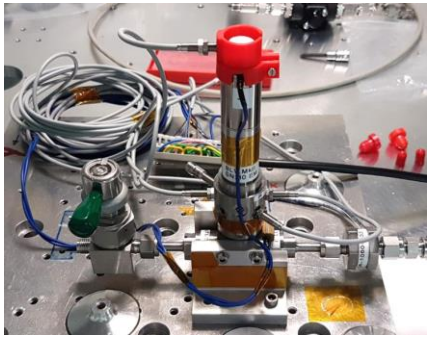
# Ball Latch Valve
# BLV.MkII
# Activity resumé

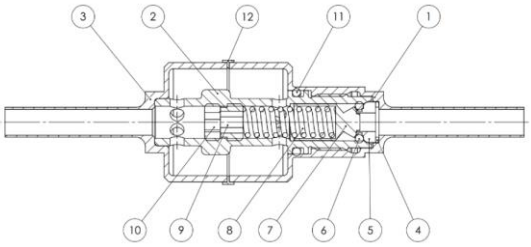
# BLV.MkII - Development objectives

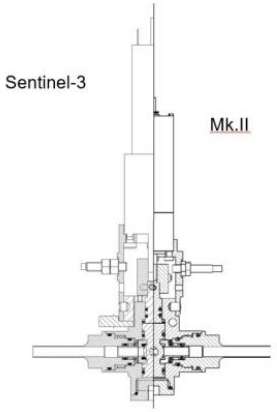
- Reduction of weight vs. BLV.S3 → achieved (853g down to 525g)
- Reduction of envelope vs. BLV.S3 → achieved (220mm down to 179mm)
- Reduction of assembly complexity vs. BLV.S3 → achieved (less parts)
- Introduction of BPR → achieved (BPR function)
- Welding → partially achieved (valve welding)
- Priming function → achieved

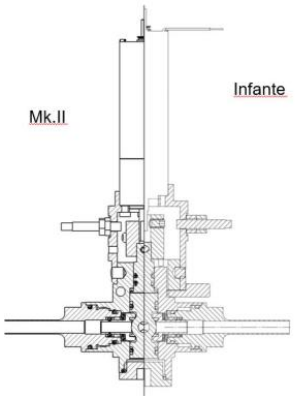
# BLV.MkII - Development steps

- Selection of Motor and gear: Maxon DCX22S + GPX22UP
- Selection of Position sensors: Contrinex 603 series
- Reduction and optimization of BLV Body parts
- Assembly and testing of Engineering Model (priming function stability and PCTFE seats for HP)
- Support of CO2M mission (design and qual testing of first sub-configuration aligned with needs of first customers)
- Parallel development of BPR stand alone valve
- Full Qualification of BLV.MkIIa and BPR



