THE IMPLEMENTATATION OF THE GRAPHICS OF PROGRAM EAGLE
A NUMERICAL GRID GENERATION   CODE
ON NASA LANGLEY SNS COMPUTER SYSTEM

Summer Research Activities
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ABSTRACT:

Program EAGLE (Eglin Arbitrary Geometry Implicit Euler) ---
Numerical Grid Generation System is a composite (multi-block),
algebraic or elliptic grid generation system designed to discretize the
domain in and/or around any arbitrarily shaped three dimensional region.
This system combines a boundary conforming surface generation scheme and
includes plotting routines designed to take full advantage of the
DISSPLA Graphics Package (Version 9.0) developed by ISSCO which is
supported by Cray machines; currently being supported by the Cray X-MP at
NASA Ames Research Center.

Program EAGLE is written to compile and execute efficiently on any
Cray machine with or without Solid State Disk (SSD) devices. Also, the
code uses namelist inputs which are supported by all Cray machines using
the FORTRAN Compiler CFT77. The namelist inputs makes it easier for the
user to understand the inputs and operation of Program EAGLE. EAGLE's
numerical grid generator is constructed in the following form:

        Main Program (EGG) -----------Executive Routine
          Subroutine SURFAC ---------Surface generation Routine
          Subroutine GRID ---------- Grid Generation Routine
          Subroutine GRDPLOT ------- Grid Plotting Routines

Program EAGLE --- Numerical Grid Generation System was jointly
developed by the Air Force Armament Laboratory's (AFATL) Aerodynamics
Branch (FXA) (Eglin AFB, Florida) and Mississippi State University's (MSU)
Dept. of Areospace Engineering. The developers documented Program EAGLE
in three(3) volumes of documentation as follows:

        Volume I   ------------ Executive and Plotting Routines
        Volume II   ----------- Surface Generation Routine
        Volume III ----------- Grid Generation Routine.

Jack Tseng, a doctoral student in the Dept. of Aerospace
Engineering, University of Kansas and in conjunction with the
Applied Aerodynamics Division/Propulsion Aerodynamics Branch of
NASA-LaRC modified Program EAGLE's code to make operational:

        Main Program (EGG)
          Subroutine SURFAC
          Subroutine GRID

on the NASA-LaRC SNS Computer (Cray 2S) System. During the modification of EAGLE by Jack Tseng, Subroutine GRDPLOT was deleted from the code by comments. Thus the code (subroutine Grid) could produce output data (coordinates) but could not implement its internal graphics subroutine. More specifically, the output data could only be displayed, graphically, in two environments:

* on NASA Ames Cray X-MP, using the Plot3D graphics package or

* on an Iris workstation at NASA LaRc, using the Plot3D graphics package (after conversion of data to acceptable form).

Jack Tseng departed NASA LaRC on June 20, 1989, leaving the EAGLE code as indicated. Johnny Houston then began working with the code. It then became the responsibility of this ASEE 89 Faculty Fellow:

A. To develop a conversion program for the output data of EAGLE's subroutine Grid to permit the data to be graphically displayed by Iris workstations at NASA LaRc, using Plot3D;

B1. To modify the code of program EAGLE to make operational subroutine Gridplot (using DI- 3000 Graphics Software Packages) on the NASA LaRC SNS Computer System
                    Or
B2. To determine how to implement, graphically, the output data of subroutine Grid on any NASA LaRC graphics terminal that has access to the SNS Computer System's DI-3000 Graphics Software Packages;

C. To develop a Quick Reference User Guide for the use of program EAGLE on the NASA LaRC SNS Computer System; and

D. To illustrate (inputs/visual graphics/hardcopy) one or more application program(s), using Program EAGLE on the NASA LaRC SNS Computer System, with emphasis on graphics illustrations.

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All of the items (A thru D) have been or will be accomplished by the end of the tenure of the Faculty Fellow's 1989 summer activities.