

2018 International Moon Village Workshop & Symposium

PROGRAM

November 4-5, 2018



Moon Village Association Institutional Members

LOCKHEED MARTIN



i s p a c e



2018 Moon Village Workshop & Symposium

Bronze Sponsors





04 November 2018
Los Angeles, CA USA

Dear Colleagues,

We would like to welcome you to the 2nd International Moon Village Workshop & Symposium.

The Moon Village Association (MVA) was created in November 2017 and has been registered as a non-profit organization in Vienna, Austria. The goal of the MVA is to establish an informal global forum for governments, industry, academia and the public interested in the development of the Moon Village concept, meant as a global moon community fostering permanent links among all stakeholders. In November 2017, an initial International Moon Village Workshop was organized by the MVA and the International Space University, and held at the ISU permanent campus in Strasbourg, France.

The MVA has organized a 2nd International Moon Village Workshop & Symposium that is occurring on 4-5 November 2018 in Los Angeles, California in cooperation with the University of Southern California (USC) and the National Space Society (NSS). The event comprises both Plenary Sessions and Working Sessions and panel discussions.

We believe that this meeting will provide a unique opportunity for stakeholders from around the world to directly contact one another to review plans, make new contacts and build relationships. And, several impactful products from this event are planned.

We look forward to working with you to realize the vision of the Moon Village – and humanity's permanent expansion to the Moon.

With best regards,

A handwritten signature in blue ink, appearing to read "G. Reibaldi".

Dr. Giuseppe Reibaldi
President,
Moon Village Association

A handwritten signature in blue ink, appearing to read "John C. Mankins".

John C. Mankins
Chair, 2018 Program Committee
Moon Village Association

**The Moon Village Association Thanks SPACE BIT for
being a Gold Sponsor of the 2018 International
Moon Village Workshop & Symposium**



OVERVIEW

The Moon Village Association

The Moon Village Association (MVA) is a non-governmental / non-profit international organization founded in 2017 to promote international discussion and formulation of plans concerning a “Moon Village”. Through its activities, the MVA is advancing the broad range of benefits for humankind that a Moon Village could establish, such as the utilization of lunar resources for civil space and commercial purposes, the accomplishment of important lunar scientific activities, and supporting progress toward longer term human and robotic space exploration, utilization and commercialization goals.

This Meeting

The 2018 International Moon Village Workshop & Symposium was organized by the MVA, the University of Southern California (USC) and the National Space Society at the USC Campus in Los Angeles, California and at the Radisson Hotel near USC. This workshop is international and interdisciplinary in scope and is focused on two goals: (1) a high-level review of global progress toward the Moon Village during 2018, and (2) the production of a series of deliverables related to different aspects of the Moon Village based on the several MVA working groups topics.

Other Notes

The plenary sessions and Sunday dinner will be video recorded and “live-streamed” to MVA members and the broader space community who are not able to be present. See the Supporting Materials section for additional information about topics such as parking, a listing of all registered attendees expected, key contact phone numbers, etc.

The Moon Village Association Thanks **LOCKHEED MARTIN** for being a Gold Sponsor of the 2018 International Moon Village Workshop & Symposium

A promotional poster for Lockheed Martin's Orion spacecraft. The background is a dark space scene with a bright sun or star on the left, creating a lens flare effect. The Orion spacecraft is shown in the center, with its service module and crew module. The Earth's horizon is visible in the lower right. The text is overlaid on the bottom half of the image.

**THE SKY IS
NOT THE LIMIT.**

AT LOCKHEED MARTIN,
WE'RE ENGINEERING A BETTER TOMORROW.

The Orion spacecraft will carry astronauts on bold missions to the moon, Mars and beyond — missions that will excite the imagination and advance the frontiers of science. Because at Lockheed Martin, we're designing ships to go as far as the spirit of exploration takes us.

Learn more at lockheedmartin.com/orion.

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DAY 0: SATURDAY 03 November

Before the formal beginning of the Moon Village event, there will be a reception at the USC Campus; this event is being held in cooperation among the MVA, the University of Southern California (USC) and the National Space Society (NSS).

