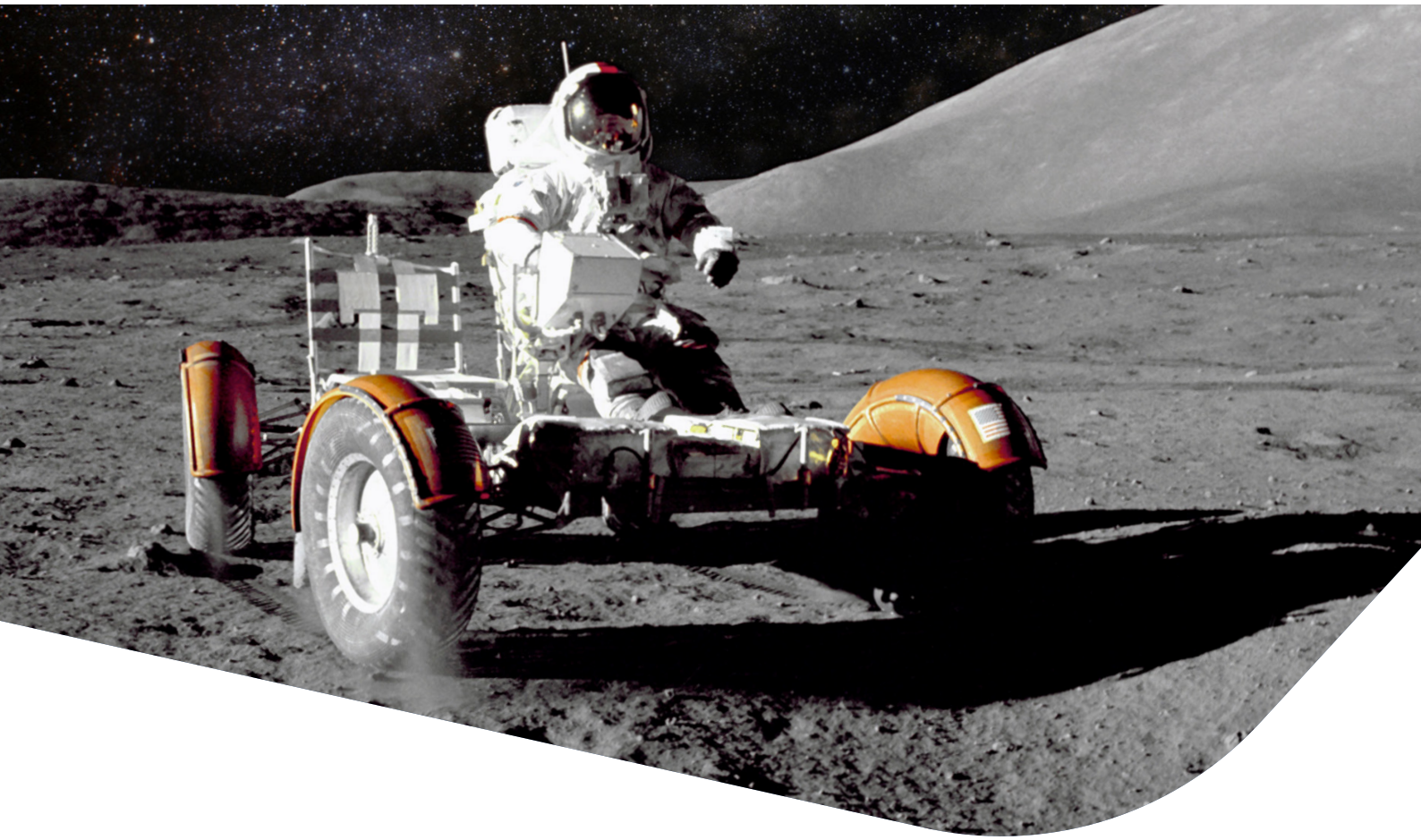
Lunar service

www.sscspace.com



About SSC

Swedish Space Corporation (SSC) provides advanced space services to public and private organizations worldwide. Built on decades of experience, we offer proven expertise in space engineering, satellite ground station services and launch services.

We help Earth benefit from space.

SSC Lunar service

SSC is the only commercial company who has been supporting lunar communications for more than a decade.

