



Crew Lunar Observations Lunar Targeting Package

Archived Version

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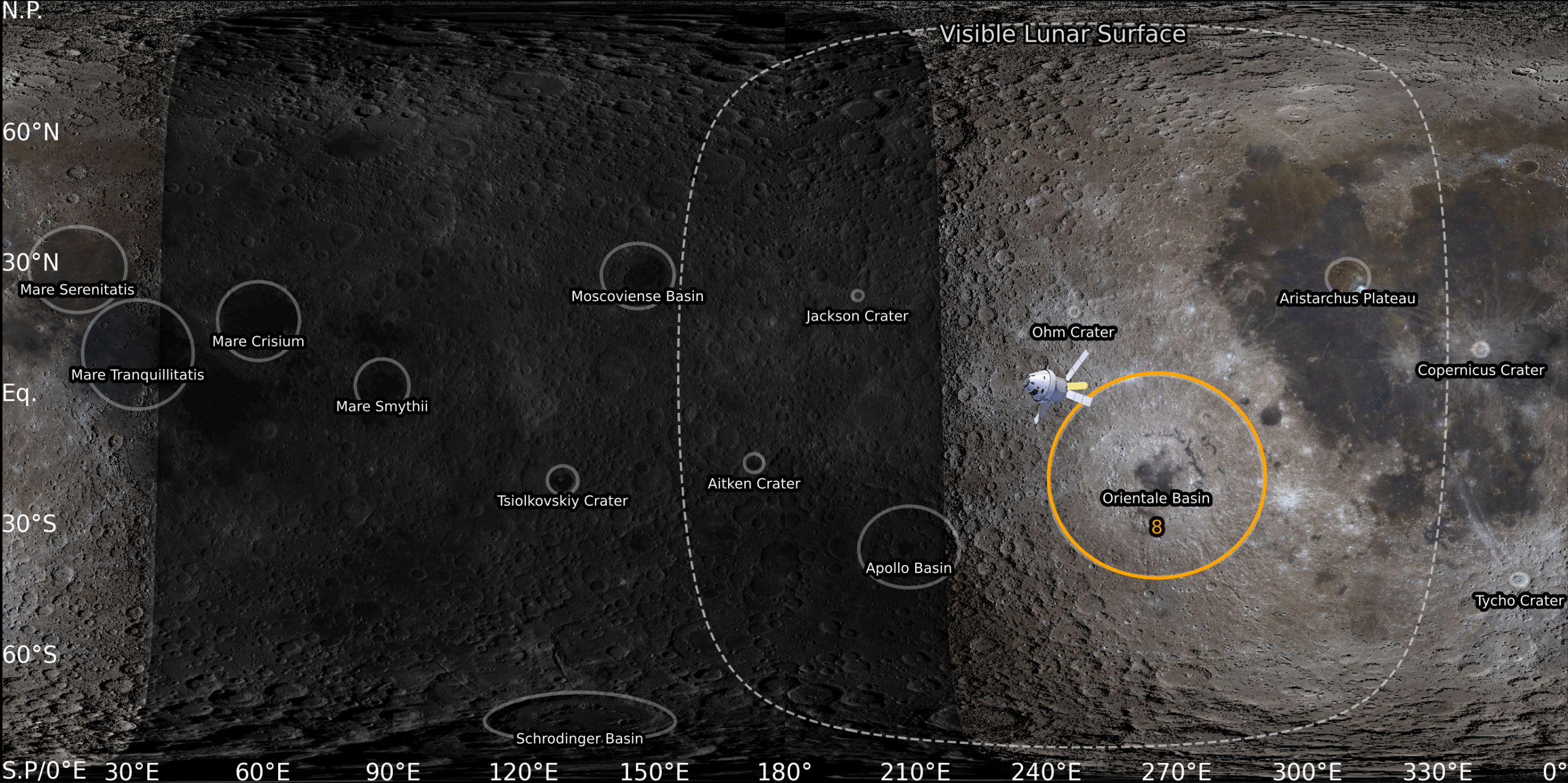


Overview

A comprehensive lunar flyby overview featuring a high-level map of all observation targets. Includes detailed shift maps and a quick-reference cue card for mission planning.



Crew Shift 2 Overview



1. Feature ID

- Feature type/name
- Target? (yes/no)
- Location
- Observation style

2. Geometry

- Size
- Shape
- Boundary Preservation

3. Color & Shadow

- Color tone
- Albedo
- Shadows/ illumination

4. Structure & Texture

- Structures
- Slopes
- Texture

5. Geologic Relations

- Association
- Contact habit
- Contact relationship

* Thoughts *

- Impressions
- Interpretations
- Any changes?

< Shift

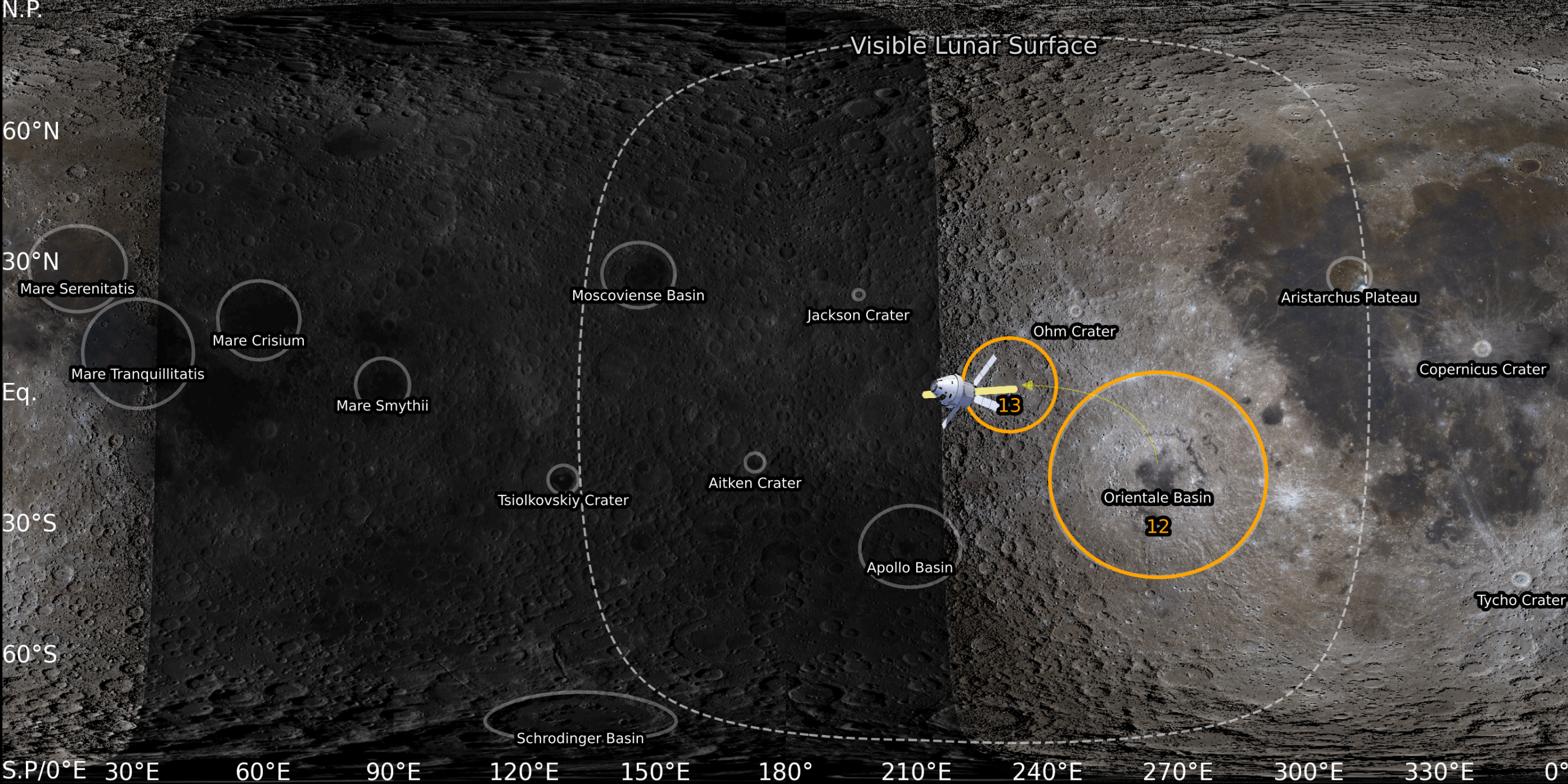
Shift >

Turn Big 15 Off

Full Screen Image



Crew Shift 3 Overview



1. Feature ID

- Feature type/name
- Target? (yes/no)
- Location
- Observation style

2. Geometry

- Size
- Shape
- Boundary Preservation

3. Color & Shadow

- Color tone
- Albedo
- Shadows/ illumination

4. Structure & Texture

- Structures
- Slopes
- Texture

5. Geologic Relations

- Association
- Contact habit
- Contact relationship

* Thoughts *

- Impressions
- Interpretations
- Any changes?

< Shift

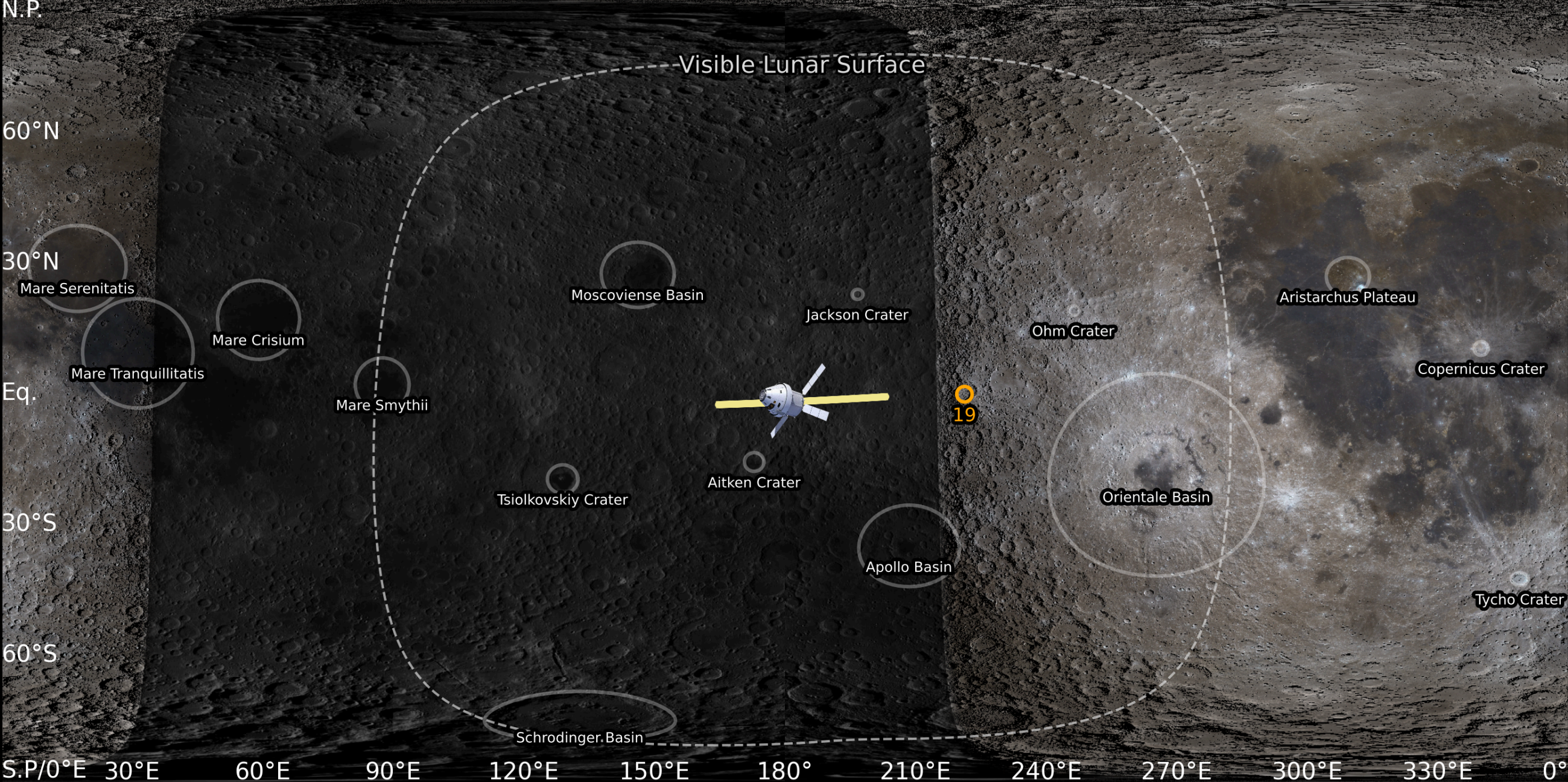
Shift >

Turn Big 15 Off

Full Screen Image



Crew Shift 4 Overview



1. Feature ID

- Feature type/name
- Target? (yes/no)
- Location
- Observation style

2. Geometry

- Size
- Shape
- Boundary Preservation

3. Color & Shadow

- Color tone
- Albedo
- Shadows/ illumination

4. Structure & Texture

- Structures
- Slopes
- Texture

5. Geologic Relations

- Association
- Contact habit
- Contact relationship

* Thoughts *

- Impressions
- Interpretations
- Any changes?

< Shift

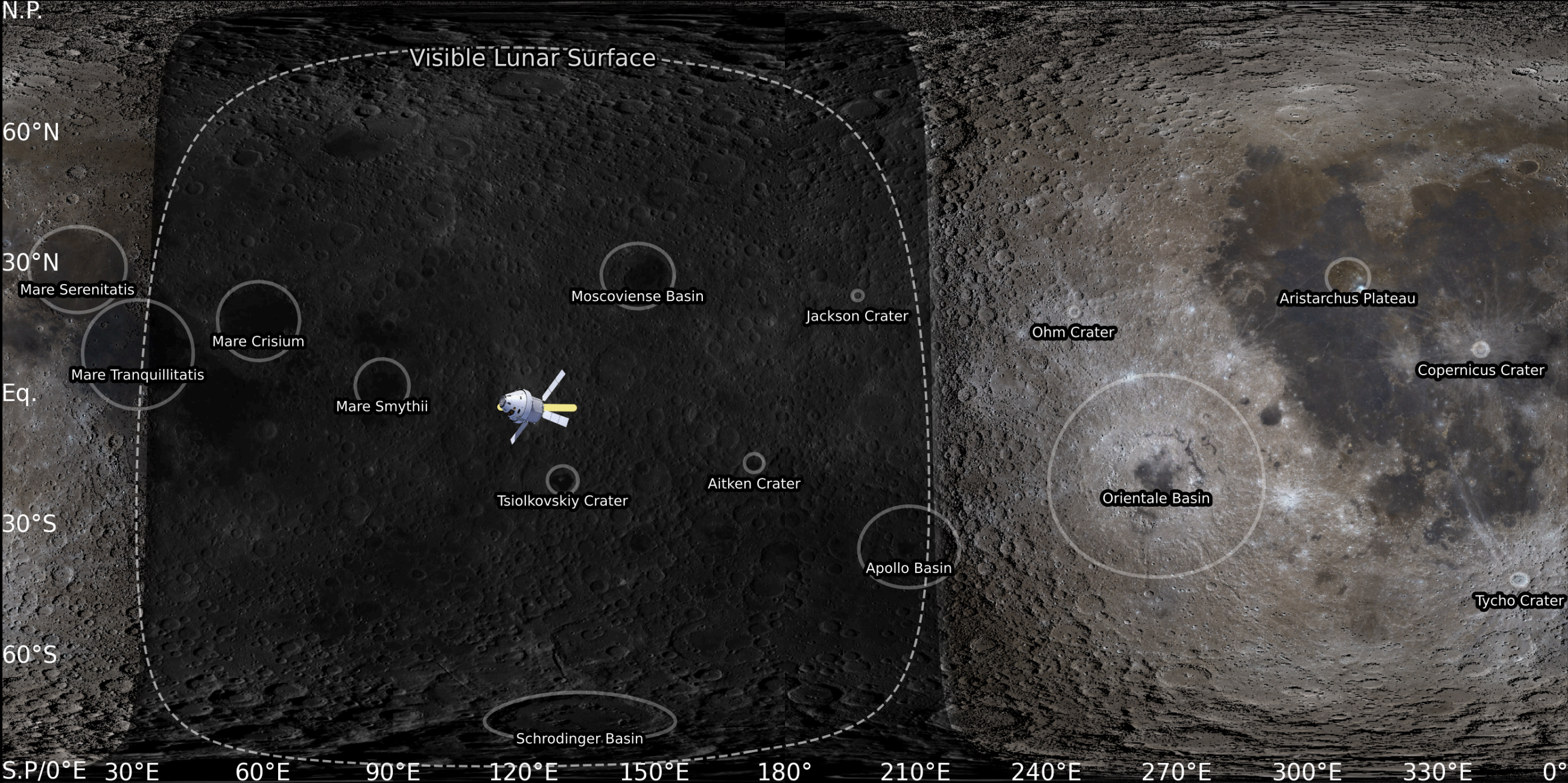
Shift >

Turn Big 15 Off

Full Screen Image



Crew Shift 5 Overview



1. Feature ID

- Feature type/name
- Target? (yes/no)
- Location
- Observation style

2. Geometry

- Size
- Shape
- Boundary Preservation

3. Color & Shadow

- Color tone
- Albedo
- Shadows/ illumination

4. Structure & Texture

- Structures
- Slopes
- Texture

5. Geologic Relations

- Association
- Contact habit
- Contact relationship

* Thoughts *

- Impressions
- Interpretations
- Any changes?

< Shift

Shift >

Turn Big 15 Off

Full Screen Image



Timeline

A graphical schedule detailing target visibility windows and observation request times. Features an interactive time input tool, an icon legend, and a structured target timeline.



Lunar Targets

An in-depth catalog of all mission targets. Each section features comprehensive information panels, example imagery across multiple camera focal lengths, and a dedicated observation cue card.

1. Discussion #1: Warm up

Target Information

- Welcome to the Moon!
- Discussion theme: Warm up to science observations of the Moon.

Camera Actions

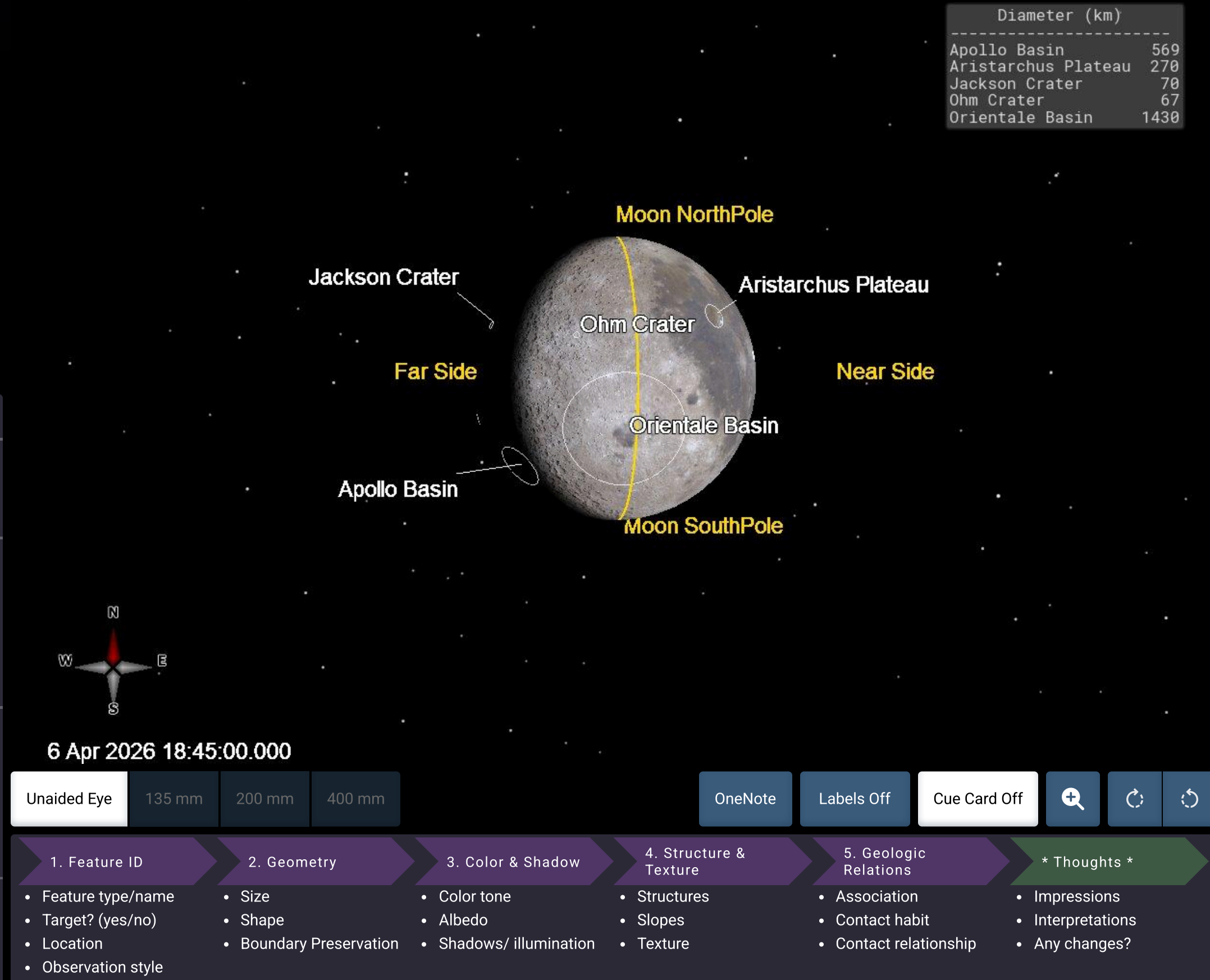
- Topics to discuss with available crew:
 1. Help orient each other using major landmarks.
 2. What about your view is familiar (features, color, etc.)?
 3. What about your view is unexpected?
- Capture images along with your discussion.

