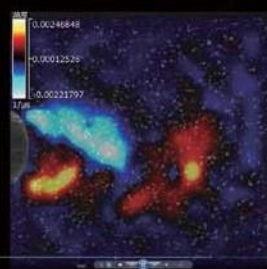
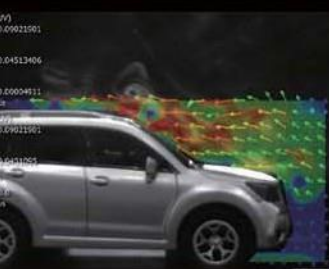


Flownizer

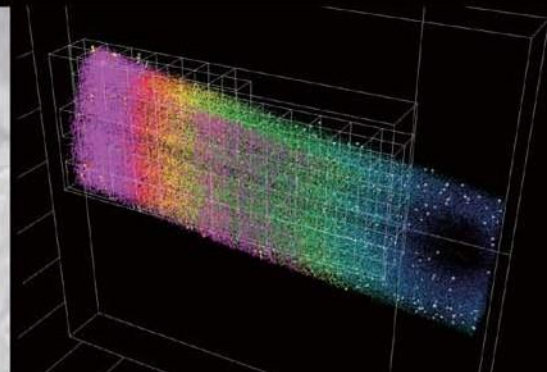
2D/2D3C/3DPTV

Flownizer is PIV software which is developed in Japan and being used by various users worldwide. User friendly interface and a high processing speed are allowing users to make their workflow smooth and time-efficient.

- Wind tunnel test
- Water flow behind obstacles
- Airflow around electrical appliances



- River flow modelling experiment
- Blood flow observation
- Circulation in a cylindrical aquarium



- Flow in micro parts
- Visualization and flow velocity measurement inside valves and engines
- Viscosity tests etc.

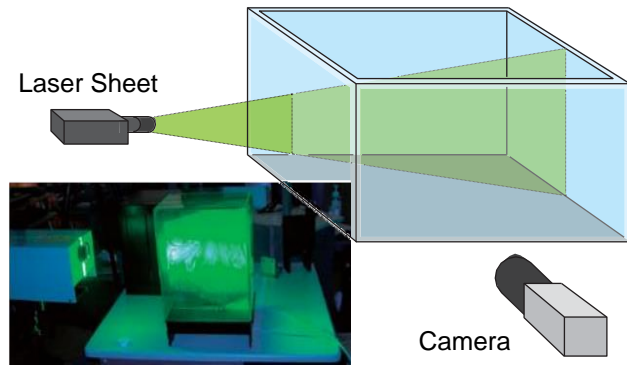
Flownizer2D/2D3C

Two-dimension and three-component Particle Image Velocimetry

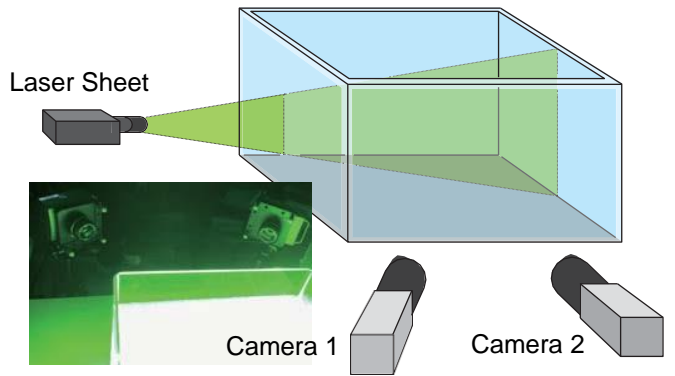
It can be used in three-component fluid measurement in various fields, including wind tunnel experiments and tank experiments. The software is able to calculate and display flow vectors and their velocity, streamlines, streak lines, path lines, as well as many other parameters.

Visualisation and Image Processing

▼2D(PIV · PTV)



▼2D3C (Stereo PTV)



Software Features

Settings

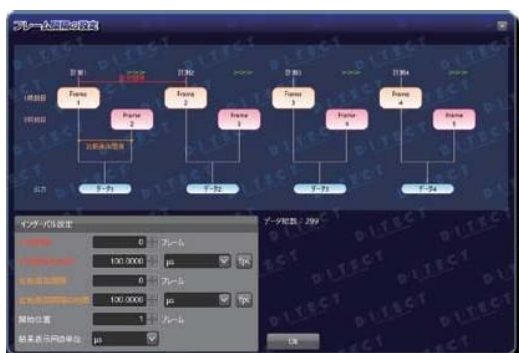
● Correlation map

The correlation map settings will help you to set the template size and searching area which have the most significant impact on the measurement results. Even a beginner in PIV can easily set parameters that give the best result. Both temporal and spatial directions can be explored by using a simple interface.



