

(NASA-CR-161858) IGDS/TRAP INTERFACE  
PROGRAM (ITIP). SOFTWARE DESIGN DOCUMENT  
(Intergraph Corp.) 13 p HC A02/HF A01

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## PREFACE

This report is the Software Design Document (SDD) for a Computer Program Contract End Item (CPCEI) identified as the IGDS/TRAP Interface Program (ITIP). Development of ITIP was performed by Intergraph Corporation as an add-on task under Contract No. NAS8-34279 for the Coal Gasification Project Office of George C. Marshall Space Flight Center (MSFC). The NASA COR for this contract is E. T. Deaton, Jr.

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## LIST OF ACRONYMS

CPCEI	Computer Program Contract End Item
DEC	Digital Equipment Corporation
DMRS	Data Management and Retrieval System
IGDS	Interactive Graphics Design System
ITIP	IGDS/TRAP Interface Program
SDD	Software Design Document
TRAP	Time-Line and Resources Analysis Program

## 1. SCOPE

This specification establishes the requirements, concepts and preliminary design for a set of software known as the IGDS/TRAP Interface Program (ITIP). This software will provide the capability to develop at an Interactive Graphics Design System (IGDS) design station process flow diagrams for use by the NASA Coal Gasification Task Team. In addition, ITIP will use the Data Management and Retrieval System (DMRS) to maintain a data base from which a properly formatted input file to the Time-Line and Resources Analysis Program (TRAP) can be extracted. This set of software will reside on the PDP-11/70 in Building 4487, MSFC, and will become the primary interface between the Coal Gasification Task Team and IGDS, DMRS and TRAP.

## 2. APPLICABLE DOCUMENTS

- IGDS8 Application Software Interface Document, 79-076, Rev. B, Intergraph Corporation, November, 1980.
- IGDS Operating Manual (IGDS8), 79-067, Rev. B, Intergraph Corporation, March 1981.
- Graphics Standard Interchange Format, 80-021, Intergraph Corporation, May 1980.
- DMRS 8.0 HOL Control Block (CB) User's Guide, 79-031, Rev. A, Intergraph Corporation July 1980.
- DMRS 8.0 HOL User's Guide, 80-124, Intergraph Corporation, April 1980.
- DMRS Data Definition Language (DDL) Compiler, Internal Report No. 79-050, Rev. B, Intergraph Corporation, January 1981.
- DMRS8 Command Language User Guide, 79-065, Rev. B, Intergraph Corporation, February 1981.

### 3. REQUIREMENTS

This document describes the preliminary design of the IGDS/TRAP Interface Program (ITIP). The ITIP software will reside on the PDP-11/70 and will interface directly with the Interactive Graphics Design System (IGDS) and the Data Management and Retrieval System (DMRS), products developed by Intergraph Corporation.

#### 3.1 Performance Requirements

The ITIP shall provide the Coal Gasification Task Team with an efficient method for developing a network flow diagram. This network flow diagram will consist of subprocess modules (nodes) which are interconnected by directed links (edges). A node may represent a lower level network, i.e. a node may itself consist of a set of lower level subprocess modules interconnected by directed links. The highest level network will be considered the master level, and tiering to seven lower levels will be supported.

The ITIP shall provide the operator with the following display and processing capabilities:

- Display the master level network flow diagram.
- Display a lower level network expansion for any node in the current network flow diagram.
- Via operator command place a node in the current network flow diagram.
- Via operator command place an edge in the current network flow diagram.
- Via operator command delete an edge in the current network flow diagram.
- Via operator command delete a node in the current network flow diagram.
- Via operator command display nodal description information.
- Via operator command define a network resource.
- Via operator command modify resource description information.
- Via operator response to prompts specify nodal description information.
- Via operator response to prompts modify nodal description information.

- Via operator response to prompts specify the project description information.
- Via operator response to prompts modify the project description information.
- Via operator command extract TRAP required information from the ITIP data base and properly format an input file for use by the TRAP program.

