# Technical Requirements for Supply Chain Feature

**Business Requirements**:

* The system must suggest the optimal time to order new plane parts, taking into account various factors such as the date of the part's last replacement, the average time between replacements, and estimated shipping times.
* The system should provide order times that are early enough to avoid shortages but late enough to keep costs low.

## Machine Learning

* The system will need a machine learning model to predict the optimal time to order new plane parts. This model should be trained on historical data, including the date of the part's last replacement, the average time between replacements, and estimated shipping times.

## Data Access

1. The system should have access to the necessary data for making predictions. This includes data on the last replacement date, average time between replacements, and estimated shipping times.
2. The system should be able to update this data regularly to ensure accurate predictions.

## Key Metrics

1. To avoid shortages, the system should track and minimize the number of incidents where demand exceeds supply. This can be measured by the frequency of stock-outs or shortages over a given period. Additionally, the system should monitor lead times (the time from when an order is placed to when it is received) and compare them with the expected usage rate of each part during that period.
2. The system should be optimized to minimize holding costs and excess inventory while ensuring parts availability. This can be measured by the inventory turnover ratio (how often inventory is sold and replaced over a given period), and the carrying cost of inventory (the total cost of storing unsold goods). The system should also track the fill rate (the percentage of customer demand that is met through immediate stock availability) to ensure customer demands are met without maintaining excessive inventory.
3. The performance of this system should be measured using the following key metrics:
   1. Accuracy of the predicted optimal order times.
   2. Number of shortages that occurred despite the system's predictions.
   3. Amount of cost savings achieved by following the system's order times.

## Design and Implementation

1. The system should be designed with a user-friendly interface that clearly displays the predicted optimal order times.
2. The system should include a feature for users to input new data and update existing data.
3. The system should be able to handle large amounts of data and make predictions quickly and accurately.