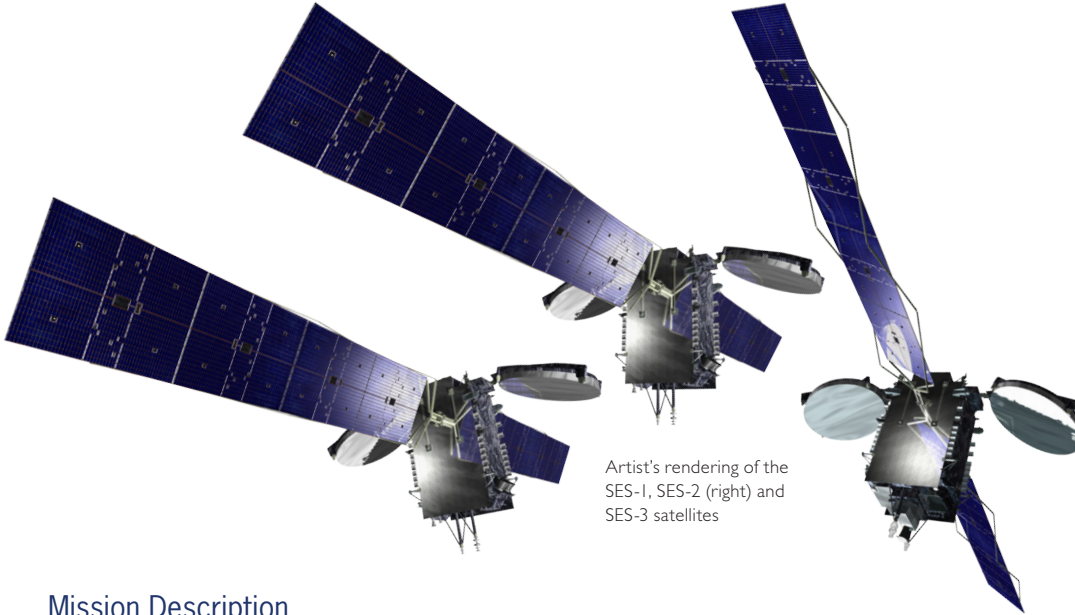




# SES-1, SES-2 and SES-3

Three Hybrid C- and Ku-band Satellites for the Continental United States



Artist's rendering of the SES-1, SES-2 (right) and SES-3 satellites

## Mission Description

The SES program consists of three virtually identical satellites, SES-1, -2 and -3, built for SES WORLD SKIES. The satellites, part of a 2007 contract for up to five similar satellites, are hybrid C- and Ku-band spacecraft that will serve North America and will replace satellites currently in orbit. The satellites also incorporate a redundant Ka-band payload. In addition, the SES-2 satellite features the Commercially Hosted InfraRed Payload (CHIRP) developed for the Air Force. A wide field of view sensor is integrated onto the satellite to validate space based infrared technologies from geosynchronous orbit.

## Spacecraft

The SES satellites are based on Orbital's Enhanced GEOStar-2.4 bus. The spacecraft each carry 24 active C-band and 24 Ku-band transponders of 36 MHz capacity each. Six of the channels in each band can be cross-strapped to the opposite band, enabling new service capability. In addition, the spacecraft has a 500 MHz redundant Ka-band payload. Each spacecraft generates approximately five kilowatts of payload power and has two 2.3 meter deployable reflectors.

## QUICK FACTS:



**Coverage:**  
CONUS

**Mission:**  
Ku- and C-band Communications for North America, and Ka-band Payload

**Customer:**  
SES WORLD SKIES



The SES-1 satellite in Orbital's Satellite Manufacturing Facility in Dulles, VA

# SES-1, SES-2 and SES-3

## Specifications

### Spacecraft

Launch Mass:	3,152 kg (6,949 lb.)
Solar Arrays:	Four panels per array, UTJ Gallium Arsenide cells
Stabilization:	3-axis stabilized
Propulsion:	Monopropellant (hydrazine) on-orbit system
Batteries:	Two >4840 W-Hr capacity Li-Ion batteries
Mission Life:	15 years

### Hybrid Payload

#### Ku-band

Repeater:	Two groups of 16-for-12 linearized TWTA's
TWTA Power:	90 W RF
Antenna:	2.3 m dual gridded shaped deployable reflector

#### C-band

Repeater:	Two groups of 16-for-12 SSPAs
SSPA Power:	20 W RF
Antenna:	2.3 m dual gridded shaped deployable reflector

#### Ka-band

Repeater:	2-for-1 TWTA
TWTA Power:	39 W RF
Antenna:	Receive and transmit horns

### Launch

SES-1:	Proton, April 24, 2010
SES-2:	Ariane, September 21, 2011
SES-3:	Proton, July 16, 2011

## Mission Partners

### SES WORLD SKIES

A leading global satellite operator providing a broad range of communications services

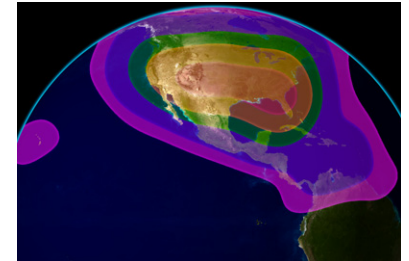
### Orbital Sciences Corporation

Prime contractor for the SES program

## SES Program Coverage Contour Maps

Payload performance exceeds requirements over the full coverage areas.

### C-band 101° West Longitude



### Ku-band 101° West Longitude

