



SECUREMETRO

Inherently secure blast resistant and fire safe metro vehicles

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– Final dissemination plan –

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1. Executive Summary

In its 2007 update to the Strategic Rail Research Agenda 2020, the European Rail Research Advisory Council (ERRAC) sets out seven research priority areas for the next decade. The third of these is “Personal Security” of staff and customers in relation to both terrorism and the more common problem of vandalism. The SecureMetro project supports this priority, and also the forecast in the original SRRA2020 report that “at least double, in some cases even quadruple the productivity of infrastructure, rolling stock and staff” is required over this period. The SecureMetro project considers threats from conventional explosives and firebombs. The four project objectives are:

- To increase metro vehicle resilience to terrorist bomb blast through selection of vehicle materials and structural design. This will reduce injuries from fragments of vehicle materials and improve structural integrity in blast situations, offering greater security to passengers and staff. This includes enhancing the ability of a vehicle to remain on the track and keep moving so that underground rescue is not required. Contribution to structural integrity standard EN12663 will allow wide and interoperable implementation of vehicles offering security by design.
- To increase security against a firebomb attack through design of fire barriers and fire suppression technology while also contributing to passenger safety from accidental or vandalism fires. Design of features to prevent the spread of fire and fumes will contribute to standards compliance (EN 45545) for fire protection of railway vehicles.
- Through increasing resilience of vehicles to blast and fire attacks and reduced damage to adjacent vehicles and infrastructure, speed up recovery following attack, allowing the rail system to “bounce-back” to normal operation quickly.
- Reduce the attractiveness of metro systems as a target for attack by reducing deaths and injuries, increased resilience, reducing economic impact and making recovery faster. This will be achieved through wide dissemination of the findings of SecureMetro, and promotion of transfer to high speed rail of the vehicle design and technology developed for metro systems.

The purpose of Deliverable D.5B.03 is to present the updated dissemination plan of the SecureMetro project. In particular it includes all the achieved and planned activities for the dissemination and exploitation of the project results to the widest possible range of audience. The report is providing the collection of partner’s activities.

All partners are encouraged to be involved in the dissemination and exploitation activities. Specifically, the partners are asked to:

- Present the project results in conferences or other events.
- Participate in workshops organized by the project in order to allow more detailed discussions on the results and take possible feedback from other experts on the SecureMetro research area.
- Prepare papers for conference proceedings or journals.
- Take part in the preparation of the SecureMetro results diffusion.

The deliverable is divided into three main sections:

- Section 2 is devoted to introducing the objectives of the SecureMetro project, and focuses on the expected added value and impacts.
- Section 3 is dedicated to the plan for exploitation and dissemination strategy.
- Section 4 develops the dissemination activities carried out by the partners during the course of the project, in direction of the three targeted categories of public: stakeholders, academic and technical community, and general public.

2. Introduction

Recent terrorist incidents on the European rail system indicate the scale of the immediate societal impact of a blast type attack, or series of related attacks. In London on 7th July 2005, 52 people in addition to 4 suicide bombers were killed, and about 700 people injured. In Madrid on 11th March 2004 the figures were 191 people killed and 1755 wounded.

Reducing the number of dead or injured in any future attack is clearly of benefit, but the measures put in place to prevent or mitigate the effects of such attacks can have their own costs to society. For example, excessive surveillance or increasing militarization of urban space can perpetuate a climate of fear. There is also the possibility that specific members of the community feel they are being identified as threats, and being targeted unfairly by certain counter terrorism measures.

The SecureMetro project avoids these pitfalls of counter terrorism, and produces a more secure rail vehicle without obtrusive surveillance or identification of specific people. This will be achieved through system design and materials choices to increase the resilience to attack of metro vehicles and speed recovery of the system in the stages following a blast or firebomb attack. This will be achieved without compromising the open access nature of rail systems or subjecting passengers to a search regime.

Previous terrorist attacks on rail systems have shown that the vulnerability exists across the EU. To reach solutions for mitigation and reduction of deaths and injuries requires common solutions across the EU so that the interoperability of the rail system is maintained and enhanced. The FP7 small/medium focused research project is the ideal instrument to develop validated guidance and contributions to EU standards on designing security into rail vehicles. The rail industry and the research facilities with the necessary expertise (e.g. explosives testing and modelling) are distributed across Europe, so great value is added to their individual contributions to rail security through working together in a European level project.

SecureMetro's impact on society will:

- Reinforce rail transport security:
 - Passive and active safety features will improve structural integrity in blast situations, offering greater security to European citizens (passengers). This includes the ability of a vehicle to remain on the track and keep moving so that in-tunnel rescue is not required.
 - Fire barriers and fire suppression technology will contribute to passenger safety from accidental fire, and increase passenger security against a firebomb attack. Design features to prevent the

spread of fire and fumes will contribute to standards compliance (EN 45545) for fire protection of railway vehicles.

- Recovery from attack will be faster if damage is contained. The impact of the attack will be reduced because damage to adjacent vehicles and infrastructure will be minimised.
- Increased security will maintain the competitiveness of rail transport relative to road and air modes. This is essential if the environmentally-friendly and energy-saving nature of rail transport is to contribute to the sustainability of surface transport in Europe.

3. Plan for dissemination of project results

The dissemination activities of the project address three main types of public using appropriate channels for each of these types:

- Stakeholders, transport professionals. SecureMetro uses ERRAC as a dissemination partner and supports and informs ERRAC, UITP, UIC and UNIFE working groups on safety and security and in particular ERRAC-ROADMAP in the development of the Safety and Security ROADMAP workshops and consultation led by ITALCERTIFER.
- Academia, researchers in the field of transportation. Publish both scientific and industrial literature, to provide a long-term archive of the findings of the project.
- General public, via the dissemination of selected information regarding the findings and achievements of the project when available, via the press and the internet. Particular care will be taken to avoid disseminating information that could be useful to carry out an attack.

