Aircraft On-Board Computer for Airbus A320-200 FMS

This program serves as a tool for performing calculations and generating a flight plan report based on the data provided by the pilot. It allows the pilot to input key information about the flight, such as the flight number, airports, flight level, number of passengers, and takeoff conditions. Based on these inputs, the program performs calculations, such as fuel mass, aircraft weights, takeoff speeds, and other essential parameters, and then generates a detailed flight plan report.

Features

- **Geographical Coordinates Lookup**: Uses a predefined dictionary of airport codes to fetch the geographical coordinates for departure, arrival, and alternate airports.
- **Distance Calculation**: Calculates the great-circle distance between airports using the geopy library.
- **Fuel Calculation**: Estimates the required fuel mass for the trip and includes additional fuel considerations.
- **Airline Identification**: Identifies the airline based on the flight number prefix using a predefined dictionary.
- **Takeoff Performance Calculation**: Calculates the necessary takeoff speeds (V1, VR, V2) based on the aircraft's weight and runway conditions.
- **Flight Plan Generation**: Generates a comprehensive flight plan report, including fuel requirements, wind conditions, and other critical information.

EXAMPLE FLIGHT

```
-----------------AIRBUS A320 A320-200 FMS----------------
page  1
--FLIGHT INIT--
FLIGHT NBR: WZZ1234
FROM: KRK
TO: NCE
ALT: FCO
CRZ/FL: 360
TEMP: 28
-----------------AIRBUS A320 A320-200 FMS----------------
page  2
--PAYLOAD--
PAX: 160
EXTRA: 0
TAXI:150
-----------------AIRBUS A320 A320-200 FMS----------------
page  3
--TAKE OFF PERFORMANCE--
FLAPS(1+F/2): 1+F
RNW/L: 2800
RNW/COND: WET
----------------
PIC (PILOT IN COMMAND) NAME: DAWID ZALEWSKI




----------------AIRBUS A320 A320-200 FMS----------------
FLIGHT PLAN
----------------
WZZ1234   KRK   NCE
Wizz Air
A320-200 / CFM56-5B4

MAXIMUM    TOW  78000  LAW  66000  ZFW  62500
ESTIMATED  TOW  64932  LAW  61292  ZFW  59140
----------------
----------------
AVG WIND:  155 / 43
----------------
    PLANNED FUEL
----------------
    FUEL/TIME
----------------
TRIP:    5037 / 85
----------------
CONT 15 MIN:  605/0015
----------------
ALT:   1397   0
----------------
MINIMUM T/OFF FUEL:    5642   133
----------------
EXTRA:      0
T/OFF FUEL:    5642
----------------
```

```
----------------
TAXI:     150
----------------
BLOCK FUEL:     5792
----------------
ROUTING
----------------
KRK / 6    FL    360   NCE / 1
----------------
DEPARTURE
----------------
KRK / 6  RNW  WET
WIND  137 / 40
----------------
ARRIVAL
----------------
NCE / 1  RNW  WET
----------------
T/OFF SPEEDS
----------------
V1:     121.6
VR:     130.6
V2:     136.16
----------------
I HEREWITH CONFIRM THAT I HAVE PERFORMED A
THOROUGH SELF BRIEFING ABOUT THE DESTINATION
AND ALTERNATE AIRPORTS OF THIS FLIGHT
INCLUDING THE APPLICABLE INSTRUMENT APPROACH
PROCEDURES, AIRPORT FACILITIES, NOTAMS AND
ALL OTHER RELEVANT PARTICULAR INFORMATION.
PIC NAME:  DAWID ZALEWSKI
----------------
PIC SIGNATURE:    DAWID ZALEWSKI
----------------
HAVE A SAFE FLIGHT !
----------------


Process finished with exit code 0
```

INSTRUCTION

```
page  1
--FLIGHT INIT--
FLIGHT NBR: WZZ1234    -->FLIGHT NUMBER                      (list with airlines codes below)
FROM: KRK              -->DEPARTURE AIRPORT                  (list with airports codes below)
TO: NCE                -->ARRIVAL AIRPORT
ALT: FCO               -->ALTERNATIVE ARRIVAL AIRPORT
CRZ/FL: 360            -->FLIGHT LEVEL    (300 or 320 or 340 or 360 or 380 or400)  e.g 360 == 36000 feet
TEMP: 28
          ---------------AIRBUS A320 A320-200 FMS---------------
page  2
--PAYLOAD--
PAX: 160               -->PAX (Number of passangers min 20 max 180 )
EXTRA: 0               --> EXTRA fuel if pilot wants
TAXI:150               -->Extra fuel for taxiing
          ---------------AIRBUS A320 A320-200 FMS---------------
page  3
--TAKE OFF PERFORMANCE--
FLAPS(1+F/2): 1+F      --> Settings of flaps  "1+F"   or "2"
RNW/L: 2800            -->LENGTH of runway min 1000 max 6250 [meters]
RNW/COND: WET
----------------
PIC (PILOT IN COMMAND) NAME: DAWID ZALEWSKI




----------------AIRBUS A320 A320-200 FMS----------------
FLIGHT PLAN
----------------
WZZ1234   KRK   NCE           -->FLIGHT NUMBER, DEPERTURE AND ARRIVAL AIRPORT
Wizz Air                      -->NAME of airline
A320-200 / CFM56-5B4          -->Airplane name and engine model

MAXIMUM    TOW  78000  LAW  66000  ZFW  62500         --> TOW = Take-Off Weight/ LAW =Landing Weight/  ZFW = Zero-Fuel Weight
ESTIMATED  TOW  64932  LAW  61292  ZFW  59140
----------------
----------------
AVG WIND:  155 / 43              -->AVERAGE WIND PARAMETERS    DIRECTION/SPEED
----------------
    PLANNED FUEL
----------------
    FUEL/TIME
----------------
TRIP:     5037 / 85     -->ALL TRIP
----------------
CONT 15 MIN:  605/0015  --> EXTRA 15 MINUTES
----------------
ALT:   1397   0         -->ALT FUEL
----------------
MINIMUM T/OFF FUEL:    5642   133      -->Minimum take-off fuel
----------------
EXTRA:     0            -->Extra fuel if pilot wants
T/OFF FUEL:    5642     -->Take-off fuel :
----------------
TAXI:    150            -->FUEL for taxiing
----------------
BLOCK FUEL:    5792    -->FINAL FUEL
----------------
ROUTING
----------------
KRK / 6    FL    360   NCE / 1  -->AIRPORTS AND NUMBER OF RUNWAY
----------------
DEPARTURE
----------------
KRK / 6  RNW  WET      --> ATMOSPHERIC PARAMETERS
WIND  137 / 40
----------------
ARRIVAL
----------------
NCE / 1  RNW  WET      --> ATMOSPHERIC PARAMETERS
----------------
T/OFF SPEEDS
----------------
V1:    121.6
VR:    130.6                -->VARIOUS SPEEDS
V2:    136.16
----------------
```

```
----------------
I HEREWITH CONFIRM THAT I HAVE PERFORMED A
THOROUGH SELF BRIEFING ABOUT THE DESTINATION
AND ALTERNATE AIRPORTS OF THIS FLIGHT
INCLUDING THE APPLICABLE INSTRUMENT APPROACH
PROCEDURES, AIRPORT FACILITIES, NOTAMS AND
ALL OTHER RELEVANT PARTICULAR INFORMATION.
PIC NAME:  DAWID ZALEWSKI
----------------
PIC SIGNATURE:   DAWID ZALEWSKI
----------------
HAVE A SAFE FLIGHT !
----------------
```