Unaided Eye Actions

- Topics to discuss with available crew:
 1. Help orient each other using major landmarks.
 2. What about your view is familiar (features, color, etc.)?
 3. What about your view is unexpected?
- Annotate your observations along with your discussion.

Science Impact

- The observations you will make throughout the flyby will pave the way for the next generation of lunar exploration.



Diameter (km)	
Apollo Basin	569
Aristarchus Plateau	270
Jackson Crater	70
Ohm Crater	67
Orientele Basin	1430

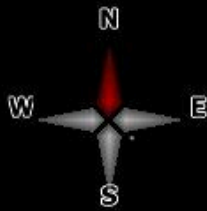
Target Information

- ## Camera Actions

- ## Unaided Eye Actions

- ## Science Impact

- The transition between the nearside and farside reveals how differences in thermal/magmatic histories shaped crustal evolution.



6 Apr 2026 18:55:00.000

Unaided Eye 135 mm 200 mm 400 mm OneNote Labels Off Cue Card Off   

1. Feature ID	2. Geometry	3. Color & Shadow	4. Structure & Texture	5. Geologic Relations	* Thoughts *
• Feature type/name	• Size	• Color tone	• Structures	• Association	• Impressions
• Target? (yes/no)	• Shape	• Albedo	• Slopes	• Contact habit	• Interpretations
• Location	• Boundary Preservation	• Shadows/ illumination	• Texture	• Contact relationship	• Any changes?
• Observation style					

-  ☐ 1. Discussion #1: Warm up 18:45 GMT
-  ☐ 2. Discussion #2: Near/Farside  18:55 GMT
-  ☐ 3. Crater Duo: Glushko (1/2)  19:15 GMT
-  ☐ 4. Crater Duo: Ohm 19:23 GMT
-  ☐ a. Window Team Position Swap 19:30 GMT
-  ☐ 5. Aristarchus Plateau  19:31 GMT

3. Crater Duo: Glushko (1/2) *GLOOSH-ko*

Target Information

- High albedo, complex crater with prominent ray system.
- W of Oceanus Procellarum, SE of Ohm, NE of Orientale.
- First of two craters in Crater Duo (Glushko, Ohm).
- First of two photometric observations of Glushko for this crew.

Camera Actions

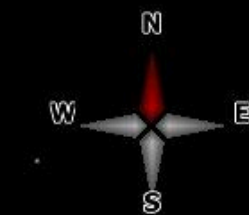
- Centered images of entire crater and ray system in a single frame.
- Image and compare the brightness and extent of rays in Glushko's and Ohm's ray systems.
- Image and describe how Glushko's rays differ in the mare vs. highlands.
- Image and describe color, albedo, and texture variations along or between Glushko's rays.

Unaided Eye Actions

- Describe the extent of Glushko's ejecta/ray system.
- Describe brightness and color variations along or between Glushko's rays.
- Describe how Glushko's rays differ in the mare vs. highlands.
- Compare the ejecta/ray systems of Glushko to Ohm.

Science Impact

- Comparative observations of the Crater Duo will be used to understand how crater ray systems evolve with time.
- Repeat observations will inform how changes in viewing conditions affect human perception of brightness, color, and texture.



6 Apr 2026 19:15:00.000

Unaided Eye	135 mm	200 mm	400 mm
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OneNote Labels Off Cue Card Off   

1. Feature ID	2. Geometry	3. Color & Shadow	4. Structure & Texture	5. Geologic Relations	* Thoughts *
• Feature type/name	• Size	• Color tone	• Structures	• Association	• Impressions
• Target? (yes/no)	• Shape	• Albedo	• Slopes	• Contact habit	• Interpretations
• Location	• Boundary Preservation	• Shadows/ illumination	• Texture	• Contact relationship	• Any changes?
• Observation style					



1. Discussion #1: Warm up18:45 GMT
2. Discussion #2: Near/Farside🔊18:55 GMT
3. Crater Duo: Glushko (1/2)🕒19:15 GMT
4. Crater Duo: Ohm19:23 GMT
- a. Window Team Position Swap19:30 GMT
5. Aristarchus Plateau🔊19:31 GMT
-

4. Crater Duo: Ohm *OH-m*

Target Information

- Small, complex crater with prominent ray system.
- Size of the "Eye of the Sahara" in Mauritania.
- Second of two craters in Crater Duo (Glushko, Ohm).

Camera Actions

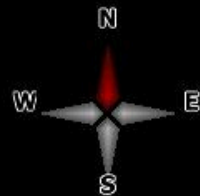
- Centered images of entire crater and ray system in a single frame.
- Image and compare the brightness and extent of rays in Ohm's and Glushko's ray systems.
- Image and describe color, albedo, and texture variations along or between Ohm's rays.

Unaided Eye Actions

- Describe the extent of Ohm's ejecta/ray system.
- Describe albedo, color, and texture variations along or between Ohm's rays.
- Compare the ejecta/ray systems of Ohm to Glushko.

Science Impact

- Comparative observations of the Crater Duo will be used to understand how crater ray systems evolve with time.



6 Apr 2026 19:23:00.000

Unaided Eye

135 mm

200 mm

400 mm

OneNote

Labels Off

Cue Card Off



1. Feature ID

- Feature type/name
- Target? (yes/no)
- Location
- Observation style

2. Geometry

- Size
- Shape
- Boundary Preservation

3. Color & Shadow

- Color tone
- Albedo
- Shadows/ illumination

4. Structure & Texture

- Structures
- Slopes
- Texture

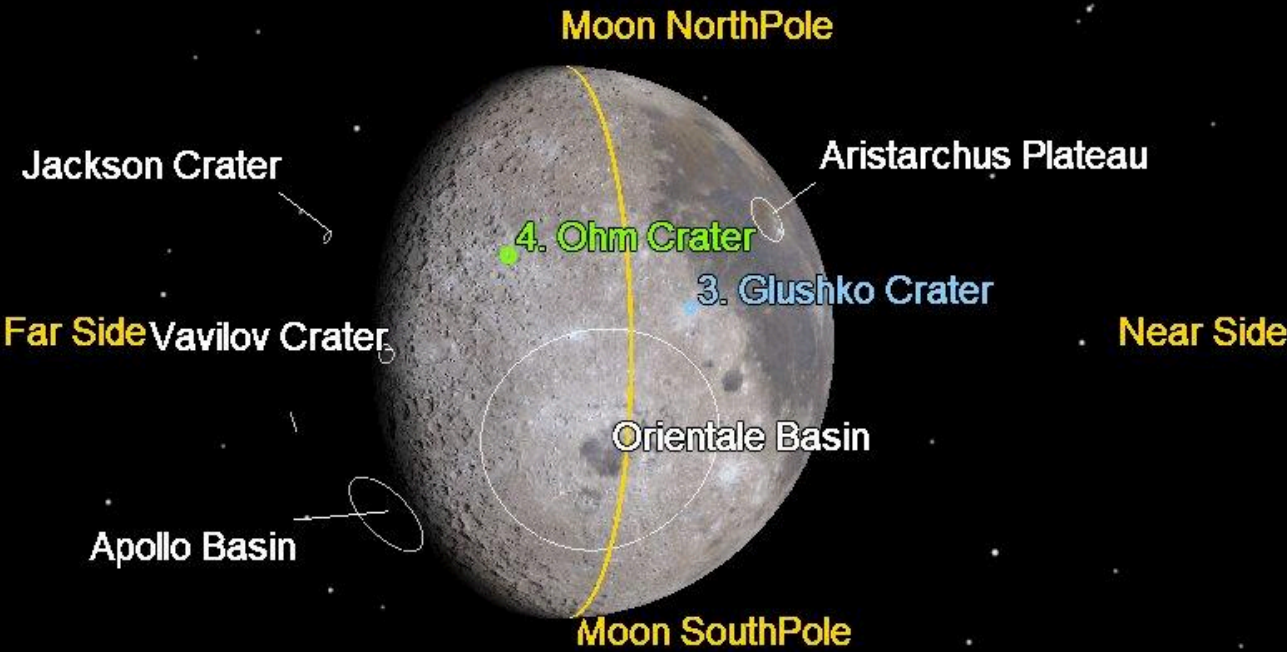
5. Geologic Relations

- Association
- Contact habit
- Contact relationship

* Thoughts *

- Impressions
- Interpretations
- Any changes?

Diameter (km)	
Ohm Crater	67
Apollo Basin	569
Aristarchus Plateau	270
Jackson Crater	70
Orientele Basin	1430



1. Discussion #1: Warm up

18:45 GMT

2. Discussion #2: Near/Farside

18:55 GMT

3. Crater Duo: Glushko (1/2)

19:15 GMT

4. Crater Duo: Ohm

19:23 GMT

a. Window Team Position Swap

19:30 GMT

5. Aristarchus Plateau

19:31 GMT

a. Window Team Position Swap

Target Information

Window team switch!

Diameter (km)

Apollo Basin569

Aristarchus Plateau270

Jackson Crater70

Ohm Crater67

Orientele Basin1430

Jackson Crater

Far Side

Apollo Basin

Moon North Pole

4. Ohm Crater

5. Aristarchus Plateau

Orientele Basin

Moon South Pole

Near Side

6 Apr 2026 19:30:00.000

Unaided Eye

135 mm

200 mm

400 mm

OneNote

Labels Off

Cue Card Off

1. Feature ID

2. Geometry

3. Color & Shadow

4. Structure & Texture

5. Geologic Relations

* Thoughts *

• Feature type/name

• Target? (yes/no)

• Location

• Observation style

• Size

• Shape

• Boundary Preservation

• Color tone

• Albedo

• Shadows/ illumination

• Structures

• Slopes

• Texture

• Association

• Contact habit

• Contact relationship

• Impressions

• Interpretations

• Any changes?

- 1. Discussion #1: Warm up 18:45 GMT
- 2. Discussion #2: Near/Farside 18:55 GMT
- 3. Crater Duo: Glushko (1/2) 19:15 GMT
- 4. Crater Duo: Ohm 19:23 GMT
- a. Window Team Position Swap 19:30 GMT
- 5. Aristarchus Plateau 19:31 GMT

5. Aristarchus Plateau *AI-R-is-TAR-kus*

Target Information

- Plateau known for its volcanic diversity and the bright Aristarchus crater.
- Within NW Oceanus Procellarum near limb.

Camera Actions

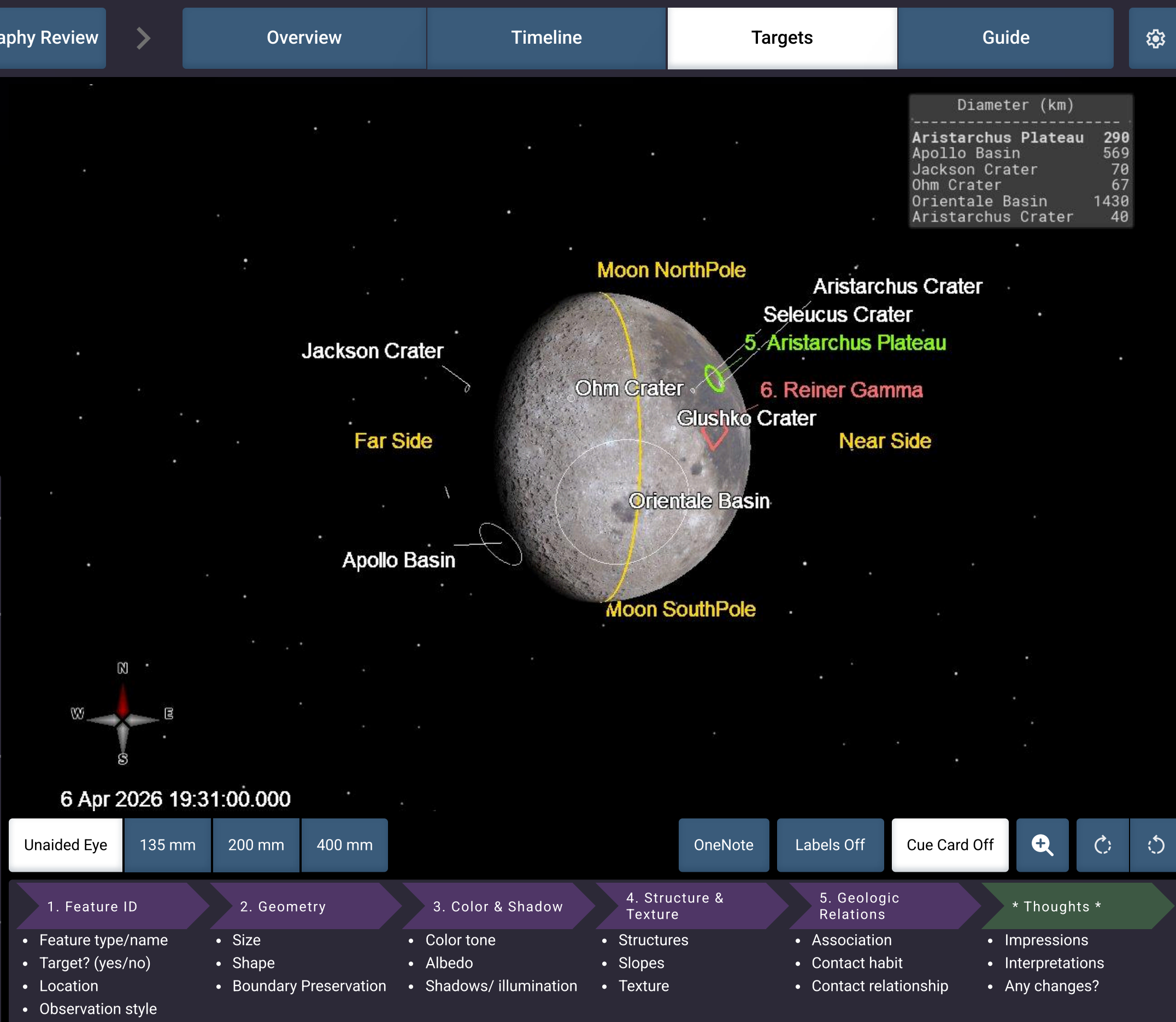
- Centered image of plateau in full zoom.
- Image and describe any topographic highs or lava channels across the plateau.
- Image and describe any color/albedo variations across the plateau.
- Image and describe the colors and textures of Aristarchus crater and rays.

Unaided Eye Actions

- Describe any color/albedo variations across the plateau.
- Describe any color/albedo variations between the plateau and the surrounding mare.
- How does the color/albedo of Aristarchus crater and rays compare to other bright features on the Moon?

Science Impact

- Your observations will inform the complex and varied volcanic and tectonic history of this unique lunar feature.





2. Discussion #2: Near/Farside

18:55 GMT
3. Crater Duo: Glushko (1/2)

19:15 GMT
4. Crater Duo: Ohm

19:23 GMT
- a. Window Team Position Swap

19:30 GMT
5. Aristarchus Plateau

19:31 GMT
6. Reiner Gamma

19:41 GMT

6. Reiner Gamma *RINE-er GAMM-uh*

Target Information

- Set of bright lunar swirls.
- In W Oceanus Procellarum near highland-mare boundary.

Camera Actions

- Centered image of swirls at full zoom.
- Image and describe the color/albedo and patterns within the swirls. Are there any variations among the different swirls?
- Image and describe the shapes of the swirls.

Unaided Eye Actions

- Can you see the swirls with the unaided eye? If so, what shapes and patterns can you resolve?
- Describe any color/albedo variations of Reiner Gamma.

Science Impact

- Your observations of the swirls provide clues as to how magnetism preserves lunar regolith against space weathering.

Diameter (km)

Apollo Basin

569

Aristarchus Plateau

270

Jackson Crater

70

Ohm Crater

67

Orientele Basin

1430

Jackson Crater

Ohm Crater

Orientele Basin

Apollo Basin

5. Aristarchus Plateau

6. Reiner Gamma

Oceanus Procellarum

Moon NorthPole

Moon SouthPole

Far Side

Near Side

W

N

E

S

6 Apr 2026 19:41:00.000

Unaided Eye

135 mm

200 mm

400 mm

OneNote

Labels Off

Cue Card Off

1. Feature ID

2. Geometry

3. Color & Shadow

4. Structure & Texture

5. Geologic Relations

* Thoughts *

Feature type/name

Target? (yes/no)

Location

Observation style

Size

Shape

Boundary Preservation

Color tone

Albedo

Shadows/ illumination

Structures

Slopes

Texture

Association

Contact habit

Contact relationship

Impressions

Interpretations

Any changes?



a. Window Team Position Swap

19:30 GMT

5. Aristarchus Plateau

19:31 GMT

6. Reiner Gamma

19:41 GMT

b. Cabin and Window Teams Swap

19:50 GMT

7. Whole Moon

20:05 GMT

8. Orientale Basin

20:15 GMT

c. Window Team Position Swap

20:30 GMT

b. Cabin and Window Teams Swap

Target Information

- Handover and switch with your crewmates.

Diameter (km)

Apollo Basin569

Aristarchus Plateau270

Jackson Crater70

Ohm Crater67

Orientele Basin1430

Moon NorthPole

Jackson Crater

Ohm Crater

Aristarchus Plateau

6. Reiner Gamma

Orientele Basin

Apollo Basin

Moon SouthPole

Far Side

Near Side

N

W

S

E

6 Apr 2026 19:50:00.000

Unaided Eye

135 mm

200 mm

400 mm

OneNote

Labels Off

Cue Card Off

1. Feature ID

2. Geometry

3. Color & Shadow

4. Structure & Texture

5. Geologic Relations

* Thoughts *

• Feature type/name

• Target? (yes/no)

• Location

• Observation style

• Size

• Shape

• Boundary Preservation

• Color tone

• Albedo

• Shadows/ illumination

• Structures

• Slopes

• Texture

• Association

• Contact habit

• Contact relationship

• Impressions

• Interpretations

• Any changes?

	☐	a. Window Team Position Swap	19:30 GMT
	☐	5. Aristarchus Plateau	 19:31 GMT
	☐	6. Reiner Gamma	 19:41 GMT
	☐	b. Cabin and Window Teams Swap	19:50 GMT
	☐	7. Whole Moon	 20:05 GMT
	☐	8. Orientale Basin	20:15 GMT
	☐	c. Window Team Position Swap	20:30 GMT

7. Whole Moon

Target Information

- Not made of cheese.

