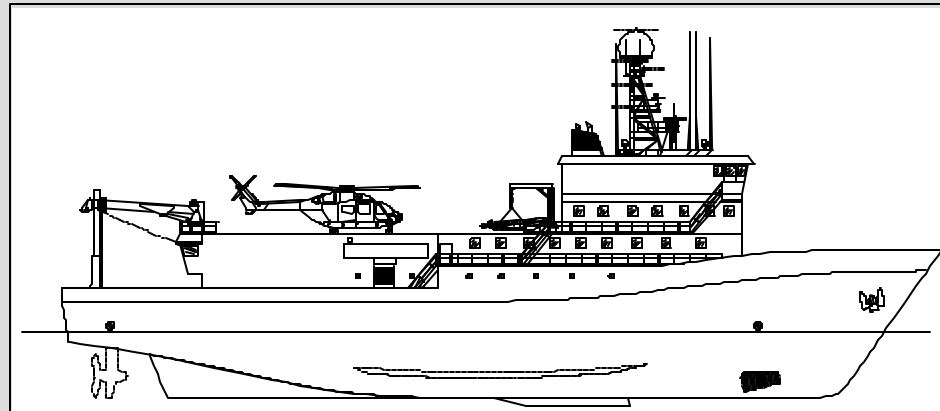
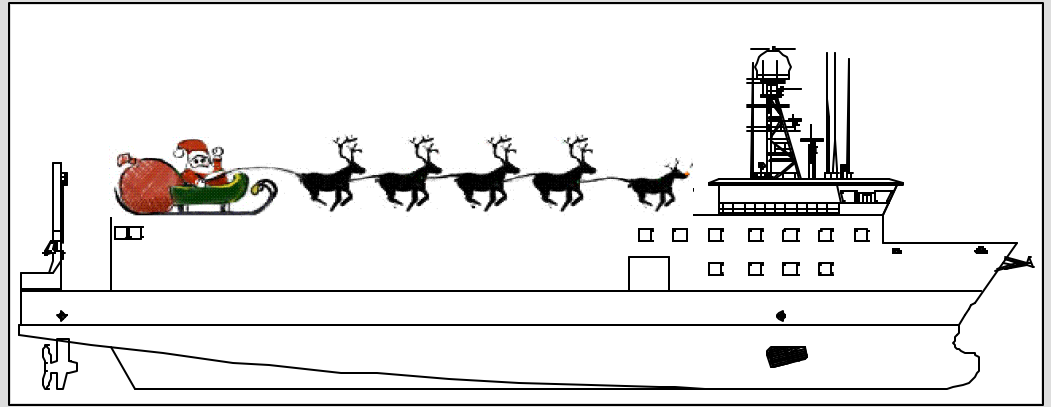
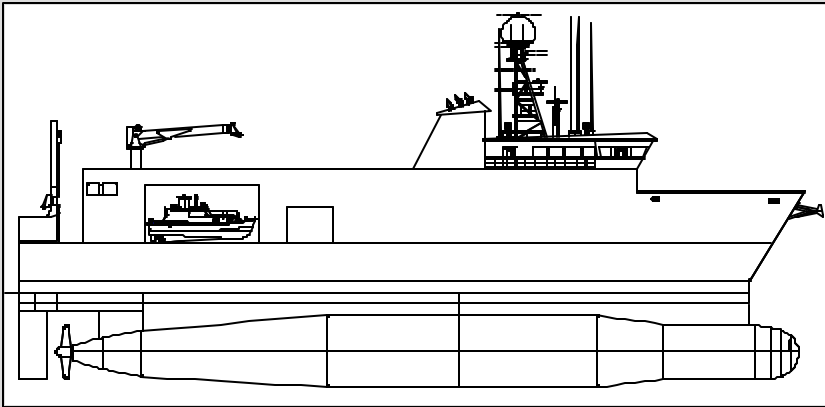


OCEAN Class AGOR Hull Selection Studies



1st Web Meeting - 20 December 2004

OCEAN Class AGOR

Hull Selection Study

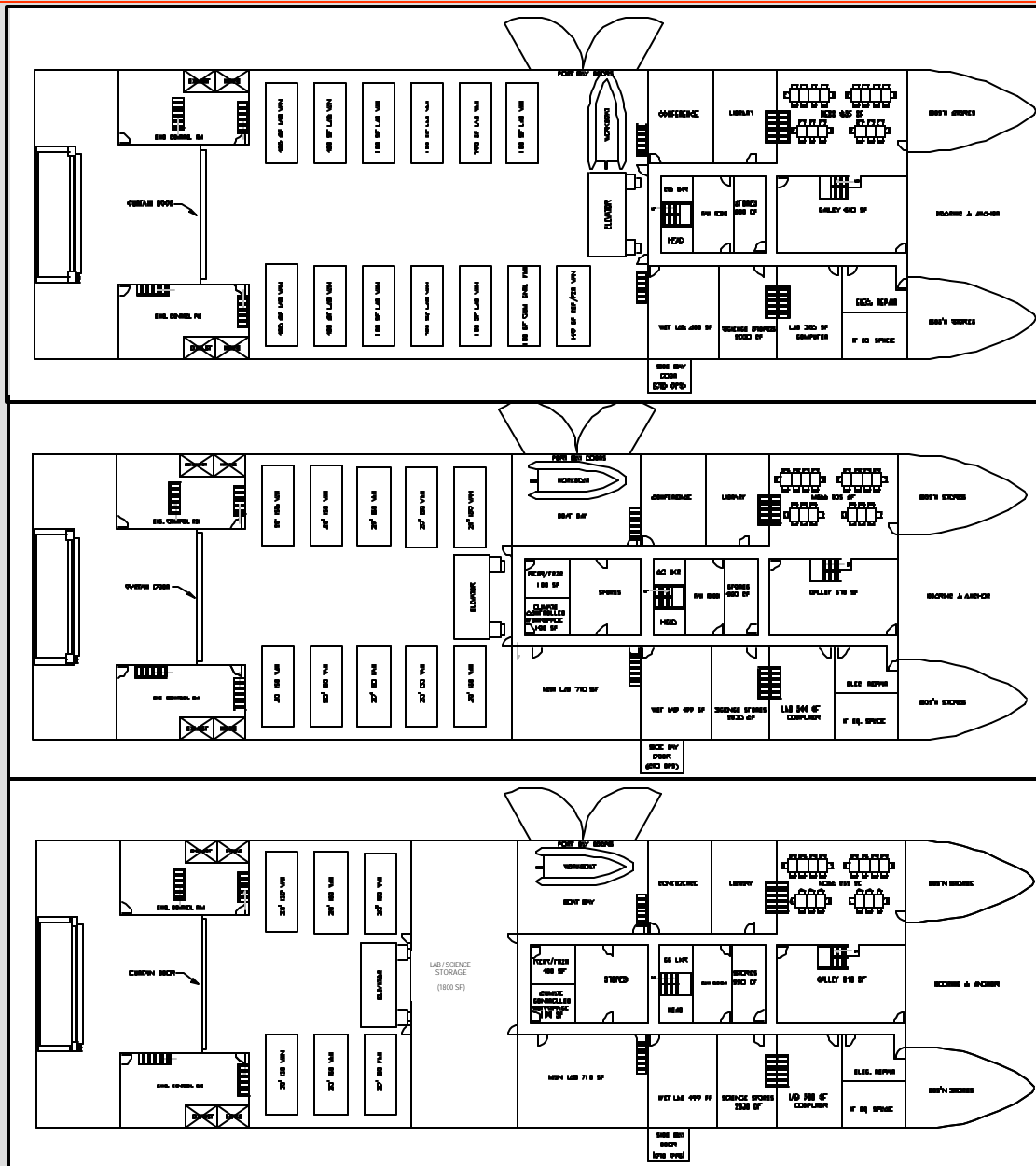
Summary of Variants

| | | <i>Characteristics</i> | <i>SMR Level</i> | <i>Work Complete</i> | <i>To Do</i> |
|----------------------------|--------------|--|-------------------------------|---|--|
| Monohull | | | | | |
| | Baseline | Phase II - no change in hull | Full UNOLS plus Navy add'l | Draft arrangement developed; seakeeping and powering carryover from phase II | Refine arrangement; incorporate comments; calculate costs |
| | Lengthened | Phase II - longer hull | Full UNOLS plus Navy add'l | Draft arrangement developed | Refine arrangement; incorporate comments; calculate costs |
| | Wider Beam | Wider beam variant | Full UNOLS plus Navy add'l | Comparative seakeeping analysis in progress | Develop arrangement if form proves desirable; incorporate comments |
| SWATH | | | | | |
| | Large Hangar | New design - longer than phase II | Full UNOLS plus Navy add'l | Draft arrangement developed | Refine arrangement; incorporate comments; calculate costs |
| | Small Hangar | New design - longer than phase II | Full UNOLS plus Navy add'l | Draft arrangement developed | Refine arrangement; incorporate comments; calculate costs |
| Catamaran (X Craft) | | | | | |
| | Large Hangar | Same as X craft in overall dimensions, but wider hulls | Partial UNOLS plus Navy add'l | Draft arrangement developed; seakeeping developed; powering carryover from phase II | Refine arrangement; Incorporate comments; Calculate costs |
| | Half Hangar | Same as X craft in overall dimensions, but wider hulls | Partial UNOLS plus Navy add'l | Draft arrangement developed; seakeeping developed; powering carryover from phase II | Refine arrangement; Incorporate comments; Calculate costs |
| | Small Hangar | Same as X craft in overall dimensions, but wider hulls | Full UNOLS plus Navy add'l | Draft arrangement developed; seakeeping developed; powering carryover from phase II | Refine arrangement; Incorporate comments; Calculate costs |

OCEAN Class AGOR

Hull Selection Study

Catamaran (X Craft) Variants



Large Hangar

| | |
|-------------------------------|-----------------------|
| Permanent Lab Area: | 700 ft ² |
| Hangar Bay Area: | 7,360 ft ² |
| Number of Vans: | 13 |
| Net Lab Area in Vans: | 1,730 ft ² |
| Total Lab Area (Perm + Vans): | 2,430 ft ² |

Medium Hangar

| | |
|-------------------------------|-----------------------|
| Permanent Lab Area: | 1410 ft ² |
| Hangar Bay Area: | xxx ft ² |
| Number of Vans: | 10 |
| Net Lab Area in Vans: | 1,330 ft ² |
| Total Lab Area (Perm + Vans): | 2,740 ft ² |

