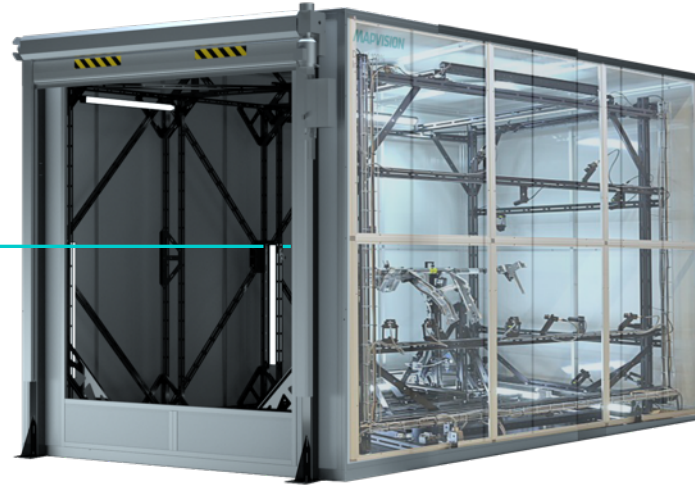


MAPVISION

100% X 100 In-Line Inspection



The screenshot displays the MAPVISION software interface, which is used for inspecting mechanical parts. The interface is divided into several sections:

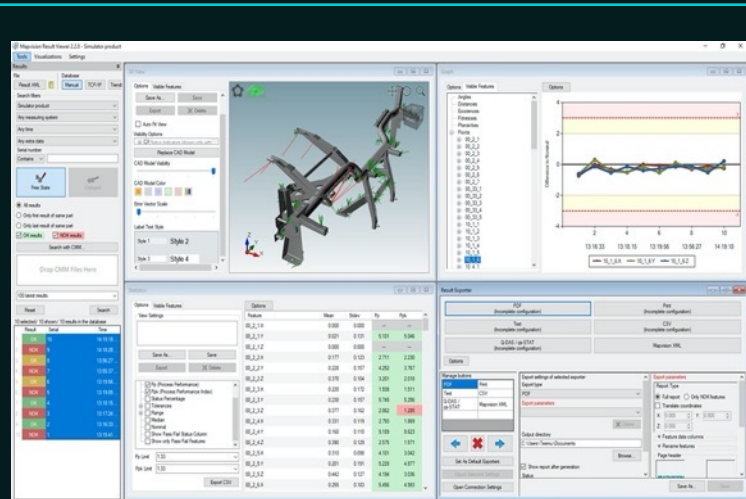
- Top Left:** A 3D model of the mechanical part being inspected, showing various features and dimensions.
- Top Right:** A graph showing the results of the inspection, with a line plot and a table of data points.
- Middle Left:** A table of inspection results, showing the name of the feature, its tolerance, and the measured value.
- Middle Right:** A table of inspection results, showing the name of the feature, its tolerance, and the measured value.
- Bottom:** A 3D model of the mechanical part with yellow boxes highlighting the inspected features.

Feature	Min	Max	Avg	High
RU_2,1,1	0.00	0.00	0.00	0.00
RU_2,1,1	0.001	0.001	0.001	0.001
RU_2,1,2	0.000	0.000	0.000	0.000
RU_2,1,3	0.017	0.020	0.019	0.020
RU_2,1,4	0.008	0.007	0.007	0.007
RU_2,2,1	0.075	0.104	0.091	0.104
RU_2,2,2	0.028	0.030	0.029	0.030
RU_2,2,3	0.077	0.102	0.092	0.102
RU_2,2,4	0.021	0.018	0.020	0.018
RU_2,3,1	0.102	0.102	0.102	0.102
RU_2,3,2	0.086	0.028	0.075	0.028
RU_2,3,3	0.016	0.006	0.010	0.006
RU_2,3,4	0.001	0.001	0.001	0.001
RU_2,3,5	0.040	0.027	0.034	0.027
RU_2,3,6	0.008	0.003	0.006	0.003

Inspection Applications for the Automotive Industry

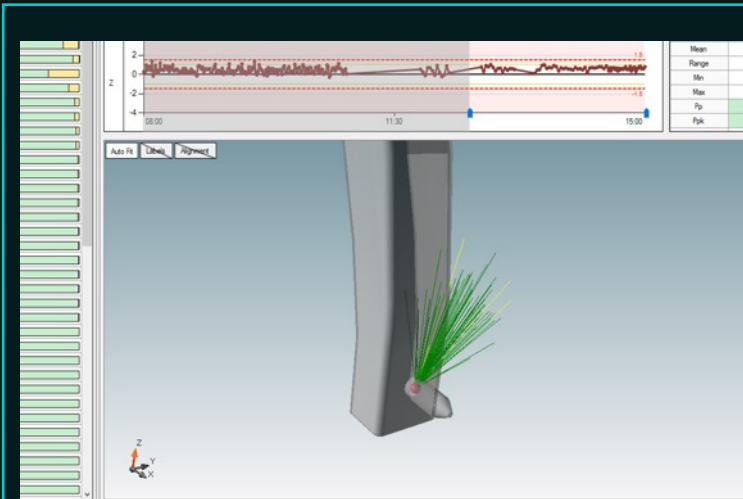
Mapvision 100% x 100% In-Line Inspection

Inspect 100% of the features for 100% of the parts you manufacture within Takt time – even for the most complex parts with hundreds of inspection points.



Safe Quality Containment

Detect out-of-spec parts as soon as they are produced to safely contain them within your facility. Avoid OEM line shutdowns and expensive warranty claims. Build a reputation for 100% delivery quality.



Real-Time Process Data Analytics

Monitor your process performance for each feature, component, and production cell in real-time. Utilize deep-dive data to reveal complex variation patterns and trends. Prevent scrap and enable advanced closed-loop manufacturing processes.



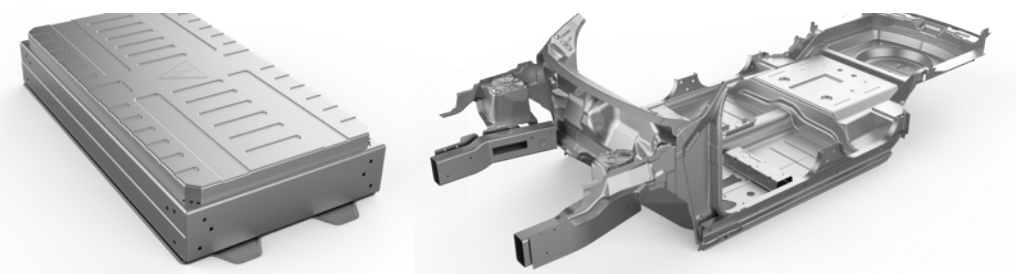
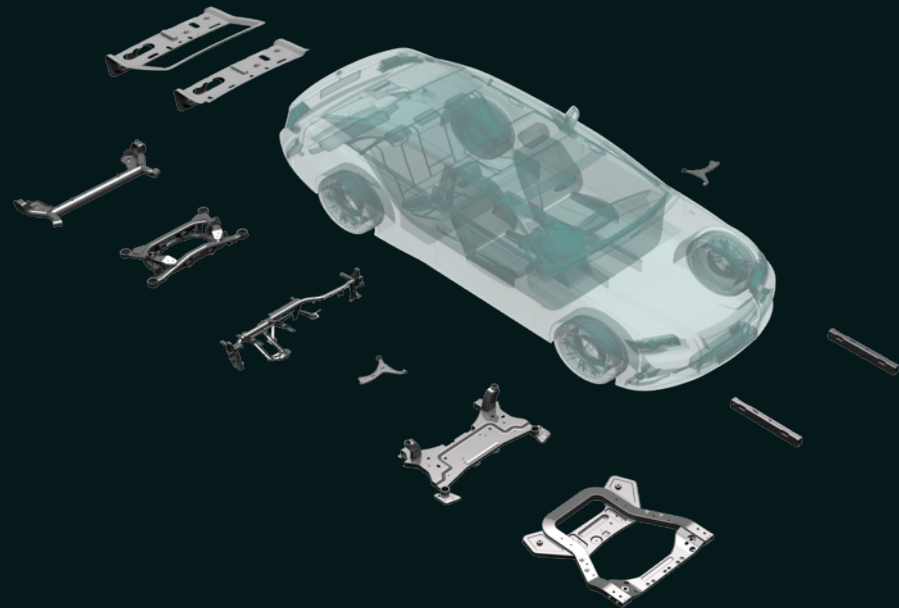
Retroactive Inspection and Virtual Sorting

