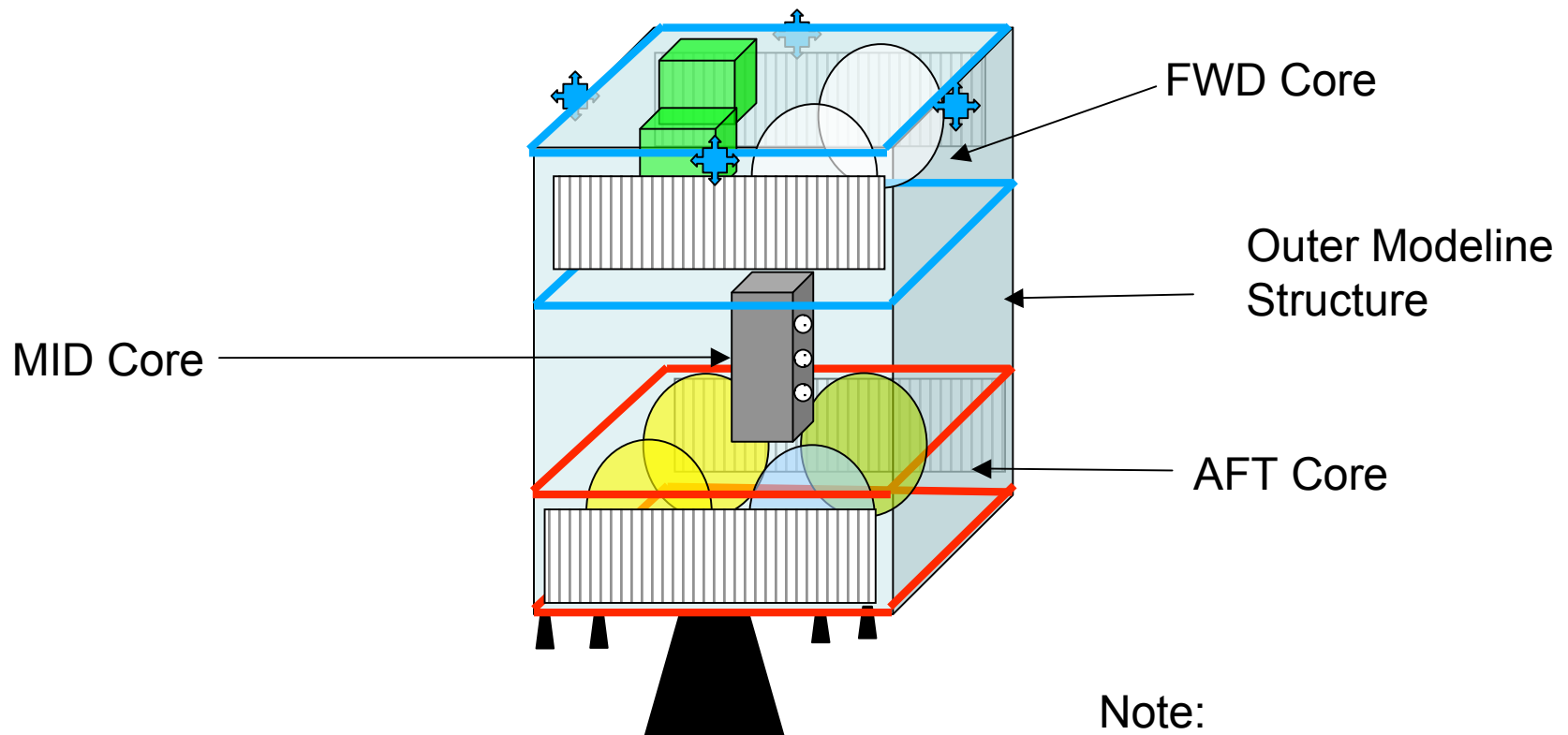


Service Module Mission Kit Design

Service Module Mission Kit Concept

- Center Module is mission kit specific
- Module design allow flexibility for mission designs.
 - Lunar Mission
 - 4 crew with additional Delta V if required and additional radiators required
 - ISS Mission
 - 6 crew with payload and consumables required
 - Hubble Mission
 - 4 crew with payload and cabin depress/repress cycle consumables required
 - Asteroid Mission
 - 4 crew with science sensor package and additional Delta V and consumables required

