

CLAIMS

What is claimed is:

1. A method comprising using at least one hardware processor to:
 - receive a payload model of a satellite payload in a satellite orbiting Earth, wherein the payload model is defined in Yet Another Next Generation (YANG) data modeling language, and wherein the payload model represents a configuration for the satellite payload, wherein the satellite payload comprises one or more components, and wherein the configuration specifies a setting for at least one of the one or more components;
 - translate the payload model into one or more satellite commands for configuring the satellite payload according to the configuration represented in the payload model; and
 - reconfigure the satellite payload using the one or more satellite commands.
2. The method of Claim 1, wherein the at least one hardware processor is comprised in a ground control system, and wherein reconfiguring the satellite payload comprises transmitting the one or more satellite commands to the satellite orbiting Earth.
3. The method of Claim 1, wherein the at least one hardware processor is comprised in the satellite, and wherein the payload model is received via transmission from a ground control system.
4. The method of Claim 1, wherein the method further comprises using the at least one hardware processor to:
 - receive telemetry from the satellite orbiting Earth; and
 - translate the telemetry into the payload model.
5. The method of Claim 1, further comprising using a network planning system to:
 - receive a service model of a service, wherein the service model is defined in the YANG data modeling language;
 - generate one or more network models based on the service model, wherein each of the one or more network models represents a network, and is defined in the YANG data modeling language, and wherein each of the one or more network models comprises satellite payload information to enable service provisioning; and
 - send at least one of the one or more network models to a control system in a network represented by the at least one network model.

6. The method of Claim 5, further comprising using the control system in the network to:

receive the at least one network model;

generate one or more device models based on the at least one network model, wherein each of the one or more device models represents a configuration of a network device in the network represented by the at least one network model, and is defined in the YANG data modeling language; and

send at least one of the one or more device models to a network device represented by the at least one device model.

7. The method of Claim 5, wherein the service model is received from an operations and business support system.

8. The method of Claim 5, further comprising using the networking planning system to communicate with a network planning system in another domain.

9. The method of Claim 8, wherein the other domain is a terrestrial communications domain.

10. The method of Claim 1, wherein reconfiguring the satellite payload comprises provisioning the satellite payload for at least one new service.

11. The method of Claim 1, wherein reconfiguring the satellite payload comprises changing at least one existing service of the satellite payload.

12. The method of Claim 1, wherein reconfiguring the satellite payload comprises terminating at least one existing service of the satellite payload.

13. The method of Claim 1, wherein the payload model further represents one or more capabilities of the satellite payload and one or more procedures for configuring the satellite payload to support one or more services.

14. The method of Claim 1, wherein the payload model comprises a representation of a digital switch matrix or channelizer of the satellite payload, a representation of one or more radio frequency (RF) components of the satellite payload, and a representation of one or more connections between the digital switch matrix or channelizer and the one or more RF components.

15. The method of Claim 14, wherein the payload model comprises a remote procedure call that updates a configuration of the digital switch matrix or channelizer.

16. The method of Claim 14, wherein the payload model comprises a remote procedure call that accounts for changes in state and redundancy of the one or more RF components.

17. The method of Claim 1, wherein the payload model comprises a representation of an analog-to-digital converter, a switch or a router, and a digital-to-analog converter.

18. The method of Claim 1, wherein the payload model comprises a remote procedure call that retrieves a state of one or more components of the satellite payload.

19. The method of Claim 1, wherein the payload model comprises a remote procedure call that accesses one or more telemetry functions of the satellite payload.

20. The method of Claim 1, wherein the payload model comprises a representation of a phased array antenna as a plurality of antenna elements.

21. The method of Claim 20, wherein each representation of one of the plurality of antenna elements comprises a representation of one or more beams, and wherein each representation of a beam represents one or more of a beam direction, minimum frequency, maximum frequency, power, gain, or normalized beam pattern.

22. The method of Claim 1, wherein the payload model comprises a remote procedure call that updates the configuration for the satellite payload, and wherein translating the payload model into one or more satellite commands comprises:

receiving a call to the remote procedure call, wherein the call is formatted in eXtensible Markup Language (XML);

accessing a translation XML document that maps the remote procedure call to one or more satellite command and control (C2) procedures; and

communicating the C2 procedures to a satellite C2 system that communicatively links with the satellite.

23. The method of Claim 1, further comprising using the at least one hardware processor to:

update the payload model to represent one or more of a current status, current configuration, or current performance of the satellite payload; and

send the updated payload model to a network planning system.

24. The method of Claim 23, further comprising using the network planning system to coordinate at least one service provided by the satellite payload with at least one service provided by one or more other network devices within a network, based on the payload model and a model, defined in the YANG data modeling language, of each of the one or more other network devices.

25. A system comprising:

at least one hardware processor; and

one or more software modules that are configured to, when executed by the at least one hardware processor, perform the method of any preceding claim.

26. A non-transitory computer-readable medium having instructions stored therein, wherein the instructions, when executed by a processor, cause the processor to perform the method of any one of Claims 1-24.

27. A method comprising using at least one hardware processor to:

receive a payload model of a satellite payload in a satellite orbiting Earth, wherein the payload model is defined in a data modeling language, and wherein the payload model represents a configuration for the satellite payload, wherein the satellite payload comprises one or more components, and wherein the configuration specifies a setting for at least one of the one or more components;

translate the payload model into one or more satellite commands for configuring the satellite payload according to the configuration represented in the payload model; and

reconfigure the satellite payload using the one or more satellite commands.