

# BAS Operational Effectiveness

Extraction – Process – Feedback Extraction – Process – Feedback

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# What do we mean by “*Operational Effectiveness*”

- BAS contributing to its full potential to building operations
- Human operators allow, enable and enhance BAS functions

## Why this topic?

- Is this “central brain” well utilized to make our buildings smart?
  - Is the BAS optimized to do what it is capable of ?
  - Valuable repository of control routines and digitized data – accessed & used?
  - How fit into a socio-technical context of building operations?
- Literature dating back to mid-1980’s. Holy Grail? Or are we at the cusp of some new IT-informed capabilities?

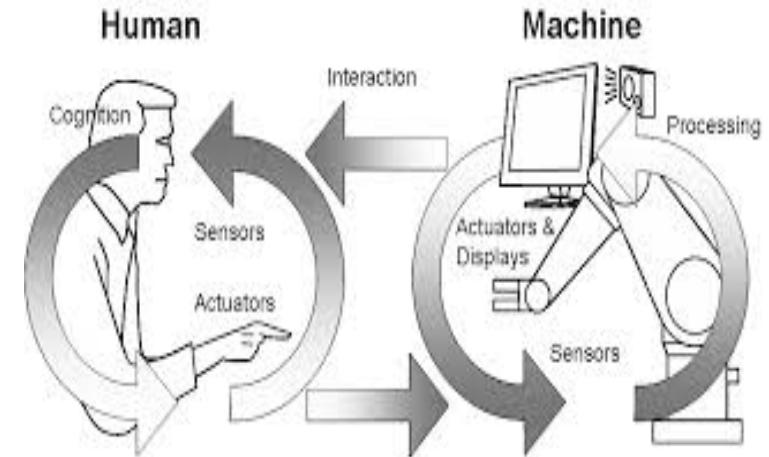
# How we got involved

- Continuing Ed Operator training – BOC, BRT – and interest in how BAS are used....or aren't.
  - BRT use of trend log data converted to visualization via ECAM. Students to support building operators in this process.
- Auto-Collect BAS data with analytics from 3<sup>rd</sup> party vendor
  - Not allowed by university.....
- Now developing system-process from ground-up. Ugh! But important learning



# Currently evolving paradigm: 2 sides (?)

- Machine side
  - Advanced control routines, often using external data
  - Data extraction and databases, internal or external
- Human side
  - Operators remain in control of key system functions
  - Does the operator know what the machine intends?
  - Can the operator work with data?
- Concept of CONJOINT SYSTEMS
  - Computer scientist Donald Norman

