Poly2SCN Interface S45

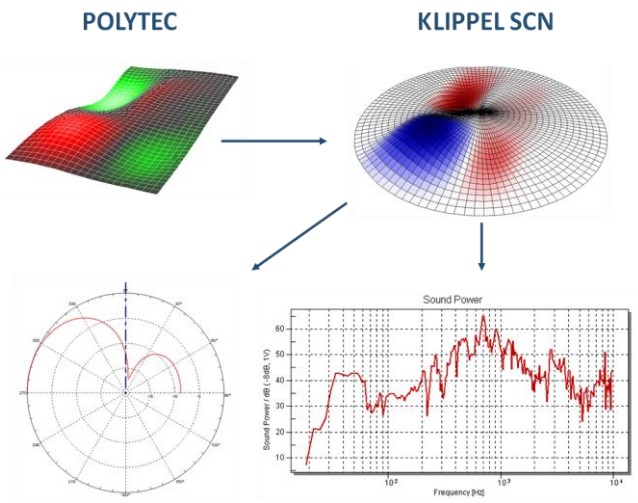
Software of the KLIPPEL ANALYZER SYSTEM (Document Revision 1.5)

FEATURES

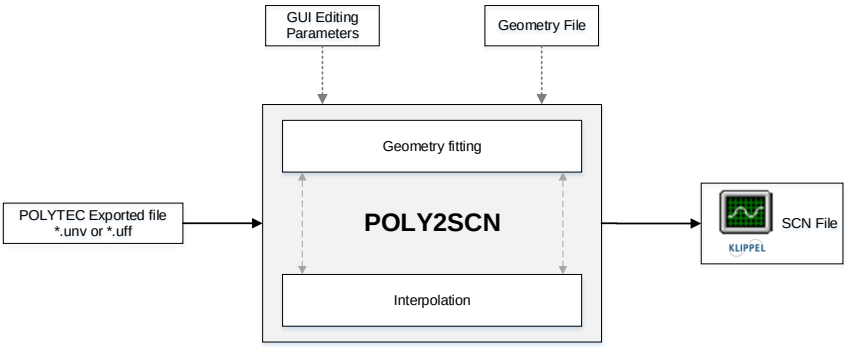
- Merges 2D or 3D vibration-geometry data from Polytec scanning systems to the Klippel SCN Software
- Easy to use GUI for vibration and geometry data interpolation and optimal fitting

BENEFITS

- Take full advantage of the SCN Software features using external vibration measurement systems.
- Use Klippel Modules such as Rocking Mode Analysis or Higher Modal Analysis with Polytec measurement data.



DESCRIPTION



Poly2SCN loads an exported Universal-File measured with PSV series Scanning Vibrometer systems (also with 3D geometry from PSV Geometry Scan Unit) and generates a synthesized grid in which the vibration data is interpolated. The geometry and the parameters of the grid can be edited to reach an optimal fitting. The Poly2SCN interface provides a *.sce file compatible with the Klippel SCN software.

