Latest Cavity Processing results from ANL/FNAL facility and optimization to reduce Field Emission

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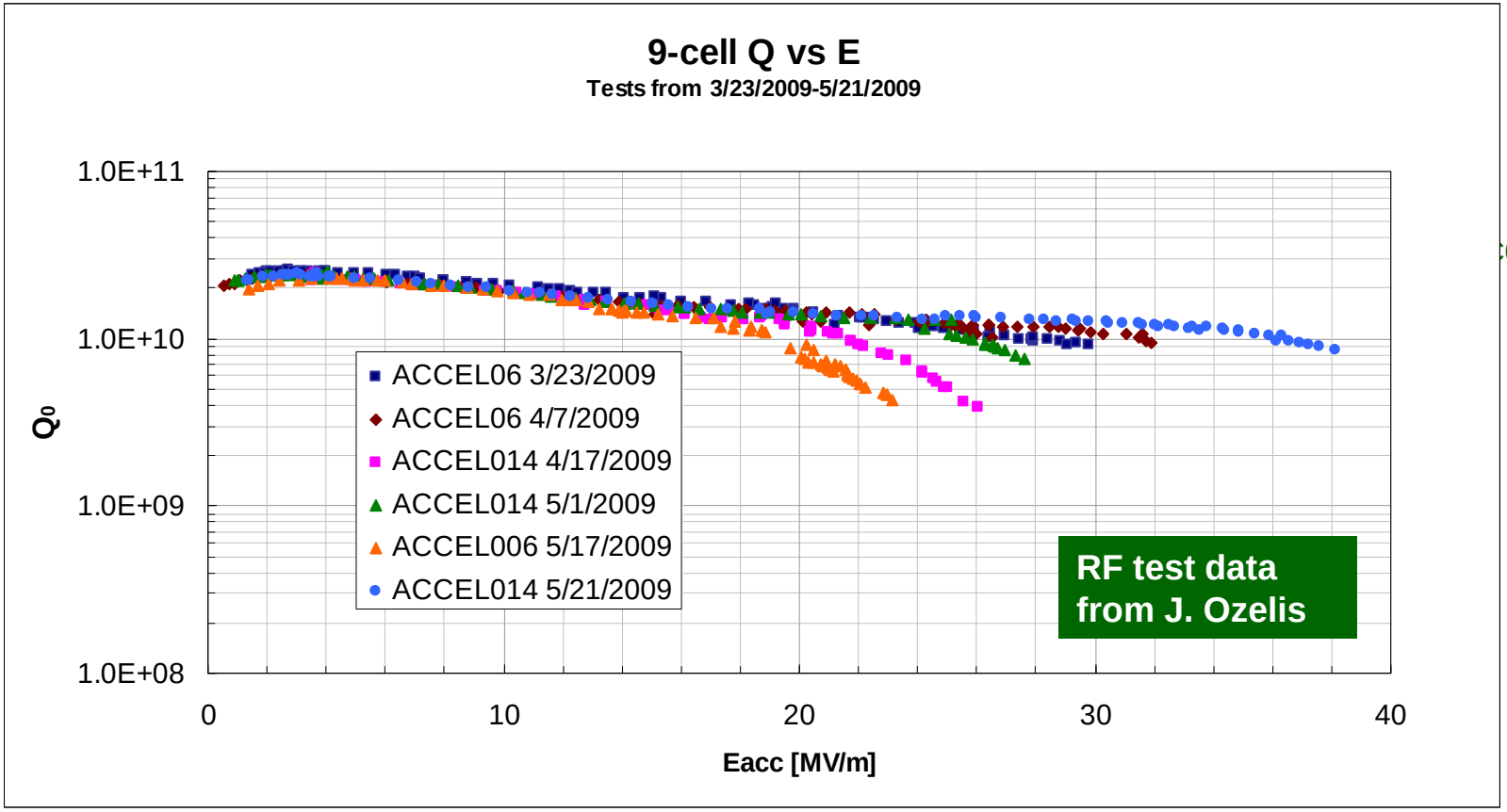