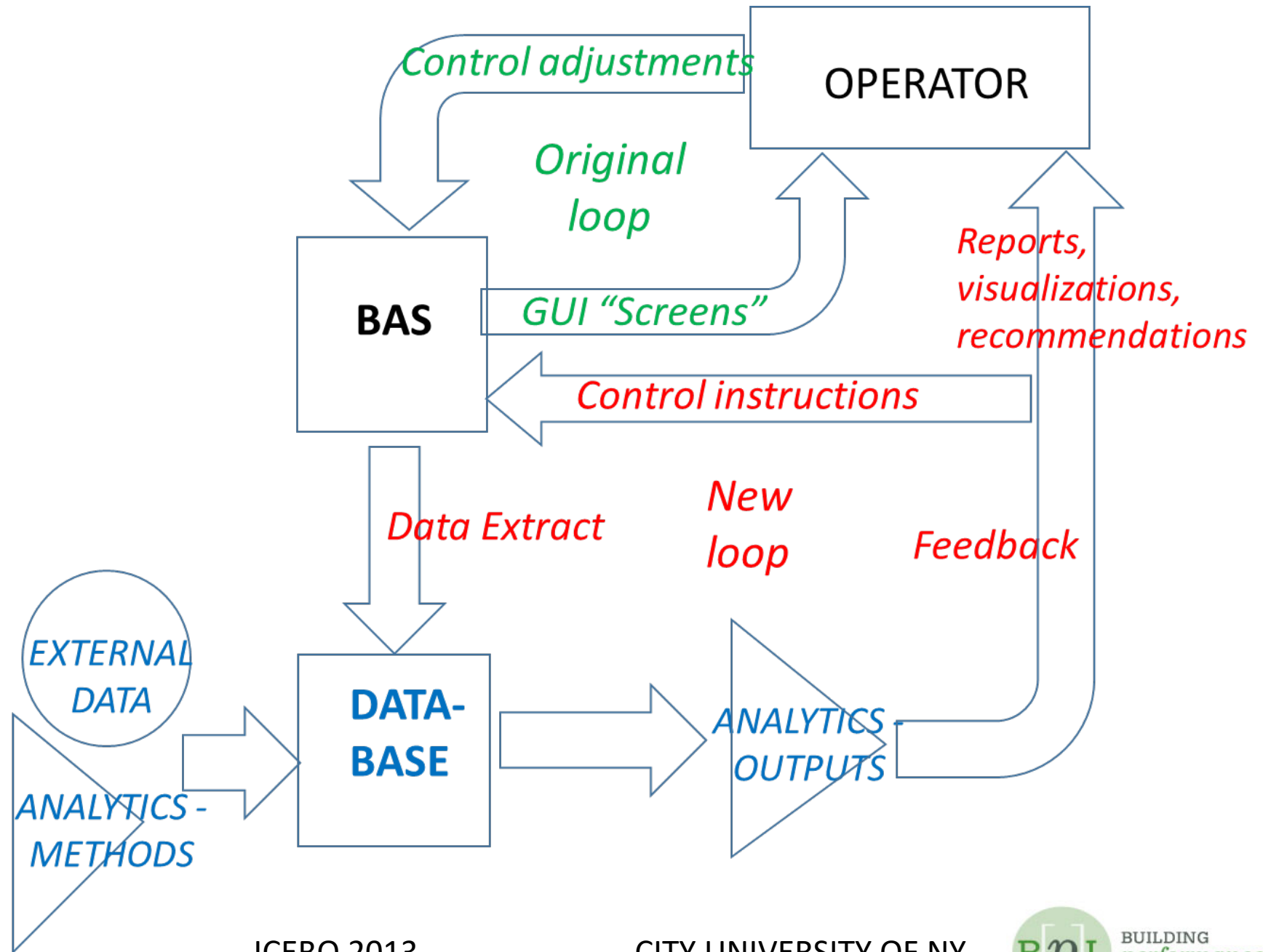


# Paradigm

**Extract –  
Process –  
Feedback**

Start-up Furor

- SkyFoundry
- Building IQ
- Optimum Energy
- KGS Clockworks
- JCI PanOptics



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# Operational Issues on the Machine Side

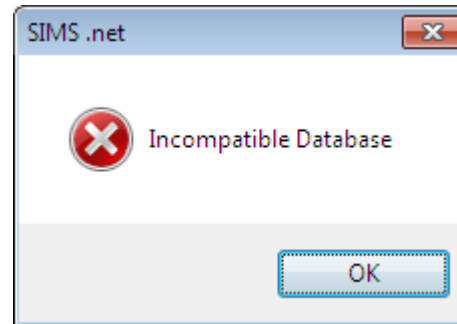
## Persistent Old Issues

- Legacy systems
  - Inter-operability
  - Data capabilities
  - Up-grade/replace decision
- Assessment
- Sensor calibration



## Emergent New Issues

- Cyber-security
- How to “suck out the data”
- **Database Feudalism**
  - proliferation without shared standard
  - Re-creating the inter-operability situation
- More complex “optimizing” control routines – ***challenges for the human operators***



# Issues on the Human Side

- Limited understanding of how operators use BAS
  - Heuristics. Hesitations with major equipment. Inconsistencies.
  - Anecdotal data about manual over-rides
- Adapt to data-driven environment, new control actions
  - Operator-sensible framework. BRT?
  - Training in use of data – reading graphics, understanding advanced control strategies-modes-actions
  - Acceptance of supervisory control role with automated routines.
- What to pay attention to?
  - Avoiding TMI – guiding focus
  - KPI for Continuous Improvement process



# Conclusion

- Brave New World of Building Big Data, much of which will be streaming from BAS. Our new paradigm.
- Furor & competition over “new apps” but industry is not taking adequate steps to assure common platform for data-sharing
- If what the building is doing does not make sense to the Operator, s/he will by-pass it. So need to make it transparent to an educated operator.



# Acknowledgements & Contact

- BRT colleagues at the Pacific Northwest National Lab
- CUNY facility engineers
- CUNY academic programs, especially at CCNY, and students
- Funders - NYSERDA, NIST/DOE, JCI, NYC DCAS

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