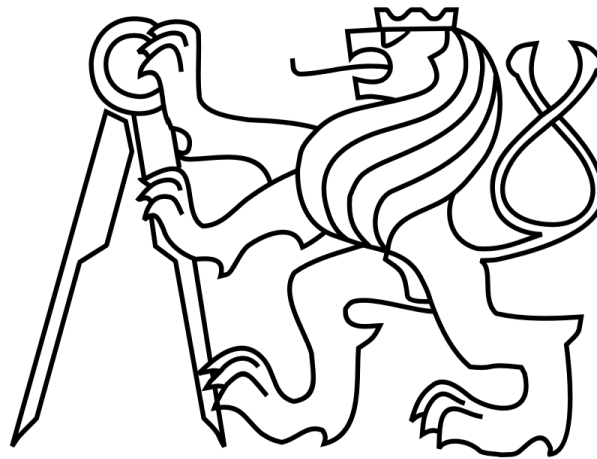


ČESKÉ VYSOKÉ UČENÍ TECHNICKÉ V PRAZE

FAKULTA STROJNÍ

Ústav výrobních strojů a zařízení



Manuál

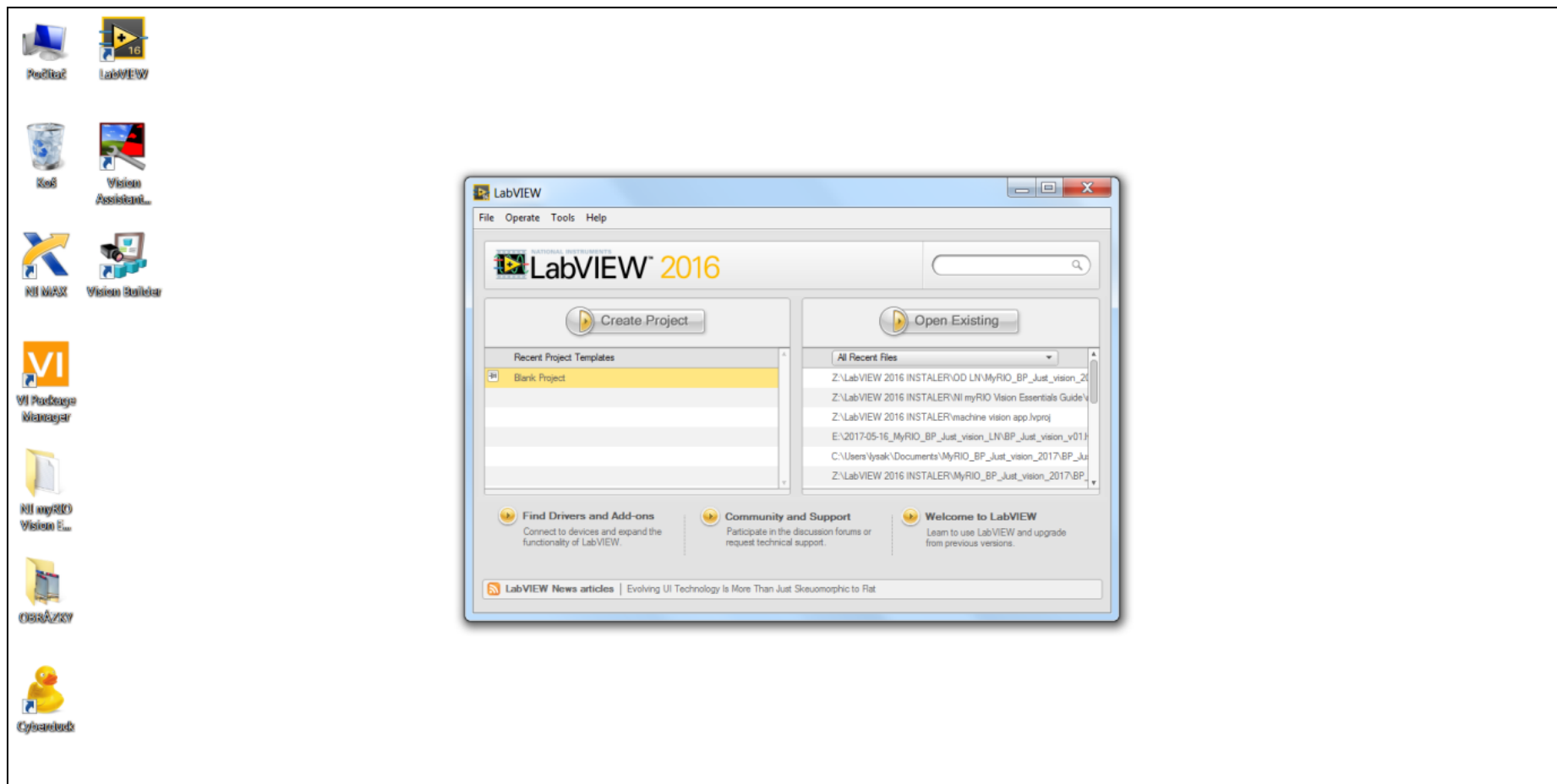
Příloha k BP 0220

2017

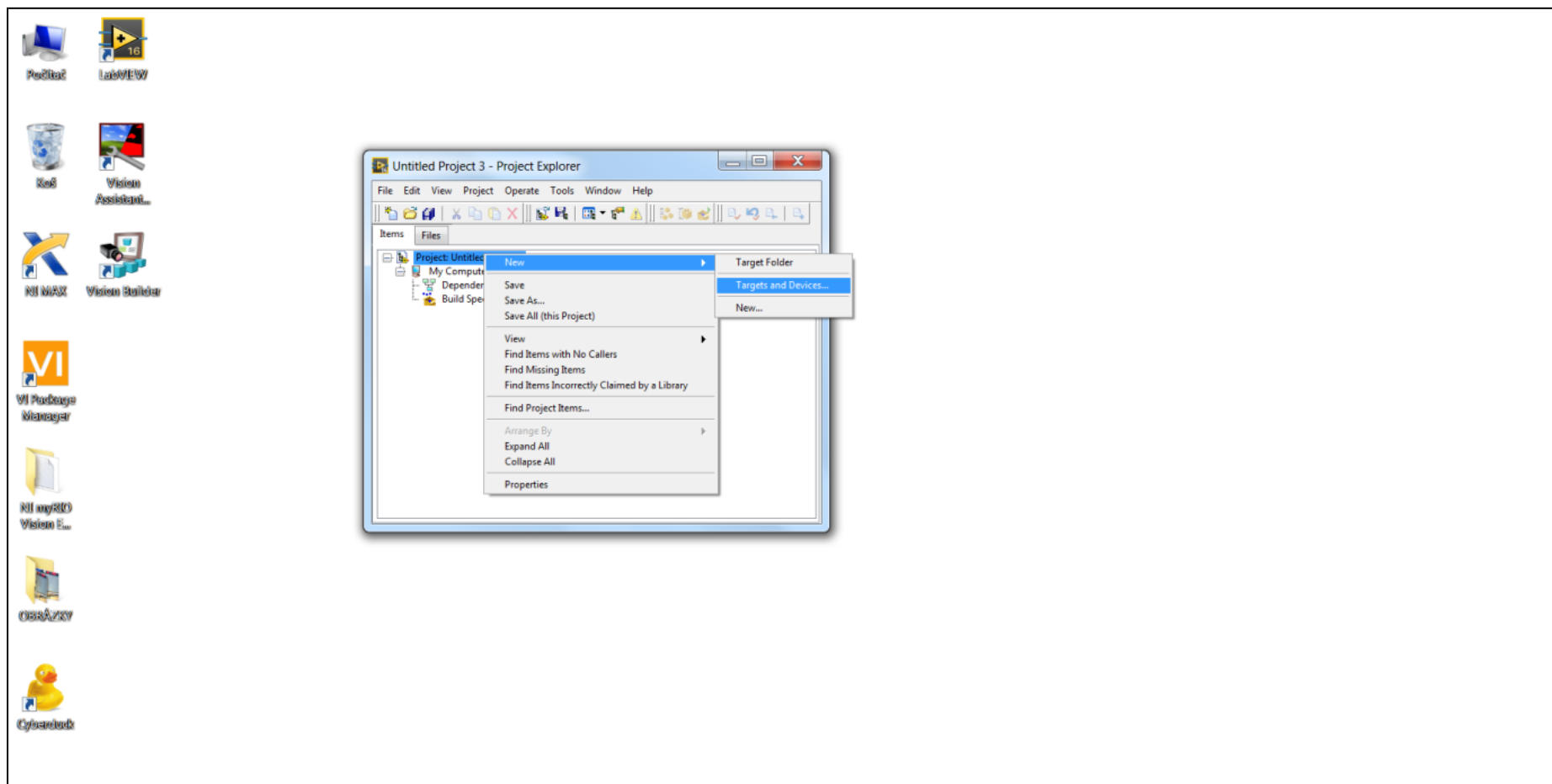
Dominik Just

Série printscreenů pro přiblížení práce v LabVIEW zachycující některé postupy tvorby programu. Slouží jako doplněk k podrobnějšímu popisu v kapitole BP s názvem "Vytvoření inspekčního programu v prostředí LabVIEW".

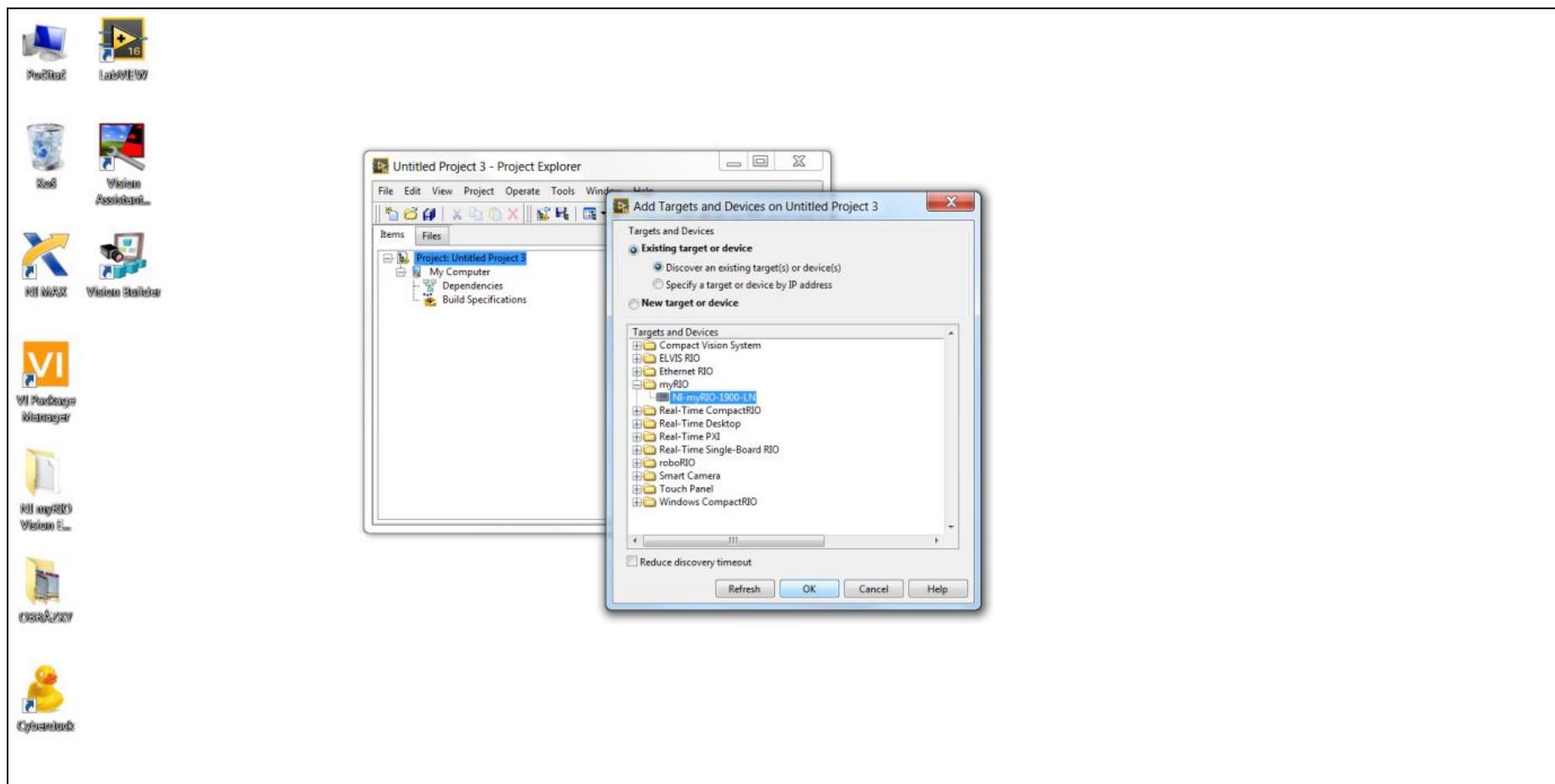
Vytvoření projektu: spuštění LabVIEW - levý dvojklik na Blank Project



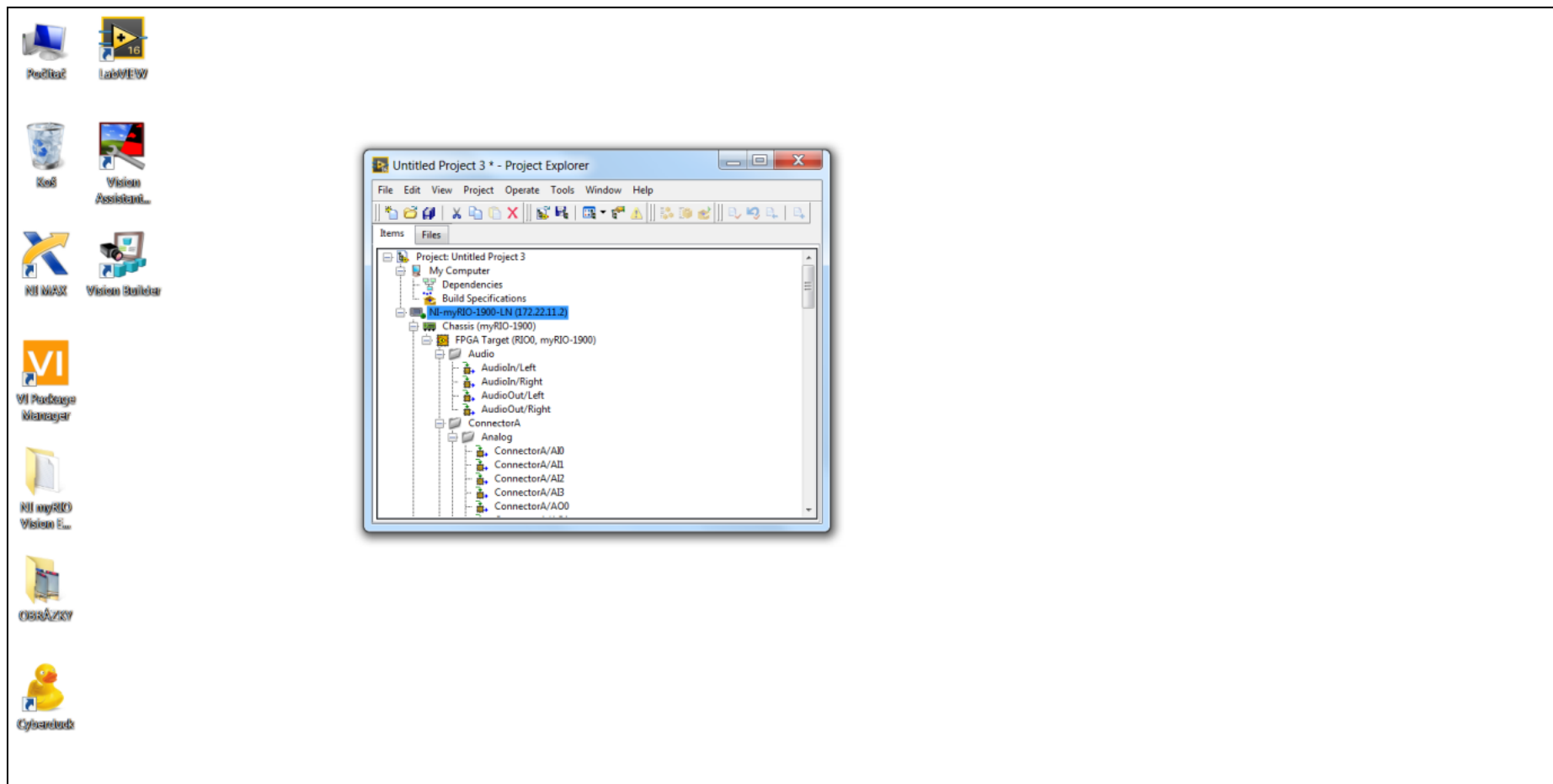
Přidání nového cíle: pravý klik na Project Untitled - New - Target and Devices...



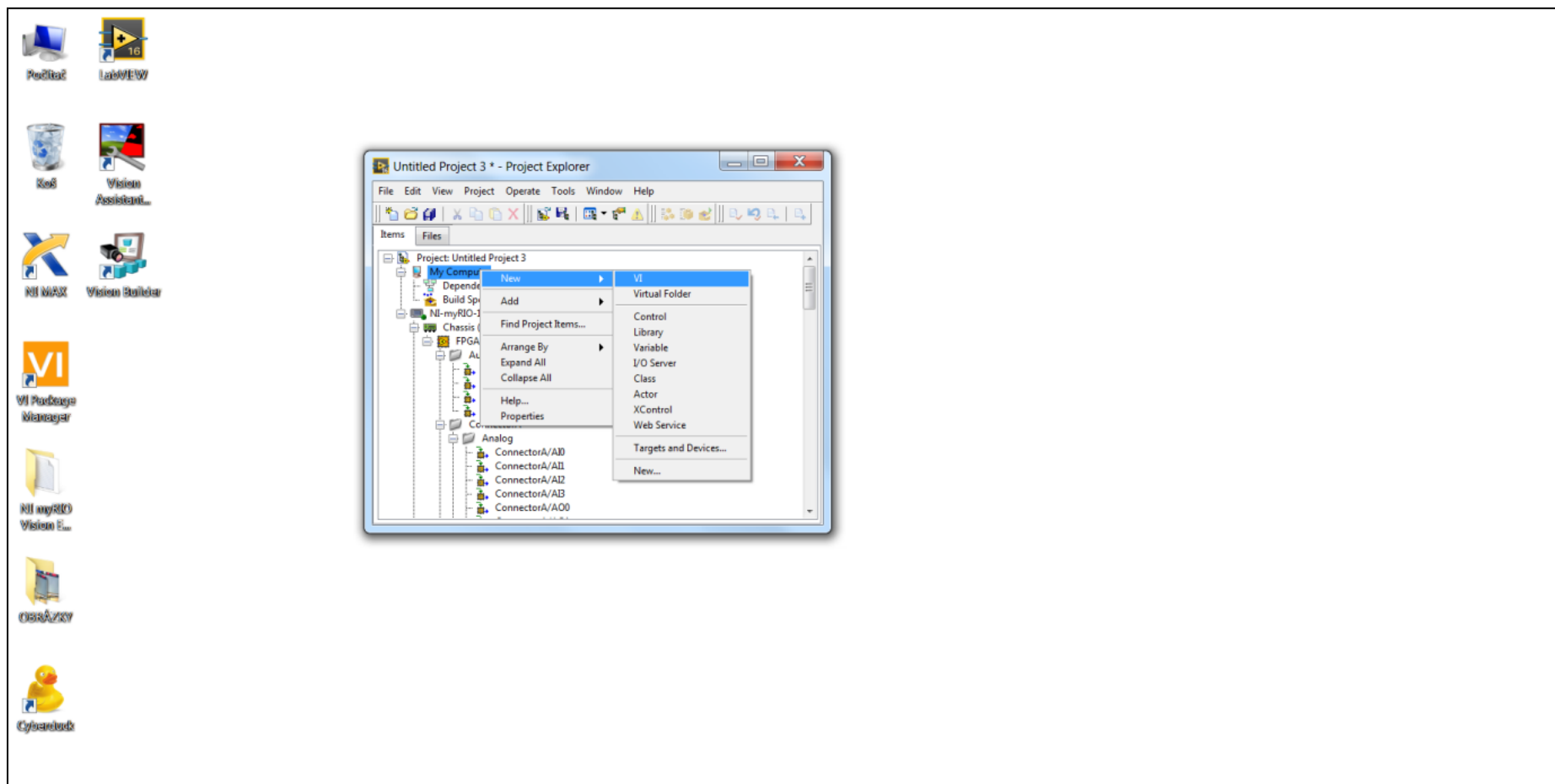
Výběr zařízení: myRIO/NI-myRIO-1990...



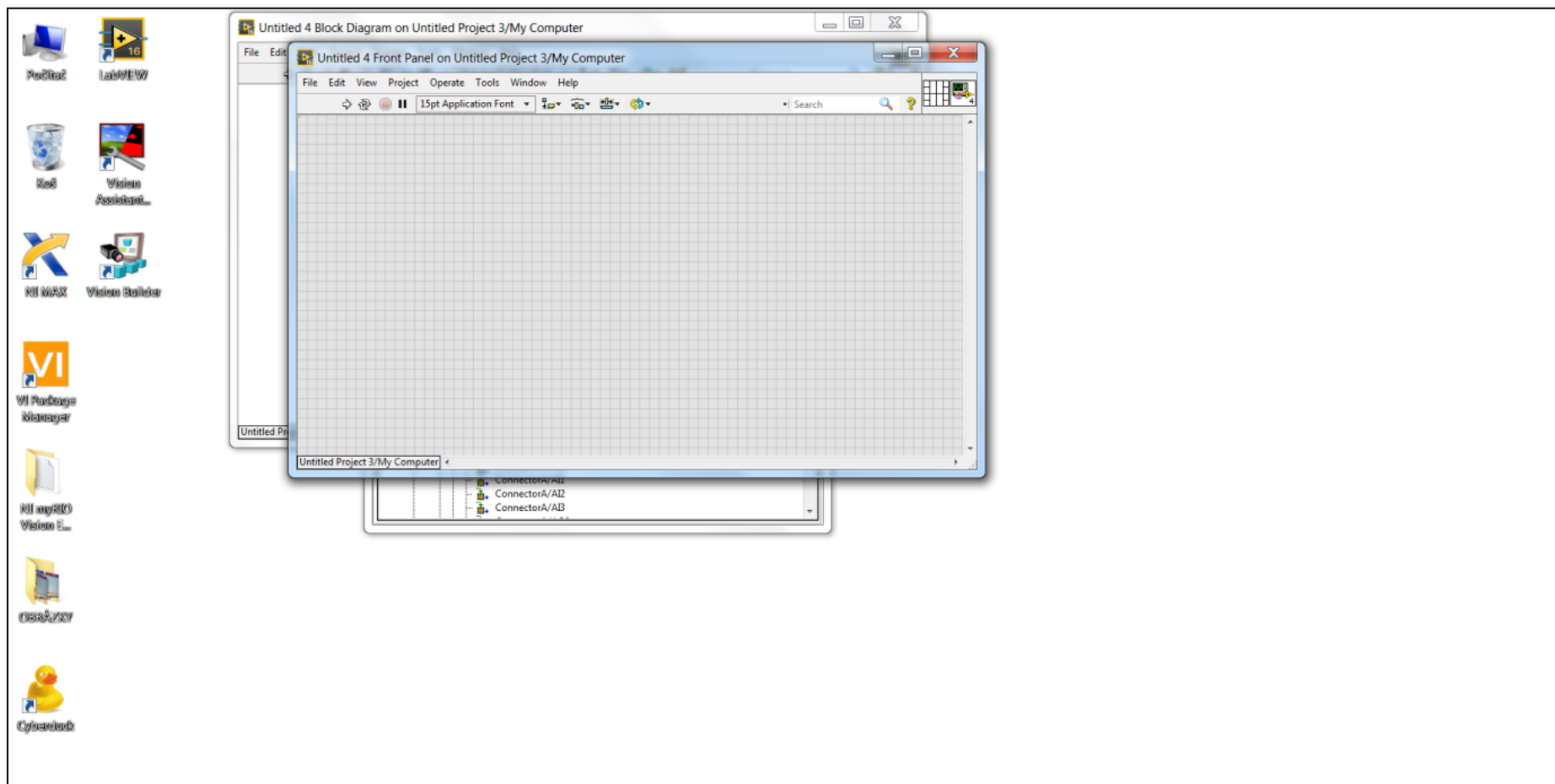
Strom projektu rozšířený o NI myRIO...



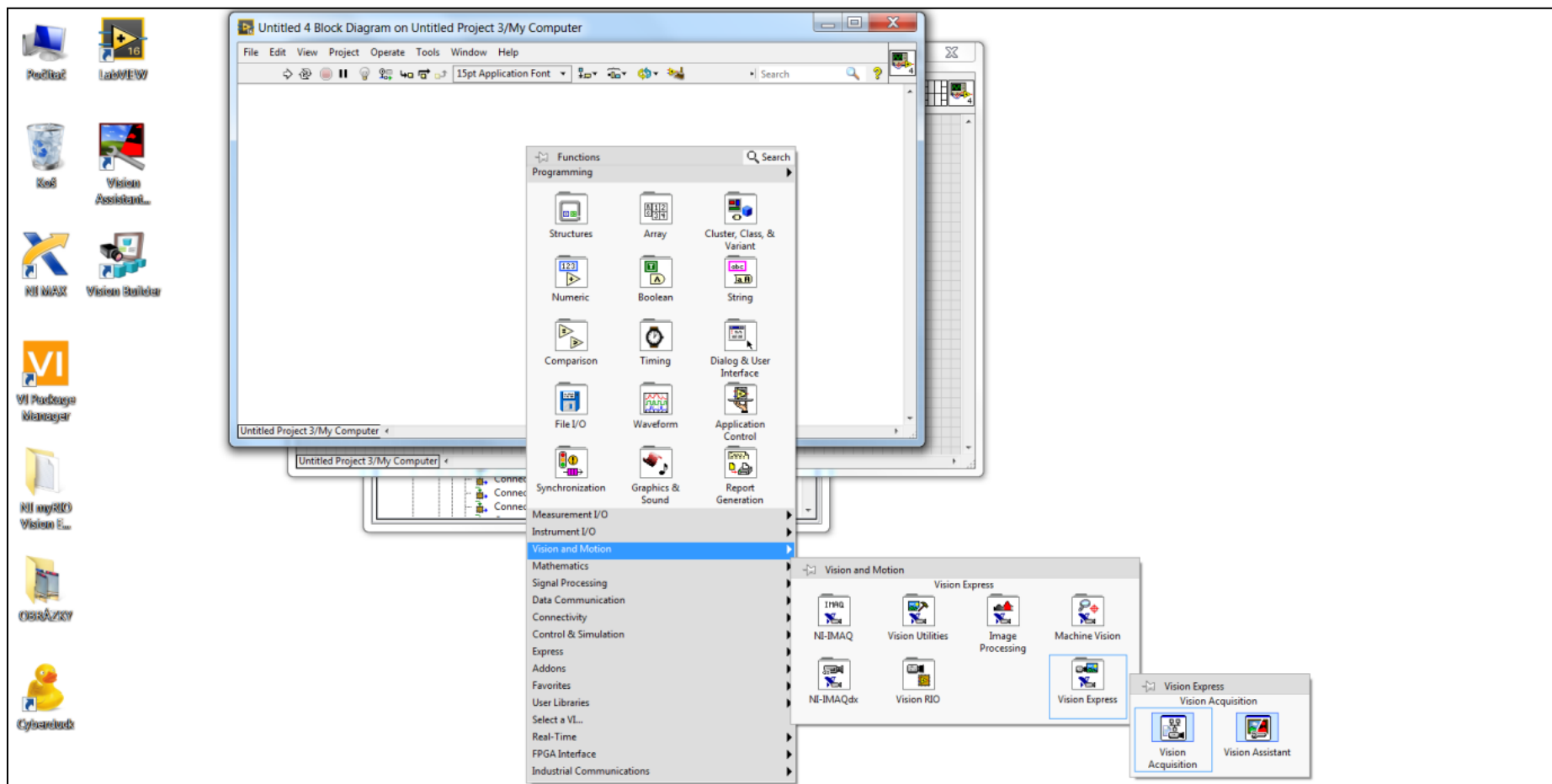
Přidání nového VI: pravý klik na My Computer - New/VI



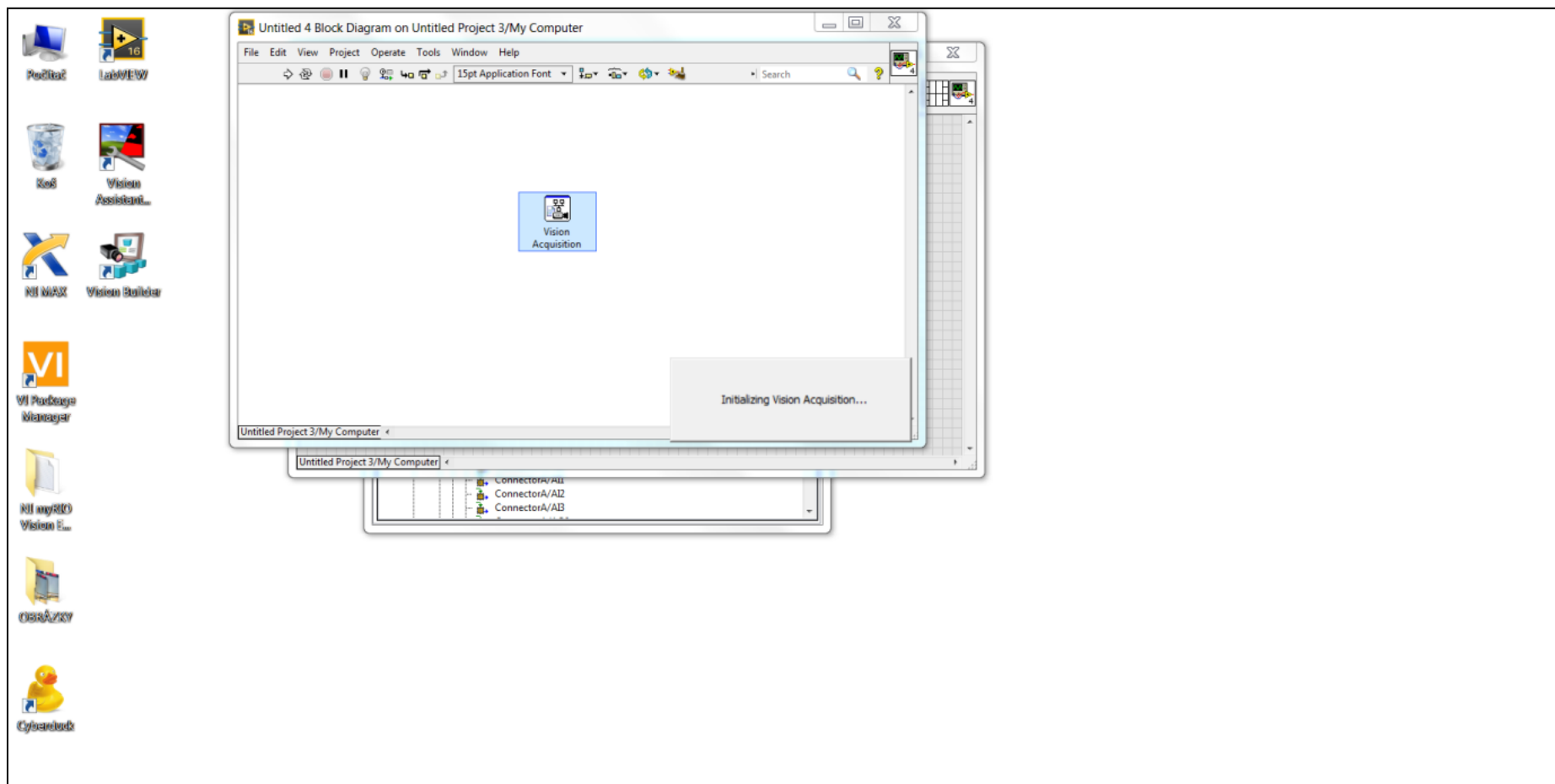
Nově otevřená okna VI: Block Diagram a Front Panel



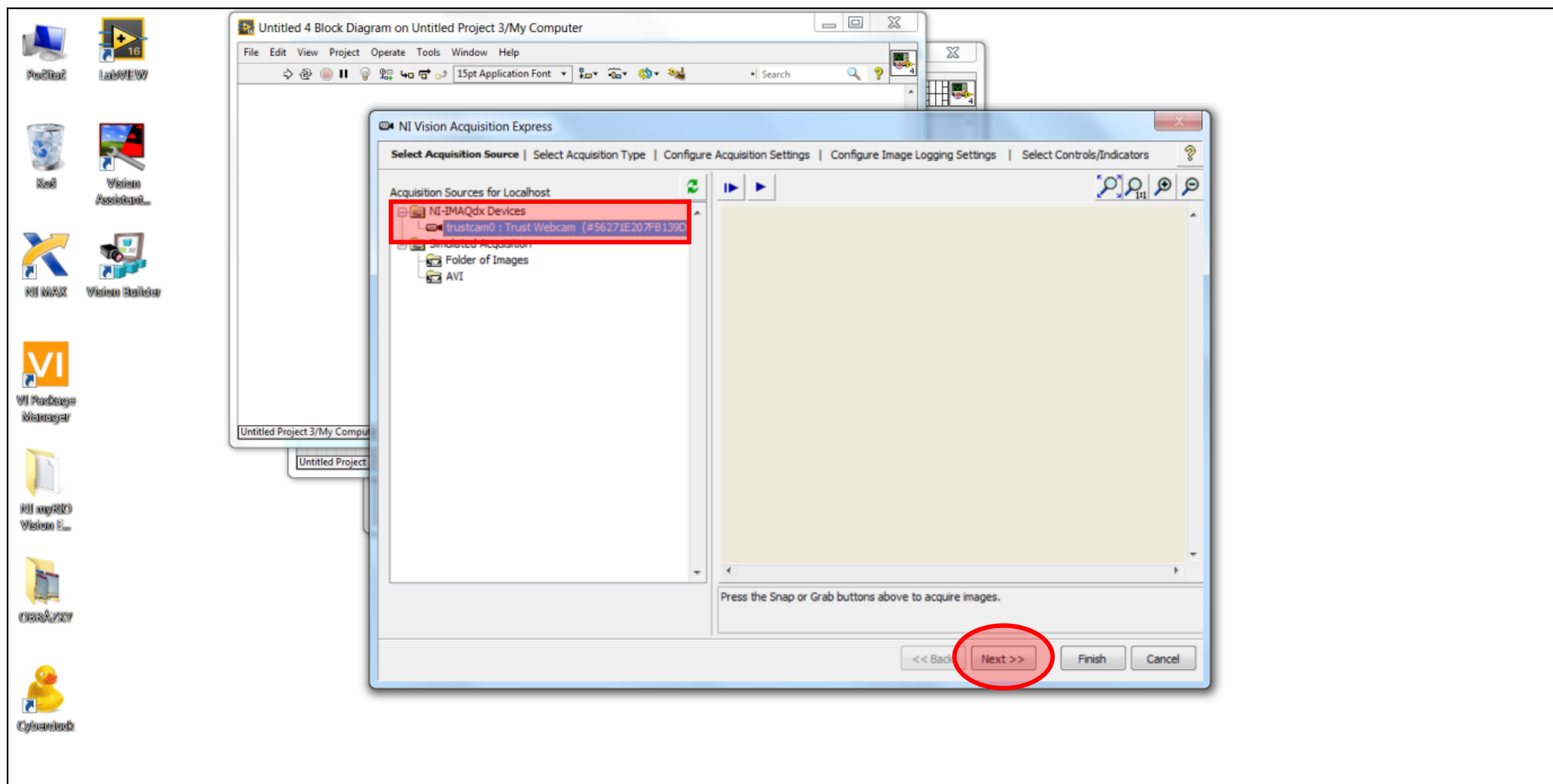
Vložení podprogramu Vision Acquisition: pravý klik na bílou plochu - Vision and Motion/Vision Express/Vision Acquisition



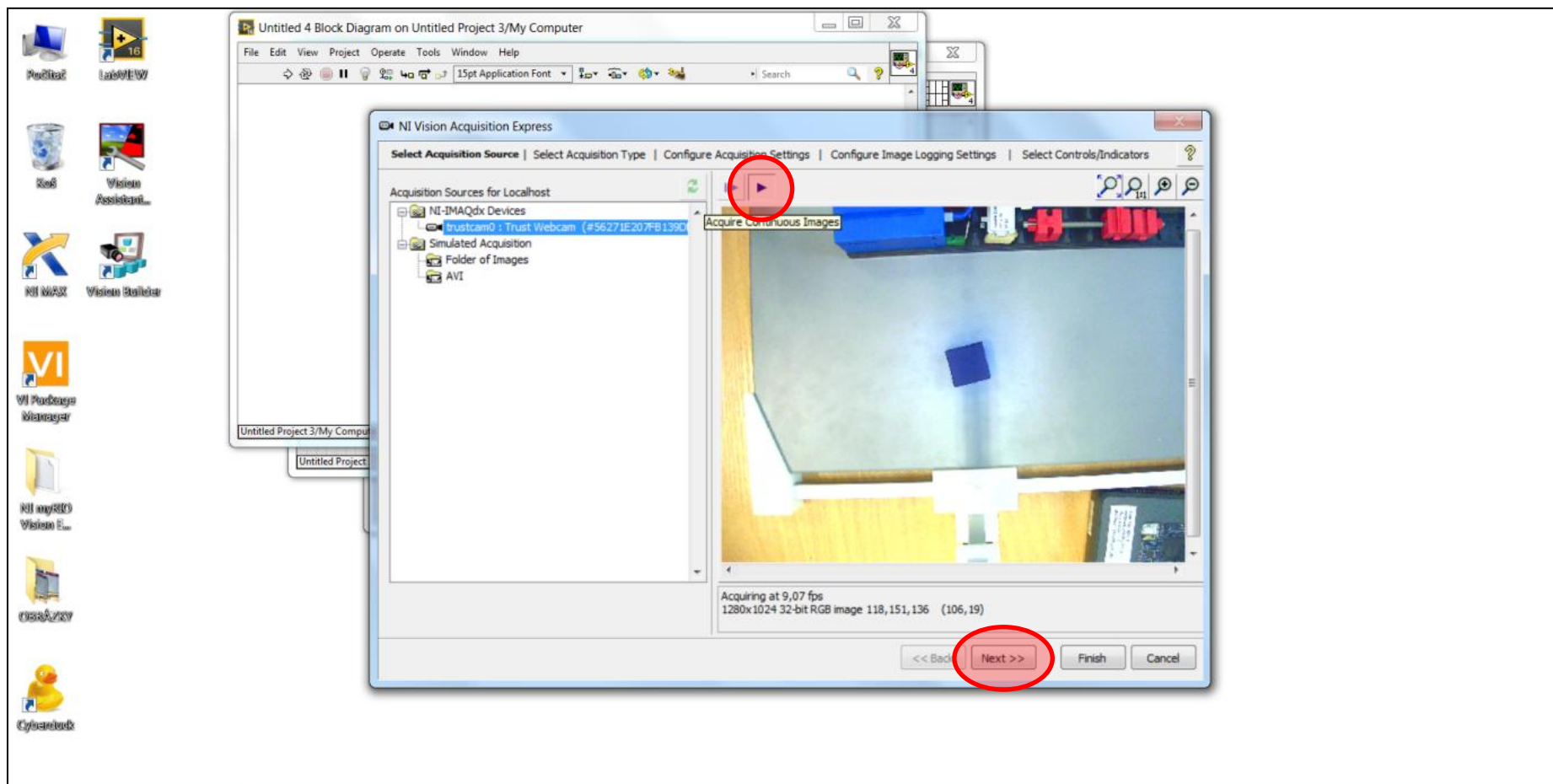
Inicializace nastavení Vision Acquisition



