首届全国天文公众科学大会
2025年 辽宁 大连

望远镜视野中的公众科学

供需之间的桥梁建构思考

报告人：徐煜华
星特朗

BIOGRAPHY

The Cornell Lab of Ornithology is one of the world leaders in the study, appreciation, and conservation of birds. Cornell uses innovative techniques to advance the understanding of nature while also getting the community involved in protecting the planet. Housing over 300 scientists, staff, and students, this organization overflows with passion and expertise.

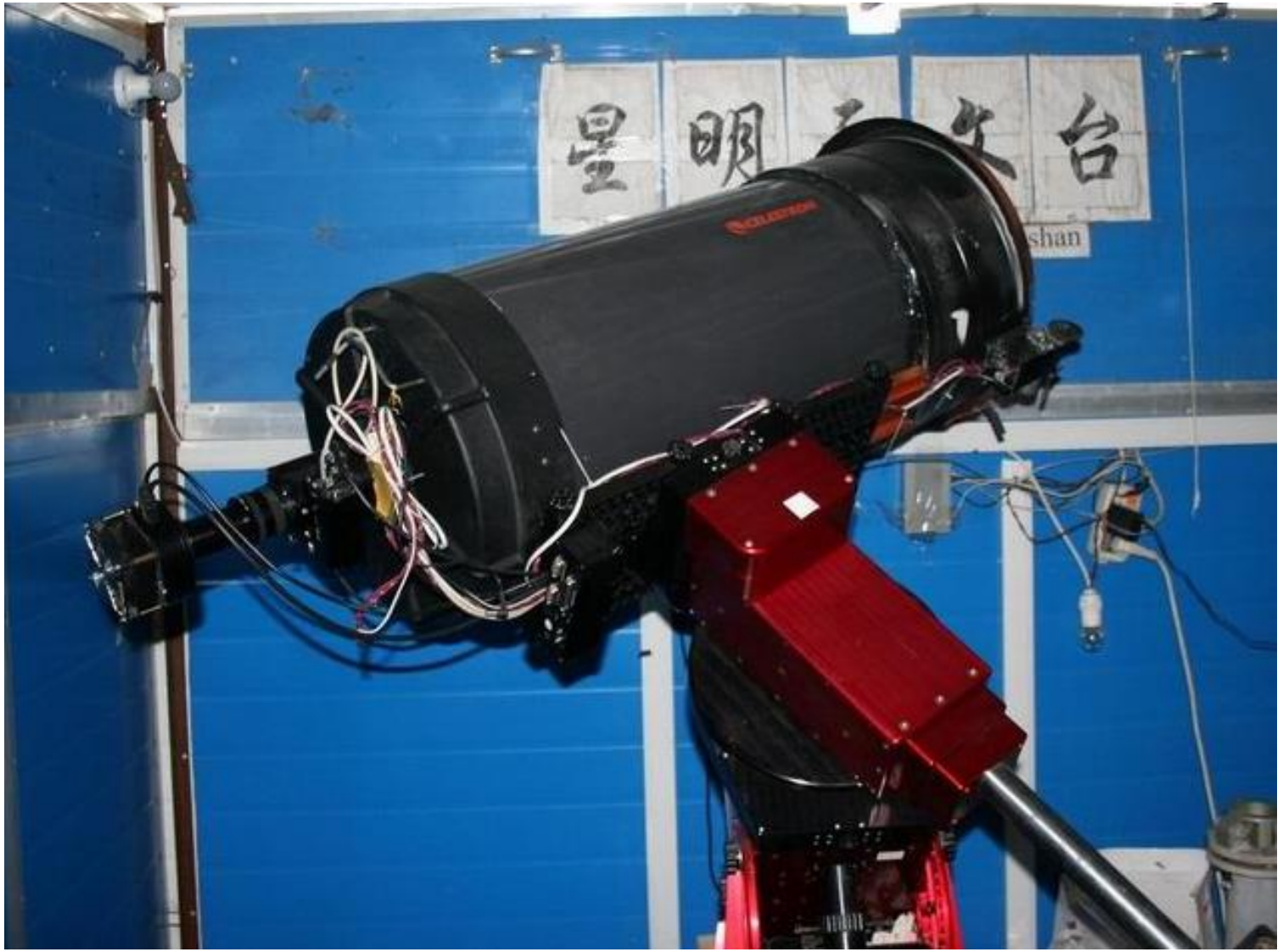
Cornell offers a thriving interactive community for visitors and members. Every day, the lab works to collect observations from everyday birders. Bird watchers of all ages and skill levels enthusiastically gather data and images to contribute to the larger picture. The eBird database, housed on the Cornell site, allows birders to track over 10,000 bird species. The Cornell Lab of Ornithology also houses live streaming webcams of birding

