

# Trackman Tutorial

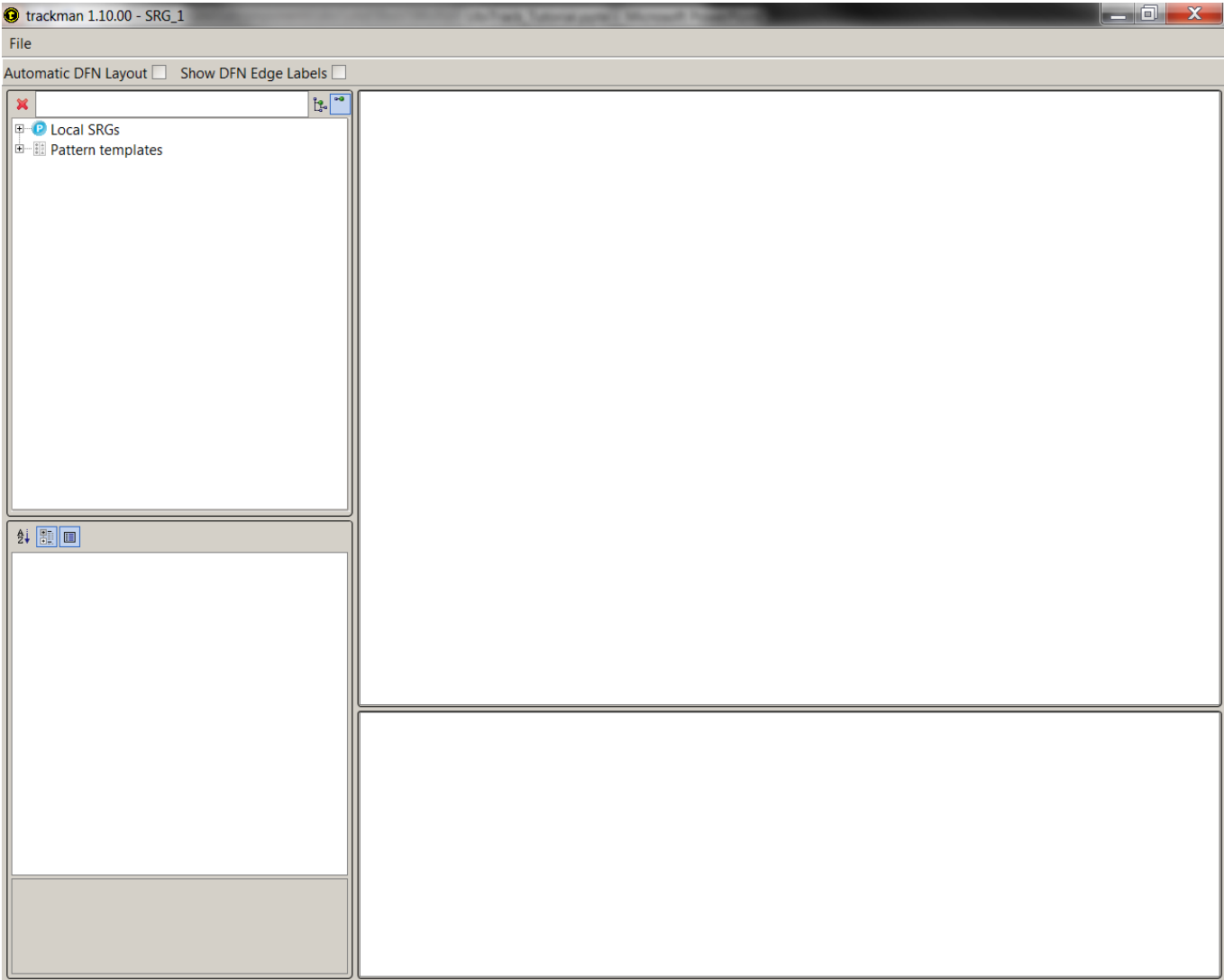
## Agenda:

