SPACEX

SES

PRESS KIT | NOVEMBER 2013

SES-8 MISSION

www.spacex.com

www.ses.com

SpaceX SES-8 Mission Press Kit

CONTENTS

SPACEX MEDIA CONTACT

Emily Shanklin
Director of Marketing and Communications
310-363-6733
media@spacex.com

SES MEDIA CONTACT

Yves Feltes
Media Relations
Tel. +352 621 168 703
Yves.Feltes@ses.com

HIGH RESOLUTION PHOTOS AND VIDEO

SpaceX will post photos and video after the mission.

High-resolution photographs can be downloaded from: spacex.com/media
Broadcast quality video can be downloaded from: vimeo.com/spacexlaunch/

MORE RESOURCES ON THE WEB

For SpaceX coverage, visit:

spacex.com
twitter.com/elonmusk
twitter.com/spacex
facebook.com/spacex
plus.google.com/+SpaceX
youtube.com/spacex

For SES coverage, visit:

ses.com
twitter.com/SES_Satellites
facebook.com/SES.YourSatelliteCompany
youtube.com/SESVideoChannel
en.ses.com/4243715/blog

WEBCAST INFORMATION

The launch will be webcast live, with commentary from SpaceX corporate headquarters in Hawthorne, CA, at spacex.com/webcast.

Web pre-launch coverage will begin at approximately 5:00 p.m. EDT.

The official SpaceX webcast will begin approximately 40 minutes before launch.

SpaceX hosts will provide information specific to the flight, an overview of the Falcon 9 rocket and SES-8 satellite, and commentary on the launch and flight sequences.

SpaceX SES-8

Mission Overview

Overview

SpaceX's customer for its SES-8 mission is the satellite communications provider SES. In this flight, the Falcon 9 rocket will deliver the SES-8 satellite to a Geostationary Transfer Orbit (GTO). SES-8 is a commercial telecommunications satellite.

The SES-8 launch window will open at approximately 5:37 p.m. EDT on November 25, 2013 from Space Launch Complex 40 at Cape Canaveral Air Force Base, Florida.

If all goes as planned, the SES-8 satellite will be deployed into its geosynchronous transfer orbit approximately 33 minutes after liftoff.

Satellite Payloads

SES-8

The SES-8 mission will launch the SES-8 commercial telecommunications satellite, an Orbital Sciences GEOStar-2 spacecraft. This hybrid Ku- and Ka-band spacecraft weighs 3,138 kg (6,918 lbs) at launch. This mission will be the first Falcon 9 launch to a geosynchronous transfer orbit, delivering the satellite to a 295 x 80,000 km orbit at 20.75 degrees inclination.

The satellite will provide communications coverage of the South Asia and Asia Pacific regions. Co-located with NSS-6 at SES's 95 degrees East orbital slot, its high performance beams will support rapidly growing markets in South Asia and Indo-China, as well as provide expansion capacity for direct-to-home (DTH), very small aperture terminal (VSAT) and government applications. The satellite is expected to provide 5 kilowatts of power to its payload of 33 Ku-band transponders.

Always a Challenging Mission

All spaceflight is incredibly complicated. Every component of the mission must operate optimally. Hardware, avionics, sensors, software and communications must function together flawlessly. If any aspect of the mission is not successful, SpaceX will learn from the experience and try again.

Prelaunch

Months before a Falcon 9 launch, both rocket stages are transported to SpaceX's development facility in McGregor, Texas for testing, and then trucked individually to SpaceX's hangar at Space Launch Complex 40 at the Cape Canaveral Air Force Station in Cape Canaveral, Florida. SpaceX's payload fairing is shipped separately to the launch site. Around 30 days before launch, the spacecraft arrives at SpaceX's SLC-40 hangar annex. Over the final month, the spacecraft is processed and encapsulated within the fairing, and the rocket stages are integrated.

The final major preflight test is a static fire, when Falcon 9's nine first-stage engines are ignited for a few seconds, with the vehicle held securely to the pad.

