// SMART CAMERAS

Getting Started with HALCON on Alecs

Prerequisites

To get started with HALCON on your Alecs camera, you need the following prerequisites:

- // A DHCP supported internet setup to connect Alecs to the internet
- // SSH software to connect your PC to Alecs
- // MVTec HALCON 26.05 or later for aarch64 architecture
- // Get a license or evaluation license and download HALCON to your PC: Get a HALCON License: Free Trial, Pricing, and Purchase | MVTec

Info:
The instructions in this document were tested with:
Alecs-L4T_R36.4.3-avt1.0.2 and HALCON version 26.05

Action steps overview

Action steps described in the following sections:

Download software from MVTec website

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Connect ALECS and also enable internet access

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Copy/install package with som

↓

Activate license

↓

Set environment variables

↓

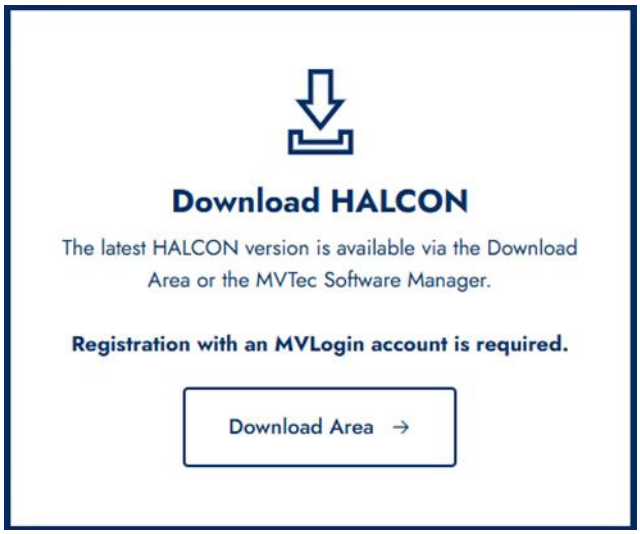
Run a sanity check.

How to download SOM via Software Manager

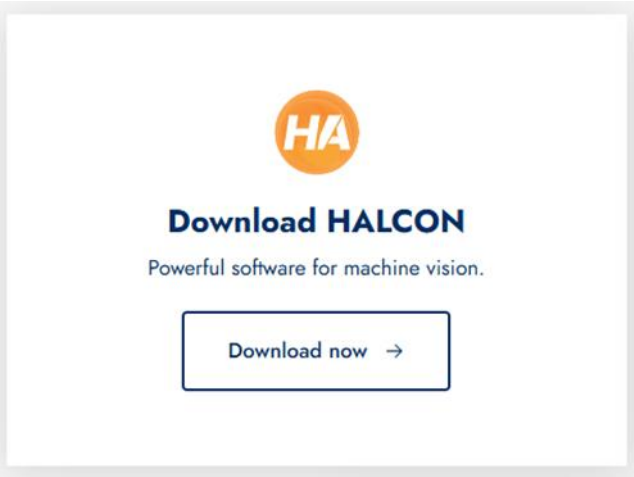
To download the MVTec Software Manager, perform the following steps:

1. Click the link below:
   Get a HALCON License: Free Trial, Pricing, and Purchase | MVTec

2. Click **Download Area** :



3. Click **Download now**:



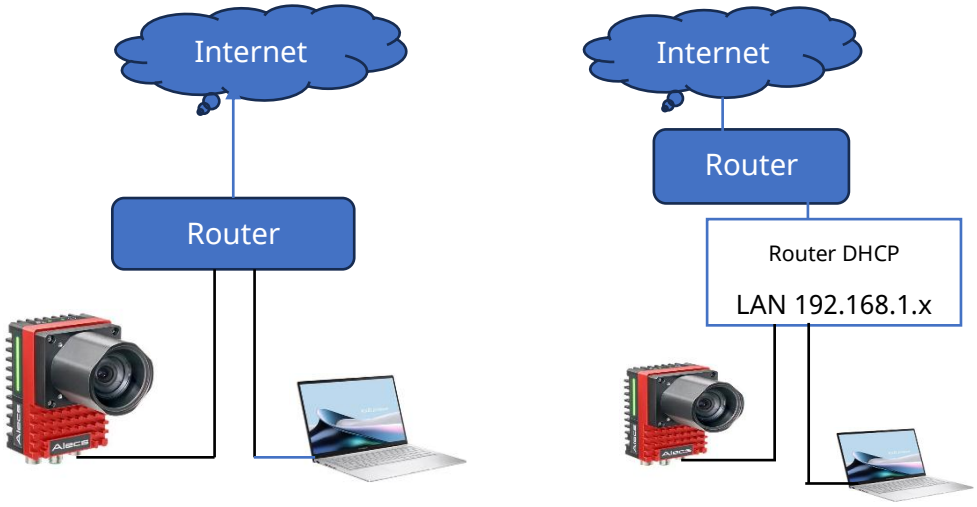
4. **Login** to sign in or to create an MVTec account:

