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Special Editorial

Artificial Intelligence: From Talos to da Vinci

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The mythical bronze creature Talos (Greek: Τάλως) was worshiped initially as the god of light or the sun in the Hellenic Island of Crete. He is supposed to have lived in the peak Kouloukona of the Tallaia Mountains in the Gerontospelio cave. His relation towards bronze and fire and his continuous voyage circling the island of Crete most probably introduces the concept of the change of the four seasons. The sun was considered in the area of the South-East Mediterranean nations as just judge, a guardian who monitors and judges from above all the actions of the commoners, a controller for the faithful application of laws in Crete [1]. Hesychios in his Lexicon notes that talos means sun and that the name Tallaios was initially attributed to Zeus [2]. The birth of the Olympian gods forged a new Pantheon and nomenclature forcing some of the old gods to fell into lower deities. This happened to Talos who soon became a mythical hero [1]. According to Apollodorus, the bronze creature was forged by the magnificent constructor Hephaestus as a gift to the mythical King Minoa to help him guard the island [3]. Although the verb "peritrohazo" (Greek: περιτροχαζω) was used, meaning a movement in a steady orbit (track), some depictions image him as a winged being. To protect the island, he was throwing rocks into unknown ships or in the case of a foreign landing he was burning with fire or with his flamed bronze body the intruders. He was holding copper plates with the laws of the island and his circle allowed him to pass all island sores three times daily [1,4-6]. Plato, speaks of him as a real person, suggesting he was the brother of King Rhadamanthys, thus a son of Zeus [5]. Talos may be considered as the token of the Cretan power, a symbol of technological development in the field of metalworking in prehistoric and Minoan times. An animated, programmed gigantic android to enforce its will. A primitive robot for basic actions having a power source, fire and ichor (Greek: ιχώρ) the sacred fluid in the vessels of the gods. The first manufactured being with his individual intelligence, a primary concept of artificial intelligence (AI) [7].

Homer was the first to introduce the term automata (Greek: αυτόματα), to describe ingenious machines built by the supreme blacksmith god of invention and technology, God of metal and fire, Hephaestus, manufactured devices "acting of one's own will" as the Hellenic word indicates [8]. Eons later, the humanoid automaton the "Automa cavaliere" (English: Automaton knight) appeared in the court of the nobleman and Duke of Milan Ludovico Maria Sforza. It was the year 1495, when Leonardo da Vinci presented his robotic knight, an innovative construction operated by a series of pulleys and cables, presenting though no individual mind. Although it was manufactured by a highly intelligent polymath, it could only be operated

through an outer intelligence [9]. Advancements made during the Fourth Industrial Revolution allowed modern technology to manufacture intelligent machines to aid the field of invasive surgery. One of those most sophisticated devises is the da Vince Surgical Tower.

Launched in the setting of the 21st century, the DaVinci System is one of the most commonly employed tools/systems, which has prevailed in the field of robotic-assisted surgery [10]. One could claim that it practically reshaped the concept of surgery, providing doctors with immense capabilities, aiming towards the optimal post-operative outcome. Through visual augmentation, high resolution 3D video, enhanced precision and reduced complication rates [11] the DaVinci Si and the latest DaVinci Xi system have been implemented in a variety of surgeries, including but not limited to general, urologic, gynecologic, thoracic and even cardiac procedures; valve and coronary artery bypass graft operations [12,13]. Da Vinci is cleared globally for cardiosurgery and came in vogue to fulfill the dream of cardiac surgeons to operate in closet chest. It offers in patients the same benefits as those that open chest incision surgery procedures do [14].

The more recent DaVinci Xi model was introduced to counteract commonly known drawbacks of the Si system, such as the inability to simultaneously manipulate the different abdominal quadrants [10]. It consists of four boom mounted robotic arms along with a mobile platform and a master console. The latter with the adaptable intraocular distance, the cushioned headrest, the modifiable arm bars and the flexible finger loops, is meticulously designed to meet the surgeon´s "demands" [12]. Every robotic arm has three degrees of freedom, which combined with the EndoWrist technology to imitate the delicate motion of the surgeon´s hand, acquires an extra seven degrees of freedom. Evidently, the combination of the user-friendly interface, the high-quality 3D intraoperative images, the multiple joints and sensors, as well as the surgeon himself, who can learn to handle the DaVinci Xi Surgical System in a relatively short period of time, has established the model in the surgical armamentarium, paving the way towards a continuously progressive future of minimally invasive and robotic surgery (Figure 1) [12].

History testifies that the nomination of the AI surgical tower as da Vinci was wrongfully given to commemorate a majestic historical figure. It is clear that the mythical creature Talos which was fabricated by the ingenious god Hephaestus was the first true automaton in the line of AI origins.

Keywords: Crete; Hephaestus; robotic surgery; cardiac surgery.

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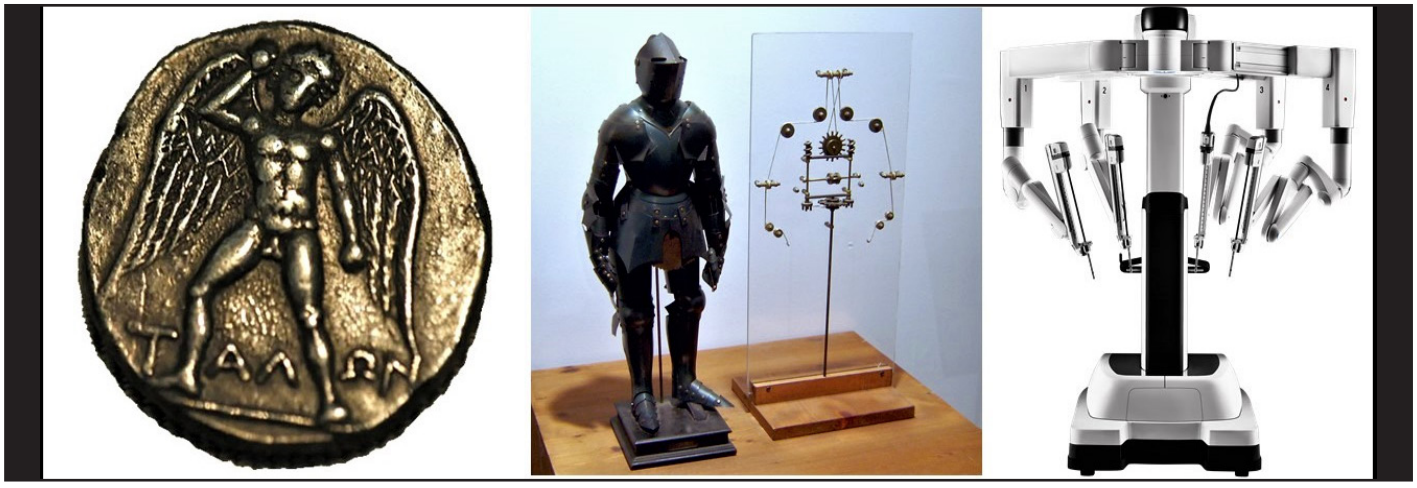

Figure 1. Winged Talos (Greek: ΤΑΛΩΝ) armed with a stone, silver didrachma from Phaistos, Crete, ca 300/280-270 BC, Museum Bibliothèque Nationale de France (Cabinet des Médailles) (left side). Model of Leonardo's Knight robot with inner workings, photo by Erik Möller, Mensch-Erfinder-Genie exhibit, Berlin 2005 (center side). DaVinci Xi Robotic Surgical System (Right side).

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