BARENTS SUPPORT NETWORK

Uku Miller

—

Offshore Search and Rescue Initative

INTRODUCTION

Project synopsis

As newfound prospects accompanied by hospitable changes to climatic conditions make way for growing economic ambitions on the Barents Sea, so arises the urgency to provide proportionate measures of safety and support for the increased human presence and activity in this hostile environment.

—

This project focuses on the architectural development of an offshore Search and Rescue station on the Barents Sea, as well as the proposal for an accompanying communication and surveillance network, with the intention of providing a viable solution for areas of activity which currently suffer from a lack of sufficient rescue service coverage.

The station would be capable of aeronautical and maritime rescue and recovery response. while providing supplies to extend the range and presence of patrol ships.

—

MOTIVE

Initial point of departure

LIFE IN EXTREME ENVIRONMENTS

Inhabiting the inhabitable

Exploring how to accomodate for the human need to venture into and inhabit harsh and inhospitable frontier environments.

INHABITING THE SEAS

Perception of a positive space

Challenging the perception of water as a negative / void space that divides in favour of something applicable for habitation.

CONTEXT

A matter of perspective

—

Buckminster Fuller's Dymaxion Projection of the World Ocean

—

Buckminster Fuller's Dymaxion Globe

IMO

1948
MAR 06

GENEVA, SWITZERLAND

—

INTERNATIONAL MARITIME ORGANIZATION

To provide machinery for cooperation among Governments in the field of governmental regulation and practices relating to technical matters of all kinds affecting shipping engaged in international trade; to encourage and facilitate the general adoption of the highest practicable standards in matters concerning maritime safety, efficiency of navigation and prevention and control of marine pollution from ships.

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UNCLOS

1982
DEC 10

MONTEGO BAY, JAMAICA

—

UNITED NATIONS CONVENTION ON THE LAW OF THE SEA

Defines the rights and responsibilities of nations with respect to their use of the world's oceans, establishing guidelines for businesses, the environment, and the management of marine natural resources.

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SOLAS

1974
NOV 01

LONDON, UNITED KINGDOM

—

INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA

Regarded as the most important of all international treaties concerning the safety of merchant ships. Specifies minimum standards for the construction, equipment and operation of ships, compatible with their safety.

MARPOL

1973
NOV 02

LONDON, UNITED KINGDOM

—

INTERNATIONAL CONVENTION FOR THE PREVENTION OF POLLUTION FROM SHIPS

Main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes.

POLAR CODE

2014
NOV 21

LONDON, UNITED KINGDOM

—

INTERNATIONAL CODE FOR SHIPS OPERATING IN POLAR WATERS

Developed to supplement existing IMO instruments in order to increase the safety of ships' operation and mitigate the impact on the people and environment in the remote, vulnerable and potentially harsh polar waters.

AEPS

1991
JUN 14

ROVANIEMI, FINLAND

—

ARCTIC ENVIRONMENTAL PROTECTION STRATEGY

The monitoring, assessment, protection, emergency preparedness / response, and conservation of the Arctic zone.

AEPS

1991
JUN 14

ROVANIEMI, FINLAND

—

ARCTIC ENVIRONMENTAL PROTECTION STRATEGY

The monitoring, assessment, protection, emergency preparedness / response, and conservation of the Arctic zone.

ARCTIC COUNCIL

1996
SEP 19

OTTAWA, CANADA

—

8
ARCTIC STATES

Canada, Kingdom of Denmark, Republic of Finland, Iceland, Kingdom of Norway, Russian Federation, Kingdom of Sweden, United States of America

6
REPRESENTATIVES OF INDIGENOUS PEOPLES
AS PERMANENT OBSERVERS

12
OBSERVER STATES

6
WORKING GROUPS

AMAP	Arctic Monioring and Assessment Programme
CAFF	Conservation of Arctic Flora and Fauna
EPPR	Emergency Prevention, Preparedness and Response
PAME	Protection of the Arctic Marine Environment
SDWG	Susitanable Development Working Group
ACAP	Arctic Contaminants Action Program

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OTTAWA, CANADA

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EPPR	Emergency Prevention, Preparedness and Response
PAME	Protection of the Arctic Marine Environment
SDWG	Susitanable Development Working Group
ACAP	Arctic Contaminants Action Program

ASARA

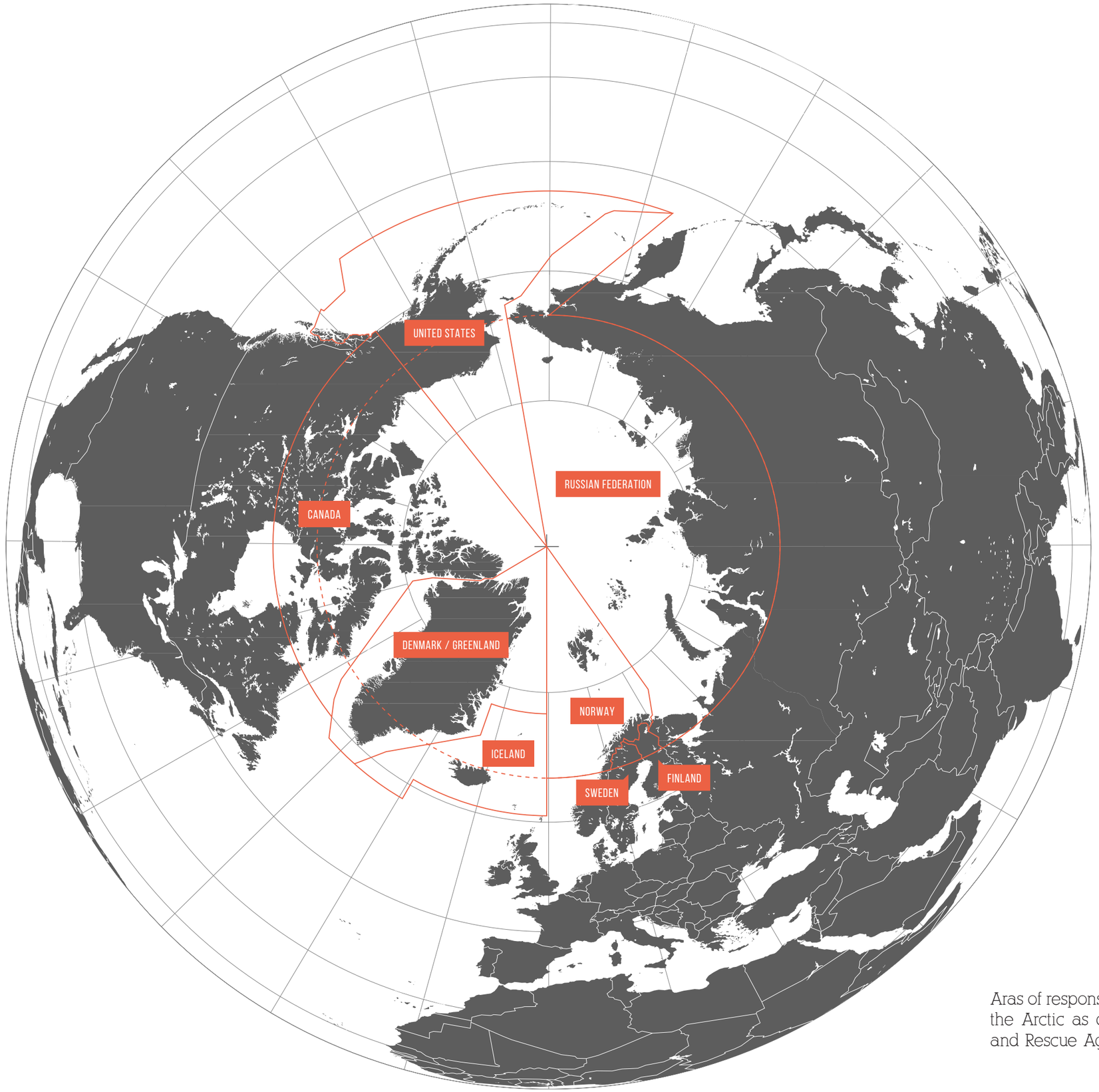
2011
MAY 12

NUUK, GREENLAND

—

ARCTIC SEARCH AND RESCUE AGREEMENT

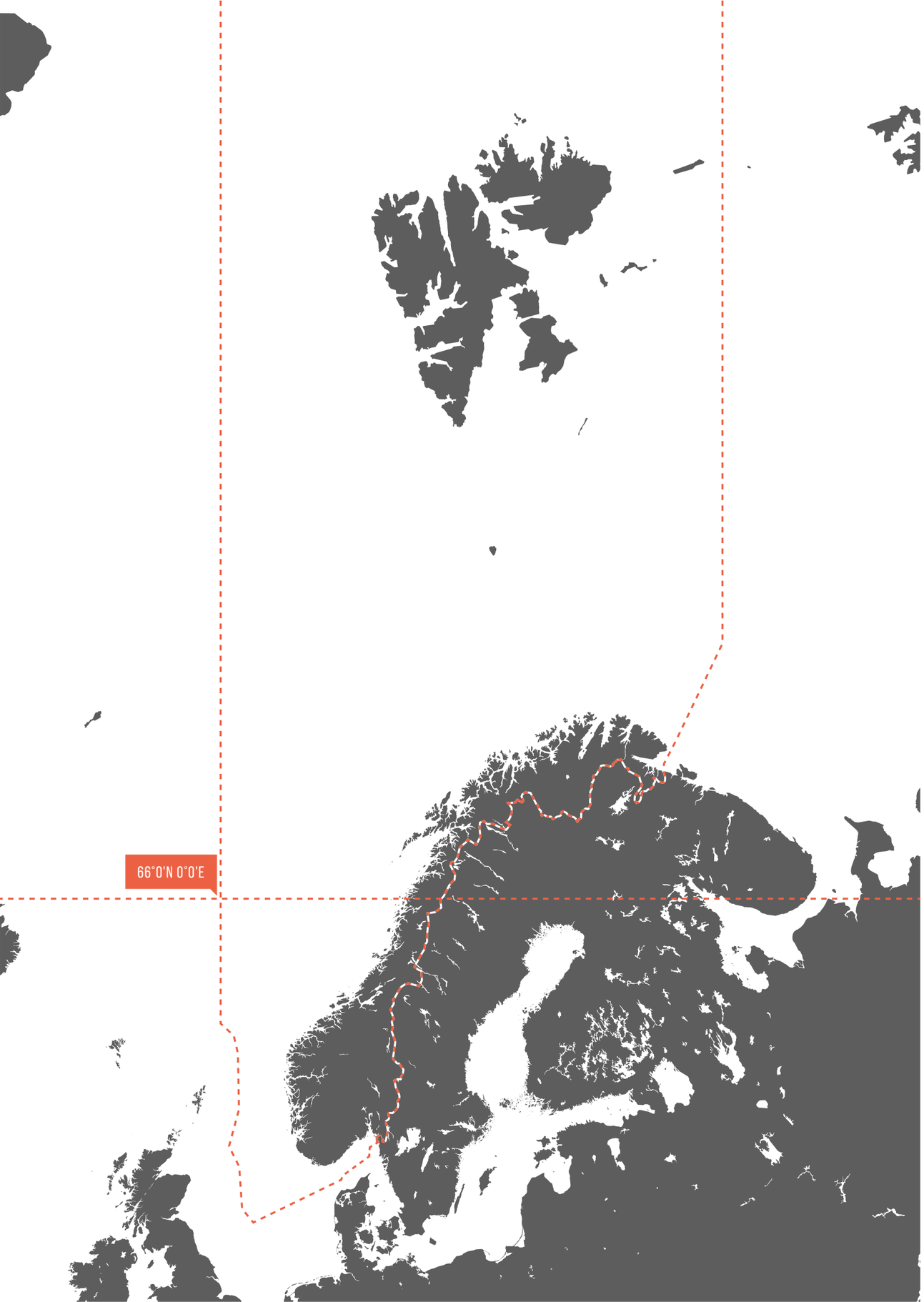
International treaty concluded among the member states of the Arctic Council to coordinate international search and rescue coverage and response in the Arctic.



ASARA

—

Aras of responsibility for countires bordering the Arctic as divided by the Arctic Search and Rescue Agreement


66°0'N 0°0'E

JRCC SN

JOINT RESCUE COORDINATION CENTRE
OF SOUTHERN NORWAY

EST

1970

SOLA

21

—

RESCUE SUB-CENTRES

JRCC NN

JOINT RESCUE COORDINATION CENTRE
OF NORTHERN NORWAY

EST

1970

BODØ

7

RESCUE SUB-CENTRES

SEARCH AND RESCUE
ON THE
BARENTS SEA

Available Resources

PUBLIC

PRIVATE

VOLUNTARY

SEARCH AND RESCUE
ON THE
BARENTS SEA

Available Resources

PUBLIC

PRIVATE

VOLUNTARY

NORWEGIAN COAST GUARD

Kystvakten

3

Nordkapp
CLASS

W320 / NOCGV *Nordkapp*
W321 / NOCGV *Senja*
W322 / NOCGV *Andenes*

3

Barentshav
CLASS

W340 / NOCGV *Barentshav*
W341 / NOCGV *Bergen*
W342 / NOCGV *Sortland*

3

NO CLASS

W303 / NOCGV *Svalbard*
W312 / NOCGV *Ålesund*
W318 / NOCGV *Harstad*

6^{+8}

NHIndustries NH90
UTILITY / TRANSPORT

SEARCH AND RESCUE
ON THE
BARENTS SEA

Available Resources

PUBLIC

PRIVATE

VOLUNTARY

NORWEGIAN COAST GUARD

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NHIndustries NH90
UTILITY / TRANSPORT

ROYAL NORWEGIAN NAVY

Sjøforsvaret

SEARCH AND RESCUE
ON THE
BARENTS SEA

Available Resources

PUBLIC

PRIVATE

VOLUNTARY

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ROYAL NORWEGIAN NAVY

Sjøforsvaret

RNOAF

ROYAL NORWEGIAN AIR FORCE

Luftforsvaret

6+8

NHIndustries NH90
UTILITY / TRANSPORT

6

P-3 Orion
MARITIME PATROL

4

Lockheed C-130J
TACTICAL TRANSPORT

11

Westland Sea King Mk. 43
DEDICATED SAR

SEARCH AND RESCUE
ON THE
BARENTS SEA

Available Resources

PUBLIC

PRIVATE

VOLUNTARY

NORWEGIAN COAST GUARD

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Barentshav
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W341 / NOCGV *Bergen*
W342 / NOCGV *Sortland*

3
NO CLASS

W303 / NOCGV *Svalbard*
W312 / NOCGV *Ålesund*
W318 / NOCGV *Harstad*

LUFTTRANSPORT

10
HELICOPTERS

14
FIXED-WING AIRCRAFT

ROYAL NORWEGIAN NAVY

Sjøforsvaret

RNOAF

ROYAL NORWEGIAN AIR FORCE

Luftforsvaret

6+8

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UTILITY / TRANSPORT

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DEDICATED SAR

SEARCH AND RESCUE
ON THE
BARENTS SEA

Available Resources

PUBLIC

PRIVATE

VOLUNTARY

NORWEGIAN COAST GUARD

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LUFTTRANSPORT

10
HELICOPTERS

14
FIXED-WING AIRCRAFT

ROYAL NORWEGIAN NAVY

Sjøforsvaret

RNOAF

ROYAL NORWEGIAN AIR FORCE

Luftforsvaret

OIL / GAS INDUSTRY

Dedicated support

6+8

NHIndustries NH90
UTILITY / TRANSPORT

6

P-3 Orion
MARITIME PATROL

4

Lockheed C-130J
TACTICAL TRANSPORT

11

Westland Sea King Mk. 43
DEDICATED SAR

SEARCH AND RESCUE
ON THE
BARENTS SEA

Available Resources

PUBLIC

NORWEGIAN COAST GUARD

Kystvakten

ROYAL NORWEGIAN NAVY

Sjøforsvaret

RNOAF

ROYAL NORWEGIAN AIR FORCE

Luftforsvaret

PRIVATE

LUFTTRANSPORT

10
HELICOPTERS

14
FIXED-WING AIRCRAFT

OIL / GAS INDUSTRY

Dedicated support

VOLUNTARY

NSSR

NORWEGIAN SOCIETY FOR SEA RESCUE

Redningsselskapet

3

Nordkapp
CLASS

W320 / NOCGV *Nordkapp*
W321 / NOCGV *Senja*
W322 / NOCGV *Andenes*

3

Barentshav
CLASS

W340 / NOCGV *Barentshav*
W341 / NOCGV *Bergen*
W342 / NOCGV *Sortland*

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W303 / NOCGV *Svalbard*
W312 / NOCGV *Ålesund*
W318 / NOCGV *Harstad*

