



Newsletter of the Pomona Valley Amateur Astronomers

In an honest search for knowledge, you quite often have
 to abide by ignorance for an indefinite period.
Erwin Schrodinger



Volume 41 Number 01

nightwatch

January 2021

President's Message

It's been too cold and wet for me to get out and observe much lately, but others have been busy. PVAA member Ludd Trozpek captured a series of frames showing the ISS soaring in front of the moon on January 21st—hopefully he'll show off his work at the upcoming meeting, or a future one.

A lot has been happening in local space. On January 17, Virgin Orbit's LauncherOne put 10 cubesats into low Earth orbit for NASA, marking the first time that Virgin Orbit had successfully launched an orbital rocket. That means five companies are now capable of launching orbital payloads from the US:

- SpaceX (Falcon 9 and Falcon Heavy)
- United Launch Alliance (Atlas V, Delta IV)
- Northrop Grumman (Minotaur, Pegasus, Antares)
- Rocket Lab (Electron; New Zealand company originally but now registered in US)
- Virgin Orbit (LauncherOne)

Blue Origin had another successful unmanned test flight of their suborbital New Shepard rocket and capsule on January 14, and they may fly humans on another test flight later this year. A SpaceX Falcon 9 launched a record number of satellites—143—into orbit on January 24. That beat the previous record of 104 satellites in a single launch, set by a Polar Satellite Launch Vehicle operated Indian Space Research Organization, in February of 2017. Just four days earlier, on January 20, SpaceX Falcon 9 booster B1051 became the first orbital booster to ever launch and land 8 times. That gets SpaceX closer to their reusability goal of launching each Falcon 9 Block 5 at least 10 times.

Our speaker this month is professional astronomer and PVAA member Dr. David Kary, of Citrus College, who will speak on the challenges of delivering remote astronomy lectures and labs during the pandemic. The meeting will be this Friday evening, January 29, at 7:30, via Zoom. I hope to see you there.

Matt Wedel

PVAA Officers and Board

Officers

President	Mathew Wedel	909-767-9851
Vice President ..	Joe Hillberg	909-949-3650
Secretary	Ken Elchert	626-541-8679
Treasurer	Gary Thompson	909-935-5509
VP Facilities	Jeff Felton	909-622-6726

Board

Jim Bridgewater (2018).....	909-599-7123
Richard Wismer(2018)	
Ron Hoekwater (2019).....	909-706-7453
Jay Zacks (2019)	

Directors

Membership / Publicity....	Gary Thompson ..	909-935-5509
Outreach	Jeff Schroeder	909-758-1840
Programs	Ron Hoekwater	909-391-1943

Special Offer!!

We have an interesting item on offer for the PVAA member who thinks they already have everything. First, a short history. Way back in the early 2000s when Alper Ates was our President, we had a member who had a little difficulty hearing his presentations. This enterprising member came up with his own solution and purchased a Radioshack Optimus – the karaoke machine pictured below – for Alper to use during his presentations to the Club. Here we are a decade or two later and this fine item is no longer being used but is still being stored by later Club President, Ron Hoekwater.

The Board would love for this item to find a new home where it can be used to the fullest instead of gathering dust in Ron’s closet. It is available to the highest bidder – or lacking that, to anyone who can put it to good use. Please express your interest to nightwatch@pvaa.us and you’ll be connected with Ron so he can get the machine to you. If we have more than one interested party, maybe we’ll need to have a “Sing Off” at our next virtual meeting to determine the winner!

Claire Stover



Club Events Calendar

Jan 29 **Virtual General Meeting –
David Kary “Teaching Astronomy Virtually”**

Feb 13 **Star Party–
Anza-Borrego Desert State Park, Headquarters Campground**

Feb 17 **Board Meeting**

Feb 26 **Virtual General Meeting**

Mar 13 **Star Party –
Anza-Borrego Desert State Park, Culp Valley**

Mar 17 **Board Meeting**

Mar 26 **Virtual General Meeting**

Apr 10 **Star Party – TBD**

Apr 21 **Board Meeting**

Apr 30 **General Meeting (presentation: TBD)**

May 8 **Star Party – TBD**

May 19 **Board Meeting**

May 28 **General Meeting (presentation: TBD)**

Jun 12 **Star Party – TBD**

Jun 16 **Board Meeting**

Jun 25 **General Meeting (presentation: TBD)**

Ludd Captures the ISS

Matt Magilke and I went down to Jurupa area (Limonite and El Palomino, approximately) to view a transit of the ISS across the Moon. We each captured some images and I attach the results of my efforts.

