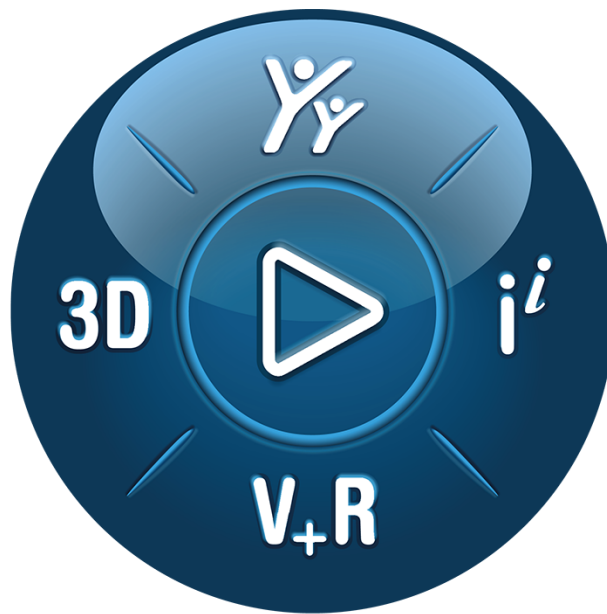


# 3D Work Instructions

## DELMIA Apriso 2021 Implementation Guide



**3DEXPERIENCE®**

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# 1 Introduction

## Scope

The scope of this document describes how to use and modify the DELMIA 3DPlay Experience for Work Instructions option in Apriso. This includes the ability to view a list of Orders, select and open an Order, interact with a 3D viewer, navigate to the Order's Operations and Steps, and view lists of Parts and Tools required for the execution of the Order.

## Intended Audience

The intended audience for this document is process authors configuring Work Instructions to be displayed using Screen Flows.

## Glossary

**Order** - An Apriso object used to describe work to be performed.

**Work Instructions 3D Business Control** – A Business Control that displays the Parts and Tools for Operations and Steps in a 3D viewer.

## 2 Overview

The DELMIA 3DPlay Experience for Work Instructions is delivered in a set of GPM packages that can be deployed in DELMIA Apriso system.

The packages contain the 3DPlay control used for viewing 3D work instructions authored in DELMIA as well as Screens and Views for selecting Orders, Operations, Parts, and Tools. The selection of the Order components moves the user to different points in the 3D work instructions and highlights the Parts and Tools selected.

The Experience package can be used as-is to view 3D work instructions associated with an Order. The package can also be a starting point for a customer implementation of 3D work instructions by services and can be modified to fit customer data and processes.

## 3 Installation

### 3.0.1 3DEXPERIENCE Platform and DELMIA Apriso Compatibility Matrix

The table below shows which versions of the 3DEXPERIENCE Platform are compatible with DELMIA Apriso releases.

3DEXPERIENCE Platform	DELMIA Apriso
R2018x FD01-FD05 R2019x GA	DELMIA Apriso 2018 SP2 through 2019 SP1
R2018x FD06+ R2019x FD01+	DELMIA Apriso 2019 SP2 and newer

### 3.1 Prerequisites

#### ► Incoming Messages Monitor configuration

3DPlay Experience for Work Instructions uses DELMIA Apriso Process Plan Resource integration and requires a correct Incoming Messages Monitor configuration. For more information refer to the **Incoming DELMIA Messages Configuration – DELMIA Apriso Configuration Manager** section of the [DELMIA Plan Approval and Distribution Integration Implementation Guide](#).

#### ► 3DPlay in DELMIA Apriso Mobile Application

3DPlay control is supported on tablet devices running the following mobile operating systems:

- ▷ iOS 13 or higher
- ▷ Android 7.0 or higher

**i** Not every 3D model will load on every device. The available memory on a device determines its loading capacity.

### 3.2 Prerequisites for Connected Mode

Connected mode in DELMIA Apriso means the ability to view in 3D Work Instruction Views and Product Build that are stored in the 3DEXPERIENCE Platform directly in DELMIA Apriso.

If no 3DXML is found in DELMIA Apriso for the given WIP Order, then the 3D model will be loaded directly from the 3DEXPERIENCE Platform.