● Correlation map

You can adjust the settings to work with various measurement know-how such as continuous emission lasers, double pulse lasers or with super high-speed videos to achieve the required accuracy.



Pre-processing

● Masking

By specifying an area you do not want to analyse, you can exclude it from the analysis to make the processing faster.

● Image processing

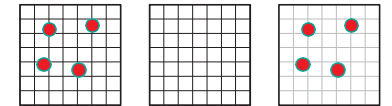
Various processing tools such as filters, convex extraction, brightness conversion, inter-image operations and others.

● Background subtraction

If a background includes static objects, it causes a vector calculation error. Background can be easily generated and changed using the original video file.



▼背景差分のイメージ



粒子のみの相関で流速を求めることが原則です。

Calibration

● Simple calibration (two points)

Specify two points of known length on the screen to perform accurate measurements.

● One-point calibration

Use projective transformation when the direction of the camera is tilted with respect to the measurement plane

● Calibration plate

Full-fledged calibration that automatically corrects lens distortion

● Results display / data output

Vectors, contours, streamlines, raw vectors, average vectors, interpolation vectors, smooth vector tools, overlay display of vector streamlines, vector trajectories, streak lines, etc.

All the data can be output to a CSV file.



Display items:

Velocity, velocity standard deviation, correlation coefficient, velocity gradient tensor, vorticity, turbulent energy, Reynolds stress

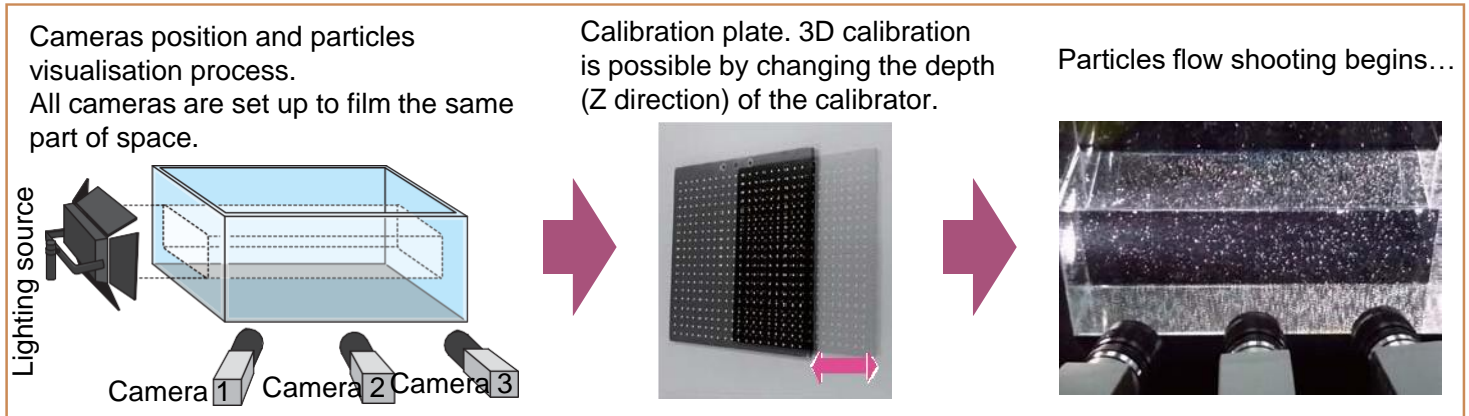
● Graph display

Display a graph for each specified line or other result data with time on the horizontal axis. Cursor moves in synchronously with video playback



Flownizer3DPTV

Synchronised cameras are used to take a video of particles in 3D space. The tracer particles are spread in the space and lit up with the light source. The system allows to calculate XYZ coordinates for each particle, track them and visualise the vectors.



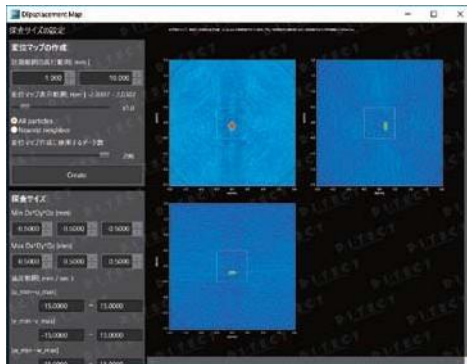
Flownizer3DPTV features

Particle mask correlation method

Particles images are automatically analysed by software. Small particles and dark or unclear particles can be successfully detected.

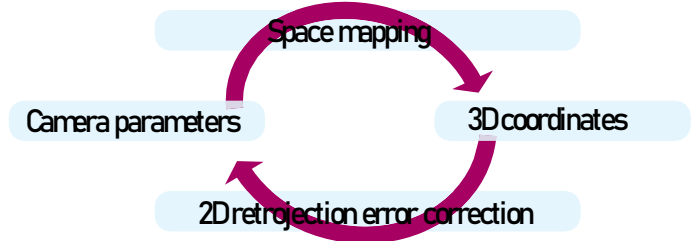
Displacement map

A contours graph of all movements of all particles. It allows to set the optimal range for the observation.



