



Generative AI for Productivity Gains

Towards the Autonomous Plant

Who still drives a car nowadays without intelligent assistance systems?



SIEMENS

How many assistance systems do you use when commissioning machines?



SIEMENS

Challenges are increasing – with new ones on top of them.

Cost pressure & efficiency



Faster innovation cycles



Quality



Flexibility



Sustainability



Lack of talent





Industrial Copilots will support humans along the industrial value chain

Design

Break new ground in creativity

Planning

Plan more efficiently than ever before

Engineering

Engineering without repetitive tasks

Operations

Transparency at your fingertips

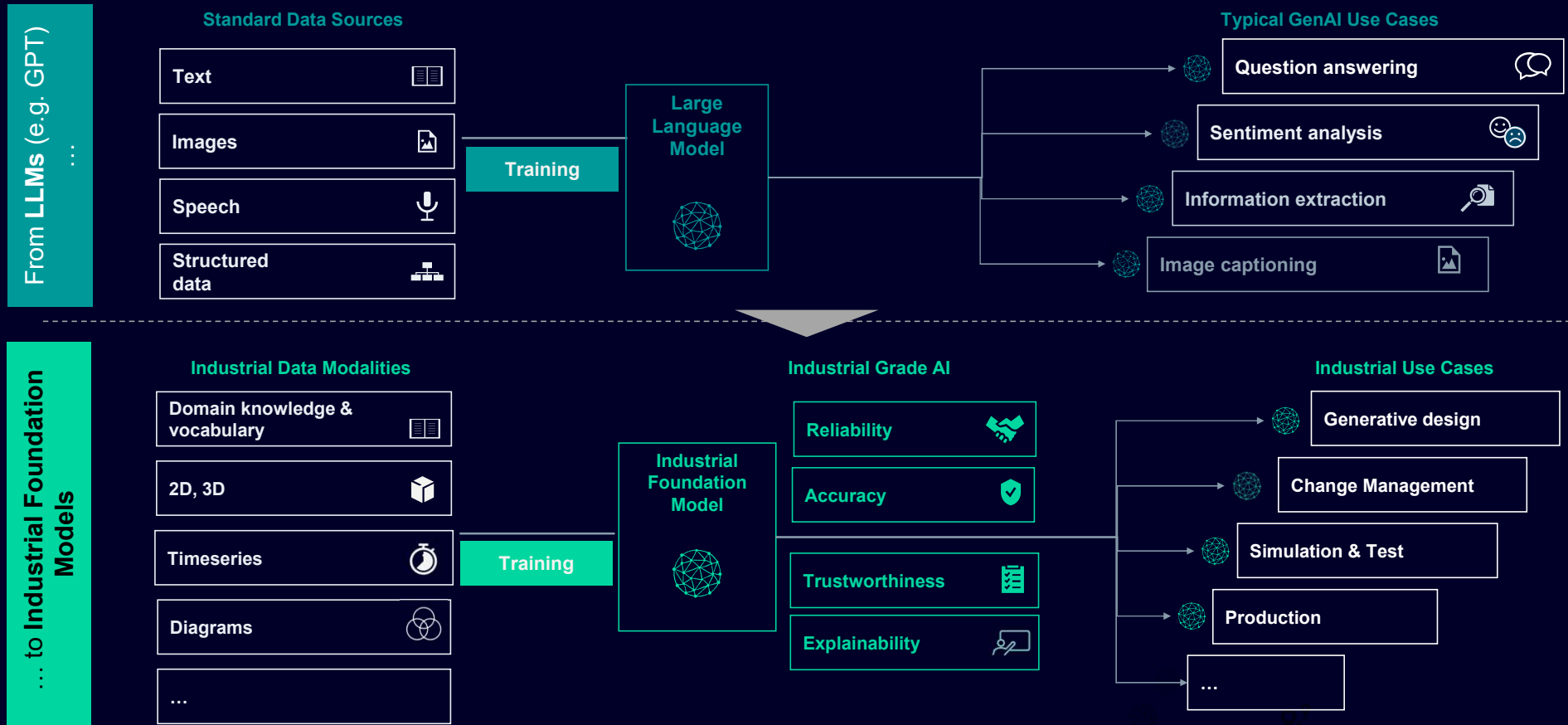
Services

Know it all – before it happens

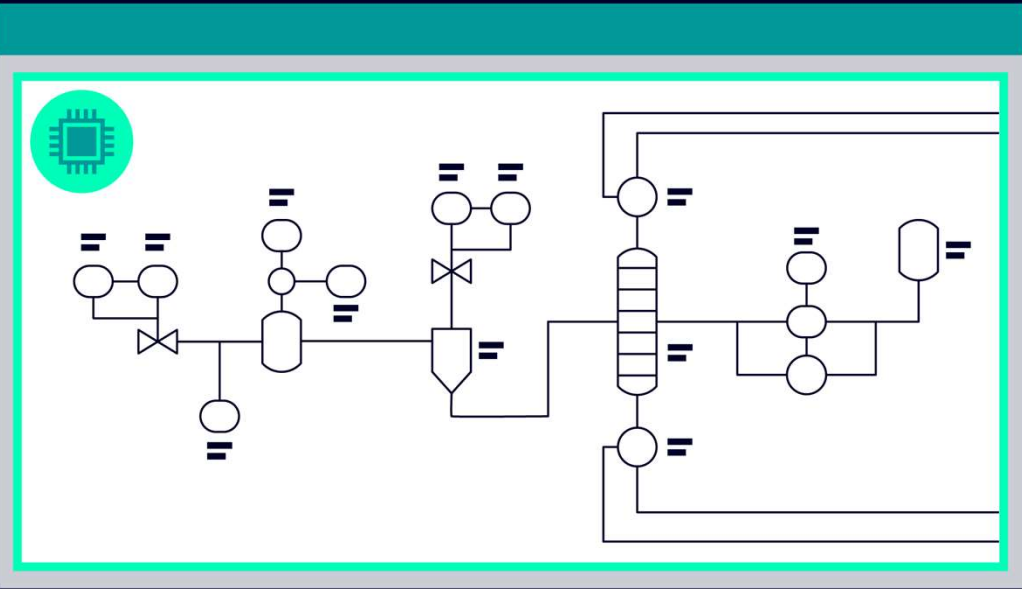
Generative AI has the potential to revolutionize the way companies design, develop, manufacture, and operate.

From LLMs to Industrial Foundation Models

