

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Use of e-Tools in Developing STEP-NC: State of the art

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Use of e-Tools in Developing STEP-NC: State of the art

STEP-NC

- **A new model of data transfer between (CAD/CAM) system and (CNC) machine**
- **A new replacement of the out of date and low level G&M codes NC language**

STEP: Standard for Exchange of Product data

The Bottleneck of the CNC Development is G&M Codes

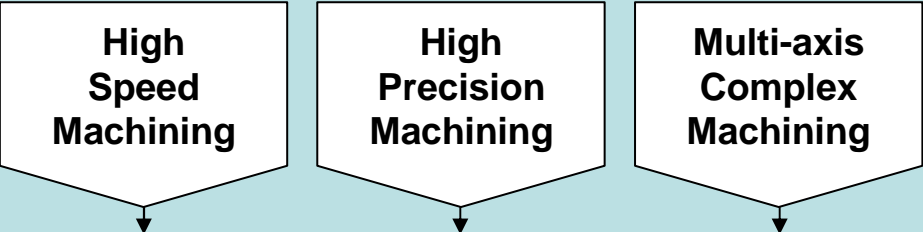
**Development
CNC**

**G&M
Codes
ISO 6983
1950s**

G&M Codes Problems:

- (1) Information loss
- (2) Difficult traceability
- (3) Lack of interoperability
- (4) Non-Compatibility with higher
level system (CAD/CAM/CAPP/MRP/...)

The Developments Leading to STEP-NC



Extensively Enhanced Productivity & Quality in Manufacturing

+ Advanced internet Technology

DA
(Design Anywhere)
CAD Germany

BA
(Build Anywhere)
South Africa

SA
(Support Anywhere)
CAM in USA

Internet

STEP-NC

Internet

why we need to such Revolution?

Exchange

From
G&M Codes

To
STEP-NC

G&M Codes Limitation:
Low flexibility Programming
statements

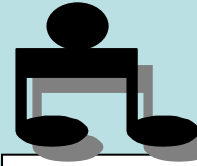
- Axis movements
- Spindle speed
- Feed rate
- Tool position
- Coolant

