

# **A computational modeling for image motion velocity on focal plane of aerial & aerospace frame camera**

A. ZHANG Xun (1,2,3), B. JIN Guang (1), C. LI Zheyu (1,2,3)

(1) Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Sciences, Changchun, China, (2) Graduate School of Sciences Academy of China, Beijing, China, (3) Aviation University of Airforce , Changchun , China (zx\_cc@126.com / Phone:+86 0431-6176162)

**Abstract:** As the resolving power and geometric accuracy of aerial & aerospace imaging is demanded to be higher, the researches in technology of IMC become very important. In order to compensate the image motion on focal plane, the rule of FPIMV (Focal Plane Image Motion Velocity) should be grasped while the posture of aircraft and the modes of imaging are under changing. In this paper, a reasonable computational modeling scheme to the problem is introduced. Coordinates transformation method is utilized for calculation of forward FPIMV under different condition of vertical and sloped imaging, meanwhile, integrated with three axes posture and angle velocity of aircraft. Forward FPIMV combine with pitch, roll and yaw FPIMV is considered simultaneously and the derivation calculating expressions of frame camera FPIMV under different conditions is presented in detail. The solution is applied to computational simulation and has been confirmed to be effective based on the calculation result and it lays the foundation for our farther researches on frame camera IMC technology.

**Key words:** IMC, FPIMV (Focal Plane Image Motion Velocity), Coordinates transformation method