

QUALITY BUILDING TEAM

QBT SESSION

*Harnessing the Power of Technology
for Building Operations*

April 6, 2016

Presenters:

Jack Hole, Partner, Haakon HVAC Services

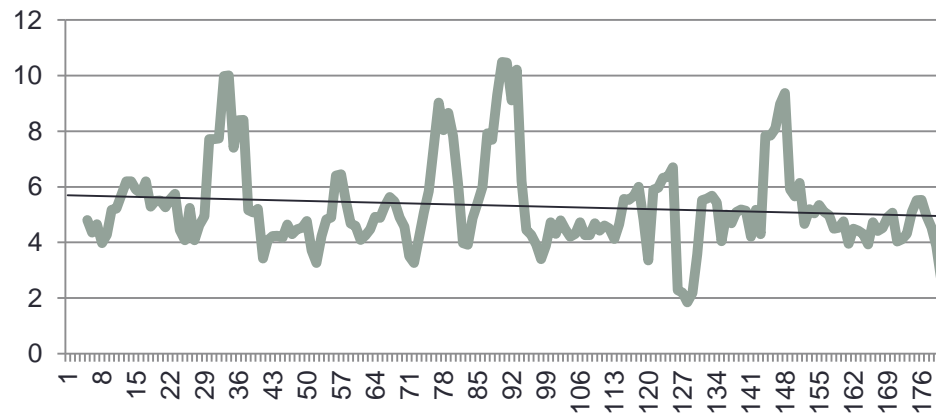
Rick Rolston, President & Founder, BuiltSpace Technologies



Lots of Talk About IT, OT & IoT

It all comes down to using information to save time and/or energy/water...

Hours Per Work Order



We are here today, to hopefully answer some of your questions!

What is the Internet of Things?



Levels

- 7 **Collaboration & Processes**
(Involving People & Business Processes)
- 6 **Application**
(Reporting, Analytics, Control)
- 5 **Data Abstraction**
(Aggregation & Access)
- 4 **Data Accumulation**
(Storage)
- 3 **Edge Computing**
(Data Element Analysis & Transformation)
- 2 **Connectivity**
(Communication & Processing Units)
- 1 **Physical Devices & Controllers**
(The "Things" in IoT)

It all comes down to using information to save time and/or energy/water...we need to measure services delivery as much as systems.

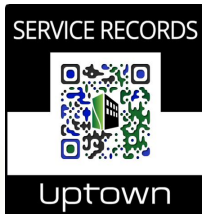
Source: IoT Reference Model (Cisco, IBM, Intel, World IoT Forum 2014)

Better Operational Processes


Across Enterprise Boundaries

Enterprise FM field solutions usually only manage enterprise workflow, leaving other stakeholders outside of core FM processes.

This creates “broken” FM processes with high administrative costs, and lost information quality.



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Vancouver Island - Service
759 B VANALMAN
VICTORIA, BC V8Z 3B8
Tel: 800-661-1626
Fax: 250-414-7520
License:

FIELD REPORT

<p>Location Name UPTOWN CENTRE 3599 DOUGLAS STREET Victoria, BC V8Z 3L6</p>	<p>Service Call 14-7038649</p>
<p>Contact/Phone -</p>	<p>Account Manager</p>
<p>Scope Description Troubleshoot CRU-16 VFD</p>	<p>Sales Follow -up Required? No</p>
<p>Scope Complete? No</p>	<p>Reason:</p>

Mod#/Ser#/Mfg/Tag#
174Z45999, 163004YJ341, Trane, CRU 16 P-2

WORK PERFORMED:
Date: 10-20-2014

Work Activity:

Quality Task Code:

Sample Taken: No

Work Performed Details:
Sourced out power supply and locked out. Disassembled VFD and replaced boards as necessary. Reassembled and programmed new boards to unit. Restarted in manual mode. unit ok. Left in automatic mode. Arranged old boards to be returned. Cru 16 P-2 serial #163004yjs41 material #174Z4599

Tasks Performed:

PARTS MATERIALS

Page 2 of 4

Quantity	Part#	Description
----------	-------	-------------

	Mobilization		Diagnostics		Work Time		Straight Time		Over Time		Premium Time	
	m	h	m	h	m	m	h	m	h	m	h	m
0	0	0	0	0	0	0	0	0	0	0	0	0

Customer PO: per Tonicha email

Technician Name : Holland, Daniel

Signature Available false

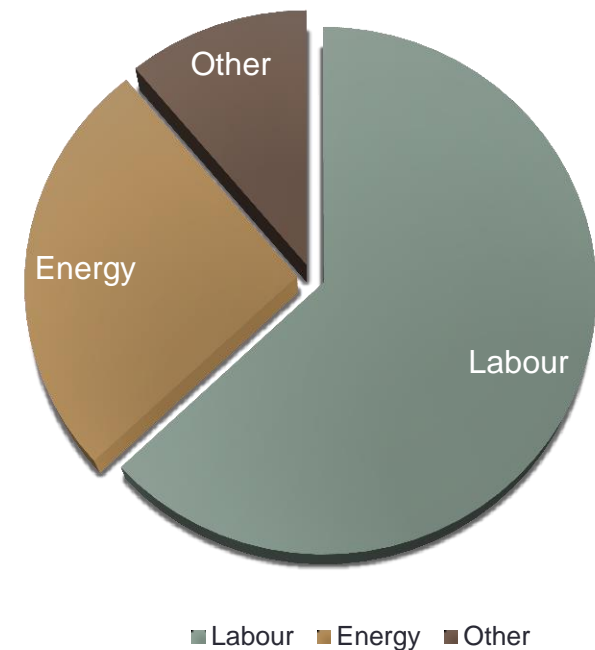
Reason: Customer Not Available

part of the terms of this document

What if We Could Measure Real-Time Operating Costs and Services Delivery?