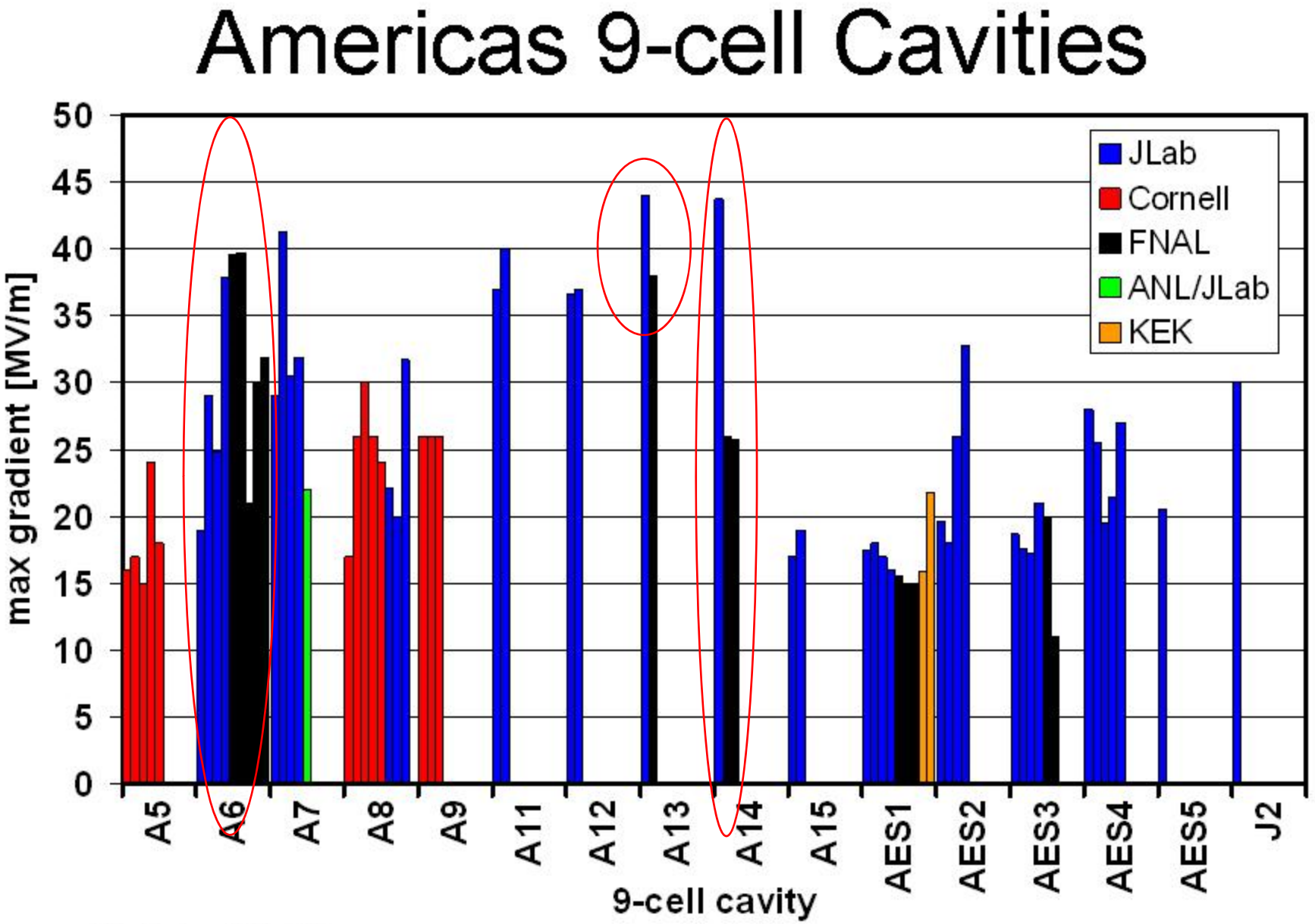
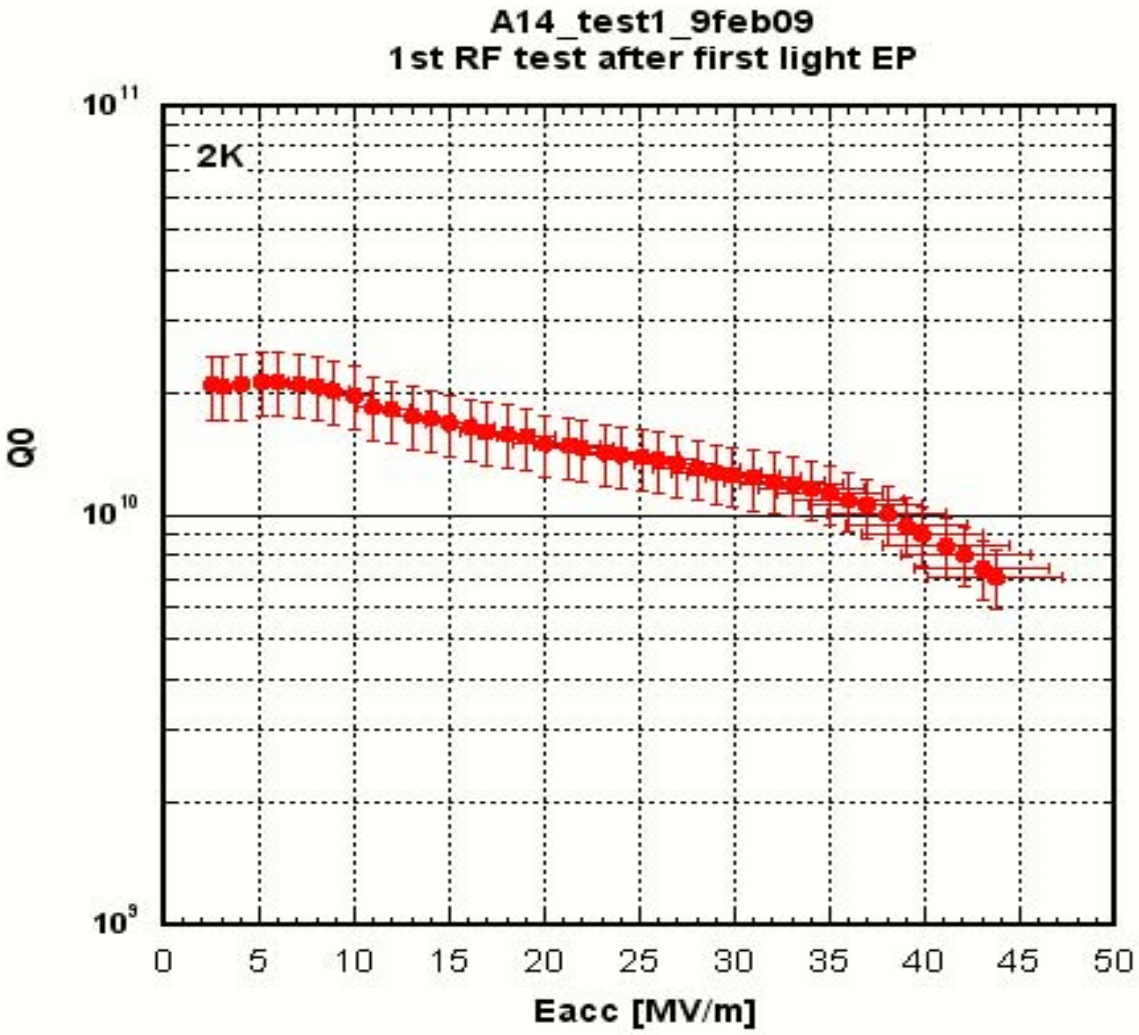
Latest Cavity Processing results



