

Curriculum Vitae

Bernard Farkin

Contact information

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Personal Information

Marital status: Married

Nationality: Belgian

Date of Birth: 12 Nov 1963

Place of Birth: Antwerp, Belgium

Residence: Germany

Summary of Experience and Background

Project and programme management of European Space Agency and EU projects, both as an ESA staff member (at ESTEC), in industry (ESTEC, ESOC) and in academia in the area of Human-Machine Systems, Space Operations and Safety Engineering.

Management of ESA Technology Transfer projects in virtual environments, intelligent agents and operations support to the energy, mining, offshore, medical and entertainment industries as well as commercial spaceflight.

Human factors and usability support for the energy industry (Nuon/Alliander -NL).

Payload integration (Columbus), system simulation and testing for various robotic systems. Payload and system testing standards development (for Terma GmbH).

Strategy and architecture for long-term space projects (lunar, Mars).

Intelligent agent specification (Brahms, Jack), procedures development and knowledge management for future space projects.

Spacecraft systems and operations simulation (DSS, SIMSAT), including physics-based spacecraft systems and operations modelling in real time for concurrent design.

Software porting and release management of SIMSAT.

Functional and human interface testing of mission control software (SCOS II, SCOS 2000).

Safety engineering using innovative methods (Resilience Engineering, FRAM) as well as traditional methods (certified in 6Sigma and DFSS – FMEA, QFD, etc.).

Development of standards (ECSS) and test methodologies for control systems and human factors. Simulation support for ESA projects (Columbus, Mars Express, Rosetta).

Payload operations and user support for microgravity experiments during parabolic flight, ground-based simulation and in orbit.

Provision of astronaut candidate training in microgravity operations during parabolic flight.

Definition of ground infrastructure for ground and flight operations.

Senior Professional Member of the International Association for the Advancement of Space Safety, member of the IASS Technical Committee on Human Factors and Performance for Space Safety.

Editor-in-Chief, later editor, of Space Safety Magazine.

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Employment history

2015-Continuing Space Renaissance Initiative DE Fulda, Germany

Charged with setting up the German division of Space Renaissance Initiative, a world-wide non-profit corporation providing R&D Consultancy and Education in Risk Assessment and Management, Space Industrialisation, Habitats and Human-Machine Systems. Head of the Space Renaissance Academy. Provision of Human Factors and Aerospace Medicine Courses in several languages.

2007-2015 HumanSpace Science Consult Mainz, Germany; Noordwijk, NL

CEO, Principal Scientist

Founder of the HumanSpace Corporation, a sole trader company (eenmanszaak) set up with support from the European Space Agency and formerly located at the ESA Business Incubator, ESTEC, Noordwijk (NL). Project Manager of the project "Intelligent Agents for Virtual Operations". This aims at developing an open source human factors design, evaluation and operations support tool combining a 3D interactive simulation platform, physics-based modelling and intelligent agents for human and machine behaviour and interaction for design, planning and testing.

Participation in ESA's Strategy & Architecture Workgroup, resulting in a 3D visualisation of lunar operations including a lunar base, mobility/transport system and deep drilling operations.

Technology transfer studies towards the energy, mining, offshore and medical industries, as well as commercial spaceflight.

Support contract via Prime Contractor OnTrack Systems BV for Nuon-Alliander, in the areas of software migration, testing and usability support. This involved office as well as operational software (Office 2000/03, Visual Basic). Follow-on support contract for Alliander on IT-infrastructure unbundling.

Contract as Principal Scientist at the Advanced Technology Europe facility of Honeywell Aerospace in Brno, Czech Republic. Responsibilities include Crew Interface, Human Factors and space operations. Participation in and management of several R&D projects sponsored by the European Commission, European Space Agency, Eurocontrol, Czech Space Office and other national authorities.

Operations Safety Analysis for DLR, Galileo Control Centre, Oberpfaffenhofen.

In-house R&D on Intelligent Agents and 3D visualisation for space exploration, as a member of Science Consult KG, Germany.

For Thales Alenia Space Deutschland: Bid Manager in the area of ground guidance systems for Galileo; Engineering Change Management for the Galileo Ground Mission segment.

