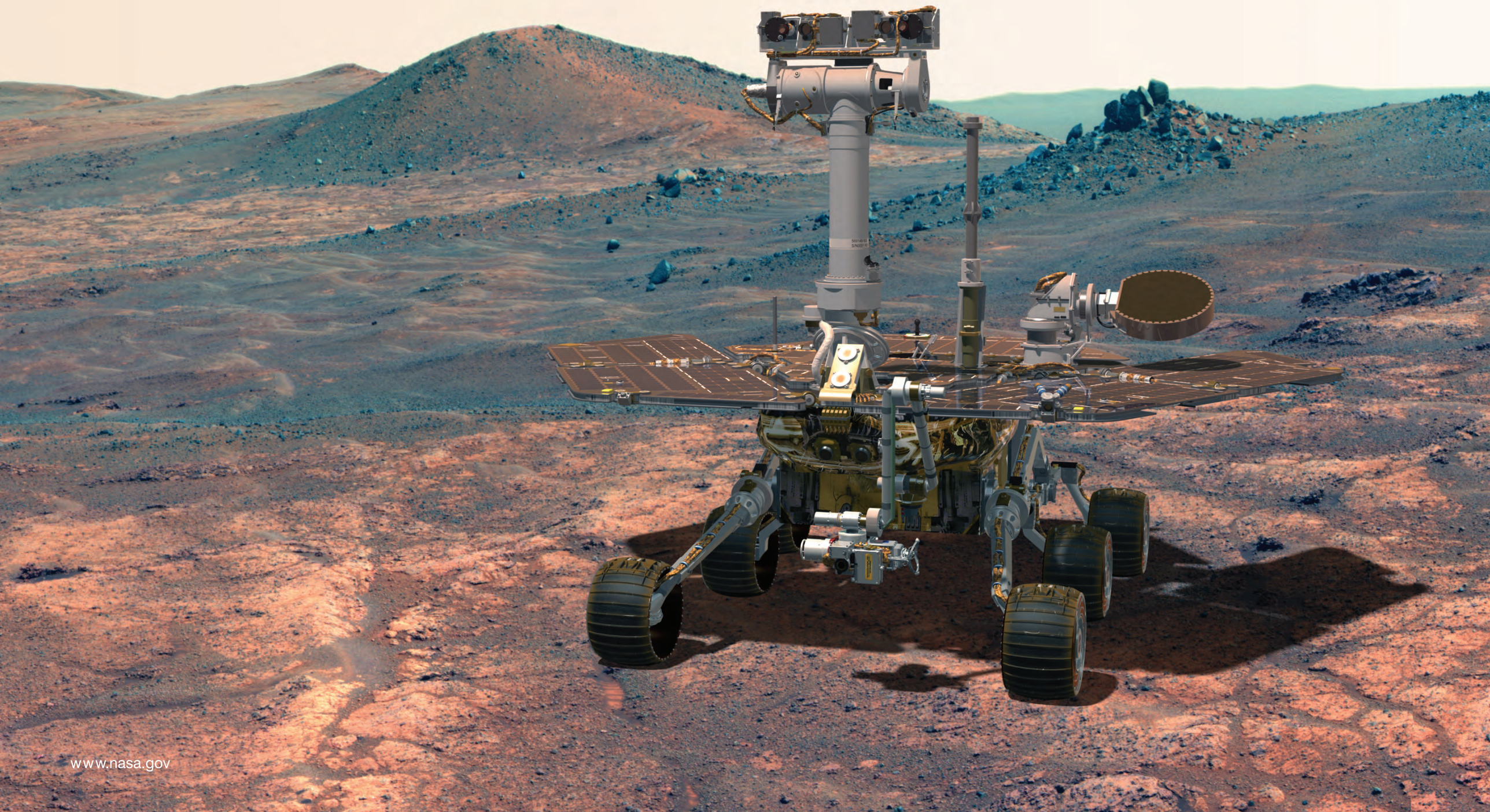
National Aeronautics and
Space Administration

Mars Exploration Rovers

2017 2018

One Martian Year • Two Earth Years



www.nasa.gov

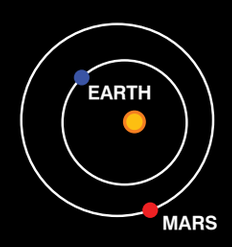
Cover *An elongated crater called Spirit of St. Louis, with a rock spire in it, dominates this scene from Opportunity's Pancam. The crater—about 110 feet (34 meters) long and about 80 feet (24 meters) wide—has a floor slightly darker than the surrounding terrain. The rocky features toward the far end of the crater is about 7 to 10 feet (2 to 3 meters) tall, rising higher than the crater's rim. Opportunity itself is overlain and scaled to its surroundings.*

Cover image credit
The component images of this mosaic view were acquired with Opportunity's panoramic camera (Pancam) on Sols 3,973 and 3,974 (March 29 and 30, 2015). NASA/JPL-Caltech/Cornell Univ./Arizona State Univ. 3D rendering of Opportunity: NASA/JPL-Caltech/Dan Maas

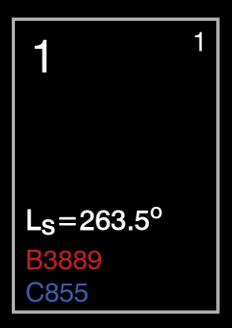
Spirit landed in Gusev crater on January 4, 2004. Opportunity landed at Eagle crater on Meridiani Planum January 25, 2004. The rovers were originally planned to operate for 90 Martian days (called sols). They have surprised even their designers with their longevity and accomplishments. Spirit lasted for over six years and 2017 marks the thirteenth anniversary of Opportunity's continuing exploration on the surface of Mars.

Visit mars.jpl.nasa.gov

How to Use the Calendar



A Martian Year Each page of the calendar has a diagram showing the relative position of Earth and Mars on the first day of the month. Mars is farther from the Sun compared with Earth, so it takes Mars longer to complete one orbit and its year is longer than an Earth year. A Mars year is 687 Earth days long - almost two Earth years. This calendar covers one Martian year and two Earth years.

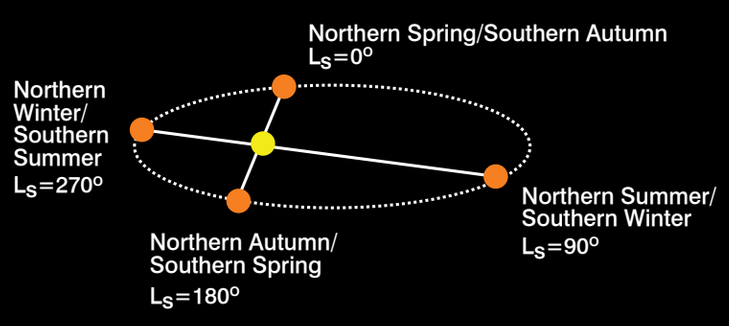


A Martian Day Mars rotates on its axis similarly to Earth, but a little more slowly, so a Mars day is a little longer than an Earth day. The Mars day, which we call a "sol," takes 24 hours, 39-1/2 minutes. The red and blue numbers in the calendar squares indicate how many sols have passed since Opportunity (designated "B" and shown in red type) and NASA's other operating rover, Curiosity ("C" in blue type) landed on Mars (Spirit had the "A" designation while she was in operation). Those dates were January 25, 2004, for Opportunity and August 6th, 2012 for Curiosity. For example, on January 1, 2015, the numbers B3889 and C855 mean that this date marks the 3889th sol that MER-B (technical name for Opportunity) has spent on Mars and the 855th sol for Curiosity. You will notice that because a sol is slightly longer than a day, about every 36 days, the calendar skips an Earth day in counting the sols for each of the rovers. This way, the days and sols can stay synchronized on the calendar.

Day of Year The number in the top right corner of each calendar square is the consecutive day of year (DOY) number, commonly used in space mission operations as a shorthand way of giving the date.

DSN Week Number This number helps all operating deep space missions schedule use of Earth-based antennas in the Deep Space Network (DSN). DSN week 1 begins on the first Monday of the calendar year and is numbered sequentially to the end of the year.

Mars Seasons Mars solar longitude (the L_S number on the first day of each month in the calendar) determines seasons on Mars. As Mars travels around the Sun through 360°, it experiences seasons just as Earth does.



ROVER INSTRUMENTS

Spirit and Opportunity

Opportunity has six science instruments, along with six engineering cameras.

Remote Sensing Instruments

Panoramic Camera (Pancam) - Creates high-resolution color images with a stereoscopic camera pair that can rotate in a complete circle and look straight up and down.

Miniature Thermal Emission Spectrometer (Mini-TES) - Analyzes infrared light to identify rock-forming minerals; measures the heat-holding properties (thermal inertia) of rocks and soils; measures atmospheric temperatures from the surface to 10 kilometers (6.2 miles) in altitude. (No longer operational)

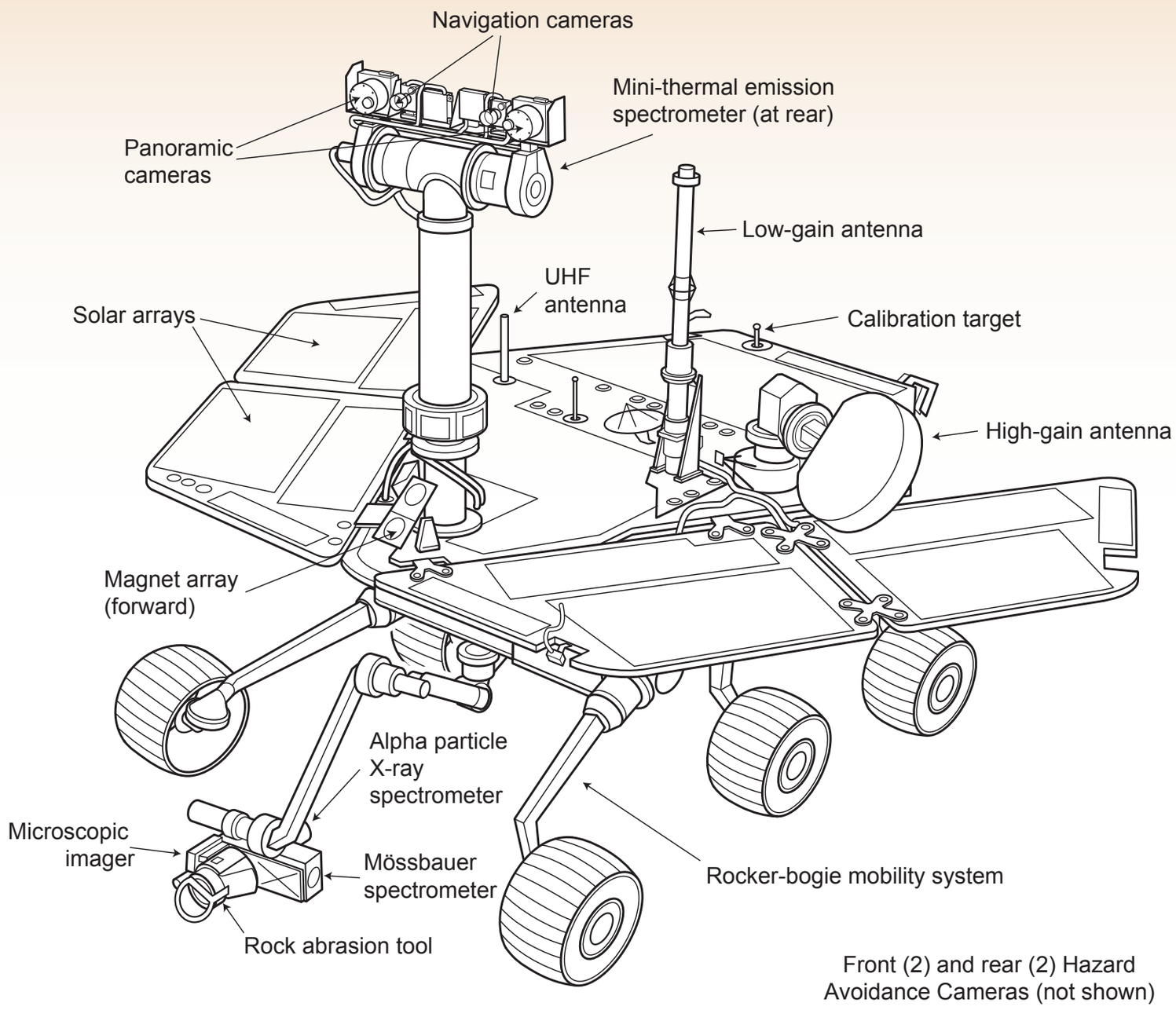
Contact Science Instruments

Rock Abrasion Tool (RAT) - Brushes and grinds rocks to clean away dust and other surface deposits so the spectrometers can analyze their composition.

