



A.G.E.
ENGINEERING

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For Mathematicians, nothing is impossible.
That is what makes them so similar to
Artists. One thing both Mathematics and
Art have in common is that both hold
the principle that nothing is foreign or
unattainable.

Martin Wohlgemuth



Mathematical thinking offers fascination and challenge. It requires fantasy, imagination, and intellectual stimulation. It is creative and playful, but also demands tenacity, resolution and a strong will to succeed.

Bernhard Weinzinger

“Making Possible the Impossible”

AGE offers a platform from which technical and mathematical ideas become reality. What sounds abstract has a high practical usefulness. High Tech from the areas of Control Technology, Software, Electronics, Hydraulics and Electromechanics, combined with Engineering performance as well as Manufacturing and Marketing, provide you with a wide, but highly specialised range of services.

In all our business units – Satellite Communications, Security, and Electronics, the well-established university training of the founders and staff of AGE, along with practical experience gained since 1980 will give you the cutting edge.

AGE® is a registered trademark for “Mathematical Services” and stands for our claim: Excellent AGE know-how optimising your needs – and your success!

Our customers testify that we put our claims into practice: “AGE succeeds in making possible the impossible.” (Head of Development of an AGE Customer).



TriAGE, the incredible Triangle Puzzle. Software and concept by Andreas Grimm. Copyright Andreas Grimm.

An aerial photograph of a mountain range, likely in the Alps, showing a complex network of white, snow-covered ridges and valleys. The terrain is rugged and mountainous, with some green patches of vegetation visible in the lower right. A semi-transparent white rectangular box is overlaid on the right side of the image, containing a quote in black text.

Mathematics is the tool that allows the exchange between theory and practice, thinking and observation. It builds the connecting bridges and shapes their ever-increasing strength.

David Hilbert

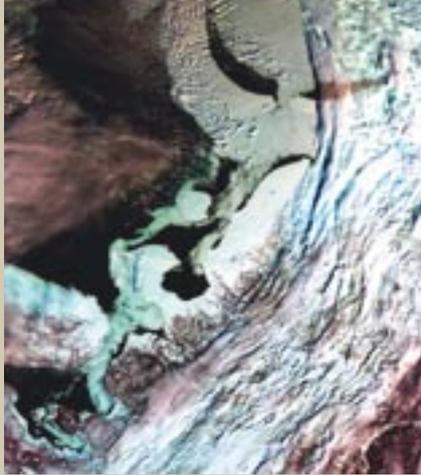
Our Competence – Your Advantage.

Our specialists use their know-how and competence purposefully to your advantage. The common denominator of our business units is the intelligent and efficient application of mathematical and highly complex processes in the industrial and scientific environment.

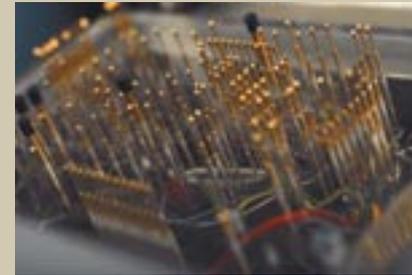
In the areas of Satellite Communications and Security, we call on cryptographic know-how, unequalled in its performance.

Our team control just as reliably the whole range of our Electronics Services:

- Development and processing
- Low and high-frequency technology
- Measurement, circuitry and control technology
- Analogue and digital technology
- Chip programming
- 19-inch technology, switchgear cabinets and small devices.



Our software specialists “speak” every relevant language: starting with the high-level languages over script tools to assembler programming for personal computers, embedded systems, signal processors, smart cards and transputers.



- 1: Archangel, northern Russia, 13 March 2003
(Photo: ESA)
- 2: ATV Satellite in the ESA/ESTEC test building
(Photo: Private archive)
- 3: AGE PCB test facility
- 4: AGE Software for crash-test facility



He is a mathematician, and therefore
persistent.

Johann Wolfgang von Goethe

Competence with Methods

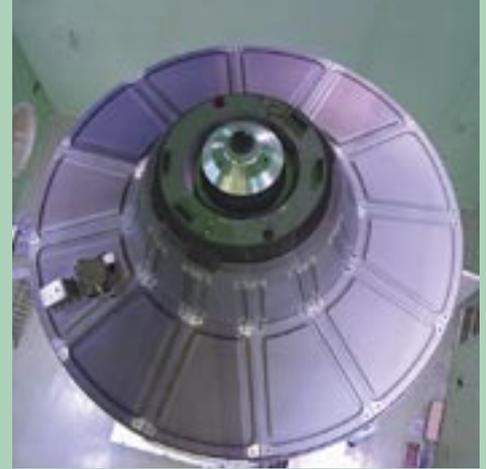
Even the best specialised competence can only be effective if it is put into practice using competent methods. Mathematical processes also play a meaningful role in the area of method competence.

