Systematic Literature Review_ Data Extraction Form

Study Identifier: ID2						**Dataset**	Telemetry data from 32 aircraft		
Title	**Rare Failure Prediction via Event Matching for Aerospace Applications**								
Year	**2019**					ML Type	SL	UL	SSL
Author(s)	**Evgeny Burnaev**								
Publication Venue	☐ **Journal**	☑ ~~**Conference**~~	☐ **Other**						
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type	☐ **Single**	☑ ~~**Hybrid**~~	☐ **Other**						
Uncertainty Consideration	☑ ~~**Yes**~~	☐ **No**	☐ **Other**						
Primary Criteria									
Secondary Criteria									
Criteria Type	☐ **Subjective**	☐ **Objective**	☑ ~~**Combined**~~						
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**						☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other : Aerospace Predictive Maintaenance**~~			
Validation	**Validated using real-world aircraft operational data**								
Contribution	☐ **Integration**	☐ **Utilization**	☐ **Extension**	☑ ~~**New method**~~					
Summary									
The paper presents a novel approach to predict rare failures in aerospace applications, utilizing advanced machine learning techniques to analyze high-dimensional time-series data from aircraft operations. The methodology is validated with real-world data, emphasizing its practical applicability and effectiveness in reducing false alarms while accurately predicting potential failures.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID4						**Dataset**	NASA's Flight Data Recorder (FDR) data		
Title	**Unsupervised Flight Phase Recognition with Flight Data Clustering based on GMM**								
Year	**2020**					ML Type	SL	UL	SSL
Author(s)	**Datong Liu, Ning Xiao, Yujie Zhang, and Xiyuan Peng**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☐ **Yes**		☑ ~~**No**~~		☐ **Other**		
Primary Criteria									
Secondary Criteria									
Criteria Type			☐ **Subjective**		☑ ~~**Objective**~~		☑ ~~**Combined**~~		

Application Domain

☐ **Automated Flight Control**	☐ **Environmental Control System**
☐ **Aircraft Health Monitoring Systems**	☐ **Fuel Management**
☐ **Air Traffic Management Systems**	☐ **Security Systems**
☐ **Navigation Systems**	☐ **Maintenance Scheduling Systems**
☐ **Communication Systems**	☐ **Weather Monitoring and Prediction Systems**
	☐ **Other :Flight Phase Recognition**

Validation	**Validated using NASA's real flight data**			
Contribution	☐ **Integration**	☐ **Utilization**	☐ **Extension**	☑ ~~**New method**~~

Summary

The paper "Unsupervised Flight Phase Recognition with Flight Data Clustering based on GMM" presents a novel method for recognizing flight phases using an unsupervised learning approach. The study utilizes the Gaussian Mixture Model (GMM) to cluster flight data from NASA's Flight Data Recorder (FDR) dataset. The method focuses on accurately identifying different phases of flight, such as taxiing, climbing, cruising, and approaching, which is crucial for subsequent anomaly detection and improving aviation safety. The paper reports that the proposed method achieves an average recognition accuracy of 90.04% across 55 flight samples, demonstrating the effectiveness of GMM in flight phase recognition.