Alpha Particle X-ray Spectrometer (APXS) - Measures the chemical composition of Martian rocks and soils.

Mössbauer Spectrometer (MB) - Measures iron-bearing minerology of rocks and soil. (No longer operational)

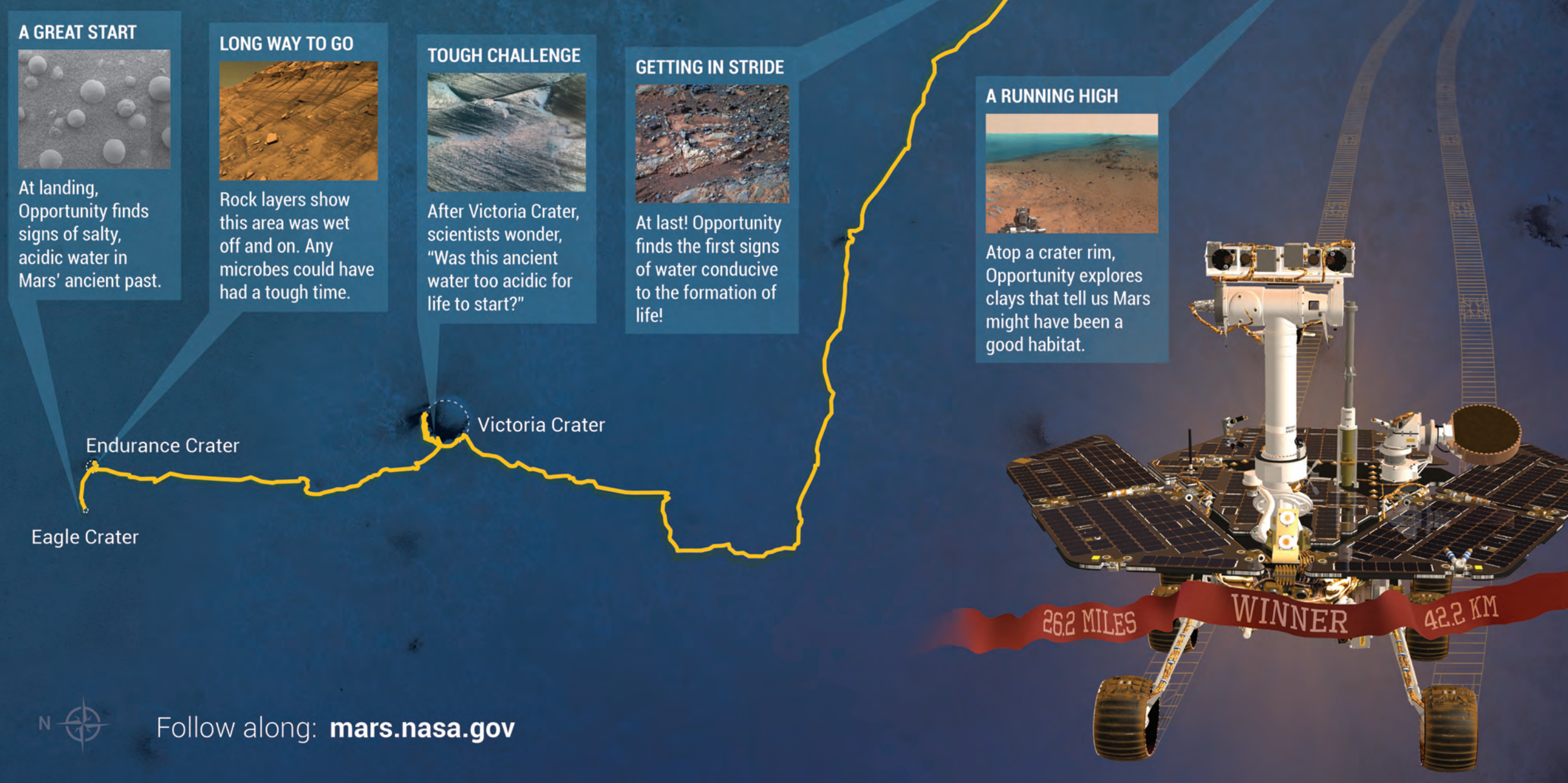
Microscopic Imager (MI) - Provides high-resolution images of the small-scale features of Martian rocks and soils.



OPPORTUNITY'S MARATHON JOURNEY!

First Marathon "Run" on Another Planet

Distance: 26.2 miles **Time:** 11 years, 2 months

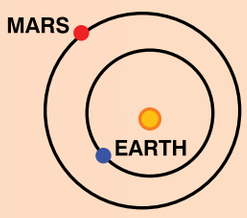


Follow along: **mars.nasa.gov**

Opportunity's Marathon Journey

Eleven years and two months after landing on Mars, the total driving distance of NASA's Mars Exploration Rover Opportunity surpassed the length of a marathon race: 26.219 miles (42.195 kilometers).
This map shows the southward path driven by Opportunity from late January 2004 until it passed marathon distance on March 24, 2015, during the 3,968th sol of the rover's work on Mars.

The rover's traverse shown here has been mapped onto an image from the High Resolution Imaging Science Experiment (HiRISE) camera on NASA's Mars Reconnaissance Orbiter. Image credit: NASA/JPL-Caltech/Univ. of Arizona



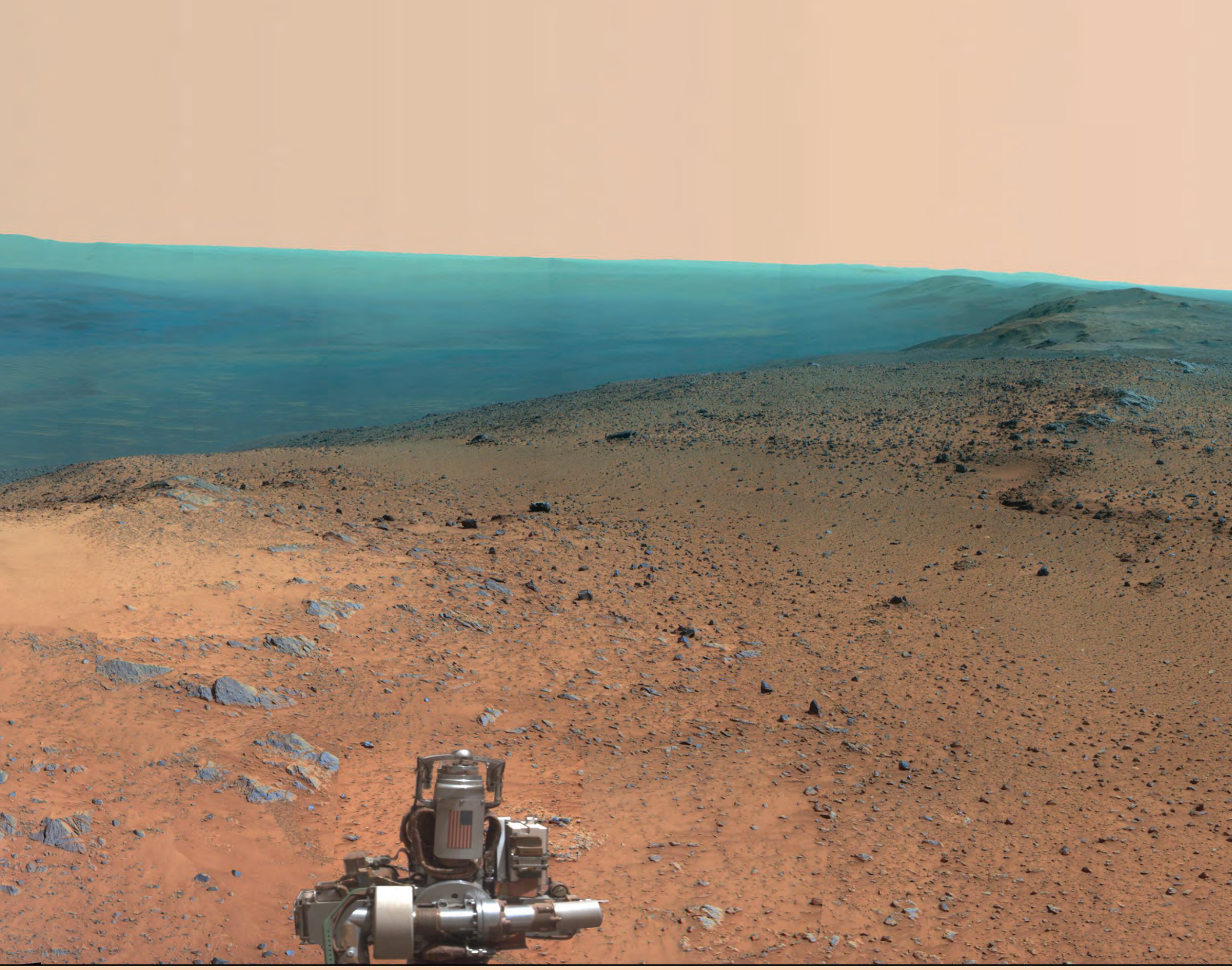
February 1, 2017

January 2017

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1 (1) L_S=290.9° B4600 C1567	2 (2) DSN Week 1 B4601 C1568	3 (3) B4602 C1569	4 (4) Spirit Landed 2004 B4603 C1570	5 (5) B4604 C1571	6 (6) B4605 C1572	7 (7) B4606 C1573
8 (8) B4607 C1574	9 (9) DSN Week 2 B4608 C1575	10 (10) B4609 C1576	11 (11) B4610 C1577	12 (12) B4611 C1578	13 (13) B4612 C1579	14 (14) B4613
15 (15) B4614 C1580	16 (16) DSN Week 3 B4615 C1581	17 (17) B4616 C1582	18 (18) B4617 C1583	19 (19) B4618 C1584	20 (20) B4619 C1585	21 (21) B4620 C1586
22 (22) B4621 C1587	23 (23) DSN Week 4 B4622 C1588	24 (24) B4623 C1589	25 (25) Opportunity's 13th Earth Anniversary B4624 C1590	26 (26) B4625 C1591	27 (27) B4626 C1592	28 (28) B4627 C1593
29 (29) B4628 C1594	30 (30) DSN Week 5 B4629 C1595	31 (31) B4630 C1596				

