JUMP POINT

FROM THE COCKPIT

GREETINGS, CITIZENS!

It wouldn't be the October issue if we didn't start off with a great big HAPPY BIRTHDAY *STAR CITIZEN*! Two of my very favorite memories are of attending the initial launch at GDC Next in Austin in 2012 (anybody remember the website breaking?!) and then the very first CitizenCon the next year, where we worked so incredibly hard to pull off our first big show and then had such a fun night relaxing afterwards. I suppose that you Subscribers understand better than most the satisfaction that comes from knowing that history since you're all consciously doing as much as you can to get extra details about how *Star Citizen* is being made. So, here's to a great birthday and to looking forward to the next one where hopefully we can celebrate in person again!

Along those lines, our big feature article this month takes a little bit of a different tact towards talking about the Origin 100 Series. As I'm sure you already know, the 100s are now flyable in the latest *Star Citizen* patch and so we wanted to give them a little bit of extra coverage. But we've talked about the physical design process so much and instead thought it would be an interesting change if we learned about the very last step of the process - how they're put through their paces by QA. To that end, we interviewed both the 100's original designers for some background and then several implementation testers to shed some light on a rarely-seen part of development.

We've also got a feature updating everyone on the recent changes to *Star Citizen*'s law and order systems. That has been a big focus this year, with everything from Armistice Zone changes to the complete prison system launched some months ago. From the very start we've known that getting the right balance was going to take time and iteration and thought... and lucky for us, we have developers with all of these virtues. We spoke with designer Luke Pressley about his work with the system and what the latest changes mean for the future.

Over on the lore side, we've got a Whitley's Guide covering Aegis' wonderful flying wing, the Eclipse bomber. The Eclipse was a ship I really rooted for a few years back and I couldn't be happier with how it turned out. I always think back to seeing the first photos of the B-2 stealth bomber being revealed when I was a kid and I wanted that kind of magic for the Eclipse. Mission accomplished there and now there's some additional lore about its origins for you to enjoy! Last but not at all least, we have a profile on Caldera, one of *Star Citizen*'s armor manufacturers. We can talk all day about how the details in pieces like this are proof of what a fascinating universe the team has been building... but you have a magazine to read! I'll see you next issue, through the **Jump Point**

Ben

DEVELOPER INTERVIEW:
LAW & ORDER UPDATE

If the 'verse seems a little safer today, it's no coincidence. *Star Citizen* Alpha 3.11 features some major updates to the law and order system, including the relaxing of Armistice Zones and other balancing changes. If you've been following development this year, you'll know there have been several updates to how criminals are punished in the game (for more, see our interview in the April 2020 issue of Jump Point). To cover this latest update, we spoke with the designer in charge of the system, Luke Pressley.

BEGIN TRANSMISSION →

JUMP POINT (JP): *Give us the overall story on the new changes to the Law System in Alpha 3.11. Why were they needed, what are they, and what impact are they having?*

LUKE PRESSLEY (LP): High-level, the main changes have been the relaxation of restrictions in the Armistice Zones around rest stops and many improvements to the existing law system.

The Armistice Zone relaxations are the first step to removing all arbitrary restrictions from the game, which will continue as and when we have the capability to properly defend and police areas. This was possible at the rest stops because, as well as reusing the existing size-4 turrets and size-6 sentries, we created an all-new size-10 turret. Together, these are capable of dealing with any ship planned for the game. And rather than impose yet another arbitrary restriction, we made the defenses fully destructible. The respawn speed is very swift at 5 minutes, though this system will be developed further in future.
   In concert with the defenses, we added the first iteration of a

security response system which, while still quite simplistic, adds up the CrimeStats of all players in the area (known internally as "heat") and spawns security ships of increasing number and strength in response. The system responds quickly to increases in an area's heat by spawning in new ships and de-spawning out any weaker ships they replace. The system responds slower to the killing of its members (should the heat not be raised by this) and slower still to decreases in heat. We will develop this system further in the future to also take into account the ships that players are using and the aggression shown.

We will roll this out across the other locations like outposts. For example, Grim HEX will need a more complex solution as the defenses there should only respond to crimes committed in its jurisdiction and not in others. Port Olisar will remain an aberration as it is a legacy location that cannot support an Armistice Zone of the radius required. In addition, we are already well underway with a closet system that will allow us to spawn security to police the interiors of stations.

As well as this, we improved the existing law systems based on feedback from the community. Back in July, I asked for the biggest

bugbears with the law system in a Spectrum discussion. From there, I planned solutions for the majority. The fix for some issues will take more time, but I identified the ones we could very quickly address. Serendipitously, the team hired a new coder at the same time and we were able to task him with these and he absolutely ploughed through them, completing many more than expected!

Of the issues we could tackle for Alpha 3.11, the highest upvoted by far was the unfairness of being arrested by simply dying in proximity of someone authorized to arrest you. We addressed this by starting/resetting an arrest timer should a criminal player be attacked by an NPC or player valid to arrest them. If the criminal dies by any means whilst this timer is active, they will be arrested. This timer is ended should the criminal manage to quantum travel.

JP: *How are timer lengths determined?*

LP: Timer lengths are determined by a gut feeling to start with and then tested to balance. We tend to err on the side of lenience in most

of cases for initial release, then we monitor the community's feedback as well as the analytics we receive.

JP: *Tell us more about pressing charges. Where did this element come from and what is it going to allow players to do?*

LP: Players are now briefly offered the option to press charges or forgive crimes committed against them. This is defaulted to press charges for crimes committed by non-party members and defaulted to forgive for party members should the notification be ignored. This allows players lured into a party only to be killed to press charges after the fact.

Sadly, on release of Alpha 3.11, two unrelated bugs with the notification system impacted the feature somewhat. The first, notifications continuing to update under transition screens was an issue we tried address, but a further bug, the first notification after death being blank, meant we could not proceed. We hope to have both fixed soon.

Again, this came from the Spectrum discussion as it was another much-requested feature to allow players performing ops to do so without constantly accruing crimes. At some point in the future, we will allow players to set a default for these options and have much more time to consider, likely in a mobiGlas app. Perhaps we can even allow for players to select defaults for players in their orgs.

JP: *Why did you choose to make missile lock a hostile act? Might it be possible for an electronic warfare tool to obfuscate locks and avoid the penalty in the future?*

LP: This was another request in the Spectrum thread and made a lot of sense as there is no non-hostile reason to lock a missile and players rightly felt they should be able to defend themselves against a potential threat. It should be noted that missile lock is only a crime within an Armistice Zone. Doing so anywhere else allows for another player to respond in kind to the hostile act. With the addition of the missile operator mode there will be many changes coming which I am

LP: The team pays a lot of attention to how griefers could take advantage of any system we implement, but we have to first draw a distinction between what is considered gameplay and what is considered griefing.

