



# Putting the AVL Tool into the Winter Maintenance Toolbox

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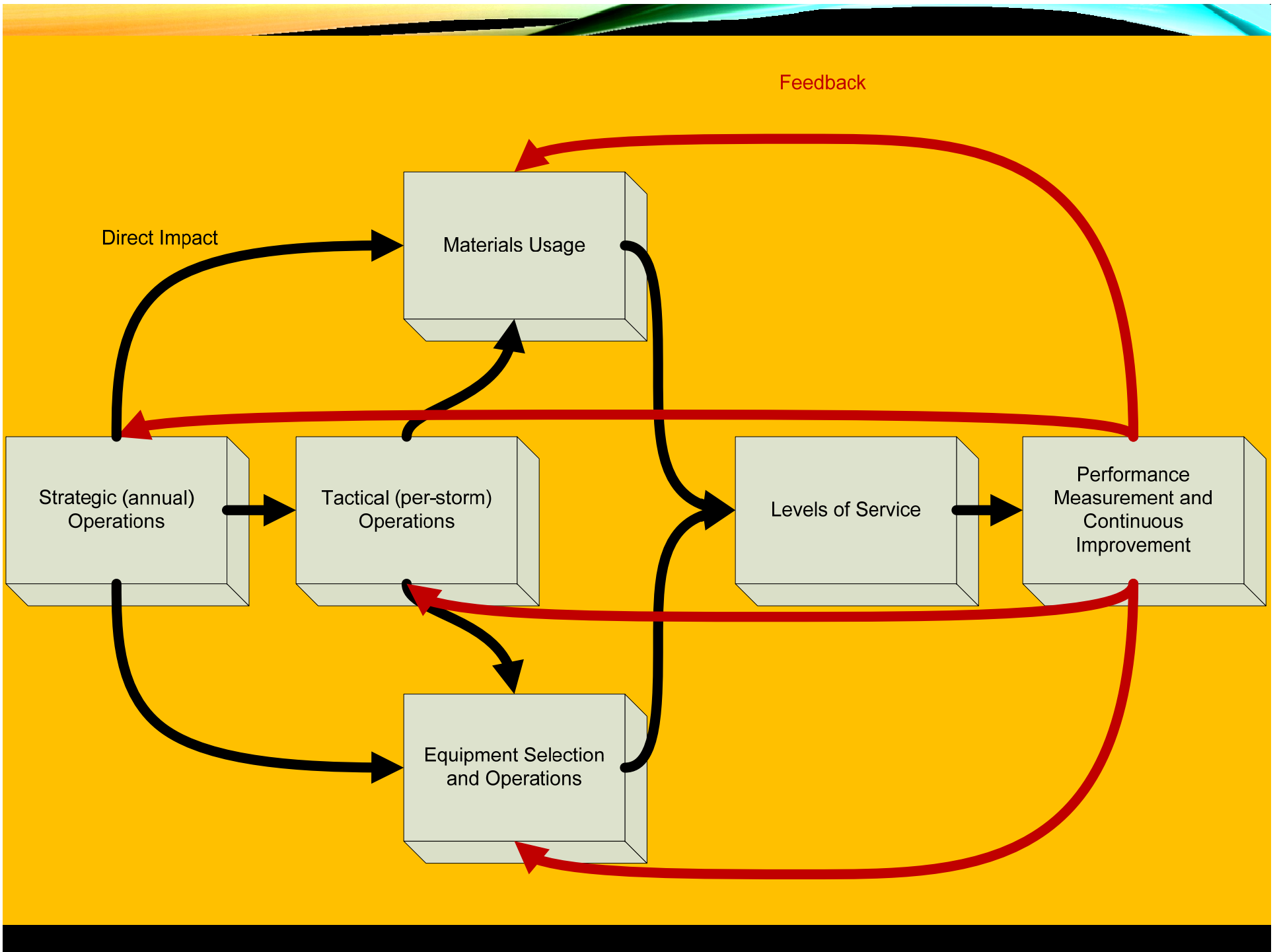
# OVERVIEW OF PRESENTATION

- Using AVL to improve operational efficiency
- Enabling change with AVL
- Initial concerns
- Limitations on thinking
- Examples both implemented and planned
- Conclusion



# COMPLEXITY

- If we want to look at winter maintenance sensibly, we need to consider it as a system
- Everything we do impacts (perhaps) everything else we do
- Which is a bit daunting!
- So, what can we do to break it down a bit and try and get a handle on it?
- When in doubt, draw a diagram!