Camera Actions

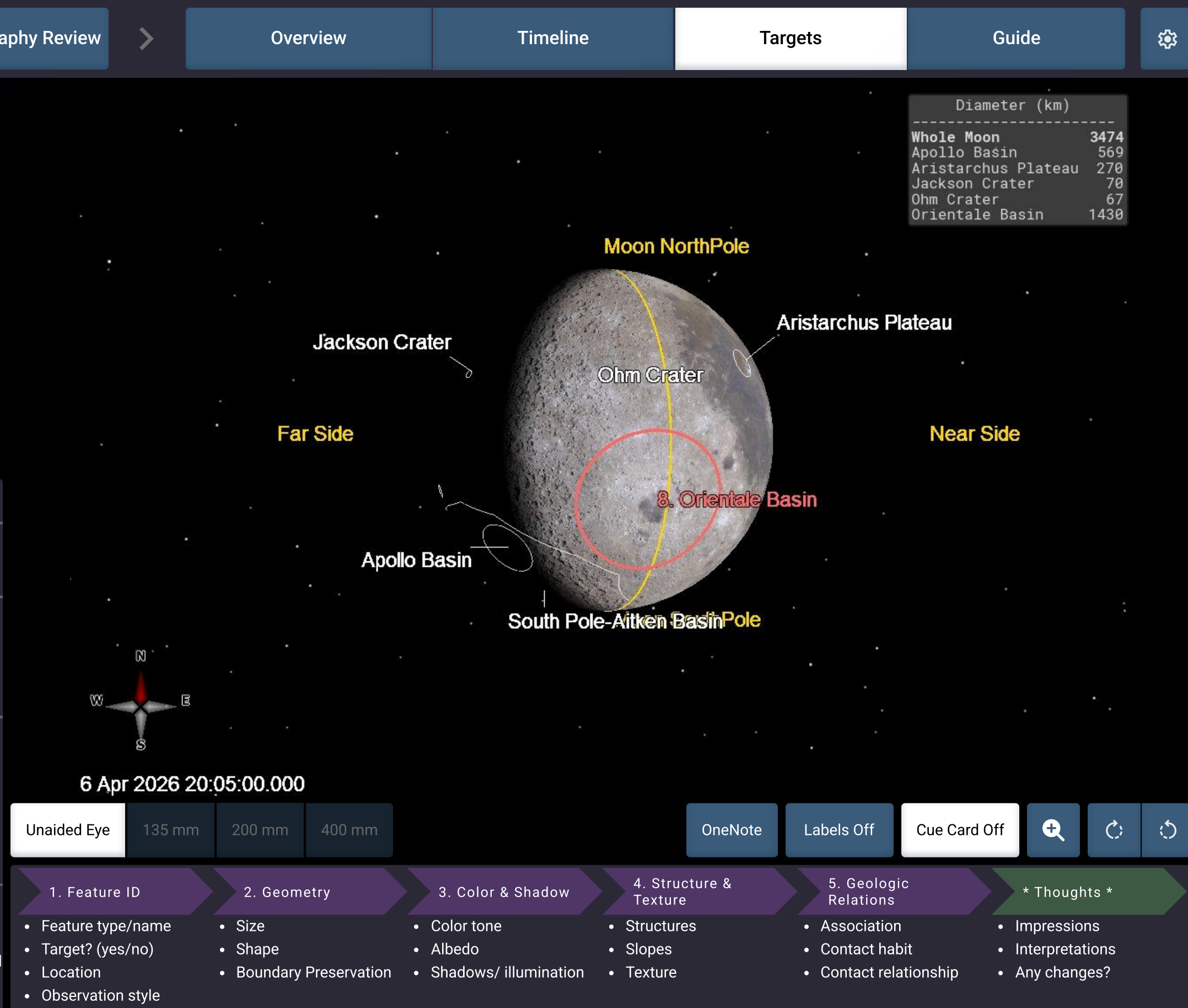
- Orient yourself to the Moon.
- Whole Moon mosaic: N-S snake pattern at mid-zoom w/ overlap.
- Image and describe color/albedo variations across the surface.

Unaided Eye Actions

- Orient yourself to the Moon.
- Describe color, albedo, texture, and topography variations visible across the surface.
- Describe topography and color variations within the illuminated part of South Pole-Aitken Basin (SPA) Basin.

Science Impact

- No one else has seen the Moon from this angle in the history of the Solar System! Your observations of SPA basin and whole Moon characteristics will help to unravel the history of the Moon in time and space.





		a. Window Team Position Swap	19:30 GMT
		5. Aristarchus Plateau	19:31 GMT
		6. Reiner Gamma	19:41 GMT
		b. Cabin and Window Teams Swap	19:50 GMT
		7. Whole Moon	20:05 GMT
		8. Orientale Basin	20:15 GMT
		c. Window Team Position Swap	20:30 GMT

8. **Orientale Basin** *OR-ee-ent-ALL*

Target Information

- Youngest large basin on the Moon.
- Prominent ejecta with secondary crater chains.
- Diameter is distance between JSC and KSC.

Camera Actions

- Centered images of entire basin and surrounding craters in a single frame.
- Mosaic entire basin at full zoom w/ overlap.
- Image and describe color, albedo, texture, and topography across mare patches and ring mountains.
- Image and describe southern dark annular ring, including boundaries and texture.
- Image and describe color/albedo variations of ejecta.

Unaided Eye Actions

- Describe color, albedo, texture, and topography across mare patches and ring mountains.
- Describe southern dark annular ring, including boundaries and color.
- Describe any color/albedo variations of ejecta.

Science Impact

- Observations will be used to study the geologic evolution of the youngest lunar basin and to inform formation hypotheses for the annular ring.



6 Apr 2026 20:15:00.000

Unaided Eye

135 mm

200 mm

400 mm

OneNote

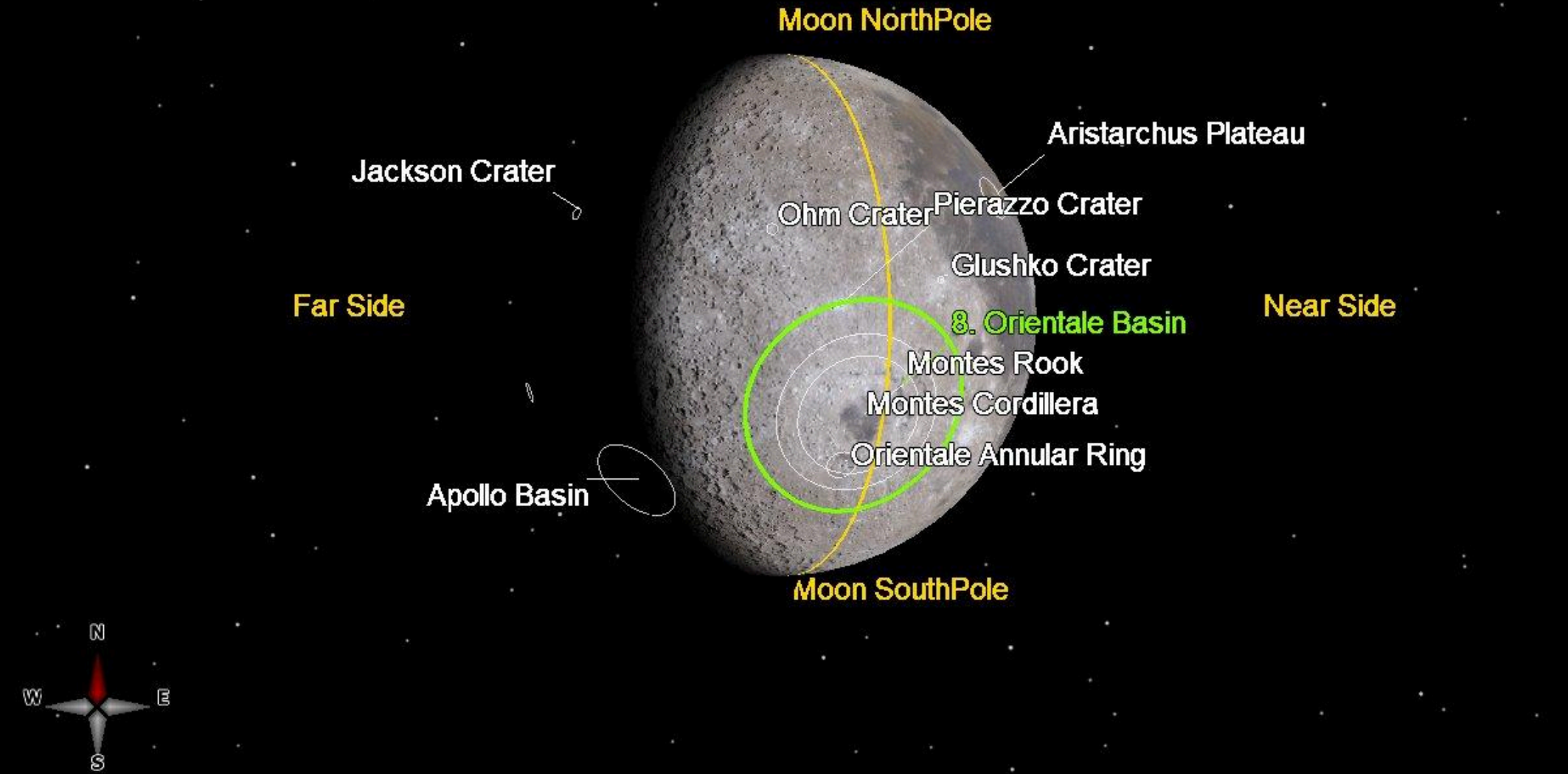
Labels Off

Cue Card Off



1. Feature ID	2. Geometry	3. Color & Shadow	4. Structure & Texture	5. Geologic Relations	* Thoughts *
• Feature type/name • Target? (yes/no) • Location • Observation style	• Size • Shape • Boundary Preservation	• Color tone • Albedo • Shadows/ illumination	• Structures • Slopes • Texture	• Association • Contact habit • Contact relationship	• Impressions • Interpretations • Any changes?

Diameter (km)	
Orientale Basin	1381
Apollo Basin	569
Aristarchus Plateau	270
Jackson Crater	70
Ohm Crater	67

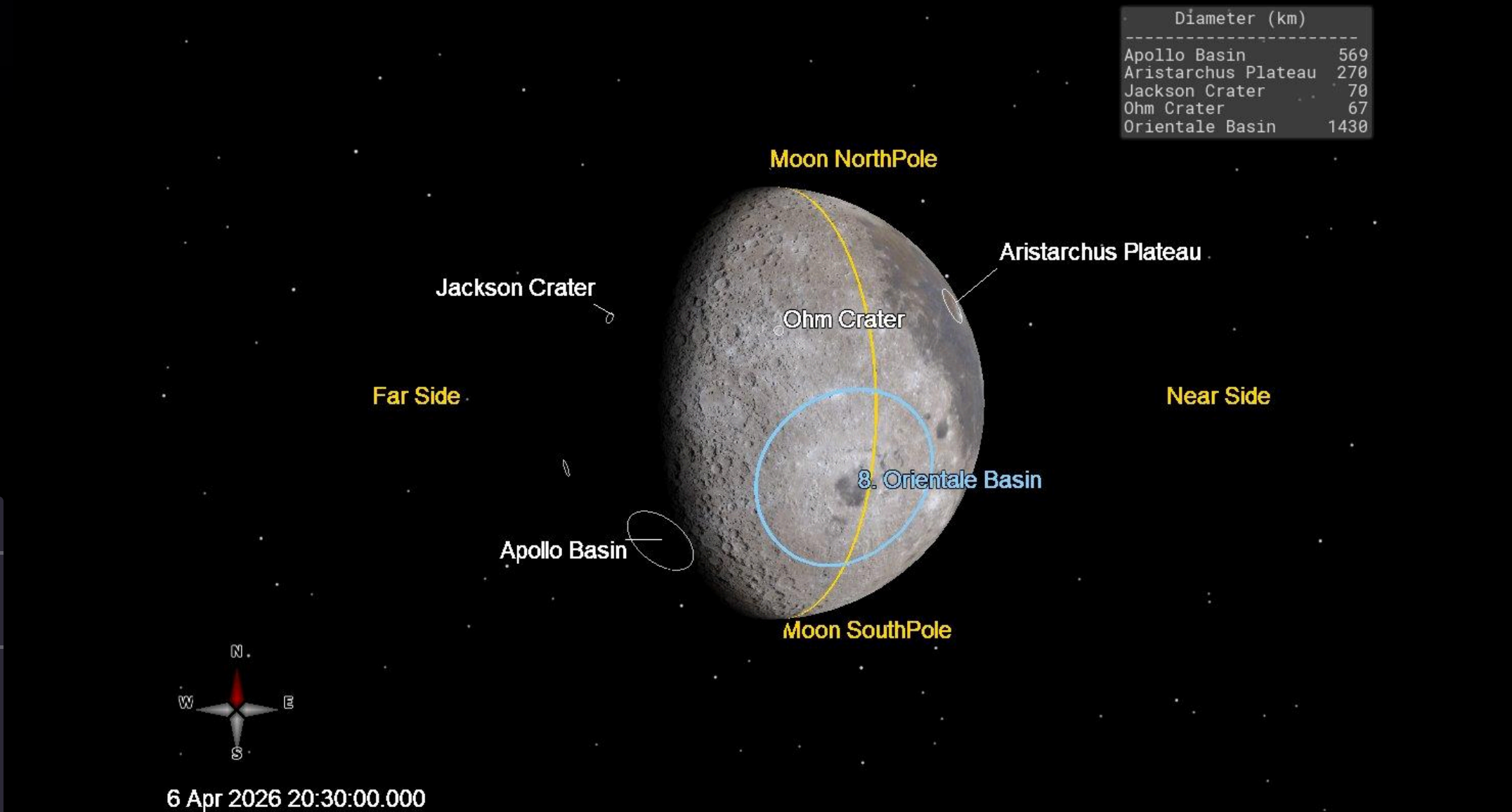


- | | |
|--------------------------------|-----------|
| 5. Aristarchus Plateau | 19:31 GMT |
| 6. Reiner Gamma | 19:41 GMT |
| b. Cabin and Window Teams Swap | 19:50 GMT |
| 7. Whole Moon | 20:05 GMT |
| 8. Orientale Basin | 20:15 GMT |
| c. Window Team Position Swap | 20:30 GMT |

c. Window Team Position Swap

Target Information

- Window team switch!



Unaided Eye

135 mm

200 mm

400 mm

OneNote

Labels Off

Cue Card Off



1. Feature ID

- Feature type/name
- Target? (yes/no)
- Location
- Observation style

2. Geometry

- Size
- Shape
- Boundary Preservation

3. Color & Shadow

- Color tone
- Albedo
- Shadows/ illumination

4. Structure & Texture

- Structures
- Slopes
- Texture

5. Geologic Relations

- Association
- Contact habit
- Contact relationship

* Thoughts *

- Impressions
- Interpretations
- Any changes?

	☐	7. Whole Moon		20:05 GMT
	☐	8. Orientale Basin		20:15 GMT
	☐	c. Window Team Position Swap		20:30 GMT
	☐	9. Crew Choice #1		20:31 GMT
	☐	10. Discussion #3: Farside Albedo/Color		20:39 GMT
	☐	d. Cabin and Window Teams Swap		20:55 GMT
	☐	11. Glushko Crater (2/2)	 	21:10 GMT

9. Crew Choice #1

Camera Actions

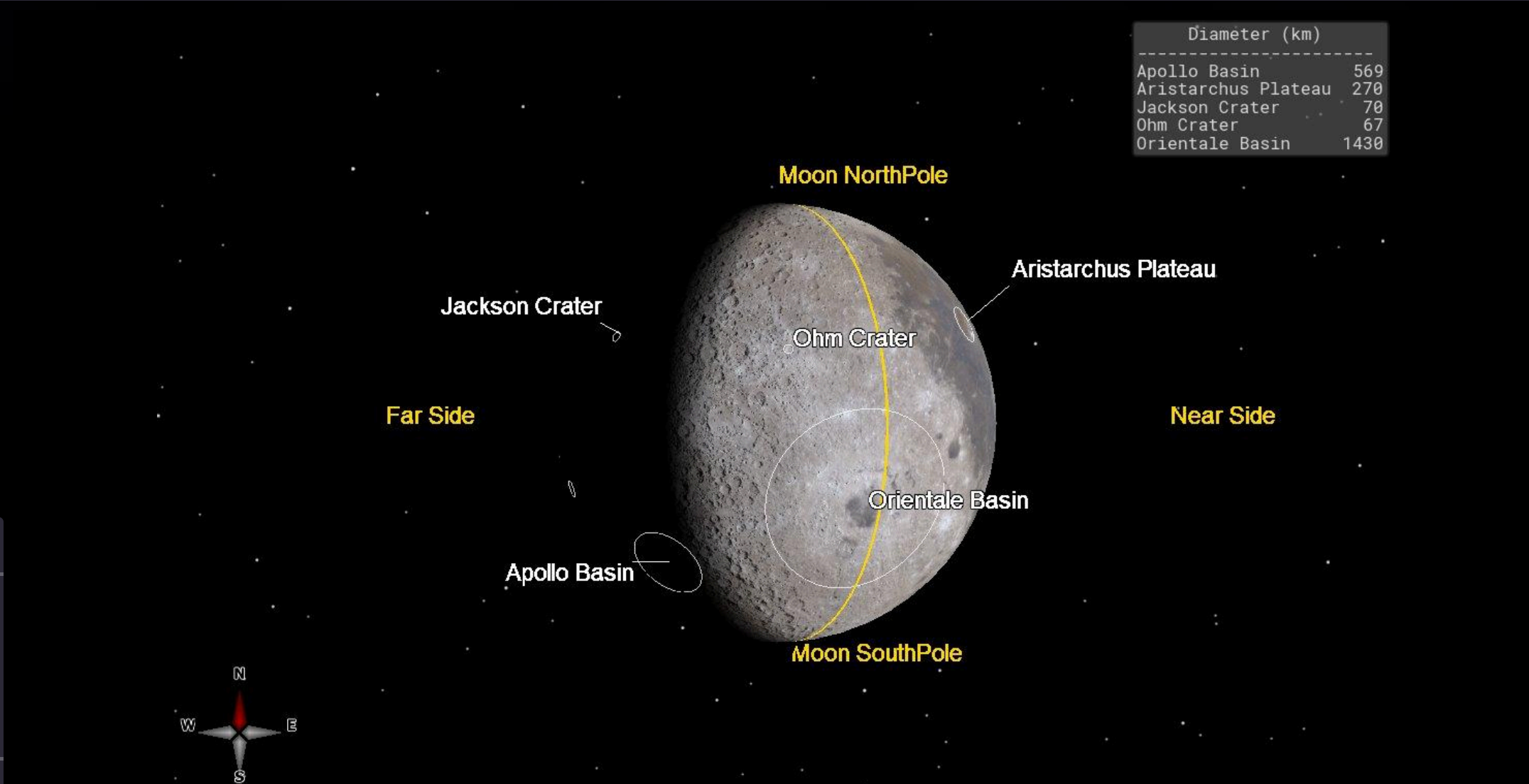
- Focus on regions, patterns, or features that interest YOU.
- Capture images to illustrate your choice, at multiple zoom levels.
- Image and describe WHY certain features or regions caught your eye.
- Remember your cue card.

Unaided Eye Actions

- Focus on regions, patterns, or features that interest YOU.
- Describe WHY certain features or regions caught your eye.
- Remember your cue card.

Science Impact

- From your unique vantage point and perspectives, you'll observe features and patterns that reveal the Moon in new ways.



6 Apr 2026 20:31:00.000

Unaided Eye

135 mm

200 mm

400 mm

OneNote

Labels Off

Cue Card Off



1. Feature ID

- Feature type/name
- Target? (yes/no)
- Location
- Observation style

2. Geometry

- Size
- Shape
- Boundary Preservation

3. Color & Shadow

- Color tone
- Albedo
- Shadows/ illumination

4. Structure & Texture

- Structures
- Slopes
- Texture

5. Geologic Relations

- Association
- Contact habit
- Contact relationship

► * Thoughts *

- Impressions
- Interpretations
- Any changes?



🏠	📺	7. Whole Moon	📺	20:05 GMT
🏠	📺	8. Orientale Basin		20:15 GMT
🏠	📺	c. Window Team Position Swap		20:30 GMT
🏠	📺	9. Crew Choice #1	🔊	20:31 GMT
🏠	📺	10. Discussion #3: Farside Albedo/Color	🔊	20:39 GMT
🏠	📺	d. Cabin and Window Teams Swap		20:55 GMT
🏠	📺	11. Glushko Crater (2/2)	🕒🔊	21:10 GMT

10. Discussion #3: Farside Albedo/Color

Target Information

- Discussion theme: Regional-scale albedo/color variations across the farside.

