Exploitable Results by Third Parties

17028 MOSIM

Project details

<table>
<thead>
<tr>
<th>Project leader:</th>
<th>Dr. Thomas Bår</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email:</td>
<td><a href="mailto:Thomas.baer@daimler.com">Thomas.baer@daimler.com</a></td>
</tr>
<tr>
<td>Website:</td>
<td><a href="http://www.mosim.eu/">http://www.mosim.eu/</a></td>
</tr>
</tbody>
</table>
**Name: MOSIM Framework**

<table>
<thead>
<tr>
<th>Input(s):</th>
<th>Main feature(s)</th>
<th>Output(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>• MMU</td>
<td>• Combination of heterogeneous motion synthesis</td>
<td>• Human simulation in chosen target</td>
</tr>
<tr>
<td>• 3D Scene incl.</td>
<td>approach by utilizing motion model units</td>
<td>engine</td>
</tr>
<tr>
<td>avatar</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Unique Selling Proposition(s):**

- The framework allows combining heterogeneous motion synthesis approaches by utilizing modular units referred as Motion Model Units (MMUs). These units can be realized in different programming languages and engines. The core framework utilizes Apache Thrift for communication and to automatically generate source code files for many programming languages.

**Integration constraint(s):**

- See: [https://github.com/Daimler/MOSIM_Core](https://github.com/Daimler/MOSIM_Core)

**Intended user(s):**

- Application developers or research engineers that have interest to generate human simulations based on existing motion model unit.

**Provider:**

- Daimler – Open Source Code
- [https://github.com/Daimler/MOSIM_Core](https://github.com/Daimler/MOSIM_Core)

**Contact point:**

- Dr. Thomas Bär – Thomas.baer@daimler.com

**Condition(s) for reuse:**

- MIT Licence

**Latest update:** June 2021

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**Involved Partner(s):** Daimler Buses, DFKI

**MOSIM-Framework for the utilization of heterogeneous digital human simulations**

**Type of Exploitable Result:**

- Tool (available as open source software)

**Description:**

- Framework to embed heterogeneous digital human simulations based on Motion Model Units (MMUs)

**Target Industry:**

- Main industry: Automotive
- Applicable across different manufacturing industries

**Current Maturity (status of May 2021):**

- Prototype

**Contact:** Thomas Bär; Klaus Fischer; Janis Sprenger
## Name: MOSIM Services

<table>
<thead>
<tr>
<th>Input(s):</th>
<th>Main feature(s):</th>
<th>Output(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avatar Description</td>
<td>Shared functionality for various functionality</td>
<td>Service depending results</td>
</tr>
<tr>
<td>Service related Properties</td>
<td>Extendible with generic services possible</td>
<td></td>
</tr>
<tr>
<td>MOSIM Framework</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Unique Selling Proposition(s):
- Service based infrastructure for shared functionality within the MOSIM framework
- Specific service interfaces defined and implemented: Inverse Kinematics (IK), Path Planning, Scene Access, Skeleton Access, Posture Blending Service, Walk Point Selection Service, Coordinate System Mapper, Collision Detection Service
- Implementation can be exchanged
- Arbitrary services can be implemented with the generic service interface
- Services can run independently or integrated in target engine

### Integration constraint(s):
- MOSIM Framework
- [https://github.com/Daimler/MOSIM_Services](https://github.com/Daimler/MOSIM_Services)

### Intended user(s):
- MMU developers
- Behavior model
- Target engine

### Provider:
- Daimler – Open Source Code
- [https://github.com/Daimler/MOSIM_Services](https://github.com/Daimler/MOSIM_Services)

### Contact point:
- Janis Sprenger

### Condition(s) for reuse:
- MIT License

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**Latest update: June 2021**

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Involved Partner(s): DFKI, Daimler Buses, University of Skövde, TWT

**MOSIM Services**

**Type of Exploitable Result:**
- Service (dedicated to Opera Engine)

**Description:**
- A path planning service which solves the planning of collision-free paths between a specified start and end point
- ROSA and direct measurements support evaluation services
- A multi-contact inverse kinematics service
- A ratating service or transfer motion from one hierarchy to another

