

ORBCOMM

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ORBCOMM

[Orbcomm](#) is a constellation of low earth orbiting satellites providing two-way data and positioning service to small, portable user terminals in the VHF and UHF frequency bands.

ORBCOMM UPDATES

- As of August 15, 2001, Orbcomm is reporting that the following satellites are operational: A1 - A8, F2, G2, B1 - B8, C1 - C5, C7, D2 - D4, D6 - D8.
- In April 2001, a group of Orbcomm licensees bought all of the business and assets of Orbcomm, which had been under Chapter 11 protection since September 2000.

ADDITIONAL SATELLITES IN ORBIT

[Orbcomm](#) launched seven satellites into orbit on December 4, 1999, bringing the constellation total to 35.

TRACKING

Orbcomm is now publishing TLE's (two-line elements) on their webpage. A very enlightened and friendly attitude that should be duplicated by other satellite companies.

Click [here](#) to jump to their list.

A great tracking program to use with those elements is "Orbcomm View" from [Northern Lights Software](#).

UPLINK FREQUENCIES

Subscriber terminals transmit data at 2400 baud up to Orbcomm spacecraft. FCC frequency allocations are as follows:

Lower Limit	Upper Limit
148.000	148.250
148.750	148.885
148.905	149.585
149.635	149.900

Uplink power of 5W, frequencies between 148 and 150.05 (189 channels), at 2400 bps.

Ground stations transmit feederlink information to the satellites on 149.610 MHz at 57.6 kbps. The signal is approximately 50 kHz wide.

DOWNLINK FREQUENCIES

Orbcomm satellites transmit to subscriber terminals at 4800 baud using symmetric differential phase shift keying (SDPSK) modulation. (SDPSK indicates a zero bit with a negative 90° phase shift and a one bit with a positive 90° phase shift.)

Transmissions are right-hand circularly polarized (RHCP).

Downlink sensitivity of -118 dBm with a bit error rate of 10^{-5} , frequencies between 137 and 138 MHz (399 channels), at 4800 bps.

Here are the frequencies allocated by the [FCC](#) for Orbcomm satellite downlinks:

Segment	Lower Limit	Upper Limit	Bandwidth
1	137.1750 MHz	137.3275 MHz	152.5 kHz
2	137.4225 MHz	137.4725 MHz	50 kHz
3	137.6500 MHz	137.7500 MHz	100 kHz
4	137.7875	137.8125	25 kHz

Feederlink data is transmitted by the satellite on 137.560 MHz at 57.6 kbps.

Orbcomm spacecraft also transmit a UHF beacon at 400.1 MHz via a one watt transmitter.

Active subscriber downlink frequencies are:

137.2250
137.2500
137.4400
137.4600
137.6625
137.6875
137.7175
137.7375
137.8000

Individual satellite frequency assignments are as follows:

Spacecraft	Orbcomm Designator	Catalog	Orbital Plane	Launch Date	Status	Frequency	Hearsat Freq
FM 1	F1	23545	F	3 Apr 95	Off	137.4600	137.4600
FM 2	F2	23546	F	3 Apr 95	Operational	137.4600	137.4600
FM 3	G1	25158	G	10 Feb 98	Operational	137.678	137.6875
FM 4	G2	25159	G	10 Feb 98	Operational	137.678	137.6875
FM 5	A1	25117	A	23 Dec 97	Operational	137.2000	137.7175
FM 6	A2	25118	A	23 Dec 97	Operational	137.2250	137.7175
FM 7	A3	25119	A	23 Dec 97	Testing	137.662	137.4400
FM 8	A4	25112	A	23 Dec 97	Operational	137.717	137.7175
FM 9	A5	25116	A	23 Dec 97	Operational	137.717	137.7175
FM 10	A6	25113	A	23 Dec 97	Operational	137.717	137.7175
FM 11	A7	25114	A	23 Dec 97	Operational	137.662	137.4400
FM 12	A8	25115	A	23 Dec 97	Operational	137.662	137.6625
FM 13	B1	25413	B	2 Aug 98	Operational	137.7375 137.8000	137.8000
FM 14	B2	25414	B	2 Aug 98	Operational	137.7375 137.8000	137.7375
FM 15	B3	25415	B	2 Aug 98	Operational	137.7375 137.8000	137.7375

