



Block 10 Technical Bulletin

# No. 1: DESIGN

Property of:

# GDI ENGINEERING



A. Sarkov  
Chief Designer

No. 524

**DECLASSIFIED**

(S11-B)

# EYES ONLY

do not copy  
do not remove from facility  
do not transfer  
acknowledge



## Technical Bulletin No. 1: DESIGN

Memorandum - 16\_FEB/2035

From: A. Sarkov, Chief Designer

Engineering and design personnel can use this guide to develop final engineering specifications and deployable unit assets. This is for Block 10 Only.

Block Development:

Block 10 - Advanced Development delivered: 1\_MAR/2036

Block 20 and beyond - TBD

Design Principles:

The primary design principles for Block 10 Development are:

- Deep Industrial Design
- Signature Iconic Form and Surface Development
- All Terrain Structures
- Affordance - Visible Technology and Function

Design Elements:

GDI design elements consist of the following:

- Hardened Surface and Edge treatments
- Integrated/Low Profile Surface detail
- Articulated Suspension
- Legacy Mil-Tech Integration

Advanced Development/Block 10 Units and Structures

Block 10 Standard engineering Principles and Elements of Design have been applied to the following units:

1. Combat Power Armor/Combat Personal Armor
  - 1.1. Elite Forward Scout/Insurgent
  - 1.2. Heavy Power Armor (in progress)
  - 1.3. Standard Infantry
2. Mining Support Vehicles
  - 2.1. Harvester
  - 2.2. Tender (in progress)
3. Combat Ground Vehicles
  - 3.1. Armor

APPROVAL *[Signature]*  
BLOCK 20 2025

GDI-ENGINEERING

- 3.1.1. Super Heavy Tank - MMTH50
- 3.1.2. Light Fighting Vehicle
- 3.1.3. High Maneuverability Light Tech Vehicle
- 3.2. **Combat Deployment and Logistics Vehicles**
  - 3.2.1. APC
  - 3.2.2. LCAC
  - 3.2.3. Vehicle Service and Repair Vehicle -RIG
- 4. **Combat Air vehicles**
  - 4.1. Close Support Air/Ground Combat
  - 4.2. F/A Units (Fighter/Attack)
- 5. **MAP - Mobile Artillery Platforms**
  - 5.1. Super Heavy Vertical
- 6. **Naval Surface Elements**
  - 6.1. Bombardment/Picket/Patrol
  - 6.2. Assault
  - 6.3. Maintenance and Construction [Semi-Autonomous]
- 7. **Combat Construction, Mining and Support Facilities**
  - 7.1. **Combat Support Structures**
    - 7.1.1. Warfactory
    - 7.1.2. Barracks
    - 7.1.3. Airfield
  - 7.2. **Mining Structures**
    - 7.2.1. TIB Silo
    - 7.2.2. Refinery
  - 7.3. **Infrastructure Support**
    - 7.3.1. Power plant
    - 7.3.2. Research
    - 7.3.3. Terraformer
    - 7.3.4. C<sup>3</sup>I Uplink
    - 7.3.5.

All Block 10 design visualization and functional specifications can be found in the GDI Engineering Central Shared Database under the direction of LtCol. Cobo, CCX- Engineering Tech Unit, Los Angeles Central Procurement Command: EXT 4775 -

  
- A. Sarkov



ID Confirmed: Spec 5.....

Acknowledge: 75b\_TREE\_Encrypt\_KEY\_128\_BIT\_OverMatrix

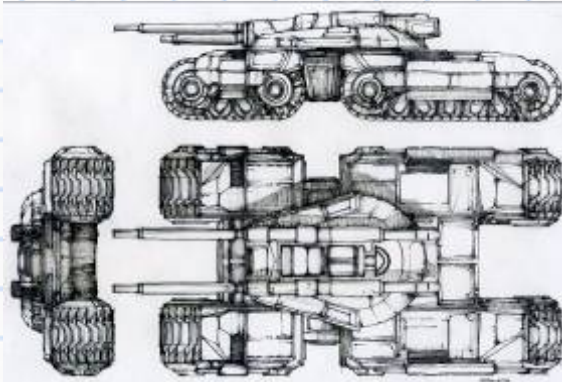
Xmit/END

Confirm 524-AS\_2\_16\_2035

RCV/END

APPROVAL   
BLOCK 20 2002

## GDI Design Principles



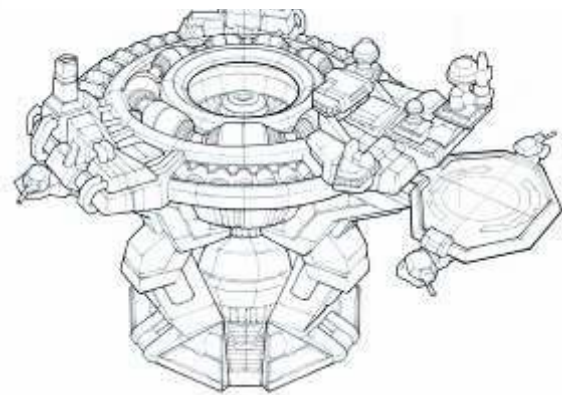
### 1<sup>st</sup>: Deep Industrial Design

- Unit specific superform, subform elements and surface detail are derived from function, method of assembly, material and core systems infrastructure (i.e.: running gear, power train, avionics, chassis, etc.) and legacy tech used in the unit.



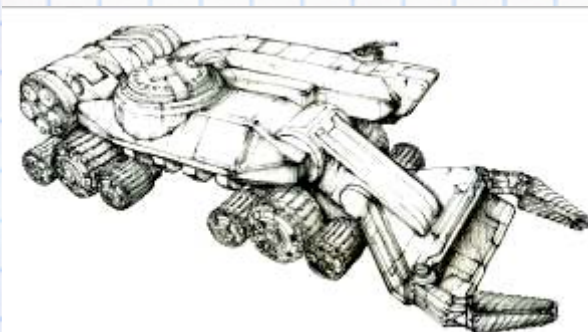
### 2<sup>nd</sup>: Signature Iconic Form and Surface Development

- Signature iconic form facilitates immediate unit identification on the battlefield. Surface development, i.e. the inter-relationship of adjacent surfaces in the form, creates unique components of GDI's visual language.



### 3<sup>rd</sup>: All Terrain Structures/Machines Building Machines

- GDI structures are designed for deployment on all combat theatre terrains including water. These structures also utilize significant underground resources including, but not limited to: storage, hardened bunkers, and power and communication infrastructure.



### 4<sup>th</sup>: Affordance

- Exposed, visible technology, clear iconic function, legacy form and detail all contribute to clear communication of each GDI unit's primary function and technology.

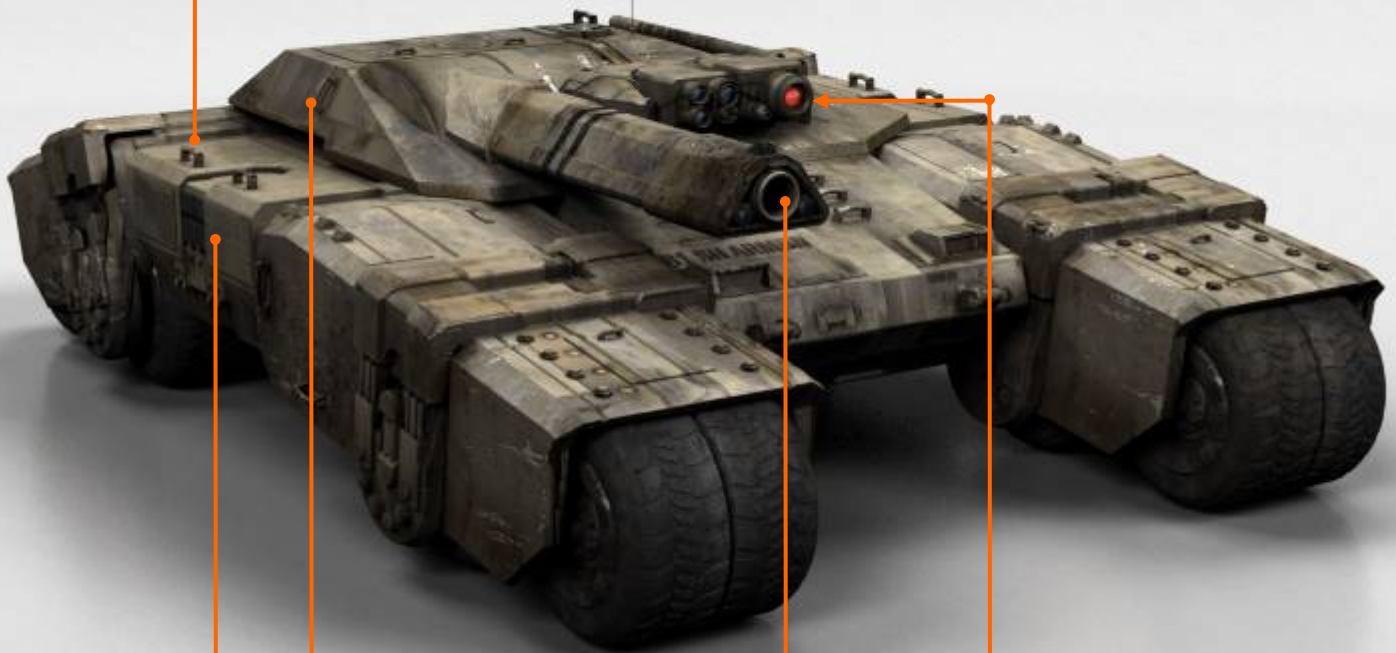
## Case Study: GCH "Mammoth" Heavy Tank

### 1A. Superform, Subform and Legacy Detail: GCH 'H'-Body

**Background:** GCH (General Combat Hull, Inc) was the first defense contractor to develop the multiple quad drive tread system used in the Mammoth. The power train and tread system (originally developed for a lighter wheeled tank codenamed: BULL) gives the Mammoth it's distinctive 'H' shape and provides superior maneuverability in all combat terrains.

'Superform' (overall iconic shape) is developed from the optimum shape required to contain the combat vehicles functional elements.

GCH - 'H' Body: BULL



'Subform' (individual intra-form elements) give the superform into interesting graphic shapes, which are informed by the combat vehicles functional subsystems.

'Legacy Detail' (familiar surface details) are derived from classic pre-Tiberium war combat vehicle and Mil-Tech components. Adding familiar visual language details to new Superform and Subform shapes provides easily understood functional icons.

