

50
YEARS
GSI

HEST vacuum system

M. Sapinski (with A. Kraemer invaluable input)

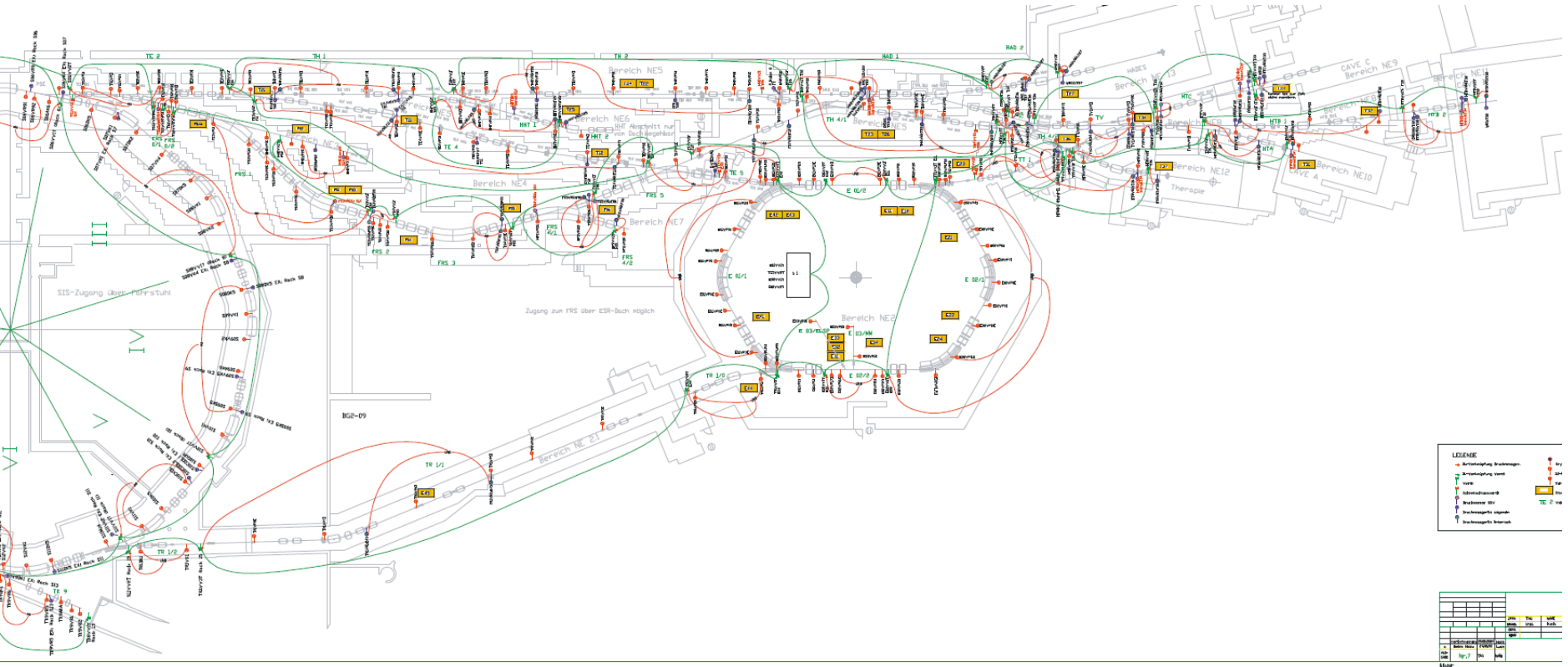
GSI Machine Meeting

Aug 27, 2019

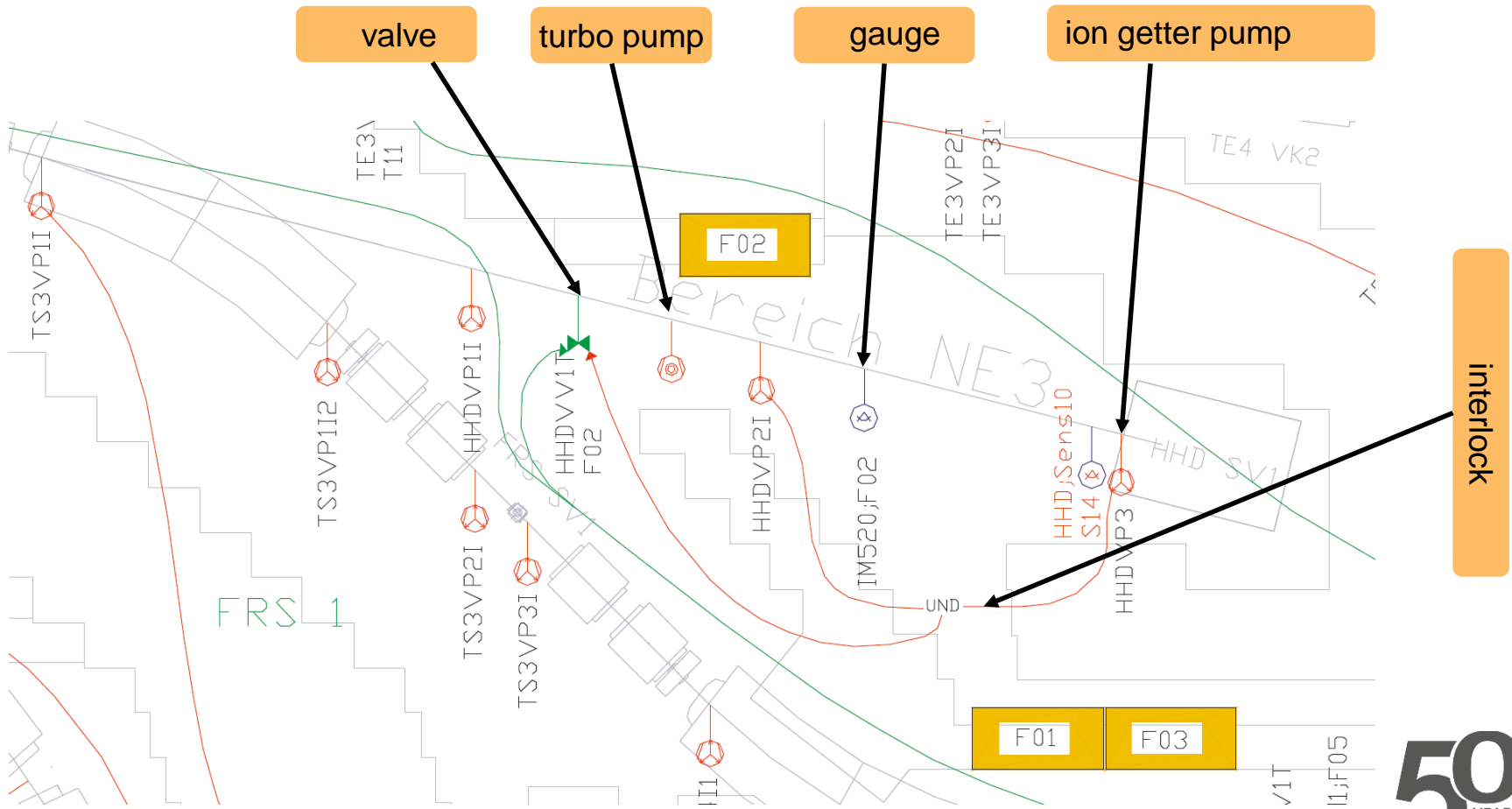
1. Current status: what do we have?
2. Failures during operation.
3. Current and FAIR vacuum control systems.
4. Perspectives.

www.gsi.de/work/gesamtprojektleitung_fair/commons/vacuum_systems.htm

Overview plan



Overview plan - zoom



- Roughing pumps: 15 fixed + mobile pumping stations
 - one mobile pumping station ~16 kEUR
- Ion getter pumps: ~110 + 10 at reinjection
 - one ion getter pump ~12 kEUR
- Valves, gate valves and fast closing valves: ~37.
- Dedicated gauges (pumps usually have one): ~30.
- We do have beakable chambers but only SIS18 extraction area and ESR injection/extraction are baked.
- Analog electronics in the tunnel and digital controllers in electronic rooms.
- Vacuum interlocks.

List of failures (last 12 months)



GS06VV2T GTS1VV1T GTE2VV1T		Failure - Vacuum Transport And Installation	HEST SIS18	000d 02h 34m 00s
GHTDVV1T / GHTCVV1T und GHTCVW2T	102321	Failure - Vacuum Transport And Installation	HEST	000d 02h 28m 00s
GHTPVV1T		Failure - Vacuum Transport And Installation	HEST	000d 07h 15m 00s
GHTDVV1T	118763	Failure - Vacuum Transport And Installation	HEST	005d 10h 50m 00s
GTH4QD21 / GTH4QD22 / GTH4MU1		Failure - Vacuum Transport And Installation	HEST	000d 01h 26m 00s
GTE1VV1S		Failure - Vacuum Transport And Installation	HEST	000d 06h 23m 00s
GTE4VV2T GTE5VV2T		Failure - Vacuum Transport And Installation	HEST	000d 00h 35m 00s

