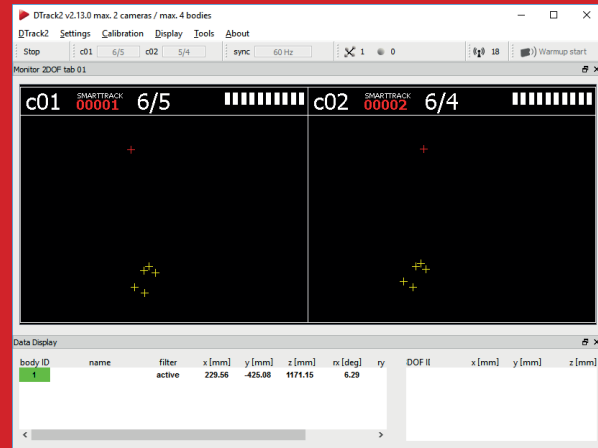# ▶ SOFTWARE

Developing the software components in-house provides us with a lot of flexibility with regards to introducing new features or enhancing the software itself. It also provides us with the possibility to create important additional tools that are beneficial for our customers. Besides DTrack2 we supply ART-Human for Motion Capture applications and ART-Satellite-Merger for extending tracking volumes into previously untrackable spaces.
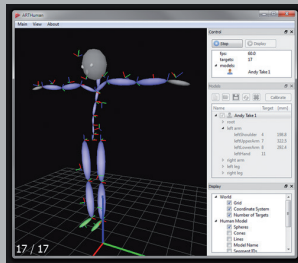
DTRACK2

The "heart" of any ART tracking system controlling all functions and performing the necessary calculations.

▶ DTRACK2 backend software runs on ART Controller
▶ DTRACK2 frontend software (GUI) controls backend remotely
▶ visualises the view of each connected camera
▶ tracks 50 6DOF targets simultaneously
▶ free SDK for integration into media control systems

ART-HUMAN

▶ calculates a human skeleton model with a simple calibration procedure
▶ fast automatic bone-length-calibration (< 1 min)
▶ full inverse kinematics
▶ uses DTrack2 output
▶ interfaces data via VRPN, 6dj, C3D or BVH and to Siemens Jack
▶ supports the ART Fingertracking system

ART-SATELLITE-MERGER

▶ for extending your tracking volume into occluded compartments, such as the interior of a car
▶ compensates for potential movement of the compartment
▶ typical ART output data stream

HYBRID TRACKING

ACCURATE HMD TRACKING FOR BIGGER AREAS!

Sensor fusion combines advantages of inertial and optical tracking technologies

▶ HMD tracking for large rooms
▶ low latency and jitter-free tracking for an enhanced immersive experience
▶ retains sub-millimetre accuracy of optical tracking

SOFTWARE DEVELOPMENT KIT (SDK)

▶ create a custom interface to DTrack2 from your own software application
▶ receives and processes data packets (UDP, ASCII)
▶ exchanges command strings (TCP, ASCII)
▶ offers sample source codes for Unix and Windows
▶ free download from ART website

▶ WHO IS ART?

ART is a leading manufacturer of high-end optical tracking systems for Virtual and Augmented Reality. ART systems are optimised for the Design Visualisation market, with the biggest sector worldwide being the automotive industry. Based on the customer list, we believe that over 80 % of all new car designs worldwide are digitally prototyped using ART systems.

Founded in 1999, ART rapidly became the leading supplier of infrared optical tracking solutions for industry, research institutes and universities. Customers choose ART systems because they need accurate, reliable and stable results to assure trouble-free operation within their large screen visualisation systems.

ART´s quality management is certified by TÜV SÜD for ISO 9001:2015, the most widely used and recognised international standard.

