BLUEDOG.DESIGN.BUREAU
BDB

MANUAL

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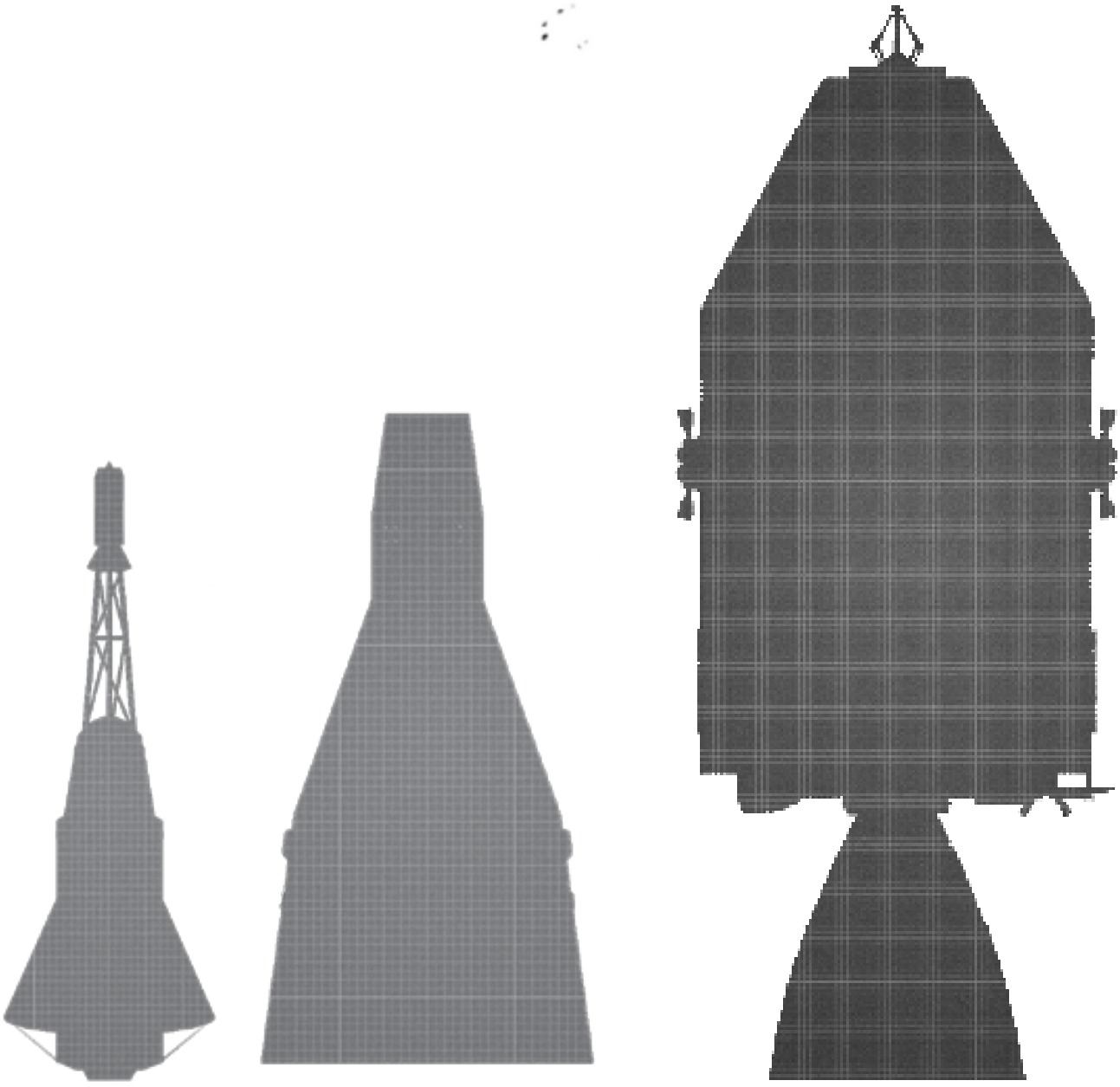
~~CONFIDENTIAL~~

Section 1. SPACECRAFTS

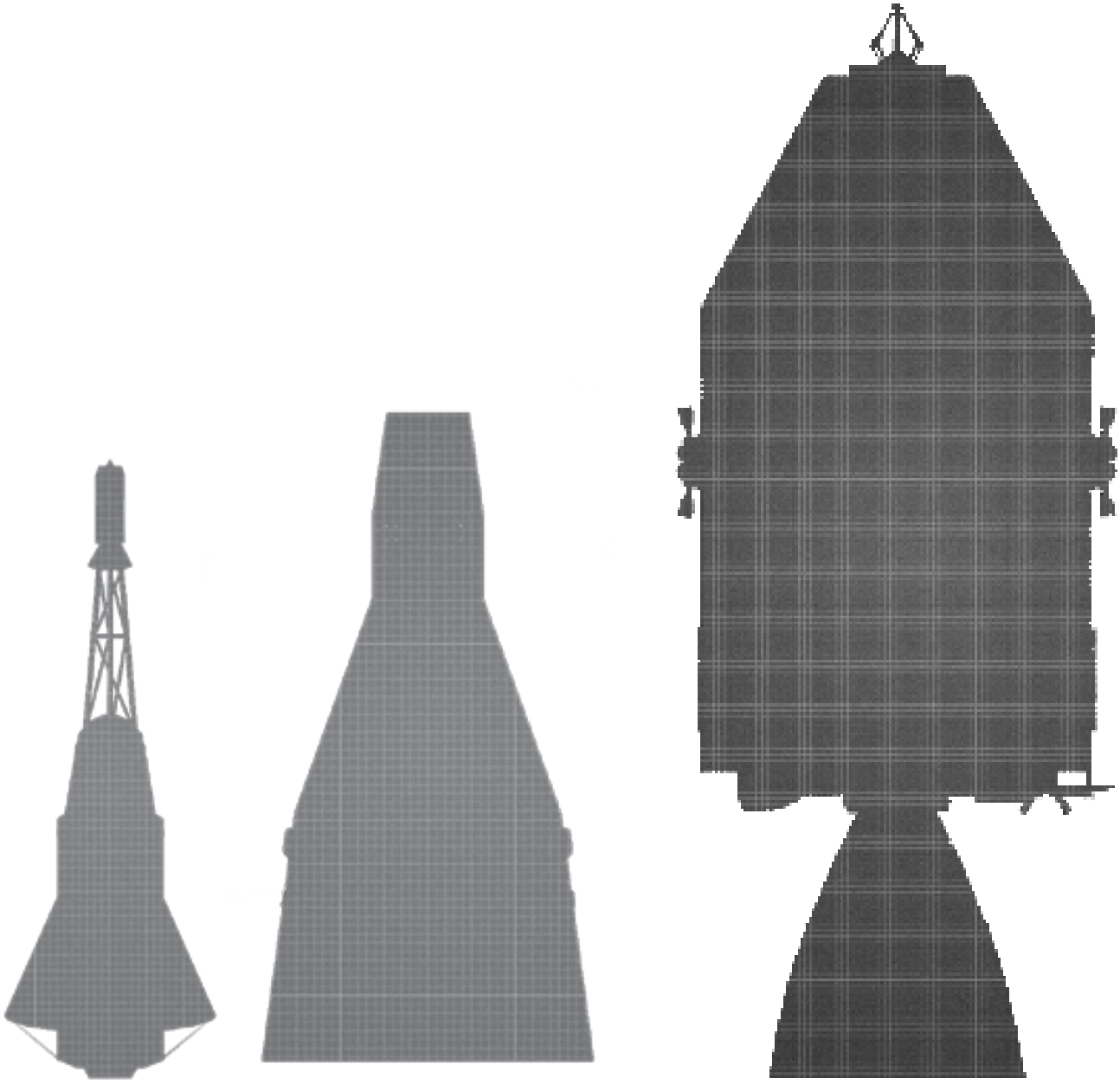
Section 2. LAUNCH VEHICLES

Section 3. UPPERSTAGES

SECTION 1. SPACECRAFTS



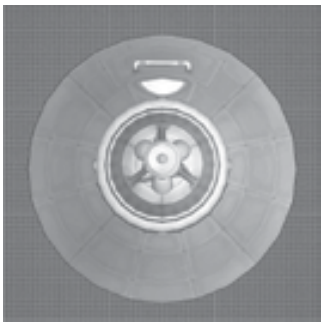
ORBITERS



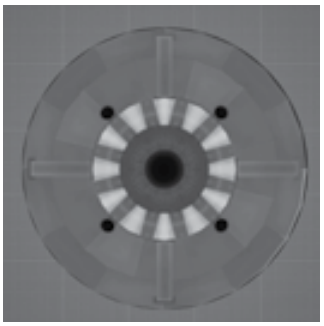
1.1 HERMES SPACECRAFT

-from top to bottom-

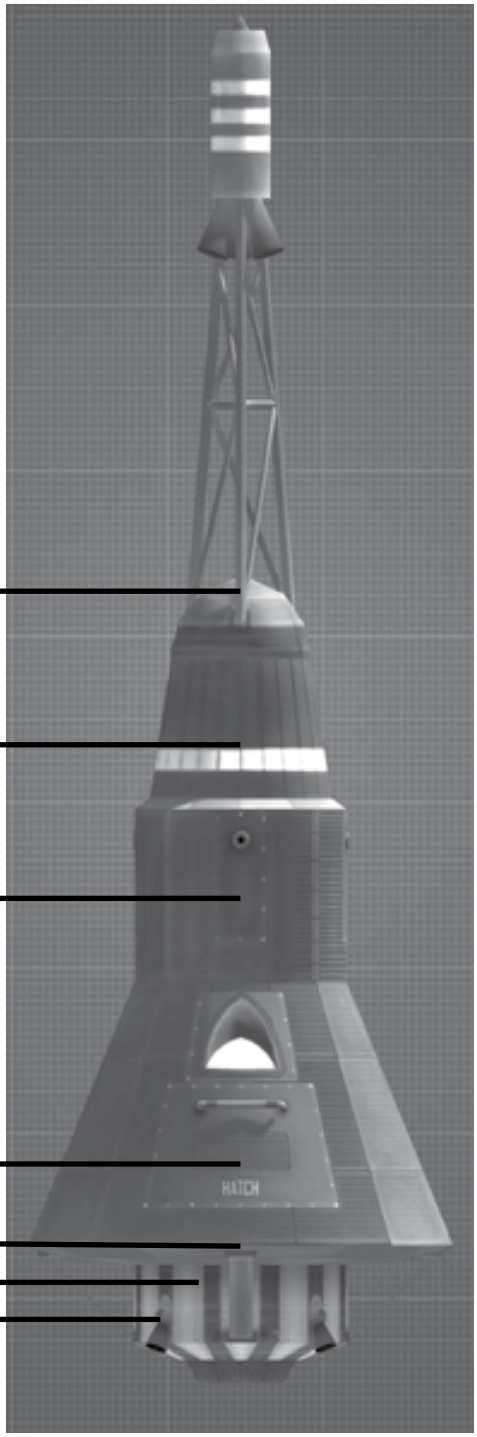
The HERMES capsule is the result of a crash program by Bloeting Aerospace to develop a manned pod as a competitor for the Krussian space program. The design was later sold to BDB for a price of 'free'. It doesn't have much scientific potential, but can be used to develop the skills your space program will need for more complex missions down the line.



Top view



View from below



HERMES M-LES (Launch Escape System

HERMES M-SAU (Science Antenna Unit)

HERMES M-LCM (Landing Control Module)

HERMES M-PRC (Personal Rentry Capsule)

HERMES M-HS (Heatshield)

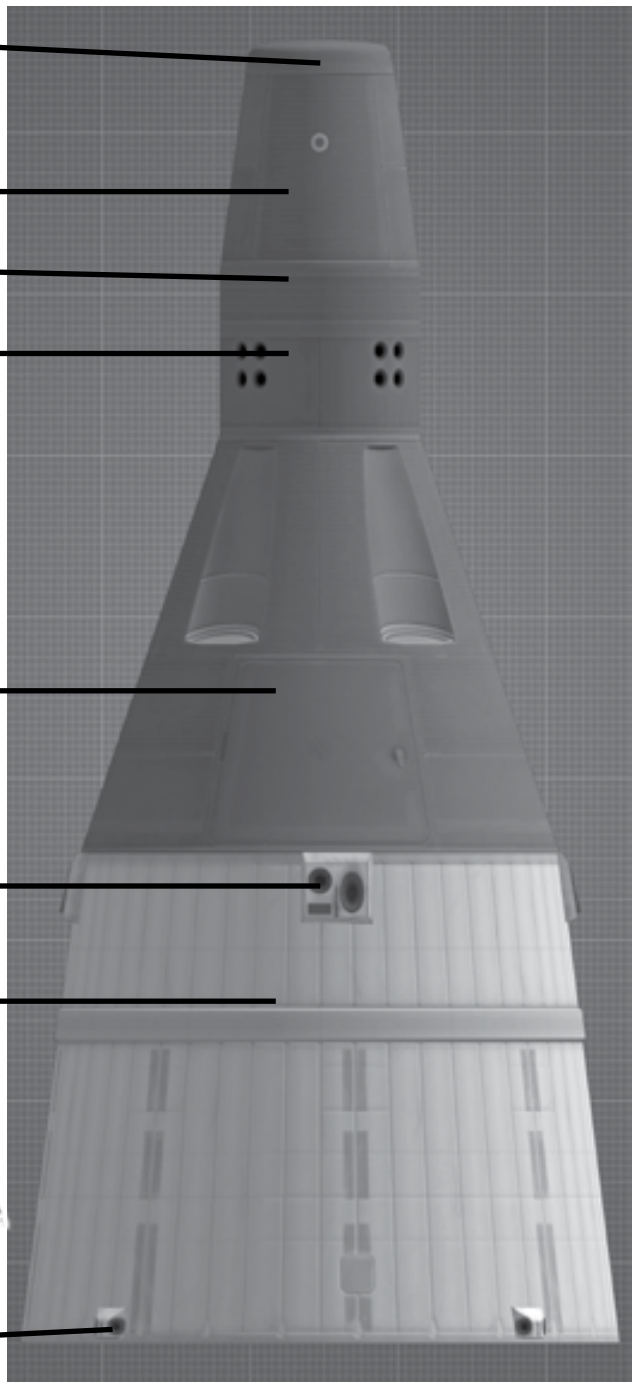
HERMES M-DB "Sheperd" Descent Booster

Hermes M-PM "Zoot" Kick Motor

1.1 VINCI SPACECRAFT

-from top to bottom-

Leo is the first pod designed to allow you to send two Kerbals into orbit. It was developed by Tantares as a contract for BDB. It includes a docking port in the nose for docking with Belle Target Vehicles or even small stations. Its capabilities can be increased by replacing the service module with an expanded crew cabin.



1.1 VINCI SPACECRAFT DETAILS

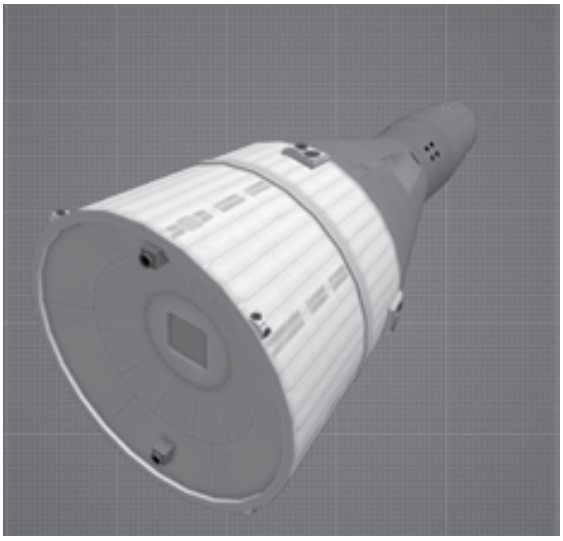


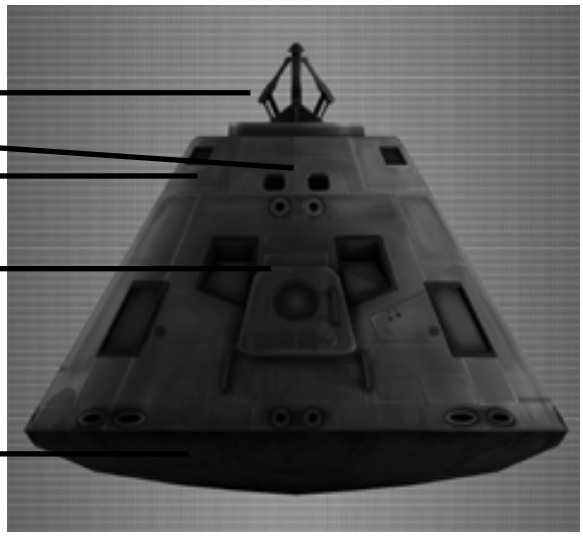
figure.1 View of Leo "Medicis" service module

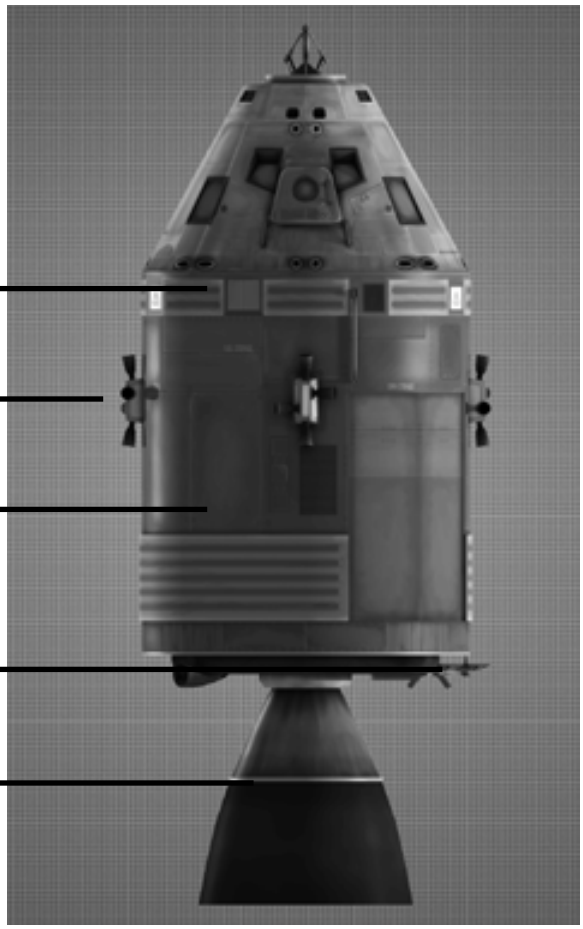
WARNING : LEO SERVICE MODULE HAS 500 UNITS OF MONOPROPELLANT WHICH DELIVER APPROX. 8MIN OF THRUST

1.1 KANE 11 CSM SPACECRFAT

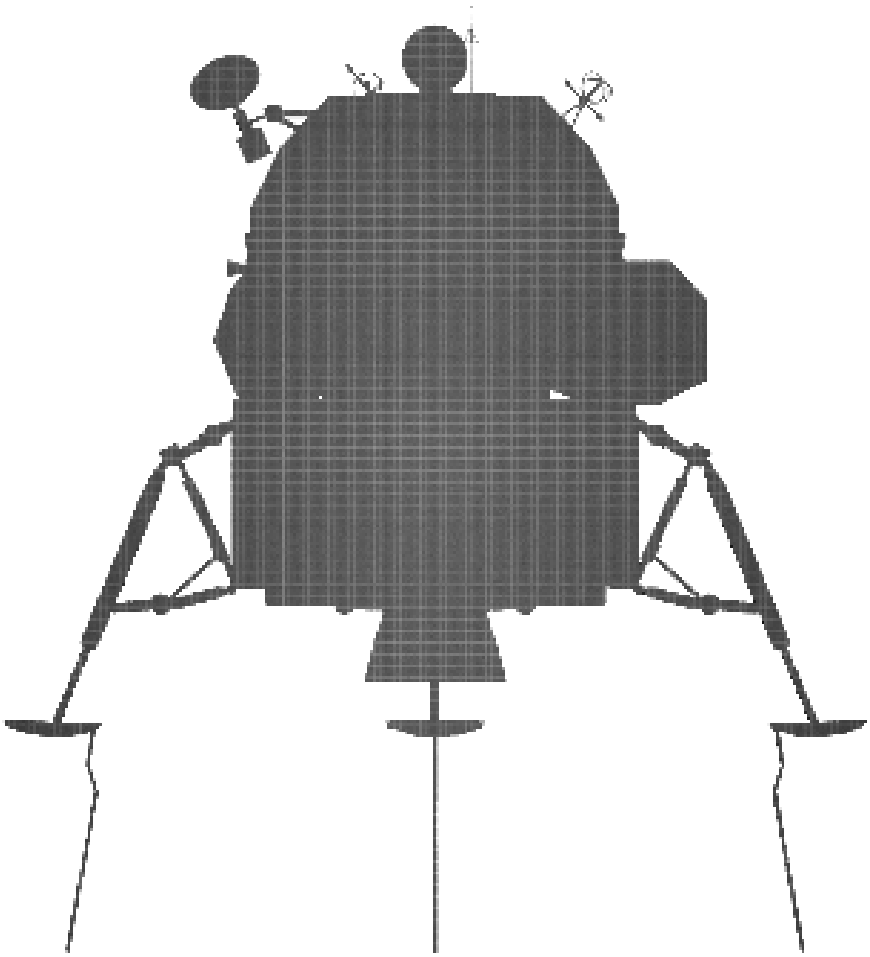
-from top to bottom-

Our flagship spacecraft is the Káne-11 CSM. The Block 1 configuration was abandoned during testing, replaced with the much safer and more able Block 2. Capable of carrying a 3 man crew, the design originally was meant to be a general purpose orbiter, then modified for a Direct Ascent Mun landing, before being pressed into service for Munar Orbit Rendezvous. The flexibility of the design is testament to its superb engineering. Using the Block 2 as a starting point, a number of variants will soon become available.





LANDERS



1.2 SINA MEM

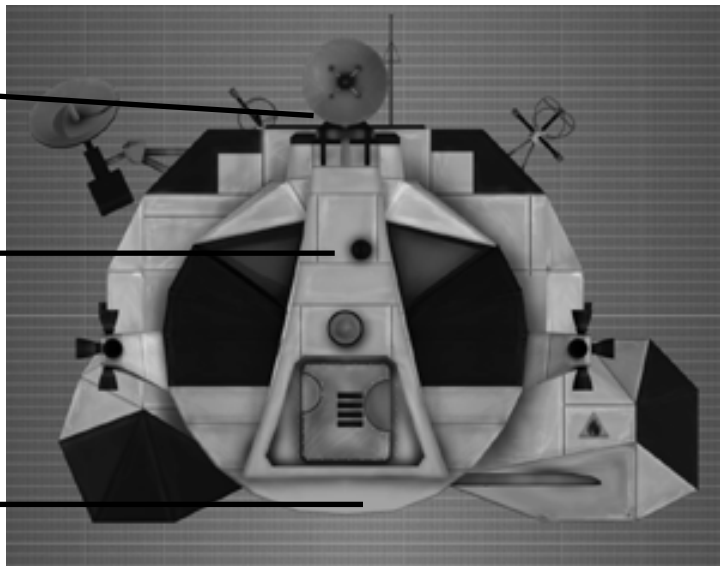
-from top to bottom-

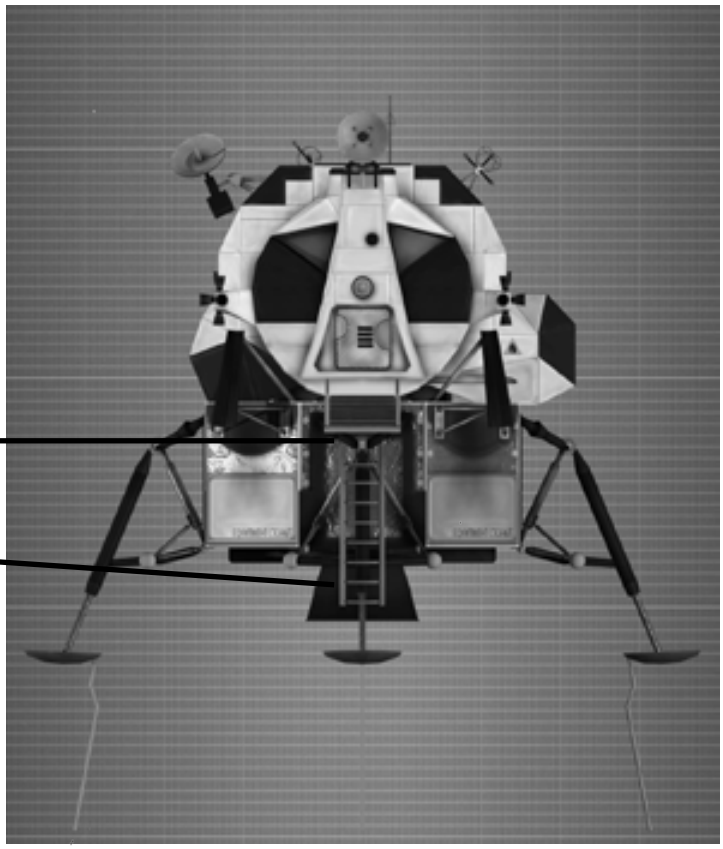
The Sina MEM is the result of a decade spanning engineering effort to produce a lander capable of safely setting two Kerbals down on the Mun, and returning them to Kerbin via Munar Orbit Rendezvous. The two stage lander is divided between the white and black Ascent Stage, which houses most of the lander's systems including the crew, and the Descent Stage, which is filled with fuel and supplies for surface operations.