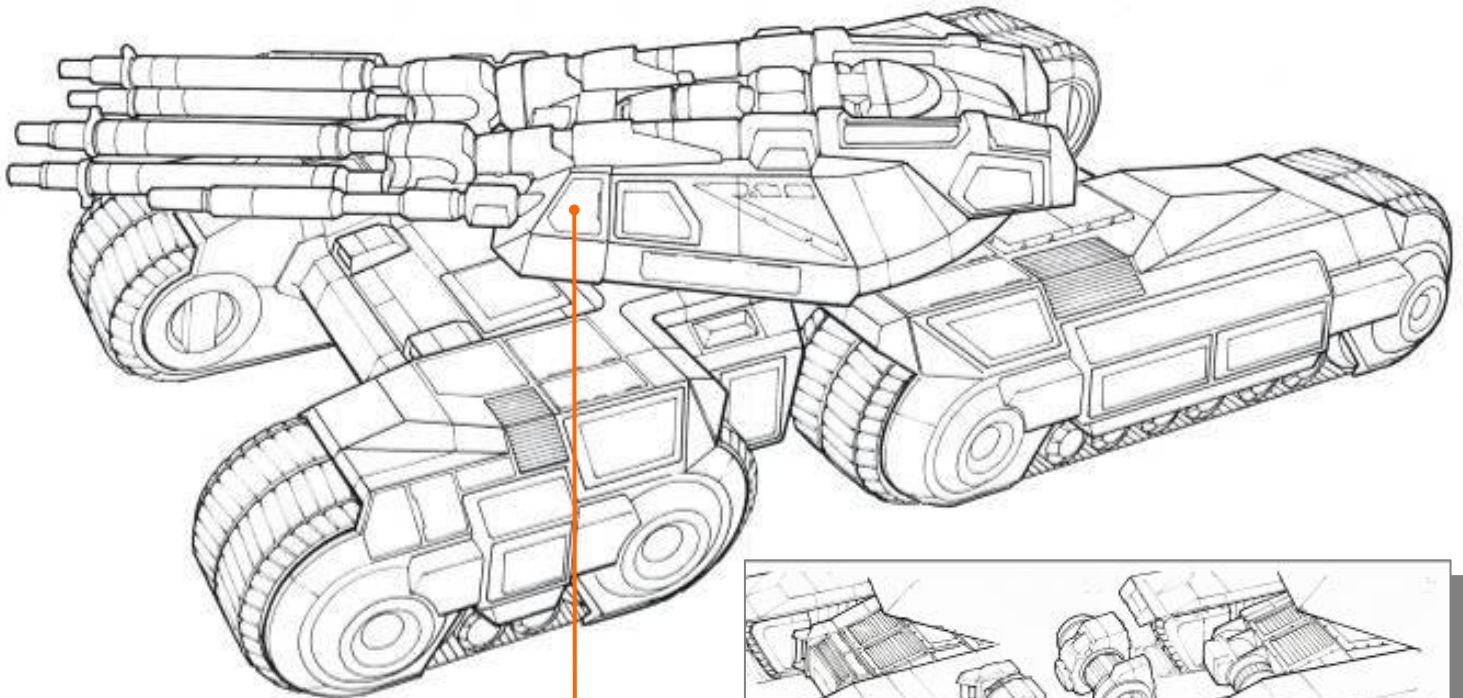
APPROVAL *Phil H. Hoff*  
BLOCK 20 2006

GDI-ENGINEERING

## Summary: Deep Industrial Design - Form, Divide and Beautify

Superform, Subform and Legacy Detail combine to create a critical component of the GDI visual language. First **develop the iconic form** that best fits the functional elements; **divide the form** into balanced intra form graphic shapes that describe the function; finally **add fractal detail "beauty"** to the form via easily recognized functional details, using legacy mil-tech visual language.

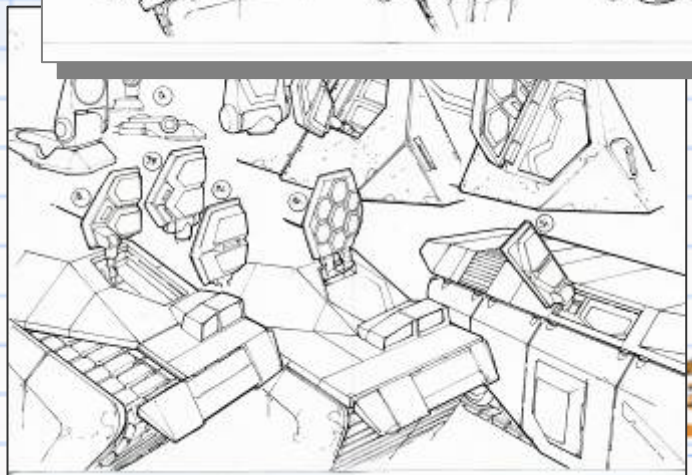
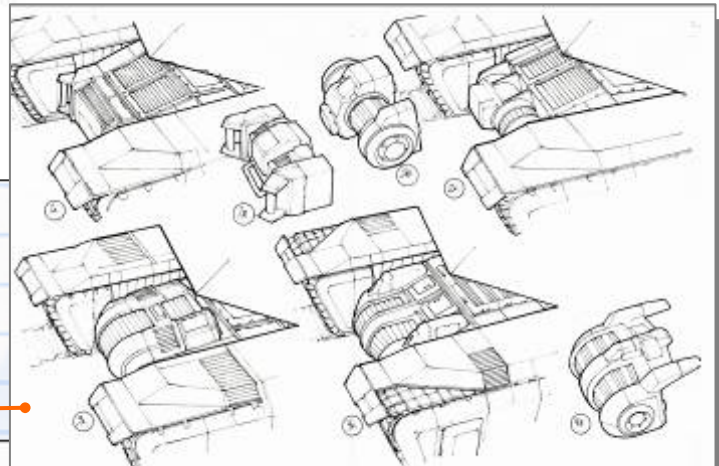
GCH - 'H' Body: MAMMOTH



**MAMMOTH - Block 20 and Up - Upgrades:** Informed by legacy details- upgrades are pulled out of and integrated in to the Super and Sub forms.

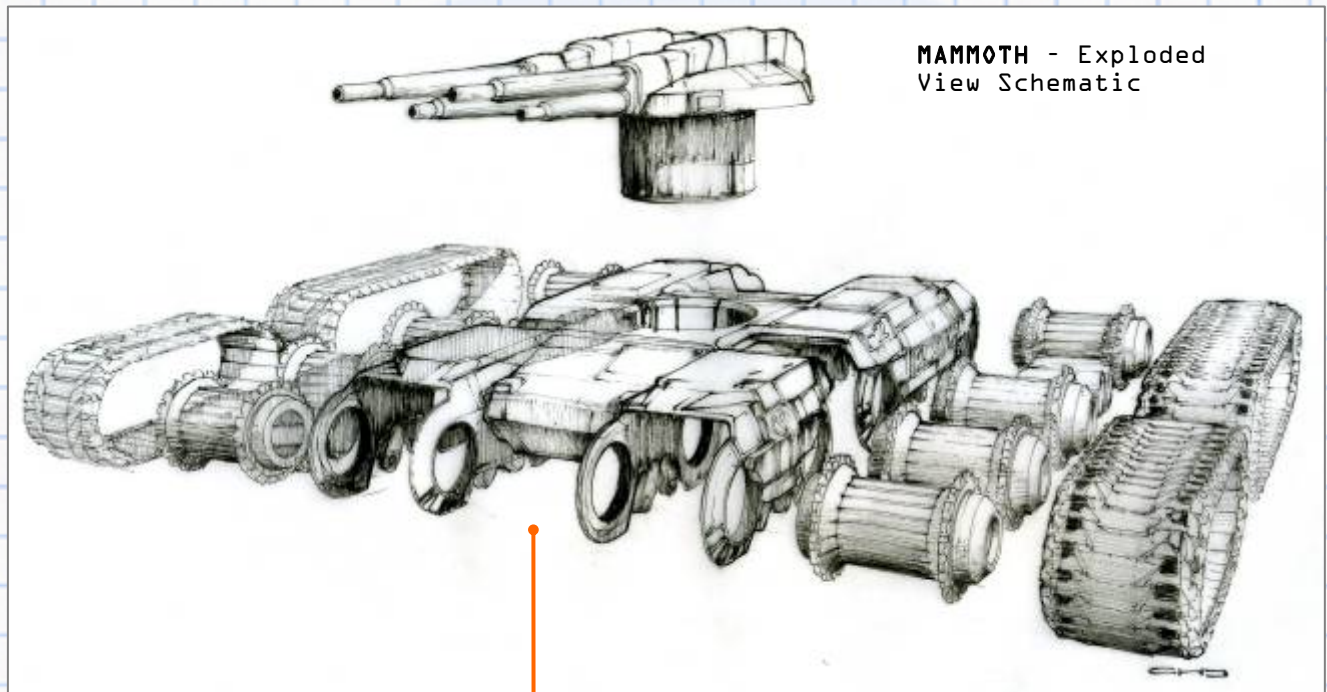
### **Iconics:**

Immediate recognition of specific unit upgrades is critical to tactical and strategic deployment in combat. Unit upgrades change the base unit silhouette in significant and easily recognizable visual language.

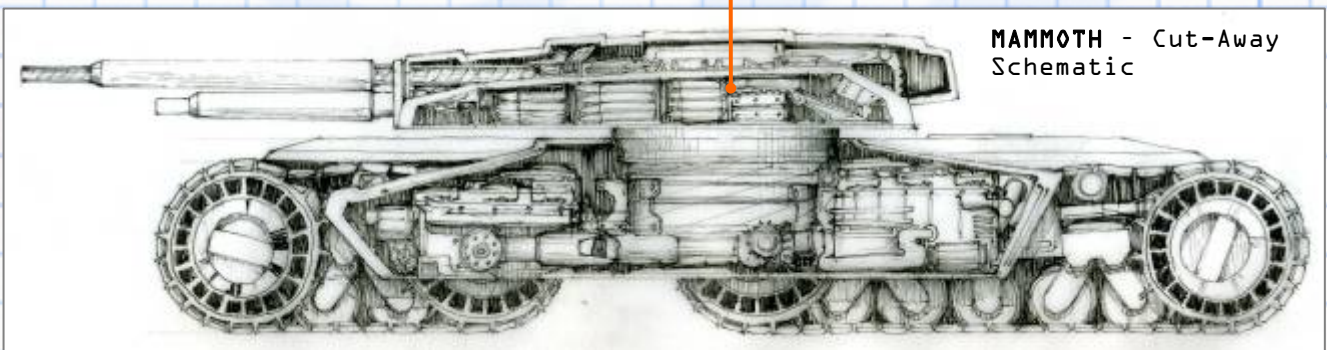


## 1B. DID Technical Schematics: Power Train/Electromotive

**Background:** Another key feature of the quad drive tread system is its use of 8 independent high torque HTSC\* electromagnetic motors driving each tread unit. Powered by dual Mil-Spec CVJF (Combat Vehicle Jet Fuel) ducted turbine generators the tread unit motors give the Mammoth advantages of speed, durability, maneuverability and IR (heat signature) reduction.



**DID Technical Schematics** - Are created to provide a deep look into the assembly and the core technical systems and subsystems of the combat vehicle. With significant advances in **\*High Temperature Super Conductor (HTSC)** materials speed, power and durability have been used extensively in the Mammoth power train and subsystems.