Conduct new inspections for new or pre-defined features on product digital twins – without needing the physical parts. Conduct sorting activities completely digitally with Virtual Sorting.

— INSPECTED PARTS

Inspect Parts of **All Sizes and High Complexity**

Inspect a wide range of welded, cast, and stamped components to ensure a stable output quality – no matter how large or complex your part is. From side beams and axle components to front end modules, underbody modules, entire ladder frames, and EV battery packs; Mapvision helps you increase productivity and quality.



Application examples in
this deck

- Underbody
- Body in White
- Ladder Frame
- EV Battery Module
- EV Battery Tray
- Cross Car Beam
- Subframe
- Body Side
- Motorcycle Frame

Underbody Inspection

400+

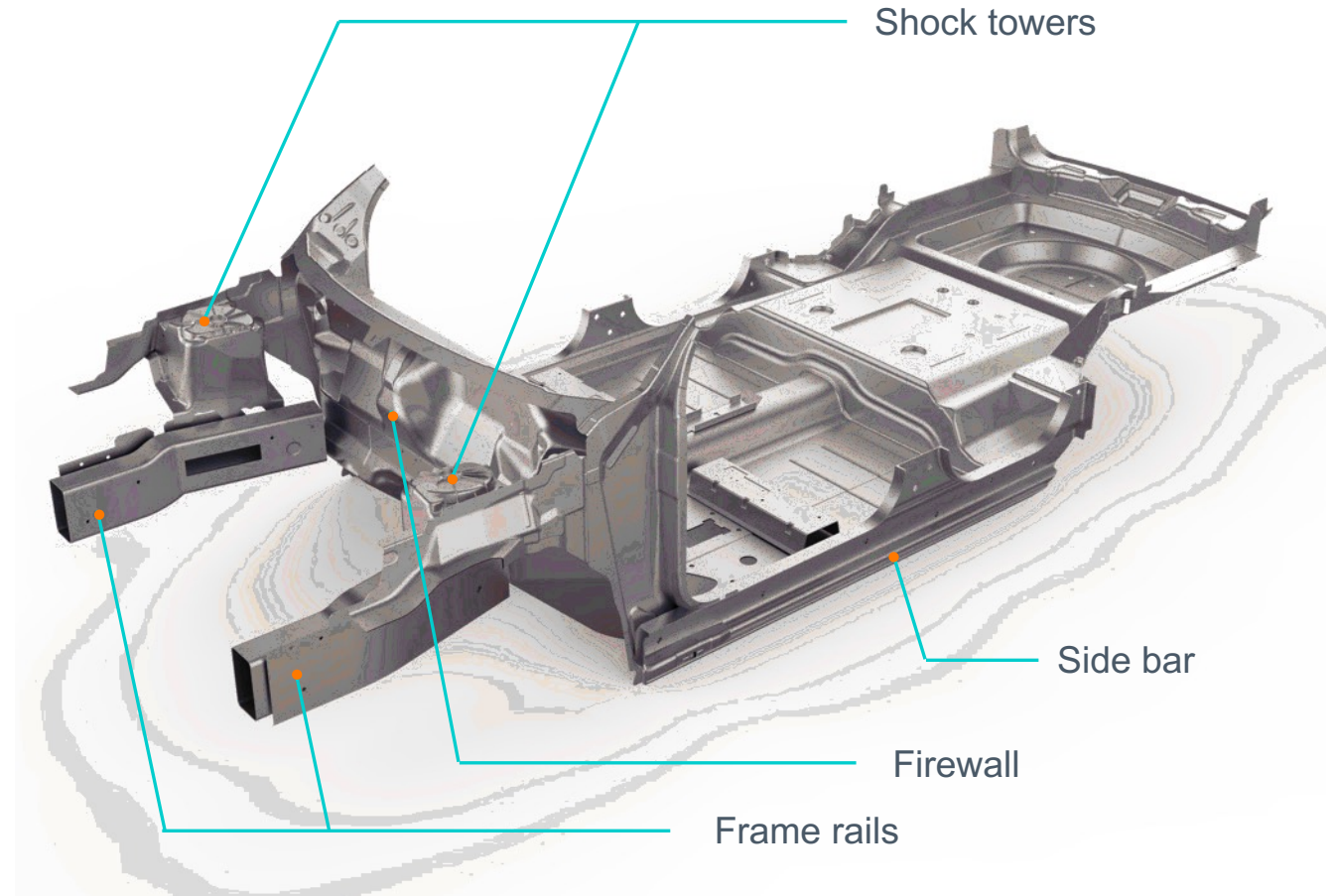
of Features Inspected

30 seconds

Inspection Cycle Time

Example Inspection Points

- Frame rail location
- Fire wall positioning
- Shock tower
 - Location and placement
 - Shock absorber mounting holes on the shock towers
- Mounting holes of the seats
- Mounting places for the subframes
- Positioning of the crash tubes
- Battery pack mounting points (for EV underbodies)



