POSSIBLE IMPACT SOLUTIONS OF THE DANGEROUS ASTEROID 29075 (1950 DA). Ireneusz Wlodarczyk, Chorzow Astronomical Observatory, e-mail: astrobit@ka.onet.pl.

Introduction: Based on all published observations, we present computations of possible impact solutions of the asteroid 29075 (1950 DA). In [1], we presented the current state of calculations of potential collisions for all the so-called Special NEAs

Computation method and results: We based our computation on the published 918 optical observations over intervals: 1950 Feb. 22.23014 – 2021 Dec 03.143961 and 12 radar observations from 2001 March 03 to 2012 May 01:
(https://minorplanetcenter.net/iau//mpc.html).

Table 1. Starting nominal keplerian elements of the asteroid 29075 (1950 DA) with the error model 'vftc17'.

a=(1.698334950413±1.051)E-09 au
e=(0.50797864522± 1.565)E-08
i=(12.169976333±3.836)E-06 deg
long. node (356.654337932±5.591)E-06 deg
arg. peric. = (224.670146075±6.515)E-06 deg
mean anomaly=(138.016815988±2.334)E-06 deg
Epoch: MJD59600 (2022-Jan-21.0) TDB
A2=(-7.29942623±1.216)E-15 au/d^2
RMS=0.5258",

Where a is a semimajor axis, e – eccentricity, i – orbital inclination long node – longitude of ascending node, arg. peric. – argument of p0erihelion, A2 – non-gravitational transverse accelaration parameter.

To compute the possible impact solutions of the asteroid 29075 (1950 DA), we used the publicly available OrbFit v.5.0.7 software. We used the error 'vftc17' model according to [2].

We used the JPL DE431 Solar System model with an additional 17 massive asteroids as described in [3] and [4].

We computed the non-gravitational effect A2.

To compute possible (29075) 1950 DA collisions with the Earth, we integrated the equation of motions until 2883 Jan. 01. We used the parameter σ_LOV = 5 and calculated 601 clones (VAs).

Results: Table 1. Impact risk table for asteroid 29075 (1950 DA).

date	σ_LOV	*p_RE*	*Exp. En.*	*PS*
YYYY/MM			MT	
2880/03/16.992	3.009	7.49E-07	7.12E-02	-3.55

where σ_LOV denotes the position along the line of variation, *LOV*, in the σ space and values of σ is here in the interval [-5,5],

Table 1 also presents the probability of Earth impact (*p_RE*) and Palermo Scale (*PS*). *PS* is the new hazard scale [5]. Expected energy (*Exp. En*.) denotes impact energy multiplied by impact probability. Units are in megatons MT (1 MT=4.184E15 J).

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References:

[1] Wlodarczyk I. (2020) *BlgAJ, 32,* 27. [2] Veres P. et al. (2017), *Icarus*, 296, 139. [3] del Vigna et al. (2018) *A&A*, 617, A61. [4] Farnocchia, D. (2013), *Icarus*, 224,1. [5] Chesley et al. (2002), *Icarus,*