CLAIMS:

1. A controlled power supply configured to supply bursts of substantially constant voltage to a plurality of pulse loads via a load switch, said power supply comprising:

a plurality of storage capacitors, each coupled to a plurality of pulse loads; and

an average current processing unit operable to compute for each of the storage capacitors an average current that should be fed to the storage capacitor, in response to an estimation of the current that is to be sourced by the respective plurality of pulse loads coupled to the storage capacitor during an active portion of a switching cycle of the respective plurality of pulse loads;

wherein each of the storage capacitors is coupled to a controller of the controlled power supply, the controller being configured to control a magnitude of a substantially constant current that continuously supplies energy to the storage capacitor to correspond to the average current computed for it.

2. The controlled power supply according to claim 1, wherein each of the storage capacitors is configured: (a) to store energy during both active and inactive portions of the respective load switching cycle; and (b) to supply stored energy to the respective plurality of pulsed loads during the active portion of the load switching cycle.

3. The controlled power supply according to claim 1, comprising a plurality of switch power supplies coupled to each of the storage capacitors and to the respective plurality of pulse loads.

4. The controlled power supply according to claim 3, wherein each of the storage capacitors is configured to supply the stored energy to the respective switch power supply to which the storage capacitor is coupled, and then to each of the pulse loads, during the active portion of the load switching cycle; wherein for

each of the switch power supplies there is comprised a controller operatively coupled to the average current processing unit configured to supply continuous energy to the respective storage capacitor at the computed substantially constant current.

5. The controlled power supply according to claim 3, wherein for each of the storage capacitors the controlled power supply comprises: (a) a switching converter controlled by a PWM switch for coupling to a voltage source and producing an output voltage; and (b) an output capacitor for storing energy and for supplying the stored energy to the pulse load during the active portion of the respective load switching cycle; wherein the controller being coupled to the switching converter for pulse width modulating the PWM switch.

6. The controlled power supply according to claim 1, wherein the average current processing unit comprises an integrator having a capacitor and a resistor selected so as to set an integration averaging interval of the integrator to be an order of magnitude larger than the largest expected pulse load interval of the switching converter.

7. The controlled power supply according to claim 1, wherein for each of the storage capacitor the controller is configured to generate switching signals for closing and opening said load switch at a rate and duty cycle that is commensurate with respective durations of the active portion and the inactive portion of the respective switching cycle.

8. The controlled power supply according to claims 1, wherein the pulse loads are antenna elements of a phased array antenna.

9. The controlled power supply according to claim 1, comprising for each of the storage capacitors a converter operable to convert input voltage inputted to it to an output of a different voltage that is fed to the storage capacitor; wherein an output of the converter exceeds a voltage of 82 Volts.

10. A method of supplying bursts of substantially constant voltage to a plurality of pulse loads, the method comprising:

for each out of a plurality of storage capacitors, each coupled to a plurality of pulse loads, computing an average current that should be fed to the storage capacitor, in response to an estimation of the current that is to be sourced by the respective plurality of pulse loads coupled to the storage capacitor during an active portion of a switching cycle of the respective plurality of pulse loads;

continuously supplying energy to each of the storage capacitors at a substantially constant current; and

for each of the storage capacitors, controlling a magnitude of a substantially constant current that continuously supplies energy to the storage capacitor to correspond to the average current computed for it.

11. The method according to claim 10, comprising storing energy in each of the storage capacitors during both active and inactive portions of a load switching cycle of the respective pulse loads, for feeding voltage to the respective pulse loads during an active portion of the load switching cycle.

12. The method according to claim 11, comprising supplying the energy, stored in each respective storage capacitor, to a respective switch power supply to which the storage capacitor is coupled and which is coupled to the respective plurality of pulse loads, and then to each of the respective plurality of pulse loads during the active portion of the load switching cycle.

13. The method according to claim 10, further comprising for each of the storage capacitors: (a) feeding energy to the storage capacitor via a switching converter; and (b) varying a duty cycle of the switching converter to produce a desired average current.

14. The method according to claim 10, further comprising for each of the storage capacitors: varying the duty cycle of the switching converter so as to maintain the current supplied by the switching converter at a level slightly above an average current required by the respective pulse loads.

~~15. The method according to claim 10, wherein the pulse loads are antenna elements~~ of a phased array antenna.

16. A phased array antenna system comprising:

a plurality of modules each containing a plurality of antenna elements adapted to scan over a predetermined field of view; and

a respective controlled power supply, according to claim 1, for ~~supplying power to the antenna elements in each module.~~

CLAIMS

1. A method of supplying bursts of substantially constant voltage to a plurality of pulse loads (11, 22), the method comprising:

providing an array of low voltage current sources (18), each for feeding constant DC (Direct Current) current at a nominal voltage to a respective storage capacitor (19), each of which is coupled to a plurality of switch power supplies (14);

coupling each of the switch power supplies (14) to a respective output storage capacitor (17) for feeding voltage to the pulse load (11,22);

storing energy in each of the storage capacitors (19) during both active and inactive portions of a load switching cycle of the respective switch power supply (14), to which the corresponding storage capacitor (19) is coupled, for feeding voltage to the respective pulse loads (11,22) during an active portion of the load switching cycle; and

supplying the energy, stored in the respective storage capacitor (19), to the respective switch power supply (14), to which the storage capacitor (19) is coupled, and then to each of the pulse loads (11, 22) during the active portion of the load switching cycle, wherein the supplying of said energy comprises computing, based on a current that is to be sourced by the load during the active portion of the load switching cycle, an average current that should be fed to the respective storage capacitor (19) in order to ensure that sufficient energy will be stored in said respective storage capacitor (19) to feed the pulse load (11, 22) without substantially completely draining said respective storage capacitor (19).

