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THE ROLE OF SOFTWARE ENGINEERING IN THE SPACE STATION PROGRAM

RICIS SYMPOSIUM 1988
INTEGRATED COMPUTING ENVIRONMENTS FOR LARGE, COMPLEX SYSTEMS

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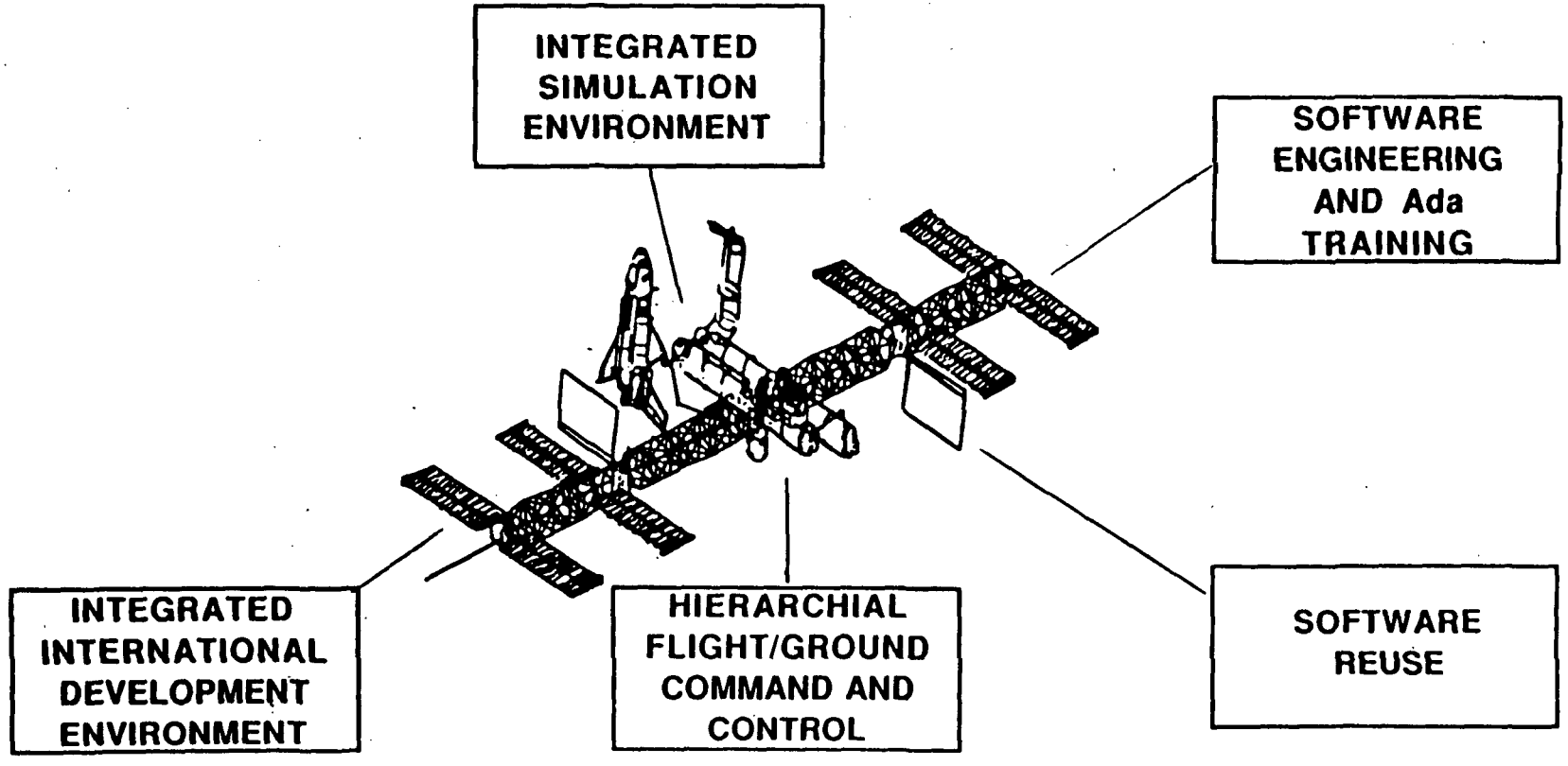
SNAPSHOTS OF SOFTWARE ENGINEERING APPLICATIONS WITHIN THE SPACE STATION FREEDOM PROGRAM



