



**A.W.A.R.E.**

***Advanced Worker Awareness to Reduce Endangerment***

**in partnership with PharmaFlight, PLC<sup>2</sup>**



*A.W.A.R.E. - a physiological evaluation program which provides scientific protocol to enhance and maintain good performance and well-being in high stress working environments*

<sup>1</sup> ATA Associates, Inc. (ATA) is a leading provider of forensic engineering, accident reconstruction, product failure analysis and technical consulting services to understand the human factors of accidents. [www.ataassociates.com](http://www.ataassociates.com)

<sup>2</sup> PharmaFlight, PLC (PF) is focused on research and the development of tools and evaluation protocols to optimize the human performance of pilots, drivers and others engaged in high stress jobs. [www.pharmaflight.hu](http://www.pharmaflight.hu)

## **A.W.A.R.E. -**

### **A Real Time Physiological Evaluation Program with Scientific Feedback**

ATA Associates has established the A.W.A.R.E. (Advanced Worker Awareness to Reduce Endangerment) program in the United States in collaboration with PharmaFlight (PF) as a physiological evaluation and feedback protocol to enhance and maintain good performance and well-being in high stress job environments. The aim is to maintain optimal physical and mental capacity among workers as a means to reduce human error and handle unexpected events professionally.

AWARE includes physiological testing with focused and informed feedback to improve the health and performance capabilities of truck drivers, railroad workers, and other personnel working in high stress roles in multiple industries. Our goal is to use scientific methodologies to assess physiological status and fatigue. ATA does this utilizing physiological testing equipment and associated algorithms developed by PharmaFlight, a company whose roots are in the Hungarian National Aviation Medical Research Institute. Its objective measurement system to measure and scale physical status was developed over the past 30+ years and over 300,000 test subjects.

## **PharmaFlight – Background**

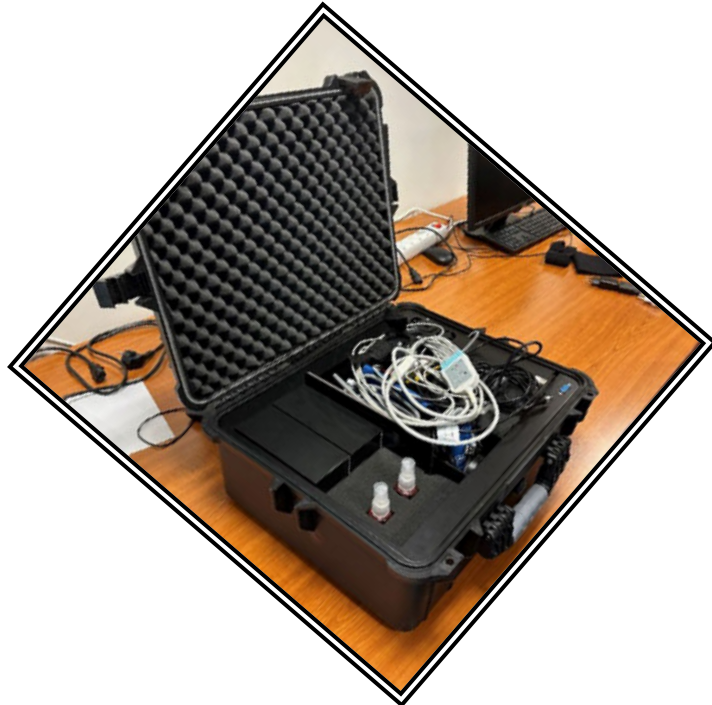
PharmaFlight tools have been used in the recruitment and selection phase of air traffic controllers for Hungarocontrol. Additionally, PF's SPED tools have been utilized to reduce the training time of pilots from thirty-six (36) months to eighteen (18) months. PharmaFlight has also utilized the SPED tools to evaluate driving instructors in the Koroknai Driving School as well as one hundred and sixty-three (163) firefighters in collaboration with the Hungarian National Directorate General for Disaster Management. BKV, the privately held corporation owned by the municipality of Budapest, runs most of the vehicles (bus, tram, rail) of the extensive network of public transportation in Budapest, including the famous Cog-Wheel Railway. PharmaFlight is currently working with BKV to complete a risk analysis of accidents involving company drivers and is also engaged in a pilot program using the SPED tools for fatigue risk management with BKV drivers.

PharmaFlight has also been engaged in several peer reviewed studies that have not yet been published. The research topics of these studies include the physical and mental assessments of pilots, risk assessment in aviation medicine, heart rate variability as an indicator of fatigue, fatigue optimization during the training of helicopter pilots, the physiological disturbances caused by insufficient sleep, and physiological measurement methods to aid in the pre-training selection process of air traffic controllers.