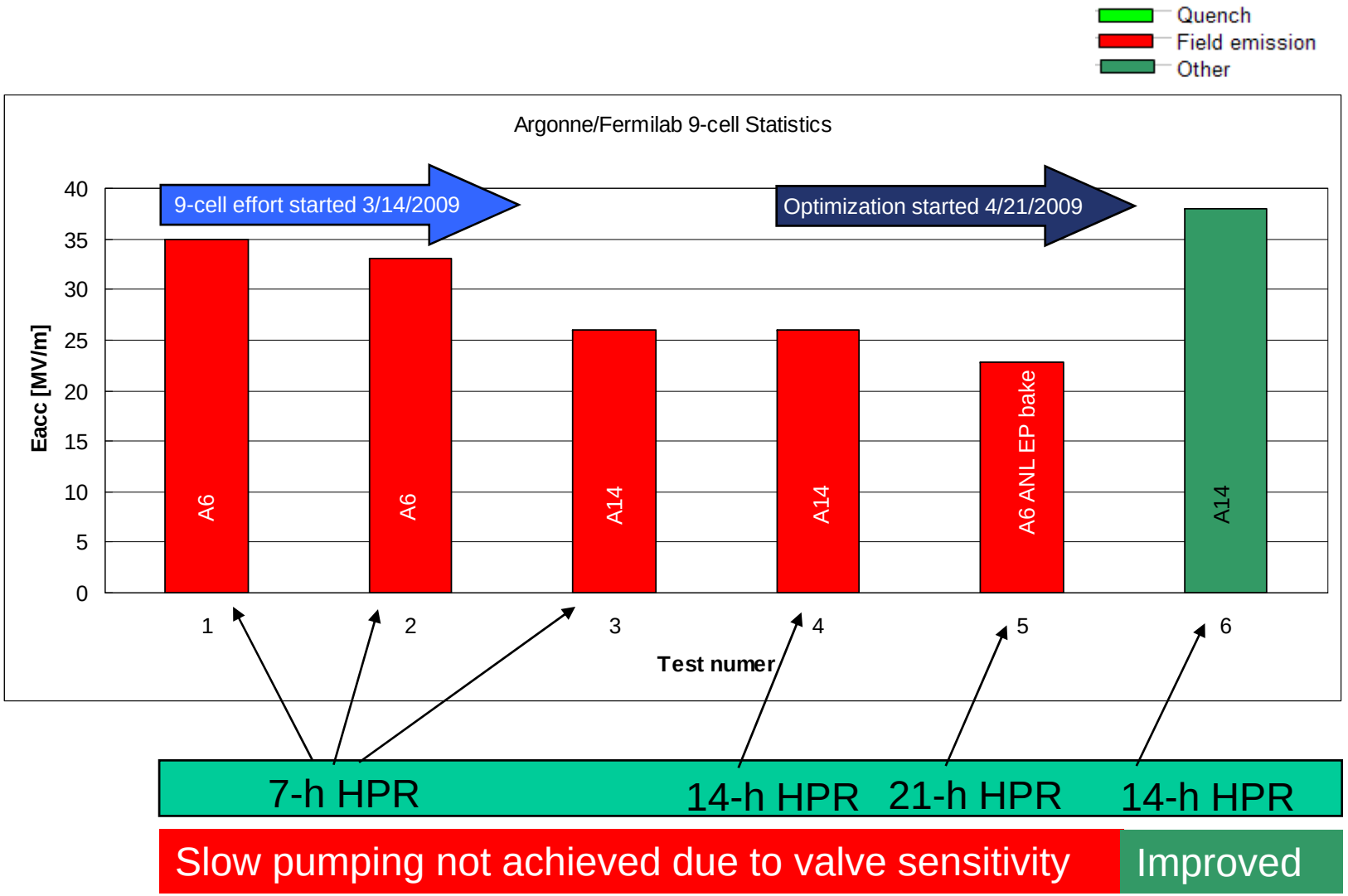
Date	9-cell	RF test #	RF test #	Max Eacc [MV/m]	Limit	Note
2009-03-23	A6	1	1	30	FE and RF system	
2009-04-07	A6	2	2	32	FE and RF system	
2009-04-17	A14	1	3	26	FE and RF system	
2009-05-01	A14	2	4	26	FE and quench	
2009-05-11	A6	3	5	22.8	FE and RF system	
2009-05-21	A14	3	6	38	RF system	FE present



