



PRESS RELEASE

InnoTrans 2016: Solaris presents the Tramino Olsztyn tram and the new Urbino 12 electric battery bus

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InnoTrans 2016: Solaris Tramino Leipzig

- **Interior of Solaris Tramino Leipzig gets showcased for the first time ever**
- **A life-size mockup on display at the Solaris stand (hall A, stall no. 302)**
- **Framework contract assumes supply of 41 trams to Leipzig from 2016 until 2020.**

The interior of the new Solaris Tramino Leipzig is on display for the first time. The stand of the Polish bus manufacturer in Hall A includes the life-sized mockup of a part of the passenger room of the latest model of the rail track Solaris. In line with the framework agreement signed in 2015, city transport operator Leipziger Verkehrsbetriebe (LVB) can order up to 41 trams in the years 2016-2020.

LVB has commissioned 14 Tramino trams so far. The first of these will be shown to the customer by the end of the year. The 37.63-meter long and 2.3-meter wide trams will consist of four sections and will be equipped with 4 classic driving bogies and one non-powered Jacobs type bogie. The tram track width amounts to 1458 mm, specific for the LVB network. Due to the desired application of bogies with classic axles, there is a step above the bogies. Yet, the passenger entry is ensured from the full low-floor area of the doors in accordance with the height of the tram stop platforms. It is a partly low-floor vehicle, as 65 percent of the passenger room is accessible from the low floor.

The stylistic concept is the result of a close-knit collaboration between the customer and the design studio IFS Design, right from the first stages of the implementation of this order. A detailed analysis of the distribution of various elements allowed to optimise the tram in terms of comfort and ergonomics, but also in terms of the habits and wishes of the tram drivers in Leipzig. It is those needs of the drivers that led to the creation of a special mockup of the driver's work station, representing the suggested solutions in minute detail. The employees of LVB had thus the opportunity to test them and to provide feedback. This enabled the manufacturer to work out the best possible design which was then turned into a product. The trams will be equipped with an ergonomic full automatized drivers seat. In order to ensure maximum aesthetic cohesion and a minimum noise of the devices installed on the car, the tram has been equipped with a roof shield.

Much time has been dedicated to planning out the passenger room, the life-size mockup of which is displayed on the Solaris stand in Hall A. The thorough design allowed the creators to make room for 75 seats, while keeping a wide passage throughout the whole Tramino. Apart from using a harmonious set of colours, ergonomic seat and railing arrangements, as well as providing four spaces for wheelchair-bound passengers, the Polish producer also decided to apply a number of additional, innovative solutions. Specially designed lighting panels have been embedded in the roof; they adjust the colour and intensity of the light to the weather conditions. In winter the lights will shine

in warm hues and in winter – in cold hues, which ought to raise the travel comfort considerably.

The tram has been equipped with four pairs of 150-millimetre-wide double doors and two pairs of single, 800-millimetre-wide doors. These parameters ensure a quick and smooth entry into and exit from the tram car. Also the passenger information system has been improved by way of special external displays, installed above the double-leaf doors, for passengers boarding the tram. The tram has been also equipped with an efficient air conditioning for the passenger room. A separate AC device ensures comfortable working conditions for the driver who will stay the longest inside the vehicle.

So far, the city transport operator in Leipzig has ordered 14 trams of the total number of 41 listed in the framework agreement, and the first completed Tramino will be presented to the customer this year.

InnoTrans 2016: Solaris Tramino Olsztyn

- **With Solaris Tramino tram transportation has been restored to Olsztyn after an absence of fifty years**
- **Since December 2015, all fifteen Tramino have driven over 600 thousand kilometres in Olsztyn**
- **See the Solaris tram in the outdoor display on exhibition track number V/615**

In December 2015, after 50 years of absence, Tramino run on new tracks in Olsztyn. The tram presented in Berlin is one of fifteen vehicles Solaris handed over to the capital of the Warmian-Masurian region. Their extraordinary construction along with the perfect choice of components have allowed Solaris engineers to significantly reduce the noise level. Therefore Tramino Olsztyn has become the quietest of all trams in service in Poland.

19th of December was the date of official restoration of tram transportation in Olsztyn. Since last winter, Solaris trams have been running on three lines consisting of 19 stops. The total length of the newly built rail tracks is 11 kilometres. So far, all fifteen Tramino have driven over 600 thousand kilometres, developing a very high level of technical readiness. Olsztyn is the second Polish city to operate Solaris trams in its fleet. In 2009, the Polish manufacturer delivered forty-five state-of-the-art low-floor Traminos to Poznań.

