HPS Software

HPS Collaboration Meeting,
SLAC, January 23, 2014

Agenda

8:30	Introduction to HPS Software	Maurik Holtrop
8:45	Status of HPS Monte Carlo	Sho Uemura
9:05	Physics Generators for HPS	Takashi Maruyama
9:25	Monitoring and Conditions DB	Jeremy McCormick
9:45	Tracking and Tracker Alignment	Per Hansson
10:05	ECal Set-Up, Monitoring, Calibration	Stuart Fegan
10:25	**Break**	

Software related in talks in later sessions:

2:05	HPS Slow Controls Status	Hovanes Egiyan
2:45	Data Management, Storage, Access	Homer Neal
4:45	Plans for the Mock Data Challenge	Matt Graham

And Yesterday:

2:10	SVT Set-Up Monitoring, Calibration and Commissioning	Omar Moreno

Monte Carlo Chain

		Goto person:
Generators	EGS5, beam background	
↓ StdHep	MadGraph/MadEvent: A' signals, tridents	Takashi
	Fluka: pions, neutrons	
Detector Simulation	GEMC, geometry development, simple studies.	Maurik, Maurizio
↓ LCIO	SLIC, production MC simulation	Sho
	detector studies, tracking studies...	Jeremy
Reconstruction	hps-java + lcsim, tracking	Pelle, Matt, Sho, Omar
	Ecal cluster & trigger,	Jeremy, Norman
↓ LCIO	JAS3 analysis	
DST	hps_dst, root analysis	Omar

Experimental Data Chain

		Goto person:
DAQ Hardware		
DAQ Software		Sergey
↓ EVIO		Eliott Wolin, Carl Timmer
Reconstruction	hps-java + lcsim, tracking	**Matt, Pelle, Sho, Omar**
↓ LCIO	Ecal cluster & trigger, JAS3 analysis	**Jeremy, Norman**
DST	hps_dst, root analysis	**Omar**

Online Monitoring

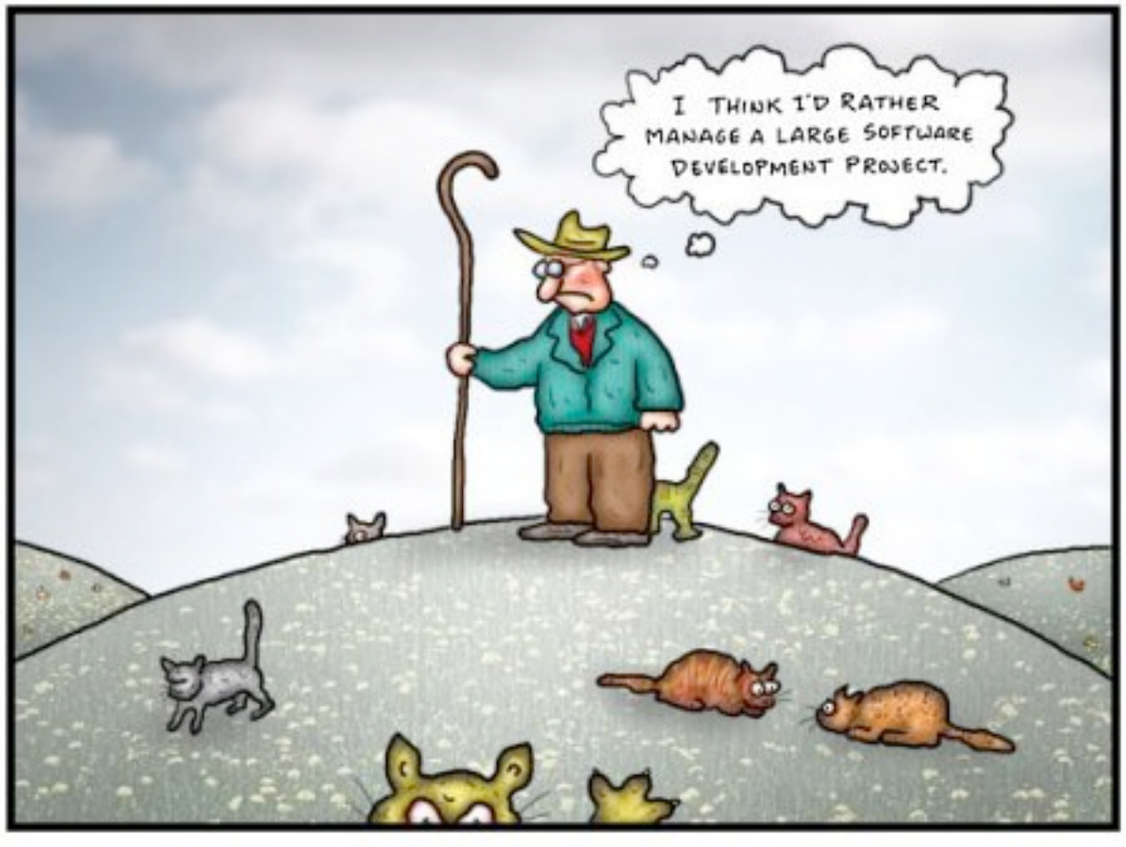
		Goto person:
DAQ Hardware		
DAQ Software		Sergey
↓ EVIO		
Event Transport Ring (ET)		
↓ Low Level Detector Monitoring	Specific programs for monitoring the detector hardware	Detector Groups
↓ Reconstruction Based Detector Monitoring	hps_java + lcsim Histograms, track based monitoring, ...	Jeremy + Detector Groups