Base Service Module



Base Service Module Design

FWD Core

- Avionics
 - Potential for Smart SM avionics
- PROP
 - four Quads of RCS thrusters
 - 24 x 100lb
 - Plumbing lines from Aft Core
- EPS
 - Solar Arrays
 - Sun Sensor
 - Power Distribution system
- ECLSS
 - Water and life support system
 - Consumables sized for 4 person crew to moon
- ATCS
 - FWD radiators
 - Plumbing to Mid and Aft Core Radiators
- Comm
 - HGA
 - S-Bands
 - Comm Hardware
- DATA BUS
 - CMD/FB from FWD, MID and AFT units

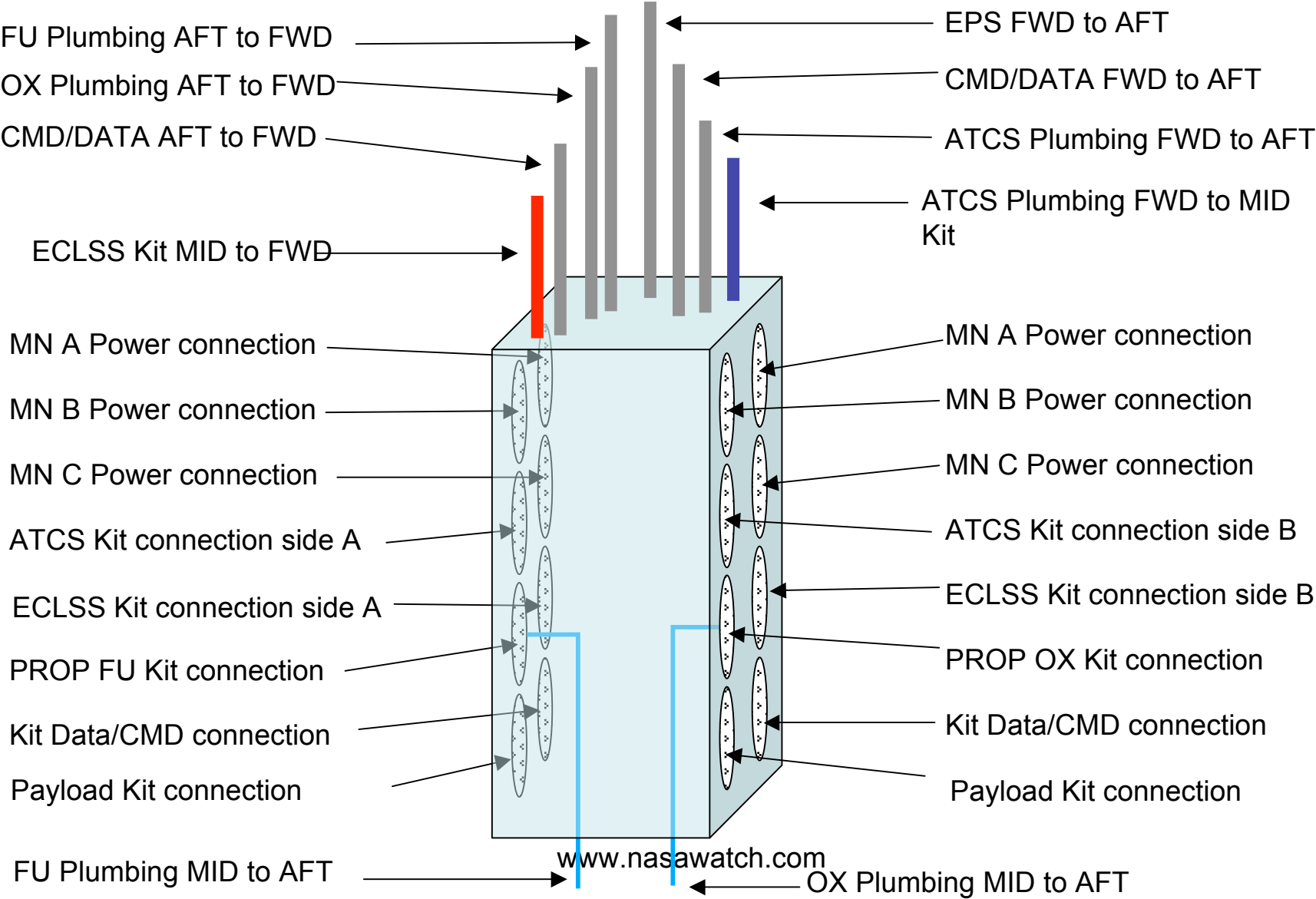
MID Core

- Structural interface between FWD and AFT Core Modules
- Avionics
 - none
- PROP
 - Plumbing lines from Aft Prop to Fwd RCS Quads
 - Plumbing connections for Prop Kit
- EPS
 - Power Distribution system fwd to aft and fwd to Kit connections
- ECLSS
 - Plumbing connections for additional consumables Kit
- ATCS
 - Plumbing connections for additional Mid radiators
 - Plumbing from Fwd to Mid and Aft Core Radiators
- Comm
 - none
- DATA BUS
 - CMD/FB from payload Kit, MID and AFT units