2004-2007 DigitalSpace Europe Ltd. Mainz, Germany; Aston, UK; Noordwijk, NL

Director and Principal Consultant

Agreement with the DigitalSpace Corporation (headquartered in Santa Cruz, California) to set up and manage their European organisation, and act as its Director and Principal Consultant in human factors modelling, 3D simulation, virtual environments and space operations.

Participation in the Cosmic Vision 2020 Programme of the European Space Agency (ESA), managing the Virtual Human Spaceflight (VHS) proposal activities of DSE. Proposal preparation for several ESA contracts in this area.

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Coordination with NASA's Space Human Factors Engineering Project (SHFE). Consultant to the European Commission Sixth Framework project European Collaboration World (ECW). Reviews of ESA (ECSS) and NASA (NSTP) standards on Human Factors and other areas.

Acting Managing Director of European Space Agency incubatee Virtunaut, a Belgian company offering virtual reality simulation of Extra-Vehicular Activity (EVA) to the general public. DSE provided Virtunaut with the software and expertise in space operations in addition to its day-to-day management.

Project manager, AvaMars educational project on virtual representations of Mars for the Contact Consortium, a not-for-profit educational organisation set up by the DigitalSpace Corporation in cooperation with British Telecom, Philips, Intel, Blaxxun, Nortel, Microsoft and others. In charge of DSE's development of an open source Agent-Based, 3D modelling system for space operations, training and outreach. This is a continuation of work done for NASA under the BrahmsVE project and was successfully proposed to the European Space Agency.

2000 – 2004 Terma GmbH/ESOC Darmstadt, Germany
Simulation Software Engineer

Employed by Terma GmbH at the European Space Operations Centre in Darmstadt and the Simulation Remote Services Centre in Weiterstadt. Responsible for evaluation and general test procedures development in the satellite simulation section of Terma, as well as standards and procedures development for simulation projects performed for the European Space Agency's robotic space programmes. Duties included procedures development for first-line, on-site simulation support. On-site simulation support duty at ESOC. Member of the Rosetta and Mars Express simulation teams. Porting of simulation software to different platforms. Topic Map technology development for on-site and distributed simulation support. Release management, preparation and delivery of simulation software for ESA.

1997 - 2000 University of Haifa/Technion IIT Haifa, Israel
Senior Research Associate

Full-time research at the Ergonomics and Human Factors Unit, Haifa University.
Management of and technical work on a project funded by the Ministry of Defence on image quality criteria and display requirements for Forward-Looking Infrared displays.
Proposal preparation for the Visual Interaction and Human Effectiveness in the Cockpit project VINTHEC II for the European Commission, this bid was successful and was awarded to a consortium in which the Technion was a full partner. Participation in academic activities, courses in perception, methodology (Haifa U.) and aerospace engineering, aerodynamics, control systems and software engineering (Technion).

1995 - 1997 SAAB Aerospace Linköping, Sweden
Senior Research Engineer

Employed by SAAB Military Aircraft (now SAAB Aerospace, Linköping, Sweden), in charge of the Human factors Laboratory (HMSL). Management of Head-Mounted Sight and Display systems development, as well as several R&D projects in co-operation with Linköping, Luleaa and Umeaa universities. Participation in EU Brite-Euram project VINTHEC (Visual Interaction and Human Effectiveness in the Cockpit), with special responsibility for eye and gazetracking experiments.

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1994 – 1995 Luleaa University of Technology Luleaa, Sweden

Principal Research Engineer

Full-time research at the Division of Technical Psychology. Responsible for the establishment and management of the Aerospace Human factors Laboratory (AHMSYSLAB). This activity was subsequently relocated to Linköping, at SAAB Military Aircraft. This included management of several projects in co-operation with the National Defence Research Establishment, the European Space Agency, SAAB and others in the areas of:

- PC-based flight simulation and Head-Up Display (HUD) modelling for military aircraft;
- Point-of-gaze measurement for cockpit evaluation and integration;
- Development of cockpit and HUD design methodologies.

Participation in academic activities, teaching of undergraduate and graduate courses in psychology and human factors engineering.

1989 - 1994 ESA/ESTEC Noordwijk, the Netherlands

Human Factors and Life Science Engineer (ESA Staff Grade A2/3)

Employed at WGO section (Man-machine Interfaces and Electrical Facilities), automation and informatics department at the European Space Research and Technology Centre (ESTEC).