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID7						**Dataset**			
Title	**Aviation Data Analytics in MRO Operations: Prospects and Pitfalls**								
Year	**2020**					ML Type	SL	UL	SSL
Author(s)	**Asteris Apostolidis, Maurice Pelt, Konstantinos P. Stamoulis**								
Publication Venue	☐ **Journal**	☑ ~~**Conference**~~				☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☐ **Single**		☑ ~~**Hybrid**~~		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**No**								
Criteria Type			☐ **Subjective**		☐ **Objective**		☑ ~~**Combined**~~		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☑ ~~**Maintenance Scheduling Systems**~~ ☐ **Weather Monitoring and Prediction Systems** ☐ **Other :**				
Validation	**Not Specified**								
Contribution	☐ **Integration**		☐ **Utilization**		☐ **Extension**		☐ **New method**		
Summary									
The paper discusses the use of supervised machine learning techniques, such as Isolation Forest and Logistic Regression, for optimizing Maintenance, Repair, and Overhaul (MRO) operations in aviation. It highlights the potential and challenges of data analytics in predicting rare events and improving maintenance processes. The study contributes methodologically by proposing approaches for enhancing MRO practices.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID9						**Dataset**			
Title	**Survey of RPAS Autonomous Control Systems Using Artificial Intelligence**								
Year	**2021**					ML Type	SL	UL	SSL
Author(s)	**Michal Aibin**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☐ **Single**		☑ ~~**Hybrid**~~		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**No**								
Criteria Type			☐ **Subjective**		☐ **Objective**		☑ ~~**Combined**~~		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**						☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other :Remotely Piloted Aircraft Systems**~~			
Validation	**Not applicable**								
Contribution	☐ **Integration**		☐ **Utilization**			☐ **Extension**	☑ ~~**New method**~~		
Summary									
The paper provides a comprehensive survey of Remotely Piloted Aircraft Systems (RPAS) and their use of AI, covering supervised, unsupervised, and reinforcement learning techniques. It discusses the challenges and benefits of integrating AI into RPAS for autonomous control, offering insights into current and future trends. The study contributes methodologically by summarizing existing approaches and identifying key issues for future research.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID11						**Dataset**	FAA Radar Dataset		
Title	**Learning Probabilistic Trajectory Models of Aircraft in Terminal Airspace From Position Data**								
Year	**2018**					ML Type	SL	UL	SSL
Author(s)	**Shane T. Barratt,**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	RQ2	RQ3	RQ4	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**NP**								
Criteria Type			☐ **Subjective**		☐ **Objective**		☑ ~~**Combined**~~		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☑ ~~**Air Traffic Management Systems**~~ ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☐ **Other :**				
Validation	**Yes**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper presents a method for learning probabilistic trajectory models of aircraft in terminal airspace using unsupervised learning techniques, specifically clustering and Gaussian mixture models, applied to FAA radar data. The approach enables accurate prediction and realistic generation of aircraft trajectories, contributing methodologically to air traffic control systems by improving safety and efficiency.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID13						**Dataset**	NASA's avData Recorder (FDR) data		
Title	**Detecting Historical Terrain Anomalies With UAV-LiDAR Data Using Spline-Approximation and Support Vector Macs**								
Year	**2023**					ML Type	SL	UL	SSL
Author(s)	**Marcel Storch,**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**No**								
Criteria Type			☐ **Subjective**		☐ **Objective**		☑ ~~**Combined**~~		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**						☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other : Archaeological Remote Sensing**~~			
Validation									
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper presents an unsupervised method for detecting historical terrain anomalies using UAV-LiDAR data combined with spline-approximation and Support Vector Machines (SVMs). The study focuses on automating the detection of terrain features, improving accuracy in areas with dense vegetation. The approach is validated with real-world data, contributing methodologically to the field of archaeological remote sensing.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID3						**Dataset**	Quick Access Recorder data from 2002 flights		
Title	**Data-Driven Long-Landing Event Detection and Interpretability Analysis in Civil Aviation**								
Year	**2022**					ML Type	SL	UL	SSL
Author(s)	**Xiong Yang, Jin Ren, Junchen Li**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☐ **Single**		☑ ~~**Hybrid**~~		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**No**								
Criteria Type			☐ **Subjective**		☐ **Objective**		☑ ~~**Combined**~~		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other : Civil Aviation**~~				
Validation	**Yes**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper proposes a data-driven workflow for detecting and analyzing long-landing events (LLEs) in civil aviation using a combination of supervised and unsupervised machine learning techniques applied to Quick Access Recorder (QAR) data. The methodology improves accuracy in LLE detection and provides interpretability through SHapley Additive exPlanations (SHAP). The study contributes methodologically by enhancing anomaly detection and interpretability in aviation safety.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID5						**Dataset**	Flight logs from 5000 real delivery drone missions		
Title	**Unsupervised Anomaly Detection for Self-flying Delivery Drones**								
Year	**2021**					ML Type	SL	UL	SSL
Author(s)	**Vikas Sindhwani, Hakim Sidahmed**								
Publication Venue	☐ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**No**								
Criteria Type			☐ **Subjective**		☐ **Objective**		☑ ~~**Combined**~~		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other : Autonomous Drone Operation**~~				
Validation	**Yes**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper proposes an unsupervised anomaly detection framework for self-flying delivery drones, utilizing flight logs from 5000 real missions. The approach effectively identifies anomalies without prior labeling, improving operational reliability and safety. The study contributes methodologically by introducing scalable algorithms for robust anomaly detection in large-scale drone operations.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID16						**Dataset**	MAVLink message data (simulated)		
Title	**RODAD: Resilience Oriented Decentralized Anomaly Detection for Urban Air Mobility Networks**								
Year	**2022**					ML Type	SL	UL	SSL
Author(s)	**Sixiao Wei, Hui Huang, Genshe Chen,**								
Publication Venue	☐ **Journal**	☑ ~~**Conference**~~				☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type	☐ **Single**	☑ ~~**Hybrid**~~	☐ **Other**						
Uncertainty Consideration	☑ ~~**Yes**~~	☐ **No**	☐ **Other**						
Primary Criteria	**Yes**								
Secondary Criteria	**No**								
Criteria Type	☐ **Subjective**	☐ **Objective**	☑ ~~**Combined**~~						
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other : Urban Air Mobility**~~				
Validation	**Yes**								
Contribution	☐ **Integration**	☑ ~~**Methodological**~~	☐ **Extension**	☐ **New method**					
Summary									
The paper presents the RODAD framework, a resilience-oriented decentralized anomaly detection system for Urban Air Mobility Networks. It uses supervised learning techniques on simulated MAVLink message data to detect GPS spoofing attacks and enhance system security. The framework is validated through a hardware-in-the-loop implementation, demonstrating its effectiveness in real-time anomaly detection and robust data access control within decentralized networks									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID 18						**Dataset**	NASA Aviation Safety Information Analysis and Sharing (ASIAS)		
Title	**Anomaly Detection in Flight Data Using the Naïve Bayes Classifier**								
Year	**2021**					ML Type	SL	UL	SSL
Author(s)	**Murtaja S. Jalawkhan, Tareef K. Mustafa**								
Publication Venue	☐ **Journal**		☑ ~~**Conference**~~			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**No**								
Criteria Type			☐ **Subjective**		☐ **Objective**		☑ ~~**Combined**~~		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other : Civil Aviation**~~				
Validation	**Yes**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper presents a supervised anomaly detection approach for civil aviation using the Naïve Bayes classifier applied to NASA's ASIAS flight data. The method effectively identifies anomalies with high accuracy, improving proactive safety management in aviation. The study contributes methodologically by demonstrating the classifier's effectiveness in real-time anomaly detection.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID 20						**Dataset**	ADS-B time series data		
Title	**TTSAD: TCN-Transformer-SVDD Model for Anomaly Detection in Air Traffic ADS-B Data**								
Year	**2024**					ML Type	SL	UL	SSL
Author(s)	**Peng Luo, Buhong Wang, Jiwei Tian**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☐ **Single**		☑ **~~Hybrid~~**		☐ **Other**		
Uncertainty Consideration			☑ **~~Yes~~**		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**No**								
Criteria Type			☐ **Subjective**		☐ **Objective**		☑ **~~Combined~~**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☑ **~~Air Traffic Management Systems~~** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☐ **Other :**				
Validation	**Yes**								
Contribution	☐ **Integration**		☑ **~~Methodological~~**		☐ **Extension**		☐ **New method**		
Summary									
The paper proposes the TTSAD model for anomaly detection in ADS-B data, combining TCN, Transformer, and SVDD. The model enhances detection accuracy, especially for complex and long-term dependencies in ADS-B data, contributing methodologically to improving air traffic management security.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID 19						**Dataset**	NASA ASRS data		
Title	**Anomaly Detection in Aviation Data using Extreme Learning Machines**								
Year	**2017**					ML Type	SL	UL	SSL
Author(s)	**Xudong Zhang, Guodong Sun, Weihua Luo,**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**No**								
Criteria Type			☐ **Subjective**		☐ **Objective**		☑ ~~**Combined**~~		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other : Civil Aviation**~~				
Validation	**Yes**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper utilizes Extreme Learning Machines (ELM) for anomaly detection in aviation data, specifically using NASA's ASRS data. The study contributes methodologically by showing how ELM can effectively detect anomalies in complex aviation datasets, improving safety management.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID 24						**Dataset**	Satellite telemetry data		
Title	**Artificial Intelligence for Trusted Autonomous Satellite Operations**								
Year	**2021**					ML Type	SL	UL	SSL
Author(s)	**Jing Liu, Xiang Li, Yue Wang, Wei Zhang**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☐ **Single**		☑ **~~Hybrid~~**		☐ **Other**		
Uncertainty Consideration			☑ **~~Yes~~**		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**No**								
Criteria Type			☐ **Subjective**		☐ **Objective**		☑ **~~Combined~~**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ **~~Other : Autonomous Satellite operations~~**				
Validation	**Yes**								
Contribution	☐ **Integration**		☑ **~~Methodological~~**		☐ **Extension**		☐ **New method**		
Summary									
The paper discusses the application of AI for autonomous satellite operations, focusing on supervised learning techniques applied to satellite telemetry data. The study contributes methodologically by improving the reliability and trustworthiness of satellite autonomy through advanced AI techniques.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID 26						**Dataset**	ADS-B data		
Title	**ADS-B Anomaly Data Detection Model Based on VAE-SVDD**								
Year	**2022**					ML Type	SL	UL	SSL
Author(s)	**Mingxuan Sun, Jian Peng, Yu Song**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☐ **Single**		☑ **~~Hybrid~~**		☐ **Other**		
Uncertainty Consideration			☑ **~~Yes~~**		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**No**								
Criteria Type			☐ **Subjective**		☐ **Objective**		☑ **~~Combined~~**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☑ **~~Air Traffic Management Systems~~** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☐ **Other :**				
Validation	**Yes**								
Contribution	☐ **Integration**		☑ **~~Methodological~~**		☐ **Extension**		☐ **New method**		
Summary									
The paper introduces a VAE-SVDD model for unsupervised anomaly detection in ADS-B data, which enhances the detection accuracy of abnormal events in air traffic control. The study contributes methodologically by integrating VAE with SVDD to improve the detection of anomalies in ADS-B data, ensuring air traffic safety.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID 28						**Dataset**	Radar data from ATC systems		
Title	**Stochastic Conformal Anomaly Detection and Resolution for Air Traffic Contro**								
Year	**2021**					ML Type	SL	UL	SSL
Author(s)	**Andrew R. Warrington, Alastair R. Allen**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**No**								
Criteria Type			☐ **Subjective**		☐ **Objective**		☑ ~~**Combined**~~		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☑ ~~**Air Traffic Management Systems**~~ ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☐ **Other :**				
Validation	**Yes**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
This paper presents a stochastic conformal anomaly detection approach for air traffic control using radar data. The method is validated in simulated airspace environments and is effective at detecting and resolving anomalies, contributing methodologically to air traffic safety.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID29						**Dataset**	Multivariate time-series data from flight records		
Title	**CAE: Contextual Auto-Encoder for Multivariate Time-Series Anomaly Detection in Air Transportation**								
Year	**2022**					ML Type	SL	UL	SSL
Author(s)	**Yiwei Xue, Peiqi Wu, Yang Yue**								
Publication Venue	☑ **Journal**			☐ **Conference**		☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**No**								
Criteria Type			☐ **Subjective**		☐ **Objective**		☑ ~~**Combined**~~		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other : Air Transportaion**~~				
Validation	**Yes**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper introduces a Contextual Auto-Encoder (CAE) model for detecting anomalies in multivariate time-series data in air transportation. The study highlights the effectiveness of CAE in identifying anomalies in complex flight records, contributing methodologically to enhancing air transportation safety.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID 30						**Dataset**	Flight operation quality assurance (FOQA) data		
Title	**A Data Analytics Framework for Anomaly Detection in Flight Operations**								
Year	**2021**					ML Type	SL	UL	SSL
Author(s)	**William H. Moore, Stephen L. Brown, James W. Smith**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☐ **Single**		☑ ~~**Hybrid**~~		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**No**								
Criteria Type			☐ **Subjective**		☐ **Objective**		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other : Flight Operations**~~				
Validation	**Yes**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper presents a data analytics framework that integrates supervised machine learning for detecting anomalies in flight operations using FOQA data. The study contributes methodologically by improving anomaly detection and risk assessment in flight operations, ensuring aviation safety.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID31						**Dataset**	Aircraft battery data		
Title	**Anomaly Detection of Vectorized Time Series on Aircraft Battery Data**								
Year	**2020**					ML Type	SL	UL	SSL
Author(s)	**Liang Zhang, Xiaodong Chen, Weiqiang Zhang**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**No**								
Criteria Type			☐ **Subjective**		☐ **Objective**		☑ ~~**Combined**~~		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other : Aircraft Maintenance**~~				
Validation	**Yes**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
This paper discusses an unsupervised anomaly detection method applied to vectorized time-series data from aircraft battery systems. The study focuses on identifying early signs of battery degradation and contributes methodologically to improving the maintenance and reliability of aircraft power systems.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID32						**Dataset**	ARINC 429 bus data		
Title	**Anomaly Detection of Aviation Data Bus Based on SAE and IMD**								
Year	**2021**					ML Type	SL	UL	SSL
Author(s)	**Hanchao Li, Xiangyu Meng, Bin Xu, Xiaodong Wu**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**No**								
Criteria Type			☐ **Subjective**		☐ **Objective**		☑ ~~**Combined**~~		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other : Aviation Data Bus Systems**~~				
Validation	**Yes**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper introduces an anomaly detection method for aviation data buses, utilizing SAE and IMD techniques on ARINC 429 bus data. The study enhances the detection of anomalies in aviation communication systems, contributing methodologically to improving system reliability.									

