SPACE_STATION

Asteroid mining vessel · design study · preliminary · v0.0.35

A crewed, solar-electric vessel assembled in low Earth orbit from Starship-launched modules, bound for Ceres. A 450 m ring of 82 pressurized segments spins at under 2 rpm for 1 g. Every number in this document is generated from the project's parameter file, CAD model and analysis scripts.

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Part 2 · Ring segment component sheets (22)

BP-S0	COMMON SEGMENT (bare)	**BP-SS**	STORM SHELTER
BP-SC	CONTROL	**BP-SR**	RECREATION
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BP-SA	AGRICULTURE / HYDROPONICS	**BP-SK**	CARGO / STORES
BP-SG	GALLEY / MESS	**BP-SP**	PORT / LIFEBOAT END
BP-SL	LIFE SUPPORT	**BP-SB**	BRIG / SECURITY
BP-SM	MEDICAL	**BP-SZ**	SPARE / GROWTH

SPACE_STATION

ASTEROID MINING VESSEL · DESIGN STUDY · PRELIMINARY · V0.0.35

RING	**450 m Ø · 82 segments**
GRAVITY	**1.0 g @ 1.99 rpm**
CREW	**300**
FLOOR	**19,106 m²**
LENGTH	**562 m**
ARRAY	**1.56 km · 1,760 panels**
DRIVE	**Hall · Isp 3,000 s**
MASS	**≈ 12,300 t dry**
COMPUTE	**AI 10 + BTC 134 MW**
TARGET	**Ceres**

450 m Ring diameter	**1.0 g** At 1.99 rpm	**300** Crew	**≈236** Starship launches (Ceres)

MISSION

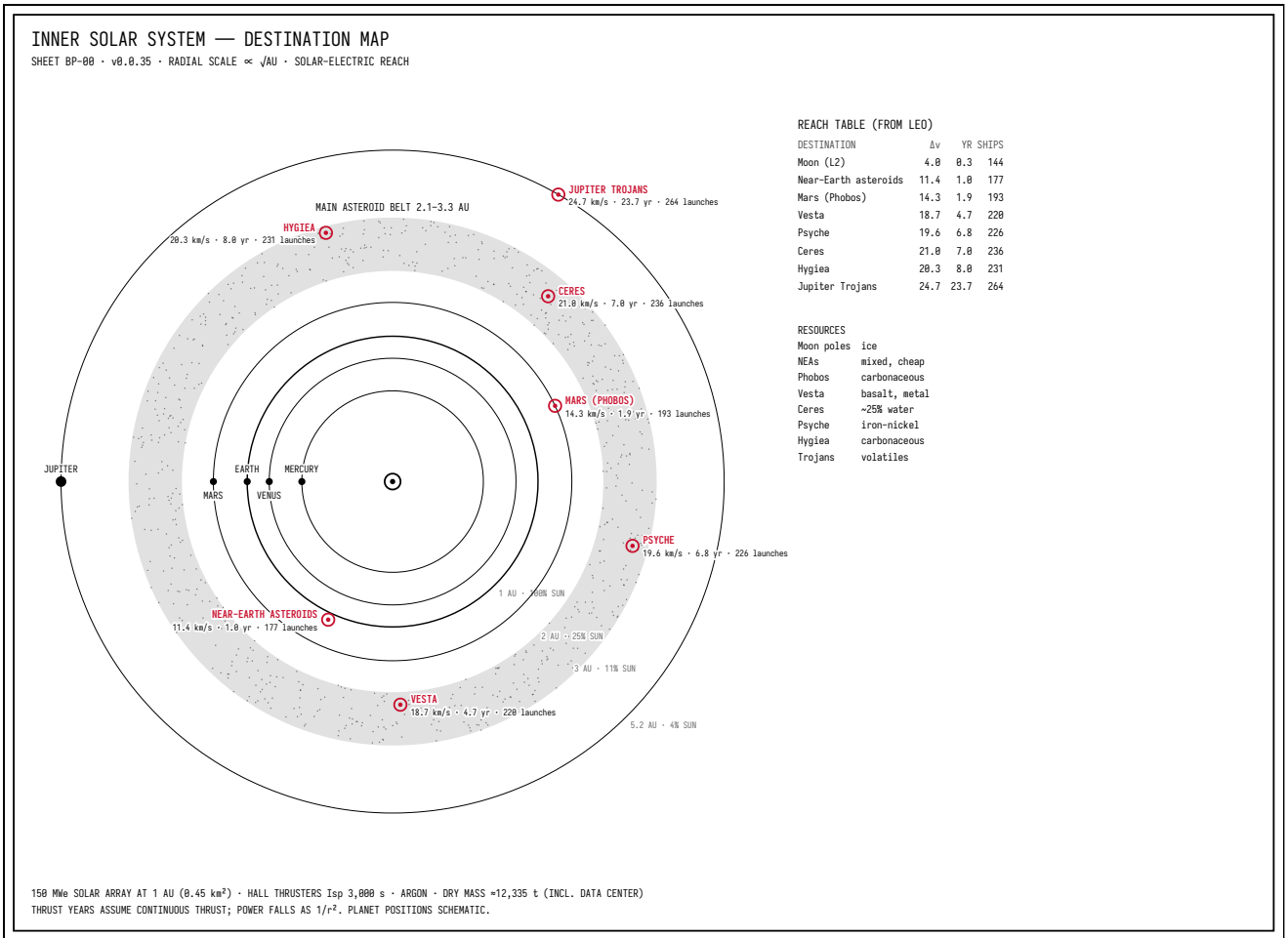
A crewed, solar-electric vessel assembled in low Earth orbit from Starship-launched modules, bound for **Ceres** in the main asteroid belt. It carries its own gravity: a 450 m ring of 82 pressurized cylinders spinning at under 2 rpm. On arrival it mines water ice for propellant and shielding, and becomes a self-refuelling base for belt operations.

Every number is derived from real physics and published launch-vehicle performance.

GENERAL DATA

Overall length	562 m (bow to nozzle exit) · array span 1,556 m
Habitat ring	450 m Ø · 82 segments, 8 m Ø × 17.2 m · 1.0 g @ 1.99 rpm · rim speed 47 m/s
Floor area	≈19,106 m² on two decks · ≈64 m² per person
Dry mass	≈12,335 t: 9,070 hull + 1,331 array, thrusters, tankage + 1,934 data center
Compute	AI + Bitcoin data center · 10 MW firm AI (~14,000 GPUs) · Bitcoin ASICs absorb all surplus (up to ~134 MW, ~9 EH/s) · carried full-size for the whole mission
Power	All-solar · 150 MWe at 1 AU (0.45 km² array, ≈1,031 t) · ≈20 MWe at Ceres · reactor deleted
Propulsion	Hall-effect electric, Isp 3,000 s, argon · Ceres: Δv 21.0 km/s, 12,883 t argon, ≈7.0 yr continuous thrust
Destination	Ceres (2.77 AU) baseline; alternatives on BP-00
Shielding	10 g/cm² water jacket at launch; Ceres regolith added on arrival
Spin control	Single ring, magnetic-bearing despun hub, momentum wheels in spine
Launches	≈236 Starship to Ceres (144–264 across BP-00 destinations): 101 hull + 17 data center + array, tankage and propellant at 120 t each

SHEET BP-00 · DESTINATION MAP

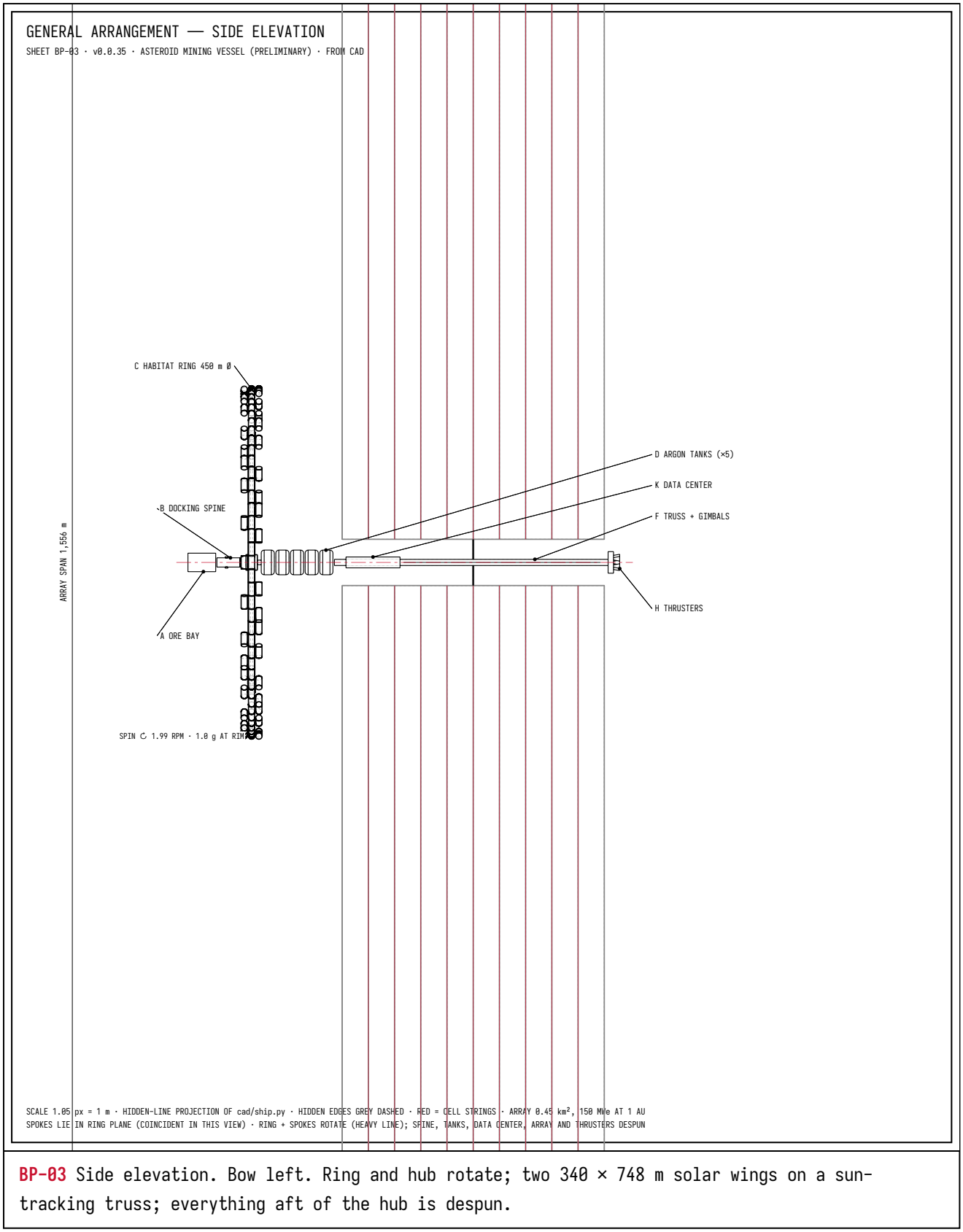


BP-00 Where a solar-electric ship can reach from LEO. Radial scale ∝ √AU. Δv, continuous-thrust years and total Starship launches per destination.

Solar-electric baseline: array 150.0 MWe @1 AU, 0.45 km², 1031 t; Hall Isp 3000 s; dry 12,335 t (incl. 1,934 t data center)

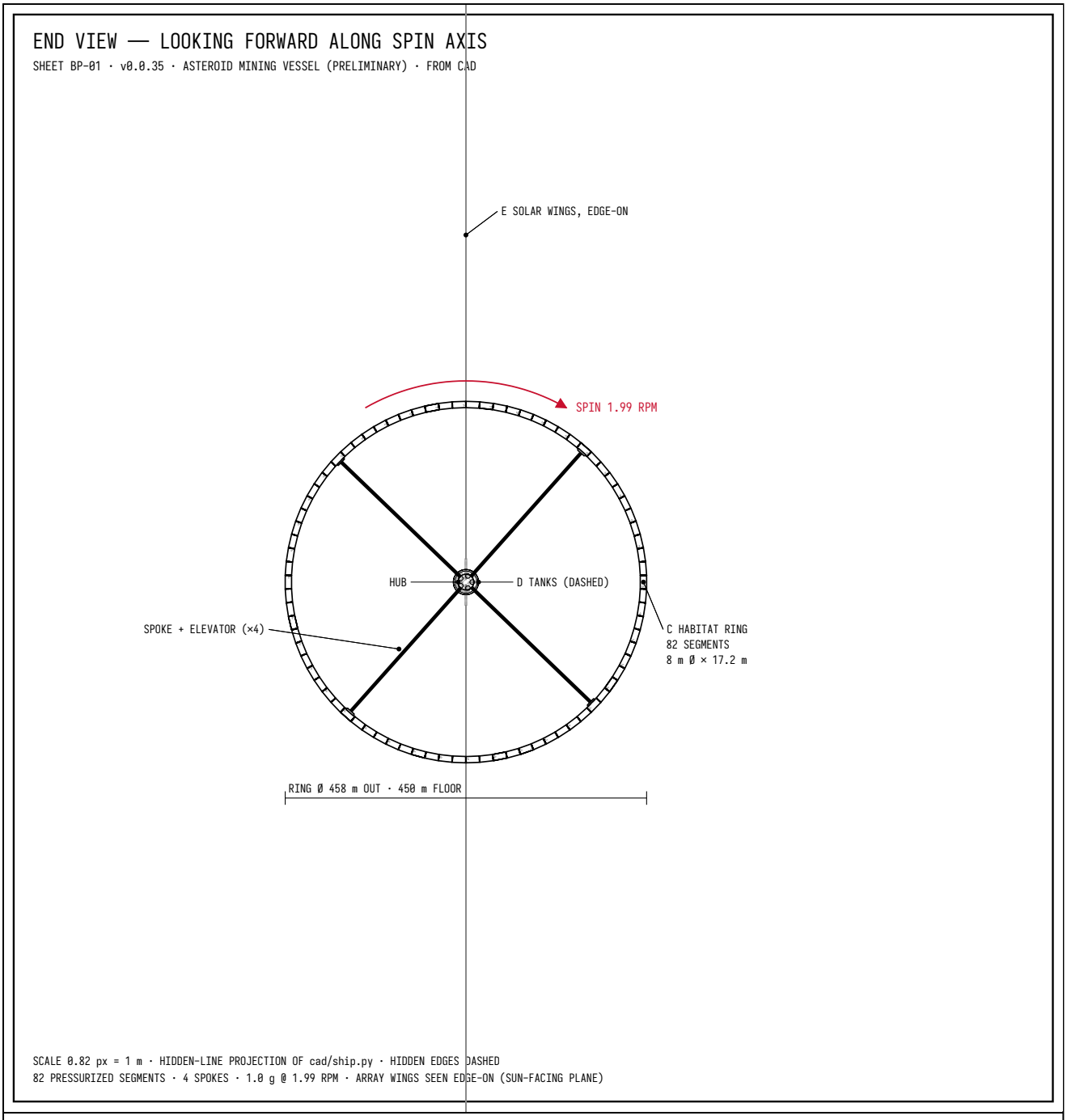
destination	a AU	Δv km/s	prop t	thrust yr	MWe there	launches	resource
Moon (L2)	1.00	4.0	1,796	0.3	150.0	144	water ice at poles
Near-Earth asteroids	1.10	11.4	5,849	1.0	124.0	177	C/S/M types
Mars (Phobos)	1.52	14.3	7,707	1.9	64.9	193	carbonaceous moon
Vesta	2.36	18.7	10,953	4.7	26.9	220	basalt, metals
Psyche	2.92	19.6	11,683	6.8	17.6	226	~metal (Fe-Ni)
Ceres	2.77	21.0	12,883	7.0	19.5	236	~25% water ice
Hygiea	3.14	20.3	12,243	8.0	15.2	231	carbonaceous
Jupiter Trojans	5.20	24.7	16,196	23.7	5.5	264	volatiles, organics

SHEET BP-03 · GENERAL ARRANGEMENT (FROM CAD)



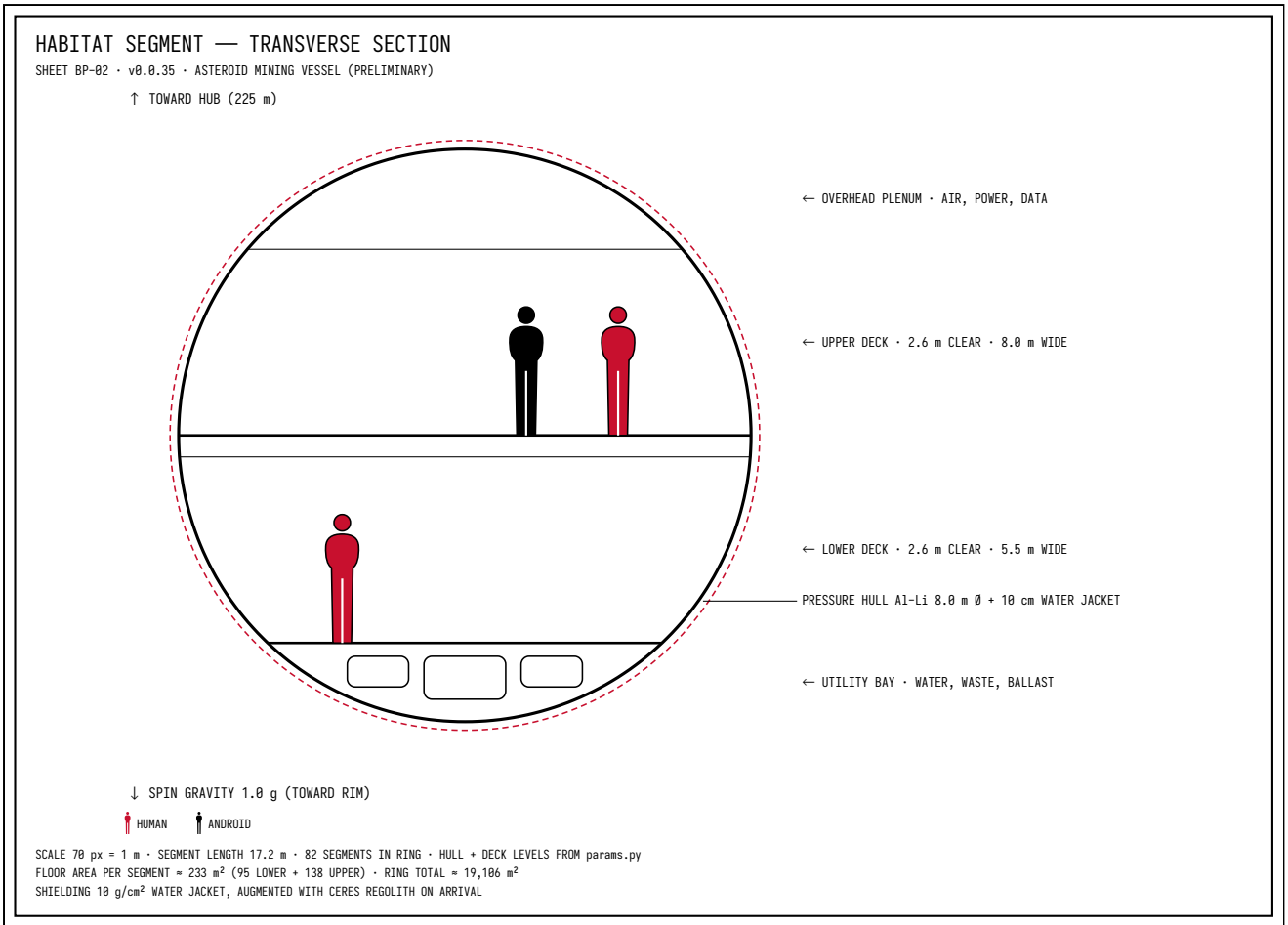
BP-03 Side elevation. Bow left. Ring and hub rotate; two 340 × 748 m solar wings on a sun-tracking truss; everything aft of the hub is despun.

SHEET BP-01 · END VIEW (FROM CAD)



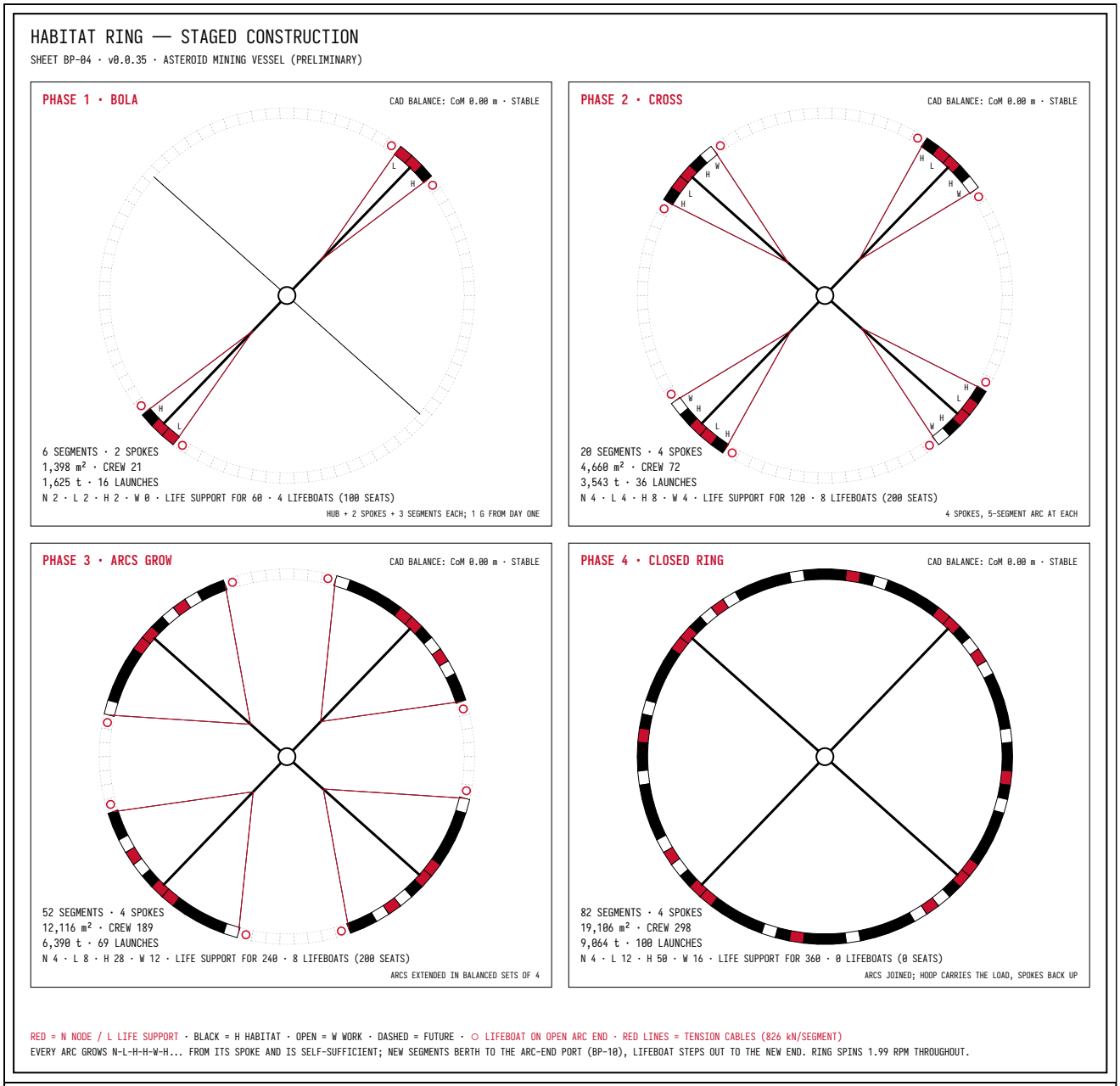
BP-01 End view along the spin axis, hidden-line projection of the CAD model: 82 segments on 4 spokes, wings edge-on.

SHEET BP-02 · SEGMENT SECTION



BP-02 Transverse section; hull and deck levels from params.py. Two decks, floors toward the rim; plenum overhead, tanks in the bilge.