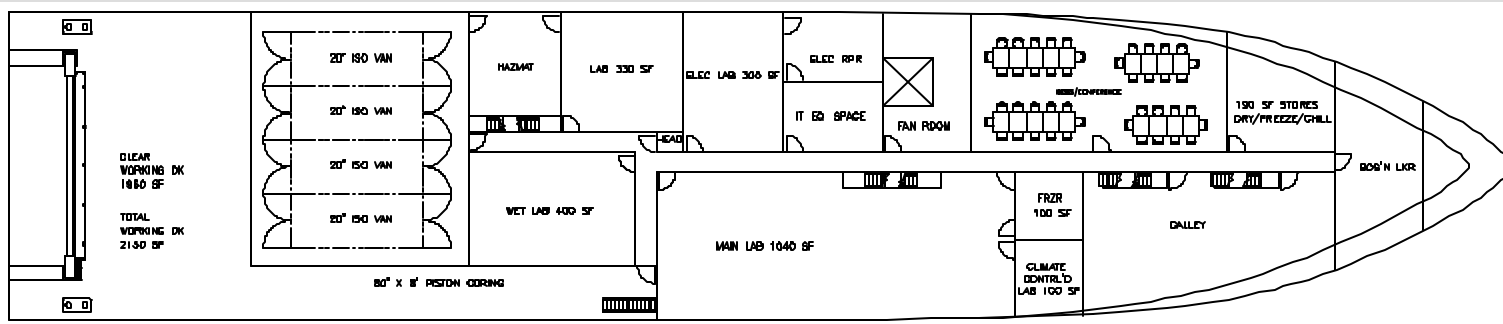
Small Hangar

| | |
|-------------------------------|-----------------------|
| Permanent Lab Area: | 3,210 ft ² |
| Hangar Bay Area: | xxx ft ² |
| Number of Vans: | 6 |
| Net Lab Area in Vans: | 800 ft ² |
| Total Lab Area (Perm + Vans): | 4,010 ft ² |

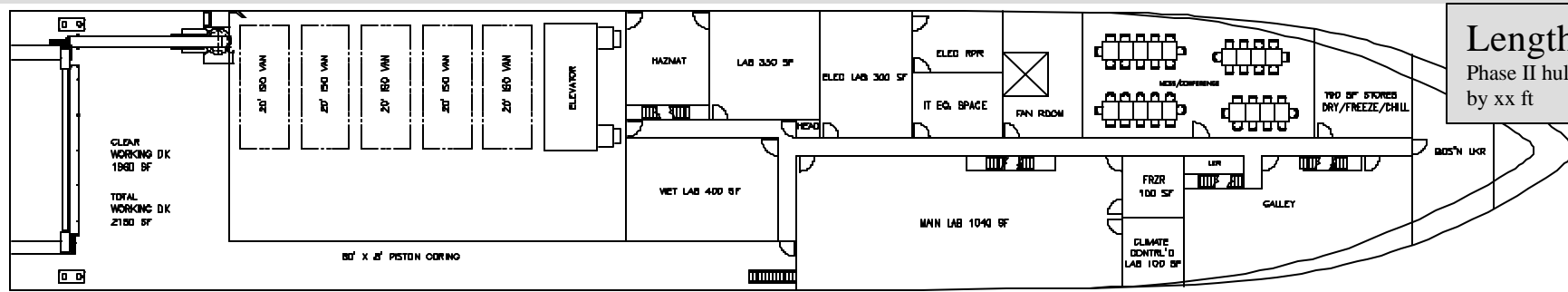
OCEAN Class AGOR

Hull Selection Study

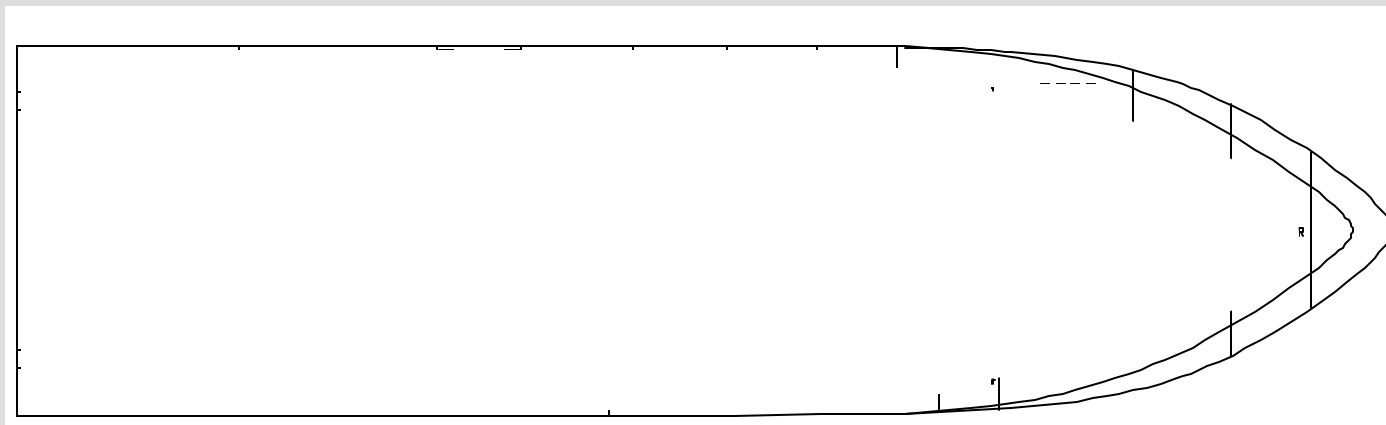
Monohull Variants



Baseline
Same hull as in phase II



Lengthened
Phase II hull lengthened by xx ft

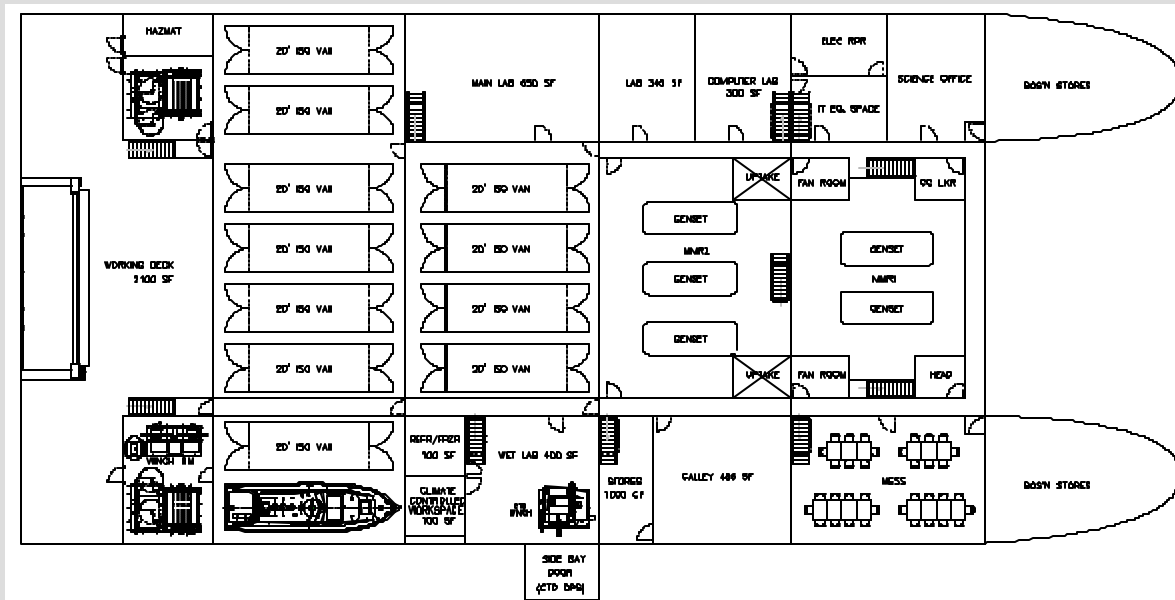


Wide Beam -
Same deck area as lengthened
Arrangement to be developed

OCEAN Class AGOR

Hull Selection Study

SWATH Variants

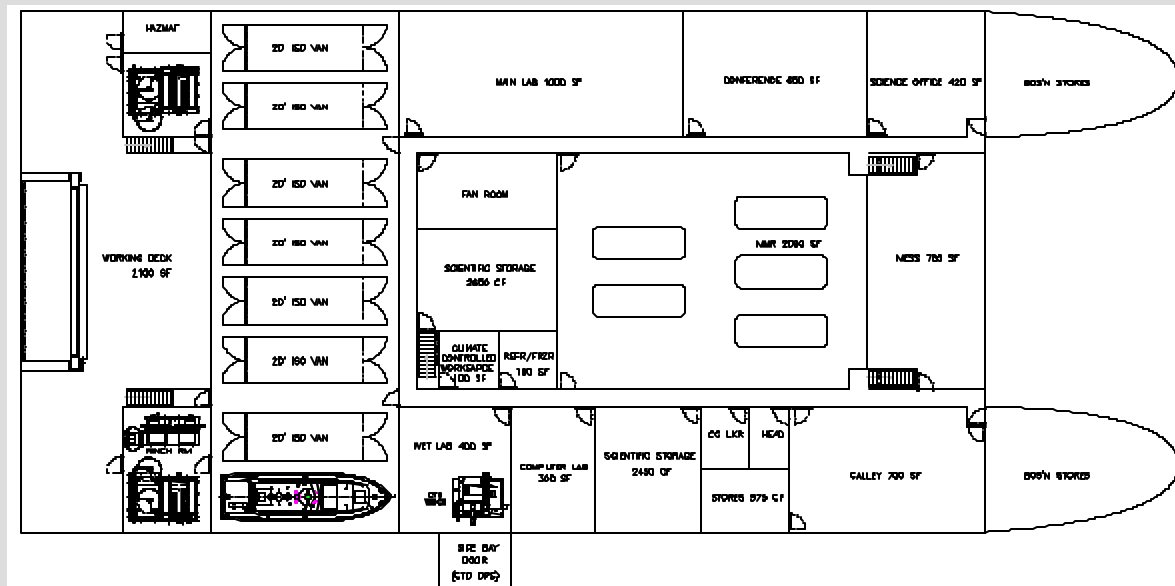


Large Hangar Bay

New design (not based on AGOR 26)

xx feet longer than AGOR 26

11 Vans



Small Hangar Bay

New design (not based on AGOR 26)

