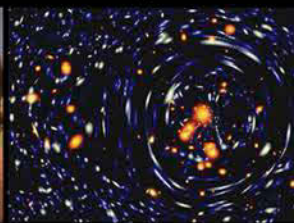


# Large Synoptic Survey Telescope

# E-News

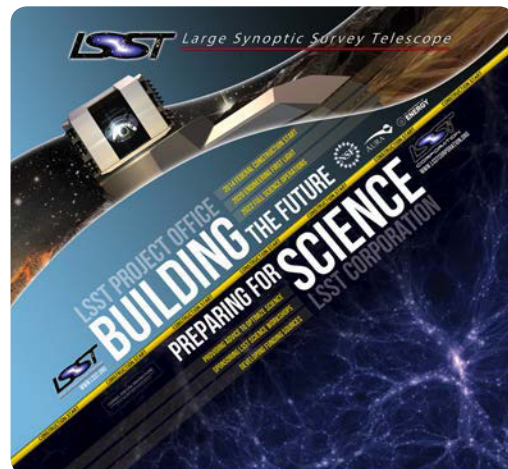


LSST E- NEWS

DECEMBER 2014 • VOLUME 7 NUMBER 4

## WELCOME TO THE NOVEMBER 2014 E-NEWS

With this issue of LSST E-News the LSST Project Office (LSSTPO) steps out as a true construction project, responsible for **Building the Future**: the LSST observing facility. In contrast, the LSST Corporation (LSSTC) will focus its efforts on **Preparing for Science**, fundraising, and defining partnerships and plans for Operations. This distinction will become more clear in the coming months with the transfer of the M1M3 mirror from LSSTC to LSSTPO and emerging support from LSSTC for the science collaborations. The LSST Project Office will remain focused on the construction of the LSST facility as detailed in the baseline plan presented to the NSF and DOE federal funding agencies. An exciting milestone was achieved as we go to press...



*November 20, 2014* – The 72,620 pound M1M3 shipping container was successfully transported from CAID Industries in Tucson to the UofA Mirror Lab. The 30ft × 30ft oversize load departed at 4am, escorted by four Tucson police cars and two pilot vehicles. Offloading was completed by 5:30am. Once Final Acceptance Testing is completed, the M1M3 will be stored locally in Tucson for final integrated testing prior to shipment to the summit facility in Chile. Additional photos available at [ls.st/1ki](http://ls.st/1ki).

## LSST “ROAD SHOW” IN AUSTRALIA

LSST Director Steve Kahn and Project Scientist Zeljko Ivezic made a tour of major astronomical institutions in Australia during the last week in October. This so-called LSST “Road Show” came at the request of the Australian astronomical community and allowed that community to interact directly with the LSST leadership in investigating possible Australian involvement in the operations phase of the program. The tour included day-long sessions at the Australian Astronomical Observatory headquarters in Sydney, at Mt. Stromlo Observatory of the Australian National University in Canberra, at Swinburne University in Melbourne, and at the International Centre for Radio Astronomy Research on the campus of the University of Western Australia in Perth.

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Each of the four-stops was well-attended by local astronomers. The visits not only allowed Steve and Zeljko to provide the attendees with a better understanding of the science and programatics of LSST, but also to hear of the exciting ways in which the Australian groups thought they could engage in the program. Australia brings a rich tradition of southern hemisphere astronomy, and the community there has played a pioneering role in a large number of relevant complementary survey projects, including GAMA, GALAH, SAMI, Wigglez, Skymapper, ASKAP, MWA, and SKA.

A highlight of the trip involved re-engaging with Jeremy Mould (now at Swinburne University), a key participant in getting LSST started when he was the Director of NOAO. Jeremy remains highly engaged in the science of LSST, and was delighted to hear of the progress we have made with the project. Pictured here (L-R) is Steve Kahn, Sarah Brough (Australian Astronomical Observatory), Jeremey Mould, and Zeljko Ivezic. Sarah served as our host for the sessions in Sydney, Canberra, and Melbourne.