One day prior to launch, Falcon 9 and its payload are transported to the launch pad and raised vertically. All ground personnel leave the pad in preparation for fueling of the launch vehicle.

Launch Sequence

The launch sequence for Falcon 9 is a process of precision necessitated by the rocket's approximately one-hour launch window, dictated by the desired orbit for the satellite. If the one-hour time window is missed, the mission will be attempted on the next day.

A little less than four hours before launch, the fueling process begins—liquid oxygen first, then RP-1 kerosene propellant. The plume coming off the vehicle during countdown is gaseous oxygen being vented from the tanks, which is why the liquid oxygen is topped off throughout the countdown.

Terminal countdown begins at T-10 minutes, at which point all systems are autonomous. The SpaceX Launch Director at the Cape Canaveral Air Force Station gives a final go for launch at T-2 minutes and 30 seconds. At T-2 minutes, the Air Force Range Control Officer confirms the physical safety of the launch area and provides the final range status. One minute before liftoff, the launch pad's water deluge system, dubbed "Niagara," is activated. Fifty-three water nozzles set low on the launch pad provide a curtain of water flowing at 113,500 liters (30,000 gallons) per minute.

Three seconds before launch, the nine Merlin engines of the first stage ignite. The rocket computer commands the launch mount to release the vehicle for flight, and at T-0 Falcon 9 lifts off, putting out 1.3 million pounds of thrust.

Flight

The vehicle will pass through the area of maximum aerodynamic pressure—max Q—approximately 80 seconds into flight. This is the point when mechanical stress on the rocket peaks due to a combination of the rocket's velocity and resistance created by the Earth's atmosphere.

Approximately 178 seconds into flight, the first-stage engines are shut down, an event known as main-engine cutoff, or MECO. Five seconds after MECO, the first and second stages will separate. Seven seconds later, the second stage's single Merlin vacuum engine ignites to begin a 5 minute, 20 second burn that brings the satellite into a parking orbit. The fairing that protects the payload is deployed early in this burn. Eighteen minutes after injection into the parking orbit, the second stage will relight for just over one minute to carry the payload to its geosynchronous transfer orbit.

Satellite Deployment

Approximately five minutes after the second burn (at the 32 minute, 53 second mark after launch), the SES-8 satellite is deployed into orbit.

SES Mission Timeline

Times and dates are subject to change

LAUNCH DAY

COUNTDOWN

Hour:Min	Events
- 13:30	Vehicle is powered on
- 3:50	Commence loading liquid oxygen (LOX)
- 3:40	Commence loading RP-1 (rocket grade kerosene)
- 3:15	LOX and RP-1 loading complete
- 0:06	Falcon 9 terminal count autosequence started
- 0:02	SpaceX Launch Director verifies go for launch
- 0:02	Range Control Officer (USAF) verifies range is go for launch
- 0:01	Command flight computer to begin final prelaunch checks. Turn on pad deck and Niagara water
- 0:00:40	Pressurize propellant tanks
- 0:00:03	Engine controller commands engine ignition sequence to start
0:00	Falcon 9 liftoff

LAUNCH

Hour:Min	Events
0:01	Max Q (moment of peak mechanical stress on the rocket)
0:03	1st stage engine shutdown/main engine cutoff (MECO)
0:03	1st and 2nd stages separation
0:03	2nd stage engine start
0:04	Fairing separation
0:08	2nd stage engine cutoff-1 (SECO-1)
0:27	2nd stage engine restart
0:28	2nd stage engine cutoff-2 (SECO-2)
0:33	SES-8 satellite deployed

Falcon 9 Rocket

Falcon 9 is a two-stage rocket designed from the ground up by SpaceX for the reliable and cost-efficient transport of satellites and SpaceX's Dragon spacecraft.

QUICK FACTS

Made in America. All of Falcon 9's structures, engines, and ground systems were designed, manufactured, and tested in the United States by SpaceX.

