ISR Systems
Integrated Space to Ground Intelligence Solutions

UTC Aerospace Systems
UTC Aerospace Systems is a global leader in the design and manufacture of ISR products for civil, commercial and military applications, with a broad portfolio of ground-based, airborne and space-based systems. Our advanced sensors cover a spectral range from the visible, mid-wave and short-wave infrared (IR) through the terahertz (THz) spectrum. Transforming a customer need to a fielded product is our specialty. As a key systems integrator, ISR Systems designs, develops, produces and supports products used around the world to explore space, keep the peace, plot the heavens, and protect the world’s armed forces.

UTC Aerospace Systems benefits from a heritage of more than eight decades, embracing the arrival of flight, space exploration, and the development of advanced defense and space systems. This legacy supports our current position as a premier supplier of products that protect the warfighter, and rapidly and accurately gather and disperse data to provide actionable intelligence to commanders on the field. Our significant presence in international defense programs and the strategic acquisition of technology companies have resulted in UTC Aerospace Systems continued growth. Our technologies are deployed and supported with military forces in North America, Europe, Middle East, Asia and the Far East.

Our engineering expertise, combined with modern process-driven design and production techniques, fuels our reputation as a trusted supplier to armed forces and civil agencies worldwide. Our commitment to quality, operational excellence and continuous improvement through ISO9001 certification, enhances our value to both customers and investors. In addition, UTC Aerospace Systems is committed to providing complete and comprehensive operational support for our equipment. Field service engineering, test equipment, special tools, manuals and training are essential to ensure operational readiness.

Our principal ISR business areas are:

- Airborne
- Force Protection
- Space & Defense
- (Tasking, Collection) Processing, Exploitation, Dissemination (PED)

Transforming Customer Needs To Fielded Products

UTC Aerospace Systems delivers products, technologies and intelligence solutions for an unparalleled range of military and civil applications:

- Autonomous unmanned aerial systems (UAS) remotely piloted aircraft (RPA)
- Counter improvised explosive device (IED) and counter insurgent (COIN) solutions
- Dual-band tactical reconnaissance systems
- Full motion video
- Image exploitation, server technology and intelligence
- Laser warning and chemical detection
- Micro-gimbals for camera stabilization
- Multispectral imaging (MSI) systems
- Optical technologies
- Space, airborne and ground (space-to-ground) sensor technologies and systems
- Shortwave infrared (SWIR) sensor systems
- Wide-area motion imagery/persistent surveillance
The capabilities and products of UTC Aerospace Systems Space and Defense Solutions have been critical enablers of defense and science missions for over 50 years.

**Space**

Our space capabilities and products include:
- Tactical ISR Satellites
- Electro-Optical Payloads
- Precision Optics and Optical Subsystems
- Actuation Systems
- Launch Vehicle and Satellite Electronics
- Attitude Determination Subsystems

Recent space programs include the first satellite specifically developed to provide direct operational ISR support to Theater Commanders (ORS-1), optical systems for Japanese Earth Observation satellites, numerous satellite attitude determination and control systems (Star Trackers, Earth Sensors, Torqurods) and electronics for a variety of satellite buses and launch vehicles.

**Optical Systems**

Our optical specialists design and manufacture large, lightweight, specialty and precision optics and optomechanical systems for a range of applications, including sophisticated space optics and payloads and precision optics for airborne and ground optical systems.

**Attitude Sensors and Control Systems**

We have been supplying mission-critical spacecraft attitude determination components and systems since the earliest days of space systems. We offer a range of satellite attitude sensors with the electronic systems necessary for integration and data handling. These systems provide unparalleled performance and reliability to platforms such as the U.S. Air Force’s Global Positioning Satellite and MILSATCOM satellites.

**Support to Scientific Missions**

Our business has made numerous contributions to NASA’s space observatories conducting astronomical studies throughout the electromagnetic spectrum. Our contributions to NASA’s Great Observatories include refurbishment of the Hubble Space Telescope’s Fine Guidance Sensors, the Chandra X-Ray telescope optics and development of the beryllium telescope for the Spitzer Infrared Observatory. Other systems delivered to support scientific missions include the telescope optical systems and controls for the 4.2-meter diameter SQIR ground-based observatory.

**Mission-Critical Electronics**

Our mission-critical electronics systems are deployed on a wide range of spacecraft platforms, individual satellite missions and constellations. We also contribute key elements to the International Space Station. As a leading supplier of data acquisition and command and control electronics, we continue to support diverse missions such as launch vehicles (Atlas, Delta, and Trident), re-entry vehicles and interceptors.

**Defense**

**Platform Electronics**

We provide flight test instrumentation systems for some of the world’s largest and most demanding aircraft. Our distributed instrumentation systems provide vital data acquisition enabling stored or real-time data retrieval for in-flight aircraft performance monitoring. Our systems feature centralized control, high-speed digital signal processing and modularity, accommodating a wide range of signal conditioning and data acquisition applications. We designed the bus interface unit for the C130J which provides funneling of various analog and discrete signals, and many other non-standard aircraft signals, and provides back-up to the mission computers. We also provide the Boeing 777 flight test instrumentation system which monitors special interest and general health parameters to verify engineering and reliability data, and provides data acquisition.