The following additional requirements must be met for the Connected Mode:

- ▶ **3DPassport and SSL** must be configured on DELMIA Apriso server

**i** For configuration details, see [Security Implementation Guide](#).

- ▶ The **3DSpace service URL** previously configured on the 3DEXPERIENCE Platform must be specified in the `WebServiceProviders.xml` file in Central Configuration directory on DELMIA Apriso server

**i** For 3DSpace installation instructions, refer to 3DEXPERIENCE Platform User Assistance on [3DS Support](#).

- ▶ 3D Work Instructions data must be generated and exported to DELMIA Apriso using the **Connected Mode** setting in Work Plan Publication application on 3DEXPERIENCE Platform
- ▶ The user must have the **IFW, CSV, and WKB licenses** on 3DEXPERIENCE Platform

## 3.3 Install and Configure DELMIA 3DPlay Experience for Work Instructions Page

All the resources required to install and configure 3DPlay Experience for Work Instructions in DELMIA Apriso are available from the dedicated **Install and Configure DELMIA 3DPlay Experience for Work Instructions** page.

DELMIA Apriso 2021 | Install DELMIA 3DPlay Experience for Work Instructions

The DELMIA 3DPlay Experience for Work Instructions supports the display of 3D data with work instructions on the manufacturing shop floor. It includes the Work Instructions 3D Business Control and the Work Instructions 3D FlexPart.

### Documentation

- 3D Work Instructions Implementation Guide**  
Provides an overview of 3D Work Instructions and describes how to use the WI Experience 3DPlay Business Control.
- Database Documentation**  
Enables viewing DELMIA Apriso database (DB) tables (organized into groups), their descriptions, and the relations between them.
- Process Builder Help**  
Provides an overview of DELMIA Apriso Process Builder (PB) and information on installing and using the application. This Help describes the user interface elements, entity maintenance, available Business Controls, and management of Processes, Operations, and Screen Flows.

### Components (GPM Packages)

The GPM Package files need to be deployed on DELMIA Apriso server for dedicated Database Management System (SQL/Oracle) and in a specified sequence both indicated below (and in their file names).

- 3DPlay Work Instructions 20 Cockpit**

Figure 1 DELMIA 3DPlay Experience for Work Instructions Page

To access the page:

1. Load <http://<server name>/Apriso/Start>. The **DELMIA Apriso Start** page is displayed.
2. Switch to the Server Configuration page using the wrench icon in the top right-hand corner.

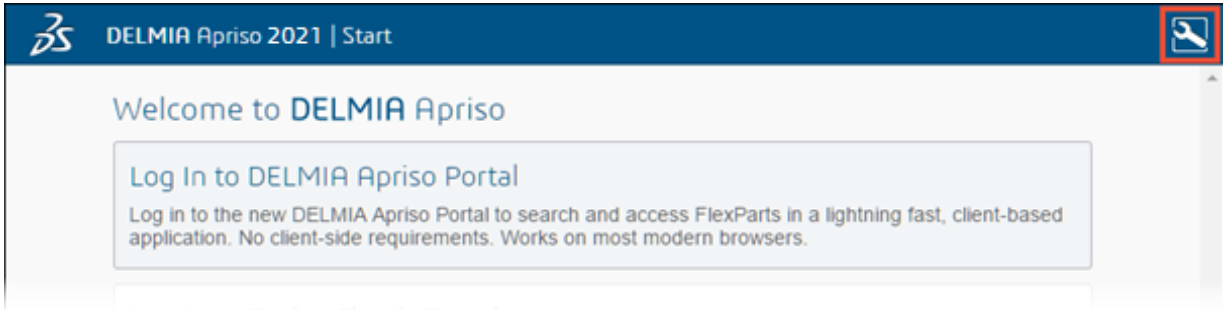


Figure 2 Switching to the Server Configuration Page

3. Navigate to **Preconfigured Solutions | 3DPlay Experience for Work Instructions** page.

**i** To access the DELMIA Apriso Server Configuration page from the server where DELMIA Apriso is installed, you can also use the **DELMIA Apriso 2021 Start** link on the desktop.