SSC has supported in total more than 10 lunar missions all the way back to the Apollo-program. We currently support the LRO mission (NASA) and have recently supported ISRO and SpaceIL in their lunar endeavors.

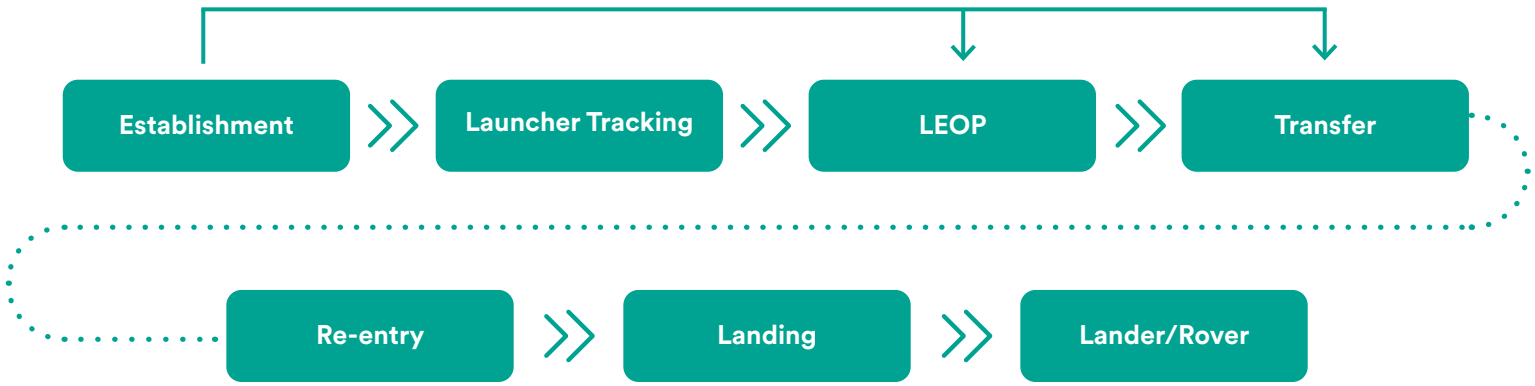
We are proud to say we have a Lunar Service of the highest quality, using a global optimized ground network of SSC stations and partner stations.

Our Network ensures reliable operations of your lunar vehicle.

Contact information
For further information please contact **info@sscspace.com** and we would connect you with a representant from our regional sales or engineering team.

The SSC Lunar service is highly reliable and cost-effective, utilizing an unparalleled network of world-wide locations.

SSC's Global Ground Station Network is designed to provide comprehensive communications and ground system support to a variety of missions. The network has been constructed for high availability in a multi-mission concept.