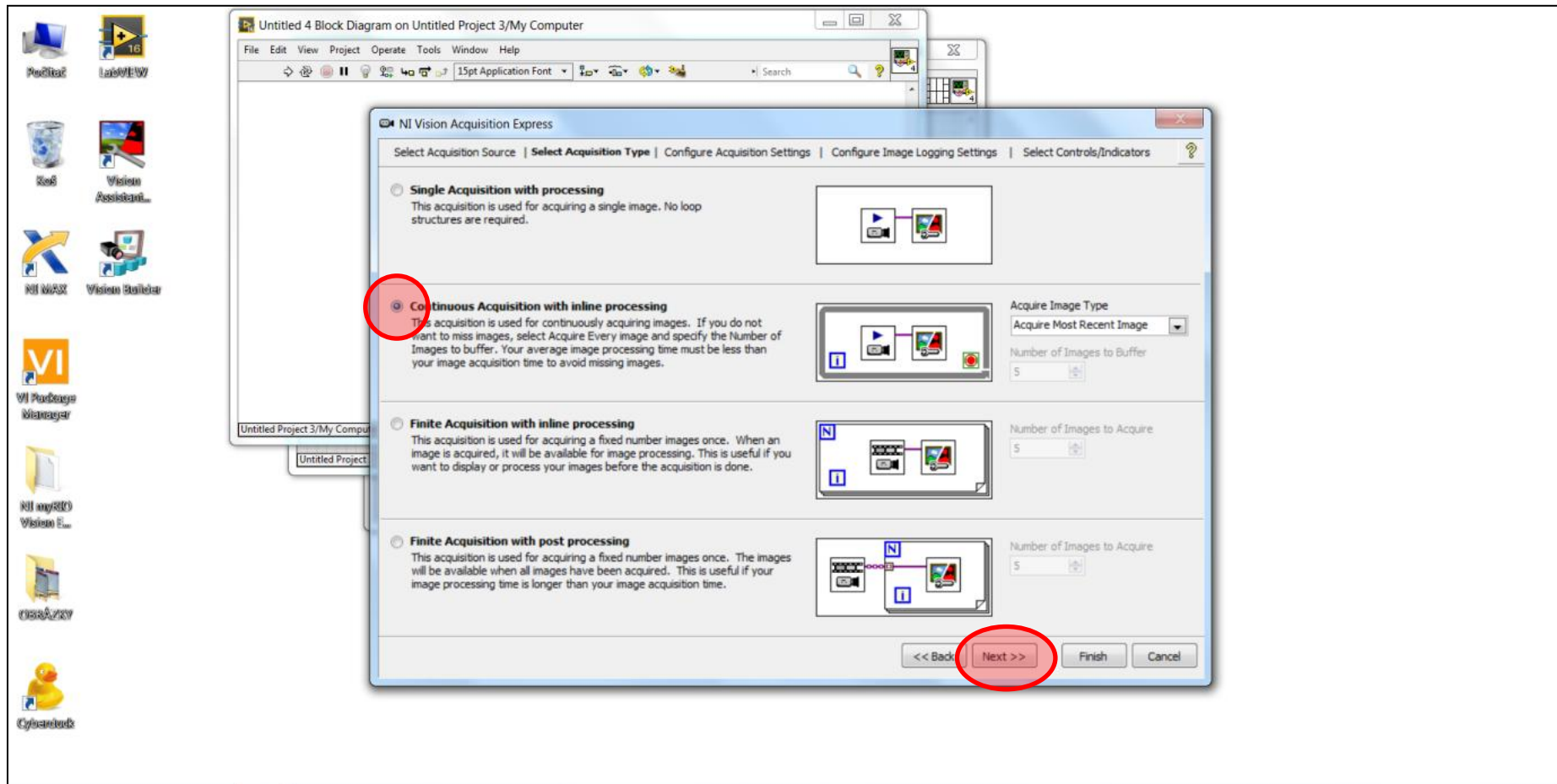
Výběr kamery



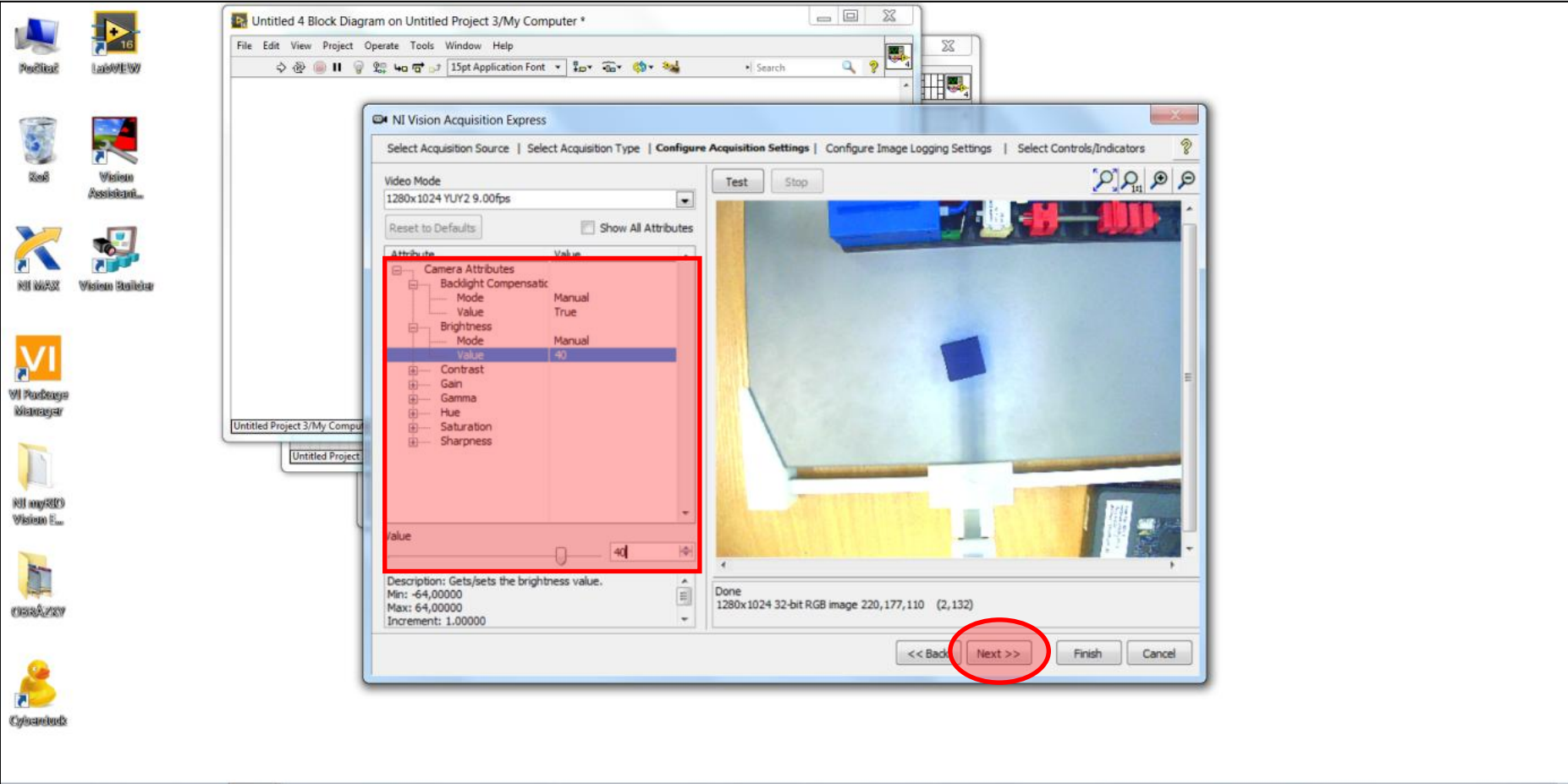
Test kamery: klik na modrý trojúhelník



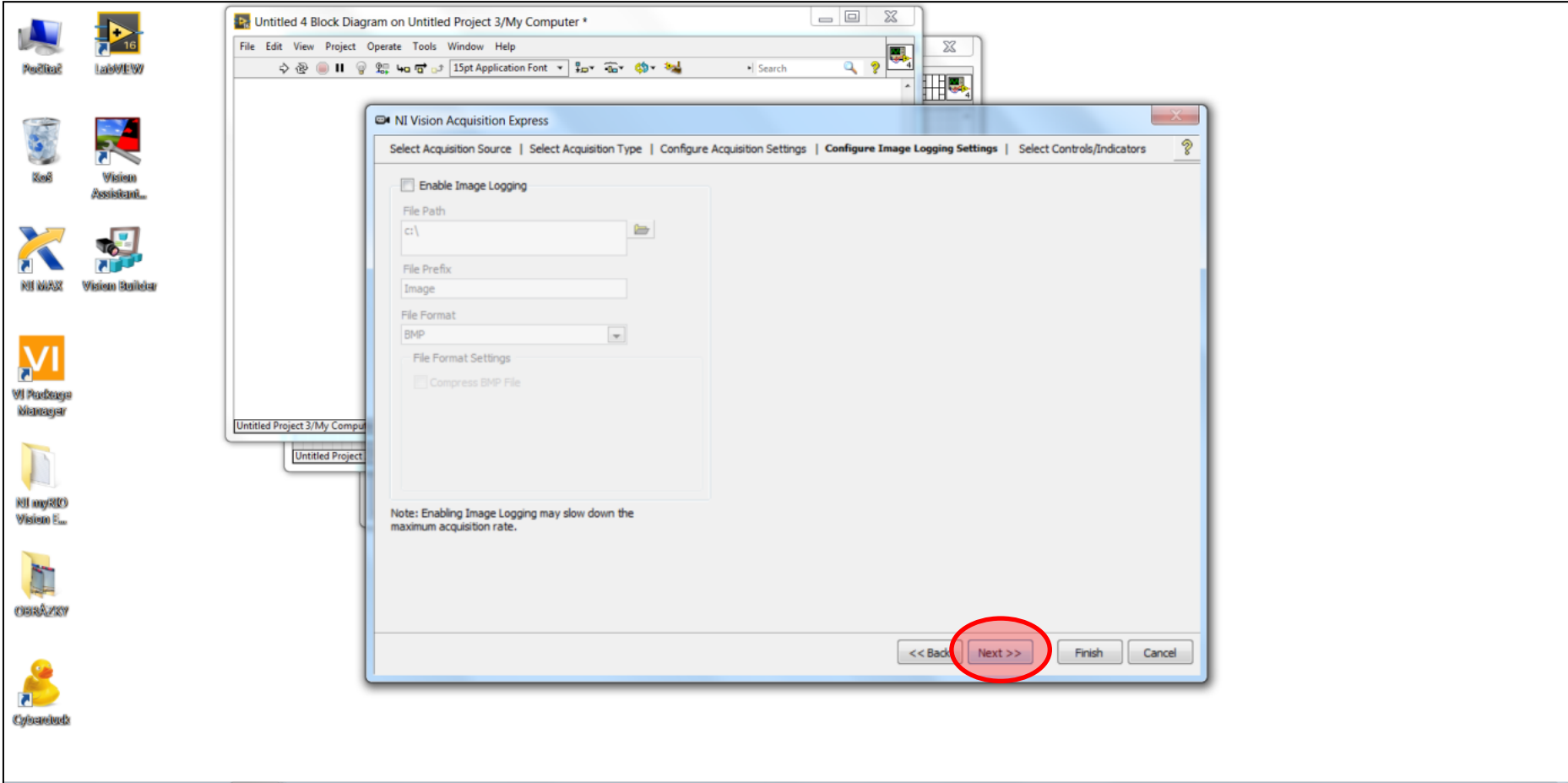
Typ VA: zaškrtnout Continuous



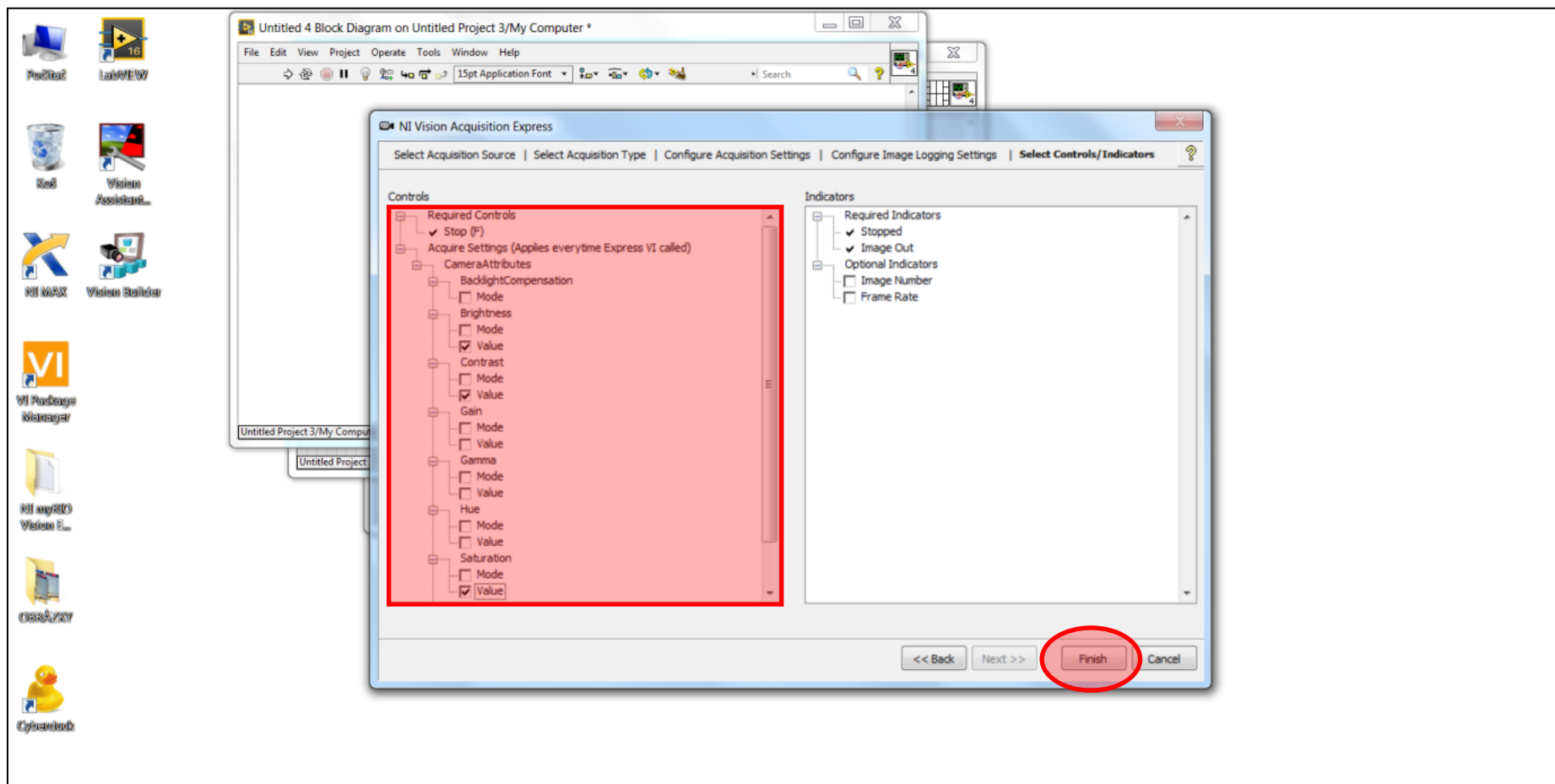
Nastavení kamery: viz BP 0220 str.33



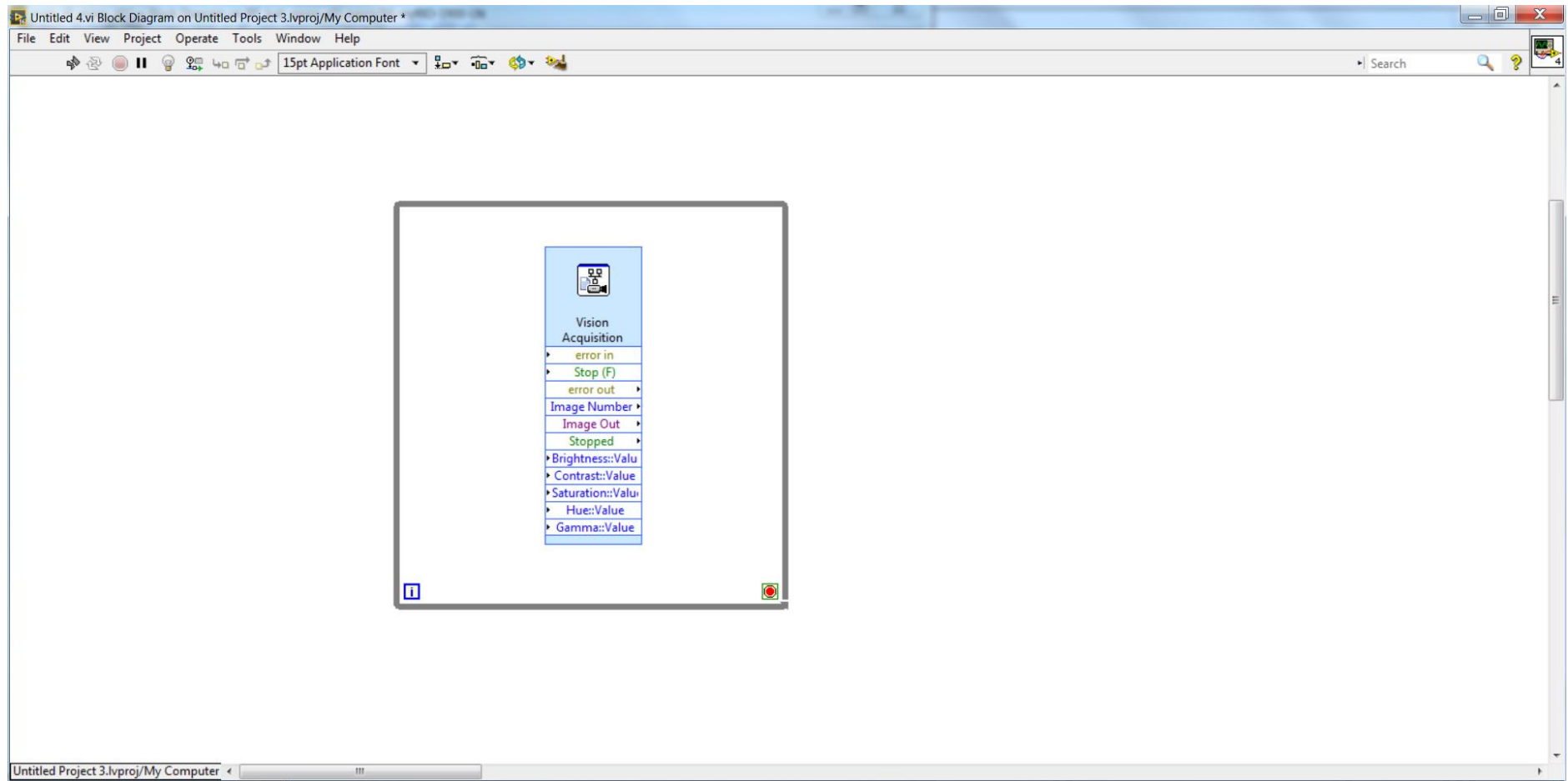
Ponecháme



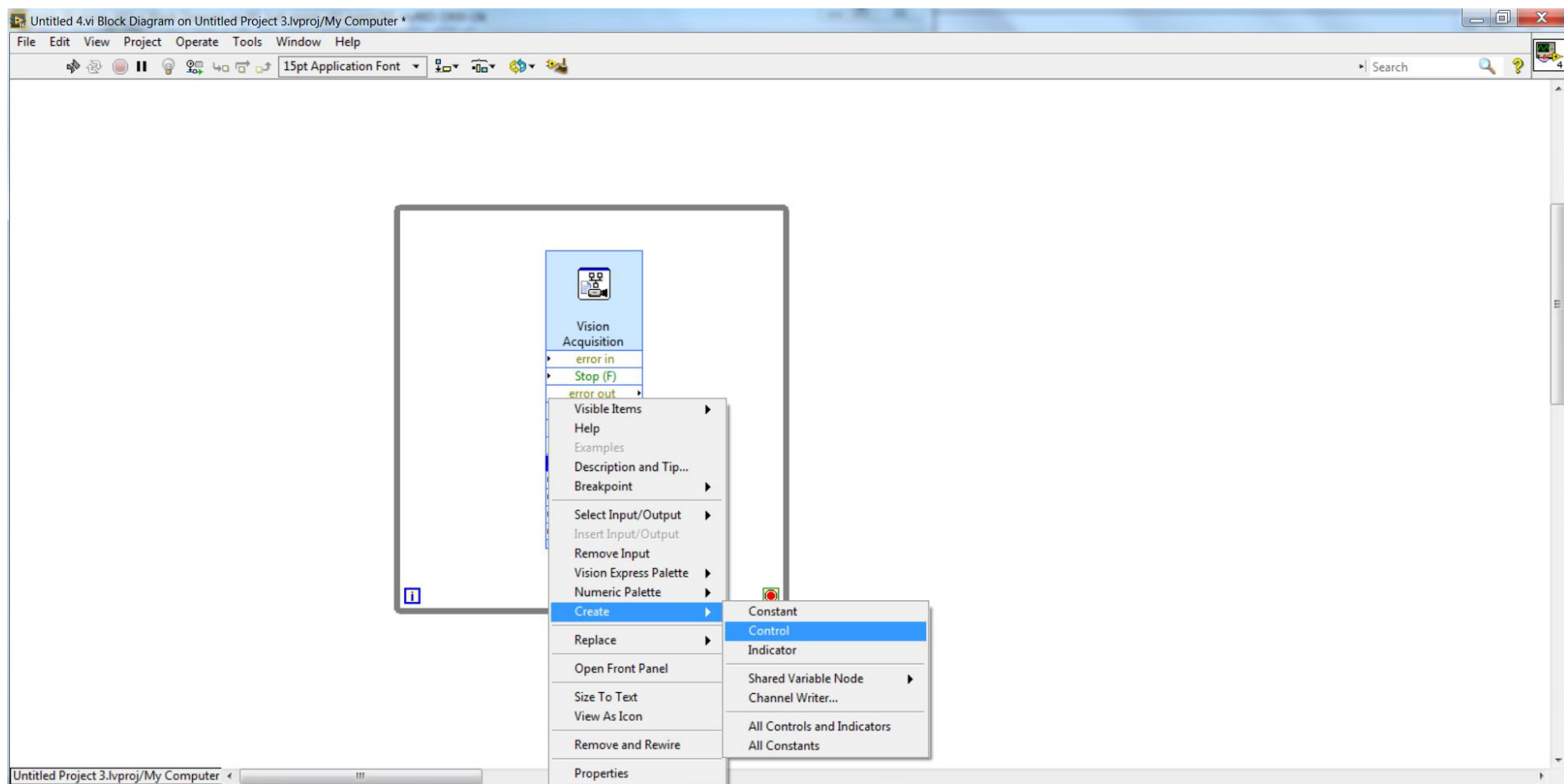
Nastavení výstupů



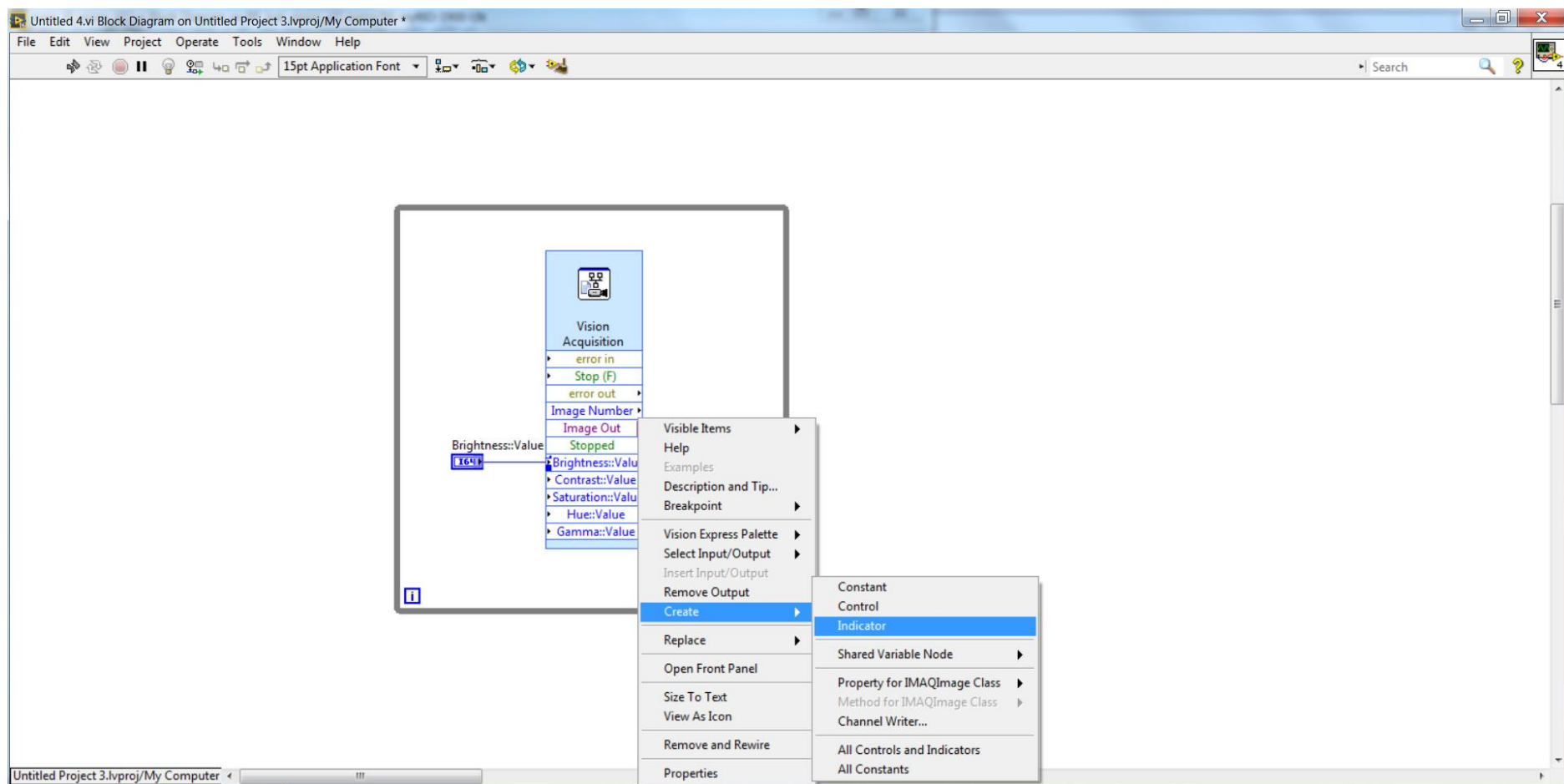
Vložený blok VA



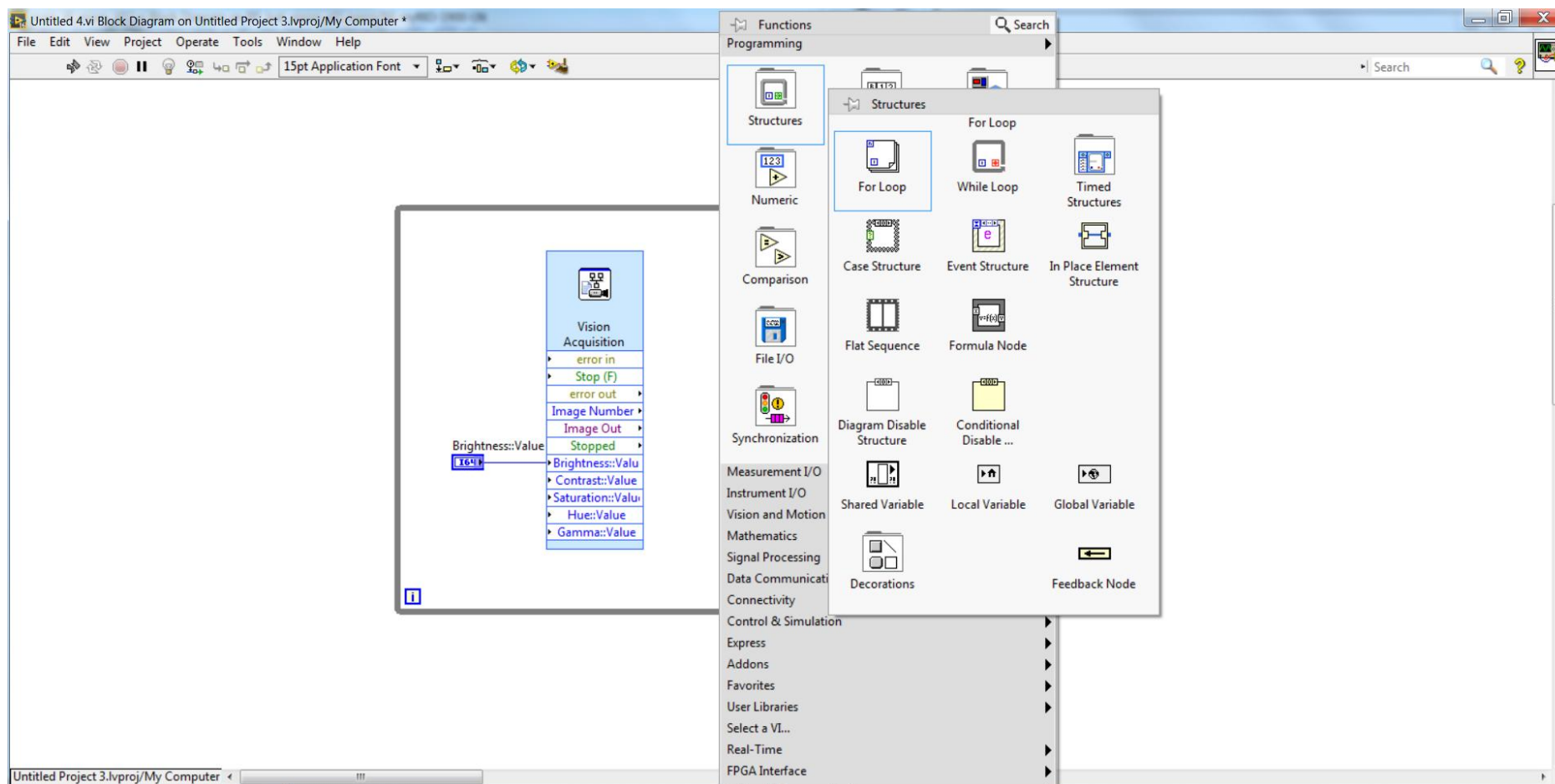
Vytvoření Controlu pro nastavení vstupu Brightness::Value: pravý klik na šipku vstupu - Create/Control



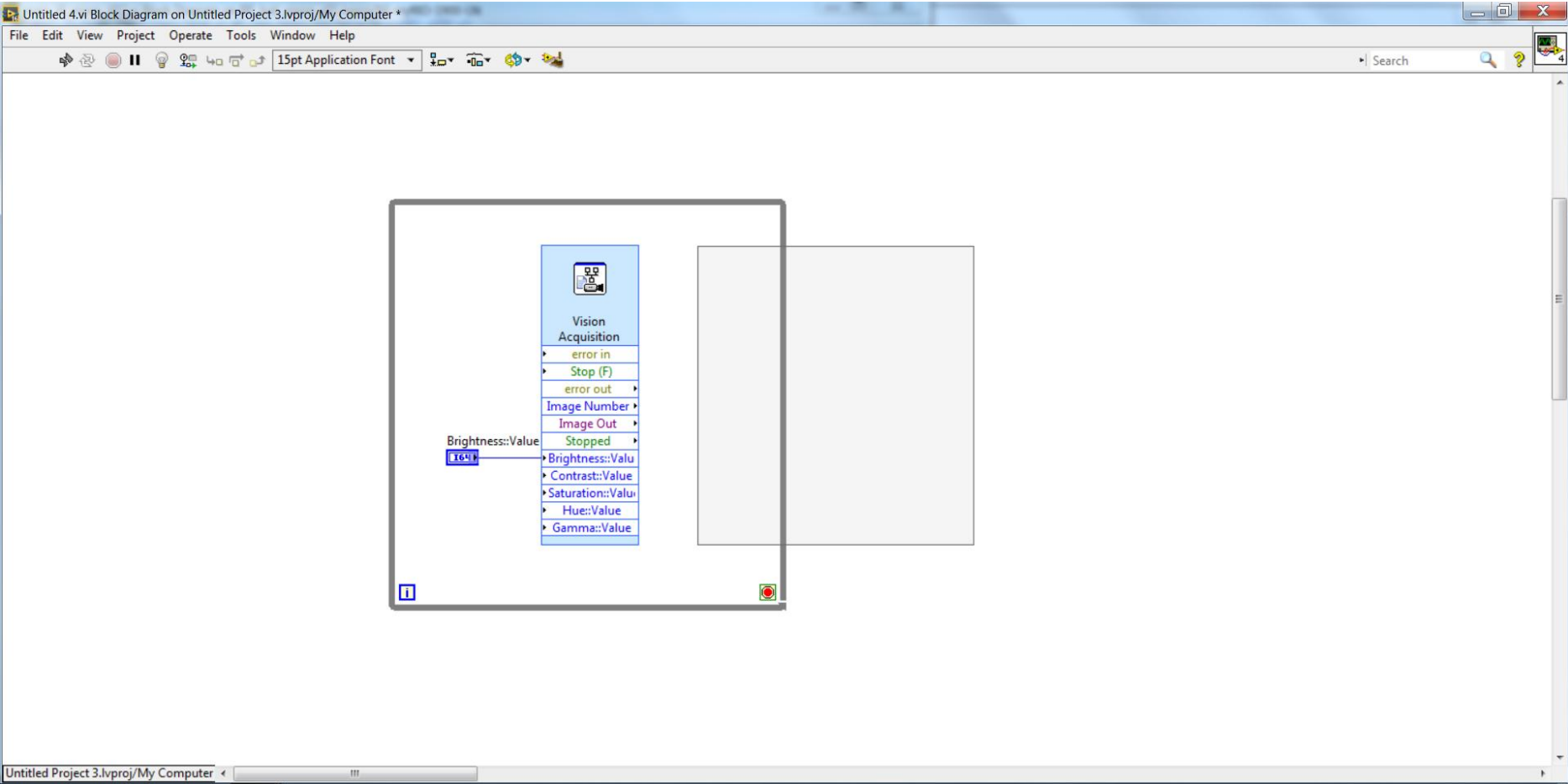
Vytvoření Indikátoru na výstupu Image Out: pravý klik na šipku výstupu - Create/Indicator



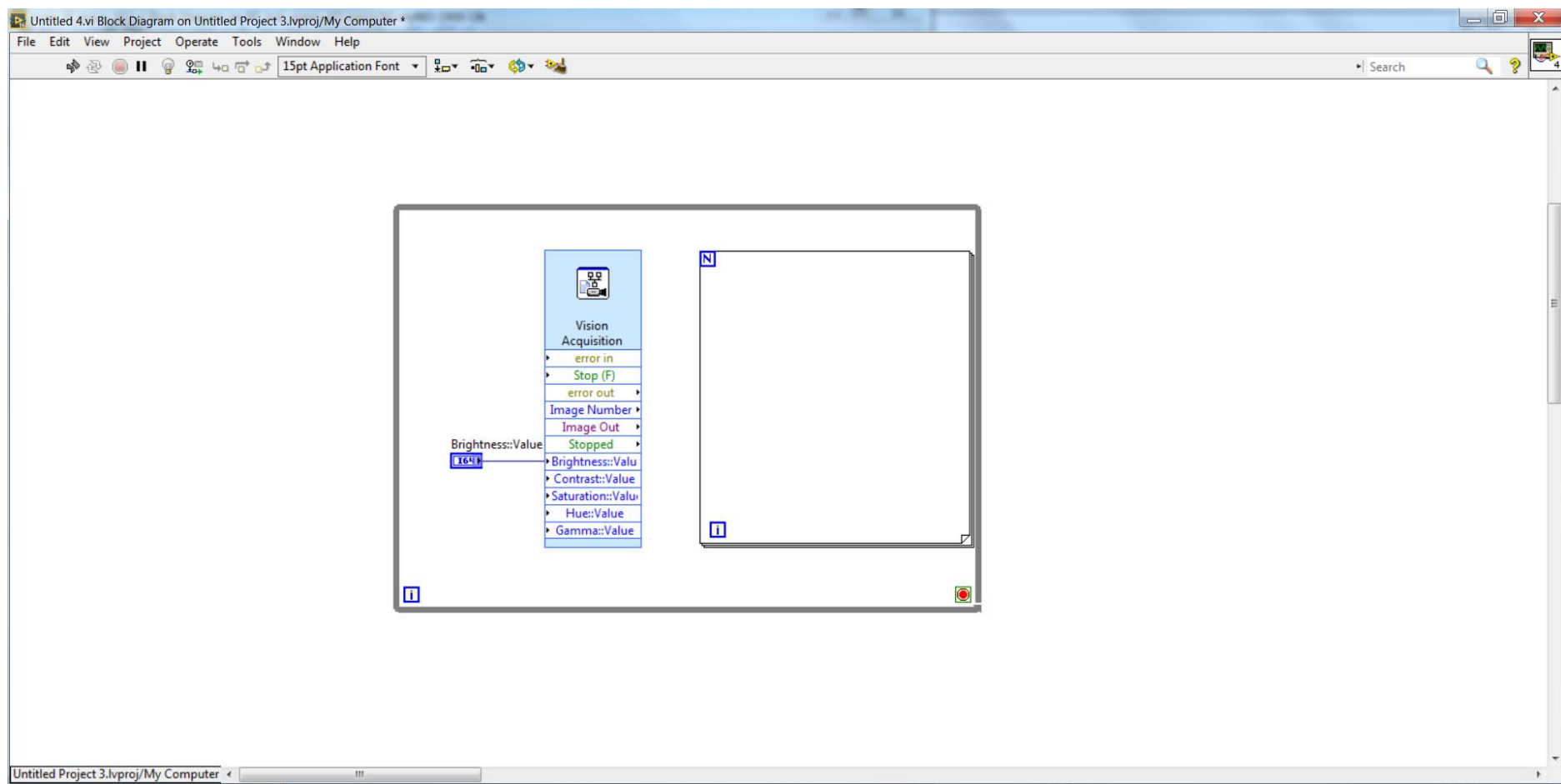
Vložení For Loop smyčky: pravý klik na bílou plochu - Structure/For Loop