21st-century rocket. As the first rocket completely developed in the 21st century, Falcon 9 was designed from the ground up for maximum reliability from a blank sheet to first launch in four and a half years (November 2005 to June 2010) for less than $300 million. An upgraded Falcon 9 with safety and reliability enhancements and greater lift capability flew for the first time earlier this fall, and will fly on the SES-8 mission.

Designed for maximum reliability. Falcon 9 features a simple two-stage design to minimize the number of stage separations. (Historically, the main causes of launch failures have been stage separations and engine failures.) With nine engines on the first stage, it can safely complete its mission even in the event of a first-stage engine failure.

Statistics. Falcon 9 topped with SpaceX fairing is 224.4 feet (68.4 meters) tall and 12 feet in diameter (the fairing is 17 feet in diameter). Its nine first-stage Merlin engines generate 1.3 million pounds of thrust at sea level, rising to 1.5 million pounds of thrust as Falcon 9 climbs out of the Earth's atmosphere.

In demand. SpaceX has nearly fifty Falcon 9 missions on its manifest, with launches scheduled for commercial and government clients.

Designed to safely transport crew. Like the Dragon spacecraft, Falcon 9 was designed from the outset to transport crew to space.

Mission success record. Falcon 9 has achieved 100% success on its six flights to date: June 2010 and December 2010 flights to orbit; a May 2012 launch of the Dragon spacecraft to the International Space Station (ISS) making SpaceX the first commercial company ever to visit the ISS; two of at least 12 launches of Dragon to the ISS as official cargo resupply missions for NASA, and launch of the CASSIOPE communications satellite for Canada's MDA Corporation in September 2013.

Why "Falcon"? Falcon 9 is named for the Millennium Falcon in the "Star Wars" movies. The number 9 refers to the nine Merlin engines that power Falcon 9's first stage; one Merlin vacuum engine powers the second stage.

ADVANCED TECHNOLOGY

First Stage

Falcon 9 tanks are made of aluminum-lithium alloy, a material made stronger and lighter than aluminum by the addition of lithium. Inside the two stages are two large tanks each capped with an aluminum dome, which store liquid oxygen and rocket-grade kerosene (RP-1) engine propellants.

The tanks and domes are fabricated entirely in-house by SpaceX. Sections of aluminum are joined together using SpaceX's custom-made friction stir welders to execute the strongest and most reliable welding technique available. The structures are painted in-house by SpaceX, concurrent with the welding process.

Falcon 9's first stage incorporates nine Merlin engines. After ignition, a hold-before-release system ensures that all engines are verified for full-thrust performance before the rocket is released for flight. Then, with thrust equal to greater than five 747s at full power, the Merlin engines launch the rocket to space. Unlike airplanes, a rocket's thrust actually increases with altitude. Falcon 9 generates 1.3 million pounds of thrust at sea level but gets up to 1.5 million pounds of thrust in the vacuum of space. The first stage engines are gradually throttled near the end of first-stage flight to limit launch vehicle acceleration as the rocket's mass decreases with the burning of fuel.

Interstage

The interstage, which connects the first and second stages, is a composite structure made of sheets of carbon fiber and an aluminum honeycomb core, and it holds the release and separation system. Falcon 9 uses an all-pneumatic stage separation system for low-shock, highly reliable separation that can be tested on the ground, unlike pyrotechnic systems used on most launch vehicles.

Second Stage

The second stage, powered by a single Merlin vacuum engine, delivers Falcon 9's payload to the desired orbit. The second stage engine ignites a few seconds after stage separation, and can be restarted multiple times to place multiple payloads into different orbits. For maximum reliability, the second stage has redundant igniter systems.

Like the first stage, the second stage is made from a high-strength aluminum-lithium alloy, using most of the same tooling, materials, and manufacturing techniques. This commonality yields significant design and manufacturing efficiencies.

