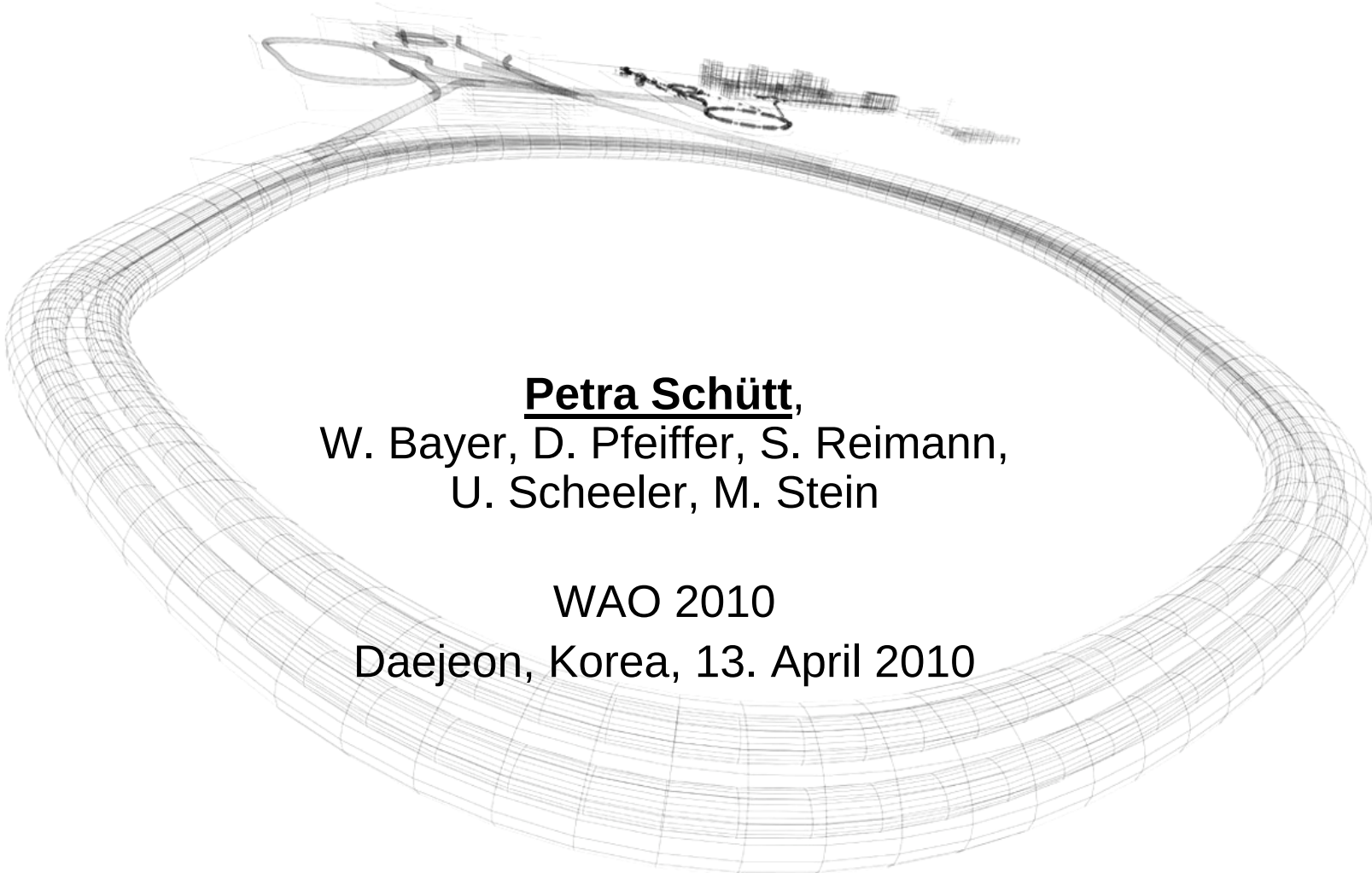
The GSI Operation Logbook OLog

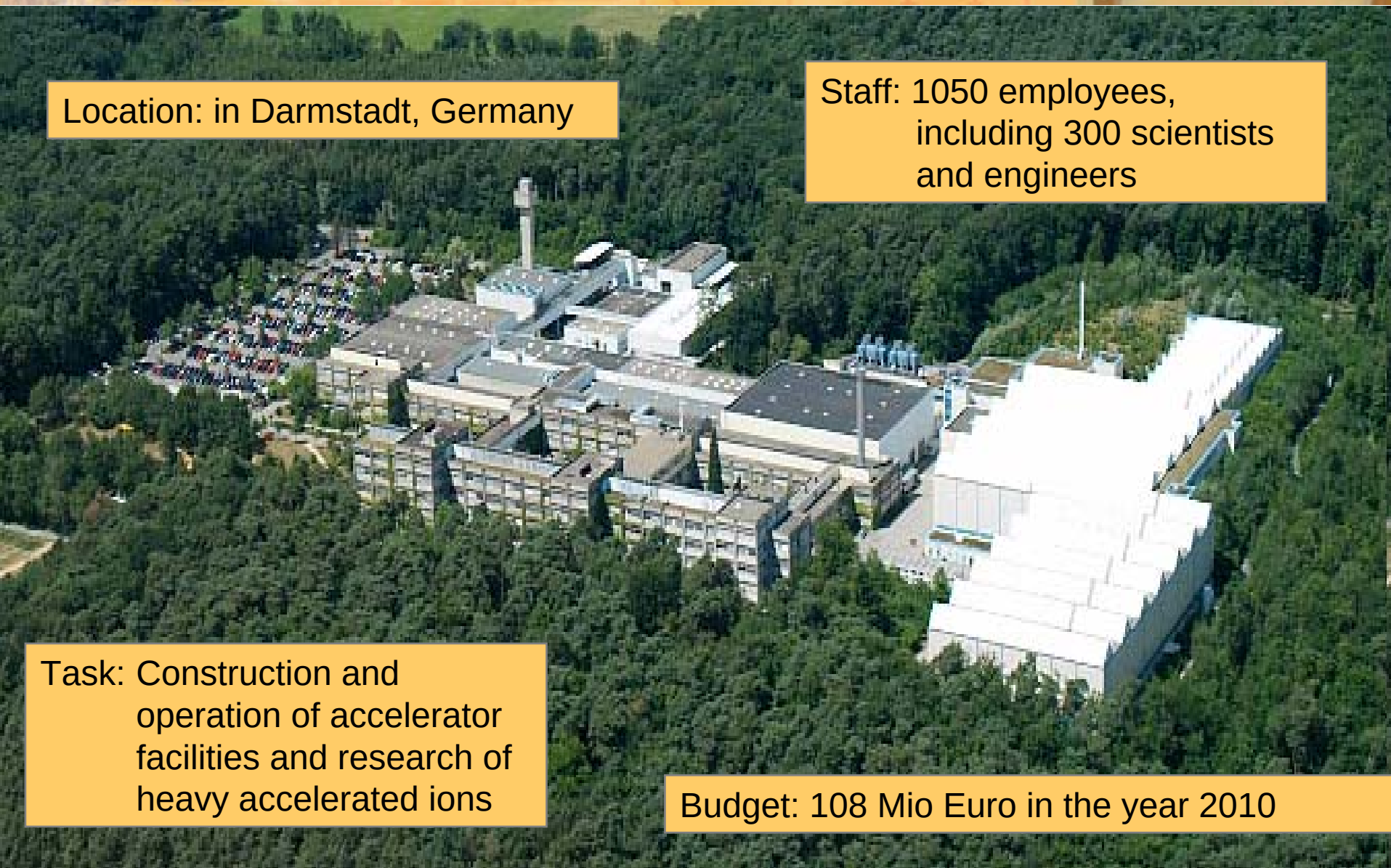


Petra Schütt,
W. Bayer, D. Pfeiffer, S. Reimann,
U. Scheeler, M. Stein

WAO 2010

Daejeon, Korea, 13. April 2010

Helmholtzzentrum für Schwerionenforschung GmbH



Location: in Darmstadt, Germany

Staff: 1050 employees,
including 300 scientists
and engineers

