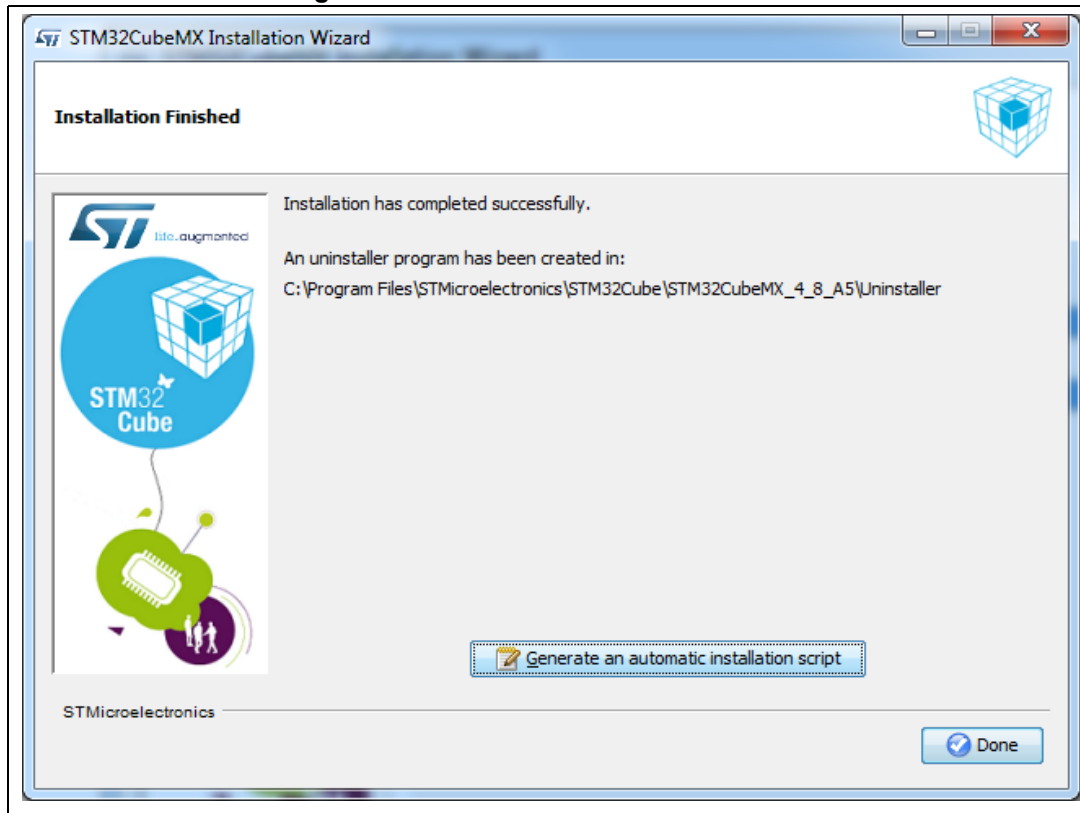### Auto-install mode

At end of an installation, performed either using STM32CubeMX graphical wizard or console mode, it is possible to generate an auto-installation script containing user installation preferences (see *Figure 3* below):
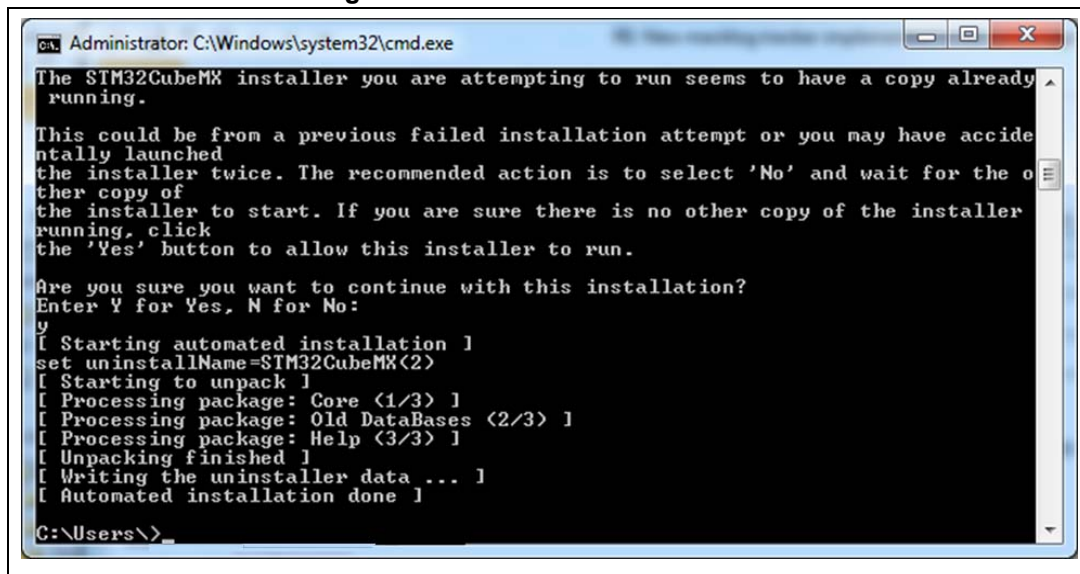
Figure 3. STM32Cube Installation Wizard

You can then launch the installation just by typing the following command:

```
java –jar SetupSTM32CubeMX-4.14.0.exe auto-install.xml
```

Figure 4. Auto-install command line

3.2.3 Uninstalling STM32CubeMX standalone version

To uninstall STM32CubeMX on Windows, follow the steps below:

1. Open the Windows Control panel**.**
2. Select Programs and Features to display the list of programs installed on your computer.
3. Right click on STM32CubeMX and select the uninstall function.

To uninstall STM32CubeMX on Linux, MacOS and Windows, follow the steps below:

- Use a file explorer, go to the Uninstaller directory of the STM32CubeMX installation, and double click the startuninstall desktop shortcut.
- or launch manually the uninstallation with java -jar <install path>/Uninstaller/uninstaller.jar.

3.3 Installing STM32CubeMX plug-in version

STM32CubeMX plug-in can be installed within Eclipse IDE development tool chain. Installation related procedures are described in this section.

3.3.1 Downloading STM32CubeMX plug-in installation package

To download STM32CubeMX plug-in, follow the sequence below:

1. Go to http://www.st.com/stm32cubemx.
2. Download STM32CubeMX- Eclipse-plug-in .zip file to your local disk.

3.3.2 Installing STM32CubeMX as an Eclipse IDE plug-in

To install STM32CubeMX as an Eclipse IDE plug-in, follow the sequence below:

1. Launch the Eclipse environment.
2. Select Help > Install New Software from the main menu bar. The Available Software window appears.
3. Click Add. The Add Repository window opens.
4. Click Archive. The Repository archive browser opens.
5. Select the STM32CubeMX- Eclipse-plug-in .zip file that you downloaded and click Open (see *Figure 5*).
6. Click OK in the Add Repository dialog box,
7. Check STM32CubeMX_Eclipse_plug-in and click Next (see *Figure 6*).
8. Click Next in the Install Details dialog box.
9. Click "I accept the terms of the license agreement" in the Review Licenses dialog box and then click Finish.
10. Click OK in the Security Warning menu.
11. Click OK when requested to restart Eclipse IDE (see *Section 3.4.2: Running STM32CubeMX in command-line mode*).

