

WHAT IS CLAIMED IS:

1. A method for transmitting an uplink signal, applied to a terminal device, comprising:
dividing a transmission time of the uplink signal into a plurality of time segments according to a third duration;

obtaining an open-loop uplink timing advance and a closed-loop uplink timing advance for each time segment, and generating a timing advance for each time segment according to the open-loop uplink timing advance and the closed-loop uplink timing advance for each time segment; and

adjusting a transmission time of one of the plurality of time segments of the uplink signal according to a corresponding timing advance for the one of the plurality of time segments;

~~2. The method of claim 1~~, wherein dividing the transmission time of the uplink signal into the plurality of time segments comprises:

receiving a first effective duration of the open-loop uplink timing advance and/or a second effective duration of the closed-loop uplink timing advance transmitted by a network side; and

dividing the transmission time of the uplink signal into the plurality of time segments according to the first effective duration and/or the second effective duration.

~~32. The method of claim 21~~, wherein determining the third duration according to the first effective duration and/or the second effective duration comprises:

taking a minimum duration of the first effective duration and the second effective duration as the third duration.

~~43. The method of claim 1~~, wherein obtaining the open-loop uplink timing advance for each time segment comprises:

calculating the open-loop uplink timing advance for each time segment according to one or more of positioning information of the terminal device, position information of a satellite, and velocity information of the satellite.

~~54. The method of claim 43~~, wherein the position information of the satellite and the

velocity information of the satellite are received from a network side or obtained according to an ephemeris received from the network side.

65. The method of claim 1, wherein obtaining the closed-loop uplink timing advance for each time segment comprises:

receiving at least one closed-loop uplink timing advance transmitted by a network side;
determining, according to a receiving time and a second effective duration of each closed-loop uplink timing advance, the closed-loop uplink timing advance that matches each time segment; and

determining the closed-loop uplink timing advance corresponding to one time segment to be set as a fixed value in a case that no closed-loop uplink timing advance matches the one time segment.

76. The method of claim 65, wherein the fixed value is set as zero.

87. The method of claim 1, wherein obtaining the closed-loop uplink timing advance for each time segment comprises:

receiving an adjustment increment for the closed-loop uplink timing advance transmitted by a network side and an adjustment step size of the adjustment increment;

calculating an elapsed duration according to an obtaining time of a last closed-loop uplink timing advance and a start time of a current time segment for pending transmission; and

calculating a closed-loop uplink timing advance for the current time segment for pending transmission according to one or more of the last closed-loop uplink timing advance, the elapsed duration, the adjustment increment, and the adjustment step size.

98. The method of claim 1, wherein generating the timing advance for each time segment according to the open-loop uplink timing advance and the closed-loop uplink timing advance for each time segment comprises:

obtaining the timing advance for each time segment by performing summation on the open-loop uplink timing advance and the closed-loop uplink timing advance for each time segment.

~~109.~~ The method of claim 1, further comprising:

receiving an uplink timing advance at a cell level or a beam level transmitted by a network side;

wherein generating the timing advance for each time segment according to the open-loop uplink timing advance and the closed-loop uplink timing advance for each time segment comprises:

obtaining the timing advance for each time segment by performing summation on the uplink timing advance at the cell level or the beam level, the open-loop uplink timing advance and the closed-loop uplink timing advance for each time segment.

~~110.~~ A method for transmitting an uplink signal, applied to a network side, comprising:

calculating at least one closed-loop uplink timing advance according to an arrival time of the uplink signal of a terminal device and transmitting the at least one closed-loop uplink timing advance to the terminal device, to enable the terminal device to obtain the closed-loop uplink timing advance that matches each time segment for transmitting the uplink signal; ~~and~~

transmitting satellite information to the terminal device to enable the terminal device to calculate an open-loop uplink timing advance for each time segment according to the satellite information, and generate a timing advance for each time segment according to the open-loop uplink timing advance and the closed-loop uplink timing advance to adjust a transmission time of one of the plurality of time segments of the uplink signal according to a corresponding timing advance for the one of the plurality of time segments; ~~and~~

~~12.~~ The method of claim 11, further comprising:

transmitting a first effective duration of the open-loop uplink timing advance and/or a second effective duration of the closed-loop uplink timing advance to the terminal device, to enable the terminal device to divide the transmission time of the uplink signal into a plurality of time segments according to the first effective duration and/or the second effective duration.

~~1311.~~ The method of claim ~~11~~10, wherein transmitting the satellite information to the terminal device comprises:

transmitting an ephemeris and/or position information of a satellite and/or velocity information of the satellite to the terminal device.

1412. The method of claim 1410, further comprising:

transmitting an adjustment increment for the closed-loop uplink timing advance and an adjustment step size of the adjustment increment to the terminal device, to enable the terminal device to calculate a closed-loop uplink timing advance for a current time segment for pending transmission according to the adjustment increment and the adjustment step size.

~~15. An apparatus for transmitting an uplink signal, applied to a terminal device, comprising:~~

~~a dividing module configured to divide a transmission time of the uplink signal into a plurality of time segments according to a third duration;~~

~~a generating module configured to obtain an open-loop uplink timing advance and a closed-loop uplink timing advance for each time segment, and generate a timing advance for each time segment according to the open-loop uplink timing advance and the closed-loop uplink timing advance for each time segment; and~~

~~an adjusting module configured to adjust a transmission time of one of the plurality of time segments of the uplink signal according to a corresponding timing advance for the one of the plurality of time segments.~~

~~16. An apparatus for transmitting an uplink signal, applied to a network side, comprising:~~

~~a first transmitting module configured to calculate at least one closed-loop uplink timing advance according to an arrival time of the uplink signal of a terminal device and transmit the at least one closed-loop uplink timing advance to the terminal device, to enable the terminal device to obtain the closed-loop uplink timing advance that matches each time segment for transmitting the uplink signal; and~~

~~a second transmitting module configured to transmit satellite information to the terminal device to enable the terminal device to calculate an open-loop uplink timing advance for each time segment according to the satellite information, and generate a timing advance for each time segment according to the open-loop uplink timing advance and the closed-loop uplink~~

~~timing advance to adjust a transmission time of one of the plurality of time segments of the uplink signal according to a corresponding timing advance for the one of the plurality of time segments.~~

~~17~~13. A communication device, comprising:

a processor;

a transceiver;

a memory; and

a computer program stored in the memory,

wherein the processor is configured to run the computer program to implement the method for transmitting the uplink signal according to any one of claims 1 to ~~10~~9.

~~18~~14. A communication device, comprising:

a processor;

a transceiver;

a memory; and

a computer program stored in the memory,

wherein the processor is configured to run the computer program to implement the method for transmitting the uplink signal according to any one of claims ~~11-10~~ to 12~~14~~.

~~19~~15. A processor-readable storage medium having a computer program stored thereon, wherein the computer program is configured to enable the processor to implement the method for transmitting the uplink signal according to any one of claims 1 to ~~10-9~~ or the method for transmitting the uplink signal according to any one of claims ~~11-10~~ to 12~~14~~.