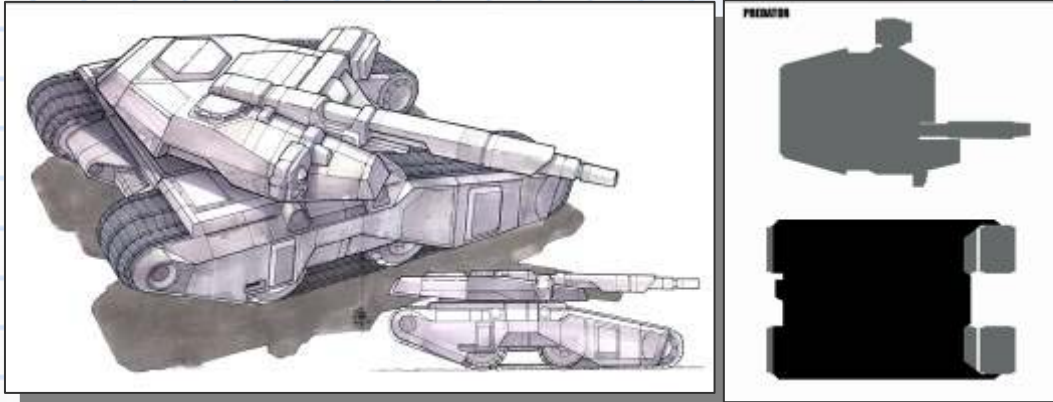


APPROVAL *John W. Hill*  
BLOCK 20 1002



### Summary: Deep Industrial Design - Technical Schematics

Understanding how a unit is manufactured, the materials used in it's construction, the interrelationship of it's core component systems and subsystems provides a level of design intelligence that can be used to inform the *life-cycle* design of the unit. For example, armed with this deep intel, it's now possible to predict damage and destruction consistent with a units material, assembly and construction. This is critical to developing a useful combat MTBF model and informing Block 20 and up development.



NOTES:

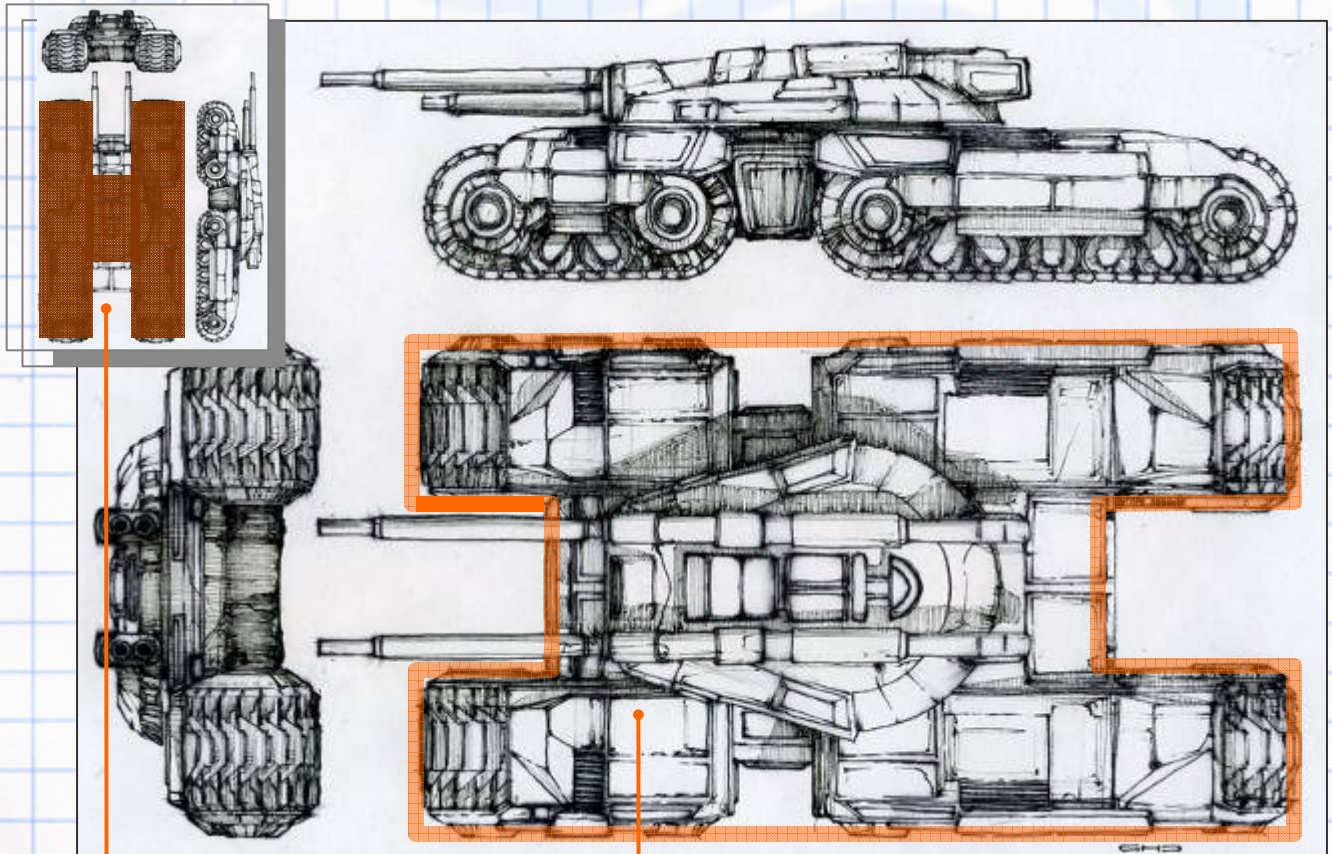


## Case Study: DN/SW "Turtle" - APC

### 2A. Iconic Form: Tactical Silhouette- "Figurative" (Mammoth)

H

**Background:** Deep Industrial Design will yield both *figurative* and *derivative* iconic forms. Strong recognizable silhouettes such as the 'H'- body Mammoth facilitate immediate unit identification on the battlefield. Use of this principle in GDI design has resulted in an 85% reduction in friendly fire incidents since 2027. Iconic forms, derived from shapes found in nature and science will also yield strong tactical silhouettes.



GCH Mammoth 'H' Body -  
Figurative Shape Iconics  
derived from core function

APPROVAL *Paul W. Hoff*  
BLOCK 20 1002

GDI-ENGINEERING

## 2B. Iconic Form: Tactical Silhouette - "Derivative" (Turtle)



**Background:** Drawing on their seminal research combining defense forms occurring in nature with historical combat tactics - DN/SW (Dai Nippon/Skunk Works) created several prototypes before settling on the ideal form for their **Turtle Armored Personnel Carrier (APC)**. Powered by the same electromotive systems as the **Mammoth**, the Turtle is, however, far faster and more dangerous than its namesake.



DN/SW 'TURTLE' - Using a shape derived from naturally occurring defensive forms, the Turtle also uses **asymmetrical** contrasting detail shapes - e.g. Raytheon's *Vigilante*™ self defense armament systems.



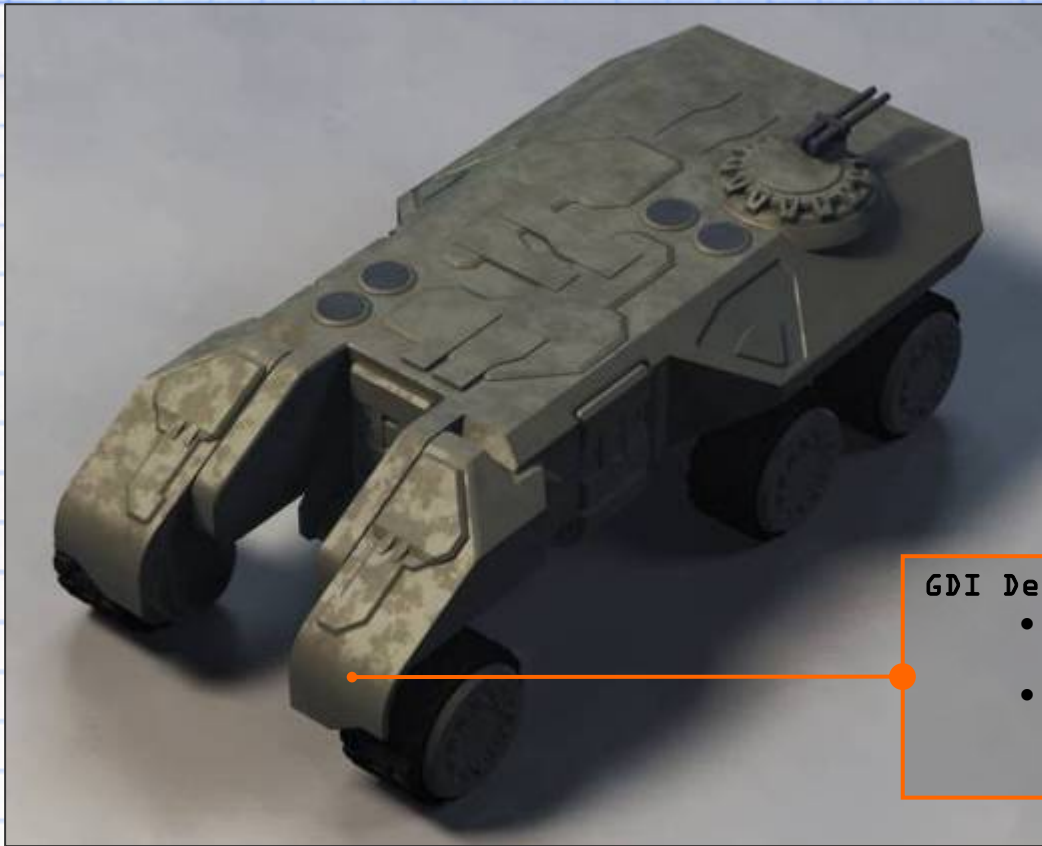
The Turtle uses a high frequency low voltage Titanium Alloy bi-metal articulated suspension which changes the running profile of the vehicle.

**Squad Deployment Mode**



The Turtle's suspension allows it to adapt to all battle terrain conditions as well as change its locomotive attitude to configure it for speedy troop insertion or for low profile squad deployment and evasion.