Figure 5. Adding STM32CubeMX plug-in archive
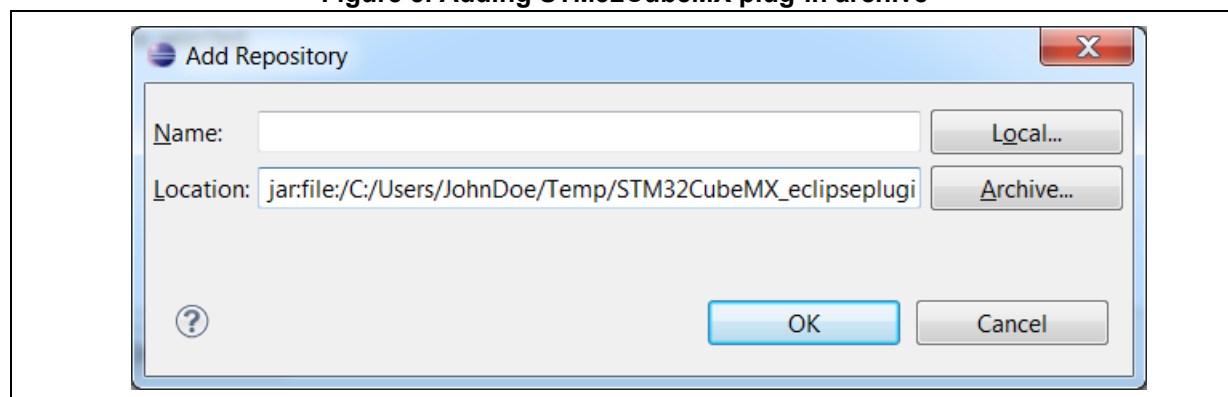
Figure 6. Installing STM32CubeMX plug-in
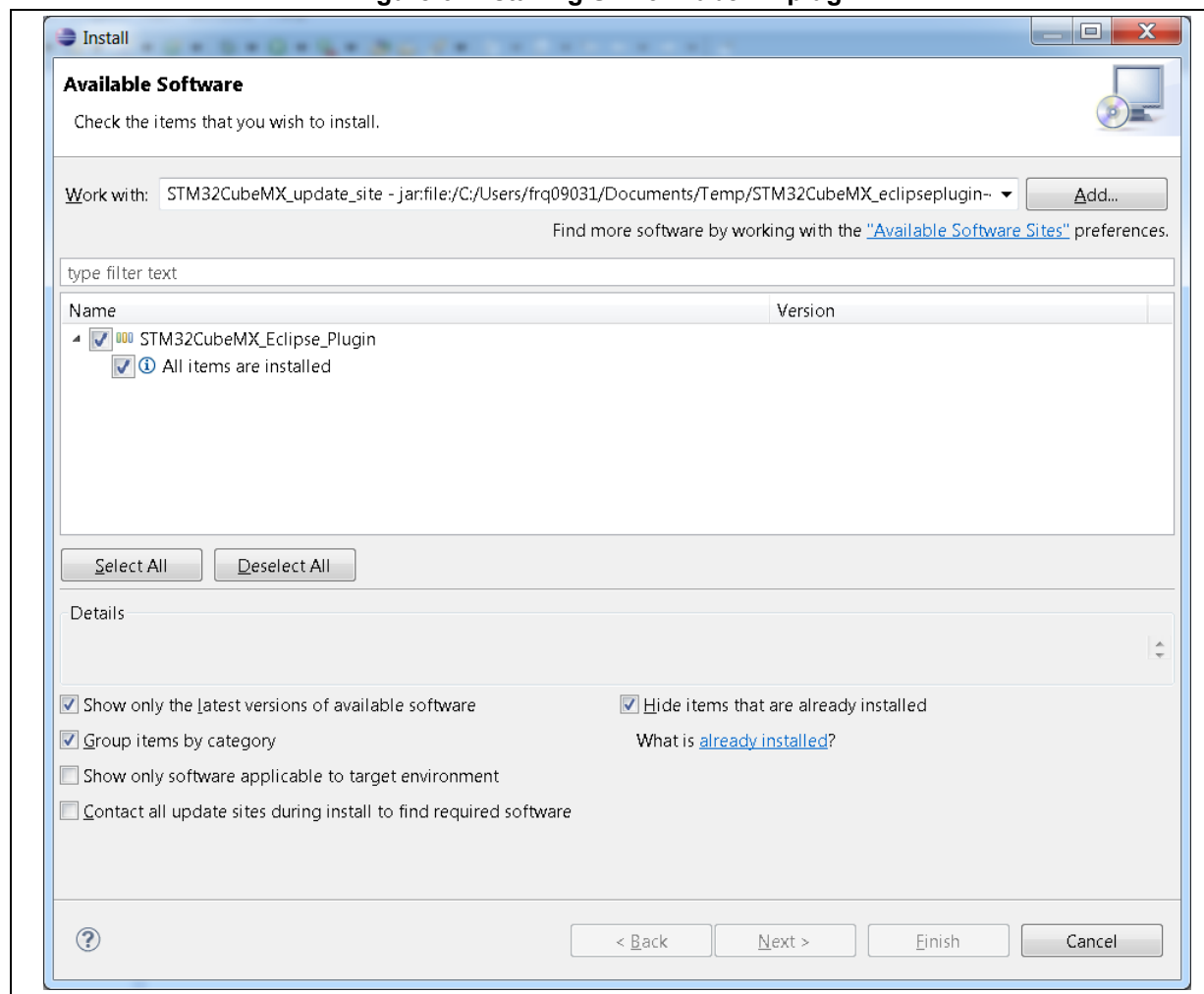
3.3.3 Uninstalling STM32CubeMX as Eclipse IDE plug-in

To uninstall STM32CubeMX plug-in in Eclipse IDE, follow sequence below:

1. In Eclipse, right-click STM32CubeMX perspective Icon (see *Figure 7*) and select Close.
2. From Eclipse Help menu, select Install New Software.
3. Click Installed Software tab, then select STM32CubeMX and click Uninstall.
4. Click Finish in Uninstall Details menu (see *Figure 8*)**.**

Figure 7. Closing STM32CubeMX perspective

Figure 8. Uninstalling STM32CubeMX plug-in

3.4 Launching STM32CubeMX

3.4.1 Running STM32CubeMX as standalone application

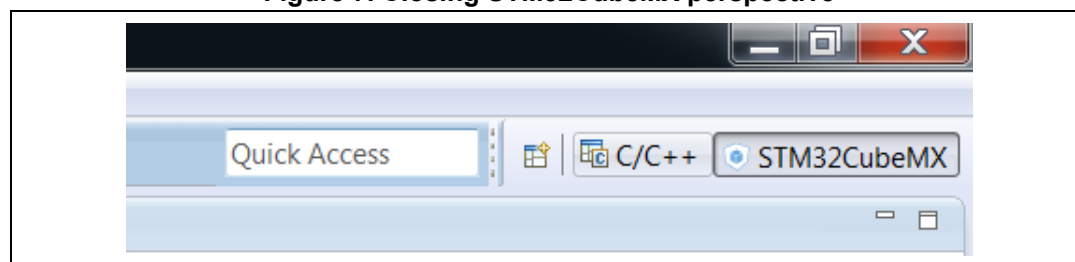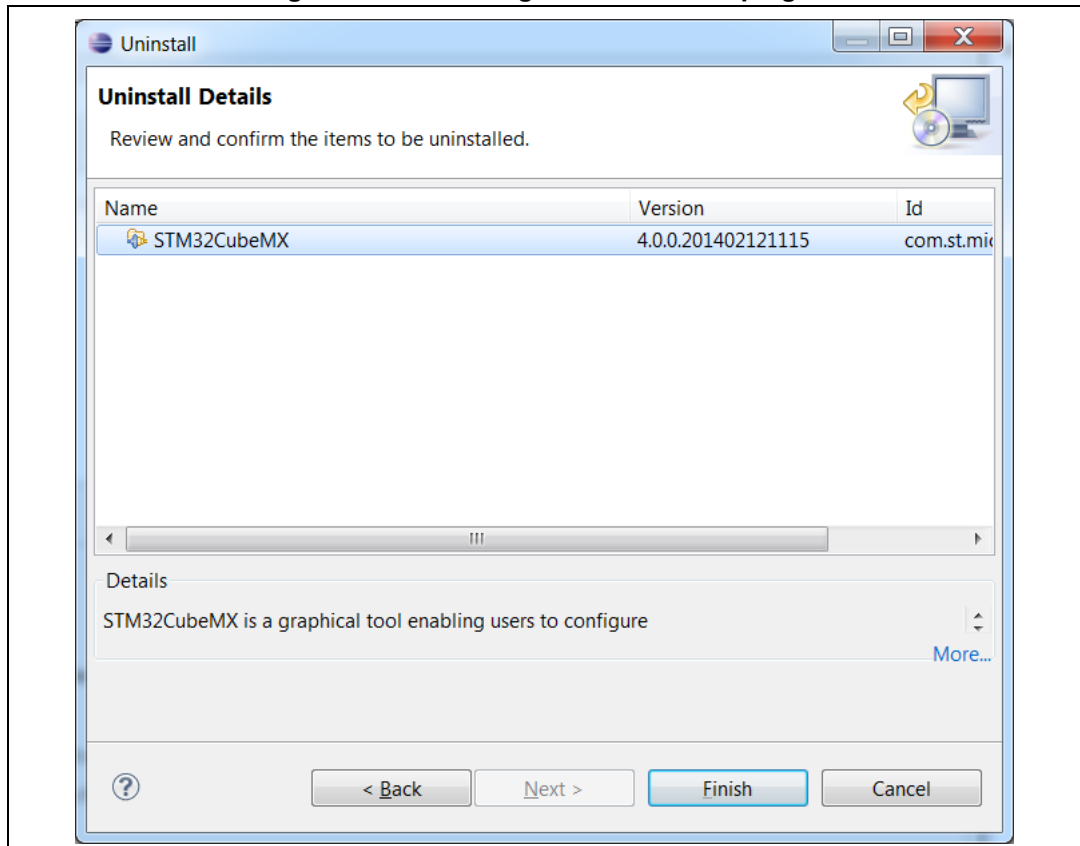To run STM32CubeMX as a standalone application on Windows:

- select STM32CubeMX from Program Files > ST Microelectronics > STM32CubeMX.
- or double-click STM32CubeMX icon on your desktop.

To run STM32CubeMX as a standalone application on Linux, launch the STM32CubeMX executable from STM32CubeMX installation directory.

3.4.2 Running STM32CubeMX in command-line mode

To facilitate its integration with other tools, STM32CubeMX provides a command-line mode. Using a set of commands, you can:

- Load an MCU
- Load an existing configuration
- Save a current configuration
- Set project parameters and generate corresponding code
- Generate user code from templates.

Three command-line modes are available:

- To run STM32CubeMX in interactive command-line mode, use the following command line:
  - On Windows:
  ```
  java -jar STM32CubeMX.exe –i
  ```
  - On Linux and MacOS:
  ```
  java -jar STM32CubeMX –i
  ```
  The "MX>" prompt is then displayed to indicate that the application is ready to accept commands.
- To run STM32CubeMX in command-line mode getting commands from a script, use the following command line:
  - On Windows:
  ```
  java -jar STM32CubeMX.exe –s <script filename>
  ```
  - On Linux and MacOS:
  ```
  java -jar STM32CubeMX –s <script filename>
  ```
  All the commands to be executed must be listed in the script file. An example of script file content is shown below:
  ```
  load STM32F417VETx
  project name MyFirstMXGeneratedProject
  project toolchain "MDK-ARM v4"
  project path C:\STM32CubeProjects\STM32F417VETx
  project generate
  exit
  ```

- To run STM32CubeMX in command-line mode getting commands from a scripts and without UI, use the following command line:
  - On Windows:
    ```
    java -jar STM32CubeMX.exe -q <script filename>
    ```
  - On Linux and MacOS:
    ```
    java -jar STM32CubeMX -q <script filename>
    ```
  Here again, the user can enter commands when the MX prompt is displayed.

See *Table 1* for available commands.

Table 1. Command line summary

Command line	Purpose	Example
help	Display the list of available commands	help
load <mcu>	Load the selected MCU	load STM32F101RCTx load STM32F101Z(F-G)Tx
config load <filename>	Load a previously saved configuration	config load C:\Cube\ccmram\ccmram.ioc
config save <filename>	Save the current configuration	config save C:\Cube\ccmram\ccmram.ioc
config saveext <filename>	Save the current configuration with all parameters, including those for which values have been kept to defaults (unchanged by the user).	config saveext C:\Cube\ccmram\ccmram.ioc
config saveas <filename>	Save the current project under a new name	config saveas C:\Cube\ccmram2\ccmram2.ioc
csv pinout <filename>	Export the current pin configuration as a csv file. This file could later be imported into a board layout tool.	Csv pinout mypinout.csv
script <filename>	Run all commands in the script file. There must be one command per line.	script myscript.txt
project couplefilesbyip <0|1>	This code generation option allows choosing between 0 for generating the peripheral initializations in the main or 1 for generating each peripheral initialization in dedicated .c/.h files.	project couplefilesbyip 1

Table 1. Command line summary (continued)

Command line	Purpose	Example
generate code <path>	Generate only "STM32CubeMX generated" code and not a complete project that would include STM32Cube firmware libraries and Toolchains project files. To generate a project, use "project generate".	generate code C:\mypath
set tpl_path <path>	Set the path to the source folder containing the .ftl user template files. All the template files stored in this folder will be used for code generation.	set tpl_path C:\myTemplates\
set dest_path <path>	Set the path to the destination folder that will hold the code generated according to user templates.	set dest_path C:\myMXProject\inc\
get tpl_path	Retrieve the path name of the user template source folder	get tpl_path
get dest_path	Retrieve the path name of the user template destination folder.	get dest_path
project toolchain <toolchain>	Specify the tool chain to be used for the project. Then, use the "project generate" command to generate the project for that tool chain.	project toolchain EWARM project toolchain "MDK-ARM V4" project toolchain "MDK-ARM V5" project toolchain TrueSTUDIO project toolchain SW4STM32
project name <name>	Specify the project name	project name ccmram
project path <path>	Specify the path where to generate the project	project path C:\Cube\ccmram
project generate	Generate the full project	project generate
exit	End STM32CubeMX process	exit

3.4.3 Running STM32CubeMX plug-in from Eclipse IDE

To run STM32CubeMX plug-in from Eclipse:
1. Launch Eclipse environment.
2. Once Eclipse IDE is open, click open new perspective: .
3. Select STM32CubeMX to open STM32CubeMX as a perspective (see *Figure 9*).
4. STM32CubeMX perspective opens (see *Figure 10*). Enter STM32CubeMX user interface via the Welcome menus.

To run STM32CubeMX as a standalone application on MacOS, double-click the STM32CubeMX icon on your desktop.