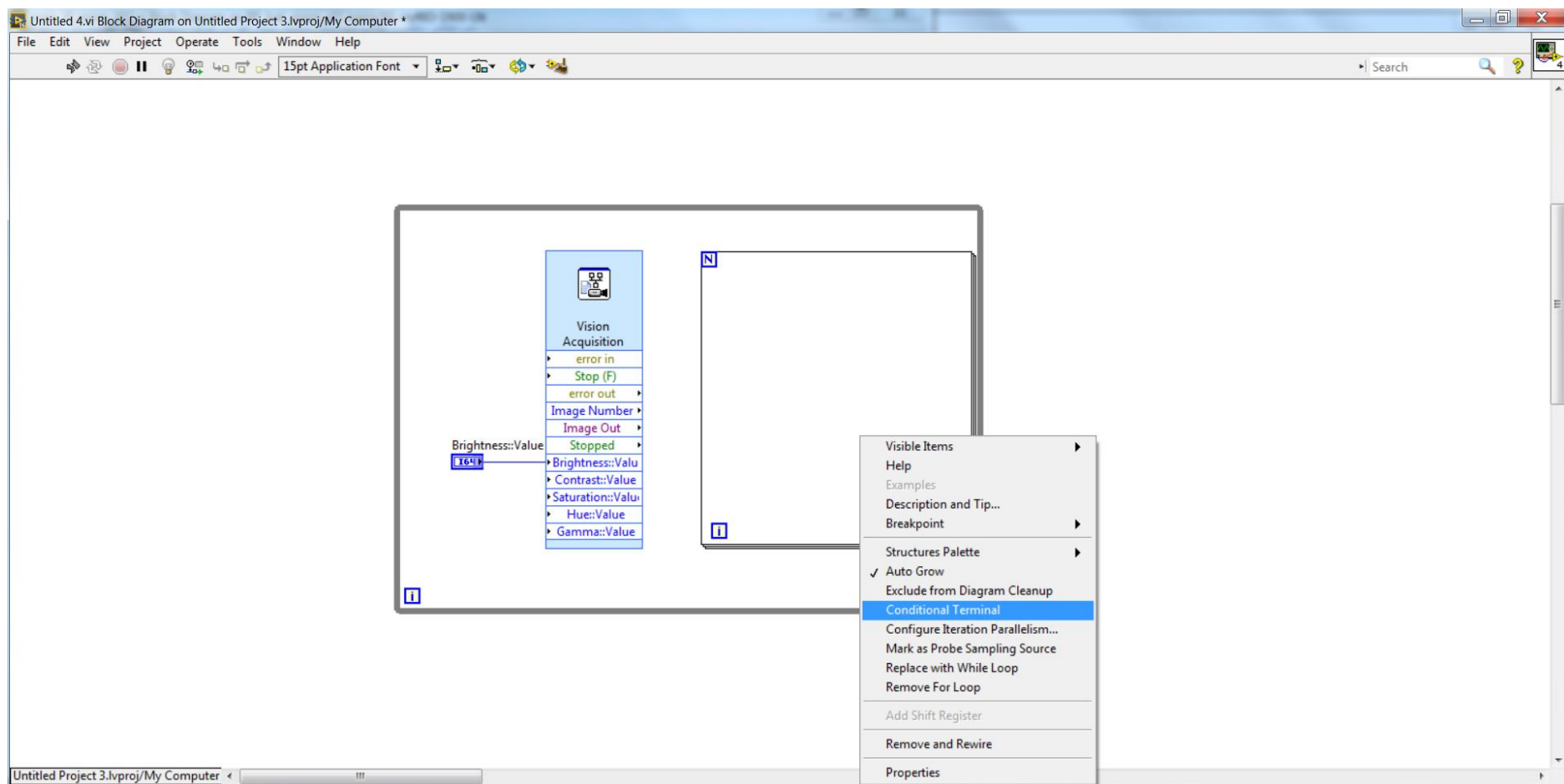
Roztažení smyčky



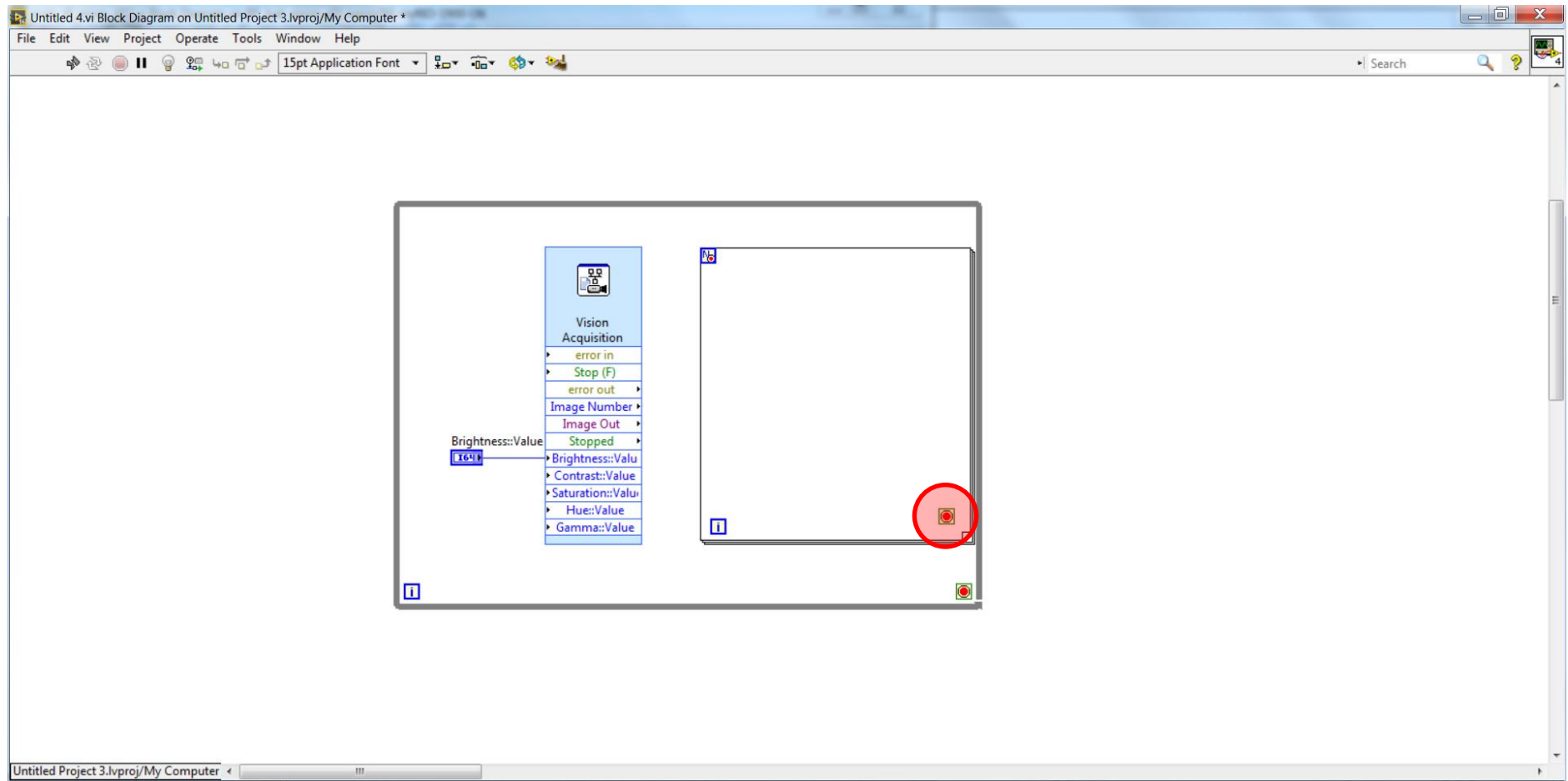
Vložená smyčka For Loop



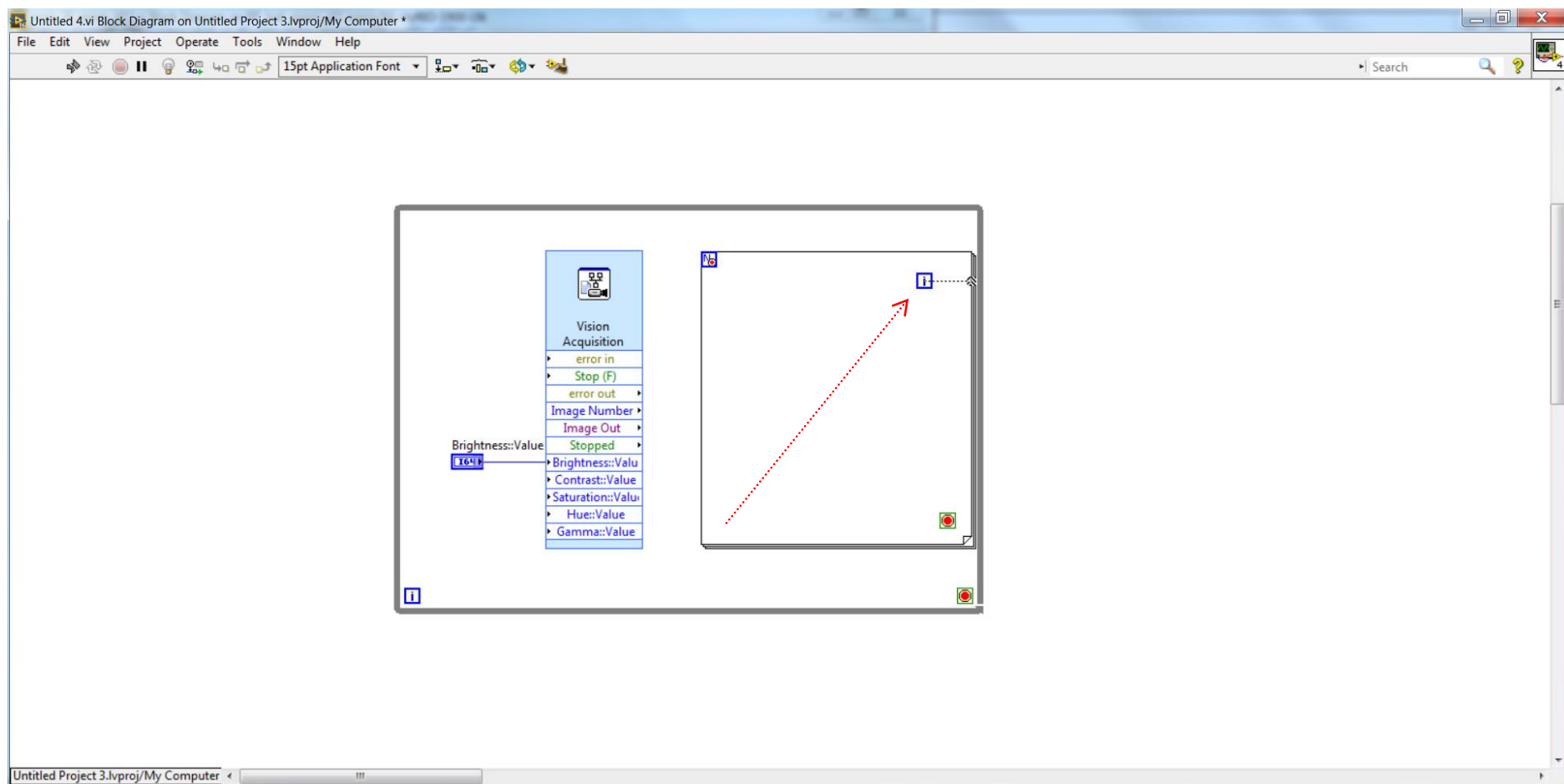
Vytvoření terminálu pro předčasné ukončení smyčky: pravý klik na rám smyčky - Conditional Terminal



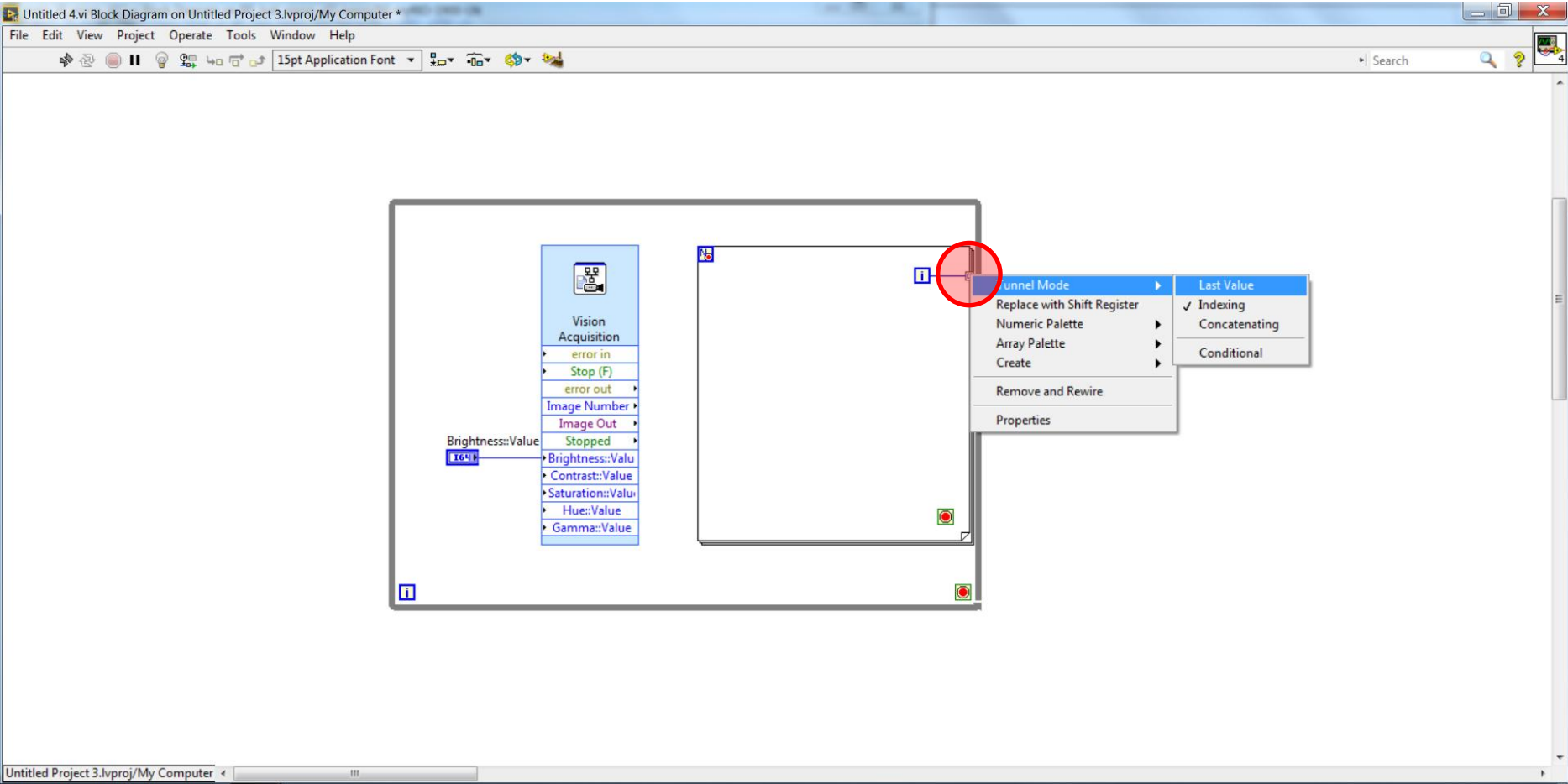
Vytvořený Conditional Terminal



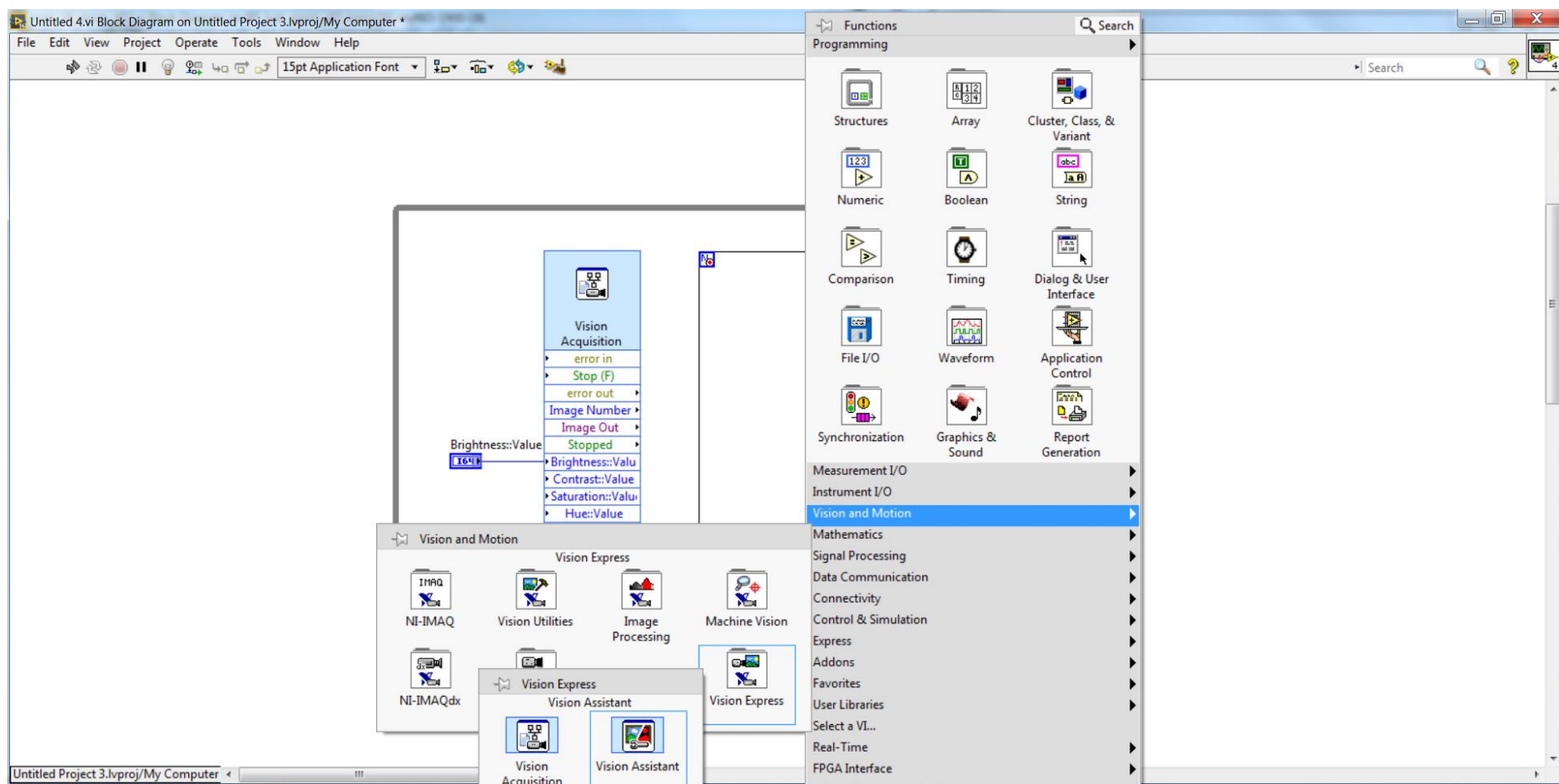
Přetažení Loop Iteration a připojení výstupu na rám smyčky



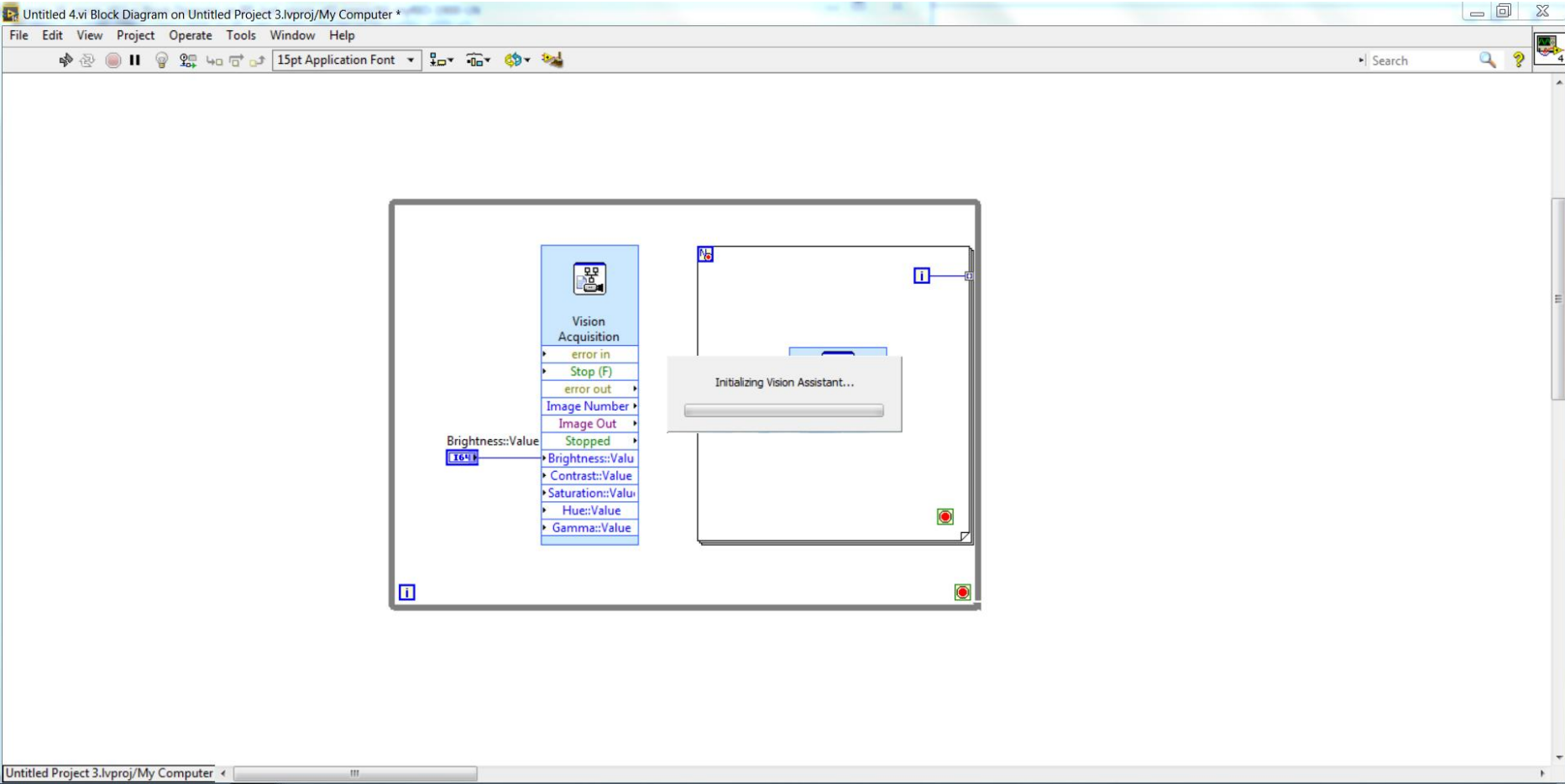
Nastavení Tunnel Mode: pravý klik na Tunnel - Tunnel Mode/Last Value



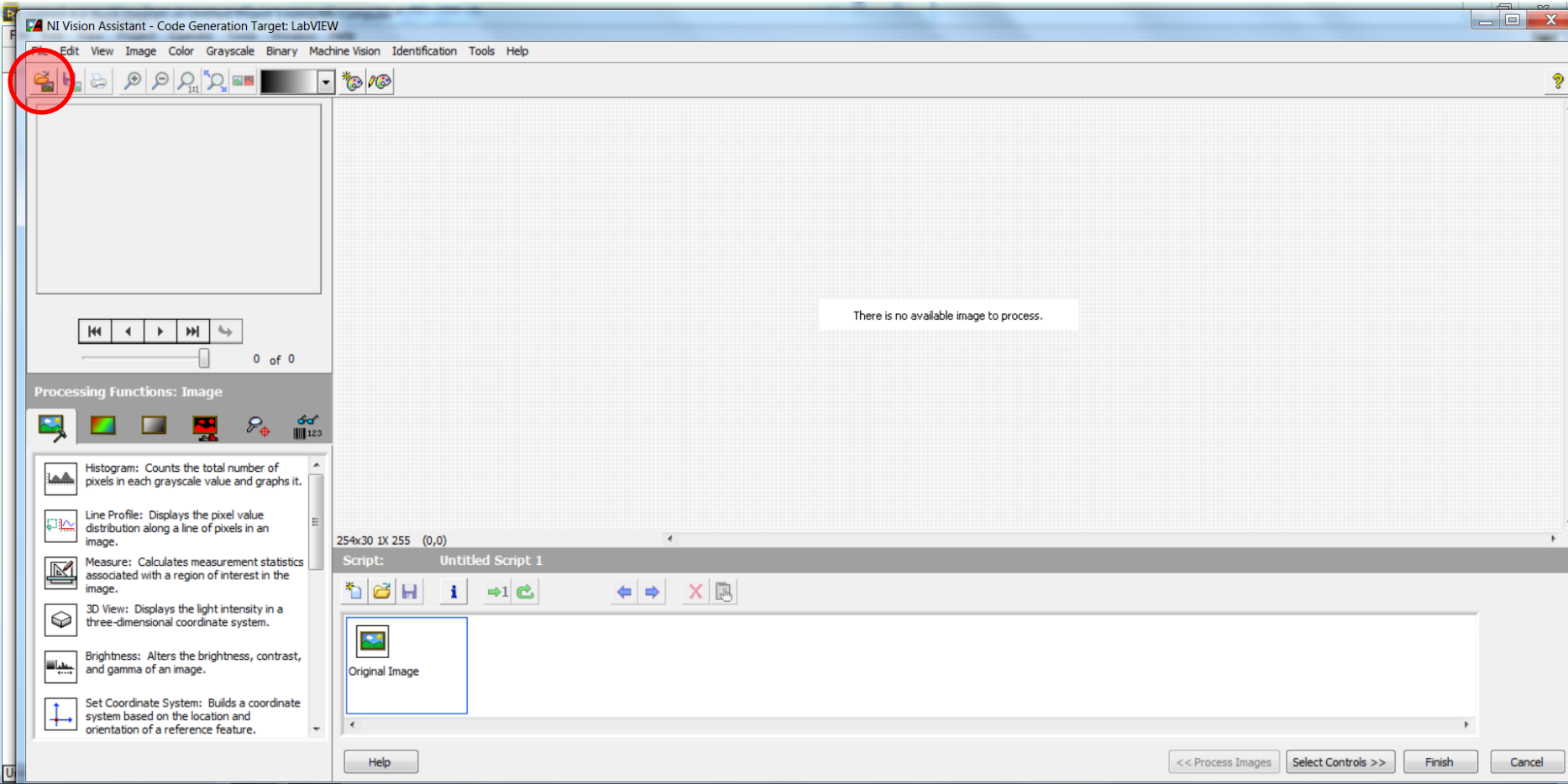
Vložení Vision Assistant: pravý klik na bílou plochu - Vision and Motion/ Vision Assistant



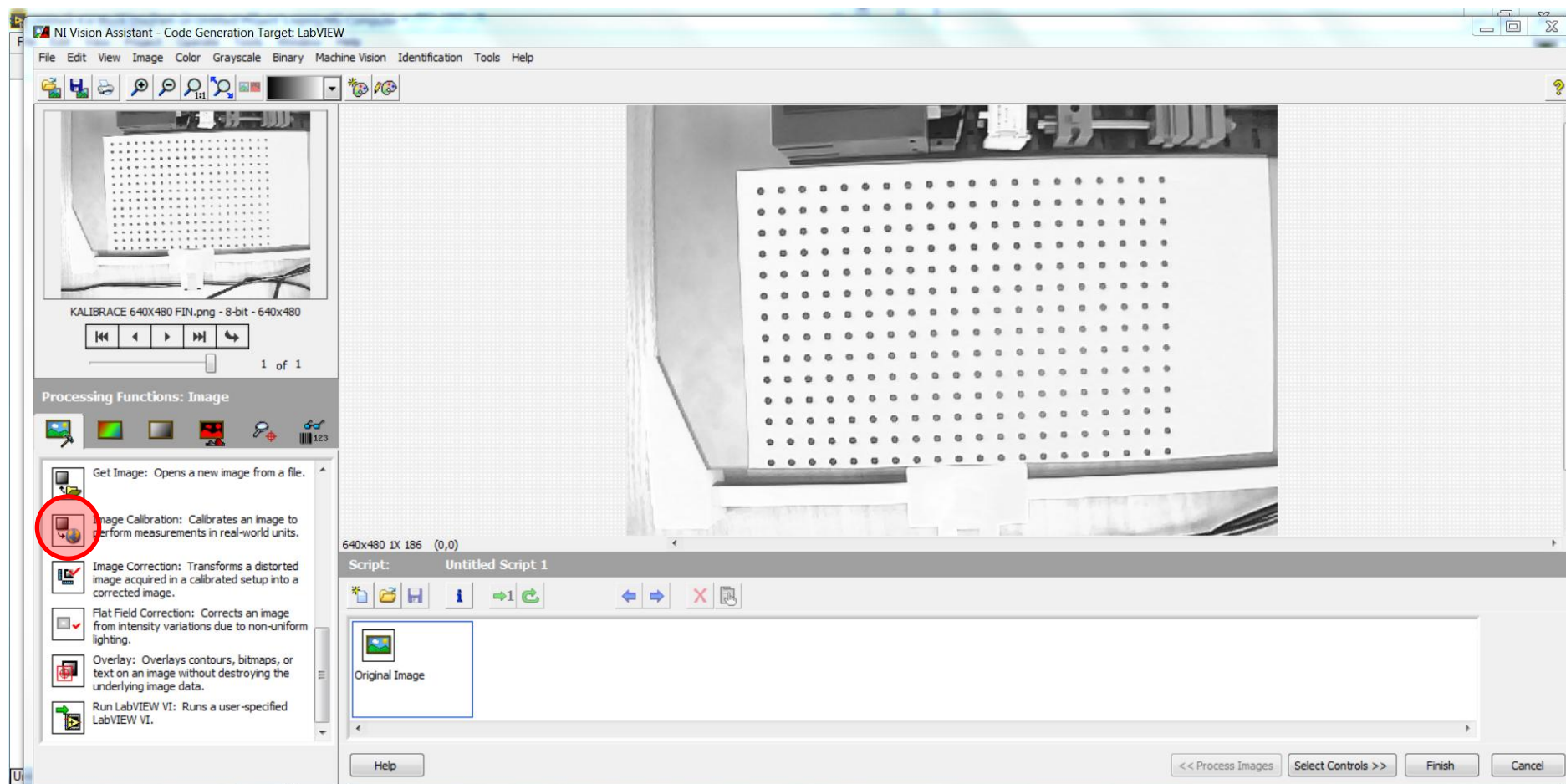
Inicialize Vision Assistant



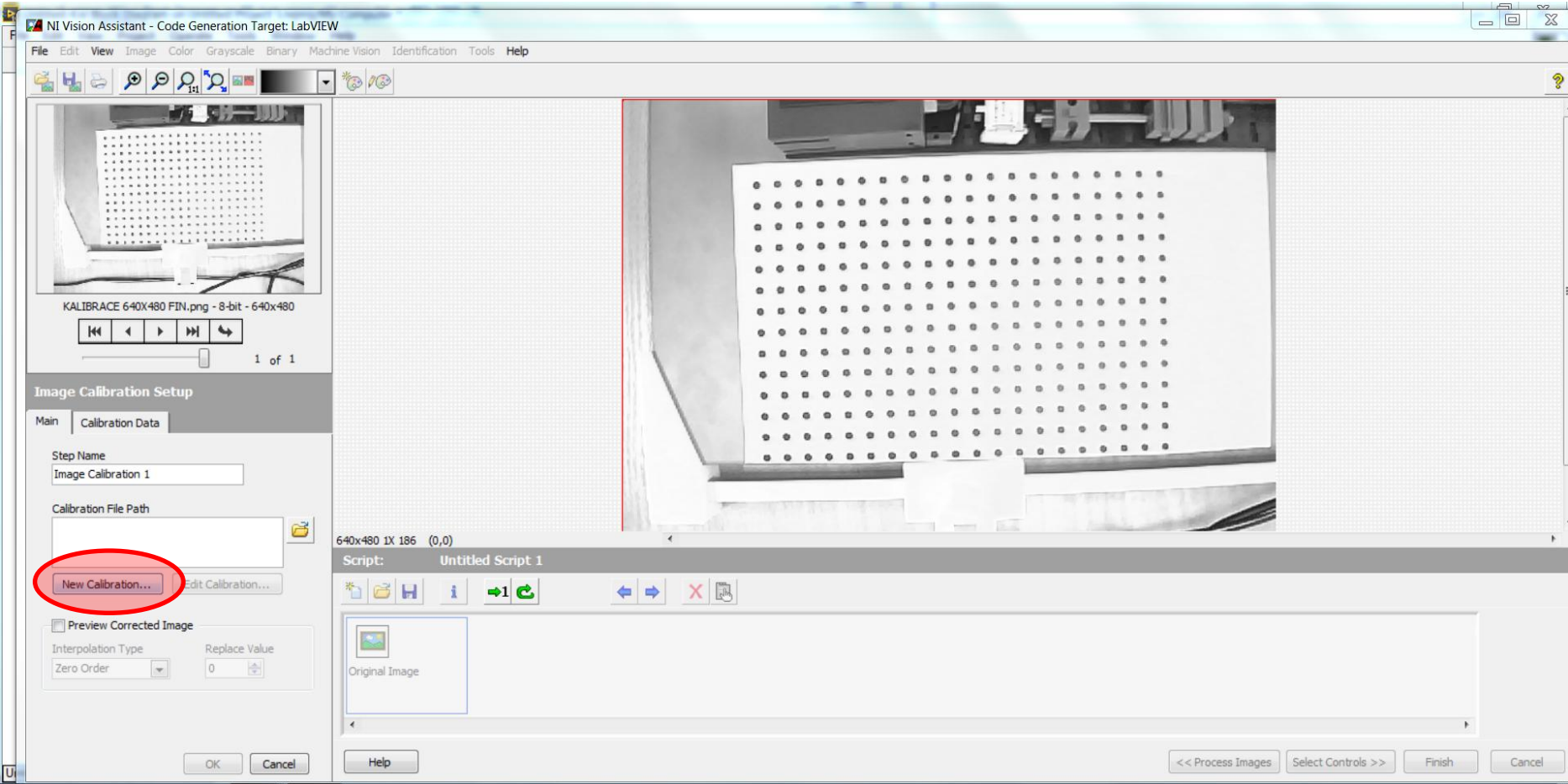
Okno Vision Assistant



Nastavení Kalibrace



New Calibration



Distortion Mode

NI Vision Assistant - Code Generation Target: LabVIEW

File Edit View Image Color Grayscale Binary Machine Vision Identification Tools Help

KALIBRACE 640X480 FIN.png - 8-bit - 640x480

1 of 1

Image Calibration Setup

Main Calibration Data

Step Name
Image Calibration 1

Calibration File Path

New Calibration... Edit Calibration...

Preview Corrected Image

Interpolation Type Zero Order

Replace Value 0

OK Cancel

Script: 640x480 13

Original Image

OK Cancel Help

Step 1 - Select Calibration Type

Flat Objects

- Point Distance Calibration**
Directly converts pixel coordinates to real-world coordinates based on a known distance.
- Point Coordinates Calibration**
Corrects camera angle distortion based on known distances between at least four points.
- Distortion Model (Grid)**
Corrects lens distortion or sensor misalignment based on one or more calibration grid images.
- Camera Model (Grid)**
Models camera parameters and lens distortion based on at least five calibration grid images.

Curved Objects

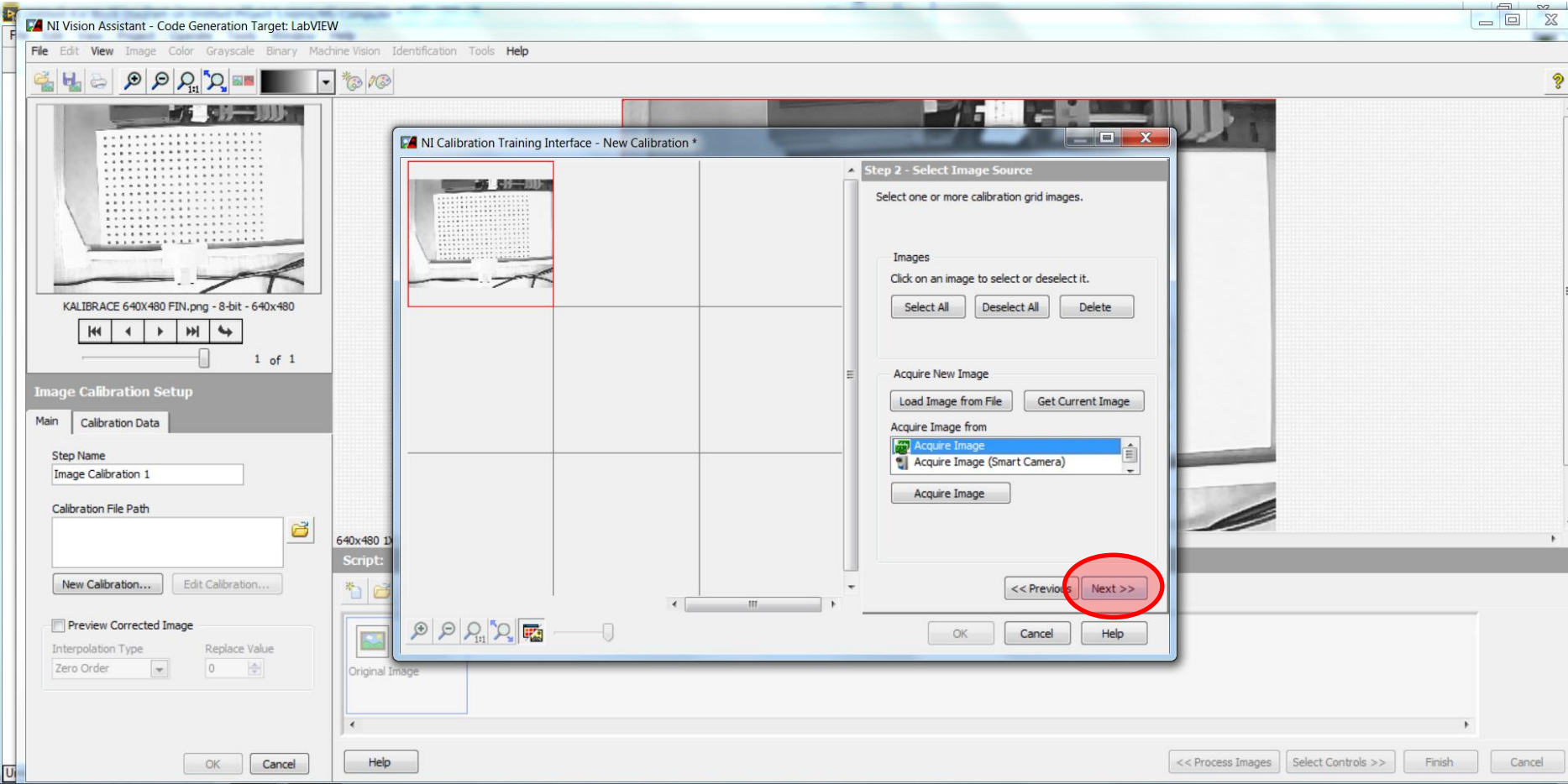
- Microplanes (Grid)**
Corrects distortion for a working plane that is not flat based on one or more calibration grid images.

