

# Preventive Maintenance System Improvements at CFHT

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# Background

- Existing system was paper-based, manual, and cumbersome
- Limited visibility
- Difficult to extract history

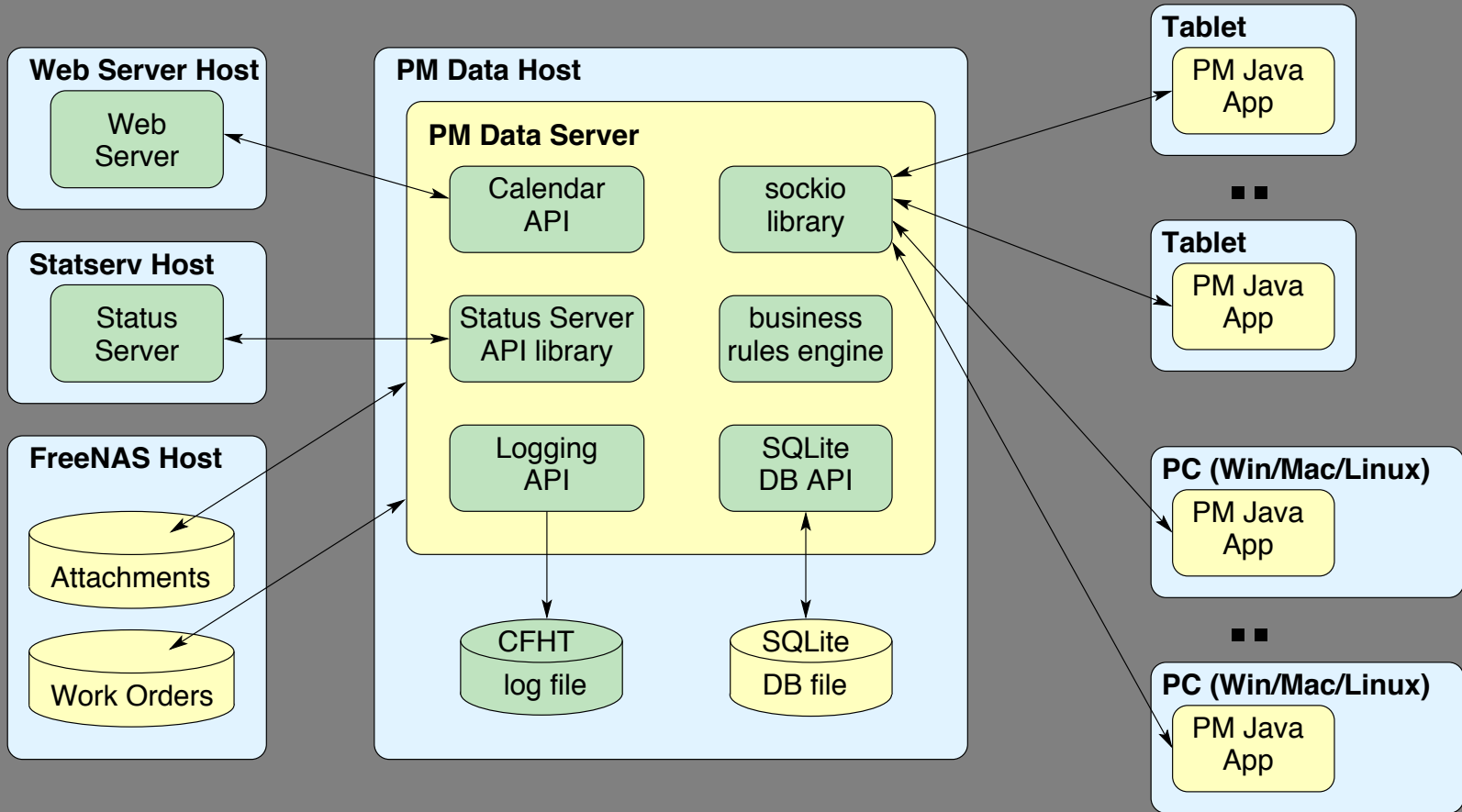


# The Improvement Process

- Learn about what other people are doing?
- Investigate commercial solutions
- Brainstorm requirements
- Evaluate build vs buy
- Design solution
- Deployment



# System Architecture




# Software Demo Screenshots



# Create Equipment Entry

Preventive Maintenance & Repair GUI v0.96

Equipment Procedure Task Work Order **Unscheduled Maintenance** Calendar Reports Statserv Administration