**Target Industry:**
- Research and Development
- Gaming

**Current Priority (June 2021):**
- Priority

**Contact:** Janis Sprenger
<table>
<thead>
<tr>
<th>Name: MMI-Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input(s):</strong></td>
</tr>
<tr>
<td>MOSIM Framework</td>
</tr>
<tr>
<td>Scene constraints</td>
</tr>
</tbody>
</table>

| **Main feature(s):** |
| Standard driven by Standardization Organization |
| Focus on industrial use and defined interface description |
| Use of MOSIM services |

| **Output(s):** |
| Standardized Interface Description |

| **Unique Selling Proposition(s):** |
| Standardized MMI Interface for the use if MMU’s |
| Use of heterogeneous motion synthesis |
| Use of different programming languages |

| **Integration constraint(s):** |
| MOSIM Framework |
| [https://github.com/Daimler/MOSIM_Core](https://github.com/Daimler/MOSIM_Core) |

| **Intended user(s):** |
| MMU developers |

| **Provider:** |
| Daimler — Open Source Code |
| [https://github.com/Daimler/MOSIM_Core](https://github.com/Daimler/MOSIM_Core) |

| **Contact point:** |
| André Rückert |

| **Condition(s) for reuse:** |
| MIT License |
| Standardization Org License (under discussion) |

**Latest update: June 2021**
<table>
<thead>
<tr>
<th>Name: Intermediate Skeleton</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input(s):</strong></td>
</tr>
<tr>
<td>- Anthropometric scaling</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Unique Selling Proposition(s):**
- Well defined skeletal definition of a humanoid actor
- All participants of the framework must agree on the specific definition
- Shared definition can be extended in the future (e.g. for more accurate human representation, for non-humanoid characters, etc.)
- Can be used in combination with the retargeting service and the retargeting configurator to allow fast, reliable, and adjustable retargeting from and to the intermediate skeleton

**Integration constraint(s):**
- Skeleton Definition (Skeleton Configurator: [https://github.com/Daimler/MOSIM_Tools](https://github.com/Daimler/MOSIM_Tools))
- Retargeting Service: [https://github.com/Daimler/MOSIM_Services](https://github.com/Daimler/MOSIM_Services)
- MOSIM Framework
- Documentation ([https://github.com/Daimler/MOSIM_Core/wiki](https://github.com/Daimler/MOSIM_Core/wiki))

**Intended user(s):**
- MMU Developers
- Service Developers
- Target Engine Developers

**Provider:**
- Daimler – Open Source Code
  - [https://github.com/Daimler/MOSIM_Core](https://github.com/Daimler/MOSIM_Core)

**Contact point:**
- Janis Sprenger

**Condition(s) for reuse:**
- MIT License

Latest update: June 2021
# Exploitable Results by Third Parties

## 17028 MOSIM

### Name: Basic Motion Model Units (MMUs)

<table>
<thead>
<tr>
<th>Input(s):</th>
<th>Main feature(s):</th>
<th>Output(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Scene constraints</td>
<td>• Utilization of various motion simulation techniques in different programming</td>
<td>• Simulated human motion in intermediate skeleton format</td>
</tr>
<tr>
<td>• MOSIM services (IK, path planning)</td>
<td>• Communication through motion model interface (MMI)</td>
<td></td>
</tr>
<tr>
<td>• MOSIM intermediate skeleton</td>
<td>• Simulation of specific human motions according to scene constraints</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Use of MOSIM services &amp; skeleton</td>
<td></td>
</tr>
</tbody>
</table>

**Unique Selling Proposition(s):**
- Implementation does not require specific programming language and motion simulation technique.
- Output is modular and can be combined to complex motions within MOSIM framework.

**Integration constraint(s):**
- See: [https://github.com/Daimler/MOSIM_Core](https://github.com/Daimler/MOSIM_Core)

**Intended user(s):**
- Application developers or research engineers who have interest to generate individual human simulations for their use cases.