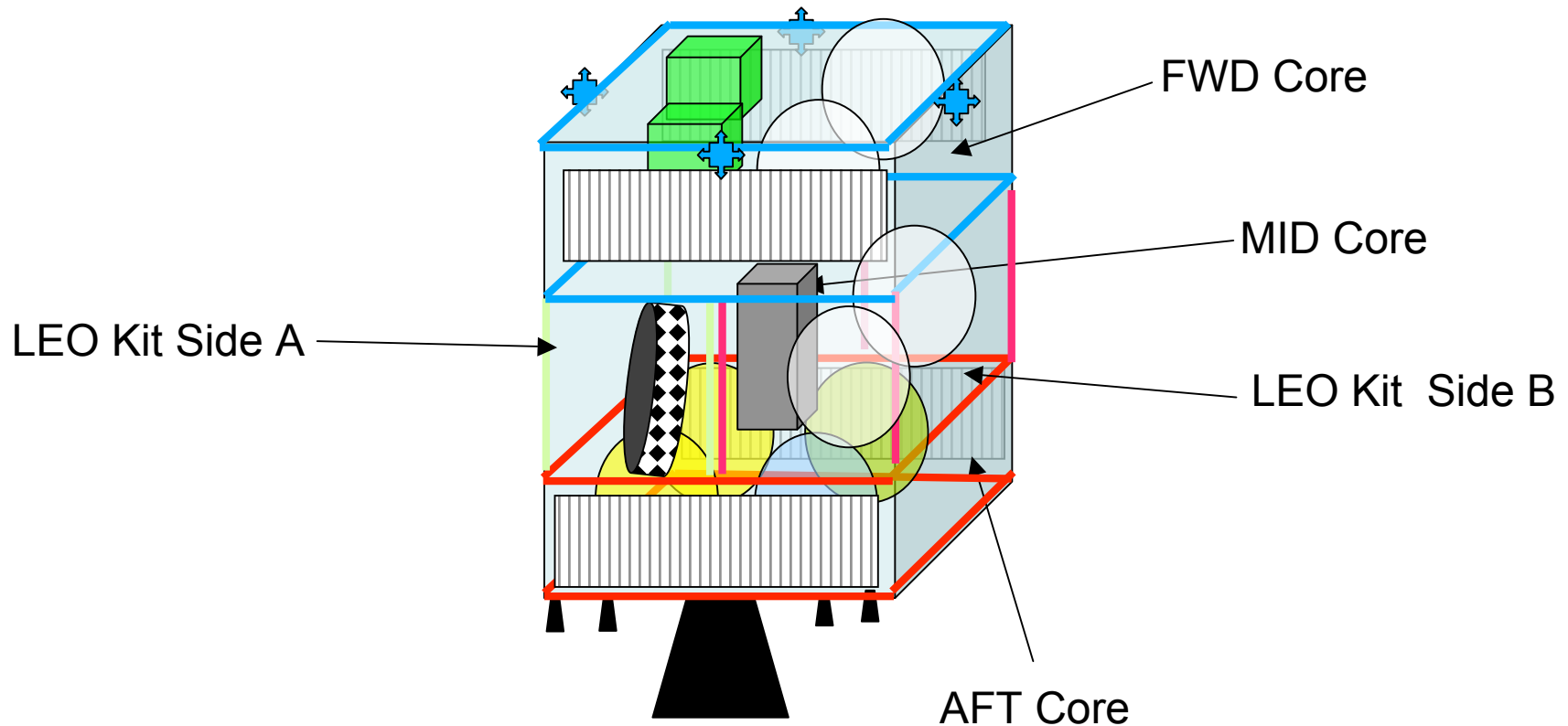
AFT Core

- Avionics
 - none
- PROP
 - 6 klb OMS Engine
 - OMS Gimbal System
 - four 870lb RCS Jets
 - One set of FU/OX/He tanks
 - 12000 lbs wet
 - ~3000 fps max
 - heaters
 - Plumbing lines to FWD core RCS
- EPS
 - Power Distribution for Prop system
- ECLSS
 - none
- ATCS
 - AFT radiators
 - Plumbing from FWD Core ATCS system
- Comm
 - Maybe an S-Band
- DATA BUS
 - CMD/FB from AFT LRUs

MID Core Schematic



LEO Service Module Configuration



LEO Service Module Configuration

LEO KIT Side A

- Payload storage
 - CMGs to ISS
 - Hubble servicing Hardware
- Avionics
 - none
- PROP
 - none
- EPS
 - Power Distribution system to payload
- ECLSS
 - none
- ATCS
 - none
- Comm
 - none
- DATA BUS
 - CMD/FB from Payload, and ATCS

MID Core

- Structural interface between FWD and AFT Core Modules
- Avionics
 - none
- PROP
 - Plumbing lines from aft core to fwd core
 - Plumbing connections for Prop Kit (**Capped**)
- EPS
 - Power Distribution system fwd to aft and fwd to Kit connections
- ECLSS
 - Plumbing connections for additional LEO consumables Kit
- ATCS
 - Plumbing connections for additional Mid radiator (**Capped**)
 - Plumbing from fwd to Mid and Aft Core Radiators
- Comm
 - none
- DATA BUS
 - CMD/FB from payload Kit, MID and AFT LRUs