SOFTWARE ENGINEERING AND ADA TRAINING

- 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
- TRAINING RECEIVING MUCH MORE ATTENTION (but its still too little and ..... maybe too late)

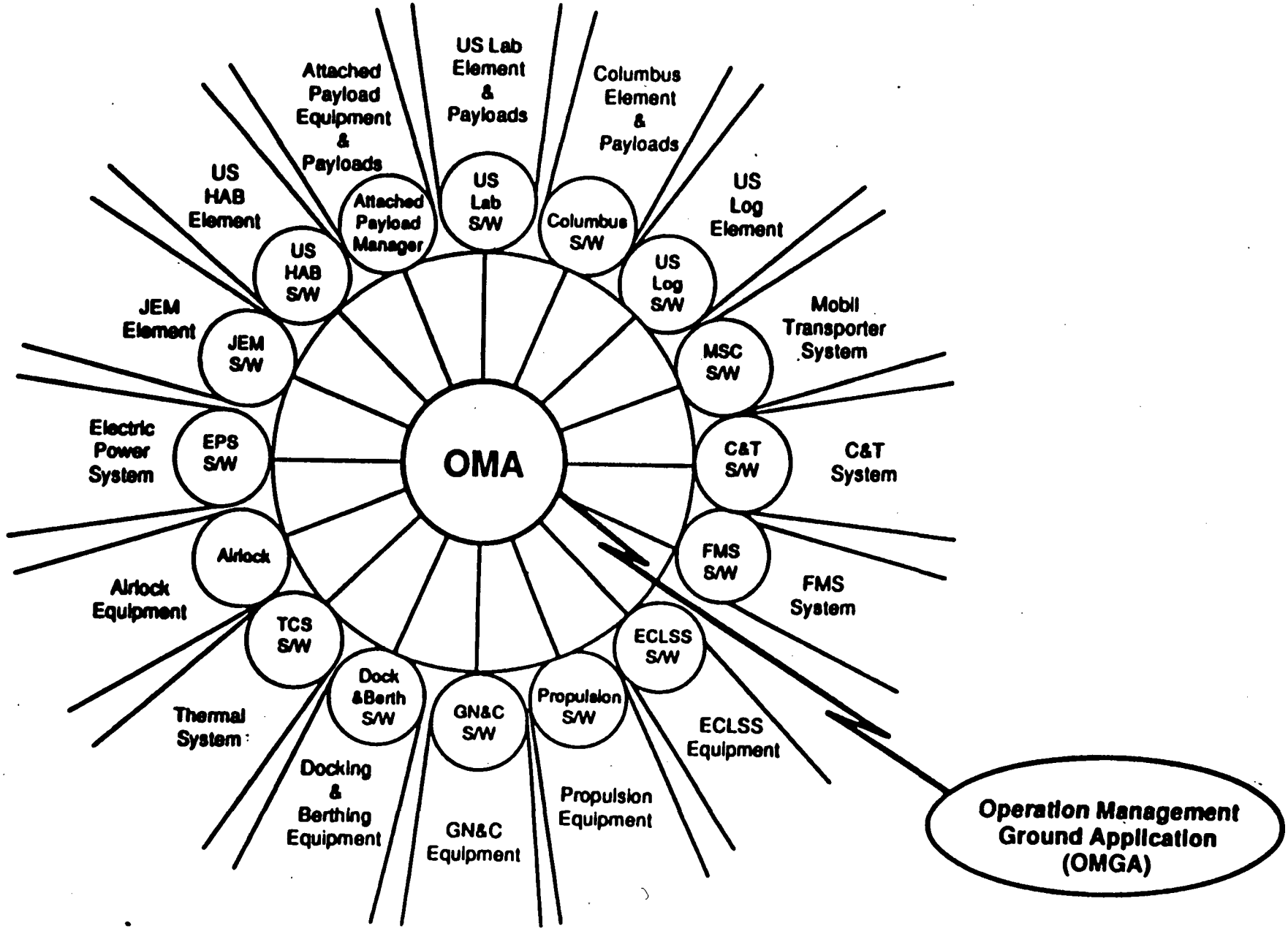
  EXAMPLES:

