SEEING IS BELIEVING

# Application Case Studies

# Overview (1/4)

| Industrial Inspection | | Guppy | Guppy PRO | Marlin | Stingray | Oscar | Pike | Manta | Prosilica GC | Prosilica GB/GS | Prosilica GE | Prosilica GX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AICON 3D – TubeInspect | Automotive | | | ● | | | | | | | | |
| EDAG – Best-Fit | Automotive | | | ● | | | | | | | | |
| Radine/Data Vision – NP Plastics | Plastic Injection | ● | | ● | | | | | | | | |
| Premier Evolvics – Automated Rapid Tester | Textile | ● | | | | | | | | | | |
| Stone Three Venture Technology - Lynxx | Mining | | | | | | | | ● | | | |
| ImageXpert – JetXpert | Printing | | | | ● | | | | | | | |
| Metaio – Unifeye Prototyping | Automotive | ● | | | | | | | | | | |
| Laetus – iCAM | Pharmaceutical | | | | ● | | | | | | | |
| Boehringer Ingelheim –Capsule Inspection | Pharmaceutical | | | ● | | | | | | | | |
| Pi4_robotics – pi4_workerbot | Misc. | ● | | | | | | | | | | |
| TriVision Packaging Inspector | Food Packaging | ● | | ● | ● | | | | | | | |
| MOS Airbag Inflator Inspection | Automotive | ● | | | | | | | | | | |

# Overview (2/4)

| | | Guppy | Guppy PRO | Marlin | Stingray | Oscar | Pike | Manta | Prosilica GC | Prosilica GB/GS | Prosilica GE | Prosilica GX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Scientific Research** | | | | | | | | | | | | |
| Alaska Departmnent of Fish and Game – Scallop Stock | Environmental Research | | | | | | | | | | ● | |
| New Jersey Insititute of Technology – Coral Reef Study | Environmental Research | | | | | | | | | | ● | |
| SensoMotoric Instruments – iView X RED Eye Tracker | Marketing, Psychology | | | | | | ● | | | | | |
| eSolar – Concentrated Solar Power Plant | Green Energy | | | | | | | | ● | | | |
| Moskow State University – Gamma Ray Observation | Astronomy | | | | | | | | | | ● | |
| 3DDynamics – Mephisto Extreme 3D Scanner | Archeology, Life Science | | | | | | ● | | | | | |
| Tytec – Stereo Wizard 3D Microscopy | Microscopy | | | | | | | | | | ● | |
| Wageningen University – Weed Scanner | Agronomy | | | ● | | | | | | | | |
| NASA/General Motors – Robonaut 2 | Robotics | | | | | | | | ● | | | |
| **Security & Traffic** | | | | | | | | | | | | |
| Idaho National Laboratory – RADAS Drone | Defense, etc. | | | | | | | | | | ● | |
| Kria – T-EXSPEED 2 Speed Enforcement | ITS | | | | | | | | | ● | | |
| China Daheng – Intersection Monitoring | ITS | | | | | | | | ● | | | |
| Cornell University AUV – Tachyon Sumbarine | Defense, etc. | ● | | | | | | | | | | |

# Overview (3/4)

| | | Guppy | Guppy PRO | Marlin | Stingray | Oscar | Pike | Manta | Prosilica GC | Prosilica GB/GS | Prosilica GE | Prosilica GX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Logistics** | | | | | | | | | | | | |
| Matrix Systems & Solution – Product Packaging & Traceability | Chemicals | | | | | | | | | | ● | |
| Matrix Systems & Solution – Mailing | Mail Processing | | | | | | | | ● | | | |
| **Multimedia & Entertainment** | | | | | | | | | | | | |
| Pompeu Fabra University – Reactable | Music | ● | | | | | | | | | | |
| FH Köln – Automatic Foosball Robot | Gaming | | | | | | ● | | | | | |
| 3db Solutions – Playland Rollercoaster | Amusement Park | | | | | | | | ● | | ● | |
| Mobidium – Virtual Stage | Advertising | ● | | | | | | | | | | |
| R&D Vision – Swing&See Golf Swing Analysis | Sports | | | | | | ● | | | | | |
| Vexcel – Bing Streetside Mapping | Multimedia | | | | | | | | ● | | | |
| space 150 – Giant Interactive Billboard | Advertising | | | | | | | | | | | ● |
| FilmFabriek – Müller Film Scanner | Film Digitization | | | | | | ● | | | | | |

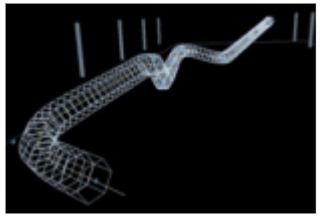
# Overview (4/4)

| Healthcare & Medical | | Guppy | Guppy PRO | Marlin | Stingray | Oscar | Pike | Manta | Prosilica GC | Prosilica GB/GS | Prosilica GE | Prosilica GX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Manchac Techn. – DOSIS pharmacy automation | Pharmacy retail | | | | | | | | ● | | | |
| SIMI Reality Motion Systems – SIMI Motion | Orthopaedics | | | | | | ● | | | | | |
| Vision Gate – Cell CT 3D Cell Analysis | Cancer Research | | | | | | | | | | ● | |
| Applied Scintillation Tech. – Dental Imaging | Dental X-Ray | | | | | | | | | | ● | |
| threeRivers 3D – 3D Arthritis Hand Scanner | Medical Research | | | | | | | | ● | | | |