**High Speed Insertion Mode**



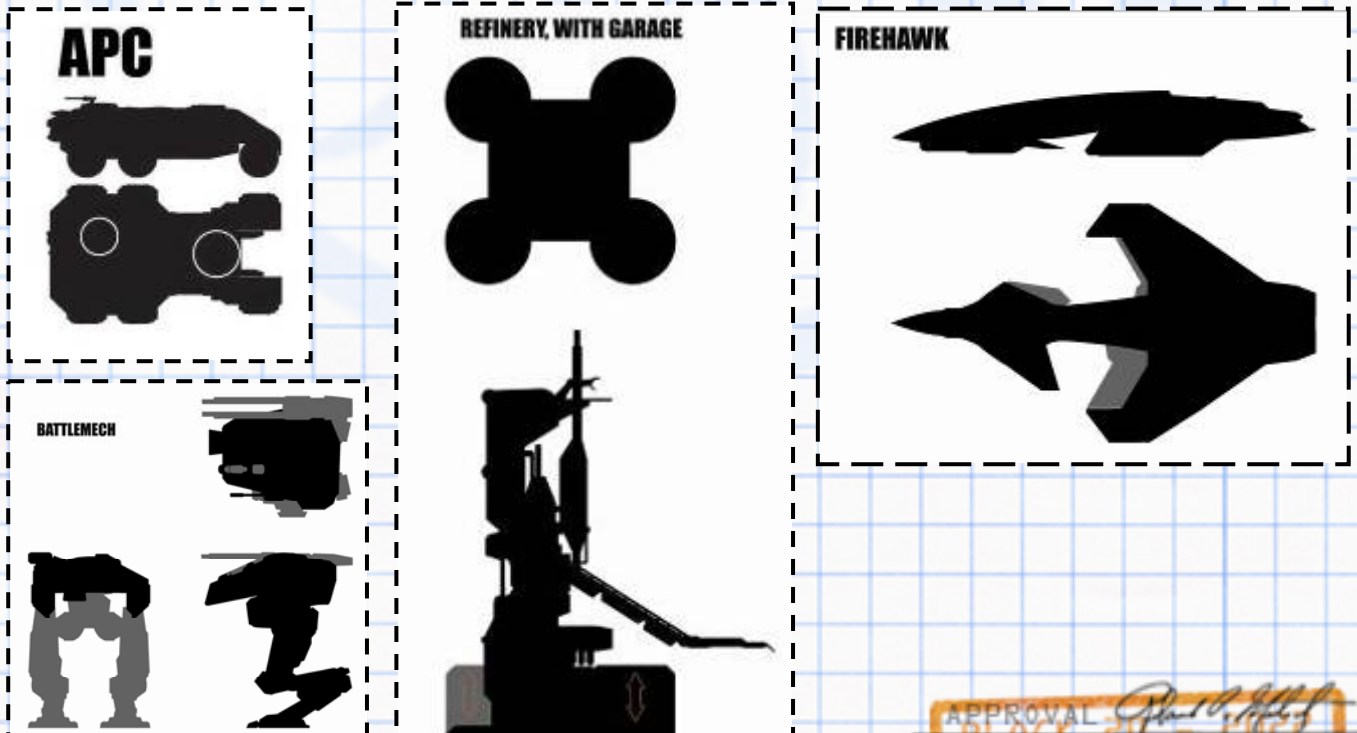
**Turtle:** The namesake of an ancient combat tactic used by the Roman Legions, the amphibious Turtle can deliver a tactical combat squad to battle-lines during all levels of combat intensity.

**GDI Design Elements**

- Articulated Suspension
- Cantilevered Independent Transaxles

**Summary: Iconic Form: Tactical Silhouette**

All GDI units and structures exhibit strong iconic form which creates easily recognized tactical silhouettes.

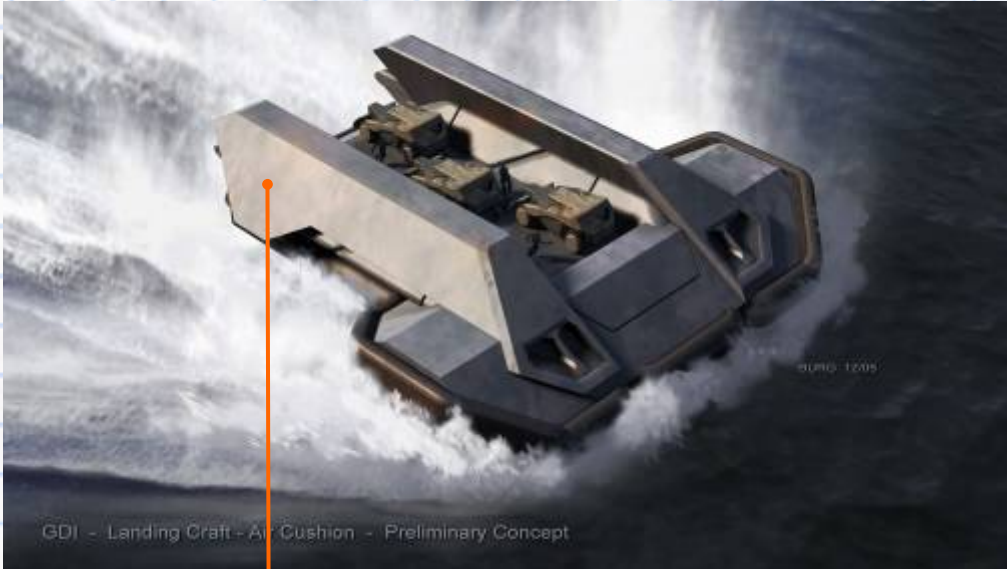


APPROVAL *John D. Hill*  
BLOCK 20 10/27

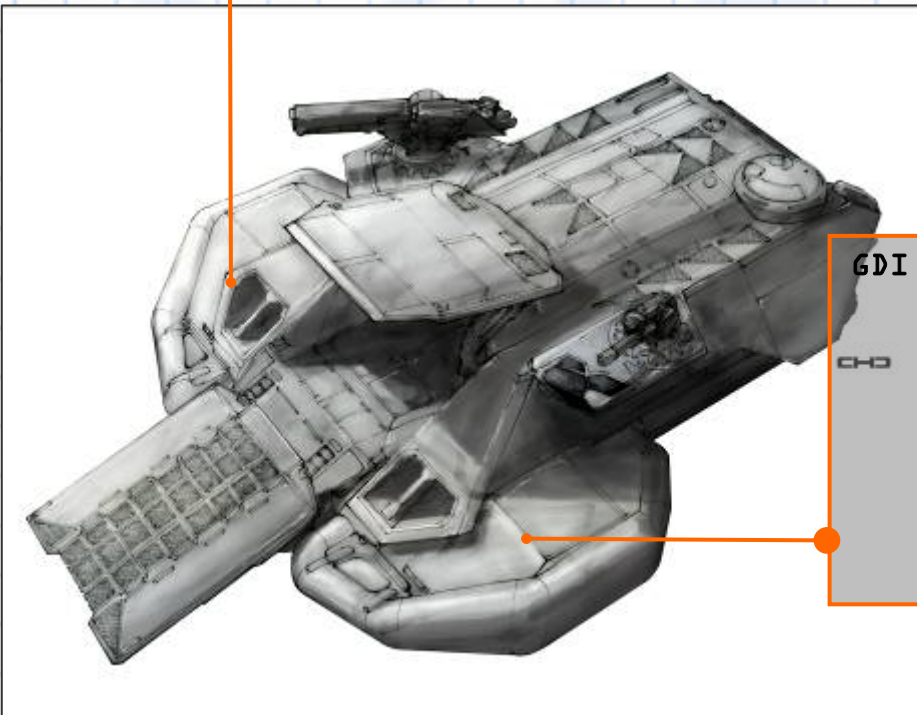
## Case Study: MiG/Scaled Composites, Inc. "LCAC"

### 2C. Surface Development - Functional Edge Transitions

Super and subform shapes are critical to providing advanced tactical combat vehicles with their operative planforms. The intra-surface transitions and edge treatments are likewise critical to effective tactical radar cross section attenuation (*generation 6 stealth*) and projectile weapon deflection.



The MiG (Mikoyan Design Bureau)/Scaled Composites LCAC - shows the angled surfaces and edge treatment typical of GDI advanced surface development. Also visible are the trapezoidal surface openings used to configure elements such as air intakes and operator compartment windows.

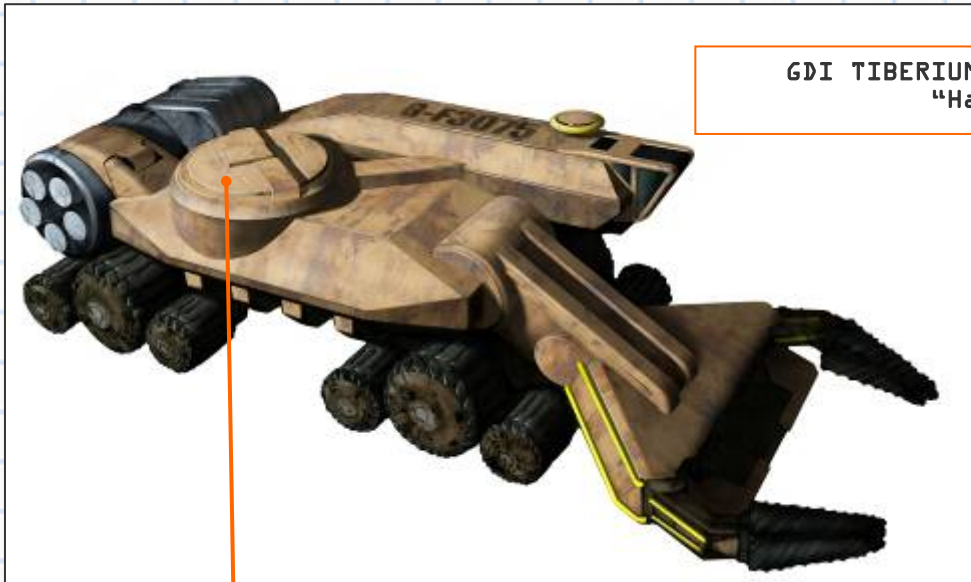


#### GDI Design Elements

- Hardened Angled Surfaces
- Beveled Edges
- Trapezoidal surface openings which conform to the surrounding shape.

## Summary: Advanced Tactical Surface Development

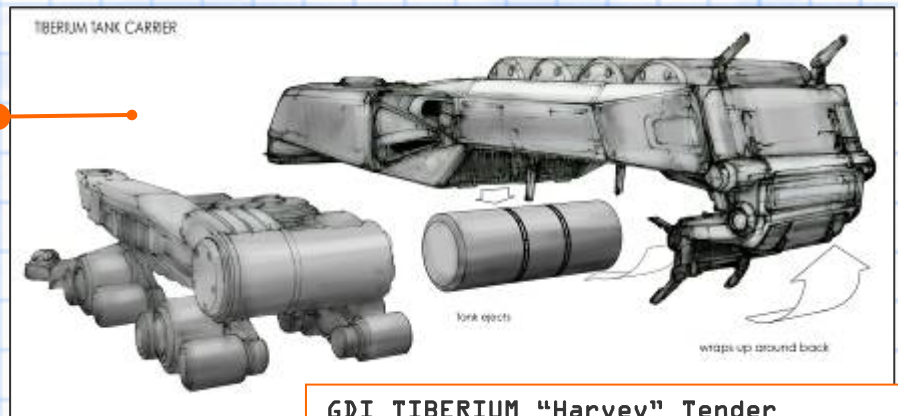
All GDI units and structures use angled surfaces and precision developed edge treatments to attenuate their radar cross section and provide protection against direct fire weapons through angular momentum micro-surface articulated material.



GDI TIBERIUM HRV Harvester  
"Harvey"

### GDI Design Elements

- Hardened Angled Surfaces
- Beveled Edges
- Contrasting asymmetrical shapes.



