FRMSc

SAFE (System for Aircrew Fatigue Evaluation)

AVIATION ENTERPRISE SOFTWARE SOLUTIONS

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FATIGUE MANAGEMENT | RISK ANALYSIS | REGULATORY COMPLIANCE

SYSTEM FOR FATIGUE PREVENTION THROUGH SPECIFICATION OF FLIGHT AND DUTY TIME LIMITATIONS IN A FLIGHT TIME LIMITATIONS SCHEME.

The **Aviation** industry is one of the most heavily regulated and safety-critical industries in the world. With the increasing demand for air travel, pilots and crew are working longer hours, flying more frequently, and experiencing more Jet lag and circadian disruption. All of these factors can contribute to fatigue, which can have serious consequences for flight safety.

Client being providing services to aviation industry wanted to build an integrated FRMSc web application and mobile apps to collect data for aviation where collected data would be used for research and anaysis by FRMSc scientists which further help to identify and assess the factors that contribute to fatigue, developing policies and procedures to manage those risks, and continuously monitoring and improving the system in effective manner.

SAFE, is a predictive fatigue model originally designed to understand the fatigue levels in aircrew. It was later enhanced to provide detailed fatigue levels in pilots for commercial, business, cargo, and air taxi operations.

SAFE predicts fatigue and duty risk of pilots and is used to assess both fatigue and operational risks in pilot schedules. It has been successfully used for investigating incidents and accidents, as well as for aircrew and student education.

OBJECTIVE

Techbit allocated highly skilled and experienced analysts seeing the cruciality of the application as no chances of skippking any minimal information can be avoided.

Main objective of the team was to design and develop FRMS to minimize the risks associated with fatigue among pilots & crew members where data will be collected and sent to scientists for research and analysis and been used by many major airlines that have contributed to the dataset including Air New Zealand, British Airways, Lufthansa, JAL, Emirates, DHL, Pan Am and Britannia.

OBJECTIVE OF FRMS IN AVIATION

- PREDICTING PERFORMANCE
- ENHANCED SAFETY
- IMPROVED PRODUCTIVITY
- RISK REDUCTION
- CONSIDERING CIRCADIAN RHYTHMS
- REGULATORY COMPLIANCE
- COST SAVINGS
- DATA-DRIVEN DECISION MAKING

STACK

TAILORING POLICIES AND PROCEDURES

INDUSTRY-SPECIFIC EXPERTISE

Allows to create fatigue policies that are specifically aligned with the needs of aviation professionals, from pilots to ground crew.

