By Mark Robins

An Ideal Hangar via AI

Software helps plan for hangar protection, efficiency and long-term structural reliability.

Hangars play a major role in aviation infrastructure. These dedicated structures designed to protect aircraft such as private planes, jets and helicopters are more than just storage buildings or utilitarian boxes. Hangars also provide space for maintenance, fueling, inspections and aircraft preparation before flight. They are carefully engineered aviation facilities that protect valuable aircraft, support maintenance operations and ensure safe daily aviation activity.

To make this happen, AI simulation software with space planning, bay scheduling and MRO capacity management can positively impact a hangar's success and long-term performance. It can take into account crucial factors including door systems, clear span options, proper ventilation and adherence to building codes for optimal functionality and longevity. With the right software used correctly, aircraft hangar planning allows owners to build facilities that are safe, scalable and cost-efficient.

"One of the most overlooked assets in an MRO operation is the hangar itself," says Matthew Curry, founder and CEO, Stax Aviation Group, Paso Robles, California. "Powered simulation allows operators to treat hangar capacity as a strategic resource by visualizing, testing and optimizing facility utilization before aircraft ever enter the building. In many cases, operators can increase throughput without adding square footage simply by making better planning decisions."

AI Simulation Software and Hangars

AI simulation software helps operators turn a complex hangar, ramp or maintenance schedule into a practical operating plan. Greg Lamp, CEO of Airplx in Boulder, Colorado, compares hangar planning to playing 3D Tetris on a calendar: teams need to know where each aircraft fits, when it fits, what has to move around it, and what happens when the schedule changes. "The software helps planners make faster, better decisions without replacing their operational judgment. It reduces manual work, improves team communication and helps operators make better use of the space they already have."

The aviation MRO industry has made tremendous strides in digitizing maintenance records and operational systems, but Tom Torosian, director of aviation business development at TruVideo in Wellesley, Massachusetts, explains a critical blind spot has remained: real-time visual context at the point of work. "Every minute an aircraft sits in a maintenance bay costs airlines money, and that occupied bay is a bay unavailable for the next aircraft in the queue. Poor communication between technicians, engineers and decision-makers compounds those delays, turning manageable repairs into extended hangar occupancy that cascades across an entire maintenance schedule."

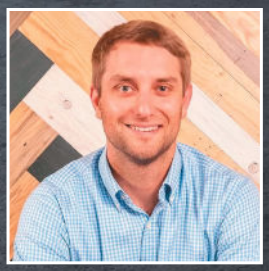
A video intelligence engine can fill this gap by embedding directly into MRO workflows as the visual layer when existing systems are missing. "AI-powered video enables technicians to instantly capture, annotate and share high-definition footage of maintenance findings — triggering faster diagnostics, sharper engineering decisions and dramatically reduced aircraft-on-ground (AOG) time," Torosian says. "The faster an aircraft is accurately diagnosed and repaired, the faster it exits the bay, and the sooner that bay is available for the next aircraft. AI-powered video intelligence doesn't just improve communication; it directly drives hangar throughput, bay utilization, and MRO capacity management in ways that scheduling software alone cannot achieve."

Next-Generation, Purpose-Built

AI simulation software for hangars is still evolving but some MROs still implement hangar space planning and bay scheduling with tools and resources that really weren't designed for it. Lamp explains that many operators are still using a mix of general-purpose tools: spreadsheets, whiteboards, Outlook calendars, Visio, Microsoft Paint, ERP/MRO schedules, and sometimes even cardboard cutouts. "Those tools are flexible … and track information …, but they are not built for aviation space planning. They do not understand physical space. An ERP schedule may know when work is due, but it usually cannot tell you where the aircraft should go, what else has to move, or whether the plan actually fits inside the hangar."