Calibration

Tracker Calibration	Gain, t_0, alignment, noise rejection	SVT Detector Group
ECAL Calibration	Gain, thresholds, t_0, noise rejection	ECAL Detector Group
Muon Detector Calibration	Gain, thresholds, t_0, noise rejection	Muon Detector Group
Conditions System	Store all calibrations & time dependent constants in convenient system.	Jeremy

Scheduling...

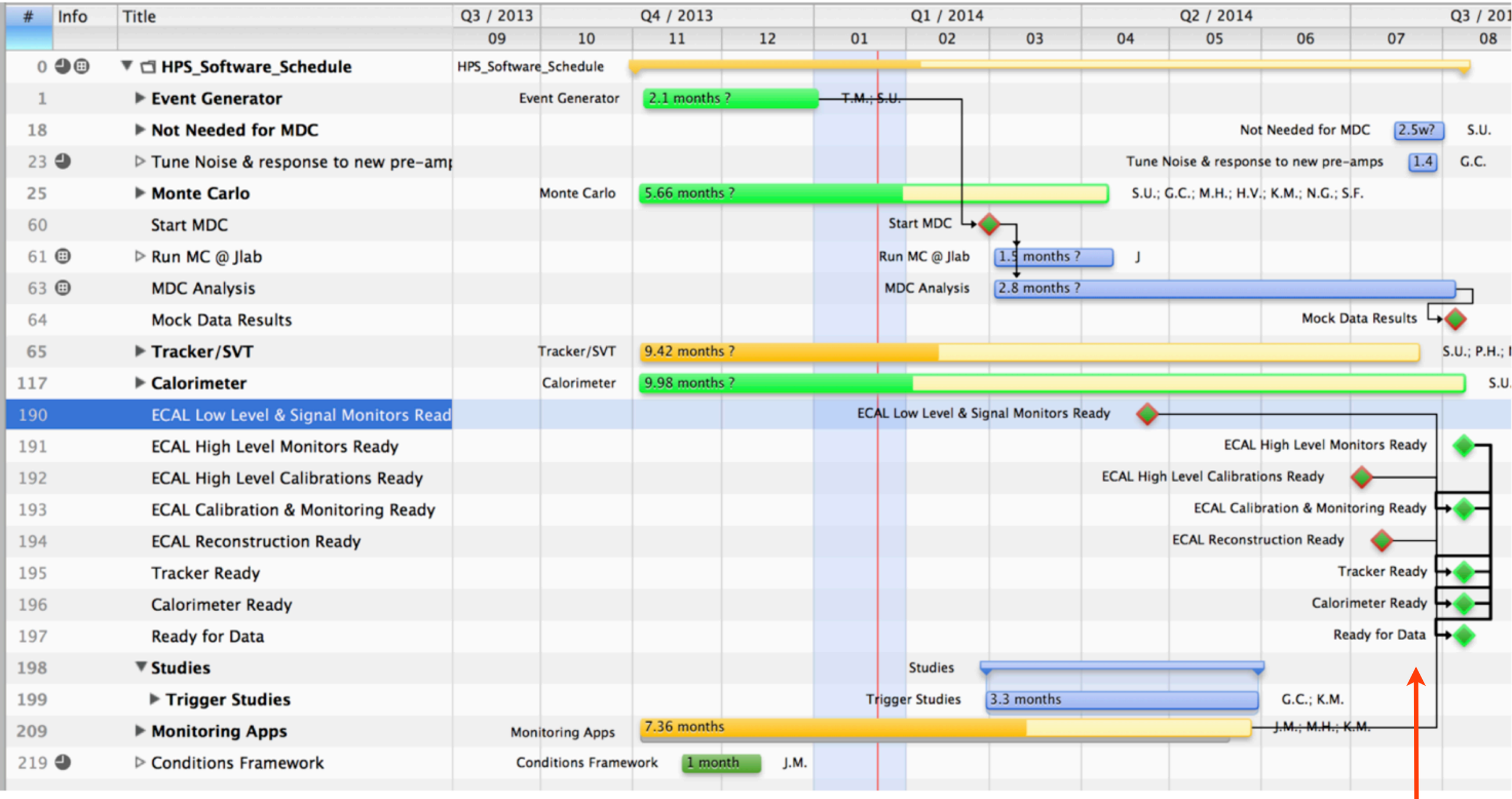
- With software it can be difficult to determine ahead of time how long a particular task will take a particular person to accomplish.
- Thus in the schedule some rather wild assumptions were made about how many hours a task would take.
- Person availability for software is not always clear or unrealistic.
- ....
- I need your input!