For instance, I don't consider a group of players locking down a rest stop as griefing as we should have the defenses and policing to make this hard work. But what I do consider griefing is destroying ships on pads either the moment they are spawned or the moment the player enters them. We're well aware that ships on pads (and even inside hangars) are vulnerable at the moment. There is a short-term fix that will address this issue at Olisar, outposts, and other locations which still prevent ship combat. The longer-term plan is two-fold: the pads at rest stops should be replaced with hangars, and scanning improvements will prevent the lock on of missiles through geometry so will players will no longer be able to lock onto a ship in a closed hangar.

JP: *What exactly is an Armistice Violation?*

LP: An Armistice Zone is an area with increased restrictions, designated as such by the UEE or governing authority. By entering the area, the player agrees to conform to the increased restriction or suffer the consequences. An Armistice Violation is any act of hostility that doesn't already carry a felony. Players are given a warning should they commit such an act, but should they persist, they will receive an Armistice Violation felony.

JP: *Have you been following player reactions to the system now that it has gone live?*

LP: My team always follows the response of the community for things they release. Given the short time the Alpha 3.11.0 PTU was running, we had to be extremely vigilant and quick to respond.

An example of what we noticed was players stealing the sentries by swallowing them in the cargo bay of their 890 Jumps. We rectified this by self-destructing the sentries and respawning them. Another example is that while the security response was capable of quickly

not knowledgeable enough or able to discuss, but I talked with the Vehicle Experience Team and we agreed that there was no non-hostile reason to lock a missile.

JP: *What exactly do CrimeStats track? Are these records permanent and how do you make sure players aren't being incorrectly flagged as criminals?*

LP: CrimeStats track the Merit Debt a player has in a jurisdiction. Merit Debt is accrued by committing felonies (each has a different Merit Debt). Each CrimeStat level is triggered at a Merit Debt threshold. Merit Debt must be paid off in prison, hacked away, or the lifetime of the crime must be waited out thereby removing the Merit Debt associated with that crime.

JP: *What kind of special attention to you have to pay with regards to griefers who will use this sort of game design to their advantage?*

spawning ships on local severs, on a live server it was not. To try and improve this we reduced the thresholds that the system responded to in order to reduce the number of spawns requested.

JP: *The folks designing guns and ships get to reference modern technology… is there anything similar for designers working on the law system? Do you do research actual laws in any way or are these systems strictly built around how the game plays?*

LP: Yes, my search history is quite alarming! We draw on modern UK and US laws as well notions from bygone times such as debtor's jail. When I was looking to build the prison gameplay, I dived deep into the purpose of prisons to see if it could be replicated in our game and, surprisingly, it mostly could. See my presentation at CitizenCon 2949 for more on that!

JP: *Do you see this as the final form of the law system or is there more work to be done?*

LP: The law system, like real world systems of law, will likely continue to develop over the lifetime of the game as new systems and features come online.

JP: *What's next for your team?*
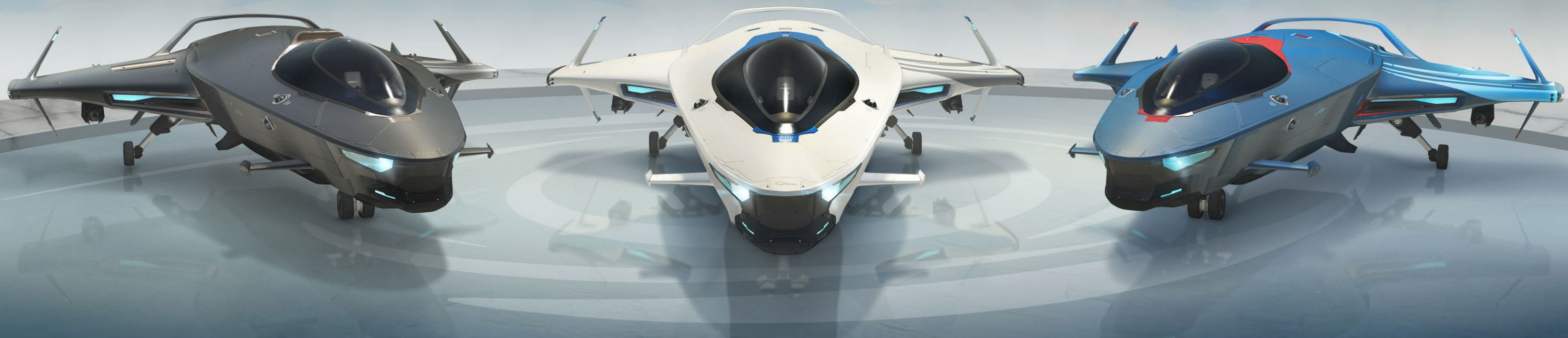
LP: Several things I can't go into, sadly.

JP: *Please let us know who was involved in making this feature possible for our credits!*

LP: Marc Prades Carceller, David Pollard, Miquel Galiana-Llorca, Elliot Maltby, Matthew Delanty, and Matthew Thompson.

END TRANSMISSION

DEVELOPER INTERVIEW:
ORIGIN 100 SERIES

The most recent update to Star Citizen **includes the launch of the long-awaited Origin 100 Series. In honor of this milestone, we spoke with both the 100 Series' designers and the QA team responsible for testing the implementation to shed some light on some of the lesser-known aspects of our shipbuilding process.**

BEGIN TRANSMISSION →

JUMP POINT: *Please give your title and let us know what you've worked on* Star Citizen.

JOHN CREWE: I'm the vehicle director and I've worked on so much I still can't remember it all, no matter how many times you ask!

CELESTE VALENTINE: Vehicle system designer for Cloud Imperium since 2019 and have so far worked on the Anvil Pisces and the Origin 100 Series.

LEE WOOD: I am the lead QA tester of the Vehicles and FPS Team at Cloud Imperium Games in the UK.

ELLIS SMITH: Senior QA tester on the Vehicles & FPS Team. I have mostly worked on ships since joining CIG and have tested all ships released from Alpha 3.5 onwards.

PIOTR CIESLAK: I'm an embedded systems design QA tester.

JP: *Give us the top-level description of the 100 Series, so where it fits in the game.*

CV: The 100 Series is Origin's own starter ship, primarily made for entry-level players. We wanted to give new players the ability to try out a variety of features in-game without needing to dedicate themselves to one specific role. With each variant having its own

internal cargo hold, missiles, guns, and a bed for logging out in, we feel it's an ideal starter ship for players to get a feel for how they want to pursue their adventure into *Star Citizen*.

JP: *How did you decide to pursue another single-seat Origin spacecraft?*

JC: Even though the 300 Series is a single-seater, it doesn't really fulfil the "basic" nature of a starter ship, so the concept for the 100 Series was born.