The Solaris Tramino for Olsztyn City Transport is 29.3 metres long and 2.5 metres wide. Its distinctive design fails to leave you indifferent. Slender and elegant lines in combination with its vibrant silver and lime colours highlight the nature of Olsztyn, a thriving modern city. This 3.8 metre high tram will carry up to 200 passengers, including forty-three people seated. This had been achieved by installing two rows of seats on both sides of tram's spacious aisle (2+2 arrangement). The Solaris Tramino is bi-directional. As it has two driver's cabins, it can be used effectively on one-rail routes so there is no need to build a tram loop. The tram has twelve sets of double doors with a width of 1,300 mm. Six sets on each side provide easy and comfortable access to the low floor that runs throughout the passenger compartment and improve passenger flows.

The Solaris Tramino for Olsztyn consist of three sections. Each of them runs on a pivoting bogie of its own. The first and last bogies are powered, while the central one is trailing. All of them were manufactured by Solaris based on its own design. In addition, thanks to its own machinery the manufacturer was able to perform the calibration of the bogies. The use of pivoting bogies significantly reduces the damage of infrastructure as well as wheelsets. Tramino Olsztyn's track has a gauge of 1,435 mm. In order to reach maximum effectiveness it uses performance wheels with a large diameter of 682 mm. However, despite the wheel dimensions the floor remains 100% low.

In designing the tram, Solaris's engineers introduced a range of innovative technologies and unusual solutions that hitherto have been unknown in Poland and even in European markets. One such development is automatic levelling at different loads and wear of wheels. This enables the tram floor to be maintained at an equal height with the platform. After the doors open, the device will measure the level of the floor, regardless whether passengers move on the tram's floor. Depending on the conditions, hydraulic actuators are able to raise or lower the bodyshell to adjust the tram to the height of a tram stop. The hydraulic actuators themselves are not involved in the bogie suspension. Thanks to its stability control system, Tramino bodies take turns and bends smoothly which significantly improves the comfort of each journey. Once the tram enters a curve the hydraulic signal is passed to other bogies providing their automatic modification. The ATM register is used as a tram's "black box". It records such performance characteristics as the speed, electricity consumption, distance

travelled and others.

Four asynchronous 120 kW traction motors deliver the necessary power. The new trams are equipped with two batteries with a 540 AH capacity which allows them to operate independently of overhead wires. Tests carried out have established that Tramino Olsztyn will be able to drive over one kilometer solely using this alternative energy. This is a few times further than the customer demanded. The batteries are charged by on-board voltage during operation. Moreover the construction of Tramino Olsztyn offers the alternative of equipping the vehicle with additional supercapacitors. The trams have been fully adjusted to be mounted with the devices so the operator may install them at any time. Solaris was the first Polish manufacturer to receive approval for rail vehicles which were fitted with this high-function, eco-friendly and in particular economical solution.

An air-conditioning system guarantees a pleasant journey even on the hottest day. The floor is completely step-free along the whole tram length even at the entrances. Located close to an access ramp near the driver's cabin, there is a specially adapted space for disabled people on the flat and step-free floor of the vehicle. Pleasant and elegant silver and lime colors make the interior seem even more spacious. All the elements inside were designed so as to create a harmonious whole which goes together with Olsztyn itself, a city steeped in the greenery of parks and nearby forests. The interior has been illuminated by steady white light with use of energy-saving LED technology.

Tram drivers, who spend the majority of their time in the vehicle, can enjoy a separate air-conditioning system as well as user-friendly and comfortable touch boards. The advantage of these devices is that they are not only easy to use, but also may be individually optimised and upgraded at any moment. In addition, thanks to the appropriate slopes of the touch boards, reflected sunlight does not cause discomfort to the driver. For even greater drivers' comfort a controller and some buttons have been integrated in the armrest where the train protection has also been placed. A dead-man's switch exists as an traditional pedal as well. In Tramino the traditional rear-view mirrors have been replaced by twin cameras. One monitors the first doors behind the driver's cabin and the second observes the whole length of the tram. The cameras are heated to provide a clear view in any conditions. Images are displayed on two monitors located at the level of the traditional mirrors. There are two shock absorbers on the front of both cabins intended to disperse energy in the event of a possible collision and offset the impact force, which increases the safety of passengers and especially the driver.

Taking into account the service technicians' needs, the designers of the Tramino were able to facilitate easy access to those elements that require maintenance most often. Thanks to the new way of opening the hatches, getting to harnesses and other components will not limit the visibility through the whole length of the tram. The fact that it is unnecessary to disassemble hatches completely will undoubtedly speed up service work and increase its efficiency. In addition engineers made sure that there was no external part on the tram which cannot be disassembled. Furthermore, as diagnosis can be carried out online the process of finding a potential defect and removing it should take much less time allowing long-term withdrawals of the vehicle from service to be avoided.