All in all, this was a very enjoyable and worthwhile visit, and we look forward to what we hope will be a long and fertile collaboration with the Australians as the LSST program moves forward.

Article written by Steve Kahn



Group photo from Melbourne, during LSST Whistlestop Tour of Australia.



Steve and Zeljko met with representatives from several universities while in Sydney, Australia.

## SUCCESSFUL DOE CD-2 REVIEW FOR THE LSST CAMERA!

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Reviewers enjoyed clear skies and presentations by a well-prepared team during the October 2014 DOE CD-2 Review of the LSST Camera.

The LSST Camera Team has just completed a very successful Department of Energy (DOE) Critical Decision-2 (CD-2) Review, an important step in gaining CD-2 approval of the performance baseline. The three-day review was held at SLAC November 4-6, 2014, and centered on a thorough examination of the cost, schedule, performance, and scope commitment to which DOE will execute the project. Reviewers described the team as being “superb”, well

prepared, and working well together. “Scientific and technical efforts are exceptionally well balanced and integrated.” They also called out the interfaces as being well defined and stable for all physical and logical interfaces. The project scope, requirements, and technical management processes were found to be in place and sufficiently well defined to establish the cost and schedule baseline. In all aspects, the review found the performance baseline adequate to achieve DOE Dark Energy Stage IV Program objectives and the technical flow-down requirements of the NSF LSST project.

Congratulations on this successful outcome go especially to Nadine Kurita, Vincent Riot, and Steve Ritz, but the entire Camera team and all the LSST Project staff that supported the technical progress to meet the review requirements and pull off the successful review are to be commended. And what’s next? The Project plans to request CD-3 approval in calendar year 2015.

Article written by Suzanne Jacoby

## LSST2014 PROJECT AND COMMUNITY WORKSHOP

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The LSST2014 Project and Community Workshop, held August 11-15 at the Hyatt Regency in downtown Phoenix, allowed LSST’s distributed technical teams to interact with each other and the broader science community. Sessions covered topics of cross-cutting significance and interest. Also for the first time, the Project shared the week with a concurrent science workshop – the LSST Observing Cadence Workshop jointly hosted by LSST and NOAO. In addition to substantive work to facilitate the transition to construction, the workshop also afforded the many new staff members who have joined LSST in recent months the opportunity to learn the LSST “big picture.”

The LSST2015 Project and Community Workshop will be held the week of August 17 in Seattle.

More than 230 people, including project personnel, stakeholders, and members of the science community attended the five day event. While similar to the five all hands meetings (AHMs) previously hosted by the Project, LSST2014 represented a rebranding of the regularly occurring broad-audience meetings as project and community workshops with a colloquial name of LSST followed by the year of the meeting.

After the meeting, the Project conducted a survey to assess the success of various elements of the workshop. 121 of the 237 attendees took the survey. On the whole, survey participants reported a good experience comparable to previous meetings’ survey results. August continued

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Most of the LSST2014 workshop's 237 attendees pose for a group photo in the Hyatt Regency Phoenix Atrium. (Image credit: LSST)

to be the most popular month for holding the workshop with 52% of respondents selecting it as their preference for the next meeting.

As with previous meetings, fullness of the schedule was the primary cause for respondent dissatisfaction. The addition of the concurrent science meeting contributed to an increase, compared to previous surveys, in the number of respondents who rated the amount of breakout sessions as excessive. Because the Project both appreciates the concerns about schedule fullness and recognizes the logistical value of coupling the project and community workshop with a science workshop, the practice likely will continue for future meetings but with an adjustment

## LSST M2 SUBSTRATE RECEIVED BY EXELIS

The LSST secondary mirror (M2) substrate has been safely relocated from Harvard University in Cambridge, MA to the Exelis facility in Rochester, NY. The mirror's trek, which involved the use of a 50-ton internal bridge crane to load the mirror transport box onto a wide-load flatbed truck and a 70-ton external crane to offload it at destination, covered 604 miles in a little over a day. The truck and pilot vehicle departed Harvard at 1 pm on October 20 and arrived in Rochester at 3 pm on October 21. Subsequently, Exelis personnel have disassembled the transport box and thoroughly inspected the substrate.