Task: Construction and
operation of accelerator
facilities and research of
heavy accelerated ions

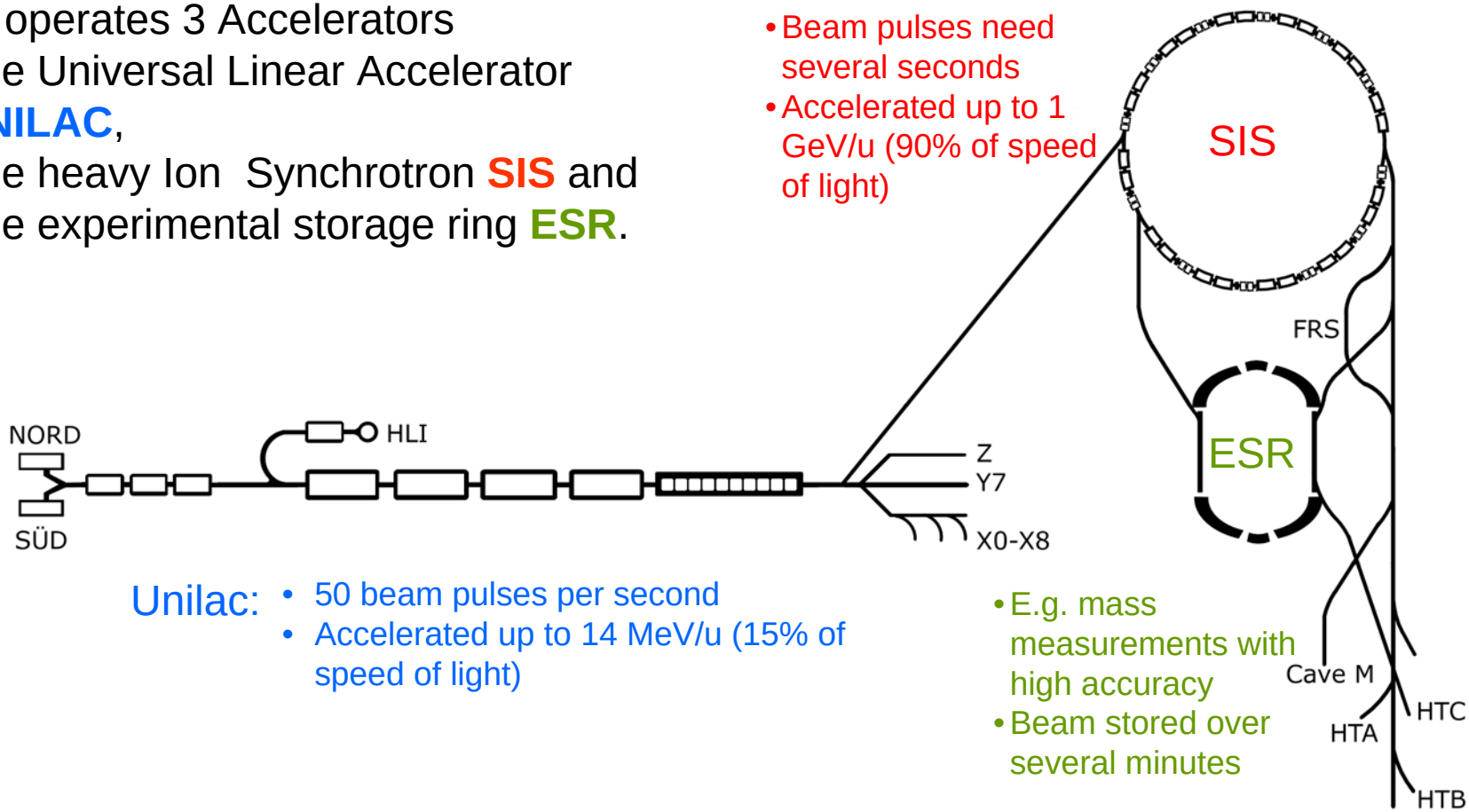
Budget: 108 Mio Euro in the year 2010

The GSI Accelerator Complex

GSI operates 3 Accelerators

- The Universal Linear Accelerator **UNILAC**,
- The heavy Ion Synchrotron **SIS** and
- The experimental storage ring **ESR**.