SHEET BP-04 · STAGED CONSTRUCTION



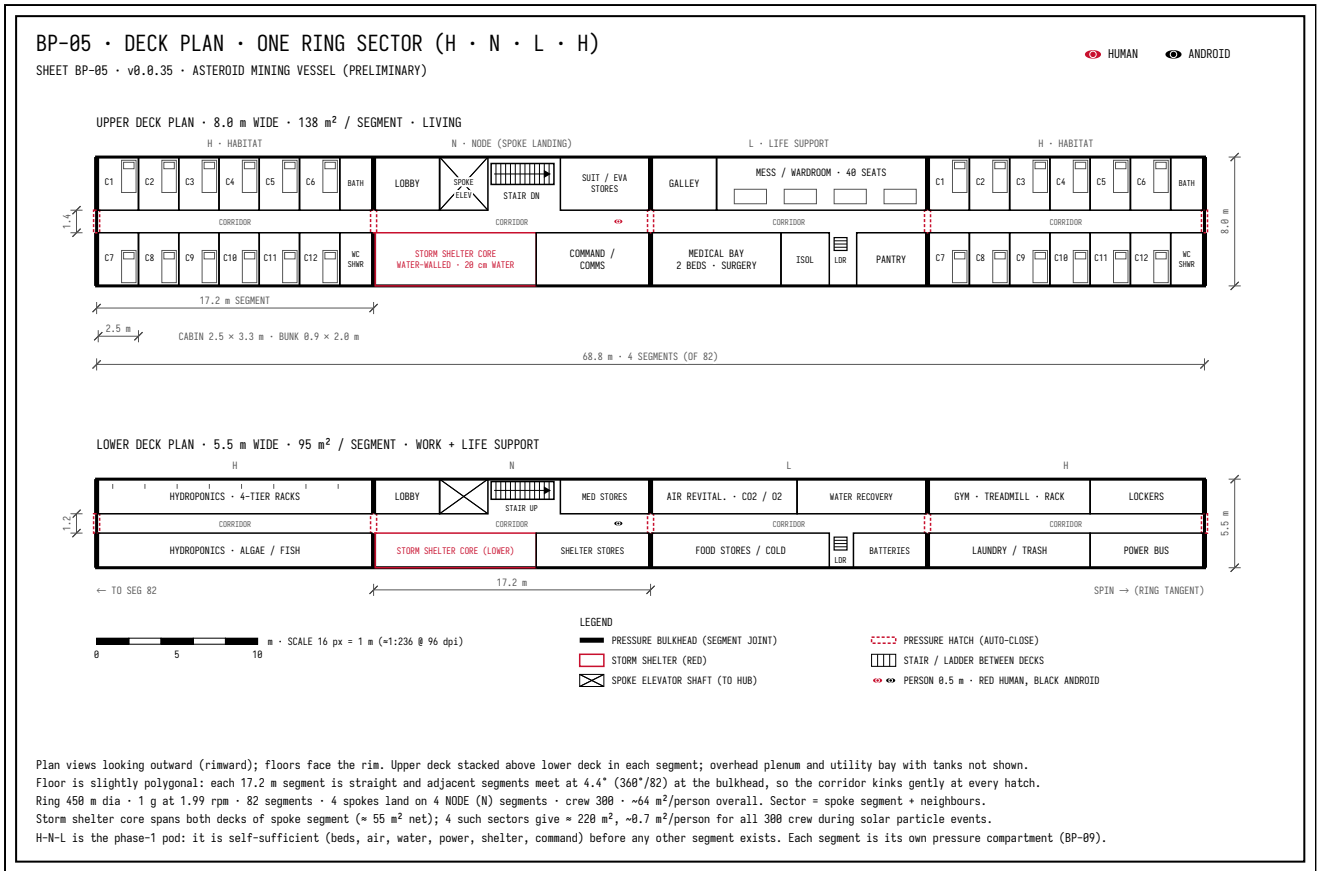
BP-04 The ring is lived in from phase 1. Two balanced 3-segment pods on opposite spokes give full 1 g after ~16 launches; arcs grow in balanced sets until the ring closes at ~100.

phase	spokes	segs	mass t	launches	floor m²	crew
1 · BOLA	2	6	1,625	16	1,398	21
2 · CROSS	4	20	3,543	36	4,660	72
3 · ARCS GROW	4	52	6,390	69	12,116	189
4 · CLOSED RING	4	82	9,064	100	19,106	298

Per-segment load at 1 g: 826 kN (open arc: carried by spoke tension cables)

Spin balance of every phase, checked against the CAD solids (cad/balance.py): centre of mass stays on the spin axis and the spin axis is the maximum principal moment, so each phase spins stably.

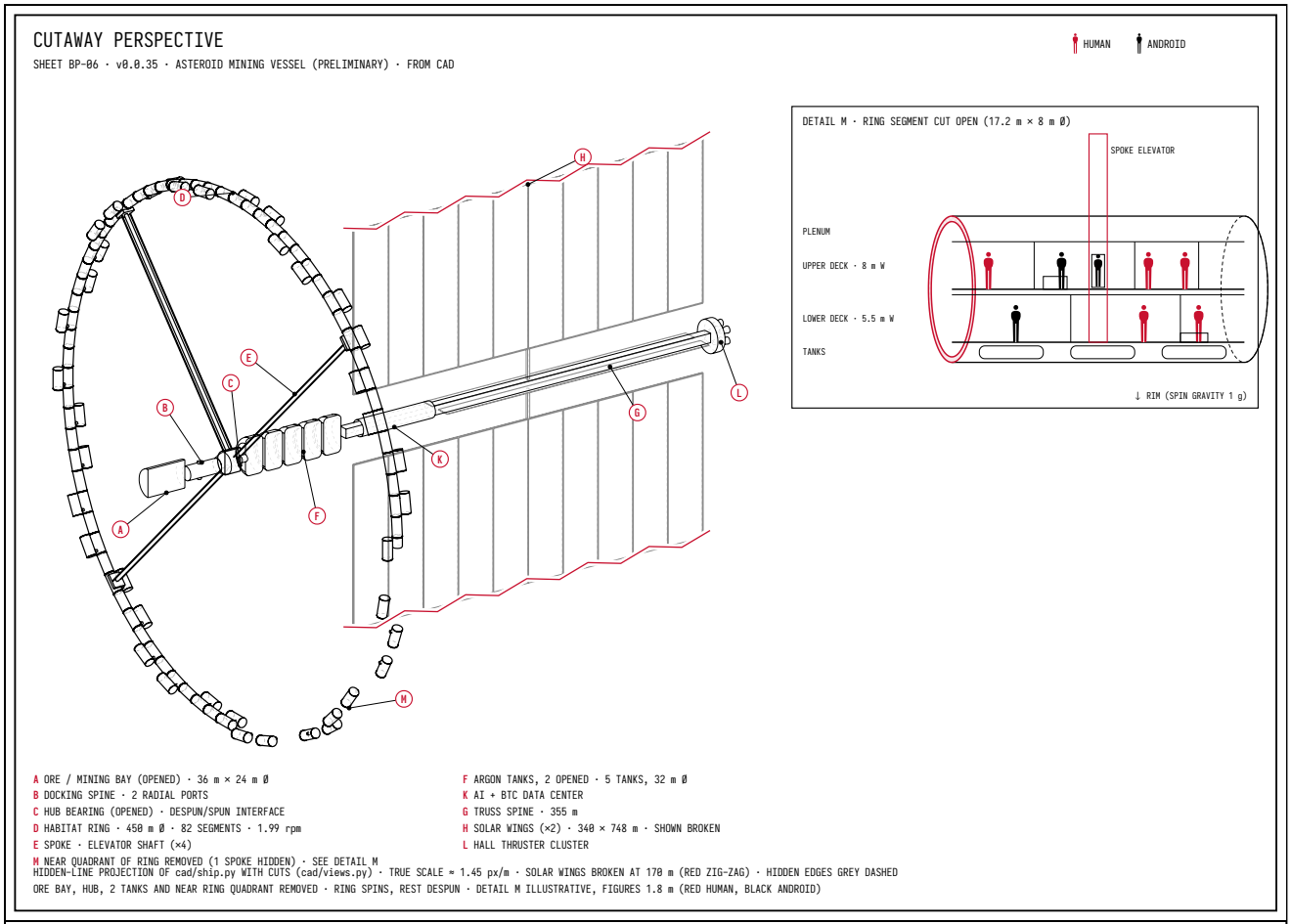
SHEET BP-05 · DECK PLAN, RING SECTOR



Plan views looking outward (rimward); floors face the rim. Upper deck stacked above lower deck in each segment; overhead plenum and utility bay with tanks not shown.
Floor is slightly polygonal: each 17.2 m segment is straight and adjacent segments meet at 4.4° (360°/82) at the bulkhead, so the corridor kinks gently at every hatch.
Ring 450 m dia · 1 g at 1.99 rpm · 82 segments · 4 spokes land on 4 NODE (N) segments · crew 300 · ~64 m²/person overall. Sector = spoke segment + neighbours.
Storm shelter core spans both decks of spoke segment (≈ 55 m² net); 4 such sectors give ≈ 220 m², ~0.7 m²/person for all 300 crew during solar particle events.
H-N-L is the phase-1 pod: it is self-sufficient (beds, air, water, power, shelter, command) before any other segment exists. Each segment is its own pressure compartment (BP-09).

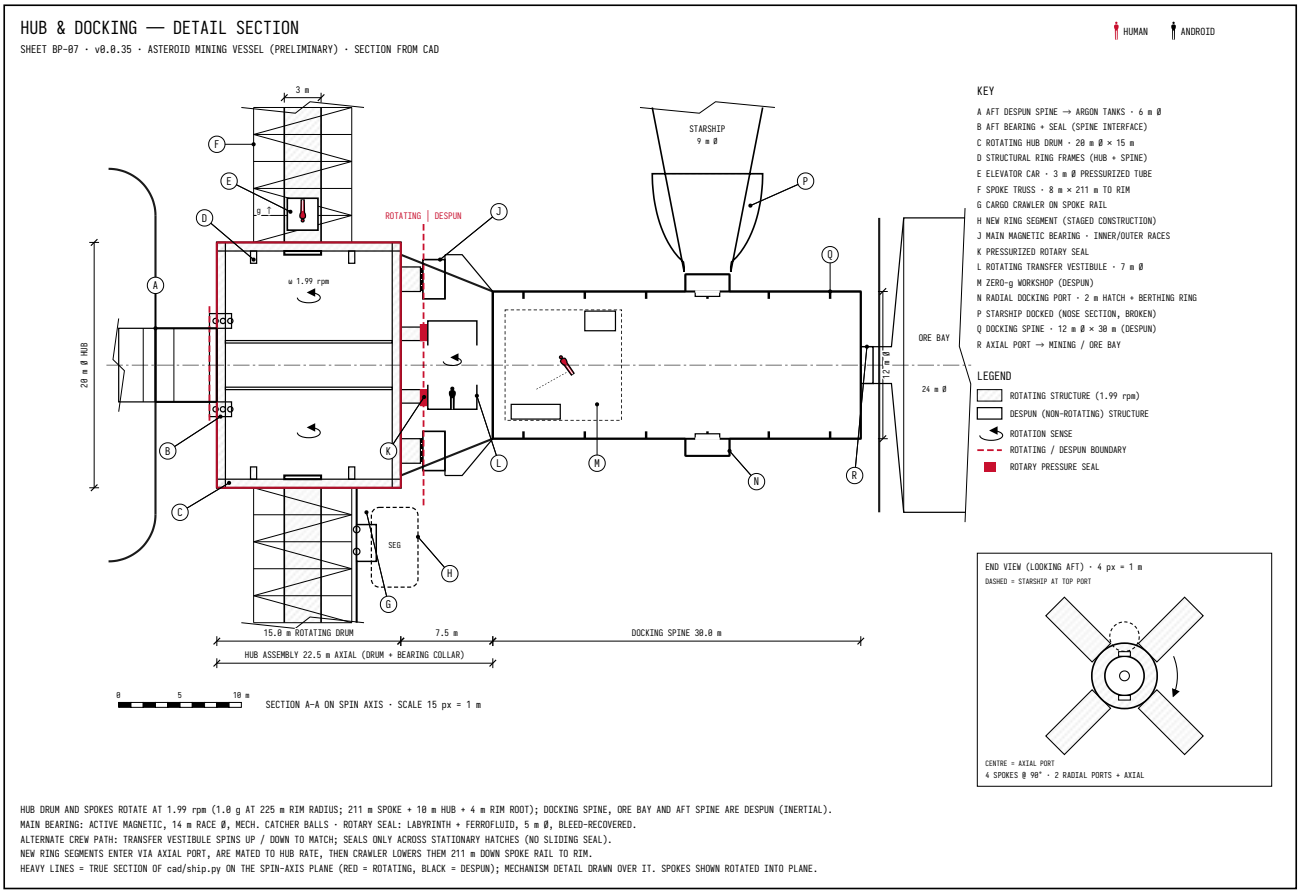
BP-05 Segment length and deck widths from params.py. Four segments around a spoke landing: cabins, galley, medical, storm shelter (upper); hydroponics, life support, gym, workshop (lower).

SHEET BP-06 · CUTAWAY PERSPECTIVE (FROM CAD)



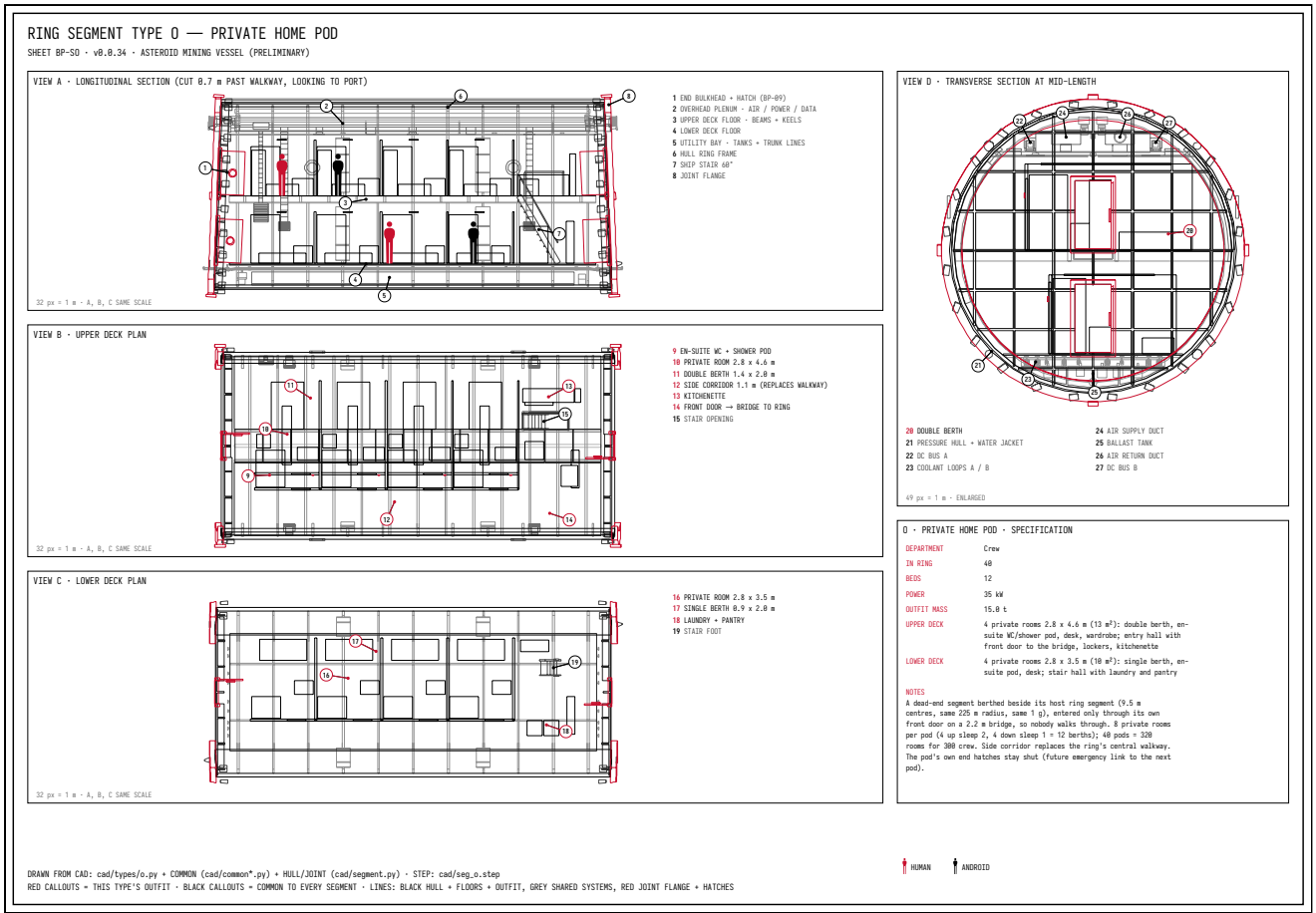
BP-06 Hidden-line projection of the CAD model with the near ring quadrant, hub, ore bay and two tanks cut away; solar wings shown broken.

SHEET BP-07 · HUB & DOCKING DETAIL



BP-07 Section along the spin axis, heavy lines cut from the CAD model: magnetic bearing, rotary seals, rotating/despun boundary, transfer vestibule, Starship berthing, spoke elevator and segment crawler.

PRIVATE HOME PODS



BP-SO Private home pod: a dead-end segment berthed beside its host ring segment (same radius, same 1 g), entered only through its own front door on a short bridge. The ring keeps the public walkway; nobody walks through a home. In 3D: segment explorer → O.

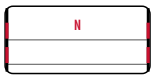
HOME POD	one segment hull (65.5 t) + outfit 15.0 t + bridge 2.5 t = 83.0 t · 1 Starship each
	beside its host at 9.5 m centres, same 225 m radius → 1.00 g, floors level with the ring
	8 private rooms: 4 × 12.9 m² (double) up, 4 × 9.8 m² (single) down · en-suite each · 12 berths
FLEET	40 pods = 320 rooms / 480 berths for 300 crew · 3,322 t · +40 launches · 1.4 MW
BALANCE	pods in opposite pairs, alternating fore/aft: CoM offset radial 0.000 m, axial 0.000 m
LOAD	815 kN per pod at 1 g, carried by the bridge yoke into the host segment's ring frames

SHEET BP-10 · SEGMENT TYPES & LIVE-ABOARD GROWTH

SEGMENT TYPES & LIVE-ABOARD GROWTH

SHEET BP-10 · v0.0.35 · ASTEROID MINING VESSEL (PRELIMINARY)

A · SEGMENT TYPES · SAME HULL, JOINT AND BOTH-END HATCHES (BP-09); OUTFIT DIFFERS



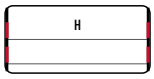
N · NODE · ×4
90.2 t · 40 kW

SPOKE LANDING · ELEVATOR · STAIRS · SUIT/EVA
STORM SHELTER (BOTH DECKS) · COMMAND/COMMS
MED STORES

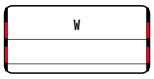


L · LIFE SUPPORT · ×12
88.2 t · 180 kW
LIFE SUPPORT FOR 30

GALLEY · MESS · MEDICAL · AIR REVITALISATION
WATER RECOVERY · POWER BUS + BATTERIES
FOOD STORES



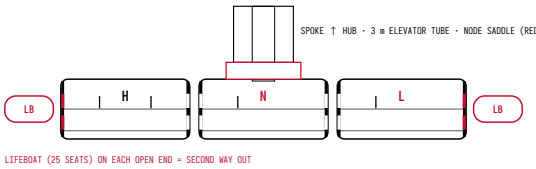
H · HABITAT · ×50
82.2 t · 60 kW
12 BEDS
12 CABINS · 2 BATHS (UPPER)
HYDROPONICS OR GYM (LOWER)



W · WORK · ×16
84.2 t · 120 kW

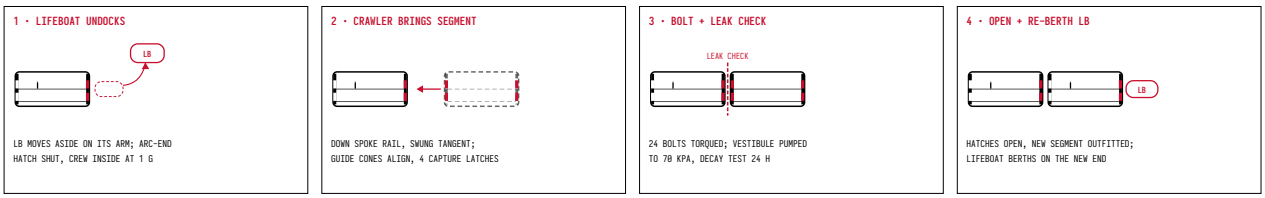
WORKSHOP · ELECTRONICS LAB · SPARES · STORAGE
SCIENCE

B · PHASE-1 POD ON EACH SPOKE: H–N–L · SELF-SUFFICIENT · TWO PODS BACK EACH OTHER UP



PER POD: 12 BEDS · AIR/WATER FOR 30
SHELTER + COMMAND IN N · GALLEY + MED IN L
PHASE 1 (2 PODS): CREW 21 · LS 60 · SEATS 100
HATCHES OPEN INSIDE THE POD; OUTER END HATCHES SHUT

C · ADDING A SEGMENT TO AN OCCUPIED ARC · NOBODY MOVES OUT · RING KEEPS SPINNING



EVERY SEGMENT HAS A FLANGED, LATCHED JOINT AND A BULKHEAD WITH 1.0 × 1.9 m HATCHES ON BOTH DECKS AT BOTH ENDS (BP-09), SO ANY END CAN BE THE OUTER WALL.
RING LAYOUT FROM EACH SPOKE: NLHHWHLHWHHWHHHLHHWHH … · TOTAL N 4 · L 12 · H 50 · W 16 = 82 · ALL 4 ARCS GROW THE SAME SEQUENCE, SO EVERY PHASE IS BALANCED (CAD CHECK, BP-04).
LOAD PATH: N SEGMENT CLAMPED IN SPOKE SADDLE; NEIGHBOURS HANG ON THE JOINT + TENSION CABLES UNTIL THE RING CLOSES (OPEN-ARC JOINT MOMENT 7.12 MN·m).

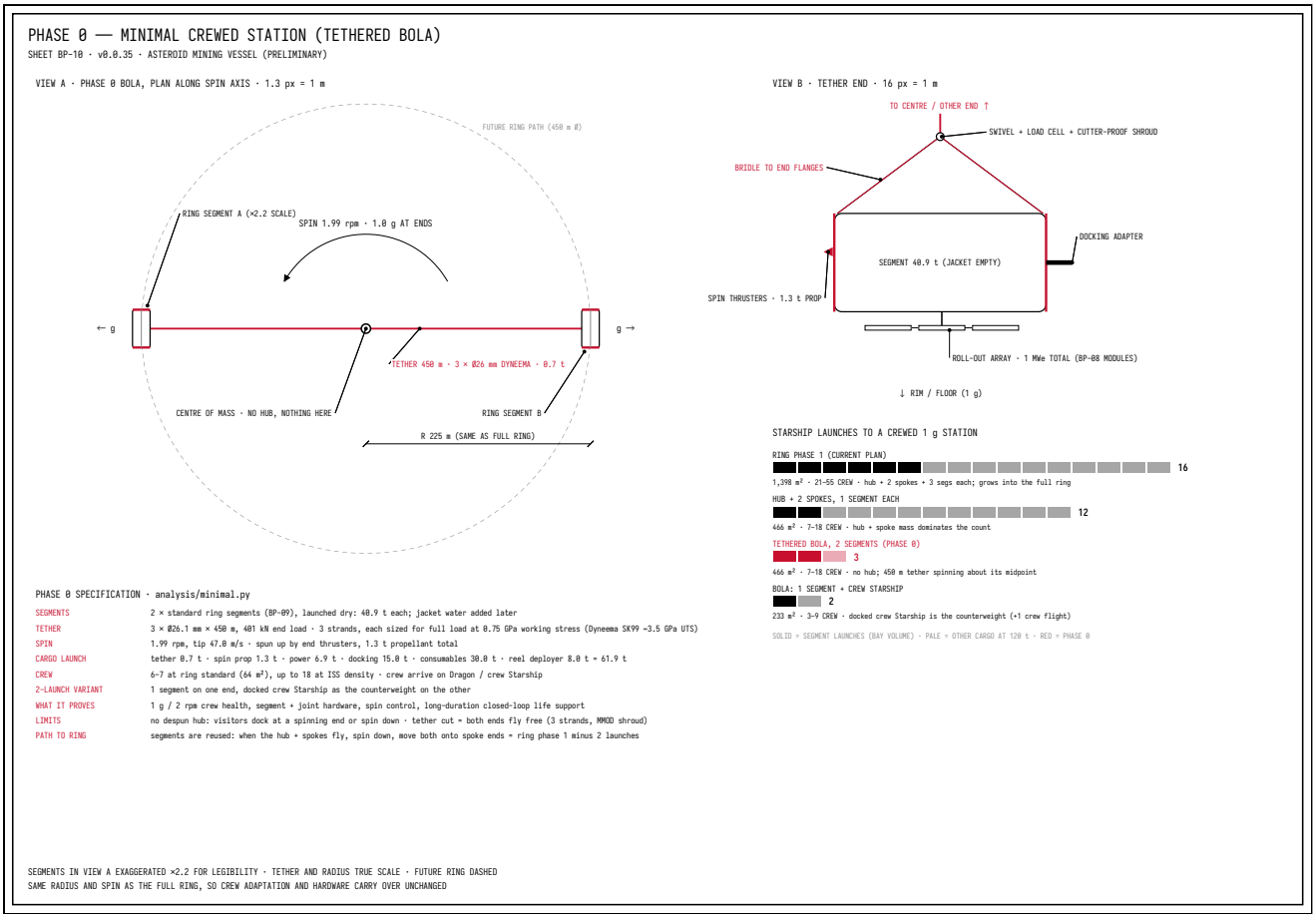
BP-10 Four segment types share one hull and joint. Each spoke's first pod (H–N–L) is self-sufficient, every open arc end carries a lifeboat, and new segments berth to an occupied arc end with the ring spinning and nobody moving out.