## 3.4 Deploying GPM Packages

To install the 3DPlay Experience for Work Instructions, use GPM to deploy the dedicated package, which you can download from the [3.3 Install and Configure DELMIA 3DPlay Experience for Work Instructions Page](#).

### Components (GPM Packages)

The GPM Package files need to be deployed on DELMIA Apriso server for dedicated Database Management System (SQL/Oracle) and in a specified sequence both indicated below (and in their file names).

 3DPlay Work Instructions 20 Cockpit

Figure 3 3DPlay Experience for Work Instructions GPM Package

# 4 Configuration

## 4.1 Order Grid

The Order Grid Screen is the starting point for the Screens provided in the GPM package. This Screen is used to select an Order in the system to view 3D work instructions. After an Order is highlighted, the View Operations button is enabled in the upper right corner to view the 3D work instruction.

The Screen contains a standard Apriso Grid Business Control. All existing columns can be removed from the grid except for WipOrderNo and WipOrderType. Additional or alternate columns can be added based on customer requirements. The Screen and component names are as follows:

- ▶ WI3D\_Orders (Screen)
  - ▷ WI3D\_OrderCockpit.List.With.Tabs (View)
    - ▶ WI3D\_OrderCockpit.List.With.Tabs (Operation)
      - ▶ Grid (Business Control)

WIP Order No	WIP Order Type	WIP Order Description	Serial No	Project Rank	Priority	Rel...	Product No	Compl Qty	UOM	Date Start	Date Started	Due Date	Status
101	Production Order	This is a description of Execution Order 101	-	-			C1P1	0/10	EA	5/10/2017 8:44:37 AM		5/10/2017 8:44:37 AM	New
102	Production Order	Work Order for Jet Engine	-	-			C1P1	0/4	EA	5/10/2017 11:23:53 AM		5/10/2017 11:23:53 AM	New
201	Production Order	This order is for the manufacturing of Jet Engine DMU2 to Apriso	-	-			C1P1	0/5	EA	5/17/2017 2:08:43 PM		5/17/2017 2:08:43 PM	New
3	Production Order	Work Order #3 for manufacturing the Jet Engine	-	-			C1P1	0/20	EA	5/9/2017 9:22:00 PM		5/9/2017 9:22:00 PM	New
301	Production Order	Please build Jet Engine DMU2 to Apriso to complete an order we received and named 301 that is due before the end of May 2017	-	-			C1P1	0/1	15	5/18/2017 7:43:13 AM		5/18/2017 7:43:13 AM	Completed
401	Production Order	Work Order 401 for the Jet Engine	-	-			C1P1	0/5	EA	5/17/2017 9:08:43 PM		5/17/2017 9:08:43 PM	New
501	Production Order	Work Order 501 for Jet Engine Assembly July 2017	-	-			C1P1	0/5	05	5/25/2017 8:19:04 AM		5/25/2017 8:19:04 AM	New

Figure 4 Order Grid

To open an Order, double-click a row in the grid, or select that row and click **View Operations**. The Screen Flow will navigate to a new Screen with the WipOrderNo and WipOrderType of the Order.

## 4.2 Operations and Steps Screen

The Operations and Steps Screen allows the user to view and interact with 3D work instructions. The Screen consists of three parts: the Operation and Step lists (tree control on the left), the Work Instructions 3D Business Control (3D model in the center), and the Parts and Tools lists (grids on the right). Selecting data on either side causes the 3DPlay content to synchronize with the selected data. Data for synchronizing the various Views with the selected Operations and Steps is passed to and from the Work Instructions 3D Business Control and the Parts and Tools list control using JavaScript and JSON as the data format.

The Screen name is WI3D\_Operations. The Screen can be used as-is or enhanced to meet customer-specific requirements.