February 2017

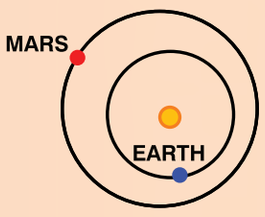
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			1 (32) L_S=309.4° B4631 C1597	2 (33) B4632 C1598	3 (34) B4633 C1599	4 (35) B4634 C1600
5 (36) C1601	6 (37) DSN Week 6 B4635 C1602	7 (38) B4636 C1603	8 (39) B4637 C1604	9 (40) B4638 C1605	10 (41) B4639 C1606	11 (42) B4640 C1607
12 (43) B4641 C1608	13 (44) DSN Week 7 B4642 C1609	14 (45) B4643 C1610	15 (46) B4644 C1611	16 (47) B4645 C1612	17 (48) B4646 C1613	18 (49) B4647 C1614
19 (50) B4648 C1615	20 (51) DSN Week 8 B4649	21 (52) B4650 C1616	22 (53) B4651 C1617	23 (54) B4652 C1618	24 (55) B4653 C1619	25 (56) B4654 C1620
26 (57) B4655 C1621	27 (58) DSN Week 9 B4656 C1622	28 (59) B4657 C1623				



View from the Summit

Opportunity raises the American flag at the top of the Cape Tribulation segment of the rim of Endeavour crater. This location is the highest elevation Opportunity has reached since departing the Victoria crater area in 2008 on a three-year, downslope journey to Endeavour crater.

The component images were taken with Opportunity's panoramic camera (Pancam) during the week after the rover's arrival at the summit on Sol 3,894 (January 6, 2015). In this version of the panorama, the landscape is presented in false color to make differences in surface materials more easily visible. Image credit: NASA/-JPL-Caltech/Cornell Univ./Arizona State Univ.



April 1, 2017

March 2017

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			1 60 L_S=325.4° B4658 C1624	2 61 B4659 C1625	3 62 B4660 C1626	4 63 B4661 C1627
5 64 B4662 C1628	6 65 DSN Week 10 B4663 C1629	7 66 B4664 C1630	8 67 B4665 C1631	9 68 B4666 C1632	10 69 B4667 C1633	11 70 B4668 C1634
12 71 B4669 C1635	13 72 DSN Week 11 B4670 C1636	14 73 C1637	15 74 B4671 C1638	16 75 B4672 C1639	17 76 B4673 C1640	18 77 B4674 C1641
19 78 B4675 C1642	20 79 DSN Week 12 B4676 C1643	21 80 B4677 C1644	22 81 Spirit ceased operation 2010 B4678 C1645	23 82 B4679 C1646	24 83 B4680 C1647	25 84 B4681 C1648
26 85 B4682 C1649	27 86 DSN Week 13 B4683 C1650	28 87 B4684 C1651	29 88 B4685 C1652	30 89 B4686	31 90 B4687 C1653	

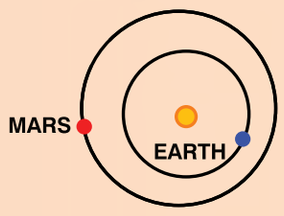
April 2017

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
						1 91 L_S=342.3° B4688 C1654
2 92 B4689 C1655	3 93 DSN Week 14 B4690 C1656	4 94 B4691 C1657	5 95 B4692 C1658	6 96 B4693 C1659	7 97 B4694 C1660	8 98 B4695 C1661
9 99 B4696 C1662	10 100 DSN Week 15 B4697 C1663	11 101 B4698 C1664	12 102 B4699 C1665	13 103 B4700 C1666	14 104 B4701 C1667	15 105 B4702 C1668
16 106 B4703 C1669	17 107 DSN Week 16 B4704 C1670	18 108 B4705 C1671	19 109 B4706 C1672	20 110 C1673	21 111 B4707 C1674	22 112 B4708 C1675
113 23 B4709 C1676 B4716 C1683 30 120	24 114 DSN Week 17 B4710 C1677	25 115 B4711 C1678	26 116 B4712 C1679	27 117 B4713 C1680	28 118 B4714 C1681	29 119 B4715 C1682

Marathon Valley Overlook

A view of Marathon Valley, a destination on the western rim of Endeavour crater, as seen from an overlook north of the valley. The scene spans from east, at left, to southeast. The Opportunity rover team selected Marathon Valley as a science destination because observations of this location using the Compact Reconnaissance Imaging Spectrometer for Mars (CRISM) instrument on NASA's Mars Reconnaissance Orbiter yielded evidence of clay minerals, a clue to ancient wet environments.

This image combines four pointings of the rover's panoramic camera (Pancam) on Sol 3,958 (March 13, 2015). In this version of the image, the landscape is presented in false color to make differences in surface materials more easily visible. Image Credit: NASA/JPL-Caltech/Cornell Univ./Arizona State Univ.



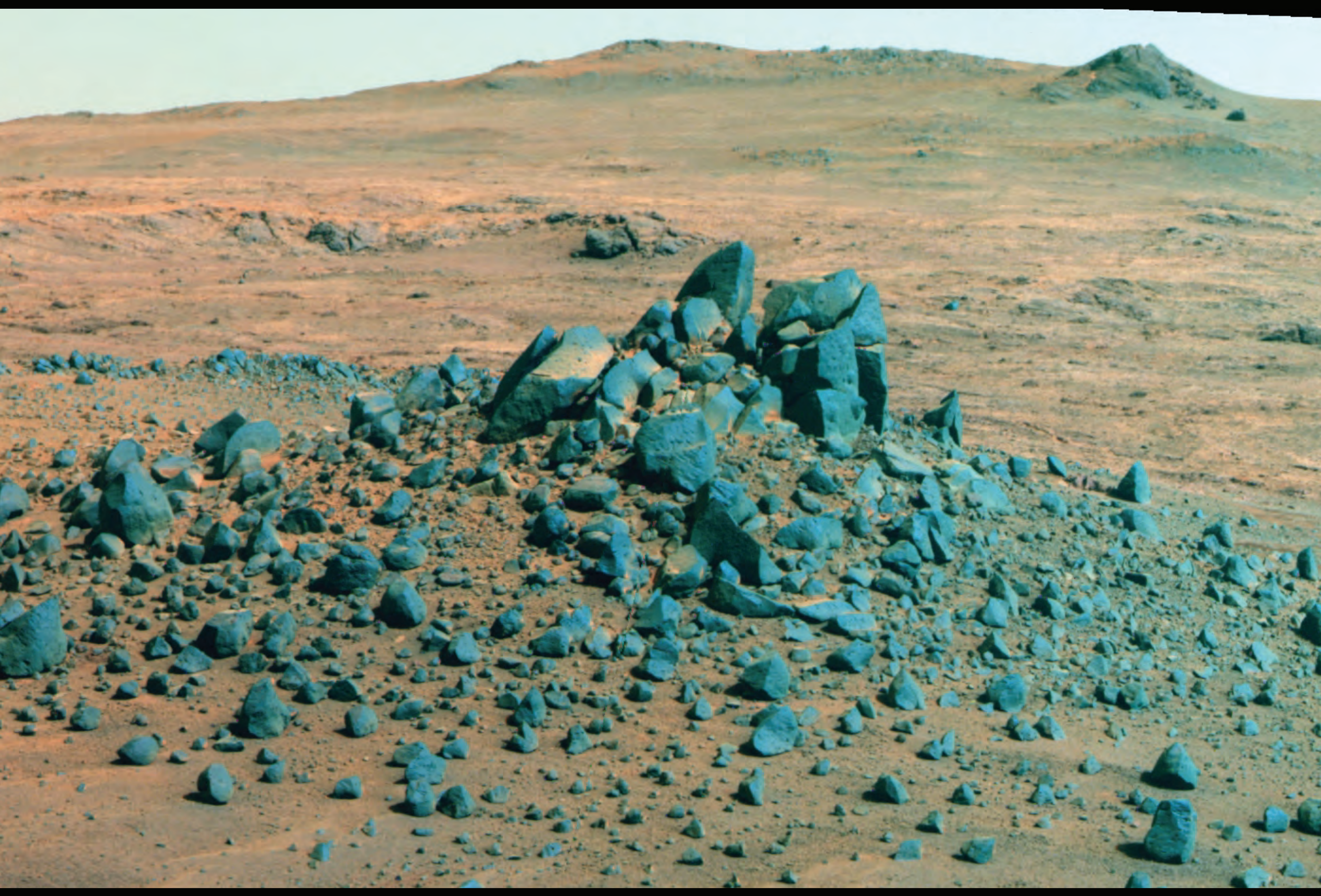
June 1, 2017

May 2017

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	1 (121) DSN Week 18 L_S=357.8° B4717 C1684	2 (122) B4718 C1685	3 (123) B4719 C1686	4 (124) B4720 C1687	5 (125) Southern Autumnal Equinox B4721 C1688	6 (126) B4722
7 (127) B4723 C1689	8 (128) DSN Week 19 B4724 C1690	9 (129) B4725 C1691	10 (130) B4726 C1692	11 (131) B4727 C1693	12 (132) B4728 C1694	13 (133) B4729 C1695
14 (134) B4730 C1696	15 (135) DSN Week 20 B4731 C1697	16 (136) B4732 C1698	17 (137) B4733 C1699	18 (138) B4734 C1700	19 (139) B4735 C1701	20 (140) B4736 C1702
21 (141) B4737 C1703	22 (142) DSN Week 21 B4738 C1704	23 (143) B4739 C1705	24 (144) B4740 C1706	25 (145) B4741 C1707	26 (146) B4742 C1708	27 (147) B4743 C1709
28 (148) C1710	29 (149) DSN Week 22 B4744 C1711	30 (150) B4745 C1712	31 (151) B4746 C1713			

June 2017

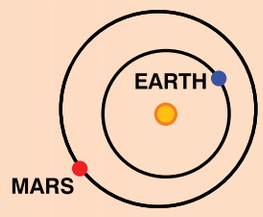
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				1 (152) L_S=13.0° B4747 C1714	2 (153) B4748 C1715	3 (154) B4749 C1716
4 (155) B4750 C1717	5 (156) DSN Week 23 B4751 C1718	6 (157) B4752 C1719	7 (158) B4753 C1720	8 (159) B4754 C1721	9 (160) B4755 C1722	10 (161) Spirit launched 2003 B4756 C1723
11 (162) B4757 C1724	12 (163) DSN Week 24 B4758 C1725	13 (164) B4759	14 (165) B4760 C1726	15 (166) B4761 C1727	16 (167) B4762 C1728	17 (168) B4763 C1729
18 (169) B4764 C1730	19 (170) DSN Week 25 B4765 C1731	20 (171) B4766 C1732	21 (172) B4767 C1733	22 (173) B4768 C1734	23 (174) B4769 C1735	24 (175) B4770 C1736
25 (176) B4771 C1737	26 (177) DSN Week 26 B4772 C1738	27 (178) B4773 C1739	28 (179) B4774 C1740	29 (180) B4774 C1741	30 (181) B4776 C1742	



Lindbergh Mound

This view shows Lindbergh Mound, which is a 7-10 foot (2-3 meter) tall rocky feature inside Spirit of St. Louis crater. Another mosaic taken from a different position shows part of the hidden side of this rocky feature in the crater.

