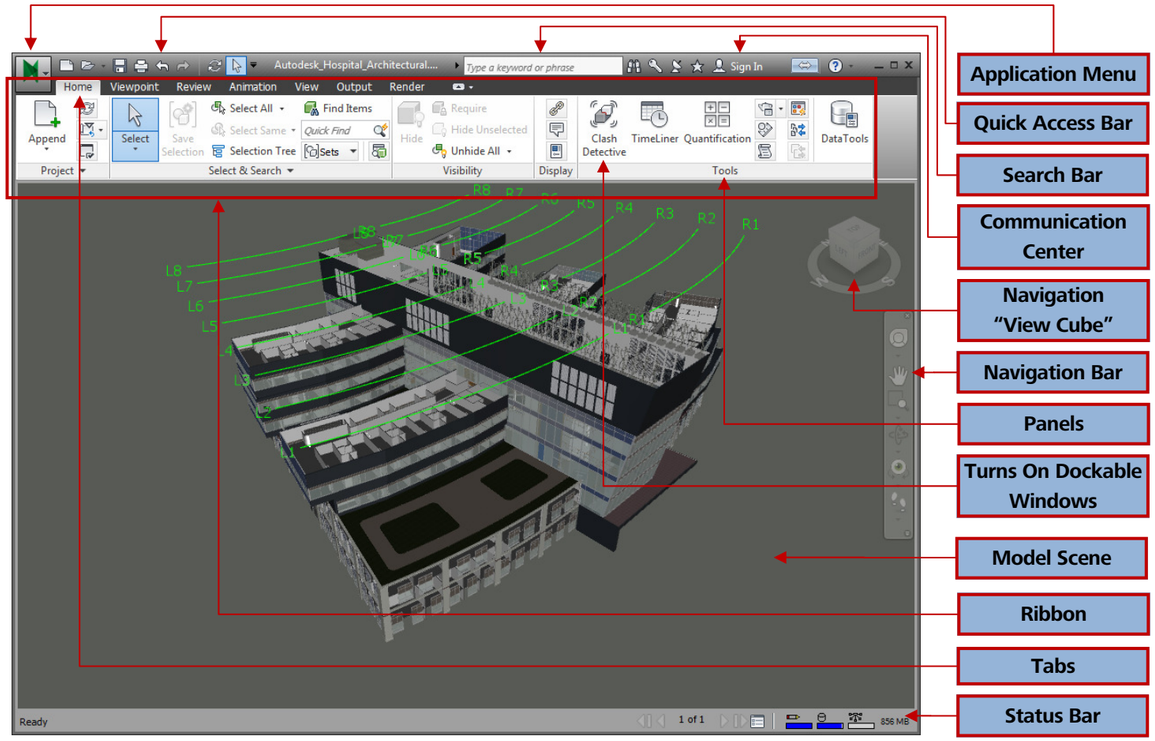
AUTODESK.

Navigation
Get around your model

Workspace Shown = Navisworks Minimal



Want more information? See Help > Quick Start > The User Interface > Parts of Autodesk Navisworks Interface

Navigation Mode	WALK	ORBIT	FREE ORBIT	CONSTRAINED	LOOK
Left Mouse Button	WALK Forward/Back WALK Left/Right	ORBIT Camera	ROTATE Model	TURN Model	LOOK Up/Down LOOK Left/Right
Right Mouse Button	Select object	Select object	Select object	Select object	Select object
Scroll Wheel	TILT Head Up/Down	ZOOM	ZOOM	TILT Camera	Nothing
Press Scroll Wheel	DOLLY Up/Down PAN Left/Right	PAN Camera	PAN Model	PAN Model	Nothing
Shift + Left Mouse Button	WALK faster	ZOOM	ZOOM	ZOOM	LOOK faster
Up/Down Arrow	WALK Forward/Back	ORBIT Camera	ROTATE Model	TILT Model	LOOK Up/Down
Left/Right Arrow	LOOK Left/Right	ORBIT Camera	ROTATE Model	TURN Model	LOOK Left/Right

AUTODESK® NAVISWORKS® MANAGE 2014

Quick Reference Guide

Getting Started
Appending Files and Navigating

The dataset for this tutorial can be found in:
C:\Program Files\Autodesk\Navisworks Manage 2014\...
\Samples\Getting Started

Step 1: App Menu > File > Open > Open — Structure.nwc

Step 2: App Menu > File > Open > Append — MEP.nwc

Step 3: App Menu > File > Open > Append — Architecture.nwc

Step 4: App Menu > File > Save As — Conference.nwf

Step 5: Ribbon > View Tab > Workspace Panel > Load Workspace > Navisworks Extended

Step 6: Press on the Clash Detective Control Bar

Step 7: Ribbon > Home Tab > Select & Search Panel > Click on "Selection Tree"

Step 8: If not already, Pin it open

Step 9: Right-click "Architecture.nwc" in the Selection Tree

Step 10: Choose Override Item > Override Transparency

Step 11: Drag the slider right, towards 70% transparent. Click OK.