**Precision Optics**

We deliver over 10,000 optics each year for specific customer applications. Our specialized capabilities include optical coatings, filters and advanced optical assemblies.

**Threat Detection Systems**

Installed across a range of military helicopters, tanks and light armored vehicles, our battlefield laser threat advance warning systems provide the extra seconds needed to ensure crew survivability. Our products detect, prioritize in order of lethality, and characterize laser rangefinders, laser designators and laser beam-riding missile threats. Our cutting-edge THz spectrometers are used for chemical and biological monitoring and identification systems. Ideal for both laboratory and deployed use, our highly sensitive THz system accurately detects a broad spectrum of chemical signatures, including vapor phase materials. University laboratories use these chemical warning sensors to test for potentially harmful chemical signatures. Ports, stadiums, airports, and other high-value assets use the THz system for chemical weapon detection.

**Left top: Force Protection, Right top: Airborne, Left bottom: Space, Right Bottom: PED**
UTC Aerospace Systems is a pioneer in modern reconnaissance, beginning more than 50 years ago with the design and manufacture of cameras for the world’s first photo-reconnaissance satellite—CORONA.

This legacy continues today within airborne reconnaissance. UTC Aerospace System sensors have supported strategic intelligence collection on the U-2 platform from its inception to today. UTC Aerospace System’s SYERS-2 multi-spectral sensor is the US Air Force’s most advanced real-time LOROP sensor.

UTC Aerospace System’s DB-110 dual-band airborne reconnaissance sensor, a derivative of the SYERS system, combines visible and infrared imaging capabilities in a compact, lightweight design. This system has proven its performance day and night operationally and in demonstrations worldwide on both manned and unmanned platforms.

**DB-110 (Dual-Band Visible/IR) Reconnaissance Pod**
UTC Aerospace Systems offers a SEEK EAGLE certified pod for F-16 and other fast-jet applications. With an integrated DB-110 sensor, this pod offers advantages over competing systems by relying on dual-environmental conditioning systems, to provide robust ground cooling and operations over a wide range of altitudes. Full-size fore and aft data-link antennae enable maximum data-link range throughout a full 360° azimuth. UTC Aerospace System sensors also offers a smaller, lighter weight pod designed for long-endurance UAV operations. Housing the same DB-110 reconnaissance system, this pod provides stand-off and vertical imaging capabilities and air-to-ground communication over constrained bandwidth systems.

**SYERS-2**
A Multispectral imaging Sensor supporting strategic intelligence collection on the U-2 from the 1960s to the present. SYERS-2A collects seven spectral bands simultaneously providing very high-resolution operational standoff imagery. The system’s shortwave IR and mid-wave IR capability enables low-light operation, penetrates haze and smoke, defeats CC&D, and supports CIED/COIN operations.

**SYERS-3**
This next-generation system employs design elements of the fielded SYERS-2A and DB-110 sensors to deliver superior collection capabilities. Key features include high geo-location accuracy, wide-area coverage, collection in six unique spectral channels, moving target indication and persistent imaging over a scene. Its high-quality imagery provides analysts with extensive target detection, discrimination and tracking capabilities to significantly reduce decision timelines.

**Optical Bar Camera (OBC)**
This high-altitude camera, the world’s highest resolution broad area synoptic sensor, has been providing panoramic imagery for over 40 years.

**C-B4™**
The C-B4™ system provides real-time information describing the type and location of targets based on discrete spectral band data in a package deployable on a tactical UAS. Small size, weight, power and cost and high performance are achieved by combining efficient on-board processing, roll-on/roll-off interfaces, innovative optical techniques, outstanding stability and an inertial navigation system for accurate geo-location coordinates. The first release utilizes 7 spectral bands: green, red, near infrared, short-wave infrared and 3-bands of long-wave infrared to accomplish its tasks. Future releases will include a TASE400 sensor with full motion video and employ hyperspectral imaging, synthetic aperture radar and/or light detection and ranging. C-B4™ delivers the capability to See threats before they become harmful to our warfighters.

**Sentinel™ CA-247 Dual-Band Wide Area Persistent Surveillance Sensor**
Tailored for around-the-clock persistent surveillance from a variety of platforms, incorporating the largest mid-wave IR detector available (16-Mpixel), this sensor provides continuous operation and wide-area motion imagery for enhanced exploitation and situational awareness. The Sentinel™ is in production for the U.S. Military.
Shortwave Infrared (SWIR) Sensors
Sensors Unlimited SWIR sensors are used in a variety of scientific, industrial, and military applications. SWIR linear arrays are integrated into spectroscopic and OCT systems, which are used in the research and medical communities; SWIR industrial cameras are integrated into inspection systems that monitor material throughout on commercial factory production lines; and SWIR military cameras are used in systems which provide operators with daylight to low light imaging capability for 24 hour persistent surveillance, and the ability to image through many types of haze, smoke, and fog for enhanced intelligence surveillance and reconnaissance (ISR) missions.

