

**THE ROLE OF SOFTWARE ENGINEERING  
IN THE SPACE STATION PROGRAM**

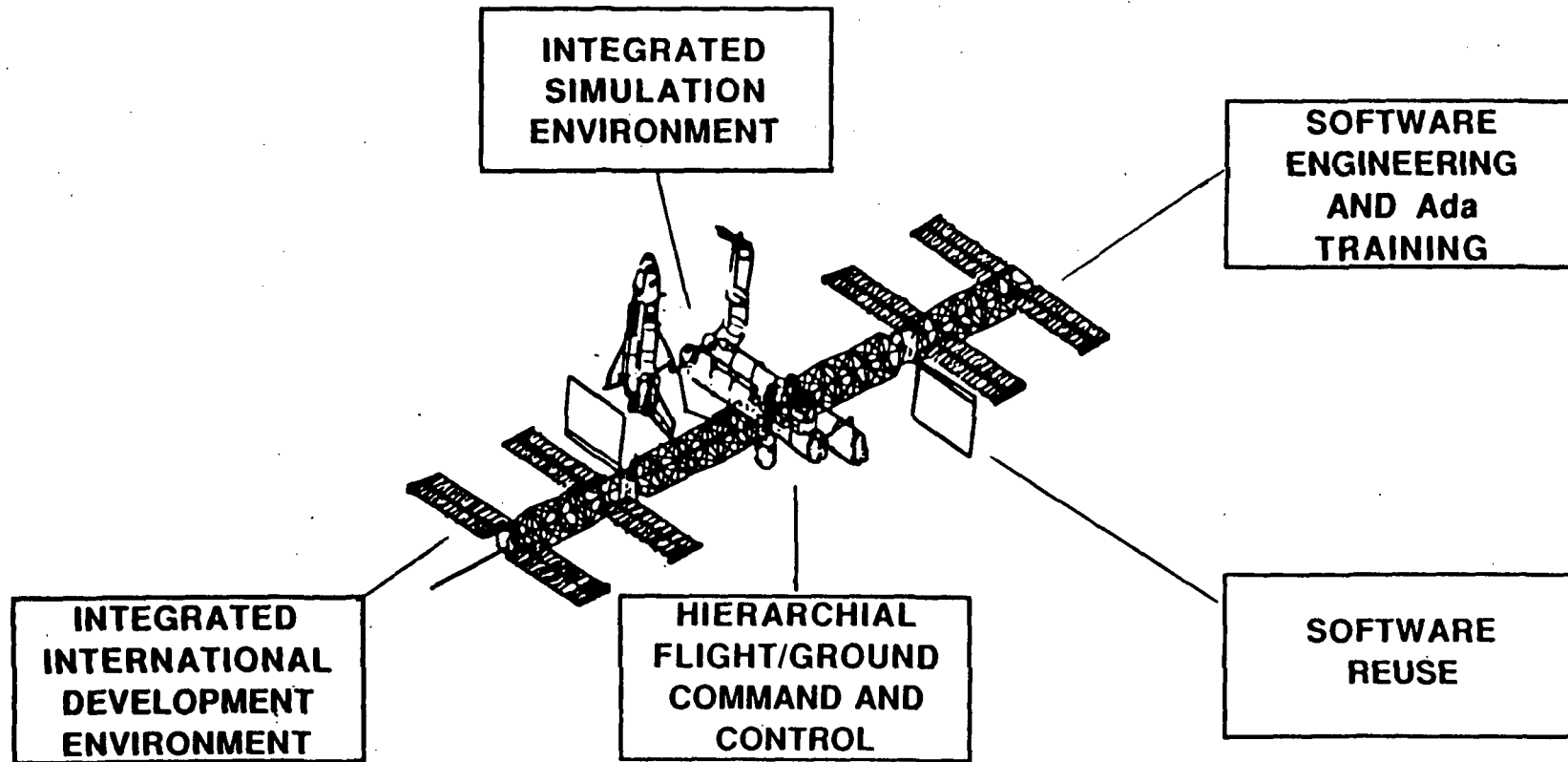
**RICIS SYMPOSIUM 1988  
INTEGRATED COMPUTING ENVIRONMENTS  
FOR LARGE, COMPLEX SYSTEMS**