The daydreams of cat herders

Schedule

http://nuclear.unh.edu/HPS/HPS_Software_Schedule/

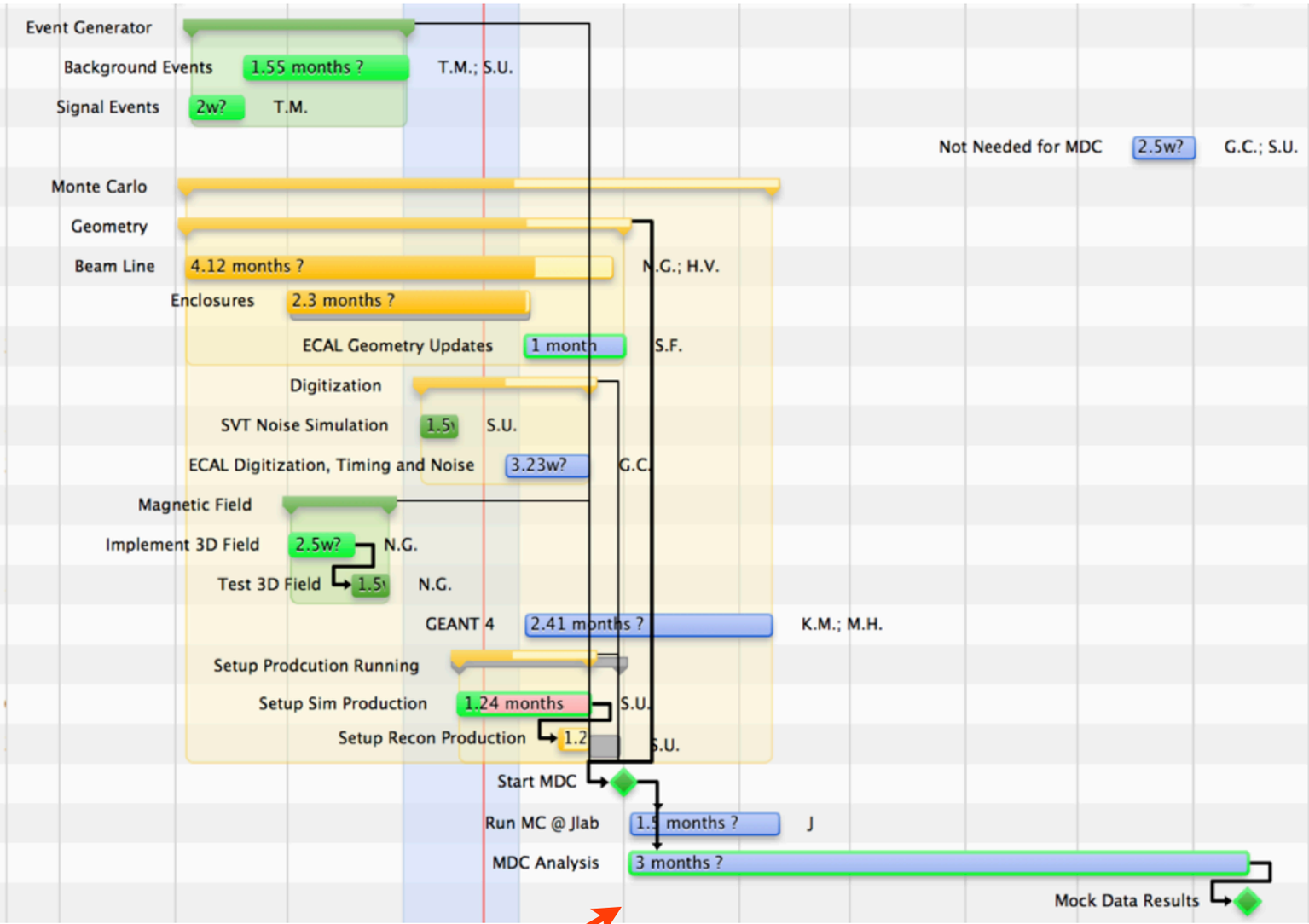


We want to keep these miles stones!

Data Ready: Early August 2014

Schedule Detail: MDC

1	**Event Generator**	**Takashi Maruya...**	100%	
2	**Background Events**	**Takashi Maruya...**	100%	
13	**Signal Events**	**Takashi Maruyama**	100%	
18	**Not Needed for MDC**	**Gabriel Charles;...**	0%	
25	**Monte Carlo**	**Sho Uemura; Ga...**	34%	
26	**Geometry**	**Stuart Fegan; No...**	33%	
27	**Beam Line**	**Norman Graf; H...**	44%	
34	**Enclosures**		80%	
37	ECAL Geometry Updates	Stuart Fegan	0%	
39	**Digitization**	**Gabriel Charles;...**	23%	
40	SVT Noise Simulation	Sho Uemura	100%	
42	ECAL Digitization, Timing and Noise	Gabriel Charles	0%	
44	**Magnetic Field**	**Norman Graf**	100%	
45	Implement 3D Field	Norman Graf	100%	
47	Test 3D Field	Norman Graf	100%	
49	**GEANT 4**	**Kyle McCarty; M...**	0%	
55	**Setup Prodcution Running**	**Sho Uemura**	20%	
56	Setup Sim Production	Sho Uemura	20%	
58	Setup Recon Production	Sho Uemura	20%	
60	Start MDC		0%	
61	Run MC @ Jlab	Jlab batch	0%	
63	MDC Analysis		0%	
64	Mock Data Results		0%	