Full range of services

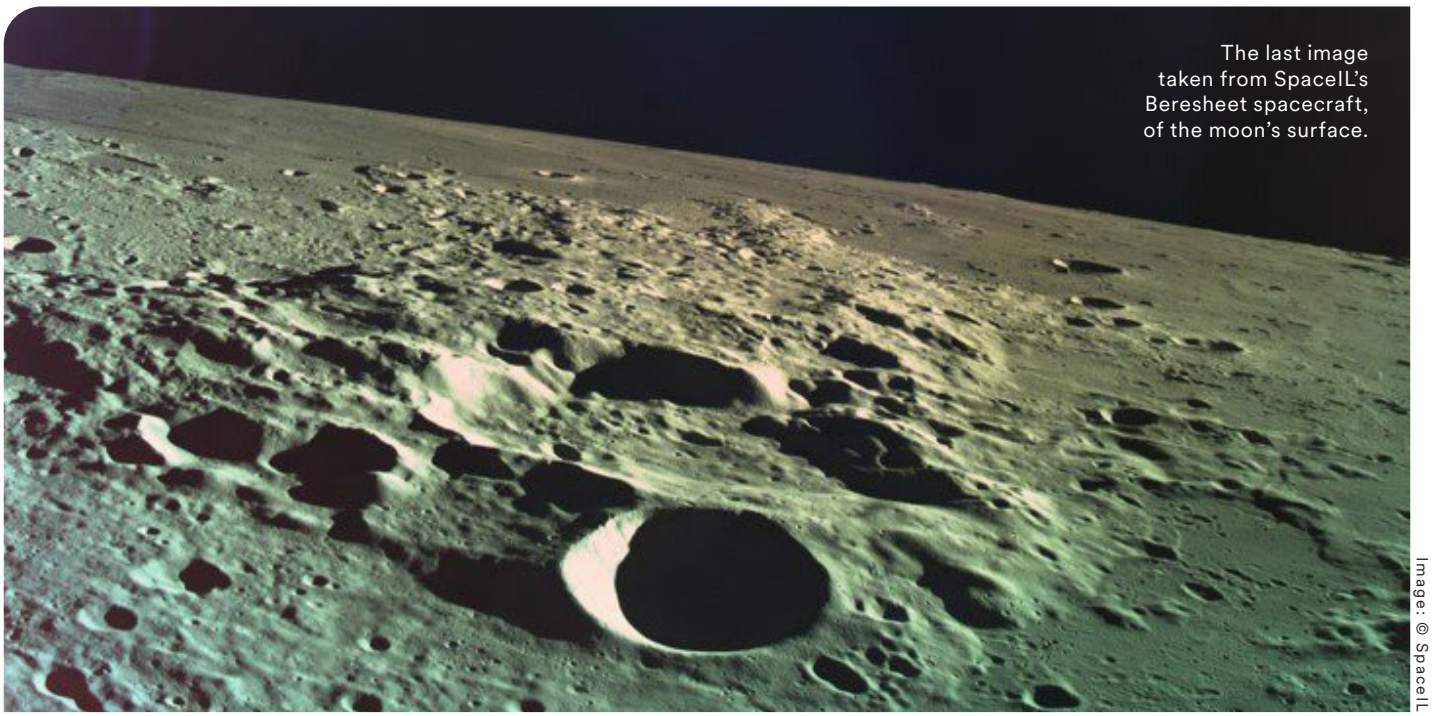
- Establishment
- Mission control
- Flight dynamics
- Monitor & Control
- Launchpad support
- Launcher tracking
- LEOP
- Re-orbit to the Moon
- Re-entry to lunar orbit
- Landing
- Lander / Rover support

Included in the service

- Scheduling support
- Telemetry playback
- Ground Network Communication
- Reporting
- Localization Service
  - o Angular
  - o Doppler
  - o Ranging
- Online-voice support

Options in the service

- Data storage
- Engineering support



The last image taken from SpaceIL's Beresheet spacecraft, of the moon's surface.

Image: © SpaceIL

Antenna & band selection

Up	Down	Commanding
X	X HGA + LGA	X HGA + LGA.
S	S	S

Antenna performance

X-band

TX	7190-7235 MHz
EIRP	75-85 dBW
RX	8450-8500 MHz
G/T	22-30 dB/K

S-band

TX	2025-2120 MHz
EIRP	68-72 dBW
RX	2200-2300 MHz
G/T	22-24 dB/K

Service \ Phase	Pre-mission	LEOP	Earth Orbit	Lunar Orbit	Lunar Surface
Establishment	X				
Engineering support	O		O	O	O
Ranging & Tracking support		X	X	X	X
Doppler support		X	X	X	X
Launcher Tracking		O			
LEOP TT&C		X			
Transfer TT&C			X		
Re-entry TT&C				X	
Landing TT&C					X
Data Reception		X	X	X	X

X = Included O = Optional

Communication - SSC Network to PoP

SSC stations
Dual MPLS

Partner stations
MPLS + Internet VPN

SSC MPLS Specification

Latency	≤ 45 ms
Jitter	≤ 15 ms
QoS	Available

Image: © SpaceIL

Zoom

Customer Case SpaceIL – April 2019

- LEOP, Earth orbit, lunar orbit, re-entry, landing
- Telemetry, Command and accurate Range and Doppler data for a very precise orbit determination during the journey to moon and during the last week after lunar orbit insertion.
- SSC was prime for the whole mission
- Additional subcontracted partners
- Partner antennas for image reception mainly after landing (supporting higher data rates)

With the SSC Lunar service, SpaceIL has been able to maintain communications with the spacecraft around the clock using the strategically located ground antennas that comprise SSC's Global Ground Station Network. This includes stations in Australia, Chile, Hawaii, South Africa, Sweden and the collaborative German Aerospace Center (DLR).

"SSC was instrumental in developing a communication solution for our mission to the Moon"

Eran Shmidt
Deputy Manager of SpaceIL Program
Head of SpaceIL Ground Segment