軍用外骨骼

簡介(中/英)

Military Exoskeleton

近年來外骨骼已為世界各國陸軍之新穎技術裝備，不僅可應用於各種演訓且可讓士兵穿戴於戰場執行多種任務，如砲兵部署陣砲時之彈藥搬運、重型武器操作、移動與救助傷患等情境。本計畫研製之軍用外骨骼系統，具備重量輕、反應迅速、扭力大等特性，可依國軍各軍種操作情境、作戰需求、士兵體格進行客製化設計，達到「提升我國國軍任務達成效率，並可減輕單兵戰場體能負擔」之目的。

Exoskeleton is the novel technology for the worldwide armies in recent years. It can not only be used in various exercises but can also allow soldiers to execute variety of tasks on the battlefield, such as ammunition handling when artillery is deployed, heavy weapon operation, mobile rescue of the wounded. In this project we developed a military exoskeleton system which has the characteristics of light weight, rapid response and large torque, and strong load capacity. This military exoskeleton can be a customized for various operating situation, combat scenario of our military, and have a good physical fitness of our soldiers. Thus can guarantee to achieve the project goal which is to improve the mission efficiency and to reduce the physical burden of soldiers of our country.

規格(中/英)

中科院研發之軍用外骨骼包含野戰型及荷重型系統，野戰型為下肢膝關節動力外骨骼系統，無荷重酬載設計，無上肢設計，扭力40 Nm以上，平均能耗<300Wh。系統總重小於10kg，空載移動速度最高可達6 km/h，採用扭力計感測器設計，穿戴者意圖偵測之時間小於100 ms，電池驅動條件下，熱插拔驅動操作6小時。荷重型外骨骼系統，增加了髖關節輔助馬達及上肢背架，重量僅增加14公斤，荷重能力可達50公斤，平均能耗<400Wh，膝關節與髖關節馬達扭力≥50牛頓米，長期平均有效減少體力消耗達30%以上。

There are two types of military exoskeleton systems researched by CSIST including Field Exoskeleton and Load-bearing Exoskeleton systems.

Field Exoskeleton is a light (<10kg), energy saving (<300Wh) powered exoskeleton with hot-swappable battery (>6hrs) that provide the knee over 40Nm extra torque for knee extension and flexion but not exceed the speed of 6km/h.

Load-bearing Exoskeleton system with additional hip assist motor and upper body frame. Load capacity comes up to 50kg and average energy consumption<400Wh with only 14kg added compared to the Field Exoskeleton system weight. Knee and hip motor torque ≥50Nm. Long-term average effective reduction of physical exertion by more than 30%.

研發成果及應用(中/英)

軍用外骨骼可應用於戰場上砲兵佈署砲彈時彈藥搬運、重武器操作等國防野戰、傷患救助及健康老人照護等場景，有效節省操作人力，提升作戰效率等用途與功能。藉此建立相關技術能量及應用經驗，未來可再朝動力上肢外骨骼及動力全身外骨骼的應用方向進行開發。

Military Exoskeleton is supported for the mission like ammunition handling, weapon operation, injured lifting, elderly care, and so on, by detecting (<100ms) the user's intention of movement by the sensors.

Military Exoskeleton is a milestone, semi-finished products of our development of exoskeleton. The final goal is to develop a whole body powered exoskeleton which can totally help the military.




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