Kane-11-DDM 0.625m Passive Docking Mechanisme (place it on the roof)

Sina-MEM-ASC Ascent Stage Cockpit

Sina-MEM-APS Ascent Propulsion System (place it on the bottom)

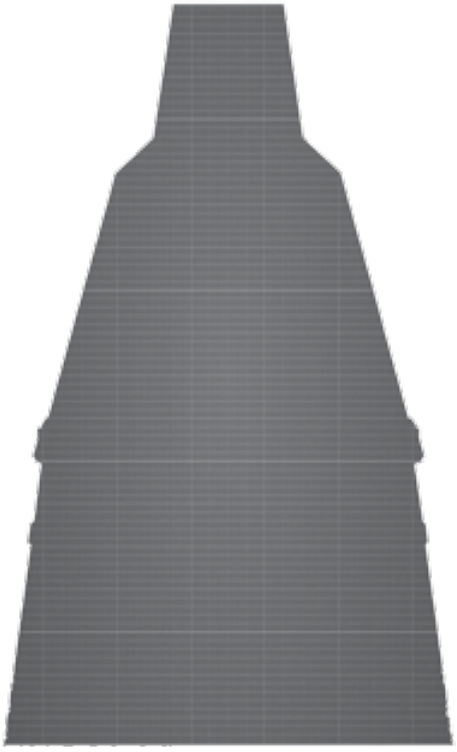


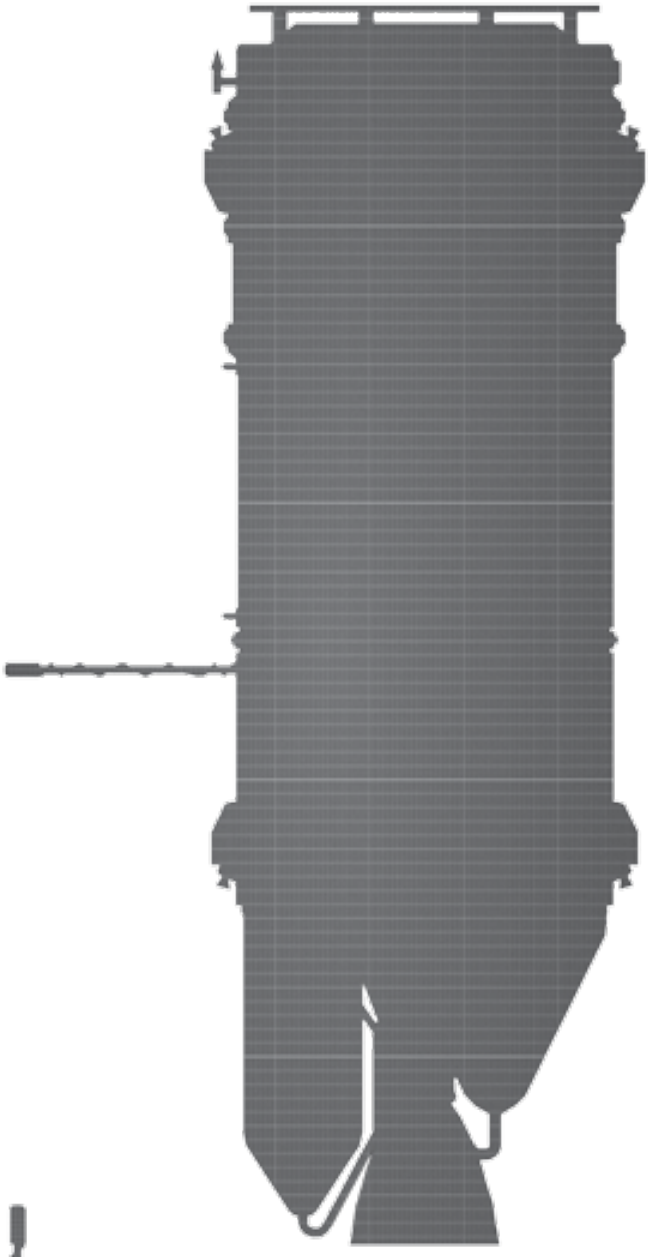


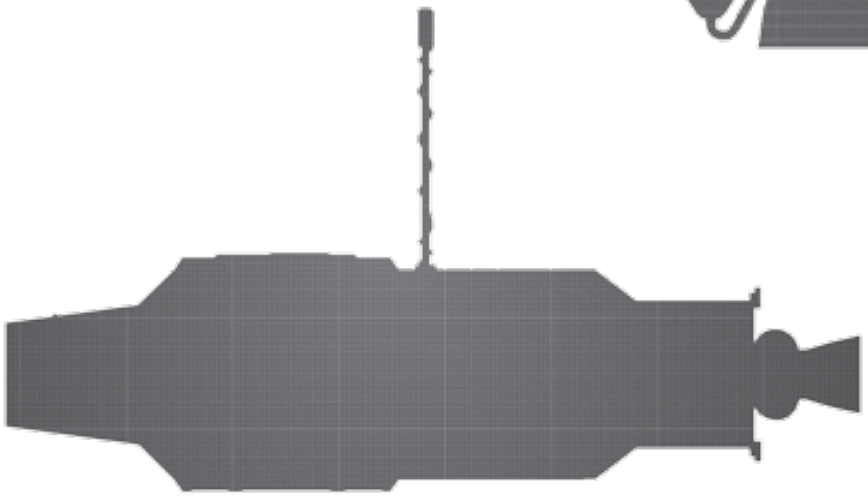
Sina-MEM-DTS Descent Stage Assembly

Sina-MEM-DPS Descent Propulsion System

RESUPPLIES







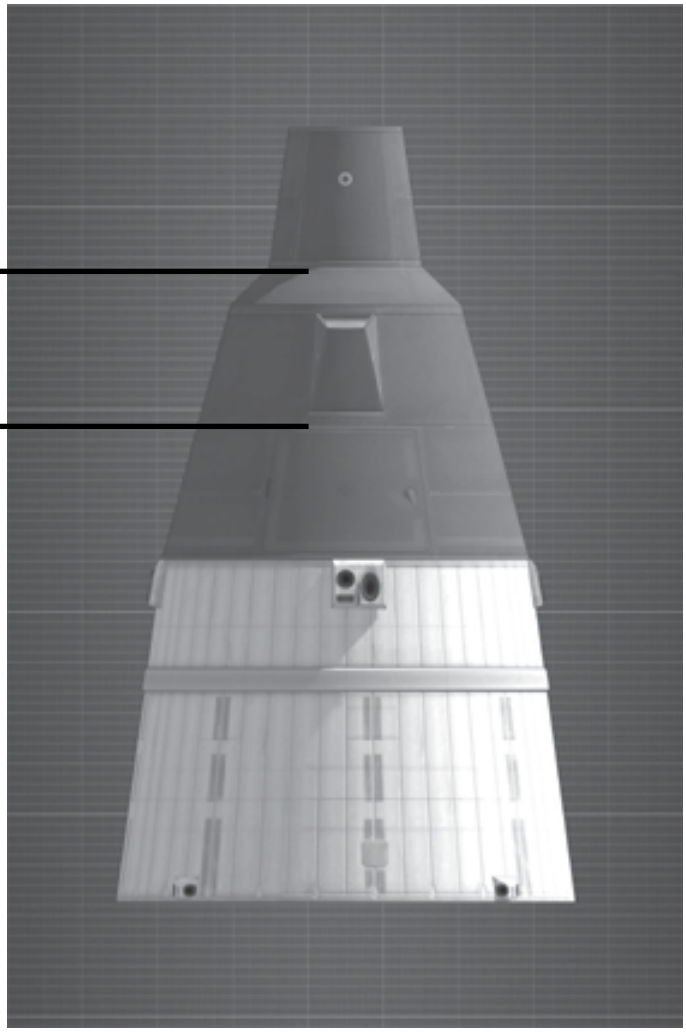
1.3 LEO AUGUSTUS CARGO

-from top to bottom-

Designed to maximize use of existing technology, the Augustus ORV (Orbital Resupply Vehicle) was the Leo team's entry into the AORV1 contract bidding. It reused the service module and most of the exterior command module hardware of the Leo CSM, albiet adjusted to form a different angle. The interior was stripped down, and the back wall - near the heat shield - was filled with an autonomous avionics package. The rest of the interior was fitted out to be pressurized with supply palletes. The disadvantage - that the palletes have to be unpressurized during EVA retrieval - is shared with the Belle ORV, however, it offers significantly more volume and can be flown on the same launch systems as the Leo CSM.

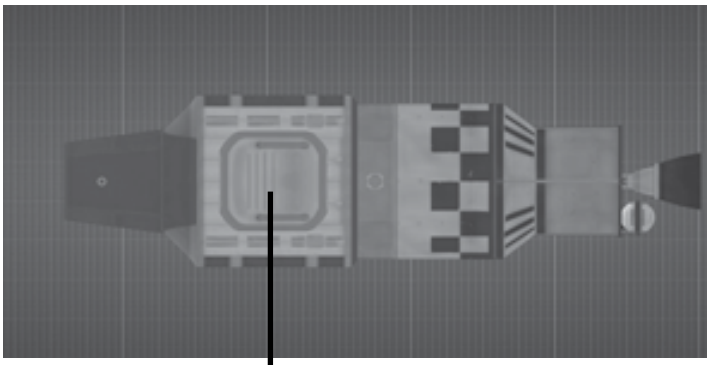
BSA-0050-0000-Leo-SA93 Structural Adaptater

Leo-M-ARP “Augustus” Automated Resupply Pod



1.4 BELLE AORV

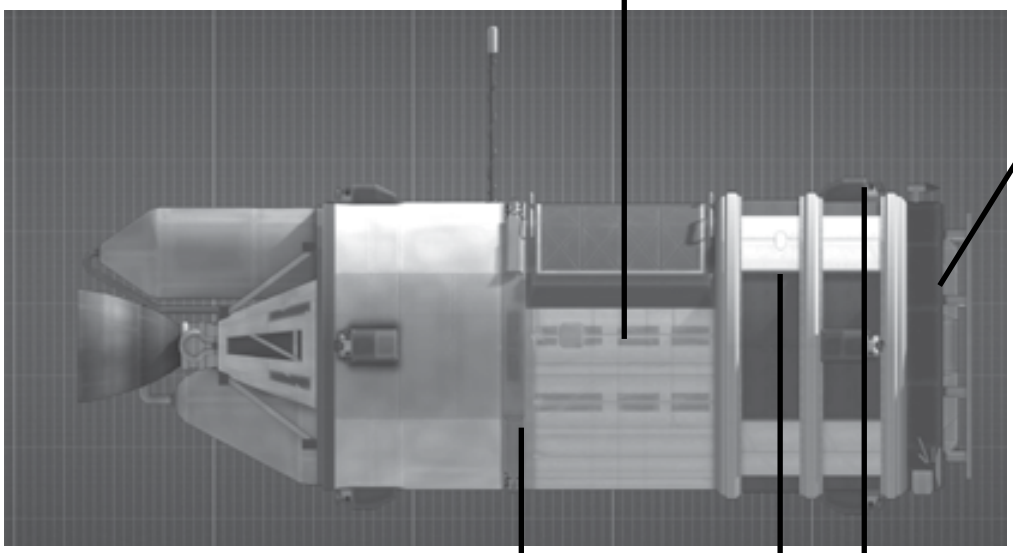
The smallest design entered into the AORV1 (Automated Orbital Resupply Vehicle - 1) contract bidding, the Belle ORV's main advantage - and disadvantage - is its size. This tiny resupply craft, built on the proven concept of using a Belle A upper stage as a service module and command bus, can be launched on smaller (and cheaper) launchers than the other two AORV1 designs. While this may allow more frequent, or perhaps more rapid launches in cases where time is sensitive, it cannot compare in terms of upmass. The other big disadvantage is that any cargo must be depressurized for retrieval during EVA - a weakness shared with the Augustus ORV.



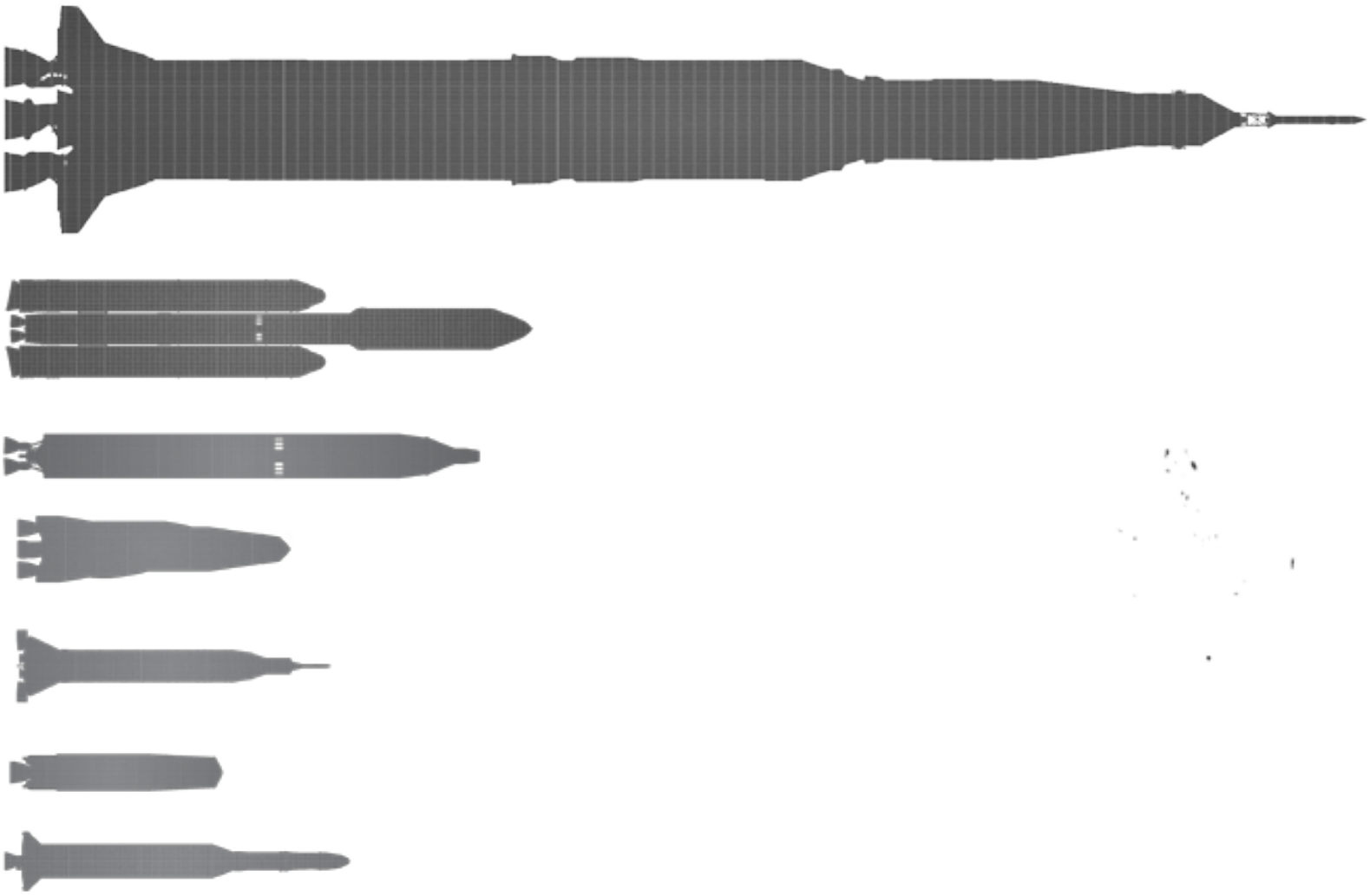
Belle-ORM Orbiter Ressuply Module

1.5 RHEA CARGO

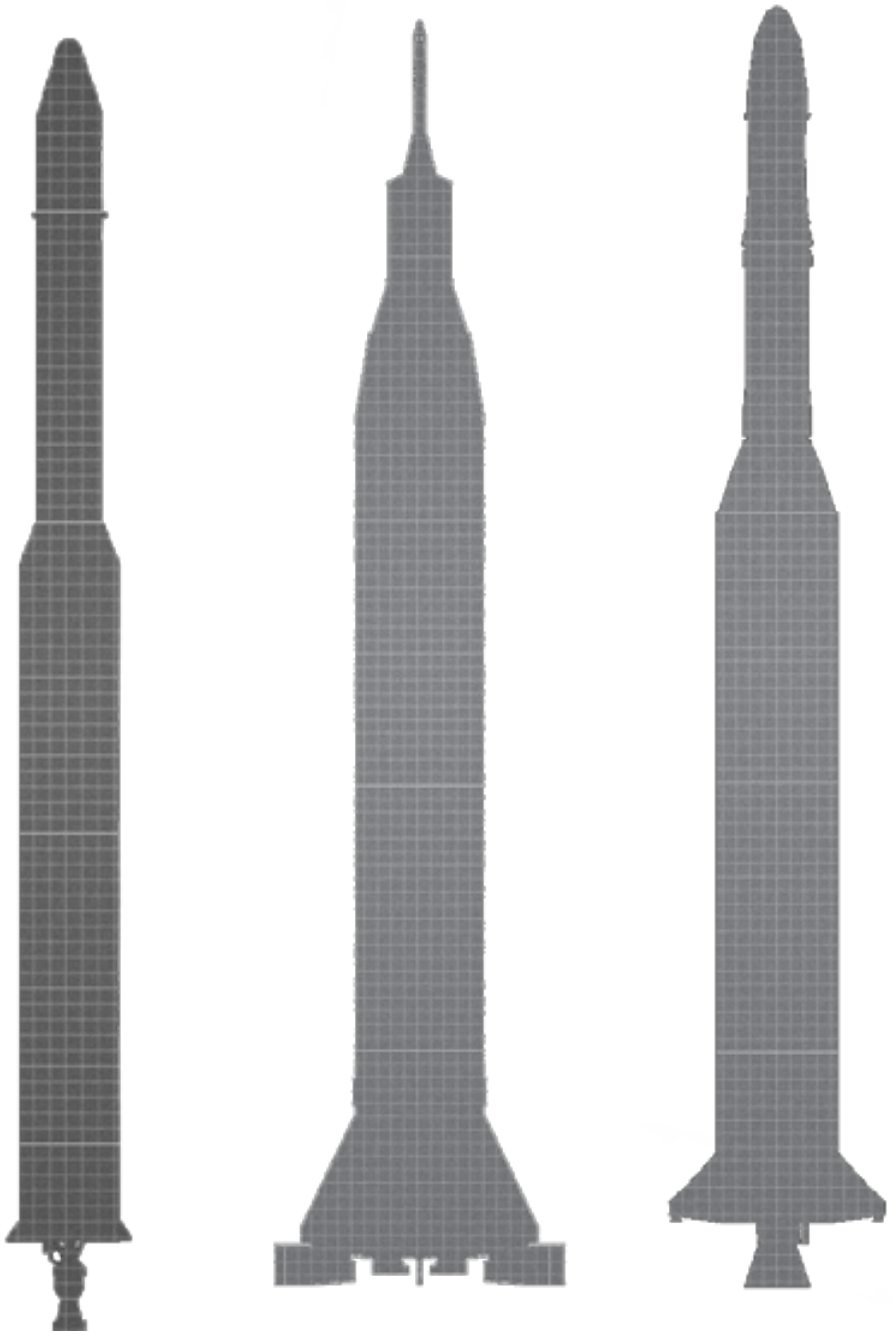
The Rhea ORV was submitted to the AORV1 contract bidding by a relative outsider team within BDB - the team responsible for the Metis Transtage. Their design used the Metis as a service module, and then added both a large pressurized volume and an unpressurized volume in the same diameter. The Rhea is the only vehicle that had a large enough diameter to mount an MOS-DM Docking Mechanism, allowing the crew to travel in and out of the pressurized compartment without conducting an EVA. The unpressurized volume can be used to send up experiment palettes and hardware to be mounted to the outside of the station. The downside of the Rhea is its large size and weight - you'll need a fairly large (and expensive) lifter to send it up. Note that the unpressurized compartment can be replaced with another pressurized module.



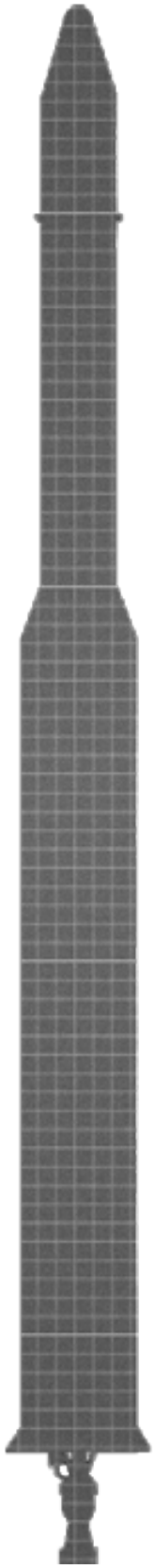
SECTION 2. LAUNCH VEHICLES



LIGHT LAUNCHERS



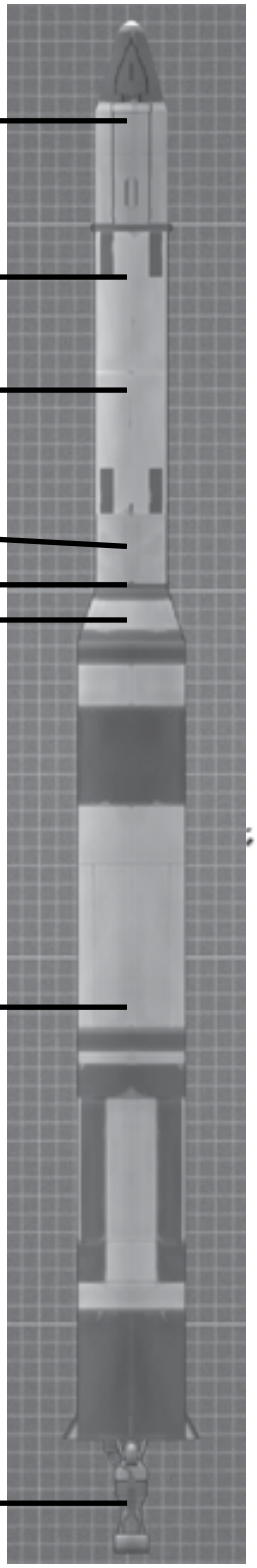
VIKLUN LAUNCH VEHICLE



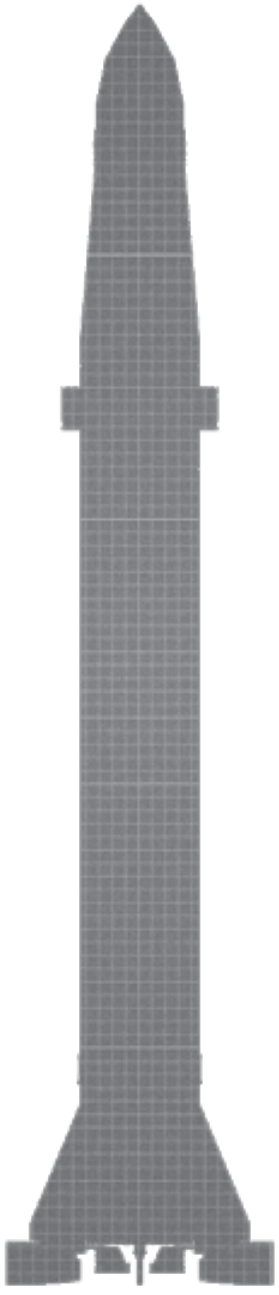
2.1 VIKLUN LAUNCH VEHICLE

-from top to bottom-

Viklun launch vehicle is the very first rocket provided by BDB, a small and cheap launcher able to loft only the lightest of payloads. Viklun consists of a Viking-50 powered first stage and an Alpha second stage, which is optimized for vacuum use only.



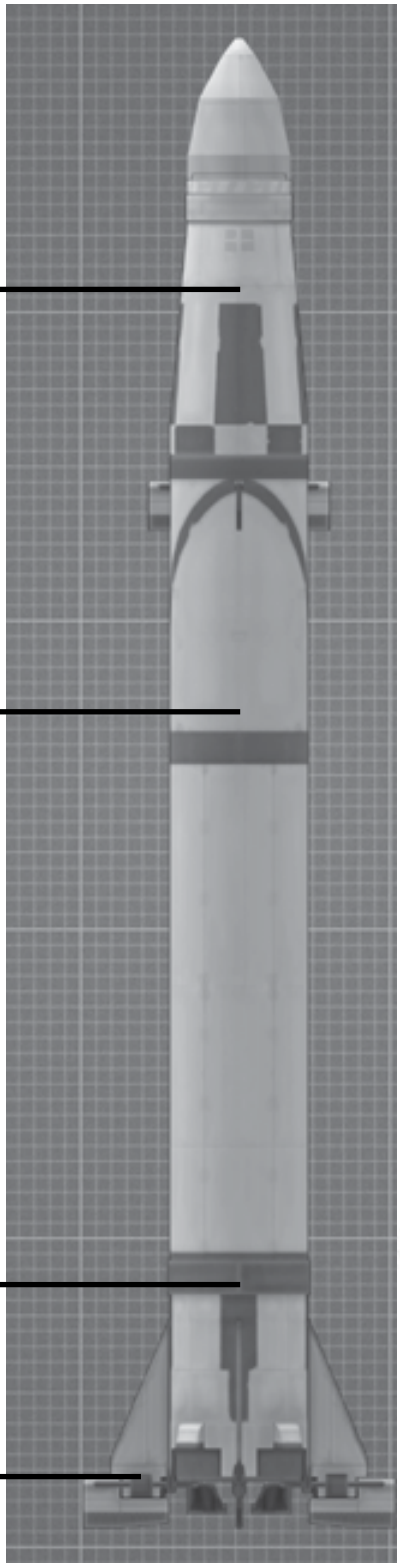
ETOH LAUNCH VEHICLE



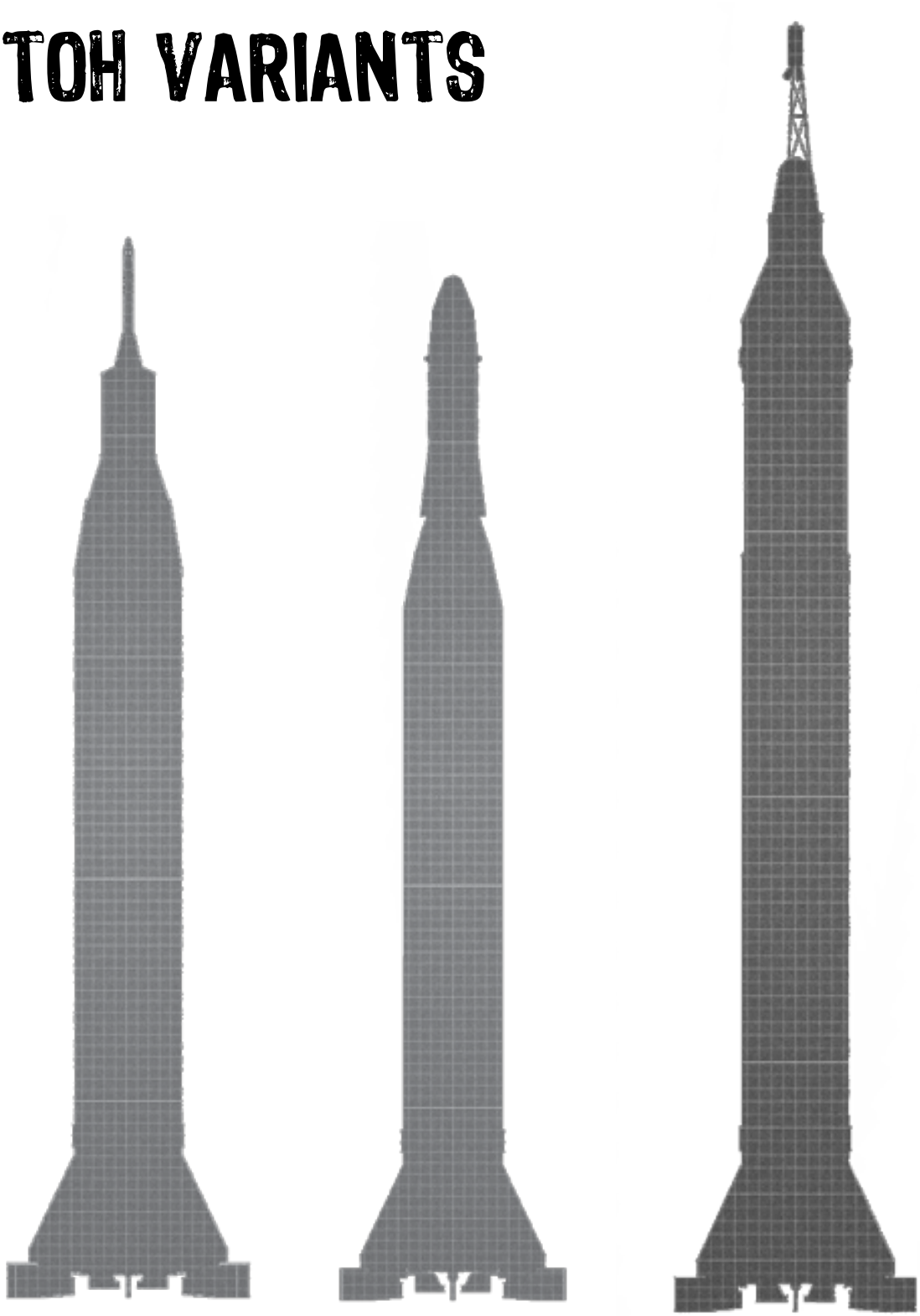
2.1 ETOH LAUNCH VEHICLE

-from top to bottom-

One of the earliest missiles developed, the SANDSTONE, known as ETOH in its civilian variants, runs on an exciting mix of oxygen and alcohol. While fairly underpowered in terms of thrust and ISP, which limits it's possibilities for expansion, it is fairly cheap and available in large supply.