xx feet longer than AGOR 26

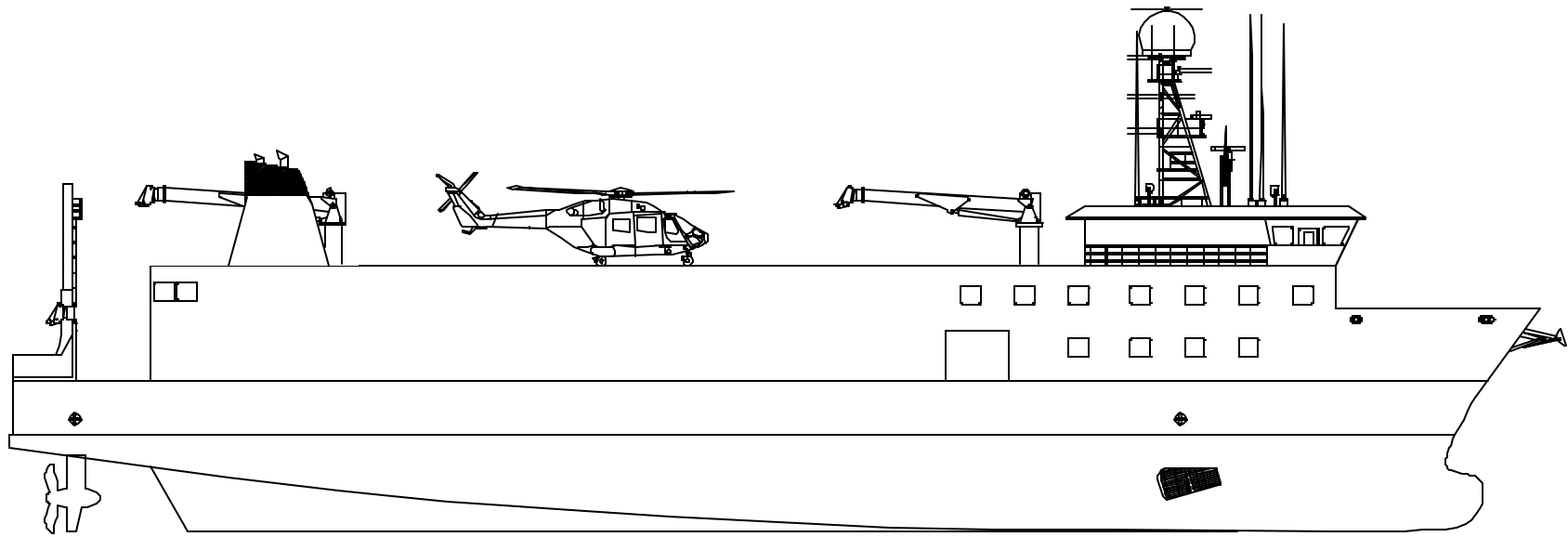
7 vans

Catamaran (X craft) Variants

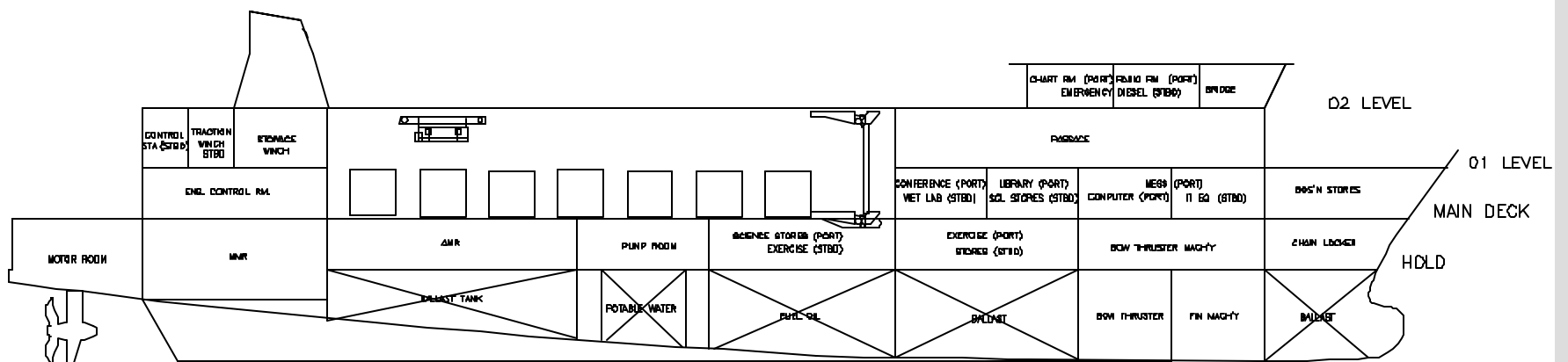
OCEAN Class AGOR

Hull Selection Study

X Craft - Full Hangar



OUTBOARD PROFILE

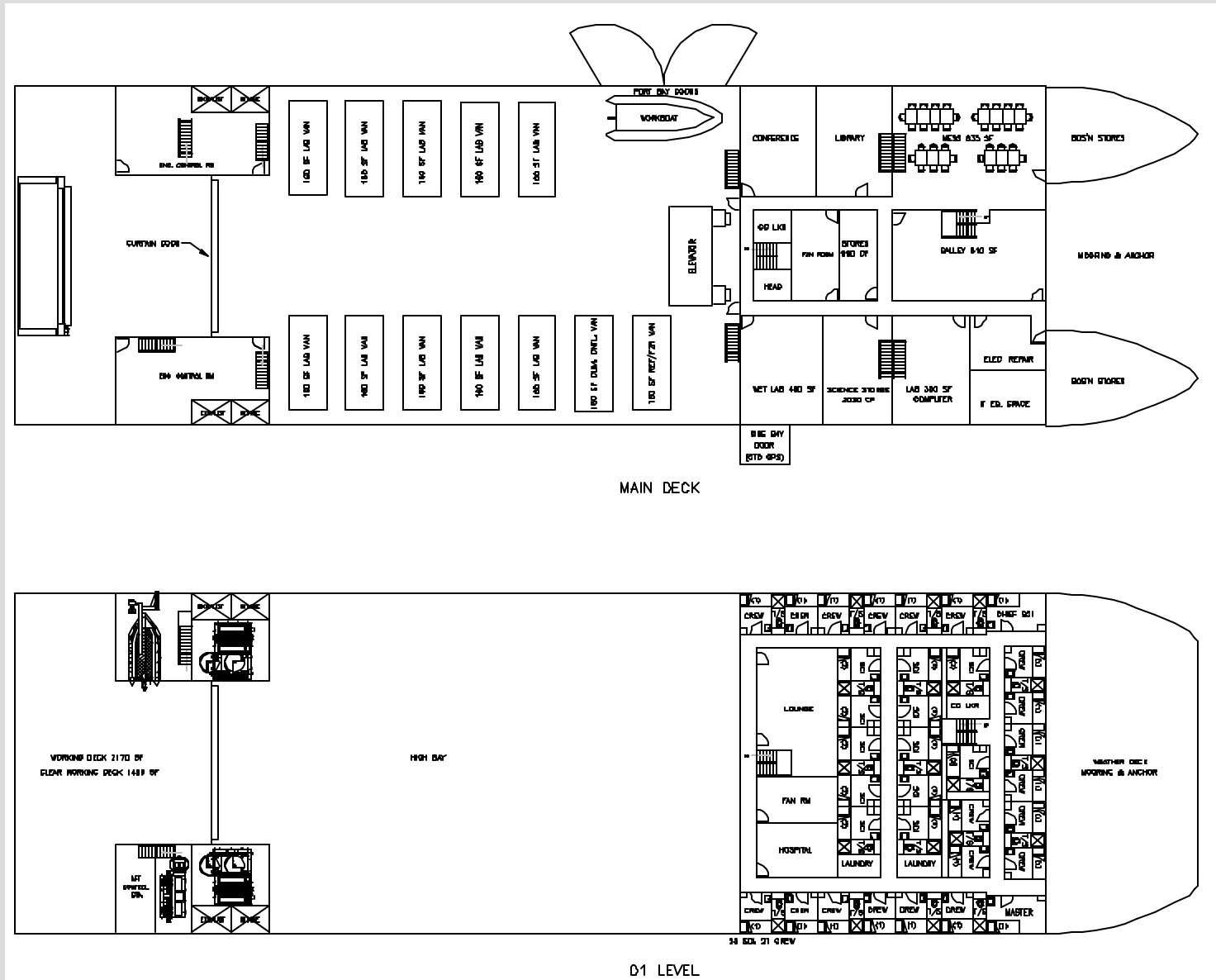


INBOARD PROFILE

OCEAN Class AGOR

Hull Selection Study

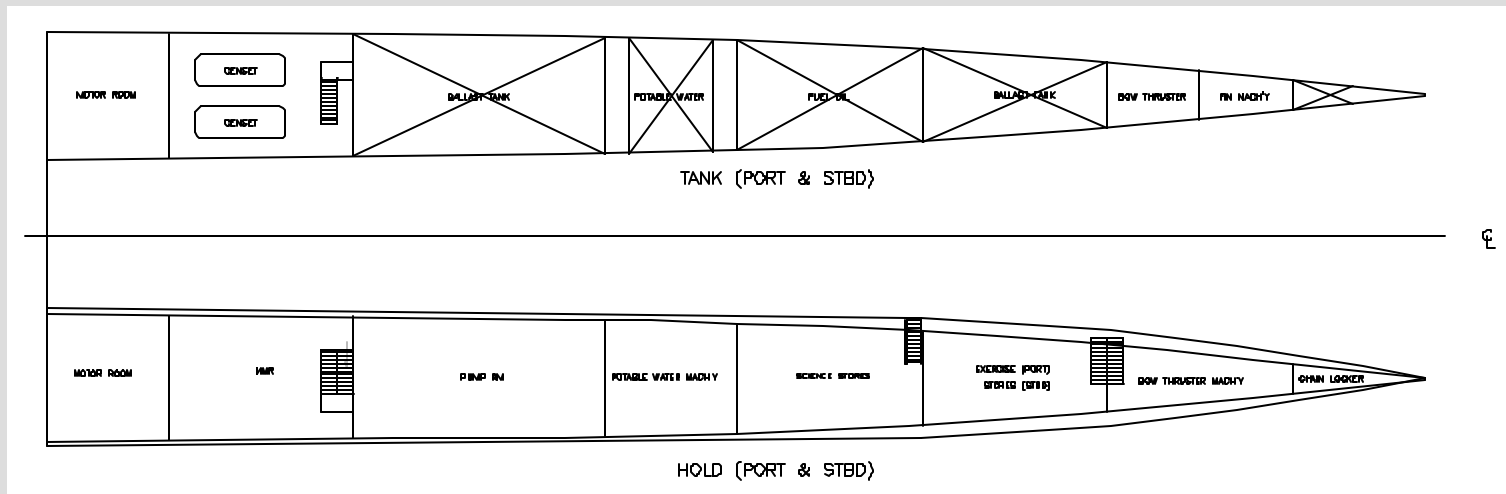
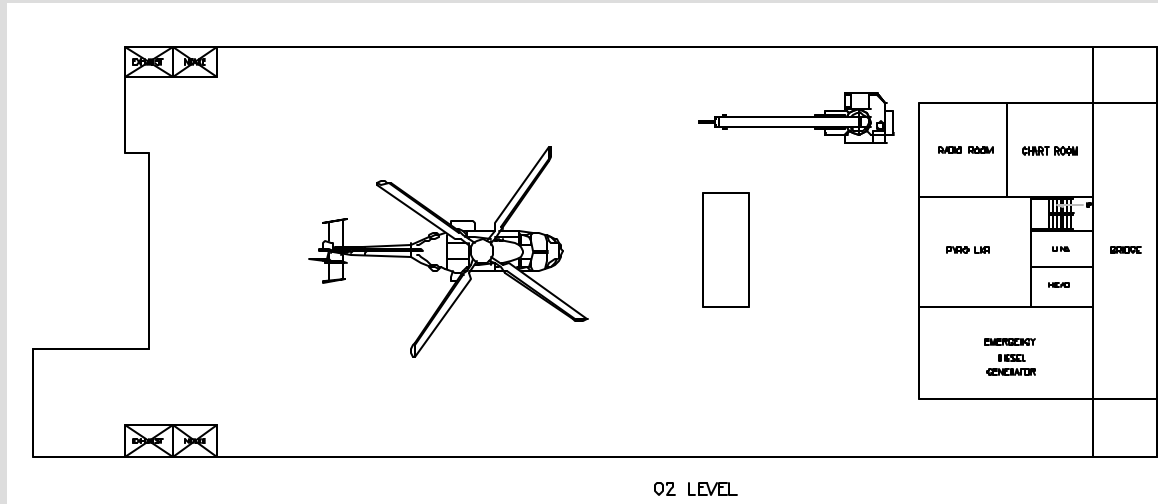
X Craft - Full Hangar