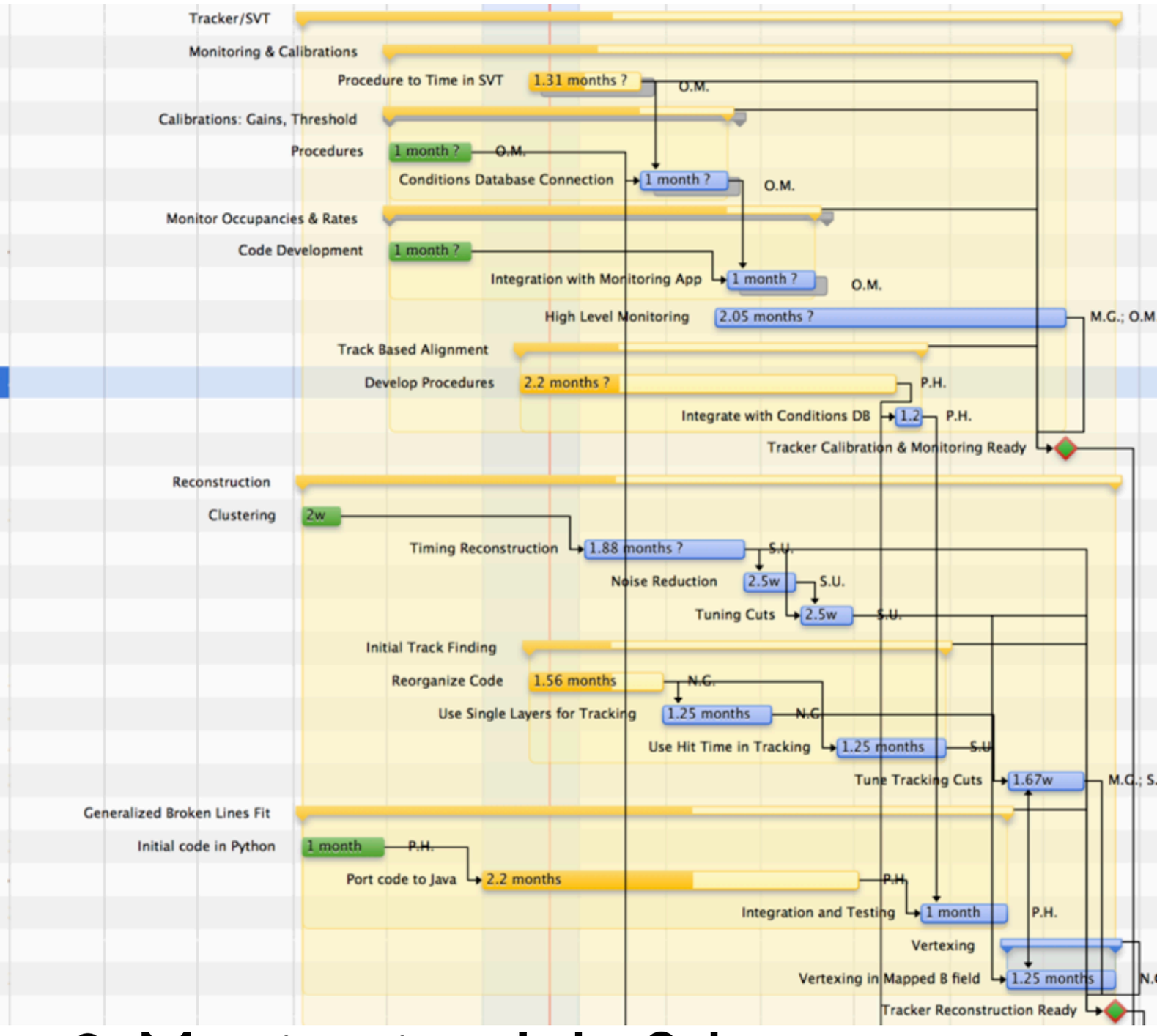


MDC Start: End of February

3 months analysis ⇒ MDC results: Middle of August 2014

Schedule Detail: Tracker

65	**Tracker/SVT**	**Sho Uemura; Per...**	31%	
66	**Monitoring & Calibrations**	**Per Hansson; Ma...**	37%	
67	Procedure to Time in SVT	Omar Moreno	30%	
69	**Calibrations: Gains, Threshold**	**Omar Moreno**	50%	
70	Procedures	Omar Moreno	100%	
72	Conditions Database Connection	Omar Moreno	0%	
74	**Monitor Occupancies & Rates**	**Omar Moreno**	80%	
75	Code Development		100%	
76	Integration with Monitoring App	Omar Moreno	0%	
78	High Level Monitoring	Matt Graham; O...	0%	
81	**Track Based Alignment**	**Per Hansson**	17%	
82	Develop Procedures	Per Hansson	20%	
84	Integrate with Conditions DB	Per Hansson	0%	
86	Tracker Calibration & Monitoring Ready		0%	
87	**Reconstruction**	**Matt Graham; N...**	28%	
88	Clustering		100%	
89	Timing Reconstruction	Sho Uemura	0%	
91	Noise Reduction	Sho Uemura	0%	
93	Tuning Cuts	Sho Uemura	0%	
95	**Initial Track Finding**	**Norman Graf; Sh...**	17%	
96	Reorganize Code	Norman Graf	50%	
98	Use Single Layers for Tracking	Norman Graf	0%	
100	Use Hit Time in Tracking	Sho Uemura	0%	
102	Tune Tracking Cuts	Matt Graham; Sh...	0%	
106	**Generalized Broken Lines Fit**	**Per Hansson**	50%	
107	Initial code in Python	Per Hansson	100%	
109	Port code to Java	Per Hansson	50%	
111	Integration and Testing	Per Hansson	0%	
113	**Vertexing**	**Norman Graf**	0%	
114	Vertexing in Mapped B field	Norman Graf	0%	
116	Tracker Reconstruction Ready		0%	