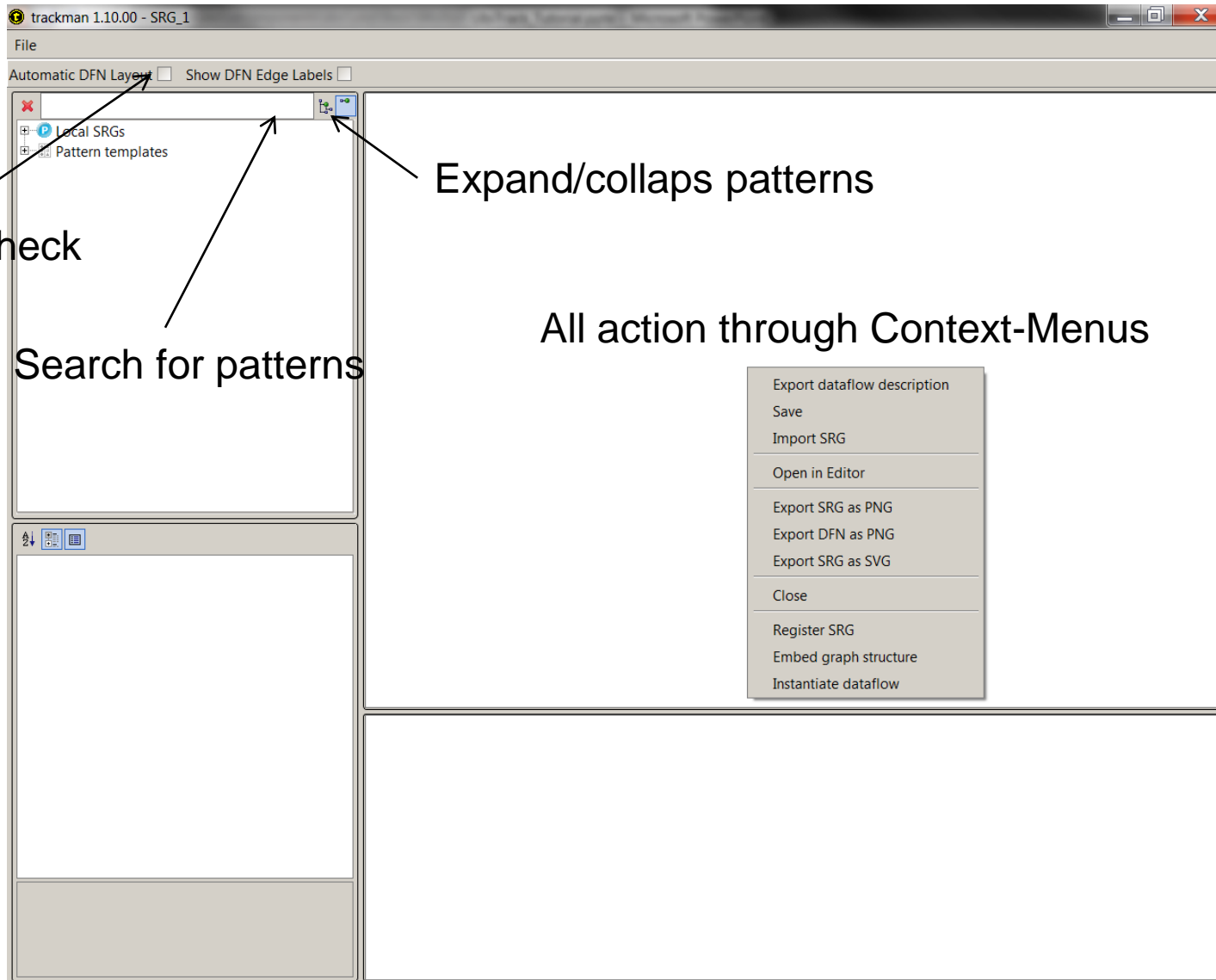
## *Overview*

- **1. Trackman basics**
- 2. Example 1, Input, Output and Visualization**
  - 1. Step 1: Camera Rendering
  - 2. Step 2: Marker Tracking
  - 3. Step 3: Object Rendering
  - 4. Step 4: Camera Intrinsic and Calibration Files
  - 5. Step 5: Static Measurements
  - 6. Step 6: Gates, Buttons and Buffer
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  - 1. Step 1: Basic Setup
  - 2. Step 2: Second Sensor and Fusion
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## Trackman basics