Multi-modality in industrial context is key



Typical diagrams in industry



Industrial Copilots in every phase along the value chain

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Industrial Copilot for Design

Break new ground in creativity

Helps brainstorming & generating different mechanical design concepts.

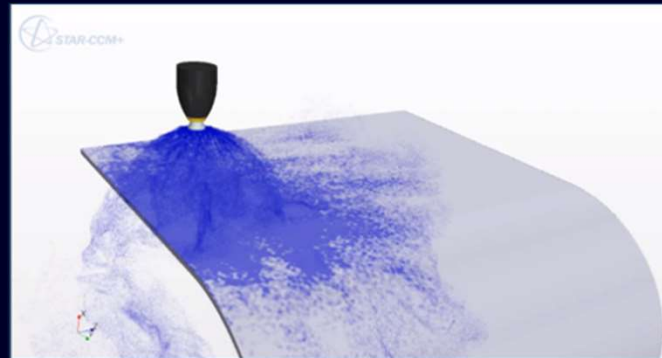
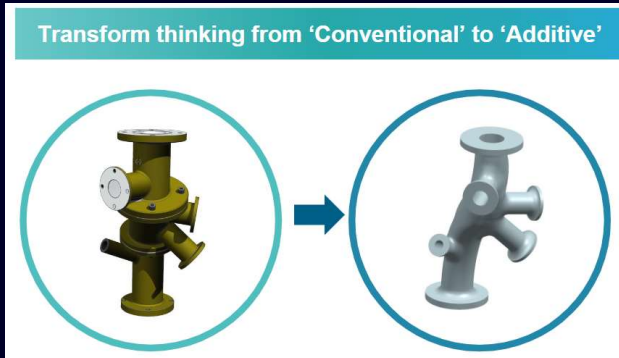
Support with initial prototypes & mockups by generating design variations, enabling faster iterations & experimentation.

Benefits

- Design guidance to eliminate errors
- Generate more solutions in less time
- Offer natural, human-like responses to facilitate adoption

Production design & optimization

AI can boost the efficiency of simulation of design for optimal result



Requirements driven design & validation

And to visualizing this result yields:

+25% Elevator

Step 13. Design linkage to maximum load.