- Beam pulses need several seconds
- Accelerated up to 1 GeV/u (90% of speed of light)



Unilac:

- 50 beam pulses per second
- Accelerated up to 14 MeV/u (15% of speed of light)

- E.g. mass measurements with high accuracy
- Beam stored over several minutes

A typical Beam Time Schedule

2. Block / 2010	April 2010	Schedule as of 17-Mrz-2010

Week 13				Week 14							Week 15							Week 16							Week 17				
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
U238, Block, 48Ca, ECR, 4-5 MeV/u, long pulses: 5ms, 5 Hz, Y7 SHIPTRAP						U241, Andersson /Düllmann, 48Ca10+ (ECR), 4.4 - 4.9 MeV/u, 4 pmicroA (pulse) at X8, 5 ms / 50 Hz, X8 TASCA					a)			U250, Ackermann, 64Ni, ECR, 4.8-5.2 MeV/u, 700 pnA, 5.5 ms (max.), Y7																	
U241, Andersson /Düllmann, 48Ca10+ (ECR), 4.4 - 4.9 MeV/u, 4 pmicroA (pulse) at X8, 5 ms / 5 Hz, X8 TASCA						U238, Block, 48Ca, ECR, 4-5 MeV/u, long pulses: 5ms, 5 Hz, Y7 SHIPTRAP								Umat, Voss, 64Ni, 4.8MeV/u, X0				b)					UMAT, Severin/Trautmann, 152Sm, 11.4 MeV/u, 5Hz, 1ms, X0					Umat, Voss, 64Ni, 4.8MeV/u, X0				
S272, Tanihata & Kanungo/Geissel, 86Kr, MUCIS, 500 MeV/nucleon, 1e10/spill, FRS											S-ESA, Durante/Schardt, 7Li, (100-300) MeV/u, 1e3 - 1e8/spill, HTA			S-ESA, Durante/Schardt, Ni, (400-1000) MeV/u, 1e3 - 1e8/spill, HTA															
																				S394, Lemmon/Leifels, 152Sm, ~5e5/spill, long extraction (10s), same energy as E082, HTD									
c)		d)		e)		E075, Herfurth, 86Kr, 30 MeV/u hinter SIS, 4 MeV/u hinter ESR, 1e6 / cycle hinter ESR, HITRAP						E067,Novotny, 7 Li+, PIG, 58.86 MeV/u, >10 muA in ESR, ESR			E082, Litvinov, 152Sm (PIG), 450-600 MeV/u, 1e9 particles/spill, SIS & ESR Cooler, stochastic pre-cooling, fast extraction, ESR															

a) UMAT, Voss, 7Li, 4.8, >=25Hz, X0

b) UMAT, Severin/Bender, 152Sm, (3.6 - 8.6) MeV/u, 5 Hz, 1ms, M-branch

c) E046, Stöhlker, 86Kr, 30 MeV/u, 1e8 particles, SIS cooler, ESR

d) E071, Hagmann, 86Kr, 30 MeV/u, 1e8 particles, SIS cooler, ESR

e) E081, Hagmann, 86Kr, 30 MeV/u, 1e8 particles, SIS cooler, ESR

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3/17/2010 8:36 AM

Goals of the development of OLog

Replace paper logbook by an electronic log

Plus

Use a database for convenient search

- Of previous settings for similar beams
- Of previous solutions for similar problems

