

Module for "Buran"

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On November 15, 1988, the first and

only flight of the domestic reusable spacecraft 11F35 "Buran" took place. In its "belly" - the cargo compartment, module 37KB No. 37070 was installed, or, as

it was officially called, the Additional Instrument Block (AIB). This module remained an unknown page in the history of the creation of the first Soviet reusable spacecraft for a long time.

The prototype of the 37KB module was the 37K series modules. In accordance with decision No. 1 of February 11, 1981 of the joint Scientific and Technical Council of the Ministry of General Machine Building, the Presidium of the USSR Academy of Sciences and the USSR Ministry of Defense, it was planned to include five target modules of the 37K series, launched as part of the Heavy Modular Ship (TKM, product 11F72M), in the 27K (Salyut-7) and 27KS (Mir) orbital complexes. At the same time, the composition of the payload for Buran was being determined. According to experts from RSC Energia (the lead company for the Buran program), a hermetically sealed module was required to accommodate the flight design test equipment of the ship. It was quite logical to use the reserve of 37K modules. In connection with this, on April 19, 1982, the General Director of NPO Energia issued Order No. 135 "On the creation of a block of additional devices (product 37KB) and a payload for testing product 11F35". According to the technical specifications, the module 37KB was planned to be used multiple times, as a prototype of future payloads for Buran. The development of design documentation was entrusted to KB Salyut, the production of flight models and testing of prototypes - M.V.Khrunichev Plant.

The following additional systems, devices and units were housed in 37KB:

- on-board measurement system;
- Buran emergency power supply system (48 batteries);
- autonomous power supply system of 37KB module (12 batteries);
- thermal control system;
- fire detection and extinguishing system;
- gas composition supply system;
- interior lighting system.

The 37KB module also housed a number of

auxiliary devices of the on-board complex control system (OCCS), necessary for its functioning.

The 37KB design consisted of a pressurized compartment with a diameter of 4.1 m and ring spacers, which were attached to the frames on both sides.

The total length of the module was 5.1 m with

a mass of 7150 kg and a volume of 37 m<sup>3</sup>. The 37KB attachment points in the payload compartment were installed on the spacers. The equipment was located both inside the pressurized compartment and outside. 37KB was connected to the orbital ship via electrical interfaces

through four boards. To monitor the operation of the equipment in emergency situations, the crew was supposed to visit the module.

A total of two flight modules and six test benches were manufactured for various tests. In February 1986, the first 37KB No. 37070

was sent to the Baikonur Cosmodrome to prepare for the 1K1 flight (the first flight of the 1K spacecraft). Its tests were conducted in MIK 132-B, where the Salyut and Mir orbital stations and the Kvant module were usually prepared. After completing the autonomous tests, the 37KB module was transported to the new MIK-OK facility 254, where it was tested already as part of "Buran". It is worth noting that the preparation cycle of "Buran" for the first flight lasted for two and a half years.

The flight of 37KB as part of "Buran" on November 15, 1988 was completely successful. The module was removed from the cargo compartment, and its interflight servicing began. In the meantime, in 1987, the second module 37KB No.

37071 was manufactured. In September of the same year, it was transferred to NPO Energia for complex tests together with the electrical analogue of "Buran". It was planned to manufacture a third flight module 37KB No. 37072 for the ZK spacecraft. In any case, in early 1988, the Ministry of General Machine Building prepared an order for its creation, which, however, was never signed. After the first two flight tests of the Buran spacecraft were completed, the modules were planned to be certified for repeat flights and equipped with scientific equipment (they were to receive the designations 37KB

No37270 and No37271).

The flight plans for the 37KB modules were closely linked to the Buran test program and changed several times. As of early 1989, the plan was as follows:

Module 37KB for Buran. Drawing by GKNPTs

- IV quarter of 1991 — flight 2K1 (second ship, first flight) lasting 1-2 days with module 37KB No37071;
- II quarter of 1992 — flight 2K2 lasting 7-8 days with module 37KB No37271;

— 1993 — flight 1K2 lasting 15-20 days with module 37KB No37270.

All four Buran flights were to be unmanned. During the flight of the 2K2 spacecraft, it was planned to practice automatic approach and docking with the Mir orbital complex. Starting from the fifth flight, a third orbital ship ZK was to be used, equipped with a life support system and two ejection seats. Flights from the fifth to the eighth were also considered test flights, so the crew was to consist of only two cosmonauts. They were planned for 1994-95. For these missions, it was planned to manufacture research modules based on the American Spacelab and Spacehab. For this, KB Salyut proposed to re-equip the second module 37KB No. 37271 and the spare (third) module 37KB No. 37072 into 37KBI No. 1 and 37KBI No. 2, respectively. It was planned to manufacture the experimental module 37KBIE for the first manned flight of the Buran-3K spacecraft in 1994. During the fifth through eighth Buran flights, modules 37KBIE, 37KBI No. 1, and No. 2 were to be delivered sequentially to the 27KS Mir complex, where they would be docked with the ship's remote manipulator to the side docking unit of the Kristall module. The 37KBI modules would be both research vehicles, carrying scientific equipment, and sealed logistics modules. They were also to return to Earth on the Buran spacecraft during their next flights to the station. At the same time, NPO Energia proposed its own version of the so-called Laboratory Compartment, and the Ministry of Defense also envisaged its own version of the module for Buran flights under military programs, which had the designation 17FZ2 NPG (non-separable payload). Unfortunately, the author does not know who was supposed to develop 17FZ2 and on what basis they were going to create it. However, already at the end of 1989, the plans for creating modules for Buran completely changed. On October 5, 1989, the Scientific and Technical Council of the Ministry of General Machine Building and the USSR Academy of Sciences was held on the promising orbital station Mir-2. The Council recognized the need to stop work on the topics 14F70 Zarya (manned reusable spacecraft), 37KBI, 37KBIZ and, within the framework of the implementation of the Mir-2 topic, to ensure the creation of a modernized 17KS No. 128 block, to develop a modernized cargo ship based on the existing stock, taking into account the transition to the 11K77 Zenit-2 launch vehicle. Work on the 37KB series modules was finally curtailed in May 1993 after the official closure of the Buran program.

The article uses materials from the book

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