DEVELOPMENT OF PROCEDURES

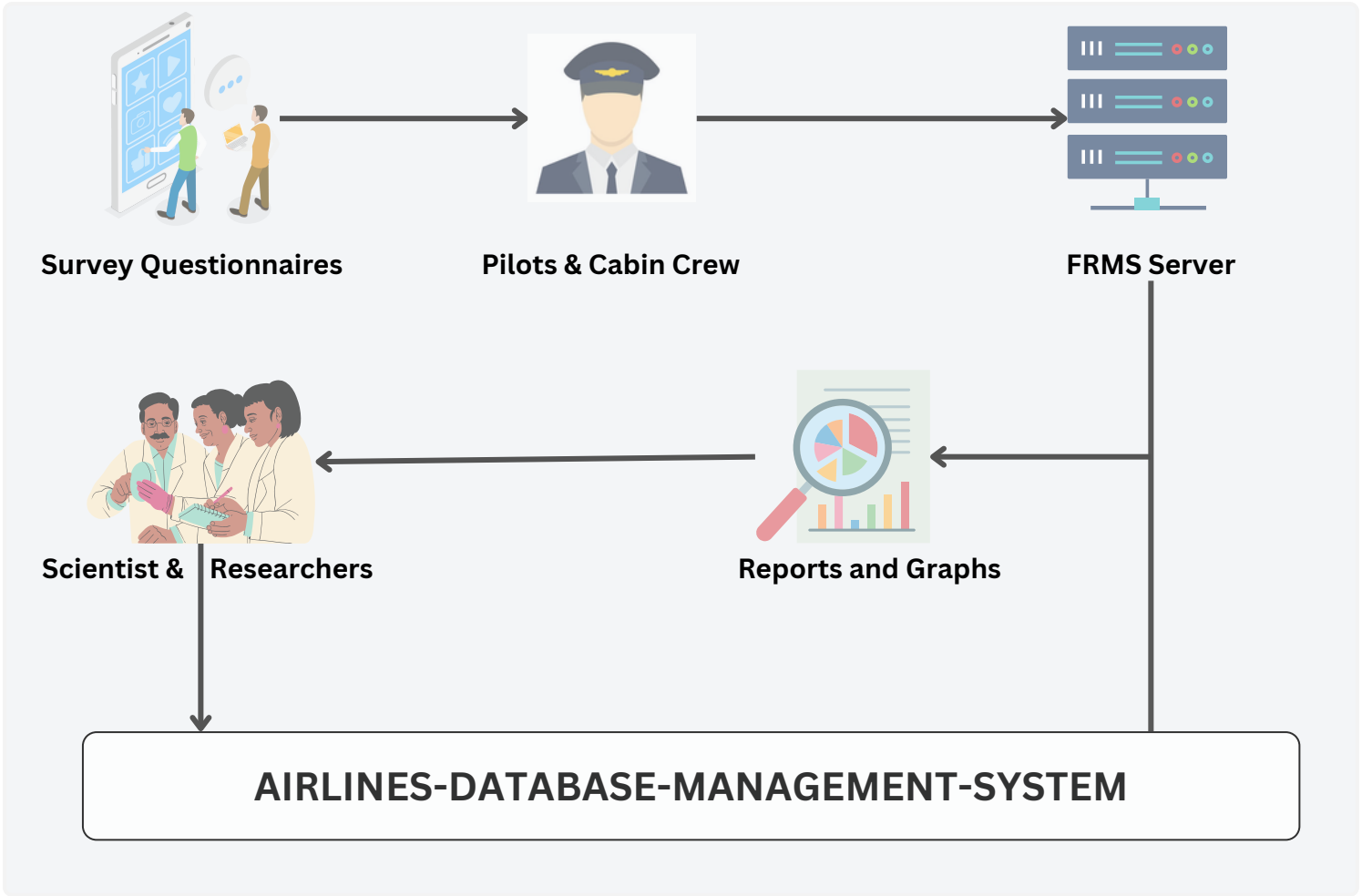
Help design work-rest schedules, shift patterns, and break times that are realistic and support the reduction of fatigue.

AVIATION REGULATIONS

Helps aviation organizations meet legal requirements while effectively managing fatigue risks.

CUSTOMIZED RISK ASSESSMENT

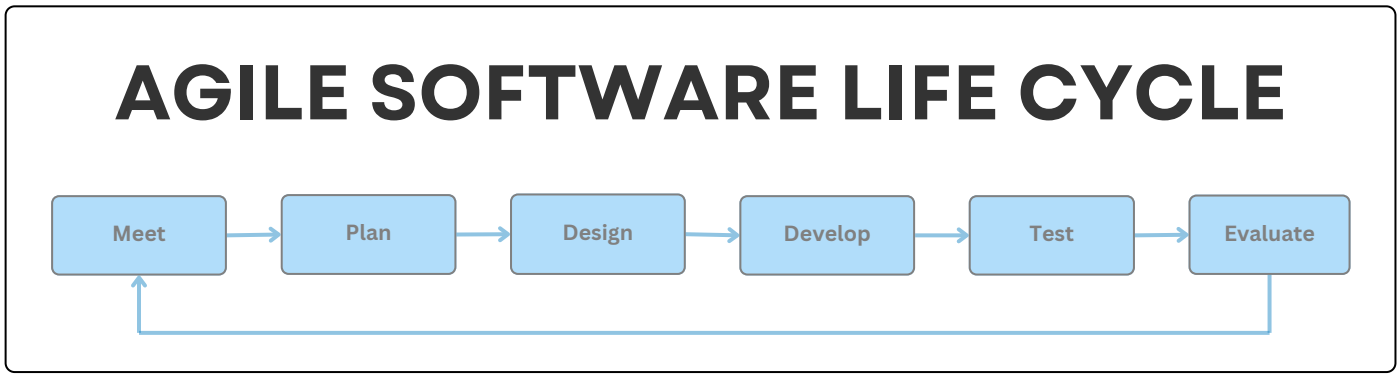
Identify potential fatigue hazards and impact on safety and performance for customized policy development.



APPROACH

Developing a FRMS for the aviation industry required a systematic and comprehensive approach that considers the unique operational and organizational characteristics of the industry.

Started with to identifying the factors that contribute to fatigue, including work schedules, sleep patterns, workload, and other related factors.