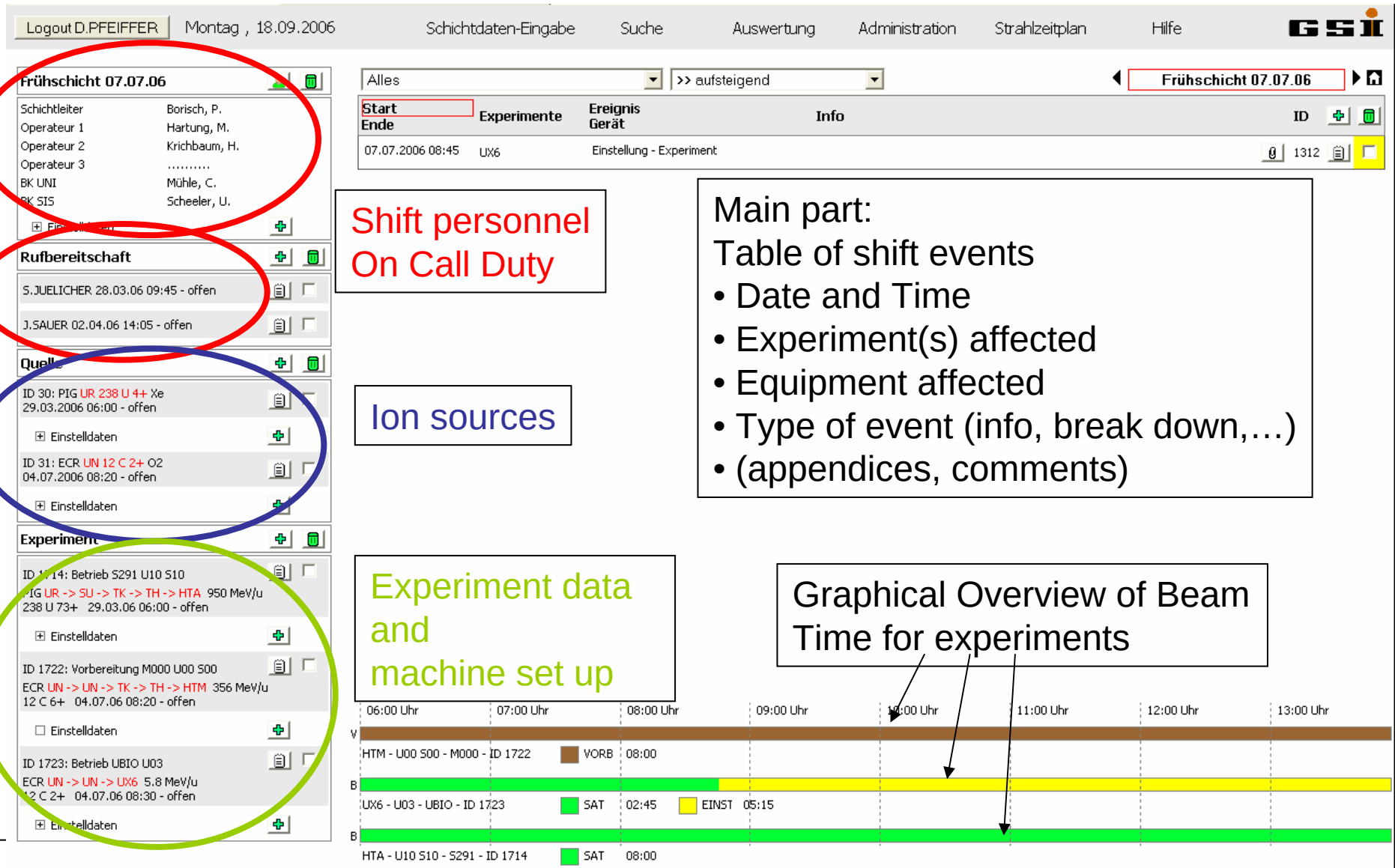
Beam Time Statistics

- Not trivial for complex parallel operation

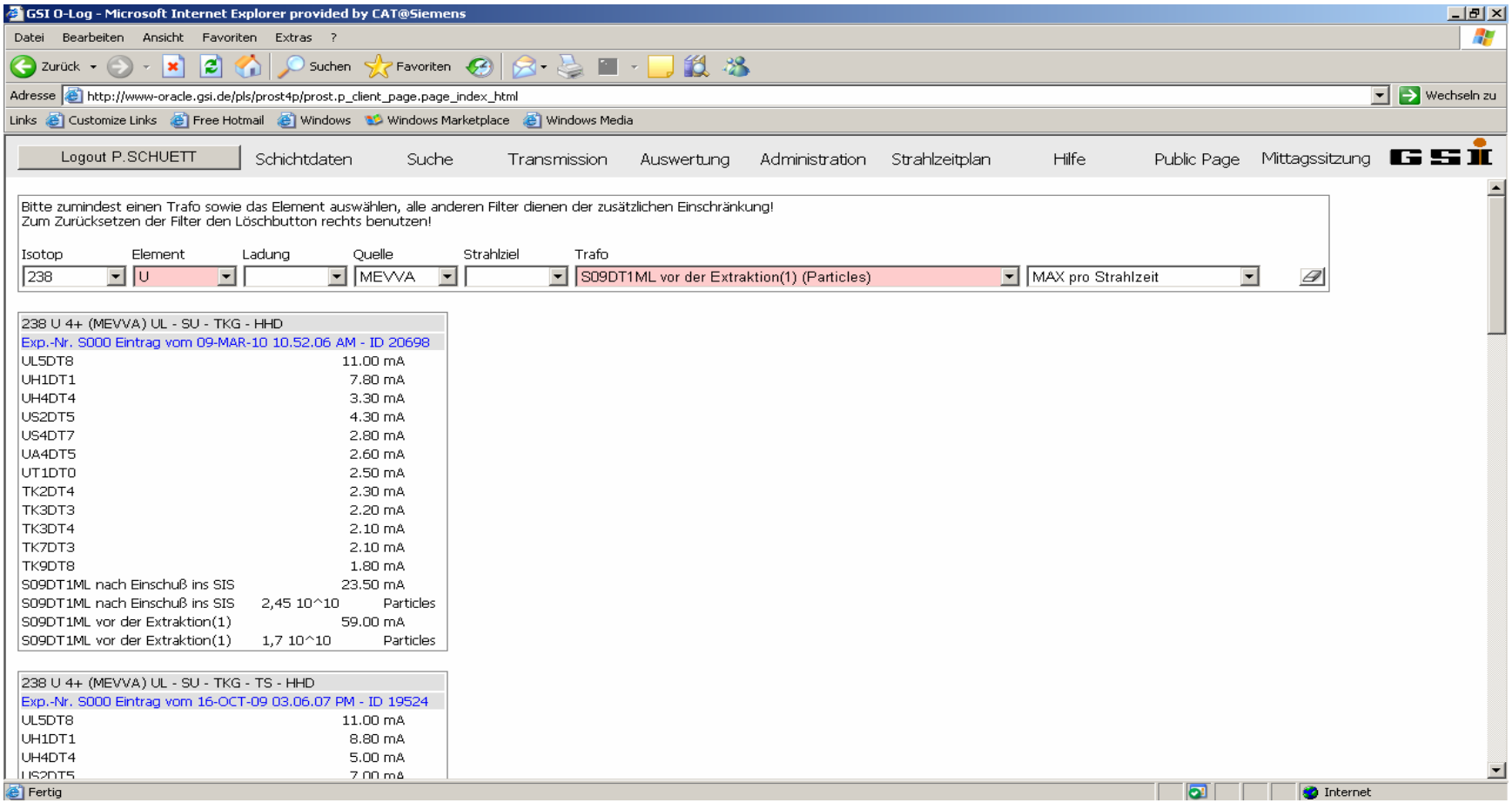
Global (read) access

- Not only the shift crew
- Experiments
- Equipment experts in the accelerator department

Main Content of the OLog



Achieved Intensity for Ion Species



Beam Time Statistics

Example: Year 2009

Statistik Betrieb **Beginn** 01.01.2009 06:00 **Ende** 31.12.2009 14:00

Status	Ereignis	Gesamt	Minuten	Prozent
SAT	Strahl auf Target (inkl. Nachoptimieren)	10169.28 h	610157	60.24
NO	Nachoptimieren	57.33 h	3440	0.34
STDBY	Standby	3093.97 h	185638	18.33
UNTERBR		3561.05 h	213663	21.09
	EINST	1567.80 h	94068	9.29
	QW	299.67 h	17980	1.78
	AUSF	1693.58 h	101615	10.03
GESAMT		**16881.63 h**	**1012898**	**100.00**

Exp-Nr.	Dest.	Vrtacc	ID
B	HTP	U04 S07	2337
U000	ESR	U13 S14	2339
B	UU	U09	2340
UBIO	UX6	U03	2341
FORS	HTB	U12 S10	2342
STHE	HTM	U12 S06	2343
STHE	HTA	U10 S05	2344
S000	HTP	U04 S06	2345
S000	HHD	U09 S10	2346
U232	UY7	U02	2347
UBIO	UX0	U03	2348

(list continues over several pages)