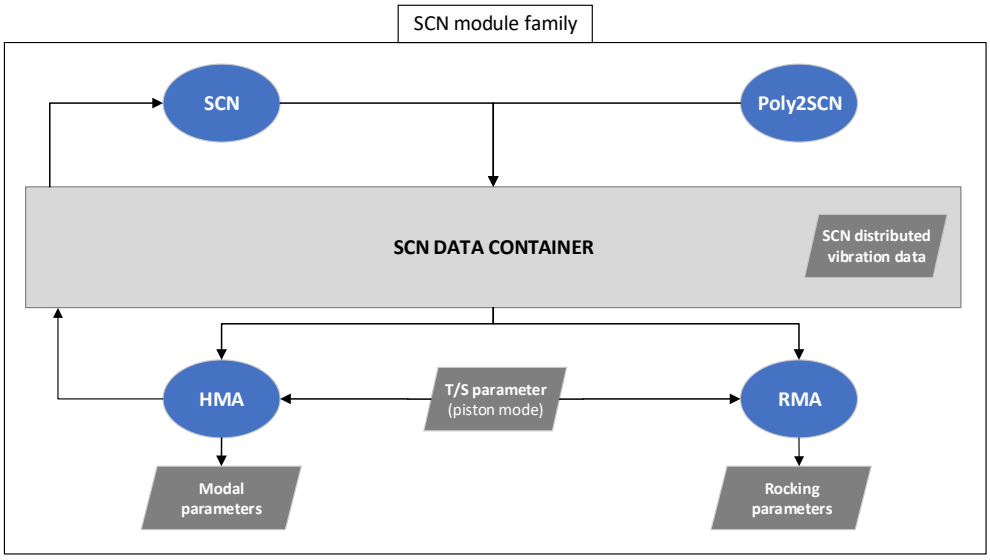
Article number	2510-043

CONTENT

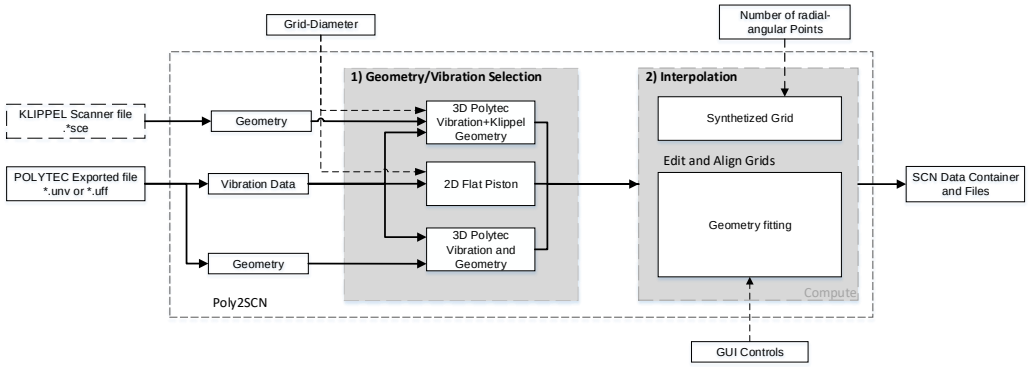
1 Overview

1.1 Principle

The Poly2SCN module allows users of the Polytec Laser Doppler Vibrometry to utilize the modules of the Klippel Scanner Landscape. By converting the measurement data of a Polytec measurement into the Klippel SCN format the user gains access to the visualization and post-processing of the Klippel SCN Software. Additionally, the post-processing modules Rocking Mode Analysis (RMA) and Higher Modal Analysis (HMA) may be used to perform further analysis of the distributed vibration data and help to improve the design and development of electroacoustic transducers.



1.2 Functionality of the interface



Vibration data measured with Polytec Scanner Vibrometers can be imported fast and easily into the Klippel SCN Software using the Poly2SCN Interface. Arbitrary measurement grids generated in the Polytec scanning process can be edited and interpolated over an optimized grid for a suitable post processing in the Klippel SCN Software.

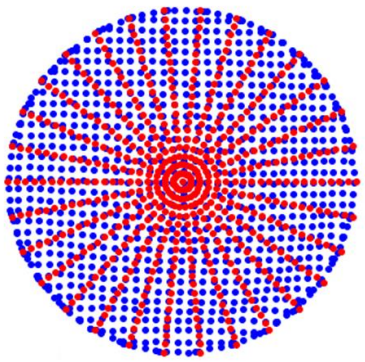
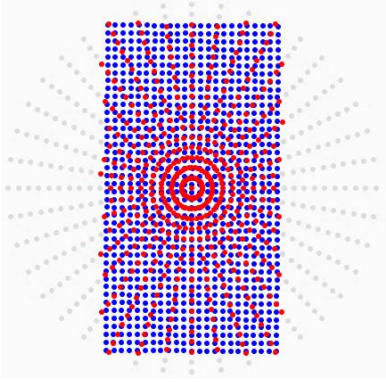
The output Klippel Scanner file *.ksp containing the vibration data measured with a Polytec system and mapped over a desired geometry, can be generated by the following two simple steps:

- Loading an exported Polytec *.uff/.unv file and selecting the desired geometry option,
- Setting the geometry parameters to get the best match between the Polytec points and the synthesized grid.