TYPE	NAME	N	MASS t	kW	CONTENTS
N	NODE	4	90.2	40	spoke landing · elevator · stairs · suit/EVA · storm shelter (both decks) · command/comms · med stores
L	LIFE SUPPORT	12	88.2	180	galley · mess · medical · air revitalisation · water recovery · power bus + batteries · food stores
H	HABITAT	50	82.2	60	12 cabins · 2 baths (upper) · hydroponics or gym (lower)
W	WORK	16	84.2	120	workshop · electronics lab · spares · storage · science

RING LAYOUT (slot 0 → 81): HWHHHHWLWHNLHHHHWHLHHHWHHHHWLWHNLHHHHWHLHHWHHHHWLWHNLHHHHWHLHHHWHHHHWLWHNLHHHHWHLH

phase	N	L	H	W	beds	LS cap	crew	boats	self-sufficient arcs · escape
1 · BOLA	2	2	2	0	24	60	21	4	yes · yes
2 · CROSS	4	4	8	4	96	120	72	8	yes · yes
3 · ARCS GROW	4	8	28	12	336	240	189	8	yes · yes
4 · CLOSED RING	4	12	50	16	600	360	298	0	yes · yes

SHEET BP-10 · PHASE 0: MINIMAL CREWED STATION



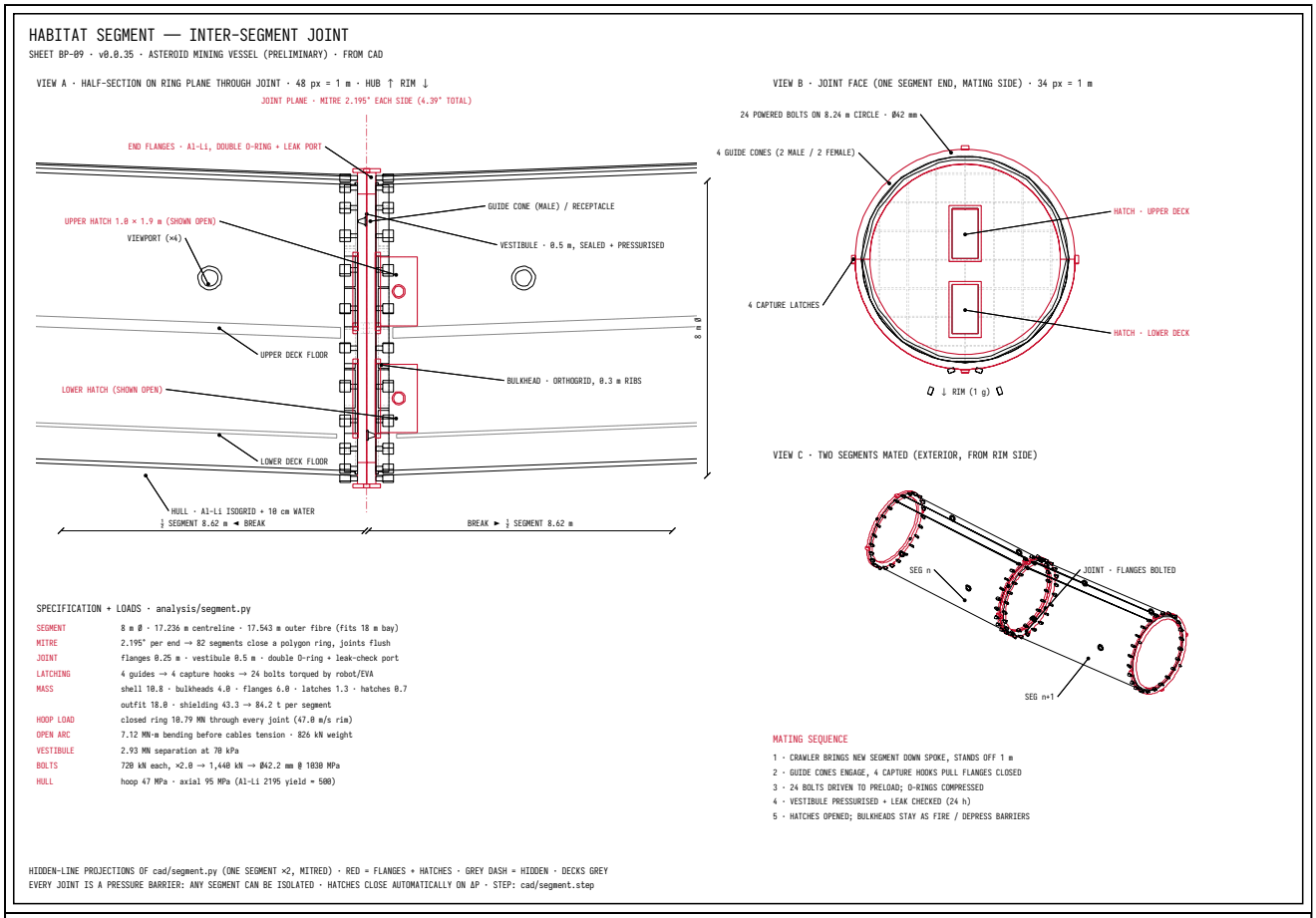
BP-10 The fewest Starship launches to a crewed 1 g station: two standard ring segments on a 450 m tether, spinning about their common centre. No hub, so the cost of hub and spokes disappears. The segments move onto spoke ends when the ring is built.

```
PHASE 0 · TETHERED BOLA (two habitat segments, 450 m tether, spins about its midpoint)
  segment in LEO 40.9 t (water jacket empty; full 84.2 t) · 1 g at 225 m, 1.99 rpm, tip 47 m/s
  tether 3 × Ø26 mm Dyneema strands, 450 m, 0.7 t · end load 401 kN
  spin-up 1.3 t propellant (Isp 300 s tip thrusters) · 1 MWe array 7 t
  non-segment cargo: tether 0.7 · spin_prop 1.3 · power 6.9 · docking 15.0 · consumables 30.0 · reel_deployer 8.0  = 62 t
```

option	segs	other t	launches	floor m²	crew	dense
Ring phase 1 (current plan)	6	1,120	16	1,398	21	55
Hub + 2 spokes, 1 segment each	2	1,110	12	466	7	18
Tethered bola, 2 segments (PHASE 0)	2	62	3	466	7	18
Bola: 1 segment + crew Starship	1	47	2	233	3	9

crew = 64 m²/person (ring standard) · dense = 25 m²/person (ISS-like)

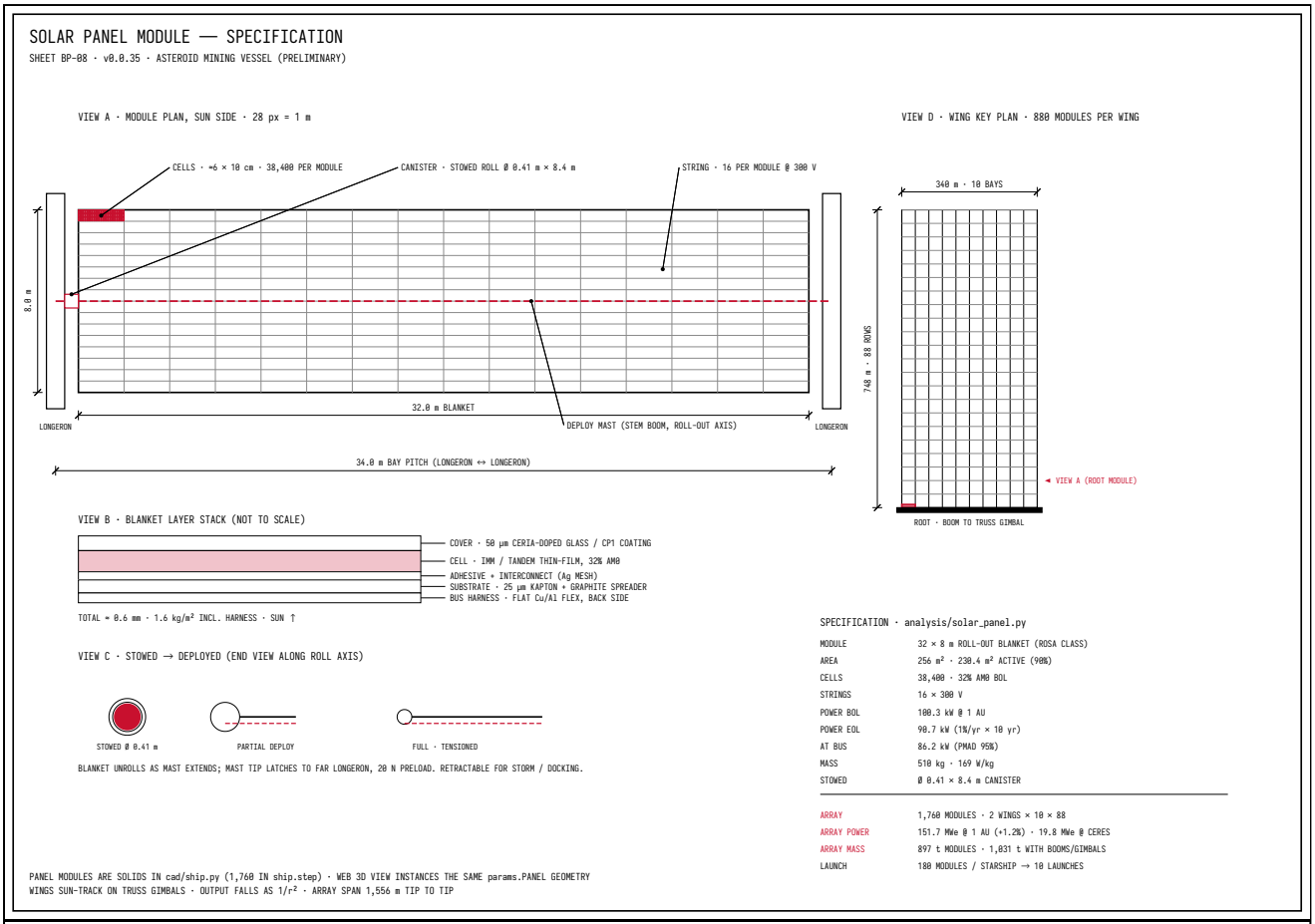
SHEET BP-09 · SEGMENT & JOINT (FROM CAD)



BP-09 How two ring segments join: mitred ends close the 82-sided ring flush; flanges, guide cones, capture latches and bolts carry the hoop load; bulkheads with deck-level hatches make every segment its own pressure compartment. See it in 3D: model viewer → Seg joint.

SEGMENT	8 m Ø · 17.236 m at centreline (17.543 outer / 16.93 inner fibre)
	ends mitred 2.195° so 82 segments close flush; end plane leans 153 mm at hull crown
	0.25 m end flanges lie inside that length → 17.543 m overall, fits 18 m Starship bay: True
JOINT	flat orthogrid bulkheads (0.3 m ribs) face a sealed 0.5 m vestibule; hatches 1.0 × 1.9 m, both decks, swing inboard
	4 guide cones · 4 capture latches · 24 powered bolts · double seal + leak check port
MASS t	shell 10.8 · bulkheads 4.0 · flanges 6.0 · latches 1.3 · hatches 0.7 · outfit 18.0 · shielding 43.3 = 84.2
LOADS	rim 47.0 m/s · closed-ring hoop tension 10.79 MN · bulkhead end load 3.52 MN
	open-arc joint moment 7.12 MN·m (before cables) · vestibule separation 2.93 MN
	per bolt 720 kN, ×2.0 = 1440 kN → Ø42.2 mm at 1030 MPa (Inconel 718)
HULL	hoop 47 MPa · axial 95 MPa at 6.0 mm equiv. (Al-Li 2195 yield ≈ 500 MPa)

■ SHEET BP-08 · SOLAR PANEL MODULE



BP-08 One 32 × 8 m roll-out blanket module and how 1,760 of them tile the two wings. Every module is a solid in the CAD model.

```
MODULE  32.0 x 8.0 m roll-out blanket (256 m², 38,400 cells, 16 strings @ 300 V)
        cell eff 32% · packing 90% · 1.0%/yr over 10 yr · PMAD 95%
        BOL 100.3 kW · EOL 90.7 kW · at bus 86.2 kW (1 AU)
        mass 510 kg (1.6 kg/m² blanket + mast + canister) → 169 W/kg
        stowed roll Ø 0.41 m × 8.4 m
LAYOUT  10 bays × 88 rows per wing (34 m × 8.50 m pitch) = 880 per wing, 1760 total
ARRAY   151.7 MWe at bus (target 150, margin +1.2%) · 19.8 MWe at Ceres
        blankets 897 t · 180 modules per Starship → 10 launches
```

■ ANALYSIS · AI DATA CENTER + BITCOIN LOAD BALANCING

AI is the firm load; Bitcoin ASICs are the interruptible sink that absorbs any spare array power and shed instantly for thrust, life support or ore processing. Light lag kills mining beyond cislunar space (10-minute blocks vs 8–22 minute one-way lag), so Bitcoin earns during the multi-year LEO build-out and stops at departure.

```
Firm loads: habitat 4.5 MW, AI 10.0 MW (14,286 GPUs)

phase                          array MW  thrust    AI  BTC MW   EH/s lag min  btc viable?
LEO construction (ring done)      150.0     0.0  10.0   133.5   8.90     0.0  yes
Earth-escape spiral               150.0   145.5   0.0     0.0   0.00     0.0  yes
Cruise to belt (thrusting)         37.5    33.0   0.0     0.0   0.00     8.3  NO: stale blocks (10-min blocks vs lag)
Parked at Ceres, mining            19.5     0.0   9.0     0.0   0.00    22.0  NO: stale blocks (10-min blocks vs lag)

Sized for peak IT load 144 MW (LEO, array fully available):
  radiators 134 thousand m² (0.13 km²) at 320 K, 1,073 t
  hardware  861 t  →  total 1,934 t, ≈16 extra Starship launches
AI-only (10 MW) module: radiators 9,344 m², 135 t total
```

■ CAD MODEL

Every drawing, the live 3D view and the analysis scripts derive from one parametric model: params.py → cad/ship.py (build123d / OpenCascade). Download: ship.step (FreeCAD, Fusion, Onshape) · ship.glb.

```
PART              VOLUME m³   SURFACE m²  MOTION
ore_bay              16,286        3,619  despun
dock                  3,423        1,392  despun
collar                1,343          748  despun
hub                   4,712        1,571  ROTATING
aft_spine               141          151  despun
tanks                65,373       14,872  despun
truss                22,720       11,488  despun
datacenter           10,776        3,387  despun
dc_radiators          2,448       12,667  despun
wing_structure       11,169       55,235  despun
solar_wings          22,528      908,160  despun  · 1760 modules
stern                 4,310        1,847  despun
thrusters               660          752  despun
ring                 71,275       45,679  ROTATING
spokes                7,492       12,433  ROTATING
pods                 35,058       23,115  ROTATING
```

■ ANALYSIS · SPIN GRAVITY

```
radius m  rpm@1g rpm@0.5g rpm@0.38g rim m/s@1g head-foot dg%
      50    4.23     2.99      2.61       22.1           3.6
     100    2.99     2.11      1.84       31.3           1.8
     150    2.44     1.73      1.51       38.4           1.2
     225    1.99     1.41      1.23       47.0           0.8
     300    1.73     1.22      1.06       54.2           0.6
     500    1.34     0.95      0.82       70.0           0.4
```

■ ANALYSIS · HULL MASS & LAUNCH COUNT

Ring radius 225 m, diameter 450 m, spin 1.99 rpm, rim speed 47 m/s
Segments: 82 x 8 m dia x 17.2 m long (polygon, 4.4 deg each)
Habitable volume ~71,044 m3
Segment mass 84.2 t (structure + joint 22.8, outfit 18, shielding 43.3) · analysis/segment.py
Ring 6,904 t | spokes 1266 | hub 400 | power 300 | consumables 200
TOTAL 9,070 t
Launches: 82 segment + 19 other = 101 to LEO
Without deep-space shielding: ring 3,346 t, still 82 segment launches (bay volume limits, not mass)

■ ANALYSIS · BELT MISSION PROPULSION (SUPERSEDED NUCLEAR-ELECTRIC STUDY, KEPT FOR COMPARISON)

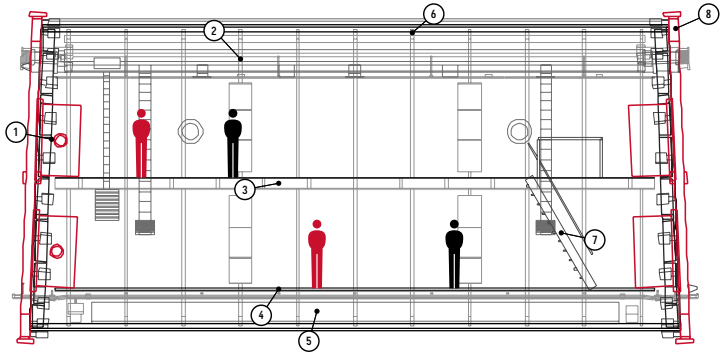
One-way delta-v 18.4 km/s, NEP specific mass 10 kg/kWe

case	Isp	MWe	reactor t	prop t	burn yr	launches
One-way, argon Hall thrusters	3000	50	500	8,577	3.6	179
One-way, gridded ion / VASIMR	6000	50	500	3,624	6.1	137
One-way, VASIMR, 100 MWe	6000	100	1,000	3,807	3.2	143
Round trip, no refuel, VASIMR 100 MWe	6000	100	1,000	9,012	7.6	186
Round trip + 5000 t ore, no refuel	6000	100	1,000	11,522	9.7	207

RING SEGMENT TYPE COMMON — COMMON SEGMENT

SHEET BP-S0 · v0.0.35 · ASTEROID MINING VESSEL (PRELIMINARY)

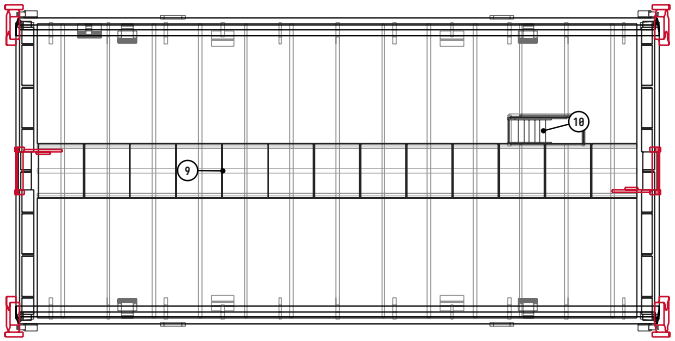
VIEW A · LONGITUDINAL SECTION (CUT 0.7 m PAST WALKWAY, LOOKING TO PORT)



1 END BULKHEAD + HATCH (BP-09)
2 OVERHEAD PLENUM · AIR / POWER / DATA
3 UPPER DECK FLOOR · BEAMS + KEELS
4 LOWER DECK FLOOR
5 UTILITY BAY · TANKS + TRUNK LINES
6 HULL RING FRAME
7 SHIP STAIR 60°
8 JOINT FLANGE

32 px = 1 m · A, B, C SAME SCALE

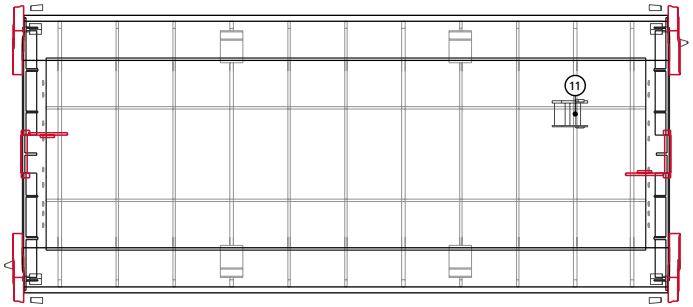
VIEW B · UPPER DECK PLAN



9 CENTRAL WALKWAY
10 STAIR OPENING

32 px = 1 m · A, B, C SAME SCALE

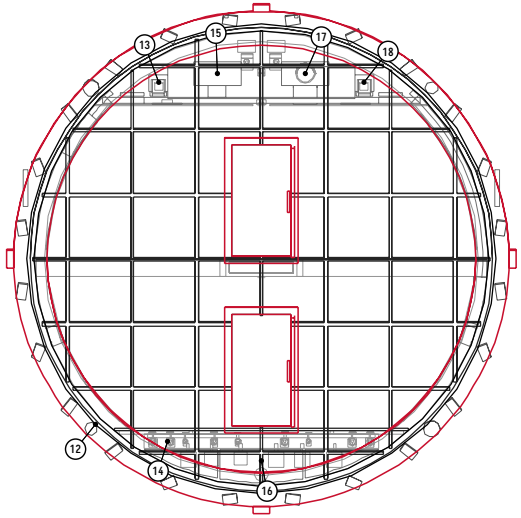
VIEW C · LOWER DECK PLAN



11 STAIR FOOT

32 px = 1 m · A, B, C SAME SCALE

VIEW D · TRANSVERSE SECTION AT MID-LENGTH



12 PRESSURE HULL + WATER JACKET
13 DC BUS A
14 COOLANT LOOPS A / B
15 AIR SUPPLY DUCT
16 BALLAST TANK
17 AIR RETURN DUCT
18 DC BUS B

49 px = 1 m · ENLARGED

COMMON · COMMON SEGMENT · SPECIFICATION

DEPARTMENT	Common
IN RING	82

NOTES
Hull, joint, structure, plenum and utility bay shared by every segment type.

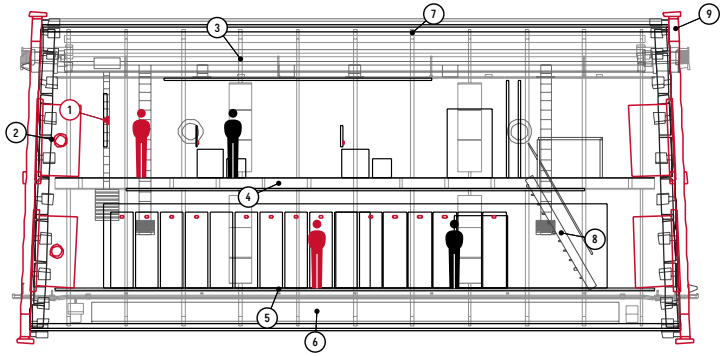
HUMAN ANDROID

DRAWN FROM CAD: cad/types/common.py + COMMON (cad/common*.py) + HULL/JOINT (cad/segment.py) · STEP: cad/seg_common.step
RED CALLOUTS = THIS TYPE'S OUTFIT · BLACK CALLOUTS = COMMON TO EVERY SEGMENT · LINES: BLACK HULL + FLOORS + OUTFIT, GREY SHARED SYSTEMS, RED JOINT FLANGE + HATCHES

RING SEGMENT TYPE C — CONTROL

SHEET BP-SC · v0.0.35 · ASTEROID MINING VESSEL (PRELIMINARY)

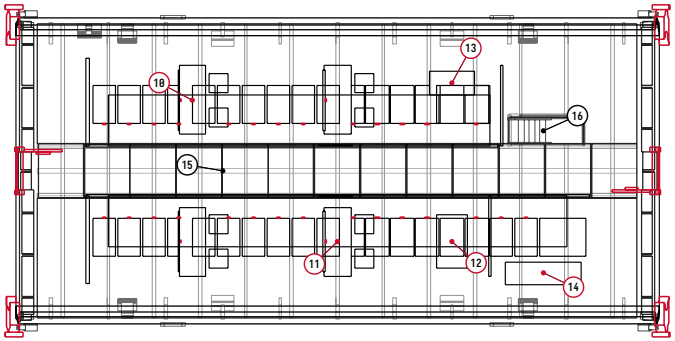
VIEW A · LONGITUDINAL SECTION (CUT 0.7 m PAST WALKWAY, LOOKING TO PORT)



1 DISPLAY WALL 4 m
2 END BULKHEAD + HATCH (BP-09)
3 OVERHEAD PLENUM · AIR / POWER / DATA
4 UPPER DECK FLOOR · BEAMS + KEELS
5 LOWER DECK FLOOR
6 UTILITY BAY · TANKS + TRUNK LINES
7 HULL RING FRAME
8 SHIP STAIR 60°
9 JOINT FLANGE

32 px = 1 m · A, B, C SAME SCALE

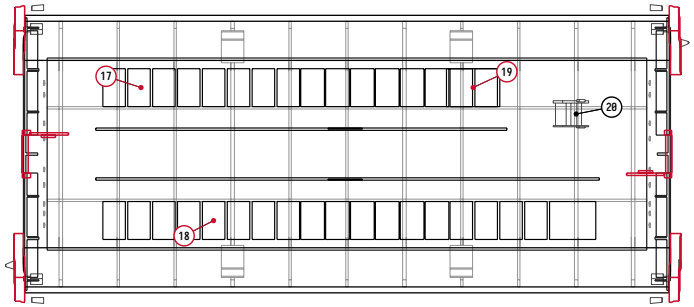
VIEW B · UPPER DECK PLAN



10 CONSOLE POD, 2 SEATS (x4)
11 RING OPS CONSOLE
12 WATCH OFFICER DESK
13 COMMS/NET RACK
14 PROCEDURE LOCKERS
15 CENTRAL WALKWAY
16 STAIR OPENING

32 px = 1 m · A, B, C SAME SCALE

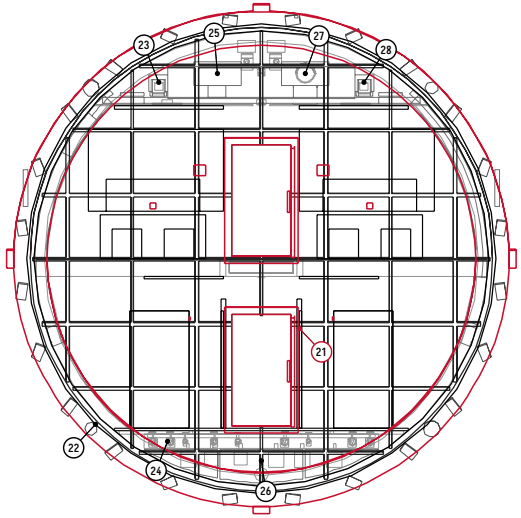
VIEW C · LOWER DECK PLAN



17 SERVER RACKS (16) ~8 kW EA
18 IN-ROW COOLER (4)
19 UPS/BATTERY CABINET (2)
20 STAIR FOOT

32 px = 1 m · A, B, C SAME SCALE

VIEW D · TRANSVERSE SECTION AT MID-LENGTH



21 GLAZED CORE ENCLOSURE
22 PRESSURE HULL + WATER JACKET
23 DC BUS A
24 COOLANT LOOPS A / B
25 AIR SUPPLY DUCT
26 BALLAST TANK
27 AIR RETURN DUCT
28 DC BUS B

49 px = 1 m · ENLARGED

C · CONTROL · SPECIFICATION

DEPARTMENT	Command
IN RING	2
BEDS	0
POWER	180 kW
OUTFIT MASS	20.0 t
UPPER DECK	ring operations floor: 3 console pods (ring ops, spin & balance, traffic control), wall display, watch officer desk
LOWER DECK	computer core: 2 rows of server racks with in-row coolers, UPS/battery cabinets

NOTES

Two redundant control segments 180 deg apart; each upper deck seats a 6-person watch at three 2-seat consoles (ring ops, spin & balance with ballast-pump control, docking/traffic) facing a 4 m display wall. Lower deck holds 16 racks at ~8 kW (128 kW) cooled by 4 in-row coolers into the coolant loop, plus 2 UPS cabinets for 15 min ride-through; total ~180 kW.

