**Galileo from Giove to constellation**

**Soon, with the launch of four more Satellites from Kourou the Galileo constellation will be almost completed. Since the launch of GIOVE A and later Giove-B ESA and Galileo have come a long way. The deployment of the constellation and the ground segment have been a massive undertaking. So it’s time to look back and consider the remarkable progress that has been made by Europe in satellite navigation and also to look towards the future and what it might hold.**

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| 10:00:00 | ESA leader |
| 10:00:10 | Title:  **GALILEO FROM GIOVE TO CONSTELLATION** |
| 10:00:10   * EXT. GIOVE A launch - Baikonour, Kazakhstan - Dec 2005 - Roscosmos * INT. GIOVE A cleanroom GV’s - 2005 - ESA * INT. GIOVE B cleanroom GV’s - 2008 -ESA * Animation Maser Hydrogen Atomic clock - 2008 - ESA * INT. Maser clock details - 2008 - ESA * Animation Maser Hydrogen Atomic clock - 2008 - ESA * INT. GIOVE B cleanroom GV’s - 2008 -ESA * INT. Chibolton Observatory Galileo first test signals - Chibolton, UK— 2006 -ESA * EXT. Galileo sat 1-2 launch - Kourou, French Guiana - 2011 - ESA/CNES/ArianeGroup * Animation Galileo constellation with 4 sat - Unknown date - ESA * INT. Galileo first position fix - ESTEC, Noordwijk, The Netherlands - 2012 - ESA | December 2005, a Soyuz from Baikonur successfully launches GIOVE A. This satellite was essential to secure the frequencies allocated for the Galileo programme. With Giove-A on orbit and the frequencies secured Galileo could move Forward.  In 2008, GIOVE-B is also launched from Kazakhstan. It is the first satellite to carry the European developed Maser atomic clock. This extremely stable atomic clock is now standard on all Galileo satellites but ten years ago it was the most advanced clock ever flown for navigation purposes. The excellent test signals sent out by GIOVE-B are a prelude of what is yet to come.  In 2011 the first complete Galileo satellites are launched and by October 2012 ESA has 4 satellites on orbit. This is the minimum of satellites needed to determine a position and ESA can start with the so-called in orbit validation phase. On 12 march 2013 the historic first position fix using only Galileo satellites takes place. The system is validated on orbit and works well. |
| 10:01:29:10  - INT. Interview Paul Verhoef - ESA offices - Brussels, Belgium - June 2018 - ESA | **ITW Paul Verhoef, Director of Navigation – ESA**  *The quality of the Galileo signals is very good. We have compared and measured our signals with the signals coming from other systems like GPS or the Russian Glonas or the chinese Baidu. We know that at the moment our signals are among the best. So we are very proud of that.* |
| 10:01:50:14   * Animation Galileo Ground segment - Unknown date - ESA * INT. Galileo control Room - Oberpfaffenhoven, Germany - 2013 - ESA * EXT. Galileo Control Center - Oberpfaffenhoven, Germany - 2013 -ESA * EXT. Galileo Control Center - Fucino Italy -2013 -ESA * EXT. Aerial shot of Galileo Facility - Kourou, French Guiana - 2018 - ESA/CNES/ArianeGroup * INT. Galileo Facilties Galileo 9-10 inside fairing - Kourou French Guiana - 2015 - ESA * EXT. Soyuz LAUNCH Galileo 9-10 - Kourou, French Guiana - ESA/CNES/ArianeGroup * EXT. Ariane 5 LAUNCH Galileo 19-20-21-22 Kourou, French Guiana - ESA/CNES/ArianeGroup | In parallel with the construction of the space component ESA is building a ground segment with two control centers to guide the satellites and disseminate the signal. One is built in Oberpfaffenhoven, Germany and one in Fucino Italy.  At the Europe’s Spaceport in Kourou dedicated facilities are reserved for the deployment phase. During the last couple of years ESA built and launched Galileo satellites in record time using both Soyuz and Ariane 5 launchers. Now ESA launches a third and final Ariane 5 with another 4 satellites |