JP: *How did you tackle the challenge of making a new luxury spacecraft that fits below the 300 Series in the Origin lineup?*

JC: Origin is a luxury brand, so a cut-down, basic starter may seem like an odd choice, but if you look to the real world, you'll see many modern premium brands such as BMW and Mercedes still offer

"entry-level" vehicles to give you a taste of what comes further up the chain. We looked at what the 300 Series had and how we could reduce that down to make it more compact and cheaper. The key changes are reduced cargo and weapons and limited living facilities.

JP: *Did the process of making the 100 Series flight-ready lead to any changes to the original design? How common is that in the process?*

CV: Much of the original design has stayed the same, however we did have to make the size of the ship a little bigger than the concept. Our metrics have changed since the initial design was put together, so fitting all of the components in using the original size would have been a tight squeeze, leading to a very uncomfortable pilot! We try to limit changes as much as possible, as we do want to stay faithful to what is initially shown, but we are a constantly evolving team and changes to initial concepts can happen.

JC: As Celeste mentioned, some items changed size which necessitated a lengthening of the chassis, but that was also in part due to having to rotate the internal 2 SCU 90 degrees. We had the choice of making the ship longer or wider to accommodate this and longer looked better.

JP: *One thing discussed early on was the AIR fuel system on the 100 Series. Is that still in the works?*

CV: The AIR fuel system is still being worked on and won't come into play until after NPC refueling is available. However, the 100 Series is still a very fuel-efficient ship.

JC: When we first announced the AIR system, we did an update about how ships in the future would be able to refuel, as not all ships will keep their fuel intakes and will require mid-space refueling to avoid breakdowns. We don't currently have NPC or player-driven refueling which prevents us turning those restrictions on. In Alpha 3.11, the 100 Series reflects the AIR system by having a superior passive fuel-regen rate.

JP: *Owners are loving the storage compartment. What do you see it being used for long term?*

CV: The internal storage compartment is supposed to be for carrying cargo, but you can also hide a person inside, so who knows! I'm sure the community will try fitting all sorts of things in there and I'm looking forward to seeing what they come up with. I'm going to use mine to carry as many Picos as I can.
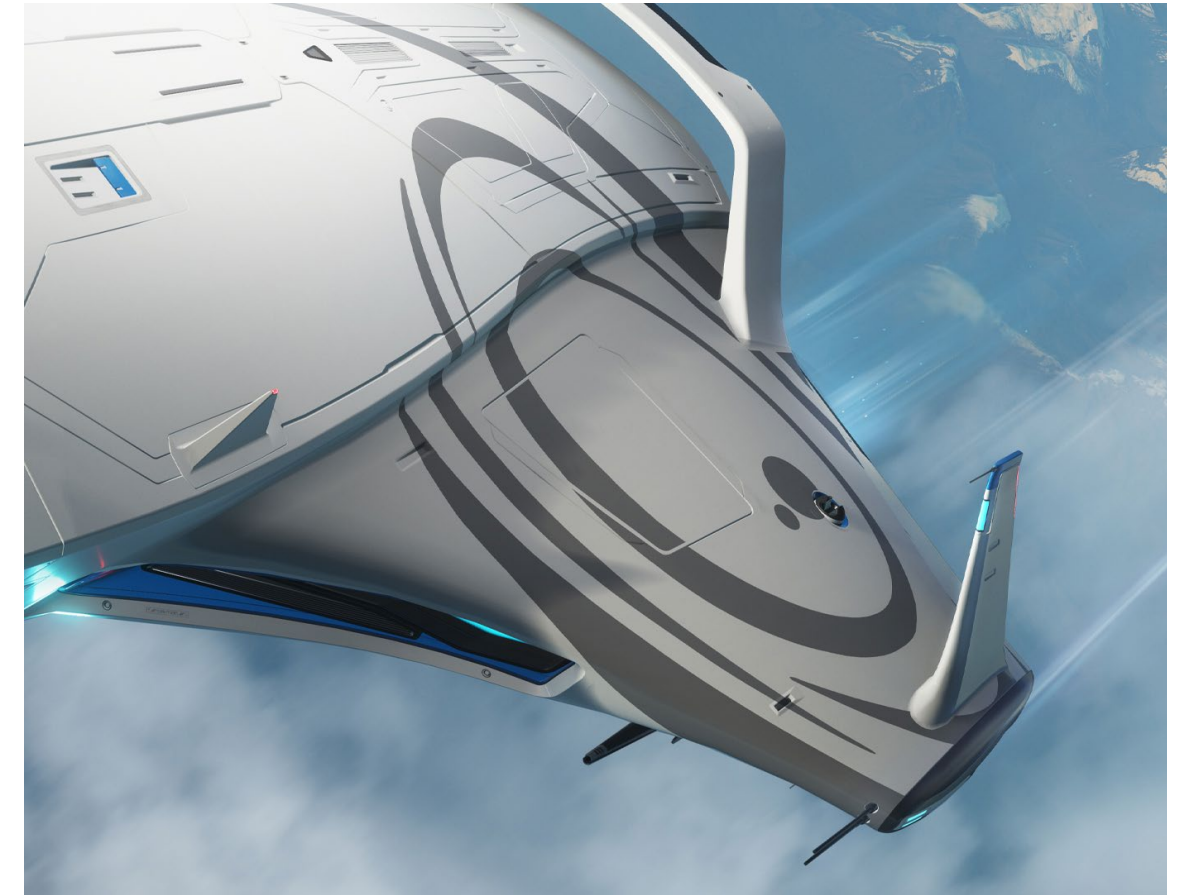
JP: *What was the impetus for the two 100 Series variants? Were they all designed together or did the variants come later like the 300 series?*

CV: We wanted to give players the option to pursue more specific roles, so these variants were designed at the same time as the initial 100i concept.

JP: *Here's your chance to play ship salesman - I'm an interested new pilot and I'm looking at the Aurora, the 100 Series, etc. Why should I pick the 100?*

JC: The big decider could be as simple as looks; the Aurora is very rugged and utilitarian but the 100 Series is much sleeker and sportier. One big difference, and the primary reason in my mind, is that you can complete all the initial missions with the 100 Series as you can simply walk into the ship carrying boxes, something not possible with the Aurora or Mustang. Out of the box, the 100 Series is as capable as a modestly-customized Aurora, giving it a small advantage there. And while the Aurora could be upgraded in missile size beyond what the 100 Series can offer, the 125a can carry more.