–(YOU CAN TYPE IN EVERY CONDITION OF RUNWAY for example DRY but only WET impact on speeds)--

"KRK": # Kraków, Poland - John Paul II International Airport Kraków-Balice
"WAW": # Warsaw, Poland - Warsaw Chopin Airport
"NCE": # Nice, France - Nice Côte d'Azur Airport
"CDG": # Paris, France - Charles de Gaulle Airport
"FCO": # Rome, Italy - Leonardo da Vinci–Fiumicino Airport
"VIE": # Vienna, Austria - Vienna International Airport
"PRG": # Prague, Czech Republic - Václav Havel Airport Prague
"ZRH": # Zurich, Switzerland - Zurich Airport
"AMS": # Amsterdam, Netherlands - Amsterdam Airport Schiphol
"FRA": # Frankfurt, Germany - Frankfurt Airport
"MUC": # Munich, Germany - Munich Airport
"BCN": # Barcelona, Spain - Barcelona-El Prat Airport
"MAD": # Madrid, Spain - Adolfo Suárez Madrid-Barajas Airport
"LIS": # Lisbon, Portugal - Humberto Delgado Airport
"ATH": # Athens, Greece - Athens International Airport
"BRU": # Brussels, Belgium - Brussels Airport
"DUB": # Dublin, Ireland - Dublin Airport
"CPT": # Cape Town, South Africa - Cape Town International Airport
"LED": # Saint Petersburg, Russia - Pulkovo Airport
"HEL": # Helsinki, Finland - Helsinki-Vantaa Airport
"OSL": # Oslo, Norway - Oslo Gardermoen Airport
"SVO": # Moscow, Russia - Sheremetyevo International Airport
"IST": # Istanbul, Turkey - Istanbul Airport
"SOF": # Sofia, Bulgaria - Sofia Airport
"BUD": # Budapest, Hungary - Budapest Ferenc Liszt International Airport
"VNO": # Vilnius, Lithuania - Vilnius Airport
"RIX": # Riga, Latvia - Riga International Airport
"TIA": # Tirana, Albania - Tirana International Airport
"SKG": # Thessaloniki, Greece - Thessaloniki Airport
"ARN": # Stockholm, Sweden - Stockholm Arlanda Airport
"CPH": # Copenhagen, Denmark - Copenhagen Airport
"TXL": # Berlin, Germany - Berlin Tegel Airport
"DUS": # Düsseldorf, Germany - Düsseldorf Airport
"MRS": # Marseille, France - Marseille Provence Airport
"NAP": # Naples, Italy - Naples International Airport
"GVA": # Geneva, Switzerland - Geneva Airport
"LJU": # Ljubljana, Slovenia - Ljubljana Jože Pučnik Airport
"BEG": # Belgrade, Serbia - Belgrade Nikola Tesla Airport
"OTP": # Bucharest, Romania - Henri Coandă International Airport
"ZAG": # Zagreb, Croatia - Franjo Tuđman Airport
"TLL": # Tallinn, Estonia - Tallinn Airport
"GOT": # Gothenburg, Sweden - Gothenburg Landvetter Airport
"EDI": # Edinburgh, Scotland - Edinburgh Airport
"BRS": # Bristol, England - Bristol Airport

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"LGW":  # London, England - Gatwick Airport
"BHX":  # Birmingham, England - Birmingham Airport
"LHR":  # London, England - London Heathrow Airport
"MAN":  # Manchester, England - Manchester Airport

    "LOT": "LOT Polish Airlines",
    "WZZ": "Wizz Air",
    "DLH": "Lufthansa",
    "AFR": "Air France",
    "BAW": "British Airways",
    "AZA": "Alitalia",
    "SAS": "SAS Scandinavian Airlines",
    "KLM": "KLM Royal Dutch Airlines",
    "EIN": "Aer Lingus",
    "IBE": "Iberia"
```

HAVE FUN ! ~ DAWID ZALEWSKI