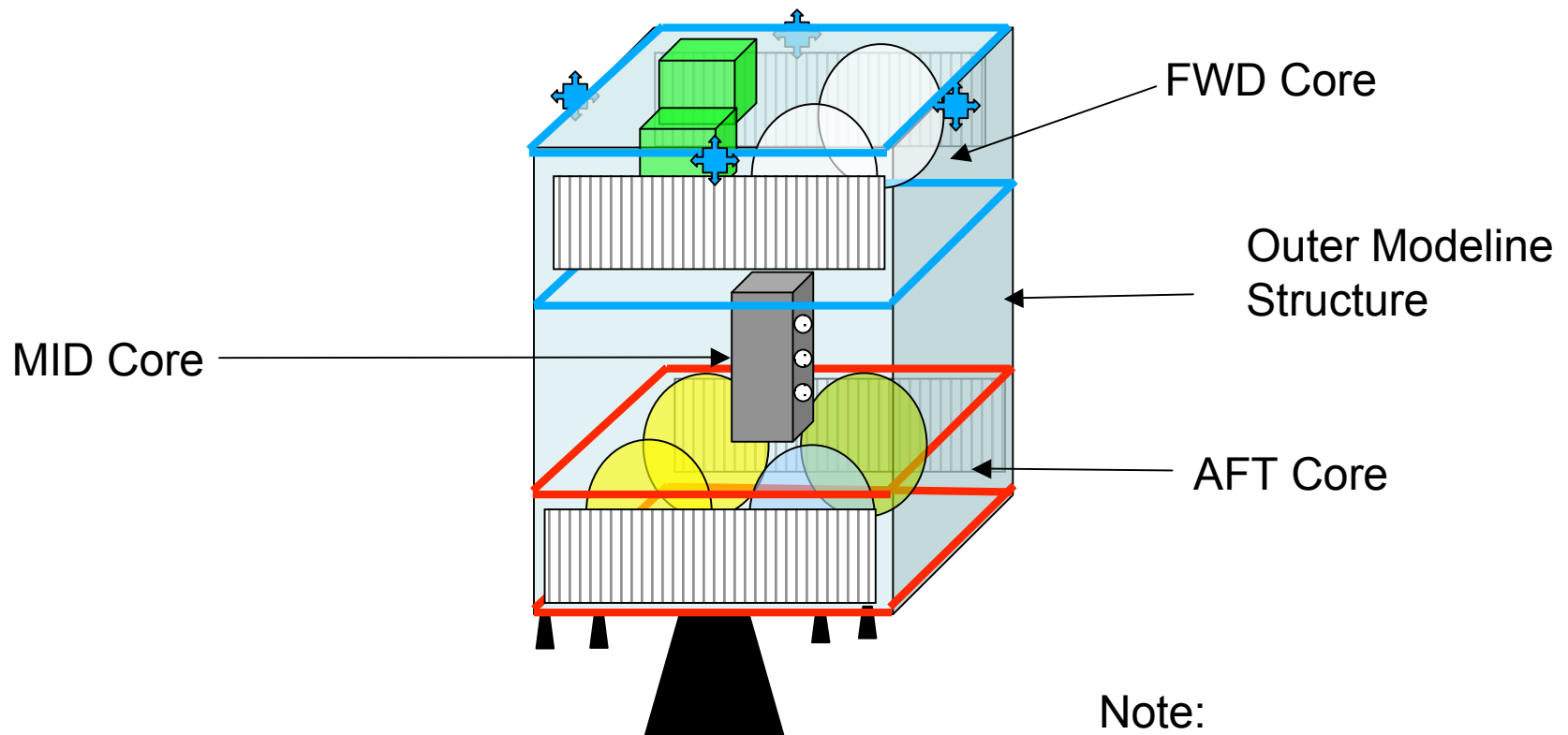


# Service Module Mission Kit Design

# 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