Step 12: Turn off the display of lines. Ribbon > Viewpoint Tab > Render Style Panel > select "Lines"

Step 13: Explore the model using the Walk Tool. Ribbon > Viewpoint Tab > Navigate Panel > Walk

Step 14: Left-click and push the mouse forward to WALK

Step 15: Move the mouse left or right to LOOK left/right

Step 16: Turn on the avatar (Third Person mode). Ribbon > Viewpoint Tab > Navigate Panel > Realism > Third Person

Step 17: Roll the mouse wheel to LOOK up/down

Step 18: Hold the mouse wheel to PAN up/down/left/right

Step 19: Turn on Collision Detection inside the "Realism" drop down. Walk forward

Step 20: Turn on Gravity inside the "Realism" drop down, to walk up and down stairs

Step 21: Ribbon > Viewpoint Tab > Navigate Panel > Zoom Window Drop Down > Zoom All

Proceed to Sectioning ...

Quick Tip: To emphasize your model, use the Selection Tree to override the Transparency of other disciplines' files to 70%. Use the Section Planes to further isolate a level.

Want More Information?
Technical Support: support.autodesk.com
Discussion Forums: forums.autodesk.com > Navisworks
Subscription Center: subscription.autodesk.com > Training
Autodesk Consulting: autodesk.com/consulting

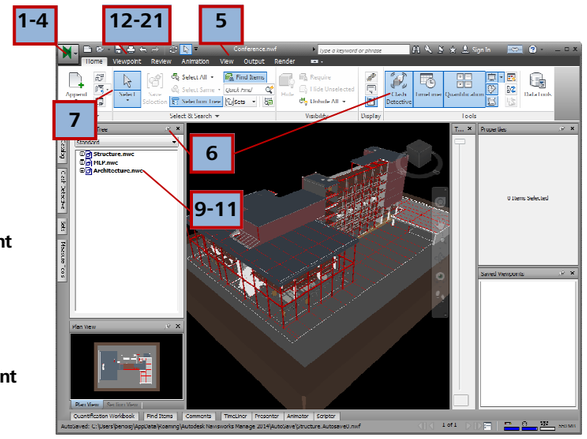
What is Navisworks?

Building Information Modeling has become synonymous with programs like Revit, but BIM does not stop there. Navisworks enables you to interrogate and utilize this information throughout the design, build, and operation stages without the need for a design application.

Navisworks is designed to bring together geometry and data created by multidisciplinary teams, on the largest projects, into a single model. This model is available for clash detection, virtual construction, quantities, tenant improvements, and lifecycle management over the entire life span of the building.

The Navisworks engine intelligently prioritizes all objects in a scene. If your computer is unable to draw all geometry while navigating, the engine elects to 'drop out' the finer detail, allowing you to continue navigating in real time.

Workspace Shown = Navisworks Extended



Quick Tip: Press Shift when starting the Options Editor dialog - "Green N" > Shift-Options. This will run the enhanced version of program options settings.

File Types
See *Help > User Guide > Work With Files > Native File Formats* for more information.

	Cache Files are exported directly out of some applications. They contain only the raw data necessary to bring in the file.
	File Sets assemble multiple files (DWGs, NWCs, SATs, DGNs, other NWFs) into one model. Links are live and update like xrefs.
	Dataset File is a published NWF and directly contains the data of all linked files. Linked files are frozen and unnecessary.

Sectioning
Slice up your building to see inside

Step 1: Ribbon > Viewpoint Tab > Sectioning Panel > Enable Sectioning

Step 2: Ribbon > Sectioning Tools Contextual Tab > Mode Panel > Verify set to "Planes"

Step 3: Planes Settings Panel > Current: Plane 1

Step 4: Planes Settings Panel > Alignment: Top

Step 5: Application Menu > Options > In Tree Expand on Interface

Step 6: Select on Display Units

Step 7: Set Linear Units to Feet and Inches. Ok out.

Step 8: Ribbon > Sectioning Tools Tab > Transform Panel > Move

Step 9: Ribbon > Sectioning Tools Tab > Transform Panel > Expand on "Transform" Panel Drop Down

Step 10: Change Z to 14 Feet

Step 11: Planes Settings Panel > Set Current: Plane 2
Notice: Plane 2 Light bulb Turns On.