A representative example from Satellite technology: Service redesign after the launch of a satellite into space is generally impossible. Therefore, all eventualities must be taken into consideration – nothing should be left out!

Our long term activity in the Satellite Test Centre at the European Space Agency (ESA) has therefore equipped us with the best expertise for special knowledge in the linking of design, engineering, production and quality assurance, in accordance with the highest European regulations.

AGE is specialist for the Engineering Process "PSS05", used by the ESA, and its successor, "ECSS". No one else had ever before implemented the software-based specialised process at the ESA. We have adapted the process for related areas such as electronics, electromechanics, mathematics and control technology, and have also successfully applied it in these areas. In this framework, FMEA/FMECA (Failure Modes Effects Critical Analysis) were carried out, and successfully for the first time in the software area. A pioneering performance.

By applying this methodology to its suppliers, AGE provides the customer with a closed, transparent and especially tried and tested system.



1|2|3: ATV Satellite in the ESA/ESTEC test building (Photos: Private archive)

An aerial photograph of a coastline, showing a mix of blue water, brownish-orange land, and white sandy beaches. A semi-transparent grey rectangular box is overlaid on the left side of the image, containing text.

**What we do for you –
Satellite Communications
Business Unit**

Satellite Communications Business Unit

Reliable and safe communication is increasingly becoming a competitive deciding factor. Satellite communications are taking a key role, with ever-increasing meaning.

Our Satellite Communications business unit supports you on all bandwidths: from the conception and implementation to the supervision of your system. If required, of course, we can take care of individual tasks of your application:

- Expansion of your terrestrial or wireless network with satellite channels (e.g. VSAT (Very Small Aperture Terminal) Networks)
- New satellite network connection as alternative to terrestrial connection
- Integration of the End-to-End encryption in your IT security policy
- Interface adaptation
- Hardware supply (Buy/Lease)
- Transceiver (Downlink) and transmitter (Uplink) hardware implementation
- Encryption hardware for encryption and decryption, as well as authentication
- Qualified training
- Selection of technically and economically favourable SAT providers
- Bandwidth optimisation using AGESCOM-Pool
- Monitoring, servicing and (remote) maintenance of the running systems



Envisat satellite, artist's impression
(Picture: ESA)

What makes us stand out:

- We combine satellite communications and high-score cryptography.
- We offer crypto-engineering following state-of-the-art standards of European space industry.
- Along with standard encryption, we also use proprietary encryption algorithms.
- We offer modern satellite communication combining product and service (transponder sharing for bandwidth optimisation).



- 1: Artistic view of Galileo (Picture: ESA)
- 2: The Beagle 2 landing site (Photo: ESA)
- 3: Mauna Kea Volcano, Hawaii - CHRIS image - 15 April 2002 (Photo: ESA)

The background is an abstract, textured composition. It features a mix of vibrant green, deep orange, and bright red, with some darker, almost black, areas. The textures appear to be layered and somewhat grainy, suggesting a digital or artistic rendering. A semi-transparent white rectangular box is positioned in the upper left quadrant, containing the text.

What we do for you –
Security Business Unit

Security Business Unit

Further possibilities imply further risks. This is especially true for electronic communications. The AGE Security business unit provides several Workpackages to tackle the new risk, which cover the increasing security requirements of our customers.



“IT Security Consulting” WORKPACKAGE

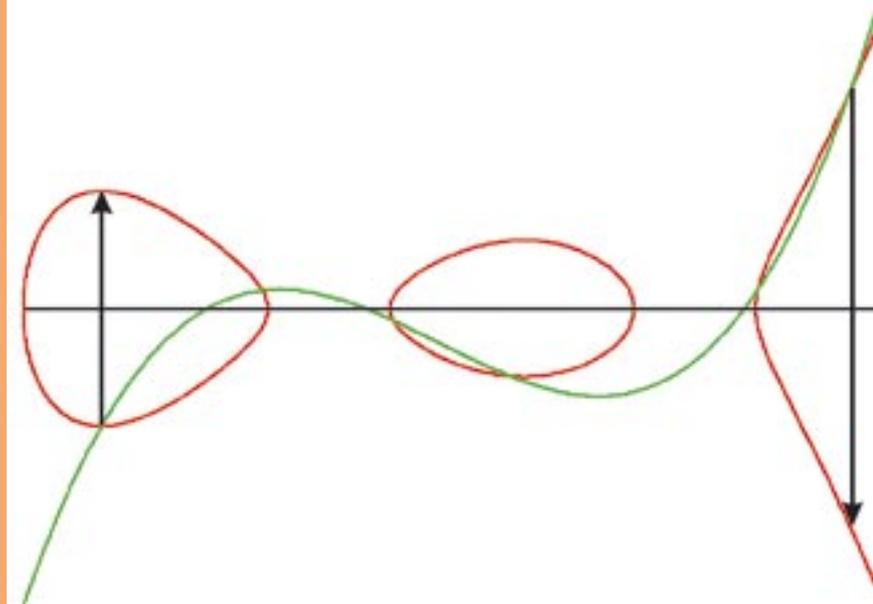
- Design and redesign of IT security policies
- Execution of risk and security analysis
- Definition of security requirements
- Documentation of current security levels
- Target/actual analysis against international minimum standards
- Design of security concepts and procedural instructions
- Execution of security analyses on all levels of the security organisation
- Personnel training
- Information meetings for IT security
- IT security project management