Million Sq.Ft. Portfolio

Typical Operating Cost	\$
Labour (In-house & Contract)	\$1,200/hr
Maintenance/Repairs	\$360/hr
Energy Consumption	\$240/hr
Field Service	\$90+/hr



Can we make our buildings more efficient?

Case Study – Uptown Village



- Digital O&M Manual
- Real-Time Visibility to Service Interventions

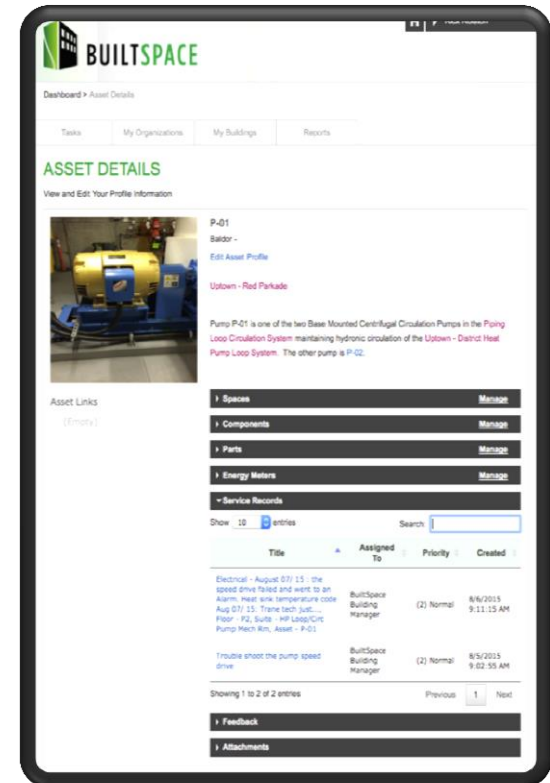


Better Information Available Anywhere

Everything in one place

- Easy to Use
- Navigate through buildings from anywhere
- Interactive description of equipment and systems, with supporting documents
- Complete service history
- Standardized safety & service procedures
- Capture equipment and condition
- Digital transactions
- Operations & maintenance metrics/reporting

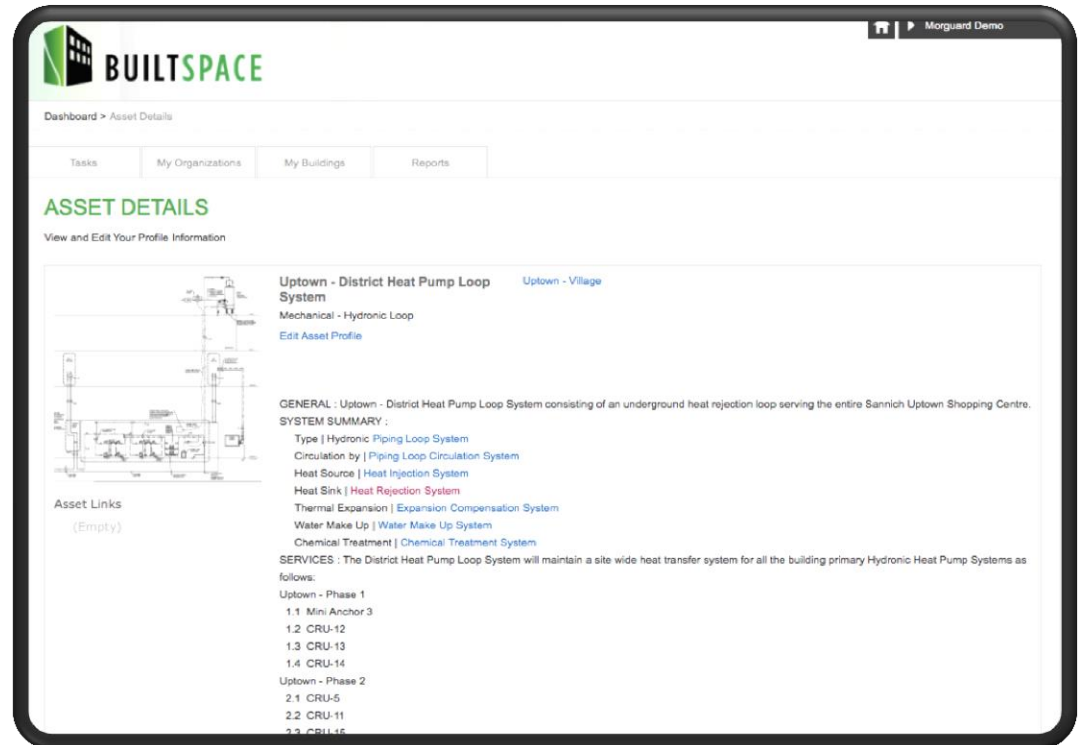
Secure , Access “by invitation”