This approximately 32 degree wide mosaic was acquired with Opportunity's panoramic camera (Pancam) on Sol 4,066 (July 2, 2015). Pancam's 753nm, 535nm, and 432nm filters were used in making this mosaic. Image credit: NASA/JPL-Caltech/Cornell Univ./Arizona State Univ.



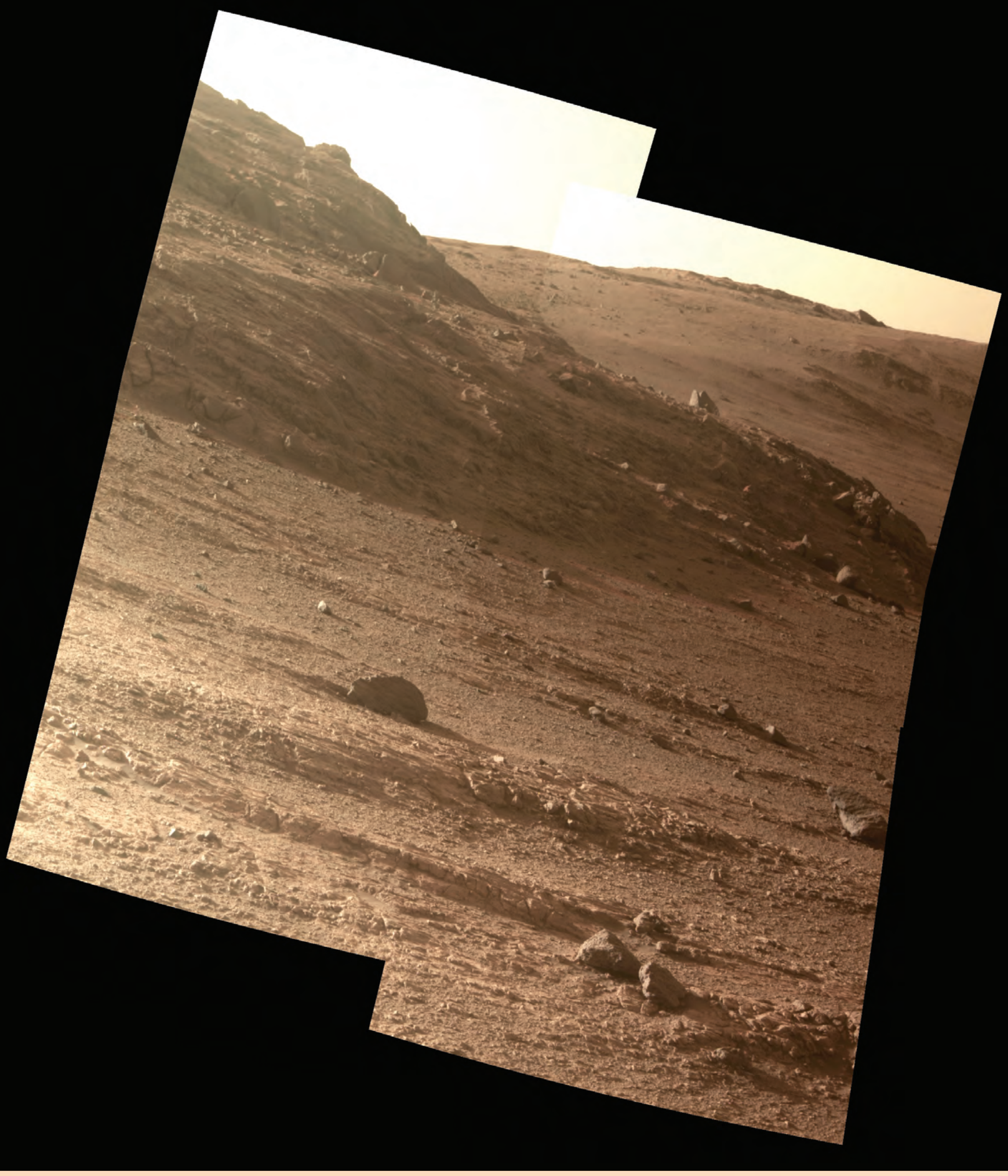
August 1, 2017

July 2017

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
						1 182 L_S=27.1° B4777 C1743
2 183 B4778 C1744	3 184 DSN Week 27 B4779 C1745	4 185 Mars Pathfinder/ Sojourner landed 1997 C1746	5 186 B4780 C1747	6 187 B4781 C1748	7 188 Opportunity launched 2003 B4782 C1749	8 189 B4783 C1750
9 190 B4784 C1751	10 191 DSN Week 28 B4785 C1752	11 192 B4786 C1753	12 193 B4787 C1754	13 194 B4788 C1755	14 195 B4789 C1756	15 196 B4790 C1757
16 197 B4791 C1758	17 198 DSN Week 29 B4792 C1759	18 199 B4793 C1760	19 200 B4794 C1761	20 201 B4795	21 202 B4796 C1762	22 203 B4797 C1763
204 23 B4798 C1764 B4805 C1771 30 211	205 24 B4799 C1765 B4806 C1772 31 212	25 206 DSN Week 30 B4800 C1766	26 207 Earth-Mars Solar Conjunction B4801 C1767	27 208 B4802 C1768	28 209 B4803 C1769	29 210 B4804 C1770

August 2017

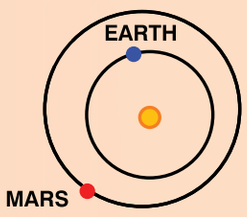
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
		1 213 DSN Week 31 L_S=41.2° B4807 C1773	2 214 B4808 C1774	3 215 B4809 C1775	4 216 B4810 C1776	5 217 B4811 C1777
6 218 Curiosity landed 2012 B4812 C1778	7 219 DSN Week 32 B4813 C1779	8 220 B4814 C1780	9 221 B4815 C1781	10 222 C1782	11 223 B4816 C1783	12 224 B4817 C1784
13 225 B4818 C1785	14 226 DSN Week 33 B4819 C1786	15 227 B4820 C1787	16 228 B4821 C1788	17 229 B4822 C1789	18 230 B4823 C1790	19 231 B4824 C1791
20 232 B4825 C1792	21 233 DSN Week 34 B4826 C1793	22 234 B4827 C1794	23 235 B4828 C1795	24 236 B4829 C1796	25 237 B4830 C1797	26 238 B4831
27 239 B4832 C1798	28 240 DSN Week 35 B4833 C1799	29 241 B4834 C1800	30 242 B4835 C1801	31 243 B4836 C1802		



Marathon Valley North Wall

This field of view features part of the north wall of Marathon Valley, to the northwest of the Opportunity rover.

This mosaic—with a field of view of approximately 30 degrees—was acquired with Opportunity's panoramic camera (Pancam) on Sol 4,087 (July 24, 2015). Pancam's 753nm, 535nm, and 432nm filters were used in making this mosaic. Image credit: NASA/JPL-Caltech/Cornell Univ./Arizona State Univ.



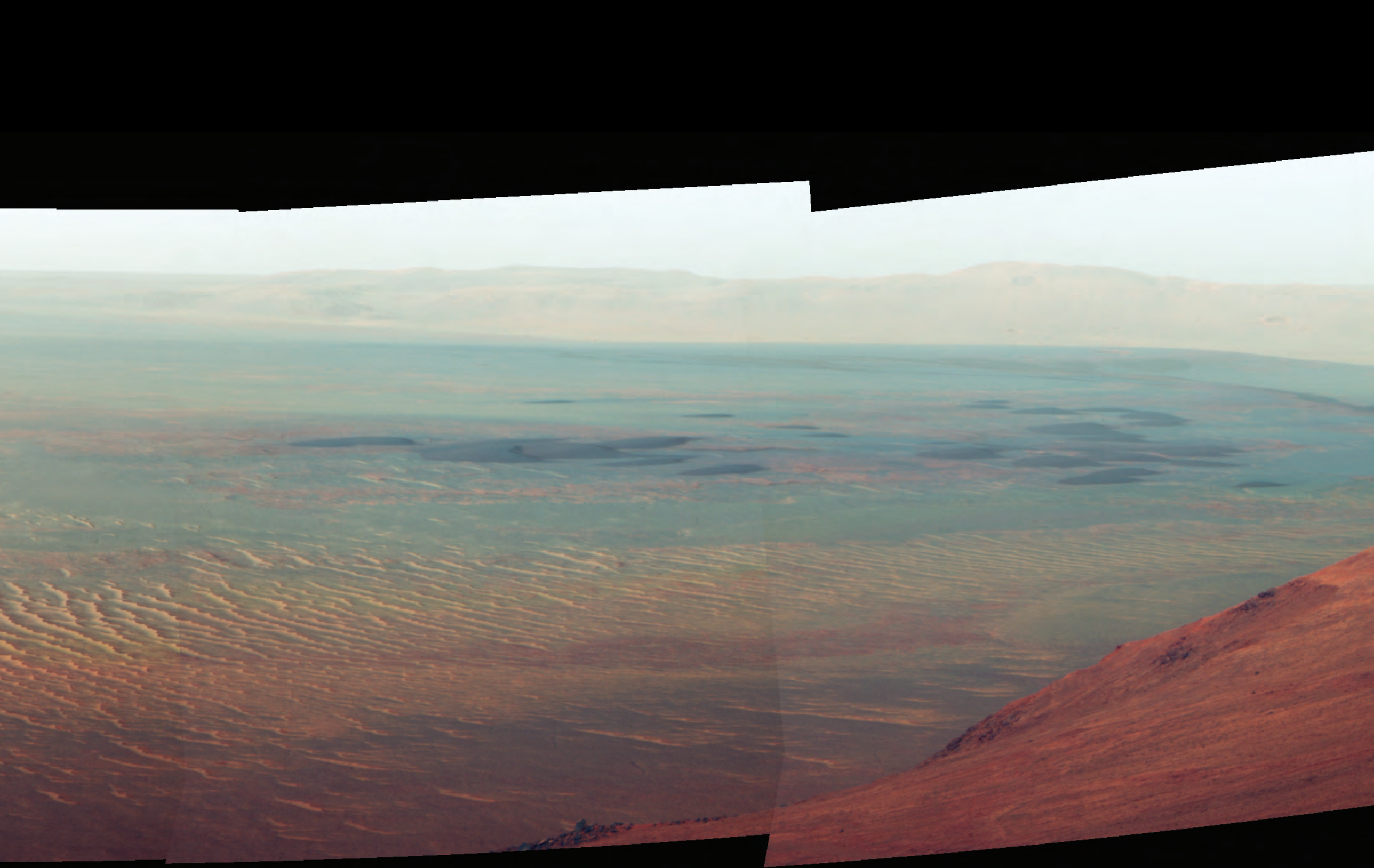
October 1, 2017

September 2017

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
					1 244 L_S=54.9° B4837 C1803	2 245 B4838 C1804
3 246 B4839 C1805	4 247 DSN Week 36 B4840 C1806	5 248 B4841 C1807	6 249 B4842 C1808	7 250 B4843 C1809	8 251 B4844 C1810	9 252 B4845 C1811
10 253 B4846 C1812	11 254 DSN Week 37 B4847 C1813	12 255 B4848 C1814	13 256 B4849 C1815	14 257 B4850 C1816	15 258 B4851 C1817	16 259 B4852 C1818
17 260 C1819	18 261 DSN Week 38 B4853 C1820	19 262 B4854 C1821	20 263 B4855 C1822	21 264 B4856 C1823	22 265 B4857 C1824	23 266 B4858 C1825
24 267 B4859 C1826	25 268 DSN Week 39 B4860 C1827	26 269 B4861 C1828	27 270 B4862 C1829	28 271 B4863 C1830	29 272 B4864 C1831	30 273 B4865 C1832

