

PTYS 442/542 – Mars
Homework #2 –due Wed 2/18

Turn in at: <https://d2l.arizona.edu/d2l/home/1707011>

1) As with the last homework we'll examine two images in HiReport except this time we'll take advantage of the full power of the instrument and look at the full-resolution data.

<http://hireport.lpl.arizona.edu/hireport/hi>

username: MarsClass password: MarsClass2015

This time, in addition to the general description you did last time, look for images with features you recognize. E.g. pick at least one image that has obvious impact craters in it. Is the crater simple or complex? Describe the features you can use to tell the difference. Does the crater still have an obvious ejecta blanket? What does that mean for its age? What other geologic landforms does the crater superpose and what landforms are superposed on the crater? Etc...

You might recognize other features if you've had some geology courses before and it's fine to focus on them instead of impact craters.

On the HiReport observation page there are several links just above the image thumbnail. First you need to download HiView, which allows you to rapidly scroll and zoom over these very large images.

<http://www.uahirise.org/hiview/>

Click on the 'HTTP' link in HiReport to download the full image file in Jpeg 2000 format. This will be a very big file; you should do this somewhere on campus that has a fast internet connection. Open HiView and go to 'File' -> 'Open File' and select your downloaded file. There are tutorials on using HiView on the website above and I'll show a quick demo (the basic functionality is pretty straightforward).

When you describe the craters (or other features in your image) some of the description must reference small-scale features. Examine some part of the image at full resolution and describe what you see – draw some conclusions from this observation about what happened when the crater or other feature was created or subsequently modified.

You should look at the full resolution monochrome (RED) images and the color images for this homework, and 3D anaglyphs if they exist. What do these datasets reveal? What do the colors seem to indicate?

Keep HiView installed on your computer, you'll need it throughout the semester.

2) HiRISE target Selection

Use the HiWISH website that I demoed in class (<http://www.uahirise.org/hiwish/>) to browse Mars and create at least 3 HiRISE target suggestions. Give some thought to what you expect to see and include this in the 'Science Rationale' box and put 'Mars Class' in the special notes box. You'll also need to choose a primary science theme based on the descriptions that are on the targeting page. The grade for this question will be based on how well thought out the science rationale is. I'll provide feedback and then you can update the suggestions.

A few things to bear in mind:

- The north polar area will be in darkness or obscured by haze – no imaging north of ~55 N at this time
- Choose 3 targets that are separated from each other by at least 10 degrees of longitude, so they do not conflict with each other.
- Some areas on the equator are heavily contested and difficult to acquire observations in, such as near Valles Marineris or near the Curiosity or Perseverance landing sites. Again, you can still plan an observation here if there's a (very) good reason to do so, but it will be harder to acquire. Anywhere you see lots of previous images or suggestions is more heavily contested.
- The equatorial and mid-latitude areas are well illuminated, but the closer to a pole you get (especially illuminated south pole) then the more likely it is that we can acquire your image.
- Don't use any seasonal (solar longitude) restrictions or phase/incidence/emission angle restrictions in the advanced options.
- Don't select 'yes' for stereo unless you know you need it. And don't bother selecting "yes" for CRISM as it is no longer operating.
- Do change the resolution (binning) to what you need, but most of these will be bin-2. We now restrict bin1 imaging to certain detectors as others have more noise problems in bin-1 mode.

After you create each suggestion the HiWish website will tell you the suggestion ID. Please just list these suggestion numbers in your homework—no need to write any more than that. I will view what you entered via HiReport or HiWish.

Write a brief (1-3 sentence) science rationale that gives a good reason for taking the image. If you write something too long it won't normally be read anyhow.