**NOVEMBER 9-10, 1988**

**DANA HALL  
SPACE STATION PROGRAM OFFICE  
RESTON, VIRGINIA**

*57-6/19729*  
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# SNAPSHOTS OF SOFTWARE ENGINEERING APPLICATIONS WITHIN THE SPACE STATION FREEDOM PROGRAM



# SOFTWARE ENGINEERING AND ADA TRAINING

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- o **SOFTECH (RICIS) 1987 SURVEY OF NASA:**
  - **OVER 150 ADA PROJECTS WITHIN 5 YEARS**
  - **MINIMAL EXPERIENCED PERSONNEL**
  - **MUCH SOFTWARE ENGINEERING AND ADA TRAINING NEEDED**
  - **FEW WRITTEN SOFTWARE DEVELOPMENT POLICIES**
  
- o **TRAINING RECEIVING MUCH MORE ATTENTION (but its still too little and ..... maybe too late)**

**EXAMPLES:**

- **EXPANDED COMPUTER-BASED AND CLASS ROOM TRAINING FROM SSE**
- **TOP MANAGEMENT ATTENTION**

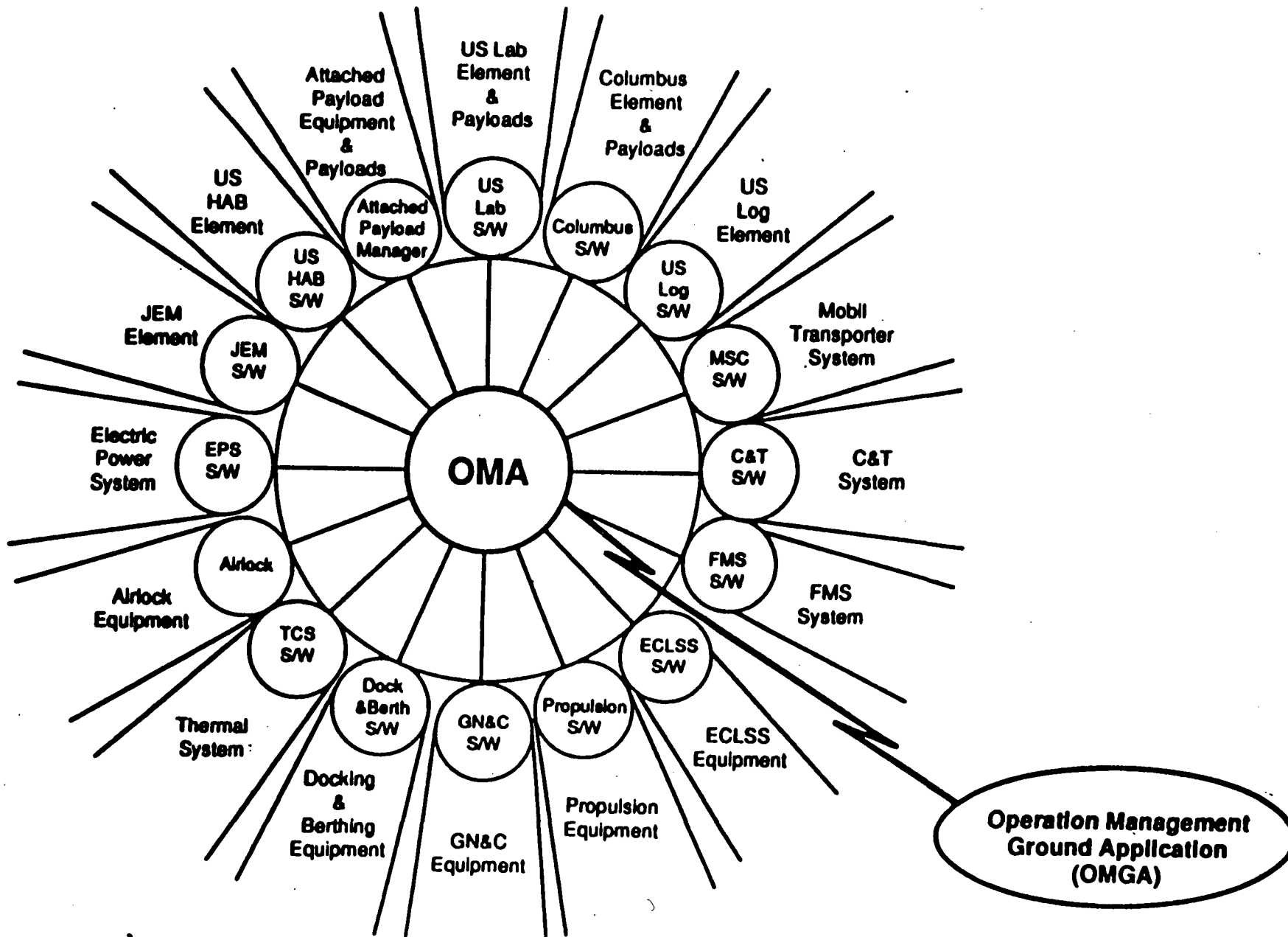
# SOFTWARE REUSE

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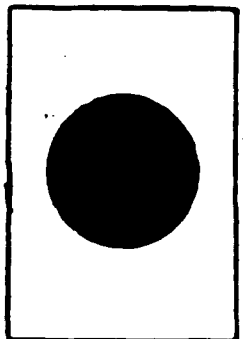
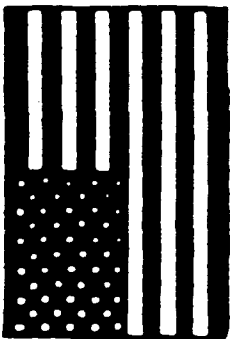
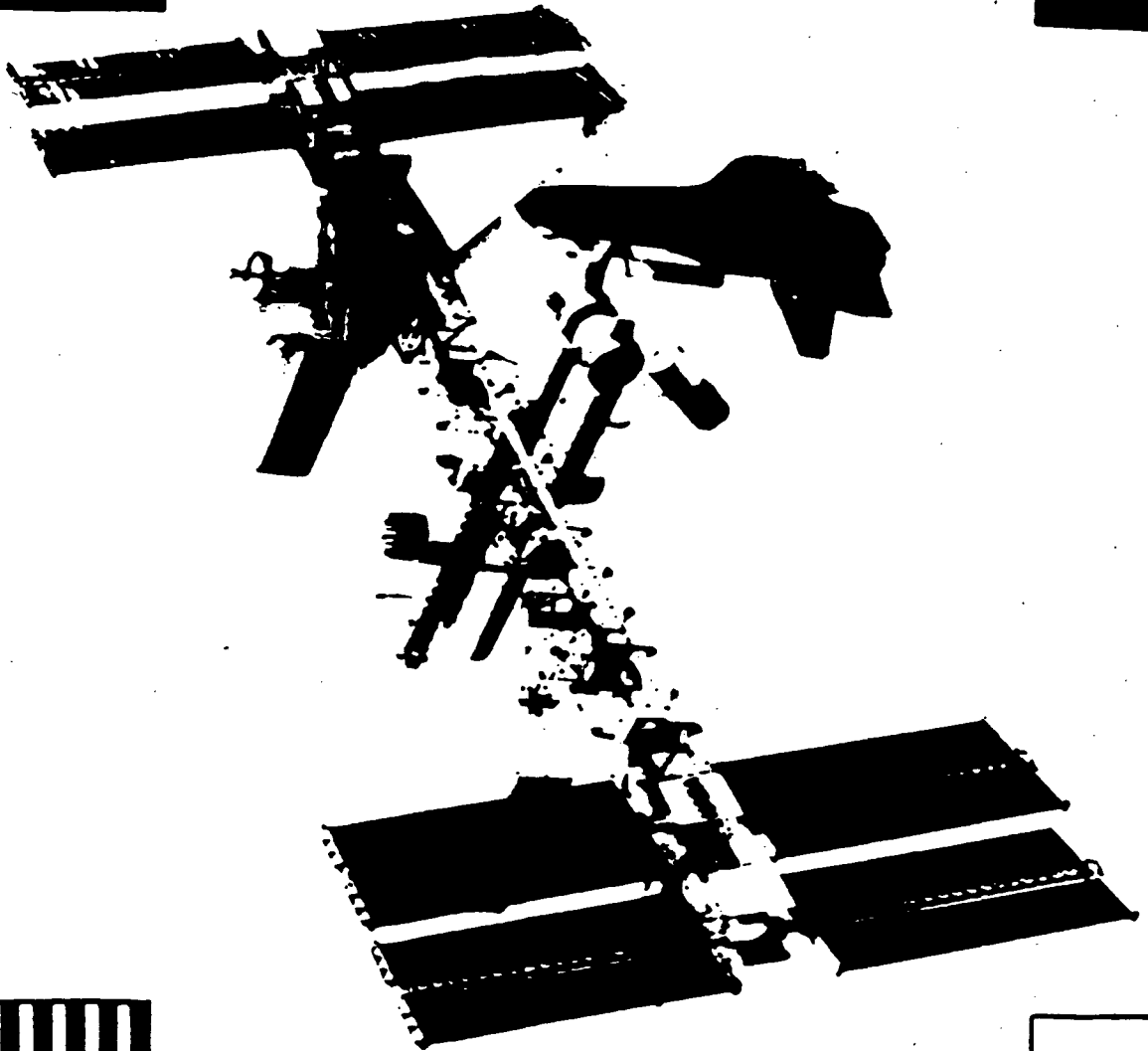
- o **WANT TO CAPITALIZE ON RESEARCH AND EXPERIENCE TO DATE**
  - **EXAMPLES:**
    - o **ARMY 'RAPID' TOOL FOR LIBRARY MANAGEMENT**
    - o **UNIVERSITY TAXONOMY/ ATTRIBUTES WORK**
  