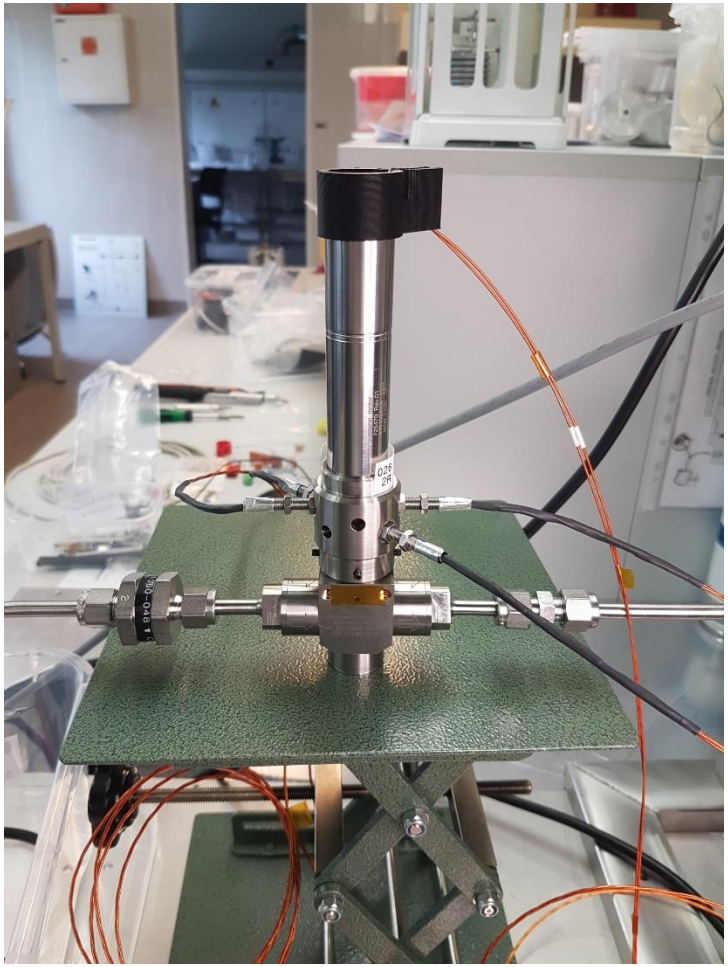



# BLV.MkIIa - Configuration

BLV.MkIIa is the first sub-configuration of the BLV.MkII 2nd Gen. Ball Latch Valve's selected for qualification and for use on Copernicus CO2M spacecrafts.

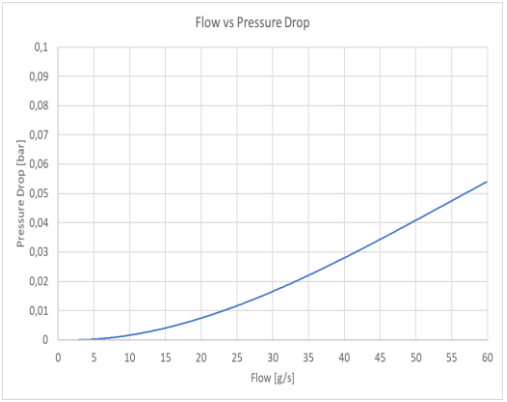
- N2H4 compatible (Ti6Al4.5V, SS416, PTFE and EPDM E540-80 as materials of wetted parts)
- Light weight motor and gear
- Open-close detection through proximity switches as in BLV.S3 heritage
- Priming function (2 additional sensors) for total elimination of waterhammer effect
- Flight cap for protection from MLI entanglement

Other sub-configurations (high pressure, green propellant… ) in discussions with potential customers.