Study Identifier: ID 33						**Dataset**	Real images of aircraft landing gear component surfaces		
Title	**Anomaly Detection for Industrial Surface Inspection: Application in Maintenance of Aircraft Components**								
Year	**2022**					ML Type	SL	UL	SSL
Author(s)	**Falko Kähler, Ole Schmedemann,**								
Publication Venue	☐ **Journal**	☑ ~~**Conference**~~				☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**No**								
Criteria Type			☐ **Subjective**		☐ **Objective**		☑ ~~**Combined**~~		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other : Aircraft Maintenance (Surface Inspection)**~~				
Validation	**Yes**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper applies a convolutional autoencoder (CAE) for detecting surface defects on aircraft landing gear components using an unsupervised anomaly detection approach. Despite promising results, the study indicates that further improvements in data quality and model architecture are necessary for deployment. The study contributes methodologically to the domain of aircraft maintenance, specifically in automating surface inspection processes									

Study Identifier: ID 34						**Dataset**	Simulated data (UAV flight dynamics)		
Title	**A Data-Driven Approach for Detection and Isolation of Anomalies in a Group of UAVs**								
Year	**2015**					ML Type	SL	UL	SSL
Author(s)	**Wang Yin, Wang Daobo, Wang Jianhong**								
Publication Venue	☑ **Journal**			☐ **Conference**		☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type	☑ ~~**Single**~~			☐ **Hybrid**		☐ **Other**			
Uncertainty Consideration	☑ ~~**Yes**~~			☐ **No**		☐ **Other**			
Primary Criteria	**Yes**								
Secondary Criteria	**No**								
Criteria Type	☐ **Subjective**			☐ **Objective**		☑ ~~**Combined**~~			
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**						☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other : UAV Operations**~~			
Validation	**Yes**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
This paper presents an unsupervised approach for detecting and isolating anomalies in a group of UAVs using a data-driven method. The approach, validated with simulated UAV flight data, identifies abnormal aircraft behavior by detecting changes in dynamic model parameters. The study contributes methodologically to enhancing safety in UAV operations.									

Study Identifier: ID 35						**Dataset**	Simulated electro-mechanical actuator signals		
Title	**An Attention Graph Stacked Autoencoder for Anomaly Detection of Electro-Mechanical Actuator Using Spatio-Temporal Multivariate Signals**								
Year	**2021**					ML Type	SL	UL	SSL
Author(s)	**Xiaolong Xu, Fangnan Liu, Yu Feng, Xuejiao Xu**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type	☑ **~~Single~~**		☐ **Hybrid**		☐ **Other**				
Uncertainty Consideration	☑ **~~Yes~~**		☐ **No**		☐ **Other**				
Primary Criteria	**Yes**								
Secondary Criteria	**No**								
Criteria Type	☐ **Subjective**		☐ **Objective**		☑ **~~Combined~~**				
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**			☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ **~~Other : Electro-Mechanical Systems~~**						
Validation	**Yes**								
Contribution	☐ **Integration**		☑ **~~Methodological~~**		☐ **Extension**		☐ **New method**		
Summary									
The paper proposes an attention graph stacked autoencoder (AGSAE) for detecting anomalies in electro-mechanical actuator systems using spatio-temporal multivariate signals. The model effectively captures the spatial and temporal dependencies in the data, enhancing the detection of anomalies in complex systems. The study contributes methodologically to improving the reliability of electro-mechanical systems.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID 36						Dataset	NASA Aviation Safety Reporting System (ASRS) data		
Title	Few-Shot Anomaly Detection with Adaptive Feature Transformation and Descriptor Construction								
Year	2022					ML Type	SL	UL	SSL
Author(s)	Mengshi Hu, Junyu Cao, Haoyuan Li								
Publication Venue	☑ Journal		☐ Conference			☐ Other			
Research Question									
RQ1	RQ2	RQ3	RQ4	RQ5	RQ6	RQ7	RQ8	RQ9	RQ10
Fulfillment of inclusion criteria									
IC1	IC2	IC3	IC4	IC5	IC6	IC7	IC8	IC9	IC10
Quality Assessment Score									
QC1	QC2	QC3	QC4	QC5	QC6	QC7	QC8	QC9	QC10
Solution Type			☐ Single		☑ ~~Hybrid~~		☐ Other		
Uncertainty Consideration			☑ ~~Yes~~		☐ No		☐ Other		
Primary Criteria	Yes								
Secondary Criteria	No								
Criteria Type			☐ Subjective		☐ Objective		☑ ~~Combined~~		
Application Domain									
☐ Automated Flight Control ☐ Aircraft Health Monitoring Systems ☐ Air Traffic Management Systems ☐ Navigation Systems ☐ Communication Systems					☐ Environmental Control System ☐ Fuel Management ☐ Security Systems ☐ Maintenance Scheduling Systems ☐ Weather Monitoring and Prediction Systems ☑ ~~Other : Aviation Safety~~				
Validation	Yes								
Contribution	☐ Integration		☑ ~~Methodological~~		☐ Extension		☐ New method		
Summary									
This paper presents a few-shot learning approach for anomaly detection in aviation data, specifically targeting scenarios where labeled data is scarce. The proposed method integrates adaptive feature transformation and descriptor construction to enhance the detection accuracy. The study contributes methodologically by improving anomaly detection in low-data environments.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID 37						**Dataset**	Satellite telemetry data		
Title	**Anomaly Detection of Satellite Telemetry Based on Optimized Extreme Learning Machine**								
Year	**2021**					ML Type	SL	UL	SSL
Author(s)	**Tianrui Wang, Yang Yang, Yi Zhang**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☐ **Single**		☑ **~~Hybrid~~**		☐ **Other**		
Uncertainty Consideration			☑ **~~Yes~~**		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**No**								
Criteria Type			☐ **Subjective**		☐ **Objective**		☑ **~~Combined~~**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ **~~Other : Satellite Operations~~**				
Validation	**Yes**								
Contribution	☐ **Integration**		☑ **~~Methodological~~**		☐ **Extension**		☐ **New method**		
Summary									
<u>The paper discusses the use of an optimized Extreme Learning Machine (ELM) for anomaly detection in satellite telemetry data. The model effectively identifies abnormal telemetry signals, contributing methodologically to improving the reliability and safety of satellite operations.</u>									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID 38						**Dataset**	Flight data records		
Title	**An Incremental Clustering Method for Anomaly Detection in Flight Data**								
Year	**2018**					ML Type	SL	UL	SSL
Author(s)	**Li Zhang, Xiaodong Song, Jinfeng Yang**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**NO**								
Criteria Type			☐ **Subjective**		☐ **Objective**		☑ ~~**Combined**~~		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other :Flight operations**~~				
Validation	**Yes**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
This paper presents an incremental clustering method for anomaly detection in flight data. The approach effectively identifies anomalies in flight operations and contributes methodologically to enhancing safety and reliability in aviation.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID 39						**Dataset**	Borescope inspection images of aircraft engine compressor blades		
Title	**A Deep-Learning-Based Approach for Aircraft Engine Defect Detection**								
Year	**2023**					ML Type	SL	UL	SSL
Author(s)	**Anurag Upadhyay, Jun Li, Steve King, Sri Addepalli**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**NO**								
Criteria Type			☐ **Subjective**		☐ **Objective**		☑ ~~**Combined**~~		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other : Aircraft Maintenance**~~				
Validation	**Yes**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper presents a deep-learning framework for detecting defects in aircraft engine compressor blades using borescope inspection images. The study demonstrates the effectiveness of a customized U-Net architecture in detecting defects, contributing methodologically to automated aircraft maintenance.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID67						**Dataset**	None		
Title	**Exploiting Augmented Intelligence in the Modeling of Safety-Critical Autonomous Systems**								
Year	**2023**					ML Type	SL	UL	SSL
Author(s)	**Zhibin Yang**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☐ **Yes**		☑ ~~**No**~~		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ ~~**Objective**~~		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**						☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other : Safety-Critical Autonomous Systems**~~			
Validation	**Case Study**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper explores the use of augmented intelligence in the modeling of safety-critical autonomous systems, focusing on integrating machine learning components within a model-driven development (MDD) framework. The authors propose a methodology that combines restricted natural language requirements with SysML to create precise and unambiguous system models. This approach is validated through a case study on Autonomous Guidance, Navigation, and Control (AGNC) systems, demonstrating the effectiveness of augmented intelligence in improving the modeling process for complex safety-critical system.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID68						**Dataset**	None		
Title	Dynamic Spectrum Management with Network Function Virtualization for UAV Communication								
Year	**2021**					ML Type	None	UL	SSL
Author(s)	**Zhibin Yang**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ **~~Single~~**		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☐ **Yes**		☑ **~~No~~**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ **~~Objective~~**		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ **~~Other: UAV Communication~~**				
Validation	**Theoretical Framework**								
Contribution	☑ **~~Integration~~**		☑ **~~Methodological~~**		☐ **Extension**		☐ **New method**		
Summary									
The paper proposes a communication solution integrating Dynamic Spectrum Management (DSM) and Network Function Virtualization (NFV) to enhance UAV communication networks. It addresses spectrum scarcity and computational load challenges by virtualizing network functions and managing spectrum dynamically. The proposed solution provides a framework for efficient spectrum usage and supports high-throughput, low-latency communication in UAV operations, particularly in urban areas. The study highlights the potential for DSM and NFV to mitigate common issues in UAV communication, offering a robust and scalable architecture for future applications.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID69						**Dataset**	None		
Title	**Towards Reliable Identification and Tracking of Drones Within a Swarm**								
Year	**2024**					ML Type	SL	UL	SSL
Author(s)	**Nisha Kumari**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~Single~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☐ **Yes**		☑ ~~No~~		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ ~~Objective~~		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**						☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~Other: Swarm Robotics~~			
Validation	**Simulation**								
Contribution	☐ **Integration**		☑ ~~Methodological~~		☐ **Extension**		☑ ~~New method~~		
Summary									
This paper introduces a novel deep learning-based approach for the reliable identification and tracking of drones within a swarm, using YOLOv6 for detection and a Kalman filter for tracking. The study focuses on enhancing real-time surveillance capabilities, especially in densely populated drone environments. The approach was tested under various conditions and configurations, demonstrating robust performance in both sparse and dense drone swarms. The paper contributes to the field by addressing the challenges associated with dynamic and dense swarm behavior, providing a scalable and accurate tracking system.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID70						**Dataset**	None		
Title	**Enhanced Airborne Optical Sectioning Design via HSV Color Space for Detecting Human Object Under Obscured Aerial Image Environment**								
Year	**2023**					ML Type	None	UL	SSL
Author(s)	**KangSoo Ryu**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ **~~Single~~**		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☐ **Yes**		☑ **~~No~~**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ **~~Objective~~**		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**						☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ **~~Other: Search and Rescue (SAR)~~**			
Validation	**Simulation**								
Contribution	☑ **~~Integration~~**		☐ **Methodological**		☐ **Extension**		☐ **New method**		
Summary									
This paper presents an enhanced Airborne Optical Sectioning (AOS) technique using HSV color space preprocessing to improve the detection of human objects obscured in aerial images, particularly in dense forest environments. The proposed method focuses on distinguishing human shapes by removing tree parts from the images and enhancing visibility through HSV color space adjustments. The technique is validated through simulations, demonstrating its potential for efficient search and rescue operations without the need for expensive thermal imaging equipment.									

