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THE DUAL 7600 AS AN INTERIM PRE-ACAP  
COMPUTER AT NCAR

Factors Requiring Increase in Computing Power during FY 1976

- (1) Increased demand for service by NCAR and university users, largely related to preparations for FGGE.
- (2) Budget leveling.

Advantages of Dual-Processor 7600

(1) Increases computing capacity by a factor of about 1.5: Counting the 6600 as 0.2 times a 7600, we have power of 1.2 at beginning of FY 1976. Because of common large core memory (LCM) and contention between processors for LCM access, we may estimate dual-processor system as equivalent to 1.8 7600's. Thus, replacing 6600 by second 7600 processor yields ratio  $\frac{1.8}{1.2} = 1.5$  between power at end of FY 1976 and power at beginning of FY 1976.

In addition, we expect that mass store will be installed before second processor. Hence, FY 1976 power is of the order of twice the (1973) 7600.

- (2) The two processors can be operated as essentially independent 7600's. Hence, software development expense is minimal.
- (3) Installation of the second processor and peripherals can be regarded as upgrade of current 7600 system - hence a sole-source procurement rather than a full-scale RFP, bid, evaluation, and contract award procedure.
- (4) Our plan is based on conversion to purchase in FY 1976 of the present 7600 system including peripherals, and lease of the second processor with its peripherals. Since the interface between the basic 7600 processor

and the dual processor must be factory installed, the 7600 processor to be purchased will actually be a completely new replacement for the present 7600 CPU. We expect that a 7600 built in 1975 will be far more reliable, from the outset, than the present one, which was built in 1971.

Control Data has already volunteered its willingness to apply the accumulated purchase option credit to the dual processor system, and has confirmed that the purchase of one processor and the lease of the other would be acceptable.

In addition, the plan calls for removal of the 6600 system, as surplus, at the time of installation of the dual processor 7600 (certain 6600 peripherals will be retained for use with the second 7600 CPU). The basic 7600 processor will be retained after the ACAP is installed, but the dual processor will no longer be needed. Thus its lease is expected to continue for two to three years.

(5) Does not require extensive remodeling of building, although some installation costs will be incurred.

#### Disadvantages

(1) The principal disadvantage of following this course of action is that it implies a further delay of the ACAP, which then could not even be installed before the beginning of FGGE in 1977, assuming that funds for the initial ACAP commitment were made available in FY 1977.

(2) Not only is the dual-processor 7600 inadequate to handle the FGGE computations, but it cannot even handle the currently projected demand for computer resources which will be generated by the preparations for FGGE.

At best it provides an interim stop-gap solution for NCAR/University computing requirements in the atmospheric sciences. (The proposal to lease the second processor on a year-to-year commitment emphasizes the interim nature of the dual-processor system.)

(3) While a dual-processor system can handle nearly twice as many individual programs in a given time interval, the execution of any single model will take at least as long on the dual-processor system as on a single 7600: It is probably impossible to employ both processors simultaneously on a single model.

#### Other Comments

CDC originally proposed financing the purchase of a dual-processor system through a long-term lease-purchase plan offered by their subsidiary Commercial Credit. This plan is similar to one proposed last summer for the 7600 alone. This plan is not recommended for the following reasons:

(a) It implies a long-term commitment, and, by extension, that the dual-processor system will satisfy NCAR and university needs for an extended period which is not true on the basis of reasonable estimates.

(b) It is doubtful that GSA would find such a plan acceptable since it involves essentially a mortgage with interest at a rate higher than that generally available to the government.

(c) The only advantage of the lease-purchase plan is that it does not require a major capital outlay in FY 1976.