



Bearing AT 2021

Installation and Operations Guide

2 | Adams/Bearing AT Installation Guide

Corporate

MSC Software Corporation
4675 MacArthur Court, Suite 900
Newport Beach, CA 92660
Telephone: (714) 540-8900
Toll Free Number: 1 855 672 7638
Email: americas.contact@mscsoftware.com

Europe, Middle East, Africa

MSC Software GmbH
Am Moosfeld 13
81829 Munich, Germany
Telephone: (49) 89 431 98 70
Email: europe@mscsoftware.com

Japan

MSC Software Japan Ltd.
Shinjuku First West 8F
23-7 Nishi Shinjuku
1-Chome, Shinjuku-Ku
Tokyo 160-0023, JAPAN
Telephone: (81) (3)-6911-1200
Email: MSCJ.Market@mscsoftware.com

Asia-Pacific

MSC Software (S) Pte. Ltd.
100 Beach Road
#16-05 Shaw Tower
Singapore 189702
Telephone: 65-6272-0082
Email: APAC.Contact@mscsoftware.com

Worldwide Web

www.mscsoftware.com

Support

<http://www.mscsoftware.com/Contents/Services/Technical-Support/Contact-Technical-Support.aspx>

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About MSC Software

Overview

MSC Software Corporation is the leading global provider of virtual product development (VPD) tools, including simulation software and professional services. MSC Software helps companies make money, save time, and reduce costs associated with designing, testing, producing, and supporting manufactured products. MSC Software works with thousands of companies worldwide, in hundreds of industries, to develop better products faster by using information technology, software, and services to enhance and automate the product design and manufacturing process. Simulating your product performance reduces development costs, time to market, and warranty costs.

About Virtual Product Development and Adams

You've heard it before: manufacturing companies today face intense global competition, demanding customers, fragmented markets, increasing product complexity, compressed product cycles, price and profit pressures, strict regulatory and liability environments, systems integration and supply chain issues, skyrocketing costs of testing and physical prototyping, and on and on... What you don't often hear, though, is a strategy for enabling your company to improve your new product development process to meet these challenges. Whether you are delivering airplanes, automobiles, ships, biomedical devices, golf clubs or children's toys to your customers, MSC Software's goal is to help you improve your new product development process, allowing you to be significantly better at your concept development, design, testing, and production activities through the application of VPD. VPD is an environment that uses an integrated combination of both simulation software technology and traditional techniques to design, test, manufacture, and support products. The result is that cost-effective designs that meet all performance, safety, durability, and reliability requirements can be brought to market in less time and for less cost. Adams, as part of VPD, is focused on enhancing your ability to make better product development decisions, explore innovative design alternatives, and consistently get the product right. It is the world's most widely used mechanical system simulation software. It enables you to produce virtual prototypes, realistically simulating the full-motion behavior of complex mechanical systems on your computers and quickly analyzing multiple design variations until an optimal design is achieved. This reduces the number of costly physical prototypes, improves design quality, and dramatically reduces product development time.

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For help with installing or using an MSC Software product, contact MSC technical support. Our technical support provides technical assistance on questions related to installation and use of the software. For further details please see the Technical Support Usage Guide, which is accessible via our support web site.

You can reach MSC technical support on the web, by telephone, or e-mail.

Web

Go to the MSC Software web site at **www.mscsoftware.com**, and click on **Services** → **Technical Support**. Here, you can find a wide variety of support resources including Product Updates, Discussions, Technical Articles, and Documentation updates.

In addition, we provide several excellent sources of online information:

- **SimCompanion** - Find solutions to problems in this repository of troubleshooting tips, examples, and frequently asked questions. To access the SimCompanion, go to:
<http://simcompanion.mscsoftware.com>
- **VPD Community** - The VPD community is where to go when you are looking for peer support, as well as technical expertise. Many of our consultants, developers, and technical support staff monitor the forums. To sign up for the forums, go to:

<http://forums.mscsoftware.com>

Then:

- To view the Adams discussions, select Adams.
- To view product alerts and company news and events, select MSC News.

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MSC Software (www.mscsoftware.com)

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MSC Software store (store.mscsoftware.com)

Store.mscsoftware.com is the first virtual marketplace where clients can find engineering expertise, and engineers can find the goods and services they need to do their job.

Types of installations

The way you install Bearing AT product depends on your needs of using Adams/View or Adams/Car products and your usage of other Adams plugins:

- **User installation directory** – use default or select directory in which to install Bearing AT product. This path will be written to MDI_USER_PLUGIN_DIR system or user environment variable. This environment variable is used by Adams plugin manager to locate and load all plugins. Remember that all plugins should be compatible with the one and only Adams versions.
- **Adams installation directory** - Bearing AT product will be installed under Adams top directory. This type of installation enables you to use this product with multiple Adams versions on single machine at the same time. The MDI_USER_PLUGIN_DIR environment variable is not appended by the installation path since Adams plugin manager will find Bearing AT installation automatically. With this type of installation there is no desktop icon created, no Bearing AT folder under Windows Start menu and no uninstaller created for this product stored under your system. You can repair installation by running this installer over existing installation. Uninstallation of this product will be done by Adams uninstaller.

Adams and related SW specifications

The Bearing AT is installed as plugin to Adams/View or Adams/Car therefore existing Adams installation of one supported version is prerequisite. The table below outlines the software specifications for Bearing AT toolkit.

Operating System	Adams version	Nastran version
Windows 7 64-bit	2018.1	2017.0
Windows 10 x64 Pro Version 1803	2019.0	2017.1
SuSE 12 SP1 Linux Enterprise Server (Kernel 3.12.49-11-default)	2019.2	
SuSE 12 SP2 Linux Enterprise Server (Kernel 4.4.21-69-default)	2020-711253	2018.1
SuSE 12 SP4 Linux Enterprise Server (Kernel 4.12.14- 94.41-default)	2020 FP1-748966	2018.2
Red Hat Enterprise Linux 7.3 x64 (Kernel 3.10.0-514)	2021.0.1 , 2021.0.2	2019.0
Red Hat Enterprise Linux 7.5 x64 (Kernel 3.10.0-862)	2021.1	2019 Feature Pack 1
Red Hat Enterprise Linux 7.7 x64 (Kernel 3.10.0- 1062.el7.x86_64)	2021.2 , 2021.2.2	2020
		2021.1
		2021.2

You need Nastran or Adams ViewFlex to compute raceway stiffness matrix. In case you do not have Nastran installation, make sure you have valid Adams ViewFlex license available. Please note that currently there are supported i8 versions of Nastran only.

NOTE:

The table with supported SW versions is supposed to be read column-wise. It means that any combination of the SW versions listed in the table is supported.

Supported linux platform depends on the version of Adams for which the Bearing AT 2021 is installed.

For more information, please read relevant sections of *Adams Installation and Operations Guide* document or visit [MSC Platform Support](#) web page.

Installing Bearing AT

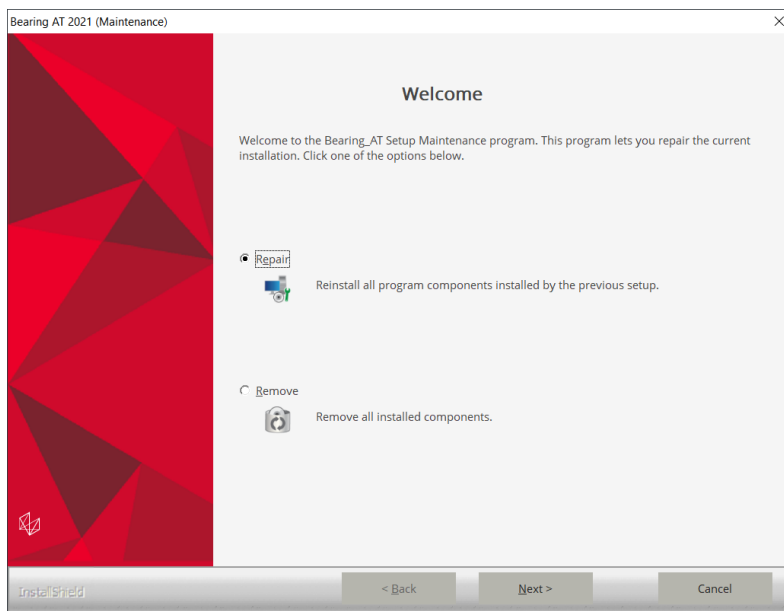
Following sections explain how to install Bearing AT on Windows and Linux.