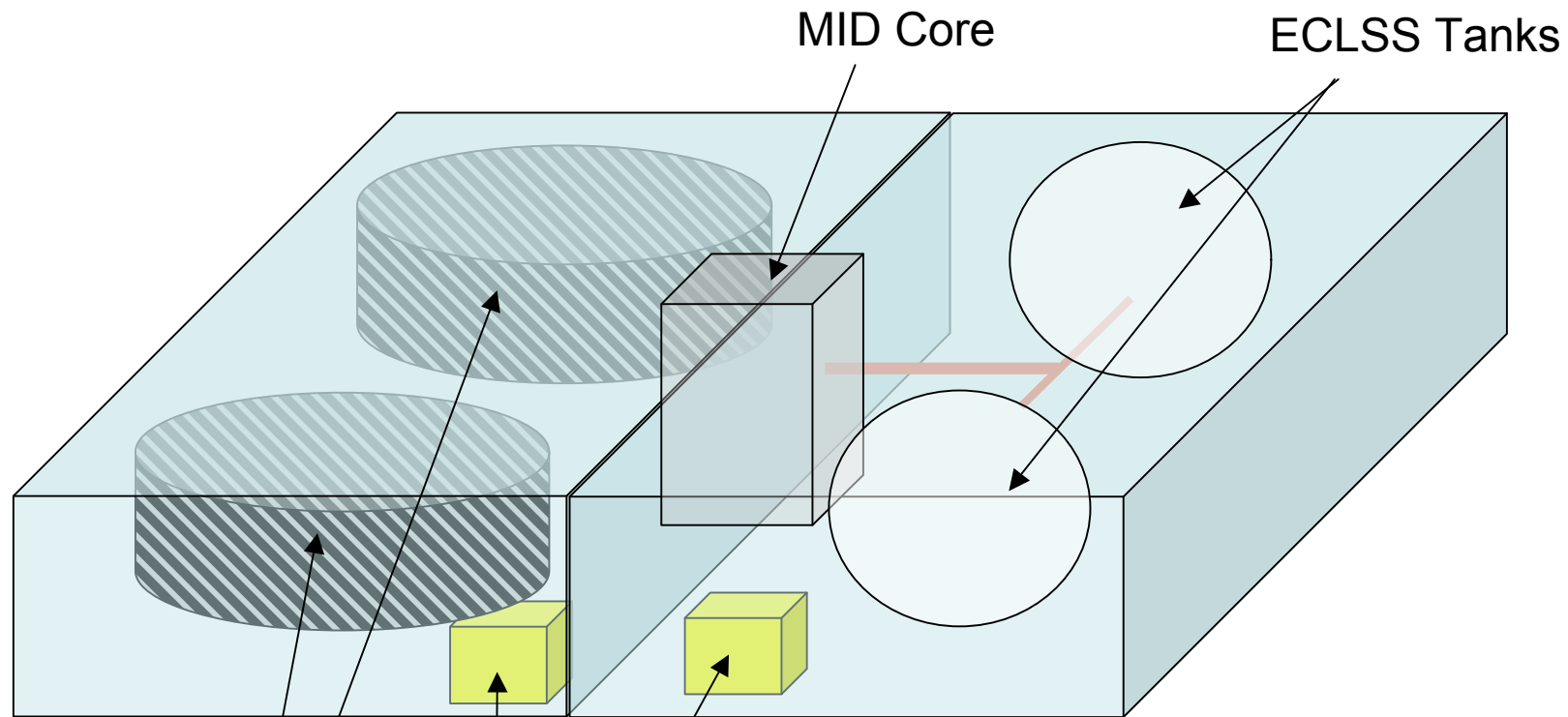
LEO KIT Side B

- Avionics
 - none
- PROP
 - none
- EPS
 - Power Distribution for ECLSS system
- ECLSS
 - Additional consumables for 6 man ISS mission
 - Additional consumables for 4 man Hubble mission with four cabin depress/repress cycles
- ATCS
 - none
- Comm
 - none
- DATA BUS
 - CMD/FB from ECLSS and ATCS

