Purpose – For Lunar, the CCSDS plans on defining Prox-1 directives for S-band and maybe K-band. I would like to get your thoughts on my ideas below for expanding these Prox-1 directives. I don’t know all the values for all the parameters yet, but I do know that Lunar operations plans to add the rate 2/3 LDPC k=4096 code and OQPSK and GMSK modulations.

Principles to adhere to for this change:

1. Make the directive set useable for more than just S-band (Lunar). Make it multi-frequency compatible, except there is no way I can or need to make it compatible with the original UHF directives in current Prox-1.
2. Use Tables for frequencies and data rates (allows missions more flexibility)
3. Define a channel number index into the frequency tables … same for data rate tables
4. Put the directive type as bit 0 (up front) instead of at the last bit in the directive. (Note: we were forced to do it the wrong way by CE Mars 98 design)
5. Use one directive for SET TRANSMITTER PARAMETERS, SET RECEIVER PARAMETERS like Electra does (SET PL\_EXT) but rename it: SET TRANSCEIVER PARAMETERS.

I’d like to define the directives to be 32 bits long instead of 16 bits. Do you think that is a problem extending to 32 bits ?

1. New SET TRANSCEIVER PARAMETERS directive (32 bits):

* Bit 0-3: Directive Type (4 bits) – Provides maximum of 16 directives; value= ‘0000’
* Bit 4: Transceiver Side (1 bit) – Set up the Receiver or the Transmitter
* Bit 5-7: Frequency Band – UHF, S, Ka, Optical, reserves
* Bit 8: Frequency Table – 0 = Default; 1 = Extended
* Bit 9-13: Frequency Channel Number – Up to 32 frequency assignments are available per table
* Bit 14: Data Rate Table - 0 = Default; 1 = Extended
* Bit 15-19: Data Rate - Up to 32 data rate assignments are available per table
* Bit 20-22: Coding (accommodates new LDPC rate 2/3 code k=4096, reserved bits)
* Bit 23-25: Carrier Modulation – (accommodates new OQPSK and GMSK)
* Bit 26-27: Bit Data Format – NRZ-L, Bi-Phase-L, …
* Bit 28: Protocol Mode – 0 = Prox-1; 1= No Protocol (Raw mode)
* Bit 29-30: Carrier Suppression – 0 = Suppressed Carrier; 1 = Residual Carrier, reserved bits
* Bit 31: Transceiver Coherency – 0 = Coherent; 1 = Non-coherent

1. SET CONTROL PARAMETERS directive (32 bits)

* Bit 0-3: Directive Type (4 bits) – Provides maximum of 16 directives; value=’0001’
* Bit 4-9: Time Sample (6 bits) –
* Bit 10-12: Duplex (3 bits) –
* Bit 13: Remote No More Data (1 bit) –
* Bit 14: Token (1 bit) –
* Bit 15-31: Reserved

1. SET V(R) (COP command) (32 bits)

* Bit 0-3: Directive Type (4 bits) – Provides maximum of 16 directives; value=’0002’
* Bit 4-27: Receiver Frame Sequence Number (24 bits)
* Bit 28-31: Reserved

1. REPORT REQUEST directive (32 bits)

* Bit 0-3: Directive Type (4 bits) – Provides maximum of 16 directives; value=’0003’
* Bit 4-8: Status Report Request Type (5 bits)
* Bit 9-11: Time Tag Report Request Type (3 bits)
* Bit 12: PCID 0: PLCW Request (1 bit)
* Bit 13: PCID 1: PLCW Request (1 bit)
* Bit 14-31: Reserved

1. REPORT SOURCE SPACECRAFT ID directive (32 bits)

* Bit 0-3: Directive Type (4 bits) – Provides maximum of 16 directives; value=’0004’
* Bit 4-19: Source Spacecraft ID – Provides for Version 3 & Version 4 SCID values
* Bit 20-31: Reserved

NOTE: Eliminate the SET PL\_EXTENSIONS Directive since it was Electric Transceiver specific for Mars

Question: What do you think about the names of these parameters ? Descriptive enough ?

Your thoughts ?