# CONCERNS

- Obviously “big brother” was one early one, but this has dissipated as technology in general is tracking all of us
- Challenges about data are very real
  - FOIA issues (although Bitbleach works, we understand...)
  - Storage issues
  - Data management
- Involvement of the public in internal actions
  - Can we trust the public with our data?
  - Well, perhaps it is their data after all (see above)?



# LIMITATIONS ON THINKING

- GPS/AVL is a tool, but only a tool
- It can be a force multiplier, but just having AVL will not improve performance
- It CAN be part of the solution to the “if you do not measure it, you cannot manage it” issue, but...
- That implies a plan to use the new data that is collected (or the old data that is now collected more efficiently) in a new way, to effect change
- Change is hard!



# APPLYING AVL

- So can we use the diagram to consider how AVL can help us achieve our goals?
- What are our goals?
- Once we know that, we can figure out the whole process of getting to our goals more efficiently



# THE CENTER POINT

- Level of service drives all our decisions
- Or, it should!
- In short, level of service is the equivalent of the old saying: If you don't know where you are going, you will end up somewhere else!
- So, do you know where you are going?



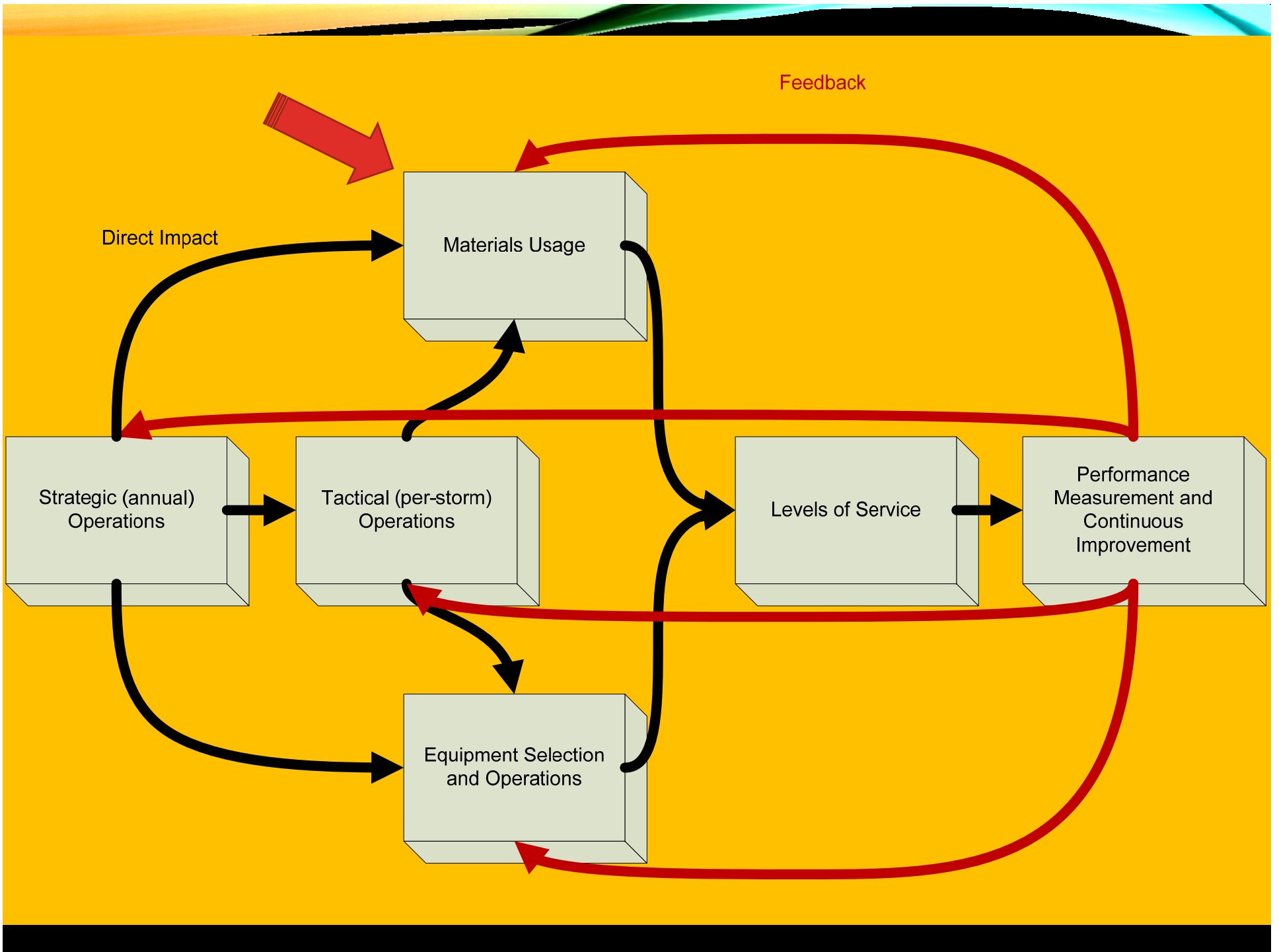
# HOW CLEAN IS CLEAN ENOUGH?