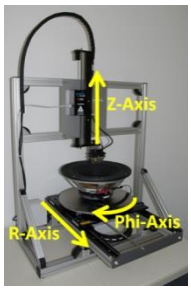
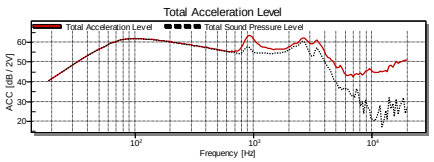
2 Examples

Poly2SCN supports Exported Polytec files containing 2D or 3D geometry data. By loading this file, the interface will automatically enable the Geometry/Vibration Selection options compatible with the measured file and the user can choose the more convenient way for his study. The three possible modes are described here:

- **2D Flat Piston:** This mode projects the vibration data over a flat synthesized grid. This mode is useful if no geometry information is available for the driver. In the case of a Polytec file containing only 2D geometry data, the diameter of the measured grid is required.
- **3D Polytec Vibration and Geometry:** This mode is available when geometry data is provided in the exported Polytec file. It will map the vibration and geometry points onto an optimized synthesized grid.
- **3D Polytec Vibration + Klippel Geometry:** This mode can be used with any kind of Polytec data and projects the vibration points onto a geometry measured with the displacement sensor of the Klippel SCN software. (Note: This mode requires a Klippel file containing the geometry).

Examples	Circular Geometry	Rectangular Geometry
		

3 Requirements

3.1 Input File		
.unv file	The Poly2SCN module is developed to import vibration data into the SCN software defined in the universal file format (*.unv or *.uff). It is preferred that the vibration data is exported as transfer function of Displacement, Velocity or Acceleration to Voltage. Detailed information is given in section 4.2.	
3.2 Hardware		
Laser Doppler Vibrometer (LDV)	The vibration data for large structures can be measured e.g., with Laser Doppler Vibrometer (LDV) - Polytec PSV-500. The vibration data has to be converted into .unv files to enable the import into Poly2SCN.	
Optional: Scanning Vibrometer Hardware (SCN) (Art. #:2510-004)	The Scanning Vibrometer (SCN) performs a non-contact measurement of the mechanical vibration and the geometry data of cones, diaphragms, panels and enclosures. The 3D geometry data can be imported additionally to the vibration data.	
3.3 Software		
Klippel dB-Lab Software	Version requirement > 212.100	
Poly2SCN Software	Poly2SCN software module for Klippel dB-Lab	
Scanning Software (SCN) with Import/Export Interface	The SCN Analysis Software performs visualization, animation and a modal analysis of the mechanical vibration using the scanned data which is provided by the vibrometer.	

4 Limitations

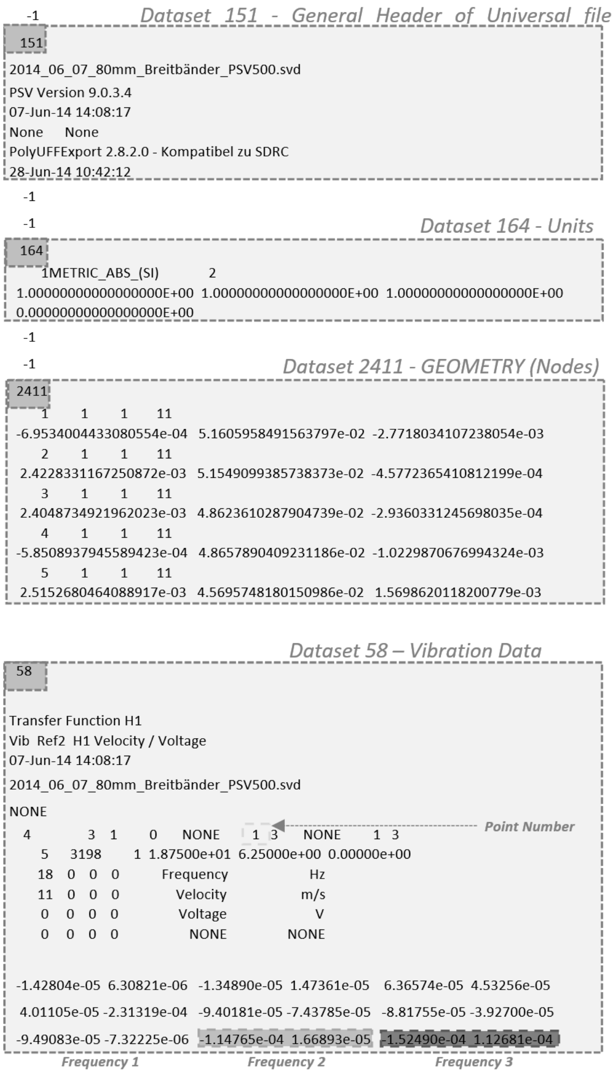
4.1 Device Under Test

Driver Orientation	The driver needs to be mounted in a perpendicular plane in front of the sensor head to prevent any optical distortion of the measurement grid geometry.