## PharmaFlight - Device

The PharmaFlight SPED device was named from the acronym formed from “Special Physiological Evaluations of Drivers.” Over a period of 12 years, the device and its protocols for use have been developed, tested, and improved. Its use and protocols have been validated by physiologists and PharmaFlight engineers. The PharmaFlight approach is to use well known non-invasive physiological testing methods as well as questionnaires to monitor fatigue levels during and off duty.

The measurements are made with the best available technology and instruments. The main goal with the device is to measure available raw data to analyze the workers mental, physical, and physiological state of mind.



## A.W.A.R.E. - Testing components

- Brain Activity Sensor
  - A head band that measures brainwaves- using EEG (Electroencephalogram) sensors to study the brains function and cognitive process, consists of 7 sensors, 2 on the forehead, 2 behind the ears, 3 reference sensors. These sensors help identify sleep cycles data and other useful information about the brains activity.
- Arteriography
  - Measure Aortic Pulse wave velocity basically how stiff your arteries are which could affect how well blood travels through the body. Having this data can give indicators to Cardiovascular risks which then will be a starting point to how you can make better choices to bring that risk down
- O2 sensor
  - Measures your muscle oxygen uptake and release giving information on how healthy the oxygen flow is between muscles and body. It measures Hemoglobin and myoglobin in the user’s capillaries for real time muscle oxygenation and Hemoglobin index.
- Temperature sensor
  - Measures mean temperature of the body while giving feedback on overall temperature of body which will indicate more than you truly realize like, how fast your metabolism is

running, when your body wants to go to sleep, how stressed out you are, and whether your metabolic health is improving.

- ECG
  - Provides information about the hearts electrical activity through repeated cardiac cycles. This helps identify how well the blood returns to the heart as an example- if it shows blocked or narrowed data then it could be a reason for chest pain or coronary artery disease.

### **A.W.A.R.E. - Stands out from the rest of the generic wearable devices like FITBIT, Apple watch, Garmin etc.**

- Wearables need at least 2 months to be attuned to the users body AWARE program is attuned within first test
- The wearables need to be worn 24/7 the AWARE program is a 15 minute test that can't be done however many times you need it to be done.
- AWARE accumulates 800 data points of information that can be used to evaluate the subject per test
- Wearables could be compromised by too much sweat getting between the sensors and body or not having the strap at the correct tightness etc.
- AWARE program is in a controlled setting in a supine resting posting with dimed lights and no distraction, this increases output of quality results

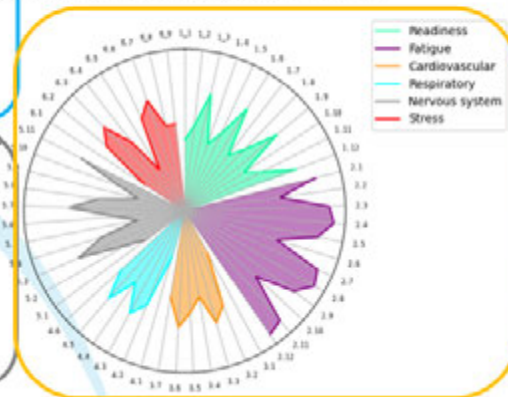
## Results and evaluation

### John Doe RESULTS:

The scores range from 0 to 1, where 1 signifies the highest possible score and 0 signifies the lowest possible score.

<b>Overall Score</b>	<b>Actual Rank</b>	<b>Absolute Rank</b>
0,36	12/19	45%
<b>Score Change</b>	<b>Rank Change</b>	
-0,02	▼3	

Factor	Score	Change	Actual Rank	Absolute Rank
<b>Readiness</b>	0,44	0	12/19	63%
<b>Fatigue</b>	0,3	0,03	15/19	78%
<b>Health</b>				
<b>Cardiovascular</b>	0,41	0,02	9/19	47%
<b>Respiratory</b>	0,41	-0,01	15/19	78%
<b>Nervous system</b>	0,29	0,02	17/19	81%
<b>Stress</b>	0,37	-0,01	11/19	56%

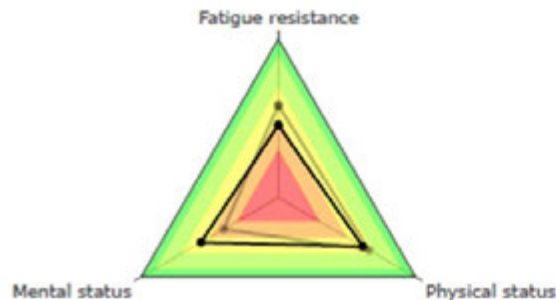


### EVALUATION:



Sample date: 2023-07-28 15:27

The scores range from 0 to 1, where 1 signifies the highest possible score and 0 signifies the lowest possible score. Factor scores are compound results from different measurement methods, the score does not indicate medical diagnostic scores, but the difference from optimal physiological states. Score change indicates the change in factor score from measurement to measurement. Multiple measurements from a single client can show trends and tendencies and therefore are recommended.