OCEAN Class AGOR

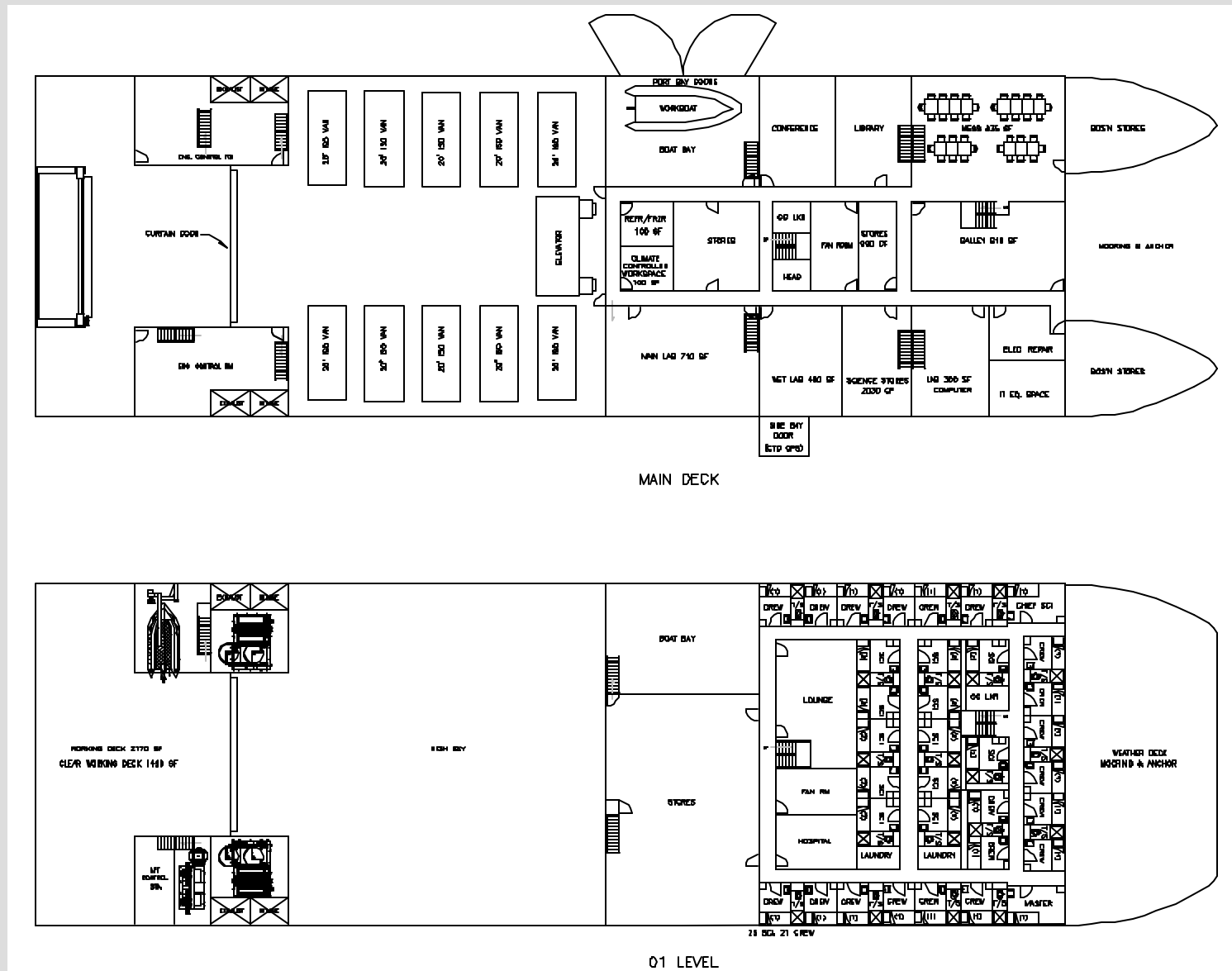
Hull Selection Study

X Craft - Full Hangar



OCEAN Class AGOR

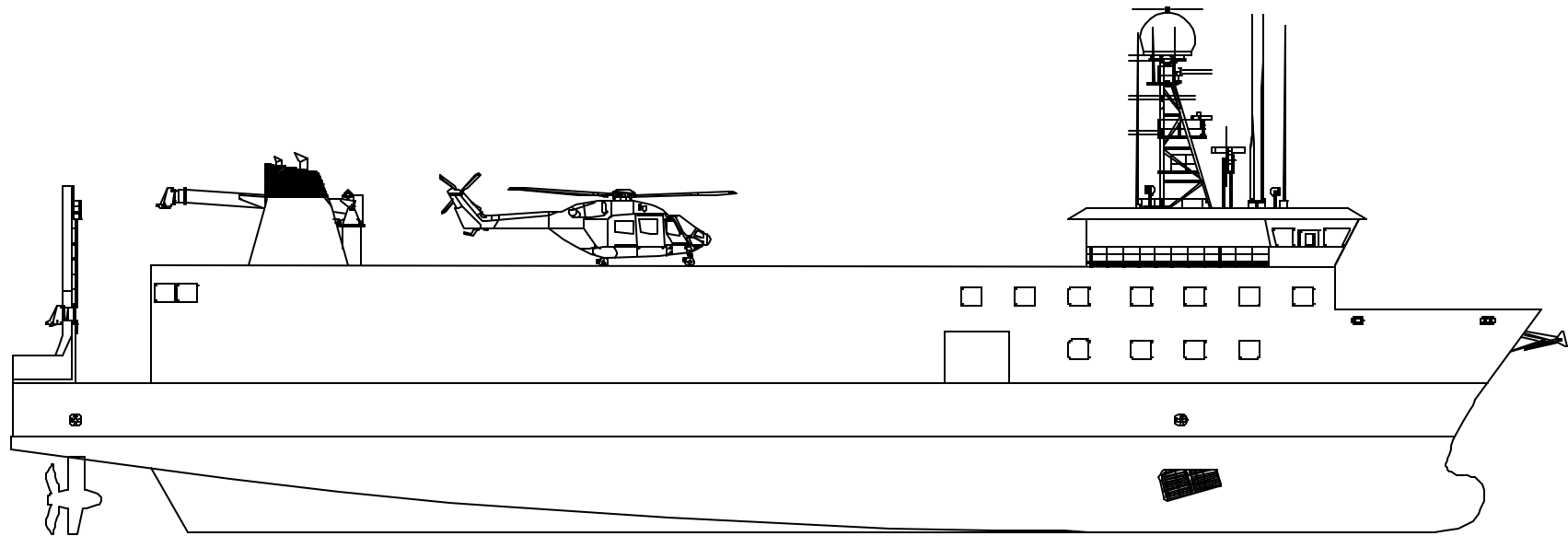
Hull Selection Study



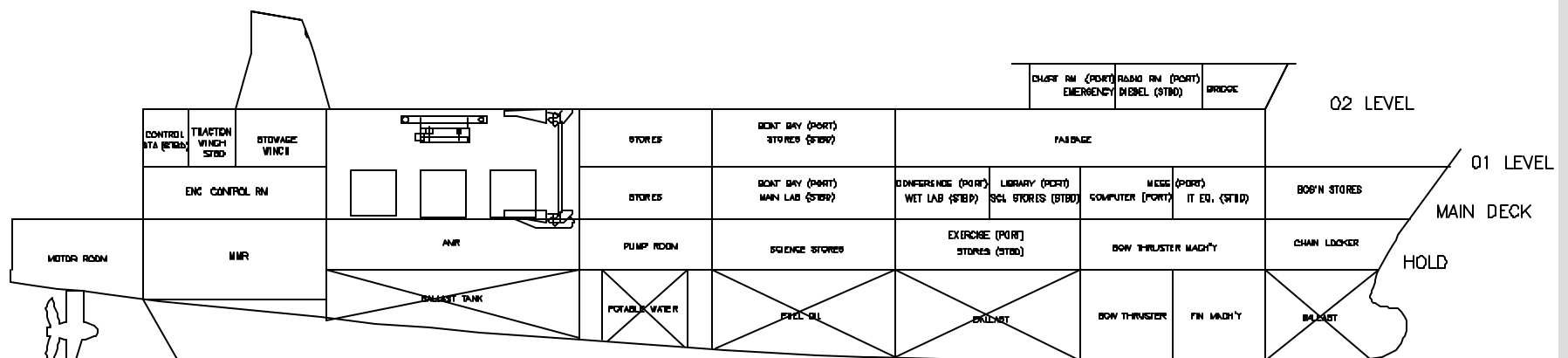
OCEAN Class AGOR

Hull Selection Study

X Craft - Small Hangar



OUTBOARD PROFILE

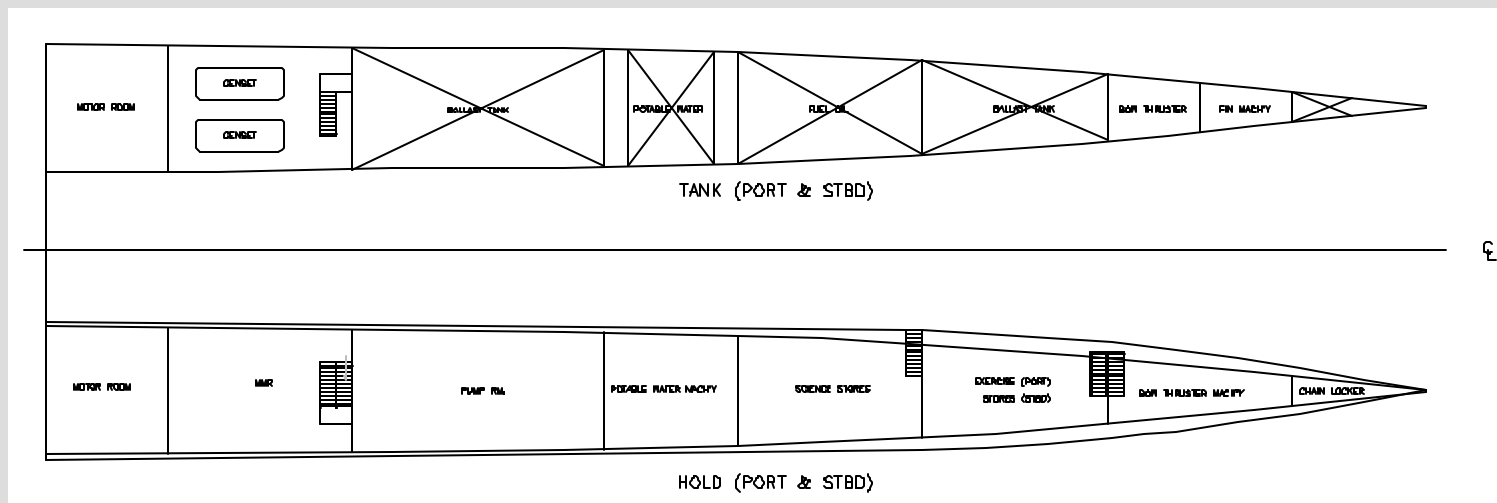