# TubeInspect

## AICON 3D Systems GmbH, Germany

| | |
|---|---|
| **Category:** | Industrial Inspection |
| **Industry:** | Automotive |
| **Application:** | 3D measurement of tubes and pipes (fuel, braking fluid, etc.) |
| **Challenges:** | - Synchronized capture from up to 16 cameras<br>- Deferred image transfer |
| **Camera Solution:** | AVT Marlin FireWire cameras |

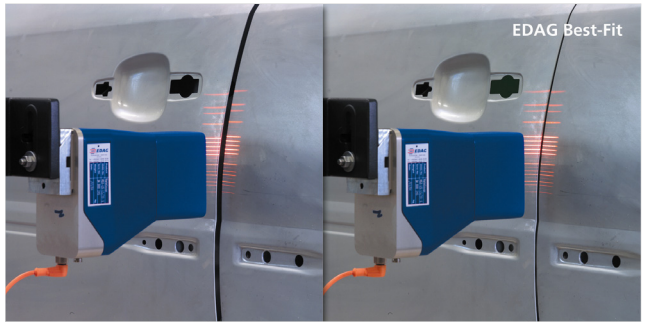


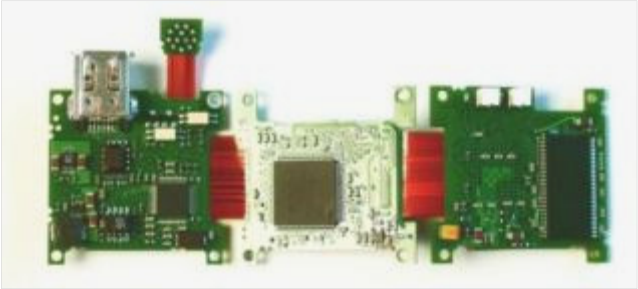
Full case study | YouTube Video

# EDAG Best-Fit

## EDAG GmbH & Co. KgaA, Germany

| | |
|---|---|
| **Category:** | Industrial Inspection |
| **Industry:** | Automotive |
| **Application:** | Gap optimization in car body manufacturing |
| **Challenges:** | - Integration in custom vision sensor with laser projection<br>- Multi-camera system |
| **Camera Solution:** | AVT Marlin board-level camera |





Full case study

# NP Plastics

## Radine BV/Data Vision BV, The Netherlands

| | |
|---|---|
| **Category:** | Industrial Inspection |
| **Industry:** | Plastic injection moulding |
| **Application:** | Quality inspection of plastic rollers for document binders |
| **Challenges:** | - 100% inspection<br>- 600 pieces/minute<br>- 2 different viewing angles |
| **Camera Solution:** | AVT Marlin F-046 + Guppy F-080 |

Full case study | YouTube Video

# Premier ART

## Premier Evolvics Pvt. Ltd., India

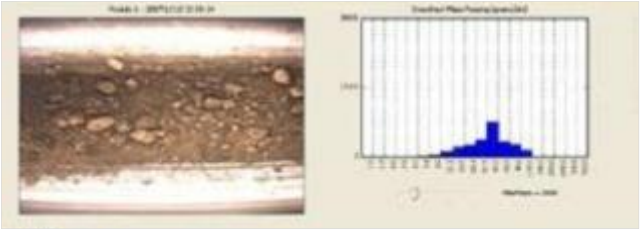
| | |
|---|---|
| **Category:** | Industrial Inspection |
| **Industry:** | Textile |
| **Application:** | Cotton fiber grading |
| **Challenges:** | - Migration from analog to digital interface;<br>- High cost sensitivity |
| **Camera Solution:** | AVT Guppy F-044 (interlaced) |

Full case study

# Lynxx
# Optical Particle Analyzer

## Stone Three Venture Technology Ltd., South-Africa

| | |
|---|---|
| **Category:** | Industrial Inspection |
| **Industry:** | Mining |
| **Application:** | Optical ore size measurement |
| **Challenges:** | - Replace manual sample measurement with automated, 100% measurement<br>- Harsh environment (dust, temp.) |
| **Camera Solution:** | AVT Prosilica GC1020C |

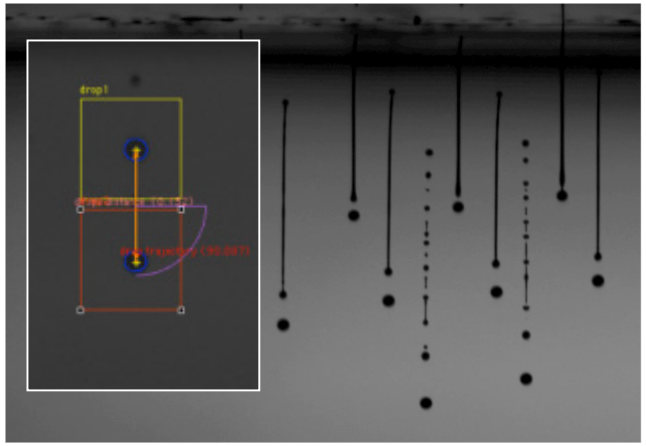


Full case study

# JetXpert

## ImageXpert Inc., USA

| | |
|---|---|
| **Category:** | Industrial Inspection |
| **Industry:** | Printing , printing supplies |
| **Application:** | Ink jet drop-in-flight analysis for quality assurance |
| **Challenges:** | Measure ink droplet volume, trajectory and speed at 10 m/s |
| **Camera Solution:** | AVT Stingray F-080/Guppy F-080 |