Knowledge Transfer

Interactive Digital
Operations &
Maintenance

Connected to the
Equipment by Asset Tag



Visibility To Service Interventions



Dashboard > Uptown > Assets

Home Buildings Users Sent Documents Floor Plans

Asset Groups Service Records

3671 UPTOWN BLVD - CRU11 (UNDER CONTRACT)

Total Number of Assets: 78

Show 10 entries

Search:

Edit	Item Name	Description	Make	Model	Serial Number	Category	Building	Installation Date	Status	Parent	Owned By	Managed By	Last Task	Task By	New Tasks (90d)
	CRU11 HP-90	Heat Pump	Trane	GEHE0363	W11L21230	Heat Pump	Uptown - CRU-11	2012-11-09	Operating			Morguard Investments - Victoria	2016-03-31	John Doe	2
	CRU11 HP-01	Heat Pump	Trane	GEHE0425	W11L21227	Heat Pump	Uptown - CRU-11	2012-11-09	Operating			Morguard Investments - Victoria	2016-02-22	Bryan Truong	2
	CRU11 HP-02	Heat Pump	Trane	GEHE0363	W11L21228	Heat Pump	Uptown - CRU-11	2012-11-09	Operating			Morguard Investments - Victoria	2016-02-22	Bryan Truong	2
	CRU11 HP-03	Heat Pump	Trane	GEHE0243	W11L21231	Heat Pump	Uptown - CRU-11	2012-11-09	Operating			Morguard Investments - Victoria	2016-02-16	Bryan Truong	1
	CRU11 HP-09	Heat Pump	Trane	GEHE0485	W11L21623	Heat Pump	Uptown - CRU-11	2012-11-09	Operating			Morguard Investments - Victoria	2016-02-16	Bryan Truong	1
	CRU11 HP-10	Heat Pump	Trane	GEHE0485	W11L21606	Heat Pump	Uptown - CRU-11	2012-11-09	Operating			Morguard Investments - Victoria	2016-02-16	Bryan Truong	1
	CRU11 HP-11	Heat Pump	Trane	GEHE0605	W11L21243	Heat Pump	Uptown - CRU-11	2012-11-09	Operating			Morguard Investments - Victoria	2016-02-16	Bryan Truong	1

Standardized Procedures

Deployed across properties and service providers, allowing benchmarking of service interventions.

The mobile app interface for Uptown PM Equipment Checklist is displayed on a tablet. The header shows the 'Uptown' logo. Below it, the title 'PM EQUIPMENT CHECKLIST' is followed by a 'Save' button. The 'General Information' section includes fields for Building (Uptown - CRU-16), Address (3680 Uptown Boulevard, Victoria, British Columbia), Date (February 1, 2016), Time (8:37 AM), and Select Contact Person. The 'Asset Name' section has a red warning message: 'Editing asset or part information below will update the database when the form is saved.' Below this, the 'Asset Name' field is filled with 'CRU16 HP-31'. The 'Make' field is 'Trane', 'Model' is 'GEH0363', and 'Serial Number' is 'W11K20310'. The 'Description' field is 'Heat Pump'. The 'Physical Location' field is '309' and 'Service Location' is '0'. The 'Parts Information' section has a 'Show Part(s)' button. The 'Checklist' section shows 'Heat Pump (3 mo)'. The 'Inspection(s)' section has a green button labeled 'Complete & No Issues Found'. At the bottom, there is a filter section with 'R 1' and buttons for 'Good', 'Repaired/Replaced', 'Monitor', and 'Quote Repair'.

The desktop app interface for Uptown PM Equipment Checklist is displayed on a monitor. The header shows the 'BUILTSPEACE' logo and 'WEST BAY' logo. Below it, the title 'PM EQUIPMENT CHECKLIST' is followed by a 'Add new item' button. The table below lists equipment items with columns for Name, Modified, Modified By, Building, Asset Name, and No of Issues.

