PTC Technical Specialists E-Newsletter

Date: September 2010

PTC Product Focus

Pro/TOOLKIT: the Primary Customization and Automation Tool for Pro/ENGINEER

With the Pro/ENGINEER Toolkit API, companies can extend, automate, and customize a wide range of functionality from design through manufacturing. Pro/TOOLKIT allows:

- Automating modeling for derived or single-use models driven by geometric or parametric constraints
- Monitoring the state of user's interactive session to enforce company rules or offer design advice
- Integrating external applications requiring access to Pro/ENGINEER data or operations
- Extending the Pro/ENGINEER User Interface with custom processes seamlessly embedded into the interface
- Automating tedious or difficult Pro/ENGINEER operations with applications designed to save design time and prevent mistakes
- Creating processes to run automatically without user interface on demand or at designated times

Characteristics

- C library programming interface to Pro/ENGINEER
- Over 2500 functions
- 2 modes of communication
- Bi-directional data transfer between applications and Pro/ENGINEER

User requirements

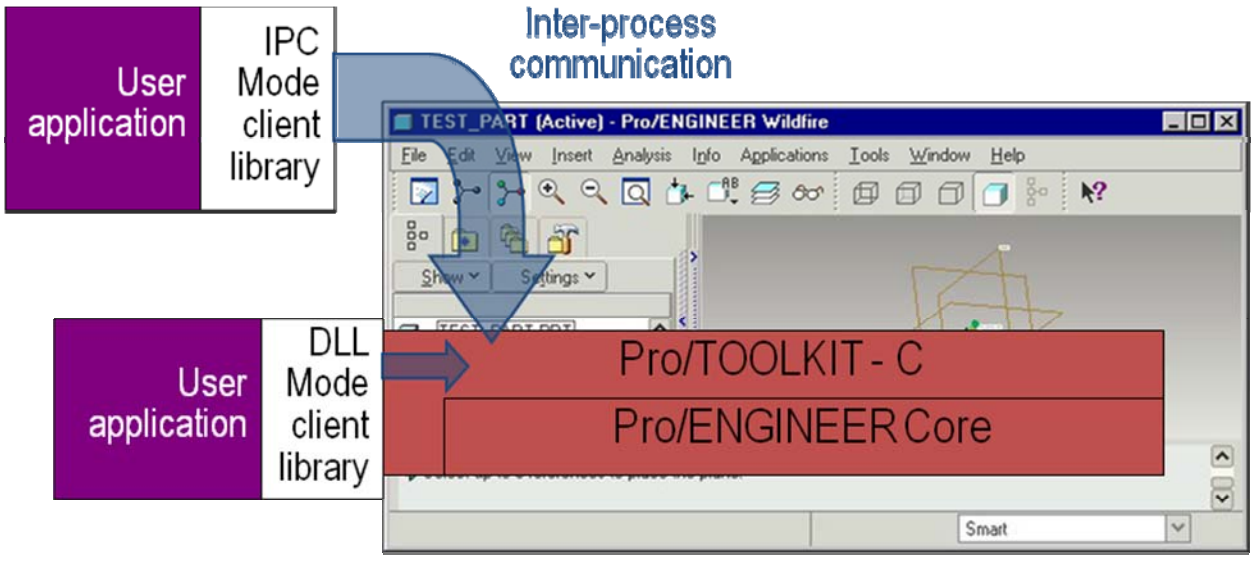
- C programming skills, knowledge of pointers and data structures
- Development license to develop applications; applications may be unlocked and distributed within the enterprise without the Pro/TOOLKIT development license

Pro/TOOLKIT supports two types of applications:

- Synchronous
    - Applications invoked from commands within a running session of Pro/ENGINEER
    - Mode of communication may be:
        - DLL - fastest method
        - spawn (multiprocess) - slower, but offers more flexible link options
- Asynchronous
    - Applications running outside of Pro/ENGINEER that start or connect to one or more Pro/ENGINEER sessions
    - Communication is multiprocess

Architecture

DLL applications are loaded directly into the Pro/ENGINEER process space and IPC applications run as a separate process with inter-process communications passing parameters between the applications.