Merlin 1D Engine

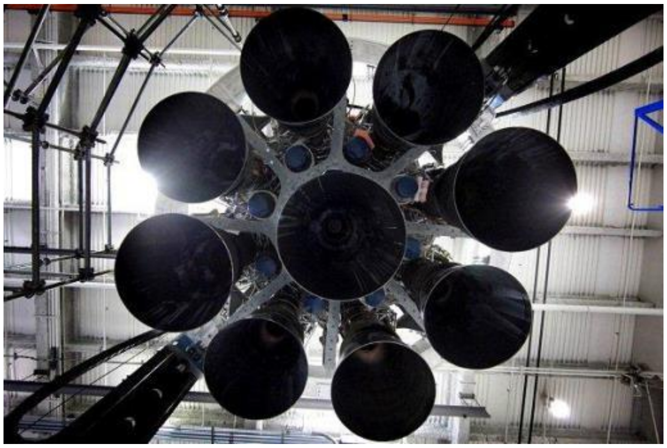
The Merlin engine that powers the first stage of Falcon 9 is developed and manufactured in-house by SpaceX . Burning liquid oxygen and rocket-grade kerosene propellant, a single Merlin engine generates 654 kilonewtons (147,000 pounds) of thrust at liftoff, rising to 716 kilonewtons (161,000 pounds) as it climbs out of Earth's atmosphere. Merlin's thrust-to-weight ratio exceeds 150, making the Merlin the most efficient booster engine ever built, while still maintaining the structural and thermal safety margins needed to carry astronauts.

Falcon 9 is the only vehicle currently flying with engine out capability; Falcon 9 can lose up to two of its Merlin engines on the first stage and still complete its mission. The nine-engine architecture on the first stage is an improved version of the design employed by the Saturn I and Saturn V rockets of the Apollo program, which had flawless flight records in spite of engine losses.

The Merlin 1D engine provides a number of improvements over its Merlin 1C predecessor, including greater performance, improved manufacturability by using high efficiency processes, increased robotic construction and reduced parts count.

High-pressure liquid oxygen and kerosene propellant are fed to each engine via a single-shaft, dual-impeller turbopump operating on a gas generator cycle. Kerosene from the turbopump also serves as the hydraulic fluid for the thrust vector control actuators on each engine, and is then recycled into the low-pressure inlet. This design eliminates the need for a separate hydraulic power system, and eliminates the risk of hydraulic fluid depletion. Kerosene is also used for regenerative cooling of the thrust chamber and expansion nozzle.

Octaweb



The Octaweb thrust structure of the nine Merlin engines improves upon the former 3x3 engine arrangement, increasing the Falcon 9's reliability while streamlining its manufacturing process. It houses the nine Merlin 1D engines and was designed to handle the increase in thrust from the Merlin 1C to Merlin 1D engine design. To form the structure, sheet metal is welded together and engines are placed into the nine slots. The eight engines surrounding one center engine simplify the design and assembly of the engine section, reducing production time from about three months to a matter of weeks.

The new layout also provides individual protection for each engine, and further protects other engines in case of an engine failure. It significantly reduces both the length and weight of the Falcon 9 first stage. With this design, Falcon 9 is also prepared for reusability – the Octaweb will be able to survive the first stage's return to Earth post-launch.

Reliability

This flight represents the seventh flight of the Falcon 9, following six successful missions.

An analysis of launch failure history between 1980 and 1999 by the Aerospace Corporation showed that 91% of known failures can be attributed to three causes: engine failure, stage-separation failure, and, to a much lesser degree, avionics failure. Because Falcon has nine Merlin engines clustered together to power the first stage, the vehicle is capable of sustaining an engine failure and still completing its mission. This is an improved version of the architecture employed by the Saturn I and Saturn V rockets of the Apollo program, which had flawless flight records despite the loss of engines on a number of missions. With only two stages, Falcon 9 limits problems associated with separation events.

SpaceX maximizes design and in-house production of much of Falcon 9's avionics, helping ensure compatibility among the rocket engines, propellant tanks, and electronics. In addition, SpaceX has a complete hardware simulator of the avionics in its Hawthorne factory. This simulator, utilizing electronics identical to those on the rocket, allows SpaceX to check nominal and off-nominal flight sequences and validate the data that will be used to guide the rocket.

