Vega-C: power and versatility

Europe’s new launch vehicle, Vega-C, is near completion. Elements will soon be shipped to Kourou for assembly and preparation for Vega-C’s inaugural flight. This new launcher improves its Vega predecessor by offering more power and versatility at similar cost. This new design allows Vega-C to transport larger and heavier payloads into space making it a world-class competitor on the global launcher market while ensuring Europe’s independent access to space.

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| Image | Text |
| 10:00:00:00 | INTRO+TITLE: Vega-C: power and versatility |
| 10:00:07:24   * GV’s Vega-C interstage - Airbus Defence & Space, Leiden, The Netherlands - November 2020 – ESA (2 shots) * Vega-C 2nd stage, Vega-C production factory - Avio, Colleferro, Italy - October 2020 – ESA * Vega launchpad, Europe Spaceport –Kourou, French Guyana - 2019 - ESA (2 shots) * GV’s Vega-C fairing production facility - RUAG Space, Zurich, Switzerland - October 2020 – ESA * Aerial, Vega-C production factory - Avio, Colleferro, Italy - October 2020 – ESA * Vega-C thrust vector control system and interstage-1 – SABCA, Brussels, Belgium – October 2020 – ESA * Vega-C production factory and robot - Avio, Colleferro, Italy - October 2020 – ESA (3 shots) | Across several sites in Europe elements of the first Vega-C are being produced, tested and prepared for shipping to Europe’s Spaceport in Kourou, French-Guiana. There, all these elements will be assembled for Vega-C’s inaugural flight.  Vega-C is the result of excellent collaboration across Europe’s space industry with AVIO as prime contractor and ESA overseeing the design and production of this new lightweight launcher.  ESA’s new Vega-C launcher will be more versatile, cost-effective and powerful – prerequisites to comply with evolving market demands. |
| 10:00:44:07   * Interview: Giorgio Tumino, Head of Vega-C and Space Rider developments, ESA - October 2020 - ESRIN, Frascati, Italy – ESA | Giorgio Tumino: Head of Vega-C and Space Rider developments, ESA  So the need to design a new Vega and with the so-called consolidated version Vega-C, comes from the need, from the wish to provide the European answer to the growing market of small spacecrafts. And in fact, with the new Vega-C, we are able to increase the launch capability to put into orbit nearly 60 percent of additional mass. With respect to the previous Vega reaching up to 2.3 tons of spacecraft mass.  [00:04:19][41S] |
| 10:01:16:18   * Animation. Vega-C stage – 2021 – ESA * P120C hot fire test BEAP, Europe Spaceport – Kourou, French Guyana – January 2019 – CNES * Zefiro-40 hot fire test, AVIO test facility – Sardinia, Italy – March 2018 – ESA (2 shots) * P120C transport to BEAP, Europe Spaceport – Kourou, French Guyana – January 2019 – CNES * ELA-4 Early combined test, Europe spaceport – Kourou, French Guyana – October 2020 – ESA/CNES * Animation, Ariane 6 booster assembly at ELA-4 – 2019 – ESA * Animation, Avum+ upper stage with spacerider – unknown date – ESA * Avum+ motor, Vega-C production factory - Avio, Colleferro, Italy - October 2020 – ESA * Vega-C interstage-1 – SABCA, Brussels, Belgium – October 2020 – ESA * Vega-C thrust vector control system – SABCA, Brussels, Belgium – October 2020 – ESA * Vega-C thrust vector control system test – SABCA, Brussels, Belgium – October 2020 – ESA | To lift this increased payload mass the four-stage Vega-C has two new and more powerful solid rocket motors, the P120C for the first stage and the Zefiro-40 for the second stage. The P120C will also be used as strap-on boosters for the upcoming Ariane 6 launcher, sharing development and production costs between two launchers by using common building blocks. Vega’s reignitable upper stage AVUM+ has a liquid-fueled engine and has been designed for extended stays in space.  In addition, all interstage segments of the launcher have been redesigned, new avionics and actuators subsystems have been developed, including thrust vector control. |
| 10:02:02:03   * Interview: Tillo Vanthuyne, Programme Manager Vega-C, SABCA - Brussels, Belgium – October 2020 – ESA | Tillo Vanthuyne, Programme Manager Vega-C, SABCA:  thrust vector control systems are the systems that control the thrust of the launcher. The thrust is needed to lift the launcher to space. This thrust vector control system consist of two electromechanical actuators and electronics, a cable set and a battery set. The battery set delivers the power to the electronics, which is called IPU Integrated Power and Drive Unit. And this integrated power and drive unit controls the two electromechanical actuators. These actuators gimble the nozzle. They are put at ninety degrees so we can gimbal's the nozzle in any direction we want in order to be able to steer the launcher to its desired trajectory. |