Tracker Calibration & Monitoring: July 8th

Tracker Reconstruction: July 24th

Schedule Detail: ECAL - 1

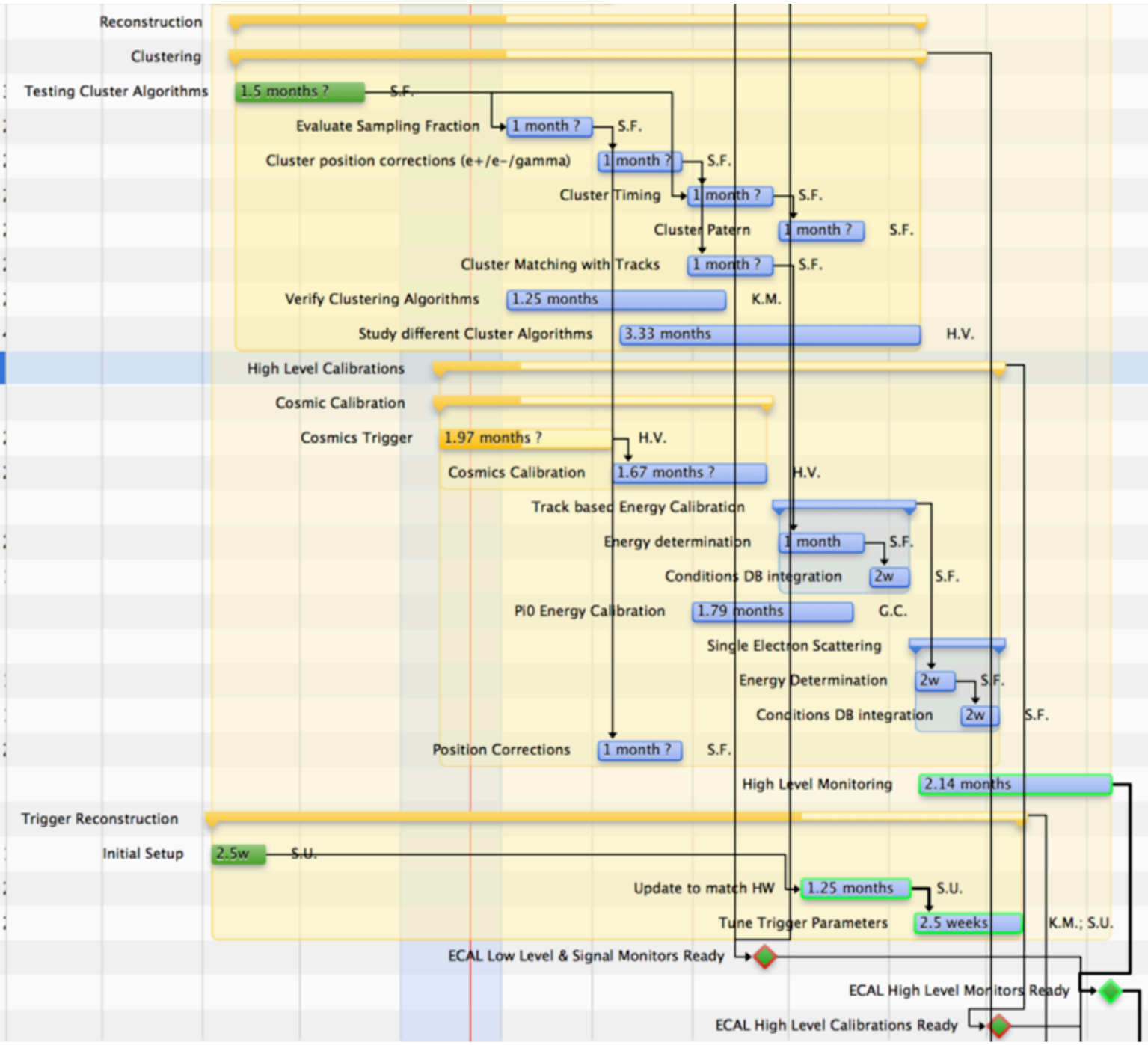
117	**Calorimeter**	**Sho Uemura; An...**	15%	Calorimeter
118	**Low Level Monitors**	**Andrea Celentan...**	33%	Low Level Monitors
119	Low Level Monitor App	Andrea Celentano	0%	Low Level Monitor App 2.38 weeks ? A.C.
121	**Light Monitoring System**	**Andrea Celentan...**	40%	Light Monitoring System
122	Light Monitoring System Firmware	Andrea Celentano	100%	Light Monitoring System Firmware 1.19 months ? A.C.
124	Incorporate with EPICS	Ken Livingston	0%	Incorporate with EPICS 1.25 months ? K.L.
126	Integrate with Conditions DB	Andrea Celentano	0%	Integrate with Conditions DB 2.33w A.C.
128	**Signal Level Monitoring**		0%	Signal Level Monitoring
129	Occupancy & Rates		0%	Occupancy & Rates 2w
130	**Low Level Calibrations**		50%	Low Level Calibrations
131	**Gains and Thresholds**		50%	Gains and Thresholds 4.5 months
135	**Reconstruction**	**Stuart Fegan; Ky...**	16%	Reconstruction
136	**Clustering**	**Stuart Fegan; Ky...**	16%	Clustering
137	Testing Cluster Algorithms	Stuart Fegan	100%	Testing Cluster Algorithms 1.5 months ? S.F.