Underbody Inspection

300+

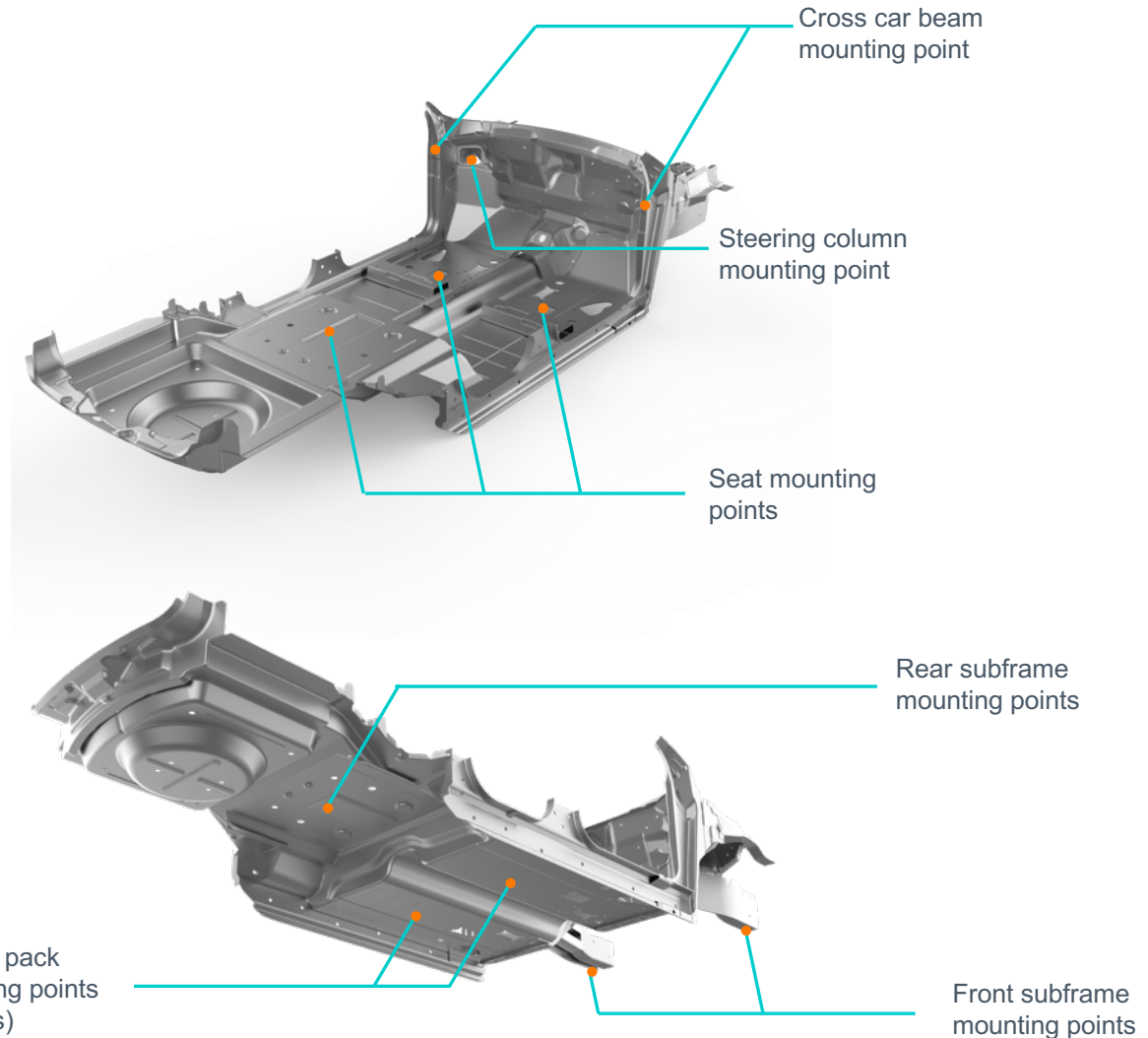
of Features Inspected

30 seconds

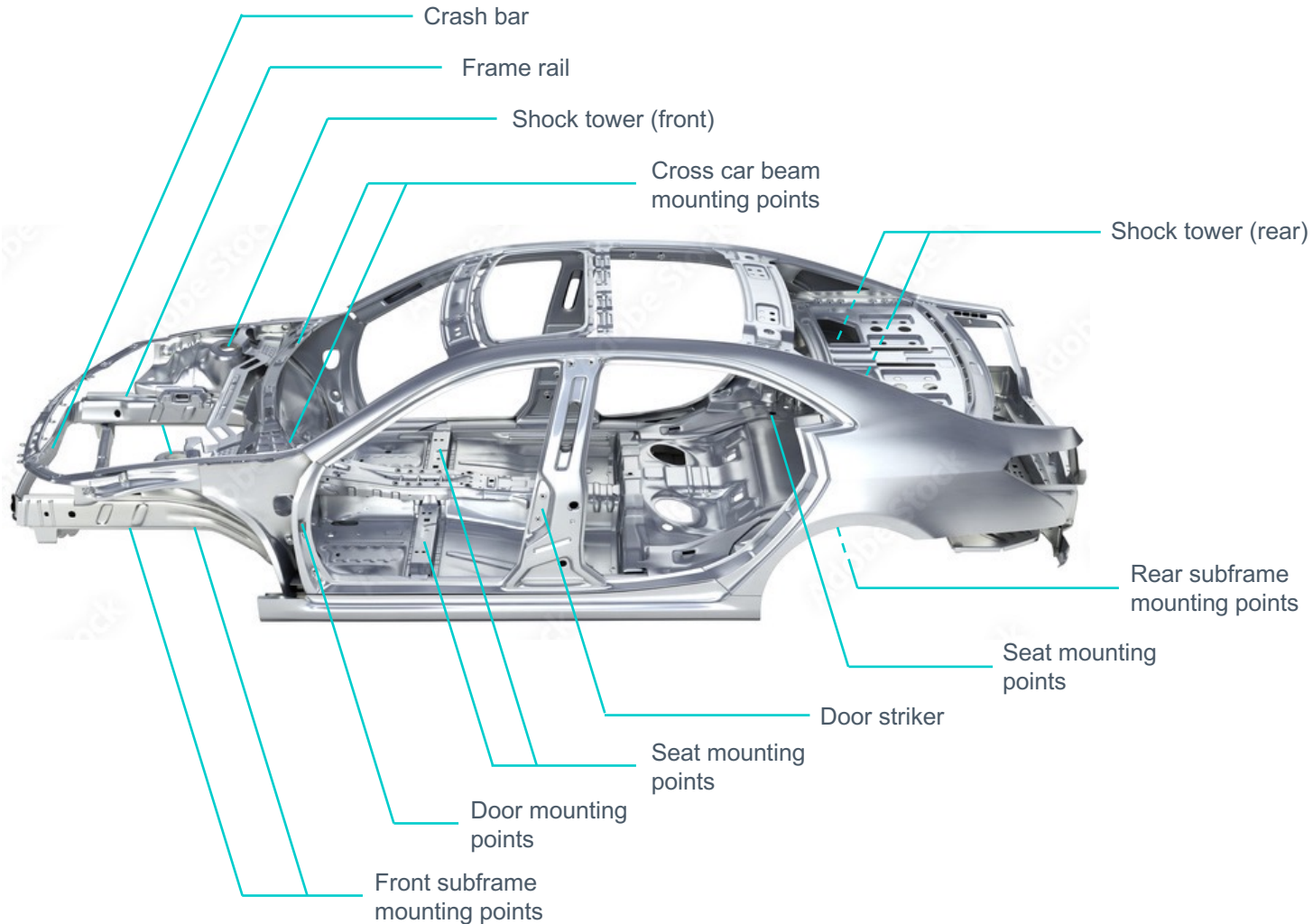
Inspection Cycle Time

Example Inspection Points

- Frame rail location
- Fire wall positioning
- Shock tower
 - Location and placement
 - Shock absorber mounting holes on the shock towers
- Mounting holes of the seats
- Mounting places for the subframes
- Positioning of the crash tubes
- Battery pack mounting points (for EV underbodies)