| 10:02:46:05   * Vega-C thrust vector control system and interstage-1 – SABCA, Brussels, Belgium – October 2020 – ESA (2 shots) * P120C hot fire test BEAP, Europe Spaceport – Kourou, French Guyana – January 2019 – CNES * GV’s Vega-C fairing production facility - RUAG Space, Zurich, Switzerland - October 2020 – ESA (2 shots) * Animation Vega-C, SSMS payload delivery – unknown date – ESA (3 shots) * Vega SSMS delivering satellites into space – 2020 – ESA * Animation. Vega-C in flight – unknown date - ESA | These new interstages were redesigned in a way that minimises costs and limits the assembly processes in Kourou.  With a height of 9 m and a diameter of 3.3 m Vega-C’s fairing is also larger than the current Vega. This is needed to accommodate larger payloads.  Vega-C is also a versatile launcher, it can deliver one large payload up to 2.3 tonnes into its reference low Earth orbit but also, through a range of adaptors such as the Small Spacecraft Mission Service and others, allows for ridesharing of two or more payloads in various configurations. ESA is already looking to the future and plans to expand the capabilities of Vega-C even further and to optimise the Vega-C launch services. |
| 10:03:35:23   * Interview: Daniel Neuenschwander, Director of Space Transportation – March 2021 – ESA | Daniel Neuenschwander, Director of Space Transportation:  In terms of missions, we can really have a broad portfolio of activities. For example, we will launch our first operational reusable vehicle of Europe, Space Rider, which will be launched with Vega-C then operate a couple of months in low earth orbit before coming back autonomously on Earth. So with Vega-C, we really have an enhanced opportunity. You also have an enhanced payload volume under the fairing, we have the double with regard to Vega and this at similar prices that Vega initially, so an enhanced competitively, so Vega C will offer new services, competitive services for European institutional needs first, but also global market needs. |
| 10:04:25:18   * Vega-C 2nd stage, Vega-C production factory - Avio, Colleferro, Italy - October 2020 – ESA * Vega-C upperstage, Vega-C production factory - Avio, Colleferro, Italy - October 2020 – ESA (2 shots * GV’s Vega-C interstage - Airbus Defence & Space, Leiden, The Netherlands - November 2020 – ESA (2 shots) * GV Vega-C fairing production facility - RUAG Space, Zurich, Switzerland - October 2020 – ESA * Animation Vega-C launch – unknown date - ESA | With Vega-C Europe consolidates its position in the global launcher market. European industry is once more working together to prove its excellence and reliability. Vega-C offers affordable launches combined with innovative payload versatility which make this a competitive launcher. At the same time, Vega-C helps to ensure Europe’s independent access to space for years to come. |
|  | B-ROLL |
| **B-Roll : 10:05:04:07**  Giorgio Tumino, Head of Vega-C and Space Rider developments, ESA - October 2020 - ESRIN, Frascati, Italy – ESA | Giorgio Tumino: Head of Vega-C and Space Rider developments, ESA - ENGLISH  So Vega-C is the new European answer in space transportation for the launch of small spacecrafts into orbit. With small we mean from 1kg up to 2.3 tonnes.  So the, uh, the production of Vega-C is extremely important for European industries because a Vega-C is a meant to do, let's say, be launched four or five times per year in perspective. Therefore, there will be a recurrent return into European industry in terms of production, producing the modules, building the launchers, or so that there can be, uh, let's say, a return on the investment made by the participating states. Recurrently and on a yearly basis to their industry. And this is a certainly extremely important and extremely efficient also in particular, Vega-C, because of some of the elements that are produced to launch Vega-C are also in common with the Ariane-6 production that with the objective to reduce both the development and the production cost and make European launches more efficient.  The Vega-C is the consolidated version of the current Vega that we operate regularly and it’s consolidated in terms of performances as well as in terms of flexibility. In fact, it brings the capability to lift into space about 60 percent of additional payload mass, and it allows also to bring into space several satellites with the same mission. And in this respect that we plan to have a different services for a small spacecraft satellite.  Vega-C will offer an excellent, a great opportunity to the small space craft market, in fact, with the multiple options, launch options that we have with Vega-C. We are able to put into space satellites which range from a mass of 1 kg or micro, mini, small spacecraft up to big satellites in the order of 2.3 tonnes. So with different launch services, we can have several satellites in the same launch, several satellites sharing the launch cost or main payload paying the full ticket for the launch service. |
