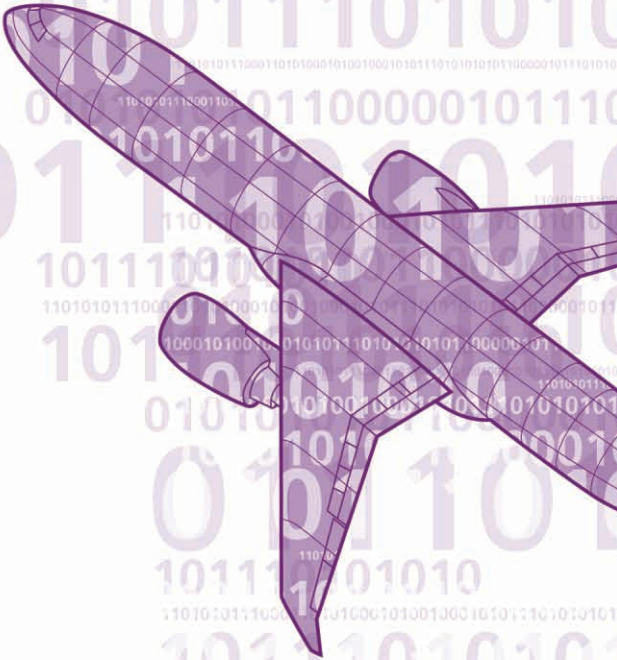


GE
Aviation

Innovative

digital systems



imagination at work

Our Digital Systems business is structured around integrated technology **to closely align with the systems you require**

Introduction



GE Aviation, through its Systems division (formerly Smiths Aerospace) is a leading global provider of innovative solutions to builders and operators of military and civil aircraft, engines and land vehicles, from large transports to fighters, UAVs to armored vehicles, and from helicopters to regional and business jets.

GE is a transatlantic aerospace systems and equipment business. Through its expertise in digital, electrical power and mechanical systems, it has a unique range of specializations, essential to create affordable integrated aerospace systems which are critical to aircraft performance.

Our Systems Customer Services organization provides tailored integrated support services to maximize customer aircraft availability.

The Digital Systems business is structured around integrated technology to closely align with the systems you require. We specifically focus on displays systems, platform computing systems, mission management, information systems and flight management systems.

I look forward to being able to meet your business needs.

Stuart I. Mullan, President




Organization



Our Digital Systems business is managed by **a team of experienced professionals with a broad knowledge** of the aerospace industry

Management and locations



| | Platform Computing Systems | Flight Management Systems | Mission Management Systems | Information Systems | Displays Systems |
|--|--|--|--|--|--|
| <p>Stuart I Mullan President</p> <p>John L Armendarez VP Products & Programs</p> <p>Michael W Taylor VP Supply Chain Management</p> <p>Gerald L Vossler VP Advanced Marketing & Engineering Technology</p> <p>Stephen L Littauer VP Finance</p> <p>William S Bova VP Contracts</p> <p>John Pflug VP Engineering</p> <p>Bill Olsson VP Manufacturing</p> <p>Tony Stewart VP Quality & Continuous Improvement</p> <p>Dennis M Carvalho Human Resources</p> <p>Robert J Mills Business Systems</p> | <p>Don Morrow Vice President</p> <p>Modular processing systems</p> <p>In-flight refueling</p> <p>Platform systems integration</p> <p>Distributed computing systems</p> <p>Vehicle management systems</p>   | <p>Dale Masbruch Vice President</p> <p>Flight management systems</p> <p>Navigation</p> <p>Surveillance</p> <p>Adaptable data link communications</p> <p>Required navigation performance</p> <p>Global positioning</p> <p>Lateral and vertical guidance</p> <p>Flight planning</p> | <p>Tom Prater Vice President</p> <p>Stores/weapon management systems</p> <p>Navigation/attack systems</p> <p>Gun control</p> <p>Missile sub-systems</p> <p>Interference blanking systems</p> <p>Land navigation and reference</p> | <p>Marc Brodeur Director</p> <p>Data acquisition and recorders</p> <p>Data transfer and mass memory systems</p> <p>Integrated vehicle health management</p> <p>Video and imagery management systems</p> <p>Ground support systems</p> | <p>Alaistair Backx Director</p> <p>Graphics and display processing</p> <p>Large area integrated display units</p> <p>Multi-function head down displays</p> <p>Head up displays</p> <p>Standby flight displays</p> <p>Cockpit display systems</p> <p>Electronic flight and system displays</p> |
| | <p>Grand Rapids, MI, USA Cheltenham, UK Clearwater, FL, USA</p> | <p>Grand Rapids, MI, USA Clearwater, FL, USA</p> | <p>Grand Rapids, MI, USA Clearwater, FL, USA</p> | <p>Grand Rapids, MI, USA Germantown, MD, USA Southampton, UK Clearwater, FL, USA</p> | <p>Cheltenham, UK Clearwater, FL, USA</p>  |