1 Installing on Windows

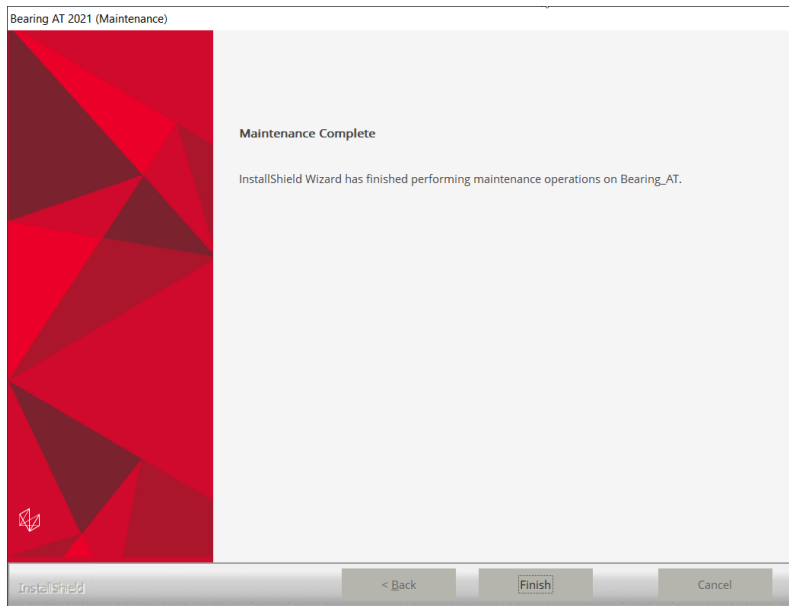
Open Windows Explorer and browse to your Bearing AT file location and run (double click) the executable file **bearing_at_2021.0.0_win64.exe**.

Updating

If an instance of current Bearing AT version is already installed, you can either repair or remove the old instance. This installation does not touch previous versions of Bearing AT

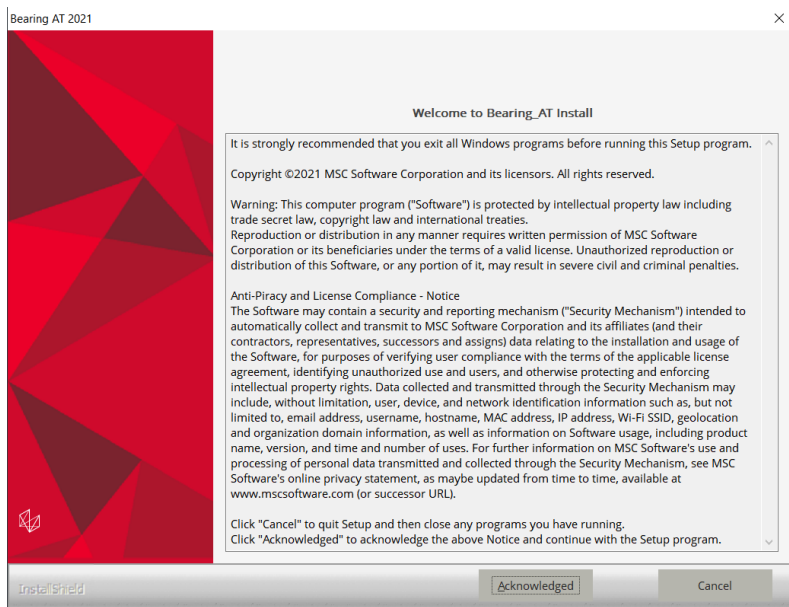


Select **Finish** to complete the process and run the **bearing_at_2021.0.0_win64.exe** again.



Welcome page

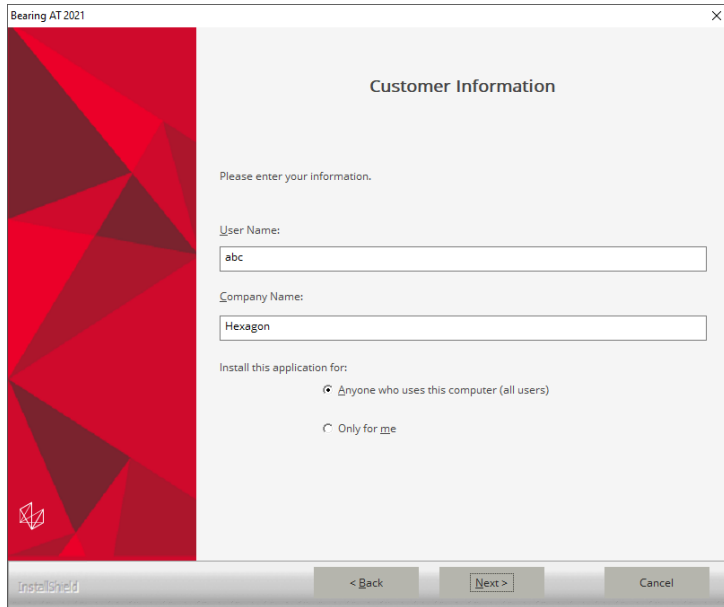
Next screen shows the Welcome page. Select **Next >** button to continue or **Cancel** button to exit without installing.



Customer info

In the Customer Information window, enter your user and company name, and then select one of the following:

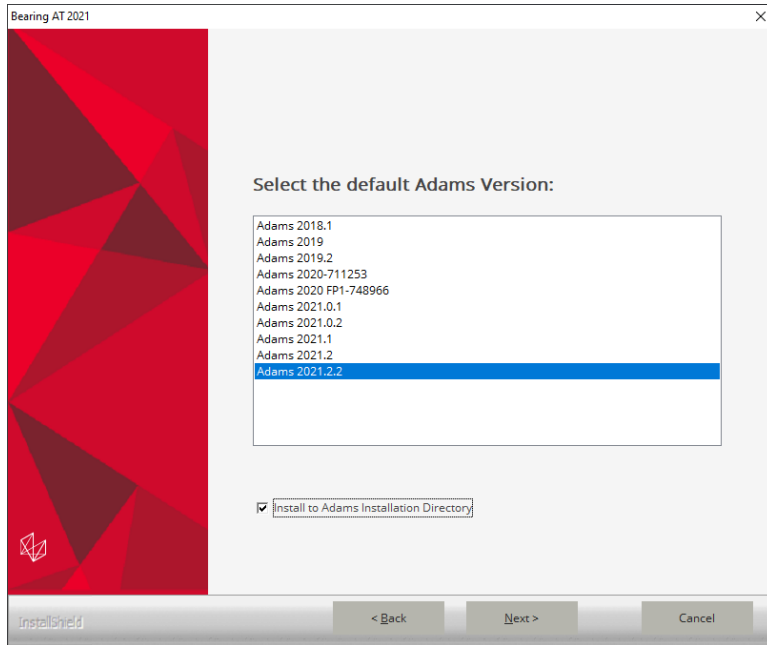
- **Anyone who uses this computer (all users)** - Anyone logged on to this machine can run Bearing AT
- **Only for me** - A user must be logged on using the user name and password that was used at the time of installation.



Adams Version

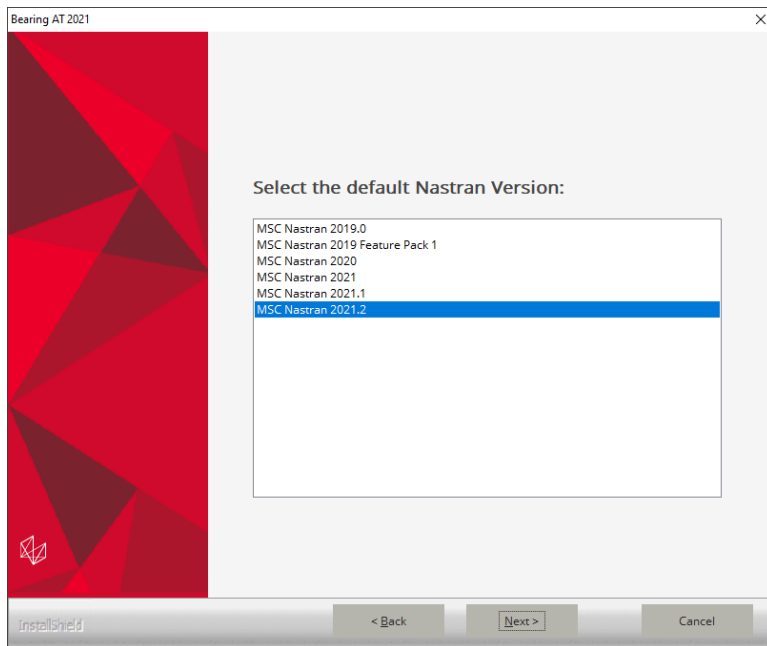
In this step you choose one of the valid Adams versions, the list is based by the installed ones. If the list is empty, please cancel the installation of Bearing AT and install the most recent Adams version first. Make sure you select the same Adams version during Gear AT installation in case you plan to use both toolkits. The list of currently supported Adams versions is shown on the figure below.

