

# BAS Operational Effectiveness (BAS-OE) - VNO Experiment #1

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## Problem

A large amount of building operator work now revolves around controlling and monitoring through the BAS, but there are issues:

- No industry protocols or established best practices exist for BAS use
- Each operating team develops their own way of using the BAS
- Different approaches for viewing system status and interpreting conditions

## Objectives of the Current Experiment – VNO #1

- Understand range of building operators' practices with their BAS
- Identify where added information may help operations (for energy efficiency)
- Develop data extraction and visualization to facilitate operator use
- Evaluate impacts of informational tools on operator use of BAS and building performance management

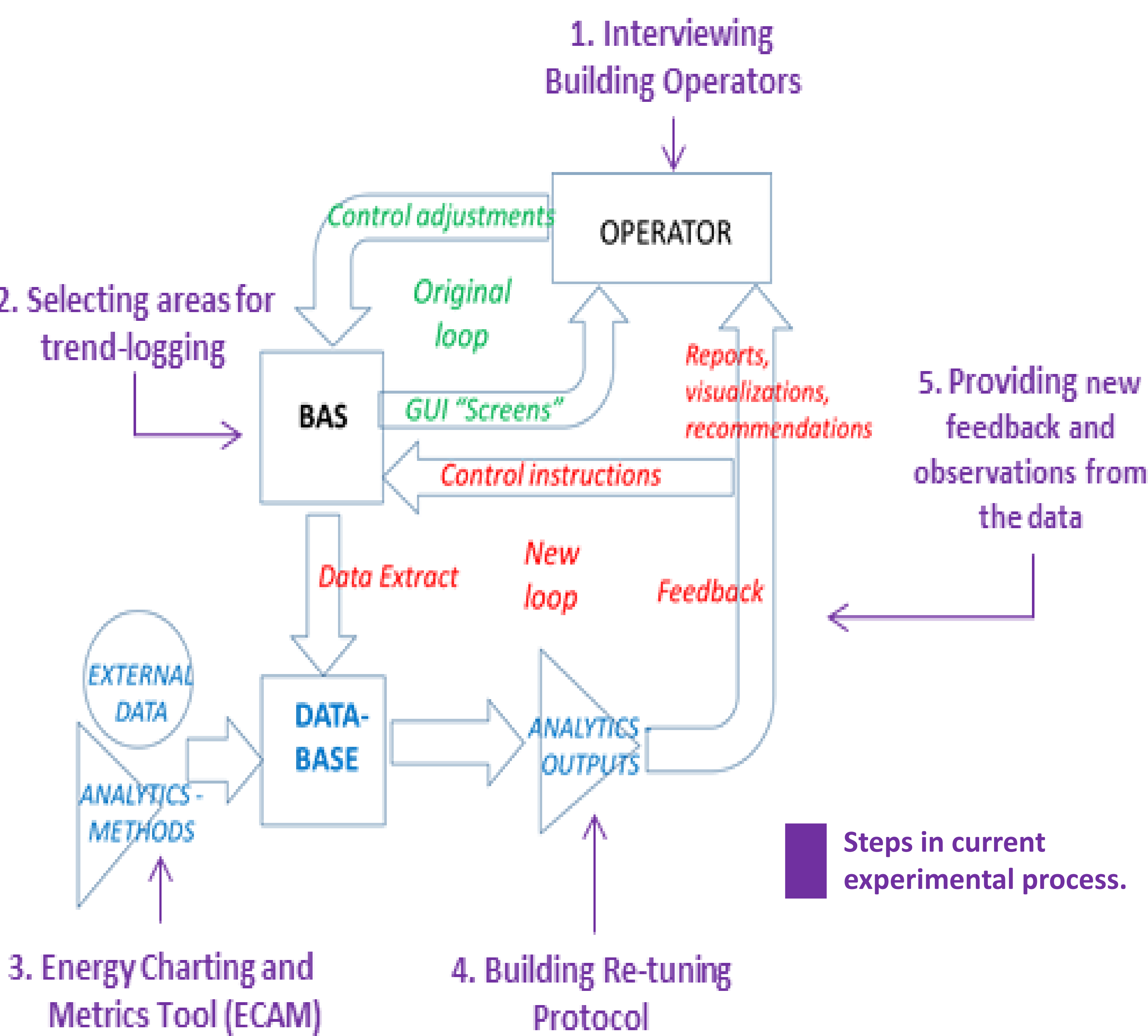


Figure 1: Building Performance Lab conceptual flow diagram, with overlay of VNO Experiment #1 steps

## Procedures – See Steps in Figure 1

- Conduct Initial BAS Practices Survey
- Develop hypothesis based on building survey
- Design fieldwork plan and site interview questions
- Create BAS operation findings based on site visit
- Set up trend-log for BRT measures
- Feedback information to operators
- Evaluate

## Hypotheses, Drawn from Survey Questionnaire

- There will be no formalized, systematic approach to using “key indicators” to monitor building functions
- Limited use of trend-logs
- Information feedback can improve operational effectiveness in various functional areas (to be identified)

**VNO Building Site Interview Questions**

- Overall Building functions
- Type of BAS
- Types of Equipment
- Different types of HVAC operations based on BRT Protocol

Figure 2: Sample building interview from one of the VNO sites



## Findings from Operator Interviews/BAS Controls

- Limited tracking of outside air control (minimum, economizer, pre-occupancy start-up)
- Operators don't compute air fraction to see how much ventilation they are getting
- Operators don't look at total outside air damper closure; nor do they have the ability to track that operation
- Primitive pre-occupancy pattern only for heating (one-hour delay) and not for cooling
- Not very much air control on the dampers from start-up
- Minimum outside air is set at 10%, and can't be monitored
- Economizer mode is not tracked in any systematic way

## Conclusion/Next Steps

- Some operators exert manual control over aspects of their air handler unit functions
- To optimize, we will set trend-logs for following BRT measures:
  - Minimum outside air control
  - Air-side economizer functions
  - Pre-occupancy damper closure
- We then will track and analyze the trended BRT measures and provide feedback to the operators
- We are presently setting up the trend-logs and visualizations for this phase of the experiment; we plan to be supplying feedback to the operators in June 2014.