First, see the [attached mp4 video](#) of the transit. The ISS enters from upper right and exits left bottom. This video is slowed down by approximately a factor of two--the time of the ISS to cross the lunar disc was about 0.6 seconds. Note that the video is mirror-reversed because I used a diagonal so I wouldn't have to contort so much to get under the telescope to focus and control the camera.

Second, I have one frame capture as the ISS is coming out of the terminator. A detailed examination, frame by frame, showed the ISS as it crossed the disc in 17 frames at 30 fps. This was the most aesthetically pleasing. I flipped it in Photoshop so the orientation is correct.

This was done with the 120mm f/8.3 achromatic refractor I got from Larry Pall about a decade ago, at prime focus. No tracking. The transit was at 16:37:51.8 PST on 21 January 2021 with sunset occurring at 1711. The Moon was approximately 120 degrees azimuth and altitude 55 degrees.

I was actually sloppy on the focus because it was breezy (shaking aluminum tripod) and sunny and I had to have a jacket over my head to see my LCD screen. I'd do a better job next time and knew going in it wasn't my best effort, but figured "good enough is perfect". I only gave it a 50-50 chance I'd capture anything.

Ludd Trozpek

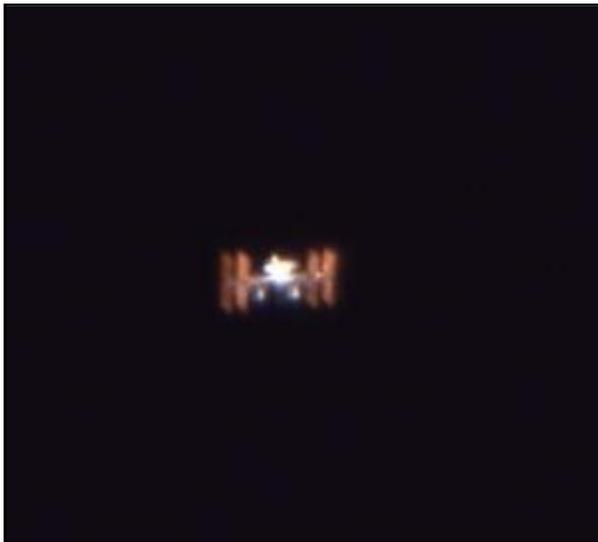
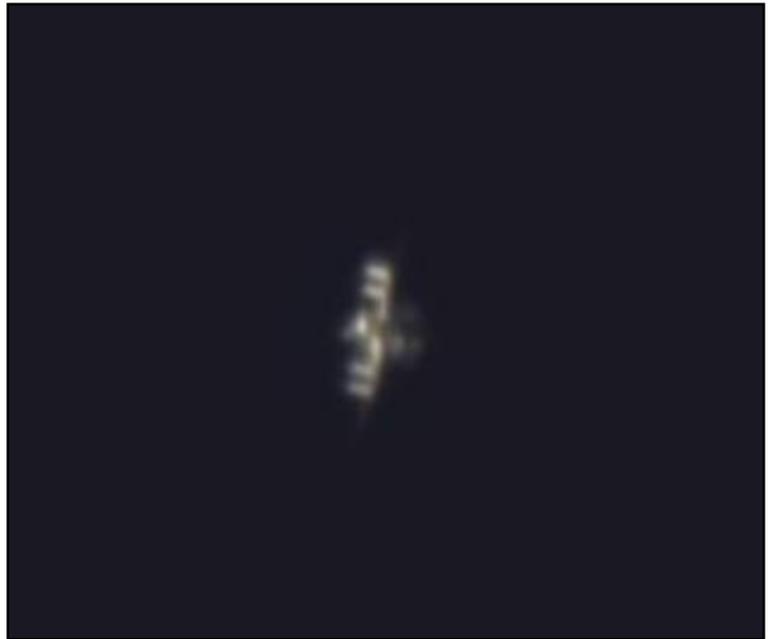


Here is my setup for capturing the transit of the ISS.

ISS Photos from Matt Magilke, Accounting Professor at Claremont McKenna College

January 6, 2021

A stacked image from 50/100 singles.
53 degrees elevation.