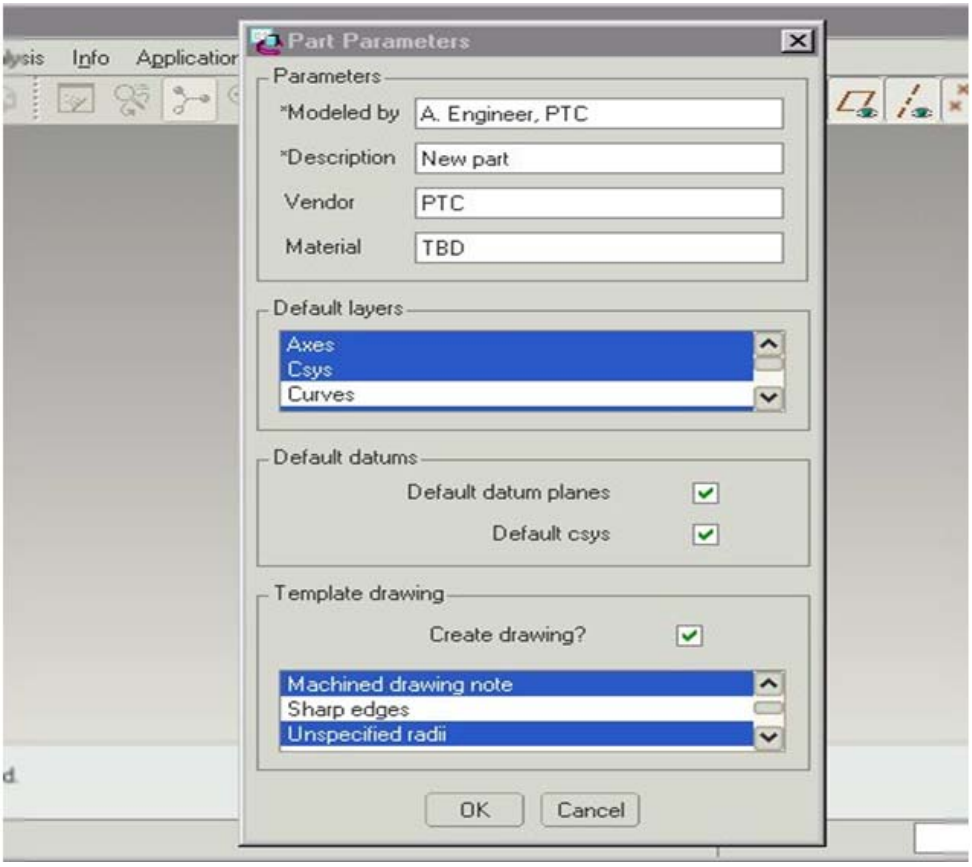


Pro/TOOLKIT application code can be invoked by

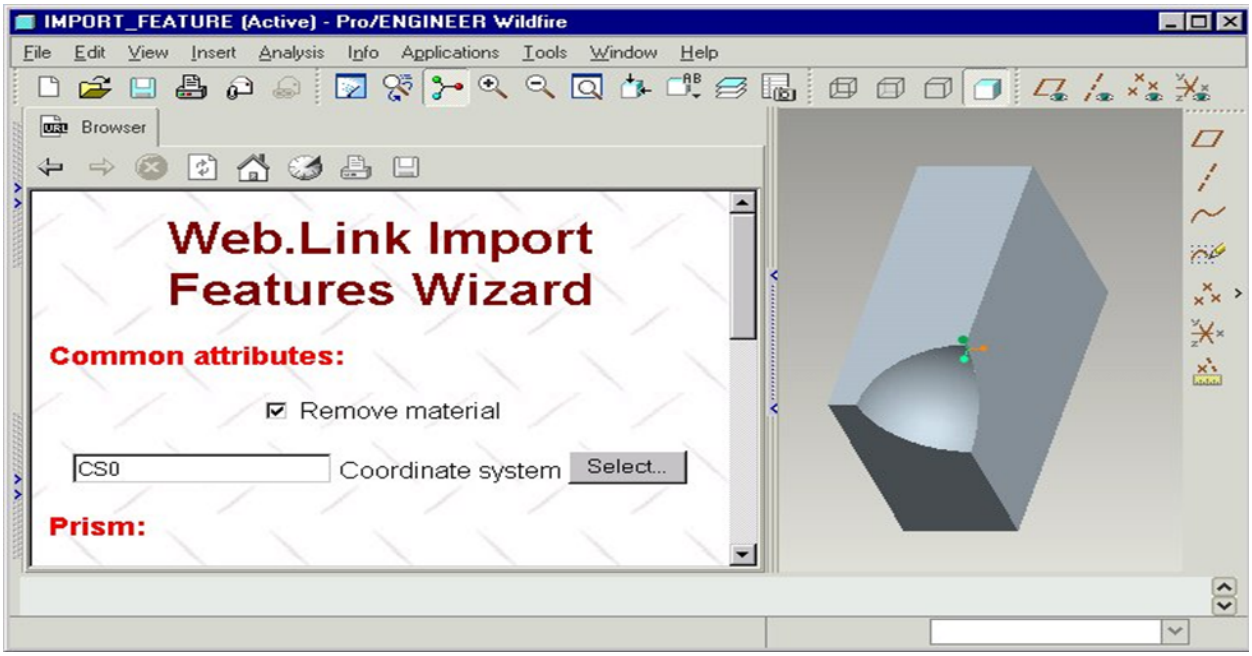
- Pro/ENGINEER startup
  - launched immediately upon registration of the Pro/TOOLKIT application
- User interface driven
  - invoked by user choosing application-created menu buttons and user interface components
- Event driven
  - invoked when certain events happen within Pro/ENGINEER
- Task driven
  - invoked by function calls from other external foreign applications

Examples

1. Custom Pro/TOOLKIT user interface to automate repetitive or critical tasks
   - model creation from templates
   - geometry creation
   - drawing creation

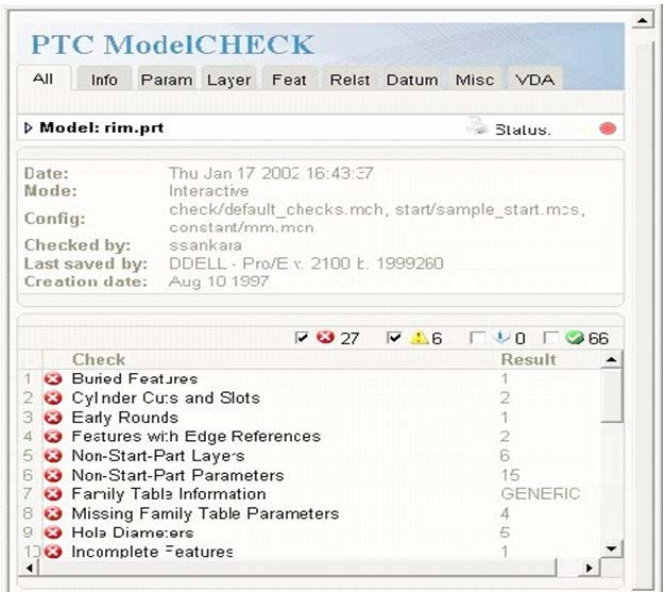


2. Pro/TOOLKIT back-end to an interactive Pro/Web.Link web page in the embedded browser

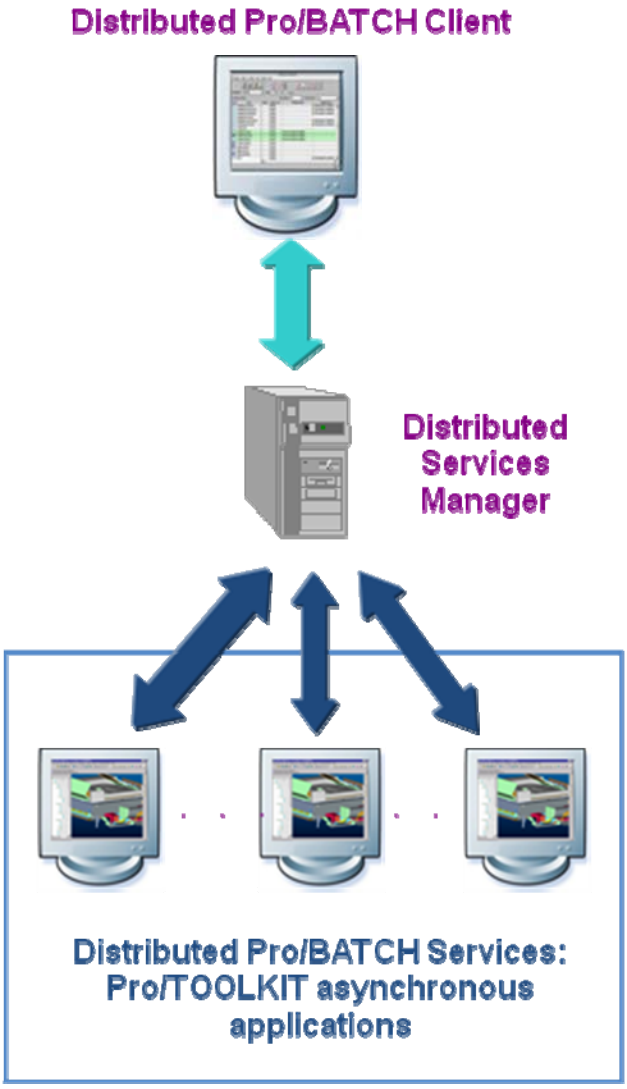


3. PTC's ModelCHECK:

   - Leveraging Pro/TOOLKIT functions to:
     - Enforce standards
     - Verify models
     - Assist repairs
     - Validate user modeling



4. PTC's Distributed Pro/BATCH:
    - Includes Pro/TOOLKIT asynchronous applications as services that:
        - Generate an extensive set of EXPORT and IMPORT formats
        - Execute ModelCHECK
        - Plot and print models
        - Save models with display for preview in ProductView