Responsible for the following areas within the ESTEC Crew Workstation Testbed: Human Factors Evaluation, crew training for simulations, Human Factors project management and Mechanical Crew Interfaces and Support Equipment development and evaluation during parabolic flight.

Member of the parabolic flight technical management team, responsible for human factors engineering and experimental procedures. Several experiments performed during parabolic flight, Principal Investigator for the Linear Force Torso Restraint and Air Suction Cup Shoes (ASCS). Co-investigator for the ASCS as flown on the STS-42 IML-1 Spacelab mission.

Human factors support for the Columbus Attached Laboratory/Node Vestibule experiment, including operational analysis and crew interfaces evaluation during parabolic flight. Follow-up of Columbus Vestibule studies with industry.

Principal investigator for the Adhesive Retention Surface Experiment, using subjective evaluation methods, during parabolic flight and support/mission preparation/training for the same experiment flown on the Mir orbital station.

Member of the Columbus Proposal Evaluation Panel on Human Factors and Crew Systems. Inputs to ESA-RQ-013 (Columbus Human Factors Requirements Document).

Study manager of the Cognitive Approach to Crew Activity contract. This resulted in a tool, the Cognitive Activity Analysis Toolset (CAATS).

Study manager of Specific Methods for MMI Design contract (SMID). This attempted to identify methodologies for MMI design, irrespective of the development tools.

Preparatory work for the continuation of the CAATS and SMID tools, combined in a coherent toolset, called Cognitive Analysis, Design and Evaluation Tool Set (CADETS). This development took place under the Technological Research Programme of ESA. Study manager of the CADETS contract.

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Study manager of Head-motion Tracking System and Eye Point of Gaze technical developments of HFE tools. This resulted in an integrated head, eye and hand tracking system for Human Factors Evaluation and new control applications. Pilot studies using this tool, focusing on display layout, crew interaction and basic human factors research. Coordination with the Dutch Aerospace Laboratory (NLR) on the applications of Eye-tracking for aerospace.

Member of the Tender Evaluation Board for the Simulation of Virtual Reality (Man in Virtual Space) contract. Follow-on activities in cooperation with Simulation section on the use of virtual reality and telepresence for space systems.

Technical officer for ESTEC participation in the proposal for Computer-aided Man Evaluation (CAMEVAL) project, funded by ESPRIT (European Community).

Participation in in-house courses in human reliability assessment and spacecraft systems engineering.

Human Factors Project planning for General Support Technology Programme, Advanced Crew Terminal. Coordination with QA and safety divisions on Human Reliability, error analysis, Caution and Warning, and general safety issues.

1988 - 1989 Space Applications Services SA Brussels, Belgium
Human Factors and Life Science Engineer

Employed as study engineer working on the requirements and design definition of the Columbus payload ground segment for both flight and ground operations. Member of the Columbus-Hermes Coherence Support Contract Team with specific responsibility for crew systems.

Specialist support in the areas of man-machine interfaces, life sciences and human factors engineering applicable to manned spaceflight. This included ground, flight and microgravity user operations as well as crew systems requirements analysis for the European Space Agency.

1987 – 1988 NAVCOMOST Ostend, Belgium
Medic (S/M)

Selected for training at the Royal School of the Medical Service of the Belgian armed forces. Research work at the Centre for Hyperbaric Medicine, related to retinal processing, Critical Flicker Fusion Frequency and hyperoxia. Performed duty as a Navy Medic in the Belgian Navy aboard mine sweepers and diving operations vessels.

Languages

Dutch, English and Swedish (on native level), Hebrew, German, French (excellent oral fluency and reading, good writing skills).

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Education

1983 – 1987 University of Göteborg Göteborg, Sweden

Fil.Kand. (B.Sc.), VG (First Class equivalent)

Main specialisation in Human Factors Engineering, psychobiology.

Minor subject: Linguistics, specialising in Psycho- and Biolinguistics.

Dissertation: Potential indicators for inert gas narcosis in divers.

Supervisor: Prof. Percy Löwenhard.

1989 - 1990 Stirling University Stirling, UK

M.Sc.

Subsea/Space Human Factors. Master of Science by Research at the Space and Underwater Psychobiology Unit.

Thesis: Knowledge of Arm Position in Altered Force Environments.