The project maintains a web site giving general information regarding the project, its progress and its findings, in a public area dedicated to the non-sensitive information suitable for the general public, and in a private area for the sensitive data that cannot be shared out of the project partners.

4. Dissemination activities

4.1. *Dissemination to stakeholders, transport professionals*

Rail operation and the infrastructure is recognised as a critical priority because the economic impacts of a terrorist attack extend well beyond the immediate effects of the attack (e.g. loss of service, destruction of vehicles, destruction of infrastructure) into the surrounding businesses and wider economy. This is in addition to the human and psychological costs. The full cost of an attack is very difficult to evaluate – while the cost of repairing physical damage of bombs may run into the tens of millions, the knock-on effects (such as reduced economic activity, delayed or reduced investment in urban centres, loss of tourism, etc.) are likely to be far higher

The design recommendations of the SECUREMETRO project will lead to a rail system in which the impact of a terrorist attack is reduced. The rail system will therefore become a less attractive target, and is hence less likely to suffer an attack in the first place. The economic impact of SECUREMETRO to the Rail Industry and wider community can be summarised as:

- Improved potential to save lives and lessen injury.
- Reduced damage to rolling stock and infrastructure.
- Faster system recovery from a major incident.
- Reduction of ‘knock-on’ effects to wider economy.

The SECUREMETRO project will ensure that vehicle design guidance developed for increased resilience to blast and fire attacks contributes to enhanced vehicle interoperability. The project's contribution to standards and design guidance at a European level will support achievement of common security standards across the EU, while taking account of national characteristics and local awareness of security issues. This will lower development costs for new or rebuilt vehicles as the standards and materials to be used will not require repeated research and bespoke solutions from each vehicle builder. The project aims also to contribute to the enhanced interoperability, and ease the integration of the European railway:

- Interoperability will diminish or even eliminate the necessity of passenger transfers at national borders. This will result in huge amounts of time and money savings for both customers and railway operators.
- Interoperability will allow full competition between railway economic stakeholders that, along with economic gains from higher productivity, shorter development cycle, lower maintenance costs, optimised exploitation, will result in decreasing rail transport prices, thus bringing to the rail transport new customers.

4.2. Dissemination through technical articles and papers

Technical papers describing the work and results of the project will be published in targeted journals and conferences, covering academic publications to stimulate high quality research in materials and technologies to support the design advice developed by SECUREMETRO.

The project was presented in international congresses in the domain of transportation:

- ITST'2011, 11th International Conference on ITS Telecommunications, August 23-25 2011, Saint-Petersburg, Russia
- World Congress on Railway Research WCRR Lille 2011 (Lille, May 22-26, 2011).
- UIC 6th World Security Congress (Istanbul, April 21-23, 2010).
- Innotrans (Berlin, September 21-24, 2010).
- Transec 2011 (13-14 September 2011)
- TRA 2012
- UITP Local Rail Summit 2012
- Innotrans 2012 – Berlin – 18-21 Sept 2012.
- Homsec salon (Madrid, March 12-15, 2013)
- MetroRail – Madrid - 09-11 April 2013.
- Rail Interiors Expo in Boston, USA, 24-26 October 2012.

This particular event provided the project with a unique opportunity to heavily promote and gain exposure for our work within the USA. As a result we have created contacts within government and transportation agencies who have shown an interest in the project findings..

Other conferences are planned, in particular:

- 60th UITP world congress (2013)

- IEEE ICALT/AMSS conference in Sousse (Tunisia), 29-31 May 2013 – accepted article
- 5th ONCF / UIC International Seminar on Railway Safety and Security (Tangier, Morocco, 10-12 April 2013).
- Paper in Safety Science Journal (under review)
- TRA 2014

4.3. Communication for the general public

The outcome of SECUREMETRO is of interest to the general public. The participants feel that the dissemination of the solutions found in Securemetro should include communication to the mass audience.

Web site

The primary communication tool is the web site of the project, presenting the main objective and results. The non-sensitive data, aimed at general dissemination, is available from the main page of the site. Such information include the general description of the project, as well as documents identified in the Description of Work, such as some deliverables, namely D1.01, D1.02, D1.05, D2.02, D3.01, D3.02, D3.03, D3.04, D4.03, D5A.04, D5A.06, as well as all the D5B and D6 deliverables. Other deliverables will have a public version, bowdlerized so they don't contain information that could be used to carry out an attack. D5.05 is in this category.

Moreover, video footage and photographs of the tests were recorded for the production of a specific video document for the communication of the project (notably, to be available on the web site) for general explanation of the objectives and results.

Obviously, some aspects of the project are not for the general public. Proof-reading of the disseminated data will ensure the confidentiality of the results that might be used to improve a terrorist attack, and no information will be released without prior consent of the partners of the project. Information restricted to the partners, EC and specifically authorized persons, is available on the private area of the web site. Particularly sensitive data, notably some of the deliverables, can be further protected by PGP encryption in order to prevent access by unauthorized parties, even if they have managed to crack the login / password allowing access to the private area. With PGP, the files can only be accessed by identified persons who have given their public PGP key for encoding. PGP is still considered the most secure way to encrypt data, and an officially recommended data encryption method. As of writing this deliverable, decision has not been made regarding the list of authorized people and the list of documents to be encrypted, but a list of deliverables that are restricted for security reasons is already in the Description of Work of the project, and can be used as a preliminary list of candidate encrypted files: D1.03, D1.04, D2.01, D2.03, D2.04, D2.05, D3.05, D4.01, D4.02.

