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Photography of Solar Corona Using Indian Air Force Aeroplane

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Abstract

The teams of the Indian Air Force participated actively in the programme. They made several supersonic flights to follow shadow zone of the moon on earth along the path of totality, thereby extending the duration of totality. Another aircraft AN32 was dedicated to acquire airborne images of the sun through filters attached to photographic cameras. The preliminary look at the coronal photographs obtained from AN-32 aircraft using video camera indicates that one can record the solar corona upto large distances from the sun from aeroplane in comparison with observations from the ground levels using similar cameras with same f-ratios.

Key Words : Solar corona, Supersonic aircraft, AN32 IAF plane, Video recording

Summary

An expedition to photograph the solar corona during the total solar eclipse of October 24, 1995 from an aircraft was conceived. The salient feature behind this expedition was that incase, low level cloud formation took place on the morning of October 24, 1995, one would be able to photograph it well above the cloud layers.

On October 21, 1995, Cowsik visited Agra and held extensive technical discussions with the pilots and other senior officers and also undertook inspection of AN-32 aircraft and the IL-76 aircraft, which were offered to us by the IAF (see photographs). After taking into consideration the pros and cons of the expedition, it was decided to choose AN-32 aircraft for flying the team. After selecting the aircraft the big question that was lingering in the minds of the team was where to photograph the sun from. The idea of sitting at the tip of the opened rear ramp to photograph the sequence of eclipse was given up as that place happened to be an air suction point. Also taking the pictures through the double walled curved windows would be unwise as it would present multiple internal reflections. After detailed study of the interior of the aircraft, a suggestion was made by the IAF personnel that one may try using the crew escape hatch which is located on the roof of the cockpit. After familiarising with the aircraft stationed on the ground, a trial flight was undertaken on October 22, 1995.

Accompanied by the IAF personnel, the team flew in the AN-32 aircraft with the rear ramp and the crew escape hatch fully opened. A few mock attempts were made to photograph the sun by physically putting the head, hands and the camera out of the aircraft through the escape hatch. This process was nothing but a superlative stunt!! The plane kept an altitude of 10,000 ft above the sea level. After the trial flight it was decided that the aircraft would fly towards west upto Nim-ka-thana, take a round about turn and fly towards Lucknow keeping track of the totality path on the day of the eclipse. Another trial run on October 23, 1995 gave enough input and courage to prepare to photograph the sequence of eclipse on October 24, 1995.

At Agra air-base, it was a cool and very clear morning on the October 24, 1995. The team was picked up at 0545 hrs in the morning and taken to the technical area where the pilots and other flying staff had briefings. While Krishnakumar and Banerjee had still photo cameras, Ramani carried a Sony Video Camera to cover the full sequence. Each one occupied a vantage point inside the AN-32 aircraft and the plane took off around 0645 hours from Agra.

Flying westward it reached Nim-ka-thana and took a round about turn to fly eastward. Keeping an altitude of about 10,000 ft, the aircraft which was earlier pressurised, was de-pressurised and the rear ramp was fully opened so was also the crew escape hatch. Climbing onto a folding stool in the cockpit, each one of the team member put his head, hand and camera out of the air-craft through the hole - braving the air blast and took pictures. Five minutes before the totality started there was a sort of cooling effect and the air became turbulent. Still photography became difficult due to cooling effect around totality and the air currents. The air turbulence experienced around totality was absent after 5 minutes of the totality. In the video photographs of solar corona it was noticed that the poles were rather elongated. The whole sequence of the total solar eclipse was captured in its eternal beauty with the video camera from the start to the end. The totality lasted for 51 seconds.

The pilots were spell bound watching for the first time in their lives a total solar eclipse, flying the aircraft. It was for the first time that the rear ramp and crew escape hatch were opened.

IAF LENDS A HELPING HAND FOR THE TOTAL SOLAR ECLIPSE