| 10:07:42:16  Giorgio Tumino, Head of Vega-C and Space Rider developments, ESA - October 2020 - ESRIN, Frascati, Italy – ESA | Giorgio Tumino: Head of Vega-C and Space Rider developments, ESA – Italian   * What is Vega-C? * What are the differences between Vega and Vega-C? * What will the future hold for Vega launchers? * What services can Vega-C offer? |
| 10:10:07:21  Tillo Vanthuyne, Programme Manager  Vega-C, SABCA - Brussels, Belgium – October 2020 – ESA | Tillo Vanthuyne, Programme Manager Vega-C, SABCA – ENGLISH  Vega-C is the successor of Vega. So we need to increased performances. It means bigger thrust vector control systems and a bigger interstage 01 structure.  Sabca delivers the thrust vector control systems and the interstage to the prime of the launcher Avio . We developed in close cooperation these systems with the prime Avio, with the support of ESA.  So Sabca makes those Thrust vector control systems for the four stages of the Vega launcher and also for the four stages of the Vega-C launcher. The Vega-C launcher is different with relation to the Vega launcher for the first two stages. We have the P80 which is transformed to the P120and the Z23, to a Z40. So we have two brand new thrust control systems in the Vega-C launcher and a new interstage 01 ring.  we are here now in the interstate 01 of the Vega-C structure. This structure is completely integrated in SABCA. You see behind me the thrust Vector control systems, the electronics, everything is integrated in SABCA in order to minimize the cost at Kourou.  So all operations that can be performed in Europe are less expensive than the operations that we need to do in Kourou. So we try to optimize and do as much as possible in Europe, the operations before we ship the interstage to Kourou.  So the challenges for SABCA were to develop in a really short timeframe, cost effective thrust vector control system and Interstage which increased performances but with reduced costs, which is one of the primary objectives of the Vega-C launcher with relation to Vega Launcher. To have a cost effective launch service provider. The majority of the costs are fixed during the design phase. So during the design phase, we had specific attention to the cost. We designed the architecture of the thrust vector control system in that way that we can minimize the power. Minimizing the power means minimizing the cost of batteries, minimizing the cost of equipment. We also reduce the quantity of parts in the electromechanical actuators and electronics. We have also a commonality between the stages of the Vega-C launcher. The electronics between the Z40 and the P120 is common. We have a common architecture of the emecs, the emecs of P120. It has a common architecture as the one on the Z40. With these elements, we reduce the development time and also the development costs. So money is a scarce good, so we want to use it as best as possible. That's why we try to use as much as possible the building blocks. An example is, for instance, the reuse of the thrust vector control system from the third stage of the Vega Launcher for the IXV-vehicle. We try to do the same thing for the space rider. |
| 10:13:28:19  Tillo Vanthuyne, Programme Manager Vega-C, SABCA - Brussels, Belgium – October 2020 – ESA | Tillo Vanthuyne, Programme Manager Vega-C, SABCA – DUTCH   * What is Vega-C? * What are thrust vector control systems? * Role of Sabca * Innovation in vega-C * How does the thrust vector control system work? * Cost reduction on Vega-C * Different between electric and hydraulic actuators * Importance of Vega-C for European industry |
| 10:16:26:18  Claudio Milana: Head of the Launch Systems Development Programs, Avio – October 2020 - Avio, Colleferro, Italy - ESA | Claudio Milana: Head of the Launch Systems Development Programs, Avio - ENGLISH  So Vega-C is the new generation launcher that is inherited by Vega and is based on the same concept, on the same architectural design, but with several differences, with several changes in terms of design, solution, implementation and technologies. And in order to cope with the specific driver of Vega-C the target increase of performance, increase of payload fairing volume, increase of reliability, versatility and robustness, and last but not least, to reduce the cost. So it's really important design to cost approach, to be implemented. So in order to satisfy such a requirement, Vega-C is oriented to capture the wider market for Vega by including and accommodating a heavier and larger payloads, like the earth observation satellites up to 2300 kilos for 700 kilometer orbit. And this means that we increase more than 30 percent with respect to the iso performance of Vega. And this is something that is really important also because in such way