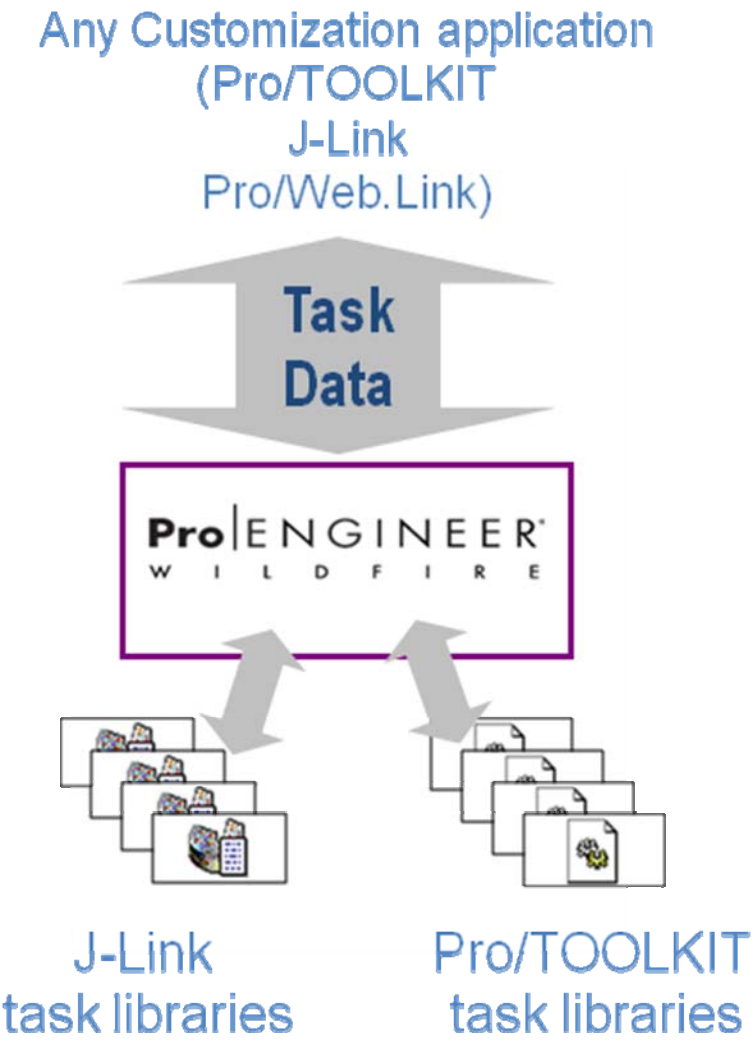
Interoperability

Pro/E Wildfire allows Pro/TOOLKIT and J-Link programmers to create reusable task libraries.

- Library functions can take any combination and number of name-value pairs as input and output arguments.

- Library functions can be invoked by any other customization application

Pro/E Wildfire supports the common goal of “write once, use in any situation” for customization efforts.



Sample Libraries

Session	**Solid models**
▪ Menus	▪ Dimensions
▪ Messages	▪ Parameters
▪ View and Window manipulation	▪ Geometric tolerances
▪ Interactive Selection	▪ Feature information and operations
▪ Custom dialogs	▪ Feature creation
▪ Custom graphics and text	▪ Family tables
▪ Mouse input	▪ Layers

- Command line arguments
- Pro/Intralink workspace
- Session notifications

Asynchronous

- Start/connect to Pro/ENGINEER

Models

- Operations & info
- Export Plot Files
- Import, Export 2d and 3d formats
- Access external data
- Regeneration
- Model notifications
- Unit and unit systems support

Modules

- Cabling
- Diagram
- Piping
- Sheetmetal
- Manufacturing
- Weld

UI

- Popup menus in graphics window and model tree
- Access to the preselection buffer
- Object/action tool support
- Add functions to the relations dialog
- Improved chain and surface collection interaction

- Units
- Mass properties
- Geometry & geometry items
- Solid and feature notifications
- Top down design

Parts

- Materials

Assemblies

- Simplified Representations
- Access Assembly components
- Interference and Clearance calculations

2D Models

- Views
- Tables
- Sheets
- Notes
- Entities
- Groups
- Symbols

Features

- Round and chamfer element tree
- Draft and shell element tree
- XML support for element trees
- Improved support for feature references in trees

Sheetmetal

- Flat and flange wall element trees

Drawings & Annotations	Utilities
▪ Get and set current drawing model ▪ Cross-reference drawing & solid annotations ▪ Access gtol properties	▪ Sketcher utilities ▪ Widestring utilities

Back To Top

PTC Product Focus

Relex - Fully Integrated Reliability Management Solutions

Click Here To View

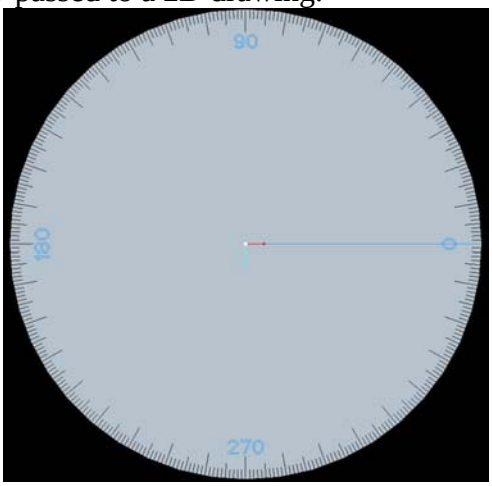
Back To Top

Tips of the Month

Pro/ENGINEER Visibility Study Analysis Feature

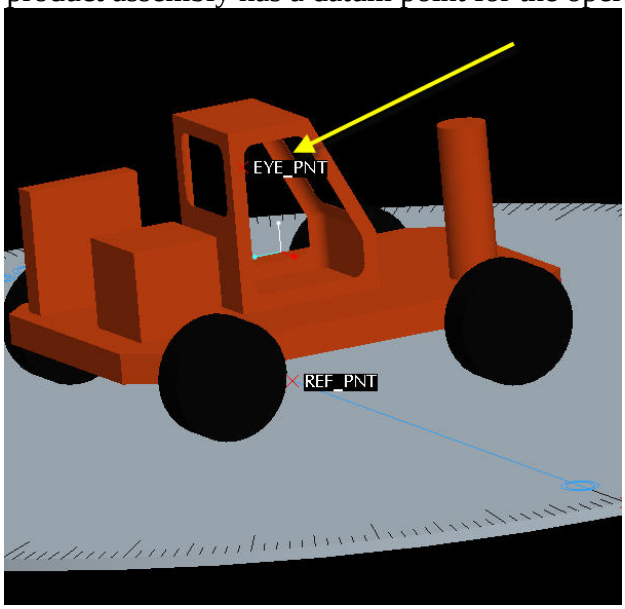
This section is intended to outline the steps required to set up an assembly level visibility study. The resulting analysis feature will show distinct "visible" and "non-visible" lines of sight. Downstream deliverables include a saved analysis feature and a 2D drawing. *__Note__: Pro/ENGINEER's Behavioral Modeling Extension (BMX) is required…* More notes are included at the end of this section…

1. Start by creating a "Visibility Study" assembly in Pro/E. This assembly has a generic "Ground" component with graduated markings used to measure visibility angles. There is also a collection of datum curves that can be modified to match the final analysis results and subsequently passed to a 2D drawing.