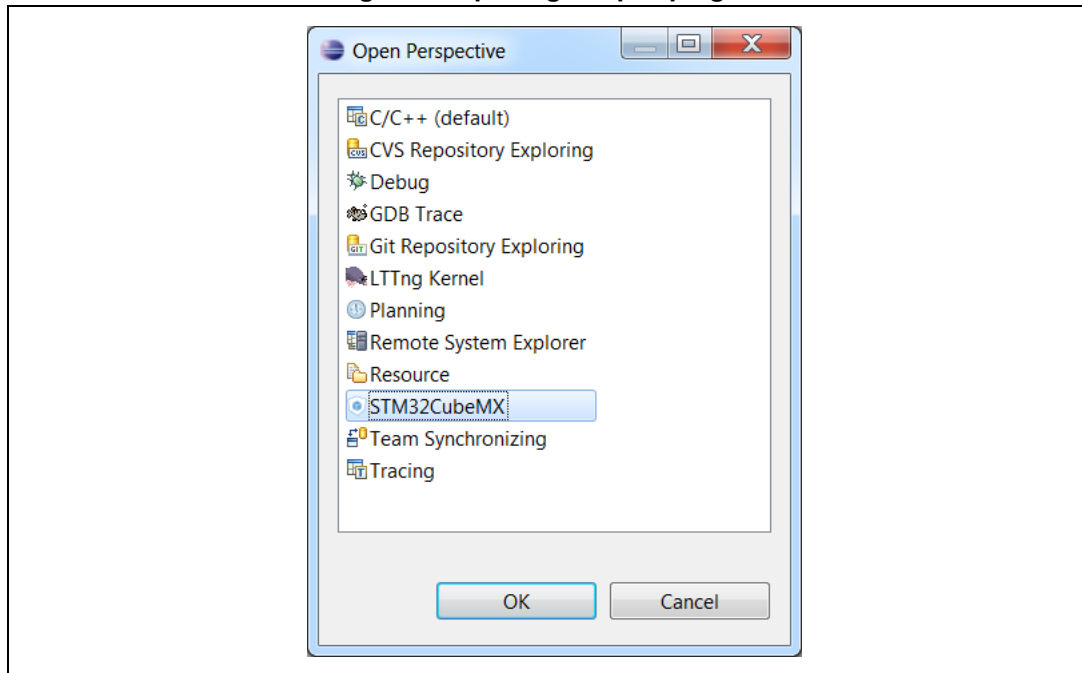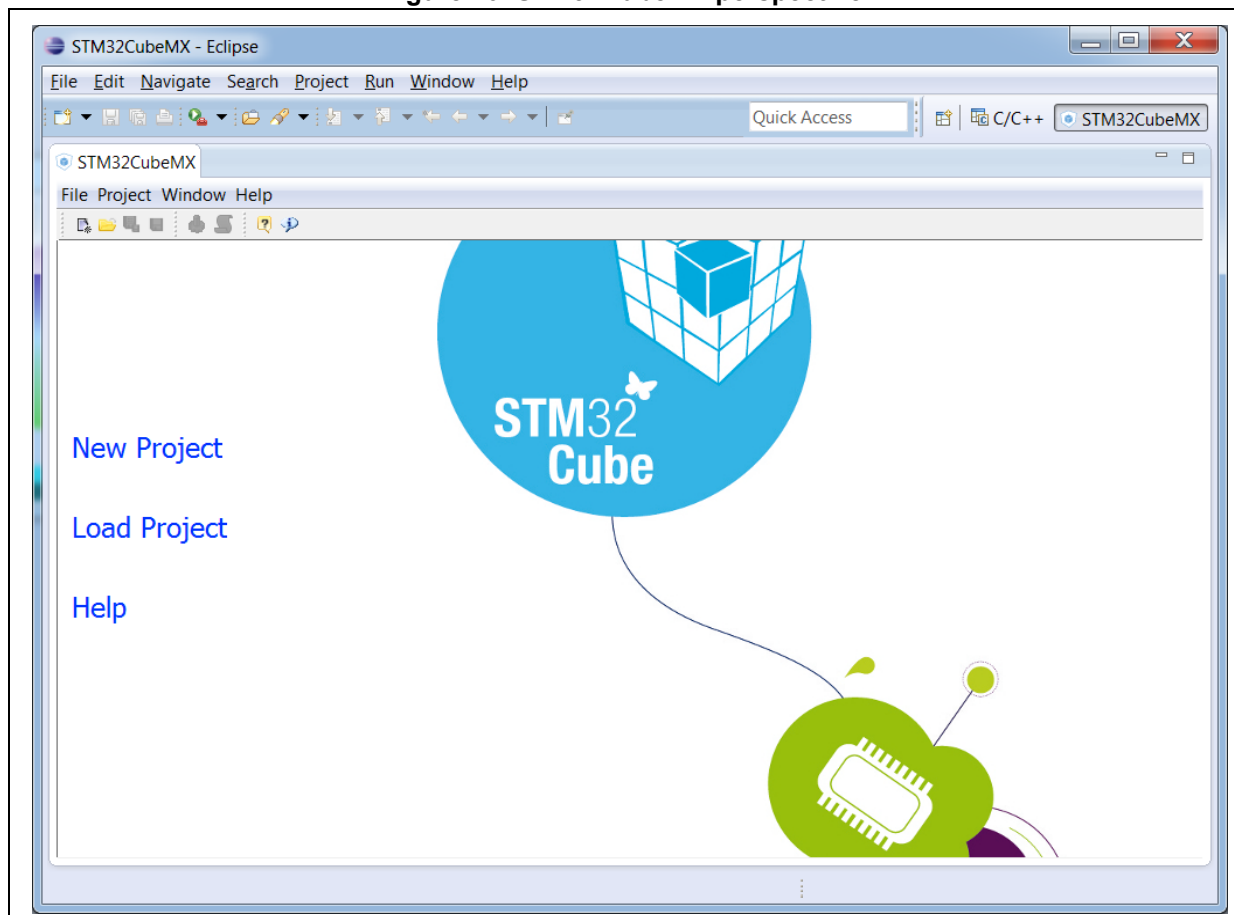**Figure 9. Opening Eclipse plug-in**

Figure 10. STM32CubeMX perspective

3.5 Getting STM32Cube updates

STM32CubeMX implements a mechanism to access the internet and to:

- Perform self-updates of STM32CubeMX and of the STM32Cube firmware packages installed on the user computer
- Download new firmware packages and patches

Installation and update related sub-menus are available under the Help menu.

Off-line updates can also be performed on computers without internet access (see *Figure 16*). This is done by browsing the filesystem and selecting available STM32Cube firmware zip packages.

If the PC on which STM32CubeMX runs is connected to a computer network using a proxy server, STM32CubeMX needs to connect to that server to access the internet, get self-updates and download firmware packages. Refer to *Section 3.5.1: Updater configuration* for a description of this connection configuration.

To view Windows default proxy settings, select Internet options from the Control panel and select LAN settings from the Connections tab (see *Figure 11*).

Figure 11. Displaying Windows default proxy settings
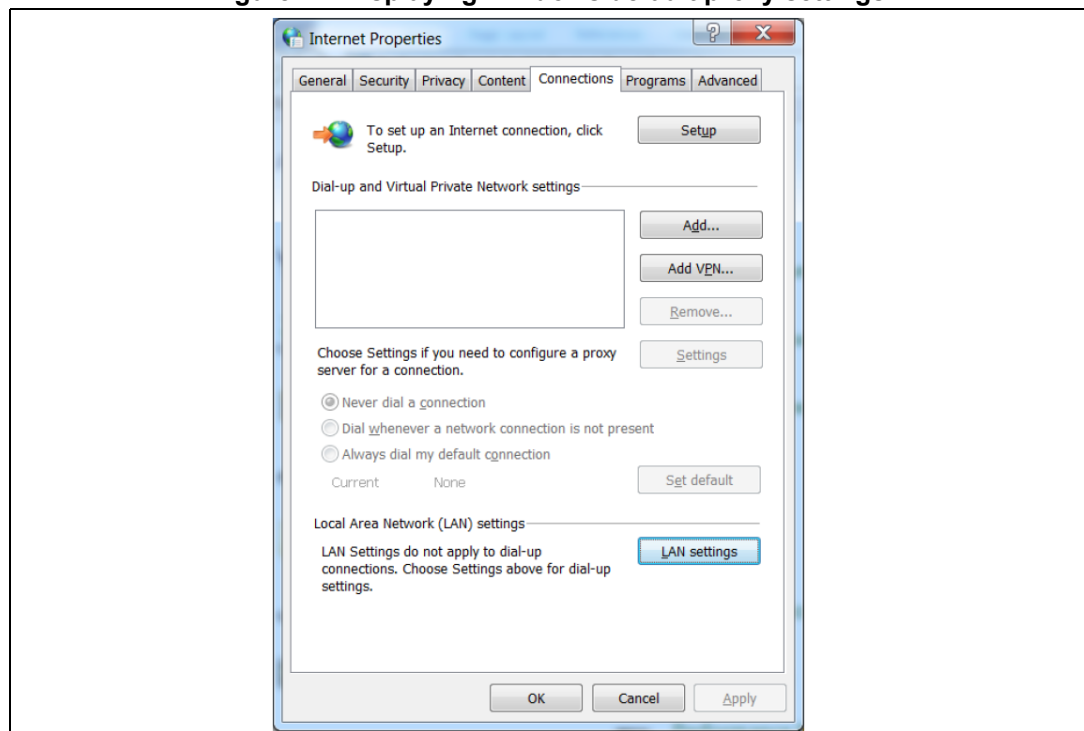
Several proxy types exist and different computer network configurations are possible:

- Without proxy: the application directly accesses the web (Windows default configuration).
- Proxy without login/password
- Proxy with login/password: when using an internet browser, a dialog box opens and prompts the user to enter his login/password.
- Web proxies with login/password: when using an internet browser, a web page opens and prompts the user to enter his login/password.