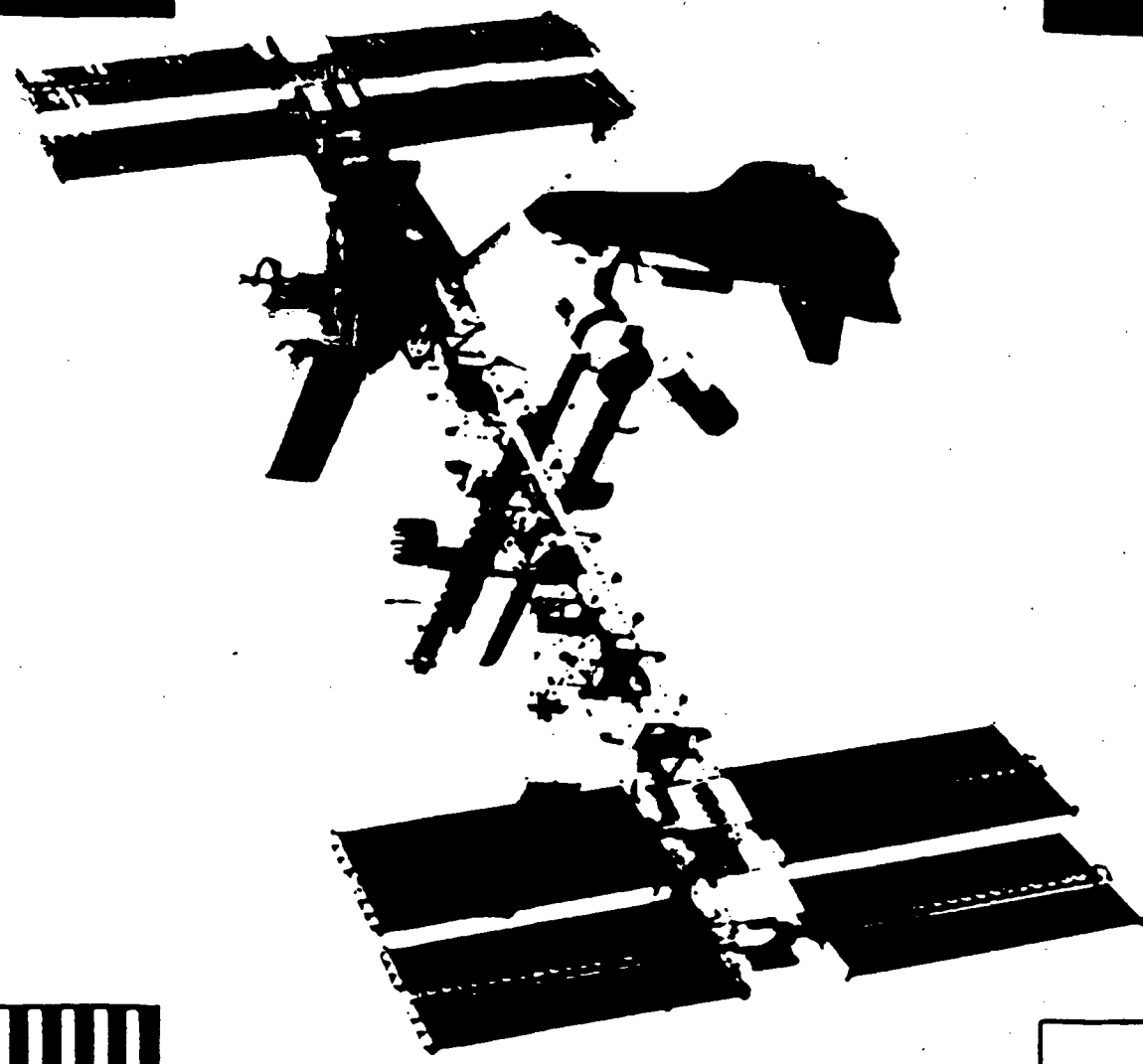
  - EXPANDED COMPUTER-BASED AND CLASS ROOM TRAINING FROM SSE
  - TOP MANAGEMENT ATTENTION