Body in White Inspection



500+

of Features Inspected

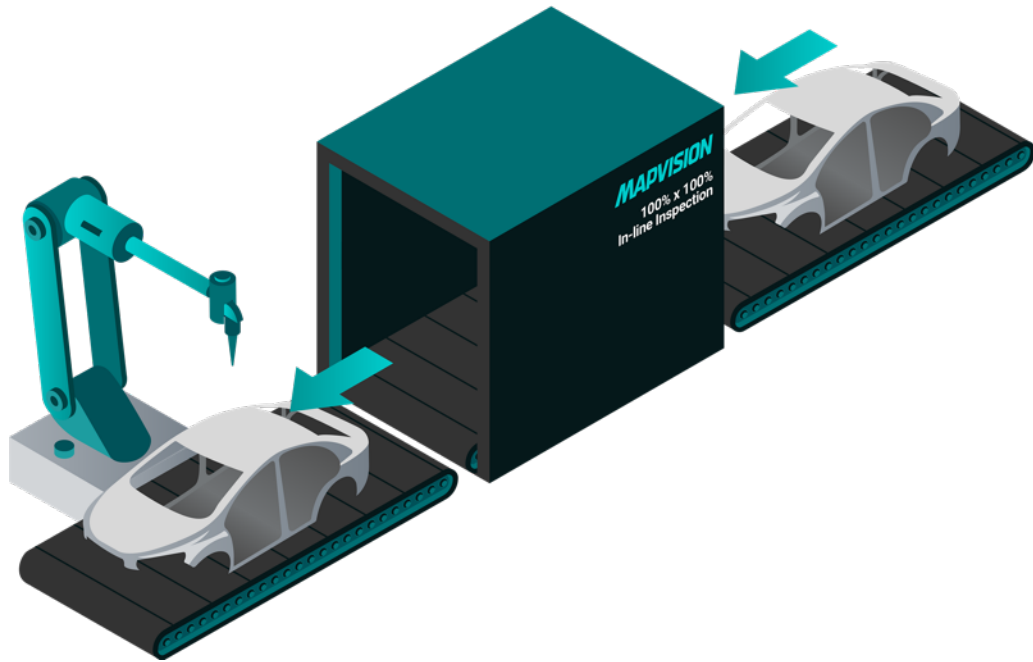
35 seconds

Inspection Cycle Time

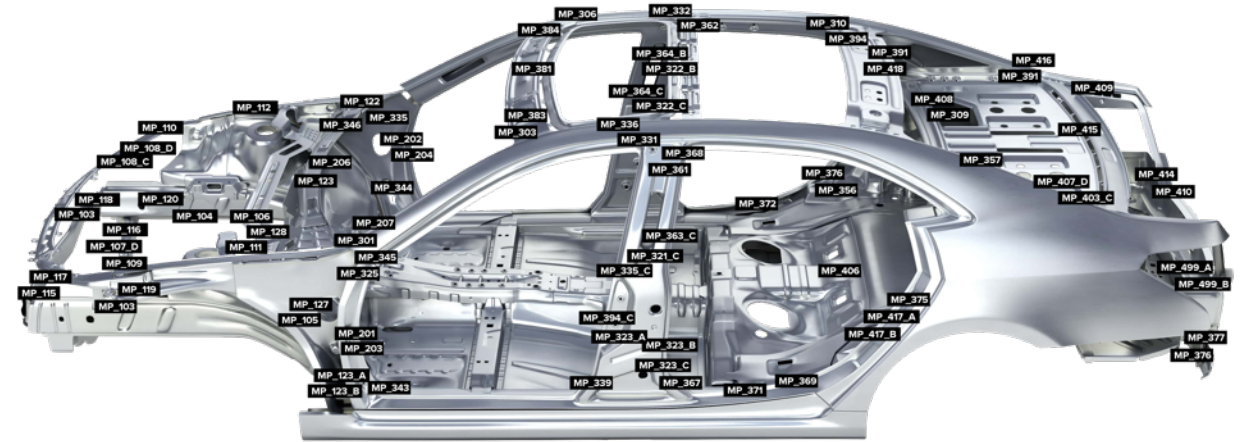
Example Inspection Points

- Mounting points of the subassemblies (e.g. front subframe, rear subframe, etc.)
- Shock towers
- Seat mounting points
- CCB mounting points
- Door mounting points
- Frame rail
- Crash bar
- Steering column mounting points
- Firewall
- Battery pack mounting points (for EVs)

Body in White Inspection

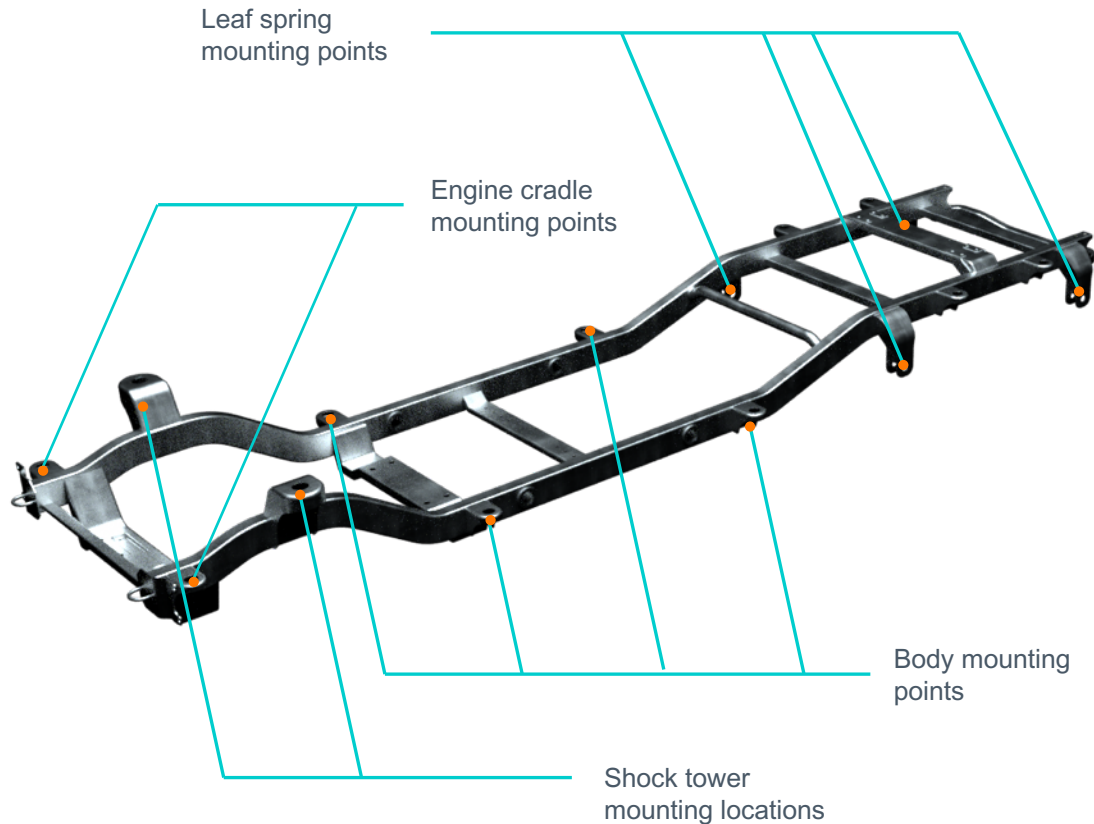


A pass-through loading mechanism is used to load the body in white parts into the system for inspection.