1. Go to `<UbiTrackDir>\Trackman\bin\`
2. Execute „startTrackman.bat“





Always check

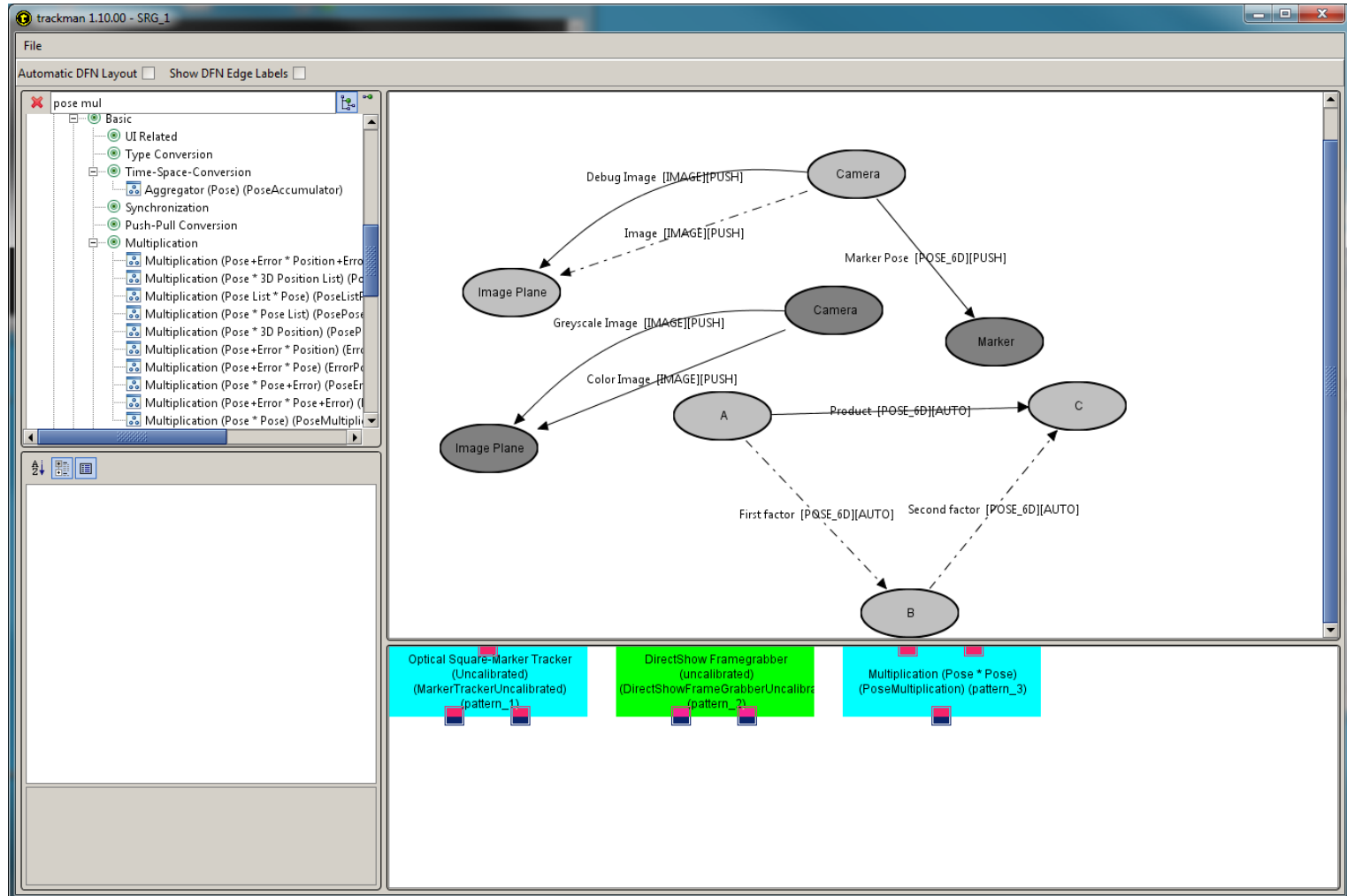
Search for patterns

Expand/collaps patterns

All action through Context-Menus

- Export dataflow description
- Save
- Import SRG
- Open in Editor
- Export SRG as PNG
- Export DFN as PNG
- Export SRG as SVG
- Close
- Register SRG
- Embed graph structure
- Instantiate dataflow

# Trackman



trackman 1.10.00 - Example1

File

Automatic DFN Layout  Show DFN Edge Labels

direct

- Local SRGs
  - Example1
    - DirectShow Framegrabber (uncalibrated)
- Pattern templates
  - Category catalogue
    - Vision
      - Sensor
        - Vision
          - Test
          - Static Measurement
          - OptiTrack
          - NDIOptotrak
          - Miscellaneous
          - Image Source
          - Framegrabbers
            - DirectShow Framegrabber (uncalibrated)
            - DirectShow Framegrabber (Direct)
          - CalibFile
          - Art

Attributes

Common	
Name	DirectShow Framegrabber...
ID	pattern_6
Ubitrack attributes	
time offset	0
divisor	1
image width	320
image height	240
camera name	

Values

**DirectShow Framegrabber (uncalibrated)**  
 This component grabs images from a DirectShow device and pushes them.

DirectShow Framegrabber (uncalibrated)  
 (DirectShowFrameGrabberUncalibrated pattern\_6)

trackman 1.10.00 - Example1

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Common

Name	DirectShow Framegrabber...
ID	pattern 6

Ubitrack attributes

time offset	0
divisor	1
image width	320
image height	240
camera name	

**DirectShow Framegrabber (uncalibrated)**  
This component grabs images from a DirectShow device and pushes them.

## Actions on pattern



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7. Step 7: Trigger and Fusion

### 3. Example 2, Fusion

1. Step 1: Basic Setup
2. Step 2: Second Sensor and Fusion
3. Step 3: Advanced Fusion

# Example 1, Input, Output and Visualization

Demo

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# Example 1, Input, Output and Visualization

