

GAAST Workstream 5: The Future of Work

Industry Wide Skills Matrix (with AI impact)

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Please note:

- ALL roles detailed in this report may be subject to additional regulatory training and licence obligations
- This is not the definitive list of roles within the industry and excludes many support functions including HR, Legal, Finance, and others.
- The report was summarized and synthesized using the Galileo Tool from the Josh Bersin Company: <https://getgalileo.ai/agent> with input from key stakeholders from the GAAST group.

A living breathing document!

Welcome to our discussion on the future of the workforce! This document is intended to be a living resource, designed to evolve with your valuable insights and ideas. Your feedback is crucial in shaping it into a powerful tool for building the workforce of tomorrow across our industry. **We'd love to hear from you**

- **Share your resources!** If you have any materials that could enhance this document, please share them generously.
- **Please share any comments with Secretariat secretariat@gaast.aero or hoskissonj@iata.org**

Resources and Sources

This review has been based on the following **primary sources** and aims to provide a summarized view of the changes that will have an impact on aviation and aerospace in the coming years. It is not a complete list of all resources, but these are regarded as best in class.

The report was summarized and synthesized using the Galileo Tool from the Josh Bersin Company: <https://getgalileo.ai/agent> with input from key stakeholders from the GAAST group.

Industry Reports & Research-Based Insights

1. [Boeing Pilot & Technician Outlook \(2023-2042\)](#)

- Boeing regularly publishes forecasts on **pilot demand, maintenance technician shortages, and cabin crew growth** due to increasing passenger travel.
- **Key takeaway:** The global demand for pilots and maintenance engineers will likely **increase significantly** over the next 20 years.

2. [Airbus Global Market Forecast \(GMF\) 2023-2042](#)

- Airbus provides long-term aviation industry projections, including **fleet expansion trends, aircraft orders, and labor needs**.
- **Key takeaway:** Aircraft fleets are expected to **double** by 2042, increasing demand for maintenance, repair, and operations personnel.

3. [Federal Aviation Administration \(FAA\) & ICAO/ACI Workforce Outlook](#)

- The FAA and International Civil Aviation Organization (ICAO) and ACI release studies on **air traffic management (ATM), aviation safety roles, and AI's impact on airport operations**.
- **Key takeaway:** AI will **automate portions of air traffic control**, reducing the need for controllers but increasing demand for AI system oversight roles.

4. [Association of Aerospace Industries Reports \(NASA, \[AIA\]\(#\), \[EASA\]\(#\)\)](#)

- Leading aerospace regulators and industry associations (including NASA & the European Aviation Safety Agency) publish papers on **R&D expansion, next-generation propulsion, and commercial space travel workforce needs**, including a road map on the impact of AI on the industry (EASA)

- **Key takeaway:** Space and **future aviation technologies will create thousands of new roles** in commercial spaceflight, orbital mechanics, and advanced propulsion.

Skills & Automation Impact Research

5. [World Economic Forum \(WEF\) "Future of Jobs Report" \(2023-2035\)](#)

- WEF's annual job market outlook assesses **AI-driven job disruption** across aviation, aerospace, and logistics.
- **Key takeaway:** AI will **reduce demand for certain administrative and operational roles** in aviation while creating **higher demand** for technical and data-driven roles.

6. [McKinsey Global Institute: AI & Employment Shift Predictions \(2024-2040\)](#)

- McKinsey studies **AI adoption in aviation, automation's effect on job roles, and future workforce transitions**.
- **Key takeaway:** Jobs in **operations, maintenance, and R&D** will grow, while **administration & air traffic control jobs** may decline due to automation.

7. [Deloitte Aerospace & Defense Industry Outlook \(2024-2043\)](#)

- Deloitte releases annual aerospace workforce reports, focusing on **commercial aviation, MRO (Maintenance, Repair & Overhaul), and space exploration workforce trends**.
- **Key takeaway:** AI and robotics will improve efficiency but require **human oversight**

8. [International Air Transport Association \(IATA\) Traffic Forecasts \(2024-2043\)](#)

- IATA tracks global **passenger traffic growth, fleet expansion, and route demand** to correlate growing labor needs in **flight operations & ground services**.
- **Key takeaway:** Air travel demand is expected to **double in the next 20 years**, increasing hiring needs for pilots, cabin crew, and safety/security roles.

9. [OECD Workforce Trends & AI Adoption \(2024-2045\)](#)

- The OECD monitors **airline digital transformation and AI employment shifts** across airport services and flight administration.

- **Key takeaway:** AI will impact **flight scheduling, operations, and security**, eliminating some administrative roles while expanding tech-driven ones.

10. Document Reviewers: Please note any additional sources you believe should be considered here:

- <https://stem.caa.co.uk/careers-in-aviation-and-aerospace/>

Flight Operations – Please note ALL roles may be subject to additional regulatory training and licence obligations