“IT Protection optimisation” WORKPACKAGE

- Firewalls
- Virus protection and content filtering
- Hard and software encryption
- User authentication
- Update of protection systems using the latest encryption solutions

“Customised Encryption Algorithms” WORKPACKAGE

- Development of an individual, customised encryption algorithm
- Integration of these algorithms into open security systems



Calculation using hyperelliptic curves (HECC)

What distinguishes us:

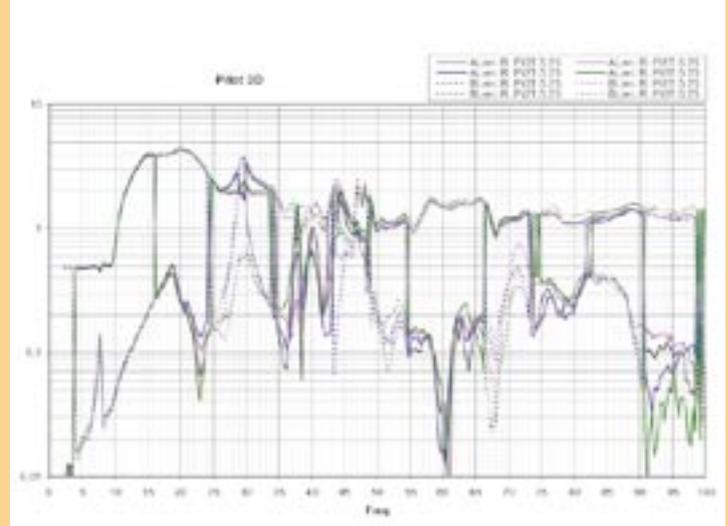
- Through the use of recognised standard methods of the European space industry, we reach a unique level of quality and security in other lines of business also.
- Along with standard encryption, we also offer customised encryption algorithms.
- Conventional concepts provide single solutions, which, due to their universality, must show system-limited security holes.
- In contrast to a pure encryption consulting, we are not dependent on traditional technology. Our goal for the customer is not just limited to reaching recognised standards, but to guarantee real security performance that will constantly withstand any attack.

The background of the slide is an abstract, textured composition. It features a mix of warm colors, primarily shades of orange, red, and yellow, with some darker, almost black or dark green, streaks and patches. The texture appears to be that of a rough, possibly metallic or mineral surface, with various grainy and fibrous patterns. The overall effect is one of organic complexity and vibrant energy.

What we do for you –
Electronics Business Unit

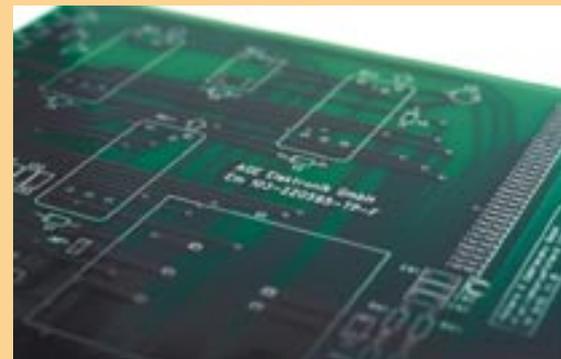
Electronics Business Unit

AGE loves complexity! In our Electronics business unit also, mathematical processes play an important role. The results are anything but theoretical number play: we offer practically tried and tested solutions and products, which prove their reliability also in industrial applications.