Name	Modified	Modified By	Building	Asset Name	No of Issues
2016-02-01 - Uptown - CRU-16 - CRU16 HP-31	2/1/2016 8:38 AM	Bryan Truong	Uptown - CRU-16	CRU16 HP-31	0
2016-02-01 - Uptown - CRU-16 - CRU16 HP-32	2/1/2016 9:47 AM	Bryan Truong	Uptown - CRU-16	CRU16 HP-32	0
2016-02-01 - Uptown - CRU-16 - CRU16 HP-33	2/1/2016 9:23 AM	Bryan Truong	Uptown - CRU-16	CRU16 HP-33	0
2016-02-01 - Uptown - CRU-16 - CRU16 HP-34	2/1/2016 9:08 AM	Bryan Truong	Uptown - CRU-16	CRU16 HP-34	0
2016-02-01 - Uptown - CRU-16 - CRU16 HP-37	2/1/2016 10:10 AM	Bryan Truong	Uptown - CRU-16	CRU16 HP-37	0
2016-02-01 - Uptown - CRU-16 - CRU16 HP-38	2/1/2016 3:08 PM	Bryan Truong	Uptown - CRU-16	CRU16 HP-38	0
2016-02-01 - Uptown - CRU-16 - CRU16 HP-39	2/1/2016 3:15 PM	Bryan Truong	Uptown - CRU-16	CRU16 HP-39	0
2016-02-01 - Uptown - CRU-16 - CRU16 HP-40	2/1/2016 4:09 PM	Bryan Truong	Uptown - CRU-16	CRU16 HP-40	0
2016-02-01 - Uptown - CRU-16 - CRU16 HP-41	2/1/2016 10:33 AM	Bryan Truong	Uptown - CRU-16	CRU16 HP-41	0
2016-02-01 - Uptown - CRU-16 - CRU16 HP-42	2/1/2016 11:03 AM	Bryan Truong	Uptown - CRU-16	CRU16 HP-42	0
2016-02-01 - Uptown - CRU-16 - CRU16 HP-44	2/1/2016 3:29 PM	Bryan Truong	Uptown - CRU-16	CRU16 HP-44	0
2016-02-01 - Uptown - CRU-16 - CRU16 HP-45	2/1/2016 3:01 PM	Bryan Truong	Uptown - CRU-16	CRU16 HP-45	0
2016-02-01 - Uptown - CRU-16 - CRU16 HP-47	2/1/2016 1:15 PM	Bryan Truong	Uptown - CRU-16	CRU16 HP-47	0
2016-02-01 - Uptown - CRU-16 - CRU16 HP-48	2/1/2016 1:25 PM	Bryan Truong	Uptown - CRU-16	CRU16 HP-48	0
2016-02-01 - Uptown - CRU-16 - CRU16 HP-49	2/1/2016 11:26 AM	Bryan Truong	Uptown - CRU-16	CRU16 HP-49	0
2016-02-01 - Uptown - CRU-16 - CRU16 HP-50	2/1/2016 10:48 AM	Bryan Truong	Uptown - CRU-16	CRU16 HP-50	0
2016-02-01 - Uptown - CRU-16 - CRU16 HP-51	2/1/2016 12:00 PM	Bryan Truong	Uptown - CRU-16	CRU16 HP-51	0
2016-02-01 - Uptown - CRU-16 - CRU16 HP-52	2/1/2016 12:12 PM	Bryan Truong	Uptown - CRU-16	CRU16 HP-52	0
2016-02-01 - Uptown - CRU-16 - CRU16 HP-53	2/1/2016 11:49 AM	Bryan Truong	Uptown - CRU-16	CRU16 HP-53	0
2016-02-01 - Uptown - CRU-16 - CRU16 HP-54	2/1/2016 11:17 AM	Bryan Truong	Uptown - CRU-16	CRU16 HP-54	0
2016-02-01 - Uptown - CRU-16 - CRU16 HP-55	2/1/2016 11:38 AM	Bryan Truong	Uptown - CRU-16	CRU16 HP-55	0
2016-02-02 - Uptown - CRU-16 - CRU16 HP-1	2/2/2016 3:42 PM	Bryan Truong	Uptown - CRU-16	CRU16 HP-1	0
2016-02-02 - Uptown - CRU-16 - CRU16 HP-15	2/2/2016 12:51 PM	Bryan Truong	Uptown - CRU-16	CRU16 HP-15	0
2016-02-02 - Uptown - CRU-16 - CRU16 HP-17	2/2/2016 10:57 AM	Bryan Truong	Uptown - CRU-16	CRU16 HP-17	0
2016-02-02 - Uptown - CRU-16 - CRU16 HP-19	2/2/2016 11:18 AM	Bryan Truong	Uptown - CRU-16	CRU16 HP-19	0

Measure & Verify Service Costs

What should it cost?
Did the work get done?

BuiltSpace, for the first time, provides measurement and verification of service interventions.

