Calypso is used for the Coordinate measuring machine, and is one of the most highly evaluated software applications in the world. It includes a CAD kernel that ensures unmatched operability.

**Improved AI Function**

The AI function includes three algorithms for automatic element recognition, automatic coordinate system setting, and automatic measuring plane recognition while assisting operators.

The AI function supports not only points, straight lines, flat surfaces, spheres, symmetrical points, circles, and cylinders but also cones, ellipses, square holes, and long holes without the need to select the element types before measuring.

Simple operation procedures enable successive measurements from measuring one of the elements at random points to pressing the “Terminate” button to stop element measurements.

- **Automatic Geometric Element Recognition**
  Our own measuring method and recognition algorithms (patented in Japan and overseas) enable automatic recognition of geometric forms by the direct measurement (probing) of a workpiece. This dramatically reduces procedures to input measuring items.

- **Automatic Coordinate System Recognition**
  Measured geometric elements and items required for coordinate system settings (spatial compensation, rotational compensation, origin) are determined automatically and these settings are configured.
**Automatic Generation of Measuring Path**

Calypso’s safety plane philosophy eliminates the need to input probe path points (intermediate points). Once the bypass boundaries (area around the workpiece) are specified, the probe automatically moves on the safety plane so it does not interfere with the workpiece. For movement on the same surface, another safety plane can be configured to make the amount of movement smaller.

The measuring path is generated automatically in accordance with safety plane, supplementary safety plane, number of measuring points, and probing return distance. Measuring path points and probing points can be specified arbitrarily within and between measuring elements, which allows the operator to create the most appropriate measuring path.

**On-screen Probe Angle Simulator** *(For Articulating Probe Head)*

An operator may wonder whether the probe is oriented correctly after specifying an orientation such as A-axis: 0°, and B-axis: -90°. The on-screen probe angle simulator provides a screen image of the probe positioned at the input rotation angle and the inclination angle, so the operator can confirm that the desired result has been attained.

When CAD data is available, clicking an element automatically changes the ideal probe orientation based on the normal information. This function becomes especially helpful in the case of inclined holes and inclined axis.

Even when CAD data is not available, the orientation of the probe can be changed automatically to the normal direction relative to the actually measured projection plane.

An operator used to input the rotation angle while inspecting the workpiece and plans considering interference with the stylus. With the on-screen probe angle simulator, rotation angle settings become simpler than ever before.
Geometric Element Preview Function

Measured geometric elements are iconified. Once these icons are selected, target geometric elements are highlighted on CAD screen and property window of the element appears. In the preview of property window, following commands are executed; input of nominal and tolerance values, number of probing points, and measurement method (scanning or point).

Navigation Function for Measurement Procedure

Measured geometric elements are iconified and lined up in order of operation procedure. Operators can freely change the order and delete the icons. Once icons are selected, target geometric elements are highlighted on CAD screen and operators can check the measurement procedures.

Diverse Measurement Results

Roundness color level evaluation

Flatness color level evaluation
Report function PiWeb reporting (Calypso 6.0 or later ver.)

PiWeb reporting is a new reporting engine of Calypso. PiWeb provides a reporting function, which is a standard function of Calypso, and enables template creation, searching, viewing and report generation of measurement results. Moreover, statistical analysis is enabled by the optional PiWeb reporting plus. PiWeb saves the time and labor previously required for the analysis of large volumes of measurement data by making it quick and easy.

<table>
<thead>
<tr>
<th>PiWeb reporting &amp; reporting plus functions list</th>
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<tr>
<td>Number of measuring results able to be saved in database</td>
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<tr>
<td>Template creating function</td>
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<td>Export to csv files</td>
<td>X</td>
<td>○</td>
</tr>
<tr>
<td>Independent operating function separated from Calypso</td>
<td>X</td>
<td>○</td>
</tr>
</tbody>
</table>

Geometric deviation display using Calypso data

Most recent data output function

Statistics analysis tool (reporting plus)

Number of errors reported for each workpiece and task

PiWeb reporting & reporting plus functions list

Designer function for creating original template

Select the item from tool box

Export to csv files

Independent operating function separated from Calypso

Output report

Search function

Export to csv files

Number of measuring results able to be saved in database

Template creating function

Statistics analysis tool

PiWeb reporting & reporting plus functions list

Data Processor System (Software)

TOKYO SEIMITSU
Actual Point Memory

Calypso memorizes actual measured points so that re-measurements are not necessary to execute calculation. Recall of a point element selects an arbitrary point group and analyzes a partial plane and other. This function memorizes all probing points and execute re-calculation selecting the points to be used.