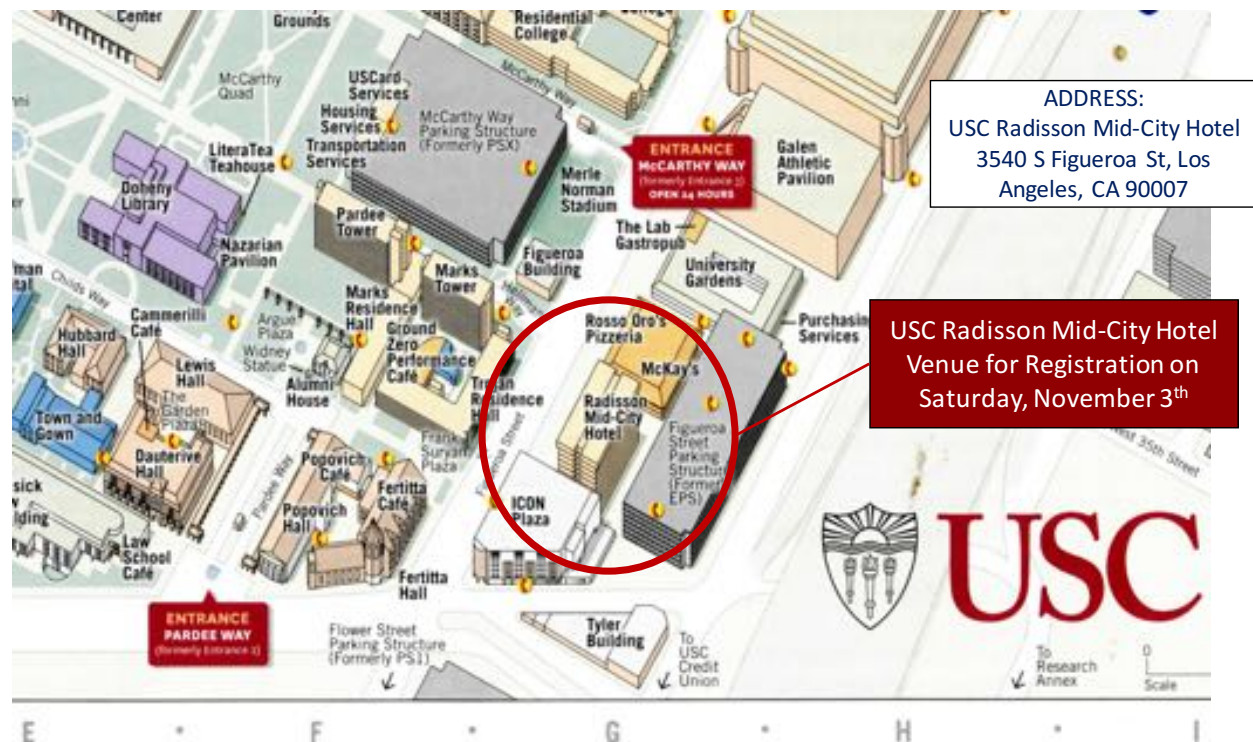
Information on these events is provided below.

Meeting Locations – Overview

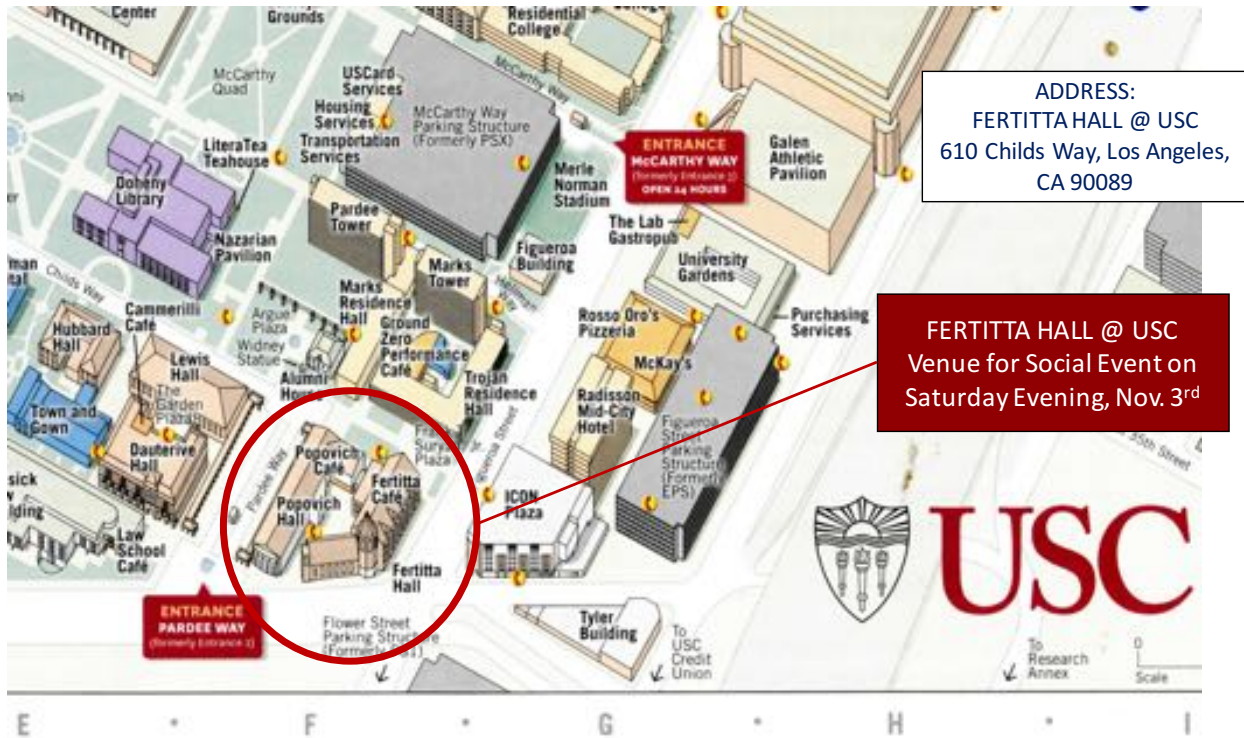
Registration for the MV Workshop & Symposium will take place at the Radisson Hotel Los Angeles (see map below), beginning at **3:00 pm**. A map of the complete USC campus is provided in the Appendices of this program. There will be an additional opportunity to register on Sunday; see the details for Day 1 below.