we are able to gain market to be to better respond to market position, to market need for what is concerning the differences between Vega, Vega-C, we can say that in a few words. The first is that on Vega-C, we have a commonality between Ariane-6 and Vega-C for what is concerning the first stage, so the P120. The second point is that we have two solid rocket boosters that are increased in terms of performance with respect to the Vega one, and we increase also in terms of performance and flexibility the fourth stage, the last stage of the Vega-C increased performance because we have a bigger tank with 30 percent in addition of loaded propellant and increased flexibility because we are able to make consecutive ignition of the engine and we are able also to optimize the software and the agency for what is concerning to the mission simulation. Finally, we have an avionic that the centralized like Vega, but is with higher versatility, higher robustness, higher reliability. This is in order to overcome all the limitation and the constraint coming from the Vega heritage.  Avio is the prime contractor of the launch vehicle, and the ground proximity means where the ground proximity means are the ground means near living near the launch vehicle. As a prime contractor Avio has the overall responsibility in terms of technical, programmatic and financial aspects for the overall launch vehicle and ground proximity means in front of ESA. And for such reason, Avio has been assigned with the design authority of the launch vehicle and GPM and that the design and product warranty with respect to ESA. So it's something that is breaking with respect to the past rules and is something that entrusts the industry with more authority to take the decisions  Well, the challenge of Vega-C we can resume in only in one word, that is competitiveness. So competitiveness is, let me say, the challenge of Vega-C. This is exactly the reason for which of the ministerial of 2012 founded such kind of programme and then also the following one in 2014 and 2016. It's really important because to reach the competitiveness, that's all to explore and grant also a wider market with respect to Vega-C does mean that we need to increase the qualification domain to Vega in order to satisfy also, multiple missions, complex missions that for the time being are not allowed by the Vega domain, the qualification domain. To do that, we have a compromise between the technical aspects and the economic aspects because on one side we need to increase the performance, we need to increase the payload volume. We need to do better in terms of reliability, robustness and flexibility. But at the same time, we need to reduce the exploitation cost. So we need to implement, since the beginning, a stronger design to cost approach with the final goal, that is to make lower exploitation cost. This is really important because otherwise we are not able to satisfy the market need and we are not able to fight with our competitors.  Vega-C is based on the same concept and the same architectural design of Vega. This means that we have a configuration based four stages. The first three stages are based on solid propulsion, the fourth stage based on liquid propulsion system. The avionic is centralized for both launchers, but in the case of Vega-C, there is an increase in terms of reliability, flexibility and robustness. For what is concerning the difference and what has been changed between Vega and Vega-C, for sure, the payload fairing is larger. So three point three meters with respect to the two point six of Vega. Increased performance for the two SRM, P120 and Zefiro-40.  Well, in terms of benefits, let me say that we have several benefits coming from the Vega-C development and qualification. First, because we have technological improvements so we have additional material, additional technology, new concept, a new approach in order to be implemented as soon as possible in the order that these are under manufacturing for the time being. In addition, we have an increased performance, so the first benefit is, I repeat, the competitiveness. Competitiveness does mean on one side to increase the performance, to make a more powerful the launch vehicle in order to satisfy the market need. On the other side is to pay attention to the exploitation cost because otherwise the business is not able to be sustained. So in order to sustain the business that we need to make everything cheaper with respect to the Vega experience. [So this is the new challenge for what is concerning the new launcher, and this is applicable for Vega-C, but is also applicable for Ariane-6 and this is let me say the guideline that has been identified and funded by the ministerial council. So Vega-C is let me say the solution for the future is the resolution in terms of improvement of the performance. So a new