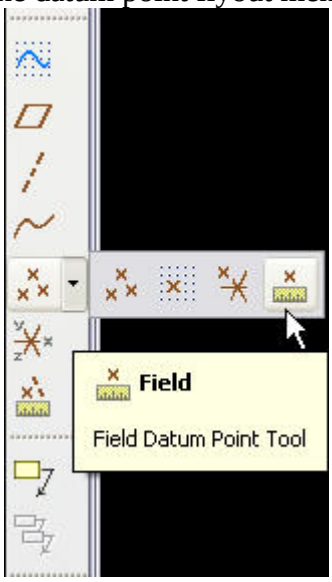


2. Add the desired product assembly (a solid shrinkwrap or envelope component can be used in place of a top-level assembly) to the Visibility_Study assembly.

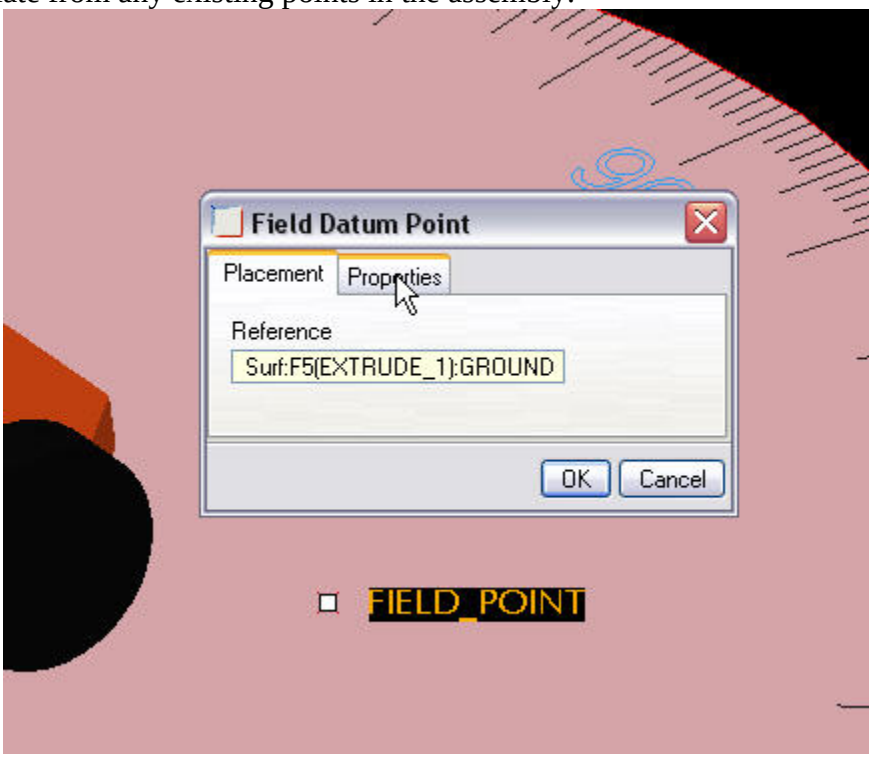
3. Make sure that the product assembly has a datum point for the operator's eye location



4. Add a **Field Point** to the Visibility_Study assembly.
    - Field Points are found in the datum point flyout menu

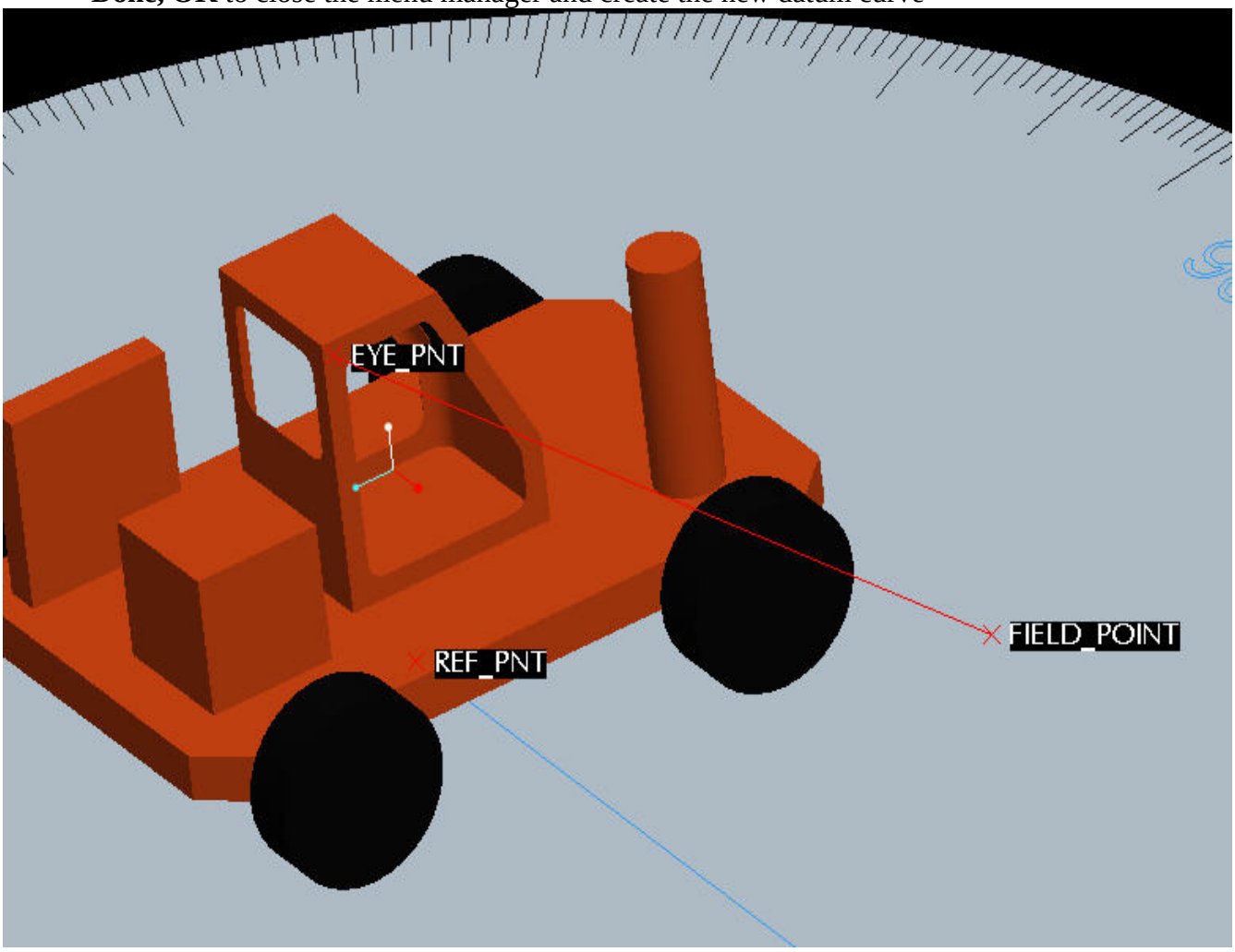


5. Place the Field Point on the top surface of the **Ground.prt**. Location of the field point on the surface is not critical. Rename the newly created point "FIELD_POINT" to help differentiate from any existing points in the assembly.