- o **POLICY WILL ENCOURAGE REUSE**
  - **COMPONENT DEVELOPMENT**
  - **TRY DURING RAPID PROTOTYPING**
  
- o **PIVOT POINTS**
  - **CONTRACTOR INCENTIVES**
  - **ACCOUNTABILITY AND LIABILITY**

# HIERARCHIAL COMMAND AND CONTROL





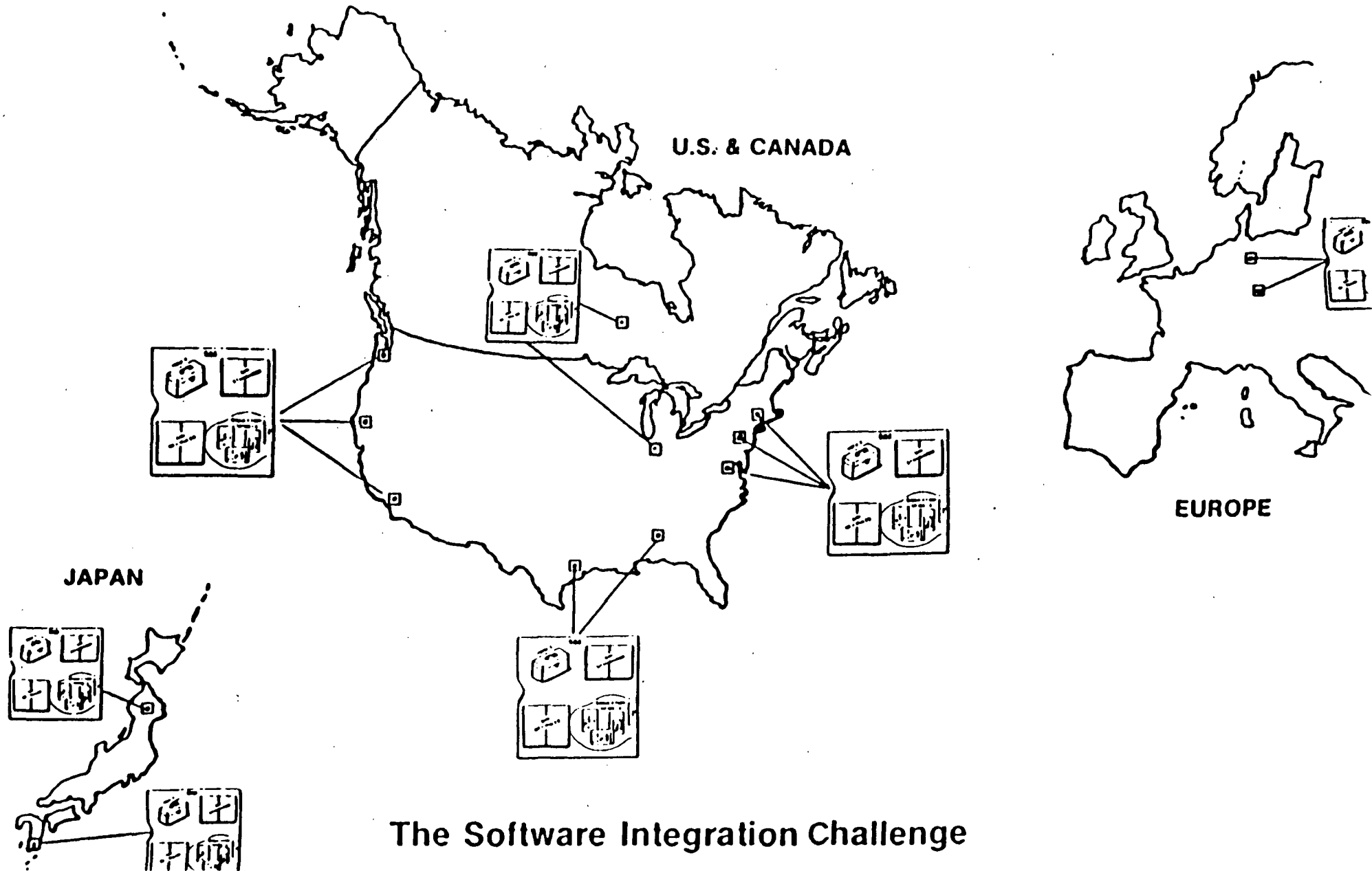
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# PROGRAM CHARACTERISTICS