We followed Agile software development approach

Once the factors were identified, level of fatigue risk associated with each factor, using a variety of tools and techniques such as;

- Fatigue risk assessments
- Fatigue modeling
- Continuous Monitoring and Improvement
- ICAO Industry Regulations
- Identification of Highest Risk Areas

And Other data-driven approaches were explored for the enhancement of factors aligned with Aviation industry.

SUPPORT CONTINUOUS MONITORING OF ROSTER **FATIGUE RISK**

KEY STEPS TEAM IDENTIFIED BEFORE DEVELOPING AN FRMSc

CROSS-FUNCTIONAL TEAM
DevOps and PM's assigned for development of platform including Android App, iOS App, Web Application and Architect.

IDENTIFIED & ASSESS FATIGUE RISKS
Conducted comprehensive assessment of the Aviation's operations to identify the factors that contribute to pilot fatigue. As such flight schedules, workloads, and rest periods, etc.

DEVELOPMENT OF POLICIES & PROCEDURES
Based on the assessment, we defined and developed policies and procedures addressing the identified risks including changes to scheduling practices, duty limits, and rest periods.

STAKEHOLDER'S PRIORITY
Engaged with stakeholders in the aviation industry, including regulators, airlines, and pilot unions, to share best practices and develop industry-wide standards for FRMS.

System intended to be developed required to limiting the number of hours aircrew's work and specifying the minimum rest time which is required before commencement of each flight duty period.

FRMS is to support the safe application of such FTL Schemes by recognising the need for aircrew be adequately rested before commencing and during flying duties by facilitating both proactive and reactive interventions in relation to the implementation of FTL Schemes.

RESEARCH INDICATES FATIGUE MANAGEMENT IMPROVE PRODUCTIVITY BY UP TO **15-20%**

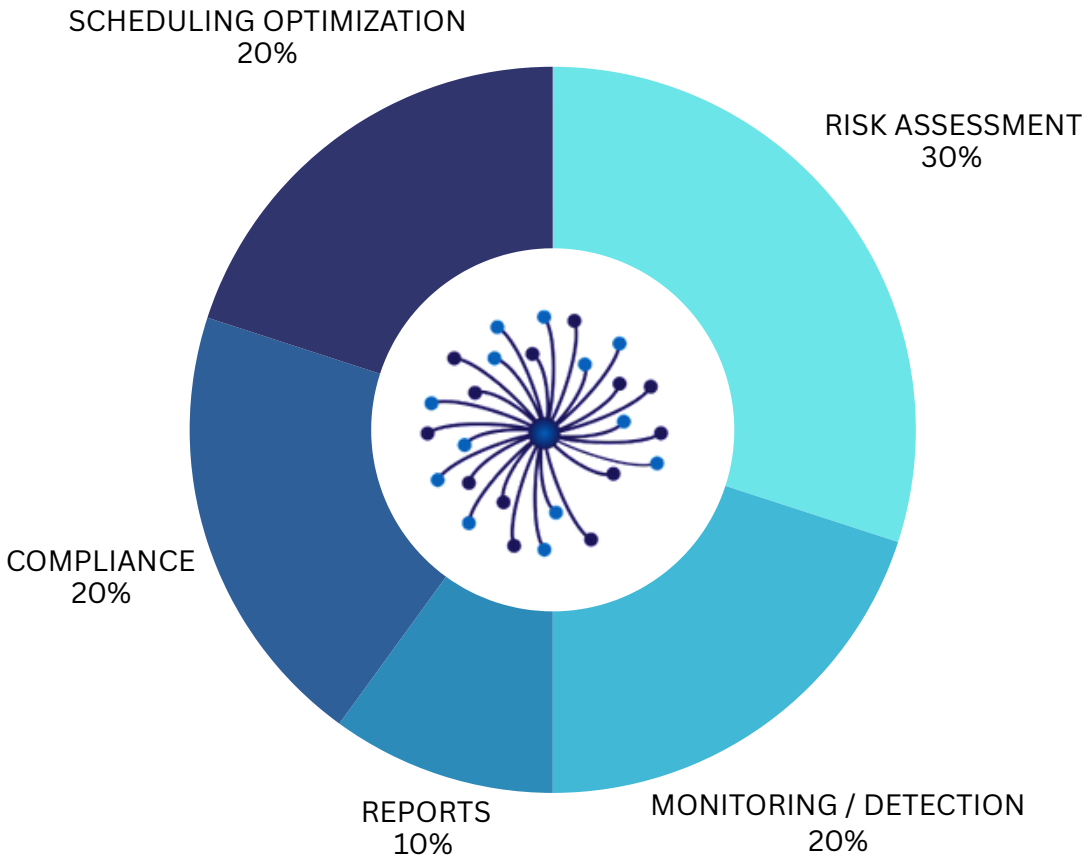
CHALLENGES

Developing FRMS for aviation already is a quite challengine, the major challenge cased was integrating the portal with various systems used in the aviation industry, such as;