 Make:  Model:

Description:


Location:  Status:

External Contact:  Serial Number:

Comment:

Attachments:

Description	Filename	Size
Operation Manual	30 and 40 hp SE manual-1.pdf	2246778
Parts Catalog	SSR-HXP30SEParts.pdf	2670427

Notes: 

# Create Preventive Maintenance Task

Preventive Maintenance & Repair GUI v0.96

Equipment Procedure **Task** Work Order Unscheduled Maintenance Calendar Reports Statserv Administration

Location: **Basement** System: **Dry Air System**

Description: **Air compressor #1 monthly pm**

Status: **Scheduled** Trigger: **Periodic**

Priority: **High** Last Completion Date: **11/23/16**

Work Type: **Mechanical** NextDueDate: **12/23/16**

Asset: **Summit Daycrew** Delay Period: **1** Months

Equipment:	Description	Location	Status	Make	Model
Air Compressor #1		Basement	Active	Ingersoll Rand	SSR-UP6-30-200

Tools:

- 1/4in-3in extension
- 1/4in ratchet
- 10mm socket 1/4in drive
- funnel (if adding oil)
- grease gun
- large crescent wrench (if adding oil)
- rag

Materials:

- absorbent pads
- oil (if needed)

Procedure:

- 1) unload
- 2) Lock out de-energize
- 3) Remove side and rear pannel 10mm socket
- 4) check belt and sheaves for wear. wipe dust if present.
- 5) check level and color of oil.
- 6) check for leaks on fittings, blocks, hoses
- 7) grease motor. (1 pump)
- 8) blow out condenser
- 9) change oil absorbent mats under compressor

Comment:

Clear Find Print Save

# Create Preventive Maintenance Task

Preventive Maintenance & Repair GUI v0.96

Equipment Procedure **Task** Work Order Unscheduled Maintenance Calendar Reports Statserv Administration

Location: Basement System: Dry Air System

Description: Air compressor #1 monthly pm

Status: Scheduled Trigger: Periodic

Priority: High Last Completion Date: 11/23/16

Work Type: Mechanical

Asset: Summit Daycrew

Equipment: Air Compressor #1

Tools: 1/4in-3in extension wrench  
1/4in ratchet  
10mm socket 1/4in  
funnel (if adding oil)  
grease gun  
large crescent wrench

Materials: absorbent pads  
oil (if needed)

Procedure:

- 1) unload
- 2) Lock out de-energize
- 3) Remove side and rear panel 10mm socket
- 4) check belt and sheaves for wear. wipe dust if present.
- 5) check level and color of oil.

Comment:

Clear Find Print Save

### Step Instructions

Add a new instruction step

User Feedback

ABCI 123I NONE

Insert Procedure Save Cancel



# Work Orders are Scheduled

Preventive Maintenance & Repair GUI v0.96

Equipment Procedure Task Work Order **Unscheduled Maintenance** **Calendar** Reports Statserv Administration

Location:  System:

Description:

View: Year  
 Status: Active  
 Priority:   
 Work Type:   
 Asset:

2016

January							February							March							April						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
					1	2		1	2	3	4	5	6			1	2	3	4	5						1	2
3	4	5	6	7	8	9	7	8	9	10	11	12	13	6	7	8	9	10	11	12	3	4	5	6	7	8	9
10	11	12	13	14	15	16	14	15	16	17	18	19	20	13	14	15	16	17	18	19	10	11	12	13	14	15	16
17	18	19	20	21	22	23	21	22	23	24	25	26	27	20	21	22	23	24	25	26	17	18	19	20	21	22	23
24	25	26	27	28	29	30	28	29	27	28	29	30	31	24	25	26	27	28	29	30							
31																											

May							June							July							August						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7				1	2	3	4						1	2	1	2	3	4	5	6	
8	9	10	11	12	13	14	5	6	7	8	9	10	11	3	4	5	6	7	8	9	7	8	9	10	11	12	13
15	16	17	18	19	20	21	12	13	14	15	16	17	18	10	11	12	13	14	15	16	14	15	16	17	18	19	20
22	23	24	25	26	27	28	19	20	21	22	23	24	25	17	18	19	20	21	22	23	21	22	23	24	25	26	27
29	30	31	26	27	28	29	30	24	25	26	27	28	29	30	28	29	30	31									
													31														