<< Previous Next >>

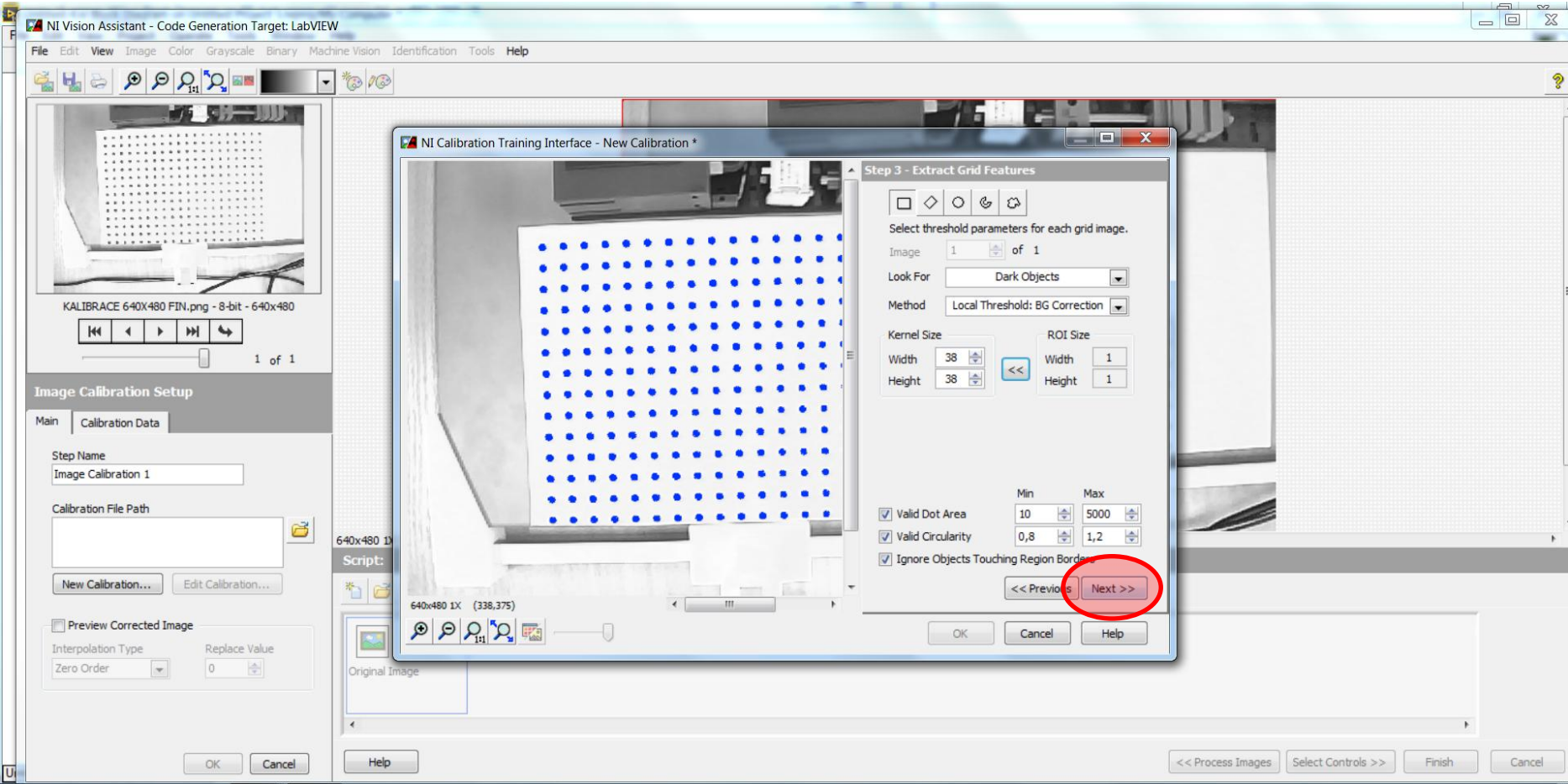
OK Cancel Help

<< Process Images Select Controls >> Finish Cancel

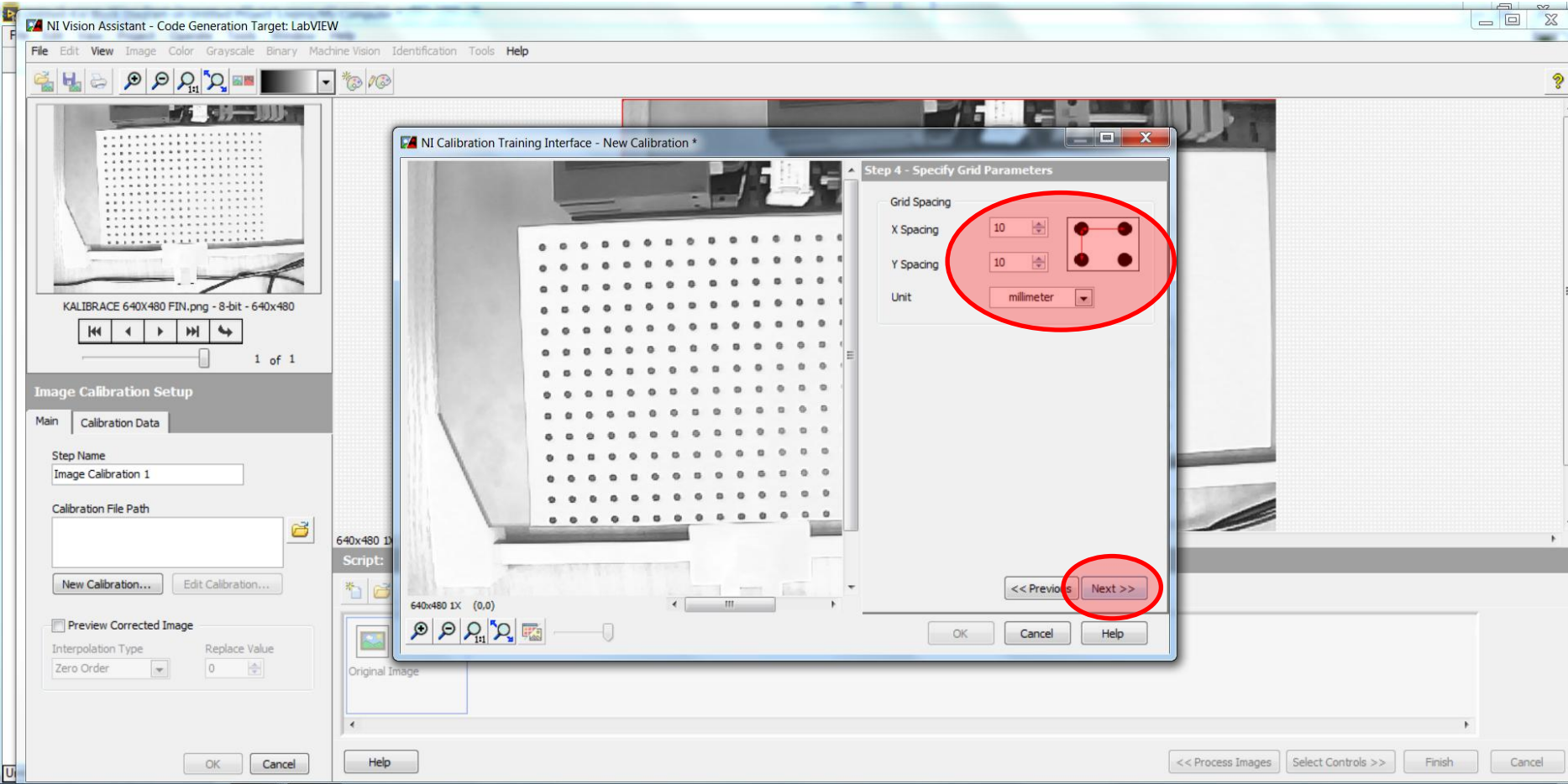
Ponechat



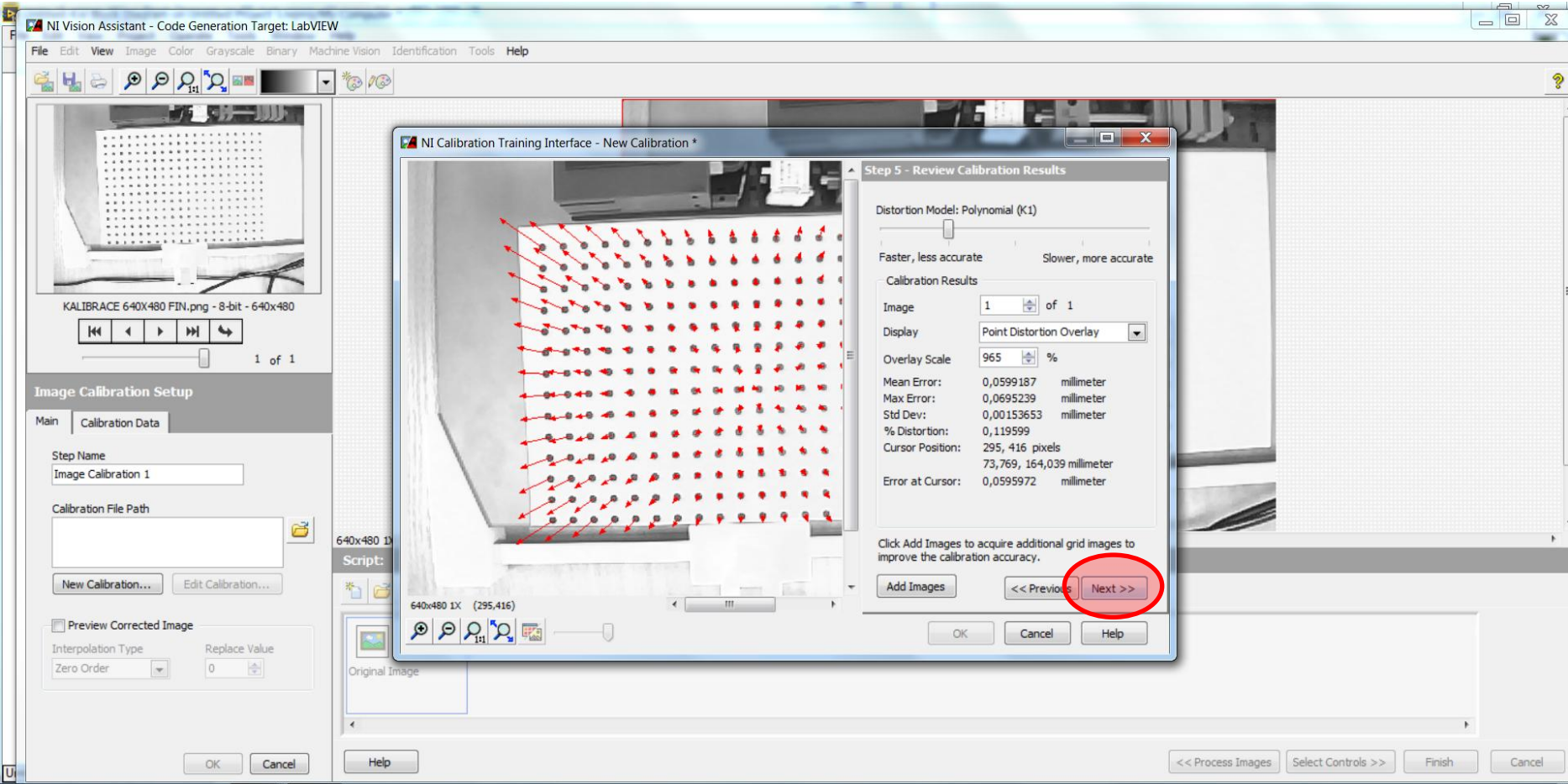
Ponechat



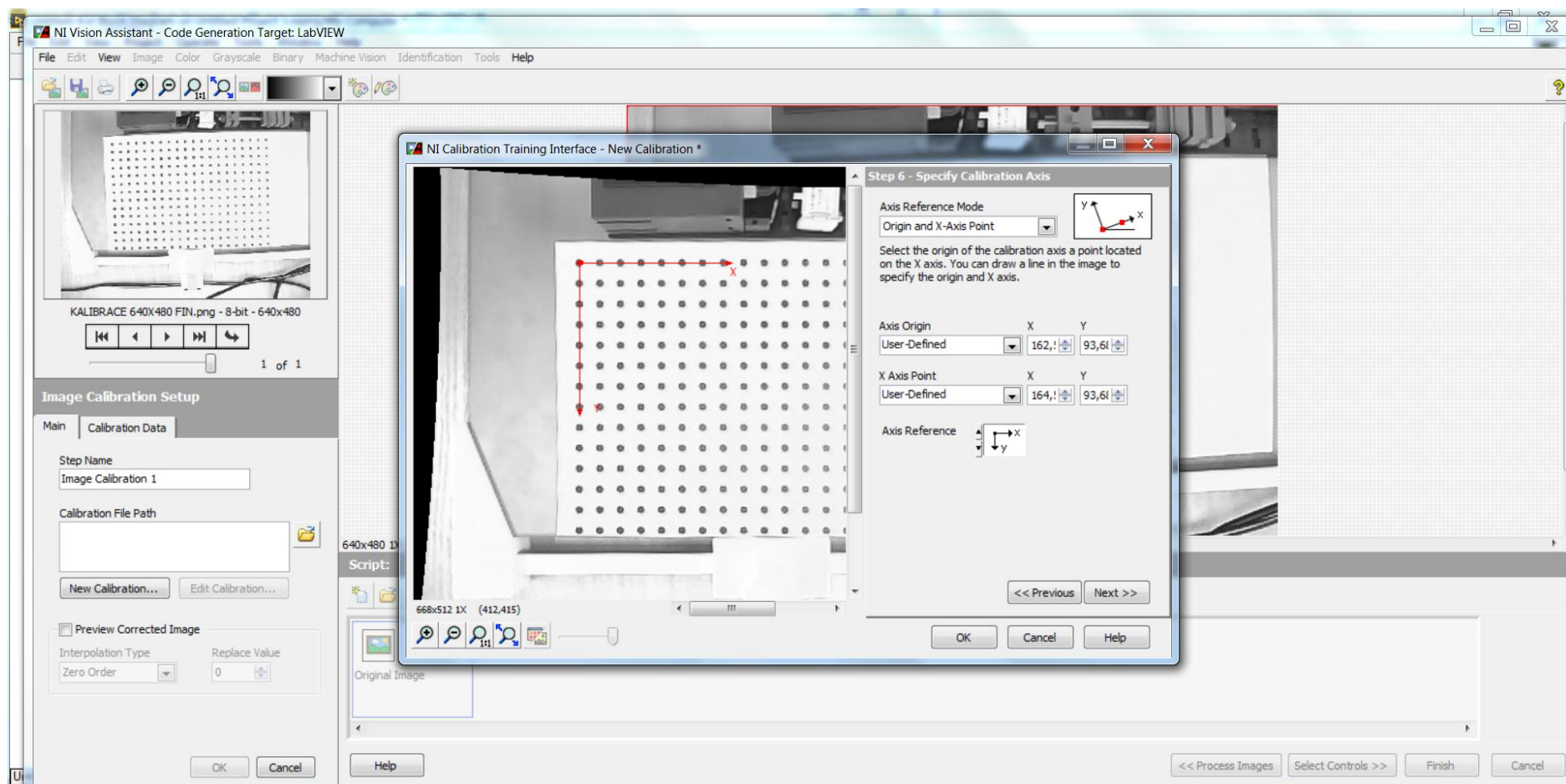
Nastavit: X Spacing=10, Y Spacing=10, Unit=millimeter



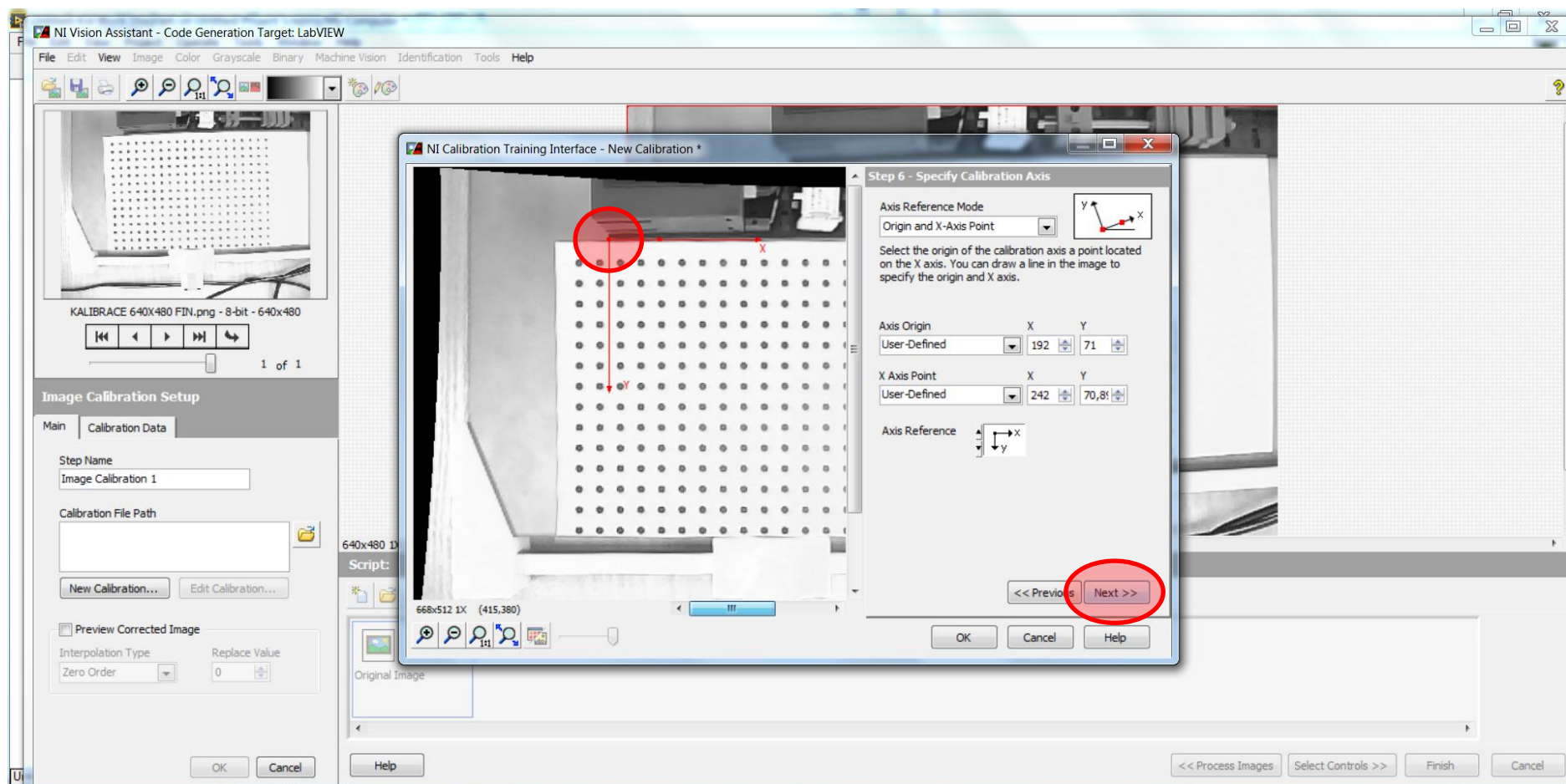
Ponechat



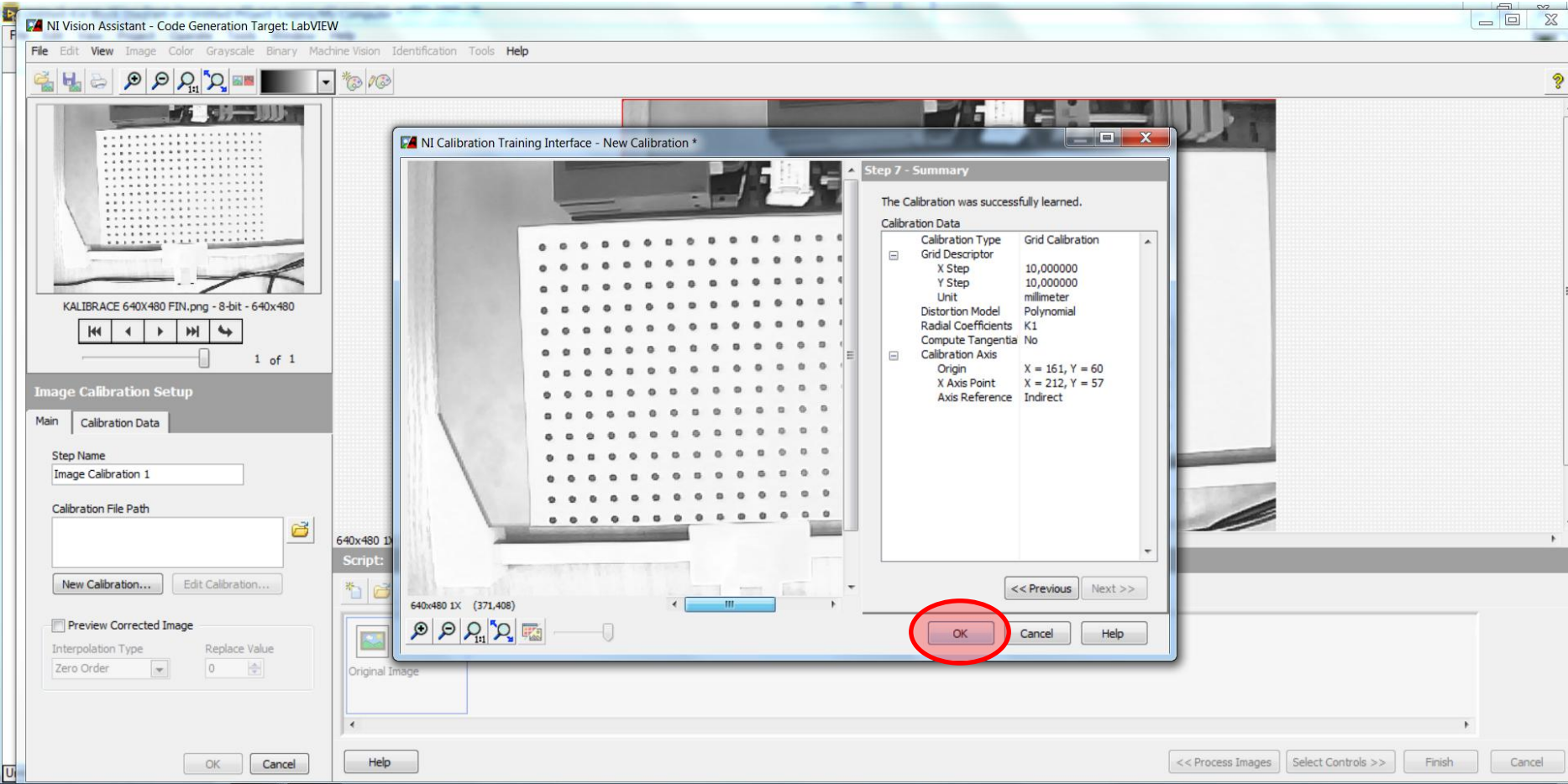
Nastavení souřadnic: levý klik na roh a tažení kus vodorovně, viz příští obraz



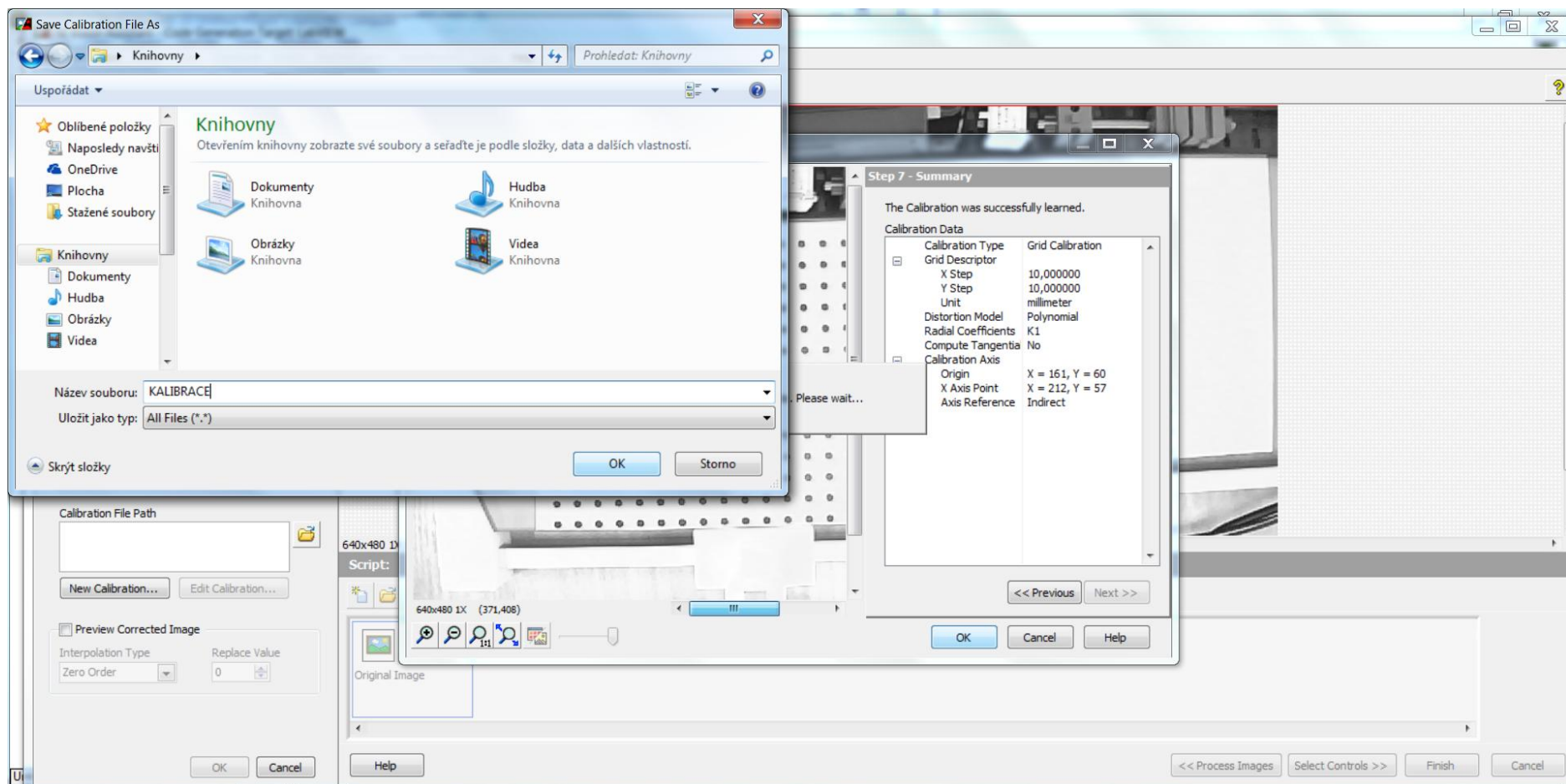
Nastavený souřadný systém



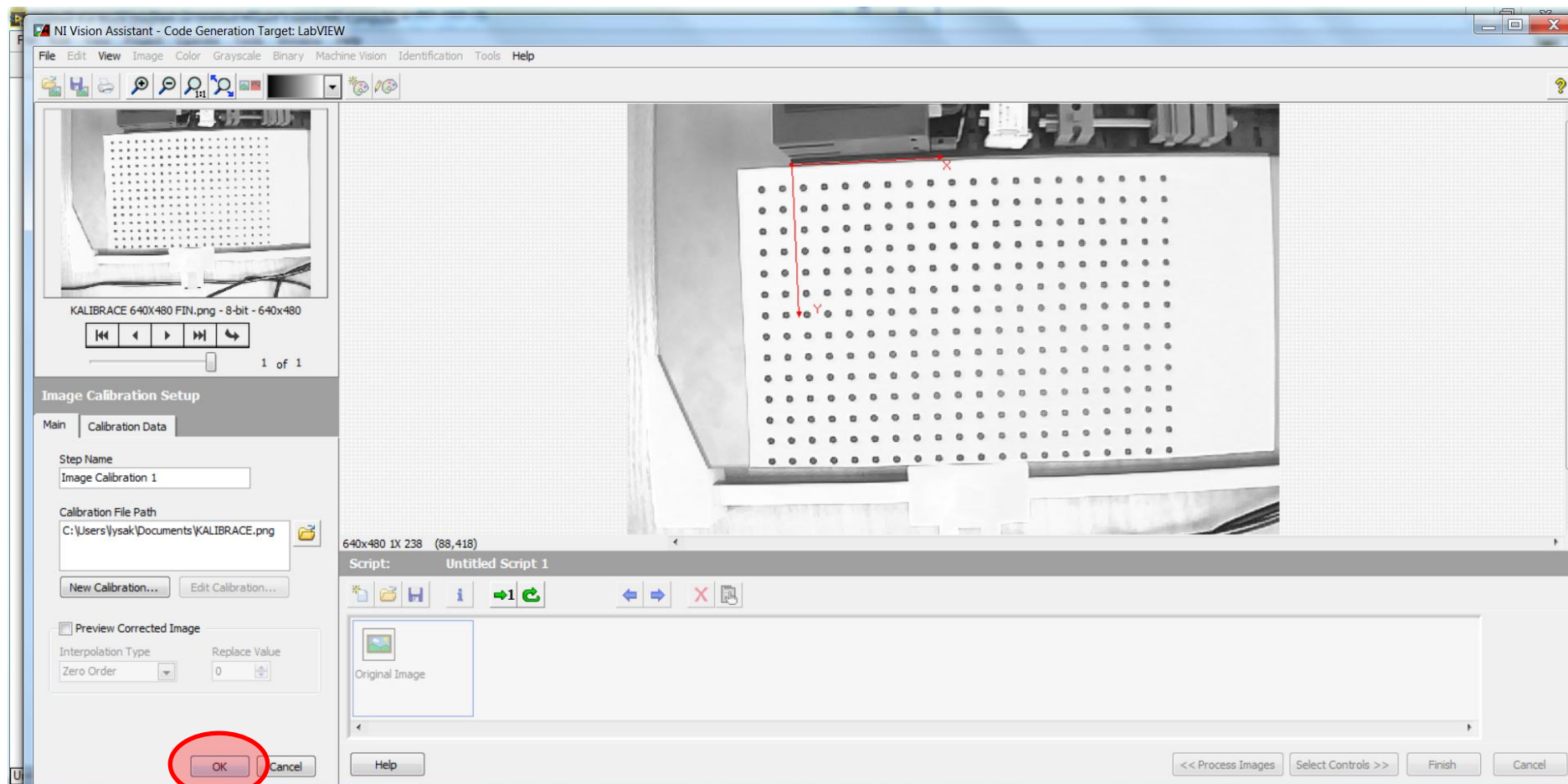
Potvrzení nastavení



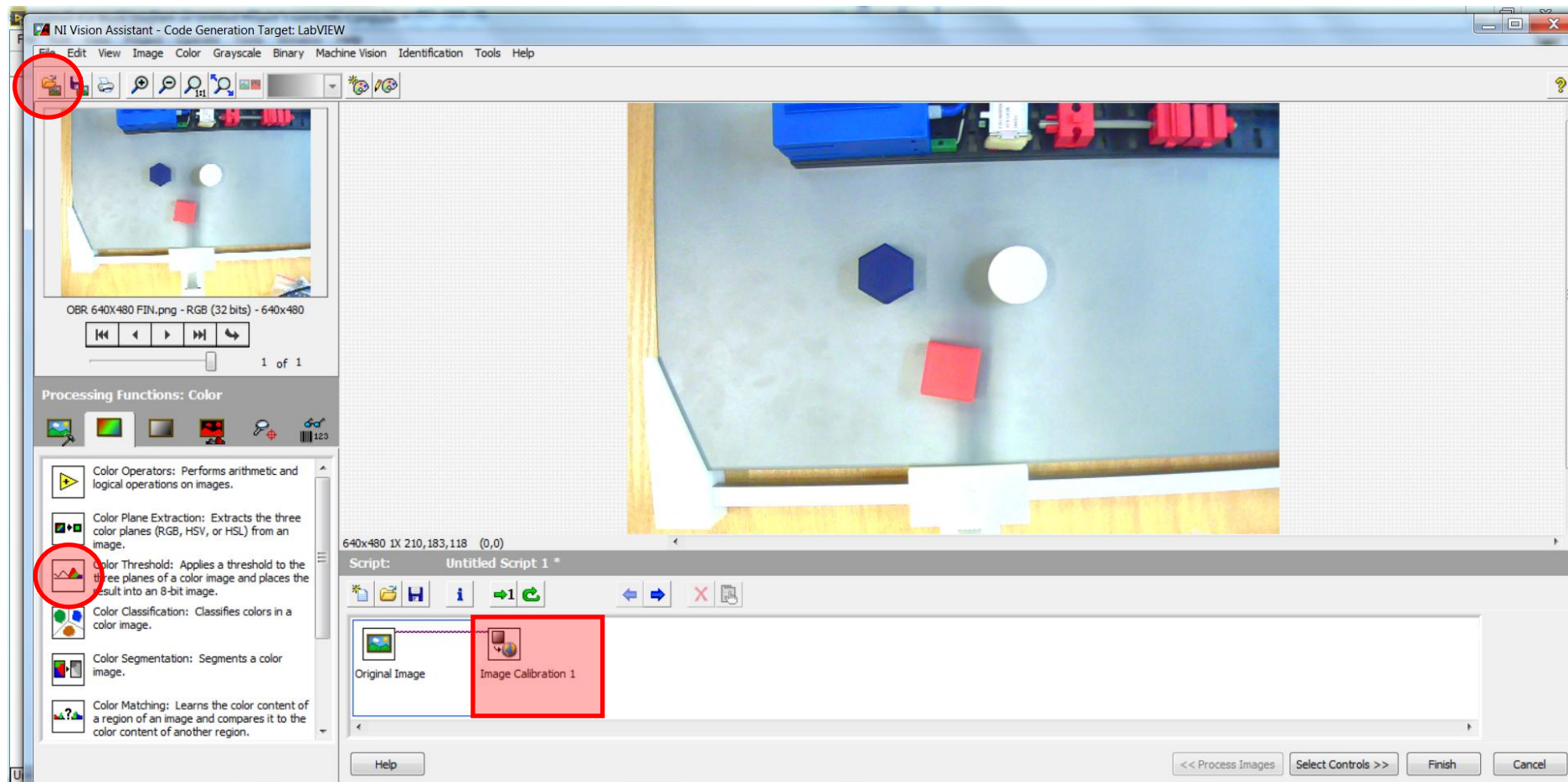
Uložení kalibrace do složky Projektu



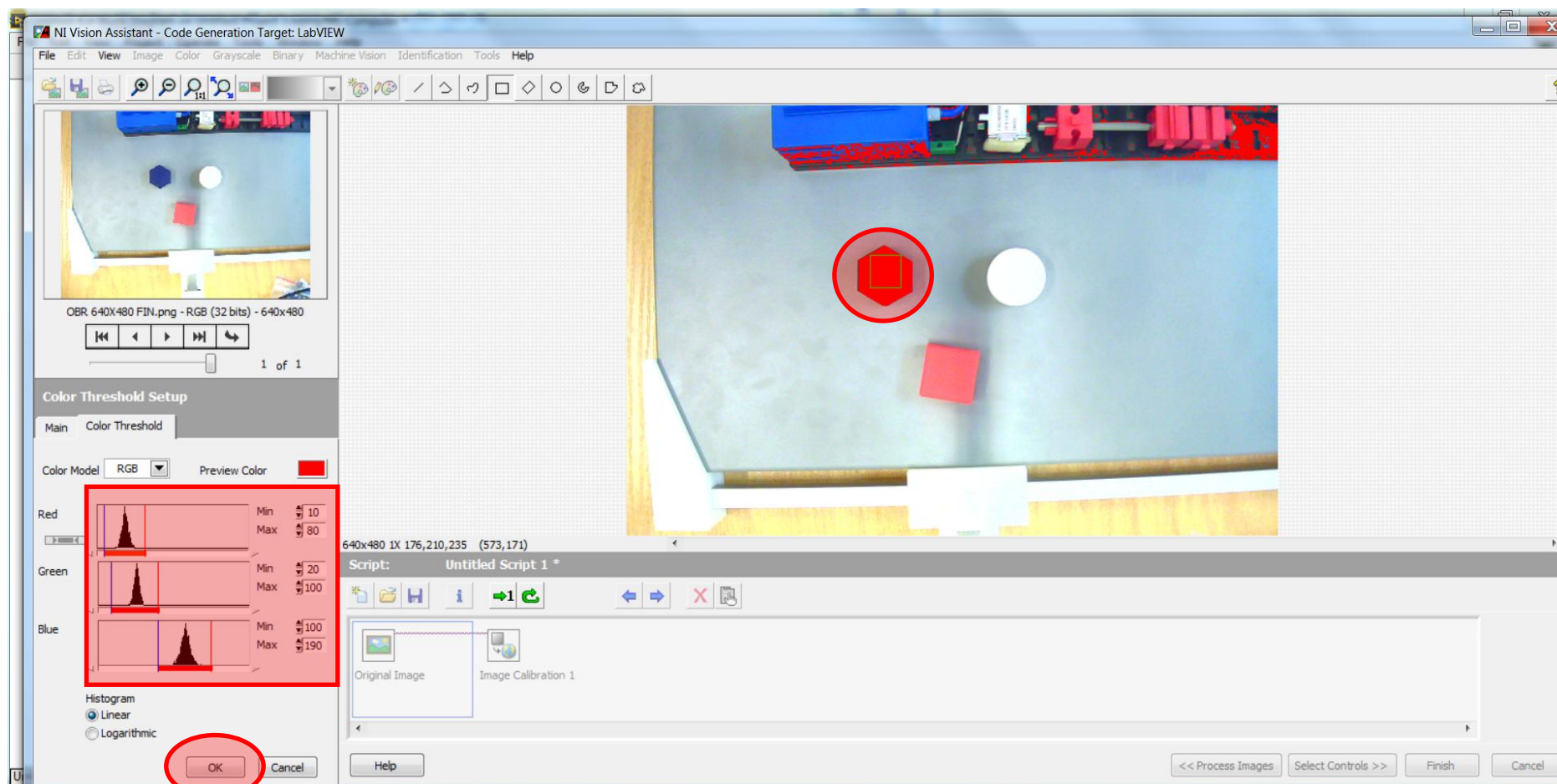
Ukončení nastavení kalibrace



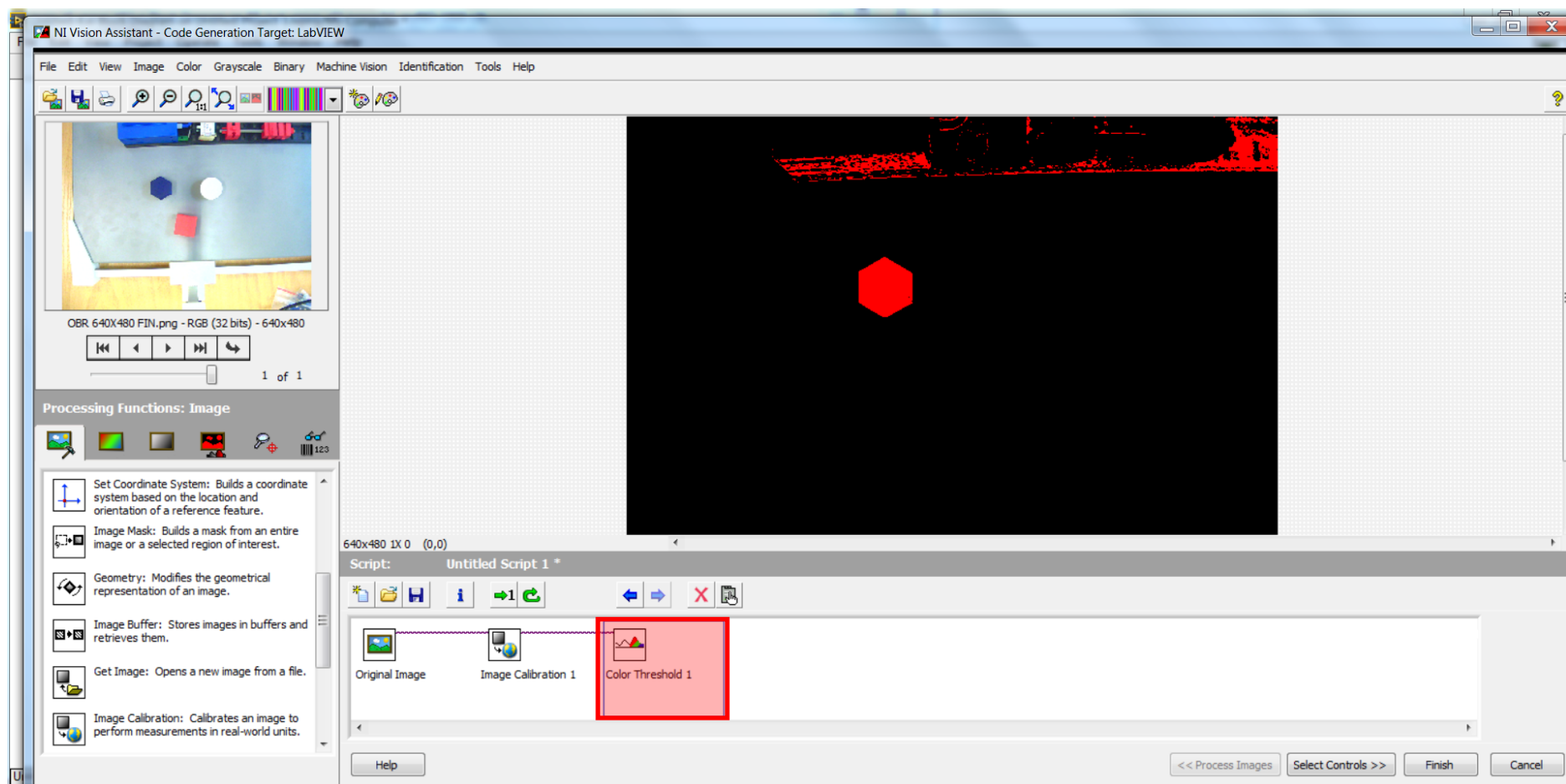
Nastavení binarizace: klik na druhou záložku nástrojů Color/Color Threshold