Your mental and physical status is average, your fatigue resistance shows diminished result.

Mental status has improved, physical status has slightly deteriorated, fatigue resistance has deteriorated since the previous measurement.

### Blue section

Displays the attendee's overall score; its actual cohort and global ranks (means full database, based on age); and its change in score and rank from the previous measurement.

### Gray section

Displays the featured attendee's individual factor scores, changes of these scores, along with its rankings. These are based on our database as well and are age and gender matched. With the growth of the database on specific working areas further intricate evaluation become possible.

The factors are calculated based on individual parameters, the optimum values of those parameters and the connection is based on literature data and cutoff points from our own database.

#### Yellow section

The pie chart represents the individual sub-factor scores underlying each of the factors listed in gray section of the profile. Each of the sub-factors is represented by a line drawn from the center to the periphery of the circle. The center of the circle corresponds to the worst possible score for each sub-factor (0), and the outer edge of the circle marks the best possible score for each sub-factor (1).

#### Green section

A written summarization for the attendee, these have life style advices and other suggested changes and problems involved.



## Testing and Analysis for Safer and More Efficient Driver Performance

ATA Associates and PHARMAFLIGHT are partnering to establish a physiological testing program to evaluate the health and performance capabilities of truck drivers.

The program tests drivers for physiological symptoms that may affect their job performance and could reveal potential safety issues. The test evaluations focus on deviations from optimum health (cardiovascular, respiratory, neurological), fatigue and stress.

Portable test equipment is placed on a resting test subject and simultaneously records and evaluates approximately 800 selected medical and physiological parameters. The testing process takes just eight minutes with the results available within an hour.

This test provides a comprehensive picture of an individual's current physiological and mental conditions and provides an objective baseline for tracking the individual's future well-being. The intent of this joint effort is to improve the overall performance of truck drivers, thereby contributing to the overall safety of our nation's roadways.

The benefits of establishing a baseline and tracking system include the following:

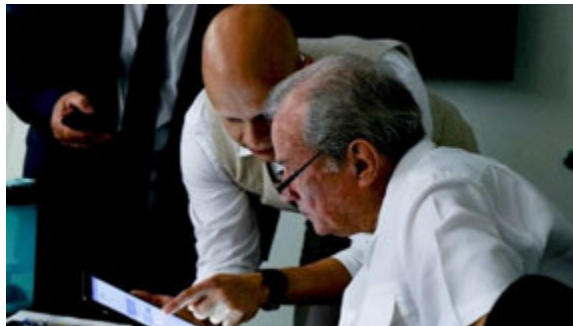
- Safety Improvement
- Performance Improvement
- Mitigation of Driver Fatigue
- Driver Retention Improvement
- Reduced Litigation Risks



## Testing and Examinations

### Anthropometry

The amount of viscera, bone, muscle, and body fat is measured in both relative (percentile) and absolute (kilogram/lbs) values. These values are used to maintain or improve quality of life and to avoid risk factors from less-than-ideal body composition, such as obesity and emaciation. Reference data from more than 300,000 individual test subjects is utilized.



### Resting Evaluations

We use a standardized protocol for every measurement to eliminate the differentiating causes of individual lifestyle and activity patterns. Measurements are taken in a controlled setting and the participants rest quietly in supine position for 5 minutes before the measurements start. Five different devices are noninvasively placed on the individual and the test is completed in approximately eight minutes. The focus during resting evaluations is to get objective data of an individual's physiological state (stress, surfeit, cardiovascular, respiratory state, peripheral nervous system, sleep efficiency).



Overall, we get a clear picture on the individual's physiological status, which can indicate future mental and physiological status, loadability, and aptitudes.

### Assessment of Cardiovascular Status

Overall cardiovascular status is an important aspect of individual health. Our measurements enable us to receive data on endothelial function, central blood pressure and large arterial characteristics of the patients. The test gives a clear picture about vascular functions, possible dysfunctions, heart rate, vascular stiffness and cardiovascular risks. These are related to sedentary work and considerable stress and workload.

### Heart Rate Variability

The application of heart rate variability (HRV) to assess risk for sudden cardiac death and diabetic neuropathy is well known. HRV represents a physiological phenomenon that may be monitored and analyzed to determine the state of the nervous system. We also collect ECG data so the electric functions of the heart can be analyzed.



### Monitoring of Relaxing Capacities of the Brain

We use a commercially available dry electrode EEG device with a high sampling frequency that is placed on the individual's forehead and wraps around to touch the backs of the ears. The device can monitor the electric signals of brain cells, hemisphere dominance and brain wave dynamics in the frontal lobe.

### Muscle Oxygen Consumption, Metabolism Tracking

Muscle oximetry, based on near-infrared spectroscopy (NIRS), provides noninvasive information about changes in oxygenation and hemodynamics in muscle tissue based on the oxygen-dependent characteristics of near-infrared light.