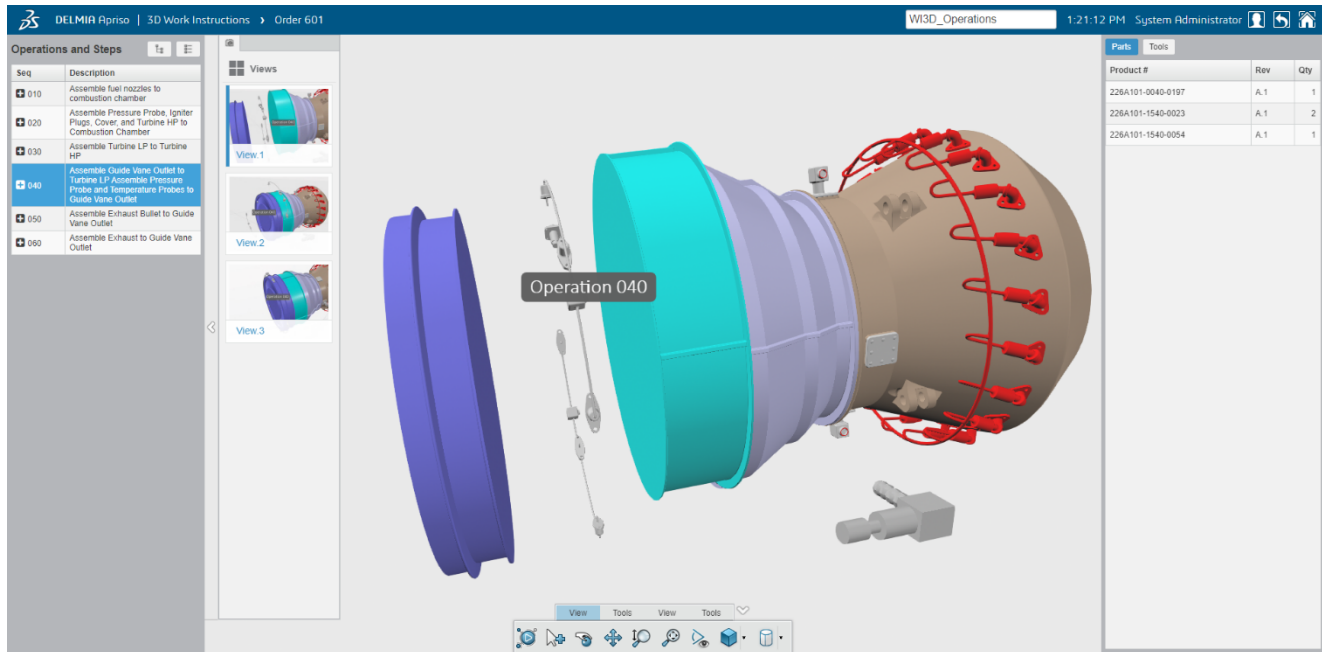


Figure 5 Operations and Steps Screen

### 4.2.1 Operations and Steps List

The Operations and Steps list View uses a tree control that displays a list of the Operations assigned to the selected Order and the Steps assigned to each Operation. The selected Operation or Step is passed to the 3D Play Business Control via JavaScript and to the Parts and Tools list Views, causing them to synchronize their data and display to the selected Operation or Step.

The screen and component names are as follows:

- ▶ WI3D\_Operations (Screen)
  - ▷ WI3D\_Operations\_View (View)
    - ▶ WI3D\_Oper\_List (Operation)
      - ▶ Tree (Business Control)

The default configuration of the Operations and Steps list is:

- ▶ Multiple Selections for the tree control must be set to “False”. The Work Instructions 3D Business Control will only accept a single Operation or Operation Step as an input.
- ▶ The RefName for an Operation is PROCESS\_OPERATION.PPROperationID, and the RefName for a Step is UNIT\_CHARACTERISTIC.FreeTextValue. Operation and Step identifiers are concatenated strings that include the “\_” character. For both Operations and Steps, only use the substring to the left of the “\_”. OprSequenceNo and StepSequenceNo are needed for each row to filter Parts and Tools when selected. (StepSequenceNo will be null if an Operation is selected.)
- ▶ The following events call JavaScript to synchronize the Views when an Operation is selected:

- ▷ NoOperationSelected – Resets the Work Instructions 3D Business Control, removing all markup and returning to full product buildup. No JSON data is passed.
- ▷ OperationSelected – Passes the following data in JSON format to the Work Instructions 3D Business Control:

```
{'operId': '', 'refName': 'ref123', 'instName': ''}
```

The player will display a representation of the Operation specified by one of the following input parameters: InstName (InstanceName), refName (Reference.PLMEExternalID), or operId (Reference.Title).