October 2017

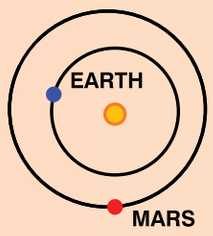
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1 274 L_S=68.1° B4866 C1833	2 275 DSN Week 40 B4867 C1834	3 276 B4868	4 277 B4869 C1835	5 278 B4870 C1836	6 279 B4871 C1837	7 280 Mars Aphelion B4872 C1838
8 281 B4873 C1839	9 282 DSN Week 41 B4874 C1840	10 283 B4875 C1841	11 284 B4876 C1842	12 285 B4877 C1843	13 286 B4878 C1844	14 287 B4879 C1845
15 288 B4880 C1846	16 289 DSN Week 42 B4881 C1847	17 290 B4882 C1848	18 291 B4883 C1849	19 292 B4884 C1850	20 293 B4885 C1851	21 294 B4886 C1852
22 295 B4887 C1853	23 296 DSN Week 43 B4888 C1854	24 297 C1855	25 298 B4889 C1856	26 299 B4890 C1857	27 300 B4891 C1858	28 301 B4892 C1859
29 302 B4893 C1860	30 303 DSN Week 44 B4894 C1861	31 304 JPL B4895 C1862				



Dunes in Endeavor Crater

While exploring through Marathon Valley, Opportunity captured this beautiful mosaic of the dunes in the valley of the Endeavour crater floor.

This mosaic—with a field of view of approximately 73 degrees—was acquired with Opportunity's panoramic camera (Pancam) on Sol 4,142 (September 18, 2015). Pancam's 753nm, 535nm, and 432nm filters were used in making this mosaic. Image credit: NASA/JPL-Caltech/Cornell University/Arizona State University



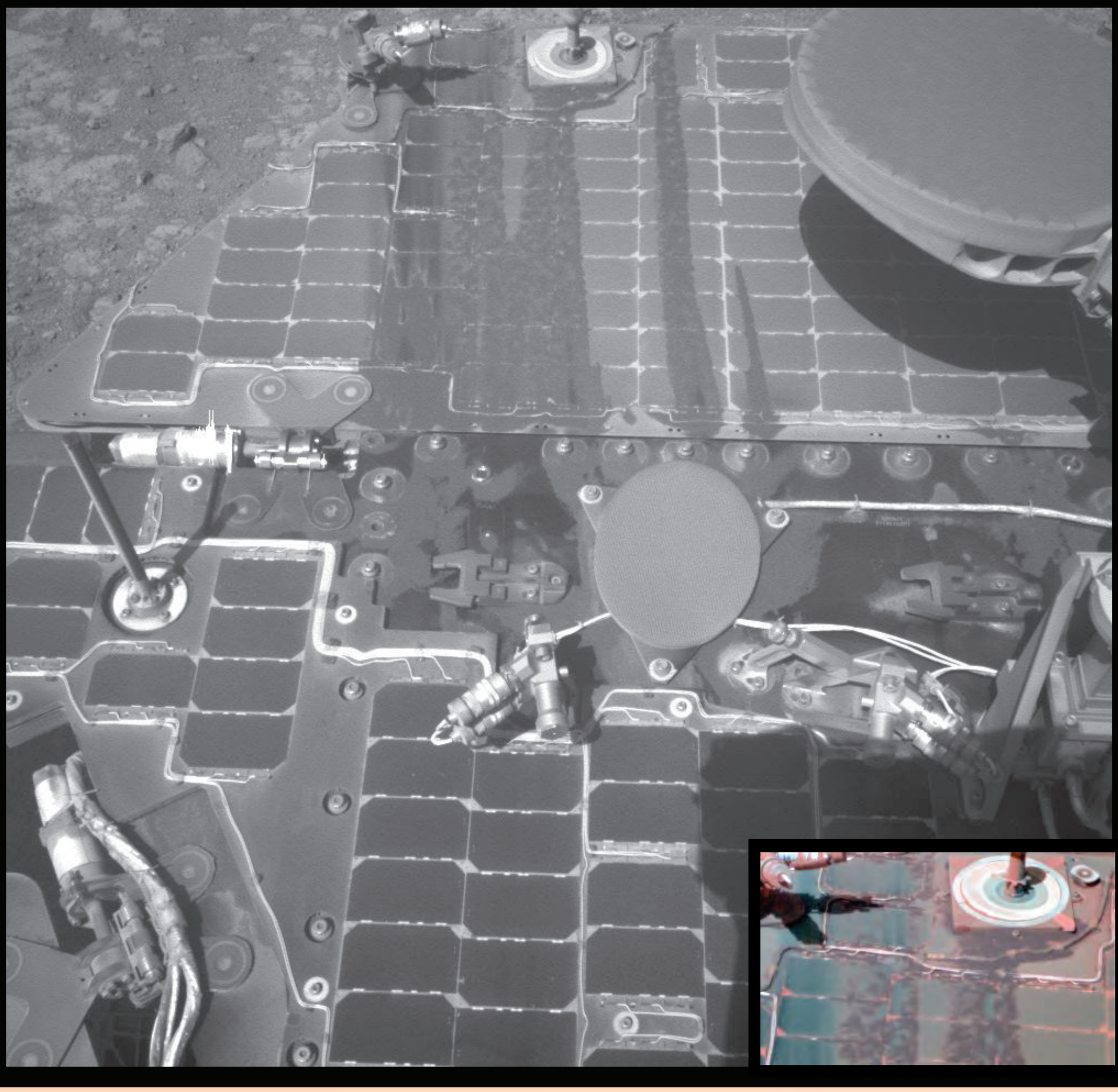
December 1, 2017

November 2017

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			1 305 L_S=81.6° B4896 C1863	2 306 B4897 C1864	3 307 B4898 C1865	4 308 B4899 C1866
5 309 B4900 C1867	6 310 DSN Week 45 B4901 C1868	7 311 B4902 C1869	8 312 B4903 C1870	9 313 B4904	10 314 B4905 C1871	11 315 B4906 C1872
12 316 B4907 C1873	13 317 DSN Week 46 B4908 C1874	14 318 B4909 C1875	15 319 B4910 C1876	16 320 B4911 C1877	17 321 B4912 C1878	18 322 B4913 C1879
19 323 B4914 C1880	20 324 DSN Week 47 Southern Winter Solstice B4915 C1881	21 325 B4916 C1882	22 326 B4917 C1883	23 327 B4918 C1884	24 328 B4919 C1885	25 329 B4920 C1886
26 330 Curiosity launched 2011 B4921 C1887	27 331 DSN Week 48 B4922 C1888	28 332 B4923 C1889	29 333 B4924 C1890	30 334 B4924 C1891		

December 2017

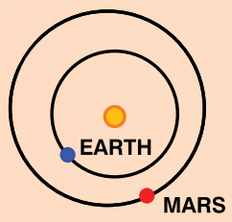
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
					1 335 L_S=94.8° C1892	2 336 B4926 C1893
3 337 B4927 C1894	4 338 DSN Week 49 B4928 C1895	5 339 B4929 C1896	6 340 B4930 C1897	7 341 B4931 C1898	8 342 B4932 C1899	9 343 B4933 C1900
10 344 B4934 C1901	11 345 DSN Week 50 B4935 C1902	12 346 B4936 C1903	13 347 B4937 C1904	14 348 B4938 C1905	15 349 B4939 C1906	16 350 B4940
17 351 B4941 C1907	18 352 DSN Week 51 B4942 C1908	19 353 B4943 C1909	20 354 B4944 C1910	21 355 B4945 C1911	22 356 B4946 C1912	23 357 B4947 C1913
358 24 B4948 C1914 B4955 C1921 31 365	25 359 DSN Week 52 B4949 C1915	26 360 B4950 C1916	27 361 B4951 C1917	28 362 B4952 C1918	29 363 B4953 C1919	30 364 B4954 C1920



Dust Streaks on Solar Array

This image shows streaks of dust or sand on Opportunity's rear solar panel after a series of drives during which the rover was pointed steeply uphill. At the time this photo was taken, the rover was located on the north-facing slope of Knudsen Ridge, which forms part of the southern edge of Marathon Valley. During an earlier forward, uphill drive in this region, Opportunity's tilt reached 32 degrees, the steepest ever for any rover on Mars. While the rover was so steeply tilted, accumulated dust on its deck was affected by vibrations from wheels slipping against the ground. Tilt in the same direction continued with two downhill drives in reverse between that ascent and when this images was taken.