	Skill	Beginner	Intermediate	Advanced	Industry Leader	AI Impact (1-5)	AI Impact Explanation
Technical	Aerodynamics & Flight Mechanics	Understands basic flight principles and aircraft control.	Applies aerodynamic models for real-world flight performance.	Optimizes aircraft performance factoring in various flight conditions.	Develops next-gen aerodynamic solutions for fuel efficiency and sustainability.	3	AI enhances simulations and flight performance tracking, but pilots must still apply real-world knowledge.
Technical	Aviation Regulations (ICAO, FAA, EASA)	Recognizes key global and regional aviation regulations.	Ensures compliance with standard procedures.	Manages regulatory policies and advises stakeholders on compliance.	Shapes and influences aviation policies and legal frameworks.	2	AI automates compliance monitoring, but legal and regulatory interpretation requires human expertise.
Technical	Navigation & Instrumentation	Understands basic avionics, GPS, and flight instruments.	Effectively uses flight management systems and automation features.	Handles complex navigation scenarios and system failures.	Innovates future-flight navigation technology such as AI-driven autopilot.	4	AI advances real-time navigation tools, but pilots and controllers remain responsible for in-flight decisions.
Technical	Meteorology	Reads basic weather charts and reports.	Assesses weather forecasts and adjusts flight	Makes in-flight decisions based on weather conditions.	Develops advanced meteorological models and predictive tools for aviation.	4	AI enhances weather predictions and hazard detection, but pilots must interpret and apply

			plans accordingly.				adjustments in real-time.
Behavioral	Situational Awareness & Decision-Making	Recognizes environmental and in-flight cues.	Applies decision-making frameworks in standard flight operations.	Responds effectively to emergency situations and real-time operational changes.	Develops systematic approaches for improving global aviation safety decision-making.	3	AI assists with predictive data analytics and alerts, but human situational awareness is still necessary.
Behavioral	Communication & Teamwork	Collaborates with flight crews and follows ATC instructions.	Coordinates effectively with ATC, cabin crew, and dispatch teams.	Leads problem-solving efforts across flight operations teams.	Establishes new aviation communication and teamwork best practices.	2	AI improves real-time communication tools and coordination but does not replace human collaboration.
Behavioral	Crisis Management & Emergency Response	Learns emergency response protocols and in-flight procedures.	Acts quickly in emergency situations following standardized protocols.	Leads emergency response efforts and crisis management scenarios.	Designs and implements crisis management strategies for the aviation industry.	3	AI supports emergency scenario training and response planning, but human leadership is necessary in a real crisis.
Behavioral	Leadership & Adaptability	Demonstrates basic leadership in controlled flight settings.	Maintains composure under pressure while managing in-flight decisions.	Leads aviation operations efficiently in high-stress environments.	Defines industry-leading strategies for adaptive leadership in aviation environments.	1	AI cannot replace human leadership, critical thinking, or adaptability in high-pressure situations.

Cabin Crew: Please note ALL roles may be subject to additional regulatory training and licence obligations

Skill Type	Skill	Beginner	Intermediate	Advanced	Industry Leader	AI Impact (1-5)	AI Impact Explanation
Technical	Customer Service & Hospitality	Delivers basic passenger services and meets routine customer needs.	Manages customer expectations and improves service quality.	Resolves customer issues with professionalism, ensuring top-tier experience.	Develops strategies to enhance airline service standards and passenger experience.	2	AI supports customer interaction (e.g., chatbots, self-service kiosks), but human presence remains essential.
Technical	First Aid & Medical Training	Knows basic CPR and first aid procedures.	Administers in-flight medical aid and uses defibrillators if needed.	Leads medical response efforts during mid-flight emergencies.	Develops airline-wide medical training and first aid protocols.	3	AI provides real-time medical guidance and diagnostics, but human response is necessary to treat passengers.
Technical	Safety & Emergency Procedures	Understands emergency exits and follows instructions.	Conducts evacuation drills and applies safety measures effectively.	Takes leadership in emergency evacuations, fire hazards, and security incidents.	Creates effective safety training programs and ensures airline-wide policy enforcement.	3	AI improves safety training via simulations, but human judgment and action are required in real emergencies.
Behavioral	Conflict Resolution & Problem-Solving	Identifies and escalates	Resolves minor conflicts effectively	Handles major disruptions, de-escalating	Develops global airline conflict resolution	2	AI helps predict passenger sentiment issues, but human problem-solving

		passenger conflicts.	while maintaining professionalism.	aggressive passengers.	training programs.		remains crucial for conflict resolution.
Behavioral	Communication & Cultural Awareness	Communicates clearly with passengers and follows service protocols.	Understands cultural differences and adapts service to passenger expectations.	Handles language barriers, supports diverse teams, and trains peers.	Develops cultural competency and diversity training for international airline staff.	2	AI-driven translation improves multilingual interactions, but human adaptability is essential for cultural understanding.
Behavioral	Teamwork & Adaptability	Works under supervision in a team environment.	Coordinates effectively with pilots, ground crew, and other cabin crew members.	Demonstrates leadership and quick adaptability in fast-changing environments.	Develops best-practice teamwork strategies for airline operations.	1	AI can assist in crew scheduling, but interpersonal teamwork skills remain human-driven.
Technical	Languages & Interpersonal Skills	Uses essential phrases for passenger assistance.	Communicates fluently in a secondary language and assists diverse passengers.	Handles multilingual situations and teaches language courses for colleagues.	Sets language and interpersonal expectations for the aviation industry.	2	AI translation improves basic speech comprehension, but interpersonal skills require human emotional intelligence.
Behavioral	Crisis Management & De-escalation	Recognizes signs of distress or potential passenger conflict.	Applies training techniques to de-escalate tense situations.	Leads crisis response efforts and ensures passenger safety.	Creates behavior-response strategies to improve crisis management industry-wide.	3	AI helps detect disruptive behavior patterns and assists in emergency response, but human intervention is key.