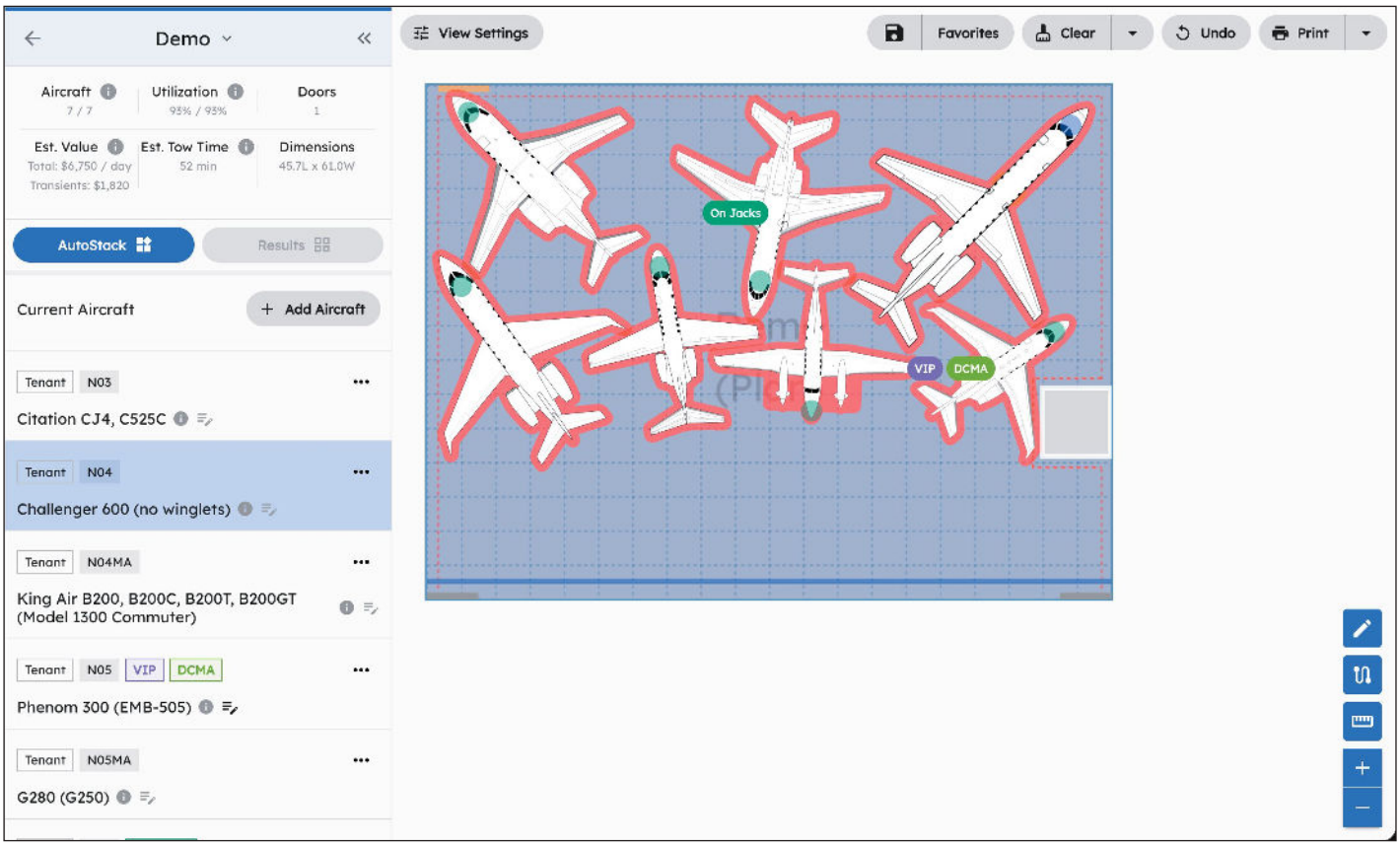
Torosian agrees many MROs still rely on spreadsheets, whiteboards, and Outlook calendars to manage bay scheduling, many also depend on manual, paper-based inspection documentation and fragmented verbal communication between technicians and engineers. "The compounding effect of both is the same: aircraft stay in bays longer than necessary, hangar space gets locked up, and capacity planning becomes reactive rather than strategic."