Full case study | YouTube Video

# Unifeye Prototyping

## Metaio GmbH, Germany

| | |
|---|---|
| **Category:** | Industrial Inspection |
| **Industry:** | Automotive |
| **Application:** | Integration of virtual prototypes into existing vehicles using Augmented Reality |
| **Challenges:** | High-precision measurement with measuring arm |
| **Camera Solution:** | AVT Guppy F-080 |

Full case study | YouTube Video

# iCAM

## Laetus GmbH, Germany

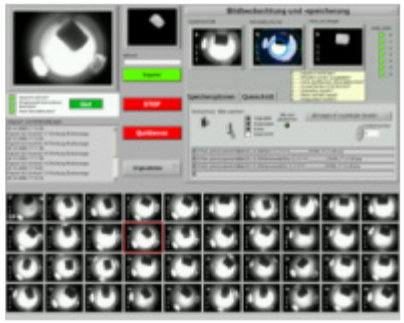
| | |
|---|---|
| **Category:** | Industrial Inspection |
| **Industry:** | Pharmaceuticals |
| **Application:** | Drug packaging inspection and tracking |
| **Challenges:** | - OEM camera development<br>- Reduce camera diversity for various applications |
| **Camera Solution:** | AVT Stingray board-level camera |

Full case study

# Drug Capsule Inspection

## Boehringer Ingelheim, Germany

| | |
|---|---|
| **Category:** | Industrial Inspection |
| **Industry:** | Pharmaceuticals |
| **Application:** | Measurement of micronized powder quantity in drug capsules |
| **Challenges:** | - 100% inspection<br>- 80,000 capsules/hour<br>- very small quantities (5.5 mg) |
| **Camera Solution:** | AVT Marlin F-046 |



Full case study

# Pi4_workerbot

## pi4_robotics GmbH, Germany

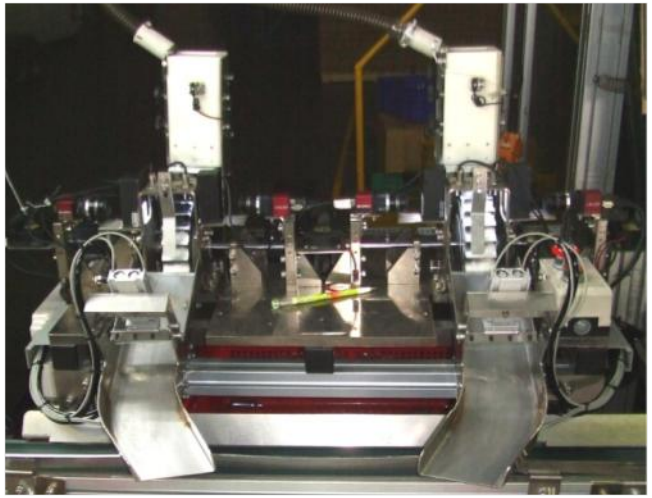
| | |
|---|---|
| **Category:** | Industrial Inspection |
| **Industry:** | Miscellaneous |
| **Application:** | Labor-intensive or hazardous manufacturing and inspection tasks |
| **Challenges:** | Plug-and-play camera swap |
| **Camera Solution:** | AVT FireWire cameras (Guppy, Stingray, etc.) |

Full case study | YouTube Video

# Airbag Inflator Inspection

## MOS Industrial, Taiwan

| | |
|---|---|
| **Category:** | Industrial Inspection |
| **Industry:** | Automotive |
| **Application:** | Quality control of gas cylinder valves for airbag inflation |
| **Challenges:** | - 100% inspection<br>- Limited space<br>- Cost constraints |
| **Camera Solution:** | AVT Guppy F-033 |

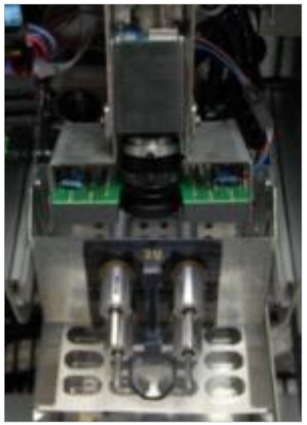


Full case study

# DOSIS

## Manchac Technologies LLC, USA

| | |
|---|---|
| **Category:** | Healthcare & Medical |
| **Industry:** | Pharmacy Retail |
| **Application:** | Automated prescription packaging at pharmacy shop |
| **Challenges:** | - Manage up to 60 different solid oral medications<br>- Error-free packaging |
| **Camera Solution:** | AVT Prosilica GC1020 |

