Gentile Professor Alberotanza,

Comincio in italiano, perché siamo in Italia. La ringrazio per la sua introduzione e ringraziamo tutta la città di Venezia per l'ospitalità riservataci.

Ladies and Gentlemen,

Dear participants to the International Symposium on Radar Altimetry,

Dear colleagues,

You have already heard that *acqua alta* (high water) is a symbol of Venice. A symbol like the Canal Grande or the *Carnevale*, and all of you who have ever experienced what that means, *acqua alta*, when tourists and locals try to keep balance on small catwalks in the centre of Venice, an umbrella in one hand and shopping bags in the other, shows that *acqua alta* in this location really means something, and this was one of the reasons Venice was chosen for this symposium. Venice, the "sinking city" as it has been called in the past, is under threat from both rising sea levels and sinking grounds.

Our Earth observation satellites up in orbit don't have to fear the *acqua alta*, but instead they help us, day by day, measurement by measurement, to understand the global mosaic of environmental changes in which Venice and its high water are just a small but not unimportant piece.

Lets build a bridge from *acqua alta* to *altimetry:* The reason for welcoming you, more than 500 experts from some 30 countries of this world, is a unique scientific stocktaking: 15 years of Progress in Radar Altimetry. Indeed, the time span we analyse in the coming week, and the wealth of scientific findings, the increment of knowledge and understanding derived from altimetry measurements is impressive and important, in many contexts, and I think we will be even more impressed after this week when you have reported the findings you have come to report.

From the European point of view it started on 17th of July 1991, almost 15 years ago, when ESA launched its first European Remote Sensing Satellite, ERS-1, with a radar altimeter on board, shortly followed by the TOPEX/Poseidon mission, and I am sure my colleague Philip Goudy will elaborate a bit on this part. Since then we always had a series of altimeters in orbit, usually

always a combination of a high inclination altimeter on ERS-1 followed by ERS-2, later by ENVISAT and a mid-inclination instrument on TOPEX/Poseidon and later followed by Jason.

In March 2002, when we launched Envisat, the flagship of European Earth observation, and the world's largest ever environmental satellite, this enabled major scientific results. I would like to highlight some of them:

With Envisat and its predecessors, it was possible to really measure, not just calculate: Global sea level rise. It was determined by scientists within 3mm/year in the last 15 years. It was accompanied of course by a temperature increase of the sea surface of 0.13 degrees Celsius since 1992.

The monitoring of sea ice thickness and Antarctica ice-shelves collapse, which is now possible from satellites, is one of the major achievements scientists have recorded.

The accurate mapping of tectonic plates and tectonic structures, including submarine mountain chains, deep trenches and subduction zones, and phenomena like El Nino and La Nina, the Gulf stream, the North Atlantic drift are now constantly observed.

Last but not least if you look back to the hurricanes hitting the Florida coast, what we have seen as a result is a special combination of instruments including altimetry where it was possible to measure the depths of the water body which fed the biggest hurricane ever measured by altimetry in combination with other instruments.

We are also looking forward to new results you have to report to us but this impressive number of missions is only the start. In the near future we will see new important chapters opening with ESA's Earth Explorer series of satellites. Earth Explorer satellites are ESA's first Earth observation science satellites nad we have some exicting missions to come, also in the context of the work you are doing.

The next launch will be GOCE, the Gravity field and steady state Ocean Circulation Explorer, which will provide us with an even better gravity field, necessary, with higher spatial resolution and better knowledge of the gravity, which will also help us to distinguish in altimetry measurements between the gravity part of the surface and currents, which is one of the important areas of research

Shortly after this Explorer mission we will see SMOS, ESA's Soil Moisture and Ocean Salinity mission. Ocean salinity is another very important parameter of the ocean circulation patterns. We measure temperature… sea surface height… geoid… With improved geoid we can distinguish what is current driven from what is the gravity part of the sea surface, and the SMOS mission will hopefully give us information about the ocean salinity parameter of the thermohaline current system.

Unfortunately we lost the CryoSat mission in October last year, but 10 days ago the Programme Board of Earth Observation, formed of our member states that decide about our programme, has approved my proposal to rebuild it. So hopefully early in 2009 we will see one of the most advanced radar altimeter ever, the SIRAL instrument on the CryoSat mission, flying and hopefully successful in measuring both land and sea ice, where we still have gaps, even though we measure them with the current satellites, but we always have gaps close to the poles and although we still have problems with the resolution of the actual altimeters, we can measure the sea ice cover and also the thickness of the sea ice.

Although the impressive measurements of ERS and ENVISAT will be continued, at the last Ministerial conference in Berlin in December, Ministers decided that we can now start building the GMES system which is an operational system, so after the meteorological missions we made operational in Earth observation some 30 years ago it is now time for environmental monitoring and security, which is what GMES stands for, for which we will build a new system of operational satellites. One of them, Sentinel 3, will also carry a radar altimeter so we will have a continued operational altimetry series of satellites coming from Europe, and I think that with that the success story of radar altimetry can continue and will have operational instruments because this is one of the major requirements.

We are proud that this week we have brought together, with our CNES colleagues, five scientific communities at this occasion – cryosphere, hydrology, marine geodesy, oceanography and the "integrated approach" including in-situ data and modelling – is, I think, already a success, and I also am convinced that the interdisciplinary approach and the interaction between experts from all these fields, as you are, will boost the scientific and application return. This was also recently an outcome of our Science Strategy team. Three weeks ago we had 180 scientists gather to discuss with us about the future of the science programme in Europe, and one of the strong recommendations was that inter-disciplinarity is now absolutely necessary because the boundary between the different science areas are really disappearing.

For the week ahead of you, I wish you all fruitful discussions, energy and success. Those having shown energy and success already are for example, our two organisers Jérôme Benveniste and Yves Ménard from ESA and CNES, whom I sincerely thank for their efforts during the last months. I can only say that whenever I stayed late in my office in the last weeks, Jérôme, who works in the same building, was still working in preparation of this Symposium and I am absolutely sure it was the same on CNES side, so thank you for your effort. And don't forget: The next time we meet for such an event, based on the 15-year record, will not be before the year 2020! So I wish you a very successful week and I hope you can also find some time to visit this wonderful city of Venice.

Thank you very much for coming.

Volker Liebig

Director of Earth Observation, ESA