Man/Women-Power Considerations for Construction

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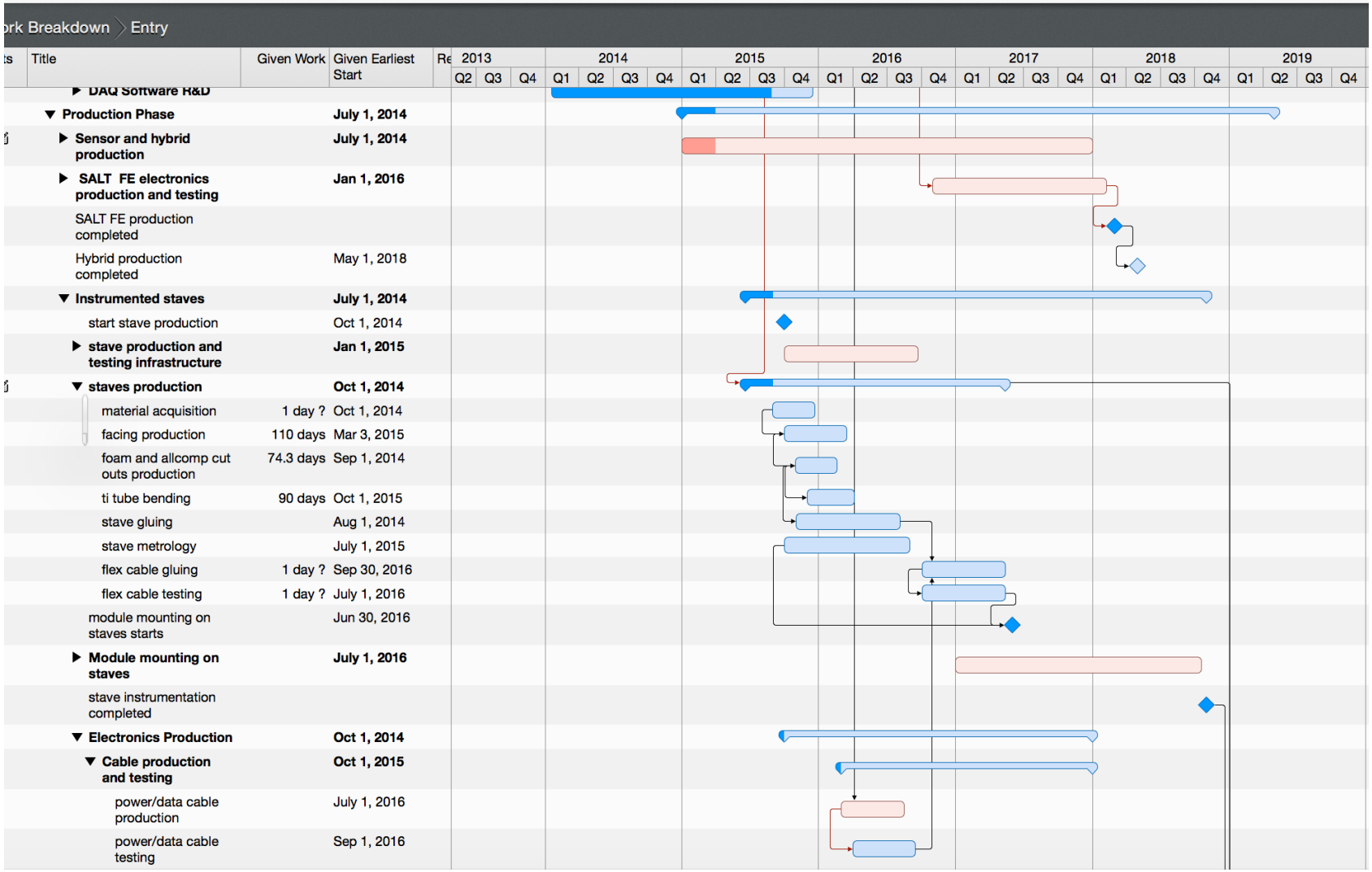
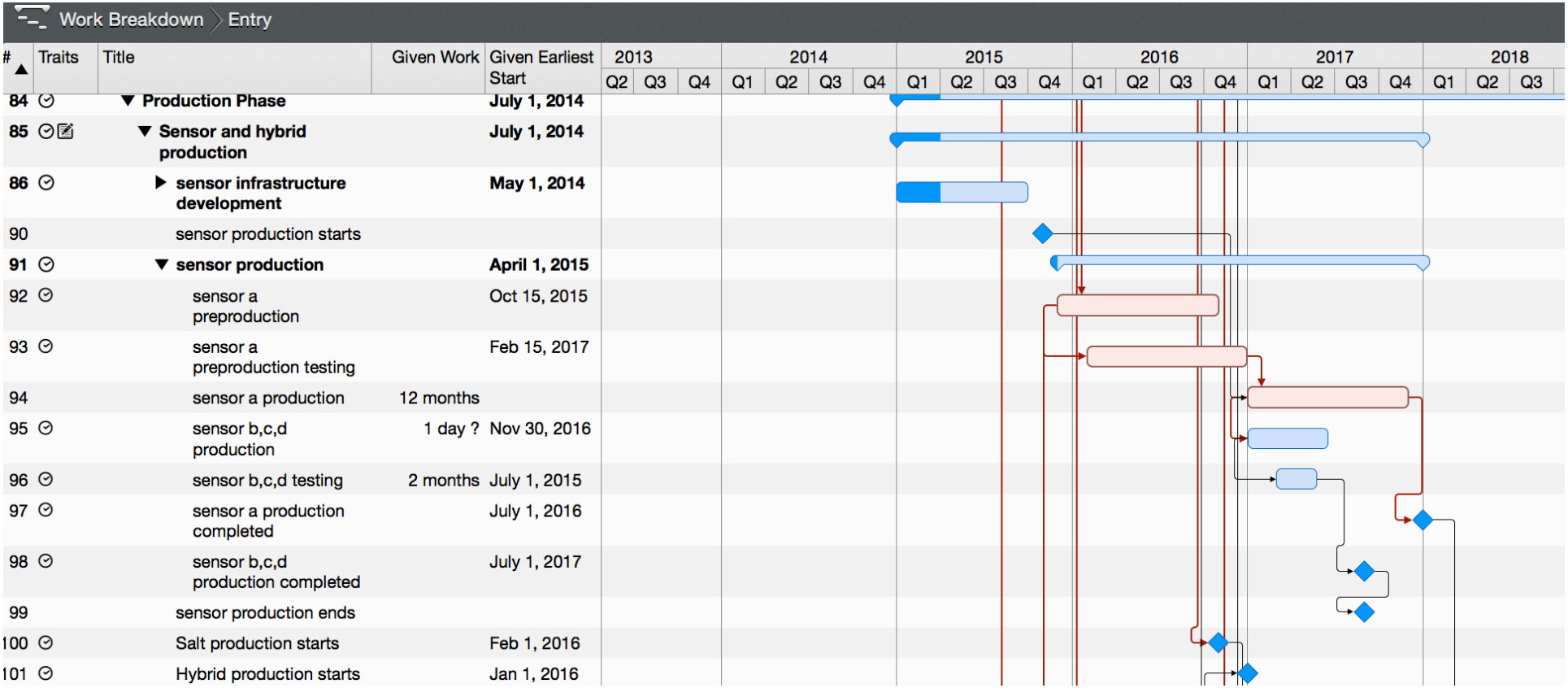
Critical path items