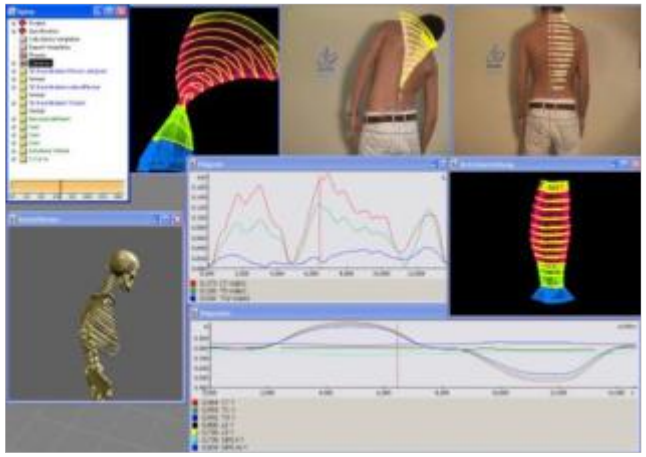


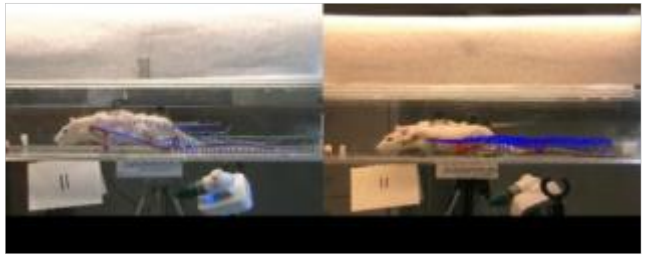
Full case study | YouTube Video

# SIMI Motion

## SIMI Reality Motion Systems GmbH, Germany

| | |
|---|---|
| **Category:** | Healthcare & Medical |
| **Discipline:** | Orthopaedics |
| **Application:** | R&D, diagnostic and treatment of musculoskeletal diseases |
| **Challenges:** | - Motion capture without markers<br>- High image quality<br>- High frame rates |
| **Camera Solution:** | AVT Pike F-032 (208 fps) |



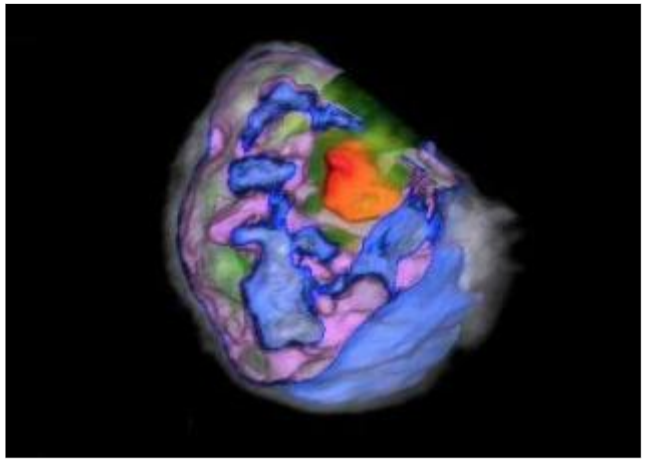


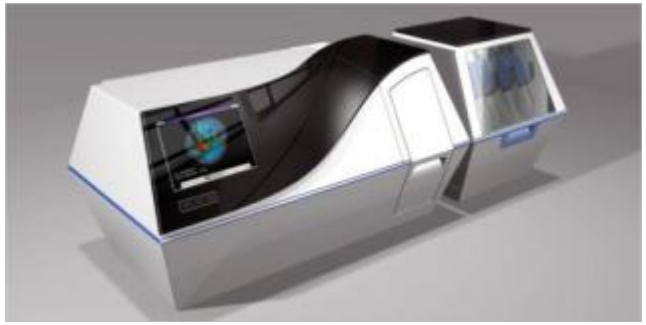
Full case study | YouTube Video

# Cell CT

## Vision Gate Inc., USA

| | |
|---|---|
| **Category:** | Healthcare & Medical |
| **Discipline:** | Cancer Research |
| **Application:** | 3D quantitative analysis of cancer biosignatures in lung cells |
| **Challenges:** | - Microscopy application<br>- 360° cell rotation<br>- 500 high-quality images per cell |
| **Camera Solution:** | AVT Prosilica GE1650 |

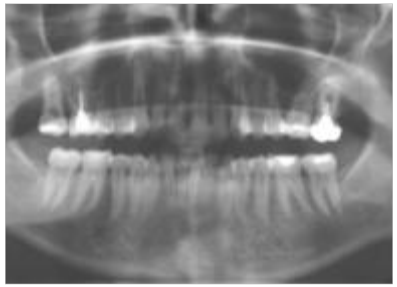




Full case study | YouTube Video

# Dental Imaging System

## Applied Scintillation Technologies, UK

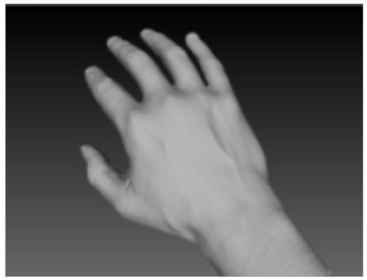


| | |
|---|---|
| **Category:** | Healthcare & Medical |
| **Discipline:** | Dental Imaging (X-Ray) |
| **Application:** | Inspection of X-ray-sensitive coating on dental imaging CCDs |
| **Challenges:** | - High-precision measurement<br>- Microscopy<br>- X-Ray |
| **Camera Solution:** | AVT Prosilica GE49000 (16 Mpixel) |