HUMAN ANDROID

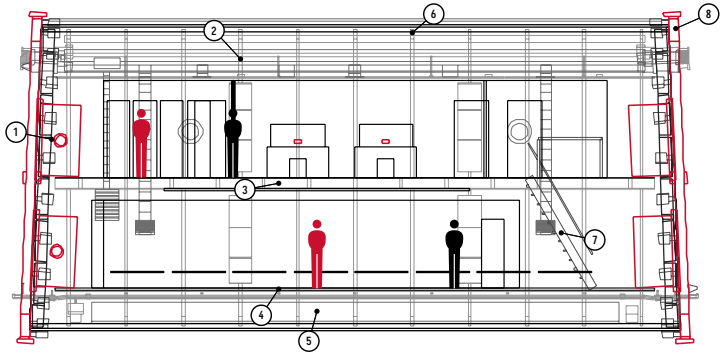
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RED CALLOUTS = THIS TYPE'S OUTFIT · BLACK CALLOUTS = COMMON TO EVERY SEGMENT · LINES: BLACK HULL + FLOORS + OUTFIT, GREY SHARED SYSTEMS, RED JOINT FLANGE + HATCHES

RING SEGMENT TYPE N — SPOKE NODE

SHEET BP-SN · v0.0.35 · ASTEROID MINING VESSEL (PRELIMINARY)

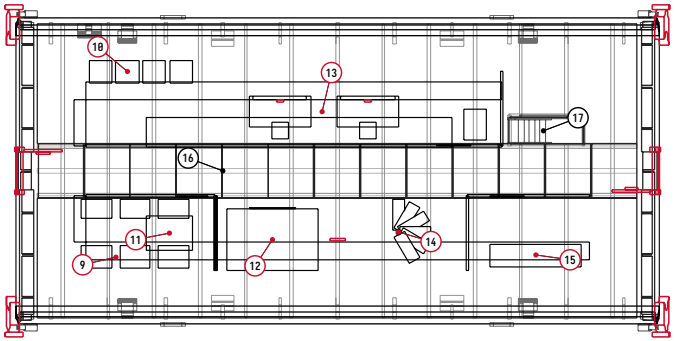
VIEW A · LONGITUDINAL SECTION (CUT 0.7 m PAST WALKWAY, LOOKING TO PORT)



1 END BULKHEAD + HATCH (BP-09)
2 OVERHEAD PLENUM · AIR / POWER / DATA
3 UPPER DECK FLOOR · BEAMS + KEELS
4 LOWER DECK FLOOR
5 UTILITY BAY · TANKS + TRUNK LINES
6 HULL RING FRAME
7 SHIP STAIR 60°
8 JOINT FLANGE

32 px = 1 m · A, B, C SAME SCALE

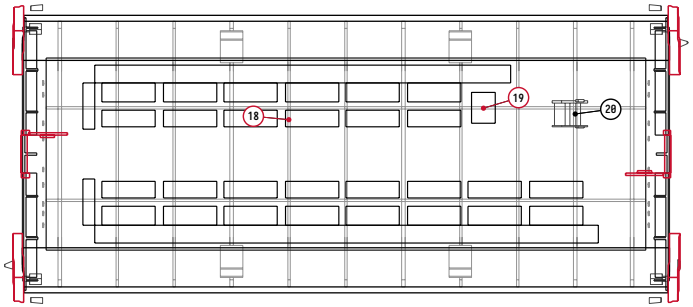
VIEW B · UPPER DECK PLAN



9 EVA SUIT ROOM, 6 STANDS
10 COMMS RACKS (4) ~15 kW
11 SUIT RECHARGE/DRY RACK 3 kW
12 SPOKE ELEVATOR 2.0 x 2.4 m, 12 P
13 NODE WATCH CONSOLES (2)
14 SPIRAL SPOKE STAIR
15 NODE LOCKERS
16 CENTRAL WALKWAY
17 STAIR OPENING

32 px = 1 m · A, B, C SAME SCALE

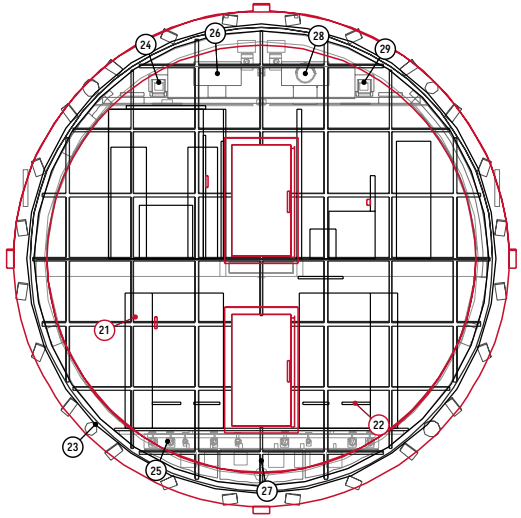
VIEW C · LOWER DECK PLAN



18 STORM SHELTER FOR 80
19 SHELTER STORES / O2 CANDLES
20 STAIR FOOT

32 px = 1 m · A, B, C SAME SCALE

VIEW D · TRANSVERSE SECTION AT MID-LENGTH



21 WATER-WALL TANKS ~12 m3
22 FOLD-DOWN BENCHES
23 PRESSURE HULL + WATER JACKET
24 DC BUS A
25 COOLANT LOOPS A / B
26 AIR SUPPLY DUCT
27 BALLAST TANK
28 AIR RETURN DUCT
29 DC BUS B

49 px = 1 m · ENLARGED

N · SPOKE NODE · SPECIFICATION

DEPARTMENT	Command
IN RING	4
BEDS	0
POWER	45 kW
OUTFIT MASS	22.0 t
UPPER DECK	spoke elevator landing + spoke stair tower (-x), EVA suit room with 6 suit stations, comms/node watch room (+x)
LOWER DECK	radiation/storm shelter for 80 (water-wall tanks along hull sides, fold-down benches), shelter stores

NOTES

The spoke elevator car (2.0 x 2.4 m, 12 persons) lands inside the -x side bay of the upper deck with a spiral spoke stair beside it, so the walkway and bulkhead end zones stay clear. EVA room holds 6 suits on donning stands with a 3 kW recharge/dry rack; comms room carries 2 consoles and 4 racks (~15 kW). Lower deck is a storm shelter for ~80 people (4 nodes cover 300 crew) behind ~12 m3 of water-wall tanks, about 0.4 m2 each.

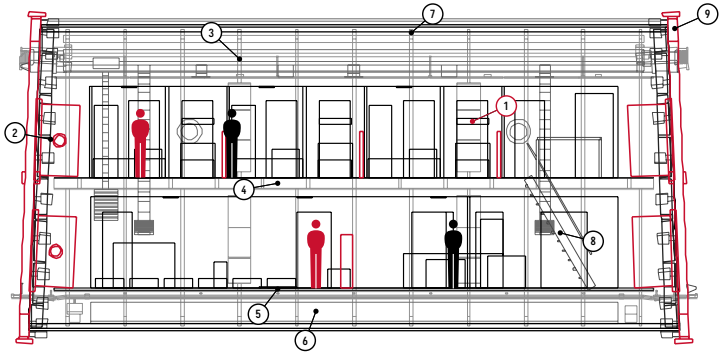
HUMAN ANDROID

DRAWN FROM CAD: cad/types/n.py + COMMON (cad/common*.py) + HULL/JOINT (cad/segment.py) · STEP: cad/seg_n.step
RED CALLOUTS = THIS TYPE'S OUTFIT · BLACK CALLOUTS = COMMON TO EVERY SEGMENT · LINES: BLACK HULL + FLOORS + OUTFIT, GREY SHARED SYSTEMS, RED JOINT FLANGE + HATCHES

RING SEGMENT TYPE F — FAMILY QUARTERS

SHEET BP-SF · v0.0.35 · ASTEROID MINING VESSEL (PRELIMINARY)

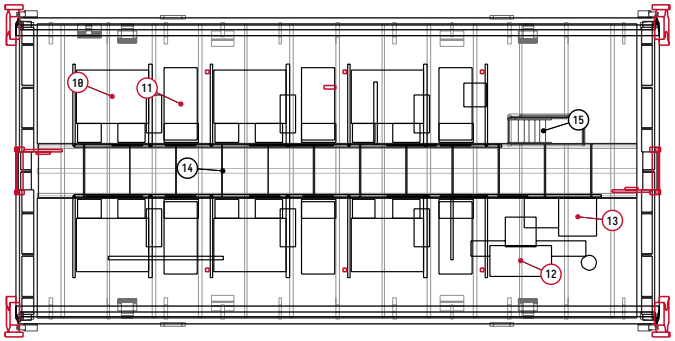
VIEW A · LONGITUDINAL SECTION (CUT 0.7 m PAST WALKWAY, LOOKING TO PORT)



1 2-TIER CHILD BUNK
2 END BULKHEAD + HATCH (BP-09)
3 OVERHEAD PLENUM · AIR / POWER / DATA
4 UPPER DECK FLOOR · BEAMS + KEELS
5 LOWER DECK FLOOR
6 UTILITY BAY · TANKS + TRUNK LINES
7 HULL RING FRAME
8 SHIP STAIR 60°
9 JOINT FLANGE

32 px = 1 m · A, B, C SAME SCALE

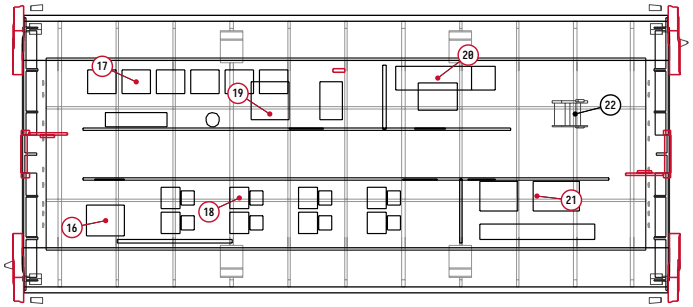
VIEW B · UPPER DECK PLAN



10 PARENTS' ROOM 2.0 x 3.0 m
11 CHILDREN'S BUNK ROOM 1.6 m
12 FAMILY LOUNGE
13 BATH POD
14 CENTRAL WALKWAY
15 STAIR OPENING

32 px = 1 m · A, B, C SAME SCALE

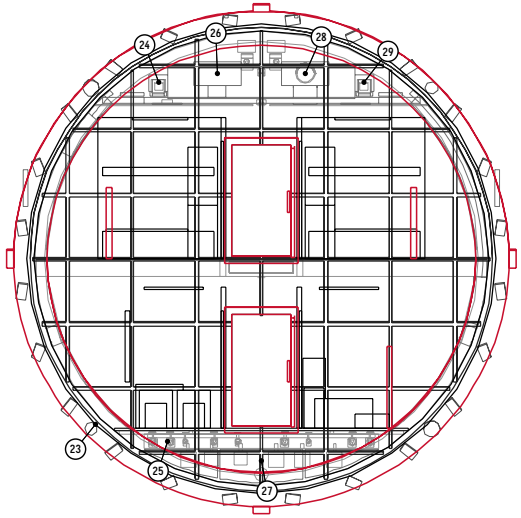
VIEW C · LOWER DECK PLAN



16 TEACHER STATION
17 CHILDCARE, 6 NAP COTS
18 CLASSROOM, 12 DESKS
19 PLAY MAT
20 KITCHENETTE COUNTER
21 WASH ROOM
22 STAIR FOOT

32 px = 1 m · A, B, C SAME SCALE

VIEW D · TRANSVERSE SECTION AT MID-LENGTH



23 PRESSURE HULL + WATER JACKET
24 DC BUS A
25 COOLANT LOOPS A / B
26 AIR SUPPLY DUCT
27 BALLAST TANK
28 AIR RETURN DUCT
29 DC BUS B

49 px = 1 m · ENLARGED

F · FAMILY QUARTERS · SPECIFICATION

DEPARTMENT	Crew
IN RING	4
BEDS	18
POWER	55 kW
OUTFIT MASS	18.0 t
UPPER DECK	6 two-room family suites (3.6 m x 3.0 m: parents' room + children's bunk room), family lounge/bath
LOWER DECK	classroom (12 desks), childcare/play room with nap cots, kitchenette, wash room

NOTES

Long-stay families: 6 suites each sleep 2 adults (double berth) + 1 child bunk = 18 berths per segment, 72 across 4 segments. Suites are 3.6 m along the ring, split into a 2.0 m parents' room and 1.6 m children's room, doors on the walkway. Lower deck serves ~20 children: 12-seat classroom with teacher station and screen, padded play/childcare room with 6 nap cots. ~55 kW incl. galley kettle/oven.

HUMAN ANDROID

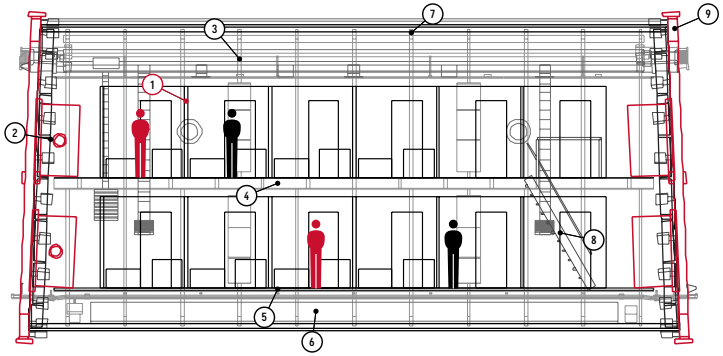
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RED CALLOUTS = THIS TYPE'S OUTFIT · BLACK CALLOUTS = COMMON TO EVERY SEGMENT · LINES: BLACK HULL + FLOORS + OUTFIT, GREY SHARED SYSTEMS, RED JOINT FLANGE + HATCHES

RING SEGMENT TYPE H — HABITAT

SHEET BP-SH · v0.0.35 · ASTEROID MINING VESSEL (PRELIMINARY)

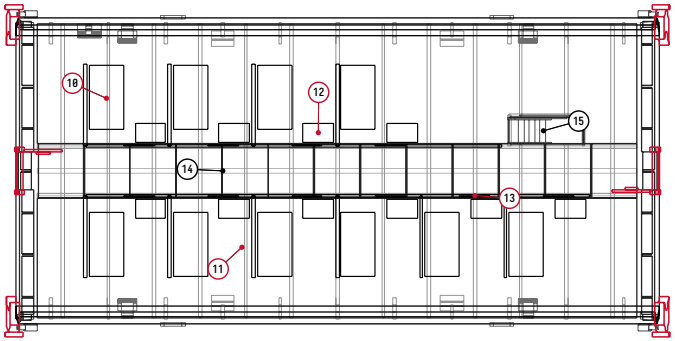
VIEW A · LONGITUDINAL SECTION (CUT 0.7 m PAST WALKWAY, LOOKING TO PORT)



1 CABIN PARTITION 2.4 m HIGH
2 END BULKHEAD + HATCH (BP-09)
3 OVERHEAD PLENUM · AIR / POWER / DATA
4 UPPER DECK FLOOR · BEAMS + KEELS
5 LOWER DECK FLOOR
6 UTILITY BAY · TANKS + TRUNK LINES
7 HULL RING FRAME
8 SHIP STAIR 60°
9 JOINT FLANGE

32 px = 1 m · A, B, C SAME SCALE

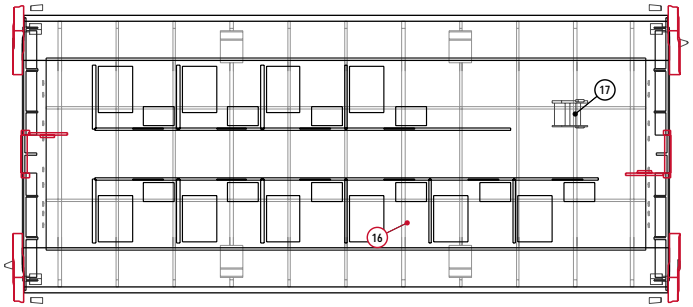
VIEW B · UPPER DECK PLAN



10 BUNK 0.9 x 1.6 m
11 SINGLE CABIN 2.2 x 2.1 m
12 DESK + LOCKER
13 CABIN DOOR 0.8 m
14 CENTRAL WALKWAY
15 STAIR OPENING

32 px = 1 m · A, B, C SAME SCALE

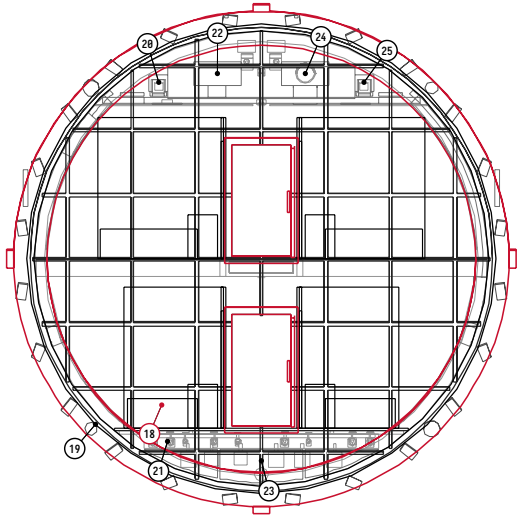
VIEW C · LOWER DECK PLAN



16 COMPACT CABIN 2.2 x 1.7 m
17 STAIR FOOT

32 px = 1 m · A, B, C SAME SCALE

VIEW D · TRANSVERSE SECTION AT MID-LENGTH



18 LOWER CABIN BUNK
19 PRESSURE HULL + WATER JACKET
20 DC BUS A
21 COOLANT LOOPS A / B
22 AIR SUPPLY DUCT
23 BALLAST TANK
24 AIR RETURN DUCT
25 DC BUS B

49 px = 1 m · ENLARGED

H · HABITAT · SPECIFICATION

DEPARTMENT	Crew
IN RING	25
BEDS	20
POWER	60 kW
OUTFIT MASS	16.0 t
UPPER DECK	10 single cabins in total, on both sides of the walkway (2.2 m pitch, ~3 m deep)
LOWER DECK	10 compact cabins in total (~2 m deep)

NOTES

Reference type. 20 single cabins on a 2.2 m pitch, each with bunk, desk and locker, doors opening onto the central walkway; baths and laundry are shared with neighbouring segments. 25 H segments give 500 berths for 300 crew plus changeover.

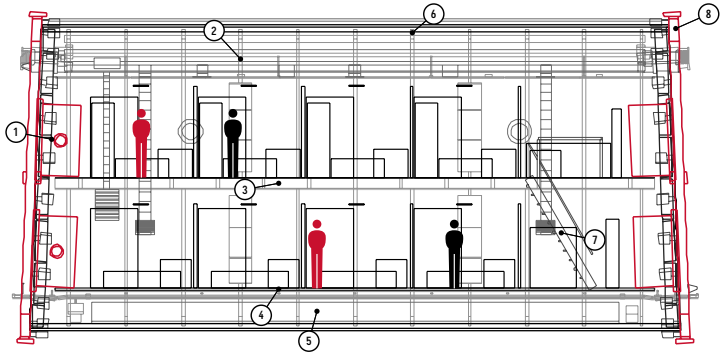
HUMAN ANDROID

DRAWN FROM CAD: cad/types/h.py + COMMON (cad/common*.py) + HULL/JOINT (cad/segment.py) · STEP: cad/seg_h.step
RED CALLOUTS = THIS TYPE'S OUTFIT · BLACK CALLOUTS = COMMON TO EVERY SEGMENT · LINES: BLACK HULL + FLOORS + OUTFIT, GREY SHARED SYSTEMS, RED JOINT FLANGE + HATCHES

RING SEGMENT TYPE O — PRIVATE HOME POD

SHEET BP-SO · v0.0.35 · ASTEROID MINING VESSEL (PRELIMINARY)

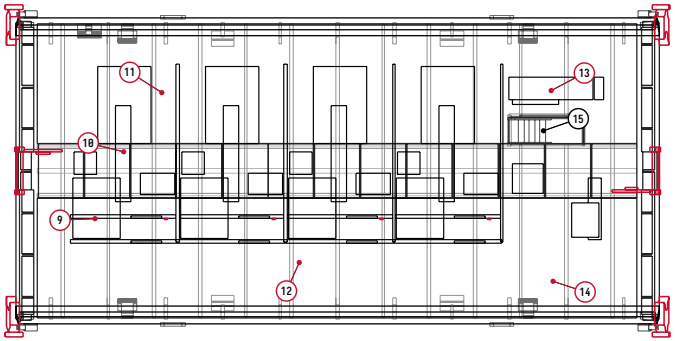
VIEW A · LONGITUDINAL SECTION (CUT 0.7 m PAST WALKWAY, LOOKING TO PORT)



1 END BULKHEAD + HATCH (BP-09)
2 OVERHEAD PLENUM · AIR / POWER / DATA
3 UPPER DECK FLOOR · BEAMS + KEELS
4 LOWER DECK FLOOR
5 UTILITY BAY · TANKS + TRUNK LINES
6 HULL RING FRAME
7 SHIP STAIR 60°
8 JOINT FLANGE

32 px = 1 m · A, B, C SAME SCALE

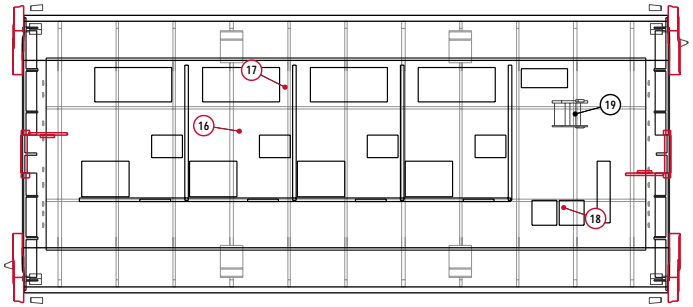
VIEW B · UPPER DECK PLAN



9 EN-SUITE WC + SHOWER POD
10 PRIVATE ROOM 2.8 x 4.6 m
11 DOUBLE BERTH 1.4 x 2.0 m
12 SIDE CORRIDOR 1.1 m (REPLACES WALKWAY)
13 KITCHENETTE
14 FRONT DOOR → BRIDGE TO RING
15 STAIR OPENING

32 px = 1 m · A, B, C SAME SCALE

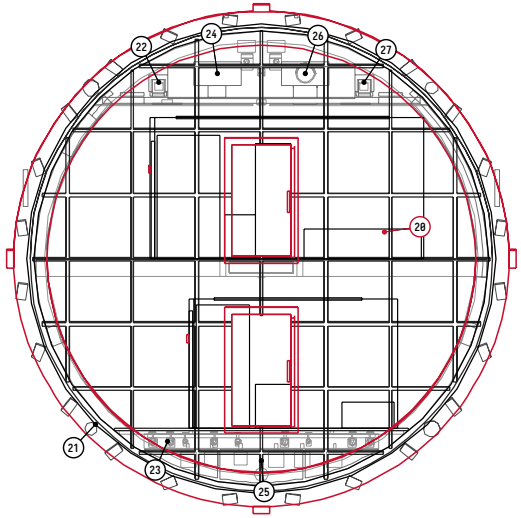
VIEW C · LOWER DECK PLAN



16 PRIVATE ROOM 2.8 x 3.5 m
17 SINGLE BERTH 0.9 x 2.0 m
18 LAUNDRY + PANTRY
19 STAIR FOOT

32 px = 1 m · A, B, C SAME SCALE

VIEW D · TRANSVERSE SECTION AT MID-LENGTH



20 DOUBLE BERTH
21 PRESSURE HULL + WATER JACKET
22 DC BUS A
23 COOLANT LOOPS A / B
24 AIR SUPPLY DUCT
25 BALLAST TANK
26 AIR RETURN DUCT
27 DC BUS B

49 px = 1 m · ENLARGED

O · PRIVATE HOME POD · SPECIFICATION

DEPARTMENT	Crew
IN RING	40
BEDS	12
POWER	35 kW
OUTFIT MASS	15.0 t
UPPER DECK	4 private rooms 2.8 x 4.6 m (13 m²): double berth, en-suite WC/shower pod, desk, wardrobe; entry hall with front door to the bridge, lockers, kitchenette
LOWER DECK	4 private rooms 2.8 x 3.5 m (10 m²): single berth, en-suite pod, desk; stair hall with laundry and pantry

NOTES

A dead-end segment berthed beside its host ring segment (9.5 m centres, same 225 m radius, same 1 g), entered only through its own front door on a 2.2 m bridge, so nobody walks through. 8 private rooms per pod (4 up sleep 2, 4 down sleep 1 = 12 berths); 40 pods = 320 rooms for 300 crew. Side corridor replaces the ring's central walkway. The pod's own end hatches stay shut (future emergency link to the next pod).