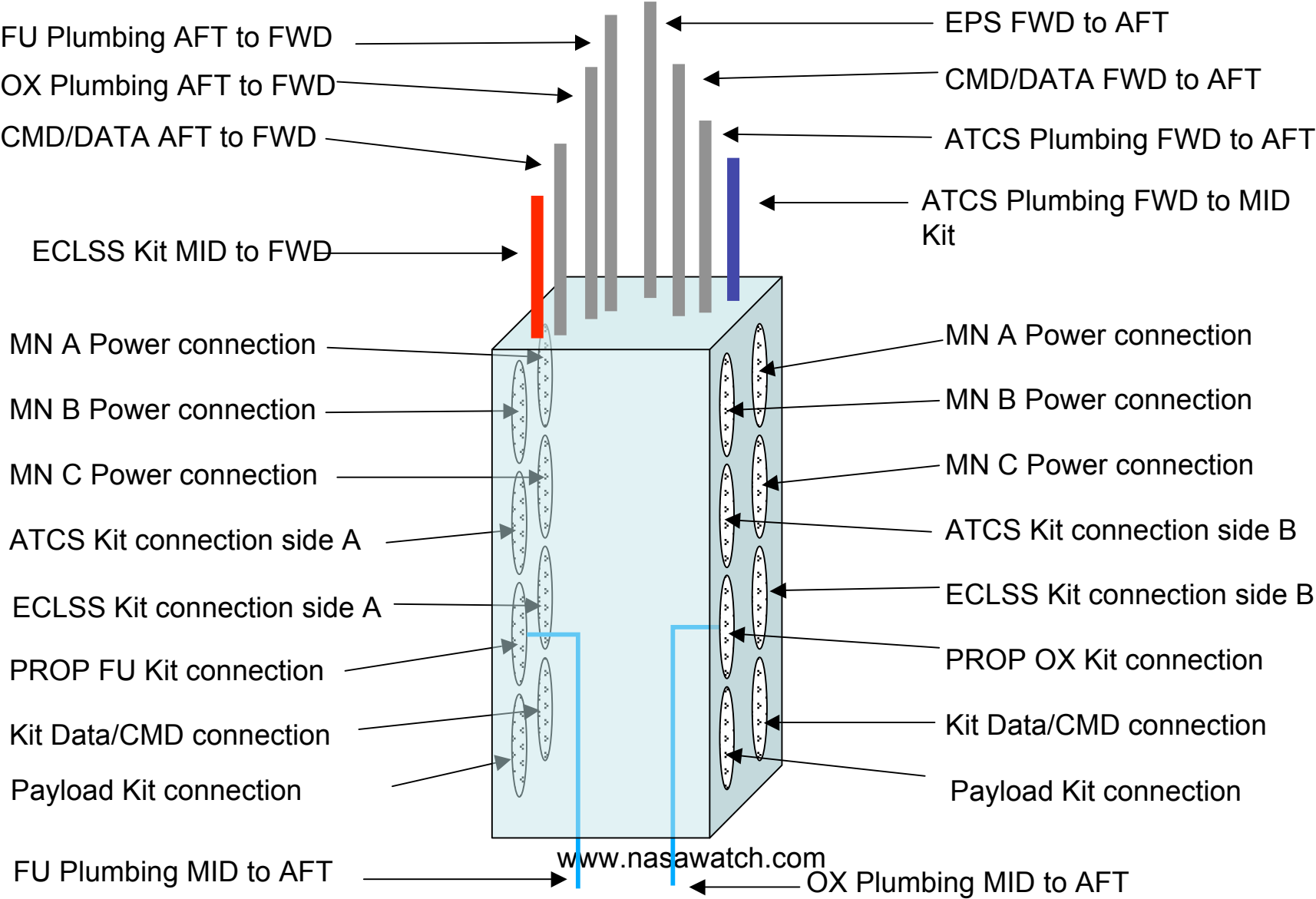
## MID Core

- 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