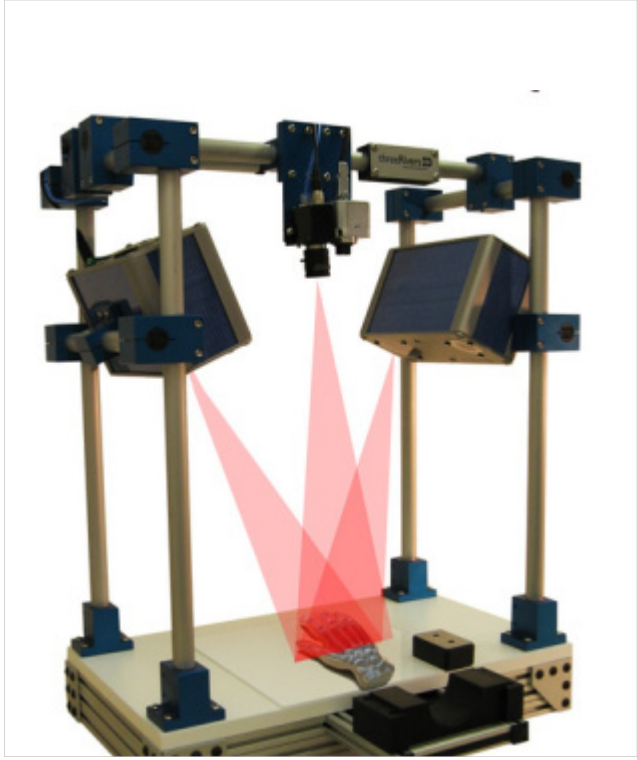
Full case study

# 3D Arthritis Hand Scanner

## threeRivers 3D, USA



| | |
|---|---|
| **Category:** | Healthcare & Medical |
| **Discipline:** | Arthritis Research |
| **Application:** | Diagnostics and monitoring of rheumatoid arthritis |
| **Challenges:** | - Laser triangulation<br>- Multi-camera<br>- Risk of motion blur |
| **Camera Solution:** | AVT Prosilica GC1290 |

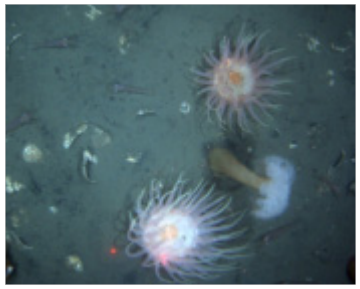


Full case study

# Scallop Stock Assessment

## Alaska Department of Fish and Game, USA

| | |
|---|---|
| **Category:** | Science & Research |
| **Discipline:** | Environmental Research |
| **Application:** | Statistical assessment of scallop stock in Bering Sea |
| **Challenges:** | - Underwater imaging<br>- Low light condition<br>- Cable length (ship → sled) |
| **Camera Solution:** | AVT Prosilica GE1380C |

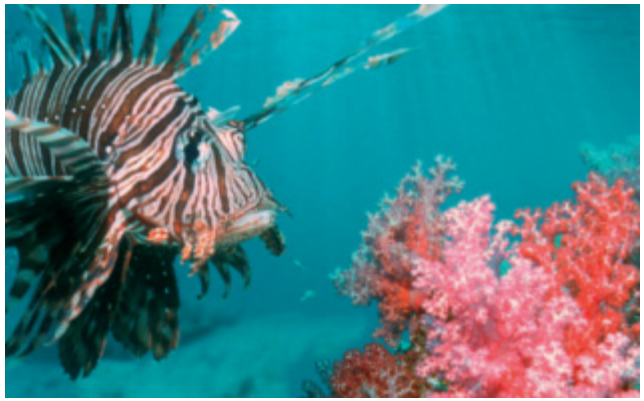


Full case study

# Coral Reef Study

## New-Jersey Institute of Technology, USA

| | |
|---|---|
| **Category:** | Science & Research |
| **Discipline:** | Environmental Research |
| **Application:** | Statistical population assessment of endangered fish species |
| **Challenges:** | - Underwater imaging<br>- Multi-camera system<br>- Cable length (camera → PC) |
| **Camera Solution:** | AVT Prosilica GC1380C |



Full case study

# iView X RED

## SensoMotoric Instruments GmbH, Germany

| | |
|---|---|
| **Category:** | Science & Research |
| **Discipline:** | Behavior Research |
| **Application:** | Eye-Tracking for marketing, ergonomics and psychology,... |
| **Challenges:** | - No head-mounted apparatus<br>- Fast, minimal eye movements<br>- Changing lighting conditions |
| **Camera Solution:** | AVT Pike (customized) |

Full case study | YouTube Video

# Concentrated Solar Power

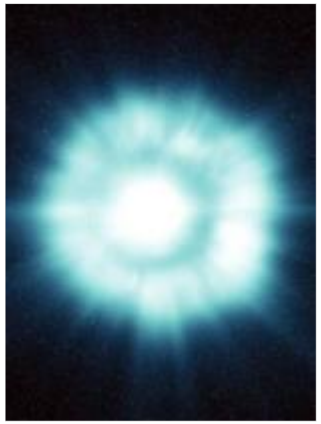
## eSolar Inc., USA

| | |
|---|---|
| **Category:** | Science & Research |
| **Discipline:** | Solar power |
| **Application:** | Thermal solar power plant with vision-based sun tracking |
| **Challenges:** | - Cable length<br>- Hard climate conditions (heat) |
| **Camera Solution:** | AVT Prosilica GC750 |

Full case study | YouTube Video

# Gamma Ray Observation

## Moskow State University, Russia



| | |
|---|---|
| **Category:** | Science & Research |
| **Discipline:** | Astronomy |
| **Application:** | Detection and measurement of gamma ray bursts |
| **Challenges:** | - lowest possible exposure<br>- Lowest possible readout<br>- High resolution |
| **Camera Solution:** | AVT Prosilica GE4000 (11 MPixel) |