▶ USE CASES

ART tracking devices are optimised for use with VR/AR installations. The determination of the accurate position and orientation of objects is the basic premise for 3D visualisation, and puts the users "inside" the 3D model to dramatically enhance their understanding of complex data. Application examples are virtual prototyping, ergonomic research, quality management and training. ART systems are trusted by a wide range of industrial companies as well as research and training establishments.

VIRTUAL REALITY
Virtual Reality (VR) is a computer generated world in which the user can perform tasks using real world movements and actions. The user sees a stereoscopic image and is able to judge distances and proportions. He can also use his hands to manipulate virtual objects. For a realistic interaction with the virtual content, accurate and reliable motion tracking technology is a necessity.

© Jaguar Landrover

AUGMENTED REALITY
ART's take on Augmented Reality (AR) combines the physical and the virtual world in a very precise way. By tracking a video camera the virtual data can be superimposed on a physical prototype.

© Audi

MOTION CAPTURE FOR ERGONOMIC INVESTIGATIONS AND PRODUCTION PLANNING
"Motion Capture" is the technique of digitising the movement of people, animals or objects. In the case of the ART Motion Capture system, targets are attached to the subject's limbs (no need for lycra body suits!) and the data is captured by performing a range of movements in front of an array of pre-installed cameras.

ART▶

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March 2019

Accurate.Reliable.Tracking.

ART▶

SMARTTRACK

ART Controller

ART motion tracking systems are designed and built with the company's strong quality ethic, which means that accuracy, reliability and stability are designed into our products from the start. Our customers in the primary markets of Industrial Visualisation and Academic Research demand no less. All our products and components are "Made in Germany". ART has been focusing on the VR market from the outset. The proof is in the products we develop, such as ARTTRACK5/C, our unique and very successful third generation Cave specific camera.

Our unique range of tracked input devices supported by sophisticated software utilities means that we provide best possible integration with your immersive virtual environment. Our broad range of adapted targets for different brands of stereo glasses shows our special dedication to the VR market. Or you can bring your own target (BYOT) and track it with any of our systems. We are happy to assist in defining proper geometries for your custom targets.

ART tracking systems have been specifically designed for demanding professional applications in the manufacturing and research sectors.
Our customers choose ART not just for the primary requirements of high accuracy and low latency, but also because systems are always ready for immediate use due to their extreme reliability and stability.

From special tracking targets to customised cameras for unusual tracking purposes, ART systems can be adapted to fulfil a wide variety of user requirements. With all tracking algorithms and hardware developed inside the company, ART has the know-how to modify systems for your unique and challenging project that cannot be solved by standard systems.
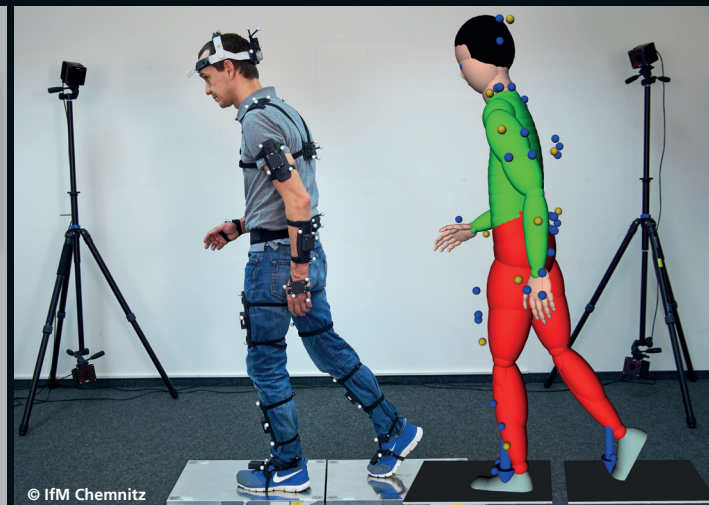
Key features:
- ▶ single cable simplifies installation*
- ▶ ART Controller acts as processor and router*
- ▶ support for active and passive targets
- ▶ noiseless, no fan*
- ▶ invisible IR (850nm) means no visual distraction
- ▶ BYOT (bring your own target)
- ▶ accurate and consistent 6DOF tracking data
- ▶ combination and upgrade possibilities*
- ▶ external synchronisation for stereo glasses

