

# CORRESPONDENCE

## Fate of Zond 4

Sir, I am puzzled by the letter of Mr. S. B. Kramer in the July issue of *Spaceflight* in which he quotes the fact that Zond 4 still appears in the Satellite Situation Reports listed as "current elements not maintained" as evidence that it is still in orbit. Although it seems fairly obvious that this remark actually means "current elements secret" when it is given for all the recent USAF satellites, surely it actually means what it says when applied to objects in very high and eccentric orbits — the US radar tracking systems cannot detect passive spacecraft at very large distances; their initial function is to warn of potentially hostile vehicles, which would only attain relatively low apogees. Hence, for instance, most of the final rocket stages of Soviet planetary probes are not even catalogued although they must exist; and the NASA scientific satellite Explorer 14 is still listed as 'current elements not maintained', even though orbital calculations by the Royal Aircraft Establishment in England suggest it should have decayed in 1965! [1]. Similarly, early satellites in Clarke (geostationary) orbit are no longer tracked. Thus 'current elements not maintained' just means "we've lost it!" and the question of what happened to Zond 4 is still very much open.

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## REFERENCE

1. *Revised Table of Earth Satellites*, Vol 1, RAE, 1978.

## Soyuz 22: A Military Connection?

Sir, Mr. N. L. Johnson's article "The military and civilian Salyut space programmes," (*Spaceflight*, Aug-Sep 1979) suggests many interesting points. One thing I can't agree, however, is the nature of the Soyuz 22 flight of September 1976. Mr. Johnson insists this was militarily motivated. I believe the flight of Valery Bykovsky and Vladimir Aksyonov was of a primarily civilian (Earth resources) nature, although I don't deny secondary military purposes.

Consider the following: Aksyonov is a civilian engineer. Mr. Johnson himself stated in his article that military Salyut crews are exclusively military officers, and I don't think Soyuz 22 was an exceptional military flight.

The main sensor of Soyuz 22 spacecraft was the MKF-6 multispectral six-camera complex. This was a medium focal-length, wide-angle camera system with ground resolution of the order of 10 metres, and not suited to locate and identify military targets, e.g. aircraft, tanks and missile silos.

The Soviets have consistently neglected to reveal the inside of military Salyut stations, but the inside of Soyuz 22 appears in some Soviet references [1].

The flight of Soyuz 22 was a "spin-off" of the Apollo-Soyuz Test Project, planned to use up surplus ASTP back-up hardware [2]. The spacecraft was modified from Type 5/2/3 of Mr. Johnson's classification, putting the MKF-6 camera in place of the androgynous docking system. Bykovsky had been training officer of ASTP and being familiar with the vehicle, it was logical that he should command the Soyuz 22 mission.

From 1973 to 1975 (possibly to 1976) the Soviets had three distinct and isolated manned spaceflight programmes: civilian Salyut, military Salyut and ASTP. It is not surprising that Pyotr Klimuk had not been aware of Soyuz 22 flight.

Orbital inclination of Soyuz 22 (approximately 65°) is no proof of its military nature, because an Earth resources mission also needs wide coverage, hence a large inclination angle. Standard inclination of 51.6° cannot even cover the whole land area of East Germany, co-developer of MKF-6 camera.

The fact that Viktor Gorbatko (commander of Soyuz 24 to military Salyut 5) was a back-up of Bykovsky in the Soyuz 31/29 flight [3] provides fresh evidence for the exchange of cosmonauts between military and civilian Salyut programmes. It appears that the two programmes are not so strictly isolated as we had thought.

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## REFERENCES

1. For example, *Osvoenie Kosmicheskogo Prostranstva v CCCP 1976*, Nauka, Moscow.
2. Anatoly Bessonov, "The Soyuz 22 space mission", *New Times*, No. 39, 1976.
3. E. Knorre, "Intercosmos: Third International Flight", *New Times*, No. 37, 1978.

## Out of this World!

Sir, I attended the 3rd BIS, Conference on Interstellar Studies and I must say that never before have I had a more enjoyable, or wholly well spent time in my life. The topics discussed were excellently covered by the speakers and there was ample time left for the audience to question them on their papers. Some of the topics were of great personal interest, i.e., "In-flight Maintenance of Starships" (T. J. Grant), "The likelihood of Finding Extraterrestrial Laser Signals" (Monte Ross), and "Propulsion Requirements for a Quantum Interstellar Ramjet" (H. D. Froning, Jr). Others were new to me like E. J. Coffey's "The Nature of Living Organisms", and "The Improbability of Intelligent Extraterrestrials" (A. Bond) which have given me much food for thought. This was the first such conference of the BIS I have been able to attend, and I would like to thank all those who had a part in making it possible.

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## Mysteries of Soyuz 1

Sir, I have just recently had the pleasure of reading James Oberg's excellent article on the tragic and mysterious flight of Soyuz 1 [1]. Therein, Mr. Oberg concluded that Soyuz 1 was to have been part of a mission profile like that of the Soyuz 4 and 5 docking and crew transfer via EVA. With this, I would like to take issue.

I favour a position presented by Mr. Oberg in an earlier article [2]. At that time he characterized the Soyuz 1 flight as a manned qualification test of the spacecraft. A successful Soyuz 1 mission would have cleared the way for the flight of a Soyuz 4/5 profile. I believe this to be a more likely chain of events for the reasons outlined below.

The Soviets have consistently preceded manned flights of new hardware or mission profiles with unmanned flight tests. Prior to Soyuz 1, two unmanned Soyuz (as opposed to Zond) configuration flights were launched [3]. Cosmos 133, 28 November 1966, and Cosmos 140, 7 February 1967, each spent two