QUICK NAVIGATION

Biography Jump to section
Celestron Picks Jump to section

FAST FACTS

- Founded in 1915
- Located in the Imogene Powers Johnson Center for Birds and Biodiversity in Sapsucker Woods Sanctuary



- 公众超新星搜寻项目（PSP）
- 国家天文科学数据中心中国虚拟天文台团队和星明天文台合作开展的公众科学项目
- PSP项目设备为一架星特朗C14，该设备自2015年7月28日（本文所有时间均为北京时间）上线以来，兢兢业业，让不少公众通过该项目参与进科学发现，取得了不俗的战绩。截至2021年12月31日，C14在PSP中已发现40颗候选体，其中19颗超新星、9颗河外新星获得证认。
- （左图及以上数据均摘取自《公众超新星搜寻项目2021年度总结》）

PSP项目2021年开始投入使用HMT（半米望远镜），截至目前，使用C14和HMT共同观测。

Search

太空碎片监测

WAYFINDER

LEGEND

Filters

Layers

Shortcuts

Objects List

Crow's Nest

Glint Evader

Reset View

N/A

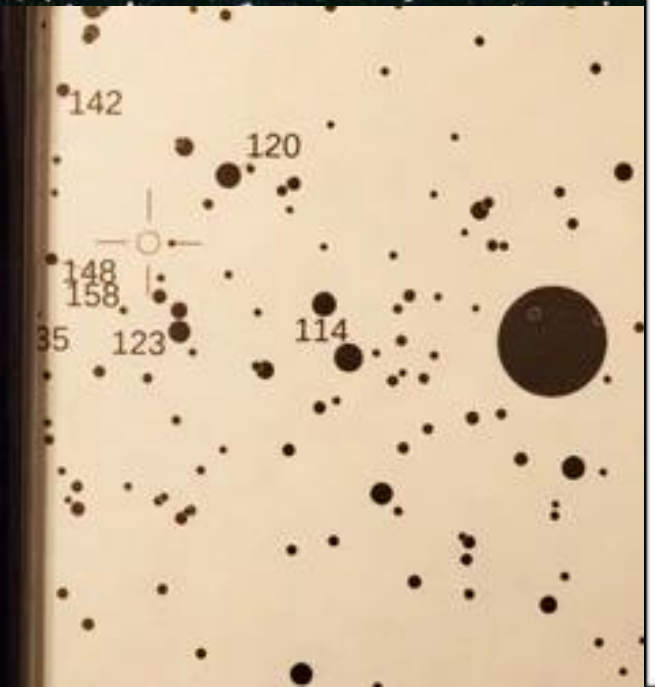
LIVE

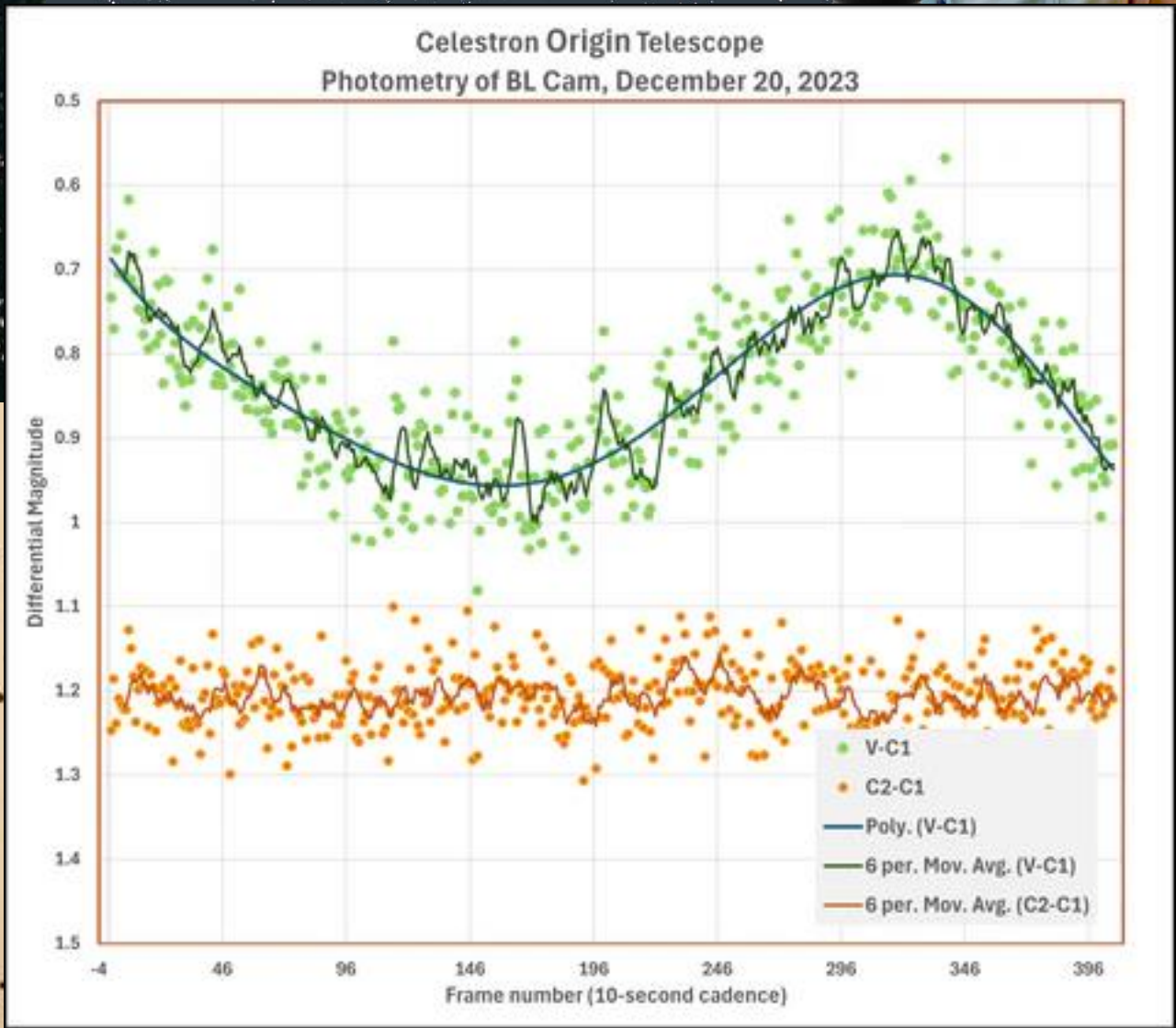
Jul 29 2025 11:55:00.000 | 12:00:00.000 | 12:05:00.000 | 12:10:00.000 | 12:15:00.000 | 12:20:00.000 | 12:25:00.000

CESIUM ion

Using the
Celestron Origin for Science

by Richard Berry





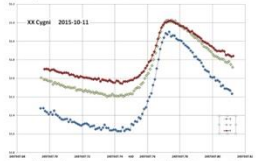
APPENDIX A:
Science with the RASA

Because of its high étendue, the RASA is an exceptionally science-capable optical system. The combination of large aperture, fast focal ratio, and wide field combine to the benefit of the science observer. This is especially true in programs that require large numbers of images or large swaths of sky to be taken and searched rapidly.

Variable Star Photometry

One of the strongest contributions to science from amateur astronomers is through photometry of variable stars. The American Association of Variable Star Observers (AAVSO), the Center for Backyard Astrophysics (CBA), and the British Astronomical Association (BAA) are among the organizations that run active variable-star programs. The advent of CCDs increased both the number and precision of the work done by these groups.

To make an observation, the telescope points to a field containing a program star, makes a series of images through one or more color filters, then moves to the next program star. One telescope can visit hundreds of stars per night, or it may dwell on a single star all night long. The images are then calibrated and the magnitude of the stars are measured relative to comparison stars in the same field of view.



The star XX Cygni goes through a complete pulsation is just over three hours. XX Cygni has been followed for over 100 years. To check for ongoing changes in the period of the star, the observer used the versatile 11-inch RASA to make alternating 15-second CCD images through photometric B, V, and R filters. Plotting the light curve gave the time of maximum light to better than a minute.