**Provider:**
- Daimler – Open Source Code
  - [https://github.com/Daimler/MOSIM_Core](https://github.com/Daimler/MOSIM_Core)

**Contact point:**
- Dr. Hans-Joachim Wirsching – hjwirsching@human-solutions.com

**Condition(s) for reuse:**
- MIT License

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**Involved Partner(s):** Daimler, DFKI, HS, LUT, Mimic, Sign Time, Uni Siegen

**Basic MMUs**

- **Type of Exploitable Result:** Open Source
- **Description:**
  - Basic MMUs for composition of abstract tasks in manufacturing use case stories
  - Generic MMI interface for usage in modular MOSIM Framework
  - Utilization of MOSIM intermediate skeleton
- **Target Industry:** Manufacturing industry: Production design
- **Current Maturity (Status of May 2021):** Prototype
- **Contact:** Hans-Joachim Wirsching Human Solutions GmbH
### Name: MMU library

<table>
<thead>
<tr>
<th>Input(s):</th>
<th>Main feature(s):</th>
<th>Output(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ MMU description</td>
<td>▪ Search for specific motion</td>
<td>▪ MMU package (zip Archive)</td>
</tr>
<tr>
<td>▪ MMU requirements</td>
<td>▪ Preview the motion (image, video)</td>
<td></td>
</tr>
<tr>
<td>and motion types</td>
<td>▪ Buy and download the MMU</td>
<td></td>
</tr>
<tr>
<td>▪ Search for specific motion</td>
<td>▪ Preview the motion (image, video)</td>
<td></td>
</tr>
<tr>
<td>▪ Buy and download the MMU</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Unique Selling Proposition(s):
- The gallery offers a wide range of MMUs to fit different use cases.
- MMU providers can upload and sell their MMUs on the library
- MMU users can download and combine them to create various simulations.

#### Integration constraint(s):
- Local version available on the user’s computer
- Online version available on the MOSIM website and 3rd-party web shops

#### Intended user(s):
- MMU providers who want to sell their own MMUs
- Everyone who wants to download and use MMUs within the MOSIM framework

#### Provider:
- MP Mimic Production GmbH (Library concept)
- MOSIM partners (Library development and MMU creation)

#### Contact point:
- Alexandre Donciu-Julin - a.djulin@mimicproductions.com

#### Condition(s) for reuse:
- Available online (MOSIM website, third-party webshops)
  See [https://www.mosim.eu/download.php](https://www.mosim.eu/download.php)

*Latest update: June 2021*

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**Involved Partner(s): Mimic Productions, HS, LUT**

**Implementation of a centralized MMU library**

- **Type of Exploitable Result:**
  - Service

- **Description:**
  - The gallery offers a wide range of MMUs to fit different use cases.
  - MMU providers can upload and sell their MMUs on the library
  - MMU users can download and combine them to create various simulations.

- **Target Industry:**
  - Industrial Simulations, Artificial Intelligence, Chat-bots, Entertainment, etc.

- **Current Maturity (status of June 2021):**
  - Prototype available on MOSIM website: [https://www.mosim.eu/download.php](https://www.mosim.eu/download.php)

- **Contact:** Alexandre Donciu-Julin, Mimic Productions
### Name: Task Editor

<table>
<thead>
<tr>
<th>Input(s):</th>
<th>Main feature(s):</th>
<th>Output(s):</th>
</tr>
</thead>
</table>
| ▪ Task list (high level description of worker tasks)  
  ▪ Simulation scene  
  ▪ User list  
  ▪ Project list  
  ▪ Tool list | ▪ Simple task editing for human workers  
  ▪ Organization of simulation projects  
  ▪ User management and access rights for shared project data  
  ▪ Multiuser collaboration of simulation project  
  ▪ Web interface | ▪ Direct integration to AJAN reasoning service  
  ▪ XML and JSON standardized format output of tasks |

#### Unique Selling Proposition(s):
- Based on industrial manufacturing workflow requirements
- Extendable for other use cases
- Support for multi-avatar environments and avatar interactions
- Automatic synchronization of scene elements with target engine
- Generating human simulation without need for programming

#### Integration constraint(s):
- Web server with database backend and PHP support
- Internet domain (if deployed on Internet) and HTTPS certificate for secure connection (if accessible outside local network)