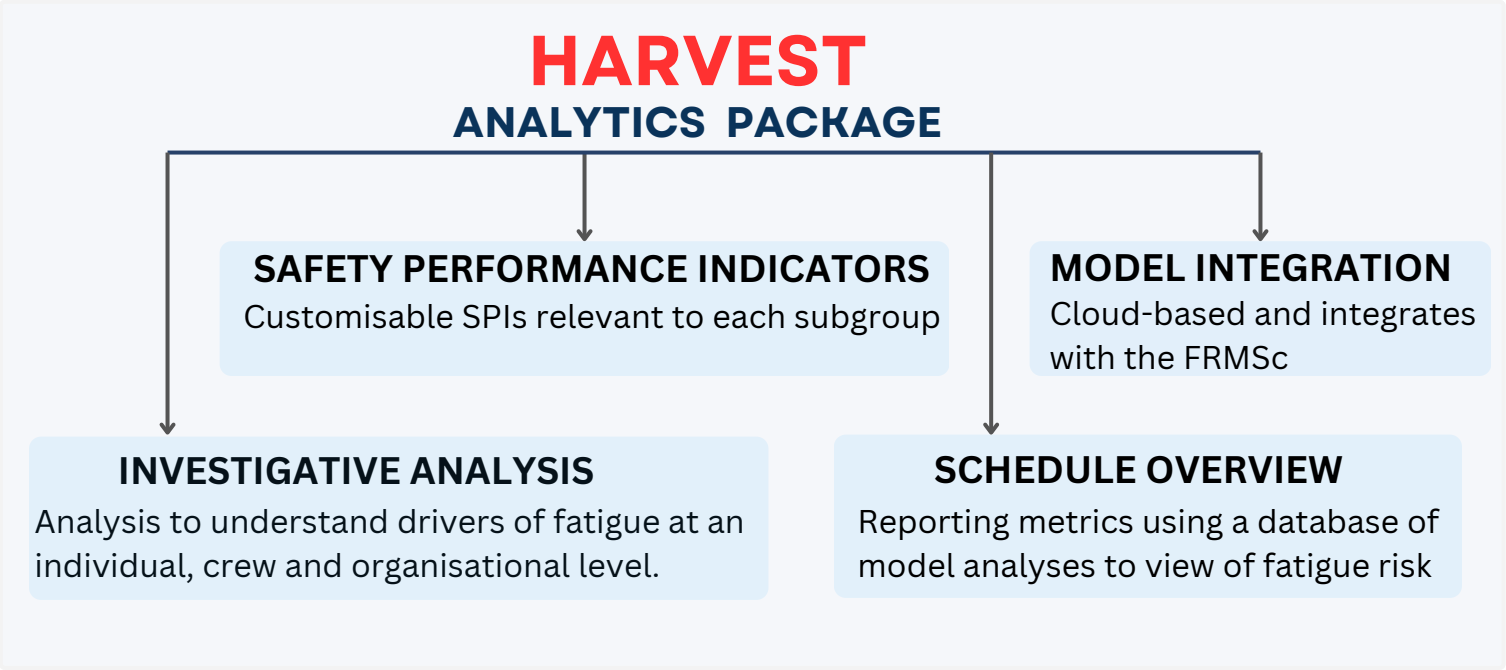
- Flight Operations
- Crew Scheduling
- Flight Analytics
- Real Time Weather Data

Which has different data formats/sets and protocols whereas ensuring the accuracy and consistency of the data that the portal uses, as inaccurate data would lead to incorrect risk assessments and poor decision-making by Scientists and researchers .

ASPECTS OF FRMS'c



Most challenging part was to build custom FRMSc HARVEST analytics package. Where system takes schedule details and the outputs of the FRMSc model analyses, to provide a useful tool for FRMS managers to evaluate trends, fatigue hotspots in schedule design and identify fatigue risk.