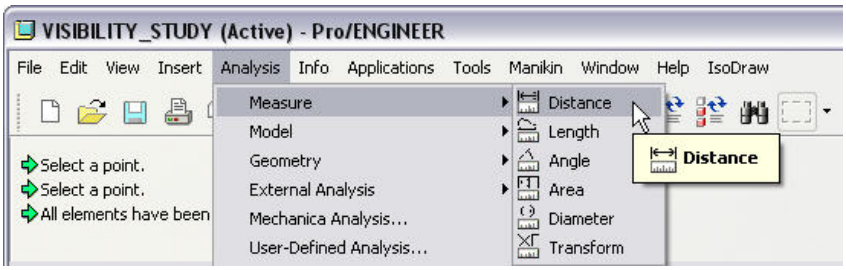


6. Create a new Datum Curve  to connect the **Eye Point** to the **Field Point.**
   - Keep the defaults that appear in the menu manager and click **Done**.

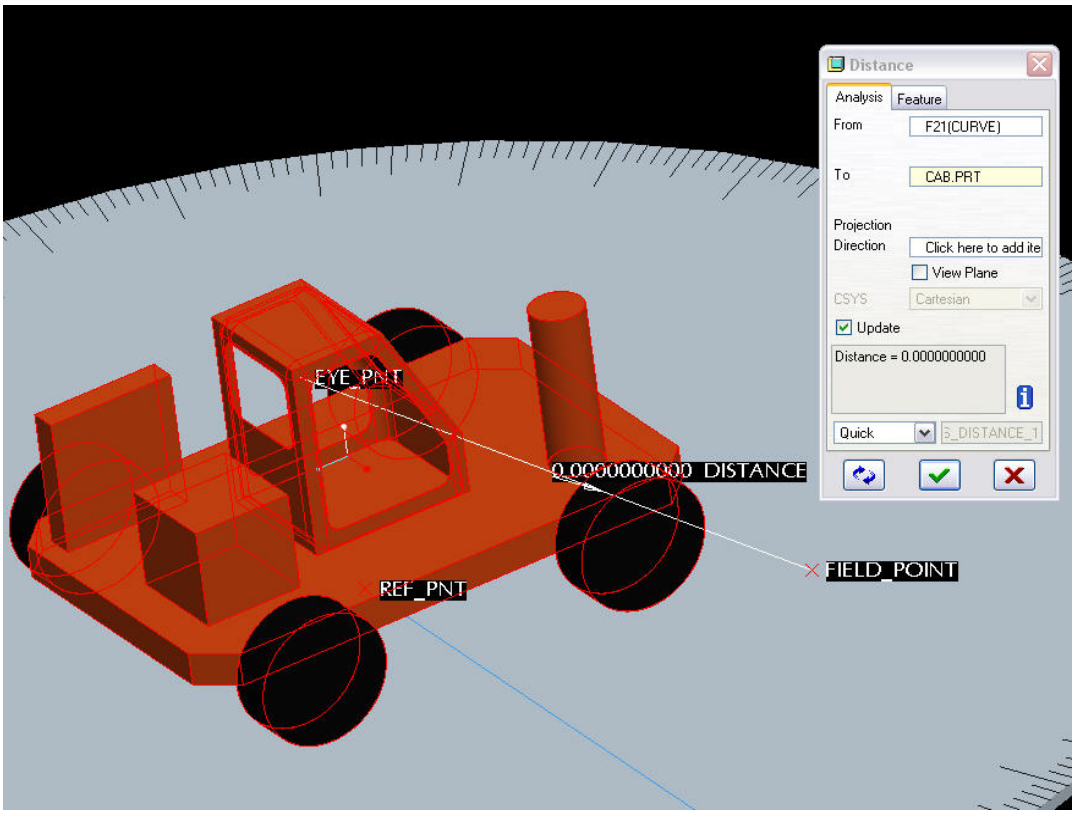
   - While holding the **Ctrl** key, select the Eye Point and the Field Point. Click **OK, Done, OK** to close the menu manager and create the new datum curve



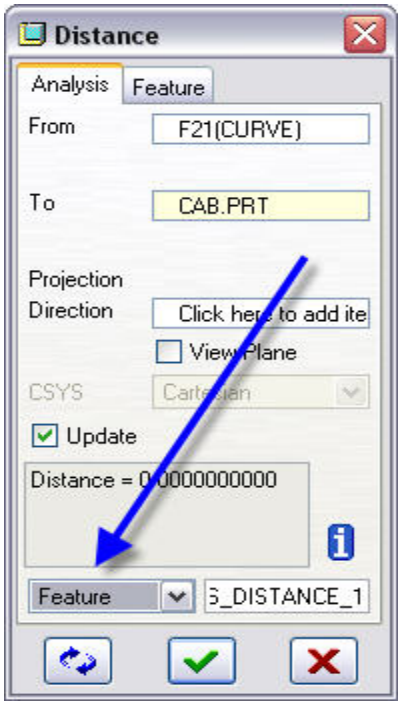
7. Create an Analysis Feature to measure the distance between the newly created datum curve and the product assembly.
    - **Analysis > Measure > Distance** from the Pro/E toolbar.



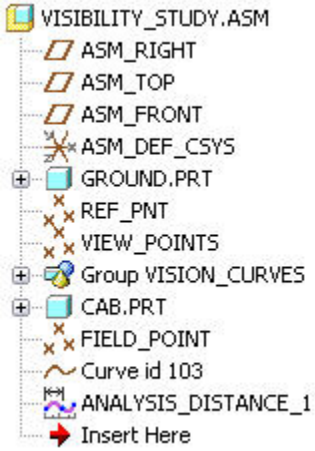
    - Measure From: Datum Curve, To: Product Part/Assembly/Shrinkwrap/Envelope, etc…



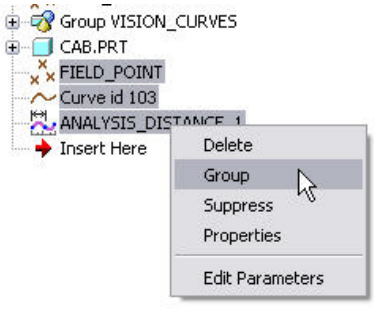
    - Change the Analysis type to “Feature” and click the Green Checkbox to complete the feature.



8. The following three features should be in consecutive order in the model tree:
   - FIELD_POINT
   - Curve id xxx
   - ANALYSIS_DISTANCE_1

