**iconiconValidation Results**

For the validation procedure, the BADA implementation of BlueSky was tested against the values provided by the BADA Performance Table Data files. All validated BlueSky aircraft were therefore set to according masses and altitude and then commanded to either climb or descend. To avoid changes to the source code, the altitude was not frozen during the test cases. The data was recorded in the first time step, where the aircraft had a vertical speed. Hence, the BADA and BlueSky altitude results differ slightly.

**1. BADA**

**Jet aircraft**

* aircraft tested: A320, B744 and F100
* sample size: four climbs and four descents in different altitudes and flight phases per aircraft. The total number of test cases is 23, as one test case took place outside the flight enveloppe

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Alt [ft] | TAS[kt] | Ma[-] | Thr[N] | Drag[N] | FF[kgm] | Vspd[fpm] | ESF[-] |
| max. deviation | 0.35012 | 0.05468 | 0.00484 | 0.83541 | 3.32976 | 0.05960 | 0.66078 | 0.00470 |
| max. rel.  deviation [%] | 0.35012 | 0.01180 | 1.79259 | 0.00013 | 0.00170 | 0.02104 | 0.05964 | 0.57378 |
| mean | 0.09458 | 0.01850 | 0.00149 | 0.27720 | 0.72209 | 0.02555 | 0.29274 | 0.00245 |
| standard deviation | 0.08913 | 0.02038 | 0.00141 | 0.17291 | 0.89737 | 0.01504 | 0.17128 | 0.00153 |

**Turboprop aircraft**

* aircraft tested: D328, DH8C and SB20
* sample size: four climbs and four descents in different altitudes and flight phases per aircraft. The total number of test cases is 23, as one test case took place outside the flight enveloppe

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Alt [ft] | TAS[kt] | Ma[-] | Thr[N] | Drag[N] | FF[kgm] | Vspd[fpm] | ESF[-] |
| max. deviation | 0.50170 | 0.20084 | 0.00500 | 1.19667 | 0.61344 | 0.04750 | 0.55847 | 0.00494 |
| max. rel.  deviation [%] | 0.00173 | 0.11897 | 1.66508 | 0.00553 | 0.00358 | 0.65972 | 0.01913 | 0.53729 |
| mean | 0.11426 | 0.01911 | 0.00226 | 0.38272 | 0.27162 | 0.02916 | 0.21820 | 0.00278 |
| standard deviation | 0.11874 | 0.04048 | 0.00181 | 0.37955 | 0.14525 | 0.01561 | 0.16325 | 0.00154 |

**2. Default Aircraft**

* aircraft tested: B744, based on open source information only
* sample size: four climbs and four descents in different altitudes and flight phases as well as one level flight[[1]](#footnote-1). The total number of test cases is nine

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Alt [ft] | TAS[kt] | Ma[-] | Thr[N] | Drag[N] | FF[kgm] | Vspd[fpm] | ESF[-] |
| max. deviation | 0.60892 | 0.05043 | 0.00295 | 134940.89 | 163622.28 | 326.0 | 1529.25 | 0.36078 |
| max. rel.  deviation [%] | 0.03045 | 0.01011 | 0.41583 | 31.72825 | 40.87 | 314.47 | 63.88 | 32.50279 |
| mean | 0.20266 | 0.01763 | 0.00140 | 116360.48 | 52495.23 | 149.52 | 554.99 | 0.04189 |
| standard deviation | 0.24142 | 0.02113 | 0.00163 | 92071.18 | 43828.51 | 120.65 | 624.95 | 0.11960 |

1. This phase was tested against the BlueSky implementation of the B744, as BADA itself does not provide the user with level flight information [↑](#footnote-ref-1)