4.2 Input File format

Universal File

The interface needs universal file formats: *.unv or *.uff for the Polytec vibration data. It is preferred that the vibration data is exported as transfer function of Displacement, Velocity or Acceleration to Voltage. The universal file format is developed by the Structural Dynamics Research Corporation (SDRL). Detailed information and documentation of the universal file format can be found on the SDRL website. An example of the input file can be seen below:

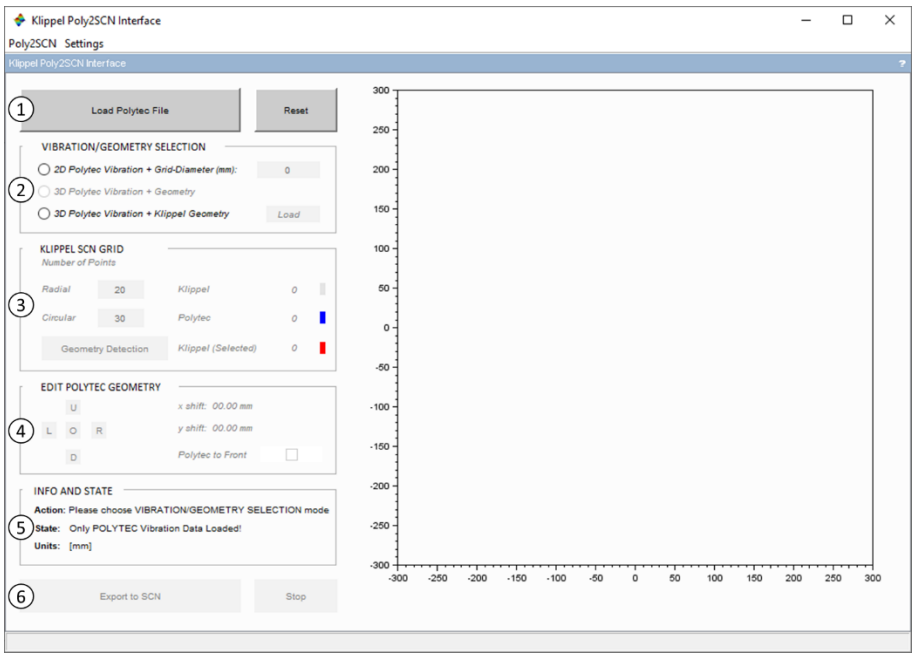


```
-1                Dataset 151 - General Header of Universal file
151
2014_06_07_80mm_Breitbänder_PSV500.svd
PSV Version 9.0.3.4
07-Jun-14 14:08:17
None     None
PolyUFFExport 2.8.2.0 - Kompatibel zu SDRC
28-Jun-14 10:42:12
-1
-1                Dataset 164 - Units
164
1METRIC_ABS_(SI)          2
1.00000000000000000E+00  1.00000000000000000E+00  1.00000000000000000E+00
0.00000000000000000E+00
-1
-1                Dataset 2411 - GEOMETRY (Nodes)
2411
1      1      1      11
-6.9534004433080554e-04  5.1605958491563797e-02  -2.7718034107238054e-03
2      1      1      11
2.4228331167250872e-03  5.1549099385738373e-02  -4.5772365410812199e-04
3      1      1      11
2.4048734921962023e-03  4.8623610287904739e-02  -2.9360331245698035e-04
4      1      1      11
-5.8508937945589423e-04  4.8657890409231186e-02  -1.0229870676994324e-03
5      1      1      11
2.5152680464088917e-03  4.5695748180150986e-02  1.5698620118200779e-03

                  Dataset 58 – Vibration Data
58

Transfer Function H1
Vib  Ref2  H1 Velocity / Voltage
07-Jun-14 14:08:17
2014_06_07_80mm_Breitbänder_PSV500.svd
NONE
4          3  1      0    NONE    1  3    NONE    1  3      Point Number
   5     3198      1  1.87500e+01  6.25000e+00  0.00000e+00
  18   0   0   0        Frequency              Hz
  11   0   0   0        Velocity               m/s
   0   0   0   0        Voltage                V
   0   0   0   0        NONE                   NONE

-1.42804e-05 6.30821e-06  -1.34890e-05 1.47361e-05   6.36574e-05 4.53256e-05
4.01105e-05 -2.31319e-04  -9.40181e-05 -7.43785e-05  -8.81755e-05 -3.92700e-05
-9.49083e-05 -7.32225e-06  -1.14765e-04 1.66893e-05  -1.52490e-04 1.12681e-04
   Frequency 1               Frequency 2               Frequency 3
```

