# Summary of the Workshop on Process Planning Concepts, Representations and Architectures

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*Texas A&M University*

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On August 5-6, 1991, a group of process planning researchers gathered at Texas A&M University to discuss a number of issues related to process planning. The workshop was cosponsored by the National Institute of Standards and Technology (NIST) and Texas A&M University and co-chaired by Steven Ray of NIST, and Richard Wysk of Texas A&M. There were several motivations for this meeting. One was a desire to enhance the ability of academic researchers to use each other's results. Another was to enhance communication between process planning researchers and relevant standardization committees.

A number of specific goals for the meeting were identified early on. These included a functional definition for process planning, the definition of a unified infrastructure for process planning systems, and the establishment of positions on key issues within process planning. Secondary goals were the identification of similarities and differences in process planning architectures, recognition of the value of consensus of process planning architectures to future process planning research, identification of consensus information models to support process planning.

The group defined process planning as: *"Creating work instructions to realize a product or goal that meets customer requirements. A work instruction is the specification of an activity and the resources to perform the activity."* Process planning as viewed by this group is primarily in the domain of discrete manufacturing activities. After 1 1/2 days of discussion, the following positions evolved:

1. To adopt the infrastructure as shown in Figure 1.

2. To adopt the ISO TC184/SC4/WG3/P11 Process Plan Model, with extensions, for plan representation.

3. To endorse the use of the ISO Process Plan Model as a formalized view of a larger, "complete" plan formulation model which has an as yet undefined structure.

4. To adopt the STEP Model (ISO 10303), with possible extensions, for product definition input.

5. To create a forum for the exchange of process planning research information, by means of:
   a) An electronic newsgroup, or mailing list, for open discussion.
   b) An electronic annotated bibliographic service.

# Modular Planning System Infrastructure

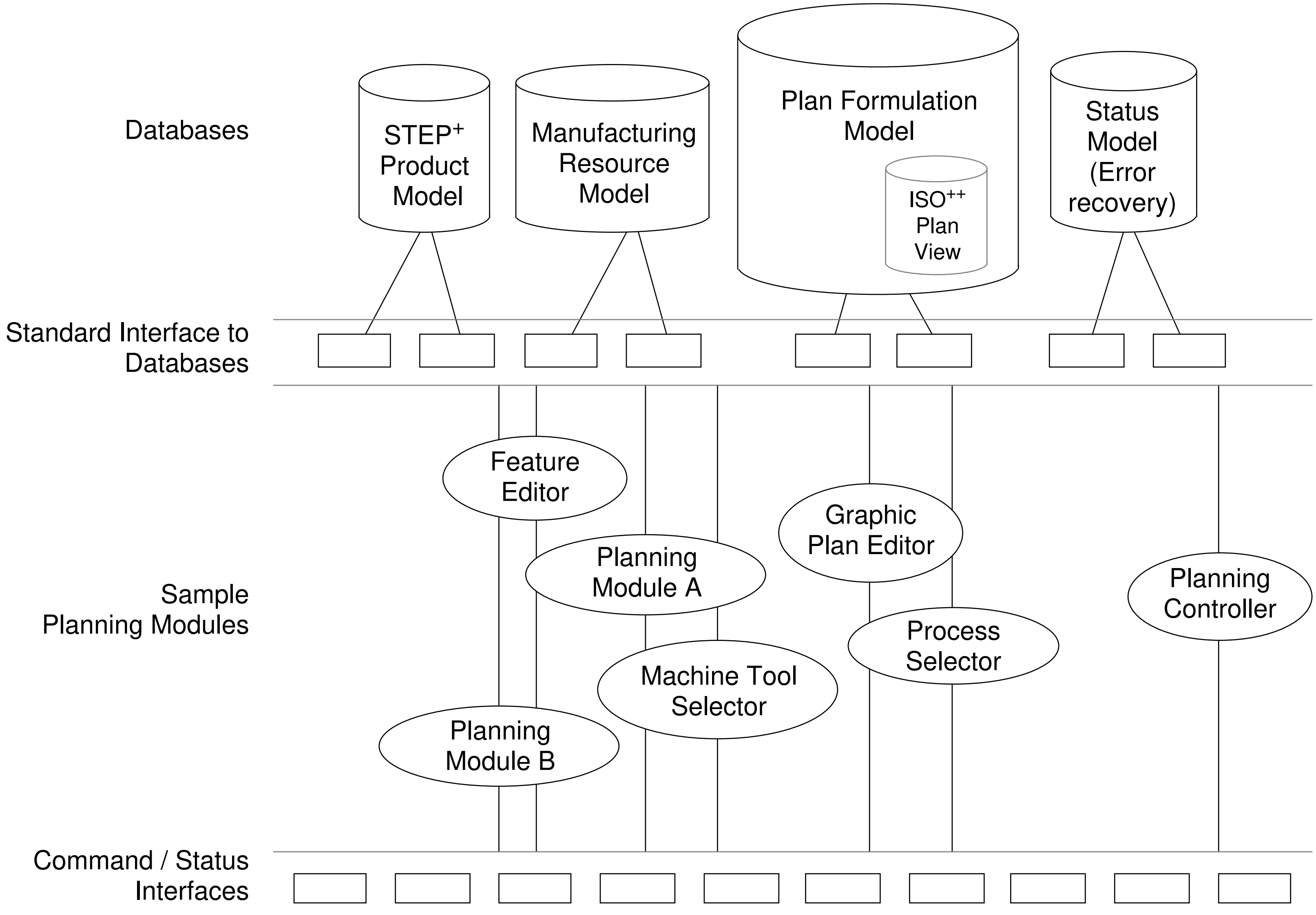


*Figure 1. This is the infrastructure adopted by the attendees of the Workshop on Process Planning Concepts, Representations and Architectures, as an integrating framework for process planning research.*

c) A process planning library service.
d) An annual workshop to assess needs and progress.

6. To call for a manufacturing resource model which will enable collaborative research in process planning.

7. We see the following list of activities as candidate process planning modules within our adopted infrastructure.
strategic planning
execution planning
process selection
resource selection
process design
design feedback
error recovery
process ordering
process deconfliction
process optimization
product interpretation
process grouping
equipment programming
operation instruction authoring
parameter specification
tooling design
fixture design
inspection design
setup requirements
intermediate product descriptions
stock selection

8. We anticipate the plan formulation model is likely to contain the following:

geometric relationships
physical relationships
situation relationships
plan fragments
temporal relationships
metrics
* efficiency
* fidelity
planning assumptions
planning premise
functional constraints
manufacturing strategy
materials planning strategy
planning status

... to serve as a scratch pad and as an interface to other CIM activities.

The workshop was intended to create a group identity for the process planning research community. Since there is no identifiable forum dedicated to process planning research issues, the intent was to provide a mechanism to encourage the timely and free interchange of ideas and results. Other research issues requiring attention were identified in the areas of supporting technologies, standards, representation, storage and access, and implementation. It was felt by the group that there is no identifiable source currently taking responsibility for funding process planning research. The pronounced lack of funding inhibits significant progress.

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