Some of the inspection points as tagged by the measurement algorithms

Ladder Frame Inspection



250+

of Features Inspected

30 seconds

Inspection Cycle Time

Example Inspection Points

- Mounting points of the body
- Shock tower mounting locations
- Engine cradle mounting points
- Leaf spring mounting points
- Other functional mounting points

Ladder Frame Inspection

Tools Settings

Results

File Database

Result XML Manual

Product	Status
LF LHD	█ █ █
LF RHD	█

28.11.2013 29.11.2013 30.11.2013

16:00 08:00 00:00

Parts / hour

09:24 - 28.11.2013 09:09 - 30.11.2013

Free State Clamped

All results
 Only first result of same part

Compare Selected 275 results

Cell

Comparison	Item	Status
<input checked="" type="checkbox"/>	Adjust A	█ █ █
<input type="checkbox"/>	B	█

Automatic loading is stopped Start automatic loading

Features

Feature	Status
211-212-213 MNP	█ █ █
204-205-206 QRS	█ █ █
060 ABC	█ █ █
062_2-064 QRS	█ █ █
103-104 QRS	█ █ █
143-144-145 ABC	█ █ █
099-100-101 QRS	█ █ █
151-152-153 ABC	█ █ █
109-110 ABC	█ █ █
151-152-153 QRS	█ █ █
60 GHAA	█ █ █
143-144-145 QRS	█ █ █
131-132-133 QRS	█ █ █
066-067 GHAA	█ █ █
062_1 QRS	█ █ █
127-128-129 ABC	█ █ █
147-148-149 QRS	█ █ █
190-192-191 ABC	█ █ █
112-113 QRS	█ █ █
90 ABC	█ █ █
077-078-079 ABC	█ █ █
127-128-129 QRS	█ █ █
106-107 QRS	█ █ █
209-210 MNP	█ █ █
077-078-079 QRS	█ █ █
097-103-104 ABC	█ █ █
91 ABC	█ █ █
119-120-121 QRS	█ █ █
071 GHAA	█ █ █
123-124-125 QRS	█ █ █
001-002-009 ABC	█ █ █
074-075-076 ABC	█ █ █

Automatic scaling Min/Max 0.1 Maximize

X

Y

Z

Feature	Mean	Range	T Range	Pp	Ppk
099-100-101 QRS X	-0.973	2.326	4.800	2.09	1.24
099-100-101 QRS Y	-0.383	0.808	4.400	5.24	4.33
099-100-101 QRS Z	-1.444	3.300	4.500	1.07	0.38

EV Battery Module Inspection

700+

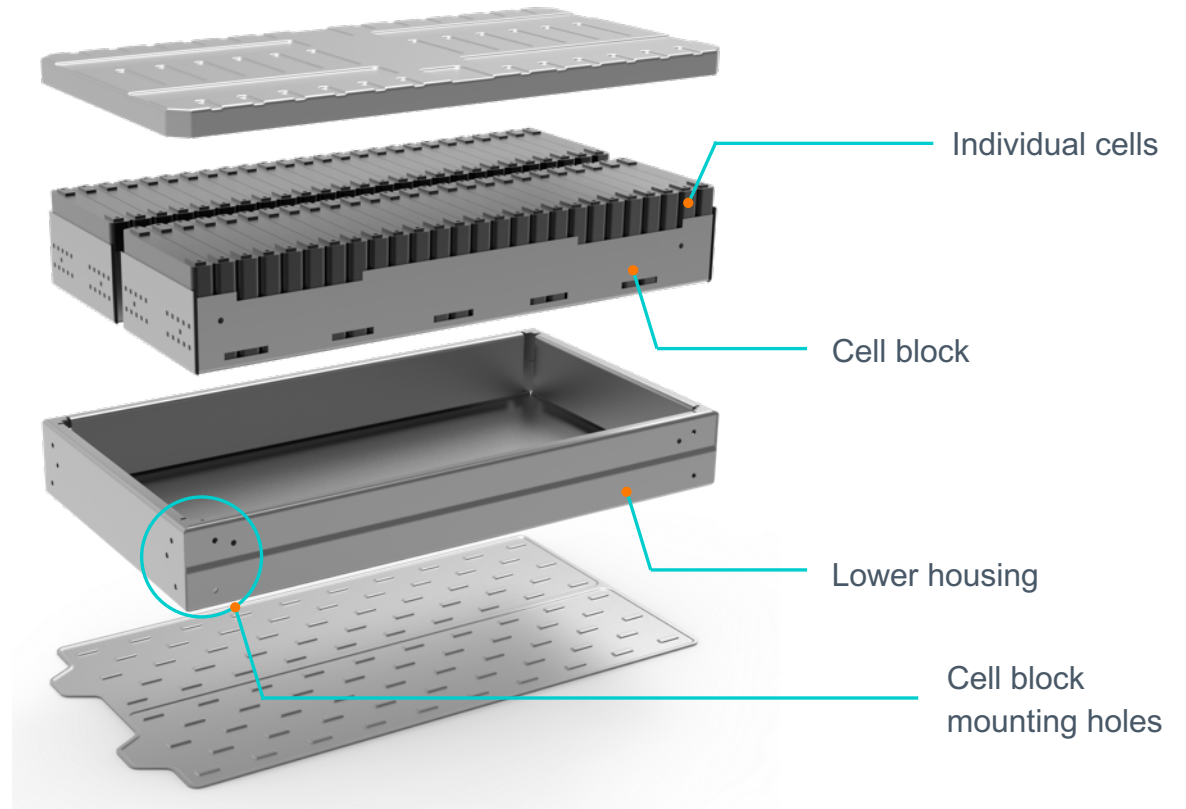
of Features Inspected

35 seconds

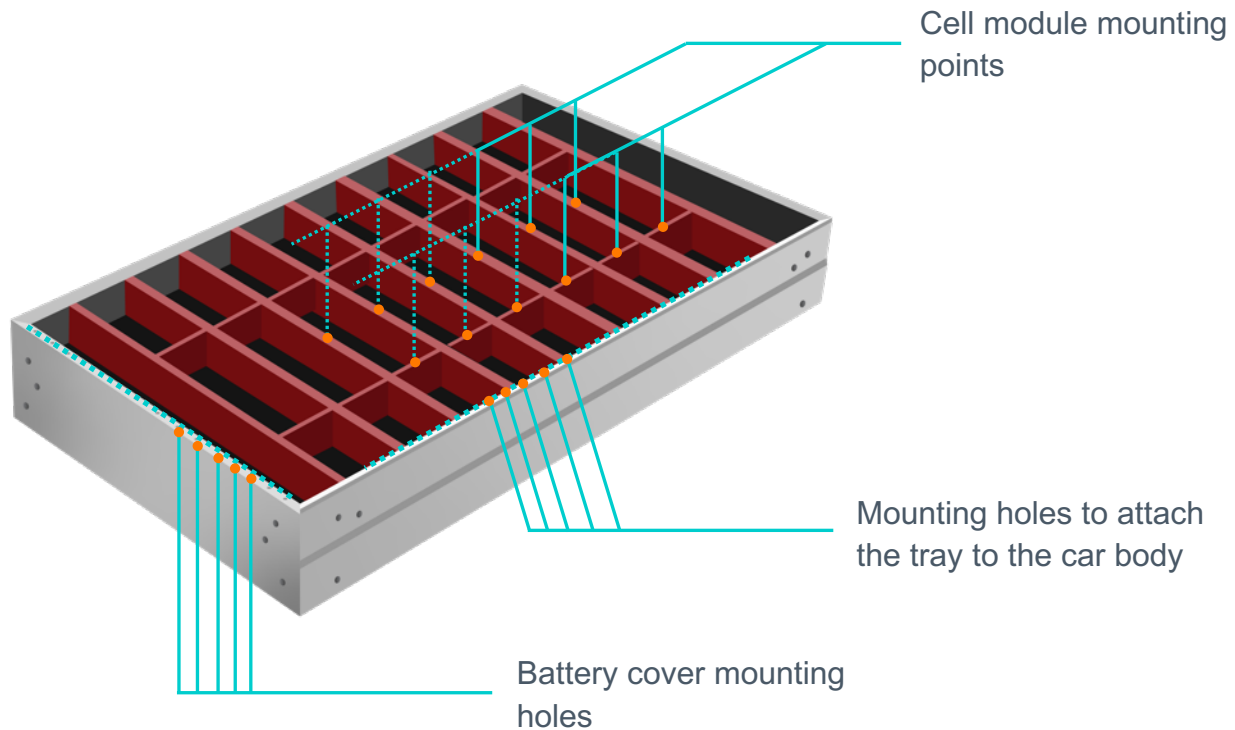
Inspection Cycle Time

Example Inspection Points

- Cell block position on the defined planes
- 3D location (x, y, z) of individual cells
- Distance between cell block and lower housing side
- 3D location (x, y, z) of the lower housing corners
- Side flatness of the lower housing
- 3D location (x, y, z) of the cell block mounting holes