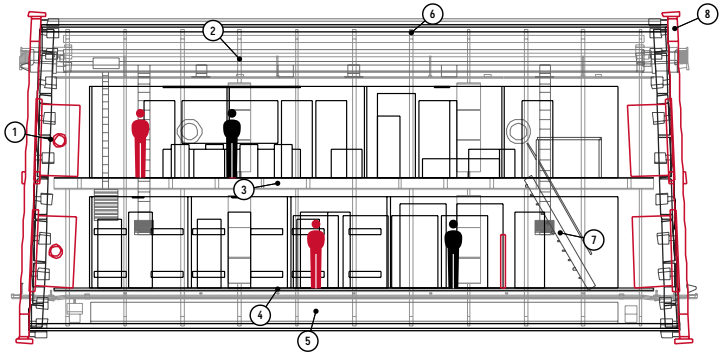
HUMAN ANDROID

DRAWN FROM CAD: cad/types/o.py + COMMON (cad/common*.py) + HULL/JOINT (cad/segment.py) · STEP: cad/seg_o.step
RED CALLOUTS = THIS TYPE'S OUTFIT · BLACK CALLOUTS = COMMON TO EVERY SEGMENT · LINES: BLACK HULL + FLOORS + OUTFIT, GREY SHARED SYSTEMS, RED JOINT FLANGE + HATCHES

RING SEGMENT TYPE V — VIP / GUEST

SHEET BP-SV · v0.0.35 · ASTEROID MINING VESSEL (PRELIMINARY)

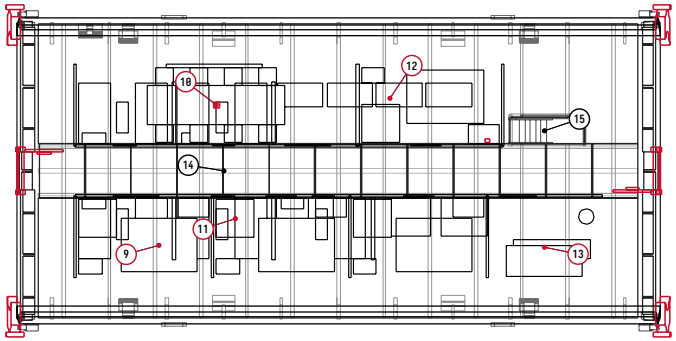
VIEW A · LONGITUDINAL SECTION (CUT 0.7 m PAST WALKWAY, LOOKING TO PORT)



1 END BULKHEAD + HATCH (BP-09)
2 OVERHEAD PLENUM · AIR / POWER / DATA
3 UPPER DECK FLOOR · BEAMS + KEELS
4 LOWER DECK FLOOR
5 UTILITY BAY · TANKS + TRUNK LINES
6 HULL RING FRAME
7 SHIP STAIR 60°
8 JOINT FLANGE

32 px = 1 m · A, B, C SAME SCALE

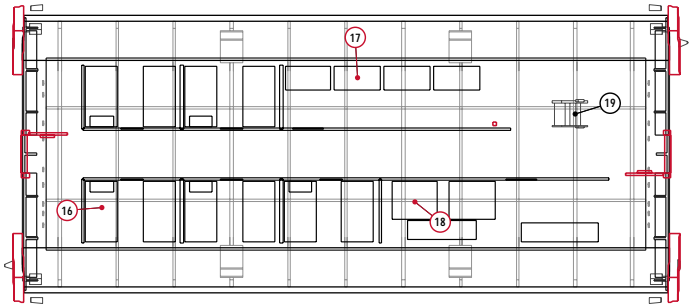
VIEW B · UPPER DECK PLAN



9 DOUBLE BERTH 1.4 x 2.0 m
10 MEETING ROOM 8 SEATS
11 EN-SUITE POD 1.0 x 1.0 m
12 GUEST CABIN 3.8 x 2.2 m
13 GUEST LOUNGE
14 CENTRAL WALKWAY
15 STAIR OPENING

32 px = 1 m · A, B, C SAME SCALE

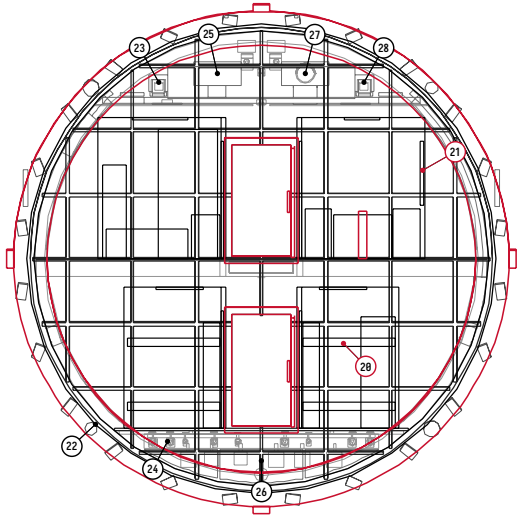
VIEW C · LOWER DECK PLAN



16 BUNK BAY 4 BERTHS
17 LUGGAGE LOCKERS
18 WASH PODS
19 STAIR FOOT

32 px = 1 m · A, B, C SAME SCALE

VIEW D · TRANSVERSE SECTION AT MID-LENGTH



20 2-TIER BUNKS
21 DISPLAY WALL 2.5 m
22 PRESSURE HULL + WATER JACKET
23 DC BUS A
24 COOLANT LOOPS A / B
25 AIR SUPPLY DUCT
26 BALLAST TANK
27 AIR RETURN DUCT
28 DC BUS B

49 px = 1 m · ENLARGED

V · VIP / GUEST · SPECIFICATION

DEPARTMENT	Crew
IN RING	1
BEDS	24
POWER	45 kW
OUTFIT MASS	15.0 t
UPPER DECK	4 visitor cabins with en-suite pods (3 x 3.6 m on −x, 1 x 3.8 m on +x), 8-seat meeting room
LOWER DECK	overflow bunk rooms for crew changeover (5 bays x 4 bunks = 20), luggage lockers, wash pod

NOTES

Single guest segment: 4 visitor cabins 3.6 x 3.0 m with double berth, desk and en-suite pod; 8-seat meeting/briefing room 7.4 m long with display wall. Lower deck absorbs crew-changeover overlap: 20 bunks in 2-tier pairs (two shuttle loads overlapping ~1 week), with lockers for luggage. ~45 kW.

HUMAN ANDROID

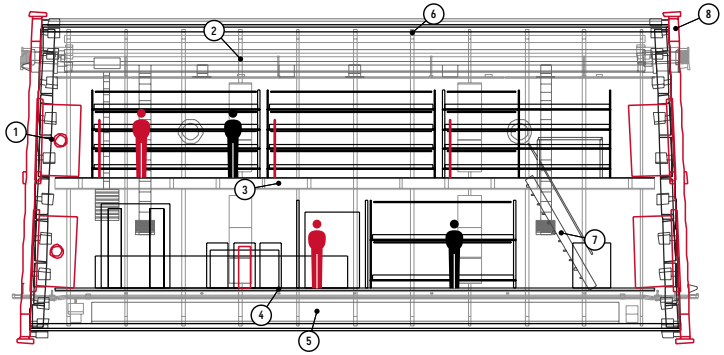
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RED CALLOUTS = THIS TYPE'S OUTFIT · BLACK CALLOUTS = COMMON TO EVERY SEGMENT · LINES: BLACK HULL + FLOORS + OUTFIT, GREY SHARED SYSTEMS, RED JOINT FLANGE + HATCHES

RING SEGMENT TYPE A — AGRICULTURE / HYDROPONICS

SHEET BP-SA · v0.0.35 · ASTEROID MINING VESSEL (PRELIMINARY)

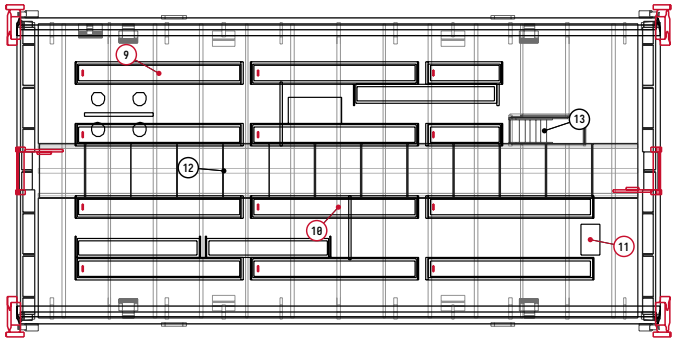
VIEW A · LONGITUDINAL SECTION (CUT 0.7 m PAST WALKWAY, LOOKING TO PORT)



1 END BULKHEAD + HATCH (BP-09)
2 OVERHEAD PLENUM · AIR / POWER / DATA
3 UPPER DECK FLOOR · BEAMS + KEELS
4 LOWER DECK FLOOR
5 UTILITY BAY · TANKS + TRUNK LINES
6 HULL RING FRAME
7 SHIP STAIR 60°
8 JOINT FLANGE

32 px = 1 m · A, B, C SAME SCALE

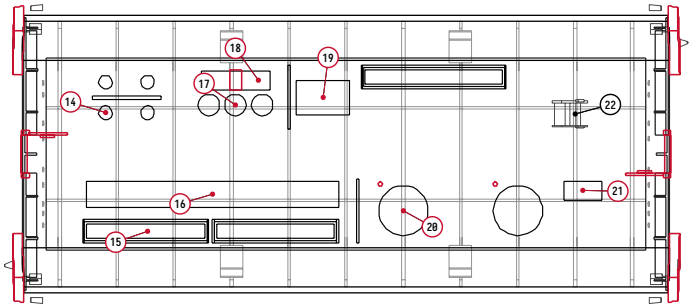
VIEW B · UPPER DECK PLAN



9 4-TIER LED GROW RACK
10 GROW RACK ROW (INNER)
11 HARVEST BENCH
12 CENTRAL WALKWAY
13 STAIR OPENING

32 px = 1 m · A, B, C SAME SCALE

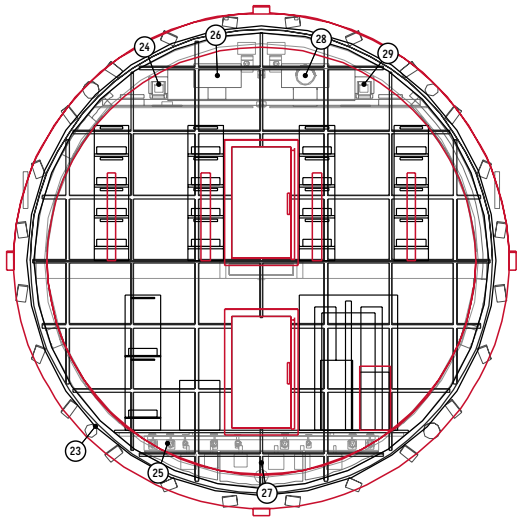
VIEW C · LOWER DECK PLAN



14 SPIRULINA PBR COLUMNS
15 2-TIER GROW RACK
16 POTTING / SEEDLING BENCH
17 NUTRIENT STOCK TANKS
18 DOSING PUMPS / EC CONTROL
19 GERMINATION CABINET
20 TILAPIA TANK 1.5 M3
21 BIOFILTER
22 STAIR FOOT

32 px = 1 m · A, B, C SAME SCALE

VIEW D · TRANSVERSE SECTION AT MID-LENGTH



23 PRESSURE HULL + WATER JACKET
24 DC BUS A
25 COOLANT LOOPS A / B
26 AIR SUPPLY DUCT
27 BALLAST TANK
28 AIR RETURN DUCT
29 DC BUS B

49 px = 1 m · ENLARGED

A · AGRICULTURE / HYDROPONICS · SPECIFICATION

DEPARTMENT	Life support
IN RING	8
BEDS	0
POWER	95 kW
OUTFIT MASS	22.0 t
UPPER DECK	2 grow bays: 4 rows of 4-tier LED racks (0.6 m deep, 0.45 m tier pitch) along both sides, harvest bench
LOWER DECK	2-tier grow racks, 2 tilapia tanks (1.5 m3), 4 spirulina photobioreactor columns, nutrient mixing skid, seedling/germination cabinet

NOTES

About 150 m2 of LED canopy per segment (upper 4 tiers, lower 2 tiers) at ~0.45 kW/m2 lamp density, giving ~70 kW lighting plus pumps/HVAC = 95 kW. At ~45 m2 of hydroponic canopy per person for a full diet, one segment yields roughly 3.3 person-equivalents (about 1.1% of the 300 crew's food); all 8 segments together cover ~9% of calories plus most fresh greens, with algae and fish adding protein and air revitalisation (~25 kg O2/day from plants and algae per segment).

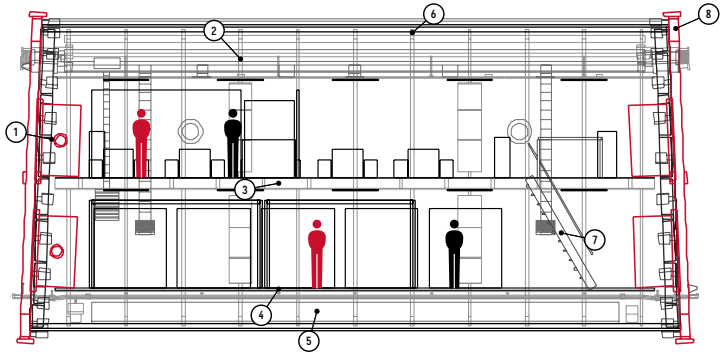
HUMAN ANDROID

DRAWN FROM CAD: cad/types/a.py + COMMON (cad/common*.py) + HULL/JOINT (cad/segment.py) · STEP: cad/seg_a.step
RED CALLOUTS = THIS TYPE'S OUTFIT · BLACK CALLOUTS = COMMON TO EVERY SEGMENT · LINES: BLACK HULL + FLOORS + OUTFIT, GREY SHARED SYSTEMS, RED JOINT FLANGE + HATCHES

RING SEGMENT TYPE G — GALLEY / MESS

SHEET BP-SG · v0.0.35 · ASTEROID MINING VESSEL (PRELIMINARY)

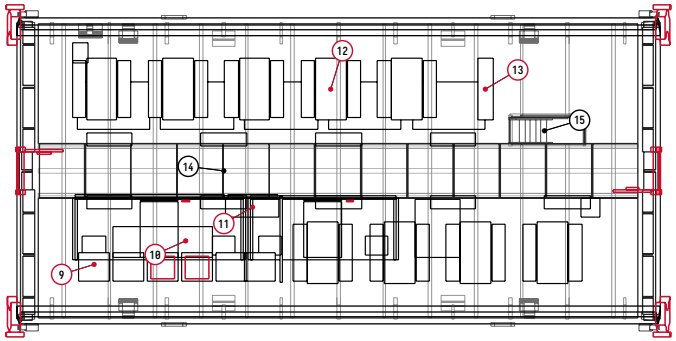
VIEW A · LONGITUDINAL SECTION (CUT 0.7 m PAST WALKWAY, LOOKING TO PORT)



1 END BULKHEAD + HATCH (BP-09)
2 OVERHEAD PLENUM · AIR / POWER / DATA
3 UPPER DECK FLOOR · BEAMS + KEELS
4 LOWER DECK FLOOR
5 UTILITY BAY · TANKS + TRUNK LINES
6 HULL RING FRAME
7 SHIP STAIR 60°
8 JOINT FLANGE

32 px = 1 m · A, B, C SAME SCALE

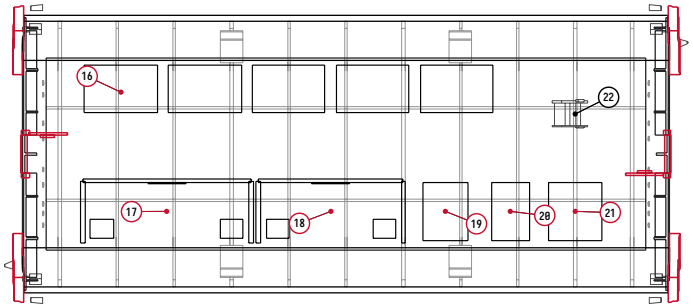
VIEW B · UPPER DECK PLAN



9 COMBI OVENS 2 x 1.8 M
10 GALLEY PREP ISLAND 2.6 M
11 SERVING COUNTER / PASS
12 MESS TABLE 6 SEATS (60 TOTAL)
13 BAR COUNTER
14 CENTRAL WALKWAY
15 STAIR OPENING

32 px = 1 m · A, B, C SAME SCALE

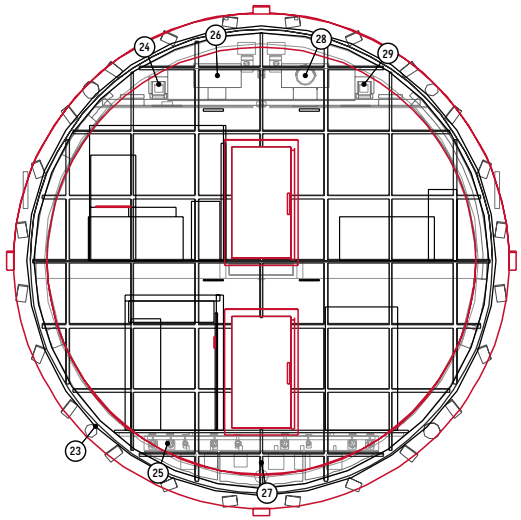
VIEW C · LOWER DECK PLAN



16 DRY STORES SHELVING
17 FREEZER WALK-IN −18 C
18 CHILLER WALK-IN +3 C
19 REFRIG. CONDENSING UNITS 20 KW
20 WASTE COMPACTOR
21 THAW / COOK-CHILL BENCH
22 STAIR FOOT

32 px = 1 m · A, B, C SAME SCALE

VIEW D · TRANSVERSE SECTION AT MID-LENGTH



23 PRESSURE HULL + WATER JACKET
24 DC BUS A
25 COOLANT LOOPS A / B
26 AIR SUPPLY DUCT
27 BALLAST TANK
28 AIR RETURN DUCT
29 DC BUS B

49 px = 1 m · ENLARGED

G · GALLEY / MESS · SPECIFICATION

DEPARTMENT	Life support
IN RING	3
BEDS	0
POWER	70 kW
OUTFIT MASS	18.0 t
UPPER DECK	galley (−x, y −7..−1.5: ovens, hobs, prep, sinks, dishwasher); mess hall 60 seats at 6-seat tables both sides of the walkway; serving line
LOWER DECK	freezer (−18 C) and chiller walk-ins, dry stores shelving, cook-chill/thaw, waste compactor

NOTES

Three galleys serve 300 crew in two sittings of ~50, so each mess seats 60 at ten 6-seat tables (~1 m2/seat incl. aisles). Galley load ~45 kW (combi ovens, induction, dishwasher) plus ~20 kW refrigeration. Lower stores hold ~30 days for 100 crew (~1.8 kg/person/day, ~5.4 t), about 40% frozen, with resupply via the end hatches.

HUMAN ANDROID

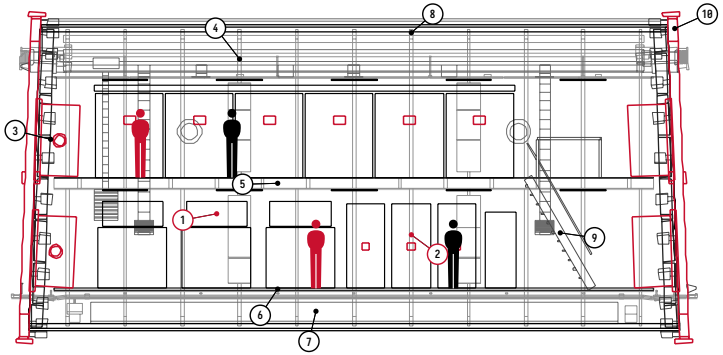
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RED CALLOUTS = THIS TYPE'S OUTFIT · BLACK CALLOUTS = COMMON TO EVERY SEGMENT · LINES: BLACK HULL + FLOORS + OUTFIT, GREY SHARED SYSTEMS, RED JOINT FLANGE + HATCHES

RING SEGMENT TYPE L — LIFE SUPPORT

SHEET BP-SL · v0.0.35 · ASTEROID MINING VESSEL (PRELIMINARY)

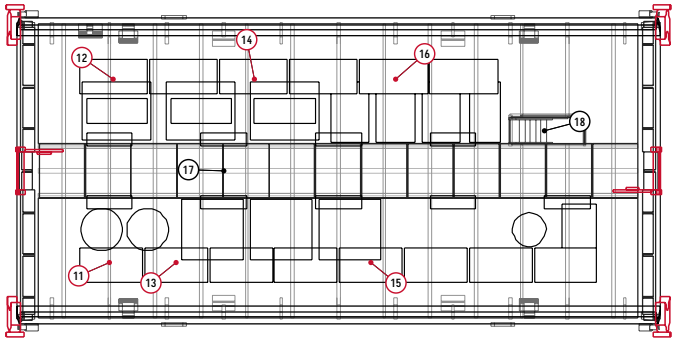
VIEW A · LONGITUDINAL SECTION (CUT 0.7 m PAST WALKWAY, LOOKING TO PORT)



1 ARC FAN 2.5 m3/s
2 HEPA/CHARCOAL FILTERS
3 END BULKHEAD + HATCH (BP-09)
4 OVERHEAD PLENUM · AIR / POWER / DATA
5 UPPER DECK FLOOR · BEAMS + KEELS
6 LOWER DECK FLOOR
7 UTILITY BAY · TANKS + TRUNK LINES
8 HULL RING FRAME
9 SHIP STAIR 60°
10 JOINT FLANGE

32 px = 1 m · A, B, C SAME SCALE

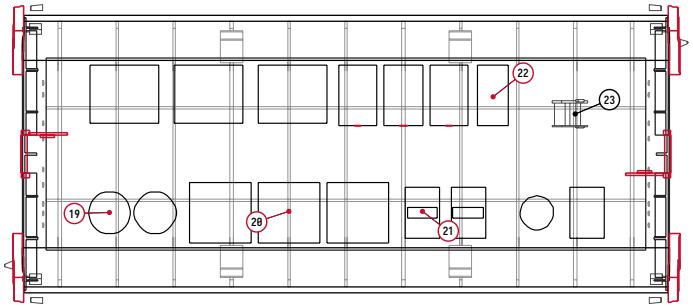
VIEW B · UPPER DECK PLAN



11 TRACE CONTAMINANT CONTROL
12 CO2 REMOVAL CDRA x2
13 WATER PROCESSOR x3
14 SABATIER REACTOR
15 URINE PROCESSOR x2
16 O2 ELECTROLYSIS x3 ~45 kW
17 CENTRAL WALKWAY
18 STAIR OPENING

32 px = 1 m · A, B, C SAME SCALE

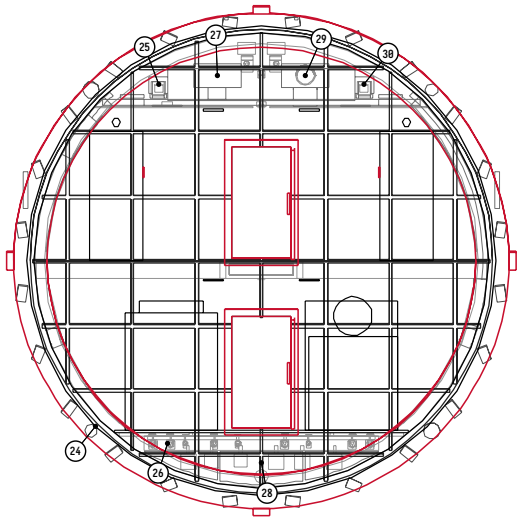
VIEW C · LOWER DECK PLAN



19 O2/N2 BUFFER VESSELS
20 POTABLE/GREY/BRINE TANKS
21 PUMP SKIDS
22 LI-ION BANK 400 kWh
23 STAIR FOOT

32 px = 1 m · A, B, C SAME SCALE

VIEW D · TRANSVERSE SECTION AT MID-LENGTH



24 PRESSURE HULL + WATER JACKET
25 DC BUS A
26 COOLANT LOOPS A / B
27 AIR SUPPLY DUCT
28 BALLAST TANK
29 AIR RETURN DUCT
30 DC BUS B

49 px = 1 m · ENLARGED

L · LIFE SUPPORT · SPECIFICATION

DEPARTMENT	Life support
IN RING	6
BEDS	0
POWER	95 kW
OUTFIT MASS	24.0 t
UPPER DECK	+x: CO2 removal (4-bed molecular sieve) + Sabatier + O2 electrolysis racks; -x: trace contaminant control, water processor + urine processor, control console
LOWER DECK	+x: arc ventilation fan/filter plant, battery bank; -x: O2/N2 buffer tanks, potable + wastewater tanks, pump skids

NOTES

Sized for ~50 crew per segment (6 segments + 50% margin across 300): CO2 removal ~50 kg/day, electrolysis O2 ~42 kg/day (~2 kg/h H2O, ~45 kW), water recovery ~180 L/day at 98%. Lower deck fans move ~2.5 m3/s through HEPA/charcoal beds for the adjacent arc, with a ~400 kWh Li-ion bank riding through power outages. Racks are 0.9 m deep with front access from the walkway.