### 3.2 Operational Requirements

A functional block diagram of the hardware involved in the IGDS/TRAP Interface Program is given in Figure 3.2-1. The major components are:

- IGDS Design Station - Operator interaction with ITIP
- PDP-11/70 - Host computer for the ITIP Software
- Honeywell 560 - Host computer for the TRAP software
- PDP/Honeywell Interface - Link over which TRAP input file is transmitted

The relationship between the ITIP software components is depicted in Figure 3.2-2. These components are:

- ITIP Software (described herein)
- IGDS Software (Intergraph product)
- DMRS Software (Intergraph product)
- TRAP Software (NASA product)

### 3.3 Design Requirements

In addition to the ITIP performance and operational requirements defined in the preceding sections, certain requirements are imposed on ITIP by the environment in which it is designed to operate. These general design requirements are as follows:

- The ITIP Software shall be designed for implementation on a Digital Equipment Corporation (DEC) PDP-11/70 utilizing the RSX-11M-PLUS Operating System.

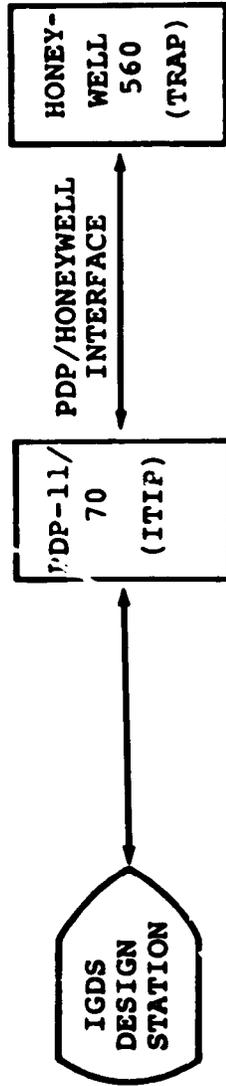


FIGURE 3.2.-1 ITIP FUNCTIONAL BLOCK DIAGRAM

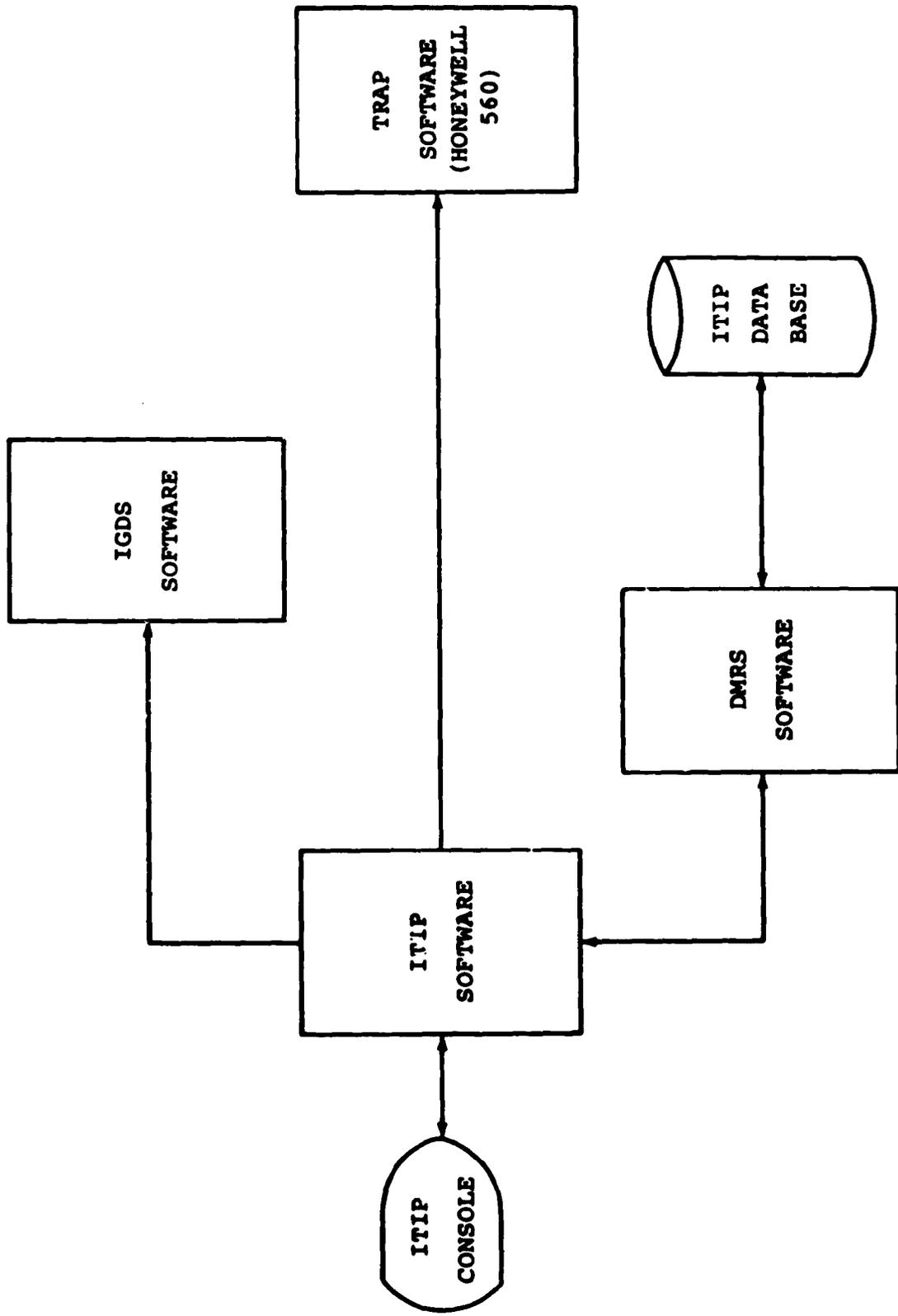


FIGURE 3.2-2 ITIP SOFTWARE SYSTEM OVERVIEW

- The ITIP Software shall be designed to interface with Intergraph Corporation Interactive Graphics Design System 8.3.
- The ITIP software shall be designed to interface with Intergraph Corporation Data Management and Retrieval System 8.0.
- The ITIP software shall be designed to interface with the TRAP resident on a Honeywell 5600.
- The ITIP software shall be designed to use an Intergraph Corporation PDP-11/70 to Honeywell 560 communication link.
- The ITIP software shall be modular in design and shall be programmed in FORTRAN IV-PLUS language.