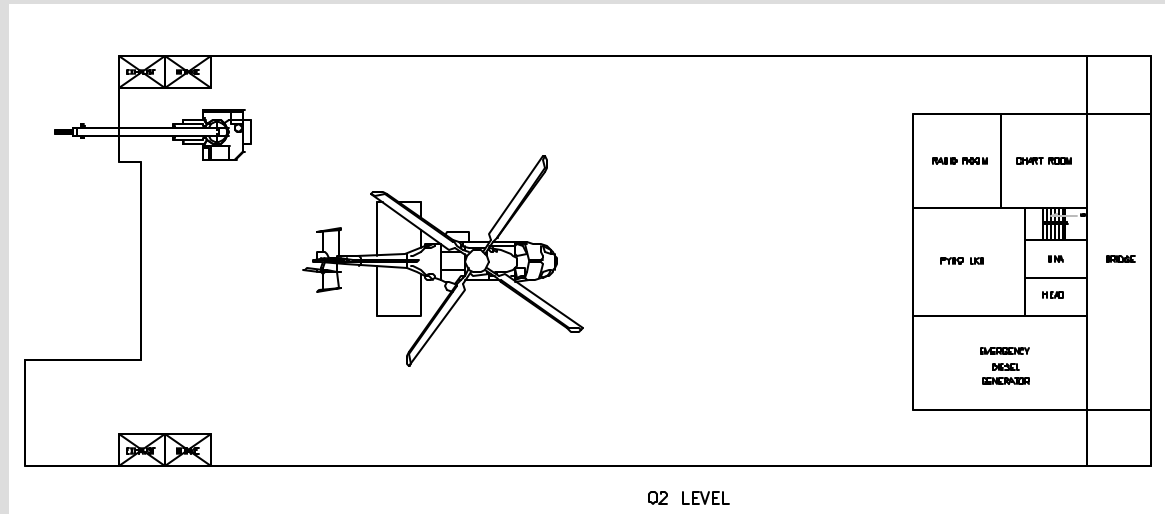


INBOARD PROFILE

OCEAN Class AGOR

Hull Selection Study

X Craft - Small Hangar

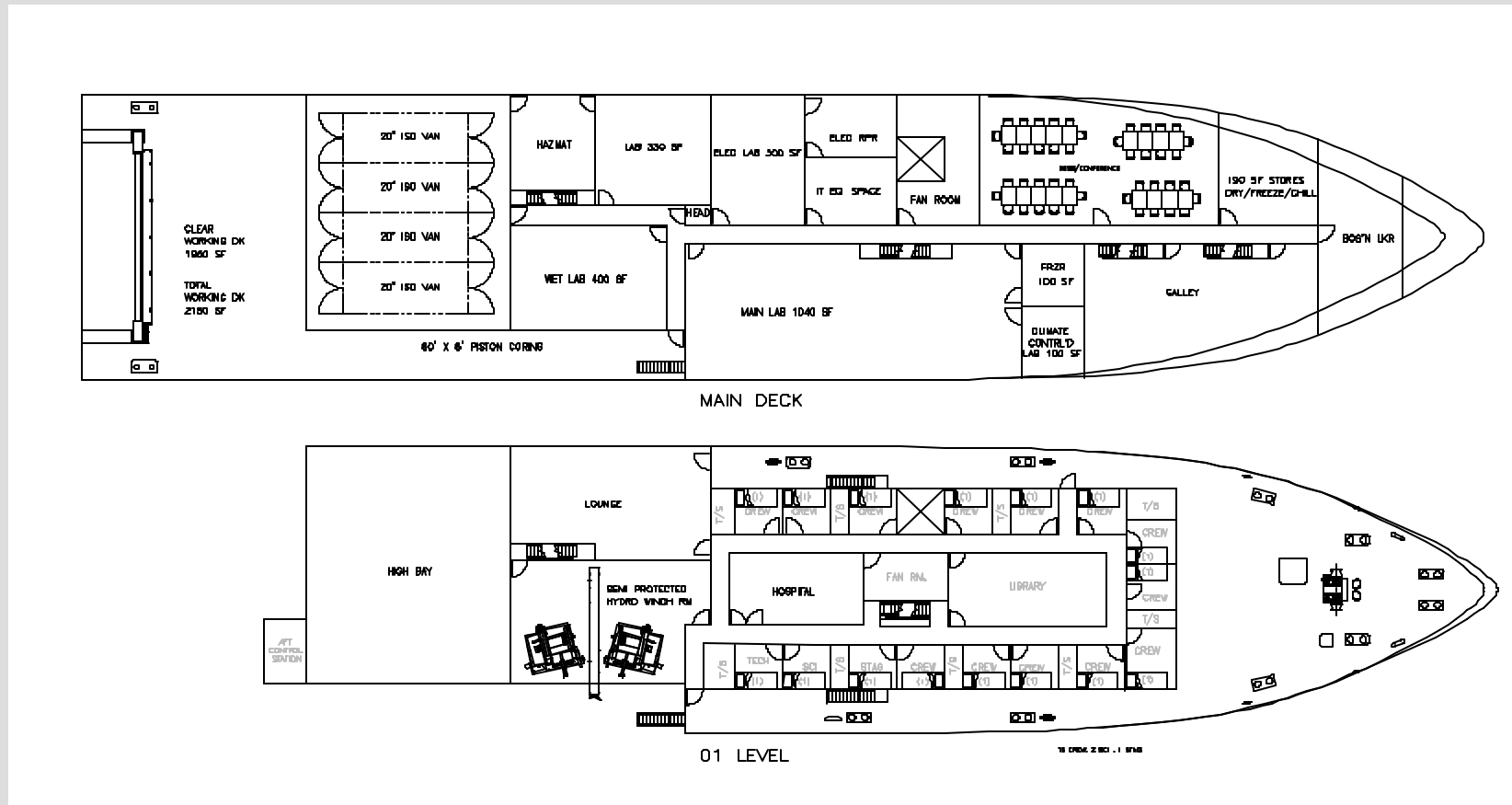


Monohull Variants

OCEAN Class AGOR Hull Selection Study

Baseline Monohull

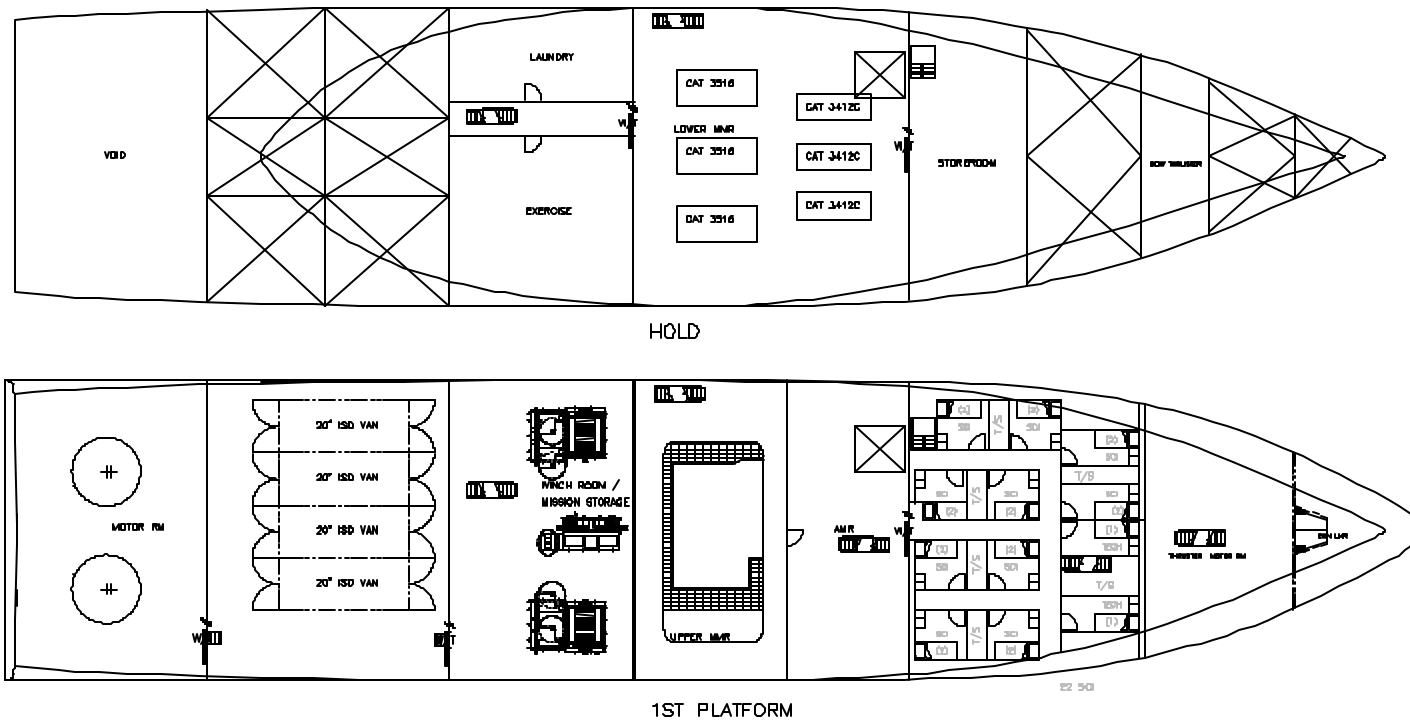
Phase II hull rearranged to accommodate helo and vans