Air Traffic Management & Navigation: Please note ALL roles may be subject to additional regulatory training and licence obligations

Skill Type	Skill	Beginner	Intermediate	Advanced	Industry Leader	AI Impact (1-5)	AI Impact Explanation
Technical	Airspace Regulations & Procedures	Understands basic airspace classifications.	Applies airspace rules in routine operations.	Manages high-density airspace and regulatory changes.	Shapes and influences global airspace policies and regulations.	4	AI improves regulatory compliance monitoring, but human oversight ensures safe implementation and enforcement.
Technical	Radar & Navigation Systems	Learns radar fundamentals and basic navigation principles.	Uses radar and tracking systems for guiding aircraft safely.	Manages high-density airspace navigation and emergency scenarios.	Innovates next-gen radar tracking and satellite-based navigation technology.	4	AI automates radar-based tracking and predictive navigation but still requires human decision-making in dynamic conditions.
Behavioral	Multi-Tasking Under Pressure	Responds to isolated signals and task prioritization under supervision.	Manages multiple aircraft and real-time problem-solving.	Oversees complex coordination efforts with multiple stakeholders.	Develops best practices for improving operational capacity under pressure.	3	AI helps manage data loads, but human operators must make complex, high-stakes split-second decisions.

Behavioral	Communication & Coordination	Communicates with pilots and ground crew using standard protocols.	Coordinates complex air traffic routing and flow control.	Leads communications and manages large-scale aviation events.	Develops global air traffic communication protocols and collaboration standards.	3	AI enhances voice recognition for seamless ATC coordination, but human communication skills remain crucial.
Technical	Weather Interpretation & Forecasting	Reads METAR/TAF weather reports.	Applies weather data to adjust flight plans.	Takes predictive actions to minimize weather-related risks.	Develops advanced meteorological models and safety policies.	4	AI significantly improves weather prediction models, but human expertise is needed for real-time interpretation and decision-making.
Behavioral	Analytical Thinking & Problem-Solving	Identifies potential risks based on training scenarios.	Solves real-time navigation conflicts and route deviations.	Optimizes air traffic flow in high-pressure situations.	Develops AI-integrated air traffic safety solutions.	3	AI provides faster analysis of air traffic situations, but human expertise is required for final decisions in complex scenarios.
Behavioral	Stress Management & Situational Awareness	Handles controlled responsibilities under supervision.	Manages mental workload to maintain peak performance.	Leads critical incident responses and remains calm under extreme conditions.	Develops industry-wide psychological resilience training for controllers.	2	AI assists in workload balancing, but stress management and situational awareness are inherently human skills.
Technical	Flight Scheduling & Route Optimization	Understands flight scheduling principles and slot management.	Analyzes route planning to minimize delays	Develops large-scale flight crew and fleet scheduling models.	Shapes future airspace optimization strategies	5	AI fully automates route optimization with predictive

			and maximize efficiency.		leveraging AI and automation.		analytics, minimizing human intervention.
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Aircraft Maintenance & Engineering: Please note ALL roles may be subject to additional regulatory training and licence obligations

Skill Type	Skill	Beginner	Intermediate	Advanced	Industry Leader	AI Impact (1-5)	AI Impact Explanation
Technical	Mechanical & Electrical Troubleshooting	Assists with basic system checks and diagnostics.	Diagnoses and repairs common mechanical and electrical faults.	Leads troubleshooting efforts for complex system failures.	Develops predictive maintenance models and automated diagnostics.	5	AI-powered predictive maintenance tools increase efficiency and reduce downtime by detecting issues before they occur.
Technical	Aviation Safety & Maintenance Regulations	Understands key aviation maintenance regulations (EASA, FAA).	Ensures compliance with safety protocols and performs routine audits.	Manages compliance programs and regulatory reporting.	Shapes global aviation safety policy and creates new regulatory frameworks.	4	AI automates tracking of compliance adherence and assists in safety audits, improving adherence rates.
Technical	Engineering Drawing Interpretation	Reads and understands basic aircraft schematics.	Uses technical plans to execute component repairs and modifications.	Analyzes and optimizes structural engineering designs.	Drives innovation in engineering standards and blueprinting technologies.	3	AI aids in reading and analyzing schematics, but human expertise is required for verification and execution.

Technical	Materials Science & Structural Analysis	Understands fundamental properties of aircraft materials.	Applies material selection and structural testing techniques.	Conducts fatigue analysis and improves material performance.	Develops advanced aerospace composite materials and stress-resistant structures.	4	AI enhances material selection by predicting stress and failure patterns, improving component durability.
Technical	Quality Control & Safety Compliance	Learns inspection protocols and follows set procedures.	Ensures consistent adherence to maintenance quality standards.	Leads audits and implements new safety processes.	Establishes industry-wide safety and quality frameworks.	4	AI-driven inspections improve defect detection, but human verification remains necessary for final checks.
Technical	Hydraulic & Pneumatic Systems Knowledge	Learns basics of fluid-powered systems in aircraft.	Performs system maintenance and repairs.	Manages complex hydraulic and pneumatic failure analysis.	Innovates efficiency improvements for fluid-powered aircraft components.	4	AI improves system monitoring and fault detection, reducing maintenance costs and human intervention.
Technical	Computer-Aided Design (CAD)	Assists in digital modeling of basic components.	Uses CAD software to modify and assess designs.	Creates advanced models with AI-driven design optimizations.	Develops next-generation aircraft design tools and methodologies.	5	AI accelerates simulation and testing, reducing design iteration time and improving accuracy.
Behavioral	Problem-Solving & Attention to Detail	Identifies and fixes simple	Diagnoses challenging issues and follows	Resolves complex failures and continuously improves	Develops new methodologies for	3	AI supports issue detection, but human expertise is essential for

		mechanical errors.	troubleshooting protocols.	engineering practices.	efficiency and problem-solving.		technical decision-making and final execution.
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Ground Operations & Airport Services: Please note ALL roles may be subject to additional regulatory training and licence obligations