Asteroid Photometry

Amateur astronomers have made significant contributions to science by making light curves of asteroids. From a light curve, it is possible to determine the rotation period and pole orientation of the asteroid. The wide field of RASA combined with the large aperture makes it possible to follow an asteroid for multiple nights while using the same set of comparison stars, resulting in more homogenous data.

Comet Science

Although professional observatories using telescopes similar to the RASA have largely supplanted amateur comet searches, amateurs continue to contribute by following comets and measuring their changing brightness. The light curve of a comet during an apparition may hold surprises as the comet brightens (or fails to brighten) and undergoes outbursts of activity.

Novae and Supernovae Searching

So much sky and so few telescopes! Novae pop up unexpectedly in rich Milky Way fields, while supernovae appear in and around distant galaxies. Regular surveillance programs carried out by amateur astronomers can and do turn up both types of exploding stars.

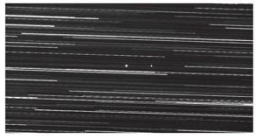
Low Earth Object (LEO) Spotting

Spotting and following Earthy-orbiting satellites has become an exoteric hobby among space enthusiasts. National governments track their satellites with fast, wide-field optics similar to the RASA, so it's only natural that amateur space hobbyists have turned to the RASA. Their targets include spy satellites, discarded booster rockets, space observatories, debris from satellite collisions, and assorted debris down to the basketball size range. To spot objects in LEO, the search instrument stares into space making short exposures, while a dedicated computer processes images looking for moving objects. Pairs of such imaging systems located a few kilometers apart can locate objects in space and determine their orbits.

Search for Near Earth Objects (NEO)

Our planet has been and will be hit again by a class of asteroids called Near Earth Objects. NASA and other space agencies are actively surveying the skies to identify and classify all objects that pose a danger to life here, and they are using instruments like the RASA to do so. The Catalina Sky Survey, Pan-STARRS, LINEAR, Spacewatch, NEOWISE, and the PS1 Consortium all employ fast, wide-angle optics in search of these objects. Of course, their optics may be fancier – an aperture measured in meters, a many-degrees field of view, and gigapixel CCD cameras – but there will never be enough eyes watching the sky.

"Amateur satellite trackers need the wide field and large aperture of an instrument like the RASA. Satellites move quickly, so you need to capture their light in seconds," noted optical designer Mark Ackermann, "and with exposure times of a minute or two, you can catch Earth-crossing asteroids and comets." The RASA's high étendue also makes it suited for supernova searches. In each case, the name of the game is to cover lots of sky in a short time, then cover it all again a few nights later to look for changes. The ATLAS Project, funded by a $5M NASA grant, will search using two 500mm aperture f/2 telescopes with fields 7.4 degrees on a side. A 36 cm version of the RASA could, for $14,000, do the same, and falling not far behind in capability, at a tiny fraction of the cost."



With the RASA pointed to a location in the sky (and no equatorial tracking), satellites in geosynchronous orbit will stay stationary in the field of view while stars will appear as streaks. Image by Richard Berry.