Tramino Olsztyn will be shown at InnoTrans in Berlin on the outdoor display on exhibition track number V/615.

So far, Solaris has completed deliveries of trams to Poznań, Poland (forty-five units), to Jena, Germany (five bi-directional vehicles) and to Olsztyn, Poland (fifteen trams). In the years 2017-2020 the manufacturer will deliver further forty-one trams to Leipzig, Germany.

Olsztyn citizens are already familiar with Solaris buses. The Polish manufacturer has delivered almost sixty units to the capital of Warmian-Masurian region, including thirty-two 12-metre Urbino and twenty-six articulated buses. Like the trams, the newest buses are varnished in coherent and eye-catching silver and lime colors.

InnoTrans 2016: the new Solaris Urbino 12 electric

- **The new Solaris Urbino 12 electric on display at InnoTrans 2016 (outdoor display in the hall Sommergarten V/810)**
- **Electric Solaris awarded „Bus of the Year 2017” title**
- **Nearly 80 electric buses ordered by operators in seven countries**

Zero-emission, incredibly quiet vehicles, smoothly running up to bus stops – these are the defining features of the latest electric Solaris buses supplied to the Hamburg-based public transport operator

Hochbahn AG and officially presented in the German port city in August. Three state-of-the-art buses of the Urbino 12 electric kind – a model that has been awarded the prestigious Bus of the Year 2017 title – will frequent above all the route of the innovative bus line 109 on which the Hamburg operator is trying out only vehicles with unconventional drive systems. One of them will be shown at this year's InnoTrans fair in Berlin, on an outdoor display stand set up in the Sommergarten area (V/810).

The 12-metre Urbino electric bus for the Hamburg operator Hochbahn is equipped with an electric ZF AVE 130 axle. The innovative electric bus features lithium-ion batteries of 100 kWh and electric fittings supplied by Medcom. The vehicle uses a roof-mounted charging system which allows the bus to run effortlessly on its route all day long. This is possible thanks to the application of an external charger of 300 kW power situated somewhere on the bus travel route.

"Supplying three battery buses to Hamburg turned out to be a challenging order for Solaris, since it was the first time that we had to adapt the product to an existing charging infrastructure in the city. By meeting the ordering party's requirements, Solaris has proven its flexibility and competence as provider of innovative electric buses. Thanks to our know-how and experience we are now extremely well-prepared to the era of electromobility," said Dr. Andreas Strecker, CEO of Solaris Bus & Coach S.A., during the official presentation of the vehicles in Hamburg.

The display at the stall will also include an external charger made by Siemens. Thanks to the retractable pantographs and a charging power reaching 300 kW, the bus needs only six minutes to recharge its batteries.

Solaris presented its first fully electric bus in 2011. Over a period of five years the manufacturer has widened its offer, providing vehicles of a length from 8.9 to 18.75 meters. These can be fitted with various types of batteries and recharging systems. There are nearly 80 Urbino electric buses rolling currently on the streets of Austria, the Czech Republic, Finland, Spain, Germany, Poland and Sweden. One of these Urbino buses, the Solaris Urbino 12 electric for Hochbahn AG, will be shown at a special outdoor display in the Sommergarten hall during the InnoTrans 2016 (V/810) trade fair.

About Solaris Bus & Coach

Solaris Bus & Coach is a major European producer of city, intercity and special-purpose buses as well as low-floor trams. Since the start of production in 1996, over 14 000 vehicles have already left the factory in Bolechowo near Poznań. They are running in 30 countries. Despite its young age, Solaris has become one of the trendsetting companies in its industry. For many years it has been the indisputable leader among the suppliers of city buses in Poland as well as one of the largest suppliers of city buses in Germany.

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About our company

Solaris Bus & Coach sp. z o.o. is one of the leading producers of city and intercity buses in Europe. It focuses in particular on the development of zero-emission vehicles, i. e. electric and hydrogen buses as well as trolleybuses. This has resulted in the widest zero-emission product range in the European market and a leading position in this segment with a market share of 15.2%. Nearly 25,000 Solaris vehicles have been delivered so far and they ply the streets in 850 towns and cities across 33 countries located throughout Europe as well as beyond it. Solaris is part of the Spanish CAF Group (Construcciones y Auxiliar de Ferrocarriles) S.A. From conception, to the design and manufacturing phases, all Solaris buses are produced in Poland. Moreover, all activities undertaken by the manufacturer are in line with the brand's mission, which is reflected in the motto "We are changing

the image of public transport". Solaris also actively partners with public transport operators and provides them with comprehensive support in their transition to zero-emission mobility.