TopoCalib and Holo3 status, 2021.03.22

Source code

Integrated in UnityControl, develop branch.

Compile order:  
UnitySC.PM.PSD.Tools.Holo3.sln  
UnitySC.PM.PSD.Tools.TopoCalib.sln  
PSD.sln  
(all in debug or all in release)

GlobalTopo can be run from Demeter only.  
NanoTopo can be run from Demeter, or as a standalone app, UnitySC.PM.PSD.Tools.NanoTopo.sln.  
NanoTopo sandalone can be used to recompute processing using existing pictures.  
In the future, being able to replay topos from Demeter (and existing files) will be important for debugging purposes (just like replaying a calibration from existing files is already possible with “debug” rights).

UnitySC.PM.PSD.Tools.TopoCalib.sln is the least integrated part.  
It is started by Demeter as a process, with setting passed as command line arguments and through ini file change.

UnitySC.PM.PSD.Tools.Holo3.sln contains all C++ Holo3 code required to run GlobalTopo and Nanotopo from Demeter.  
The c++ code can be debugged when running Demeter, yet in the future it should have a better integration (ideally by porting parts to C# in the same time as seeking speed optimizations, but mixed assemblies could help too).  
All code redundancies and inconsistent build settings have been removed from UnitySC.PM.PSD.Tools.Holo3.sln. The only duplicate that remains is the file NanoCore.cs (duplicate will be removed when the standalone UnitySC.PM.PSD.Tools.NanoTopo.sln will be too).

Due to other priorities, the Nanotopo integration in Demeter is still minimal.  
In particular, log integration is missing, the output folder setting is not respected, and the older ini file IniRep is still being used.

Ini files

In code default values and duplicates have been removed from the calibration files. The only duplicate remaining is the reference point, as there where still a lot of questioning about it.  
  
Also, while the calibration ini files themselves have been freed from duplicates, there still are duplicates with Demeter files. This should be addressed in a future pass, in order to cleanly separate machine parameters, recipe settings, and calibration results.

Path duplicates (where to find those ini files was inconsistent) have been removed from UnitySC.PM.PSD.Tools.Holo3.sln and PSD.sln.  
The now unique entries can be found in H3AppToolsDecl.h:

LPCSTR \_LastCalibPath = \_T("C:\\UnitySC\\Psd\\Temp\\TopoCalib\\Result");  
 LPCSTR \_InputSettingsFile = \_T("SensorData.txt");  
 LPCSTR \_CheckMesureFile = \_T("CheckMesure.txt");

LPCSTR \_CamCalibSubfolder = \_T("Calib\_cam");  
 LPCSTR \_CamCalibIntrinsicParamsFile = \_T("CalibCam\_0.txt");  
 LPCSTR \_CamCalibLogSubfolder = \_T("log");

LPCSTR \_SysCalibSubfolder = \_T("Calib\_Sys");  
 LPCSTR \_MatrixScreenToCamFile = \_T("Res1.txt");  
 LPCSTR \_MatrixWaferToCameraFile = \_T("EP\_ref\_CamFrame.txt");  
 LPCSTR \_PhaseReferenceXFile = \_T("ResX.klib");  
 LPCSTR \_PhaseReferenceYFile = \_T("ResY.klib");

LPCSTR \_UWPhiSubfolder = \_T("Calib\_UWPhi");  
 LPCSTR \_UWMirrorMaskFile = \_T("UWMask.hbf");

All those files could benefit from having more explicit names…  
  
"SensorData.txt" is the input file, and contains compute parameters, recipe parameters, and settings for the standalone calib app (ignored when the process is started by Demeter).  
The subfolder Calib\_cam contains camera calibration value (intrinsic parameters).  
The subfolder Calib\_Sys contains system calibration values (extrinsic transformation matrixes).

Demeter now keeps an history of previous calibrations done on the tool.  
More exactly 2 histories, for FW and BW sides.  
Both history folders are set in AlgorithmsConfiguration.xml, and each history entry contains both the source calibration images and the calibration results.  
TopoCalibExplorer.exe may be placed in a history folder to monitor calibration changes.