高通光率、快焦比、大口径、宽视场

适合需要大视场和高采样频率的项目

变星测光、小行星测光、彗星观测、新星与超新星搜索、近地天体（NEO）搜索、地球轨道低轨目标观测

中国语境下的机遇与边界

科研平台主导：中国科学院国家天文台等单位牵头建立了虚拟天文台、公众超新星搜寻等平台，让业余天文爱好者有渠道参与专业研究

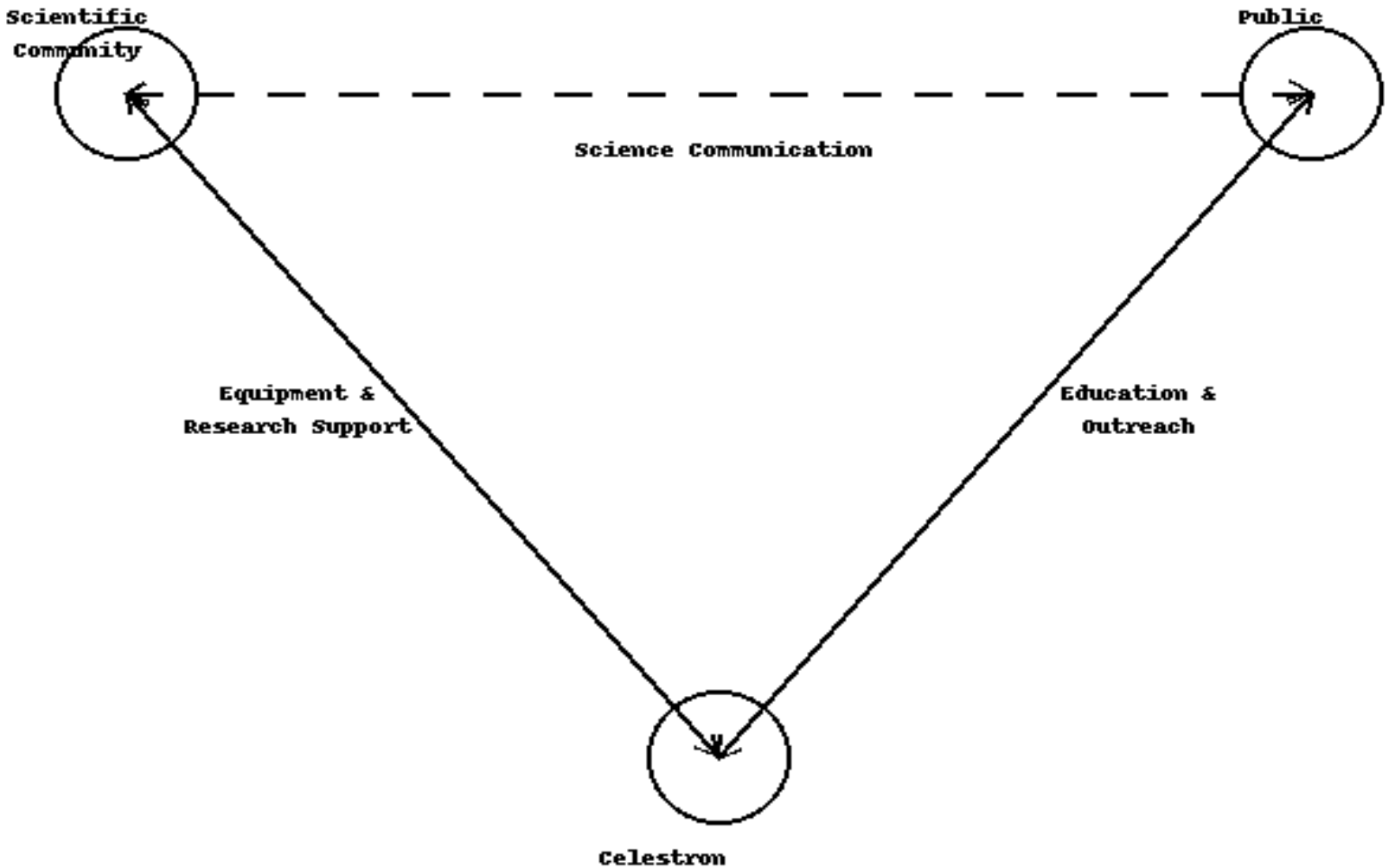
企业定位：

科研的支持者与赋能者

政策与社会环境：当前中国政府倡导提升全民科学素质，科研单位也积极开展公众参与项目 。望远镜企业应抓住机遇，多承担社会责任，塑造**可靠的科普伙伴**形象。

三重“中介”作用

- **设备支撑**：星特朗通过提供高品质的天文仪器和技术平台，降低公众参与科研的门槛。其望远镜、配套自动寻星系统和摄影设备为公众获取科研级观测数据提供了可能。
- **用户教育**：作为厂商，星特朗拥有广泛的用户群体和培训资源，可承担公众科学项目的教育支撑角色。通过教育中介作用，**星特朗可以将生硬的科研任务转化为公众易于参与的学习实践**，巩固了科研界与公众合作的基础。
- **科学传播**：星特朗还能扮演科研成果与公众沟通的媒介，放大公众科学项目的影响力。依托其品牌渠道，星特朗可以将专业研究转译为大众易懂的内容，吸引更多公众关注。



图：科研界、望远镜厂商与公众三者的互动关系示意图（望远镜厂商作为桥梁连接科学需求与公众参与）。科学界提供研究课题和指导，公众贡献观测数据和参与热情，星特朗居中提供设备支持、培训教育和传播途径，促进三方协同。

一些可能的场景