September							October							November							December						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3							1			1	2	3	4	5				1	2	3	
4	5	6	7	8	9	10	2	3	4	5	6	7	8	6	7	8	9	10	11	12	4	5	6	7	8	9	10
11	12	13	14	15	16	17	9	10	11	12	13	14	15	13	14	15	16	17	18	19	11	12	13	14	15	16	17
18	19	20	21	22	23	24	16	17	18	19	20	21	22	20	21	22	23	24	25	26	18	19	20	21	22	23	24
25	26	27	28	29	30	23	24	25	26	27	28	29	27	28	29	30	25	26	27	28	29	30	31				
							30	31																			

Weekends  
 Holidays  
 Daycrew  
 Exchange Day

Publish PM Schedule  
 View TOM Schedule  
 Reset  
 Reload

# Work Orders are Executed

Preventive Maintenance & Repair GUI v0.96

Equipment Procedure Task **Work Order** Unscheduled Maintenance Calendar Reports Statserv Administration

Location: Basement System: Dry Air System

Description: Air compressor #1 monthly pm

Priority: High Status: Scheduled Progress: 1 of 14

Work Type: Mechanical # People Involved: Job ID:

Asset: Summit Daycrew Hours Spent:

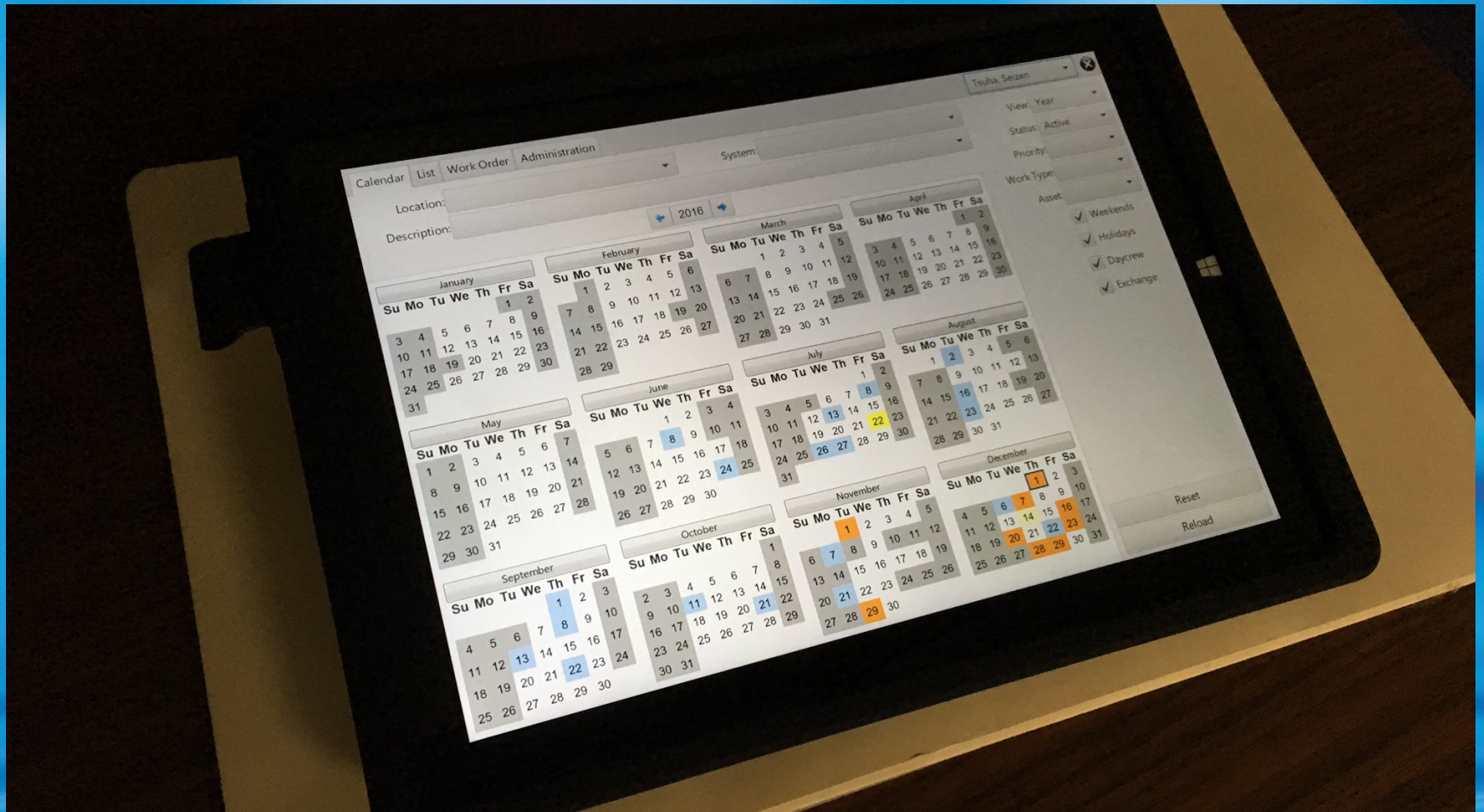
Due Date: 12/23/16

Equipment:	Description	Location	Status	Make	Model
	Air Compressor #1	Basement	Active	Ingersoll Rand	SSR-UP6-30-200
	1/4in-3in extension				
	1/4in ratchet				
	10mm socket 1/4in drive				
Tools:	funnel (if adding oil)				
	grease gun				
	large crescent wrench (if adding oil)				
	rag				
Materials:	absorbent pads				
	oil (if needed)				
	1) unload				<input type="checkbox"/>
	2) Lock out de-energize				<input type="checkbox"/>
	3) Remove side and rear pannel 10mm socket				<input type="checkbox"/>
	4) check belt and sheaves for wear. wipe dust if present.				<input type="checkbox"/>
	5) check level and color of oil.				<input type="checkbox"/>

Comment:

Clear Find Print Modified by

# Use a Tablet to Record Maintenance



# Tablet Challenge

- Can't use WiFi at the summit
- Need to download content to the tablet
- Need to upload content upon completion



# View Scheduled Maintenance Calendar

Calendar
List
Work Order
Administration

Tsuha, Seizen
✕

Location:

Description:

System:

← 2016 →

January

Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

February

Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29					

March

Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

April

Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

May

Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

June

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

July

Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

August

Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

September

Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3
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11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

October

Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

November

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20	21	22	23	24	25	26
27	28	29	30			

December

Su	Mo	Tu	We	Th	Fr	Sa