Step 12: Planes Settings Panel > Alignment: Front

Step 13: Transform Panel > Change Z to 0 Feet

Step 14: Plane Settings Panel > Enable Plane 3

Step 15: Align to Left, Set to 0 Feet

Step 16: Turn Off Plane 3

Step 17: Align Plane 2 to Bottom, Set Z to –12 Feet

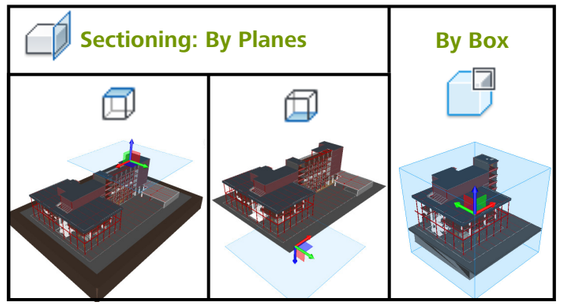
Step 18: Link Section Planes

Step 19: Set Current: Plane 1, to flip the UCS MOVE Gizmo

Step 20: Mouse to the MOVE Gizmo, Grip the Blue Z-Axis to Drag the Slicer Up and Down

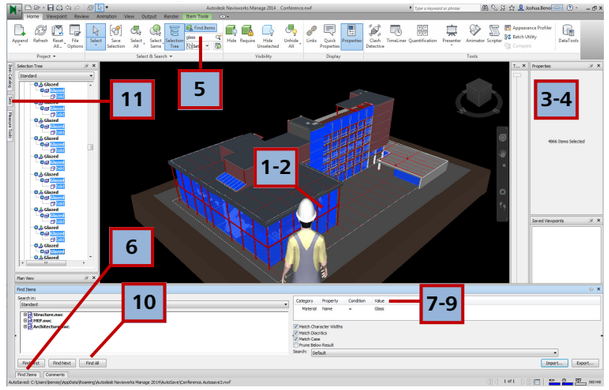
Step 21: Disable Plane 1 and Plane 2

Proceed to Search Sets...



Search Sets
Create dynamically refreshed selection sets

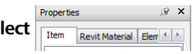
Workspace Shown = Navisworks Extended



Step 1: Navigate to any glass-faced section of the building

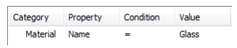
Step 2: Select one of the sections of glass (May be transparent.)

Step 3: Mouse over Properties on the right

Step 4: Select  and observe 

Step 5: Ribbon > Home tab > Select & Search panel > Find Items

Step 6: Mouse over Find Items. Pit it open.

Step 7: Set: 

Step 8: Add a second criteria: Item Name = Glazed

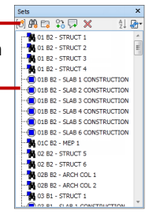
Step 9: Right-click the new criteria and select Or Condition

Step 10: Press Find All

Step 11: Mouse over Sets tab on the left, pin it open

Step 12: Select on Save Selection

Step 13: Name the Search Set by typing:
Architectural Glass



Proceed to Clash Detection...

The selection sets are identified by this icon: , and the search sets are identified by this icon:

A SELECTION SET only includes objects currently selected.

A SEARCH SET is automatically updated each time you use it to include items that match the search criteria.

In the above exercise, it would add any additional window glass that has been subsequently added to the project. Search Sets can be EXPORTED to other projects.

Quick Tip: Define a number of generic searches. For example: Level 1, Structural Steel, etc. Then save and re-use them on future projects.

Clash Detection
Identify, collaborate, resolve interferences

Step 1: Mouse over Clash Detective on the left. Pin it open.

Step 2: Click Add Test at the Top Right of Clash Detective

Step 3: Click Add Test at the Mid-Left above the tabs

Step 4: On the Select tab, in Selection A, change the drop down filter to "Sets"

Step 5: Select on our new Search Set "Architectural Glass"

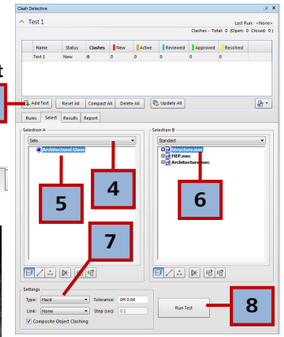
Step 6: On the Select tab, in Selection B, select Structure.nwc

Step 7: In Settings, verify:
Type = Hard
Tolerance = 0.00 feet

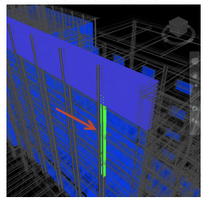
Step 8: Press Run Test

Step 9: Observe the changes:

- Results tab set current
- First clash > Selected
- First clash > Zoomed into view:



Quick Tip: Use clash rules to eliminate false positives. Ignore same layer, group, file, points, etc.



Quick Tip: To clash point cloud data, select it in one of the panes. Choose , set Type to Clearance, and set Tolerance to 0.01 ft.

Proceed to Redlining ...

