

**PDC2021**  
**Vienna, Austria**

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**MORE BUCKS FOR THE BANG: NEW SPACE SOLUTIONS, IMPACT TOURISM  
AND ONE UNIQUE SCIENCE & ENGINEERING OPPORTUNITY  
AT T-6 MONTHS AND COUNTING**

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## ABSTRACT

For now, the Planetary Defense Conference *Exercise 2021*'s incoming *fictitious(!)* asteroid, 2021 PDC, seems headed for impact on October 20<sup>th</sup>, 2021, exactly 6 months after its discovery. Today (April 26<sup>th</sup>, 2021), the impact probability is 5%, in a steep rise from 1 in 2500 upon discovery six days ago. We all know how these things end. Or do we? Unless somebody kicked off another headline-grabbing media scare or wants to keep civil defense very idle very soon, chances are that it *will* hit (note: *this is an exercise!*). Taking stock, it is barely 6 months to impact, a steadily rising likelihood that it will actually happen, and a huge uncertainty of possible impact energies: First estimates range from 1.2 Mt<sub>TNT</sub> to 13 Gt<sub>TNT</sub>, and this is not even the worst-worst case: a 700 m diameter massive NiFe asteroid (covered by a thin veneer of Ryugu-black rubble to match size and brightness) would come in at 70 Gt<sub>TNT</sub>. In down to Earth terms, this could be all between smashing fireworks over some remote area of the globe and a 7.5 km crater downtown somewhere. Considering the deliberate and sedate ways of development of interplanetary missions it seems we can only stand and stare until we know well enough where to tell people to pack up all that can be moved at all and save themselves. But then, it could just as well be a smaller bright rock. The best estimate is 120 m diameter from optical observation alone, by 13% standard albedo. NASA's upcoming DART mission to binary asteroid (65803) Didymos is designed to hit such a small target, its moonlet Dimorphos. The Deep Impact mission's impactor in 2005 successfully guided itself to the brightest spot on comet 9P/Tempel 1, a relatively small feature on the 6 km nucleus. And 'space' has changed: By the end of this decade, one satellite communication network plans to have launched over 11000 satellites at a pace of 60 per launch every other week. This level of series production is comparable in numbers to the most prolific commercial airlines. Launch vehicle production has not simply increased correspondingly – they can be reused, although in a trade for performance. Optical and radio astronomy as well as planetary radar have made great strides in the past decade, and so has the design and production capability for everyday 'high-tech' products. 60 years ago, spaceflight was invented from scratch within two years, and there are recent examples of fast-paced space projects as well as a drive towards 'responsive space'. It seems it is not quite yet time to abandon all hope. We present what could be done and what is too close to call once thinking is shoved out of the box by a clear and present danger, to show where a little more preparedness or routine would come in handy – or become decisive. And if we fail, let's stand and stare safely and well instrumented anywhere on Earth together in the greatest adventure of science.

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**Comments:** *oral presentation preferred, poster (or equivalent) welcome*

*(Alternative session, Time slot, Oral or Poster, Etc...)*