Space Systems
The ExoMars autonomous mission

Ultralight Rotary Power
Austro Engine’s aero solution

Cable Assembly
Advanced wiring systems

Autonomous Mining
Digging deep into the technology
The Talon 120 produced by Baltimore, Maryland specialist UAV Solutions is a small, lightweight, electric-powered Unmanned Aerial Vehicle for surveillance and experimentation. Designed to be rugged and rapidly deployed, including hand launching it has found users in the military, the police and universities.

Profiled in depth in issue 3 of *Unmanned Systems Technology* magazine (Summer 2015), the Talon 120 platform is produced from carbonfibre and Kevlar material and has a wingspan of 10 feet. It features a modular nose section that can handle a range of cameras, sensors and other payloads up to 2 lb in weight.

The Talon 120 is capable of fully autonomous operation and has radio and video communication on a single encrypted digital data line. As standard it carries a beneficially combined, stabilised, colour and thermal imager payload.

Designed optionally for hand, bungee or catapult launch, UAV Solutions’ Talon 120 can fly for up to two hours and can be configured for belly or parachute landing. In all respects it is the state of the art of this type of unmanned system, hence the in depth coverage in the latest issue of the acclaimed new UST publication.

Key suppliers to the Talon 120 include:

- **Propellor:** APC
- **Motor:** Scorpion Power System
- **Speed controller:** Castle Creations
- **Battery:** Tattu
- **Pitot tube & GPS:** 3DR
- **Fasteners:** Hi-Tech Fasteners
- **Carbon, Kevlar fibers & Epoxy:** Fibre Glast
- **Sailcloth:** Honeywell Spectra
- **Paint:** DuPont
- **Design software:** Solidworks

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**DOSSIER: UAV SOLUTIONS TALON 120**

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A variety of different types of engine are currently employed across the burgeoning number of unmanned aerial vehicles flying around the globe. For certain applications the rotary is the favoured type and there are a number of companies offering those. A particular feature of the rotary engine manufactured by Austro Engine GmbH is that it is certified for aviation use in many countries. While not yet a normal UAV requirement, it is likely to become so as operational constraints are relaxed.

To date over 1200 examples of the AE50R have been supplied. It is a single rotor engine that weighs less than 25 kg yet produces in excess of 41 kW. It has port injection of Avgas or gasoline fuel and is run by a full engine management system. Cooling is via a combination of liquid and forced air supply, the latter controlling the temperature of the rotor. Produced at Wiener Neustadt near Vienna in Austria, this engine will be fully detailed in UST issue 3.

The in depth Dossier on the AE50R will be accompanied by an overview of the sister 2.0 litre turbodiesel I4. Likewise produced by Austro Engine, the 123.5 kW, 186 kg AE300 is applicable where a UAV requires higher power and the use of kerosene-based fuel. Together the AE50R and the, likewise aviation authority certified AE300 provide valuable options for UAV producers as the technology expands its scope.

Key component suppliers to the Austro Engine AE50R and AE300 include:

- **Epitrochoid, sideplates & eccentric shaft:** Gerhard Rauch GmbH
- **Surface coating:** Bodycote
- **Surface coating:** IPT
- **Turbocharger:** KKK
- **Engine management components:** Bosch
- **Starter motor:** Letrika
- **Lubricants:** Castrol
- **Dynos:** AVL
- **CMM equipment:** Zeiss
- **Gearbox:** Hör Technology GmbH
- **Various components:** Daimler
The Unmanned Systems Technology ‘focus’ examines all elements that are critical to the success of the unmanned vehicle. Encompassing everything from engines to aerodynamics, chassis structure to electronics, GPS to camera and imaging systems – every component, the materials it’s made of, the coatings & surface treatment applied to it, and how to improve upon it will be studied in great detail.

In our Summer 2015 issue, we turn our attention to the crucially important field of CABLE HARNESSES & ASSEMBLIES.

The focus will look at the critical role of the cable harness in unmanned systems that are dominated by electronic systems – put simply every connection counts! These harness systems make up a substantial proportion of the size, weight and power of an unmanned system and custom designs for each variant of a platform are becoming increasingly complex to develop, build and install.

The article will look at the challenges of harness design, from the tools available to the expanding choice of technologies. While copper cabling is still the dominant technology, enhanced by composite materials to reduce weight, optical interconnect and flexible substrates are all making an impact on the development of the harness.

If you are a manufacturer of cable harnesses or the components within them, working with unmanned vehicles our editors would be pleased to talk to you. Don’t miss this opportunity to be involved in an in-depth insight which will be used as a reference by engineers worldwide for many years to come.
The Unmanned Systems Technology ‘focus’ examines all elements that are critical to the success of the unmanned vehicle. Encompassing everything from engines to aerodynamics, chassis to electronics, GPS to camera and imaging systems – every component, the materials it’s made of, the coatings & surface treatment applied to it, and how to improve upon it will be studied in great detail.

In our Summer 2015 issue, we turn our attention to the critical role that TRANSPONDERS play for unmanned systems in the air, land and sea.

Knowing the location of an unmanned system, together with receiving timely updates regarding an unmanned systems’ health and operation forms an indispensable element of unmanned vehicle operations. Transponder technology is a fast-moving area of unmanned technology. It forms a vital element for the integration of unmanned aerial vehicles into civilian airspace. On land and on the high seas, transponders enable the operator to determine the location of their vehicles when they are well beyond visual range.

The article will examine the challenges in designing and implementing transponder technology for unmanned systems. It will investigate the challenges that unmanned vehicle size, weight and power consumption have for transponder designers, and how transponder technology can develop to accommodate the increasing amount of information which unmanned systems operators require for the safe operation of their vehicles. In addition, it will focus on how existing challenges in terms of available radio frequency bandwidth are being met by transponder designers, and how transponder technology will develop in the future.

If you are a manufacturer of transponders for unmanned vehicles our editors would be pleased to talk to you. Don’t miss this opportunity to be involved in an insight which will be used as a reference by engineers world-wide for many years to come.
Mining companies have been using unmanned systems for a few years now in commercial operation and have a wide range of different platforms and use cases for different types of mining environments. The technologies vary from retro fit sensors and control units to fully custom designs, and from remote control to fully autonomous operation.

In the next issue of *Unmanned Systems Technology* magazine Nick Flaherty our Technology Editor will report on the leading technology suppliers and their different strategies for mining systems. He'll look at everything from autonomous haulage trucks to excavators and bulldozers. We'll look at the different technologies that the innovators in the field are using, the reliability challenges they face and the lessons learned for autonomous systems working in such hazardous environments.

If you are a manufacturer of end user autonomous mining systems or components used within them our editors would be pleased to talk to you. Don’t miss this opportunity to be involved in an in-depth insight which will be used as a reference by engineers world-wide for many years to come.
The European Space Agency is planning the ExoMars mission to the planet in 2018, and autonomous space vehicles are at the heart of the plans. After a nine-month journey the ExoMars rover will travel across the Martian surface to search for signs of life. It will collect samples with a drill and analyse them with next-generation instruments. ExoMars will be the first mission to combine the capability to move across the surface and to study Mars at depth.

In the next issue of Unmanned Systems Technology magazine Nick Flaherty our Technology Editor will look at the different technologies being developed for the challenging environment of space to support truly autonomous operation, from satellite systems to ground-based explorers.

If you are a manufacturer of end user autonomous systems or components for use in space our editors would be pleased to talk to you. Don’t miss this opportunity to be involved in an in-depth insight which will be used as a reference by engineers world-wide for many years to come.
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