Skill Type	Skill	Beginner	Intermediate	Advanced	Industry Leader	AI Impact (1-5)	AI Impact Explanation
Technical	Aviation Safety Protocols	Learns airside safety guidelines and emergency procedures.	Applies safety measures during normal airport operations.	Develops and enforces safety regulations for ground operations.	Establishes global airport safety protocols and regulatory frameworks.	4	AI enhances real-time safety monitoring using predictive analytics but still requires human intervention.
Technical	Logistics & Time Management	Assists with aircraft turnaround, baggage handling, and crew coordination.	Manages scheduling and workflow efficiency for multiple flights.	Oversees entire airport logistics, optimizing ground operations.	Develops industry-wide logistics frameworks and AI-enhanced scheduling models.	4	AI optimizes baggage handling, crew planning, and turnaround workflows, reducing manual input.
Behavioral	Communication & Teamwork	Works collaboratively with supervisors and follows operational instructions.	Coordinates effectively between flight crew, ATC, and airport staff.	Leads ground crew teams and identifies workflow improvements.	Develops communication protocols to enhance cross-functional airport coordination.	2	AI improves scheduling and task assignment, but human communication is essential for operational success.
Technical	Emergency Response &	Understands the basics of airport	Implements security measures and aids in	Manages airport-wide security programs and	Innovates global aviation security	3	AI helps detect security threats, but human response teams remain

	Security Procedures	emergency response.	emergency evacuations.	crisis response strategies.	policies and risk frameworks.		necessary for execution.
Technical	Aircraft Weight & Balance Calculations	Assists in loading and unloading cargo per safety guidelines.	Calculates and distributes weight balance for aircraft efficiency.	Manages aircraft load planning systems and regulatory compliance.	Develops new automated weight and balance optimization technologies.	4	AI automates weight distribution calculations, significantly improving accuracy and efficiency.
Technical	Ground Support Equipment Operation	Learns to operate baggage carts, tugs, and refueling trucks.	Uses multiple ground service equipment safely and efficiently.	Trains others and optimizes equipment usage around airport operations.	Develops next-gen autonomous airport vehicle operation models.	4	AI is advancing autonomous ground support equipment, reducing human intervention in repetitive tasks.
Behavioral	Manual Dexterity & Physical Endurance	Performs physically demanding tasks (e.g., baggage handling, fueling).	Works efficiently while following physical safety guidelines.	Leads teams in high-intensity work environments and reduces injury risks.	Redesigns manual workplace ergonomics and improves safety regulations.	2	AI can automate some physical tasks (e.g., baggage handling), but humans remain essential in most airport roles.
Behavioral	Customer Service & Conflict Resolution	Assists passengers with lost baggage and inquiries.	Handles customer disputes and resolves service complaints.	Manages customer service teams and escalations professionally.	Develops passenger experience strategies based on analytics and feedback.	2	AI improves customer interactions with self-service kiosks and chatbots, but human service remains key for complex issues.

Aviation Management & Administration: Please note ALL roles may be subject to additional regulatory training and licence obligations

Skill Type	Skill	Beginner	Intermediate	Advanced	Industry Leader	AI Impact (1-5)	AI Impact Explanation
Technical	Strategic Planning & Operations Management	Learns basic airline operations and business concepts.	Manages operational projects and workforce planning.	Develops corporate aviation strategies and efficiency improvements.	Shapes industry-wide aviation operations and technology advancements.	4	AI improves operational planning with advanced analytics and forecasting, but human leadership remains essential.
Technical	Aviation Regulations & Compliance	Understands aviation regulatory bodies and compliance basics.	Ensures daily compliance with aviation laws and safety protocols.	Leads regulatory audits and oversees compliance programs.	Develops and influences global aviation policies.	3	AI automates compliance tracking, but changes in legislation and interpretation require human expertise.
Behavioral	Leadership & Decision-Making	Assists in decision-making processes at an operational level.	Makes team-oriented decisions and implements strategies.	Leads large-scale aviation business units while managing change.	Defines industry leadership frameworks and crisis response strategies.	2	AI supports decision-making by providing data insights, but leadership is irreplaceable by automation.
Technical	Financial Analysis & Budgeting	Learns financial structures, airline revenue	Manages aviation budgets and	Leads multi-million-dollar financial planning	Develops new aviation financial models and	4	AI enhances financial forecasting and cost optimization, minimizing human

		streams, and costs.	applies cost-saving strategies.	and investment analysis.	investment frameworks.		effort for manual calculations.
Technical	Crisis & Risk Management	Understands common aviation risks and mitigation strategies.	Implements risk assessment techniques in daily operations.	Manages emergency response teams and contingency planning.	Develops global aviation crisis management policies and frameworks.	4	AI predicts risks using big data analytics but requires human leadership for real-time crisis resolution.
Behavioral	Negotiation & Stakeholder Management	Supports negotiations and vendor discussions.	Manages agreements with partners and regulatory authorities.	Leads high-level airline negotiations and stakeholder engagement.	Develops international aviation trade policies and business structures.	2	AI provides data-driven insights to improve negotiations, but human relationships drive success.
Technical	Data Analysis & Forecasting	Learns basic data management and statistical tools.	Uses AI-driven analytics for business performance evaluation.	Leads organizational strategies with predictive data models.	Develops industry-wide aviation forecasting and demand management standards.	5	AI revolutionizes forecasting models with predictive analytics, reducing reliance on traditional methods.
Behavioral	Customer Experience & Service Strategy	Understands the fundamentals of passenger satisfaction.	Executes customer experience initiatives and process improvements.	Develops airline-wide service strategies and branding.	Leads global passenger experience innovation and personalization efforts.	3	AI enhances personalization through predictive behavior analysis, but human interaction remains key to customer service execution.