Volume self-calibration

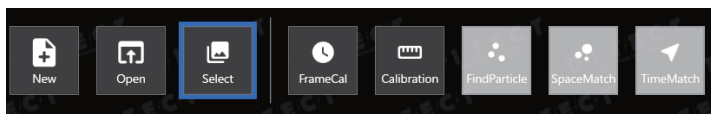
The obtained 3D result is reprojected as a 2D image. The error patterns are analysed and the camera parameters are adjusted accordingly. Space mapping is performed again using the new parameters to calculate the 3D result. By repeating this process, the number of errors will be gradually reduced and the accuracy will be significantly improved. All you need is only to set the number of repetitions in advance, so that the software will automatically perform all calculations.



Processing flow:

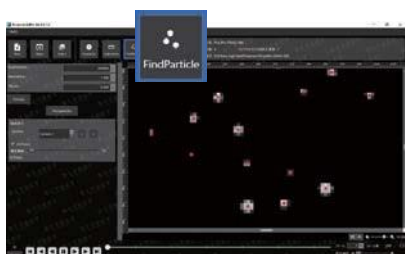
① Choosing files.

Adding target videos and calibration images taken by each camera into the project.



② Calibration.

If the calibration performed with the calibration plate, the datum point (0) and X, Y directions are automatically detected. When completed, the cameras positions will be displayed from what it will be clear if the calibration was successful.



③ Particles detection.

Once the calibration is done, the particles analysing button becomes available.



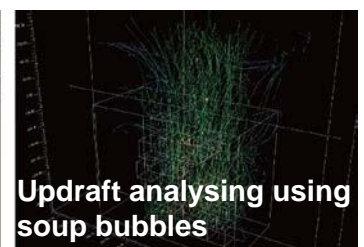
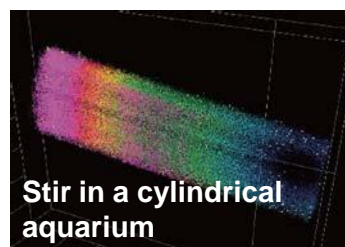
④ Space mapping.

Video taken by multiple cameras are analysed and the position of each particle calculated. It allows to determine the position of the particle at each time in 3D.



⑤ Vectors calculation.

Video taken by multiple cameras are analysed and the position of each particle calculated. It allows to determine the position of the particle at each time in 3D.



Optional equipment:

Scheimpflug adapter (only for Flownizer 2D3C):

• It may happen that the laser sheet and the camera are not faced each other properly and it prevents the camera to focus. The Scheimpflug adapter shifts the optical axis to have the required level of the depth of focus.



Calibration plate:

• A single plate composed of multiple markers with different position in the Z-axis composing a grid.



Flownizer versions comparison:

	2D	2D3C	3DPTV
Measurement space	Plane, pseudo-plane, surface flow (projection surface).	Plane, the width of the light of the laser sheet.	Three dimensional space
Vector components	2D (X, Y)	3D (X, Y, Z)	3D (X, Y, Z)
Method	PIV or PTV (selection)	PIV	PTV
Cameras QTY	1 piece	2 pcs	2 pcs or more
Scheimpflug	Not required	Recommended	Not required
Calibration	Dot calibration plate, plain scale	Multiple plane plate	Plate movements at a specified distance

System configuration samples:

	2D	2D3C	3DPTV
High-speed camera	1	High-speed camera	2
Lens	1	Lens	2
Laser sheet	1	Laser sheet	1
Flownizer 2D2C software	1	Flownizer 2D3C software	1
		Scheimpflug adapter	2
		Calibration plate	1

Main features:

Supported formats	Video: AVI, WMV, still image sentence: BMP, JPG, TIFF, PNG		
Output expansions	CSV data, video files (AVI, WMV), still images (BMP, JPG)		
Velocity	X, Y	X, Y, Z	X, Y, Z
Output values	Correlation coefficient, velocity gradient tensor, tension, turbulence, Reynolds stress		Average flow velocity
Streamline result	Streamline, trajectory, streakline		
Graphs	Specified points, lines, areas		
Error vectors	Luminance, correlation coefficient, velocity numerical filter, velocity upper and lower limits		
Supported OS	Win 7, Win 8.1 (32 bit, 64 bit), Windows 10 / 11 (64 bit)		Windows 10 / 11 (64 bit)
CPU	Intel Pentium 4 or better (multi core CPU recommended)		
Memory	1GB RAM or more (3GB or more recommended)		2GB RAM or more
Storage	2GB free space (HDD or SSD)		10GB free space or more
Display	1280 x 800 or more recommended		1280 x 1024 or more



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