At **6:00 pm** on Saturday, there will be Social / Reception on the USC Campus that is open to Moon Village meeting attendees; please see the second map below. The agenda is presented in the table on the page following.

Saturday Registration for the Moon Village Meeting



Social / Reception: USC Campus



Program Overview

Saturday (November 3) – MV W/S & Symposium Day 0

Primary Location: USC Campus

TIME	TITLE / CONTENT	LOCATION
3:00 PM - 6:00 PM	Early Registration 2018 Moon Village International Workshop & Symposium	At the Radisson Hotel Lobby
6:00 PM – 8:00 PM	Joint Social “Hour” (NSS Space Settlement Summit / USC Space Business Meeting / MVA International Moon Village Workshop)	USC / Fertitta Hall 5th Floor Patio

DAY 1: SUNDAY

04 November

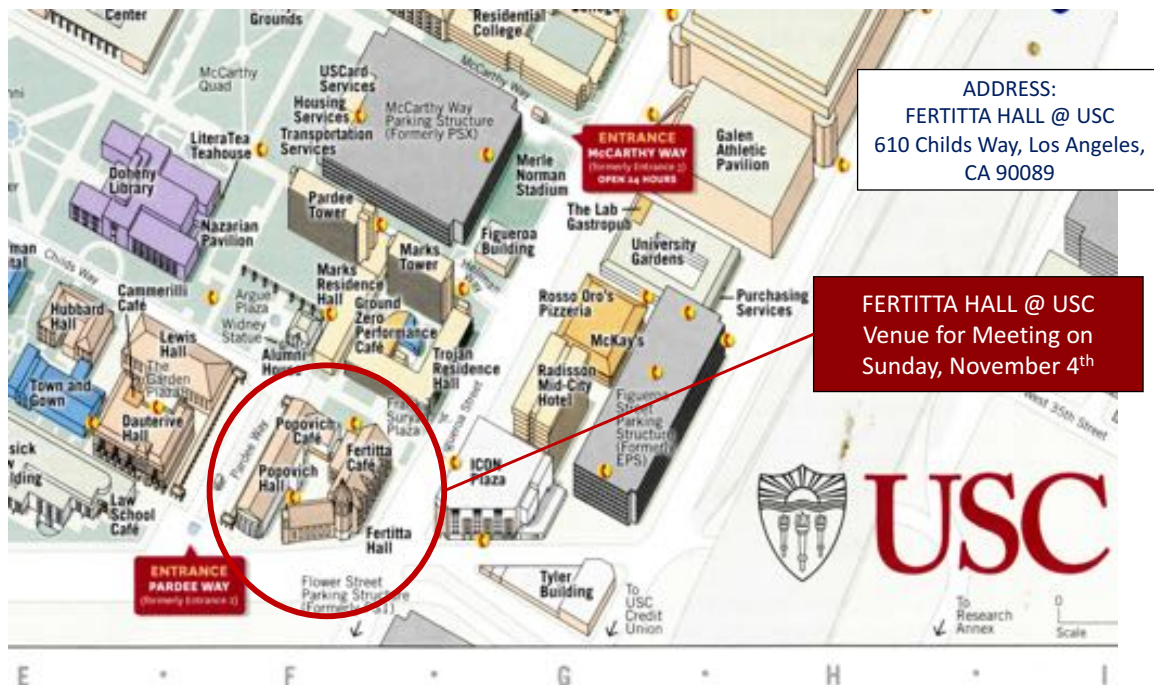
The first day of the Moon Village Workshop & Symposium will be held on the USC Campus; it will comprise both plenary / keynote lectures and (in the afternoon) a series of in parallel working sessions. The details are provided below.