Study Identifier: ID71						**Dataset**	None		
Title	**Resilient Design and Operation of Cyber-Physical Systems with Emphasis on Unmanned Autonomous Systems**								
Year	**2018**					ML Type	RL	UL	SSL
Author(s)	**George Vachtsevanos**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☐ **Single**		☑ **~~Hybrid~~**		☐ **Other**		
Uncertainty Consideration			☑ **~~Yes~~**		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☐ **Objective**		☑ **~~Combined~~**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**						☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ **~~Other: Unmanned Autonomous Systems~~**			
Validation	**Simulation, Theoretical Framework**								
Contribution	☐ **Integration**		☑ **~~Methodological~~**		☐ **Extension**		☐ **New method**		
Summary									
This paper introduces a comprehensive framework for the resilient design and operation of Cyber-Physical Systems (CPS), with a focus on Unmanned Autonomous Systems (UAS). The proposed framework integrates self-organization and reconfigurable control strategies to enhance the resilience and safety of these systems. The authors emphasize the importance of maintaining system stability and integrity in the presence of severe disturbances by employing Reinforcement Learning (RL) and Markov Decision Processes (MDP) for decision-making. The study provides a theoretical foundation for improving the robustness and fault-tolerance of UAS, supported by simulation results demonstrating the effectiveness of the proposed methodologies.									

Study Identifier: ID72						**Dataset**	PADRE Dataset		
Title	**PADRE: A Repository for Research on Fault Detection and Isolation of Unmanned Aerial Vehicle Propellers**								
Year	**2024**					ML Type	SL	UL	SSL
Author(s)	**Radosław Puchalski**								
Publication Venue	☑ **Journal**			☐ **Conference**		☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☐ **Yes**		☑ ~~**No**~~		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ ~~**Objective**~~		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other: UAV Propeller Fault Detection**~~				
Validation	**Dataset, Simulation**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper presents PADRE, an open-source repository designed to support research on fault detection and isolation (FDI) in unmanned aerial vehicles (UAVs), particularly focusing on propeller faults. The repository includes a wide range of sensor data collected during UAV flights under various fault conditions, enabling researchers to develop and validate their fault detection algorithms. The paper details the data acquisition process, the structure of the repository, and the use of the data for training machine learning models. The authors also propose new quality metrics for evaluating classifiers, considering the complexity of fault detection tasks and processing time.									

Study Identifier: ID73						**Dataset**	None		
Title	**A Survey on Clock Synchronization in the Industrial Internet**								
Year	**2023**					ML Type	None	UL	SSL
Author(s)	**Fan Dang**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☐ **Yes**		☑ ~~**No**~~		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ ~~**Objective**~~		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other: Industrial Internet**~~				
Validation	**Survey**								
Contribution	☐ **Integration**		☐ **Methodological**		☐ **Extension**		☑ ~~**New method**~~		
Summary									
The paper provides a comprehensive survey on clock synchronization techniques within the Industrial Internet, highlighting the importance of precise, secure, and robust synchronization protocols across various industrial applications. The study categorizes existing clock synchronization methods, evaluates their applicability in different industrial scenarios, and discusses potential future developments. The paper does not use any specific datasets but focuses on reviewing and classifying clock synchronization protocols and their application in the Industrial Internet.									

Study Identifier: ID74						**Dataset**	Crazyflie 2.0 quadcopter platforms Dataset		
Title	**Controlling Draft Interactions Between Quadcopter Unmanned Aerial Vehicles with Physics-aware Modeling**								
Year	**2021**					ML Type	SL	UL	SSL
Author(s)	**Ion Matei**								
Publication Venue	☑ **Journal**			☐ **Conference**		☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☐ **Single**		☑ ~~**Hybrid**~~		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☐ **Objective**		☑ ~~**Combined**~~		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other: UAV Draft Interaction**~~				
Validation	**Simulation, Experimentation**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
This paper addresses the challenge of controlling the interactions between quadcopter UAVs when flying in close proximity, focusing on the disturbances caused by air drafts. The authors propose a physics-infused machine learning approach to model these interactions and develop control strategies to mitigate their effects. The study combines model predictive control (MPC) and trajectory planning to ensure stability and reduce tracking errors. The methodology is validated through experiments using Crazyflie 2.0 UAVs and simulations, demonstrating the effectiveness of the proposed approach in maintaining UAV stability and safety during close-proximity flight operations.									

Study Identifier: ID75						**Dataset**	Data from a pilot case study in a smart factory Dataset		
Title	**Big Data Summarisation and Relevance Evaluation for Anomaly Detection in Cyber Physical Systems**								
Year	**2017**					ML Type	Nonee	UL	SSL
Author(s)	**Ada Bagozi,**								
Publication Venue	☐ **Journal**		☑ ~~**Conference**~~			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☐ **Yes**		☑ ~~**No**~~		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ ~~**Objective**~~		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**						☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other: Smart Factory**~~			
Validation	**Pilot Case Study**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~			☐ **Extension**		☐ **New method**	
Summary									
The paper presents a state detection service for Cyber-Physical Systems (CPS) that employs big data summarisation and relevance evaluation techniques to detect anomalies. The proposed approach focuses on efficiently managing and analyzing large amounts of data collected in real-time from interconnected systems. The paper uses a pilot case study in a smart factory to validate the approach, demonstrating its applicability in detecting anomalies in industrial environments, particularly in monitoring spindle operations and tool wear.									

Study Identifier: ID77						**Dataset**	Simulation data (TJ3G28C solar cell) dataset		
Title	**Robust Anomaly Identification Algorithm for Noisy Signals: Spacecraft Solar Panels Model**								
Year	**2019**					ML Type	SL	UL	SSL
Author(s)	**Ada Bagozi,Wael A. Murtada**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ ~~**Objective**~~		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**						☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other: Spacecraft Electrical Power Subsystems**~~			
Validation	**Simulation**								
Contribution	☐ **Integration**		☐ **Methodological**		☐ **Extension**		☑ ~~**New method**~~		
Summary									
The paper presents a robust anomaly identification algorithm designed to handle noisy signals, focusing on spacecraft solar panels. The proposed method enhances the Prony feature extraction technique by using short-time energy (STE) to improve its robustness in noisy environments. The algorithm is validated through simulations using a mathematical model of the TJ3G28C solar cell, which accurately reflects the electrical characteristics of spacecraft power systems. The study demonstrates that the algorithm can effectively detect and classify different types of anomalies under various noise levels, providing a reliable solution for spacecraft fault detection.									

Study Identifier: ID78						**Dataset**	Simulation data from X-Plane flight simulator dataset		
Title	**Dynamic Data-Driven Learning for Self-Healing Avionics**								
Year	**2019**					ML Type	SL	UL	SSL
Author(s)	**Shigeru Imai**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☐ **Single**		☑ ~~**Hybrid**~~		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☐ **Objective**		☑ ~~**Combined**~~		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other: Avionics, Self-Healing Systems**~~				
Validation	**Simulation**								
Contribution	☐ **Integration**		☐ **Methodological**		☐ **Extension**		☑ ~~**New method**~~		
Summary									
The paper presents a dynamic data-driven learning framework for self-healing avionics systems, capable of detecting and correcting faults in sensor data streams. The framework combines expert-defined error signatures with a dynamic Bayes classifier to identify and adapt to new failure modes. The system is validated using simulation data from X-Plane, demonstrating the ability to detect and correct anomalies such as incorrect airspeed or fuel quantity readings in real-time, improving the resilience and reliability of avionics systems.									

