

## HARRIS ON TERRORISM AND ASTEROID RISKS

For terrorism deaths I referred to the following web site:

<http://www.johnstonsarchive.net/terrorism/intlterror.html>

Using statistics compiled by the U.S. Department of State for international terrorism, I tally up an average of about 1,000 deaths per year over the eight years between 1997 and 2004. This includes the one big spike of 9/11, but enough other years to smooth it out to less than half the total. Without 9/11, it would be around 600 per year. So, taking a life span to be 80 years and the population of the world to be 6 billion, we have the chance of death by terrorism in a lifetime to be one in  $(6 \text{ billion})/(80,000)$ , or about one in 75,000. I rounded to 80,000 since the number is at least that uncertain. Note that this process essentially assumes that, in addition to the usual number of deaths from international terrorism, there will be a 9/11-type catastrophe somewhere on the globe every several years. Excluding 9/11 and such repeats, the probability becomes about one in 120,000.

For the asteroid risk, I referred to the NASA report of a few years ago that I participated in (so the numbers are somewhat my own). The publication can be found at:

<http://neo.jpl.nasa.gov/neo/report.html>

In that report, we estimate a "nominal" risk from asteroid impacts of about 1,300 deaths/year from all sizes of impacts. That translates to about one in 60,000 using the above population of the planet and human lifetime. However, we are discovering NEAs (near-earth asteroids) all the time, and with each asteroid discovered and certified not to be on a collision course in our lifetimes, the short-term risk (in the next 100 years or so) is reduced. So far we have retired about half the total risk, so it is arguably only about one in 100,000. However, you will see in the report that the range of uncertainty is a factor of several, so it is reasonable to say that the risk is in the same range as from terrorism, in the general range of one in a hundred thousand. We know they are out there, we can count them in our telescopes, and we know statistically how often they hit the Earth. We know roughly the statistical probability of any one hitting the Earth, however there is considerable uncertainty concerning the consequences of an impact of a given size. However, other than this uncertainty, the rest is pretty hard fact, even if we have never experienced it even once.

In both cases, the odds vary by region. In the case of terrorism, the most dangerous place to live is in the Middle East. In the case of impact hazard, most dangerous is living along an exposed shoreline where an impact-generated tsunami might get you.

If I were an actuary selling insurance for death by asteroid or death by terrorism, I'd charge about the same premium for either one. The only difference is, with terrorism I'd probably have to pay up a small amount every year. With the asteroid, we'll all go together and I won't be around to pay up.

Alan W. Harris

Senior Research Scientist

Space Science Institute

4603 Orange Knoll Ave.

La Canada, CA 91011-3364

818-790-8291

[awharris@SpaceScience.org](mailto:awharris@SpaceScience.org)