www.nasawatch.com

No Changes to FWD and AFT Cores

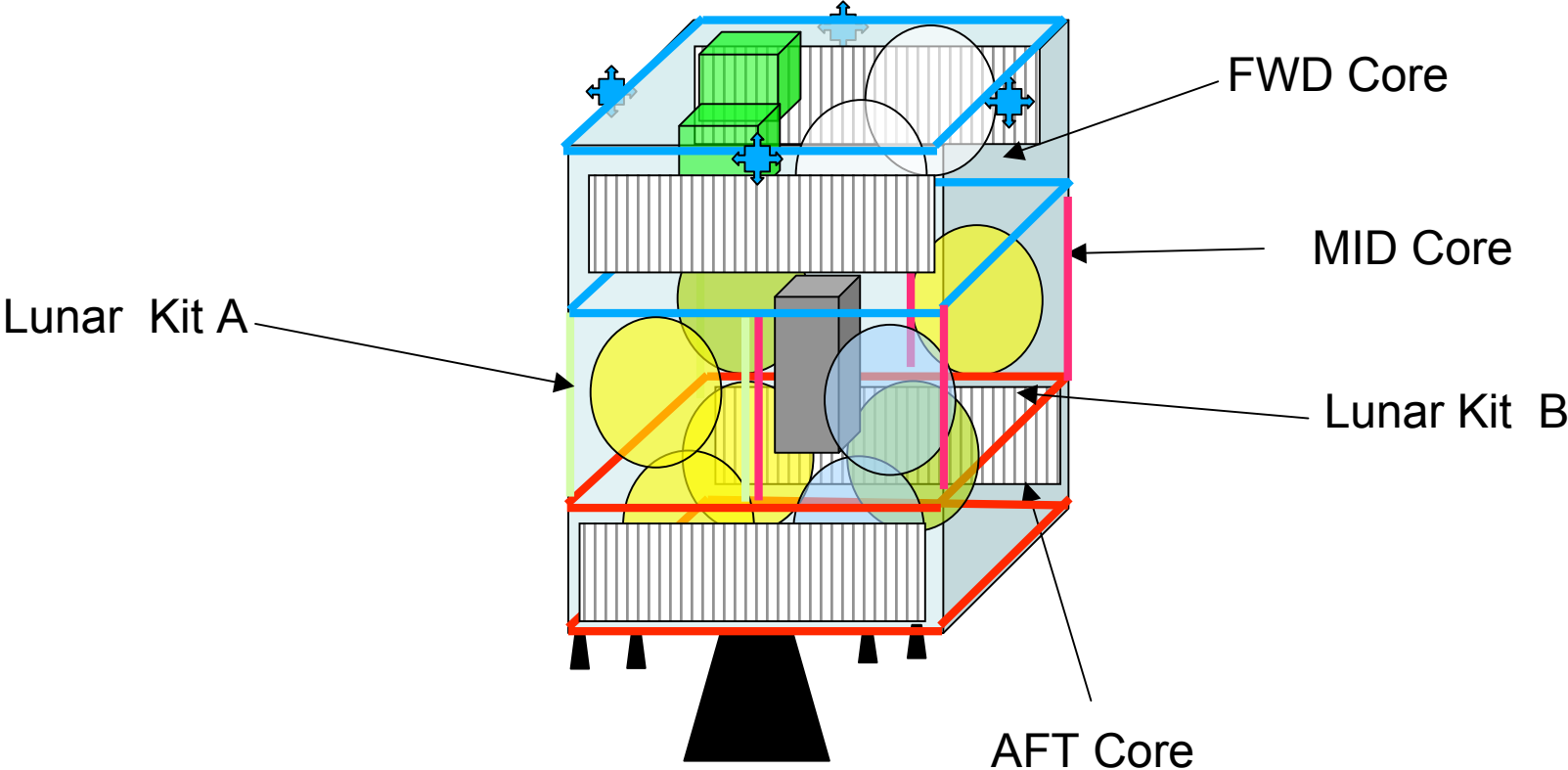
LEO Mission Kit Schematic



Payload

EPS/DATA/CMD Distributions
for Kit Side A & B www.nasawatch.com

Lunar Service Module Configuration



Lunar Service Module Configuration

Lunar KIT Side A

- Payload
 - none
- Avionics
 - none
- PROP
 - FU/HE tanks
 - Provide additional ~3000 fps
 - ~6000 lbs wet
- EPS
 - Power Distribution system for ATCS and Prop system
- ECLSS
 - none
- ATCS
 - MID radiator A
- Comm
 - none
- DATA BUS
 - CMD/FB from Prop kit