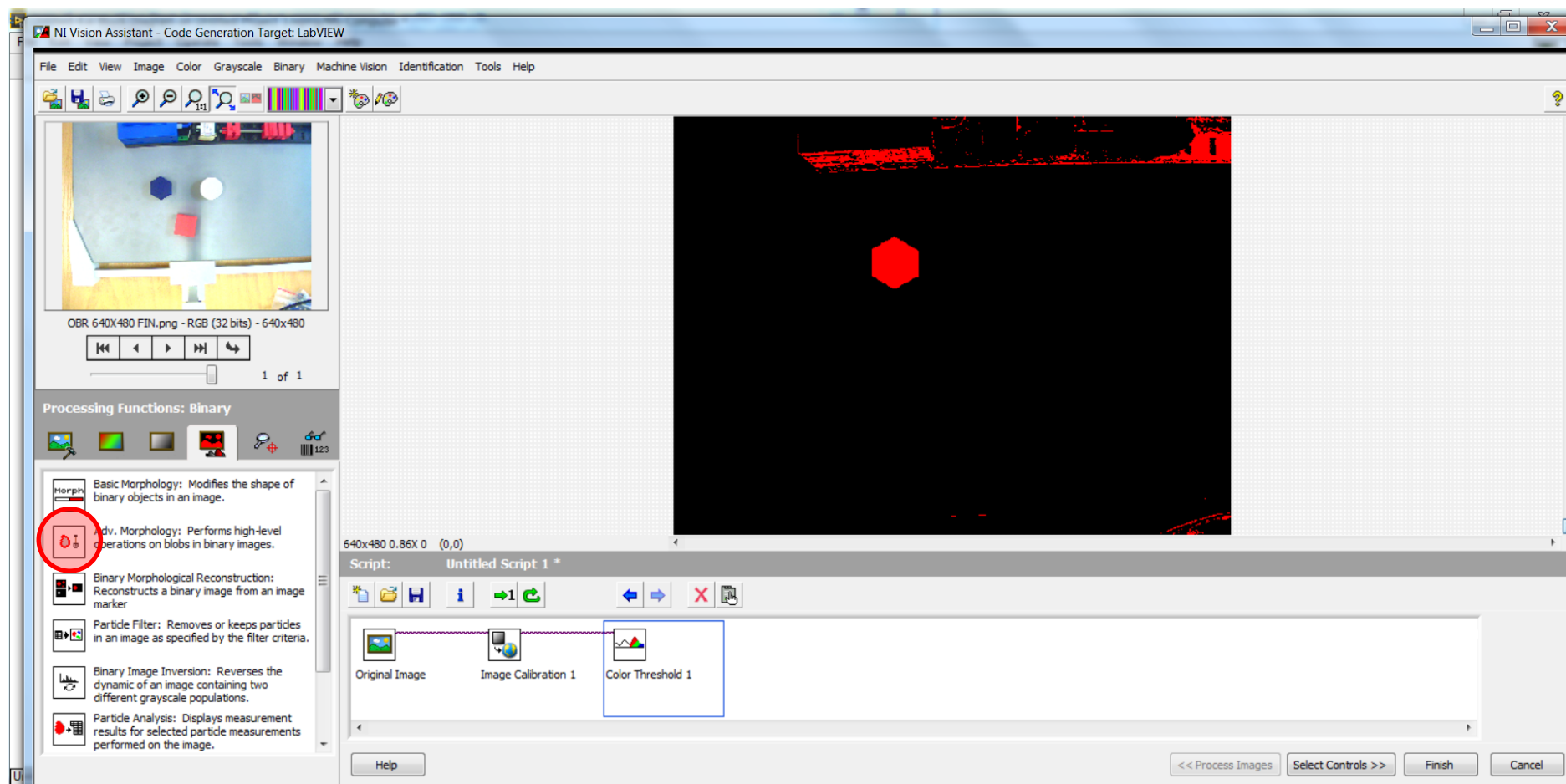
Vybrat část dílce, který chceme mít jinou barvou než okolí - nastavit 3x hodnoty Min a Max podle píků v histogramu



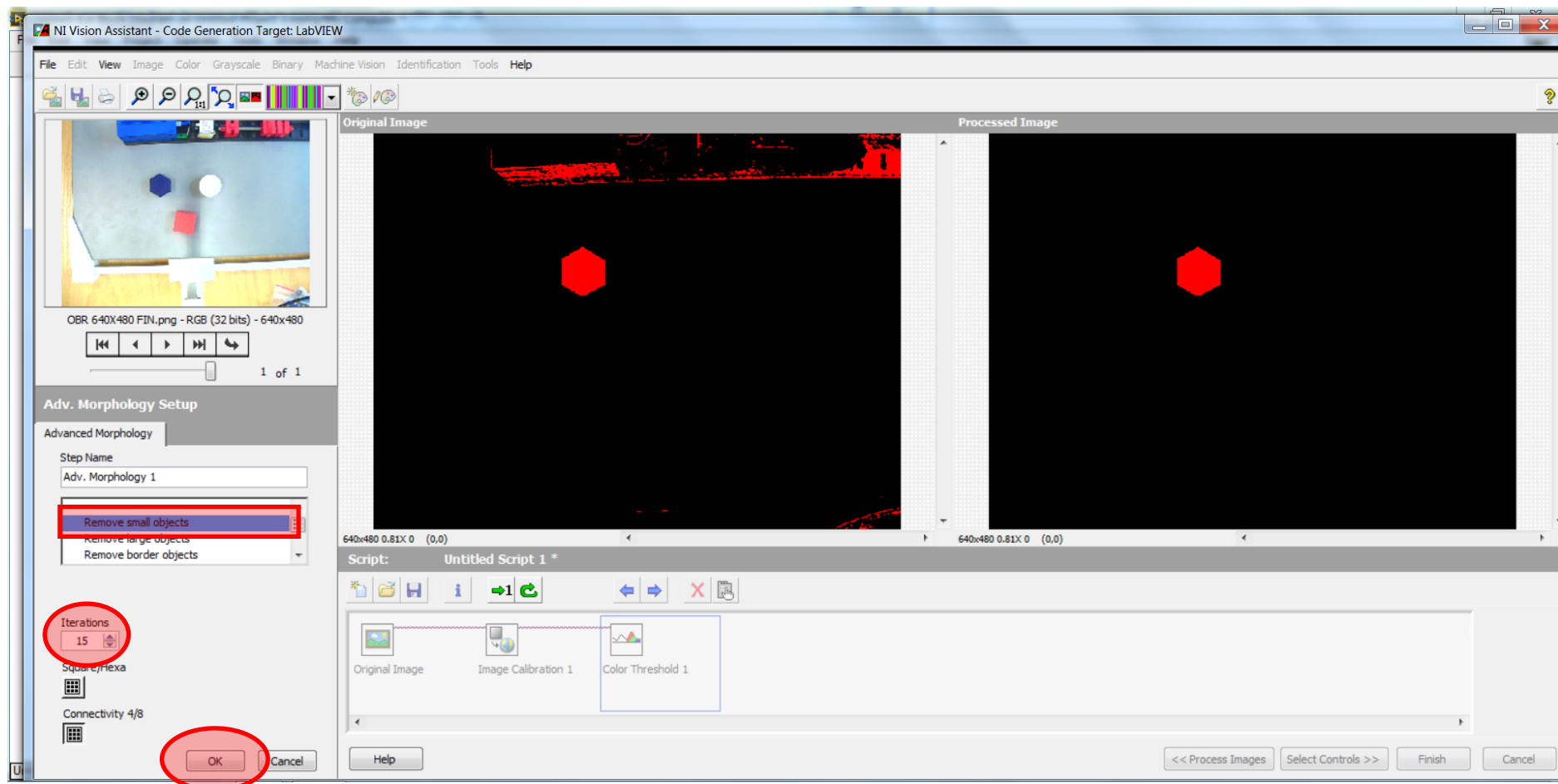
Binarizovaný obraz



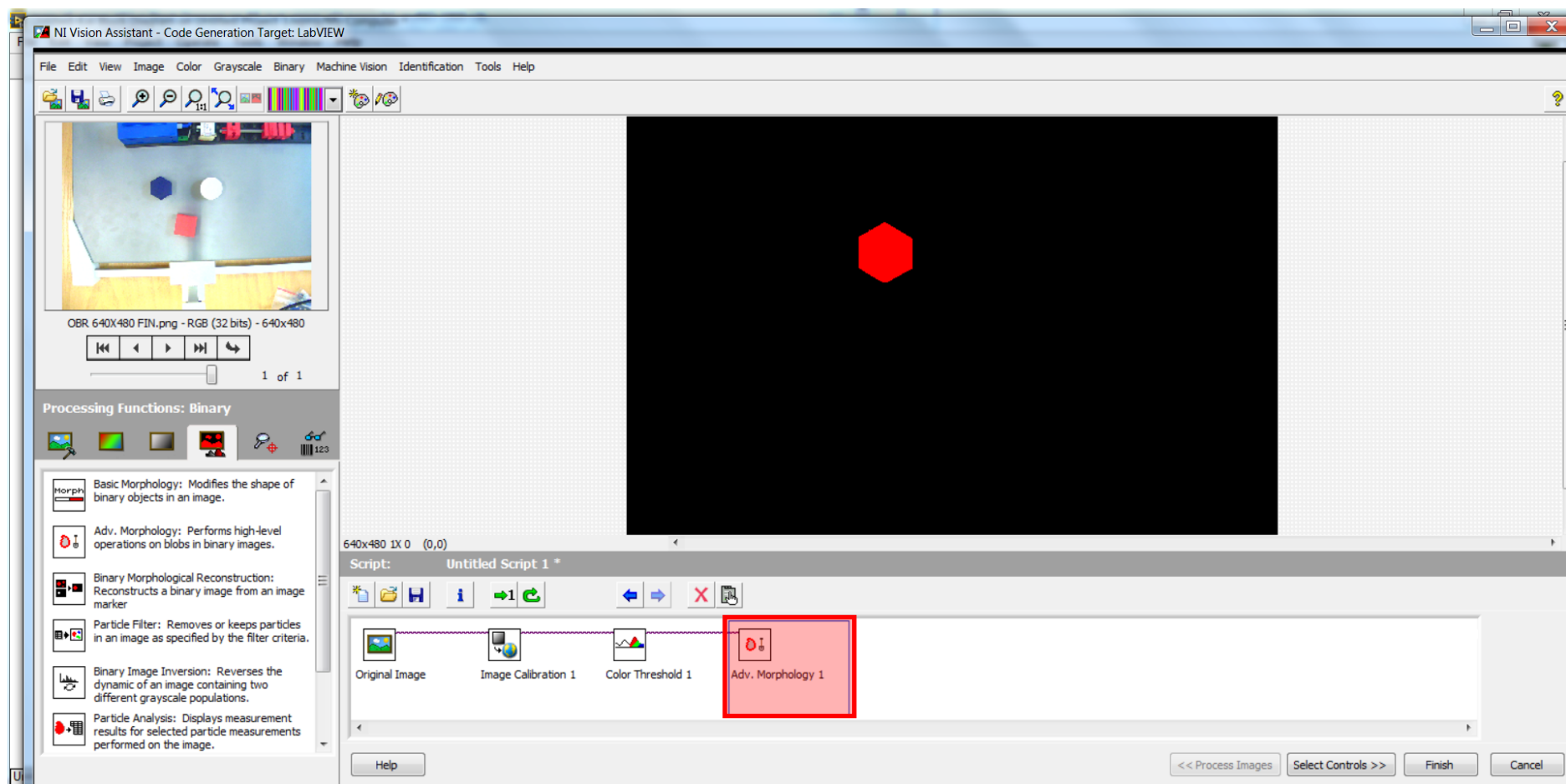
Odstranění rušivých elementů: Záložka nástrojů Binary/Adv. Morphology



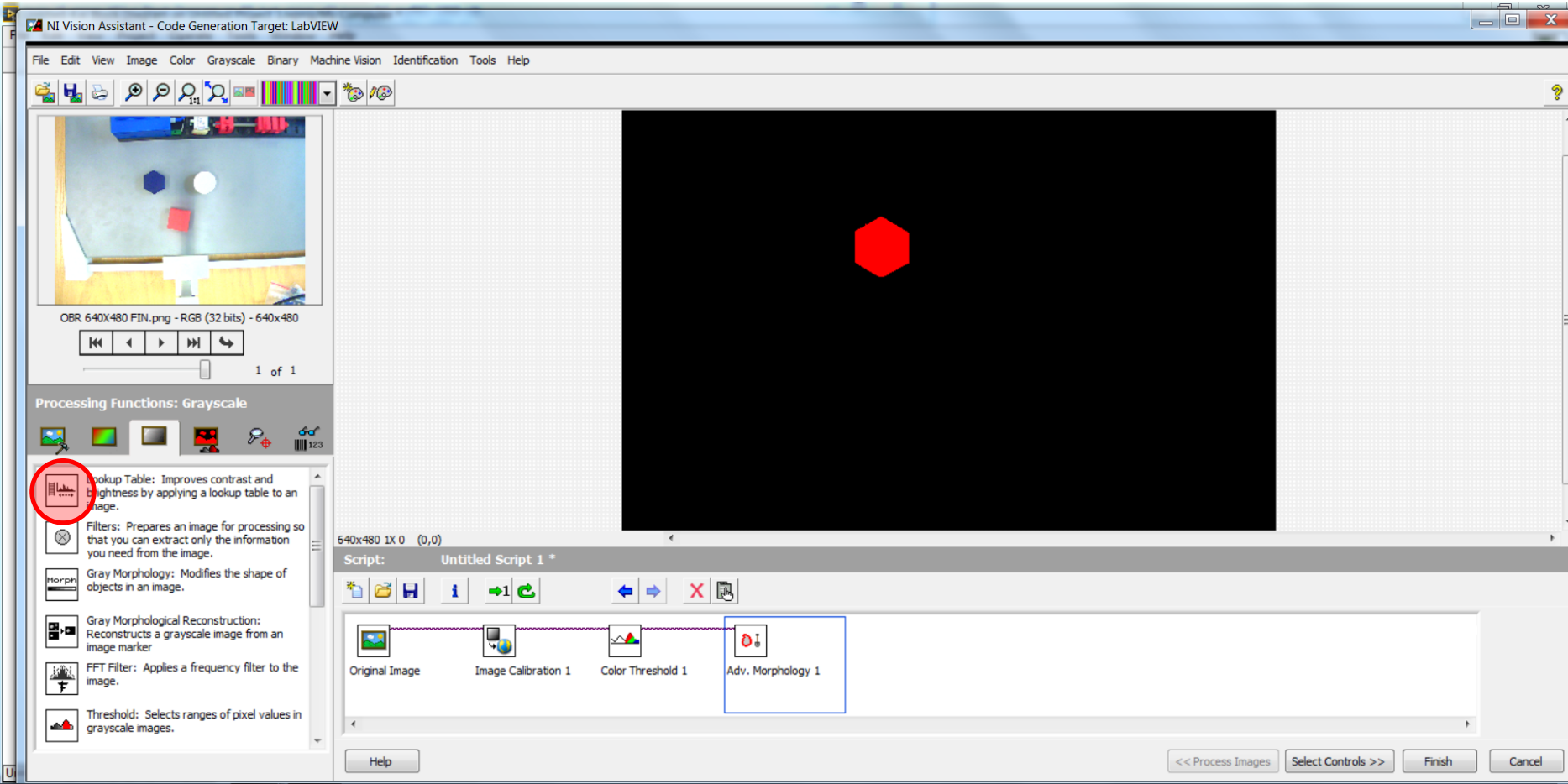
Nastavení: Remove small objects - Iterations=15



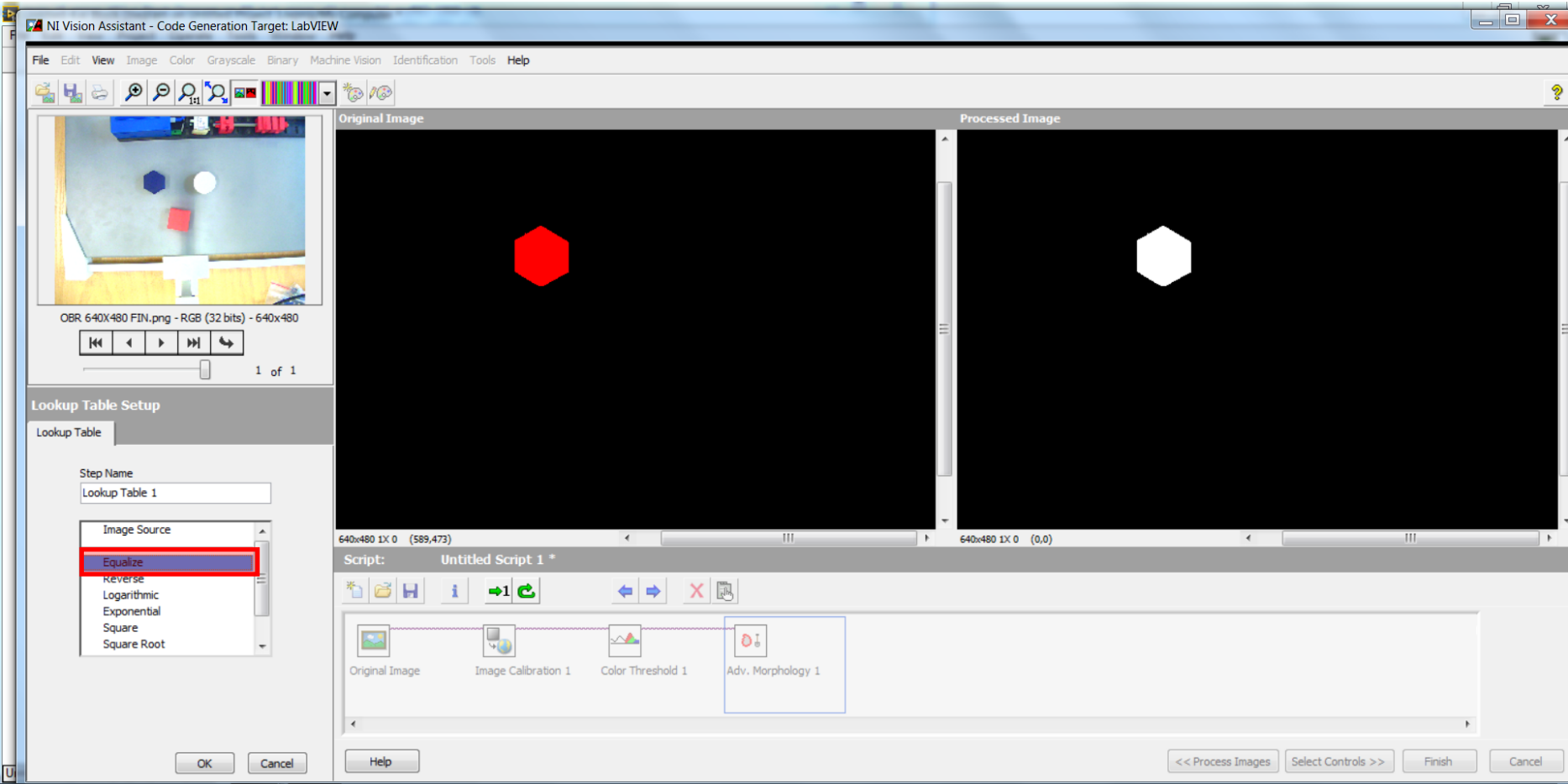
Čistý obraz



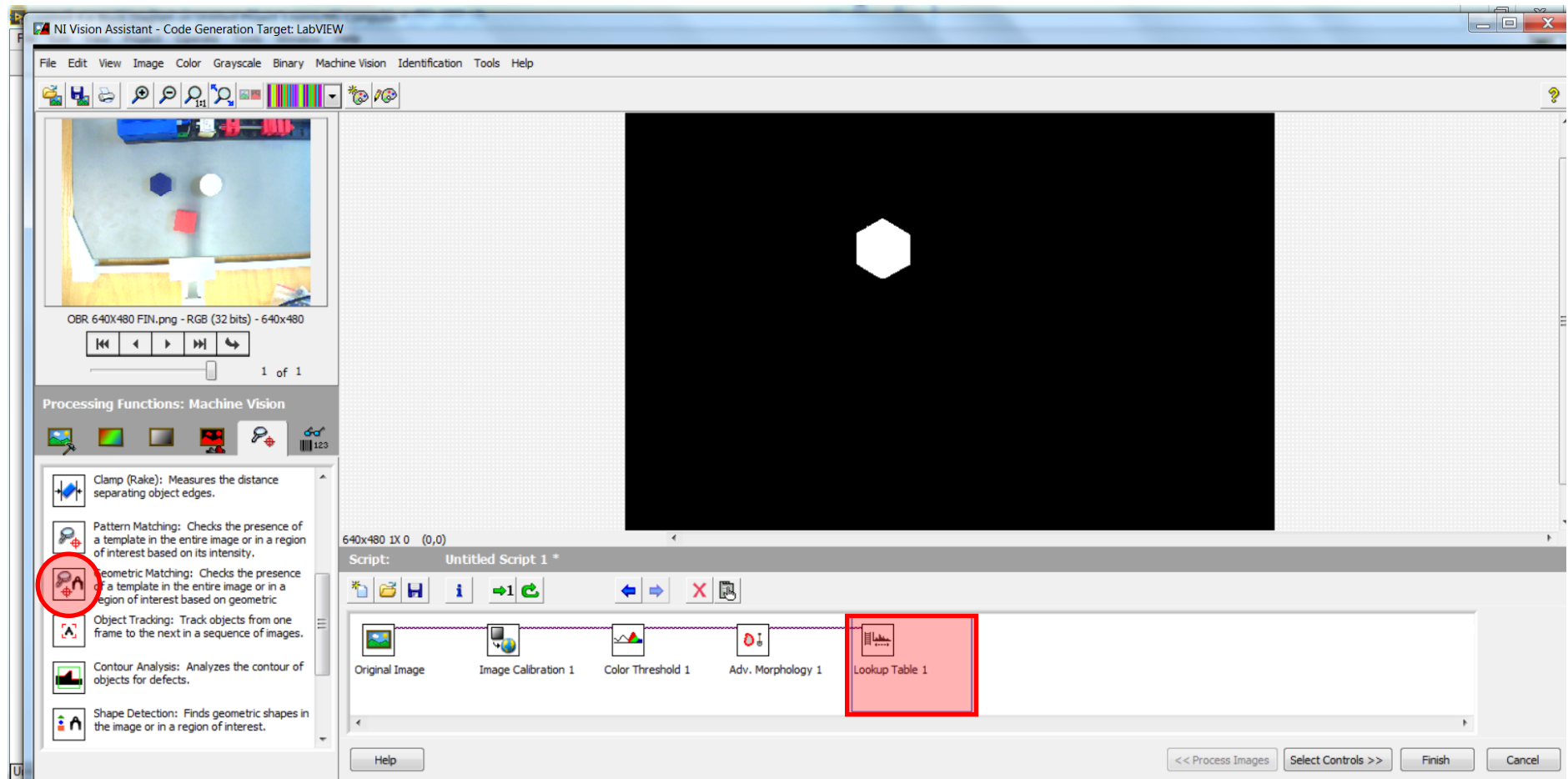
Převedení na černobílý obraz: Grayscale/Lookup Table



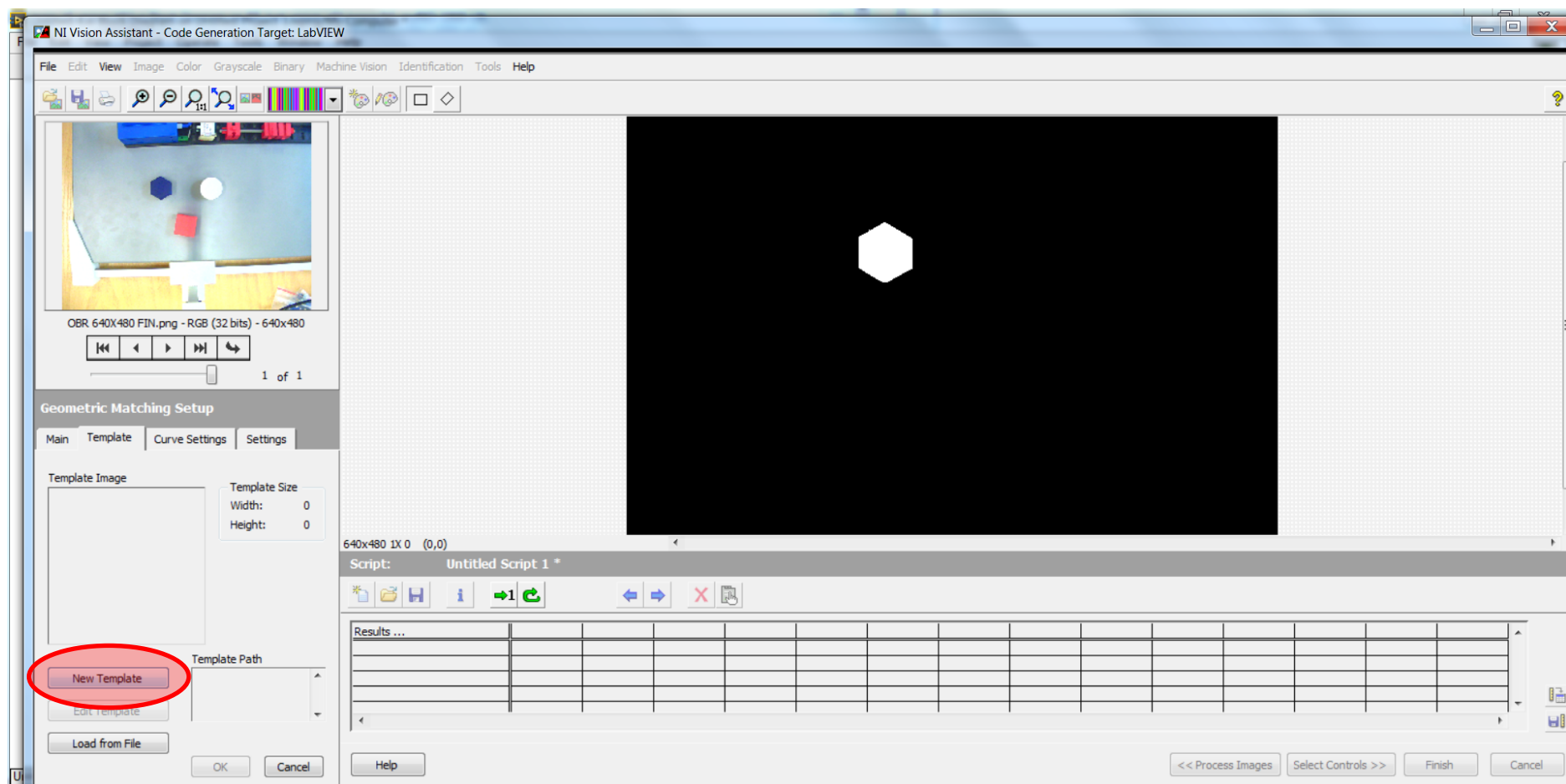
Nastavení: Equalize



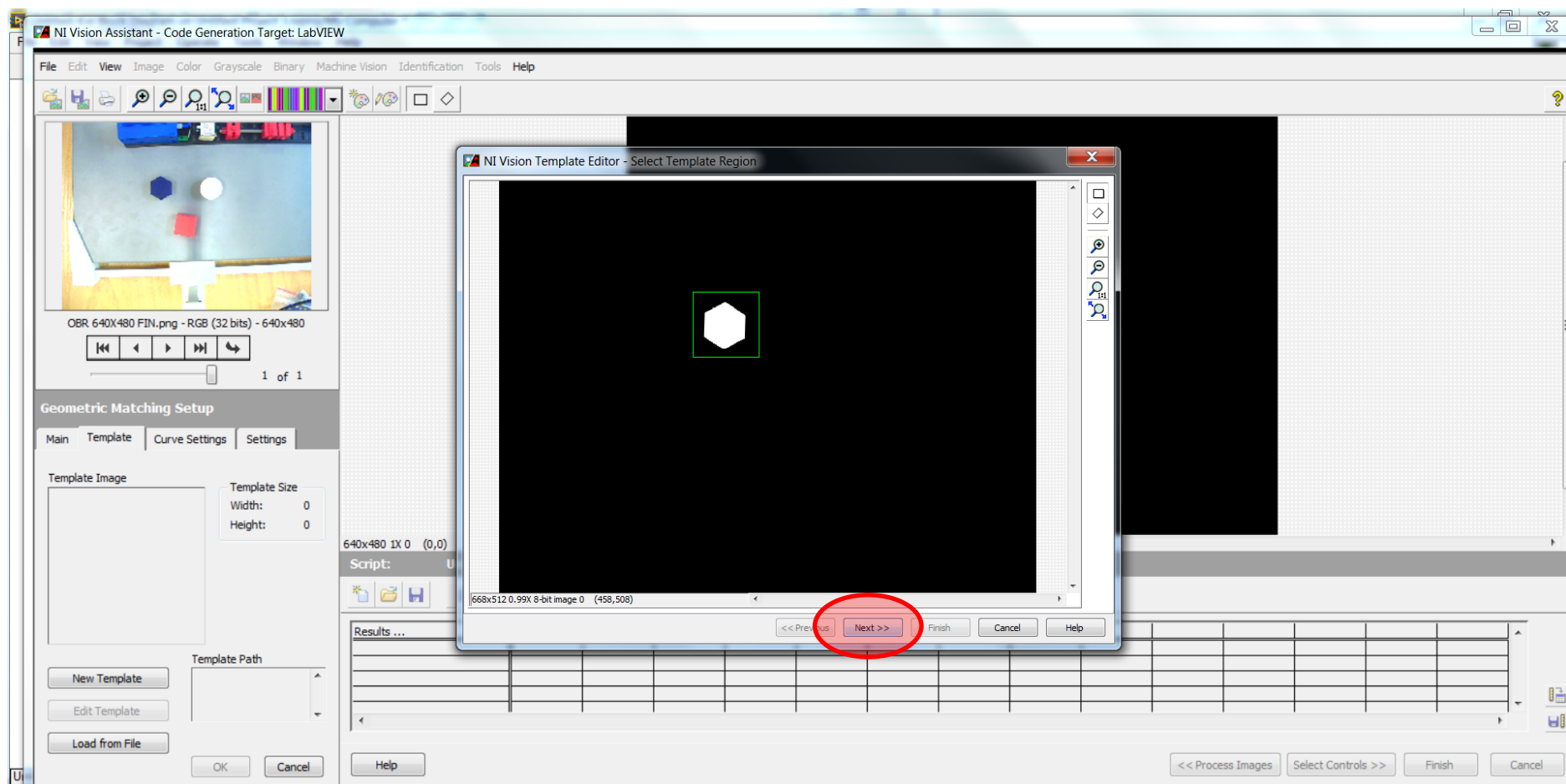
Přiřazení tvaru: Výběr Machine Vision/Geometric Matching