Opportunity captured this image from a navigation camera on the rover's mast on Sol 4,322 (March 21, 2016). The inset image was collected by the rover's panoramic camera (Pancam). Image credits: NASA/JPL-Caltech (navigational camera image) and NASA/JPL-Caltech/Cornell Univ./Arizona State Univ. (Pancam image)



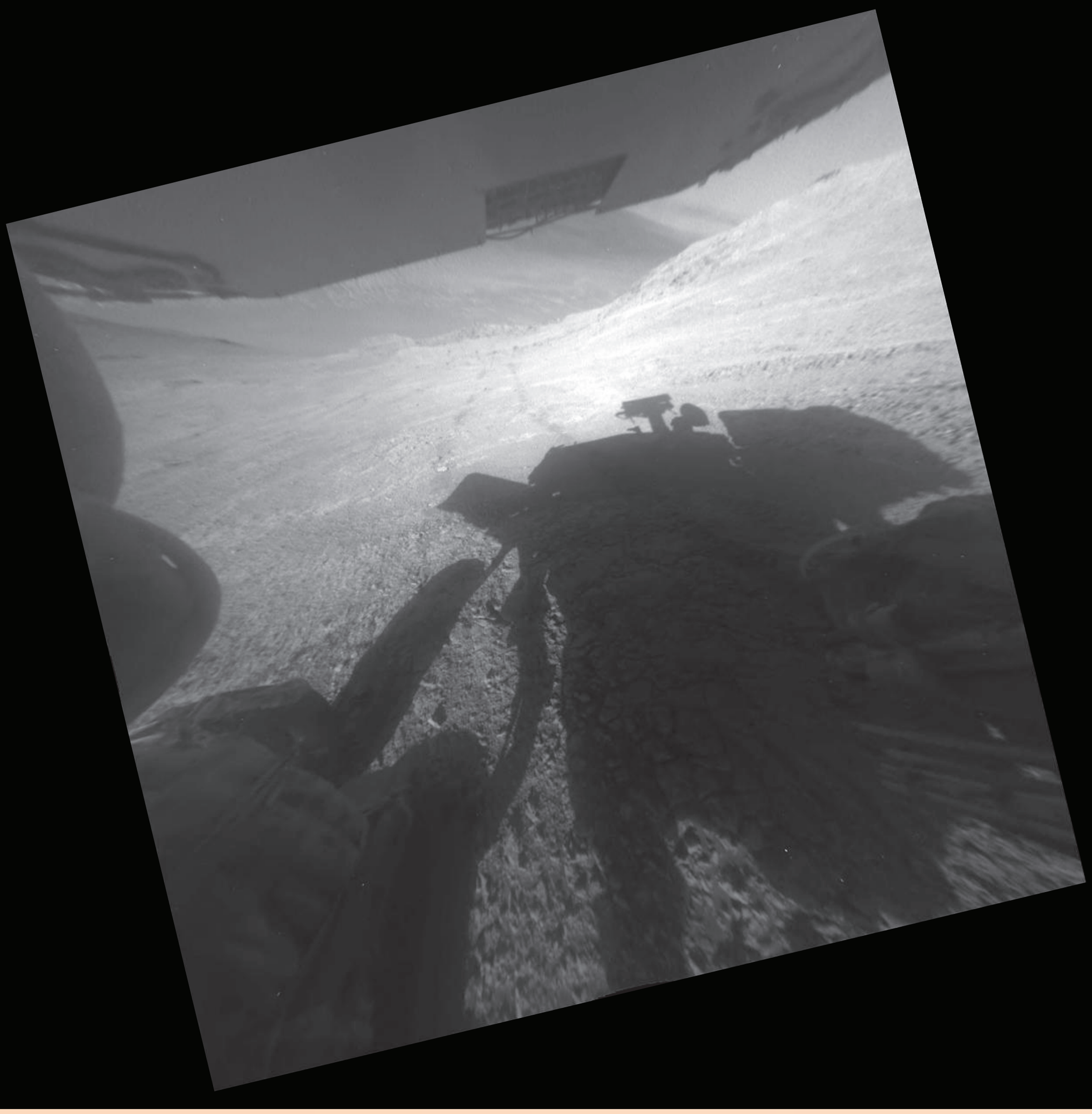
February 1, 2018

January 2018

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	1 (1) DSN Week 1 L_S=108.8° B4956 C1922	2 (2) B4957 C1923	3 (3) B4958 C1924	4 (4) Spirit landed 2004 B4959 C1925	5 (5) B4960 C1926	6 (6) B4961 C1927
7 (7) C1928	8 (8) DSN Week 2 B4962 C1929	9 (9) B4963 C1930	10 (10) B4964 C1931	11 (11) B4965 C1932	12 (12) B4966 C1933	13 (13) B4967 C1934
14 (14) B4968 C1935	15 (15) DSN Week 3 B4969 C1936	16 (16) B4970 C1937	17 (17) B4971 C1938	18 (18) B4972 C1939	19 (19) B4973 C1940	20 (20) B4974 C1941
21 (21) B4975 C1942	22 (22) DSN Week 4 B4976 C1943	23 (23) B4977	24 (24) B4978 C1944	25 (25) Opportunity 14th Earth Anniversary B4979 C1945	26 (26) B4980 C1946	27 (27) B4981 C1947
28 (28) B4982 C1948	29 (29) DSN Week 5 B4983 C1949	30 (30) B4984 C1950	31 (31) B4985 C1951			

February 2018

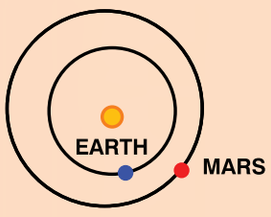
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				1 (32) L_S=123.1° B4986 C1952	2 (33) B4987 C1953	3 (34) B4988 C1954
4 (35) B4989 C1955	5 (36) DSN Week 6 B4990 C1956	6 (37) B4991 C1957	7 (38) B4992 C1958	8 (39) B4993 C1959	9 (40) B4994 C1960	10 (41) B4995 C1961
11 (42) B4996 C1962	12 (43) DSN Week 7 B4997 C1963	13 (44) C1964	14 (45) B4998 C1965	15 (46) B4999 C1966	16 (47) B5000 C1967	17 (48) B5001 C1968
18 (49) B5002 C1969	19 (50) DSN Week 8 B5003 C1970	20 (51) B5004 C1971	21 (52) B5005 C1972	22 (53) B5006 C1973	23 (54) B5007 C1974	24 (55) B5008 C1975
25 (56) B5009 C1976	26 (57) DSN Week 9 B5010 C1977	27 (58) B5011 C1978	28 (59) B5012 C1979			



Shadows and Tracks

Opportunity's shadow and wheel tracks appear in this image, taken just after a drive on a slope above Endeavour crater. The upper portion of the wide-angle image shows the underside of Opportunity's solar array. On the day this image was captured, Opportunity drove westward about 40 feet (12 meters) along the ridge forming the southern edge of Marathon Valley, which cuts east-west through the western rim of Endeavour crater. In this image, the slope descends to the left into Marathon Valley, and the broad floor of Endeavour crater can be glimpsed just beneath the underside of the solar array.

The Opportunity rover captured this image with a rear hazard avoidance camera (hazcam) on Sol 4,323 (March 22, 2016). The image has been rotated 13.5 degrees to adjust for the tilt of the rover on a hillside. This version has also been geometrically linearized to straighten curves that are an effect of the fisheye lens in the raw image. Image Credit: NASA/JPL-Caltech



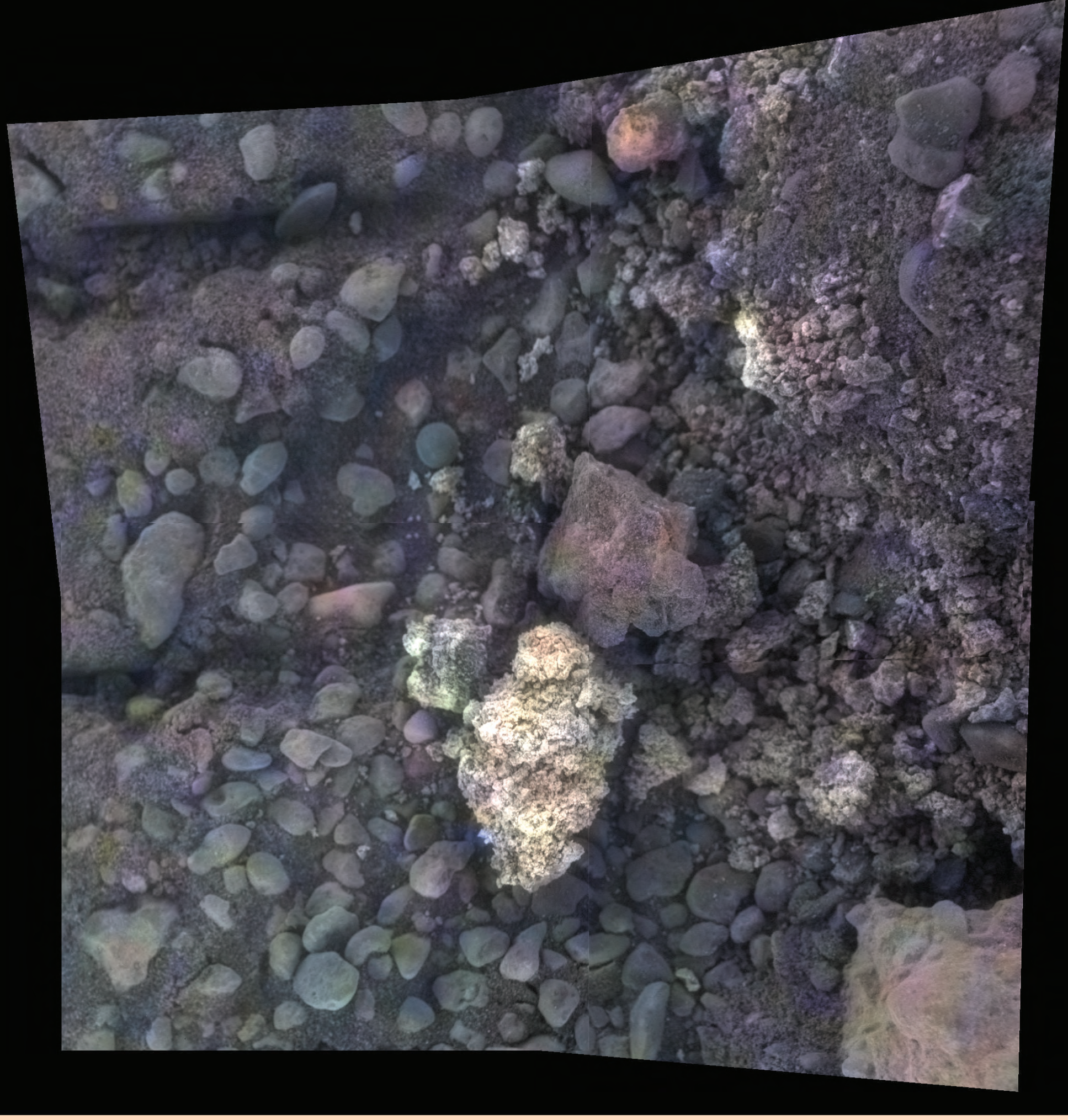
April 1, 2018

March 2018

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				1 60 L_S=136.6° B5013	2 61 B5014 C1980	3 62 B5015 C1981
4 63 B5016 C1982	5 64 DSN Week 10 B5017 C1983	6 65 B5018 C1984	7 66 B5019 C1985	8 67 B5020 C1986	9 68 B5021 C1987	10 69 B5022 C1988
11 70 B5023 C1989	12 71 DSN Week 11 B5024 C1990	13 72 B5025 C1991	14 73 B5026 C1992	15 74 B5027 C1993	16 75 B5028 C1994	17 76 B5029 C1995
18 77 B5030 C1996	19 78 DSN Week 12 B5031 C1997	20 79 B5032 C1998	21 80 B5033 C1999	22 81 Spirit ceased operation 2010 B5034 C2000	23 82 C2001	24 83 B5035 C2002
25 84 B5036 C2003	26 85 DSN Week 13 B5037 C2004	27 86 B5038 C2005	28 87 B5039 C2006	29 88 B5040 C2007	30 89 B5041 C2008	31 90 B5042 C2009

April 2018

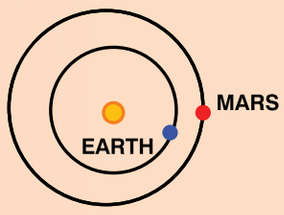
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1 91 L_S=152.2° B5043 C2010	2 92 DSN Week 14 B5044 C2011	3 93 B5045 C2012	4 94 B5046 C2013	5 95 B5047 C2014	6 96 B5048 C2015	7 97 B5049 C2016
8 98 B5050	9 99 DSN Week 15 B5051 C2017	10 100 B5052 C2018	11 101 B5053 C2019	12 102 B5054 C2020	13 103 B5055 C2021	14 104 B5056 C2022
15 105 B5057 C2023	16 106 DSN Week 16 B5058 C2024	17 107 B5059 C2025	18 108 B5060 C2026	19 109 B5061 C2027	20 110 B5062 C2028	21 111 B5063 C2029
22 112 B5064 C2030	23 113 DSN Week 17 B5065 C2031	24 114 B5066 C2032	25 115 B5067 C2033	26 116 B5068 C2034	27 117 B5069 C2035	28 118 B5070 C2036
29 119 C2037	30 120 DSN Week 18 B5071 C2038					



Private Joseph Field

This image shows a target called Private Joseph Field that is within the Marathon Valley area of the western rim of Endeavour crater. The mosaic shows an area spanning about 2 inches (5 centimeters). Geochemical data indicate the presence of magnesium and iron sulfates at this location, most likely corresponding to the white pebble visible near the center of the image. These sulfates may have formed from the interaction of acidic fluids with the rocks along the rim of Endeavour crater.

