
Arent and JGC Jointly Develop End-to-End Automation for 3D Piping Design

Integration of “Auto Plot PATHFINDER” and “PlantStream” automates the workflow from plot plan design to 3D piping design

Connecting data across upstream and downstream plant design toward greater EPC-wide efficiency (design time reduced from approximately four months to approximately three weeks)

Results to be presented at the 57th Autumn Meeting of the Society of Chemical Engineers, Japan on September 15

Arent Inc. (Head Office: Minato-ku, Tokyo; President and Representative Director: Hiroki Kambayashi; “Arent”), a company driving digital transformation in the construction industry, has jointly developed, together with JGC CORPORATION (Head Office: Nishi-ku, Yokohama, Kanagawa; “JGC”), the overseas EPC operating arm of the JGC Group (JGC Holdings Corporation), a system that seamlessly automates the plant-design workflow from plot plan design through 3D piping design.

The solution was achieved by integrating “Auto Plot PATHFINDER,” an automated plot plan design system developed by JGC, with “PlantStream,” an AI-powered 3D CAD solution for plant design developed by Arent.

The results of this joint development will be presented on Tuesday, September 15, 2026, at the 57th Autumn Meeting of the Society of Chemical Engineers, Japan, to be held at Hiroshima University’s Higashi-Hiroshima Campus.

Key Highlights

End-to-end automation from plot plan design to 3D piping design

By integrating Auto Plot PATHFINDER (JGC) with PlantStream (Arent), the companies have created a seamless workflow from equipment layout planning to 3D piping design. This enables teams to begin engineering studies using consistent-quality 3D models from an early stage of a project.

Extending data into downstream workflows to improve overall design efficiency

The 3D models generated through the integration can be smoothly utilized in downstream activities such as plant safety assessments and automated piping quantity take-offs. Connecting data from upstream through downstream processes is expected to contribute to higher productivity across the entire EPC lifecycle.

Jointly developed data-integration foundation demonstrates significant schedule reduction

The companies jointly developed a “Piping Master Data Format” and converters that enable data exchange between the two systems. In an actual case, the design period was reduced from approximately four months to approximately three weeks.*

* Design periods are based on research by Arent and JGC and may vary depending on the project scope and conditions.

Related Video

A video demonstrating the workflow from plot plan design to 3D piping design enabled by this integration is available at:

<https://youtu.be/VhVvhW7kXhk>

Background

In plant engineering, 3D models are not merely final deliverables; they also serve as a foundation for a wide range of engineering studies, including safety assessments and piping quantity take-offs.

Among these activities, plot plan design, which determines equipment layout, and piping routing design are core processes in creating a 3D model. Establishing a consistent-quality 3D model early in a project is essential for efficiently advancing subsequent design work and engineering studies.

To enable these studies to be performed earlier and more efficiently, Arent and JGC have respectively developed PlantStream and Auto Plot PATHFINDER.

However, although the two systems handle common data such as equipment specifications and piping information, their data formats were not compatible. As a result, it had not been possible to automate the entire workflow from plot plan design through 3D piping design in a seamless manner.

Development Details

As part of this joint development, the companies established a “Piping Master Data Format” that allows piping information to be readily converted into the formats used by both systems.

They also developed a converter that transforms equipment specifications and plot plan data output by Auto Plot PATHFINDER into a format that can be used by PlantStream.

These developments enable data integration between the two systems, making it possible to automate the entire process from plot plan design through 3D piping design.

Results

Previously, Auto Plot PATHFINDER alone could not evaluate whether piping could be appropriately laid out on pipe racks.

Through the integration with PlantStream, engineers can now evaluate piping layouts in a 3D model. The resulting data can also be smoothly extended into downstream activities, including plant safety assessments and automated piping quantity take-offs.

The integration has also significantly shortened the design period. A process that required approximately four months when performed manually, or approximately one and a half months when the two systems were used separately, was reduced to approximately three weeks through the integrated workflow.

This makes it possible to conduct studies using 3D models from an earlier stage of the project and is expected to contribute to greater efficiency across the overall design process.

Presentation at the 57th Autumn Meeting of the Society of Chemical Engineers, Japan

- Date and time: Tuesday, September 15, 2026, 15:00–15:20 (JST)
- Venue: Hiroshima University, Higashi-Hiroshima Campus, Venue K (Building K, 3F, K314)
- Session: SY-82 “Recent Advances in Process Systems Engineering” (Presentation No. K219)
- Title: End-to-End Automation of Plot Plan Design and 3D Piping Design through the Integration of Auto Plot PATHFINDER and PlantStream
- Presenters: Yoshinori Yamada (presenter), Keisuke Aizawa, Hiroyuki Koito, Toshikazu Miyashita (JGC); Hisashi Kamiya and Takeshi Oda (Arent Inc.)
- Conference website: https://www4.scej.org/meeting/57f/en_index.html

Future Outlook

Going forward, the two companies will expand the scope of automated design and data handling to further improve efficiency across the overall design process.

By rapidly generating consistent-quality 3D models from the early stages of basic design and facilitating the use of data in downstream workflows, Arent and JGC aim to contribute to higher productivity in plant engineering.

About PlantStream

PlantStream is an AI-powered 3D CAD solution for plant design provided by Arent. It automates engineering tasks such as plant layout and piping routing, helping reduce design hours and improve design quality. From the early stages of design, PlantStream can generate MTO (Material Take-Off) and engineering-hour data and export models to major 3D CAD platforms.

PlantStream is used worldwide by EPC contractors, engineering companies, plant owners, and other organizations. It supports greater engineering productivity and more efficient project execution across phases including FS (Feasibility Study) and FEED (Front End Engineering Design). PlantStream was jointly developed by Arent Inc. and Chiyoda Corporation.

Product website: <https://plantstream3d.com>

About Auto Plot PATHFINDER

Auto Plot PATHFINDER is an automated plot plan design system developed by JGC. By quantifying and formalizing the expertise of experienced designers and combining it with various mathematical optimization algorithms, the system can generate multiple plot plan alternatives in a short period of time.

Product website: https://www.jgc.com/en/business/tech-innovation/epc/ap_pathfinder.html

About Arent Inc.

With the mission of “democratizing tacit knowledge,” Arent promotes digital transformation in the construction industry. The company operates through two core businesses: a DX business that works with client companies to solve industry challenges, and a product business that develops and provides proprietary SaaS solutions.

Through offerings such as the LightningBIM series of Revit plugins designed to make BIM more intuitive, as well as the expansion of its group through M&A, Arent uses technology to address structural challenges in the construction industry.

Company Profile

Company name: Arent Inc.

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Representative: Hiroki Kambayashi, President and Representative Director

Established: July 2, 2012

Capital: JPY 1.286 billion

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