OCEAN Class AGOR Hull Selection Study

Baseline Monohull

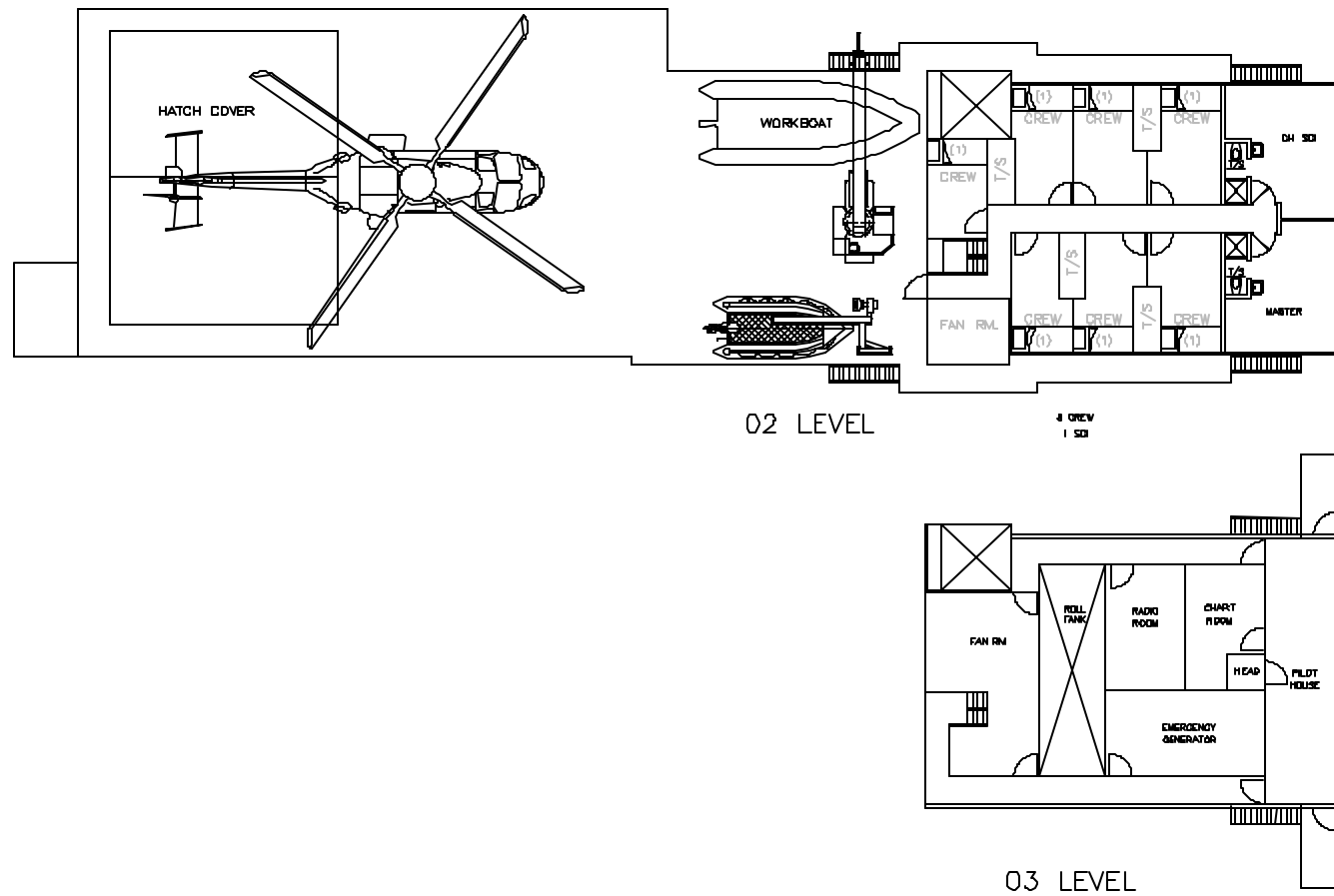
Phase II hull rearranged to accommodate helo and vans



OCEAN Class AGOR Hull Selection Study

Baseline Monohull

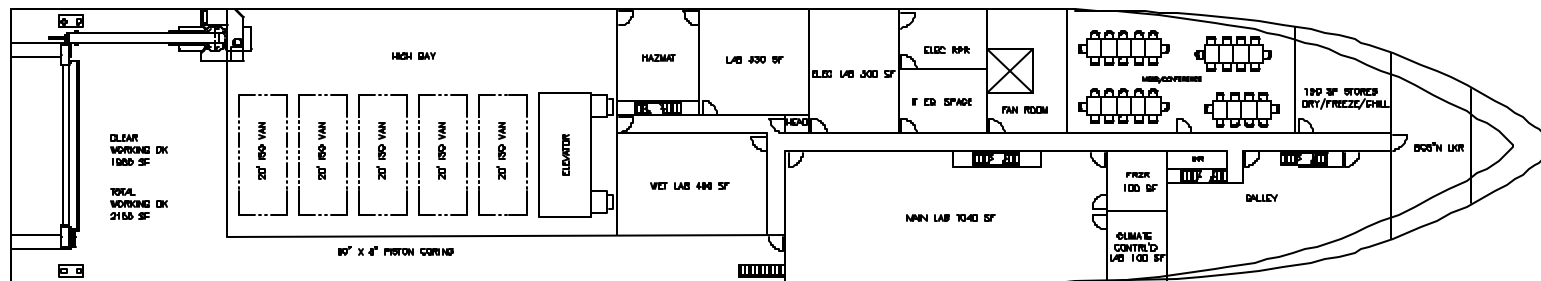
Phase II hull rearranged to accommodate helo and vans