Study Identifier: ID79						**Dataset**	ArduPlane simulation data dataset		
Title	**Unmanned Aerial Vehicle Security Using Recursive Parameter Estimation**								
Year	**2014**					ML Type	None	UL	SSL
Author(s)	**Zachary Birnbaum**								
Publication Venue	☐ **Journal**		☑ ~~**Conference**~~			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ ~~**Objective**~~		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other: UAV Security**~~				
Validation	**Simulation**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper presents a security framework for unmanned aerial vehicles (UAVs) using recursive parameter estimation to monitor airframe and control parameters in real-time. The proposed system is designed to detect cyber-attacks and hardware failures by identifying deviations from nominal parameter values. The validation is performed using the ArduPlane platform with a Hardware in the Loop (HIL) setup, demonstrating the system's capability to detect significant changes in UAV behavior, which could indicate potential security threats or system failures									

Study Identifier: ID80						**Dataset**	Public UAV flight data from University of Minnesota UAV Laboratory		
Title	**Flight Data Outlier Detection by Constrained LSTM-Autoencoder**								
Year	**2023**					ML Type	SL	UL	SSL
Author(s)	**Long Gao**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☐ **Yes**		☑ ~~**No**~~		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ ~~**Objective**~~		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other: Flight Data Monitoring**~~				
Validation	**Simulation**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper presents a constrained LSTM-Autoencoder model for detecting outliers in flight data, specifically focusing on time-series data related to flight height. The model integrates semantic and descriptive feature learning to enhance the accuracy and reliability of outlier detection. The study uses publicly available flight data from the University of Minnesota UAV Laboratory to validate the model, demonstrating significant improvements in detecting anomalies compared to existing methods. The proposed framework is particularly effective in distinguishing outliers from normal data points, making it a valuable tool for enhancing flight safety through improved data monitoring.									

Study Identifier: ID81						**Dataset**	Thor Flight 69 dataset (Publicly available)		
Title	**Data-driven Unsupervised Anomaly Detection and Recovery of Unmanned Aerial Vehicle Flight Data Based on Spatiotemporal Correlation**								
Year	**2023**					ML Type	SL	UL	SSL
Author(s)	**Yang Lei**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☐ **Yes**		☑ ~~**No**~~		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ ~~**Objective**~~		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**						☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other: UAV Flight Data Monitoring**~~			
Validation	**Simulation**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~			☐ **Extension**		☐ **New method**	
Summary									
The paper proposes a spatiotemporal correlation-based LSTM-Autoencoder (STC-LSTM-AE) for unsupervised anomaly detection and recovery in UAV flight data. The method is designed to identify and recover from anomalies by analyzing spatiotemporal correlations in flight data, reducing reliance on expert knowledge for parameter selection. The Thor Flight 69 dataset, containing flight data from the University of Minnesota, is used to validate the approach, demonstrating its effectiveness in detecting and recovering anomalies, particularly in noisy data environments.									

Study Identifier: ID82						**Dataset**	DARS dataset (Publicly available)		
Title	**Active Learning with Rationales for Identifying Operationally Significant Anomalies in Aviation**								
Year	**2019**					ML Type	SL	UL	SSL
Author(s)	**Manali Sharma**								
Publication Venue	☐ **Journal**		☑ ~~**Conference**~~			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☐ **Single**		☑ ~~**Hybrid**~~		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☐ **Objective**		☑ ~~**Combined**~~		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other: Aviation Anomaly Detection**~~				
Validation	**Simulation, Case Study**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
This paper proposes an active learning framework combined with subject matter expert rationales for improving the detection of operationally significant anomalies in aviation data. The study uses the PDARS dataset to identify anomalies that pose potential safety risks and enhances the existing Multiple Kernel Anomaly Detection (MKAD) method by incorporating expert feedback. The approach demonstrates significant improvements in precision and recall for detecting relevant anomalies, reducing the time and effort required for expert manual review.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID113						**Dataset**	OpenSky Network (real-world data)		
Title	**Multidevice False Data Injection Attack Models of ADS-B Multilateration Systems**								
Year	**2019**					ML Type	None	UL	SSL
Author(s)	**Fute Shang**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ ~~**Objective**~~		☑ ~~**Combined**~~		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other: Air Traffic Surveillance**~~				
Validation	**Simulation, Experimentation**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper presents a model for multidevice false data injection attacks on ADS-B (Automatic Dependent Surveillance-Broadcast) multilateration systems, commonly used in air traffic control. The study describes how attackers can use multiple low-cost transmitters to inject false ADS-B messages, effectively bypassing existing location verification mechanisms. The proposed model is validated using real-world data from the OpenSky Network, demonstrating that the attack can be executed with fewer devices and lower costs compared to previous methods. The study also discusses possible countermeasures to mitigate such attacks, including moving receivers and randomizing their operational status.									

Study Identifier: ID112						**Dataset**	C-MAPSS dataset (Publicly available)		
Title	**Predictive Maintenance Analytics and Implementation for Aircraft: Challenges and Opportunities**								
Year	**2023**					ML Type	SL	UL	SSL
Author(s)	**Izaak Stanton**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☐ **Single**		☑ ~~**Hybrid**~~		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☐ **Objective**		☑ ~~**Combined**~~		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other: Aircraft Maintenance**~~				
Validation	**Simulation, Case Study**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper provides a comprehensive review of predictive maintenance (PdM) applications in the aircraft industry, focusing on the challenges and opportunities associated with implementing PdM strategies. The study highlights the use of data-driven approaches, particularly using the C-MAPSS dataset, to optimize maintenance schedules, reduce aircraft downtime, and improve overall safety. The authors discuss various predictive models, the importance of real-time diagnostics, and the role of machine learning in enhancing maintenance decision-making processes. The paper also addresses the need for greater automation and the development of new technologies to fully realize the potential of PdM in aviation.									

Study Identifier: ID114						**Dataset**	Custom dataset (Generated from real-life experiments and simulations)		
Title	**Autonomous Vision-based Micro Air Vehicle for Indoor and Outdoor Navigation**								
Year	**2015**					ML Type	None	UL	SSL
Author(s)	**Izaak Stanton**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ ~~**Objective**~~		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other: MAV Navigation, Robotics**~~				
Validation	**Real-world Experiments, Simulation**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The thesis presents a comprehensive solution for autonomous navigation of Micro Aerial Vehicles (MAVs) in both indoor and outdoor environments. It introduces a scalable and flexible system architecture that combines inertial navigation with vision-based techniques. The proposed solution focuses on achieving robust and accurate navigation in cluttered environments, demonstrated through a series of real-world experiments, including flights in a coal mine and complex indoor/outdoor transitions. The study emphasizes the importance of sensor fusion, real-time processing, and the system's ability to handle delays and inaccuracies in sensor measurements.									

Study Identifier: ID84						**Dataset**	Optocoupler data from thermal stress accelerated aging tests		
Title	**VAE-based Anomaly Detection for Embedded Computer Electronic Components**								
Year	**2022**					ML Type	SL	UL	SSL
Author(s)	**Shuda Gao**								
Publication Venue	☐ **Journal**		☑ ~~**Conference**~~			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☐ **Yes**		☑ ~~**No**~~		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ ~~**Objective**~~		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**						☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other: Embedded Systems, Electronic Components**~~			
Validation	**Experimentation**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper introduces a Variational Autoencoder (VAE)-based approach for anomaly detection in embedded computer electronic components. By leveraging thermal stress accelerated aging data from optocouplers, the method models the normal operating status of components and detects anomalies based on reconstruction error. The paper emphasizes the advantages of this method over conventional techniques, highlighting its accuracy, real-time applicability, and potential for improving the reliability and lifespan of embedded systems.									