This image is a combination of four frames from the microscopic imager on the robotic arm of the Opportunity rover, with enhanced color information added from the rover's panoramic camera. The component images were captured on Sol 4,389 (May 29, 2016). Image Credit: NASA/JPL-Caltech/Cornell Univ./USGS/Arizona State Univ.



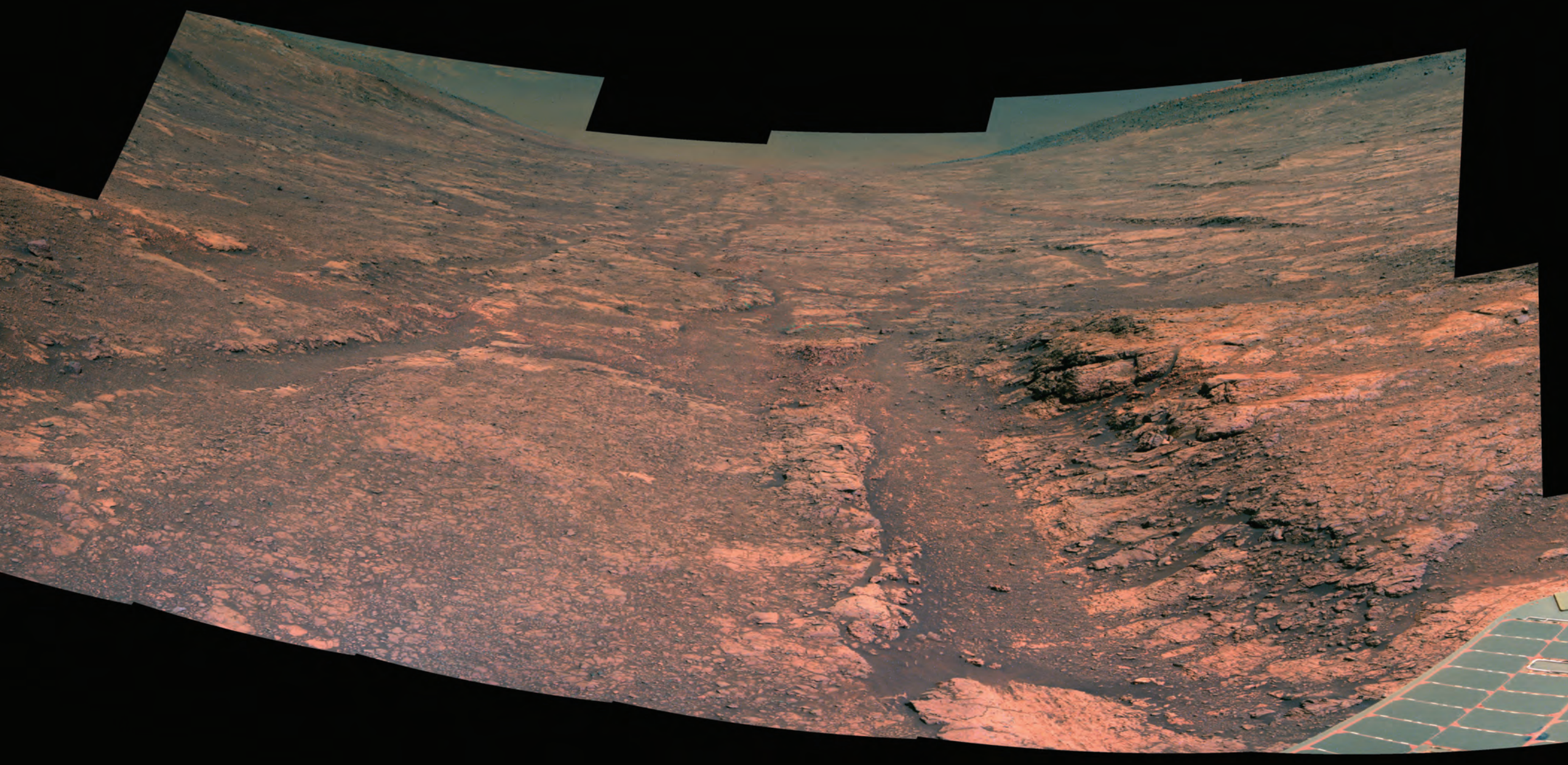
June 1, 2018

May 2018

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
		1 121 L_S=168.0° B5072 C2039	2 122 B5073 C2040	3 123 B5074 C2041	4 124 B5075 C2042	5 125 B5076 C2043
6 126 B5077 C2044	7 127 DSN Week 19 B5078 C2045	8 128 B5079 C2046	9 129 B5080 C2047	10 130 B5081 C2048	11 131 B5082 C2049	12 132 B5083 C2050
13 133 B5084 C2051	14 134 DSN Week 20 B5085 C2052	15 135 B5086	16 136 B5087 C2053	17 137 B5088 C2054	18 138 B5089 C2055	19 139 B5090 C2056
20 140 B5091 C2057	21 141 DSN Week 21 B5092 C2058	22 142 Southern Spring Equinox B5093 C2059	23 143 B5094 C2060	24 144 B5095 C2061	25 145 B5096 C2062	26 146 B5097 C2063
27 147 B5098 C2064	28 148 DSN Week 22 B5099 C2065	29 149 B5100 C2066	30 150 B5101 C2067	31 151 B5102 C2068		

June 2018

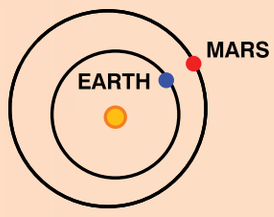
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
					1 152 L_S=185.3° B5103 C2069	2 153 B5104 C2070
3 154 B5105 C2071	4 155 DSN Week 23 B5106 C2072	5 156 C2073	6 157 B5107 C2074	7 158 B5108 C2075	8 159 B5109 C2076	9 160 B5110 C2077
10 161 Spirit launched 2003 B5111 C2078	11 162 DSN Week 24 B5112 C2079	12 163 B5113 C2080	13 164 B5114 C2081	14 165 B5115 C2082	15 166 B5116 C2083	16 167 B5117 C2084
17 168 B5118 C2085	18 169 DSN Week 25 B5119 C2086	19 170 B5120 C2087	20 171 B5121 C2088	21 172 B5122	22 173 B5123 C2089	23 174 B5124 C2090
24 175 B5125 C2091	25 176 DSN Week 26 B5126 C2092	26 177 B5127 C2093	27 178 B5128 C2094	28 179 B5129 C2095	29 180 B5130 C2096	30 181 B5131 C2097



Marathon Valley Grooves

These grooves were found by Opportunity along the side of Endeavour crater's rim, near Marathon Valley. Opportunity investigated these features to help the science team better understand if they were shaped by wind or by water. The groove on the right side of the image is approximately one meter wide from rim to rim.

Component images were captured with Opportunity's panoramic camera (Pancam) from Sols 4,461 to 4,467 (August 11, 2016 to August 17, 2016). Pancam's 753nm, 535nm, and 432nm filters were used in making this mosaic. Image credit: NASA/JPL-Caltech/Cornell Univ./Arizona State Univ.