Curry explains that previous tools could track schedules and



Greg Lamp
AirPlx

Tom Torosian
TruVideo



AirPlx's purpose-built hangar and ramp planning software combines visual planning, aircraft geometry, scheduling, simulation and optimization in one place. Shown here is a digital twin of a real hangar with aircraft and visualizing customer SOPs. AirPlx image.

maintenance events, but they could not provide an accurate way to visualize, test and optimize how aircraft physically occupy and move through a facility. "Traditional scheduling systems are excellent at tracking work; they're not designed to optimize physical space. The real opportunity lies in connecting operational schedules with spatial planning so that both time and space are managed together. Modern platforms create a digital representation of the hangar environment and allow operators to model aircraft movements, maintenance bay assignments, tow paths, clearance requirements, equipment staging areas and future maintenance schedules in real time."

Next-generation, purpose-built hangar and ramp planning software like AirPlx combines visual planning, aircraft geometry, scheduling, simulation and optimization in one place. Lamp explains this gives MRO teams a visual, shared planning layer on top of the schedule. It helps them move faster, reduce manual rework and turn the plan into something the whole team can understand and execute. AirPlx creates a digital twin of the real hangar, ramp, aircraft and schedule. That gives AI and optimization tools the operational context they need to be useful, instead of asking a generic AI tool to guess how a hangar works."

Sources at Lincoln, Nebraska-based Duncan Aviation explain that "AirPlx augments our team's expertise by helping surface planning options, constraints, and fit considerations that are difficult to evaluate quickly with traditional tools."

Advanced optimization engines can evaluate thousands of possible aircraft placement scenarios in seconds and recommend layouts that maximize space utilization while maintaining required safety margins. "Stax capabilities include capacity planning, fit analysis, conflict detection, scenario modeling and what-if simulations that allow MROs to evaluate future workloads before accepting additional aircraft," Curry says. "Some platforms can also incorporate historical operational data to identify trends, improve forecasting accuracy, and help management make more informed decisions regarding staffing, facility utilization and growth planning."

Curry cautions that one important distinction is that today's hangar software planning tools are decision-support systems, not decision-makers. "Responsibility for operational safety, regulatory compliance, and maintenance execution remains with the operator. The value of Stax software lies in helping organizations consistently apply safety and operational standards while improving visibility into complex planning decisions. The system can help support compliance efforts by documenting aircraft positioning decisions, movement plans, and capacity assessments, creating a more auditable planning process."

Video Intelligence Engine

A video intelligence engine can modernize the inspection and communication process without displacing the scheduling and ERP systems already in use; in fact, it actually enhances them. "Technicians capture structured, AI-tagged video documentation as a natural part of their workflow," Torosian says. "Engineers receive real-time visual context and can make repair decisions remotely, eliminating the delays caused by waiting for the right expert to physically arrive at the aircraft. AI within the platform automatically organizes footage by aircraft, task, and finding — feeding structured visual data back into the maintenance workflow

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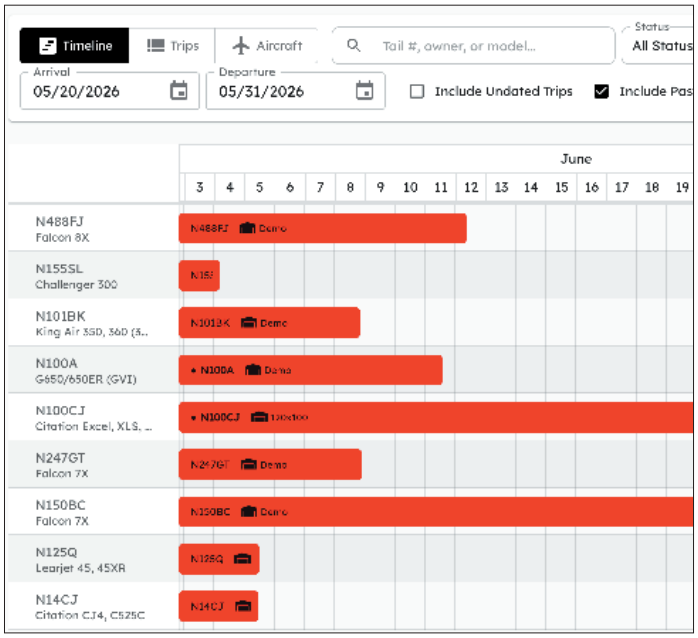
and creating a feedback loop that shortens repair cycles. The result is a meaningful reduction in the time each aircraft occupies a bay, which is the most direct lever available for improving hangar space utilization and MRO capacity. What starts as a workflow upgrade quickly becomes a measurable competitive advantage in throughput and bay availability."