Show Open Bug Reports

GSI O-Log

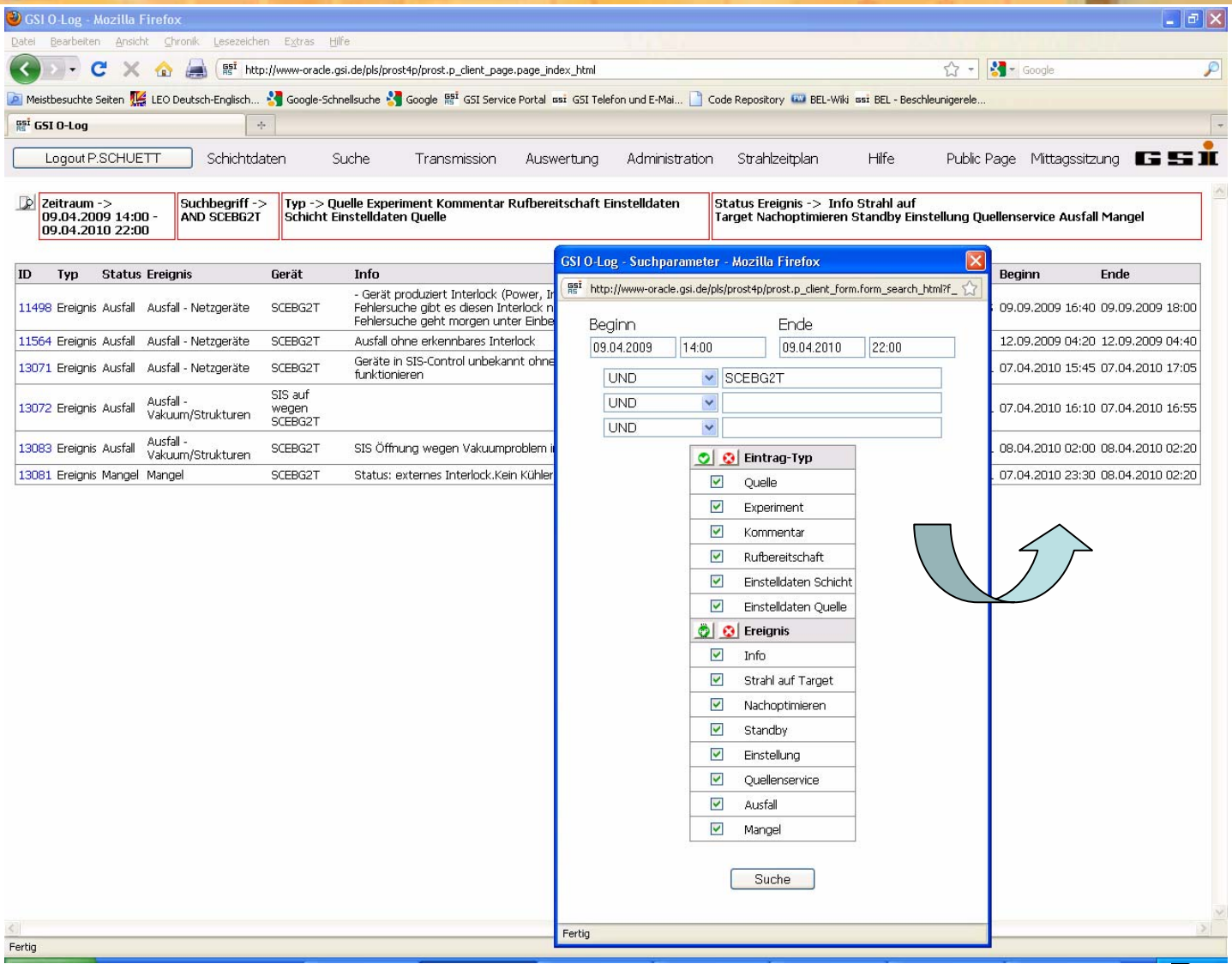
Logout P.SCHUETT | Schichtdaten | Suche | Transmission | Auswertung | Administration | Strahlzeitplan | Hilfe | Public Page | Mittagssitzung

