NASA'S LUNAR RECONNAISSANCE ORBITER MISSION SUPPORT FOR THE 2017 SOLAR ECLIPSE. A. J. P. Jones[1,2], L. V. Bleacher[1], M. L. Wasser[1,3], N. E. Petro[1], E. Wright[1,4], D. Ladd[1,4], G. W. Patterson[5], J. Keller[1], and the LRO Mission Team, [1]NASA's Goddard Space Flight Center (8800 Greenbelt Road, Greenbelt MD 20771; andrea.j.jones@nasa.gov), [2]Planetary Science Institute, [3]ADNET Systems, Inc., [4]Universities Space Research Association, [5]The Johns Hopkins University Applied Physics Laboratory.

Introduction: NASA's Lunar Reconnaissance Orbiter (LRO) has been in orbit around the Moon since 2009, characterizing the lunar surface and collecting data that is revolutionizing our understanding of Earth's nearest celestial neighbor. With all eyes on the Moon during the total solar eclipse of August 21, 2017, the LRO team worked to highlight the Moon as the central player in the solar eclipse. We wanted to use the event to inspire people to talk about, learn about, and get excited about the Moon and NASA lunar science and exploration, and better understand how the Moon (particularly the shape of the Moon, which we know to magnificent detail because of LRO) affects the experience of eclipse observers on the ground. We provided information and resources to help the public learn about the Moon and engage in these discussions, and presented an opportunity for people energized by the eclipse to sustain their interest in space science and observation through International Observe the Moon Night (InOMN). The LRO team worked within NASA, particularly with the 2017 NASA eclipse team and partners, and with other outside partners to accomplish these goals.

Before the Eclipse: *Presentations and public engagement.* We presentated to a number of audiences before the August 2017 solar eclipse, with a goal of raising awareness of the eclipse, answering questions, sharing resources, and encouraging participation. For example, Jones presented at the National Science Foundation-sponsored International Public Science Events Conference (IPSEC) in Madison, WI, alongside colleagues coordinating eclipse activities in Charleston, SC, together highlighting the solar eclipse, InOMN, and ways to incorporate space science into public science events. Jones presented at the NASA/SSERVI Exploration Science Forum at NASA Ames, encouraging lunar scientists to get involved in both the eclipse and InOMN. We helped lead a solar eclipse session at the National Association for Interpretation Annual Conference in Corpus Christie, TX in November 2016, and followed up with a Moon-focused for interpreters from the National Park Service, the US Fish & Wildlife Service, and other US public lands as part of an Earth to Sky webinar series. We also presented on these themes for NASA's Museum Alliance and Solar System Ambassadors. We took these conversations public at outreach events across the country.

Physical products. We created three products specifically for the eclipse: LRO eclipse glasses (see Fig. 2), an LRO eclipse litho [1], and an eclipse/InOMN Save-the-Date card [2].

More than 50 people on or associated with the LRO team distributed over 38,000 LRO/NASA eclipse items in 36 US states and 1 territory, reaching over 18,000 people outside of our support for NASA official eclipse-viewing sites. Estimated reach at eclipse events/through eclipse interactions when including official viewing sites: 156,000 people. NASA distributed a further 20,000 eclipse packets nationwide, which included the LRO eclipse litho and eclipse/InOMN Save-the-Date card.

Fig. 1. Map of LRO event support and materials distribution for the August 21, 2017 solar eclipse.

Online resources. The LRO Public Engagement Team created a collection of Moon activities we recommended for use at solar eclipse events and shared it through the LRO and InOMN websites. We also contributed LRO and lunar content for the NASA 2017 solar eclipse website [3].

The LRO Visualization Team created solar eclipse visualizations that highlighted the Moon [e.g. 4] and were recruited to create key eclipse visualization products that made use of LRO data, including the most accurate map of a total solar eclipse path ever created [5, 6].

The LRO Camera team captured an image of the Moon's shadow on the Earth during the solar eclipse. We promoted this in part through a Wave-at-the-Moon campaign [7], where we encouraged everyone in this hemisphere of the Earth to go out and wave at the Moon as LRO took our picture.