GDI TIBERIUM "Harvey" Tender

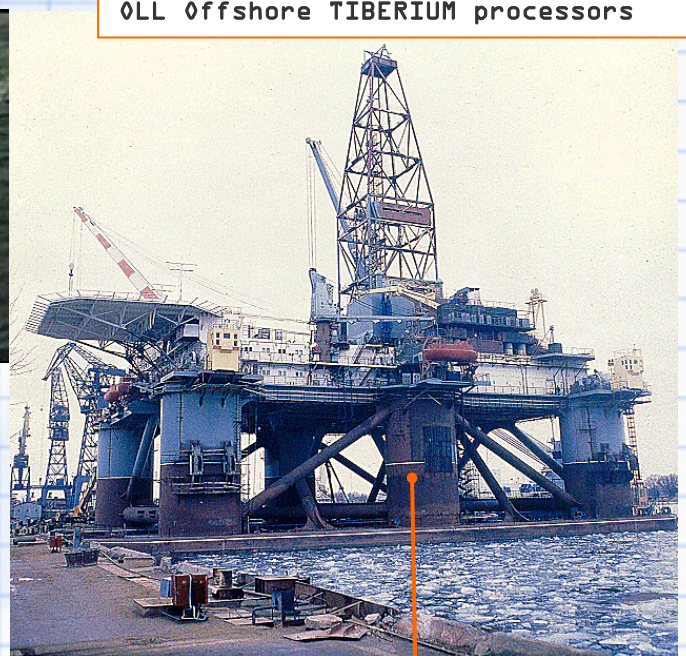
NOTES:

**Background:** Otani/Lincoln Laboratories (OLL), the prime contractor for the GDI Mil-Spec Omnibus Agency (GMSOA) oversees the development, fabrication and deployment of military, research, communication, Tiberium and infrastructure facilities worldwide. Using advanced autonomous industrial engineering, concurrent AI and robotic manufacturing and test systems OLL creates high output automated production lines and facilities for all of GDI's combat and infrastructure support units.

### 3a. All Terrain Structures (ATS): Build Anywhere Extension

OLL received its first Research and Development contract for semi-autonomous structures in 2009. Over the course of the next 15 years they produced several prototype facilities culminating in the first ATS deployment of a barracks facility in 2025. The design for the Personnel Support Structure (PSS-Barracks) continues to be a viable operating combat facility. Following the successful introduction of the PSS, successful testing and deployment of seven more ATS facilities was completed in 2032.

OLL Offshore TIBERIUM processors



**Otani/Lincoln Laboratories** was a commercial manufacturer of offshore Tiberium processing platforms. In 2006 they made a classified presentation to the GDI Mil-Spec Omnibus Agency (GMSOA) proposing a new kind of all terrain structure for the design and deployment of the next generation of GDI combat and infrastructure facilities. The financial details of the 100 year contract are classified.

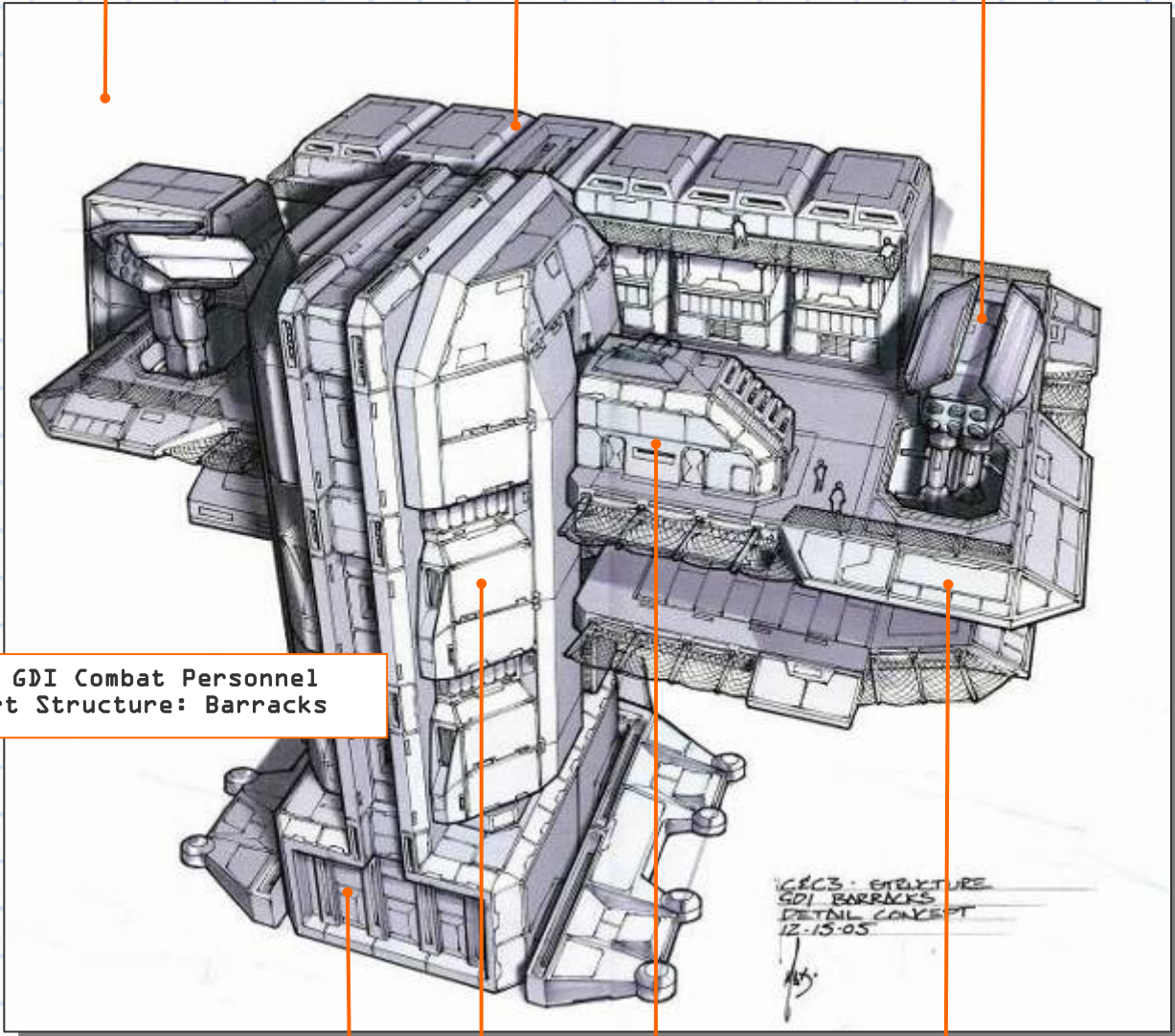
APPROVAL *[Signature]*  
BLOCK 20 1002

GDI-ENGINEERING

- GDI Hardened Angled Surfaces/ Beveled Edges
- Contrasting asymmetrical shapes

• Crew Quarters

• Self Defense Systems



OLL's GDI Combat Personnel Support Structure: Barracks

- Ground Level Deployment Blast Doors

• Multi-level Platforms

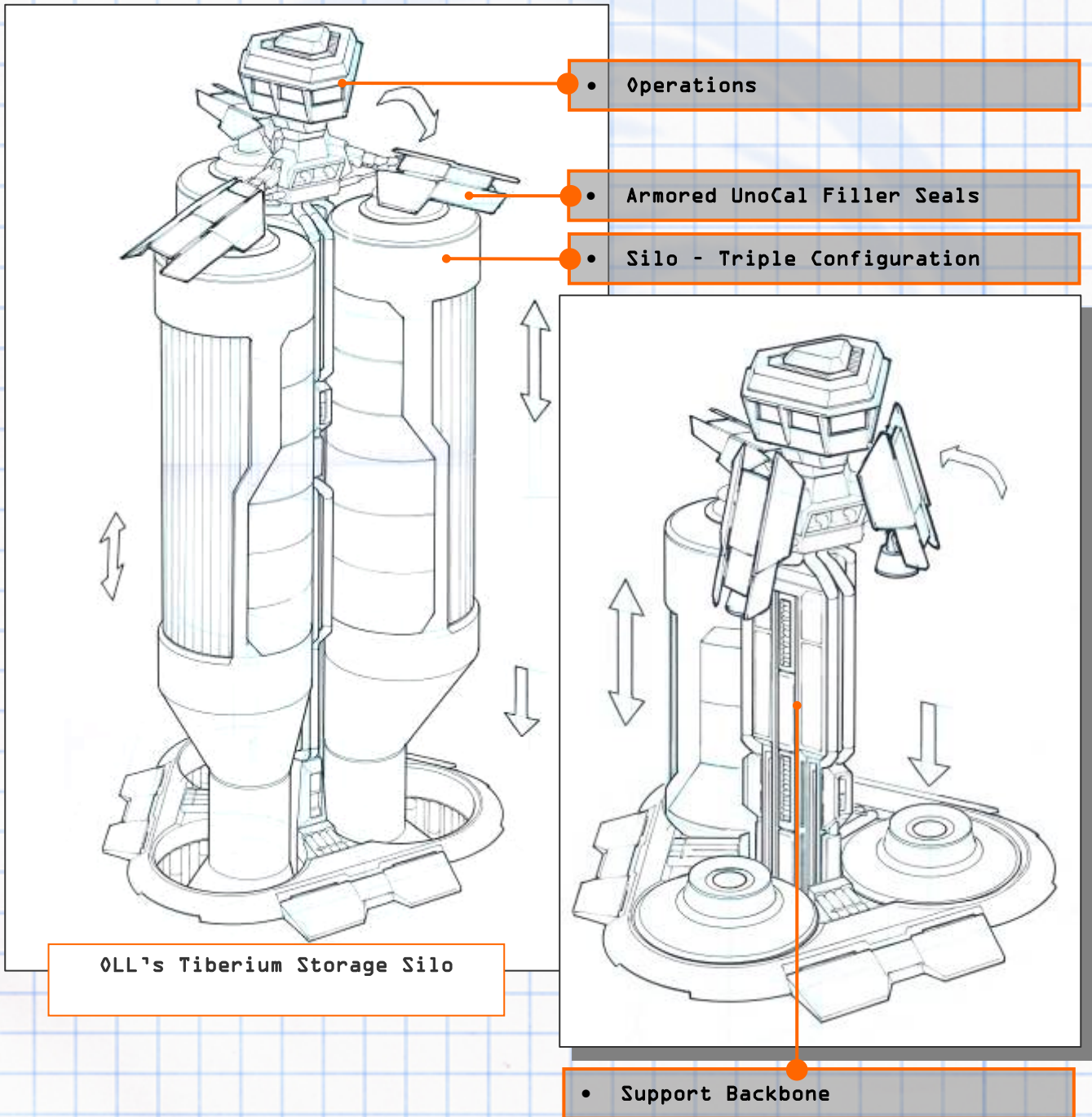
• Elevator Mechanicals

• Single Pylon Support Structure

APPROVAL *Paul H. Hoff*  
BLOCK 20 1/22/06

### 3b. ATS: Hardened Underground Elements

A significant early development in OLL's ATS initiative was the inclusion of underground infrastructure in the core design of the facilities. Limited at first to below grade support for the massive single pylon designs of the block 10 structures - OLL subsequently put storage, manufacturing, material handling and testing facilities into below grade configurations.