Title	Details	Created Date	Modified Date	Due Date	Created By	Status	Priority
CRU4 HP-06 - Replace filters - Repaired/Replaced	One 20x30x2, no tag	02-17-16	02-17-16		Bryan Truong	Closed	(2) Normal
CRU13 HP-39 - Replace filters - Repaired/Replaced	One 20x25x2	02-17-16	02-17-16		Bryan Truong	Closed	(2) Normal
CRU13 HP-40 - Replace filters - Repaired/Replaced	One 21x30x2	02-17-16	02-17-16		Bryan Truong	Closed	(2) Normal
CRU11 HP-01 - Replace filters - Repaired/Replaced	One 19x28x2	02-16-16	02-16-16		Bryan Truong	Closed	(2) Normal
CRU11 HRV-02 - Replace filters - Repaired/Replaced	Two 16x24x1	02-16-16	02-16-16		Bryan Truong	Closed	(2) Normal
CRU11 HP-02 - Replace filters - Repaired/Replaced	One 19x28x2	02-16-16	02-16-16		Bryan Truong	Closed	(2) Normal
CRU11 HP-03 - Replace filters - Repaired/Replaced	One 18x24x2	02-16-16	02-16-16		Bryan Truong	Closed	(2) Normal
CRU11 HP-05 - Replace filters - Repaired/Replaced	One 21x30x3	02-16-16	02-16-16		Bryan Truong	Closed	(2) Normal
CRU11 HP-10 - Replace filters - Repaired/Replaced	One 20x30x2	02-16-16	02-16-16		Bryan Truong	Closed	(2) Normal
CRU11 HRV-03 - Replace filters - Repaired/Replaced	Two 16x24x1	02-16-16	02-16-16		Bryan Truong	Closed	(2) Normal
CRU11 HP-09 - Replace filters - Repaired/Replaced	One 20x30x2	02-16-16	02-16-16		Bryan Truong	Closed	(2) Normal
CRU11 HP-11 - Replace filters - Repaired/Replaced	One 20x30x2	02-16-16	02-16-16		Bryan Truong	Closed	(2) Normal
CRU11 HRV-04 - Replace filters - Repaired/Replaced	Two 16x24x2	02-16-16	02-16-16		Bryan Truong	Closed	(2) Normal
CRU11 HP-12 - Replace filters - Repaired/Replaced	One 20x30x2	02-16-16	02-16-16		Bryan Truong	Closed	(2) Normal
CRU11 HP-13 - Replace filters - Repaired/Replaced	One 20x30x2	02-16-16	02-16-16		Bryan Truong	Closed	(2) Normal
CRU11 HRV-05 - Replace filters - Repaired/Replaced	Two 16x20x2	02-16-16	02-16-16		Bryan Truong	Closed	(2) Normal
CRU11 HP-14 - Replace filters - Repaired/Replaced	One 20x30x2	02-16-16	02-16-16		Bryan Truong	Closed	(2) Normal
CRU11 HP-15 - Replace filters - Repaired/Replaced	One 20x30x2	02-16-16	02-16-16		Bryan Truong	Closed	(2) Normal
CRU11 HRV-06 - Replace filters - Repaired/Replaced	Two 16x24x1	02-16-16	02-16-16		Bryan Truong	Closed	(2) Normal
CRU11 HP-16 - Replace filters - Repaired/Replaced	One 20x30x2	02-16-16	02-16-16		Bryan Truong	Closed	(2) Normal
CRU11 HP-17 - Replace filters - Repaired/Replaced	One 18x25x1, 8' then	02-15-16	02-15-16		Bryan Truong	Closed	(2) Normal
CRU11 HRV-07 - Replace filters - Repaired/Replaced	Two 16x20x1	02-15-16	02-15-16		Bryan Truong	Closed	(2) Normal
CRU11 HP-18 - Replace filters - Repaired/Replaced	One 19x26x2	02-15-16	02-15-16		Bryan Truong	Closed	(2) Normal
CRU11 HP-17 - Replace filters - Repaired/Replaced	One 19x26x2	02-15-16	02-15-16		Bryan Truong	Closed	(2) Normal
CRU11 HP-02 - Replace filters - Repaired/Replaced	One 19x26x2	02-15-16	02-15-16		Bryan Truong	Closed	(2) Normal
MA3 HP-20 - Replace filters - Repaired/Replaced	One 20x30x2	02-15-16	02-15-16		Bryan Truong	Closed	(2) Normal
MA3 HP-18 - Replace filters - Repaired/Replaced	One 20x30x2	02-15-16	02-15-16		Bryan Truong	Closed	(2) Normal
MA3 HP-19 - Replace filters - Repaired/Replaced	One 20x30x2	02-15-16	02-15-16		Bryan Truong	Closed	(2) Normal
CRU14 HP-26 - Replace filters - Repaired/Replaced	Three 20x25x1	02-15-16	02-15-16		Bryan Truong	Closed	(2) Normal
CRU14 HP-28 - Replace filters - Repaired/Replaced	Three 20x25x1	02-15-16	02-15-16		Bryan Truong	Closed	(2) Normal

Page 1 of 4

TRANE
Nonresidential Service
7000 VINELAND BLVD
WICHITA, KS 67208
Tel: (620) 451-1000
Fax: (620) 451-1000
License:

FIELD REPORT

Location Name: UPTOWN CENTRE
3000 DODGE AVE STREET
WICHITA, KS 67208-6100

Contact/Phone: Account Manager

Scope Description: Troubleshoot CRU16 VFD
Subs Follow-up Required? No

Scope Complete? No

Modifications/Tag: 17424000, 17424000, Trane, CRU16 P-2

WORK PERFORMED:
Date: 10-20-2014
Work Activity:
Quality Task Code:
Sample Taken: No

Work Performed Details:
Repaired and power supply and tested out. Disassembled VFD and replaced boards as necessary. Reassembled and programmed new boards to unit. Replaced in manual mode, unit ok. Left in automatic mode. Arranged all boards to be returned. CRU16 P-2
Notes: #17424000, #17424000

Tasks Performed:

PARTS MATERIALS

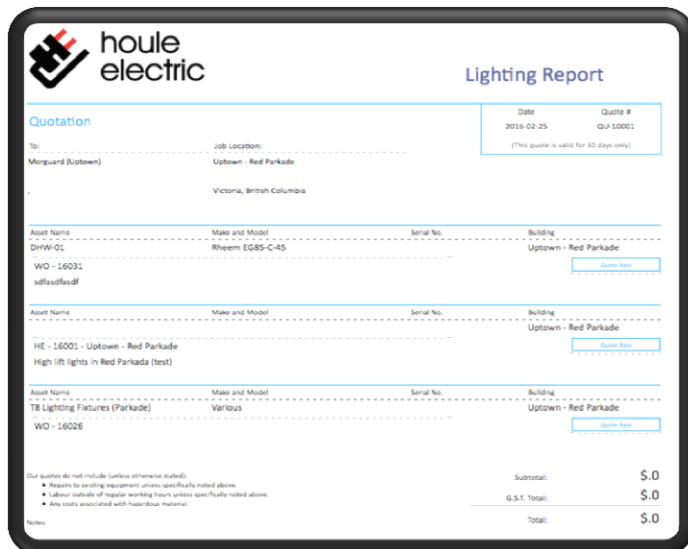
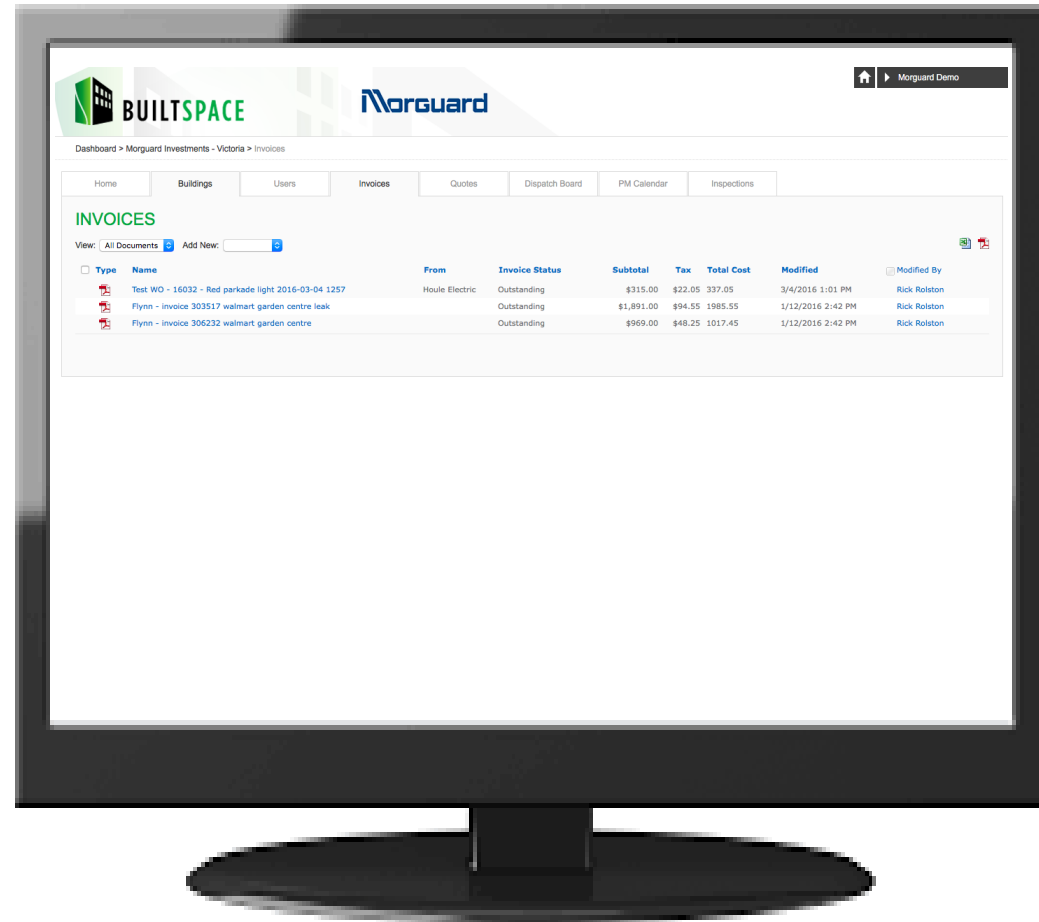
	A	B	C	D	E	F	G	H
1								
2								
3	Count of Title	Column Labels						
4	Row Labels	Uptown - CRU-11	Uptown - CRU-13 & 4	Uptown - CRU-14	Uptown - CRU-15	Uptown - CRU-16	Uptown - Mini Anchor 3	Grand Total
5	2/1/2016					22		22
6	2/10/2016		12		3		1	16
7	2/11/2016		8				14	22
8	2/12/2016						14	14
9	2/15/2016	3	2	3			3	11
10	2/16/2016	17						17
11	2/17/2016		3					3
12	2/2/2016					13		13
13	2/3/2016			5	14			19
14	2/4/2016			5	14			19
15	2/5/2016			2	12		3	17
16	2/9/2016		8	1			1	10
17	Grand Total	20	33	16	43	35	36	183



Direct Digital Exchange

Quotes, approvals & invoices can be exchanged digitally.

Invoices from all service providers available as documents and data for integration into ERP.



Case Study - BC Legislature




By Ryan Bushby (HighInBC) (Own work) [CC BY 2.5
(<http://creativecommons.org/licenses/by/2.5>)], via Wikimedia Commons

A platform solution that can be applied to any building, old or new.