If you prefer to install Bearing AT directly under Adams, you can select Adams version of your choice and set the *Install to Adams Installation Directory* check box on.



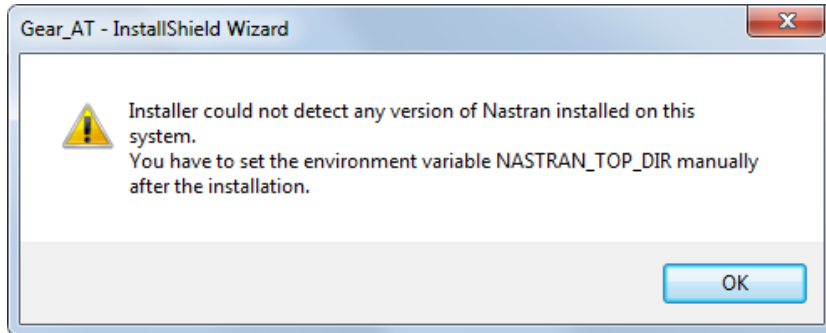
Nastran version

Select preferred Nastran version to be used with Bearing AT for FE preprocessing. You need Nastran or Adams ViewFlex to create the punch files for contact processing. In case you do not have Nastran installation, make sure you have valid Adams ViewFlex license available. Please note that currently there are supported i8 versions of Nastran only, limited to the list shown on the figure below.



You can proceed with the installation of Bearing AT without Nastran and install it later, but you have to set up `NASTRAN_TOP_DIR` environment variable manually. This variable should point to the Nastran installation directory, e. g. `c:\MSC.Software\MSC_Nastran\2021.2`

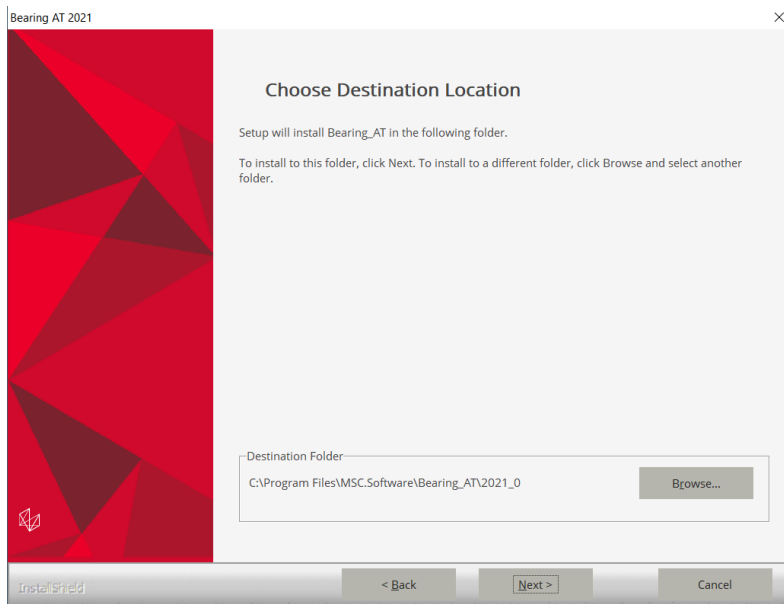
Bearing AT cannot run Nastran on remote machine but can export all Nastran input files along with batch file so you can submit Nastran job on a different machine. You need Nastran punch files (*.pch) to be placed back in the working directory to submit Bearing AT contact analysis.



Installation Folder

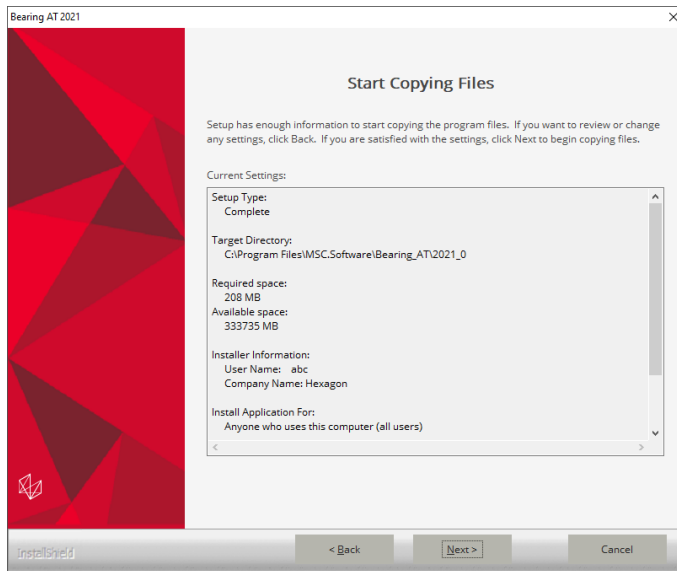
In the install location window select the destination folder. This folder is referred to as *Bearing _AT_Install_Dir* throughout this manual.

In case you opted to install Bearing AT under Adams, the *Bearing _AT_Install_Dir* path is automatically determined from system registry which points to Adams installation directory hence this page is skipped.

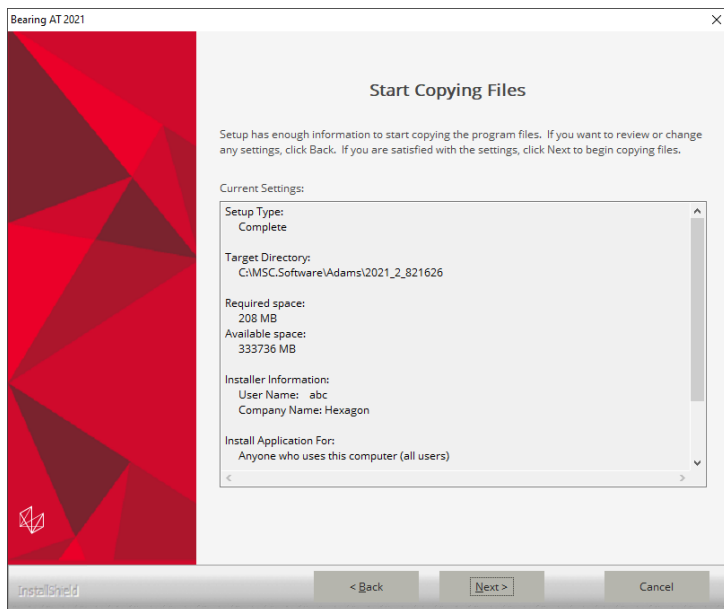


Review Settings

Confirm the installation settings and then select **Next** to begin the installation.

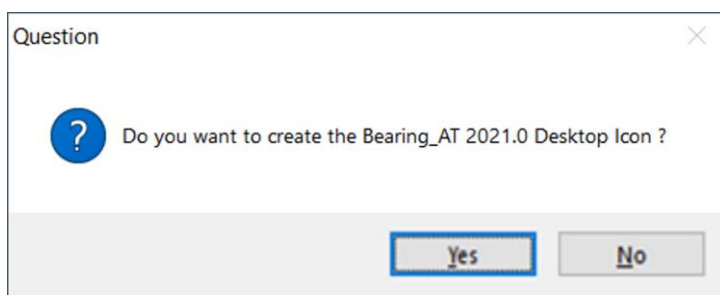


In case you have selected to install Bearing AT directly under Adams, the target directory should be set to Adams installation directory.