JP: *Do you see the 100 Series as completely finished or is there more work to be done in the future? Could we see another variant someday?*

JC: Aside from the AIR system, it's pretty final. There are a few more component hatches to open up when the items are ready, but beyond that, we're happy with it and have no further plans to add variants.
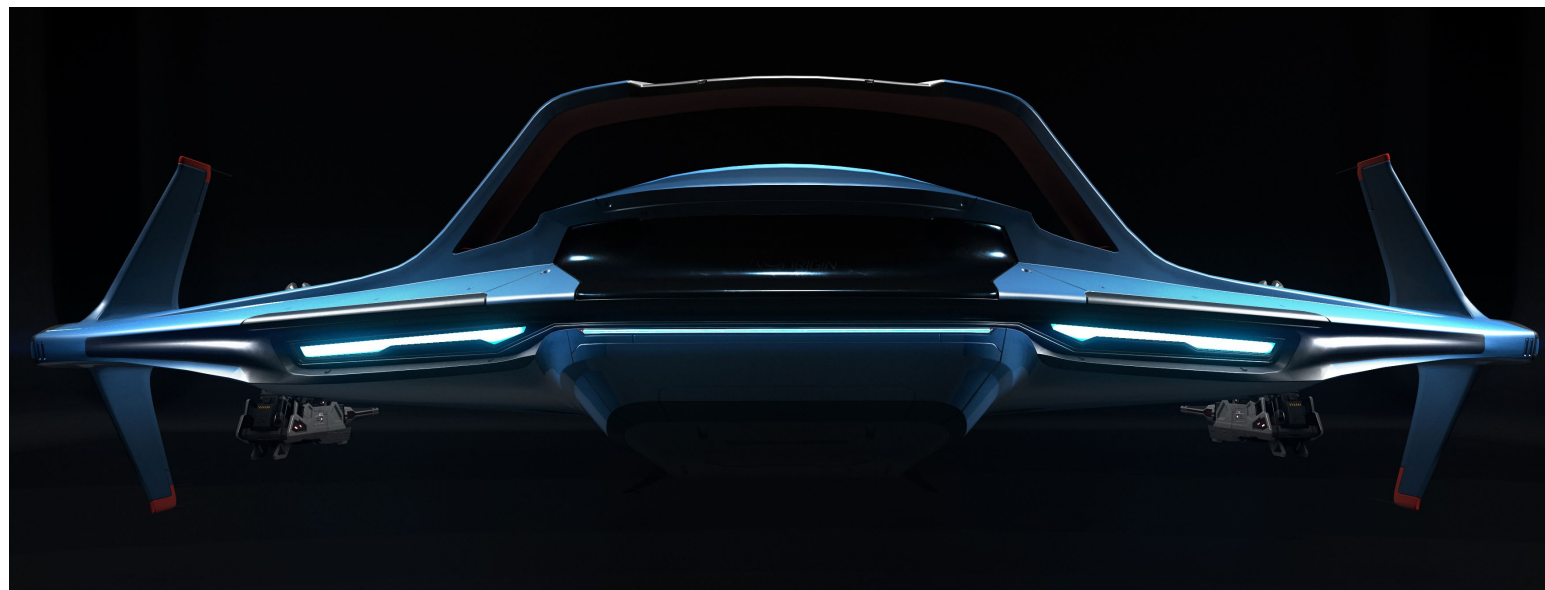
JP: *How do you put a new ship through its paces? Is there a particular checklist?*

LW: We do have a checklist that we use to put our new ships through their paces. This covers a wide range of checks for every aspect of the ship, from making sure it spawns in the correct hangar size to ensuring damage is represented properly on the skins. We even check the ships in Arena Commander to make sure they are up to snuff for that mode as well. Once the checklist is completed, we like to put the team on what we call "destructive" testing, where we assign testers to put it through any gameplay loops they choose as well as do anything that comes to mind to destroy the ship. This is the best part of testing as we get to play with the ins and outs of the entire ship but put it under way more extraneous testing in obscure situations that maybe only some players will use it for.

PC: As an embedded tester - someone who works more closely with a specific team of designers as opposed to the 'main' QA - I support System Design during the production of the ship. Then, when the ship is nearing release, a longer period of testing by multiple QA starts. We test most fundamental aspects, such as art, flight, combat, trading if applicable, sound, and such. However, due to the complexity of *Star Citizen* and the multitude of systems interacting with each other, it is paramount to also test as many complex or rare edge-cases as possible. We try to not settle into a routine and imagine as unusual situations as possible, because once the ship goes to the backers, they will put it through its paces in very creative ways!

JP: *Walk us through an hour of testing if you can. I'm really interested in the day-to-day here, the stuff you might take for granted because it's just what you've become an expert at.*

LW: An hour of testing varies from where abouts we are in the testing phase for the ship. So, let's say it's the first hour we have with the ship. Typically, we go to a landing zone, anywhere with an ASOP terminal, and just have a look at the ship's art when it spawns in the hangar.

I think the most fun I have when testing is exploring some of the bigger ones for the first time; how vast they can be really reminds you of the true scope we are aiming for in the game. We like to note down major noticeable issues and then move onto the checklist, with various members of the team taking different aspects, such as basic flight or weapons.

ES: When we first start testing a Ship, the focus is on the checklist and finding and bugging any issues we encounter during these checks. As these issues are resolved by the development teams, it's important that QA regress these issues to ensure they have been fixed and haven't caused any further issues.

PC: This is a bit hard to answer since testing different elements is very different when it comes to how long it takes, how complex the setup is, etc. Sometimes, in an hour I'll be able to test multiple or all animations, UI elements, and such. Sometimes investigating a single issue - say, a server performance issue with the behavior of ship cargo over time - will require running multiple clients, using different CVARs (console

commands) for debugging, on top of having a low reproduction chance. I've worked with *Star Citizen* ships for almost three years now and not a week goes by where a new issue doesn't surprise me.

JP: *Has the process of testing a ship become smoother as we've finished more spacecraft? It certainly seems like they're delivered much more quickly today!*

LW: Much like everything in *Star Citizen*, the process of testing a ship is a complex thing. It's hard to say if it got smoother, but I will say that the team that I lead (Vehicles and FPS) has some of the hardest working individuals I've ever had the pleasure of working with. If the process is made easier in any way, it's hands down because of the team and all the effort they put into it. Ships differ in needs and complexity, but we always manage to hit our testing deadlines, making sure that all aspects of the ships are tested and any issues are conveyed to the production and dev teams. It's very taxing work, but they manage to maintain a high level of professionalism and focus and they are a delight to work with.

ES: The smoothness of the process for testing ships in QA is very much dependent on the development team. In the case of the Origin 100 Series, the ships were passed to QA in near-complete condition. This meant that testing the 100 Series was a lot easier than it has been for some other ships, where QA were waiting for work to be completed during the testing phase.

PC: I believe it has got smoother, also thanks to the fact that you gain more knowledge as you go, and, compared to many other companies in the industry, staff working on ships seem to have quite low turnover, so I feel like we built a great understanding and rapport over the years. This also allows new employees to settle in quickly. The testing efficiency could always improve, and we continue to work on it, but I feel like we're always progressing.

JP: *How long does it take to test a new ship? How many testers are involved in the process?*

LW: The length it takes to test a new ship is variable based on size. Large ships can take weeks. I remember when the team was testing the 890 Jump, it was literally weeks of destructive testing and bug regression (checking issues had been fixed). That's just because these large ships can have any amount of issues in a whole range of ways from how complex and intricate they are! We have a team of eight

testers, not including me, which was recently increased from five. These extra three testers have helped so much. During testing, all eight of them will touch the ship at some point and I will also look at it. However, roughly half of them will have a fuller focus on the ship and the other half will be dealing with other requests we get in.

