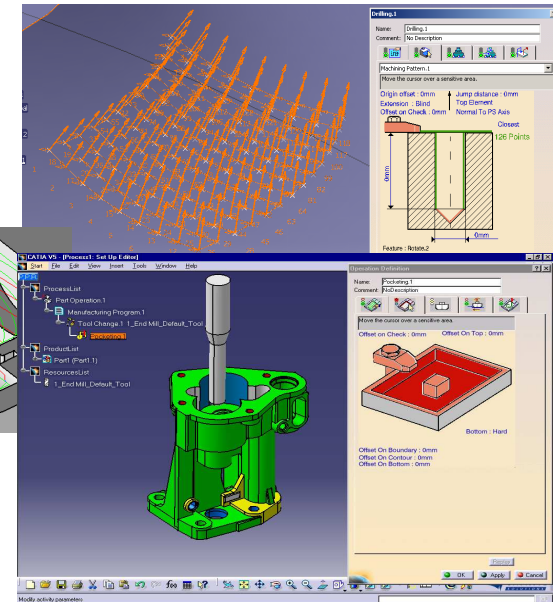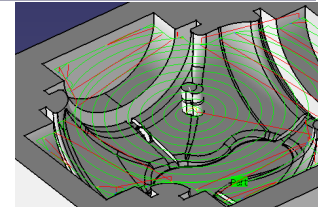
- 3,4 & 5 axis Operations :
  - Roughing
  - Sweep Roughing
  - Roughing Rework
  - Sweeping
  - Pencil Operation
  - Zlevel Machining
  - Contour driven machining
    - Between contour
    - By parallel contour
    - Spine contour

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3 # CATIA V5 Machining | Total Solution

Core NC Functionality   *(5 axis Flank Machining)*

– Integration of industry proven V4 Technology within V5

– Surpass V4 MMP in ease of use & capabilities

- Multiple Drive Surfaces
- Multiple Part Surfaces
- "Curves as Part" mode
  – Navigation for "Curves as Part" mode
- Multiple Axial & Radial Passes
  – Contact height control
  – By offset or by recomputing on Axial Levels
- Fanning management
  – Ability to de-activate fanning for Start/End position
  – Control of User defined Cutting length
- Joggle and Fillet Management
- Conical Cornerisation
- Several Tool Axis Strategies
  – Tanto Fan / Combine Tanto
  – Combine Parelm / Mixed Combine
  – Normal to PS
- Global auxiliary guiding curve

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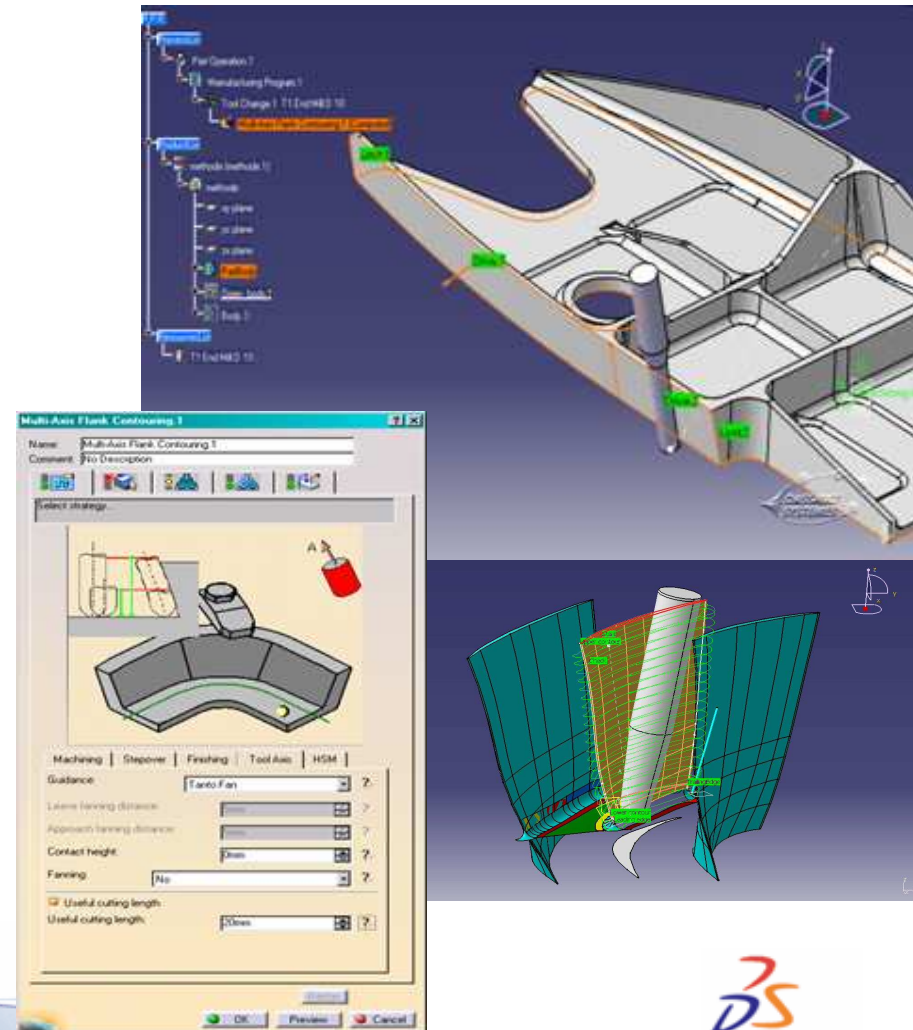
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3 CATIA V5 Machining | Total Solution