Camera Actions

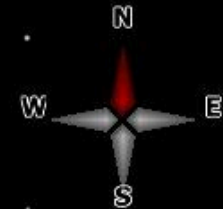
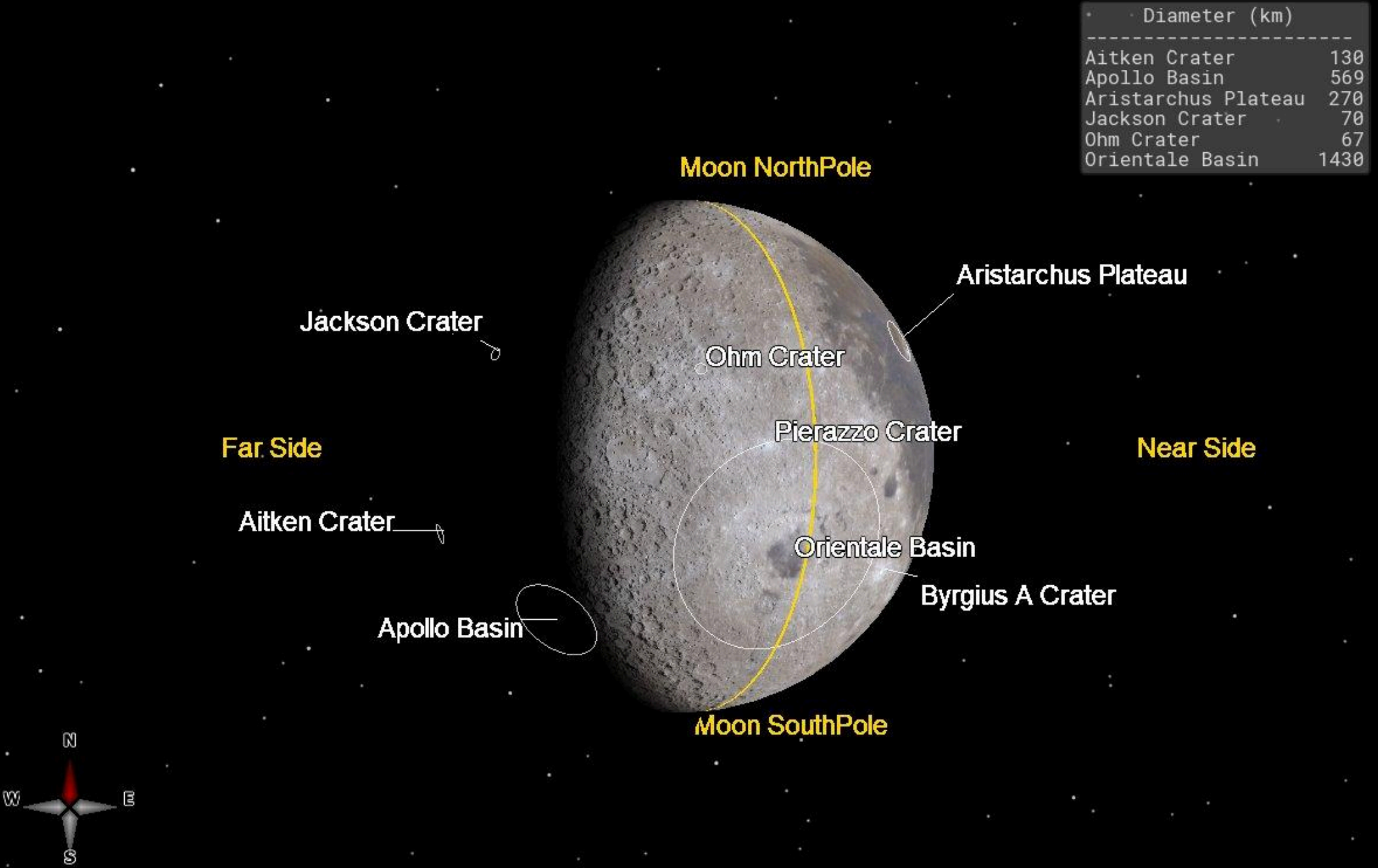
- Topics to discuss with available crew:
 - What patterns/variations in regional albedo do you see? Are they associated with specific features, such as rayed craters Pierazzo (pee-ROT-so) or Byrgius A (BUR-gee-us A)?
 - What patterns/variations in regional color or hue do you see? Are they associated with specific features?
- Capture images along with your discussion.

Unaided Eye Actions

- Topics to discuss with available crew:
 - What patterns/variations in regional albedo do you see? Are they associated with specific features, such as rayed craters Pierazzo (pee-ROT-so) or Byrgius A (BUR-gee-us A)?
 - What patterns/variations in regional color or hue do you see? Are they associated with specific features?
- Annotate your observations along with your discussion.

Science Impact

- Human vision offers a unique perception of albedo/color that cameras may not capture.
- The full lunar disk offers the ability to compare large-scale albedo/color patterns.



6 Apr 2026 20:39:00.000

Unaided Eye	135 mm	200 mm	400 mm
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OneNote	Labels Off	Cue Card Off	🔍	🔄	🔄
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1. Feature ID	2. Geometry	3. Color & Shadow	4. Structure & Texture	5. Geologic Relations	* Thoughts *
- Feature type/name - Target? (yes/no) - Location - Observation style	- Size - Shape - Boundary Preservation	- Color tone - Albedo - Shadows/ illumination	- Structures - Slopes - Texture	- Association - Contact habit - Contact relationship	- Impressions - Interpretations - Any changes?

Moon SouthPole

- Impressions
- Interpretations
- Any changes?

Diameter (km)	
Glushko Crater	43
Aitken Crater	130
Apollo Basin	569
Jackson Crater	70
Ohm Crater	67
Orientele Basin	1430

Target Information

- ## Camera Actions

- ## Unaided Eye Actions

- ## Science Impact

-
- | Diameter (km) | |
|-----------------|------|
| Glushko Crater | 43 |
| Aitken Crater | 130 |
| Apollo Basin | 569 |
| Jackson Crater | 70 |
| Ohm Crater | 67 |
| Orientele Basin | 1430 |
- 6 Apr 2026 21:10:00.000
- Unaided Eye 135 mm 200 mm 400 mm OneNote Labels Off Cue Card Off

1. Feature ID	2. Geometry	3. Color & Shadow	4. Structure & Texture	5. Geologic Relations	* Thoughts *
• Feature type/name	• Size	• Color tone	• Structures	• Association	• Impressions
• Target? (yes/no)	• Shape	• Albedo	• Slopes	• Contact habit	• Interpretations
• Location	• Boundary Preservation	• Shadows/ illumination	• Texture	• Contact relationship	• Any changes?
• Observation style					



		10. Discussion #3: Farside Albedo/Color		20:39 GMT
		d. Cabin and Window Teams Swap		20:55 GMT
		11. Glushko Crater (2/2)		21:10 GMT
		12. Orientale Basin		21:18 GMT
		13. Hertzsprung Basin		21:34 GMT
		e. Window Team Position Swap		21:41 GMT
		14. Crew Choice #2		21:42 GMT

12. Orientale Basin

OR-ee-ent-ALL

Target Information

- Youngest large basin on the Moon.
- Prominent ejecta with secondary crater chains.
- Diameter is distance between JSC and KSC.

Camera Actions

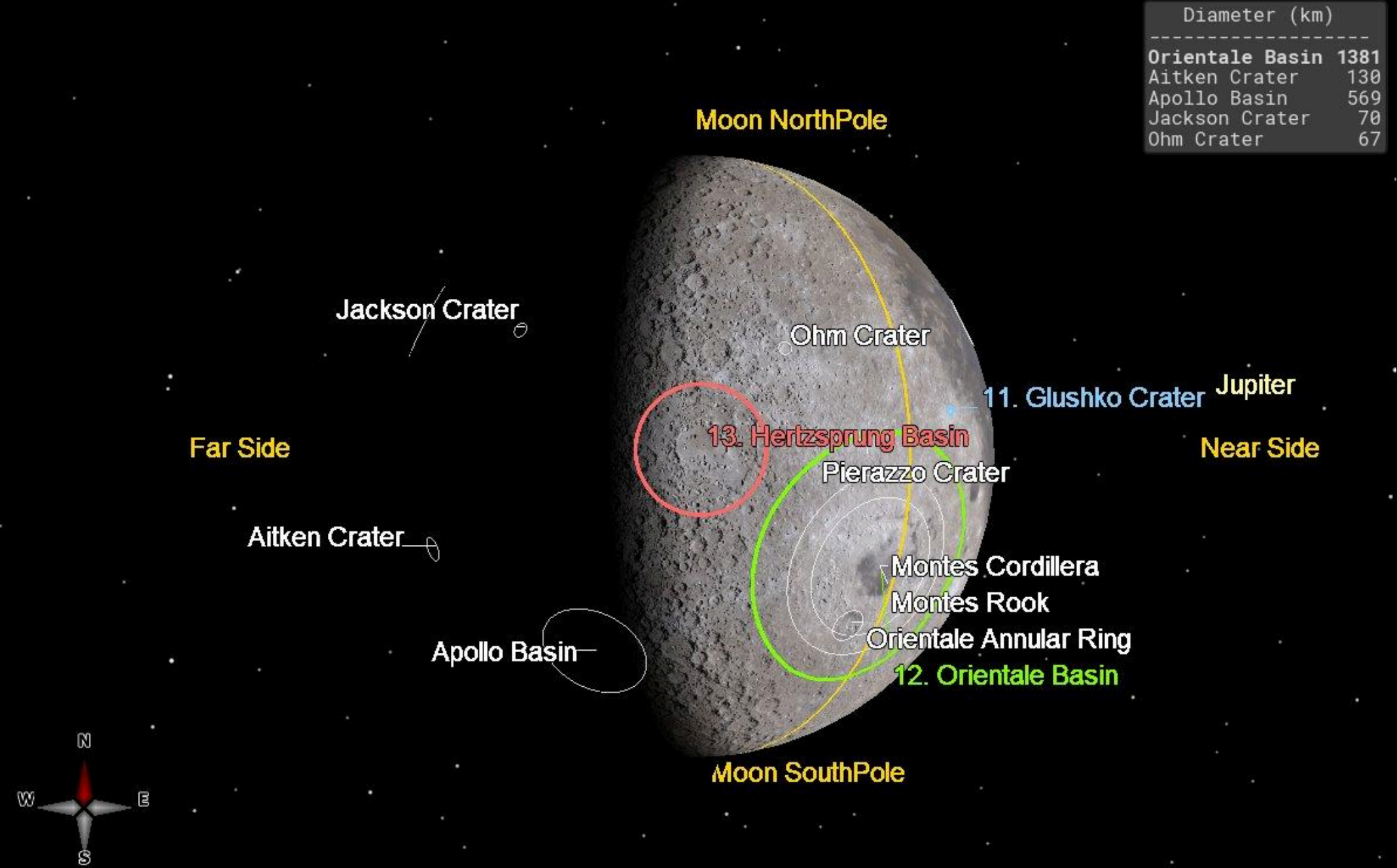
- Centered images of entire basin and surrounding craters in a single frame.
- Mosaic entire basin at full zoom w/ overlap.
- Image and describe color, albedo, texture, and topography across mare patches and ring mountains.
- Image and describe southern dark annular ring, including boundaries and texture.
- Image and describe color/albedo variations, topography, and extent of ejecta including secondary crater chains.

Unaided Eye Actions

- Describe color, albedo, texture, and topography across mare patches and ring mountains.
- Describe southern dark annular ring, including boundaries and color.
- Describe any color/albedo variations, topography, and extent of ejecta including secondary crater chains.

Science Impact

- Observations will be used to study the geologic evolution of the youngest lunar basin and to inform how large impacts change the lunar surface.



Diameter (km)	
-----	-----
Orientale Basin	1381
Aitken Crater	130
Apollo Basin	569
Jackson Crater	70
Ohm Crater	67

6 Apr 2026 21:18:00.000

Unaided Eye	135 mm	200 mm	400 mm	OneNote	Labels Off	Cue Card Off			
1. Feature ID	2. Geometry	3. Color & Shadow	4. Structure & Texture	5. Geologic Relations	* Thoughts *				
• Feature type/name • Target? (yes/no) • Location • Observation style	• Size • Shape • Boundary Preservation	• Color tone • Albedo • Shadows/ illumination	• Structures • Slopes • Texture	• Association • Contact habit • Contact relationship	• Impressions • Interpretations • Any changes?				

1. Feature ID	2. Geometry	3. Color & Shadow	4. Structure & Texture	5. Geologic Relations	* Thoughts *
• Feature type/name	• Size	• Color tone	• Structures	• Association	• Impressions
• Target? (yes/no)	• Shape	• Albedo	• Slopes	• Contact habit	• Interpretations
• Location	• Boundary Preservation	• Shadows/ illumination	• Texture	• Contact relationship	• Any changes?
• Observation style					



10. Discussion #3: Farside Albedo/Color

65

20:39 GMT
- d. Cabin and Window Teams Swap

20:55 GMT
11. Glushko Crater (2/2)

🕒

🔊

21:10 GMT
12. Orientale Basin

🔊

21:18 GMT
13. Hertzprung Basin

21:34 GMT
- e. Window Team Position Swap

21:41 GMT
14. Crew Choice #2

21:42 GMT

e. Window Team Position Swap

Target Information

- Window team switch!

Diameter (km)

Aitken Crater 130

Apollo Basin 569

Jackson Crater 70

Ohm Crater 67

Orientale Basin 1430

Moon NorthPole

Jackson Crater

Ohm Crater

13. Hertzprung Basin

Orientale Basin

Apollo Basin

Moon SouthPole

Far Side

Near Side

Aitken Crater

N

S

E

W

6 Apr 2026 21:41:00.000

Unaided Eye

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OneNote

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Cue Card Off

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1. Feature ID

2. Geometry

3. Color & Shadow

4. Structure & Texture

5. Geologic Relations

* Thoughts *

• Feature type/name

• Target? (yes/no)

• Location

• Observation style

• Size

• Shape

• Boundary Preservation

• Color tone

• Albedo

• Shadows/ illumination

• Structures

• Slopes

• Texture

• Association

• Contact habit

• Contact relationship

• Impressions

• Interpretations

• Any changes?

Р	☐	d. Cabin and Window Teams Swap	20:55 GMT
Р	☐	11. Glushko Crater (2/2)	  21:10 GMT
Р	☐	12. Orientale Basin	 21:18 GMT
Р	☐	13. Hertzprung Basin	21:34 GMT
Р	☐	e. Window Team Position Swap	21:41 GMT
Р	☐	14. Crew Choice #2	21:42 GMT

14. Crew Choice #2

Camera Actions

- Focus on regions, patterns, or features that interest YOU.
- Capture images to illustrate your choice, at multiple zoom levels.
- Image and describe WHY certain features or regions caught your eye.
- Remember your cue card.

Unaided Eye Actions

- Focus on regions, patterns, or features that interest YOU.
- Describe WHY certain features or regions caught your eye.
- Remember your cue card.

Science Impact

- From your unique vantage point and perspectives, you'll observe features and patterns that reveal the Moon in new ways.



6 Apr 2026 21:42:00.000

Unaided Eye

135 mm

200 mm

400 mm

OneNote

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Cue Card Off



1. Feature ID

- Feature type/name
- Target? (yes/no)
- Location
- Observation style

2. Geometry

- Size
- Shape
- Boundary Preservation

3. Color & Shadow

- Color tone
- Albedo
- Shadows/ illumination

4. Structure & Texture

- Structures
- Slopes
- Texture

5. Geologic Relations

- Association
- Contact habit
- Contact relationship

* Thoughts *

- Impressions
- Interpretations
- Any changes?



		13. Hertzprung Basin	21:34 GMT
		e. Window Team Position Swap	21:41 GMT
		14. Crew Choice #2	21:42 GMT
		15. Discussion #4: Terminator	21:50 GMT
		f. Cabin and Window Teams Swap	22:05 GMT
		16. Ohm Crater	22:20 GMT
		17. Discussion #5: Limb	22:28 GMT

15. Discussion #4: Terminator

Target Information

- Discussion theme: Terminator topography and color of the lunar surface.

Camera Actions

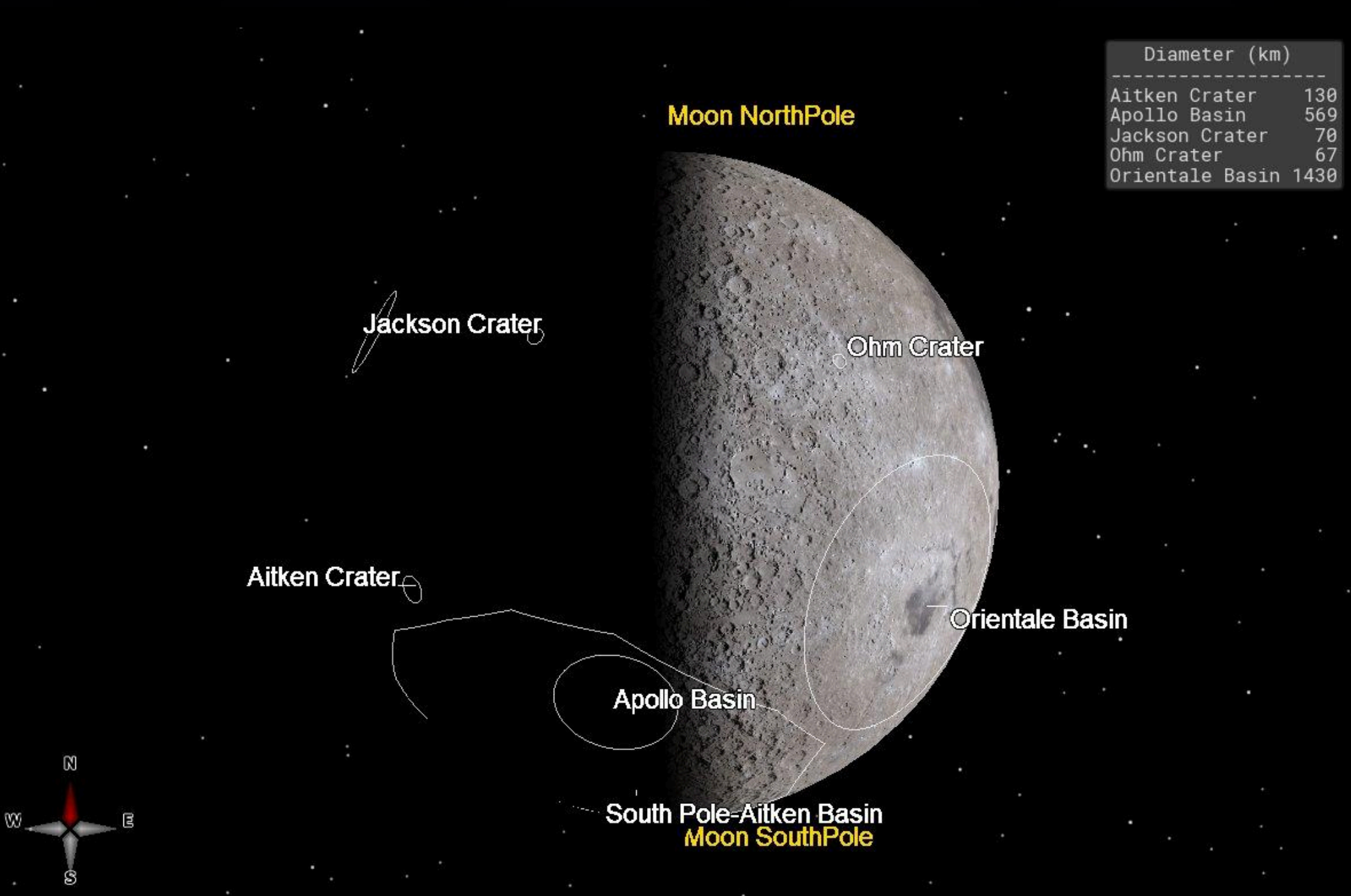
- Topics to discuss with available crew:
 - How do the quantities and sizes of craters and mountains vary along the terminator?
 - Describe the topography of features along or near the terminator, including eastern South Pole-Aitken Basin and Apollo Basin.
 - Describe any color and tone variations along the terminator.
- Capture images to illustrate your discussion.

Unaided Eye Actions

- Topics to discuss with available crew:
 - How do the quantities and sizes of craters and mountains vary along the terminator?
 - Describe the topography of features along or near the terminator, including eastern South Pole-Aitken Basin and Apollo Basin.
 - Describe any color and tone variations along the terminator.
- Annotate your observations along with your discussion.

Science Impact

- Observations will be used to understand how viewing geometry and lighting along the terminator affect perceptions of morphology, topography, and color.



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Unaided Eye

135 mm

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400 mm

OneNote

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1. Feature ID

2. Geometry

3. Color & Shadow

4. Structure &
Texture

5. Geologic
Relations

* Thoughts *

- Feature type/name
- Target? (yes/no)
- Location
- Observation style

- Size
- Shape
- Boundary Preservation

- Color tone
- Albedo
- Shadows/ illumination

- Structures
- Slopes
- Texture

- Association
- Contact habit
- Contact relationship

- Impressions
- Interpretations
- Any changes?



	☐	13. Hertzprung Basin	21:34 GMT
	☐	e. Window Team Position Swap	21:41 GMT
	☐	14. Crew Choice #2	21:42 GMT
	☐	15. Discussion #4: Terminator	21:50 GMT
	☐	f. Cabin and Window Teams Swap	22:05 GMT
	☐	16. Ohm Crater	22:20 GMT
	☐	17. Discussion #5: Limb	22:28 GMT

f. Cabin and Window Teams Swap

Target Information

- Handover and switch with your crewmates.