### Temperature Measurement, Tracking

We measure changes in skin temperature during the resting assessment to provide information on peripheral vasculature status, underlying illnesses and peripheral nervous system status.

These tests have their roots in evaluating international aviation personnel, but are being modified for use in the trucking, marine and petrochemical sectors in which staff and employee performance projections are critically important. Beyond increasing production and efficiency, one of the chief by-products of implementing these types of evaluations and analytics would be to create safer work environments.

## ATA-Pharmaflight research summary

Fatigue risk management, the objective classification of load-ability and actual physiological state is in the main focus in areas of expertise with high workload and stress (Locke et al. 2018, Noone et al. 2018, Lemire 2017) and especially in aviation (Waclawski et al. 2017, Caldwell et al. 1997).

Apart from the fact that the scientific knowledge is rapidly expanding on circadian rhythm, sleep, fatigue and physiological effects of shiftwork this body of knowledge has not helped in micromanagement and fine tuning of everyday work, scheduling and logistics (Dinges 1996, Van Cutsem 2017).

Current best practice involves questionnaire based subjective classification of fatigue and is based on predictive algorithms (Caldwell et al. 2009, Dai et al. 2018). The results strongly depend on the measured person's daily motivation, actual mood; the algorithms are not based on objective data.

Our plan is to evaluate the usability of several physiological measurement methods both in aviation and in trucking. There is huge need for a complex yet simple to use physiological measurement system to be able to assess fatigue and load-ability (Hu et al. 2020).

The measurements system would include several physiological measurement methods, collecting data during the same time simultaneously, all methods have an extensive literature background and are in use to partly measure reaction time, actual physiological and mental status:

Electroencephalography (EEG) measurements are usually done in simulator sessions to measure the efficiency of the central nervous system (Cabon 1993, Samel 1997, Wright & McGown 2001).

Heart rate variability (HRV) measurements provide clinical level of evaluation in changes in peripheral nervous system (Barkoff 2004, Boissoneault 2018).

Fatigue can cause changes in the electric function of the heart, with electrocardiography (ECG) these changes can be measured and evaluated (Huang Si 2018, Hu 2020).

Cardiovascular risk factor screening is a major field of concern for fields of high stress and mainly sitting work (Peter 2009, Carmel 2005, Gary 2004).

Changes in circadian rhythm is well known to cause problems in shiftwork and areas of long haul work shifts, these changes can be measured with the aforementioned physiological measurement methods (Caldwell 2019, Pichard 2019, Geiger-Brown 2012).

To enhance our physiological measurements, we also plan to use a cognitive function test. The CogScreen test system is FAA approved, standardized neuropsychical cognitive test, with the following testing areas: focus, memory, visual functions,

problem solving ability, reaction time, simultaneous information processing ability, quick changes in concentrating ability. Baseline data is from different aged pilot groups (Kay 1988).

During our measurements we plan on measuring truck drivers in the US and aviation personnel (mainly flight instructors) in Hungary.

The measured group would be age and experience matched, around 15-30 people both in the trucker group and in the pilot group.

The measurement method would be the same, all measurement would be done in a noninvasive way for 6-8 minutes in supine position, in a temperature and light controlled room with closed eyes and perfect rest.

CogScreen testing would be done before the prescribed simulator sessions to create a baseline cognitive status.

The prescribed simulator sessions would be best to focus on either short or long haul working conditions, having every little detail (paperwork, sleeping and resting circumstances) accurately determined.

Resting measurements would be done before and after every simulator session with Cogscreen sessions after sessions.



**ATA ASSOCIATES**



**PHARMA FLIGHT**

**AWARE**

A Fatigue Recognition and Management Program  
In Partnership with PHARMAFLIGHT

# AWARE

Advanced Worker Awareness to Reduce Endangerment

AWARE is a physiological evaluation using PHARMAFLIGHT's SPED device, which provides data and solutions to maximize driver performance and mitigate fatigue, thereby improving safety on the roadways, reducing litigation risks and improving the driver's quality of life.



The AWARE program and use of the SPED testing device is not only an analysis tool, but a complete service aimed at maintaining the physical and cognitive performance of your workforce. The goal is to help your team reach and sustain optimal conditions, so they can handle unexpected events professionally and safely.



Different levels and combinations of fatigue and stress play a crucial role in events caused by human error. Fatigue and stress affect reaction time, perception, focus and resolve. This is why optimizing human performance is key to workplace efficiency and safety.

## Industry Standard

Some best practices regarding fatigue risk management are based on predictive algorithms using subjective questionnaires. The results of these questionnaires can change according to the individual's actual motivation and mood. Additionally, these algorithms are not based on objective data analysis.