launcher, bigger and more performant and cheaper, so able to be sell at the right price in the future in the frame of the exploitation phase  OK. So, erm, so Vega-C is a new generation launcher that is replacing Vega launcher as soon as it will be performed, the maiden flight and after the transition phase, and is really important for what is concerning the member states and the European space community, because this is let me say the chance we have to enlarge the market today identified with Vega and with the current qualification domain. This is the way to satisfy multiple mission and multiple customers needs, the way to improve, let me say the concept of the Europeanisation.... Is the way to make a European what for the time being is not yet European. For example, we have several aspects that there can be an addressed. The propellant tank is one example of Europeanisation of the order on Vega-C. So we are overcoming and we are, let me say, making it better with respect to the limitation, the existing limitation of Vega. Also in terms of the georeturn, also in terms of Europeanisation of the order  Yes, for sure, let me say that we have two kinds of aspects that are, let me say the first time for Vega-C and this is I think the first time in Europe, the first is exactly a collaboration, the collaboration we have with Ariane group in order to coordinate and to approach the common bloc that is represented by the P120, the first stage of Ariane-6 on one side, the first stage of Vega-C on the other side are a common bloc for both the launchers. And this means that the agency and the member states wanted since the beginning to have only one development to satisfy the need for both launchers. This means we were obliged to reach a compromise, to make an interaction, to collaborate between us in order to find a common solution. At the end, after three years, four years, we can say that such experiment was successful because the P120 has been fully qualified and so everything was good at the end. And this means that it's a really important aspect. The second one is the one concerning at the launchpad Vega-C will be let me say we are we are complementing and we are adapting the ground segment at the launch base in order to be compatible with Vega-C and Vega on one side and on the other side. This means that during the transition phase, the Vega-C will be, let me say the Vega- and Vega will use the same launch pad and this is very hard work to do because we don't want to block Vega when we are making a modification. We are making upgrading of the launch base. But at the end and during the transition, it will be, let me say, the first time that two different launcher will be launched at the same time from the same launch pad.  well, the impact of Vega. Vega is one of the document that is already applicable to Vega-C is the reach regulation and it's let me say a green regulation. That is, let me say something really new. But it's really important because this means that we need to think when we design a system or a subsystem, we need to think to the environment. So we need to respect the environment. So we need to find a solution from a technological point of view and from a design point of view that are choosing the right material and so on. Granting let me say the respect of the rules are coming from the reach. The process has been already started and several material has been changed since Vega-C. So Vega-C is an improvement, a big improvement with respect to Vega and Vega-E that will come and they will represent the evolution of Vega-C will extreme such kind of concept. |
| 10:28:35:24  Claudio Milana: Head of the Launch Systems Development Programs, Avio – October 2020 - Avio, Colleferro, Italy - ESA | Claudio Milana: Head of the Launch Systems Development Programs, Avio – Italian   * What is Vega-C? * What is the role of Avio? * What are the challenges for Vega-C? * Why is Vega-C important for European industry? * What makes Vega-C innovative? |
| 10:37:55:20  Matteo Rendina: Manager Project Office, RUAG Space – October 2020 - RUAG Space, Zurich, Switzerland – ESA | Matteo Rendina: Manager Project Office, RUAG Space - ENGLISH  In the ... Facility of RUAG-space we manufacture the payload fairing for the Vega and Vega-C launch vehicle. The payload fairing is the uppermost part of the launch vehicle. Its responsibility is to protect the satellite from the external environment during the last phase of the ground operation and during the launch vehicle atmospheric flight. Once the launch vehicle is outside the atmosphere the payload fairing is separated from the launch vehicle.  Compared to the predecessor Vega, the payload fairing for Vega-C has a larger diameter. This was are required by our customer Avio because the new launch vehicle is more performing than the previous one. To enable Vega-C to launch larger payload into orbit it was therefore necessary to develop a larger payload fairing. And this is now what we have done.  