Post Processing

- *Catia V5 supports the Following Postprocessors by directly including the runtime within its software.*
  - *Cenit.*
  - *ICAM.*
  - *IMS.*
- *These products are regarded as the leading post processing companies in the field and this allows V5 customers who have invested in these products to continue to use them directly from within the catia manufacturing environment.*
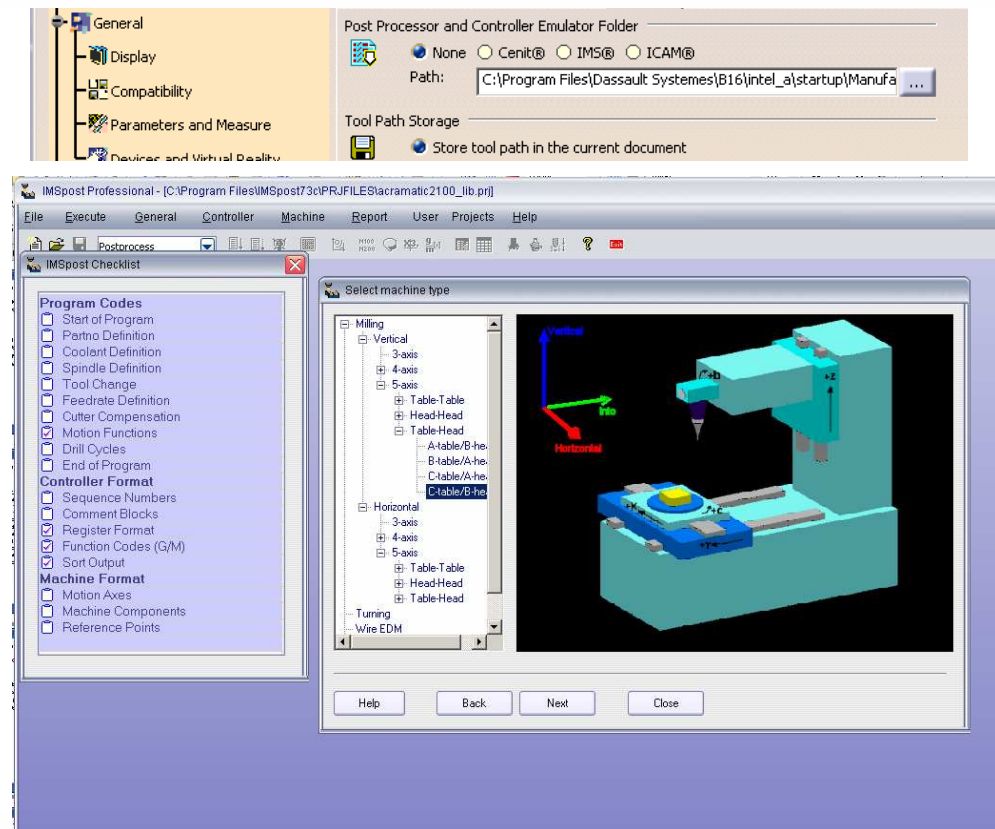
3 # CATIA V5 Machining | Total Solution

Setup Sheets – Shop Floor Documentation

- *Catia V5 includes a Catscript that generates a basic shop floor HTML format document. This includes hyperlinks to all the Part Operations information on toolists, operation types, feeds, speeds, etc, etc.*