# SO WE KNOW OUR GOAL NOW

- How do we get there?
- In a timely manner (whatever timely actually means for us)
- Using an appropriate level of effort
  - Equipment
  - Manpower
  - Materials
  - Information
- How can AVL help us to get to the level of service more efficiently?



Salt

***Prewetted salt @ 12' wide lane (assume 2-hr route)***

<b><i>Surface Temperature (° Fahrenheit)</i></b>	<b><i>32-30</i></b>	<b><i>29-27</i></b>	<b><i>26-24</i></b>	<b><i>23-21</i></b>	<b><i>20-18</i></b>	<b><i>17-15</i></b>
Heavy Frost, Mist, Light Snow	50	75	95	120	140	170
lbs of salt to be applied per lane mile						
Drizzle, Medium Snow 1/2" per hour	75	100	120	145	165	200
Light Rain, Heavy Snow 1" per hour	100	140	182	250	300	350

***Prewetted salt @ 12' wide lane (assume 3-hr route)***

<b><i>Surface Temperature (° Fahrenheit)</i></b>	<b><i>32-30</i></b>	<b><i>29-27</i></b>	<b><i>26-24</i></b>	<b><i>23-21</i></b>	<b><i>20-18</i></b>	<b><i>17-15</i></b>
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Light Rain, Heavy Snow 1" per hour	150	210	275	375	450	525

# OK SO WE HAVE A CHART...

- Obviously AVL can help us measure what comes out of the truck, but...
- Let's be really clear what we are measuring
- Typically we are noting what the material spreader setting is,
  - which might or might not be what the actual application rate is
  - So clearly we still need calibration, and...
  - We need to measure application rates in a second way so we can check...