Meeting Location – Overview

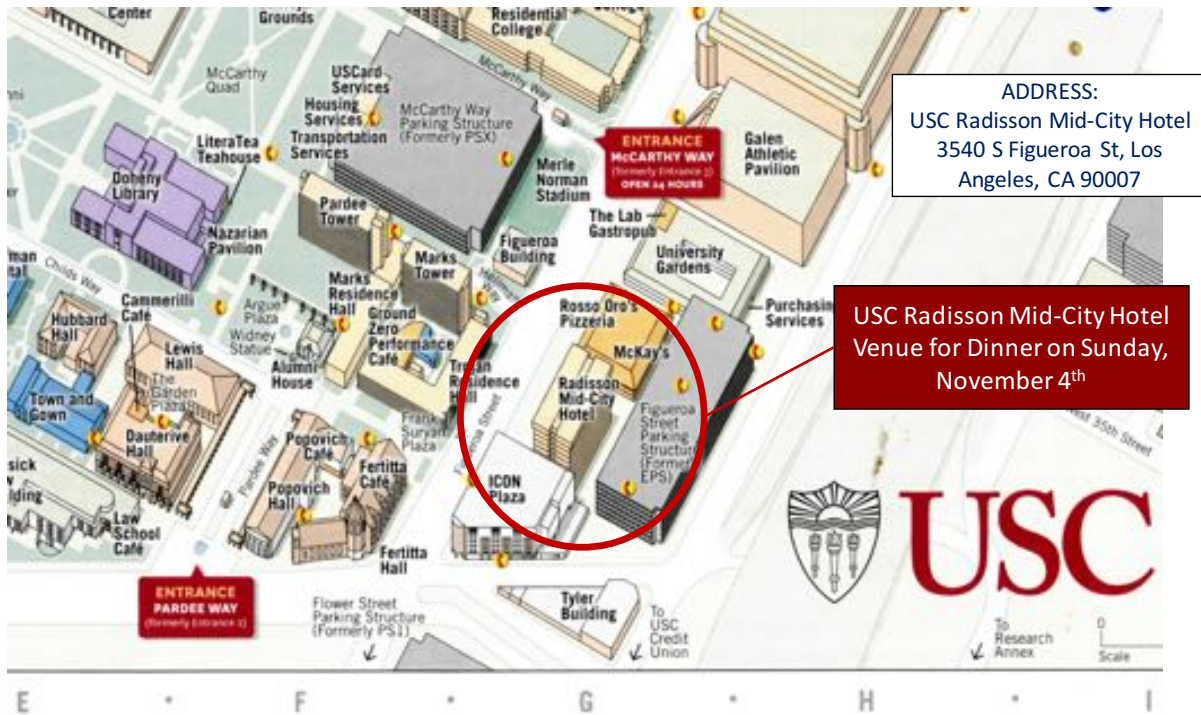
The MV events on Sunday will take place in several locations.

- **First**, the plenary sessions will be in the large conference room in Fertitta Hall on the Lower Level – **Room LL 105**. Take the elevator down to the lower level.
- **Second**, the coffee breaks and luncheon on Sunday will be served at Fertitta Hall in the foyer outside the conference rooms. See the Agenda that follows for timing.
- **Third**, the Breakout Sessions will be held on both the 2nd Floor and the 5th Floor of Fertitta Hall – details are provided below.
- **Finally**, the dinner on Sunday evening will be held at the Radisson Hotel on the Second Floor.

Sunday Plenary Sessions & Workshops: USC Campus



Sunday Evening Dinner: Radisson Hotel



Details of the agenda are provided below.

Program Schedule – Overview

Sunday (November 4) – MV W/S & Symposium Day 1

Primary Location: USC Campus

TIME	TITLE / CONTENT	LOCATION	
7:00 AM - 8:00 AM	MVA W/S Registration	USC / Fertitta Hall (Lower Level Foyer)	
8:00 AM - 10:00 AM	Opening Plenary Session (Chair: Giuseppe Reibaldi) Welcome / Keynote Presentations	USC / Fertitta Hall (LL105)	
	Giuseppe Reibaldi (President, MVA)		Welcome (10 min)
	Dr. Scott Pace (Executive Secretary, US National Space Council)		Keynote Returning to the Moon, the Exploration Campaign and Humanity's Future Plenary Presentation 1 / 25 min
	Johann-Dietrich (Jan) Woener (Director General, ESA)		Welcome Remarks via Video (5 min)
	James (Jim) Green (NASA Chief Scientist, former)		Plenary Presentation 2 (20 min)
	Pierre Franck (Grand Duchy of Luxembourg Trade and Investment Office, San Francisco)		Plenary Presentation 3 (20 min)
	Mark Hopkins (CEO, National Space Society)		Plenary Presentation 4 (20 min)
	Rob Chambers & Kat Coderre (Lockheed Martin)		Plenary Presentation 5 (20 min)
10:00 AM - 10:30 AM	Coffee Break	Foyer Area outside LL105	
10:30 AM – 12:10 NOON	MVA W/S Plenary Session (Chair: John C. Mankins)	USC / Fertitta Hall (LL105)	
	Yvette Gonzales (Int'l Lunar Exploration Working Group (ILEWG) / EuroMoonMars)		Plenary Presentation 6 (20 min)
	INATANI, Yoshifumi (JAXA / ISAS)		Plenary Presentation 7 (20 min)
	Tai Sik Lee (ROK / Korea / Hanyang University, International Space Exploration Research Institute)		Plenary Presentation 8 (20 min)
	Bob Richards (Moon Express)		Plenary Presentation 9 (20 min)
	George Sowers (Colorado School of Mines / Center for Space Resources)		Plenary Presentation 10 (20 min)