If necessary, contact your IT administrator for proxy information (proxy type, http address, port).

STM32CubeMX does not support web proxies. In this case, the user will not be able to benefit from the update mechanism and will need to manually copy the STM32 firmware packages from http://www.st.com/stm32cube to the repository. To do it, follow the sequence below:

1.   Go to http://www.st.com/stm32cube and download the relevant STM32Cube firmware package from the *Associated Software* section.

2.   Unzip the zip package to your STM32Cube repository. Find out the default repository folder location in the Updater settings tab as shown in *Figure 12* (you might need to update it to use a different location or name).

3.5.1   Updater configuration

To perform STM32Cube new library package installation or updates, the tool must be configured as follows:

1.   Select **Help > Updater Settings** to open the **Updater Settings** window.

2.   From the **Updater Settings** tab (see *Figure 12*)

    a)   Specify the repository destination folder where the downloaded packages will be stored.

    b)   Enable/Disable the automatic check for updates.

Figure 12. Updater Settings window
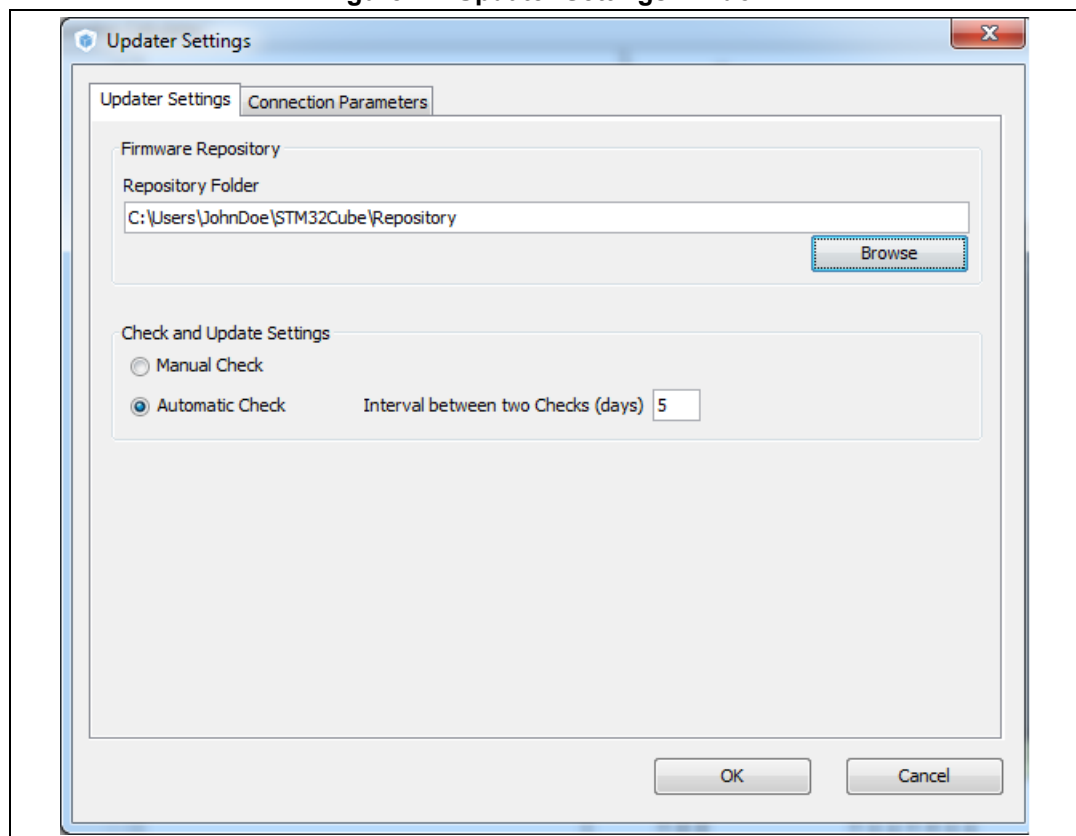
3. In the **Connection Parameters** tab, specify the proxy server settings appropriate for your network configuration by selecting a proxy type among the following possibilities:
   – No Proxy (see *Figure 13*)
   – Use System Proxy Parameters (see *Figure 14*)
     On Windows, proxy parameters will be retrieved from the PC system settings.
     Uncheck "Require Authentication" if a proxy server without login/password configuration is used.
   – Manual Configuration of Proxy Server (see *Figure 15*)
     Enter the Proxy server http address and port number. Enter login/password information or uncheck "Require Authentication" if a proxy server without login/password configuration is used.

4. Uncheck **Remember my credentials** to prevent STM32CubeMX to save encrypted login/password information in a file. This implies reentering login/password information each time STM32CubeMX is launched.

5. Click the Check Connection button to verify if the connection works. A green check mark appears to confirm that the connection operates correctly :

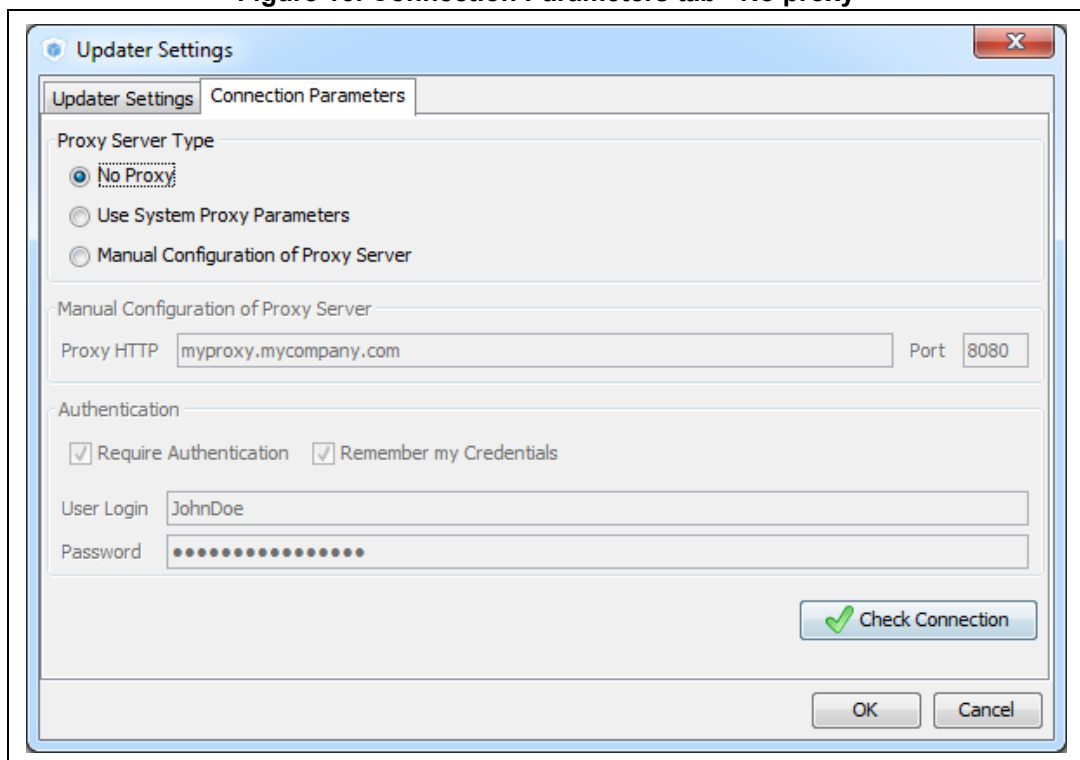**Figure 13. Connection Parameters tab - No proxy**