Diameter (km)	

Aitken Crater	130
Apollo Basin	569
Jackson Crater	70
Moscoviense Basin	455
Ohm Crater	67
Orientale Basin	1430

Unaided Eye

135 mm

200 mm

400 mm

OneNote

Labels Off

Cue Card Off

1. Feature ID	2. Geometry	3. Color & Shadow	4. Structure & Texture	5. Geologic Relations	* Thoughts *
- Feature type/name - Target? (yes/no) - Location - Observation style	- Size - Shape - Boundary Preservation	- Color tone - Albedo - Shadows/ illumination	- Structures - Slopes - Texture	- Association - Contact habit - Contact relationship	- Impressions - Interpretations - Any changes?



		13. Hertzprung Basin	21:34 GMT
		e. Window Team Position Swap	21:41 GMT
		14. Crew Choice #2	21:42 GMT
		15. Discussion #4: Terminator	21:50 GMT
		f. Cabin and Window Teams Swap	22:05 GMT
		16. Ohm Crater	22:20 GMT
		17. Discussion #5: Limb	22:28 GMT

16. Ohm Crater

Target Information

- Small, complex crater with prominent ray system.
- Size of the "Eye of the Sahara" in Mauritania.

Camera Actions

- Centered images of entire crater and ray system in a single frame.
- Images of crater and ray system at full zoom.
- Image and describe the brightness and extent of rays in Ohm's ejecta/ray system.
- Image and describe any albedo or texture variations along or between Ohm's rays.

Unaided Eye Actions

- Describe the extent of Ohm's ejecta/ray system.
- Describe albedo, color, and texture variations along or between Ohm's rays.

Science Impact

- Observations will be used to understand the formation, dynamics, and weathering of extensive crater ray systems.

Moscoviense Basin

Aitken Crater

Jackson Crater

Vavilov Crater

Apollo Basin

Orientele Basin

16. Ohm Crater

W

N

E

S

6 Apr 2026 22:20:00.000

Diameter (km)

Ohm Crater67

Aitken Crater130

Apollo Basin569

Jackson Crater70

Moscoviense Basin455

Orientele Basin1430

Unaided Eye

135 mm

200 mm

400 mm

OneNote

Labels Off

Cue Card Off

1. Feature ID

2. Geometry

3. Color & Shadow

4. Structure & Texture

5. Geologic Relations

* Thoughts *

• Feature type/name

• Target? (yes/no)

• Location

• Observation style

• Size

• Shape

• Boundary Preservation

• Color tone

• Albedo

• Shadows/ illumination

• Structures

• Slopes

• Texture

• Association

• Contact habit

• Contact relationship

• Impressions

• Interpretations

• Any changes?

- Impressions
- Interpretations
- Any changes?



		f. Cabin and Window Teams Swap	22:00 GMT
		16. Ohm Crater	22:20 GMT
		17. Discussion #5: Limb	22:28 GMT
		18. Earthset	22:38 GMT
		19. Vavilov Crater	22:46 GMT
		g. Window Team Position Swap	22:53 GMT
		20. Crew Choice #3	22:54 GMT

18. Earthset

Target Information

- The Earth, setting behind the Moon.

Camera Actions

- Capture images at multiple scales.
- Ensure focal point of camera remains on an illuminated surface (Moon or Earth).
- Image and compare colors visible on the Moon and Earth.

Unaided Eye Actions

- Describe and compare colors visible on the Moon and Earth.
- Describe the appearance of the lunar horizon in front of Earth.

Science Impact

- Observations will be used to understand how perception of color on the Moon changes when Earth is in view.



Diameter (km)	

Aitken Crater	130
Apollo Basin	569
Jackson Crater	70
Moscoviense Basin	455
Ohm Crater	67
Schrodinger Basin	343
Tsiolkovskiy Crater	200

Unaided Eye135 mm200 mm400 mm

OneNoteLabels OffCue Card Off

1. Feature ID	2. Geometry	3. Color & Shadow	4. Structure & Texture	5. Geologic Relations	* Thoughts *
- Feature type/name - Target? (yes/no) - Location - Observation style	- Size - Shape - Boundary Preservation	- Color tone - Albedo - Shadows/ illumination	- Structures - Slopes - Texture	- Association - Contact habit - Contact relationship	- Impressions - Interpretations - Any changes?



🚩	📺	f. Cabin and Window Teams Swap	22:00 GMT
🚩	📺	16. Ohm Crater	22:20 GMT
🚩	📺	17. Discussion #5: Limb	🔊 22:28 GMT
🚩	📺	18. Earthset	🕒 22:38 GMT
🚩	📺	19. Vavilov Crater	🔊 22:46 GMT
🚩	📺	g. Window Team Position Swap	22:53 GMT
🚩	📺	20. Crew Choice #3	🔊 22:54 GMT

19. Vavilov Crater

VAH-vill-off

Target Information

- Complex crater with central peak.
- Just E of the terminator, along W rim of Hertzprung Basin.

Camera Actions

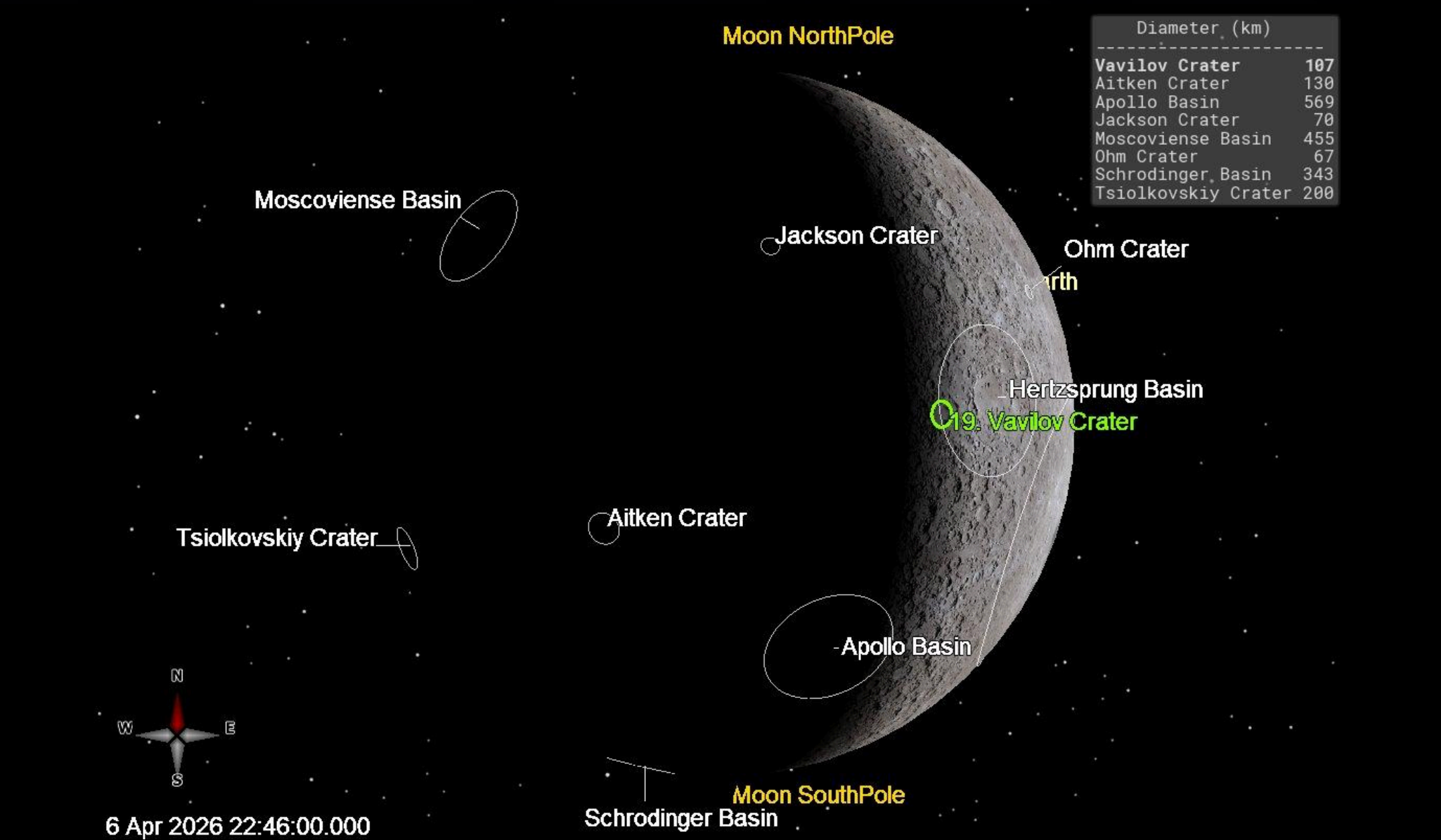
- Centered images of crater at full zoom.
- Image and describe the central peak and terraced walls.
- Image and describe color, albedo, or texture variations across the crater.
- Image and describe Vavilov's ejecta/ray system, if visible.

Unaided Eye Actions

- Can you resolve Vavilov's central peak?
- Describe color and albedo variations across the crater.
- Describe Vavilov's ejecta/ray system, if visible.

Science Impact

- Observations will be used to understand the formation, dynamics, and degradation of crater morphology.



Diameter (km)	
Vavilov Crater	107
Aitken Crater	130
Apollo Basin	569
Jackson Crater	70
Moscoviense Basin	455
Ohm Crater	67
Schrodinger Basin	343
Tsiolkovskiy Crater	200

6 Apr 2026 22:46:00.000

Unaided Eye	135 mm	200 mm	400 mm	OneNote	Labels Off	Cue Card Off	🔍	🔄	🔄
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1. Feature ID	2. Geometry	3. Color & Shadow	4. Structure & Texture	5. Geologic Relations	* Thoughts *
• Feature type/name • Target? (yes/no) • Location • Observation style	• Size • Shape • Boundary Preservation	• Color tone • Albedo • Shadows/ illumination	• Structures • Slopes • Texture	• Association • Contact habit • Contact relationship	• Impressions • Interpretations • Any changes?

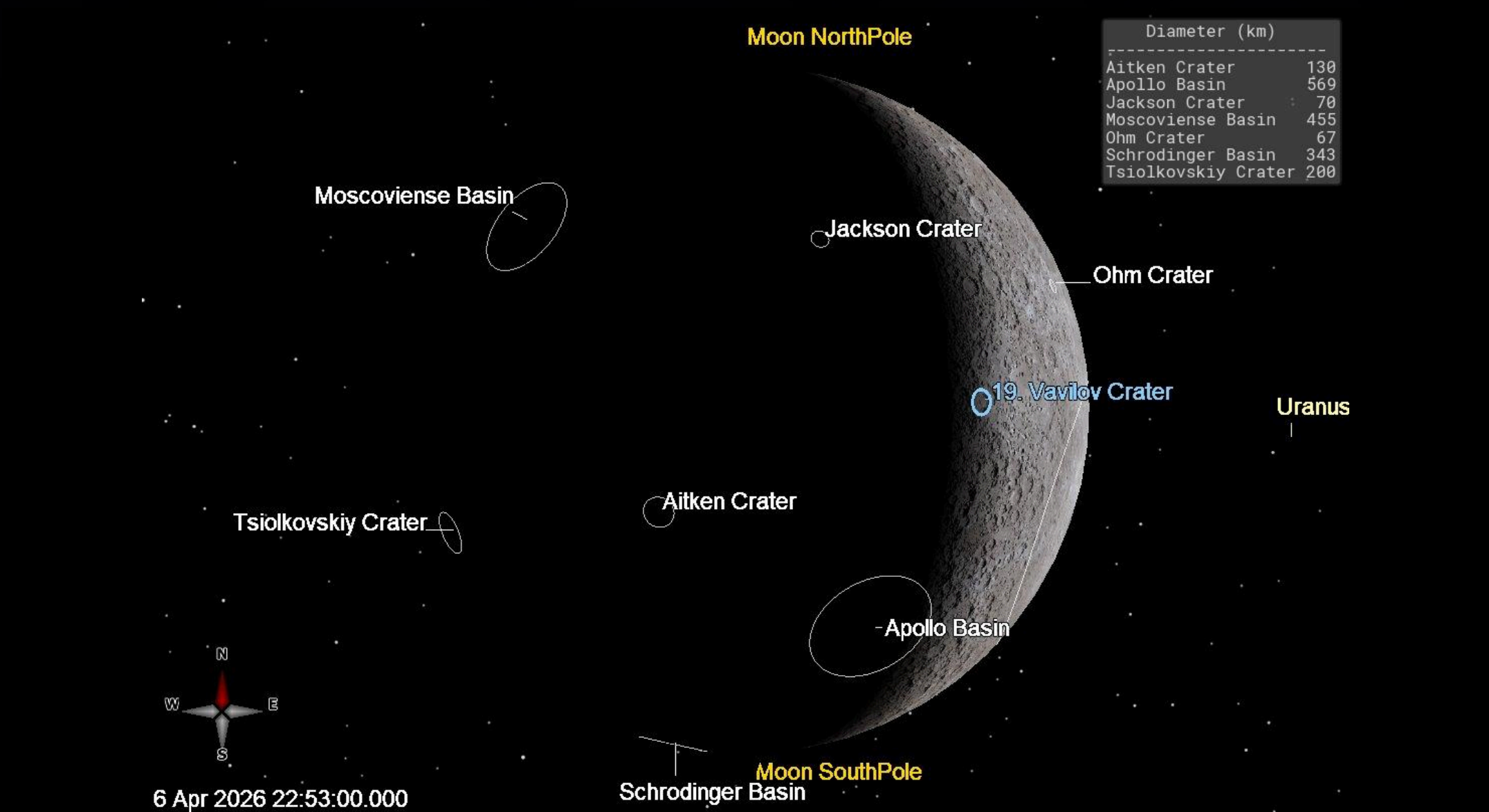


	☐	f. Cabin and Window Teams Swap	22:00 GMT
	☐	16. Ohm Crater	22:20 GMT
	☐	17. Discussion #5: Limb	22:28 GMT
	☐	18. Earthset	22:38 GMT
	☐	19. Vavilov Crater	22:46 GMT
	☐	g. Window Team Position Swap	22:53 GMT
	☐	20. Crew Choice #3	22:54 GMT

g. Window Team Position Swap

Target Information

- Window team switch!



Diameter (km)	
Aitken Crater	130
Apollo Basin	569
Jackson Crater	70
Moscoviense Basin	455
Ohm Crater	67
Schrodinger Basin	343
Tsiolkovskiy Crater	200

Unaided Eye

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200 mm

400 mm

OneNote

Labels Off

Cue Card Off

1. Feature ID	2. Geometry	3. Color & Shadow	4. Structure & Texture	5. Geologic Relations	* Thoughts *
- Feature type/name - Target? (yes/no) - Location - Observation style	- Size - Shape - Boundary Preservation	- Color tone - Albedo - Shadows/ illumination	- Structures - Slopes - Texture	- Association - Contact habit - Contact relationship	- Impressions - Interpretations - Any changes?

- | | | | |
|---|--------------------------|------------------------------|---|
|  | ☐ | 16. Ohm Crater | 22:20 GMT |
|  | ☐ | 17. Discussion #5: Limb |  22:28 GMT |
|  | ☐ | 18. Earthset |  22:38 GMT |
|  | ☐ | 19. Vavilov Crater |  22:46 GMT |
|  | ☐ | g. Window Team Position Swap | 22:53 GMT |
|  | ☐ | 20. Crew Choice #3 |  22:54 GMT |

20. Crew Choice #3

Camera Actions

- Focus on regions, patterns, or features that interest YOU.
- Capture images to illustrate your choice, at multiple zoom levels.
- Image and describe WHY certain features or regions caught your eye.
- Remember your cue card.

Unaided Eye Actions

- Focus on regions, patterns, or features that interest YOU.
- Describe WHY certain features or regions caught your eye.
- Remember your cue card.

Science Impact

- From your unique vantage point and perspectives, you'll observe features and patterns that reveal the Moon in new ways.



Unaided Eye

135 mm

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400 mm

OneNote

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Cue Card Off



1. Feature ID

- Feature type/name
- Target? (yes/no)
- Location
- Observation style

2. Geometry

- Size
- Shape
- Boundary Preservation

3. Color & Shadow

- Color tone
- Albedo
- Shadows/ illumination

4. Structure & Texture

- Structures
- Slopes
- Texture

5. Geologic Relations

- Association
- Contact habit
- Contact relationship

* Thoughts *

- Impressions
- Interpretations
- Any changes?



🏠	☐	19. Vavilov Crater	📡 22:46 GMT
🏠	☐	g. Window Team Position Swap	22:53 GMT
🏠	☐	20. Crew Choice #3	🎧 22:54 GMT
🏠	☐	21. Impact Flashes	23:02 GMT
🏠	☐	22. Lofted Lunar Dust	🕒 23:10 GMT
🏠	☐	23. Earthrise	🕒 🎧 23:18 GMT
🏠	☐	h. Observation Break	23:30 GMT

21. Impact Flashes

Target Information

- Short-lived flashes on the lunar surface caused by impact bombardment.

Camera Actions

- No images required, but can use the camera as a viewfinder.
- Monitor dark regions of the Moon for impact flashes.
- If observed, report number, annotate location, and describe flash (color, brightness, shape, duration).

Unaided Eye Actions

- Monitor dark regions of the Moon for impact flashes.
- If observed, report number, annotate location, and describe flash (color, brightness, shape, duration).

Science Impact

- Observations of impact flashes will be used to provide insight into the Moon's dynamic environment as well as the impactors that modify the lunar surface and build the regolith and dust environment.
- Citizen scientists across Earth are monitoring the Moon during your flyby for impact flashes!

Moscoviense Basin

Tsiolkovskiy Crater

6 Apr 2026 23:02:00.000

Unaided Eye135 mm200 mm400 mm

Moon NorthPole

Jackson Crater

Ohm Crater

Uranus

Aitken Crater

Apollo Basin

Moon SouthPole

Schrodinger Basin

Diameter (km)

Aitken Crater130

Apollo Basin569

Jackson Crater70

Moscoviense Basin455

Ohm Crater67

Schrodinger Basin343

Tsiolkovskiy Crater200

OneNote

Labels Off

Cue Card Off

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🔄

1. Feature ID

2. Geometry

3. Color & Shadow

4. Structure & Texture

5. Geologic Relations

* Thoughts *

• Feature type/name

• Target? (yes/no)

• Location

• Observation style

• Size

• Shape

• Boundary Preservation

• Color tone

• Albedo

• Shadows/ illumination

• Structures

• Slopes

• Texture

• Association

• Contact habit

• Contact relationship

• Impressions

• Interpretations

• Any changes?



		19. Vavilov Crater		22:46 GMT
		g. Window Team Position Swap		22:53 GMT
		20. Crew Choice #3		22:54 GMT
		21. Impact Flashes		23:02 GMT
		22. Lofted Lunar Dust		23:10 GMT
		23. Earthrise		23:18 GMT
		h. Observation Break		23:30 GMT

22. Lofted Lunar Dust

Target Information

- Lunar dust may be lofted above the lunar surface.
- Observe just before the Earth rises, along the dark western limb NW of Tsiolkovsky.
- Earthshine will illuminate any lofted dust (but the brightness of Earth will wash out any faint dust after Earthrise).

Camera Actions

- Capture images of the dark limb at multiple scales to potentially identify dust in the exosphere.
- Is there any evidence of glow along the horizon?
- N-S snaking mosaic limb at full zoom w/ overlap.
- Ensure focal point remains on an illuminated surface.
- Image and describe any colors visible along the Moon's limb.

Unaided Eye Actions

- Capture images of the dark western limb NW of Tsiolkovsky at multiple scales to potentially identify dust in the exosphere.
- Comment on the sharpness or fuzziness of the lunar limb.

Science Impact

- Your observations will be used to understand the dust environment within the exosphere in the context of observations from Apollo missions and orbital spacecraft.

Moon NorthPole

Moscoviense Basin

Jackson Crater

Aitken Crater

Tsiolkovskiy Crater

Apollo Basin

Schrodinger Basin

Moon SouthPole

Diameter (km)

Aitken Crater130

Apollo Basin569

Jackson Crater70

Moscoviense Basin455

Schrodinger Basin343

Tsiolkovskiy Crater200

6 Apr 2026 23:10:00.000

Unaided Eye135 mm200 mm400 mm

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1. Feature ID

2. Geometry

3. Color & Shadow

4. Structure & Texture

5. Geologic Relations

* Thoughts *

• Feature type/name

• Target? (yes/no)

• Location

• Observation style

• Size

• Shape

• Boundary Preservation

• Color tone

• Albedo

• Shadows/ illumination

• Structures

• Slopes

• Texture

• Association

• Contact habit

• Contact relationship

• Impressions

• Interpretations

• Any changes?