Study Identifier: ID85						**Dataset**	MSL, SMAP, SMD, KARI, Synthetic dataset (public and private datasets)		
Title	**Towards an Awareness of Time Series Anomaly Detection Models' Adversarial Vulnerability**								
Year	**2022**					ML Type	SL	UL	SSL
Author(s)	**Shahroz Tariq**								
Publication Venue	☐ **Journal**		☑ ~~**Conference**~~			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ ~~**Objective**~~		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**						☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other: Time Series, Anomaly Detection**~~			
Validation	**Experimentation**								
Contribution	☐ **Integration**		☐ **Methodological**		☐ **Extension**		☑ ~~**New method**~~		
Summary									
The paper investigates the adversarial vulnerabilities of state-of-the-art time series anomaly detection models. By applying well-known adversarial attacks like FGSM and PGD to models trained on datasets from aerospace, power plants, and server machines, the study demonstrates significant performance drops in anomaly detection accuracy. The findings raise awareness of the need for adversarial robustness in time series anomaly detection, especially in critical domains like aerospace and cyber-physical systems. The research highlights the susceptibility of these systems to adversarial attacks and underscores the importance of developing more robust models to mitigate these risks.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID86						**Dataset**	NASA SMAP and MSL spacecraft datasets (Publicly available)		
Title	**Spacecraft Anomaly Detection with Attention Temporal Convolution Networks**								
Year	**2023**					ML Type	SL	UL	SSL
Author(s)	**Liang Liu**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☐ **Yes**		☑ ~~**No**~~		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ ~~**Objective**~~		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other: Spacecraft Telemetry Data**~~				
Validation	**Experimentation**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper presents an anomaly detection framework based on Temporal Convolution Networks (TCNs) with graph attention mechanisms to handle the multivariate telemetry data from spacecraft. The proposed model is designed to capture the complex correlations among variables in time series data, improving the detection of anomalies in spacecraft systems. The study demonstrates the model's effectiveness using the NASA SMAP and MSL datasets, achieving superior performance compared to existing methods, particularly in precision, recall, and F1-score.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID87						**Dataset**	Statlog Shuttle dataset, Real payload dataset from a spacecraft		
Title	**Anomaly Detection of Aerospace Facilities Using GANomaly**								
Year	**2023**					ML Type	SL	UL	SSL
Author(s)	**Junrong Du**								
Publication Venue	☐ **Journal**		☑ ~~**Conference**~~			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☐ **Yes**		☑ ~~**No**~~		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ ~~**Objective**~~		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other: Aerospace Data Analysis**~~				
Validation	**Experimentation**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper introduces a GANomaly-based framework for detecting anomalies in aerospace data. The proposed method is validated on the Statlog Shuttle dataset and a real payload dataset from a spacecraft, demonstrating superior performance in detecting anomalies compared to traditional methods. The study emphasizes the GANomaly framework's ability to model the complex relationships in aerospace data, making it effective for real-time anomaly detection in space operations.									

Study Identifier: ID88						**Dataset**	Real-world flight dataset (collected on a flight-by-flight basis, 2000+ flights)		
Title	**Anomaly Detection of Aerospace Facilities Using GANomaly**								
Year	**2023**					ML Type	SL	UL	SSL
Author(s)	**Sijie He**								
Publication Venue	☐ **Journal**		☑ ~~**Conference**~~			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☐ **Objective**		☑ ~~**Combined**~~		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other: Aircraft Flight Data Monitoring**~~				
Validation	**Simulation, Real-world Data**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper proposes the DAVAC model for detecting anomalies in multivariate time series flight data by learning the variable associations under normal and anomalous conditions. The model utilizes nonlinear Granger causality to uncover the relationships between variables and detect anomalies through changes in these associations. The method is validated using a large real-world flight dataset, showing significant improvements in anomaly detection and diagnosis compared to existing methods. The paper emphasizes the importance of detecting subtle changes in variable associations to enhance flight safety.									

Study Identifier: ID89						**Dataset**	Gamma ray detector dataset (Real-world data from a satellite in China)		
Title	**An Improvement Growing Neural Gas Method for Online Anomaly Detection of Aerospace Payloads**								
Year	**2019**					ML Type	SL	UL	SSL
Author(s)	**Lei Song**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☐ **Yes**		☑ ~~**No**~~		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ ~~**Objective**~~		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**						☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other: Aerospace Equipment Monitoring**~~			
Validation	**Case Study, Real-world Data**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper proposes an improved Growing Neural Gas (GNG) method for online anomaly detection in aerospace payloads. The method enhances the traditional GNG by optimizing the learning rate adjustment and neuron addition and deletion mechanisms. The proposed approach is validated using a real-world dataset from a gamma ray detector mounted on a satellite. The study demonstrates that the improved method achieves higher anomaly detection accuracy and computational efficiency compared to conventional methods, making it suitable for real-time monitoring of critical aerospace systems.									

Study Identifier: ID90						**Dataset**	Spacecraft telemetry data (Real-world data)		
Title	**MTV: Visual Analytics for Detecting, Investigating, and Annotating Anomalies in Multivariate Time Series**								
Year	**2022**					ML Type	SL	UL	SSL
Author(s)	**Dongyu Liu**								
Publication Venue	☐ **Journal**	☑ ~~**Conference**~~	☐ **Other**						
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type	☑ ~~**Single**~~	☐ **Hybrid**	☐ **Other**						
Uncertainty Consideration	☑ ~~**Yes**~~	☐ **No**	☐ **Other**						
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type	☐ **Subjective**	☑ ~~**Objective**~~	☐ **Combined**						
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**			☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other: Aerospace, Multivariate Time Series**~~						
Validation	**Case Studies, User Studies**								
Contribution	☐ **Integration**	☑ ~~**Methodological**~~	☐ **Extension**	☐ **New method**					
Summary									
The paper introduces MTV, a visual analytics system designed to detect, investigate, and annotate anomalies in multivariate time series data. The system is developed through iterative design involving aerospace experts and is validated using real-world spacecraft telemetry data. MTV integrates multiple machine learning models, including ARIMA, LSTM, and TadGAN, to detect anomalies in large-scale time series data. The system supports human-AI collaboration, allowing domain experts to interact with the ML outputs, perform in-depth investigations, and annotate significant events. The study demonstrates that MTV enhances the efficiency and effectiveness of anomaly detection and investigation in complex industrial environments.									

Study Identifier: ID91						**Dataset**	NASA FOQA dataset (Flight Operations Quality Assurance)		
Title	**Semi-Markov Switching Vector Autoregressive Model-Based Anomaly Detection in Aviation Systems**								
Year	**2016**					ML Type	SL	UL	SSL
Author(s)	**Dongyu Liu**								
Publication Venue	☐ **Journal**		☑ ~~**Conference**~~			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ ~~**Objective**~~		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other: Aviation Safety, Flight Data Analysis**~~				
Validation	**Real-world Data, Simulation**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper introduces a Semi-Markov Switching Vector Autoregressive (SMS-VAR) model for anomaly detection in aviation systems. The model focuses on detecting operationally significant events by analyzing heterogeneous, multivariate, and variable-length time series data from flights. Using the NASA FOQA dataset, the study demonstrates that the SMS-VAR model can effectively detect anomalies caused by mechanical, environmental, or human factors. The paper highlights the model's scalability and its potential for real-time anomaly detection in aviation systems.									

Study Identifier: ID92						**Dataset**	FlightRadar24 and FlightStats datasets (Publicly available)		
Title	**Detecting Flight Trajectory Anomalies and Predicting Diversions in Freight Transportation**								
Year	**2016**					ML Type	SL	UL	SSL
Author(s)	**Claudio Di Ciccio**								
Publication Venue	☐ **Journal**		☐ **Conference**			☑ ~~**Other**~~			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ ~~**Objective**~~		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**						☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other: Aviation, Freight Transportation**~~			
Validation	**Real-world Data, Simulation**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper introduces a prediction model for detecting anomalies in flight trajectories and predicting flight diversions in freight transportation. The model leverages publicly available flight data from FlightRadar24 and FlightStats to identify deviations from expected flight behavior and predict potential diversions. The study demonstrates the effectiveness of the model in providing early warnings of diversions, allowing logistics providers to respond proactively, thereby minimizing disruption to supply chains. The model's accuracy is validated through extensive real-world data, showing high precision and recall in detecting flight diversions.									

Study Identifier: ID93						**Dataset**	Boeing 787-9 sensor data (Real-world data from 44,118 flights)		
Title	Anomaly Detection in Airliner Centrifugal Compressor Using Sensor Data during the Climb Phase								
Year	**2023**					ML Type	SL	UL	SSL
Author(s)	**Attiano Purpura-Pontoniere**								
Publication Venue	☐ **Journal**		☑ ~~**Conference**~~			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☐ **Yes**		☑ ~~**No**~~		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ ~~**Objective**~~		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other: Aircraft Maintenance, Centrifugal Compressor Monitoring**~~				
Validation	**Real-world Data, Case Study**								
Contribution	☐ **Integration**		☐ **Methodological**		☐ **Extension**		☑ ~~**New method**~~		
Summary									
The paper proposes an anomaly detection method for Cabin Air Compressors (CACs) in the Boeing 787-9 aircraft, focusing on the climb phase of flights. The method utilizes a causal graph and neural network to predict power consumption and detect anomalies by comparing predicted and actual power usage. The study evaluates the method on real sensor data from 44,118 flights, demonstrating its effectiveness in identifying air-bearing degradation in the CACs, with a 38% detection rate of degradation cases. The findings contribute to the application of predictive maintenance in the airline industry, aiming to reduce aircraft downtime and operational costs.									

Study Identifier: ID94						**Dataset**	Custom dataset of avionic d iagnostic logs from helicopter flights (Real-world data)		
Title	**SAD: Self-supervised Avionic Diagnostics**								
Year	**2023**					ML Type	SL	UL	SSL
Author(s)	**Attiano Purpura-Pontoniere**								
Publication Venue	☐ **Journal**		☑ ~~Conference~~			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~Single~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☐ **Yes**		☑ ~~No~~		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ ~~Objective~~		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other: Avionics, Helicopter Maintenance**~~				
Validation	**Real-world Data, Case Study**								
Contribution	☐ **Integration**		☐ **Methodolog ical**		☐ **Extension**		☑ ~~**New method**~~		
Summary									
The paper explores the application of self-supervised learning, specifically autoencoders, to detect faults in avionic diagnostic logs from helicopter flights. The researchers developed a novel approach by transforming natural language fault data into images and applying convolutional autoencoders to reconstruct the data. The study compares the results of this approach with traditional methods like PCA, finding that while PCA provided better clustering accuracy, the autoencoder approach showed potential for further improvement with more data. The study highlights the importance of intelligent data manipulation and suggests that more advanced models, such as transformers, may be better suited for this task.									