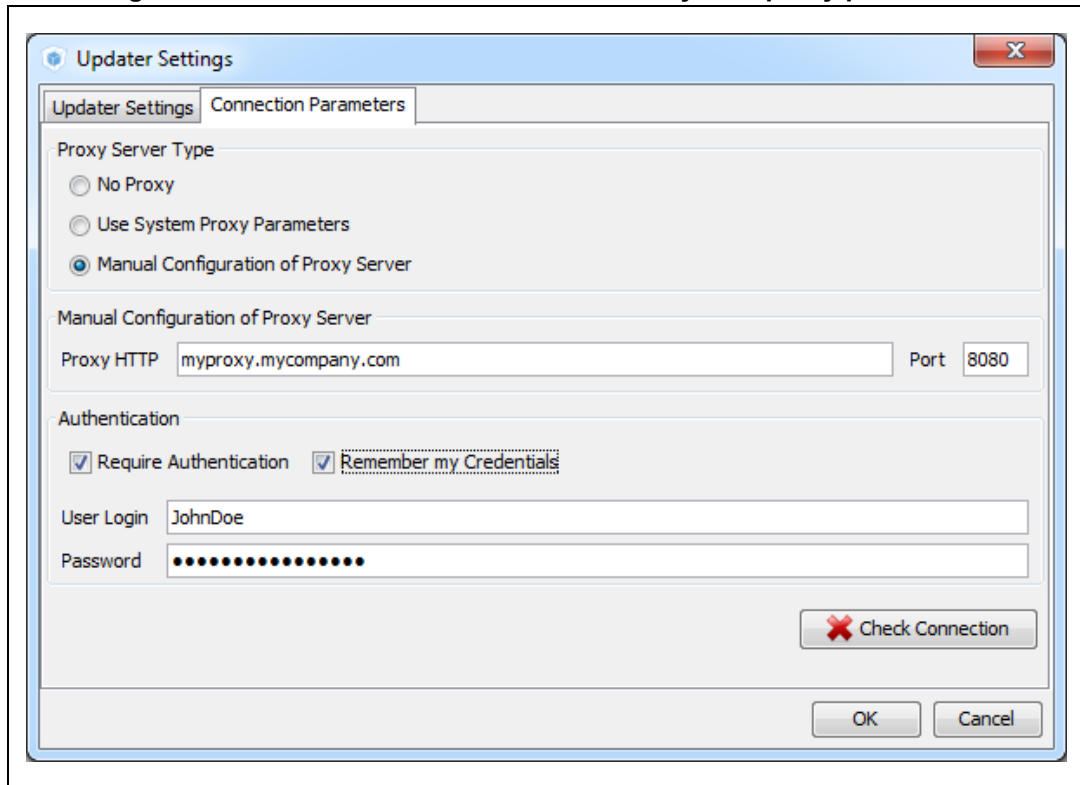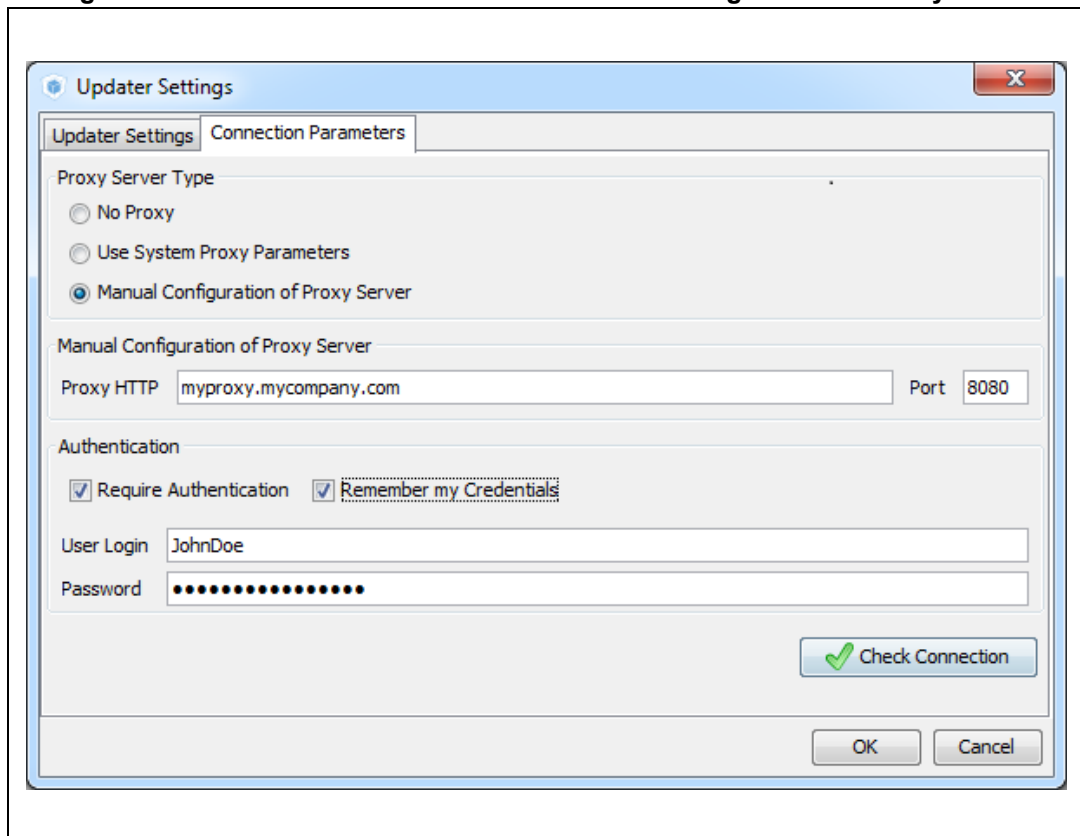**Figure 14. Connection Parameters tab - Use System proxy parameters**

Figure 15. Connection Parameters tab - Manual Configuration of Proxy Server

6. Select **Help > Install New Libraries** sub-menu to select among a list of possible packages to install.

7. If the tool is configured for manual checks, select **Help > Check for Updates** to find out about new tool versions or firmware library patches available to install.

3.5.2 Downloading new libraries

To download new libraries, follow the steps below:

1. Select **Help > Install New Libraries** to open the **New Libraries Manager** window.

    If the installation was performed using STM32CubeMX, all the packages available for download are displayed along with their version including the version currently installed on the user PC (if any), and the latest version available from *http://www.st.com*.

    If no Internet access is available at that time, choose "Local File". Then, browse to select the zip file of the desired STM32Cube firmware package that has been previously downloaded from st.com. An integrity check is performed on the file to ensure that it is fully supported by STM32CubeMX.

    The package is marked in green when the version installed matches the latest version available from *http://www.st.com*.

2. Click the checkbox to select a package then "Install Now" to start the download.

See *Figure 16* for an example.