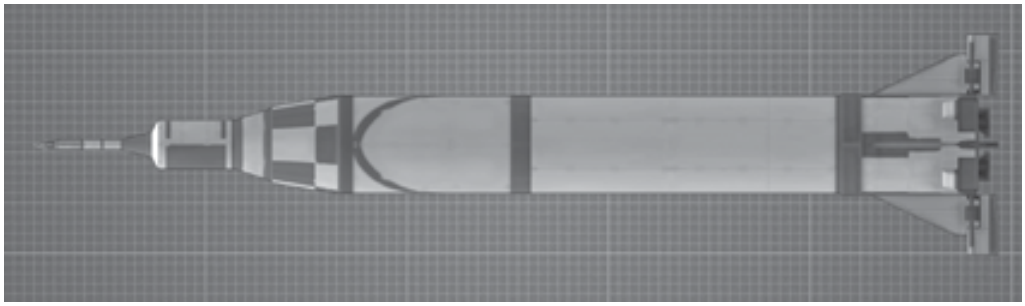
ETOH VARIANTS



2.1 ETOH VICENZA

-from top to bottom-

BDB's first satellite design, SIENNO, was orbited using an ETOH rocket using VICENZA upper stages, following issues with the development of the BRUN rocket (pg9). While we hope that your space program finds earlier success, we have elected to include detailed descriptions of the design for historical purposes.

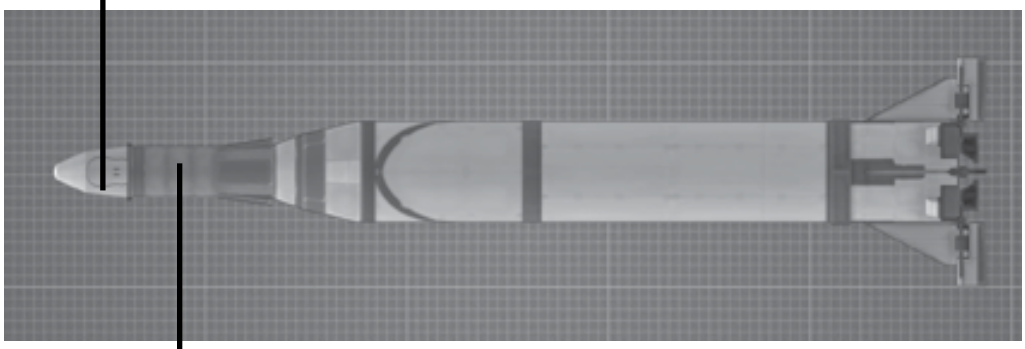


2.1 ETOH SATEVIS

-from top to bottom-

Though the ETOH is now considered a rarely used relic, there were still many examples sitting in storage. BDB decided to use them for engineering tests of reentry vehicles, after fixing two small solid upper stages to the top. A leftover rocket of this variant was later used to give a small backwater country their first satellite.

Staara-10-LYC "Aethra" Solid rocket booster

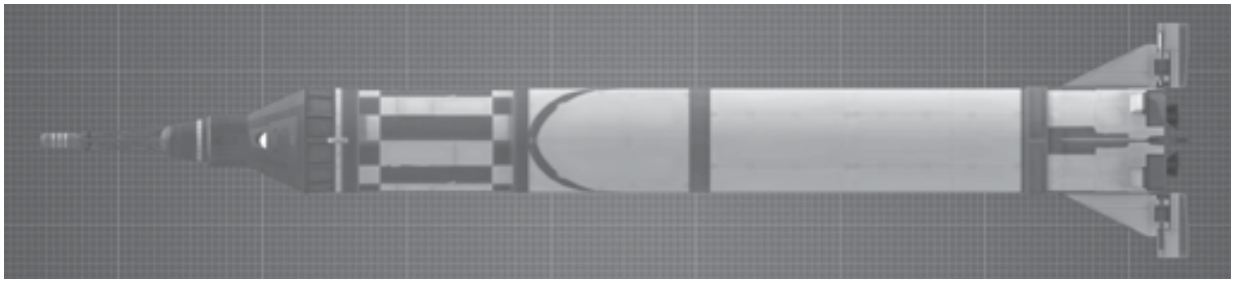


Staraa-31-III- "Satevis" Solid rocket booster

2.1 ETOH HERMES

-from top to bottom-

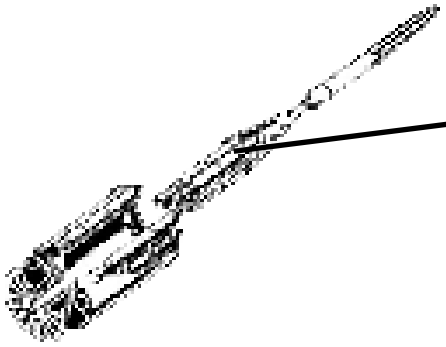
While the ETOH is not capable of bringing a HERMES capsule to orbital velocity, the unknowns inherent of the great void of space needed to be explored in a controlled manner. Specifically, engineers were unsure whether or not the HERMES heatshield would actually work. The rocket was later used to launch HERMES on several suborbital flights.



2.1 VICENZA ROCKET DETAIL

-from top to bottom-

When searching for a cheap solution for helping small probes reach orbital velocity and beyond, BDB engineers came up with a solution that used clusters of VICENZA solid rocket boosters in an 11-3-1 configuration. The design was later encased in a fairing for the CHRYSLUS II rocket (pg21). Refer to diagrams for staging information.



HLR-VD3 goes inside the HLR-VD11 decoupler and "Vicenza-11"

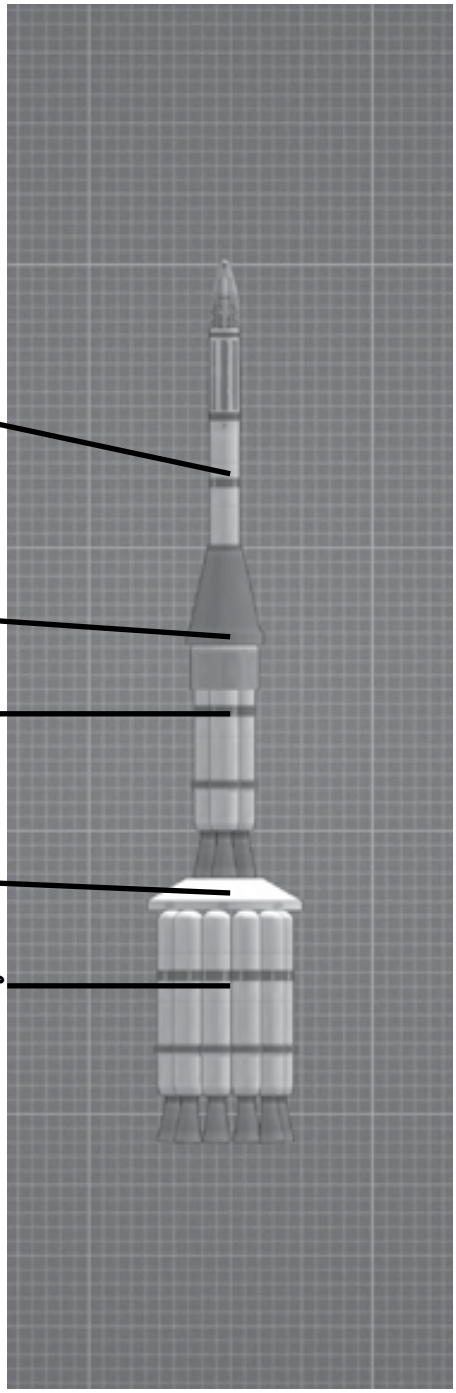
HLR-291 "Vicenza" Solid rocket booster

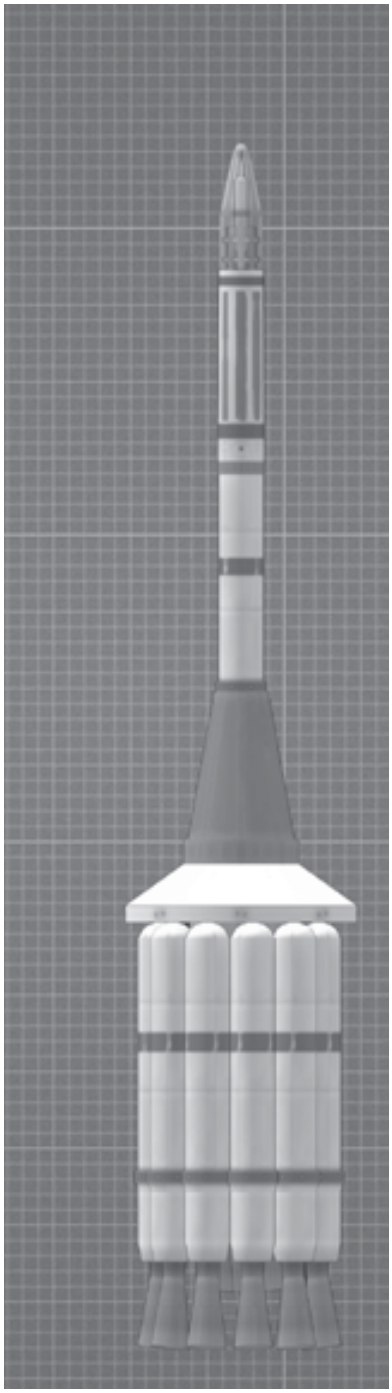
HLR-VD3 decoupler

HLR-293 "vicenza-3" Solid rocket booster

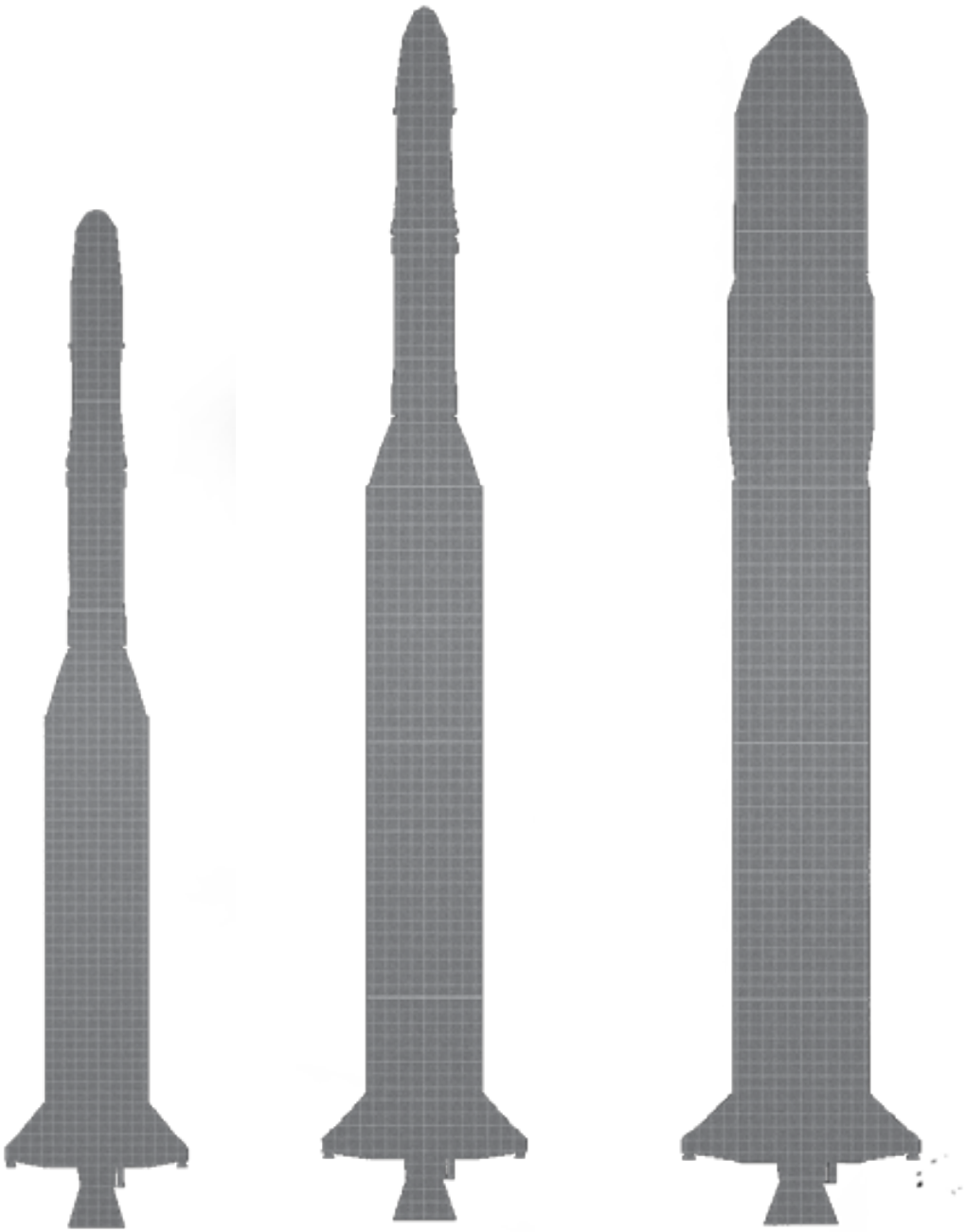
HLR-VD11 decoupler

HLR-2911 "Vicenza-11" Solid rocket booster





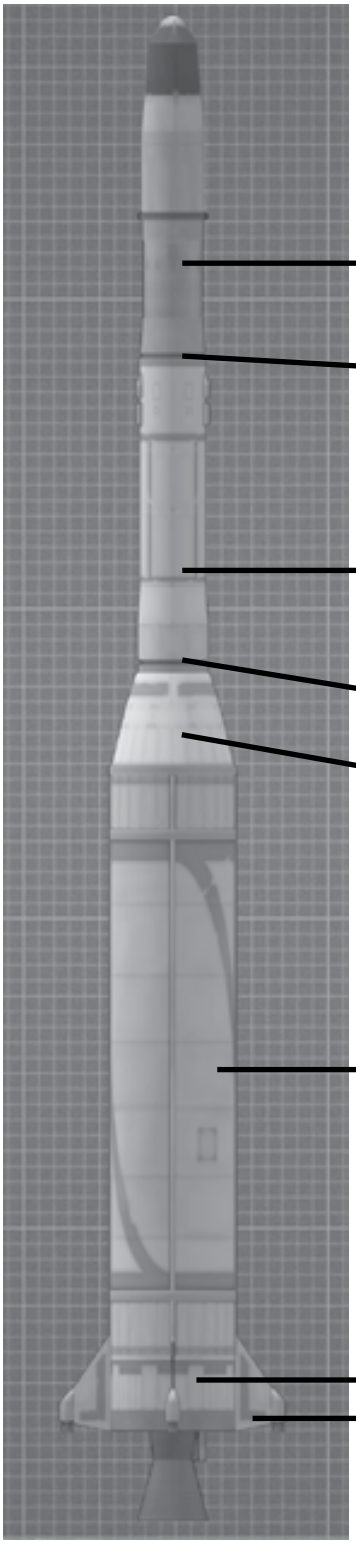
ROSUETTE ROCKET



2.1 ROSUETTE A ROCKET

-from top to bottom-

ROSUETTE is a small launcher designed and manufactured by BDB's overseas affiliates. It combines a liquid first stage with two solid upper stages. Like other BDB upper stage solid motors, they include SAFESOLID™ technology to allow more precise burns. For details about Topaz go page 18.



Rosuette-64 "Snooky" Solid rocket booster

Brun-625 stack decoupler

Rosuette-107 "Topaz" Solid rocket booster

Brun-625 stack decoupler

Rosuette-6SA Structural Adaptater

Rosuette-1000 Liquid fuel tank

Rosuette-175 "Vixen" Liquid engine

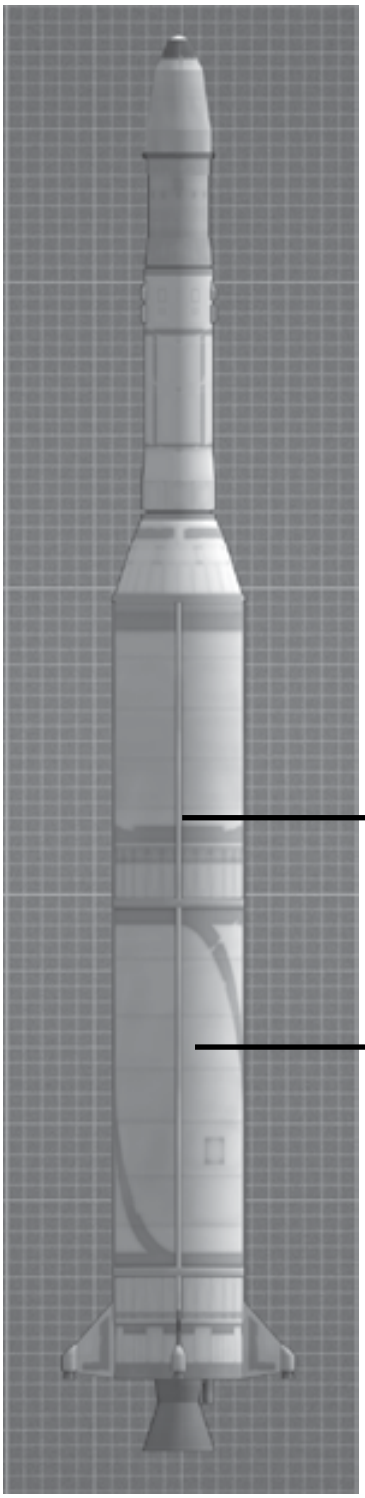
Rosuette-2 "Ailette" Aerodynamic Vernier

2.1 ROSUETTE B ROCKET

-from top to bottom-

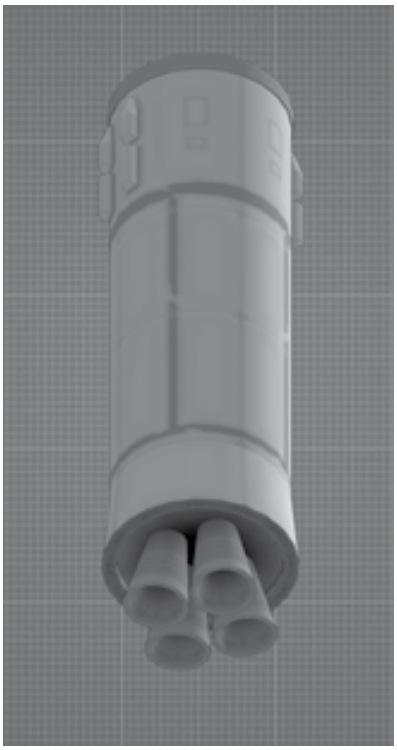
When trying to increase the capabilities of the ROSUETTE A, engineers decided to take the obvious route: Extending the first stage tanks. Thus, the ROSUETTE B was born.

(Topaz description : TOPAZ upper stage, which features four nozzles directing the thrust from a single solid rocket motor.)



Rosuette-500 L.Q.F

Rosuette-1000 Liquid fuel tank

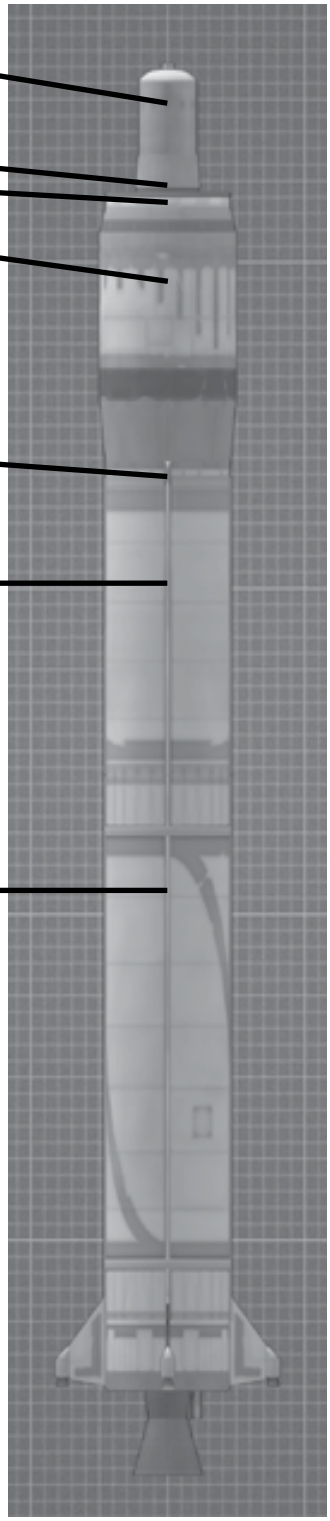


Topaz upperstage with 4 combustion chambers

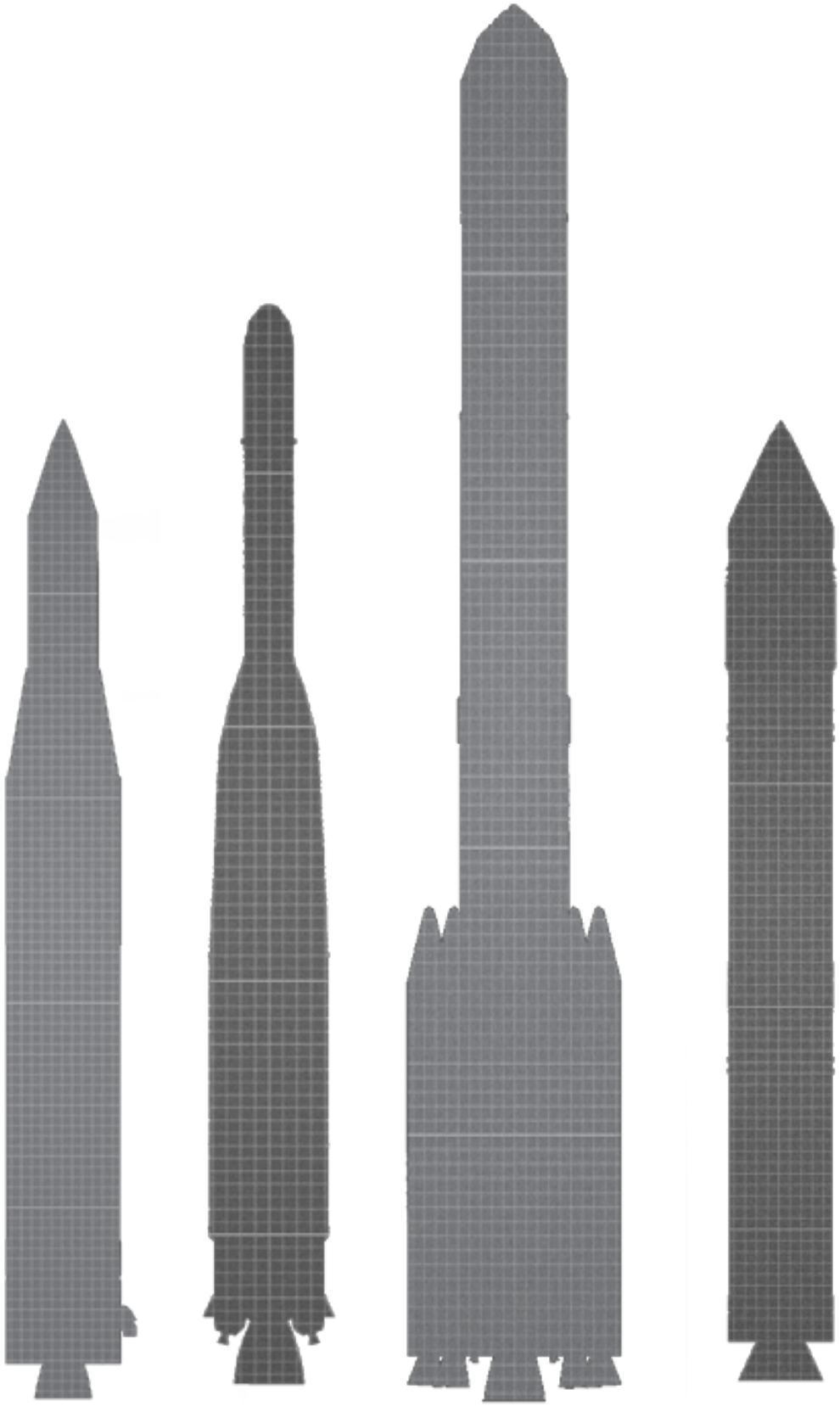
2.1 ROSUETTE BP4

-from top to bottom-

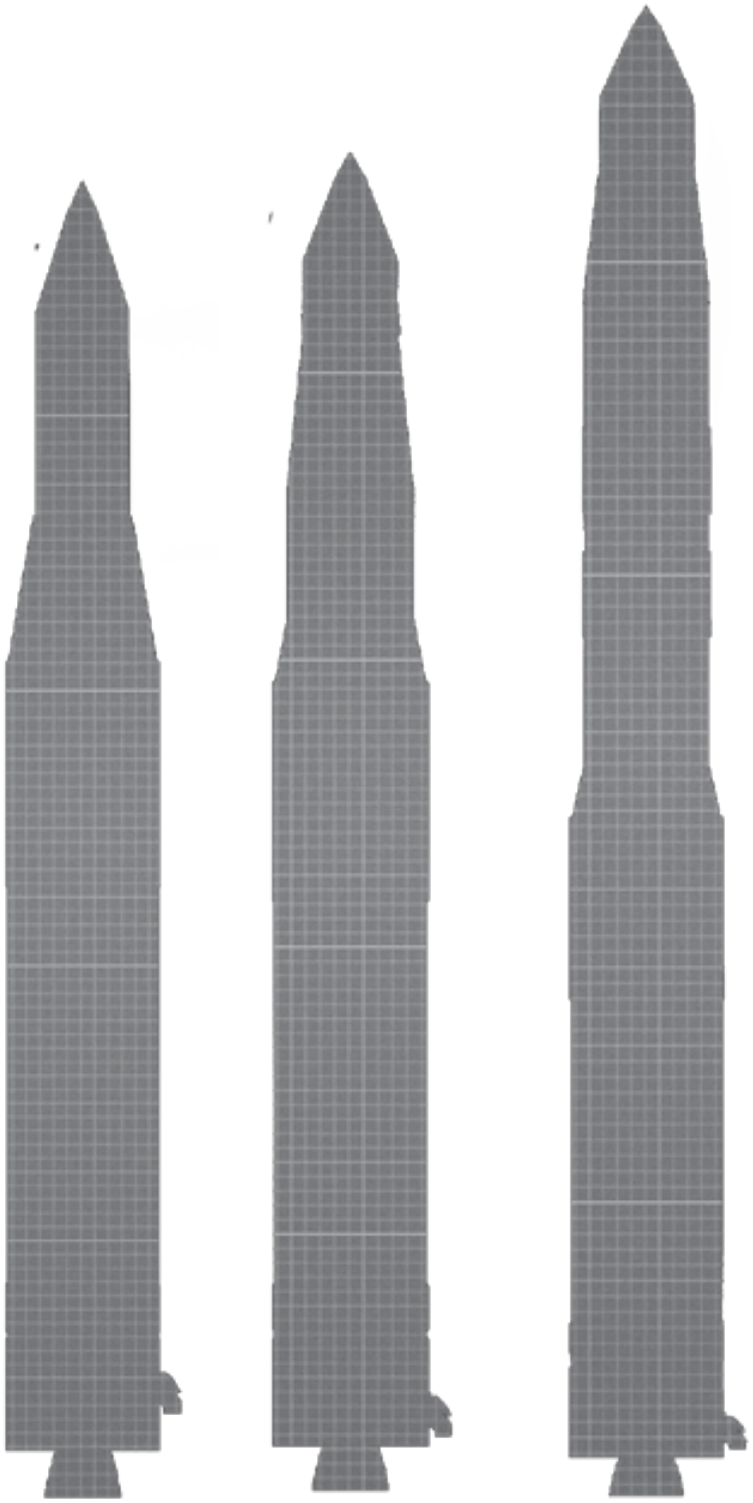
The ROSUETTE BP4 is the most powerful version of the ROSUETTE family, replacing the TOPAZ with an all-new 1.25m solid rocket.