6+8

NHIndustries NH90
UTILITY / TRANSPORT

6

P-3 Orion
MARITIME PATROL

4

Lockheed C-130J
TACTICAL TRANSPORT

11

Westland Sea King Mk. 43
DEDICATED SAR

25 / 25

Petter C. G. Sundt
CLASS

SEARCH AND RESCUE
ON THE
BARENTS SEA

Available Resources

PUBLIC

NORWEGIAN COAST GUARD

Kystvakten

ROYAL NORWEGIAN NAVY

Sjøforsvaret

RNOAF

ROYAL NORWEGIAN AIR FORCE

Luftforsvaret

PRIVATE

LUFTTRANSPORT

10
HELICOPTERS

14
FIXED-WING AIRCRAFT

OIL / GAS INDUSTRY

Dedicated support

VOLUNTARY

NSSR

NORWEGIAN SOCIETY FOR SEA RESCUE

Redningsselskapet

NEAR-BY VESSELS

First responders

3

Nordkapp
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6+8

NHIndustries NH90
UTILITY / TRANSPORT

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P-3 Orion
MARITIME PATROL

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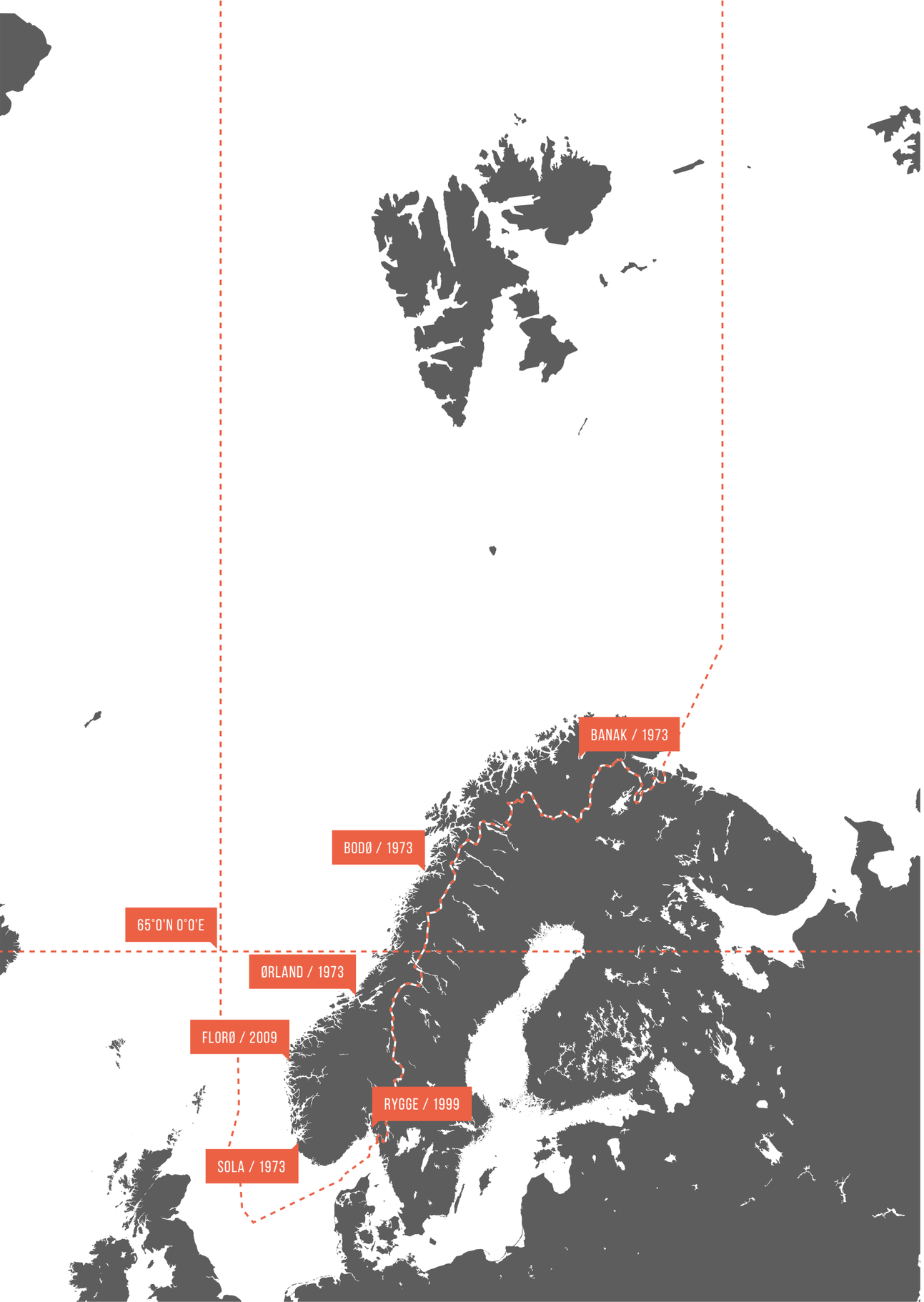
Lockheed C-130J
TACTICAL TRANSPORT

11

Westland Sea King Mk. 43
DEDICATED SAR

25 / 25

Petter C. G. Sundt
CLASS



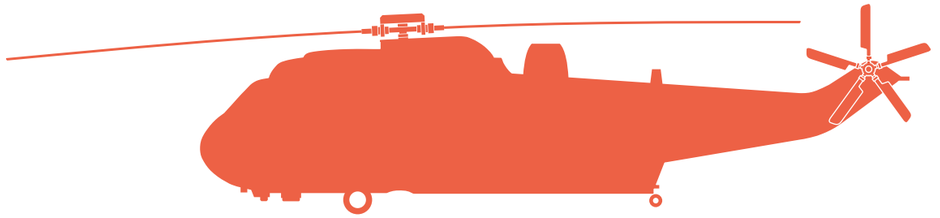
NO. 330
SQUADRON

RNOAF

6
BASES

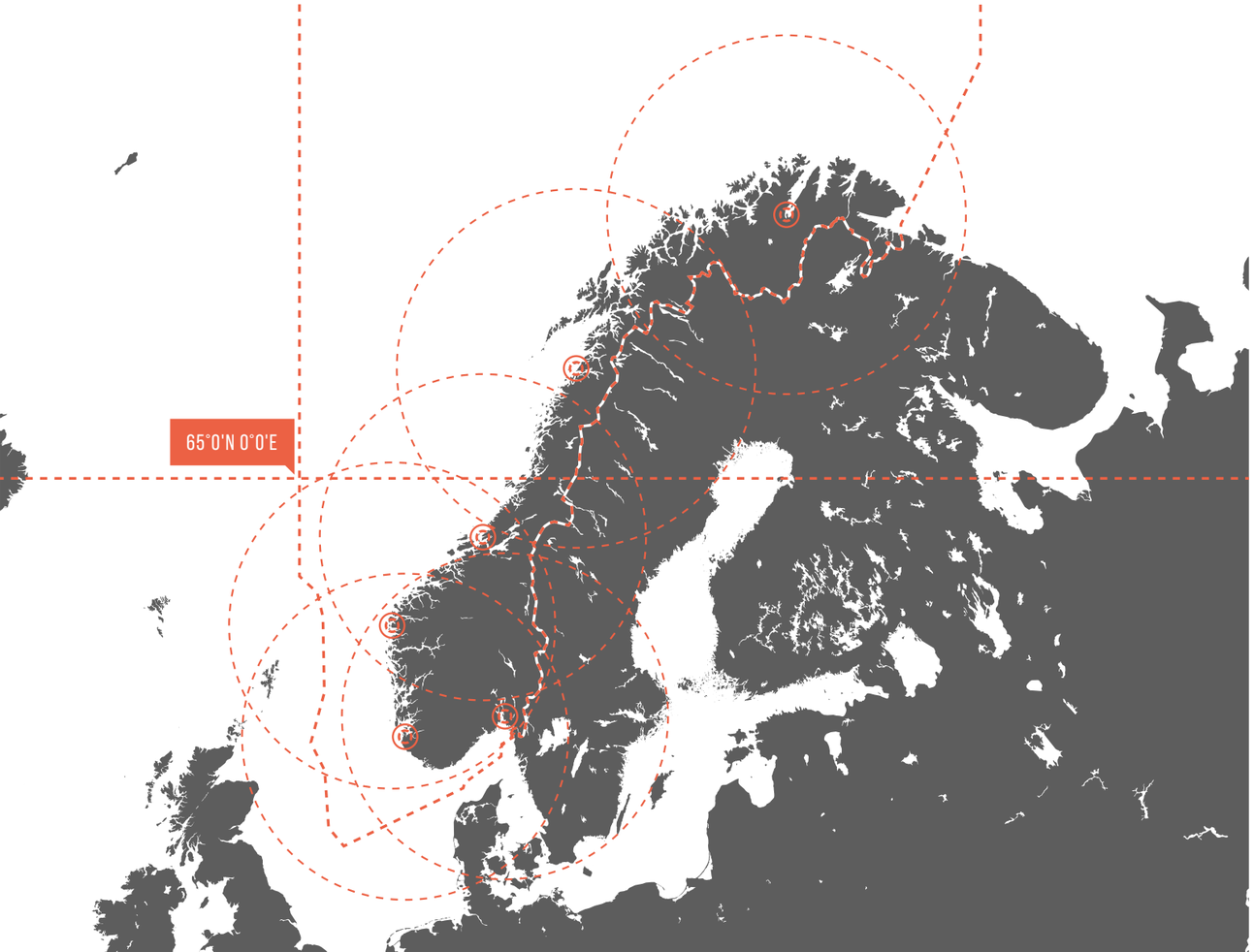
Sola, Ørland, Bodø, Banak, Rygge, Florø

12
WESTLAND WS-61 SEAKINGS



7
CREW MEMBERS

- Pilots
- Systems operator
- Navigator
- Lift operator / technician
- Rescue Swimmer
- Anaesthesiologist



NAWSAHR

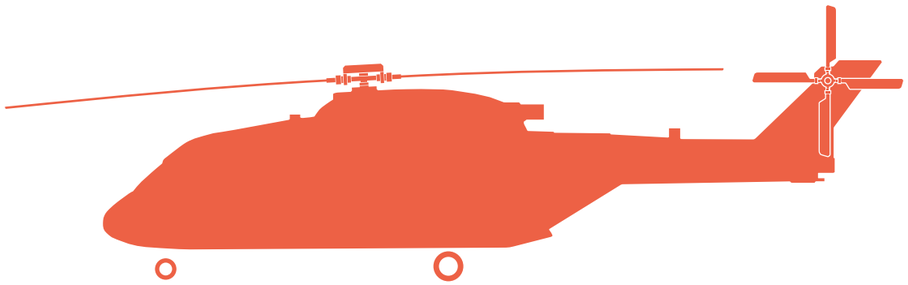
2011-2020

NORWEGIAN ALL-WEATHER
SEARCH AND RESCUE HELICOPTER

7
BASES

Sola, Ørland, Bodø, Banak, Rygge, Florø, Svalbard

16+6
AGUSTAWESTLAND AW101-612



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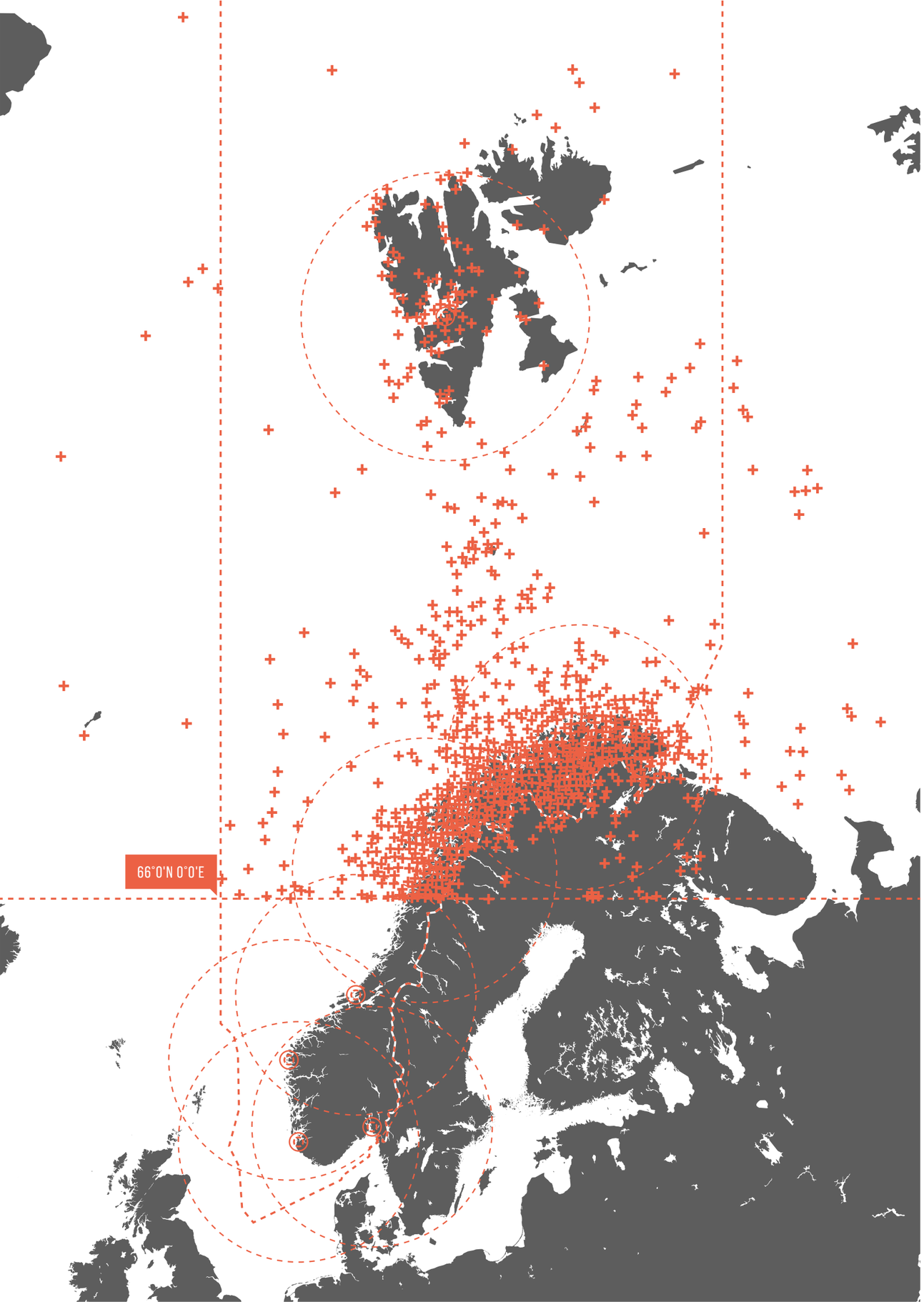
CREW MEMBERS

- Pilots
- Systems operator
- Navigator
- Rescue Swimmer
- Anaesthesiologist



NORWEGIAN ALERTS AND RESCUE OPERATIONS

2008-2012

“ Remote surveillance and detection technologies (i.e., satellite communications, GPS availability, weather stations) are critical for establishing situational awareness for both preventive and response issues. This overall capability is limited in the Arctic due to a lack of coverage and the availability of real-time weather information. ”

2009

ARCTIC COUNCIL

Arctic Marine Shipping Assessment

AMSA

EVALUATION

Limitations and deficiencies

REMOTENESS

Long distances combined with limited Search and Rescue oriented infrastructure leading to long response times in critical situations. Helicopters struggle with only a few hours of flight time and lack of refueling options.

CLIMATE

Limited availability of real-time weather information. Critically low survival time once exposed to the sea. Harsh and debilitating conditions for rescue craft and vessels.

COMMUNICATION

Services based on geostationary satellites are reduced when passing 72°N latitude and cannot be considered reliable in areas above 75°N. Critical gaps in Arctic satellite coverage and communication systems.

BARENTS SUPPORT NETWORK

Placement strategy

RUSSIAN BORDER

ARCTIC OCEAN

FRANZ JOSEF LAND

SVALBARD

NOVAYA ZEMLYA

BARENTS SEA

KARA SEA

BEAR ISLAND

NORWEGIAN SEA

BARENTS SUPPORT NETWORK

Placement strategy

ARCTIC OCEAN

FRANZ JOSEF LAND

SVALBARD

NOVAYA ZEMLYA

BARENTS SEA

BEAR ISLAND

NORWEGIAN SEA

KARA SEA

RUSSIAN BORDER

GAS AND OIL RESERVES

BARENTS SUPPORT NETWORK

Placement strategy

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FRANZ JOSEF LAND

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NOVAYA ZEMLYA

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BEAR ISLAND

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NORWEGIAN SEA

RUSSIAN BORDER

GAS AND OIL RESERVES

FISHING AREAS

ARCTIC OCEAN

FRANZ JOSEF LAND

SVALBARD

NOVAYA ZEMLYA

BARENTS SEA

BEAR ISLAND

NORWEGIAN SEA

KARA SEA

BARENTS SUPPORT NETWORK

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RUSSIAN BORDER

GAS AND OIL RESERVES

FISHING AREAS

OIL TRANSPORT

CARGO SHIPPING

BARENTS SUPPORT NETWORK

Placement strategy

ARCTIC OCEAN

FRANZ JOSEF LAND

LONGYEARBYEN

SVALBARD

NOVAYA ZEMLYA

BARENTS SEA

BEAR ISLAND

KARA SEA

NORWEGIAN SEA

BANAK

MURMANSK

BODØ

NARYAN-MAR

VORKUTA

ARKHANGELSK

NADYM

ØRLAND

RUSSIAN BORDER

GAS AND OIL RESERVES

FISHING AREAS

OIL TRANSPORT

CARGO SHIPPING

GROUND STATION

BARENTS SUPPORT NETWORK

Placement strategy

ARCTIC OCEAN

FRANZ JOSEF LAND

LONGYEARBYEN

SVALBARD

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BARENTS SEA

BEAR ISLAND

KARA SEA

NORWEGIAN SEA

BANAK

MURMANSK

BODØ

NARYAN-MAR

VORKUTA

ARKHANGELSK

NADYM

ØRLAND

RUSSIAN BORDER

GAS AND OIL RESERVES

FISHING AREAS

OIL TRANSPORT

CARGO SHIPPING

GROUND STATION

MONITORING BUOY

BARENTS SUPPORT NETWORK

Placement strategy

ARCTIC OCEAN

FRANZ JOSEF LAND

LONGYEARBYEN

SVALBARD

№03 76°36'33.7"N 30°27'42.5"E

BARENTS SEA

№05 73°28'30.1"N 33°03'19.3"E

NOVAYA ZEMLYA

№03 73°28'30.1"N 33°03'19.3"E

№04 73°28'30.1"N 33°03'19.3"E

№01 74°45'40.6"N 22°56'27.4"E

№02 73°28'30.1"N 33°03'19.3"E

BEAR ISLAND

KARA SEA

№02 73°28'30.1"N 33°03'19.3"E

№01 73°28'30.1"N 33°03'19.3"E

NORWEGIAN SEA

BANAK

MURMANSK

BODØ

NARYAN-MAR

VORKUTA

ARKHANGELSK

NADYM

ØRLAND

RUSSIAN BORDER

GAS AND OIL RESERVES

FISHING AREAS

OIL TRANSPORT

CARGO SHIPPING

GROUND STATION

MONITORING BUOY

SEARCH AND RESCUE STATION

CAPABILITES

Barents Support Network

—

SUPPORT STATION

—

MONITORING BUOY

CAPABILITES

Barents Support Network

SUPPORT STATION

Providing an off-shore platform for aeronautical SAR operations

MONITORING BUOY

CAPABILITES

Barents Support Network

SUPPORT STATION

Providing an off-shore platform for aeronautical SAR operations

Storage and distribution of emergency response equipment

MONITORING BUOY

CAPABILITES

Barents Support Network

SUPPORT STATION

Providing an off-shore platform for aeronautical SAR operations

Storage and distribution of emergency response equipment

Storage for fuel and provisions to extend the range and effectiveness of patrol ships