Today’s ISR needs are extremely tactical, demanding a high level of persistence and the ability, in many cases, to identify individual humans in the field of interest. As a result, due to its exceptional capabilities, SWIR technology has become the “next generation” of imaging sensors for ground, airborne and space applications.

Whether aboard UAVs, mounted on rooftops and street corners, integrated into small crawling robots, or fitted to Special Operations Command vehicles and weapons, SWIR offers our defenders a new weapon in the war on terror.

Shortwave Infrared Systems
ISR-Princeton has the SWIR capability into several commercial and military focused systems. Sensors Unlimited SWIR systems have application in both the commercial and military markets, and include portable SWIR viewers for surveillance, target tracking, and inspection; vision enhancement systems for shipboard and ground vehicle applications; and, blended SWIR systems, which provide the unique features of SWIR, LWIR (thermal), and visible in a small, compact enclosure.

Cloud Cap Technology UAS Components
Micro-Gimbals
Providing stabilized payloads for unmanned and manned ISR missions, UTC Aerospace Systems is a leader in supporting UAS platforms, providing the TASE family of stabilized micro-gimbal camera systems suitable for:
- Aerial surveying, mapping and utility inspection
- UAS and Aerostat surveillance and road clearing
- CIED/CON applications
- Unmanned surface vehicles and atmospheric science applications

The Piccolo Family of UAV Autopilots
A complete, off-the-shelf avionics system including the core autopilot, flight sensors, navigation, wireless communication, and payload interfaces suitable for:
- Fixed-wing, helicopter and hand-launched UAVs
- Target drones
- Integration in gas, electric, and non-powered aircraft
- Payload intensive UAV integrations
- Range-safety monitors or independent telemetry sources

Cloud Cap Technology
Electronic Fuel Injection Systems (EFI)
Electronic Fuel Injection (EFI) engines are optimized for the ever increasing challenges of small displacement engines providing many benefits to include:
- Better engine reliability
- Increased fuel economy (endurance)
- Easier starting at all temperatures
- Expanded engine operating envelope (gain altitude)
- Reduced maintenance and operation costs
PED Systems
Actionable Information to the Customer

All UTC Aerospace Systems sensors are available with Processing, Exploitation and Dissemination (PED) capabilities providing the customer with a full turnkey system from sensor through ground to finished intelligence.

These fully integrated systems are customised to match customer facility, mobility and CONOPs requirements. The ground station is well established, proven and reliable, offering speed and accuracy having been developed to stringent military and civilian standards. It is presently in service with the UK RAf and multiple international customers in support of F-16 and F-15 programmes as well as the UK Royal Navy.

Merlin
An intelligence exploitation system at the forefront of geospatial ISR data screening. Merlin provides a comprehensive set of tools for exploitation of still and motion imagery with an intuitive user interface allowing intelligence derived from live image streams to be available in near-real-time.

Image/Intelligence Reference Library (IRL)
A multi-intelligence library providing automatic cataloguing and storage of product containing metadata. The IRL enables fast search and retrieval of geospatial and temporal data based on STANAG 4559 Ed.3 requirements and allows manual ingest of un-tagged information and associations to previously stored intelligence.

DACAR Airborne Reference Library
Acting as an IRL in the sky the DACAR allows streaming of imagery from the platform to the ground over low bandwidth datalinks.

Ingest Systems
The Rapid Acquisition and Bulk Intelligence Translator (RABIT) and Video Input and Standards Converter (VISC) provide the capability to ingest large volumes of still imagery or live video streams into the IRL and Merlin. They will convert still imagery into STANAG 4545, 7023 and NITF 2.1 and any video stream with metadata into STANAG 4659 allowing automated ingest into the IRL and fully exploitable imagery into Merlin.

Ground Station solutions
UTC Aerospace Systems Intelligence Ground Stations are available in many configurations depending on the customer needs. The ground stations are provided as Fixed office base systems in standard racking (FGS), Transportable systems installed in transit cases (TGS) and Mobile systems (MGS) integrated into 20ft ISO cabins with a Prime Mover Vehicle and power and datalink trailer. All ground stations include the Merlin, IRL and Ingest systems required to operate a full intelligence system. These products are now complimented by Maritime and Commercial systems for operators with limited installation space.
UTC Aerospace Systems is linked with some of the greatest developments in scientific and aviation history. Today, as a global leader in aerospace and defense, we continue to excel by aligning ourselves with the best and brightest minds. Visionary, driven people – people like you – will find there are a wide variety of opportunities for growth and success.

Find opportunities at http://utcaerospacesystemscareers.com – just search for ISR Systems in the Keywords field for more information.