SpaceX uses a hold-before-release system—a capability required by commercial airplanes, but not implemented on many launch vehicles. After the first-stage engines ignite, Falcon 9 is held down and not released for flight until all propulsion and vehicle systems are confirmed to be operating normally. An automatic safe shutdown occurs and propellant is unloaded if any issues are detected.

SpaceX Fairing

The payload fairing sits atop Falcon 9 for the delivery of satellites to destinations in low-Earth orbit (LEO), geosynchronous transfer orbit (GTO) and beyond. SpaceX designed and developed its 5-meter fairing and manufactures every unit in Hawthorne, Calif. With an all-pneumatic deployment system (like Falcon 9's interstage), the fairing experiences low shock and can be tested on the ground.

The fairing is a composite structure made of sheets of carbon fiber and an aluminum honeycomb core. Large enough to carry a city bus, the fairing stands 17' in diameter and 43' tall and is designed to reliably meet all mission requirements.

There are two halves to the fairing. One side is passive, and one is active with all actively controlled systems.

Structurally, the lower joint connects the fairing to the payload attach fitting and the 2nd stage. There is a vertical seam connecting the two fairing halves. The same latch mechanism is used in 14 locations along the vertical seam. Four pushers that share similar design components with the stage separation system separate the fairing halves at deployment.

Falcon 9 uses an all-pneumatic stage separation system for low-shock, highly reliable separation that can be tested on the ground, unlike pyrotechnic systems used on most launch vehicles.

SpaceX Facilities

SPACE LAUNCH COMPLEX 40, CAPE CANAVERAL AIR FORCE STATION

Cape Canaveral, Florida

SpaceX's Space Launch Complex 40 at Cape Canaveral Air Force Station is a world-class launch site that builds on strong heritage: The site at the north end of the Cape was used for many years to launch Titan rockets, among the most powerful rockets in the US fleet. SpaceX took over the facility in May 2008.

The center of the complex is composed of the concrete launch pad/apron and flame exhaust duct. Surrounding the pad are four lightning towers, fuel storage tanks, and the integration hangar. Before launch, Falcon 9's stages and the payload are housed inside the hangar, where the payload is encapsulated within the fairing. A crane/lift system moves Falcon 9 into a transporter-erector system and the payload and fairing are mated to the rocket. The vehicle is rolled from hangar to launch pad on fixed rails shortly before launch to minimize exposure to the elements.

SpaceX Launch Control, also at Cape Canaveral, is responsible for operating the Falcon 9 throughout the launch countdown.

SPACEX HEADQUARTERS

Hawthorne, California

SpaceX's rockets and spacecraft are designed and manufactured at the company's headquarters in Hawthorne, California – a complex that spans nearly one million square feet.

ROCKET DEVELOPMENT FACILITY

McGregor, Texas

Engines and structures are tested at a 900-acre state-of-the-art rocket development facility in McGregor, Texas.

SPACE LAUNCH COMPLEX 4E, VANDENBERG AIR FORCE BASE

Lompoc, California

SpaceX's Space Launch Complex 4E at Vandenberg Air Force Base in California is used for launches to high inclination and polar orbits, and will support launches of the Falcon Heavy.

SpaceX Company Overview

SpaceX designs, manufactures, and launches the world's most advanced rockets and spacecraft. The company was founded in 2002 by Elon Musk to revolutionize space transportation, with the ultimate goal of enabling people to live on other planets. Today, SpaceX is advancing the boundaries of space technology through its Falcon launch vehicles and Dragon spacecraft.

Transforming the Way Rockets Are Made

SpaceX's proven designs are poised to revolutionize access to space. Because SpaceX designs and manufactures its own rockets and spacecraft, the company is able to develop quickly, test rigorously, and maintain tight control over quality and cost. One of SpaceX's founding principles is that simplicity and reliability are closely coupled.

Making History

SpaceX has gained worldwide attention for a series of historic milestones. It is the only private company ever to return a spacecraft from low-Earth orbit, which it first accomplished in December 2010. The company made history again in May 2012 when its Dragon spacecraft attached to the International Space Station (ISS), exchanged cargo payloads, and returned safely to Earth—a technically challenging feat previously accomplished only by governments. SpaceX began official cargo resupply to the ISS in October 2012, with the first of 12 commercial resupply (CRS) missions.