Automatic Stylus Calibration

A single probing with the calibration ball in the shaft direction performs stylus calibration automatically. Once the stylus system is calibrated, automatic calibration for all registered directions can be performed by simply selecting an icon. Automatic stylus calibration can be incorporated into measuring programs.

NG Re-measurement Function

If the measured value lies outside the preset tolerance after CNC measurement, re-measurement of the element can be carried out. If this function is valid, a message window with a list of tasks out of the tolerance (NG) appears, enabling re-measurement. "In the re-measurement, measurement is carried out only for the NG tasks." When the re-measurement is completed and the results within the tolerance are obtained, the printout and the text file to be output are revised by changing the status of the re-measured points only to OK.

Spiral Measurement

The cylindrical profile in spiral can be measured by setting the starting height, the number of rotations and the lead in advance. The hole center position can be calculated by measuring the screw hole along the peak and valley.
Diverse Edit Functions
Calypso powerfully assists such operations as (1) Completing a regular part program by editing a teaching program created based on provisional measurement (2) Editing a complete program to register it as another program and (3) Reviewing the measurement items and measurement sequence after creation. Measurement sequence can be changed simply by moving the element icons. It has an unparalleled advanced algorithm that can be found easy as you get accustomed to using it.

- Measurement plan editor element
  In Calypso, CNC part program is referred to as measurement plan. Various factors of evaluation method, such as out-of-range measurement points of measured elements (measurement items), existence and type of filter can be collectively specified retrospectively.

- Mirror image function
  For measurement of left and right symmetrical components for auto parts, etc., mirror image of a part program on one side can be created and used as a program for the other side.

- Editing of measuring conditions
  Conditions of each element in a created measurement plan can be easily edited.
  - Changing the measurement point.
  - Change from point measuring to scanning measuring.
  - Changing specified height, position, auxiliary refuge surface, dimensions and tolerance and element name.
  - Addition and deletion of measurement items.
  - Rearrangement of element icons that have been created.
  - Paint brush copy: Various measuring conditions and evaluation items configured for the measurement of one element can be collectively copied and registered for another element (property).

Interchange of Icons
For example, once an analysis item “Circle 1” is newly added, the roundness measurement item is added to the end of all measurement characteristics. However, this makes the measurement program unclear which circle of a workpiece to be measured. To make the measurement program clearer and easier, characteristics of the same elements should be put together. Just by the select of a characteristic to be moved and drag-and-drop to anywhere, you can move an item and create a better measurement program that anyone can understand.

Calypso Macro Function
This function enables configuration of a number of “small” measurement plans within a “large” measurement plan.

- Benefits of Calypso macro function
  - Able to create measurement plans of a plurality of repetitive parts easily
  - Able to combine part-wise measurement plans easily (Utilization Example)
**Calypso Auto Run Function**

This function iconizes a number of measurement plans so that they can be started by simple operations. A number of different workpieces can be arranged within the measuring range (on the surface plate of the measuring machine) for measurement. Image file may be pasted on the single work icon and the junction icon. (.bmp/.jpg/.gif)

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**Calypso offline teaching functions**

Calypso has an offline teaching function, with which you can create a measurement program only by carrying out operations on the data processing system after incorporating a CAD model without performing teaching by using actual workpieces.

- **Shorten leadtime by pre-creation of measuring procedure**
  
  When the workpiece is in production and not available, by using CAD model and create the program, it is able to be measured immediately after the workpiece is manufactured.

- **Simplified measuring procedure, data sharing**
  
  Significantly improve measuring efficiency by automatic recognition function for appropriate stylus and element sorting function that makes moving path the shortest when measuring workpiece.

- **Reading CAD data with PMI allows generating the measuring elements automatically**
  
  Enables automatic creation of evaluation items and measuring element by importing CAD model with PMI.

**Offline teaching (Calypso standard function)**

Offline teaching function is standardly installed in Calypso.