LIGHT MEDIUM LAUNCHERS



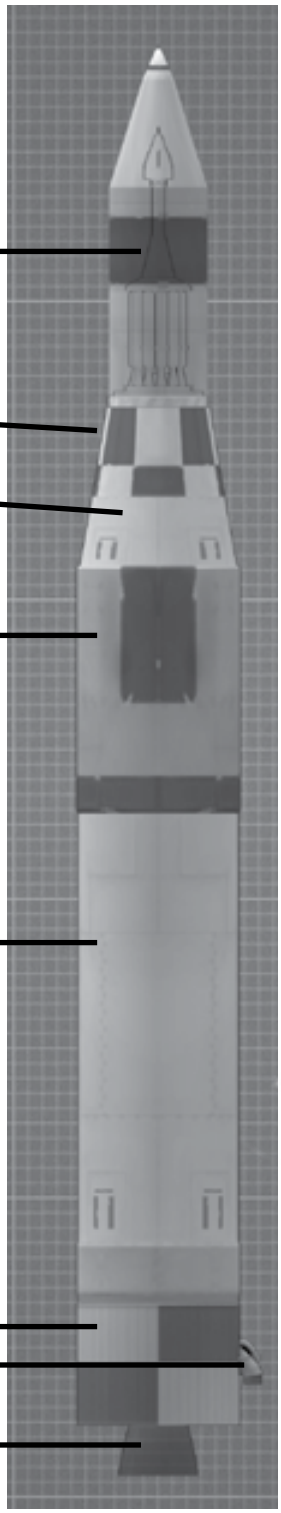
CHRYSLUS LAUNCH VEHICLE



2.2 CHRYSLUS II LAUNCH VEHICLE

-from top to bottom-

The CHRYSLUS rocket was designed to fill the same role as the FENRIS (pg27), and as a result they have very similar performance. During the early days of BDB, a number of CHRYSLUS rockets were acquired, and frugality demanded that they be put to use. The rockets were fitted with the VICENZA upper stage, encased in a 0.9375m fairing.



HLR “Sergent” rocket

Chryslus-9SA Structural Adaptater

Chryslus-5SA Structural Adaptater

Chryslus-700 Liquid fuel tank

Chryslys-1200 Liquid fuel tank

Chryslus-EF “Engine fairing”

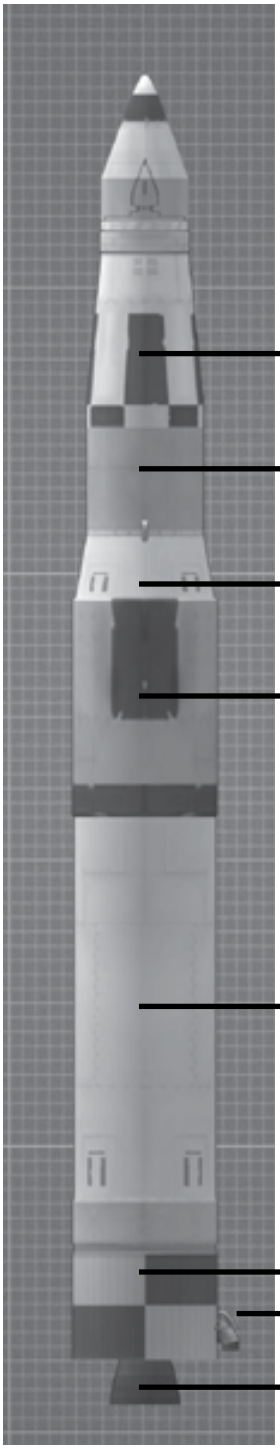
Chrysuslus-EES “Rhesus” Vernier Exhaust engine

Chryslus-3DS “Polaris” Liquid engine

2.2 CHRYSLUS IVA LAUNCH VEHICLE

-from top to bottom-

Proponents of the CHRYSLUS rockets, specifically those paid to manufacture it, proposed upgrading the rocket to use a liquid upper stage engine, rather than diminutive solid boosters. The CHRYSLUS IV, while not a particularly well received rocket, is still available in our catalog for special order. The families of those workers ask that you take the design into consideration.



Chryslus-320 Liquid fuel tank

Chryslus-6K “Seeker” Liquid engine

Chryslus-5SA Structural Adaptater

Chryslus-700 (short) Liquid fuel tank

Chryslus-1200 Liquid fuel tanks

Chryslus-EF engine fairing

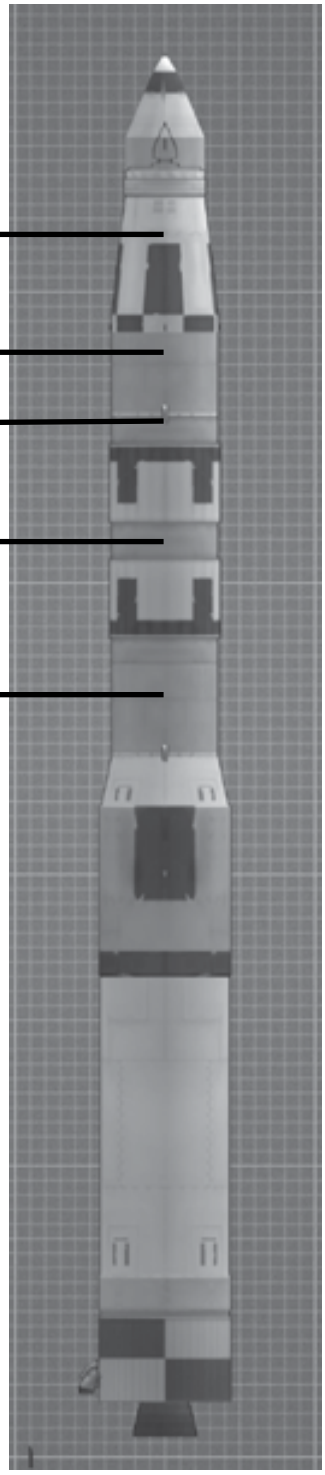
Chryslus-EE5 “Rhesus” Vernier Exhaust engine

Chryslus-3DS “Polaris” Liquid engine

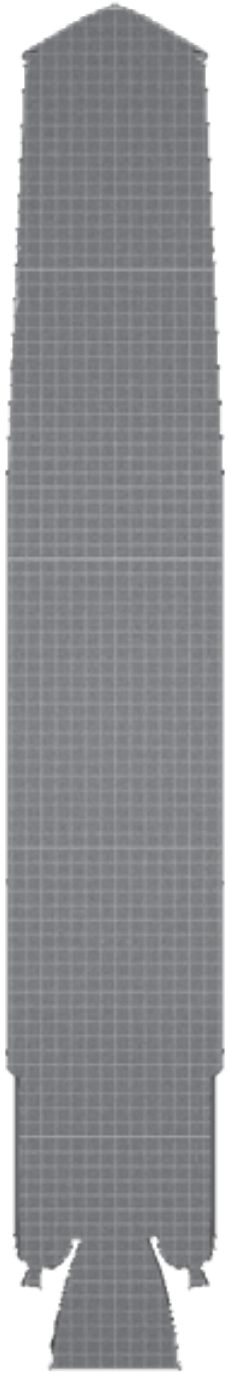
2.2 CHRYSLUS IVB LAUNCHE VEHICLE

-from top to bottom-

Further upgrades to the CHRYSLUS were proposed, specifically the addition of a more powerful storable propellant stage between the two stages of the IVA. This combination proved too much for the POLARIS engine to lift once mated to a payload, and as a result BDB recommends the addition of strap on DIOSCURI boosters in order to get the rocket off the ground.



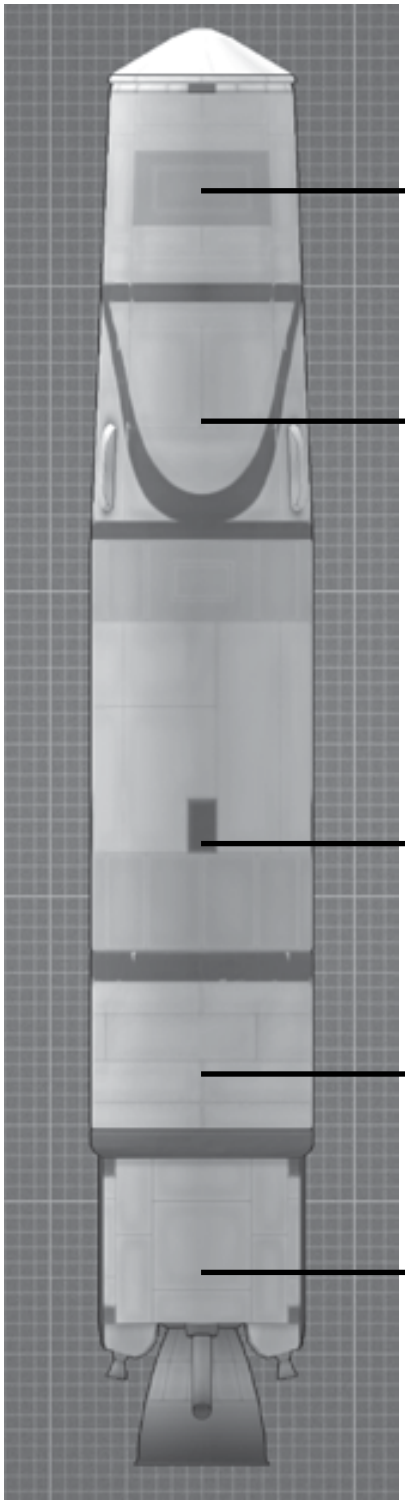
FENRIS LAUNCH VEHICLE



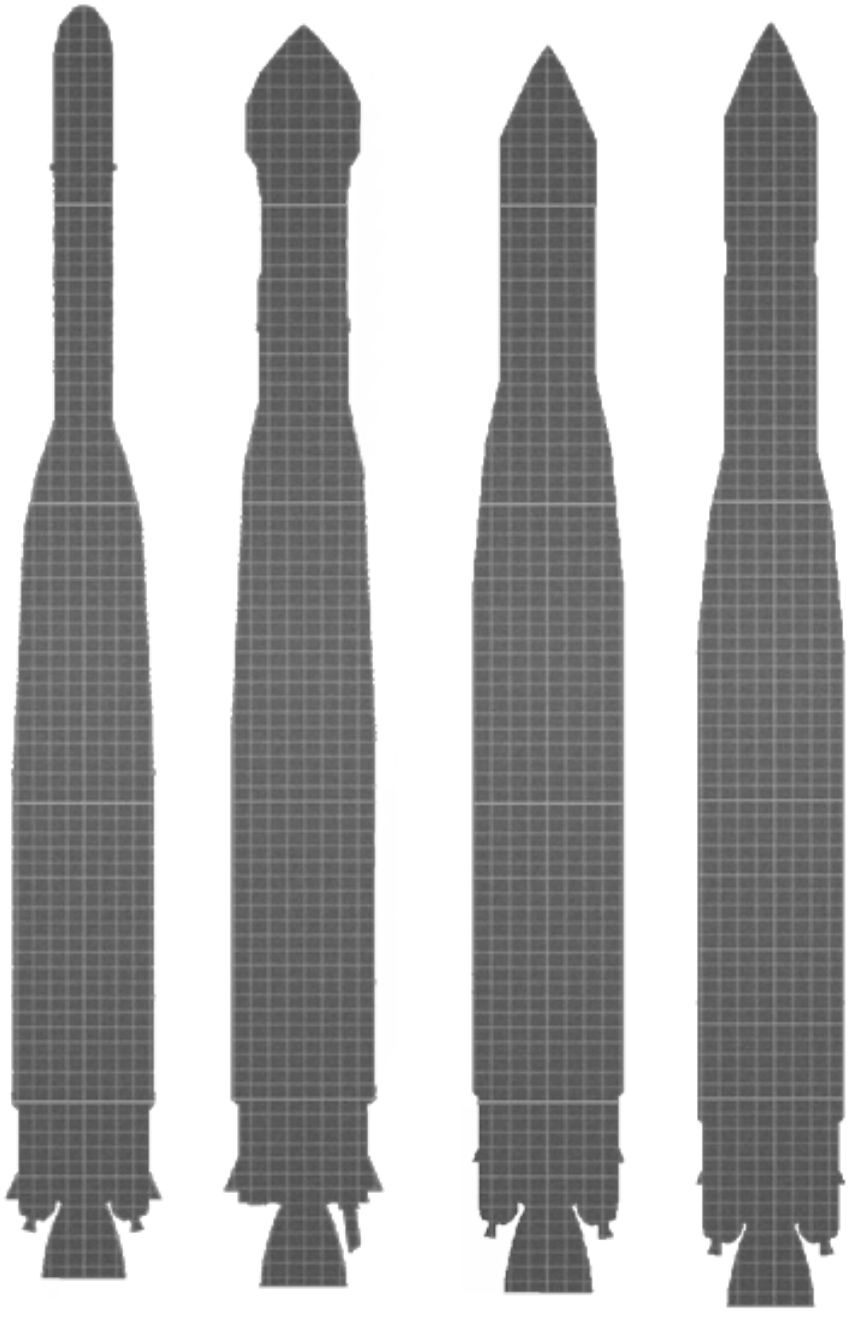
2.2 FENRIS VEHICLE

-from top to bottom-

Originally designed as an intermediate ballistic missile, the Fenris has been adapted for use as a light-medium launcher for probes and satellites. Forces inside BDB have vested interests in the continued use of the launcher, despite outside criticisms. As a result it has been continuously modified with numerous variants to meet the changing demands of our customers.



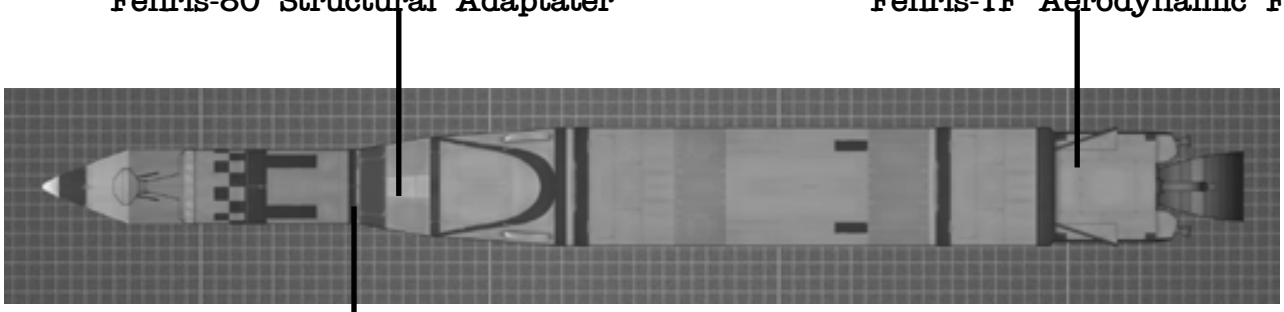
FENRIS LAUNCH VEHICLE VARIANTS



FENRIS BELLE A

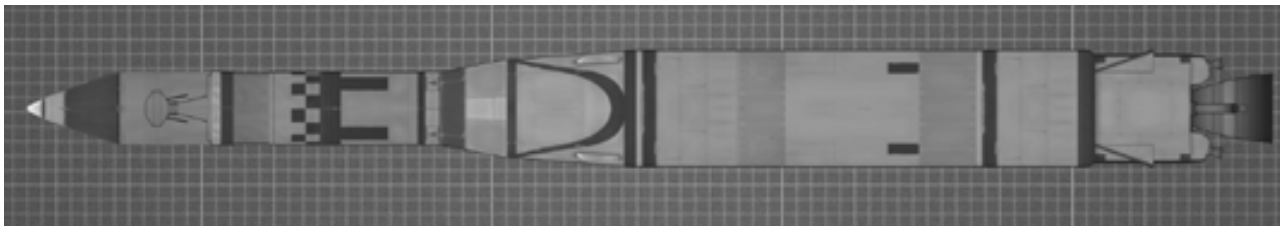
-from top to bottom-

One of the first uses of the BELLE upper stage was delivering photoreconnaissance satellites to orbit and back. BDB offers this variant of FENRIS launcher with the classified equipment removed from the fairing, leaving room for more peaceful payloads.



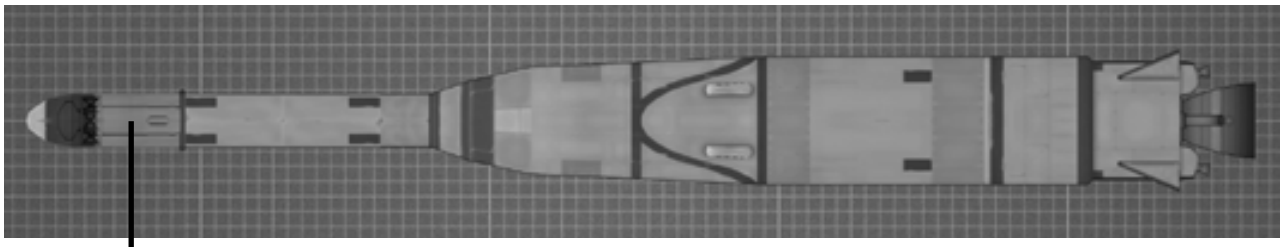
FENRIS BELLE B

-from top to bottom-



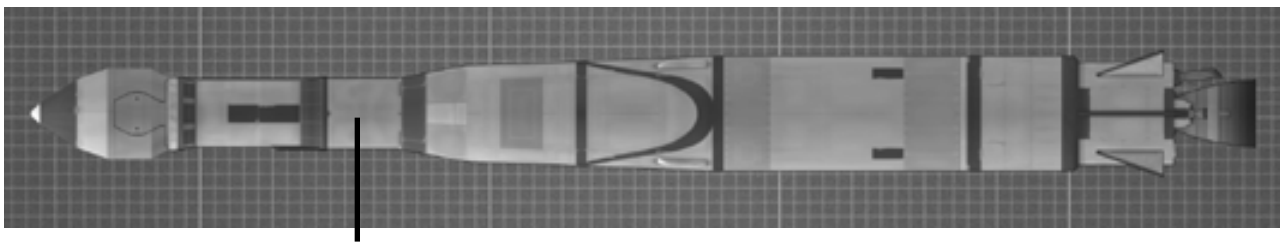
FENRIS ALPHA

-from top to bottom-

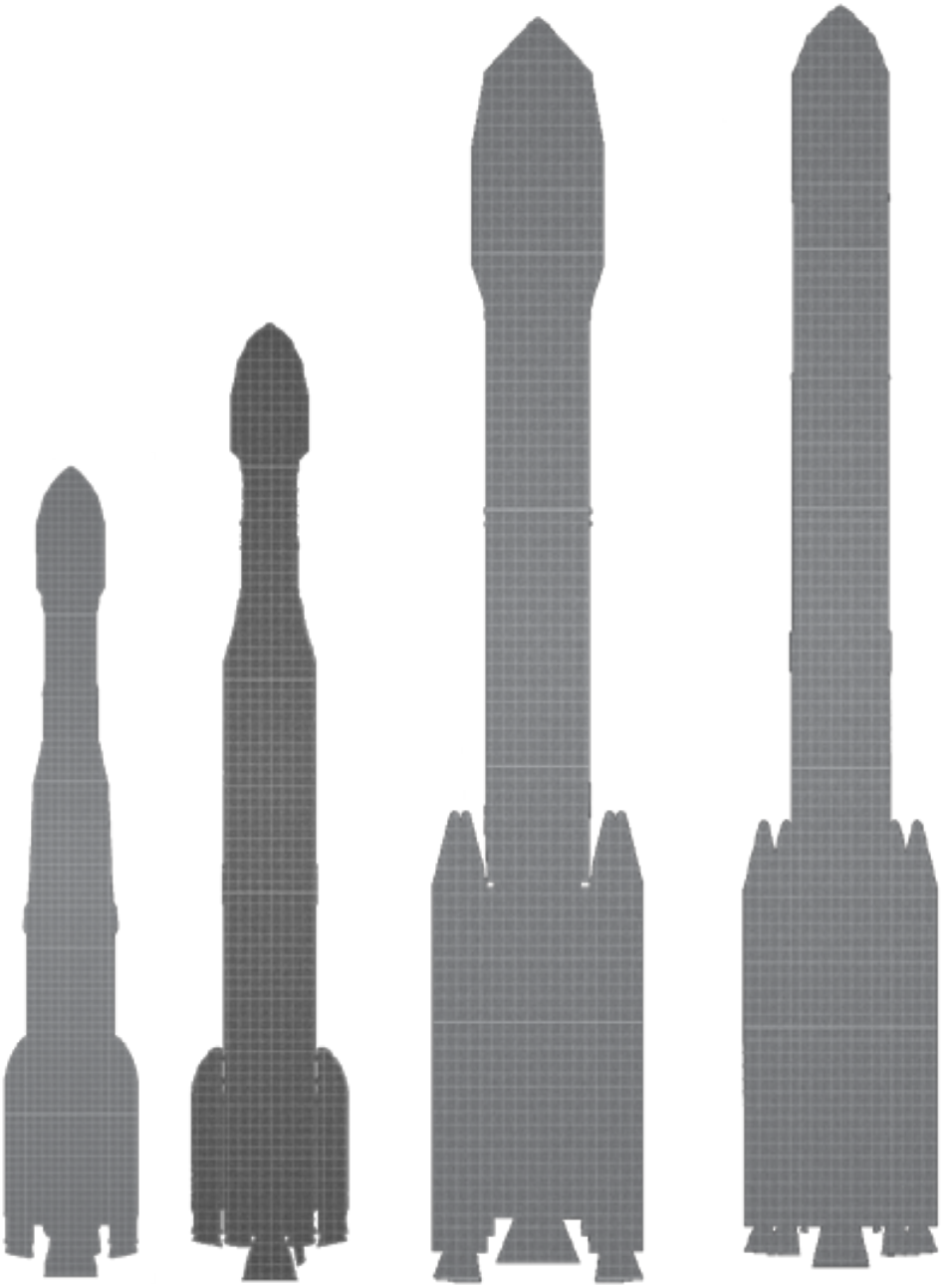


FENRIS ALPHASTAR

-from top to bottom-



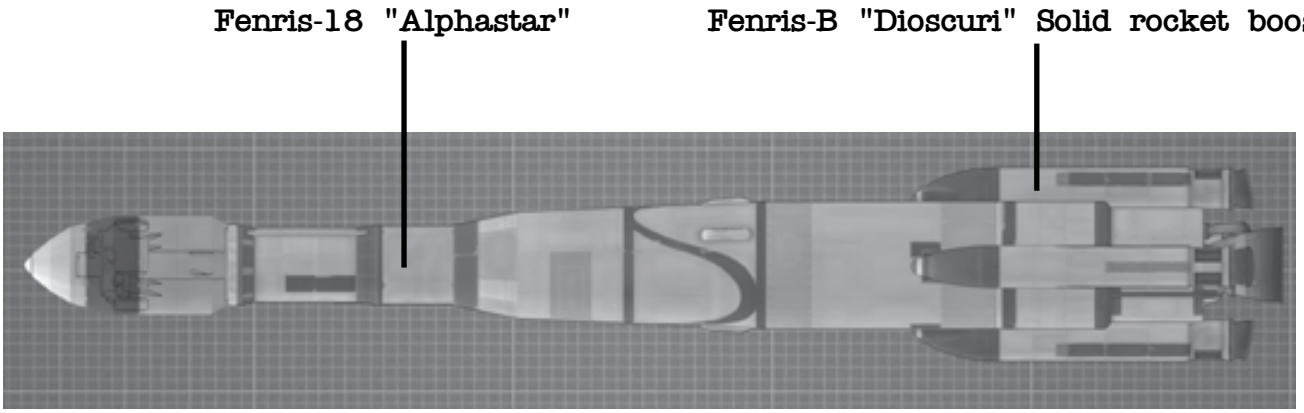
DALETH LAUNCH VEHICLE



2.2 DALETH-E

-from top to bottom-

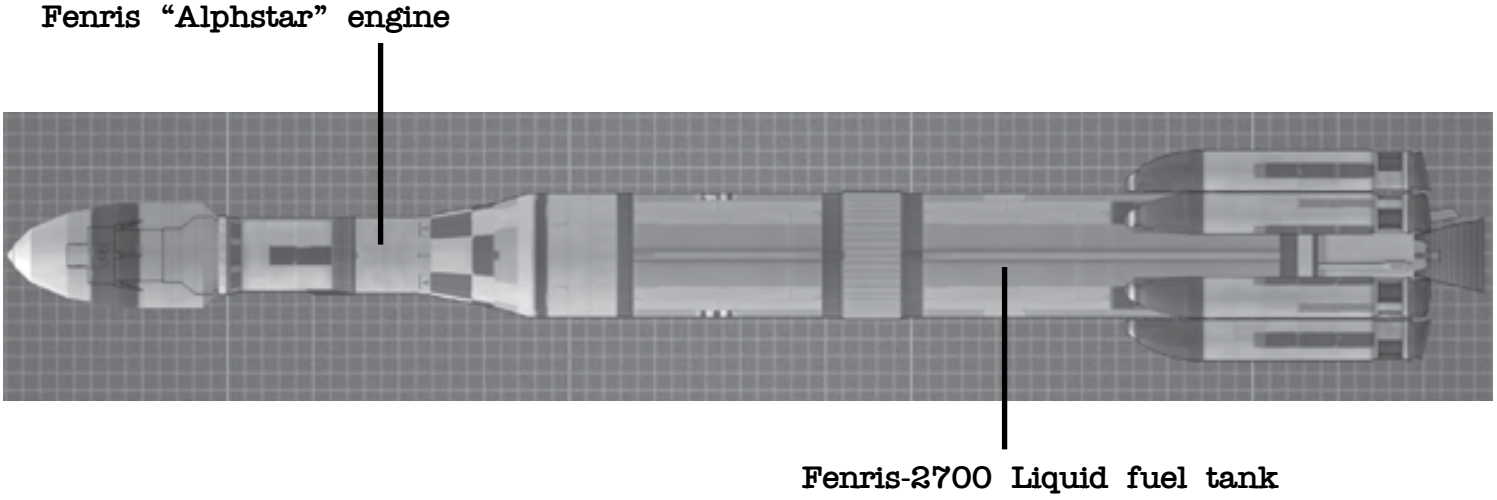
The DALETH is a development of the FENRIS-ALPHASTAR launcher. Using uprated versions of the ALPHASTAR upper stage, as well as a variety of solid kick stages and strap on boosters, it continued the heritage (and contracts) of the FENRIS booster.