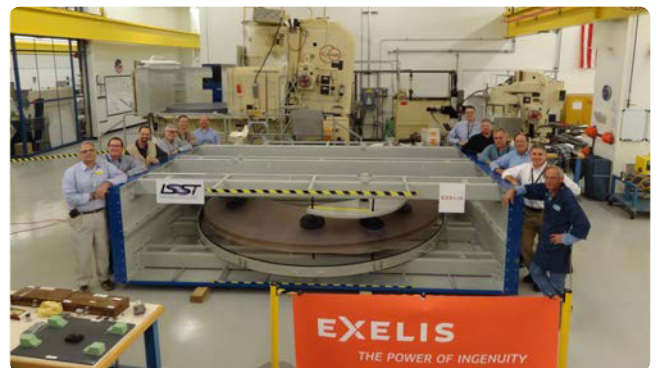
in approach, perhaps having consecutive rather than concurrent workshops.

While the Project's most recent previous broad-audience meetings have been held in Tucson, Arizona, downtown Phoenix was chosen as the LSST2014 locale in an attempt to accommodate previous requests for a venue nearer to a major airport and with more dining and entertainment options outside of the workshop hotel. Attendees appreciated the ease of getting to the venue but were less enthusiastic about the urban setting. In particular, many lamented the lack of green space.

Holding the meeting in Phoenix also was intended as a half-way measure toward potentially rotating the workshop's venue among LSST partners' home locations, as has been frequently suggested. As a test of the organizing committee's ability to logistically support a workshop hosted at a location remote from LSST headquarters, LSST2014 was successful enough to convince the Project to announce Seattle as the location for LSST2015.

For more information about LSST2014, including the workshop's presentations and a full report on the post-meeting survey results, visit [project.lsst.org/meetings/lsst2014](http://project.lsst.org/meetings/lsst2014).

Article written by Robert McKercher



LSST Telescope and Site Project Manager William Gressler and Exelis personnel pose with the LSST secondary mirror (M2) substrate in the vendor's receiving area. (Image credit: LSST)

*Continued on p. 5*

LSST Head of Safety Chuck Gessner observed the loading of the M2 transport box from Harvard Physics Lab storage onto the truck. LSST Telescope and Site Subsystem Manager Bill Gressler observed the mirror's offloading at Exelis' receiving area. Accelerometers were used to monitor and record acceleration, temperature, and movement forces on the mirror during its road trip. Neither the active nor the passive accelerometers indicated any problems during transport.

Delivery of the M2 substrate to Exelis highlighted the kick-off of the M2 Cell Assembly Fabrication effort. Exelis has been awarded the contract to process the M2 substrate to a finished polished state and also to provide final design, fabrication, assembly, test, and delivery of the M2 Cell Assembly. The M2 assembly will ultimately be integrated onto the telescope on Cerro Pachón in Chile. The 3.4-meter diameter mirror is a solid meniscus design fabricated from ultra low expansion (ULE™) glass manufactured by Corning Incorporated, Corning, NY.



View a gallery of images of the M2 relocation at [ls.st/hxs](http://ls.st/hxs)  
(Image credit: LSST)

## NEW HIRES

The LSST Hiring Campaign continues in full force as the project staffs up to meet the demands of the construction effort. Current positions, along with those filled and coming soon, are posted online at [www.lsst.org/hiring](http://www.lsst.org/hiring). The five individuals below have joined the project recently as examples of *Top Talent Working in a Team Environment that Inspires Excellence* – welcome!



Compliance and Quality Administrator,  
Veronica Huerta

### Project Office

**Veronica Huerta** joined the LSST Project Office November 3, 2014 as Compliance and Quality Administrator. She is responsible for ensuring all Project activities comply with federal regulations, awards, agreements, and applicable terms and conditions of AURA policies and procedures and the Award Management Manual. Veronica has 10 years of auditing and compliance experience, most recently from Raytheon

Missile Systems where she conducted weekly policy and procedure audits to ensure compliance with government regulations. Veronica's ability to obtain rulings, interpretations of government regulations, and approvals for compliance with federal policy will prove invaluable to the LSST Project in the construction phase's environment of heightened compliance and regulatory oversight.