The number of visits to the web site is considered to be a good indication of the general interest to the project, considering that the first information people have regarding the project is its name, which directly leads to the site by googling "Securemetro". The number of visited pages for each visit is also an indicator of the "actual" interest shown by the visitors: the casual web surfer knows most of the basic information after looking at the front page, whereas the genuinely interested visitor who wants to find out more will look at the whole site, hence the interest to plot both the number of unique visitors to the site, and the number of accesses to pages: the ratio gives the attention actually paid to the project by the visitors. For the year 2012 and January 2013, the frequentation of the web site is shown in Figure 1 below:

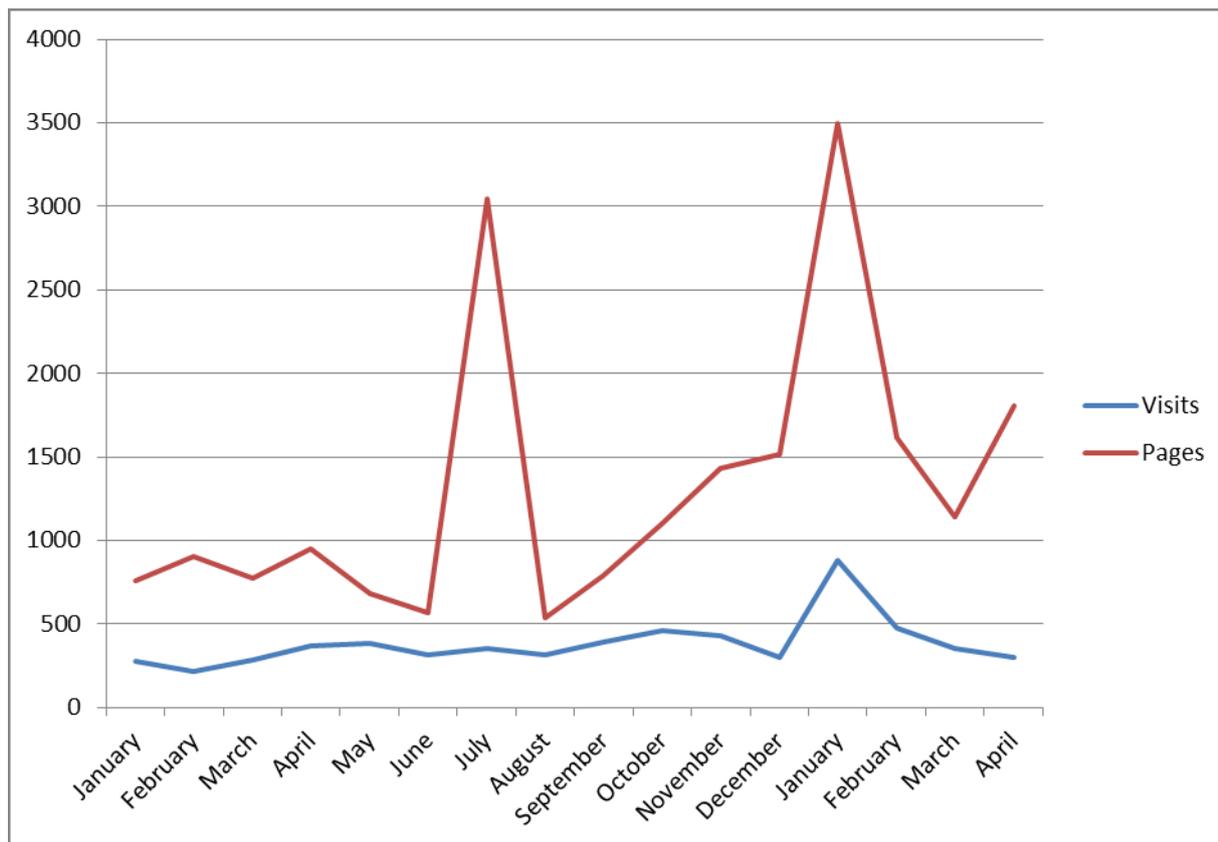


Figure 1: Site frequentation in 2012 and April 2013

The number of visitors appears to have remained fairly constant throughout the year, but with a surprisingly fluctuating interest, decreasing during the summer but increasing sharply by the end of the year. We have no definitive explanation for the sharp increase of the number of visited pages in July: further investigation reveals that this number is caused by very high peaks on three days (July 18, 26 and 27), which also correspond to the highest numbers of clicks and bandwidths, but not a particularly high number of visits, as if the visitors had wanted to see the whole contents several times and download (or upload) a lot of data.

The even higher peak in January 2013 is easily explained by the press release discussed in the next section.

Press release: 25 January 2013

On January 23rd, 2013, the University of Newcastle issued information regarding the project on its web site. Although intended to remain a low profile, local-scale release, the information was immediately noticed by the local press and within a day the press and internet coverage had reached a worldwide scale. In order to catch up with the unexpected success, a press release was quickly made available, first on the UK side, then on the Spanish side of the project. A more comprehensive version of the press release was made available a few weeks later in the “Research & Innovation / Transport / Projects” pages of the European Commission:

Underground railway systems are an intrinsic part of modern city living, enabling a wide variety of human activities, from work to leisure. Unfortunately, metro and commuter trains remain vulnerable to attack, a fact highlighted by the Madrid bombings in 2004 and the 7/7 attack in London in 2005.

NewRail's Conor O'Neill, who coordinates the SecureMetro project, says, "We are seeking to build public confidence in the security of the metro vehicle, thereby retaining and attracting new commuters to the system as a whole."

The project has focussed on two key areas: containing the impact of an explosion and, particularly, reducing debris – the main cause of death and injury in an explosion.

Following a review of terrorist attacks on metro systems worldwide, covering the past 60 years, the SecureMetro team have re-designed current vehicles. O'Neill says completely replacing existing vehicles was not an option. Instead, they developed and incorporated new technologies and materials into existing carriages to improve performance.

Tethering heavy ceiling panels and other equipment using retention wire was one key modification made in the development of the SecureMetro prototype. Plastic film coatings were also added to windows, to protect people outside the train from flying glass, and heavier structures were replaced with lighter-weight and energy-absorbing materials.