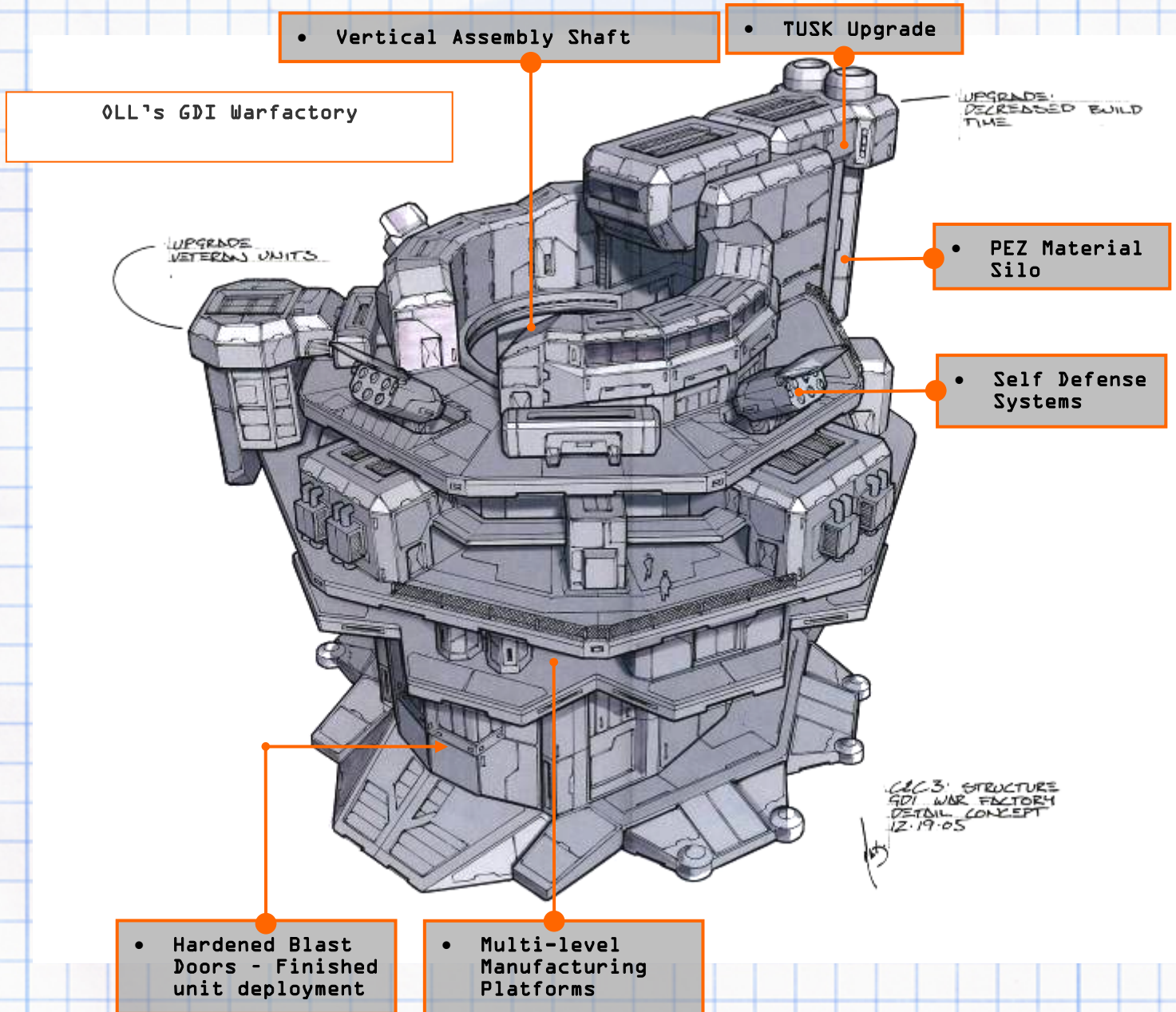


APPROVAL *[Signature]*  
BLOCK 20 2002



### 3c. ATS: Machines Building Machines- Weapons of Mass Production

During the latter part of the 2020 decade it was rumored that OLL was working on an advanced integrated hybrid weapons manufacturing facility to replace its own sprawling factory complex at White Sands, NM. In 2040, 30 years after their initial contract, GDI deployed the first OLL designed War Factory of the modern era during the battle of San Vicente in Argentina.

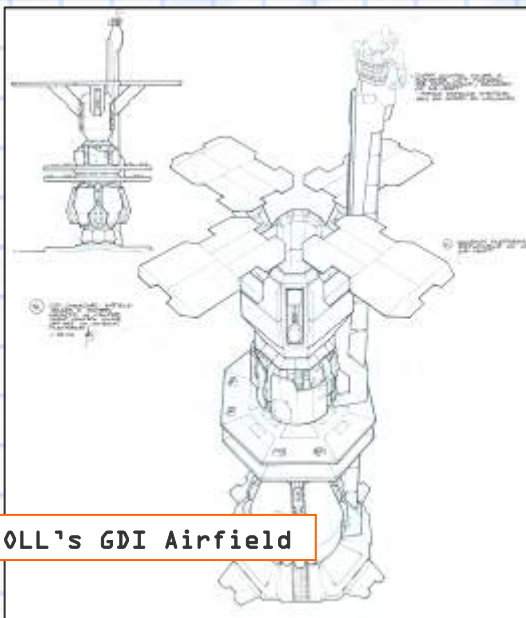


2041 Addendum: The development of the Warfactory Type 2 field retrofit codenamed: "TUSK" - enables the base facility to produce the GCH 'H' body armored cavalry unit which includes the Mammoth. While this is still in the prototype stage the test results and early battlefield performance indicate higher manufacturing output for light armored units and production of the 'H' body Mammoth in the two to three minute range.

### Summary: All Terrain Structures

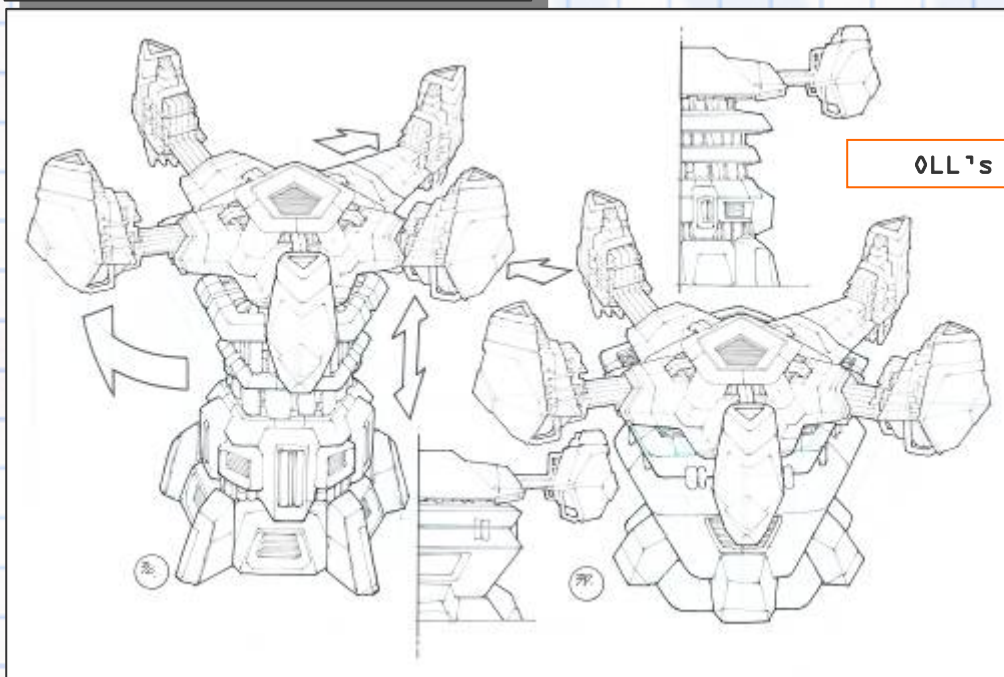
Combining the ability to manufacture light and heavy armor in a high throughput robotic manufacturing with the build anywhere and ATS design principles the OLL Warfactory was credited with turning the tide of the battle and obtaining victory for the GDI ground forces over NOD terrorist cells worldwide. While the actual output of the Warfactory is classified the numbers are reported in the press to be in the range of 1 to 2 minutes for light armored vehicles and tanks. For purposes of this bulletin the numbers will remain classified.

It is expected that all GDI structures will be fully converted to ATS configurations by mid century: 2050.



OLL's GDI Airfield

### Notes:



OLL's GDI Terraformer

**Affordance** is an Industrial Design term that refers to the relationship of the visual language to clear communication of the function of an object. In other words - Does it look like it does what it does? Does its form communicate its function?

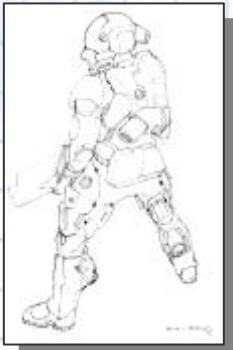
The principle concepts of affordance for GDI design are as follows:

- **Functional Aesthetic:** Form follows function



**GDI's Heavy Mobile Artillery Platform:** MAP-H is considered to be the quintessential example of functional aesthetic. It is 100 tons of mass destruction.

- **Archetypal form:** derived from synthesized and natural sources



**GDI's Red ZONE Trooper design** is based on observation of predatory animals in the wild. Natural archetypes can be synthesized to create effective combat form and function.

- **Visible Technology:** make the functional elements visible in the form - don't hide the tech.



**SAAB/Lancaster Lifting Body, Inc.'s A-15 ORCA** It is said that aircraft are the perfect embodiment of functional aesthetic. There is no room for anything extraneous in the form and the A-15 is no exception.

### 4a. Functional Aesthetic: Form Follows Function

#### Case Study: MAP-H - Heavy Mobile Artillery Platform

- Rail Gun - dual rail gives longer range and greater accuracy.