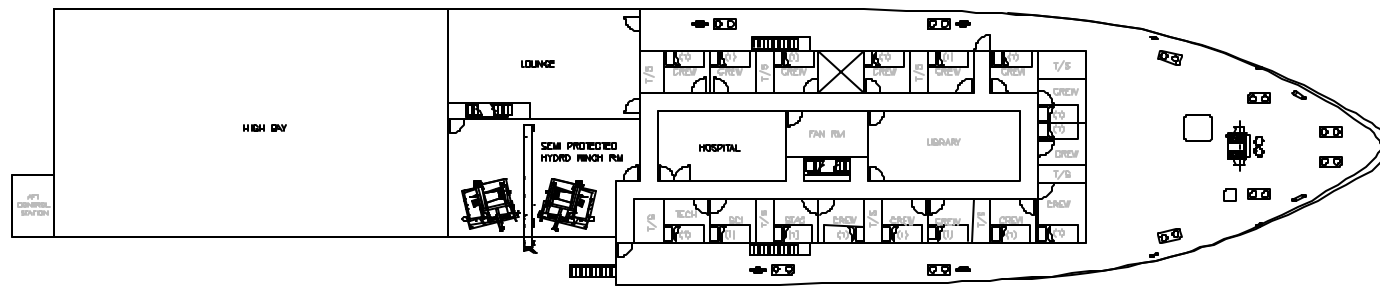
OCEAN Class AGOR Hull Selection Study

Lengthened Monohull

Phase II hull lengthened by
and rearranged to
accommodate helo and vans



MAIN DECK

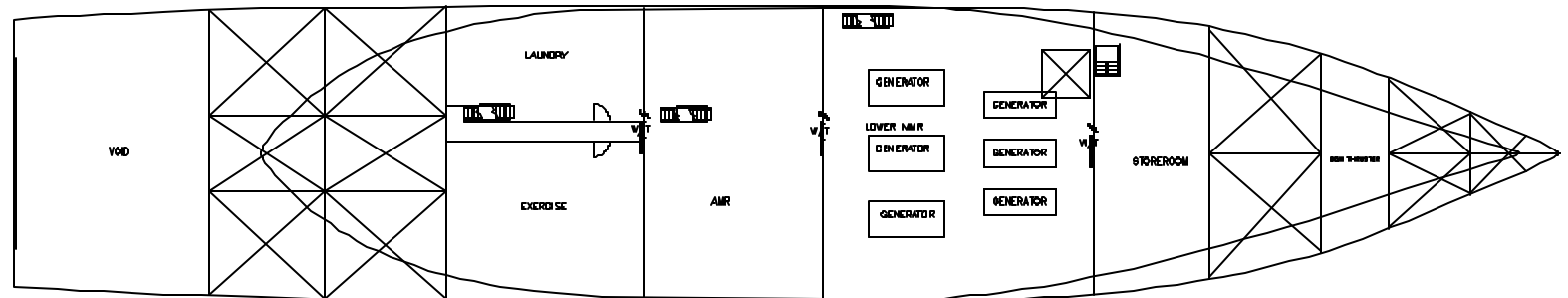


01 LEVEL

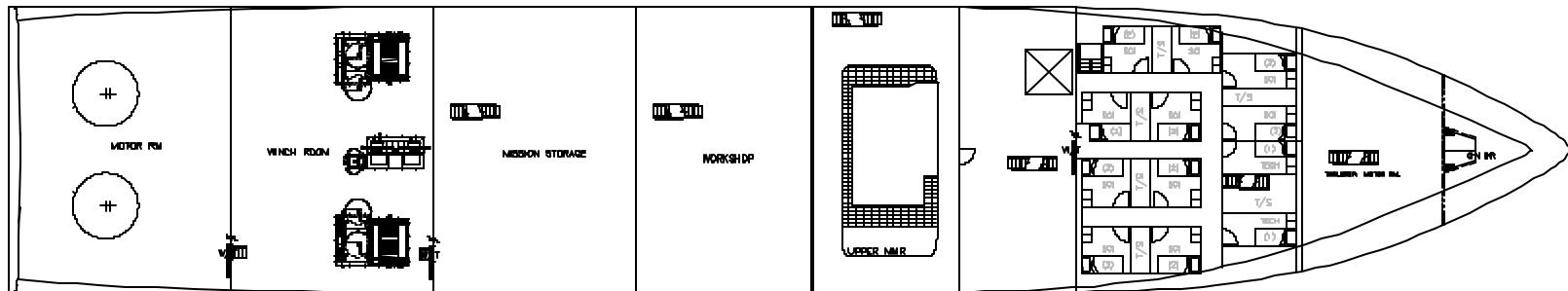
OCEAN Class AGOR Hull Selection Study

Lengthened Monohull

Phase II hull lengthened by
and rearranged to
accommodate helo and vans



HOLD

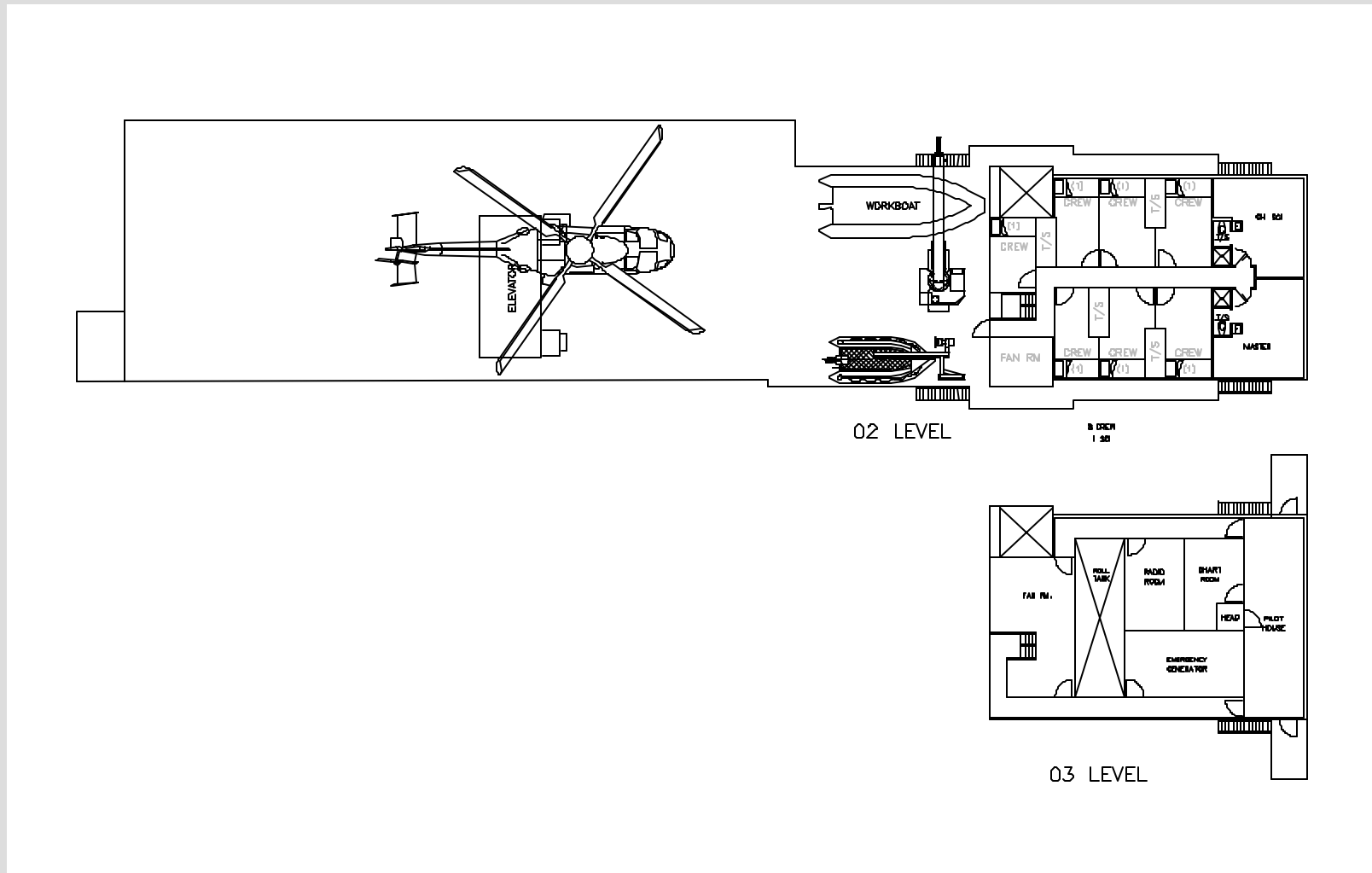


1ST PLATFORM

OCEAN Class AGOR Hull Selection Study

Lengthened Monohull

Phase II hull lengthened by
and rearranged to
accommodate helo and vans



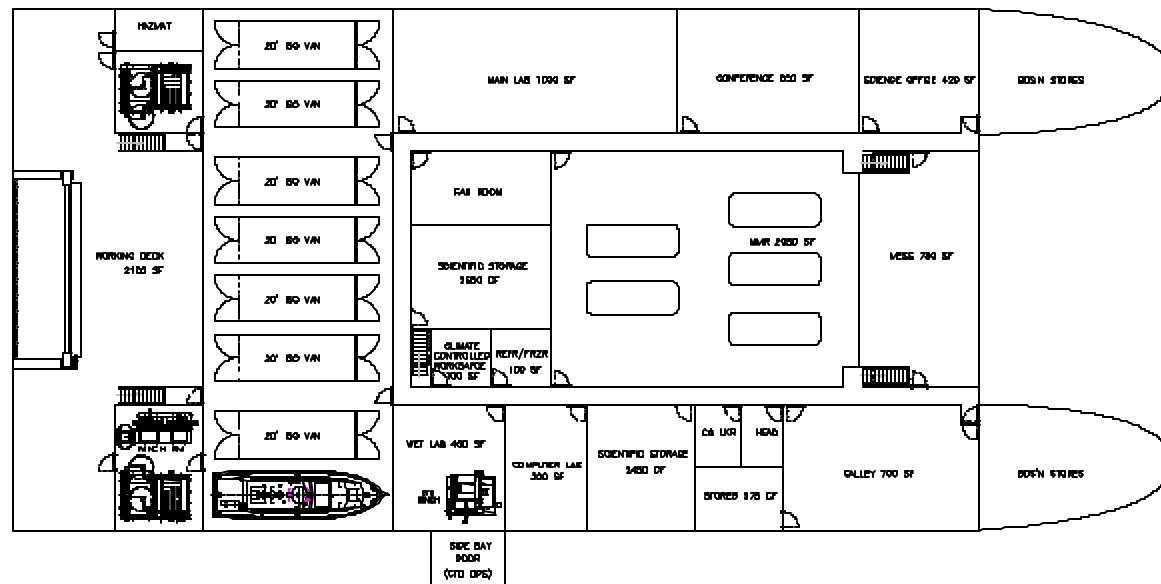
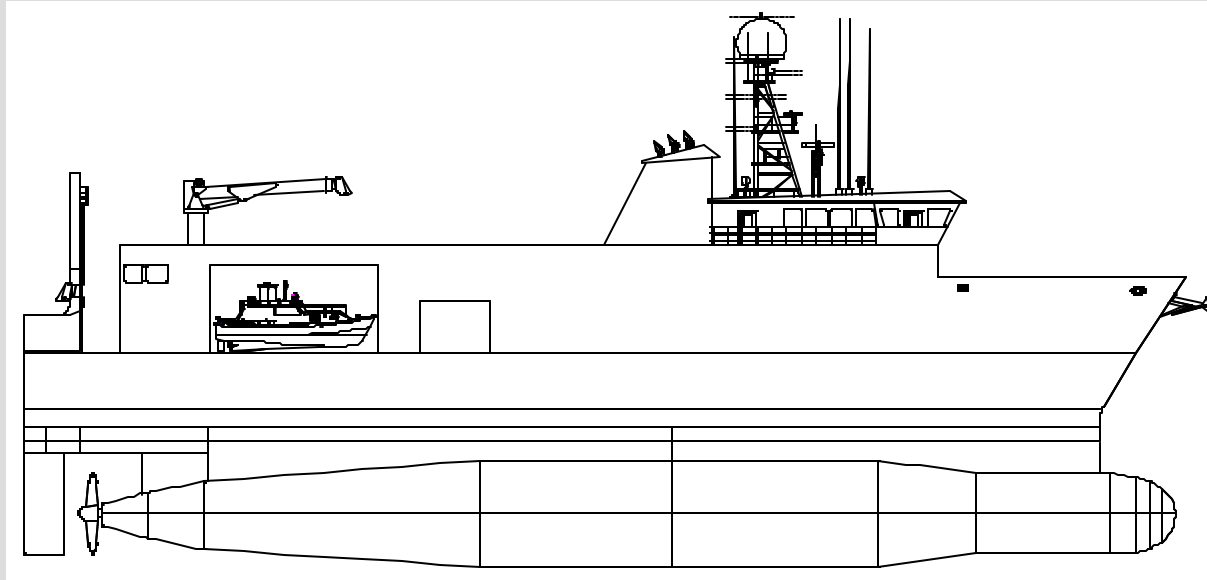
SWATH Variants

OCEAN Class AGOR

Hull Selection Study

SWATH

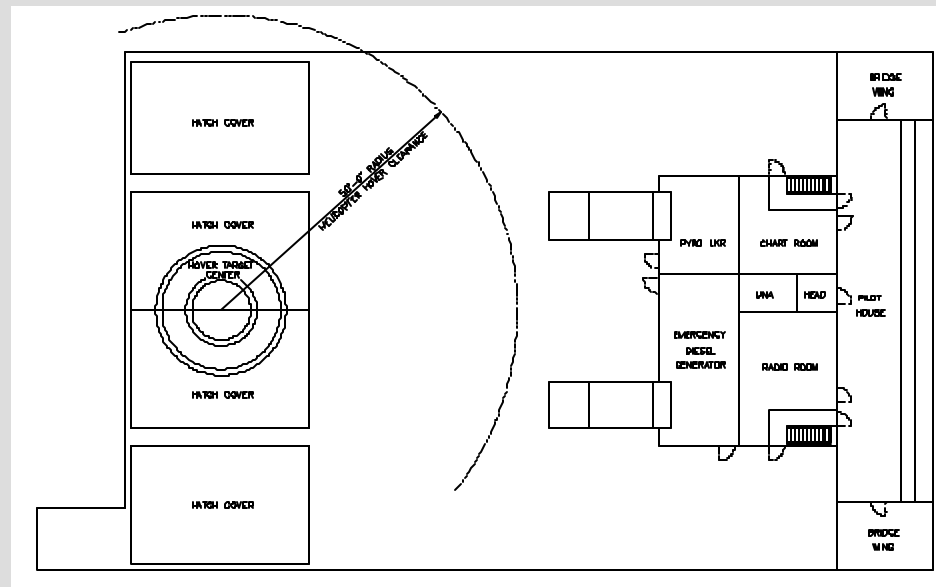
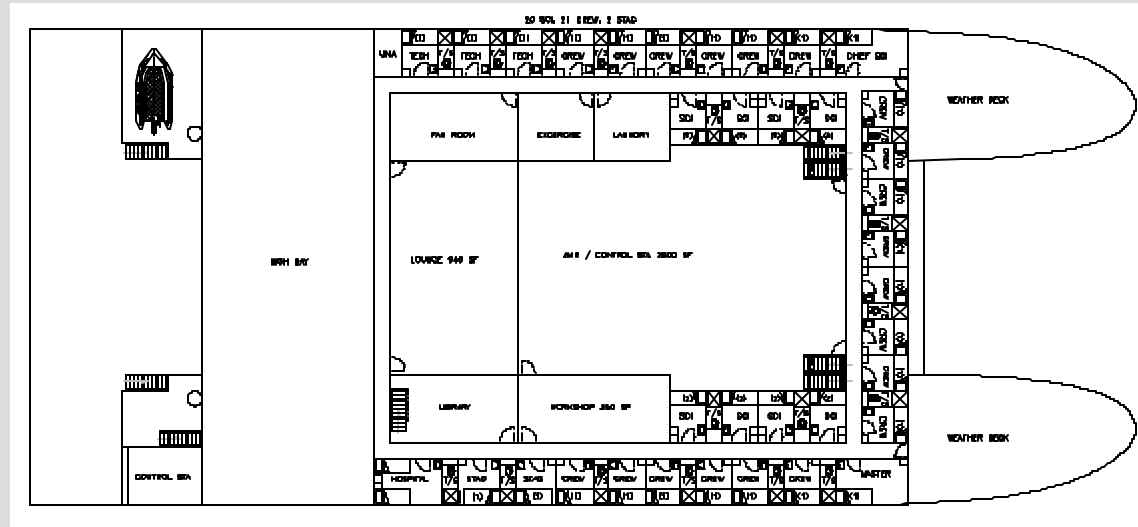
New design hull lengthened from phase II by xx feet