EV Battery Tray Inspection



200+

of Features Inspected

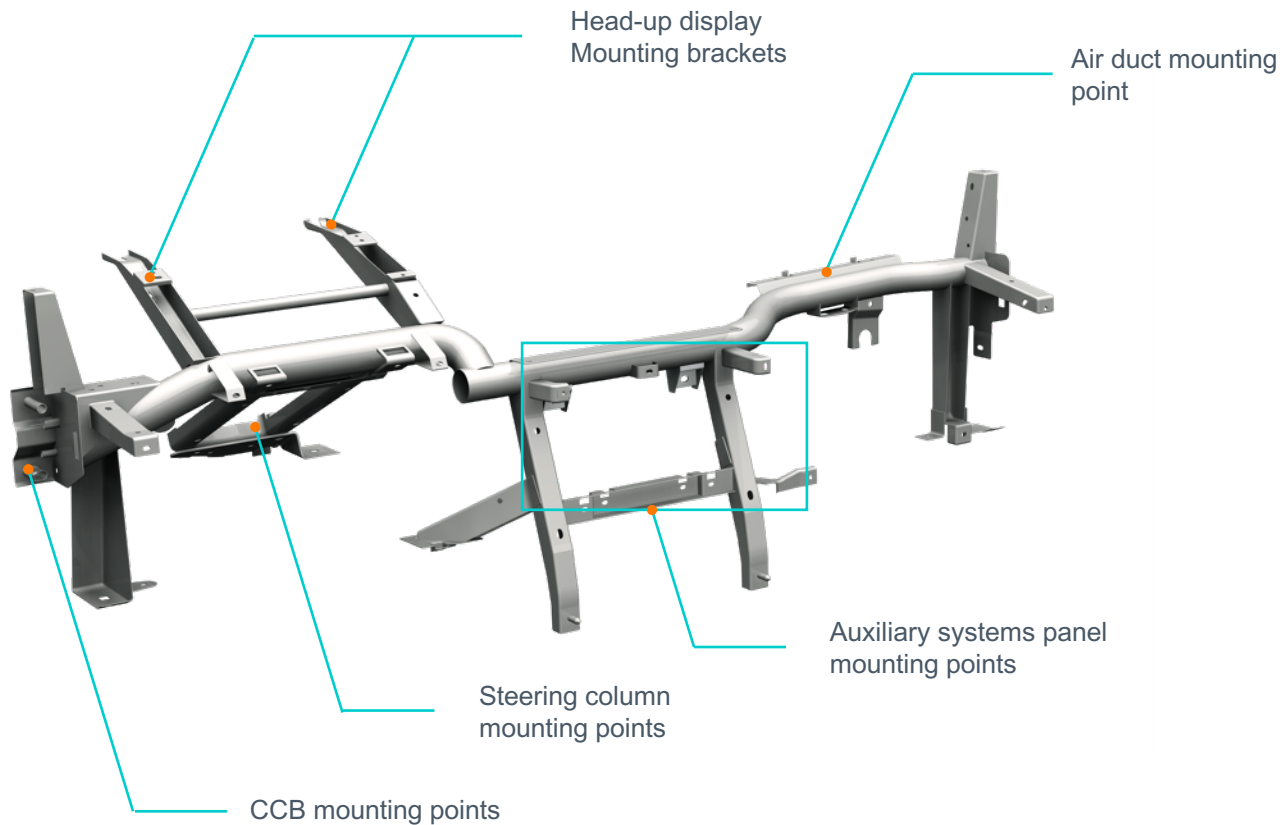
30 seconds

Inspection Cycle Time

Example Inspection Points

- 3D location (x, y, z) of cell module mounting points
- 3D location (x, y, z) of mounting holes to attach the tray to the car body
- 3D location (x, y, z) of mounting holes for the battery cover
- Distances between certain holes
- Presence check for nuts and bolts

Cross Car Beam Inspection



200+

of Features Inspected

30 seconds

Inspection Cycle Time

Example Inspection Points

- Location of the mounting points of the CCB
- Head-up display mounting brackets
- Steering column mounting points
- Auxiliary systems panel mounting points (check the name)
- Other mounting locations

Cross Car Beam Inspection

Mapvision Result Viewer 2.2.0 - Simulator product

Tools Visualizations Settings

Results

File: Result XML Manual TCP/IP Trend

Search filters: Simulator product, Any measuring system, Any time, Any extra data, Serial number, Contains

Free State Clamped

Fit results: Only first result of same part, Only last result of same part, OK results, NOK results

Drop CMM Files Here

100 latest results

10 selected / 10 shown / 10 results in the database

Result	Serial	Time
OK	10	14:19:18
NOK	9	14:19:28
OK	8	13:56:27
NOK	7	13:55:37
OK	6	13:19:56
NOK	5	13:19:05
OK	4	13:18:15
NOK	3	13:17:24
OK	2	13:16:33
NOK	1	13:15:41

3D View

Options: Visible Features, Save As..., Export, Delete, Auto Fit View, Visibility Options, Replace CAD Model, CAD Model Visibility, CAD Model Color, Error Vector Scale, Label Text Style