MID Core

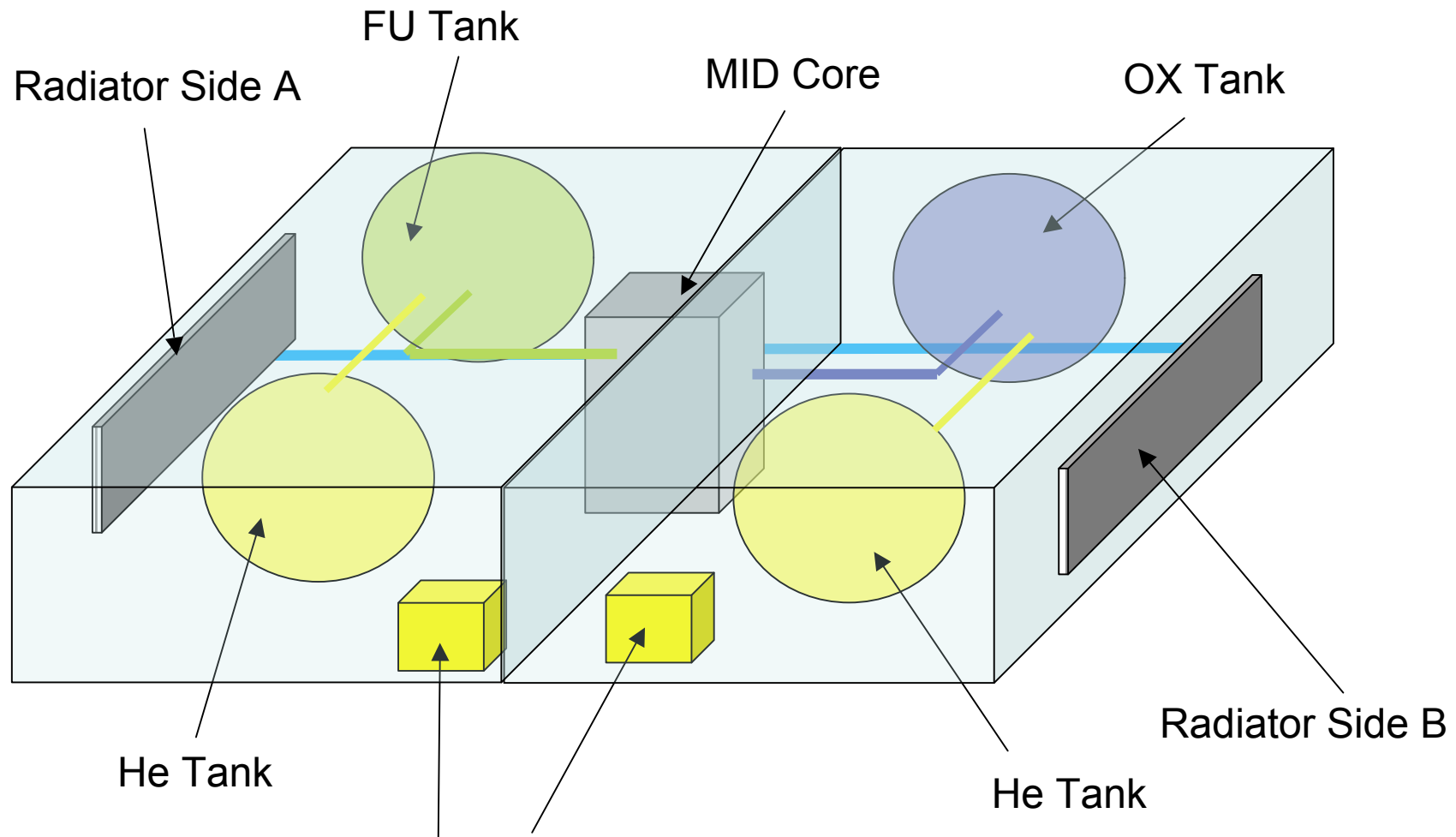
- Structural interface between FWD and AFT Core Modules
- Avionics
 - none
- PROP
 - Plumbing lines from aft core to fwd core
 - Plumbing connections for Prop Kit
- EPS
 - Power Distribution system fwd to aft and fwd to Kit connections
- ECLSS
 - Plumbing connections for additional consumables Kit (**capped**)
- ATCS
 - Plumbing connections for addition Mid radiators
 - Plumbing from fwd to Mid and Aft Core Radiators
- Comm
 - none
- DATA BUS
 - CMD/FB from payload Kit, MID and AFT LRUs

Lunar KIT Side B

- Avionics
 - none
- PROP
 - OX/He tanks
 - Provide additional ~3000 fps
 - ~6000 lbs wet
- EPS
 - Power Distribution for ATCS and Prop system
- ECLSS
 - none
- ATCS
 - MID radiator B
- Comm
 - none
- DATA BUS
 - CMD/FB from Prop Kit

No Changes to FWD
and AFT Cores

Lunar Mission Kit Schematic



EPS/DATA/CMD Distributions
for Kit Side A & B www.nasawatch.com