Advancing the Future

Under a $1.6 billion contract with NASA, SpaceX will fly at least 10 more cargo supply missions to the ISS for a total of 12—and in the near future, SpaceX will carry crew as well. Dragon was designed from the outset to carry astronauts and now, under a $440 million agreement with NASA, SpaceX is making modifications to make Dragon crew-ready.

SpaceX is the world's fastest-growing provider of launch services. Profitable and cash-flow positive, the company has nearly 50 launches on its manifest, representing about $4 billion in contracts. These include commercial satellite launches as well as NASA missions.

Currently under development is the Falcon Heavy, which will be the world's most powerful rocket. All the while, SpaceX continues to work toward one of its key goals—developing reusable rockets, a feat that will transform space exploration by radically reducing its cost.

Key SpaceX Milestones

- **March 2002** SpaceX is incorporated
- **March 2006** First flight of SpaceX's Falcon 1 rocket
- **August 2006** NASA awards SpaceX $278 million to demonstrate delivery and return of cargo to ISS
- **September 2008** Falcon 1, SpaceX's prototype rocket, is first privately developed liquid-fueled rocket to orbit Earth
- **December 2008** NASA awards SpaceX $1.6 billion contract for 12 ISS cargo resupply flights
- **July 2009** Falcon 1 becomes first privately developed rocket to deliver a commercial satellite into orbit
- **June 2010** First flight of SpaceX's Falcon 9 rocket, which successfully achieves Earth orbit
- **December 2010** On Falcon 9's second flight and the Dragon spacecraft's first, SpaceX becomes the first commercial company to launch a spacecraft into orbit and recover it successfully
- **May 2012** SpaceX's Dragon becomes first commercial spacecraft to attach to the ISS, deliver cargo, and return to Earth
- **August 2012** SpaceX wins $440 million NASA Space Act Agreement to develop Dragon to transport humans into space
- **October 2012** SpaceX completes first of 12 official cargo resupply missions to the ISS, beginning a new era of commercial space transport
- **September 2013** First flight of SpaceX's upgraded Falcon 9 rocket, with successful reentry of the first stage booster

Profile

SpaceX is a private company owned by management and employees, with minority investments from Founders Fund, Draper Fisher Jurvetson, and Valor Equity Partners. The company has more than 3,000 employees at its headquarters in Hawthorne, California; launch facilities at Cape Canaveral Air Force Station, Florida, and Vandenberg Air Force Base, California; a rocket development facility in McGregor, Texas; and offices in Houston, Texas; Chantilly, Virginia; and Washington, DC.

For more information, including SpaceX's Launch Manifest, visit the SpaceX website at www.spacex.com.

SpaceX Leadership

ELON MUSK
CEO and Chief Designer

Elon Musk is the CEO/chief designer Space Exploration Technologies (SpaceX) and CEO and Product Architect of Tesla Motors.

At SpaceX, Elon is the chief designer, overseeing development of rockets and spacecraft for missions to Earth orbit and ultimately to other planets. SpaceX has achieved a succession of historic milestones since its founding in 2002. The SpaceX Falcon 1 was the first privately developed liquid-fuel rocket to reach orbit. In 2008, SpaceX's Falcon 9 rocket and Dragon spacecraft won a NASA contract to provide the commercial replacement for the cargo transport function of the space shuttle, which retired in 2011. In 2010, SpaceX, with its Dragon spacecraft, became the first commercial company to successfully recover a spacecraft from Earth orbit. In 2012, SpaceX became the first commercial company to attach a spacecraft to the International Space Station and return cargo to Earth.

At Tesla, Elon has overseen product development and design from the beginning, including the all-electric Tesla Roadster, Model S, and Model X. Transitioning to a sustainable-energy economy in which electric vehicles play a pivotal role has been one of his central interests for almost two decades, stemming from his time as a physics student working on ultracapacitors in Silicon Valley.