MONITORING BUOY

CAPABILITES

Barents Support Network

SUPPORT STATION

Providing an off-shore platform for aeronautical SAR operations

Storage and distribution of emergency response equipment

Storage for fuel and provisions to extend the range and effectiveness of patrol ships

A constant presence where needed most

MONITORING BUOY

CAPABILITES

Barents Support Network

SUPPORT STATION

Providing an off-shore platform for aeronautical SAR operations

Storage and distribution of emergency response equipment

Storage for fuel and provisions to extend the range and effectiveness of patrol ships

A constant presence where needed most

MONITORING BUOY

Monitoring and streaming of live weather data and ice conditions

CAPABILITES

Barents Support Network

SUPPORT STATION

Providing an off-shore platform for aeronautical SAR operations

Storage and distribution of emergency response equipment

Storage for fuel and provisions to extend the range and effectiveness of patrol ships

A constant presence where needed most

MONITORING BUOY

Monitoring and streaming of live weather data and ice conditions

Observation and tracking of wildlife movement

CAPABILITES

Barents Support Network

SUPPORT STATION

Providing an off-shore platform for aeronautical SAR operations

Storage and distribution of emergency response equipment

Storage for fuel and provisions to extend the range and effectiveness of patrol ships

A constant presence where needed most

MONITORING BUOY

Monitoring and streaming of live weather data and ice conditions

Observation and tracking of wildlife movement

Providing safe navigation routes

CAPABILITES

Barents Support Network

SUPPORT STATION

Providing an off-shore platform for aeronautical SAR operations

Storage and distribution of emergency response equipment

Storage for fuel and provisions to extend the range and effectiveness of patrol ships

A constant presence where needed most

MONITORING BUOY

Monitoring and streaming of live weather data and ice conditions

Observation and tracking of wildlife movement

Providing safe navigation routes

Extension and relay of short range communications

CAPABILITES

Barents Support Network

SUPPORT STATION

Providing an off-shore platform for aeronautical SAR operations

Storage and distribution of emergency response equipment

Storage for fuel and provisions to extend the range and effectiveness of patrol ships

A constant presence where needed most

MONITORING BUOY

Monitoring and streaming of live weather data and ice conditions

Observation and tracking of wildlife movement

Providing safe navigation routes

Extension and relay of short range communications

Providing sufficient coverage of areas of activity

CAPABILITES

Station and auxiliary equipment

—

SUPPORT STATION

—

Satellite communications
COSPAS-SARSAT UPLINK

—

Oil spill response and containment
SURFACE SKIMMERS
POLLUTION-CONTROL BOOMS
OIL STORAGE TANKS

CAPABILITES

Station and auxiliary equipment

—

SUPPORT STATION

—

Satellite communications
COSPAS-SARSAT UPLINK

—

Oil spill response and containment
SURFACE SKIMMERS
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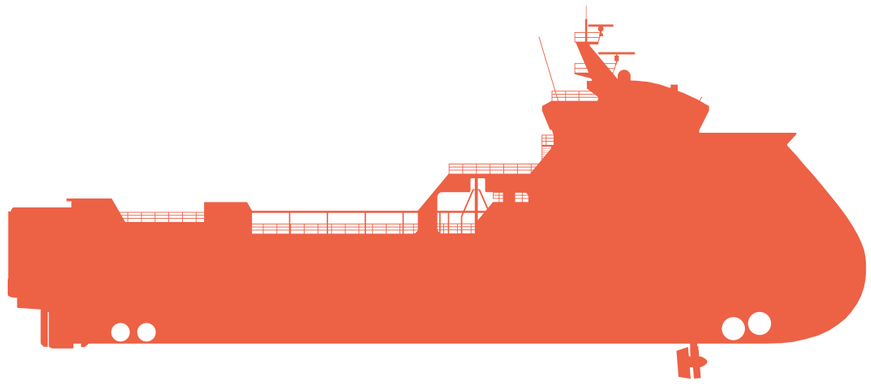


—

PATROL VESSEL

Ulstein
SX123

—

2

AgustaWestland
AW101-612

CREW MANIFEST

Housing capacity

ACTIVE CREW

Operational and maintenance

COMMAND

AW101 CREW

MEDICAL STAFF

MAINTENANCE STAFF

TEMPORARY HOUSING

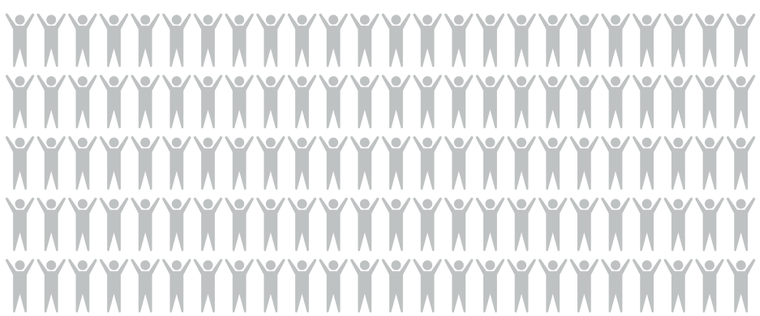
Emergency and visiting

PRIORITY VISITING

PATROL SHIP CREW

CIVILIAN / VISITING STAFF

EMERGENCY HOUSING



DISASTER HOUSING

REFERENCE

Existing projects of relevance

ANTARCTIC RESEARCH STATIONS

Daily life in polar conditions
Isolation and self-sustainability
Energy production
Housing conditions
Waste management and disposal
Storage needs

LAND BASED RESCUE STATIONS

Equipment and capabilities
Response procedures
Program and layout

COAST GUARD PATROL SHIPS

Equipment and capabilities
Housing conditions
Water management and processing
Waste management and disposal

REFERENCE

Primary case study

SEVAN 1000 FPSO

Goliat field

Sevan 1000 FPSO being towed towards the Goliat site on board the Dockwise Vanguard

CLASS
Sevan 1000

COMPLETION YEAR
2015

YARD
Hyundai Heavy Industries / HH

CLIENT
Eni Norge AS

FIELD
Goliat, Barents Sea, NCS

WATER DEPTH
380-400 m

OVERALL LENGTH
112 m / 107 m

DIAM. IN WATERLINE
90 m

DISPLACEMENT AT
210 000 mT

DECK AREA
9000 m^2

ACCOMODATION
120 persons

MOORING
spread moored, 14 lines

PROGRAM

Operational and common spaces

PROGRAM

Operational and common spaces

EMERGENCY RESPONSE

Equipment storage	90 M²
Changing room / preparation	75 M²
Stand-by room	65 M²
Meeting room	35 M²
Equipment off-load / maintenance	90 M²
Drying room	10 M²
	365 M²

PROGRAM

Operational and common spaces

EMERGENCY RESPONSE

Equipment storage	90 M²
Changing room / preparation	75 M²
Stand-by room	65 M²
Meeting room	35 M²
Equipment off-load / maintenance	90 M²
Drying room	10 M²
	365 M²

EMERGENCY RECEPTION

Waiting area / identification	85 M²
Immediate treatment	75 M²
Intensive care	50 M²
Operation room / preparation	42 M²
Drying room public	25 M²
Showers / bathrooms	42 M²
Post-treatment orientation	35 M²
Decontamination	20 M²
Quarantine	50 M²
Morgue	20 M²
Medical staff changing room	50 M²
Medical staff lounge	65 M²
Meeting room	35 M²
	594 M²

PROGRAM

Operational and common spaces

EMERGENCY RESPONSE

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	365 M²

LIVING QUARTERS

Response personnel	252 M²
Medical staff	52,5 M²
Officers' quarters	172 M²
Maintenance staff	158 M²
Emergency housing	105 M²
Civilian / visiting staff	126 M²
Patrol ship crew	126 M²
Priority visiting	172 M²
	1164 M²

EMERGENCY RECEPTION

Waiting area / identification	85 M²
Immediate treatment	75 M²
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Medical staff lounge	65 M²
Meeting room	35 M²
	594 M²

COMMON SPACES

Dining hall	485 M²
Kitchen	125 M²
Leisure hall	225 M²
Theatre	58 M²
Training / physical recreation	230 M²
Sports hall / disaster housing	1195 M²
Public areas / lounge	225 M²
Public kitchen	70 M²
Gardens / hydroponics	504 M²
Washing room / dryers	35 M²
	3152 M²

PROGRAM

Operational and common spaces

EMERGENCY RESPONSE

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Priority visiting	172 M²
	1164 M²

COMMAND

Communications' bridge	75 M²
Officers' lounge	65 M²
Meeting rooms	90 M²
Bathrooms	35 M²
	265 M²

EMERGENCY RECEPTION

Waiting area / identification	85 M²
Immediate treatment	75 M²
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COMMAND

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	265 M²

PROVISIONS

Storage	70 M²
Dry storage	70 M²
Cold storage	54 M²
Cooler	54 M²
Freezer	54 M²
	302 M²

PROGRAM

Operational and common spaces

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Equipment storage	90 M²
Changing room / preparation	75 M²
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PROVISIONS

Storage	70 M²
Dry storage	70 M²
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Cooler	54 M²
Freezer	54 M²
	302 M²

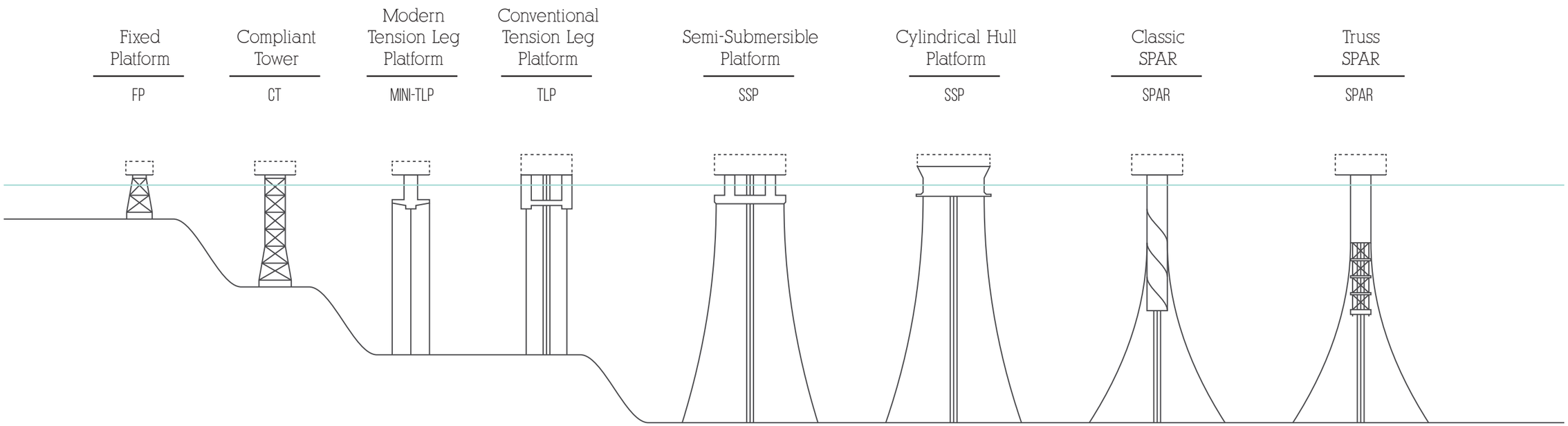
MAINTENANCE

Hangar bays	884 M²
Main storage holds	708 M²
	1592 M²

7434
sq.m

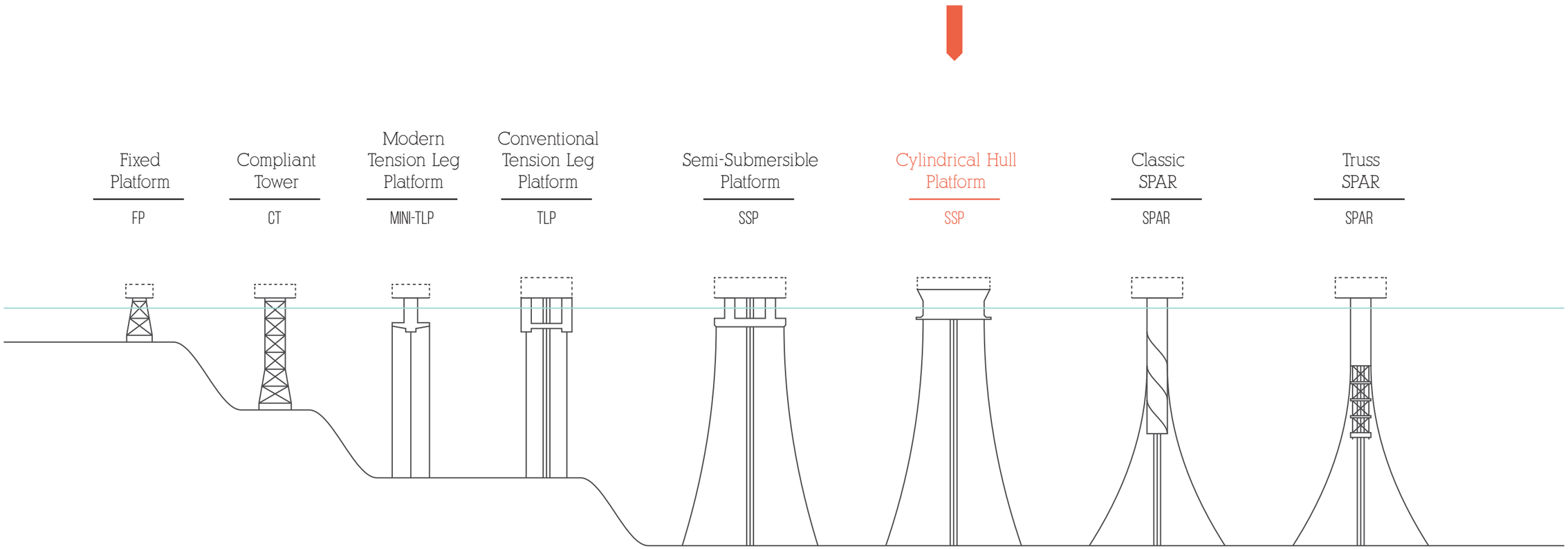
REFERENCE

Existing platform catalogue



REFERENCE

Existing platform catalogue



Fixed Platform	Compliant Tower	Modern Tension Leg Platform	Conventional Tension Leg Platform	Semi-Submersible Platform	Cylindrical Hull Platform	Classic SPAR	Truss SPAR
FP	CT	MINI-TLP	TLP	SSP	SSP	SPAR	SPAR
-520M	370-910M	180-1300M	-2000M	150-3000M	60-3000M	500-3000M	500-3000M

REFERENCE

Hull details

U.S. PATENT NO.

US8251003 B2

Offshore buoyant drilling, production, storage and offloading structure

PUBLICATION TYPE
Grant

APPLICATION NO.
US 12/914,709

PUBLICATION DATE
Aug 28, 2012

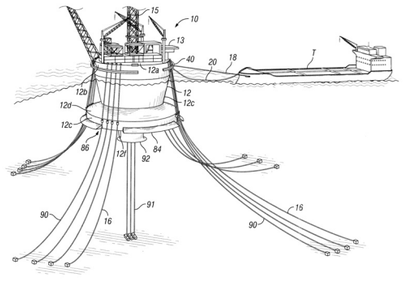
FILING DATE
Oct 28, 2010

PRIORITY DATE
Nov 8, 2009

INVENTORS
Nicolaas J. Vandenworm

ORIGINAL ASSIGNEE
Ssp Technologies, Inc.

ALSO PUBLISHED AS
CN102438890A
CN102438890B
EP2496469A1
US8544402
US8733265
US20110107951
US20120291685
US20130305976
WO2011056695A1



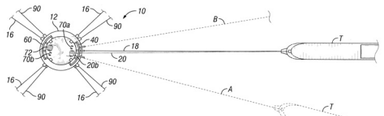


FIG. 5

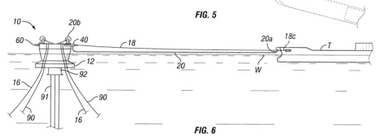


FIG. 6

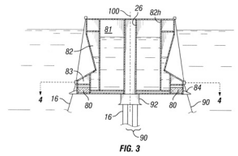


FIG. 3

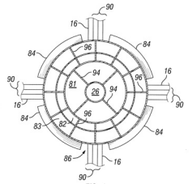


FIG. 4

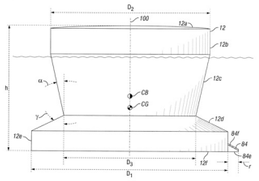


FIG. 2

U.S. PATENT NO.

