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**Vortex dynamics and flapping patterns of the inverted flag with a bluff body** HYEONSEONG KIM, JUNYOUNG KIM, DAEGYOUM KIM, KAIST — Flow-induced vibration of flexible structures for energy harvesting has drawn attention recently. The inverted flag whose trailing edge is clamped and leading edge is free to move was known to self-excite in a uniform flow of both water and air. In this study, we investigated the effect of an upstream bluff body, a flat plate, on the dynamics of the downstream inverted flag. Periodic vortical structures created by an upstream bluff body make the dynamics of the inverted flag quite different from those of the inverted flag without the bluff body. We examined the motion of the inverted flag by varying the relative displacement of the inverted flag from the bluff body and their relative size. Our results show that the inverted flag can flap with higher frequency and larger amplitude with the upstream bluff body. We also compared the dynamics of the inverted flag with those of the general flag with the upstream bluff body. In order to better understand the dynamics of the flag, the analysis of the flow patterns using particle image velocimetry was also conducted.

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