Platform Computing Systems

GE has earned an outstanding reputation over more than 30 years for successful platform systems integration on programs such as the C-130 Self-Contained Navigation System and C-130 AMP, P-3 Tactical Navigation System, F-4 Phantom, EH-101 Displays System, KC-767 Mission Control System, and major airborne computational platforms such as the Boeing 787 Common Computing System.

GE offers a complete, integrated solution to the technical challenges and the business, technology, and risk constraints customers face, so that they benefit from a single contact and lower risk, more cost effective solution.

Through the many avionics platform activities supported over this time, GE has also gained extensive experience in the development and implementation of Systems Integration Laboratories and simulation based test stations that reduce development risk and the potential for undetected problems.

GE's range of Modular Processing Systems (Mission Processor, Avionics and Flight Management Computer, Common Core System, Remote Data Concentrators and Vehicle Management Computer) provides a flexible and scalable computing resource capable of hosting a wide variety of software applications.

The Remote Data Concentrators are extremely flexible and adaptable which makes them well suited for many applications requiring remote processing, pre-processing, or data concentration and conversion. The RDCs are also compact in size and light weight which further enhances their ability to be used in many different applications.



Don Morrow
Vice President, Platform Computing Systems

GE has a reputation for successful **platform systems integration** and providing flexible, **scalable computing resources**



The Mission Processor is a video processing/computer platform capable of merging various types of analog video, digital map video, or textured graphics formats with selectable overlay data to provide a high speed, high resolution fiber optic video output to as many as ten separate display units.

The Avionics and Flight Management Computer (AFMC) provides true open system architecture with extensive Input/Output capability in a lightweight and highly configurable DO-254 Level B Certified chassis. The AFMC hosts the Software Common Operating Environment, allowing the safe operation of several functions, such as Flight Management, Communication Management and Radio Control, within one system.

The Common Core System (CCS) provides shared system platform resources to host functional systems such as Avionics, Environmental Control,

Electrical, Mechanical, Hydraulic, Auxiliary Power Unit, Cabin Services, Flight Controls, Health Management, Fuel, Payloads, and Propulsion. The CCS utilizes Remote Data Concentrators to consolidate inputs from aircraft systems and aircraft sensors, then provide that information to the computer resources via the Avionics Full Duplex Switched Ethernet network.

Fault-tolerant Vehicle Management Computers range from strictly digital computer systems in Distributed System architectures, to hybrid designs that include signal acquisition/generation functions and actuator control electronics embedded in the physically redundant control units. Model 2970A1 is a highly reliable system employing a high-performance cross-channel data network for safety-critical guidance, navigation, and flight control applications.

GE In-Flight Refueling Systems provide control for all aspects of the aerial refueling process.

The Aerial Refueling Control Computer is designed with extensive Input/Output capability for handling all the crew interface and system functionality required for controlling air refueling operations for the 767 Global Tanker Transport Aircraft.