US20120298027 A1

Offshore floating production, storage, and offloading vessel for use in ice-covered and clear water applications

PUBLICATION TYPE
Application

APPLICATION NO.
US 13/159,383

PUBLICATION DATE
Nov 29, 2012

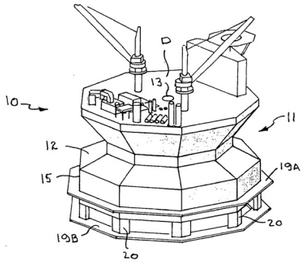
FILING DATE
Jun 13, 2011

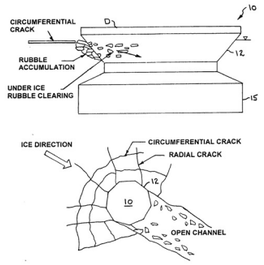
PRIORITY DATE
Jan 1, 2007

INVENTORS
Nagan Srinivasan

ORIGINAL ASSIGNEE
Nagan Srinivasan

ALSO PUBLISHED AS
CA2747255A1
CA2747255C
EP2271548A1
EP2271548A4
EP2271548B1
US7958835
US8511246
US20090126616
WO2009088489A1





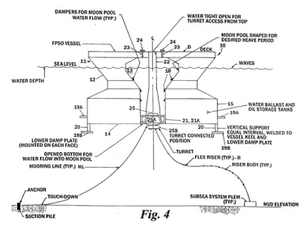


Fig. 4

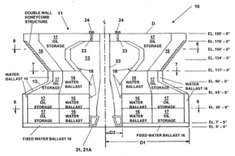
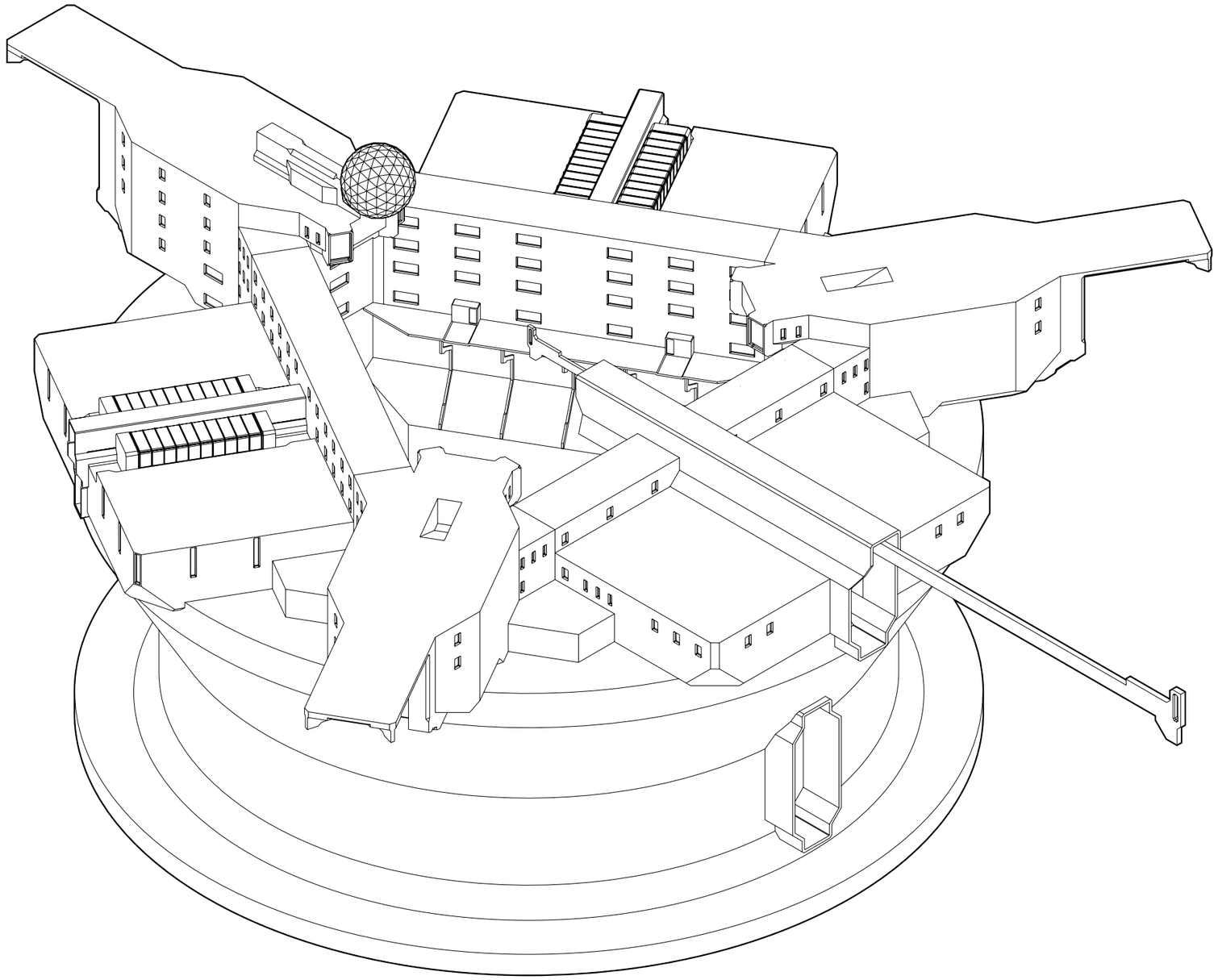


Fig. 5

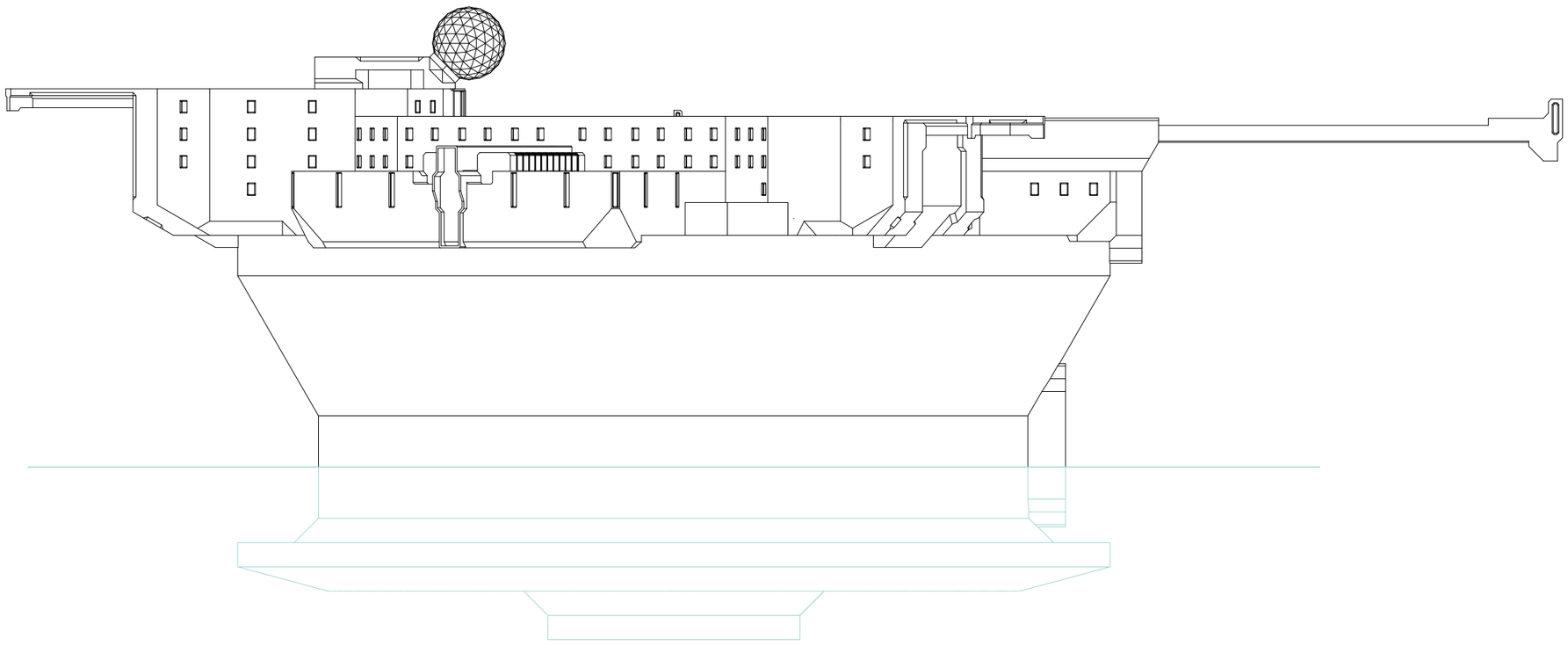
OVERVIEW

Isometric projection



ELEVATION

Barents support station



90°

ELEVATION

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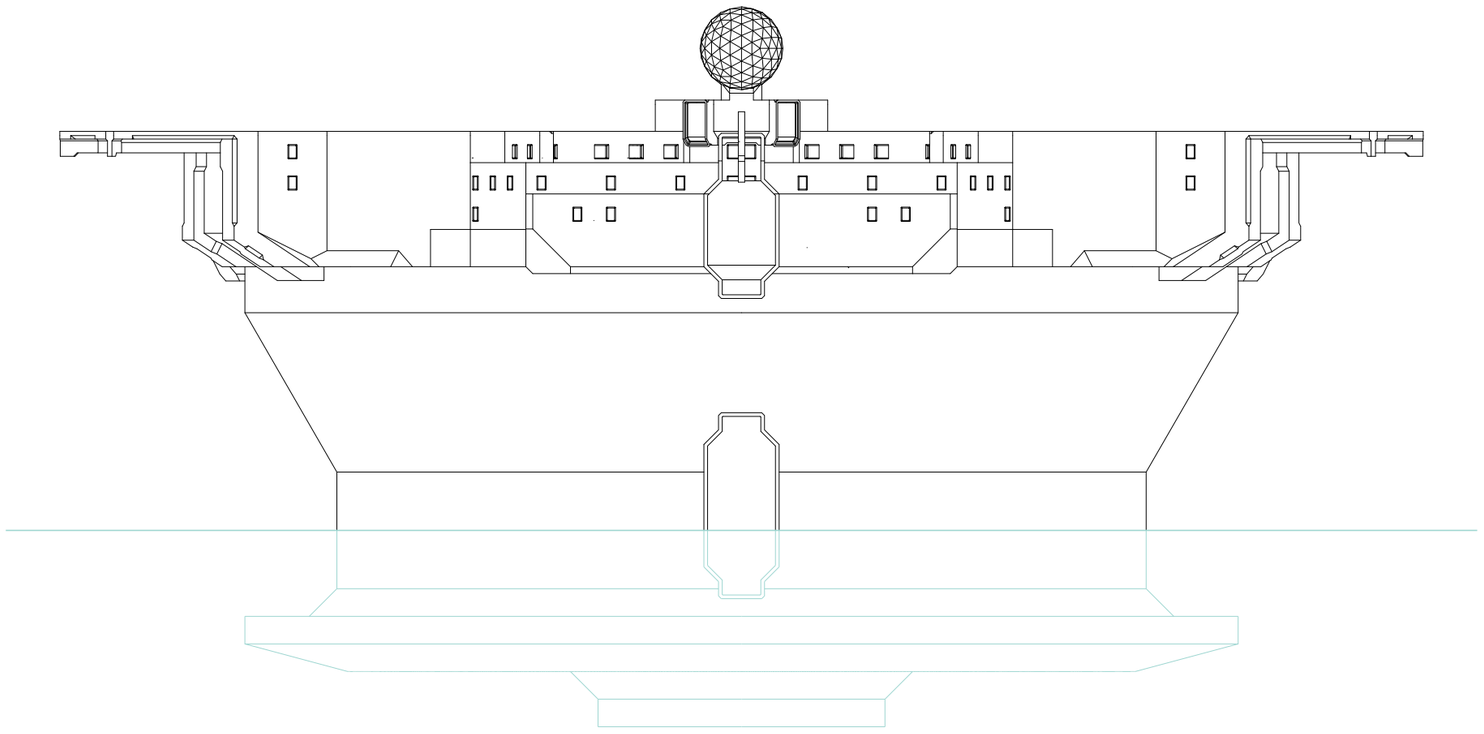
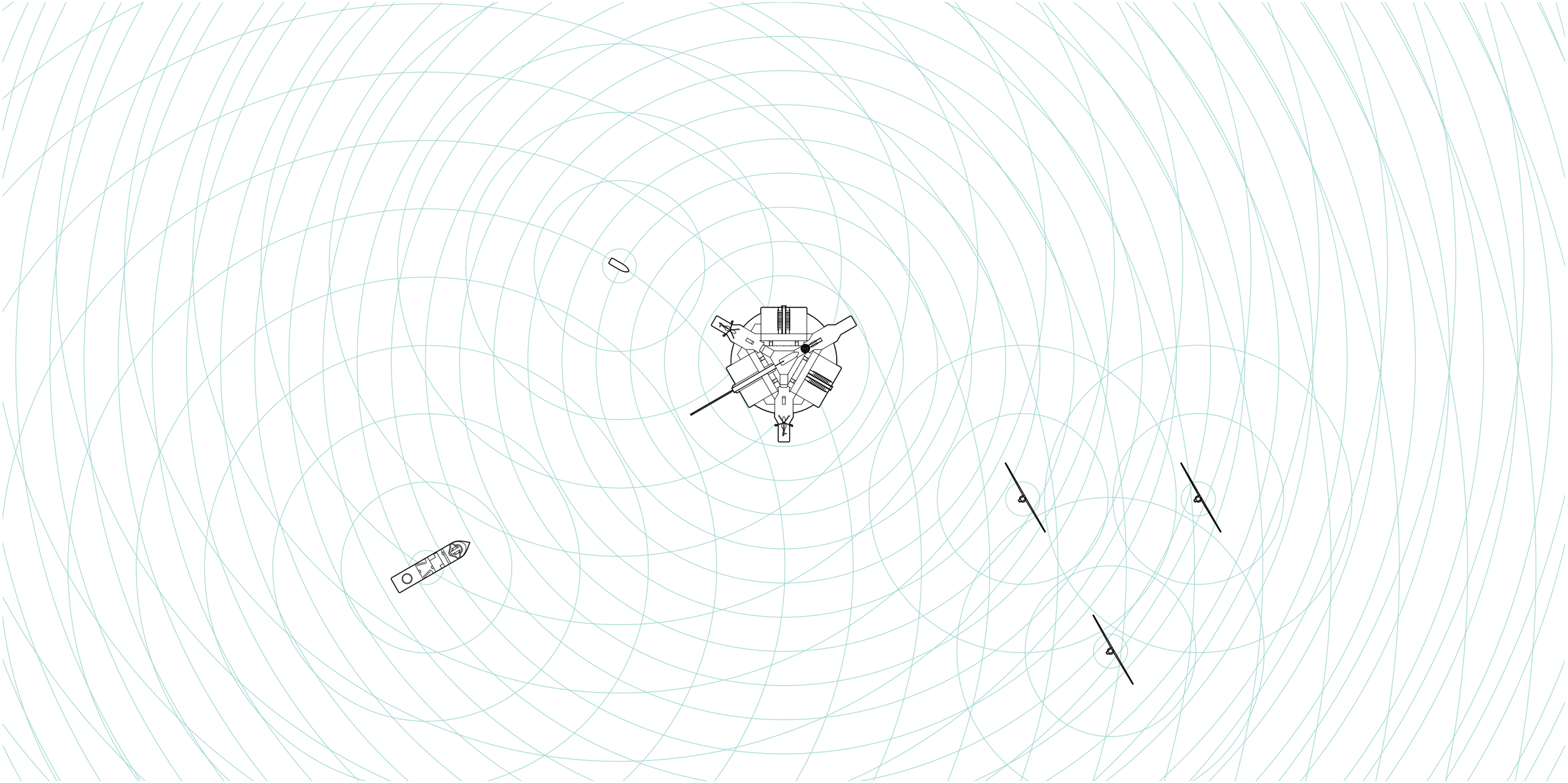