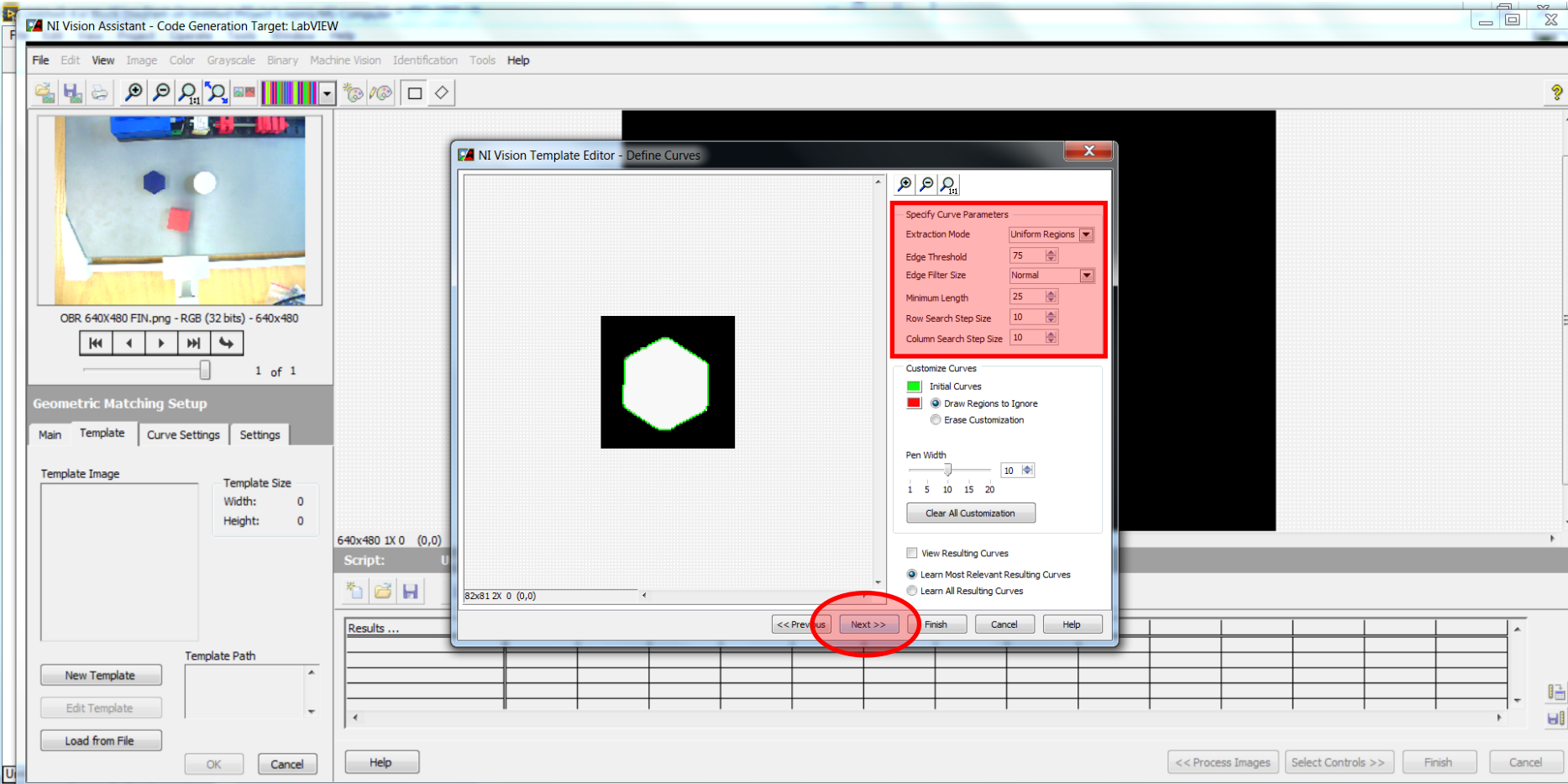
Nastavení: New Template



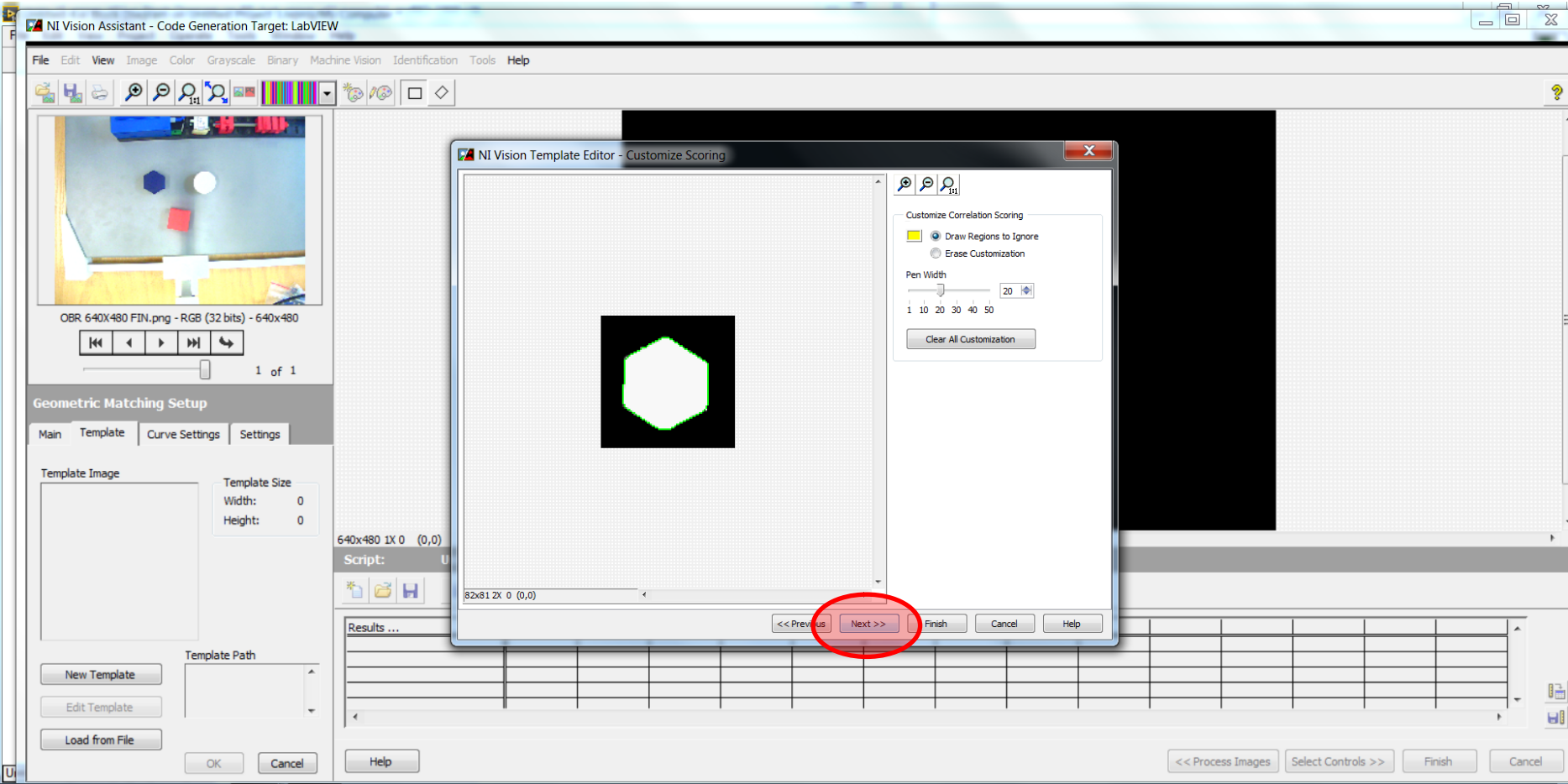
Označení tvaru



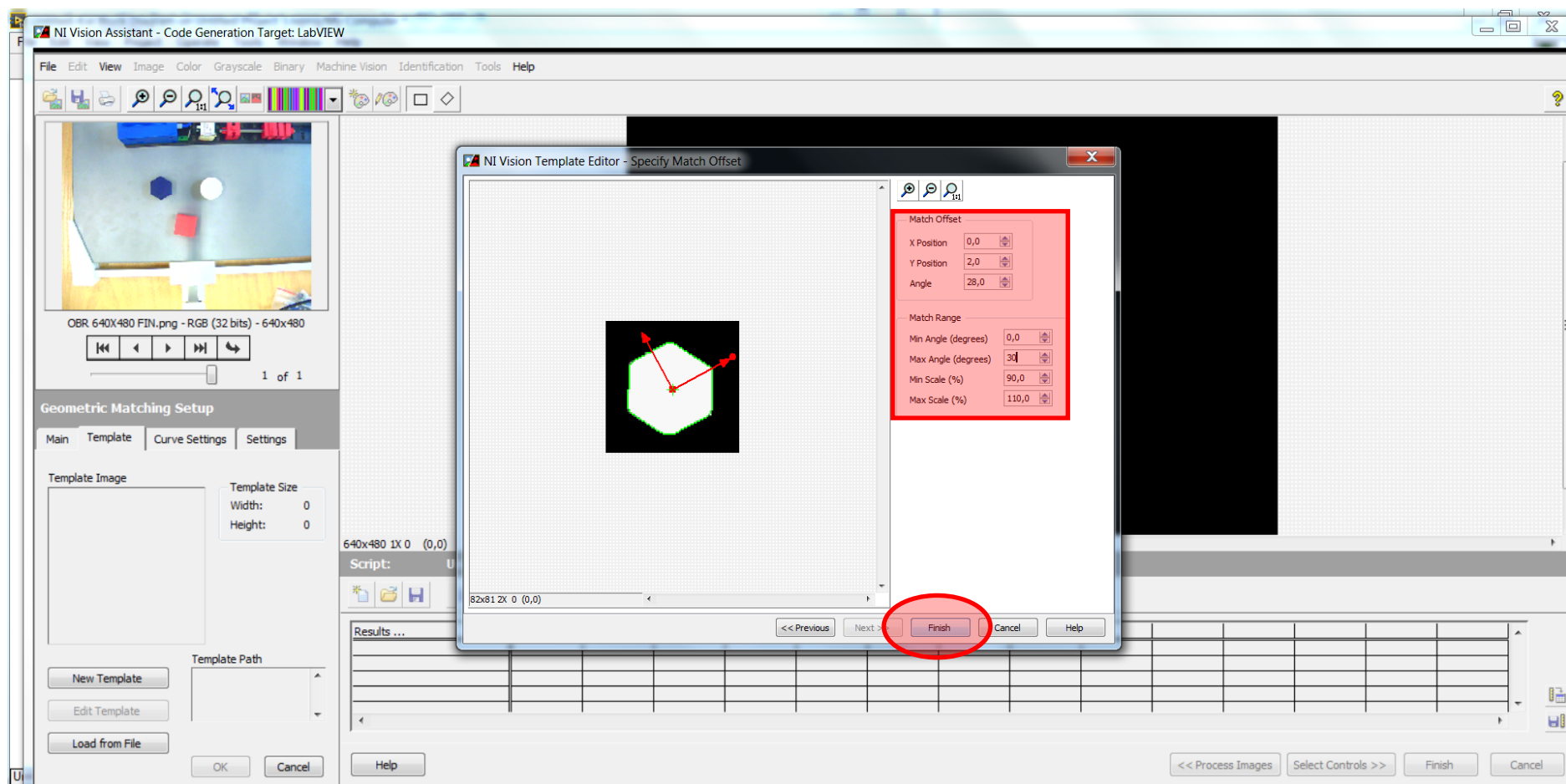
Nastavení: Extraction Mode=Uniform Regions, Row Search Step Size=10, Column Search Step Size=10



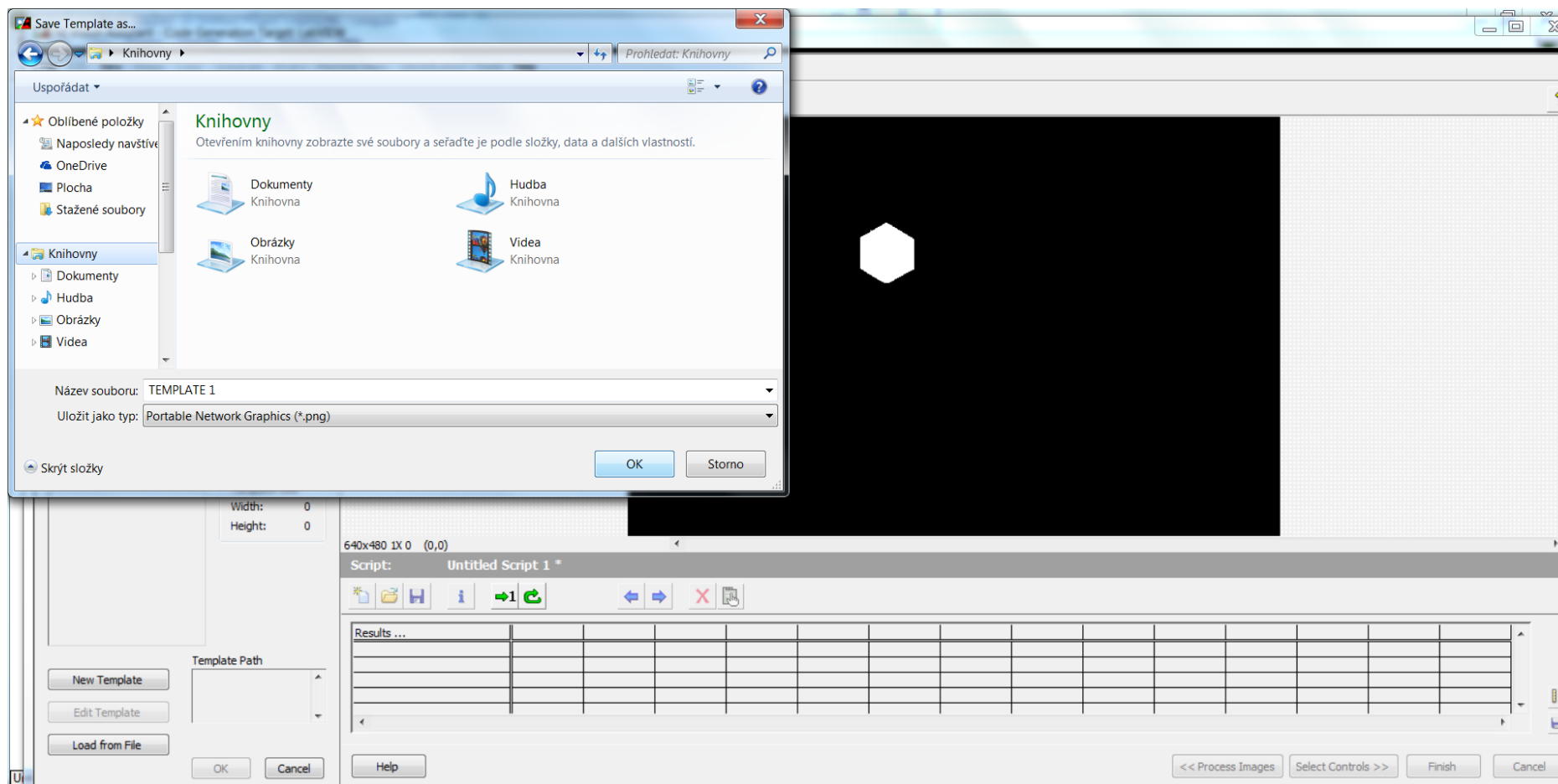
Ponecháme



Nastavení orientace: nastavení souřadného systému, Max Angle=30 (pro šestiúhelník)



Uložit Template do složky projektu



Settings: Rotated/Max=30

The screenshot shows the NI Vision Assistant interface. The main window displays an image of a white cube on a dark background, with a red bounding box and rotation angle of 58.0°. The 'Geometric Matching Setup' dialog box is open, with the 'Settings' tab selected. The 'Rotated' checkbox is checked, and the 'Max' value is set to 30. The 'OK' button is highlighted with a red circle.

Number of Matches to Find: 1
Minimum Score: 800
Subpixel Accuracy:
Contrast Reversal: Original
Search Strategy: Balanced

Search for Matches that are

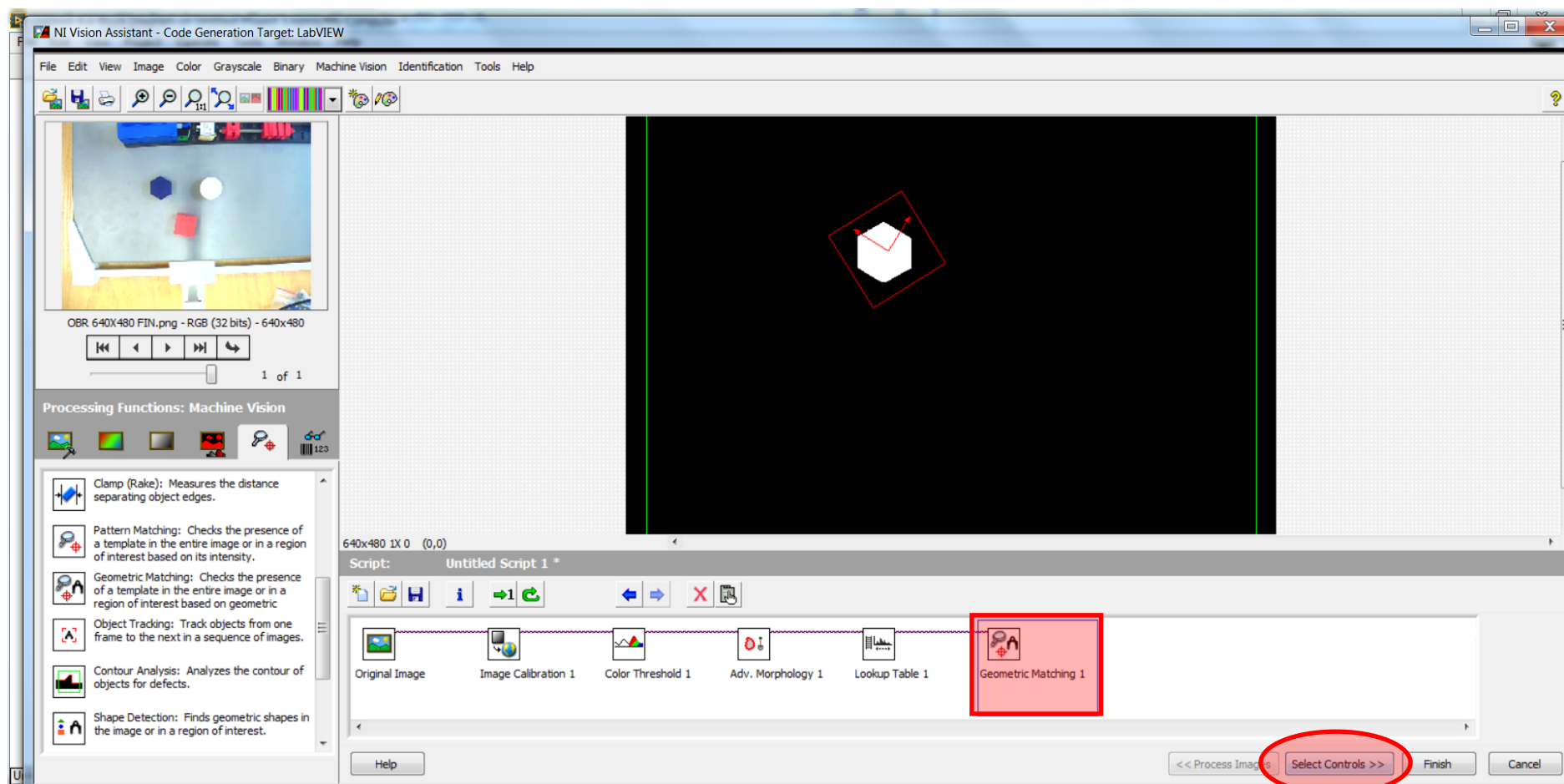
		Min	Max
<input checked="" type="checkbox"/>	Rotated	Range 1	0 30
<input type="checkbox"/>	Rotated	Range 2	0 360
<input type="checkbox"/>	Scaled	Range	90 110
<input checked="" type="checkbox"/>	Occluded	Range	0 25

Algorithm: Edge Based

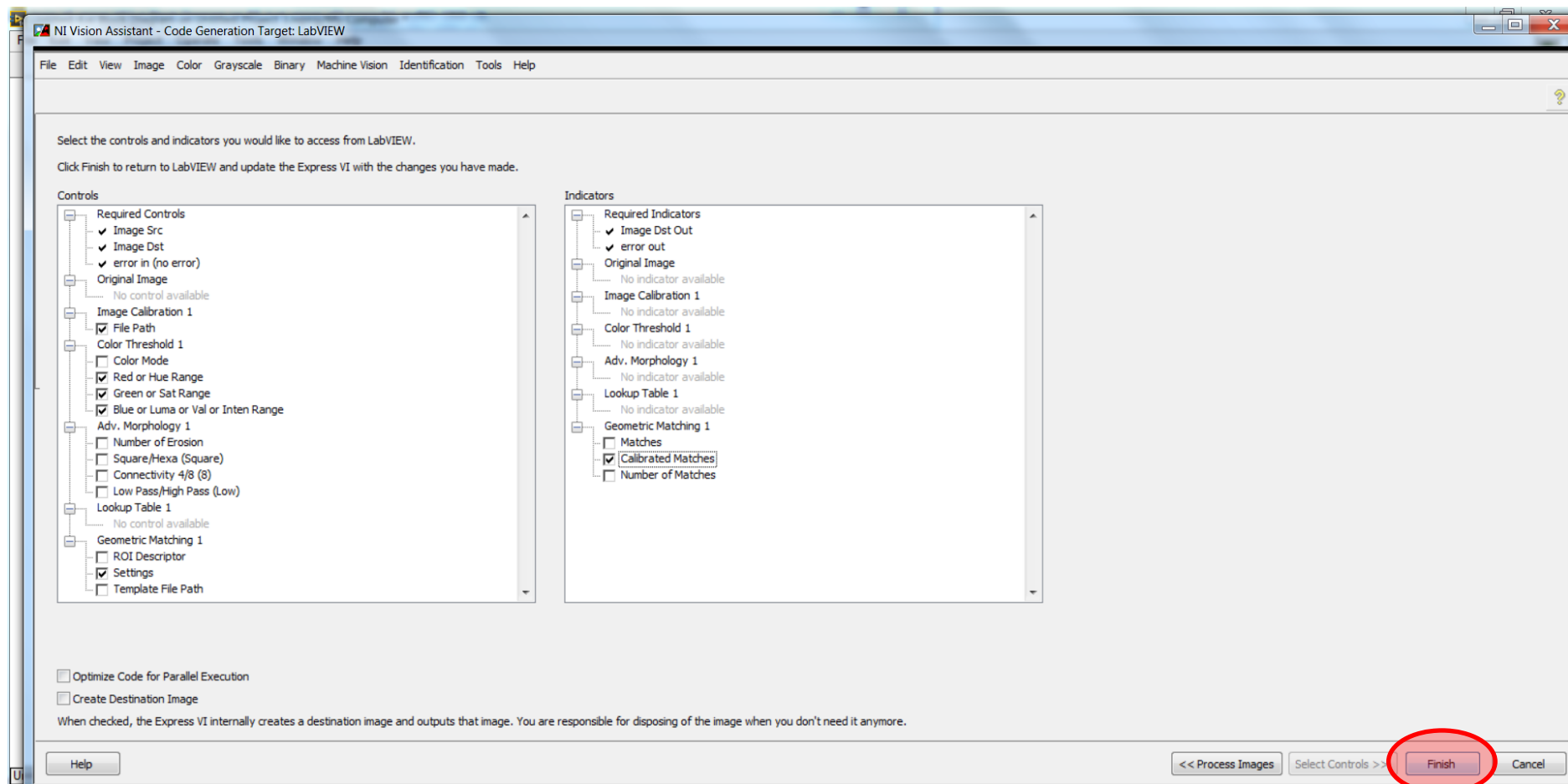
Results ...

	1
X Position	257,81
Y Position	166,12
X Position (mm)	45,54
Y Position (mm)	53,57
Angle	58,00

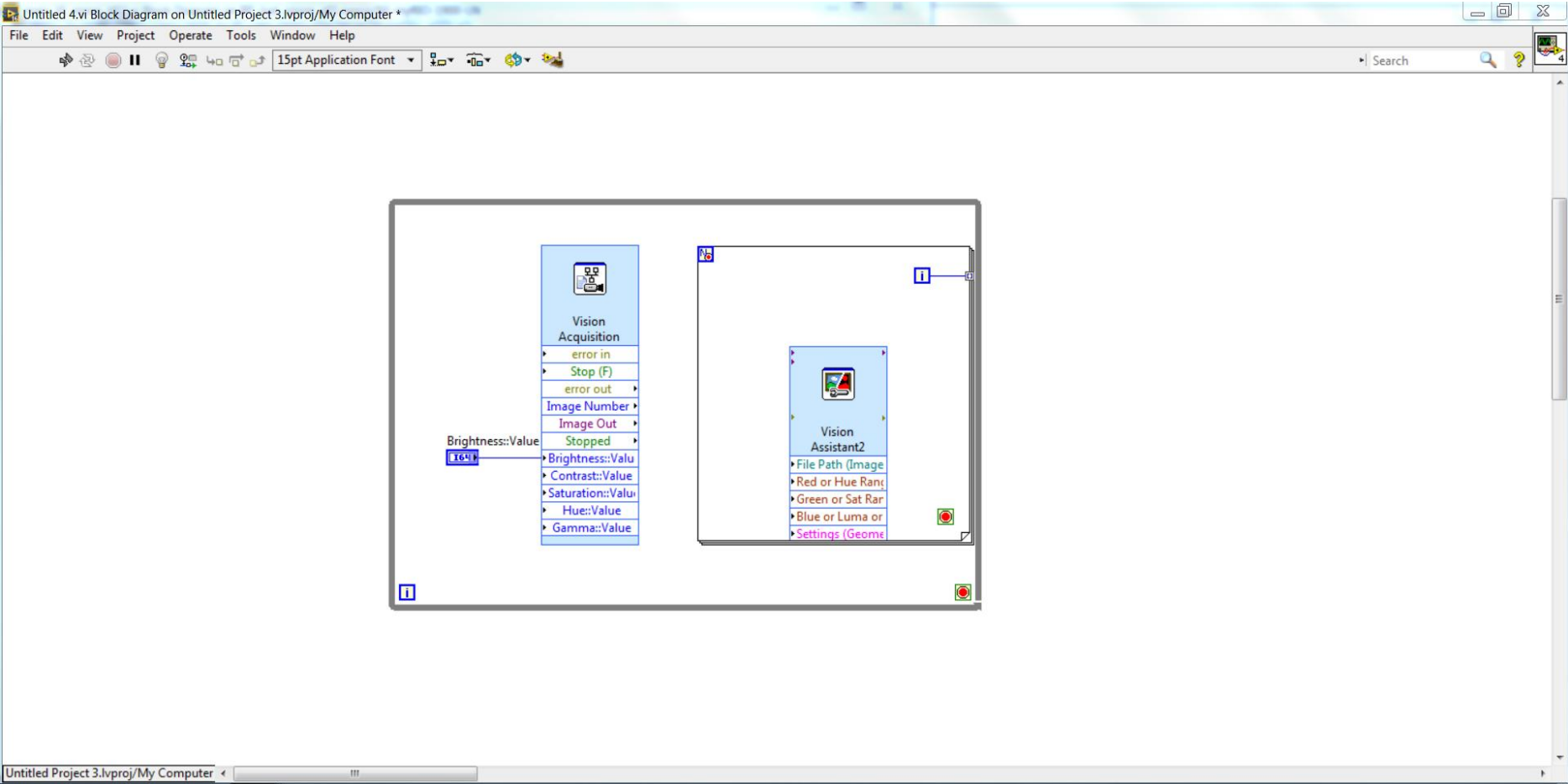
Nastavit vstupy a výstupy: Select Controls



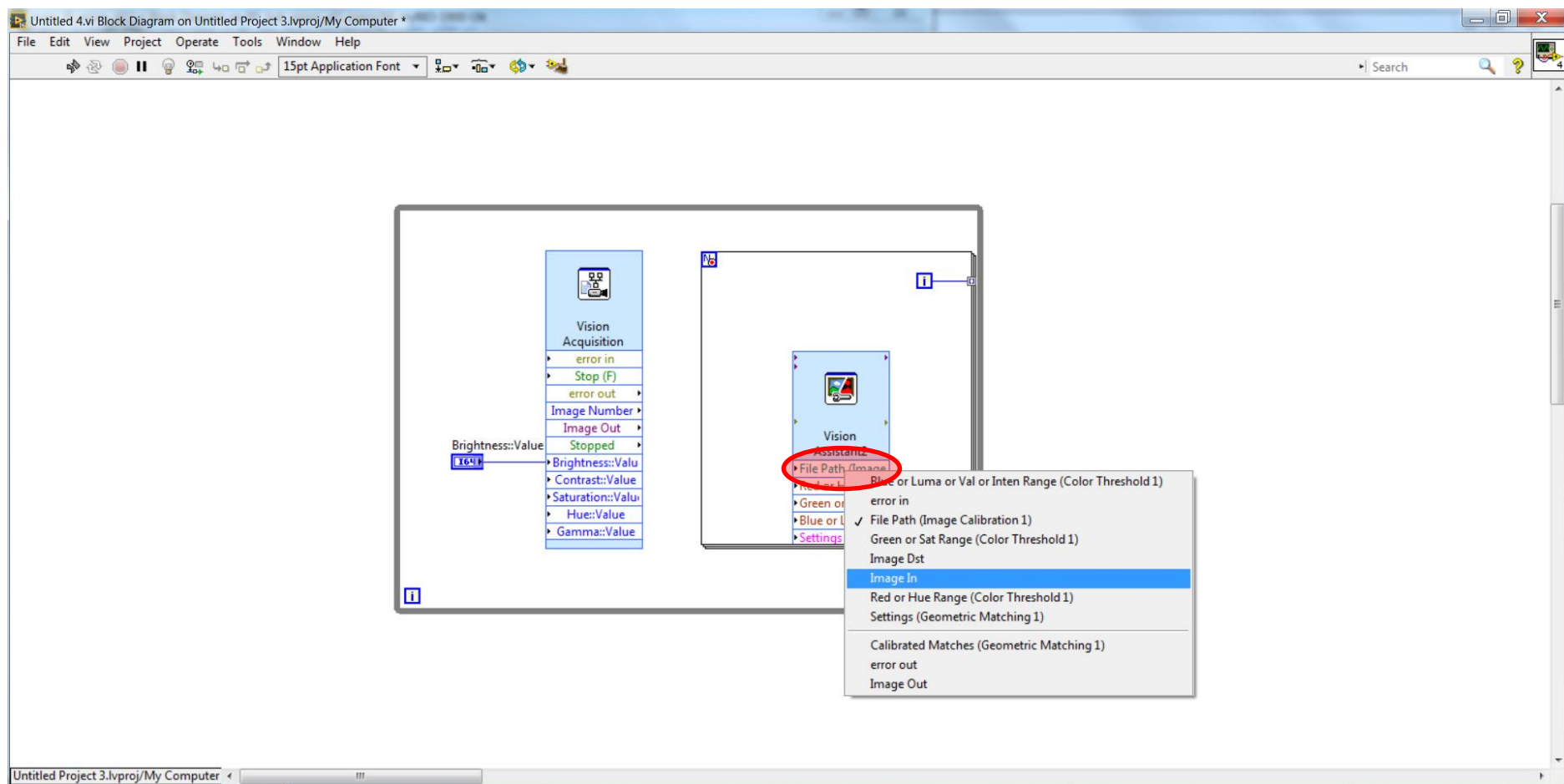
Zaškrtnout požadované vstupy a výstupy VA



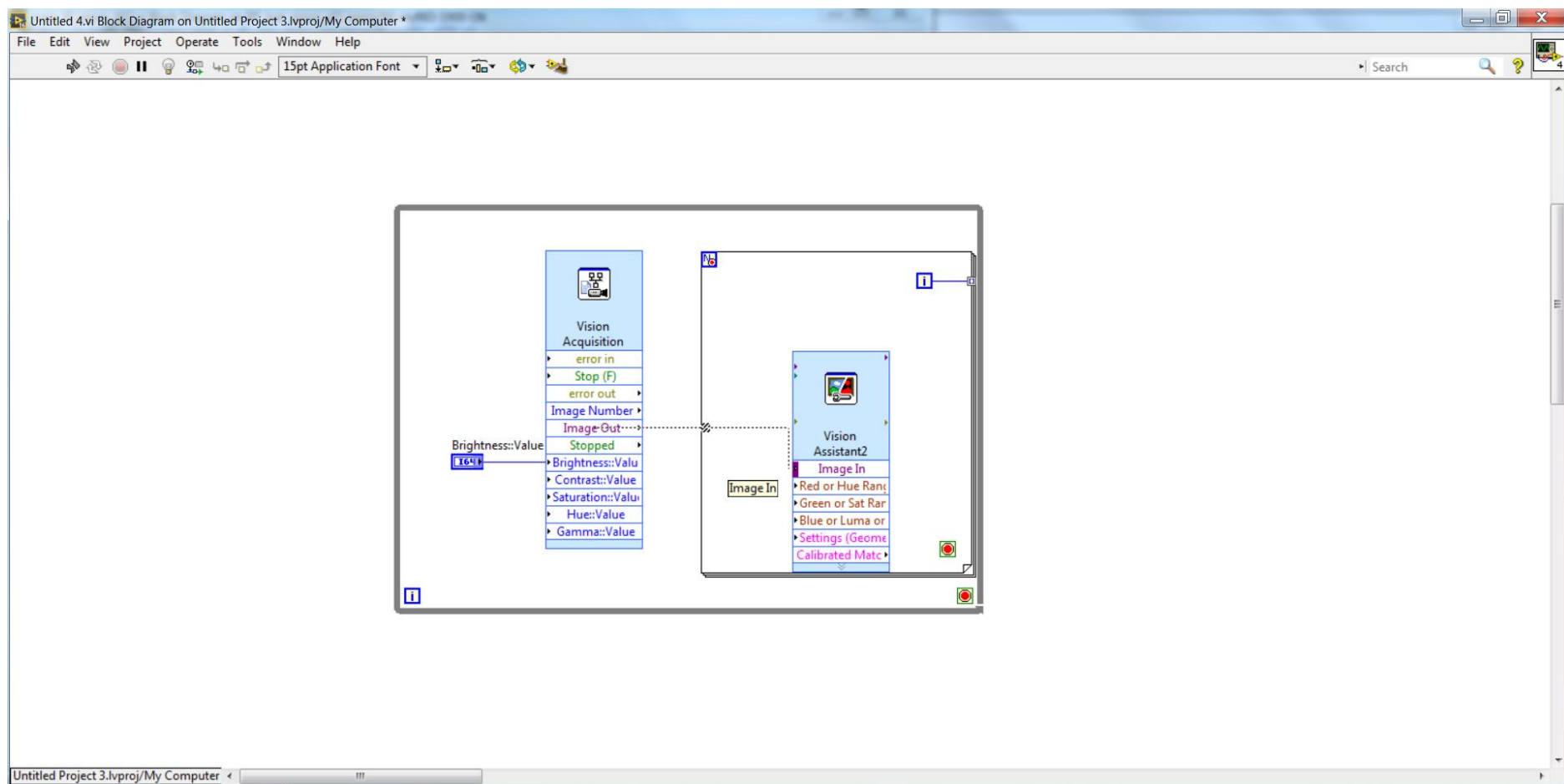
Blok VA v Block Diagramu



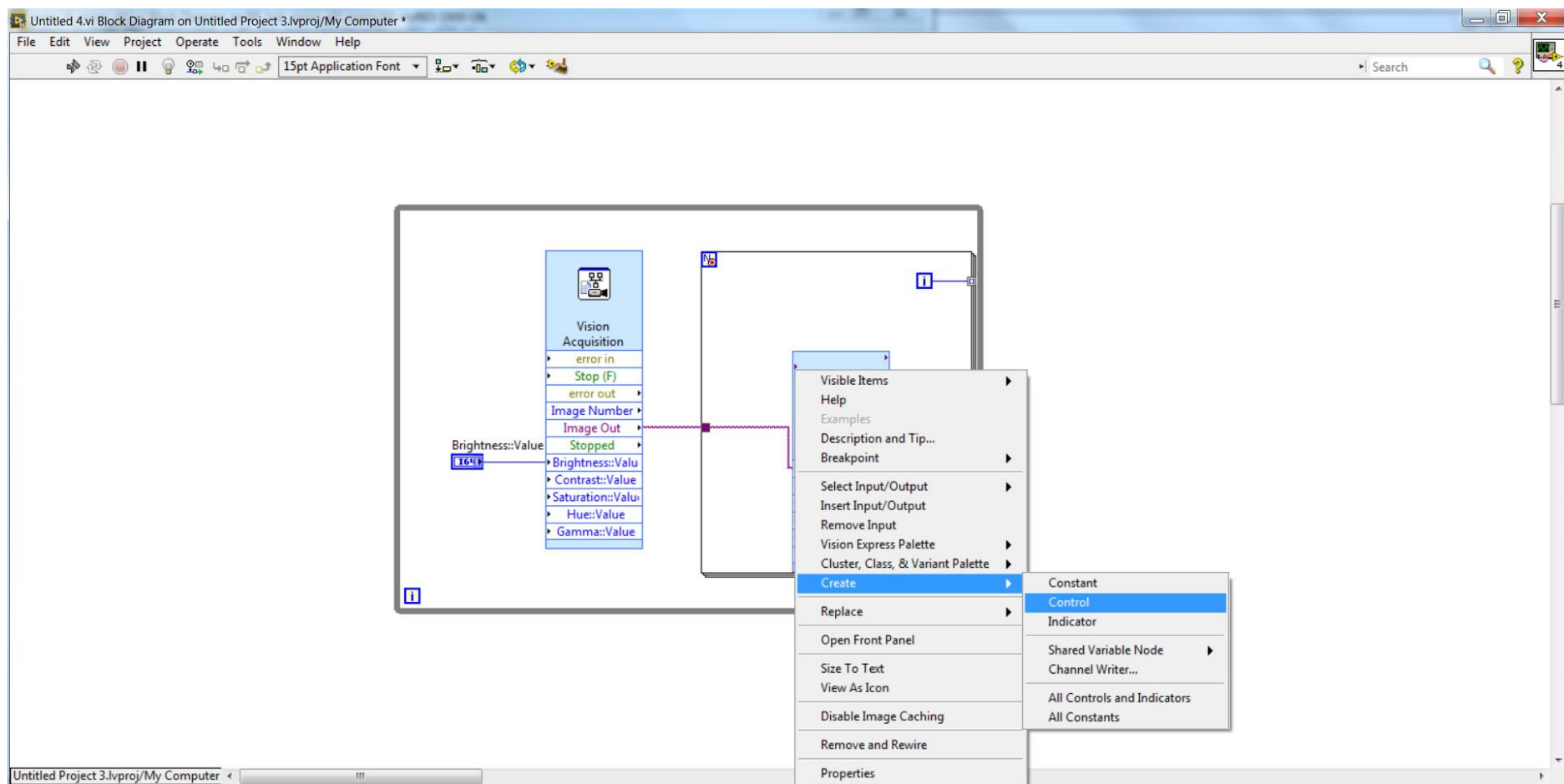
Zařazení vstupu Image In na první pozici: levý klik na kartu prvního vstupu - Image In



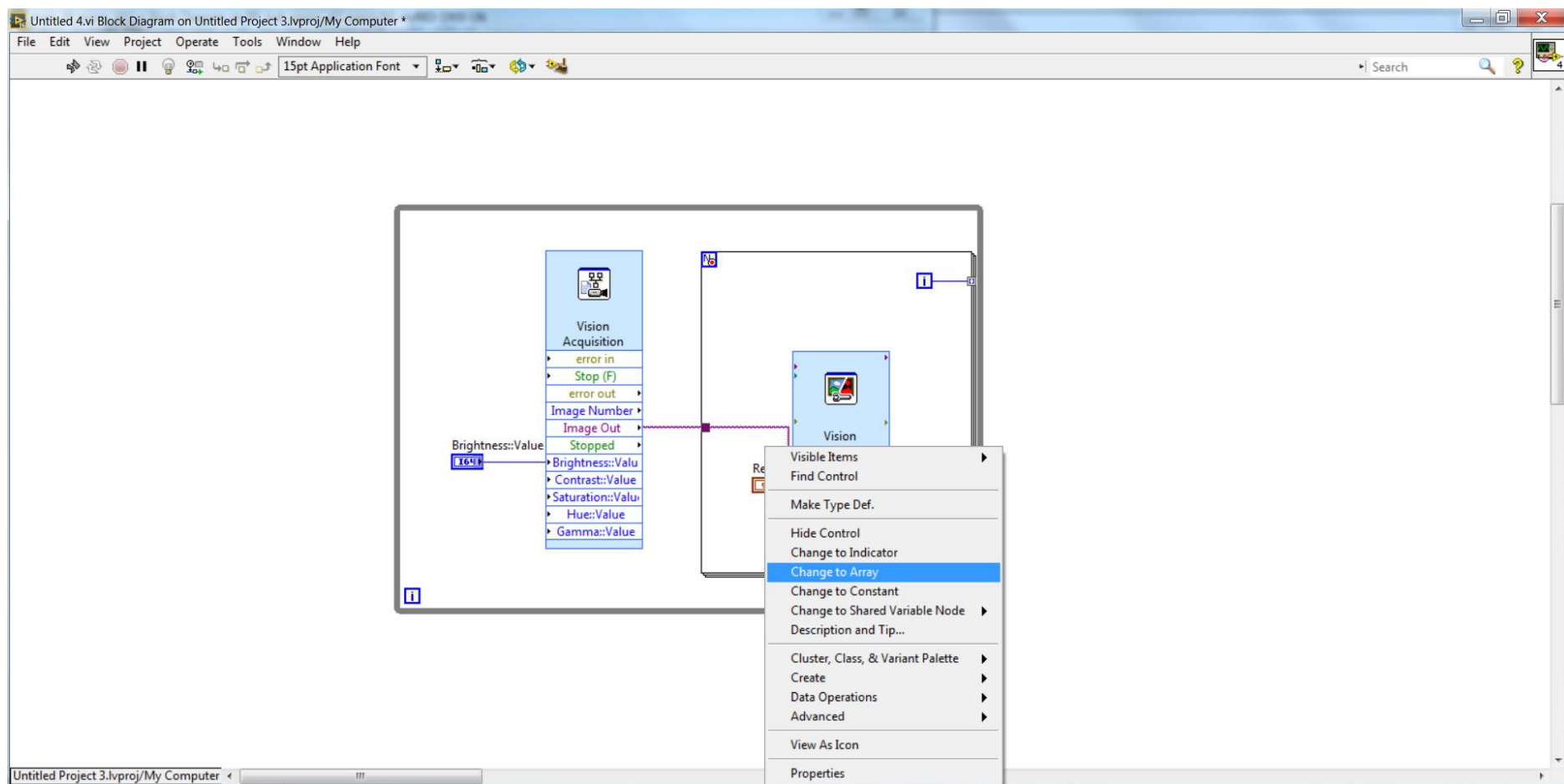
Propojení Image Out s Image In: levý klik na šipku výstupu Image Out a tažení k šipce vstupu Image In