Focus on debris

O'Neill says dealing with loose objects is crucial, reducing the risk of fatalities and injury from flying debris. It also means gangways are kept relatively clear, allowing quicker access for emergency staff seeking to help injured passengers.

Being able to analyse an actual blast wave travelling the length of a coach was key to assessing the performance of the new interior furnishings. A real test explosion on board the prototype was therefore an absolutely critical element for the project. This not only provided a first-hand opportunity to review the performance of the new technologies, but also validated the blast simulations which modelled the tests.

In order to understand the mechanics of the explosion – which takes less than a second – the team used high-speed cameras, allowing them to slow down the blast footage. "The video and images captured clearly demonstrated the successful application of our research," says O'Neill.

[Watch the video here.](#)

"Terrorism is a constant threat and remains high on the agenda for many countries around the world," O'Neill says, "and with trains being part of everyday life, the project has a clear relevance for the general public and day-to-day commuters. In the event of a terrorist bomb attack the technologies investigated by the SecureMetro project will help reduce the number of injuries and fatalities.

"In addition, adopting our low-cost solutions into the design and manufacturing stages will not lead to a marked increase in the cost of rolling stock," he adds. "For retrofit and future construction, it opens up a new competition in the rail industry supply chain to provide blast-resilient solutions."

"A bomb on a train is always going to be devastating," O'Neill concedes, "but what we are trying to do is find a way in which the vehicle itself can help to mitigate the impact of an attack."

SecureMetro partners believe that their results could help to reaffirm commuter confidence in the security and protection offered by metro vehicles and the systems within which they run. “Passengers can travel safe in the knowledge that, in the event of attack, the vehicle will act as their last line of defence,” says O’Neill. “This could eventually mean increased uptake of passengers, boosting commuter count in cities that operate these vehicles.”

Informing policy

SecureMetro is now in a position to advise the rail industry on the design of more resilient rail vehicles, and it is currently seeking to have its findings incorporated into European and national standards and regulations.

O’Neill says the project’s success has a lot to do with the quality of its partners: “The diversity in expertise across the European partners has allowed the project to engage various specialists in the field of explosives research, something that is extremely difficult to achieve on a national level.”

SecureMetro project partners:

- NewRail - University of Newcastle upon Tyne
- Bombardier
- MAXAM-EXPAL
- STAM
- Istituto Affari Internazionali
- RATP
- Spanish Railways Foundation
- Suncove S.A.
- Metro de Madrid
- TECNALIA
- IFSTTAR

At the same time, Nolan adds, EU support has also been vital. “Undertaking large-scale tests such as those conducted by SecureMetro can be a resource- and cost-intensive activity, and it is thanks to EU funding that this project has not only assessed terrorist attacks on current vehicles, but allowed us to demonstrate our research in a metro vehicle prototype.”

European Commission Project Officer Alexandra Gurau says improving the security of passengers through intelligent structural design is one of the challenges now being addressed by the European railway system. “SecureMetro is a very welcome European initiative that properly addresses these challenges, by developing blast-proof technologies and systems that should help save lives.”

With its diverse and well-assembled consortium, Gurau says SecureMetro has the potential to deliver a positive step forward, even a step change, in European railway safety and security.

Below is a list of the reported papers, reports and web pages devoted to Securemetro following the press release. More references may exist, that we are not aware of. URLs are given when available, although due to the constantly evolving nature of the internet we cannot guarantee that the pages are still accessible when you read this report.

4.3.1.1. Television

- Sky News: <http://news.sky.com/story/1041571/bomb-proof-trains-engineers-reveal-designs>
- BBC (local and national): <http://www.bbc.co.uk/news/uk-england-tyne-21149334>
- ITV: <http://www.itv.com/news/story/2013-01-23/bomb-proof-train-carriages/>
- ITV: <http://www.itv.com/news/update/2013-01-23/engineers-in-position-to-advice-rail-industry-chiefs/>
- Reuters
- EBRU TV: <http://news.ebru.tv/en/search/bomb-proof-trains-created-in-the-eu>
- CNN: <http://edition.cnn.com/video/#/video/world/2013/01/25/pkg-robertson-bomb-proof-train.cnn?iref=allsearch>
- CBS News: http://www.cbsnews.com/8301-205_162-57565437/watch-british-scientists-developing-bomb-proof-train/
- Discovery channel
- Telecinco: http://www.telecinco.es/video/video-embed.html?contentId=MDSVID20130123_0111
(Headlines: minute 0 / Securemetro: from minute 10)
- Cuatro: http://www.cuatro.com/noticias-cuatro/en_directo/noticias-cuatro-14h/Noticias_Cuatro_14_h_2_1545630102.html (Securemetro : from minute 14:37)
- Antena 3:
<http://www.antena3.com/videos/noticias2-completo/2013-enero-23-2013012300028.html>
(Securemetro: from minute 10)
- RTVE País Vasco: <http://www.rtve.es/alacarta/videos/telenorte-pais-vasco/telenorte-pais-vasco-26-02-13/1700098/> (Securemetro from minute 12:50 through 14:43).
- TVE 1 telediario: <http://www.rtve.es/alacarta/videos/telediario/telediario-21-horas-06-04-13/1751412/> (Securemetro starts at minute 24:15)
- RSI (Italian-speaking Swiss radio & television) :
http://info.rsi.ch/home/channels/informazione/esteri/info_on_line/2013/01/23--Treni-a-prova-di-bomba-VIDEO-un
- France 3: Evening news.