0°

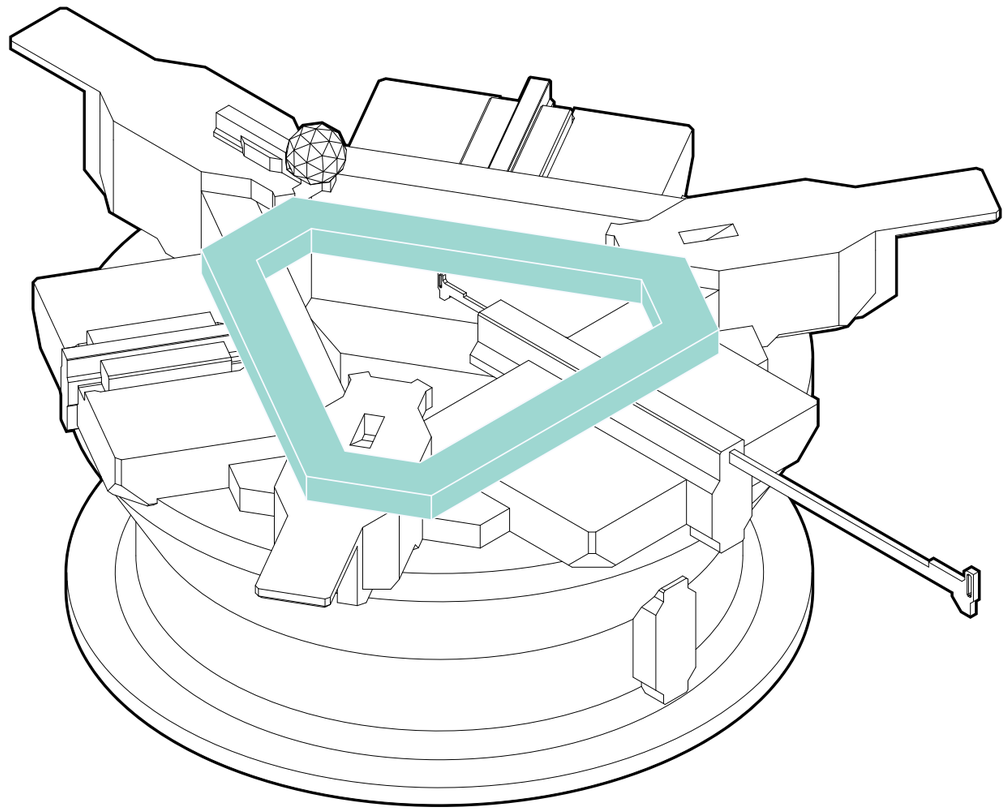
SITE

Station with turbines and patrol vessel



CIRCULATION

Access and internal movement

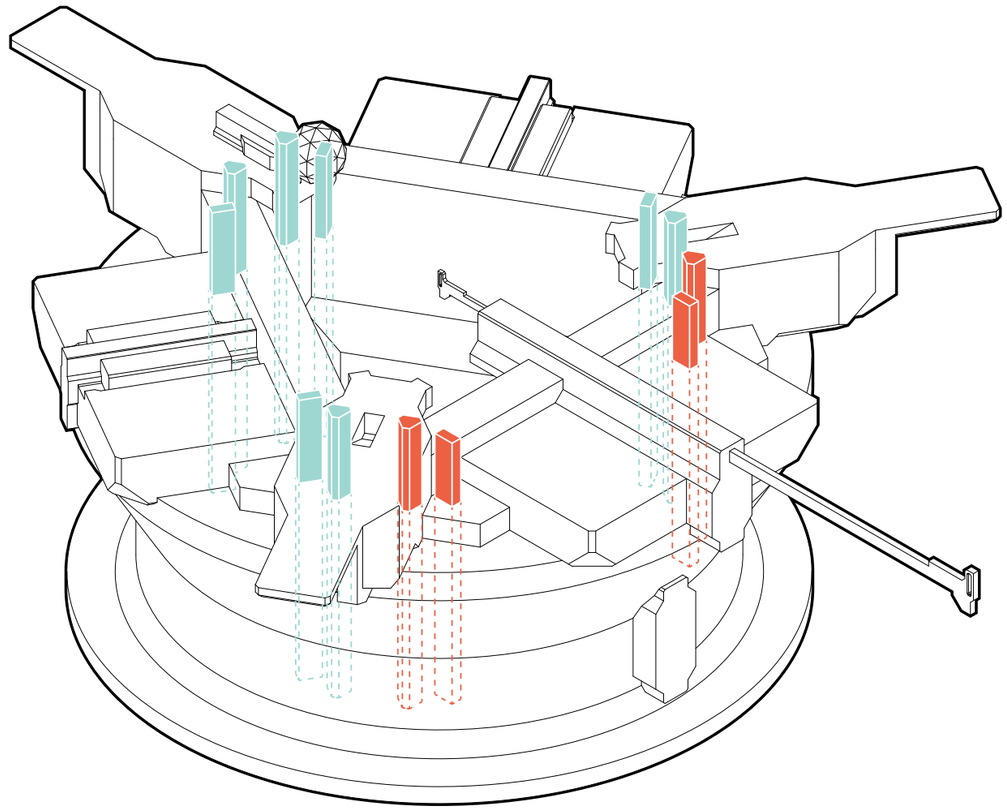


MAIN HALLWAY

Complete circulation on the main floor

CIRCULATION

Access and internal movement

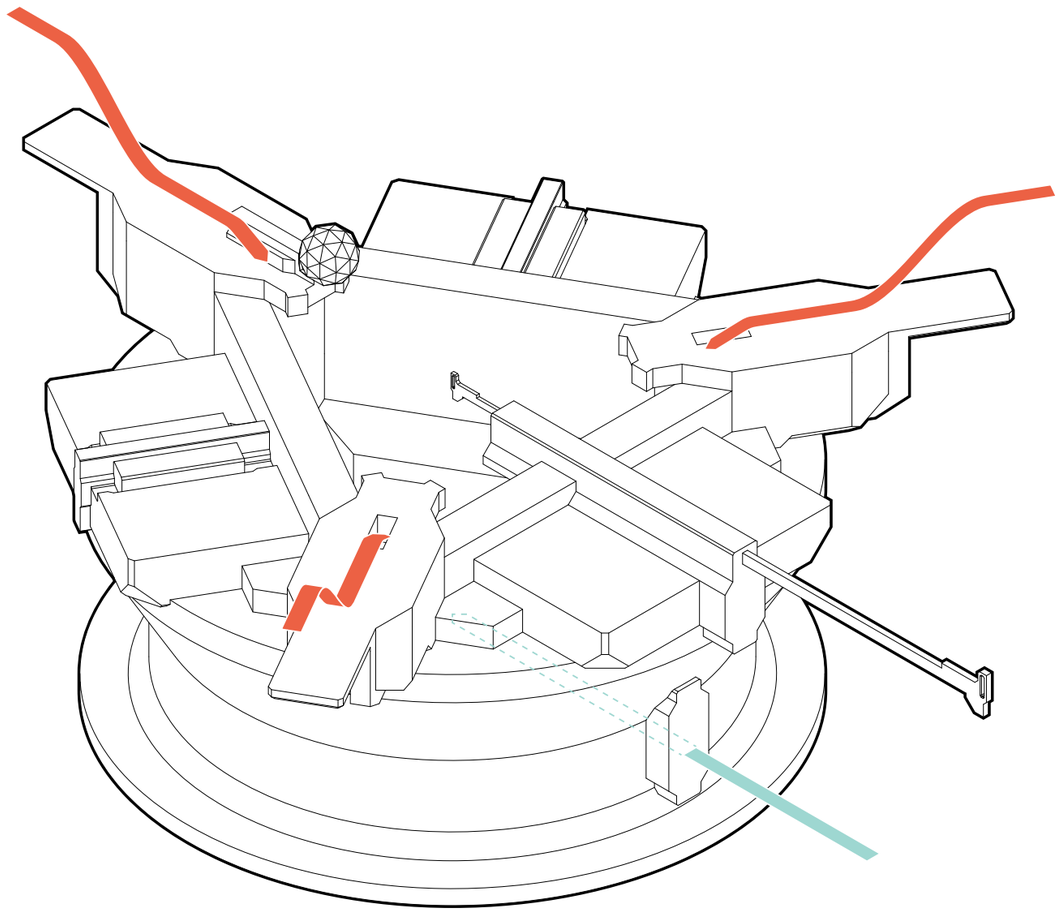


VERTICAL CONNECTIONS

Common use and operational use lifts and stairs

CIRCULATION

Access and internal movement

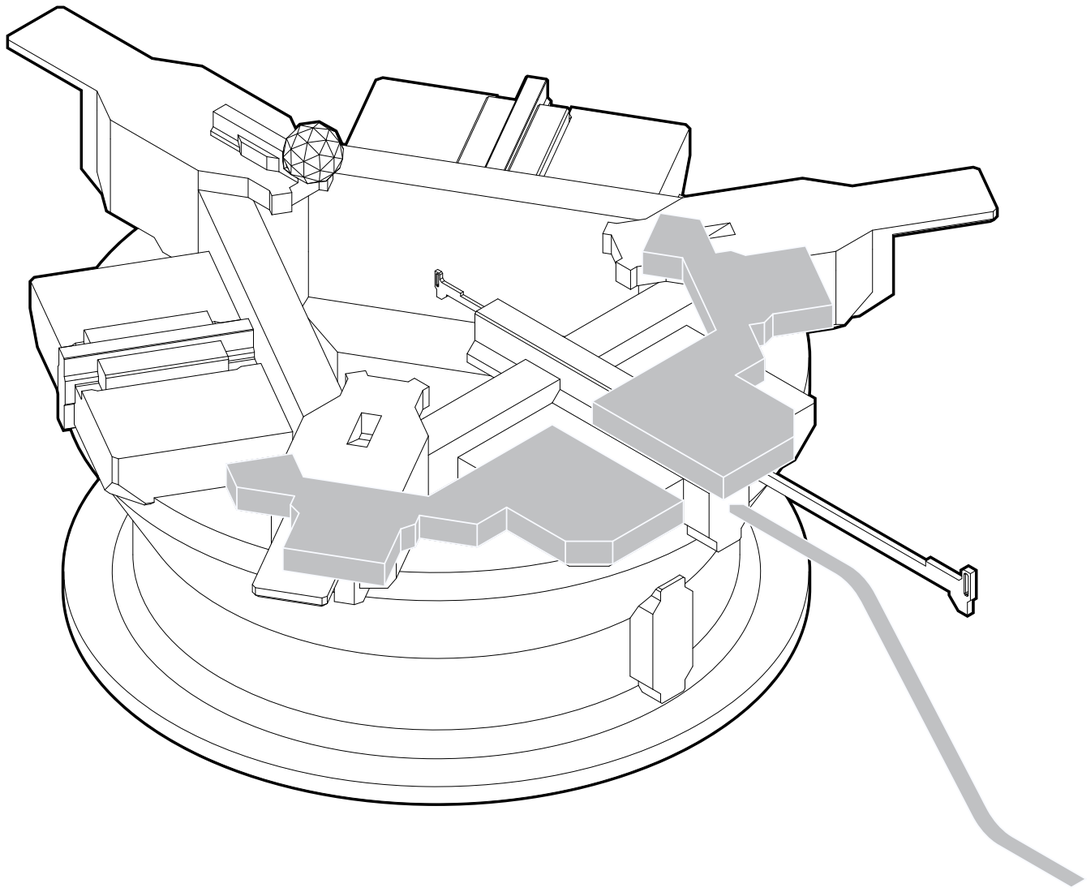


ACCESS

Air and sea

CIRCULATION

Access and internal movement

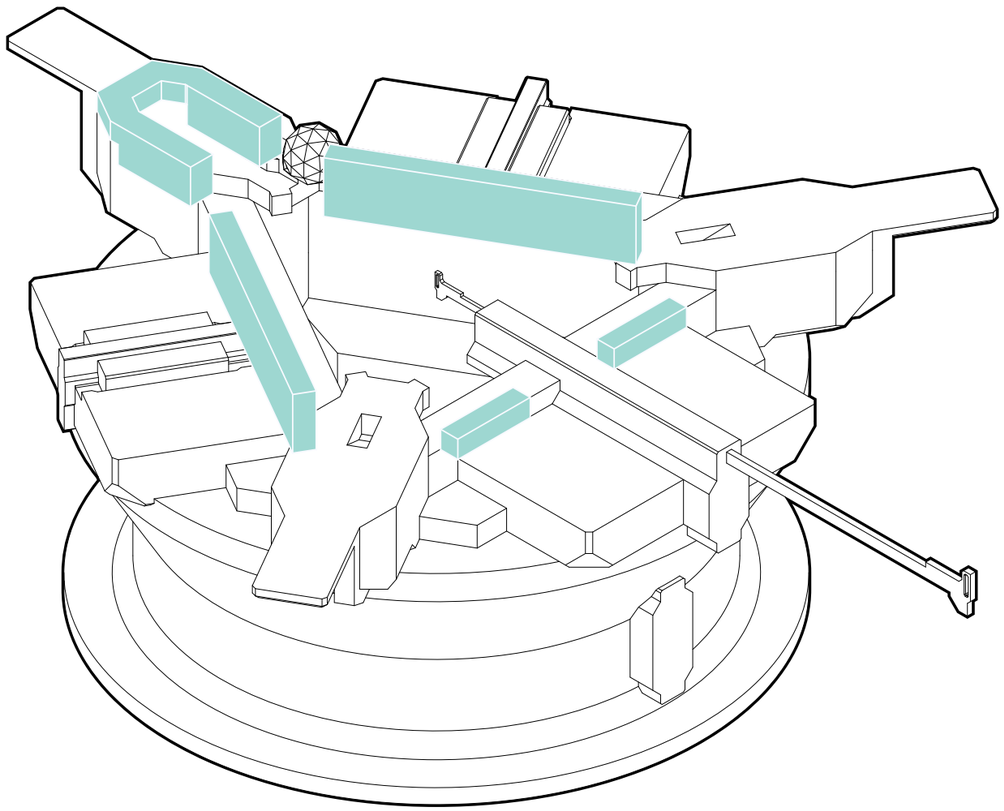


STORAGE

Provisions holds and circulation

LAYOUT

Programmatic division

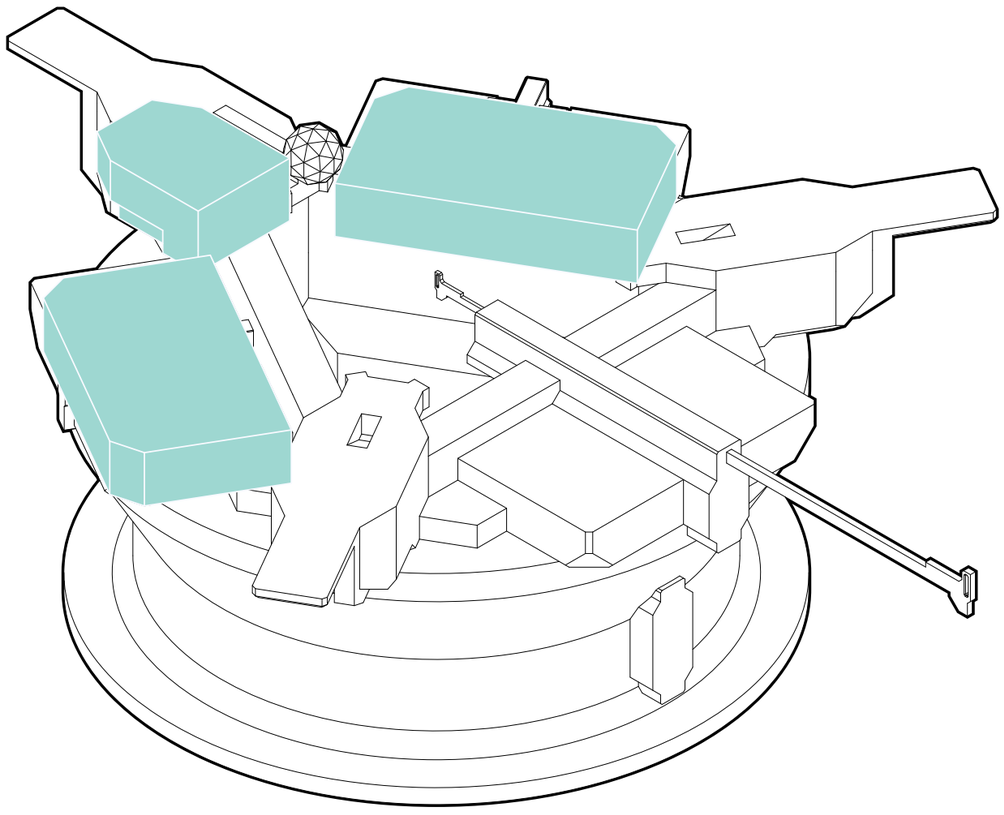


LIVING QUARTERS

Housing for crew and rescues

LAYOUT

Programmatic division

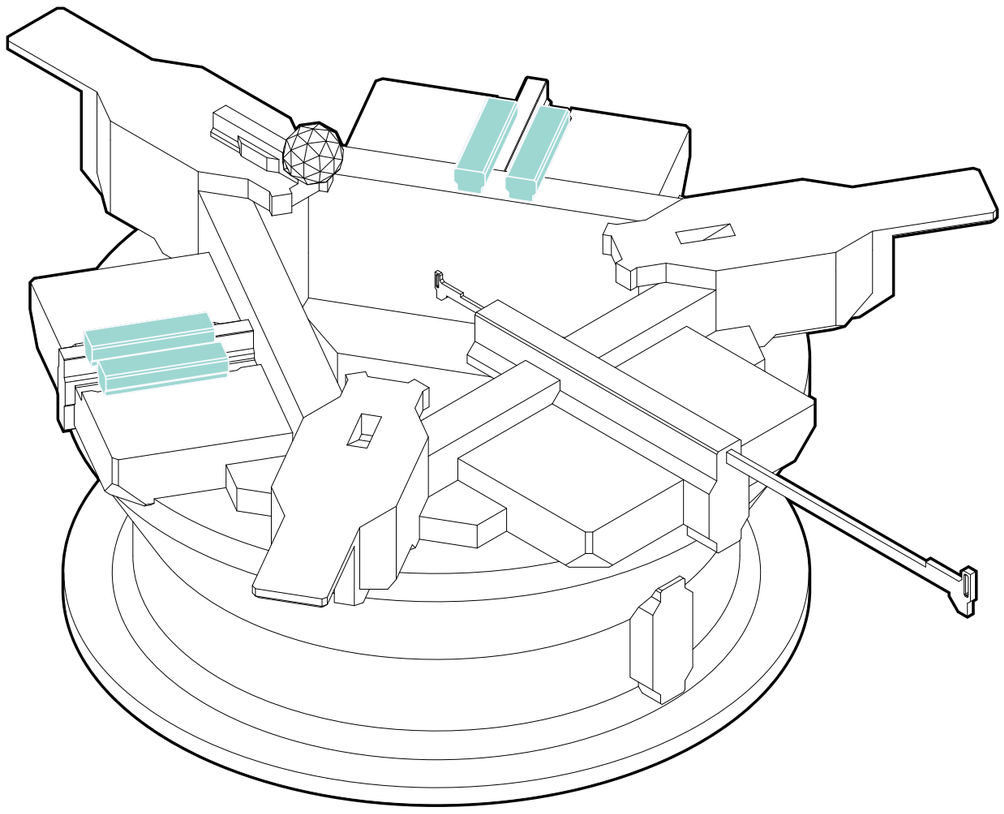


COMMON SPACES

Leisure, dining and training

LAYOUT

Programmatic division

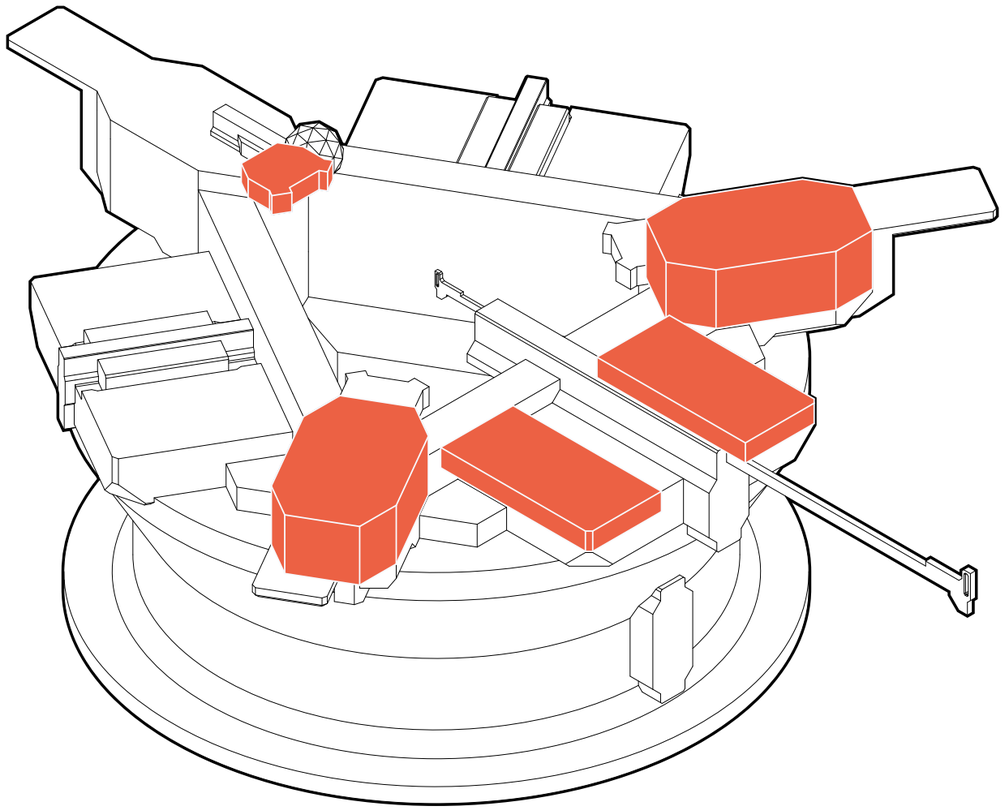


HYDROPONICS

Fresh food production

LAYOUT

Programmatic division

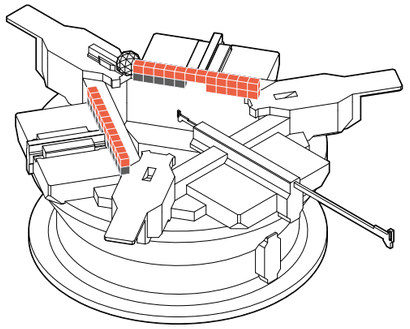


OPERATIONS

Emergency response and reception

HOUSING UNITS

Variations and layout



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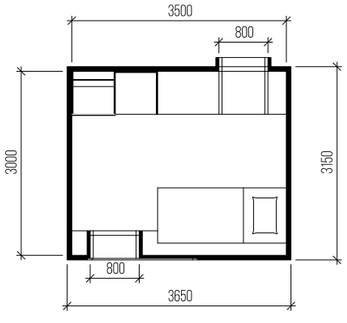
AW101 CREW / MEDICAL STAFF / MAINTENANCE STAFF



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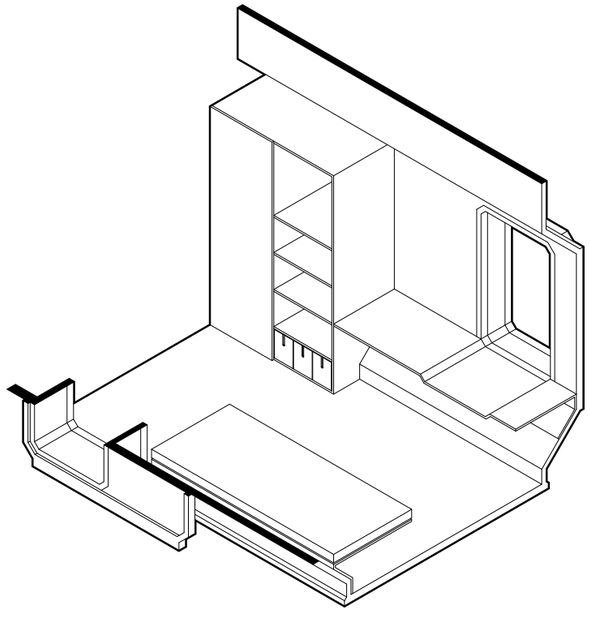