2.2 DALETH-1000

-from top to bottom-

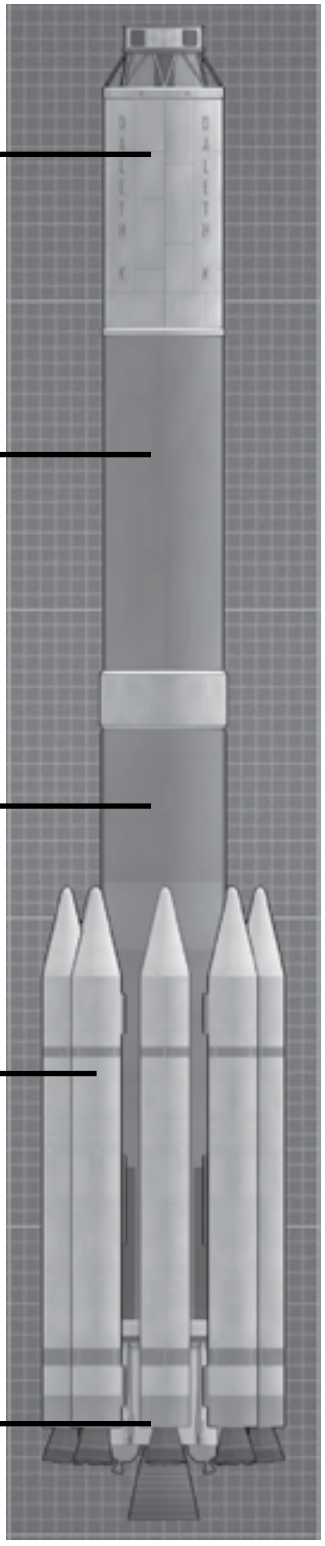
The DALETH-1000 uses an extended long tank FENRIS first stage, as well as an upgraded solid rocket kick stage. The number of solid rocket boosters has been increased from three to six.



2.2 DALETH 2000

-from top to bottom-

DALETH 2000 is the final version of the DALETH rocket's evolution, using a new first stage, a new upper stage, and new solid rocket boosters. While all parts of this rocket can trace their lineage in some way to the original FENRIS, ALPHASTAR, and DALETH components, the actual hardware is completely new. It is the ultimate expression of the capabilities inherent in 1.5m launchers.



Daleth-K Interstage Decoupler

Daleth-2-1500 Liquied fuel tank

Daleth-2-2200 Liquid fuel tank

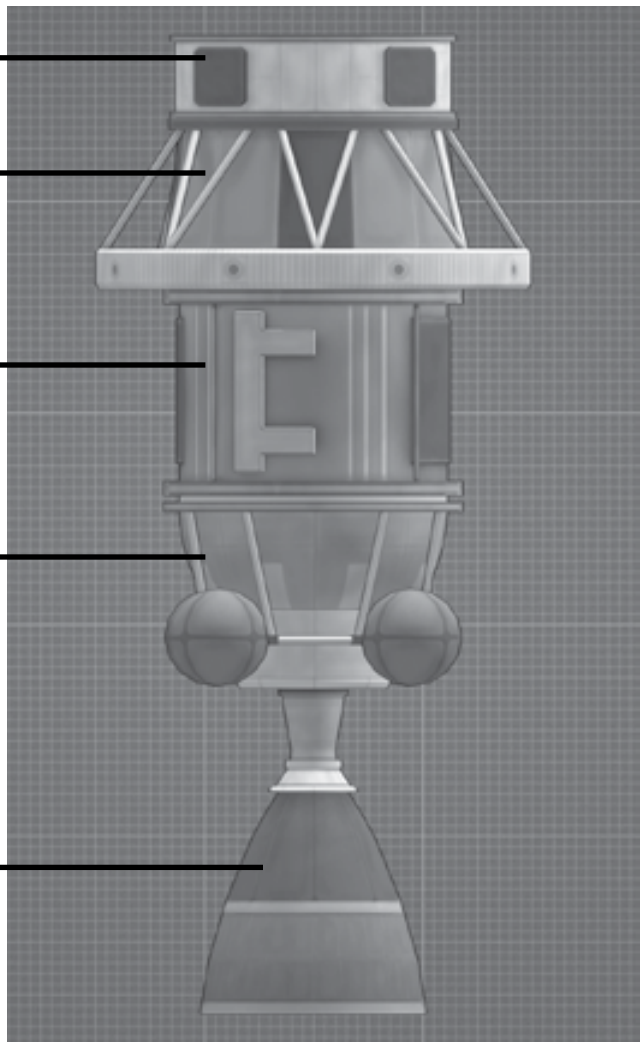
Daleth-CGR-40 "Ruby" Solid rocket booster (x8)
or : Daleth-CGR-46 "Emarld" Solid rocket booster
Daleth-CGR-60 "Sapphire" Solid rocket booster

Daleth-SSR-27a "Darkah" liquid engine

DALETH-K TRANSTAGE

-from top to bottom-

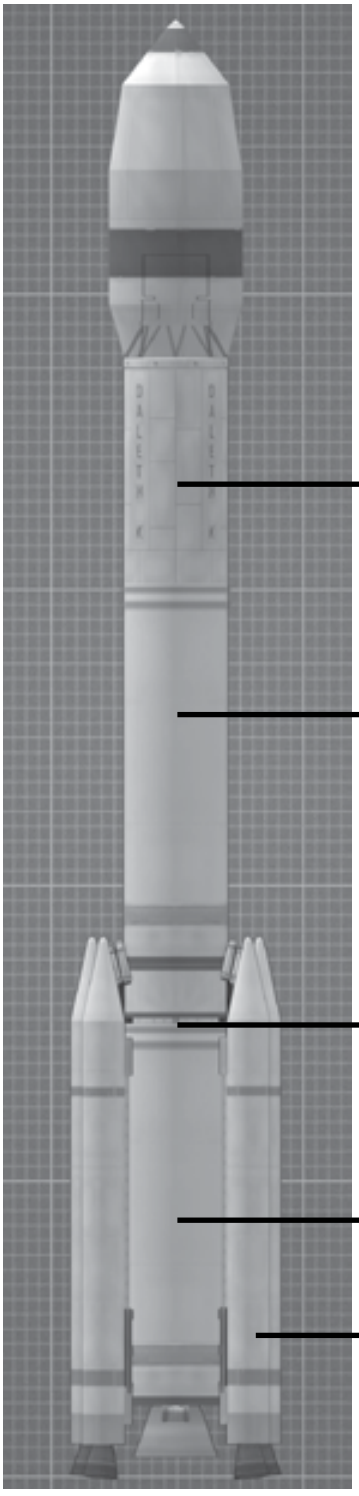
The DALETH-K TRANSTAGE is an advanced upper stage using storable propellants. While still using an engine descended from the venerable ALPHASTAR, it uses all new tankage and a unique fairing base.



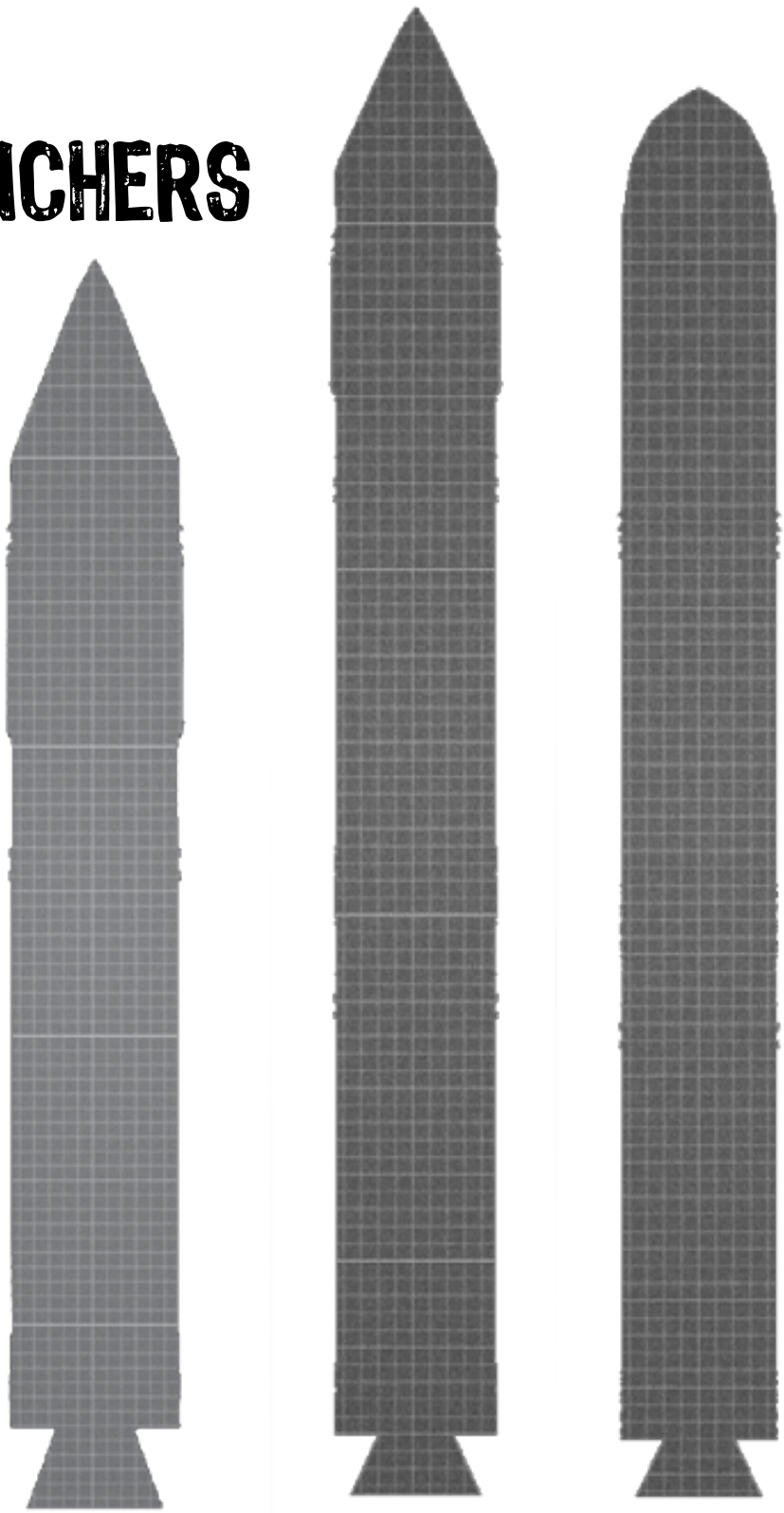
2.2 DALETH LITE

-from top to bottom-

DALETH-LITE is the most unconventional version of DALETH rocket. The DARKAH first stage has been replaced by two powerful TYNDAREUS solid rocket boosters, based on refurbished solid fuel based ballistic missiles.



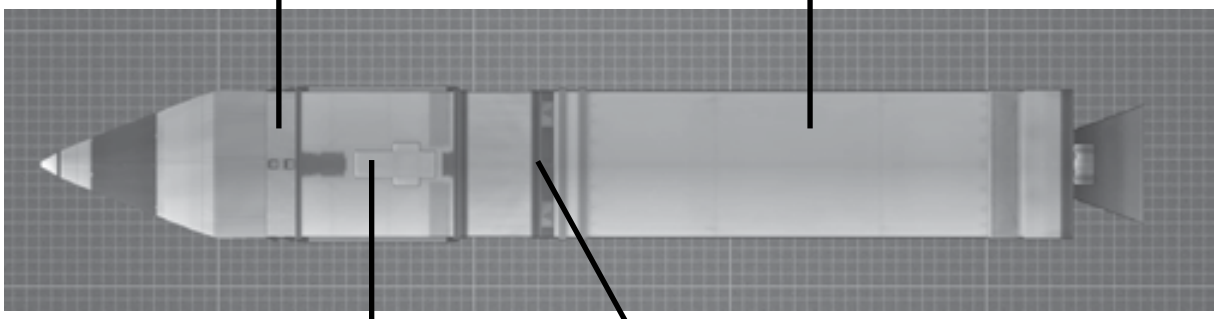
SOLID LAUNCHERS



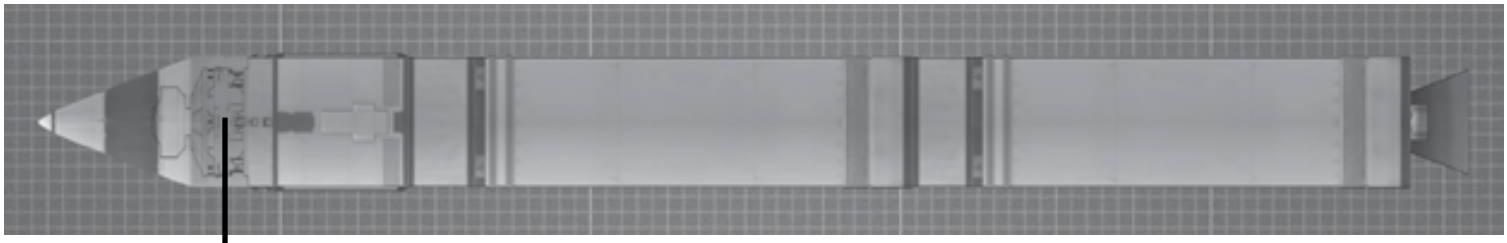
2.2 MINERVA I SOLID LAUNCHER

-from top to bottom-

Using mass produced solid rocket boosters derived from military ICBMs, Bluedog Design Bureau offers a number of low cost alternatives to satellite launches into orbit. However, the reduced price tag is offset by the fact that the booster stages cannot be throttled or shut off.

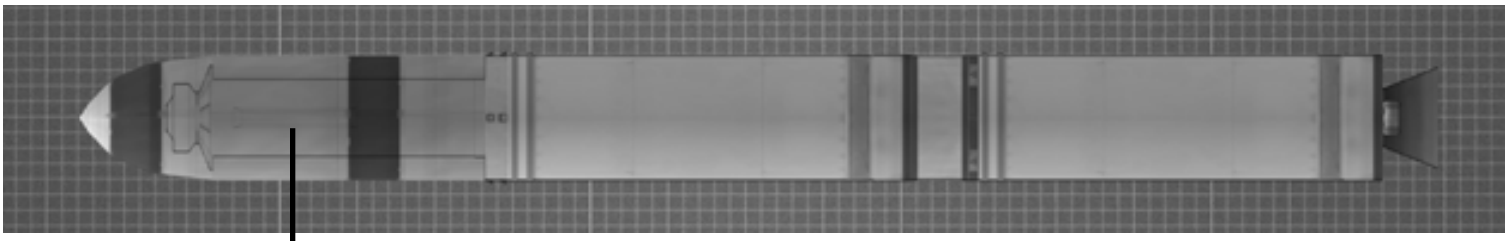


2.2 MINERVA II SOLID LAUNCHER

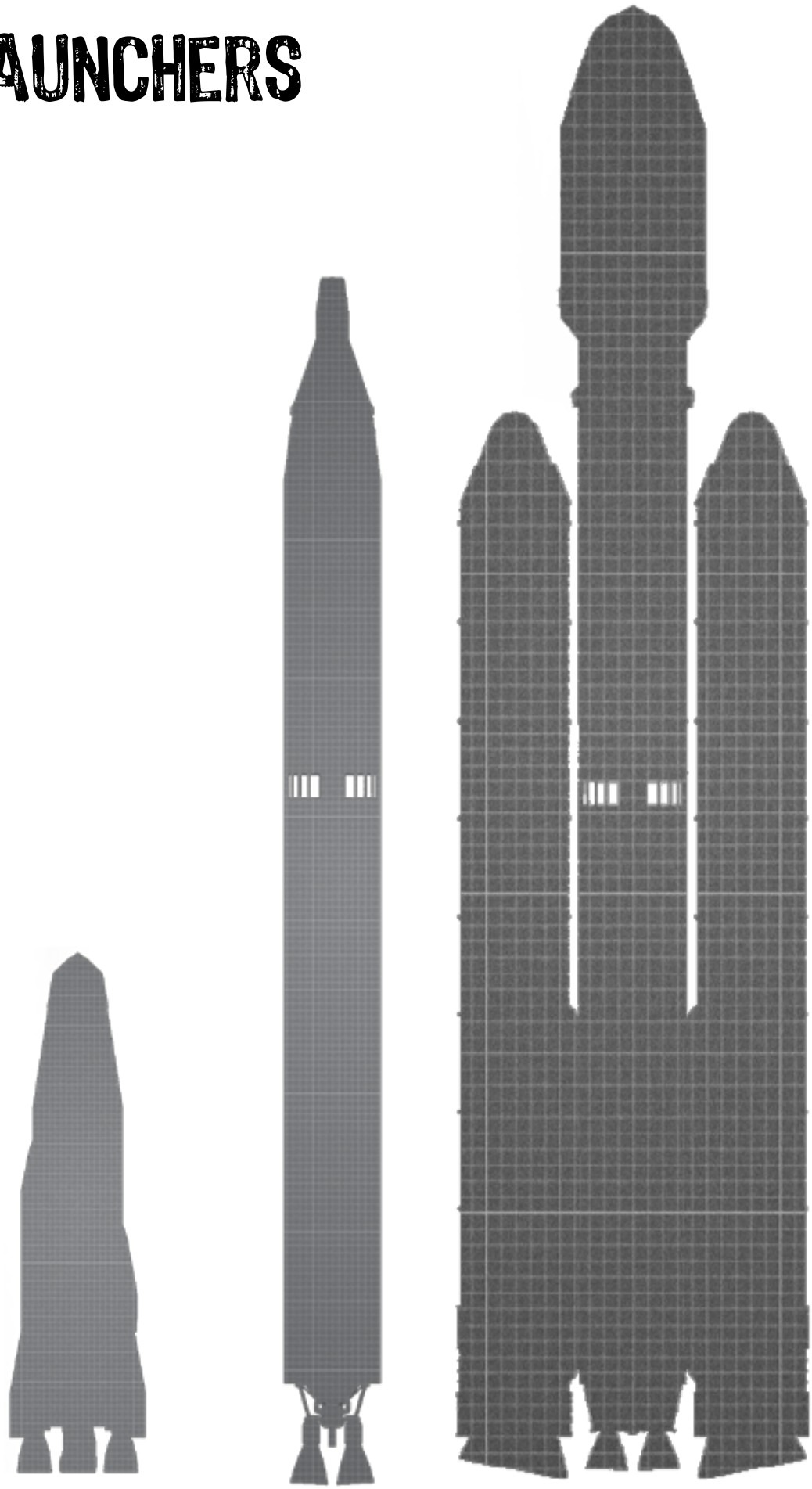


2.2 CARAVEL SOLID LAUNCHER

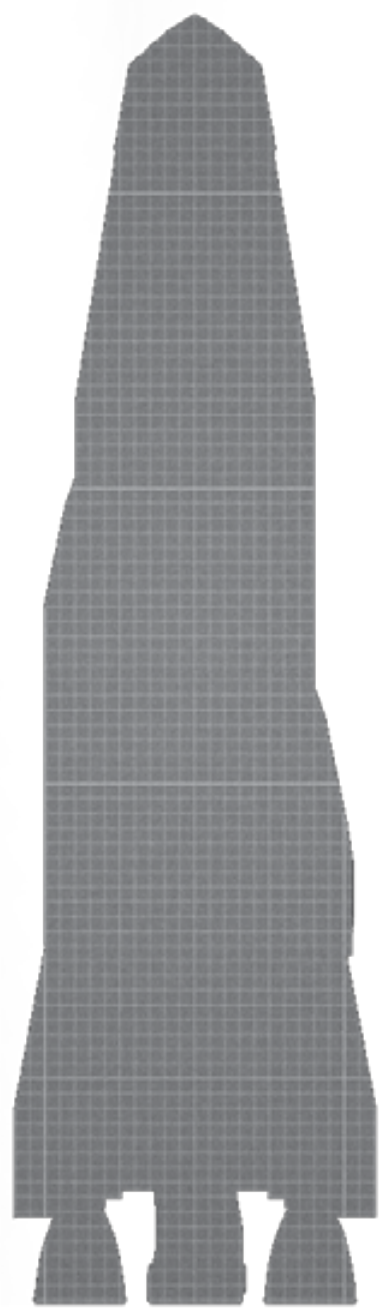
-from top to bottom-



MEDIUM LAUNCHERS



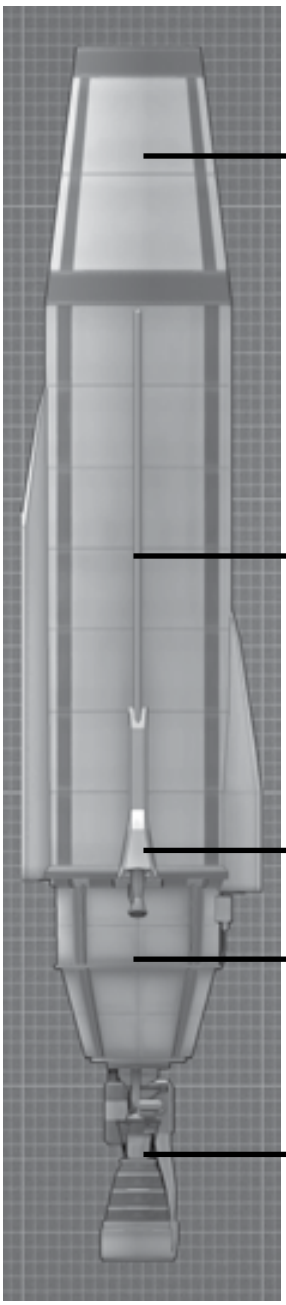
MUO LAUNCH VEHICLE



2.3 MUO LAUNCH VEHICLE

-from top to bottom-

The MUO missile was one of the first long range missiles developed, when rocket design was in its infancy. Engineers were afraid to base a design on igniting large liquid engines in flight. As a result, it uses a unique stage-and-a-half design, where the vacuum-optimized sustainer engine is lit on the ground with the boosters. The booster engines are dropped in flight once the sustainer's TWR is high enough. The MUO family is one of the longest living rocket designs, having been adapted to carry HERMES manned capsules, as well as BELLE and INON upper stages.



