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268 072

FTD-TT- 61-203/1

**UNEDITED ROUGH DRAFT TRANSLATION**

268072  
62-1-4

AT SUPERSONIC VELOCITY

BY: Author Unknown

English Pages: 3

SOURCE: Sovetskaya Litva, 28 July 1961, p. 3

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FTD-TT- 61-203/1

Date 27 Nov. 19 61

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At Supersonic Velocity

( PRI SVERKHEZVUKOVOY SKOROSTI )

Article from Russian Newspaper Sovetskaya Litva (Lithuanian SSR) July 28, 1961  
p. 3, columns 2-4

With the appearance (advent) of jet aircraft there was a sharp rise in velocity and altitude of flight. And here it appeared that the old friend - the parachute can no longer guarantee safety of the pilot during emergency. If previously in such instances the pilot abandoned the aircraft, crawling out from the cockpit, presently at speeds of 500 km/hr and over this has become impossible. A powerful stream of air exerts great pressure on all the objects coming out from the aircraft. If the pilot would succeed in getting out from the aircraft then the stream of air would immediately carry him toward the empennage. Tragic outcome is then unavoidable. That is why jet aircraft are provided in case of emergency with special devices which eject - catapult - the pilot together with the seat. The seat and pilot sitting on it are shot out from the cockpit; like a round from a cannon.

During the shot out originate more than twenty-fold overloads affecting the seat and pilot. True, they are of very short duration, these overloads, and by observing all the rules of catapulting they are endured with relative ease. But when the seat has already separated itself from the aircraft, the pilot experiences even greater overloads. But the seat is being sharply ~~retarded~~ retarded by the air stream. In addition the pilot collides with counter air flow with a force of up to 2 tons (at an aircraft velocity of about 1000 km/hr at medium altitudes). Luckily the impact also is of very short duration - not longer than one tenth of a fraction of a second.

How to manage these overloads? the seat is made of such form that the body of the pilot adheres to it most solidly and by the largest area. Pilot do wear special anti-G suits.

And how do we handle the iar impact ? The most vulnerable part here is the pilot's face. A special blind is pulled over the face to protect same.

The first task after being catapulted- stabilize the orderless flight of the seat, its ~~uncontrolled~~ somersaulting which can be fatal for men.

Within one half of a second after the shot out a special automatic mechanism extends ~~stabilizing~~ stabilizing flaps and the so called ~~gun~~ parachute gun goes into action - a pyrotechnical device which activates a small parachute. Rotation of the seat is slowed down, the stabilizing parachute tilts it along the air stream, and the speed of the seat is retarded.

It is known, that already at an altitude of 3-4 km a lack of oxygen (anoxia) is felt. And at present time flights are conducted at much higher altitudes. In a high altitude aircraft the pilot is protected by a special pressurized cockpit (air tight cockpit) in which proper temperature and pressure are maintained. But how is it when it becomes necessary to abandon ~~aircraft~~ aircraft ? In the very cockpit in case of emergency there can be simultaneous dehermetization (depressurization). Here help is offered by compensation suits and high altitude head gears.

In the head gear, as well as in a pressurized cabin, the human body is exposed to uniform higher air pressure, which circulates freely between the surface of the body and the air tight shell of the ~~headgear~~ protective suit. The high altitude protective clothing is in essence a very light, elastic, gas impermeable "cabin" fitted directly over the body.

But even all this, it is understood, is not sufficient, the ejection seats which are suitable for saving from aircraft travelling at near sonic velocities, can offer no help to the pilot if the emergency occurs on an aircraft flying with greater supersonic speed- the seat must be ejected with greater care. And it is a fact that many aircraft fly already at velocities of more than 2000 km/hr. Exper

imental rocket powered aircraft reached velocities of 4000 km/hr. Already now is needed safety equipment also for pilots of rocket aircraft and for cosmonauts of inhabited satellites.

In recent years were produced new types of ejection seats. Instead of a pyro technical cartridge they use a rocket engine. The most perfect samples of such seats allow to eject at a velocity of up to 24000 km/hr.

Developed were also the first samples of special safety capsules. It is like a small cabin formed by extensible walls. Such a capsule closes automatically and becomes hermetically sealed prior to catapulting, offering protection against counter stream of air and safe landing. In addition it also serves as a container for rescue devices (parachutes, emergency supply, oxygen equipment etc.) and as a rescue raft in case of falling into the water. This releases the pilot from the necessity of putting on wearing a larger number of equipment.

After catapulting the capsule descends with the aid of a parachute system. At the time of descent (drop) from the capsule are extended four telescopic rods, which stabilize the landing. They are also provided with floats.

In development are also samples of ejection cabins, which represent in fact the whole forward part of the fuselage including the cockpit - in case of an emergency that entire part separates from the aircraft and descends on parachutes.

Developed were also rescue systems capable of saving astronauts in case of trouble with the rocket already at take off - the capsule breaks away from the rocket, it flies up high into the air and then descends with the aid of parachutes.