Shared Coordinates
Align Project Origins and Orientation

Step 1: Export NWC Cache files from each design product. Use the same file names for the life of the project.

Step 2: Open the first NWC Cache file

Step 3: Append any additional Cache files

Step 4: Enable Tools > Global Options > Interface > Snapping > Snap to Vertex

Step 5: Select Measure Tools > Point to Point

Step 6: Measure between points which should be common in the two models

Step 7: Select the file you wish to move in the Selection Tree

Step 8: Select Measure Tools > Transform Objects. The current change is only temporary.

Step 9: Right-click the file in the Selection Tree. Select Override Transform. The change is now stored for the Cache file.

Step 10: Save the File Set as an NWF.

Redlining
Record & collaborate decisions

Step 1: Ribbon > Review tab > BOTH Redline & Tags panels

Step 2: Draw a cloud around the clash, click for each arc

Step 3: Add a Redline Tag to the cloud
2 clicks: Leader start at target-finish at tag

Step 4: Add Comment box pops up, add a comment: Fix it!

Step 5: Ribbon > Viewpoint tab > Navigate panel > Pan

Step 6: Pan away from the clash. The markup vanishes.

Step 7: Ribbon > Review tab > Comments panel > select Find Comments

Step 8: Press Find. Select Clash1.

Step 9: Observe it zooms back to Clash1.

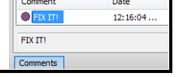
Step 10: Ribbon > Review tab > Comments panel > Search bar

Step 11: Type in "Fix It!", click . Same effect.

Proceed to Timeliner ...

Quick Tip: Use Redline Tags to make notes about markups. Only Redline Tags can be searched.

Quick Tip: To edit a Redline Tag, mouse over the Comments bar. Right-click the Redline Tag item, select Edit Comment.

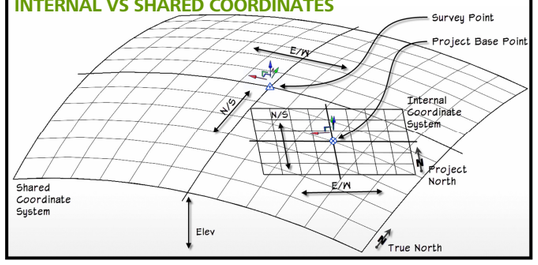


SHARED COORDINATES are used for remembering the mutual positions of multiple interlinked files. Those interlinked files can be all Revit files, or a combination of Revit, DWG, and DXF files. Navisworks will recognize Shared Coordinates when present.

Quick Tip: You should derive shared coordinates from only one file. That one file defines the coordinates for all other files that compose the project. Acquire coordinates from one file and then publish those coordinates to other files.

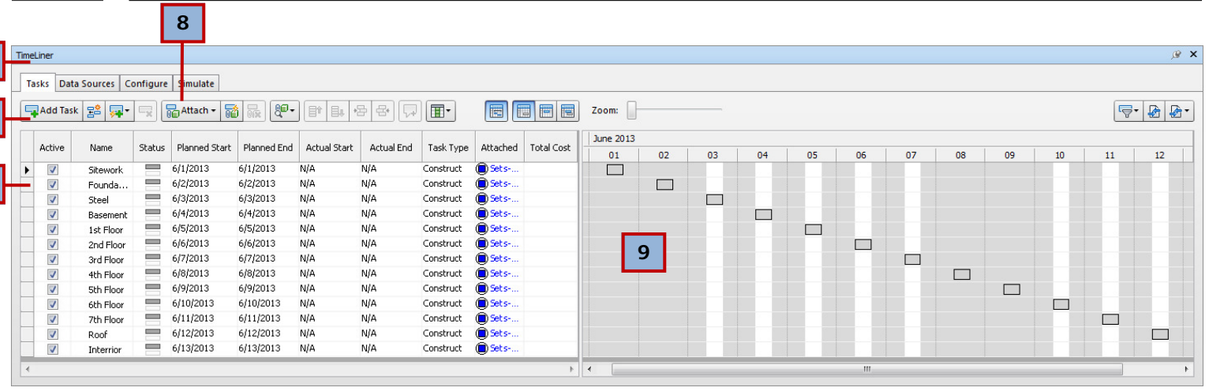
Quick Tip: Place a physical monument at the project origin of each design file. This will provide a common point for step 6.

INTERNAL VS SHARED COORDINATES



Timeliner

Model your project tasks & schedules



TimeLiner Tasks

Use the TimeLiner to link your model to an external construction schedule for visual time and cost based planning.