MUO-700 fuel tank

MUO-2200 fuel tank

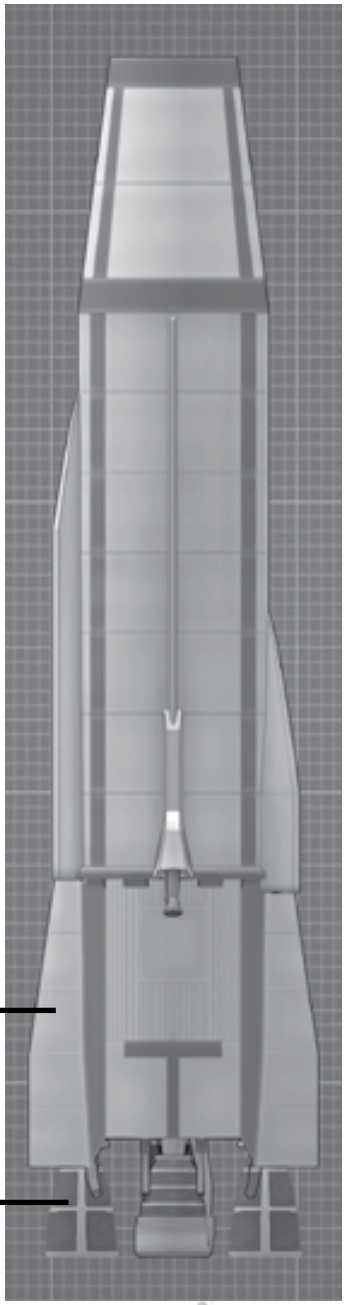
MUO-101 "Crow" Vernier

MUO-700 Adaptater fuel tank

MUO Booster Fairing

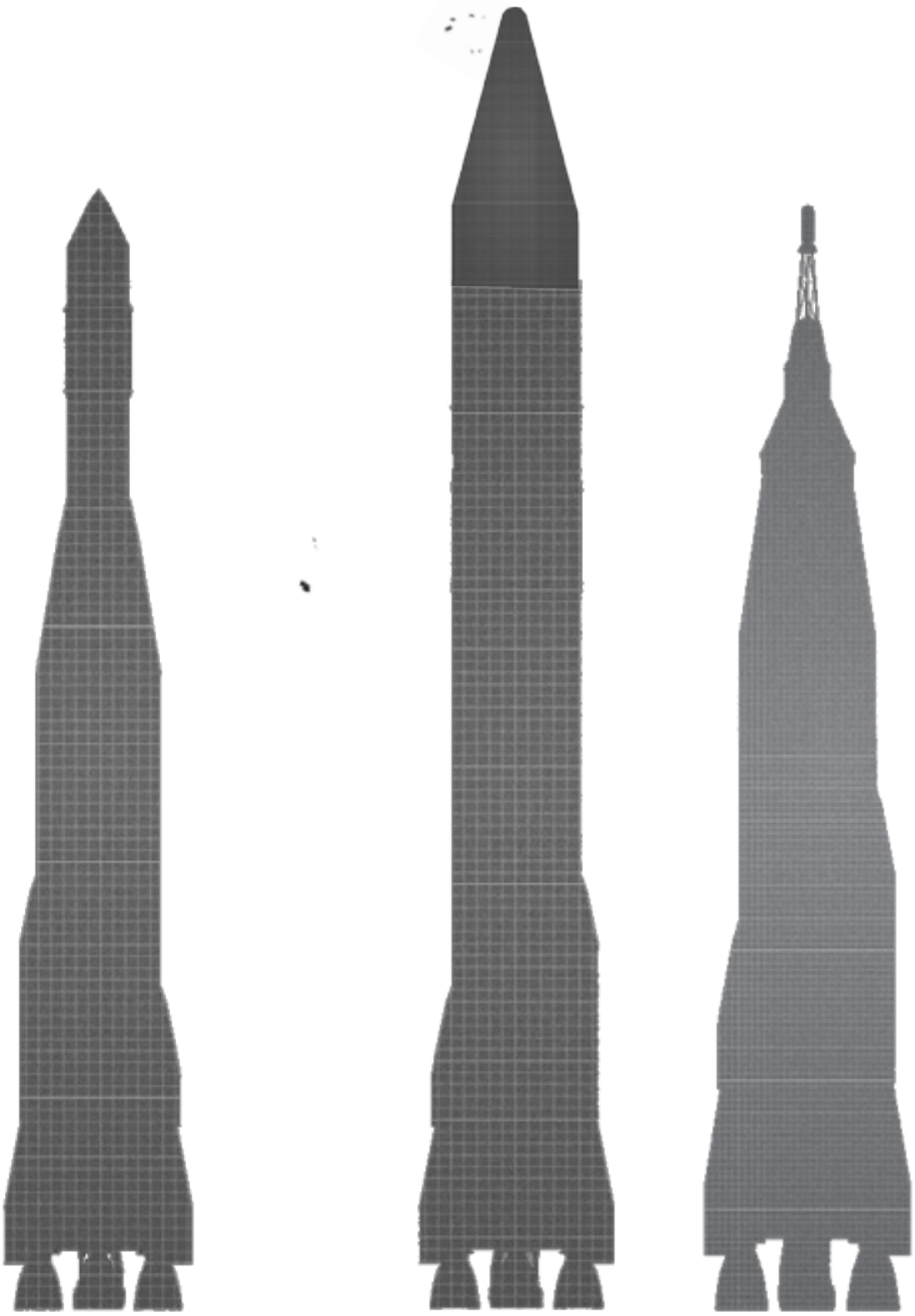
MUO-105 "Vulture" liquid engine

MUO-89 "Buzzard" liquid engine



WARNING THE BOOSTER FAIRING SHOULD BE STAGED BETWEEN 20.000 AND 25.000 KM

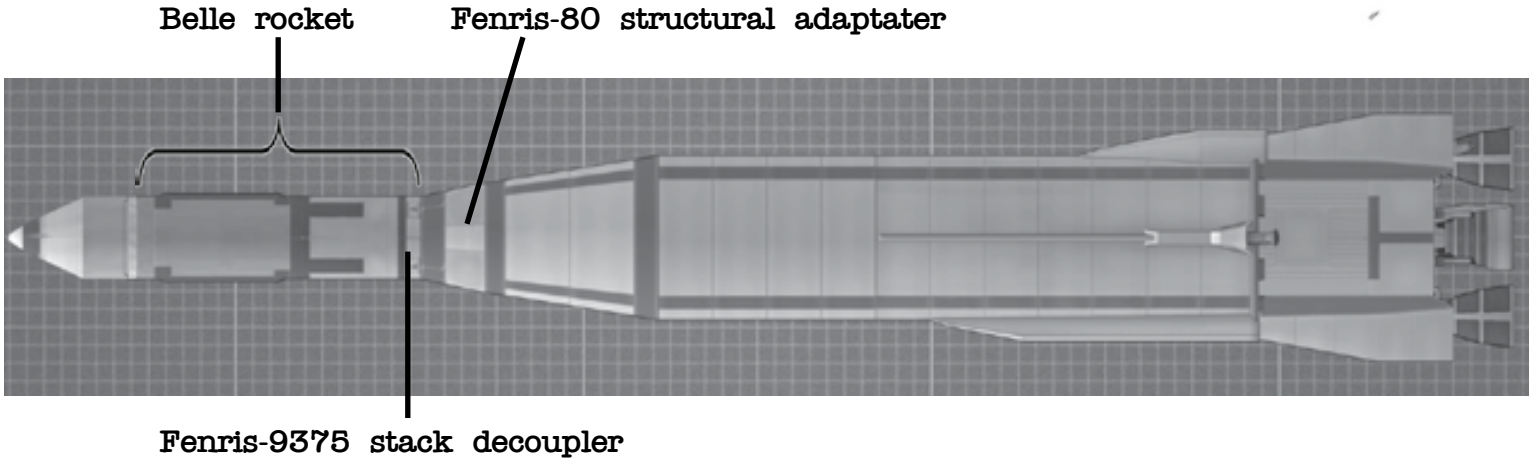
MUO LAUNCH VEHICLE VARIANTS



2.3 MUO-BELLE

-from top to bottom-

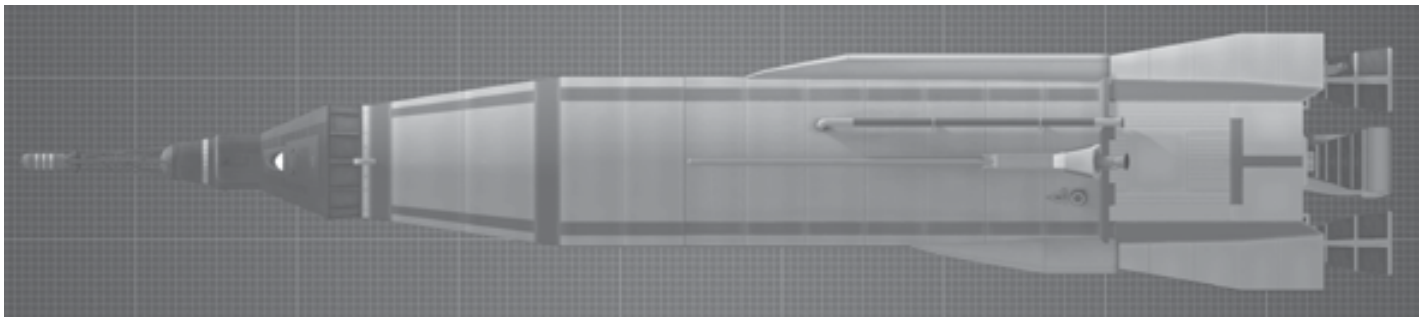
The BELLE upper stage was originally a secret project run by the military. It is only recently that the designs have been made available to BDB. An advanced upper stage, it includes full three axis control, an internal probe core, and a vacuum engine. Its capabilities have been expanded several times.



2.3 MUO HERMES

-from top to bottom-

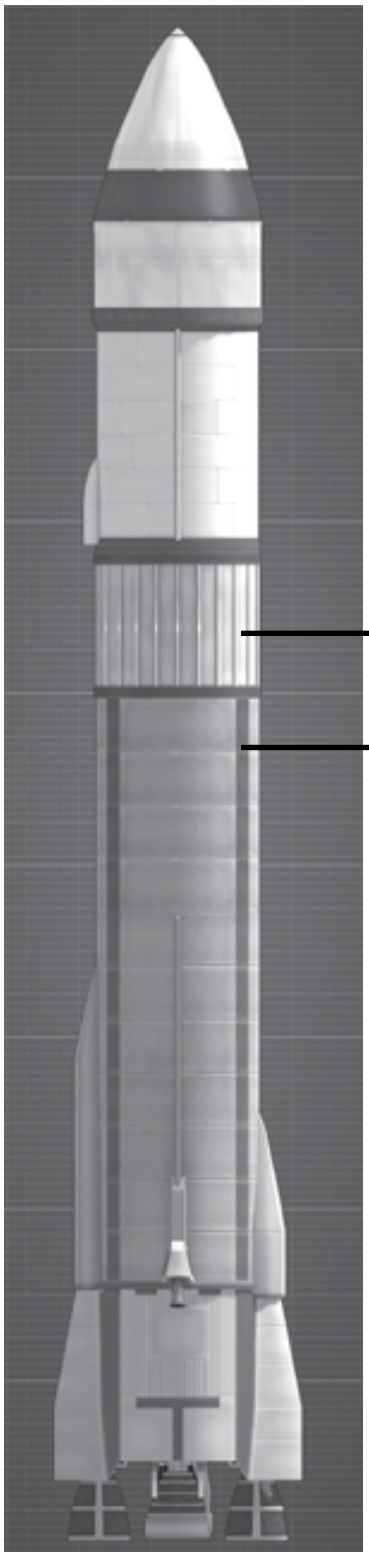
While the Etoh-Hermes was capable of suborbital test flights, the Muo-Hermes is capable of delivering the Hermes to orbit. This allows us to do more than give pilots momentary weightlessness - now we are able to put them into a stable orbit, from where we can observe their physiology (with their permission, of course) and allow them to conduct simple experiments and record their sightings from space. While certainly limited in potential, this spacecraft is an important step towards things to come.

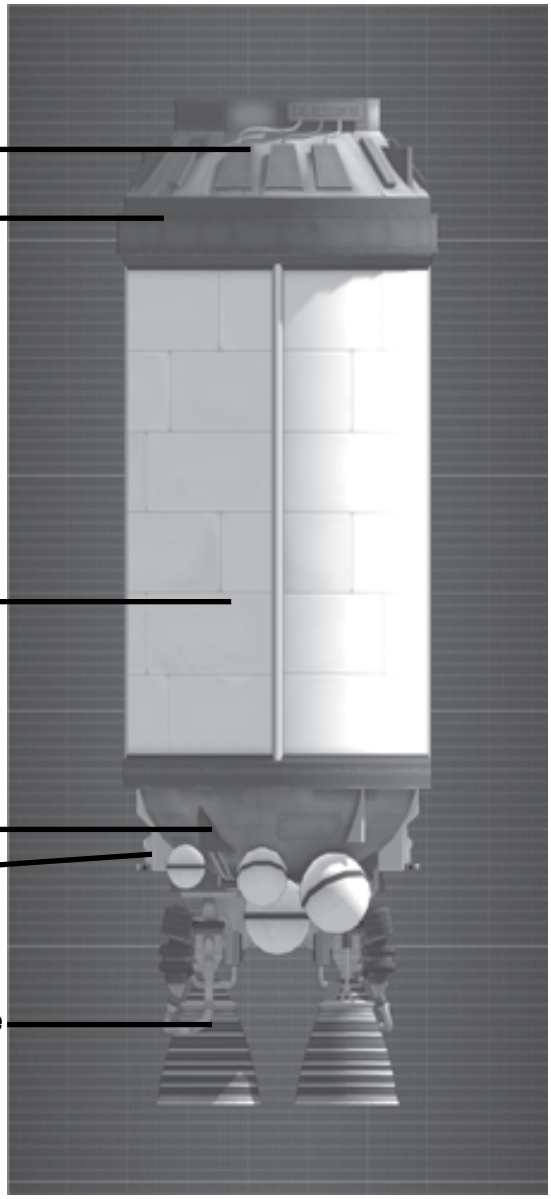


2.3 MUO INON

-from top to bottom-

INON is an advanced cryogenic upper stage, which has finally borne fruit after a long and laborious design process. When paired with the MUO booster it is capable of sending large probes and other hardware to the far reaches of space.





Inon-ACS Avionics and Constrol System

Inon 1.875 Fairing Base

Inon-D-1300 Liquid fuel tank

Inon Straight decoupler

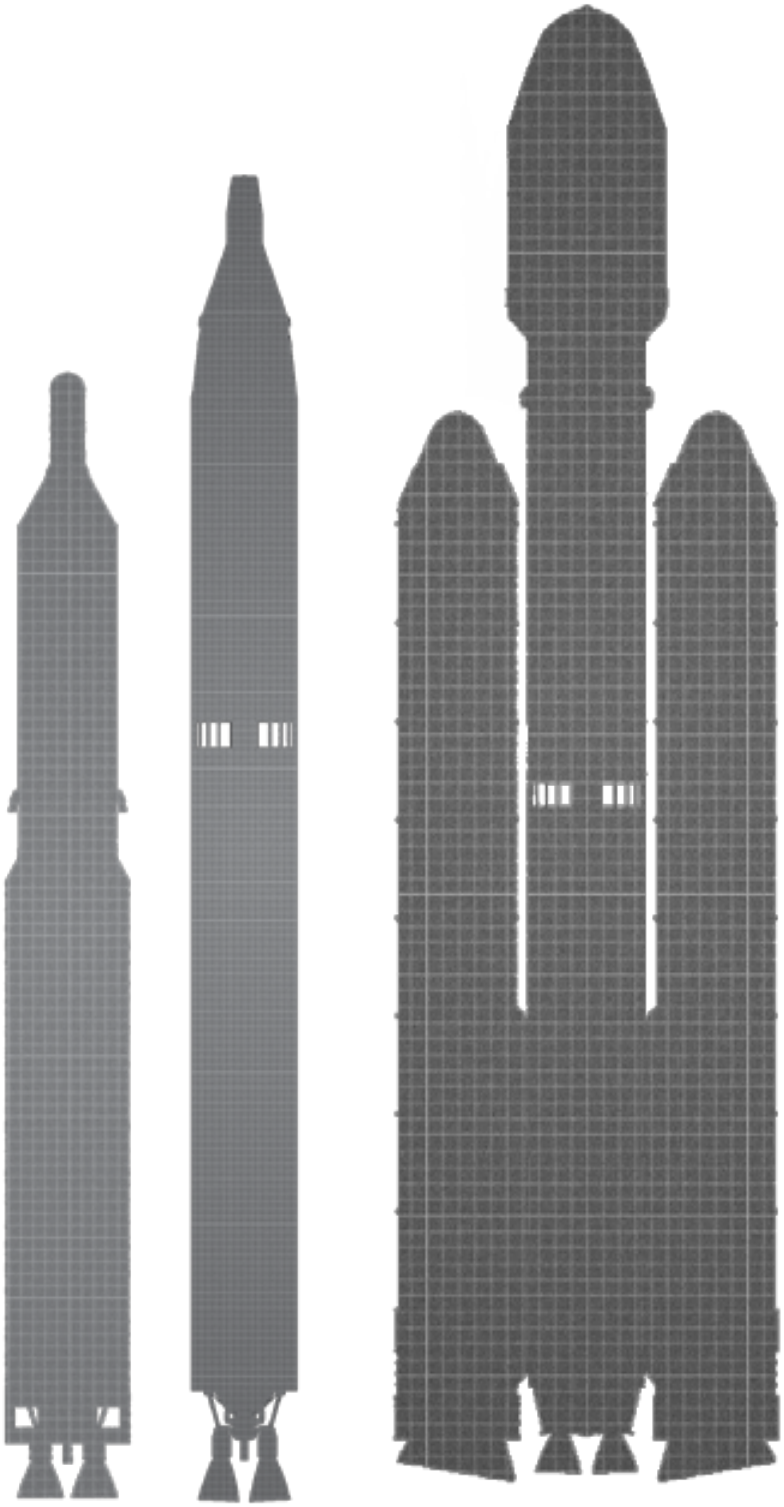
Muo-1200 fuel tank

Inon Engine monting plate

Inon-CRB 3 way RCS Block

Inon-R-10A4 “Isor” Liquid engine

PROMETHEUS LAUNCH VEHICLES



2.3 PROMETHEUS I ICBM

-from top to bottom-

The PROMETHEUS-I ICBM was an early missile with a high throw weight. Its choice of fuels made it unsuitable for use as a ballistic missile, and they were quickly mothballed. BDB has purchased the stored missiles, and replaced the warhead with scientific instruments.

Prometheus-I “Crius” Anterior probe core

Brun-625 stack decoupler

Prometheus-I-160 Structural adpatator

Prometheus-1300 Liquid fuel tank

Prometheus-I-200 “Letto” liquid engine

Prometheus-I-15 stack decoupler

Prometheus-I-140 Structural adaptator

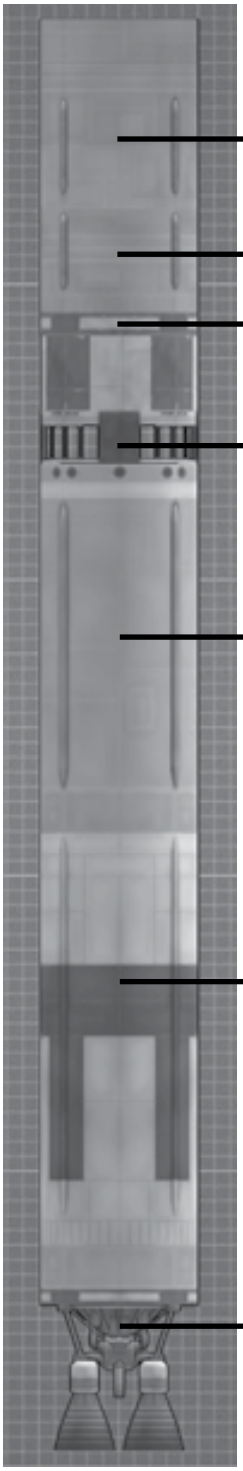
Prometheus-I-4000 Liquid fuel tank

Prometheus-I-640 “Perses” liquid engine

2.3 PROMETHEUS II LAUNCH VEHICLE

-from top to bottom-

The PROMETHEUS-II ICBM replaced the PROMETHEUS-I. Using storable propellants, it could stay ready to launch indefinitely. It was so successful, in fact, they made too many. BDB has purchased the surplus and refurbished them for use as launchers for the SPICA program. The remaining launchers were later converted to the PROMETHEUS-III variants.



Prometheus-II- fairing base

Prometheus-II-1100 Liquid fuel tank

Prometheus-II-600 Liquid fuel tank

Prometheus-II-250 “Lelantos” liquid engine

Prometheus-II-875 stack decoupler

Prometheus-II-1900 Liquid fuel tank

Prometheus-II-3000 Liquid fuel tank

Prometheus-II-675 “Pallas” liquid engine

~~SECRET~~ SPECIAL HANDLING

2.3 PROMETHEUS II VINCI

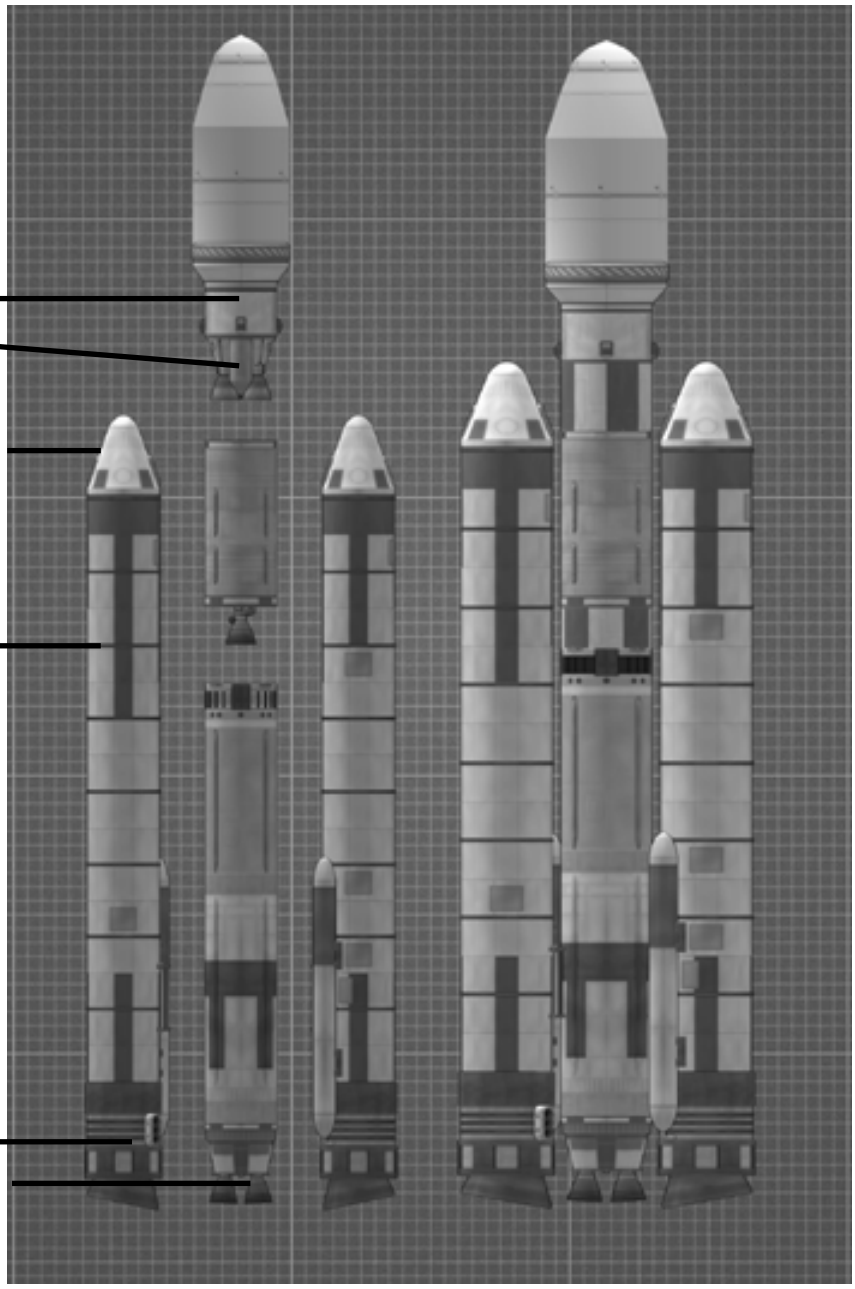
-from top to bottom-

The Leo program was another necessary stepping stone for BDB, from which we planned to learn techniques for EVA and orbital rendevous. The crash nature of the program required a pre-existing lifter that could quickly be man-rated. Thus, the Prometheus II missile was adapted for use as a crew launch vehicle. A number of variants were spawned by this program, which contributed significantly to the further development of the Prometheus family for other uses.

2.3 PROMETHEUS III LAUNCH VEHICLE

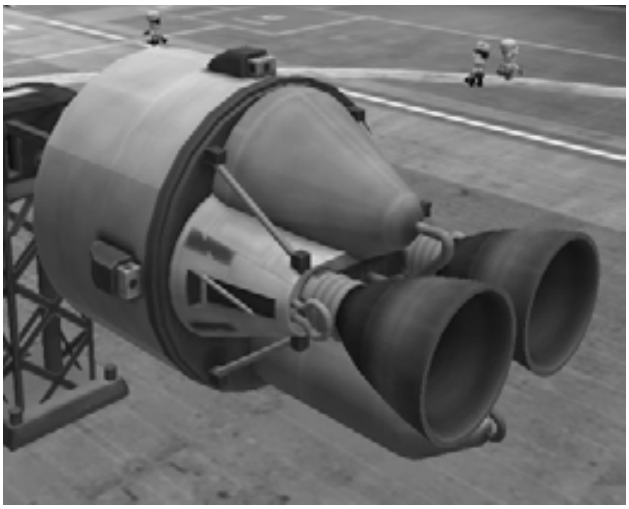
-from top to bottom-

Due to budget cuts, BDB chose to re-use PROMETHEUS-II launchers rather than develop a new medium-heavy lifter. Upgrades include the options to add either a BELLE upper stage or the new METIS Transtage, and large 1.875m strap-on solid rocket motors. As a result of the increased complexity, BDB's graphic design department has included exploded views of the launcher.

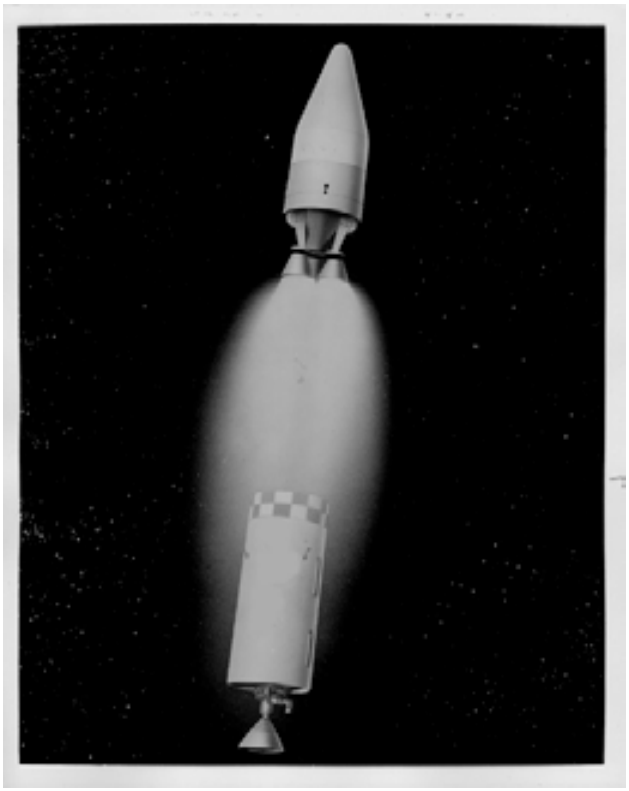


METIS TRANSTAGE DETAILS

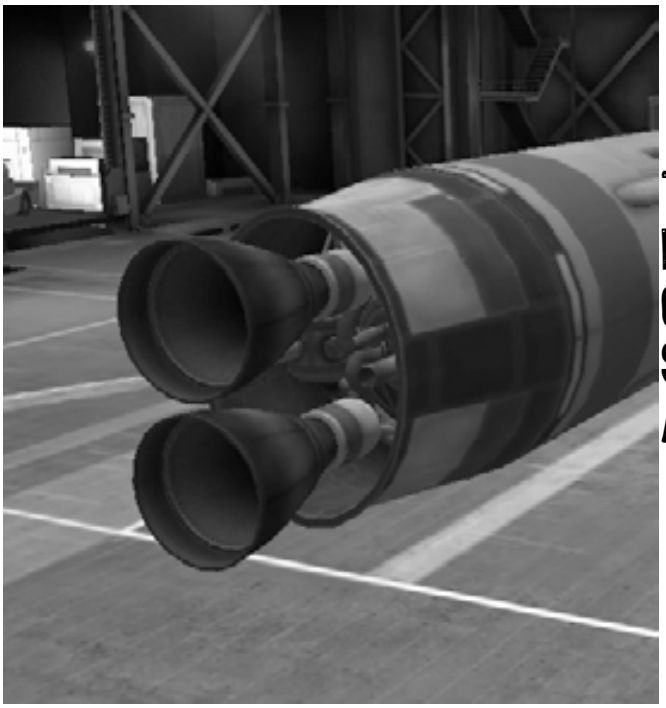
Additional views of the METIS TRANSTAGE. It uses a unique design where the fuel tanks are side by side, rather than stacked vertically. By extending down on either side of the uprated ALPHASTAR engines, the fuel capacity remains roughly the same while overall length is reduced. It includes monopropellant and RCS thrusters.