## Step 1: Camera Rendering

1. **Create new SRG**
2. **Rename it to Example1**
3. **Save SRG**
4. **New Patterns:**
  1. DirectShow Framegrabber (uncalibrated)
    - Camera-Name „4000“
  2. Background Video
    - Connect to „Color Image“
5. **Save SRG**
6. **„Instantiate Dataflow“**
7. **„Stop“ Dataflow**

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# Example 1, Input, Output and Visualization

## Step 2: Marker Tracking

### 1. New Patterns:

#### 1. Optical Square-Marker Tracker (Uncalibrated)

- Connect to „Grayscale Image“

### 2. Change Background Video

- Isolate pattern input
- Connect to „Debug Image“

### 3. Always Save before starting

### 4. „Instantiate Dataflow“

### 5. „Stop“ Dataflow

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# Example 1, Input, Output and Visualization

## Step 3: Object Rendering

### 1. New Patterns:

#### 1. Renderer: X3D Object Settings

- Merge „X3D Object“-Node with „Marker“-Node
- Select „doc/misc/coord\_system.x3d“

#### 2. Renderer: X3D Object Pose

- Merge „Camera“-Node with „Camera“-Node
- Connect to „Marker Pose“



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# Example 1, Input, Output and Visualization

## Step 4: Camera Intrinsics and Calibration Files

### 1. Camera calibration

### 2. New Patterns:

#### 1. DirectShow Framegrabber

- Set Width=640, Height=480, Name=4000
- Set Intrinsic and Distortion

#### 2. Renderer: Intrinsic Camera Parameters

- Merge „Camera“-Node with „Camera“-Node
- Connect to „Camera Intrinsics“
- Set Calibration Image Width to 640, Height to 480

#### 3. Optical Square-Marker Tracker (Calibrated)

- Replaces old Marker Tracker

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# Example 1, Input, Output and Visualization

## Step 5: Static Measurements

### 1. Isolate x3d patterns

### 2. New Pattern:

#### 1. Static Measurement (Pose)

- Merge „A“-Node with „Marker“-Node
- Rename „B“-Node to „Object“
- Set x position to 0.1

### 3. Merge „Renderer: X3D Object Settings“ with „Object“-Node

### 4. Set the target of the „Renderer: X3D Object Pose“ to the „Object“-Node

### 5. New Pattern:

#### 1. Multiplication (Pose \* Pose)

- Merge A with Camera-Node
- Merge Edges

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# Example 1, Input, Output and Visualization

## Step 6: Gates, Buttons and Buffer

1. **Remove Static Pose**
2. **New Pattern:**
  1. Buffer (Pose)
    - Merge „A“-Node with „Marker“-Node
    - Connect to „Second factor“
  2. Optical Square-Marker Tracker (Calibrated)
    - Merge „Marker“-Node with „Object“-Node
  3. Gate (Pose)
    - Merge „A“-Node with „Camera“-Node
    - Merge Edges („Object“-Node)
  4. Application Push Source (Button)
    - Merge „A“-Node with „Event“-Node
    - Merge Edges
  5. Inversion (Pose)
3. **Fill missing edge using a pose multiplication and the pose inversion**

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## Example 2, Calibration and Fusion

Demo



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# Example 1, Input, Output and Visualization

## Step 1: Basic Setup

1. **Create new SRG**
2. **Rename it to Example2**
3. **Create SRG with:**
  1. DirectShow Framegrabber (calibrated)
  2. Background Video and Intrinsic
  3. x3d-Rendering with object
  4. Optical Square-Marker Tracker (Calibrated)
4. **Save SRG**

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# Example 1, Input, Output and Visualization

## Step 2: Second Sensor and Fusion

### 1. New Pattern:

1. Test sensor (Pose)
  - Merge „Imaginary sensor“-Node with „Marker“-Node
2. Set Rendering Target to „Imaginary object“

## Example 1, Input, Output and Visualization Step 2: Second Sensor and Fusion

Didn't work? Why?

# Example 1, Input, Output and Visualization

## Step 2: Second Sensor and Fusion

### 1. New Pattern:

#### 1. Linear Interpolation (Pose)

- Merge „A“-Node with „Marker“-Node
- Use as input for Multiplication

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# Example 1, Input, Output and Visualization

## Step 2: Second Sensor and Fusion

### 1. Remove Linear Interpolation

### 2. New Pattern:

1. Optical Square-Marker Tracker (with Error Estimation)
  - Replaces Marker Tracker
2. Simple Kalman Filter (Pose)
  - Merge „A“-Node with „Camera“-Node
3. Converter (ErrorPose to Pose)
  - Convert „Fused Pose (Pull)“ Error Pose to Pose



## Extra: Calibration