NGAO System Design
Project Plans and Schedule

Don Gavel

AO System (WBS 3.2) &
Laser Facility (WBS 3.3) Design Kickoff

NGAO Team Meeting #9
August 24, 2007

Today's Agenda

- **10:00 am Review of project plan & schedule 3.2 & 3.3 (Gavel)**

- 10:30 am Inputs to System Design Phase & Expected Outputs (Wizinowich)

- 11:15 am Outputs of the system architecture phase (Dekany)

- 12:15 pm Lunch break

- 12:45 pm Open questions going into the system design phase (Dekany)

- 1:45 pm Discussion of roles & teams, charge & deliverables (Gavel)

- 2:45 pm Further clarification

- 3:30 pm Done

Where we are in the project

- Completed initial trade studies phase (9 months) and architecture definition phase (4 months)
- Selected a baseline architecture: "Cascaded Relay"
  - Serves both deployable multi-object and narrow field science instruments on 5 arcmin and 30 arcsec respectively
  - 9 laser guidestar tomography, variable asterism
  - 3 natural guidestars – Infrared tip/tilt sensors with wavefront correction for high sky coverage, deployed on a 180 arcsec technical field
  - Exciting range of science cases: high-resolution solar system (asteroids, moons), extra-solar planets, Galactic center, Hi-z galaxies
- Now starting the system design phase, a 3 ½ month process
- The purpose of this meeting is to further introduce the baseline architecture and to organize the design effort

AO System Design Plan – (WBS 3.2)

ID	WBS	Task Name	Lead	Work	Start	2008
235	3.2	AO System	DG	1,709 hrs	Tue 5/29/07	
236	3.2.1	AO System Architecture	DG	40 hrs	Tue 9/4/07	DG
237	3.2.2	AO Enclosure	JM	40 hrs	Mon 10/1/07	JM
238	3.2.3	Opto-mechanical	BB	959 hrs	Tue 5/29/07	
239	3.2.3.1	Field Rotation	BB	45 hrs	Tue 9/4/07	BB,CL
240	3.2.3.2	Optical Relay	BB	60 hrs	Tue 9/4/07	BB,CL,RD
241	3.2.3.3	Optical Switchyard	BB	50 hrs	Tue 9/4/07	BB,CL
242	3.2.3.4	Optical Support Structure	BB	45 hrs	Mon 11/5/07	CL,BB
243	3.2.3.5	Wavefront Sensors	VV	240 hrs	Wed 8/22/07	
244	3.2.3.5.1	High Order LGS Wavefront Sensor	VV	80 hrs	Wed 8/22/07	VV,JM
245	3.2.3.5.2	High Order NGS Wavefront Senso	VV	40 hrs	Wed 8/22/07	VV,JM
246	3.2.3.5.3	Low Order NGS Wavefront Sensor	VV	80 hrs	Wed 8/22/07	SK,JM,VV,AM
247	3.2.3.5.4	Calibration Wavefront Sensor	CN	40 hrs	Wed 8/22/07	CN
248	3.2.3.6	Wavefront Correctors	CN	115 hrs	Mon 8/13/07	
249	3.2.3.6.1	Tip/Tilt Corrector	BB	20 hrs	Mon 10/1/07	RF,BB
250	3.2.3.6.2	Deformable Mirror	CN	50 hrs	Mon 8/13/07	CN,BB
251	3.2.3.6.3	Tip/tilt Vibration Mitigation	CN	45 hrs	Wed 8/22/07	CN,EJ,DG
252	3.2.3.7	Acquisition Cameras	CN	40 hrs	Mon 10/1/07	
253	3.2.3.7.1	NGS Acquisition Camera	CN	20 hrs	Mon 10/1/07	CN
254	3.2.3.7.2	LGS Acquisition Camera	CN	20 hrs	Mon 10/1/07	CN
255	3.2.3.8	Atmospheric Dispersion Correction	RD	24 hrs	Tue 8/21/07	BB,RD
256	3.2.3.9	Alignment, Calibration, Diagnostics, M	CN	60 hrs	Tue 5/29/07	CN,RF,DLM
257	3.2.3.10	Atmospheric Profiler	MB	50 hrs	Wed 8/22/07	MB
258	3.2.3.11	d-IFU & LOWFS AO & Object Selection	AM	200 hrs	Wed 8/22/07	AM,DG,JM
259	3.2.3.12	PSF Monitoring Camera	MB	30 hrs	Mon 10/1/07	MB,CN
260	3.2.4	Non-real-time Control	EJ	330 hrs	Mon 6/25/07	
261	3.2.4.1	Non-RTC Software	EJ	170 hrs	Mon 6/25/07	EJ,PS,JJ
262	3.2.4.2	Non-RTC Electronics	EJ	160 hrs	Mon 7/23/07	JC,MR,EJ
263	3.2.5	Real-time Control	DG	340 hrs	Wed 8/1/07	
264	3.2.5.1	RTC Architecture Analysis and Design	DG	180 hrs	Wed 8/1/07	DG,EJ,RF,MR
265	3.2.5.2	RTC Software Module Definition	EJ	80 hrs	Mon 9/3/07	EJ,MR
266	3.2.5.3	RTC Hardware Module Definition	MR	80 hrs	Mon 9/3/07	EJ,MR

