SOFTWARE ERROR EXPERIMENT

SOFTWARE RELIABILITY STUDIES

GOAL

TO DEVELOP ANALYTIC METHODS TO PROVE PERFORMANCE PROPERTIES
AND MEASURE RELIABILITY PROPERTIES OF SOFTWARE
SOFTWARE ERROR EXPERIMENT

SOFTWARE RELIABILITY STUDIES

IMPORTANCE OF RESEARCH

Software is one of the elements whose unreliability characteristics need to be evaluated if estimates of avionics systems unreliability are to be believable.

Of the software reliability models proposed in the past decade, none has yet been shown to be adequate for prediction/estimation purposes in the context of highly reliable systems.
SOFTWARE ERROR EXPERIMENT

PROG SPEC

- PROG 1 DEV
  - ACCEPT TEST
    - EXECUTE
      - VOTER/COMPARATOR
        - ERROR INDICATOR
          - ERROR 1
          - ERROR 2
          - ERROR N
          - REPLICATE 1

- PROG 2 DEV
  - ACCEPT TEST
    - EXECUTE
      - VOTER/COMPARATOR
        - VOTED OUTPUT
          - DYNAMICS GENERATOR
          - ERROR INDICATOR
            - ERROR 1

- PROG 3 DEV
  - ACCEPT TEST
    - EXECUTE
      - VOTER/COMPARATOR
        - ERROR INDICATOR
          - ERROR 1
          - ERROR N
          - REPLICATE K
PRELIMINARY RESULTS OF THE SOFTWARE REPETITIVE RUN EXPERIMENT

PROB ERROR DUE TO FAULT

PROGRAM 1

PROGRAM 2

FAULTS OF PROGRAM 1

FAULTS OF PROGRAM 2
SOFTWARE ERROR EXPERIMENTS

FUTURE PLANS

0 ANALYZE DATA FROM ADDITIONAL VERSIONS

0 GENERATE MULTIPLE VERSIONS OF CONTROL PROBLEM

0 DEVELOP MORE SOPHISTICATED MODEL