Modern video intelligence solutions leverage artificial intelligence to automatically detect anomalies and flag potential defects during inspections, turning passive footage into active diagnostic data. AI-driven object recognition can identify components, cross-reference known failure patterns, and surface relevant maintenance history in real time — giving technicians and engineers insights that previously required hours of manual review.

Torosian believes the downstream impact of all this on hangar space is direct and measurable: faster AI-assisted diagnostics mean shorter bay dwell times, fewer aircraft waiting for engineering approvals, and a more fluid, predictable flow of aircraft through the maintenance facility. "What video intelligence replaces is a fragmented, delay-prone system of verbal descriptions, handwritten notes, and static photographs that left engineers making critical decisions without the full visual picture — and aircraft sitting idle in bays they should have vacated hours earlier."



Shown here is AirPlx's AI making suggestions for where to position an aircraft. AirPlx image.

Other Factors

It is nearly impossible to not discuss the cloud when discussing today's high-tech AI simulation software. The cloud makes

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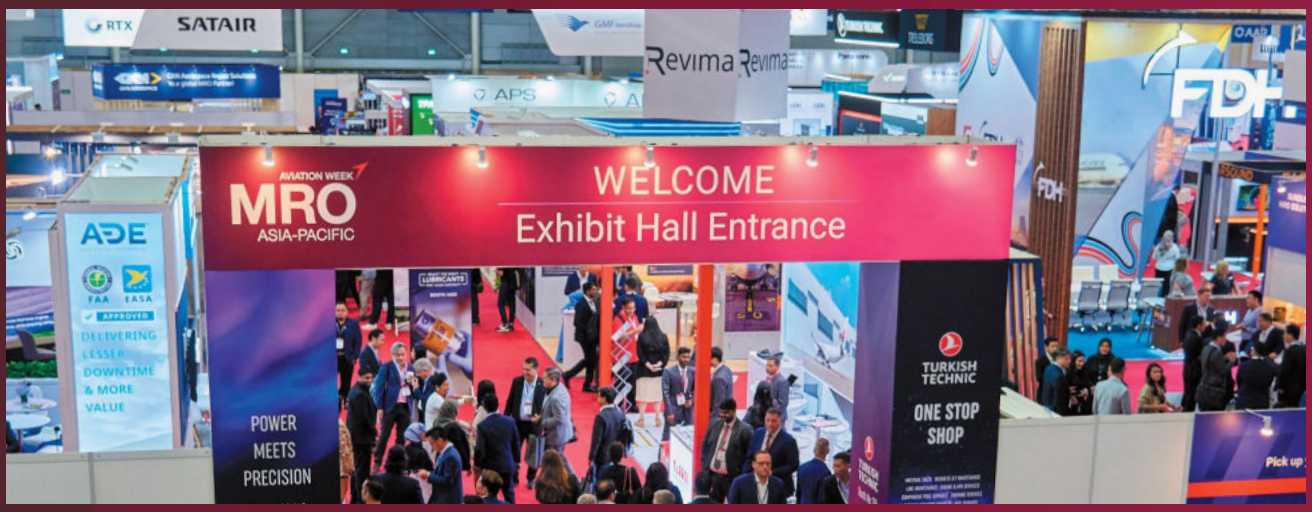