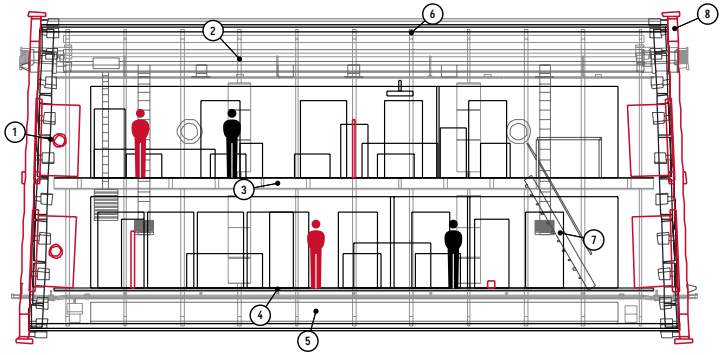
HUMAN ANDROID

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RING SEGMENT TYPE M — MEDICAL

SHEET BP-SM · v0.0.35 · ASTEROID MINING VESSEL (PRELIMINARY)

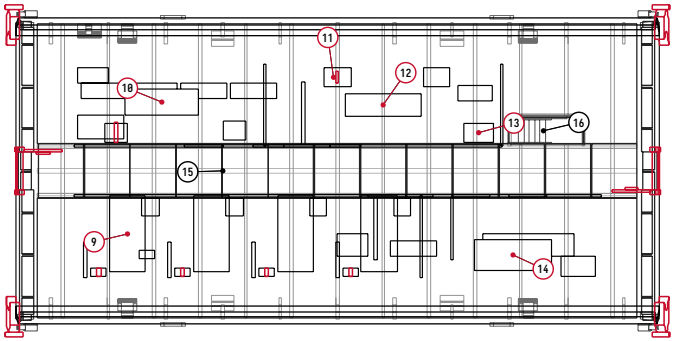
VIEW A · LONGITUDINAL SECTION (CUT 0.7 m PAST WALKWAY, LOOKING TO PORT)



1 END BULKHEAD + HATCH (BP-09)
2 OVERHEAD PLENUM · AIR / POWER / DATA
3 UPPER DECK FLOOR · BEAMS + KEELS
4 LOWER DECK FLOOR
5 UTILITY BAY · TANKS + TRUNK LINES
6 HULL RING FRAME
7 SHIP STAIR 60°
8 JOINT FLANGE

32 px = 1 m · A, B, C SAME SCALE

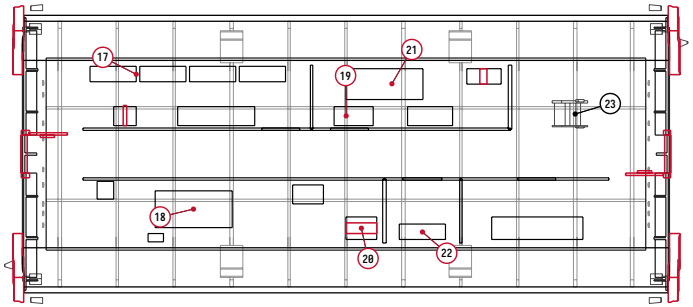
VIEW B · UPPER DECK PLAN



9 WARD BED BAY 2.2 M (4 BEDS)
10 CLINIC EXAM COUCH
11 ANAESTHESIA MACHINE
12 OPERATING TABLE
13 SCRUB SINK
14 NURSE STATION
15 CENTRAL WALKWAY
16 STAIR OPENING

32 px = 1 m · A, B, C SAME SCALE

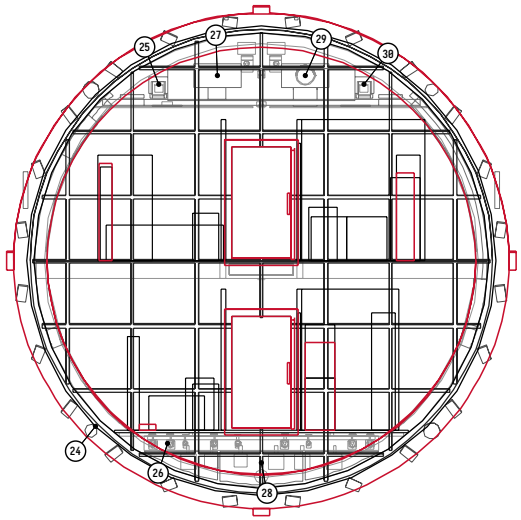
VIEW C · LOWER DECK PLAN



17 PHARMACY DRUG SHELVING
18 ISOLATION BED (NEG. PRESSURE)
19 TLD BADGE READER
20 HEPA EXHAUST UNIT
21 WHOLE-BODY COUNTER
22 ANTE-ROOM PPE LOCKER
23 STAIR FOOT

32 px = 1 m · A, B, C SAME SCALE

VIEW D · TRANSVERSE SECTION AT MID-LENGTH



24 PRESSURE HULL + WATER JACKET
25 DC BUS A
26 COOLANT LOOPS A / B
27 AIR SUPPLY DUCT
28 BALLAST TANK
29 AIR RETURN DUCT
30 DC BUS B

49 px = 1 m · ENLARGED

M · MEDICAL · SPECIFICATION

DEPARTMENT	Life support
IN RING	2
BEDS	5
POWER	45 kW
OUTFIT MASS	14.0 t
UPPER DECK	-x: 4-bed ward (2.2 m bed bays); +x: clinic/exam room, operating theatre (3.6 m long) with scrub sink
LOWER DECK	-x: negative-pressure isolation room with ante-room; +x: pharmacy, radiation dosimetry lab

NOTES

Two medical segments (one per ring half) give 8 ward beds + 2 isolation beds for 300 crew (~3%), matching ISS/Antarctic station sick-bay ratios plus a surgical capability. Theatre has fixed table, overhead lamp, anaesthesia and imaging cart (~15 kW peak); isolation room has its own HEPA exhaust fan unit. The dosimetry lab reads crew badges and runs a whole-body counter for solar-event exposure tracking; total load ~45 kW.

HUMAN ANDROID

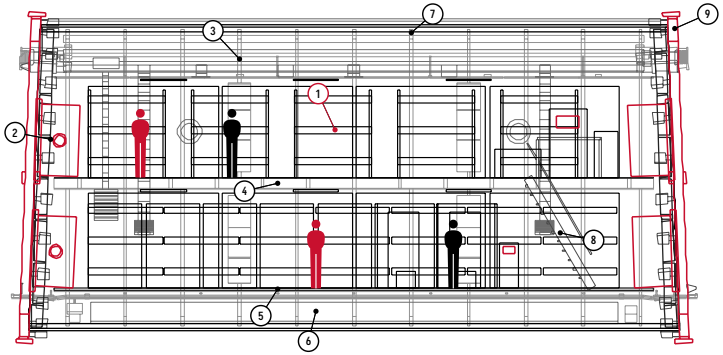
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RING SEGMENT TYPE S — STORM SHELTER

SHEET BP-SS · v0.0.35 · ASTEROID MINING VESSEL (PRELIMINARY)

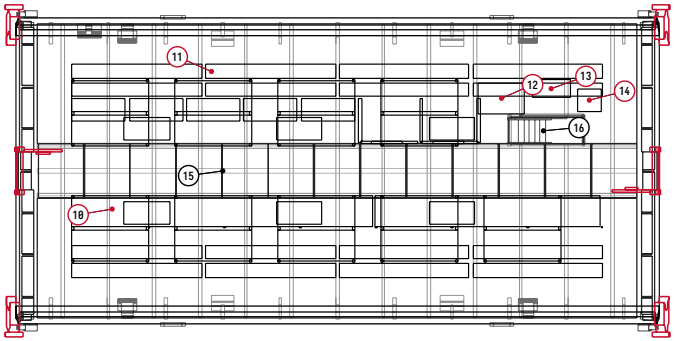
VIEW A · LONGITUDINAL SECTION (CUT 0.7 m PAST WALKWAY, LOOKING TO PORT)



1 3-TIER BUNK STACK
2 END BULKHEAD + HATCH (BP-09)
3 OVERHEAD PLENUM · AIR / POWER / DATA
4 UPPER DECK FLOOR · BEAMS + KEELS
5 LOWER DECK FLOOR
6 UTILITY BAY · TANKS + TRUNK LINES
7 HULL RING FRAME
8 SHIP STAIR 60°
9 JOINT FLANGE

32 px = 1 m · A, B, C SAME SCALE

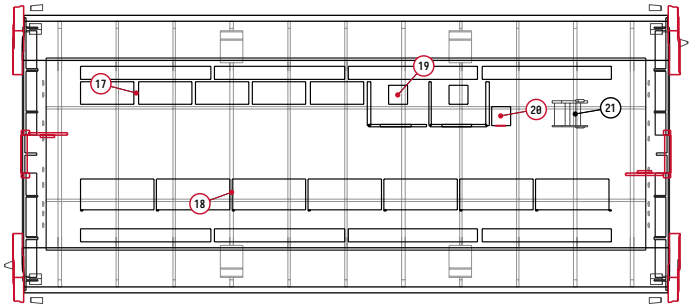
VIEW B · UPPER DECK PLAN



10 TRIPLE BUNK BLOCK 0.8 x 2.0 M
11 WATER-WALL TANK 0.36 M
12 RAD / MED WATCH DESK
13 DOSIMETRY / COMMS RACK
14 AED / MED CABINET
15 CENTRAL WALKWAY
16 STAIR OPENING

32 px = 1 m · A, B, C SAME SCALE

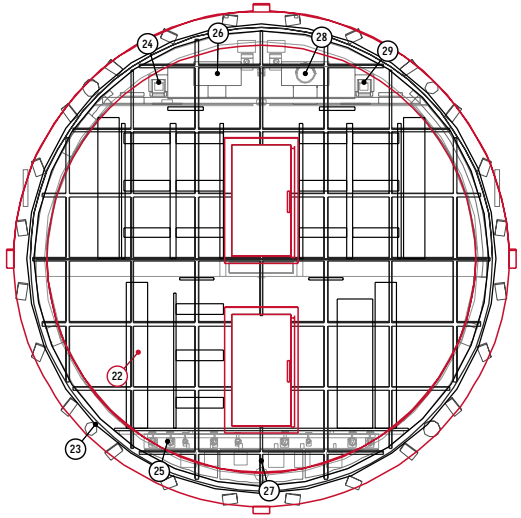
VIEW C · LOWER DECK PLAN



17 30-DAY STORES RACKS
18 LOWER BUNKS 21
19 WC POD 1.2 x 1.5 M
20 WATER DISPENSER
21 STAIR FOOT

32 px = 1 m · A, B, C SAME SCALE

VIEW D · TRANSVERSE SECTION AT MID-LENGTH



22 LOWER WATER-WALL TANK
23 PRESSURE HULL + WATER JACKET
24 DC BUS A
25 COOLANT LOOPS A / B
26 AIR SUPPLY DUCT
27 BALLAST TANK
28 AIR RETURN DUCT
29 DC BUS B

49 px = 1 m · ENLARGED

S · STORM SHELTER · SPECIFICATION

DEPARTMENT	Life support
IN RING	4
BEDS	75
POWER	35 kW
OUTFIT MASS	38.0 t
UPPER DECK	bunk bays: 9 triple-tier bunk blocks (54 bunks) with cross aisles, water-wall tanks on both side walls, rad/med station
LOWER DECK	21 triple-tier bunks (-x), 30-day stores racks, 2 WC pods, water dispenser (+x), water-wall tanks both sides

NOTES

Four shelters x 75 = 300 crew, the whole complement, for a solar particle event. Bunks are 0.8 x 2.0 m in triple tiers (submarine practice) inside 0.36-0.40 m water-wall tanks (16 tanks, ~48 m3 / ~48 t water) lining the side walls, adding ~36 g/cm2 to the hull shielding. Stores hold 30 days x 75 crew of food (~1.8 kg/p/d, ~4 t) plus emergency CO2 scrubber cartridges; 35 kW keeps lights, fans and scrubbers running.

HUMAN ANDROID

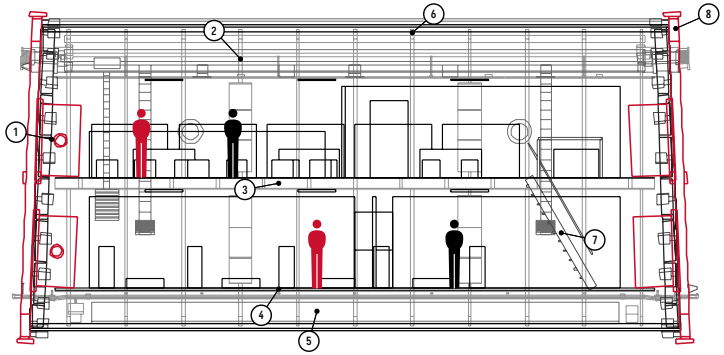
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RED CALLOUTS = THIS TYPE'S OUTFIT · BLACK CALLOUTS = COMMON TO EVERY SEGMENT · LINES: BLACK HULL + FLOORS + OUTFIT, GREY SHARED SYSTEMS, RED JOINT FLANGE + HATCHES

RING SEGMENT TYPE R — RECREATION

SHEET BP-SR · v0.0.35 · ASTEROID MINING VESSEL (PRELIMINARY)

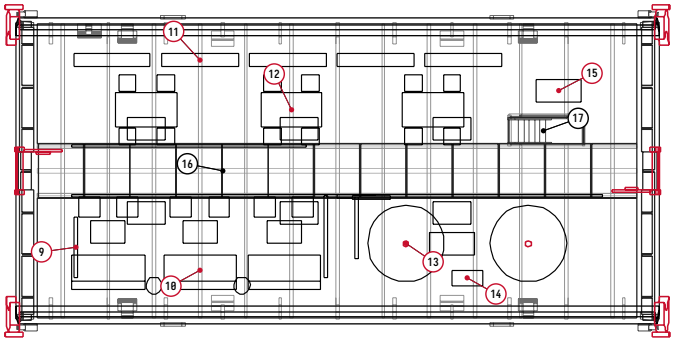
VIEW A · LONGITUDINAL SECTION (CUT 0.7 m PAST WALKWAY, LOOKING TO PORT)



1 END BULKHEAD + HATCH (BP-09)
2 OVERHEAD PLENUM · AIR / POWER / DATA
3 UPPER DECK FLOOR · BEAMS + KEELS
4 LOWER DECK FLOOR
5 UTILITY BAY · TANKS + TRUNK LINES
6 HULL RING FRAME
7 SHIP STAIR 60°
8 JOINT FLANGE

32 px = 1 m · A, B, C SAME SCALE

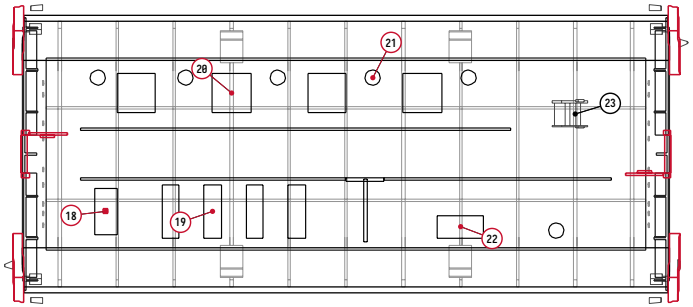
VIEW B · UPPER DECK PLAN



9 LOUNGE SCREEN
10 LOUNGE SOFAS
11 LIBRARY SHELVING
12 READING TABLE
13 VR PAD 2.0 M
14 VR COMPUTE RACK
15 CATALOGUE TERMINALS
16 CENTRAL WALKWAY
17 STAIR OPENING

32 px = 1 m · A, B, C SAME SCALE

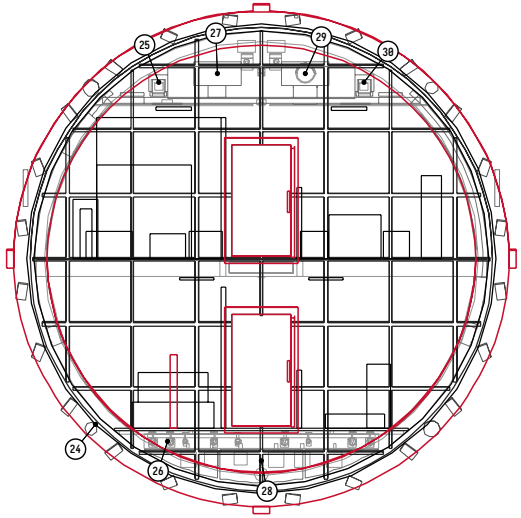
VIEW C · LOWER DECK PLAN



18 CHAPEL ALTAR / LECTERN
19 CHAPEL BENCHES
20 QUIET ROOM CUSHIONS
21 PLANTERS
22 VESTRY CABINET
23 STAIR FOOT

32 px = 1 m · A, B, C SAME SCALE

VIEW D · TRANSVERSE SECTION AT MID-LENGTH



24 PRESSURE HULL + WATER JACKET
25 DC BUS A
26 COOLANT LOOPS A / B
27 AIR SUPPLY DUCT
28 BALLAST TANK
29 AIR RETURN DUCT
30 DC BUS B

49 px = 1 m · ENLARGED

R · RECREATION · SPECIFICATION

DEPARTMENT	Recreation
IN RING	3
BEDS	0
POWER	25 kW
OUTFIT MASS	11.0 t
UPPER DECK	lounge 6.5 m (−x aft), VR room 2 pads (−x fwd), library / reading room (+x)
LOWER DECK	chapel / multi-faith room 8 seats (−x), quiet room with cushions and plants (+x)

NOTES

Three segments give ~45 lounge seats, 30 reading seats and 6 VR pads for 300 crew, so a third of an off-shift can relax at once. VR pads are 2.0 m clear circles behind a sound wall; the library holds ~2,000 physical volumes plus terminals. Lower deck is deliberately soft and quiet (non-denominational chapel, meditation room with plants); 25 kW covers lighting, VR rigs and screens.

HUMAN ANDROID

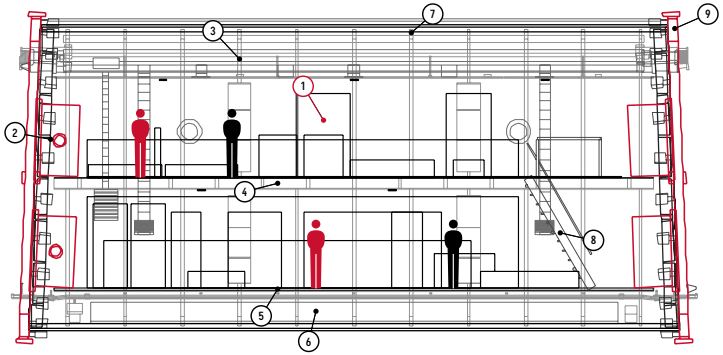
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RED CALLOUTS = THIS TYPE'S OUTFIT · BLACK CALLOUTS = COMMON TO EVERY SEGMENT · LINES: BLACK HULL + FLOORS + OUTFIT, GREY SHARED SYSTEMS, RED JOINT FLANGE + HATCHES

RING SEGMENT TYPE X — EXERCISE

SHEET BP-SX · v0.0.35 · ASTEROID MINING VESSEL (PRELIMINARY)

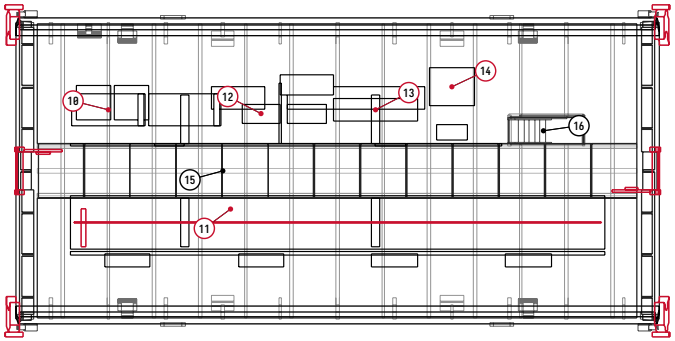
VIEW A · LONGITUDINAL SECTION (CUT 0.7 m PAST WALKWAY, LOOKING TO PORT)



1 CABLE MACHINE
2 END BULKHEAD + HATCH (BP-09)
3 OVERHEAD PLENUM · AIR / POWER / DATA
4 UPPER DECK FLOOR · BEAMS + KEELS
5 LOWER DECK FLOOR
6 UTILITY BAY · TANKS + TRUNK LINES
7 HULL RING FRAME
8 SHIP STAIR 60°
9 JOINT FLANGE

32 px = 1 m · A, B, C SAME SCALE

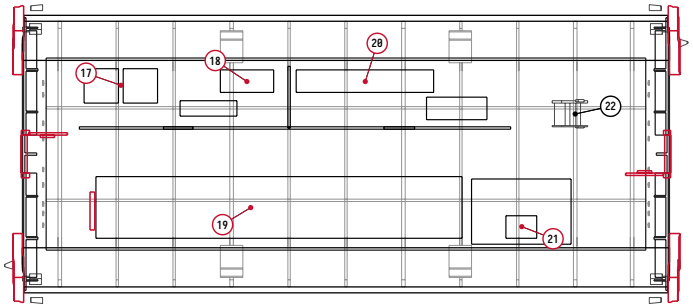
VIEW B · UPPER DECK PLAN



10 TREADMILL
11 RUNNING LANE 14 M
12 EXERCISE BIKE
13 ROWING ERGOMETER
14 SQUAT RACK
15 CENTRAL WALKWAY
16 STAIR OPENING

32 px = 1 m · A, B, C SAME SCALE

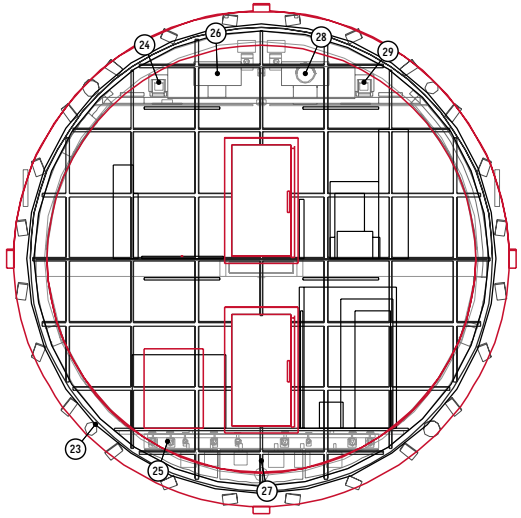
VIEW C · LOWER DECK PLAN



17 SHOWERS
18 LOCKERS
19 POOL 1.6 x 9.5 M 18 M3
20 KIT / TOWEL STORES
21 FILTER / HEATER SKID
22 STAIR FOOT

32 px = 1 m · A, B, C SAME SCALE

VIEW D · TRANSVERSE SECTION AT MID-LENGTH



23 PRESSURE HULL + WATER JACKET
24 DC BUS A
25 COOLANT LOOPS A / B
26 AIR SUPPLY DUCT
27 BALLAST TANK
28 AIR RETURN DUCT
29 DC BUS B

49 px = 1 m · ENLARGED

X · EXERCISE · SPECIFICATION

DEPARTMENT	Recreation
IN RING	2
BEDS	0
POWER	25 kW
OUTFIT MASS	24.0 t
UPPER DECK	14 m running lane along −x side, gym bay +x (2 treadmills, 2 bikes, rowing ergometer, squat rack, cable machine)
LOWER DECK	resistance/stretch pool 1.6 x 9.5 m (~18 m3 water), changing room with 2 showers, towel/kit stores

NOTES

Two segments give 300 crew ~2.5 h/day of 1 g exercise each across ~16 stations (ISS-style 2 h/day protocol). A straight 14 m lane allows interval sprints; in the 225 m ring Coriolis on a runner is small (<3%) when running along Y. The 18 m3 pool doubles as potable/fire water reserve and adds ~1.8 t/m2 radial shielding under the gym; about 25 kW for treadmills, pool heat/filtration and HVAC load.