## DISTRIBUTED SOFTWARE DEVELOPMENT & MAINTENANCE



**The Software Integration Challenge**

# **INTEGRATED, INTERNATIONAL ENVIRONMENTS**

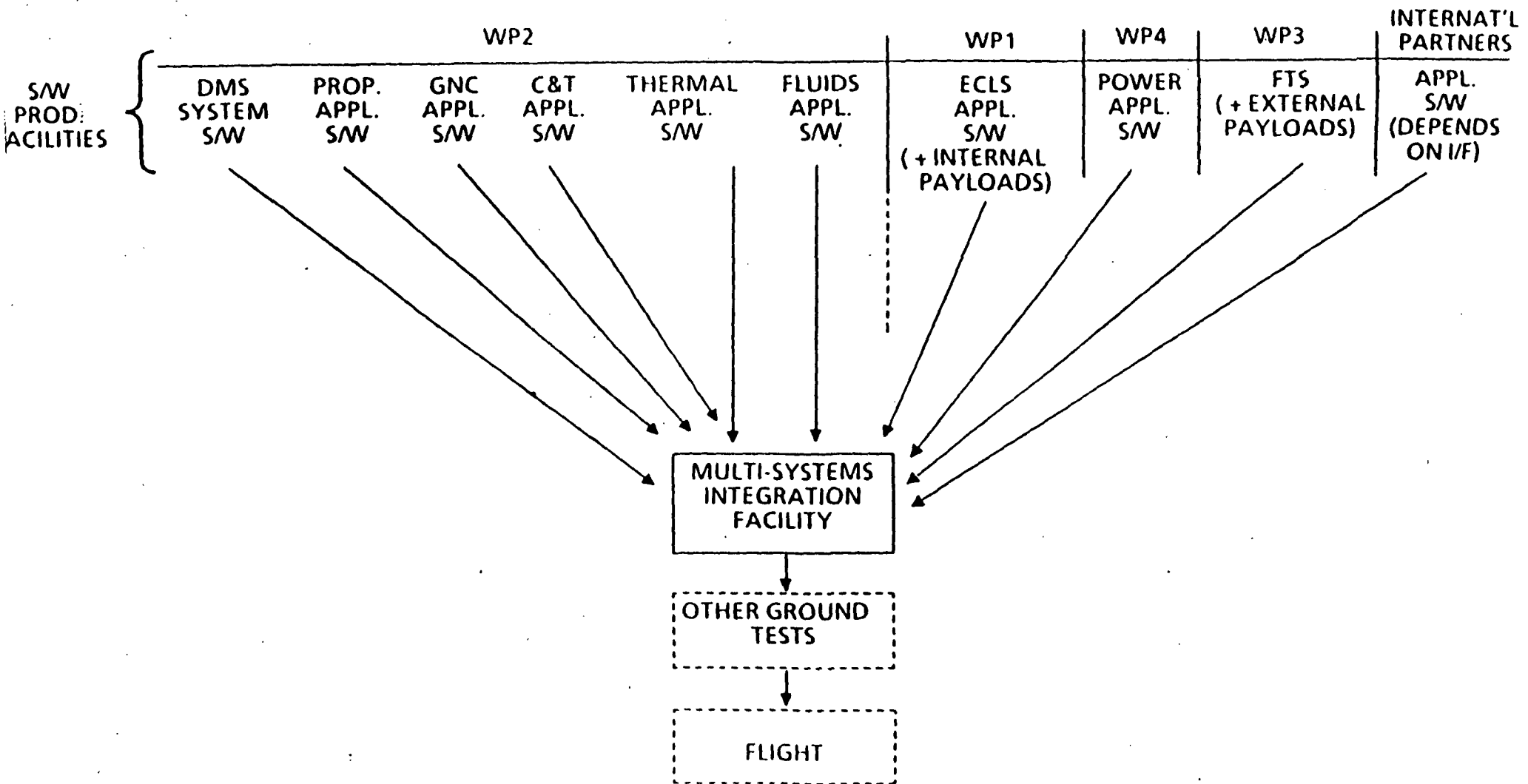
**(HOW MUCH IS NECESSARY FOR SPACE STATION FREEDOM PROGRAM ?)**

- **ESA, NASDA, AND CANADA WILL PROVIDE MISSION/LIFE CRITICAL FLIGHT SOFTWARE**
  - **QUALITY OF PARTNER DEVELOPMENT ENVIRONMENTS UNKNOWN AND UNCONTROLLED**
  - **LIMITED EXPERIENCE IN MAN-RATED, COMPLEX SOFTWARE**
  
- **HOW COMMON OR INTEROPERABLE MUST BE THE DEVELOPMENT ENVIRONMENTS?..... AND HOW DO WE ANSWER THAT QUESTION?**
  - **WRITE TIGHT INTERFACE SPECS?**
    - **HOW CAN WE DETERMINE NECESSARY DATA EXCHANGES?**
  - **PROVIDE THE SSE TO THE PARTNERS?**
    - **TECHNOLOGY TRANSFER (?)**
  - **SHARE A CRITICAL SUBSET?**
    - **STANDARDS? TOOLS? ALL OR PART? ENVIRONMENTS ARE TIGHTLY INTEGRATED**

