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### Introduction

Radioactive noble gas monitoring contributes significantly to underground nuclear explosion monitoring because noble gases are more mobile through soil and rock. The Wireless Independent Noble Gas Samplers (WINGS) are inexpensive, autonomous, portable sampling systems that allow for multiple units to be placed in-field for improved temporal and spatial resolution of noble gas tracking.



### Physical components:

- 14 3.4 Liter Sample Tanks
- 14 Electric Ball Valves
- Vent Solenoid
- 12V Battery
- Air Compressor
- Air Line with Quick Connects
- Electrical Control Box
- Storage Crate

### Focuses:

- Automation
- Wireless Control
- Low Idle Power Consumption



# Wireless Independent Noble Gas Sampler: Software Overview

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	My organization - 7302PC         ← Back         Search         5 Devices         \$ Sampler 3vd00         \$ Sampler 4vd00         \$ Sampler 2vd00	X I Samplerv1dOO offine •• A UT My organization - 7302PC Add Tag Dashboard Timeline Device Info Metadata Action Latest Last Hour 6 Hours 1 Day 1 Week Global Status NO ERROR Log Output	ons Log Datastreams 1 Month 3 Months Custom Manual Mode	Primary Contro All Stop Auto Enable
	Sampler5vd00	PUMP_CLOSED_EVENT : Component: PUMP Index: 0 Pressure Sensor O psi -10 275	Manual ControlsPressure Sensor ReadingPumpOutflow SolenoidTank SelectorTank SolenoidFansScroll down for more	Purge All Tank Operation Operation State Tank Selector Run Operation Use Time Based Operation Is Fill Setpoint Pressed
		Tank Settings And Status         Tank Selector         Tank Pressure         Tank Status         Tank Solenoid         Tank Enable Autofill         Tank Setpoint Pressure         Tank Fill Time s	-       0       +       Current Error         0       Error Select         TANK EMPTY       Error Acknowledge         0       Reset Error System         -       0         -       0	- O + Auto Enable - O + Scheduled Runtime - Day Hour Minute
ත ල ම		Reset Tank Statuses Debug 178	Diagnostic System Diagnostic Status Run Diagnostic Run Self_Diagnostic	- Purge All Purge Enabled Purge Cycle Co

The Blynk interface provides an intuitive and easy to use control panel that provides feedback data from the sampler as well.



Wiring diagram depicting all electrical components within the control box.



# Conclusion



#### **Future Improvements:**

- More robust error handling
- Continued operations with loss of connection
- More user-friendly interface
- Battery voltage display
- Operate on UTC for time zones
- Improved preliminary testing

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