ID	Event	Device	Start	End	Info
102321	Failure - Vacuum Transport And Installation	GHTDVV1T ,GHTCVW1T und GHTCVW2T	2018-11-23 17:40:00	2018-11-23 20:08:00	Ventile haben keine definierte Position -> RB
118763	Failure - Vacuum Transport And Installation	GHTDVV1T	2019-03-01 23:10:00	2019-03-07 10:00:00	Ventil zugefahren, Interlock Hochspannung Modul 1 und Modul 2

Comment	2019-03-02 01:33
Comment	An GHTDVV1T Vorpumpensicherung getauscht. Bei Inbetriebnahme kamen die Messröhren GHTCVW1T und GHTCVW2T mit P1/P2 (Rack 33 in NE9). Nach Rücksprache mit Experimentator von HTD (Hr. Sturm) soll die Reparatur am Montag erfolgen.
Author	Miriam Klich
Comment	2019-03-06 08:17
Comment	Messröhre muss getauscht werden und es wurde ein Leck in HTD festgestellt. Behebung durch Vakuumpumpe bis Donnerstagmorgen zugesagt.
Author	Stephan Reimann

Not many failures, low criticality (eg. switch to another beam line if possible), relatively easy access.

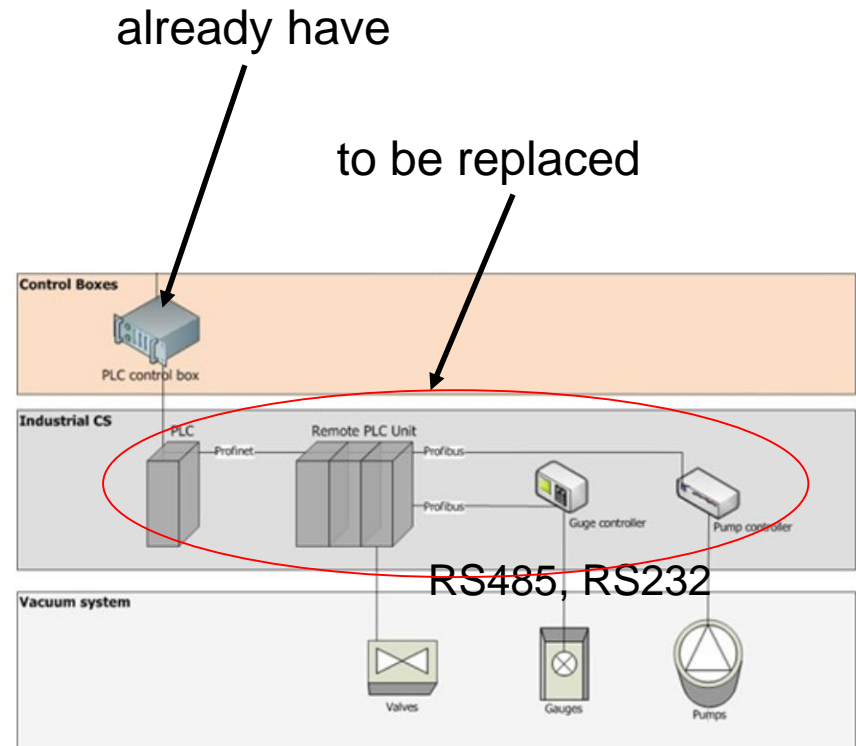


Control system

- Renovated in early 1990's
- The same hardware as in SIS18 (NOT like UNILAC's old system)
- Can run for another ~10 years
- Remote control of valves, reading of gauges

FAIR vacuum control system:

- PLC-based Industrial CS
- Easy, standard, robust reliable, radiation-compatible
- HEST system is already quite centralized – probably no recabling needed
- + Remote control of pumps



What should be done and when?

1. An online vacuum system status page (like for SIS18),
centralized information page about vented sectors – ASAP.
2. Replacement of ion getter pumps (12kEUR each)
– every year new pumps are acquired and replaced if needed (2019-2024)
3. Reconfiguration of new HHD beamline (2021, additional ion pump).
4. Upgrade of the control system (2023-2024).

The vacuum system upgrade (and other upgrades) depends on long-term perspectives for HEST. What will happen when FAIR is ready?

Experiments should submit proposals and decisions should be made at management level.