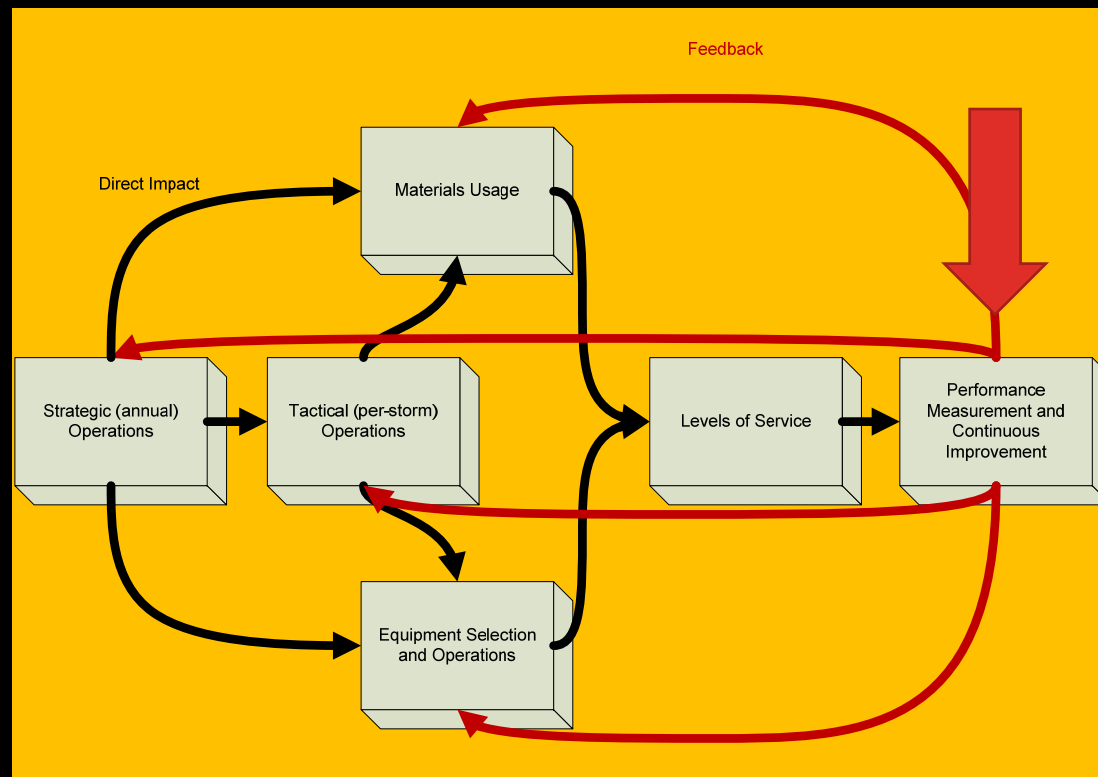


# THE SECOND WAY

- Measure what we load onto the truck, and what comes off the truck when we get done
  - Weigh out, weigh back in, account for fuel, liquid and solid usage
  - Weigh what we actually load onto the truck and what we unload at the end of a shift
  - Measure weight in the hopper in real-time during application process
- Benefits – warning if things are going out of calibration, better accuracy on application rate
- Issue – how much variation is acceptable?
- Is measuring loading by the bucket acceptable any more?

# RELATED CHALLENGE

- It does no good if differences between suggested and actual application rates are not addressed