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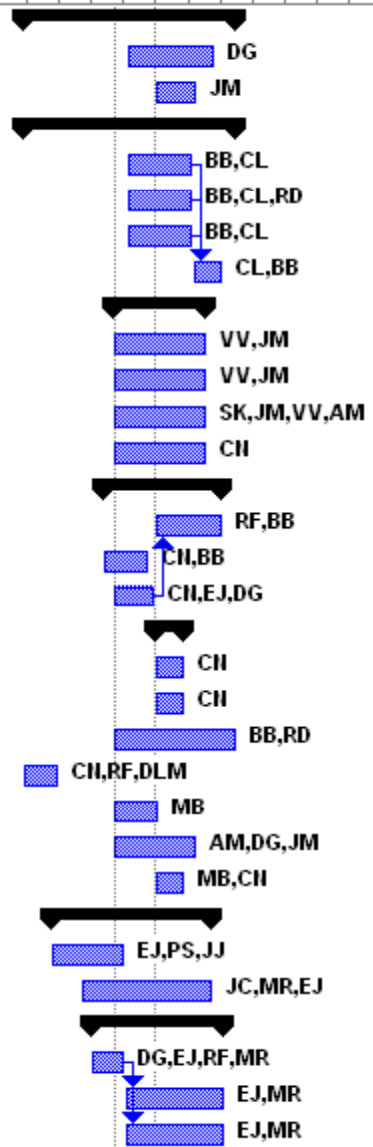
Laser System Design Plan – (WBS 3.3)

ID	WBS	Task Name	Lead	Work	Start	2008
						M J J A S O N D J F M A
267	3.3	**Laser Facility**		**570 hrs**	**Mon 8/6/07**	
268	3.3.1	**Laser System Architecture**	VV	80 hrs	Mon 8/27/07	VV
269	3.3.2	**Laser Enclosure**	JM	80 hrs	Mon 10/22/07	JM
270	3.3.3	**Laser**	DG	20 hrs	Mon 10/22/07	VV
271	3.3.4	**Laser Launch Facility**	**VV**	**200 hrs**	**Mon 8/6/07**	
272	3.3.4.1	Laser Beam Transport	CN	50 hrs	Mon 8/6/07	CN,VV,JC
273	3.3.4.2	Laser Pointing & Diagnostics	VV	80 hrs	Mon 8/6/07	VV,CN,JC,BB
274	3.3.4.3	Laser Launch Telescope	VV	70 hrs	Mon 8/6/07	VV,CN,JC
275	3.3.5	**Laser Safety Systems**	**JC**	**40 hrs**	**Mon 10/8/07**	
276	3.3.5.1	Personnel and Equipment Safety Syst	JC	20 hrs	Mon 10/8/07	JC
277	3.3.5.2	Aircraft, Satellite & Laser Traffic Contr	JC	20 hrs	Mon 10/8/07	JC
278	3.3.6	**Laser System Control**	**JC**	**150 hrs**	**Mon 10/1/07**	
279	3.3.6.1	Laser System Software	EJ	80 hrs	Mon 10/1/07	EJ,PS
280	3.3.6.2	Laser System Electronics	JC	70 hrs	Mon 10/1/07	JC
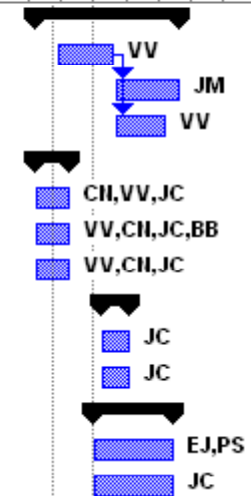
Where to get information

http://www.oir.caltech.edu/twiki_oir/bin/view.cgi/Keck/NGAO/WebHome

Keck.NGAO

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r53 - 22 Aug 2007 - 22:42 - ViswaVelur

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- Keck Observatory is a Partnership between Caltech, CARA, University of California with participation of University of Hawaii and NASA