	☐	19. Vavilov Crater		22:46 GMT
	☐	g. Window Team Position Swap		22:53 GMT
	☐	20. Crew Choice #3		22:54 GMT
	☐	21. Impact Flashes		23:02 GMT
	☐	22. Lofted Lunar Dust		23:10 GMT
	☐	23. Earthrise	 	23:18 GMT
	☐	h. Observation Break		23:30 GMT

23. Earthrise

Target Information

- When the Earth rises above the Moon's limb, returning into view.

Camera Actions

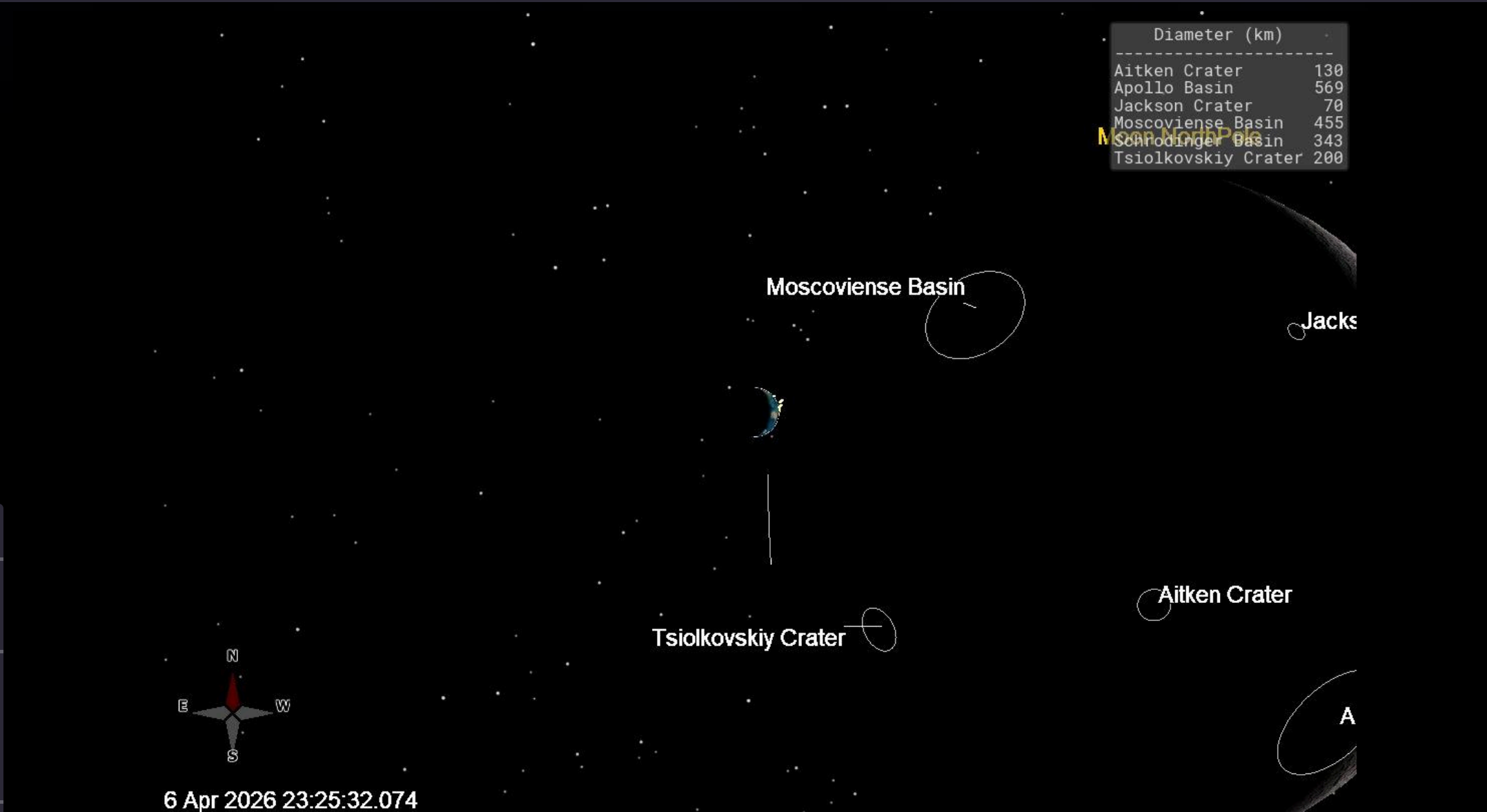
- Capture images at multiple scales.
- Ensure focal point of camera remains on an illuminated surface (Moon or Earth).
- Image and compare colors visible on the Moon and Earth.

Unaided Eye Actions

- What are your impressions of our planet rising beyond the Moon?
- Describe and compare colors visible on the Moon and Earth.

Science Impact

- Observations will be used to understand how perception of color on the Moon changes when Earth is in view.



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200 mm

400 mm

OneNote

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Cue Card Off



1. Feature ID

2. Geometry

3. Color & Shadow

4. Structure & Texture

5. Geologic Relations

► * Thoughts *

- Feature type/name
- Target? (yes/no)
- Location
- Observation style

- Size
- Shape
- Boundary Preservation

- Color tone
- Albedo
- Shadows/ illumination

- Structures
- Slopes
- Texture

- Association
- Contact habit
- Contact relationship

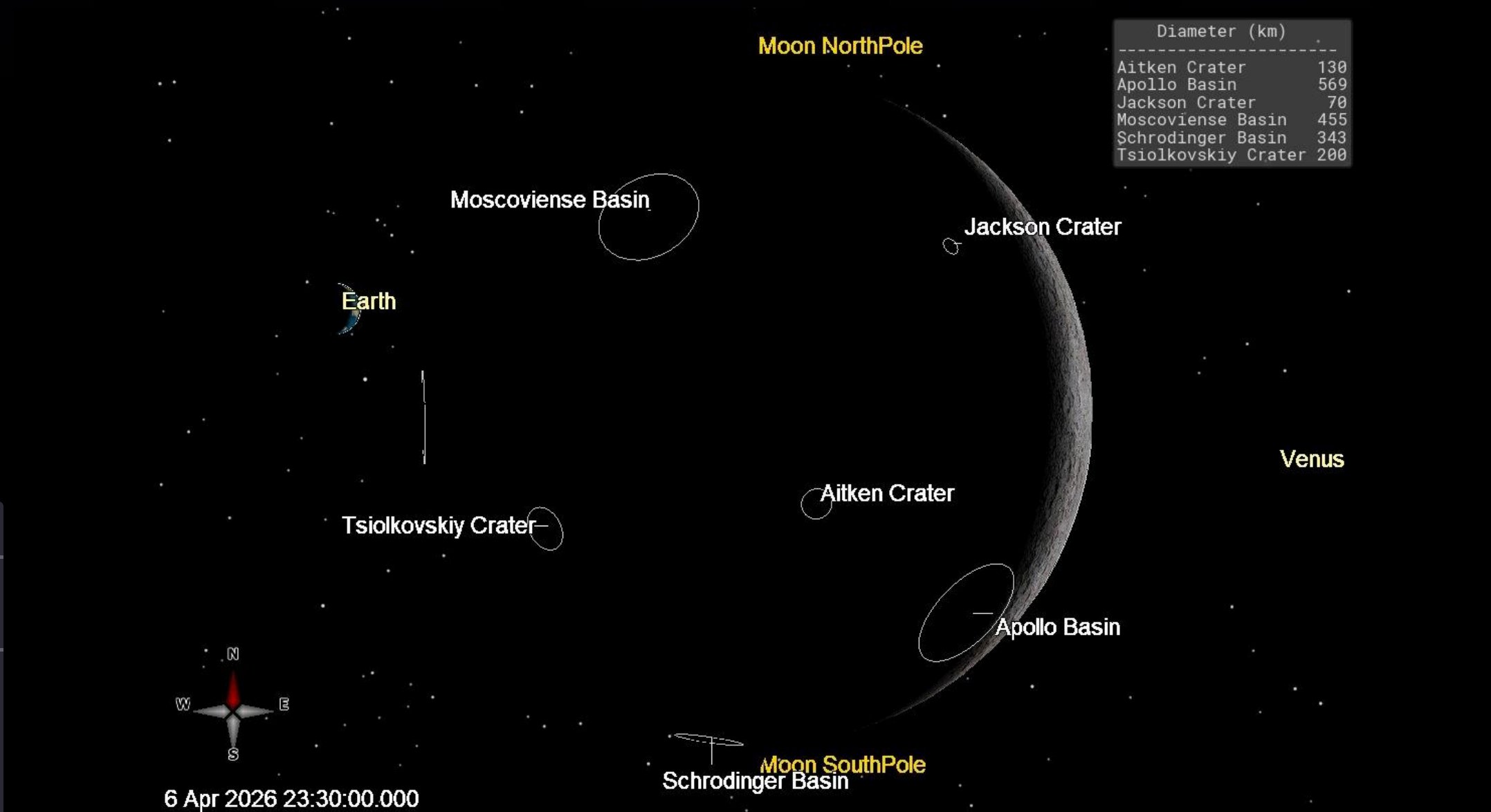
- Impressions
- Interpretations
- Any changes?

		g. Window Team Position Swap	22:53 GMT
		20. Crew Choice #3	 22:54 GMT
		21. Impact Flashes	23:02 GMT
		22. Lofted Lunar Dust	 23:10 GMT
		23. Earthrise	  23:18 GMT
		h. Observation Break	23:30 GMT

h. Observation Break

Target Information

- Moon not in view.



Unaided Eye

135 mm

200 mm

400 mm

OneNote

Labels Off

Cue Card Off



1. Feature ID

2. Geometry

3. Color & Shadow

4. Structure & Texture

5. Geologic Relations

► * Thoughts *

- Feature type/name
- Target? (yes/no)
- Location
- Observation style

- Size
- Shape
- Boundary Preservation

- Color tone
- Albedo
- Shadows/ illumination

- Structures
- Slopes
- Texture

- Association
- Contact habit
- Contact relationship

- Impressions
- Interpretations
- Any changes?



🚩 ☐	22. Lofted Lunar Dust	👤 23:10 GMT
🚩 ☐	23. Earthrise	🕒🔊 23:18 GMT
🚩 ☐	h. Observation Break	23:30 GMT
🚩 ☐	24. Sunset	🕒🔊 00:36 GMT
🚩 ☐	25. Discussion #6: Forward Look	🔊 00:44 GMT
🚩 ☐	26. Eclipsed Moon (1/2)	00:54 GMT
🚩 ☐	27. Deep Space (1/2)	00:54 GMT

24. Sunset

Target Information

- Solar corona: The outer atmosphere of the Sun.
- Polar plume: Thin streamers that project from the Sun's N and S poles.
- Helmet streamer: Long cap-like structure with pointed peaks.
- Coronal loop: Arcs close to Sun's surface.
- Lunar dust: Dust from the Moon that is lofted above the lunar surface and illuminated by the Sun.

Camera Actions

- Use D5 with long lens to image continuously.
- Image and describe the visibility, color, and shape of the solar corona as a whole and its substructures (e.g., plumes, streamers).
- Is there any evidence of glow behind the horizon? If so, image and describe at multiple scales.
- Image and describe the morphology of the lunar limb, including its sharpness or fuzziness.

Unaided Eye Actions

- Describe the visibility, color, and shape of the solar corona as a whole and its substructures (e.g., plumes, streamers).
- Describe the glow behind the horizon, if glow is visible.
- Describe the morphology of the lunar limb, including its sharpness or fuzziness.

Science Impact

- Your observations and continuous image captures will be used to understand dynamics of the solar corona.
- The eclipse provides a unique viewing geometry to search for possible lofted dust above the lunar surface.



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1. Feature ID	2. Geometry	3. Color & Shadow	4. Structure & Texture	5. Geologic Relations	* Thoughts *
- Feature type/name - Target? (yes/no) - Location - Observation style	- Size - Shape - Boundary Preservation	- Color tone - Albedo - Shadows/ illumination	- Structures - Slopes - Texture	- Association - Contact habit - Contact relationship	- Impressions - Interpretations - Any changes?



	☐	22. Lotted Lunar Dust		23:10 GMT
	☐	23. Earthrise		23:18 GMT
	☐	h. Observation Break		23:30 GMT
	☐	24. Sunset		00:36 GMT
	☐	25. Discussion #6: Forward Look		00:44 GMT
	☐	26. Eclipsed Moon (1/2)		00:54 GMT
	☐	27. Deep Space (1/2)		00:54 GMT

25. Discussion #6: Forward Look

Target Information

- Discussion theme: Reflect on your science observations of the Moon.

Camera Actions

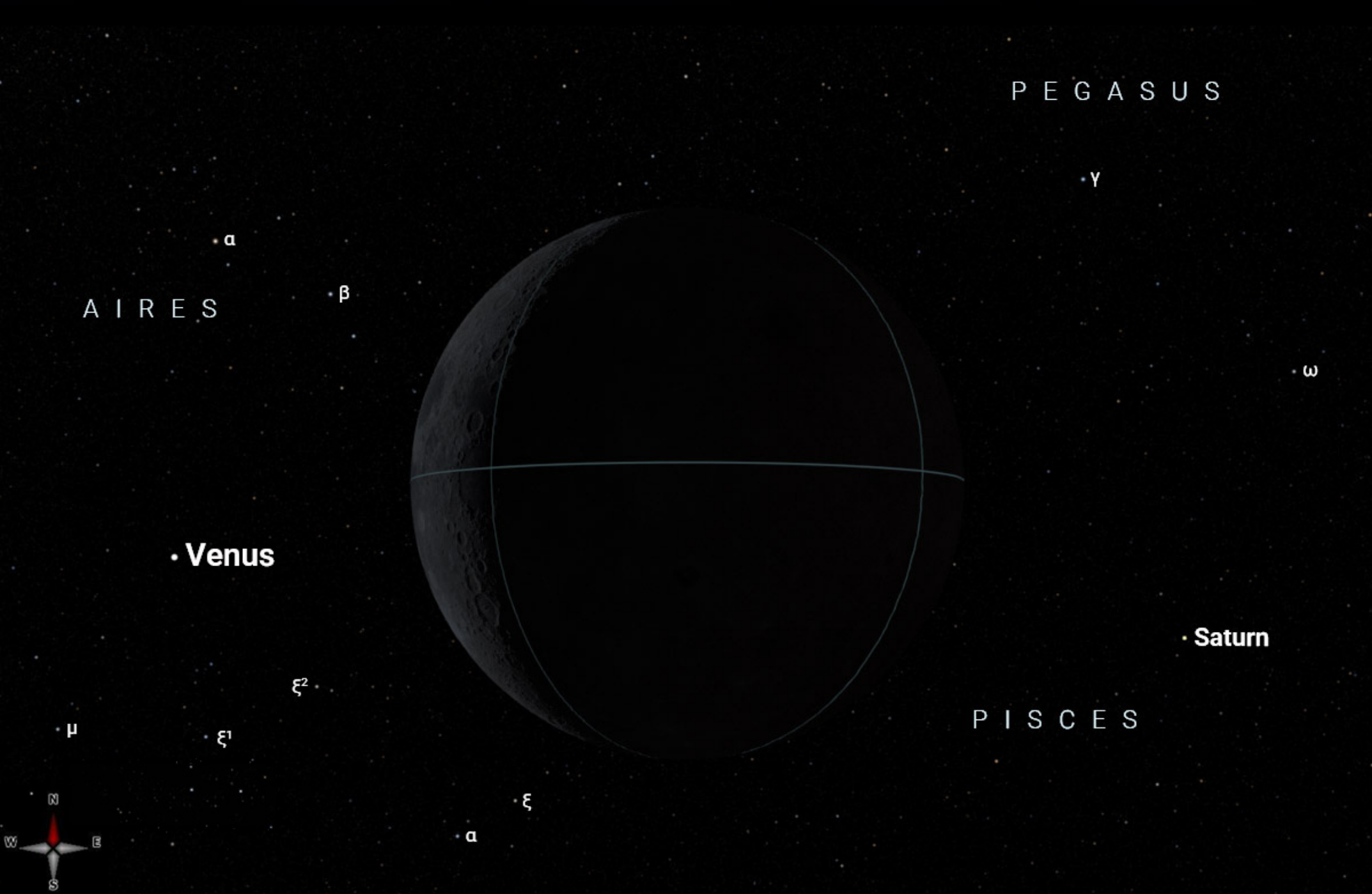
- Topics to discuss with available crew:
 - Synthesize your scientific observations throughout the flyby.
 - Reflect on the Moon that you saw, the features that impressed you most, and your experiences.
 - Look forward to how your experience can inform future Artemis science operations.
- Capture images along with your discussion.

Unaided Eye Actions

- Topics to discuss with available crew:
 - Synthesize your scientific observations throughout the flyby.
 - Reflect on the Moon that you saw, the features that impressed you most, and your experiences.
 - Look forward to how your experience can inform future Artemis science operations.
- Annotate your observations along with your discussion.

Science Impact

- The observations you made throughout the flyby will pave the way for the next generation of lunar exploration.



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1. Feature ID

2. Geometry

3. Color & Shadow

4. Structure &
Texture

5. Geologic
Relations

* Thoughts *

- Feature type/name
- Target? (yes/no)
- Location
- Observation style

- Size
- Shape
- Boundary Preservation

- Color tone
- Albedo
- Shadows/ illumination

- Structures
- Slopes
- Texture

- Association
- Contact habit
- Contact relationship

- Impressions
- Interpretations
- Any changes?



🏠	☐	22. Lorted Lunar Dust	👤 23:10 GMT
🏠	☐	23. Earthrise	🕒🎧 23:18 GMT
🏠	☐	h. Observation Break	23:30 GMT
🏠	☐	24. Sunset	🕒🎧 00:36 GMT
🏠	☐	25. Discussion #6: Forward Look	🎧 00:44 GMT
🏠	☐	26. Eclipsed Moon (1/2)	00:54 GMT
🏠	☐	27. Deep Space (1/2)	00:54 GMT

26. Eclipsed Moon (1/2)

Target Information

- When the Sun is behind the lunar disk and the only illumination on the Moon is Earthshine.

Camera Actions

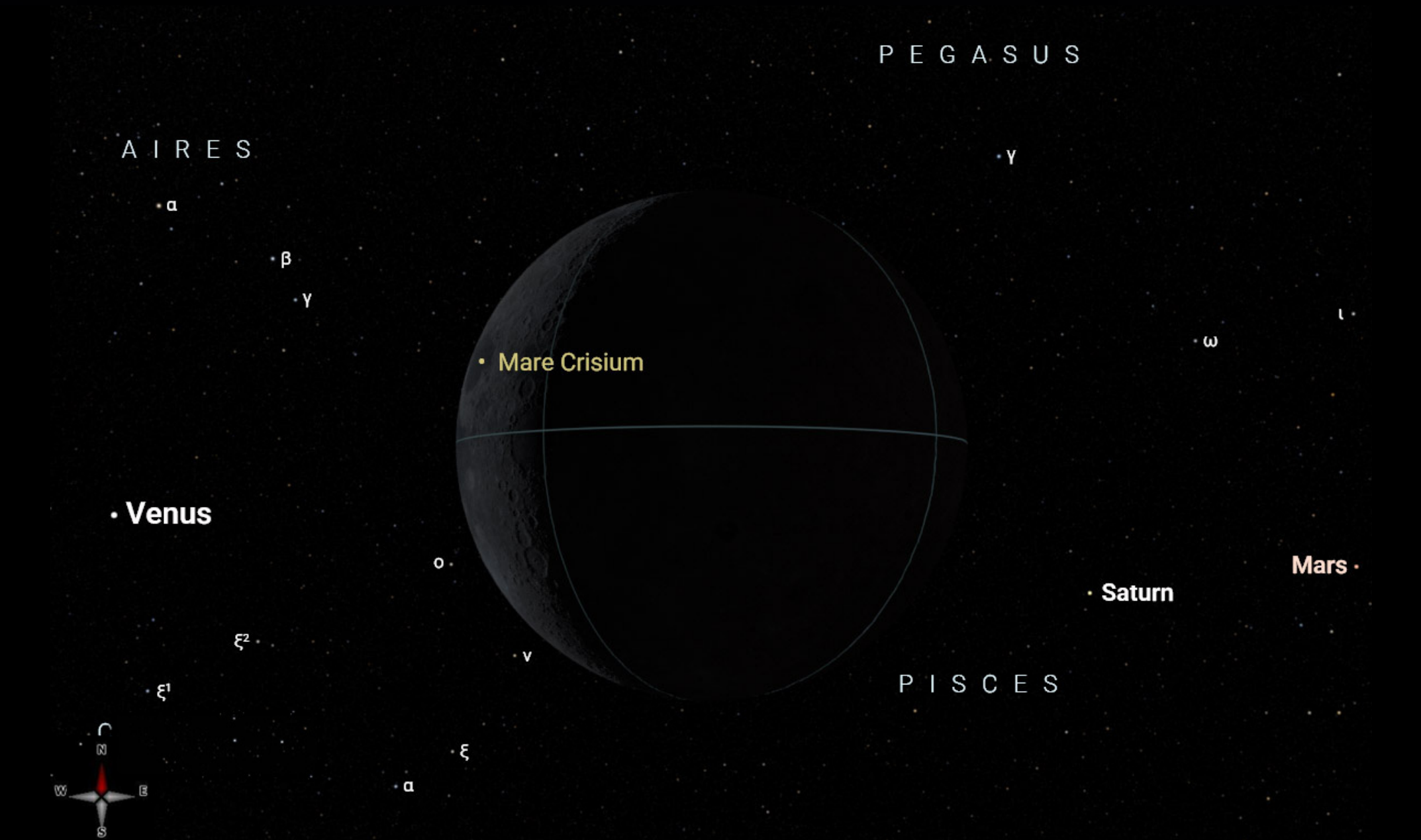
- Use D5 with long lens.
- Orient yourself to the Moon, now only illuminated by Earthshine.
- Whole Moon mosaic: N-S snake pattern at mid-zoom w/ overlap.
- Image and describe color/albedo variations across the surface.

