

Landing a potato crisp

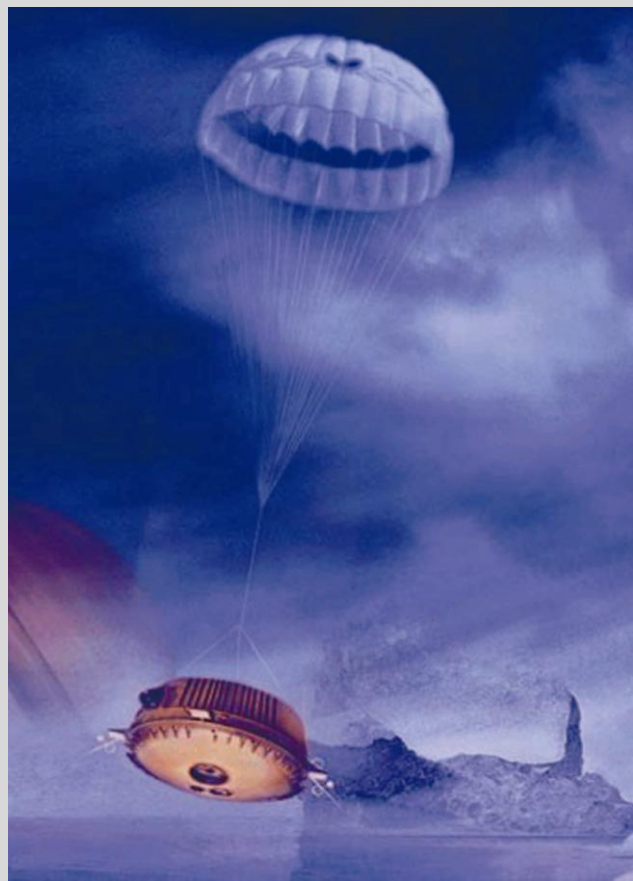
Space know how for the landing of a probe on Saturn's moon Titan helps with the support of the European Space Agency's Technology Transfer Program to develop a new food packaging machine.

Hypersonic Technology (HTG), in Göttingen, Germany specialises in solving aerodynamic flow problems for space projects such as ESA's ELITE initiative which examines the flight characteristics of Europe's launchers. By observing how model spacecraft behave in wind tunnels, HTG can calculate the effects of very fast air flow on the motion, temperature and physical properties of space vehicles. These experiments help designers to decide on the best materials for building spacecraft, and also to determine the angle and speed at which a vehicle can re-enter the Earth's atmosphere and land safely.

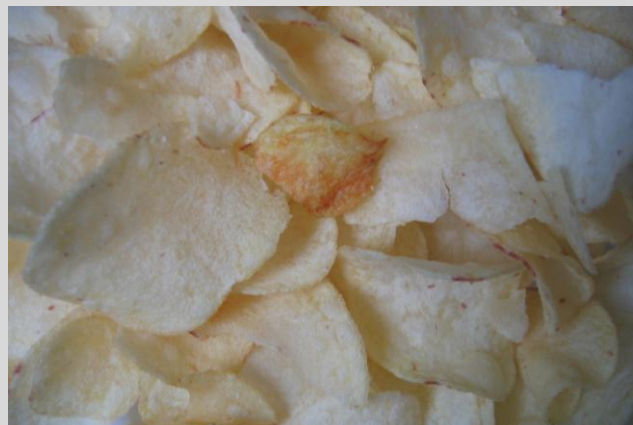
The aerodynamics of food

In 1998, MST Aerospace – the German Spacelink partner – was challenged by an inquiry from a German packaging machine manufacturer, ROVEMA. The company wanted to develop a machine that could fill packages with lightweight food products, such as potato crisps, quickly and without breaking them. As the leader in the sector of packaging machines, ROVEMA is a group of companies with subsidiaries in Austria, Spain, Italy, the Netherlands, UK and the USA. Although the company produces a range of packaging machines, it must introduce new machines to its product line every two-to-three years in order to stay competitive. The constant search for ways to improve the performance of the machines led ROVEMA to explore space technologies and know-how. After some consideration of the request, MST Aerospace recognised that the scientific problem of dropping a potato crisp into a bag without breaking it is conceptually similar to landing a spacecraft safely. Both problems must take into account the optimum speed for a safe descent, and also consider

how the flow of air affects the temperature, structure, speed and direction of the falling object. Familiar with HTG's expertise in solving this type of problem, MST Aerospace introduced the company to ROVEMA as a partner in product design and development. Using the modelling, calculation



Landing a spacecraft on Earth or the ESA Huygens probe on Saturn's moon Titan, as seen here, is just like dropping a crisp into a bag.



methods and measurement know-how developed through work on ESA projects, HTG was able to develop a bagging system for ROVEMA which could be integrated into a new packaging machine. This device can package foods 30 to 50 per cent faster than standard equipment by accelerating the products to be packed through aerodynamic flow. The company also worked with ROVEMA to test the machine in use, adjusting the system until it reached the best balance of speed compared to breakage. ROVEMA tested a prototype model and the new packaging machine went into mass-production in 1999. The machine was first presented to the public already at the major international packaging trade-fair, INTERPACK, in Düsseldorf, Germany in May, 1999. When introducing the machine to the market, ROVEMA anticipated an annual turnover of about 30 MEURO from this innovative machine. Although the above-described life cycle of packaging machines amounts only to two to three years, even now, i. e. almost ten years after initiation of the space technology transfer, the ROVEMA machine making use of the product acceleration system developed by HTG is still being sold 50 times per year, corresponding to an annual turnover of up to 10 MEURO.



Packaging machine of Rovema.

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