PC: For disciplines such as art, it's often more or less directly proportional to the size of the ship, but when we have ships like the RSI Mantis coming in - as the first ship to offer interdiction gameplay - a considerable amount of time has to be devoted to the gameplay feature as it requires collaboration with other departments. As for the number, I'd say it's almost always in double digits - and we always try to communicate and encourage our colleagues company-wide to use new ships when possible while going about their other tasks.

JP: *Do multiple variants of a ship increase the amount of effort required for testing? Do you test a base ship more than the variants or is it the same process for all three?*

LW: Our team prides itself in checking variants as much as we check the base ships. We put the same amount of effort and care into checking them as we know that the variants are as important to players and we wouldn't feel right if we didn't give them the attention they deserved.
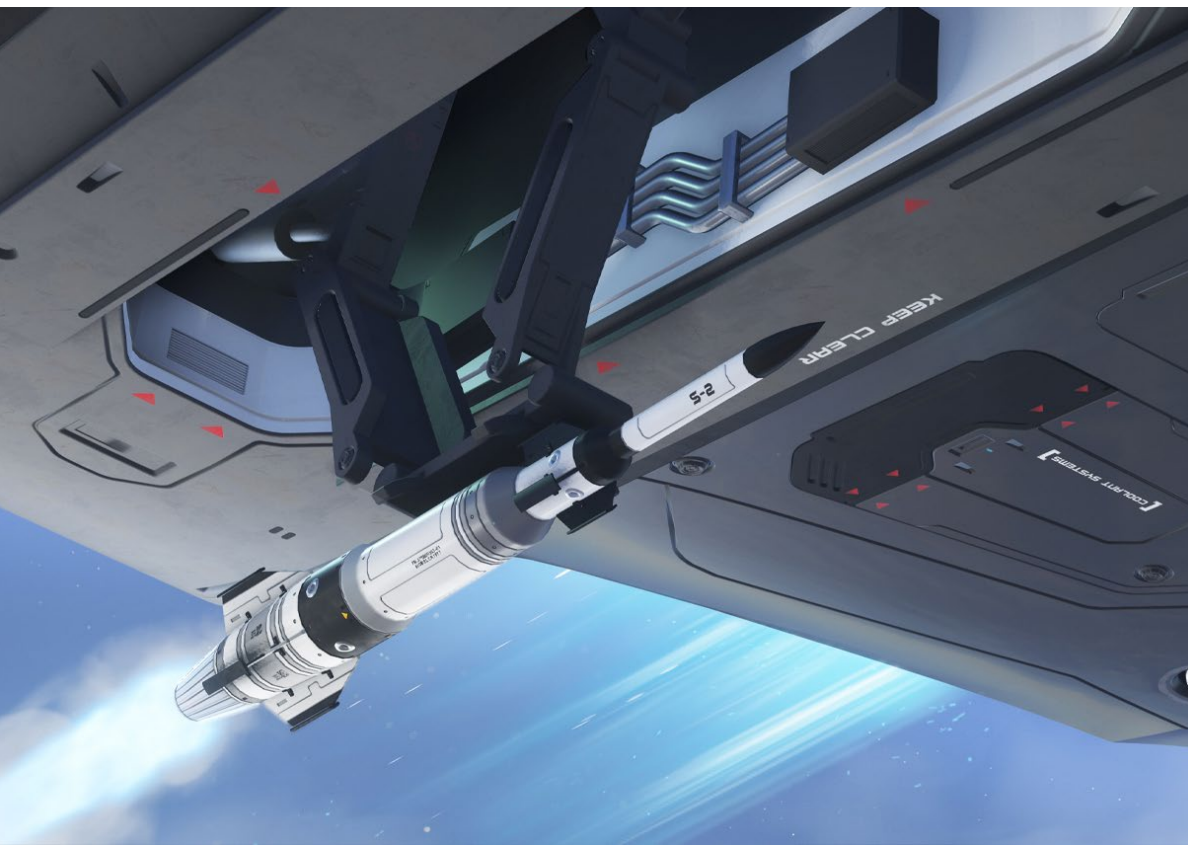
PC: I'd honestly love to be able to bring up a hilarious anecdote here but I don't think I can without fabricating one - the ship was in a really good state when we started. There were some tricky issues, but nothing extraordinary. I think it speaks to the ship pipeline being improved, as mentioned in one of the previous questions, and, of course, the tremendous talent and hard work of the ship's creators.

JP: *Can you give us a hint as to what you're testing now that the 100 Series is out there in the 'verse?*

LW: Sure, here are two hints about two different things we're looking at at the moment. They may be abstract, but they are hints and I don't want to get too much in trouble for breaking NDAs!
• Rising Temperature
• Location of drama

ES: All I can say is that I am currently testing an annual in-game event and will be testing any new ships that may or may not be coming soon.

JP: *Have you been following player reactions to the ship now that it has launched?*

CV: I've been following since it initially went into the PTU to read up on feedback. Doing so enabled us to act fast on making tweaks to the flight balance and fuel consumption before the final push into the live game.

ES: When variants of a ship are little more than a paint job like the Argo MOLE Carbon and Talus, testing is not really impacted that much. We will still check the other variants to ensure issues found with the base version are also present, but we don't have checklists for each variant. Additional testing for these variants is art based and doesn't add a significant amount of time to our process. In the case of the Origin 100 Series, the variants are different ships with different functions so these are all tested separately as it's likely that the 125a will have different issues than the 100i or 135c.

PC: Sometimes, variants introduce completely new gameplay elements, such as the Cutlass Red which, combined with the fact that it has been released separately from the Black, means it gets as much testing as a brand-new ship.

JP: *Did you run into any unusual situations while testing the 100 series?*

LW: Fortunately (or unfortunately depending on your perspective) the 100i came in really well put together for QA. So off the top of my head I can't think of any unusual situations. Sorry!

ES: We did have a fun issue early on in the ship testing phase where if the player had logged out of the game in a 100 Series ship bed, they would log back in and would be lying down within the wall of ship.

I'm so grateful to the players for their feedback and for jumping straight into giving the 100 Series a try.

LW: I only briefly look at player reactions myself as I just like to focus on the work but it's nice to see the positive reception to the 100 Series. I really like it myself.

ES: During release periods such Alpha 3.11.0, a lot of our testing is moved from internal builds to the PTU, so we get to see player reactions to new content this way.

PC: Yes, it's part of the process to not only follow reactions but also the feedback and issues that - unavoidably - will only get discovered by our players in a live environment.

JP: *Do you have any special message for the community?*

CV: Thank you! I read your community posts and watch a lot of the videos of you exploring around in these ships. Seeing you getting excited about the little details and things such as the door animation honestly makes me so happy, so thank you.