# THE ... SHERLOCK ISSUE

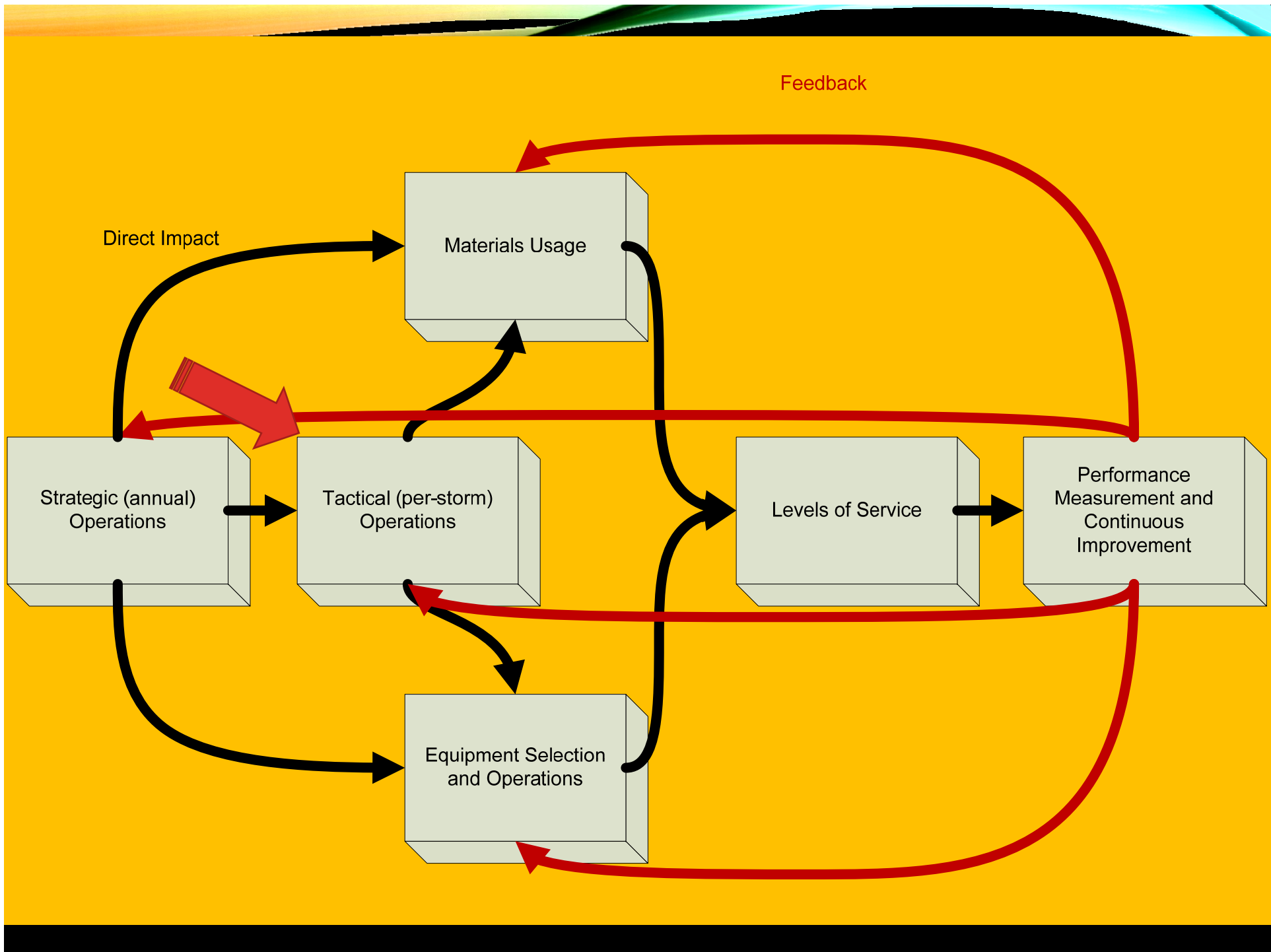
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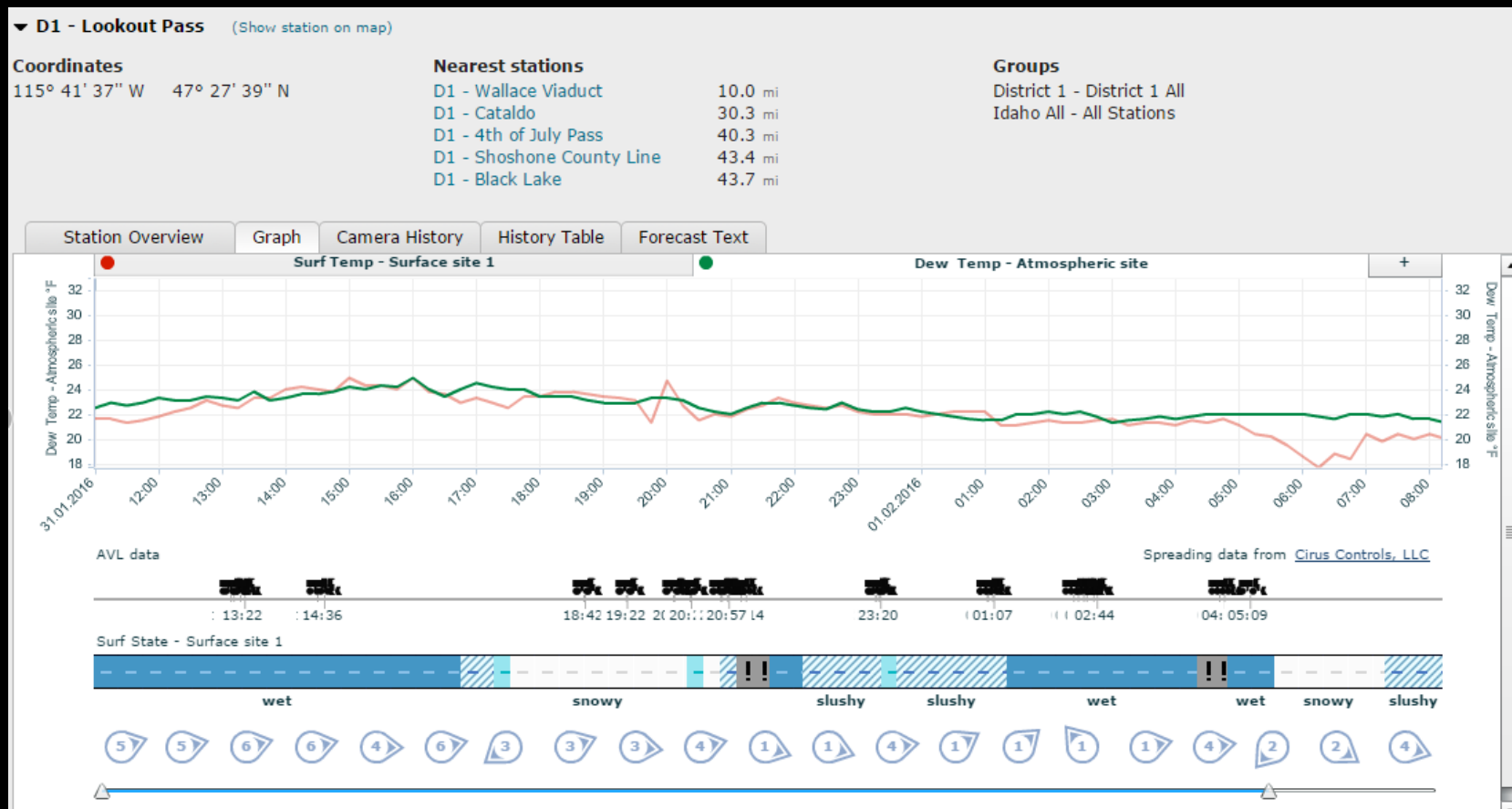