View of the “Metis” liquid engine.

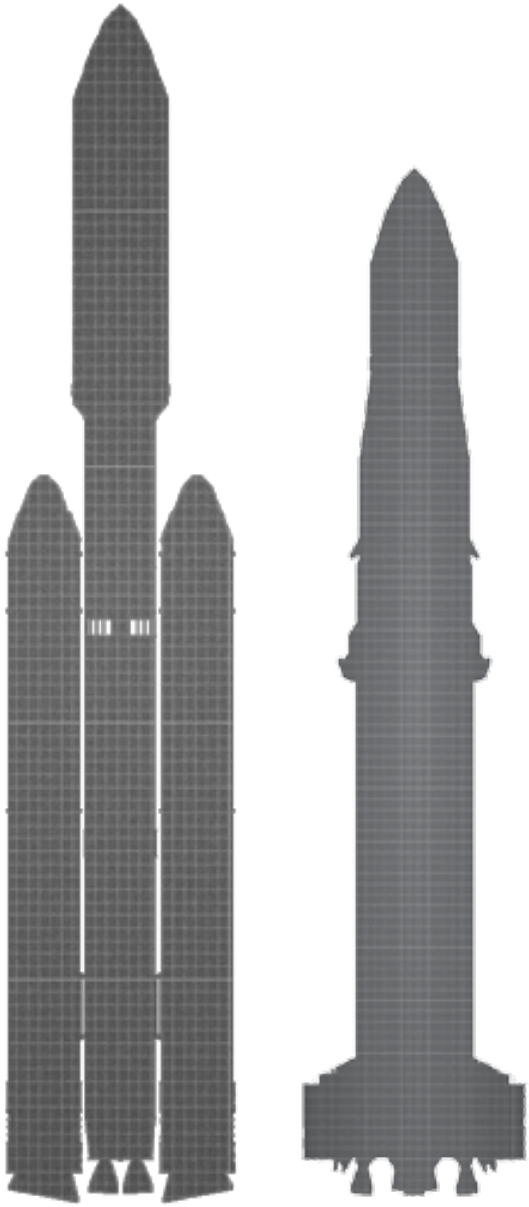


Transtage getting in action

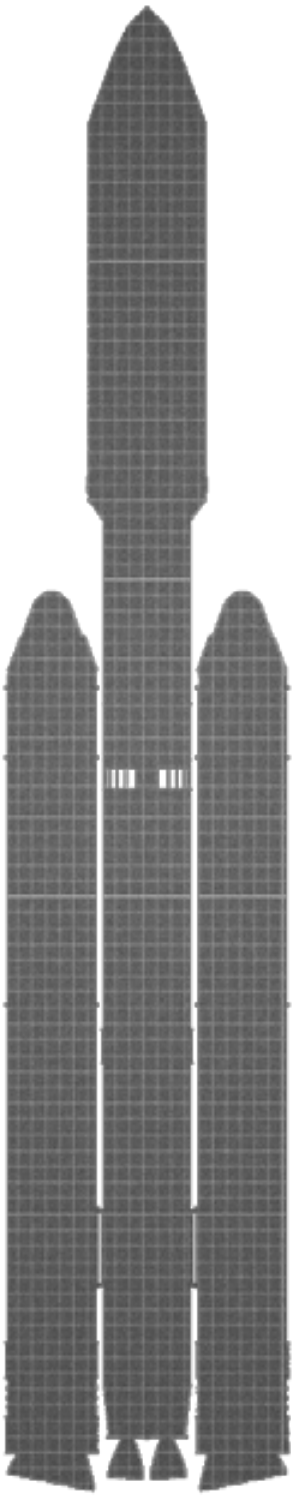


THE PROMETHEUS FIRST STAGE ENGINES HAVE SHROUDS WHICH CAN BE DISABLED WHEN NOT USING STRAPS OR WHEN BEING USED AS AN UPPERSTAGE

MEDIUM HEAVY LAUNCHERS



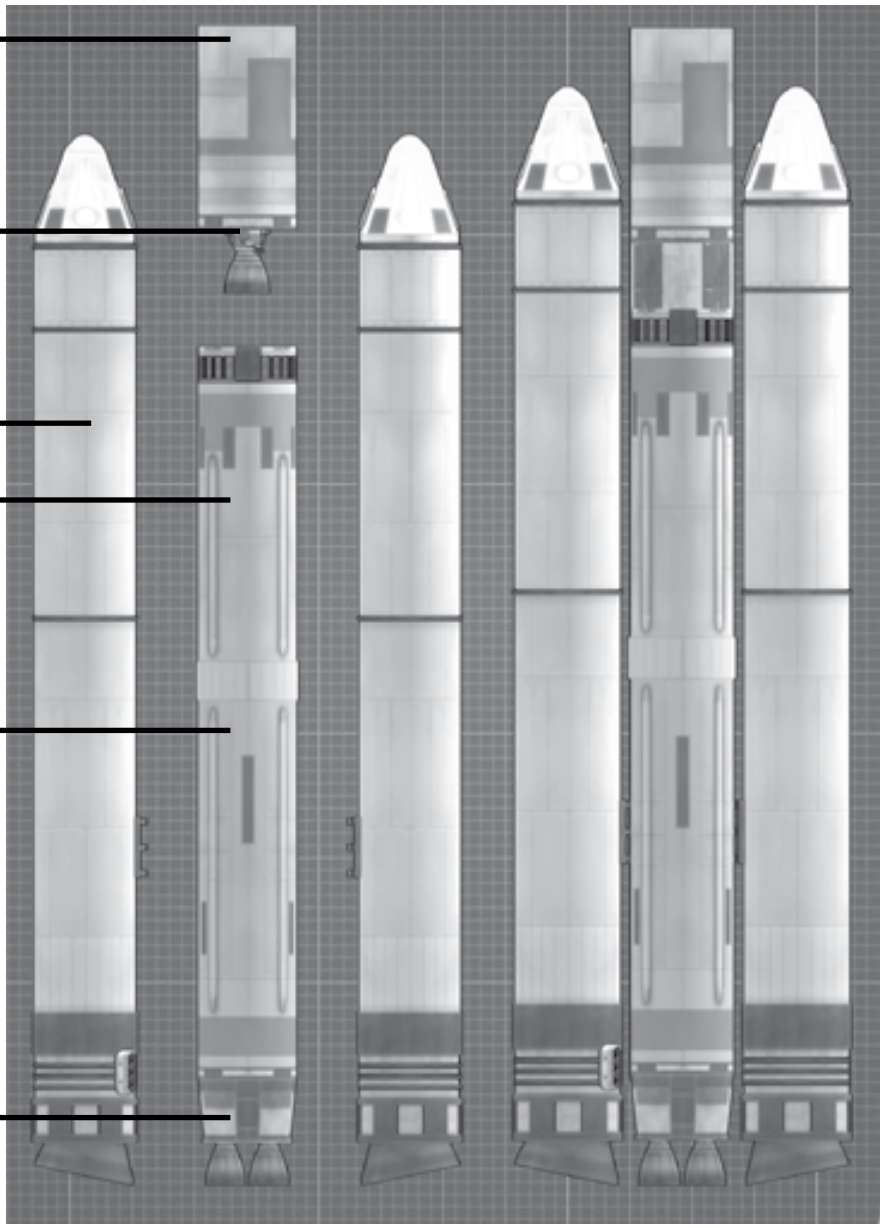
PROMETHEUS IV



2.4 PROMETHEUS IV

-from top to bottom-

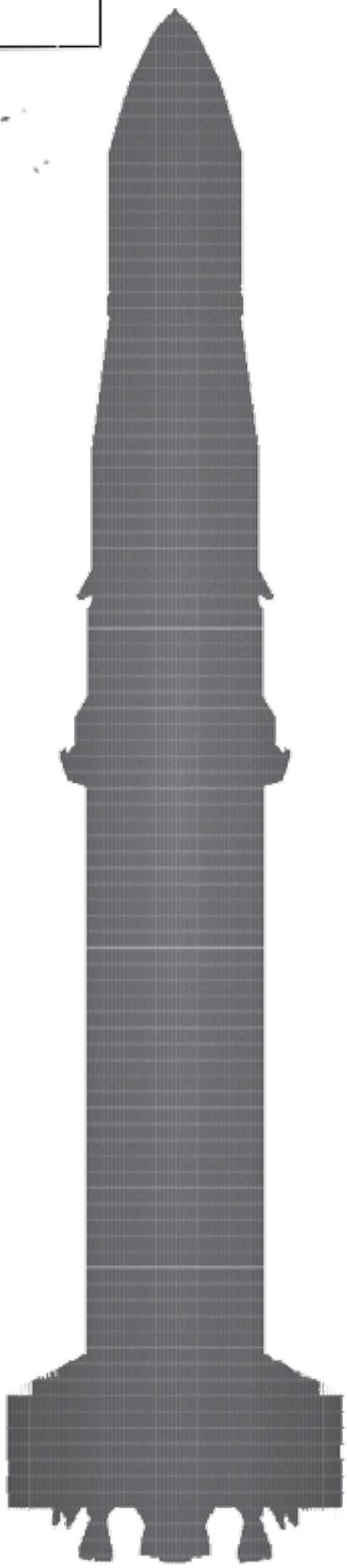
Demand for an even more capable PROMETHEUS launcher led to the development of the PROMETHEUS-IV. It features uprated engines and fuel tanks, and new strap on SRMs. Useful for launching large probes into deep space. Typically the SRMs are ignited on the ground, and the first stage engine is ignited 10 seconds before SRM burn out, effectively lifting the entire rocket stack into the upper atmosphere before the main engines are even used !



1. SECURITY CLASSIFICATION
CONFIDENTIAL

2. CONTRACTOR
808

SARNUS S1 ROCKET



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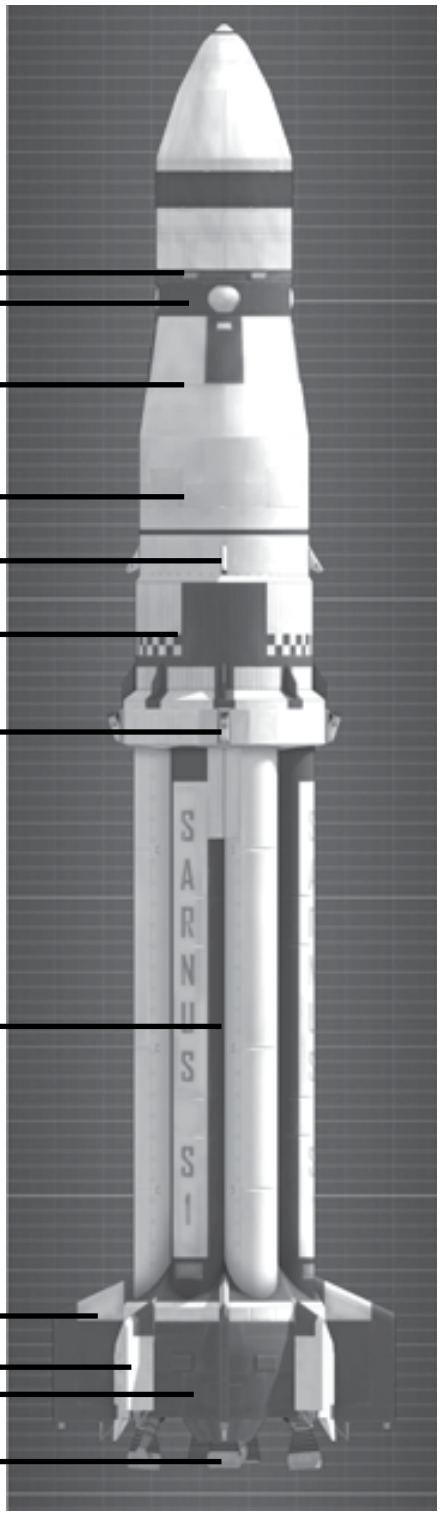
D-~~SECRET~~ SPECIAL HANDLING

2.4 SARNUS S1 ROCKET

-from top to bottom-

Standing at 3.75m in diameter, the Sarnus S1 is our first true 'heavy' lifter. The clustered engine designs of the stages leverage existing engine development programs from smaller rockets, while the clustered tanks save development funds by reusing existing tooling. Originally designed to lift the Káne-11 CSM into low orbit, our flagship spacecraft quickly outgrew the Sarnus S1. It still lives on as our entry-level heavy lift vehicle.

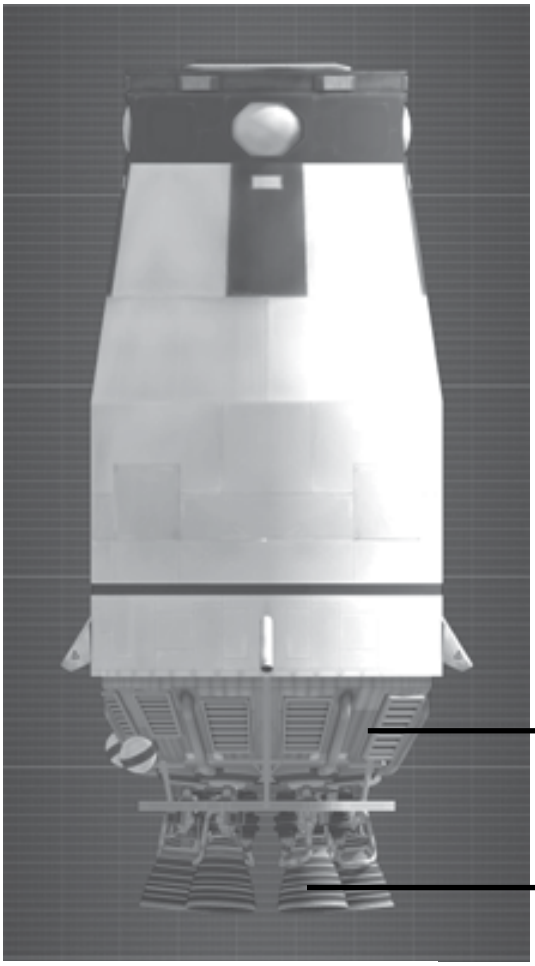


Sarnus-SIV-25 Fairing Base
Sarnus-SIV-CGI Instrument Unit
Sarnus-SIV-2200 Liquid fuel tank
Sarnus-SIV-3200 Liquid fuel tank
Sarnus-SIV-SRM Ullage motor
BDS-0300-Sarnus-SIV Interstage
Sarnus-SI-SRM Retro motor
Sarnus-SI-13900 Liquid fuel tank
Sarnus-SI-LAS Large Aerodynamic Surface
Sarnus-SI-SAS Small Aerodynamic Surface
Sarnus-SI-2800 Engine Mount
Sarnus-HD1-260 "Navi" Liquid engine

2.4.1 SARNUS S1 SECOND STAGE

-from top to bottom-

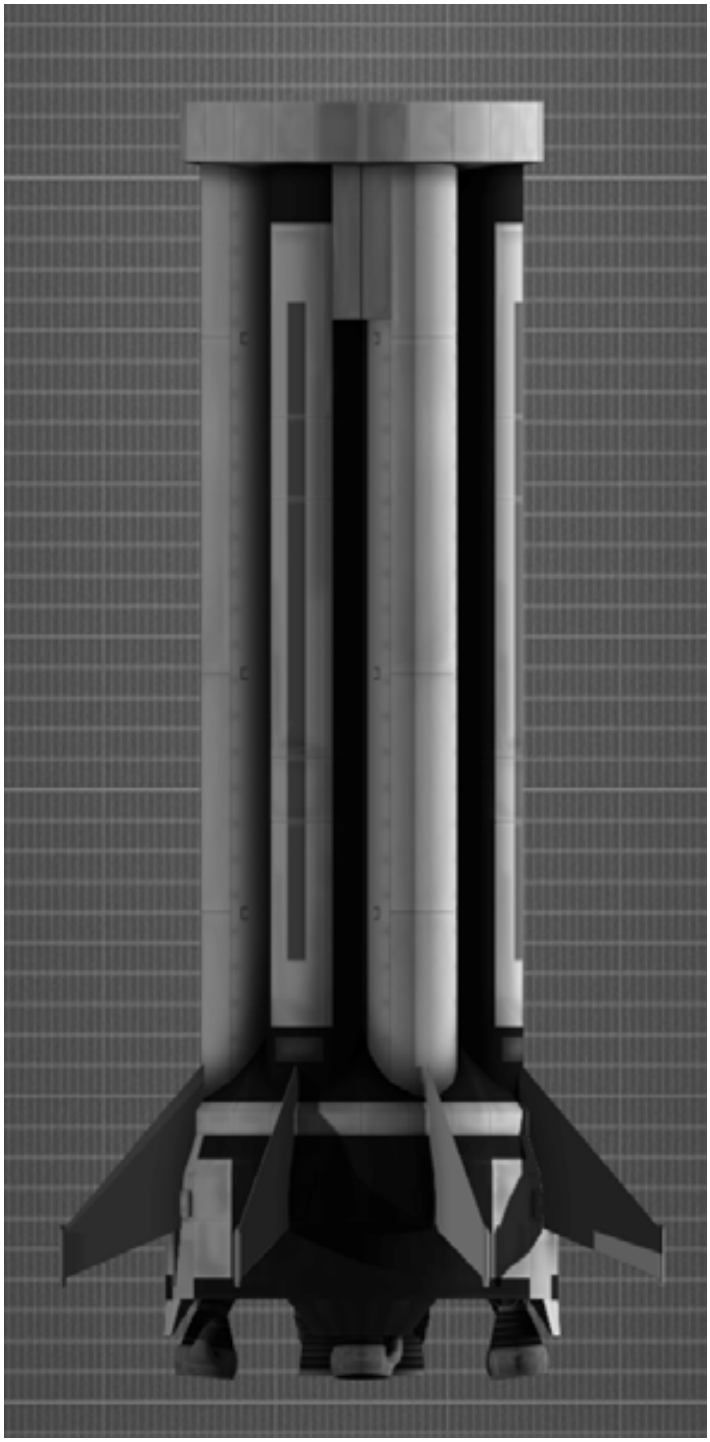
Like the Sarnus SI's first stage, the Sarnus S-IV stage makes use of existing developments. In particular, it clusters 6 of the 'Isor' cryogenic engines from the Inon-D upper stage to power a significantly larger rocket. Despite the size of the cluster, the individual engines have very low thrust. The resulting low TWR limits the ability of the stage, and the rocket as a whole, for large payloads. The higher ISP, though, means that it still can be useful as a Kerbin departure stage.



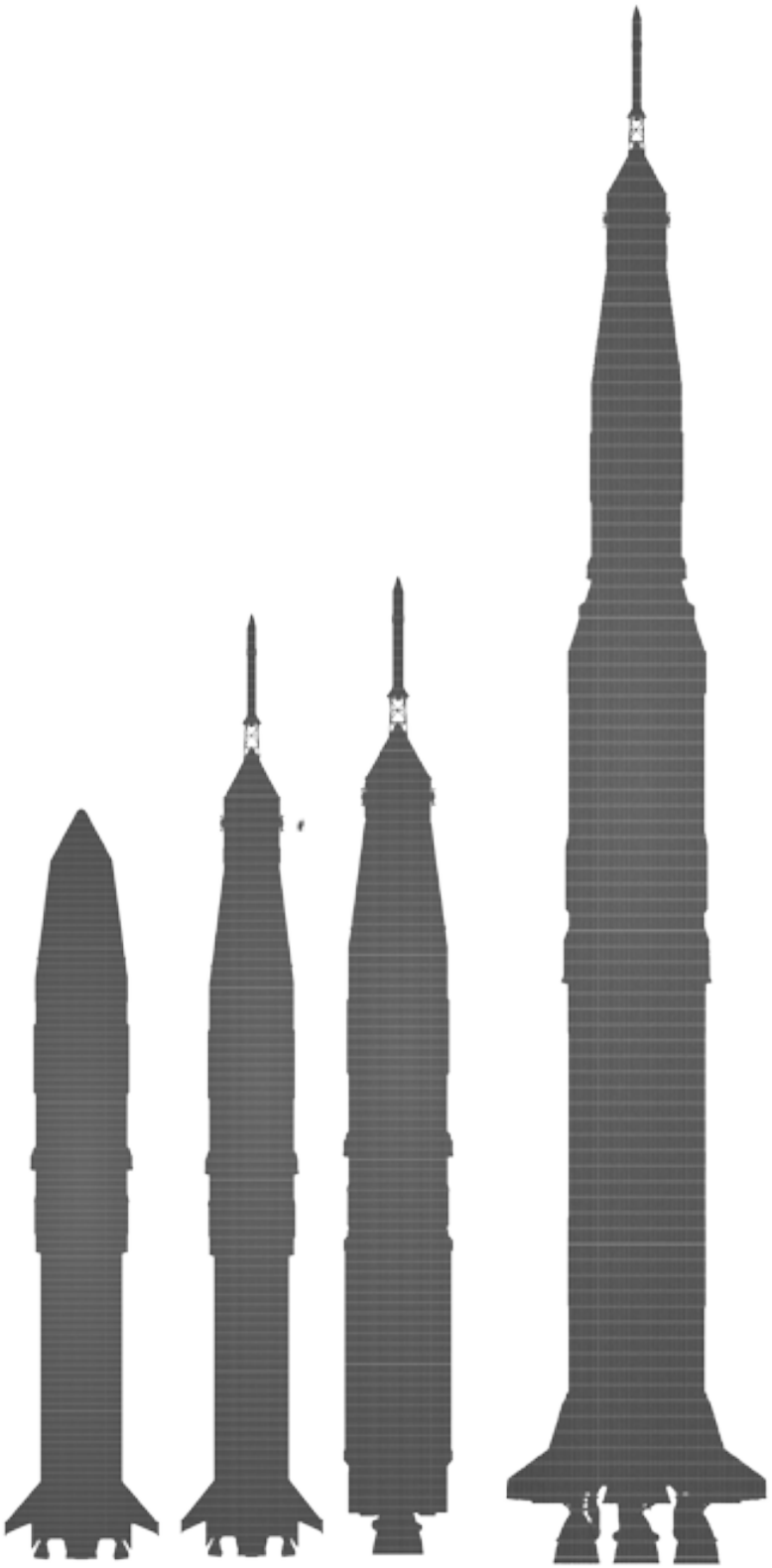
2.4.1 SARNUS S1 SECOND STAGE

-from top to bottom-

The fastest and cheapest way to develop a large rocket stage is to reuse existing assets. The Sarnus S-I stage uses both existing tank tooling from the Etoh and Chryslus series, as well as new, simplified engines derived from the Chryslus engines. While the setup costs are significantly lower, the clustered tank design wastes volume, increases dry mass, and is more expensive to manufacture. By the time it saw use, it was already resigned to being a stopgap design.



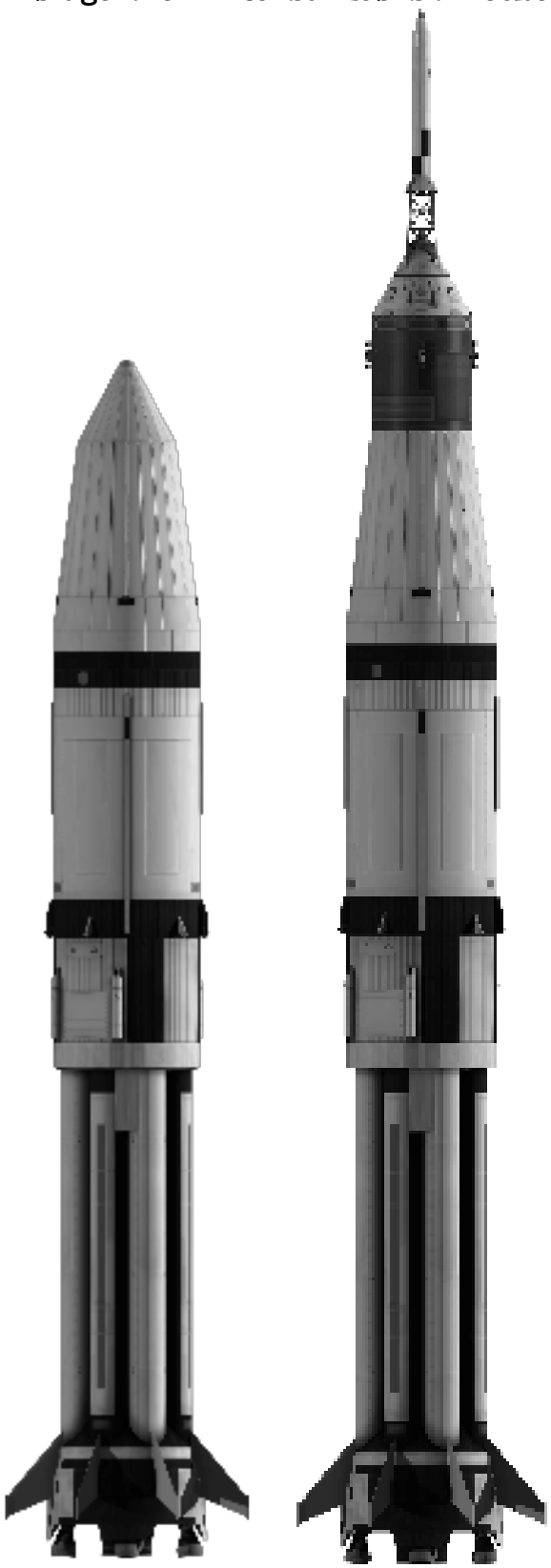
HEAVY LAUNCHERS



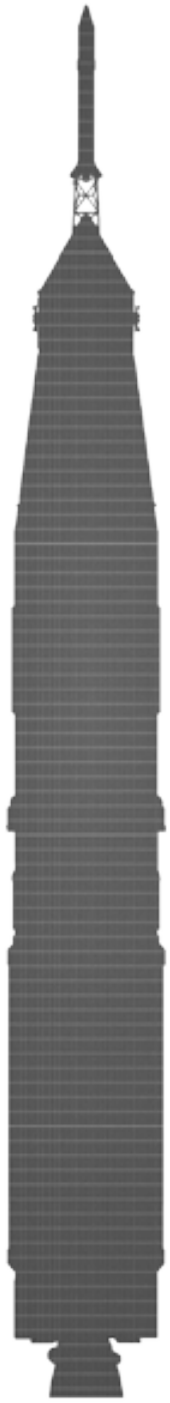
2.5 SARNUS S1-B

-from top to bottom- For details about SIVB Stage go page 67

As the Káne-11 CSM grew in size and weight, it became apparent that the Sarnus S1 would not be sufficient to place the spacecraft into Kerbin orbit. While the first stage was powerful enough, the second stage, with its 6 small engines, lacked the TWR to effectively use the tremendous deltaV afforded by its high energy fuel. The Sarnus S1-B uses the enhanced Sarnus S-IVB upper stage from the Sarnus SV rocket to deliver larger payloads to LKO and beyond.



