

What is claimed:

1. A method for increasing the bandwidth of a satellite system, the satellite system comprising a plurality of satellites, wherein the plurality of satellites are arranged in multiple planes, with a nominal number of satellites in each plane, wherein the method comprises:

establishing, between a minimal-set satellite network portal (SNP) having a first coverage area and a first one of at least two gateway antennas disposed on at least one of the satellites of the plurality of satellites, a first communications link having a first bandwidth; and

establishing, between an interstitial SNP having a second coverage area and a second one of the at least two gateway antennas disposed on the at least one satellite of the plurality of satellites, a second communications link having a second bandwidth, wherein the second coverage area overlaps at least a portion of the first coverage area;

channelizing, into a first group of channels each of which channels is associated with a different range of frequencies than the other channels in the first group, a first gateway beam received by the one satellite over the first communications link;

channelizing, into a second group of channels each of which channels is associated with a different range of frequencies than the other channels in the first group, a second gateway beam received by the one satellite over the second communications link, wherein:

(a) the first and second groups have the same number of channels,

(b) for each channel having a particular range of frequencies in the first group, there is a channel in the second group having the same range of frequencies; and

summing channels from the first group and the second group that have the same range of frequencies.

2. The method of claim 1 wherein the second bandwidth is substantially equal to the first bandwidth.

3. The method of claim 1 and further comprising directing the summed channels to respective radio transceivers on the one satellite for transmission to ground-based user terminals.

4. The method of claim 1 wherein the nominal number of satellites per plane is increased, the method further comprising:

deactivating a first radio transceiver of a plurality thereof on the one satellite, the first radio transceiver having at least a first channel of the first group of channels allocated thereto; and

re-allocating the first channel to a second radio transceiver of the plurality thereof, wherein the second radio transceiver transmits a beam to a first geographic region.

5. The method of claim 4 wherein the first radio transceiver has a first channel of the second group of channels allocated thereto, the method further comprising re-allocating the first channel of the second group of channels to the second radio transceiver.

6. The method of claim 5 and further comprising re-allocating, from the second radio transceiver to a third radio transceiver, the first channel of the first group of channels and the second channel of the second group of channels, wherein, when reallocation occurs:

- (a) the third radio transceiver is capable of transmitting to the first geographic region and,
- (b) the second radio transceiver is incapable of transmitting to the first geographic region.

7. A method for increasing the bandwidth of a satellite system, the satellite system comprising a plurality of satellites, wherein the plurality of satellites are arranged in multiple planes, with a nominal number of satellites in each plane, wherein the method comprises:

disposing an interstitial satellite network portal (SNP) having a first coverage area relatively closer to a first minimal-set SNP than the first minimal-set SNP is to any other minimal-set SNP; and

establishing a communications link between the interstitial SNP and one of at least two gateway antennas disposed on one satellite of the plurality of satellites, wherein the communication link transmits an interstitial gateway beam that increases bandwidth nominally provided to the satellite by a communications link established between the first minimal-set SNP and a second of the at least two gateway antennas disposed on the one satellite of the plurality of satellites;

forming a first group of channels from a gateway beam received over the communications link between the minimal-set SNP and the second gateway antenna;

increasing the nominal number of satellites per plane;

deactivating a first radio transceiver of a plurality thereof on the one satellite of the plurality of satellites;

re-allocating, to a second radio transceiver of the plurality, a first channel of the first group of channels that was formerly allocated to the first radio transceiver, wherein the second radio transceiver transmits a beam to a first geographic region.

8. The method of claim 7 wherein the interstitial gateway beam substantially doubles the bandwidth provided to the satellite.

9. The method of claim 7 and further comprising:

forming a second group of channels from the interstitial gateway beam; and

summing channels from the first group and the second group.

10. The method of claim 9 and further comprising directing the summed channels to respective radio transceivers on the one satellite for generation of antenna beams.

11. The method of claim 7 and further comprising re-allocating, from the second radio transceiver to a third radio transceiver, the first channel of the first group of channels, wherein, when reallocation occurs:

(a) the third radio transceiver is capable of transmitting to the first geographic region and,

(b) the second radio transceiver is incapable of transmitting to the first geographic region.

12. A method for increasing the bandwidth of a satellite system, the satellite system comprising a plurality of satellites, wherein the plurality of satellites are arranged in multiple planes, with a nominal number of satellites in each plane, wherein the method comprises:

disposing an interstitial satellite network portal (SNP) having a first coverage area relatively closer to a first minimal-set SNP than the first minimal-set SNP is to any other minimal-set SNP;

establishing a communications link between the interstitial SNP and one of at least two gateway antennas disposed on one satellite of the plurality thereof, wherein the communication link transmits an interstitial gateway beam that increases bandwidth nominally provided to the satellite by a communications link established between the first minimal-set SNP and a second of the at least two gateway antennas disposed on the one satellite of the plurality thereof;

forming a first group of channels from a gateway beam received over the communications link between the minimal-set SNP and the second gateway antenna;

forming a second group of channels from the interstitial gateway beam; and
summing channels from the first group and the second group;

increasing the nominal number of satellites per plane;

deactivating a first radio transceiver of a plurality thereof on the one satellite;

re-allocating, to a second radio transceiver of the plurality, a first channel of the first group of channels and a first channel of the second group of channels, both of which channels being formerly allocated to the first radio transceiver, wherein the second radio transceiver transmits a beam to a first geographic region.

13. The method of claim 12 and further comprising re-allocating, from the second radio transceiver to a third radio transceiver, the first channel of the first group of channels and the second channel of the second group of channels, wherein, when reallocation occurs:

(a) the third radio transceiver is capable of transmitting to the first geographic region and,

(b) the second radio transceiver is incapable of transmitting to the first geographic region.