Geometric Editing with BRL-CAD™ 6.0 for Microsoft® Windows®

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Geometric Editing with BRL-CAD 6.0 for Microsoft Windows

- Role Of AMRDEC
- Conversion to Microsoft Windows platform
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- BRL-CAD 6.0 Conversion
- General Observations on the Conversion Process
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- Conclusions
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Role Of AMRDEC

• The AMRDEC is responsible for providing data and analyses in the development of missile systems & aviation platforms

• BRL-CAD (raytracing and MGED only) is utilized:

  (1) in the design level studies to determine ordinance system requirements (depth of penetration, etc.)
  
    (2) missile terminal engagements (impact location and terminal angle optimizations)
  
    (3) Map impact locations from high fidelity flight simulations to Pk/h cell by cell maps
Conversion to Windows platform

- Silicon Graphics computers are
  1. Expensive to purchase
  2. Difficult to keep on maintenance
  3. Slower than personal computers

- Personal computers are faster, cheaper and easier to justify the expense

- LINUX is not the OS of choice for our computer programmers

So -

Porting to Microsoft Windows became the **Challenge**
<table>
<thead>
<tr>
<th>Version</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.4</td>
<td>1998</td>
</tr>
<tr>
<td>LIBRT and LIBWDB only**</td>
<td></td>
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<tr>
<td>5.3</td>
<td>2001</td>
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<tr>
<td>MGED and Corresponding libraries</td>
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<tr>
<td>6.0</td>
<td>2002</td>
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<tr>
<td>MGED and Corresponding libraries</td>
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** There was not an easy way to port MGED to Windows at that time
The following tools and libraries were converted:

<table>
<thead>
<tr>
<th>MGED</th>
<th>LIBBN</th>
</tr>
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<tbody>
<tr>
<td>RT</td>
<td>LIBBU</td>
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<tr>
<td>NIRT</td>
<td>LIBDM</td>
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<tr>
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<td>LIBRT</td>
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<tr>
<td></td>
<td>LIBSYSV</td>
</tr>
<tr>
<td></td>
<td>LIBTERMIO</td>
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<td>LIBWDB</td>
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General Observations on the Conversion Process

- TCL is not 100% cross platform, there are UNIX/Microsoft Windows only routines and MGED uses some of these UNIX only routines

- Windows is not as forgiving on memory as UNIX (i.e. memory leaks appeared)
General Observations on the Conversion Process

Upgraded from: to:
TCL 8.3       TCL 8.4
TK 8.3       TK 8.4
ITCL 3.2     ITCL 3.2.1
IWIDGETS 3.0.0  IWIDGETS 4.0.0

• These upgrades solved problems with path names, mainly / (UNIX) vs \ (Windows)

• In upgrading the above libraries, some TCL scripts had to be updated with the new ways to call the functions
LIBBN, LIBOPTICAL, LIBSYSV and LIBWDB:
Required little or no changes (updates to reflect current C programming practices)

LIBTERMIO:
Made all functions stubs; the function calls are there, but have no functionality

LIBDM:
Added an OpenGL display manager for Windows
LIBBU:

• Hard coded path to BRL-CAD location

• Changed \ to // for all paths to be compatible with Windows

• No parallel support was added

• Commented out this line in the routine that frees malloc memory

  `*(((int *)ptr) = -1; /* zappo! */`

  * It causes MGED to crash under Windows when a material name is undefined
Changes to Library Functions

LIBRT:

- Changed the pipes calls to Windows pipe calls
- Renamed variables *near*, *far* and *small*, to avoid Windows keywords
- Minor changed to various system function calls to convert to the Windows format
Changes to Library Functions

LIBFB:

• Frame buffer server functions are stubs

• Added an OpenGL frame buffer interface for Windows

• Only the transient windows function at this time
Changes to MGED

• Forced the default file open to be binary; otherwise the database file could not be opened
• Changed the pipes calls to Windows pipe calls
• Changed the routines that catch the data from stdout to place in the MGED command window
• Lots of minor changes to the calling syntax of functions for Windows compatibility
• Added editing functions (edcodes, edmater, etc.) to open notepad
DEMONSTRATION