In TimeLiner tasks can be created in one of the following ways:

- **Manually, one at a time**
- **Automatically, based on object structure in the Selection Tree, or the selection and search sets**
- **Automatically, built from data sources added to TimeLiner**

Step 1: Ribbon > Home tab > Tools panel > TimeLiner

Step 2: TimeLiner window> Tasks tab > Add Task 

Step 3: Create ALL Tasks seen above

Step 4: Ribbon > Home tab > Select & Search panel > Sets drop down > Manage Sets

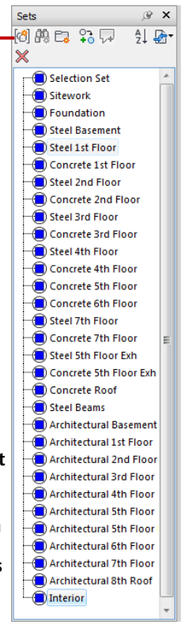
Step 5: Ribbon > Home tab > Select & Search panel > Selection Tree 

Step 6: Explore the Selection Tree
Expand on Structure.nwc, etc

Step 7: Create Selection Sets Similar to what is seen in the image on right

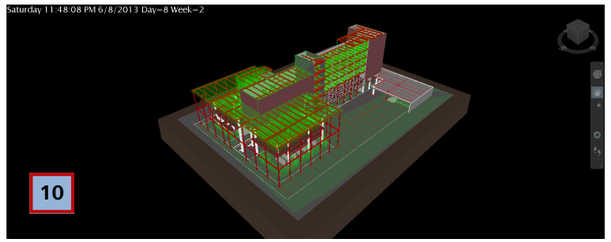
Step 8: TimeLiner window > Attach each Set to a Task using Attach button

Step 9: Observe Timeline to right of tasks



Proceed to TimeLiner Simulation…

Quick Tip: Observe in the top image the "Task Type" column. When this is blank, the Task does not participate in the Simulate video. The "Task Type" list is derived on the "Configure" tab. Three Default Task Types: Construct, Demolish, Temporary



TimeLiner Simulation

Watch your building being built from the ground up by playing a video of your TimeLine

Step 1: TimeLiner window > Configure tab

Step 2: Click Appearance Definitions...

Step 3: Click Add button

Quick Tip: Export your Task List to create a folder of Selection Sets that match the name of Tasks. Sets are automatically attached to the Tasks.

Step 4: Rename the new appearance to White (90% Transparent)

Step 5: Double-click in the color swatch and set to be white

Step 6: Set Transparency to 90%. Ok out. Do Not Use Just Yet.

Quick Tip: Meaning of Appearances:

- **Start Appearance - how the items will look at the start of the task**
- **End Appearance - how the items will look when the task is completed**
- **Early Appearance - how the items will look if the task is started before the planned time**
- **Late Appearance - how the items will look if the task is started after the planned time**
- **Simulation Start Appearance - how the items should be displayed at the start of a simulation. Simulation start precedes all task starts**

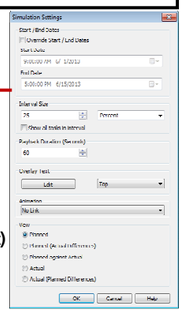
Step 7: TimeLiner window > Simulate tab

Step 8: Click Settings button Settings...

Step 9: Set according to image to right

Step 10: Press Play

Step 11: Try different Settings and Appearances:
Enable: "Show all tasks in interval"
Set Start Appearance: White (90% Transparent)



Proceed to Quantification…

Quick Tip: Primavera P6 v8.2 now supported

Quantification

Generate a quantity takeoff for analysis

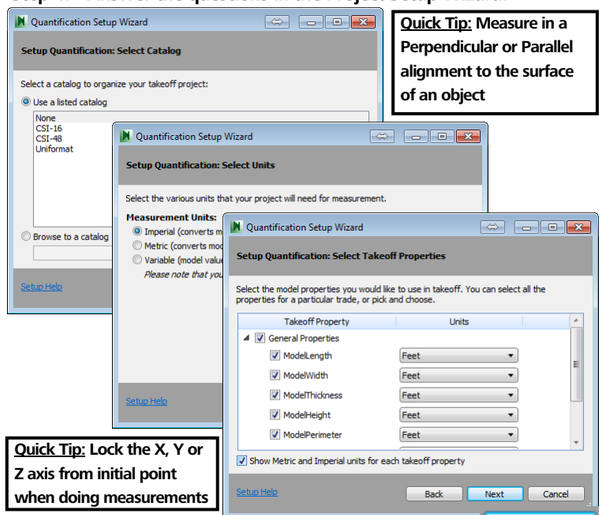
Quantification gives you the tools to automatically make material estimates, measure areas and count building components

Step 1: Save your NWF file

Step 2: Click the Project Setup... button

Step 3: It may ask: Would you like to view Quantification getting started tutorials now? > Remind me later

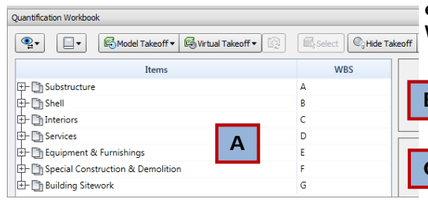
Step 4: Answer the questions in the Project Setup Wizard:



Quick Tip: Measure in a Perpendicular or Parallel alignment to the surface of an object

Quick Tip: Lock the X, Y or Z axis from initial point when doing measurements

Step 5: Choosing Catalog CSI-16 in the Wizard results in this tree structure. To explore different Catalog tree structures, close your file without saving. Re-open the NWF file and try a different Catalog in the Wizard.