LW: Just know that I appreciate you all and your dedication to the product. I hope the work we do results in you enjoying this and all future content for years to come.

ES: Thank you for your continued support. I hope you enjoy the new content for ships that will be appearing soon too!

PC: Thank you for all your support, feedback, and passion for the game, as well as all the positive interactions during playtesting. (Even when I'm there without a CIG tag, our community is great!)

JP: *Please let us know who was involved in making the 100 Series flyable for our credits!*

JC: Lots of people in the vehicle pipeline helped out here and, as always, I tend to forget someone but on the art side we had Colin Baynard and Ashley Aslett do the interior with Daniel Dexter-Taylor on the exterior. Celeste Valentine took care of the design setup and then we had the usual passes from the downstream teams such as Tech Art, Audio, and VFX.

LW: The Q&A Team included myself, Ellis Smith, Joseph Ceesay, Adam Bourne, Tristan Snell, Callum Henry, Hayden Kelshaw, and Matt Dunphy.

ES: From the UK QA side: Deen Mugal, Piotr Cieslak, Lee Wood, Ellis Smith, Joseph Ceesay, Callum Henry, Adam Bourne, Hayden Kelshaw, Matthew Dunphy, Harry Woodhouse, Harvey Webb-Jones, Joe Dines, Thomas Hoskings, Delyan Ivanov, Max Southerton, and Zaim Anwar.

END TRANSMISSION

AEGIS
DYNAMICS

THE
AEGIS DYNAMICS
ECLIPSE

DEVELOPMENT HISTORY

DEVELOPMENT HISTORY

ORIGIN

The Eclipse is Aegis Dynamics' most advanced jump-capable bomber, declassified for the first time in 2947. But the background for its development dates back several hundred years to the company's initial success as the Messer administration's prime shipbuilder. From the company's founding to the fall of the Messers in 2792, Aegis was responsible for developing everything from powerful warships to nimble light fighters. The company stocked most of the UEEN for generations only to find itself politically unpopular. Instead, budgets for new advanced fighters and warships were awarded to Anvil Aerospace and other smaller companies, leaving Aegis' once cutting-edge development teams to focus only on maintaining and advancing their existing ship designs. The Eclipse is the ship that, one hundred and thirty years later, broke that trend.

The Eclipse's path to development is unique. In August 2918, a remote sensing suite (the location and type of which are still classified) seemingly identified something military intelligence had been on the lookout for for years: a standing Vanduul fleet anchorage. The location had been determined by studying patterns of Vanduul raids and attempting to find a center point that might be supplying the raider craft. Telescopy soon confirmed that there was, indeed, an object at one of the theorized locations and intelligence analysts soon transformed rough scans of a distant object into a theoretical standing base with drydock facilities for an entire enemy fleet and a network of sensor drones protecting its approaches.

The Navy was faced with a challenge: how to eliminate or capture the base without giving away the latest in sensor achievements and without alerting the enemy to the presence of the powerful warships that would be needed for the attack. The enemy, planners believed, would likely be able to either put up a strong defense or quickly strip the facility if discovered. A traditional strike, which would need to traverse a lengthy, open area of deep space for hours and hours, was deemed unlikely to succeed. Reaching the anchorage would require something unlike anything else in the UEEN inventory: a fully stealth-focused bomber that was still capable of delivering high-powered munitions to a target. These theoretical bombers could, planners reasoned, sneak past enemy scanners and deliver a crippling blow. They would then be followed up with larger warships waiting further behind that could either completely destroy or board the facility depending on the tactical situation at the time.

The potential for striking a genuine Vanduul facility was deemed worthy of the expense of commissioning dedicated spacecraft. The job would need to be done quickly, efficiently, and completely secretly. There could be no open bidding or public construction contracts; the new bomber would be known only to its builders and those involved in the preparation for the base assault. Here, Aegis' reputation for losing out on modern naval contracts came back to help it. The attack-planners reasoned that by using Aegis instead of Anvil, the project would remain secret. They even opted to further confuse matters by naming the project Eclipse, a word that if discovered would point to Roberts Space Industries rather than Aegis.

DEVELOPMENT & LAUNCH

The Eclipse project would need to adhere to an incredibly strict timeline in order to meet the navy's schedule for attacking the Vanduul anchorage. The project would go from concept to production-capable model in only nine months, producing four dozen stealth bomber vehicles in the process. All of this would be done without the knowledge of most of the company, all third-party contractors, and the standard design and factory facilities that Aegis had been using to maintain ships like the Gladius and Retaliator. Those chosen for the Eclipse team were moved to an underground bunker outfitted by a naval construction unit for ship production while the engineers worked through the design phase.

Against all odds, the project went smoothly and resulted in a flying-wing-style spacecraft that was constructed from the very latest in sensor-defeating composites and outfitted with copious classified equipment. The first Eclipse testbed flew at just four months with the final production layout locked in at seven. No expense was spared in the production: the sticker price for the initial four squadrons of Eclipse "service prototypes" was more than the cost to refit an equal number of Javelin destroyers. To say that Aegis was happy to have the work would be an understatement. While it would be decades before anyone involved in the project could acknowledge their involvement, the effect on the company's bottom line became clear in just a few years. What's more, Aegis' dedication to the project is believed to have led directly to the modern resurgence in support for its designs, including the much more public commissioning of the Sabre space-superiority fighter a few years later.

Then, through no fault of its own, the project failed. On July 14, 2920, the four Eclipse squadrons and their specially trained crews rendezvoused with a UEEN battle group that included a carrier and destroyer squadron. The bombers, looking like nothing else that had ever flown, performed perfectly and flew ahead of the fleet's main body where they discovered... an unusually shaped rock. The initial intelligence had been bad and there was no Vanduul anchorage supplying raiders in the first place; what analysts believed were power generators and docked hulls in the initial holography were simply unusual shapes and badly-captured reflections. A belief in their own theory and a desire to see what they wanted in limited

intelligence had cost the UEE billions of credits in spacecraft development... and produced an effective stealth bomber without a specific mission.

One question remained: what to do with the Eclipse? Unwilling to admit the depths of their tactical mistake, the military opted to continue development of the bomber, keeping it top secret in the event it might be needed for a similar mission in the future. For fifteen years, Aegis' underground facilities continued to produce Eclipse bombers and the military continued to use them extremely selectively for strike operations that would leave no one behind to describe their attackers. Study of the now-declassified records shows that the spacecraft was used for only a dozen missions in this period, nine against Vanduul targets and three striking and quickly eliminating the bases of criminal organizations.