Cybersecurity was also challenging, as the FRMS portal contains sensitive information such as crew schedules, maintenance records, and safety reports, which must be kept secure from unauthorized access/data breaches.

SURVEYS INDICATE THAT ORGANIZATIONS WITH STRONG FATIGUE MANAGEMENT SYSTEMS REPORT A INCREASE IN EMPLOYEE ENGAGEMENT IN **20-30%** SAFETY INITIATIVES, LEADING TO A SAFER OVERALL WORK ENVIRONMENT.

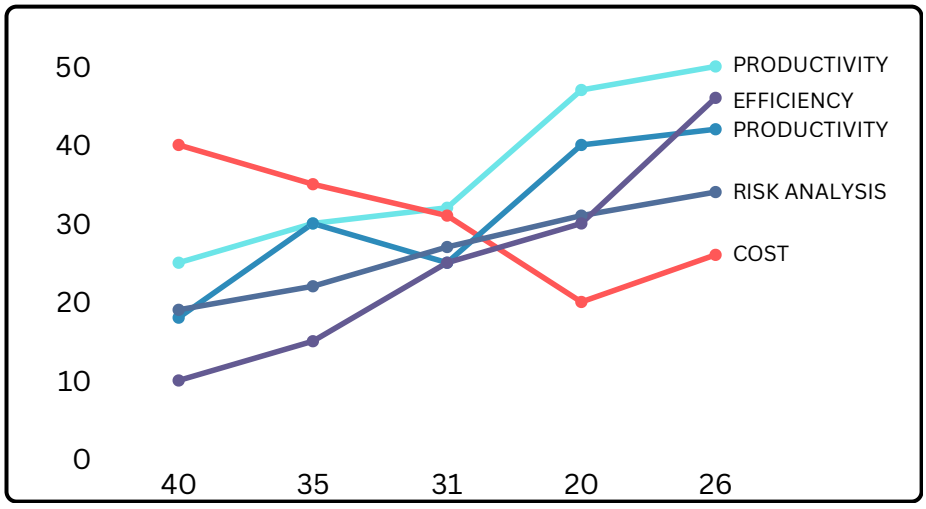
BUSINESS SOLUTION

FRMS offered numerous benefits to the client in terms of feedback including improved safety, as FRMS portals we built help identify potential hazards and risks, and provide the necessary information to FRMS team to avoid them.

PRODUCTIVITY

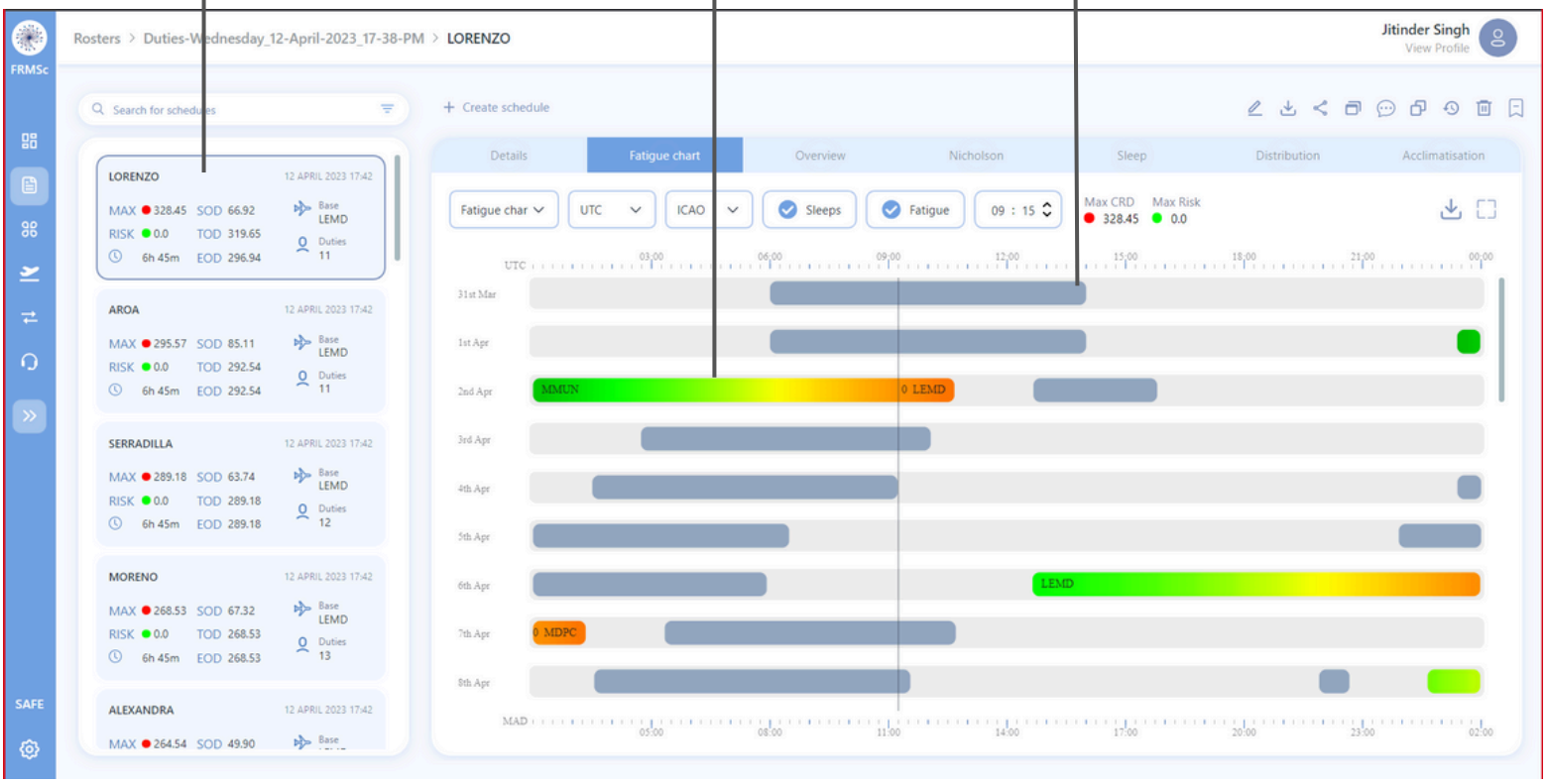
UP BY **32**% BASED ON RESEARCHERS STUDY OVER THE SPAM OF