As seen above, the load/force cases on the green lines are very similar at the

Convergent Modeling™ technology

Design rules & validation ✓

- Overhang Angle
- Printable Volume
- Wall Thickness
- Wholly Enclosed Volume

Performance Optimization & validation

Build processing & validation

Lightweight structure design & optimization

The central image is a collage showing various stages of design and optimization for a mechanical linkage. It includes a 3D model of the linkage, a stress analysis visualization, and a physical model of the part. A large blue arrow points from this collage towards the right, leading to the photograph of the part in a vehicle chassis.

Industrial Copilot for Planning

Plan more efficiently than ever before

Improve resource allocation and ensuring the most efficient use of materials, time and people. By generating different planning scenarios, potential risks and optimal strategies can be worked out.

Benefits

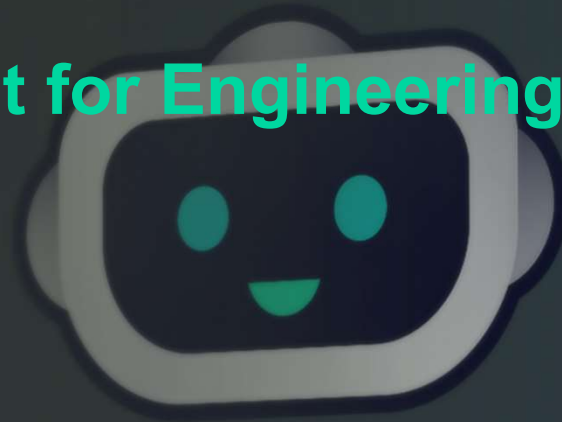
- Improving manufacturing efficiency
- Optimize production processes
- Increased production capacity
- Reduced production lead-time
- Increased energy efficiency

Factory storage planning with AI



Industrial Copilot for Engineering

Automate the automation



Quickly generate, optimize, debug, and document complex PLC code or create an HMI visualization on an engineering instruction.

Huge reduction in workload and repetitive tasks.

Shorten development times.

Benefits

- Automated code generation
- Fast and easy localization and fixing of errors
- Optimized machine performance
- Reduced programming effort
- Enables AI capabilities even in old, shutdown machines

Industrial Copilot for Engineering

Design

Break new ground
in creativity

Planning

Plan more efficiently than
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Engineering 

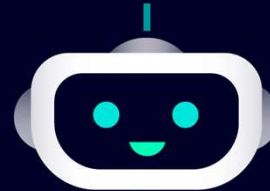
Engineering without
repetitive tasks

Operations

Transparency at
your fingertips

Service

Know it all – before
it happens



I can help you with

First Wave

First Wave

1. Generation of SCL Code

- Create Device
- Create & import SCL code
- Explain SCL code

2. Documentation Search

- TIA Portal help via prompt
- Explanation and Links to relevant chapters will be provided

3. Creation of WinCC Unified Screens

- Create Device
- Configuration of Connectivity
- Configuration of UMAC
- Create/Update Visualization

Example – Generating PLC-Code

SIEMENS Industrial Copilot

PLC Engineering
 WinCC Unified HMI Engineering
 Ask Docu

I can help you with PLC engineering tasks. Where should we start?

Please create an SCL code that generates a triangular signal with a period of 500ms.

```

Here is the SCL code for generating a triangular signal with a period of 500ms:
""scd
FUNCTION_BLOCK "FB_TriangularSignalGenerator"
(S7_Optimized_Access := 'TRUE')
VERSION : 0.1

VAR_INPUT
    SignalPeriod : DInt := 500; // Signal period in ms
    CurrentTime : DInt; // Current time in ms
END_VAR

VAR_OUTPUT
    TriangularSignalValue : Real; // Output of the triangular signal (range -1 ... 1)
END_VAR

BEGIN
    // Calculation of the triangular signal, normalized to -1 ... 1 range
    // abs function is required to create ups and downs.
    TriangularSignalValue := 2 * ABS(FMOD(Real(#CurrentTime), Real(#SignalPeriod)) /
    Real(#SignalPeriod) - 0.5) - 1;
END_FUNCTION_BLOCK
    
```

Thank you. Please add this code as a new function in my current TIA Portal project.