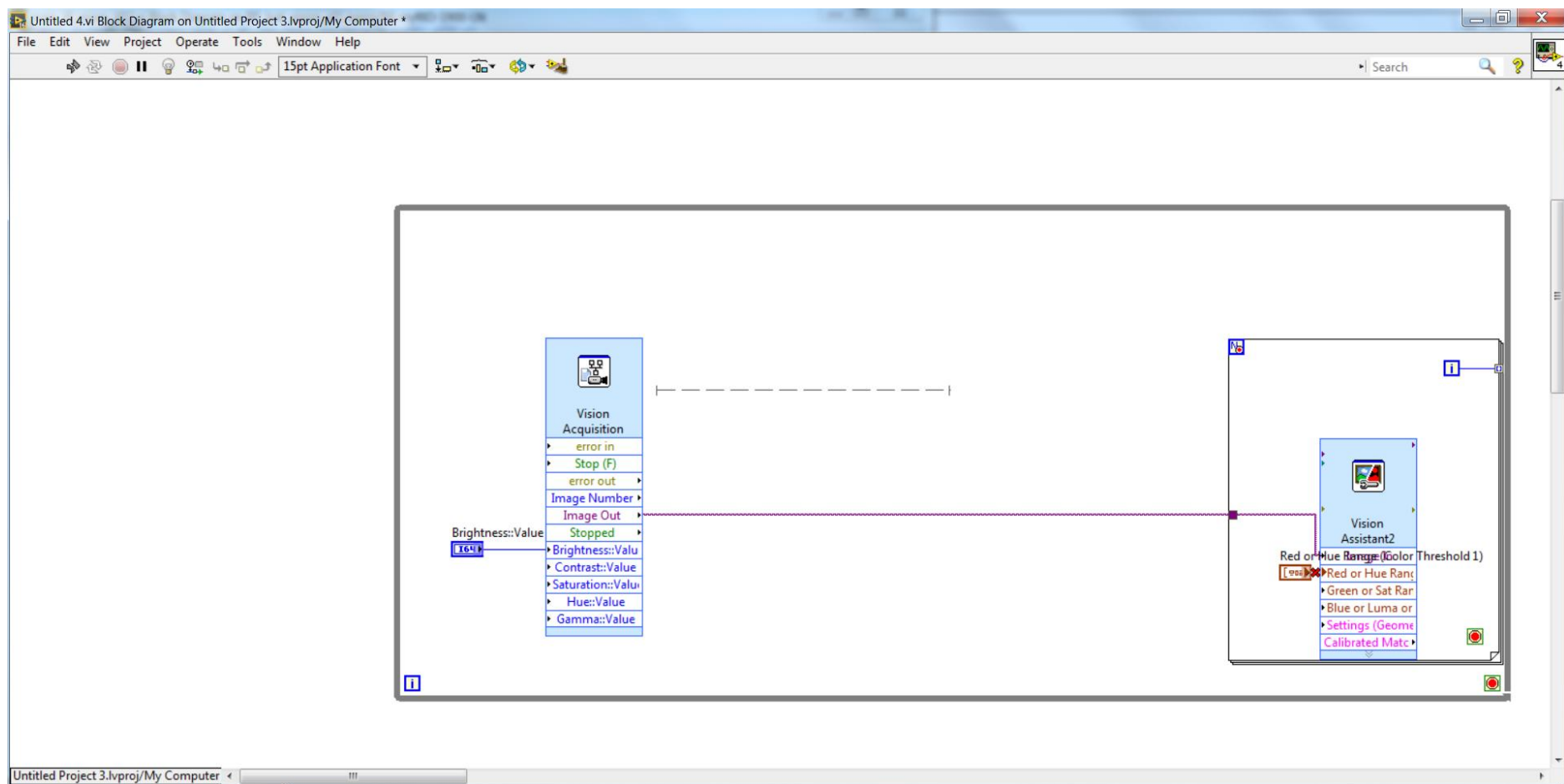
Vytvořit Control na vstup Red or Hue Range: pravý klik na šipku vstupu - Create/Control



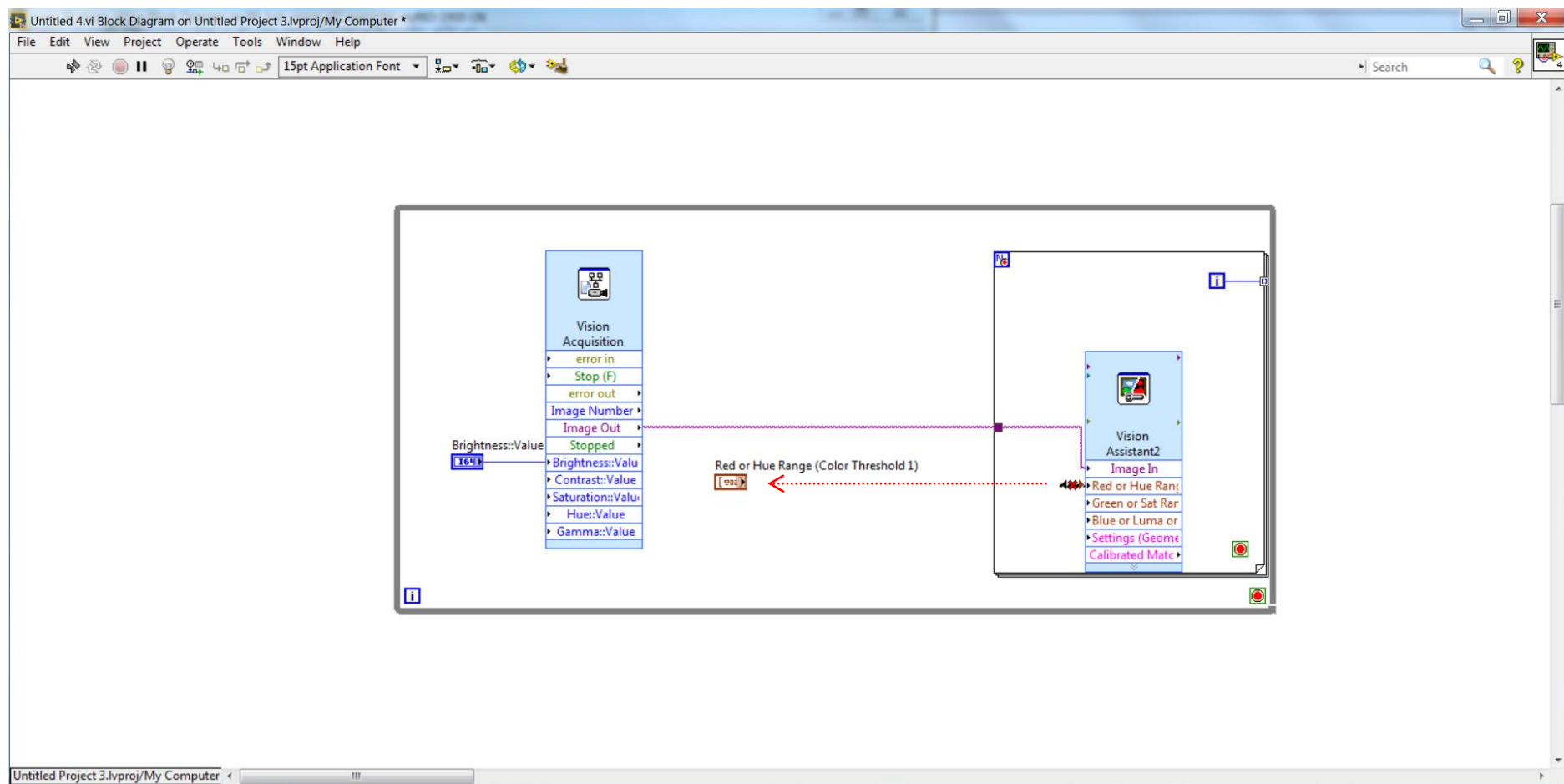
Změnit Control na Array: pravý klik na Control - Change to Array



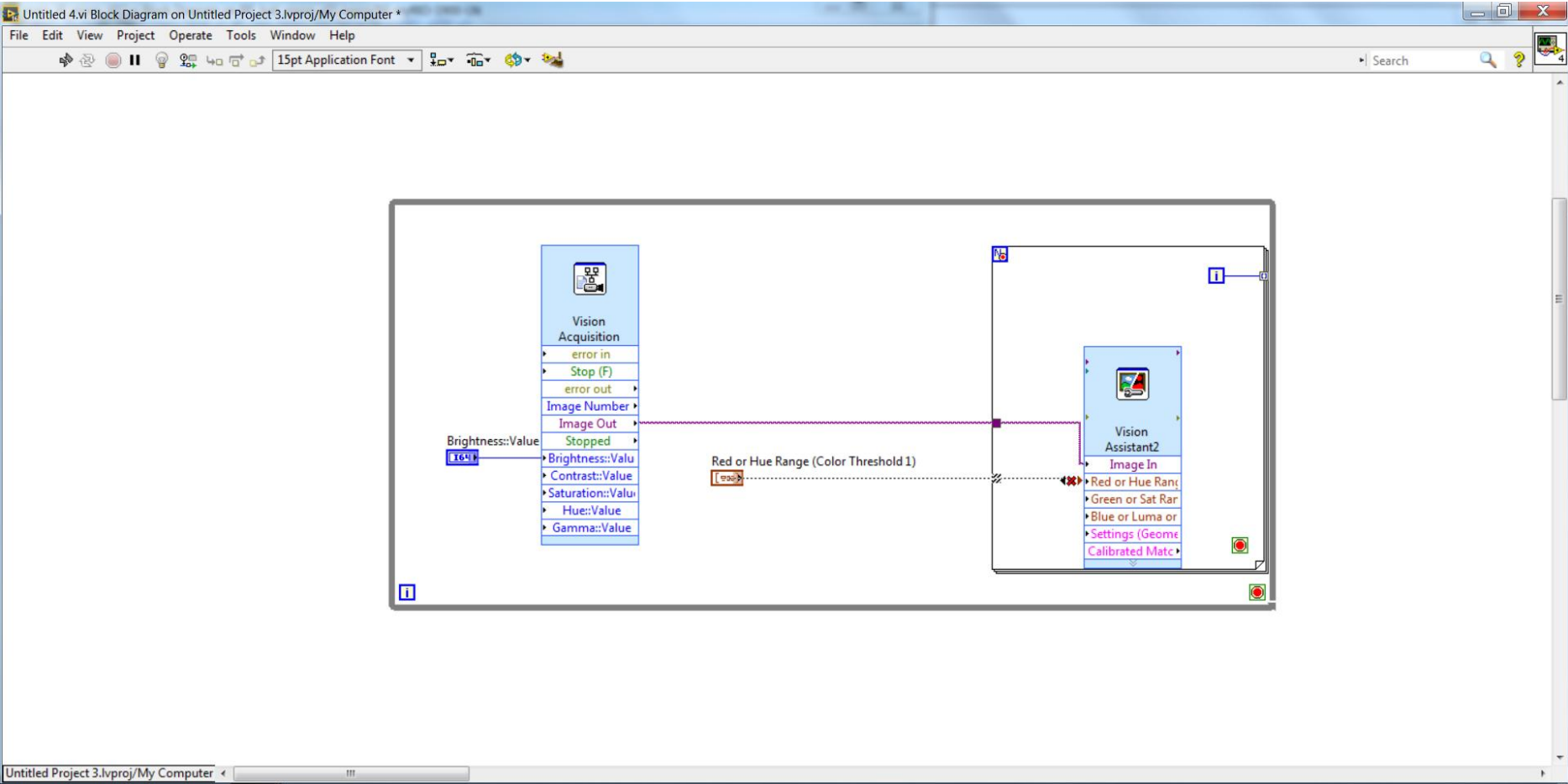
Roztažení blokového schématu: ctrl+levý klik a tažení



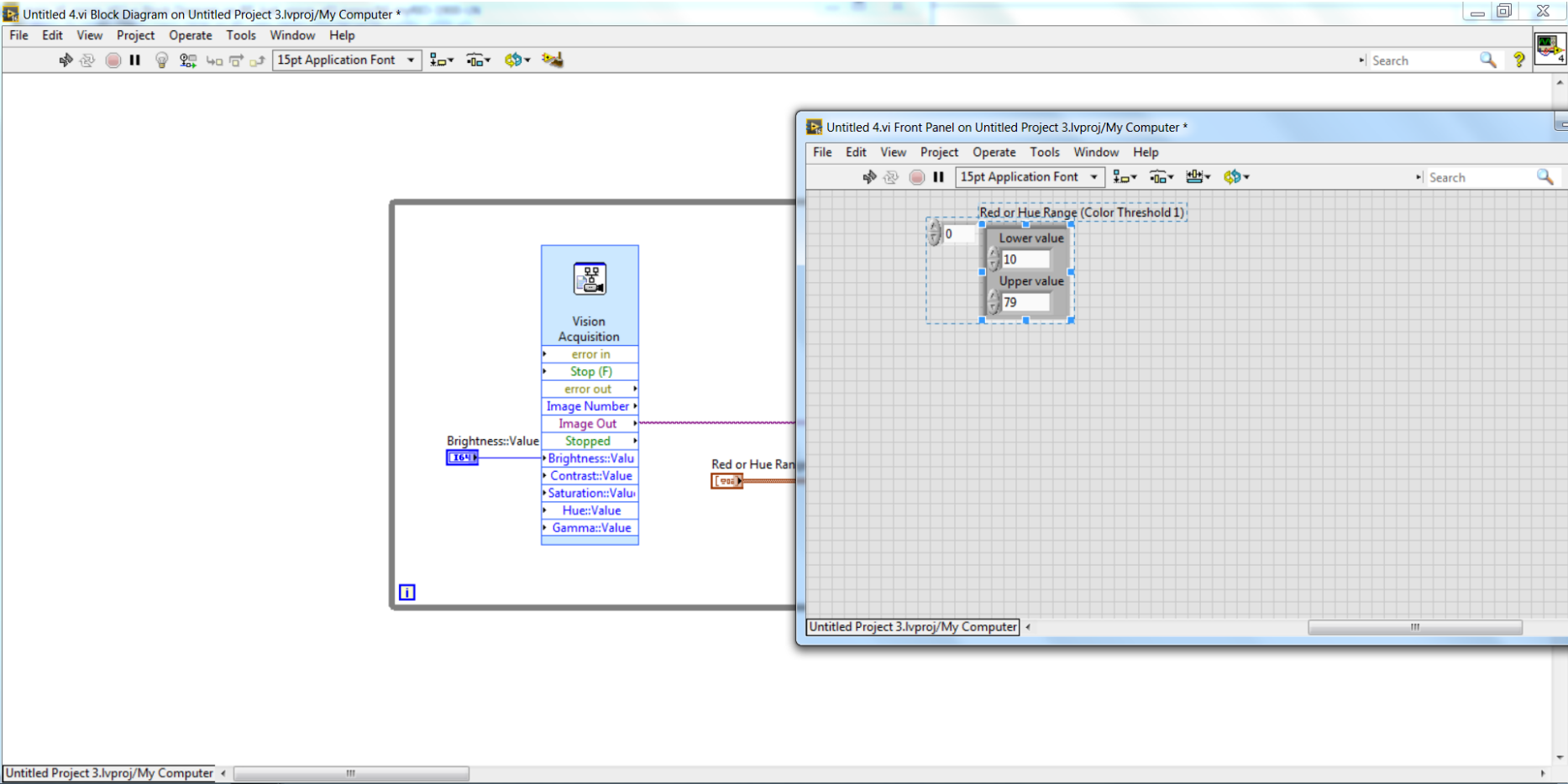
Vytažení Array z For Loop smyčky



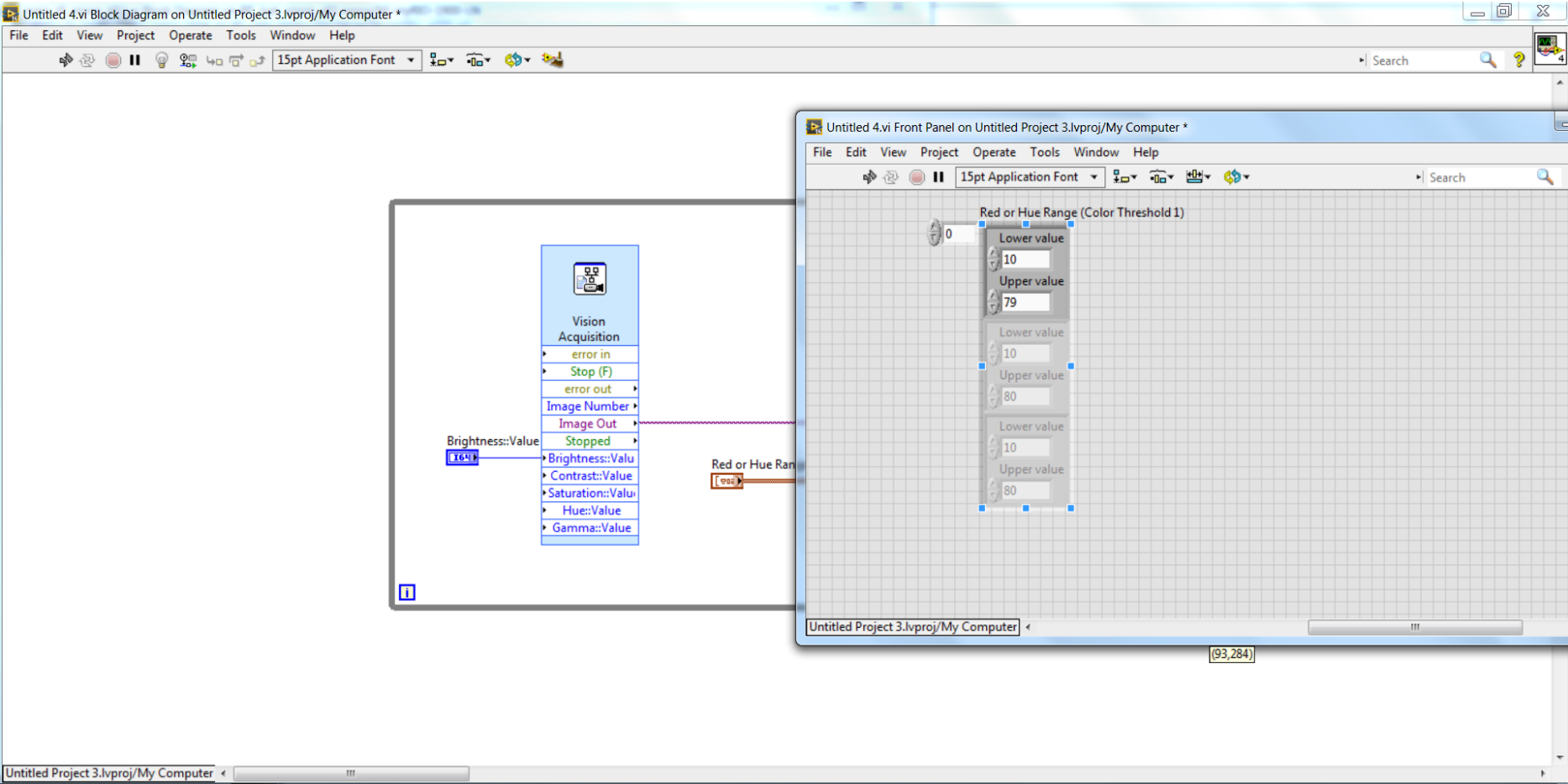
Připojení Array ke vstupu Red or Hue Range přes rámec smyčky kdy vznikne Tunnel na přechodu



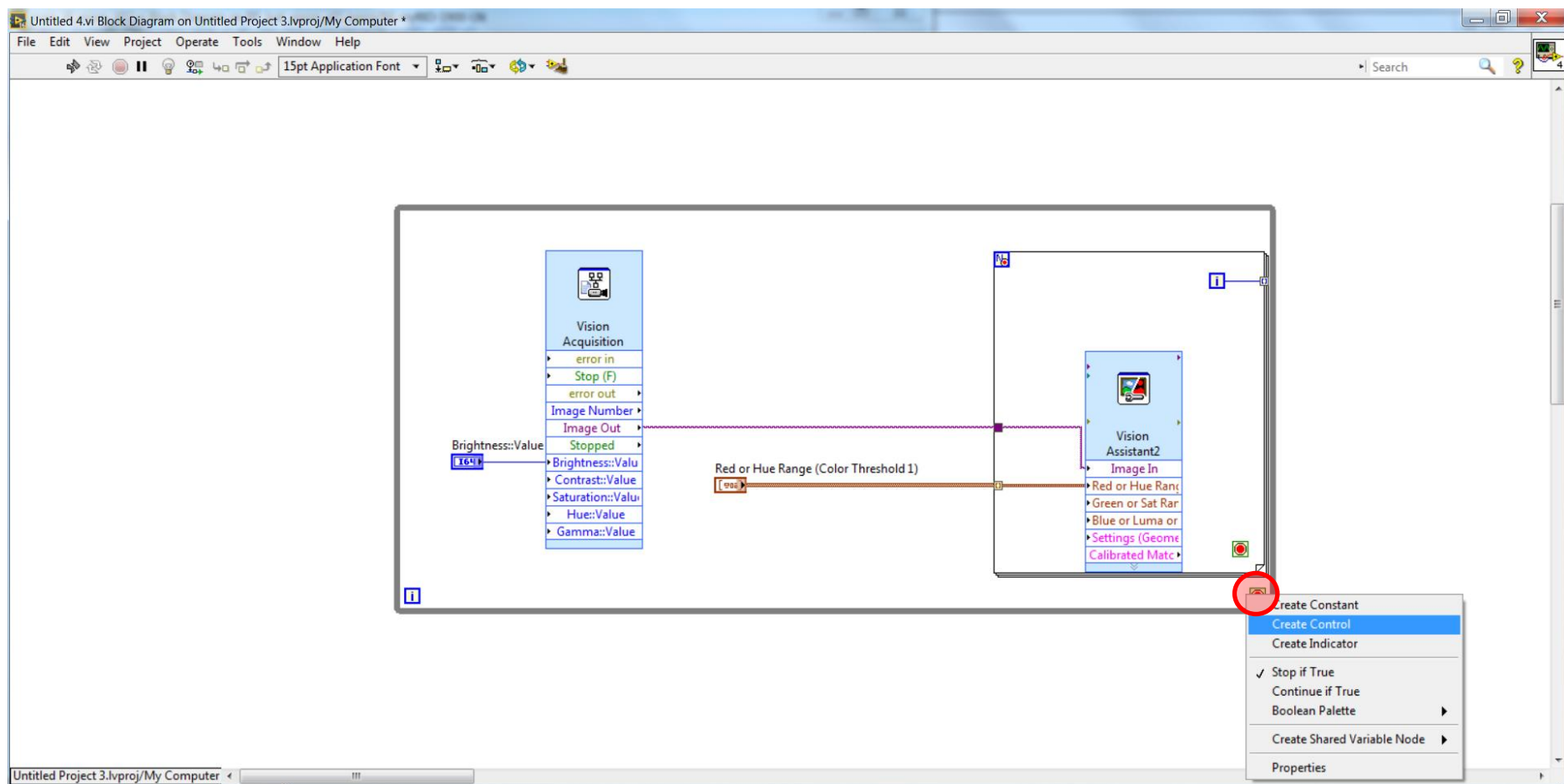
Pravý dvojklik na Array otevře jeho umístění ve Front Panelu



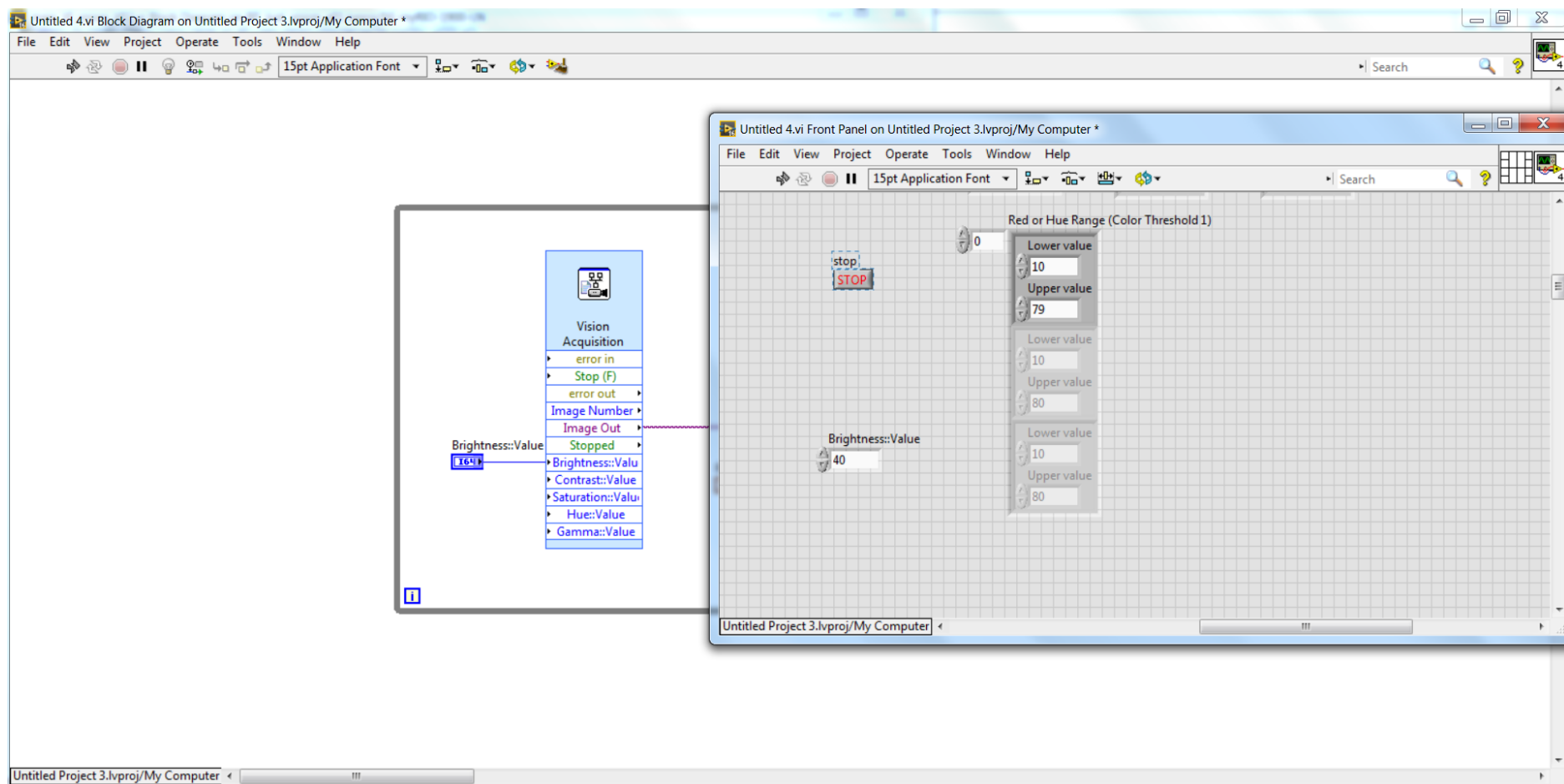
Roztáhneme Array na tříprvkové pole



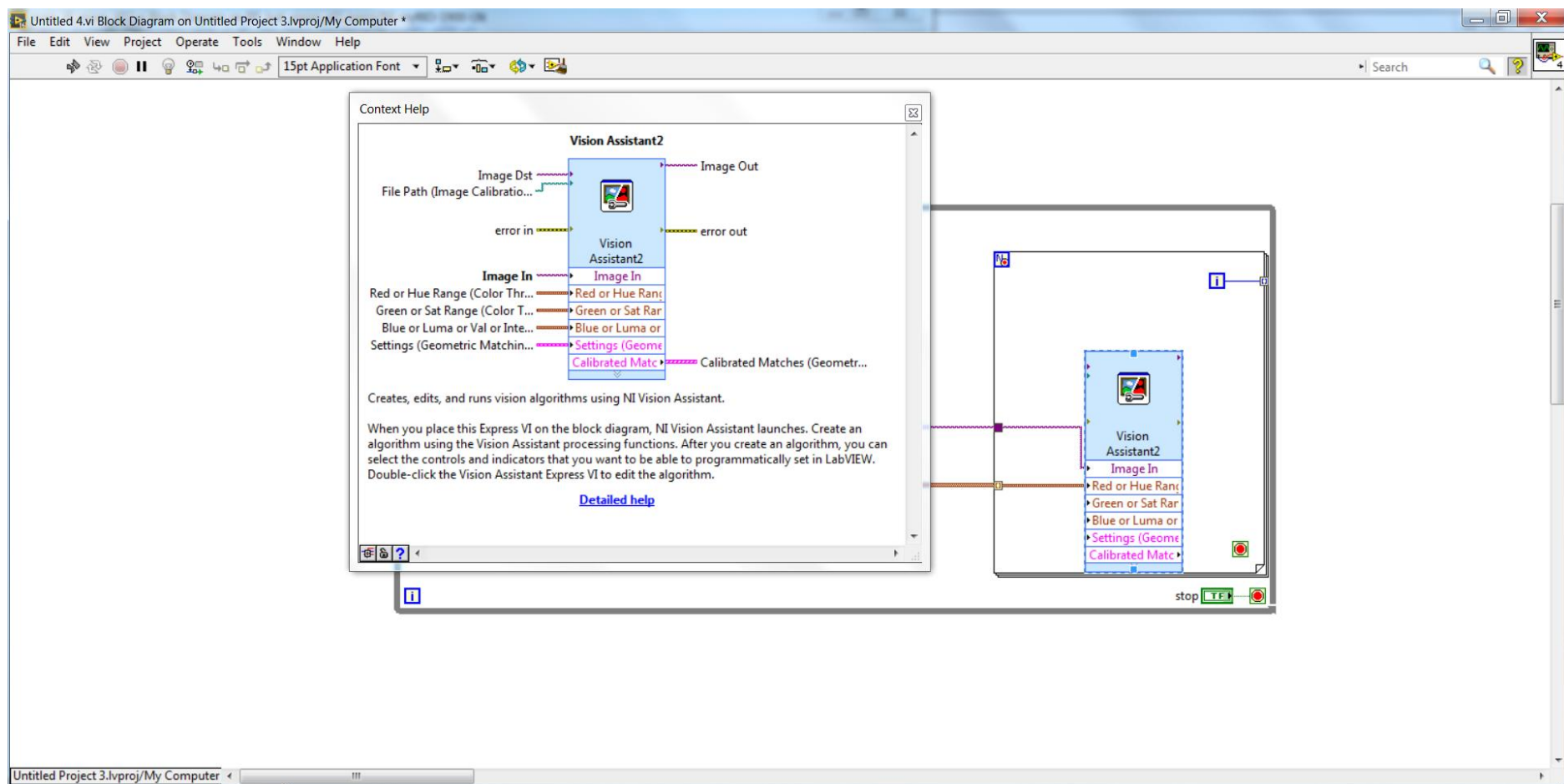
Vytvořit Control pro Loop Condition: pravý klik na Loop Condition - Create Control



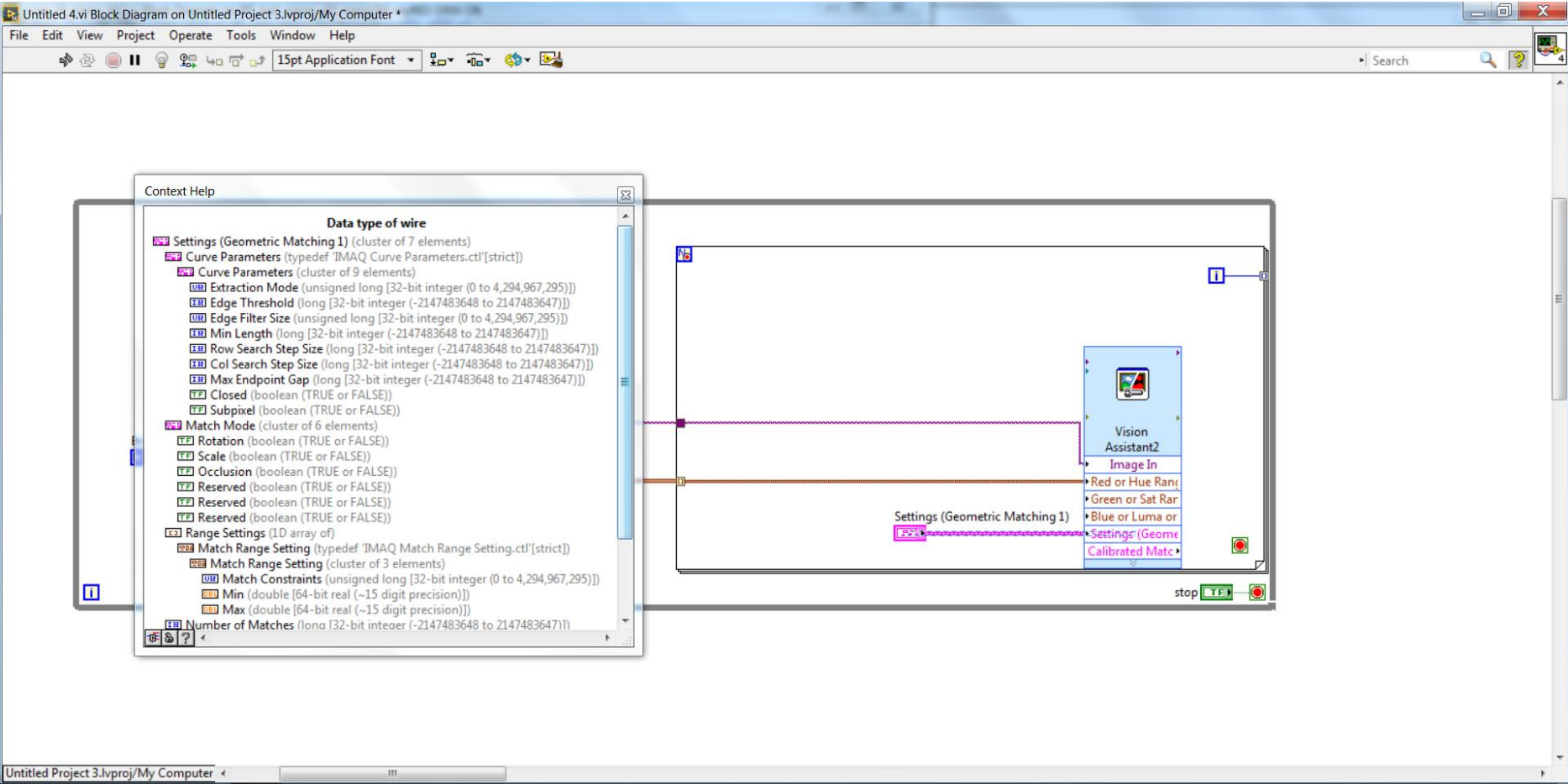
Levý dvojklik na Loop Condition otevře jeho umístění ve Front Panelu



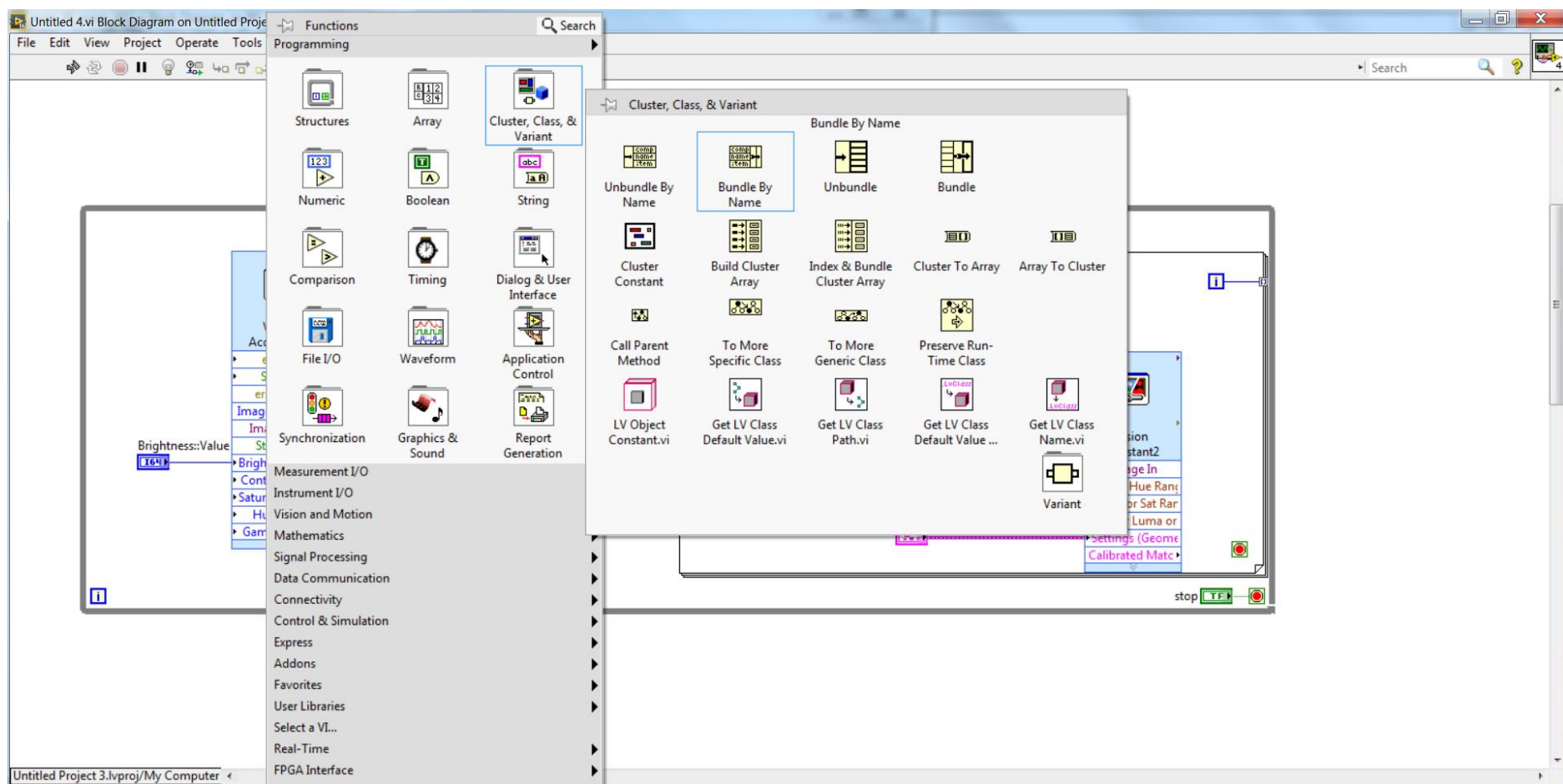
Pro nápovědu označte část blokového schématu a stiskněte ctrl+H