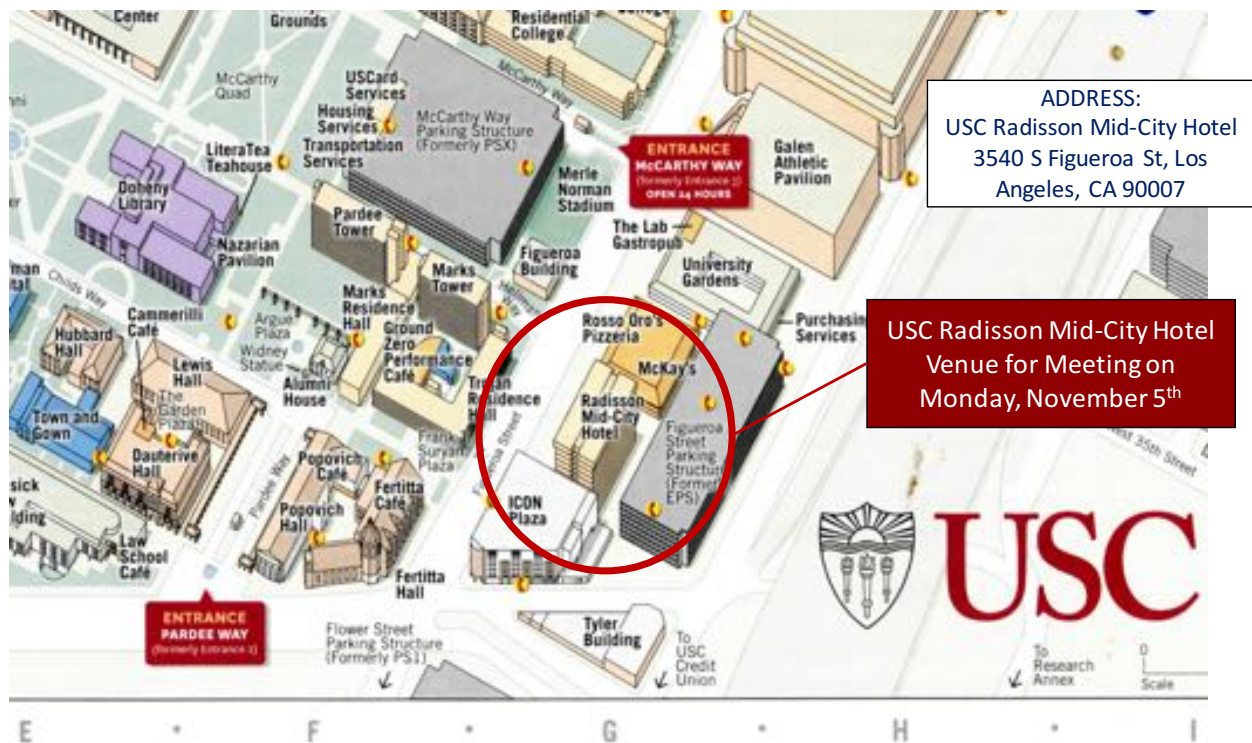
TIME	TITLE / CONTENT		LOCATION
12:10 PM - 12:40 PM	John C Mankins (MVA Vice President; 2018 MV WS&S Program Chair)	Organization of the Meeting Review of 2018 Results Charge to Splinter Sessions / mini-Workshops	USC / Fertitta Hall (LL105)
12:40 PM - 1:45 PM	Luncheon Chair: Oleh Ventskovsky Recognition of Sponsors Presentation: NewSpace 2060 Competition Winner(s)		USC / Fertitta Hall (Lower Level Foyer)
MVA Working Group Splinter Sessions / mini-Workshops			
1:45 PM - 5:00 PM	Breakout 1 2 nd Floor / Room JFF 236)	Focus on What & When: Scenario Alpha: Human Space Flight Focus (Architectures, Standards & Human Factors; Missions, Markets & Economics + Services)	USC / Fertitta Hall Lecture Rooms (5+ Rooms; see details at right)
	Breakout 2 2 nd Floor / Room JFF 239)	Focus on What & When: Scenario Beta: Focus on Science (Architectures, Standards & Human Factors; Missions, Markets & Economics + Services)	
	Breakout 3 2 nd Floor / Room JFF 240)	Focus on What & When: Scenario Gamma: Focus on Commerce (Architectures, Standards & Human Factors; Missions, Markets & Economics + Services)	
	Breakout 4 Room LL 101	Cross-Cutting Topics / Focus on WHY: Moon Village Missions, Markets & Economics + Critical Services	
	Breakout 5 Room LL 102	Cross-Cutting Topics / Focus on HOW: Cultural Considerations; Coordination & Cooperation; Analogues; Outreach	
5:00 PM - 5:30 PM	(Chair: John C. Mankins) MVA W/S Plenary Session Preliminary Out-briefs from Breakout Sessions		USC / Fertitta Hall (LL105)
5:30 PM	Formal End - Day 1		
6:30 PM - 8:30 PM	Dinner (joint with USC Space Business Event) Ceremony: Signing of the MVA – ForAllMoonkind MOU		Radisson Hotel 2 nd Floor Banquet Room

DAY 2: MONDAY
05 November

The second day of the Moon Village event will be held entirely at the Radisson Hotel across the street from USC; it will comprise plenary lectures (in the morning & afternoon), and reports from the Day 1 working sessions in the afternoon.