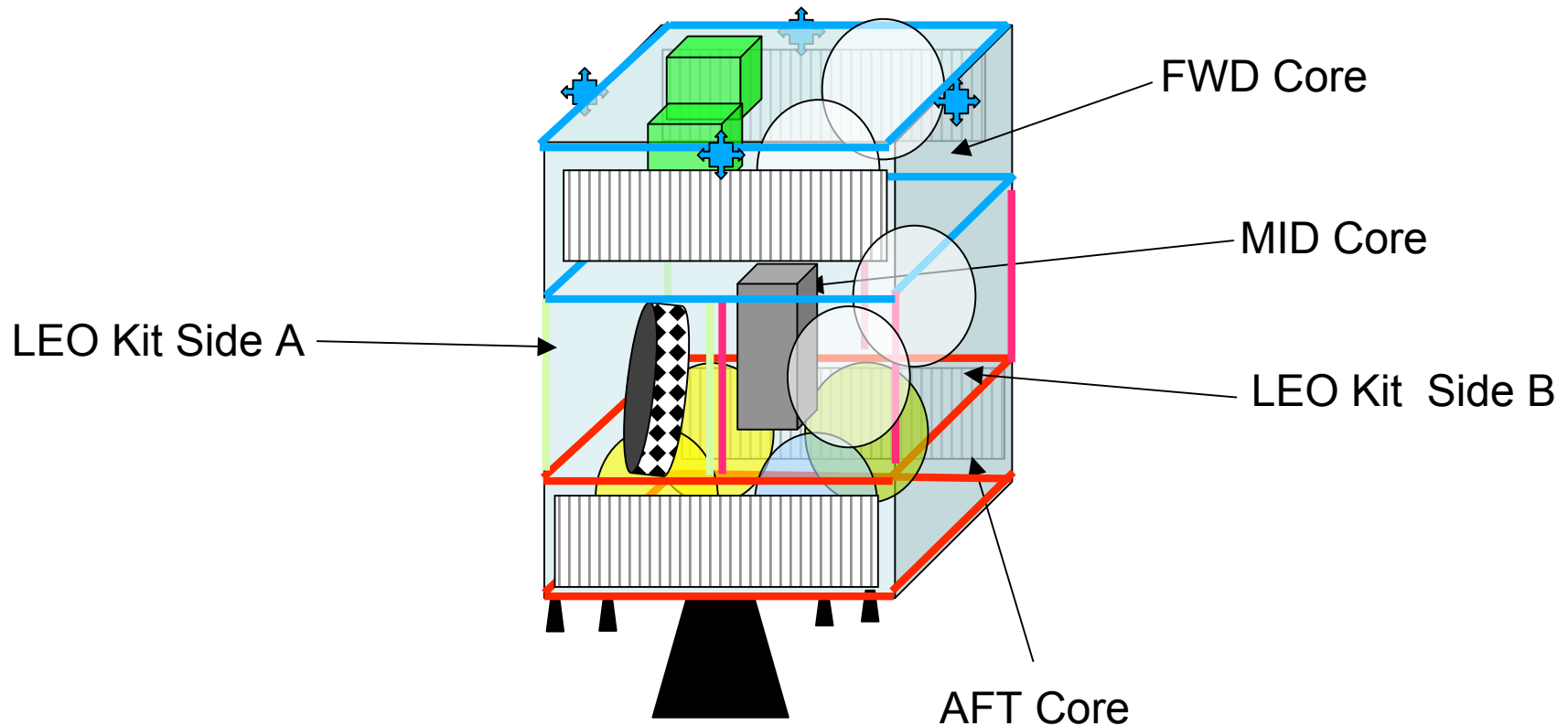
## AFT Core

- 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

