ONX and OFFX

USER GUIDE

Version 2.2

ON-DESIGN and OFF-DESIGN

AIRCRAFT ENGINE

CYCLE ANALYSIS

COMPUTER PROGRAMS

By

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Developed for use with *Aircraft Engine Design,* AIAA Education Series

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Preface

ONX and OFFX are a set of user friendly computer programs written for the preliminary analyses of common air breathing aircraft engine cycles. This manual explains how you can use the ONX and OFFX programs. These programs are based on the models and methods of design point (on-design) and off-design analysis contained in *Aircraft Engine Design*, AIAA Education Series. Developed for use on an IBM Personal Computer (PC) or a compatible personal computer, both ONX and OFFX display and use menus to help you describe the air breathing engine and analysis of interest.

The first part of this manual explains how to use the ONX program. This program can be used to analyze the design point (on-design) performance of an engine cycle with changes in the design flight condition (altitude and/or Mach number), cycle design variable (e.g., fan pressure ratio, cycle bypass ratio, compressor pressure ratio), cycle design limit (maximum temperature at main burner or afterburner exit), or component efficiency (e.g., main burner combustion efficiency). Once a specific engine design point is selected, this program determines the reference engine parameters that are needed in the off-design cycle analysis program (OFFX), and transfer of this information is accomplished by creation of a reference data file.

The last part of this manual explains how to use the OFFX program. This program can be used to analyze the off-design performance of a specific engine design. The user can analyze the change in engine performance with changes in flight condition (altitude and Mach number), throttle setting, and nozzle setting.

Program Codes and Compatibility

The on-design and off-design cycle analysis programs are furnished in executable code on one 3-1/2" 1.44M high-density, double-sided diskette. The on-design program is named ONX.EXE, and the off-design program is named OFFX.EXE. This diskette also contains the two data files AAF.DAT and AAFAB.DAT. These programs were compiled from FORTRAN source codes using Microsoft FORTRAN Version 5.1 with the math emulation option and will run on PC compatible computers with MS-DOS 3.3 and a minimum of 256K random access memory (RAM). If you have a math coprocessor (8087, 80287, etc.) installed, these programs will use it to improve the speed of real arithmetic. If you don't have a math coprocessor installed, these programs will run just fine and give the same results using emulation.

When printed output is requested, it is directed to the printer in 80-column format. The programs use PRN as the device name for your printer. Thus, if you use a serial printer, you will need to redirect the output using the MS-DOS command MODE PRN:= <port>, where <port> is either COM1: or COM2:. So that program execution is not delayed by the printer, a print spooler is recommended when sending output to the printer. ONX and OFFX cycle analysis programs will operate on an IBM Personal Computer or "compatible" running MS-DOS or PC-DOS Version 3.3 or later.

ONX and OFFX Product Assistance Request

Instructions

So that you can be assisted more effectively, please answer the following questions and supply the necessary information. Note or print out any on-screen messages you get when the problem occurs. Send completed request along with your name, address, and phone number to:

> Dr. Jack D. Mattingly
> 15101 - 91st. Place NE
> Bothell, WA   98011

Diagnosing a Problem
1. Can you reproduce the problem?

2. Does the problem occur with another copy of the original disk of your software?

3. Does the problem occur with another system (if available)?

4. If you were running windows or other memory-resident software at the same time, does the problem also occur when you don't use the other software?

5. Give a brief description of the software problem or user guide comment(s).

Hardware
1. Computer:
     Manufacturer/model   Total memory   Math coprocessor

                                            M Hz

        CPU speed   Display (make, model, type)

2. Floppy-disk drives (make, number, size, density):

3. Hard-disk drive (make, model, size):

4. Printer (make, model, type):

5. Boards:
    Add-on RAM board (make, model, type):

    Graphics-adapter board (make, model, type):

    Other boards installed (make, model, type):