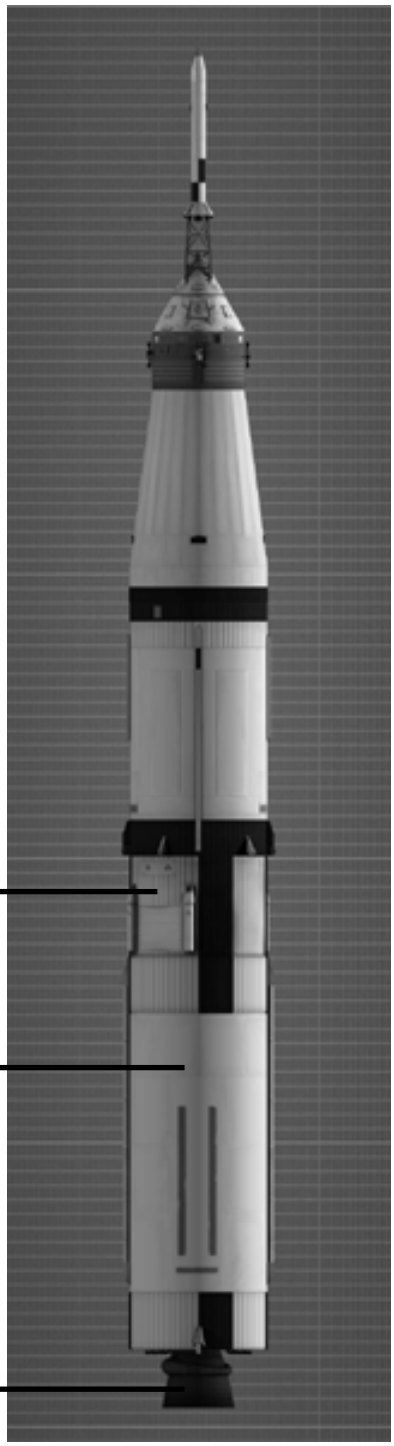
SARNUS S1-C ROCKET



2.5 SARNUS S1-C ROCKET

-from top to bottom-

The SI-C refresh of the Sarnus I design replaces the expensive S-I stage with a cheaper to manufacture S-IE stage, which incorporates a single 'Regor' engine from the larger Sarnus SV. The excess payload capacity offered from the more efficient design allows larger payloads to reach orbit, from fully loaded CSMs, to resupply freighters, and even small station segments.



Sarnus-SIVB-38IA Interstage

Sarnus-SIE-13900 Liquid fuel tank

Sarnus-LE1F-2214 "Regor" Liquid Engine

2.5.1 SARNUS S1-E FIRST STAGE

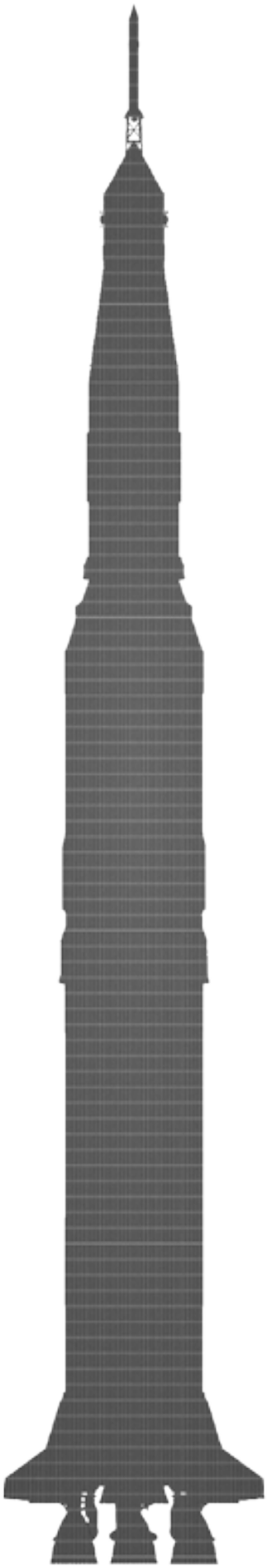
-from top to bottom-

The S-I stage, though easy to produce from existing production facilities, was not a very efficient design. The clustered engines also increased the complexity, and expense, of the stage. The S-IE stage replaces the 8 small engines with a single mighty 'Regor' engine, and the new monolithic tankage significantly reduces the mass of the stage.

Muo-1E-101 "Crow" Radial Engine

1. SECURITY CLASSIFICATION
CONFIDENTIAL
2. CONTRACTOR
BDB

SARNUS SV ROCKET



2.5 SARNUS SV ROCKET

-from top to bottom- Stages are detailed on page 68-69-70

The Sarnus SV is the largest rocket ever constructed. Significantly more massive than even heavy class launchers, the SV and its derivatives possess the ability to send manned Mun missions or large monolithic stations in a single launch, or even manned interplanetary vehicles in just a few launches. This is the rocket the won the space race, now available for requisition. Discounts are available for space programs willing to subsidize our record keeping process.

Kane-11-LES PEBKAC Launch Escape System

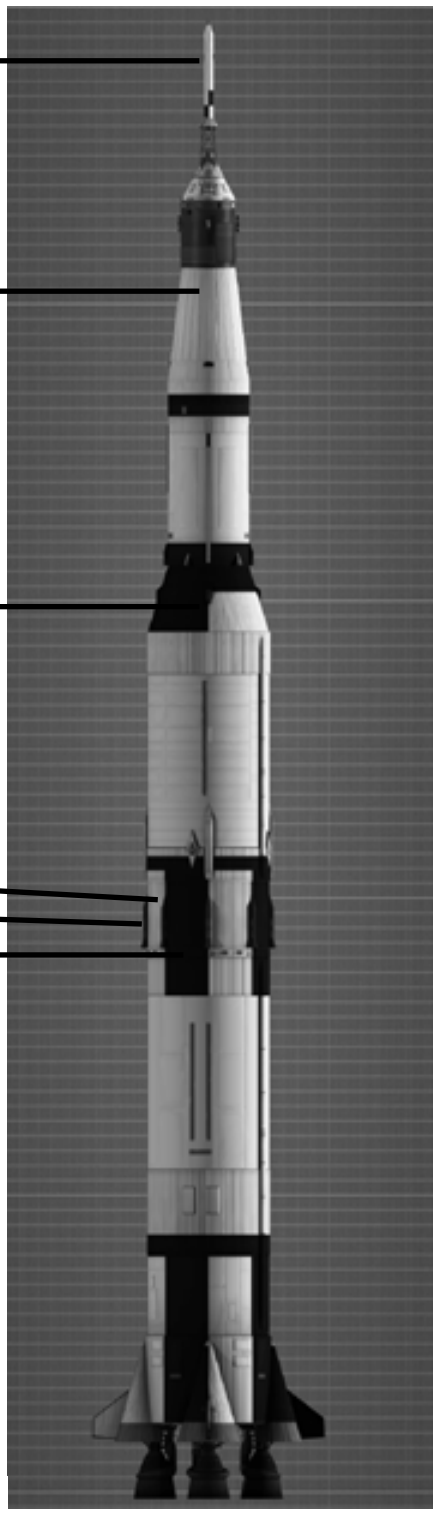
Sarnus-SIVB-LAM Lander Adaptater Module

Sarnus-SIVB-W56IA Interstage Adapter

Sarnus-SII-56IA Interstage

Sarnus-SII-SUM Ullage Motor

Sarnus-SIC-56SD 5.625 Stack Decoupler



2.5.1 SARNUS SV SI-C FIRST STAGE

-from top to bottom-

The power of the Sarnus SV comes from its enormous first stage, the S-IC. Powered by 5 mighty 'Regor' engines, it gulps fuel from the 5.625m fuel tanks at an unbelievable rate. Future growth options include possibilities for stretched tanks, stage-and-a-half staging to drop the outer engines, and strap-on liquid or solid boosters.

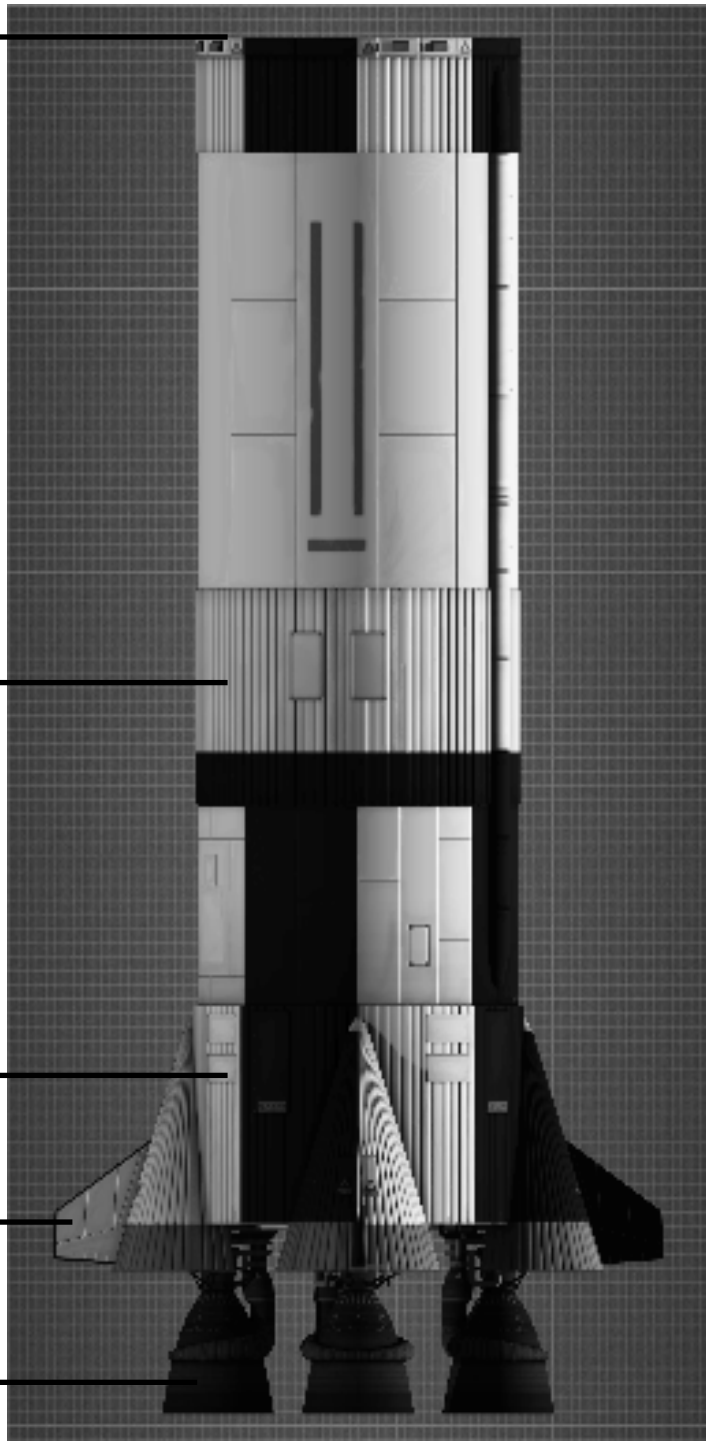
Sarnus-SIC-56SD 5.625 Stack Decoupler

Sarnus-SIC-70K Liquid Fuel Tank

Sarnus-SIC-FE5M Engine Mount

Sarnus-SIC-ASF Aerodynamic Fin

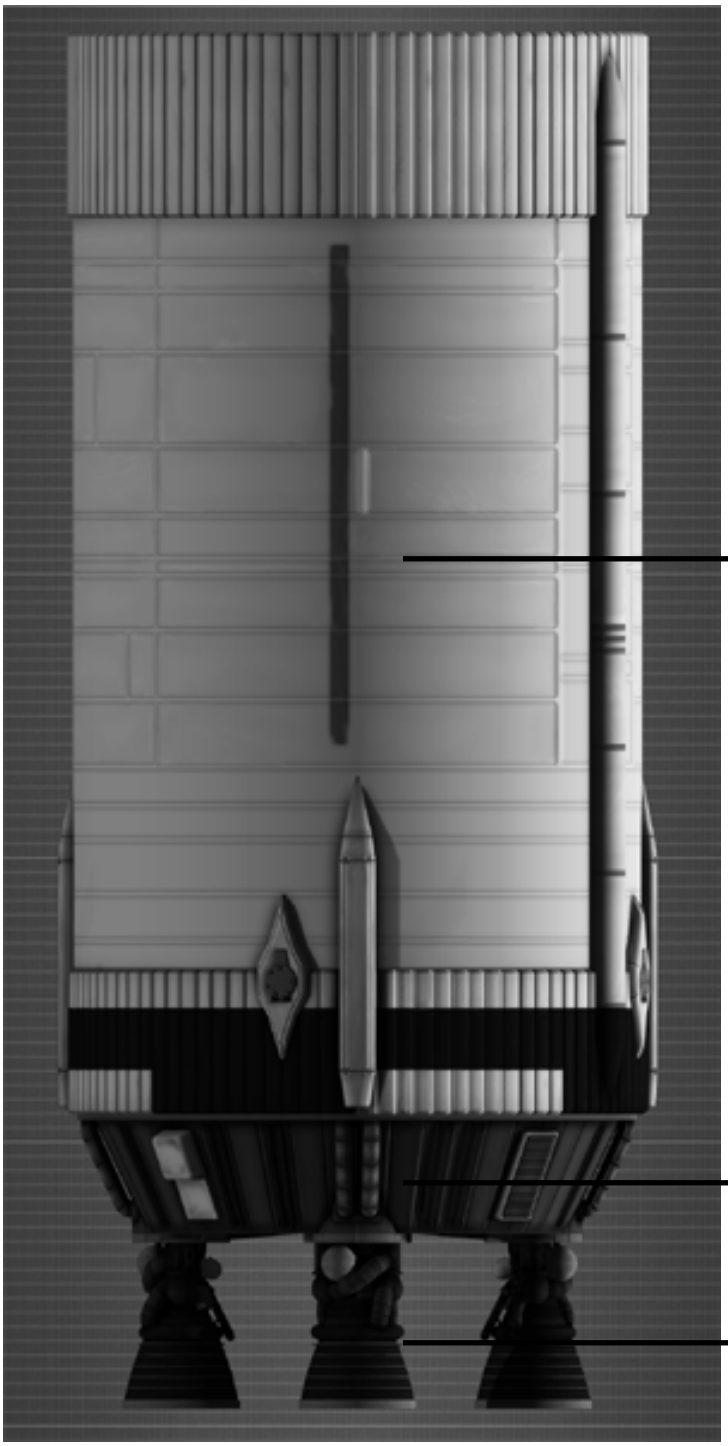
Sarnus-LE1F-2214 "Regor" Liquid Engine (x5)



2.5.2 SARNUS SV SECOND STAGE

-from top to bottom-

While the S-IC provides the liftoff power for the Sarnus SV, the vast amount of the deltaV for the rocket comes from the equally massive S-II stage, with 5 'Dnoces' cryogenic engines. The special insulation and construction keeps the freezing propellants cold at a minimum cost of weight. The 5 engines are powerful enough to complete an ascent and orbital insertion of the third stage and payload.



Sarnus-SII-47K Liquid Fuel Tank

Sarnus-SII-2300 Engine Mount

Sarnus-HE2J-550 "Dnoces" Cryogenic engine (x5)

2.5.3 SARNUS SV THIRD STAGE STAGE

-from top to bottom-

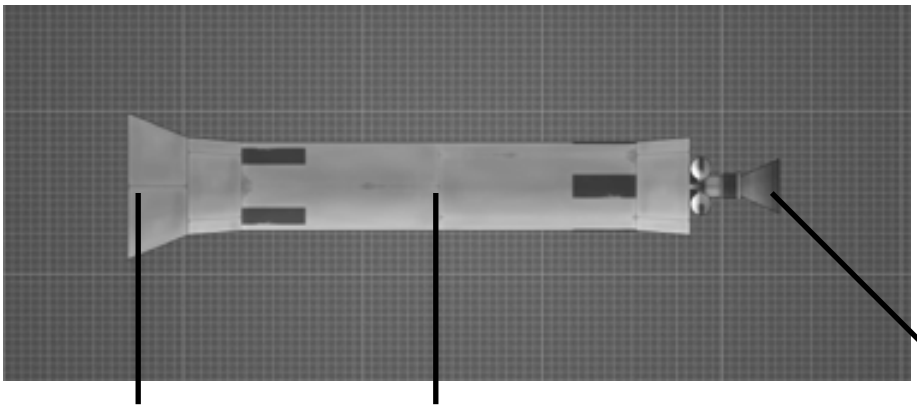
The low TWR of the original S-IV stage limited the growth opportunities of the Sarnus SI rocket. The Sarnus SV's third stage, the S-IVB, replaced the clustered engines with a more powerful, but lower ISP, 'Dnoces' cryogenic engine in a single mount. Coupled with larger fuel tanks and attitude control thrusters, the S-IVB is a significant upgrade. Use on a Sarnus SI variant as an upper stage, or a Sarnus SV as a Kerbin departure stage.

SECTION 3. UPPER STAGES

3.1 ALPHA UPPER STAGE

-from top to bottom-

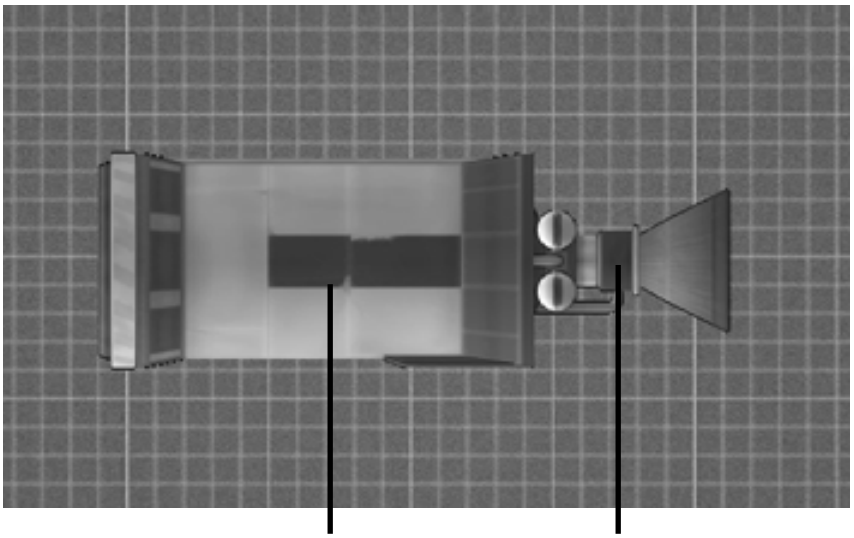
The Alpha upper stage is the first real upper stage created by BDB aming to provied better range and efficiency to launch probes. Alpha upper stage uses same “Alpha” engine as the second stage of the original Viklun rocket.



Brun-4688 fairing base Brun-120 liquid fuel tank Brun-12 “Alpha” liquid engine

3.1 ALPHASTAR UPPER STAGE

-from top to bottom-

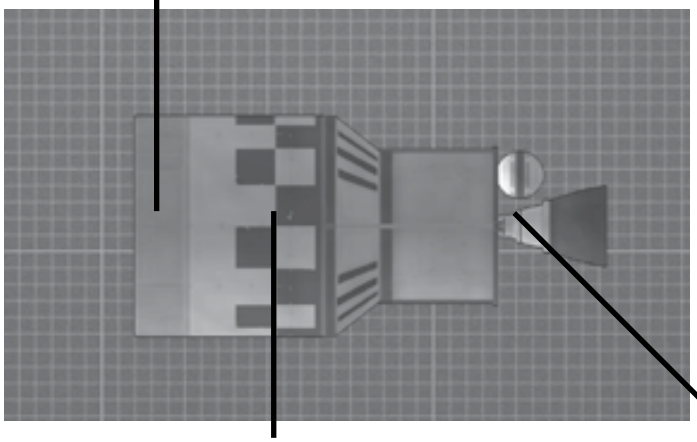


Fenris-200 liquid fuel tank Fenris-18 “Alphastar” liquid engine

3.1 BELLE A

-from top to bottom-

Belle TRU Telemetry Response Unit



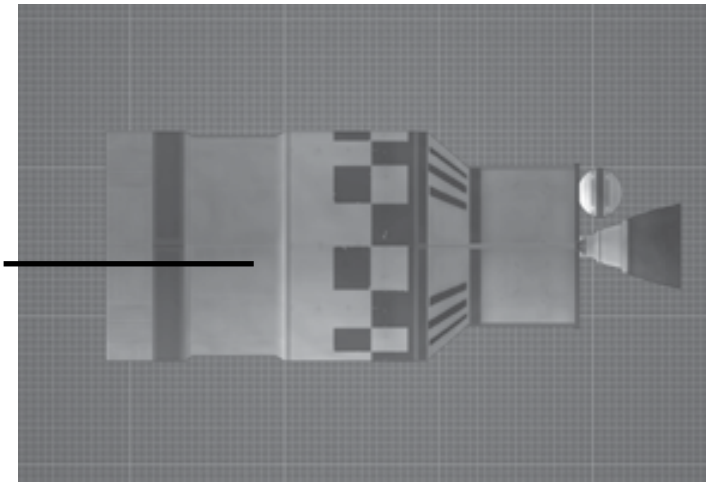
Belle-160 liquid fuel tank

Belle-A-25 “Hadar” liquid engine

3.1 BELLE B

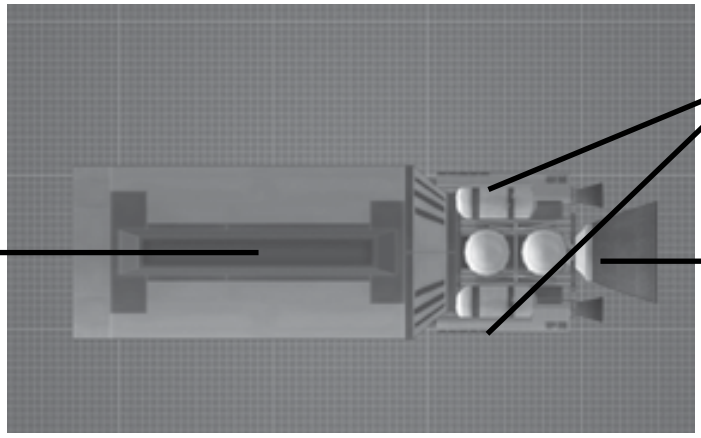
-from top to bottom-

Belle-140 liquid fuel tank



3.1 BELLE D

-from top to bottom-



Belle-D-4 “Nafuni” liquid engine

Belle-180 liquid fuel tank

Belle-D35 “Mafuni” liquid engine

APPENDIX A: REAL NAMES

The following appendix lists the various part series in BDB, followed by their corresponding real life names.

MANNED SPACECRAFT

Hermes : Mercury
SPICA : Gemini
Kane : Apollo

LAUNCH VEHICLE

Viklun- Vanguard
Alpha- Able
Alphastar- Ablestar
Etoh- Redstone/ Juno I
Vicenza- Baby Sergeant
Rosuette- Diamant
Chryslus- Jupiter/ Juno II
Muo- Atlas
Belle- Agena
Inon- Centaur
Fenris- Thor
Daleth- Delta
Dioscuri- Castor
Prometheus- Titan
Sarnus- Saturn

APPENDIX B: NAME ORIGINS

The following appendix describes the origins of some of the names used in Bluedog Design Bureau, for those curious. This is by no means exhaustive, as it does not even begin to cover the names of many of the individual engines and other parts. However it should provide insight into the kind of inane logic that comes into generating names for BDB parts. As a general rule of thumb, most parts that need a "name" in their description, get a name based on the first interesting word on their Wikipedia page.

Hermes - Hermes is the Greek name for the Roman god Mercury. The name was chosen by PassingLurker, who originally made the Bloeting Corp parts.

Spica - The brightest star in the Virgo constellation. Name chosen by Beale, who made the Spica parts.

Viklun - Named after former Overkill composer Simon Viklund. Appropriate for a Viking rocket.

Alpha and Alphastar - An 'A' name was needed to correspond to 'Able'. 'Alpha' was cool enough.

Etoh - The Redstone missile was powered by liquid oxygen, and ethyl alcohol mixed with water. Ethyl alcohol's structural formula is often abbreviated to 'EtOH'.

Vicenza - The 30th Field Artillery Regiment, based in Vicenza, Italy was one of the users of the MGM-29 Sergeant missile, on which the Baby Sergeants used for Juno 1 and 2 were based.

Rosuette - Phonetic name derived from the word 'Rose', which seemed appropriate for a romantic language and a rocket with red stripes.

Chryslus - The Jupiter rocket was manufactured by the Chrysler company. Chryslus is a fictional equivalent from the Fallout universe.

Muo - Derived from the name of the MUOS satellites, which were launched on Atlas V rockets.

Belle - The Agena upper stage was powered by an engine from Bell Aerospace.

Inon - Centaur did not have a good name forthcoming, and eventually was named after Inon Zur, composer for the Fallout series among other games.

Fenris - Also known as Fenrir, a giant wolf from Norse mythology.

Daleth - Delta is the fourth letter of the greek alphabet. Daleth is the fourth letter of the Hebrew alphabet.

Dioscuri - Another name for the star Castor.

Prometheus - In greek mythology, Prometheus was one of the Titans, specifically the one who gave man fire. All the Prometheus parts are named after Titans, or phonetic alterations to the names of the Titans after BDB ran out of Titan names.