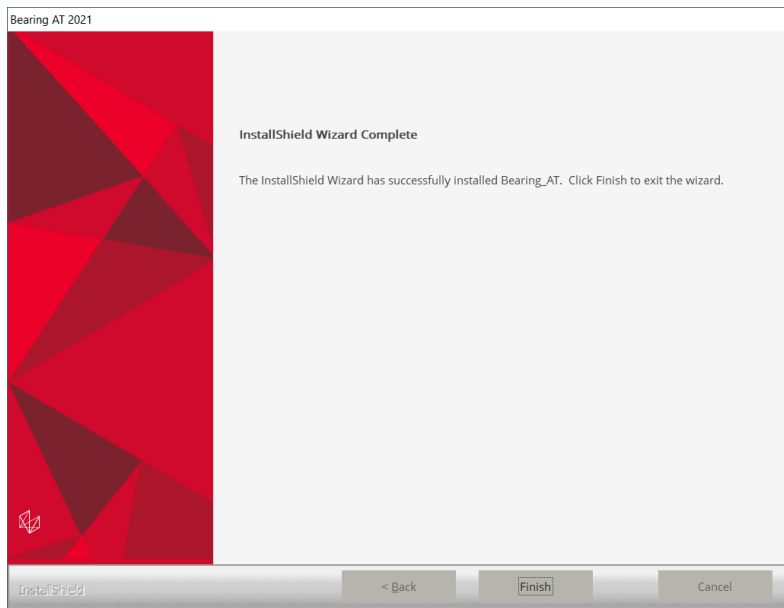


Completion

Before the Setup is complete you are prompted to create a desktop icon.



Setup completion window appears as shown below. Select **Finish**.



2 Installing on Linux

Go to the directory of the Bearing AT installer location and open the terminal. Executing the installation binary may require adding execution privilege:

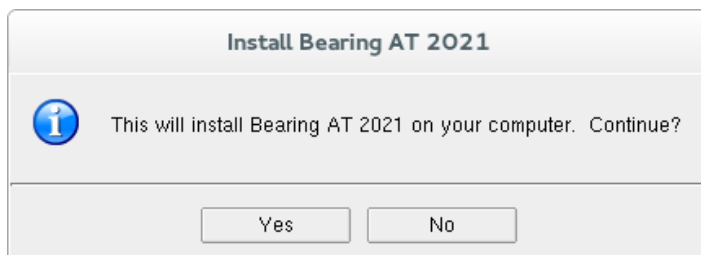
```
chmod +x bearing_at_2021.0.0_linux64.bin
```

Start the installation program **bearing_at_2021.0.0_linux64.bin**. For example:

```
./bearing_at_2021.0.0_linux64.bin
```

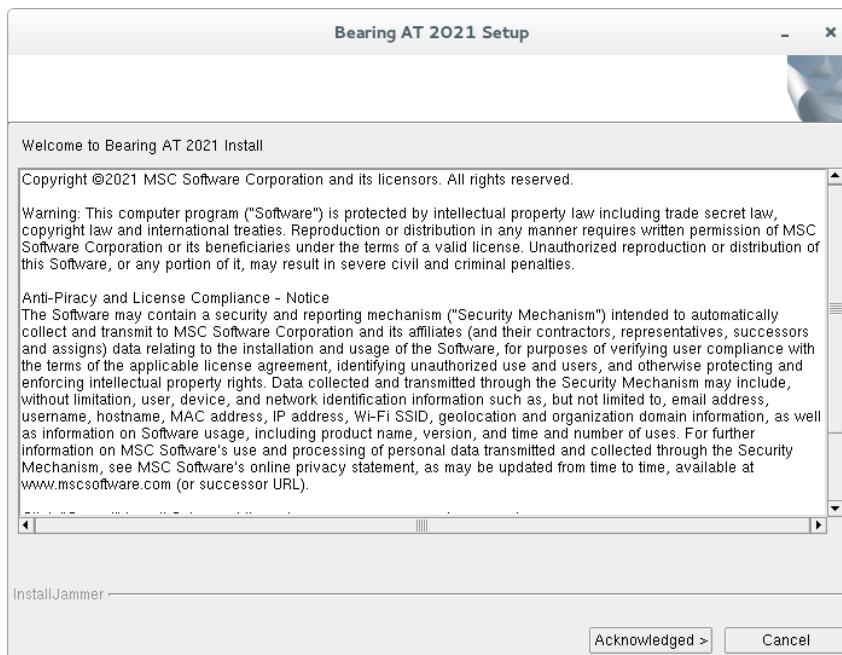
Installing

You will see a confirmation dialog box. Select **Yes** button to begin the installation.



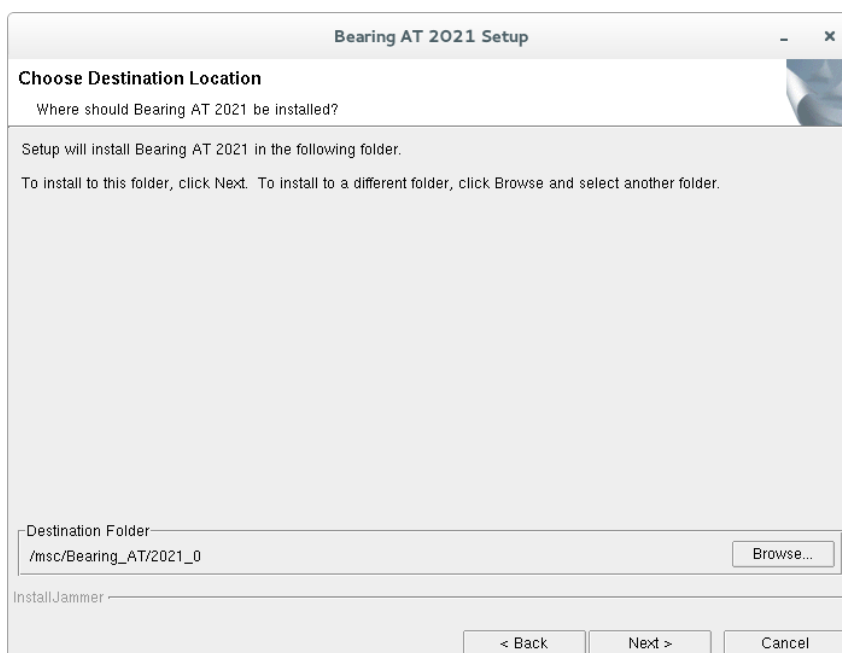
Welcome page

Next screen shows the Welcome page. Select **Acknowledged >** button to continue or **Cancel** button to exit without installing.

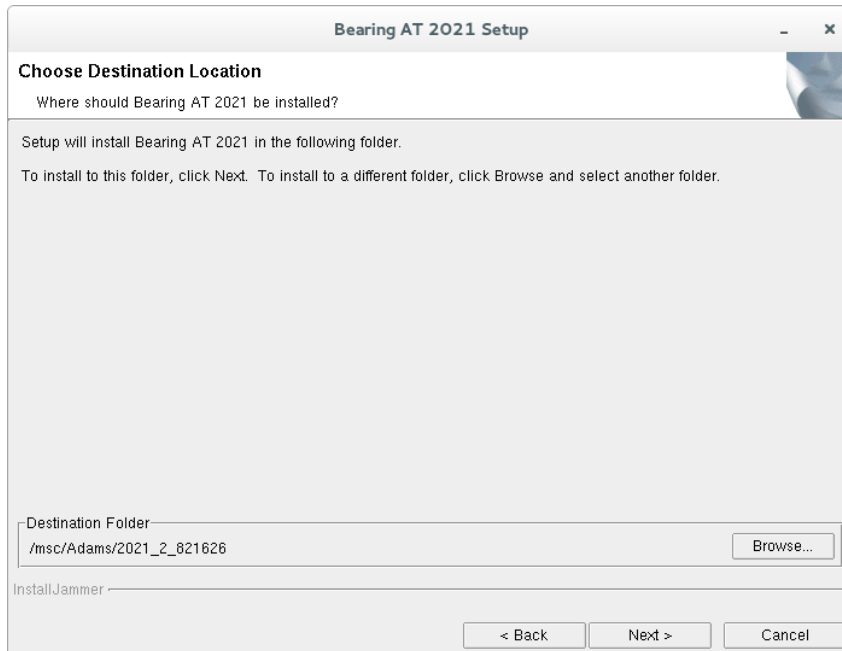


Destination Location

In the install location reporting window select the destination folder. This folder is referred to as *Bearing_AT_Install_Dir* throughout this manual. The default path is set to `/msc/Bearing_AT/2021_0`