FM 16	B4	25416	B	2 Aug 98	Operational	137.7375 137.8000	137.8000
FM 17	B5	25420	B	2 Aug 98	Operational	137.7375 137.8000	137.8000
FM 18	B6	25419	B	2 Aug 98	Operational	137.7375 137.8000	137.7375
FM 19	B7	25418	B	2 Aug 98	Operational	137.7375 137.8000	137.7375
FM 20	B8	25417	B	2 Aug 98	Operational	137.7375 137.8000	137.7375
FM 21	C1	25475	C	23 Sep 98	Operational	137.2500 137.2250	137.2500
FM 22	C2	25476	C	23 Sep 98	Operational	137.2500 137.2250	137.2500
FM 23	C3	25477	C	23 Sep 98	Operational	137.2500 137.2250	137.6625
FM 24	C4	25478	C	23 Sep 98	Operational	137.2500 137.2250	137.2500
FM 25	C5	25479	C	23 Sep 98	Operational	137.2500 137.2250	137.2500
FM 26	C6	25480	C	23 Sep 98	Operational	137.2500 137.2250	137.6625
FM 27	C7	25481	C	23 Sep 98	Operational	137.2500 137.2250	137.2500
FM 28	C8	25482	C	23 Sep 98	Operational	137.2500 137.2250	137.6625
FM 30	D2	25980	D	9 Dec 99	Operational		
FM 31	D3	25981	D	9 Dec 99	Operational		
FM 32	D4	25982	D	9 Dec 99	Operational		
FM 33	D5	25983	D	9 Dec 99	Not Available		

FM 34	D6	25986	D	9 Dec 99	Operational
FM 35	D7	25985	D	9 Dec 99	Operational
FM 36	D8	25984	D	9 Dec 99	Operational

The frequencies noted as "Hearsat" are derived from two-line element (TLE) data available at the [Hearsat website](#) operated by [John David Corby](#).

LAUNCHES

As of December 4, 1999, Orbcomm had launched 35 satellites. Not all of them work.

The FCC has authorized Orbcomm to launch a total of 48 satellites, but plans for the remaining 13 are not finalized.

- Orbital Science's *Stargazer* Lockheed L-1011 aircraft launched a Pegasus rocket containing seven Orbcomm satellites midday Saturday, December 4, 1999, about 50 miles offshore from the Wallops Island facility in Virginia.
- Orbital Science's *Stargazer* Lockheed L-1011 aircraft launched a Pegasus rocket containing eight Orbcomm satellites early Wednesday morning, September 23, 1998, about 50 miles offshore from the Wallops Island facility in Virginia.
- Orbital Science's *Stargazer* Lockheed L-1011 aircraft launched a Pegasus rocket containing eight Orbcomm satellites on Sunday, August 2, 1998, offshore from the Wallops Island facility in Virginia. The eight satellites were placed into a 820 km x 823 km circular orbit at a 45 degree inclination.
- Hitching a ride with a US Navy GEOSAT Follow-On satellite, two Orbcomm satellites were carried into orbit by a Taurus rocket launched from Vandenberg Air Force Base on February 10, 1998.
- At 2:11 p.m. on December 23, 1997, a Pegasus XL rocket carrying eight satellites was launched from a L-1011 aircraft off the coast of Virginia. Seventy-two minutes later the satellites were injected into their target orbits approximately 500 miles above the earth.
- Two satellites were launched in April of 1995, from which intermittent commercial service was started in 1996.

These low earth orbit (LEO) satellites are designed to communicate with low-data rate subscriber communicators (SCs) and fixed site stations.

Date	Launch Site	Vehicle	Count
December 4, 1999	Off the coast Virginia	Pegasus XL via L-1011	7
September 23, 1998	Off the coast Virginia	Pegasus XL via L-1011	8
August 2, 1998	Off the coast Virginia	Pegasus XL via L-1011	8
February 2, 1998	Vandenberg Air Force Base California	Taurus	2
December 23, 1997	Off the coast Virginia	Pegasus XL via L-1011	8
April 3, 1995	Vandenberg Air Force Base California	Pegasus XL via L-1011	2

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Updated August 18, 2001