Future IR/Submm Space Missions and Instruments

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Since the sixties, IR Astronomers have continuously aimed to position their telescopes at higher altitudes in order to reduce the influence of the earth atmosphere. Observatories and equipment were developed and constructed for high-altitude sites and aircraft and balloon-borne platforms. In particular the Kuiper Air-borne Observatory (KAO) played an important role in the development of IR instrumentation and IR astronomy. It was the AFGL Rocket Sky Survey that revealed the treasures of the IR sky. A 16.5 cm helium-cooled telescope, mounted on a sounding rocket, was carried into space for a 3-minute observation. In nine flights the spinning telescope covered about 90% of the sky at 11 and 20 μm, 70% at 4 μm and 50% at 27 μm. The tremendous success of the first IR satellite mission, IRAS, encouraged the planning of other IR satellites, in particular observatory-style missions (IRTS, ISO, SIRTF, ASTRO-F, etc.). To date six IR/Submm missions have been successfully completed, and one (SWAS) is still in operation. The success of these missions, and in particular of ISO spectroscopy, has put the IR/Submm wavelength region right in the focus of modern astronomy. Consequently, another half dozen missions are now under construction or being considered and studied. In this presentation I will give a short summary of the past IR space missions, describe the evolution of their capabilities and give references to their main scientific results. Then I will address the future missions, their potentials and objectives. I will conclude with a forward look on IR/Submm satellite astronomy for the next 25 years.