### Data Management/Education and Public Outreach



Technical Manager for Data Management,  
Frossie Economou

**Frossie Economou** joined LSST on August 4 2014, as Technical Manager for Data Management (DM) and Education & Public Outreach (EPO). She splits her time between building a team to support the development and science quality activities of the far-flung DM group and planning for the software development effort of the EPO team. Frossie is very excited by the

*Continued on p. 6*

technical ambition of the LSST project, the open-source software development culture, and the extraordinary opportunities presented by the data, both for academic research and public engagement.

## Telescope and Site



Senior Mechanical Engineer, Gary Muller

The Telescope and Site subsystem added three new team members during the quarter.

**Gary Muller** joined the LSST Telescope and Site Mechanical Engineering group on September 8, 2014, as a Senior Mechanical

Engineer with emphasis on the M1M3 Cell Assembly. This subsystem includes the 8.4-meter diameter telescope cell structure and the mirror support system. Gary worked at NOAO and the GMT prior to his return to Tucson and LSST.

**Ed Stover** joined the team as Senior Engineering Associate effective October 15, transferring



Senior Engineering Associate, Ed Stover

from NSO. Since joining NOAO in 1989, Ed has worked on a diverse number of projects that includes supporting both the NOAO stellar and NSO solar communities and their scientific objectives. During his more than 23 years with NSO he helped design, install, and maintain the GONG network, and the SOLIS suite of instruments. Ed also provided a wide range of upgrading and repair support to the McMath Pierce Solar Telescope.

**Jaime Seriche** joined the LSST team in Chile on October



Summit Worksite Inspector, Jaime Seriche

20 as the Summit Inspector Tecnico de Obras (ITO), or Worksite Inspector. Jaime previously worked in the SOAR project as Worksite Administrator and has many years of experience in the construction sector.

## LSST SCIENCE ADVISORY COMMITTEE SEEKS COMMUNITY INPUT

Now that federal construction on LSST has formally begun, the LSST Project has constituted a Science Advisory Committee (SAC). The committee's job is to represent the wider scientific community (including the US astronomical community) and to advise LSST Project Director Steve Kahn as decisions are made throughout the LSST construction phase.

The SAC's ultimate goal is to help the LSST project and the community maximize the science output from LSST. The committee's purview includes, but is not limited to, the choice of observing cadences, plans for scientific commissioning of the LSST, and the relationship between the LSST project, the science community, and LSST science collaborations. The LSST SAC website ([ls.st/avq](http://ls.st/avq)) lists the SAC's members and includes previous meetings' minutes.



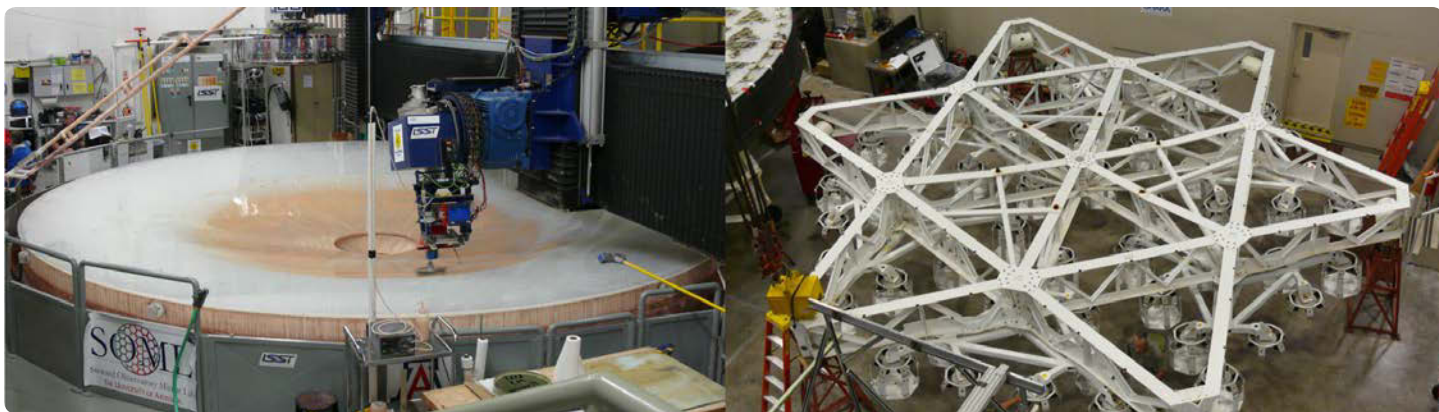
LSST SAC Chair Michael Strauss models his LSST 2012 All Hands Meeting t-shirt (Image credit: LSST)