The Hose Drogue Controller (HDC) is an integrated Line Replaceable Unit containing the hardware and software necessary to control a refueling mission via the NATO compatible hose and drogue method. The HDC manages the Hose Drum Unit and Wing Aerial Refueling Pod electronics to trail and rewind the refueling hose smoothly, detect and maintain tension on the receiver aircraft attachment, regulate fuel delivery, and monitors the system for faults and data collection for post mission analysis.



Flight Management Systems

GE is the world-wide leader in Flight Management Systems, with systems specified by many of the world's airlines for their Boeing and Airbus aircraft.

The extreme precision, which controls the aircraft track to an accuracy of three wing-widths and the time of arrival to within 6 seconds anywhere in the flight plan, makes the system the preferred solution for military and civil operators world-wide. Benefits include reduced distance traveled and fuel consumption, with lower community noise.

The new, advanced Flight Management System (FMS) for the Airbus A319/320/321 and A330/340 families, developed in association with Thales, meets both forward fit and retrofit needs. It also provides the right tactical tool for Communications/Navigation/Surveillance with Air Traffic Management capability.

Our Flight Management Computer System (FMCS) is standard equipment on all new Boeing 737 aircraft. Software and hardware updates provide the latest technology to continue to meet the needs of the world's evolving airspace, offering safe and efficient improvements to aircraft operations. Integrating Required Navigation Performance (RNP RNAV) and Global Positioning capabilities, the FMCS incorporates advanced navigation performance capable of RNP 0.1 operations.

The advanced FMCS is available for retrofit into existing fleets, enabling access to terminal procedures, airports, and airspace requiring state-of-the-art technology, combining improved performance with high reliability. A unique adaptable data link feature allows an airline to customize their ACARS communication messages, whilst the navigation data base facilitates automated flight.



Dale Masbruch
Vice President, Flight Management Systems



GE's world-leading Flight Management Systems remain the preferred solution for military and civil operators worldwide

The FMS for the "Classic" Boeing 747 and 707 aircraft is based on the proven technology and design of the Boeing 737 FMS, and is available in a triple or dual FMS design for navigation, lateral and vertical guidance, flight planning and data link communications.

GE is the first to offer this FANS 1 certified system for the B747 "Classic" aircraft.

The Advanced Flight Management Systems (AFMS) for the B767 Tanker and P-8A are similar. The AFMS includes software partitions for Data Communication Management and Radio Management functions. The system consists of two computers, up to six Multipurpose Control Display Units and 6-10 Remote Interface Units (RIU). The AFMS configuration offers more functionality with fewer boxes, whilst the RIU reduces aircraft wiring.

Modular software design on the AFMS and FMS allows for upgrades to be done without removing the unit from the aircraft. The systems are Lateral Navigation (LNAV) and Vertical Navigation (VNAV) capability compliant and multi-sensor navigation compliant with RTCA DO-236A.

The Military Flight Management System for the C-130 Avionics Modernization Program (AMP) boasts unprecedented configuration flexibility with a truly open hardware and software architecture. Configurable for commercial or military applications, the system mitigates obsolescence, permits easy, inexpensive computer upgrades and allows multiple circuit card suppliers to integrate features. The open architecture and Custom Off-The-Shelf

(COTS)-based construction reduce acquisition and upgrade costs through competitively selected Versa Modular Europa cards. Partitioned software ensures operational integrity and permits low cost software upgrades.

The power of the system is its capacity to be configured for a broad range of applications, to be Global Air Traffic Management capable, and to remain current with technological advancements.





Mission Management Systems

GE is a recognized leader in the control and processing of all mission-related functionality of military aircraft and land-based vehicles. Our Mission Management Systems group has extensive experience in a wide variety of systems and technologies, including stores management systems, sensor and payload management, reference products, missile sub-systems, mission systems, electronic warfare and communications management.