OCEAN Class AGOR Hull Selection Study

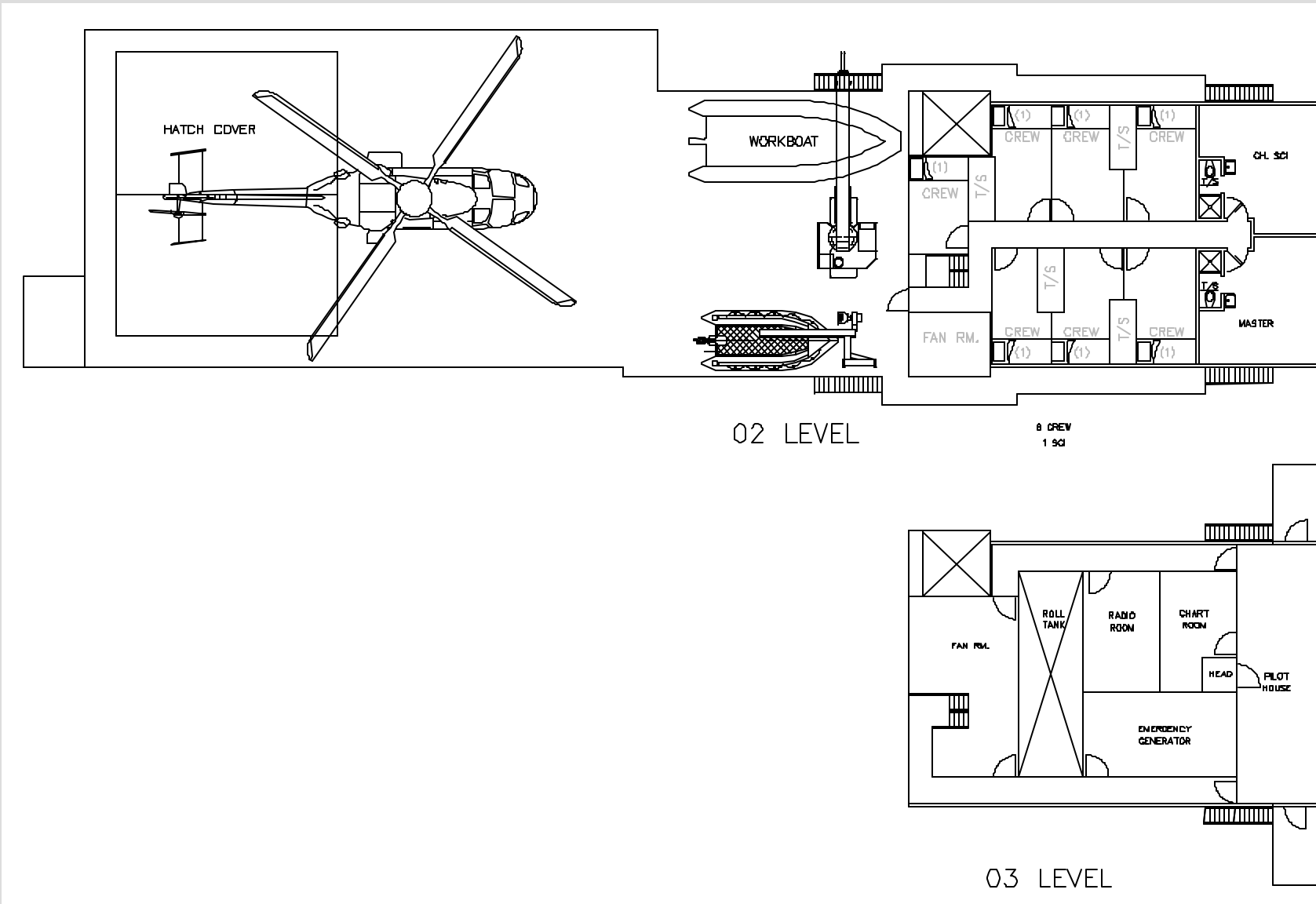
SWATH

New design hull lengthened
from phase II by xx feet



OCEAN Class AGOR

Hull Selection Study



- Wide beam monohull seakeeping - Is wider better (for seakeeping) ?
 - Preliminary results show degradation of performance
 - Roll performance sensitive to frequency
 - Selection of beam (and roll period) important to avoid resonance
 - 1989 UNOLS Wide Beam Monohull
 - $L_{wl} = 224$ ft; $Beam_{wl} = 62$ ft; Draft = 15 ft draft
 - Seakeeping performance similar to AGOR 14/15 (stretched)
 - Power 30% higher than for slender monohull in phase II

| | OCEAN Phase II | AGOR 14/15 | AGOR 23-25 | 1989 UNOLS RV |
|------|----------------|------------|------------|---------------|
| LWL | | | 254 | 224 |
| Beam | | | 52.5 | 62 |
| L/B | #DIV/0! | #DIV/0! | 4.8 | 3.6 |

- X craft - Evaluate at heavier displacement necessary to meet SMRs
- Keep overall dimensions the same as ONR X Craft and increase hull beam for greater displacement
- Pitch motions are similar to ONR X craft and monohull
- Roll performance is improved over ONR X craft
- Lateral accelerations not yet finished, but expected to be worse than SWATH and monohull

OCEAN Class AGOR
Hull Selection Study

Operating Cost Analysis

OCEAN Class AGOR

Hull Selection Study

Van Impacts on Operating Cost:

- UNOLS van pools in Delaware and Oregon (28 total vans)
- Van day rate of \$60 - \$90
- Shipping is major expense - approximately \$3-4K each way

| Van Cost Calculation: | |
|--|-----------|
| Days at sea per year | 270 |
| Van day rate | \$75 |
| Van annual rate | \$20,250 |
| Avg number of days per cruise | 17 |
| Average number of cruises per year | 15.9 |
| Van RT shipping cost (est.) | \$7,000 |
| Annual cost of shipping for single van | \$111,176 |
| Annual van cost for the ship (assume 50% van turnover per cruise): | |
| 13 vans | \$985,897 |
| 12 vans | \$910,059 |
| 10 vans | \$758,382 |
| 7 vans | \$530,868 |
| 6 vans | \$455,029 |
| 4 vans | \$303,353 |

OCEAN Class AGOR Hull Selection Study

Operating Cost Analysis

| Year | Monohull - baseline | Monohull - stretch | SWATH - low vans | SWATH - high vans | X Craft - Large Hangar | X Craft - Medium Hangar | X Craft - Small Hangar |
|------------------------------------|------------------------|--------------------|---------------------|----------------------|---------------------------|----------------------------|---------------------------|
| Salaries & Wages | | | | | | | |
| A. Ship's company | \$2,435,141 | \$2,435,141 | \$2,435,141 | \$2,435,141 | \$2,435,141 | \$2,435,141 | \$2,435,141 |
| B. Marine Operations Staff | \$321,169 | \$321,169 | \$321,169 | \$321,169 | \$321,169 | \$321,169 | \$321,169 |
| Repairs & Maintenance | | | | | | | |
| A. Normal Maint. & Repair | \$227,438 | \$227,438 | \$271,598 | \$271,598 | \$271,598 | \$271,598 | \$271,598 |
| B. MOSA | \$493,736 | \$493,736 | \$589,600 | \$589,600 | \$589,600 | \$589,600 | \$589,600 |
| TOTAL | \$721,174 | \$721,174 | \$861,198 | \$861,198 | \$861,198 | \$861,198 | \$861,198 |
| Other Expenses | | | | | | | |
| A. Fuel & Lube Oil | \$692,995 | \$692,995 | \$883,208 | \$883,208 | \$1,099,200 | \$1,099,200 | \$1,099,200 |
| B. Food | \$161,710 | \$161,710 | \$161,710 | \$161,710 | \$161,710 | \$161,710 | \$161,710 |
| C. Insurance | \$107,148 | \$107,148 | \$107,148 | \$107,148 | \$107,148 | \$107,148 | \$107,148 |
| D. Stores Minor Equip., & Supplies | \$125,418 | \$125,418 | \$125,418 | \$125,418 | \$125,418 | \$125,418 | \$125,418 |
| E. Travel | | | | | | | |
| Domestic | \$46,414 | \$46,414 | \$46,414 | \$46,414 | \$46,414 | \$46,414 | \$46,414 |
| Foreign | \$106,038 | \$106,038 | \$106,038 | \$106,038 | \$106,038 | \$106,038 | \$106,038 |
| F. Shore Facilities Support | \$168,652 | \$168,652 | \$168,652 | \$168,652 | \$168,652 | \$168,652 | \$168,652 |
| G. Miscellaneous | \$189,126 | \$189,126 | \$196,691 | \$196,691 | \$181,561 | \$181,561 | \$181,561 |
| H. Amortization | | | | | | | |
| Total | \$1,597,501 | \$1,597,501 | \$1,795,279 | \$1,795,279 | \$1,996,141 | \$1,996,141 | \$1,996,141 |
| Total Direct Costs | \$5,074,985 | \$5,074,985 | \$5,412,787 | \$5,412,787 | \$5,613,649 | \$5,613,649 | \$5,613,649 |
| Indirect Costs | \$659,748 | \$659,748 | \$703,662 | \$703,662 | \$729,774 | \$729,774 | \$729,774 |
| Total Operating Costs | \$5,734,734 | \$5,734,734 | \$6,116,449 | \$6,116,449 | \$6,343,423 | \$6,343,423 | \$6,343,423 |
| Van Costs | | | | | | | |
| Total Van Capacity | 4 | 6 | 7 | 12 | 13 | 10 | 6 |
| Annual Van Cost | \$303,352 | \$455,028 | \$530,866 | \$910,056 | \$985,894 | \$758,380 | \$455,028 |
| TOTAL OPERATING COSTS | \$6,038,086 | \$6,189,762 | \$6,647,315 | \$7,026,505 | \$7,329,317 | \$7,101,803 | \$6,798,451 |
| C. Days at Sea | 270 | 270 | 270 | 270 | 270 | 270 | 270 |
| F. Daily Rate | \$22,363 | \$22,925 | \$24,620 | \$26,024 | \$27,146 | \$26,303 | \$25,179 |