139	Evaluate Sampling Fraction	Stuart Fegan	0%	Evaluate Sampling Fraction 1 month ? S.F.
141	Cluster position corrections (e+/e...	Stuart Fegan	0%	Cluster position corrections (e+/e-/gamma) 1 month ? S.F.
143	Cluster Timing	Stuart Fegan	0%	Cluster Timing 1 month ? S.F.
145	Cluster Patern	Stuart Fegan	0%	Cluster Patern 1 month ? S.F.
147	Cluster Matching with Tracks	Stuart Fegan	0%	Cluster Matching with Tracks 1 month ? S.F.
149	Verify Clustering Algorithms	Kyle McCarty	0%	Verify Clustering Algorithms 1.25 months K.M.
151	Study different Cluster Algorithms	Holly Vance	0%	Study different Cluster Algorithms 3.33 months H.V.
153	**High Level Calibrations**	**Stuart Fegan; Ga...**	5%	High Level Calibrations 6.25 months ? S.F.; G.C.; H.V.
178	**High Level Monitoring**		0%	High Level Monitoring 2.14 months
182	**Trigger Reconstruction**	**Kyle McCarty; Sh...**	20%	Trigger Reconstruction
183	Initial Setup	Sho Uemura	100%	Initial Setup 2.5w S.U.
185	Update to match HW	Sho Uemura	0%	Update to match HW 1.25 months S.U.
187	Tune Trigger Parameters	Kyle McCarty; Sh...	0%	Tune Trigger Parameters 2.5 weeks K.M.; S.U.
190	ECAL Low Level & Signal Monitors Ready		0%	ECAL Low Level & Signal Monitors Ready
191	ECAL High Level Monitors Ready		0%	ECAL High Level Monitors Ready