5. Click **Download Software Manager** to start the download:

How to install HALCON on Alecs

To install HALCON on Alecs, follow these steps:

1. Connect Alecs to the internet. Please use any one of these topologies:



2. SSH into Alecs:
   `ssh -XY Alecs@IP address`
3. Check if Alecs is connected to the internet using command:
   `ping 8.8.8.8`
4. Copy the downloaded HALCON package from your PC to Alecs.
5. Unzip the package into a folder in Desktop, navigate into the folder and run the following commands:
   a. List the catalog and available feed URLs
      `./som cat`
   b. To install, for example, the runtime version of HALCON, type
      ./som --accept HASH -f FEED install rt
      and replace FEED with the actual feed URL or a unique substring of the feed URL, e.g., halcon-26.05 or later. The --accept HASH is not used for initial call but must be added for the second call incl. the respective HASH. The rt cmd does not install all the packages like the Image acquisition. The Package for GeniCamTL and optionally tensorrt should be selected when installing online via MVTec software manager.
   c. The EULA is displayed. Then a line appears showing your previous command with the additional parameter ‘accept <HASH>’.

Tip:
To get help with commands, use:
`./som help`

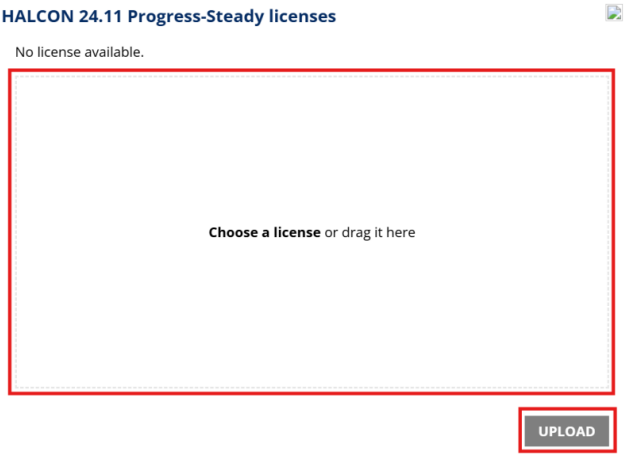
The HALCON package is installed in home directory in the subfolder MVTec. This is recommended, otherwise root access (via sudo) is required for certain calls.

Activating the license

To install HALCON licenses on Alecs:

1. To launch the Software Manager tool please refer the section How to install HALCON on ALECS.

2. Drag the license file into the appropriate area and click **Upload.**



3. To use the activation code, Alecs must have internet access.

Setting the environment variable

To set the environment variable, use the following commands:

```
export HALCONARCH=aarch64-linux
export HALCONROOT=/home/MVTec/HALCON-26.05
export HALCONEXAMPLES=${HALCONROOT}/examples
export HALCONIMAGES=${HALCONROOT}/examples/images
export PATH=${HALCONROOT}/bin/${HALCONARCH}:${PATH}
export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:${HALCONROOT}/lib/${HALCONARCH}
```

Extend the library path, we strongly recommend including these and all following paths system wide as defaults.

```
export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:/usr/lib/aarch64-linux-gnu
export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:/usr/local/cuda/targets/aarch64-linux/lib
export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:${HALCONROOT}/lib/${HALCONARCH}
```

To use the camera with GPU the following library should be installed.

```
libcublas-12-6
libcudnn9-cuda-12
libcudnn9-dev-cuda-12
cuda-nvrtc-12-6
cuda-nvrtc-dev-12-6
```

For using tensorrt via AI2 interface, the following libraries are needed, in addition (including occurring dependencies):

```
tensorrt
tensorrt-libs
libcudla-12-6
nvidia-l4t-dla-compiler
```

For tensorrt further paths must be added:

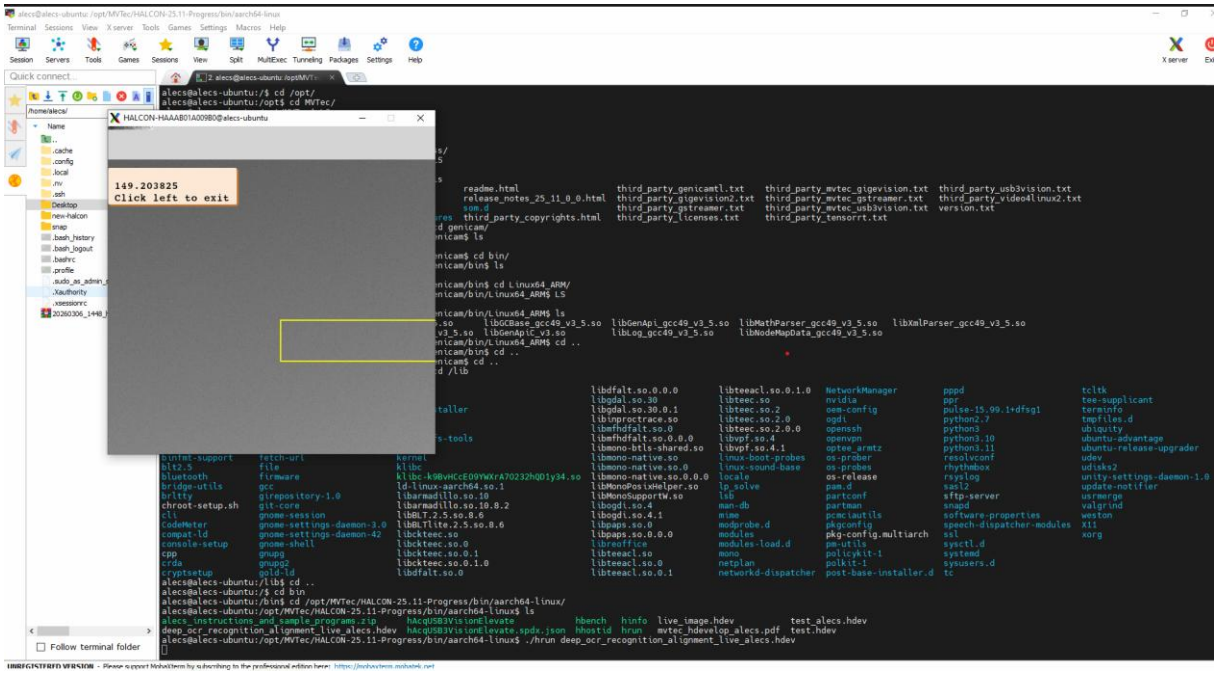
```
export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:/lib/aarch64-linux-gnu
export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:/usr/local/cuda/targets/aarch64-linux/lib/
export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:/usr/lib/aarch64-linux-gnu/nvidia/
```

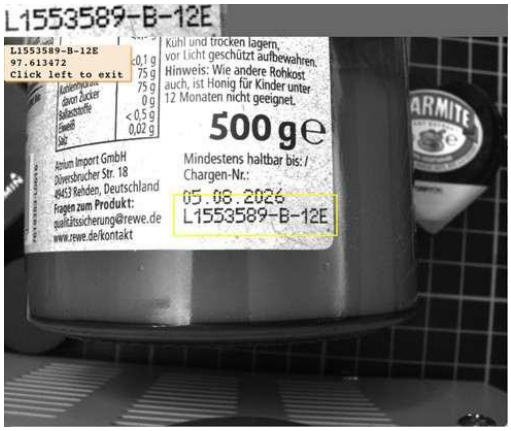
Running HALCON code

For a sanity check, if HALCON works, you can navigate to run the hbench program, which performs a quick benchmark on Alecs:

```
./hrun hbench.hdev
```

This will start the example code as shown in the following screenshots:





Note:
When running programs with live images and in a while() loop, you need to have means to terminate the loop and close the camera properly. Otherwise, you could leave the camera opened, such that following calls to it would be “blocked” until you restart your Alecs camera.

Additional information on hrun

The hrun program offers multiple possibilities to get the contents of temporary variables (useful for time measurements) as well as to set input variables. The options and their descriptions are listed upon calling `hrun –help` (or just `hrun`). Among them, there are two helpful options that help with controlling input and output:

// `-D <variable>=<value>`
Set a global variable, which has been defined in the program, to a value. Please look up the HDevelop User's Guide (section 8.3.2) for more information about global variables in HDevelop.

// -d, --dump=[variable]
Dump the content of a variable at the end of the program. You can use it multiple times (for multiple variables) in the same call.