Quick Tip: Limit sectioning planes or boxes to elements you have selected. Great for levels!

A. Navigation pane. This contains a list of Items and WBS (Work Breakdown Structure) codes
B. Rollup pane. The summary of your takeoff items. Right-click a column header to change the columns displayed in the Rollup pane
C. Takeoff pane. Displays all takeoff items. Right-click a column header to change the columns displayed in the Takeoff pane

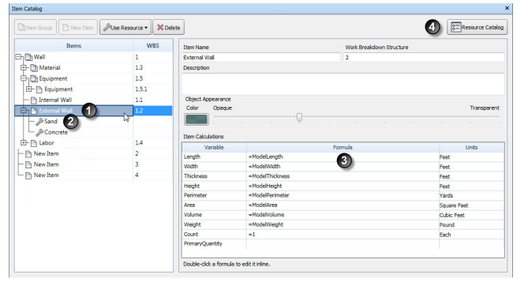
Step 6: Create some Sample Resources and Items

Step 7: In the Quantification Workbook, click the Item you want to use for the takeoff. In the Scene view or Selection Tree, select the object(s) you want to take off. Right-click selected object(s) > Quantification > Takeoff to: (name of existing Item)

Step 8: The takeoff appears in the Quantification Workbook, under the existing catalog Item

Quick Tip: The available measurements (variables) are:
Length Width Height Perimeter Thickness
Weight Area Volume Count

Key terms	Before you begin	Create your first takeoff
Quantification workbook The main workspace that contains the object data for the takeoffs you create in a project. **Item catalog** The organizational database for your takeoff project, defining takeoff groups and disciplines. **Resource catalog** The resources needed for successful completion of a project, related by function and type including materials, equipment or tools.	**Supported files** Files must contain properties and a GUID from the original design application. Quantification supports native and aggregated files from Autodesk and non-Autodesk applications. See Property Mapping. **Catalog integration** Ensure your IT administrator has integrated your most commonly used catalogs into Quantification.	1. Create project 2. Select takeoff items 3. Create takeoff items 4. Perform takeoff 5. Export takeoff data



1. Item.
2. Resource.
3. Formulas. Double-click on a Formula to edit.
4. Resource Catalog. Click to switch between Resource Catalog and Item Catalog.

Quantification workflow:

1. **In Navisworks, open a design data source file**
2. **Open the Quantification workbook**
3. **Set up a project**
4. **Create or select takeoff items**
5. **Hide unwanted items**
6. **Use measurement tools for items not in catalog (for virtual takeoff)**
7. **Organize takeoff items (change item order, create new items)**
8. **Edit formulas/parameters**
9. **Refresh model after changing data**
10. **Analyse and validate takeoff data**
11. **Output takeoff data to Excel XLSX format**

Model takeoff

Model takeoff uses the properties embedded in the design source files to create takeoff data. It extracts the objects from the model and displays them as Items in the Quantification Workbook.

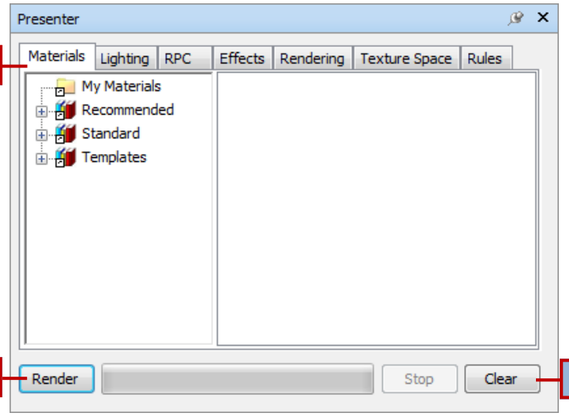
Virtual takeoff

Perform virtual takeoff to add takeoff items that are not linked to a model object, or where an item appears in the model but contains no associated properties. You can use measure tools in conjunction with a virtual takeoff, and associate a viewpoint with the virtual takeoff Item.

Proceed to Presenter, Animator, Scripter...