Meeting Location – Overview

Symposium: Radisson Hotel Los Angeles



The details are provided below.

Program Schedule – Overview

Monday (November 5) – MV W/S & Symposium Day 2

Primary Location: Radisson Hotel (Across from USC Campus)

TIME	TITLE / CONTENT	LOCATION	
7:00 AM - 8:00 AM	MVA W/S Registration	Radisson / 2 nd Floor Foyer Area	
8:00 AM - 8:30 AM	Day 2 Opening Plenary Session Welcome & Recap of Day 1 (Reibaldi / Mankins) Daily Announcements	Radisson / Hall – 2 nd Floor	
8:30 AM -10:30 AM	MVA W/S Plenary Session / Plenary Presentations (Chair: Giuseppe Reibaldi)	Radisson / Hall – 2 nd Floor	
	Mark Kinnersley (Director, Orion European Service Module, Airbus DS Sp Systems Inc.)		Plenary Presentation 11 (20 min)
	Greg Autry (Professor; USC)		Plenary Presentation 12 (20 min)
	Steven Brody (VP; North American Ops ISU)		Plenary Presentation 13 (20 min)
	Michelle L.D. Hanlon (Co-Founder; For All Moonkind)		Plenary Presentation 14 (20 min)
	Rahul Narayan (CEO, Axiom res.. Labs / Team Indus)		Plenary Presentation 15 (20 min)
10:30 AM - 11:00 AM	Coffee Break	Radisson / 2 nd Floor Foyer Area	
11:00 AM - 12:30 NOON	MVA W/S Plenary Session: Presentations & Panel Discussion Chair: Oleh (Oleg) Ventskovsky	Radisson / Hall – 2 nd Floor	
	Torsten Kriening (President; PTScientists GmbH)		Plenary Presentation 16 (20 min)
	Mark Nail (co-Founder; OffWorld, Inc.)		Plenary Presentation 17 (20 min)
	Gary Calnan (CEO; CisLunar Industries)		Plenary Presentation 18 (20 min)
	Ryutaro Ichikawa (BD, Ispace)		Plenary Presentation 19 (20 min)
	Panel Discussion: Future Directions for the Moon Village Chair: Oleh (Oleg) Ventskovsky This panel, comprising key institutional members will last 30 min.		
12:30 PM - 1:30 PM	Formal Luncheon Pre-Luncheon Special Presentation / Announcement	Radisson / 2 nd Floor Room	
1:30 PM – 3:00 PM	Results from Day 1 Sessions / Workshops and Working Discussion (Chair: John C. Mankins / Various Breakout Session Speakers)	Radisson / Hall – 2 nd Floor	

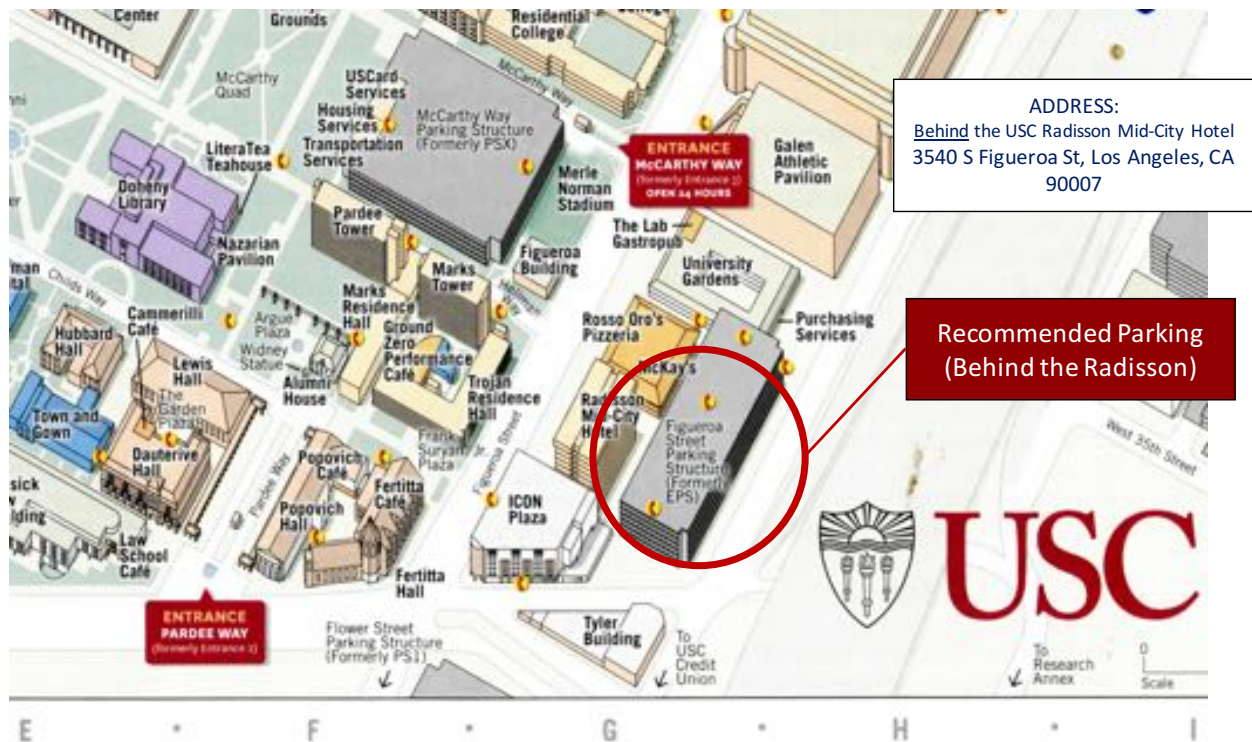
TIME	TITLE / CONTENT	LOCATION
3:00 PM - 3:30 PM	Coffee Break	Radisson / 2 nd Floor Foyer Area
3:30 PM - 4:30 PM	Special Panel Discussion: Next Steps for the Moon Village Association Chair: Oleh (Oleg) Ventskovsky This panel will include selected MVA institutional members	Radisson / Hall – 2 nd Floor
4:30 PM - 5:00 PM	Announcements & Closing Remarks (G. Reibaldi / J. Mankins) Special Announcement: Selection of the Location / Dates for the 2019 Moon Village Workshop & Symposium	Radisson / Hall – 2 nd Floor
5:00 PM	End – 2 nd International Moon Village Workshop & Symposium	Radisson / Hall – 2 nd Floor

