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Report on IKI RAN

To whom it may concern.

I am very pleased and honored to be offered the opportunity to report on IKI, which is one of the great space research institutes in the world. Its leaders must be commended for undertaking such a review, involving some of the scientists who know the Institute well and have enjoyed cooperating with its scientists and technicians.

I know IKI since the very beginning of its existence and more actively, as a French Scientist, when I was the Director of the Laboratoire de Physique Stellaire et of CNRS Planétaire (now renamed IAS) between 1969 and 1983, and then as Director of the Scientific Program of the European Space Agency, ESA, between 1983 and 2001. In the course of all these years, I have also met regularly with its scientists and leaders in the framework of COSPAR and at the International Space Science Institute of which I am presently the Executive Director.

IKI RAN has always fascinated me for the extraordinary talents of its scientists and engineers in proposing extremely original and ambitious missions in nearly all domains of space science: astrophysics, plasma physics and Solar System/planetary exploration. Another very important characteristic of this great institute has been -and still is- the generous policy inspired by all its successive directors of implementing -and opening- its programs through -and to- a broad international cooperation, with no exclusion. Most impressive has been indeed the venture initiated by IKI at the occasion of the return of Comet Halley to perihelion back in 1986, which involved all the main space faring nations of the world: the United States, Europe through the European Space Agency, and Japan. IKI was at the center of that memorable and unique venture with its two Vega probes used as pathfinders for the European Giotto mission. Thanks to the relentless efforts of IKI, that cooperation was extended to other domains of science in particular in the area of Solar-Terrestrial relations, which involved the same partners and their respective missions: Interbal, Cluster, Geotail, Wind, SOHO and several others.

Nearly 50 years after its creation back in 1965, IKI is faithful to its reputation and to its original ambition of "being the leading space research institute of the Russian Academy of Sciences for outer space studies". IKI is indeed a pole of excellence in all domains of space research.

In space astronomy, it has among its members the most famous theoreticians and instrumentalists in the world. Their talents are exploited worldwide and they participate in nearly all first class missions of NASA, ESA and Japan. Very important has been their role in the gamma ray INTEGRAL mission and the rich harvest this cooperative Russia and ESA project has accumulated. Noteworthy are the results obtained on Supernovae and positron

annihilation, as well as those coming out of the most sensitive X ray survey of the sky using very clever new methods of data analysis. IKI was the original inspirer of the Radio-Astron mission, now called Spectrum-R, and exploited for both radio astronomy purposes and for the study of the solar wind with the highest time resolution ever achieved, with new features of the wind structure discovered thanks to the high apogee of the mission.

It would be very difficult for me to enter into all the details of the IKI achievements in plasma physics thanks to IKI participation to the CLUSTER and IACG missions already mentioned. Let me just say in a few words that IKI is one of the main contributors to our understanding of the magnetospheric structure and to the study of the ionosphere. The rich past of IKI scientists in fusion research offers them a unique ability to compare our natural magnetic shield to the structures and conceptual designs of fusion reactors. This is unique in a single institute!

Last but certainly not least in this short overview of the most striking achievements of IKI is its involvement in planetary and Solar System exploration. Everyone in the space science community will remember the historic exploration of Venus upper atmosphere with stratospheric balloons. This research is now extended through the contribution of IKI scientists to the exploitation of results from ESA Venus Express mission. Not less significant is the participation of IKI to the ESA-led Bepi Colombo mission to Mercury. Also full of high-level expectation are the foreseen cooperative endeavors of IKI with ESA on their future Mars program.

As far as the exploration of Mars is concerned, I have always been very much impressed by the very clever concept of the IKI missions to Phobos. Unfortunately, neither of the two Phobos missions launched in the late 1980s and the more recent Phobos-Grunt mission, not forgetting in this list the Mars 96 one, have been crowned with the expected success. This is probably not just bad luck but what I would consider as the consequence of the lack of a high level management expertise –which IKI had in the past- and has been lost. This is one of the most important advise I would like to convey to the readers of this report, as I consider that the excellence of the scientific research and expertise of the Institute should not be sacrificed by a lack of attention given to this essential and critical aspect of space research. I urge the Russian Space Agency and the Academy to pay a lot of attention to this problem which, if not corrected, may affect not only the reputation of IKI itself but also of the space capability of Russia to maintain an ambitious space program without deceiving all its partners. This is even more urgent that, if I understand well, there exists a plan to launch another more simple and more reliable mission to Phobos in the medium-term future around 2020.



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