AWARE's goal is to bring new methods to combating worker fatigue and finding ways to improve productivity and quality of life based on data collected and analysis by the SPED device and our team.

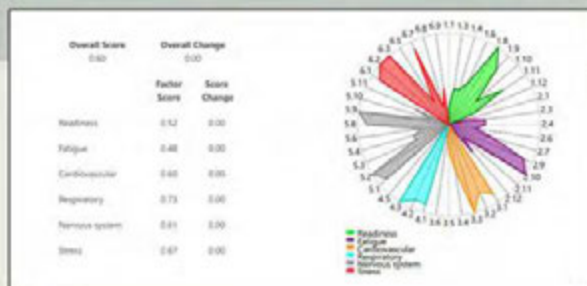
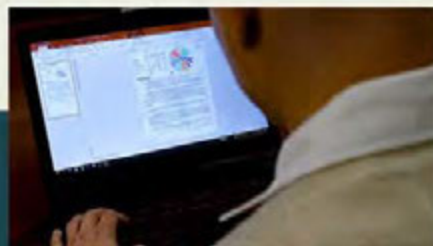


## How AWARE Works

An on-site non-invasive measurement will be performed, which usually takes about 15 minutes. Results of the measurement are generated and sent via email, including an assessment with recommended directives targeting health improvement and sustainability.

## Benefits

Our AWARE program can be used to optimize efficient performance, while maintaining high workload levels. This is paramount in industries where age limits and defined fitness levels are required. Additionally, the continued use of this program offers the opportunity to keep older colleagues in the best possible condition by monitoring their ongoing physiological status.



## Evaluation/Results

- The overall score is valued 0-100. The closer the subject is to 100, the better physiological status they are in.
- The overall score change will be used to determine how well the subject is adhering to the wellness plan. If the overall score is a positive number, then the subject is making progress towards achieving a better overall score.



## Utilization

Optimize Performance - Our resting evaluation can be used to optimize the efficient performance of workers; which is much needed in occupations where fitness tests are required.

Performance Management - A program would include multiple measurements a year, accompanied by lifestyle wellness consulting. This would include monitoring performance improvement while maintaining optimal physiological and cognitive states.

Physiological testing and analysis programs have been used in collaboration with aviation systems, public transport networks, driving schools and in evaluating air force pilots, firefighters and high-level athletes.



## History and Past Experience

Previous iterations of physiological testing and analysis programs have served as developmental precursors to the AWARE program; ATA's business and systems partner PHARMAFLIGHT has had some notable successes:

### Hungarocontrol Air Navigation Services

PHAPA system was used in the selection phase of Hungarocontrol air traffic controller recruitment between 2018-2020.

### Debrecen Public Transport Company

Making public transport safer for passengers and less demanding for drivers is a primary focus. A collaboration program was started with the Debrecen Public Transport Company in 2017. In this program, around 110 bus and tram drivers' physiological states are continuously measured.

### Koroknai Driving School

Driving instructors of Koroknai Driving School started using the physiological measuring system in the summer of 2022.

### Firefighters

163 firefighters were extensively evaluated in a shared project with the Hungarian National Directorate General for Disaster Management. The goal was to provide reliable long-term information about choosing the right role for staff and maintaining a positive quality of life.

### Athletes

This program has been used in fine tuning the day-to-day training methods of high-level athletes in various sports like handball, weight lifting, basketball and football.



*Creating Client Solutions and Resources for Over 50 Years!*



The value that the AWARE system brings to your organization derives from creating a workforce that is performing at optimal cognitive and physiological levels. This provides increased levels of safety and efficiency in the workplace and on the roadways, resulting in reduced insurance and litigation expenses. The AWARE program will also promote a better quality of life for your workers; the by-product of which is increased productivity over longer periods of time and minimized staff turnover.

Contact ATA Associates today for more details on how to help you improve staff performance and safety!

# AWARE

## A Fatigue Recognition and Management Program Introduced by ATA Associates and PHARMAFLIGHT

AWARE (Advanced Worker Awareness to Reduce Endangerment) is a physiological evaluation solution to improve highway safety.

- Improve Performance
- Mitigate Fatigue
- Reduce Litigation Risks
- Improve Quality of Life



To create a healthier workforce of truck drivers and safer roadways, ATA has partnered with Hungarian research and development organization PHARMAFLIGHT to perform physiological examinations and evaluations. These evaluations promote higher levels of body and mind function, leading to more efficient and safer job performance.



An on-site non-invasive measurement is performed in about 15 minutes. Measurement results are emailed directly to the test subject and include an assessment with recommended directives targeting health improvement and sustainability.

Some best practices regarding fatigue risk management are based on predictive algorithms using subjective questionnaires. Questionnaire results can change according to the individual's actual motivation and mood.

AWARE's goal is to bring new scientific methods to combating worker fatigue and finding ways to improve productivity and quality of life based on data collected using our system.