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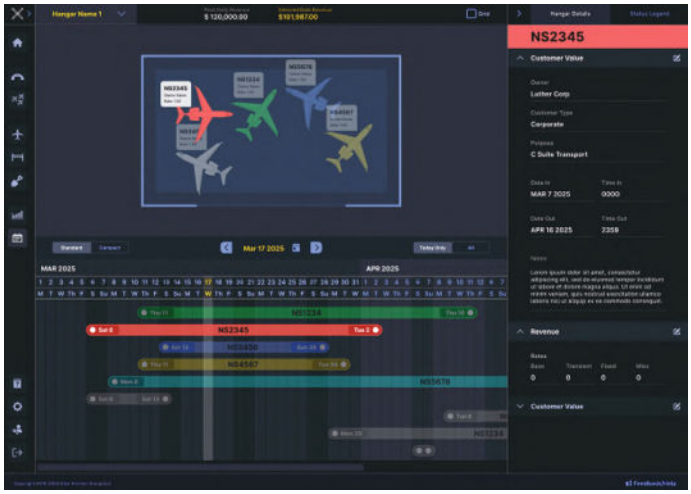
hangar planning easier to share, update and use across the team. Instead of passing around files or relying on one local workstation, everyone can work from the same current plan. "It also reduces installation complexity and gives software providers more compute power behind the scenes," Lamp says. "That matters for simulation and optimization, where the system may need to evaluate many possible planning options quickly."

Do not forget about customization. Hangars are incredibly complex, especially in MRO environments. The aircraft is only one part of the planning problem; teams also have to account for tooling, equipment, work areas, restricted zones, doors, columns, and all the other real-world constraints inside the hangar.

Every hangar is unique. Curry explains that differences in building geometry, support columns, maintenance docks, office spaces, fire suppression systems, utility locations and door configurations can dramatically impact usable space. "The Stax platform addresses this by creating digital representations of each facility. Operators can model exact hangar dimensions and incorporate permanent infrastructure, restricted areas, maintenance bays, equipment storage locations and custom operating procedures. This customization allows simulations to reflect real-world conditions rather than idealized floor plans. The result is more accurate planning, improved operational confidence and safer aircraft movements."

Lamp explains that up until now, "The most customizable tools were often general-purpose drawing tools like Visio or Microsoft Paint, but those tools were never designed for aviation planning. AirPlx has taken this problem seriously by building highly customizable hangar modeling into purpose-built planning software, so operators can model real-world complexity with aircraft, schedules, clearances and operational constraints all connected." AVM



Stax capabilities include capacity planning, fit analysis, conflict detection, scenario modeling and what-if simulations that allow MROs to evaluate future workloads before accepting additional aircraft according to Stax CEO Matthew Curry. Stax image.

Digital hangar simulation software allows MRO operators to visualize aircraft placement, maintenance bay assignments and movement plans before execution, helping maximize facility utilization while reducing operational risk. Image courtesy of Stax Aviation Group

Effective Hangar Planning

Effective hangar planning requires much more than simply measuring aircraft dimensions. A comprehensive solution should account for numerous operational variables, including:

- Aircraft length, wingspan, and tail height
- Maintenance work scope and required access zones
- Safety clearances and fire-code requirements
- Tow paths and aircraft movement logistics
- Ground support equipment staging areas
- Personnel access requirements
- Hangar door constraints and infrastructure limitations
- Planned maintenance schedules and duration estimates
- Simultaneous maintenance activities occurring within the facility
- Future arrivals, departures and schedule changes

The most effective systems provide real-time visualization, scenario planning, capacity forecasting and conflict identification. They should also integrate with existing maintenance and operational workflows rather than operate as standalone tools.

Matthew Curry, founder and CEO, Stax Aviation Group, Paso Robles, California.