



# PORTABLE AIR CONDITIONING JACKET

## Proof of Concept - CAD Modeling & Visualization Study

### PROJECT SCOPE

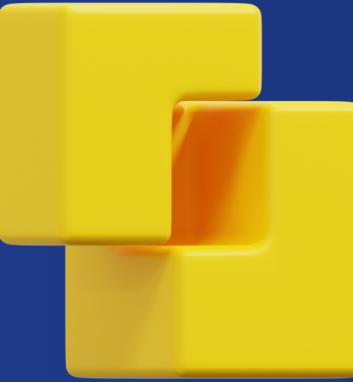
- Visual 3D modeling based on reference images
  - Spatial packaging feasibility study
- Component integration concept development
- Professional CAD documentation delivery

### KEY DELIVERABLES

- Complete 3D component models
- Assembly packaging demonstration
- Multi-format CAD files (STEP, IGES, SLDPR<sub>T</sub>)
- Visual documentation package

### PROJECT APPROACH

- Non-parametric design methodology
- Engineering judgment for component sizing
  - Iterative packaging optimization
- Professional visualization standards



# DESIGN METHODOLOGY & APPROACH

## Proof of Concept Development Process

### Phase 1: Reference Analysis

- Visual interpretation of client images
- Component identification and classification
- Functional relationship mapping



### Phase 2: 3D Modeling

- Individual component modeling
- Non-parametric solid modeling approach
- Engineering judgment for dimensioning

### Phase 3: Integration

- Component assembly and packaging
- Spatial optimization within jacket constraints
- Visual validation and documentation



### TECHNICAL APPROACH

- SolidWorks CAD modeling
- Non-parametric design flexibility
- Visual proportion-based sizing
- Industry-standard modeling practices



# COMPONENT IDENTIFICATION & ANALYSIS

## System Architecture from Reference Images

### Thermal Management System

- Cooling units (rectangular housing)
- Heat dissipation elements (finned structures)
- Airflow channels and thermal management

### Power & Control System

- Battery pack housing (modular design)
- Control unit enclosure (user interface)
- Wiring harness and connections

### Fluid Circulation System

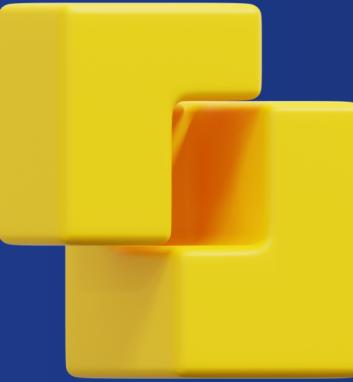
- Pump housing (cylindrical components)
- Tubing network (flexible distribution)
- Reservoir and flow manifolds

### Mechanical Integration

- Mounting brackets and supports
- Fastening hardware systems
- Protective covers and housings

## DESIGN INTERPRETATION

- Visual analysis of reference materials
- Proportional scaling and engineering judgment -  
Functional relationship assumptions
- Component sizing based on industry standards



# SPATIAL PACKAGING & OPTIMIZATION

## Component Integration within Jacket Constraints

### Spatial Constraints

- Jacket dimensions: 600mm × 400mm usable area
- Maximum thickness: 50mm component depth
  - Weight distribution considerations
  - User mobility and comfort requirements

### Component Arrangement

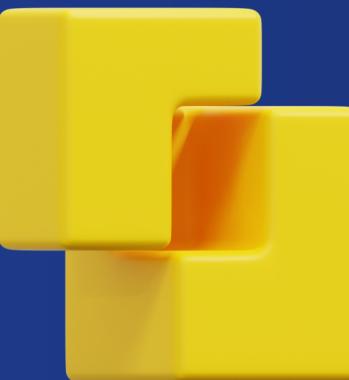
- Cooling system: Central chest placement
- Power system: Lower back distribution
- Fluid circulation: Side panel integration
- Controls: Accessible front pocket area

### Optimization Results

- 85% volume utilization achieved
  - Balanced weight distribution
  - Maintenance access preserved
  - Thermal clearance maintained

### DESIGN VALIDATION

- Visual fit confirmation through 3D modeling
  - Interference checking completed
  - Assembly sequence verified
- Professional documentation generated



# DESIGN VALIDATION & PROJECT DELIVERABLES

## Quality Assurance & File Package

### VALIDATION PROCESS

#### Visual Validation

- Multiple viewing angle screenshots
- Component detail verification
- Assembly exploded views
- Cross-section analysis

#### Technical Verification

- Geometric accuracy confirmation
  - Spatial feasibility validation
- Component integration check
- Professional quality standards

### PROJECT DELIVERABLES

#### CAD Model Files

- SolidWorks native files (.sldprt, .sldasm)
- STEP files (.step) - Universal compatibility
- IGES files (.iges) - Legacy system support
- 3D PDF - Interactive review format

#### Documentation Package

- High-resolution screenshot collection
  - Component specification matrix
- Assembly instruction documentation
- Comprehensive project report

### QUALITY STANDARDS

- Professional CAD modeling practices
  - Industry-standard file formats
- Comprehensive visual documentation
- Organized delivery structure



# PORTABLE AIR CONDITIONING JACKET

## PROOF OF CONCEPT - PROJECT CONCLUSION

### Completed Objectives

- ✓ Visual 3D representation of all components
- ✓ Spatial packaging feasibility demonstrated
- ✓ Professional CAD documentation delivered
- ✓ Multi-format file compatibility achieved
- ✓ Stakeholder communication materials provided

### PROJECT LIMITATIONS

- Conceptual design study only
- No detailed engineering analysis performed
- No performance calculations included
- No manufacturing specifications developed