**Step 1 Load CAD model (supporting SAT format*)**

Import CAD model data and display it on the Calypso screen.

*CAD model except for SAT format, CAD conversion program may be required. Please refer to the next page.

**Step 2 Create automatic measuring program**

Measurement programs can be created by simple operations since any point mouse-clicked on the screen becomes the measurement point. Also, created programs can be optimized by the element sorting function and the automatic stylus recognition function, significantly improving the measurement efficiency.

- **Element sorting function**
  
  Sorting the elements to minimize the moving path within the elements or the designated element group improves the measurement efficiency.

- **Stylus automatic recognition function**
  
  From the styluses registered in advance, the stylus in the closest posture to the element direction (if the workpiece has a cylindrical profile, direction of the axis, if it is a plane, direction of the normal line) is automatically recognized.

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**Example of creation of measuring program**

*Stylus simulation (optional) is required to display the probe and stylus on the screen.

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Before sorting element

After sorting element

It selects most suitable stylus depending on designated elements (slanting surface).
**Offline teaching support function (optional)**

The offline teaching function can be upgraded by adding options, such as CAD conversion programs, Stylus Simulation and Calypso Planar, respectively.

- Supports various formats of CAD models used around the world (CAD conversion programs)
- Avoids collision risk by pre-measurement checking for interference between the workpiece and the stylus (Stylus Simulation)
- Enables creation of measurement programs on an office PC, which is not connected to the coordinate measuring machine (Calypso Planar)

**Prepare for probe system**

The probe system to be used can be easily created by “Stylus System Creator” included in Stylus Simulation (option). Using the created probe system, simulation of the measuring path (checking for interference with the workpiece) is carried out. (See Step 4).

**Load CAD model**

By using the CAD conversion programs (option), different CAD models other than those of the standard SAT format can also be imported. Imported CAD models are displayed on the Calypso screen. The program can also be used on CAD models containing product and manufacturing information (PMI), such as models in CATIA V5 and SolidWorks.

<table>
<thead>
<tr>
<th>Applicable CAD format</th>
<th>CATIA V5, SolidWorks, Siemens NX, JT Open, Solid Edge</th>
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</table>

*CAD conversion program is required depending on the CAD model you wish to import. Please refer to the list of CAD conversion program specification in page 47 for applicable versions of CAD format.

**Create automatic measuring program**

When CAD models are imported by using the optional conversion programs, measurement programs can also be created by the simple operation of clicking on the screen to input the measurement point as with the CAD models in the standard SAT format. Moreover, when CAD models with product and manufacturing information (PMI) are imported, labor and time required for creating measurement programs can be significantly reduced because elements and evaluation items can be automatically generated.

**Simulate measuring path**

The created measuring path is subjected to simulation to check for interference between the workpiece and the stylus. If interference is detected, the interfered element and the evacuation face position are displayed on a list, which makes it possible to find the areas to be modified at a glance.

Preliminary simulation can help avoid the risk of collision between the workpiece and the stylus, greatly enhancing the safety in the actual measurement.

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**Data Processor System (Software)**

**Applicable CAD format**

- SAT(ACIS), STEP, IGES(3D), VDAFS(3D), Inventor, SolidWorks, Parasolid, Creo Parametric(Pro/ENGINEER), CATIA V4, CATIA V5, Siemens NX, JT Open, Solid Edge
- CATIA V5, SolidWorks, Siemens NX

*Stylus simulation (optional) is required

*CAD conversion program is required depending on the CAD model you wish to import. Please refer to the list of CAD conversion program specification in page 47 for applicable versions of CAD format.

**Prepare for probe system**

1. Select the socket
2. Select the probe
3. Select the extension
4. Select the stylus

**Load CAD model**

1. Import PMI (CAD model)
2. Import PMI (CAD model with PMI)
3. Import PMI (CAD model with PMI)

**Create automatic measuring program**

1. Select the socket
2. Select the probe
3. Select the extension
4. Select the stylus

**Simulate measuring path**

1. Simulation display
2. List will show up when it detects interference of stylus

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**Accretech**

TOKYO SEIMITSU
Calypso Option Programs

Table File Output Program (option)
Theme measuring results, tolerances, and other information of the theme whose measurement name is selected can be output as text. Multiple workpieces can be accumulated to a single file.

