

Small satellites

Conventional, large satellites cost tens or even hundreds of millions of pounds, but going into space can now cost much less as scientists learn to think small.

Large communications satellites move as the planet turns, and so they always remain in geostationary orbit 36,000 kilometres above the same point on earth below. There they relay live television and thousands of telephone calls around the world.

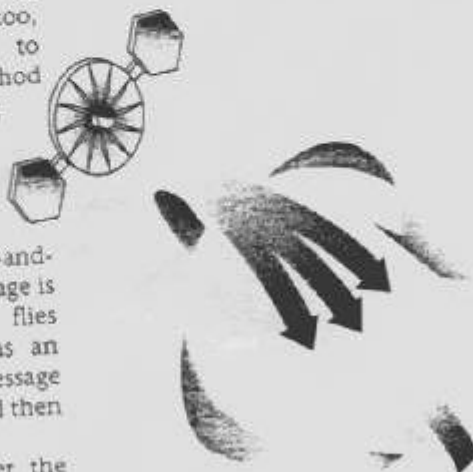
However, conventional satellites are heavy, complex and very expensive to design, build and launch. Small satellites, on the other hand, are much simpler and cheaper. They contain standard electronic components and so are quick to design and build. Because they are small and light, too, they are much easier and cheaper to launch. In fact, the most common method is a free ride on a rocket that is carrying a large satellite into orbit.

Large satellites are vital to instant, large-volume communications, but small ones are ideal for another form of communications known as "store-and-forward". With this technique, a message is beamed up to the satellite as it flies overhead. The satellite then acts as an orbiting "post office". It stores the message until it passes over the destination and then transmits the message back to earth.

When such a satellite orbits over the poles, it passes over every point of the earth's surface at least twice a day. Its orbit takes about 90 minutes, and the earth turns

20 degrees during each pass of the satellite. Within hours, therefore, information can pass from one point on the earth to any other.

At an average altitude of about 500 kilometres, small satellites in polar orbits are much closer to the earth than geostationary satellites. This means that less power is needed to transmit signals from such satellites. Moreover, the simple equipment for receiving signals – a small computer, radio and antenna – can fit into a briefcase.



Fill in the table.

	large satellites	small satellites
description		
orbit		
distance from the planet, altitude		
function, purpose		

Solution ...

	large satellites	small satellites
description	heavy, complex, expensive to build and launch	cheaper, quick to design, less power for transmission, cheap to build, easy to launch, light, simple
orbit	geostationary	polar orbit, 90 minutes
distance from the planet, altitude	36000 km	500 km
function, purpose	TV, telephone, large volume communications	"store and forward"-system, orbital post office