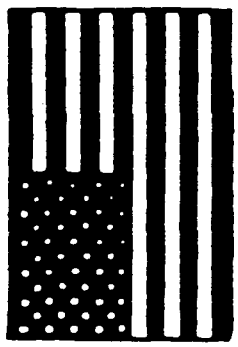
SOFTWARE REUSE

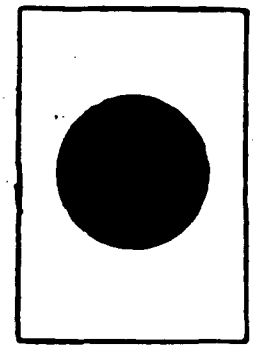
- WANT TO CAPITALIZE ON RESEARCH AND EXPERIENCE TO DATE
  - EXAMPLES:
    - ARMY 'RAPID' TOOL FOR LIBRARY MANAGEMENT
    - UNIVERSITY TAXONOMY/ ATTRIBUTES WORK
- POLICY WILL ENCOURAGE REUSE
  - COMPONENT DEVELOPMENT
  - TRY DURING RAPID PROTOTYPING
- PIVOT POINTS
  - CONTRACTOR INCENTIVES
  - ACCOUNTABILITY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

HIERARCHIAL COMMAND AND CONTROL









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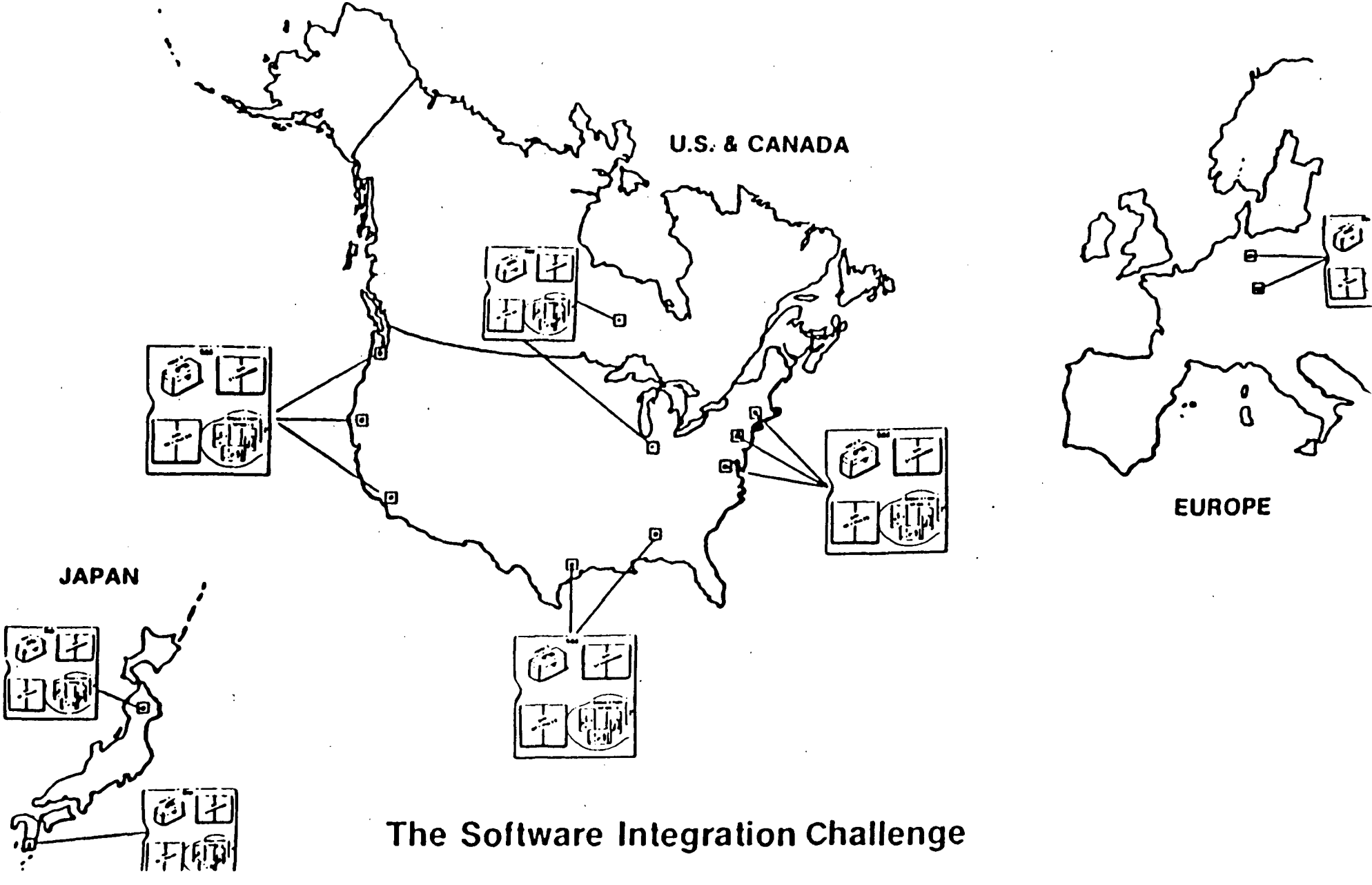
PROGRAM CHARACTERISTICS
DISTRIBUTED SOFTWARE DEVELOPMENT & MAINTENANCE



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?