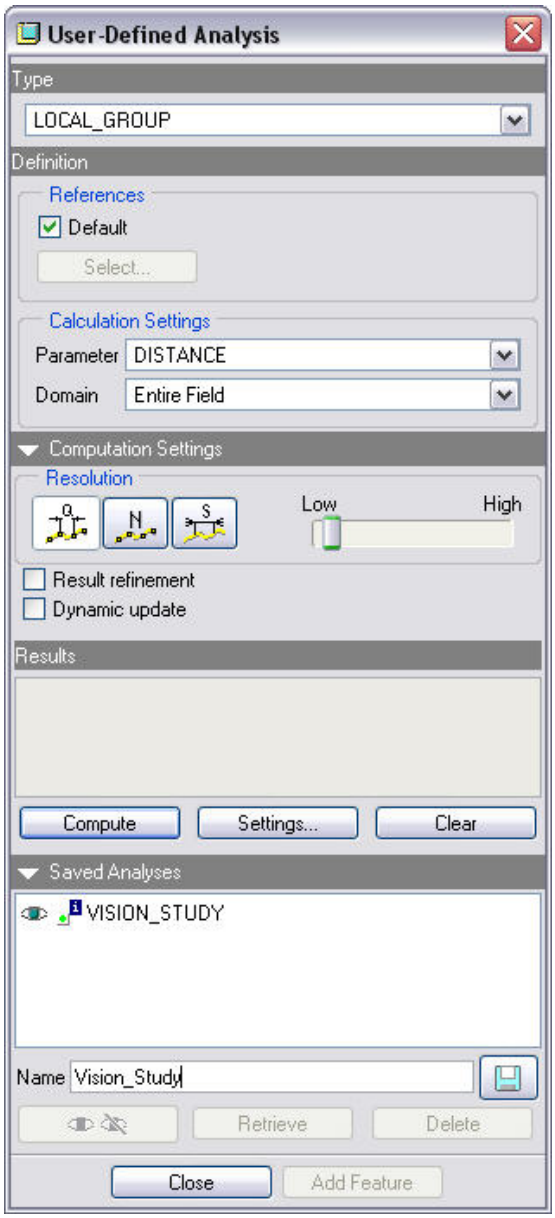


9. Select the three features mentioned above and group them together to create a new UDA group feature in the model tree.
   - Select the three features, **Right-Click** in the model tree and choose **Group** from the Right Mouse button menu

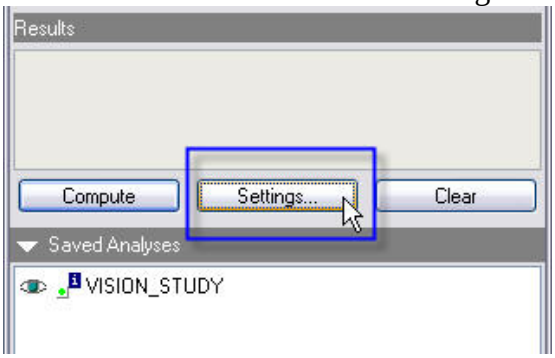


10. Create a new **User-Defined Analysis** to see the line of sight analysis for the assembly.
    - Select **Analysis > User-Defined Analysis…** from the Pro/E toolbar

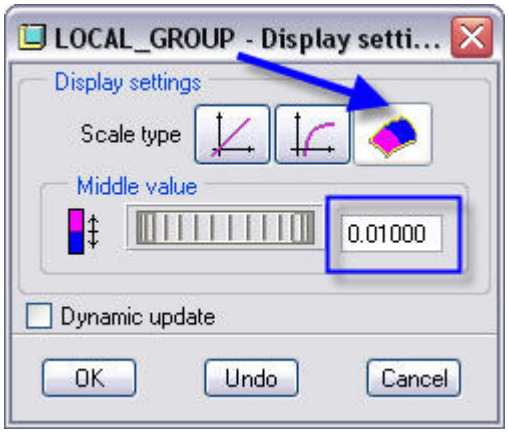
11. In the User-Defined Analysis window, leave the settings proved as their default values.
    - Expand the “Computation Settings” and “Saved Analyses” drop-down menus.
    - Type a new name for the saved analysis feature and click the “Save” icon to store it



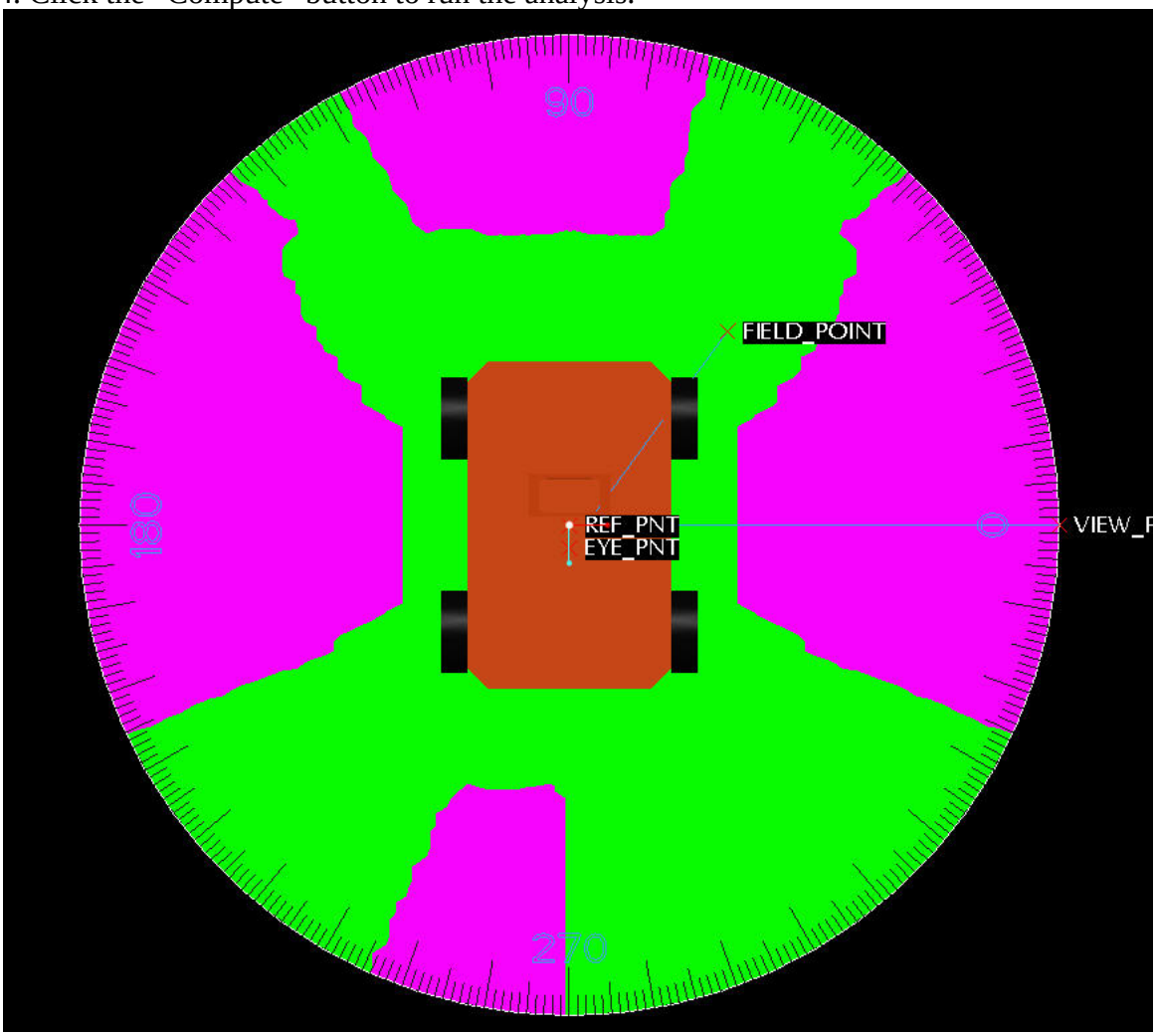
12. Click the “Settings…” button in the results section to change the analysis settings.