Auswertung Mangel **Beginn** 02.04.2010 22:00 **Ende** 09.04.2010 22:00

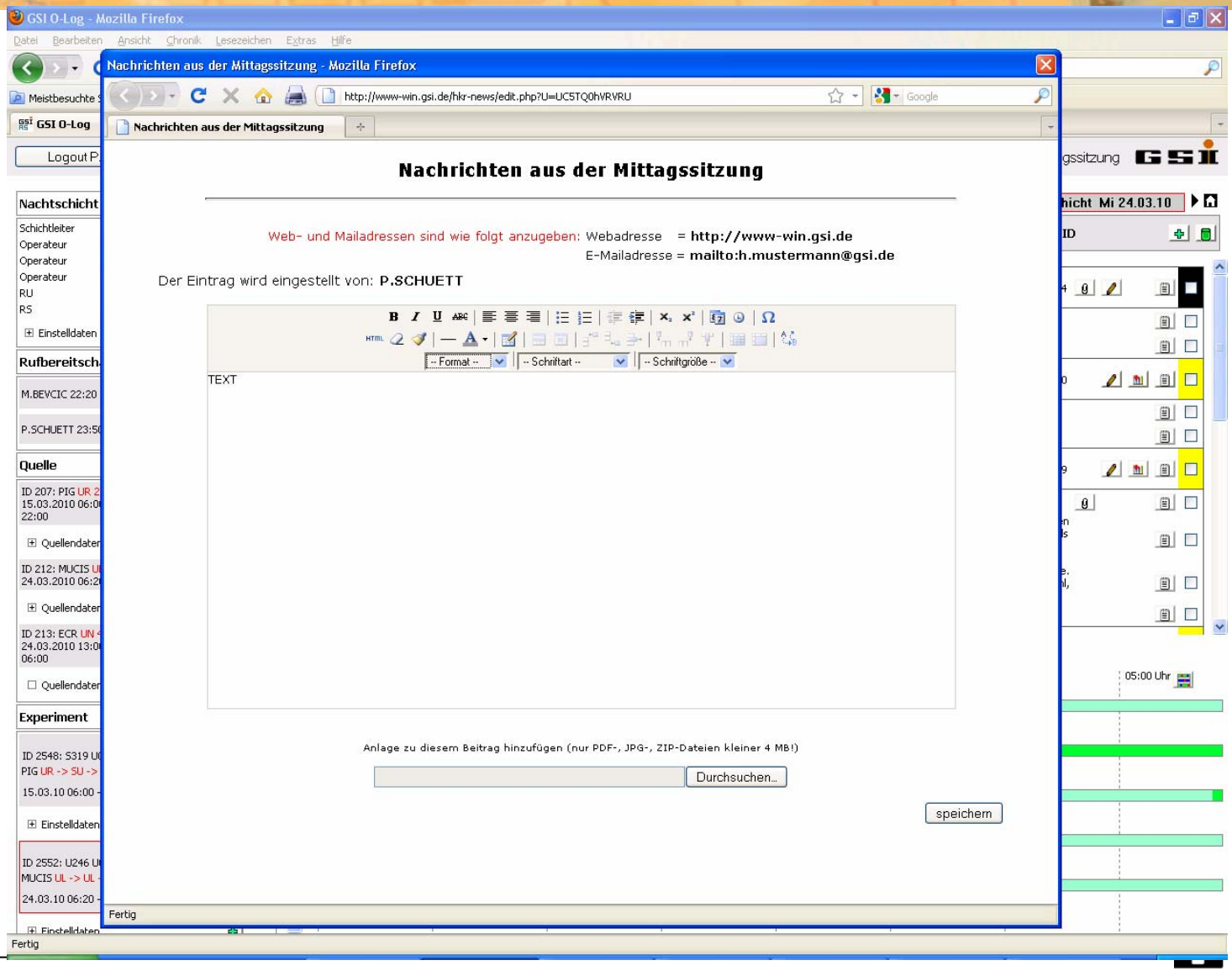
Mangel						
Gerät	**Info**	**von**	**bis**	**Dauer/min**	**Experimente**	**Strahlziel**
TK4BB12	Fehlermeldung im Interlockprogramm: Rückmeldung eines Resets Bedeutung unklar	18.08.2009 17:25		10080		
UE1BE4	Phase ist nicht stabil!	27.08.2009 05:30		10080		
UZEMS0H / UZEMS0V	Steerer vertauscht. H=V und V=H !!!	21.09.2009 21:45		10080		
UXHMS1H UXHMS1V	H/V vertauscht	13.02.2010 16:30		10080		
TK4DG3	Mehrere Drahtpositionen defekt !	09.03.2010 18:10		10080		
TK3MV	--TK3MV1+2 SOLL-IST Abweichung überprüfen (ca 10mV) --TK3MV 3/4 Theorie 5.68Volt eingestellt 5.92Volt .Eingestellter Wert zuweit von der Theorie entfernt.	13.03.2010 10:25		10080		
O-LOG RB	Obwohl man im Formular die angerufene Zeit ändern kann, wird diese im Hauptfeld nicht übernommen. Update der BES Personen erforderlich	22.03.2010 18:05		10080		
UE1BE1	Enveloppenanzeige invertiert !	24.03.2010 18:45		10080		
S09DT1ML	Dier SIS Trafo für die automatische Stromprotokollierung und fürs TDP liefert bei hoher Aussteuerung neg. Meswerte auf FT, Bitte immer kontrollieren und gegebenenfalls den Messbereich von S09DT_ML unempfindlicher schalten. USc	01.04.2010 13:05		10080		
IBHS	Im IBHS werden keine Autosaves für den Beschleuniger U10 abgelegt / angezeigt (außer einem mit dem Namen U10-UL-SU-TK-%%%%-%%%%.dat)	07.04.2010 19:05	08.04.2010 15:25	1220		
E01DX1	Status: Power off. Ursache unklar	07.04.2010 23:00		2820		
SCEBG2T	Status: externes Interlock.Kein Kühlerbetrieb, Intensitätsverlust für HITRAP	07.04.2010 23:30	08.04.2010 02:20	170		
SIS	Sporatische Aussetzer in HFS	08.04.2010 15:50		1810		
UE1BE5	Tauchkolben fährt nicht -> nur geringe Ampl.	08.04.2010 18:40		1640		
UE1BE8	Massive Amplitudenschwankungen	08.04.2010 18:45		1635		
		Anzahl 15	**Stunden 1666.92**	**Minuten 100015**		

Exp-Nr.
E071
E075
E081
S272
U225
U238
ohne Exp-Nr.