HUMAN ANDROID

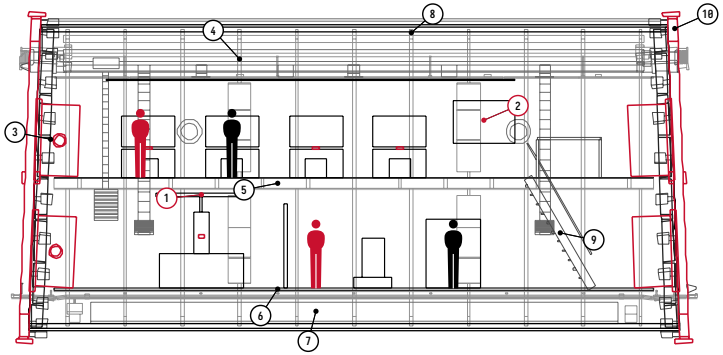
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RED CALLOUTS = THIS TYPE'S OUTFIT · BLACK CALLOUTS = COMMON TO EVERY SEGMENT · LINES: BLACK HULL + FLOORS + OUTFIT, GREY SHARED SYSTEMS, RED JOINT FLANGE + HATCHES

RING SEGMENT TYPE D — DRONE / ROBOT OPS

SHEET BP-SD · v0.0.35 · ASTEROID MINING VESSEL (PRELIMINARY)

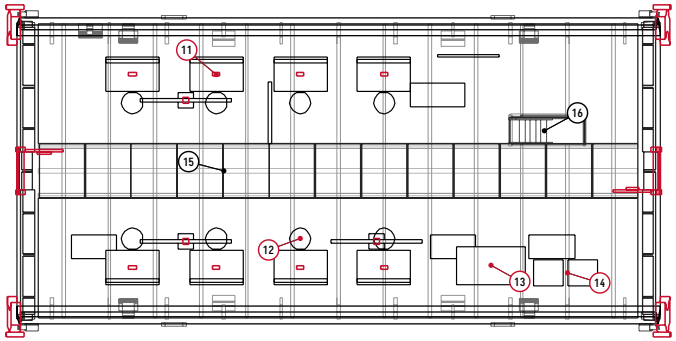
VIEW A · LONGITUDINAL SECTION (CUT 0.7 m PAST WALKWAY, LOOKING TO PORT)



1 GANTRY HOIST 250 kg
2 PLOT DISPLAY 1.6 m
3 END BULKHEAD + HATCH (BP-09)
4 OVERHEAD PLENUM · AIR / POWER / DATA
5 UPPER DECK FLOOR · BEAMS + KEELS
6 LOWER DECK FLOOR
7 UTILITY BAY · TANKS + TRUNK LINES
8 HULL RING FRAME
9 SHIP STAIR 60°
10 JOINT FLANGE

32 px = 1 m · A, B, C SAME SCALE

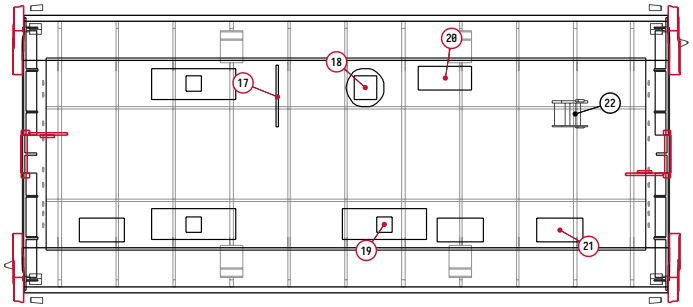
VIEW B · UPPER DECK PLAN



11 PILOT CONSOLE x8, 3 SCREENS
12 PILOT CHAIR
13 SUPERVISOR DESK 1.0 x 1.8 m
14 COMMS / SERVER RACKS 15 kW
15 CENTRAL WALKWAY
16 STAIR OPENING

32 px = 1 m · A, B, C SAME SCALE

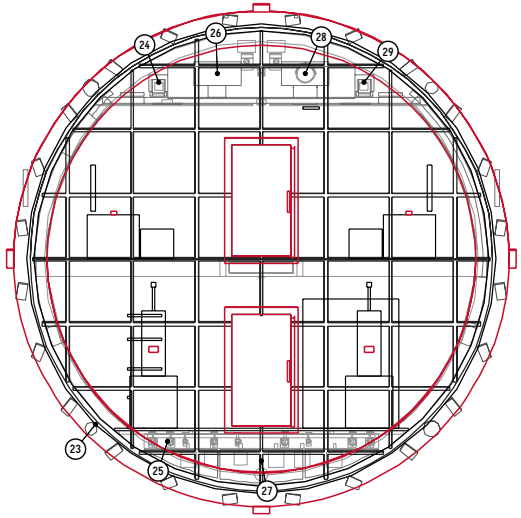
VIEW C · LOWER DECK PLAN



17 SHOP SCREEN
18 TEST CRADLE
19 REPAIR BENCH 0.8 x 2.2 m
20 CHARGING RACK 12 kW
21 PARTS RACKS
22 STAIR FOOT

32 px = 1 m · A, B, C SAME SCALE

VIEW D · TRANSVERSE SECTION AT MID-LENGTH



23 PRESSURE HULL + WATER JACKET
24 DC BUS A
25 COOLANT LOOPS A / B
26 AIR SUPPLY DUCT
27 BALLAST TANK
28 AIR RETURN DUCT
29 DC BUS B

49 px = 1 m · ENLARGED

D · DRONE / ROBOT OPS · SPECIFICATION

DEPARTMENT	Engineering
IN RING	2
BEDS	0
POWER	45 kW
OUTFIT MASS	11.0 t
UPPER DECK	telepresence control room: 8 pilot consoles with 3-screen arrays, supervisor desk, comms racks
LOWER DECK	robot repair bay: 2 heavy benches with gantry arm, test cradle, parts racks, charging rack

NOTES

Two segments let 8 pilots per shift fly ~16 mining/inspection drones (2 per pilot, one-way light lag to the near field under 0.1 s). Consoles 1.2 x 0.9 m with 3 large displays; server/comms racks about 15 kW. Lower bay repairs drones up to 1.5 m on 2 benches with 250 kg gantry hoist; charging rack 12 kW and parts stores for a 30-day turnaround.

HUMAN ANDROID

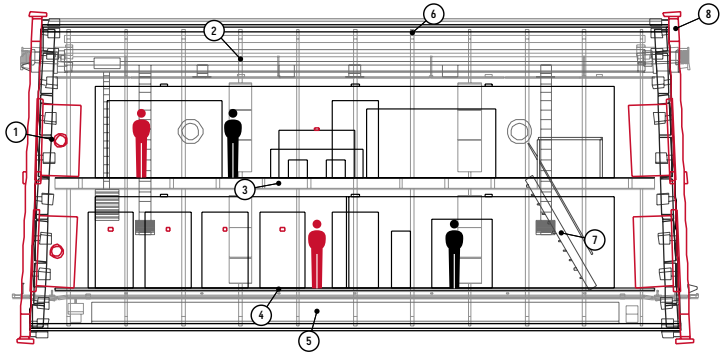
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RED CALLOUTS = THIS TYPE'S OUTFIT · BLACK CALLOUTS = COMMON TO EVERY SEGMENT · LINES: BLACK HULL + FLOORS + OUTFIT, GREY SHARED SYSTEMS, RED JOINT FLANGE + HATCHES

RING SEGMENT TYPE E — ELECTRICAL / POWER

SHEET BP-SE · v0.0.35 · ASTEROID MINING VESSEL (PRELIMINARY)

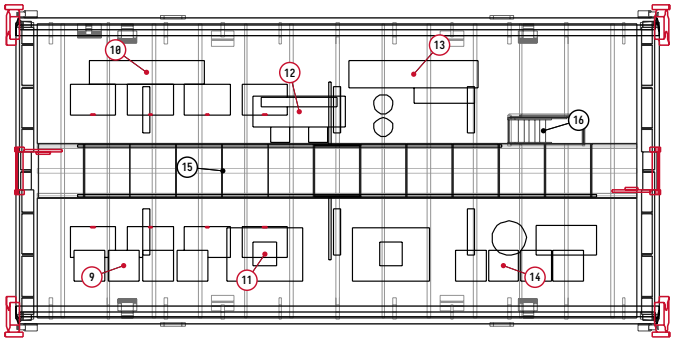
VIEW A · LONGITUDINAL SECTION (CUT 0.7 m PAST WALKWAY, LOOKING TO PORT)



1 END BULKHEAD + HATCH (BP-09)
2 OVERHEAD PLENUM · AIR / POWER / DATA
3 UPPER DECK FLOOR · BEAMS + KEELS
4 LOWER DECK FLOOR
5 UTILITY BAY · TANKS + TRUNK LINES
6 HULL RING FRAME
7 SHIP STAIR 60°
8 JOINT FLANGE

32 px = 1 m · A, B, C SAME SCALE

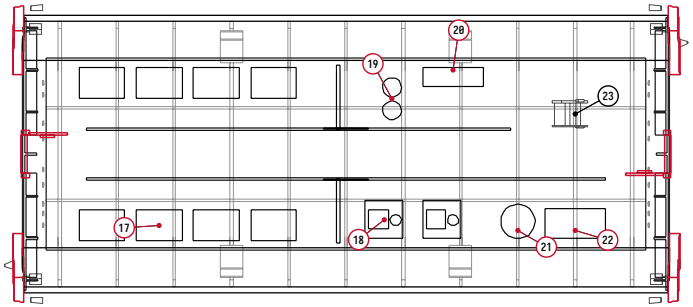
VIEW B · UPPER DECK PLAN



9 SPOKE HV SWITCHGEAR
10 PROTECTION RELAY PANELS
11 2 x 1.5 MVA SS TRANSFORMER
12 CONTROL DESK
13 SPARES RACKS
14 3 kV RING-BUS SWITCHBOARD
15 CENTRAL WALKWAY
16 STAIR OPENING

32 px = 1 m · A, B, C SAME SCALE

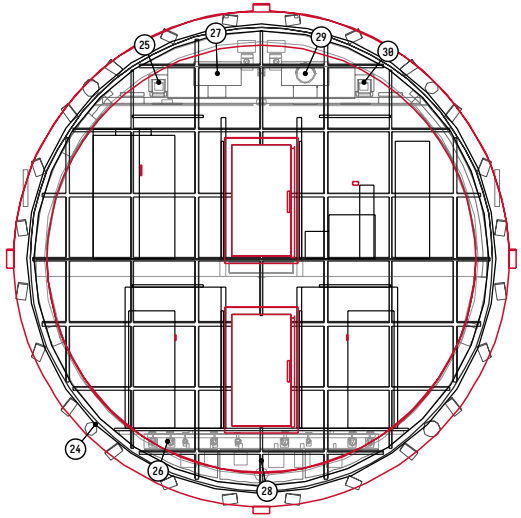
VIEW C · LOWER DECK PLAN



17 8 Li-ION RACKS ~2 MWh
18 DUPLEX COOLANT PUMPS 2x15 kW
19 FIRE-SUPPRESSION BOTTLES
20 PUMP VFD PANEL
21 EXPANSION TANK
22 PLATE HEAT EXCHANGER
23 STAIR FOOT

32 px = 1 m · A, B, C SAME SCALE

VIEW D · TRANSVERSE SECTION AT MID-LENGTH



24 PRESSURE HULL + WATER JACKET
25 DC BUS A
26 COOLANT LOOPS A / B
27 AIR SUPPLY DUCT
28 BALLAST TANK
29 AIR RETURN DUCT
30 DC BUS B

49 px = 1 m · ENLARGED

E · ELECTRICAL / POWER · SPECIFICATION

DEPARTMENT	Engineering
IN RING	2
BEDS	0
POWER	40 kW
OUTFIT MASS	34.0 t
UPPER DECK	HV converter hall: spoke feed-in switchgear, 2 x 1.5 MVA solid-state transformers, 3 kV ring-bus switchboard, control desk
LOWER DECK	battery room (8 Li-ion racks, ~2 MWh), coolant pump skids, heat exchanger, fire-suppression

NOTES

Two segments receive the spoke HV feed and step it to the 3 kV ring bus through 2 x 1.5 MVA solid-state transformers (N+1 for ~1.5 MW station load). Lower deck holds 8 battery racks (~250 kWh each, ~2 MWh total, ~1.3 h of full load) and duplex coolant pumps (2 x 15 kW) driving the converter/battery cold plates. Own load ~40 kW (pumps, controls, HVAC).

HUMAN ANDROID

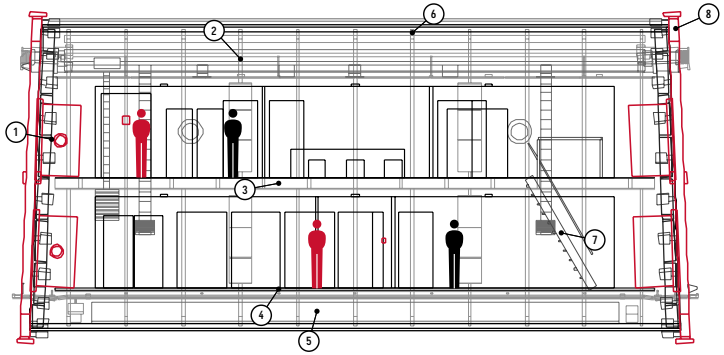
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RING SEGMENT TYPE Q — LABORATORY / ASSAY

SHEET BP-SQ · v0.0.35 · ASTEROID MINING VESSEL (PRELIMINARY)

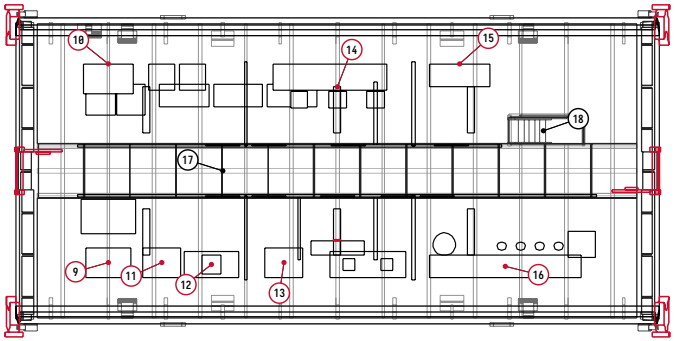
VIEW A · LONGITUDINAL SECTION (CUT 0.7 m PAST WALKWAY, LOOKING TO PORT)



1 END BULKHEAD + HATCH (BP-09)
2 OVERHEAD PLENUM · AIR / POWER / DATA
3 UPPER DECK FLOOR · BEAMS + KEELS
4 LOWER DECK FLOOR
5 UTILITY BAY · TANKS + TRUNK LINES
6 HULL RING FRAME
7 SHIP STAIR 60°
8 JOINT FLANGE

32 px = 1 m · A, B, C SAME SCALE

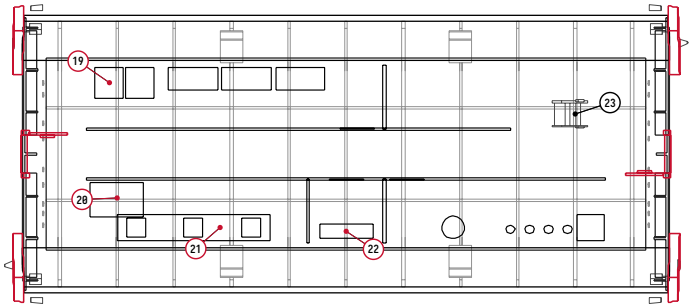
VIEW B · UPPER DECK PLAN



9 ASSAY FUME HOOD
10 BIOSAFETY CAB + INCUBATORS
11 FIRE-ASSAY FURNACE 10 kW
12 XRF BENCH
13 GEOLOGY LAB: SAW, MICROSCOPES
14 WRITE-UP OFFICE
15 REAGENT STORE
16 SAMPLE PREP / STORAGE
17 CENTRAL WALKWAY
18 STAIR OPENING

32 px = 1 m · A, B, C SAME SCALE

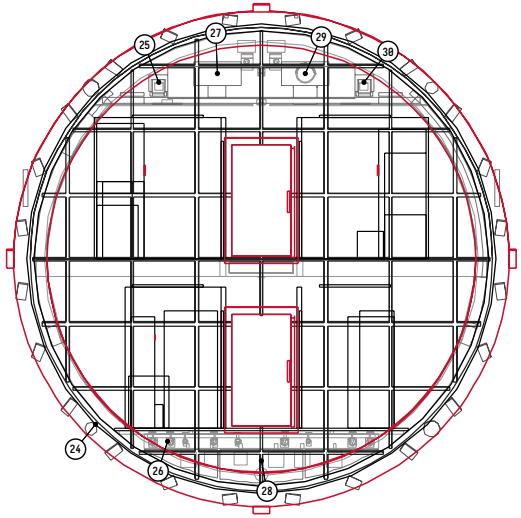
VIEW C · LOWER DECK PLAN



19 SAMPLE VAULT, -80 C FREEZERS
20 LAMINAR-FLOW GLOVE BOX
21 ISO-7 CLEAN ROOM ~12 m2
22 GOWNING AIRLOCK + LOCKERS
23 STAIR FOOT

32 px = 1 m · A, B, C SAME SCALE

VIEW D · TRANSVERSE SECTION AT MID-LENGTH



24 PRESSURE HULL + WATER JACKET
25 DC BUS A
26 COOLANT LOOPS A / B
27 AIR SUPPLY DUCT
28 BALLAST TANK
29 AIR RETURN DUCT
30 DC BUS B

49 px = 1 m · ENLARGED

Q · LABORATORY / ASSAY · SPECIFICATION

DEPARTMENT	Engineering
IN RING	2
BEDS	0
POWER	55 kW
OUTFIT MASS	18.0 t
UPPER DECK	ore assay lab (XRF, furnace, fume hood), geology lab (saw, microscopes), biology lab (biosafety cabinet, incubators)
LOWER DECK	ISO-7 clean room with gowning airlock, cold/secure sample vault, glove box

NOTES

Upper deck splits into three ~4 m labs: ore assay (fire-assay furnace 10 kW, XRF, fume hood), geology (core saw, polishing, petrographic microscopes) and biology (Class II biosafety cabinet, incubators). Lower deck has an ISO-7 clean room (~12 m2) behind a gowning airlock and a sample vault with -80 C freezers and locked drawers for ~2000 samples. Peak ~55 kW, 6 to 8 staff per shift.

HUMAN ANDROID

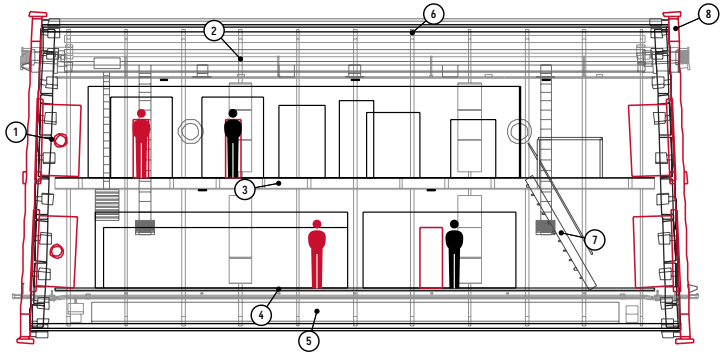
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RING SEGMENT TYPE W — WORKSHOP

SHEET BP-SW · v0.0.35 · ASTEROID MINING VESSEL (PRELIMINARY)

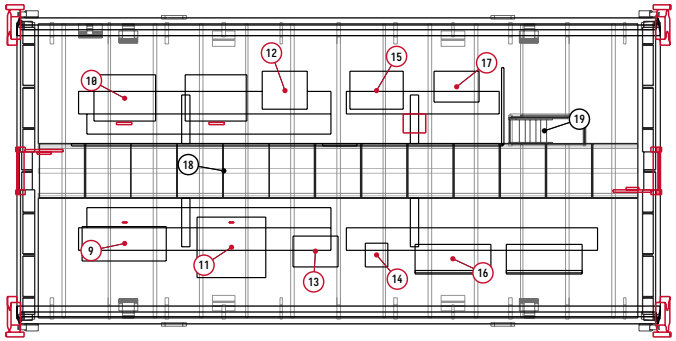
VIEW A · LONGITUDINAL SECTION (CUT 0.7 m PAST WALKWAY, LOOKING TO PORT)



1 END BULKHEAD + HATCH (BP-09)
2 OVERHEAD PLENUM · AIR / POWER / DATA
3 UPPER DECK FLOOR · BEAMS + KEELS
4 LOWER DECK FLOOR
5 UTILITY BAY · TANKS + TRUNK LINES
6 HULL RING FRAME
7 SHIP STAIR 60°
8 JOINT FLANGE

32 px = 1 m · A, B, C SAME SCALE

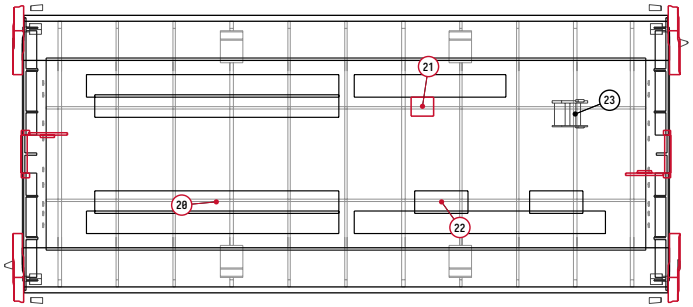
VIEW B · UPPER DECK PLAN



9 CNC LATHE 2.2 m BED
10 2 x L-PBF METAL PRINTER 5 kW
11 5-AXIS MILL
12 POWDER SIEVE / GLOVEBOX
13 BANDSAW
14 DRILL PRESS
15 VACUUM FURNACE 6 kW
16 WORKBENCHES + TOOL BOARDS
17 WIRE EDM
18 CENTRAL WALKWAY
19 STAIR OPENING

32 px = 1 m · A, B, C SAME SCALE

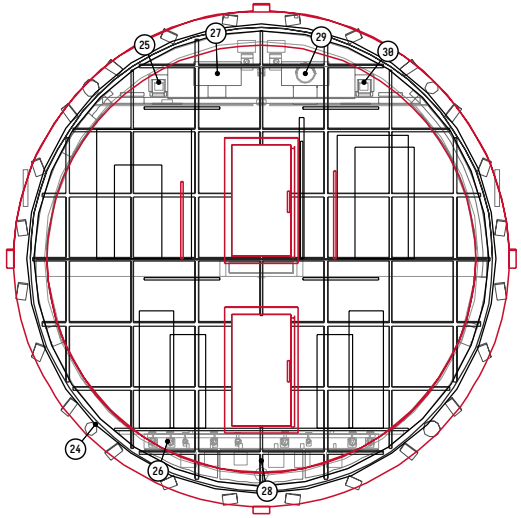
VIEW C · LOWER DECK PLAN



20 SPARES RACKING ~40 m3
21 HAZMAT CABINET
22 GOODS-IN COUNTER
23 STAIR FOOT

32 px = 1 m · A, B, C SAME SCALE

VIEW D · TRANSVERSE SECTION AT MID-LENGTH



24 PRESSURE HULL + WATER JACKET
25 DC BUS A
26 COOLANT LOOPS A / B
27 AIR SUPPLY DUCT
28 BALLAST TANK
29 AIR RETURN DUCT
30 DC BUS B

49 px = 1 m · ENLARGED

W · WORKSHOP · SPECIFICATION

DEPARTMENT	Engineering
IN RING	6
BEDS	0
POWER	45 kW
OUTFIT MASS	20.0 t
UPPER DECK	machine shop -x (lathe, 5-axis mill, bandsaw, drill press, benches); fabrication +x (2 metal L-PBF printers, powder station, heat-treat furnace, CNC cleaning)
LOWER DECK	spares stores: 2 rows of 2.0 m pallet/bin racking both sides (~40 m3), goods-in counter, hazmat cabinet

NOTES

Six workshops let the station make most of its own spares: each holds a lathe, 5-axis mill and two 250 mm L-PBF metal printers (~5 kW each) plus a 6 kW vacuum furnace for stress relief, ~45 kW peak. Machines sit on the floor beams with 1.0 m aisle-side clearance; the lower deck stores ~40 m3 of spares in racks fed via the stair hatch.