I took the picture at about 6:15am on January 7, 2021. Max elevation was 77 degrees and the photo was taken after that. Best guess is between 55-60 degrees. So about 300-315 miles away.

TEC160ED with 10Micron mount. ASI533MC camera. 2.2ms exposure, 290 gain. This image is a single frame with no stacking.

It was eclipsed by the earth up until about 13 degrees and then it brightened up. The sun was still well below the horizon.

Attach is a picture of Matt Magilke's set-up.
He built a concrete pier footing into his backyard patio in Claremont.



NASA Night Sky Notes

February 2021



This article is distributed by NASA Night Sky Network

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

Landing On Mars: A Tricky Feat!

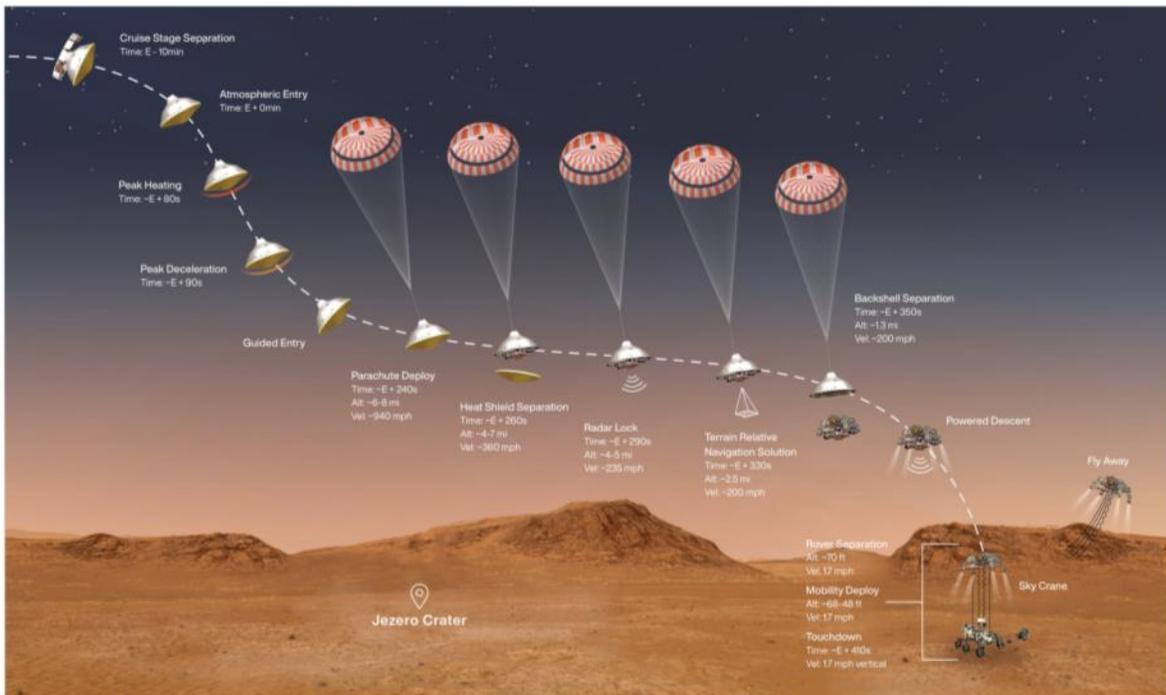
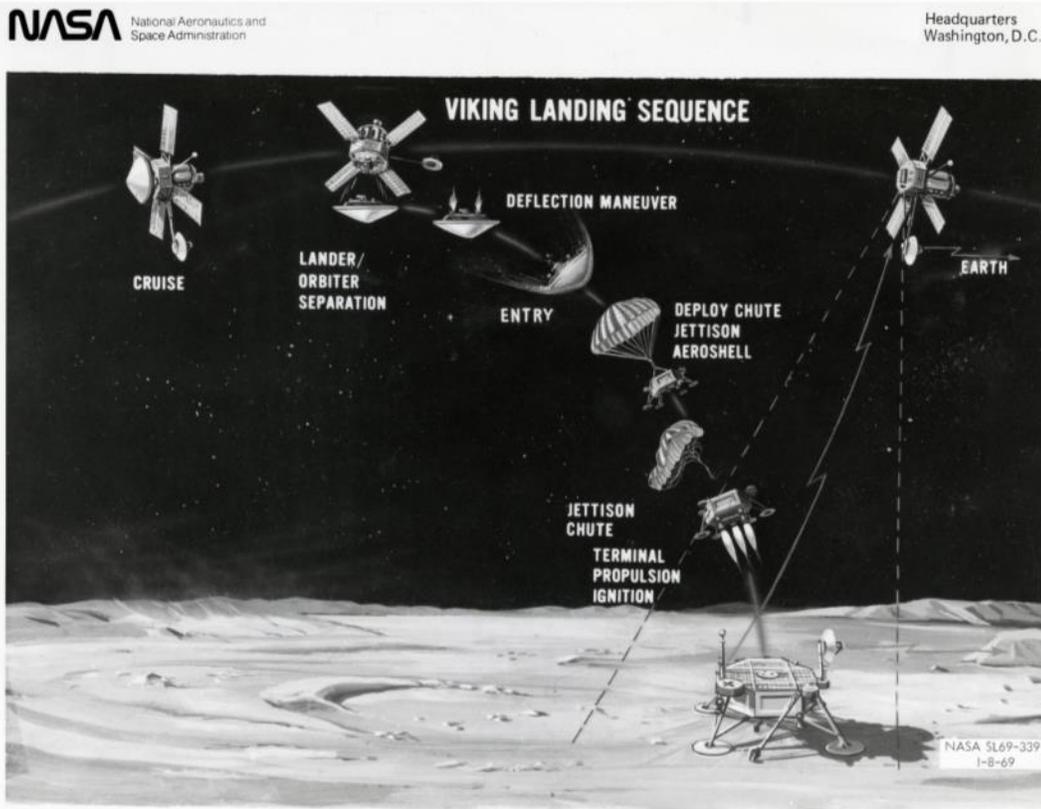
David Prosper