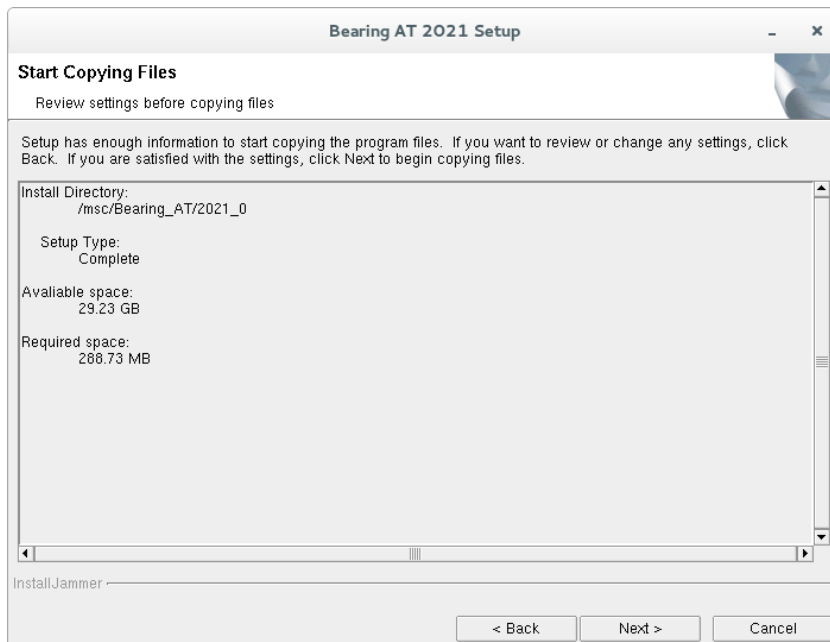


If you prefer to install Bearing AT directly under Adams, you can browse to installation path of Adams and make sure to select corresponding Adams version in next step.

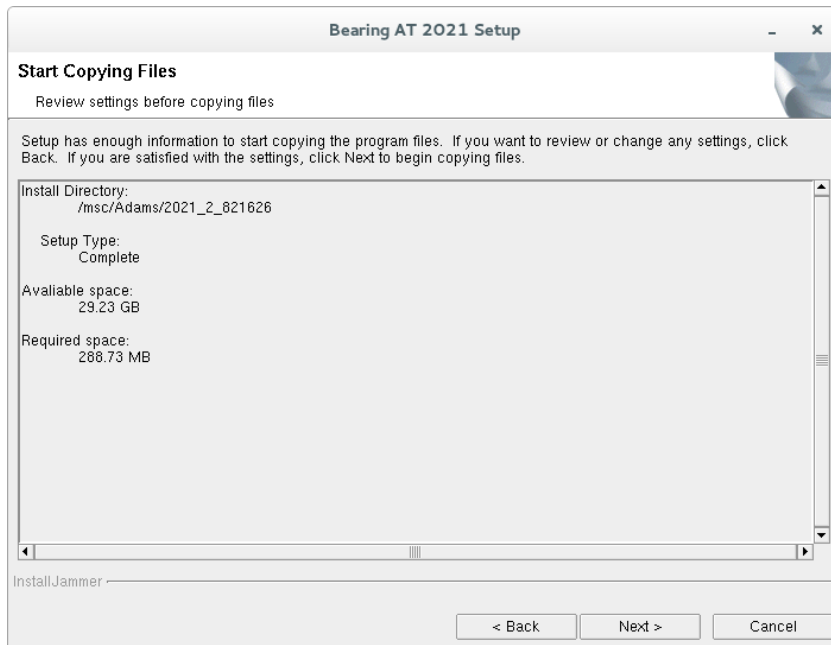


Review Settings

Confirm the installation settings and then select **Next** to begin the installation.



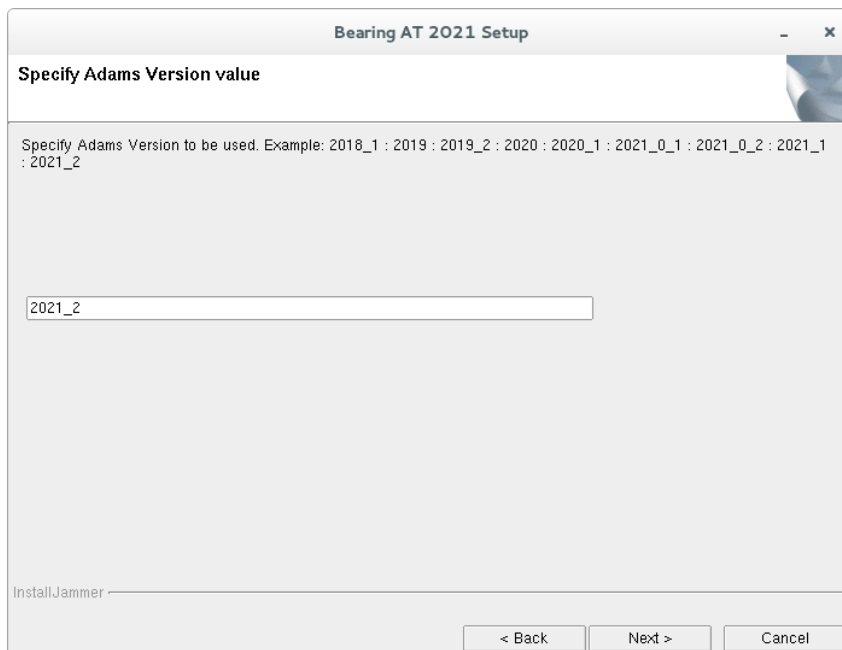
In case you have selected to install Bearing AT directly under Adams, the *Install Directory* reported should point to Adams installation directory.



Adams Version

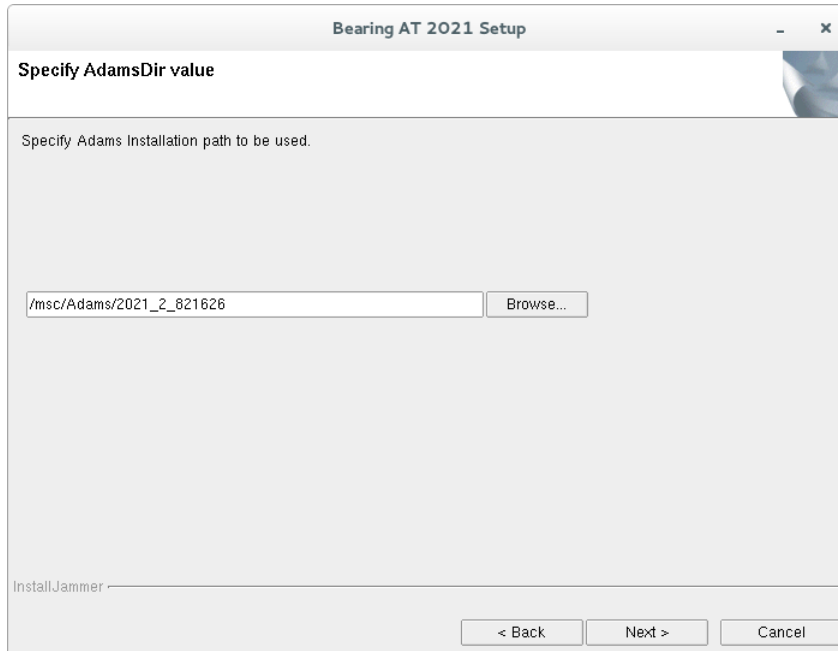
In this step specify Adams Version to be used with Bearing AT. For example:

- **2018_1** for Adams 2018.1
- **2019** for Adams 2019.0
- **2019_2** for Adams 2019.2
- **2020** for Adams 2020
- **2020_1** for Adams 2020 FP1
- **2021_0_1** for Adams 2021.0.1
- **2021_0_2** for Adams 2021.0.2
- **2021_1** for Adams 2021.1
- **2021_2** for Adams 2021.2