Full case study

# Mephisto Extreme

## 3DDynamics, Netherlands

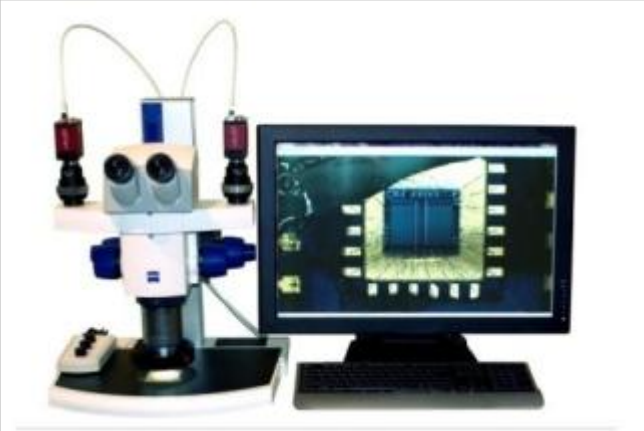
| | |
|---|---|
| **Category:** | Science & Research |
| **Discipline:** | Archeology, life science, etc. |
| **Application:** | 3D Scanning with structured light |
| **Challenges:** | - High precision with HD resolution<br>- High sensitivity<br>- Ease of use (plug-and-play) |
| **Camera Solution:** | AVT Pike F-210 |

Full case study | YouTube Video

# StereoWizard

## Tytec GmbH, Germany

| | |
|---|---|
| **Category:** | Science & Research |
| **Discipline:** | Microscopy |
| **Application:** | Real-time 3D/stereoscopic microscopy |
| **Challenges:** | - High image quality<br>- HD resolution<br>- High frame rates (real-time) |
| **Camera Solution:** | AVT Prosilica GE1910 |

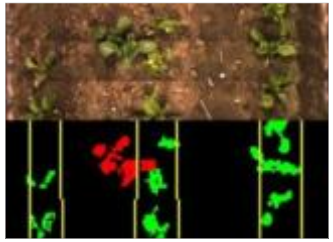


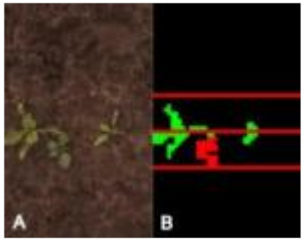
Full case study | YouTube Video

# Weed Scanner

## Wageningen University, Netherlands

| | |
|---|---|
| **Category:** | Science & Research |
| **Discipline:** | Agronomy |
| **Application:** | Vision-based weed treatment on open field |
| **Challenges:** | - Changing lighting conditions<br>- AOI, shading correction, etc.<br>- Harsh environment |
| **Camera Solution:** | AVT Marlin F-201 |





Full case study

# Robonaut 2

## NASA/General Motors, USA

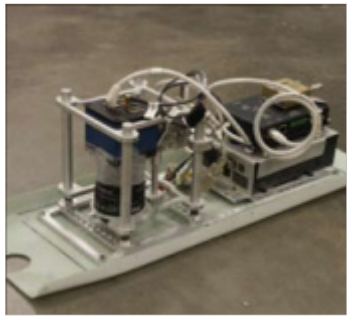
| | |
|---|---|
| **Category:** | Science & Research |
| **Discipline:** | Space exploration, robotics |
| **Application:** | Humanoid astronaut-robot for the International Space Station |
| **Challenges:** | - Humanoid package<br>- Stereoscopy + TOF<br>- Rigors of space flight |
| **Camera Solution:** | AVT Prosilica GC2450C |

Full case study | YouTube Video

# RADAS

## Idaho National Laboratory, USA

| | |
|---|---|
| **Category:** | Security & Traffic |
| **Industry:** | Security, firefighting, defense |
| **Application:** | RADAS = Rapid Airfield Damage Assessment System (reconnaissance with drone) |
| **Challenges:** | - High resolution<br>- High image quality |
| **Camera Solution:** | AVT Prosilica GE4900C (16 MPixel) |



Full case study

# T-EXSPEED 2

## Kria, Italy

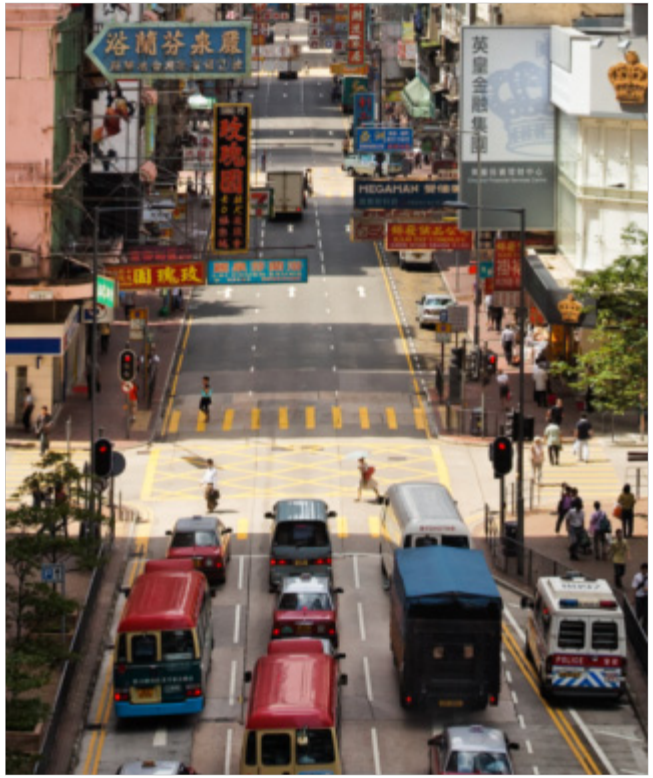
| | |
|---|---|
| **Category:** | Security & Traffic |
| **Industry:** | ITS |
| **Application:** | Radar-/laser-free, 100% vision-based speed enforcement system |
| **Challenges:** | - Changing light conditions<br>- Changing climatic conditions<br>- Limited space |
| **Camera Solution:** | AVT Prosilica GB1380C/2450C |