## 4.2.2 Work Instructions 3D Business Control

This View contains the Work Instructions 3D Business Control that displays 3D work instructions authored in DELMIA. In order to locate the 3D data, the control requires the WipOrderNo and WipOrderType of the selected Order to be passed at initialization time.

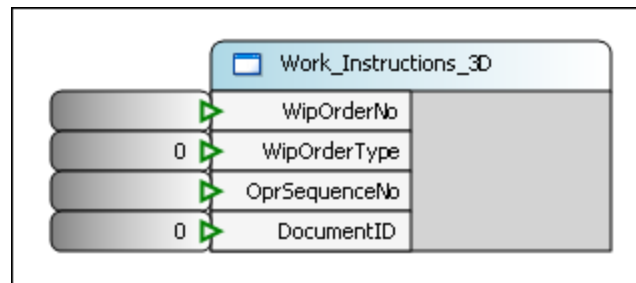


Figure 6 Work Instructions 3D Business Control

The screen and component names are as follows:

- ▶ WI3D\_Operations (Screen)
  - ▷ WI3D\_3D\_View (View)
    - ▶ WI3D\_3D\_Operation (Operation)
      - ▶ Work\_Instructions\_3D (Business Control)

JavaScript is used to manipulate the 3D work instructions loaded in the Business Control. The JavaScript passes data in JSON format. Various APIs exist to select the Views associated with a selected Operation or Step and highlight Parts and Tools. For more information on this Business Control, see the Business Controls section of the [Process Builder Help](#).

## 4.2.3 Parts and Tools List

This View contains Grids that list the Parts and Tools for the selected Operation or Step. Selecting a Part or Tool will cause the component to be highlighted in the 3D model displayed by the Work Instructions 3D Business Control.

The screen and component names are as follows:

- ▶ WI3D\_Operations (Screen)
  - ▷ WI3D\_Details\_View (View)
    - ▶ WI3D\_Part\_List (Operation)
      - ▶ GridToolList (Grid Business Control)
      - ▶ GridPartList (Grid Business Control)

The default configuration of the grids is as follows:

- ▶ The CSS class names for the Parts and Tools Grids must be different from each other.
- ▶ The WipOrderType and WipOrderNo must be passed to both Grids so they can select the proper data from the database.
- ▶ The Selection Mode for the Grids should be “Single”.
- ▶ The Parts Grid must include the PRODUCT.ProductNo for each Part in the Grid. (This does not have to be visible on the Grid.)
- ▶ The Tools Grid must include the EQUIPMENT.Equipment for each Tool in the Grid. (This does not have to be visible on the Grid.)
- ▶ Additional columns from the Part and Tool objects can be added to the Grids, but you may need to adjust the screen layout since space is limited. (A scroll bar will be displayed if the Grid is too wide.)
- ▶ A JavaScript event listener is included for messages. This is needed to interact with the Work Instructions 3D Business Control for any Parts that are selected on the model.
  - ▷ If the messageType is “3DPlayEvent3DPartSelected”:
    - ▶ If the Action is “add”, toggle the selection for the Grid item that corresponds to the selected Part to “true”.
    - ▶ If the Action is “remove”, toggle the selection for the Grid item that corresponds to the selected Part to “false”.
  - ▷ If the messageType is “3DPlayEvent3DSelectionModeChange”:
    - ▶ If the mode is “single”, change the Parts and Tools Grids to “Single” Selection Mode.
    - ▶ If the mode is “multiple”, change the Parts and Tools Grids to “Multiple” Selection Mode.
- ▶ The AprisoPartSelected event is called when an item on the Parts Grid is selected and passes this JSON data to the event:

```
{'CompInstanceID': '', 'PLMEntityName': '', 'ProductNoOrEquipment': 'Part123'}
```

The player will select a Part in the model specified by one of the following input parameters: CompInstanceID (InstanceName), PLMEntityName (Reference.PLMExternalID), or ProductNoOrEquipment (Reference.Title).