TRACKPACK/E

- ▶ cost-efficient
- ▶ small size
- ▶ frame rate up to 120 Hz
- ▶ sensor resolution 1.1 MP
- ▶ up to 8 cameras connect directly to ART Controller
- ▶ can be mixed and matched with ARTTRACK5(/C)
- ▶ silent in operation

Size (mm):	70 x 59 x 97
Weight:	475 g
Frustum**:	60 m³
Standard focal length:	f = 3.5 mm

© Virtalis

INTERACTION DEVICES

To navigate and interact with the Virtual Reality special devices are necessary. To make this as easy and intuitive as possible, ART has developed several unique interaction devices for use in Virtual Reality projections, such as Flysticks and Fingertracking.

FINGERTRACKING2 TACTILE

- ▶ for haptic feedback in your VR applications
- ▶ compatibility with high frame rates of ARTTRACK5
- ▶ intensity of the vibration can be controlled
- ▶ various sizes for finger thimbles
- ▶ fully supported, i.e. including vibro-tactile feedback, in TechViz and IC.IDO
- ▶ Fingertracking support in Siemens PS, DeltaGen, EON Icube 8, IC.IDO, IPSI Server, Virtalis, VR Concept
- ▶ further VR codes in preparation

ARTTRACK5

- ▶ integrated image processing
- ▶ configurable alphanumeric display
- ▶ frame rate up to 300 Hz
- ▶ sensor resolution 1.3 MP
- ▶ large tracked volume per camera
- ▶ extreme wide angle lenses available
- ▶ easily and completely scalable

Size (mm):	100 x 100 x 92
Weight:	950 g
Frustum**:	100 m³
Standard focal length:	f = 3.5 mm

© IfM Chemnitz

SMARTTRACK

- ▶ integrated image processing and tracking data calculation
- ▶ frame rate up to 60 Hz
- ▶ plug & play tracking solution for small volumes
- ▶ pre-calibrated and ready to use
- ▶ the ideal mobile, out-of-the-box tracking system

Size (mm):	410 x 90 x 60
Weight:	1.25 kg
Frustum**:	4.75 m³

©VirtualPaint

FLYSTICK2

- ▶ six programmable buttons maximises functionality with your 3D software
- ▶ analogue "top hat" joystick for intuitive virtual world navigation
- ▶ up to eight Flystick2 can be used together in collaborative sessions
- ▶ "hot swap" rechargeable batteries for uninterrupted use
- ▶ wireless operation as standard, but a wired version is available for secure areas
- ▶ lightweight and ergonomic

FLYSTICK3

- ▶ four programmable buttons to maximise functionality with your 3D software
- ▶ analogue "top hat" joystick for intuitive virtual world navigation
- ▶ extremely light-weight (120g) wireless interaction device
- ▶ base station charging unit for easy location
- ▶ two different passive target geometries available for multiple user sessions