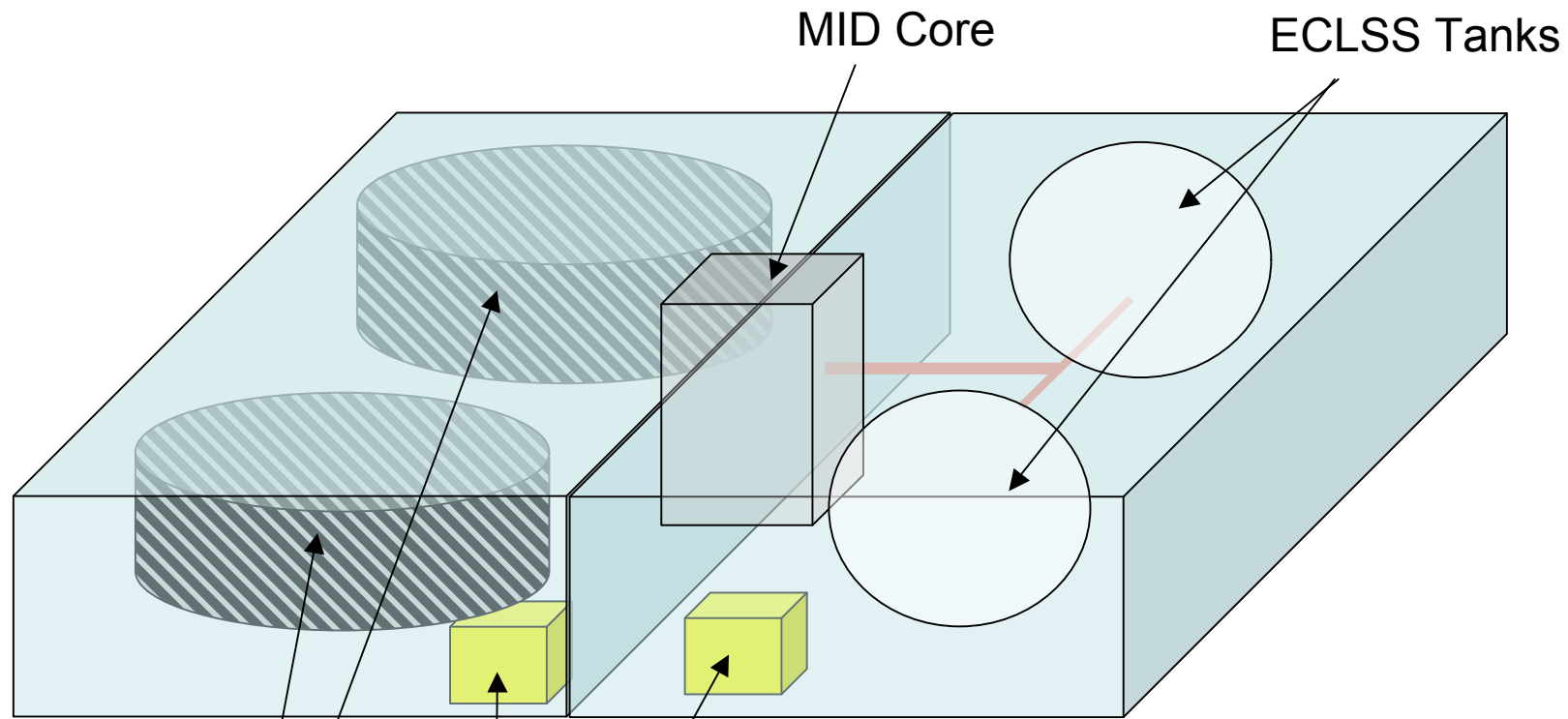
## LEO KIT Side B

- 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](http://www.nasawatch.com)