GE has provided affordable, comprehensive and safe system solutions for integrating weapons on military aircraft for more than 30 years, to customers including the US Navy, US Army and UK Ministry of Defense. As the leading Stores Management System (SMS) developer and manufacturer, GE has delivered over 5,000 systems world-wide for a myriad of fixed and rotary wing applications. Applications include F-35, F/A-18, P-8A, AH-64D, AH-1Z, AV-8B, Japanese P-X, Nimrod, BAE Hawk, Tornado and NH-90.

Our modular Stores Management System can control a vast array of stores, including fuel tanks, guns, targeting and reconnaissance pods, micro munitions, dumb and smart weapons, and missiles. Our flexible systems are fully compliant with the MIL-STD-1760D standard and are capable of supporting future stores as well as legacy stores within a unified design.



Tom Prater
Vice President, Mission Management Systems



GE is a leader in the control and processing of all **mission-related functionality** of military aircraft and land-based vehicles



determination, both stationary and moving, as in the NFM, with the addition of accurate land navigation, both autonomous and with blended GPS.

Innovative international cooperation and system software partitioning allows Industrial Participation and exportability criteria to be achieved. Additional technology is inserted to meet customer requirements for increased affordability and future growth.

GE is a leader in interference blanking technology. Interference Blanker Units coordinate the operation of an aircraft's onboard transmitters and receivers to prevent interference and/or receiver damage when operating in multiple overlapping frequencies. Systems are deployed on the Boeing F/A-18E/F Super Hornet.

GE is an established world leader in the development, manufacture and support of tactical military land vehicle heading/pointing and Land Navigation Systems (LNS), offering a "Best Value" solution within the mid-level performance/cost market segment.

Our North Finding Module (NFM) is a small, lightweight, and low cost heading/pointing system specifically developed for a wide array of new and existing military vehicles. The LNS with Precision Attitude Capability (NavPAC) is a low cost navigation and heading/pointing system. NavPAC provides precision azimuth





Information Systems

GE is a first choice provider of information solutions to the aerospace, defense, and related high-technology markets, supporting the complete mission cycle with end-to-end mission, maintenance, safety and training information systems.

Combining the resources and capabilities at locations in both the UK and North America, product areas supported include: Data Transfer and Mass Storage; Integrated Vehicle Health Management; Data Acquisition and Recording; Video and Imagery Management Systems; and Ground Support Systems. These products enhance situational awareness and logistics capability to provide information management superiority to the warfighter in the network centric environment.

GE is a leader in data loading, recording and mass memory systems, providing both stand-alone solutions and new, integrated systems. These information management systems, already in use on thousands of combat aircraft, are also under development for numerous new aircraft, including the F-16 Block 60, F-22 and the F-35. GE's Data Transfer and Mass Storage products are designed around open system architectures, network interfaces, and file systems. Recognizing that data storage requirements on military aircraft are constantly increasing, our data transfer and mass storage products are exponentially expandable in both capacity and bandwidth. In addition, we can provide embedded information processing functions such as: network centric file server; digital terrain system; terrain awareness and avoidance; digital maps; situational awareness; Air Combat Maneuvering and Instrumentation; On-Board Electronic Warfare Simulator; Threat Response Processing; and in-flight re-planning. Recognizing the importance of Information Assurance our products include the ability to protect the information.



Marc Brodeur
Director,
Information Systems



GE is a first choice provider of information systems solutions, supporting the complete mission cycle

GE is the world leader in Integrated Vehicle Health Management technology, with over 3000 installations delivered worldwide. Our success is based on our expertise in aerospace, support-ability, maintenance and safety systems. We utilize a unique combination of signal acquisition monitoring, recording, data mining and decision support for: Health and Usage Monitoring Systems (HUMS); Rotor Track and Balance (RADS); Fatigue, Loads and Operational usage monitoring (FUMS); Prognostics and Health Management (PHM); Probabilistic Diagnostic and Prognostic System (ProDAPS); Engine Monitoring (EDMS & IDMS); and electrical power (AEPHM).