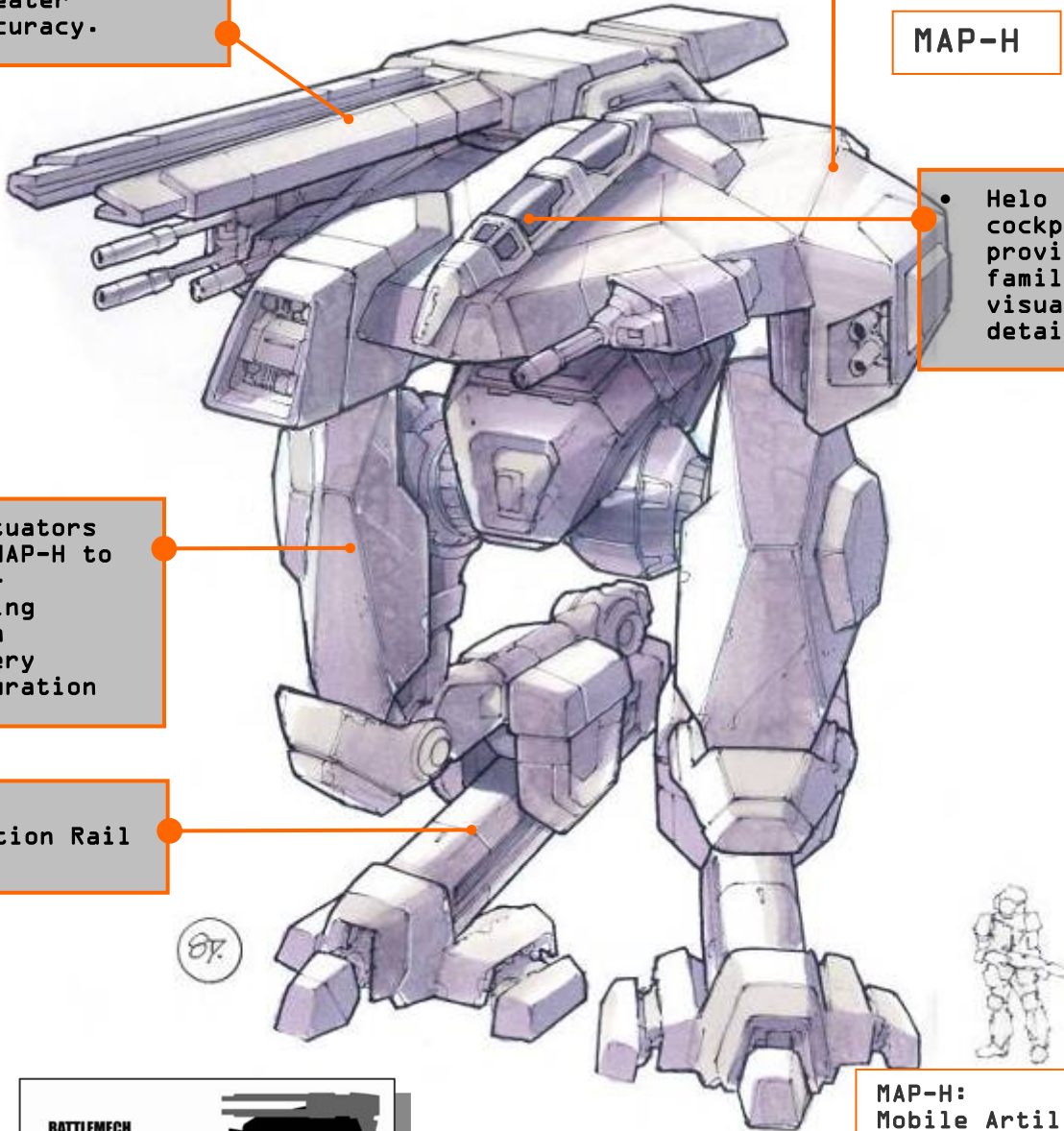
- Upper Turret 360° rotation - rounded platform

MAP-H

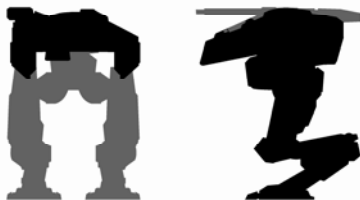
- Helo type cockpit provides familiar visual detail

- Leg Actuators allow MAP-H to squat - providing optimum artillery configuration

- Recoil Absorption Rail



BATTLEMECH



Don't forget Shape Icons

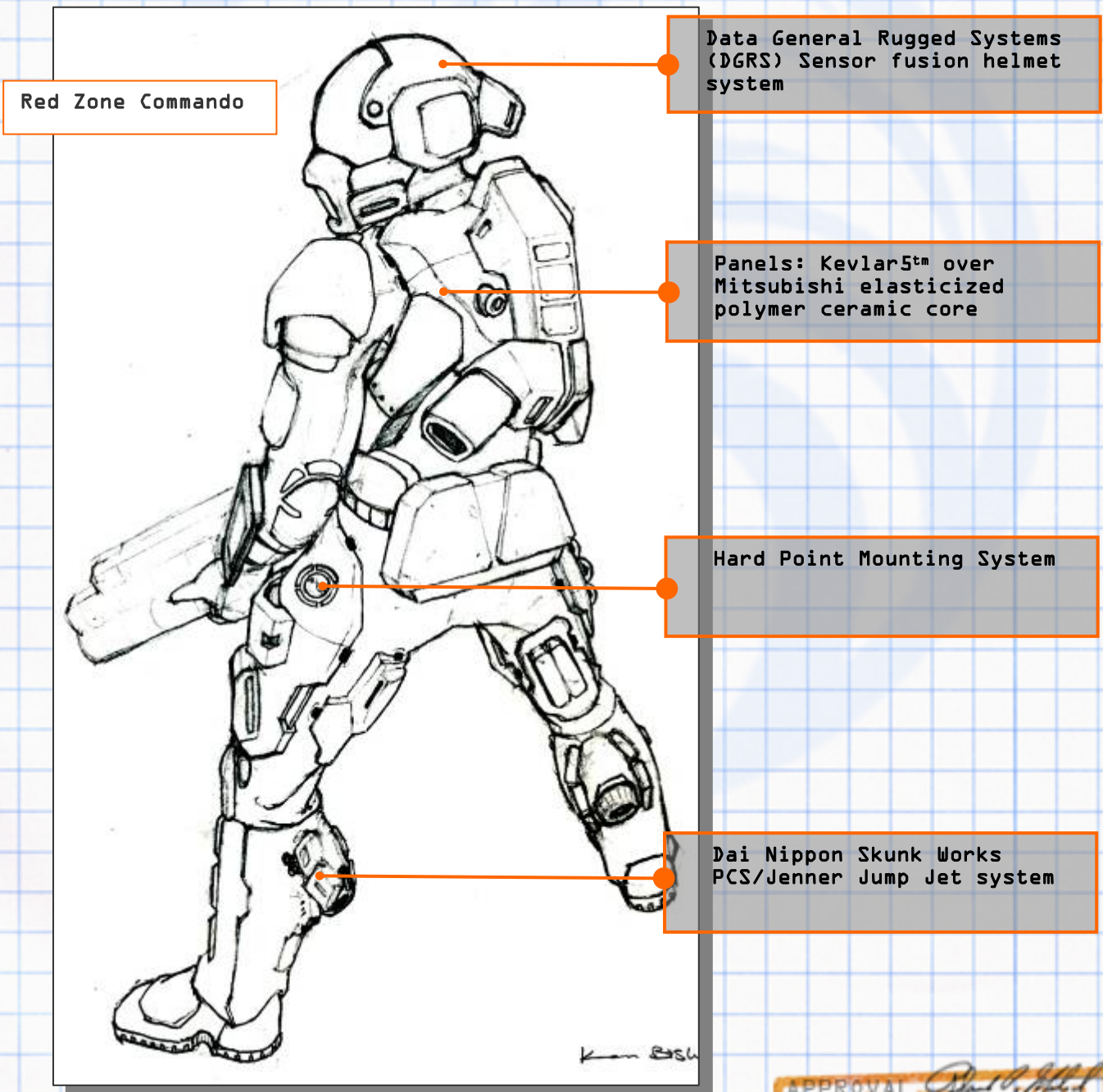
MAP-H:  
Mobile Artillery  
Platform - Heavy

APPROVAL *[Signature]*  
BLOCK 20 2006

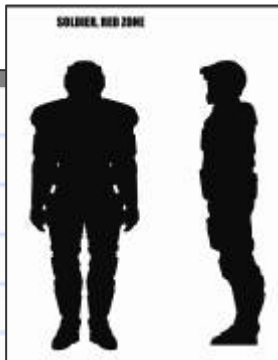
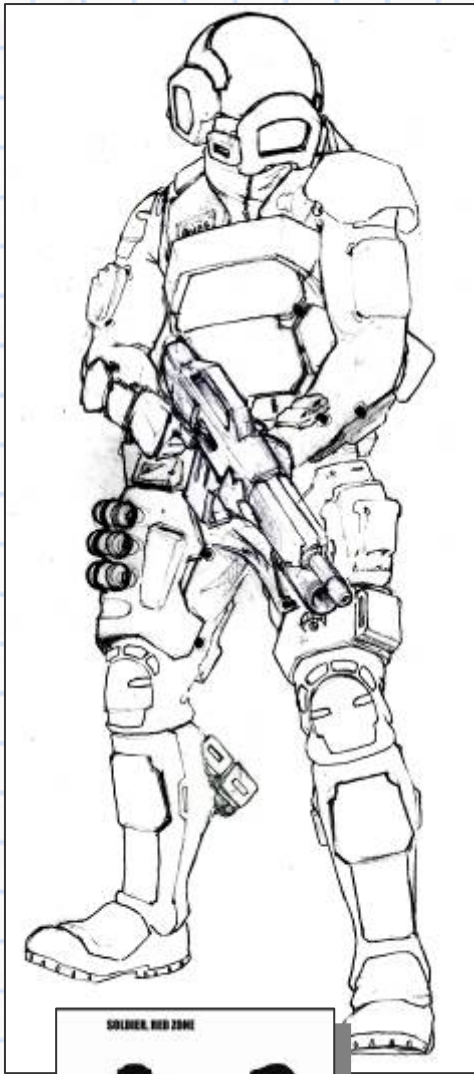
#### 4b. Archetypal Form: Contextual Design

Graphic forms of the Red Zone Commando armor and equipment were derived from the posture, locomotion and function of predatory animals such as feral dogs, raptors and big cats (leopards, jaguars etc.) inspiration. It was important in the design to be able to "See the Soldier" in the equipment and not hide the human, which ultimately is the core technology at the foundation of all Combat Armor Development. For further information see GDI Technical Bulletin #4 - GDI Combat Uniform and Equipment.

#### Case Study: CPA - Red Zone Commando Combat Power Armor



APPROVAL *[Signature]*  
BLOCK 20 2002



Blue Zone Commando

**Contextual Design** - is a critical part of the GDI design process. In order to create valid and deep Industrial Design the context of the world in which the design will exist must be considered at every step.

Re-configuring Red-Zone power armor for use in the Blue Zone battle arena requires a thorough understanding of the needs of the soldier and the context of his field of service.