| 10:02:29:11  - INT. Interview Paul Verhoef - ESA offices - Brussels, Belgium - June 2018 - ESA | **ITW Paul Verhoef, Director of Navigation – ESA**  *With this we have 26 satellites in orbit. Two of which are in an elliptical orbit, which despite a slightly wrong orbit we can still use. One of the satellites is a reserve and another satellite is faulty and we cannot completely use it. So we will have more or less 24 satellites operational in orbit and this is what the desired minimum is for full operations.* |
| 10:02:54:14   * Animation Galileo constellation - Unknown date - ESA * EXT. Satellite dishes - Redu, Belgium - 2012 - ESA * INT. Galileo Facilties, GV’s Galileo 23-24-25-26 - Kourou, French Guiana - June 2018 - ESA * INT. Galileo Facilties Galileo 9-10 - Kourou, French Guiana - 2015 - ESA * Still. Galileo 2nd generation preliminary Design - 2014 - ESA * INT. GIOVE B cleanroom GV’s - 2008 -ESA * INT. Galileo Facilties, Fitcheck Galileo 23-24-25-26 - Kourou, French Guiana - June 2018 - ESA | With the constellation up and running the European space agency will further expand the ground segment in the years to come and launch more satellites, either as spares or as replacements for the older satellites.  Starting in 2025 Europe will have a new and improved generation of Galileo satellites ready for orbit. Despite ESA going from a satellite navigation novice to expert in 15 years, the design and services of this second generation system will be very much market driven. |
| 10:03:27:00   * INT. Interview Paul Verhoef - ESA offices - Brussels, Belgium - June 2018 - ESA | **ITW Paul Verhoef, Director of Navigation – ESA**  *The market is of course a very important point for us because although in the beginning one could argue that this was very much a market pushed by technology. And if you want by us. Now the market is developing so fast and is going to be so enormous that we have an incredible responsibility. The market has expectations; they want u to come with new features. At the same time, they want to be capable to do the things they have done, they don’t want unnecessarily replace their equipment. So we need the legacy services to continue while we introduce new features.* |
| 10:04:03:10   * INT. Smartphones in navigation van - The Netherlands - 2018 - ESA * EXT. Construction site - unknown date - ESA * EXT. Agriculture vehicle - unknown date- ESA * EXT. Rescue helicopter - Switzerland - unknown date - ESA * Insert. Navigation Screens - Unknown date -ESA * EXT. Girl with smartphone - videoblocks * INT. Smartphone - The Netherlands - 2018 - ESA * EXT. Girls with smartphone and in station - videoblocks * Animation. Galileo Satellite 360° fly around -ESA | A market that is booming. Industry, agriculture, rescue services, governments are all reliant on satellite navigation. And with the newest smartphones, which are Galileo ready, even the general public has this technology in the palm of its hand, literally.  With Galileo, Europe now has its own fully operational satellite navigation system at a time where the importance of Navigation services is only increasing. |
|  | **B-ROLL** |
| 10:04:31:05   * INT. Interview Paul Verhoef - ESA offices - Brussels, Belgium - June 2018 - ESA | **ITW Paul Verhoef, Director of Navigation, ESA - ENGLISH**   * Quality of the signal * Market requirements * History of the Galileo system |
| 10:06:57:03   * INT. Interview Paul Verhoef - ESA offices - Brussels, Belgium - June 2018 - ESA | **ITW Paul Verhoef, Director of Navigation, ESA - FRENCH**   * Quality of the signal * History of the Galileo system * How the market has changed |
| 10:09:18:21   * EXT. GIOVE A launch - Baikonour, Kazakhstan - Dec 2005 - Roscosmos * INT. GIOVE A cleanroom GV’s - 2005 - ESA | **GIOVE A**  **Launch Campaign and satellite GV**  **Archive footage 2005**  **ESA**  (20 shots) |
| 10:11:28:03   * INT. GIOVE B cleanroom GV’s - 2008 -ESA | **GIOVE B**  **satellite GV**  **Archive footage 2008**  **ESA**  (13 shots) |
| 10:12:54:15   * Animation Galileo satellites being deployed and constellation - Unknown date - ESA | **Galileo satellites**  **4 satellites deployment on orbit**  **Animation**  **ESA** |
| **10:15:05:03** | **END** |