Full case study

# Intersection Monitoring

## China Daheng, China

| | |
|---|---|
| **Category:** | Security & Traffic |
| **Industry:** | ITS |
| **Application:** | Red light/wrong lane turn enforcement, ALPR |
| **Challenges:** | - Changing light conditions<br>- Changing climatic conditions<br>- High resolution for several lanes |
| **Camera Solution:** | AVT Prosilica GC1600C/2450C |

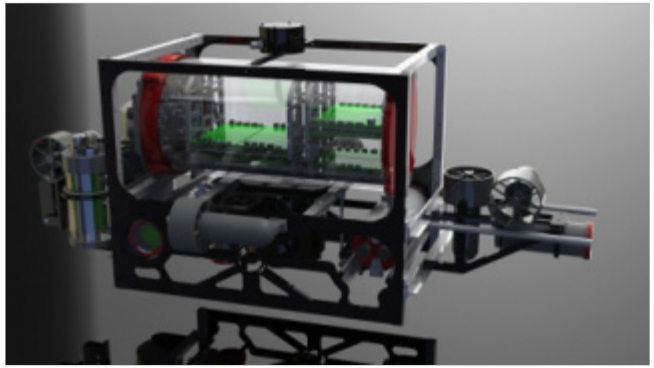


Full case study

# Tachyon

## Cornell University AUV, USA

| | |
|---|---|
| **Category:** | Security & Traffic |
| **Industry:** | Defense, rescue |
| **Application:** | Autonomous underwater vehicle |
| **Challenges:** | - Changing light conditions<br>- Weight and size limitations |
| **Camera Solution:** | AVT Guppy F-046/F-080 |

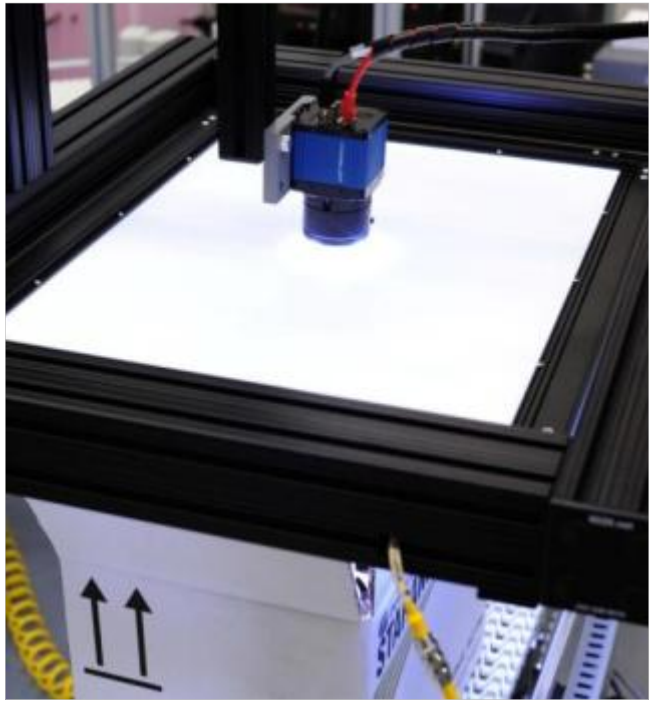


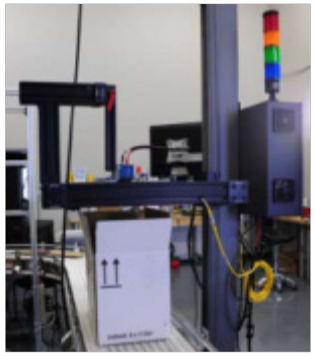
Full case study | YouTube Video

# Product Traceability

## Matrix Systems & Solutions, USA

| | |
|---|---|
| **Category:** | Logistics |
| **Industry:** | Chemicals |
| **Application:** | Datamatrix code reader on bottle packaging line |
| **Challenges:** | - Very small codes on bottle caps<br>- Read full bottle case at once<br>- Random rotation of screwed caps |
| **Camera Solution:** | AVT Prosilica GE4900 (16 MPixel) |



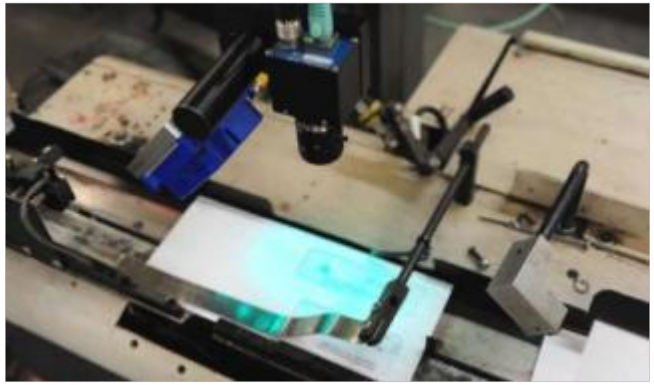


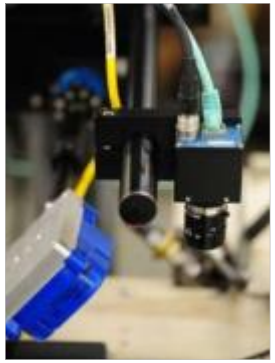
Full case study

# Mail Processing

## Matrix Systems & Solutions, USA

| | |
|---|---|
| **Category:** | Logistics |
| **Industry:** | Document mailing |
| **Application:** | Track mailing of sensitive medical documents with data matrix code |
| **Challenges:** | - 100% error free for legal reasons<br>- Very small code (< 6 mm)<br>- High speed (10,000 codes/h) |
| **Camera Solution:** | AVT Prosilica GC1020 |