GE is a world leader in the design, development, and production of solid-state flight data acquisition and recording systems. Having delivered over 9,000 systems to date. Our small, rugged and highly adaptable family of flight data recorders meets customers'

demands on more than 80 fixed and rotary wing aircraft types. Products include: Flight/Crash Data Acquisition and Recording Systems; Voice and Data Recorders; Maintenance Data Recorders; and Data Recovery Playback and Evaluation Systems.

Since pioneering solid-state digital video recording in 1997, GE has become one of the leaders in Video and Imagery Management Systems. Recording and distributing analog and digital video for playback and ground debrief, the systems also process images of video and sensor data for correlation that support precision attack, target tracking, target ID, image fusion, indirect vision, and autonomous navigation. Video management systems include: video recorders; video encoders; video multiplexing/switching; video and image processing; and integrated systems.



GE supports the complete, end-to-end mission life cycle for a full array of domestic and international tactical fighter, rotary wing, and specialty platforms with its Ground Support Systems. Technology provided includes: force level planning; war gaming; mission planning; mission rehearsal; and mission debrief for analysis and training. These systems are fully featured, Windows-based, open architecture computers that provide interoperability with third party software, flight hardware and other mission planning systems.





Displays Systems

GE is a major supplier of sophisticated displays systems to the UK and US Military, as well as to commercial aircraft worldwide.

Our SMART displays provide integral graphics generation and video processing, and are offered in a range of sizes, using both commercial off-the-shelf (COTS) technology and custom display heads. Our expertise in modular design allows the same core hardware to be used for different display dimensions, providing customers with more flexibility and value.

Displays can be offered as stand-alone or as part of an integrated system, providing customers with a single drop-in solution using existing aircraft sensor interfaces. Our Integrated Standby Instrument System (ISIS) is the most innovative and advanced electronic standby instrument available in the market today.

Our range of cockpit display systems and display products includes graphics and display processing, large area integrated display units, multi-function head down displays, Head Up Displays (HUD), standby flight displays, cockpit display systems, and electronic flight and system displays.

GE has over 40 years experience in providing graphics and display processing solutions for the aerospace market. This has culminated in a range of 'World Class' display solutions for our customers across a myriad of both commercial and military platforms.



Alastair Back
Director,
Displays Systems

GE's integrated standby instrument system is the **most innovative** and **advanced electronic standby instrument** available



Our Large Area Display features integral signal and video processing and graphics generation, eliminating the need for a separate symbol generator or Mission Computer, reducing power, weight and volume requirements. The unit can be stand-alone or fitted with other IDU to provide a fully integrated Cockpit Display System.

Our multi-function head down displays offer 600x600 colour display with luminance and night vision instrument system performance designed for military aircraft (fixed or rotary wing) and can display video, text and graphics. The unit contains extensive built-in test, has low power requirements (115Vac or 28Vdc) and is lower in weight and higher in reliability than comparative cathode ray tube/ symbol generator combinations.

GE's multi-mode Head Up Displays (HUD) provide primary flight, navigation and weapon aiming symbology including FLIR imagery.

An integral Up Front Control Panel enables the pilot to control the aircraft's navigation, attack system and HUD moding.

GE's standby flight and display instruments include the 3ATI digital repeater unit, featuring a high-resolution active matrix liquid crystal display and ARINC 429 and discrete interfaces. The ISIS is a 'three-in-one' self-sensing 3ATI colour display, providing an independent source of attitude, airspeed, Mach, altitude and vertical speed. Each ISIS can store up to 32 different aircraft configurations and option sets including static source error correction and Vmo/Mmo limits.

Our Electronic Flight & System Displays include the high performance 5-ATI Integrated Display Unit, incorporating analogue and digital signal processing to provide full Electronic Flight Instrument System (EFIS) functionality in a single unit, offering a simple EFIS upgrade for many classic aircraft, since no additional symbol generator is required.

The Engine Instrument Display System (EIDS) is designed to replace electro-mechanical engine instruments fitted to C-130 and P-3 aircraft, with system reliability over 20 times better than existing indicators. The compact design releases space for further upgrades.



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