CIVILIAN USE

While the Eclipse remained top secret, much of the technology it developed or premiered did not, with stealth composites and anti-scanner technology finding their way to many platforms in the UEEN. By 2945, continued development of the Eclipse was an open question as, even undiscovered, it no longer provided the military advantage it once did. Simultaneously, rumors of a top-secret military bomber supposedly used for illegal missions began to circulate in the public, with some descriptions of the theoretical ship matching the Eclipse. In late 2946, aerospace

watchers captured the first images of the Eclipse taking off from a naval base in a film that spread so quickly it could not be contained by military censors. On the same day, in an adjacent star system, a Hull-C freighter was destroyed, prompting many to assume that the top-secret military spacecraft had been used in an illegal attack. However, the Hull-C in question, King's Twelve, was conclusively determined to have been destroyed by pirates who had accidentally ignited its cargo of fusion cores while trying to capture it.

Facing loud conspiracy theorists and not seeing a particular value to continuing the classification of the Eclipse, the UEEN opted to take their response one step further than anyone had expected. In a series of articles in the Terra Gazette, military sources revealed the ship's design, its secret history, and then announced that it would be made available to qualified civilian units on the frontier in need of advanced striking power. With the Eclipse out of the bag, so to speak, it could be reformatted as a tool for allowing smaller frontier forces to strike back against raiders immediately instead of waiting for assistance from a spread-thin navy. With hundreds of already-built Eclipses in storage, the ships were operating in civilian hands in a matter of weeks, with additional production picking up at Aegis' standard factories to meet the new demand. In just under three decades, the Eclipse had turned around Aegis' fortunes and was now beginning a second life where it sees significantly more action.
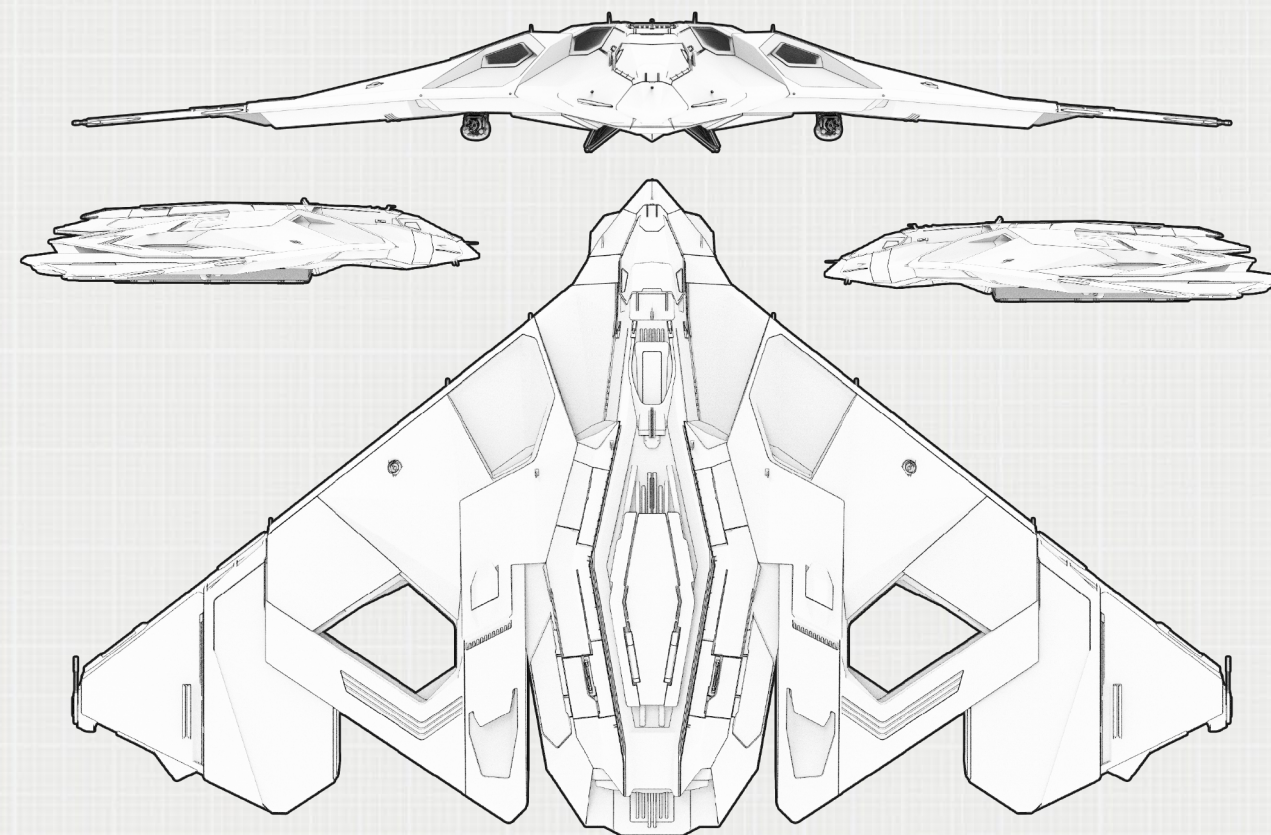
ECLIPSE

MANUFACTURER	AEGIS
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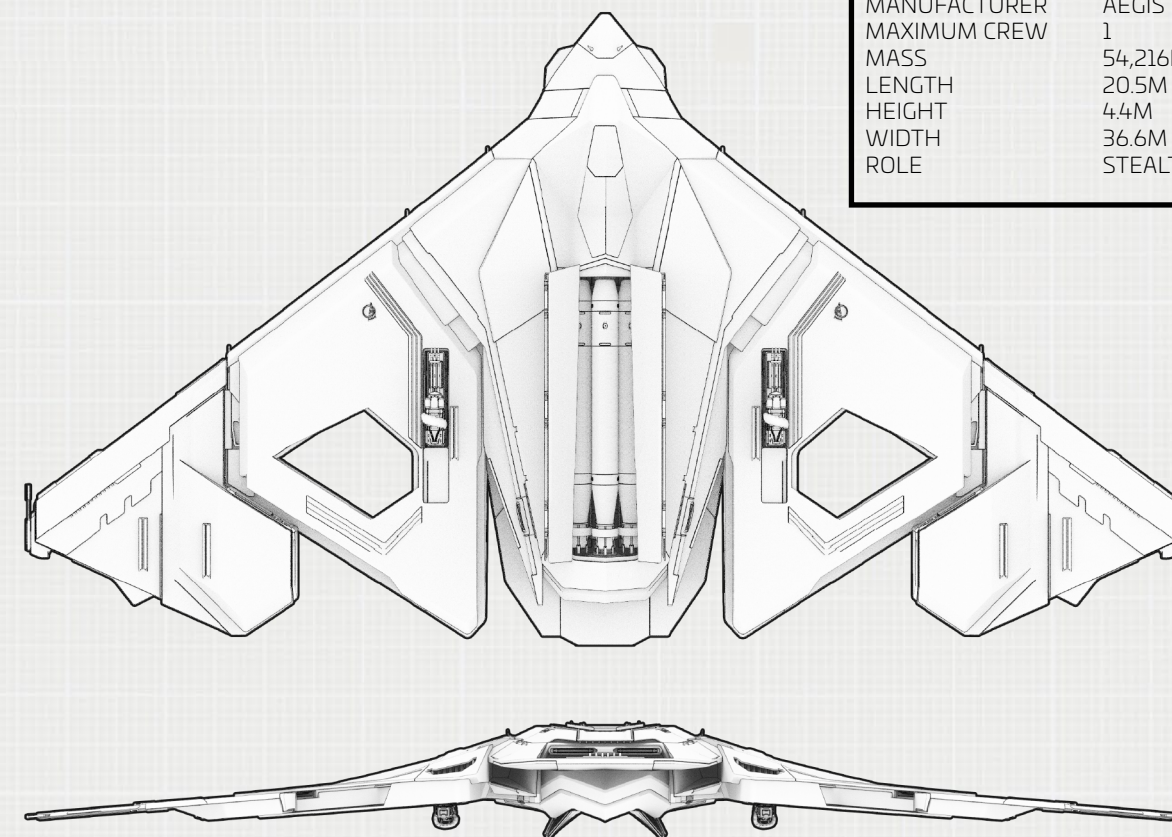
CALDERA