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4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

View:

Status:

Priority:

Work Type:

Asset:

Weekends  
 Holidays  
 Daycrew  
 Exchange

Reset

Reload

# Look at the Daily List

Calendar
List
Work Order
Administration

Tsuha, Seizen
✕

Location:

Description:

System:

← 2016 →

January

Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

February

Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29					

March

Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

April

Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

May

Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

June

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

July

Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

August

Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

September

Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

October

Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

November

Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

December

Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

View: Year

Status: Active

Priority:

Work Type:

Asset:

- Weekends
- Holidays
- Daycrew
- Exchange

■ Basement - Dry Air System - Air compressor #1 monthly pm
 

↓

■ Basement - Dry Air System - Air compressor #2 monthly pm
 

↓

More Details
Reload



# Go to Equipment and Perform Maintenance

Calendar List Work Order Administration Tsuha, Seizen

Location: Basement System: Dry Air System

Description: Air compressor #1 monthly pm

Priority: High Status: Scheduled Progress:

Work Type: Mechanical # People Involved:  Job ID:

Asset: Summit Daycrew Hours Spent:

Due Date: 12/23/2016

Comment:

► Equipment

► Tools

► Materials

▼ Procedure

Procedure
unload
Lock out de-energize
Remove side and rear pannel 10mm socket
check belt and sheaves for wear. wipe dust if present.
check level and color of oil.
check for leaks on fittings, blocks, hoses
grease motor. (1 pump)
blow out condenser





# Complete and Save Work Order

Calendar List Work Order Administration Tsuha, Seizen X

Location:  System:

Description:

Priority:  Status:  Progress:

Work Type:  # People Involved:  Job ID:

Asset:  Hours Spent:

Completed Date:  Update Date:

Comment:

► Equipment

► Tools

► Materials

▼ Procedure

Procedure	
unload	<input checked="" type="checkbox"/>
Lock out de-energize	<input checked="" type="checkbox"/>
Remove side and rear pannel 10mm socket	<input checked="" type="checkbox"/>
check belt and sheaves for wear. wipe dust if present.	<input checked="" type="checkbox"/>
check level and color of oil.	<input checked="" type="checkbox"/>
check for leaks on fittings, blocks, hoses	<input checked="" type="checkbox"/>
grease motor. (1 pump)	<input checked="" type="checkbox"/>
blow out condenser	<input checked="" type="checkbox"/>



# Next Steps

- Finish tablet rollout
- Add predictive maintenance using business rules
- Add reports
- Asset management



# Questions?