#### Intended user(s):
- MOSIM framework end users

#### Provider:
- Lappeenranta University of Technology
- [https://github.com/Lappeenranta-University-of-Technology/mosim-task-editor-server](https://github.com/Lappeenranta-University-of-Technology/mosim-task-editor-server)

#### Contact point:
- Adam Klodowski

#### Condition(s) for reuse:
- Apache2 license

*Latest update: June 2021*
<table>
<thead>
<tr>
<th>Name: Reasoning Engine (AJAN)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input(s):</strong></td>
</tr>
<tr>
<td>- Behavior Models (SPARQL-BTs)</td>
</tr>
<tr>
<td>- High-Level Tasks</td>
</tr>
<tr>
<td>- MOSIM Framework endpoints, like Scene-Access</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unique Selling Proposition(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Domain-free multi-agent system web service for behavior modeling and execution of agents, based on SPARQL-BTs</td>
</tr>
<tr>
<td>- AJAN is fully integrated into the MOSIM infrastructure and is used for dynamic execution of available MMUs based on predefined tasks of the High-Level Task Editor</td>
</tr>
<tr>
<td>- Has a web editor for intuitive modeling of so-called MOSIM-breakdowns</td>
</tr>
<tr>
<td>- It can be easily extended (with the AJAN-Plug-In System) with additional AI methods like, Reinforcement Learning, Action Planning a.o.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Integration constraint(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>- MOSIM context: MOSIM Framework, MMUs, High-Level Task Editor</td>
</tr>
<tr>
<td>- General: HTTP + RDF</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intended user(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>- MOSIM users in general who want to run avatar tasks or model avatar behavior in detail or test MMU behavior</td>
</tr>
<tr>
<td>- Expert users who are skilled in modeling agents and thus in implementing autonomous system behavior</td>
</tr>
<tr>
<td>- Novices who have no prior knowledge of RDF and SPARQL but still want to model avatar behavior based on expert template</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Provider:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- DFKI – Open Source Code</td>
</tr>
<tr>
<td>- AJAN-service: <a href="https://github.com/aantakli/AJAN-service">https://github.com/aantakli/AJAN-service</a></td>
</tr>
<tr>
<td>- AJAN-editor: <a href="https://github.com/aantakli/AJAN-editor">https://github.com/aantakli/AJAN-editor</a></td>
</tr>
<tr>
<td>- AJAN-MOSIM-Unity: <a href="https://github.com/aantakli/AJAN-MOSIM-unity">https://github.com/aantakli/AJAN-MOSIM-unity</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Contact point:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- André Antakli</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Condition(s) for reuse:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- AJAN-service: LGPL-2.1 License</td>
</tr>
<tr>
<td>- AJAN-editor: MIT License</td>
</tr>
<tr>
<td>- AJAN-MOSIM-Unity: MIT License</td>
</tr>
</tbody>
</table>

*Latest update: <18.06.2021>*
Involved Partner(s): DFKI
Reasoning Engine (AJAN) for Breakdownexecution

Type of Exploitable Result:
- Service (available as Open Source)

Description:
- Multi-Agent System for the graphical modeling and execution of system behavior.
- AJAN is a Web service that follows the Linked Data paradigm.
- The behavior model used for the BDI-Agent Plan is based on RDF/SPARQL. Behavior Trees AJAN provides an interface to use other AI methods for behavioral modeling.

Target Industry:
- Can be used for orchestration and control of linked data domains
- Can be used for the modeling and execution of behaviors of autonomous entities such as simulated pedestrians, workers and robots

Current Maturity (status of June 2021):
- Prototype

Contact: Andre Antaki, DFKI
## Module add-on for human centric process validations (IC.IDO)