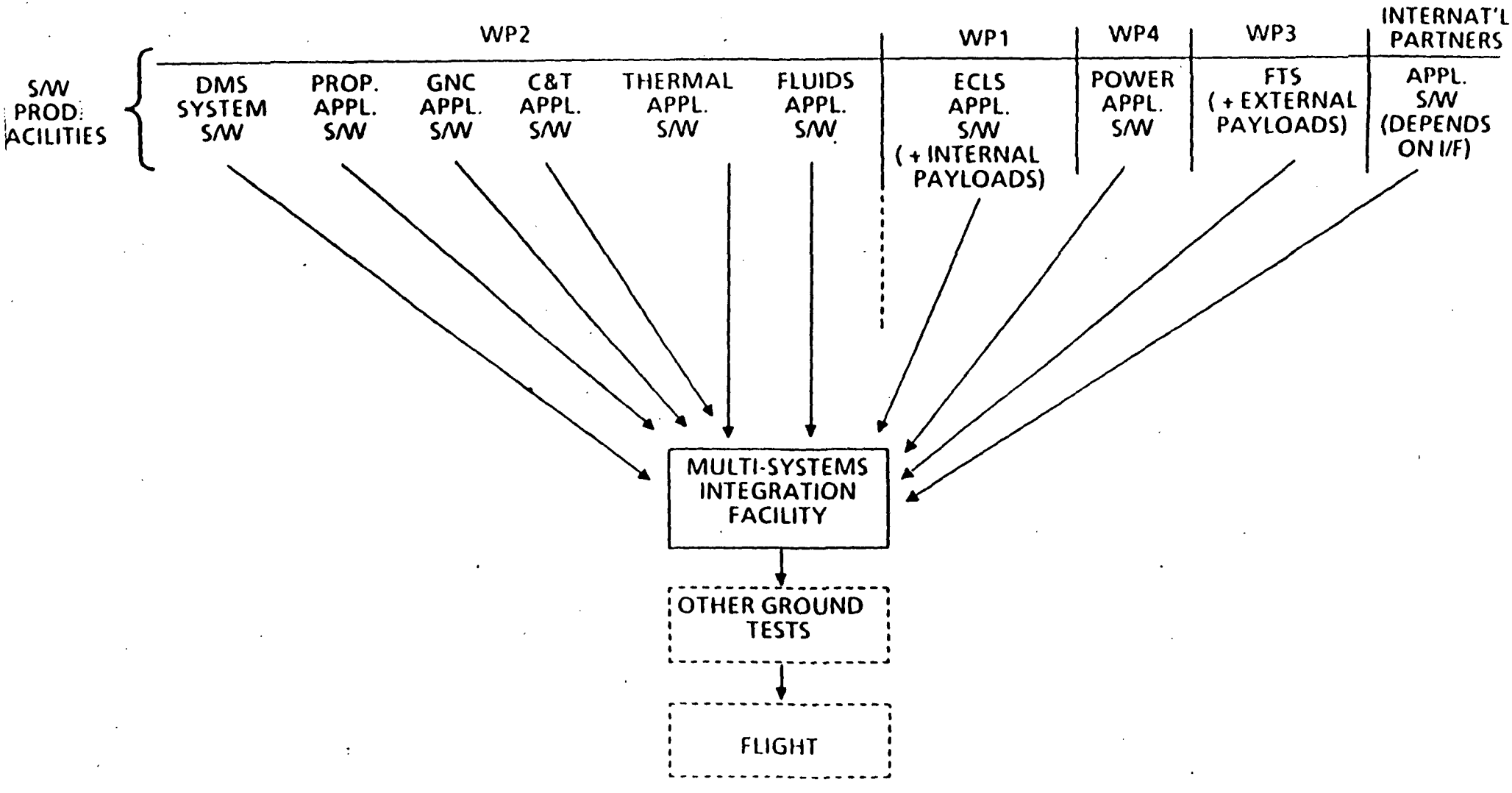
    → HOW CAN WE DETERMINE NECESSARY DATA EXCHANGES?
  - PROVIDE THE SSE TO THE PARTNERS?