to

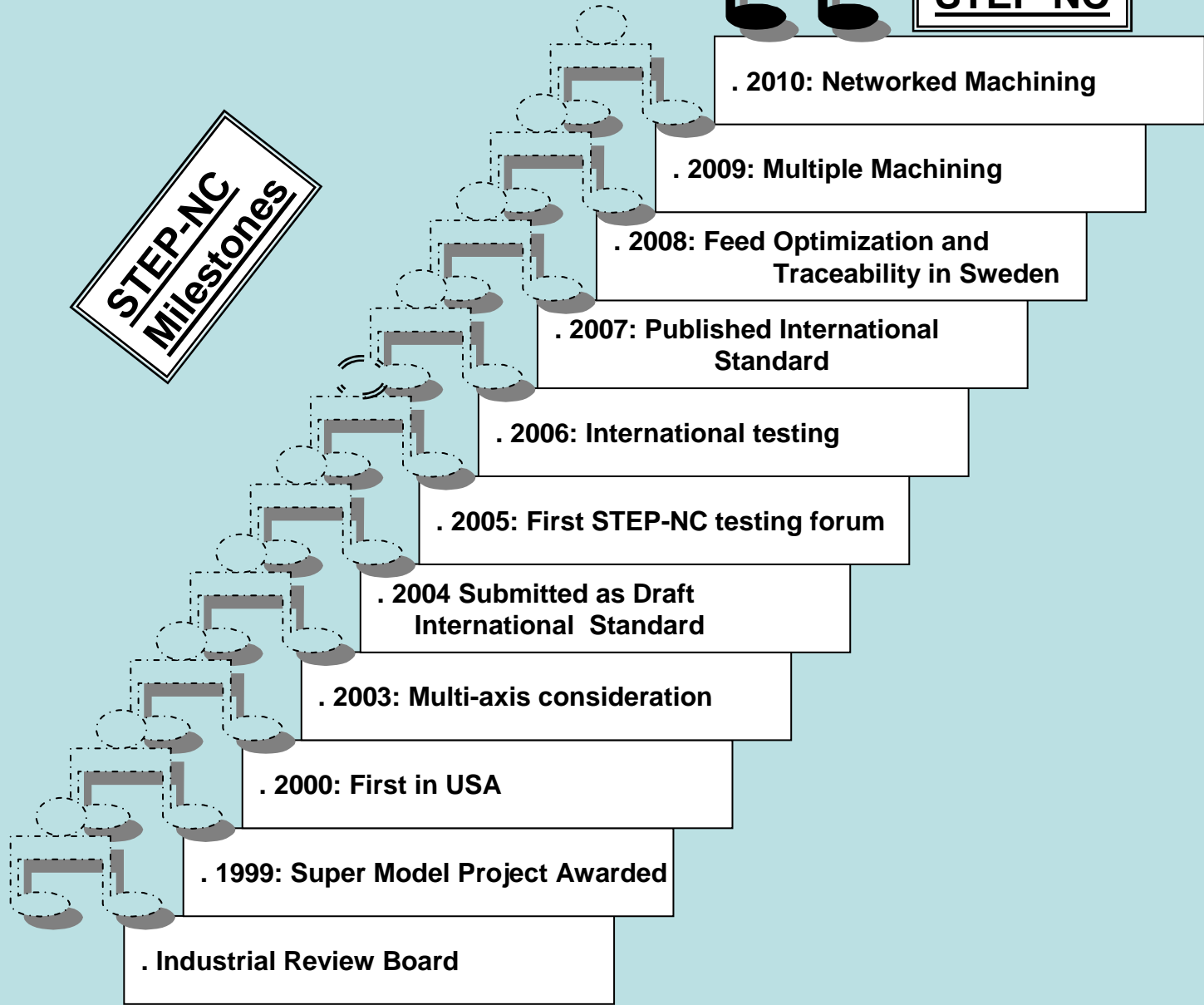
STEP-NC:
High flexibility machine and
product features