# AWARE - VALUES AND BENEFITS



The value the AWARE program brings to your organization derives from creating a workforce that is performing at optimal cognitive and physical levels. This provides increased levels of safety and efficiency in the work place and on the roadways, resulting in reduced insurance and litigation expenses.



Different levels and combinations of fatigue and stress play a crucial role in human error caused events. Fatigue and stress affect reaction time, perception, focus and resolve. This is why optimizing human performance is key to workplace efficiency and safety.



The AWARE program is not only an analysis tool, but also a complete service aimed at maintaining the physical and mental performance of your workforce.



The goal is to help your team reach and maintain optimal physical and mental condition, so they can handle unexpected events professionally and safely.

Contact ATA today to get the whole story on our new AWARE program and see how you can take a step forward!



# THE EXPERT

NOVEMBER 2023

[www.ataassociates.com](http://www.ataassociates.com)

## INTRODUCING THE AWARE PROGRAM AT CVSA CONFERENCE

ATA Associates and Hungarian company PHARMAFLIGHT proudly unveiled their groundbreaking AWARE program at the Commercial Vehicle Safety Alliance (CVSA) Conference, held in Grapevine, Texas, from September 18-21, 2023. This innovative wellness program is designed to address stress and fatigue management, recognizing the unique challenges faced by the transportation sector in terms of driver well-being, safety, and performance.



Stress and fatigue among drivers can result in reduced alertness, an increased risk of accidents, and overall diminished health and job satisfaction. The AWARE test can be done in 8-minutes, is non-invasive, and provides an assessment of an individual's overall physiological state. Attendees at the CVSA Conference had the opportunity to undergo this test and received their results within 24 hours.

Rodolfo Giacoman, a Fatigue Management Specialist for CVSA, commented, "While the CVSA and the North American Fatigue Management Program (NAFMP) do not endorse any products or services, I personally found the test to be an excellent tool to help motor carriers manage fatigue. The NAFMP recommends that motor carriers implement a Fatigue Risk Management System that includes 'proactive' controls to identify and counteract fatigue hazards. The test conducted by ATA Associates not only serves as 'fit for duty' fatigue management technology but also as a proactive control to screen for potential health risk factors, such as sleep disorders, metabolic syndrome, and other fatigue-inducing conditions. The test report I received was accurate, providing not only a score but also a clear description of each finding. It also included useful recommendations to improve my risk factors. The return on investment for motor carriers that implement a fatigue management program with tools like this one is significant; you can explore the ROI calculator at [nafmp.org](http://nafmp.org)."

During our attendance at CVSA, we completed testing on ten volunteers. We treated the testing as simulation of what can take place on-site, ensuring the most accurate results. Each individual was tested in a private room, which was set with low lighting and provided ample space to conduct the test in a well-tempered environment. The results we obtained from the device, as well as the feedback from each subject, were all very positive.

The test assesses nine overall sections, and each subject is assigned a score to measure their performance in these areas: Mental Status, Physical Status, Fatigue Resistance, Readiness, Fatigue, Cardiovascular, Respiratory, Nervous System, and Stress. We believe that by evaluating all of these aspects together, we can gather enough information to create a comprehensive wellness plan and help individuals improve their overall quality of life.

*(Continued on Page 2)*

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Point of impact  
ATA Associates  
 $S = \sqrt{15 \times R \times (F \pm m)}$   
 $D = 30 \times f \times 0.7$

## INTRODUCING THE AWARE PROGRAM AT CVSA CONFERENCE (cont.)

Name	Mental Status	Physical Status	Fatigue Resistant	Readiness	Fatigue	Cardiovascular	Respiratory	Nervous System	Stress
Subject 1	0.45	0.73	0.64	0.42	0.54	0.67	0.98	0.61	0.71
Subject 2	0.65	0.61	0.53	0.5	0.49	0.55	0.88	0.6	0.69
Subject 3	0.56	0.76	0.68	0.51	0.64	0.8	0.95	0.72	0.77
Subject 4	0.65	0.72	0.64	0.54	0.68	0.75	0.9	0.72	0.9
Subject 5	0.66	0.76	0.65	0.59	0.62	0.78	0.9	0.67	0.77
Subject 6	0.71	0.64	0.54	0.51	0.51	0.73	0.9	0.64	0.79
Subject 7	0.69	0.67	0.61	0.54	0.64	0.72	0.85	0.68	0.79
Subject 8	0.77	0.78	0.66	0.74	0.6	0.77	0.98	0.68	0.76
Subject 9	0.66	0.81	0.74	0.68	0.69	0.78	0.9	0.76	0.71
Subject 10	0.69	0.75	0.59	0.66	0.53	0.8	0.98	0.64	0.71

Figure 1: Results from CVSA Conference Volunteers

To better understand the results provided above, it's essential to grasp the system we use. Notice that everyone has a numerical score associated with each column, all of which are under 1.00. This is because 1.00 represents the maximum achievable score, akin to scoring 100 on a math test. However, in reality, the human body rarely reaches perfection, so it is unlikely to see a score of 1.00. On the other end of the scale, a score with .00 would be akin to scoring 0 on a test, also highly improbable as it would indicate a critical condition, something we aim to prevent through our AWARE program.