- The ITIP software shall provide the capability for effective man/machine communication in support of network flow process development and information specification.

### 3.3.1 Source and Types of Input

Inputs to ITIP shall consist of two types. Default values for data base entities shall be provided by the ITIP initialization processing. Operator inputs shall be made via the IGDS design station.

### 3.3.2 Destination and Types of Output

All outputs of ITIP shall consist of data in one of four categories:

- Output of network process information to the ITIP data base.
- Output of network flow diagram to an IGDS design file and display of the network process at the IGDS design station.
- Output of status information and prompts for operator input to the IGDS design station.
- Output of a properly formatted file describing the network flow diagram to the TRAP on the Honeywell 560.

### 3.3.3 Information Processing

Processing functions performed within ITIP shall consist of the following:

- Processing of operator inputs at the IGDS design station.
- Insertion of network process information into the ITIP data base.
- Extraction of TRAP required network process information and generation of a TRAP input file.

### 3.4 Data Base Requirements

The ITIP shall provide sufficient space for storage of all significant information related to the network flow diagram and the network process definition. The data structure to be used for the graphic display of the network flow diagram will be provided by the IGDS design file. ITIP interaction with this data base will be inherent in the IGDS software. The data structure to be used for the network process definition information will be defined using DMRS capabilities. ITIP interaction with this data base will be provided through calls to DMRS modules.