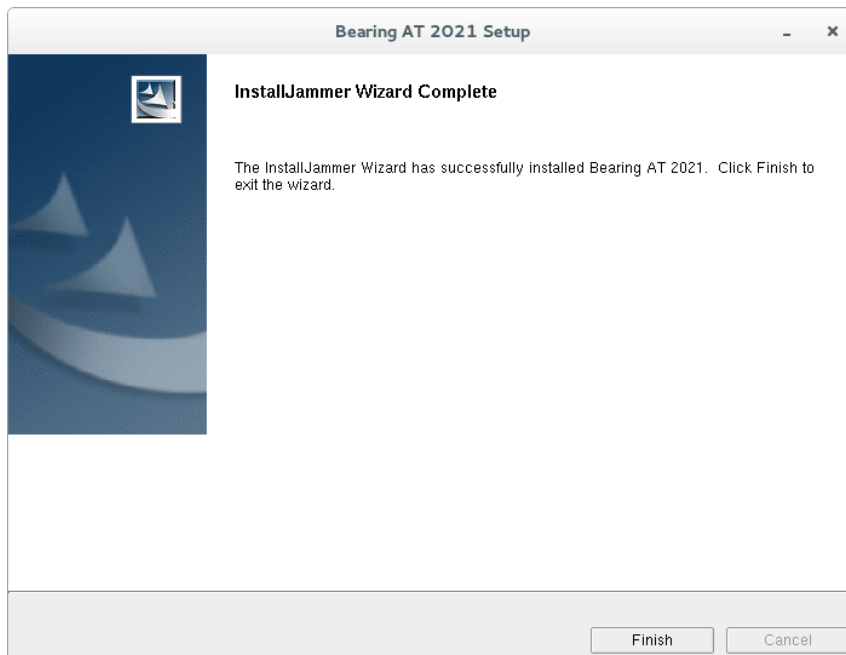
Adams Installation Path

Specify installation path to Adams version. If you opted to install directly under Adams, the Adams installation path you specify in this step should be identical to the *Destination folder* you entered in few steps before.



Completion

Setup completion window appears as shown below. Select **Finish**.



Set up environment variables

In case of the “**User installation directory**“ installation type was chosen the **MDI_USER_PLUGIN_DIR** environment variable has to be set up or appended to the actual *Bearing_AT_Install_Dir* path. This enables the Adams plugin manager to locate Bearing AT plugin installation directory. This environment variable has to be set up manually for instance:

```
export MDI_USER_PLUGIN_DIR=/msc/Bearing_AT/2021_0
```

or

```
setenv MDI_USER_PLUGIN_DIR /msc/Bearing_AT/2021_0
```

You need Nastran or Adams ViewFlex to create the punch files for contact processing. To locate Nastran installation by Bearing AT you have to set up **NASTRAN_TOP_DIR** environment variable manually, for instance:

```
export NASTRAN_TOP_DIR=/msc/MSC_Nastran/2021.2/bin/msc20212
```

or

```
setenv NASTRAN_TOP_DIR /msc/MSC_Nastran/2021.2/bin/msc20212
```

In case you do not have Nastran installation, make sure you have valid Adams ViewFlex license available.

Licensing

Please copy the license features of Bearing AT in your overall MSC license file.

```

FEATURE PA_CATDirect_U5 MSC 2016.0115 15-jan-2016 3 4BD6A00EB4EC \
ISSUED=19-dec-2013 ck=151 SN=1288214-7c91d2ae0686dfbdc66d-4d3e
FEATURE PA_Materials_Enterprise MSC 2016.0115 15-jan-2016 3 \
A7D5CD0C5F2F ISSUED=19-dec-2013 ck=222 \
SN=1174246-ccac818ab9689382023f-43f9
FEATURE PA_RandomAnalysis_Tool MSC 2016.0115 15-jan-2016 3 \
59009B5C656D ISSUED=19-dec-2013 ck=81 \
SN=1125067-8d822f1808ef461fbb1f-c91f
#
# MSC Toolkits
#
FEATURE TK_AdWiMo_BASE MSC 2016.0115 15-jan-2016 3 972C551C5C8E \
ISSUED=27-jan-2015 ck=98 SN=1187362-cf8d73fdb76564f60947-5812
FEATURE TK_AdWiMo_BASE_PRE MSC 2016.0115 15-jan-2016 3 A0D4B3350987 \
ISSUED=27-jan-2015 ck=130 SN=1293921-b74e92ecf3b4cc6660bc-743f
FEATURE TK_AdWiMo_BASE_SOLVER MSC 2016.0115 15-jan-2016 3 \
1B95AB62AAC6 ISSUED=27-jan-2015 ck=115 \
SN=1227345-b67a50db521132937f4c-465a
FEATURE TK_BearingAT_BASE MSC 2016.0115 15-jan-2016 3 27E818C22649 \
ISSUED=27-jan-2015 ck=153 SN=1356269-57bf094d6ac6c4aa66de-543e
FEATURE TK_BearingAT_BASE_PRE MSC 2016.0115 15-jan-2016 3 \
F730E0C5E6C8 ISSUED=27-jan-2015 ck=104 \
SN=1146504-a173703ccd528dd1ff65-e4c0
FEATURE TK_BearingAT_BASE_SOLVER MSC 2016.0115 15-jan-2016 3 \
0F2258ED9BF6 ISSUED=27-jan-2015 ck=129 \
SN=1017687-bfe6768fe1c0a0fe78a3-85a1
FEATURE TK_GearAT_BASE MSC 2016.0115 15-jan-2016 3 9F5678D87E46 \
ISSUED=27-jan-2015 ck=127 SN=988907-f675b4697108836e703b-5734
FEATURE TK_GearAT_BASE_PRE MSC 2016.0115 15-jan-2016 3 BADBF4255F5E \
ISSUED=27-jan-2015 ck=144 SN=1428005-4b9d8360414dea8b559f-fa55
FEATURE TK_GearAT_BASE_SOLVER MSC 2016.0115 15-jan-2016 3 \
FE59E5107D2E ISSUED=27-jan-2015 ck=99 \
SN=1223862-df7f55300ec7b7a1fb9e-880b
FEATURE TK_GearAT_Adanced MSC 2016.0115 15-jan-2016 3 ABC481F9266C \
ISSUED=27-jan-2015 ck=145 SN=1235180-1e2908a948719b627c84-1e87
FEATURE TK_GearAT_Adanced_PRE MSC 2016.0115 15-jan-2016 3 \
6A9825214AD8 ISSUED=27-jan-2015 ck=109 \

```

In addition to a Bearing AT license, access to the Adams ViewFlex license is required. This provides access to the finite element meshing and calculation technology used in the pre-processing setup. The ViewFlex license is consumed only while pre-processing in Adams View. During analysis only the Bearing AT license is consumed in addition to the usual Adams Solver license.

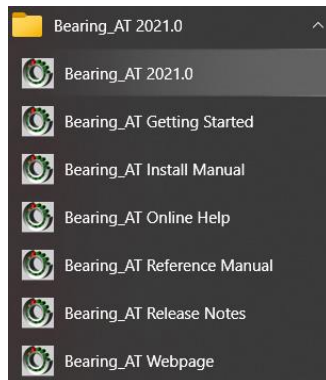
Running Bearing AT

Following section explains how to load the **Bearing AT plugin** on Windows and Linux.

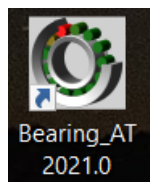
1 Launch Bearing AT on Windows

If you installed Bearing AT in user installation directory (default) you have number of options how to run the product with Adams.

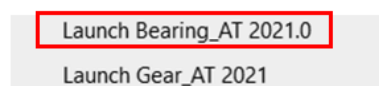
Go to the Windows **Start** menu and Select **All Programs**. Go to **Bearing AT 2021.0** folder and select **Bearing AT 2021.0** icon; this will launch Adam/View.



You can use the desktop icon



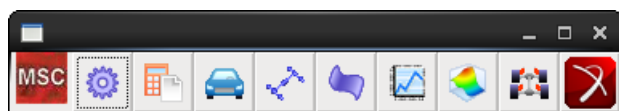
Or you can launch Bearing AT via the context menu of the explorer in the working directory



In case you installed Bearing AT under Adams installation directory you simply launch Adams View or Car version you opted and load the plugin. **There is none of options mentioned above available for you in this case.**

2 Launch Bearing AT on Linux

The Adams Toolbar is a starting point to using Adams products on Linux. Make sure to start Adams version which the Bearing AT 2021 was installed to, thus assure that Bearing AT plugin is compatible with Adams version. To learn how to start Adams on Linux read the **adams_20xx_doc_install.pdf** document provided with the Adams installation. The toolbar of Adams is shown below.