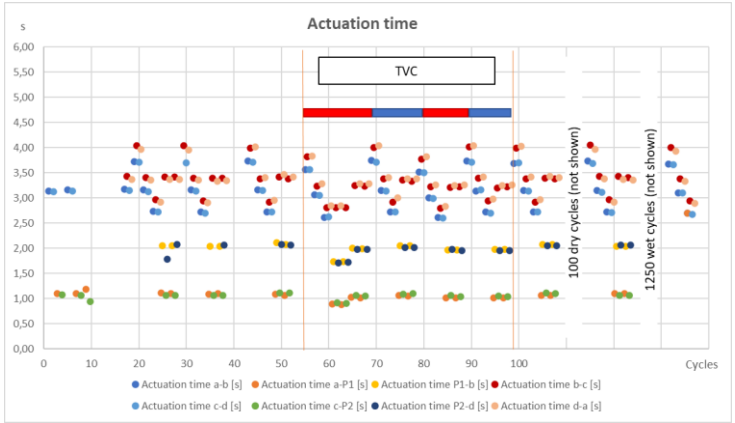


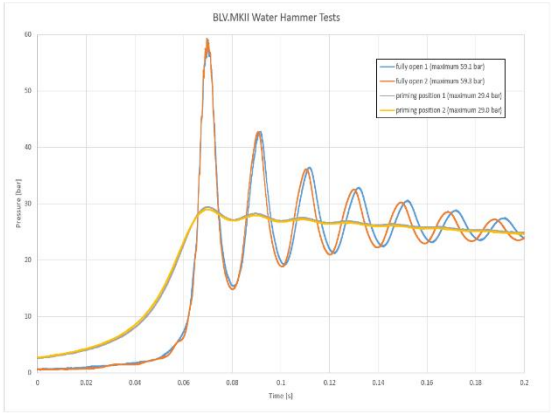
# BLV.MkIIa - Performance

Mass: 525g X/Y/Z box: 133x75x180 mm
MEOP: 28 bar Proof: 42 bar Burst: 70 bar
(50bar for outlet) (82bar for outlet)
Actuation time open/close: 3s close/priming: 1s
Inrush current: < 1A nominal current: <50mA
Internal leakage: < 1,0E-05scc/s external leakage: < 1,0E-06scc/s
Flow at priming: <2g/s (N2)
100 dry life cylces 1.250 wet life cylces 1.500+ cylces in qual



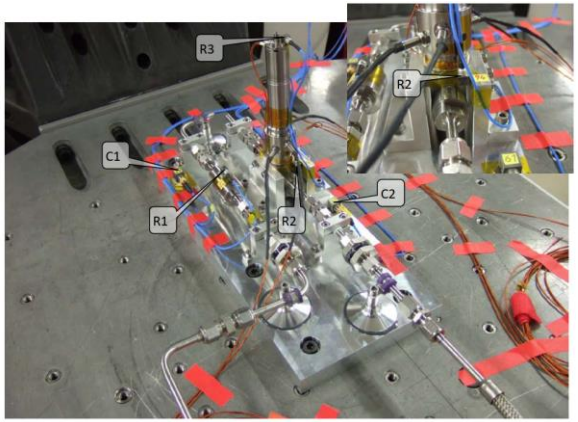

Extremely low pressure drop at full open.
No waterhammer with priming function.
Stable electrical performance over all lifetime.



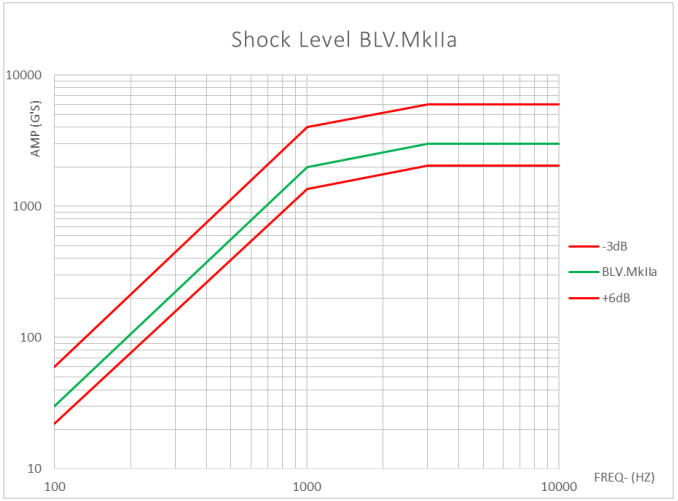



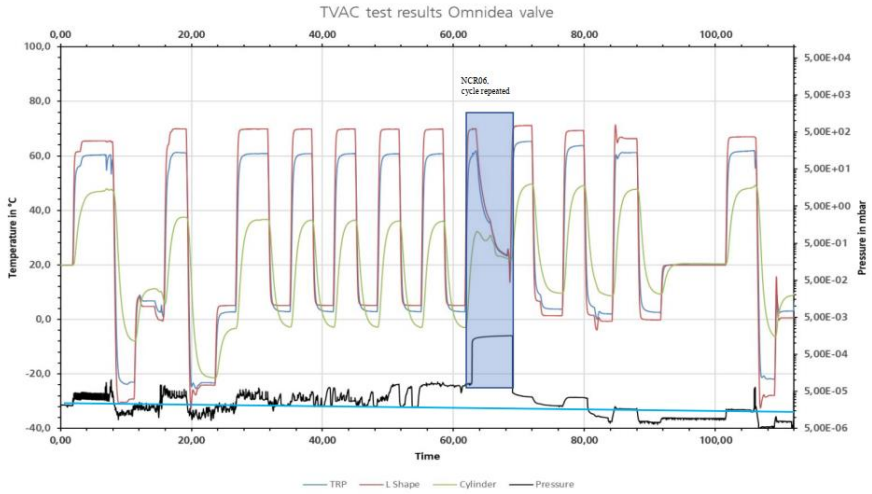
# BLV.MkIIa - Vibration / Pyroshock / TVC

