FTD-TT-63-24

6332

TRANSLATION

MAIN GOALS OF THE HISTORICAL FLIGHT

By

B. Semenov

FOREIGN TECHNOLOGY DIVISION

AIR FORCE SYSTEMS COMMAND

WRIGHT-PATTERSON AIR FORCE BASE

OHIO

UNEDITED ROUGH DRAFT TRANSLATION

MAIN GOALS OF THE HISTORICAL FLIGHT

BY: B. Semenov

English Pages: 5

SOURCE: Russian Periodical, Sovetskaya Rossiya, Nr. 192 (1872), August 15, 1962, p 2

PREPARED BY:

TRANSLATION DIVISION
FOREIGN TECHNOLOGY DIVISION
WP-AFB, OHIO.

MAIN GOALS OF THE HISTORICAL FLIGHT

by

B. Semenov, Candidate of Tech. Sciences

2. The Astronaut is Master of his Ship

The pilots A. G. Nikolayev and P. R. Popovich are confronted with a series of most interesting problems, among them how to further improve the system of control of the ship.

With each new thrust into outer space man more and more feels himself master of the ship. Or, descriptively speaking, he is growing space wings and handles them more confidently.

How is the control of a space ship effected?

We have called on our scientific observer, Candidate of Technical Sciences B. Semenov, to answer this question.

----o----

Because of the special conditions of flight in airless space the space-ship has special physical organs of control. What are they?

First of all it is necessary to determine the orientation of the space ship, to eliminate its disorderly rotation, which starts up when the mechanism works for separating the last stage of the rocket carrier, that is, to stabilize the ship and turn it to a given position with regard to the earth, the moon, or the sun. To solve this it is necessary to know how to determine the rotation of the ship around its center of gravity and control it. The second problem is to change the direction or speed of the ship.

Here are some examples of the control of a space ship.

A special compass of the astronaut can serve as a gyroscope. This instrument has a rotor, the flywheel, which revolves at a furious speed. The peculiarity of the gyroscope is the maintaining of an unchanged position of

the axis of rotation of the rotor in space. This property of the gyroscope makes it possible to determine easily the rotation of the ship around its center of gravity and then to stabilise it.

For control of the turning of a ship around its center of gravity one can use a flywheel. If one, let us say by an electric motor, puts it into rapid rotation, then the ship itself begins to turn in the opposite direction. And if the ship was turning one can thus stop it by adjusting the rate of turning of the flywheel.

Another method of turning the ship consists in the use of miniature rocket engines. If the thrust of the engine is not directed through the center of gravity of ship then then a rotational movement will result and the ship begins to turn.

The only method of changing the speed or direction of the flight in space consists in the use of the rocket engine. The ship is first oriented in the necessary position and then the rocket engine is cut in. It imports to the ship the desired amount of thrust and in the desired direction. One of the very important maneuvers in the control of a spaceship is the conducting of it from the orbit of flight around the earth onto the landing trajectory. In order to carry out this maneuver the satellite-spaceship is oriented in such a way that the thrust of the rocket engine will act as a brake on the ship reducing the speed of its flight. After the braking it passes into an eliptical orbit intersecting the surface of the earth. In proportion as the ship comes down it gets into denser and denser layers of atmosphere. The braking is considerably reinforced by its friction against the air. The appears in principle the possibility of using the increasing agrodynamic forces for stabilizing the ship, for controlling its flight, and for correcting its trajectory downward.

The spaceship Vostok possesses a completely automatic system of control. The automatic devices without any intercession of the astronaut at all stabilize the ship. They prevent its disorderly turning and orient it in accordance with a given program.

The automatic installations aid the astronaut in keeping the correct orientation of the ship. But at any moment the aviator-astronaut can cut out the automatic part and take over manual control, as did A. Nikolayev and P. Popovich.

The intercession of the astronaut in the control of the ship is required not only in case the automatic devices get out of order. They, of course, are duplicated, and there are other automatic devices which provide for the correct working of all the apparatus, which cut out the instruments that are not functioning and cut in spare ones in their place.

No, the intercession of the astronaut is required mainly in those situations which cannot be foreseen on the earth and which arise in the process of the space flight. It is just here also that man distinguishes himself from the most perfected "thinking" electronic machines, that he can evaluate the circumstances and take the correct measures without a previously prepared program, without detailed instructions having been developed for this occasion.

Flights in space will furnish valuable materials, which will make it possible to create constantly more perfected systems of control of spaceships. For the first time in history of technology two astronauts coordinated their actions. This is a tremendous accomplishment which shows to what height technology has risen, what an obedient machine the ship has become in the hands of the astronaut.

The creation of a perfected and dependable system of control of spaceships is the magnificent accomplishment of Soviet scientists and designers.

The flight of our astronauts is a further step forward on the road to the accomplishment of interplanetary flights, to the full conquest of the ocean of outer space.

DISTRIBUTION LIST

DEPARTMENT OF DEFENSE	Nr. Copies
HEADQUARTERS USAF	
AFCIN-3D2	1
ARL (ARB)	1
OTHER AGENCIES	
CIA	1
NSA	6
DIA	9
AID	2
OTS	2
AEC	2
PWS	1
NASA	1
ARMY	3
NAVY	3
RAND	1
NAFEC	1

MAJOR AIR COMMANDS		Nr. Copies
AFSC		
SCFDD		1
ASTIA		25
TDBTL		5
TDBDP		5
AEDC	(AEY)	1
SSD	(SSF)	2
APGC	(PGF)	1
ESD	(ESY)	1
RADC	(RAY)	1
AFMDC	(MDF)	1
AFSWC	(SWF)	1
AFMTC	(MTW)	1