Sensor production is in the critical path



#	Traits	Title	Given Work	Given Earliest Start
84		**Production Phase**		**July 1, 2014**
85		**Sensor and hybrid production**		**July 1, 2014**
86		**sensor infrastructure development**		**May 1, 2014**
90		sensor production starts		
91		**sensor production**		**April 1, 2015**
92		sensor a preproduction		Oct 15, 2015
93		sensor a preproduction testing		Feb 15, 2017
94		sensor a production	12 months	
95		sensor b,c,d production	1 day ?	Nov 30, 2016
96		sensor b,c,d testing	2 months	July 1, 2015
97		sensor a production completed		July 1, 2016
98		sensor b,c,d production completed		July 1, 2017
99		sensor production ends		
100		Salt production starts		Feb 1, 2016
101		Hybrid production starts		Jan 1, 2016

Construction tasks

- Work at all institutions: Chip testing, electronics testing, at CERN: detector box, testing finished modules after shipment, mounting in box….
- Electronics production (Maryland)
- Machining (Cincinnati)
- Data flex & hybrid production (Milano)

Syracuse tasks

- Construct bare staves (metrology)
- Test & glue on dataflex cables (metrology)
- Test hybrids
- Construct modules & test them (metrology)

Syracuse tasks II

- Glue modules to staves (metrology)
- Wire bond modules
- Test full stave electrically
- Package and ship to CERN

Manpower situation

- Generally we need to use the people we have
- Syracuse
  - 5 faculty @ ½: 2.5 fte contingency only
  - 5 grad students: 2.5 fte
  - 2 Res. Prof. & 2 postdocs: 2 fte (other UT tasks, procurements, oversight….)
  - 10 undergraduates @ 20%: 2 fte,
  - 1/2 tech: 1/2 fte
  - Total time: 7*40=280 hr/week, yearly total 13,000 hours (46 weeks)
  - Contingency = 100 hr/week, 4,600 hours

Construction Time Estimates

Item	Manpower time
bare staves	1360 hours
Test and glue data flex (320) (metrology)	960hours
Test hybrids (use test bonds)	1000 hours
Unpack Si inspect and test	2000 hours
Construct modules & Test	1400 hours
Glue modules to staves	600 hours

Construction Time Estimates II

Item	Manpower time
Wire bond modules to flex	2300 hours
Measure Si positions	320 hours
Cool down stave and test	320 hours
Test full stave electrically	160 hours
Vibration free stave transport system	1000 hours
Package for shipment to CERN	200 hours
TOTAL	11600 hours

Bare stave tasks

- ❑ Bend tubes – 2 hr
- ❑ Braise tubes & test – 1 hr (testing)
- ❑ Cut Carbon fiber faces – 30 min
- ❑ Mount 1st side facings to vacuum jig & mount on granite table – 20 min
- ❑ Glue end blocks to facing – 1 hr
- ❑ Glue on foams – 4.5 hr
- ❑ Cut trough for cooling tube (shop)

Bare stave tasks II

- Epoxy in tube - 1 hr
- Glue carbon foam over tube and opposite side facing - 1 hr
- Trim facings - 30 min
- Glue in ultem inserts -1 hr
- Metrology & other tests including cool down -2 hr
- Move to storage - 10 min
- Ancillary (little things) – 1 hr
- Total: 14 hours
- Times 80 staves= 10 hr

Conclusion

- Sufficient manpower to do the project
- Spatial needs within the clean room are an issue
- Propose starting bare stave construction in early fall in order to use available manpower and finishing this task before others. Otherwise we have unused manpower