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In 2014, research by BI Intelligence indicated six major industries would be the first of many to be transformed by emerging drone technology [i.e., unmanned aerial vehicle (UAV) or unmanned aircraft system (UAS)]. At the top of this list was Security and Monitoring. Indeed, during the past few years the use of drone technology for the inspection and monitoring of dams and levees has increased rapidly. This rate of integration is, in part, due to the August 2016 revisions of FAA regulations. Nevertheless, perhaps the most significant explanations for the increasing usage of drones for inspection, monitoring, and evaluation of dams and levees are personnel safety, flexibility, speed and volume of data acquisition, and cost.

This paper discusses how drone technology is well suited to dam and levee safety applications, why it should be pursued, and how it can provide a new way to approach and perform dam safety inspections. The paper also presents a selection of recent site inspections where photostitching and aerial imagery were used to capture surfaces and generate 3D models, pictures, and point clouds of gated spillways, embankment dams, hydraulic structures, rock slopes, and sinkholes. We also include a direct comparison between LiDAR recently flown by helicopter to terrain data collected by a drone. It also discusses how drones, through remote observation, allow an inspection team to more safely and efficiently observe areas that are not accessible or require difficult access. Long-term monitoring of structures can become more dynamic through periodic flights to update terrain and surface information and help track changes.

Although drones are a cost-effective and efficient contribution to inspections, there are challenges with data acquisition—things to know before you fly. These include accuracy requirements, flight strategies and site conditions, shadowing, and handling and processing large amounts of geospatial data. This paper presents insights into these challenges to encourage the appropriate use and application of this emerging technology.