No Changes to FWD and AFT Cores

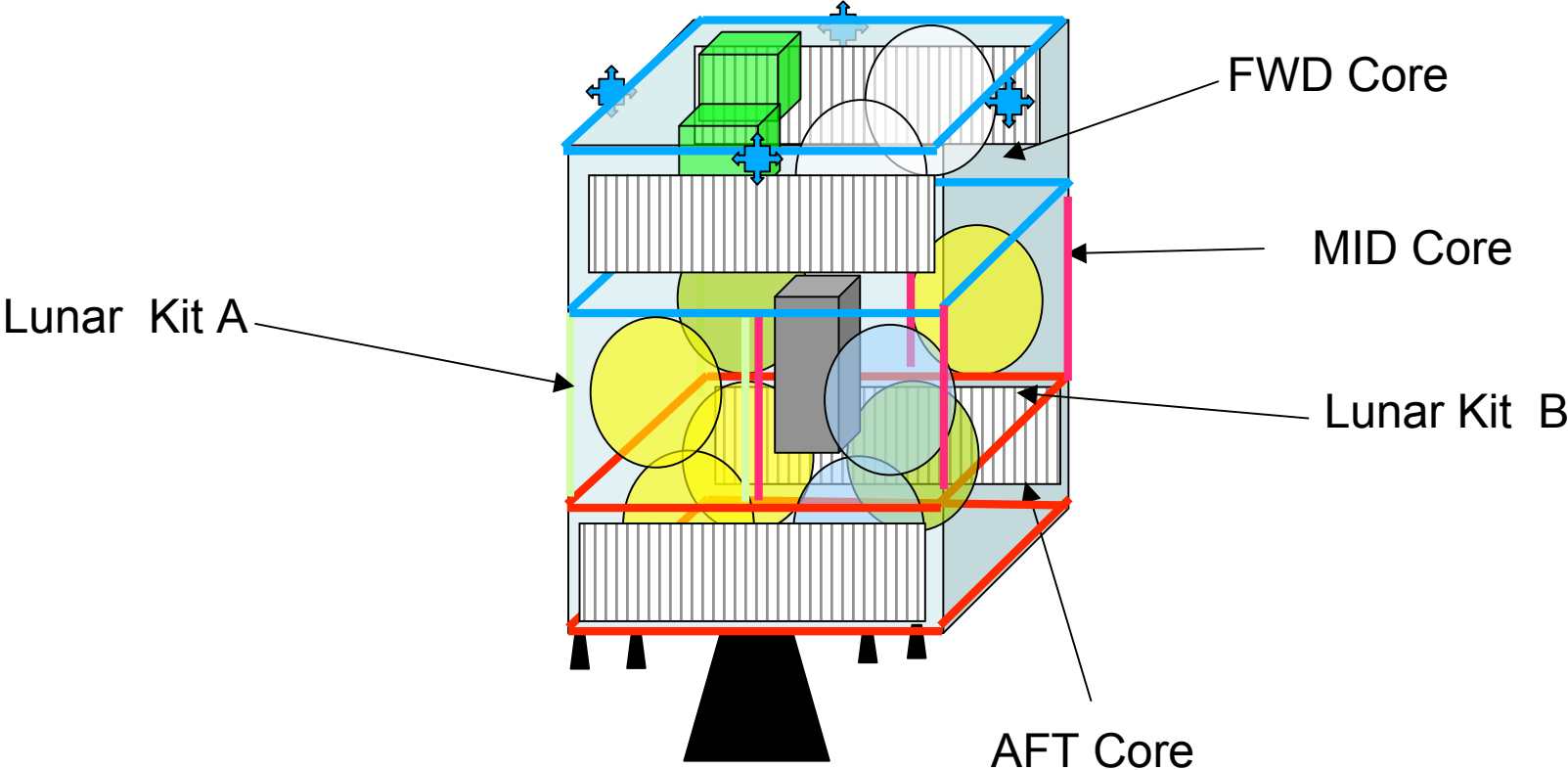
# LEO Mission Kit Schematic



Payload

EPS/DATA/CMD Distributions  
for Kit Side A & B [www.nasawatch.com](http://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