Aviation Safety, Security & Investigation: Please note ALL roles may be subject to additional regulatory training and licence obligations

Skill Type	Skill	Beginner	Intermediate	Advanced	Industry Leader	AI Impact (1-5)	AI Impact Explanation
Technical	Safety Management Systems (SMS)	Understands basic SMS principles and safety culture.	Implements SMS frameworks in daily operations.	Conducts safety audits and enhances reporting metrics.	Develops and influences global safety management frameworks in aviation.	4	AI enhances real-time safety monitoring and predictive risk analysis but still requires human oversight for interpretation and intervention.
Technical	Risk Assessment & Hazard Analysis	Learns basic aviation hazards and risk assessment methods.	Applies risk analysis in operational planning.	Leads risk minimization efforts and mitigation procedures.	Develops predictive models for systemic risk management in aviation safety.	4	AI helps assess past incidents and predict risks, but human expertise is needed to adapt mitigation strategies.
Technical	Accident Investigation Techniques	Understands fundamental accident investigation concepts.	Participates in accident investigation teams, collecting and analyzing data.	Leads complex investigations and reconstructs crash scenarios.	Develops global aviation safety policies based on investigation findings.	5	AI accelerates accident reconstruction and predictive failure analysis, improving prevention efforts.
Technical	Aviation Security Protocols	Learns airport security procedures and passenger screening.	Implements security measures and threat assessments.	Leads aviation security teams and manages crisis scenarios.	Shapes aviation-wide security frameworks and counterterrorism strategies.	4	AI enhances security scanning and threat detection, but human monitoring and

							intervention remain critical.
Behavioral	Human Factors & Fatigue Management	Understands the impact of fatigue and stress on performance.	Applies fatigue risk management techniques in daily operations.	Implements fatigue monitoring programs and data-driven interventions.	Develops global aviation human factors and fatigue management regulations.	3	AI helps monitor crew fatigue and work schedules, but human oversight is needed for real-world decision-making.
Technical	Aircraft Performance & Systems Knowledge	Learns about aircraft performance parameters and system interactions.	Applies system diagnostics and performance monitoring.	Analyzes performance deviations and optimizes aircraft efficiency.	Innovates next-generation aircraft safety and efficiency systems.	4	AI-driven analytics enhance aircraft performance monitoring, predicting system failures before they occur.
Technical	Legal & Regulatory Compliance	Learns aviation laws and industry-specific regulations.	Ensures regulatory adherence and applies compliance measures.	Manages compliance enforcement and legal risk strategies.	Shapes global aviation legal policy and regulatory frameworks.	3	AI helps track compliance requirements, but policy interpretation and legal decision-making require human expertise.
Technical	Crisis Response & Emergency Planning	Understands basic emergency response protocols.	Coordinates emergency planning efforts and scenario exercises.	Leads crisis response efforts and recovery operations.	Develops global crisis management frameworks for aviation-wide use.	4	AI improves emergency response simulations, enhancing preparedness, but human leadership and execution remain critical.

Aerospace & Aviation R&D: Please note ALL roles may be subject to additional regulatory training and licence obligations

Skill Type	Skill	Beginner	Intermediate	Advanced	Industry Leader	AI Impact (1-5)	AI Impact Explanation
Technical	Aerodynamics & Computational Fluid Dynamics (CFD)	Learns basic airflow concepts and aerodynamic principles.	Uses CFD tools to analyze airflow and aerodynamic performance.	Develops optimized aerodynamic models and real-world simulations.	Innovates next-generation aerodynamic designs for aviation and aerospace applications.	5	AI accelerates CFD simulations, reducing computational time and improving design efficiency.
Technical	Structural Analysis & Composite Materials	Understands basic structural engineering and material properties.	Applies structural testing and material optimization methodologies.	Develops high-performance materials and lightweight aerospace structures.	Pioneers advancements in composite materials and structural efficiency.	5	AI enhances structural durability predictions and material design, improving safety and fuel efficiency.
Technical	Artificial Intelligence & Automation in Aviation	Learns AI fundamentals and basic automation applications.	Designs AI-driven solutions for flight optimization and predictive maintenance.	Leads autonomous system development for aviation and aircraft operations.	Defines next-generation AI frameworks for fully autonomous aviation systems.	5	AI-driven automation is revolutionizing aviation operations, from autopilot to predictive fault detection.
Technical	Aerospace Propulsion Systems	Understands propulsion principles and	Works on turbofan, electric, and hybrid	Develops high-efficiency propulsion systems for next-	Innovates cutting-edge propulsion technologies such as hypersonic and	4	AI assists in performance optimization and real-time monitoring,

		engine mechanics.	propulsion technologies.	gen aircraft and spacecraft.	nuclear propulsion for aerospace.		reducing emissions and improving efficiency.
Technical	Research & Experimental Testing	Learns essential research methodologies and testing protocols.	Conducts experimental testing and validates new aviation tech solutions.	Leads aerospace R&D projects focusing on innovation and efficiency gains.	Shapes aviation R&D policies and global scientific advancements.	4	AI improves data analysis and predictive modeling in experimental testing but still requires human oversight.
Technical	Programming & Data Modeling (MATLAB, Python)	Acquires basic programming and data analysis skills.	Writes simulation scripts for aircraft modeling and performance prediction.	Develops AI-driven algorithms for flight optimization and autonomous systems.	Innovates large-scale, AI-enhanced aerospace simulations and predictive models.	5	AI-powered data modeling accelerates computational research, enabling advanced predictive analytics.
Technical	Human-Machine Interface (HMI) Design	Understands basic cockpit and control system designs.	Designs intuitive interfaces to improve pilot-automation collaboration.	Develops adaptive, AI-driven interfaces for human-machine interactions.	Creates future AI-driven HMI frameworks for fully autonomous aircraft.	4	AI refines HMI designs to optimize usability and safety, reducing potential pilot errors.
Technical	Advanced Mathematics & Physics	Applies fundamental aerodynamics and physics concepts.	Uses mathematical models to simulate aircraft flight and stresses.	Develops aviation computation frameworks and mathematical models for aerospace applications.	Creates physics-based AI systems for next-gen aviation research.	5	AI enhances physics simulation and system performance analysis, reducing experimentation costs and time.