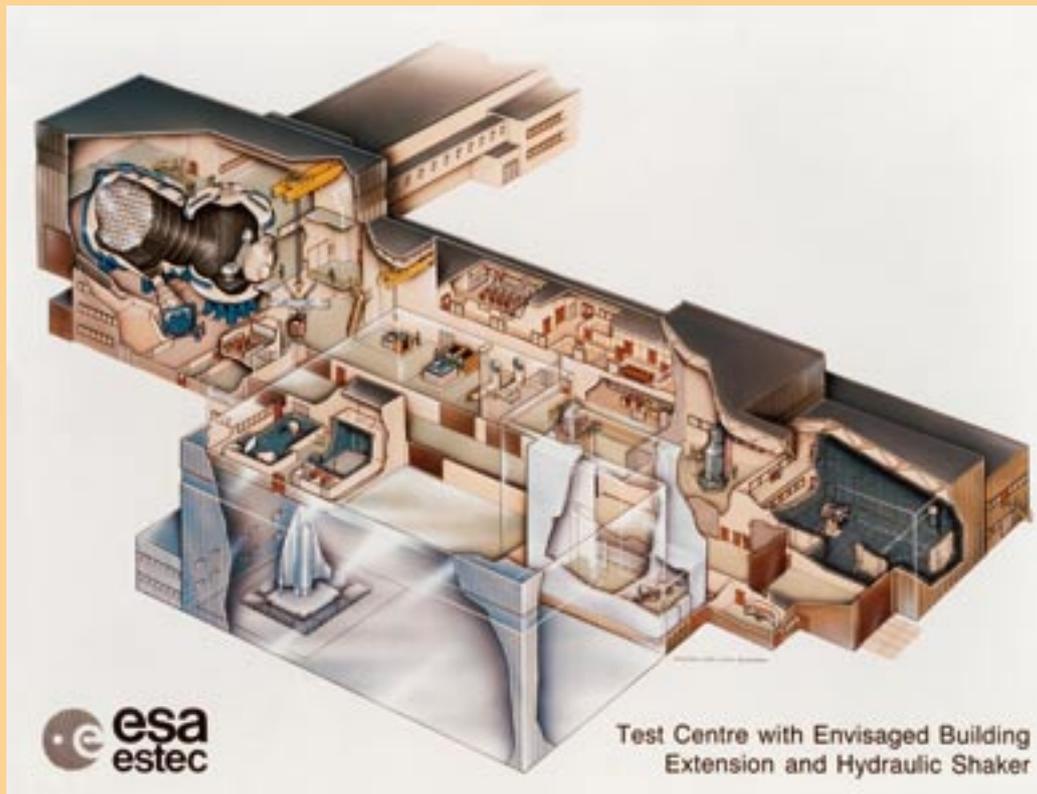
- Test stands with and for servo-hydraulic drives: Single and multi-axis test stands for Automotive, Construction and Satellite industries, e.g. crash-test plants, satellite shakers, earthquake simulators, axial test stands, as well as driving and flight simulators.
 - Specialised control and evaluation algorithms
 - Measuring data acquisition and analysis
 - Operation and control devices
 - Safety devices for electronic circuits
 - Mechanical structure analysis based on proprietary, patented processes.

- 1: 3D Sweep analysis (AGE Patent)
- 2: AGE printed circuit board
- 3: AGE measuring device



What distinguishes us:

- Along with the software, hardware, and electromechanical components, we provide systems that exhibit complexity far beyond normal engineering standards.
- We ensure that the development of complex algorithms and strongly customised hardware (embedded systems, programmable logic, etc.) is always focused on implementation in the industrial field.
- AGE holds patents in the areas of:
 - Structural analysis
 - Multi-axis control
 - Safety devices for actuators
 - Electro-hydraulic acceleration control (et al.)
 - Industrial bus design (et al.)



Competence from Experience: Reference Projects

Satellite Communications and Security Business

Units:

Giesecke & Devrient, Germany:

- POS Terminal and PIN-Generator for magnetic cards:
 - Security concept
 - Development of soft and hardware with encryption processors
 - PCB facility and plot software

Thomson, France:

- Development of copyright protection methods
- Manufacture of copier machines

Anonymous customers:

- Definition and design of encryption engineering processes
- Applications using secure satellite data transfer
- Development of customised encryption algorithms

Electronics Business unit:

Daimler Chrysler AG, Germany:

- Acceleration control for hydraulic transverse movement of driving simulators in Berlin (co-operation with the company Rexroth/Lohr)

EADS, Germany:

- Development of the measuring, operation, and control technology for the Eurofighter actuator test stands

ESA (European Space Agency):

- Design and construction of an 8-actuator control for the "HYDRA" satellite shaker
- Software and hardware engineering in accordance with methods "PSS05" and "ECSS", respectively
- 3-D mechanical structural analysis for satellites
- Sweep analysis for the "Envisat" and "ATV" satellites

Volkswagen AG, Germany:

- Hydraulic control for the non-destructive crash-test facility



One should not confuse what to us
seems unlikely or unnatural, with what is
actually impossible.

Carl Friedrich Gauss

Challenge us.

Take advantage of the innovation that exists only at AGE!

Gain from tried and tested know-how, which we have gathered through years of experience.

We will gladly test for you the first step of the engineering process, to see how we can also "Make Possible the Impossible" for you.

We look forward to your call – and to new challenges!

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