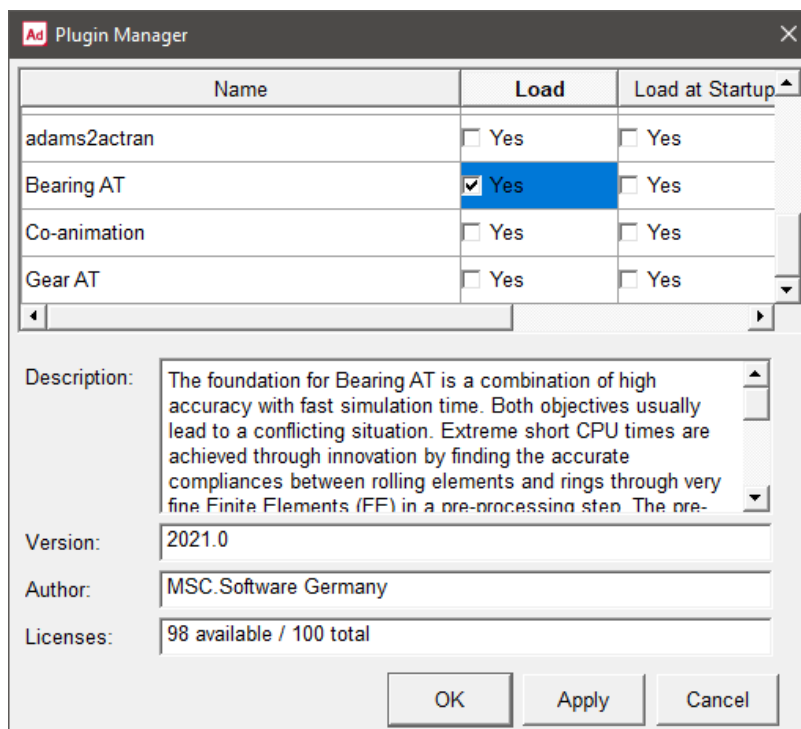


3 Loading Plugin

After Start Up from Adams/View open the plugin ribbon or go to **Tools -> Plugin Manager**. In the ribbon click on the Bearing AT Button in the Bearing AT tab.

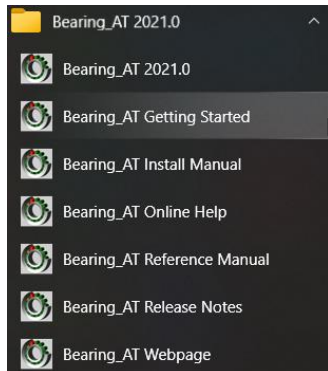


This opens the Plugin Manager if the plugin is not loaded so far. Check the plugin checkbox **Bearing AT**. Specify if you want it to start every time you start ADAMS/View or just for a single session by clicking on **Load at Startup**. The **Bearing AT** menu will be available in the Adams toolbar and in the ribbon plugin tab.

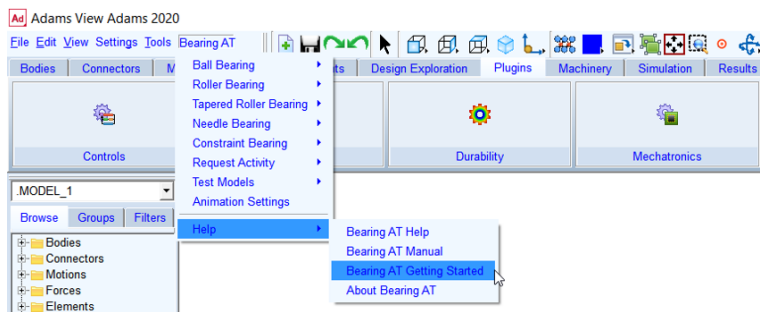


4 Getting Started with Bearing AT

To help you get familiar with Bearing AT plugin we provide the Getting Started document along with example model and files in the installation folder. You can access Getting started document either from windows Start menu



or from Bearing AT menu in Adams.



5 Bearing AT initialization

If you load the plugin the *Bearing_AT_ini.cmd* file is automatically imported from the *Bearing_AT_Install_Dir/bearing_at* directory. You can use this file to set your personal preferences such as:

- FE preprocessor
- request activity
- background color
- solver settings
- relative paths for property files

or any other of your choice.

```

simulation set solver_preference= external
simulation set show_all_messages=yes
color modify color=-.colors.background red_component=0.72 green_component=0.72 blue_component=0.72
*
variable set variable=.bearing_at.variables.relative_path integer=1 &
comment="0-> do not use relative paths", &
"1-> use relative paths"
*
variable set variable_name = .bearing_at.variables.preprocessor &
string_value = "Internal Viewflex" &
comment="Internal Viewflex, External Viewflex, Internal Nastran, External Nastran, Heshier only"
*
! defaults for request activity
variable set variable_name =.bearing_at.udes.ac_ball_bearing.request_activity &
string_value = "on","on","on","on","on","off","off","off","off","off" &
comments = "" &
"1-> Bearing displacements", &
"2-> Velocity", &
"3-> Acceleration", &
"4-> Force ", &
"5-> Rolling elements", &
"6-> unused", &
"7-> unused", &
"8-> unused", &
"9-> unused", &
"10->unused"
*
! defaults for request activity
variable set variable_name =.bearing_at.udes.ac_needle_bearing.request_activity &
string_value = "on","on","on","on","on","off","off","off","off","off" &
comments = "" &
"1-> Bearing displacements", &
"2-> Velocity", &
"3-> Acceleration", &
"4-> Force ", &
"5-> Rolling elements", &
"6-> unused", &
"7-> unused", &
"8-> unused", &
"9-> unused", &
"10->unused"
*
! defaults for request activity
variable set variable_name =.bearing_at.udes.ac_roller_bearing.request_activity &
string_value = "on","on","on","on","on","off","off","off","off","off" &
comments = "" &
"1-> Bearing displacements", &
"2-> Velocity", &
"3-> Acceleration", &
"4-> Force ", &
"5-> Rolling elements", &
"6-> unused", &
"7-> unused", &
"8-> unused", &
"9-> unused", &
"10->unused"
*
! defaults for request activity
variable set variable_name =.bearing_at.udes.ac_tapered_bearing.request_activity &
string_value = "on","on","on","on","on","off","off","off","off","off" &
comments = "" &
"1-> Bearing displacements", &
"2-> Velocity", &
"3-> Acceleration", &
"4-> Force ", &
"5-> Rolling elements", &
"6-> unused", &
"7-> unused", &
"8-> unused", &
"9-> unused", &
"10->unused"

```

The file could be located in the:

- Plugin installation directory - *Bearing_AT_Install_Dir/bearing_at*,
- Home directory,
- Working directory,

and is read in that order.

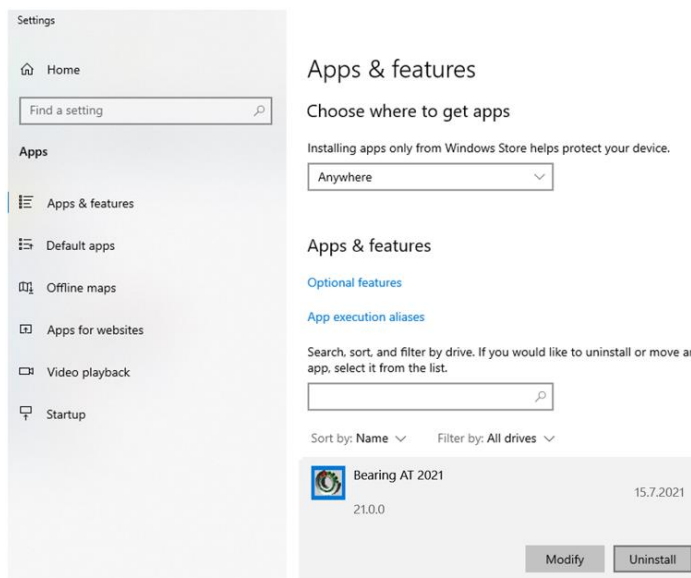
Uninstalling Bearing AT

IMPORTANT NOTE:

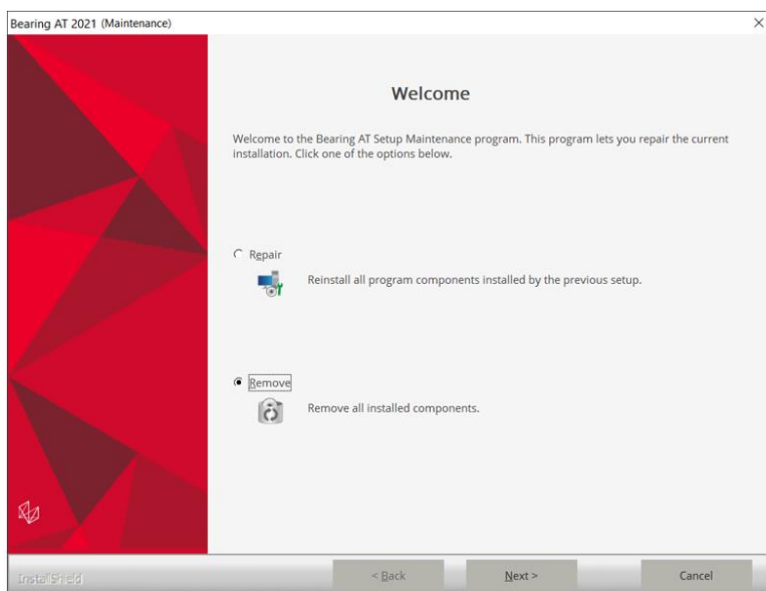
In case you have installed Bearing AT directly under Adams installation directory, there is no uninstaller program available. The product will be removed along with Adams uninstallation.

