

BAS Operational Effectiveness

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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 3rd party vendor
 - Not allowed by university.....
- Now developing system-process from ground-up. Ugh! But important learning



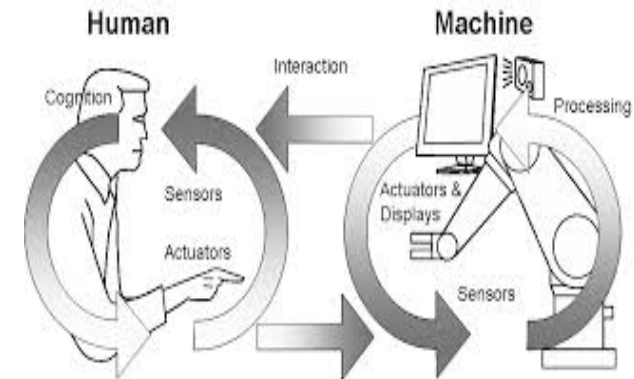
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Currently evolving paradigm: 2 sides (?)

- 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

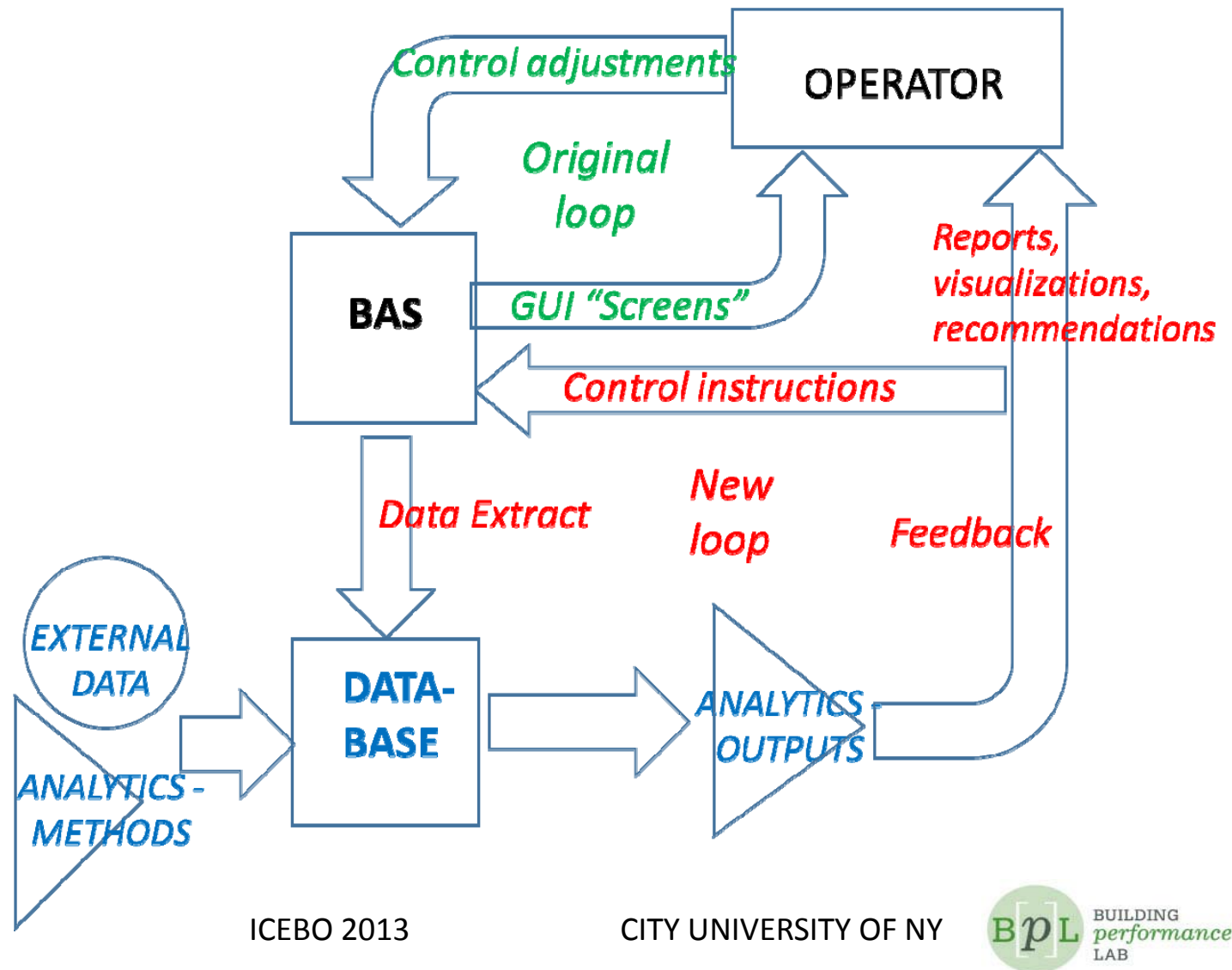


Paradigm

**Extract –
Process –
Feedback**

Start-up Furor

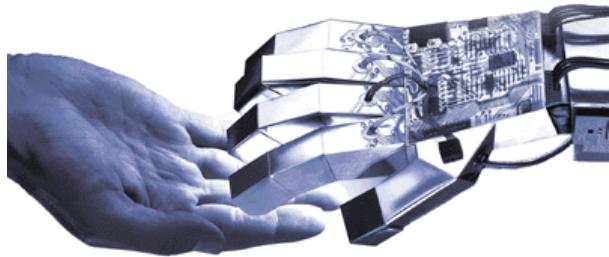
- SkyFoundry
- Building IQ
- Optimum Energy
- KGS Clockworks
- JCI PanOptics



Operational Issues on the Machine Side

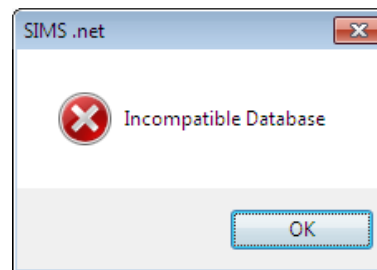
Persistent Old Issues

- 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



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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

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