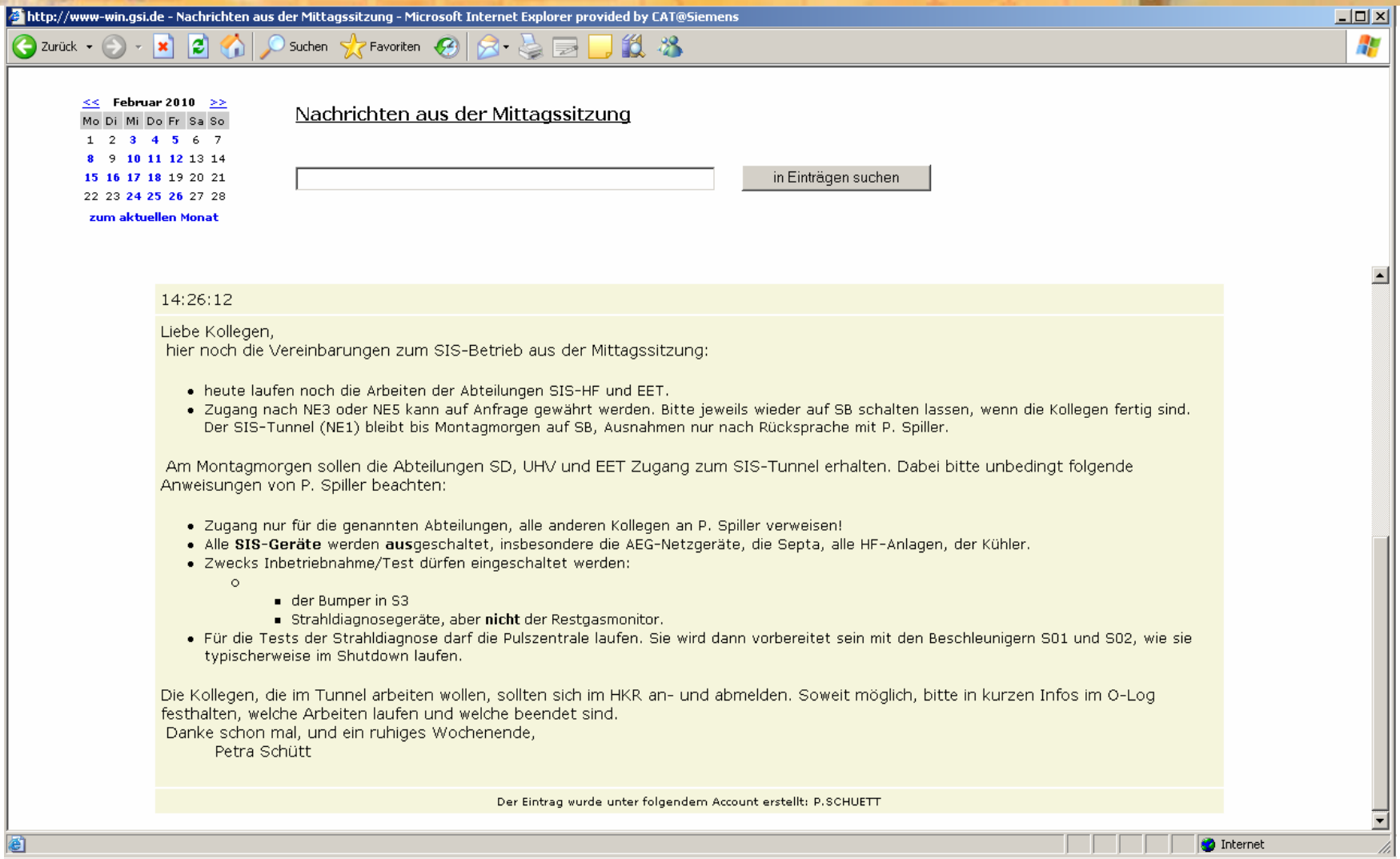
Search for Entries about SCEBG2T



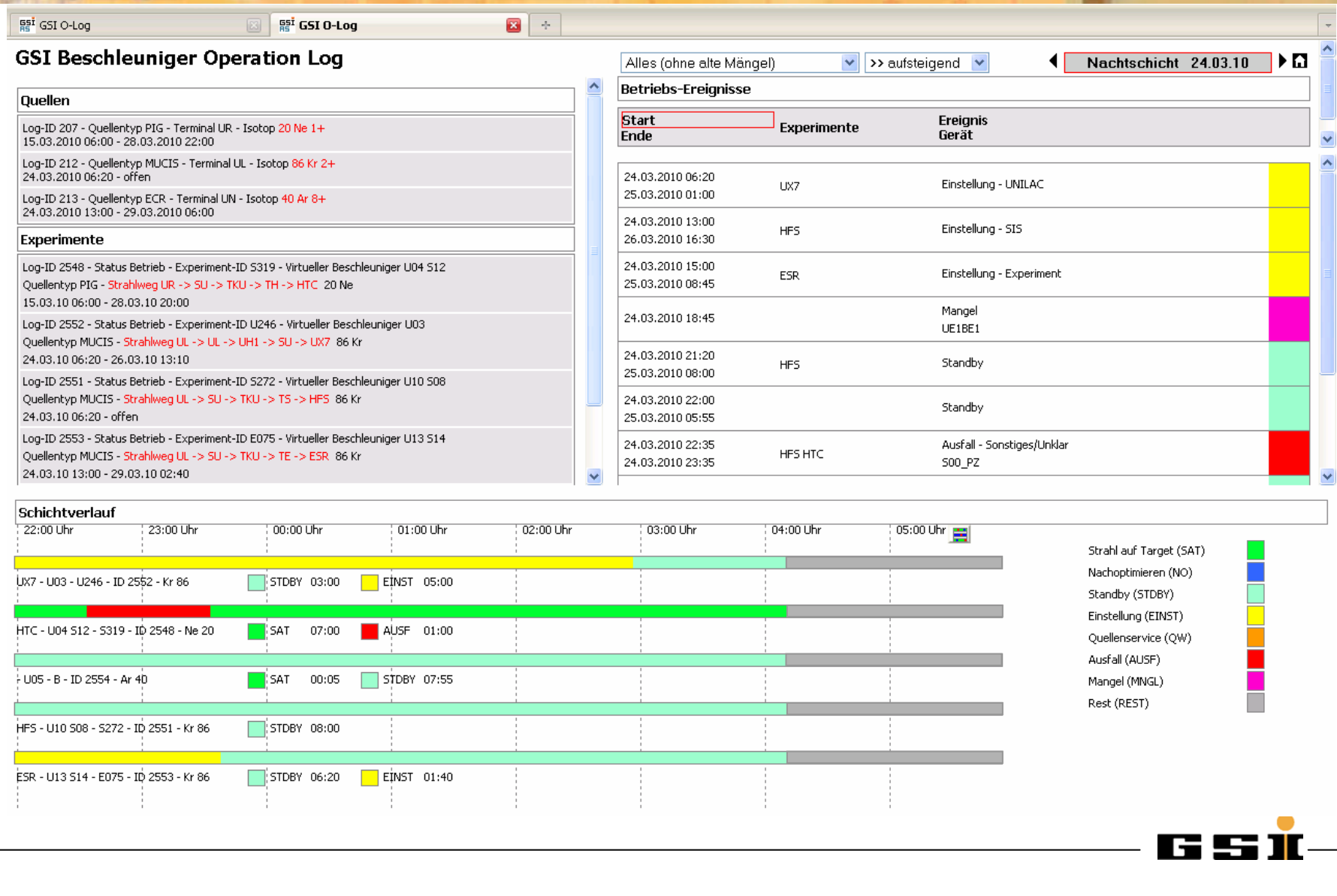
Daily Info for the Shift Crew (Authors view)