<table>
<thead>
<tr>
<th>Input(s):</th>
<th>Main feature(s):</th>
<th>Output(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geometrical scene + constrains</td>
<td>Simulation of specific human motions according to scene constraints</td>
<td>Validated and optimized worker process sequences</td>
</tr>
<tr>
<td>Process data</td>
<td>Use of MOSIM services &amp; skeleton</td>
<td>Ergonomics estimation</td>
</tr>
<tr>
<td>MOSIM services</td>
<td>Easy adaption of scenario parameters and start of a new simulation / virtual tryout environment</td>
<td></td>
</tr>
<tr>
<td>MOSIM intermediate skeleton</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Unique Selling Proposition(s):
- Integration in production planning process
- Data usage of production planning system
- Realistic motion simulation

### Integration constraint(s):
- MOSIM outcome stability/robustness (MMU availability, behavior modelling)
- 3D production input availability
- Availability of a human body model (RAMSIS support)
- Transfer of meta data out of source systems as simulation parameters

### Intended user(s):
- Production Planning Engineers
- Final assembly line workers (blue color people)

### Provider:
- ESI Software Germany GmbH

### Contact point:
- André Rückert – andre.rueckert@esi-group.com

### Condition(s) for reuse:
- IC.IDO proprietary license

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**Latest update: June 2021**
### Name: Module for Production Planning Software

<table>
<thead>
<tr>
<th>Input(s):</th>
<th>Main feature(s):</th>
<th>Output(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Geometrical scene + constraints</td>
<td>• Simulation of human body based on the scenario</td>
<td>• Simulated human body motion based on the scenario: location of parts, tools and carriers</td>
</tr>
<tr>
<td>• Process data</td>
<td>• Easy adaption of scenario parameters and start of a new simulation</td>
<td>• Ergonomics estimation</td>
</tr>
<tr>
<td></td>
<td>• Fast simulation answer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 1:1 visualization of simulation results in e.g. VR possible</td>
<td></td>
</tr>
</tbody>
</table>

| Unique Selling Proposition(s):    | • Integration in production planning process                                      |                                                                            |
|                                   | • Data usage of production planning system                                         |                                                                            |
|                                   | • Realistic motion simulation                                                     |                                                                            |

| Integration constraint(s):        | • 3D production planning SW tool decision                                        |                                                                            |
|                                   | • Availability of a human body model                                             |                                                                            |
|                                   | • Transfer of meta data out of source systems as simulation parameters            |                                                                            |

| Intended user(s):                 | • Production Planning Engineers                                                  |                                                                            |
|                                   | • Ergonomics Specialist (Technician or Engineer)                                 |                                                                            |

| Provider:                         | Daimler Protics GmbH                                                            |                                                                            |
| Contact point:                    | Immo Güntke, Daimler Protics GmbH, immo.guerntke@daimler.com                    |                                                                            |

| Condition(s) for reuse:          | Daimler or rather Daimler Protics GmbH proprietary license license              |                                                                            |

Latest update: June 2021

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**Involved Partner(s): Daimler Protics**

**Module for Production Planning Software**

**Type of Exploitable Results:**
- Add-on (or as Service)

**Description:**
- Possibility to simulate Human Model in 3D production scenario within a given production planning visualization
- Based on existing assembly sequence plans
- Including equipment, tools, etc.

**Target Industry:**
- Automotive
- Production Planning
- Service

**Maturity:**
- Proof of concept

**Contacts:** Immo Güntke (Daimler Protics GmbH)
### Name: RAMSIS Interface to MMU library

<table>
<thead>
<tr>
<th>Input(s):</th>
<th>Main feature(s):</th>
<th>Output(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geometrical scene constraints</td>
<td>Simulation of human motion based on motion capture data</td>
<td>Simulated human motion in RAMSIS avatar format</td>
</tr>
<tr>
<td>RAMSIS avatar</td>
<td>Consideration of scene constraints and avatar dimensions</td>
<td></td>
</tr>
<tr>
<td>Motion task</td>
<td>Extendable by additional motion data</td>
<td></td>
</tr>
</tbody>
</table>

**Unique Selling Proposition(s):**
- Seamless integration in RAMSIS simulation framework
- Customization by additional specific motion data
- Realistic motion simulation