Figure 16. New library Manager window
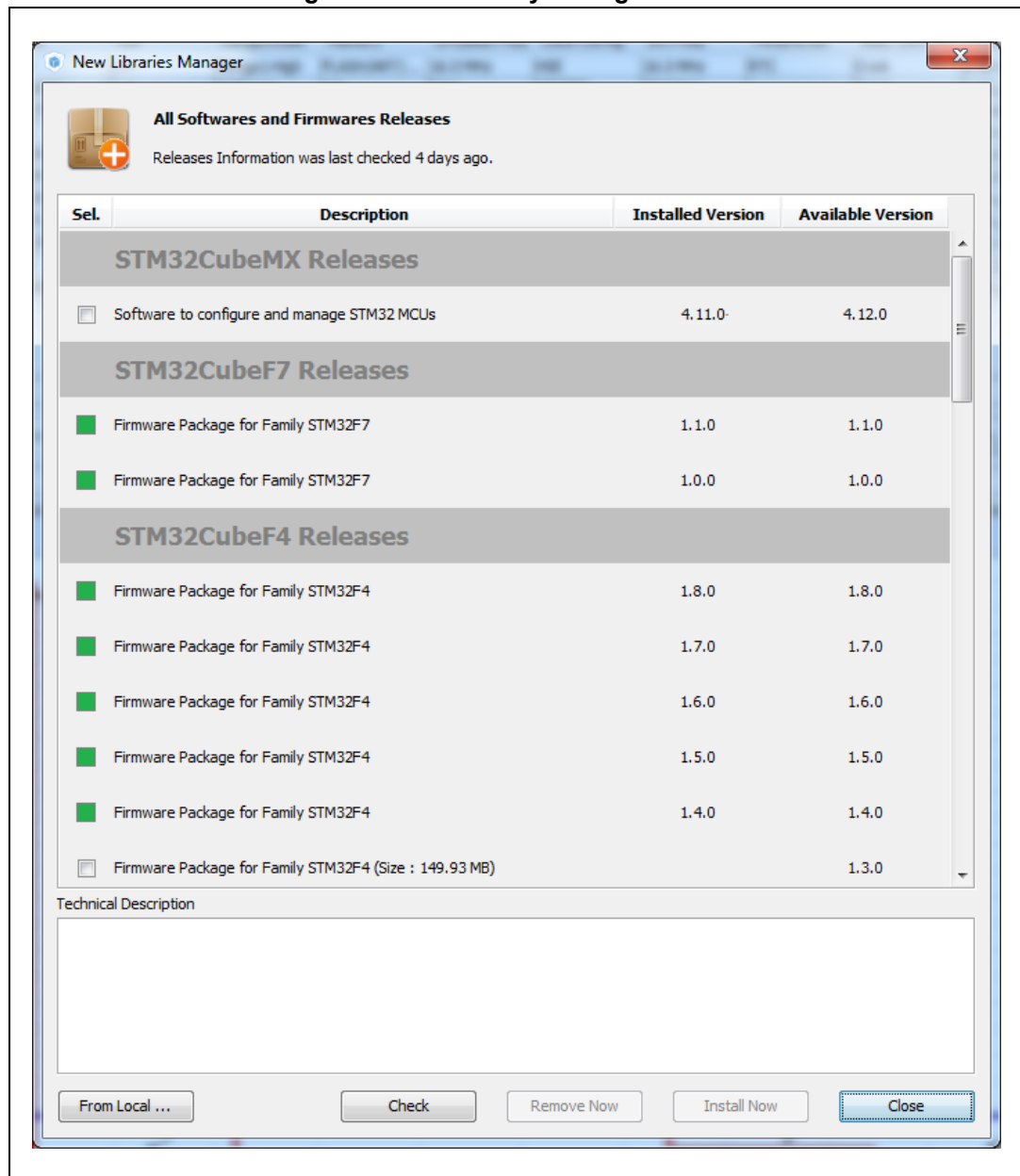
3.5.3 Removing libraries

Proceed as follows to clean up the repository from old library versions thus saving disk space:

1. Select **Help > Install New Libraries** to open the **New Libraries Manager** window.
2. Click a green checkbox to select a package available in stm32cube repository.
3. Click the **Remove Now** button and confirm. A progress window then opens to show the deletion status.

Refer to *Figure 17* to *Figure 19* for an example.
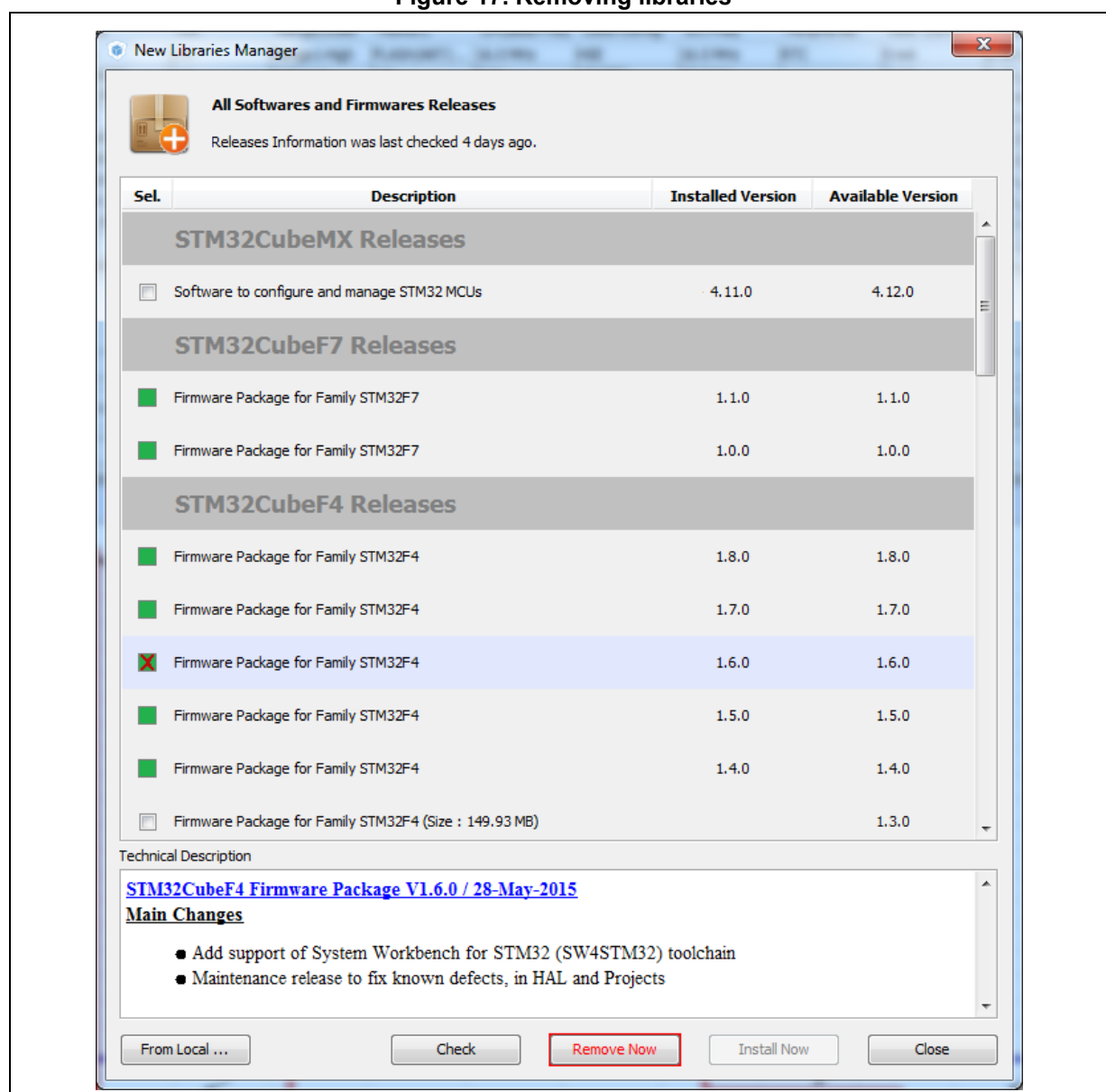
Figure 17. Removing libraries