# THE QUALITY CONTROL ISSUE

- Are you ISO certified?
- Should you be?
- Do you have some other certification that is equivalent?
- Why not?



# TRACKING TRUCKS AT RWIS SITES





# THE SWAMP ISSUE

- Too much data...
- How do you make it manageable, because if you don't nobody will use it
- QC suggests simple checks and only digging deeper if a problem is found
- Create a geofenced location to do your monitoring...

▼ D1 - Lookout Pass (Show station on map)

Coordinates

115° 41' 37" W 47° 27' 39" N

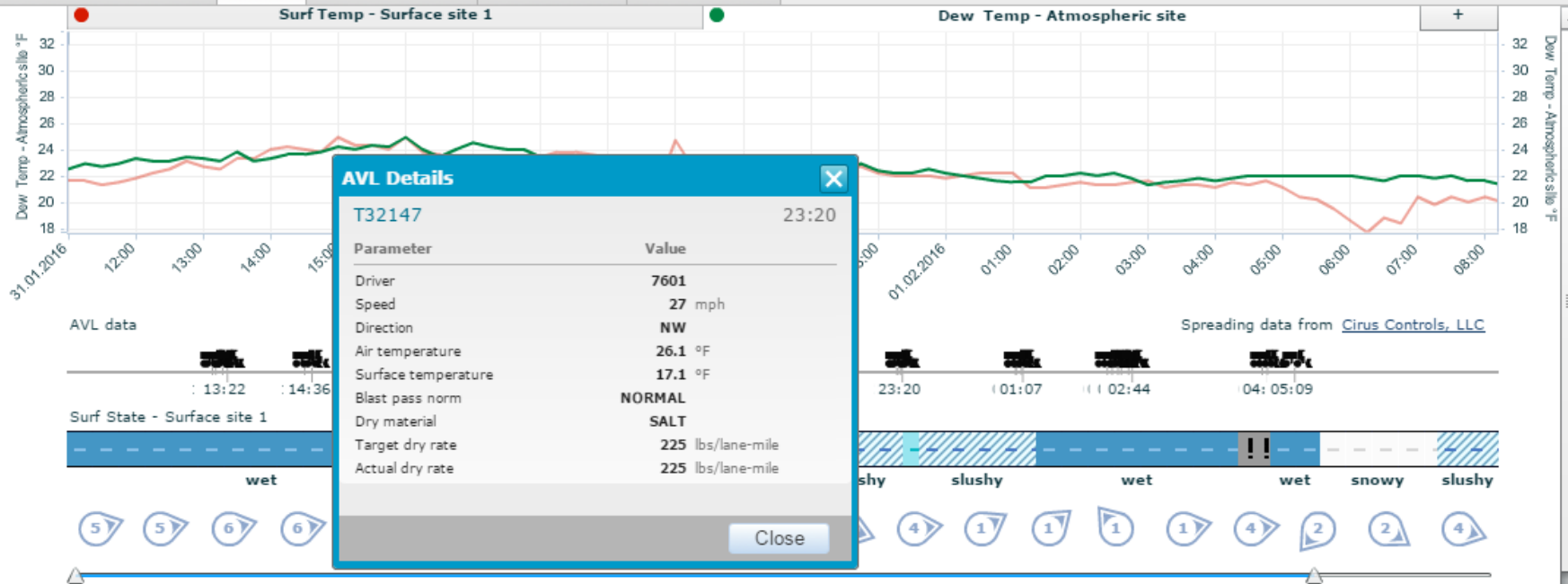
Nearest stations

D1 - Wallace Viaduct	10.0 mi
D1 - Cataldo	30.3 mi
D1 - 4th of July Pass	40.3 mi
D1 - Shoshone County Line	43.4 mi
D1 - Black Lake	43.7 mi