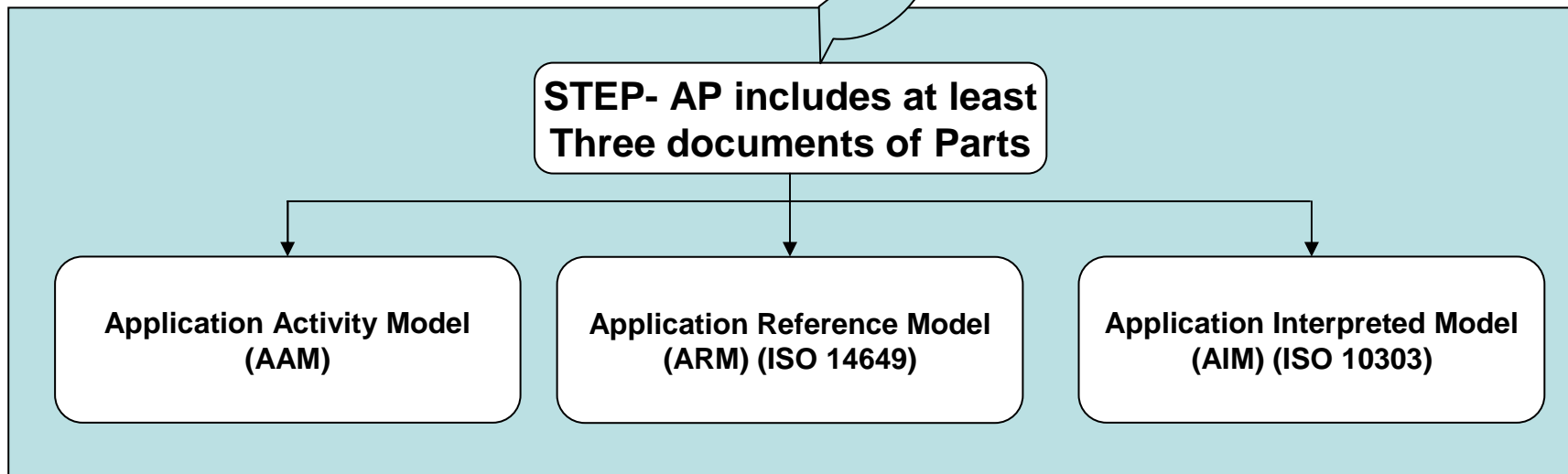
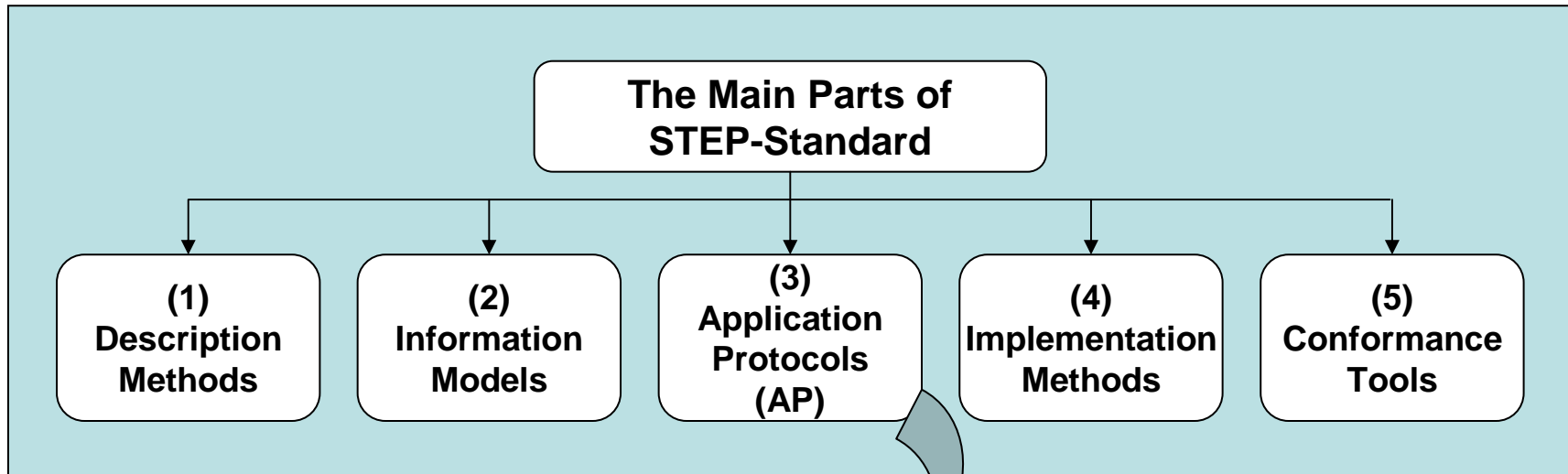
- Working step
- Machining feature
- Machining operation
- Machining strategy
- Machining w. piece