**Integration constraint(s):**
- Available in ergonomic tool RAMSIS

**Intended user(s):**
- Ergonomic package engineers who intend to evaluate dynamic ergonomic aspects.

**Provider:**
- Human Solutions GmbH

**Contact point:**
- Dr. Hans-Joachim Wirsching – hjwirsching@human-solutions.com

**Condition(s) for reuse:**
- Human Solutions proprietary license

*Latest update: June 2021*

**Involved Partner(s):**
- HS RAMSIS interface to MMU library

**Type of Exploitable Result:**
- Add-on

**Description:**
- Extension of RAMSIS motion simulation capabilities by MMU transition and constraint techniques
- Extension of RAMSIS motion simulation kernel by MMI interface concepts
- Implementation of interface between RAMSIS human model and MOSIM intermediate skeleton

**Target Industry:**
- Automotive industry: Product design

**Current Maturity (Status of May 2021):**
- Prototype

**Contact:**
- Hans-Joachim Wirsching, Human Solutions GmbH
### Exploitable Results by Third Parties

**17028 MOSIM**

<table>
<thead>
<tr>
<th>Input(s):</th>
<th>Main feature(s)</th>
<th>Output(s):</th>
</tr>
</thead>
</table>
| - Unreal Scene | - Conversion of the Unreal simulation into the format applied by MOSIM  
- Coupling of the MMU’s, services and the MOSIM register | - MOSIM generated motions fulfilled by the Unreal character in the Unreal scene |

| Unique Selling Proposition(s): | Integration of MOSIM into Unreal  
- Additional Game Engine extends the amount of possible users of MOSIM considerably |
| Integration constraint(s): | - Conversion of the Unreal simulation into the format applied by MOSIM  
- Coupling of the MMU’s, services and the MOSIM register |
| Intended user(s): | Everyone who wants to use MOSIM with the Unreal Engine |
| Provider: | TWT GmbH |
| Contact point: | Caroline Handel |
| Condition(s) for reuse: | MIT Licence |

*Latest update: June 2021*

**Involved Partner(s):** TWT GmbH  
**MOSIM Plugin for Tronis®**

**Type of Exploitable Result:** Add-on  
**Description:**  
- Connection between Tronis® pedestrian simulation and MOSIM library with the MOSIM intermediate skeleton  
- Possibility to realize more complex behaviors with the MMI toolkit (task list, behavior modeling)  
- Compatibility to standardized task descriptions with the MOSIM task editor  
**Target Industry:**  
- Main industries: Automotive  
**Current Maturity (status of April 2020):**  
- Concept  
**Contact:** Caroline Handel, TWT GmbH
### Name: Mevea integration to MOSIM framework

<table>
<thead>
<tr>
<th>Input(s):</th>
<th>Main feature(s)</th>
<th>Output(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task list for human avatars</td>
<td>Simulation of the human interacting with machines</td>
<td>Human simulation in environment with machines that are digital twin of real machines</td>
</tr>
<tr>
<td>MMUs</td>
<td>Testing sensors' digital twins with human models</td>
<td>Human – machine interaction</td>
</tr>
<tr>
<td>Services</td>
<td>Evaluation of hazardous scenarios</td>
<td>Digital twins of sensors can interact with human avatars in the scene</td>
</tr>
<tr>
<td>Human avatars</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Unique Selling Proposition(s):**
- State of the art real-time simulation of machines
- Digital twins of sensors modules
- Support for motion platforms and real controls
- Hardware in the loop integration
- Operator training (including scenarios with observers)

**Integration constraint(s):**
- Mevea software package
- Mosim framework
- Unity

**Intended user(s):**
- MOSIM framework end users who need also dynamics real-time multibody simulator

**Provider:**
- Mevea Oy

**Contact point:**
- Asko Rouvinen

**Condition(s) for reuse:**
- Commercial license

*Latest update: June 2021*
### Exploitable Results by Third Parties

**17028 MOSIM**

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**Name: IPS platform as a MMU target engine**

<table>
<thead>
<tr>
<th>Input(s):</th>
<th>Main feature(s)</th>
<th>Output(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMU</td>
<td>Use features from MMUs</td>
<td>Animation of MMU</td>
</tr>
<tr>
<td>3D geometry</td>
<td>Possibility to blend MMUs with the algorithm heavy IMMA motions</td>
<td></td>
</tr>
</tbody>
</table>