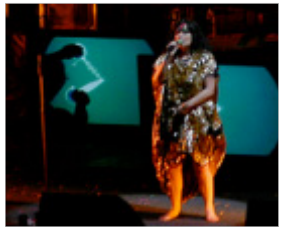


Full case study

# Reactable

## Pompeu Fabra University Barcelona, Spain

| | |
|---|---|
| **Category:** | Multimedia & Entertainment |
| **Industry:** | Music |
| **Application:** | Machine-vision-based synthesizer with table-top interface |
| **Challenges:** | - Real-time processing<br>- Ambient lighting interference<br>- 100% reliability |
| **Camera Solution:** | AVT Guppy F-046 (with NIR-Filter) |



Full case study | YouTube Video

# Automatic Foosball Robot

## Cologne University of Applied Science, Germany

| | |
|---|---|
| **Category:** | Multimedia & Entertainment |
| **Industry:** | Gaming |
| **Application:** | Experimental automated foosball (table soccer) |
| **Challenges:** | - Ball tracking<br>- Real-time processing<br>- Fast reaction |
| **Camera Solution:** | AVT Pike F-032 |

Full case study | YouTube Video

# Playland Roller Coaster

## 3db Solutions, Canada

| | |
|---|---|
| **Category:** | Multimedia & Entertainment |
| **Industry:** | Amusement parks |
| **Application:** | Souvenir photographs during roller-coaster rides |
| **Challenges:** | - High speed<br>- Motion blur<br>- Cable length |
| **Camera Solution:** | AVT Prosilica GC1600C/GE1650C |

Full case study

# Virtual Stage

## Mobidium SAS, France

| | |
|---|---|
| **Category:** | Multimedia & Entertainment |
| **Industry:** | Advertising |
| **Application:** | Interactive advertising floor/wall |
| **Challenges:** | - Real-time interaction (speed)<br>- Multi-camera networking (mosaic mode) |
| **Camera Solution:** | AVT Guppy F-033 (with IR-pass) |

Full case study | YouTube Video

# Swing&See

## R&D Vision, France

| | |
|---|---|
| **Category:** | Multimedia & Entertainment |
| **Industry:** | Sports |
| **Application:** | Golf swing tutorial tool |
| **Challenges:** | - High frame rates for image-per-image slow motion<br>- Multi-camera synchronization |
| **Camera Solution:** | AVT Pike F-032C |

Full case study | YouTube Video

# Bing Streetside

## Vexcel, Austria

| | |
|---|---|
| **Category:** | Multimedia & Entertainment |
| **Industry:** | Online maps and navigation |
| **Application:** | Mobile imaging system to capture street landscapes |
| **Challenges:** | - Changing lighting conditions (outdoor)<br>- Multi-camera (up to 12/vehicle) |
| **Camera Solution:** | AVT Prosilica GC1380C |

Full case study | YouTube Video

# Forever 21 Times Square Billboad

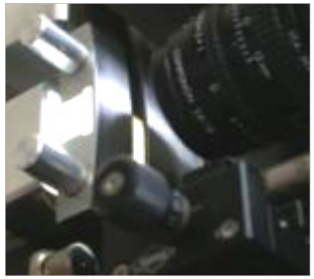
## space150 Inc., USA

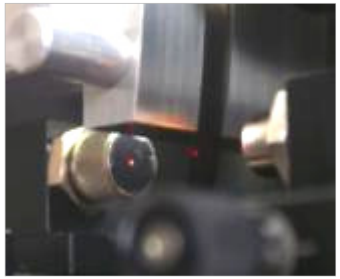
| | |
|---|---|
| **Category:** | Multimedia & Entertainment |
| **Industry:** | Advertising |
| **Application:** | Giant interactive billboard (point of sale advertising) |
| **Challenges:** | - Changing lighting conditions (outdoor)<br>- High resolution and high speed |
| **Camera Solution:** | AVT Prosilica GX1910C (HD) |

Full case study | YouTube Video

# Müller HM Data Framescanner

## FimFabriek, Netherlands



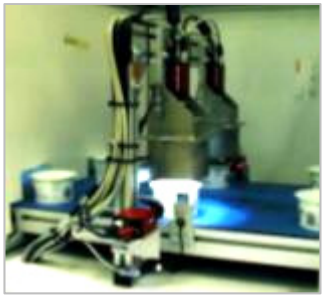


| | |
|---|---|
| **Category:** | Multimedia & Entertainment |
| **Industry:** | Film digitization/restoration |
| **Application:** | Frame-by-frame, multi-format thin film scanning |
| **Challenges:** | - High image quality<br>- Synchronized image capture |
| **Camera Solution:** | AVT Pike F-145C |

Full case study | YouTube Video

# TriVision Packaging Inspector

## TriVision a/s, Denmark



| | |
|---|---|
| **Category:** | Industrial Inspection |
| **Industry:** | Food Packaging |
| **Application:** | 100% quality inspection of food containers |
| **Challenges:** | - High accuracy<br>- High speed<br>- System modularity |
| **Camera Solution:** | 53 AVT Stingray, Marlin and Guppy |

Full case study | YouTube Video

SEEING IS BELIEVING