The screenshot shows the Siemens TIA Portal interface. On the left, the 'Project tree' shows the hierarchy: MyProject > PLC_1 [CPU 1515-2 PN] > Program blocks > FB_TriangularWaveGenerator [FB1]. The main window displays the variable declaration table for the function block:

Name	Data type	Default value	Retain	Accessible f...	Writ...	Visible in ...	Comment
Input							
Time_Period	Int	500	Non-retain	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Time period for signal generator in milli...
Output							
Triangle_Signal	Real	0.0	Non-retain	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Output triangle signal
InOut							
Static							
Time_Counter	Int	0	Non-retain	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Temp							

Below the table, the SCL code editor shows the implementation of the function block:

```

IF CASE FOR WHILE (*...) REGION
1
2 // Compute time counter
3
4 #Time_Counter := #Time_Counter + 1;
5
6 // Reset time counter after time period
7
8 IF #Time_Counter >= #Time_Period THEN
9
10 #Time_Counter := 0;
11 END_IF;
12
13 // Compute triangle signal
14
15 [#Triangle_Signal := 2 * ABS(2 * (INT_TO_REAL(#Time_Counter) / INT_TO_REAL(#Time_Period))
16 - FLOOR(0.5 + INT_TO_REAL(#Time_Counter) / INT_TO_REAL(#Time_Period))) - 1;
    
```

At the bottom, the 'Compile' tab shows a message: 'Compiling finished (errors: 0; warnings: 0)'. A table below this message shows the compilation status for different paths:

Path	Description	Go to ?	Errors	Warnings	Time
PLC_1			0	0	6:06:02 PM
Hardware configuration					6:06:02 PM
Program blocks			0	0	6:06:02 PM
	No block was compiled. All blocks are up-to-date.				6:06:02 PM
	Compiling finished (errors: 0; warnings: 0)				6:06:03 PM

Industrial Copilot for Operations

Transparency at your fingertips

Enable operators and maintenance engineers to interact with machines.

Identify machine issues and provide solutions to fix it.

Optimize production workflows.

Fix Error ▶

Benefits

- Reduced downtimes thanks to recommendations for fixing machine issues
- Amplified abilities of the lower skilled workers
- Shorter ramp-up times due to recommendations based on best practices
- Increased efficiency by retrieving key shift and production insights

Industrial Copilot for Operations

Create a table with total downtime for each cell

Oct 28, 2024, 11:15:25 PM

Here is a table summarizing the total downtime for each cell based on the provided observations:

Cell Total Downtime (hh:mm:ss)

Cell1 2:01:45

Cell2 3:24:58

Cell3 3:09:40

Cell4 3:14:58

Cell5 3:39:18

This table consolidates the downtime for each cell, allowing you to quickly identify which cells experienced the most downtime.

Oct 28, 2024, 11:15:32 PM

Which cell had the highest total down-time? in one phrase

Oct 28, 2024, 11:15:49 PM

Cell 2 had the highest total downtime.

