A Revit add-in for architects and urban designers to easily communicate between Radiance and Revit

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Daylight Simulation Program

Elements needed for a daylight simulation*

* Reinhart CF, Daylighting course lectures, MIT, 2012
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Building Information Modeling (BIM):

Building Information Modeling (BIM) is an intelligent 3D model-based process that equips architecture, engineering, and construction professionals with the insight and tools to more efficiently plan, design, construct, and manage buildings and infrastructure. (https://www.autodesk.com/solutions/bim)
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Advantages:

• No need to have an extra software to communicate between the modelling software and Radiance
• No need to specify scene geometry / space usage / geographical specifications / building orientation
• No need to manually explode and change each solid glass object to a one surface object
• Such a tool can be helpful during each step in Architectural design process from the beginning to the end.
• Any inputs (like material specifications, rooms selection, etc.) that assign to the model whenever in the design process can be valid until the end
• It provides raw Radiance files (*.rad, *.mat, and *.pts files) to do whatever we want with Radiance and Daysim.

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Advantages:

• It can handle any complexities in the model, but we should be aware about the Radiance efficiency if the exported rad files become very heavy.

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AftabRad Revit Add-in Interfaces

Tutorial link:  http://aftabsoft.net/aftab-rad.php
AftabRad Revit Add-in Interfaces

How to Define Radiance Materials?

- Creating Radiance Material based on Revit Categories

[Tutorial link:](https://www.aftabsoft.net/AftabRadTutorial/RadMaterialByCategories.htm)
AftabRad Revit Add-in Interfaces

How to Define Radiance Materials?

• Creating Radiance Material based on Revit Categories
• Replacing the Revit Materials with Radiance Material

Tutorial link: https://www.aftabsoft.net/AftabRadTutorial/RadMaterialBySelectedSurfaces.htm
https://www.aftabsoft.net/AftabRadTutorial/RadMaterialByRevitMaterial.htm
AftabRad Revit Add-in Interfaces

How to Define Radiance Materials?

- Creating Radiance Material based on Revit Categories
- Replacing the Revit Materials with Radiance Material
- Modifying the Exported Radiance Materials Before Start to Calculate

Tutorial link: https://www.aftabsoft.net/AftabRadTutorial/materialEditorPanel.htm
AftabRad Revit Add-in Interfaces

How to Create Calculation Points File?

- By selecting **Surfaces** in the model
- By selecting **Elements**

Tutorial link: [https://www.aftabsoft.net/AftabRadTutorial/BySelectingElementsSurfaces.htm](https://www.aftabsoft.net/AftabRadTutorial/BySelectingElementsSurfaces.htm)
How to Create Calculation Points File?

- By selecting Surfaces in the model
- By selecting Elements
- By selecting some **Sensor Elements** as calculation points

Tutorial link: [https://www.aftabsoft.net/AftabRadTutorial/CreateCalculationPointsFile.htm](https://www.aftabsoft.net/AftabRadTutorial/CreateCalculationPointsFile.htm)
How to Create Calculation Points File?

- By selecting Surfaces in the model
- By selecting Elements
- By selecting some Sensor Elements as calculation points
- By selecting some **Rooms** or **Spaces**

Tutorial link: [https://www.aftabsoft.net/AftabRadTutorial/BySelectingRoomsSpaces.htm](https://www.aftabsoft.net/AftabRadTutorial/BySelectingRoomsSpaces.htm)
How to Create Calculation Points File?

It creates: *.pts files
How to do a View Based Simulations?

- By selecting some Revit views

Tutorial link: [https://www.aftabsoft.net/AftabRadTutorial/DefiningSpecificViews.htm](https://www.aftabsoft.net/AftabRadTutorial/DefiningSpecificViews.htm)
How to do a View Based Simulations?

- By selecting some Revit views

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Which Types of Analyses can be done by this Add-in?

- Shadow Range
- Sunlight Hours
- One Day Sunlight Hours
- UTCI based Sunlight Hours
- Exposure2sunlight (EN 17037)
- Annual Sunlight Exposure
- View Analysis (EN 17037)
- Visibility Analysis

Tutorial link: https://aftabsoft.net/aftab-rad.php#CalculationTypes
AftabRad Revit Add-in Interfaces

Which Types of Analyses can be done by this Add-in?

Shadow Range

Tutorial link:  https://aftabsoft.net/aftab-rad.php#CalculationTypes
Which Types of Analyses can be done by this Add-in?

Annual DGP

Tutorial link: https://aftabsoft.net/aftab-rad.php#CalculationTypes
AftabRad Revit Add-in Interfaces

Which Types of Analyses can be done by this Add-in?

Without Sky (Night Time Scene)

Tutorial link: https://aftabsoft.net/aftab-rad.php#CalculationTypes
How to handle big size 3Ds model when exporting to Radiance?

• Excluding to export any elements that is hidden in the current view inside Revit

Tutorial link:  https://www.aftabsoft.net/AftabRadTutorial/simplification_byHidingElements.htm
How to handle big size 3Ds model when exporting to Radiance?