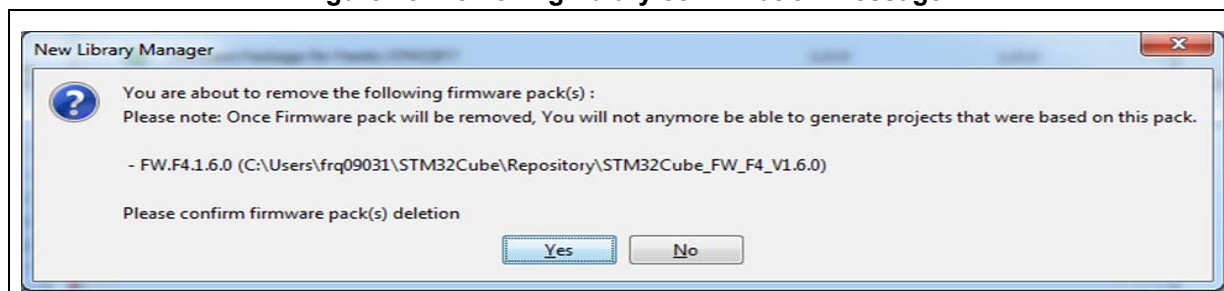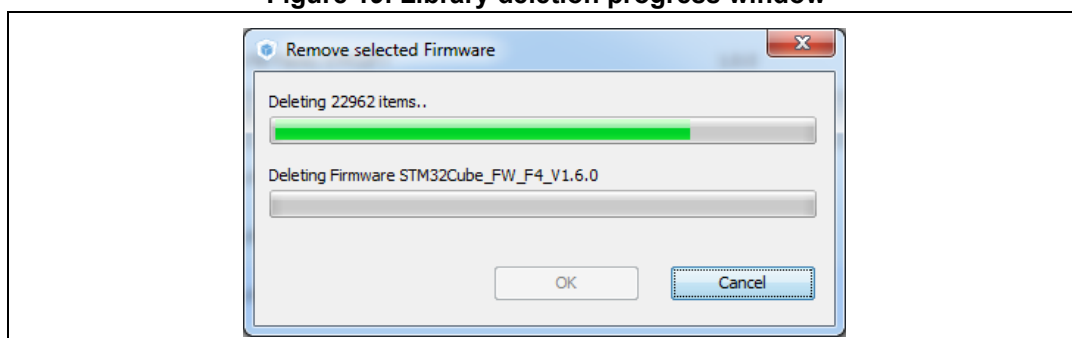**Figure 18. Removing library confirmation message**

Figure 19. Library deletion progress window

3.5.4 Checking for updates

When the updater is configured for automatic checks, it regularly verifies if updates are available. In this case, a green arrow icon ⬇ appears on the tool bar.

When automatic checks have been disabled in the updater settings window, the user can manually check if updates are available:

1.   Click the icon to open the **Update Manager** window or Select **Help > Check for Updates**. All the updates available for the user current installation are listed.
2.   Click the check box to select a package, and then Install Now to download the update.

4 STM32CubeMX User Interface

STM32CubeMX user interface consists of a main window, a menu bar, a toolbar, four views (Pinout, Configuration, Clock Configuration, Power Consumption Calculator) and a set of help windows (MCUs selection, Update manager, About). All these menus are described in the following sections.

For C code generation, although the user can switch back and forth between the different configuration views, it is recommended to follow the sequence below:

1. Select the relevant IPs and their operating modes from the **Pinout** view.
2. Configure the clock tree from the clock configuration view.

   In the **Pinout** view, configure the RCC peripheral by enabling the external clocks, master output clocks, audio input clocks (when relevant for your application). This automatically displays more options on the **Clock tree** view (see *Figure 23*).
3. Configure the parameters required to initialize the IP operating modes from the configuration view.
4. Generate the initialization C code.

4.1 Welcome page

The Welcome page is the first window that opens up when launching STM32CubeMX program. It remains open as long as the application is running. Closing it closes down the application. Refer to *Figure 20* and to *Table 2* for a description of the Welcome page.
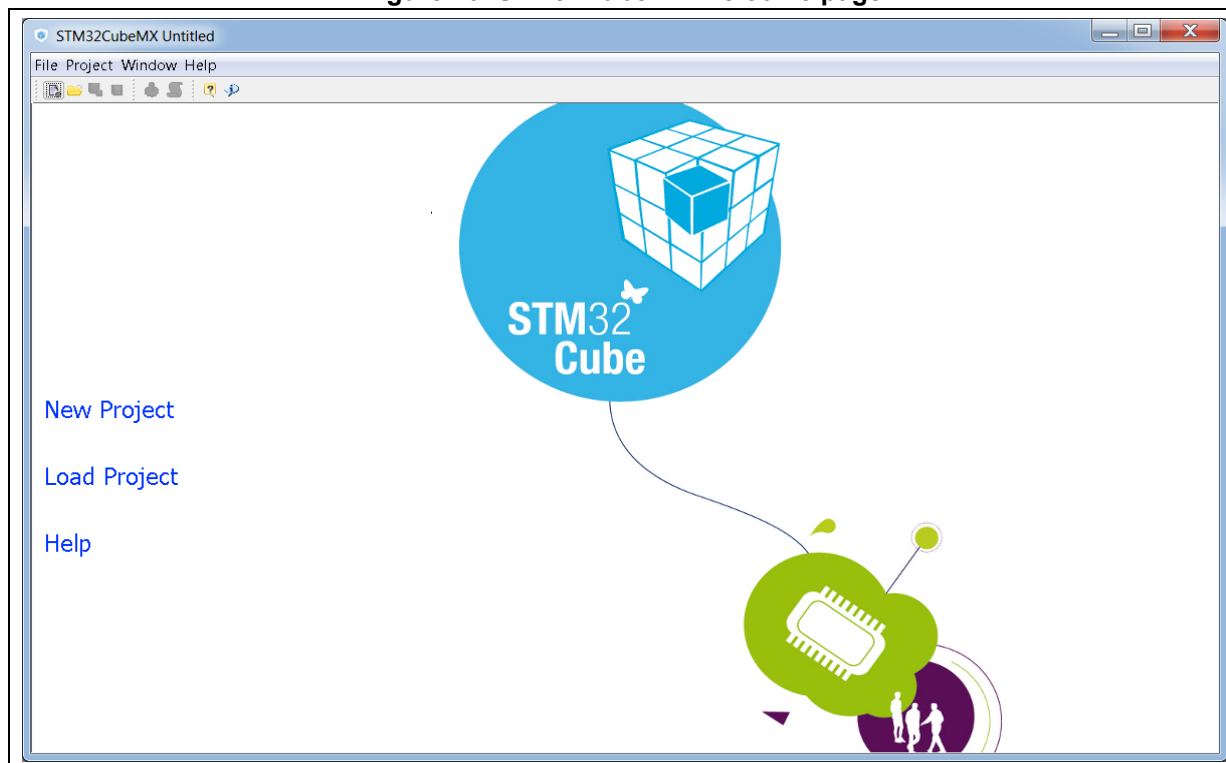
Figure 20. STM32CubeMX Welcome page

Table 2. Welcome page shortcuts

Name	Description
New Project	Launches STM32CubeMX new project creation by opening the New project window (select an MCU from the MCU selector tab or a board configuration from the Board selector tab).
Load Project	Opens a browser window to select a previously saved configuration (.ioc file) and loads it. **Caution:** **When upgrading to a new version of STM32CubeMX, make sure to always backup your projects before loading the new project (especially when the project includes user code).**
Help	Opens the user manual.

4.2 New project window

This window shows two tabs to choose from:

- The MCU selector tab offering a list of target processors
- A Board selector tab showing a list of STMicroelectronics boards.

The MCU selector allows filtering on various criteria: series, lines, packages, peripherals and additional MCU characteristics such as memory size or number of I/Os (see *Figure 21*).

The Board selector allows filtering on STM32 board types, series and peripherals (see *Figure 22*). Only the default board configuration is proposed. Alternative board configurations obtained by reconfiguring jumpers or by using solder bridges are not supported.

When a board is selected, the **Pinout** view is initialized with the relevant MCU part number along with the pin assignments for the LCD, buttons, communication interfaces, LEDs, etc...(see *Figure 24*). Optionally, the user can choose to initialize it with the default peripheral modes (see *Figure 25*).

When a board configuration is selected, the signals change to 'pinned', i.e. they cannot be moved automatically by STM32CubeMX constraint solver (user action on the peripheral tree, such as the selection of a peripheral mode, will not move the signals). This ensures that the user configuration remains compatible with the board.

Figure 21. New Project window - MCU selector