Oct 28, 2024, 11:15:54 PM



Industrial Copilot for Service

Building customer relationships through enhanced service

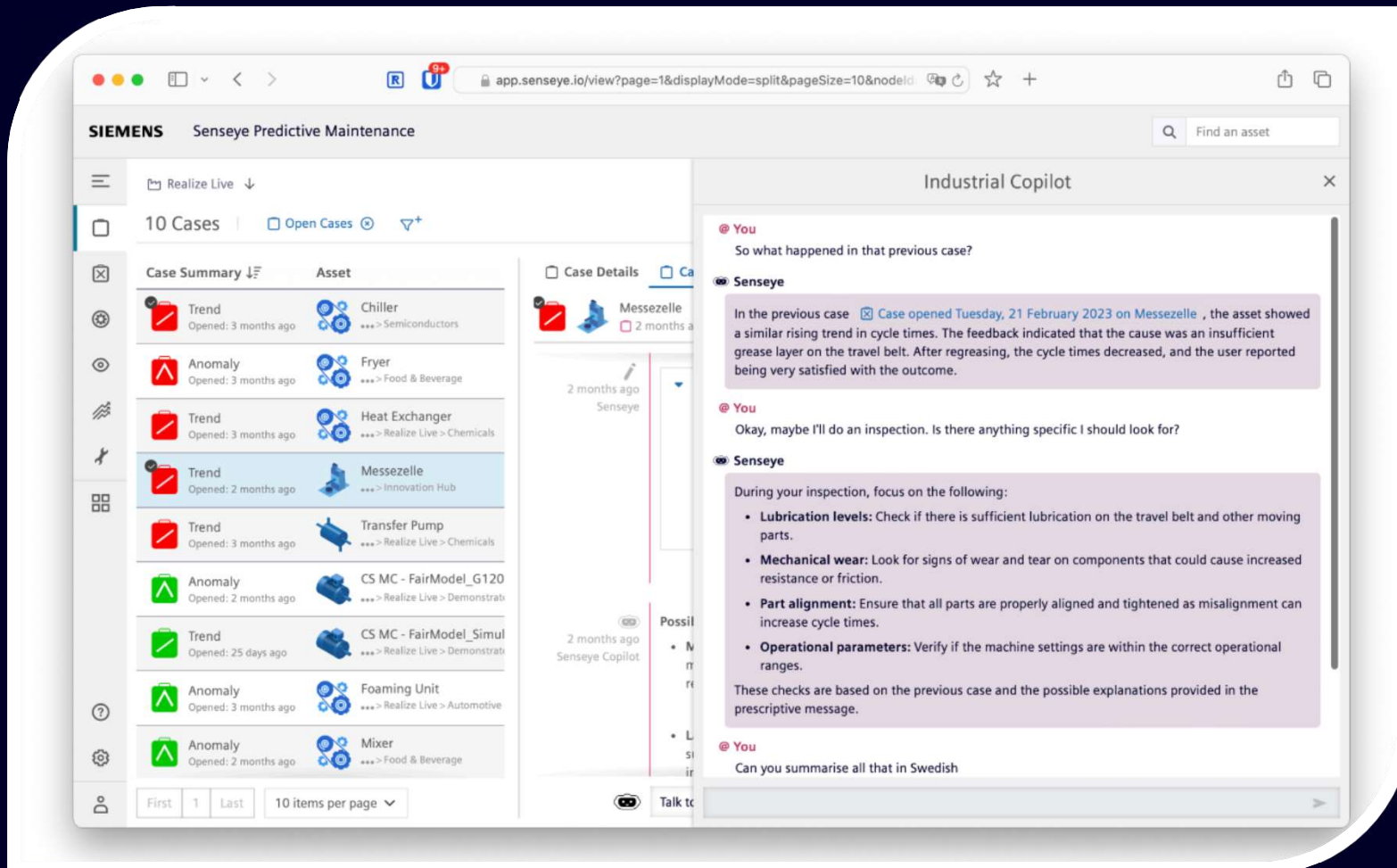
Support service activities by offering automated instructions and solutions.

Make tailored recommendations for maintenance, upgrades or additional services.

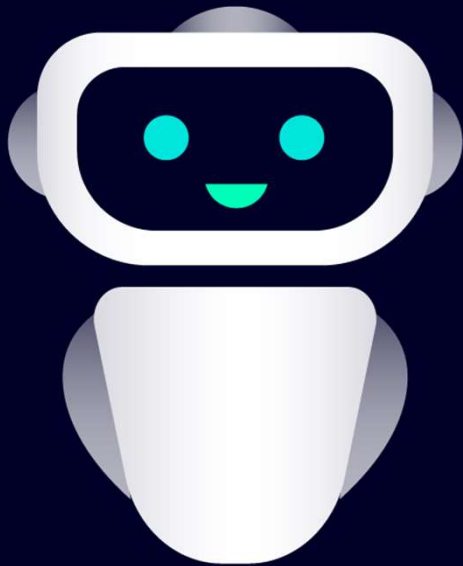
Benefits

- Improvement in downtime forecasting
- Increase in maintenance staff productivity
- Reduction in maintenance costs
- Integrates seamlessly into existing workflows
- Ensures safe and sustainable operations
- Enables and empowers remote workers

Maintenance Copilot



Industrial Generative AI Giving automation experts superpowers



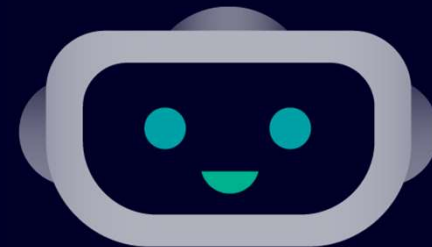
- **It understands the industrial context**
- **Integrated into industrial software**
- **Reduces manual work**
- **Faster onboarding**
- **Time saving**

Contact

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FME PLATFORM AI FOR INDUSTRY

BEDANKT VOOR JE AANDACHT!

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FME AI FOR INDUSTRY JAAREVENT



**Bedankt voor
je aandacht!**