ECAL Low Level Monitoring: April 23rd

ECAL High Level Monitoring : August 8th

Schedule Detail: ECAL - 11

135	**Reconstruction**	**Stuart Fegan; Ky...**	16%
136	**Clustering**	**Stuart Fegan; Ky...**	16%
137	Testing Cluster Algorithms	Stuart Fegan	100%
139	Evaluate Sampling Fraction	Stuart Fegan	0%
141	Cluster position corrections (e+/e...	Stuart Fegan	0%
143	Cluster Timing	Stuart Fegan	0%
145	Cluster Patern	Stuart Fegan	0%
147	Cluster Matching with Tracks	Stuart Fegan	0%
149	Verify Clustering Algorithms	Kyle McCarty	0%
151	Study different Cluster Algorithms	Holly Vance	0%
153	**High Level Calibrations**	**Stuart Fegan; G...**	5%
154	**Cosmic Calibration**	**Holly Vance**	20%
155	Cosmics Trigger	Holly Vance	40%
157	Cosmics Calibration	Holly Vance	0%
159	**Track based Energy Calibration**	**Stuart Fegan**	0%
160	Energy determination	Stuart Fegan	0%
162	Conditions DB integration	Stuart Fegan	0%
164	**Pi0 Energy Calibration**	**Gabriel Charles**	0%
171	**Single Electron Scattering**	**Stuart Fegan**	0%
172	Energy Determination	Stuart Fegan	0%
174	Conditions DB integration	Stuart Fegan	0%
176	Position Corrections	Stuart Fegan	0%
178	**High Level Monitoring**		0%
182	**Trigger Reconstruction**	**Kyle McCarty; Sh...**	20%
183	Initial Setup	Sho Uemura	100%
185	Update to match HW	Sho Uemura	0%
187	Tune Trigger Parameters	Kyle McCarty; Sh...	0%
190	ECAL Low Level & Signal Monitors Ready		0%
191	ECAL High Level Monitors Ready		0%
192	ECAL High Level Calibrations Ready		0%



ECAL Reconstruction: July 4th

ECAL High Level Calibrations : July 11th

Scheduling

That looks kind of good

BUT...

Resource Utilization

No Resources Assigned	11/4/13									
Andrea Celentano	12/2/13		42%	5%	21%	4%	23%			
Gabriel Charles	1/28/14			6%	47%	22%	102%	80%		22%
Holly Vance	1/13/14			26%	56%	53%	53%	30%	10%	
Homer Neil										
Jeremy McCormick	11/4/13	48%	23%	38%	18%	48%				
Jlab batch	3/3/14					23%	10%			
Ken Livingston	3/4/14					38%	9%			
Kyle McCarty	2/3/14				26%	67%	62%	58%	15%	8%
Matt Graham	3/17/14					11%	21%	21%	12%	8%
Maurik Holtrop	2/3/14				15%	25%	25%	8%		
Maurizio Ungaro										
Norman Graf	11/4/13	5%	36%	14%	40%	40%	6%		14%	30%
Omar Moreno	12/2/13		23%	9%	25%	25%	21%	12%	12%	3%
Per Hansson	11/4/13	48%		33%	50%	50%	50%	42%	40%	7%
Raphaël Dupré										
Sho Uemura	11/4/13	30%	4%	32%	78%	40%	45%	75%	31%	37%	1%
Stuart Fegan	11/11/13	36%	34%		100%	100%	100%	89%	50%	9%
Takashi Maruyama	11/5/13	17%	19%	1%						
Yuri Gernstein										

Some people have unrealistic loads under this model ⇒

Either assign them to higher % software,
or find other contributors,
or redefine the task.

Software Workshop

- Next week after Software Review
- We're expecting reasonably good turnout.
- Use it to:
  - Get up to speed on a task
  - Learn about the framework
  - Get started on analysis
- Join HPS-Software mailing list, ask questions get involved.