Compared to Vega the payload fairing for Vega-C is about 60 centimetre larger in diameter, which enables the launch vehicle to bring into orbit larger satellite.  having a large payload fairing on top of the launch vehicle permit the launch vehicle to bring it to orbit larger satellites or as recently is very demanded, is to bring into orbit a cluster of small to medium satellites.  The payload fairing is designed to sustain speed up to 4000 kilometres an hour in the atmosphere and temperature reaching almost 1000 degrees.  The payload fairing is made of carbon composite fibres, aluminum honeycomb core and thermal protection on the outside.  The most difficult part to manufacture a fairing is that the curing process of the composite material. For doing this we need highly specialized people which are constantly trained to maintain their skills over the years.  The form of the payload fairing is obtained during the laydown process of the material and the composite fibre and the honeycomb core on the bonding mold, the curing process into the oven, solidifies these stacking of materials into the final product that has sufficient stiffness to survive to the mission on top of the launch vehicle.  The role of RUAG is to support ESA's access to space. For doing this we provide the engineering knowhow and production capability which was implemented in the various launch vehicle programmes.  we have 50 years of experience developing payload fairing for our launch vehicles. We started in the 70s with the development of the first payload fairing for the Ariane programme and then we moved into the Vega programme in the early years 2000.  we develop new solutions for reducing the cost of our products and to improve their performance. All this is possible thanks to the commitment of the Swiss government, to the space activities, and this will by their investment of the part of the benefits that work is generating in normal operations.  RUAG space collaborate with ESA and the other main European partners in the development of a launch vehicle through the FEPP-programme of ESA RUAG space, develop new technologies that are helping to improve the competitiveness in the worldwide market of our launch vehicles.  RUAG pace supports their customers like Avio as well during the preparation of the launch in the French Guiana by providing a team of engineers and technicians that works in ? with the local team of Arainespace and Avio.  Implementation of a programme such as Vega-C enable the European industry to create and maintain stable and highly qualified workplaces, particularly in Switzerland. We have the opportunity through this programme to provide as well training for young students that upholders scholarship into the industry.  during this launch campaign, you can see how the European countries are able to collaborate and to bring to success these complex operations of launching a rocket into space. |
| 10:43:42:00  Matteo Rendina: Manager Project Office, RUAG Space – October 2020 - RUAG Space, Zurich, Switzerland – ESA | Matteo Rendina: Manager Project Office, RUAG Space – Italian   * What does RUAG space make for Vega-C? * Properties of the Payload fairing * Benefits of this new fairing? * RUAG space payload fairing * RUAG space since 50 years * Importance of Vega-C for European Industry * Benefits of space programmes for industry * Participating in a launch campaign like Vega or Ariane |
| 10:46:15:18  Javad Fatemi: Systems Engineer, Airbus Defense & Space - November 2020 - Airbus Defence & Space, Leiden, The Netherlands - ESA | Javad Fatemi: Systems Engineer, Airbus Defense & Space - English  Airbus Netherlands is the design authority for interstage one-two of Vega-C. That means that we are responsible for design, development, qualification and production of flight models of the interstage one-two.  The Market demand for launching of small satellites with low price has challenged the industry to come up with innovative solutions and innovative technologies to answer to this demand. So, um, with a big theme, uh, within, uh, for Vega-C, uh, we try to, uh, come with viable solutions with low cost and faster development to answer the market demand.  The most important of the collaboration between us and the European industries, and especially ESA, has been in the new approach for development and qualification of launcher structures. We introduced the very innovative way of working, new processes based on simulations that are validated by, supported by test. So we could finally qualify, uh, the interstage 1, 2 to of Vega-C by means of simulation.  