Unaided Eye Actions

- Orient yourself to the Moon, now only illuminated by Earthshine.
- Describe color, albedo, texture, and topography variations visible across the surface.
- Monitor for impact flashes. If observed, annotate location and describe flashes (color, brightness, shape, duration).

Science Impact

- Without the Sun in view, observations will be used to understand how perceptions of color and brightness change under Earthshine's unique spectrum.

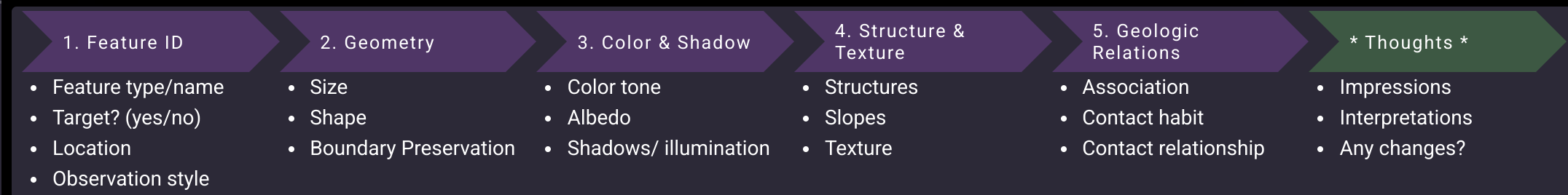


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1. Feature ID	2. Geometry	3. Color & Shadow	4. Structure & Texture	5. Geologic Relations	* Thoughts *
- Feature type/name - Target? (yes/no) - Location - Observation style	- Size - Shape - Boundary Preservation	- Color tone - Albedo - Shadows/ illumination	- Structures - Slopes - Texture	- Association - Contact habit - Contact relationship	- Impressions - Interpretations - Any changes?

- Observations of Mars feed-forward for future human exploration to the Red Planet.
- Eclipse observations provide the opportunity to observe zodiacal light within the Solar System.
- Your fly-by timing may coincide with a comet break-up due to Sun proximity.





	☐	25. Discussion #6: Forward Look		00:44 GMT
	☐	26. Eclipsed Moon (1/2)		00:54 GMT
	☐	27. Deep Space (1/2)		00:54 GMT
	☐	i. Window Team Position Swap		01:03 GMT
	☐	28. Eclipsed Moon (2/2)		01:04 GMT
	☐	29. Deep Space (2/2)		01:04 GMT
	☐	30. Sunrise		01:23 GMT

i. Window Team Position Swap

Target Information

- Window team switch!



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1. Feature ID

2. Geometry

3. Color & Shadow

4. Structure &
Texture

5. Geologic
Relations

* Thoughts *

- Feature type/name
- Target? (yes/no)
- Location
- Observation style

- Size
- Shape
- Boundary Preservation

- Color tone
- Albedo
- Shadows/ illumination

- Structures
- Slopes
- Texture

- Association
- Contact habit
- Contact relationship

- Impressions
- Interpretations
- Any changes?



🚩 ☐	25. Discussion #6: Forward Look	🔊 00:44 GMT
🚩 ☐	26. Eclipsed Moon (1/2)	00:54 GMT
🚩 ☐	27. Deep Space (1/2)	00:54 GMT
🚩 ☐	i. Window Team Position Swap	01:03 GMT
🚩 ☐	28. Eclipsed Moon (2/2)	🔊 01:04 GMT
🚩 ☐	29. Deep Space (2/2)	01:04 GMT
🚩 ☐	30. Sunrise	🕒🔊 01:23 GMT

28. Eclipsed Moon (2/2)

Target Information

- When the Sun is behind the lunar disk and the only illumination on the Moon is Earthshine.

Camera Actions

- Use D5 with long lens.
- Orient yourself to the Moon, now only illuminated by Earthshine.
- Whole Moon mosaic: N-S snake pattern at mid-zoom w/ overlap.
- Image and describe color/albedo variations across the surface.

Unaided Eye Actions

- Orient yourself to the Moon, now only illuminated by Earthshine.
- Describe color, albedo, texture, and topography variations visible across the surface.
- Monitor for impact flashes. If observed, annotate location and describe flashes (color, brightness, shape, duration).

Science Impact

- Without the Sun in view, observations will be used to understand how perceptions of color and brightness change under Earthshine's unique spectrum.



Unaided Eye

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OneNote

Labels Off

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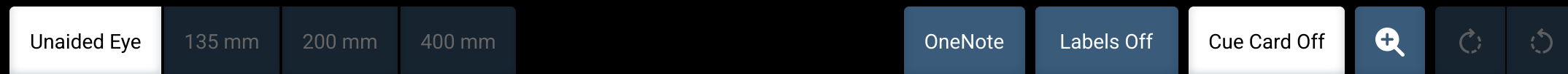
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1. Feature ID	2. Geometry	3. Color & Shadow	4. Structure & Texture	5. Geologic Relations	* Thoughts *
- Feature type/name - Target? (yes/no) - Location - Observation style	- Size - Shape - Boundary Preservation	- Color tone - Albedo - Shadows/ illumination	- Structures - Slopes - Texture	- Association - Contact habit - Contact relationship	- Impressions - Interpretations - Any changes?

- Observations of Mars feed-forward for future human exploration to the Red Planet.
- Eclipse observations provide the opportunity to observe zodiacal light within the Solar System.
- Your fly-by timing may coincide with a comet break-up due to Sun proximity.



1. Feature ID	2. Geometry	3. Color & Shadow	4. Structure & Texture	5. Geologic Relations	* Thoughts *
• Feature type/name	• Size	• Color tone	• Structures	• Association	• Impressions
• Target? (yes/no)	• Shape	• Albedo	• Slopes	• Contact habit	• Interpretations
• Location	• Boundary Preservation	• Shadows/ illumination	• Texture	• Contact relationship	• Any changes?
• Observation style					



26. Eclipsed Moon (1/2)

00:54 GMT



27. Deep Space (1/2)

00:54 GMT



i. Window Team Position Swap

01:03 GMT



28. Eclipsed Moon (2/2)



01:04 GMT



29. Deep Space (2/2)

01:04 GMT



30. Sunrise



01:23 GMT

30. Sunrise

Target Information

- Solar corona: The outer atmosphere of the Sun.
- Polar plume: Thin streamers that project from the Sun's N and S poles.
- Helmet streamer: Long cap-like structure with pointed peaks.
- Coronal loop: Arcs close to Sun's surface.
- Lunar dust: Dust from the Moon that is lofted above the lunar surface and illuminated by the Sun.

Camera Actions

- Use D5 with long lens to image continuously.
- Describe any differences in what you see now vs. at sunset.
- Image and describe the visibility, color, and shape of the solar corona as a whole and its substructures (e.g., plumes, streamers).
- Is there any evidence of glow behind the horizon? If so, image and describe at multiple scales.
- Image and describe the morphology of the lunar limb, including its sharpness or fuzziness.

Unaided Eye Actions

- Describe the visibility, color, and shape of the solar corona as a whole and its substructures (e.g., plumes, streamers).
- Describe the glow behind the horizon, if glow is visible.
- Describe the morphology of the lunar limb, including its sharpness or fuzziness.

Science Impact

- Your observations and continuous image captures will be used to understand dynamics of the solar corona.
- The eclipse provides a unique viewing geometry to search for possible lofted dust above the lunar surface.



7 Apr 2026 01:23:00.000

Unaided Eye

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1. Feature ID

- Feature type/name
- Target? (yes/no)
- Location
- Observation style

2. Geometry

- Size
- Shape
- Boundary Preservation

3. Color & Shadow

- Color tone
- Albedo
- Shadows/ illumination

4. Structure & Texture

- Structures
- Slopes
- Texture

5. Geologic Relations

- Association
- Contact habit
- Contact relationship

* Thoughts *

- Impressions
- Interpretations
- Any changes?



User Guide

Instructions and operational guidelines for effectively utilizing the lunar targeting package.





Views

A comprehensive lunar map designed for detailed geographical review. Features references for customizable views, terrain labeling, and simulated lunar phases.

ARTEMIS

Lunar Targeting Package

LTP FINAL

Lunar Targeting Plan

Lunar Geography Review

>

Views

Observation Guidance

Glossary

Cue Card

Views

Nearside

West Limb

Farside

East Limb

Labels

None

Minimum

Minimum + Scale

Medium

Maximum



Page Controls

Hide Controls

Reset Zoom

Phases

Full

Third Quarter

Waning Crescent

Waxing Crescent

First Quarter

< Phase

Phase >



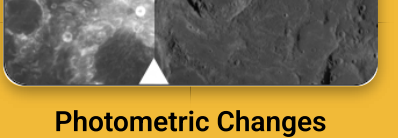
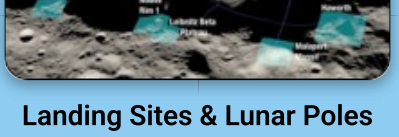
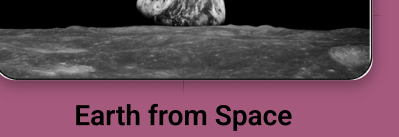
Observation Guidance

Detailed advice and criteria for capturing high-quality scientific observations.



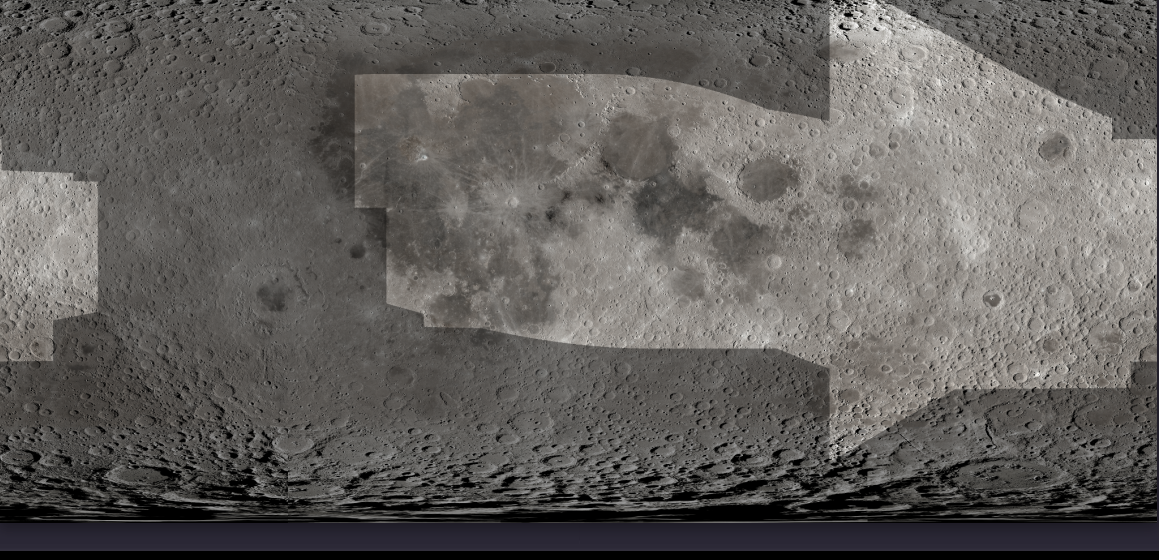
Overview

- This Lunar Geography Review is a study aid that highlights success criteria for achieving your Artemis II IVA Science Objectives through imaging, observation, and annotation and provides guidance for imaging and observations prior to navigating the Lunar Targeting Plan during the Lunar Pass.
- Artemis II IVA Science Objectives trace to the following science themes:

Color/Albedo	View Changes	Geologic Targets		
 Color Provinces & Albedo Variation Color differences may be connected to initial variations in crustal composition, or some evolutionary difference.	 Photometric Changes Physical and compositional properties of lunar regolith can be inferred by analyzing repeat images of the same location.	 Tectonics Crew observations of surfaces under low-sun angle lighting will augment mapping of tectonic features on the Moon.	 Volcanic History Identifying color differences within the mare basalts, and across several units may be related to age and/or composition.	 Impact History Crew will image and describe multiple impact craters, starting with the largest visible features (basins) down to identifying the smallest observable feature.
Geographic Targets		Time-Critical Events		
 Landing Sites & Lunar Poles Artemis II crewed observations and photography of the south polar region and future Artemis landing sites will benefit mission planning and serve as inspiration.	 Terminator & Limb Views of the sharp terminator or lunar limb will identify subtle morphologies highlighted in a contrast illumination.	 Earth from Space Crew observations of the Earth from deep space enable characterization of color, identification of surface features, and estimation of cloud cover.	 Dust & Exosphere Apollo crew member observations varied on what they saw in the lunar exosphere.	 Impact Flashes Crew members will observe any un-illuminated lunar surface to identify flashes on the surface (caused by micro-meteorite bombardment).

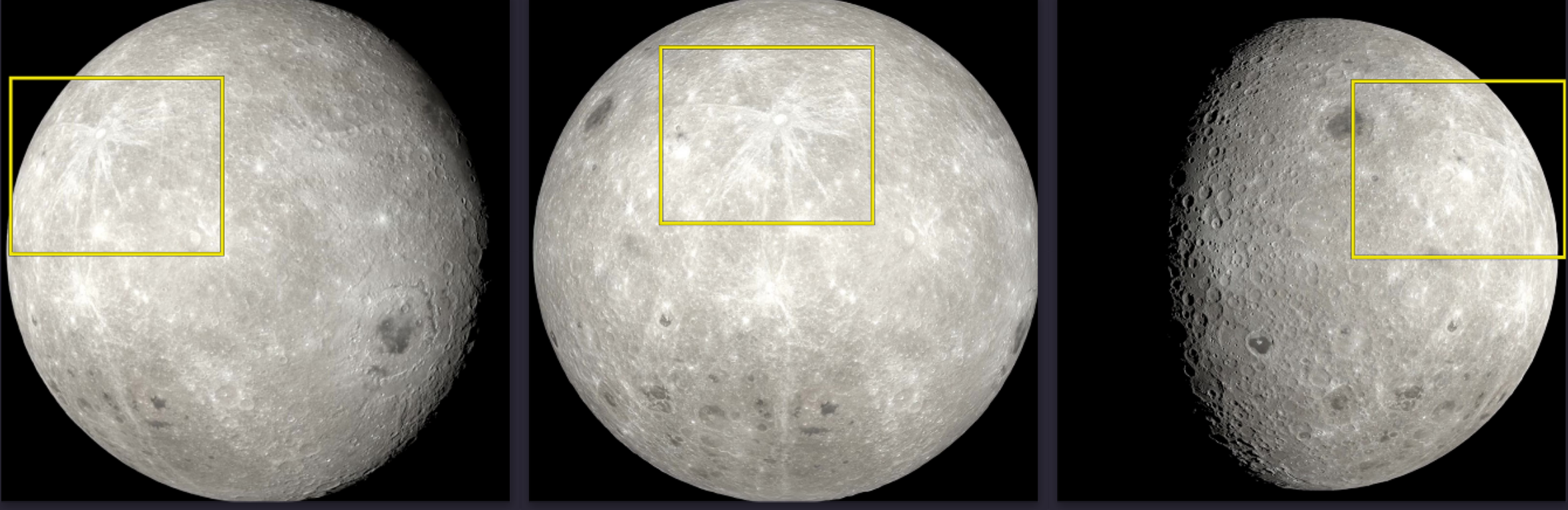
Unviewed Lunar Locations

- Your observations of the dark parts of the map will be the first direct human observations of features that were either not illuminated by the Sun or not viewed while in orbit during Apollo missions.
- The highlighted parts of the map depict sunlit regions Apollo astronauts could see from orbit. The darkened parts of the map were either never in sunlight (the large gap that includes Orientale) or were beyond the horizon of the spacecraft. The large cone shape represents part of Apollo 13's flyby.



Photometric Changes

- By acquiring repeat images and observations of the same location at different times and viewing geometries, you will capture changes in physical and compositional properties of lunar regolith during the Lunar Pass.
- The dynamic range of viewing geometries and distance from the lunar surface that you will have affords us the opportunity to observe the moon in a way that has not been previously observed by spacecraft or Apollo missions.
- Your Lunar Targeting Plan defines when designated times are for making photometric observations.



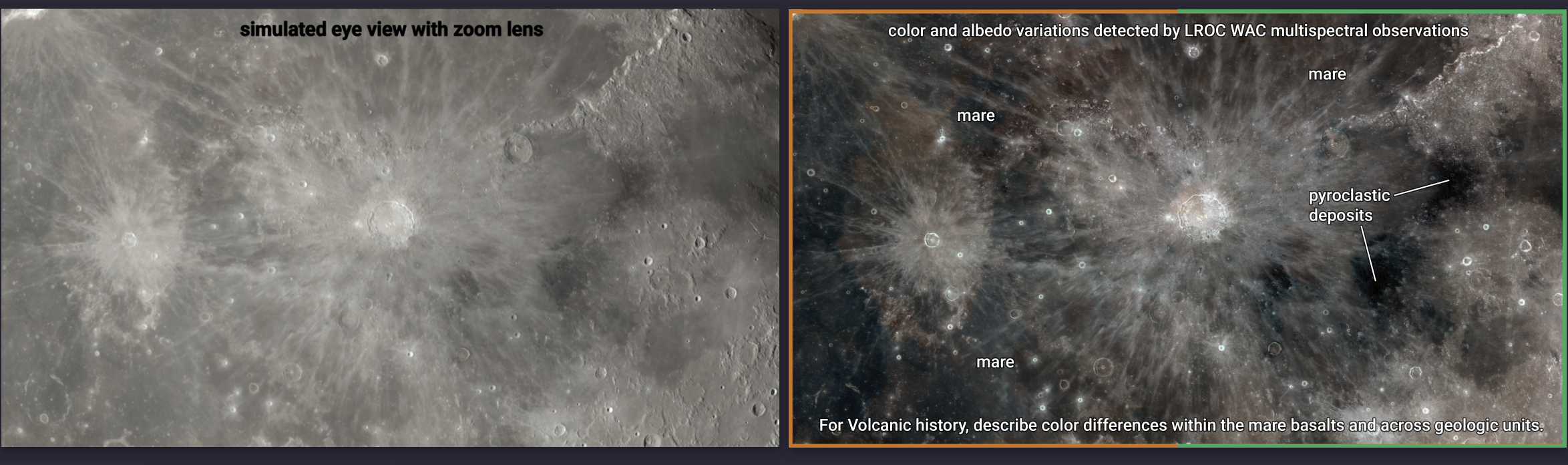
Geologic Science Themes

- Some lunar surface features were formed by multiple surface processes and correspond to more Geologic Science Themes than others.
- Practice by clicking on the "Color and Albedo, Tectonics, and Impact History" buttons to see how two lunar surface targets can have dynamic volcanic, tectonic, and impact histories.
- The annotations on the maps point to examples of the types of features that the Artemis II Lunar Science Team would like for you to observe and describe.
- For a refresher on geologic vocabulary, refer to the "Glossary" tab if needed.