- Excluding to export any elements that is hidden in the current view inside Revit
  - Hide the Selected Elements or Categories

Tutorial link: [https://www.aftabsoft.net/AftabRadTutorial/simplification_byHidingElements.htm](https://www.aftabsoft.net/AftabRadTutorial/simplification_byHidingElements.htm)
How to handle big size 3Ds model when exporting to Radiance?

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How to handle big size 3Ds model when exporting to Radiance?

- Excluding to export any elements that is hidden in the current view inside Revit
  - Hide the Selected Elements or Categories
  - Hide by Section Box

Tutorial link: [https://www.aftabsoft.net/AftabRadTutorial/simplification_bySectionBox.htm](https://www.aftabsoft.net/AftabRadTutorial/simplification_bySectionBox.htm)
How to handle big size 3Ds model when exporting to Radiance?

- Excluding to export any elements that is hidden in the current view inside Revit
- Excluding to export any elements in AftabRad Add-in
  - Hide the Selected Categories

Tutorial link:  https://www.aftabsoft.net/AftabRadTutorial/simplification_byCategories.htm
AftabRad Revit Add-in Interfaces

How to handle big size 3D models when exporting to Radiance?

• Excluding to export any elements that is hidden in the current view inside Revit
• Excluding to export any elements in AftabRad Add-in
  ▪ Hide the Selected Categories
  ▪ Hide Extra Details of Selected Families

Tutorial link:  https://www.aftabsoft.net/AftabRadTutorial/simplification_byAreaLimitation.htm
Creating Only One Surface for Each Transparent Solid Object

Tutorial link:  https://www.aftabsoft.net/AftabRadTutorial/simplification_ToSingleSurface.htm
AftabRad Revit Add-in Interfaces

[Image of the user interface for AftabRad Revit Add-in Interfaces]

- **File**
  - Architecture
  - Structure
  - Steel
  - Precast
  - Systems
  - Insert
  - Annotate

- **Export to Radiance**
- **Click to Find Material**
- **Calculation Points Creation**
- **Import Data to Revit**

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**Settings**

- **Material File Name:** 
- **Open PTS File:**
- **Open EPW Files:**
  - EPW File Link 1
  - EPW File Link 2

- **Location:**
  - Latitude: 59.33
  - Longitude: 18.07
  - Time Zone: 1.0
  - Rotation: 39.78

- **Units:**
  - Millimeter
  - Centimeter
  - Meter
  - Foot
  - Inch

- **Scale Factor:**
  - 0.03048

- **Type of Sky/Analysis:**
  - Static
  - Dynamic Daylight Analysis
  - Static Daylight Analysis

- **Daylight Factor:**
- **Date:**
  - 00:00:00
  - March 1
  - 2019

- **Time:**
  - 00:00:00

- **Triangle Level of Detail:**
  - Automatic
  - Custom

- **Export Options:**
  - OBJ Export
  - VRML Export
  - STL Export
  - GLB Export
  - Mat based Rad file

- **Isolate Exported Elements**
- **Use Accelerad for the Calculation**

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For more information please check: www.aftabsoft.net
AftabRad Revit Add-in Interfaces

Tutorial link: https://www.aftabsoft.net/AftabRadTutorial/radControlPanel.htm
AftabRad Revit Add-in Interfaces

It creates:
* *.rad
* *.mat
* *.sky
* *.bat

Tutorial link:  [https://aftabsoft.net/aftab-rad.php#CalculationTypes](https://aftabsoft.net/aftab-rad.php#CalculationTypes)
AftabRad Revit Add-in Interfaces

Tutorial link: https://aftabsoft.net/aftab-rad.php#Dat2Revit
AftabRad Revit Add-in Interfaces

Tutorial link:  https://www.aftabsoft.net/AftabRadTutorial/RadianceDat2Html.htm
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Tutorial link: https://aftabsoft.net/aftab-rad.php#Dat2Revit
AftabRad Revit Add-in Interfaces

Tutorial link: https://www.aftabsoft.net/AftabRadTutorial/RadianceDat2Html.htm
AftabRad Revit Add-in Interfaces

It is recommended to use Adobe Acrobat Reader to open any 3D PDF file

http://aftabsoft.net/AftabRad/vis3d/sunhours/sunhours_test.pdf

Tutorial link: https://www.aftabsoft.net/AftabRadTutorial/exportAsU3D.htm
AftabRad Revit Add-in Interfaces

Tutorial link:  https://www.aftabsoft.net/AftabRadTutorial/hdrFalseColorPage.htm
AftabRad Revit Add-in Interfaces

Tutorial link: https://www.aftabsoft.net/AftabRadTutorial/hdrEvalglarePage.htm
AftabRad Revit Add-in Interfaces

Tutorial link: https://www.aftabsoft.net/AftabRadTutorial/windAnalysis_byOpenFoam.htm
AftabRad Revit Add-in Interfaces

Tutorial link: https://www.aftabsoft.net/AftabRadTutorial/DF_PtsCalculation_Dynamo.htm

Under Development
For more information about AftabRad Add-in and also see some of the tutorials that have been made until now, you can check this link:

http://www.aftabsoft.net/aftab-rad.php

Thank you so much