**Admin Dashboard (Superuser Overview)**

* System & User Management
  + Full multi-organization authentication controls (ATO, Airline, Flight School)
  + Role-based access control management, including creation/deletion of user accounts
  + Email pattern detection and auto-routing configuration
  + Test account management and automated test scripts for all roles
* Global Analytics & Monitoring
  + Comprehensive real-time dashboards (KPIs, performance metrics, compliance graphs)
  + 3D risk assessment matrix with drill-down details (Occurrence, Severity, Detection)
  + Historical data analysis and predictive risk forecasting
  + Full view of performance metrics (reaction times, fatigue risk, SOP compliance)
* Infrastructure & API Administration
  + API integration management (document extraction, multi-factor authentication endpoints, cross-reference resolver, terminology standardization)
  + CI/CD pipeline monitoring, database health (PostgreSQL, TimescaleDB, MongoDB), and performance benchmarks
* Regulatory Compliance & Security
  + Automated compliance tracking, audit logs, and blockchain-backed audit trails
  + Zero-trust security settings, AI-driven anomaly and intrusion detection
  + GDPR-compliant data lifecycle and deletion policies
* Knowledge Graph & Data Insights
  + Administration of knowledge graph generation and semantic search APIs
  + Full access to cross-reference resolution and terminology standardization controls
* System Configuration & Extensions
  + Configuration of open plugin ecosystem, third-party connectors, and enterprise integrations
  + Overarching dashboard that aggregates all modules and provides drill-downs into each functionality

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**ATO (Approved Training Organization) Dashboard**

* Compliance & Regulatory Oversight
  + Regulatory compliance tracking with real-time alerts and historical audit logs
  + Certification status distributions and blockchain-backed audit trails
  + Automated regulatory gap analysis and risk matrix overviews
* Resource, Scheduling & Operations
  + High-level scheduling for instructors, trainees, aircraft, and simulators
  + Integration with external calendars (Google, Outlook) and automated conflict detection
  + Maintenance and inspection tracking (flight records, MRO system integration)
* Global Performance Analytics
  + 3D risk assessment matrix (interactive, with drill-down risk details)
  + Trend analysis for safety, compliance, and performance metrics
  + Aggregated KPI dashboards for organization-wide training effectiveness
* Document & Knowledge Management
  + Access to e-manual uploads, AI-powered document extraction, and compliance mapping
  + High-level view of syllabus generation status and regulatory mapping
* Shared Knowledge Graph
  + Overview of semantic search and knowledge graph outputs relevant to regulatory standards
* Communication & Notifications
  + Organization-level messaging and real-time notification systems for operational updates

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**Instructor Dashboard**

* Session & Syllabus Management
  + AI-powered drag-and-drop syllabus builder with inline compliance indicators
  + Tools for module/lesson extraction, competency analysis, and scheduling of training sessions
  + Real-time session planning with automated conflict detection and calendar integration
* Assessment & Grading Tools
  + Competency-based assessment system with one-click grading and gradesheet management
  + Real-time performance evaluation and AI-driven adaptive assessment recommendations
  + Instructor feedback tools with speech-to-text integration and visual analytics (spider/radar charts)
* Performance Monitoring
  + Live trainee analytics with performance heatmaps and trend charts
  + 3D risk matrix insights relevant to session outcomes (drill-down for incident logs)
  + Adaptive learning path recommendations based on individual trainee performance
* Document & Resource Access
  + Upload and share training guides, e-manuals, and session-specific documents
  + Access to AI-extracted content for syllabus enhancement and compliance review
* Collaboration & Communication
  + In-app messaging, group chats, and video conferencing for real-time debriefs
  + Collaborative editing in shared workspaces (syllabus, assessments)
* Knowledge Graph Insights
  + Access to curated knowledge graph views linking training modules to regulatory references

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**Examiner Dashboard**

* Detailed Assessment & Grading
  + Comprehensive performance evaluation tools with one-click grading
  + Automated feedback summaries (speech-to-text, AI-generated reports)
  + Detailed gradesheets and competency breakdowns via interactive charts
* Debriefing & Reporting Tools
  + Session replay with timestamped event tagging for post-training analysis
  + Tools for flagging deviations, inconsistencies, and generating custom debrief reports
* Visual Analytics
  + Performance heatmaps, competency dashboards, and risk analysis charts
  + Integration of 3D risk matrix visualizations focused on trainee performance
* Communication & Collaboration
  + Direct messaging with trainees and instructors for evaluation feedback
  + Shared dashboards for collaborative reviews of assessment trends
* Knowledge Graph Access
  + View semantic relationships among training content, regulatory standards, and assessment outcomes

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**Student Dashboard**

* Personalized Learning & Syllabus Access
  + Customized syllabus display with progress tracking and competency indicators
  + Access to interactive e-learning modules (video tutorials, quizzes, interactive lessons)
  + Downloadable training guides and compliance checklists
* Schedule & Session Overview
  + Calendar view of upcoming training sessions, assignments, and notifications
  + Automated session reminders and conflict alerts
* Assessment Results & Feedback
  + Detailed performance reports with visual charts (radar charts, progress bars)
  + Instructor feedback summaries and AI-driven recommendations for improvement
* Resource & Document Repository
  + Centralized access to training documents, videos, and supplementary materials
  + Searchable document library powered by AI-driven extraction and knowledge graph queries
* Communication Tools
  + In-app messaging for direct contact with instructors and examiners
  + Q&A forums or interactive discussion boards for peer support
* Simplified Risk & Performance Insights
  + Basic risk indicators and performance trends to guide self-assessment
  + AI-driven recommendations for additional practice based on progress

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**Shared/General Features (Accessible by All Roles, with Role-Based Detail Levels)**

* **Real-Time Communication & Collaboration**
  + Messaging system, group chats, and notification subscriptions
  + Video conferencing and collaborative document editing
* **Document Management & Analysis**
  + Drag-and-drop file uploads, AI-based document extraction, OCR, and compliance mapping
* **Analytics & Visualizations**
  + Interactive dashboards with live data feeds, performance metrics, and trend graphs
  + 3D risk assessment matrix available at varying detail levels
* **Knowledge Graph & Semantic Search**
  + AI-powered knowledge graphs for quick reference and in-depth training insights
  + Semantic search across documents and training modules
* **Offline & Mobile Support**
  + PWA capabilities with offline caching, background sync, and mobile-responsive design
* **API & External Integrations**
  + Endpoints for document extraction, multi-factor authentication, simulator telemetry, and external data feeds
* **Continuous Updates & Notifications**
  + Automated notifications for regulatory changes, new documents, and training updates
  + Real-time alert systems integrated across dashboards

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**Usage & Implementation Notes:**

* **Admin** sees an extensive menu with high-level management, system configuration, and full access to every module.
* **ATO** focuses on compliance, scheduling, and organizational performance with regulatory oversight.
* **Instructors** receive tools for session planning, syllabus management, assessments, and real-time student monitoring.
* **Examiners** have dedicated assessment, debriefing, and detailed performance reporting features along with communication tools for evaluation.
* **Students** see a streamlined dashboard focused on their learning path, schedules, performance feedback, and resource access.
* **Shared modules** (e.g., real-time communication, document management, knowledge graphs) appear across multiple dashboards but may present different levels of detail based on the role.