BBC interview with Dr. Jason Palmer (amended version):

Can you make a general comment about the project, where it stands, and why it is an important pursuit?

As Prof. Pugno points out the whole endeavour needs a concerted effort (there may be even more than 300 researchers working on individual aspects of the space elevator system but they do not collaborate under a single coordinated framework) and an appropriate funding. With the recent foundation of ISEC (International Space Elevator Consortium; see **http://www.internationalspaceelevatorconsortium.org**/ or soon www.ISEC.inf) and a new web based space elevator wiki (see **www.spaceelevatorwiki.com**) there's the promising opportunity to globally support and align research efforts. Regarding activities in Europe we are at EuroSpaceward of course grateful to have been supported since 2007 by the National Research Fund of Luxembourg and do our best that this important support will last.

According to a statement by Dr. Edwards at the conference "the advance in the past 10 years has been such that the current primary hurdles are financial and political. With these two hurdles addressed the technical work can be completed and the first space elevator can be built". This may sound little bit too optimistic, because the CNT fibre production technology to fabricate a mega cable of 36000 km or even 100000 km at a minimum strength of 10 GPa is at the moment still missing as the conference clearly highlighted. However, Prof. Windle's team at Cambridge seems to lead the way, being able to produce almost cm long individual macroscopic CNT threads with tensile strength of up to 9 N/tex which compares to about 9 GPa at the given density of their material. Scaling up the Cambridge laboratory process to industrial production and spinning these threads into ropes and cables with 10GPa should be soon possible. Hence, if we concentrate research funds on scaling up the results of Cambridge we may be very soon there where Prof. Pugno sees the minimum requirement and a prototype space elevator cable may be built.

Why important pursuit:

We're strongly focusing on the environmental necessity to pursuit this and therefore invited Prof. Cockell, Open University UK (author of the book *Space on Earth – Saving Our World by Seeking Others*) to bring this to the point and communicate clearly: that we have to look after the life support systems of the Earth from space in order to be able to survive!

Furthermore NASA's and ESA's beautiful concepts on clean Solar Power Satellites and HE3 mining of the moon will only be feasible with the kind of access to space that the elevator promises!

Last but not least the spin-offs of the pursuit! E.g. cables for suspension bridges that easily span the narrows of Gibraltar or Messina.

What was/is the general feeling at the conference about progress toward a functional space elevator?

I think the conference made us more realistic that there is still a long way to go, especially if we are not able to furnish the project with appropriate funding. At one moment after Prof. Pugno's presentation the "air was out", because we all have in mind a tensile strength of approx 60 GPa for the threshold level of functional space elevator cable based on the calculations of Dr. Edwards and other experts. The thermo dynamical limit according to Prof.

Pugno is **45** GPa. Following his proposal our efforts should focus on designing a system with a flaw tolerant cable of 10 GPa. We've still to discuss what this implies for the design and reachable payload capacity/yield of the system since the cable's taper ratio/mass would have to be significantly increased.

Other possible constraints: the presentation of Prof Vesselin Shanov's from University of Cincinnati's NanoWorld, on pure CNT arrays that unexpectedly stop growth at approx 2 cm length (which is inexplicable at the moment) may show up an other limit. However, according to Prof. Shanov hopes are there that this may be overcome.

Is everyone equally hopeful?

Unfortunately the mainstream space industry and academia is not. E.g. the International Space University (ISU) still considers the space elevator as not feasible or at least impractical. NASA, ESA and JAXA have currently no roadmaps that include the space elevator. Only the Japanese Governmental body MITI has one (according to a presentation by Akira Tsuchida, Flight Director of ISS Kibo at JAXA) which foresees (or aims at) CNT textiles with stretching strength of 10 GPa by 2018 and 100 GPa by 2026 (I'd been joking about the Y2026 goal during the conference, pointing out that they've still not been briefed by Prof. Pugno)

Is there a consensus as to when such an elevator will be technologically feasible?

Not really. My estimation: perhaps by 2015 (this means the generally accepted cognition of feasibility) and if proven feasible we may see the first functional elevator between 2040-2050.

What are the greatest challenges and barriers that remain?

I would like to add to Prof. Pugno's remark: convince the "rocket community" about it! There is an established industry of rocket producers that may see their existence threatened. It will be difficult to enter PPP models of funding if this group is heavily lobbying against it.

Which aspects or parts of the project seem to you to be assured (e.g. type of tether, general climber design, power delivery, overall size or capacity, etc.?)

power beaming and general system design

Which are in the most doubt?

See my previous statements. I'd like to add the dynamics of the mega cable (e.g. gravity induced oscillations by the moon etc.), how to clean up space debris and last but not least a reliable business model based on **an** appropriate legal framework.

MK, Luxembourg, Dec 12, 2008 (amended on Dec 14, 2008)