altitudes of 1,500 and 3,000 meters (4,000 and 8,000 ft). Ventilators were tested against models simulating a normal lung, a low compliance (ARDS) lung and a high-resistance (asthma) lung, with various FiO_2. The volumes delivered were measured with dedicated instrument of the French Air Force physiological laboratory.

Results:

	Normal Lung	Asthma	ARDS
LTV 1000: % maximum variation V delivered/V_t set	+16	+18	-16
T BIRD VSO2: % maximum variation V delivered/V_t set	-17	-18	-22

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Conclusions: Both ventilators performed well. In hypo-barometric conditions, the LTV1000 showed mostly a moderate increase in volume delivered for normal lung and asthma and moderate decrease and increase for ARDS, whereas the TBIRD VSO2 showed a moderate decrease in all cases (more marked with FiO_2 = 21%).

Keywords: air evacuation; altitude; ventilator
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A Pilot Study of Performance of LTV1000 and TbirdVSO2 Ventilators at Simulated Altitude: Study of Fraction of Inspired Oxygen

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Introduction: The performance of two ventillators built with an advanced turbine delivery system (LTV1000 and $TbirdVSO_2$) was studied. The ventilators' abilities to deliver a set fraction of inspired oxygen (FiO_2) in the face of cabin altitude change and compliance and resistance variation were compared.

Methods: A decompression chamber was used to simulate the hypo-barometric environment from 1,500 to 3,000 meters (4,000 to 8,000 ft). A model of normal lung was used. Ventilators were tested with V_t = 700 ml and various FiO_2 set (21%, 50%, 90%). Each FiO_2 set was noted, the effective FiO_2 assessed by the ventilators (paramagnetic analysis) and the FiO_2 delivered (dedicated instrument of the French physiological laboratory of aviation) was measured.

Results: The maximum variation of FiO_2 really delivered compared to FiO_2 set and FiO_2 assessed is shown in the Table.

Ventilator	LTV 1000	LTV 1000	T BIRD VSO2	T BIRD VSO2
FiO2 set (%)	50	90	50	90
% variation FiO2 delivered/set	-3	+10	+20	+10
% variation FiO2 delivered/ assessed	+28	+30	+29	+14

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Conclusions: Both ventilators showed a moderate variation between FiO_2 set and delivered. On the other hand, variations between FiO_2 delivered and assessed are high, suggesting the inefficiency of ventilators hypo-barometric conditions.

Keywords: air-evacuation; altitude; ventilator
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Medical Air Transportation with Tbird Ventilator: Cabin Altitude Must be Input!

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Introduction: Mechanical ventilators suffer from variations in the environmental pressure. For a Tbird ventilator, the cabin altitude value should be input manually, which might be tedious. The ability of the Tbird VS02 to deliver a set tidal volume at high altitude was assessed in two cases: with and without the input of cabin altitude.

Methods: A decompression chamber was used to mimic the hypo-barometric environment at a range of cabin simulated altitudes of 1,500 and 3,000 meters (4,000 and 8,000 ft). A model of a normal lung was used. The ventilator was tested with V_t set = 400 ml and various FiO_2 (21%, 50%, 90%), with and without inputting cabin altitude. The volume delivered was measured using the dedicated instrument of the French Physiological Laboratory of Aviation and Space Medicine of the Air Force.

Results:

	1,500 m	3,000 m
V_t set (ml)	400	400
Volume delivered without input of cabin altitude	280 ±5	125 ±10
Volume delivered with input of cabin altitude	385 ±5	350 ±10

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Conclusions: Performance of the Tbird VSO_2 are reduced dramatically regarding V_t if the value of cabin altitude is not input manually. Concomitantly to the development of highly specialized machines, there is the need to train personnel to optimize the performance of the ventilators.

Keywords: air-evacuation; altitude; ventilator
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An Intensive Care Unit Taking Off!

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Introduction: Aeromedical evacuation (MEDEVAC) is a dimensioning component of French Armed Forces foreign deployment. Considering the technical limitations of the previous collective MEDEVAC system (conversion of an Airbus A 310), the Ministry of Defense asked for a new one, designed for MEDEVAC of multiple critically injured patients.

Methods: A non-dedicated vector among existing French Air Force aircraft with cargo capacity, high range, and permanent availability was selected. A platform meeting medical and aeronautical standards was created, based on a combination of specifically designed, modifiable modules.