10,5

sq.m



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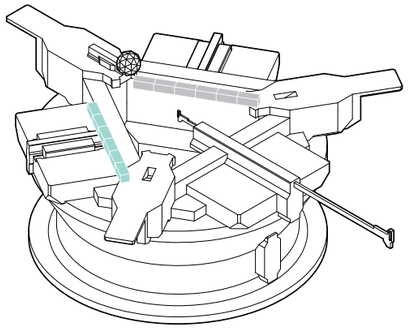
44

One Person units

HOUSING UNITS

Variations and layout



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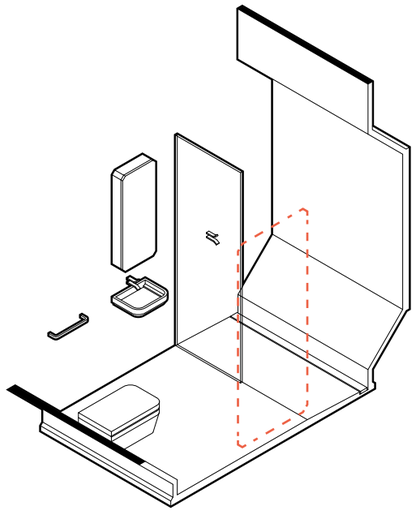
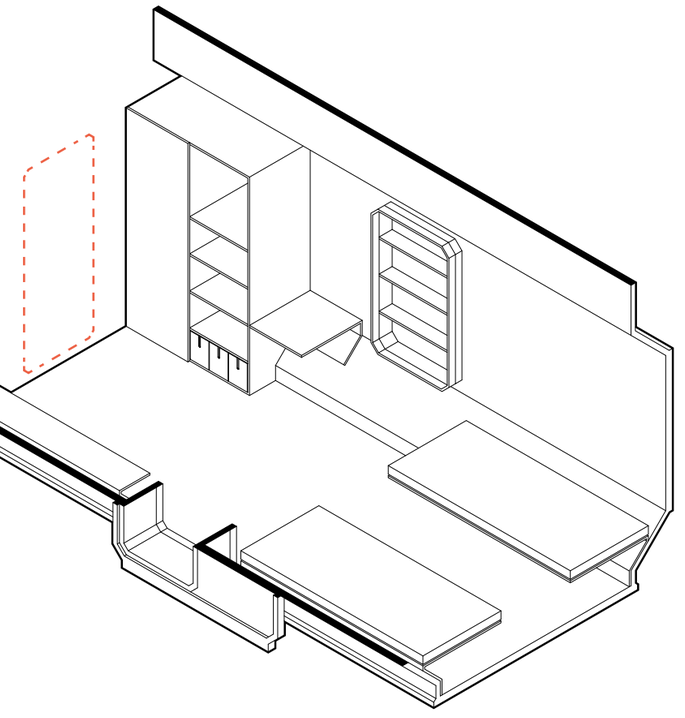
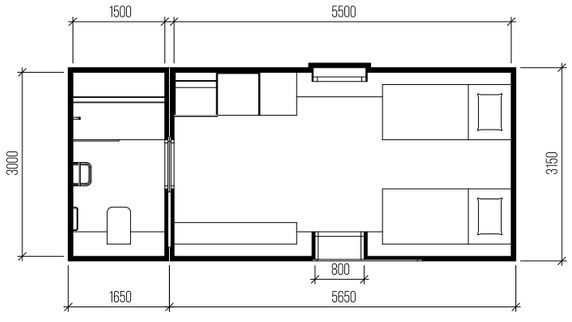
VISITING CIVILIAN / PATROL SHIP CREW







—

16,5 + 4,5

sq.m

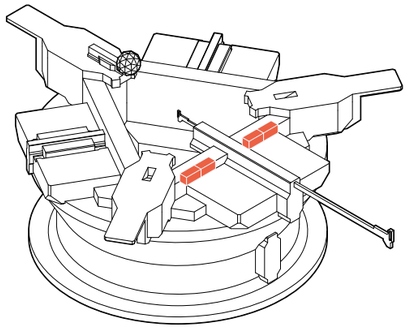
—

12

Two Person units

HOUSING UNITS

Variations and layout



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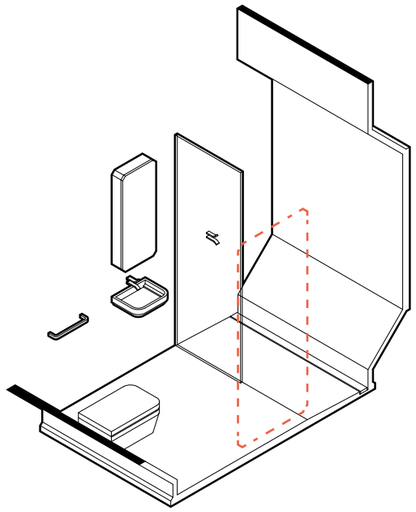
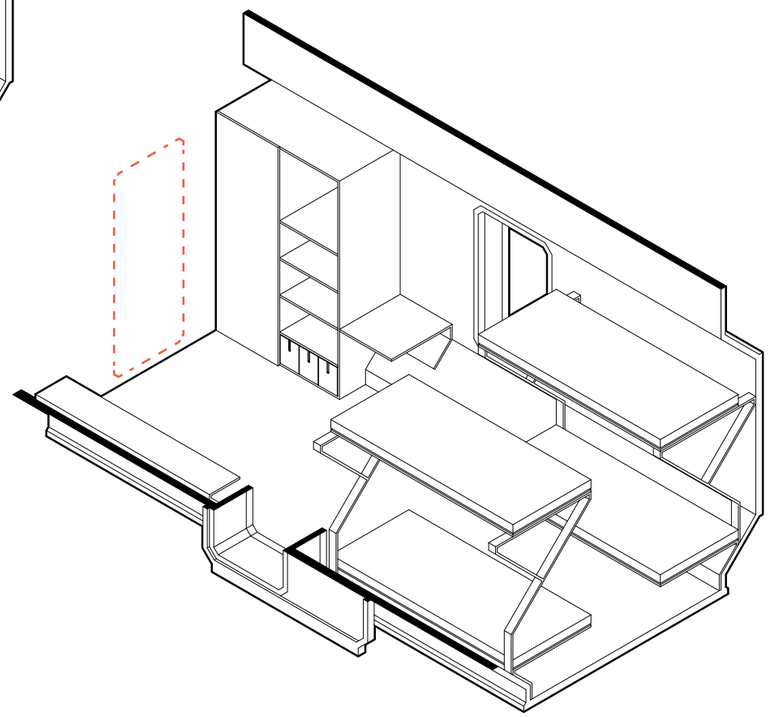
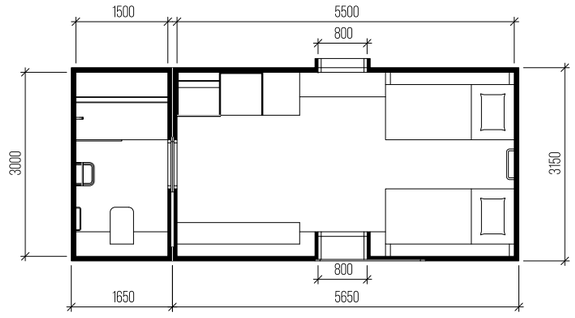
EMERGENCY HOUSING







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16,5 + 4,5

sq.m

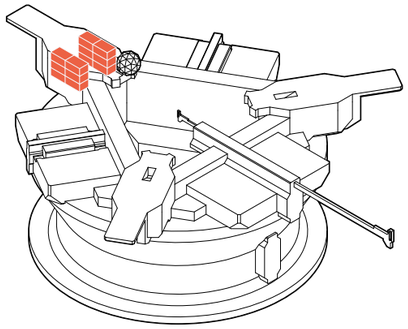
—

4

Four person units

HOUSING UNITS

Variations and layout



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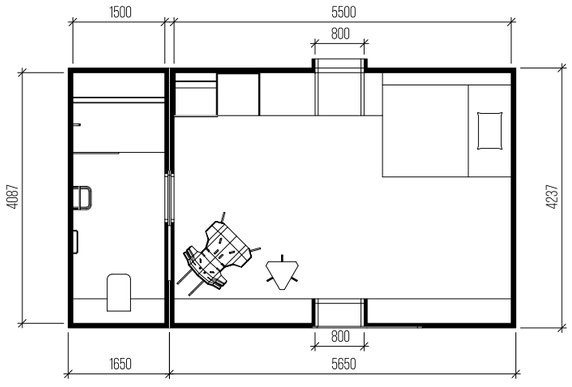
OFFICERS' QUARTERS / PRIORITY VISITING



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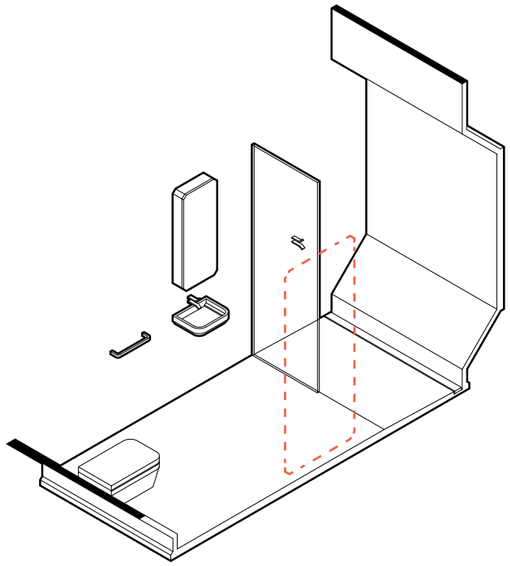
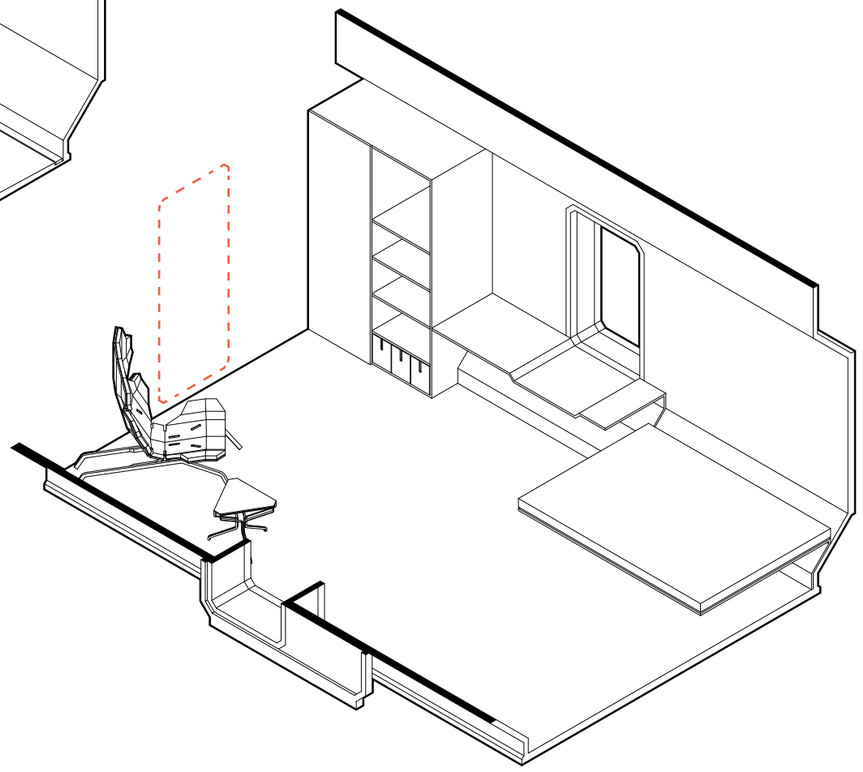
22,5 + 6,1

sq.m





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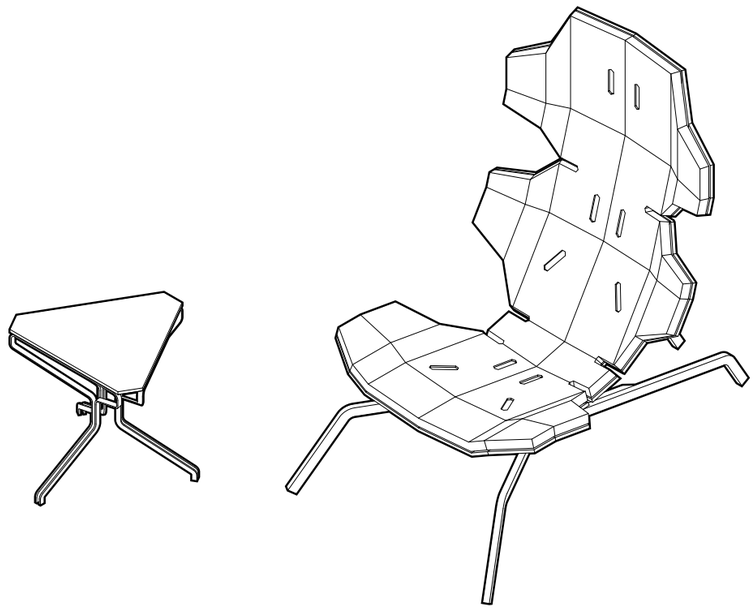
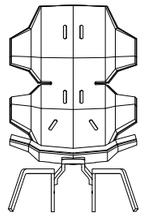
12