Integrated Service Management

Each FM and service team can now schedule and dispatch preventative maintenance and emergency service calls, **even to each other!**



STREAMTECH SYSTEMS

SERVICE WORK ORDER

Job Status

Open

Work Category

PM

WO Number

WO - 16047

Dispatch


Work Performed

Equipment

Summary

Materials & Tools

Invoice View



Work Performed

Date:

2016-04-04

Technician

Travel Time:

Equipment Serviced

Start Time:

Describe the work that was performed...

End Time:

Total Hours:

0.00


Labour Type:

Insert Work Done

Labour Rate:

Labour Cost:

\$0.00



Photo(s)


Click here to insert a picture

Click here to insert a picture

Click here to insert a picture

PREVIOUS

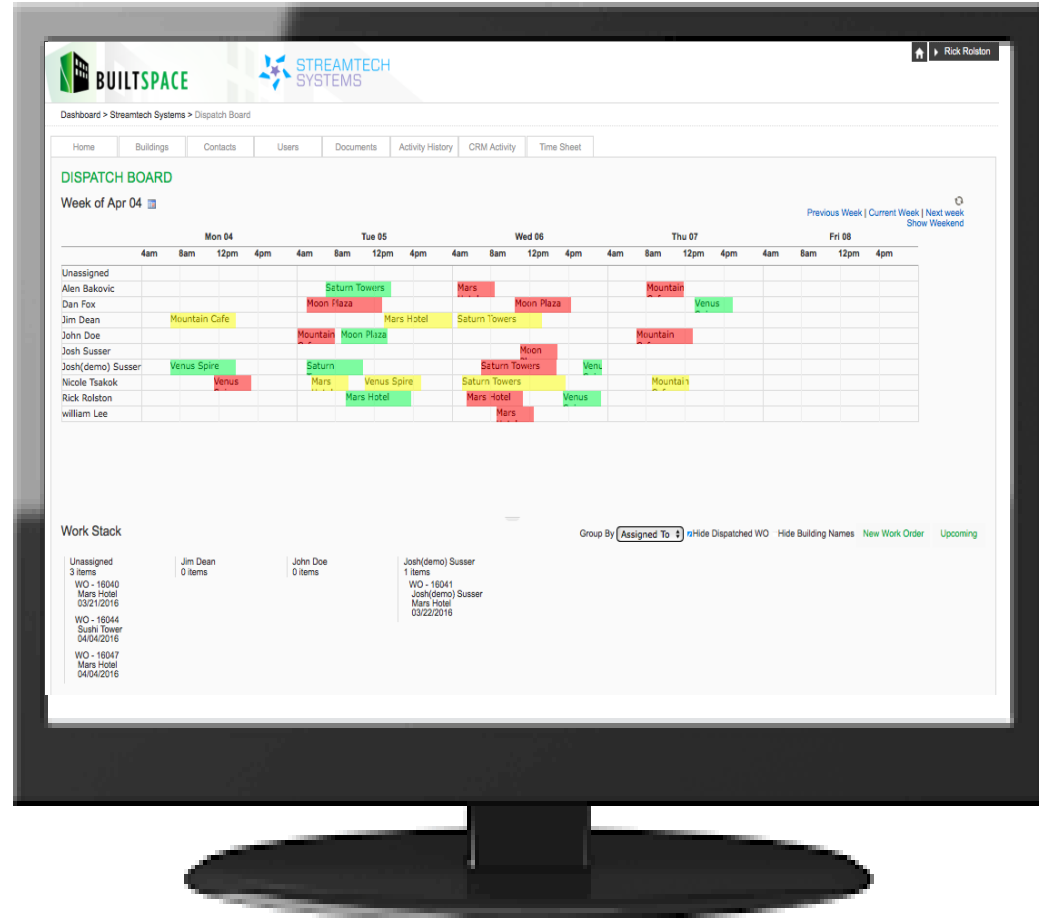
NEXT



powered by

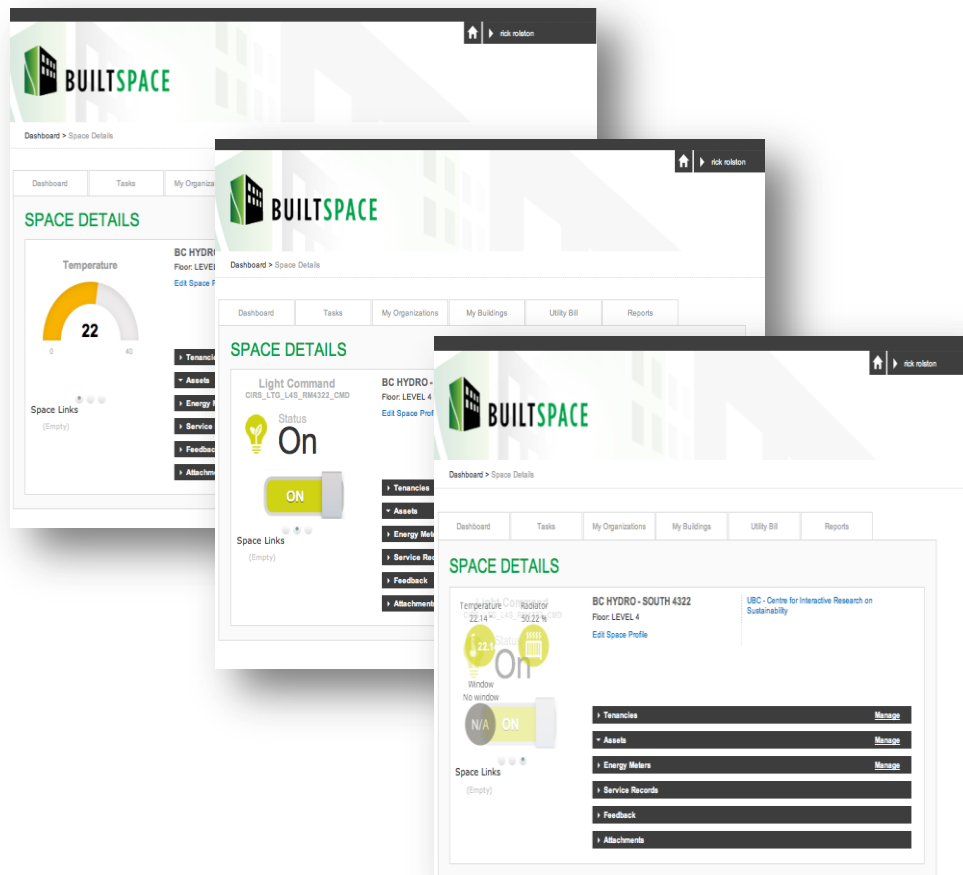
BIO SCIENCE FILM

Form Name: Service Work Order (SWO)



Each intervention is digitally recorded & measured, allowing real-time control of operating costs.

Case Study – UBC CIRS



The Inhabitant Interface at UBC CIRS provides real-time control of workspace environment for occupants, and community interactions, from their desktop.