**STEP-NC
Milestones**

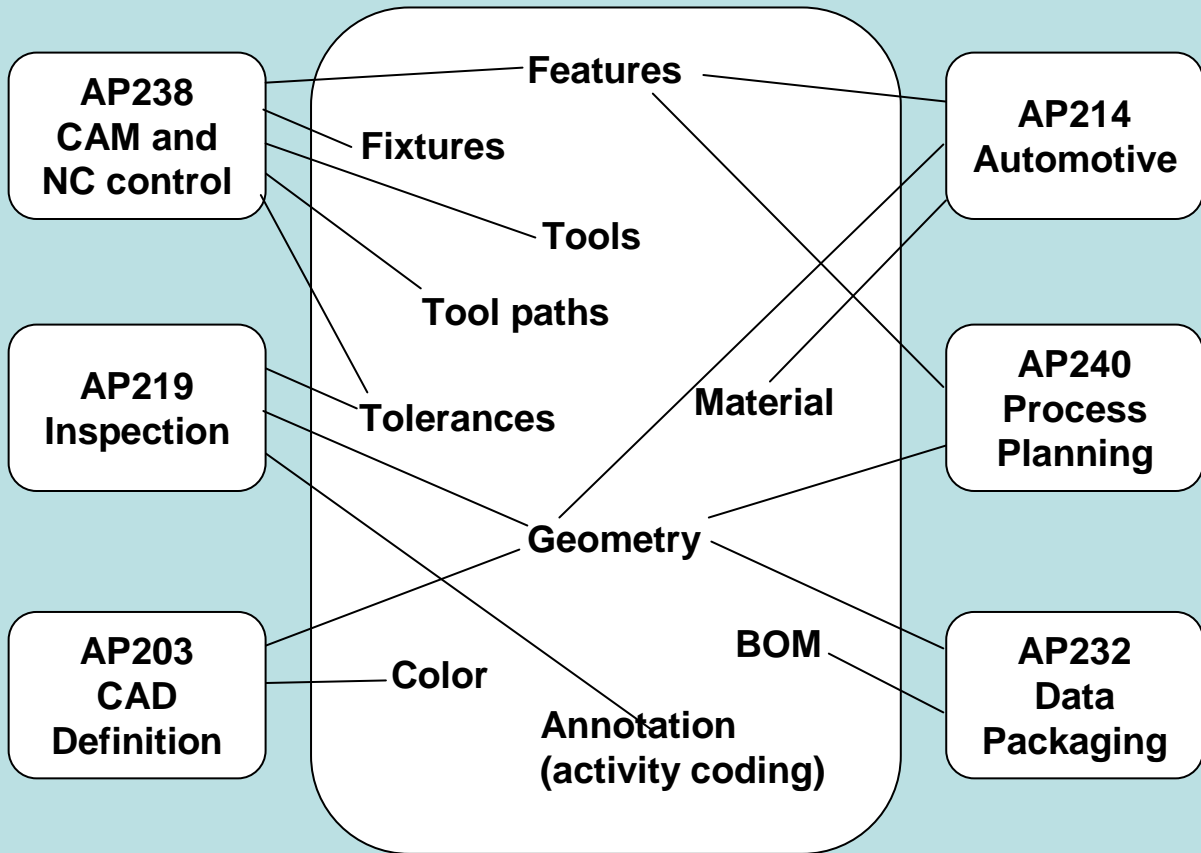


STEP-NC





**Information Defined by STEP for Manufacturing
(now more than 40 Application Protocols)**



The STEP-NC System Main Features

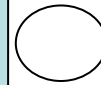
- (1) Seamless Information Flow**
- (2) Feature-Based Machining**
- (3) Autonomous and intelligent CNC**
- (4) Fault Tolerable**
- (5) Networked and distributive**
- (6) Modular**
- (7) Scalability**
- (8) Portable**

STEP-NC Benefits

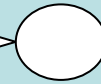
- (1) Provides CNC with geometrical and technological data**
- (2) Task oriented data**
- (3) Conformance data to the CAM, or NC**
- (4) Reducing machining time**
- (5) Bi-directional information flow (CAD/CAM to CNC)**
- (6) Web-based distributed manufacturing (e-manufacturing)**
- (7) Increase the CNC accuracy**
- (8) Enable full checking of your program**
- (9) Enable parallel programming of multiple cutting tools**
- (10) Providing quality control on CNC**
- (11) Real time machine optimization (feed, speed,...)**
- (12) Saving on Machine tool cost**



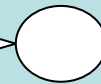
Future Implications



Tool Path Generation:
To reduce machining error



Multi-agent Systems:
To reach the Integrated e-manufacturing system



CONCLUSION

STEP-NC:
Will become very powerful tool for integration of
CAD/CAM systems

STEP-NC:
Will complete the entire product development chain
By linking the CAPP and CNC

STEP-NC:
Can overcome the resistance of using G-codes
when the company owners see cost reduction in
design to manufacturing process chain



Thank You

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