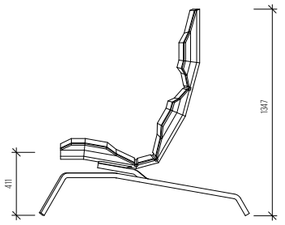
Officers' units

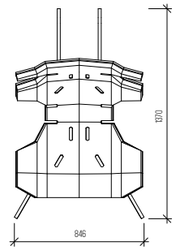
INTERIOR ELEMENTS

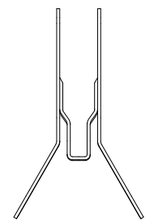
Barents chair and coffe table

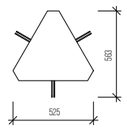


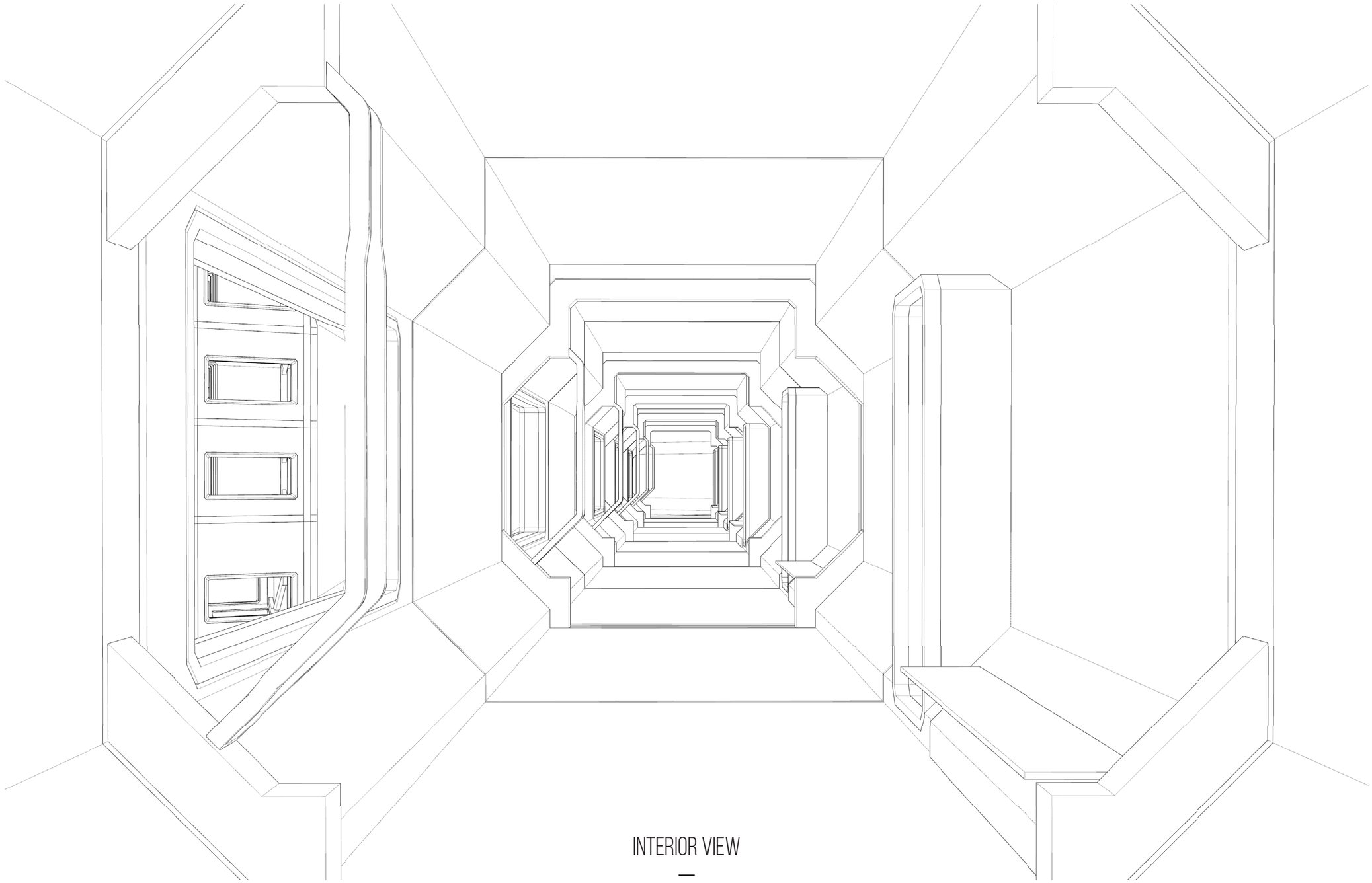












INTERIOR VIEW

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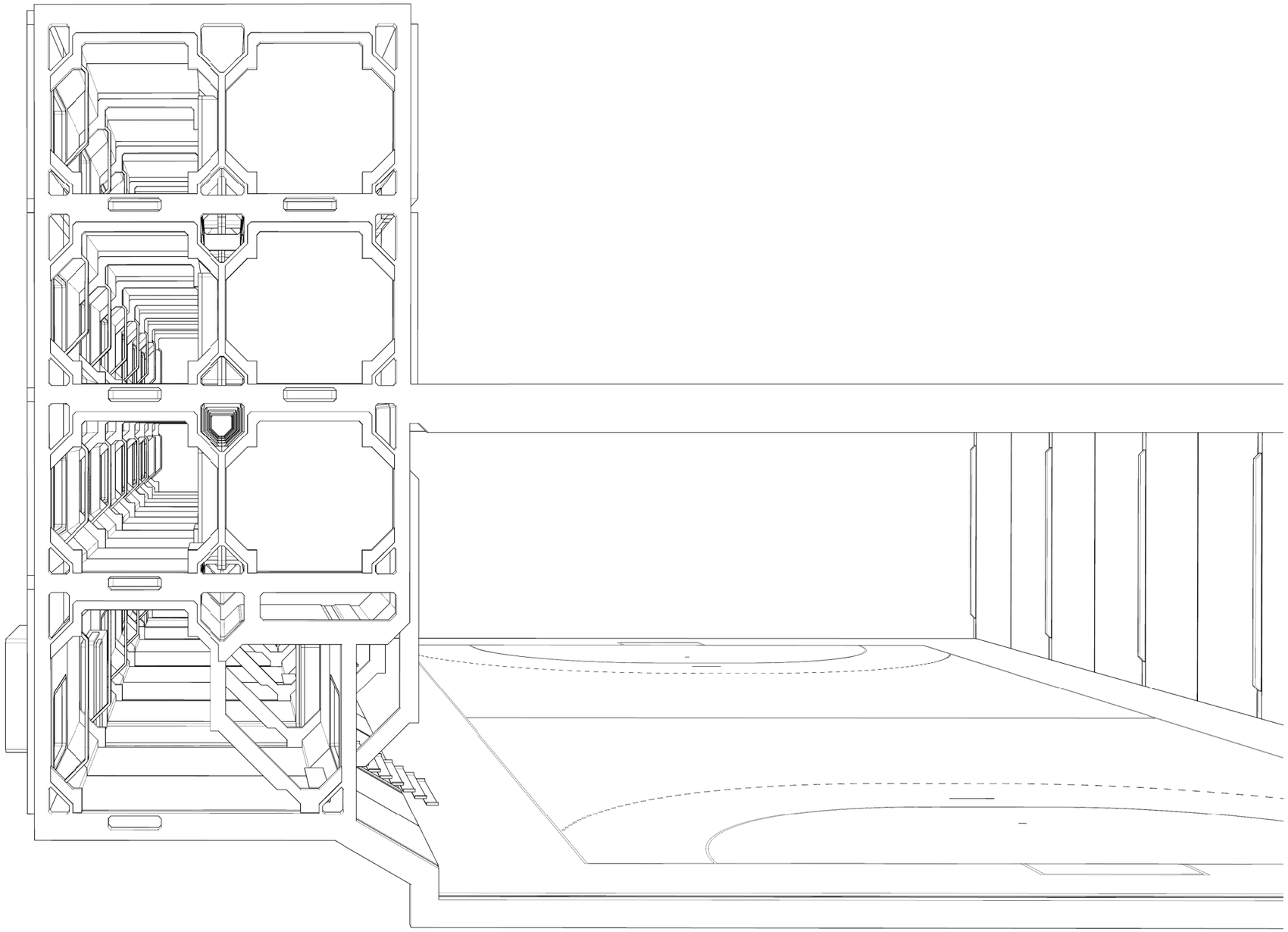
living quarters' hallway

INTERIOR VIEW

—

main hallway



INTERIOR EXTRACT

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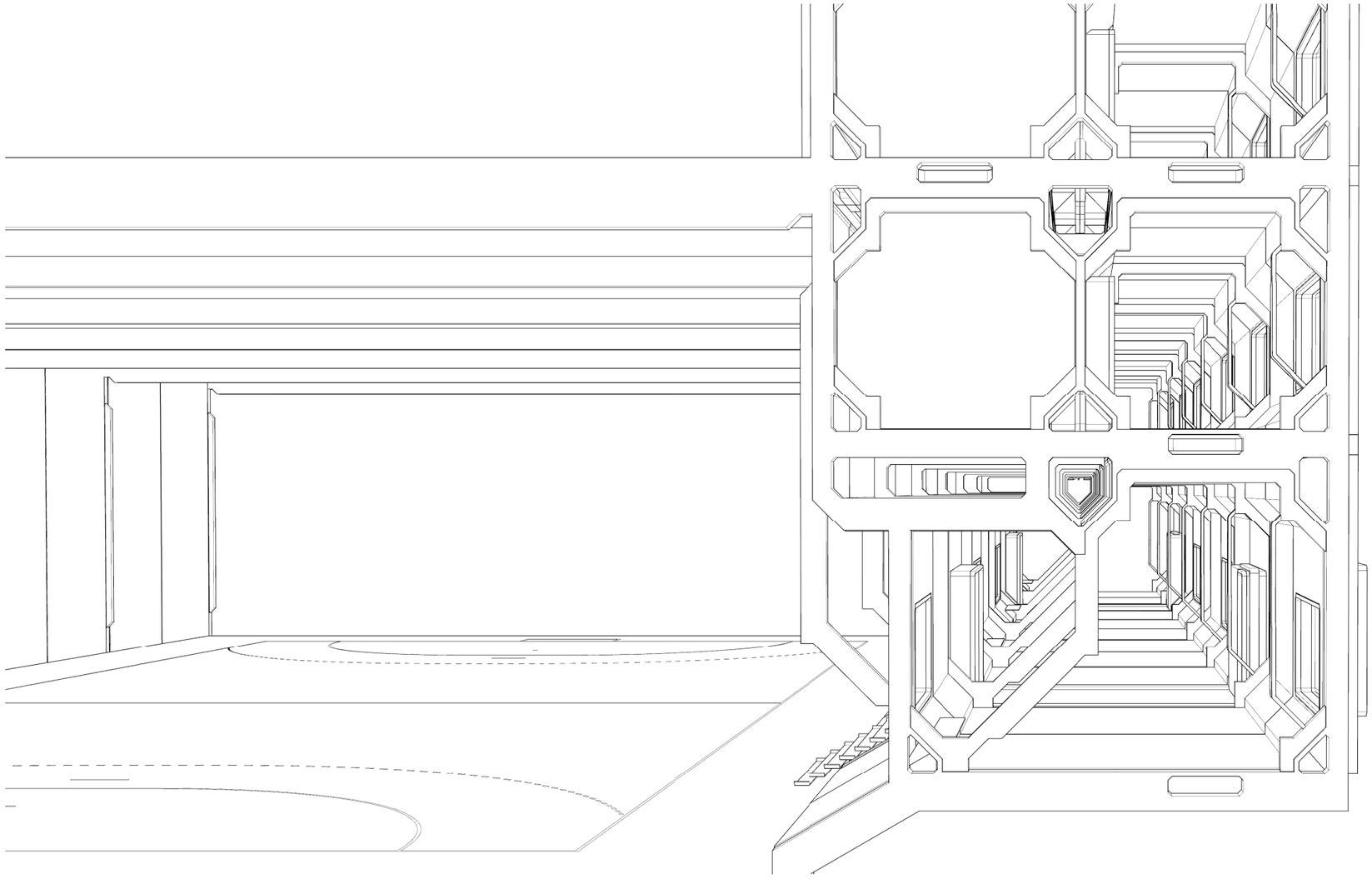
Living quarters and sports hall



INTERIOR EXTRACT

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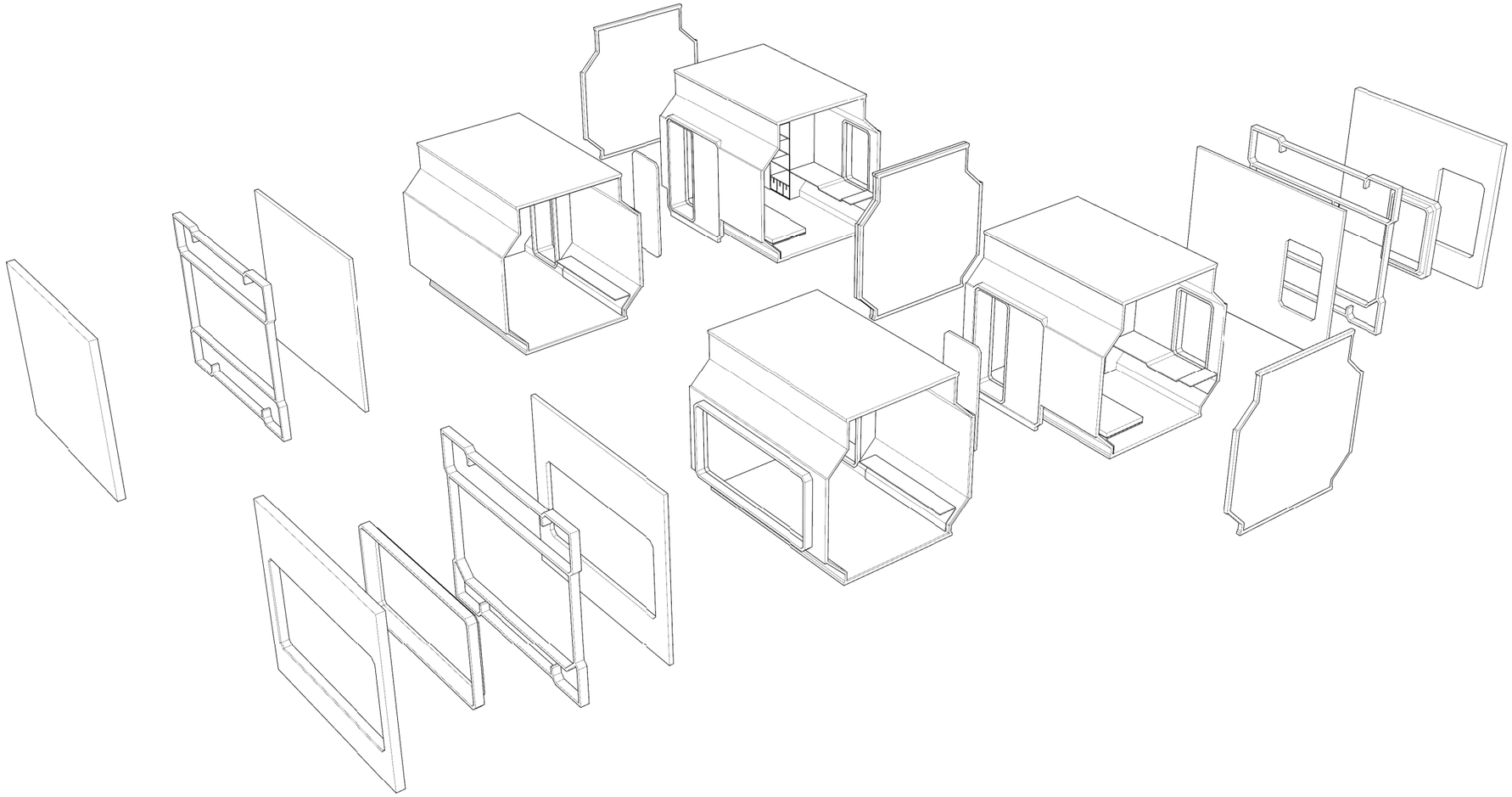
Structure and communications