2 YEARS

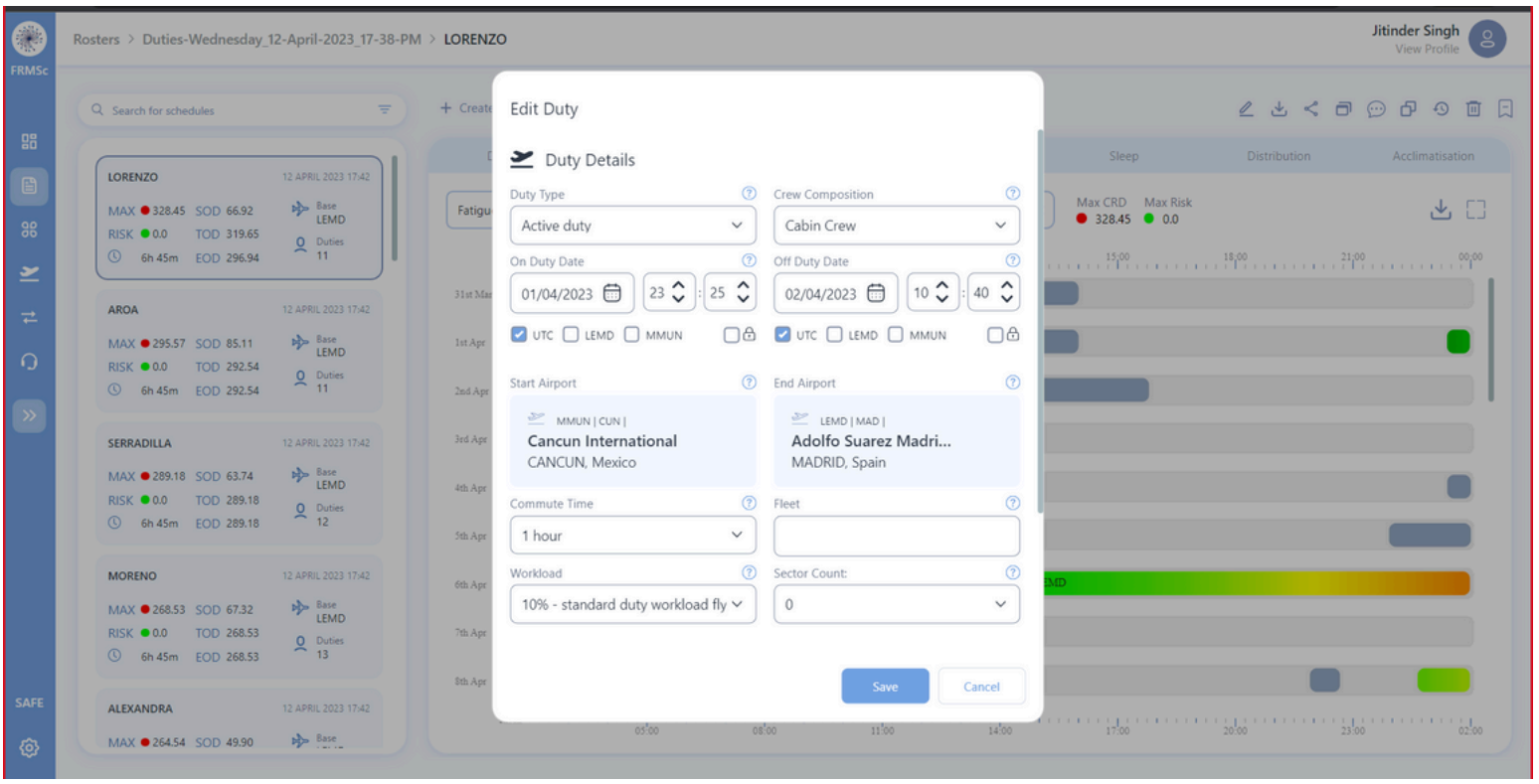


- Real-time access to critical information for better decision-making.
- Data analysis for continuous improvement and optimization.
- Real-time access to critical information for informed decision-making.
- Enhanced data analysis for continuous improvement and optimization.