SUPPORTING MATERIALS

SUPPORTING MATERIALS

Selected Key Information

Parking



Phone Numbers

JOHN C. MANKINS: +1 (703) 625-0424

KATIE MANKINS: +1 (703) 850-7097

AGGIE KOBRIN: +1 (949) 836-8464

REGISTERED PARTICIPANTS

Registered / Planned Meeting Attendees

First / Initial	Family	Organization	MVA Topic Areas of Interest
Tamara	Alvarez	Student / The New School	N/A
Shigeru	Aoki	Aerospace & Robotics Technology Group; Institute of Technology; Shimizu Corporation	Architectural Concepts; Economics, Missions & Markets
Greg	Autry	University of Southern California	Economics, Missions & Markets
Serdar	Baycan	NSS / Tectura Architects	Architectural Concepts; Economics, Missions & Markets
Dallas	Bienhoff	Cislunar Space Development Company, LLC	Architectural Concepts; Economics, Missions & Markets
Petr	Bohacek	Unknown / Student	N/A
Steven	Brody	International Space University	Outreach
Margaret	Burke	Public Participant	N/A
James	Burke	NSS Member, JPL Retired	Architectural Concepts
Luis	(Burke)	Public Participant	N/A
Gary	Calnan	CisLunar Industries	Architectural Concepts; Economics, Missions & Markets
Sophia	Casanova	University of New South Wales	N/A
Robert P.	Chambers	Lockheed Martin, Inc.	Architectural Concepts; Economics, Missions & Markets
A.C.	Charania	Blue Origin	Architectural Concepts; Economics, Missions & Markets
Kathleen	Coderre	Lockheed Martin, Inc.	Architectural Concepts; Economics, Missions & Markets
Emeline	De Antonio	MVA Board / CNES	Outreach
Art	Dula	Heinlein Foundation	Cooperation & Coordination
Alain	Dupas	Alain Dupas International Consultant	Architectural Concepts Issues; Economics, Missions & Markets; Moon Village & Exploration Analogues; Cultural Considerations
Antoine	Faddoul	Tony Sky Design Group	Architectural Concepts; Human Factors; Economics, Missions & Markets; Moon Village & Exploration Analogues; Cultural Considerations