4.3.1.2. Radio

- BBC Newcastle
- BBC National news
- LBC London: <http://www.lbc.co.uk/bomb-proof-trains-engineers-reveal-designs-66259>
- Metro Radio: <http://www.metroradio.co.uk/news/uk-and-world/20130122-bomb-proof-trains-engineers-reveal-designs/>
- Clare FM (Ireland)
- Radio Betis (Spain)

4.3.1.3. General press

- The Daily Mail: <http://www.dailymail.co.uk/sciencetech/article-2266670/The-bomb-proof-train-carriages-save-lives-British-engineers-lead-mission-learn-7-7-bombings.html?ito=feeds-newsxml>
- The Daily Mirror: <http://www.mirror.co.uk/news/uk-news/bomb-proof-rail-carriages-securemetro-proposals-1550531>
- The Telegraph: <http://www.telegraph.co.uk/news/uknews/road-and-rail-transport/9819472/Newcastle-University-scientists-develop-bomb-proof-trains.html>.
- The independent: <http://www.independent.co.uk/news/uk/home-news/trains-to-be-bomb-proofed-as-study-identifies-simple-design-changes-that-could-lessen-impact-of-terrorist-attack-8462205.html>
- The Australian : <http://www.theaustralian.com.au/news/world/british-researchers-make-bomb-proof-trains-with-plastic-coated-windows/story-e6frg6so-1226560624576>
- The Gulf Today: <http://gulftoday.ae/portal/b29067d0-f1bd-4c56-9300-89b65bdece33.aspx>
- The Belfast Telegraph: <http://www.belfasttelegraph.co.uk/news/local-national/uk/designs-to-cut-rail-attacks-impact-16264809.html>
- The Journal: <http://www.journallive.co.uk/north-east-news/todays-news/2013/01/23/newcastle-university-leads-research-in-terror-bomb-train-attacks-61634-32657838/>
- International Business Times: <http://tv.ibtimes.com/scientists-test-bomb-proof-train-8696>
- Destinations of the World News: <http://www.dotwnews.com/focus/bomb-proof-carriages-built-for-london-underground>
- Metro Herald: <http://e-edition.metroherald.ie/2013/01/23/>
- USA Today: <http://www.usatoday.com/media/cinematic/video/1864151/watch-how-bomb-proof-train-reacts-to-attack/>
- Awaz Today: http://www.awaztoday.com/News_UK-News-Newcastle-engineers-research-bomb-proof-train-carriages_1_29726_Political-News.aspx
- The Age: <http://media.theage.com.au/technology/tech-talk/uk-university-develops-blastproof-trains-3976589.html>
- El Mundo. 23/01/2013 - “Vagones de trenes más resistentes a las bombas” (paper edition only)
- Presspeople. 23/01/2013 - [Proyecto de investigación SecureMetro](#)
- La Voz de Rusia. 24/01/2013 - [Fabrican trenes a prueba de bombas](#)
- La Repubblica: <http://video.repubblica.it/mondo/gb-treni-rinforzati-contro-gli-attentati/117300/115762>
- Il Corriere della Serra: <http://video.corriere.it/antiterrorismo-scientiati-gb-studiano-treno-antibomba/fb3a3eba-66cc-11e2-95de-416ea2b54ab7>

4.3.1.4. Specialized press

- The Engineer: <http://www.theengineer.co.uk/sectors/rail-and-marine/news/improved-carriage-design-could-reduce-bomb-related-injuries/1015305.article>

- Vía Libre: <http://www.vialibre-ffe.com/noticias.asp?not=10098&cs=acti>;
<http://www.spanishrailwaysnews.com/noticias.asp?not=330&cs=tech>
- Metro Report (Mar 2013) - pp. 16-17
- Eurotransport (issue 1 2013) – Front page mention, article on pg 41-43 :
<http://www.eurotransportmagazine.com/9686/news/industry-news/reducing-the-impact-of-a-terrorist-attack-on-our-trains-and-metros/>
- Environmental Engineering (journal for the Society of Environmental Engineers) – featured in front page
- Treneando : <http://treneando.com/2013/01/24/cientificos-britanicos-ensayan-tecnologias-que-minimicen-danos-por-atentados-en-los-trenes/>
- Un Tram de Tren. 23/01/2013 - [Vuelan un vagón de Metro de Madrid](#)
- Railway Gazette: <http://www.railwaygazette.com/news/single-view/view/metro-cars-blown-up-to-test-bomb-resilience/archiv/2013/januar.html>
- Rail Technology Magazine: [http://www.railtechnologymagazine.com/Rail-News/anti-terrorist-carriages-under-development?utm_medium=email&utm_source=Rail+Technology+Magazine&utm_campaign=2089761_tthedailyrailnews+January+2013+Week+4&dm_i=IJS,18SGX,2L6EL0,47KOC,1](http://www.railtechnologymagazine.com/Rail-News/anti-terrorist-carriages-under-development?utm_medium=email&utm_source=Rail+Technology+Magazine&utm_campaign=2089761_thedailyrailnews+January+2013+Week+4&dm_i=IJS,18SGX,2L6EL0,47KOC,1)
- Today’s railways Europe, April 2013: “Controlled explosion in Sunsundegui prototype metro car”, short article on page 15.