    → TECHNOLOGY TRANSFER (?)
  - SHARE A CRITICAL SUBSET?

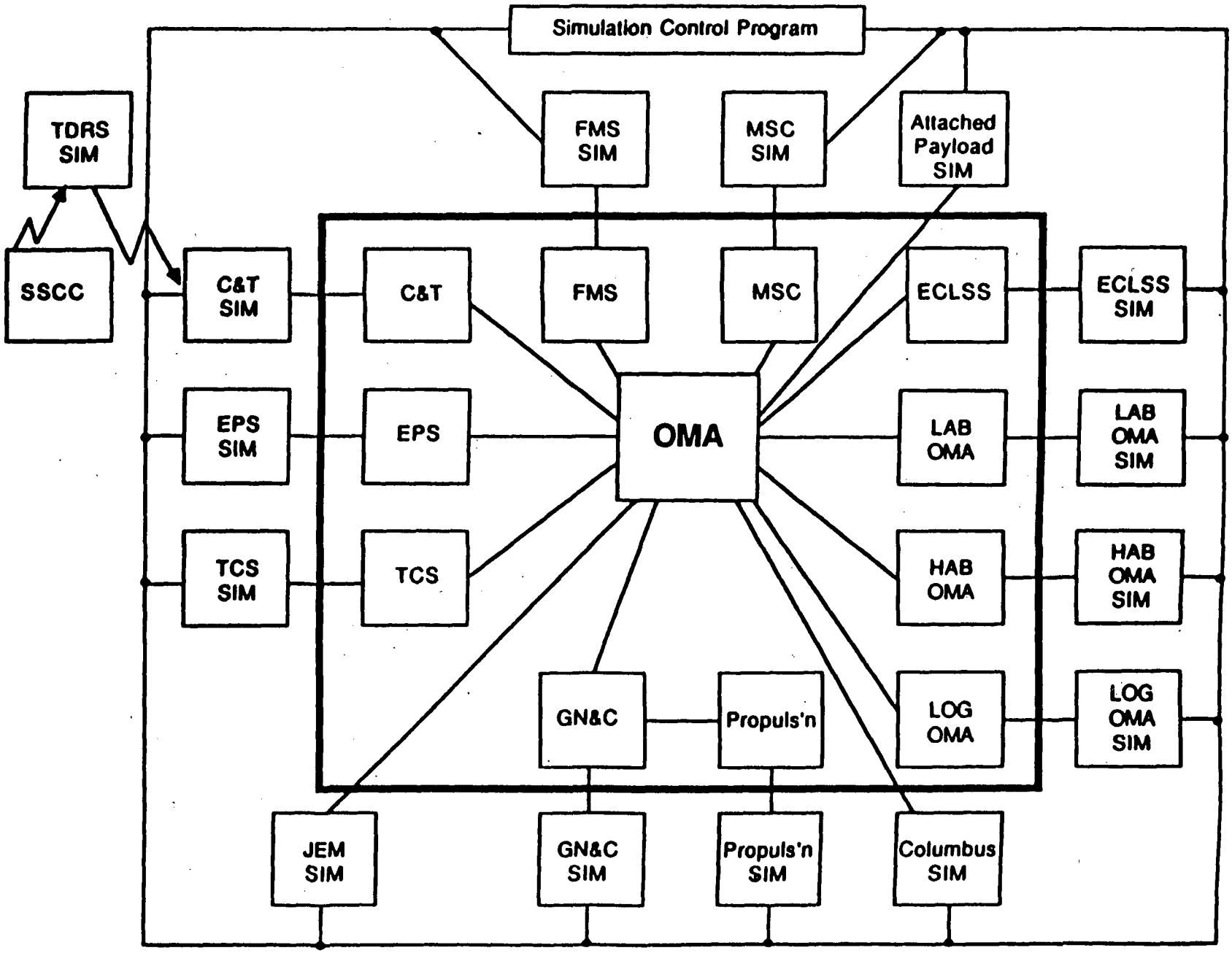
    → STANDARDS? TOOLS? ALL OR PART? ENVIRONMENTS ARE TIGHTLY INTEGRATED

THIS ISSUE MUST BE SETTLED SOON