First / Initial	Family	Organization	MVA Topic Areas of Interest
Richard	Fischer	MVA WG Lead / NASA MSFC	Moon Village & Exploration Analogues; TBD
Jeff	Foust	The Space Review	N/A
Pierre	Franck	Grand Duchy of Luxembourg; Trade and Investment Office (San Francisco)	Architectural Concepts; Economics, Missions & Markets; others?
Yvette	Gonzales	International Lunar Exploration Working Group (ILEWG) / EuroMoonMars	Architectural Concepts; Economics, Missions & Markets; others?
James	Green	NASA HQ	Architectural Concepts; Economics, Missions & Markets; others?
Steve	Green	N/A	N/A
Michelle	Hanlon	For All Moonkind	Cultural Considerations
Mark	Hopkins	National Space Society	N/A
Ryutaro	Ichikawa	Ispace Technologies, inc.	Architectural Concepts; Economics, Missions & Markets
Yoshifumi	Inatani	JAXA / ISAS	Architectural Concepts
Daniel	Inocente	Skidmore, Owings & Merrill LLP (SOM)	Architectural Concepts
Joshua	Izenberg	OffWorld, Inc.	Architectural Concepts; Economics, Missions & Markets; Critical Services
Ronald	Jones	National Space Society	Architectural Concepts
Mykhailo	Kaliapin	Yuzhnoye State Design Office	Architectural Concepts; Economics, Missions & Markets; Critical Services
Lakshmi	Karan	N/A	N/A
Kyunghwan	Kim	BIB Innovative Human-Centered Design Lab	Architectural Concepts; Human Factors; others – TBD
Shinichi	Kimura	Tokyo University of Science	Human Factors; Critical Services; Economics, Missions & Markets
Mark	Kinnersley	Airbus DS Space Systems, Inc.	Architectural Concepts; Human Factors; Economics, Missions & Markets
Elissavet	Koumi	Student	N/A
Torsten	Kriening	PTScientists	Economics, Missions & Markets; Critical Services
Josh	Lalonde	International Space University / Student	ALL (Architectural Concepts, MV Standards, Human Factors; Economics, Markets & Missions; M3RDB; Critical Services; Coordination & Cooperation; Moon Village &

First / Initial	Family	Organization	MVA Topic Areas of Interest
			Exploration Analogues; Cultural Considerations; Outreach
Charles	Lauer	MVA WG / Rocketplane	Economics, Missions & Markets; Critical Services
Tai Sik	Lee	MVA Board / Hanyang University, International Space Exploration Research Institute	N/A
Randy	Liebermann	Lunar City	Cultural Considerations; Cooperation & Coordination
John	Mankins	MVA Board / Mankins Space Technology Inc.	ALL (Focus on: Architectural Concepts, M3RDB)
Katie	Mankins	University of California SB	N/A
Mihoko	Murata	IHI	Architectural Concepts; Economics, Missions & Markets
Mark	Nall	Off-World, Inc.	Architectural Concepts; Economics, Missions & Markets; TBD
Rahul	Narayan	Axiom Research Labs Private Limited; Team Indus	Economics, Missions & Markets; TBD
Chris	Nie	Lockheed Martin Corporation	Architectural Concepts; Economics, Missions & Markets
Christine	Nobbe	NSS Saint Louis Space Frontier	Architectural Concepts; Economics, Missions & Markets
Misuzu	Onuki	MBA WG / Space Business Consultant	Outreach
Scott	Pace	US National Space Council	N/A
Seth	Potter	NSS Member	Architectural Concepts; Mission & Markets Requirements Data; Coordination & Cooperation
Giuseppe	Reibaldi	MVA Board / ESA Retired	Cooperation & Coordination
Bob	Richards	Moon Express	Architectural Concepts; Economics, Missions & Markets
Henk	Rogers	International Moonbase Alliance	Moon Village & Exploration Analogues
John	Rummel	SETI Institute	Human Factors, Cultural Considerations
Nikola	Schmidt	MVA Member	N/A
David	Schrunk	Science of Laws Institute	Architectural Concepts; Human Factors
Brent	Sherwood	NASA Jet Propulsion Laboratory	Architectural Concepts
Dale	Skran	National Space Society	Architectural Concepts; Economics, Markets & Missions; Critical Services

First / Initial	Family	Organization	MVA Topic Areas of Interest
George	Sowers	Colorado School of Mines	Economics, Markets & Missions
Adrian	Stoica	NASA Jet Propulsion Laboratory	Architectural Concepts
Charles	Stotler	Air & Space Law / University of Mississippi	Cooperation & Coordination
Alexander	Sullivan	University of Southern California	Architectural Concepts; Economics, Markets & Missions
Pavlo	Tanasyuk	SpaceBit	Economics, Markets & Missions
Madhu	Thangavelu	University of Southern California	Architectural Concepts; Economics, Markets & Missions; Outreach
Rebecca	Thoss	Ball Corporation	N/A
Peter	Toth	ExtraTerrestrial Power Ltd.	Architectural Concepts; Critical Services
Hayaki	Tsuji	Tsuji Music Office	Cultural Considerations(?)
Helen	Tung	NewSpace2060 International Moon Pitch Competition	Economics, Missions & Markets; Outreach
Hidetsugu	Ukuda	MHI (Mitsubishi Heavy Industries)	Architectural Concepts; Economics, Missions & Markets
Oleg	Ventskovsky	MVA Board / Yuzhnoye State Design Office	Architectural Concepts; Human Factors; Economics, Missions & Markets; Coordination & Cooperation; Outreach
Sam	Ximenes	XArc Exploration Architecture Corporation	Architectural Concepts
Taichi	Yamazaki	Astrax, Inc.	Economics, Missions & Markets; Outreach
Melodie	Yashar	Space Exploration Architecture	Architectural Concepts

Map of USC Campus