- ▶ The AprisoToolSelected event is called when an item on the Tools Grid is selected and passes this JSON data to the event:

```
{'CompInstanceID': '', 'PLMEntityName': '', 'ProductNoOrEquipment': 'Tool123'}
```

The player will select a Tool in the model specified by one of the following input parameters: `CompInstanceID (InstanceName)`, `PLMEntityName (Reference.PLMExternalID)`, or `ProductNoOrEquipment (Reference.Title)`.

- ▶ The `emptySelected` event is called to clear out all of the selected Parts and Tools for the Work Instructions 3D Business Control when a different Part or Tool is selected on the Grid.

## 4.3 Supported 3DExperience Data

Part references/instances must be unique in order to support the cross-highlighting of individual Parts. If the names are not unique, a single Part using the non-unique name will be assigned to the Operation or Step level with the Quantity updated to reflect the total number of Parts using the non-unique name. When a Part with a non-unique name is selected in the Parts list, all Part references using the non-unique name will be highlighted in the 3D model.

## 5 Known Issues

In some scenarios 3DPlay Experience for Work Instructions performance may be sub-optimal

### Symptoms:

The system may stop responding when displaying a complex 3D model using DELMIA 3DPlay Experience for Work Instructions.

### Problem Description:

In the case of less powerful hardware configurations, the 3D model display performance may be sub-optimal due to significant use of system resources.

It is not possible to annotate 3D model when using iOS app

### Symptoms:

When using 3DPlay Experience for Work Instructions in iOS, it is not possible to annotate the opened 3D model using the Tools > Annotation Commands > Text option.

### Problem Description:

This is a known issue with the 3DPlay control, which will be addressed in a future release.

The server returns a 404 error for certain files when the 3D Work Instructions control loads

### Symptoms:

When the 3DWI control loads, the server returns a 404 error for the following files:

- ▶ /Apriso/Portal/3DPlay/3DPlay/.3DPlay.mkversion.mk (Firefox, Chrome, Microsoft Edge, and Microsoft Edge Legacy)
- ▶ /Apriso/Portal/3DPlay/DMU\*/DMU\*.js
- ▶ /Apriso/Portal/3DPlay/QualityManager/QualityManager.js (Chrome Version 65.0.3325.146 [Official Build] [64-bit])

### Problem Description:

These errors do not impact functionality.

Multiple selection missing for 3D Work Instructions in iOS and Android

### Symptoms:

When using 3DPlay Experience for Work Instructions in iOS or Android, the multiple selection button is missing.

**Problem Description:**

There is not enough space to display the multiple selection button, so the button is automatically hidden.

**Error messages for Connected Mode are not displayed in the UI****Symptoms:**

When using 3DPlay Experience for Work Instructions in Connected Mode, there are no error messages displayed in the UI when a 3D model does not load.

**Problem Description:**

In Connected Mode, error messages are sent only to the console, and are not displayed to the user.

**Connected Mode 3D Model is not displayed in DELMIA Apriso Mobile Application on iOS****Symptoms:**

When using 3DPlay Experience for Work Instructions in Connected Mode, the 3D model is not displayed in the DELMIA Apriso Mobile Application on iOS.

**Problem Description:**

This is a known issue with the 3DPlay control, which will be addressed in a future release.

**Workaround**

Open the 3DPlay Experience for Work Instructions in DELMIA Apriso Portal.

## 6 References

### Internal Documentation

#### 1. ***Process Builder Help***

Provides an overview of DELMIA Apriso Process Builder (PB) and information on installing and using the application. This Help describes the user interface elements, entity maintenance, available Business Controls, and management of Processes, Operations, and Screen Flows.

#### 2. ***DELMIA Plan Approval and Distribution Integration Implementation Guide***

Describes what configurations have to be created, changed, or validated in DELMIA Apriso before the whole solution can be used for manufacturing.

#### 3. ***Security Implementation Guide***

Provides an overview of DELMIA Apriso security and information on effectively securing all instances of DELMIA Apriso.

### 3DS Support Knowledge Base

If you have any additional questions or doubts not addressed in our documentation, feel free to visit the **3DS Support Knowledge Base** at <https://support.3ds.com/knowledge-base/>.