Far Side Example: Moscoviense Basin

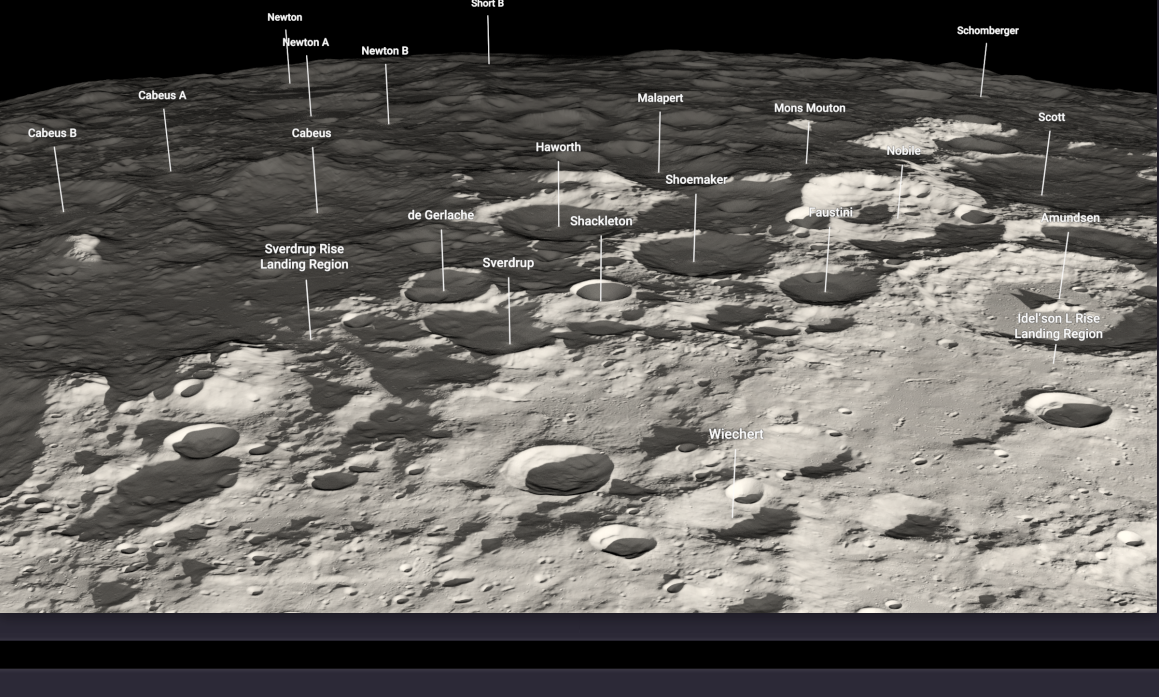


Near Side Example: Copernicus Crater



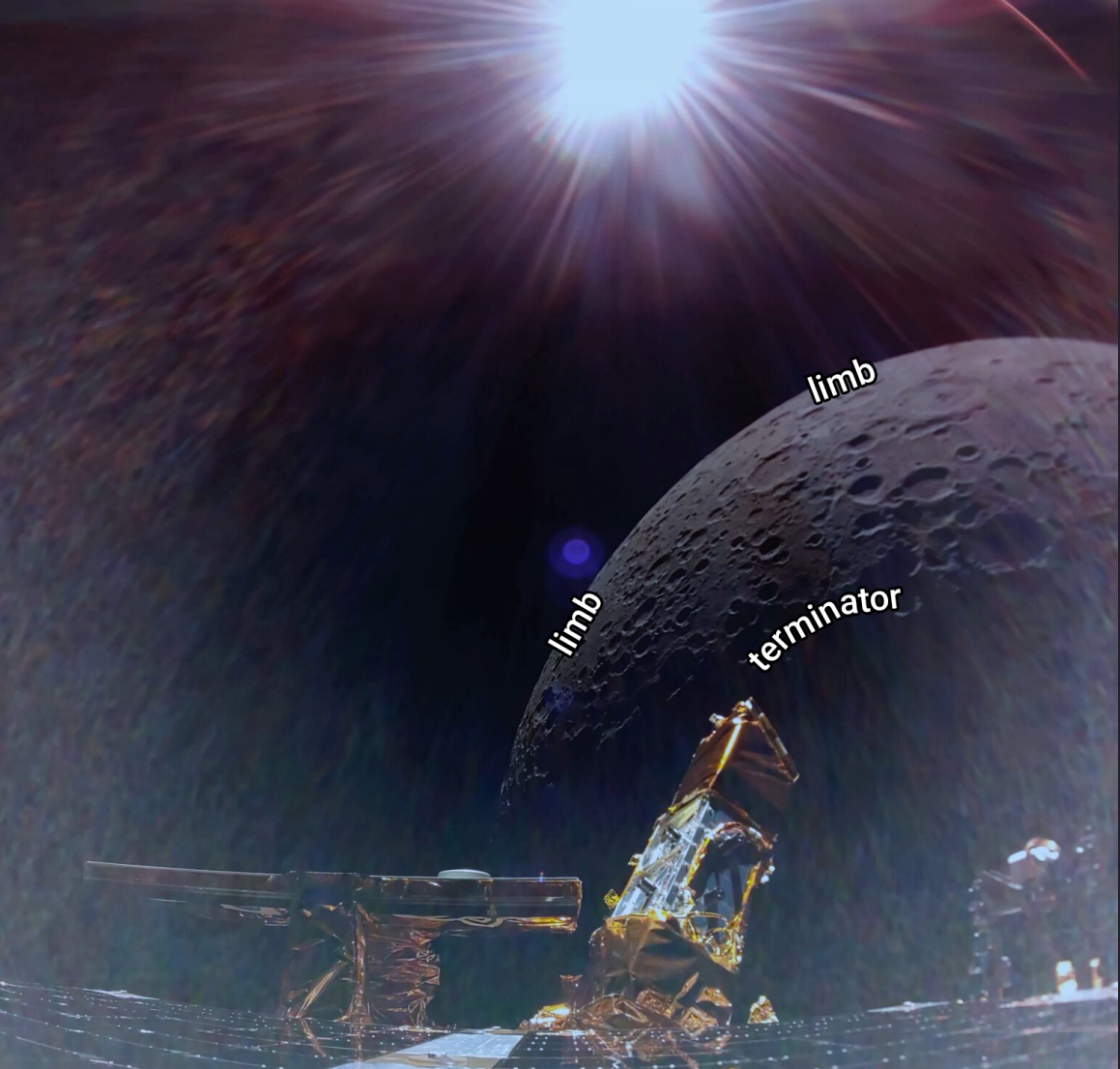
Landing Sites & Lunar Poles (Geographic Science Theme)

- Observations and images of the polar regions and possible future landing sites will benefit mission planning (both for tactical and scientific reasons) and serve as inspiration for the future of Artemis.



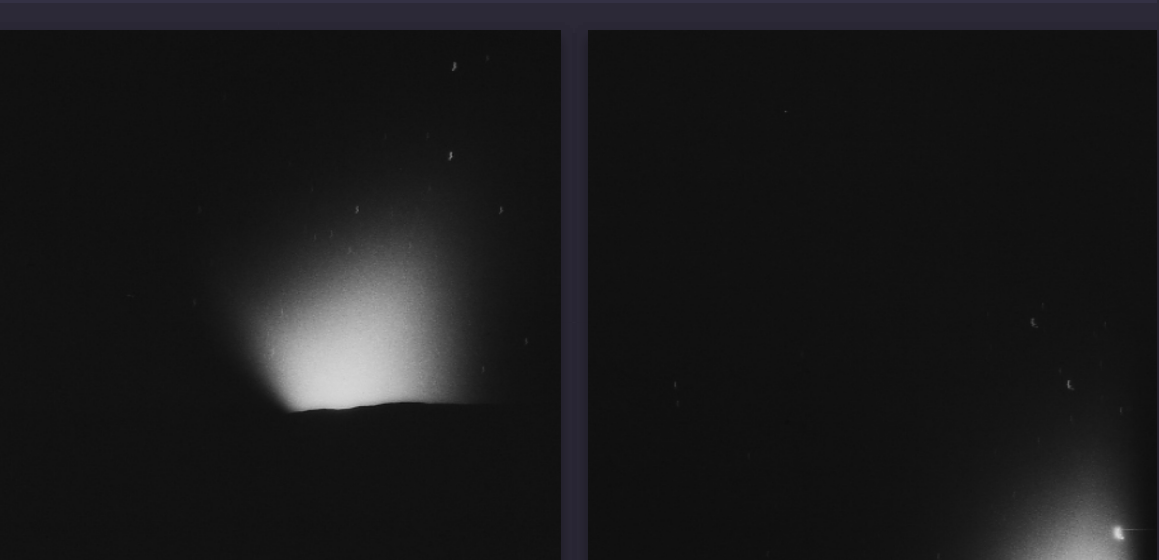
Limb & Terminator (Geographic Science Theme)

- Low sun angles at the terminator enhance surface morphology by casting long shadows and highlighting texture.
- The limb provides horizon views that expose subtle topography for you to observe.
- To capture the texture of the lunar surface in low illumination conditions, mosaic up and down the terminator.



Dust & Exosphere (Time-Critical Event)

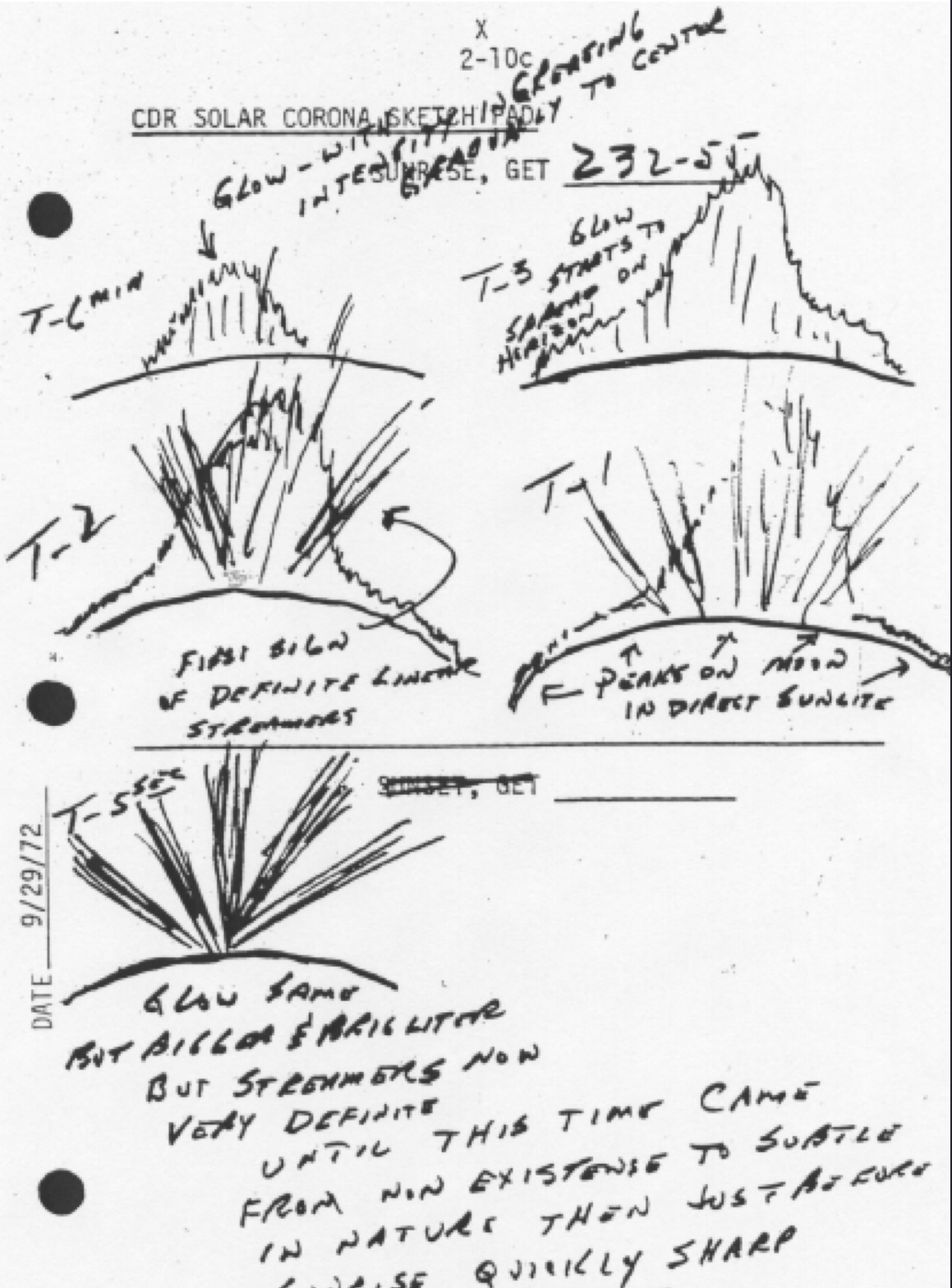
- Crews in orbit during Apollo observed rays of material in the exosphere as the sun rose and set. It is unclear if these rays were prominent due to a dusty exosphere (i.e. the Moon is lofting dust at sunset and sunrise), Zodiacal light, or a mis-observation of a separate phenomenon. Your observations of the limb and terminator at key moments during the Lunar Pass can help uncover what these rays might be.
- Apollo 15, 31 Jul 1971
- Solar corona images taken 1 minute before sunrise (left) and 1 minute after sunset (right)



CDR Solar Corona sketch by Eugene Cernan during Apollo 17.

Time refers to the time before first appearance of the sun.

- T-6 min: Glow-with intensity increasing gradually to center
- T-3 min: Glow starts to spread on horizon
- T-2 min: First sign of definitely linear streamers
- T-1 min: Peaks on Moon in direct sunlight
- T-5 sec: Glow same but bigger and brighter but streamers now very definite until this time came from non-existent to subtle in nature then just as glow sunrise quickly sharp



Unnamed Features

- Most of the mountain ranges and small craters on the lunar Farside are unnamed.
- Below are notional maps of unnamed features on the Farside with image footprints from Apollo 8 and Apollo 13 and unnamed small, fresh craters on the east and west limbs.





Glossary

Definitions of key terminology, acronyms, and geographical classifications used throughout the targeting package.



Albedo	Surface Brightness. <i>Scientifically</i> : the relative amount (ratio) of light that a surface reflects compared to the total incoming sunlight. A surface with a high albedo will reflect more sunlight than a surface with low albedo.
Central Peak	A central mountain rising above the floor of a crater. Material in the central peak originates from many kilometers below the surface. Typically observed in craters larger than 20 km but smaller than 175 km in diameter.
Closest Approach viewing	Features will be at their largest when at closest approach
Color provinces	The surface of the Moon has subtle variations in color, depending on the geologic material and chemistry present. Apollo crews saw regions or provinces where the surface was tan, light brown, or blue-gray.
Craters	Impact craters are excavated by meteoroid collisions.
Craters, catena	Chain of closely spaced craters. These craters usually form from impacts but could also form from subsurface processes.
Craters, complex	Large impact craters with one or more central peak mountain. 20-175 km (12-100 mi). <i>See Jackson Crater.</i>
Craters, floor fractured	Usually large (20 km+) impact craters with radial, concentric, and/or polygonal fractures on crater floor.
Craters, simple	Small, bowl-shaped impact craters. 0-20 km (0-12 mi) across. <i>See Kundt Crater.</i>
Craters, peak-ring	Very Large impact craters, where peak rings—circular mountain ranges—are formed within the crater. <i>See Orientale Basin.</i>
Crater, rays	Lunar crater rays are bright, radial deposits of ejected material extending outwards from impact craters.
Contact	Boundary between two different geological units.
Contact, sharp	Abrupt, well-defined boundary between two different geologic units.
Contact, gradational	Gradual transition between two different geologic units.
Discontinuous	Refers to a boundary that is broken or interrupted in its continuity.
Embaying	Refers to one feature that surrounds another, usually higher relief feature. The contact resembles a curved or indented shoreline.
Exosphere	The Moon's extremely thin layer of atmosphere, made up of trace amounts of gasses.
High sun angle	Ideal for color and albedo observations.
Horizon glow	Phenomenon where dust particles in the Moon's thin atmosphere create a glow during Lunar sunset on the Lunar horizon.
Hummocky	Terrain characterized by small, rounded hills or mounds.
Image mosaic mapping	Taking multiple overlapping camera images as trained enables the creation of maps and image mosaics of large regions on the Moon.
(Impact) Basin	Large craters on the Moon, usually 200 km (125 mi) in diameter or larger. Their formation impacts were so massive, they made permanent basins where the lunar crust is very thin. <i>See Korolev Basin, South Pole Aitken Basin.</i>
(Impact) Breccia	Rocks composed of fragments of older rocks, minerals, or glass. Impact breccias are lithified (formed into rock) by heat and shock compaction from impacts.
Impact flashes	Flashes on the lunar surface caused by micro-meteorite bombardment.
Limb viewing	The topographic 'skyline' can be viewed along the limb
Low sun angle	Ideal for morphological observations.
Lunar limb	The visible horizon of the Moon's surface from any vantage point. Looking north from Earth, the left horizon of the Moon is known as the 'Western Limb', the right horizon of the Moon is known as the 'Eastern Limb'.
Lunar swirls	High albedo curving surface features coincident with regions of strong magnetic fields. Apollo crews described them as swirly, wispy, and winding. <i>See Reiner Gamma</i>
Mare basalts	Basalts (dark colored igneous rock) from areas on the Moon that are darker and smoother than their surroundings.
Mare regions, patches, or fill	Dark regions paved or filled by volcanic deposits. Also called "seas", "oceans", "lakes", "marshes", or other bodies of water. Apollo 11 landed in the Sea of Tranquility, or <i>Mare Tranquillitatis</i> . Patches or Volcanic Fill simply refer to smaller areas of volcanic deposits, a common feature on the far side.
Morphology	The external structure, form, and shape of landforms.
Nadir viewing	Features are the least geometrically distorted when looking at them from the top-down.
Photometric changes	Repeat observations of the same features over different viewing angles are used to understand physical and compositional properties of lunar regions.
Photometry	(<i>photo-metry, literally 'light measuring'</i>) A technique focused on the measurement and analysis of light reflected by planets and moons in our solar system and beyond.
Pyroclastic deposits	Large, accumulated volcanic deposits from explosive volcanism.
Regolith	The fragmented layer of rocky material at the lunar surface. This covers bedrock and is often powdery with few large rocks.
Sinuuous	Refers to a thin, highly curvy feature.
Solar corona	The Sun's outermost part of its atmosphere, seen during total solar eclipses.
Space weathering	Modification or changes in the surface of an airless planetary body from exposure to radiation and collisions by cosmic rays, solar wind, and micrometeorite impacts. On the Moon, this causes surface darkening.
Tectonic scarps, Fault scarps	Cliffs produced by tectonic processes.
Terminator	The Lunar terminator divides the illuminated (Lunar day) and shadowed portions (Lunar night) of the Moon viewed from Earth.
Undulating	Wavy surface or feature.
Volcanic clasts	Volcanic fragments within regolith or breccias.
Wrinkle ridges	Elongated, curving and braided, positive-relief features found in dark mare basalts. Wrinkle ridges consist of a broad low relief arch-like feature and a superimposed narrow, higher relief ridge.
Zodiacal light	The phenomenon caused by dust particles located in the inner solar system, between the Sun and Jupiter.

Cue Card

A quick-reference guide designed to aid crew members in executing productive, high-yield scientific observations during active target windows.





1. Feature ID

Feature type/name	
Target?	Is it from the targeting plan?
Location:	Hemisphere, position relative to other features
Observation style:	How are you identifying it (eyes or camera)?
Viewing geometry:	Oblique or nadir?

2. Geometry

Size:	In your FOV, relative to natural scale bars (complex craters, named features)
Shape:	Circular, elongated, polygonal, sinuous, curvilinear, ...
Boundary preservation:	Well-defined/fresh/sharp, scalloped, degraded, discontinuous

3. Color & Shadow

Color tone:	Lighter/darker gray, tan, brown, orange, ...
Albedo:	Brighter/darker, consistent, variable, streaks, ...
Shadows/illumination:	Length, coverage, direction, near terminator, ...

4. Structure & Texture

Structures:	Raised rim, peak structure, terrace, plateau, valley, ...
Slopes:	Steep, gentle
Texture:	Rough, smooth, rugged, infilled, hummocky, undulating, ...

5. Geologic Relations

Association:	Radiating/stemming from, flowing from, ...
Contact habit:	Sharp, gradational, ...
Contact relationship:	Embaying, dissecting, on top of, under...

* Optional Thoughts *

Impressions:	Human response, emotions
Interpretations:	Earth analogs, formation
Any Changes?	Since your last observation or during your observation?