4.3.1.5. Internet: general media, including blogs

- RailPage (Australia): <http://www.railpage.com.au/f-p1796525.htm#1796525>
- http://www.youreporter.it/video_Treni_fatti_esplodere_per_costruire_vagoni_antibomba
- http://www.cronacaqui.it/gossip/28438_esperimenti-antiterrorismo-sui-treni-video.html
- Yahoo News: <http://uk.news.yahoo.com/blast-resistant-train-designs-revealed-004618577.html#tJ8da0U>
- MSN video: <http://video.uk.msn.com/watch/video/bid-to-bomb-proof-train-carriages/2i24c72p?cpkey=4c2b99c5-3fd3-4436-9c3f-fdc82f8e6da3|||&sf=Relevancy>
- LiveLeak.com : http://www.liveleak.com/view?i=b36_1358969018
- 9MSN: <http://news.ninemsn.com.au/technology/2013/01/23/17/41/bomb-proof-train-design-could-save-lives-researchers>
- Digital Journal: <http://www.digitaljournal.com/article/341940>

4.3.1.6. Internet: corporative web sites

- Fundación de los Ferrocarriles Españoles: <http://www.ffe.es/noticias/noticia.asp?id=226>
- Newcastle University. School of Mechanical & Systems Engineering:
<http://www.ncl.ac.uk/mech/about/news/item/securemetro-reducing-the-impact-of-a-terrorist-attack>

- Newcastle University. Press release. 23/01/2013
[Reducing the impact of a terrorist attack on trains and metros](#)
- European Commission - http://ec.europa.eu/research/transport/projects/items/securemetro_en.htm

Following this press coverage, the frequentation of the web site of the project rose very significantly the days when articles and reports were published (cf. Figure 2). It is easy to see that after a peak of curiosity (number of visited pages) and interest (number of visited pages per visit) on the days of the press coverage, there was a sharp decrease after a couple of days, as expected, but the rise in interest remains considerably higher than before the press coverage. On the long term though, the trend is a slow decrease, but the number of visited pages per visit ("actual interest rate") still appears higher than before January 23rd. One can deduce that a communication plan benefits from a press coverage giving the big picture, linking to the web site where the detailed information is available. This is in line with the usual experience. An interesting point, though, is that the main origin of the visits is Google or other search engines, so a good part of the visitors did not just follow a link in the articles or blogs but grabbed the name Securemetro, or key words associated to what Securemetro does, and actively looked for more information, showing the interest triggered by the coverage.

Unfortunately the national statistics cannot be established, as in most cases the country of origin is reported "unknown".

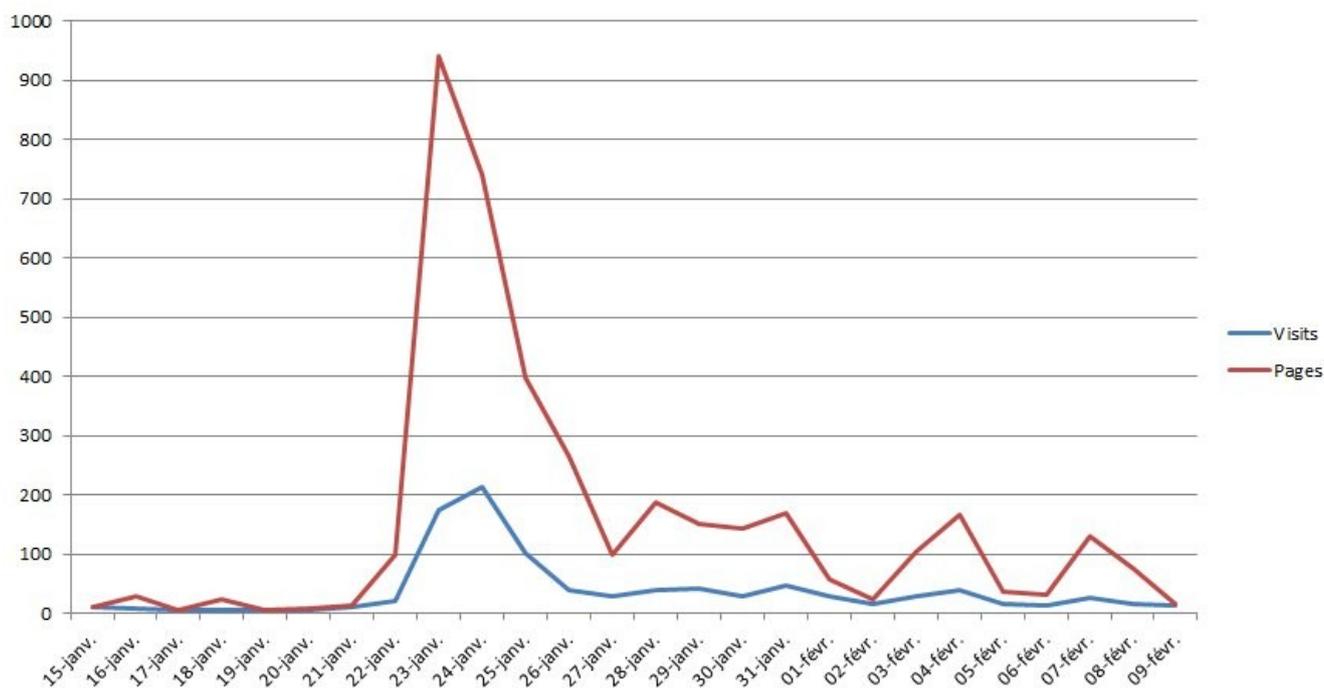


Figure 2: Site frequentation before and after the press release on 23 January.

4.4. Dissemination through the Exploitation Group

The project has set up an Exploitation Group consisting of a list of people among the stakeholders, public transport operators and researchers in the field, who are invited to attend and participate in meetings presenting and discussing the results of Securemetro and their relations with the needs of the industry and with other research projects devoted to the metro and railway security. This group plays two roles within the project:

- First, it was used early in the project to highlight security concerns for operators and other stakeholder who are not full members of the project.
- Second, it provides dissemination, implementation and development route for the work of the project.