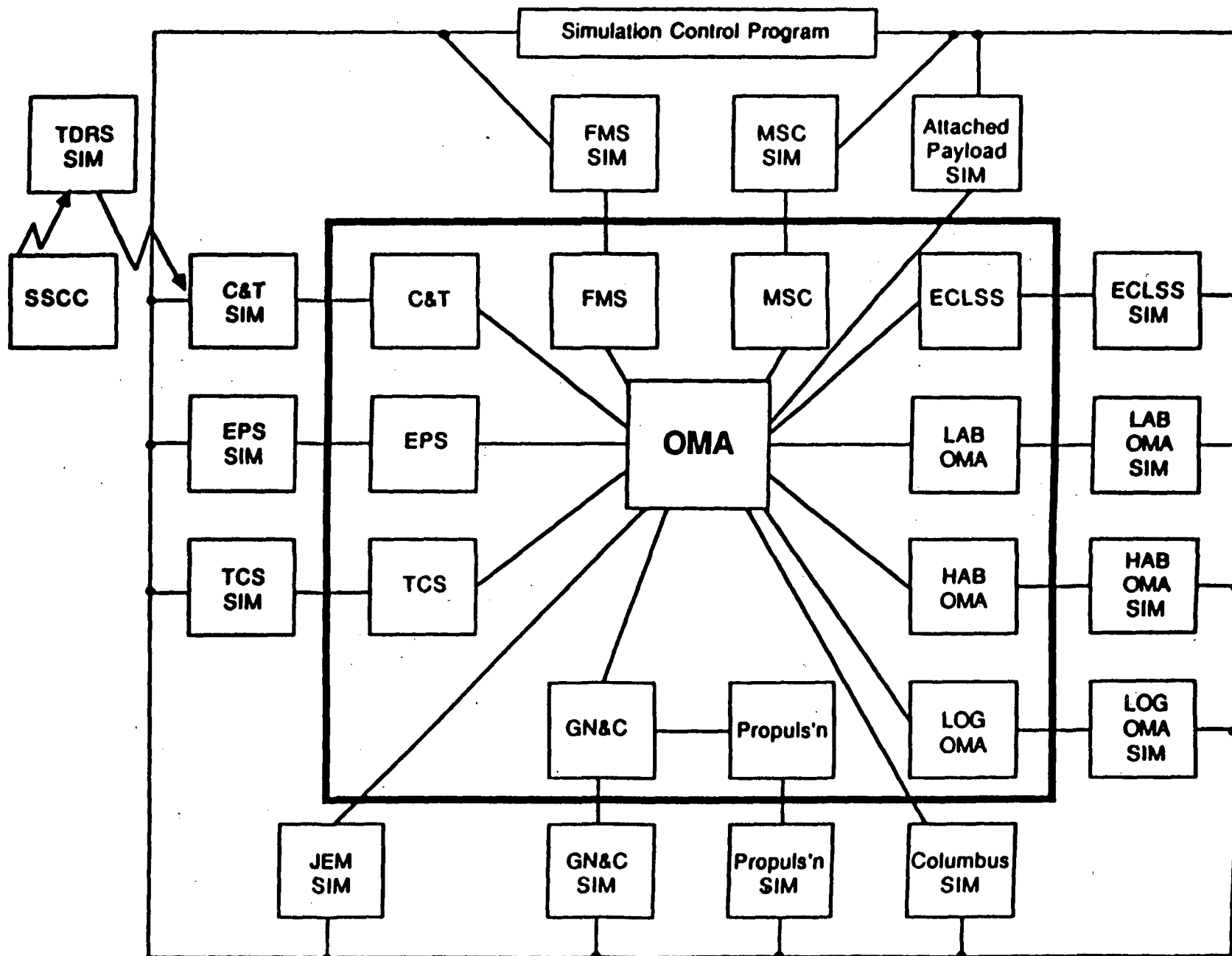
**THIS ISSUE MUST BE SETTLED SOON**



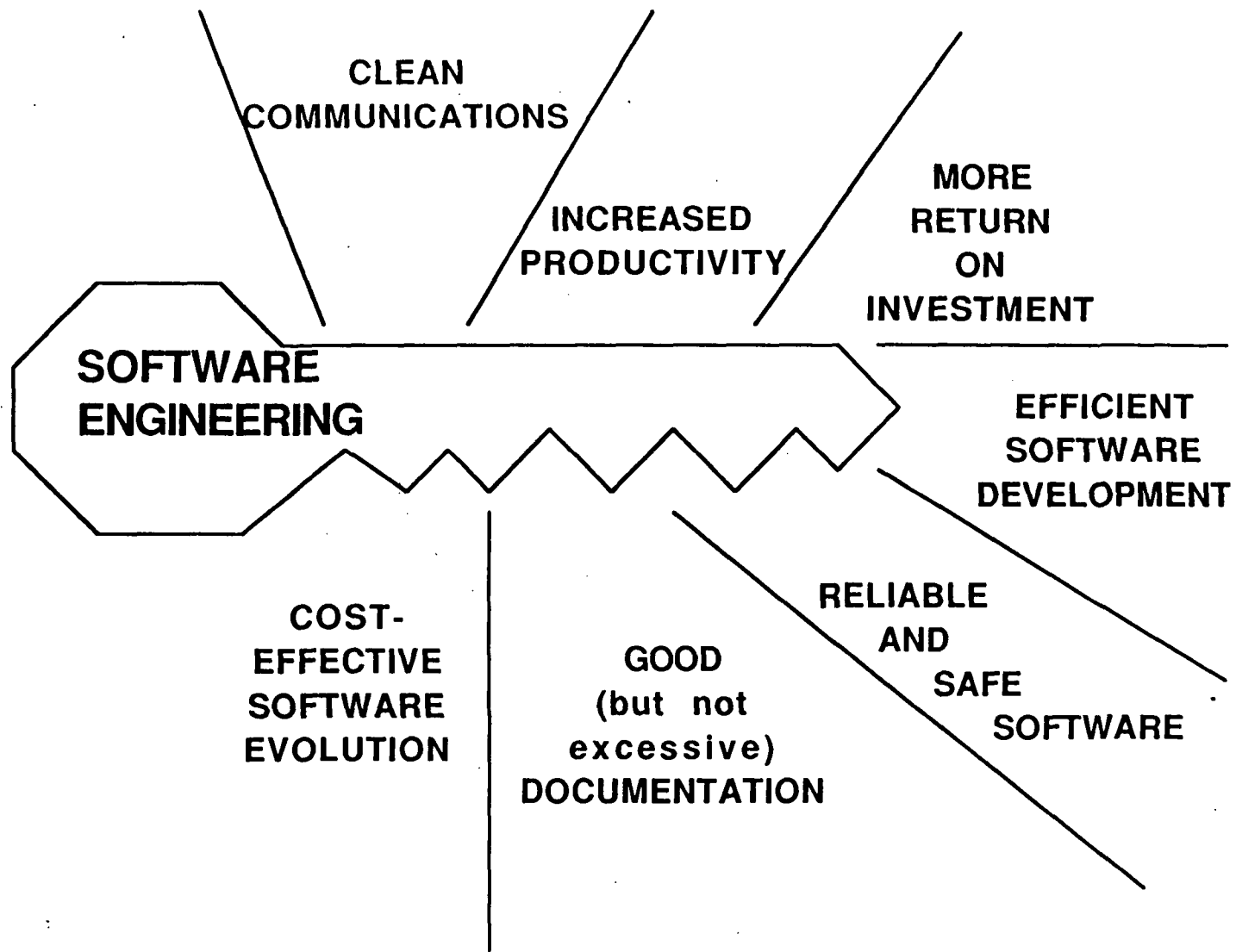
# SOFTWARE PRODUCTION, INTEGRATION, AND MANAGEMENT



# INTEGRATED SIMULATION ENVIRONMENT



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**SOFTWARE ENGINEERING IS THE KEY TO MAXIMIZING PROGRAM "PROFIT"**