

# , Modular Gas Sampler/Analysers for On-Site Inspections

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A gas sampler system has been designed, built, and deployed that may contribute to the near-field detection of underground nuclear explosions. The system is inexpensive, portable, and autonomously collects samples for subsequent lab analysis. Collection duration and interval parameters can be adjusted using Wi-Fi or other communications network based on the intended collection site. Radioactive gas samples can be analysed in- or near-field with 2''x4''x16'' NaI(Tl) detectors, or analysed off-site with a xenon separation and analysis system. To facilitate near-field analysis and improve detection limits for radionuclides, samples are filtered through charcoal traps which are then counted on a NaI(Tl) detector. The minimum detectable activity for  $^{127}\text{Xe}$  and  $^{133}\text{m}$ ,  $^{133}\text{Xe}$  in charcoal traps is 4.5 Bq, resulting in a minimum detectable concentration of 150 Bq/m<sup>3</sup>. Future iterations of the gas sampler will contain one sample bottle that autonomously filters samples through charcoal traps for real-time measurements. This design provides the possibility for the gas samplers to aid in radionuclide measurements in an on-site inspection. Deployment of these samplers is modeled in a companion presentation titled "Modeling the use of mobile modular gas samplers in near-field detection using HYSPLIT".

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## Promotional text

A team of students at The University of Texas at Austin has designed, tested, and deployed inexpensive, portable gas samplers with autonomous sampling capabilities to offer an increased geographic and temporal resolution during on-site inspections.

## Oral preference format

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