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## **Real-time monitoring of the response of fish to changing flow levels and ice formation in rivers using PIT and PIV technologies**

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### **Abstract :**

The determination of the response of fish to changing habitat conditions is currently hampered by the lack of appropriate monitoring tools. In this poster, we describe a new system which uses a network of 256 PIT (passive integrated transponder) antennas embedded in the substrate of a river to provide real-time monitoring of the movement of PIT-tagged fish within the study section. The system was installed in fall 2006 on the Xavier brook, a tributary of the Sainte-Marguerite River (Saguenay, Canada). A synoptic description of flow velocities within the section is obtained using our PIV (particle image velocimetry) application which determines the spatial distribution of surface flow velocities from oblique digital video images of the water surface. Various field applications are possible including the monitoring of changes in surface flow velocities during floods and ice cover formation. The PIV algorithm is also very effective for tracking the movement of river ice at the water surface. Future projects involve combining PIT and PIV technology to monitor fish movements in response to rapidly changing habitat conditions. These technologies have the potential to provide fundamental information on fish movements at high flows and during ice cover formation. It allows continuous monitoring of physical conditions and biological responses before, during and after meteorological events. Understanding the link between fish movements and the dynamic of their habitat is imperative in a context of habitat modelling, river restoration and assessing impacts of anthropogenic modifications and potential effects of climate change.