| Top of valve results | Resonant Freq. [Hz] | Amplitude [g] | Difference in Frequency [%] | Difference in Amplitude [%] |
|---|---|---|---|---|
| Resonance X - 1st | 565,0 | 7,603 | -0.442 % | +16.61 % |
| Resonance X - 2nd | 562,5 | 8,866 | ---------- | ---------- |
| Resonance X - 3rd | 566,6 | 12,550 | +0.729 % | +41.55 % |
| Resonance Y - 1st | 626,8 | 8,530 | 0 % | +13.07 % |
| Resonance Y - 2nd | 626,8 | 9,645 | ---------- | ---------- |
| Resonance Y -3rd | 627,7 | 14,740 | +0.144 % | +52.83 % |
| Resonance Z - 1st | > 2000 | - | - | - |
| Resonance Z - 2nd | > 2000 | - | ---------- | ---------- |
| Resonance Z - 3rd | > 2000 | - | - | - |

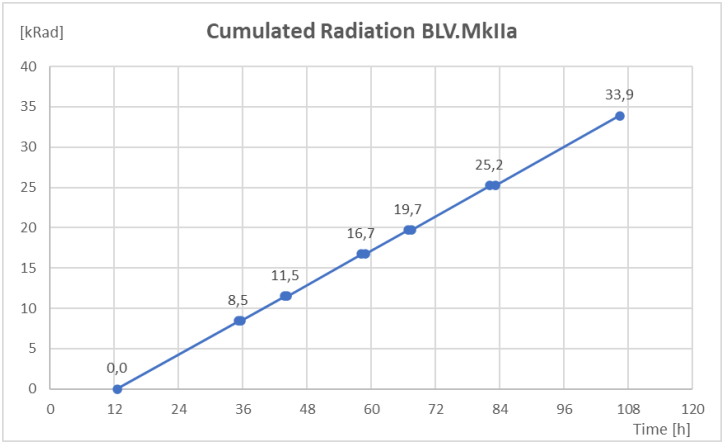


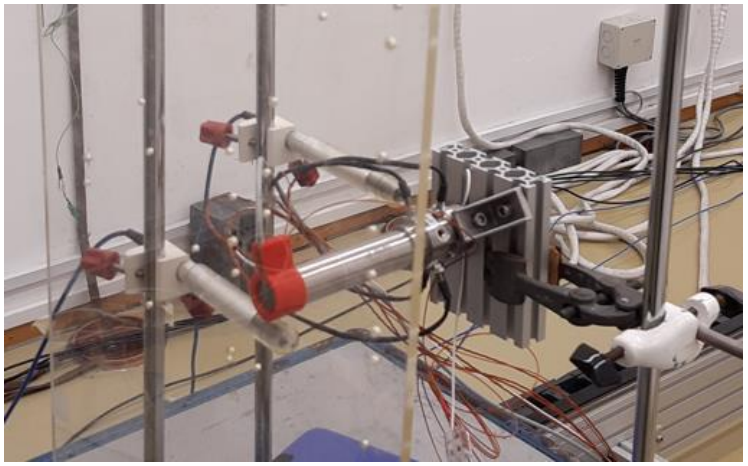

No resonances below 2000 Hz at body level.



# BLV.MkIIa - Radiation / Magnetics / EMC



33,9 kRad achieved
low magnetic moment

Copernicus CHIME
alike EMC test campaign