- *This script can be modified if desired.*
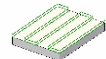
3   CATIA V5 Machining | Total Solution

Setup Sheets – Shop Floor Documentation

- *There are other alternatives to the standard script……*
- *With the openness of V5 and the use of Visual Basic it is possible to create bespoke templates, which will provide individual manufacturing areas the ability to customise and support their own shop documentation needs.*

3   # CATIA V5 Machining | Total Solution

V5 integrated Machining Simulation Portfolio
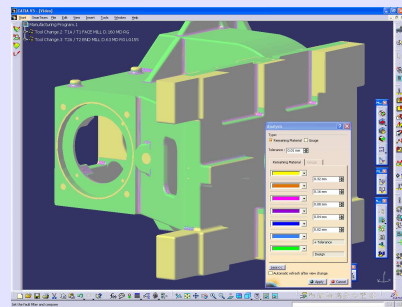
NCG

NVG

MSG

MBG
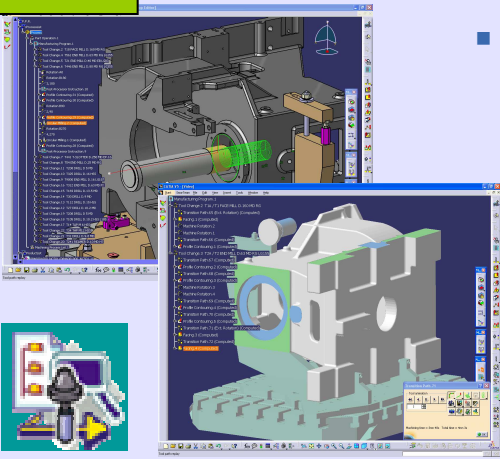
- NC Manufacturing Review : Part   Verification via Video/Photo
  - Material Removal Simulation
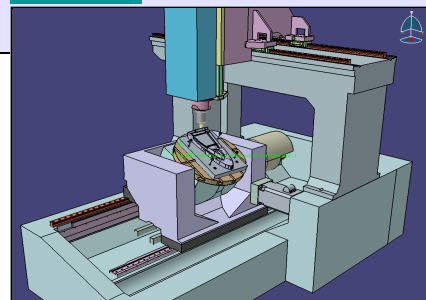 - Works on CATIA Tool path
  - Works on ISO Code
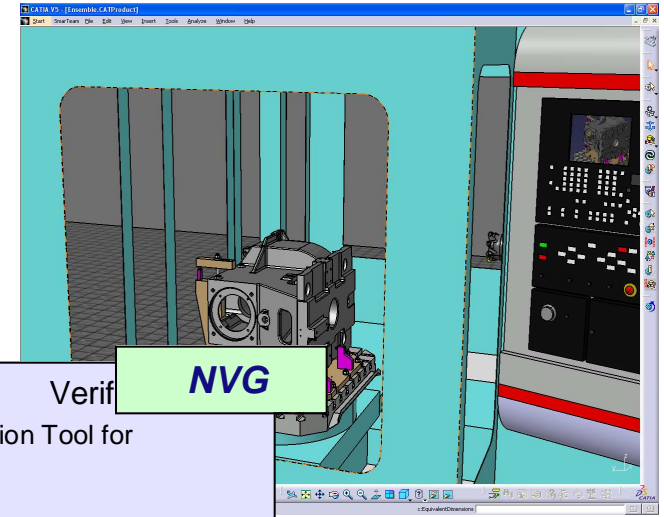
- NC Manufacturing   Verif
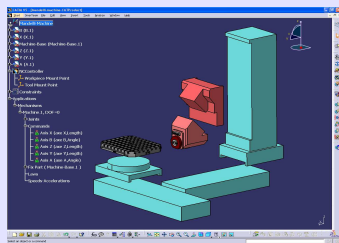 - Analysis and Validation Tool for Machined Parts

NC Machine Tool Simulation
- Works on CATIA Tool path
- Works on ISO Code
- Material removal at V5R17

- NC Machine Tool Builder
  - Resource modeling tool (NC Machine, Peripheral Device)

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4   Conclusion : CATIA V5 Machining

- **Native V5 PLM Fundamental**

- **Accessible to All**

- **Providing Superior Value to:**
  - Compete more effectively and produce parts quicker
  - Improve quality of finished parts
  - Optimize the use of your machine tools
  - Better link between design and manufacturing as well as a better collaboration within the manufacturing team to increase the standardization and capitalize on users know-how Capture

- **Scalable Implementation**

Now make it yours…

CATIA