- Compliance with safety regulations.
- Improved collaboration among stakeholders.
- Enhanced efficiency and reduced operational costs.
- Improved safety outcomes for passengers, crew, and aircraft.

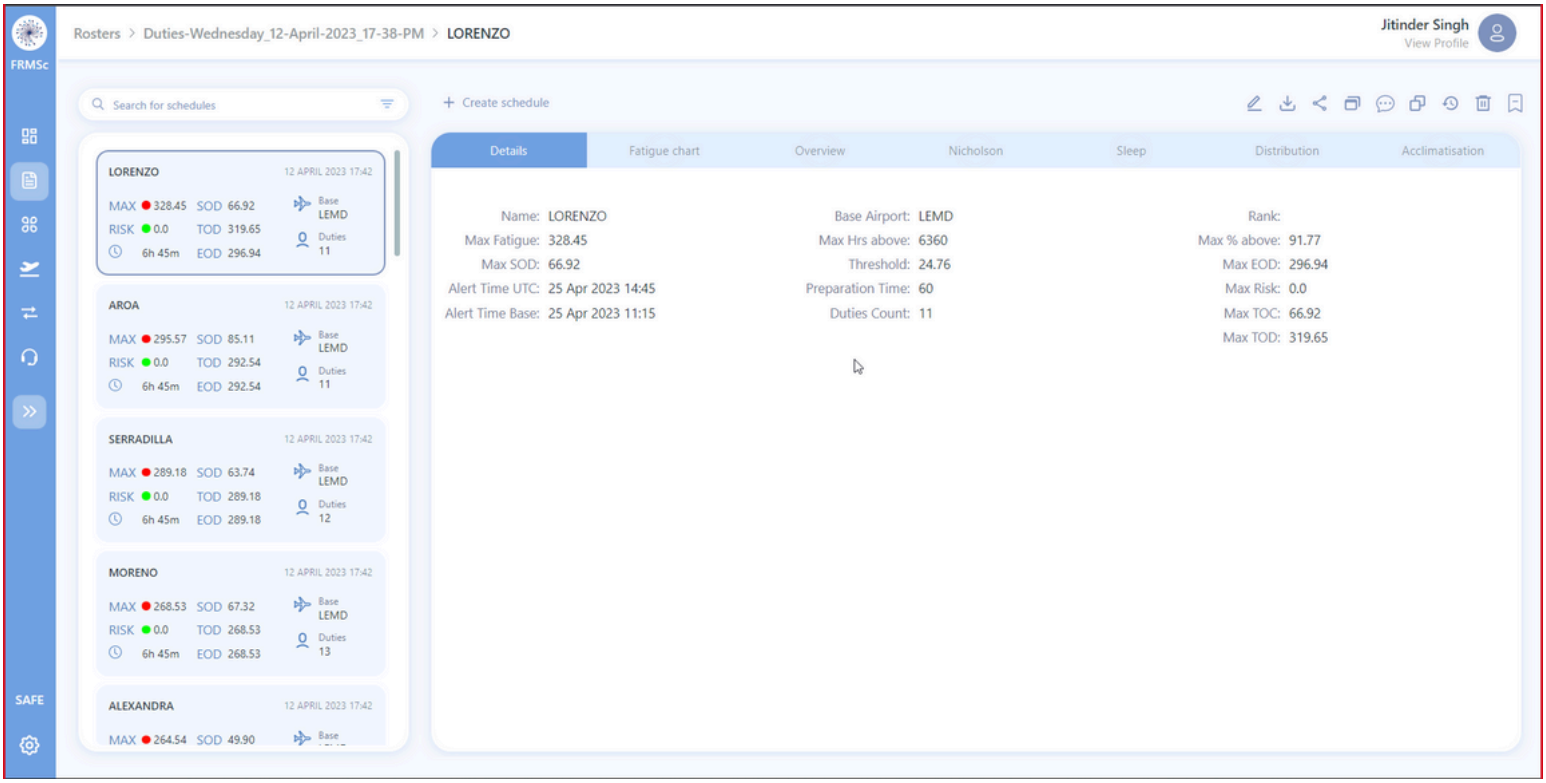
FLIGHT SCHEDULE **FATIGUE HEAT MAP** **IDEL TIME**