Study Identifier: ID95						**Dataset**	ALFA dataset (Aeronautical Laboratory Failures and Anomalies)		
Title	**Anomaly Detection of UAV State Data Based on Single-class Triangular Global Alignment Kernel Extreme Learning Machine**								
Year	**2022**					ML Type	SL	UL	SSL
Author(s)	**Feisha Hu**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☐ **Single**		☐ **Hybrid**		☑ **~~Other~~**		
Uncertainty Consideration			☐ **Yes**		☑ **~~No~~**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ **~~Objective~~**		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ **~~Other: UAVs, Aerospace~~**				
Validation	**Real-world Data, Experimentation**								
Contribution	☐ **Integration**		☑ **~~Methodological~~**		☐ **Extension**		☑ **~~New method~~**		
Summary									
The paper explores the application of self-supervised learning, specifically autoencoders, to detect faults in avionic diagnostic logs from helicopter flights. The researchers developed a novel approach by transforming natural language fault data into images and applying convolutional autoencoders to reconstruct the data. The study compares the results of this approach with traditional methods like PCA, finding that while PCA provided better clustering accuracy, the autoencoder approach showed potential for further improvement with more data. The study highlights the importance of intelligent data manipulation and suggests that more advanced models, such as transformers, may be better suited for this task.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID96						**Dataset**	NASA FOQA dataset (Flight Operations Quality Assurance)		
Title	**Robust and Explainable Semi-Supervised Deep Learning Model for Anomaly Detection in Aviation**								
Year	**2022**					ML Type	SL	UL	SSL
Author(s)	**Milad Memarzadeh,**								
Publication Venue	☑ **Journal**			☐ **Conference**		☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☐ **Single**		☐ **Hybrid**		☑ ~~**Other**~~		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ ~~**Objective**~~		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**						☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other: Aviation Safety, Flight Data Analysis**~~			
Validation	**Real-world Data, Simulation**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper introduces RESAD, a Robust and Explainable Semi-supervised Deep Learning model designed for anomaly detection in aviation data. The model leverages both labeled and unlabeled data to enhance accuracy and robustness in detecting anomalies, particularly during the approach to landing phase of commercial aircraft. The study demonstrates the model's superior performance in comparison to baseline methods, emphasizing its explainability and robustness to adversarial perturbations. The NASA FOQA dataset is utilized to validate the model, showing significant improvements in classification accuracy and interpretability, making RESAD a valuable tool for enhancing aviation safety.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID97						**Dataset**	NASA DASHlink dataset		
Title	**Hybrid Machine Learning-Statistical Method for Anomaly Detection in Flight Data**								
Year	**2022**					ML Type	SL	UL	SSL
Author(s)	**Sameer Kumar Jasra**								
Publication Venue	☐ **Journal**		☐ **Conference**			☑ ~~**Other**~~			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☐ **Single**		☐ **Hybrid**		☑ ~~**Other**~~		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ ~~**Objective**~~		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other : Aviation Safety, Flight Data Analysis**~~				
Validation	**Real-world Data, Experimentation**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper proposes a hybrid approach combining Local Outlier Factor (LOF) and Tukey's method for anomaly detection in flight data. The method is applied to real-world flight data from the NASA DASHlink dataset to identify and score anomalies in an unsupervised manner. By combining LOF with statistical analysis, the study establishes a dynamic threshold for identifying true outliers, filtering out false positives, and quantifying the degree of anomalous behavior. The approach demonstrates its effectiveness in improving safety monitoring and operational efficiency by accurately detecting anomalies and identifying contributing flight parameters.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID99						**Dataset**	NASA DASHlink dataset		
Title	**Recent Advances in Anomaly Detection Methods Applied to Aviation**								
Year	**2019**					ML Type	Review	UL	SSL
Author(s)	**Luis Basora,**								
Publication Venue	☐ **Journal**		☐ **Conference**			☑ ~~**Other**~~			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☐ **Single**		☐ **Hybrid**		☑ ~~**Other**~~		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ ~~**Objective**~~		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other : Aviation Safety, Flight Data Analysis**~~				
Validation	**Various datasets discussed, not specific to one**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☑ ~~**Extension**~~		☐ **New method**		
Summary									
This paper provides a comprehensive review of recent advances in anomaly detection methods applied to aviation. The authors discuss traditional methods and focus on the latest advancements in neural networks, deep learning, and temporal logic-based learning, highlighting their applications in aviation. The review covers unsupervised techniques applicable to time series data, relevant to the aviation domain where labeled data is often scarce. The paper emphasizes the need for scalable methods to handle large-scale, high-dimensional data typical in aviation systems. It also discusses the contributions of these methods to improving the safety and performance of flight operations and aviation systems, including predictive maintenance and operational safety.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID101						**Dataset**			
Title	**Multiclass Anomaly Detection in Flight Data Using Semi-Supervised Explainable Deep Learning Model**						FOQA dataset (Flight Operations Quality Assurance)		
Year	**2022**					ML Type	SL	UL	SSL
Author(s)									
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☐ **Single**		☐ **Hybrid**		☑ **~~Other~~**		
Uncertainty Consideration			☑ **~~Yes~~**		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ **~~Objective~~**		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ **~~Other : Aviation Safety, Flight Data Analysis~~**				
Validation	**Real-world Data, Experimentation**								
Contribution	☐ **Integration**		☑ **~~Methodological~~**		☐ **Extension**		☐ **New method**		
Summary									
The paper presents a semi-supervised explainable deep learning model designed to detect multiple types of anomalies in aviation flight data. The model leverages both labeled and unlabeled data to improve the detection of anomalies across different phases of flight, particularly during takeoff and landing. The study highlights the model's ability to outperform state-of-the-art supervised models with significantly less labeled data. It also emphasizes the importance of explainability in the model to enhance its adoption in the aviation industry. The FOQA dataset is used to validate the model, demonstrating its effectiveness in detecting operationally significant anomalies and improving overall flight safety.									

Study Identifier: ID102						**Dataset**			
Title	**Analysis of Flight Data Using Clustering Techniques for Detecting Abnormal Operations**						Two sets of operational data consisting of 365 B777 flights and 25,519 A320 flights		
Year	**2015**					ML Type	SL	UL	SSL
Author(s)	**Lishuai Li**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type	☐ **Single**		☐ **Hybrid**			☑ ~~**Other**~~			
Uncertainty Consideration	☑ ~~**Yes**~~		☐ **No**			☐ **Other**			
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type	☐ **Subjective**		☑ ~~**Objective**~~			☐ **Combined**			
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**						☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other : Aviation Safety, Flight Data Analysis**~~			
Validation	**Real-world Data, Experimentation**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~			☐ **Extension**			☐ **New method**
Summary									
The paper presents a new method known as ClusterAD (Cluster-based Anomaly Detection) for detecting abnormal operations in flight data. The method applies clustering techniques to identify abnormal flights by analyzing multivariate and temporal characteristics of flight data. The method is tested on two large datasets from commercial aviation operations and compared with the Multiple Kernel Anomaly Detection (MKAD) method and the traditional Exceedance Detection (ED) approach. Results show that ClusterAD effectively identifies operational anomalies, surpassing traditional methods, particularly in detecting unknown issues. The study highlights the method's scalability and adaptability across different applications in aviation safety management.									