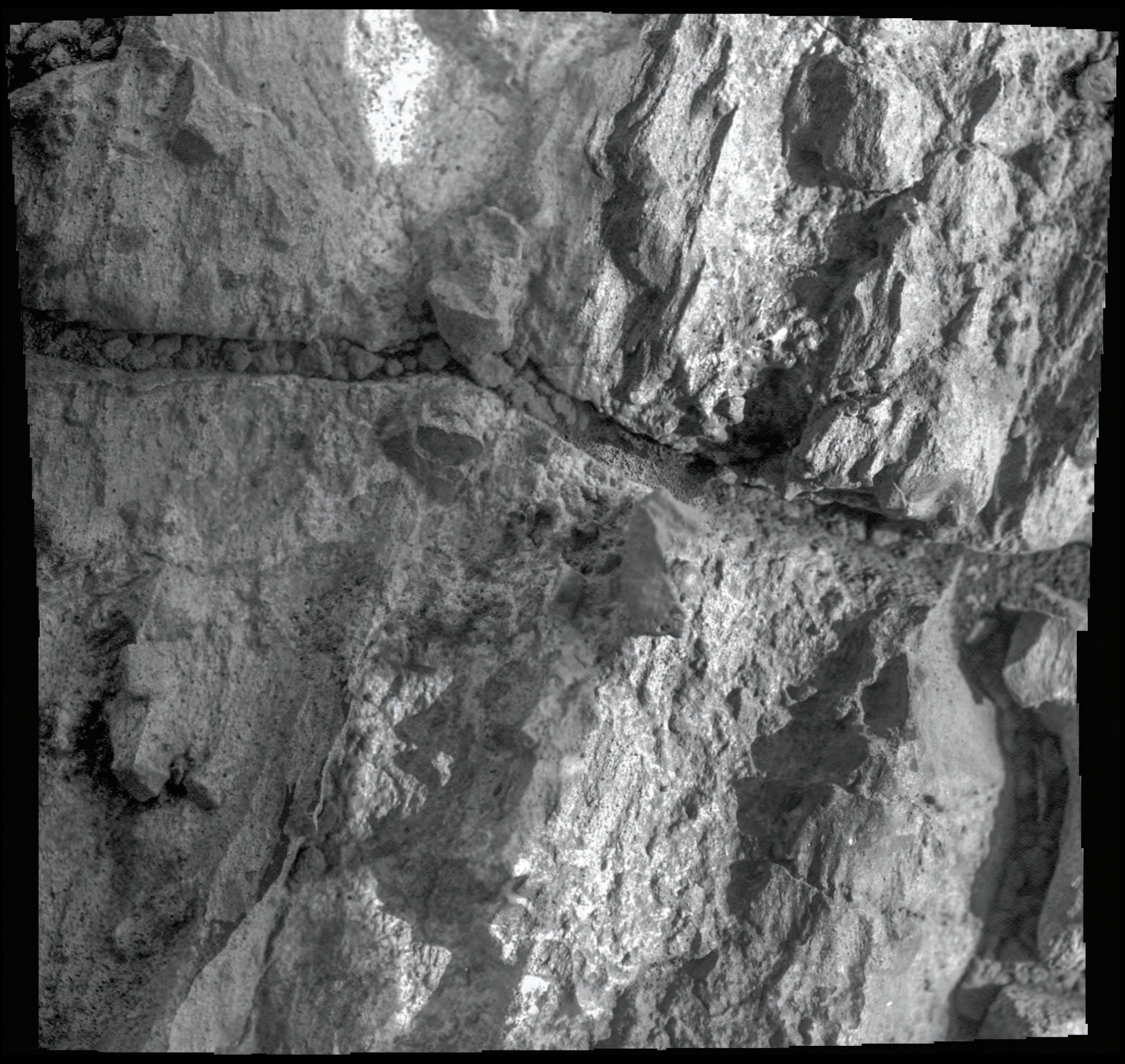
August 1, 2018

July 2018

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1 182 L_S=202.9° B5132 C2098	2 183 DSN Week 27 B5133 C2099	3 184 B5134 C2100	4 185 Mars Pathfinder/ Sojourner landed 1997 B5135 C2101	5 186 B5136 C2102	6 187 B5137 C2103	7 188 Opportunity launched 2003 B5138 C2104
8 189 B5139 C2105	9 190 DSN Week 28 B5140 C2106	10 191 B5141 C2107	11 192 B5142 C2108	12 193 B5143 C2109	13 194 C2110	14 195 B5144 C2111
15 196 B5145 C2112	16 197 DSN Week 29 B5146 C2113	17 198 B5147 C2114	18 199 B5148 C2115	19 200 B5149 C2116	20 201 B5150 C2117	21 202 B5151 C2118
22 203 B5152 C2119	23 204 DSN Week 30 B5153 C2120	25 205 B5154 C2121	25 207 B5155 C2122	26 207 B5156 C2123	27 208 Earth-Mars Opposition B5157 C2124	28 209 B5158 C2125
29 210 B5159	30 211 DSN Week 31 B5160 C2126	31 212 B5161 C2127				

August 2018

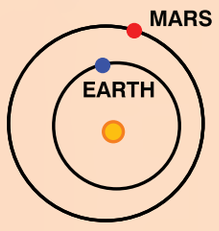
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			1 213 L_S=221.8° B5162 C2128	2 214 B5163 C2129	3 215 B5164 C2130	4 216 B5165 C2131
5 217 B5166 C2132	6 218 DSN Week 32 Curiosity landed 2012 B5167 C2133	7 219 B5168 C2134	8 220 B5169 C2135	9 221 B5170 C2136	10 222 B5171 C2137	11 223 B5172 C2138
12 224 B5173 C2139	13 225 DSN Week 33 B5174 C2140	14 226 B5175 C2141	15 227 B5176 C2142	16 228 B5177 C2143	17 229 B5178 C2144	18 230 B5179 C2145
19 231 C2146	20 232 DSN Week 34 B5180 C2147	21 233 B5181 C2148	22 234 B5182 C2149	23 235 B5183 C2150	24 236 B5184 C2151	25 237 B5185 C2152
26 238 B5186 C2153	27 239 DSN Week 35 B5187 C2154	28 240 B5188 C2155	29 241 B5189 C2156	30 242 B5190 C2157	31 243 B5191 C2158	



Inspecting Gasconade

This relatively bright outcropping of rock, dubbed "Gasconade," was investigated while the Opportunity rover was perched on Spirit Mound at the western edge of Mars' Endeavour crater. The view covers an area about 2 inches (5 centimeters) wide. Opportunity's inspection found Gasconade to be a wind-etched outcrop with angular bits of darker rock within a lighter matrix, which may have been formed from fallout of the same impact event that excavated the crater.

This image is a mosaic of four frames captured by the microscopic imager on the robotic arm of the Opportunity rover. The component images were captured on Sol 4,512 (October 2, 2016). Image credit: NASA/-JPL-Caltech/Cornell Univ.



October 1, 2018

September 2018

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
						1 244 L_S=241.3° B5192 C2159
2 245 B5193 C2160	3 246 DSN Week 36 B5194 C2161	4 247 B5195	5 248 B5196 C2162	6 249 B5197 C2163	7 250 B5198 C2164	8 251 B5199 C2165
9 252 B5200 C2166	10 253 DSN Week 37 B5201 C2167	11 254 B5202 C2168	12 255 B5203 C2169	13 256 B5204 C2170	14 257 B5205 C2171	15 258 B5206 C2172
16 259 Mars Perihelion B5207 C2173	17 260 DSN Week 38 B5208 C2174	18 261 B5209 C2175	19 262 B5210 C2176	20 263 B5211 C2177	21 264 B5212 C2178	22 265 B5213 C2179
266 23 B5214 C2180 B5220 C2187 30 273	24 267 DSN Week 39 B5215 C2181	25 268 B5216 C2182	26 269 C2183	27 270 B5217 C2184	28 271 B5218 C2185	29 272 B5219 C2186

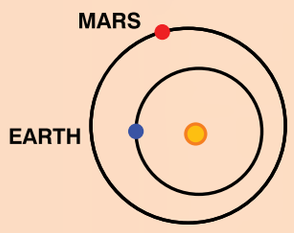
October 2018

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	1 274 L_S=260.3° B5221 C2188	2 275 DSN Week 40 B5222 C2189	3 276 B5223 C2190	4 277 B5224 C2191	5 278 B5225 C2192	6 279 B5226 C2193
7 280 B5227 C2194	8 281 B5228 C2195	9 282 DSN Week 41 B5229 C2196	10 283 B5230 C2197	11 284 B5231	12 285 B5232 C2198	13 286 B5233 C2199
14 287 B5234 C2200	15 288 B5235 C2201	16 289 DSN Week 42 Southern Summer Solstice B5236 C2202	17 290 B5237 C2203	18 291 B5238 C2204	19 292 B5239 C2205	20 293 B5240 C2206
21 294 B5241 C2207	22 295 B5242 C2208	22 296 DSN Week 43 B5243 C2209	22 297 B5244 C2210	25 298 B5245 C2211	26 299 B5246 C2212	27 300 B5247 C2213
28 301 B5248 C2214	29 302 B5249 C2215	30 303 DSN Week 44 B5250 C2216	31 304 JPL B5251 C2217			

Martian Dust Devil

From its perch high on the rim of Endeavour crater, Opportunity recorded this image of a Martian dust devil twisting through the crater floor below. The view looks back at the rover's tracks leading up the north-facing slope of Knudsen Ridge, which forms part of the southern edge of Marathon Valley. Just as on Earth, a dust devil is created by a rising, rotating column of hot air. When the column whirls fast enough, it picks up tiny grains of dust from the ground, making the vortex visible. Dust devils were a common sight for Opportunity's twin rover, Spirit, in its outpost at Gusev crater. However, dust devil sightings—like this one—have been rare for Opportunity.

Opportunity captured this image using its navigation camera on Sol 4,332 (March 31, 2016). Image Credit: NASA/JPL-Caltech



December 1, 2018

November 2018

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				1 305 L_S=279.8° B5252 C2218	2 306 C2219	3 307 B5253 C2220
4 308 B5254 C2221	5 309 DSN Week 45 B5255 C2222	6 310 B5256 C2223	7 311 B5257 C2224	8 312 B5258 C2225	9 313 B5259 C2226	10 314 B5260 C2227
11 315 B5261 C2228	12 316 DSN Week 46 B5262 C2229	13 317 B5263 C2230	14 318 B5264 C2231	15 319 B5265 C2232	16 320 B5266 C2233	17 321 B5267 C2234
18 322 B5268	19 323 DSN Week 47 B5269 C2235	20 324 B5270 C2236	21 325 B5271 C2237	22 326 B5272 C2238	23 327 B5273 C2239	24 328 B5274 C2240
25 329 B5275 C2241	26 330 DSN Week 48 Curiosity launched 2011 B5276 C2242	27 331 B5277 C2243	28 332 B5278 C2244	29 333 B5279 C2245	30 334 B5280 C2246	

December 2018

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
						1 335 L_S=298.2° B5281 C2247
2 336 B5282 C2248	3 337 DSN Week 49 B5283 C2249	4 338 B5284 C2250	5 339 B5285 C2251	6 340 B5286 C2252	7 341 B5287 C2253	8 342 B5288 C2254
9 343 C2255	10 344 DSN Week 50 B5289 C2256	11 345 B5290 C2257	12 346 B5291 C2258	13 347 B5292 C2259	14 348 B5293 C2260	15 349 B5294 C2261
16 350 B5295 C2262	17 351 DSN Week 51 B5296 C2263	18 352 B5297 C2264	19 353 B5298 C2265	20 354 B5299 C2266	21 355 B5300 C2267	22 356 B5301 C2268
357 23 B5302 C2269 B5309 C2275 30 364	358 24 DSN Week 52 B5303 C2270 B5310 C2276 31 365	25 359 B5304	26 360 B5305 C2271	27 361 B5306 C2272	28 362 B5307 C2273	29 363 B5308 C2274

QUICK FACTS

Mars Exploration Rovers

Mission Objective	To determine the climatic and geologic history of two sites on Mars with evidence of past, persistent water activity that may have supported microbial life.
Primary Mission	90 Martian days (sols)
Primary/Extended Mission	Spirit - 6 years Opportunity - Over a decade
Launch Vehicle	Boeing Delta II
Launch	Spirit - June 10, 2003 (UTC); Opportunity - July 7, 2003 (UTC)
Landing	Spirit - January 4, 2004 (UTC) at Gusev Crater (14.57°S, 175.47°E) Opportunity - January 25, 2004 (UTC) at Eagle Crater on Meridiani Planum (1.95°S, 354.47°E)
Landing Technology	Atmospheric entry aeroshell, backshell with parachute and retro rockets, and airbags to cushion landing.
Size	1.6 meters high, 1.5 meters long, 2.2 meters wide (5.2 feet high, 4.9 feet long, 7.2 feet wide)
Arm Reach	0.7 meters (~2.3 feet)
Wheel Diameter	25 centimeters (~10 inches)
Mass	180 kilograms (~400 pounds)
Total Distance	Spirit - 7.7 kilometers (4.8 miles) Opportunity - 43.5 kilometers (27+ miles)
Images Sent to Earth	Spirit - 125,000 Opportunity - 200,000+

The Jet Propulsion Laboratory in Pasadena, California, designed and built the rovers Spirit and Opportunity. JPL also manages the Mars Exploration Rover Project for NASA's Science Mission Directorate in Washington, D.C.

National Aeronautics and Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

www.nasa.gov

JPL 400-0000 12/16

The aeroshell protects the rover from fiery temperatures as it enters the Martian atmosphere.
(Artist's rendering)