Graph

Options: Visible Features, Angles, Distances, Fitnesses, Planarities, Points

Statistics

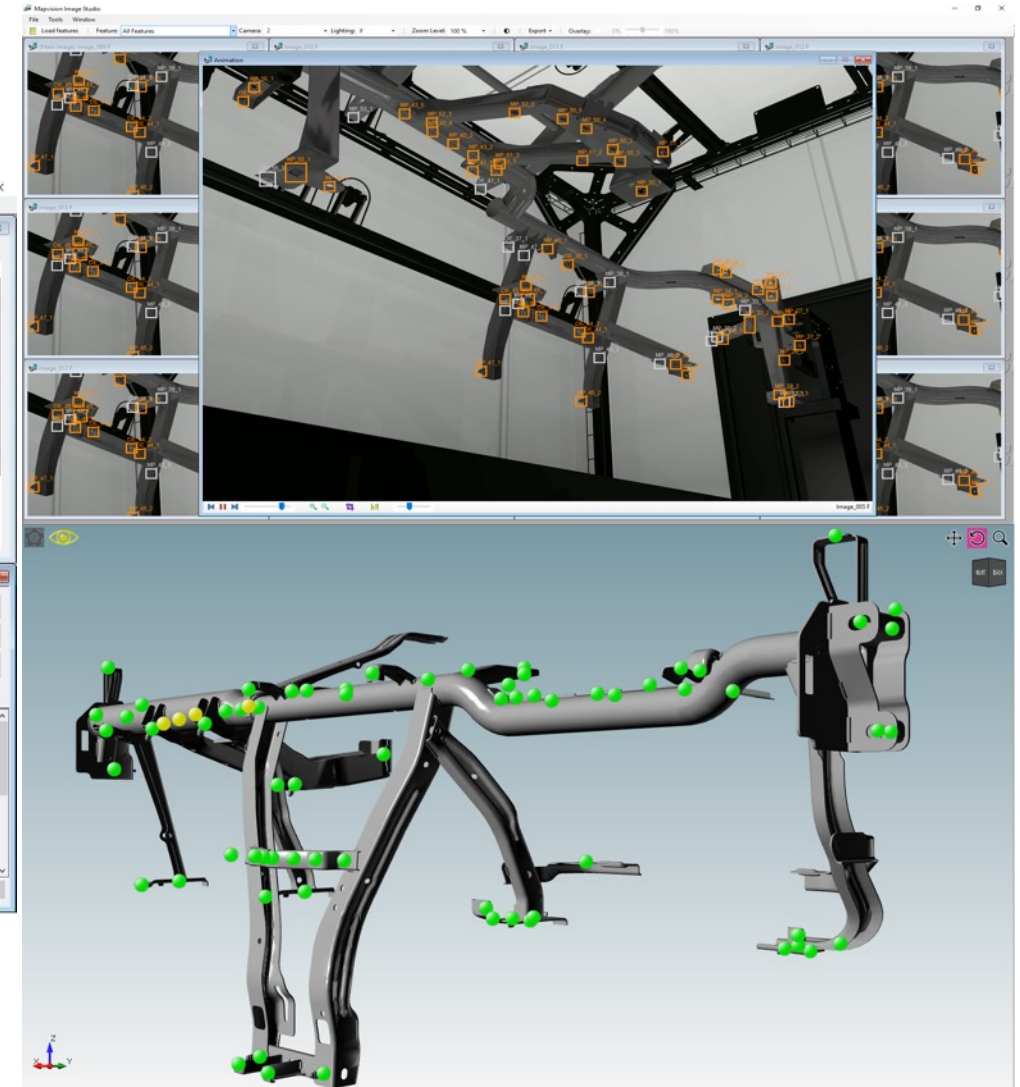
Options: Visible Features, View Settings, Save As..., Export, Delete, Pp (Process Performance), Ppk (Process Performance Index), Status Percentage, Tolerances, Range, Median, Normal, Show Pass/Fail Status Column, Show only Pass/Fail Features

Feature	Mean	Stdev	Pp	Ppk
00_2_1,X	0.000	0.000	—	—
00_2_1,Y	0.021	0.131	5.101	5.046
00_2_1,Z	0.000	0.000	—	—
00_2_2,X	0.177	0.123	2.711	2.230
00_2_2,Y	0.228	0.157	4.252	3.767
00_2_2,Z	0.370	0.104	3.201	2.018
00_2_3,X	0.220	0.172	1.533	1.511
00_2_3,Y	0.230	0.157	5.745	5.256
00_2_3,Z	0.377	0.162	2.062	1.285
00_2_4,X	0.331	0.119	2.783	1.869
00_2_4,Y	0.160	0.110	9.109	6.623
00_2_4,Z	0.390	0.129	2.575	1.571
00_2_5,X	0.310	0.098	4.101	3.042
00_2_5,Y	0.201	0.191	5.228	4.877
00_2_5,Z	0.442	0.127	4.194	3.036
00_2_6,X	0.255	0.183	5.456	4.993

Result Exporter

PDF (Incomplete configuration), Text (Incomplete configuration), Q-DAS / sp-STAT (Incomplete configuration), Print (Incomplete configuration), CSV (Incomplete configuration), Mapvision XML

Export parameters: Report Type (Full report, Only NOK features), Translate coordinates, Feature data columns, Rename features, Page header