The Perseverance rover and Ingenuity helicopter will land in Mars's Jezero crater on February 18, 2021, NASA's latest mission to explore the red planet. Landing on Mars is an incredibly difficult feat that has challenged engineers for decades: while missions like Curiosity have succeeded, its surface is littered with the wreckage of many failures as well. Why is landing on Mars so difficult?

Mars presents a unique problem to potential landers as it possesses a relatively large mass and a thin, but not insubstantial, atmosphere. The atmosphere is thick enough that spacecraft are stuffed inside a streamlined aeroshell sporting a protective heat shield to prevent burning up upon entry - but that same atmosphere is not thick enough to rely on parachutes alone for a safe landing, since they can't catch sufficient air to slow down quickly enough. This is even worse for larger explorers like Perseverance, weighing in at 2,260 lbs (1,025 kg). Fortunately, engineers have crafted some ingenious landing methods over the decades to allow their spacecraft to survive what is called *Entry, Descent, and Landing (EDL)*.

The Viking landers touched down on Mars in 1976 using heat shields, parachutes, and retrorockets. Despite using large parachutes, the large Viking landers fired retrorockets at the end to land at a safe speed. This complex combination has been followed by almost every mission since, but subsequent missions have innovated in the landing segment. The 1997 Mars Pathfinder mission added airbags in conjunction with parachutes and retrorockets to safely bounce its way to a landing on the Martian surface. Then three sturdy "petals" ensured the lander was pushed into an upright position after landing on an ancient floodplain. The Opportunity and Spirit missions used a very similar method to place their rovers on the Martian surface in 2004. Phoenix (2008) and Insight (2018) actually utilized Viking-style landings. The large and heavy Curiosity rover required extra power at the end to safely land the car-sized rover, and so the daring "Sky Crane" deployment system was successfully used in 2012. After an initial descent using a massive heat shield and parachute, powerful retrorockets finished slowing down the spacecraft to about 2 miles per hour. The Sky Crane then safely lowered the rover down to the Martian surface using a strong cable. Its job done, the Sky Crane then flew off and crash-landed a safe distance away. Having proved the efficacy of the Sky Crane system, NASA will use this same method to attempt a safe landing for Perseverance this month!

You can watch coverage of the Mars Perseverance landing starting at 11:00 AM PST (2:00 PM EST) on February 18 at nasa.gov/nasalive. Touchdown is expected around 12:55 PM PST (3:55 PM EST). NASA has great resources about the Perseverance Rover and accompanying Ingenuity helicopter on mars.nasa.gov/mars2020. And of course, find out how we plan to land on many different worlds at nasa.gov.