Supervisor: Dr. Helen E. Ross.

1997-2000 Haifa University, Technion Institute of Technology Haifa, Israel

Postgraduate courses in human factors, aerospace engineering, aerodynamics, control systems and perception, methodology, instrumentation and software engineering.

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Publications

1. Carlloz M., Farkin B., Oernhagen H. **Comparison of some possible tests for narcosis measurement in diving.** In: Proceedings, XVth annual EUBS meeting on diving and hyperbaric medicine. Eilat, Israel, 1989
2. SAS and CISI Ingenierie study team. **Ground infrastructure for Columbus payload flight operations.** ESA Document FR/7559/SAS, 1989.
3. Steinicke L., Farkin B. **Concepts, ideas and opinions on a resource management system for Columbus payloads.** SAS document COL-GIF-WP100, 1989.
4. Farkin, B. **Comments on the SSIS Human-Computer Interface Guide.** ESOC/SPSD technical note, 1988.
5. Ross H.E., Farkin B. **Knowledge of Arm Position under varied gravito-inertial force in parabolic flight.** In: Microgravity Experiments during parabolic flights with Caravelle. ESA WPP-021. October 1991.
6. **Adhesive Retention Surface Experiment report.** In: COLCAMP 2 parabolic flight report. ESA MCUD-GO, ESA-ESTEC, 1992.
7. Hollnagel E., Hougaard P., Rosness R., Farkin B. **A Specific Method for Task-based Interaction Design.** In: Proceedings from the Fourth International Conference on Human-Machine Interaction and Artificial Intelligence in Aerospace. Toulouse, France, 1993.
8. Macleod, I., Farkin B., Helyer P. **The Cognitive Activity Analysis Toolset.** In: British Ergonomics Society Proceedings, 1994.
9. Mooij H., Farkin B. **OBSERVER for Point-of-Gaze Determination in Real Time.** In: ITEC Conference proceedings, The Hague, 1994.
10. Farkin-Eden, B. **Criteria for image quality assessment in FLIR displays.** Institute of Information Processing and Decision Making, IIPDM Technical Report (in Hebrew). Haifa, Israel 1999.
11. Farkin, B., Damer, B., Clancey W.J et al. **BrahmsVE: from Human factors Modelling to 3D Virtual Environments.** SESP 04 Proceedings, European Space Agency . ESTEC, Noordwijk 2005
12. Farkin, B. **Virtual Human Spaceflight.** In: Cosmic Vision 2020, European Space Agency. ESA BR 247. ESTEC, Noordwijk 2009
13. T. Sgobba, Farkin, B. **Welcome Back, Celestial Eagle: Safety of Supersonic Air Launches.** In: Space Safety Magazine. Issue 11, 2015

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Further education / seminars

- 09/2010** Honeywell Aerospace, 6Sigma Green Belt, Safety Engineering
- 07/1995** NATO AGARD, Elektrophysiological Methods in Aerospace
- 03/1994** ESA, Human Reliability and Dependability
- Senior Professional Member of International Association for the Advancement of Space Safety (IAASS);
 - Member of the technical Committee "Human Factors and Performance for Space Safety" of the IAASS.

Software skills	Knowledge	Experience
1 = excellent, 2 = good, 3 = average, 4 = low		
SPICE	2	4years
SPICE S4S (ESA)	1	6years
DOORS	4	2 years
STQY	1	7years
PRINCE2	1	10 years
TQM	1	5 years
ECSS	1	10 years
MIL-STD-1472	1	15 years
FMEA/FMECA	1	10 years
FTA	1	10 years
FRAM	1	3 years
RE	1	3 years
GMTA	1	10years
XML	3	5 years
UML	3	2 years
XSLT	2	4 years

Software-Tools	Knowledge	Experience
1 = excellent, 2 = good, 3 = average, 4 = low		
MS Office	1	10 years
C++	4	5 years
Open Office	4	5 years
BRAHMS	1	5 years
JACK	2	5 years
AutoCAD	3	5 years
Catia	4	5 years
MATLAB	3	10 years
SimuLink	3	10 years
SAS	3	10 years
BMDP	3	10 years
Pascal	3	5 years
VB	3	5 years
Basic	3	10 years
Python	4	5 years
SIMSAT	1	5 years
SCOS	1	5 years