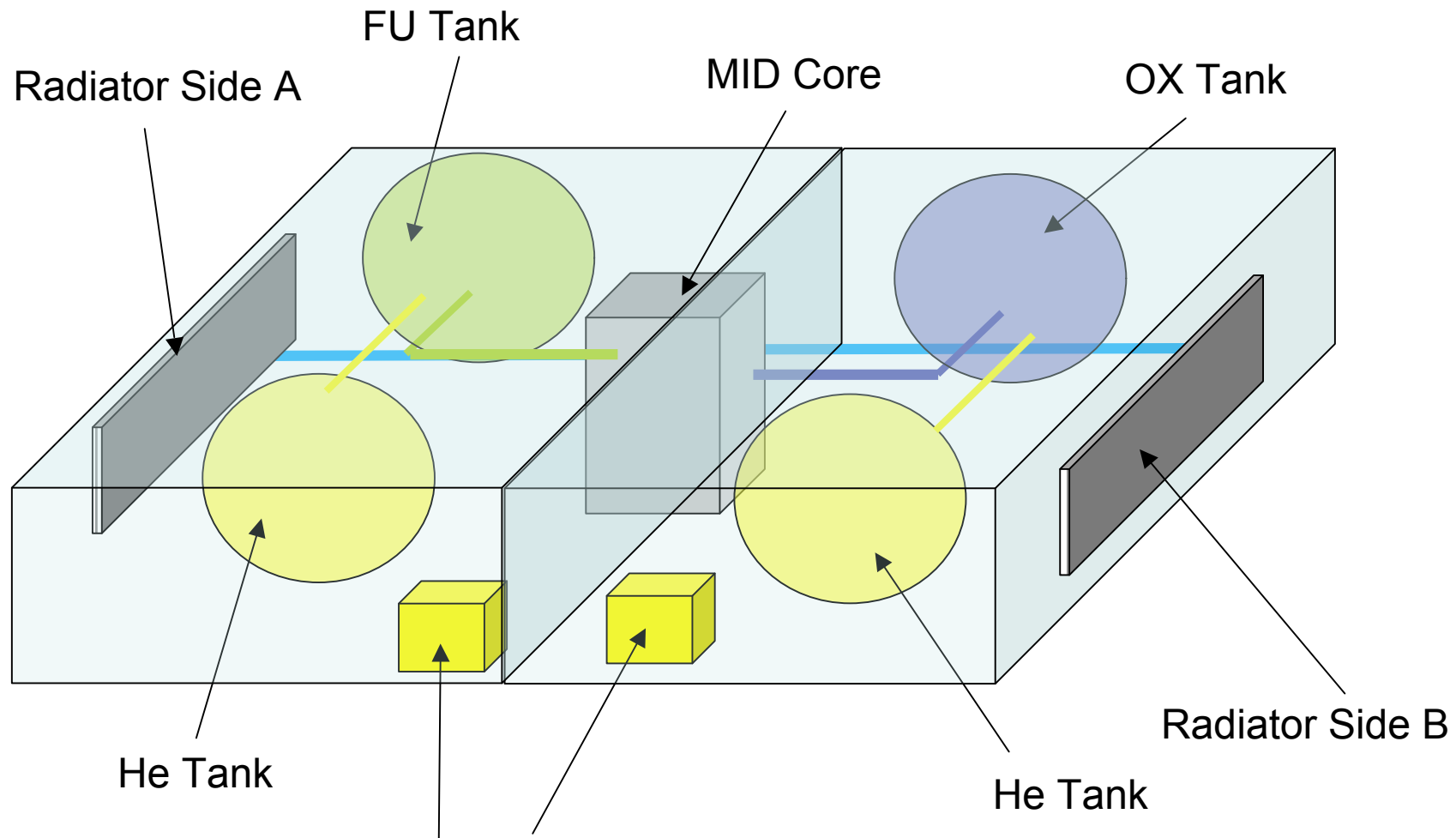
- Structural interface between FWD and AFT Core Modules
- Avionics
  - none
- PROP
  - Plumbing lines from aft core to fwd core
  - Plumbing connections for Prop Kit
- EPS
  - Power Distribution system fwd to aft and fwd to Kit connections
- ECLSS
  - Plumbing connections for additional consumables Kit (**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](http://www.nasawatch.com)