Note: The dataset 58 of the universal file may contain different kinds of measured data and allows to export multiple datasets into one file. Make sure that in the exporting process the data is exported as **Transfer function of Displacement, Velocity or Acceleration to Voltage.** Please keep in mind that large files will increase the computation time.

5 Setup

5.1 Graphical User Interface

GUI	
Load Polytec File and Reset (1)	Load Polytec File: shows a file selection dialog that asks the user to choose an UFF-file (*.unv or *.uff) for the conversion.
Vibration Geometry Selection (2)	The interpolation mode of the loaded Polytec data is selected. Depending on the imported UFF-file, various options are available here.
Klippel SCN Grid (3)	The parameters for the target Klippel SCN Grid are specified.
Edit Polytec Geometry (4)	The imported grid can be shifted to optimally match the target grid.
Info and State (5)	Information about the current state of the conversion and helpful instructions are displayed.
Export to SCN (6)	Starts the actual interpolation process and the imported vibration data will be interpolated onto the specified target Klippel SCN Grid.

5.2 Input

Input Data	Vibration and [optional] geometry measurement data from Polytec **(1)**	A *.unv/.uff file (exported from the Polytec software) which contains the vibration and optional geometry data. (*This file must contain transfer function data with Displacement, Velocity or Acceleration to Voltage*). The information contained in this file enables the different options for the data/geometry available in the interface.
	[Optional] Klippel Scanner file **(2)**	A *.sce file exported from the Klippel SCN software containing the driver geometry. To be specified only when *3D Polytec Vibration + Klippel Geometry* mode is selected.

Input Variables	Vibration/Geometry selection **(2)**	Three modes can be selected depending on the desired analysis to be performed and the availability of the data in the Polytec file. The vibration data can be mapped over a Klippel geometry, a flat piston or the geometry measured with a Polytec system.
	Diameter **(2)**	Diameter of the Polytec measurement grid. Not needed if *3D Polytec Vibration and Geometry* mode is selected.
	Grid radius/angle resolution **(3)**	Determines the number of radial/angular points of the exported grid.
	Geometry Detection **(3)**	Asymmetrically or irregularly shaped geometries can be detected by the Geometry Detection.
	Geometry shift **(4)**	Parameters to edit the geometry of the Polytec points allowing an optimal match of the synthesized grid.

6 Results

6.1 Result Data

Exported file	The interface will generate a SCN data container operation, from which the SCN visualization can be opened. The data container also functions as input to the RMA and HMA. In addition, the data is written to the hard drive as *.ksp Klippel Scanner Project file, the *.sce and *.bin files to be opened with the Klippel SCN software in the same directory where the *Exported Polytec file* is located. (*Polytec File folder\Database_NAME\POLY2SCN_results)* To open the file in the SCN software, click on the *Open File* option in the window opened when the export process is finished. Please refer to C5 Scanner Vibrometer Specification for more information.

7 References

7.1 Related Modules	• SCN Module (Scanning Software) • RMA Module (Rocking Mode Analysis) • HMA Module (Higher Mode Analysis)
7.2 Manuals	• Poly2SCN User Manual • SCN User Manual • RMA User Manual • HMA User Manual
7.3 Application Notes	• AN30 Scanning Rectangular Speakers • AN31 Cone Vibration and Radiation Analysis • AN68 Importing Polytec data into SCN Application notes can be downloaded from www.klippel.de.
7.4 Literature	• Detailed information and documentation of the universal file format can be found here: SDRL website

Find explanations for symbols at:

http://www.klippel.de/know-how/literature.html

Last updated: 08.10.2021

Designs and specifications are subject to change without notice due to modifications or improvements.