Airline Commercial & Business Roles: Please note ALL roles may be subject to additional regulatory training and licence obligations

Skill Type	Skill	Beginner	Intermediate	Advanced	Industry Leader	AI Impact (1-5)	AI Impact Explanation
Technical	Market Analysis & Competitive Intelligence	Learns industry basics and market trends.	Conducts competitor benchmarking and airline demand studies.	Develops strategic business insights through data analysis.	Shapes global airline market strategies and competitive positioning.	4	AI enhances data-driven insights, enabling real-time analysis of market trends and competitive positioning.
Technical	Revenue Management & Dynamic Pricing	Understands airline pricing models and revenue streams.	Applies dynamic pricing methods and demand forecasting.	Develops revenue-maximizing strategies using AI-powered analytics.	Leads the evolution of airline revenue management systems.	5	AI fully automates real-time pricing optimization, significantly improving revenue and profitability.
Technical	Customer Relationship Management (CRM)	Learns basic CRM tools and data management.	Applies data-driven marketing to retain and acquire customers.	Develops predictive customer engagement models using AI.	Leads airline CRM innovation and customer experience strategies.	4	AI enhances personalization through behavioral analytics, improving customer targeting and retention.
Technical	Digital Marketing & Branding	Understands airline branding and digital outreach basics.	Manages online campaigns and social media engagement.	Uses AI to refine digital marketing and targeted ad strategies.	Develops industry-wide digital branding best practices.	4	AI improves marketing automation, real-time campaign

							optimization, and sentiment analysis.
Technical	Commercial Contract Negotiation	Learns principles of airline partnerships and contractual terms.	Manages supplier/vendor contract discussions and analysis.	Leads high-stakes aviation contract negotiations.	Redefines industry contractual frameworks and legal best practices.	2	AI supports automated contract analysis, but human negotiation is critical for strategic agreements.
Technical	Business Analytics & Data Interpretation	Learns fundamentals of aviation data and business intelligence.	Uses data visualization and predictive modeling for decision-making.	Leads corporate strategies using AI-based business forecasting.	Develops industry-wide business intelligence frameworks.	5	AI-driven analytics revolutionize business data interpretation, enabling more accurate decision-making.
Technical	Airline Schedule Planning & Network Optimization	Understands basics of airline route economics and fleet scheduling.	Assists with optimizing aircraft utilization and network performance.	Manages large-scale flight scheduling and efficiency improvements.	Develops next-generation AI-powered scheduling optimization.	5	AI fully automates schedule planning, reducing delays, optimizing fuel efficiency, and increasing profitability.
Technical	Corporate Communications & Media Management	Assists in airline PR and internal communications.	Manages media strategies, crisis response, and brand messaging.	Leads corporate reputation management and global media campaigns.	Develops aviation-wide media relations and crisis communication best practices.	3	AI optimizes media sentiment tracking and content personalization, but human PR management remains vital.

Space & Future Aviation Technologies Please note ALL roles may be subject to additional regulatory training and licence obligations

Skill Type	Skill	Beginner	Intermediate	Advanced	Industry Leader	AI Impact (1-5)	AI Impact Explanation
Technical	Aerospace Engineering & Propulsion	Learns fundamentals of aerodynamic principles and propulsion systems.	Works with propulsion models and improves aerospace efficiency.	Leads development of next-generation aircraft and spacecraft engines.	Develops breakthrough propulsion technologies such as hypersonic and nuclear propulsion.	5	AI revolutionizes propulsion design, enhancing performance simulations and reducing development time.
Technical	Satellite & Orbital Mechanics	Understands basic satellite dynamics and orbital mechanics.	Assists in trajectory planning and satellite positioning.	Leads satellite navigation, trajectory correction, and deployment strategies.	Develops next-gen autonomous orbital navigation and space situational awareness frameworks.	5	AI enables autonomous satellite positioning and orbital corrections, reducing human intervention.
Technical	Space Law & Regulatory Frameworks	Learns basics of international space treaties and policies.	Applies legal principles in operational space missions and projects.	Leads regulatory compliance and develops international partnerships.	Shapes global space policy frameworks and legal strategies.	3	AI enhances policy data tracking and compliance analysis, but human legal arbitration remains necessary.
Technical	Zero-Gravity & Life-Support Systems	Understands key life-support challenges in microgravity environments.	Designs and improves space habitat and astronaut support systems.	Optimizes oxygen, water, and waste recycling systems for long-term missions.	Innovates advanced life-support technologies for deep-space exploration.	4	AI improves environmental control systems, optimizing oxygen/water