Data from C. Ginsburg


A14_test1_9feb09
1st RF test after first light EP
2K
Q0
10^{11}
10^{10}
10^{9}
0
5
10
15
20
25
30
35
40
45
50
Eacc [MV/m]

Latest Cavity Processing results



9-cell procedures

without cage attached

21 Assemble FPC port
22 Assemble bottom HOM port
23 Assemble top HOM port
24 Assemble field probe
25 Assemble Top beamline flange
26 Tighten all the seals

31 Insert two bolts to bottom flange
32 tricke flow HPR water and wait for later in the day

32 Run HPR 3h35m x 2 rinse from top to bottom and bot

46 Slowly open vacuum cart manual valve, roughing line v
47 Once cavity vacuum reached < 20 mTorr, start turbo

1 Ultrasonic one hour with 1% liqui-nox with or without cage attached Hoist fixture of gantry
2 DI water rinsing to remove the soap
3 Dis-assemble the cavity from ultrasonic tank gantry
4 Cage needs to be rinsed and wiped if not with the cavity
5 Attach the cage if not on
6 Use mini-cart to transport cavity vertically onto lift-cart
7 Open HPR doors, remove the wand cover
8 Use lift-cart to attach cavity to HPR stand
9 Move cavity up and down to set the HPR up limit and lower limit
10 Cover the top beam line flange, secured by clamp
11 Run HPR 3h35m x 1, rinse from cavity top to bottom
12 Lift cavity above the wand
13 Cover the wand with bag, close the HPR door Turn on water flow of the HPR wand
14 Dry overnight
15 Pre-assemble bottom flange N2 blow clean harware
16 Wait 30 minutes and change to new cleanroom suit
17 Stop water, open HPR door
18 Cover bottom HOM, beam line and FPC ports
19 Move cavity onto lift-cart Cover remaining open ports
20 Move cavity onto wall support
21 Assemble FPC port
22 Assemble bottom HOM port
23 Assemble top HOM port
24 Assemble field probe
25 Assemble Top beamline flange
26 Tighten all the seals
27 Move cavity to lift-cart
28 open HPR doors, remove wand cover
29 Move cavity onto HPR stand
30 remove the cavity bottom cover
31 Insert two bolts to bottom flange
32 tricke flow HPR water and wait for later in the day
32 Run HPR 3h35m x 2 rinse from top to bottom and bottom to top
33 Move cavity above wand
34 Stop water, cover the wand, close HPR doors, turn on water flow
35 Dry overnight
36 N2 blow clean hardware
37 wait 30 minutes, change new cleanroom gown
38 Stop water, open HPR doors
39 Attach bottom flange, clamp one side
40 Insert rest Snug tight 4 bolts
41 MOve cavity to lift-cart
42 tighten the bottom flange
43 Make sure no positive pressure of the pumpline bellow
44 Connect the bellow to cavity valve
45 Open the cavity valve
46 Slowly open vacuum cart manual valve, roughing line vacuum should remain below 1 torr
47 Once cavity vacuum reached < 20 mTorr, start turbo
48 Conduct initial leak check once vacuum reaches <6e-6 torr
49 Evacuate cavity overnight
50 Final leak check of cavity
51 Close cavity valve
52 transport cavity to IB1 with cavity lying on cart seat at 30-45 degree
53 Move cavity to test stand vertically
54 Attach cavity to test stand
55 Test stand portable clean area 1 hour prep
56 Attach pumping line to cavity valve, pump the line to reach 5e-6 torr
57 Open the cavity valve, observer the pressure change
58 Close the test stand vacuum line on top of the stand
59 Move the test stand into the dewar
60 Connect the vacuum line, turn back on the turbo
61 Cavity RF test

A14 procedural changes

- Ultrasonic without cage
  - 9-cell cage generates large amount of powders
- New preassembly procedures
  - Stricter assembly practice
  - Bolt tightening after all ports are sealed
- Final Assembly procedures
  - Minimized the human activity after final HPR
  - Piloting bolts
- Evacuation
  - Slow evacuation improved (still not the best)

Future Improvement

- Assembly
  - Relocate the N2 cleaning station
  - Remote flange handler
  - Semi-automatic flange assembly
- Infrastructure
  - Better clean room clothing
  - New 9-cell cage with less particulates
  - Particulate free gantry handler
  - Better fixture for assembly station
  - Automatic cavity evacuation

Internal review recommendations are to be considered.