During the Eclipse: *LRO Support for Official NASA Eclipse-Viewing Locations.* The LRO team played a major role in four official NASA eclipse

viewing site events across the country: the Salem-Keizer Volcanoes baseball stadium in Oregon, the Idaho Falls Chukars baseball stadium in Idaho, the Charleston Riverdogs baseball stadium in South Carolina, and at Homestead National Monument of America in Nebraska.

The three events in baseball stadiums were conducted through partnerships with Minor League Baseball (MiLB) teams located along the path of totality. Our MiLB partners handled event logistics, provided facilities, connected NASA Subject Matter Experts (SMEs) with local media, and drew in captive crowds. This local support allowed a small number of NASA representatives to reach nearly 30,000 people at baseball stadium eclipse events. LRO provided engaging educational content relevant to the context, SMEs to guide the eclipse viewing experience, eclipse glasses, and safety information. Our stadium eclipse events drew an audience that included science enthusiasts who do not typically attend baseball games as well as baseball enthusiasts who do not normally attend science events–a win for both partners.

Fig. 2. (Left) A child practicing use of LRO eclipse glasses before the 2017 solar eclipse in Homestead, NE. (Right) LRO's Molly Wasser engaging visitors at EclipseFest in the Salem-Keiser Volcanoes baseball stadium in Oregon.

Additional LRO support for eclipse events. LRO team members supported solar eclipse events across the country, interacting with thousands of people nationwide. The LRO Public Engagement Team provided all LRO team members with physical and virtual resources, including a slide deck of LRO science results and solar and lunar eclipse connections that they could draw from for eclipse event presentations.

Social and traditional media coverage. In the summer of 2017, LRO launched a new flagship NASA social media account: @NASAMoon. This account features lunar science and exploration content from across NASA, and we encourage all lunar scientists and research teams funded by NASA to contribute. @NASAMoon played a major role in our eclipse social media campaign, which we implemented in coordination with the NASA social media team. This effort peaked when @NASAMoon blocked @NASASun on Twitter during the eclipse [8]. This was the most shared tweet of the eclipse, with 26 million impressions, drawing attention from Time [9] and Buzzfeed [10]. @NASAMoon gained over 27,000 new followers on 8/21/17, with whom we continue to share NASA lunar science content. @NASAMoon has since topped 100,000 followers.

Fig. 3. Observing the solar eclipse from UCLA's Mattel Children's Hospital. Eclipse glasses provided by LRO.

LRO-supported eclipse efforts were highlighted through several other media outlets, including NASA Features [11, 12], Business Insider, The Weather Channel, Newsweek, Space.com, and The Daily Mail. LRO team members were interviewed by radio and television stations across the country.

After the Eclipse: *International Observe the Moon Night.* After audiences were energized by the 2017 solar eclipse, we presented InOMN [13]–a program LRO leads–as a perfect opportunity to sustain the interest in space science and celestial observation and a way to annually engage the science-interested public.

References: [1] https://lunar.gsfc.nasa.gov/images/LRO_Eclipse_Litho.pdf. [2] https://www.lpi.usra.edu/observe_the_moon_night/wp-content/uploads/2015/05/InOMN-2017_TotSolEclipse_SaveTheDate.pdf. [3] https://eclipse2017.nasa.gov. [4] https://svs.gsfc.nasa.gov/12648. [5] https://svs.gsfc.nasa.gov/4518 [6] https://www.nasa.gov/feature/goddard/2017/nasa-moon-data-provides-more-accurate-2017-eclipse-path. [7] https://www.nasa.gov/feature/goddard/2017/nasa-s-lro-team-wants-you-to-wave-at-the-moon. [8] https://twitter.com/NASAMoon/status/899681358737539073. [9] http://time.com/4909998/solar-eclipse-nasa-moon-twitter-trolled-sun/. [10] https://www.buzzfeed.com/buzzfeednews/total-solar-eclipse-day?bftwnews&bftw&utm_term=.yuZYV6okRZ#.ldJ2yOepZW. [11] https://www.nasa.gov/feature/goddard/2017/the-moon-is-front-and-center-during-a-total-solar-eclipse. [12] https://www.nasa.gov/feature/goddard/2017/solar-eclipse-knocks-nasa-goddard-into-the-park. [13] https://observethemoonnight.org.