							recycling processes in space habitats.
Technical	AI & Automation in Aerospace	Understands basic AI concepts in autonomous avionics.	Works with AI-driven guidance and automation in aerospace technologies.	Develops intelligent control systems for autonomous spacecraft and aviation.	Innovates self-learning AI-driven spacecraft and UAVs.	5	AI is fundamentally reshaping aerospace operations through fully autonomous navigation, fault diagnosis, and decision-making.
Technical	Cybersecurity for Space Systems	Learns fundamental cybersecurity principles for aerospace control systems.	Implements cybersecurity frameworks to protect spacecraft communication.	Develops encryption and AI-driven threat detection systems.	Defines aerospace cybersecurity strategy for global defense and exploration.	5	AI strengthens cybersecurity by autonomously detecting and responding to spaceborne data breaches.
Technical	Computational Simulations & Modeling	Learns basic simulations for flight dynamics and materials testing.	Uses AI-enhanced simulations to model space environments and flight predictions.	Develops industry-leading computational models for spacecraft testing.	Innovates AI-driven real-time simulation environments for deep-space applications.	5	AI accelerates complex aerospace simulations, optimizing design and operational readiness.
Technical	Advanced Propulsion & Energy Systems	Understands alternative propulsion methods such as ion thrusters and fuel cells.	Works with sustainable propulsion models for spacecraft efficiency.	Develops new space propulsion systems including plasma and electric propulsion.	Leads groundbreaking research into nuclear and antimatter propulsion systems.	5	AI advances propulsion efficiency, optimizing fuel management and engine performance in deep-space travel.

Changing shape of the workforce based on available industry data

Aviation Sector	Estimated Workforce Distribution (%)	5-Year Outlook (2029)	10-Year Outlook (2034)	20-Year Outlook (2044)	Key Trends Impacting Demand
Flight Operations (Pilots & Crew)	~5-8% of aviation workforce	▲ Moderate increase	▲ High demand rise	▲ Very high demand	Global pilot shortages due to increasing air travel & slow training capacity. AI may automate some functions, but pilot roles will remain essential.
Cabin Crew & Passenger Services	~15-20% of aviation workforce	▲ Moderate increase	▲ High demand increase	▲ Very high demand	Growth tied to rising passenger numbers. AI will enhance service functions, but human interaction remains crucial.
Air Traffic Management & Navigation	~3-5% of aviation workforce	▼ Slight decline	▼ Moderate decline	▼ Significant decline	AI & automation expected to streamline air traffic control. Demand will shift towards AI system oversight roles.
Aircraft Maintenance & Engineering	~20-25% of aviation workforce	🔧 Stable demand	▲ Higher demand	▲ Substantial demand	As aviation fleets grow & new materials emerge, maintenance jobs will expand. AI-assisted diagnostics will require more high-tech specialists.
Ground Operations & Airport Services	~15-20% of aviation workforce	▲ Limited growth	▲ Moderate demand growth	🔧 Stable demand	AI & robotics will automate baggage handling & logistics, but human supervision & security roles remain.
Aviation Management & Administration	~5-8% of aviation workforce	🔧 Stable demand	▼ Mild decline	▼ Moderate decline	AI-driven automation is reducing certain business management tasks, but strategic leadership remains critical.

Aviation Safety, Security & Investigation	~3-5% of aviation workforce	▲ Moderate growth	▲ Significant growth	▲ High demand	Security threats and regulatory complexity will increase demand for aviation safety specialists. AI will assist but not replace roles.
Aerospace & Aviation R&D	~3-5% of aviation workforce	▲ Increase	▲ Deep specialization demand	▲ Major demand rise	AI, green energy, and hypersonic travel will drive R&D job expansion, requiring new skills.
Airline Commercial & Business Roles	~5-8% of aviation workforce	⚖ Stable demand	▼ Mild decline	▼ Moderate decline	AI will automate pricing & market analysis, but customer engagement & negotiations will still need human input.
Space & Future Aviation Technologies	~1-3% of aviation workforce	▲ Rapid growth	▲ Very high demand	▲ Extremely high demand	Space tourism, lunar bases, and commercial spaceflight will skyrocket demand, creating new jobs.

Expected Job Growth Sectors:

- ✓ **Pilots & Flight Operations:** Air travel demand is booming, creating long-term global pilot shortages.
- ✓ **Cabin Crew:** AI won't replace human service roles, ensuring steady demand.
- ✓ **Aircraft Maintenance & Engineering:** Expanding aircraft fleets, new materials, and AI-assisted diagnostics create high demand.
- ✓ **Aerospace R&D & Space Sector:** Next-gen propulsion, sustainable aviation, and commercial spaceflight fuel long-term job creation.

▼ Expected Job Decline Sectors:

- ✗ **Air Traffic Management:** AI & automation will optimize workflows, reducing human controller loads.
- ✗ **Airline Business Roles & Management:** AI-driven software will absorb many scheduling, pricing, and forecasting functions.
- ✗ **Ground & Airport Operations:** Autonomous baggage handling, check-in automation, and AI-driven logistics will cut manual jobs.

How AI & Technology Will Shape Future Aviation Jobs

- ◆ **AI-assisted air traffic control** may reduce the need for human controllers but create new AI oversight roles.
- ◆ **Automation in ground operations** will shift labor demands from manual workers to AI system supervisors.

- ◆ **Sustainable aviation initiatives** will drive demand for **electric, hydrogen, and zero-emission aircraft engineers**.
- ◆ **Commercial space expansion** will boost careers in **hypersonic travel, satellite servicing, and space logistics**.