Presenter, Animator, Scripter

Render, animate & interact with the model



An important enhancement to the Autodesk line of products is the introduction of Ray Trace. Navisworks will now render the Autodesk library of materials. Any Autodesk materials applied to a model in Revit will persist in Navisworks. The look and feel of the model will be consistent from Autodesk product to Autodesk product. As of 2014, material libraries are now included. Don't forget, you can also view your NWD models on the Autodesk BIM 360 Glue mobile iPad app. NOTE: Tutorial dataset does not have Revit materials pre-assigned

Step 1: Model space: Use ViewCube to zoom in tight anywhere

Step 2: Ribbon > Viewpoint tab > Save, Load & Playback panel > Save Viewpoint. "Saved Viewpoints" opens. Save as: "My View"

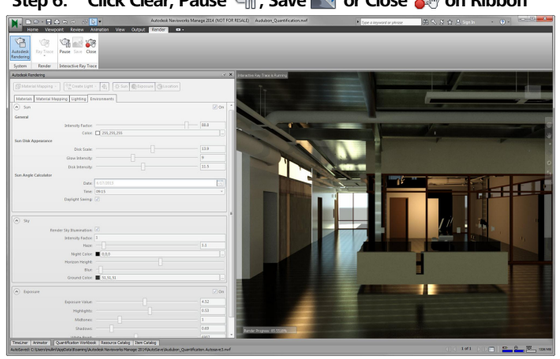
Step 3: Ribbon > Home tab > Tools panel > Presenter

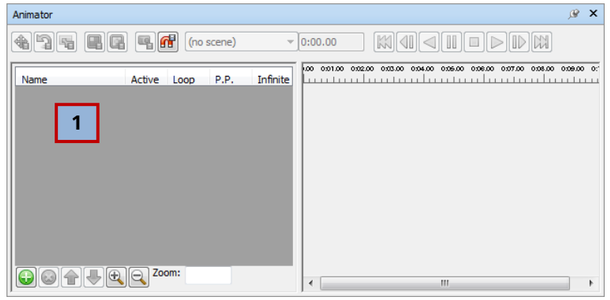
Step 4: Set up the scene:

Use Materials tab to drag and drop materials onto items in the model; Or Rules tab to set up rules which define project-wide material application; Or Texture Space tab to more accurately map materials onto items in scene; Or Lighting tab to set up additional lighting; Or Effects tab to add background/foreground effects to scene; Or Rendering tab to select a rendering style

Step 5: Click Render to start the rendering process. Rendering process can be stopped by clicking Stop

Step 6: Click Clear; Pause , Save or Close on Ribbon





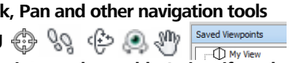
The Animator and Scripter windows are the two dockable windows that are used to create and edit object animation

Once you have set up and rendered a scene, you can additionally create animation in that scene. The rendering that you have set up will be applied to each frame of the animation

Step 1: Ribbon > Animation tab > Create panel > Animator

Step 2: Ribbon > Animation tab > Create panel > Record

Step 3: Use Focus, Orbit, Walk, Look, Pan and other navigation tools to fly the camera around the building

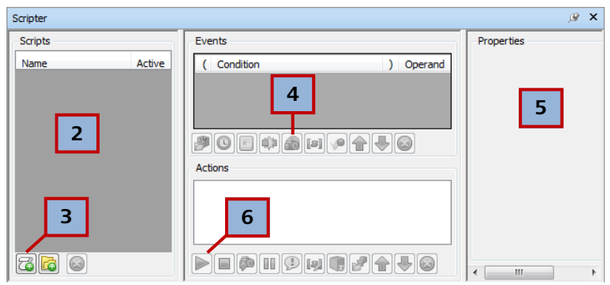


Step 4: Ribbon > Animation tab > Script panel > Enable Scripts if used

Step 5: Ribbon > Animation tab > Recording panel > Pause or Stop

Step 6: Ribbon > Animation tab > Playback panel > Play

Step 7: Ribbon > Animation tab > Export panel > Export



Step 1: Animator: Create "Open Door" animation that rotates a door by 90-degrees. While recording, use Gizmo: Rotate to manually turn door

Step 2: Ribbon > Home tab > Tools panel > Scripter

Step 3: Click Add New Script. Name it: Door Script

Step 4: In Events, click "On Hotspot"

Step 5: In Properties, set Hotspot: Sphere. Click Pick button and locate in front of a door that you will navigate thru. Trigger when entering, radius 4-feet

Step 6: In Actions, click "Play Animation" > Open Door. Properties pane: set parameters: Animation = Open Doors; Pause = Checked; Starting at Start; Ending at End. This opens our doors. Reverse start/end to close door

Step 7: Walk through the doors. You should see them open

Quick Tips

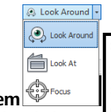
Goodie Bag

FOCUS You can put the Scene View into focus mode until the next click. When you are in focus mode, clicking on an item swivels the camera so that the point clicked is in the center of the view. This point becomes the focal point for the Orbit tools (Steering Wheels and Navigation Bar) in a 3D workspace only.