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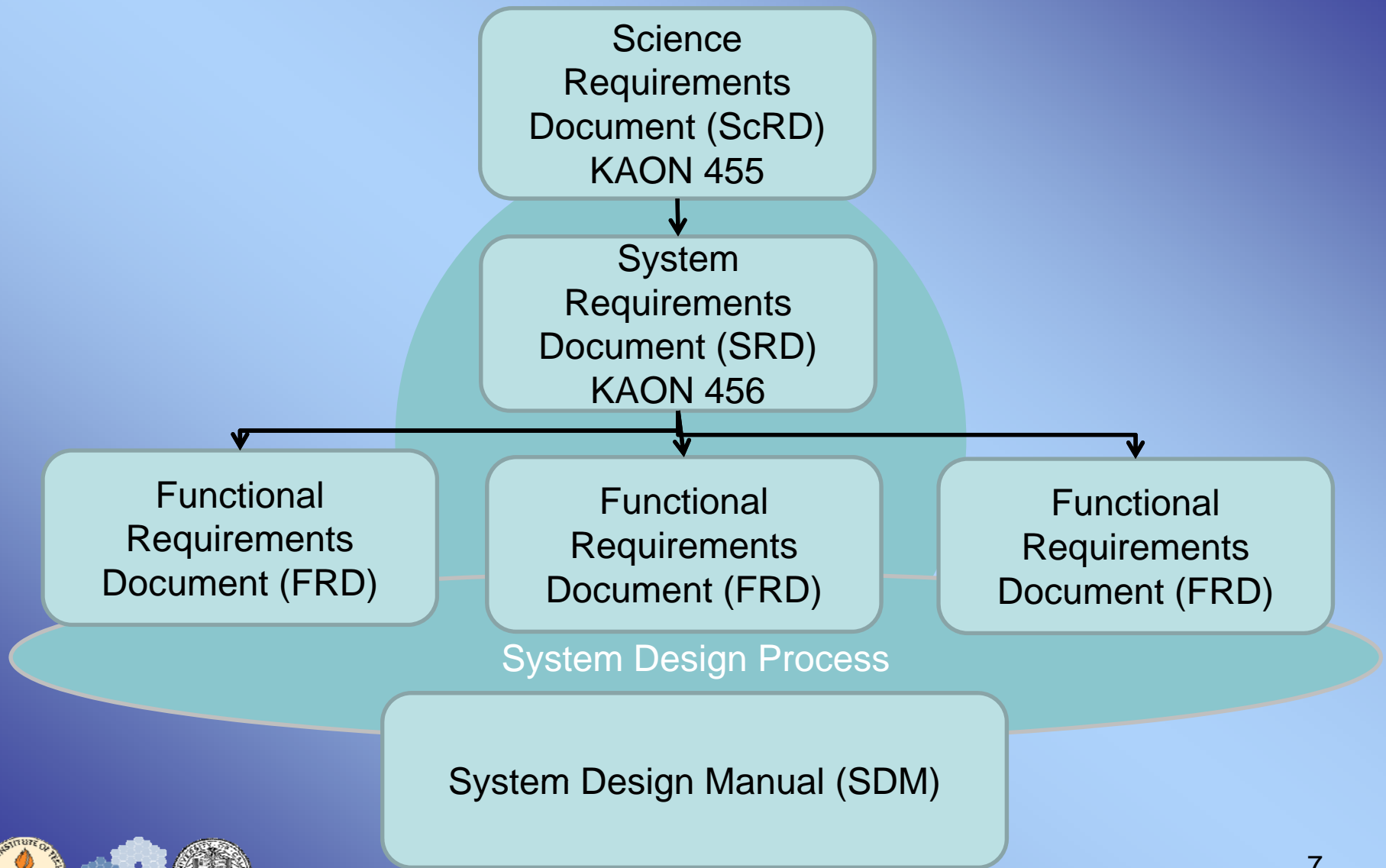 - Related Links
  - Tutorials

Keck/NGAO

Project Scope: Enable front-page astronomical science by designing, building, and deploying the world's most advanced astronomical adaptive optics instrumentation capability

- NGAO Project Directory
- NGAO Document and Presentation Templates

Documents organized by

- Keck Adaptive Optics Notes (KAONs)
  - Specifications Documents (ScRD, SRD, FRDs)
  - Trade study reports
- Deliverables of WBS activities
- Meeting presentations and minutes

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Requirements Flow-Down

Science Requirements Document (ScRD) KAON 455

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System Requirements Document (SRD) KAON 456

Functional Requirements Document (FRD)

Functional Requirements Document (FRD)

Functional Requirements Document (FRD)

System Design Process

System Design Manual (SDM)

See Also

- NGAO System Architecture Definition KAON 499

- System Design Phase Systems Engineering Management Plan (SEMP) KAON 414

  – This one has task definitions by WBS entry

Management Philosophy

- Small tight teams
  - AO Opto-mechanical
  - AO Wavefront sensors
  - AO Software
  - Laser projection Opto-mechanical
  - Laser Software
- At least weekly informal meetings of each team
- ~ 1 per month all-team meetings

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