Subframe Inspection

150+

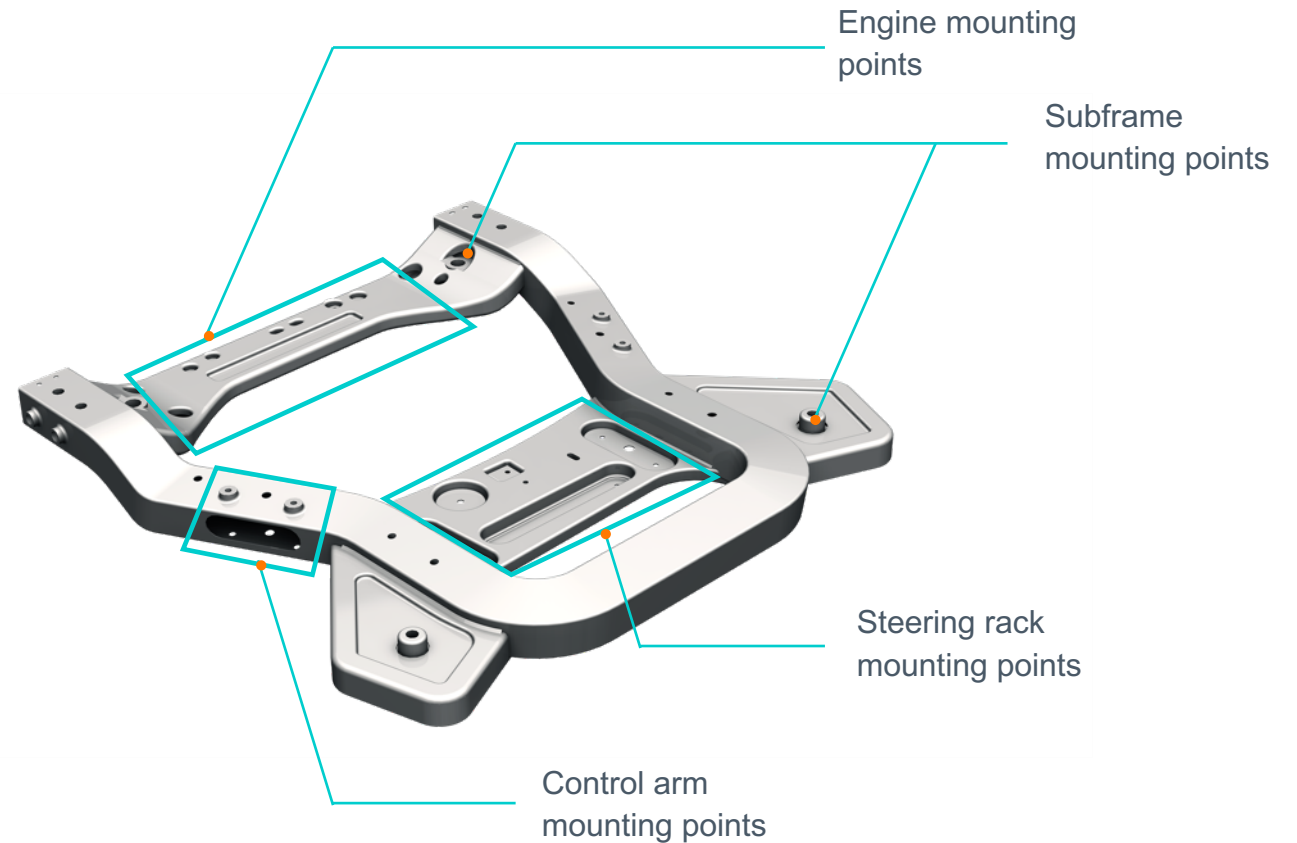
of Features Inspected

30 seconds

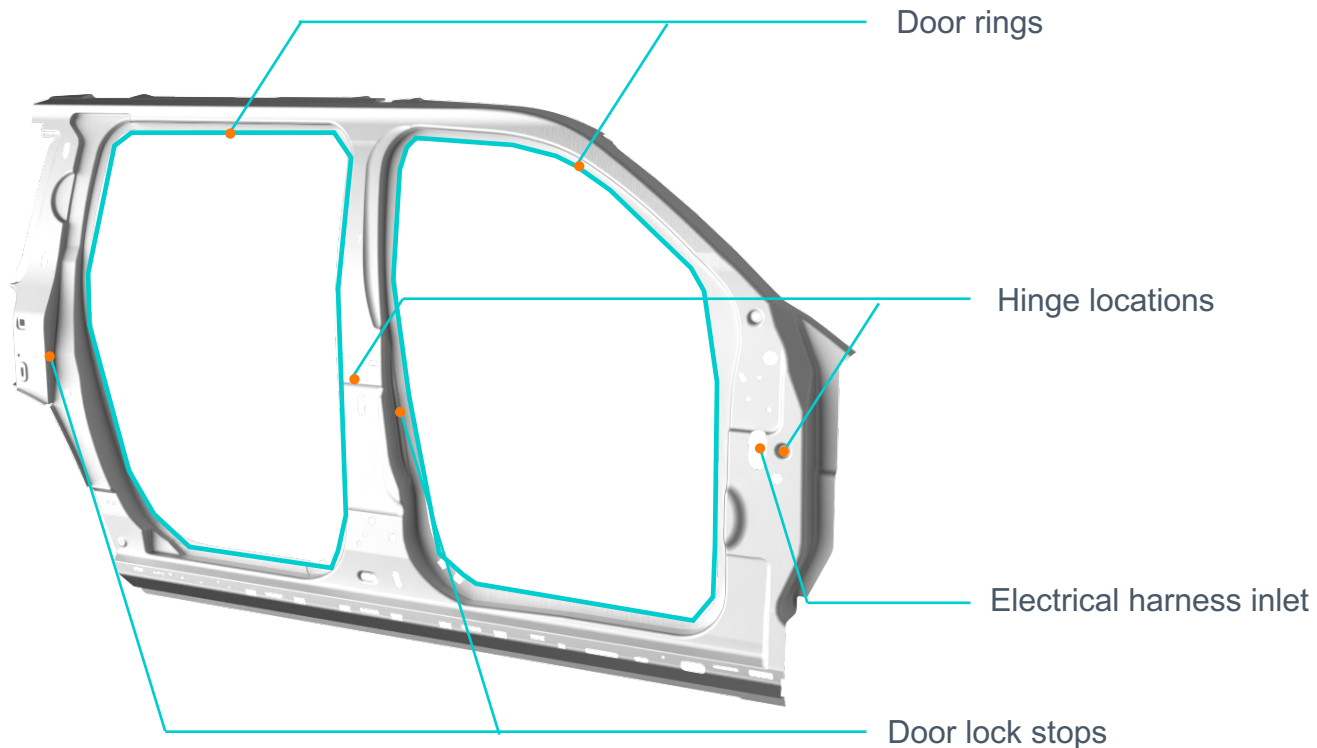
Inspection Cycle Time

Example Inspection Points

- Mounting points of the subframe
- Control arm (e.g. tension arm) mounting points
- Engine mounting points
- Steering rack mounting points
- Various other critical mounting points



Body Side Inspection



250+

of Features Inspected

30 seconds

Inspection Cycle Time

Example Inspection Points

- Mounting locations of door hinges
- Mounting locations of door lock stops
- Critical edge location points of the door ring
- Electrical harness inlet

Motorcycle Frame

100+

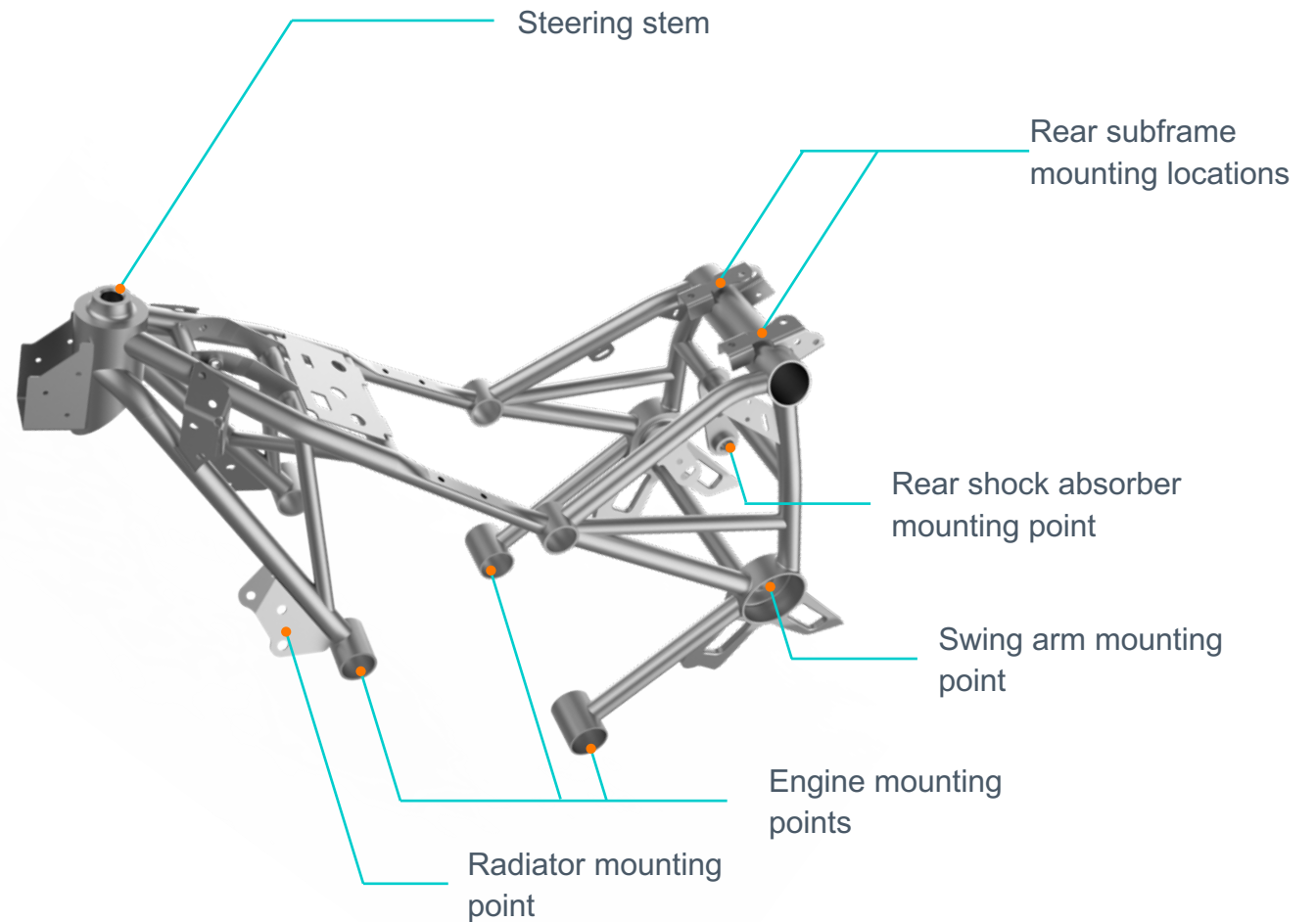
of Features Inspected

20 seconds

Inspection Cycle Time

Example Inspection Points

- Position of the steering stem
- Radiator mounting points
- Engine mounting points
- Rear subframe mounting points
- Rear shock absorber mounting points
- Swing arm mounting points
- Distances between various features
- Various child component presence checks



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www.mapvision.fi/contact-us

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SEE YOUR POTENTIAL



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