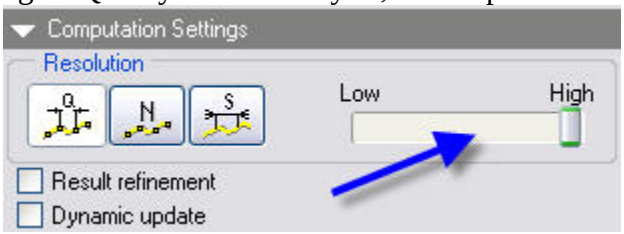
13. Change the Display Setting to “Two color shading” as well as changing the “Middle value” to **.01**. Click **OK** when finished.



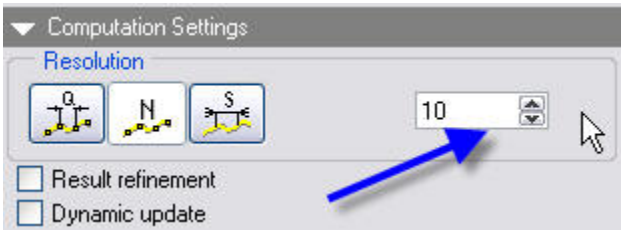
14. Click the “Compute” button to run the analysis.



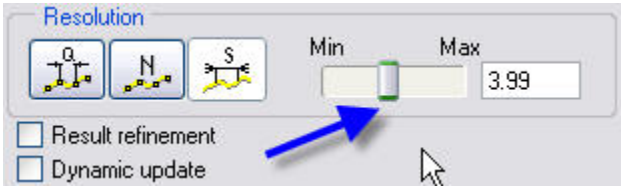
15. The accuracy of the analysis can be adjusted in several ways.
    - When using a “Quality” based analysis, the scope can be set from Low to High



    - When using a “Numeric” analysis, the number of points can be adjusted from 0 to 100

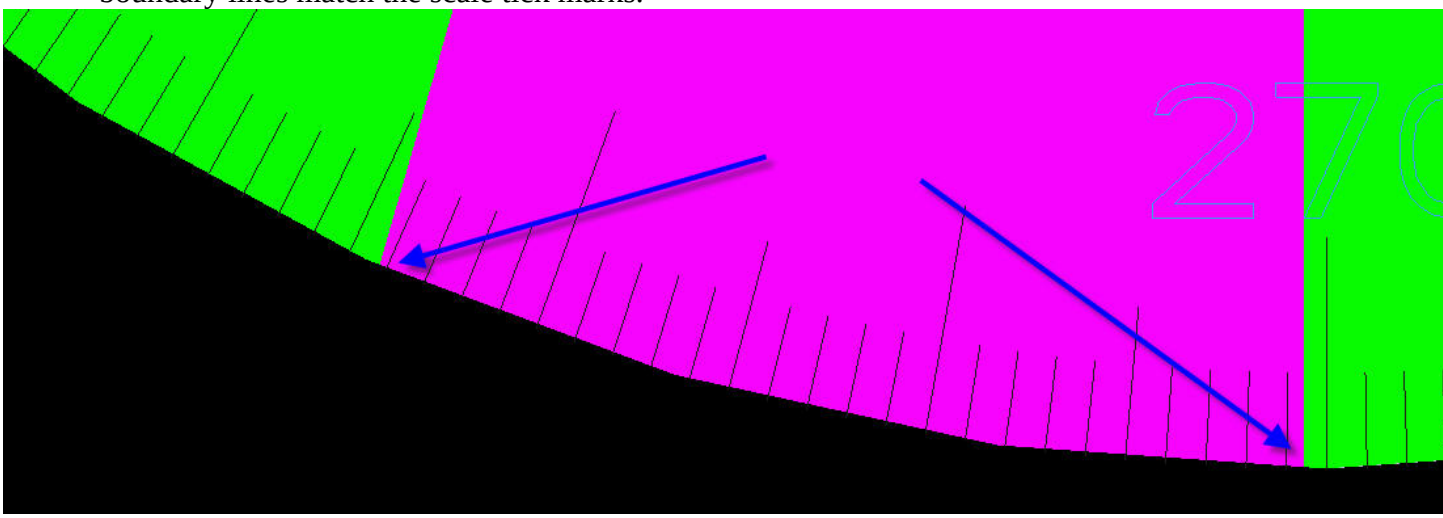


    - When using a “Step” analysis, the increment between measurements can be adjusted



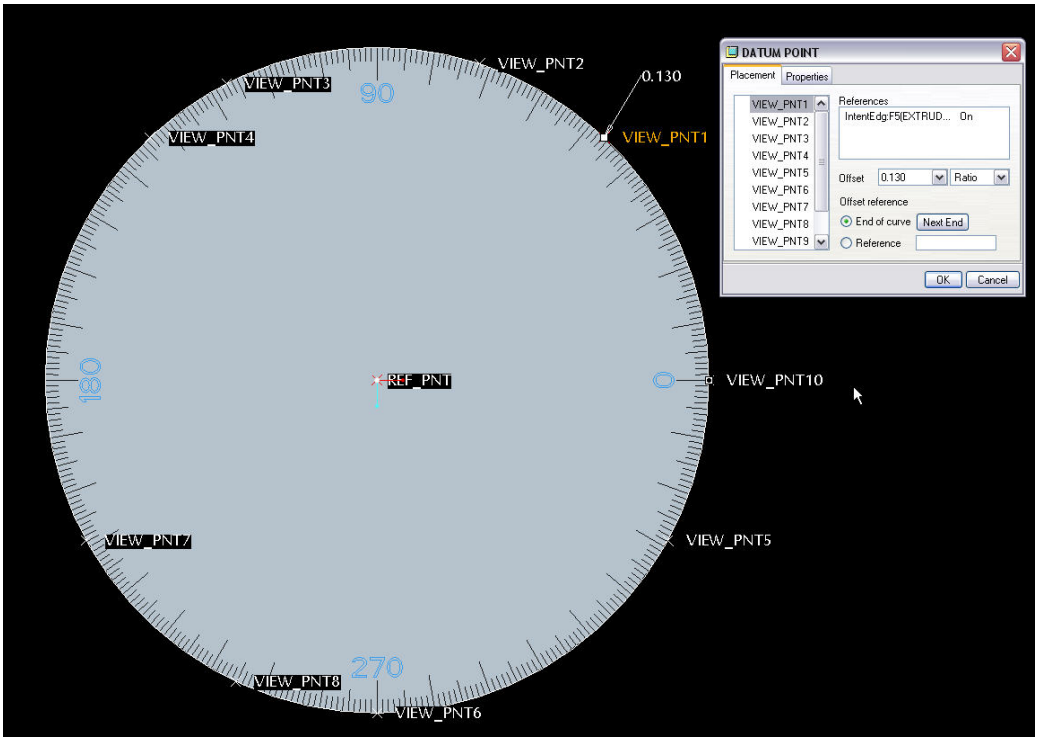
16. When the analysis is complete, choose “Add Feature” to place the analysis feature in the model tree.

17. With the analysis results still displayed on the screen, note where the green/purple boundary lines match the scale tick marks.