When examining the dataset we've collected, you can draw assumptions based on these numerical scores. For instance, consider Subject 1's mental status, which is rated at .45. While this may appear low and concerning, it is crucial to take the environment into account. In this case, Subject 1 was at a three-day convention, consistently engaging with people, listening, waking up early, and probably not getting enough sleep at night. Considering these circumstances, the lower score becomes more understandable. Now, extend this approach to each column, and you can derive assumptions about how the body is performing in a specific environment. The AWARE program can use this information to improve these scores within the context of a trucker's day-to-day activities.


If we were conducting this research on a larger scale, the representation of these numbers might be slightly different but would convey the same story. Below, in the Average table, you'll find the same scores as seen above, grouped together and assigned an overall power group ranking. This ranking is valuable for large-scale businesses, making it easy to assess how their employees are performing overall and how their rankings are improving.

	Mental Status	Physical Status	Fatigue Resistant	Readiness	Fatigue	Cardiovascular	Respiratory	Nervous System	Stress
Average	0.68	0.68	0.60	0.60	0.59	0.71	0.80	0.63	7.00
Standard Deviation	0.14	0.10	0.13	0.16	0.13	0.10	0.13	0.12	0.13
50 Percentile	0.69	0.68	0.59	0.61	0.59	0.73	0.85	0.64	0.70
Average Percentile	49	50	52	58	50	43	41	49	50

Figure 2: Overall Power Group Ranking

"ATA Associates is committed to the well-being of those in the transportation industry. The AWARE program represents our dedication to addressing the stress and fatigue that are all too common in this field," said Bob Swint, CEO of ATA Associates. "We were thrilled to introduce this program at the CVSA Conference, where we engaged with industry leaders and professionals who share our commitment to safety and health."

PHARMAFLIGHT International Science and Service Center PLC.

 PHARMAFLIGHT

*For the comfort  
of aviation*

 PHARMAFLIGHT  
HUNGARY

International Science and  
Service Center PLC.

2022.

SPED







# INSPIRATION

Optimal driver performance is the cornerstone of road safety and a guarantee of economic success.



**PHARMAFLIGHT**

*For the comfort of aviation*

CAO



OA

## SPED

PHARMAFLIGHT Aviation  
Physiological Analyzer

Fatigue and stress have a significant impact on reaction time, perception and concentration, and play a crucial role in human error caused aviation incidents, accidents and disasters. This is the reason why optimising human performance is the focus of aerospace medicine and research. As fatigue could not be detected by a short duration, low-intervention, frequently repeatable objective measurement to monitor daily activity, my colleagues and I have been looking for a methodology and toolset to achieve this. This endeavour has been strengthened by a written agreement signed by the Secretary General of ICAO (International Civil Aviation Organization) to share our research results with international professional organisations. As a result, we have developed a service that includes a bag-sized device and an evaluation protocol that uses sensors to take a painless physiological measurement in 6 minutes, followed by an analysis in a short time. The test is simple to use and compact in size, so it can be performed anywhere, anytime. The results will show how to reduce the risk of fatigue and maintain optimal physical and mental well-being, backed up by a team of doctors, biologist and



**Gyula Györi**

*Honorary associate professor  
Head of Research*

 **PHARMAFLIGHT**

development engineers. The device and the method, which I offer you as a complex service, have been presented under the name PHAPA (PHARMAFLIGHT Aviation Physiological Analyzer) System in the summer of 2022 to the directors of SAIC and NASA in Houston.

Subsequently, we made further adaptations to the methodology and developed the SPED (Special Physiological Evaluation of Drivers) System for road transport and, returning to the world of sports, we created the PEACS (Physiological Evaluation of Athletic and Cognitive Status) System for elite athletes.

SPECIAL PHYSIOLOGICAL  
EVALUATION OF DRIVERS

# SPED

System

01

The different levels and combination of fatigue and stress play a crucial role in human error caused events. Fatigue and stress affect reaction time, perception, focus, resolve and the ability to make decisions quickly and effectively. Accident prevention and safe working practices are at the heart of the effectiveness of public transport, trucking and driver training schools. The SPED (Special Physiological Evaluation of Drivers) system, adapted for road transport is based on the experience of the PHAPA (Pharmaflight Aviation Physiological Analyzer) System developed for the aviation industry and aircrew, uses this methodology to assess drivers' physiological abilities, current state and fatigue levels in a 6-minute sensor-based diagnostic procedure.

