

Advances in deep water sampling with an unmanned aerial vehicle water sampler

Abstract:

Unmanned Aerial Systems (UAS), commonly known as drones, provide an innovative approach to sample the water column in a lake setting. An unmanned aerial vehicle (UAV) water sampler has been developed and used to sample pit lakes in Nevada as well as Dillon Reservoir in Summit County, Colorado. The UAV water sampler consists of a hexacopter that can be equipped with a conductivity, temperature, and depth (CTD) probe or a 1.2L Niskin water sampler. The development of this low-cost UAV water sampler has created wide-spread opportunities for environmental monitoring in high risk environments. Pit lakes have substantial health and safety risks for human water samplers including work on water, falls from heights, exposure to hazardous chemicals and media, and work below unstable walls. Collectively, this innovation will help mining companies: (1) minimize health and safety risks associated with water sampling, (2) improve pit lake management by more frequent data acquisition, and (3) reduce overall monitoring costs. Outside the mining sector, this technology may also prove useful in a wide variety of environments, such as open storage tanks, evaporation ponds, municipal reservoirs, off shore oil spills, and disaster areas.