"TAKE THE NEXT STEP"

This slogan is the first thing many associate with Caldera, an armor manufacturer that strives to master environmental extremes. Initially considered a niche market, Caldera has exceeded even CEO Layth Brentano's wildest expectations thanks to the now-famous slogan and ad that popularized the brand. The most iconic, featuring an explorer trekking through the snow with a raised arm braced against the bitter wind, could be found on a near-perpetual loop in spaceports around the UEE. In it, the protagonist's Novikov armor accumulates frost and snow as they summit the rim of a massive caldera moments before sunset. The drone camera, buffeted by high winds, follows shakily and with each step reveals an incredible panoramic view of the crater. The now-iconic slogan then fading into the top half of the ad.

"I've always loved that ad. It embodies what I want people to feel when wearing Caldera; awe on a personal scale," said Brentano. "Plus, that ad features the actual prototype suit and the person wearing it is the reason we're around."

CONFIDENCE INTERVAL

Layth Brentano often described himself as a "capable engineer, but a better go-getter." Born in a bitterly cold region of Vann, Croshaw, Brentano spent much of his youth outside helping maintain his family's mining outpost. In the harsh weather, the machines frequently needed repairs and Brentano dedicated long hours, bundled up against the cold, helping his uncle patch broken parts as best he could. All the while, he developed a passion for mechanics that would last his entire life.

A scholarship brought Brentano to Reisse to attend the University of Rhetor. There, surrounded by fellow engineers, he soon realized that while he had very inventive ideas, executing them required a level of skill that only top students possessed. One engineer in particular would highlight this to Brentano.

Tetsuya Lang was infamous around campus for his genius. Lang began working on ways to mitigate thermal expansion on metals during his first year and never stopped. Lang was presenting an update on his ongoing work to his third-year class when a comment from Brentano would inspire a solution to a problem that had stymied progress for months. The two quickly became inseparable, with Lang recognizing that Brentano excelled at non-linear thinking and had an eye for application. Brentano noted that heat resistant armor often accounted for thermal expansion by incorporating other materials between the pieces. If they could limit those other materials, they could build a safer and sturdier suit. Once Lang's initial experiments showed promise, Brentano handled the arduous application process that would grant the pair a prestigious UEE student research grant and their own lab on campus. By graduation, their experiments were given an R&D grant and a provisional lab on Persei, where most of the cutting-edge work in the Empire was done.

CHAIN REACTION

The initial review of Brentano and Lang's work in Persei highlighted several critical benchmarks that the pair missed. When they were reassigned to a small lab near the loud landing pads, Brentano knew their grant was on the line. Then, one day in the hall, Brentano struck up a conversation with Akili Harris from a nearby Department of the Interior lab. The former Navy pilot flew research missions collecting core samples from planets, moons, and asteroids. The two bonded over tales of toiling in harsh weather conditions, and it was quickly apparent that she had spent more time in extreme environments than anyone

Brentano had ever met. He practically dragged her back to their lab. After examining their work, Harris showed off a strange geometric scar on her left leg, seared there years ago when a hydrothermal vent unexpectedly erupted and melted part of her armor. If their tech had been available, maybe she wouldn't have been injured.

Harris returned to Brentano and Lang's lab the next day with her current armor kit and they began making upgrades. She became a frequent guest during Brentano and Lang's frantic final months in Persei. With a new practical application for their research, they made fast progress. However, the timing was too late and the pair lost their grant. Fortunately, Harris had become invested in the project and offered to help facilitate their move to Mentor, even flying the most valuable equipment there herself. To thank her, Brentano offered to build Harris a suit to her specifications. She agreed and continued to share her insights into the design, insisting on several key features including ample storage and an ultra-comfortable inner lining. The prototype impressed Brentano so much he offered Harris a cut of every one sold.

Harris retired from the Department of the Interior and worked with Lang to perfect the cold and warm weather suit prototypes while Brentano tried to find a buyer. Government officials called the suit first-class but couldn't justify the high per-unit cost with their budget. Potential investors worried it was a specialist suit that few would need, so Brentano set out to prove why someone would want it. He asked Harris to take him to the most beautiful place she'd been. Footage from that adventure to the snowy caldera convinced several early investors to come onboard, and also inspired the company's name.

Brentano stressed over the suit's first run as it sat on store shelves for almost a year before becoming the hottest buy of 2942. This sudden success hinged on solid reviews, strong word of mouth reviews of the few suits sold, and a little luck. In late 2941, a government report revealed that the recently discovered Kabal system contained a planet with ancient Tevarin settlements. Missed by the initial scans but discovered by a survey team on foot, pictures of extraordinary Tevarin buildings covered in native plant life flooded the spectrum. Brentano saw an immediate increase in sales and capitalized. He recut footage from his trip with Harris into the famous ad and put it on as many landing zone vid screens as possible. With sales spiking and increased consumer interest in explorer suits, Caldera secured funding for a significant production run and never looked back.

Ever since, Caldera has scaled operations swiftly but smartly, with an eye on maintaining quality standards. While it has strategically expanded its product line, its flagship product remains the Novikov and Pembroke environmental suits, which attracts a wide and loyal fan-base spanning professional explorers to weekend adventurers. Tetsuya Lang drives new product development and continues to tinker with older designs he believes could be improved. Akili Harris still consults for Caldera when not out on an adventure of her own. Meanwhile, Brentano keeps his eye on the big picture as CEO and keeps the company focused on maintaining its image as a manufacturer of dependable and durable high-tech environmental armor. He personally field-tests every new product and provides vital engineering and user feedback. He even explored the far reaches of his homeworld of Vann while wearing the Novikov suit. When asked about the experience for a local paper, Brentano replied that he was "glad I didn't have one of these when I was a kid. I would've spent all my time running around in the snow instead of falling in love with engineering."