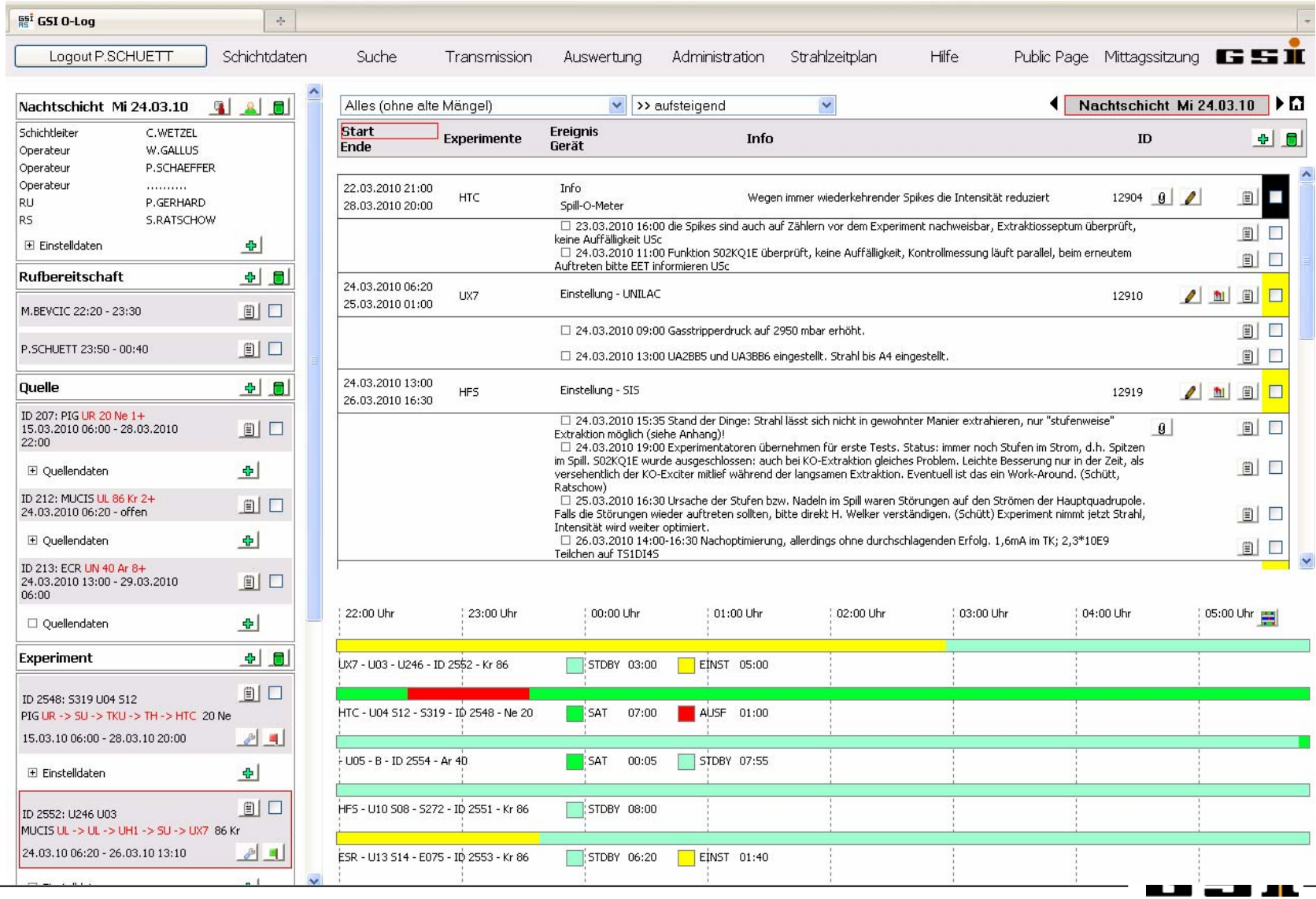
Daily Info for the Shift Crew II



Public Page


GSI O-Log
GSI O-Log
GSI Beschleuniger Operation Log
Alles (ohne alte Mängel)
>> aufsteigend
Nachtschicht 24.03.10
Quellen
Log-ID 207 - Quellentyp PIG - Terminal UR - Isotop 20 Ne 1+
15.03.2010 06:00 - 28.03.2010 22:00
Log-ID 212 - Quellentyp MUCIS - Terminal UL - Isotop 86 Kr 2+
24.03.2010 06:20 - offen
Log-ID 213 - Quellentyp ECR - Terminal UN - Isotop 40 Ar 8+
24.03.2010 13:00 - 29.03.2010 06:00
Experimente
Log-ID 2548 - Status Betrieb - Experiment-ID S319 - Virtueller Beschleuniger U04 S12
Quellentyp PIG - Strahlweg UR -> SU -> TKU -> TH -> HTC 20 Ne
15.03.10 06:00 - 28.03.10 20:00
Log-ID 2552 - Status Betrieb - Experiment-ID U246 - Virtueller Beschleuniger U03
Quellentyp MUCIS - Strahlweg UL -> UL -> UH1 -> SU -> UX7 86 Kr
24.03.10 06:20 - 26.03.10 13:10
Log-ID 2551 - Status Betrieb - Experiment-ID S272 - Virtueller Beschleuniger U10 S08
Quellentyp MUCIS - Strahlweg UL -> SU -> TKU -> TS -> HFS 86 Kr
24.03.10 06:20 - offen
Log-ID 2553 - Status Betrieb - Experiment-ID E075 - Virtueller Beschleuniger U13 S14
Quellentyp MUCIS - Strahlweg UL -> SU -> TKU -> TE -> ESR 86 Kr
24.03.10 13:00 - 29.03.10 02:40
Betriebs-Ereignisse
Start
Ende
Experimente
Ereignis
Gerät
24.03.2010 06:20
25.03.2010 01:00
UX7
Einstellung - UNILAC
24.03.2010 13:00
26.03.2010 16:30
HFS
Einstellung - SIS
24.03.2010 15:00
25.03.2010 08:45
ESR
Einstellung - Experiment
24.03.2010 18:45
Mangel
UE1BE1
24.03.2010 21:20
25.03.2010 08:00
HFS
Standby
24.03.2010 22:00
25.03.2010 05:55
Standby
24.03.2010 22:35
24.03.2010 23:35
HFS HTC
Ausfall - Sonstiges/Unklar
S00_PZ
Schichtverlauf
22:00 Uhr
23:00 Uhr
00:00 Uhr
01:00 Uhr
02:00 Uhr
03:00 Uhr
04:00 Uhr
05:00 Uhr
UX7 - U03 - U246 - ID 2552 - Kr 86
STDBY 03:00
EINST 05:00
HTC - U04 S12 - S319 - ID 2548 - Ne 20
SAT 07:00
AUSF 01:00
- U05 - B - ID 2554 - Ar 40
SAT 00:05
STDBY 07:55
HFS - U10 S08 - S272 - ID 2551 - Kr 86
STDBY 08:00
ESR - U13 S14 - E075 - ID 2553 - Kr 86
STDBY 06:20
EINST 01:40
Strahl auf Target (SAT)
Nachoptimieren (NO)
Standby (STDBY)
Einstellung (EINST)
Quellenservice (QW)
Ausfall (AUSF)
Mangel (MNGL)
Rest (REST)

Protected Page with Internal Info



History

Fall 2005	Start of first prototype development
	Tests offline (cannot be handled → discard)
Summer 2006	Start of development of version 2
January 2007	Start of use in Operations
	Adaptation to Needs of Shift Crew
	– Information channel added
	– public page
	– automatic import of machine data
January 2008	Stable Version reached
Ongoing	– minor changes and bug fixes,
	– adaptations to changing IT environment
	– actualization of default data, e.g. personnel

Open Problems

- Data Access
  - Connection between accelerator data base and IT data base
  - Access to public part from outside GSI
- Validation of automatic data import
  - E.g. machine set up, transmission data
  - MUST be checked by shift crew
- Change of logging “style” or “culture” (compared to paper log)
  - Shift crew has a special view on events, which is not shared by everybody, e.g. the groups responsible for some equipment
  - Bug reports are read without the possibility to interact with the author → must be complete