The first Exploitation Group meeting took place in Lille in October, 2010 and an account of it is given in deliverable D5A.01. A second meeting, organised in Paris on 7 June 2013, discussed the final results and conclusions of the project, and was opened to a wider audience than the exploitation group, including stakeholders and members of research projects with which contacts have been made during the course of SecureMetro. It was not, however, opened to the general public due to the sensitive nature of the findings of the project. The agenda of this meeting is as follows:

	Friday 7th June 2013	Partner
08:30	Registration	
09:00	Welcome and introduction	E.M. El Koursi (Ifsttar)
09:10	Safety and security approach in guided transport systems	J. Zachmann (EC)
09:30	SecureMetro results – overview	C. O’Neill (Unew)
10:00	Coffee break	
	Session 1 – SecureMetro test Results	
10:30	Blast simulation results	U. Battista (Stam)
11:00	Blast test results – state of the art (Mdm carriage)	R. Seddon (Tecnalia)
11:30	Blast test results – SecureMetro prototype	R. Seddon (Tecnalia)
12:00	Questions & answers	
12:30	Lunch	
	Session 2 – Related projects	
13:30	RESTRAIL project	M.H. Bonneau (UIC)
13:50	SECRET project	V. Deniau (Ifsttar)
14:10	SECUR-ED Mass Transportation	J. Pepinster (RATP)
14:30	Security in railways	J. Pires (UIC)
14:50	Coffee break	
	Session 3 – Approaches to security	
15:10	Metro de Madrid approach	A. de Santiago (Mdm)
15:30	RATP approach	J.L. Planchet (RATP)
15:50	CARONTE project: Creating an Agenda on Transportation security	EM El Koursi (Ifsttar)
16:10	Discussion and conclusion	EM El Koursi (Ifsttar) / C. O’Neill (Unew)
16:40	Close	

4.5. **Presentation of the results of the European project SECUREMETRO**

A presentation of the results of the project to the Spanish interested public was held on 19th June 2013 in Madrid, at the headquarters of the Spanish Railways Foundation (FFE).

The day was opened by Ignacio Gonzalez, CEO of Metro de Madrid, and Juan Pedro Pastor, managing director of the Spanish Railways Foundation. Mr. González stressed the importance of increasing passenger safety as a constant premise of the Madrid Metro.

The Conference was a meeting and discussion point for innovative materials and their validation, passive safety rolling stock, as well as other key issues with a future vision. The contributions from operators, OEM, and researchers offered a broad view of the different subject tackled by SECUREMETRO and their feasibility in the market.

The results presented during the day were:

- Assessment of the state of the art in design practices regarding the safety of the vehicle.
- Specification of vehicle performance desired for attack cases identified in the project.
- Description of the design specifications for blast mitigation and protect occupants and the structure of railway vehicles.
- Description of the design specifications for the mitigation of incendiaries, occupant protection and the structure of railway vehicles and infrastructure and surrounding stations.
- Recommendations for the TSI and CEN: identify the relevant technical data in order to propose additions to the standards of structural integrity and fire performance of vehicles.

During the event, representatives from urban rail operators, manufacturers, research centres, universities and public administrations gathered and discussed around the issues tackled by SECUREMETRO around safety and security issues.

The programme of the day was the following:

PRESENTATION OF THE SECUREMETRO PROJECT RESULTS-SPAIN

Madrid, 19th of June 2013

9.00 h. **Reception**

9.30 h. **Welcome and opening**

Juan Pedro Pastor, Managing Director, Spanish Railways Foundation.

Ignacio González Velayos, CEO, Metro de Madrid

10.00 h. **Presentation of the SECUREMETRO Project results**

Conor O'Neill, SECUREMETRO Coordinator, Newrail.

Antonio de Santiago, R&D Coordinator, Metro de Madrid.

10.45 h. SECUREMETRO results: Future developments

Nieves Murillo, Project Director, Tecnalia.

Pablo Bernárdez, Area Manager, R&D department, EXPAL

Jean Luc Bruyelle, French Institute of Science and Technology for transport, technology and networks (IFFSTAR)

11.30 h. Coffe Break**12.00 h. New challenges in railway safety: The vision of the urban operators**

Moderator: Antonio de Santiago, R&D Coordinator, Metro de Madrid.

Michael Pellot, Transportes Metropolitanos de Barcelona (TMB)

13.00 h. New challenges in railway safety: The vision of the Spanish rolling stock industry

Moderator: Angeles Tauler, R&D Manager, Spanish Railways Foundation

Emilio García, R&D Director, Patentes Talgo

Francisco Toledo, Co-coordinator of the Safety and Security Working Group of the Spanish Railways Technological Platform (PTFE)- Director of the INFORSE group, University of Valencia

Daniel Alvear, Director of the GIDAI group, University of Cantabria.

José María Malo Arribas, Safety Projects Director, Fundación CIDAUT

14.00 h. Closing

The day attracted substantial coverage in the Spanish press, specifically:

General press:

- Diario del henares: <http://www.diariodelhenares.com/noticia/54399/madrid/comunidad-de-madrid/metro-lidera-un-proyecto-que-desarrolla-los-materiales-m%C3%A1s-seguros-en-caso-de-atentado/>
- Europapress: <http://www.europapress.es/madrid/noticia-metro-lidera-proyecto-consigue-desarrollar-materiales-mas-seguros-caso-atentado-tren-20130619121618.html>
- lainformacion.com: http://noticias.lainformacion.com/economia-negocios-y-finanzas/seguros/madrid-metro-presenta-un-proyecto-que-desarrolla-materiales-mas-seguros-en-caso-de-atentado-en-un-tren_kmE955wpANYybBTMPV77d6/
- La Vanguardia: <http://www.lavanguardia.com/local/madrid/20130619/54376778765/metro-lidera-un-proyecto-que-consigue-desarrollar-los-materiales-mas-seguros-en-caso-de-atentado-en.html>
- La voz libre: <http://www.lavozlibre.com/noticias/ampliar/773121/metro-de-madrid-lidera-un-proyecto-de-materiales-mas-seguros-en-caso-de-atentado>