INTERIOR EXTRACT

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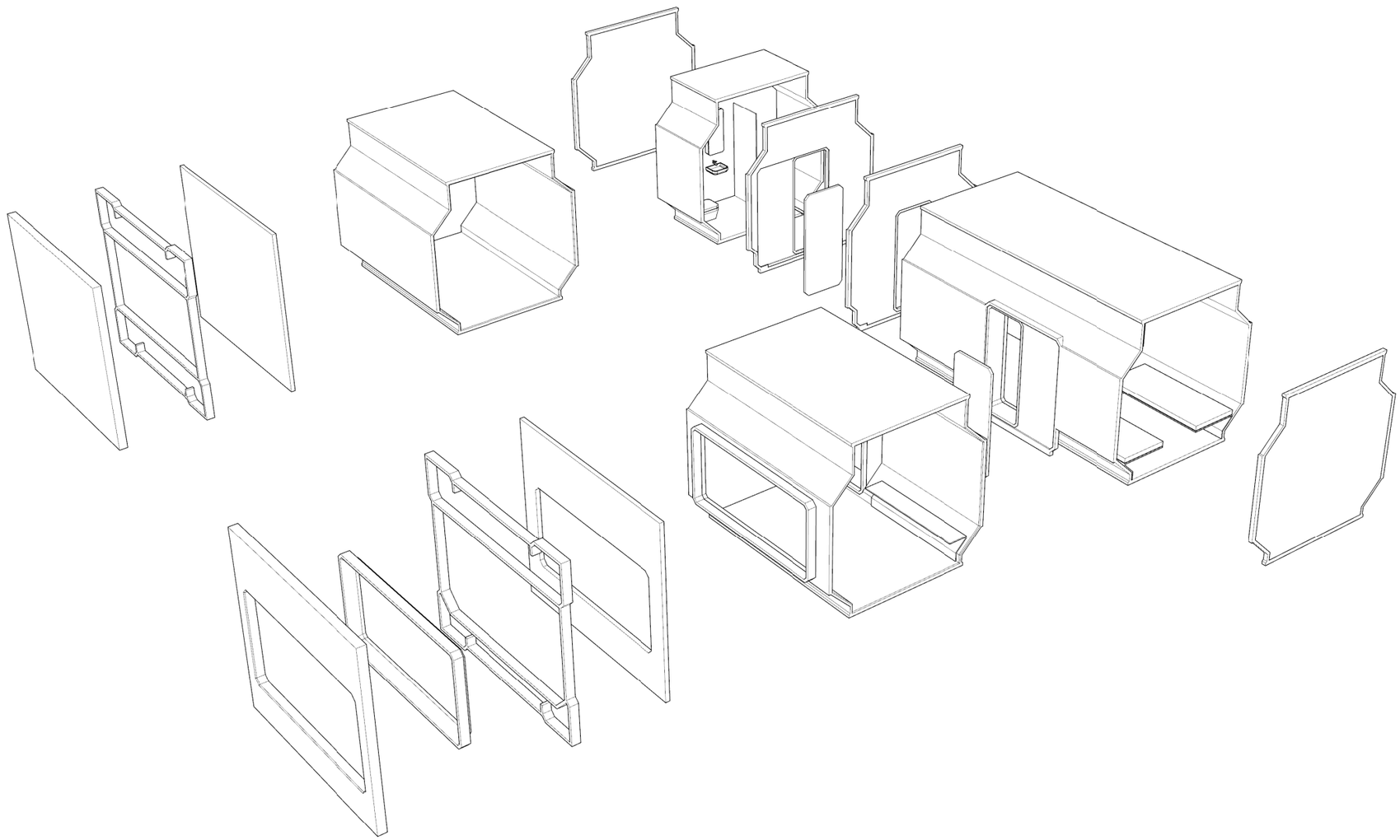
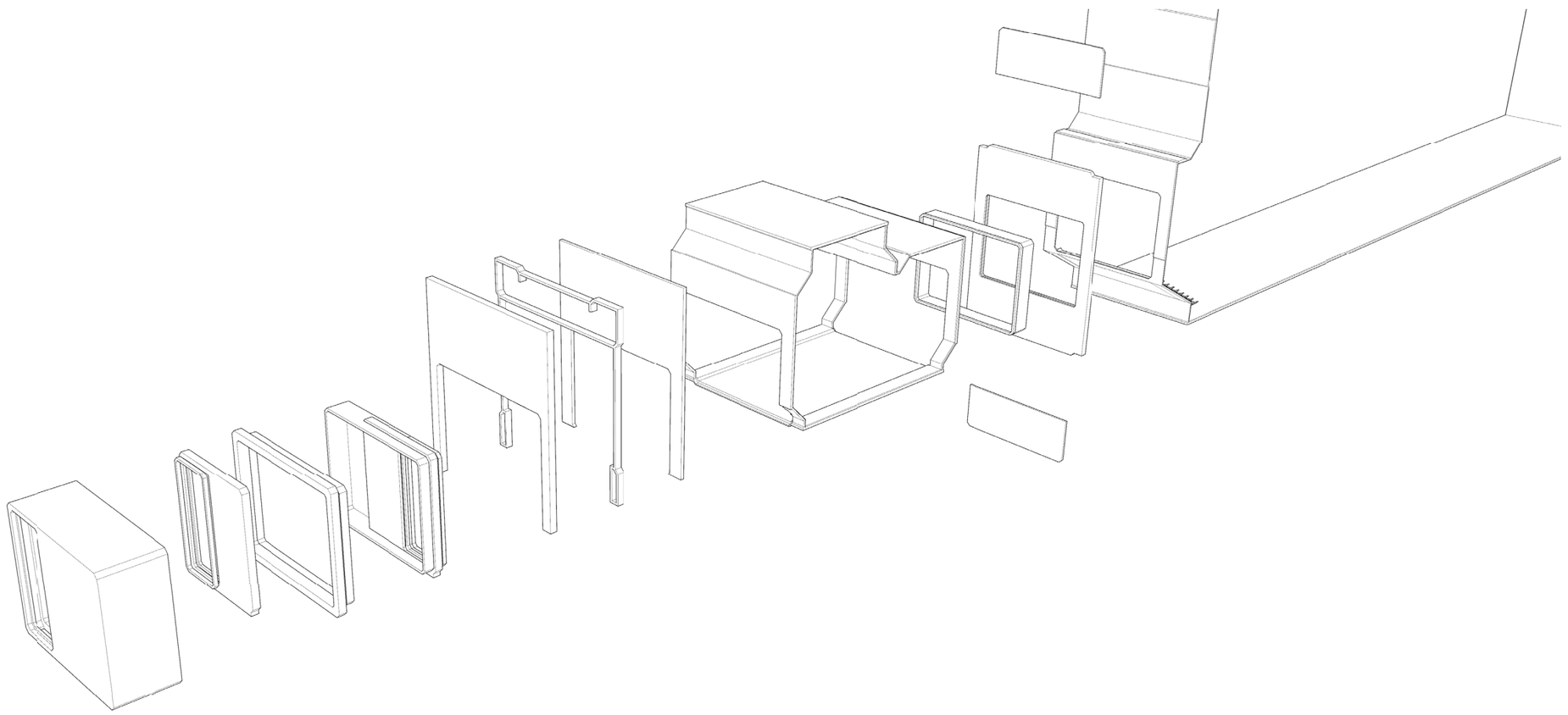
Hallway and two single person units



INTERIOR EXTRACT

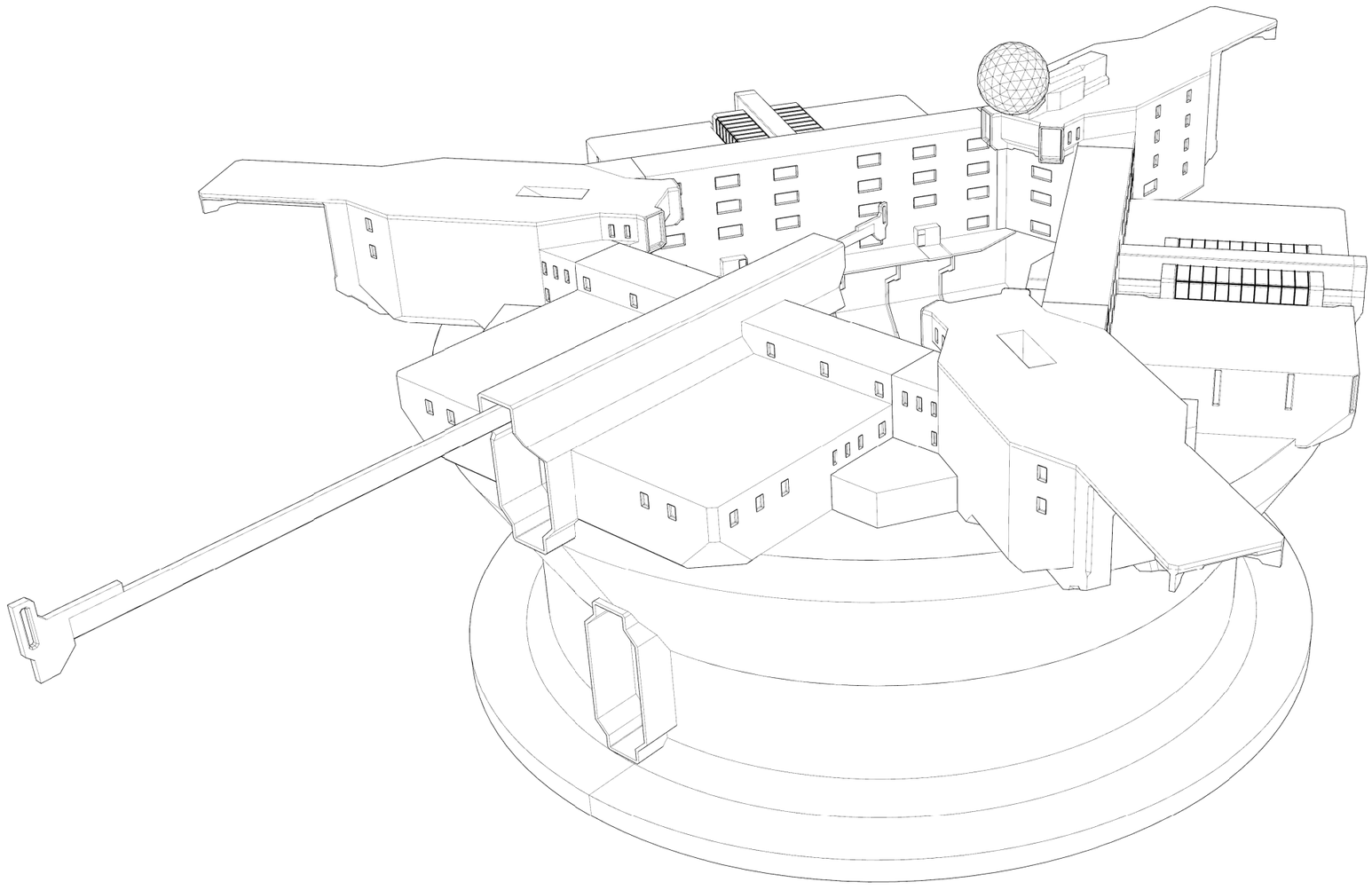
—

Hallway and two person unit with batrhoom



INTERIOR EXTRACT

Airlock to exterior and access to sports hall through main hallway



EXTERIOR VIEW

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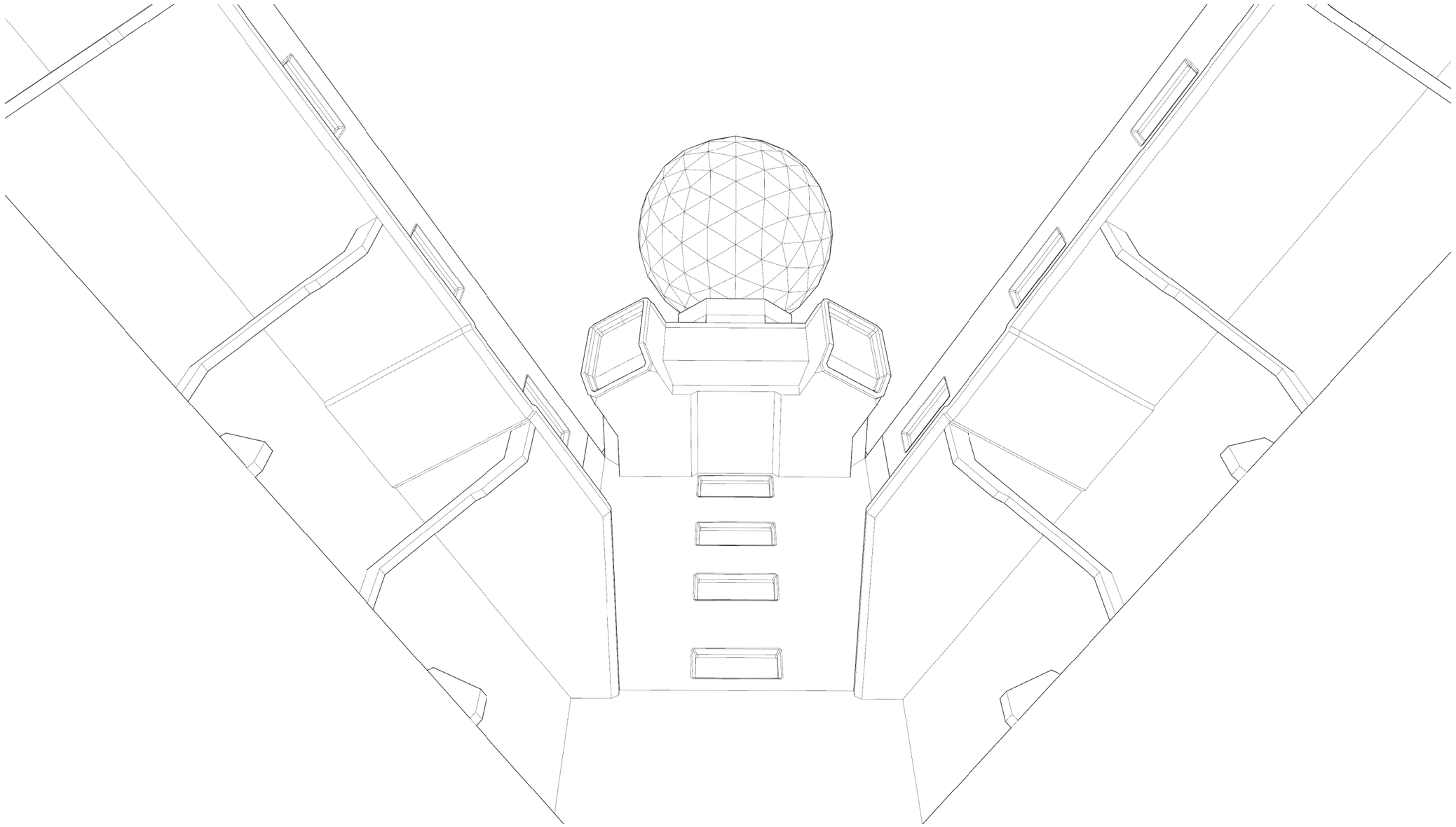
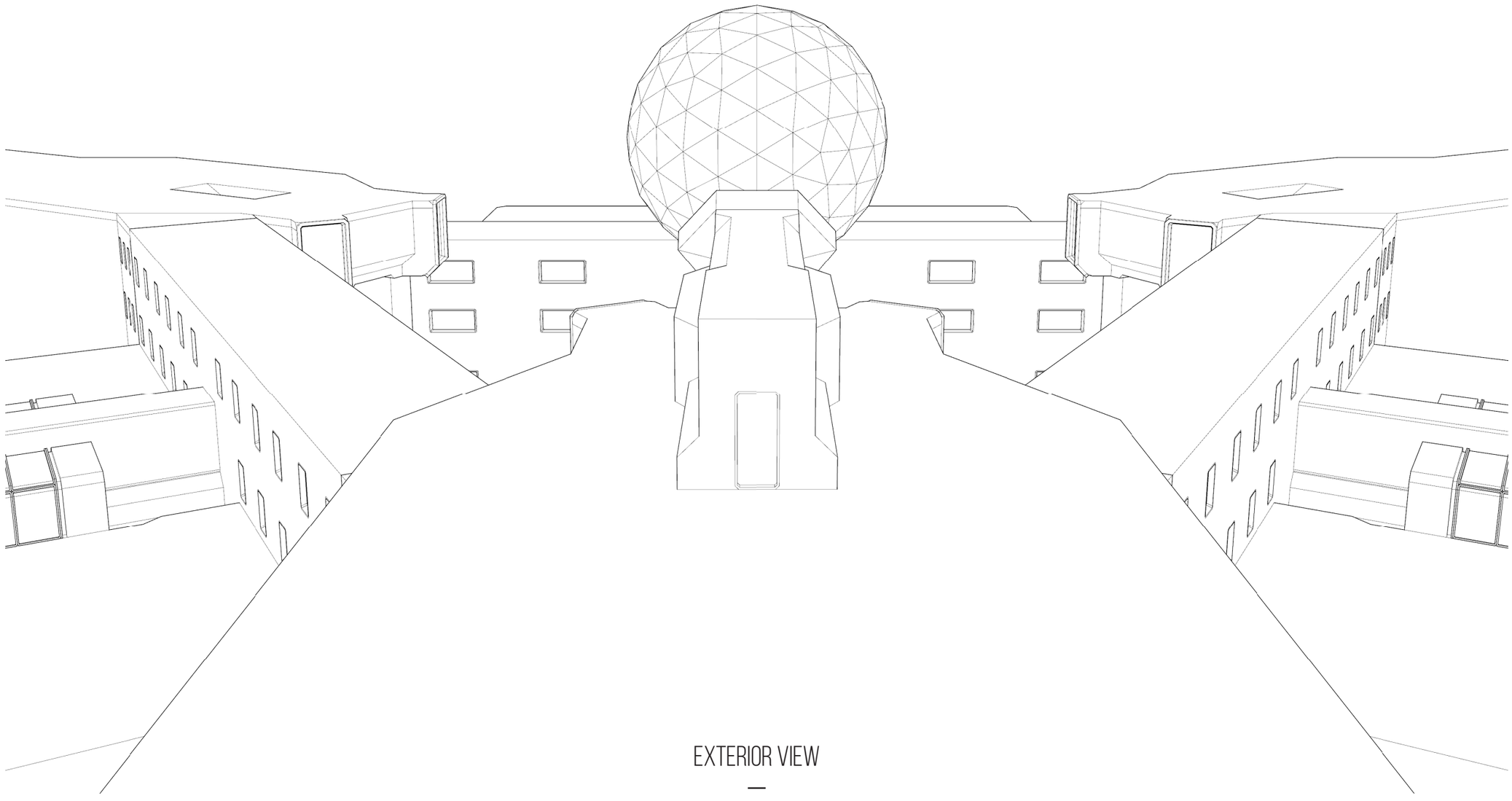
overview



EXTERIOR VIEW

—

from the moonwell



EXTERIOR VIEW

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visiting deck