JLab Hall D Staffing Needs

Elliott Wolin, 15-Nov-2000

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Introduction

In this note I estimate the number of JLab staff members needed to be hired or assigned to work on the Hall D detector and online efforts as part of the Hall D group. I also estimate the number of additional staff members needed to be hired into the JLab DAQ, Electronics, Target, and Computer groups (not counting existing staff temporarily assigned to Hall D). I mainly discuss permanent staff, and only briefly mention project staff. I do not discuss temps hired for specific jobs, as these costs should be included in the detector construction budget.

A future note will discuss JLab staffing needs to support the Hall D physics and software efforts.

My manpower estimates and hiring timelines are included in Elton's Hall D cost/manpower spreadsheet (soon to be released). At the bottom of this note is a text version of the relevant piece.

Why discuss this now

It's important to start discussing this now for a number of reasons. It takes time to hire people, and we need to be ready to hire when it becomes possible. Certain positions are hard to fill, and JLab might want to fill them before they're really needed to ensure that someone is available when they ARE needed. We'll need support from other groups at JLab, and we want to ensure they know how much support we need, and that they agree to provide this support. Finally, we want a good estimate of our personnel needs as early as possible so we don't get caught short; i.e. it's better to be realistic up front than to try to get more staff late in the game.

I suspect most of us can come up with additional reasons...

Background for analysis

I base my recommendations on discussions with the heads of the JLab DAQ, Electronics, Target, and Computer groups, as well as with the head of the CLAS electronics group, other JLab employees, Hall D members (especially Elton), and on my own experience.

Relation to CLAS

Although the Hall D and CLAS efforts are roughly the same size overall, CLAS is more complicated mechanically, whereas Hall D is more complicated electronically. Further, Hall D cannot afford to approach electronics, DAQ, online, and control in the fragmented way done by CLAS.

Hall D Mechanical staff

Paul Brindza estimates Hall D will need 6 permanent mechanical engineering staff (head engineer, lead designer, lead technician, designer, 2 mechanical technicians). I believe this is somewhat less than CLAS currently employs.

I estimate we'll need 6-7 additional project staff (2 designers, 1 welder, 3-4 technicians), or about 20 man-years, depending on how much mechanical work is done at the universities.

Hall D Electronics staff

Based on the CLAS experience I believe Hall D will need 2 permanent designers and 4-5 permanent electronics technicians . CLAS currently employs 3 technicians, uses a varying number of graduate and undergraduate EE students, and uses 2-3 technicians from the JLab Electronics group. The head of the CLAS electronics group claims this has never been enough.

Hall D is more complicated and sophisticated electronically than CLAS, and will likely use proportionally less commercial electronics. Thus I believe we'll need more permanent electronics staff than CLAS.

It's hard to estimate how many project electronics staff will be needed to design/build/test/install Hall D equipment, as this depends on how much work is done at JLab versus at the universities. Six technician man-years may be enough if Hall D employs 4-5 permanent electronics technicians, and if a lot of design work is done at the universities. Otherwise JLab will need additional project designers and technicians.

Hall D Computer staff

The Hall D online computer system will contain a large number of single-board computers, a smaller number of SMP workstations, a level 3 trigger farm, plus auxiliary equipment (UPS, routers, switches, hubs, RAID, printers, etc.). The JLab Computer group will provide system management advice and support, but requires we have our own personnel to handle the day-to-day work. The tape silos will be located in the computer center, and will be managed by computer center personnel.

CLAS has 1 computer professional dedicated to system management, but has a smaller number of computers, a simpler network topology, and no online farm system. I believe Hall D will need 2 permanent computer professionals to manage and maintain the Hall D online computer systems.

Note that here I do not include physicists/programmers working on the online software.

JLab DAQ group staff

Graham Heyes estimates he'll need 2 additional computer professionals to support the Hall D DAQ system. Currently this group has 6 members (5 physicist/programmers, 1 physicist/electronics designer) supporting three halls plus outside groups.

Recently there was an additional visiting electronics engineer/designer in the DAQ group who developed a number of critical boards for CLAS. Given the Hall D need for custom digital boards I feel it's important that the DAQ group add an additional engineer/designer. I note that the visitor will likely become available to be hired by the DAQ group about the time Hall D would need him.

JLab Electronics group staff

Chris Cuevas estimates he'll need 1 additional electronics designer/coordinator and 2 additional technicians to support Hall D. Currently this group has 8 members (head, 2 engineer/designers, 5 technicians) supporting the three halls and the Target and Detector groups. CLAS currently keeps 2 -3 FTE's busy.

How to balance having technicians work in this group versus working directly for Hall D is not obvious. In general, technicians in this group should be responsible for hardware that is commonly used around the lab, while Hall D should hire technicians to work on equipment unique to Hall D. I believe we should lean towards hiring our own technicians when possible.

JLab Target group staff

Mikell Seely believes he'll need NO additional staff members to support the Hall D target design and construction effort, assuming the target is as simple as he's been led to believe, and he's given ample time to design and build it. This group will soon have 8 members (3 physicists, 1 engineer, 4 technicians) who design, build, and maintain cryotargets in the three halls.

The target should require little maintenance, perhaps 1/4 -1/2 FTE shared between the JLab target group and Hall D.

JLab Computer group staff

Ian Bird estimates he'll need an additional 1/2 FTE to support the Hall D online, assuming we hire our own computer support personnel as discussed above. This work mainly involves maintenance of computer and network hardware, operating systems and related software, online database hardware and software, and level 3 farm system.

Note that here I do not discuss Computer center staff needed to support the Hall D offline analysis effort.

Conclusions

Hall D and JLab must be ready to start hiring the moment it becomes possible. Thus we need a good estimate of how much manpower is needed and when it must be available. This note, although incomplete, is intended to get this discussion and analysis started.

Spreadsheet

The following spreadsheet shows how many of each type of permanent staff JLab will need to hire, and when. "Year n" denotes the n'th year of "real" funding for Hall D (whatever that means). I assume the detector building will be available around the 3rd or 4th year. Full permanent staffing occurs in year 5. Staff physicists and programmers are not included.

Please comment!

Funding Year	1	2	3	4	5	6
Hall D Staff (long-term)						
Lead mech engineer	1	1	1	1	1	1
Lead mech designer	0.5	1	1	1	1	1
Lead mech technician	1	1	1	1	1	1
Mechanical designer		1	1	1	1	1
Mechanical technician		0.5	1.5	3	4	4
Electrical designer	1	2	2	2	2	2
Electrical technician		1	1.5	2	4	4
Computer professional			1	2	2	2
Sub Total	3.5	7.5	10	13	16	16
Jlab Staff (non-Hall D)						
DAQ group - computing		1	1.5	2	2	2
DAQ group - EE		1	1	1	1	1
Electronics group - EE		1	1	1	1	1
Electronics group - tech			1	2	2	2
Computing group			0.5	0.5	0.5	0.5
Target group				0	0	0

Sub Total	0	3	5	6.5	6.5	6.5
Total	3.5	10.5	15	19.5	22.5	22.5

Last updated on the 5'th of April, 2001 by cmeyer@ernest.phys.cmu.edu.