In addition, Elon is the non-executive chairman and principal shareholder of SolarCity, which he helped create. SolarCity is now the leading provider of solar power systems in the United States.

Prior to SpaceX, Elon cofounded PayPal, the world's leading Internet payment system, and served as the company's Chairman and CEO. Before PayPal, he cofounded Zip2, a provider of Internet software to the media industry.

He has a physics degree from the University of Pennsylvania and a business degree from Wharton.

GWYNNE SHOTWELL
President and Chief Operating Officer

As President and Chief Operating Officer of SpaceX, Gwynne Shotwell is responsible for day-to-day operations and for managing all customer and strategic relations to support company growth. She joined SpaceX in 2002 as Vice President of Business Development and built the Falcon vehicle family manifest to nearly 50 launches, representing nearly $5 billion in revenue. She is a member of the SpaceX Board of Directors.

Prior to joining SpaceX, Gwynne spent more than 10 years at the Aerospace Corporation. There she held positions in Space Systems Engineering & Technology as well as Project Management. She was promoted to the role of Chief Engineer of an MLV-class satellite program, managed a landmark study for the Federal Aviation Administration on commercial space transportation, and completed an extensive analysis of space policy for NASA's future investment in space transportation. Gwynne was subsequently recruited to be Director of Microcosm's Space Systems Division, where she served on the executive committee and directed corporate business development. She also served as a Chair of the AIAA Space Systems Technical Committee.

Gwynne participates in a variety of STEM (Science, Technology, Engineering and Mathematics)-related programs, including the Frank J. Redd Student Scholarship Competition. Under her leadership the committee raised more than $350,000 in scholarships in six years. She was named winner of the 2011 World Technology Award for Individual Achievement in Space, and in June 2012 she was inducted into the Women in Technology International Hall of Fame. She is a member of the World Economic Forum's Global Agenda Council on Space Security.

Gwynne received, with honors, her bachelor's and master's degrees from Northwestern University in Mechanical Engineering and Applied Mathematics, and currently serves on the Advisory Council for Northwestern's McCormick School of Engineering. She has authored dozens of papers on a variety of subjects including standardizing spacecraft/payload interfaces, conceptual small spacecraft design, infrared signature target modeling, space shuttle integration, and reentry vehicle operational risks.

SES Company Overview

SES is a world-leading satellite operator with a global fleet of 54 geostationary satellites, complemented by a network of teleports around the world. Our satellites cover 99% of the world’s population and enable our customers to provide services to every part of the world.

SES provides satellite communications services to broadcasters, content and internet service providers, mobile and fixed network operators and business and governmental organisations worldwide.

Each day, the world's leading broadcasters use SES satellites to deliver thousands of hours of TV programming, providing information and entertainment to hundreds of millions of homes around the globe. SES satellites broadcast more than 6,000 TV channels, and form the world's largest satellite media broadcasting platform to more than 276 million TV homes around the world. With more than 1,700 high definition channels, SES satellites also form the world's leading HD distribution platform.

SES' satellites allow our enterprise customers to enjoy unrivalled connectivity anytime and anywhere. Telecommunications operators use our satellites to provide high-speed broadband access that bridges the digital divide and connects GSM networks in remote places. Governments rely on SES' connectivity to establish secure communication links to support their vital missions.

SES is listed on NYSE Euronext Paris and Luxembourg Stock Exchange: SESG, and holds participations in Ciel in Canada (70%), QuetzSat in Mexico (49%), YahLive in the Middle East (35%) as well as a strategic participation in satellite infrastructure start-up O3b Networks (46.88%).

SES Fleet Investment Programme

Aside SES-8, SES is investing in three more new satellite launches through 2015 to increase opportunities for both customers and users. The new satellites will enable improved coverage in fast-growing economies in Asia, Africa and Latin America and will help to deliver bandwidth-hungry services in established markets.

The new ASTRA 5B, ASTRA 2G and SES-9 satellites will complement our expanding fleet of satellites and network of teleports which provide regional, continental and combined worldwide coverage and interconnectivity.