1 Uninstall Bearing AT on Windows

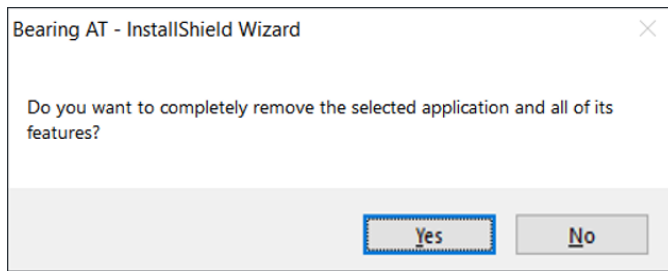
To uninstall the product, go to **Apps & features** > select **Bearing_AT 2021** and **Uninstall**.



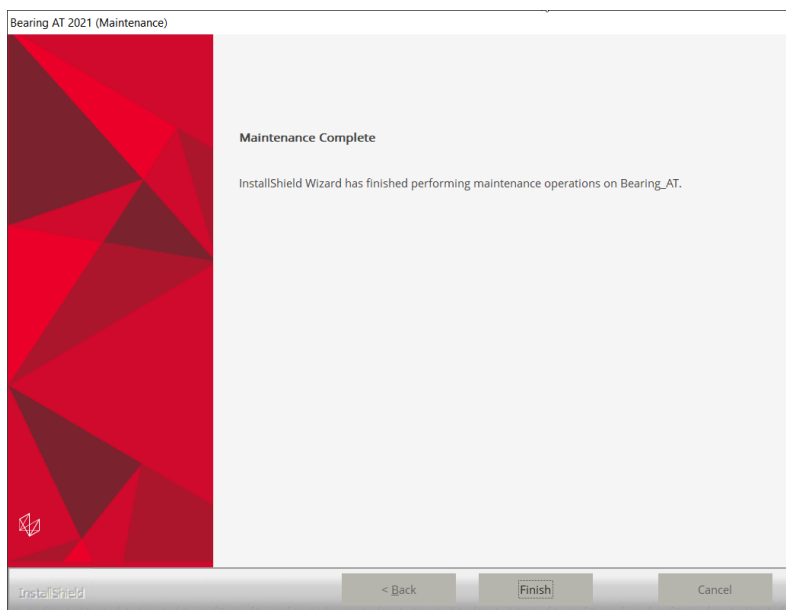
Select **Remove** and click **Next**.



Confirm the removal operation to finish the process.



Select **Finish** to complete uninstall process.



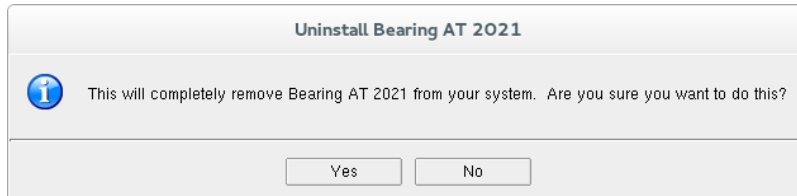
Please note you have to remove NASTRAN_TOP_DIR environment variable manually after uninstalling Bearing AT. Be aware that this variable is shared with the Gear AT installation.

After uninstalling the installation folder is cleaned up but left for previously installed versions of Bearing AT. For instance, if the *Bearing_AT_Install_Dir* was *c:\MSC.Software\BEARING_AT\2021_0* there will remain following empty folder *c:\MSC.Software\ BEARING _AT* after uninstallation.

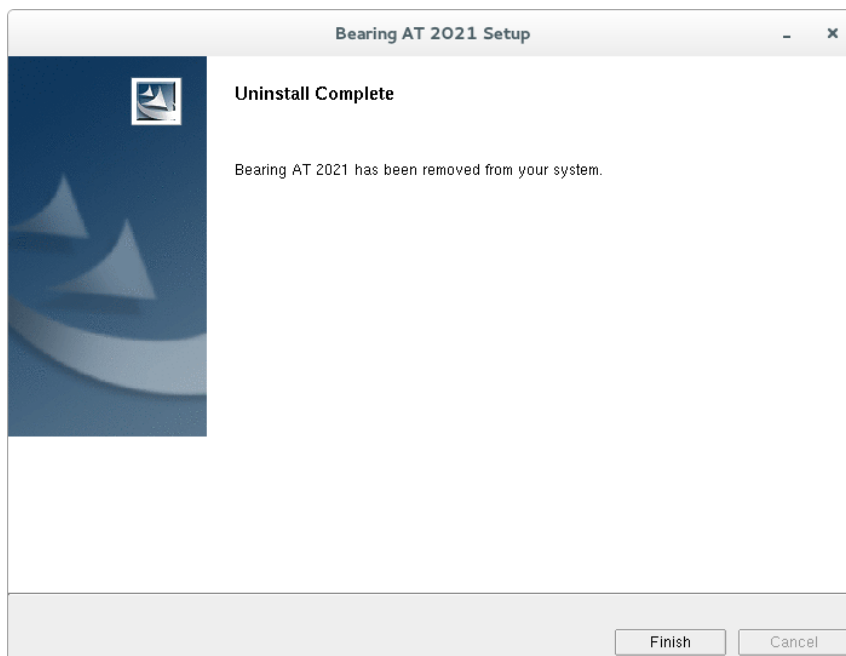
2 Uninstall Bearing AT on Linux

To uninstall Bearing AT plugin, go to *Applications – MSC.Software – Uninstall Bearing AT 2021* or go to the *Bearing_AT_Install_Dir* and execute *uninstall* program.

Confirm the removal operation to finish the process.



A summary dialog box announces the completion of the uninstallation process. Selecting **Finish** will complete it.



After uninstalling the installation folder is cleaned up but left for previously installed versions of Bearing AT. For instance, if the *Bearing_AT_Install_Dir* was */msc/Bearing_AT/2021_0* this empty folder will remain after uninstallation.

3 Removal of Bearing AT from Adams installation directory

If you need to remove Bearing AT plugin from the system which was installed directly under Adams installation directory, you have to delete following files and folder on windows system:

- *Adams_Install_Dir/bearing_at*
- *Adams_Install_Dir/win64/bearing_at_solver.dll*
- *Adams_Install_Dir/win64/bearing_at_view.dll*
- *Adams_Install_Dir/win64/bearing_at_plg.xml*

and following files and folder on linux system:

- *Adams_Install_Dir/bearing_at*
- *Adams_Install_Dir/figure_bat*
- *Adams_Install_Dir/linux64/bearing_at_solver.so*
- *Adams_Install_Dir/linux64/bearing_at_view.so*
- *Adams_Install_Dir/linux64/bearing_at_plg.xml*

There are no environment variables and/or registry set up during installation of Bearing AT under Adams installation directory.

Special hints

1 Previous installed versions of Bearing AT

It is recommended to uninstall previous versions of Bearing AT but not mandatory. You can handle multiple versions of Bearing AT with the environment variable `MSC_USER_PLUGIN_DIR`.

Just set the path to the Bearing AT installation of your choice. Be aware that you can set this environment as `USER` or as `SYSTEM` variable. Make sure that a path to a Bearing AT Plugin is only set once.

In case you installed Bearing AT under Adams installation directory, there is no `MSC_USER_PLUGIN_DIR` set by installer since Adams will automatically locate the plugin by itself. In that case there is no uninstaller available neither on Windows nor on Linux.