ARTTRACK5/C

Based on the ARTTRACK5 it provides the same features plus:
- ▶ separate camera head and electronics box
- ▶ ideal for multi-sided projections
- ▶ extremely discrete visual appearance – diameter of only 36.5 mm
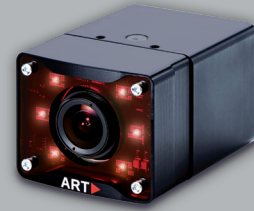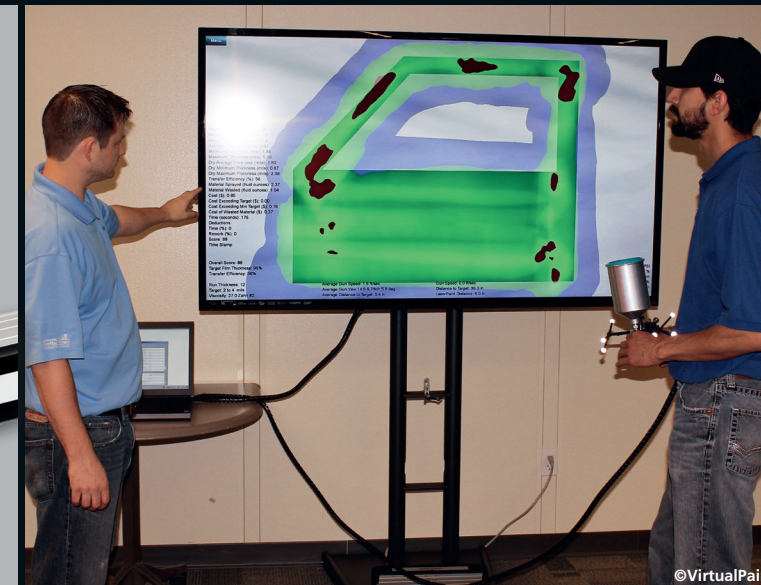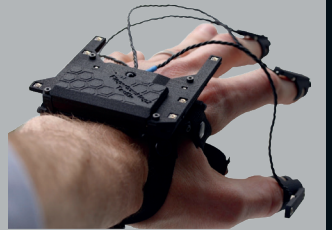- ▶ flexible mounting options thanks to 60 cm cable between head and box

	Camera head	Electronics box ***
Size (mm):	Ø36.5, L = 67	100 x 100 x 55
Weight:	160 g	540 g
Frustum**:	50 m³	
Standard focal length:	f = 4.0 mm	

© Daimler

ART CONTROLLER

- ▶ embedded Linux with DTrack2 backend
  - ▶ performs all calculations
  - ▶ processes the image data in TRACKPACK systems
  - ▶ stores all system settings and configurations
- ▶ operates and powers up to 8 cameras directly
- ▶ rackmount (19") case (3U)
- ▶ compatible to ARTTRACK 1/2/3 (with additional synccard)
- ▶ ethernet connection

Size (mm):	480 x 345 x 135 (3U)
Weight:	9.75 kg

MARKERS & TARGETS

For different requirements you might need different markers and targets.
For full body Motion Capture we provide a complete body segment based target set designed to be worn over normal clothes which is available as an optical or hybrid version and can be worn in a variety of combinations such as full and half body. The tracked data can be visualised as a realtime manikin in ART's ART-Human application, or recorded for post-processing.
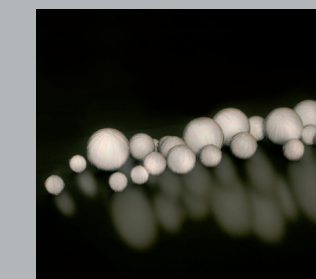
MOTION CAPTURE

- ▶ individual 6DOF targets – no lycra body suit needed!
- ▶ 6DOF targets track the body's limbs
- ▶ absolute position of the human body
- ▶ use your tracking data directly in real-time, without the need for post processing
- ▶ compatible with Fingertracking

MARKERS

- ▶ spherical
- ▶ coated spherical
- ▶ flat (i.e. stickers)
- ▶ active flat:
  - ▶ long range
  - ▶ outdoor
- ▶ single LED markers:
  - ▶ short range

TARGETS

- ▶ passive reflective
  - ▶ glasses targets
    + one size fits all (generic targets)
    + adapted clip-on for popular brands of stereo glasses
  - ▶ hand & tree targets
  - ▶ customised targets
- ▶ with active LEDs
  - ▶ call us to discuss your custom requirement
  - ▶ evaluation kit available

* Except for SMARTTRACK   ** with 12mm spherical markers   *** not displayed in picture

** with 12mm spherical markers