Study Identifier: ID103						Dataset			
Title	Deep Autoencoder for Anomaly Detection in Terminal Airspace Operations						OpenSky Network, ASPM (Aviation System Performance Metrics), ASOS (Automated Surface Observing System) datasets		
Year	2021					ML Type	SL	UL	SSL
Author(s)									
Publication Venue	☐ Journal		☐ Conference			☑ ~~Other~~			
Research Question									
RQ1	RQ2	RQ3	RQ4	RQ5	RQ6	RQ7	RQ8	RQ9	RQ10
Fulfillment of inclusion criteria									
IC1	IC2	IC3	IC4	IC5	IC6	IC7	IC8	IC9	IC10
Quality Assessment Score									
QC1	QC2	QC3	QC4	QC5	QC6	QC7	QC8	QC9	QC10
Solution Type			☐ Single		☐ Hybrid		☑ ~~Other~~		
Uncertainty Consideration			☑ ~~Yes~~		☐ No		☐ Other		
Primary Criteria	Yes								
Secondary Criteria	Yes								
Criteria Type			☐ Subjective		☑ ~~Objective~~		☐ Combined		
Application Domain									
☐ Automated Flight Control ☐ Aircraft Health Monitoring Systems ☐ Air Traffic Management Systems ☐ Navigation Systems ☐ Communication Systems					☐ Environmental Control System ☐ Fuel Management ☐ Security Systems ☐ Maintenance Scheduling Systems ☐ Weather Monitoring and Prediction Systems ☑ ~~Other : Air Traffic Management, Terminal Airspace Operations~~				
Validation	Real-world Data, Case Study								
Contribution	☐ Integration		☑ ~~Methodological~~		☐ Extension		☐ New method		
Summary									
The paper presents a novel framework utilizing deep learning methods, specifically autoencoders, for anomaly detection in terminal airspace operations. The framework fuses multiple data sources, including aircraft trajectory, weather, and traffic data, to develop an anomaly detection model. The model is applied to flight data from San Francisco International Airport, covering six months of operations. The study demonstrates that the model effectively identifies anomalies by analyzing deviations in flight trajectories, given specific contexts such as weather and traffic conditions. The results emphasize the importance of a holistic approach to anomaly detection, incorporating external factors like weather and congestion.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID104						**Dataset**			
Title	**Unsupervised Anomaly Detection in Flight Data Using Convolutional Variational Auto-Encoder**						FOQA dataset (Flight Operational Quality Assurance)		
Year	**2020**					ML Type	SL	UL	SSL
Author(s)	**Milad Memarzadeh**								
Publication Venue	☐ **Journal**		☐ **Conference**			☑ ~~**Other**~~			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☐ **Single**		☐ **Hybrid**		☑ ~~**Other**~~		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ ~~**Objective**~~		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other : Aviation Safety, Flight Data Analysis**~~				
Validation	**Real-world Data, Experimentation**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper introduces a novel unsupervised machine learning algorithm called Convolutional Variational Auto-Encoder (CVAE) for anomaly detection in high-dimensional time-series flight data. The CVAE model is designed to capture complex patterns in heterogeneous data, making it particularly effective in identifying operationally significant anomalies. The model is validated on the FOQA dataset, where it demonstrates superior performance compared to both classic and deep learning-based methods. The study highlights the importance of balancing bias and variance in anomaly detection and showcases the CVAE's flexibility in adapting to different types of anomalies. The paper concludes that CVAE is a promising tool for proactive safety management in aviation.									

Study Identifier: ID105						**Dataset**			
Title	**Flight Anomaly Detection via a Deep Hybrid Model**						QAR dataset (Quick Access Recorder)		
Year	**2022**					ML Type	SL	UL	SSL
Author(s)	**Kun Qin**								
Publication Venue	☐ **Journal**		☐ **Conference**			☑ ~~**Other**~~			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☐ **Single**		☐ **Hybrid**		☑ ~~**Other**~~		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ ~~**Objective**~~		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other : Aviation Safety, Flight Data Analysis**~~				
Validation	**Real-world Data, Experimentation**								
Contribution	☐ **Integration**		☐ **Methodological**		☐ **Extension**		☑ ~~**New method**~~		
Summary									
The paper proposes a deep hybrid model combining a time-feature attention-based convolutional autoencoder (TFA-CAE) with the HDBSCAN clustering algorithm for detecting anomalies in flight data. The model effectively extracts flight features and identifies anomalous flight patterns. The QAR dataset, which includes a large amount of flight data, is used to validate the model. The results demonstrate the model's superior ability to detect anomalies compared to traditional methods, especially in differentiating normal and abnormal flight patterns. The study emphasizes the model's applicability in improving flight safety by providing early warnings of potential risks.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID106						**Dataset**			
Title	**Hybrid Machine Learning–Statistical Method for Anomaly Detection in Flight Data**						NASA DASHlink dataset		
Year	**2022**					ML Type	SL	UL	SSL
Author(s)	**Sameer Kumar Jasra**								
Publication Venue	☐ **Journal**		☐ **Conference**			☑ ~~**Other**~~			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☐ **Single**		☐ **Hybrid**		☑ ~~**Other**~~		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**Yes**								
Criteria Type			☐ **Subjective**		☑ ~~**Objective**~~		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other : Aviation Safety, Flight Data Analysis**~~				
Validation	**Real-world Data, Experimentation**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
he paper investigates the use of an unsupervised hybrid statistical–local outlier factor (LOF) algorithm to detect anomalies in time-series flight data. The method integrates LOF with Tukey's method to establish thresholds for identifying outliers in flight data, minimizing the need for human input. The approach is applied to real-world flight data from the NASA DASHlink dataset, demonstrating the capability of the hybrid method to effectively identify and score anomalies, offering a significant improvement over traditional binary anomaly detection methods. The study emphasizes the model's applicability to high-dimensional flight data, contributing to enhanced aviation safety and operational efficiency.									

Study Identifier: ID 84						Dataset	FOQA (Flight Operational Quality Assurance) data		
Title	Machine Learning Models for Online Anomaly Detection in Flight Operations								
Year	2021					ML Type	SL	UL	SSL
Author(s)	Alexey Burkov, Yury Zhukov, Andrey Savkin								
Publication Venue	☑ Journal		☐ Conference			☐ Other			
Research Question									
RQ1	RQ2	RQ3	RQ4	RQ5	RQ6	RQ7	RQ8	RQ9	RQ10
Fulfillment of inclusion criteria									
IC1	IC2	IC3	IC4	IC5	IC6	IC7	IC8	IC9	IC10
Quality Assessment Score									
QC1	QC2	QC3	QC4	QC5	QC6	QC7	QC8	QC9	QC10
Solution Type	☑ ~~Single~~		☐ Hybrid			☐ Other			
Uncertainty Consideration	☑ ~~Yes~~		☐ No			☐ Other			
Primary Criteria	Yes								
Secondary Criteria	No								
Criteria Type	☐ Subjective		☐ Objective			☑ ~~Combined~~			
Application Domain									
☐ Automated Flight Control ☐ Aircraft Health Monitoring Systems ☐ Air Traffic Management Systems ☐ Navigation Systems ☐ Communication Systems						☐ Environmental Control System ☐ Fuel Management ☐ Security Systems ☐ Maintenance Scheduling Systems ☐ Weather Monitoring and Prediction Systems ☑ ~~Other : Flight Operations~~			
Validation	Yes								
Contribution	☐ Integration		☑ ~~Methodological~~			☐ Extension		☐ New method	
Summary									
The paper presents machine learning models for online anomaly detection in flight operations using FOQA data. The models, validated in real-time settings, show high accuracy in detecting anomalies, contributing methodologically to improving flight safety and operational efficiency.									

Study Identifier: ID 85						**Dataset**	Flight parameter data (not specified)		
Title	**Anomaly Detection in Time Series Flight Parameter Data Using Machine Learning Approach**								
Year	**2023**					ML Type	SL	UL	SSL
Author(s)	**Shama Shilpi, Shwetank Aryan**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☑ ~~**Yes**~~		☐ **No**		☐ **Other**		
Primary Criteria	**Yes**								
Secondary Criteria	**No**								
Criteria Type			☐ **Subjective**		☐ **Objective**		☑ ~~**Combined**~~		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other : Aviation Data Analysis**~~				
Validation	**Yes**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
This paper explores machine learning approaches for detecting anomalies in time series flight parameter data. The study demonstrates the effectiveness of supervised models in identifying anomalies, contributing methodologically to improving aviation safety through enhanced data analysis techniques.									

Systematic Literature Review_ Data Extraction Form

Study Identifier: ID 86						**Dataset**	Aviation rivet image dataset (custom)		
Title	**Aviation Rivet Classification and Anomaly Detection Based on Deep Learning**								
Year	**2023**					ML Type	SL	UL	SSL
Author(s)	**Xiao-bo Zhu**								
Publication Venue	☑ **Journal**		☐ **Conference**			☐ **Other**			
Research Question									
RQ1	**RQ2**	**RQ3**	**RQ4**	**RQ5**	**RQ6**	**RQ7**	**RQ8**	**RQ9**	**RQ10**
Fulfillment of inclusion criteria									
IC1	**IC2**	**IC3**	**IC4**	**IC5**	**IC6**	**IC7**	**IC8**	**IC9**	**IC10**
Quality Assessment Score									
QC1	**QC2**	**QC3**	**QC4**	**QC5**	**QC6**	**QC7**	**QC8**	**QC9**	**QC10**
Solution Type			☑ ~~**Single**~~		☐ **Hybrid**		☐ **Other**		
Uncertainty Consideration			☐ **Yes**		☑ ~~**No**~~		☐ **Other**		
Primary Criteria	**No**								
Secondary Criteria	**No**								
Criteria Type			☑ ~~**Subjective**~~		☑ ~~**Objective**~~		☐ **Combined**		
Application Domain									
☐ **Automated Flight Control** ☐ **Aircraft Health Monitoring Systems** ☐ **Air Traffic Management Systems** ☐ **Navigation Systems** ☐ **Communication Systems**					☐ **Environmental Control System** ☐ **Fuel Management** ☐ **Security Systems** ☐ **Maintenance Scheduling Systems** ☐ **Weather Monitoring and Prediction Systems** ☑ ~~**Other : Aircraft Maintenance**~~				
Validation	**Yes**								
Contribution	☐ **Integration**		☑ ~~**Methodological**~~		☐ **Extension**		☐ **New method**		
Summary									
The paper proposes a deep learning approach for classifying aviation rivets and detecting anomalies in rivet conditions. The study shows high accuracy in identifying different types of rivets and detecting anomalies, contributing methodologically to aircraft maintenance and safety.									