Groups

District 1 - District 1 All  
Idaho All - All Stations

- Station Overview
- Graph
- Camera History
- History Table
- Forecast Text



### AVL Details



T32147

20:06

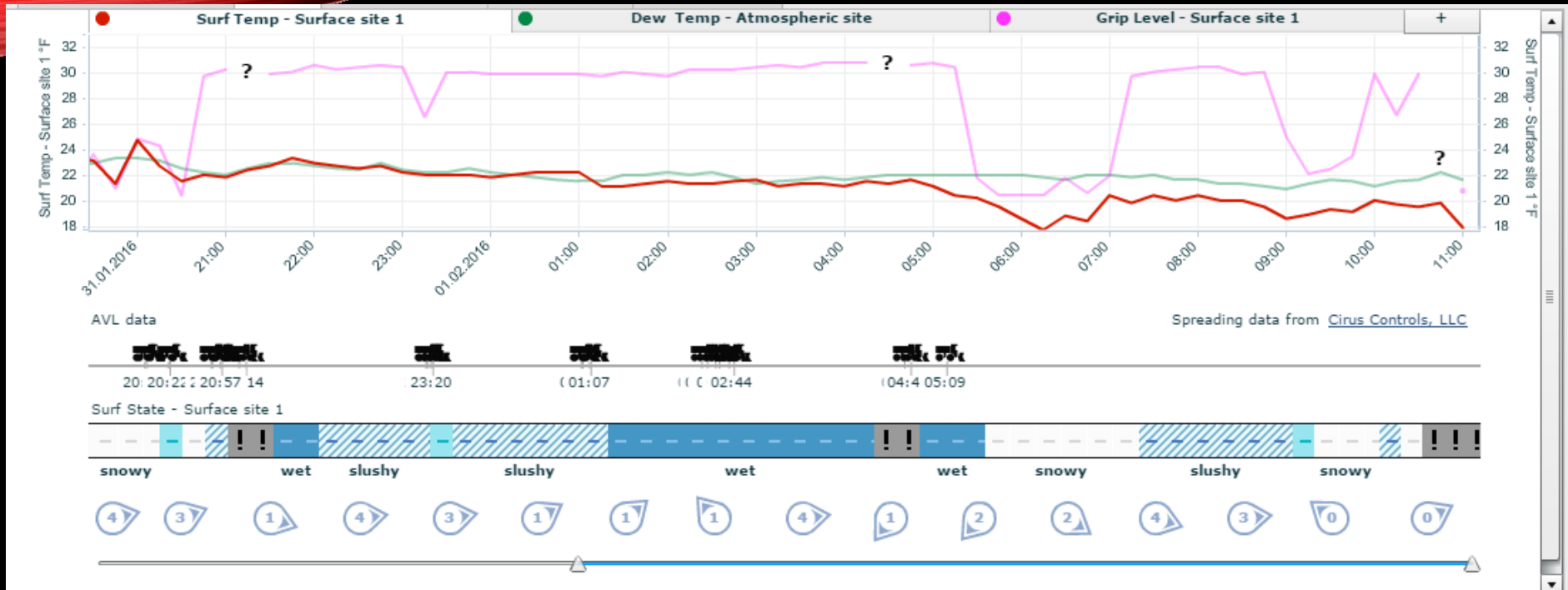
Parameter	Value
Driver	7601
Speed	20 mph
Direction	SSE
Air temperature	27.1 °F
Surface temperature	21.0 °F
Blast pass norm	<b>NORMAL</b>
Dry material	<b>SALT</b>
Target dry rate	275 lbs/lane-mile
Actual dry rate	275 lbs/lane-mile
Pre-wet material	<b>BRINE</b>
Target pre-wet rate	14 gal/lane-mile
Actual pre-wet rate	33 gal/lane-mile

Close



# THE GRIP FACTOR ISSUE

- Clearly a pertinent and extremely useful tool to measure outcome of your actions,
- BUT
- Are you creating the expectation of providing high grip throughout the storm...
- If that is your goal, that is fine, but is it really?







# CONCLUSIONS

- Not a magic wand, but rather a force multiplier
- Significant issues remain, but others have already discussed how to address these
- End goals must remain central to the use of the technology – where on the diagram will this be helping you?

“You can’t always get what you want”

Jagger and Richards, 1968

“But if you try sometimes, you just might find  
You get what you need”

# QUESTIONS?

## Contact Info

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## Useful Information

<http://www.saltinstitute.org/publication/safe-and-sustainable-snowfighting/>