FATIGUE DETAILED CHART WITH SCHEDULE



PILOT / CREW SCHEDULE EDITOR



DETAILED PILOT's SCHEDULE AND TRACK

DESIGNED

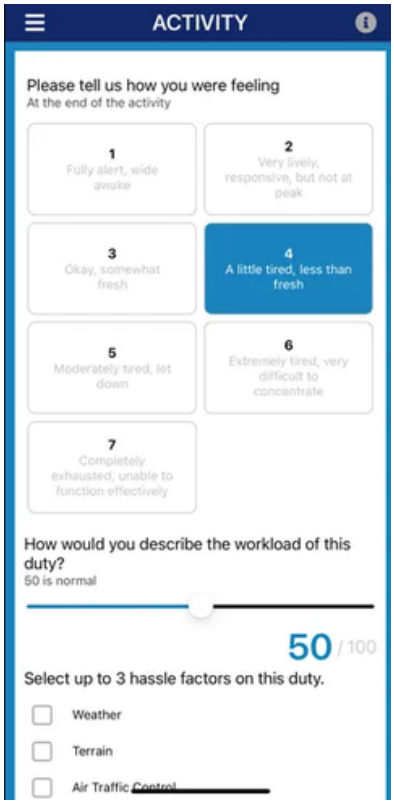
AND

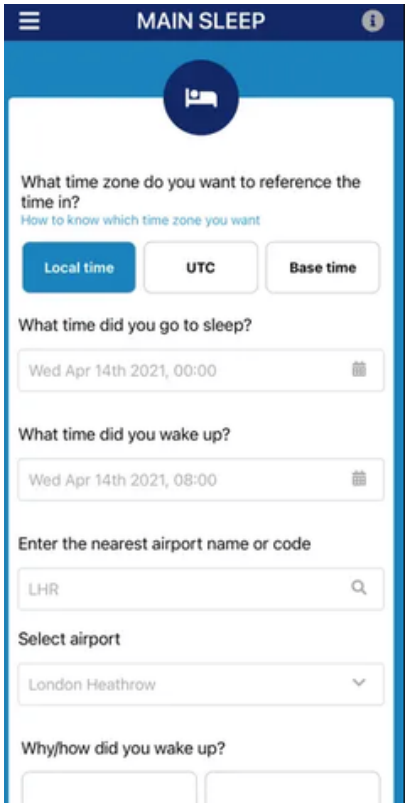
DEVELOPED

iOS

&

ANDROID





PILOT SURVEY CLIENT SIDE

FRMSC FULFILS ITS PURPOSE FOR RESEARCH BY THEIR RESEARCHERS AND SCIENTISTS FROM AVIATION AND HUMAN BEHAVIOUR.

IT IS WELL ANTICIPATED, THE APPLICATION WILL FULFIL VARIOUS OTHER ROLES BENEFITING THE WHOLE INDUSTRY WITH HAVING A HUGE IMPACT ON THE PILOTS, CREW, AIRLINES, AND MORE.

IMPACT

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Do Innvoative.
ReThink