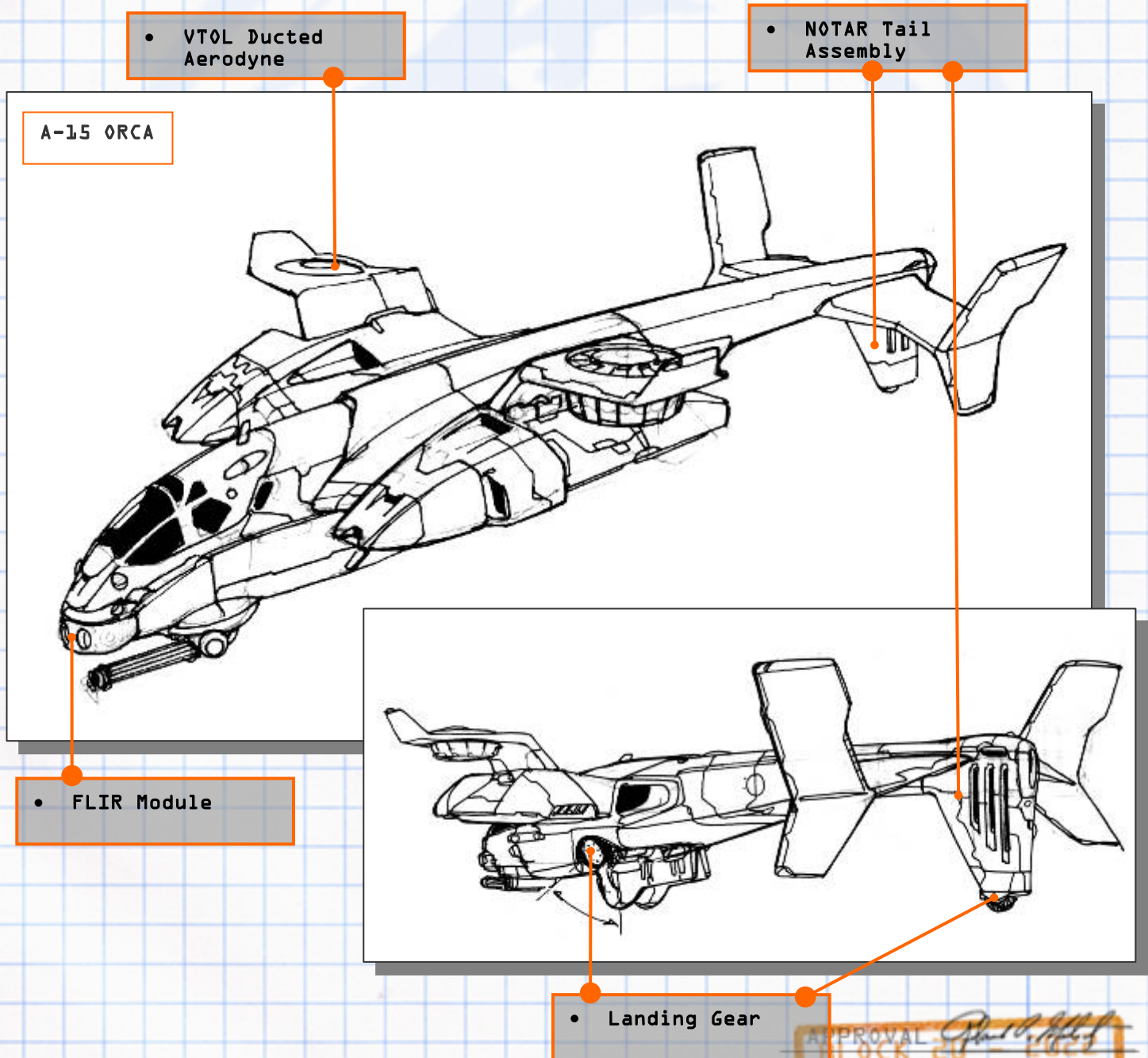
APPROVAL *Paul D. Hoff*  
BLOCK 20 10/27/06

#### 4c. Visible Technology

GDI is known for creating functional (some would call them ugly) combat units and structures. One of the key elements in GDI design is "making the tech visible". While NOD design tends to mask the functional tech in highly sophisticated form GDI units and structures "wear their tech on their sleeves".

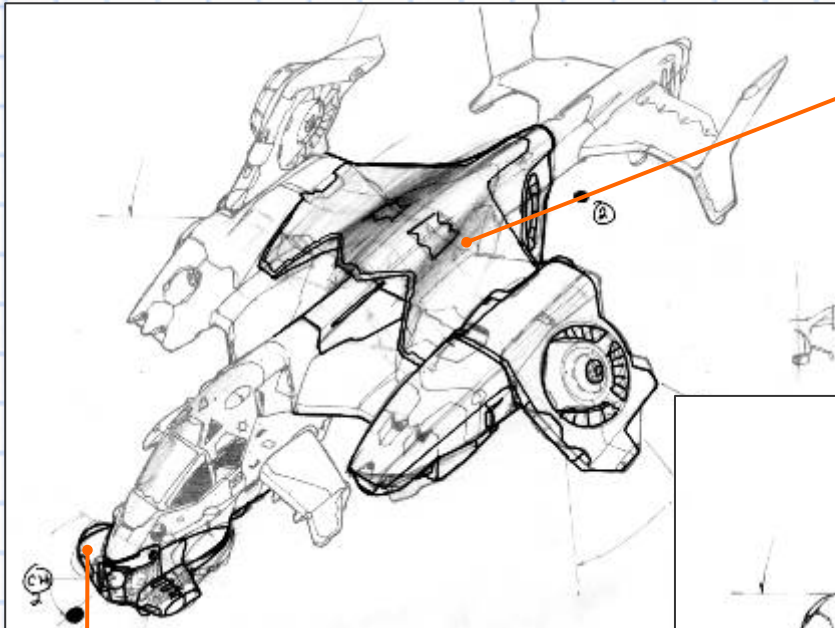
The SAAB/Lancaster Lifting Body, Inc.'s A-15 'ORCA' is a prime example of making technology visible in the most advanced attack aircraft in the history of GDI engineering.

#### Case Study: A-15 'ORCA'



APPROVAL *[Signature]*  
LOCK 20 2002

## A-15 ORCA: Block 20 thru Block 50 Tech Upgrades

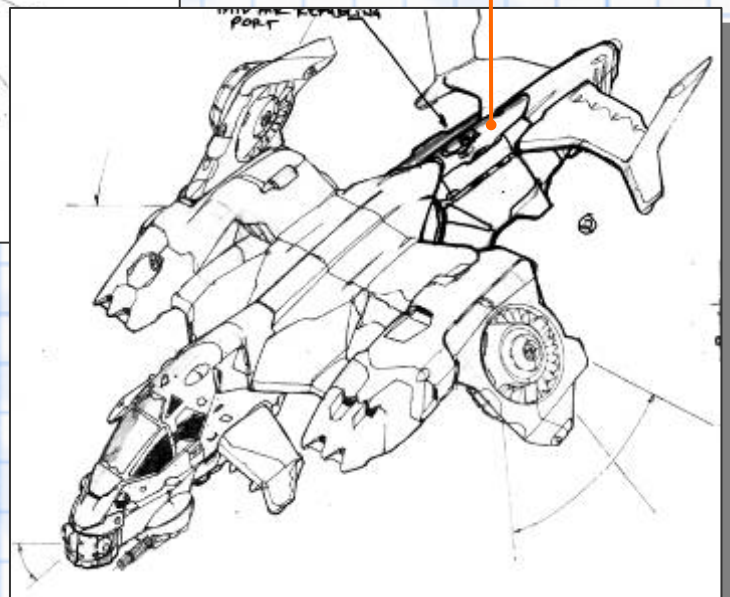


'LINEBACKER' Engine Upgrade

**LBCR** (Lifting Body Combat Thrust Retrofit)

'NERF' Fuel Tanks

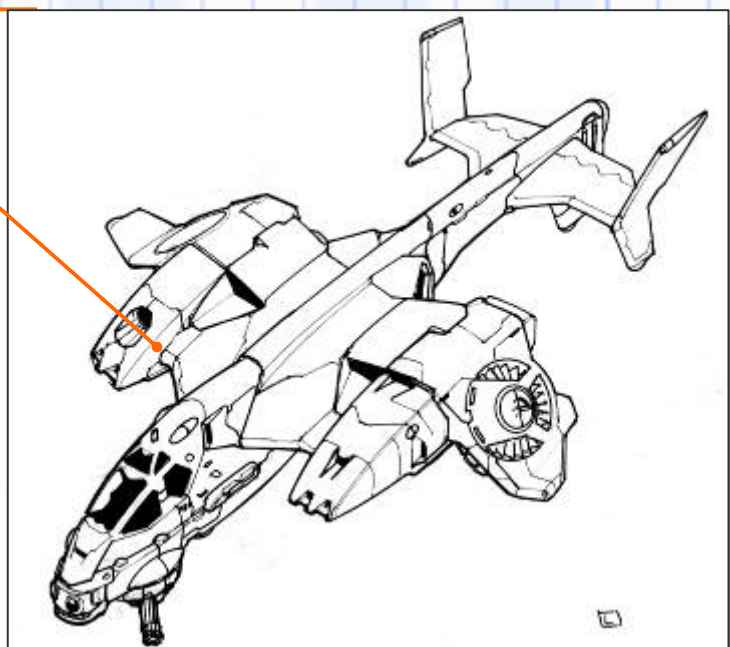
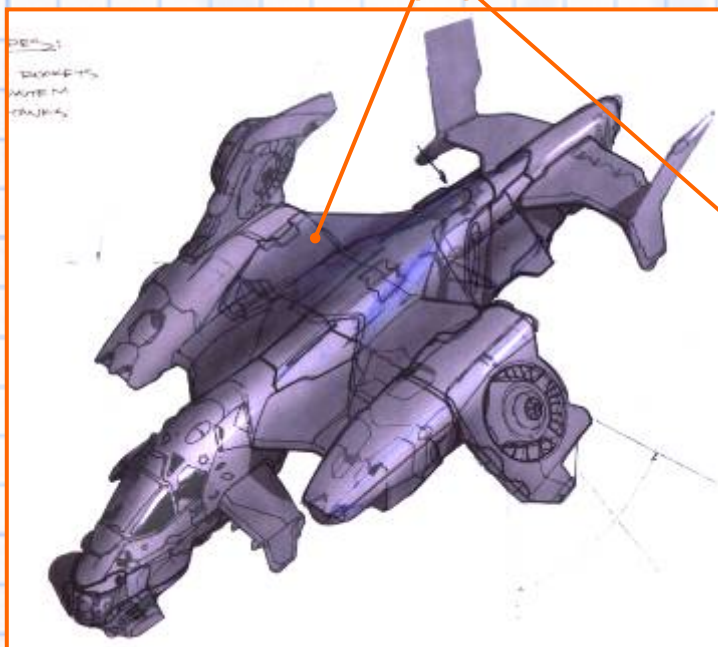
**NERF** (Nominal Extended Range Fuel)



'HAMMERHEAD' EMP

**HMRD** (High Frequency Massive Radiant Disruptor)

Affordance: The A-15 ORCA with Block 20 thru 50 upgrades VS. the base A-15 ORCA - Notice the silhouette change



APPROVAL  
BLOCK 20 - 1002



### Summary: Affordance - Creating Visual Fiction

Creating a visual design language that describes function is also telling story of the unit. The story of the unit - its visual fiction - is the result of its form, its function and making the technology and of the unit visible- all in the context its world.

### Addendum: Block 10 Technical Bulletin Schedule -

- Technical Bulletin No.1 - Design - V2.0 Complete
- Technical Bulletin No.2 - Panel-Flage - V2.0 Complete
- Technical Bulletin No.3 - Environment Fractals - V1.0 In Process
- Technical Bulletin No.4 - NOD - V1.0 Complete
- Technical Bulletin No.5 - Xenomorphs- V1.0 In Process
- Technical Bulletin No.6 - Character - V1.0 In Process
- Technical Bulletin No.7 - UI/HUD - V1.0 Not Started
- Technical Bulletin No.8 - Color and Graphics - V1.0 In Process
- Technical Bulletin No.9 - Visual Effects - V1.0 In Process
- Technical Bulletin No.10 - Rendering Technology - V1.0 In Process
- Technical Bulletin No.11 - In-Game Cinematics - V1.0 In Process
- Technical Bulletin No.12 - TBD
- Technical Bulletin No.13 - TBD
- Technical Bulletin No.14 - TBD
- Technical Bulletin No.15 - TBD

APPROVAL *Paul W. Hoff*  
BLOCK 20 2006