

## P3E News

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*There has been gratifying progress on the P3E project. Currently the first modules are being completed. We hope, that some of them will be integrated into the satellite by the time of this year's AMSAT-DL membership meeting. The membership meeting will take place in Marburg, so that we might have the opportunity to see P3E in the integration room either before or after the meeting.*



Fig.1

### Engine Mount

Since the well-known 400-N engine for OSCAR-10 and 13 is no longer usable on P3E, a completely new mounting had to be developed for the smaller 220-N propulsion system. In the meantime it has been completed and is ready for installation (Fig. 1).

### Solar Cells from RWE

Thanks to the support of the DLR, RWE Solar will present us with solar cells at no charge, which will be assembled at Astrium and mounted with glass covering. Two panels will be fitted with GaAs cells and five other panels will receive high-efficiency silicon solar cells. There will be somewhat greater electrical energy available compared with OSCAR-10 and OSCAR-13. RWE is the largest supplier of space qualified solar cells, and we have the opportunity to test the latest technology under real space conditions. Last November we received a generous contribution in the amount of £10,000 from

AMKSAT-UK, which was designated for the funding of the solar panels. Again, our hearty thanks to the all of the AMSAT-UK members for this exemplary gesture; it represents the best tradition of P3D. The Danish AMSAT-OZ has also made a contribution of 2500 EURO available. We hope that other organizations will follow this example.

### IHU-3 Status

In the meantime Lyle Johnson and Chuck Green have completed the circuit and the layout for the new IHU-3 for P3E and P5A (Figs. 2, 3, and 4). The first prototype has been built in the meantime. The new IHU-3 is no longer a paper concept, but a reality. It is not yet operationally ready, however, since the FPGA's, which contain the largest part of the logic, must still be programmed. The IHU (Integrated Housekeeping Unit) circuit board is notably smaller at 100 X 150 mm than the old IHU or also the IHU-2. It has fewer discrete components, since many

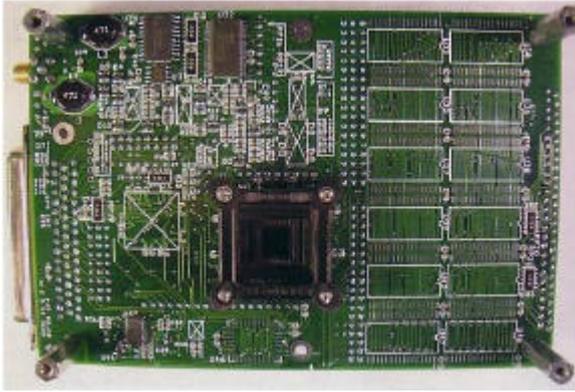


Fig. 2

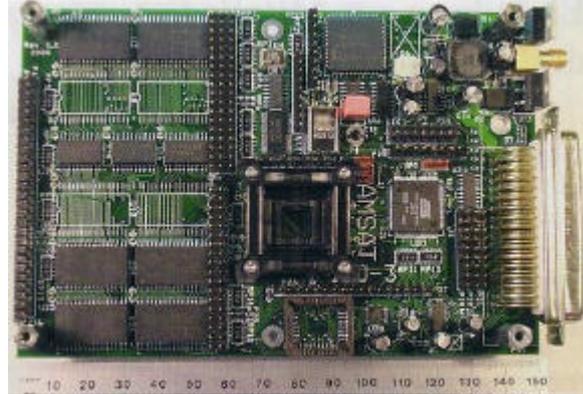


Fig. 3

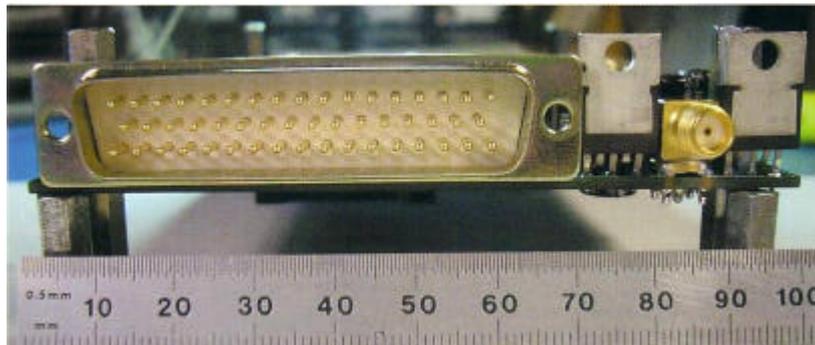


Fig. 4

of these functions are stored in the FPGA building blocks. The two large IC components will naturally be used only in the engineering model, so that the FPGA building blocks can be developed and tested. The FPGA building blocks will be soldered solidly in place in the flight version and then can no longer have their program changed. The 241-pin connector is likewise intended for debugging and will not be available on future boards. Since these are early prototypes a few small mechanical modifications are necessary. The six memory building blocks are only loaded by four in order to test the EDAC error correction. The EDAC logic has to correct the error with each attempt. The various memory chips will be tested in the next two prototypes, and thereby fully test the EDAC logic.

Lyle Johnson will breathe “life” into the IHU-3 and test the hardware functions. After that it will be the software team’s job to port the IPS software to the IHU-3. Since there have been several basic design changes in the hardware concept this is really no small task.

The plan is to build two of these new IHU-3 modules into the P3E IHU module, because of the reduced space requirement. The second, redundant IHU-3 can take over the full functionality at any time based on the CAN networking, or it can take on other tasks during the Mission. Additionally, it was thought to use the new IHU-3 hardware for the RUDAK system. This RUDAK would further distribute the new FEC transfer method and would also be useable for the distribution of pictures from the cameras. No thought has yet been given to a PACSAT mailbox, however the FEC system would make a kind of satellite SMS possible with little cost on the ground

### **Frequency Plan Coordination with the IARU**

The IARU Advisory Board received the proposal for the AMSAT-DL coordination at the end of the year. The Board is now considering the multi-page document. A final confirmation of the frequencies, which were published in the last issue, was not available at publication time.

## **P3E Command Stations**

AMSAT-DL is pleased to announce that the following international team is ready for the command operation of the AMSAT-P3E satellite. The call signs are naturally already familiar since they were active in the command operations of AO-40 and earlier satellites, and bring extensive experience. Good coverage is guaranteed because of the diverse geographic locations, which is important in the hours and days just after the launch. The following individuals are on the team:

Stacey Mills, W4SM, Virginia, USA  
Ian Ashley, ZL1AOX, New Zealand  
Paul Willmott, VP9MU/G6KCV, Bermudas  
Graham Ratcliff, VK5AGR, South Australia  
James Miller, G3RUH, United Kingdom  
Miroslav Kasal, OK2AQK, Czech Republic  
Colin Hurst, VK5HI, South Australia  
Peter Gülzow, DB2OS, Germany

Our command stations have played an important role in the success story of our Phase 3 Satellites, because after the launch their job really takes place. This kind of project could never take place without their dedication, experience and motivation and the “ham spirit”.

*Welcome on board!*