- Madridpress: http://madridpress.com/not/156743/metro_lidera_un_proyecto_de_seguridad_en_caso_d_e_atentado_en_un_tren/
- Madrid actual: <http://www.madridactual.es/20130619532094/el-consejero-delegado-de-metro-presenta-los-resultados-del-proyecto-securemetro>
- Madrid network: <http://www.madridnetwork.org/noticias/detalle/Metro-lidera-un-proyecto-que-desarrolla-los-materiales-mas-seguros-en-caso-de-atentado>
- Terra: <http://noticias.terra.es/espana/comunidades-autonomas/madrid/metro-lidera-un-proyecto-que-consigue-desarrollar-los-materiales-mas-seguros-en-caso-de-atentado-en-un-tren.41013d49d455f310VgnCLD2000000ec6eb0aRCRD.html>
- Servimedia: <http://www.servimedia.es/Noticias/DetalleNoticia.aspx?seccion=21&id=300346>
- http://www.teinteresa.es/comunidad-de-madrid/madrid/Metro-proyecto-desarrollar-materiales-atentado_0_940706544.html
- Te interesa: <http://villaviciosadigital.es/metro-se-implica-en-un-proyecto-que-fomenta-los-materiales-de-seguridad-en-caso-de-atentado/>
- Es por Madrid: <http://www.espormadrid.es/2013/06/el-metro-en-el-proyecto-securemetro.html>
- Madrid Wiki: <http://madridwiki.com/post/53444482864/el-metro-en-el-proyecto-securemetro-para-la>

Specialized press:

- Mundo ferroviario: <http://mundo-ferroviario.es/index.php/articulos-de-curiosidades/11778-jornadas-de-presentacion-de-los-resultados-del-proyecto-europeo-securemetro>
- Ingenieros: <http://www.ingenieros.es/jornadas/ver/madrid-presentacion-de-los-resultados-del-proyecto-securemetro/262>
- Cronica ferroviaria: <http://www.cronicaferroviaria.blogspot.fr/2013/06/presentacion-de-los-resultados-de.html>
- Via libre: <http://www.vialibre-ffe.com/noticias.asp?not=10941&cs=acti>

Specialized blogs:

- Ecotren.es: <http://tren.elangel.es/noticias/?p=72>
- Treneando: <http://treneando.com/2013/06/20/sobre-empresas-y-tren-13/>
- ANAF: http://www.anaftren.com/CAS/noticias/2013/06-21-resultados_securemetro.php

- Anden 1:
http://www.anden1.org/webTemp/blog/2013/06/21/presentados_resultados_securemetro_explosiones/

Institutional web sites:

- Metro de Madrid:
<http://www.metromadrid.es/es/comunicacion/prensa/2013/Junio/noticia7.html>
- Gidai group: <http://gidai.group.blogspot.com.es>

5. Conclusion

The plan for exploitation is intended to ensure that the results of the project are made visible for all those concerned with the improvement of the security of metro vehicles in front of bomb attacks, and to promote their implementation through the available means of scientific communication and standardisation. The purpose of the present deliverable was to list the completed and on-going achievements of the project in this domain, as well as the opportunities and already done work in this regard. The activities in the domain of standardisation are described in deliverable D5A.04.

The topics were chosen according to the main area of the objectives of SecureMetro project and to the involvement of other European projects dealing with safety and security aspects. Projects SecureMetro, RESTRAIL, Secur-ED and SECRET address many common issues, which yields the possibility of a linkage between all projects. Several points were raised, such as the opportunity to bring together a wide number of experts, or to avoid duplicating work already undertaken. Regarding the final results of SecureMetro, the main conclusions could be summarised as follows:

- Following a review covering the past 60 years of terrorist attacks on metro systems worldwide, the SecureMetro team has sought to re-design of the current vehicles, since completely replacing them was not a practically and economically viable option. Instead, they developed and incorporated new technologies and materials to be applied into existing carriages in order to improve their performance. Tethering heavy ceiling panels and other equipment using retention wire was one key modification made in the development of the SecureMetro prototype. Plastic film coatings were also added to windows, to protect people outside the train from flying glass, and heavier structures were replaced with lighter-weight and energy-absorbing materials. Dealing with loose objects is crucial to reduce the risk of fatalities and injuries from flying debris, and also to ensure gangways are kept relatively clear, allowing quicker access for emergency staff and easier evacuation. Being able to analyse an actual blast wave travelling the length of a coach was key to assessing the performance of the new design solutions. A real test explosion on board a specifically built test carriage was therefore an absolutely critical element for the project. This not only provided a first-hand opportunity to review the performance of the new technologies, but also validated the blast simulations which modelled the tests. In order to understand the mechanics of the explosion – which takes less than a second – the team used high-speed cameras, allowing them to slow down the blast footage.
- The results of the Securemetro projects allowed to improve the resilience of the metro vehicle, the passenger and staff in the following ways:

- Improved resistance of the windows, that cleanly separate from the body and do not shatter thanks to the use of protective film and bonding. This results in the absence of broken glass flying towards the platform in case of blast in a station.
- Improved resistance of the ceiling panels and light/speaker heavy elements, using retaining cables to the main vehicle (primary) structure: the ceiling does not fall on the passengers, and does not cover the ground which would make egressing difficult and hazardous.
- Improved lights using LEDs, which have been shown to keep performing throughout the trial and after. This is an important point to improve the possibility to enter and egress the carriage, walk safely, assess the damages and bring rescue.
- Recommendation to reinforce the driver's bulkhead.
- Use of flexible backing layer on certain key elements of the secondary structure to improve flexibility under blast loading.
- Design and performance of a testing procedure taking into consideration the inside pressure wave in order to predict the damage caused by the blast and gathering important data through the proper choice and placement of pressure sensors.

Based on the discussion of the second Exploitation Group meeting, it seemed to be necessary to organise more specific discussion with stakeholders to promote the consensus and clarify the different approaches, and to develop a clear connection with standardisation bodies to contribute to EU Guidelines, Standards and Regulatory environment to integrate inherently more secure vehicle design into existing guidelines on interoperability and standardization.