**Unique Selling Proposition(s):**
- Make use of MMU library inside IPS IMMA

**Integration constraint(s):**
- License of IPS IMMA

**Intended user(s):**
- Simulation engineers in production

**Provider:**
- IPS AB

**Contact point:**
- Tobias Forsberg

**Condition(s) for reuse:**
- Perpetual or leasing license of IPS IMMA

**Latest update: June 2021**

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**Involved Partners:** FCC, IPS AB

**IPS platform as a MMU target engine**

**Type of Exploitable Result:**
- Add-on

**Description:**
- Connection between IPS IMMA and MOSIM MMI using the MOSIM MMI interface
- IPS IMMA imports and utilizes certain MMUs
- Can be used in workforce optimization module of IPS software

**Target Industry:**
- Main industries: Automotive

**Current Maturity (status of May 2021):**
- Prototype

**Contact:** Niklas Delhi, FCC
<table>
<thead>
<tr>
<th>Input(s):</th>
<th>Main feature(s):</th>
<th>Output(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production assembly structure in AVIX</td>
<td>Line balancing with time and ergonomic aspects</td>
<td>Line optimization with increased capacity</td>
</tr>
<tr>
<td>Ergonomic simulation from IPS</td>
<td>Visualization of ergonomic load per manually activity in assembly</td>
<td>Improved ergonomic situation for operators</td>
</tr>
</tbody>
</table>

**Name: Ergonomic Balancing**

**Unique Selling Proposition(s):**
- Combines optimization of production capacity and ergonomic load for operators.

**Integration constraint(s):**
- Ergonomic simulation in IPS to calculate ergonomic load automatically.
- Or manually performed ergonomic assessment

**Intended user(s):**
- Production engineers, Process planners

**Provider:**
- Solme AB

**Contact point:**
- Oskar Ljung

**Condition(s) for reuse:**
- AVIX license

**Latest update: June 2021**

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**Involved Partner(s):** Solme AB, IPS AB

**Name of Exploitable Result:**

**Type of Exploitable Result:**
- Add-on

**Description:**
- Connection between IPS and AVIX
- Visualization of ergonomic assessment in Yamazumi chart

**Target Industry:**
- Automotive
- Production with manual operations with high repetitivity

**Current Maturity (status of June 2021):**
- Start of Industrialization

**Contact:** Oskar Ljung, Solme AB
# Exploitable Results by Third Parties

## 17028 MOSIM

### Name: IPS workplace optimization

<table>
<thead>
<tr>
<th>Input(s):</th>
<th>Main feature(s):</th>
<th>Output(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 3D Geometry 3D geometry</td>
<td>- Wizard to set up and adapt simulations wrt ergonomics</td>
<td>- Videos of simulations</td>
</tr>
<tr>
<td>- JSON file from Avix with instructions on the setup of bite-sized simulations</td>
<td>- Simulations possible to view and adapt</td>
<td>- Optimized simulations wrt ergonomics</td>
</tr>
<tr>
<td>- Rebalancing in Avix based on times</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Unique Selling Proposition(s):
- Setting up advanced ergonomically sound simulations, guided from start to finish
- Use EPP for finalized step of optimizing positions of surrounding geometries

### Integration constraint(s):
- Avix software
- IPS IMMA software

### Intended user(s):
- Simulation engineers within production
- Ergonomists

### Provider:
- IPS AB

### Contact point:
- Tobias Forsberg (tobias.forsberg@industrialpathsolutions.com)

### Condition(s) for reuse:
- Perpetual license or leasing

**Latest update: June 2021**

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Involved Partners: IPS AB, FCC, SOLME AB, Skövde
IPS workplace optimization add-on

**Type of Exploitable Result:**
- Add-on

**Description:**
- Midway software connection between AVIX, IPS and EPP
- Multiple model optimization with regards to assembly time and ergonomics
- Connects workplace optimization with the MRRs through IPS IMMA add-on

**Target Industry:**
- Main industries: Automotive

**Current Maturity (status as of May 2021):**
- Prototype

**Contact:** Tobias Forsberg IPS