Please contact any of the SAC members if you have questions or would like to give input into any aspect of LSST.

Article written by Michael Strauss, Princeton University, LSST SAC Chair

## LSST MIRROR NEARS COMPLETION

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The LSST monolithic M1M3 mirror blank approaches completion at the University of Arizona's Steward Observatory Mirror Lab. The combined primary (M1) and tertiary (M3) surfaces are seen on the left in this image from July 2014 with the red polishing compound highlighting the active polishing zone of M3. In anticipation of completion, the vacuum lifting fixture (right, September 2014) is being assembled to supply suction to lift the mirror off the polishing cell and lower it into the mirror transport box once the polishing is complete. The fixture will then be disassembled and stored locally until it's time to reinstall the M1M3 for final optical testing in the telescope cell prior to shipment to Chile.

## ANDY CONNOLLY'S TED TALK

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In March of 2014, UW astronomer and LSST Simulations Lead Andy Connolly was a featured speaker at the Vancouver, Canada, TED Symposium. He describes LSST when talking about "What's the Next Window into our Universe?". This talk is now featured online ([ls.st/xwj](https://ls.st/xwj)):

*"Big Data is everywhere — even the skies. In an informative talk, astronomer Andrew Connolly shows how large amounts of data are being collected about our universe, recording it in its ever-changing moods. Just how do scientists capture so many images at scale? It starts with a giant telescope..."*

## TMA CONTRACT OFFICIALLY SIGNED

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August 13, 2014 – The LSST Telescope Mount Assembly (TMA) contract has been signed by AURA and vendor GHESA Ingeniería y Tecnología, S.A (in consortium with ASTURFEITO, S.A.). The official signing took place in Spain between AURA President William Smith (right) and GHESA Union Temporal de Empresas Manager Luis Garcia Marchena (left) and witnessed by Spanish notary Jose Maria Garcia Pedraza.

GHESA, a state-of-the-art technological equipment manufacturer, is one of the largest engineering firms in Europe with technological and management capacity for development of varied, complex international projects. Asturfeito is a Spanish industrial group founded in 1989 as a manufacturing shop offering services in the fabrication, installation, and commissioning of large scientific structures with very accurate tolerance requirements.

The LSST TMA contract's scope covers design, fabrication, testing and final commissioning.

### LSST E-NEWS TEAM:

- Suzanne Jacoby (Editor-in-Chief)
- Robert McKercher (Staff Writer)
- Mark Newhouse (Design & Production: Web)
- Emily Acosta (Design & Production: PDF/Print)
- Additional contributors as noted

*The effort to build the LSST is a partnership between public and private organizations. Financial support for LSST Design and Development comes from the National Science Foundation, the Department of Energy, and private funding raised by the LSST Corporation, a non-profit 501(c)3 corporation formed in 2003, with headquarters in Tucson, AZ. Contributions from private foundation gifts, grants to universities, and in-kind support from laboratories and other LSST Member Institutions were key to early construction and critical developments. The LSST Project Office for central management was established as an operating center under management of the Association of Universities for Research in Astronomy (AURA). The Department of Energy funded effort is managed by the SLAC National Accelerator Laboratory (SLAC).*

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