2. The method according to claim 1, wherein supplying the energy stored in the respective storage capacitor (19) to the respective switch power supply (14) comprises:

supplying continuous energy to the respective storage capacitor(19) at a substantially constant current equal in magnitude to the average current.

3. The method according to claim 1 or 2, further comprising:

feeding energy to the respective storage capacitor (19) via a switching converter (24);and

varying a duty cycle of the switching converter (24) to produce a desired average current.

4. The method according to claim 3, further comprising:

varying the duty cycle of the switching converter (24) so as to maintain the current supplied by the switching converter (24) at a level slightly above an average current required by the pulse load (11,22).

5. The method according to claim 3 or 4, further comprising:

setting an integration averaging interval of the switching converter (24) to be an order of magnitude larger than a largest expected pulse load interval.

6. The method according to any one of claims 1 to 5, wherein a single pulse load is coupled to each of the switch power supplies (14).

7. The method according to any one of claims 1 to 5, wherein at least two of the pulse loads (11,22) are coupled to each of the switch power supplies (14).

8. The method according to any one of claims 1 to 7, wherein the pulse loads (11, 22) are antenna elements (11) of a phased array antenna.

9. A controlled power supply configured to supply bursts of substantially constant voltage from a respective storage capacitor (19) to a plurality of pulse loads (11,22) via a load switch (23), said power supply comprising:

an array of low voltage current sources (18), each for feeding constant DC (Direct Current) current at a nominal voltage to a respective storage capacitor (19);

a plurality of switch power supplies (14) coupled to each of the storage capacitors (19)

and to respective pulse loads (11,22);

each of the storage capacitors (19) being configured for storing energy during both active and inactive portions of a load switching cycle of the respective switch power supply (14), to which the corresponding storage capacitor (19) is coupled, when the pulse loads (11,22) are inactive;

a respective output storage capacitor (17) in association with each of the switch power supplies (14) for feeding voltage to the respective pulse loads (11, 22) during an active portion of the load switching cycle;

the respective storage capacitor (19) being configured for supplying the stored energy to the respective switch power supply (14), to which the storage capacitor (19) is coupled, and then to each of the pulse loads(l 1, 22), during the active portion of the load switching cycle; and

an average current processing unit (33) responsive to a predetermined current that is to be sourced by the pulse load (11, 22) during the active portion of the load switching cycle for computing an average current that should be fed to the respective storage capacitor (19) to ensure that sufficient energy will be stored in said respective storage capacitor (19) to feed the pulse load (11, 22) without substantially completely draining said respective storage capacitor (19).

10. The controlled power supply according to claim 9, wherein for each of the switch power supplies (14) there is comprised:

a controller (30) operatively coupled to the average current processing unit (33) configured to supply continuous energy to the respective storage capacitor (19) at a substantially constant current equal in magnitude to said average current and configured to generate switching signals for closing and opening said load switch (23) at a rate and

duty cycle that is commensurate with respective durations of the active portion and the inactive portion of the switching cycle.

11. The controlled power supply according to claim 10, further comprising in respect of each controller (30);

a switching converter (24) controlled by a PWM switch (29) for coupling to a voltage source (21) and producing an output voltage; and

a storage capacitor (19) for storing energy and for supplying the stored energy to the load (22) during the active portion of the load switching cycle;

said controller (30) being coupled to the switching converter (24) for pulse width modulating the PWM switch (29).

12. The controlled power supply according to claim 9 or 11, wherein:

the average current processing unit (33) comprises an integrator (46) having a capacitor (C12) and a resistor (RIO) selected so as to set an integration averaging interval of the integrator (46) to be an order of magnitude larger than the largest expected pulse load (11, 22) interval of the switching converter (24).

13. The controlled power supply according to any one of claims 9 to 12, wherein a single pulse load (11,22) is coupled to each of the switch power supplies (14).

14. The controlled power supply according to any one of claims 9 to 12, wherein at least two of the pulse loads (11, 22) are coupled to each of the switch power supplies (14).

15. The controlled power supply according to any one of claims 9 to 14, wherein the pulse loads (11,22) are antenna elements (11) of a phased array antenna.

16. A phased array antenna system comprising:

a plurality of modules each containing a plurality of antenna elements (11) adapted to

scan over a predetermined field of view; and

a respective controlled power supply, according to claim 15, for supplying power to the antenna elements (11) in each module.