Regional Differences

Continent	Key Workforce Trends (2024-2044)	5-Year Outlook (2029)	10-Year Outlook (2034)	20-Year Outlook (2044)
North America USCA	- Mature aviation market but growing demand for MRO (maintenance, repair & overhaul) and pilots. - AI automation will reduce some administrative & scheduling jobs. - NASA & SpaceX expansion will drive aerospace R&D jobs in the U.S.	📊 Stable – U.S. and Canada will require more pilots & maintenance workers but see reduced ground and admin roles .	▲ Growth in maintenance & space workforce – AI-driven logistics efficiency offsets job declines in ground ops.	▲ Major demand in space technologies & green aviation – Increased focus on electric planes & urban air mobility .
Europe EU	- Stringent EU regulations drive aviation compliance workforce. - Electric & hydrogen aviation will increase demand for aerospace engineers. - ATC & admin roles may decline due to automation.	📊 Stable – Pilot shortages remain, but AI efficiency assists scheduling & aircraft MRO.	▲ More demand for sustainable aviation engineers – Airlines shift to new fuels & emissions compliance.	▼ Decline in traditional airline administration jobs as AI-driven air traffic management reduces human controllers .
Asia-Pacific 🌐	- Fastest-growing aviation market, especially in China & India. - Massive demand for pilots, engineers, and cabin crew. - Low automation adoption now, but expected to grow.	▲ Major growth – Asia will require 50% more pilots in 5 years . Cabin crew & MRO roles also expand.	▲ High expansion – AI-supported flight operations will streamline efficiency, growing technical & AI-driven jobs .	▲ Largest employment jump in aviation jobs worldwide – China, India & ASEAN regions dominate global fleet expansion.

Middle East 🌐	- Gulf carriers (Emirates, Qatar, Etihad) fuel global aviation job creation. - Major hub airports (Dubai, Doha, Istanbul) drive demand in flight & ground ops. - Aerospace R&D growing in UAE & Saudi Arabia.	▲ Steady growth – Increased need for pilots, engineers & air traffic controllers due to rising passenger traffic.	▲ More AI-driven security roles – Gulf airlines adopt cutting-edge automation early.	🏗️ Stable in growth – Demand for high-skill workers remains while automation reduces routine labor jobs.
Latin America 🌐	- Growing low-cost carriers (LCCs) mean more demand for pilots & cabin crew. - Severe infrastructure bottlenecks slowing advanced aviation adoption. - Less automation = More need for manual operations workforce.	▲ Rapid fleet expansion needs pilots & crew. High demand for maintenance roles.	▲ Growing domestic & regional networks need logistics, security & airline business jobs.	🏗️ Stable, but slow AI adoption delays automation-driven role changes.
Africa 🌐	- Fastest-growing passenger aviation market (IATA 2023). - Infrastructure growth = Increase in ground operations, flight training, & maintenance. - Boeing & Airbus expanding fleet orders across the region.	▲ Pilot & MRO demand increase, especially in Nigeria, South Africa, Kenya, and Ethiopia.	▲ Huge expansion in aviation jobs – Africa becomes regional aviation hub for connections & tourism.	▲ Continued workforce growth in aviation, with localized AI adoption.

Observations on Future Workforce Demand by Continent

✅ Strongest Job Growth Regions (2044)

1 **Asia-Pacific (China, India, ASEAN)** – PILOTS, AEROSPACE ENGINEERS, AVIATION MANAGEMENT

🌐 **Largest workforce expansion globally** due to population size, new fleets, and urban aviation growth.

2 **Middle East (Dubai, UAE, Saudi Arabia, Qatar)** – AI-ENABLED AIRPORT OPERATIONS, AEROSPACE R&D

🚀 **Massive investment in smart airports & space technology** ensures steady job growth.

3 **Africa (Nigeria, South Africa, Ethiopia, Kenya, Egypt)** – PILOTS, MAINTENANCE, CABIN CREW

✈️ **Fastest-growing passenger market** but lower automation adoption preserves workforce demand.

✅ Moderate Job Growth Regions

4 **North America (U.S., Canada)** – SPACE, GREEN AVIATION, MAINTENANCE

🚀 **NASA-driven space roles + AI in sustainability push** high-tech aviation jobs.

5 **Europe (UK, France, Germany, Netherlands, Spain)** – SUSTAINABLE AVIATION ENGINEERING, COMPLIANCE

🌱 **EU emissions targets push for industry transformation**, supporting R&D jobs.

❌ Regions Facing AI-Driven Job Disruptions

6 **Latin America (Brazil, Mexico, Argentina)** – MIXED AVIATION GROWTH

🤖 **Automation progress slow**, but infrastructure investment could increase demand in the long run.

Future AI Impact on Aviation Workforces

1. **Pilots & Flight Crew** – ▲ **HIGH demand long-term** (Asia, Africa, Middle East)
✈️ **Job security remains strong** due to increasing global fleets.
2. **Engineers & Technicians** – ▲ **Major demand growth** (Europe, Middle East, Africa)
✂️ **MRO (Aircraft Maintenance & Repair) needs keep growing**, despite robotic automation.
3. **Air Traffic Controllers (ATC)** – ▼ **Likely decline due to AI-based airspace management**
📡 **North America & Europe shifting to AI controllers**, reducing hiring, but human oversight still needed.
4. **Aerospace R&D & Space Systems** – ▲ **Explosive growth** (North America, Middle East, China)
🌍 ✂️ **Commercial spaceflight & green aviation fuels sector expansion**.
5. **Ground & Airport Operations** – ▼ **Job losses due to AI & robotics** (North America, Europe)
📦 **Cargo & airport logistics will automate, keeping fewer manual jobs**.
6. **Airline Administration & Scheduling** – ▼ **Decline due to AI automation** (Global)
🚂 **Revenue management, pricing & scheduling becoming AI-optimized**.