SES Key Milestones

Innovation is embedded in SES' DNA. Besides introducing DTH satellite broadcasting in Europe and developed co-positioning of multiple satellites at one orbital position in 1989, SES was also the first to introduce digital TV in Europe in 1995 and was pioneer in carrying HDTV signals over satellite in 2004.

And SES doesn't just stop there. SES has also been working with our industry partners to make sure satellite remains relevant in the future of TV broadcasting. From the SAT>IP communications protocol that SES jointly developed in 2012 and the first Ultra HD demo channel that was broadcast in the new HEVC standard in 2013, SES has exhibited that it is ready to develop technology that will lead to success in the customers' markets.

SES' investment in O3b Networks, the world's first constellation of medium earth orbit satellites, also illustrates how SES is helping to develop the world’s first ultra-low latency, fibre speed satellite network. SES is also the first commercial satellite operator to commit to launching the first geostationary satellite launch using SpaceX's Falcon 9 rocket.

History of SES

1985: SES, Europe’s first private satellite operator, is founded in Luxembourg and signs launch agreement with Arianespace
1988: First satellite, ASTRA 1A, launches on ARIANE 4 at 19.2 East
1990: ASTRA was reaching 16.6 million cable and direct-to-home (DTH) households in Europe.
1991: Co-location - an innovation by SES. SES’ first satellite co-located to multiply the number of services that could be transmitted from one position.
1995: SES goes digital - a huge attraction for channel providers was SES’ pioneering of digital broadcasting technology.
2001: SES acquires Americom from GE. SES GLOBAL is established with two operating companies: SES ASTRA and SES Americom
2004: SES Americom is the first satellite company to carry HDTV signals
2006: SES further refines its strategy of geographic expansion by acquiring New Skies Satellites
2008: SES combines its Americom and New Skies segments into a single division called SES World Skies
2009: SES dives into strategic investment in O3b Network
2010: SES celebrates 25 years
2011: SES merges with SES ASTRA and SES World Skies to form one company, SES
2012: SES unveiled SAT>IP a new technology standard for satellite reception to IP-enabled devices at home
2013: SES launches its first Ultra HD demo channel in HEVC standard
2013: SES now operates in local offices in 22 countries worldwide

Fact Sheet: SES-8

Overview

SES is a leading global satellite operator which owns and operates 54 telecommunications satellites which cover 99 per cent of the world's population.

In November 2013, its newest satellite dedicated to serving the Asia-Pacific region, SES-8, will become SES' 55th satellite in orbit and the first communications satellite launched to geostationary orbit by private spaceflight firm, SpaceX.

If successful, the launch of SES-8 on SpaceX's Falcon 9 rocket opens the door to a new chapter in the satellite industry, as the SpaceX launcher – owned by billionaire technology entrepreneur, Elon Musk – represents a shorter, more cost efficient path to space.

Services and coverage

SES-8 will provide satellite communications services to broadcasters, content and internet service providers, mobile and fixed network operators, and business and governmental organisations in South Asia and Indochina.

Connecting homes and businesses via satellite enables a variety of applications; including Direct-to-Home (DTH) satellite television as well as Internet and mobile connectivity in remote geographies.

It will be co-located with another SES-owned satellite, NSS-6, at the prime orbital location of 95°E. Co-location significantly raises the levels of reliability and security for customers of both satellites.

SES in Asia-Pacific

SES has been headquartered regionally in Singapore since 1999 and leads the market in Asia-Pacific, in meeting the increasing popularity of direct-to-home (DTH) satellite television across the region.

Today, it carries the highest number of pay DTH channels (900 channels), translating to over 30 million pay TV homes in the region – more than any other satellite operator.

In the past three years, SES has committed three new SES satellites solely dedicated to serve fast-growing markets in the region. These satellites represent a significant capital investment, as an average-sized communications satellite costs upwards of US$250 million.

Together with four other SES satellites which provide coverage over multiple regions, including Asia-Pacific, SES will operate a robust fleet of seven satellites in this region by 2015.