

SUMMARY

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Authors of papers given at the Small instrument Workshop have indicated many different ways to reduce instrument weight, power and cost. Factors of 10 in weight and power are not out of the realm of possibility. Such instruments could be built today. One method is to simply reduce the number of sensors and the overall complexity of the instrument. This lowers the weight, power, and cost, but may also lose some science. However, for certain specific missions, those that are exploratory in nature, this method may still be able to retain all the basic measurements. We have also heard of other recent sensor developments that reduce the weight (and power) by factors of two to four, with a potential increase in science. Most of these reported have been either recently flown in space, or are currently being developed and will be ready for the near-future NASA missions.

Papers describing sensors for the more distant (> 5 years) future were presented at the Workshop. If these sensors can be developed to make practical space plasma measurements, they could potentially revolutionize Code SS instrumentation and missions. These sensors will have weight and power requirements that are another factor of 2 to 10 ICSS than present-day possibilities (a factor of 20 to 100 ICSS than instruments built a few years ago). Entirely different types of spacecraft should be designed around such instruments, microspacecraft. This may be the only practical way that a multi-spacecraft mission like the "Plasma Turbulence Explorers" could be properly carried out.

The technology for a reduction of weight and power for the instrument electronics is already available. Factors of 10 are currently possible for certain electronics areas for some instruments. These should be incorporated in mission planning. DPUS are increasing in capability and decreasing in weight and power with each additional year. The idea of using common DPUS has been explored in the Workshop and has been found to be applicable for certain sets of instruments. The total number of DPUS thus could be reduced by a factor of two to three.

The enclosed papers represent some of the current technology available to NASA. However, to fully utilize the technology towards practical space instrumentation, NASA needs to fund sensor, power supply and electronics development. Code SS is in great need

for a Space Physics Instrument Development Program (SPIDP), similar to the one that exists for the NASA Planetary Division. We hope this can happen very soon.