SOFTWARE PRODUCTION, INTEGRATION, AND MANAGEMENT



INTEGRATED SIMULATION ENVIRONMENT



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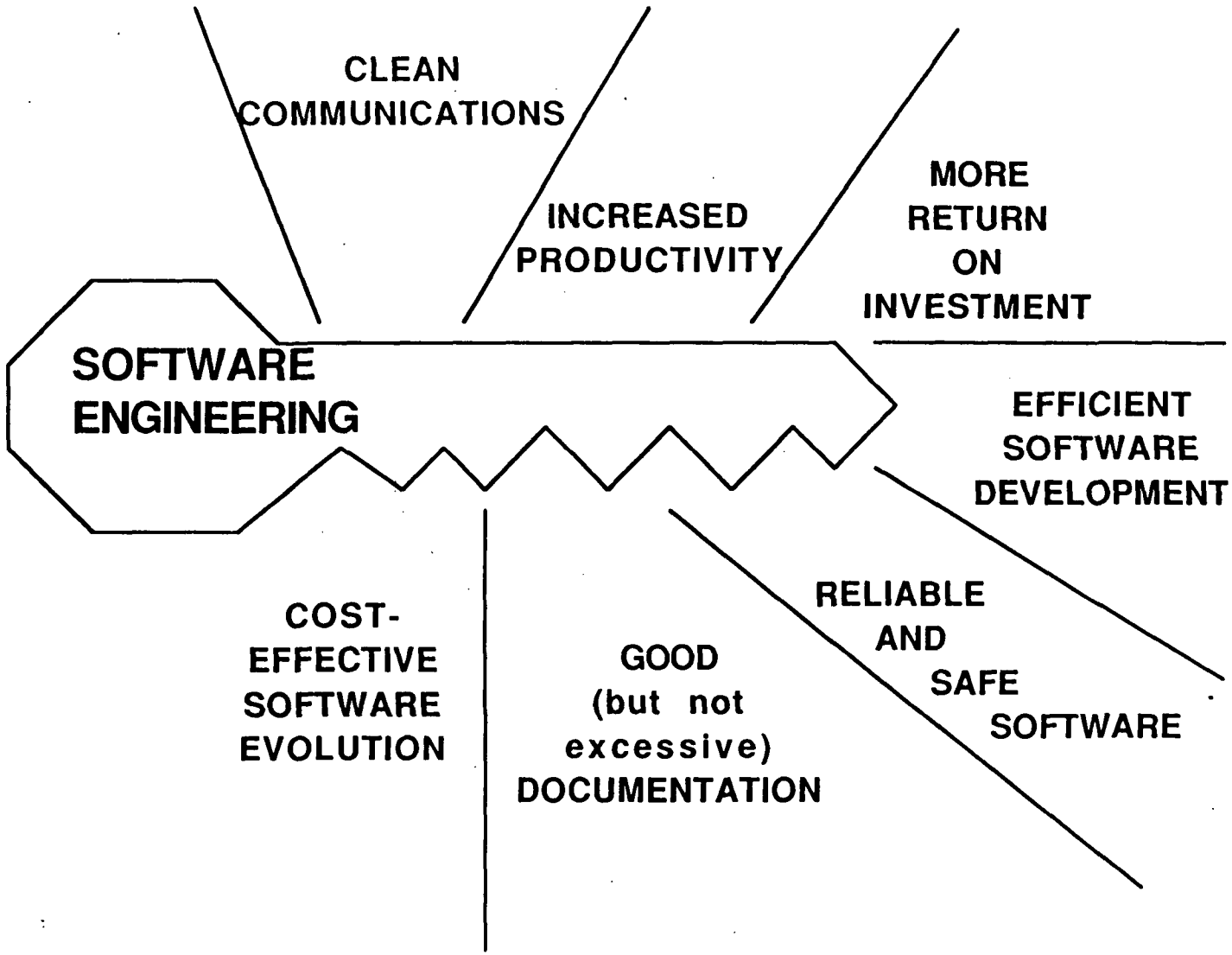

SOFTWARE ENGINEERING IS THE KEY TO MAXIMIZING PROGRAM "PROFIT"