Case Study – HVAC Services

Example: HVAC Services (2015, 2,322 WO)

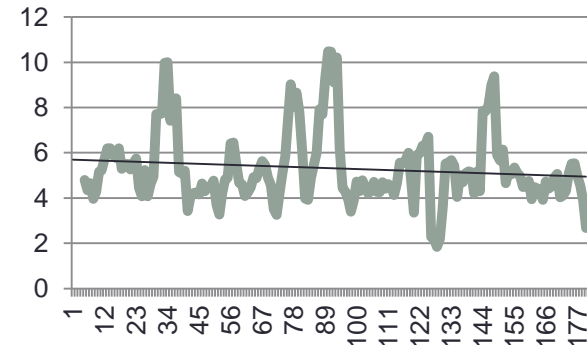
~17 % (1 hour) decrease in hours/WO with corresponding increase in number of daily work orders, with ~14 % increase in revenues

Delivered direct savings of over \$100 per work order (17% reduction in labour costs)

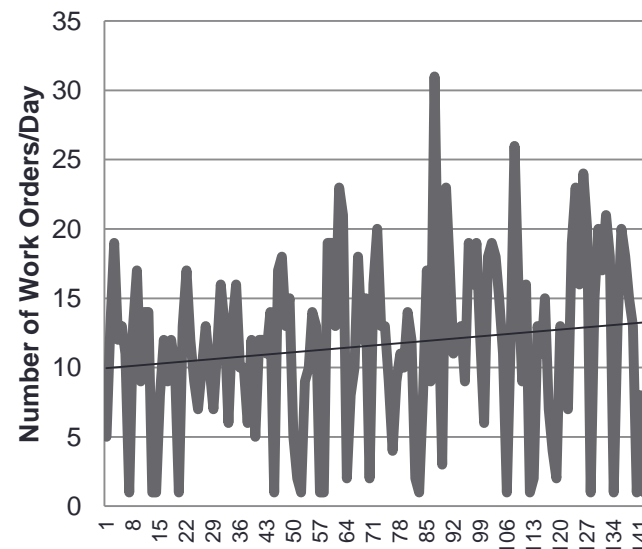
Available for the next job (on average) 1 hour sooner!

Additional savings accrued to both service provider and his customers, as a result of digital data exchange, and reduced administration.

Hours Per Work Order



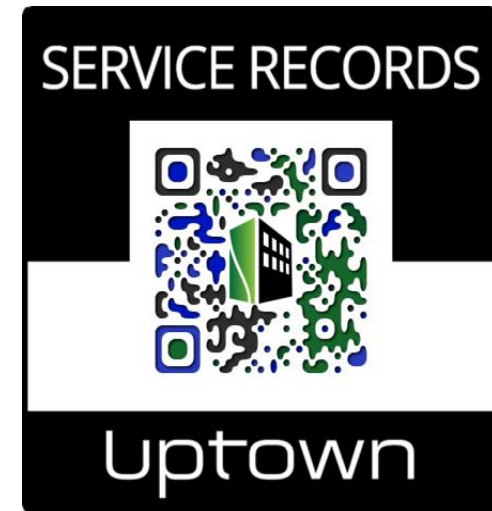
Daily Work Orders



You are Invited...

If you are seeing these labels in your mechanical/electrical rooms, your service providers are already collecting digital service records.

We can help you work together with your preferred partners.



THANK YOU

For further information please contact:

Rick Rolston, CEO
BuiltSpace Technologies Corp.
Suite 505-1281 West Georgia Street,
Vancouver BC Canada

Rick@builtspace.com

Direct: (604)398-6035