In a 2D workspace, the camera is moved to the center of the box of focused item while the z value remains the same.

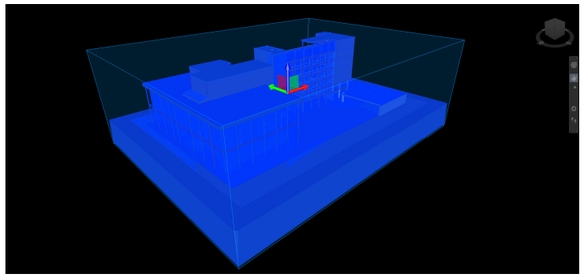
Model space > Navigation Bar > Look flyout > Focus
Model space (no selection) > Right-click menu:
Scene > Focus
Model space (make a selection).
Ribbon > Item Tools Contextual tab > Look At panel > Focus on Item

Ribbon > Viewpoint tab > Navigation Panel > Look Around > Focus



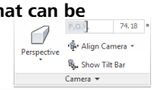
Ribbon > Home tab > Select Item
Select any item(s), Right-click > Focus On Item

Quick Tip: Set Presenter profile > Options Editor to Advanced, dialog box will include a full list of parameters, allow you to change the type of foreground



FIT SELECTION When sectioning by box, try "Select All" on the Ribbon > Home tab, then on the Ribbon > Sectioning Tools tab try "Fit Selection." The Sectioning Box will now encompass the entire project.

Field Of View Defines the area of the scene that can be viewed thru the camera: Ribbon > Viewpoint tab > Camera panel > F.O.V. slider

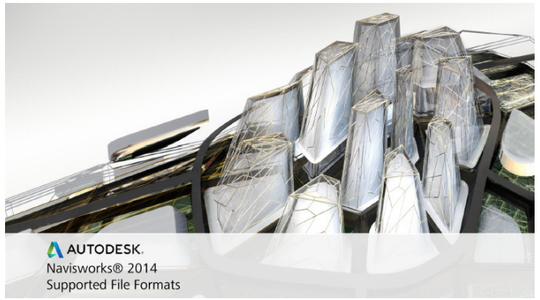


In Presenter, Animator & Scripter, when you are recording, you can add predefined views and record based on those views. Then tweak that in the animator.

High-End Renderings - Suggested Settings for Production:
Global Options > Interface > Display: Level Of Detail drop down > Low (Tradeoff between 2D fidelity & higher rendering performance)
Navisworks has two graphics engines - Presenter & Autodesk, choose the one that works best with your video card.
Hardware Acceleration, Occlusion Culling = On. Hardware: SSD's, Maximum RAM, 64-bit OS, Direct3D 9® and OpenGL® capable graphics card with Shader Model 2 (minimum)

Collaboration

Supported file types



Format	Extension	File Format Version
Navisworks	.nwd .nwf .nwc	All versions
AutoCAD	.dwg, .dxf	Up to AutoCAD 2014
MicroStation (SE, J, V8 & XM)	.dgn .prp .prw	v7, v8
3D Studio	.3ds .prj	Up to Autodesk 3ds Max 8 2014
ACIS SAT	.sat .sab	All ASM SAT. Up to ACIS SAT v7
Catia	.model .session .exp .dlv3 .CATPart .CATProduct .cgr	V4, v5
CIS/2	.stp	STRUCTURAL_FRAME_SCHEMA
DWF/DWFx	.dwf .dwfx	All previous versions
FBX	.fbx	FBX SDK 2011.3.1
IFC	.ifc	IFC2X_PLATFORM, IFC2X_FINAL, IFC2X2_FINAL, IFC2X3
IGES	.igs .iges	All versions
Inventor	.ipt .iam .ipj	Up to Inventor 2014
Informatix MicroGDS	.man .cv7	v10
JT Open	.jt	v8.0 & v8.1 only – based on v8.1 rev B specification
NX	.prt	3 – 8.5
PDS Design Review	.dri	Legacy file format. Support up to 2007.
Parasolids	.x_b	Up to schema 16
Pro/ENGINEER	.prt .asm .g .neu	Wildfire 5.0, Creo Parametric 1.0-2.0
RVM	.rvm	Up to 12.0 SP5
Revit	.rvt	2011 - 2014
SketchUp	.skp	v5 up to v8
Solidworks	.prt .sldprt .asm .sldasm	2001 Plus-2013
STEP	.stp .step	AP214, AP203E3
STL	.stl	Binary only
VRML	.wrl .wrz	VRML1, VRML2