HUMAN ANDROID

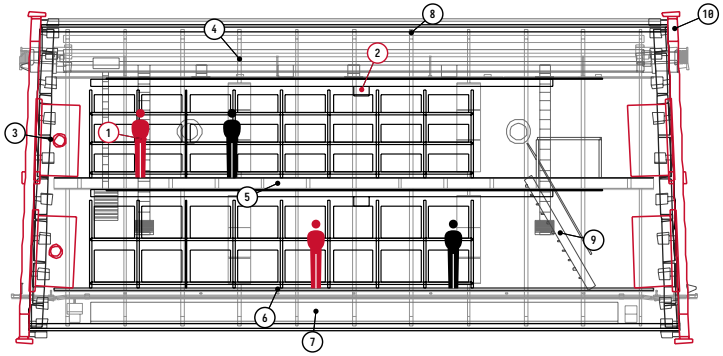
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RED CALLOUTS = THIS TYPE'S OUTFIT · BLACK CALLOUTS = COMMON TO EVERY SEGMENT · LINES: BLACK HULL + FLOORS + OUTFIT, GREY SHARED SYSTEMS, RED JOINT FLANGE + HATCHES

RING SEGMENT TYPE K — CARGO / STORES

SHEET BP-SK · v0.0.35 · ASTEROID MINING VESSEL (PRELIMINARY)

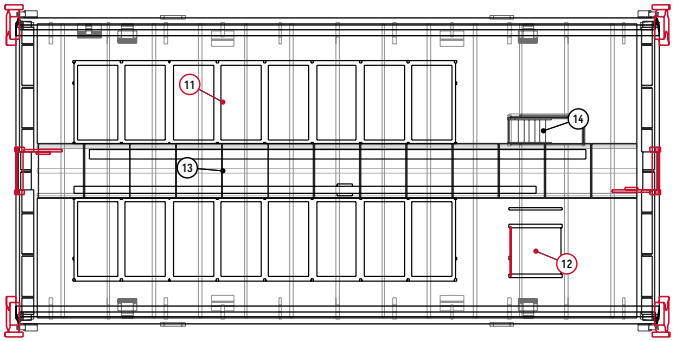
VIEW A · LONGITUDINAL SECTION (CUT 0.7 m PAST WALKWAY, LOOKING TO PORT)



1 PALLET 1.0 x 1.2 m
2 HOIST TROLLEY 500 kg
3 END BULKHEAD + HATCH (BP-09)
4 OVERHEAD PLENUM · AIR / POWER / DATA
5 UPPER DECK FLOOR · BEAMS + KEELS
6 LOWER DECK FLOOR
7 UTILITY BAY · TANKS + TRUNK LINES
8 HULL RING FRAME
9 SHIP STAIR 60°
10 JOINT FLANGE

32 px = 1 m · A, B, C SAME SCALE

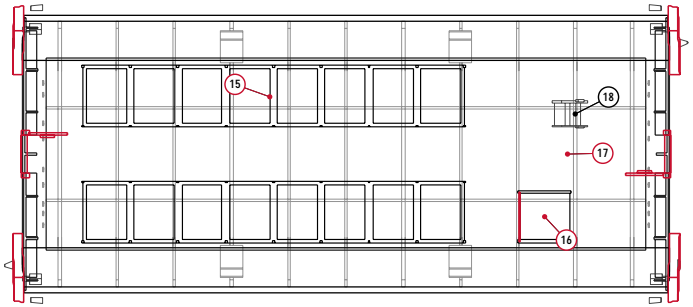
VIEW B · UPPER DECK PLAN



11 PALLET RACK 3-LEVEL
12 CARGO LIFT 1.3 x 1.3 m
13 CENTRAL WALKWAY
14 STAIR OPENING

32 px = 1 m · A, B, C SAME SCALE

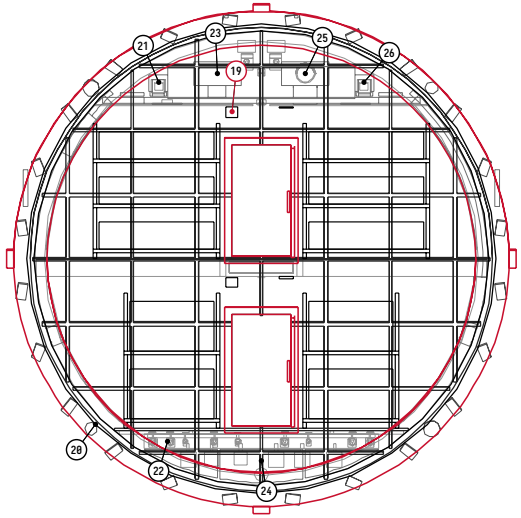
VIEW C · LOWER DECK PLAN



15 PALLET RACK 2-LEVEL
16 LIFT LANDING
17 PALLET STAGING (WALKWAY)
18 STAIR FOOT

32 px = 1 m · A, B, C SAME SCALE

VIEW D · TRANSVERSE SECTION AT MID-LENGTH



19 OVERHEAD HOIST RAIL
20 PRESSURE HULL + WATER JACKET
21 DC BUS A
22 COOLANT LOOPS A / B
23 AIR SUPPLY DUCT
24 BALLAST TANK
25 AIR RETURN DUCT
26 DC BUS B

49 px = 1 m · ENLARGED

K · CARGO / STORES · SPECIFICATION

DEPARTMENT	Logistics
IN RING	4
BEDS	0
POWER	12 kW
OUTFIT MASS	9.0 t
UPPER DECK	2 rows of 3-level pallet racks, overhead hoist rail over the walkway, cargo lift (-x aft)
LOWER DECK	2 rows of 2-level racks, lift landing, pallet staging

NOTES

Racks take standard 1.0 x 1.2 m space pallets (40 positions per segment, 4 segments 160 pallets ~ 90 days of dry stores for 300 crew). Pallets move on hand jacks along the central walkway and an overhead 500 kg hoist rail spans it at ceiling height, so the walkway stays clear at floor level. A 1.3 x 1.3 m cargo lift (-x, y 4.4..6.0) links the decks through a COMMON slab hatch; 12 kW.

HUMAN ANDROID

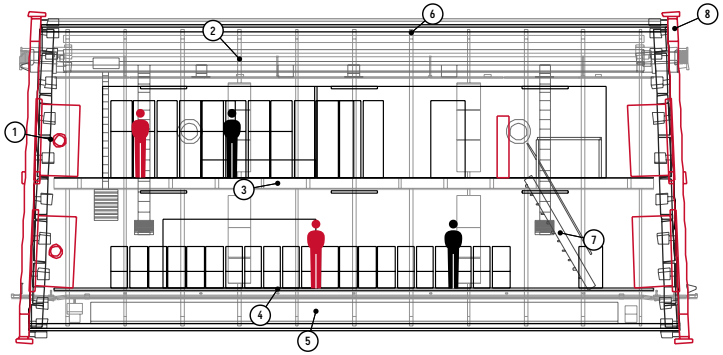
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RED CALLOUTS = THIS TYPE'S OUTFIT · BLACK CALLOUTS = COMMON TO EVERY SEGMENT · LINES: BLACK HULL + FLOORS + OUTFIT, GREY SHARED SYSTEMS, RED JOINT FLANGE + HATCHES

RING SEGMENT TYPE P — PORT / LIFEBOAT END

SHEET BP-SP · v0.0.35 · ASTEROID MINING VESSEL (PRELIMINARY)

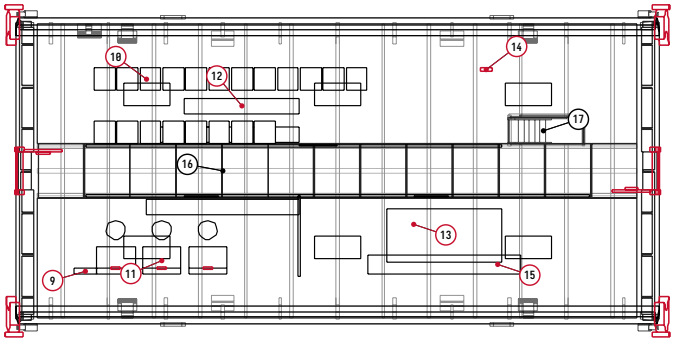
VIEW A · LONGITUDINAL SECTION (CUT 0.7 m PAST WALKWAY, LOOKING TO PORT)



1 END BULKHEAD + HATCH (BP-09)
2 OVERHEAD PLENUM · AIR / POWER / DATA
3 UPPER DECK FLOOR · BEAMS + KEELS
4 LOWER DECK FLOOR
5 UTILITY BAY · TANKS + TRUNK LINES
6 HULL RING FRAME
7 SHIP STAIR 60°
8 JOINT FLANGE

32 px = 1 m · A, B, C SAME SCALE

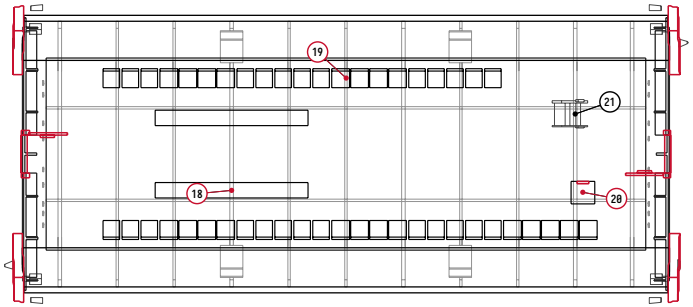
VIEW B · UPPER DECK PLAN



9 COLLAR STATUS PANEL
10 EVA SUIT LOCKERS x24
11 COLLAR CONSOLE x3
12 DONNING BENCH
13 READY ROOM TABLE
14 O2 CHARGE STATION
15 TOOL / SPARES RACKS
16 CENTRAL WALKWAY
17 STAIR OPENING

32 px = 1 m · A, B, C SAME SCALE

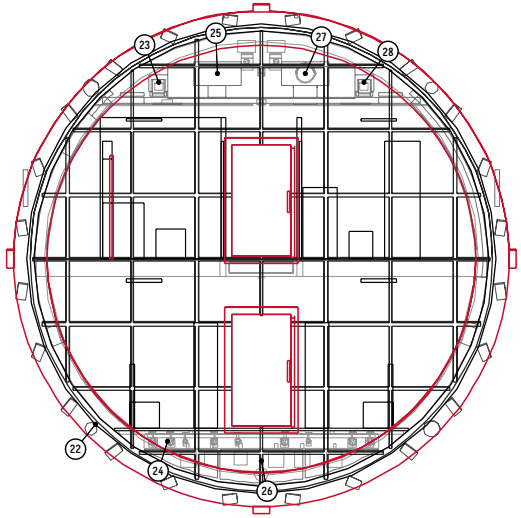
VIEW C · LOWER DECK PLAN



18 SURVIVAL-KIT LOCKERS
19 LIFEBOAT SEATS x26
20 BOARDING MARSHAL POST
21 STAIR FOOT

32 px = 1 m · A, B, C SAME SCALE

VIEW D · TRANSVERSE SECTION AT MID-LENGTH



22 PRESSURE HULL + WATER JACKET
23 DC BUS A
24 COOLANT LOOPS A / B
25 AIR SUPPLY DUCT
26 BALLAST TANK
27 AIR RETURN DUCT
28 DC BUS B

49 px = 1 m · ENLARGED

P · PORT / LIFEBOAT END · SPECIFICATION

DEPARTMENT	Logistics
IN RING	4
BEDS	0
POWER	25 kW
OUTFIT MASS	11.0 t
UPPER DECK	docking-collar control station (−x), suit locker room with 24 EVA suit lockers + donning benches (+x)
LOWER DECK	lifeboat boarding lounge: 26 strapped seats, survival-kit lockers, boarding marshal post

NOTES

Caps each open arc of the ring during construction; the end hatch carries a docking collar run from a 3-console control station with collar status panel. The lower deck stages a full 25-crew lifeboat load (26 seats at 0.5 m pitch) with survival kits, and 24 EVA suit lockers sit upstairs. When the ring closes the collar is removed and the segment is re-outfitted as a normal type; about 25 kW for consoles, suit chargers and lighting.

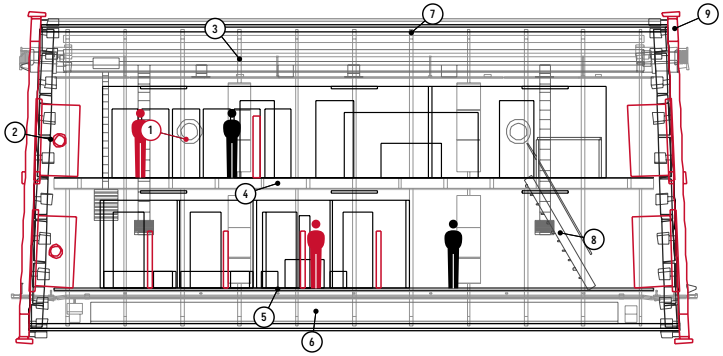
HUMAN ANDROID

DRAWN FROM CAD: cad/types/p.py + COMMON (cad/common*.py) + HULL/JOINT (cad/segment.py) · STEP: cad/seg_p.step
RED CALLOUTS = THIS TYPE'S OUTFIT · BLACK CALLOUTS = COMMON TO EVERY SEGMENT · LINES: BLACK HULL + FLOORS + OUTFIT, GREY SHARED SYSTEMS, RED JOINT FLANGE + HATCHES

RING SEGMENT TYPE B — BRIG / SECURITY

SHEET BP-SB · v0.0.35 · ASTEROID MINING VESSEL (PRELIMINARY)

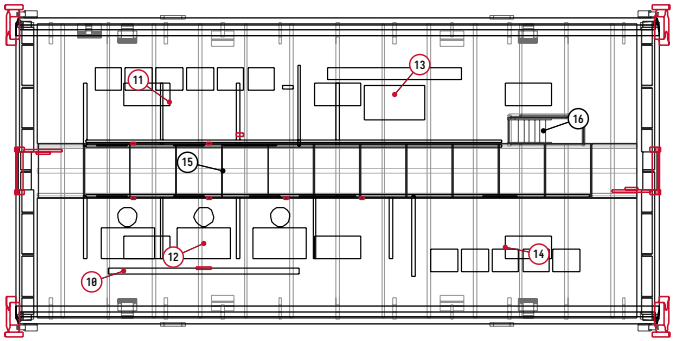
VIEW A · LONGITUDINAL SECTION (CUT 0.7 m PAST WALKWAY, LOOKING TO PORT)



1 GUN SAFES x6
2 END BULKHEAD + HATCH (BP-09)
3 OVERHEAD PLENUM · AIR / POWER / DATA
4 UPPER DECK FLOOR · BEAMS + KEELS
5 LOWER DECK FLOOR
6 UTILITY BAY · TANKS + TRUNK LINES
7 HULL RING FRAME
8 SHIP STAIR 60°
9 JOINT FLANGE

32 px = 1 m · A, B, C SAME SCALE

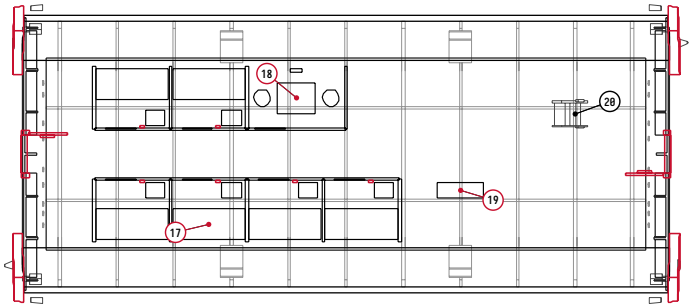
VIEW B · UPPER DECK PLAN



10 CAMERA / RECORDS WALL
11 ARMORY · DOUBLE VAULT WALL
12 SECURITY OFFICE · 3 DESKS
13 NON-LETHAL RACK + BENCH
14 RECORDS ROOM · FILES
15 CENTRAL WALKWAY
16 STAIR OPENING

32 px = 1 m · A, B, C SAME SCALE

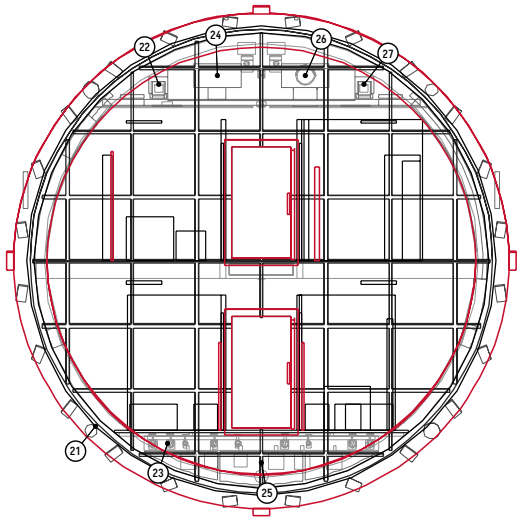
VIEW C · LOWER DECK PLAN



17 HOLDING CELLS 2.0 x 2.0 m x6
18 INTERVIEW ROOM 2.3 m
19 GUARD STATION
20 STAIR FOOT

32 px = 1 m · A, B, C SAME SCALE

VIEW D · TRANSVERSE SECTION AT MID-LENGTH



21 PRESSURE HULL + WATER JACKET
22 DC BUS A
23 COOLANT LOOPS A / B
24 AIR SUPPLY DUCT
25 BALLAST TANK
26 AIR RETURN DUCT
27 DC BUS B

49 px = 1 m · ENLARGED

B · BRIG / SECURITY · SPECIFICATION

DEPARTMENT	Other
IN RING	1
BEDS	6
POWER	20 kW
OUTFIT MASS	13.0 t
UPPER DECK	security office + records/monitoring (-x), armory locker room (+x, behind a vault wall)
LOWER DECK	6 holding cells 2.0 x 2.0 m (-x 4, +x 2), interview room (+x)

NOTES

Sized at 2% of 300 crew: six single holding cells (2.0 x 2.0 m, bunk, steel toilet/basin) on the lower deck, out of the main traffic, with a 2.3 m interview room fitted with a table and recorder. Upstairs a 3-desk security office with a camera/records wall and lockable files fronts the walkway; the armory is a double-walled locker room with gun safes and a non-lethal rack. ~20 kW (monitoring, doors, lighting).

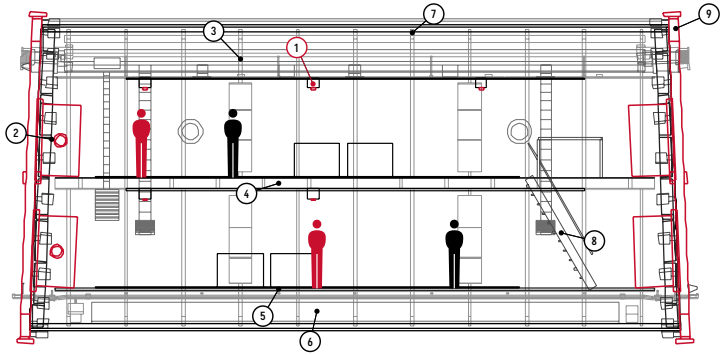
HUMAN ANDROID

DRAWN FROM CAD: cad/types/b.py + COMMON (cad/common*.py) + HULL/JOINT (cad/segment.py) · STEP: cad/seg_b.step
RED CALLOUTS = THIS TYPE'S OUTFIT · BLACK CALLOUTS = COMMON TO EVERY SEGMENT · LINES: BLACK HULL + FLOORS + OUTFIT, GREY SHARED SYSTEMS, RED JOINT FLANGE + HATCHES

RING SEGMENT TYPE Z — SPARE / GROWTH

SHEET BP-SZ · v0.0.35 · ASTEROID MINING VESSEL (PRELIMINARY)

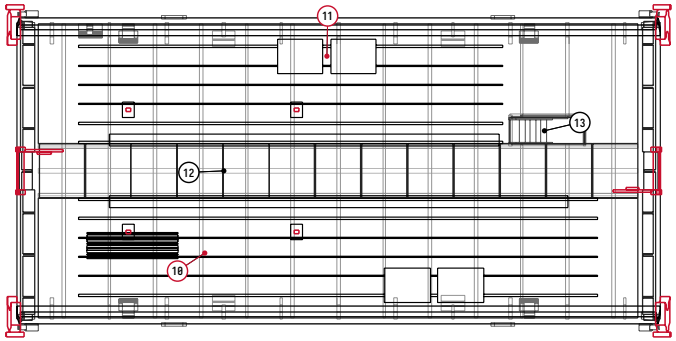
VIEW A · LONGITUDINAL SECTION (CUT 0.7 m PAST WALKWAY, LOOKING TO PORT)



1 UTILITY DROP 400 V / DATA / AIR / H2O
2 END BULKHEAD + HATCH (BP-09)
3 OVERHEAD PLENUM · AIR / POWER / DATA
4 UPPER DECK FLOOR · BEAMS + KEELS
5 LOWER DECK FLOOR
6 UTILITY BAY · TANKS + TRUNK LINES
7 HULL RING FRAME
8 SHIP STAIR 60°
9 JOINT FLANGE

32 px = 1 m · A, B, C SAME SCALE

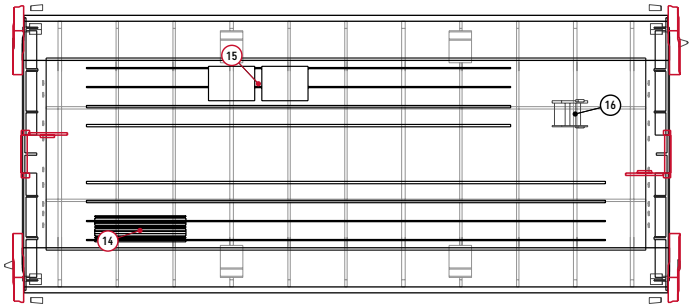
VIEW B · UPPER DECK PLAN



10 SEAT-TRACK RAILS 0.5 m PITCH
11 CARGO CRATES 0.9 x 1.2 m
12 CENTRAL WALKWAY
13 STAIR OPENING

32 px = 1 m · A, B, C SAME SCALE

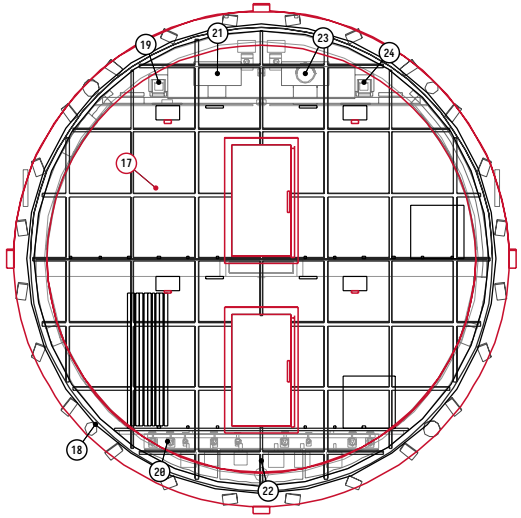
VIEW C · LOWER DECK PLAN



14 STOWED PARTITIONS 1.2 x 2.4 m x10
15 CRATED FITTINGS
16 STAIR FOOT

32 px = 1 m · A, B, C SAME SCALE

VIEW D · TRANSVERSE SECTION AT MID-LENGTH



17 OPEN OUTFIT-READY BAY
18 PRESSURE HULL + WATER JACKET
19 DC BUS A
20 COOLANT LOOPS A / B
21 AIR SUPPLY DUCT
22 BALLAST TANK
23 AIR RETURN DUCT
24 DC BUS B

49 px = 1 m · ENLARGED

Z · SPARE / GROWTH · SPECIFICATION

DEPARTMENT	Other
IN RING	3
BEDS	0
POWER	10 kW
OUTFIT MASS	4.0 t
UPPER DECK	open bay: seat-track rails at 0.5 m pitch both sides, 6 ceiling utility drops, 4 cargo crates
LOWER DECK	open bay: seat-track rails, 4 utility drops, stack of 10 stowed partition panels, 2 crates

NOTES

Empty but outfit-ready: aircraft-style seat-track rails (50 mm, 0.5 m pitch along y) let any type's furniture, walls and racks bolt down without hull work. Ceiling utility drop points (power 400 V/10 kW reserve, data, air, water QDs) sit at 2.2 m spacing matching the HABITAT cabin grid. Ten 1.2 x 2.4 m partition panels and crated fittings are stowed so a crew of 4 can convert the segment in about a week.

HUMAN ANDROID

DRAWN FROM CAD: cad/types/z.py + COMMON (cad/common*.py) + HULL/JOINT (cad/segment.py) · STEP: cad/seg_z.step
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