Illustrations of the Entry, Descent, and Landing (EDL) sequences for Viking in 1976, and Perseverance in 2021. Despite the wide gap between these missions in terms of technology, they both performed their landing maneuvers automatically, since our planets are too far apart to allow Earth-based engineers to control them in real time! (NASA/JPL/Caltech)

PVAA Bylaws changes

The PVAA Board has identified several issues with the current club Bylaws. Per Article IX of the Bylaws, the procedure for amending the Bylaws is that proposed changes will be published in the club newsletter to be read and openly discussed at two regularly-scheduled general meetings. A final vote will be held at a third regularly-scheduled general meeting. Proposed changes must pass by a vote of 2/3 of the members present.

The proposed changes are detailed below.

Article V - Officers and Members of the Board of Officers, Section 1, 1.0

Current language:

The Board of Officers of the Pomona Valley Amateur Astronomers shall consist of the following elected officers (in order of succession): President, Vice President, Secretary, Treasurer, Vice President of Facilities and Resources, Four Board Members at Large.

Proposed new language:

The Board of Officers of the Pomona Valley Amateur Astronomers shall consist of the following elected officers (in order of succession): President, Vice President, Secretary, Treasurer, and Four Board Members at Large. A Vice President of Facilities and Resources may be elected when the club has facilities and resources that would benefit from or require such oversight, and a Workshop Director may be appointed by the Board if the need arises for someone to oversee workshops in the future.

Rationale for the change:

The club does not currently have any facilities, and our shared resources are down to a handful of pieces of equipment in a few members' garages. We currently have a VP of Facilities and Resources—club member Jeff Felton—but for the last several years that person has had no facilities or resources to oversee. So it seems logical to thank Jeff for his service and dissolve the position, while leaving open the option of electing someone to the position in the future, should there be a need.

Similarly, the position of Workshop Director is currently unfilled, and since we have not given workshops in several years, it seems best to make this an ad-hoc position. Per Article VII, the Workshop Director is not elected, but appointed.

Article XI - Membership Database and Mailing List, Section 1, 1.0

Current language:

The full membership list, including names, addresses, and phone numbers, is to be made available to any member of the club on request in printed form, on gummed labels, or on computer disk. (The member requesting the information must pay any associated costs.) A mailing originating from individual members must state that it is not an official club mailing.

Proposed change:

The Board proposes to delete this article in its entirety and change the numbering of Article XII to Article XI.

Rationale for the change:

The idea of giving out the contact information of everyone in the club to any member that asks is out of

step with modern privacy concerns. The problem of getting information out to club members has been largely solved by the advent of email and the internet. If any member needs to get information out to the entire club, they can post it to the club Facebook page, or send it to the Board to be distributed to the membership pending the Board's approval.

Article XII - Incorporation and Tax-Exempt Status, Section 3, 1.0 - Ongoing Reporting Requirements

Current description:

(This section lists the state and federal entities to which the club must report regularly to maintain its status as a tax-exempt 501(c)(3) nonprofit public benefit corporation, and currently also lists the specific forms required and their URLs.)

Proposed new language:

For the Pomona Valley Amateur Astronomers to maintain its federal and state tax-exempt status and operate as a 501(c)(3) nonprofit public benefit corporation in the state of California, regular (annual or biennial) reporting is required to the US Internal Revenue Service, California Franchise Tax Board, California Secretary of State, and California Attorney General's Registry of Charitable Trusts. The specific forms, their annual due dates, and the websites where they may be found will be kept in a separate document, which will be assigned to a PVAA officer to keep up-to-date.

Rationale for the change:

The problem with listing the specific forms and their URLs in the Bylaws is that although the forms are easy to find online, the specific URLs often change from year to year as various government entities overhaul their websites, and occasionally the names of the forms change as well. Listing the precise forms required in any given year as well as their URLs means that the Bylaws will regularly become out of date and require revision. For these reasons, the board unanimously approved Claire Stover's recommendations that

1. a separate document be created to list the current URL for each document that is required to be filed by the PVAA as a non-profit organization
2. this document be assigned to a PVAA officer to keep up-to-date
3. this document be referenced in Article XII of the by-laws

All Articles

The board unanimously approves correcting all the typographical errors in the Bylaws. The club secretary, Ken Elchert, has compiled a list.