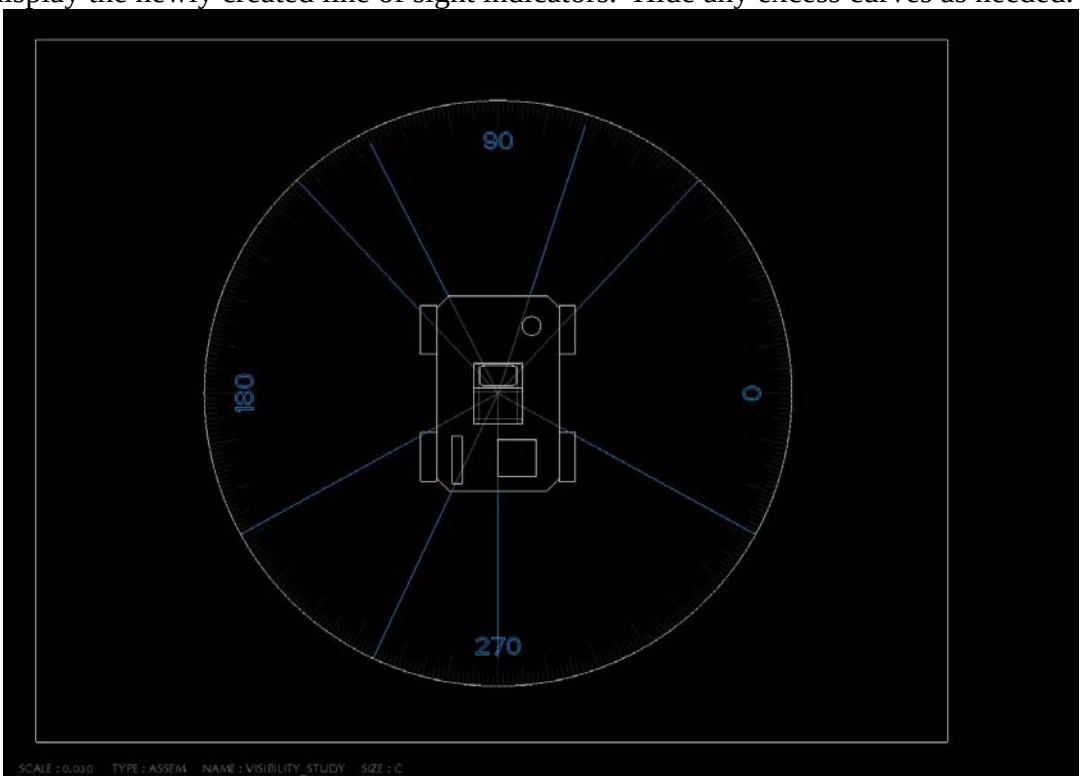


18. Select **VIEW_POINTS** from the model tree and Edit Definition to change the point locations

19. Move the point locations to match the markings noted in step 17.



20. Create a new drawing and place the Visibility Assembly study. Use the TOP view to display the newly created line of sight indicators. Hide any excess curves as needed.



**** General Notes ****

- The analysis feature is NOT persistent, meaning it will not show up in a drawing, or during the redefinition of existing features in the assembly

- The same analysis feature can be reused for different settings of the EYE POINT

- In order to delete the analysis group in the model tree, you must first delete the saved analysis from the **Analysis > Saved Analysis** menu

- If using a shrinkwrap, best results are obtained by creating a shrinkwrapped solid; also make sure to include any necessary datum features

- To improve analysis time and resolution of the analysis feature, the surface of the "GROUND.PRT" can be divided into any desired number of separate surfaces (i.e. quadrants)

- 64-bit machines are recommended for larger/more complex assemblies

- More information can be found by searching for "user defined analysis" in the Pro/E Help menu as well as the Behavioral Modeling Analysis Pro/E Help Topic Collection PDF

Back To Top

Tips of the Month

Arbortext Custom Tables – Flexible Information Display

Click Here To View

Back To Top

Announcements

The PTC/USER Portal is getting an updated, fresh user interface.

The functionality is remaining the same but the site is being redesigned to allow for easier navigation by users.

You will also begin to see blog articles being posted by the PTC/USER Board of Directors highlighting different aspects of your community and other relevant info.

The four major areas in which our site design has been updated are:

1. Redesigned Header Area
2. Simplified Navigation
3. New Site Wide Right Side Bar
4. Other Design Elements

For more details on these changes you can read about them in the What's New guide.

Enjoy the redesigned site and we look forward to your feedback.

Evan Caille

PTC/USER Board of Directors

PTC Tips & Techniques Newsletter Archives

Did you miss an issue? Can't find that awesome technique you read about? Fear not, you can click on the link below and go through our Customer PTC E-Newsletter archives.

Customer Care Zone

PTC Tips & Techniques Webcasts: Work Smarter. Not Harder.

Click below to see regularly scheduled Tips & Techniques technical Webcasts that are designed to provide you with the most popular time-saving tricks that Pro/ENGINEER users of all skill levels will find useful. Get more out of your maintenance dollars!

Tips & Techniques: Work Smarter Not Harder!

Special Hardware offers for PTC Customers

- http://www.hp.com/go/ptc
- http://www.hp.com/go/ptcworkstation

PTC Sponsored Events

- http://www.ptc.com/company/news/events/index.htm

Explore what is new with the Pro/ENGINEER Wildfire family!

http://www.ptc.com/go/showcase

Connect with PTC using the latest Social Networking resources:

Also visit http://social-product-development.blogspot.com/

Back To Top

Upcoming Events & Training Class Schedules

Upcoming, 2010	Your local Pro/Engineer User Groups http://www.ptcuser.org/rugs/
June 12 – 15, 2011	Las Vegas, NV USA PTC/USER World Event http://www.ptcuser.org/

Events

Our seminars and conferences seek to provide you with relevant information regarding product development trends in your industry as well as innovative software learning experiences. Think of them as a constructive day off where you can share experiences and swap ideas with your peers.

If you can't manage to get away, we'll bring it to you. Check back often for regularly scheduled live webcast events.

You're Invited to Attend…

Please visit the PTC Education Services website for the latest training information including course descriptions, schedules, locations, and pricing.

- Attend a course at any PTC Center and receive a free copy of Pro/ENGINEER Wildfire Student Edition!

http://www.ptc.com/services/edserv/index.htm

Live Instructor-Lead Virtual PTC Training Courses

Virtual Classrooms provide interactive learning with a trained PTC instructor in convenient and manageable sessions that last approximately 4 hours over a series of days. It's easy to join a class right from your desk using a phone or voice-over IP technology.

Sessions are performed just like a traditional ILT (including interactive exercises where you and the instructor can work on lab exercises together) and feature some of our most popular ILT courses. These sessions cover the exact same material as the traditional ILT in-center courses. Also look for some of our most frequently requested mini-topics delivered in the same format that are only an hour - two hours in duration.

If you have any questions about these sessions or would like to see getting other courses, not on this list, on the schedule please feel free to contact me for more details. They are a great way to bring training to you without you having to worry about location or being out from work for long stretches.

You can register for these sessions just as you would for any normal ILT class either by:

1. calling order admin at http://www.ptc.com/services/edserv/training/registra.htm or
2. you can go to PTC University directly at http://www.ptc.com/learning and submit a registration request directly. All you have to do is search the catalog by typing in "virtual" in the search field and you will see a listing.

PTC

Note: This PTC E-Newsletter will continue to be used for the following:

1) Inform you on events related to PTC products (user groups, conferences, training schedules, etc.)

2) Educate you on solutions that are available at PTC

3) Tips & Techniques using PTC Products

Note: These messages are compiled in the local PTC office and will be distributed via e-mail.

Back To Top