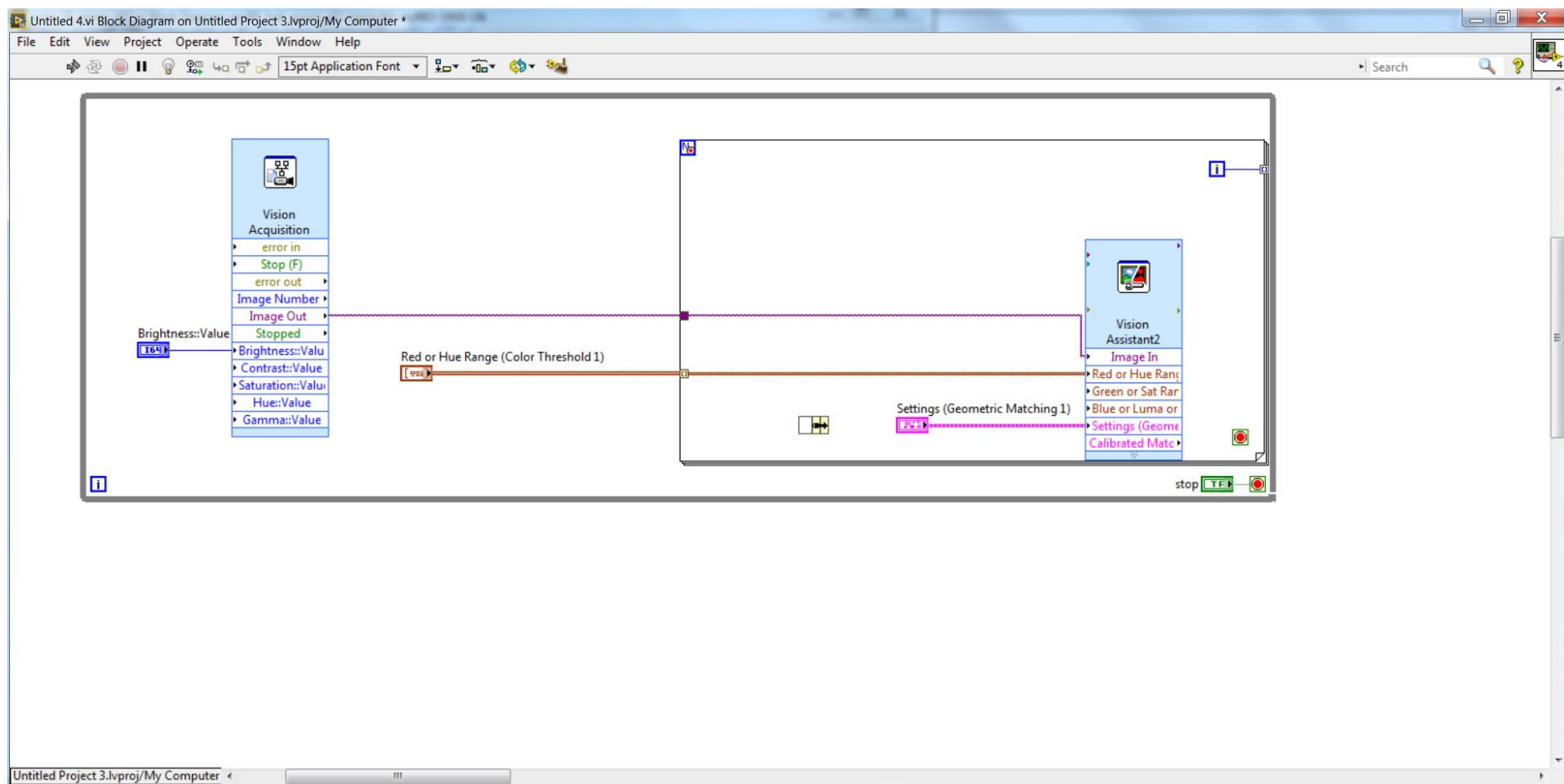
Složení clusteru na vstupu Setting



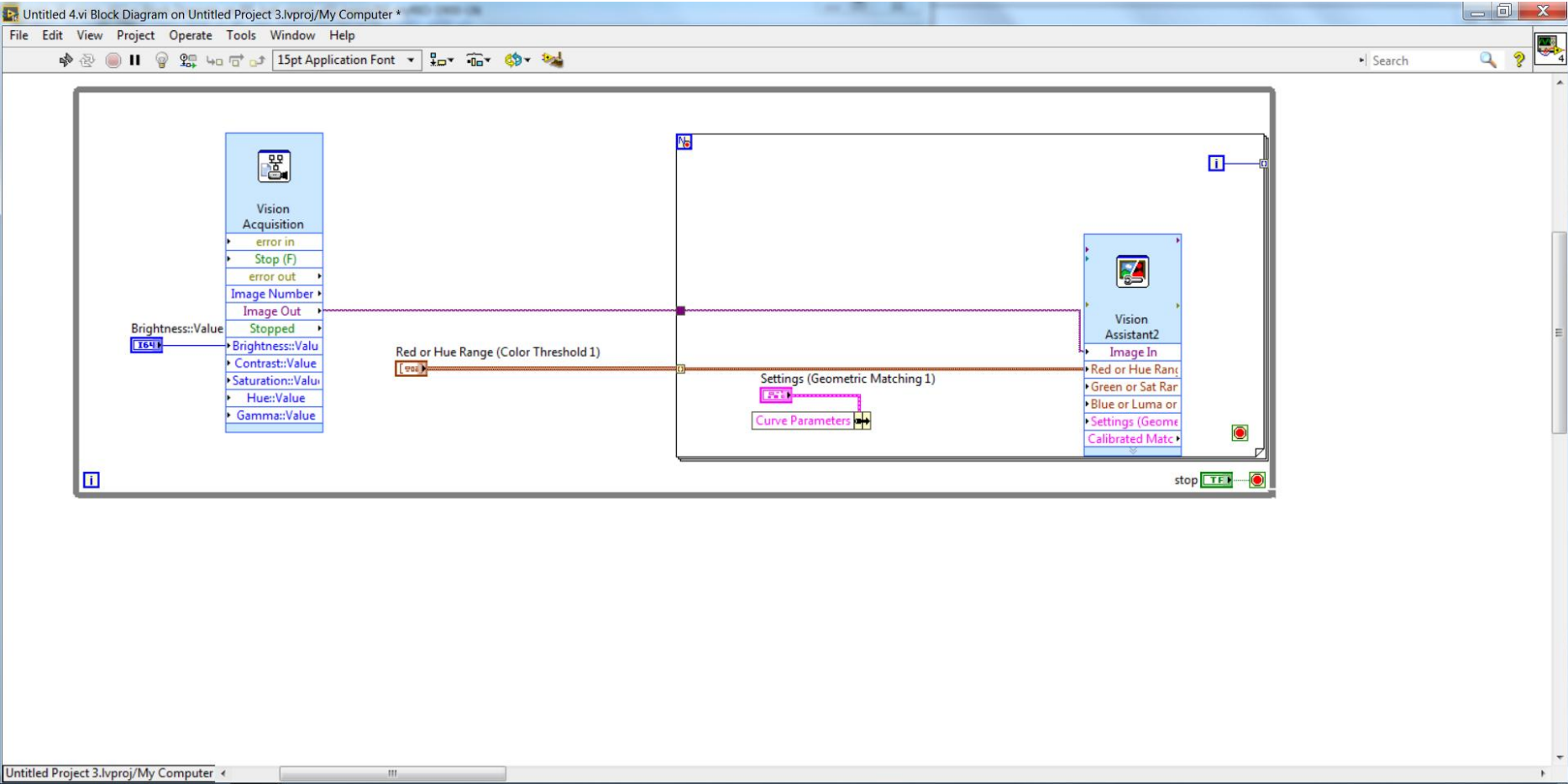
Vložení nástroje Bundle By Name: pravý klik na bílou plochu - Cluster, Class, & Variant/Bundle By Name



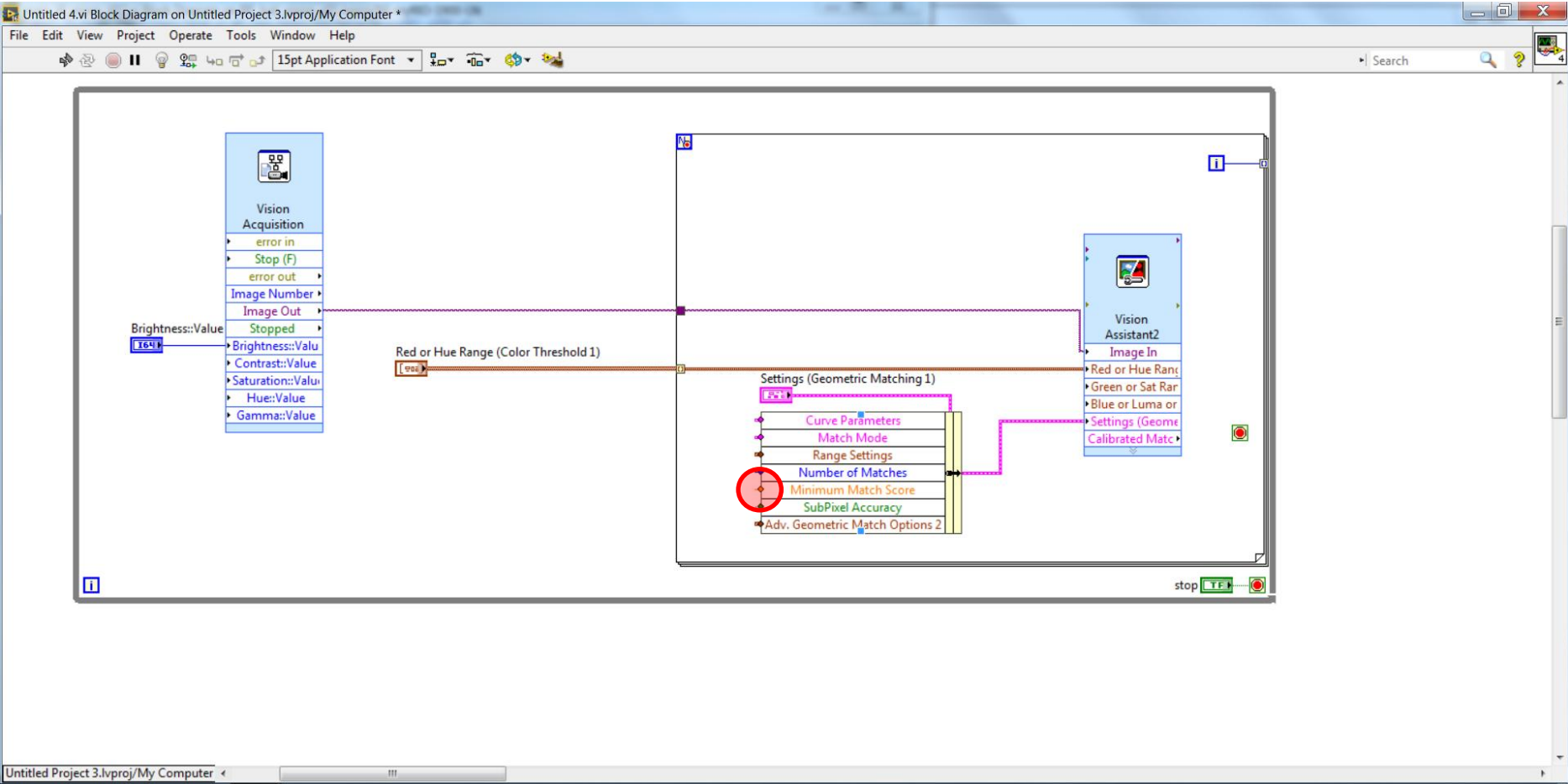
Vložený Bundle



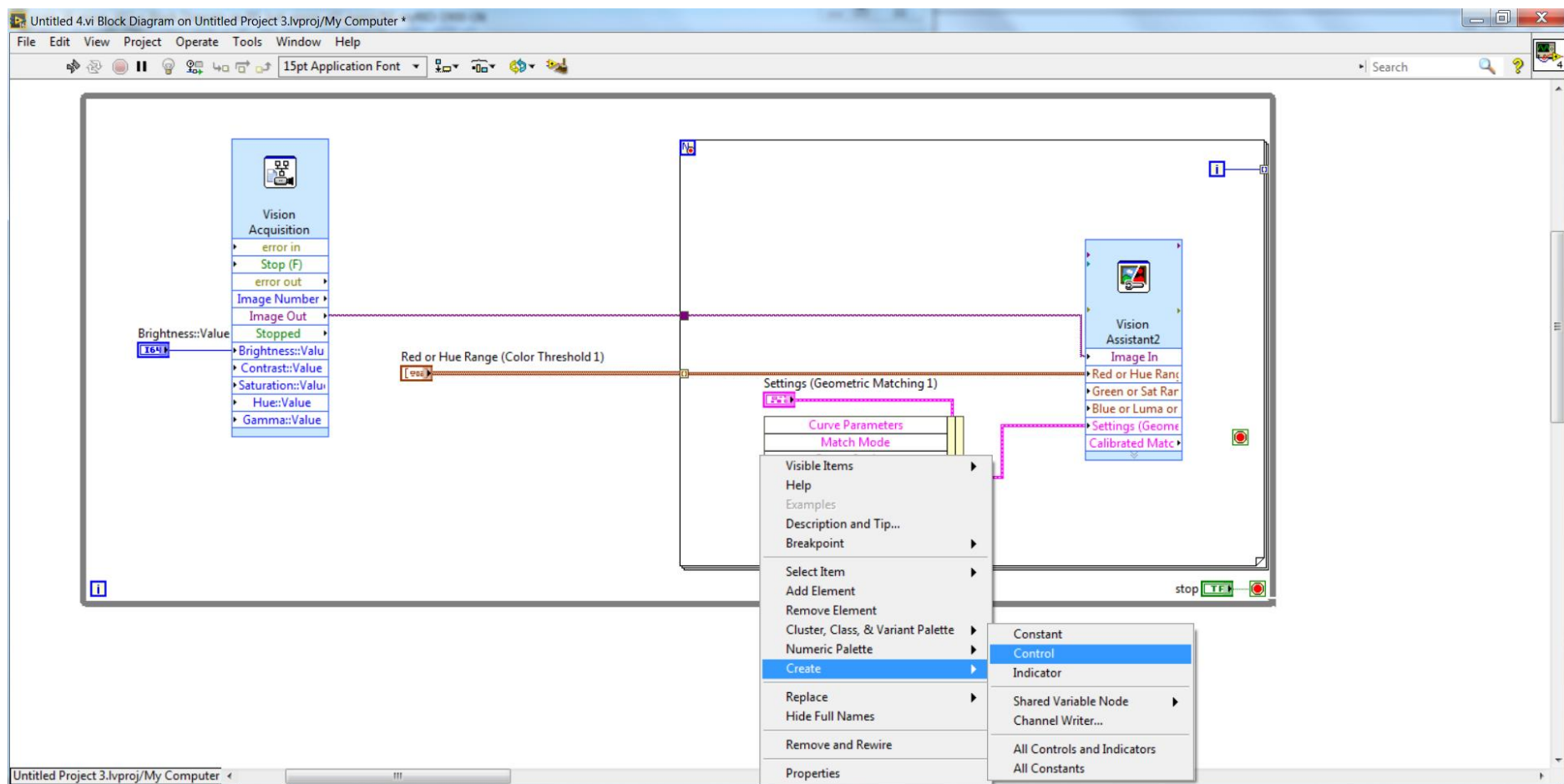
Přepojit Control ze vstupu VA na Bundle



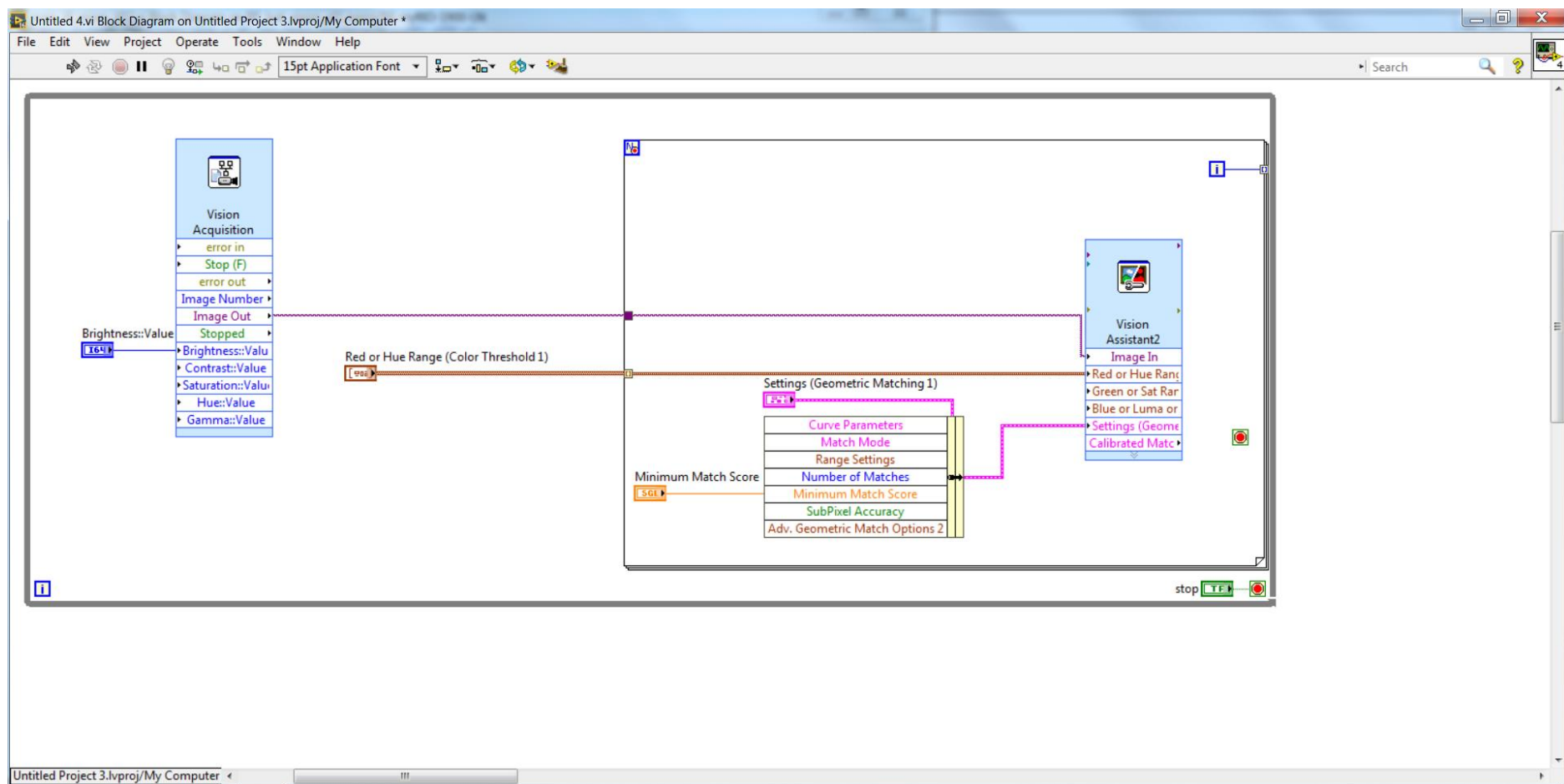
Roztažený Bundle s jednotlivými prvky clusteru



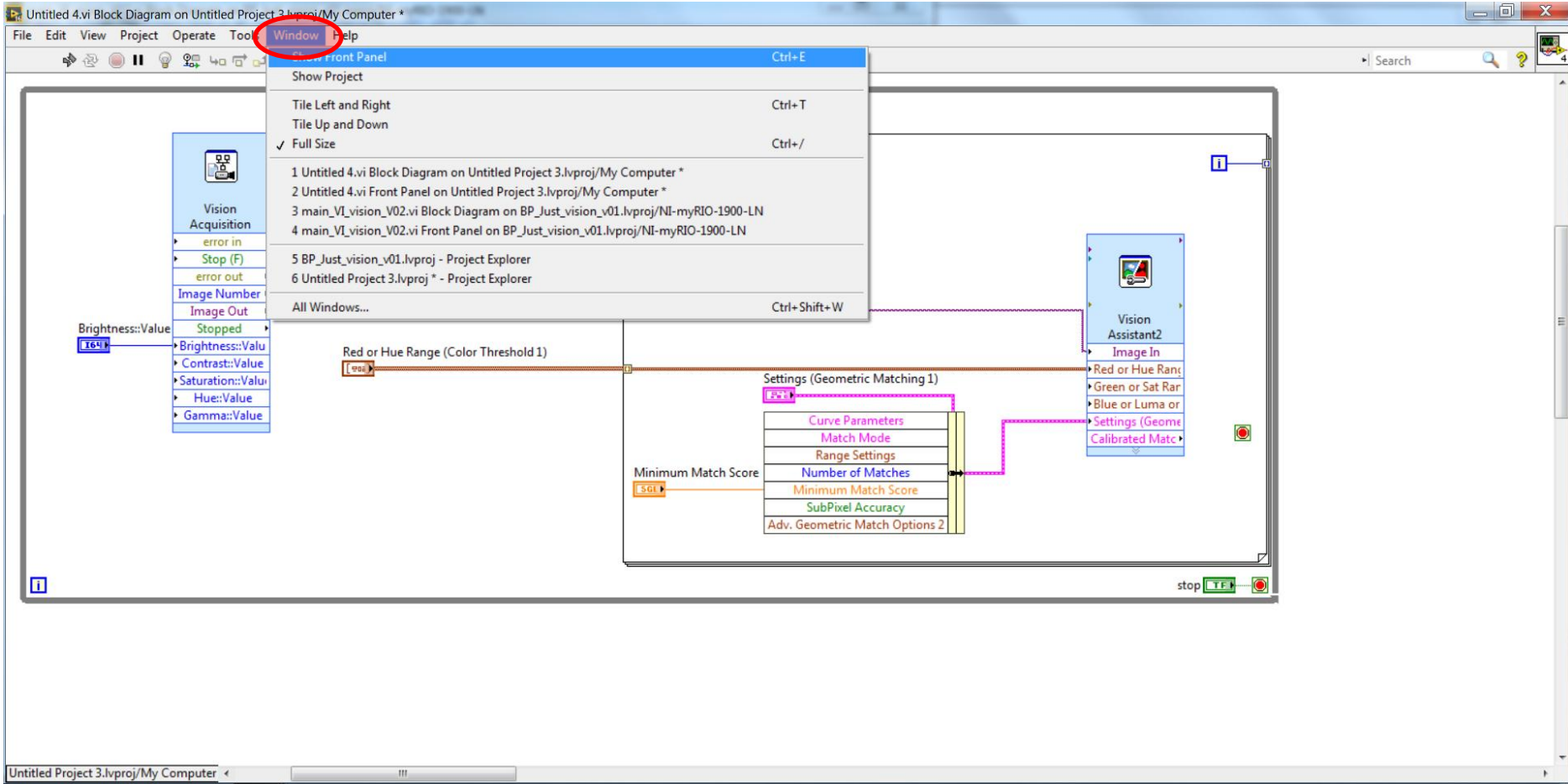
Vytvořit Control pro nastavení Minimum Match Score: pravý klik na vstup - Create/Control



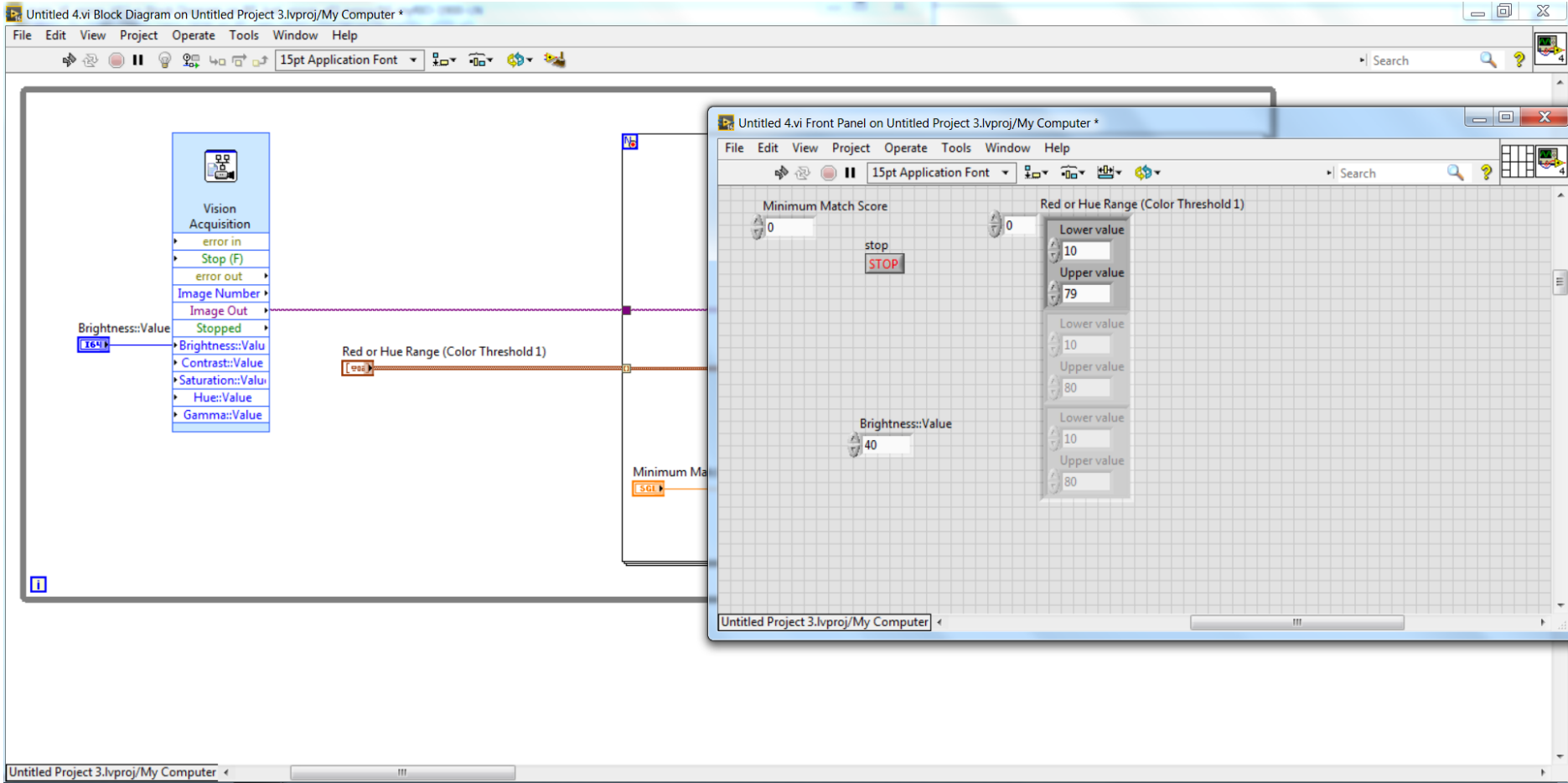
Vytvořený Control pro nastavení Min Score



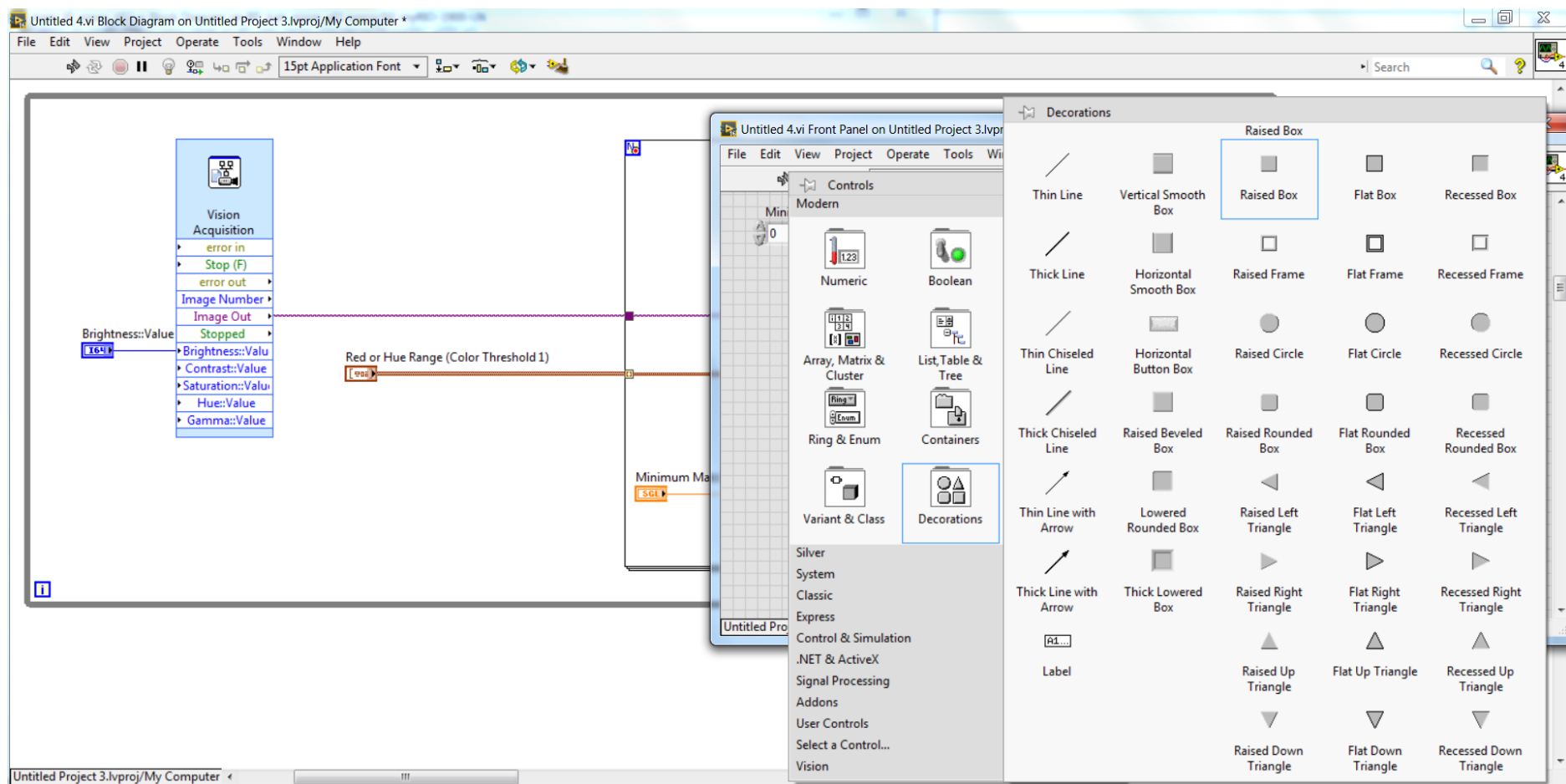
Přepnutí z Block Diagramu do Front Panelu: Window/Show Front Panel



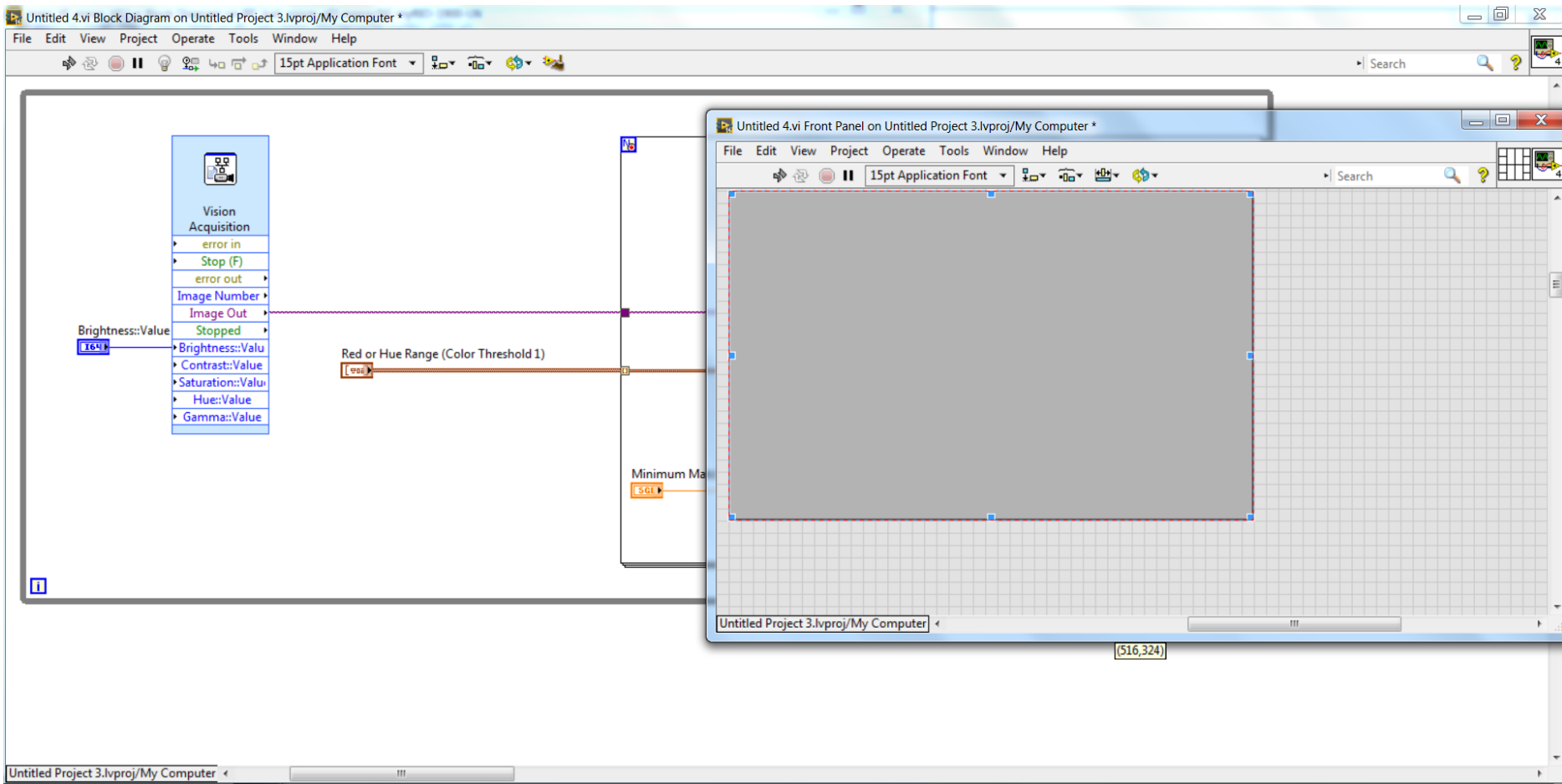
Front Panel



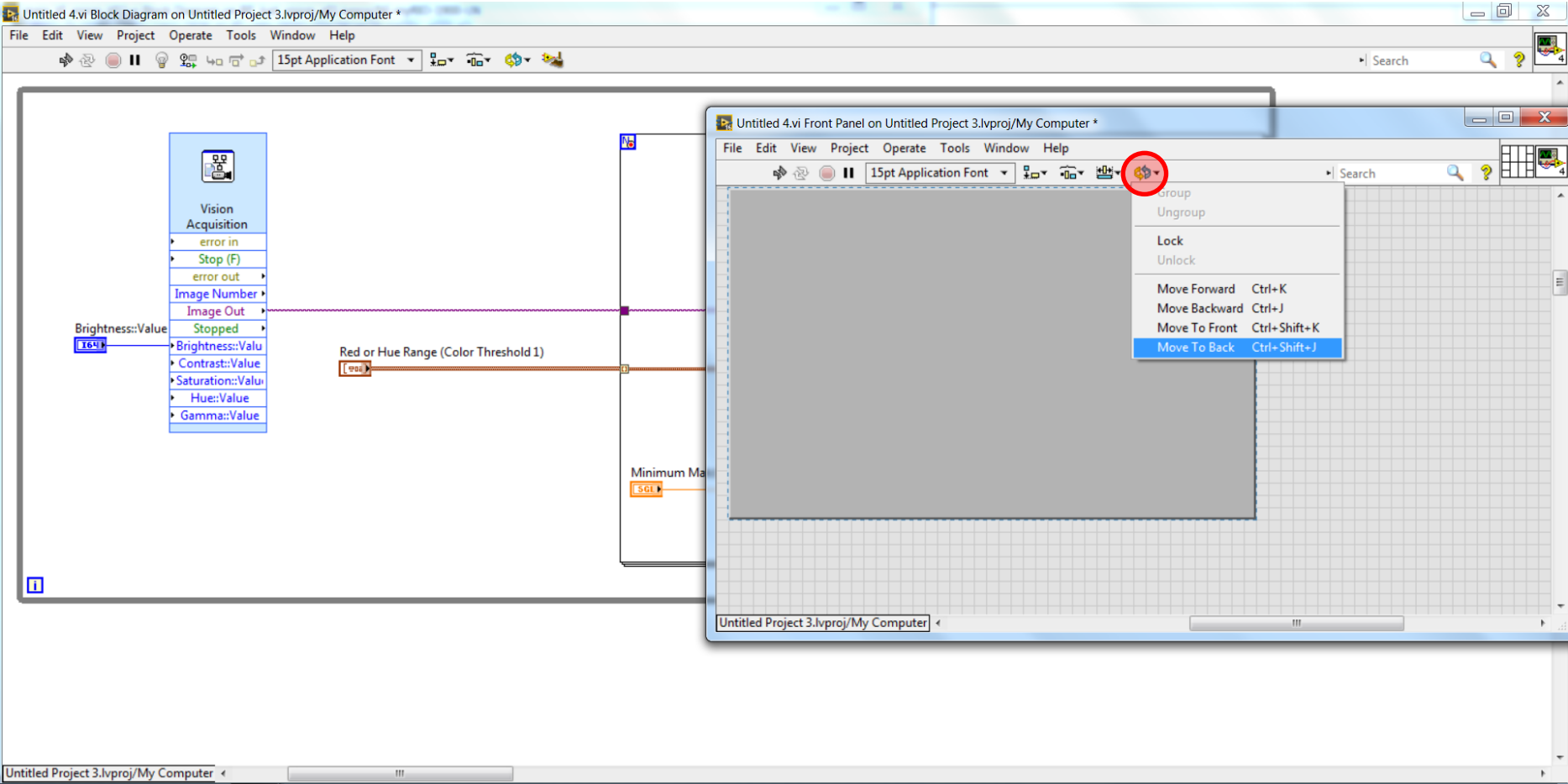
Vytvoření rámu: pravý klik na čtverečkovanou plochu - Decorations/Raised Box



Roztažení rámu



Přenesení rámu na pozadí



Untitled 4.vi Block Diagram on Untitled Project 3.lvproj/My Computer *

File Edit View Project Operate Tools Window Help

15pt Application Font

Search

1

Brightness::Value
164

Red or Hue Range (Color Threshold 1)
Lower

Minimum Match Score
50

1

Untitled 4.vi Front Panel on Untitled Project 3.lvproj/My Computer *

File Edit View Project Operate Tools Window Help

15pt Application Font

Search

Minimum Match Score
0

stop
STOP

Brightness::Value
40

Red or Hue Range (Color Threshold 1)

Lower value
10
Upper value
79

Lower value
10
Upper value
80

Lower value
10
Upper value
80

Untitled Project 3.lvproj/My Computer