## COLLABORATIONS

Debrecen Public Transport Company, Hungary

Making public transport safer for passengers and less demanding for drivers is one of our main focus in using the SPED System. We started our collaboration program with the Debrecen Public Transport Company in 2017. We are continuously measuring around 110 bus, trolley and tram drivers monitoring their physiological state (stress, surfeit, cardiovascular, respiratory state, peripheral nervous system, sleep efficiency). Based on the measured results, our staff provides lifestyle management advice to the participants to improve performance, manage and minimise individual risk factors.

TRANS-SPED, Hungary

One of the most important players in road transport and logistics services. Truck drivers face significant challenges every day. They manoeuvre large vehicles carrying



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PHARMAFLIGHT



heavy loads, often classified as dangerous material, for long periods in an environment that, although commonplace, is extremely tiring. Maintaining a good physiological and mental state to be able to deal is key in this area of transportation. It is also important to note that this area experiences high pressure to become more innovative, easy to use solutions are more and more needed to optimise performance, workload monitoring, support of recruitment, training. With TRANS-SPED, we are continuously improving the quality of data collecting, looking for new solutions in both commercially available and self-developed devices.

Koroknai Driving School Debrecen, Hungary

The Koroknai Driving School offers a full range of driver training, and is outstanding in the field of innovation and methodological development. Their aim is to meet the growing demand for training in a professional manner, to increase the daily workload of instructors by optimising their performance and to reduce the stress levels associated with fatigue.






## RECRUITMENT PROGRAM

## PERFORMANCE MANAGEMENT PROGRAM


## RECREATION PROGRAM



One of the biggest challenges for companies employing drivers is to select the most suitable driver or other professional for the company's tasks. The difficulty comes from the fact that the candidate tries to be best prepared for the hiring date, which is a reflection of his or her state of mind at that moment. It does not, however, give any information about his or her general aptitudes and suitability for the job that he or she will have to do. The assessment includes an evaluation of the candidate's individual abilities - mental and physical - and is tailored to the client's expectations. We can determine whether the applicant is more suitable for the job. It includes a one-off assessment for each candidate, after which a performance ranking list can be established on request to filter outliers. Measurements can also be taken anonymously. In all cases, the tests are conducted in compliance with the applicable privacy policy guidelines.

Includes regular measurements (2-3 times/year), with lifestyle management consulting, while monitoring performance improvement and maintaining optimal physiological and mental state especially under high professional requirements. Employees and managers working on operative levels with high loads of stress and responsibility are strongly advised to go under the SPED System resting evaluation on a regular basis.

Our resting evaluation can be used to optimise the efficient performance of workers, maintaining high workload levels, which is much needed in industries where age limits are defined and fitness tests are required. In road transport, too, experience is of paramount importance, so keeping elderly colleagues in the best possible condition can be of significant benefit to both companies and individuals. The continued use of the SPED system offers the opportunity to do just that, by monitoring optimal physiological status for non-diagnostic purposes, which can improve quality of life, workload and daily performance.





## PHARMAFLIGHT

Each of our programmes is a complex system of services, the elements of which are self-assessed measurement results, optimised for different professional organisations. The service starts with the acceptance of a protocol developed through a professional survey and analysis according to the client's

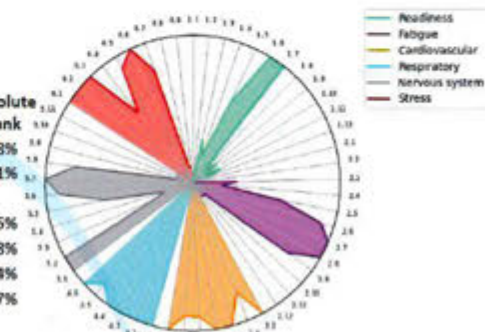
needs. Our staff will then carry out an on-site measurement of the programme participants, which is non-invasive in all cases and usually takes six minutes. Following the measurement, an assessment is automatically generated and sent to the person measured via the e-mail address provided. The client

receives an analysis from the professional staff according to the protocol approved by the client. Ongoing contact is maintained by operating an on-call centre where partners can access the support agreed upon.

### 1856 RESULTS:

*The scores range from 0 to 1, where 1 signifies the highest possible score and 0 signifies the lowest possible score.*

Overall Score	Actual Rank	Absolute Rank		
0,43	XX/XX	51%		
Score Change	Rank Change			
0	0			
Factor	Score	Actual Rank	Absolute Rank	
Readiness	0,32	0	XX/XX	28%
Fatigue	0,43	0	XX/XX	31%
<b>Health</b>				
Cardiovascular	0,94	0	XX/XX	95%
Respiratory	0,98	0	XX/XX	98%
Nervous system	0,56	0	XX/XX	54%
Stress	0,73	0	XX/XX	67%



### EVALUATION:



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