TESCHART Plus: Inspection Chart Generation Program (option)
TESCHART is an add-in program that can be used to import measurement results into Microsoft Excel and create inspection charts. The charts can be generated in special formats, in which detailed output layout can be configured, as well as in the basic format. If the measurement result includes NG data, a message can be displayed to confirm the operator whether or not to save the data. It is possible to highlight out-of-tolerance data, insert figures and create graphs by making use of the Microsoft Excel functions. By setting up automatic processing, series of operations, such as importing data from the measuring machine, saving the file and printing, can be carried out continuously. Newly added DB function, which accumulates the measurement results and creates a database to search, referencing, and output the past measurement results, and web function, which displays inspection charts created by TESCHART Plus on the web browser of other LAN-connected PCs have greatly improved the user-friendliness.

*Measurement data of Calypso and XYANA2000, O-SELECT, ACCTee are available
*For Microsoft Office Excel 2007 or later (required separately)
Expanded Plot (optional)

Expanded plot is a function which enables integration of various geometric form drawings such as roundness, flatness, cylindricity and straightness into one format of drawing and print out. Additionally it is able to integrate and print out comparison drawing in case of profile measurement is optionally installed. Also it provides a function that is capable of changing a point of view, magnification of drawing and error magnification in an image viewer and it enables various printing. It is able to collect a number of measuring tasks you wish to make it into drawing and print out by adding graphic element icon to the measuring task.

CAD Conversion Program (2D) (optional)

Creation of measurement programs based on element recognition (offline teaching) is also possible from 2D CAD programs, such as DXF, VDAFS (2D) and IGES (2D). *Please refer to page 40 to 41 for 3D CAD models

List Calibration (option)

Rotation angles to be used can be pre-registered in a list for automatic calibration of the items included in the list.

EDM Module (option)

This electric discharge machine offline setup option provides evaluation of workpiece and electrode positions based on a master pallette and other references.

Hole Pattern Best Fit (option)

This function rotates or offsets the hole pattern in true position calculation to perform best fit.

Pipe Evaluation Function (option)

Pipe profiles are defined by intricately jointed cylindrical elements. This function calculates bent and twisted angles and intersection points of profiles. CAD data and manual input of values or measurement of master parts can define pipe profiles.

DMIS Compatible System (option)

The ZVI interface is a function that converts measuring programs and commands created by a commercially available offline teaching system, and performs measuring operations. DMIS import is a function that imports measuring programs created in DMIS language and converts them to Calypso measuring programs. DMIS result output is a function that exports Calypso measuring results to a DMIS format file.

*DMIS (Dimensional Measuring Interface Standard): Common measuring program language

PCM (Parameter Coded Measurement) (option)

This option produces an original message window before or after execution of a CNC measuring plan, and lets the operator configure detailed settings for the next action based on measurement results. When forms are identical, except for certain measured lengths or measured diameters, variables can be used for the reference values so multiple workpieces can be measured using the same part program. Parameter-Coded Measurement makes it possible to create highly refined original programs because the measuring path and other measuring machine movements can be controlled as required. Programs are text-based, so they can be incorporated into Calypso part programs, which makes Parameter-Coded Measurement a powerful CNC support tool.

Free Form Curved Surface Evaluation (option)

Errors of actual measured value and nominal value are displayed as colored dots (standard function). Operators can check errors of each actual measured value for flatness, roundness and cylindricity evaluations visually, and recognize the concavity and convexity of a flat surface at a glance. Addition of optional Free Form function allows free form evaluations.
Cylindrical Cam Measurement

Cylindrical cam measurement is available using a rotary table. Cam is measured at a constant radius on the center of rotation axis. The center line and groove width of the cam are evaluated. When a rotary table is used, scanning measurements enable evaluations. (Calypso CURVE standard function)

Form Data ASCII Input/Output Program (option)

This is an optional program to add functions to read point sequence data of ASCII files as nominal value point sequence of 2-dimensional curve elements, and save 2-dimensional curve element measurement results as an ASCII file.

IGES/DXF-ASCII conversion program (option)

This optional program can convert IGES/DXF data to an ASCII file which can be used as nominal value data of 2 dimensional curve elements, and convert actual measurement data with Calypso CURVE to IGES/DXF data.