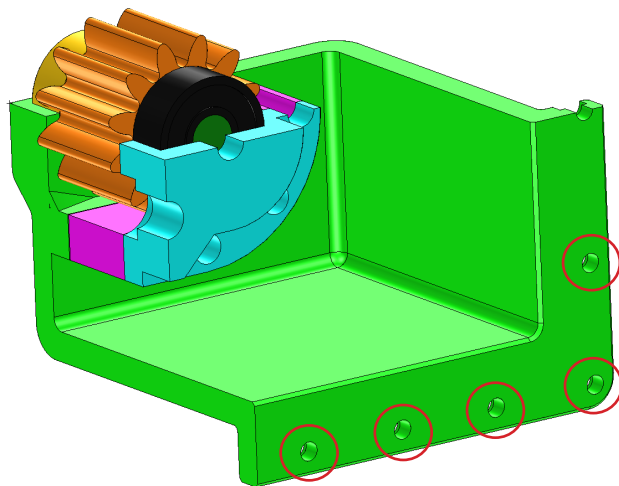# Patran CAE Solid Modeling
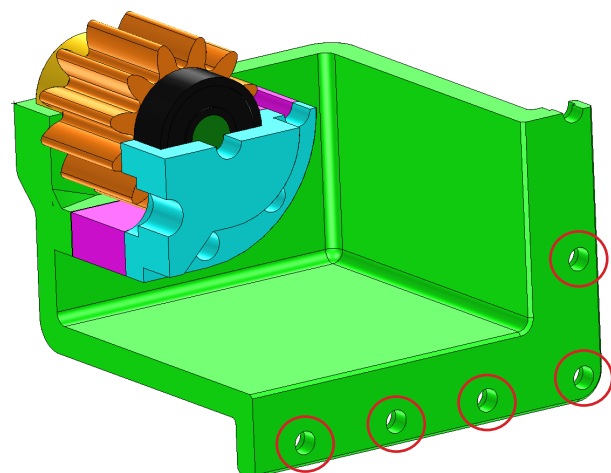## Solid Modeling Functionality within Patran

Overview

The Patran CAE Solid Modeling module makes available functionality to create and edit solid geometry within Patran. Analysts can use this module to create conceptual models or edit existing solid geometry. The module may also be used to remedy "dirty" geometry that cannot be immediately meshed. Given Patran's existing meshing capabilities, the availability of solid modeling capabilities makes Patran a flexible pre/post processor for the FEA workflow.

Capabilities

- Solid primitive creation
  - Block, cylinder, cone, sphere, torus
- B-Rep solid creation
  - Extruded solid
  - Revolved solid
- Solid Editing
  - Boolean, edge blend, imprint, shell, break
- Mid-plane surface extraction
- Refit to parasolid
- Automatic/Interactive feature recognition
  - Parasolid based
  - Recognizable features
    - Hole
    - Blend
    - Chamfer
  - Added functions
    - Edit
    - Delete
    - Show
- Support transform operations

- Interactive recognition of 5 features
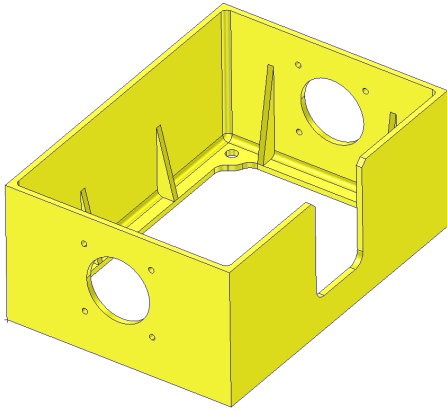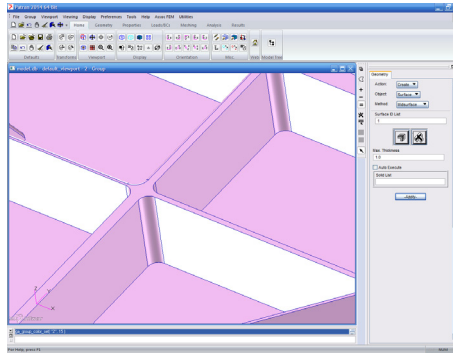- Modify feature parameter
  - Increase diameter from 4mm to 5mm

- Original geometry is modified automatically
- FEA and CAE data are updated accordingly
  - No additional editing or re-meshing of FEM is needed

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Solid editing operation

- Boolean operations - add, subtract, intersect
- Edge blend - constant, radius, chamfer
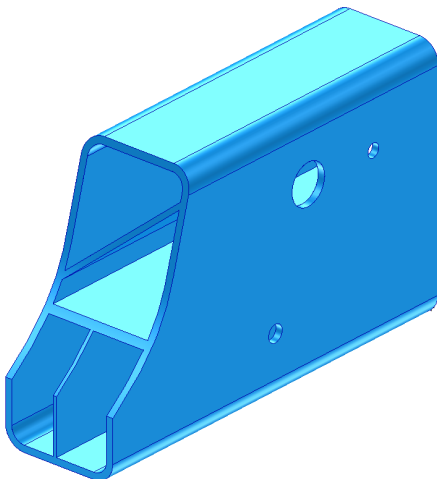- Imprint - solid on solid
- Shell - create thin wall solids

Mid-surface creation

- Idealization for thin walled bodies
- Automatic
- Manual with trimming tools
  - Perform additional editing
  - Trimming of overlapped edges

Solid creation operations

- Primitive creation
  - Block, cylinder, cone, sphere, torus
  - Optional on-the-fly Boolean operation
- Extrude and revolve surfaces to solids
- Transformations, including group transform

Finite element and geometry integration

- Auto update of FEM and CAE data after solid editing operations
- On-the-fly conversion of Patran native geometry

Automatic and interactive feature recognition

- Parasolid based
- Recognizable features
  - Hole
  - Blend
  - Chamfer
- Edit/Delete/Show features

MSC Software

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