Avio and ESA have been collaborative and supportive for our new way of working based on simulation driven product development and simulation supported by test for qualification of the product. And they have been supporting the same supportive at the same time, critical, and that help us to establish these new processes and general processes and methodologies for fast and the low cost development of launcher structures for Vega-C and that pave the way for us to apply these methodologies in our near future launcher development.  Airbus Netherlands produces the interstage one-two of Vega-C. It's a structure connecting the first stage of launcher to the second stage. And after about two and a half minutes burn out of P120, the first stage of launcher, the separation ring will separate the first stage from the rest of the launcher.  The interstage contains, uh, primary structures and the secondary structures we produce both primary and secondary structures, uh, composing of interface rings, stiffen panels, but also, uh, brackets for attachment of equipment, specifically the eight retro rockets in Vega-C  Generally speaking, the Vega-C has 40 percent more capability for launching of payload compared to Vega. So you can imagine that the interstage of Vega-C is also larger than Interstage of Vega. Another difference is that we optimized the design of interstage one-two of Vega-C for cost and for performance compared to Vega, but also, uh, by robot assembly. We significantly reduce the manufacturing and assembly cost of the Vega-C interstage one-two.  The market demand for launching of small satellites to orbit for lower price has challenged the industry to come with innovative solutions which are more cost effective and can be developed in the shorter time. That forced us to develop an interest stage, which is more performant than at the interstage of Vega, but almost for the for the same price of Vega. |
| 10:49:06:07  Andrea Leone: Integration Manager, Avio - October 2020 - Avio, Colleferro, Italy | Andrea Leone: Integration Manager, Avio – Italian   * Explanation of the Vega- C interstage 2-3 structure * Explanation Vega-C 2nd stage and Zefiro-40 engine |
| 10:51:42:11  Andrea Leone: Integration Manager, Avio - October 2020 - Avio, Colleferro, Italy | Andrea Leone: Integration Manager, Avio – French   * Explanation of the Vega- C interstage 2-3 structure * Explanation Vega-C 2nd stage and Zefiro-40 engine |
| 10:54:06:00  Daniel Neuenschwander, Director of Space Transportation – March 2021 – ESA | Daniel Neuenschwander, Director of Space Transportation ESA – English  So Vega-C is the enhanced version of Vega in terms of performance. We go with the development of two new solid rocket motors from 1.5 tonnes to 2.3 tonnes. In terms of versatility, we can address a segment of payloads. We can, for example, launch a small satellite between 1 and 400 kilograms in ride-share missions. We can launch two satellites at dual launch capacity above 400 kg, each payload or one big satellite. In terms of missions, we can really have a broad portfolio of activities. For example, we will launch our first operational reusable vehicle of Europe, Space Rider, which will be launched with Vega-C then operate a couple of months in low earth orbit before coming back autonomously on Earth. So with Vega-C, we really have an enhanced opportunity. You also have an enhanced payload volume under the fairing, we have the double with regard to Vega and this at similar prices that Vega initially, so an enhanced competitivity, so Vega C will offer new services, competitive services for European institutional needs first, but also global market needs. Ariane-6, Vega-C together, will form the new European family of launchers, which will enable access to space for Europe and with this also use of space for Europe. |
| 10:55:50:09  Aerial shots: Avio Vega-C production factory - October 2020 - Avio, Colleferro, Italy - ESA | Aerial shots: Avio Vega-C production factory (5 shots) |
| 10:57:12:24  GV’s Avio Vega-C production factory - October 2020 - Avio, Colleferro, Italy | GV’s Avio Vega-C production factory - October 2020 (39 shots) |
| 11:01:00:21  GV’s Vega-C interstage 1-2 - November 2020 - Airbus Defence & Space, Leiden, The Netherlands | GV’s Vega-C interstage 1-2 (28 shots) |
| 11:09:44:21  GV’s Vega-C fairing production facility - October 2020 - RUAG Space, Zurich, Switzerland - October 2020 - RUAG Space, Zurich, Switzerland | GV’s Vega-C fairing production facility (40 shots) |
| 11:15:45:08  Matteo Rendina: Manager Project Office, RUAG Space  Explaining fairing production process -October 2020 - RUAG Space, Zurich, Switzerland | Matteo Rendina: Manager Project Office, RUAG Space - English   * Explaining fairing production process (14 shots) |
| 11:21:17:20  GV’s Vega-C thrust vector control system and interstage - October 2020 - SABCA, Brussels, Belgium | GV’s Vega-C thrust vector control system, test and interstage at SABCA (38 shots) |
| 11:27:43:23 | ESA OUTRO |
| 11:27:55:24 | END OF PROGRAMME |